Influences of Curing Conditions and Organic Matter on Characteristics of Cement-treated Soil for the Wet Method of Deep Mixing

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Academic Abstract

The wet method of deep mixing constructs binder-treated soil columns by mixing a binder-water slurry with soft soil in-situ to improve the engineering properties of the soil. The strength of binder-treated soil is affected by characteristics of the in-situ soil and binder, mixing conditions, and curing conditions.

The study presented herein aims to investigate the influences of curing time, curing temperature, mix design proportion, organic matter in the soil, and curing stress on the strength of cement-treated soil. Fabricated and natural soft soils were mixed with a cement-water slurry to mimic soil improved by the wet method of deep mixing. Laboratory-size samples were cured under various curing conditions and tested for unconfined compressive strength (UCS).

The experimental test results showed that (1) a higher curing temperature and longer curing time generally increase the strength; (2) organic matter in cement-treated soil decrease and/or delay the strength development; and (3) curing stress affects the strength but its effect is influenced by drainage conditions. Based on the test results, strength-predicting correlations for cement-treated soil that account for various curing conditions and organic contents were proposed and validated.

This research contributes to advancing the knowledge about the effects of strength-controlling factors of soil improved by cement and to improving the reliability of strength predictions with the proposed correlations. Therefore, the number of sample batches that need to be prepared and tested in a deep mixing project can be reduced, thereby saving the project's time and costs while achieving the target strength of the improved soil.

Influences of Curing Conditions and Organic Matter on Characteristics of Cement-treated Soil for the Wet Method of Deep Mixing

Hwanik Ju

General Audience Abstract

The deep mixing method has gained popularity in the U.S. as a ground improvement technique since the late 1990s. This method involves blending the native soil that needs to be improved with a binder such as cement and/or lime. Two types of deep mixing methods are available, depending on how to add binder to the soil: the wet method injects a binder-water slurry, while the dry method uses a powder form of binder.

The binder reacts with water and soil thereby enhancing the engineering properties of the soil. The strength of binder-treated soil is influenced by many factors: (1) characteristics of native soil and binder; (2) mixing conditions (e.g., the amount of binder added and mixing energy); and (3) curing conditions (e.g., curing time, temperature, and stress).

In this dissertation, the effects of curing conditions and organic matter in the soil on the strength of cement-treated soil were investigated. Fabricated and natural soils were mixed with cement-water slurry to simulate the wet method, and the prepared samples were cured under various conditions. The strength results of cured samples showed that the characteristics of cement-treated soil are significantly affected by the amount of cement in the mixture, curing time, curing temperature, organic matter in soil, and curing stress. The test results were also used to derive correlations that account for the influences of curing conditions and organic matter.

The findings and strength-predicting correlations presented in this research are expected to improve the knowledge about the deep mixing method and the reliability of strength prediction in a deep mixing project. This research, eventually, contributes to reducing time and cost of the project.

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Chapter 1. Introduction

1.1. Research Background and Motivation

Since the late 1900s, the deep mixing method, also known as cement deep mixing (CDM) and deep soil mixing (DSM), has been one of the most popular ground improvement techniques in the U.S. By mixing soft soil in-situ with a binder (e.g., cement, lime, and ground blast furnace slag) the deep mixing method creates binder-treated soil columns to improve the ground. The soft soil is stabilized by adding a binder-water slurry, known as the wet method, or a dry powder form of a binder, known as the dry method. The deep mixing method is used to increase the strength and stiffness and to decrease the permeability and compressibility of the native soil. The advantages of the deep mixing method are: (1) it results in a large and rapid increase in strength; (2) it has relatively little impact on adjacent environments with low construction noise and vibration; and (3) it has a variety of applications to various types of soil and site conditions (Bruce et al. 2013; Kitazume and Terashi 2013; Porbaha 1998). The deep mixing method is now a reliable and robust technique in the U.S. with the wet method being the main portion of the deep mixing method market, accounting for about $200 million annually (Bruce 2000).

A successful deep mixing project is guaranteed when factors that control the performance of deep mixed columns are well-designed considering the site. The pattern of the columns, binder type and its amount, mixing energy and mixing machine, and curing time and temperature should be designed considering the site conditions. The strength of binder-treated soil by the deep mixing method is the main consideration in a deep mixing project, and it is influenced by characteristics of native soil and binder, mixing conditions, and curing conditions. It is well-known that the strength of binder-treated soil increases with curing temperature, curing time, amount of binder in the mixture, and consolidation pressure applied during the curing (Bruce et al. 2013; Ju 2019; Kitazume and Terashi 2013; Nevarez-Garibaldi et al. 2018). On the other hand, for binder-treated organic soil, the organic matter in the soil hinders the strength development resulting in a lower

strength than the strength of binder-treated inorganic soil (Åhnberg and Holm 2017; Bennett 2019; Clare and Sherwood 1954; Hernandez-Martinez 2006; Kang et al. 2017; Tremblay et al. 2002). When cement-treated soil is subjected to curing stress, the strength generally increases with the stress although the effect of curing stress is influenced by cement content and drainage conditions (Jongpradist et al. 2011; Suzuki et al. 2014; Taguchi et al. 2006; Taiyab et al. 2012; Yamamoto et al. 2002).

Although many researchers have studied the influences of factors that control the properties of cement-treated soil based on laboratory experiments, there are discrepancies in mixing, curing, and testing conditions between field and laboratory environments (Ju et al. 2023; Kitazume et al. 2003). Unlike in the field, a cement-treated soil sample is prepared using accurately measured mixture components and mixed homogeneously by careful mixing. Additionally, laboratory samples are usually placed in a mold with minimized air bubbles and voids in the mixture and cured under controlled temperature and humidity while blocked from the adjacent environment. The different conditions in the field and laboratory can cause critical under- or over-estimation of the characteristics of cement-treated soil. Therefore, laboratory experimental research should be carried out with care to reflect the field condition as much as possible.

Despite the advancements in the deep mixing method, the design methods for a deep mixing project rely on oversimplifying several critical strength-controlling factors. What engineers currently lack in design methods for mix proportions are robust frameworks for quantitatively accounting for the influences of curing temperature and time, soil's organic matter, and consolidation stress during curing on the strength and other characteristics of binder-treated soils. Continuing to oversimplify our design methods for the deep mixing method by neglecting these factors results in relying on large factors of safety and mandating an excessive number of expensive and time-consuming laboratory experiments, which increase in project durations and total costs. Reliable correlations allow accurate estimations of the effects of different curing conditions and soil types on the strength and other characteristics of cement-treated soil. With a better understanding of the effects of different mix proportions, curing conditions, and soil types on the strength of cement-treated soil and correlations to account for their effects, the number of sample batches that need to be tested in different projects can be reduced. Then, a more

robust design of mixture proportions to achieve the target strength and stiffness will become possible with the consequent savings in project time and cost.

1.2. Research Objectives

The main objective of this research is to establish robust techniques for mix proportion design for the wet method of deep mixing using cement for soft soils considering various curing conditions. The tasks to attain the main objective are:

Task 1: Predict the influence of mix proportion and curing conditions (time and temperature) on the strength of cement-treated soil. The strength and rate of strength development of cement-treated soils increase with curing time, temperature, and the amount of added cement to the soil. These positive influences on the strength can be predicted using a correlation.

Task 2: Predict the detrimental effect of soil's organic matter on the strength of cement-treated soil. Soil's organic matter decreases the strength of cement-treated soils and delays the rate of strength gain by hindering cementitious reaction. Further, the effect of organic matter on strength is reduced (and may completely diminish) as curing time and the amount of added cement increase. This trend can be estimated by a correlation as a function of the amount of organic matter, cement, water, and soil solids in the cement-treated soil mixture and the curing time.

Task 3: Investigate the influence of curing stress and drainage conditions on the strength of cement-treated soil cured under vertical stress. In the presence of confining stresses during curing (referred to as curing stress), the strength is expected to increase because more water can be expelled and the voids in the mixture can be reduced by the curing stress. The water in the sample near the drainage boundary is squeezed out easily, while the water far away from the drainage boundary cannot come out due to cement hardening over time. This results in non-uniform strength distribution of the sample.

1.3. Dissertation Structure and Contents

This dissertation follows a manuscript format, having seven chapters and three appendices containing supplementary data. Following the introductory chapter (Chapter 1), the three tasks stated above are addressed in a series of manuscripts from Chapters 2 to 6. Chapters 2 and 4 are conference proceedings already published. The manuscripts in Chapters 3, 5, and 6 will be submitted to peer-reviewed geotechnical engineering journals.

In Chapter 2, the influence of exposure to water during curing on the strength of cement-treated soil is investigated. The cemented fabricated soil samples are cured at 21.1 °C and 45.0 °C for the short-term (28 days) and long-term (up to 400 days). During the curing, some samples are taken out from the mold and returned to the curing environment again for continuous curing. Unconfined compressive strength (UCS) test results on the cured samples show the importance of the effect of exposure to different adjacent environments during the curing on the strength of cement-treated soil.

Chapter 3 contains a manuscript that investigates the influence of curing temperature on the strength of cement-treated soil. The strength test results of cement-treated soil with various mix proportions cured under different times and temperatures are presented. Based on the test results, strength-predicting correlations for constant curing temperatures and changing curing temperatures are proposed and validated against experimental results. This chapter suggests a framework for the mix proportions design for a deep mixing project where the influence of curing time and temperature should be considered.

In Chapter 4, the detrimental effect of six commercial organic compounds on strength of cement-water slurry is tested to find a reference organic compound as preliminary research of Chapter 5. Humic acid, tannic acid, sucrose, ethylenediaminetetraacetic acid (EDTA), ethylene glycol, and xanthan gum are blended with cement-water slurry and tested after 7, 12, and 28 days of curing. From the strength test results, tannic acid is found as an organic compound that has the strongest negative effect on the strength of cementitious material among the six organic compounds.

Chapter 5 contains a manuscript that discusses the effect of organic matter in soil on the strength of cement-treated soil. Tannic acid was used to fabricate organic soil in the laboratory to control the organic content of the soil. The strength test results of cement-

stabilized fabricated organic soil are shown in this chapter, and a strength-predicting correlation for cement-treated organic soil is derived using the test results. The applicability of the correlation is tested by using the strength test results of cement-treated natural organic soils. The framework presented in this chapter can be used to quantitatively characterize the influence of organic matter and to determine an appropriate binder and its amount for the wet method of deep mixing project that treats organic soils.

Chapter 6 contains a manuscript about the influence of curing stress and drainage conditions on the strength of cement-treated soil. To apply vertical load to cement-treated soil mixture during curing allowing single and double drainage conditions, a new consolidation apparatus was developed. After the consolidation and curing, the strength and the water content of the sample were measured. The test results indicated that the strength of cement-treated soil is affected by not only the cement content and curing stress but also the drainage conditions. The strength distribution of the sample cured under curing stress was not uniform because of different drainage path lengths.

Chapter 7 discusses conclusions and future work derived from this research.

1.4. Significance

This research established robust techniques to design mix proportions for the wet method of deep mixing accounting for the influences of curing conditions and organic matter on the characteristics of cement-stabilized soil. This work will upgrade an understanding of the influences and suggest frameworks for quantitatively predicting the influences on the strength of cement-treated soil with strength-predicting correlations. Therefore, this research will contribute to reducing the required number of batches in the mixture proportions design of a deep mixing project and improving the reliability of strength prediction, thereby increasing the cost and time effectiveness of the project.

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Chapter 2. Effect of Exposure to Water at Different Temperatures During Curing on the Strength of Cement-treated Soil

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2.1. Abstract

This paper presents unconfined compressive strength (UCS) test results of cement-treated soil cured under different curing conditions. During curing in water at different temperatures (21.1 and 45.0 °C), the samples for short-term curing were demolded at different times and then placed into the water again to continue the curing. UCS tests were conducted on all the short-term curing samples after an entire curing time of 28 days. On the other hand, for long-term curing, some samples were demolded at 7 days and exposed to the water for further curing, while the other samples were sealed by a plastic mold during the entire curing period without any exposure to the water. The entire curing times for the long-term curing were between 100 and 400 days. The UCS test results showed that for the short-term curing, a sample demolded later and exposed to water for a short period was stronger than the sample exposed to water early. This trend was more evident at a high temperature (45.0 °C), but the differences in the strength were small. For the long-term curing, a sample cured in the mold at room temperature (21.1 °C) for the entire curing time had a higher UCS than the sample demolded at 7 days and exposed to water for further curing, while there was no demolding effect at 45.0 °C. The test results implied that a cement-treated soil sample cured in the mold can have a higher strength than a soil-cement column for the wet method of deep mixing that is exposed to materials around the column depending on curing conditions.

2.2. Introduction

The deep mixing method is a ground improvement technique that constructs soil-binder columns under the ground to improve soft in-situ soil by blending the soil with a binder such as cement and lime. When cement hydration occurs, cement reacts with water from either the in-situ soil or cement-water slurry. The cement hydration reaction produces calcium hydroxide and calcium silicate hydrate (C-S-H) that contribute to the strength development of cement-treated material, and the strength increases with time (Kitazume and Terashi 2013). The strength of cement-treated soil increases with curing time and temperature, the amount of cement added to the mixture (cement dose), and applied

curing stress during curing, while it decreases with organic content and water content of the native soil and total-water-to-cement ratio (w_t:c) which is the weight ratio of the cement and water in the mixture (Babasaki et al. 1996; Bruce et al. 2013; Ju 2019; Kitazume and Terashi 2013; Nevarez-Garibaldi et al. 2018; Porbaha 1998).

A laboratory test program is usually performed in the design of a deep mixing project to determine the appropriate type of binder and mixture proportion for the in-situ soil and predict geotechnical properties, including the strength of the improved soil. However, there are discrepancies between a cement-treated soil sample in the laboratory and a soil-cement column in the field in terms of many factors such as curing conditions. In the laboratory, the cement-treated soil mixture is generally placed in a plastic mold and cured under controlled curing conditions, while the mixture in the field is exposed to various materials (e.g., water, seawater, and adjacent soil) during curing. The curing temperatures in the field and the laboratory are also different. Generally, the temperature of in-situ soil from the surface to about 1 m (surface zone) is sensitive to weather conditions, from about 1 m to 6 or 20 m (shallow zone) is changed by seasons, while the temperature below shallow zone (deep zone) slightly increase with depth (Popiel et al. 2001b). Although the temperature of an installed column in the field ranges between about 10 °C and higher than 100 °C (Ahnberg et al. 1989), it is affected by many factors, such as the amount and type of binder, the thermal conductivity of adjacent materials, arrangement of soil-cement columns, etc. (Jacobson et al. 2003). On the other hand, a cement-treated soil sample in the laboratory is cured at a controlled temperature. These different curing conditions can reduce the reliability of improved soil characteristics prediction with the laboratory test results.

Despite this potential issue, only a few studies have been conducted on the influence of sample surface exposure to adjacent materials and different temperatures. The sample surface exposure effect to several materials on the long-term strength of cement-treated soil was studied by Kitazume et al. (2003). They cured soil-cement samples at 20.0 °C, and after two weeks of curing they removed the top end of the molds. The samples were then placed in different materials (freshwater, seawater, and untreated clay), and the top surface of the samples was exposed to the material until the desired curing time of up to 12 months. To describe the surface exposure effect using the needle penetration test

results of the sample sides, the authors introduced the strength ratio, which is the ratio of the strength at a location of the sample to the strength near the center where the strength is not reduced by the exposure. The strength ratio near the exposed surface decreased with curing time when the needle penetration test position is close to the exposed surface to freshwater and seawater, while the strength ratio increased as the test position is approaching the center. The strength ratios near the center remained at 1.0 regardless of curing time. Kitazume et al. (2003) explained this result with two factors that influence the strength coincidently: the strength development due to cement hydration reaction and the strength reduction due to exposure to freshwater or seawater. On the other hand, they did not observe the strength reduction at the surface of a sample exposed to the untreated clay. The effect of exposure to different curing conditions was also investigated by Le Kouby and Guimond-Barrett (2015) using improved soil by blast furnace slag cement. After 7 days of curing, they extracted samples from the molds and placed the samples in three different curing conditions: water, wetting and drying cycles, and air, and performed UCS tests on the samples at 30 days. Their UCS test results showed that the strength of improved soil is the highest when the samples were immersed in water at 20.0 °C from 7 to 30 days. The samples exposed to the cycles of wetting and drying conditions also showed some strength development, while the strength of air-dried samples increased slightly since the sample exposure to air resulted in insufficient water for cement hydration (Le Kouby and Guimond-Barrett 2015). All studies introduced above, however, cured samples only at 20.0 °C. This research studied the influence of exposure to freshwater at two different curing temperatures (21.1 and 45.0 °C) on the strength of cement-treated soil with two different cement doses.

2.3. Experimental Program

2.3.1. Materials

The same soil used by Ju (2019) and Nevarez-Garibaldi et al. (2018) was fabricated for this research. The components of the base soil are silica flour (65%) and fine sand (10%) from Short Mountain Silica Co., Mooresburg, Tennessee, and kaolin (20%) and bentonite (5%) from Highwater Clays, Inc., Asheville, North Carolina. The fine sand was obtained

from sieve sizes between No. 40 and 200. The produced moist base soil has a liquid limit of 35.4 and a plastic limit of 14.1 and is categorized as lean clay (CL) by the Unified Soil Classification System (USCS) (ASTM D2487). The base soil was designed to represent in-situ soil that needs to be improved by the wet method of deep soil mixing and to be readily fabricated without significant differences in the characteristics of soil for batches. The properties and the grain size distribution of the base soil are presented in Table 2.1 and Figure 2.1, respectively. A binder used in this study was Ordinary Portland Cement type I/II. The cement from the bag had some cement chunks, so the cement passing sieve No. 10 (2.00 mm) was used.

Table 2.1. Properties of the base soil.

Specific gravity (G_s)	Water content (%)	Atterberg limits			% Fines
		Liquid limit (LL)	Plastic limit (PL)	Plasticity index (PI)	
2.66	35.0	35.4	14.1	21.3	86.9

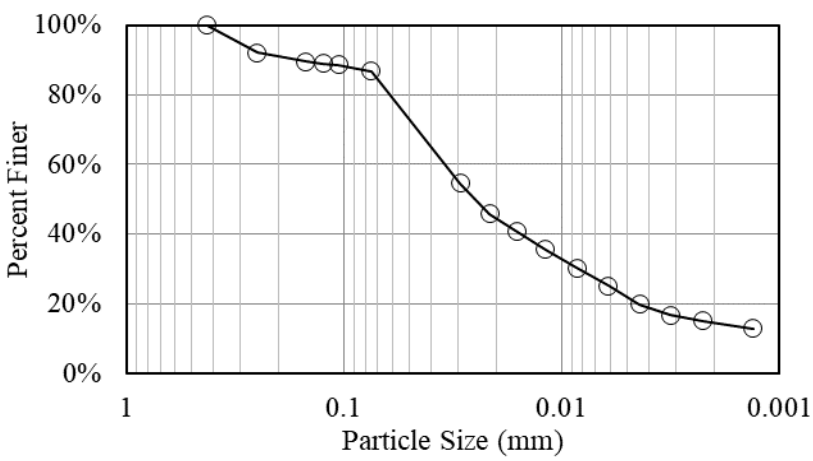

Figure 2.1. Grain size distribution of the base soil.

2.3.2. Sample preparation

Cement-treated soil mixture was prepared in two phases. First, homogeneously mixed dry base soil components and water were mixed by a stand kitchen mixer with a dough hook for 5 minutes in addition to about 3 or 4 times of manual mixings that interrupted the

mechanical mixing several times for thorough mixing. The total mixing time for base soil was about 8 minutes. The water content of the moist base soil was close to the liquid limit of the soil. The prepared base soil was hydrated overnight in a humidity-controlled room after it was transferred into a plastic container and sealed with a lid and polythene wrap. After the hydration, the base soil was blended with cement-water slurry which was prepared by mixing dry cement and water using a commercial food blender for 3 minutes. The mixing of the base soil and slurry was done by 10 minutes of mechanical mixing using the stand kitchen mixer and about 3 or 4 times of manual mixings during the mechanical mixing. The total time for soil-cement mixing was about 13 minutes. After the soil-cement mixing is completed, only 30 minutes were allowed to prepare samples and place the samples in desired curing conditions. The prepared cement-treated soil mixture was transferred into a 50 mm in diameter and 100 mm in height plastic cylinder in three lifts. At each lift, the cylinder was tapped on a hard and flat surface to minimize entrained air bubbles in the mixture. The cylinder filled with the mixture was then sealed with a lid and electric tape tightly. Ten samples were prepared for each batch, and they were cured under the designed curing conditions until UCS tests.

2.3.3. Mix designs

The mix design controlling factors used for this study were the water-to-cement ratio of the slurry (w:c) and the cement factor in-place ($\alpha_{in\text{-}place}$). w:c is the weight ratio of the water in the slurry to the cement, and $\alpha_{in\text{-}place}$ is the ratio of the weight of cement to the volume of the mixture. Two mix proportions were used for this study with the same w:c = 1.0: Mix 1 ($\alpha_{in\text{-}place}$ = 125 kg/m^3) and Mix 2 ($\alpha_{in\text{-}place}$ = 350 kg/m^3). The $\alpha_{in\text{-}place}$ value of Mix 2 is higher than Mix 1, so the cement-treated soil mixture with the mix proportion of Mix 1 has a less cement dose than that with the mix proportion of Mix 2.

2.3.4. Curing conditions

The cement-treated soil samples were cured at room temperature (21.1 °C) and a high temperature (45.0 °C). The samples cured at room temperature were stored in a plastic container with water, and the container was placed in a humidity-controlled room. Meanwhile, the samples cured at a high temperature were placed in a water tank, and the

temperature of the water was maintained at 45.0 °C by heating and circulating the water using a thermostat. During the curing, some samples were extracted from the mold and returned to the curing conditions soon after the demolding, so they are exposed to the water at controlled temperatures and cured until UCS tests. A total of 8 batches were prepared for this study: 4 batches were cured for the short-term and the other 4 batches were cured for the long-term. For the short-term curing, a pair of samples were demolded at 3, 7, 14, 21, and 28 days and exposed to water for the rest of the curing times. Figure 2.2 describes the curing plan for the short-term curing. For the long-term curing, some samples were demolded at 7 days and cured under the same curing conditions again, while the others were cured in the plastic mold for the entire curing time. For the long-term curing, only one sample was tested for some curing conditions because only 10 samples were prepared per a cement-treated soil batch to secure a high sample preparation quality. The detailed curing and testing plans for the long-term curing are shown in Figure 2.3. UCS tests were conducted on all cured samples after the entire curing time of 28 days for the short-term curing. For the long-term curing, the samples were tested at a curing time range from 100 to 400 days to cover a case with a curing time longer than a year as in other studies on the long-term strength of cement-treated soil (Kitazume et al. 2003; Pham et al. 2017; Shihata and Baghdadi 2001; Zhang et al. 2014).

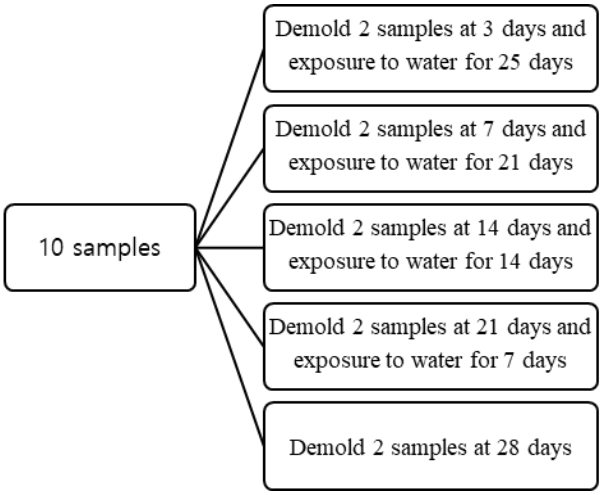

Figure 2.2. Curing plan for the short-term curing.

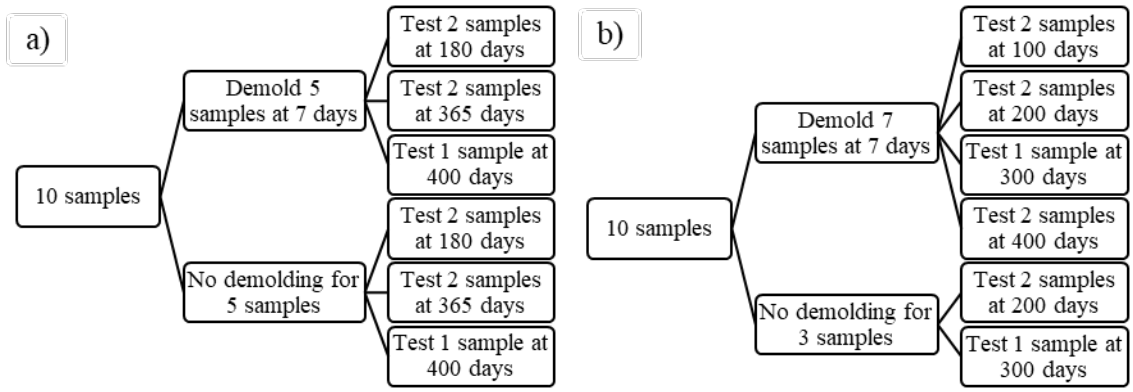

Figure 2.3. Curing and testing plans for the long-term at (a) 21.1 °C and (b) 45.0 °C.

Comparing the strengths of a pair of samples cured under the same curing condition can be an indicator to evaluate the sample preparation quality. The test results showed small percentage differences of paired samples in strength implying homogeneous soil-cement mixtures and good sample preparation quality. In pairs of samples for the short-term curing, the average percentage difference in strength was 5.7%, and the differences tended to be higher when the curing temperature is high. On the other hand, for the long-term curing, the average percentage difference in strength was 7.3%, but no remarkable trend was observed according to curing temperature, curing time, and demolding status.

2.3.5. Strength testing methods

At the desired entire curing time under different curing conditions, a sample was taken out from the water. For a demolded sample, the top and bottom edges of the sample were ground by an end-face grinder, so the end faces are flat and parallel to each other. A sample cured in a plastic mold without demolding was extracted from the mold by cutting the bottom of the mold with a saw and pushing the sample from the bottom to the top. Then, the end surfaces of the sample were ground as the demolded samples were treated. The UCS tests were conducted following ASTM D2166 to measure the cured strength of the cement-treated soil.

2.4. Test Results and Discussion

2.4.1. Short-term curing

The UCS of cement-treated soil with Mix 1 and Mix 2 at 28 days of curing (UCS_{28days}) that was exposed to water at room and high temperatures for the short-term curing is presented as a function of demolding time in Figure 2.4. The UCS_{28days} is high when a sample is cured at a high temperature (45.0 °C) and the mixture has more cement dose (Mix 2). The UCS_{28days} is generally low when a sample is demolded early and exposed to water for a longer period, regardless of curing temperature and mix design: UCS_{28days} linearly increases with demolding time as shown in Figure 2.4. Although the differences in the UCS_{28days} due to the different demolding times are very small, the differences are greater at 45.0 °C than at 21.1 °C. In other words, the gradient of a linear trendline in Figure 2.4 is higher when samples are cured at 45.0 °C than at 21.1 °C. For example, for Mix 1 at 45.0 °C, the average UCS_{28days} of samples demolded at 28 days (3.7 MPa) is 0.5 MPa higher than samples exposed to water from 3 days (3.2 MPa), while the difference in the average UCS_{28days} between 3 days (1.1 MPa) and 28 days (1.4 MPa) for the Mix 1 at 21.1 °C is 0.3 MPa. This indicates that direct contact with water during curing can reduce the strength of cement-treated soil compared to a sample cured in a plastic mold. The reason for this might be due to the increased water content of the sample surfaces, and potentially inside the samples. At a high temperature, water can diffuse more actively and get deep into the sample more easily increasing the water content and resulting in more strength reduction. Additionally, more water can diffuse into the surface than into the center of a sample resulting in decreasing water content distribution from the sample surface to the center. Therefore, it is expected that the strength at the exposed sample surface is lower than the strength at the center of the sample as Kitazume et al. (2003) reported. Temperature monitoring during the curing process and water content measurements after curing at different sample locations in future research can support this. However, as Ju (2019) reported which used the same sample size as this research, the temperature of a cement-treated soil sample at the center was consistent with the temperature of the water near the sample. This might be because the size of the sample was too small to have a noticeable temperature difference between the sample center and

the water. Therefore, a larger sample size is recommended for temperature monitoring during sample curing.

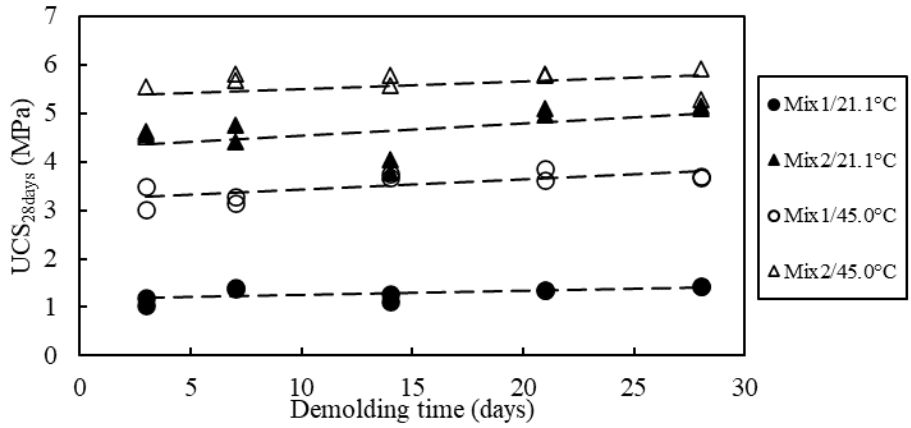

Figure 2.4. Effect of demolding on UCS_{28days} for the short-term curing.

2.4.2. Long-term curing

The UCS of cement-treated soil cured at 21.1 and 45.0 °C for the long-term is presented in Figure 2.5. The UCS_{28days} demolded at 7 days from the short-term curing are also plotted to present the strength development trends better. The UCS of demolded samples cured at 21.1 °C does not increase much after 28 days, while the UCS of samples at 45.0 °C keeps increasing even after 28 days. This shows the effect of a high curing temperature on the strength of cement-treated soil. In Figure 2.5b), the UCS of Mix 2 at 45.0 °C demolded at 7 days and tested at 300 days of the total curing is remarkably lower than the UCS of the samples from the same batch at 200 and 400 days, and it is out of the trendline of the batch. Therefore, this data should be considered an outlier due to an unknown error in the mixing, curing, or testing process. The finding from Figure 2.4 (i.e., a higher curing temperature and more cement in the mixture result in higher strength) also can be observed in Figure 2.5. However, the difference in cement dose (Mix 1 and Mix 2) does not significantly affect the demolding effect that decreases the strength. Figure 2.5 also shows that the UCS increases with curing time which has been widely reported by other researchers (Bruce et al. 2013; Kitazume and Terashi 2013; Terashi 1997). At 21.1 °C (Figure 2.5a), a sample cured in the plastic mold for the entire curing

time is stronger than the sample demolded at 7 days. The differences between the UCS of demolded and molded (non-demolded) samples are more significant when the samples are cured for a long time. At 45.0 °C (Figure 2.5b), however, the effect of exposure to water is negligible for both Mix 1 and Mix 2. Thus, for the long-term curing, the demolding effect is more significant at room temperature and longer curing times. This result is not consistent with the test results for the short-term curing.

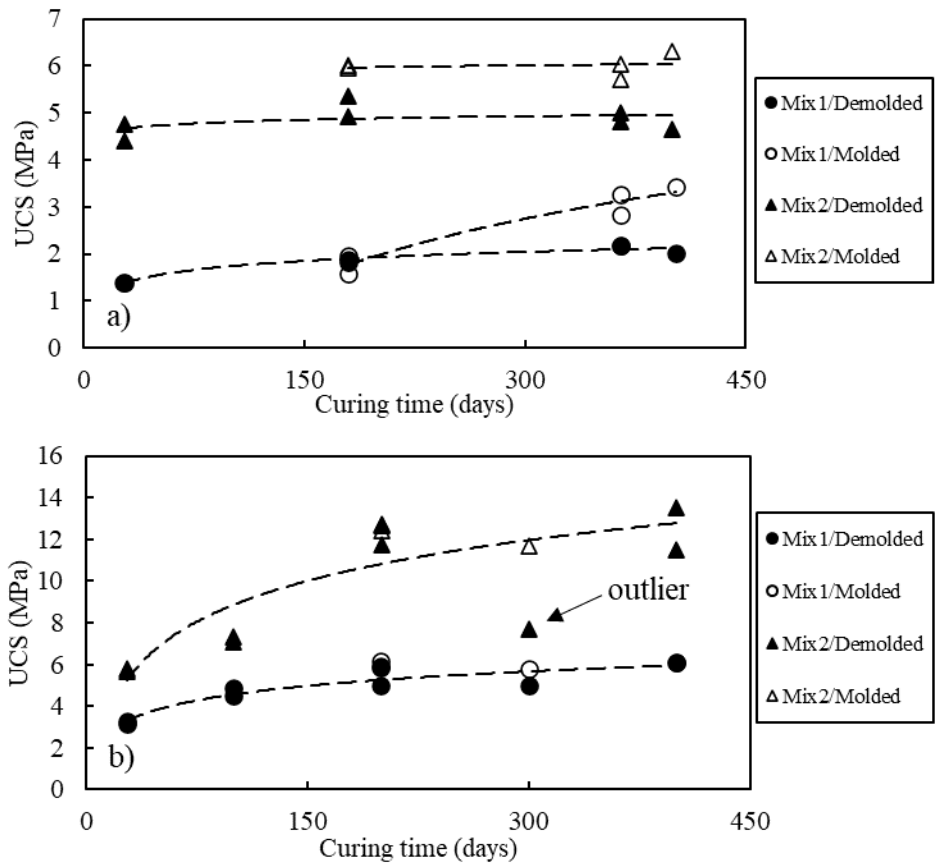

Figure 2.5. Effect of demolding on UCS for the long-term curing at a) 21.1 °C and b) 45.0 °C.

High temperature not only accelerates the cement hydration thereby increasing the strength of cement-treated soil but also leads to more active water diffusion into the sample surfaces. The water diffusion into the surface can reduce the strength in two ways: (1) interfering with the cement hydration reaction by reducing the hydration heat

and (2) increasing the water content of the sample. The strength increases rapidly with time at early curing time, and a high curing temperature also boosts the strength development (Babasaki et al. 1991; Clare and Pollard 1954; Hodges et al. 2008; Ju 2019; Kitazume and Terashi 2013; Nevarez-Garibaldi et al. 2018). The strength difference between two samples at different curing times can be large even if the curing time difference is small. Therefore, the strength reduction by a sample exposure to water can cause a greater effect on the strength for the short-term curing at a high temperature than at a low temperature.

However, the water cannot diffuse deep into the center of a sample and reduce the strength at the center as reported by Kitazume et al. (2003) because a diffusion distance to the center is longer than that to the sample surface and the diffusion can be blocked by already formed cement hydration products. At a high curing temperature, more cement hydration occurs with time overcoming the strength reduction due to the demolding effect. In other words, for the long-term curing, the strength development of the cement-treated soil is more influenced by the cement hydration than the demolding effect thereby reducing the strength difference between molded and demolded samples.

2.5. Conclusion

The influence of sample exposure to water at different temperatures during curing on the strength of cement-treated soil was investigated. The prepared samples were cured at room temperature (21.1 °C) and a high temperature (45.0 °C), but some samples were demolded from the mold during curing and exposed to water until the UCS test. The test results showed that for the short-term curing (up to 28 days), the strength of cement-treated soil is high when the sample was demolded later and exposed to water for a short time. The demolding effect for the short-term was more significant at a high temperature, but the differences in the strength due to the different demolding times were small. For the long-term curing at 21.1 °C, the strength of samples cured without demolding was greater than that of the samples exposed to water from 7 days to the desired curing time, and this demolding effect became more significant as curing time increased. At 45.0 °C, however, the demolding effect was insignificant. The reason for the discrepancies in the

significance of the demolding effect at different temperatures for the short-term and the long-term curing might be that the strength development of cement-treated soil is not only influenced by exposure to water during curing but also controlled by curing time and temperature. This research suggests that the strength of a cement-treated soil sample that is prepared and cured in the laboratory can be higher than the strength of a soil-cement column in the field improved by cement because samples in the laboratory are cured in the mold during curing and protected from surface exposure to adjacent materials. Depending on the curing time and temperature, the significance of this effect can be different.

2.6. Acknowledgement

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Chapter 3. Effect of Curing Temperature on the Strength of Cement-treated Soil for the Wet Method of Deep Mixing

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3.1. Abstract

The wet method of deep mixing improves the engineering properties of soft soil by mixing the soil with a binder-water slurry. The strength of deep mixed soil is influenced by many factors. This paper mainly focuses on investigating the influence of curing temperature on the strength of cement-treated soil. Fabricated lean clay (CL) and cement-water slurry were blended to simulate soft soil improved by the wet method of deep mixing. The prepared cement-treated soil samples were cured at constant curing temperatures (-10, -5, 0, 5, 25, 35, 45, and 55 °C) for 3 to 400 days and at changing curing temperatures (from 25 to 45 °C vice versa) for 3 to 28 days. The strength of the samples was measured by an unconfined compressive strength (UCS) test after the curing. The test results showed that a long curing time and a high temperature increase the strength, but their effects diminish with time, while curing at sub-zero curing temperatures slows the cement hydration reaction and hinders the strength development. When curing temperature changes, a sample cured at a low temperature and then cured at a high temperature was stronger than a sample initially cured at a high temperature. Based on the UCS test results, strength-predicting correlations for cement-treated soil were proposed considering the influences of the mix design and curing conditions. The correlations were validated against experimental test data, and the predicted UCS by the correlations showed good agreement with the measured UCS. The uncertainty of the coefficients in the correlations were tested by using the resampling method, bootstrapping. The correlation is expected to contribute to reducing the required number of sample batches to predict the strength of in-situ soil improved by cement in a wet method of deep mixing project.

3.2. Introduction

The deep mixing method is a soil stabilization technique that involves creating binder-treated soil columns by mixing soft in-situ soil with a cementitious binder such as cement and lime. The deep mixing method is widely used to enhance the strength and stiffness and reduce the permeability and compressibility of soft soils. The wet method adds a

binder to the soil in a binder-water slurry form, while the dry method uses a dry powder form of the binder. The strength of deep mixed soil is influenced by characteristics of the in-situ soil, mixing equipment, type and the amount of binder added, and curing conditions such as curing stress, time, and temperature (Bruce et al. 2013; Consoli et al. 2007; Ju 2019; Kitazume and Terashi 2013; Nevarez-Garibaldi et al. 2018; Porbaha 1998; Terashi 1997). Out of these factors, the amount of binder and the curing time and temperature are important strength-controlling factors.

It has been widely accepted that the strength of soil stabilized by cement generally increases with curing time and temperature (Babasaki et al. 1991; Bruce et al. 2013; Clare and Pollard 1954; Hirabayashi et al. 2009; Hodges et al. 2008; Kitazume and Terashi 2013). When cement-treated soil is cured at a high temperature, the cement hydration reaction occurs more actively and more cement hydration products such as C-S-H that harden the soil can be produced (Chitambira et al. 2007; Wang et al. 2016). Although an elevated curing temperature accelerates the strength development of cement-treated soil, its effect diminishes as the curing time elapses (Hirabayashi et al. 2009; Ju 2019; Nevarez-Garibaldi et al. 2018; Zhang et al. 2014). Especially, after 90 days, the increase in strength is minor even with a high curing temperature (Zhang et al. 2014). Conversely, for cement-treated organic soil, an elevated curing temperature can reduce the strength by making the organic matter in the soil more actively hinder the cement hydration reaction (Åhnberg and Holm 2017; Hernandez-Martinez 2006).

On the other hand, when cement-treated soil is cured at a temperature lower than 0 °C, very little or no strength development occurs by cement hydration (Chai et al. 2017; Kido et al. 2009; Sato et al. 2006; Song et al. 2022). At -20 °C, the strengths of soils stabilized by blast furnace cement and a special cement that is more efficient for peat improvement do not increase until 28 days of curing, even after increasing the binder content. Conversely, at a curing temperature of -5 °C, there was a small increase in strength with increasing curing time and binder content (Kido et al. 2009). The strength of soil stabilized by cementitious binder does not increase enough even after the curing temperature increases later due to permanent damage in soil structure and microcracks because of the initial freezing curing temperature. Thus, soil stabilization using a

cementitious binder is recommended to avoid when a curing temperature is very low (≤ 0 °C), (Song et al. 2022).

The curing temperature of a deep mixed cement-treated soil column in the field is not constant. Generally, a ground temperature from the surface to 20 m changes seasonally (Popiel et al. 2001a). In a cement-treated soil column, the heat generated from the cement hydration reaction, which is an exothermic reaction, increases the temperature of adjacent soil, especially during the early stage of curing. When a curing temperature is initially low and increases later, the strength increases rapidly and even exceeds the strength of improved soil continuously cured at a high temperature (Sato et al. 2006; Song et al. 2022). The initial low curing temperature effect is controlled by not only its temperature and curing time but also by the soil type. The strength of cement-treated soil initially cured at a low temperature can increase after the curing temperature increases and finally achieve the target strength; however; it is only possible when the period of the curing at a low temperature is short, and the applied curing temperatures are above freezing temperatures (Song et al. 2022). Compared to the constant curing temperature effect, the influence of changing temperature during the curing on the strength has not been extensively studied. And most strength-predicting correlations for cement-treated soil only consider isothermal curing.

Despite extensive research on the influence of curing temperature, there is still a lack of knowledge about special curing conditions (e.g., freezing curing temperatures and changing curing temperatures). Therefore, it is of practical importance to have a robust strength-predicting correlation that can account for a curing history covering a wide range of curing times and temperatures. In this paper, unconfined compressive strength (UCS) tests were performed on cement-treated soil samples cured under various curing conditions to study the influence of curing temperature on the strength. Based on test results, strength-predicting correlations for constant and changing curing temperatures were proposed and validated against experimental data.

3.3. Methodology

In this research, fabricated base soil was blended with cement-water slurry with different mix designs and placed into a plastic mold for curing. The prepared samples were cured under various curing conditions. After the desired curing time, the cement-treated soil sample was prepared for a UCS test. Figure 3.1 describes the experiment process of this research.

Figure 3.1. Experiment process

3.3.1. Materials

The base soil was designed to be consistently reproducible and to represent in-situ soft soil that needs to be treated by the wet method of deep mixing to improve the geotechnical properties of soil. It was made of silica flour (65%) and fine sand (10%) from Short Mountain Silica Co., Mooresburg, Tennessee, and kaolin (20%) and bentonite (5%) from Highwater Clays, Inc., Asheville, North Carolina. Fine sand was obtained from between sieves No. 40 (0.425 mm) and No. 200 (0.075 mm). The index properties of the base soil are shown in Table 3.1. Based on the Unified Soil Classification System (USCS), the base soil was classified as lean clay (CL). The water content of the base soil was set to 35% which is the same as its liquid limit (LL). The particle size distribution of the base soil is given in Figure 3.2.

Table 3.1. Base soil index properties

Properties	Value
USCS classification	CL
Specific gravity, G_s	2.66
Liquid limit, LL	35
Plastic limit, PL	13
Plasticity index, PI	22
Water content, w (%)	35
Fines (%)	86.9

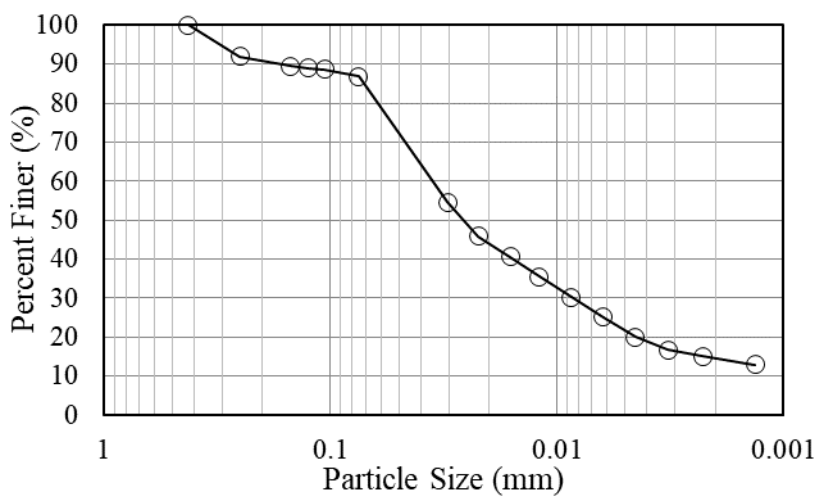

Figure 3.2. Particle size distribution of base soil

Portland Cement Type I/II, commonly used in deep mixing applications for inorganic soft soil, was selected as a binder. The specific gravity of the cement used in this research was 3.15. The cement sieved through a No. 10 sieve (2.0 mm) was used to avoid cement lumps in a bag.

3.3.2. Cement-treated soil sample preparation

Dried base soil components (silica flour, kaolin, fine sand, and bentonite) were collected in a jar mill and homogenized using a mixing jar for 10 minutes. Tap water was added to achieve the water content of the base soil. The dried base soil and water were mixed by a

stand kitchen mixer with a dough hook attached for 5 minutes. The mechanical mixing process was interrupted 3-4 times in order to scrape off the mixture that sticks to the inner surface of the mixing bowl and the dough hook and to move the mixture to the center of the bowl for a thorough mixing. The total mixing time was between 7 and 9 minutes. The base soil was transferred into a plastic container and covered with a plastic wrap and lid then stored in a humidity-controlled room at room temperature overnight for clay hydration.

After the hydration, cement-water slurry with a desired water-to-cement ratio of the slurry (w:c) was prepared by mixing cement and water with a commercial food blender for 3 minutes. The cement-water slurry was added to the moist base soil to achieve each designed mix proportion, and the slurry and soil were mixed using the stand kitchen mixer for 10 minutes. The mixing speed for the soil-cement mixing was faster than that for the base soil mixing. The mixing was paused for 3-4 times for manual mixing for the same purpose as the base soil mixing, and the total mixing time for the soil-cement mixing was between 13 and 14 minutes.

Immediately following the soil-cement mixing, the thoroughly mixed cement-treated soil mixture was moved into a cylindrical plastic mold (50 mm x 100 mm). The mold was filled with the mixture in three lifts by tapping the bottom of the mold against a hard and flat surface to remove air bubbles in the mixture. After the last lift, a straight edge spatula scraped the top surface to remove the excess mixture and level the surface. The sample was sealed with a plastic lid and electric tape to avoid moisture loss and stored in desired curing condition. The time to mold, seal, and begin curing each sample was always less than 30 minutes so that the cement hydration reaction is minimized outside of the desired curing conditions.

3.3.3. Sample curing

Prepared cement-treated soil samples were cured in different environments depending on their desired curing temperature. For curing temperatures from 25 to 55 °C, samples were placed in temperature-controlled water baths that maintain the water temperature within a range of ±1.5 °C using a LAUDA ECO Heating and Cooling thermostat with a SILVER

control head. For curing temperatures between -10 and 5 °C, samples were cured in a temperature and humidity chamber (Cincinnati Sub Zero ZP-16) that circulates temperature-controlled air.

There were three categories of curing conditions: 1) short-term curing at a constant temperature, 2) long-term curing at a constant temperature, and 3) short-term curing at changing temperatures as described in Table 3.2. For the short-term curing, the maximum curing period was 28 days, while a sample for the long-term curing was cured for up to 400 days. For the curing at a constant temperature, the temperature was maintained during the whole curing process. On the other hand, for the curing at changing temperatures, the curing temperature was changed at one of the 7th, 14th, and 21st days of curing from 25 to 45 °C or vice versa.

Table 3.2. Three categories of curing conditions

	Short-term curing at a constant temperature	Long-term curing at a constant temperature	Short-term curing at changing temperatures
Curing temperature (°C)	-10, -5, 0, 5, 25, 35, 45, 55	25, 45	25 ➔ 45 or 45 ➔ 25
Curing time (days)	3, 7, 14, 28	7, 28, 180, 365, 400	7, 14, 21, 28

3.3.4. Testing program

The common mix design controlling parameters for the wet method of deep mixing were selected as the mix design parameters for this research. The cement factor in-place ($\alpha_{in-place}$) is defined as the weight of the cement divided by the total volume of the mixture (Equation 3.1-a). The water-to-cement ratio of the slurry (w:c) is the weight ratio of the water in the slurry to the cement (Equation 3.1-b).

a) $\alpha_{in-place} = \frac{W_c}{V_{mix}}$ b) $w:c = \frac{W_{w,slurry}}{W_c}$ *Equation 3.1*

Table 3.3 shows the mix designs used in this research. Selected $\alpha_{in\text{-}place}$ and w:c values are within the practical ranges of mix design for the wet method of deep mixing. The mix design using $\alpha_{in\text{-}place}$ of 125 kg/m^3 combined with w:c of 0.6 was excluded because insufficient water in the mixture makes the mixture very thick. A stiff mixture results in a time delay to prepare a homogeneous mixture and high-quality specimens. The mix design of $\alpha_{in\text{-}place}$ of 350 kg/m^3 with w:c of 1.4 was also excluded for the opposite reason. The mixture with too much water makes specimen preparation difficult and causes bleeding water in the specimens during curing.

Table 3.3. Mix designs used in this research

		w:c		
		0.6	1.0	1.4
$\alpha_{in\text{-}place}$ (kg/m^3)	125	X	O	O
	200	O	O	O
	275	O	O	O
	350	O	O	X

3.3.5. Unconfined compressive strength (UCS) test

The strength of a cement-treated soil sample was measured by the UCS test. A cured sample was stripped from the plastic mold by cutting the bottom of the mold using a miter saw and pushing the sample from the bottom. The top and bottom ends of the sample were ground with a rock-core grinder to make end surfaces flat and parallel each other that allows a uniform stress distribution under loading during the UCS test. UCS test was conducted on a pair of cured samples by following ASTM D2166 using a GEOTAC Sigma-1 Automated Load Test System at a strain rate of 1%/min.

3.3.6. Bootstrapping

The best way to validate a strength-predicting correlation derived from test results is to repeat tests on a large number of batches, but it is time- and cost- consuming and practically impossible. Therefore, bootstrapping was used to estimate the uncertainty of

the coefficients in the correlations. Bootstrapping is a statistical technique that resamples data with replacement from the original data (Chernick 2011). The uncertainty estimation using bootstrapping followed steps below:

a. Randomly select batch data from the test results;
b. Determine the coefficients of a strength-predicting correlation for the selected bat ch data using a least squares regression;
c. Repeat steps a-b 9,999 times;
d. Calculate mean, standard deviation, 95% confidence intervals of the coefficients;
e. Obtain the correlation matrix of the coefficients.

3.4. Test Results and Discussion

In this section, the unconfined compressive strength (UCS) test data of cement-treated soil cured at room temperature (21.1 °C) for from 3 to 28 days obtained by Nevarez-Garibaldi et al. (2018) also used in addition to UCS test results obtained in this paper. The data set from Nevarez-Garibaldi et al. (2018) is missing test results at 3 days in some batches. However, it is still reasonable to include their data because they used the same base soil and cement, and their sample preparation, and test methods were also the same as this paper except for the curing environment. They cured samples at room temperature (21.1 °C) by immersing the samples in water in a plastic container stored in the humidity-controlled room.

3.4.1. Influence of curing time and mix design

Based on the UCS test results of samples cured at room temperature, Nevarez-Garibaldi et al. (2018) proposed a strength-predicting correlation that accounts for the influence of curing time and mix design proportion as shown in Equation 2.2:

$$\frac{UCS_{pred}}{p_a} = \left[a_1 + a_2 \ln\left(\frac{t}{t_0}\right)\right] * [w_t:c]^{a_3} * [\gamma_{d,mix}:\gamma_w]^{a_4} \qquad \textit{Equation 3.2}$$

where, UCS_{pred} = predicted UCS; p_a = atmospheric pressure; a_1, a_2, a_3, and a_4 = dimensionless coefficients; t = curing time (in days in this paper); t_0 = reference time for normalization (1 day in this paper); $w_t:c$ = total-water-to-cement ratio (the weight ratio of water in the base soil and slurry to cement); $\gamma_{d,mix}$ = dry unit weight of mixture; γ_w = unit weight of water for normalization. In Equation 3.2, the parameters $w_t:c$ is used instead of $w:c$ because it can account for the relationships between the amount of soil solid, water and cement in the mixture, while $w:c$ is the weight ratio of the water in the mixture to cement.

Figure 3.3 shows the influence of short-term curing time on the UCS. The strength of cement-treated soil develops with curing time and curing temperature, but the effect of curing time becomes less significant as curing time increases. The strength increases with a logarithmic function of curing time regardless of curing temperature.

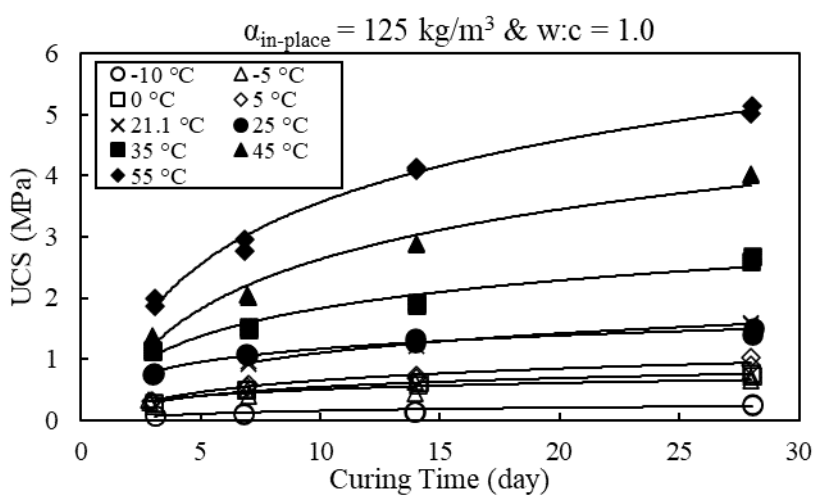

Figure 3.3. Influence of curing time on the strength of cement-treated soil

The influence of mix design on the strength is presented in Figure 3.4. Despite some scatter in Figure 3.4(a), the 28-day UCS (UCS_{28days}) increases with curing temperature, while it decreases as the total-water-to-cement ratio increases following a power function

at non-freezing temperatures (≥ 0 °C) as introduced by other researchers (Filz et al. 2005; Hodges et al. 2008; Jacobson et al. 2003; Janz, Mårten 2002; Miura et al. 2001; Nevarez-Garibaldi et al. 2018). At freezing temperatures (-10 and -5 °C), however, the cement hydration reaction in the mixture is limited because of a low temperature and frozen water (ice) that cannot react with cement. Thus, the mix design including the total-water-to-cement ratio does not have a significant impact on the strength at a freezing temperature. The dry unit weight of the mixture is also a strength controlling factor of cement-treated soil mixture (Nevarez-Garibaldi et al. 2018), as presented in Figure 3.4(b). With the same cement factor in-place ($\alpha_{in\text{-}place}$), the UCS increases as a power function of the dry unit weight of the mixture regardless of curing time and curing temperature. Figure 3.4(b) also demonstrates the positive effect of curing time and curing temperature on strength.

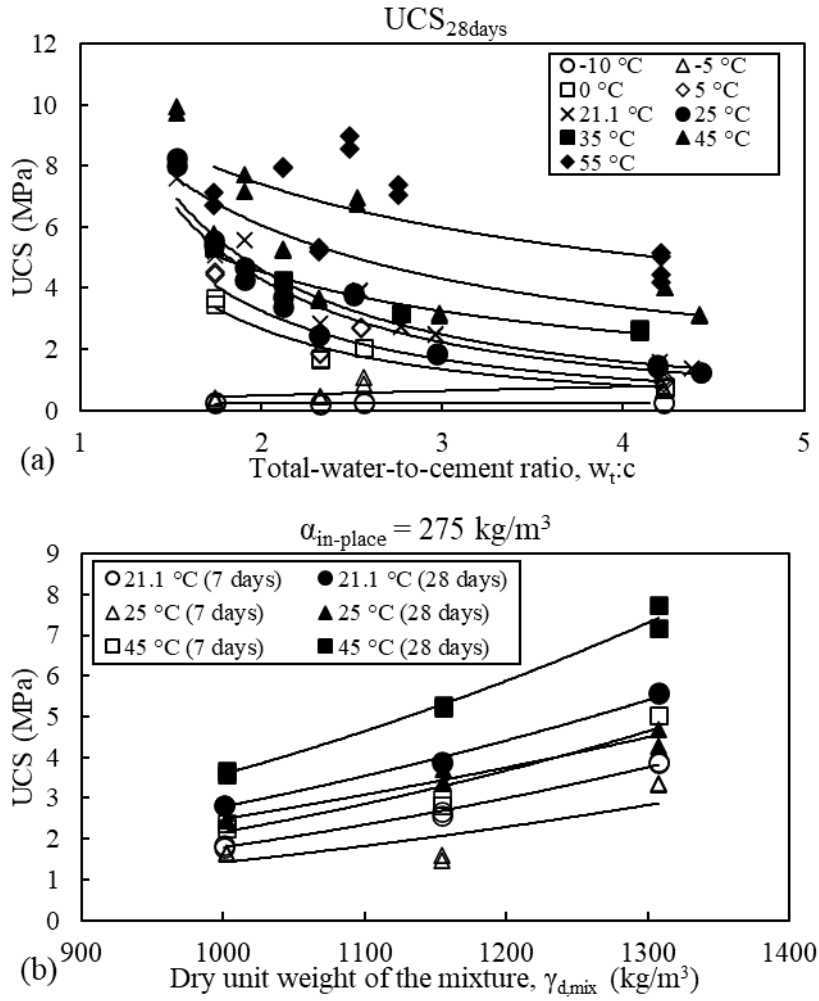

Figure 3.4. Influence of mix design on the strength of cement-treated soil: (a) total-water-to-cement ratio (w_t:c), and (b) dry unit weight of the mixture ($\gamma_{d,mix}$)

Based on the test results presented in Figures 3.3 and 3.4, the strength of cement-treated soil for a given curing temperature can be estimated by using a logarithmic function of curing time, a power function of total-water-to-cement ratio, and a power function of dry unit weight of mixture as proposed by Nevarez-Garibaldi et al. (2018) in Equation 3.2.

3.4.2. Influence of long-term curing

Figure 3.5 shows the relationship between curing time and UCS of cement-treated soil with various mix designs that cured for up to 365 days at 45 °C (filled symbols with solid trendlines) and 25 °C (empty symbols with dashed trendlines). The numbers in the legend

in Figure 3.5 represent the mix design of the cement-treated soil (e.g., 125/1.0: $\alpha_{in\text{-}place}$ = 125 kg/m^3 and w:c = 1.0). For long-term curing, the UCS increases with both the curing time and curing temperature, but the rate of increase in the strength decreases as the curing time increases following a logarithmic function of time, similarly to short-term curing. Figure 3.5 indicates that curing at an elevated temperature can be a more effective way to accomplish the designed target strength of cement-treated soil than curing for a long time because about half of the strength at 365 days develops in the first 28 days. For example, the 28-day UCS of the mixture with the $\alpha_{in\text{-}place}$ of 125 kg/m^3 and the w:c of 1.0 cured at 45 °C is 47.2 % of its 365-day UCS. Although the UCS does not increase remarkably after 180 days, the strength development does not stop up to 365 days regardless of curing temperature and mix designs. This continuous strength development at a long-term curing could be attributed to the pozzolanic reaction between clay minerals and cement hydration products that is not observed in concrete, mortar, and cement-treated granular soils (Zhang et al. 2014).

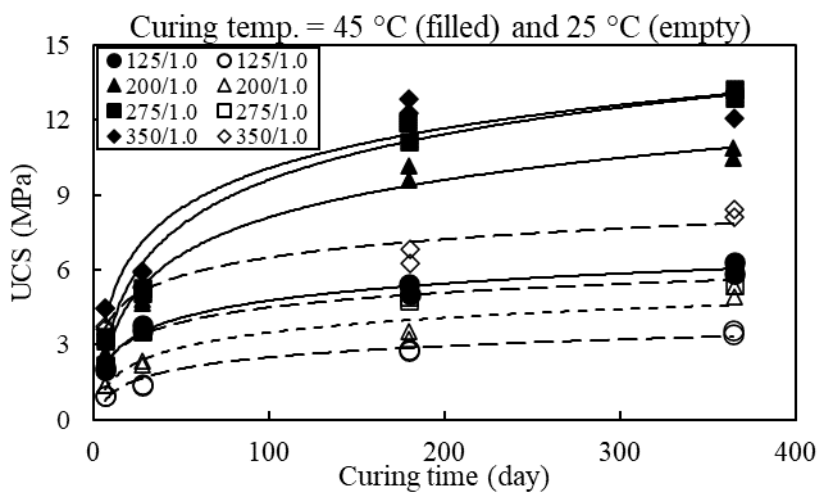

Figure 3.5. Influence of long-term curing on the strength of cement-treated soil

3.4.3. Influence of constant curing temperature

Curing temperature accelerates or decelerates cement hydration reaction in cement-treated soil mixture affecting the strength development as shown in Figure 3.6. With an elevated curing temperature, the required curing time to achieve the target strength can be

reduced. For example, the 3-day UCS at 55 °C (1.93 MPa on average) is greater than the 28-day UCS at 21.1 °C (1.58 MPa on average). On the other hand, the 3-day UCS at 25 °C (0.77 MPa on average) is greater than the 28-day UCS at 0 °C. Figure 3.6 indicates that other factors being constant, the strength of cement-treated soil increases as an exponential function of constant curing temperature resulting in the relationship in Equation 3.3:

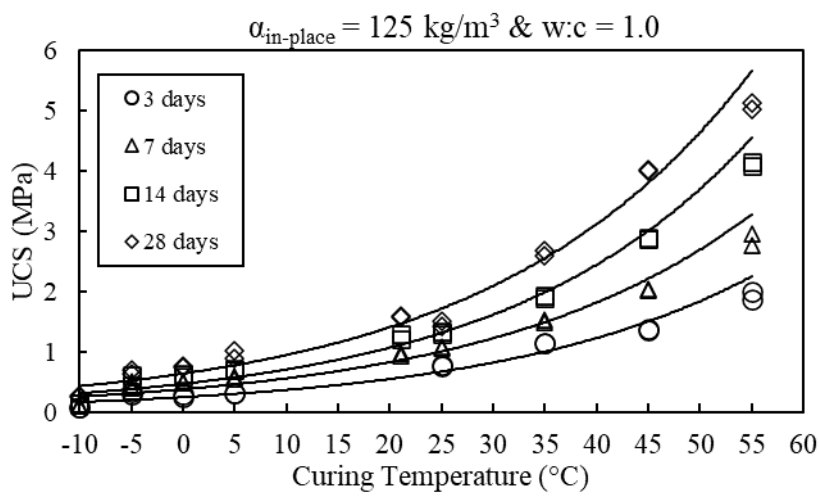

Figure 3.6. Influence of constant curing temperature on the strength of cement-treated soil

$$\frac{UCS_{pred}}{p_a} = b_1 * b_2^{\frac{T-T_0}{T_0}} \qquad \textit{Equation 3.3}$$

where, b_1, and b_2 = dimensionless coefficients that will be discussed in detail later; T = curing time (in °C in this paper); T_0 = reference temperature for normalization.

Figure 3.7 presents the relationship between curing time and UCS of two different mix designs and curing temperatures at -10, 0, 25, and 45 °C. In Figure 3.7, the filled symbols with solid trendlines represent a mixture with a total-water-to-cement ratio (w_t:c) of 4.20 ($\alpha_{in\text{-}place}$ = 125 kg/m^3 and w:c = 1.0), and the empty symbols with dashed trendlines represent a mixture with a w_t:c of 1.74 ($\alpha_{in\text{-}place}$ = 350 kg/m^3 and w:c = 1.0). The previously discussed trends that the increase in UCS with increasing curing time and

curing temperature and with decreasing total-water-to-cement ratio can be also seen in Figure 3.7. Additionally, the extent of the effect of curing temperature on the strength of cement-treated soil depends on the w_t:c. When the curing temperature increases from -10 to 0 °C, the UCS of the mixture with the low w_t:c increases more. On the other hand, when the curing temperature increases in the non-freezing temperature range (from 25 to 45 °C), the effect of curing temperature is more significant when the w_t:c is high.

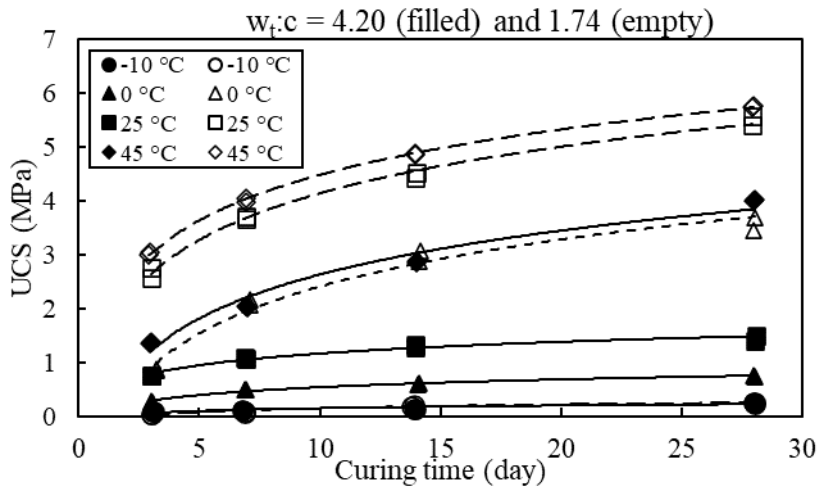

Figure 3.7. Relationship between the effects of curing temperature and total-water-to-cement ratio (w_t:c)

3.4.4. Influence of changing curing temperature

The UCS of cement-treated soil samples with two mix designs ($\alpha_{in\text{-}place}$ = 125 and 275 kg/m^3 and w:c = 1.0) cured under changing curing temperature conditions are plotted against the curing time in Figure 3.8. Some UCS test results of the samples cured at constant curing temperatures at 25 and 45 °C are also plotted to track the strength development trend before the curing temperature change. Since the strength of cement-treated soil is affected by curing time and curing temperature, the strength development trend depends on the curing history. It is obvious that a sample cured at a high temperature for a longer curing time shows a higher UCS, as shown in Figure 3.8. A sample cured at 25 °C for 7 days and then cured at 45 °C for 21 days (empty symbols in

Figure 3.8(a)) is stronger than a sample cured at 25 °C for 14 days and then cured at 45 °C for 14 days (empty symbols in Figure 3.8(b)).

Additionally, when two samples are cured at two sequent curing temperatures for the same times but in a different order, a sample initially cured at the low temperature and subsequently cured at the high temperature (empty symbols in Figure 3.8) has a higher strength than that cured at the high temperature first (filled symbols in Figure 3.8). After a curing temperature change to a high temperature, a sample initially cured at a low temperature increases the strength rapidly. On the other hand, the extent of strength gain of a sample initially cured at a high temperature significantly diminishes when a curing temperature decreases. In other words, if curing temperature changes during curing, an initial low curing temperature followed by a high curing temperature is better than an initially high temperature followed by a low temperature. This might be because the cement hydration reaction products, calcium silicate hydrate (CSH) and calcium hydroxide ($Ca(OH)_2$), form more at a high temperature and coat the remaining unreacted cement particles disturbing further reaction (Jurong 2019). If an initial temperature is low, a little amount of hydration products form, and most of the cement particles are not surrounded by the hydration products and/or the hydration product coating is not thick. When the curing temperature increases, the left unreacted cement particles can react with water actively due to the high temperature.

Even though the strength development tendency of cement-treated soil changes after the curing temperature increases or decreases, the trendlines in Figure 3.8 indicate that the tendencies for both before and after the curing temperature change follow a logarithmic function of curing time. Therefore, the strength of cement-treated soil cured at changing curing temperatures can be estimated by using a sum of the two logarithmic functions of curing time.

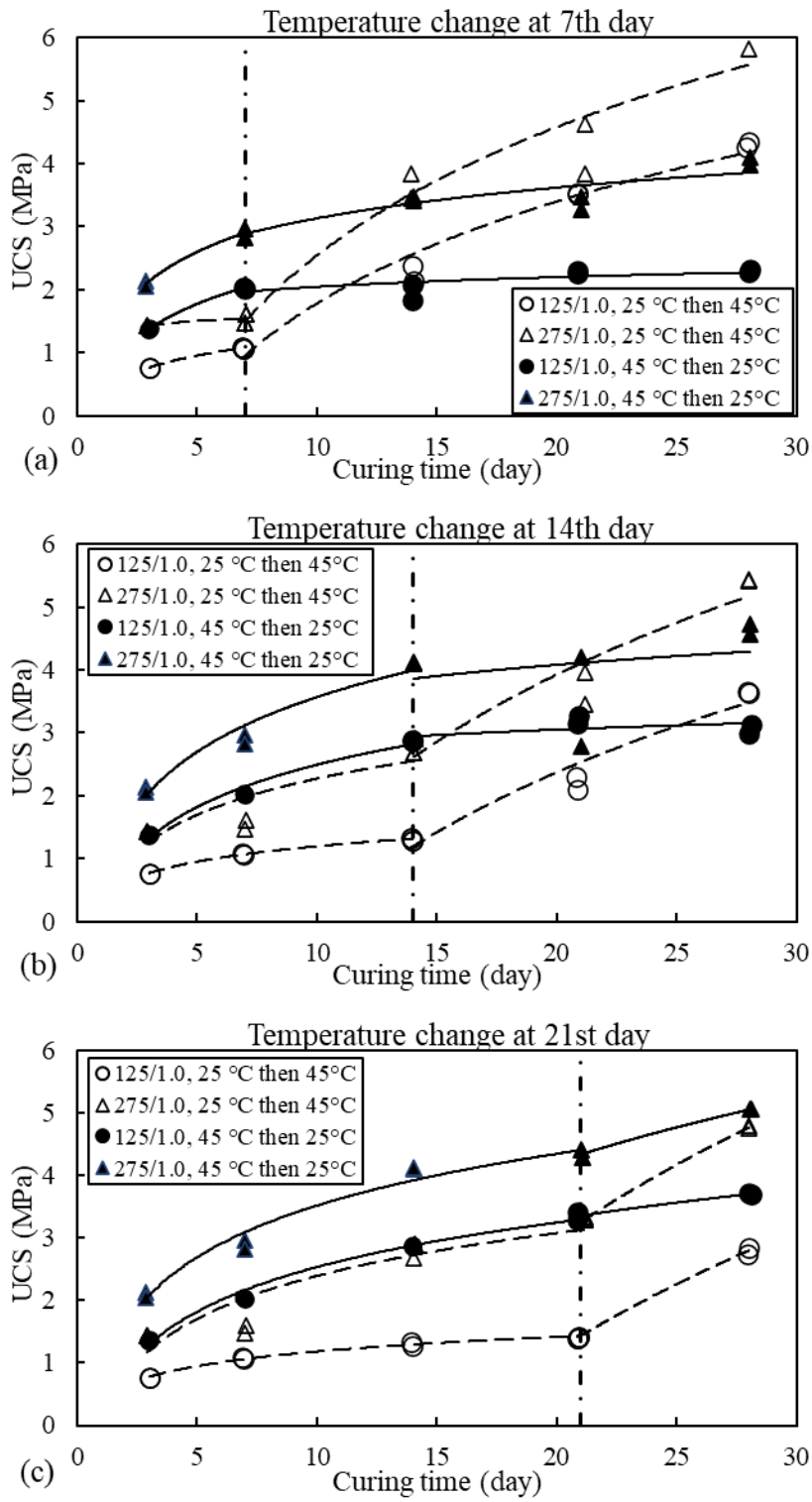

Figure 3.8. Influence of changing curing temperature on the strength of cement-treated soil: curing temperature change at (a) 7th day, (b) 14th day, and (c) 21st day

Figure 3.9 presents the average of the 28-day UCS of cement-treated soil with the mix design of $\alpha_{in\text{-}place}$ = 125 and w:c = 1.0 cured under changing curing temperatures conditions. The previously introduced findings: (1) a longer curing time at a high temperature causes a higher strength and (2) a sample cured at a low temperature first is stronger than that initially cured at a high temperature can also be found in Figure 3.9. It is worth noting that a sample first cured at 25 °C for 7 days and subsequently cured at 45 °C for 21 days shows a higher UCS than a sample cured at 45 °C for the entire 28 days. The same result was observed from the mixture with $\alpha_{in\text{-}place}$ = 275 and w:c = 1.0. This result is also consistent with the findings from other research on the influence of changing curing temperature (Sato et al. 2006; Song et al. 2022).

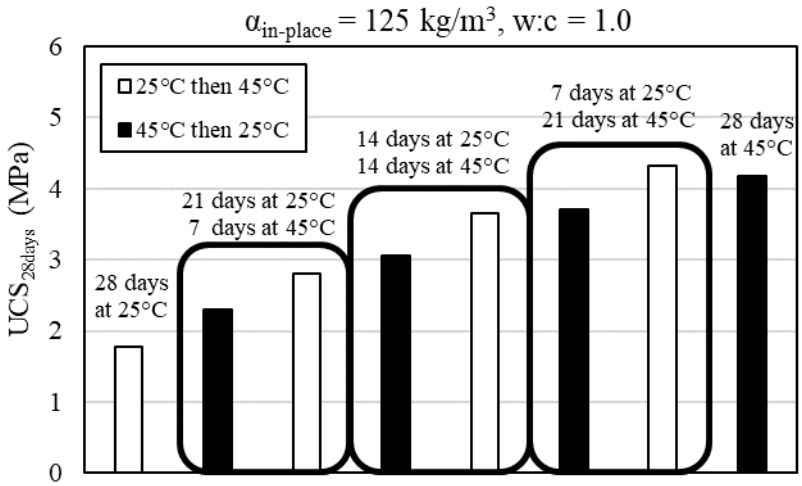

Figure 3.9. UCS_{28days} of cement-treated soil cured under changing curing temperatures

3.4.5. Strength-predicting correlation

In the previous sessions, the influences of curing time and mix design proportion on the strength of cement-treated soil that can be accounted for by the strength-predicting correlation proposed by Nevarez-Garibaldi et al. (2018) (Equation 3.2) were demonstrated; a logarithmic function of curing time and power functions of total-water-to-cement ratio (w_t:c) and dry unit weight of mixture ($\gamma_{d,mix}$). Considering the relationship between the effect of the w_t:c and curing temperature, as shown in Figure 3.3, the curing temperature term was added to the w_t:c term resulting in Equation 3.4. Equation 3.4 is a

strength-predicting correlation that additionally accounts for the influence of curing temperature. However, in order to predict the strength with Equation 3.4, care is required in determining the curing time range in the test program since it contains a logarithmic function of curing time. This limitation will be discussed later in detail.

$$\frac{UCS_{pred}}{p_a} = \left[c_1 + c_2\, ln\left(\frac{t}{t_0}\right)\right] * \left[w_t : c\right]^{c_{3,1} + c_{3,2} * \frac{T - T_0}{T_0}} * \left[\gamma_{d,mix} : \gamma_w\right]^{c_4} \qquad \textit{Equation 3.4}$$

where, c_1, c_2, $c_{3,1}$, $c_{3,2}$ and c_4 = dimensionless coefficients. The coefficients can be determined by using a least squares regression, and they can vary depending on not only the selected data set but also the soil type and binder type. If there is only one curing temperature considered in a project, the curing temperature, T, is equal to the reference temperature, T_0, reducing Equation 3.4 to Equation 3.2.

It should be noted that at a sub-zero temperature, some of the water in the mixture will freeze before reacting with cement and will not contribute to strength gain. The total-water-to-cement ratio (w_t:c) is defined as the weight of water that is available for cement hydration reaction divided by the weight of cement. Therefore, to predict the strength of cement-treated soil cured at temperatures below 0 °C using Equation 3.4, it is of importance to use the weight of unfrozen water that can react with cement in the calculation of the w_t:c. Otherwise, the strength of cement-treated soil cured at a sub-zero temperature is significantly over-predicted by Equation 3.4.

From Figure 3.8, it was found that the strength of cement-treated soil increases with a logarithmic function of curing time even after the temperature changes. Based on this aspect, a strength-predicting correlation for changing curing temperature was derived by repeating the right side of Equation 3.4 with the curing time and curing temperature at the second curing phase as presented in Equation 3.5. To predict the strength using Equation 3.5, one has to select the range of curing times for the test program carefully because it also has logarithmic functions of curing time as Equation 3.4 does. The reason for this will be explained later in detail.

$$\frac{UCS_{pred}}{p_a} = \left[c_1 + c_2\, ln\left(\frac{t_1}{t_0}\right)\right] * [w_t : c]^{c_{3,1} + c_{3,2} * \frac{T_1 - T_0}{T_0}} * [\gamma_{d,mix} : \gamma_w]^{c_4}$$
$$+ \left[c_5 + c_6\, ln\left(\frac{t_2}{t_0}\right)\right] * [w_t : c]^{c_{7,1} + c_{7,2} * \frac{T_2 - T_0}{T_0}} * [\gamma_{d,mix} : \gamma_w]^{c_8}$$

Equation 3.5

where, t_1 and t_2 = curing time at the first and second curing phase, respectively; T_1 and T_2 = curing temperature at the first and second curing phase, respectively; c_5, c_6, $c_{7,1}$, $c_{7,2}$ and c_8 = dimensionless coefficients for the second curing phase. And again, the coefficients can be determined by using a least squares regression, and they can vary depending on not only the selected data set but also the soil type and binder type.

3.4.6. Validation of proposed strength-predicting correlations

The proposed strength-predicting correlations for constant and changing curing temperature were validated by the following steps: (1) Select a calibration data set that can cover reasonable ranges of curing time, mix design, and curing temperature obtained in this research, (2) Determine the coefficients for the strength-predicting correlation that produce the best fit between the measured UCS and predicted UCS for the selected calibration data set by a least squares regression, (3) Predict the UCS of the other data (validation data set) using the obtained coefficients in the second step, and (4) Compare the predicted UCS of test data set with the measured UCS.

Figure 3.10 shows the relationship between the predicted UCS (UCS_{pred}) by Equation 3.4 (the strength-predicting correlation for constant curing temperature) and the measured UCS (UCS_{meas}) of the calibration data set and the validation set. The coefficients for Equation 3.4 obtained using the calibration data set are also presented in Table 3.4. As previously discussed, the total-water-to-cement ratio (w_t:c) of cement-treated soil cured at freezing temperatures (-10 and -5 °C) should be calculated using the weight of unfrozen water in the mixture. For regression purposes only, the unfrozen water content model (Equation 3.6) proposed by Anderson and Tice (1972) was utilized to estimate the total-water-to-cement ratio of cement-treated soil cured at sub-zero temperatures because

measurements of unfrozen water content or total-water-to-cement ratio were not available in these experiments.

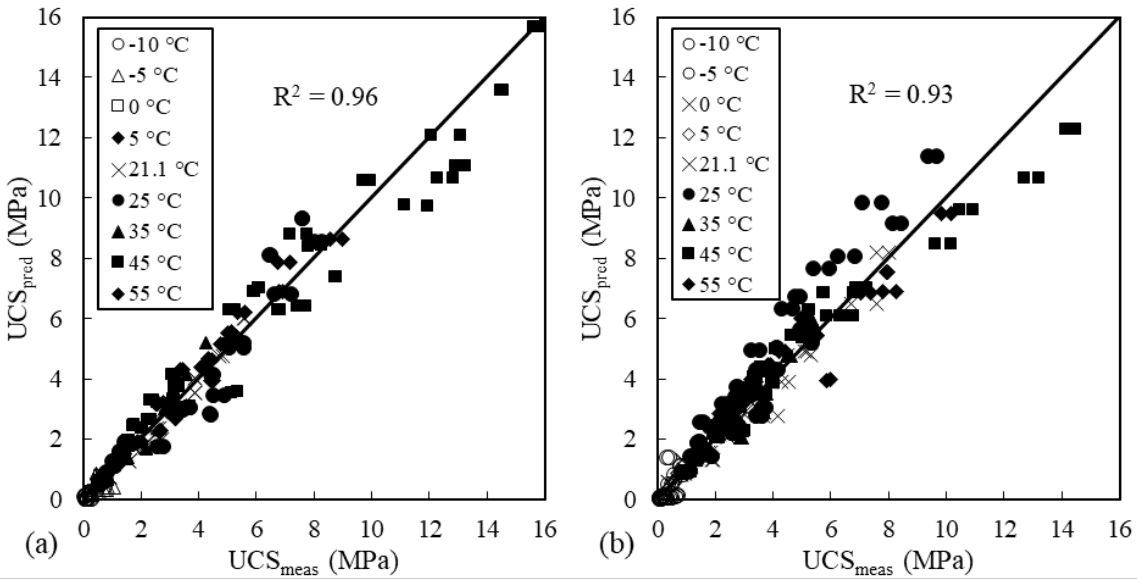

Figure 3.10. Validation of Equation 3.4: (a) calibration data set and (b) validation data set

Table 3.4. Coefficient values for calibration data set using Equation 3.4

Coefficient	c_1	c_2	$c_{3,1}$	$c_{3,2}$	c_4
Value	0.94	29.1	-1.57	0.52	1.89

$$w_{unfrozen} = a * (-T)^b \qquad \textit{Equation 3.6}$$

where, $w_{unfrozen}$ = unfrozen water content; a and b = dimensionless coefficients.

Although the strength of cement-treated soil cured at 25 and 45 °C for long-term curing are slightly over- and under-predicted, respectively, the predicted UCS agrees well with the measured UCS overall regardless of curing time, curing temperature, and mix design. The comparisons in Figure 3.10 indicate that Equation 3.4 can be practically used for the strength prediction of cement-treated soil with various curing times, proportions of mix design, and constant curing temperatures.

The uncertainty of the coefficients in Equation 3.4 was estimated using bootstrapping with 10,000 times of resampling. Table 3.5 presents the mean, standard deviation (SD), and 95% confidence interval (CI) of the coefficients. The correlation between the coefficients was also investigated, and the correlation matrix of the coefficients is shown in Table 3.6.

Table 3.5. Uncertainty of the coefficients in Equation 3.4

Coefficient	Mean	Standard deviation	Confidence interval (95%)	
			Lower bound	Upper bound
c_1	3.35	4.47	-2.20	8.90
c_2	29.3	2.96	25.7	33.0
c_3	-1.70	0.103	-1.82	-1.57
$c_{3,2}$	0.598	0.0496	0.537	0.660
c_4	1.86	0.251	1.54	2.17

Table 3.6. Correlation matrix of the coefficients in Equation 3.4

	c_1	c_2	$c_{3,1}$	$c_{3,2}$	c_4
c_1	1.0000	-0.5417	-0.0289	-0.1751	0.1667
c_2	-0.5417	1.0000	-0.6565	0.5337	-0.6238
c_3	-0.0289	-0.6565	1.0000	-0.7090	0.1983
$c_{3,2}$	-0.1751	0.5337	-0.7090	1.0000	-0.3809
c_4	0.1667	-0.6238	0.1983	-0.3809	1.0000

The strength-predicting correlation for changing curing temperatures (Equation 3.5) was also validated following the steps introduced at the beginning of this sub-chapter. Figure 11 presents the relationships between measured and predicted UCS for the calibration set (Figure 11(a)) and the validation set (Figure 11(b)). The coefficients for Equation 5 determined by using the calibration data set that were used to predict the strength shown in Figure 11 are shown in Table 7. Although the data size used is small, and its prediction quality is not as good as Equation 4, Equation 5 still produces good fits between the

predicted and measured UCS regardless of mix design and curing history as shown in Figure 11. Therefore, Equation 5 can be practically used for the strength prediction of cement-treated soil when the curing temperature changes.

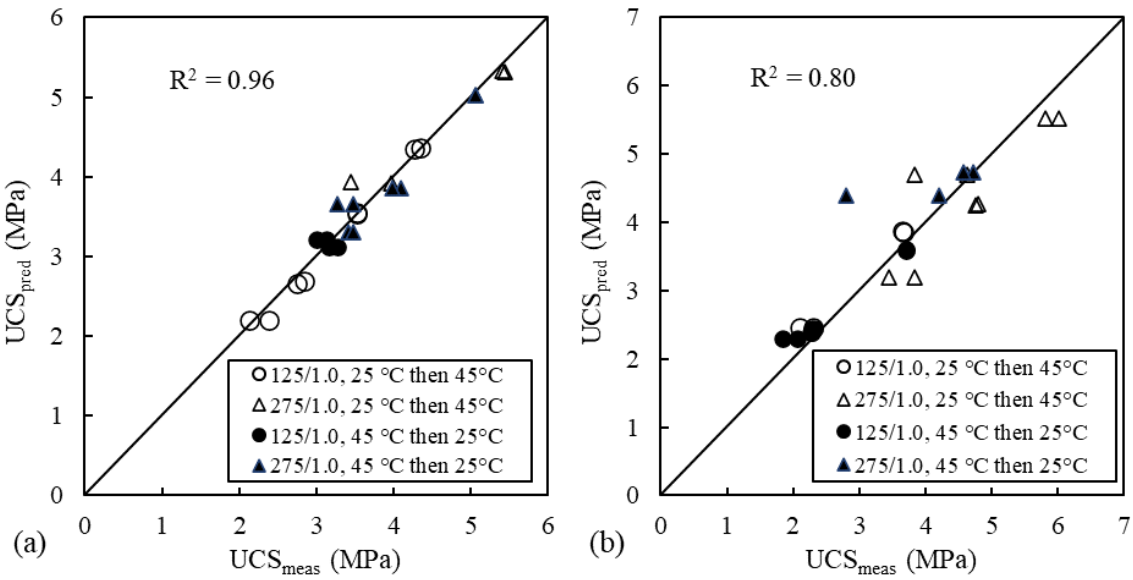

Figure 3.11. Validation of Equation 3.5: (a) calibration data set and (b) validation data set

Table 3.7. Coefficient values for calibration data set using Equation 3.5

Coefficient	c_1	c_2	$c_{3,1}$	$c_{3,2}$	c_4
Value	-67.2	14.4	-2.75	0.73	10.5
Coefficient	c_5	c_6	$c_{7,1}$	$c_{7,2}$	c_8
Value	-112.5	19.2	-2.91	2.02	3.70

Bootstrapping was used to investigate the uncertainty of the coefficients in Equation 3.5. Resampling was repeated until the number of coefficients set that satisfies all the constraints below is 10,000.

- R^2 value of both calibration set and validation set > 0.5
- Coefficient c_1: $-200 < c_1 < 200$
- Coefficient $c_{7,1}$: $-200 < c_{7,1}$

When a correlation between two coefficients in the correlation matrix is higher than 0.9 or lower than -0.9, the coefficient was fixed to the corresponding value in Table 3.7. The bootstrapping was repeated until no coefficient has correlation with other coefficients higher than 0.9 and lower than -0.9. Tables 3.8 and 3.9 present the uncertainty and correlation matrix of the coefficients in Equation 5, respectively.

Table 3.8. Uncertainty of the coefficients in Equation 3.5

Coefficient	Mean	Standard deviation	Confidence interval (95%)	
			Lower bound	Upper bound
c_1	-4.47	7.06	-13.2	4.30
c_2	16.4	3.79	11.7	21.1
$c_{3,1}$	-2.81	0.134	-2.97	-2.64
c_6	-21.8	2.77	-25.3	-18.4
c_8	-2.97	0.0885	-3.08	-2.86

Table 3.9. Correlation matrix of the coefficients in Equation 3.5

	c_1	c_2	$c_{3,1}$	c_6	c_8
c_1	1.0000	-0.7996	0.1303	-0.0066	-0.0824
c_2	-0.7996	1.0000	-0.6665	-0.0732	0.1430
$c_{3,1}$	0.1303	-0.6665	1.0000	0.0474	-0.1204
c_6	-0.0066	-0.0732	0.0474	1.0000	-0.8882
c_8	-0.0824	0.1430	-0.1204	-0.8882	1.0000

Based on the validation results, Equations 4 and 5 can predict the strength of cement-treated soil with various mix proportions cured under different curing times and temperatures. To predict the strength using Equation 4 and 5, the coefficients in the correlations must be determined using the batch test results of in-situ soil improved by cement that covers interested ranges of mix designs and curing time and temperatures. With the coefficients for the target cement-treated soil, the correlations is expected to provide reliable strength predictions.

However, it should be noted that both Equations 3.4 and 3.5 provide accurate strength predictions only when a curing time of interest is in the range of minimum and maximum curing times in the available data. In other words, if one were to use Equations 3.4 and 3.5 to estimate the strength of cement-treated soil after just 1 day of curing using the data in this study, where the minimum curing time is 3 days, the equations would under-predict the strength. As seen in Figure 3.12(a), the predicted UCS by Equation 3.4 using the coefficients in Table 3.4 fits well with the measured UCS for the curing times between 3 and 28 days, but it decreases rapidly as the curing time decreases from 3 days to 0 days. The predicted UCS for a curing time less than 0.8 days is even negative, which cannot be true. Similarly, in Figure 3.12(b), Equation 3.5 produces accurate predictions of UCS for curing times between 3 and 14 days in the first curing phase and between 21 and 28 days in the second curing phase. The negative values of predicted UCS immediately after the beginning of the first and second curing phases also can be found in Figure 3.12(b). This limitation of Equations 3.4 and 3.5 is due to the logarithmic function of curing time that converges to negative infinity ($-\infty$) as a curing time approaches zero.

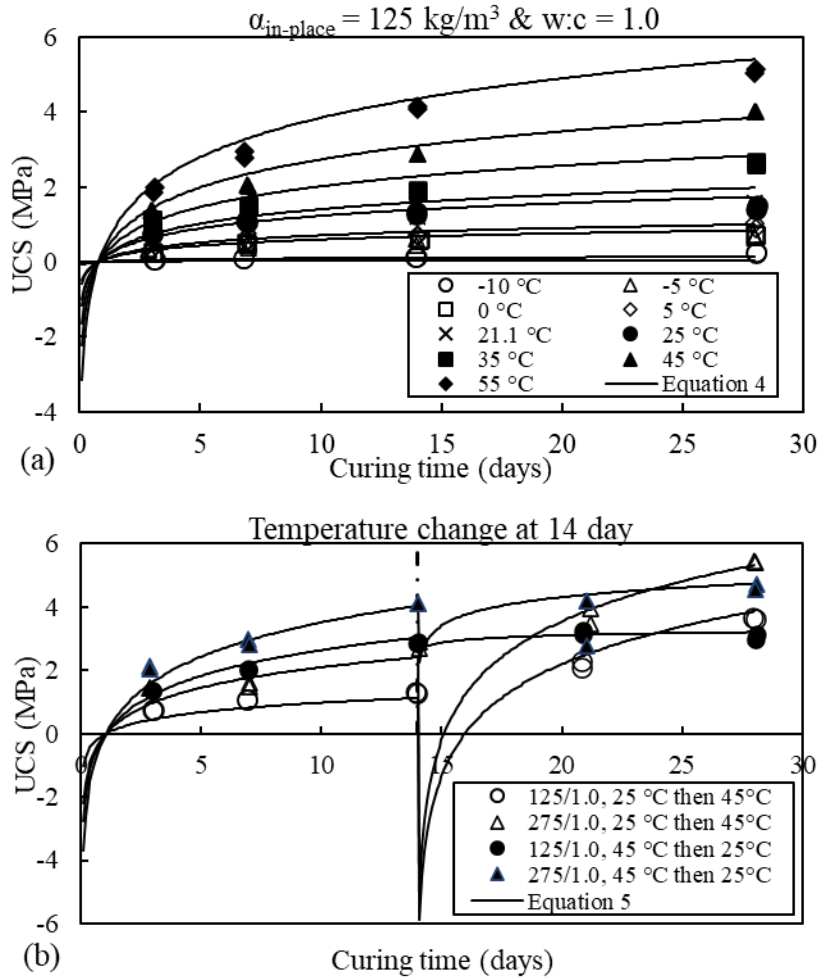

Figure 3.12. Under-predicted UCS at the beginning of the curing phases by using: (a) Equation 3.4 and (b) Equation 3.5

3.5. Conclusion

In this study, the influences of curing time, mix design proportion, and curing temperature on the strength of cement-treated soil for the wet method of deep mixing were investigated. Fabricated lean clay and cement-water slurry mixture was cured under different curing conditions and tested using unconfined compressive strength (UCS) tests. The test results presented that the strength increases with curing time (t), curing temperature (T), and dry unit weight of the mixture ($\gamma_{d,mix}$) but decreases with total-water-to-cement ratio (w_t:c). Strength-predicting correlations that account for these effects were also proposed and validated by independent experiment data sets, and the uncertainty of the coefficients in the correlations was investigated using bootstrapping. The correlations

produced high quality strength predictions, even though they would under-predict the strength when the curing time of interest is earlier than the minimum curing time in available data. The findings and correlations presented in this paper can aid in accurately predicting the strength of deep mixed soil and reducing the number of sample batches that need to be tested in the design of the mixture proportion for a wet method of deep mixing project thereby saving the project's time and costs.

3.6. Acknowledgments

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Chapter 4. Influence of Organic Matter on Strength Development of Cement-water Slurry

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4.1. Abstract

The wet method of deep mixing employs cement-water slurry to increase the strength, reduce the compressibility, and reduce the hydraulic conductivity of the soil. Organic soils can be challenging to treat because organic matter can interfere with cementitious reactions. Some types of organic matter reduce the mixture strength at early curing times while having little effect on the long-term strength, and other types of organic matter reduce both the short- and long-term strengths. A research program is underway to develop a framework for quantitatively representing the impact of organics on the strength development of soil-cement mixtures. Reproducible fabricated organic soils will be employed to develop the framework, and then the ability of the framework to represent the strength development of natural organic soils will be assessed. As a first step, the influence of the following six readily available organic compounds on the strength development of cement-water slurries was investigated: humic acid, tannic acid, sucrose, ethylenediaminetetraacetic acid (EDTA), ethylene glycol, and xanthan gum. These organic compounds were separately mixed with the cement-water slurry at dosages of 10% and 2% by dry weight of cement and cured at room temperature for 7, 12, and 28 days. The results showed that tannic acid and sucrose significantly reduce the unconfined compressive strength (UCS) of the cement-water slurry. EDTA also had a negative effect on UCS, but the effect disappears at low concentrations and after long curing times. Humic acid, ethylene glycol, and xanthan gum had little or no effect on UCS compared to the other three organic compounds. Tannic acid was selected for further testing over a wide range of concentrations of tannic acid with cement-water slurry because tannic acid can have a dramatic detrimental effect on UCS, and it occurs in natural soils. The findings from the further tests include the following: (1) increasing tannic acid concentration reduces UCS and (2) the detrimental effect of tannic acid appears to decrease as curing time increases. The test results indicate that tannic acid may be a suitable organic compound for fabricating organic soils to use in a laboratory investigation to develop a quantitative framework for representing the influence of organic matter on the strength development of soil-cement mixtures.

4.2. Introduction

Organic matter in natural soil can interfere with cement hydration reactions, thereby reducing ultimate strength and/or delaying the strength development of cement-treated soils in cement stabilization projects. Some organic material reduces the strength of soil-cement mixtures significantly at early curing times while having little effect on long-term strength, and some other organic material has a negative effect on both the short- and long-term strengths (Clare and Sherwood 1954; Estabragh et al. 2016a; Shao et al. 2008; Tremblay et al. 2002).

Tremblay et al. (Tremblay et al. 2002) mixed 13 different organic compounds separately with clay and silt and added cement to the soils to investigate the effect of the organic compounds on cement-treated soils. After 7 and 28 days of curing, they observed that acetic acid, humic acid, tannic acid, sucrose, ethylenediaminetetraacetic acid (EDTA), and ethylene glycol remarkably reduced the undrained shear strength (s_u) of cement-treated clay and silt. Of these organic compounds, humic acid and tannic acid exist in natural soils. Kang et al. (2017) showed a detrimental effect of humic acid on the strength of cement-treated clay. They proposed that a threshold cement content that represents the amount of cement necessary to overcome the negative effect of humic acid on strength exists. Abrams (1920) and Fang (2021) studied the effect of tannic acid on the strength of concrete and mortar. They found that tannic acid reduces strength at short curing times. At long curing times, the detrimental effect of tannic acid was reduced or, in some cases, even produced higher strength than mixtures without tannic acid. Based on the literature, it is likely that the tannic acid complexes with calcium ions, thereby removing calcium that would otherwise be precipitated as CH, C-S-H, etc.

Several researchers have studied the influence of organic compounds on cement hydration reaction and strength development of cement paste. However, most researchers focused only on the short-term effect of organics on strength development. Thomas and Birchall (Thomas and Birchall 1983) found that sucrose and raffinose are the best cement hydration retarders. They stated that alkaline stability and calcium-binding capacity make sugars an effective retarder, especially in strong alkali environments. Juenger and Jennings (2002) found that sugar delays the cement hydration reactions, but increases the

ultimate strength. The delaying effect of sugar is less significant at high curing temperatures. The hydration retarding effect of sucrose is likely due to its adsorption to anhydrous cement surfaces (Smith et al. 2011). The influence of EDTA on early cement hydration was studied by Thomas and Double (1983). They stated that EDTA increases the thickness of C-S-H gel coating around unreacted cement particles and decreases the permeability of the coating, thereby hindering the reaction of water and unreacted cement particles. While the exact mechanisms are not well understood, it is posited that humic acid, tannic acid, EDTA, and ethylene glycol complex with Ca^{2+} during hydration, thereby negatively affecting hydration; evidence for such mechanisms is present in the literature for similar organics (Banfill 1986; Jakubeková et al. 1988; Ramachandran 1976).

Xanthan gum is a biopolymer that is usually used in the food industry, and it exists in natural soils. In geotechnical applications, xanthan gum has been introduced as an inexpensive additive for soil strengthening (Abdelaziz et al. 2019; Antonette et al. 2019; Chang et al. 2015; Dehghan et al. 2019; Lee et al. 2019). Qi et al. (2019) investigated the use of xanthan gum as a retarder of cement hydration. They mixed cement-water slurry with xanthan gum and sodium silicate and found that, at a given curing time, the compressive strength of the mixture decreased with the increasing concentration of xanthan gum.

As a preliminary study of the effect of organic matter on the strength of cement-treated soil research, this paper investigates the detrimental effect of six organic compounds (humic acid, tannic acid, sucrose, EDTA, ethylene glycol, and xanthan gum) on strength development due to cement hydration.

4.3. Experimental Program

4.3.1. Materials

A commercially available Type I/II Portland cement was used in this study. The following organic compounds were used: humic acid (53680) from Sigma-Aldrich; xanthan gum from Judee's Gluten Free; and tannic acid (A17022), EDTA (A10713),

ethylene glycol (A11591), and sucrose (A15583) from Alfa Aesar. These six organic compounds were selected because they have been empirically shown to detrimentally affect cement hydration and some of them exist in significant quantities in natural soils. Ethylene glycol is liquid and miscible with water, and the other five organic compounds are solid and soluble in water.

4.3.2. Sample preparation

Initial slurry specimens were prepared using water-to-cement ratio (*w*:*c*) of 0.8 and organic compound concentrations of 10% and 2% by dry weight of cement. The slurries were mixed for three minutes using a commercial food blender. These batches are listed in the first 12 rows of Table 4.1 below the column headings. Batches of 10% humic acid and xanthan gum were discarded because the mixtures were too thick to mix thoroughly with the food blender. Cement-water slurry batches without organics with *w*:*c* ranging between 1.0 and 0.4 were also prepared to serve as references for batches with organics (C-1.0 to C-0.4 in Table 4.1). For the further investigation of tannic acid, concentrations of 1.0, 0.5, 0.25, and 0.1% tannic acid were mixed with cement-water slurry with *w*:*c* of 0.8 (T-1 to T-0.1 in Table 4.1). After curing, all of the samples described above exhibited bleed water, which is excess water collected at the top of the sample. Bleed water reduces the *w*:*c* of the cured mixture below the initial *w*:*c* of the mixture. The after-curing *w*:*c* values are listed in Table 4.1. To prevent bleed water during curing, different percentages of tannic acid by cement (4.0, 3.0, 2.0, 1.5, 1.25, 1, 0.6, 0.4, and 0.25%) were mixed with cement-water slurry with *w*:*c* of 0.4 (TA-4 to TA-0.25 in Table 4.1). For tannic acid with cement-water slurry with *w:c* of 0.4, a kitchen mixer was used as thorough mixing was impossible with the food blender because of increasing mixture viscosity. All samples were formed in 50-mm-diameter by 100-mm-tall plastic molds, and the sealed molds were cured in a water bath in a humid room at room temperature for 7, 12, and 28 days.

Table 4.1. Cement-water slurry batches with different organic compounds

Batch name	**Organic matter**	**Initial organic by cement (%)**	**Initial *w*:*c***	**Ave. *w*:*c* after curing**
H-10 (discarded)	Humic acid	10.00	0.8	N/A
H-2		2.00		0.726
E-10	EDTA	10.00		0.599
E-2		2.00		0.760
EG-10	Ethylene glycol	10.00		0.682
EG-2		2.00		0.625
S-10	Sucrose	10.00		0.778
S-2		2.00		0.794
X-10 (discarded)	Xanthan gum	10.00		N/A
X-2		2.00		0.744
T-10	Tannic acid	10.00		0.790
T-2		2.00		0.791
T-1		1.00		0.785
T-0.5		0.50		0.778
T-0.25		0.25		0.612
T-0.1		0.10		0.540
TA-4		4.00	0.4	0.400
TA-3		3.00		
TA-2		2.00		
TA-1.5		1.50		
TA-1		1.00		
TA-0.6		0.60		
TA-0.4		0.40		
TA-0.25		0.25		
TA-0		0.00		
C-1.0	N/A	0.00	1.0	0.712
C-0.9			0.9	0.635

C-0.8			0.8	0.607
C-0.7			0.7	0.599
C-0.6			0.6	0.551
C-0.5			0.5	0.470
C-0.4			0.4	0.392

* Average w:c after curing for H-10 and X-10 batches are not available because they were discarded. The mixtures were too thick to thoroughly mix.

4.3.3. Testing methods

After the designed curing time, samples were removed from the plastic molds. The top and bottom surfaces of the samples were grounded to ensure flat and parallel surfaces. Unconfined compressive strength (UCS) tests were conducted on cured samples following ASTM D2166 using a GEOTAC Sigma-1 Automated Load Test System at a strain rate of 1% per minute. Cement-water slurry samples without organics and with initial *w*:*c* lower than 0.7 (C-0.4 to C-0.6) and some tannic acid batches with *w*:*c* of 0.4 were tested using a FORNEY QC-50-DR compression testing machine that can apply a vertical load of 400,000 lbf (1799.3 kN).

4.4. Test Results and Discussion

4.4.1. Six organic compounds with cement-water slurry (initial w:c = 0.8)

As mentioned above, bleed water was generated during curing for specimens from all batches except the tannic acid batches with *w*:*c* of 0.4. The average weight of bleed water after curing is presented in Table 4.2 for the specimens with 10% and 2% organic concentration. The bleed water in tannic acid with cement-water slurry is similar regardless of the organic concentration. Sucrose and EDTA at 10% concentration have more bleed water after curing than the mixtures with 2%, while ethylene glycol has less bleed water for the high concentration. Further research is necessary to understand the cause of these trends.

Table 4.2. Average weight of bleed water in grams after curing

Organic concentration	Humic acid	Tannic acid	Sucrose	EDTA	Ethylene glycol	Xanthan gum
10%	--	1.7	3.9	36.3	21.5	--
2%	14.1	1.6	1.2	7.6	33.7	10.9

To account for the effect of the bleed water, the water-to-cement ratio of the slurry (*w*:*c*) after curing was considered instead of the initial *w*:*c*. Two assumptions were made for the determination of *w*:*c* after curing: (1) bleed water does not include organic matter and cement and (2) the cured samples are homogeneous. Figure 4.1 shows the relationships between *w*:*c* after curing and the unconfined compressive strength (UCS) at different organic concentrations. It should be noted that some samples were too weak to be extracted from the mold for testing (e.g., 10% and 2% tannic acid) which are plotted with UCS of 0 in Figure 4.1. On the other hand, some other samples were too strong to fail with the UCS test devices employed (e.g., 2% ethylene glycol at 28 days), and these cases are not presented in Figure 4.1. The solid lines in Figure 4.1 are trendlines for the UCS of cement-water slurry without organics. As shown in Figure 4.1, the humic acid, ethylene glycol, and xanthan gum batches with cement-water slurry have similar or even higher strengths than the cement-water slurry without organics. This indicates that humic acid, ethylene glycol, and xanthan gum do not negatively affect cement hydration when their concentrations by the weight of cement are 10% or less. The UCS of EDTA with cement-water slurry is much lower than that of the cement-water slurry without organics at 7 days, but it approaches the UCS of cement-water slurry without organics after 12 and 28 days when the concentration is low (2%). This suggests that EDTA reduces the strength or delays the strength gain of cement-water slurry, but the effect of EDTA is reduced by decreasing its concentration and increasing the curing time.

On the other hand, tannic acid and sucrose show a noticeable negative influence since most tannic acid and sucrose samples were too weak to test or had a very small UCS when tested. However, as Juenger and Jennings (2002) reported, sucrose does not reduce the ultimate strength; it rather delays strength increase. Therefore, it is expected that the

UCS of sucrose with cement-water slurry will increase and approach the UCS of cement-water slurry without organics when it is cured for a long time.

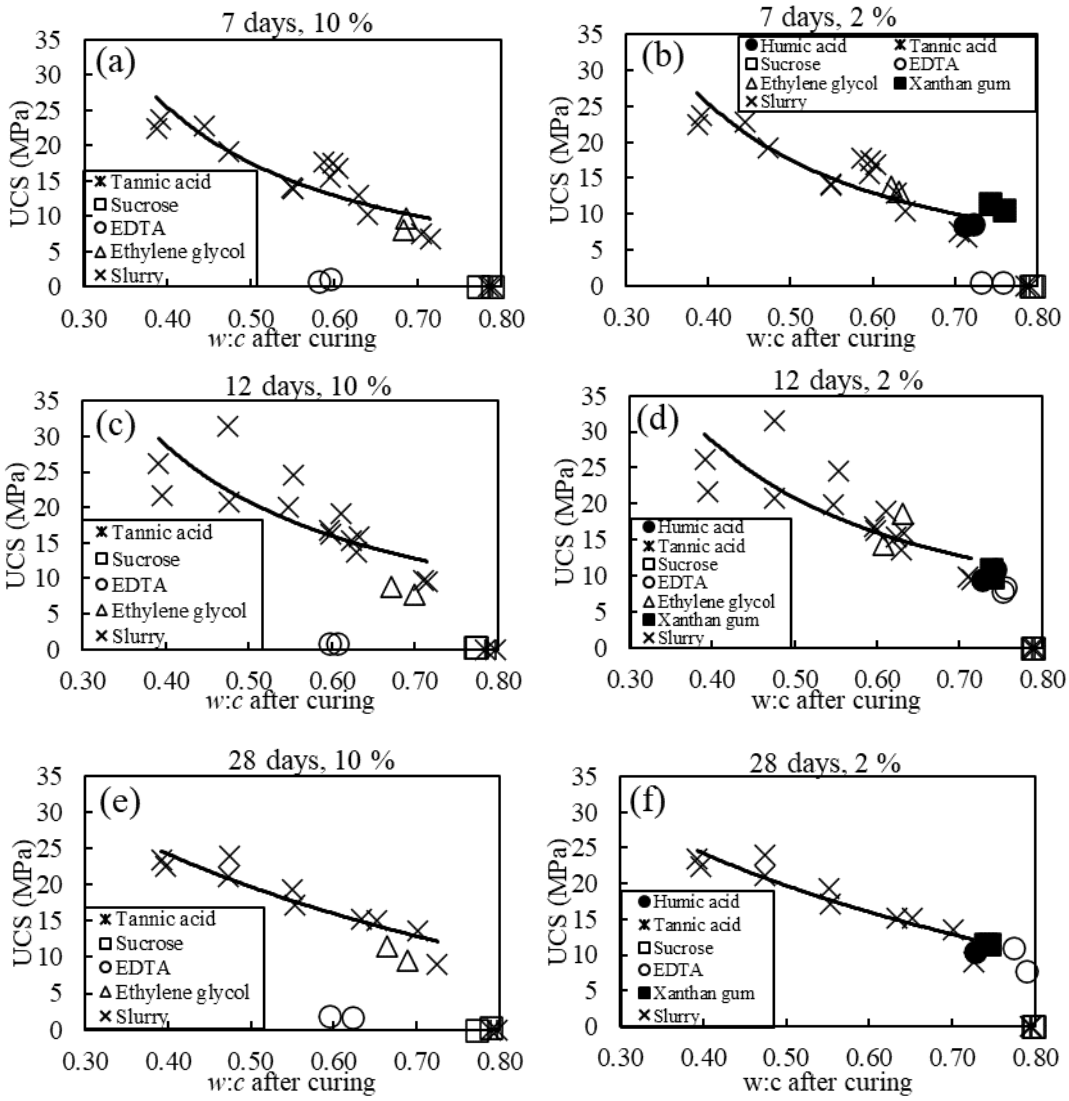

Figure 4.1. Influence of organic compounds on UCS with organic concentrations of 10% (a, c, e) and 2% (b, d, f) after 7 days (a, b), 12 days (c, d), and 28 days (e, f)

4.4.2. Tannic acid with cement-water slurry (initial w:c = 0.8)

Tannic acid at 10% and 2% concentration has a significant negative effect on cement hydration as shown in the previous section. The effect of tannic acid at concentrations less than 2 % was investigated. Figure 4.2 shows the relationship between measured UCS

and tannic acid concentration. The UCS decreases with increasing tannic acid concentration, and that of tannic acid concentration of 1% batch converged to zero regardless of curing time. However, the detrimental effect of tannic acid on cement hydration decreases as curing time increases. Although there is some scatter and a small number of data, the UCS of 0.1% of tannic acid at 7 days is similar to that of cement-water slurry without tannic acid (0%) at 7 days. In this regard, at 12 and 28 days of curing, the UCS of 0.1% tannic acid could be even higher than those of cement-water slurry without tannic acid.

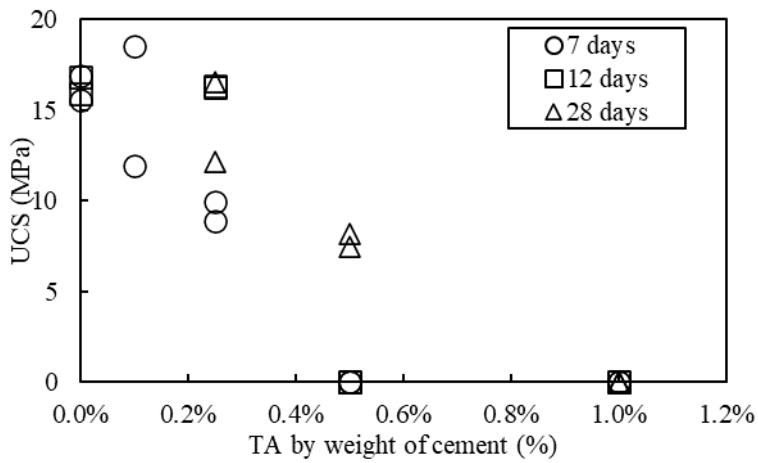

Figure 4.2. Influence of tannic acid (initial w:c = 0.8)

Bleed water was also observed in the samples of tannic acid below 2% with cement-water slurry with *w*:*c* of 0.8 after curing, and the weight of bleed water increased with decreasing the tannic acid concentration, as shown by the increasing discrepancy between the *w*:*c* ratio before and after curing as the tannic acid concentration decreases for batches T-1 to T-0.1 in Table 4.1. Although the initial *w*:*c* was the same for all different concentrations of tannic acid with cement-water slurry batches, the *w*:*c* after curing varied due to different amounts of bleed water in the samples. Figure 4.2 shows the detrimental effect of tannic acid on strength development due to cement hydration, but the variations in *w*:*c* after curing are not considered in Figure 4.2.

4.4.3. Tannic acid with cement-water slurry (w:c = 0.4)

Theoretically, *w*:*c* of 0.42 is the minimum ratio to achieve full hydration (Mindess et al. 2003). In other words, all water and cement in a mixture with *w*:*c* of 0.42 will be used for cement hydration. To completely avoid the bleed water issue after curing, various concentrations of tannic acid with cement-water slurry with *w*:*c* of 0.4 were prepared using a kitchen mixer and tested. No bleed water was observed after curing. Figure 4.3 presents the UCS of tannic acid with cement-water slurry (*w*:*c* = 0.4) corresponding to different concentrations of tannic acid. Compared to the UCS of cement-water slurry (0%), tannic acid drastically reduces UCS when the tannic acid concentration is higher than 0.4%. However, when the concentration is 0.25%, the UCS increases and approaches the UCS of cement-water slurry at 7 and 12 days. Moreover, the UCS of 0.25% tannic acid at 28 days is greater than that of cement-water slurry. This is consistent with the findings in the previous section for tannic acid with a cement-water slurry of initial *w:c* of 0.8: (1) tannic acid reduces the strength of cement-water slurry and (2) the detrimental effect of tannic acid is less significant for long-term curing and low concentration. While the test results show the detrimental effect of tannic acid on cement hydration, the exact mechanism of action requires additional study.

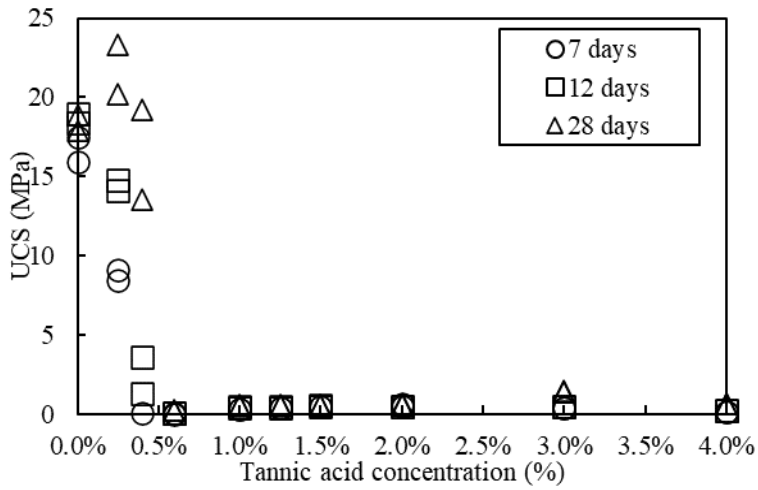

Figure 4.3. Influence of tannic acid (w:c = 0.4)

4.5. Conclusion

The influence of six organic compounds (humic acid, tannic acid, sucrose, ethylenediaminetetraacetic acid (EDTA), ethylene glycol, and xanthan gum) was studied in this research. It was found that humic acid at low concentration (2%), ethylene glycol, and xanthan gum at low concentration (2%) do not have a noticeable negative impact on the unconfined compressive strength (UCS). EDTA reduced UCS significantly at high concentration (10%) and short curing time. Tannic acid and sucrose showed a strong detrimental effect on UCS even at low concentration (2%) and long curing time. Lower concentrations of tannic acid with cement-water slurry having water-to-cement ratios (*w*:*c*) of 0.4 and 0.8 were also investigated. The detrimental effect of tannic acid on UCS increases as the concentration of tannic acid increases. However, the effect became less significant as curing time increases. Based on these results, tannic acid appears to be a promising organic compound for fabricating reproducible organic soils to be used in laboratory experiments to develop a framework for representing the effects of organic matter on the treatability of organic soils by the wet method of deep mixing and other cement stabilization methods. If such a framework can be developed, its applicability to naturally occurring organic soils can then be assessed.

4.6. Acknowledgments

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Chapter 5. Strength of Cement-stabilized Organic Soil

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5.1. Abstract

This paper presents strength test results of fabricated and natural organic soils stabilized by cement to investigate the influence of organic matter on the strength of cement-stabilized soft soil. For the fabricated organic soil, tannic acid was used to represent organic matter in the soil that has a negative effect on the strength. The organic soils were mixed with a cement-water slurry to simulate the wet method of deep mixing and cured at room temperature from 3 to 28 days. Unconfined compressive strength (UCS) and laboratory miniature vane shear tests were performed on the cured samples to measure the strength. The strength tests results showed that the strength of cement-stabilized organic soil increases with curing time and the amount of cement in the mixture. However, the strength of cement-treated fabricated organic soil decreased with the concentration of tannic acid. Thermogravimetric analyses (TGA) were also conducted to explore the mechanism of the strength gain retarding effect of tannic acid. The TGA results indicated that tannic acid consumes calcium ions, Ca^{2+}, and hiders the formation of calcium hydroxide, $Ca(OH)_2$, in the mixture so reducing the strength of a sample. Additionally, the time-UCS plot showed that the strength increases following an S-shape curve. Based on the test results, a strength-predicting correlation for cement-stabilized organic soil was derived using the logistic S-shape function. It was validated using experimental data from three cement-stabilized organic soils, and the uncertainty of the coefficients in the correlation was analyzed by means of the bootstrapping method. The correlation is of sufficient accuracy with good agreement between predicted and measured strengths. It can predict the strength of cement-stabilized organic soil improved by the wet method of deep mixing using the correlation coefficients from the reduced number of batch test results.

5.2. Introduction

The deep mixing method (DMM) of ground improvement mixes a cementitious binder with the native soil to improve the engineering properties of the soil. The wet method adds a cementitious binder to soft soil in a binder-water slurry form, while the dry

method involves adding a binder in dry powder form. In a deep mixing project treating organic soil, organic matter in the soil is one of the main factors affecting the strength of binder-treated soils along with soil type, curing time, curing temperature, and the amount of added binder (Bruce et al. 2013; Horpibulsuk et al. 2011; Jacobson et al. 2003; Kitazume and Terashi 2013; Terashi 1997). The characteristics and strength development trend of organic soil stabilized by a binder are different from that of cement-stabilized inorganic soil (Baker 2015). In addition to its high compressibility and water content, organic soils can make a deep mixing project challenging because the organic matter in natural soil can interfere with cementitious reactions, and thereby reduce the ultimate strength and/or delay the strength development of treated soil (Baker 2015; Bennett 2019; Clare and Sherwood 1954; Estabragh et al. 2016b; Kang et al. 2017; Shao Li et al. 2008; Tremblay et al. 2002). For cement stabilization of organic soil, an additional stabilizing agent or more binder compared to inorganic soil should be added to the soil to overcome the detrimental effects of the organic matter on the strength (Chen and Wang 2006; Clare and Sherwood 1954; Hebib and Farrell 2003; Janz, Mårten 2002; L.S. Wong et al. 2008; Li et al. 2012; Zhu et al. 2009).

Many researchers have investigated the influence of organic matter on cement-stabilized soil. Clare and Sherwood (1954) categorized organic matter into three groups: inactive or slightly active, active, and very active. They found that glucose and nucleic acid are the most 'active' retarders. The observed strength reduction was attributed to an 'active' fraction of the organic matter in the natural soil that absorbs calcium ions, coats soil particles, and interferes with bonding between the cement matrix and the soil particles. However, this detrimental effect can be overcome by adding more cement, calcium chloride, or super-rapid-hardening cement (Clare and Sherwood 1954). For cement-stabilized natural clay and silt, some organic compounds (e.g., cellulose fibers, starch, vegetable oil, and kerosene) do not have a significant effect on cement hydration (Tremblay et al. 2002). Conversely, acetic acid, benzoic acid, humic acid, tannic acid, sucrose, EDTA, and ethylene glycol delay the strength development and/or reduce the strength of the stabilized soil. Acids and EDTA with low pH reduce the pH of cement-stabilized soils and prevent the formation of cement hydration products (e.g., C-S-H and ettringite). Sucrose is absorbed into the clay and cement particles thus delaying the

cementing process. However, ethylene glycol does not hinder the cement hydration reaction, but it delays the reaction by increasing the pore size of the cement-stabilized soil solution (Tremblay et al. 2002). For a given cement content, the time-strength curve of cement-treated marine dredged clay with humic acid is controlled by a humic acid ratio, the dry mass ratio of the humic acid to the soil (Kang et al. 2017). On the other hand, for a given humic acid ratio, the time-strength curves are controlled by cement content. It should be noted that the cement content in Kang et al. (2017), the dry mass of cement divided by the sum of the dry mass of cement and soil, is higher than the cement content normally used, the dry mass ratio of the cement to the soil. They concluded that the influence of humic acid on the strength development of cement-treated marine dredged clay varies depending on the cement and humic acid contents. The harmful effect of humic acid can be neutralized by adding additional cement to the soil-cement mixture, and there is a threshold of cement content at which the effect of humic acid is overcome (Kang et al. 2017). The threshold concept has been also introduced by other organic soil cement stabilization research using different types of soil and binder (Baker 2015; Bennett 2019; Ju et al. 2022; Li et al. 2012). This threshold can be a function of cement content, curing time, or organic matter content.

Tannic acid, the organic matter used in this research for fabricated organic soil (FOS), has been introduced as a cement hydration retarder. In concrete, the strength reduction due to tannic acid is a function of tannic acid concentration (Abrams 1920). The effect of tannic acid on the strength of concrete is more significant when the mixture has finer aggregates, less moisture, and a shorter curing time. At an early age of cement hydration of concrete and mortar, tannic acid can stick to cement particles very easily and strongly interact with hydration products changing the structure of the hydration products (Fang 2021). Consequently, tannic acid retards the cement hydration reaction and strength development of concrete and mortar remarkably. A strong detrimental effect of tannic acid on the strength of cementitious material was also reported in authors' preliminary research (Ju et al. 2022, see Chapter 4).

Despite the research on the influence of organic matter on the strength of cement-stabilized soil, an attempt to derive a correlation that quantitatively predicts the strength has not been widely made. This paper investigated the negative effect of organic matter

on the strength development of cement-stabilized organic soil and introduced a strength-predicting correlation for organic soil improved by the wet method of deep mixing using cement.

5.3. Materials and Test Procedure

5.3.1. Materials

A fabricated organic soil (FOS) used in this study was designed to achieve two purposes: (1) to represent organic soil in-situ that has organic matter with negative effect on the strength of cement-stabilized soil; (2) to secure reproducibility for consistent test results. FOS consist of tannic acid and lean clay (CL), which is made of silica flour (65%), kaolin (20%), fine sand (10%), and bentonite (5%). Tannic acid ($C_{76}H_{52}O_{46}$) was manufactured by Alfa Aesar (A17022), and its purity is greater than or equal to 93%. Figure 5.1 shows the XRD patterns of tannic acid. FOS with various tannic acid concentrations were prepared to mimic a wide range of organic contents of soil. As examples, the physical properties and particle size distribution of the CL without tannic acid (CL+TA (0.0%)) and the FOS with 0.2% of tannic acid by total dry weight of base soil (CL+TA (0.2%)) are presented in Table 5.1 and Figure 5.2, respectively. FOS with TA = 0.2% has slightly higher Atterberg limits than pure CL clay, but there is no big difference in specific gravity and particle size distribution including fine content between the two base soils. The water content (w) of the base soils were set to their liquid limit.

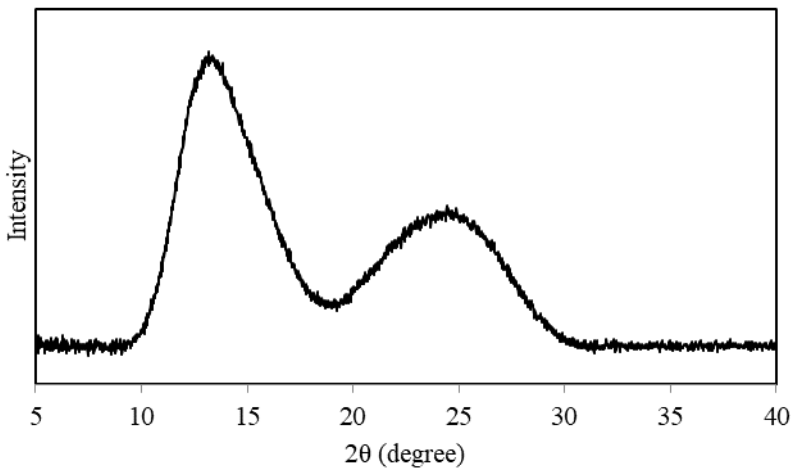

Figure 5.1. XRD pattern of tannic acid

Table 5.1. Physical properties of fabricated organic soils (0.0 % and 0.2 % tannic acid)

	CL+TA (0.0 %)	CL+TA (0.2 %)
Liquid limit (LL)	35.4	36.5
Plastic limit (PL)	14.1	15.1
Plasticity index (PI)	21.3	21.4
Specific gravity	2.66	2.65
Fine content (%)	86.9	86.8

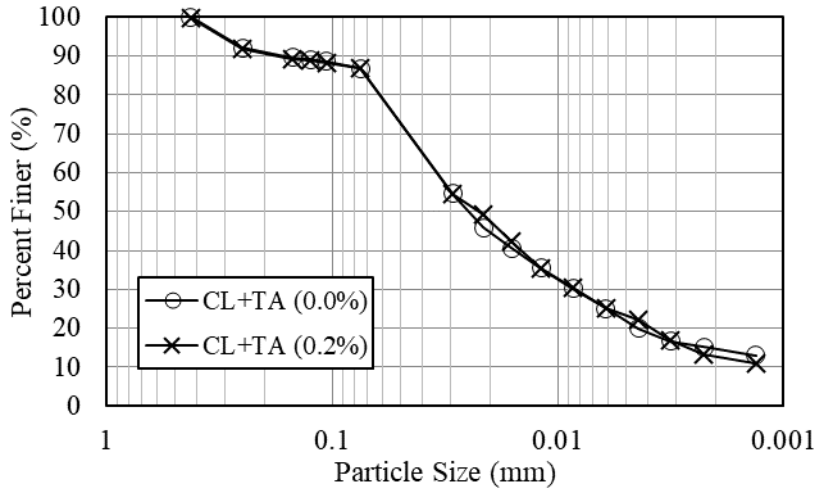

Figure 5.2. Particle size distribution of fabricated organic soils (0.0 % and 0.2 % tannic acid)

Two types of natural organic soil from Wildwood, FL (NOS1) and Boston, MA (NOS2) were stabilized by cement and tested after curing to validate the strength-predicting correlation derived from cement-stabilized FOS test results. To secure the homogeneity of the soils and remove large size gravel and wood pieces, the soils were sieved pass through a #4 sieve and homogenized with a shovel. This task was conducted as quickly as possible to minimize moisture loss and oxidization. The water content, organic content, and specific gravity of NOS1 and NOS2 after the homogenization are shown in Table 5.2.

Table 5.2. Properties of natural organic soils

	NOS1	NOS2
Water content (%)	11.2	54.2
Organic content (%)	2.97	5.48
Specific gravity	2.56	2.52

Typical tap water and a commercially available Quikrete Portland Cement Type I/II were used in this study. Cement in a bag was passed through the #10 sieve to remove lumps of cement before being used.

5.3.2. Specimen preparation

This research followed the mixing and sample preparation process used described by Ju (2019) and Nevarez-Garibaldi et al. (2018). For fabricated organic soil (FOS) mixing, dried components of silica flour, kaolin, fine sand, bentonite and tannic acid were placed into a U.S. Stoneware High-Alumina Ceramic jar (1.5 gallons) and thoroughly mixed by a U.S. Stoneware 775RMV Jar Mill. The dried FOS was recovered from the mill and mixed with water achieving the target water content. The mixing was conducted by a Hobart Legacy HL 120 Kitchen Mixer equipped with a dough hook for 5 minutes in addition to 3-4 times manual mixing during the 5 minutes of mechanical mixing. The purpose of the manual mixing was to scrape soil from the bowl surface and the dough hook to the center of the bowl for thorough mixing. The prepared moist FOS was transferred to a sealed plastic container and placed in a humidity-controlled room overnight for clay hydration.

For soil-cement mixing, organic soil (FOS, NOS1, or NOS2) was moved to the mixing bowl and mixed with a cement-water slurry by the kitchen mixer for 10 minutes. The cement-water slurry was prepared using an Oster-14 speed blender for 3 minutes. 3-4 times manual mixing was also conducted during the 10 minutes of mechanical mixing as done in the base soil mixing for FOS. The thoroughly mixed cement-stabilized organic soil mixture was placed into a 50-mm diameter by 100-mm tall cylindrical plastic mold. The mixture filled the mold in three lifts, and air bubbles were pulled out from the mixture by tapping the mold against a hard flat surface after placing each lift. After removing the excess mixture and leveling the surface of the top lift using a straight edge, the mold was covered by a plastic lid and sealed tightly with electric tape. The preparation of 10 samples per batch after the completion of mixing was completed within 30 minutes to minimize the mixture hardening before placing samples into the curing condition. The prepared samples were placed in plastic containers of water in the humidity-controlled room at room temperature and cured for desired time.

5.3.3. Strength tests

After desired curing time, an unconfined compressive strength (UCS) test was conducted on the majority of samples in accordance with ASTM D2166 (ASTM 2016a). A sample was taken out from the plastic mold by cutting the bottom of the mold with a miter saw and then pushing the sample from the bottom to the top. The top and bottom surfaces of the extracted sample were ground by a Vinci Technologies end face grinder to have flat and parallel end surfaces. Then, the UCS of a sample was tested by a GEOTAC Sigma-1 Automated Load Test System at a strain rate of 1% per minute. A laboratory miniature vane shear test was performed following ASTM D4648 (ASTM 2016b) on samples that were too weak to stand on their own for the UCS test or were prone to get damaged during the sample extraction for the UCS test. After the plastic lid and electric tape were removed the cured sample in the mold was tested using a 12.7mm x 12.7mm vane and spring 1.

5.3.4. Thermogravimetric analysis (TGA)

For thermogravimetric analysis (TGA), cement-stabilized fabricated organic soil (FOS) with tannic concentrations of 0.00, 0.25, and 0.50 % were prepared and cured for 7, 14, 21, and 28 days. The mixture proportion for TGA was $\alpha_{in\text{-}place}$ of 350 kg/m3 and w:c of 0.6. After the curing, a sample was extracted from the cylindrical plastic mold and crushed and powdered. The TGA was conducted with a TGA 5500 from TA Instruments, heating the samples up to 800 °C at a heating rate of 10 °C/min under a nitrogen gas atmosphere. The TGA data were collected from six identical samples to minimize potential errors due to the small amount of TGA samples.

The content of the calcium hydroxide, $Ca(OH)_2$, was calculated at 400 – 500 °C because it decomposes at that temperature range (Pham et al. 2017; Scrivener et al. 2018). Other materials in the sample such as tannic acid, and bentonite also decompose at 400 – 500 °C. However, the differences in their contents between samples with different tannic acid concentrations and curing times are negligible because the difference in tannic acid amount in samples is very small and the amount of bentonite is almost constant.

Therefore, any change in mass loss at 400 – 500 °C corresponds predominately to the amount of $Ca(OH)_2$ in the sample.

5.3.5. Testing program

The water-to-cement ratio of the slurry (w:c) and the cement factor in-place ($\alpha_{in\text{-}place}$) were selected as the mix designs controlling parameters. The w:c is defined as the weight ratio of water in the slurry to the cement, and $\alpha_{in\text{-}place}$ is defined as the weight of cement divided by the volume of the mixture.

The mix designs for cement-stabilized fabricated organic soil (FOS) are shown in Table 5.3. The concentration of tannic acid (TA%) is defined as the dry weight of tannic acid divided by the total dry weight of base soil components (silica flour, kaolin, fine sand, bentonite, and tannic acid). For 24 batches among the total of 34 batches, a pair of samples were tested at 3, 7, 14, and 28 days of curing time, and the remaining two samples were left as extras.

Table 5.3. Testing program for cement-stabilized fabricated organic soil (FOS)

w:c	$\alpha_{in\text{-}place}$ (kg/m^3)	TA%	Number of batches
0.6	200	0.025, 0.05, 0.1, 0.15, 0.2, 0.25	6
	250	0.25	1
	275	0.2	1
	300	0.25	1
	350	0.1, 0.2, 0.25, 0.3, 0.38	5
	400	0.3	1
	450	0.3	1
1.0	125	0.2	1
	200	0.2, <u>0.225</u>, <u>0.25</u>	3
	275	0.2	1
	350	0.2, <u>0.25</u>, <u>0.3</u>, <u>0.35</u>	4
1.4	100	0.2	1
	125	0.2, <u>0.225</u>, <u>0.25</u>	3
	200	0.2	1
	275	0.2, <u>0.23</u>, <u>0.26</u>, <u>0.3</u>	4
Total number of batches			34

Note: Batches with underlined TA% tested at 3, 7, 10, 14, 17, 21, 24, and 28 days, and a pair of samples were tested only at 7 and 28 days of curing.

A total of 26 batches of cement-stabilized natural organic soil using NOS1 (13 batches) and NOS2 (13 batches) were prepared for the strength-predicting correlation validation. Table 5.4 provides the mix designs for NOS1 and NOS2 treated by cement. Out of the 13 batches for each soil, 10 batches were made initially, and strength tests on a pair of cured samples were performed after 3, 7, 14, and 28 days of curing.

Table 5.4. Test program for cement-stabilized natural organic soil (NOS1 and NOS2)

w:c	$\alpha_{in\text{-}place}$ (kg/m^3)
0.6	<u>125</u>
	200
	275
	350
1.0	<u>50</u>
	125
	200
	275
	350
1.4	<u>50</u>
	125
	200
	275
Total number of batches	13

Note: Batches with underlined $\alpha_{in\text{-}place}$ were tested at 1, 3, 7, 10, 14, 17, 21, 24, and 28 days, and the remaining one sample was left as an extra.

5.3.6. Bootstrapping

To evaluate the robustness of a strength-predicting correlation derived based on experimental data, repeating multiple times of sample batch preparations and tests is ideal, which is time-consuming and costly. Instead, bootstrapping that randomly selects data with replacement from the available data (resampling) with 10,000 of repetitions was used to analyze the uncertainty of the coefficients in the strength-predicting correlation derived in this research. The batch data was randomly selected as a calibration set, and the coefficients in the correlation were obtained by using a least squares regression. After collecting 10,000 sets of coefficients, the mean, standard deviation, 95% confidence intervals of the coefficients were determined along with the correlation matrix of the coefficients.

5.4. Test Results and Discussion

5.4.1. Strength development of cement-stabilized fabricated organic soil (FOS)

Figure 5.3 presents the strength of cement-stabilized fabricated organic soil (FOS) at various tannic acid concentrations (TA) with the mix design of $\alpha_{in\text{-}place}$ = 275 kg/m^3 and w:c = 1.4. The strength of mixture with TA = 0.30% from 3 to 10 days were measured by miniature vane shear test. The strength test data of cement-stabilized lean clay without tannic acid (TA = 0.0%) from Nevarez-Garibaldi et al. (2018) is included in Figure 5.3 as a reference group. The UCS increases as curing time, while it decreases as the TA % increases. The strength development trend with the curing time for the mixtures with TA = 0.20, 0.23, and 0.26% are almost the same each other after 7 days. However, at 3 days, the UCS of TA = 0.26% is very low (0.02 MPa), and it increases rapidly between 3 and 7 days. On the other hand, the mixture with TA = 0.30% shows a significant increase in strength after 10 days and achieves a similar strength with other mixtures at 28 days. Figure 5.3 indicates that tannic acid hinders the strength development of cement-stabilized soil. Its negative effect is more significant when the TA is high but becomes less significant as curing time increases. The findings from Figure 5.3 are consistent with the test results of the cement-water slurry mixture with tannic acid from our preliminary research (Ju et al. 2022). This implies that tannic acid plays a role as a strength development retarder in cement-treated soil, and the selection of tannic acid to represent organic matter in soil with a negative effect on the strength of cement-stabilized soil is reasonable.

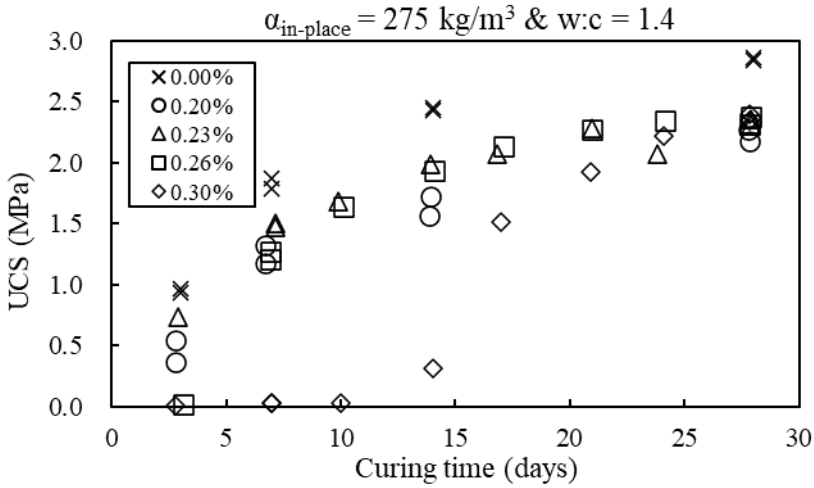

Figure 5.3. UCS test results of cement-stabilized fabricated organic soil (FOS)

A threshold where the organic soil improved by cement offsets the strength detrimental effect of organic matter can be defined by the curing time, the amount of cement (e.g., $\alpha_{in\text{-}place}$), or the organic content of the soil. In Figure 5.3, the curing time threshold for the cement-stabilized FOS with TA = 0.26% is between 3 and 7 days. The threshold of curing time for the mixtures with TA less than 0.26 is less than 3 days, while that for the mixture with TA = 0.30% is between 10 and 14 days.

Figures 5.4a) and 5.4b) show the changes in the average of $Ca(OH)_2$ weight loss from thermogravimetric analysis (TGA) with curing time and UCS test results of the corresponding samples, respectively. Each point in Figure 5.4a) is an average of six TGA runs, and error bars represent standard deviation. The amount of $Ca(OH)_2$ and UCS increases as curing time increases and TA% decreases. The fact that the low amount of $Ca(OH)_2$ from a sample with high TA% implies that tannic acid in cement-stabilized FOS consumes the calcium ions (Ca^{2+}) and hinders the formation of $Ca(OH)_2$ thereby reducing the UCS. However, the differences in the amount of $Ca(OH)_2$ and UCS between samples with TA = 0.00 and 0.25% decrease with time as can be seen in Figure 5.4. On the other hand, the increases in both the amount of $Ca(OH)_2$ and UCS of cement-stabilized FOS with TA = 0.50% are negligible even after the 28 days of curing. This indicates that with the mixture proportion of $\alpha_{in\text{-}place}$ = 350 kg/m^3 & w:c = 0.6, the mixture with TA = 0.50%

does not exceed its threshold of curing time until 28 days. The TGA results imply that the negative effect of tannic acid on the strength by consuming Ca^{2+} weakens over time.

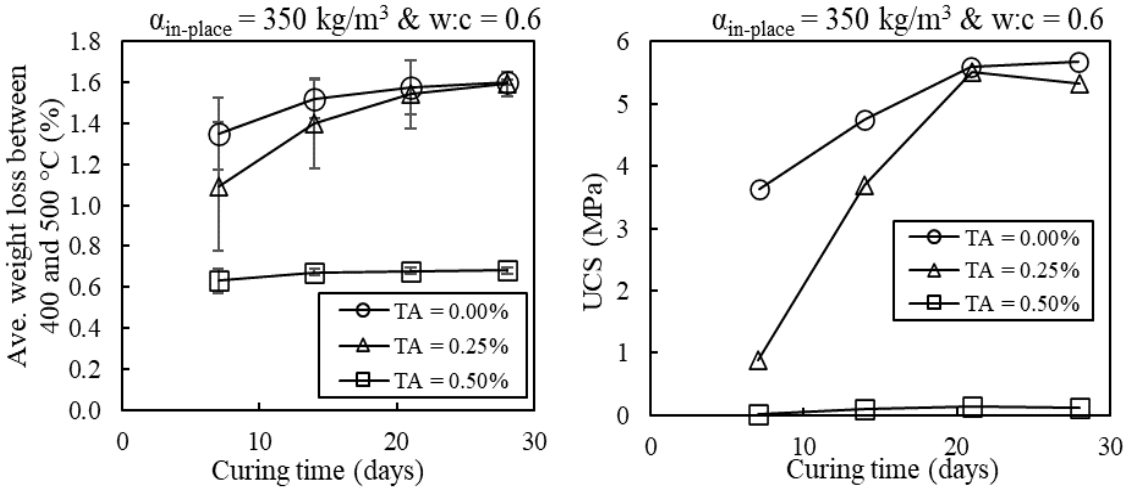

Figure 5.4. Test results of cement-stabilized fabricated organic soil (FOS) a) TGA and b) UCS

In Figure 5.3, the UCS versus curing time plot for cement-stabilized fabricated organic soil (FOS) with varying TA, the UCS of mixture with TA = 0.30% is very low (less than 0.04 MPa) until 10 days, but it starts to increase at 14 days (0.3 MPa). Between 14 and 17 days, the UCS remarkably increases, and the strength development tapers off from 17 to 28 days. This observation suggests that the relationship between curing time and UCS of cement-stabilized organic soil follows an S-shape curve (initial slow growth, rapid growth, late-stage slow growth, and no growth). The strength development trend of other mixtures in Figure 5.3 also can be explained by the S-shape of curing time-UCS curves. The UCS of the mixtures with TA less than or equal to 0.26% might be low initially but increase significantly when cured for a time of slightly less than 3 days showing the initial slow growth and rapid growth stages of the S-shape curve. After 3 days, the increase in UCS bates until 28 days (late-stage slow growth). It is expected that the UCS will stop increasing sometime after 28 days (no growth). The other cement-stabilized FOS not presented in Figure 5.3 also showed an S-shape curve in the curing time-UCS relationship.

An S-shape curve of data is a very common phenomenon over almost all areas in cumulative progress such as cumulative costs, biological population growths, and chemical reactions (Bejan and Lorente 2011). In geotechnical engineering, S-curves can be found commonly in particle size distribution (Chang et al. 2019; Ju 2019; Nevarez-Garibaldi et al. 2018) and one-dimensional compression behavior (Bobet et al. 2011; Hebib and Farrell 2003; Lemos et al. 2020; Locat et al. 1996; Venda Oliveira et al. 2012).

5.4.2. Strength-predicting correlation for cement-stabilized organic soil

The logistic function (Equation 5.1) that describes an S-curve was selected to derive a strength-predicting correlation for cement-stabilized organic soil because it is simple and common. In the logistic function, the coefficient L is the curve's maximum, k is the logistic growth rate or steepness of the curve, and x_0 is the x value of the S-curve's midpoint.

$$f(x) = \frac{L}{1 + e^{-k(x - x_0)}} \qquad \textit{Equation 5.1}$$

The logistic function for the strength of cement-stabilized organic soil is Equation 5.2. In Equation 5.2, UCS_{pred} is the predicted unconfined compressive strength (UCS), and it is normalized by the atmospheric pressure P_a. The ratio of t/t_0 is the curing time in days (t) normalized by a reference time (t_0) of one day.

$$\frac{UCS_{pred}}{P_a} = \frac{L}{1 + e^{-k\left(\frac{t}{t_0} - x_0\right)}} \qquad \textit{Equation 5.2}$$

The coefficients L, k, and x_0 in Equation 5.2 for cement-stabilized fabricated organic soil (FOS) batches were individually determined by a least-squares regression. Figure 5.5 shows the good agreements between measured UCS and predicted UCS using Equation

5.2 and L, k, and x_0 values of some representative batches as examples. The S-shape curves in the curing time-predicted UCS plots can be seen in Figure 5.5.

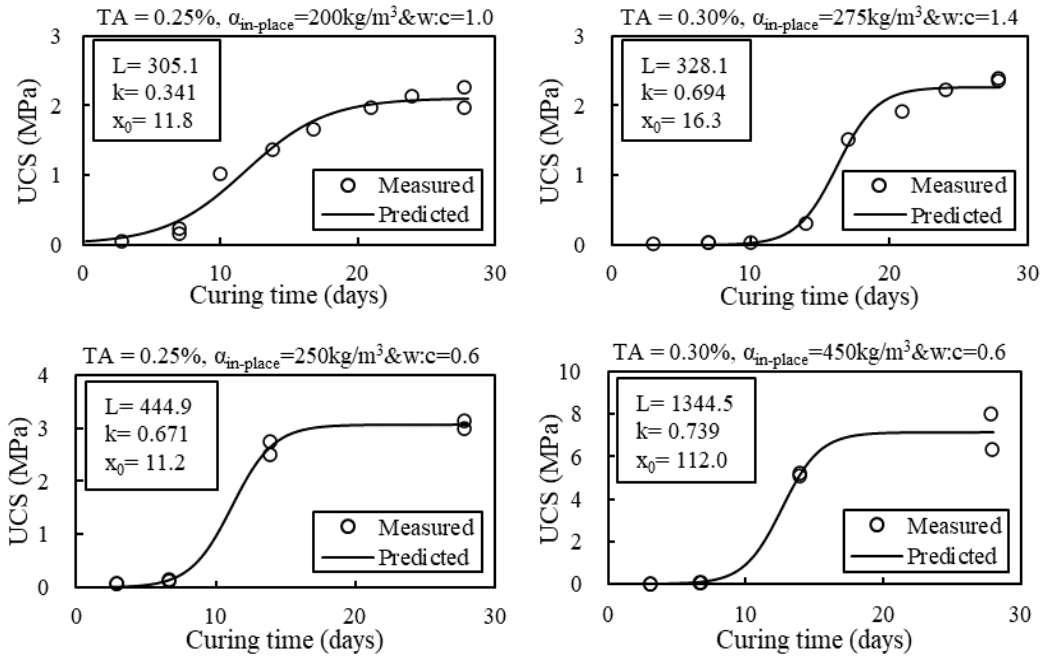

Figure 5.5. Relationship between measured/predicted UCS by Equation 5.2 with curing time

To account for the influences of organic matter and mix design on the strength of cement-stabilized organic soil, the coefficients L, k, and x_0 were assumed to be functions of weight ratios of the mixture components; the weight ratios of tannic acid (organic matter) to cement (T/C), tannic acid to water (T/W), and tannic acid to soil solid (T/S). The obtained coefficients of each batch were plotted against the weight ratios of corresponding batches to approximate the three coefficients as a function of the three weight ratios, resulting in nine relationships. Figure 5.6 shows the relationship between the coefficient L and the weight ratio of T/C as an example. The coefficient L and the weight ratio of T/C have an exponential relationship. Using the obtained relationships, the equations for L, k, and x_0 as a function of T/C, T/W, and T/S were derived. Between all possible alternatives, Equations 5.3, 5.4, and 5.5 produced the highest R^2 values and were selected as the equations for the coefficients L, k, and x_0.

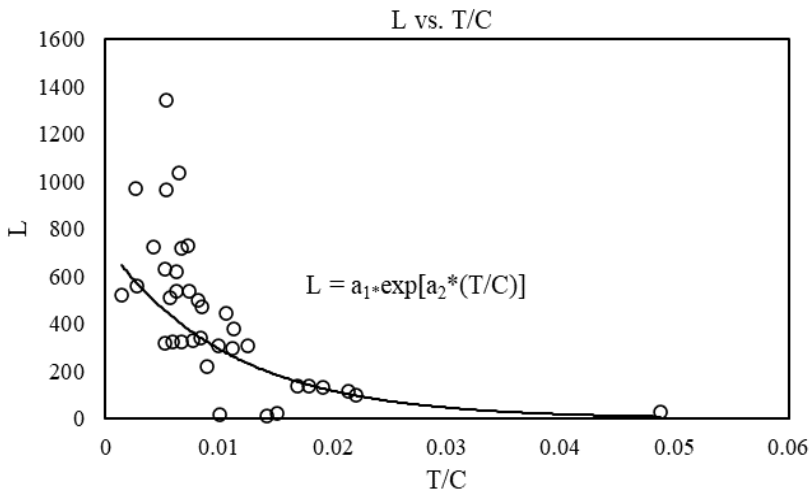

Figure 5.6. Relationship between the coefficient L and the corresponding weight ratio of T/C

$$L = b_1 * exp\left[b_2 * \left(\frac{T}{C}\right)\right] * \left[\left(\frac{T}{W}\right)\right] \qquad \textit{Equation 5.2}$$

$$k = \left[b_3 * \left(\frac{T}{W}\right)^{b_4}\right] + \left[b_5 * \left(\frac{T}{S}\right)^{b_6}\right] \qquad \textit{Equation 5.3}$$

$$x_0 = b_7 * \left[\left(\frac{T}{C}\right)^{b_8}\right] * \left[\left(\frac{T}{W}\right)^{b_9}\right] * \left[\left(\frac{T}{S}\right)^{b_{10}}\right] \qquad \textit{Equation 5.4}$$

where, b_1 to b_{10} are dimensionless coefficients. Finally, Equations 5.3, 5.4, and 5.5, were substituted into Equation 5.2. The derived strength-predicting correlation for cement-stabilized organic soil is shown in Equation 5.6. For cement-stabilized FOS, the parameter T is the weight of tannic acid (organic matter) added to the mixture. However, T for cement-stabilized natural organic soil can be calculated by multiplying the soil's organic content and the weight of the soil because the organic content of natural organic soil is constant.

$$\frac{UCS_{pred}}{P_a} = \frac{b_1 * exp\left[b_2 * \left(\frac{T}{C}\right)\right] * \left[\left(\frac{T}{W}\right)\right]}{1 + e^{-\left[\left[b_3 * \left(\frac{T}{W}\right)^{b_4}\right] + \left[b_5 * \left(\frac{T}{S}\right)^{b_6}\right]\right]\left(t - \left[b_7 * \left[\left(\frac{T}{C}\right)^{b_8}\right] * \left[\left(\frac{T}{W}\right)^{b_9}\right] * \left[\left(\frac{T}{S}\right)^{b_{10}}\right]\right]\right)}} \qquad \textit{Equation 5.5}$$

5.4.3. Validation of the strength-predicting correlation

The validation of Equation 5.6 using the cement-stabilized fabricated organic soil (FOS) is done by the following steps: (1) Choose a calibration data set including wide ranges of curing times, mix designs, and tannic acid concentrations and a validation data set, the remaining data after choosing the calibration data set; (2) Obtain the best coefficients of b_1 to b_{10} for the calibration data set using a least squares regression; (3) Predict the strength of validation data set using the coefficient in step 2; and (4) Compare the predicted strength in step 3 with the measured strength.

Table 5.5 lists the cement-stabilized FOS batches selected as the calibration data set the validation data set. The coefficient values determined by the calibration data set are in Table 5.6, and the relationships between the measured UCS (UCS_{meas}) and predicted UCS (UCS_{pred}) by Equation 5.6 using the coefficients in Table 5.6 for the calibration data set and validation data set are presented in Figure 5.7. It is obvious that the strength prediction quality of the calibration data set (R^2 = 0.88) is higher than that of the validation data set (R^2 = 0.77). However, Equation 5.6 also produces a good agreement between the measured and predicted UCS for the validation data set.

Table 5.5. Cement-stabilized fabricated organic soil (FOS) batch information for validation of Equation 5.6

w:c	$\alpha_{in\text{-}place}$ (kg/m^3)	TA% - Calibration data set	TA% - Validation data set
0.6	200	0.025, 0.25	0.05, 0.1, 0.15, 0.2
	250		0.25
	275	0.2	
	300		0.25
	350	0.1, 0.38	0.2, 0.25, 0.3
	400		0.3
	450	0.3	
1.0	125	0.2	
	200	0.225	0.2, 0.25
	275		0.2
	350	0.2, 0.35	0.25, 0.3
1.4	100	0.2	
	125	0.225	0.2, 0.25
	200		0.2
	275	0.2, 0.3	0.23, 0.26
Total number of batches		14	20

Table 5.6. Coefficient values for calibration data set using Equation 5.6

Coefficient	b_1	b_2	b_3	b_4	b_5
Value	1.50E+06	-330.3	5.84E+13	5.80	1.19E-03
Coefficient	b_6	b_7	b_8	b_9	b_{10}
Value	-0.561	1.04E+08	0.546	-0.733	2.95

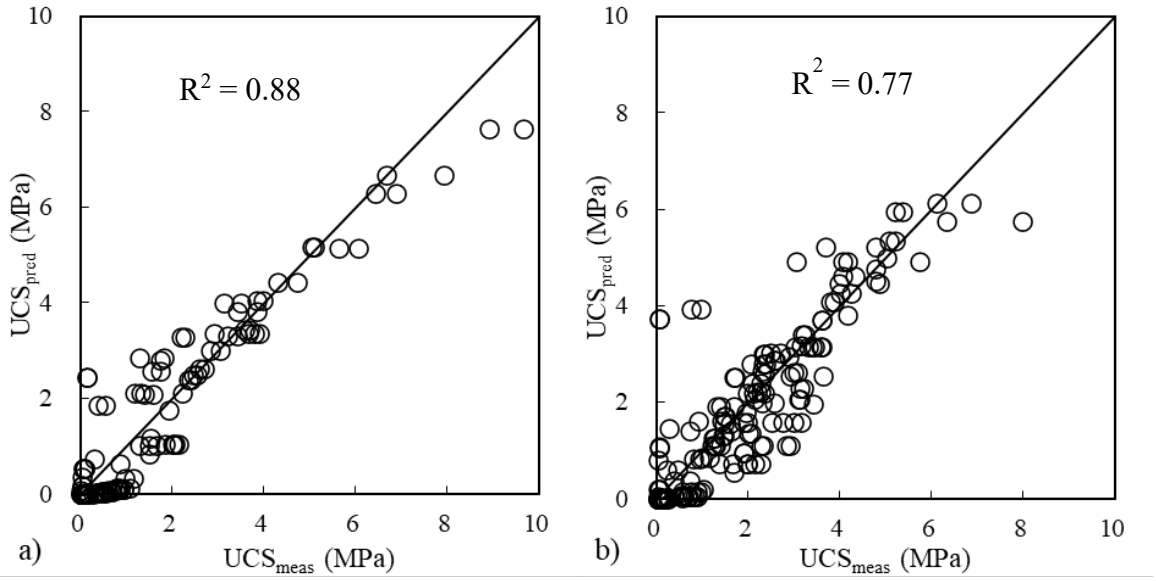

Figure 5.7. Relationships between UCS_{meas} and UCS_{pred} by Equation 5.6 using coefficients in Table 5.6 a) calibration data set and b) validation data set

Although Equation 5.6 is validated by the experiment data of cement-stabilized FOS, it is of practical importance to test the applicability of the correlation to cement-stabilized natural organic soils so that the correlation can be practically used in a wet method of deep mixing project in the field. UCS tests were conducted on two types of cement-stabilized natural organic soils (NOS1 and NOS2), and the test results are shown in Figure 5.8.

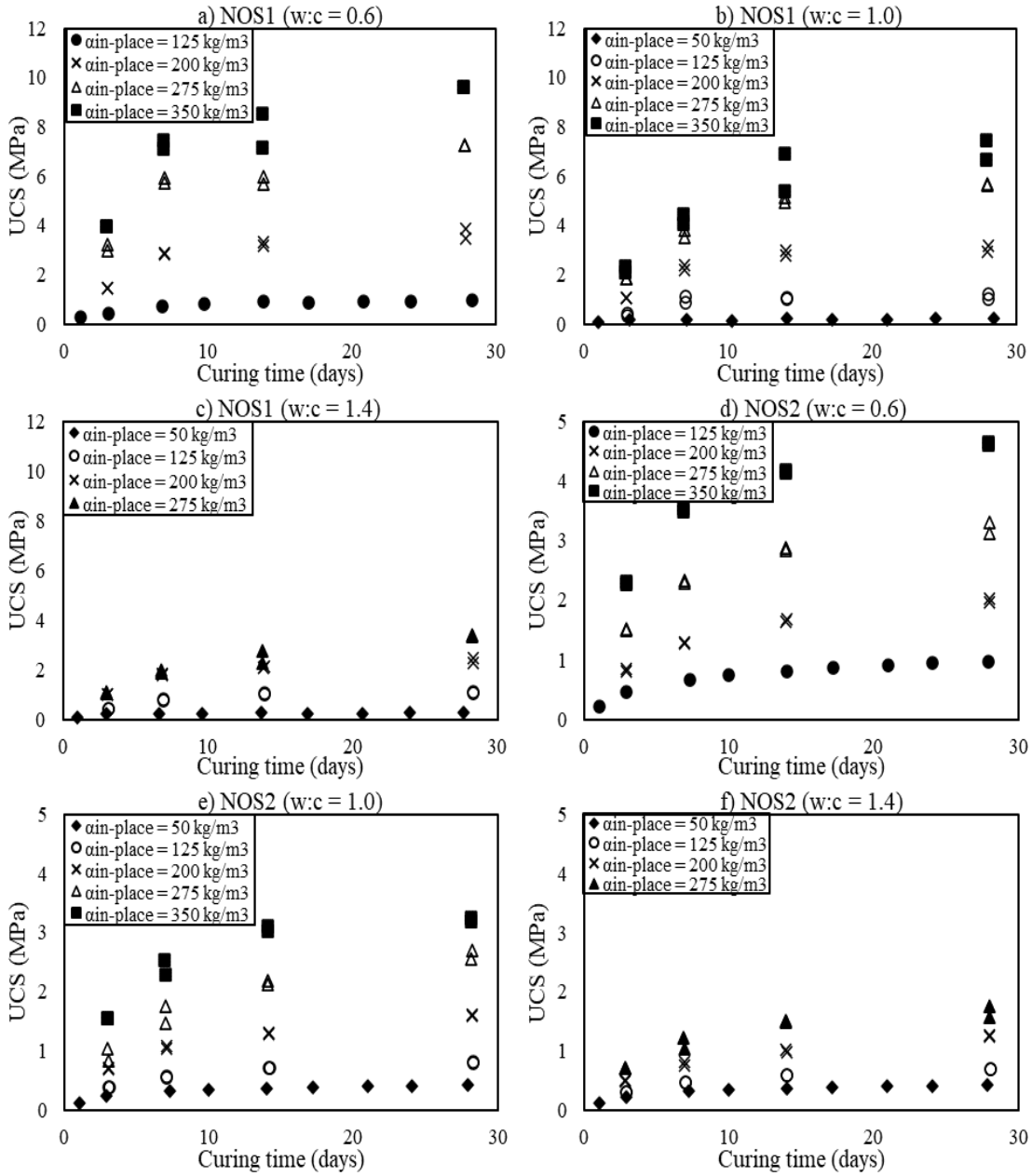

Figure 5.8. UCS test results of cement-stabilized natural organic soils
a) ~ c) NOS1 and d) ~ f) NOS2

The validation process followed the same steps as the validation using the cement-stabilized FOS data. Among the 13 batches in total, six batches, two batches from different w:c values (filled symbols in Figure 5.8), were selected as a calibration data set for each soil. The left seven batches were used as the validation data set. The coefficient values for cement-stabilized NOS1 and NOS2 determined by using their calibration data

set are provided in Table 5.7, and the relationships between the UCS_{meas} and UCS_{pred} by Equation 5.6 using the coefficients in Table 5.7 for the calibration and validation data set are presented in Figure 5.9.

Table 5.7. Coefficient values for calibration data set of cement-stabilized natural organic soils using Equation 5.6

NOS1	Coefficient	b_1	b_2	b_3	b_4	b_5
	Value	2684.8	-10.7	31.1	0.020	-20688.0
	Coefficient	b_6	b_7	b_8	b_9	b_{10}
	Value	1.88	0.36	1.71	-2.25	-0.26
NOS2	Coefficient	b_1	b_2	b_3	b_4	b_5
	Value	1376.8	-6.26	13.9	0.022	-33.6
	Coefficient	b_6	b_7	b_8	b_9	b_{10}
	Value	0.34	5.75E-07	4.90	-11.8	2.99

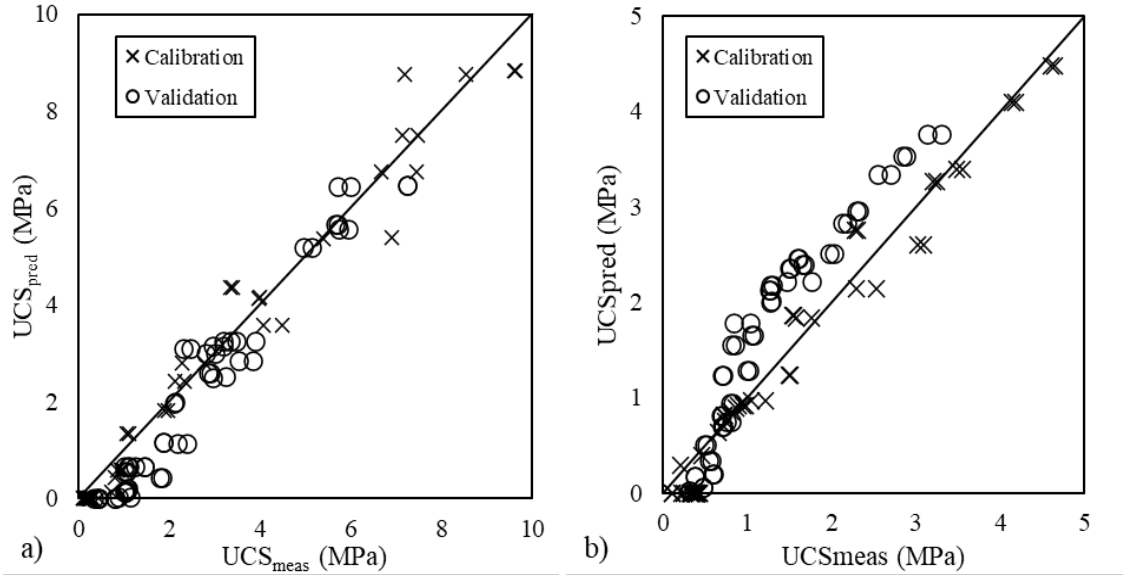

Figure 5.9. Relationships between UCS_{meas} and UCS_{pred} by Equation 5.6 using coefficients in Table 5.7 for cement-stabilized natural organic soils a) NOS1 and b) NOS2

The R^2 values of calibration and validation data sets for cement-stabilized NOS1 are 0.97 and 0.90, respectively, while those for NOS2 are 0.96 and 0.72, respectively. Equation

5.6 produces a better prediction result for cement-stabilized NOS1 than for NOS2 in validation. In Figure 5.9a), Equation 5.6 underpredicts the strength of cement-stabilized NOS1 when the UCS_{meas} is less than 3 MPa. On the other hand, Equation 5.6 tends to underpredict the strength of cement-stabilized NOS2 when the UCS_{meas} is less than 0.6 MPa, while it overpredicts the strength if it is greater than 0.6 MPa as shown in Figure 5.9b). However, Equation 5.6 provides overall good agreements between the UCS_{meas} and UCS_{pred} for both cement-stabilized natural organic soils.

The uncertainties of the coefficients in Equation 5.6 for cement-stabilized FOS, NOS1, and NOS2 were analyzed by using bootstrapping. From the test results, a calibration set (14 batches for FOS and 6 batches for NOS1 and NOS2) was randomly selected, and the remaining batches were used as a validation set (20 batches for FOS and 7 batches for NOS1 and NOS2). Table 5.8 shows the calibration batch selection criteria for the three cement-stabilized soils. The corresponding coefficients set for the selected calibration set were determined by least square regression and predicted UCS values of both calibration and validation sets were calculated using the coefficients from the calibration set. The R^2 value for the calibration set and validation set were also determined. After that, the coefficients set that produces R^2 values for both the calibration and validation sets greater than 0.5 was collected until the number of the coefficients sets is 10,000. If there is a coefficient that has a correlation greater than 0.9 or less than -0.9 with any other coefficient, the coefficient was fixed to its value in Tables 5.6 and 5.7 and bootstrapping was repeated until all the coefficients have a correlation between -0.9 and 0.9 with other coefficients. The mean, standard deviation (SD), and 95% confidence intervals (CI) of the coefficients for cement-stabilized FOS, NOS1, and NOS2 are presented in Table 5.9, and the correlation matrix of the coefficients is shown in Table 5.10.

Table 5.8. Calibration batch selection for cement-stabilized FOS, NOS1 and NOS 2

FOS		
w:c	$\alpha_{in\text{-}place}$ (kg/m^3) / TA %	Selected number of batches for calibration set
0.6	200 / 0.025, 0.05, 0.1, 0.15, 0.2, 0.25	2
	250 / 0.25, 275 / 0.2, 300 / 0.25	1
	350 / 0.1, 0.2, 0.25, 0.3, 0.38	2
	400 / 0.3, 450 / 0.3	1
1.0	125 / 0.2, 200 / 0.2, 0.225, 0.25, 275 / 0.2	2
	350 / 0.2, 0.25, 0.3, 0.35	2
1.4	100 / 0.2, 125 / 0.2, 0.225, 0.25, 200 / 0.2	2
	275 / 0.2, 0.23, 0.26, 0.3	2
Total		**14**
NOS1 and NOS2		
w:c	$\alpha_{in\text{-}place}$ (kg/m^3)	Selected number of batches for calibration set
0.6	125, 200, 275, 350	2
1.0	50, 125, 200, 275, 350	2
1.4	50, 125, 200, 275	2
Total		**6**

Table 5.9. Uncertainty of the coefficients in Equation 3.6

Coefficient	Mean	SD	CI	
			LB	UB
FOS				
b_2	-782	27.4	-807	-756
b_3	6.26E+11	3.32E+11	3.18E+11	9.33E+11
b_4	1.16E+09	1.41E+10	-1.19E+10	1.42E+10
b_5	1.86E+10	6.08E+10	-3.76E+10	7.49E+10
b_6	1197	20503	-17765	20159
b_7	2.61E+08	1.39E+09	-1.02E+09	1.54E+09
b_8	-0.0308	0.659	-0.640	0.578
NOS2				
b_2	-11.17	1.00	-12.4	-9.9
b_5	-4.71E+08	7.55E+09	-9.84E+09	8.90E+09
b_6	4.06E+08	1.30E+10	-1.58E+10	1.66E+10
b_7	4.53E+06	8.33E+07	-9.89E+07	1.08E+08
b_8	-1.88E+06	2.98E+07	-3.89E+07	3.51E+07
NOS2				
b_2	-7.12	0.420	-7.51	-6.73
b_3	62.7	893	-764	889
b_4	0.0447	0.296	-0.229	0.318
b_5	-32.1	11.7	-42.9	-21.3
b_6	0.329	0.116	0.221	0.436
b_7	0.00169	0.0216	-0.0183	0.0217
b_8	10.9	54.4	-39.4	61.2

Table 5.10. Correlation matrix of the coefficients in Equation 5.6

FOS	b_2	b_3	b_4	b_5	b_6	b_7	b_8
b_2	1.0000	0.0525	0.1166	-0.1111	0.0063	-0.0319	-0.0101
b_3	0.0525	1.0000	-0.0104	-0.0388	0.0030	0.1392	0.1391
b_4	0.1166	-0.0104	1.0000	0.1106	-0.0048	-0.0088	-0.2176
b_5	-0.1111	-0.0388	0.1106	1.0000	-0.0179	-0.0254	-0.1596
b_6	0.0063	0.0030	-0.0048	-0.0179	1.0000	-0.0106	0.0000
b_7	-0.0319	0.1392	-0.0088	-0.0254	-0.0106	1.0000	0.3825
b_8	-0.0101	0.1391	-0.2176	-0.1596	0.0000	0.3825	1.0000
NOS2	b_2	b_5	b_6	b_7	b_8		
b_2	1.0000	0.0699	-0.0480	-0.0852	0.1029		
b_5	0.0699	1.0000	0.3729	0.0029	-0.0017		
b_6	-0.0480	0.3729	1.0000	-0.0017	0.0020		
b_7	-0.0852	0.0029	-0.0017	1.0000	-0.4703		
b_8	0.1029	-0.0017	0.0020	-0.4703	1.0000		
NOS2	b_2	b_3	b_4	b_5	b_6	b_7	b_8
b_2	1.0000	0.0250	-0.0017	0.0106	-0.0085	0.0135	-0.1144
b_3	0.0250	1.0000	0.7786	0.1493	0.8446	-0.0051	-0.0058
b_4	-0.0017	0.7786	1.0000	0.2819	0.8684	0.0137	-0.0078
b_5	0.0106	0.1493	0.2819	1.0000	-0.1298	0.1662	0.0009
b_6	-0.0085	0.8446	0.8684	-0.1298	1.0000	-0.1016	0.0011
b_7	0.0135	-0.0051	0.0137	0.1662	-0.1016	1.0000	0.0015
b_8	-0.1144	-0.0058	-0.0078	0.0009	0.0011	0.0015	1.0000

Equation 5.6 has been validated against the experimental test results of the three different types of cement-stabilized organic soils. Therefore, the proposed strength-predicting correlation for cement-stabilized organic soil (Equation 5.6) can be practically used to predict the strength of organic soil improved by cement in a wet method of deep mixing project that treats organic soil.

5.5. Conclusion

In this study, cement-stabilized organic soils were tested to investigate the influence of organic matter on the strength of cement-stabilized organic soil. Unconfined compressive strength (UCS) test results showed that organic matter in soil hinders the strength

development of cement-stabilized soil. However, the negative effect of organic matter diminished with increasing curing time and the amount of cement added and decreasing organic matter concentration. Thermogravimetric analyses (TGA) result of cement-stabilized fabricated organic soil with tannic acid implied that tannic acid consumes the calcium ions in the mixture preventing the formation of calcium hydroxide thereby reducing the strength. From the UCS test results, an S-shape curve in the relationship between curing time and UCS was observed. Based on this idea, a strength-predicting correlation for cement-stabilized organic soil was derived by using the logistic function that describes an S-shape curve. The correlation is a function of the curing time and weight ratios of the mixture components. The correlation was validated against the experimental data of three different cement-stabilized organic soils. It produced a good fit between the measured and the predicted UCS for all tested cement-stabilized organic soils. Accordingly, the correlation is expected to be practically used in estimating the strength of cement-stabilized organic soil in a wet method of deep mixing project with a set of coefficients determined by regression analysis using a small number of sample batches.

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Chapter 6. Influence of Consolidation Stress and Drainage Conditions on the Strength of Cement-treated Soil

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6.1. Abstract

The deep mixing method is one of the popular ground improvement techniques that constructs cement-treated soil columns by blending in-situ soft soil with a cementitious binder. The improved soil column in the field is cured under confining pressure. In most laboratory research, however, the effect of curing stress is ignored. A new consolidation apparatus that allows applying vertical stress to cement-treated soil during curing was fabricated. Cement-treated soil samples with different mixture proportions were subjected to different curing stresses under single or double drainage conditions. After the consolidation and curing, the samples were tested by unconfined compressive strength (UCS) test or punch compression test. The findings from the test results indicated that the strength of cement-treated soil is affected by curing stress, mix proportion, and drainage conditions. The different drainage path lengths in a cement-treated soil sample under curing stress induced non-uniform strength distribution implying the importance of the effect of drainage path length.

6.2. Introduction

The deep mixing method that constructs binder-treated soil columns to improve the geotechnical properties of soft soil is one of the popular ground improvement techniques in many countries due to its rapid and large strength increase and wide range of applicability (Bruce et al. 2013; Kitazume and Terashi 2013). A commonly used binder for the deep mixing method is cement, and it is mixed with in-situ soft soil in a form of a cement-water slurry (wet method) or dry powder (dry method). Deep mixed cement-treated soil gains strength as time elapses, and there are many factors that affect the strength. For example, the curing time, curing temperature, and amount of cement increase the strength, while the organic matter in soil can decrease the strength (Babasaki et al. 1991; Bruce et al. 2013; Hodges et al. 2008; Ju 2019; Kitazume and Terashi 2013).
After soft soil is mixed with cement in the field, the cement-treated soil is cured under confining stresses (Onorato and Bonita 2021; Taiyab et al. 2012; Uchaipichat 2017; Yamamoto et al. 2002). Curing stress applied to a deep mixed column during the curing

is also an important factor in determining the engineering properties of cement-treated soil. However, the influence of curing stress has not been extensively investigated compared to other aforementioned factors. In addition, most cement-treated soil research carried out in the laboratory cured and tested their samples under atmospheric pressure ignoring the curing stress effect (Ju et al. 2022; Nevarez-Garibaldi et al. 2018; Tremblay et al. 2002; Zhang et al. 2014).

The strength of improved soil by deep mixing increases not only due to the cement hydration but also due to the curing stress. With increasing curing stress and cement content, the strength increases and the compressive strain at failure decreases irrespective of the curing time showing a brittle behavior. (Fatahi et al. 2012; Onorato and Bonita 2021; Shibi and Ohtsuka 2021; Skels et al. 2013; Starcher 2013; Suzuki et al. 2014; Taguchi et al. 2006; Taher et al. 2011; Taiyab et al. 2012; Yamamoto et al. 2002). The curing stress effect is more significant at a low cement content and in the early curing period, but its effect is generally less significant than the effect of cement content (Skels et al. 2013; Taiyab et al. 2012). The water in a cement-treated soil sample squeezes out from the sample due to the curing pressure (consolidation) reducing the volume and water content of the sample. The reduced water content due to the consolidation is one of the reasons for the high strength of a sample under curing stress (Shibi and Ohtsuka 2021; Taguchi et al. 2006). The effectiveness of curing stress is also influenced by the type of native soil. When soils are improved by cement and cured under curing stress, fine-grained soils generally have a greater increase in strength than granular soils (Onorato and Bonita 2021).

Despite promising findings by many researchers as introduced above, they mostly focused on the strength of a whole cement-treated soil sample without considering the effect of drainage conditions and drainage path length. In the presence of curing stress of cement-treated soil, it is clear that a sample with a double-drained condition loses more water than a sample under a single-drained condition. Additionally, the water in the sample near the drainage boundary is squeezed out easily, while the water far away from the drainage boundary cannot come out due to cement hardening over time. This results in non-uniform strength distribution of the sample. Based on this aspect, this study

investigates the effect of curing stress, drainage conditions, and drainage path length on the strength of cement-treated soil.

6.3. Experimental Methods

6.3.1. Materials

Cement-treated soil was prepared by mixing artificial soil, fat clay (CH), with cement-water slurry. The soil consists of silica flour (57%) kaolin (20%), bentonite (13%), and fine sand (10%). The index properties and particle size distribution are presented in Table 6.1 and Figure 6.1, respectively. For cement-water slurry, commercially available Portland Cement Type I/II and typical tap water were used. To eliminate cement chunks, cement was sieved by a #10 sieve (2.0 mm) before being used.

Table 6.1. Artificial fat clay index properties

Properties	Value
USCS classification	CH
Specific gravity, G_s	2.64
Liquid limit, LL	65
Plastic limit, PL	19
Plasticity index, PI	46
Water content, w (%)	65
Fines (%)	85.7

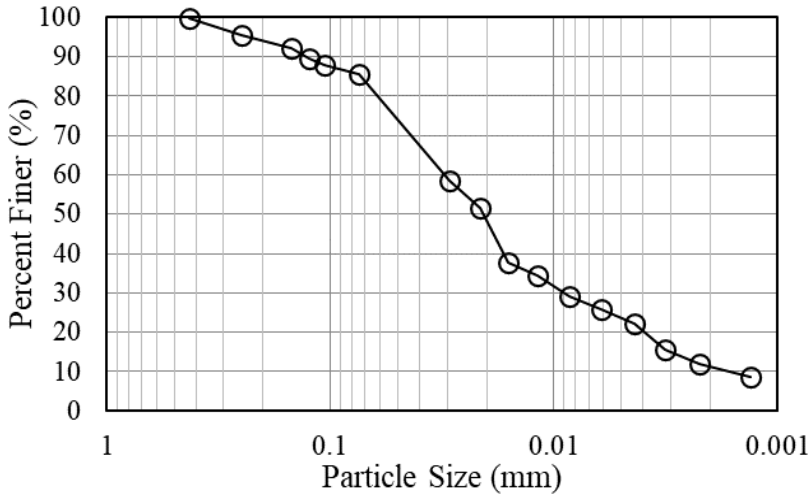

Figure 6.1. Particle size distribution of base soil

6.3.2. Cement-treated soil mixture preparation

To fabricate artificial fat clay, the dried clay components were thoroughly mixed by a jar mill for 10 minutes. Water was added to the clay components to achieve the target water content of 65%, which is the same as the liquid limit of the clay. They were mixed by a stand kitchen mixer for 5 minutes with additional 3-4 times of manual mixing that interrupted the mixing by the mixer in order to collect the soil on the inner surface of the bowl to the center. The homogeneously mixed moist soil was placed into a plastic container and sealed, then hydrated in a humidity room overnight. The next day, cement and water were blended with a commercial food blender for 3 minutes. The artificial clay and cement-water slurry were mixed together by the stand kitchen mixer for 10 minutes. Again, 3-4 times of manual mixing was performed for the same reason as the artificial clay fabrication.

6.3.3. Consolidation and curing

A new apparatus that allows applying vertical stress to a cement-treated soil sample during curing was developed. Figure 6.2 shows the schematic illustration of the apparatus (Figure 6.2.a) and a picture of the apparatus components (Figure 6.2.b). The apparatus consists of a pair of bottom supports with attached threaded rods and thread knobs, a bottom plate, a cylinder, a top cover, and a load cap. The diameter, height, and thickness

of the cylinder were 7.37 cm (2.9 inches), 25.4 cm (10 inches), and 0.76 cm (0.3 inches), respectively. Therefore, a cement-treated soil sample in this research had a diameter of 7.37 cm and an initial height of 25.4 cm. To prevent mixture leakage from the top and bottom of the cylinder, rubber gaskets were placed between the top cover and cylinder top and between the bottom plate and cylinder bottom. By tightening thread knobs, the apparatus axially compresses the top and bottom rubber gaskets securing mixture leakage prevention. Drainage conditions were controlled by inserting plug fittings into the bottom plate.

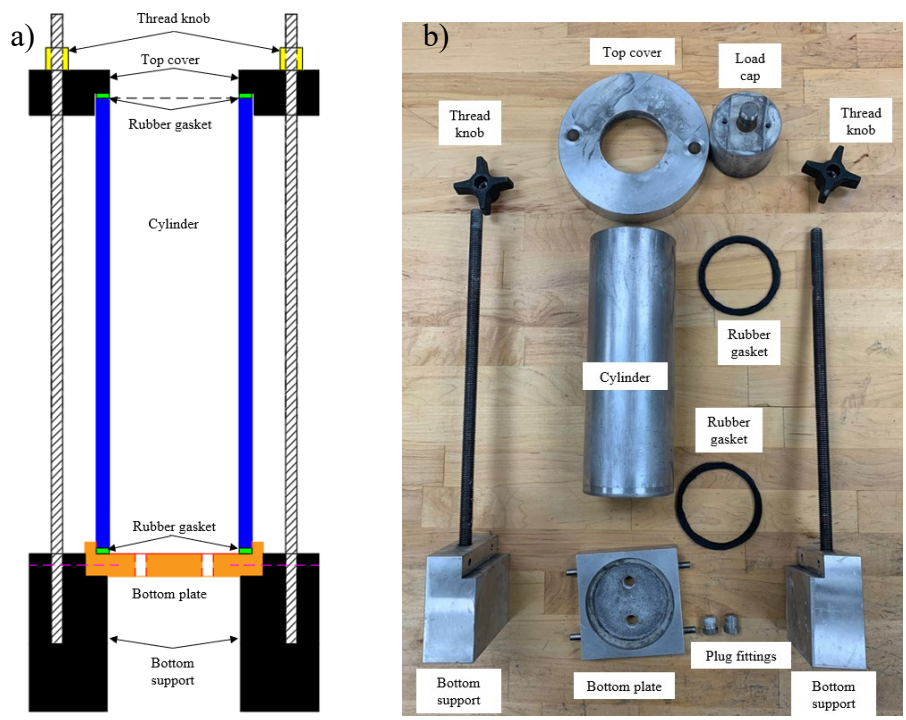

Figure 6.2. Consolidation and curing apparatus a) schematic illustration and b) apparatus components

The consolidation and curing setup was done by the following:

1) Apply vacuum grease to the inner surface of the cylinder to minimize friction with the cement-treated soil mixture so the applied load can be constant with depth. Another role of vacuum grease is to allow easy sample extraction after the consolidation and curing.

2) Fit a rubber gasket into the groove of the bottom plate and place a porous stone and filter paper. The holes in the bottom plate should be filled with plug fittings to prevent water leakage through the holes during sample molding.

3) Assemble the apparatus and tighten the thread knobs placing another rubber gasket between the cylinder top and the top cover.

4) Transfer the prepared cement-treated soil mixture into the cylinder in 5-6 lifts carefully. After each lift, tap the apparatus against a hard and flat surface to remove air bubbles in the mixture.

5) Remove the top cover and rubber gasket at the top and level the top surface of the sample eliminating the excess mixture and carefully preventing the mixture leakage from the bottom.

6) Place filter paper and a porous stone on the top of the sample and assemble the apparatus again.

7) Apply vacuum grease to the side of the load cap to minimize the friction with the inner surface of the cylinder and attach the load cap to a load test system.

8) Place the apparatus on a load test system.

9) Complete the setup as shown in Figure 6.3.

Figure 6.3. Consolidation and curing setup

Vertical stress was applied to the cement-treated soil sample. To avoid the sample mixture being squeezed out from the cylinder due to rapid loading, a ramp loading with a loading rate of 25 kPa/min was applied. For a curing stress of 50 kPa, for example, the stress was increased to 50 kPa in 2 minutes and then maintained at 50 kPa. For consolidation and curing under a double-drained condition, the plug fittings at the bottom plate were removed right before the sample is subjected to the loading. On the other hand, the plug fittings remained filling the bottom plate holes for a single-drained condition.

6.3.4. Sample extraction and strength tests

After the sample curing under curing stress for three days, the apparatus was taken down from the loading system and disassembled. The sample was extracted from the cylinder using a Shelby tube extruder. The extracted samples were tested by unconfined compressive strength (UCS) test or punch compression test.

The strength of a consolidated and cured sample was measured by the UCS test. The extracted sample was cut to have a height-to-diameter ratio between 2 and 2.5, and its top and bottom surfaces were trimmed by a wire saw level and parallel end surfaces. The UCS test was carried out in accordance with ASTM D2166 with a strain rate of 1% per minute. After the UCS test, the water contents of the top, middle, and bottom of the sample were measured.

After the sample extraction, a sample for the punch compression test was cut horizontally by a diamond saw to have five disk-shaped specimens with a minimum height of 2.54 cm (1 in). A 1.59 mm (2/32 inch) nail punch was attached to the wedge grip of a universal testing machine (MTS Insight 150 SL). The vertical load was applied to the top surface of a disk-shaped specimen through the nail punch with the test rate of 0.127 mm/s (0.005 in/s). The maximum applied vertical load at failure was measured. Figure 6.4 presents the punch compression test setup. After the tests, the water content of the specimen was measured.

Figure 6.4. Punch compression test setup

6.3.5. Testing program

In this research, the mixture proportion of cement-treated soil was controlled by two parameters, cement factor in-place ($\alpha_{in\text{-}place}$) and water-to-cement ratio of the slurry (w:c). $\alpha_{in\text{-}place}$ is the weight of cement divided by the volume of cement-treated soil mixture, and w:c is the weight ratio of water in the slurry to cement. The test program was established to investigate the influence of mixture proportion, drainage conditions, and curing stress on the strength of cement-treated soil. Two different mixture proportions with the same $\alpha_{in\text{-}place}$ of 350 kg/m^3 and different w:c of 0.6 and 1.0 were selected. Single and double drainage conditions were allowed by plug fittings at the bottom plate as mentioned previously. Two different vertical stresses of 50 and 100 kPa were applied to a sample using ramp loading. The effect of drainage path length was tested by using cement-treated soil with different mix proportions (w:c = 0.6 and 1.0) and the same curing stress and drainage conditions. Table 6.2 summarizes the details of the samples tested.

Table 6.2. Details of testing program

<table>
<tr><th>Sample ID</th><th>w:c</th><th>Curing stress (kPa)</th><th>Drainage conditions</th><th>Conducted test after 3 days</th></tr>
<tr><td>A</td><td>0.6</td><td rowspan="4">50</td><td rowspan="2">Single</td><td rowspan="6">UCS test</td></tr>
<tr><td>B</td><td>1.0</td></tr>
<tr><td>C</td><td>0.6</td><td rowspan="2">Double</td></tr>
<tr><td>D</td><td>1.0</td></tr>
<tr><td>E</td><td>1.0</td><td rowspan="4">100</td><td>Single</td></tr>
<tr><td>F</td><td>0.6</td><td>Double</td></tr>
<tr><td>G</td><td>0.6</td><td rowspan="2">Single</td><td rowspan="2">Punch compression test</td></tr>
<tr><td>H</td><td>1.0</td></tr>
</table>

6.4. Test Results and Discussion

6.4.1. Strength after the consolidation and curing

Figure 6.5 and Table 6.3 present the unconfined compressive strength (UCS) and water content of the cement-treated soil samples after the consolidation and curing. The water content values in Figure 6.5 and Table 6.3 are the average of the water contents from the top, middle, and bottom of samples. With a water-to-cement ratio of the slurry (w:c) of 0.6, the higher cement content, the UCS is higher, and the water content is lower than those of the samples with w:c of 1.0, regardless of drainage conditions. When curing stress is increased from 50 kPa to 100 kPa, the water content decreases under both single and double drainage conditions. On the other hand, the UCS increases with curing stress under a single drainage condition, while it decreases with increasing curing stress under a double drainage condition. This emphasizes the importance of drainage conditions. Depending on drainage conditions, the amount of water remaining in the cement-treated soil mixture to be used for the cement hydration reaction is different. With a single-drained condition, more water is squeezed out from Sample E (w:c = 1.0 and P = 100 kPa) than Sample B (w:c = 1.0 and P = 50 kPa) due to higher stress. But Sample E still has enough water to react with cement so it can have a higher UCS and lower water

content than Sample B. Under a double-drained condition, however, Sample F (w:c = 0.6 and P = 100 kPa) originally has less water than Sample E. Moreover, it loses more water than Sample C (w:c = 0.6 and P = 50 kPa) due to the higher stress. Therefore, not all cement particles can react with water causing a lower UCS than Sample D. The lower water content of Sample F than Sample C supports this idea. In the comparison between single and double drainage conditions, the water content of the samples with single drainage is greater than that of samples with double drainage because less water is expelled from a sample under the single-drained condition. The samples with double-drainage are weaker than the samples with single drainage due to the lack of water for the cement hydration reaction. However, further research is required to explain these trends more persuasively. Comparing the amount of cement hydration reaction products in the samples using thermogravimetric analysis (TGA) would support this idea and provide a more solid conclusion.

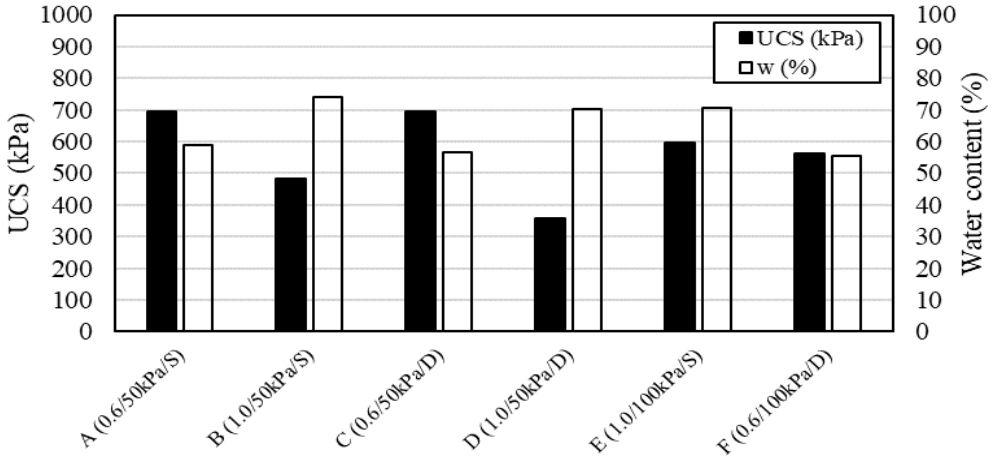

Figure 6.5. UCS and water content of cement-treated soil under cured under curing stress

Table 6.3. UCS and water content of cement-treated soil under cured under curing stress

		Single drainage		Double drainage	
		w:c		w:c	
UCS (kPa)		0.6	1.0	0.6	1.0
Curing stress, P (kPa)	50	695	484	693	358
	100	X	595	563	X
w (%)		0.6	1.0	0.6	1.0

Curing stress, P (kPa)	50	58.8	74.0	56.8	70.3
	100	X	70.7	55.3	X

6.4.2. Influence of drainage path length

Five disk-shaped specimens collected from a cement-treated soil sample subjected to a vertical stress with single drainage during curing were numbered 1 through 5, starting with specimens taken from the bottom of the sample. Figure 6.6 presents the punch compression test and water content test results. Instead of the measured maximum applied load and water content of specimens, Figure 6.6 shows the changes in the maximum applied load ratio and water content ratio. The ratios are defined as the measurement of each specimen divided by the largest value of the five specimen measurements. The reason for using the ratios is the test results of the two sets are not comparable because (1) the punch compression test is not a standardized test; (2) sample locations where a disk-shaped specimen was collected is not corresponding to the locations of the other sample; (3) some water was added to the specimens when the sample was cut by the diamond saw. Therefore, in Figure 6.6, only the strength and water content of specimens taken from the same cement-treated soil sample should be compared.

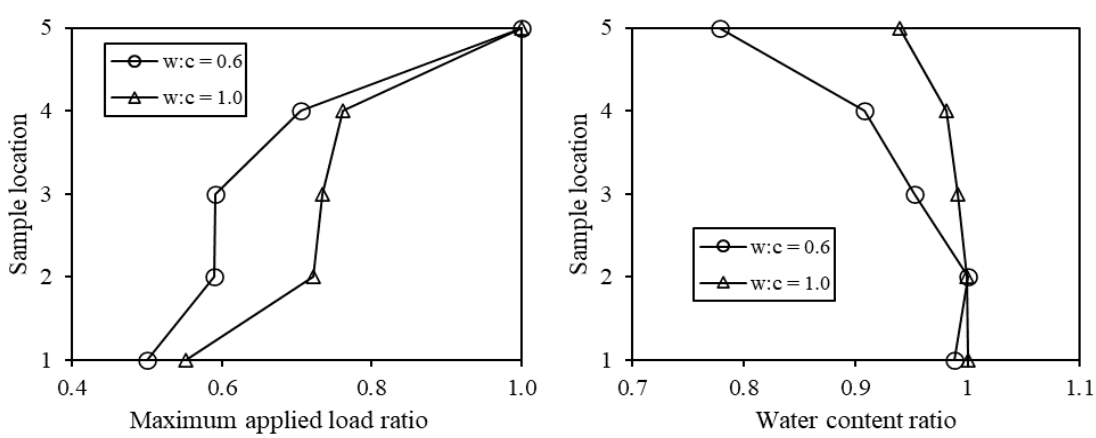

Figure 6.6. Punch compression test results a) maximum applied load ratio and 2) water content ratio

As shown in Figure 6.6, the maximum applied load ratio increases, while the water content ratio generally decreases as the drainage path length is getting shorter, i.e., the sample location number increases from 1 (bottom) to 5 (top). The difference in drainage path length results in non-uniform distributions of strength and water content. The water in specimen 5, near the drainage boundary, can be drained easily and quickly due to the short drainage path length resulting in lower water content and higher strength. On the other hand, at sample location 1, the water cannot move up to the drainage boundary easily because of cement hardening with time and a longer distance to the drainage boundary thereby having a higher water content and lower strength.

6.5. Conclusion

In this study, the influences of curing stress, drainage condition, and drainage path length on the strength of cement-treated soil were investigated. From the test results, the following key conclusions can be drawn:

- The strength of cement-treated soil subjected to curing stress increased with the amount of cement, irrespective of drainage conditions.
- When curing stress increases, the strength increases under a single-drained condition because of the lowered water content. However, the strength decreases with increasing curing stress under a double-drained condition because too much water is drained from the sample so not all cement particles in the sample can react with water. Further research using thermogravimetric analysis (TGA) to compare the amount of cement hydration products is required to advance this conclusion.
- With the same mix proportion and curing stress, a single drainage condition resulted in a higher strength of a sample than a double drainage condition. This also might be because the double drainage condition squeezed out too much water so not all the cement in the mixture can react with water.
- Depending on drainage path length, the strength and water content of the point of interest in a sample vary, and the strength distribution of the sample is not uniform. When the drainage path length is short, more water can be expelled from the sample resulting in higher strength and lower water content than other points where the

drainage path length is long.

6.6. Acknowledgments

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Chapter 7: Conclusions and Future Work

The primary objective of this work was to study the influence of strength-controlling factors of cement-treated soil for the wet method of deep mixing. The three tasks investigated the influences of (1) curing time and temperature, discussed in Chapters 2 and 3; (2) organic matter in the soil, discussed in Chapters 4 and 5; and (3) curing stress and drainage conditions, discussed in Chapter 6. Through the three tasks, this dissertation provided robust frameworks for quantitatively characterizing the influences of curing conditions and soil's organic matter on the strength of cement-treated soil. Also, proposed correlations can improve the reliability of strength predictions. Consequently, this research project contributes to reducing the required number of batches in the mixture proportion design of a deep mixing project thereby increasing the cost and time effectiveness of the project.

A summary of the findings presented in this dissertation are:

- The strength of cement-treated soil significantly depends on curing conditions. When a cement-treated soil sample is exposed to water during curing, it has a lower strength than a sample cured in a plastic mold. The lower strength of the sample exposed to water is due to increased water content. Although the difference in strengths between the two samples in different curing conditions was not significant, this tendency generally becomes more remarkable the longer the sample is exposed to water and the higher the curing temperature. This suggests that with the same mix design and curing time, a cement-treated soil sample that is cured under well-controlled curing conditions in the laboratory can be stronger than a cement-treated soil column in the field.
- At a non-freezing curing temperature (≥ 0 °C), the strength increases with increasing the amount of cement, curing time, and curing temperature, but the strength development due to time becomes less significant at late curing times. At a freezing curing temperature (< 0 °C), on the other hand, the cement hydration reaction is restricted due to the freezing temperature and insufficient water to react with cement because some of the water freezes. Therefore, the strength of cement-

treated soil at a freezing temperature does not increase noticeably regardless of the mixture proportion and curing time.

- When a curing temperature is increased or decreased during the curing, the strength of cement-treated soil increases as the curing time at a high temperature increases. If two sequent curing temperatures are applied for the same times but in a different order, a sample first cured at a high temperature and subsequently cured at a low temperature has lower strength than a sample cured at a low temperature first.
- Among the six organic compounds tested in Chapter 4, humic acid, tannic acid, sucrose, ethylenediaminetetraacetic acid (EDTA), ethylene glycol, and xanthan gum, tannic acid showed the strongest detrimental effect on the strength of cement-water slurry. Humic acid, ethylene glycol, and xanthan gum reduced strength only at a high concentration. EDTA has a negative effect, but the test results presented that its effect diminishes with time and is weaker than tannic acid and sucrose.
- The strength test results of cement-treated fabricated organic soil using tannic acid showed that the strength increases with curing time and amount of cement but decreases with organic matter (tannic acid) concentration. Thermogravimetric analysis (TGA) results indicated that tannic acid reduces the strength by consuming calcium ions (Ca^{2+}) consequently hindering the formation of calcium hydroxide in the mixture.
- There is a threshold of the amount of cement in the mixture and curing time where cement-treated organic soil overcomes the detrimental effect of organic matter and starts to increase its strength. Because of the negative effect of organic matter on the strength, a strength curve in the relationship between curing time and strength is S-shaped. The S-shape of the strength development curve follows the stages of an initial slow increase before the threshold, a rapid increase after the threshold, a late-stage slow growth, and no growth in strength.
- When curing stress increases, the strength of cement-treated soil increases under a single-drained condition, while it decreases under a double-drained condition. If soft soil is improved by cement with the same mix proportion and subjected to the

same curing stress, a single drainage condition results in a higher strength than a double drainage condition. The lower strengths of cement-treated soil consolidated and cured under double drainage conditions are attributed to the lack of water to react with cement for cement hydration reaction. Under a double-drained condition, more water drains out from the sample compared to a single-drained condition.

- The strength distribution of cement-treated soil cured under curing stress is non-uniform because of different drainage path lengths. The strength of a point in a sample increases as the distance from the point to the drainage boundary decreases. Near the drainage boundary, water in the sample is easily expelled resulting in lower water content and higher strength compared to a part of the sample with a long drainage path length.

Recommendations for future research include:

1. Only one type of base soil, fabricated lean clay (CL), was used to investigate the influences of mix proportion, curing time, and curing temperature on the strength of cement-treated soil. Although the strength-predicting correlation provided a prediction quality covering wide ranges of mix proportions, curing times, and curing temperatures, the findings and the correlation should be validated using other types of cement-treated soil.
2. The influence of soil's organic matter was studied, and the strength predicting correlation for cement-treated organic soil was validated by strength test results of two different types of cement-treated natural organic soil. However, all the samples for this topic were cured only at room temperature for up to 28 days. Therefore, further research on curing cement-treated organic soil at various curing temperatures with longer curing times would support the findings from this research and improve the applicability of the strength-predicting correlation.
3. The newly developed consolidation apparatus allowed an application of curing stress to cement-treated soil during the curing. However, only fabricated fat clay (CH) was used as a based soil, and UCS and punch compression tests in this research were carried out after the consolidation and curing of the sample. The

consolidation parameters such as compressibility, permeability, and coefficient of consolidation are expected to change during the consolidation and curing with time. They might also vary depending on drainage path length. Investigation of changes in the consolidation parameters at different locations of cement-treated soil during consolidation and curing is required.

Appendix A. Batch Data Sheets

- Batch data sheets for Chapter 2: Batch series R

- Batch data sheets for Chapter 3

  : Batch series

  1. T, S, and A: Constant temperature for short-term curing
  2. M: Constant temperature for short- and long-term curing
  3. L: Constant temperature for long-term curing
  4. D: Changing temperature for short-term curing

- Batch data sheets for Chapter 5

  : Batch series

  1. O: Cement-treated fabricated soil (FOS)
  2. J: Cement-treated natural organic soil 1 (NOS1)
  3. B: Cement-treated natural organic soil 2 (NOS2)

- Batch data sheets for Chapter 6: Batch series C

Laboratory Mixing Data
Batch R-1

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.00
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	125
Weight of Slurry Water, $w_{w,slurry}$ (g)	310.0
Weight of Dry Cement, w_c (g)	310.0
Weight of Moist Soil, w_{soil} (g)	3838.3
Weight of Slurry (g)	620.0
Specific Gravity of Solids	2.71
water content of mix	0.41
Dry unit wt. of mix (kg/m^3)	1276.6

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2900
Weight of Soil Water, $w_{w,soil}$ (g)	1015
Total weight of soil used, W_t (g)	3902.2
Weight of Dry Cement, w_c (g)	314.0
Weight of Slurry Water, $w_{w,slurry}$ (g)	314.0
Soil Water Content, w (%)	35.00
Water:Cement Ratio, w:c	1.00
Cement Content, a_W (%)	10.83%
Cement Factor, α (kg/m3)	149.64
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	124.99
Volume Ratio, VR (%)	19.72
Total-Water-to-Cement Ratio, w_T:c	4.22

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	314.0
Volume Ratio, VR (%)	19.72
Total-Water-to-Cement Ratio, w_T:c	4.22
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	125.0

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes (Demolding time)
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	11/2 4:15 PM	27.8	11/30 12:10 PM	51.9	100.7	21.1	100	378.8	0	1.0	1.03	1.94	0.995	1.0	1775.9	3 days
J	11/2 4:15 PM	27.8	11/30 12:23 PM	52.0	101.5	21.1	100	384.3	0	1.2	1.08	1.95	0.996	1.2	1783.7	3 days
B	11/2 4:15 PM	27.8	11/30 12:38 PM	51.9	100.3	21.1	100	379.2	0	1.38	1.10	1.93	0.995	1.4	1785.8	7 days
I	11/2 4:15 PM	27.4	11/30 12:59 AM	51.9	98.6	21.1	100	373.0	0	1.4	1.37	1.9	0.992	1.4	1785.6	7 days
C	11/2 4:15 PM	27.9	11/30 1:33 PM	51.9	100.5	21.1	100	379.2	0	1.1	1.09	1.93	0.995	1.1	1783.1	14 days
H	11/2 4:15 PM	27.9	11/30 1:50 PM	52.0	99.7	21.1	100	375.8	0	1.3	1.24	1.92	0.993	1.3	1775.8	14 days
D	11/2 4:15 PM	27.9	11/30 2:07 PM	51.9	98.7	21.1	100	374.4	0	1.4	1.31	1.9	0.992	1.4	1794.4	21 days
G	11/2 4:15 PM	27.9	11/30 2:24 PM	51.9	100.2	21.1	100	378.1	0	1.4	1.42	1.93	0.994	1.4	1780.7	21 days
E	11/2 4:15 PM	27.9	11/30 2:48 PM	51.9	99.9	21.1	100	377.2	0	1.4	1.07	1.92	0.994	1.4	1781.4	28 days
F	11/2 4:15 PM	28.0	11/30 3:12 PM	51.9	99.8	21.1	100	376.5	0	1.4	1.49	1.92	0.994	1.4	1779.4	28 days

Laboratory Mixing Data
Batch R-2

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.00
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	350
Weight of Slurry Water, $w_{w,slurry}$ (g)	870.0
Weight of Dry Cement, w_c (g)	870.0
Weight of Moist Soil, w_{soil} (g)	2475.5
Weight of Slurry (g)	1740.0
Specific Gravity of Solids	2.82
water content of mix	0.56
Dry unit wt. of mix (kg/m^3)	1094.4

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	1900
Weight of Soil Water, $w_{w,soil}$ (g)	665
Total weight of soil used, W_t (g)	2555
Weight of Dry Cement, w_c (g)	893.0
Weight of Slurry Water, $w_{w,slurry}$ (g)	893.0
Soil Water Content, w (%)	35.00
Water:Cement Ratio, w:c	1.00
Cement Content, a_W (%)	47.00%
Cement Factor, α (kg/m3)	649.97
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	350.07
Volume Ratio, VR (%)	85.67
Total-Water-to-Cement Ratio, w_T:c	1.74

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	893.0
Volume Ratio, VR (%)	85.67
Total-Water-to-Cement Ratio, w_T:c	1.74
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	350.1

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes (Demolding time)
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	11/3 5:20 PM	27.8	12/1 11:35 AM	51.9	99.5	21.1	100	360.0	0	4.6	1.21	1.92	0.993	4.6	1711.3	3 days
J	11/3 5:20 PM	27.8	12/1 12:00 PM	52.0	98.8	21.1	100	357.2	0	4.6	1.12	1.9	0.992	4.6	1699.4	3 days
B	11/3 5:20 PM	27.8	12/1 12:15 PM	51.9	99.3	21.1	100	357.8	0	4.45	1.10	1.91	0.993	4.4	1701.8	7 days
I	11/3 5:20 PM	27.8	12/1 12:33 PM	52.0	98.2	21.1	100	355.7	0	4.8	1.48	1.89	0.991	4.7	1706.8	7 days
C	11/3 5:20 PM	27.8	12/1 12:52 PM	51.9	98.4	21.1	100	355.9	0	4.1	1.31	1.9	0.992	4.0	1708.5	14 days
H	11/3 5:20 PM	27.8	12/1 1:07 PM	52.0	101.1	21.1	100	366.5	0	3.8	1.07	1.95	0.996	3.8	1706.7	14 days
D	11/3 5:20 PM	27.9	12/1 2:00 PM	52.0	96.9	21.1	100	350.7	0	5.0	1.41	1.86	0.989	5.0	1706.2	21 days
G	11/3 5:20 PM	27.9	12/1 2:19 PM	51.9	95.5	21.1	100	345.4	0	5.2	1.36	1.84	0.987	5.1	1706.2	21 days
E	11/3 5:20 PM	27.9	12/1 2:41 PM	52.0	97.9	21.1	100	355.9	0	5.1	1.34	1.88	0.991	5.1	1712.3	28 days
F	11/3 5:20 PM	27.9	12/1 3:01 PM	52.0	98.3	21.1	100	357.3	0	5.2	1.39	1.89	0.991	5.1	1712.4	28 days

Laboratory Mixing Data
Batch R-3

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.00
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	125
Weight of Slurry Water, $w_{w,slurry}$ (g)	310.0
Weight of Dry Cement, w_c (g)	310.0
Weight of Moist Soil, w_{soil} (g)	3838.3
Weight of Slurry (g)	620.0
Specific Gravity of Solids	2.71
water content of mix	0.41
Dry unit wt. of mix (kg/m^3)	1276.4

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2900
Weight of Soil Water, $w_{w,soil}$ (g)	1015
Total weight of soil used, W_t (g)	3896.4
Weight of Dry Cement, w_c (g)	314.5
Weight of Slurry Water, $w_{w,slurry}$ (g)	314.5
Soil Water Content, w (%)	35.00
Water:Cement Ratio, w:c	1.00
Cement Content, a_W (%)	10.84%
Cement Factor, α (kg/m3)	150.10
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	125.31
Volume Ratio, VR (%)	19.78
Total-Water-to-Cement Ratio, w_T:c	4.21

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	314.5
Volume Ratio, VR (%)	19.78
Total-Water-to-Cement Ratio, w_T:c	4.21
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	125.3

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes (Demolding time)
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	11/22 3:00 PM	27.9	12/20 11:36 AM	52.1	98.8	45	100	372.7	0	3.0	1.25	1.9	0.992	3.0	1770.9	3 days
J	11/22 3:00 PM	27.9	12/20 11:51 AM	52.1	98.2	45	100	370.0	0	3.5	1.28	1.89	0.991	3.5	1769.5	3 days
B	11/22 3:00 PM	27.9	12/20 12:07 PM	52.1	98.5	45	100	371.2	0	3.2	1.02	1.89	0.991	3.2	1767.5	7 days
I	11/22 3:00 PM	27.9	12/20 12:20 PM	52.0	101.4	45	100	381.5	0	3.3	1.10	1.95	0.996	3.3	1772.5	7 days
C	11/22 3:00 PM	27.9	12/20 12:31 PM	52.0	100.7	45	100	379.8	0	3.7	1.06	1.94	0.995	3.7	1774.4	14 days
H	11/22 3:00 PM	27.9	12/20 12:44 PM	52.1	100.0	45	100	376.9	0	3.8	1.38	1.92	0.994	3.7	1767.8	14 days
D	11/22 3:00 PM	28.0	12/20 1:57 PM	52.1	101.0	45	100	381.4	0	3.6	0.99	1.94	0.995	3.6	1772.2	21 days
G	11/22 3:00 PM	28.0	12/20 2:09 PM	52.0	100.5	45	100	377.1	0	3.9	1.29	1.93	0.994	3.9	1764.6	21 days
E	11/22 3:00 PM	28.0	12/20 2:27 PM	52.1	101.8	45	100	383.8	0	3.7	1.25	1.95	0.996	3.7	1766.5	28 days
F	11/22 3:00 PM	28.0	12/20 2:43 PM	51.9	100.8	45	100	379.2	0	3.7	1.38	1.94	0.995	3.7	1775.5	28 days

Laboratory Mixing Data
Batch R-4

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.00
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	350
Weight of Slurry Water, $w_{w,slurry}$ (g)	870.0
Weight of Dry Cement, w_c (g)	870.0
Weight of Moist Soil, w_{soil} (g)	2475.5
Weight of Slurry (g)	1740.0
Specific Gravity of Solids	2.82
water content of mix	0.56
Dry unit wt. of mix (kg/m^3)	1094.4

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	1900
Weight of Soil Water, $w_{w,soil}$ (g)	665
Total weight of soil used, W_t (g)	2561.6
Weight of Dry Cement, w_c (g)	895.0
Weight of Slurry Water, $w_{w,slurry}$ (g)	895.0
Soil Water Content, w (%)	35.00
Water:Cement Ratio, w:c	1.00
Cement Content, a_W (%)	47.11%
Cement Factor, α (kg/m3)	649.75
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	350.01
Volume Ratio, VR (%)	85.64
Total-Water-to-Cement Ratio, w_T:c	1.74

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	895.0
Volume Ratio, VR (%)	85.64
Total-Water-to-Cement Ratio, w_T:c	1.74
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	350.0

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes (Demolding time)
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	12/20 4:00 PM	27.9	1/17 1:04 PM	52.3	99.8	45	100	362.5	0	5.6	1.46	1.91	0.993	5.5	1690.1	3 days
J	12/20 4:00 PM	27.9	1/17 1:18 PM	52.2	101.9	45	100	368.2	0	4.5	1.23	1.95	0.996	4.5	1690.6	3 days
B	12/20 4:00 PM	27.9	1/17 1:36 PM	52.1	98.2	45	100	355.6	0	5.8	1.46	1.88	0.991	5.8	1695.6	7 days
I	12/20 4:00 PM	27.9	1/17 1:51 PM	52.2	99.1	45	100	359.0	0	5.7	1.31	1.9	0.992	5.7	1690.7	7 days
C	12/20 4:00 PM	27.9	1/17 2:06 PM	52.1	100.2	45	100	362.9	0	5.8	1.34	1.92	0.994	5.8	1701.2	14 days
H	12/20 4:00 PM	27.9	1/17 2:19 PM	52.1	99.3	45	100	359.9	0	5.6	1.16	1.91	0.992	5.6	1698.5	14 days
D	12/20 4:00 PM	27.9	1/17 2:34 PM	52.1	98.9	45	100	358.4	0	5.9	1.33	1.9	0.992	5.8	1697.9	21 days
G	12/20 4:00 PM	28.0	1/17 2:50 PM	52.1	97.1	45	100	350.7	0	5.8	1.40	1.86	0.989	5.8	1696.5	21 days
E	12/20 4:00 PM	28.0	1/17 3:09 PM	52.0	100.3	45	100	361.1	0	5.3	1.15	1.93	0.994	5.3	1696.4	28 days
F	12/20 4:00 PM	28.0	1/17 3:32 PM	52.0	93.2	45	100	334.6	0	6.0	1.79	1.79	0.983	5.9	1693.1	28 days

Laboratory Mixing Data
Batch R-5

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.00
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	125
Weight of Slurry Water, $w_{w,slurry}$ (g)	310.0
Weight of Dry Cement, w_c (g)	310.0
Weight of Moist Soil, w_{soil} (g)	3838.3
Weight of Slurry (g)	620.0
Specific Gravity of Solids	2.71
water content of mix	0.41
Dry unit wt. of mix (kg/m^3)	1276.1

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2900
Weight of Soil Water, $w_{w,soil}$ (g)	1015
Total weight of soil used, W_t (g)	3897.1
Weight of Dry Cement, w_c (g)	315.7
Weight of Slurry Water, $w_{w,slurry}$ (g)	315.7
Soil Water Content, w (%)	35.00
Water:Cement Ratio, w:c	1.00
Cement Content, a_W (%)	10.88%
Cement Factor, α (kg/m3)	150.63
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	125.68
Volume Ratio, VR (%)	19.85
Total-Water-to-Cement Ratio, w_T:c	4.20

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	315.7
Volume Ratio, VR (%)	19.85
Total-Water-to-Cement Ratio, w_T:c	4.20
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	125.7

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes -Demolding at 7 days
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	10/22 5:20 PM	179.8	4/20 12:03 PM	51.9	100.7	21.1	100	379.8	0	1.9	1.14	1.94	0.995	1.9	1781.8	Demolded
H	10/22 5:20 PM	179.8	4/20 12:22 PM	52.0	97.8	21.1	100	368.0	0	1.9	1.11	1.88	0.991	1.8	1774.1	Demolded
C	10/22 5:20 PM	364.7	10/22 10:21 AM	52.0	101.3	21.1	100	380.2	0	2.2	0.98	1.95	0.996	2.2	1763.9	Demolded
F	10/22 5:20 PM	364.7	10/22 10:35 AM	52.0	101.2	21.1	100	381.8	0	2.2	1.08	1.95	0.996	2.2	1776.6	Demolded
J	10/22 5:20 PM	402.1	11/28 7:32 PM	52.0	99.8	21.1	100	376.8	0	2.0	1.36	1.92	0.994	2.0	1780.0	Demolded
B	10/22 5:20 PM	179.8	4/20 11:31 AM	52.0	99.1	21.1	100	375.6	0	1.6	1.35	1.91	0.992	1.6	1785.8	
G	10/22 5:20 PM	179.8	4/20 11:50 AM	51.8	99.3	21.1	100	376.0	0	2.0	1.24	1.92	0.993	2.0	1793.2	
D	10/22 5:20 PM	364.7	10/22 10:51 AM	51.9	100.9	21.1	100	382.8	0	2.9	0.98	1.94	0.995	2.8	1790.1	
E	10/22 5:20 PM	364.7	10/22 11:06 AM	51.9	101.8	21.1	100	385.9	0	3.3	0.99	1.96	0.997	3.3	1789.7	
I	10/22 5:20 PM	402.1	11/28 7:47 PM	51.8	100.6	21.1	100	381.8	0	3.4	1.01	1.94	0.995	3.4	1803.1	

Laboratory Mixing Data
Batch R-6

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.00
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	350
Weight of Slurry Water, $w_{w,slurry}$ (g)	870.0
Weight of Dry Cement, w_c (g)	870.0
Weight of Moist Soil, w_{soil} (g)	2475.5
Weight of Slurry (g)	1740.0
Specific Gravity of Solids	2.82
water content of mix	0.56
Dry unit wt. of mix (kg/m^3)	1092.4

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	1900
Weight of Soil Water, $w_{w,soil}$ (g)	665
Total weight of soil used, W_t (g)	2556.6
Weight of Dry Cement, w_c (g)	905.0
Weight of Slurry Water, $w_{w,slurry}$ (g)	905.0
Soil Water Content, w (%)	35.00
Water:Cement Ratio, w:c	1.00
Cement Content, a_W (%)	47.63%
Cement Factor, α (kg/m3)	658.29
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	352.47
Volume Ratio, VR (%)	86.76
Total-Water-to-Cement Ratio, w_T:c	1.73

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	905.0
Volume Ratio, VR (%)	86.76
Total-Water-to-Cement Ratio, w_T:c	1.73
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	352.5

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes -Demolding at 7 days
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	10/28 6:30 PM	180.0	4/26 5:53 PM	52.0	99.4	21.1	100	357.0	0	5.0	1.21	1.91	0.993	4.9	1690.9	Demolded
H	10/28 6:30 PM	180.0	4/26 6:11 PM	51.8	94.8	21.1	100	340.1	0	5.4	1.32	1.83	0.986	5.4	1698.9	Demolded
C	10/28 6:30 PM	364.6	10/28 10:03 AM	52.0	100.5	21.1	100	362.1	0	5.0	1.41	1.93	0.995	5.0	1693.1	Demolded
F	10/28 6:30 PM	364.7	10/28 10:13 AM	52.1	101.1	21.1	100	363.9	0	4.8	1.17	1.94	0.995	4.8	1690.4	Demolded
J	10/28 6:30 PM	399.6	12/2 9:30 AM	52.0	101.0	21.1	100	364.1	0	4.7	1.50	1.94	0.995	4.7	1698.0	Demolded
B	10/28 6:30 PM	180.0	4/26 6:47 PM	52.0	96.9	21.1	100	351.3	0	6.1	1.52	1.86	0.989	6.0	1705.8	
G	10/28 6:30 PM	180.0	4/26 7:03 PM	51.9	101.3	21.1	100	367.9	0	6.0	1.14	1.95	0.996	6.0	1715.6	
D	10/28 6:30 PM	364.7	10/28 10:28 AM	52.0	100.7	21.1	100	366.6	0	5.7	1.36	1.94	0.995	5.7	1712.3	
E	10/28 6:30 PM	364.7	10/28 10:39 AM	52.0	100.6	21.1	100	366.2	0	6.1	1.49	1.94	0.995	6.0	1715.5	
I	10/28 6:30 PM	400.1	12/2 9:46 PM	51.9	100.7	21.1	100	366.9	0	6.3	1.34	1.94	0.995	6.3	1724.3	

Laboratory Mixing Data
Batch R-7

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.00
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	125
Weight of Slurry Water, $w_{w,slurry}$ (g)	310.0
Weight of Dry Cement, w_c (g)	310.0
Weight of Moist Soil, w_{soil} (g)	3838.3
Weight of Slurry (g)	620.0
Specific Gravity of Solids	2.71
water content of mix	0.41
Dry unit wt. of mix (kg/m^3)	1276.5

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2900
Weight of Soil Water, $w_{w,soil}$ (g)	1015
Total weight of soil used, W_t (g)	3892.2
Weight of Dry Cement, w_c (g)	313.8
Weight of Slurry Water, $w_{w,slurry}$ (g)	313.8
Soil Water Content, w (%)	35.00
Water:Cement Ratio, w:c	1.00
Cement Content, a_W (%)	10.82%
Cement Factor, α (kg/m3)	149.93
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	125.19
Volume Ratio, VR (%)	19.76
Total-Water-to-Cement Ratio, w_T:c	4.22

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	313.8
Volume Ratio, VR (%)	19.76
Total-Water-to-Cement Ratio, w_T:c	4.22
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	125.2

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes -Demolding at 7 days
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	2/6 5:20 PM	99.8	5/17 12:14 PM	52.1	99.9	45	100	377.1	0	4.5	1.22	1.92	0.993	4.5	1772.7	Demolded
J	2/6 5:20 PM	99.8	5/17 12:31 PM	52.0	101.0	45	100	381.4	0	4.9	1.29	1.94	0.995	4.8	1777.8	Demolded
B	2/6 5:20 PM	199.9	8/25 3:42 PM	52.0	100.7	45	100	381.7	0	5.0	1.50	1.94	0.995	5.0	1781.1	Demolded
I	2/6 5:20 PM	199.9	8/25 4:03 PM	52.0	98.7	45	100	373.0	0	5.9	1.61	1.9	0.992	5.9	1779.0	Demolded
C	2/6 5:20 PM	299.9	12/3 3:15 PM	52.0	101.2	45	100	383.3	0	5.0	1.47	1.95	0.996	5.0	1783.5	Demolded
E	2/6 5:20 PM	400.0	3/13 5:53 PM	52.1	100.9	45	100	382.2	0	6.1	1.17	1.94	0.995	6.1	1773.4	
F	2/6 5:20 PM	400.0	3/13 6:07 PM	52.0	99.2	45	100	376.1	0	6.1	1.40	1.91	0.993	6.1	1782.0	
D	2/6 5:20 PM	200.0	8/25 4:21 PM	51.8	100.7	45	100	381.6	0	6.2	1.65	1.94	0.995	6.1	1794.6	
G	2/6 5:20 PM	200.0	8/25 4:36 PM	51.9	99.4	45	100	376.2	0	6.0	1.74	1.92	0.993	5.9	1791.0	
H	2/6 5:20 PM	299.9	12/3 3:26 PM	52.0	100.2	45	100	378.4	0	5.8	1.58	1.93	0.994	5.8	1777.8	

Laboratory Mixing Data
Batch R-8

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.00
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	350
Weight of Slurry Water, $w_{w,slurry}$ (g)	870.0
Weight of Dry Cement, w_c (g)	870.0
Weight of Moist Soil, w_{soil} (g)	2475.5
Weight of Slurry (g)	1740.0
Specific Gravity of Solids	2.82
water content of mix	0.57
Dry unit wt. of mix (kg/m^3)	1086.2

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	1900
Weight of Soil Water, $w_{w,soil}$ (g)	665
Total weight of soil used, W_t (g)	2553.6
Weight of Dry Cement, w_c (g)	941.4
Weight of Slurry Water, $w_{w,slurry}$ (g)	941.4
Soil Water Content, w (%)	35.00
Water:Cement Ratio, w:c	1.00
Cement Content, a_W (%)	49.54%
Cement Factor, α (kg/m3)	685.54
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	360.13
Volume Ratio, VR (%)	90.36
Total-Water-to-Cement Ratio, w_T:c	1.70

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	941.4
Volume Ratio, VR (%)	90.36
Total-Water-to-Cement Ratio, w_T:c	1.70
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	360.1

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes -Demolding at 7 days
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	2/7 3:15 PM	100.0	5/18 2:42 PM	52.1	100.1	45	100	363.8	0	7.4	1.28	1.92	0.994	7.3	1701.3	Demolded
J	2/7 3:15 PM	100.0	5/18 3:05 PM	52.1	100.9	45	100	367.1	0	7.1	1.23	1.94	0.995	7.1	1705.8	Demolded
B	2/7 3:15 PM	200.3	8/26 11:15 PM	52.2	97.8	45	100	355.5	0	12.8	1.76	1.87	0.990	12.7	1700.5	Demolded
I	2/7 3:15 PM	200.3	8/26 11:36 PM	52.1	100.6	45	100	365.7	0	11.8	1.47	1.93	0.995	11.8	1707.4	Demolded
C	2/7 3:15 PM	299.8	12/4 9:40 AM	52.1	98.4	45	100	358.6	0	7.8	1.77	1.89	0.991	7.7	1711.8	Demolded
E	2/7 3:15 PM	400.0	3/14 2:55 PM	52.2	99.8	45	100	363.5	0	13.6	1.47	1.91	0.993	13.5	1701.3	
F	2/7 3:15 PM	400.0	3/14 3:12 PM	52.2	99.0	45	100	360.3	0	11.6	1.48	1.9	0.992	11.5	1700.2	
D	2/7 3:15 PM	200.3	8/26 10:40 PM	52.1	97.9	45	100	353.8	0	12.8	2.02	1.88	0.990	12.7	1693.1	
G	2/7 3:15 PM	200.3	8/26 10:52 PM	52.1	99.0	45	100	359.2	0	12.5	1.84	1.9	0.992	12.4	1701.3	
H	2/7 3:15 PM	299.8	12/4 9:55 AM	52.0	99.1	45	100	359.1	0	11.7	1.62	1.91	0.992	11.7	1704.4	

Laboratory Mixing Data
Batch T-1

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	0.60
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	200
Weight of Slurry Water, $w_{w,slurry}$ (g)	300.0
Weight of Dry Cement, w_c (g)	500.0
Weight of Moist Soil, w_{soil} (g)	3751.8
Weight of Slurry (g)	800.0
Specific Gravity of Solids	2.74
water content of mix	0.39
Dry unit wt. of mix (kg/m^3)	1325.3

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2799.5
Weight of Soil Water, $w_{w,soil}$ (g)	980
Total weight of soil used, W_t (g)	3756.5
Weight of Dry Cement, w_c (g)	509.0
Weight of Slurry Water, $w_{w,slurry}$ (g)	305.4
Soil Water Content, w (%)	35.01
Water:Cement Ratio, w:c	0.60
Cement Content, a_W (%)	18.18%
Cement Factor, α (kg/m3)	251.98
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	204.65
Volume Ratio, VR (%)	23.13
Total-Water-to-Cement Ratio, w_T:c	2.51

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	305.4
Volume Ratio, VR (%)	23.13
Total-Water-to-Cement Ratio, w_T:c	2.51
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	204.6

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	10/6 10:00 PM	2.92	10/9 8:09 PM	51.8	100.7	25	100	383.3	0	1.8	2.32	1.94	0.995	1.8	1803.1	
B	10/6 10:00 PM	6.99	10/13 9:39 PM	51.8	100.8	25	100	385.8	0	2.5	1.86	1.95	0.996	2.5	1816.1	
C	10/6 10:00 PM	13.84	10/20 6:08 PM	51.8	95.7	25	100	365.4	0	3.2	1.46	1.85	0.988	3.2	1808.3	
D	10/6 10:00 PM	27.95	11/3 8:43 PM	51.8	100.3	25	100	384.0	0	3.8	1.25	1.93	0.995	3.8	1816.4	
E	10/6 10:00 PM	27.96	11/3 9:08 PM	51.8	98.2	25	100	375.4	0	3.9	1.33	1.9	0.992	3.8	1813.8	
F	10/6 10:00 PM	13.86	10/20 6:38 PM	51.9	101.4	25	100	388.4	0	3.3	1.29	1.95	0.996	3.2	1811.2	
G	10/6 10:00 PM	7.00	10/13 10:05 PM	51.8	100.9	25	100	386.3	0	2.6	1.39	1.95	0.996	2.6	1816.2	
H	10/6 10:00 PM	2.95	10/9 8:41 PM	51.8	98.5	25	100	376.8	0	1.9	2.43	1.9	0.992	1.9	1812.3	
I	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
J	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

Laboratory Mixing Data
Batch T-2

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	0.60
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	350
Weight of Slurry Water, $w_{w,slurry}$ (g)	520.0
Weight of Dry Cement, w_c (g)	870.0
Weight of Moist Soil, w_{soil} (g)	3119.1
Weight of Slurry (g)	1390.0
Specific Gravity of Solids	2.79
water content of mix	0.42
Dry unit wt. of mix (kg/m^3)	1287.6

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2399.4
Weight of Soil Water, $w_{w,soil}$ (g)	845.3
Total weight of soil used, W_t (g)	3213.5
Weight of Dry Cement, w_c (g)	896.6
Weight of Slurry Water, $w_{w,slurry}$ (g)	537.9
Soil Water Content, w (%)	35.23
Water:Cement Ratio, w:c	0.60
Cement Content, a_W (%)	37.37%
Cement Factor, α (kg/m3)	518.84
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	351.47
Volume Ratio, VR (%)	47.62
Total-Water-to-Cement Ratio, w_T:c	1.53

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	537.9
Volume Ratio, VR (%)	47.62
Total-Water-to-Cement Ratio, w_T:c	1.53
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	351.5

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
B	10/7 4:00 PM	6.97	10/14 3:18 PM	51.9	96.8	25	100	370.6	0	5.1	0.98	1.86	0.989	5.1	1808.5	
C	10/7 4:00 PM	14.14	10/21 7:23 PM	51.8	95.7	25	100	366.6	0	7.3	1.33	1.85	0.988	7.2	1817.8	
D	10/7 4:00 PM	28.01	11/4 4:11 PM	51.8	98.1	25	100	376.4	0	8.1	1.24	1.89	0.991	8.0	1821.9	
E	10/7 4:00 PM	28.03	11/4 4:41 PM	51.8	99.2	25	100	380.9	0	8.3	1.17	1.91	0.993	8.3	1819.8	
F	10/7 4:00 PM	14.16	10/21 7:56 PM	51.8	98.0	25	100	375.3	0	6.7	1.06	1.89	0.991	6.6	1814.9	
G	10/7 4:00 PM	6.99	10/14 3:50 PM	51.9	97.9	25	100	375.6	0	5.6	1.12	1.89	0.991	5.6	1814.2	
H	10/7 4:00 PM	2.92	10/10 2:08 PM	51.8	100.2	25	100	383.4	0	4.4	1.34	1.93	0.995	4.4	1817.2	
I	10/7 4:00 PM	2.95	10/10 2:41 PM	51.8	100.3	25	100	383.5	0	4.4	1.25	1.93	0.995	4.4	1811.8	
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Laboratory Mixing Data
Batch T-3

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.00
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	125
Weight of Slurry Water, $w_{w,slurry}$ (g)	310.0
Weight of Dry Cement, w_c (g)	310.0
Weight of Moist Soil, w_{soil} (g)	3838.3
Weight of Slurry (g)	620.0
Specific Gravity of Solids	2.71
water content of mix	0.41
Dry unit wt. of mix (kg/m^3)	1275.9

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2899.1
Weight of Soil Water, $w_{w,soil}$ (g)	1015
Total weight of soil used, W_t (g)	3886.4
Weight of Dry Cement, w_c (g)	315.6
Weight of Slurry Water, $w_{w,slurry}$ (g)	315.6
Soil Water Content, w (%)	35.01
Water:Cement Ratio, w:c	1.00
Cement Content, a_W (%)	10.88%
Cement Factor, α (kg/m3)	150.99
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	125.93
Volume Ratio, VR (%)	19.90
Total-Water-to-Cement Ratio, w_T:c	4.19

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	315.6
Volume Ratio, VR (%)	19.90
Total-Water-to-Cement Ratio, w_T:c	4.19
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	125.9

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	10/9 10:00 PM	3.00	10/12 10:02 PM	51.8	95.5	25	100	357.9	0	0.8	1.91	1.84	0.988	0.8	1781.1	
B	10/9 10:00 PM	6.91	10/16 7:44 PM	51.9	94.3	25	100	354.3	0	1.1	1.80	1.82	0.985	1.1	1778.0	
C	10/9 10:00 PM	13.94	10/23 8:28 PM	51.9	95.8	25	100	358.8	0	1.3	1.59	1.85	0.988	1.3	1772.9	
D	10/9 10:00 PM	28.04	11/6 10:57 PM	51.9	90.2	25	100	338.9	0	1.4	1.12	1.74	0.979	1.4	1778.9	
E	10/9 10:00 PM	28.08	11/6 11:49 PM	51.8	93.8	25	100	352.0	0	1.5	1.11	1.81	0.985	1.5	1782.3	
F	10/9 10:00 PM	13.96	10/23 8:59 PM	51.8	92.7	25	100	347.5	0	1.3	1.41	1.79	0.983	1.3	1777.0	
G	10/9 10:00 PM	6.93	10/16 8:19 PM	51.8	93.6	25	100	351.1	0	1.1	1.75	1.81	0.985	1.1	1779.6	
H	10/9 10:00 PM	3.03	10/12 10:39 PM	51.9	89.4	25	100	333.5	0	0.8	2.11	1.72	0.978	0.8	1765.9	
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J	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

Laboratory Mixing Data
Batch T-4

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.00
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	350
Weight of Slurry Water, $w_{w,slurry}$ (g)	870.0
Weight of Dry Cement, w_c (g)	870.0
Weight of Moist Soil, w_{soil} (g)	2475.5
Weight of Slurry (g)	1740.0
Specific Gravity of Solids	2.82
water content of mix	0.56
Dry unit wt. of mix (kg/m^3)	1094.5

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	1900.5
Weight of Soil Water, $w_{w,soil}$ (g)	665
Total weight of soil used, W_t (g)	2548.9
Weight of Dry Cement, w_c (g)	890.1
Weight of Slurry Water, $w_{w,slurry}$ (g)	890.1
Soil Water Content, w (%)	34.99
Water:Cement Ratio, w:c	1.00
Cement Content, a_W (%)	46.83%
Cement Factor, α (kg/m3)	649.37
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	349.90
Volume Ratio, VR (%)	85.59
Total-Water-to-Cement Ratio, w_T:c	1.74

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	890.1
Volume Ratio, VR (%)	85.59
Total-Water-to-Cement Ratio, w_T:c	1.74
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	349.9

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	10/13 6:30 PM	3.01	10/16 6:38 PM	51.8	96.3	25	100	346.3	0	2.8	1.51	1.86	0.989	2.8	1705.0	
B	10/13 6:30 PM	6.94	10/20 4:58 PM	51.8	100.8	25	100	363.7	0	3.7	1.33	1.95	0.996	3.7	1711.3	
C	10/13 6:30 PM	13.97	10/27 5:51 PM	51.8	93.9	25	100	338.8	0	4.5	1.04	1.81	0.985	4.4	1711.9	
D	10/13 6:30 PM	27.92	11/10 4:29 PM	51.7	95.3	25	100	343.5	0	5.6	1.30	1.84	0.987	5.6	1714.3	
E	10/13 6:30 PM	27.93	11/10 4:56 PM	51.8	96.3	25	100	347.6	0	5.5	1.30	1.86	0.989	5.4	1712.7	
F	10/13 6:30 PM	13.99	10/27 6:15 PM	51.8	99.0	25	100	356.9	0	4.5	1.22	1.91	0.993	4.5	1707.8	
G	10/13 6:30 PM	6.96	10/20 5:35 PM	51.8	94.9	25	100	341.9	0	3.8	1.29	1.83	0.987	3.7	1707.7	
H	10/13 6:30 PM	3.03	10/16 7:10 PM	51.8	98.7	25	100	354.7	0	2.6	1.03	1.9	0.992	2.6	1704.6	
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Laboratory Mixing Data
Batch T-5

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.40
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	125
Weight of Slurry Water, $w_{w,slurry}$ (g)	440.0
Weight of Dry Cement, w_c (g)	310.0
Weight of Moist Soil, w_{soil} (g)	3608.4
Weight of Slurry (g)	750.0
Specific Gravity of Solids	2.71
water content of mix	0.46
Dry unit wt. of mix (kg/m^3)	1207.7

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2699.5
Weight of Soil Water, $w_{w,soil}$ (g)	945
Total weight of soil used, W_t (g)	3620.1
Weight of Dry Cement, w_c (g)	309.9
Weight of Slurry Water, $w_{w,slurry}$ (g)	433.8
Soil Water Content, w (%)	35.01
Water:Cement Ratio, w:c	1.40
Cement Content, a_W (%)	11.48%
Cement Factor, α (kg/m3)	159.18
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	125.00
Volume Ratio, VR (%)	27.35
Total-Water-to-Cement Ratio, w_T:c	4.43

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	433.8
Volume Ratio, VR (%)	27.35
Total-Water-to-Cement Ratio, w_T:c	4.43
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	125.0

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	10/15 9:30 PM	2.95	10/18 8:21 PM	51.7	91.8	25	100	338.1	0	0.6	2.39	1.78	0.982	0.6	1757.0	
B	10/15 9:30 PM	6.92	10/22 7:33 PM	51.8	90.5	25	100	333.5	0	0.8	1.34	1.75	0.980	0.8	1751.5	
C	10/15 9:30 PM	13.98	10/29 8:55 PM	51.8	95.9	25	100	357.2	0	1.0	1.76	1.85	0.988	1.0	1770.1	
D	10/15 9:30 PM	28.06	11/12 10:49 PM	51.8	95.4	25	100	351.3	0	1.3	1.58	1.84	0.987	1.2	1747.5	
E	10/15 9:30 PM	28.08	11/12 11:24 PM	51.8	94.4	25	100	347.4	0	1.3	1.64	1.82	0.986	1.3	1747.6	
F	10/15 9:30 PM	14.00	10/29 9:25 PM	51.8	93.2	25	100	342.1	0	1.0	1.85	1.8	0.984	1.0	1743.0	
G	10/15 9:30 PM	6.94	10/22 8:07 PM	51.7	97.7	25	100	359.2	0	0.8	1.70	1.89	0.991	0.8	1750.6	
H	10/15 9:30 PM	2.98	10/18 9:05 PM	51.7	91.5	25	100	337.0	0	0.6	2.38	1.77	0.982	0.6	1753.1	
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Laboratory Mixing Data
Batch T-6

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.40
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	275
Weight of Slurry Water, $w_{w,slurry}$ (g)	960.0
Weight of Dry Cement, w_c (g)	680.0
Weight of Moist Soil, w_{soil} (g)	2424.1
Weight of Slurry (g)	1640.0
Specific Gravity of Solids	2.79
water content of mix	0.64
Dry unit wt. of mix (kg/m^3)	1002.6

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	1799.7
Weight of Soil Water, $w_{w,soil}$ (g)	630.5
Total weight of soil used, W_t (g)	2411.1
Weight of Dry Cement, w_c (g)	678.8
Weight of Slurry Water, $w_{w,slurry}$ (g)	950.4
Soil Water Content, w (%)	35.03
Water:Cement Ratio, w:c	1.40
Cement Content, a_W (%)	37.72%
Cement Factor, α (kg/m3)	523.58
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	275.62
Volume Ratio, VR (%)	89.96
Total-Water-to-Cement Ratio, w_T:c	2.32

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	950.4
Volume Ratio, VR (%)	89.96
Total-Water-to-Cement Ratio, w_T:c	2.32
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	275.6

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	10/19 7:15 PM	2.97	10/22 6:26 PM	51.8	93.8	25	100	324.1	0	1.2	1.30	1.81	0.985	1.1	1640.6	
B	10/19 7:15 PM	6.97	10/26 6:38 PM	51.8	97.6	25	100	338.0	0	1.6	1.28	1.89	0.991	1.6	1644.9	
C	10/19 7:15 PM	13.88	11/2 4:20 PM	51.8	98.8	25	100	342.1	0	2.0	1.31	1.91	0.993	2.0	1646.0	
D	10/19 7:15 PM	28.15	11/16 10:50 PM	51.8	97.6	25	100	337.3	0	2.5	1.38	1.88	0.991	2.5	1640.7	
E	10/19 7:15 PM	28.17	11/16 11:18 PM	51.7	98.5	25	100	340.5	0	2.5	1.35	1.9	0.992	2.5	1646.6	
F	10/19 7:15 PM	13.90	11/2 4:47 PM	51.8	93.3	25	100	322.8	0	2.0	1.34	1.8	0.984	2.0	1642.4	
G	10/19 7:15 PM	6.99	10/26 7:06 PM	51.7	94.0	25	100	325.1	0	1.7	1.44	1.82	0.985	1.7	1645.7	
H	10/19 7:15 PM	2.99	10/22 6:59 PM	51.9	92.2	25	100	319.4	0	1.2	1.28	1.78	0.982	1.1	1638.4	
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Laboratory Mixing Data
Batch T-7

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.00
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	125
Weight of Slurry Water, $w_{w,slurry}$ (g)	310.0
Weight of Dry Cement, w_c (g)	310.0
Weight of Moist Soil, w_{soil} (g)	3838.3
Weight of Slurry (g)	620.0
Specific Gravity of Solids	2.71
water content of mix	0.42
Dry unit wt. of mix (kg/m^3)	1273.1

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2900
Weight of Soil Water, $w_{w,soil}$ (g)	1015
Total weight of soil used, W_t (g)	3892.8
Weight of Dry Cement, w_c (g)	326.5
Weight of Slurry Water, $w_{w,slurry}$ (g)	326.5
Soil Water Content, w (%)	35.00
Water:Cement Ratio, w:c	1.00
Cement Content, a_W (%)	11.26%
Cement Factor, α (kg/m3)	155.97
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	129.38
Volume Ratio, VR (%)	20.56
Total-Water-to-Cement Ratio, w_T:c	4.09

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	326.5
Volume Ratio, VR (%)	20.56
Total-Water-to-Cement Ratio, w_T:c	4.09
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	129.4

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	12/24 12:40 PM	2.99	12/27 12:19 PM	51.8	98.5	35	100	368.9	0	1.1	2.60	1.9	0.992	1.1	1780.4	
B	12/24 12:40 PM	6.98	12/31 12:09 PM	51.8	98.4	35	100	368.8	0	1.5	1.70	1.9	0.992	1.5	1781.3	
C	12/24 12:40 PM	13.99	1/7 12:23 PM	51.8	99.7	35	100	375.1	0	1.9	1.86	1.92	0.994	1.9	1784.7	
D	12/24 12:40 PM	28.01	1/21 12:48 PM	51.9	100.4	35	100	377.2	0	2.6	1.58	1.94	0.995	2.6	1778.0	
E	12/24 12:40 PM	28.03	1/21 1:16 PM	51.8	99.8	35	100	374.4	0	2.7	1.90	1.93	0.994	2.7	1777.4	
F	12/24 12:40 PM	14.01	1/7 12:50 PM	51.8	99.6	35	100	374.2	0	1.9	2.10	1.92	0.994	1.9	1780.5	
G	12/24 12:40 PM	7.00	12/31 12:34 PM	51.8	99.3	35	100	372.0	0	1.5	2.39	1.92	0.993	1.5	1778.9	
H	12/24 12:40 PM	3.00	12/27 12:45 PM	51.8	98.7	35	100	369.5	0	1.2	2.63	1.9	0.992	1.1	1773.1	
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Laboratory Mixing Data
Batch T-8

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.00
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	200
Weight of Slurry Water, $w_{w,slurry}$ (g)	500.0
Weight of Dry Cement, w_c (g)	500.0
Weight of Moist Soil, w_{soil} (g)	3384.0
Weight of Slurry (g)	1000.0
Specific Gravity of Solids	2.74
water content of mix	0.46
Dry unit wt. of mix (kg/m^3)	1215.8

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2600
Weight of Soil Water, $w_{w,soil}$ (g)	921
Total weight of soil used, W_t (g)	3500.6
Weight of Dry Cement, w_c (g)	512.6
Weight of Slurry Water, $w_{w,slurry}$ (g)	512.6
Soil Water Content, w (%)	35.42
Water:Cement Ratio, w:c	1.00
Cement Content, a_W (%)	19.72%
Cement Factor, α (kg/m3)	272.31
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	200.39
Volume Ratio, VR (%)	35.89
Total-Water-to-Cement Ratio, w_T:c	2.77

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	512.6
Volume Ratio, VR (%)	35.89
Total-Water-to-Cement Ratio, w_T:c	2.77
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	200.4

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	12/24 2:20 PM	2.95	12/27 1:13 PM	51.8	97.3	35	100	358.4	0	1.5	2.68	1.88	0.990	1.5	1745.8	
B	12/24 2:20 PM	6.95	12/31 1:01 PM	51.8	97.7	35	100	360.6	0	2.0	2.02	1.88	0.991	2.0	1749.3	
C	12/24 2:20 PM	13.96	1/7 1:18 PM	51.8	98.7	35	100	364.5	0	2.6	1.92	1.9	0.992	2.6	1752.1	
D	12/24 2:20 PM	28.01	1/21 2:36 PM	51.9	100.1	35	100	371.5	0	3.2	1.46	1.93	0.994	3.2	1757.0	
E	12/24 2:20 PM	28.03	1/21 3:04 PM	51.9	97.3	35	100	360.0	0	3.2	1.56	1.87	0.990	3.2	1749.7	
F	12/24 2:20 PM	13.98	1/7 1:44 PM	51.8	100.0	35	100	370.0	0	2.6	1.64	1.93	0.994	2.6	1752.9	
G	12/24 2:20 PM	6.96	12/31 1:26 PM	51.9	100.3	35	100	371.8	0	2.0	1.96	1.93	0.995	2.0	1752.6	
H	12/24 2:20 PM	2.97	12/27 1:41 PM	51.8	98.4	35	100	363.2	0	1.6	2.10	1.9	0.992	1.6	1750.4	
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Laboratory Mixing Data
Batch T-9

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.00
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	275
Weight of Slurry Water, $w_{w,slurry}$ (g)	680.0
Weight of Dry Cement, w_c (g)	680.0
Weight of Moist Soil, w_{soil} (g)	2929.8
Weight of Slurry (g)	1360.0
Specific Gravity of Solids	2.78
water content of mix	0.50
Dry unit wt. of mix (kg/m^3)	1155.9

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2200
Weight of Soil Water, $w_{w,soil}$ (g)	770
Total weight of soil used, W_t (g)	2955.4
Weight of Dry Cement, w_c (g)	683.0
Weight of Slurry Water, $w_{w,slurry}$ (g)	683.0
Soil Water Content, w (%)	35.00
Water:Cement Ratio, w:c	1.00
Cement Content, a_W (%)	31.05%
Cement Factor, α (kg/m3)	429.77
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	274.36
Volume Ratio, VR (%)	56.65
Total-Water-to-Cement Ratio, w_T:c	2.12

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	683.0
Volume Ratio, VR (%)	56.65
Total-Water-to-Cement Ratio, w_T:c	2.12
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	274.4

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	12/31 5:35 PM	2.89	1/3 3:02 PM	51.8	99.9	35	100	363.9	0	2.2	2.16	1.93	0.994	2.2	1724.9	
B	12/31 5:35 PM	6.86	1/7 2:13 PM	51.8	91.0	35	100	330.0	0	2.9	1.77	1.75	0.980	2.8	1718.8	
C	12/31 5:35 PM	13.93	1/14 3:53 PM	51.8	100.6	35	100	367.6	0	3.6	1.65	1.94	0.995	3.6	1730.5	
D	12/31 5:35 PM	27.98	1/28 5:03 PM	51.9	99.8	35	100	365.3	0	4.3	1.26	1.92	0.994	4.2	1732.9	
E	12/31 5:35 PM	28.00	1/28 5:28 PM	51.9	99.5	35	100	364.3	0	4.3	1.45	1.92	0.993	4.3	1731.8	
F	12/31 5:35 PM	13.95	1/14 4:23 PM	51.8	96.7	35	100	352.4	0	3.6	1.71	1.86	0.989	3.6	1727.0	
G	12/31 5:35 PM	6.88	1/7 2:39 PM	51.8	97.9	35	100	357.6	0	2.9	1.58	1.89	0.991	2.9	1731.4	
H	12/31 5:35 PM	2.91	1/3 3:24 PM	51.8	99.5	35	100	362.1	0	2.2	2.04	1.92	0.994	2.2	1723.8	
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Laboratory Mixing Data
Batch T-10

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.00
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	350
Weight of Slurry Water, $w_{w,slurry}$ (g)	870.0
Weight of Dry Cement, w_c (g)	870.0
Weight of Moist Soil, w_{soil} (g)	2475.5
Weight of Slurry (g)	1740.0
Specific Gravity of Solids	2.82
water content of mix	0.56
Dry unit wt. of mix (kg/m^3)	1094.3

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	1900
Weight of Soil Water, $w_{w,soil}$ (g)	673.8
Total weight of soil used, W_t (g)	2559.6
Weight of Dry Cement, w_c (g)	895.0
Weight of Slurry Water, $w_{w,slurry}$ (g)	895.0
Soil Water Content, w (%)	35.46
Water:Cement Ratio, w:c	1.00
Cement Content, a_W (%)	47.11%
Cement Factor, α (kg/m3)	650.26
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	350.15
Volume Ratio, VR (%)	85.71
Total-Water-to-Cement Ratio, w_T:c	1.74

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	895.0
Volume Ratio, VR (%)	85.71
Total-Water-to-Cement Ratio, w_T:c	1.74
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	350.2

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	1/7 2:45 PM	3.06	1/10 4:09 PM	51.9	97.2	35	100	348.0	0	2.9	1.58	1.87	0.990	2.9	1692.3	
B	1/7 2:45 PM	7.01	1/14 3:03 PM	51.8	99.6	35	100	357.1	0	3.8	1.40	1.92	0.994	3.8	1700.4	
C	1/7 2:45 PM	13.96	1/21 1:42 PM	51.9	99.6	35	100	357.3	0	4.5	1.38	1.92	0.994	4.5	1697.6	
D	1/7 2:45 PM	28.05	2/4 4:02 PM	51.9	91.9	35	100	330.6	0	5.5	1.60	1.77	0.982	5.4	1700.5	
E	1/7 2:45 PM	28.07	2/4 4:28 PM	51.9	97.9	35	100	352.4	0	5.4	1.37	1.89	0.991	5.3	1702.9	
F	1/7 2:45 PM	13.97	1/21 2:08 PM	51.8	90.3	35	100	322.5	0	4.7	1.57	1.74	0.979	4.6	1695.4	
G	1/7 2:45 PM	7.03	1/14 3:28 PM	51.9	97.5	35	100	348.7	0	3.7	1.23	1.88	0.990	3.7	1690.9	
H	1/7 2:45 PM	3.08	1/10 4:36 PM	51.8	99.5	35	100	355.5	0	3.0	1.77	1.92	0.994	3.0	1695.7	
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Laboratory Mixing Data
Batch T-11

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	0.60
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	200
Weight of Slurry Water, $w_{w,slurry}$ (g)	300.0
Weight of Dry Cement, w_c (g)	500.0
Weight of Moist Soil, w_{soil} (g)	3751.8
Weight of Slurry (g)	800.0
Specific Gravity of Solids	2.74
water content of mix	0.39
Dry unit wt. of mix (kg/m^3)	1325.7

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2800
Weight of Soil Water, $w_{w,soil}$ (g)	980
Total weight of soil used, W_t (g)	3758.7
Weight of Dry Cement, w_c (g)	504.9
Weight of Slurry Water, $w_{w,slurry}$ (g)	303.0
Soil Water Content, w (%)	35.00
Water:Cement Ratio, w:c	0.60
Cement Content, a_W (%)	18.03%
Cement Factor, α (kg/m3)	249.82
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	203.22
Volume Ratio, VR (%)	22.93
Total-Water-to-Cement Ratio, w_T:c	2.53

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	303.0
Volume Ratio, VR (%)	22.93
Total-Water-to-Cement Ratio, w_T:c	2.53
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	203.2

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	12/22 2:00 PM	2.98	12/25 1:25 PM	51.8	100.5	45	100	382.7	0	2.4	1.64	1.94	0.995	2.3	1805.7	
B	12/22 2:00 PM	7.10	12/29 4:29 PM	51.8	100.5	45	100	382.6	0	3.4	1.23	1.94	0.995	3.3	1803.9	
C	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
D	12/22 2:00 PM	28.07	1/19 3:33 PM	51.8	98.2	45	100	375.2	0	7.0	1.45	1.9	0.992	7.0	1811.0	
E	12/22 2:00 PM	28.09	1/19 4:03 PM	51.9	91.5	45	100	348.6	0	6.9	1.49	1.76	0.981	6.8	1801.6	
F	12/22 2:00 PM	14.02	1/5 2:27 PM	51.9	99.6	45	100	381.1	0	4.7	1.45	1.92	0.993	4.6	1805.8	
G	12/22 2:00 PM	7.12	12/29 4:55 PM	51.9	99.0	45	100	378.3	0	3.5	1.33	1.91	0.993	3.4	1806.2	
H	12/22 2:00 PM	3.00	12/25 1:52 PM	51.9	96.7	45	100	367.8	0	2.5	1.55	1.86	0.989	2.4	1798.9	
I	12/22 2:00 PM	14.04	1/5 2:57 PM	51.9	93.2	45	100	355.5	0	4.7	1.27	1.8	0.984	4.6	1803.7	
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Laboratory Mixing Data
Batch T-12

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	0.60
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	350
Weight of Slurry Water, $w_{w,slurry}$ (g)	520.0
Weight of Dry Cement, w_c (g)	870.0
Weight of Moist Soil, w_{soil} (g)	3119.1
Weight of Slurry (g)	1390.0
Specific Gravity of Solids	2.79
water content of mix	0.42
Dry unit wt. of mix (kg/m^3)	1287.6

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2400
Weight of Soil Water, $w_{w,soil}$ (g)	852
Total weight of soil used, W_t (g)	3235.5
Weight of Dry Cement, w_c (g)	902.4
Weight of Slurry Water, $w_{w,slurry}$ (g)	541.5
Soil Water Content, w (%)	35.50
Water:Cement Ratio, w:c	0.60
Cement Content, a_W (%)	37.60%
Cement Factor, α (kg/m3)	518.69
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	351.40
Volume Ratio, VR (%)	47.61
Total-Water-to-Cement Ratio, w_T:c	1.53

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	541.5
Volume Ratio, VR (%)	47.61
Total-Water-to-Cement Ratio, w_T:c	1.53
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	351.4

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	12/22 2:55 PM	2.97	12/25 2:18 PM	52.0	98.2	45	100	372.3	0	5.2	1.71	1.89	0.991	5.1	1785.7	
B	12/22 2:55 PM	7.10	12/29 5:19 PM	51.9	98.9	45	100	376.3	0	6.9	1.49	1.9	0.992	6.8	1794.9	
C	12/22 2:55 PM	14.02	1/5 3:19 PM	51.9	99.2	45	100	378.1	0	7.88	1.38	1.91	0.993	7.8	1800.7	
D	12/22 2:55 PM	28.06	1/19 4:28 PM	52.0	97.8	45	100	372.6	0	9.8	1.56	1.88	0.990	9.7	1794.5	
E	12/22 2:55 PM	28.08	1/19 4:54 PM	51.9	97.6	45	100	372.3	0	10.0	1.71	1.88	0.990	9.9	1799.4	
F	12/22 2:55 PM	14.03	1/5 3:43 PM	51.9	97.4	45	100	370.1	0	8.4	1.71	1.88	0.990	8.3	1792.5	
G	12/22 2:55 PM	7.12	12/29 5:42 PM	51.9	99.4	45	100	378.6	0	6.8	1.60	1.91	0.993	6.8	1798.9	
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I	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
J	12/22 2:55 PM	3.01	12/25 3:06 PM	51.9	97.7	45	100	370.9	0	5.4	1.39	1.88	0.991	5.3	1794.8	

Laboratory Mixing Data
Batch T-13

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.00
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	125
Weight of Slurry Water, $w_{w,slurry}$ (g)	310.0
Weight of Dry Cement, w_c (g)	310.0
Weight of Moist Soil, w_{soil} (g)	3838.3
Weight of Slurry (g)	620.0
Specific Gravity of Solids	2.71
water content of mix	0.41
Dry unit wt. of mix (kg/m^3)	1276.8

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2900
Weight of Soil Water, $w_{w,soil}$ (g)	1015
Total weight of soil used, W_t (g)	3895.4
Weight of Dry Cement, w_c (g)	312.9
Weight of Slurry Water, $w_{w,slurry}$ (g)	312.9
Soil Water Content, w (%)	35.00
Water:Cement Ratio, w:c	1.00
Cement Content, a_W (%)	10.79%
Cement Factor, α (kg/m3)	149.38
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	124.81
Volume Ratio, VR (%)	19.69
Total-Water-to-Cement Ratio, w_T:c	4.23

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	312.9
Volume Ratio, VR (%)	19.69
Total-Water-to-Cement Ratio, w_T:c	4.23
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	124.8

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	12/23 3:50 PM	2.98	12/26 3:25 PM	51.9	98.1	45	100	366.0	0	1.4	2.12	1.89	0.991	1.4	1764.2	
B	12/23 3:50 PM	6.96	12/30 2:51 PM	51.8	98.7	45	100	369.6	0	2.1	2.37	1.9	0.992	2.0	1778.4	
C	12/23 3:50 PM	13.99	1/6 3:31 PM	51.8	99.5	45	100	372.8	0	2.89	1.68	1.92	0.994	2.9	1775.2	
D	12/23 3:50 PM	27.99	1/20 3:35 PM	51.8	97.2	45	100	363.8	0	4.0	1.89	1.88	0.990	4.0	1775.3	
E	12/23 3:50 PM	28.01	1/20 4:04 PM	51.9	97.7	45	100	365.2	0	4.1	1.83	1.88	0.991	4.0	1769.4	
F	12/23 3:50 PM	14.00	1/6 3:53 PM	51.8	99.4	45	100	372.6	0	2.9	1.93	1.92	0.994	2.9	1776.9	
G	12/23 3:50 PM	6.98	12/30 3:17 PM	51.9	99.3	45	100	371.1	0	2.0	2.60	1.91	0.993	2.0	1766.3	
H	12/23 3:50 PM	3.00	12/26 3:52 PM	51.8	96.1	45	100	359.2	0	1.4	2.94	1.85	0.988	1.4	1770.1	
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Laboratory Mixing Data
Batch T-14

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.00
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	350
Weight of Slurry Water, $w_{w,slurry}$ (g)	870.0
Weight of Dry Cement, w_c (g)	870.0
Weight of Moist Soil, w_{soil} (g)	2475.5
Weight of Slurry (g)	1740.0
Specific Gravity of Solids	2.82
water content of mix	0.56
Dry unit wt. of mix (kg/m^3)	1094.5

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	1900
Weight of Soil Water, $w_{w,soil}$ (g)	665
Total weight of soil used, W_t (g)	2553.2
Weight of Dry Cement, w_c (g)	891.8
Weight of Slurry Water, $w_{w,slurry}$ (g)	891.8
Soil Water Content, w (%)	35.00
Water:Cement Ratio, w:c	1.00
Cement Content, a_W (%)	46.94%
Cement Factor, α (kg/m3)	649.55
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	349.95
Volume Ratio, VR (%)	85.61
Total-Water-to-Cement Ratio, w_T:c	1.74

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	891.8
Volume Ratio, VR (%)	85.61
Total-Water-to-Cement Ratio, w_T:c	1.74
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	350.0

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	12/23 6:00 PM	2.93	12/26 4:19 PM	51.9	96.1	45	100	343.8	0	3.0	1.61	1.85	0.988	3.0	1689.2	
B	12/23 6:00 PM	6.95	12/30 4:41 PM	51.9	99.7	45	100	358.0	0	4.0	1.47	1.92	0.994	4.0	1700.0	
C	12/23 6:00 PM	13.93	1/6 4:19 PM	51.9	96.3	45	100	344.1	0	4.90	1.67	1.86	0.988	4.8	1689.2	
D	12/23 6:00 PM	27.94	1/20 4:33 PM	52.0	99.8	45	100	359.0	0	5.8	1.63	1.92	0.994	5.7	1693.9	
E	12/23 6:00 PM	27.96	1/20 4:59 PM	51.9	98.1	45	100	352.2	0	5.8	1.67	1.89	0.991	5.8	1695.1	
F	12/23 6:00 PM	13.95	1/6 4:44 PM	51.9	98.7	45	100	353.5	0	4.9	1.58	1.9	0.992	4.9	1691.0	
G	12/23 6:00 PM	6.96	12/30 5:03 PM	51.9	99.5	45	100	356.0	0	4.1	1.54	1.92	0.994	4.0	1692.7	
H	12/23 6:00 PM	2.95	12/26 4:53 PM	51.9	93.5	45	100	331.9	0	3.1	1.80	1.8	0.984	3.0	1676.4	
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J	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

Laboratory Mixing Data
Batch T-15

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.40
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	125
Weight of Slurry Water, $w_{w,slurry}$ (g)	440.0
Weight of Dry Cement, w_c (g)	310.0
Weight of Moist Soil, w_{soil} (g)	3608.4
Weight of Slurry (g)	750.0
Specific Gravity of Solids	2.71
water content of mix	0.46
Dry unit wt. of mix (kg/m^3)	1207.4

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2700
Weight of Soil Water, $w_{w,soil}$ (g)	945
Total weight of soil used, W_t (g)	3624.8
Weight of Dry Cement, w_c (g)	310.9
Weight of Slurry Water, $w_{w,slurry}$ (g)	435.3
Soil Water Content, w (%)	35.00
Water:Cement Ratio, w:c	1.40
Cement Content, a_W (%)	11.52%
Cement Factor, α (kg/m3)	159.51
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	125.20
Volume Ratio, VR (%)	27.41
Total-Water-to-Cement Ratio, w_T:c	4.42

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	435.3
Volume Ratio, VR (%)	27.41
Total-Water-to-Cement Ratio, w_T:c	4.42
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	125.2

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	12/26 5:50 PM	3.01	12/29 6:09 PM	51.9	97.1	45	100	355.0	0	1.1	2.21	1.87	0.989	1.1	1726.1	
B	12/26 5:50 PM	6.97	1/2 5:10 PM	51.9	96.0	45	100	350.4	0	1.6	2.20	1.85	0.988	1.5	1726.9	
C	12/26 5:50 PM	13.98	1/9 5:21 PM	51.9	98.2	45	100	360.4	0	2.23	1.73	1.89	0.991	2.2	1737.1	
D	12/26 5:50 PM	28.00	1/23 5:47 PM	51.9	94.6	45	100	346.3	0	3.2	1.60	1.82	0.986	3.1	1731.1	
E	12/26 5:50 PM	28.01	1/23 6:09 PM	51.8	98.6	45	100	361.7	0	3.2	1.67	1.9	0.992	3.2	1743.9	
F	12/26 5:50 PM	14.00	1/9 5:52 PM	51.9	98.7	45	100	361.7	0	2.4	2.16	1.9	0.992	2.4	1733.6	
G	12/26 5:50 PM	6.99	1/2 5:37 PM	51.9	98.5	45	100	361.3	0	1.6	1.86	1.9	0.992	1.6	1736.0	
H	12/26 5:50 PM	3.04	12/29 6:43 PM	51.9	95.0	45	100	346.3	0	1.1	2.76	1.83	0.986	1.1	1723.2	
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J	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

Laboratory Mixing Data
Batch T-16

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.40
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	275
Weight of Slurry Water, $w_{w,slurry}$ (g)	960.0
Weight of Dry Cement, w_c (g)	680.0
Weight of Moist Soil, w_{soil} (g)	2424.1
Weight of Slurry (g)	1640.0
Specific Gravity of Solids	2.80
water content of mix	0.64
Dry unit wt. of mix (kg/m^3)	1002.4

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	1800
Weight of Soil Water, $w_{w,soil}$ (g)	630
Total weight of soil used, W_t (g)	2415.8
Weight of Dry Cement, w_c (g)	680.9
Weight of Slurry Water, $w_{w,slurry}$ (g)	953.3
Soil Water Content, w (%)	35.00
Water:Cement Ratio, w:c	1.40
Cement Content, a_W (%)	37.83%
Cement Factor, α (kg/m3)	524.16
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	275.79
Volume Ratio, VR (%)	90.06
Total-Water-to-Cement Ratio, w_T:c	2.32

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	953.3
Volume Ratio, VR (%)	90.06
Total-Water-to-Cement Ratio, w_T:c	2.32
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	275.8

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	12/30 6:30 PM	2.98	1/2 6:03 PM	51.9	91.7	45	100	317.3	0	1.8	1.98	1.77	0.982	1.8	1636.9	
B	12/30 6:30 PM	6.95	1/6 5:14 PM	51.9	96.3	45	100	335.2	0	2.3	1.53	1.85	0.988	2.2	1642.8	
C	12/30 6:30 PM	13.95	1/13 5:13 PM	51.9	92.5	45	100	322.1	0	2.97	1.72	1.78	0.983	2.9	1648.9	
D	12/30 6:30 PM	27.98	1/27 5:56 PM	51.9	94.8	45	100	331.0	0	3.6	1.52	1.82	0.986	3.6	1648.3	
E	12/30 6:30 PM	27.99	1/27 6:22 PM	51.9	93.2	45	100	325.4	0	3.7	1.53	1.8	0.984	3.7	1651.7	
F	12/30 6:30 PM	13.96	1/13 5:38 PM	51.9	97.5	45	100	339.6	0	2.9	1.48	1.88	0.990	2.9	1645.5	
G	12/30 6:30 PM	6.97	1/6 5:41 PM	51.9	93.4	45	100	325.0	0	2.4	1.78	1.8	0.984	2.4	1646.5	
H	12/30 6:30 PM	3.00	1/2 6:29 PM	51.9	95.5	45	100	331.4	0	1.8	1.93	1.84	0.987	1.7	1640.7	
I	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
J	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

Laboratory Mixing Data
Batch T-17

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	0.60
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	200
Weight of Slurry Water, $w_{w,slurry}$ (g)	300.0
Weight of Dry Cement, w_c (g)	500.0
Weight of Moist Soil, w_{soil} (g)	3751.8
Weight of Slurry (g)	800.0
Specific Gravity of Solids	2.74
water content of mix	0.39
Dry unit wt. of mix (kg/m^3)	1324.9

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2800
Weight of Soil Water, $w_{w,soil}$ (g)	980
Total weight of soil used, W_t (g)	3751.5
Weight of Dry Cement, w_c (g)	513.3
Weight of Slurry Water, $w_{w,slurry}$ (g)	308.0
Soil Water Content, w (%)	35.00
Water:Cement Ratio, w:c	0.60
Cement Content, a_W (%)	18.33%
Cement Factor, α (kg/m3)	254.45
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	206.28
Volume Ratio, VR (%)	23.36
Total-Water-to-Cement Ratio, w_T:c	2.49

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	308.0
Volume Ratio, VR (%)	23.36
Total-Water-to-Cement Ratio, w_T:c	2.49
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	206.3

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	10/29 8:00 PM	2.91	11/1 5:55 PM	52.0	95.4	55	100	360.6	0	3.1	1.54	1.83	0.987	3.0	1780.2	
B	10/29 8:00 PM	7.14	11/5 11:17 PM	51.9	96.7	55	100	367.0	0	4.8	1.41	1.86	0.989	4.8	1794.1	
C	10/29 8:00 PM	13.89	11/12 5:14 PM	52.0	96.4	55	100	366.9	0	7.01	1.41	1.85	0.988	6.9	1794.5	
D	10/29 8:00 PM	27.12	11/25 10:47 PM	51.9	98.0	55	100	373.3	0	8.7	1.33	1.89	0.991	8.6	1798.2	
E	10/29 8:00 PM	27.14	11/25 11:18 PM	52.0	96.4	55	100	367.6	0	9.1	1.64	1.85	0.988	9.0	1792.1	
F	10/29 8:00 PM	13.91	11/12 5:43 PM	52.0	98.9	55	100	377.7	0	6.1	1.14	1.9	0.992	6.1	1799.5	
G	10/29 8:00 PM	7.16	11/5 11:53 PM	52.0	98.1	55	100	373.5	0	5.0	1.48	1.89	0.991	5.0	1792.8	
H	10/29 8:00 PM	2.93	11/1 6:25 PM	52.0	98.1	55	100	370.8	0	3.2	1.74	1.89	0.991	3.2	1778.6	
I	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
J	10/29 8:00 PM	13.93	11/12 6:15 PM	52.0	98.6	55	100	375.6	0	6.8	1.33	1.9	0.992	6.8	1791.9	

Laboratory Mixing Data
Batch T-18

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	0.60
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	350
Weight of Slurry Water, $w_{w,slurry}$ (g)	520.0
Weight of Dry Cement, w_c (g)	870.0
Weight of Moist Soil, w_{soil} (g)	3119.1
Weight of Slurry (g)	1390.0
Specific Gravity of Solids	2.79
water content of mix	0.42
Dry unit wt. of mix (kg/m^3)	1288.0

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2399.6
Weight of Soil Water, $w_{w,soil}$ (g)	842.5
Total weight of soil used, W_t (g)	3229.1
Weight of Dry Cement, w_c (g)	895.2
Weight of Slurry Water, $w_{w,slurry}$ (g)	537.1
Soil Water Content, w (%)	35.11
Water:Cement Ratio, w:c	0.60
Cement Content, a_W (%)	37.31%
Cement Factor, α (kg/m3)	515.54
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	349.95
Volume Ratio, VR (%)	47.32
Total-Water-to-Cement Ratio, w_T:c	1.54

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	537.1
Volume Ratio, VR (%)	47.32
Total-Water-to-Cement Ratio, w_T:c	1.54
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	349.9

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	3/18 3:30 PM	3.02	3/21 4:02 PM	51.9	98.5	55	100	372.0	0	5.9	1.79	1.9	0.992	5.8	1786.6	
B	3/18 3:30 PM	7.02	3/25 4:04 PM	52.0	98.7	55	100	375.2	0	7.9	1.47	1.9	0.992	7.8	1792.1	
C	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
D	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
E	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
F	3/18 3:30 PM	14.72	4/2 8:47 AM	52.0	99.7	55	100	380.5	0	9.9	1.98	1.92	0.993	9.8	1797.1	
G	3/18 3:30 PM	7.04	3/25 4:30 PM	51.9	100.9	55	100	382.8	0	8.3	1.55	1.94	0.995	8.3	1789.6	
H	3/18 3:30 PM	3.06	3/21 4:51 PM	51.9	97.4	55	100	366.8	0	6.0	1.63	1.88	0.990	6.0	1778.3	
I	3/18 3:30 PM	14.74	4/2 9:08 AM	52.0	99.7	55	100	381.5	0	10.2	2.04	1.92	0.993	10.2	1801.4	
J	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

Laboratory Mixing Data
Batch T-19

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.00
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	125
Weight of Slurry Water, $w_{w,slurry}$ (g)	310.0
Weight of Dry Cement, w_c (g)	310.0
Weight of Moist Soil, w_{soil} (g)	3838.3
Weight of Slurry (g)	620.0
Specific Gravity of Solids	2.71
water content of mix	0.41
Dry unit wt. of mix (kg/m^3)	1276.4

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2899.9
Weight of Soil Water, $w_{w,soil}$ (g)	1022.4
Total weight of soil used, W_t (g)	3899.7
Weight of Dry Cement, w_c (g)	314.8
Weight of Slurry Water, $w_{w,slurry}$ (g)	314.8
Soil Water Content, w (%)	35.26
Water:Cement Ratio, w:c	1.00
Cement Content, a_W (%)	10.85%
Cement Factor, α (kg/m3)	150.10
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	125.31
Volume Ratio, VR (%)	19.78
Total-Water-to-Cement Ratio, w_T:c	4.21

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	314.8
Volume Ratio, VR (%)	19.78
Total-Water-to-Cement Ratio, w_T:c	4.21
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	125.3

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	11/3 10:10 PM	3.09	11/7 12:17 AM	51.9	94.0	55	100	348.8	0	1.9	2.09	1.81	0.985	1.9	1756.1	
B	11/3 10:10 PM	6.82	11/10 5:47 PM	52.0	95.4	55	100	355.0	0	2.8	1.53	1.84	0.987	2.8	1753.8	
C	11/3 10:10 PM	14.01	11/17 10:26 PM	51.8	99.3	55	100	371.3	0	4.12	1.69	1.92	0.993	4.1	1775.1	
D	11/3 10:10 PM	28.00	12/1 10:05 PM	52.0	97.0	55	100	363.5	0	5.1	1.65	1.87	0.989	5.0	1766.7	
E	11/3 10:10 PM	28.01	12/1 10:29 PM	52.0	99.0	55	100	370.4	0	5.2	1.68	1.9	0.992	5.1	1764.6	
F	11/3 10:10 PM	14.03	11/17 10:53 PM	51.9	93.9	55	100	351.0	0	4.2	1.61	1.81	0.985	4.1	1767.9	
G	11/3 10:10 PM	6.83	11/10 6:12 PM	51.9	99.8	55	100	373.2	0	3.0	1.46	1.92	0.994	3.0	1766.0	
H	11/3 10:10 PM	3.10	11/7 12:40 AM	51.8	100.9	55	100	376.1	0	2.0	2.30	1.95	0.996	2.0	1767.4	
I	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
J	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

Laboratory Mixing Data
Batch T-20

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.00
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	200
Weight of Slurry Water, $w_{w,slurry}$ (g)	500.0
Weight of Dry Cement, w_c (g)	500.0
Weight of Moist Soil, w_{soil} (g)	3384.0
Weight of Slurry (g)	1000.0
Specific Gravity of Solids	2.74
water content of mix	0.46
Dry unit wt. of mix (kg/m^3)	1215.4

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2600
Weight of Soil Water, $w_{w,soil}$ (g)	910
Total weight of soil used, W_t (g)	3489
Weight of Dry Cement, w_c (g)	512.9
Weight of Slurry Water, $w_{w,slurry}$ (g)	512.9
Soil Water Content, w (%)	35.00
Water:Cement Ratio, w:c	1.00
Cement Content, a_W (%)	19.73%
Cement Factor, α (kg/m3)	273.35
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	200.95
Volume Ratio, VR (%)	36.03
Total-Water-to-Cement Ratio, w_T:c	2.76

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	512.9
Volume Ratio, VR (%)	36.03
Total-Water-to-Cement Ratio, w_T:c	2.76
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	201.0

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	11/3 11:30 PM	3.07	11/7 1:04 AM	51.9	100.0	55	100	367.8	0	2.2	2.00	1.92	0.994	2.2	1736.1	
B	11/3 11:30 PM	6.80	11/10 6:42 PM	51.9	100.1	55	100	368.0	0	3.2	1.56	1.93	0.994	3.2	1735.7	
C	11/3 11:30 PM	13.99	11/17 11:22 PM	51.9	97.6	55	100	360.0	0	5.57	1.75	1.88	0.990	5.5	1740.0	
D	11/3 11:30 PM	27.98	12/1 10:57 PM	52.0	98.4	55	100	364.3	0	7.5	1.75	1.89	0.991	7.4	1743.3	
E	11/3 11:30 PM	27.99	12/1 11:19 PM	52.0	99.6	55	100	368.8	0	7.1	1.63	1.92	0.993	7.1	1746.2	
F	11/3 11:30 PM	14.02	11/17 11:56 PM	52.0	95.1	55	100	350.2	0	5.6	1.69	1.83	0.986	5.5	1734.4	
G	11/3 11:30 PM	6.82	11/10 7:04 PM	52.0	98.3	55	100	362.4	0	3.4	1.88	1.89	0.991	3.4	1733.8	
H	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
I	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
J	43042.98	3.09	11/7 1:36 AM	52.0	100.3	55	100	369.7	0	2.4	2.10	1.93	0.994	2.3	1734.2	

Laboratory Mixing Data
Batch T-21

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.00
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	275
Weight of Slurry Water, $w_{w,slurry}$ (g)	680.0
Weight of Dry Cement, w_c (g)	680.0
Weight of Moist Soil, w_{soil} (g)	2929.8
Weight of Slurry (g)	1360.0
Specific Gravity of Solids	2.78
water content of mix	0.50
Dry unit wt. of mix (kg/m^3)	1155.7

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2199.8
Weight of Soil Water, $w_{w,soil}$ (g)	770
Total weight of soil used, W_t (g)	2955.1
Weight of Dry Cement, w_c (g)	684.1
Weight of Slurry Water, $w_{w,slurry}$ (g)	684.1
Soil Water Content, w (%)	35.00
Water:Cement Ratio, w:c	1.00
Cement Content, a_W (%)	31.10%
Cement Factor, α (kg/m3)	430.48
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	274.65
Volume Ratio, VR (%)	56.74
Total-Water-to-Cement Ratio, w_T:c	2.12

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	684.1
Volume Ratio, VR (%)	56.74
Total-Water-to-Cement Ratio, w_T:c	2.12
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	274.6

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	11/9 8:05 PM	3.07	11/12 9:49 PM	52.0	99.3	55	100	359.8	0	2.6	1.80	1.91	0.993	2.6	1707.2	
B	11/9 8:05 PM	7.10	11/16 10:35 PM	52.0	99.6	55	100	360.5	0	3.9	1.88	1.92	0.993	3.8	1702.7	
C	11/9 8:05 PM	14.01	11/23 8:24 PM	52.0	98.9	55	100	360.6	0	5.0	1.53	1.9	0.992	5.0	1719.2	
D	11/9 8:05 PM	27.96	12/7 7:01 PM	52.0	99.1	55	100	361.2	0	8.0	1.58	1.9	0.992	7.9	1712.7	
E	11/9 8:05 PM	27.97	12/7 7:22 PM	52.0	99.2	55	100	362.2	0	8.0	1.58	1.91	0.993	8.0	1717.3	
F	11/9 8:05 PM	14.03	11/23 8:47 PM	52.0	99.4	55	100	361.2	0	5.2	1.72	1.91	0.993	5.1	1711.6	
G	11/9 8:05 PM	7.12	11/16 11:03 PM	52.0	96.9	55	100	325.1	0	3.9	1.66	1.86	0.989	3.9	1578.2	
H	11/9 8:05 PM	3.09	11/12 10:18 PM	52.0	97.8	55	100	352.9	0	2.8	2.27	1.88	0.990	2.7	1697.1	
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Laboratory Mixing Data
Batch T-22

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.00
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	350
Weight of Slurry Water, $w_{w,slurry}$ (g)	870.0
Weight of Dry Cement, w_c (g)	870.0
Weight of Moist Soil, w_{soil} (g)	2475.5
Weight of Slurry (g)	1740.0
Specific Gravity of Solids	2.82
water content of mix	0.56
Dry unit wt. of mix (kg/m^3)	1093.7

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	1899.9
Weight of Soil Water, $w_{w,soil}$ (g)	665
Total weight of soil used, W_t (g)	2552.7
Weight of Dry Cement, w_c (g)	896.2
Weight of Slurry Water, $w_{w,slurry}$ (g)	896.2
Soil Water Content, w (%)	35.00
Water:Cement Ratio, w:c	1.00
Cement Content, a_W (%)	47.17%
Cement Factor, α (kg/m3)	652.89
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	350.92
Volume Ratio, VR (%)	86.05
Total-Water-to-Cement Ratio, w_T:c	1.74

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	896.2
Volume Ratio, VR (%)	86.05
Total-Water-to-Cement Ratio, w_T:c	1.74
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	350.9

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	11/10 8:00 PM	3.04	11/13 8:57 PM	52.0	94.9	55	100	337.6	0	3.3	1.65	1.83	0.986	3.2	1673.1	
B	11/10 8:00 PM	7.07	11/17 9:39 PM	52.0	94.6	55	100	334.0	0	4.5	1.73	1.82	0.986	4.5	1662.6	
C	11/10 8:00 PM	13.85	11/24 4:29 PM	52.1	97.4	55	100	345.2	0	5.4	1.33	1.87	0.990	5.3	1663.8	
D	11/10 8:00 PM	27.87	12/8 4:51 PM	52.0	94.3	55	100	336.4	0	6.8	1.47	1.81	0.985	6.7	1680.9	
E	11/10 8:00 PM	27.89	12/8 5:15 PM	52.0	94.8	55	100	339.9	0	7.2	1.79	1.82	0.986	7.1	1688.4	
F	11/10 8:00 PM	13.87	11/24 4:56 PM	52.0	98.5	55	100	352.1	0	5.6	1.49	1.89	0.992	5.6	1684.0	
G	11/10 8:00 PM	7.08	11/17 10:01 PM	52.0	100.8	55	100	359.3	0	4.4	1.42	1.94	0.995	4.3	1679.0	
H	11/10 8:00 PM	3.06	11/13 9:22 PM	52.0	98.4	55	100	350.4	0	3.2	1.52	1.89	0.991	3.2	1674.3	
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Laboratory Mixing Data
Batch T-23

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.40
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	125
Weight of Slurry Water, $w_{w,slurry}$ (g)	440.0
Weight of Dry Cement, w_c (g)	310.0
Weight of Moist Soil, w_{soil} (g)	3608.4
Weight of Slurry (g)	750.0
Specific Gravity of Solids	2.71
water content of mix	0.47
Dry unit wt. of mix (kg/m^3)	1197.4

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2699.4
Weight of Soil Water, $w_{w,soil}$ (g)	945
Total weight of soil used, W_t (g)	3621.1
Weight of Dry Cement, w_c (g)	334.3
Weight of Slurry Water, $w_{w,slurry}$ (g)	468.0
Soil Water Content, w (%)	35.01
Water:Cement Ratio, w:c	1.40
Cement Content, a_W (%)	12.38%
Cement Factor, α (kg/m3)	171.68
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	132.57
Volume Ratio, VR (%)	29.50
Total-Water-to-Cement Ratio, w_T:c	4.21

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	468.0
Volume Ratio, VR (%)	29.50
Total-Water-to-Cement Ratio, w_T:c	4.21
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	132.6

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	11/17 12:00 AM	2.90	11/19 9:28 PM	52.0	96.1	55	100	349.6	0	1.4	2.34	1.85	0.988	1.4	1714.8	
B	11/17 12:00 AM	6.88	11/23 9:13 PM	52.0	97.5	55	100	355.4	0	2.2	1.70	1.87	0.990	2.1	1712.8	
C	11/17 12:00 AM	13.93	11/30 10:15 PM	52.0	94.1	55	100	352.3	0	3.4	2.10	1.81	0.985	3.4	1761.9	
D	11/17 12:00 AM	27.97	12/14 11:09 PM	51.9	94.3	55	100	344.8	0	4.5	1.95	1.82	0.985	4.4	1727.9	
E	11/17 12:00 AM	27.98	12/14 11:37 PM	51.9	97.0	55	100	353.8	0	4.2	1.68	1.87	0.989	4.2	1721.6	
F	11/17 12:00 AM	13.95	11/30 10:49 PM	51.9	97.8	55	100	355.8	0	3.4	1.78	1.88	0.991	3.4	1722.5	
G	11/17 12:00 AM	6.90	11/23 9:37 PM	52.0	98.7	55	100	359.7	0	2.4	2.20	1.9	0.992	2.4	1715.9	
H	11/17 12:00 AM	2.91	11/19 9:56 PM	52.0	96.7	55	100	349.8	0	1.5	3.23	1.86	0.989	1.5	1705.0	
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Laboratory Mixing Data
Batch T-24

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.40
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	275
Weight of Slurry Water, $w_{w,slurry}$ (g)	960.0
Weight of Dry Cement, w_c (g)	680.0
Weight of Moist Soil, w_{soil} (g)	2424.1
Weight of Slurry (g)	1640.0
Specific Gravity of Solids	2.80
water content of mix	0.64
Dry unit wt. of mix (kg/m^3)	1001.7

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	1799.6
Weight of Soil Water, $w_{w,soil}$ (g)	635.6
Total weight of soil used, W_t (g)	2424.2
Weight of Dry Cement, w_c (g)	685.5
Weight of Slurry Water, $w_{w,slurry}$ (g)	959.6
Soil Water Content, w (%)	35.32
Water:Cement Ratio, w:c	1.40
Cement Content, a_W (%)	38.09%
Cement Factor, α (kg/m3)	525.83
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	276.25
Volume Ratio, VR (%)	90.35
Total-Water-to-Cement Ratio, w_T:c	2.32

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	959.6
Volume Ratio, VR (%)	90.35
Total-Water-to-Cement Ratio, w_T:c	2.32
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	276.2

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	3/18 4:50 PM	3.02	3/21 5:14 PM	52.0	98.6	55	100	340.0	0	1.7	2.25	1.9	0.992	1.7	1623.6	
B	3/18 4:50 PM	7.00	3/25 4:53 PM	51.9	99.2	55	100	327.8	0	2.6	2.31	1.91	0.993	2.5	1558.8	
C	3/18 4:50 PM	13.94	4/1 3:27 PM	52.0	98.2	55	100	338.4	0	3.4	1.97	1.89	0.991	3.4	1620.7	
D	3/18 4:50 PM	27.97	4/15 4:13 PM	52.1	97.6	55	100	337.7	0	5.2	1.62	1.87	0.990	5.2	1625.5	
E	3/18 4:50 PM	27.99	4/15 4:37 PM	51.9	98.2	55	100	340.2	0	5.4	1.85	1.89	0.991	5.3	1635.3	
F	3/18 4:50 PM	13.96	4/1 3:51 PM	52.0	98.8	55	100	341.8	0	3.5	2.04	1.9	0.992	3.5	1627.3	
G	3/18 4:50 PM	7.02	3/25 5:14 PM	52.0	100.0	55	100	345.0	0	2.6	2.47	1.92	0.994	2.6	1624.5	
H	3/18 4:50 PM	3.03	3/21 5:37 PM	51.9	97.4	55	100	332.8	0	1.8	2.50	1.88	0.990	1.8	1613.4	
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Laboratory Mixing Data
Batch T-25

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	0.60
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	200
Weight of Slurry Water, $w_{w,slurry}$ (g)	300.0
Weight of Dry Cement, w_c (g)	500.0
Weight of Moist Soil, w_{soil} (g)	3751.8
Weight of Slurry (g)	800.0
Specific Gravity of Solids	2.73
water content of mix	0.39
Dry unit wt. of mix (kg/m^3)	1326.5

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2800
Weight of Soil Water, $w_{w,soil}$ (g)	980
Total weight of soil used, W_t (g)	3767.7
Weight of Dry Cement, w_c (g)	496.6
Weight of Slurry Water, $w_{w,slurry}$ (g)	298.0
Soil Water Content, w (%)	35.00
Water:Cement Ratio, w:c	0.60
Cement Content, a_W (%)	17.74%
Cement Factor, α (kg/m3)	245.11
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	200.09
Volume Ratio, VR (%)	22.50
Total-Water-to-Cement Ratio, w_T:c	2.57

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	298.0
Volume Ratio, VR (%)	22.50
Total-Water-to-Cement Ratio, w_T:c	2.57
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	200.1

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	3/29 11:30 AM	3.24	4/1 5:12 PM	51.6	96.6	-5	45	366.1	0	0.6	2.02	1.87	0.990	0.6	1809.7	
H	3/29 11:30 AM	3.25	4/1 5:32 PM	51.5	94.8	-5	45	351.9	0	0.2	4.38	1.84	0.987	0.2	1780.1	
I	3/29 11:30 AM	3.27	4/1 6:00 PM	51.6	100.9	-5	45	386.4	0	0.3	1.54	1.96	0.996	0.3	1829.7	
B	3/29 11:30 AM	7.22	4/5 4:51 PM	51.3	102.4	-5	45	382.9	0	0.5	5.70	2	1.000	0.5	1812.8	
G	3/29 11:30 AM	7.24	4/5 5:10 PM	51.5	100.6	-5	45	377.9	0	0.6	4.10	1.95	0.996	0.6	1800.1	
C	3/29 11:30 AM	13.97	4/12 10:46 AM	51.7	101.7	-5	45	382.4	0	0.8	5.79	1.97	0.997	0.8	1791.9	
F	3/29 11:30 AM	13.99	4/12 11:14 AM	51.5	102.1	-5	45	383.3	0	0.7	6.26	1.98	0.999	0.7	1799.1	
D	3/29 11:30 AM	28.23	4/26 5:02 PM	51.4	100.3	-5	45	377.6	0	0.9	4.19	1.95	0.996	0.9	1811.8	
E	3/29 11:30 AM	28.25	4/26 5:27 PM	51.6	100.9	-5	45	380.3	0	1.1	4.36	1.96	0.997	1.1	1804.3	
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Laboratory Mixing Data
Batch T-26

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.00
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	125
Weight of Slurry Water, $w_{w,slurry}$ (g)	310.0
Weight of Dry Cement, w_c (g)	310.0
Weight of Moist Soil, w_{soil} (g)	3838.3
Weight of Slurry (g)	620.0
Specific Gravity of Solids	2.71
water content of mix	0.41
Dry unit wt. of mix (kg/m^3)	1276.6

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2900
Weight of Soil Water, $w_{w,soil}$ (g)	1015
Total weight of soil used, W_t (g)	3900.7
Weight of Dry Cement, w_c (g)	314.0
Weight of Slurry Water, $w_{w,slurry}$ (g)	314.0
Soil Water Content, w (%)	35.00
Water:Cement Ratio, w:c	1.00
Cement Content, a_W (%)	10.83%
Cement Factor, α (kg/m3)	149.70
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	125.03
Volume Ratio, VR (%)	19.73
Total-Water-to-Cement Ratio, w_T:c	4.22

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	314.0
Volume Ratio, VR (%)	19.73
Total-Water-to-Cement Ratio, w_T:c	4.22
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	125.0

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	3/30 3:30 PM	2.84	4/2 11:46 AM	51.6	101.5	-5	45	374.7	0	0.3	3.53	1.97	0.997	0.3	1764.9	
H	3/30 3:30 PM	2.87	4/2 12:18 PM	50.9	100.8	-5	45	356.3	0	0.3	4.53	1.98	0.999	0.3	1738.5	
B	3/30 3:30 PM	6.97	4/6 2:50 PM	51.3	101.9	-5	45	378.2	0	0.5	3.25	1.99	0.999	0.5	1799.5	
G	3/30 3:30 PM	6.98	4/6 3:04 PM	51.1	101.3	-5	45	374.5	0	0.4	3.73	1.98	0.998	0.4	1801.1	
C	3/30 3:30 PM	13.95	4/13 2:11 PM	51.3	101.6	-5	45	376.0	0	0.6	3.25	1.98	0.999	0.6	1793.9	
F	3/30 3:30 PM	13.96	4/13 2:37 PM	51.3	102.4	-5	45	376.5	0	0.4	3.78	2.00	1.000	0.4	1778.5	
D	3/30 3:30 PM	27.97	4/27 2:53 PM	51.3	100.5	-5	45	370.8	0	0.7	3.16	1.96	0.997	0.7	1784.3	
E	3/30 3:30 PM	27.99	4/27 3:19 PM	51.2	102.2	-5	45	376.4	0	0.6	3.63	2.00	1.000	0.6	1790.9	
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Laboratory Mixing Data
Batch T-27

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.00
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	350
Weight of Slurry Water, $w_{w,slurry}$ (g)	870.0
Weight of Dry Cement, w_c (g)	870.0
Weight of Moist Soil, w_{soil} (g)	2475.5
Weight of Slurry (g)	1740.0
Specific Gravity of Solids	2.82
water content of mix	0.56
Dry unit wt. of mix (kg/m^3)	1094.4

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	1899.9
Weight of Soil Water, $w_{w,soil}$ (g)	665
Total weight of soil used, W_t (g)	2554.2
Weight of Dry Cement, w_c (g)	892.8
Weight of Slurry Water, $w_{w,slurry}$ (g)	892.8
Soil Water Content, w (%)	35.00
Water:Cement Ratio, w:c	1.00
Cement Content, a_W (%)	46.99%
Cement Factor, α (kg/m3)	650.03
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	350.09
Volume Ratio, VR (%)	85.68
Total-Water-to-Cement Ratio, w_T:c	1.74

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	892.8
Volume Ratio, VR (%)	85.68
Total-Water-to-Cement Ratio, w_T:c	1.74
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	350.1

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	3/31 12:10 PM	3.27	4/3 6:35 PM	51.3	99.2	-5	45	344.2	0	0.4	6.00	1.94	0.995	0.4	1680.9	
H	3/31 12:10 PM	3.28	4/3 6:48 PM	51.4	96.3	-5	45	340.0	0	0.5	3.11	1.87	0.990	0.5	1703.2	
B	3/31 12:10 PM	7.10	4/7 2:37 PM	51.3	102.3	-5	45	358.1	0	0.9	4.52	1.99	0.999	0.9	1691.6	
G	3/31 12:10 PM	7.11	4/7 2:49 PM	51.2	101.5	-5	45	385.2	0	0.6	7.24	1.98	0.999	0.6	1843.8	
C	3/31 12:10 PM	14.10	4/14 2:32 PM	51.5	103.0	-5	45	358.6	0	0.8	7.30	2	1.000	0.8	1669.4	
F	3/31 12:10 PM	14.12	4/14 3:03 PM	51.6	102.4	-5	45	355.9	0	0.8	5.80	1.99	0.999	0.8	1662.2	
D	3/31 12:10 PM	28.12	4/28 3:08 PM	51.2	102.9	-5	45	358.2	0	0.3	8.48	2.01	1.001	0.3	1693.8	
E	3/31 12:10 PM	28.15	4/28 3:39 PM	51.3	100.1	-5	45	349.3	0	0.4	7.29	1.95	0.996	0.4	1690.2	
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Laboratory Mixing Data
Batch T-28

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.40
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	275
Weight of Slurry Water, $w_{w,slurry}$ (g)	960.0
Weight of Dry Cement, w_c (g)	680.0
Weight of Moist Soil, w_{soil} (g)	2424.1
Weight of Slurry (g)	1640.0
Specific Gravity of Solids	2.79
water content of mix	0.64
Dry unit wt. of mix (kg/m^3)	1003.4

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	1799.7
Weight of Soil Water, $w_{w,soil}$ (g)	693.2
Total weight of soil used, W_t (g)	2481.7
Weight of Dry Cement, w_c (g)	695.7
Weight of Slurry Water, $w_{w,slurry}$ (g)	974.0
Soil Water Content, w (%)	38.52
Water:Cement Ratio, w:c	1.40
Cement Content, a_W (%)	38.66%
Cement Factor, α (kg/m3)	521.32
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	275.00
Volume Ratio, VR (%)	89.57
Total-Water-to-Cement Ratio, w_T:c	2.32

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	974.0
Volume Ratio, VR (%)	89.57
Total-Water-to-Cement Ratio, w_T:c	2.32
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	275.0

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	4/1 4:40 PM	2.94	4/4 3:18 PM	51.6	100.9	-5	45	346.0	0	0.2	1.46	1.96	0.996	0.1	1640.8	
H	4/1 4:40 PM	2.96	4/4 3:36 PM	50.9	101.5	-5	45	328.5	0	0.2	7.97	1.99	0.999	0.2	1590.9	
J	4/1 4:40 PM	2.98	4/4 4:04 PM	51.6	100.8	-5	45	345.7	0	0.2	1.50	1.95	0.996	0.2	1641.4	
B	4/1 4:40 PM	6.97	4/8 3:58 PM	50.8	101.5	-5	45	347.8	0	0.4	6.07	2	1.000	0.4	1692.3	
G	4/1 4:40 PM	6.99	4/8 4:29 PM	50.9	102.8	-5	45	347.0	0	0.4	6.82	2.02	1.002	0.4	1660.1	
C	4/1 4:40 PM	14.00	4/15 4:33 PM	51.3	102.7	-5	45	348.8	0	0.5	7.45	2.00	1.000	0.5	1646.4	
F	4/1 4:40 PM	13.84	4/15 12:42 PM	51.4	102.5	-5	45	341.0	0	0.8	4.47	2	1.000	0.8	1604.1	
D	4/1 4:40 PM	27.75	4/29 10:41 AM	51.3	101.5	-5	45	335.3	0	0.5	8.15	1.98	0.998	0.5	1596.6	
E	4/1 4:40 PM	27.77	4/29 11:06 AM	51.0	101.9	-5	45	338.7	0	0.4	9.52	2	1.000	0.4	1629.2	
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Laboratory Mixing Data
Batch T-29

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	0.60
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	200
Weight of Slurry Water, $w_{w,slurry}$ (g)	300.0
Weight of Dry Cement, w_c (g)	500.0
Weight of Moist Soil, w_{soil} (g)	3751.8
Weight of Slurry (g)	800.0
Specific Gravity of Solids	2.73
water content of mix	0.39
Dry unit wt. of mix (kg/m^3)	1326.2

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2799.7
Weight of Soil Water, $w_{w,soil}$ (g)	980
Total weight of soil used, W_t (g)	3763.4
Weight of Dry Cement, w_c (g)	499.5
Weight of Slurry Water, $w_{w,slurry}$ (g)	299.7
Soil Water Content, w (%)	35.00
Water:Cement Ratio, w:c	0.60
Cement Content, a_W (%)	17.84%
Cement Factor, α (kg/m3)	246.82
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	201.23
Volume Ratio, VR (%)	22.65
Total-Water-to-Cement Ratio, w_T:c	2.55

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	299.7
Volume Ratio, VR (%)	22.65
Total-Water-to-Cement Ratio, w_T:c	2.55
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	201.2

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	2/25 3:50 PM	2.87	2/28 12:38 PM	51.8	99.1	5	100	378.5	0	0.7	1.41	1.91	0.993	0.7	1810.6	
H	2/25 3:50 PM	2.89	2/28 1:08 PM	51.8	98.0	5	100	374.5	0	0.7	1.62	1.89	0.991	0.7	1811.0	
B	2/25 3:50 PM	6.93	3/4 2:13 PM	51.8	100.9	5	100	386.0	0	1.6	1.61	1.95	0.996	1.5	1817.0	
G	2/25 3:50 PM	6.94	3/4 2:30 PM	51.7	101.5	5	100	389.2	0	1.6	2.01	1.96	0.997	1.6	1824.2	
C	2/25 3:50 PM	13.91	3/11 1:43 PM	51.8	101.4	5	100	387.6	0	2.0	1.19	1.96	0.997	2.0	1813.2	
F	2/25 3:50 PM	13.92	3/11 1:56 PM	51.7	101.3	5	100	387.8	0	2.0	1.12	1.96	0.997	2.0	1821.7	
D	2/25 3:50 PM	28.13	3/25 6:58 PM	51.7	101.5	5	100	388.3	0	2.7	1.14	1.96	0.997	2.7	1819.6	
E	2/25 3:50 PM	28.14	3/25 7:18 PM	51.8	101.2	5	100	388.0	0	2.7	1.05	1.96	0.996	2.7	1820.9	
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Laboratory Mixing Data
Batch T-30

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.00
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	125
Weight of Slurry Water, $w_{w,slurry}$ (g)	310.0
Weight of Dry Cement, w_c (g)	310.0
Weight of Moist Soil, w_{soil} (g)	3838.3
Weight of Slurry (g)	620.0
Specific Gravity of Solids	2.71
water content of mix	0.41
Dry unit wt. of mix (kg/m^3)	1276.6

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2898.9
Weight of Soil Water, $w_{w,soil}$ (g)	1015
Total weight of soil used, W_t (g)	3901.1
Weight of Dry Cement, w_c (g)	314.0
Weight of Slurry Water, $w_{w,slurry}$ (g)	314.0
Soil Water Content, w (%)	35.01
Water:Cement Ratio, w:c	1.00
Cement Content, a_W (%)	10.83%
Cement Factor, α (kg/m3)	149.68
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	125.02
Volume Ratio, VR (%)	19.73
Total-Water-to-Cement Ratio, w_T:c	4.22

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	314.0
Volume Ratio, VR (%)	19.73
Total-Water-to-Cement Ratio, w_T:c	4.22
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	125.0

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	2/26 2:00 PM	2.95	3/1 12:49 PM	51.8	98.8	5	100	369.9	0	0.3	1.66	1.91	0.993	0.3	1777.1	
H	2/26 2:00 PM	2.97	3/1 1:10 PM	51.8	99.3	5	100	372.1	0	0.3	2.31	1.92	0.993	0.3	1780.3	
B	2/26 2:00 PM	6.97	3/5 1:11 PM	51.8	98.4	5	100	368.8	0	0.5	1.59	1.9	0.992	0.5	1781.3	
G	2/26 2:00 PM	6.98	3/5 1:31 PM	56.0	98.3	5	100	369.2	0	0.6	2.63	1.76	0.980	0.6	1525.8	
C	2/26 2:00 PM	14.02	3/12 2:23 PM	51.9	98.2	5	100	368.2	0	0.7	1.33	1.89	0.991	0.7	1774.7	
F	2/26 2:00 PM	14.03	3/12 2:38 PM	51.8	100.1	5	100	376.0	0	0.7	1.19	1.93	0.995	0.7	1784.8	
D	2/26 2:00 PM	27.99	3/26 1:42 PM	51.7	99.0	5	100	372.5	0	1.0	1.16	1.92	0.993	1.0	1792.9	
E	2/26 2:00 PM	28.00	3/26 2:04 PM	51.8	99.0	5	100	371.7	0	0.9	1.19	1.91	0.993	0.9	1782.5	
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Laboratory Mixing Data
Batch T-31

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.00
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	350
Weight of Slurry Water, $w_{w,slurry}$ (g)	870.0
Weight of Dry Cement, w_c (g)	870.0
Weight of Moist Soil, w_{soil} (g)	2475.5
Weight of Slurry (g)	1740.0
Specific Gravity of Solids	2.82
water content of mix	0.56
Dry unit wt. of mix (kg/m^3)	1094.6

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	1899.8
Weight of Soil Water, $w_{w,soil}$ (g)	665
Total weight of soil used, W_t (g)	2554.1
Weight of Dry Cement, w_c (g)	891.5
Weight of Slurry Water, $w_{w,slurry}$ (g)	891.5
Soil Water Content, w (%)	35.00
Water:Cement Ratio, w:c	1.00
Cement Content, a_W (%)	46.93%
Cement Factor, α (kg/m3)	649.11
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	349.82
Volume Ratio, VR (%)	85.55
Total-Water-to-Cement Ratio, w_T:c	1.74

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	891.5
Volume Ratio, VR (%)	85.55
Total-Water-to-Cement Ratio, w_T:c	1.74
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	349.8

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	2/27 5:25 PM	2.83	3/2 1:22 PM	51.8	97.8	5	100	353.1	0	1.1	1.01	1.89	0.991	1.1	1715.7	
H	2/27 5:25 PM	2.84	3/2 1:33 PM	51.6	100.1	5	100	361.7	0	1.1	0.97	1.94	0.995	1.1	1724.9	
B	2/27 5:25 PM	6.87	3/6 2:19 PM	51.7	101.0	5	100	364.4	0	2.7	1.25	1.95	0.996	2.7	1716.6	
G	2/27 5:25 PM	6.88	3/6 2:33 PM	51.8	101.0	5	100	364.2	0	2.7	1.37	1.95	0.996	2.7	1713.1	
C	2/27 5:25 PM	13.64	3/13 8:47 AM	51.8	99.6	5	100	358.8	0	3.3	1.51	1.92	0.994	3.3	1710.1	
F	2/27 5:25 PM	13.64	3/13 8:52 AM	51.7	100.3	5	100	361.8	0	3.6	1.39	1.94	0.995	3.6	1717.3	
D	2/27 5:25 PM	27.87	3/27 2:12 PM	51.8	101.2	5	100	365.6	0	4.5	1.11	1.95	0.996	4.5	1715.0	
E	2/27 5:25 PM	27.87	3/27 2:17 PM	51.7	101.2	5	100	365.6	0	4.4	1.13	1.96	0.997	4.4	1717.9	
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Laboratory Mixing Data
Batch T-32

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.40
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	275
Weight of Slurry Water, $w_{w,slurry}$ (g)	960.0
Weight of Dry Cement, w_c (g)	680.0
Weight of Moist Soil, w_{soil} (g)	2424.1
Weight of Slurry (g)	1640.0
Specific Gravity of Solids	2.79
water content of mix	0.64
Dry unit wt. of mix (kg/m^3)	1003.7

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	1800
Weight of Soil Water, $w_{w,soil}$ (g)	630
Total weight of soil used, W_t (g)	2422.9
Weight of Dry Cement, w_c (g)	678.3
Weight of Slurry Water, $w_{w,slurry}$ (g)	949.6
Soil Water Content, w (%)	35.00
Water:Cement Ratio, w:c	1.40
Cement Content, a_W (%)	37.68%
Cement Factor, α (kg/m3)	520.62
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	274.80
Volume Ratio, VR (%)	89.45
Total-Water-to-Cement Ratio, w_T:c	2.33

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	949.6
Volume Ratio, VR (%)	89.45
Total-Water-to-Cement Ratio, w_T:c	2.33
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	274.8

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	2/28 11:10 AM	3.16	3/3 3:03 PM	51.6	95.8	5	100	333.3	0	0.5	1.27	1.86	0.989	0.5	1663.9	
H	2/28 11:10 AM	3.17	3/3 3:19 PM	51.7	94.2	5	100	327.6	0	0.5	1.26	1.82	0.986	0.5	1658.1	
B	2/28 11:10 AM	7.19	3/7 3:41 PM	51.8	97.9	5	100	340.1	0	1.1	1.74	1.89	0.991	1.1	1649.6	
G	2/28 11:10 AM	7.21	3/7 4:11 PM	51.8	96.3	5	100	334.3	0	1.1	1.30	1.86	0.989	1.1	1646.0	
C	2/28 11:10 AM	14.20	3/14 4:00 PM	51.8	96.1	5	100	334.1	0	1.5	1.39	1.86	0.989	1.4	1651.7	
F	2/28 11:10 AM	14.21	3/14 4:18 PM	51.7	98.4	5	100	342.4	0	1.5	1.09	1.9	0.992	1.4	1655.4	
D	2/28 11:10 AM	28.29	3/28 6:00 PM	51.8	100.4	5	100	349.9	0	1.8	1.17	1.94	0.995	1.8	1650.6	
E	2/28 11:10 AM	28.29	3/28 6:05 PM	51.8	99.1	5	100	345.8	0	1.9	0.93	1.92	0.993	1.9	1657.4	
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Laboratory Mixing Data
Batch T-33

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	0.60
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	200
Weight of Slurry Water, $w_{w,slurry}$ (g)	300.0
Weight of Dry Cement, w_c (g)	500.0
Weight of Moist Soil, w_{soil} (g)	3751.8
Weight of Slurry (g)	800.0
Specific Gravity of Solids	2.73
water content of mix	0.39
Dry unit wt. of mix (kg/m^3)	1326.5

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2799.7
Weight of Soil Water, $w_{w,soil}$ (g)	980
Total weight of soil used, W_t (g)	3766.1
Weight of Dry Cement, w_c (g)	496.5
Weight of Slurry Water, $w_{w,slurry}$ (g)	297.9
Soil Water Content, w (%)	35.00
Water:Cement Ratio, w:c	0.60
Cement Content, a_W (%)	17.73%
Cement Factor, α (kg/m3)	245.17
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	200.13
Volume Ratio, VR (%)	22.50
Total-Water-to-Cement Ratio, w_T:c	2.57

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	297.9
Volume Ratio, VR (%)	22.50
Total-Water-to-Cement Ratio, w_T:c	2.57
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	200.1

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	5/3 5:00 PM	2.92	5/6 3:11 PM	51.8	97.5	0	45	369.2	0	0.7	1.71	1.88	0.991	0.7	1800.0	
H	5/3 5:00 PM	2.92	5/6 3:11 PM	51.7	100.9	0	45	383.0	0	0.6	1.31	1.95	0.996	0.6	1807.4	
B	5/3 5:00 PM	7.11	5/10 7:45 PM	51.8	100.6	0	45	383.4	0	1.3	1.80	1.94	0.995	1.3	1808.9	
G	5/3 5:00 PM	7.13	5/10 8:06 PM	51.8	100.0	0	45	380.0	0	1.3	1.87	1.93	0.994	1.3	1804.3	
C	5/3 5:00 PM	13.77	5/17 11:27 AM	51.7	100.4	0	45	383.4	0	1.7	1.63	1.94	0.995	1.7	1818.4	
F	5/3 5:00 PM	13.79	5/17 11:53 AM	51.5	100.4	0	45	382.4	0	1.7	1.12	1.95	0.996	1.7	1826.2	
D	5/3 5:00 PM	28.04	5/31 6:03 PM	51.7	100.8	0	45	384.0	0	2.1	1.14	1.95	0.996	2.0	1813.4	
E	5/3 5:00 PM	28.06	5/31 6:24 PM	51.6	100.5	0	45	382.7	0	2.0	1.08	1.95	0.996	2.0	1818.1	
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Laboratory Mixing Data
Batch T-34

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.00
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	125
Weight of Slurry Water, $w_{w,slurry}$ (g)	310.0
Weight of Dry Cement, w_c (g)	310.0
Weight of Moist Soil, w_{soil} (g)	3838.3
Weight of Slurry (g)	620.0
Specific Gravity of Solids	2.71
water content of mix	0.41
Dry unit wt. of mix (kg/m^3)	1276.8

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2900.5
Weight of Soil Water, $w_{w,soil}$ (g)	1016.2
Total weight of soil used, W_t (g)	3899.4
Weight of Dry Cement, w_c (g)	313.3
Weight of Slurry Water, $w_{w,slurry}$ (g)	313.3
Soil Water Content, w (%)	35.04
Water:Cement Ratio, w:c	1.00
Cement Content, a_W (%)	10.80%
Cement Factor, α (kg/m3)	149.42
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	124.83
Volume Ratio, VR (%)	19.69
Total-Water-to-Cement Ratio, w_T:c	4.23

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	313.3
Volume Ratio, VR (%)	19.69
Total-Water-to-Cement Ratio, w_T:c	4.23
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	124.8

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	5/4 1:40 PM	3.03	5/7 2:26 PM	51.6	100.9	0	45	378.9	0	0.3	1.33	1.96	0.996	0.3	1797.3	
H	5/4 1:40 PM	3.04	5/7 2:40 PM	51.6	99.7	0	45	371.6	0	0.3	1.57	1.93	0.994	0.3	1780.2	
B	5/4 1:40 PM	6.89	5/11 11:07 AM	51.8	98.1	0	45	367.2	0	0.5	2.43	1.89	0.992	0.5	1776.4	
G	5/4 1:40 PM	6.92	5/11 11:42 AM	51.8	99.4	0	45	371.1	0	0.5	2.42	1.92	0.994	0.5	1774.1	
C	5/4 1:40 PM	14.08	5/18 3:35 PM	51.8	99.5	0	45	373.3	0	0.6	0.90	1.92	0.994	0.6	1776.7	
F	5/4 1:40 PM	14.10	5/18 4:02 PM	51.7	99.2	0	45	370.7	0	0.6	2.05	1.92	0.993	0.6	1777.1	
D	5/4 1:40 PM	27.98	6/1 1:07 PM	51.8	98.8	0	45	370.6	0	0.8	1.71	1.9	0.992	0.8	1777.9	
E	5/4 1:40 PM	28.02	6/1 2:08 PM	51.7	99.7	0	45	372.1	0	0.7	1.65	1.93	0.994	0.7	1775.2	
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Laboratory Mixing Data
Batch T-35

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.00
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	350
Weight of Slurry Water, $w_{w,slurry}$ (g)	870.0
Weight of Dry Cement, w_c (g)	870.0
Weight of Moist Soil, w_{soil} (g)	2475.5
Weight of Slurry (g)	1740.0
Specific Gravity of Solids	2.82
water content of mix	0.56
Dry unit wt. of mix (kg/m^3)	1094.3

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	1900
Weight of Soil Water, $w_{w,soil}$ (g)	665
Total weight of soil used, W_t (g)	2556
Weight of Dry Cement, w_c (g)	893.8
Weight of Slurry Water, $w_{w,slurry}$ (g)	893.8
Soil Water Content, w (%)	35.00
Water:Cement Ratio, w:c	1.00
Cement Content, a_W (%)	47.04%
Cement Factor, α (kg/m3)	650.26
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	350.16
Volume Ratio, VR (%)	85.71
Total-Water-to-Cement Ratio, w_T:c	1.74

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	893.8
Volume Ratio, VR (%)	85.71
Total-Water-to-Cement Ratio, w_T:c	1.74
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	350.2

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	5/5 11:30 AM	3.20	5/8 4:18 PM	51.7	89.8	0	45	323.5	0	0.9	0.75	1.73	0.979	0.8	1714.1	
H	5/5 11:30 AM	3.21	5/8 4:34 PM	51.7	100.7	0	45	362.4	0	0.9	0.81	1.95	0.996	0.9	1714.8	
B	5/5 11:30 AM	7.08	5/12 1:32 PM	51.6	100.0	0	45	359.4	0	2.1	0.99	1.94	0.995	2.1	1716.6	
G	5/5 11:30 AM	7.10	5/12 1:55 PM	51.7	100.1	0	45	360.0	0	2.2	1.25	1.94	0.995	2.2	1715.5	
C	5/5 11:30 AM	14.13	5/19 2:40 PM	51.7	101.2	0	45	364.0	0	2.9	1.30	1.96	0.997	2.9	1710.4	
F	5/5 11:30 AM	14.15	5/19 3:03 PM	52.1	100.6	0	45	361.1	0	3.1	1.17	1.93	0.994	3.1	1681.4	
D	5/5 11:30 AM	28.00	6/2 11:23 AM	51.7	101.0	0	45	363.2	0	3.5	1.07	1.95	0.996	3.5	1715.6	
E	5/5 11:30 AM	28.01	6/2 11:39 AM	51.6	100.8	0	45	362.6	0	3.7	1.12	1.96	0.996	3.7	1722.1	
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Laboratory Mixing Data
Batch T-36

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.40
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	275
Weight of Slurry Water, $w_{w,slurry}$ (g)	960.0
Weight of Dry Cement, w_c (g)	680.0
Weight of Moist Soil, w_{soil} (g)	2424.1
Weight of Slurry (g)	1640.0
Specific Gravity of Solids	2.79
water content of mix	0.64
Dry unit wt. of mix (kg/m^3)	1003.4

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	1800
Weight of Soil Water, $w_{w,soil}$ (g)	630
Total weight of soil used, W_t (g)	2419.9
Weight of Dry Cement, w_c (g)	678.5
Weight of Slurry Water, $w_{w,slurry}$ (g)	949.8
Soil Water Content, w (%)	35.00
Water:Cement Ratio, w:c	1.40
Cement Content, a_W (%)	37.69%
Cement Factor, α (kg/m3)	521.38
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	275.01
Volume Ratio, VR (%)	89.58
Total-Water-to-Cement Ratio, w_T:c	2.32

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	949.8
Volume Ratio, VR (%)	89.58
Total-Water-to-Cement Ratio, w_T:c	2.32
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	275.0

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	5/6 11:10 AM	3.1	5/9 2:06 PM	51.7	100.1	0	45	346.7	0	0.4	1.04	1.94	0.995	0.4	1650.5	
H	5/6 11:10 AM	3.1	5/9 2:22 PM	51.7	99.3	0	45	344.8	0	0.4	0.88	1.92	0.994	0.4	1654.1	
B	5/6 11:10 AM	7.1	5/13 12:32 PM	51.7	100.8	0	45	348.8	0	0.9	0.69	1.95	0.996	0.9	1650.5	
G	5/6 11:10 AM	7.1	5/13 12:45 PM	51.6	100.4	0	45	348.6	0	0.9	0.85	1.95	0.996	0.9	1659.0	
C	5/6 11:10 AM	14.0	5/20 10:29 AM	51.6	100.2	0	45	347.6	0	1.3	0.92	1.94	0.995	1.3	1660.5	
F	5/6 11:10 AM	14.0	5/20 10:45 AM	51.7	100.5	0	45	348.8	0	1.3	0.80	1.94	0.995	1	1654.7	
D	5/6 11:10 AM	27.9	6/3 8:47 AM	51.6	100.3	0	45	348.2	0	1.7	0.92	1.94	0.996	1.6	1660.9	
E	5/6 11:10 AM	28.0	6/3 11:27 AM	51.5	100.7	0	45	349.5	0	1.7	0.99	1.96	0.996	1.7	1665.2	
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Laboratory Mixing Data
Batch T-37

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	0.60
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	200
Weight of Slurry Water, $w_{w,slurry}$ (g)	300.0
Weight of Dry Cement, w_c (g)	500.0
Weight of Moist Soil, w_{soil} (g)	3751.8
Weight of Slurry (g)	800.0
Specific Gravity of Solids	2.73
water content of mix	0.39
Dry unit wt. of mix (kg/m^3)	1326.5

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2799.9
Weight of Soil Water, $w_{w,soil}$ (g)	980
Total weight of soil used, W_t (g)	3752.6
Weight of Dry Cement, w_c (g)	494.7
Weight of Slurry Water, $w_{w,slurry}$ (g)	296.8
Soil Water Content, w (%)	35.00
Water:Cement Ratio, w:c	0.60
Cement Content, a_W (%)	17.67%
Cement Factor, α (kg/m3)	245.16
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	200.12
Volume Ratio, VR (%)	22.50
Total-Water-to-Cement Ratio, w_T:c	2.57

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	296.8
Volume Ratio, VR (%)	22.50
Total-Water-to-Cement Ratio, w_T:c	2.57
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	200.1

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	5/8 4:20 PM	3.1	5/11 6:35 PM	51.1	104.2	-10	100	381.8	0	0.1	7.98	2.04	1.003	0.1	1786.5	
H	5/8 4:20 PM	3.1	5/11 7:02 PM	51.2	103.8	-10	100	380.2	0	0.1	7.74	2.03	1.002	0.1	1776.2	
B	5/8 4:20 PM	6.8	5/15 11:10 AM	51.7	103.8	-10	100	381.4	0	0.1	6.64	2.01	1.001	0.1	1750.9	
G	5/8 4:20 PM	6.8	5/15 11:34 AM	51.3	104.6	-10	100	382.7	0	0.1	7.12	2.04	1.003	0.1	1767.9	
C	5/8 4:20 PM	13.9	5/22 2:30 PM	51.4	103.8	-10	100	381.2	0	0.2	6.85	2.02	1.002	0.2	1770.4	
F	5/8 4:20 PM	13.9	5/22 2:57 PM	51.5	104.1	-10	100	381.5	0	0.2	6.98	2.02	1.002	0	1757.9	
D	5/8 4:20 PM	28.0	6/5 4:21 PM	51.5	104.5	-10	100	382.8	0	0.2	7.24	2.03	1.002	0.2	1757.4	
E	5/8 4:20 PM	28.0	6/5 4:51 PM	51.5	104.7	-10	100	382.9	0	0.3	6.20	2.03	1.003	0.3	1752.7	
I	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
J	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

Laboratory Mixing Data
Batch T-38

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.00
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	125
Weight of Slurry Water, $w_{w,slurry}$ (g)	310.0
Weight of Dry Cement, w_c (g)	310.0
Weight of Moist Soil, w_{soil} (g)	3838.3
Weight of Slurry (g)	620.0
Specific Gravity of Solids	2.71
water content of mix	0.41
Dry unit wt. of mix (kg/m^3)	1276.7

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2900
Weight of Soil Water, $w_{w,soil}$ (g)	1015
Total weight of soil used, W_t (g)	3895.2
Weight of Dry Cement, w_c (g)	313.2
Weight of Slurry Water, $w_{w,slurry}$ (g)	313.2
Soil Water Content, w (%)	35.00
Water:Cement Ratio, w:c	1.00
Cement Content, a_W (%)	10.80%
Cement Factor, α (kg/m3)	149.51
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	124.89
Volume Ratio, VR (%)	19.71
Total-Water-to-Cement Ratio, w_T:c	4.22

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	313.2
Volume Ratio, VR (%)	19.71
Total-Water-to-Cement Ratio, w_T:c	4.22
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	124.9

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	5/8 5:30 PM	3.1	5/11 7:27 PM	52.7	105.2	-10	100	385.6	0	0.1	7.22	2	1.000	0.1	1680.8	
H	5/8 5:30 PM	3.1	5/11 7:56 PM	52.2	104.3	-10	100	376.7	0	0.1	7.62	2	1.000	0.1	1685.5	
B	5/8 5:30 PM	6.8	5/15 11:58 AM	51.5	104.6	-10	100	376.2	0	0.1	6.47	2.03	1.003	0.1	1728.8	
G	5/8 5:30 PM	6.8	5/15 12:23 PM	51.1	104.6	-10	100	375.4	0	0.1	5.73	2.05	1.004	0.1	1748.4	
C	5/8 5:30 PM	13.9	5/22 3:33 PM	51.4	105.2	-10	100	377.3	0	0.1	6.55	2.04	1.004	0.1	1726.8	
F	5/8 5:30 PM	13.9	5/22 3:59 PM	51.4	105.3	-10	100	375.7	0	0.1	6.64	2.05	1.004	0	1719.1	
E	5/8 5:30 PM	28.0	6/5 5:58 PM	51.7	104.8	-10	100	375.8	0	0.2	6.16	2.03	1.002	0.2	1708.5	
J	5/8 5:30 PM	28.0	6/5 6:25 PM	51.5	105.3	-10	100	377.7	0	0.3	6.28	2.04	1.004	0.3	1723.2	
D	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
J	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

Laboratory Mixing Data
Batch T-39

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.00
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	350
Weight of Slurry Water, $w_{w,slurry}$ (g)	870.0
Weight of Dry Cement, w_c (g)	870.0
Weight of Moist Soil, w_{soil} (g)	2475.5
Weight of Slurry (g)	1740.0
Specific Gravity of Solids	2.82
water content of mix	0.56
Dry unit wt. of mix (kg/m^3)	1094.4

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	1899.9
Weight of Soil Water, $w_{w,soil}$ (g)	665
Total weight of soil used, W_t (g)	2545.8
Weight of Dry Cement, w_c (g)	889.8
Weight of Slurry Water, $w_{w,slurry}$ (g)	889.8
Soil Water Content, w (%)	35.00
Water:Cement Ratio, w:c	1.00
Cement Content, a_W (%)	46.83%
Cement Factor, α (kg/m3)	649.98
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	350.07
Volume Ratio, VR (%)	85.67
Total-Water-to-Cement Ratio, w_T:c	1.74

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	889.8
Volume Ratio, VR (%)	85.67
Total-Water-to-Cement Ratio, w_T:c	1.74
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	350.1

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	5/11 4:30 PM	3.0	5/14 4:32 PM	51.1	107.0	-10	100	362.3	0	0.0	7.99	2.09	1.007	0.0	1648.5	
H	5/11 4:30 PM	3.0	5/14 5:00 PM	51.3	107.1	-10	100	361.6	0	0.1	7.47	2.09	1.007	0.1	1636.4	
B	5/11 4:30 PM	6.9	5/18 1:26 PM	51.5	107.1	-10	100	362.4	0	0.1	9.27	2.08	1.006	0.1	1622.3	
G	5/11 4:30 PM	6.9	5/18 1:54 PM	51.2	107.8	-10	100	362.8	0	0.1	9.11	2.11	1.008	0.1	1635.9	
F	5/11 4:30 PM	13.8	5/25 12:05 PM	51.5	107.7	-10	100	362.8	0	0.2	9.45	2.09	1.007	0.2	1614.1	
I	5/11 4:30 PM	13.9	5/25 1:40 PM	51.6	108.0	-10	100	363.3	0	0.2	8.70	2.09	1.007	0	1607.0	
E	5/11 4:30 PM	28.0	6/8 3:58 PM	51.1	107.1	-10	100	362.2	0	0.3	7.79	2.1	1.008	0.3	1649.8	
J	5/11 4:30 PM	28.0	6/8 4:26 PM	51.2	106.8	-10	100	361.9	0	0.3	9.36	2.08	1.007	0.3	1646.1	
C	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
D	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

Laboratory Mixing Data
Batch T-40

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.40
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	275
Weight of Slurry Water, $w_{w,slurry}$ (g)	960.0
Weight of Dry Cement, w_c (g)	680.0
Weight of Moist Soil, w_{soil} (g)	2424.1
Weight of Slurry (g)	1640.0
Specific Gravity of Solids	2.79
water content of mix	0.64
Dry unit wt. of mix (kg/m^3)	1094.4

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	1799.7
Weight of Soil Water, $w_{w,soil}$ (g)	693.2
Total weight of soil used, W_t (g)	2418
Weight of Dry Cement, w_c (g)	679.2
Weight of Slurry Water, $w_{w,slurry}$ (g)	950.9
Soil Water Content, w (%)	38.52
Water:Cement Ratio, w:c	1.40
Cement Content, a_W (%)	37.74%
Cement Factor, α (kg/m3)	522.37
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	275.29
Volume Ratio, VR (%)	89.75
Total-Water-to-Cement Ratio, w_T:c	2.32

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	950.9
Volume Ratio, VR (%)	89.75
Total-Water-to-Cement Ratio, w_T:c	2.32
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	275.3

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	5/11 5:40 PM	3.0	5/14 5:29 PM	51.4	105.3	-10	100	345.0	0	0.1	8.24	2.05	1.004	0.1	1577.1	
H	5/11 5:40 PM	3.0	5/14 5:29 PM	51.3	106.6	-10	100	348.1	0	0.1	7.69	2.08	1.006	0.1	1581.3	
B	5/11 5:40 PM	6.9	5/18 2:23 PM	51.2	107.1	-10	100	349.2	0	0.1	7.87	2.09	1.007	0.1	1584.6	
G	5/11 5:40 PM	6.9	5/18 2:51 PM	51.5	107.6	-10	100	349.2	0	0.1	9.93	2.09	1.007	0.1	1556.6	
C	5/11 5:40 PM	13.8	5/25 12:39 PM	51.3	107.7	-10	100	349.5	0	0.2	11.23	2.1	1.008	0.2	1573.1	
F	5/11 5:40 PM	13.8	5/25 1:07 PM	51.1	107.9	-10	100	349.7	0	0.2	10.32	2.11	1.009	0	1579.7	
D	5/11 5:40 PM	28.0	6/8 5:02 PM	51.5	107.8	-10	100	350.0	0	0.2	8.17	2.09	1.008	0.2	1558.8	
E	5/11 5:40 PM	28.0	6/8 5:31 PM	51.8	108.0	-10	100	349.7	0	0.2	9.14	2.09	1.007	0.2	1538.2	
I	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
J	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

Laboratory Mixing Data
Batch S-1

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	0.60
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	275
Weight of Slurry Water, $w_{w,slurry}$ (g)	410.0
Weight of Dry Cement, w_c (g)	680.0
Weight of Moist Soil, w_{soil} (g)	3435.5
Weight of Slurry (g)	1090.0
Specific Gravity of Solids	2.76
water content of mix	0.40
Dry unit wt. of mix (kg/m^3)	1307.3

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2599.8
Weight of Soil Water, $w_{w,soil}$ (g)	924
Total weight of soil used, W_t (g)	3506.3
Weight of Dry Cement, w_c (g)	693.5
Weight of Slurry Water, $w_{w,slurry}$ (g)	416.1
Soil Water Content, w (%)	35.54
Water:Cement Ratio, w:c	0.60
Cement Content, a_W (%)	26.68%
Cement Factor, α (kg/m3)	367.82
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	274.98
Volume Ratio, VR (%)	33.76
Total-Water-to-Cement Ratio, w_T:c	1.91

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	416.1
Volume Ratio, VR (%)	33.76
Total-Water-to-Cement Ratio, w_T:c	1.91
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	275.0

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	9/30 3:20 PM	3.1	10/3 5:33 PM	51.9	101.5	25	100	388.0	0	2.6	1.37	1.96	0.997	2.6	1808.8	
H	9/30 3:20 PM	3.1	10/3 5:45 PM	51.9	101.1	25	100	387.2	0	2.6	1.39	1.95	0.996	2.6	1811.9	
B	9/30 3:20 PM	7.0	10/7 3:46 PM	52.0	101.1	25	100	387.4	0	3.4	1.42	1.94	0.996	3.4	1807.1	
G	9/30 3:20 PM	7.0	10/7 3:58 PM	51.9	101.3	25	100	388.0	0	3.4	1.20	1.95	0.996	3.3	1808.0	
C	9/30 3:20 PM	14.0	10/14 3:26 PM	51.5	99.5	25	100	381.5	0	4.1	1.48	1.93	0.995	4.1	1839.0	
F	9/30 3:20 PM	14.0	10/14 3:39 PM	51.8	101.3	25	100	387.0	0	4.2	1.29	1.96	0.996	4.1	1814.0	
D	9/30 3:20 PM	27.8	10/28 9:34 AM	51.9	100.1	25	100	382.1	0	4.3	1.21	1.93	0.994	4.3	1805.8	
E	9/30 3:20 PM	27.8	10/28 9:48 AM	51.9	101.5	25	100	388.3	0	4.7	1.31	1.96	0.996	4.7	1806.7	
I	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
J	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

Laboratory Mixing Data
Batch S-2

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.40
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	200
Weight of Slurry Water, $w_{w,slurry}$ (g)	700.0
Weight of Dry Cement, w_c (g)	500.0
Weight of Moist Soil, w_{soil} (g)	3016.3
Weight of Slurry (g)	1200.0
Specific Gravity of Solids	2.75
water content of mix	0.54
Dry unit wt. of mix (kg/m^3)	1104.3

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2299.7
Weight of Soil Water, $w_{w,soil}$ (g)	805
Total weight of soil used, W_t (g)	3091.6
Weight of Dry Cement, w_c (g)	510.6
Weight of Slurry Water, $w_{w,slurry}$ (g)	714.9
Soil Water Content, w (%)	35.00
Water:Cement Ratio, w:c	1.40
Cement Content, a_W (%)	22.20%
Cement Factor, α (kg/m3)	307.15
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	201.05
Volume Ratio, VR (%)	52.77
Total-Water-to-Cement Ratio, w_T:c	2.97

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	714.9
Volume Ratio, VR (%)	52.77
Total-Water-to-Cement Ratio, w_T:c	2.97
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	201.0

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	11/6 9:30 AM	3.4	11/9 6:03 PM	51.8	100.0	25	100	358.1	0	0.9	2.00	1.93	0.994	0.9	1698.2	
H	11/6 9:30 AM	3.4	11/9 6:16 PM	51.7	101.0	25	100	357.0	0	0.8	1.67	1.95	0.996	0.8	1681.3	
B	11/6 9:30 AM	7.1	11/13 11:04 AM	51.6	100.0	25	100	357.5	0	1.1	1.70	1.94	0.995	1.1	1708.3	
G	11/6 9:30 AM	7.1	11/13 11:23 AM	51.2	99.2	25	100	355.0	0	1.2	1.73	1.94	0.995	1.2	1739.2	
C	11/6 9:30 AM	14.2	11/20 2:58 PM	51.9	100.0	25	100	358.1	0	1.5	1.35	1.92	0.994	1.5	1690.3	
J	11/6 9:30 AM	14.2	11/20 3:28 PM	51.8	99.8	25	100	357.4	0	1.4	1.42	1.93	0.994	1.4	1699.6	
D	11/6 9:30 AM	28.0	12/4 10:14 AM	51.8	100.3	25	100	358.4	0	1.9	1.44	1.93	0.995	1.9	1693.2	
E	11/6 9:30 AM	28.0	12/4 10:27 AM	51.8	97.1	25	100	347.2	0	1.8	1.48	1.88	0.990	1.8	1696.8	
F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
I	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

Laboratory Mixing Data
Batch S-3

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	0.60
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	275
Weight of Slurry Water, $w_{w,slurry}$ (g)	410.0
Weight of Dry Cement, w_c (g)	680.0
Weight of Moist Soil, w_{soil} (g)	3435.5
Weight of Slurry (g)	1090.0
Specific Gravity of Solids	2.76
water content of mix	0.40
Dry unit wt. of mix (kg/m^3)	1307.3

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2599.8
Weight of Soil Water, $w_{w,soil}$ (g)	924
Total weight of soil used, W_t (g)	3509
Weight of Dry Cement, w_c (g)	695.0
Weight of Slurry Water, $w_{w,slurry}$ (g)	417.0
Soil Water Content, w (%)	35.54
Water:Cement Ratio, w:c	0.60
Cement Content, a_W (%)	26.73%
Cement Factor, α (kg/m3)	368.33
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	275.27
Volume Ratio, VR (%)	33.81
Total-Water-to-Cement Ratio, w_T:c	1.91

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	417.0
Volume Ratio, VR (%)	33.81
Total-Water-to-Cement Ratio, w_T:c	1.91
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	275.3

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
H	10/26 1:30 PM	3.1	10/29 4:46 PM	52.0	100.5	45	100	382.8	0	3.6	1.78	1.93	0.995	3.6	1793.4	
I	10/26 1:30 PM	3.2	10/29 5:11 PM	52.0	101.4	45	100	386.3	0	3.7	1.86	1.95	0.996	3.7	1792.6	
B	10/26 1:30 PM	7.0	11/2 1:46 PM	52.0	100.1	45	100	382.1	0	5.1	1.56	1.92	0.994	5.0	1798.7	
G	10/26 1:30 PM	7.0	11/2 2:11 PM	52.0	101.5	45	100	387.3	0	5.1	1.77	1.95	0.996	5.0	1797.6	
C	10/26 1:30 PM	14.3	11/9 9:11 PM	52.1	101.5	45	100	388.6	0	6.1	1.46	1.95	0.996	6.1	1794.5	
F	10/26 1:30 PM	14.3	11/9 9:31 PM	52.1	101.7	45	100	388.5	0	6.1	1.55	1.95	0.996	6.1	1794.8	
D	10/26 1:30 PM	28.1	11/23 4:08 PM	52.2	99.4	45	100	388.5	0	7.8	1.68	1.91	0.992	7.7	1825.8	
E	10/26 1:30 PM	28.1	11/23 4:30 PM	52.0	100.9	45	100	383.8	0	7.2	1.49	1.94	0.995	7.2	1792.2	
A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
J	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

Laboratory Mixing Data
Batch S-4

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.40
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	200
Weight of Slurry Water, $w_{w,slurry}$ (g)	700.0
Weight of Dry Cement, w_c (g)	500.0
Weight of Moist Soil, w_{soil} (g)	3016.3
Weight of Slurry (g)	1200.0
Specific Gravity of Solids	2.75
water content of mix	0.54
Dry unit wt. of mix (kg/m^3)	1105.5

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2300
Weight of Soil Water, $w_{w,soil}$ (g)	805
Total weight of soil used, W_t (g)	3094.4
Weight of Dry Cement, w_c (g)	507.5
Weight of Slurry Water, $w_{w,slurry}$ (g)	710.5
Soil Water Content, w (%)	35.00
Water:Cement Ratio, w:c	1.40
Cement Content, a_W (%)	22.07%
Cement Factor, α (kg/m3)	305.00
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	200.12
Volume Ratio, VR (%)	52.40
Total-Water-to-Cement Ratio, w_T:c	2.98

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	710.5
Volume Ratio, VR (%)	52.40
Total-Water-to-Cement Ratio, w_T:c	2.98
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	200.1

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	9/30 11:25 AM	3.3	10/3 5:58 PM	51.9	99.8	45	100	358.1	0	1.3	1.97	1.92	0.994	1.3	1697.9	
H	9/30 11:25 AM	3.3	10/3 6:11 PM	52.0	100.4	45	100	360.7	0	1.3	2.33	1.93	0.994	1.3	1692.8	
B	9/30 11:25 AM	7.2	10/7 4:10 PM	51.8	100.6	45	100	366.4	0	1.7	1.50	1.94	0.995	1.7	1725.3	
G	9/30 11:25 AM	7.2	10/7 4:24 PM	52.0	100.5	45	100	357.8	0	1.8	1.78	1.93	0.995	1.8	1676.7	
C	9/30 11:25 AM	14.1	10/14 2:46 PM	51.6	100.4	45	100	362.4	0	2.3	1.69	1.94	0.995	2.3	1724.3	
F	9/30 11:25 AM	14.2	10/14 3:10 PM	51.6	100.8	45	100	363.3	0	2.4	1.64	1.95	0.996	2.4	1723.3	
D	9/30 11:25 AM	27.9	10/28 9:08 AM	52.0	101.3	45	100	364.1	0	3.2	1.56	1.95	0.996	3.2	1695.0	
E	9/30 11:25 AM	27.9	10/28 9:21 AM	52.1	100.4	45	100	361.0	0	3.1	1.73	1.93	0.994	3.1	1683.1	
I	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
J	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

Laboratory Mixing Data
Batch A-1

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.00
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	275
Weight of Slurry Water, $w_{w,slurry}$ (g)	680.0
Weight of Dry Cement, w_c (g)	680.0
Weight of Moist Soil, w_{soil} (g)	2929.8
Weight of Slurry (g)	1360.0
Specific Gravity of Solids	2.78
water content of mix	0.50
Dry unit wt. of mix (kg/m^3)	1155.5

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2200
Weight of Soil Water, $w_{w,soil}$ (g)	776
Total weight of soil used, W_t (g)	2962.9
Weight of Dry Cement, w_c (g)	686.7
Weight of Slurry Water, $w_{w,slurry}$ (g)	686.7
Soil Water Content, w (%)	35.27
Water:Cement Ratio, w:c	1.00
Cement Content, a_W (%)	31.21%
Cement Factor, α (kg/m3)	430.97
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	274.85
Volume Ratio, VR (%)	56.80
Total-Water-to-Cement Ratio, w_T:c	2.12

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	686.7
Volume Ratio, VR (%)	56.80
Total-Water-to-Cement Ratio, w_T:c	2.12
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	274.8

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	4/20 10:10 AM	14.0	5/4 10:43 AM	52.0	99.8	45	100	365.6	0	4.1	1.61	1.92	0.993	4.1	1722.5	
H	4/20 10:10 AM	14.0	5/4 11:11 AM	52.2	99.5	45	100	363.8	0	4.2	1.74	1.91	0.993	4.1	1710.9	
B	4/20 10:10 AM	28.0	5/18 9:49 AM	52.1	99.5	45	100	364.5	0	5.3	1.63	1.91	0.993	5.3	1715.9	
G	4/20 10:10 AM	28.0	5/18 10:16 AM	52.2	97.5	45	100	357.5	0	5.3	1.48	1.87	0.990	5.2	1714.6	
C	4/20 10:10 AM	14.1	5/4 11:31 AM	51.9	100.0	25	100	367.1	0	2.7	0.94	1.93	0.994	2.7	1737.5	
F	4/20 10:10 AM	14.1	5/4 11:55 AM	51.4	98.3	25	100	360.2	0	2.9	1.15	1.91	0.993	2.9	1764.0	
D	4/20 10:10 AM	28.0	5/18 10:41 AM	52.0	98.2	25	100	360.3	0	3.4	1.05	1.89	0.991	3.4	1727.2	
E	4/20 10:10 AM	28.0	5/18 11:03 AM	51.8	99.5	25	100	364.4	0	3.7	1.24	1.92	0.994	3.7	1736.5	
I	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
J	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

Laboratory Mixing Data
Batch A-2

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.00
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	275
Weight of Slurry Water, $w_{w,slurry}$ (g)	680.0
Weight of Dry Cement, w_c (g)	680.0
Weight of Moist Soil, w_{soil} (g)	2929.8
Weight of Slurry (g)	1360.0
Specific Gravity of Solids	2.78
water content of mix	0.51
Dry unit wt. of mix (kg/m^3)	1154.6

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2199.4
Weight of Soil Water, $w_{w,soil}$ (g)	770
Total weight of soil used, W_t (g)	2950.1
Weight of Dry Cement, w_c (g)	688.2
Weight of Slurry Water, $w_{w,slurry}$ (g)	688.2
Soil Water Content, w (%)	35.01
Water:Cement Ratio, w:c	1.00
Cement Content, a_W (%)	31.29%
Cement Factor, α (kg/m3)	433.79
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	275.99
Volume Ratio, VR (%)	57.17
Total-Water-to-Cement Ratio, w_T:c	2.11

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	688.2
Volume Ratio, VR (%)	57.17
Total-Water-to-Cement Ratio, w_T:c	2.11
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	276.0

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
H	5/18 12:20 PM	2.9	5/21 9:01 AM	2.0	4.0	45	100	364.8	0	311.9	2.18	1.93	0.994	310.2	1711.1	
I	5/18 12:20 PM	2.9	5/21 9:22 AM	2.1	4.0	45	100	365.5	0	300.2	2.06	1.93	0.994	298.4	1695.5	
B	5/18 12:20 PM	7.0	5/25 11:44 AM	2.1	3.9	45	100	360.1	0	433.8	1.54	1.9	0.992	430.4	1699.8	
G	5/18 12:20 PM	7.0	5/25 12:06 PM	2.0	4.0	45	100	367.7	0	413.3	1.37	1.94	0.995	411.2	1717.8	
C	5/18 12:20 PM	2.9	5/21 9:51 AM	2.0	3.7	25	100	341.2	0	211.3	1.16	1.79	0.984	207.9	1720.3	
F	5/18 12:20 PM	2.9	5/21 9:51 AM	2.0	3.9	25	100	341.2	0	209.3	0.83	1.92	0.993	207.9	1615.8	
D	5/18 12:20 PM	7.0	5/25 12:32 PM	2.1	3.8	25	100	355.5	0	216.8	0.64	1.86	0.989	214.4	1720.9	
E	5/18 12:20 PM	7.0	5/25 12:54 PM	2.0	3.8	25	100	358.3	0	235.8	0.93	1.88	0.990	233.5	1729.2	
A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
J	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

Laboratory Mixing Data
Batch M-1

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.00
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	200
Weight of Slurry Water, $w_{w,slurry}$ (g)	500.0
Weight of Dry Cement, w_c (g)	500.0
Weight of Moist Soil, w_{soil} (g)	3384.0
Weight of Slurry (g)	1000.0
Specific Gravity of Solids	2.74
water content of mix	0.46
Dry unit wt. of mix (kg/m^3)	1216.3

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2600
Weight of Soil Water, $w_{w,soil}$ (g)	910
Total weight of soil used, W_t (g)	3451
Weight of Dry Cement, w_c (g)	503.4
Weight of Slurry Water, $w_{w,slurry}$ (g)	503.4
Soil Water Content, w (%)	35.00
Water:Cement Ratio, w:c	1.00
Cement Content, a_W (%)	19.36%
Cement Factor, α (kg/m3)	271.27
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	199.82
Volume Ratio, VR (%)	35.75
Total-Water-to-Cement Ratio, w_T:c	2.78

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	503.4
Volume Ratio, VR (%)	35.75
Total-Water-to-Cement Ratio, w_T:c	2.78
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	199.8

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	8/25 5:00 PM	7.0	9/1 4:54 PM	52.0	100.1	25	100	373.2	0	1.4	0.88	1.93	0.994	1.4	1758.5	
H	8/25 5:00 PM	7.0	9/1 5:15 PM	52.0	100.6	25	100	376.0	0	1.4	0.77	1.93	0.995	1.4	1758.9	
B	8/25 5:00 PM	28.0	9/22 4:27 PM	52.0	100.5	25	100	375.0	0	2.2	1.20	1.93	0.995	2.2	1756.0	
G	8/25 5:00 PM	28.0	9/22 5:07 PM	52.0	99.8	25	100	372.0	0	2.4	1.33	1.92	0.994	2.4	1755.2	
C	8/25 5:00 PM	180.1	2/21 6:40 PM	52.0	100.1	25	100	374.4	0	3.2	1.21	1.92	0.994	3.2	1762.0	
F	8/25 5:00 PM	180.1	2/21 6:58 PM	52.0	97.8	25	100	364.2	0	3.6	1.45	1.88	0.990	3.5	1752.4	
D	8/25 5:00 PM	364.9	8/25 2:33 PM	52.0	101.4	25	100	379.2	0	5.4	1.44	1.95	0.996	5.4	1761.4	
E	8/25 5:00 PM	364.9	8/25 2:48 PM	51.9	99.6	25	100	372.6	0	4.9	1.33	1.92	0.993	4.9	1765.1	
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Laboratory Mixing Data
Batch M-2

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.00
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	200
Weight of Slurry Water, $w_{w,slurry}$ (g)	500.0
Weight of Dry Cement, w_c (g)	500.0
Weight of Moist Soil, w_{soil} (g)	3384.0
Weight of Slurry (g)	1000.0
Specific Gravity of Solids	2.74
water content of mix	0.46
Dry unit wt. of mix (kg/m^3)	1208.8

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2600
Weight of Soil Water, $w_{w,soil}$ (g)	910
Total weight of soil used, W_t (g)	3481
Weight of Dry Cement, w_c (g)	540.2
Weight of Slurry Water, $w_{w,slurry}$ (g)	540.2
Soil Water Content, w (%)	35.00
Water:Cement Ratio, w:c	1.00
Cement Content, a_W (%)	20.78%
Cement Factor, α (kg/m3)	288.59
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	209.07
Volume Ratio, VR (%)	38.04
Total-Water-to-Cement Ratio, w_T:c	2.67

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	540.2
Volume Ratio, VR (%)	38.04
Total-Water-to-Cement Ratio, w_T:c	2.67
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	209.1

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	8/25 10:45 PM	6.8	9/1 5:43 PM	52.1	101.0	45	100	376.0	0	2.5	1.27	1.94	0.995	2.5	1744.6	
H	8/25 10:45 PM	6.8	9/1 6:05 PM	52.1	101.0	45	100	367.1	0	2.7	1.87	1.94	0.995	2.6	1707.5	
B	8/25 10:45 PM	27.8	9/22 5:30 PM	52.1	98.8	45	100	367.1	0	4.7	1.66	1.9	0.992	4.7	1743.1	
G	8/25 10:45 PM	27.8	9/22 5:51 PM	52.1	99.4	45	100	370.0	0	4.8	1.44	1.91	0.993	4.8	1748.7	
C	8/25 10:45 PM	179.8	2/21 5:59 PM	52.1	97.0	45	100	360.8	0	9.7	1.67	1.86	0.989	9.6	1742.5	
F	8/25 10:45 PM	179.8	2/21 6:16 PM	52.1	99.6	45	100	370.8	0	10.3	1.69	1.91	0.993	10.2	1746.7	
D	8/25 10:45 PM	364.7	8/25 3:11 PM	52.0	97.9	45	100	365.3	0	11.0	1.73	1.88	0.991	10.9	1753.2	
E	8/25 10:45 PM	364.7	8/25 3:27 PM	52.2	98.2	45	100	367.3	0	10.6	1.76	1.88	0.991	10.5	1749.7	
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Laboratory Mixing Data
Batch M-3

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.00
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	275
Weight of Slurry Water, $w_{w,slurry}$ (g)	680.0
Weight of Dry Cement, w_c (g)	680.0
Weight of Moist Soil, w_{soil} (g)	2929.8
Weight of Slurry (g)	1360.0
Specific Gravity of Solids	2.78
water content of mix	0.51
Dry unit wt. of mix (kg/m^3)	1154.5

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2199.9
Weight of Soil Water, $w_{w,soil}$ (g)	774.9
Total weight of soil used, W_t (g)	2960.8
Weight of Dry Cement, w_c (g)	691.3
Weight of Slurry Water, $w_{w,slurry}$ (g)	691.3
Soil Water Content, w (%)	35.22
Water:Cement Ratio, w:c	1.00
Cement Content, a_W (%)	31.42%
Cement Factor, α (kg/m3)	434.17
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	276.15
Volume Ratio, VR (%)	57.22
Total-Water-to-Cement Ratio, w_T:c	2.11

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	691.3
Volume Ratio, VR (%)	57.22
Total-Water-to-Cement Ratio, w_T:c	2.11
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	276.1

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	8/26 5:10 PM	7.2	9/2 8:59 PM	52.0	100.4	25	100	370.1	0	2.1	0.91	1.93	0.994	2.1	1736.1	
H	8/26 5:10 PM	7.2	9/2 9:18 PM	52.1	101.1	25	100	373.4	0	2.2	0.98	1.94	0.995	2.2	1733.7	
B	8/26 5:10 PM	28.0	9/23 4:43 PM	51.9	100.6	25	100	370.9	0	3.6	1.31	1.94	0.995	3.6	1741.8	
G	8/26 5:10 PM	28.0	9/23 5:00 PM	52.0	100.6	25	100	371.3	0	3.6	1.30	1.93	0.995	3.5	1736.0	
C	8/26 5:10 PM	180.0	2/22 4:55 PM	52.0	100.3	25	100	369.8	0	5.0	1.44	1.93	0.994	4.9	1733.9	
F	8/26 5:10 PM	180.0	2/22 5:11 PM	52.1	100.2	25	100	369.7	0	4.8	1.37	1.92	0.994	4.8	1732.2	
D	8/26 5:10 PM	365.2	8/26 9:25 PM	52.0	101.2	25	100	374.3	0	6.0	1.58	1.95	0.996	5.9	1741.7	
E	8/26 5:10 PM	365.2	8/26 9:40 PM	52.0	99.9	25	100	369.6	0	5.4	1.39	1.92	0.994	5.4	1743.0	
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Laboratory Mixing Data
Batch M-4

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.00
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	275
Weight of Slurry Water, $w_{w,slurry}$ (g)	680.0
Weight of Dry Cement, w_c (g)	680.0
Weight of Moist Soil, w_{soil} (g)	2929.8
Weight of Slurry (g)	1360.0
Specific Gravity of Solids	2.78
water content of mix	0.51
Dry unit wt. of mix (kg/m^3)	1154.9

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2200
Weight of Soil Water, $w_{w,soil}$ (g)	770
Total weight of soil used, W_t (g)	2950.4
Weight of Dry Cement, w_c (g)	686.6
Weight of Slurry Water, $w_{w,slurry}$ (g)	686.6
Soil Water Content, w (%)	35.00
Water:Cement Ratio, w:c	1.00
Cement Content, a_W (%)	31.21%
Cement Factor, α (kg/m3)	432.77
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	275.58
Volume Ratio, VR (%)	57.04
Total-Water-to-Cement Ratio, w_T:c	2.11

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	686.6
Volume Ratio, VR (%)	57.04
Total-Water-to-Cement Ratio, w_T:c	2.11
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	275.6

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	8/26 7:00 PM	7.1	9/2 9:41 PM	52.1	99.9	45	100	365.5	0	3.2	1.42	1.92	0.993	3.2	1713.6	
H	8/26 7:00 PM	7.1	9/2 10:03 PM	52.1	99.1	45	100	363.0	0	3.4	1.70	1.9	0.992	3.3	1716.2	
B	8/26 7:00 PM	27.9	9/23 5:23 PM	52.2	99.0	45	100	363.7	0	5.1	1.54	1.9	0.992	5.1	1715.0	
G	8/26 7:00 PM	27.9	9/23 5:44 PM	52.1	99.9	45	100	362.2	0	5.3	1.65	1.92	0.993	5.3	1700.6	
C	8/26 7:00 PM	179.0	2/21 5:59 PM	52.2	98.2	45	100	360.8	0	12.1	1.67	1.88	0.991	11.9	1717.9	
F	8/26 7:00 PM	179.9	2/22 5:45 PM	52.2	98.7	45	100	363.2	0	11.2	1.71	1.89	0.991	11.1	1717.1	
D	8/26 7:00 PM	365.1	8/26 10:04 PM	52.1	99.3	45	100	367.2	0	13.0	1.91	1.91	0.992	12.9	1732.9	
E	8/26 7:00 PM	365.1	8/26 10:21 PM	52.1	99.0	45	100	365.4	0	13.3	1.76	1.9	0.992	13.2	1731.9	
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Laboratory Mixing Data
Batch M-5

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.00
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	125
Weight of Slurry Water, $w_{w,slurry}$ (g)	310.0
Weight of Dry Cement, w_c (g)	310.0
Weight of Moist Soil, w_{soil} (g)	3838.3
Weight of Slurry (g)	620.0
Specific Gravity of Solids	2.70
water content of mix	0.40
Dry unit wt. of mix (kg/m^3)	1290.5

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2899.8
Weight of Soil Water, $w_{w,soil}$ (g)	1018.7
Total weight of soil used, W_t (g)	3889.9
Weight of Dry Cement, w_c (g)	262.8
Weight of Slurry Water, $w_{w,slurry}$ (g)	262.8
Soil Water Content, w (%)	35.13
Water:Cement Ratio, w:c	1.00
Cement Content, a_W (%)	9.06%
Cement Factor, α (kg/m3)	125.61
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	107.77
Volume Ratio, VR (%)	16.56
Total-Water-to-Cement Ratio, w_T:c	4.84

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	262.8
Volume Ratio, VR (%)	16.56
Total-Water-to-Cement Ratio, w_T:c	4.84
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	107.8

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
H	10/18 5:20 PM	7.0	10/25 5:12 PM	51.9	99.9	25	100	378.2	0	1.0	1.40	1.93	0.994	1.0	1790.1	
I	10/18 5:20 PM	7.0	10/25 5:39 PM	52.0	100.0	25	100	379.7	0	0.9	1.50	1.92	0.994	0.9	1788.8	
B	10/18 5:20 PM	28.0	11/15 5:32 PM	52.0	97.8	25	100	370.8	0	1.4	1.41	1.88	0.991	1.4	1785.4	
G	10/18 5:20 PM	28.0	11/15 5:57 PM	51.9	98.9	25	100	374.1	0	1.5	1.40	1.9	0.992	1.5	1784.9	
C	10/18 5:20 PM	179.9	4/16 4:05 PM	52.0	101.4	25	100	382.4	0	2.8	1.10	1.95	0.996	2.8	1778.0	
F	10/18 5:20 PM	180.0	4/16 4:20 PM	51.9	101.1	25	100	382.9	0	2.8	1.06	1.95	0.996	2.8	1790.0	
D	10/18 5:20 PM	364.7	10/18 11:15 AM	51.9	101.8	25	100	386.3	0	3.4	1.26	1.96	0.997	3.4	1795.1	
E	10/18 5:20 PM	364.8	10/18 11:28 AM	51.9	96.7	25	100	386.1	0	3.7	1.15	1.86	0.989	3.6	1883.8	
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Laboratory Mixing Data
Batch M-6

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.00
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	350
Weight of Slurry Water, $w_{w,slurry}$ (g)	870.0
Weight of Dry Cement, w_c (g)	870.0
Weight of Moist Soil, w_{soil} (g)	2475.5
Weight of Slurry (g)	1740.0
Specific Gravity of Solids	2.82
water content of mix	0.56
Dry unit wt. of mix (kg/m^3)	1094.3

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	1899.8
Weight of Soil Water, $w_{w,soil}$ (g)	665
Total weight of soil used, W_t (g)	2555.7
Weight of Dry Cement, w_c (g)	893.7
Weight of Slurry Water, $w_{w,slurry}$ (g)	893.7
Soil Water Content, w (%)	35.00
Water:Cement Ratio, w:c	1.00
Cement Content, a_W (%)	47.04%
Cement Factor, α (kg/m3)	650.30
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	350.17
Volume Ratio, VR (%)	85.71
Total-Water-to-Cement Ratio, w_T:c	1.74

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	893.7
Volume Ratio, VR (%)	85.71
Total-Water-to-Cement Ratio, w_T:c	1.74
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	350.2

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	11/16 4:00 PM	7.0	11/23 4:51 PM	52.0	100.1	25	100	363.3	0	3.6	1.29	1.93	0.994	3.6	1711.0	
H	11/16 4:00 PM	7.0	11/23 5:11 PM	51.9	101.1	25	100	366.4	0	3.7	1.30	1.95	0.996	3.7	1712.9	
B	11/16 4:00 PM	28.1	12/14 5:42 PM	52.0	98.8	25	100	358.9	0	5.4	1.67	1.9	0.992	5.3	1711.2	
G	11/16 4:00 PM	28.1	12/14 6:06 PM	52.0	95.0	25	100	344.5	0	5.4	1.67	1.83	0.986	5.3	1707.1	
C	11/16 4:00 PM	180.2	5/15 9:38 PM	51.9	98.8	25	100	358.0	0	6.9	1.67	1.9	0.992	6.8	1712.0	
F	11/16 4:00 PM	180.2	5/15 9:55 PM	52.0	99.5	25	100	361.6	0	6.3	1.49	1.91	0.993	6.2	1709.7	
D	11/16 4:00 PM	364.9	11/16 1:42 PM	51.8	99.6	25	100	362.5	0	8.2	1.42	1.92	0.994	8.1	1724.8	
E	11/16 4:00 PM	364.9	11/16 1:58 PM	51.9	99.7	25	100	363.6	0	8.5	1.33	1.92	0.994	8.4	1726.2	
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Laboratory Mixing Data
Batch M-7

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.00
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	125
Weight of Slurry Water, $w_{w,slurry}$ (g)	310.0
Weight of Dry Cement, w_c (g)	310.0
Weight of Moist Soil, w_{soil} (g)	3838.3
Weight of Slurry (g)	620.0
Specific Gravity of Solids	2.70
water content of mix	0.40
Dry unit wt. of mix (kg/m^3)	1290.8

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2899.4
Weight of Soil Water, $w_{w,soil}$ (g)	1015
Total weight of soil used, W_t (g)	3885.3
Weight of Dry Cement, w_c (g)	261.4
Weight of Slurry Water, $w_{w,slurry}$ (g)	261.4
Soil Water Content, w (%)	35.01
Water:Cement Ratio, w:c	1.00
Cement Content, a_W (%)	9.01%
Cement Factor, α (kg/m3)	125.09
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	107.39
Volume Ratio, VR (%)	16.49
Total-Water-to-Cement Ratio, w_T:c	4.85

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	261.4
Volume Ratio, VR (%)	16.49
Total-Water-to-Cement Ratio, w_T:c	4.85
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	107.4

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	10/19 11:10 AM	7.0	10/26 11:06 AM	52.0	101.1	45	100	382.0	0	2.1	2.20	1.95	0.996	2.1	1781.0	
H	10/19 11:10 AM	7.0	10/26 11:34 AM	52.0	100.6	45	100	378.3	0	2.0	2.30	1.93	0.995	2.0	1767.9	
B	10/19 11:10 AM	28.4	11/16 8:52 PM	52.0	100.3	45	100	378.7	0	3.8	1.33	1.93	0.994	3.8	1774.3	
G	10/19 11:10 AM	28.4	11/16 9:11 PM	52.0	101.8	45	100	383.2	0	3.6	1.56	1.96	0.997	3.6	1775.0	
C	10/19 11:10 AM	180.2	4/17 4:33 PM	52.0	101.2	45	100	383.1	0	5.4	1.52	1.95	0.996	5.4	1785.3	
F	10/19 11:10 AM	180.2	4/17 4:48 PM	52.0	101.5	45	100	385.3	0	5.0	1.36	1.95	0.996	5.0	1787.0	
D	10/19 11:10 AM	365.2	10/19 3:04 PM	52.0	101.2	45	100	384.4	0	6.3	1.69	1.95	0.996	6.3	1789.6	
E	10/19 11:10 AM	365.2	10/19 3:18 PM	51.8	99.9	45	100	379.3	0	5.9	1.56	1.93	0.994	5.9	1800.1	
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Laboratory Mixing Data
Batch M-8

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.00
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	350
Weight of Slurry Water, $w_{w,slurry}$ (g)	870.0
Weight of Dry Cement, w_c (g)	870.0
Weight of Moist Soil, w_{soil} (g)	2475.5
Weight of Slurry (g)	1740.0
Specific Gravity of Solids	2.82
water content of mix	0.56
Dry unit wt. of mix (kg/m^3)	1094.3

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	1899.9
Weight of Soil Water, $w_{w,soil}$ (g)	665
Total weight of soil used, W_t (g)	2551.1
Weight of Dry Cement, w_c (g)	892.0
Weight of Slurry Water, $w_{w,slurry}$ (g)	892.0
Soil Water Content, w (%)	35.00
Water:Cement Ratio, w:c	1.00
Cement Content, a_W (%)	46.95%
Cement Factor, α (kg/m3)	650.24
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	350.15
Volume Ratio, VR (%)	85.70
Total-Water-to-Cement Ratio, w_T:c	1.74

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	892.0
Volume Ratio, VR (%)	85.70
Total-Water-to-Cement Ratio, w_T:c	1.74
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	350.1

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	10/19 12:50 PM	7.0	10/26 11:57 AM	52.0	98.7	45	100	355.9	0	4.5	1.80	1.9	0.992	4.5	1697.0	
H	10/19 12:50 PM	7.0	10/26 12:17 PM	52.0	101.2	45	100	365.7	0	4.5	1.70	1.94	0.996	4.5	1699.2	
B	10/19 12:50 PM	28.4	11/16 9:32 PM	52.1	96.3	45	100	346.5	0	6.0	1.63	1.85	0.988	5.9	1689.4	
G	10/19 12:50 PM	28.4	11/16 9:53 PM	52.1	97.8	45	100	352.2	0	6.0	1.57	1.88	0.990	6.0	1690.9	
C	10/19 12:50 PM	180.2	4/17 5:07 PM	52.0	96.6	45	100	350.9	0	13.0	1.72	1.86	0.989	12.8	1708.4	
F	10/19 12:50 PM	180.2	4/17 5:26 PM	52.0	96.0	45	100	348.1	0	12.4	1.75	1.85	0.988	12.3	1708.5	
D	10/19 12:50 PM	365.1	10/19 3:35 PM	52.1	101.4	45	100	367.4	0	12.1	1.62	1.95	0.996	12.1	1700.3	
E	10/19 12:50 PM	365.1	10/19 3:50 PM	52.0	99.5	45	100	360.8	0	13.2	1.78	1.91	0.993	13.1	1704.7	
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Laboratory Mixing Data
Batch L-1

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.00
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	125
Weight of Slurry Water, $w_{w,slurry}$ (g)	310.0
Weight of Dry Cement, w_c (g)	310.0
Weight of Moist Soil, w_{soil} (g)	3838.3
Weight of Slurry (g)	620.0
Specific Gravity of Solids	2.71
water content of mix	0.41
Dry unit wt. of mix (kg/m^3)	1274.9

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2898.1
Weight of Soil Water, $w_{w,soil}$ (g)	1024.5
Total weight of soil used, W_t (g)	3885.3
Weight of Dry Cement, w_c (g)	319.2
Weight of Slurry Water, $w_{w,slurry}$ (g)	319.2
Soil Water Content, w (%)	35.35
Water:Cement Ratio, w:c	1.00
Cement Content, a_W (%)	11.01%
Cement Factor, α (kg/m3)	152.78
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	127.17
Volume Ratio, VR (%)	20.14
Total-Water-to-Cement Ratio, w_T:c	4.16

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	319.2
Volume Ratio, VR (%)	20.14
Total-Water-to-Cement Ratio, w_T:c	4.16
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	127.2

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	2/14 9:45 PM	179.5	8/13 10:29 AM	51.8	99.5	45	100	372.1	0	6.8	1.43	1.92	0.994	6.8	1774.4	
H	2/14 9:45 PM	179.5	8/13 10:47 AM	51.8	98.7	45	100	368.7	0	6.6	1.39	1.9	0.992	6.6	1772.3	
B	2/14 9:45 PM	179.5	8/13 9:45 AM	51.9	99.4	25	100	370.7	0	3.5	1.05	1.92	0.993	3.5	1764.5	
F	2/14 9:45 PM	179.5	8/13 10:10 AM	51.7	98.9	25	100	369.2	0	3.4	1.03	1.91	0.993	3.4	1777.1	
C	2/14 9:45 PM	399.8	3/20 4:19 PM	52.2	100.4	45	100	376.5	0	7.3	1.36	1.92	0.994	7.3	1754.1	
G	2/14 9:45 PM	399.8	3/20 4:43 PM	51.9	98.8	45	100	369.5	0	6.9	1.26	1.9	0.992	6.9	1765.7	
D	2/14 9:45 PM	399.8	3/20 4:55 PM	51.8	100.9	25	100	377.7	0	4.5	0.97	1.95	0.996	4.5	1775.8	
E	2/14 9:45 PM	399.8	3/20 5:23 PM	51.8	100.5	25	100	375.8	0	4.9	1.15	1.94	0.995	4.9	1773.1	
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Laboratory Mixing Data
Batch L-2

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.00
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	350
Weight of Slurry Water, $w_{w,slurry}$ (g)	870.0
Weight of Dry Cement, w_c (g)	870.0
Weight of Moist Soil, w_{soil} (g)	2475.5
Weight of Slurry (g)	1740.0
Specific Gravity of Solids	2.82
water content of mix	0.56
Dry unit wt. of mix (kg/m^3)	1094.4

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	1900
Weight of Soil Water, $w_{w,soil}$ (g)	665
Total weight of soil used, W_t (g)	2550.2
Weight of Dry Cement, w_c (g)	891.0
Weight of Slurry Water, $w_{w,slurry}$ (g)	891.0
Soil Water Content, w (%)	35.00
Water:Cement Ratio, w:c	1.00
Cement Content, a_W (%)	46.89%
Cement Factor, α (kg/m3)	649.74
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	350.00
Volume Ratio, VR (%)	85.64
Total-Water-to-Cement Ratio, w_T:c	1.74

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	891.0
Volume Ratio, VR (%)	85.64
Total-Water-to-Cement Ratio, w_T:c	1.74
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	350.0

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
H	2/15 7:30 PM	181.9	8/16 4:07 PM	52.0	95.8	45	100	344.9	0	13.4	2.04	1.84	0.987	13.2	1698.2	
I	2/15 7:30 PM	181.9	8/16 4:30 PM	51.9	99.1	45	100	357.0	0	12.8	1.80	1.91	0.993	12.7	1701.5	
B	2/15 7:30 PM	181.9	8/16 4:51 PM	51.8	99.6	25	100	358.9	0	6.5	1.35	1.92	0.994	6.5	1711.9	
F	2/15 7:30 PM	181.9	8/16 5:12 PM	51.8	96.8	25	100	348.9	0	6.5	1.50	1.87	0.990	6.4	1710.3	
C	2/15 7:30 PM	399.8	3/21 3:24 PM	52.0	100.4	45	100	361.5	0	14.2	1.89	1.93	0.995	14.1	1695.3	
G	2/15 7:30 PM	399.8	3/21 3:46 PM	52.1	98.6	45	100	354.8	0	14.6	1.96	1.89	0.991	14.5	1689.0	
D	2/15 7:30 PM	399.9	3/21 4:07 PM	51.8	99.9	25	100	360.3	0	7.6	1.37	1.93	0.994	7.6	1709.9	
E	2/15 7:30 PM	399.9	3/21 4:28 PM	51.8	100.7	25	100	363.0	0	7.6	1.40	1.94	0.995	7.6	1709.7	
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Laboratory Mixing Data
Batch L-3

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	0.60
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	275
Weight of Slurry Water, $w_{w,slurry}$ (g)	410.0
Weight of Dry Cement, w_c (g)	680.0
Weight of Moist Soil, w_{soil} (g)	3435.5
Weight of Slurry (g)	1090.0
Specific Gravity of Solids	2.76
water content of mix	0.40
Dry unit wt. of mix (kg/m^3)	1307.3

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2600
Weight of Soil Water, $w_{w,soil}$ (g)	916.9
Total weight of soil used, W_t (g)	3480.9
Weight of Dry Cement, w_c (g)	689.0
Weight of Slurry Water, $w_{w,slurry}$ (g)	413.4
Soil Water Content, w (%)	35.27
Water:Cement Ratio, w:c	0.60
Cement Content, a_W (%)	26.50%
Cement Factor, α (kg/m3)	368.10
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	275.14
Volume Ratio, VR (%)	33.79
Total-Water-to-Cement Ratio, w_T:c	1.91

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	413.4
Volume Ratio, VR (%)	33.79
Total-Water-to-Cement Ratio, w_T:c	1.91
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	275.1

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	3/2 6:30 PM	176.7	8/26 10:59 AM	52.1	97.0	45	100	372.3	0	14.6	1.88	1.86	0.989	14.5	1801.2	
H	3/2 6:30 PM	176.7	8/26 11:23 AM	52.1	99.0	45	100	379.3	0	14.7	1.81	1.9	0.992	14.5	1793.8	
B	3/2 6:30 PM	176.7	8/26 11:45 AM	51.9	99.1	25	100	379.0	0	7.1	1.21	1.91	0.993	7.1	1805.3	
G	3/2 6:30 PM	176.7	8/26 12:07 PM	52.0	99.7	25	100	380.8	0	7.8	1.50	1.92	0.993	7.8	1798.7	
C	3/2 6:30 PM	396.1	4/1 7:58 PM	52.1	98.3	45	100	376.2	0	15.8	1.91	1.89	0.991	15.6	1794.2	
F	3/2 6:30 PM	396.1	4/1 8:19 PM	52.1	99.5	45	100	381.6	0	15.9	1.93	1.91	0.993	15.8	1795.5	
D	3/2 6:30 PM	396.1	4/1 8:42 PM	52.0	97.8	25	100	374.7	0	9.8	1.51	1.88	0.990	9.7	1802.9	
E	3/2 6:30 PM	396.1	4/1 9:02 PM	52.1	98.8	25	100	378.9	0	9.5	1.37	1.9	0.992	9.4	1800.4	
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Laboratory Mixing Data
Batch L-4

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.40
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	200
Weight of Slurry Water, $w_{w,slurry}$ (g)	700.0
Weight of Dry Cement, w_c (g)	500.0
Weight of Moist Soil, w_{soil} (g)	3016.3
Weight of Slurry (g)	1200.0
Specific Gravity of Solids	2.75
water content of mix	0.54
Dry unit wt. of mix (kg/m^3)	1105.7

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2299.9
Weight of Soil Water, $w_{w,soil}$ (g)	815.9
Total weight of soil used, W_t (g)	3100
Weight of Dry Cement, w_c (g)	508.1
Weight of Slurry Water, $w_{w,slurry}$ (g)	711.3
Soil Water Content, w (%)	35.48
Water:Cement Ratio, w:c	1.40
Cement Content, a_W (%)	22.09%
Cement Factor, α (kg/m3)	304.80
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	200.04
Volume Ratio, VR (%)	52.37
Total-Water-to-Cement Ratio, w_T:c	2.98

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	711.3
Volume Ratio, VR (%)	52.37
Total-Water-to-Cement Ratio, w_T:c	2.98
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	200.0

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	3/3 9:30 PM	179.6	8/30 11:16 AM	52.1	99.6	45	100	357.9	0	7.8	1.56	1.91	0.993	7.7	1685.5	
H	3/3 9:30 PM	179.6	8/30 11:35 AM	52.2	100.1	45	100	359.5	0	7.5	1.38	1.92	0.993	7.4	1679.8	
B	3/3 9:30 PM	179.5	8/30 10:34 AM	52.0	96.1	25	100	345.7	0	2.7	1.15	1.85	0.988	2.7	1694.2	
G	3/3 9:30 PM	179.6	8/30 10:55 AM	52.0	98.8	25	100	356.1	0	2.8	0.91	1.9	0.992	2.8	1696.9	
C	3/3 9:30 PM	395.0	4/1 9:24 PM	52.1	99.4	45	100	357.4	0	8.8	1.51	1.91	0.993	8.7	1686.2	
F	3/3 9:30 PM	395.0	4/1 9:45 PM	52.1	99.3	45	100	356.9	0	8.8	1.45	1.91	0.992	8.8	1684.3	
D	3/3 9:30 PM	395.0	4/1 10:09 PM	52.0	98.7	25	100	354.3	0	4.2	1.25	1.9	0.992	4.2	1689.8	
E	3/3 9:30 PM	395.0	4/1 10:32 PM	52.0	100.0	25	100	359.6	0	4.1	1.10	1.92	0.994	4.1	1693.7	
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Laboratory Mixing Data
Batch D-1

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.6

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.00
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	125
Weight of Slurry Water, $w_{w,slurry}$ (g)	310.0
Weight of Dry Cement, w_c (g)	310.0
Weight of Moist Soil, w_{soil} (g)	3838.3
Weight of Slurry (g)	620.0
Specific Gravity of Solids	2.71
water content of mix	0.41
Dry unit wt. of mix (kg/m^3)	1276.7

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2094.9
Weight of Soil Water, $w_{w,soil}$ (g)	1021
Total weight of soil used, W_t (g)	3906
Weight of Dry Cement, w_c (g)	314.1
Weight of Slurry Water, $w_{w,slurry}$ (g)	314.1
Soil Water Content, w (%)	48.74
Water:Cement Ratio, w:c	1.00
Cement Content, a_W (%)	14.99%
Cement Factor, α (kg/m3)	149.52
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	124.90
Volume Ratio, VR (%)	19.71
Total-Water-to-Cement Ratio, w_T:c	4.22

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	314.1
Volume Ratio, VR (%)	19.71
Total-Water-to-Cement Ratio, w_T:c	4.22
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	124.9

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Total curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes (Curing history)
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	2/14 3:40 PM	28.1	3/14 4:52 PM	51.8	96.6	25&45	100	363.4	0	1.8	1.69	1.87	0.989	1.8	1785.3	25C(28)-45(0)
B1	2/14 3:40 PM	28.1	3/14 5:23 PM	51.8	96.6	25&45	100	363.1	0	2.3	1.67	1.86	0.989	2.3	1780.4	45C(7)-25(21)
B2	2/14 3:40 PM	28.0	3/14 4:25 PM	51.8	99.2	25&45	100	371.0	0	2.9	1.84	1.92	0.993	2.8	1774.6	25C(21)-45(7)
C1	2/14 3:40 PM	28.1	3/14 5:50 PM	52.0	96.3	25&45	100	363.3	0	3.2	1.34	1.85	0.988	3.1	1777.8	45C(14)-25(14)
C2	2/14 3:40 PM	28.0	3/14 4:04 PM	51.8	99.6	25&45	100	373.4	0	3.7	1.45	1.92	0.994	3.6	1779.7	25C(14)-45(14)
D1	2/14 3:40 PM	28.1	3/14 6:14 PM	51.9	100.1	25&45	100	377.6	0	3.7	1.31	1.93	0.994	3.7	1783.1	45C(21)-25(7)
D2	2/14 3:40 PM	28.0	3/14 3:44 PM	51.8	100.1	25&45	100	375.2	0	4.4	1.66	1.93	0.995	4.4	1779.7	25C(7)-45(21)
E	2/14 3:40 PM	28.1	3/14 6:36 PM	51.9	100.4	25&45	100	376.0	0	4.2	1.54	1.93	0.995	4.2	1769.8	45C(28)-25(0)
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Laboratory Mixing Data
Batch D-2

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.6

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.00
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	125
Weight of Slurry Water, $w_{w,slurry}$ (g)	310.0
Weight of Dry Cement, w_c (g)	310.0
Weight of Moist Soil, w_{soil} (g)	3838.3
Weight of Slurry (g)	620.0
Specific Gravity of Solids	2.71
water content of mix	0.41
Dry unit wt. of mix (kg/m^3)	1276.7

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2899.8
Weight of Soil Water, $w_{w,soil}$ (g)	1033.7
Total weight of soil used, W_t (g)	3917.6
Weight of Dry Cement, w_c (g)	314.9
Weight of Slurry Water, $w_{w,slurry}$ (g)	314.9
Soil Water Content, w (%)	35.65
Water:Cement Ratio, w:c	1.00
Cement Content, a_W (%)	10.86%
Cement Factor, α (kg/m3)	149.48
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	124.88
Volume Ratio, VR (%)	19.70
Total-Water-to-Cement Ratio, w_T:c	4.23

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	314.9
Volume Ratio, VR (%)	19.70
Total-Water-to-Cement Ratio, w_T:c	4.23
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	124.9

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Total curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes (Curing history)
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	2/15 12:00 PM	28.0	3/15 11:20 AM	51.7	98.7	25&45	100	370.1	0	1.8	2.11	1.91	0.993	1.8	1785.1	25C(28)-45(0)
B1	2/15 12:00 PM	28.0	3/15 11:48 AM	51.9	98.3	25&45	100	369.0	0	2.3	1.67	1.89	0.992	2.3	1775.4	45C(7)-25(21)
B2	2/15 12:00 PM	28.0	3/15 10:54 AM	51.8	100.2	25&45	100	374.5	0	2.8	2.07	1.94	0.995	2.8	1776.3	25C(21)-45(7)
C1	2/15 12:00 PM	28.0	3/15 12:14 PM	51.9	99.5	25&45	100	374.0	0	3.0	1.27	1.92	0.993	3.0	1775.7	45C(14)-25(14)
C2	2/15 12:00 PM	27.9	3/15 10:35 AM	51.7	99.6	25&45	100	372.3	0	3.7	1.94	1.93	0.994	3.7	1780.2	25C(14)-45(14)
D1	2/15 12:00 PM	28.0	3/15 12:41 PM	51.9	97.0	25&45	100	365.3	0	3.8	1.43	1.87	0.989	3.7	1778.9	45C(21)-25(7)
D2	2/15 12:00 PM	27.9	3/15 10:15 AM	51.7	99.2	25&45	100	370.0	0	4.3	1.63	1.92	0.993	4.3	1774.2	25C(7)-45(21)
E	2/15 12:00 PM	28.0	3/15 1:02 PM	51.9	99.8	25&45	100	373.4	0	4.2	1.53	1.92	0.994	4.2	1770.4	45C(28)-25(0)
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Laboratory Mixing Data
Batch D-3

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.6

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.00
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	275
Weight of Slurry Water, $w_{w,slurry}$ (g)	680.0
Weight of Dry Cement, w_c (g)	680.0
Weight of Moist Soil, w_{soil} (g)	2929.8
Weight of Slurry (g)	1360.0
Specific Gravity of Solids	2.78
water content of mix	0.51
Dry unit wt. of mix (kg/m^3)	1155.1

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2200.3
Weight of Soil Water, $w_{w,soil}$ (g)	770
Total weight of soil used, W_t (g)	2956.5
Weight of Dry Cement, w_c (g)	687.4
Weight of Slurry Water, $w_{w,slurry}$ (g)	687.4
Soil Water Content, w (%)	35.00
Water:Cement Ratio, w:c	1.00
Cement Content, a_W (%)	31.24%
Cement Factor, α (kg/m3)	432.35
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	275.41
Volume Ratio, VR (%)	56.98
Total-Water-to-Cement Ratio, w_T:c	2.12

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	687.4
Volume Ratio, VR (%)	56.98
Total-Water-to-Cement Ratio, w_T:c	2.12
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	275.4

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Total curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes (Curing history)
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	2/16 1:30 PM	28.1	3/16 2:42 PM	51.8	99.8	25&45	100	366.6	0	4.1	1.48	1.92	0.994	4.1	1740.8	25C(28)-45(0)
B1	2/16 1:30 PM	28.1	3/16 3:07 PM	52.0	99.6	25&45	100	365.1	0	4.1	1.70	1.92	0.993	4.1	1728.7	45C(7)-25(21)
B2	2/16 1:30 PM	28.0	3/16 2:20 PM	51.8	97.7	25&45	100	354.8	0	4.8	2.03	1.88	0.991	4.8	1721.1	25C(21)-45(7)
C1	2/16 1:30 PM	28.1	3/16 3:30 PM	51.9	99.7	25&45	100	367.0	0	4.8	1.66	1.92	0.994	4.7	1740.6	45C(14)-25(14)
C2	2/16 1:30 PM	28.0	3/16 1:57 PM	51.8	100.4	25&45	100	367.5	0	5.4	1.84	1.94	0.995	5.4	1733.6	25C(14)-45(14)
D1	2/16 1:30 PM	28.1	3/16 3:53 PM	51.9	100.4	25&45	100	368.8	0	5.1	1.45	1.94	0.995	5.1	1738.4	45C(21)-25(7)
D2	2/16 1:30 PM	28.0	3/16 1:39 PM	51.9	100.0	25&45	100	366.1	0	5.9	1.61	1.93	0.994	5.8	1732.3	25C(7)-45(21)
E	2/16 1:30 PM	28.1	3/16 4:17 PM	51.9	99.8	25&45	100	365.3	0	5.8	2.10	1.92	0.994	5.8	1729.1	45C(28)-25(0)
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Laboratory Mixing Data
Batch D-4

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.6

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.00
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	275
Weight of Slurry Water, $w_{w,slurry}$ (g)	680.0
Weight of Dry Cement, w_c (g)	680.0
Weight of Moist Soil, w_{soil} (g)	2929.8
Weight of Slurry (g)	1360.0
Specific Gravity of Solids	2.78
water content of mix	0.51
Dry unit wt. of mix (kg/m^3)	1155.0

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2200.4
Weight of Soil Water, $w_{w,soil}$ (g)	770.5
Total weight of soil used, W_t (g)	2952.8
Weight of Dry Cement, w_c (g)	686.9
Weight of Slurry Water, $w_{w,slurry}$ (g)	686.9
Soil Water Content, w (%)	35.02
Water:Cement Ratio, w:c	1.00
Cement Content, a_W (%)	31.21%
Cement Factor, α (kg/m3)	432.57
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	275.50
Volume Ratio, VR (%)	57.01
Total-Water-to-Cement Ratio, w_T:c	2.11

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	686.9
Volume Ratio, VR (%)	57.01
Total-Water-to-Cement Ratio, w_T:c	2.11
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	275.5

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Total curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes (Curing history)
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	2/17 4:30 PM	28.0	3/17 5:11 PM	51.8	100.5	25&45	100	369.7	0	3.9	1.45	1.94	0.995	3.9	1744.8	25C(28)-45(0)
B1	2/17 4:30 PM	28.0	3/17 5:33 PM	51.9	99.8	25&45	100	367.4	0	4.0	1.44	1.92	0.994	4.0	1738.1	45C(7)-25(21)
B2	2/17 4:30 PM	28.0	3/17 4:50 PM	51.8	98.6	25&45	100	359.8	0	4.8	2.22	1.9	0.992	4.8	1730.0	25C(21)-45(7)
C1	2/17 4:30 PM	28.1	3/17 5:56 PM	51.8	99.6	25&45	100	366.4	0	4.6	1.49	1.92	0.994	4.6	1742.0	45C(14)-25(14)
C2	2/17 4:30 PM	28.0	3/17 4:29 PM	51.8	99.3	25&45	100	362.8	0	5.5	1.83	1.92	0.993	5.4	1734.1	25C(14)-45(14)
D1	2/17 4:30 PM	28.1	3/17 6:18 PM	52.0	99.6	25&45	100	367.2	0	5.1	1.33	1.92	0.993	5.1	1738.7	45C(21)-25(7)
D2	2/17 4:30 PM	28.0	3/17 4:11 PM	51.9	100.0	25&45	100	365.6	0	6.1	1.74	1.93	0.994	6.0	1730.8	25C(7)-45(21)
E	2/17 4:30 PM	28.1	3/17 6:39 PM	51.9	99.7	25&45	100	365.3	0	5.6	1.84	1.92	0.994	5.6	1730.4	45C(28)-25(0)
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Laboratory Mixing Data
Batch D-5

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.6

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.00
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	125
Weight of Slurry Water, $w_{w,slurry}$ (g)	310.0
Weight of Dry Cement, w_c (g)	310.0
Weight of Moist Soil, w_{soil} (g)	3838.3
Weight of Slurry (g)	620.0
Specific Gravity of Solids	2.71
water content of mix	0.41
Dry unit wt. of mix (kg/m^3)	1276.7

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2899.6
Weight of Soil Water, $w_{w,soil}$ (g)	1015
Total weight of soil used, W_t (g)	3889.9
Weight of Dry Cement, w_c (g)	312.8
Weight of Slurry Water, $w_{w,slurry}$ (g)	312.8
Soil Water Content, w (%)	35.00
Water:Cement Ratio, w:c	1.00
Cement Content, a_W (%)	10.79%
Cement Factor, α (kg/m3)	149.52
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	124.90
Volume Ratio, VR (%)	19.71
Total-Water-to-Cement Ratio, w_T:c	4.22

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	312.8
Volume Ratio, VR (%)	19.71
Total-Water-to-Cement Ratio, w_T:c	4.22
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	124.9

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Total curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes (Curing history)
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	5/27 11:20 AM	14.0	6/10 10:37 AM	52.0	98.8	25&45	100	372.5	0	2.1	1.02	1.9	0.992	2.1	1773.1	45C(7)-25(7)
H	5/27 11:20 AM	14.0	6/10 10:58 AM	52.1	98.1	25&45	100	369.6	0	1.9	1.04	1.88	0.991	1.8	1763.3	45C(7)-25(7)
B	5/27 11:20 AM	14.0	6/10 11:22 AM	51.8	99.3	25&45	100	370.3	0	2.4	1.95	1.91	0.993	2.4	1767.3	25C(7)-45(7)
G	5/27 11:20 AM	14.0	6/10 11:47 AM	51.9	98.9	25&45	100	367.0	0	2.2	1.75	1.9	0.992	2.1	1753.2	25C(7)-45(7)
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Laboratory Mixing Data
Batch D-6

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.6

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.00
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	125
Weight of Slurry Water, $w_{w,slurry}$ (g)	310.0
Weight of Dry Cement, w_c (g)	310.0
Weight of Moist Soil, w_{soil} (g)	3838.3
Weight of Slurry (g)	620.0
Specific Gravity of Solids	2.71
water content of mix	0.41
Dry unit wt. of mix (kg/m^3)	1276.6

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2900
Weight of Soil Water, $w_{w,soil}$ (g)	1042
Total weight of soil used, W_t (g)	3833.5
Weight of Dry Cement, w_c (g)	308.5
Weight of Slurry Water, $w_{w,slurry}$ (g)	308.5
Soil Water Content, w (%)	35.93
Water:Cement Ratio, w:c	1.00
Cement Content, a_W (%)	10.64%
Cement Factor, α (kg/m3)	149.66
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	125.00
Volume Ratio, VR (%)	19.73
Total-Water-to-Cement Ratio, w_T:c	4.22

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	308.5
Volume Ratio, VR (%)	19.73
Total-Water-to-Cement Ratio, w_T:c	4.22
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	125.0

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Total curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes (Curing history)
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
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B	6/19 4:40 PM	20.8	7/10 12:29 PM	52.0	99.1	25&45	100	370.3	0	2.3	1.65	1.91	0.992	2.3	1759.7	25C(14)-45(7)
G	6/19 4:40 PM	20.8	7/10 12:51 PM	52.0	100.6	25&45	100	374.5	0	2.1	1.45	1.94	0.995	2.1	1754.4	25C(14)-45(7)
I	6/19 4:40 PM	20.9	7/10 1:12 PM	52.0	101.5	45	100	379.5	0	3.3	1.23	1.95	0.996	3.3	1759.7	45C(21)
F	6/19 4:40 PM	20.9	7/10 1:34 PM	52.1	100.3	45	100	373.7	0	3.4	1.23	1.92	0.994	3.4	1748.8	45C(21)
D	6/19 4:40 PM	20.9	7/10 1:55 PM	52.0	100.0	25	100	375.1	0	1.4	1.17	1.92	0.994	1.4	1767.1	25C(21)
E	6/19 4:40 PM	20.9	7/10 2:14 PM	51.9	100.6	25	100	377.2	0	1.4	1.33	1.94	0.995	1.4	1772.7	25C(21)
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Laboratory Mixing Data
Batch D-7

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.6

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	8
Water:Cement Ratio of Slurry, w:c	1.00
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	275
Weight of Slurry Water, $w_{w,slurry}$ (g)	550.0
Weight of Dry Cement, w_c (g)	550.0
Weight of Moist Soil, w_{soil} (g)	2343.8
Weight of Slurry (g)	1100.0
Specific Gravity of Solids	2.78
water content of mix	0.50
Dry unit wt. of mix (kg/m^3)	1155.5

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	1799.6
Weight of Soil Water, $w_{w,soil}$ (g)	630
Total weight of soil used, W_t (g)	2417.3
Weight of Dry Cement, w_c (g)	560.3
Weight of Slurry Water, $w_{w,slurry}$ (g)	560.3
Soil Water Content, w (%)	35.01
Water:Cement Ratio, w:c	1.00
Cement Content, a_W (%)	31.13%
Cement Factor, α (kg/m3)	431.05
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	274.88
Volume Ratio, VR (%)	56.81
Total-Water-to-Cement Ratio, w_T:c	2.12

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	560.3
Volume Ratio, VR (%)	56.81
Total-Water-to-Cement Ratio, w_T:c	2.12
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	274.9

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Total curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes (Curing history)
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	3/4 2:30 PM	14.0	3/18 3:18 PM	52.1	100.5	25&45	100	368.7	0	3.4	1.33	1.93	0.994	3.4	1722.7	45C(7)-25(7)
H	3/4 2:30 PM	14.0	3/18 3:35 PM	52.0	100.6	25&45	100	369.0	0	3.5	1.14	1.93	0.995	3.5	1727.8	45C(7)-25(7)
B	3/4 2:30 PM	21.0	3/25 2:44 PM	52.0	100.9	25&45	100	369.6	0	3.3	0.85	1.94	0.995	3.3	1725.9	45C(7)-25(14)
G	3/4 2:30 PM	21.0	3/25 2:56 PM	52.0	101.0	25&45	100	371.4	0	3.5	1.12	1.94	0.995	3.5	1729.1	45C(7)-25(14)
C	3/4 2:30 PM	21.0	3/25 3:09 PM	52.0	100.9	25&45	100	370.9	0	4.2	1.03	1.94	0.995	4.2	1731.9	45C(14)-25(7)
F	3/4 2:30 PM	21.0	3/25 3:22 PM	52.0	101.0	25&45	100	370.8	0	2.8	0.76	1.94	0.995	2.8	1731.0	45C(14)-25(7)
D	3/4 2:30 PM	21.0	3/25 3:35 PM	52.0	100.6	45	100	367.7	0	4.4	1.15	1.94	0.995	4.4	1721.3	45C(21)
E	3/4 2:30 PM	21.1	3/25 3:49 PM	51.9	100.9	45	100	368.3	0	4.3	1.22	1.94	0.995	4.3	1724.8	45C(21)
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Laboratory Mixing Data
Batch D-8

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.6

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	8
Water:Cement Ratio of Slurry, w:c	1.00
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	275
Weight of Slurry Water, $w_{w,slurry}$ (g)	550.0
Weight of Dry Cement, w_c (g)	550.0
Weight of Moist Soil, w_{soil} (g)	2343.8
Weight of Slurry (g)	1100.0
Specific Gravity of Solids	2.78
water content of mix	0.50
Dry unit wt. of mix (kg/m^3)	1155.6

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	1799.6
Weight of Soil Water, $w_{w,soil}$ (g)	630
Total weight of soil used, W_t (g)	2417
Weight of Dry Cement, w_c (g)	559.6
Weight of Slurry Water, $w_{w,slurry}$ (g)	559.6
Soil Water Content, w (%)	35.01
Water:Cement Ratio, w:c	1.00
Cement Content, a_W (%)	31.10%
Cement Factor, α (kg/m3)	430.56
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	274.68
Volume Ratio, VR (%)	56.75
Total-Water-to-Cement Ratio, w_T:c	2.12

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	559.6
Volume Ratio, VR (%)	56.75
Total-Water-to-Cement Ratio, w_T:c	2.12
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	274.7

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Total curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes (Curing history)
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	3/5 4:40 PM	13.9	3/19 2:24 PM	51.8	100.9	25&45	100	368.2	0	3.9	1.72	1.95	0.996	3.8	1728.1	25C(7)-45(7)
H	3/5 4:40 PM	13.9	3/19 2:37 PM	51.8	100.7	25&45	100	367.3	0	3.5	1.34	1.94	0.996	3.5	1731.7	25C(7)-45(7)
B	3/5 4:40 PM	21.2	3/26 8:25 PM	51.8	100.7	25&45	100	368.1	0	4.6	1.53	1.94	0.995	4.6	1731.2	25C(7)-45(14)
G	3/5 4:40 PM	21.2	3/26 8:37 PM	51.9	100.2	25&45	100	366.5	0	3.9	0.97	1.93	0.995	3.8	1729.0	25C(7)-25(14)
C	3/5 4:40 PM	21.2	3/26 8:50 PM	51.9	99.6	25&45	100	363.6	0	4.0	1.58	1.92	0.993	4.0	1724.5	25C(14)-45(7)
F	3/5 4:40 PM	21.2	3/26 9:04 PM	51.8	100.1	25&45	100	372.4	0	3.5	1.32	1.93	0.994	3.5	1762.9	25C(14)-45(7)
D	3/5 4:40 PM	21.2	3/26 9:16 PM	51.8	100.6	25	100	368.4	0	3.3	1.12	1.94	0.995	3.3	1734.8	25C(21)
E	3/5 4:40 PM	21.2	3/26 9:27 PM	51.9	100.5	25	100	368.0	0	3.3	1.16	1.94	0.995	3.3	1733.4	25C(21)
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Laboratory Mixing Data
Batch D-9

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.6

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	6
Water:Cement Ratio of Slurry, w:c	1.00
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	125
Weight of Slurry Water, $w_{w,slurry}$ (g)	190.0
Weight of Dry Cement, w_c (g)	190.0
Weight of Moist Soil, w_{soil} (g)	2303.0
Weight of Slurry (g)	380.0
Specific Gravity of Solids	2.71
water content of mix	0.41
Dry unit wt. of mix (kg/m^3)	1276.7

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	1799.2
Weight of Soil Water, $w_{w,soil}$ (g)	656.7
Total weight of soil used, W_t (g)	2414.9
Weight of Dry Cement, w_c (g)	194.1
Weight of Slurry Water, $w_{w,slurry}$ (g)	194.1
Soil Water Content, w (%)	36.50
Water:Cement Ratio, w:c	1.00
Cement Content, a_W (%)	10.79%
Cement Factor, α (kg/m3)	149.43
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	124.84
Volume Ratio, VR (%)	19.70
Total-Water-to-Cement Ratio, w_T:c	4.23

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	194.1
Volume Ratio, VR (%)	19.70
Total-Water-to-Cement Ratio, w_T:c	4.23
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	124.8

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Total curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes (Curing history)
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	3/30 6:20 PM	20.85	4/20 2:36 PM	51.8	100.6	25&45	100	376.2	0	3.5	1.07	1.94	0.996	3.5	1776.3	25C(7)-45(14)
F	3/30 6:20 PM	20.85	4/20 2:48 PM	51.7	100.6	25&45	100	376.2	0	3.5	1.10	1.95	0.996	3.5	1779.7	25C(7)-45(14)
B	3/30 6:20 PM	20.86	4/20 3:02 PM	51.9	99.6	25&45	100	372.9	0	2.3	1.24	1.92	0.993	2.3	1766.5	45C(7)-25(14)
E	3/30 6:20 PM	20.87	4/20 3:17 PM	51.9	100.0	25&45	100	375.5	0	2.3	1.11	1.93	0.994	2.3	1775.0	45C(7)-25(14)
C	3/30 6:20 PM	20.88	4/20 3:32 PM	51.9	100.4	25&45	100	376.7	0	3.2	1.02	1.93	0.995	3.2	1771.8	45C(14)-25(7)
D	3/30 6:20 PM	20.89	4/20 3:45 PM	51.9	100.7	25&45	100	378.0	0	3.3	0.99	1.94	0.995	3.3	1773.4	45C(14)-25(7)
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Laboratory Mixing Data
Batch O-1

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial organic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	36.5%
Unit Weight, γ_{soil} (kg/m^3)	1842.3
Tannic acid concentration (%)	0.200%

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	0.60
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	200
Weight of Slurry Water, $w_{w,slurry}$ (g)	300.0
Weight of Dry Cement, w_c (g)	500.0
Weight of Moist Soil, w_{soil} (g)	3716.7
Weight of Slurry (g)	800.0
Specific Gravity of Solids	2.73
water content of mix	0.40
Dry unit wt. of mix (kg/m^3)	1304.0

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2799.6
Weight of Soil Water, $w_{w,soil}$ (g)	980
Total weight of soil used, W_t (g)	3762.6
Weight of Dry Cement, w_c (g)	497.1
Weight of Slurry Water, $w_{w,slurry}$ (g)	298.3
Soil Water Content, w (%)	35.01
Water:Cement Ratio, w:c	0.60
Cement Content, a_W (%)	17.76%
Cement Factor, α (kg/m3)	243.39
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	198.95
Volume Ratio, VR (%)	22.34
Total-Water-to-Cement Ratio, w_T:c	2.62

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	298.3
Volume Ratio, VR (%)	22.34
Total-Water-to-Cement Ratio, w_T:c	2.62
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	198.9

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	4/1 9:25 PM	2.8	4/4 4:26 PM	51.8	100.3	21.1	100	382.1	0	0.7	1.04	1.94	0.995	0.7	1810.0	
H	4/1 9:25 PM	2.8	4/4 4:44 PM	51.8	99.4	21.1	100	379.1	0	0.6	0.83	1.92	0.993	0.6	1807.0	
B	4/1 9:25 PM	6.7	4/8 3:18 PM	51.8	100.1	21.1	100	382.3	0	1.9	1.09	1.93	0.995	1.9	1813.4	
G	4/1 9:25 PM	6.8	4/8 3:33 PM	51.9	101.2	21.1	100	387.6	0	1.9	1.07	1.95	0.996	1.9	1810.6	
C	4/1 9:25 PM	13.9	4/15 6:25 PM	51.6	100.1	21.1	100	383.5	0	2.3	1.09	1.94	0.995	2.3	1830.7	
F	4/1 9:25 PM	13.9	4/15 6:40 PM	51.7	100.8	21.1	100	386.8	0	2.3	1.08	1.95	0.996	2.3	1825.8	
D	4/1 9:25 PM	27.5	4/29 9:44 AM	51.8	100.5	21.1	100	385.3	0	2.9	0.94	1.94	0.995	2.8	1818.4	
E	4/1 9:25 PM	27.5	4/29 10:13 AM	51.8	98.6	21.1	100	377.3	0	2.9	1.19	1.9	0.992	2.9	1813.3	
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Laboratory Mixing Data
Batch O-2

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial organic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	36.5%
Unit Weight, γ_{soil} (kg/m^3)	1842.3
Tannic acid concentration (%)	0.200%

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	0.60
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	275
Weight of Slurry Water, $w_{w,slurry}$ (g)	410.0
Weight of Dry Cement, w_c (g)	680.0
Weight of Moist Soil, w_{soil} (g)	3403.3
Weight of Slurry (g)	1090.0
Specific Gravity of Solids	2.76
water content of mix	0.41
Dry unit wt. of mix (kg/m^3)	1286.8

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2500.2
Weight of Soil Water, $w_{w,soil}$ (g)	923.4
Total weight of soil used, W_t (g)	3409.9
Weight of Dry Cement, w_c (g)	675.0
Weight of Slurry Water, $w_{w,slurry}$ (g)	405.0
Soil Water Content, w (%)	36.93
Water:Cement Ratio, w:c	0.60
Cement Content, a_W (%)	27.00%
Cement Factor, α (kg/m3)	364.68
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	273.23
Volume Ratio, VR (%)	33.47
Total-Water-to-Cement Ratio, w_T:c	1.95

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	405.0
Volume Ratio, VR (%)	33.47
Total-Water-to-Cement Ratio, w_T:c	1.95
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	273.2

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	5/27 5:10 PM	3.2	5/30 9:18 PM	52.1	100.4	21.1	100	379.8	0	1.5	1.10	1.92	0.994	1.5	1772.1	
H	5/27 5:10 PM	3.2	5/30 9:34 PM	51.8	100.9	21.1	100	381.9	0	1.3	1.00	1.95	0.996	1.3	1794.6	
B	5/27 5:10 PM	7.0	6/3 4:49 PM	51.6	98.6	21.1	100	374.3	0	2.6	1.06	1.91	0.993	2.6	1814.8	
G	5/27 5:10 PM	7.0	6/3 5:04 PM	52.0	100.9	21.1	100	384.3	0	2.7	0.96	1.94	0.995	2.7	1795.4	
C	5/27 5:10 PM	13.9	6/10 3:45 PM	51.8	100.9	21.1	100	383.8	0	3.7	0.99	1.95	0.996	3.7	1801.4	
F	5/27 5:10 PM	14.0	6/10 4:00 PM	51.9	99.2	21.1	100	377.0	0	2.9	1.03	1.91	0.993	2.9	1798.0	
D	5/27 5:10 PM	27.8	6/24 12:22 PM	51.8	101.2	21.1	100	372.5	0	3.9	0.82	1.95	0.996	3.9	1743.9	
E	5/27 5:10 PM	27.8	6/24 12:36 PM	51.8	100.9	21.1	100	368.7	0	3.8	1.07	1.95	0.996	3.8	1734.8	
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Laboratory Mixing Data
Batch O-3

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial organic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	36.5%
Unit Weight, γ_{soil} (kg/m^3)	1842.3
Tannic acid concentration (%)	0.200%

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	0.60
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	350
Weight of Slurry Water, $w_{w,slurry}$ (g)	520.0
Weight of Dry Cement, w_c (g)	870.0
Weight of Moist Soil, w_{soil} (g)	3090.0
Weight of Slurry (g)	1390.0
Specific Gravity of Solids	2.79
water content of mix	0.43
Dry unit wt. of mix (kg/m^3)	1269.5

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2399.9
Weight of Soil Water, $w_{w,soil}$ (g)	840
Total weight of soil used, W_t (g)	3225.3
Weight of Dry Cement, w_c (g)	894.4
Weight of Slurry Water, $w_{w,slurry}$ (g)	536.6
Soil Water Content, w (%)	35.00
Water:Cement Ratio, w:c	0.60
Cement Content, a_W (%)	37.27%
Cement Factor, α (kg/m3)	510.87
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	347.79
Volume Ratio, VR (%)	46.89
Total-Water-to-Cement Ratio, w_T:c	1.56

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	536.6
Volume Ratio, VR (%)	46.89
Total-Water-to-Cement Ratio, w_T:c	1.56
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	347.8

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	4/8 2:05 PM	3.3	4/11 8:26 PM	51.8	99.5	21.1	100	380.5	0	2.9	1.15	1.92	0.994	2.9	1816.7	
H	4/8 2:05 PM	3.3	4/11 8:46 PM	51.9	97.9	21.1	100	376.4	0	3.7	1.19	1.89	0.991	3.6	1816.3	
B	4/8 2:05 PM	6.9	4/15 11:08 AM	51.8	99.5	21.1	100	382.4	0	4.9	1.06	1.92	0.994	4.9	1820.0	
G	4/8 2:05 PM	6.9	4/15 11:21 AM	52.0	100.6	21.1	100	380.2	0	4.0	1.18	1.93	0.995	4.0	1780.7	
C	4/8 2:05 PM	13.8	4/22 9:26 AM	51.9	101.1	21.1	100	389.9	0	5.2	0.97	1.95	0.996	5.2	1825.0	
F	4/8 2:05 PM	13.8	4/22 9:39 AM	51.9	100.2	21.1	100	386.3	0	5.4	1.20	1.93	0.995	5.4	1824.2	
E	4/8 2:05 PM	28.1	5/6 5:18 PM	51.9	98.6	21.1	100	380.3	0	6.9	1.28	1.9	0.992	6.9	1820.6	
I	4/8 2:05 PM	28.1	5/6 5:34 PM	51.9	98.5	21.1	100	380.2	0	6.2	1.07	1.9	0.992	6.1	1822.8	
D	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
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Laboratory Mixing Data
Batch O-4

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial organic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	36.5%
Unit Weight, γ_{soil} (kg/m^3)	1842.3
Tannic acid concentration (%)	0.200%

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.00
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	125
Weight of Slurry Water, $w_{w,slurry}$ (g)	310.0
Weight of Dry Cement, w_c (g)	310.0
Weight of Moist Soil, w_{soil} (g)	3802.4
Weight of Slurry (g)	620.0
Specific Gravity of Solids	2.71
water content of mix	0.43
Dry unit wt. of mix (kg/m^3)	1252.4

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2800.2
Weight of Soil Water, $w_{w,soil}$ (g)	1025.4
Total weight of soil used, W_t (g)	3810.9
Weight of Dry Cement, w_c (g)	313.1
Weight of Slurry Water, $w_{w,slurry}$ (g)	313.1
Soil Water Content, w (%)	36.62
Water:Cement Ratio, w:c	1.00
Cement Content, a_W (%)	11.18%
Cement Factor, α (kg/m3)	151.33
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	126.17
Volume Ratio, VR (%)	19.95
Total-Water-to-Cement Ratio, w_T:c	4.26

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	313.1
Volume Ratio, VR (%)	19.95
Total-Water-to-Cement Ratio, w_T:c	4.26
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	126.2

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	5/27 6:30 PM	3.1	5/30 8:29 PM	51.8	97.7	21.1	100	364.2	0	0.4	1.35	1.89	0.991	0.4	1769.7	
H	5/27 6:30 PM	3.1	5/30 8:58 PM	51.8	99.1	21.1	100	369.2	0	0.4	1.01	1.92	0.993	0.4	1769.6	
B	5/27 6:30 PM	6.9	6/3 4:12 PM	51.8	99.0	21.1	100	369.1	0	0.7	1.20	1.91	0.993	0.7	1767.0	
G	5/27 6:30 PM	6.9	6/3 4:30 PM	51.8	99.5	21.1	100	371.4	0	0.6	1.00	1.92	0.994	0.6	1770.3	
C	5/27 6:30 PM	13.9	6/10 4:17 PM	51.8	98.5	21.1	100	368.7	0	0.8	0.94	1.9	0.992	0.8	1773.3	
F	5/27 6:30 PM	13.9	6/10 4:38 PM	51.7	97.7	21.1	100	365.1	0	0.8	0.76	1.89	0.991	0.8	1780.2	
D	5/27 6:30 PM	27.7	6/24 11:49 AM	51.9	99.8	21.1	100	385.4	0	0.9	0.90	1.92	0.994	0.9	1823.8	
E	5/27 6:30 PM	27.7	6/24 12:08 PM	52.0	98.7	21.1	100	383.9	0	1.1	1.22	1.9	0.992	1.1	1834.6	
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Laboratory Mixing Data
Batch O-5

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial organic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	36.5%
Unit Weight, γ_{soil} (kg/m^3)	1842.3
Tannic acid concentration (%)	0.200%

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.00
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	200
Weight of Slurry Water, $w_{w,slurry}$ (g)	500.0
Weight of Dry Cement, w_c (g)	500.0
Weight of Moist Soil, w_{soil} (g)	3352.4
Weight of Slurry (g)	1000.0
Specific Gravity of Solids	2.74
water content of mix	0.47
Dry unit wt. of mix (kg/m^3)	1195.5

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2499.5
Weight of Soil Water, $w_{w,soil}$ (g)	935
Total weight of soil used, W_t (g)	3417.9
Weight of Dry Cement, w_c (g)	504.2
Weight of Slurry Water, $w_{w,slurry}$ (g)	504.2
Soil Water Content, w (%)	37.41
Water:Cement Ratio, w:c	1.00
Cement Content, a_W (%)	20.17%
Cement Factor, α (kg/m3)	271.74
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	200.08
Volume Ratio, VR (%)	35.82
Total-Water-to-Cement Ratio, w_T:c	2.81

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	504.2
Volume Ratio, VR (%)	35.82
Total-Water-to-Cement Ratio, w_T:c	2.81
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	200.1

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	5/28 12:30 PM	3.3	5/31 6:50 PM	51.8	98.4	21.1	100	362.0	0	0.7	1.30	1.9	0.992	0.7	1744.2	
H	5/28 12:30 PM	3.3	5/31 7:10 PM	51.8	97.3	21.1	100	357.2	0	0.4	0.58	1.88	0.990	0.4	1739.5	
B	5/28 12:30 PM	7.4	6/4 10:04 PM	51.7	99.8	21.1	100	368.5	0	1.2	0.75	1.93	0.994	1.2	1757.5	
G	5/28 12:30 PM	7.4	6/4 10:26 PM	52.0	98.0	21.1	100	360.7	0	1.0	0.89	1.89	0.991	1.0	1734.9	
C	5/28 12:30 PM	14.5	6/11 11:38 PM	51.9	99.6	21.1	100	367.5	0	1.4	1.10	1.92	0.994	1.4	1746.5	
F	5/28 12:30 PM	14.5	6/11 11:56 PM	52.0	99.6	21.1	100	367.9	0	1.5	1.13	1.92	0.993	1.5	1738.9	
D	5/28 12:30 PM	28.1	6/25 2:54 PM	51.9	100.7	21.1	100	371.0	0	2.1	1.13	1.94	0.995	2.1	1738.0	
E	5/28 12:30 PM	28.1	6/25 3:22 PM	51.8	99.6	21.1	100	367.0	0	2.0	1.20	1.92	0.994	2.0	1747.5	
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Laboratory Mixing Data
Batch O-6

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial organic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	36.5%
Unit Weight, γ_{soil} (kg/m^3)	1842.3
Tannic acid concentration (%)	0.200%

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.00
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	275
Weight of Slurry Water, $w_{w,slurry}$ (g)	680.0
Weight of Dry Cement, w_c (g)	680.0
Weight of Moist Soil, w_{soil} (g)	2902.4
Weight of Slurry (g)	1360.0
Specific Gravity of Solids	2.78
water content of mix	0.52
Dry unit wt. of mix (kg/m^3)	1137.5

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2200
Weight of Soil Water, $w_{w,soil}$ (g)	802.7
Total weight of soil used, W_t (g)	2990.5
Weight of Dry Cement, w_c (g)	700.6
Weight of Slurry Water, $w_{w,slurry}$ (g)	700.6
Soil Water Content, w (%)	36.49
Water:Cement Ratio, w:c	1.00
Cement Content, a_W (%)	31.84%
Cement Factor, α (kg/m3)	431.56
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	275.09
Volume Ratio, VR (%)	56.88
Total-Water-to-Cement Ratio, w_T:c	2.14

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	700.6
Volume Ratio, VR (%)	56.88
Total-Water-to-Cement Ratio, w_T:c	2.14
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	275.1

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	5/28 2:00 PM	3.2	5/31 7:31 PM	51.8	99.0	21.1	100	362.4	0	1.4	1.11	1.91	0.993	1.4	1737.0	
H	5/28 2:00 PM	3.2	5/31 7:55 PM	51.9	98.6	21.1	100	360.1	0	0.9	1.00	1.9	0.992	0.9	1728.9	
B	5/28 2:00 PM	7.4	6/4 10:42 PM	51.9	100.7	21.1	100	368.5	0	2.3	1.16	1.94	0.995	2.3	1729.3	
G	5/28 2:00 PM	7.4	6/4 11:00 PM	52.0	100.2	21.1	100	365.8	0	2.2	1.23	1.93	0.994	2.2	1721.9	
C	5/28 2:00 PM	13.9	6/11 11:03 AM	51.9	99.7	21.1	100	365.3	0	2.7	1.20	1.92	0.994	2.7	1734.2	
F	5/28 2:00 PM	13.9	6/11 11:20 AM	51.9	100.4	21.1	100	367.6	0	2.5	0.73	1.94	0.995	2.5	1730.7	
D	5/28 2:00 PM	28.1	6/25 3:53 PM	51.8	100.9	21.1	100	370.0	0	3.6	1.17	1.95	0.996	3.6	1739.6	
E	5/28 2:00 PM	28.1	6/25 4:10 PM	52.0	100.7	21.1	100	368.9	0	3.6	1.22	1.94	0.995	3.6	1725.2	
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Laboratory Mixing Data
Batch O-7

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial organic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	36.5%
Unit Weight, γ_{soil} (kg/m^3)	1842.3
Tannic acid concentration (%)	0.200%

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.00
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	350
Weight of Slurry Water, $w_{w,slurry}$ (g)	870.0
Weight of Dry Cement, w_c (g)	870.0
Weight of Moist Soil, w_{soil} (g)	2452.3
Weight of Slurry (g)	1740.0
Specific Gravity of Solids	2.82
water content of mix	0.57
Dry unit wt. of mix (kg/m^3)	1079.7

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	1799.9
Weight of Soil Water, $w_{w,soil}$ (g)	657.8
Total weight of soil used, W_t (g)	2445.9
Weight of Dry Cement, w_c (g)	860.7
Weight of Slurry Water, $w_{w,slurry}$ (g)	860.7
Soil Water Content, w (%)	36.55
Water:Cement Ratio, w:c	1.00
Cement Content, a_W (%)	47.82%
Cement Factor, α (kg/m3)	648.24
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	349.57
Volume Ratio, VR (%)	85.44
Total-Water-to-Cement Ratio, w_T:c	1.76

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	860.7
Volume Ratio, VR (%)	85.44
Total-Water-to-Cement Ratio, w_T:c	1.76
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	349.6

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	5/31 10:00 PM	2.7	6/3 3:03 PM	51.8	98.9	21.1	100	354.3	0	1.3	1.30	1.91	0.993	1.3	1702.9	
H	5/31 10:00 PM	2.7	6/3 3:23 PM	51.9	99.7	21.1	100	358.7	0	1.8	1.10	1.92	0.994	1.8	1702.5	
B	5/31 10:00 PM	6.9	6/7 8:14 PM	51.8	97.1	21.1	100	349.6	0	3.2	1.38	1.87	0.990	3.2	1705.7	
G	5/31 10:00 PM	6.9	6/7 8:34 PM	51.9	95.6	21.1	100	344.6	0	3.5	1.25	1.84	0.987	3.4	1706.4	
C	5/31 10:00 PM	13.6	6/14 1:13 PM	52.0	97.3	21.1	100	351.2	0	3.9	1.16	1.87	0.990	3.8	1697.8	
F	5/31 10:00 PM	13.6	6/14 1:29 PM	52.0	98.6	21.1	100	356.2	0	4.0	1.38	1.9	0.992	4.0	1700.2	
D	5/31 10:00 PM	27.5	6/28 10:35 AM	51.9	101.1	21.1	100	364.9	0	5.1	1.03	1.95	0.996	5.0	1705.1	
E	5/31 10:00 PM	27.5	6/28 10:55 AM	51.9	100.8	21.1	100	364.1	0	5.1	1.27	1.94	0.995	5.1	1708.1	
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Laboratory Mixing Data
Batch O-8

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial organic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	36.5%
Unit Weight, γ_{soil} (kg/m^3)	1842.3
Tannic acid concentration (%)	0.200%

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.40
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	125
Weight of Slurry Water, $w_{w,slurry}$ (g)	440.0
Weight of Dry Cement, w_c (g)	310.0
Weight of Moist Soil, w_{soil} (g)	3574.7
Weight of Slurry (g)	750.0
Specific Gravity of Solids	2.71
water content of mix	0.47
Dry unit wt. of mix (kg/m^3)	1185.0

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2699.6
Weight of Soil Water, $w_{w,soil}$ (g)	987.7
Total weight of soil used, W_t (g)	3672.6
Weight of Dry Cement, w_c (g)	319.2
Weight of Slurry Water, $w_{w,slurry}$ (g)	446.8
Soil Water Content, w (%)	36.59
Water:Cement Ratio, w:c	1.40
Cement Content, a_W (%)	11.82%
Cement Factor, α (kg/m3)	160.09
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	125.56
Volume Ratio, VR (%)	27.51
Total-Water-to-Cement Ratio, w_T:c	4.48

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	446.8
Volume Ratio, VR (%)	27.51
Total-Water-to-Cement Ratio, w_T:c	4.48
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	125.6

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	5/31 11:20 PM	2.7	6/3 3:38 PM	51.8	99.1	21.1	100	363.1	0	0.3	1.11	1.91	0.993	0.3	1736.9	
H	5/31 11:20 PM	2.7	6/3 3:53 PM	52.0	98.0	21.1	100	359.0	0	0.2	0.64	1.89	0.991	0.2	1727.1	
B	5/31 11:20 PM	6.9	6/7 8:53 PM	51.8	97.6	21.1	100	358.0	0	0.6	1.34	1.88	0.991	0.6	1741.0	
G	5/31 11:20 PM	6.8	6/7 7:13 PM	51.9	98.3	21.1	100	360.6	0	0.5	1.32	1.89	0.991	0.5	1733.3	
C	5/31 11:20 PM	13.6	6/14 1:45 PM	51.9	99.5	21.1	100	365.7	0	0.6	0.92	1.92	0.993	0.6	1735.8	
F	5/31 11:20 PM	13.6	6/14 2:01 PM	51.9	99.4	21.1	100	365.1	0	0.8	1.13	1.91	0.993	0.7	1733.9	
D	5/31 11:20 PM	27.5	6/28 11:25 AM	51.7	99.7	21.1	100	365.1	0	1.0	0.83	1.93	0.994	1.0	1743.1	
E	5/31 11:20 PM	27.5	6/28 11:48 AM	51.9	100.6	21.1	100	371.0	0	0.9	0.92	1.94	0.995	0.9	1744.5	
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Laboratory Mixing Data
Batch O-9

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial organic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	36.5%
Unit Weight, γ_{soil} (kg/m^3)	1842.3
Tannic acid concentration (%)	0.200%

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.40
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	200
Weight of Slurry Water, $w_{w,slurry}$ (g)	700.0
Weight of Dry Cement, w_c (g)	500.0
Weight of Moist Soil, w_{soil} (g)	2988.0
Weight of Slurry (g)	1200.0
Specific Gravity of Solids	2.75
water content of mix	0.56
Dry unit wt. of mix (kg/m^3)	1087.3

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2199.9
Weight of Soil Water, $w_{w,soil}$ (g)	803
Total weight of soil used, W_t (g)	2990.1
Weight of Dry Cement, w_c (g)	494.8
Weight of Slurry Water, $w_{w,slurry}$ (g)	692.7
Soil Water Content, w (%)	36.50
Water:Cement Ratio, w:c	1.40
Cement Content, a_W (%)	22.49%
Cement Factor, α (kg/m3)	304.86
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	200.06
Volume Ratio, VR (%)	52.38
Total-Water-to-Cement Ratio, w_T:c	3.02

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	692.7
Volume Ratio, VR (%)	52.38
Total-Water-to-Cement Ratio, w_T:c	3.02
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	200.1

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	6/5 5:00 PM	2.8	6/8 12:21 PM	51.9	100.3	21.1	100	357.9	0	0.5	1.07	1.93	0.995	0.5	1688.3	
H	6/5 5:00 PM	2.8	6/8 12:39 PM	51.9	97.0	21.1	100	344.7	0	0.2	1.47	1.87	0.989	0.2	1681.1	
B	6/5 5:00 PM	6.7	6/12 10:56 AM	52.0	98.7	21.1	100	353.5	0	0.9	0.82	1.9	0.992	0.9	1687.2	
G	6/5 5:00 PM	6.8	6/12 11:14 AM	51.8	96.7	21.1	100	345.8	0	0.8	0.90	1.87	0.989	0.8	1694.2	
C	6/5 5:00 PM	14.0	6/19 4:00 PM	51.8	99.3	21.1	100	355.8	0	1.3	0.96	1.92	0.993	1.3	1701.0	
F	6/5 5:00 PM	14.0	6/19 4:22 PM	51.8	97.9	21.1	100	350.8	0	1.2	1.11	1.89	0.991	1.2	1698.5	
D	6/5 5:00 PM	27.9	7/3 2:09 PM	51.8	99.6	21.1	100	356.8	0	1.5	0.93	1.92	0.994	1.5	1698.9	
E	6/5 5:00 PM	27.9	7/3 2:23 PM	51.8	100.2	21.1	100	359.2	0	1.6	0.90	1.93	0.995	1.6	1702.5	
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Laboratory Mixing Data
Batch O-10

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial organic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	36.5%
Unit Weight, γ_{soil} (kg/m^3)	1842.3
Tannic acid concentration (%)	0.200%

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.40
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	275
Weight of Slurry Water, $w_{w,slurry}$ (g)	960.0
Weight of Dry Cement, w_c (g)	680.0
Weight of Moist Soil, w_{soil} (g)	2401.4
Weight of Slurry (g)	1640.0
Specific Gravity of Solids	2.80
water content of mix	0.65
Dry unit wt. of mix (kg/m^3)	988.5

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	1800.2
Weight of Soil Water, $w_{w,soil}$ (g)	657
Total weight of soil used, W_t (g)	2443.6
Weight of Dry Cement, w_c (g)	692.3
Weight of Slurry Water, $w_{w,slurry}$ (g)	969.2
Soil Water Content, w (%)	36.50
Water:Cement Ratio, w:c	1.40
Cement Content, a_W (%)	38.46%
Cement Factor, α (kg/m3)	521.93
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	275.17
Volume Ratio, VR (%)	89.68
Total-Water-to-Cement Ratio, w_T:c	2.34

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	969.2
Volume Ratio, VR (%)	89.68
Total-Water-to-Cement Ratio, w_T:c	2.34
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	275.2

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	6/5 6:25 PM	2.8	6/8 12:59 PM	52.0	96.0	21.1	100	331.0	0	0.6	0.92	1.85	0.988	0.5	1622.1	
H	6/5 6:25 PM	2.8	6/8 1:14 PM	52.0	100.5	21.1	100	346.6	0	0.4	0.56	1.93	0.995	0.4	1622.2	
B	6/5 6:25 PM	6.7	6/12 11:31 AM	51.9	99.4	21.1	100	344.0	0	1.3	0.86	1.91	0.993	1.3	1633.3	
G	6/5 6:25 PM	6.7	6/12 11:48 AM	51.8	97.2	21.1	100	336.3	0	1.2	0.73	1.88	0.990	1.2	1641.5	
C	6/5 6:25 PM	13.9	6/19 3:20 PM	51.9	97.8	21.1	100	338.7	0	1.6	1.25	1.88	0.991	1.6	1634.9	
F	6/5 6:25 PM	13.9	6/19 3:39 PM	51.8	99.3	21.1	100	343.8	0	1.7	0.67	1.92	0.993	1.7	1643.7	
D	6/5 6:25 PM	27.8	7/3 1:36 PM	51.8	97.7	21.1	100	337.4	0	2.3	1.16	1.88	0.991	2.3	1635.9	
E	6/5 6:25 PM	27.8	7/3 1:52 PM	51.8	100.4	21.1	100	347.9	0	2.2	0.88	1.94	0.995	2.2	1645.6	
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Laboratory Mixing Data
Batch O-11

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial organic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	36.5%
Unit Weight, γ_{soil} (kg/m^3)	1842.3
Tannic acid concentration (%)	0.200%

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.40
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	100
Weight of Slurry Water, $w_{w,slurry}$ (g)	350.0
Weight of Dry Cement, w_c (g)	250.0
Weight of Moist Soil, w_{soil} (g)	3770.2
Weight of Slurry (g)	600.0
Specific Gravity of Solids	2.70
water content of mix	0.45
Dry unit wt. of mix (kg/m^3)	1216.5

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2799.9
Weight of Soil Water, $w_{w,soil}$ (g)	1022
Total weight of soil used, W_t (g)	3804.7
Weight of Dry Cement, w_c (g)	254.0
Weight of Slurry Water, $w_{w,slurry}$ (g)	355.6
Soil Water Content, w (%)	36.50
Water:Cement Ratio, w:c	1.40
Cement Content, a_W (%)	9.07%
Cement Factor, α (kg/m3)	122.99
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	101.53
Volume Ratio, VR (%)	21.13
Total-Water-to-Cement Ratio, w_T:c	5.41

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	355.6
Volume Ratio, VR (%)	21.13
Total-Water-to-Cement Ratio, w_T:c	5.41
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	101.5

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	6/22 8:45 PM	2.7	6/25 2:11 PM	51.8	98.6	21.1	100	363.1	0	0.2	1.30	1.9	0.992	0.2	1745.0	
H	6/22 8:45 PM	2.7	6/25 2:36 PM	51.8	99.5	21.1	100	365.7	0	0.1	1.15	1.92	0.994	0.1	1742.2	
B	6/22 8:45 PM	6.8	6/29 3:57 PM	51.8	99.5	21.1	100	366.9	0	0.3	0.97	1.92	0.994	0.3	1750.5	
G	6/22 8:45 PM	6.8	6/29 4:17 PM	51.8	98.9	21.1	100	365.0	0	0.3	1.36	1.91	0.993	0.3	1753.5	
C	6/22 8:45 PM	13.9	7/6 6:55 PM	51.7	99.9	21.1	100	368.1	0	0.5	0.96	1.93	0.995	0.5	1753.8	
F	6/22 8:45 PM	13.9	7/6 7:07 PM	51.8	100.0	21.1	100	369.1	0	0.4	0.91	1.93	0.994	0.4	1749.9	
D	6/22 8:45 PM	27.9	7/20 6:25 PM	51.9	98.8	21.1	100	364.5	0	0.7	1.47	1.9	0.992	0.7	1746.5	
E	6/22 8:45 PM	27.9	7/20 6:40 PM	51.8	99.6	21.1	100	367.8	0	0.7	1.16	1.92	0.994	0.7	1753.5	
I	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
J	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

Laboratory Mixing Data
Batch O-12

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial organic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	36.5%
Unit Weight, γ_{soil} (kg/m^3)	1842.3
Tannic acid concentration (%)	0.250%

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	0.60
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	250
Weight of Slurry Water, $w_{w,slurry}$ (g)	380.0
Weight of Dry Cement, w_c (g)	620.0
Weight of Moist Soil, w_{soil} (g)	3507.8
Weight of Slurry (g)	1000.0
Specific Gravity of Solids	2.75
water content of mix	0.41
Dry unit wt. of mix (kg/m^3)	1292.4

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2700
Weight of Soil Water, $w_{w,soil}$ (g)	945
Total weight of soil used, W_t (g)	3628
Weight of Dry Cement, w_c (g)	635.6
Weight of Slurry Water, $w_{w,slurry}$ (g)	381.4
Soil Water Content, w (%)	35.00
Water:Cement Ratio, w:c	0.60
Cement Content, a_W (%)	23.54%
Cement Factor, α (kg/m3)	322.75
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	248.99
Volume Ratio, VR (%)	29.62
Total-Water-to-Cement Ratio, w_T:c	2.13

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	381.4
Volume Ratio, VR (%)	29.62
Total-Water-to-Cement Ratio, w_T:c	2.13
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	249.0

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	6/20 6:45 PM	2.9	6/23 4:05 PM	51.6	101.9	21.1	100	387.4	0	0.1	2.68	1.98	0.998	0.1	1821.5	
H	6/20 6:45 PM	2.9	6/23 4:26 PM	51.7	101.6	21.1	100	387.9	0	0.1	2.64	1.97	0.997	0.1	1817.2	
B	6/20 6:45 PM	6.7	6/27 10:41 AM	51.7	98.7	21.1	100	377.6	0	0.1	0.60	1.91	0.993	0.1	1824.4	
G	6/20 6:45 PM	6.7	6/27 11:14 AM	51.7	100.7	21.1	100	385.0	0	0.2	0.45	1.95	0.996	0.2	1820.9	
C	6/20 6:45 PM	13.9	7/4 3:17 PM	51.7	101.0	21.1	100	385.9	0	2.5	1.11	1.95	0.996	2.5	1819.7	
I	6/20 6:45 PM	13.9	7/4 4:11 PM	52.0	100.1	21.1	100	383.3	0	2.8	0.90	1.92	0.994	2.8	1803.9	
E	6/20 6:45 PM	27.8	7/18 1:42 PM	51.8	100.9	21.1	100	387.4	0	3.2	0.88	1.95	0.996	3.1	1824.1	
J	6/20 6:45 PM	27.8	7/18 2:35 PM	51.8	101.1	21.1	100	387.7	0	3.0	0.88	1.95	0.996	3.0	1818.7	
F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
D	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

Laboratory Mixing Data
Batch O-13

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial organic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	36.5%
Unit Weight, γ_{soil} (kg/m^3)	1842.3
Tannic acid concentration (%)	0.250%

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	0.60
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	300
Weight of Slurry Water, $w_{w,slurry}$ (g)	450.0
Weight of Dry Cement, w_c (g)	750.0
Weight of Moist Soil, w_{soil} (g)	3298.9
Weight of Slurry (g)	1200.0
Specific Gravity of Solids	2.78
water content of mix	0.42
Dry unit wt. of mix (kg/m^3)	1280.6

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2500.2
Weight of Soil Water, $w_{w,soil}$ (g)	912.5
Total weight of soil used, W_t (g)	3398.3
Weight of Dry Cement, w_c (g)	764.0
Weight of Slurry Water, $w_{w,slurry}$ (g)	458.4
Soil Water Content, w (%)	36.50
Water:Cement Ratio, w:c	0.60
Cement Content, a_W (%)	30.56%
Cement Factor, α (kg/m3)	414.17
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	300.09
Volume Ratio, VR (%)	38.02
Total-Water-to-Cement Ratio, w_T:c	1.79

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	458.4
Volume Ratio, VR (%)	38.02
Total-Water-to-Cement Ratio, w_T:c	1.79
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	300.1

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	6/20 8:25 PM	2.8	6/23 4:45 PM	51.8	101.0	21.1	100	384.1	0	0.0	3.99	1.95	0.996	0.0	1801.9	
H	6/20 8:25 PM	2.9	6/23 5:02 PM	51.7	101.4	21.1	100	385.5	0	0.0	2.37	2.0	0.997	0.0	1807.4	
B	6/20 8:25 PM	6.7	6/27 12:11 PM	51.7	99.7	21.1	100	379.2	0	0.1	2.83	1.93	0.994	0.1	1808.6	
G	6/20 8:25 PM	6.7	6/27 12:27 PM	51.9	99.5	21.1	100	377.1	0	0.1	1.56	1.92	0.993	0.1	1793.5	
C	6/20 8:25 PM	13.8	7/4 3:45 PM	51.7	98.2	21.1	100	375.4	0	3.4	1.00	1.9	0.992	3.4	1819.1	
I	6/20 8:25 PM	13.8	7/4 4:25 PM	51.8	100.2	21.1	100	384.1	0	3.0	0.96	1.93	0.995	3.0	1816.5	
D	6/20 8:25 PM	27.7	7/18 1:56 PM	52.0	100.1	21.1	100	382.3	0	3.3	0.88	1.93	0.994	3.3	1801.4	
J	6/20 8:25 PM	27.7	7/18 2:22 PM	51.8	100.9	21.1	100	386.4	0	3.6	1.08	1.95	0.996	3.6	1820.3	
F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
E	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

Laboratory Mixing Data
Batch O-14

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial organic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	36.5%
Unit Weight, γ_{soil} (kg/m^3)	1842.3
Tannic acid concentration (%)	0.300%

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	0.60
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	400
Weight of Slurry Water, $w_{w,slurry}$ (g)	600.0
Weight of Dry Cement, w_c (g)	990.0
Weight of Moist Soil, w_{soil} (g)	2881.0
Weight of Slurry (g)	1590.0
Specific Gravity of Solids	2.82
water content of mix	0.44
Dry unit wt. of mix (kg/m^3)	1257.2

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2199.7
Weight of Soil Water, $w_{w,soil}$ (g)	803
Total weight of soil used, W_t (g)	2991
Weight of Dry Cement, w_c (g)	1026.2
Weight of Slurry Water, $w_{w,slurry}$ (g)	615.7
Soil Water Content, w (%)	36.50
Water:Cement Ratio, w:c	0.60
Cement Content, a_W (%)	46.65%
Cement Factor, α (kg/m3)	632.07
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	400.01
Volume Ratio, VR (%)	58.01
Total-Water-to-Cement Ratio, w_T:c	1.38

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	615.7
Volume Ratio, VR (%)	58.01
Total-Water-to-Cement Ratio, w_T:c	1.38
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	400.0

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	6/23 6:40 PM	3.1	6/26 8:57 PM	51.7	100.5	21.1	100	380.3	0	0.0	2.12	1.94	0.995	0.0	1800.6	
H	6/23 6:40 PM	3.1	6/26 9:13 PM	51.7	100.1	21.1	100	379.9	0	0.1	1.44	1.94	0.995	0.1	1809.1	
B	6/23 6:40 PM	6.7	6/30 11:34 AM	51.6	100.7	21.1	100	382.8	0	0.1	1.17	1.95	0.996	0.1	1821.2	
G	6/23 6:40 PM	6.7	6/30 11:51 AM	51.6	100.8	21.1	100	383.0	0	0.1	1.34	1.95	0.996	0.1	1817.6	
F	6/23 6:40 PM	13.9	7/7 4:40 PM	51.9	100.8	21.1	100	385.8	0	5.2	1.27	1.94	0.995	5.2	1811.7	
I	6/23 6:40 PM	13.9	7/7 4:52 PM	51.9	101.2	21.1	100	387.4	0	5.1	1.00	1.95	0.996	5.1	1810.6	
E	6/23 6:40 PM	27.9	7/21 3:25 PM	51.8	98.7	21.1	100	378.2	0	8.0	1.43	1.9	0.992	8.0	1817.1	
J	6/23 6:40 PM	27.9	7/21 3:38 PM	51.9	99.3	21.1	100	381.0	0	6.4	1.31	1.91	0.993	6.3	1814.9	
C	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
D	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

Laboratory Mixing Data
Batch O-15

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial organic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	36.5%
Unit Weight, γ_{soil} (kg/m^3)	1842.3
Tannic acid concentration (%)	0.300%

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	0.60
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	450
Weight of Slurry Water, $w_{w,slurry}$ (g)	670.0
Weight of Dry Cement, w_c (g)	1120.0
Weight of Moist Soil, w_{soil} (g)	2672.1
Weight of Slurry (g)	1790.0
Specific Gravity of Solids	2.84
water content of mix	0.45
Dry unit wt. of mix (kg/m^3)	1245.5

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2000
Weight of Soil Water, $w_{w,soil}$ (g)	730
Total weight of soil used, W_t (g)	2718.2
Weight of Dry Cement, w_c (g)	1131.2
Weight of Slurry Water, $w_{w,slurry}$ (g)	678.7
Soil Water Content, w (%)	36.50
Water:Cement Ratio, w:c	0.60
Cement Content, a_W (%)	56.56%
Cement Factor, α (kg/m3)	766.67
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	450.00
Volume Ratio, VR (%)	70.37
Total-Water-to-Cement Ratio, w_T:c	1.24

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	678.7
Volume Ratio, VR (%)	70.37
Total-Water-to-Cement Ratio, w_T:c	1.24
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	450.0

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	6/23 11:00 PM	2.9	6/26 8:19 PM	51.9	100.0	21.1	100	380.3	0	0.1	1.62	1.93	0.994	0.1	1796.0	
H	6/23 11:00 PM	2.9	6/26 8:32 PM	51.8	101.6	21.1	100	379.9	0	0.1	1.41	1.96	0.997	0.1	1773.2	
B	6/23 11:00 PM	6.5	6/30 11:02 AM	51.6	99.0	21.1	100	376.5	0	0.2	0.65	1.92	0.993	0.2	1815.8	
G	6/23 11:00 PM	6.5	6/30 11:19 AM	51.7	100.3	21.1	100	381.1	0	0.1	0.74	1.94	0.995	0.1	1811.1	
C	6/23 11:00 PM	13.8	7/7 5:06 PM	51.9	99.7	21.1	100	381.9	0	8.0	1.47	1.92	0.994	7.9	1809.5	
F	6/23 11:00 PM	13.8	7/7 5:19 PM	51.9	101.1	21.1	100	388.4	0	6.7	1.02	1.95	0.996	6.7	1817.5	
D	6/23 11:00 PM	27.7	7/21 3:49 PM	52.0	100.0	21.1	100	384.0	0	9.7	1.52	1.92	0.994	9.6	1806.8	
E	6/23 11:00 PM	27.7	7/21 4:02 PM	51.9	98.3	21.1	100	376.3	0	9.0	1.44	1.89	0.992	8.9	1810.1	
I	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
J	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

Laboratory Mixing Data
Batch O-16

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial organic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	36.5%
Unit Weight, γ_{soil} (kg/m^3)	1842.3
Tannic acid concentration (%)	0.225%

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.00
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	200
Weight of Slurry Water, $w_{w,slurry}$ (g)	500.0
Weight of Dry Cement, w_c (g)	500.0
Weight of Moist Soil, w_{soil} (g)	3352.4
Weight of Slurry (g)	1000.0
Specific Gravity of Solids	2.74
water content of mix	0.47
Dry unit wt. of mix (kg/m^3)	1194.5

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2499.8
Weight of Soil Water, $w_{w,soil}$ (g)	912.5
Total weight of soil used, W_t (g)	3389.4
Weight of Dry Cement, w_c (g)	504.1
Weight of Slurry Water, $w_{w,slurry}$ (g)	504.1
Soil Water Content, w (%)	36.50
Water:Cement Ratio, w:c	1.00
Cement Content, a_W (%)	20.17%
Cement Factor, α (kg/m3)	274.00
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	201.30
Volume Ratio, VR (%)	36.11
Total-Water-to-Cement Ratio, w_T:c	2.80

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	504.1
Volume Ratio, VR (%)	36.11
Total-Water-to-Cement Ratio, w_T:c	2.80
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	201.3

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	8/26 4:30 PM	3.2	8/29 9:42 PM	51.8	99.9	21.1	100	369.2	0	0.4	1.12	1.93	0.994	0.4	1753.4	
B	8/26 4:30 PM	6.9	9/2 2:50 PM	51.7	100.9	21.1	100	374.0	0	1.2	1.09	1.95	0.996	1.2	1766.2	
C	8/26 4:30 PM	6.9	9/2 3:09 PM	51.8	100.2	21.1	100	370.8	0	1.0	0.73	1.94	0.995	1.0	1758.7	
D	8/26 4:30 PM	10.0	9/5 4:21 PM	51.9	101.0	21.1	100	374.2	0	1.5	1.07	1.94	0.996	1.5	1750.7	
E	8/26 4:30 PM	13.8	9/9 10:37 AM	51.9	100.5	21.1	100	372.2	0	1.7	1.14	1.94	0.995	1.7	1750.5	
F	8/26 4:30 PM	16.8	9/12 10:34 AM	51.8	101.0	21.1	100	375.3	0	1.9	1.16	1.95	0.996	1.9	1762.3	
G	8/26 4:30 PM	20.9	9/16 2:30 PM	51.9	100.9	21.1	100	374.9	0	2.1	0.92	1.94	0.996	2.1	1759.2	
H	8/26 4:30 PM	24.0	9/19 3:38 PM	51.9	100.6	21.1	100	372.8	0	2.0	0.92	1.94	0.995	2.0	1748.2	
I	8/26 4:30 PM	27.7	9/23 10:06 AM	52.0	100.2	21.1	100	371.4	0	2.0	0.81	1.93	0.994	2.0	1748.3	
J	8/26 4:30 PM	27.7	9/23 10:27 AM	51.8	100.7	21.1	100	374.7	0	2.1	1.05	1.94	0.996	2.1	1768.7	

Laboratory Mixing Data
Batch O-17

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial organic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	36.5%
Unit Weight, γ_{soil} (kg/m^3)	1842.3
Tannic acid concentration (%)	0.250%

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.00
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	200
Weight of Slurry Water, $w_{w,slurry}$ (g)	500.0
Weight of Dry Cement, w_c (g)	500.0
Weight of Moist Soil, w_{soil} (g)	3352.4
Weight of Slurry (g)	1000.0
Specific Gravity of Solids	2.74
water content of mix	0.47
Dry unit wt. of mix (kg/m^3)	1195.4

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2500
Weight of Soil Water, $w_{w,soil}$ (g)	912.5
Total weight of soil used, W_t (g)	3387.9
Weight of Dry Cement, w_c (g)	500.1
Weight of Slurry Water, $w_{w,slurry}$ (g)	500.1
Soil Water Content, w (%)	36.50
Water:Cement Ratio, w:c	1.00
Cement Content, a_W (%)	20.00%
Cement Factor, α (kg/m3)	271.91
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	200.17
Volume Ratio, VR (%)	35.84
Total-Water-to-Cement Ratio, w_T:c	2.81

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	500.1
Volume Ratio, VR (%)	35.84
Total-Water-to-Cement Ratio, w_T:c	2.81
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	200.2

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	8/26 4:30 PM	3.2	8/29 10:10 PM	51.4	96.3	21.1	100	354.7	0	0.1	2.46	1.87	0.990	0.1	1772.4	
B	8/26 4:30 PM	7.0	9/2 3:37 PM	51.7	99.6	21.1	100	367.4	0	0.2	0.91	1.93	0.994	0.2	1758.0	
C	8/26 4:30 PM	7.0	9/2 3:57 PM	51.8	100.3	21.1	100	369.8	0	0.2	0.55	1.94	0.995	0.2	1747.9	
D	8/26 4:30 PM	10.0	9/5 4:44 PM	51.7	99.4	21.1	100	366.5	0	1.0	0.85	1.92	0.994	1.0	1752.9	
E	8/26 4:30 PM	13.8	9/9 10:56 AM	51.9	100.3	21.1	100	372.3	0	1.4	0.80	1.93	0.995	1.4	1757.2	
F	8/26 4:30 PM	16.8	9/12 10:52 AM	51.8	100.5	21.1	100	373.1	0	1.7	0.88	1.94	0.995	1.7	1759.9	
G	8/26 4:30 PM	20.9	9/16 2:50 PM	51.9	100.9	21.1	100	373.6	0	2.0	0.91	1.94	0.995	2.0	1749.2	
H	8/26 4:30 PM	24.0	9/19 4:03 PM	51.5	99.8	21.1	100	369.9	0	2.2	0.89	1.94	0.995	2.1	1779.4	
I	8/26 4:30 PM	27.8	9/23 10:45 AM	51.9	100.9	21.1	100	374.2	0	2.0	0.87	1.94	0.995	2.0	1754.2	
J	8/26 4:30 PM	27.8	9/23 11:06 AM	51.8	100.0	21.1	100	371.1	0	2.3	0.94	1.93	0.994	2.3	1762.0	

Laboratory Mixing Data
Batch O-18

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial organic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	36.5%
Unit Weight, γ_{soil} (kg/m^3)	1842.3
Tannic acid concentration (%)	0.250%

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.00
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	350
Weight of Slurry Water, $w_{w,slurry}$ (g)	870.0
Weight of Dry Cement, w_c (g)	870.0
Weight of Moist Soil, w_{soil} (g)	2452.3
Weight of Slurry (g)	1740.0
Specific Gravity of Solids	2.82
water content of mix	0.57
Dry unit wt. of mix (kg/m^3)	1079.3

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	1799.75
Weight of Soil Water, $w_{w,soil}$ (g)	657
Total weight of soil used, W_t (g)	2438.7
Weight of Dry Cement, w_c (g)	860.2
Weight of Slurry Water, $w_{w,slurry}$ (g)	860.2
Soil Water Content, w (%)	36.51
Water:Cement Ratio, w:c	1.00
Cement Content, a_W (%)	47.80%
Cement Factor, α (kg/m3)	649.82
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	350.03
Volume Ratio, VR (%)	85.65
Total-Water-to-Cement Ratio, w_T:c	1.76

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	860.2
Volume Ratio, VR (%)	85.65
Total-Water-to-Cement Ratio, w_T:c	1.76
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	350.0

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	8/28 4:00 PM	2.8	8/31 10:43 AM	51.7	98.6	21.1	100	353.8	0	0.3	1.21	1.91	0.993	0.3	1710.4	
B	8/28 4:00 PM	7.1	9/4 5:13 PM	51.8	100.5	21.1	100	363.6	0	3.2	1.26	1.94	0.995	3.1	1713.9	
C	8/28 4:00 PM	7.1	9/4 5:36 PM	51.9	95.9	21.1	100	345.8	0	3.2	1.74	1.85	0.988	3.2	1701.4	
D	8/28 4:00 PM	10.0	9/7 3:35 PM	51.9	98.6	21.1	100	356.0	0	2.9	0.91	1.9	0.992	2.9	1705.9	
E	8/28 4:00 PM	14.2	9/11 9:49 PM	51.8	100.6	21.1	100	364.1	0	4.2	1.23	1.94	0.995	4.2	1717.1	
F	8/28 4:00 PM	17.0	9/14 3:03 PM	52.0	97.5	21.1	100	355.1	0	4.0	1.28	1.88	0.990	4.0	1715.2	
G	8/28 4:00 PM	21.0	9/18 4:34 PM	51.9	97.0	21.1	100	350.4	0	4.8	1.45	1.87	0.990	4.8	1710.6	
H	8/28 4:00 PM	23.9	9/21 2:19 PM	52.0	98.8	21.1	100	353.3	0	5.1	1.33	1.9	0.992	5.0	1683.7	
I	8/28 4:00 PM	28.0	9/25 4:53 PM	51.9	96.2	21.1	100	347.2	0	4.8	1.14	1.85	0.988	4.8	1707.1	
J	8/28 4:00 PM	28.1	9/25 5:16 PM	51.8	100.4	21.1	100	363.8	0	3.7	0.93	1.94	0.995	3.7	1716.1	

Laboratory Mixing Data
Batch O-19

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial organic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	36.5%
Unit Weight, γ_{soil} (kg/m^3)	1842.3
Tannic acid concentration (%)	0.300%

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.00
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	350
Weight of Slurry Water, $w_{w,slurry}$ (g)	870.0
Weight of Dry Cement, w_c (g)	870.0
Weight of Moist Soil, w_{soil} (g)	2452.3
Weight of Slurry (g)	1740.0
Specific Gravity of Solids	2.82
water content of mix	0.57
Dry unit wt. of mix (kg/m^3)	1079.1

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	1799.72
Weight of Soil Water, $w_{w,soil}$ (g)	657
Total weight of soil used, W_t (g)	2439.6
Weight of Dry Cement, w_c (g)	861.9
Weight of Slurry Water, $w_{w,slurry}$ (g)	861.9
Soil Water Content, w (%)	36.51
Water:Cement Ratio, w:c	1.00
Cement Content, a_W (%)	47.89%
Cement Factor, α (kg/m3)	650.82
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	350.32
Volume Ratio, VR (%)	85.78
Total-Water-to-Cement Ratio, w_T:c	1.76

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	861.9
Volume Ratio, VR (%)	85.78
Total-Water-to-Cement Ratio, w_T:c	1.76
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	350.3

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	8/28 5:40 PM	2.7	8/31 10:56 AM	51.3	101.5	21.1	100	366.6	0	0.0	4.06	1.98	0.998	0.0	1750.8	
B	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
C	8/28 5:40 PM	7.0	9/4 5:58 PM	51.5	101.8	21.1	100	374.0	0	0.0	2.08	1.976	0.998	0.0	1760.7	
D	8/28 5:40 PM	9.9	9/7 4:00 PM	51.8	100.8	21.1	100	364.0	0	1.7	0.60	1.947	0.996	1.7	1713.9	
E	8/28 5:40 PM	14.2	9/11 10:08 PM	51.9	100.6	21.1	100	363.9	0	3.4	0.96	1.939	0.995	3.4	1712.8	
F	8/28 5:40 PM	16.9	9/14 3:27 PM	51.8	97.6	21.1	100	353.2	0	3.2	1.01	1.884	0.991	3.2	1715.5	
G	8/28 5:40 PM	21.0	9/18 4:59 PM	51.9	101.0	21.1	100	365.7	0	4.3	1.36	1.947	0.996	4.2	1714.3	
H	8/28 5:40 PM	23.9	9/21 2:39 PM	51.9	100.0	21.1	100	362.8	0	4.8	1.23	1.929	0.994	4.8	1716.7	
I	8/28 5:40 PM	28.0	9/25 5:44 PM	51.6	94.6	21.1	100	343.8	0	4.4	1.47	1.835	0.987	4.3	1738.0	
J	8/28 5:40 PM	28.0	9/25 6:06 PM	51.9	98.0	21.1	100	354.7	0	4.1	1.11	1.887	0.991	4.1	1708.1	

Laboratory Mixing Data
Batch O-20

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial organic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	36.5%
Unit Weight, γ_{soil} (kg/m^3)	1842.3
Tannic acid concentration (%)	0.350%

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.00
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	350
Weight of Slurry Water, $w_{w,slurry}$ (g)	870.0
Weight of Dry Cement, w_c (g)	870.0
Weight of Moist Soil, w_{soil} (g)	2452.3
Weight of Slurry (g)	1740.0
Specific Gravity of Solids	2.82
water content of mix	0.57
Dry unit wt. of mix (kg/m^3)	1079.0

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	1799.76
Weight of Soil Water, $w_{w,soil}$ (g)	657
Total weight of soil used, W_t (g)	2441.3
Weight of Dry Cement, w_c (g)	863.3
Weight of Slurry Water, $w_{w,slurry}$ (g)	863.3
Soil Water Content, w (%)	36.50
Water:Cement Ratio, w:c	1.00
Cement Content, a_W (%)	47.96%
Cement Factor, α (kg/m3)	651.43
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	350.49
Volume Ratio, VR (%)	85.86
Total-Water-to-Cement Ratio, w_T:c	1.76

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	863.3
Volume Ratio, VR (%)	85.86
Total-Water-to-Cement Ratio, w_T:c	1.76
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	350.5

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	8/30 12:00 PM	3.0	--	--	--	21.1	100	--	0	--	--	--	--	--	--	Vane shear
B	8/30 12:00 PM	7.0	9/6 11:02 AM	51.6	101.5	21.1	100	363.6	0	0.0	3.80	1.97	0.997	0.0	1713.9	
C	8/30 12:00 PM	7.0	9/6 11:18 AM	51.1	102.5	21.1	100	366.5	0	0.0	4.91	2	1.000	0.0	1742.0	
D	8/30 12:00 PM	10.1	9/9 2:14 PM	51.1	101.8	21.1	100	365.9	0	0.0	3.24	1.99	0.999	0.0	1756.1	
E	8/30 12:00 PM	14.0	9/13 10:59 AM	51.7	101.7	21.1	100	357.2	0	0.0	3.94	1.97	0.998	0.0	1675.0	
F	8/30 12:00 PM	17.0	--	--	--	21.1	100	--	0	--	--	--	--	--	--	Vane shear
G	8/30 12:00 PM	21.1	9/20 2:42 PM	52.0	100.2	21.1	100	361.0	0	0.9	0.59	1.93	0.994	0.8	1696.8	
H	8/30 12:00 PM	24.0	9/23 11:25 AM	51.9	99.6	21.1	100	358.5	0	1.8	0.96	1.92	0.994	1.7	1702.8	
I	8/30 12:00 PM	27.9	9/27 10:08 AM	51.8	100.2	21.1	100	364.1	0	3.4	0.92	1.94	0.995	3.4	1727.0	
J	8/30 12:00 PM	27.9	9/27 10:34 AM	51.7	99.7	21.1	100	361.6	0	3.9	1.19	1.93	0.994	3.8	1726.4	

Laboratory Mixing Data
Batch O-21

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial organic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	36.5%
Unit Weight, γ_{soil} (kg/m^3)	1842.3
Tannic acid concentration (%)	0.225%

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.40
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	125
Weight of Slurry Water, $w_{w,slurry}$ (g)	440.0
Weight of Dry Cement, w_c (g)	310.0
Weight of Moist Soil, w_{soil} (g)	3574.7
Weight of Slurry (g)	750.0
Specific Gravity of Solids	2.71
water content of mix	0.47
Dry unit wt. of mix (kg/m^3)	1185.0

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2699.91
Weight of Soil Water, $w_{w,soil}$ (g)	985.5
Total weight of soil used, W_t (g)	3657.5
Weight of Dry Cement, w_c (g)	317.8
Weight of Slurry Water, $w_{w,slurry}$ (g)	444.9
Soil Water Content, w (%)	36.50
Water:Cement Ratio, w:c	1.40
Cement Content, a_W (%)	11.77%
Cement Factor, α (kg/m3)	160.07
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	125.54
Volume Ratio, VR (%)	27.50
Total-Water-to-Cement Ratio, w_T:c	4.48

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	444.9
Volume Ratio, VR (%)	27.50
Total-Water-to-Cement Ratio, w_T:c	4.48
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	125.5

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	9/2 5:45 PM	3.0	9/5 5:05 PM	51.7	100.2	21.1	100	368.3	0	0.3	1.27	1.937	0.995	0.3	1750.8	
B	9/2 5:45 PM	6.9	9/9 2:46 PM	51.8	100.7	21.1	100	369.9	0	0.5	1.00	1.945	0.996	0.5	1745.6	
C	9/2 5:45 PM	6.9	9/9 3:08 PM	51.9	99.6	21.1	100	365.5	0	0.6	1.24	1.918	0.993	0.5	1733.6	
D	9/2 5:45 PM	9.7	9/12 11:17 AM	51.7	98.5	21.1	100	361.0	0	0.6	1.05	1.904	0.992	0.6	1745.3	
E	9/2 5:45 PM	13.9	9/16 3:33 PM	51.8	100.7	21.1	100	369.7	0	0.8	1.33	1.945	0.996	0.8	1744.7	
F	9/2 5:45 PM	16.9	9/19 4:26 PM	51.7	100.0	21.1	100	366.6	0	0.9	1.26	1.932	0.995	0.9	1744.1	
G	9/2 5:45 PM	20.9	9/23 2:34 PM	51.8	100.2	21.1	100	368.5	0	0.8	0.93	1.935	0.995	0.8	1748.3	
H	9/2 5:45 PM	23.9	9/26 2:32 PM	51.7	98.9	21.1	100	363.2	0	0.8	1.12	1.912	0.993	0.8	1746.5	
I	9/2 5:45 PM	27.9	9/30 3:53 PM	51.8	96.4	21.1	100	354.4	0	0.9	0.98	1.86	0.989	0.9	1743.5	
J	9/2 5:45 PM	27.9	9/30 4:13 PM	51.9	99.6	21.1	100	366.5	0	0.9	1.09	1.918	0.993	0.9	1738.7	

Laboratory Mixing Data
Batch O-22

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial organic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	36.5%
Unit Weight, γ_{soil} (kg/m^3)	1842.3
Tannic acid concentration (%)	0.250%

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.40
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	125
Weight of Slurry Water, $w_{w,slurry}$ (g)	440.0
Weight of Dry Cement, w_c (g)	310.0
Weight of Moist Soil, w_{soil} (g)	3574.7
Weight of Slurry (g)	750.0
Specific Gravity of Solids	2.71
water content of mix	0.47
Dry unit wt. of mix (kg/m^3)	1185.7

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2699.87
Weight of Soil Water, $w_{w,soil}$ (g)	985.5
Total weight of soil used, W_t (g)	3664.6
Weight of Dry Cement, w_c (g)	316.7
Weight of Slurry Water, $w_{w,slurry}$ (g)	443.4
Soil Water Content, w (%)	36.50
Water:Cement Ratio, w:c	1.40
Cement Content, a_W (%)	11.73%
Cement Factor, α (kg/m3)	159.21
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	125.01
Volume Ratio, VR (%)	27.36
Total-Water-to-Cement Ratio, w_T:c	4.49

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	443.4
Volume Ratio, VR (%)	27.36
Total-Water-to-Cement Ratio, w_T:c	4.49
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	125.0

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	9/2 7:00 PM	2.9	9/5 5:20 PM	51.5	101.7	21.1	100	372.0	0	0.0	4.61	1.974	0.998	0.0	1755.2	
B	9/2 7:00 PM	6.9	9/9 3:30 PM	51.7	100.7	21.1	100	369.4	0	0.1	1.35	1.949	0.996	0.1	1750.1	
C	9/2 7:00 PM	6.9	9/9 3:47 PM	51.6	101.3	21.1	100	371.4	0	0.1	3.76	1.962	0.997	0.1	1750.7	
D	9/2 7:00 PM	9.7	9/12 11:36 AM	51.8	101.0	21.1	100	370.3	0	0.2	1.36	1.949	0.996	0.2	1739.3	
E	9/2 7:00 PM	13.9	9/16 3:56 PM	51.9	100.4	21.1	100	368.1	0	0.6	1.11	1.935	0.995	0.6	1733.4	
F	9/2 7:00 PM	16.9	9/19 4:57 PM	51.7	97.5	21.1	100	357.3	0	0.7	1.25	1.886	0.991	0.7	1746.2	
G	9/2 7:00 PM	20.8	9/23 2:54 PM	51.7	99.9	21.1	100	367.0	0	0.8	0.99	1.931	0.994	0.8	1749.5	
H	9/2 7:00 PM	23.8	9/26 2:53 PM	51.8	99.5	21.1	100	365.4	0	0.7	1.02	1.919	0.993	0.7	1740.4	
I	9/2 7:00 PM	27.9	9/30 4:34 PM	51.8	99.7	21.1	100	366.4	0	0.8	0.74	1.924	0.994	0.8	1740.7	
J	9/2 7:00 PM	27.9	9/30 4:59 PM	51.8	98.2	21.1	100	361.5	0	0.9	1.00	1.895	0.992	0.9	1743.2	

Laboratory Mixing Data
Batch O-23

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial organic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	36.5%
Unit Weight, γ_{soil} (kg/m^3)	1842.3
Tannic acid concentration (%)	0.230%

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.40
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	275
Weight of Slurry Water, $w_{w,slurry}$ (g)	960.0
Weight of Dry Cement, w_c (g)	680.0
Weight of Moist Soil, w_{soil} (g)	2401.4
Weight of Slurry (g)	1640.0
Specific Gravity of Solids	2.80
water content of mix	0.65
Dry unit wt. of mix (kg/m^3)	988.6

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	1797.72
Weight of Soil Water, $w_{w,soil}$ (g)	695
Total weight of soil used, W_t (g)	2475.9
Weight of Dry Cement, w_c (g)	701.1
Weight of Slurry Water, $w_{w,slurry}$ (g)	981.5
Soil Water Content, w (%)	38.66
Water:Cement Ratio, w:c	1.40
Cement Content, a_W (%)	39.00%
Cement Factor, α (kg/m3)	521.67
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	275.09
Volume Ratio, VR (%)	89.63
Total-Water-to-Cement Ratio, w_T:c	2.34

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	981.5
Volume Ratio, VR (%)	89.63
Total-Water-to-Cement Ratio, w_T:c	2.34
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	275.1

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	9/4 7:10 PM	2.9	9/7 4:23 PM	51.9	93.7	21.1	100	323.5	0	0.7	1.18	1.81	0.985	0.7	1633.6	
B	9/4 7:10 PM	7.1	9/11 10:30 PM	51.9	96.1	21.1	100	332.6	0	1.5	1.08	1.85	0.988	1.5	1638.3	
C	9/4 7:10 PM	7.2	9/11 10:51 PM	51.8	97.8	21.1	100	338.2	0	1.5	1.17	1.89	0.991	1.5	1638.5	
D	9/4 7:10 PM	9.9	9/14 3:48 PM	51.7	96.2	21.1	100	333.1	0	1.7	1.32	1.86	0.989	1.7	1649.4	
E	9/4 7:10 PM	13.9	9/18 5:26 PM	51.9	93.0	21.1	100	320.8	0	2.0	1.42	1.79	0.983	2.0	1628.5	
F	9/4 7:10 PM	16.8	9/21 3:01 PM	51.8	98.7	21.1	100	342.0	0	2.1	1.01	1.9	0.992	2.1	1641.1	
G	9/4 7:10 PM	21.0	9/25 6:31 PM	51.8	95.1	21.1	100	328.2	0	2.3	1.34	1.83	0.987	2.3	1637.1	
H	9/4 7:10 PM	23.8	9/28 2:55 PM	51.9	97.2	21.1	100	336.3	0	2.1	1.06	1.87	0.990	2.1	1633.1	
I	9/4 7:10 PM	27.9	10/2 4:48 PM	51.8	98.8	21.1	100	341.8	0	2.3	1.03	1.91	0.993	2.3	1640.9	
J	9/4 7:10 PM	27.9	10/2 5:12 PM	51.9	97.9	21.1	100	340.3	0	2.4	0.89	1.89	0.991	2.4	1644.5	

Laboratory Mixing Data
Batch O-24

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial organic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	36.5%
Unit Weight, γ_{soil} (kg/m^3)	1842.3
Tannic acid concentration (%)	0.260%

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.40
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	275
Weight of Slurry Water, $w_{w,slurry}$ (g)	960.0
Weight of Dry Cement, w_c (g)	680.0
Weight of Moist Soil, w_{soil} (g)	2401.4
Weight of Slurry (g)	1640.0
Specific Gravity of Solids	2.80
water content of mix	0.65
Dry unit wt. of mix (kg/m^3)	988.4

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	1799.77
Weight of Soil Water, $w_{w,soil}$ (g)	695
Total weight of soil used, W_t (g)	2478
Weight of Dry Cement, w_c (g)	702.3
Weight of Slurry Water, $w_{w,slurry}$ (g)	983.2
Soil Water Content, w (%)	38.62
Water:Cement Ratio, w:c	1.40
Cement Content, a_W (%)	39.02%
Cement Factor, α (kg/m3)	522.12
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	275.22
Volume Ratio, VR (%)	89.71
Total-Water-to-Cement Ratio, w_T:c	2.34

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	983.2
Volume Ratio, VR (%)	89.71
Total-Water-to-Cement Ratio, w_T:c	2.34
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	275.2

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	9/6 1:30 PM	3.1	9/9 4:06 PM	51.3	101.8	21.1	100	349.7	0	0.0	2.95	1.984	0.999	0.0	1661.4	
B	9/6 1:30 PM	6.9	9/13 11:58 AM	51.8	100.0	21.1	100	346.1	0	1.2	0.94	1.928	0.994	1.2	1640.1	
C	9/6 1:30 PM	6.9	9/13 12:16 PM	51.9	100.3	21.1	100	347.2	0	1.3	0.81	1.932	0.995	1.3	1637.5	
D	9/6 1:30 PM	10.1	9/16 4:19 PM	51.9	99.1	21.1	100	342.6	0	1.7	1.21	1.91	0.993	1.6	1634.5	
E	9/6 1:30 PM	14.1	9/20 3:22 PM	51.8	100.2	21.1	100	347.0	0	2.0	0.86	1.933	0.995	1.9	1643.1	
F	9/6 1:30 PM	17.1	9/23 3:18 PM	51.8	96.2	21.1	100	332.8	0	2.2	1.37	1.857	0.989	2.1	1640.3	
G	9/6 1:30 PM	20.9	9/27 12:07 PM	51.8	99.8	21.1	100	346.5	0	2.3	0.87	1.927	0.994	2.3	1645.7	
H	9/6 1:30 PM	24.2	9/30 5:23 PM	51.9	98.1	21.1	100	339.5	0	2.4	1.19	1.892	0.991	2.3	1637.2	
I	9/6 1:30 PM	27.9	10/4 10:15 AM	51.9	94.2	21.1	100	329.8	0	2.4	1.14	1.815	0.985	2.3	1653.6	
J	9/6 1:30 PM	27.9	10/4 10:37 AM	51.9	100.5	21.1	100	355.0	0	2.4	0.76	1.934	0.995	2.4	1667.6	

Laboratory Mixing Data
Batch O-25

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial organic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	36.5%
Unit Weight, γ_{soil} (kg/m^3)	1842.3
Tannic acid concentration (%)	0.300%

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.40
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	275
Weight of Slurry Water, $w_{w,slurry}$ (g)	960.0
Weight of Dry Cement, w_c (g)	680.0
Weight of Moist Soil, w_{soil} (g)	2401.4
Weight of Slurry (g)	1640.0
Specific Gravity of Solids	2.80
water content of mix	0.65
Dry unit wt. of mix (kg/m^3)	988.3

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	1799.69
Weight of Soil Water, $w_{w,soil}$ (g)	695
Total weight of soil used, W_t (g)	2470.5
Weight of Dry Cement, w_c (g)	700.5
Weight of Slurry Water, $w_{w,slurry}$ (g)	980.7
Soil Water Content, w (%)	38.62
Water:Cement Ratio, w:c	1.40
Cement Content, a_W (%)	38.92%
Cement Factor, α (kg/m3)	522.36
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	275.29
Volume Ratio, VR (%)	89.75
Total-Water-to-Cement Ratio, w_T:c	2.34

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	980.7
Volume Ratio, VR (%)	89.75
Total-Water-to-Cement Ratio, w_T:c	2.34
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	275.3

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	9/6 3:20 PM	3.0	--	--	--	21.1	100	--	0	--	--	--	--	--	--	Vane shear
B	9/6 3:20 PM	7.0	--	--	--	21.1	100	--	0	--	--	--	--	--	--	Vane shear
C	9/6 3:20 PM	7.0	--	--	--	21.1	100	--	0	--	--	--	--	--	--	Vane shear
D	9/6 3:20 PM	10.0	--	--	--	21.1	100	--	0	--	--	--	--	--	--	Vane shear
E	9/6 3:20 PM	14.0	9/20 3:44 PM	51.9	96.2	21.1	100	331.4	0	0.3	0.82	1.855	0.988	0.3	1630.2	
F	9/6 3:20 PM	17.0	9/23 3:38 PM	51.9	96.9	21.1	100	335.7	0	1.5	0.98	1.869	0.990	1.5	1639.2	
G	9/6 3:20 PM	20.9	9/27 12:40 PM	51.9	95.0	21.1	100	328.3	0	2.0	1.39	1.832	0.987	1.9	1635.2	
H	9/6 3:20 PM	24.1	9/30 5:48 PM	51.9	96.2	21.1	100	333.3	0	2.3	1.31	1.854	0.988	2.2	1635.9	
I	9/6 3:20 PM	27.8	10/4 11:04 AM	52.0	98.3	21.1	100	340.5	0	2.4	0.94	1.891	0.991	2.3	1633.5	
J	9/6 3:20 PM	27.8	10/4 11:27 AM	51.8	99.8	21.1	100	346.3	0	2.4	0.97	1.925	0.994	2.4	1644.0	

Laboratory Mixing Data
Batch O-26

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial organic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	36.5%
Unit Weight, γ_{soil} (kg/m^3)	1842.3
Tannic acid concentration (%)	0.250%

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	0.60
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	200
Weight of Slurry Water, $w_{w,slurry}$ (g)	300.0
Weight of Dry Cement, w_c (g)	500.0
Weight of Moist Soil, w_{soil} (g)	3716.7
Weight of Slurry (g)	800.0
Specific Gravity of Solids	2.73
water content of mix	0.40
Dry unit wt. of mix (kg/m^3)	1304.1

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2799.7
Weight of Soil Water, $w_{w,soil}$ (g)	980
Total weight of soil used, W_t (g)	3752.4
Weight of Dry Cement, w_c (g)	494.3
Weight of Slurry Water, $w_{w,slurry}$ (g)	296.6
Soil Water Content, w (%)	35.00
Water:Cement Ratio, w:c	0.60
Cement Content, a_W (%)	17.66%
Cement Factor, α (kg/m3)	242.68
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	198.47
Volume Ratio, VR (%)	22.27
Total-Water-to-Cement Ratio, w_T:c	2.63

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	296.6
Volume Ratio, VR (%)	22.27
Total-Water-to-Cement Ratio, w_T:c	2.63
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	198.5

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
H	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
B	3/18 3:00 PM	7.0	--	--	--	--	100	--	0	--	--	--	--	--	--	Vane shear
G	3/18 3:00 PM	7.0	--	--	--	--	100	--	0	--	--	--	--	--	--	Vane shear
C	3/18 3:00 PM	14.0	--	--	--	--	100	--	0	--	--	--	--	--	--	Vane shear
F	3/18 3:00 PM	14.0	--	--	--	--	100	--	0	--	--	--	--	--	--	Vane shear
D	3/18 3:00 PM	28.0	--	--	--	--	100	--	0	--	--	--	--	--	--	Vane shear
E	3/18 3:00 PM	28.0	--	--	--	--	100	--	0	--	--	--	--	--	--	Vane shear
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Laboratory Mixing Data
Batch O-27

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial organic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7
Tannic acid concentration (%)	0.100%

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	0.60
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	200
Weight of Slurry Water, $w_{w,slurry}$ (g)	300.0
Weight of Dry Cement, w_c (g)	500.0
Weight of Moist Soil, w_{soil} (g)	3751.8
Weight of Slurry (g)	800.0
Specific Gravity of Solids	2.73
water content of mix	0.39
Dry unit wt. of mix (kg/m^3)	1326.4

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2799.5
Weight of Soil Water, $w_{w,soil}$ (g)	980
Total weight of soil used, W_t (g)	3762.8
Weight of Dry Cement, w_c (g)	497.0
Weight of Slurry Water, $w_{w,slurry}$ (g)	298.2
Soil Water Content, w (%)	35.01
Water:Cement Ratio, w:c	0.60
Cement Content, a_W (%)	17.75%
Cement Factor, α (kg/m3)	245.63
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	200.44
Volume Ratio, VR (%)	22.55
Total-Water-to-Cement Ratio, w_T:c	2.56

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	298.2
Volume Ratio, VR (%)	22.55
Total-Water-to-Cement Ratio, w_T:c	2.56
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	200.4

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	3/23 3:00 PM	2.9	3/26 12:54 PM	51.8	101.5	21.1	100	391.1	0	1.4	1.06	1.96	0.997	1.4	1830.9	
H	3/23 3:00 PM	2.9	3/26 1:14 PM	51.8	101.0	21.1	100	389.1	0	1.3	0.87	1.95	0.996	1.3	1828.4	
B	3/23 3:00 PM	7.1	3/30 4:48 PM	51.9	101.9	21.1	100	393.5	0	2.3	1.16	1.96	0.997	2.3	1824.9	
G	3/23 3:00 PM	7.1	3/30 5:06 PM	51.9	101.1	21.1	100	390.7	0	2.1	1.03	1.95	0.996	2.1	1828.3	
C	3/23 3:00 PM	14.0	4/6 3:27 PM	51.7	100.9	21.1	100	389.6	0	3.0	1.23	1.95	0.996	3.0	1838.5	
F	3/23 3:00 PM	14.0	4/6 3:41 PM	51.8	101.5	21.1	100	392.4	0	3.1	1.34	1.96	0.997	3.1	1831.6	
D	3/23 3:00 PM	27.8	4/20 10:21 AM	51.8	101.6	21.1	100	393.3	0	3.5	0.93	1.96	0.997	3.4	1838.9	
E	3/23 3:00 PM	27.8	4/20 10:37 AM	52.0	100.2	21.1	100	387.3	0	3.6	1.51	1.93	0.994	3.6	1823.1	
I	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
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Laboratory Mixing Data
Batch O-28

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial organic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7
Tannic acid concentration (%)	0.050%

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	0.60
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	200
Weight of Slurry Water, $w_{w,slurry}$ (g)	300.0
Weight of Dry Cement, w_c (g)	500.0
Weight of Moist Soil, w_{soil} (g)	3751.8
Weight of Slurry (g)	800.0
Specific Gravity of Solids	2.73
water content of mix	0.39
Dry unit wt. of mix (kg/m^3)	1326.2

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2800
Weight of Soil Water, $w_{w,soil}$ (g)	986.6
Total weight of soil used, W_t (g)	3771.4
Weight of Dry Cement, w_c (g)	500.1
Weight of Slurry Water, $w_{w,slurry}$ (g)	300.1
Soil Water Content, w (%)	35.24
Water:Cement Ratio, w:c	0.60
Cement Content, a_W (%)	17.86%
Cement Factor, α (kg/m3)	246.60
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	201.08
Volume Ratio, VR (%)	22.63
Total-Water-to-Cement Ratio, w_T:c	2.56

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	300.1
Volume Ratio, VR (%)	22.63
Total-Water-to-Cement Ratio, w_T:c	2.56
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	201.1

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	3/24 12:30 PM	3.1	3/27 2:34 PM	51.9	101.5	21.1	100	390.2	0	1.7	1.66	1.95	0.996	1.7	1814.6	
H	3/24 12:30 PM	3.1	3/27 2:51 PM	51.9	100.1	21.1	100	385.7	0	1.7	2.07	1.93	0.994	1.7	1823.2	
B	3/24 12:30 PM	7.2	3/31 4:45 PM	51.9	101.0	21.1	100	390.1	0	2.6	1.44	1.95	0.996	2.6	1825.5	
G	3/24 12:30 PM	7.2	3/31 5:00 PM	51.9	101.4	21.1	100	391.9	0	2.6	1.35	1.95	0.996	2.6	1829.7	
C	3/24 12:30 PM	13.9	4/7 10:04 AM	51.9	101.4	21.1	100	390.8	0	3.2	1.36	1.95	0.996	3.2	1822.8	
F	3/24 12:30 PM	13.9	4/7 10:17 AM	51.9	101.6	21.1	100	392.2	0	3.2	1.18	1.96	0.996	3.2	1822.1	
D	3/24 12:30 PM	28.2	4/21 4:30 PM	51.9	101.6	21.1	100	392.3	0	3.8	1.13	1.96	0.997	3.8	1825.7	
E	3/24 12:30 PM	28.2	4/21 4:43 PM	52.0	101.2	21.1	100	390.9	0	3.9	1.23	1.95	0.996	3.9	1820.7	
I	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
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Laboratory Mixing Data
Batch O-29

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial organic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7
Tannic acid concentration (%)	0.025%

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	0.60
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	200
Weight of Slurry Water, $w_{w,slurry}$ (g)	300.0
Weight of Dry Cement, w_c (g)	500.0
Weight of Moist Soil, w_{soil} (g)	3751.8
Weight of Slurry (g)	800.0
Specific Gravity of Solids	2.73
water content of mix	0.39
Dry unit wt. of mix (kg/m^3)	1326.5

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2801.5
Weight of Soil Water, $w_{w,soil}$ (g)	980
Total weight of soil used, W_t (g)	3765.2
Weight of Dry Cement, w_c (g)	496.5
Weight of Slurry Water, $w_{w,slurry}$ (g)	297.9
Soil Water Content, w (%)	34.98
Water:Cement Ratio, w:c	0.60
Cement Content, a_W (%)	17.72%
Cement Factor, α (kg/m3)	245.22
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	200.17
Volume Ratio, VR (%)	22.51
Total-Water-to-Cement Ratio, w_T:c	2.57

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	297.9
Volume Ratio, VR (%)	22.51
Total-Water-to-Cement Ratio, w_T:c	2.57
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	200.2

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	3/25 10:30 PM	2.8	3/28 6:22 PM	51.9	101.0	21.1	100	388.8	0	1.4	1.47	1.95	0.996	1.4	1819.4	
H	3/25 10:30 PM	2.8	3/28 6:37 PM	51.8	101.3	21.1	100	391.1	0	1.6	1.83	1.96	0.996	1.6	1830.5	
B	3/25 10:30 PM	7.0	4/1 9:53 PM	51.9	101.5	21.1	100	391.9	0	2.6	2.22	1.96	0.996	2.5	1821.2	
G	3/25 10:30 PM	7.0	4/1 10:07 PM	51.9	101.5	21.1	100	391.8	0	2.5	1.23	1.96	0.996	2.5	1822.5	
C	3/25 10:30 PM	13.7	4/8 2:42 PM	51.9	101.5	21.1	100	392.4	0	3.0	1.63	1.95	0.996	3.0	1824.0	
F	3/25 10:30 PM	13.7	4/8 2:57 PM	51.9	101.8	21.1	100	393.4	0	2.8	1.05	1.96	0.997	2.8	1825.4	
D	3/25 10:30 PM	27.4	4/22 8:56 AM	51.9	99.0	21.1	100	382.1	0	3.7	1.41	1.91	0.993	3.7	1827.5	
E	3/25 10:30 PM	27.9	4/22 9:10 PM	51.8	101.6	21.1	100	393.2	0	3.6	1.22	1.96	0.997	3.6	1838.4	
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Laboratory Mixing Data
Batch O-30

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial organic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7
Tannic acid concentration (%)	0.150%

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	0.60
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	200
Weight of Slurry Water, $w_{w,slurry}$ (g)	300.0
Weight of Dry Cement, w_c (g)	500.0
Weight of Moist Soil, w_{soil} (g)	3751.8
Weight of Slurry (g)	800.0
Specific Gravity of Solids	2.73
water content of mix	0.39
Dry unit wt. of mix (kg/m^3)	1326.5

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2799.8
Weight of Soil Water, $w_{w,soil}$ (g)	980
Total weight of soil used, W_t (g)	3760.9
Weight of Dry Cement, w_c (g)	495.6
Weight of Slurry Water, $w_{w,slurry}$ (g)	297.4
Soil Water Content, w (%)	35.00
Water:Cement Ratio, w:c	0.60
Cement Content, a_W (%)	17.70%
Cement Factor, α (kg/m3)	245.06
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	200.06
Volume Ratio, VR (%)	22.49
Total-Water-to-Cement Ratio, w_T:c	2.57

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	297.4
Volume Ratio, VR (%)	22.49
Total-Water-to-Cement Ratio, w_T:c	2.57
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	200.1

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	3/31 9:30 PM	2.9	4/3 7:10 PM	51.8	101.1	21.1	100	387.0	0	1.3	1.26	1.95	0.996	1.3	1819.4	
H	3/31 9:30 PM	2.9	4/3 7:26 PM	51.8	101.0	21.1	100	387.1	0	1.4	1.66	1.95	0.996	1.4	1815.9	
B	3/31 9:30 PM	6.6	4/7 10:43 AM	51.8	100.7	21.1	100	386.7	0	2.0	1.65	1.94	0.996	2.0	1822.7	
G	3/31 9:30 PM	6.6	4/7 11:00 AM	51.9	100.8	21.1	100	386.8	0	1.9	1.16	1.94	0.995	1.9	1816.4	
C	3/31 9:30 PM	13.9	4/14 6:09 PM	51.9	100.9	21.1	100	386.8	0	2.6	1.14	1.95	0.996	2.6	1813.7	
F	3/31 9:30 PM	13.9	4/14 6:25 PM	51.8	100.8	21.1	100	386.6	0	2.3	0.82	1.95	0.996	2.3	1818.6	
D	3/31 9:30 PM	27.8	4/28 4:12 PM	52.0	101.3	21.1	100	388.5	0	3.1	0.99	1.95	0.996	3.1	1805.9	
E	3/31 9:30 PM	27.8	4/28 4:29 PM	51.8	100.8	21.1	100	386.9	0	3.1	1.03	1.95	0.996	3.1	1817.7	
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Laboratory Mixing Data
Batch O-31

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial organic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7
Tannic acid concentration (%)	0.380%

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	0.60
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	350
Weight of Slurry Water, $w_{w,slurry}$ (g)	520.0
Weight of Dry Cement, w_c (g)	870.0
Weight of Moist Soil, w_{soil} (g)	3119.1
Weight of Slurry (g)	1390.0
Specific Gravity of Solids	2.79
water content of mix	0.42
Dry unit wt. of mix (kg/m^3)	1287.3

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2399.8
Weight of Soil Water, $w_{w,soil}$ (g)	840
Total weight of soil used, W_t (g)	3224.8
Weight of Dry Cement, w_c (g)	903.5
Weight of Slurry Water, $w_{w,slurry}$ (g)	542.1
Soil Water Content, w (%)	35.00
Water:Cement Ratio, w:c	0.60
Cement Content, a_W (%)	37.65%
Cement Factor, α (kg/m3)	521.02
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	352.47
Volume Ratio, VR (%)	47.82
Total-Water-to-Cement Ratio, w_T:c	1.53

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	542.1
Volume Ratio, VR (%)	47.82
Total-Water-to-Cement Ratio, w_T:c	1.53
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	352.5

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	4/7 12:10 PM	3.0	--	--	--	21.1	100	--	0	--	--	--	--	--	--	Vane shear
H	4/7 12:10 PM	3.0	--	--	--	21.1	100	--	0	--	--	--	--	--	--	Vane shear
G	4/7 12:10 PM	7.0	--	--	--	21.1	100	--	0	--	--	--	--	--	--	Vane shear
I	4/7 12:10 PM	7.0	--	--	--	21.1	100	--	0	--	--	--	--	--	--	Vane shear
C	4/7 12:10 PM	14.0	--	--	--	21.1	100	--	0	--	--	--	--	--	--	Vane shear
F	4/7 12:10 PM	14.0	--	--	--	21.1	100	--	0	--	--	--	--	--	--	Vane shear
D	4/7 12:10 PM	28.0	--	--	--	21.1	100	--	0	--	--	--	--	--	--	Vane shear
E	4/7 12:10 PM	28.0	--	--	--	21.1	100	--	0	--	--	--	--	--	--	Vane shear
B	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
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Laboratory Mixing Data
Batch O-32

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial organic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7
Tannic acid concentration (%)	0.090%

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	0.60
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	350
Weight of Slurry Water, $w_{w,slurry}$ (g)	520.0
Weight of Dry Cement, w_c (g)	870.0
Weight of Moist Soil, w_{soil} (g)	3119.1
Weight of Slurry (g)	1390.0
Specific Gravity of Solids	2.79
water content of mix	0.42
Dry unit wt. of mix (kg/m^3)	1287.9

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2399.9
Weight of Soil Water, $w_{w,soil}$ (g)	840
Total weight of soil used, W_t (g)	3222.9
Weight of Dry Cement, w_c (g)	894.0
Weight of Slurry Water, $w_{w,slurry}$ (g)	536.4
Soil Water Content, w (%)	35.00
Water:Cement Ratio, w:c	0.60
Cement Content, a_W (%)	37.25%
Cement Factor, α (kg/m3)	515.82
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	350.08
Volume Ratio, VR (%)	47.34
Total-Water-to-Cement Ratio, w_T:c	1.53

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	536.4
Volume Ratio, VR (%)	47.34
Total-Water-to-Cement Ratio, w_T:c	1.53
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	350.1

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	4/8 8:40 PM	3.0	4/11 9:02 PM	52.0	100.8	21.1	100	387.0	0	3.1	1.05	1.94	0.995	3.1	1805.8	
H	4/8 8:40 PM	3.0	4/11 9:18 PM	51.8	99.5	21.1	100	382.3	0	3.5	1.02	1.92	0.994	3.5	1820.0	
B	4/8 8:40 PM	6.7	4/15 2:02 PM	51.8	99.0	21.1	100	380.2	0	4.8	1.32	1.91	0.993	4.7	1825.6	
G	4/8 8:40 PM	6.7	4/15 2:18 PM	51.9	99.1	21.1	100	381.7	0	4.3	1.06	1.91	0.993	4.3	1817.9	
C	4/8 8:40 PM	13.6	4/22 11:25 AM	51.7	99.0	21.1	100	380.2	0	6.1	1.27	1.91	0.993	6.0	1827.3	
F	4/8 8:40 PM	13.6	4/22 11:40 AM	51.9	99.2	21.1	100	382.0	0	5.7	1.31	1.91	0.993	5.6	1818.8	
D	4/8 8:40 PM	27.9	5/6 5:50 PM	52.0	98.9	21.1	100	381.6	0	6.9	1.41	1.9	0.992	6.9	1819.4	
I	4/8 8:40 PM	27.9	5/6 6:18 PM	51.9	100.1	21.1	100	382.8	0	6.5	1.18	1.93	0.994	6.4	1808.2	
E	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
J	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

Laboratory Mixing Data
Batch O-33

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial organic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7
Tannic acid concentration (%)	0.250%

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	0.60
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	350
Weight of Slurry Water, $w_{w,slurry}$ (g)	520.0
Weight of Dry Cement, w_c (g)	870.0
Weight of Moist Soil, w_{soil} (g)	3119.1
Weight of Slurry (g)	1390.0
Specific Gravity of Solids	2.79
water content of mix	0.42
Dry unit wt. of mix (kg/m^3)	1288.0

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2399.4
Weight of Soil Water, $w_{w,soil}$ (g)	840
Total weight of soil used, W_t (g)	3225.3
Weight of Dry Cement, w_c (g)	893.9
Weight of Slurry Water, $w_{w,slurry}$ (g)	536.3
Soil Water Content, w (%)	35.01
Water:Cement Ratio, w:c	0.60
Cement Content, a_W (%)	37.26%
Cement Factor, α (kg/m3)	515.41
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	349.89
Volume Ratio, VR (%)	47.31
Total-Water-to-Cement Ratio, w_T:c	1.54

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	536.3
Volume Ratio, VR (%)	47.31
Total-Water-to-Cement Ratio, w_T:c	1.54
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	349.9

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	5/13 2:45 PM	3.0	5/16 2:07 PM	51.5	101.5	21.1	100	386.0	0	0.0	4.28	1.97	0.998	0.0	1823.1	
H	5/13 2:45 PM	3.0	5/16 2:33 PM	51.3	101.9	21.1	100	390.3	0	0.0	4.13	1.98	0.999	0.0	1851.1	
B	5/13 2:45 PM	6.8	5/20 8:50 AM	51.7	94.7	21.1	100	362.5	0	0.1	2.80	1.83	0.987	0.1	1824.4	
G	5/13 2:45 PM	6.8	5/20 9:07 AM	51.7	99.9	21.1	100	380.9	0	0.1	3.45	1.93	0.995	0.1	1818.8	
C	5/13 2:45 PM	13.8	5/27 10:30 AM	51.9	99.5	21.1	100	380.7	0	3.1	0.85	1.92	0.993	3.1	1811.0	
F	5/13 2:45 PM	13.8	5/27 11:00 AM	51.9	98.9	21.1	100	380.8	0	4.1	1.02	1.91	0.992	4.0	1820.9	
D	5/13 2:45 PM	28.0	6/10 1:45 PM	51.9	99.0	21.1	100	380.3	0	4.2	1.09	1.91	0.993	4.2	1816.6	
I	5/13 2:45 PM	28.0	6/10 2:13 PM	51.9	99.0	21.1	100	381.4	0	5.8	0.99	1.91	0.992	5.7	1820.6	
E	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
J	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

Laboratory Mixing Data
Batch O-34

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial organic soil
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	35.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7
Tannic acid concentration (%)	0.300%

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	0.60
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	350
Weight of Slurry Water, $w_{w,slurry}$ (g)	520.0
Weight of Dry Cement, w_c (g)	870.0
Weight of Moist Soil, w_{soil} (g)	3119.1
Weight of Slurry (g)	1390.0
Specific Gravity of Solids	2.80
water content of mix	0.42
Dry unit wt. of mix (kg/m^3)	1286.9

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2399.4
Weight of Soil Water, $w_{w,soil}$ (g)	843.5
Total weight of soil used, W_t (g)	3229.3
Weight of Dry Cement, w_c (g)	911.6
Weight of Slurry Water, $w_{w,slurry}$ (g)	546.9
Soil Water Content, w (%)	35.15
Water:Cement Ratio, w:c	0.60
Cement Content, a_W (%)	37.99%
Cement Factor, α (kg/m3)	524.93
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	354.25
Volume Ratio, VR (%)	48.18
Total-Water-to-Cement Ratio, w_T:c	1.52

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	546.9
Volume Ratio, VR (%)	48.18
Total-Water-to-Cement Ratio, w_T:c	1.52
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	354.3

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
H	5/13 5:05 PM	3.0	--	--	--	21.1	100	--	0	--	--	--	--	--	--	Vane shear
I	5/13 5:05 PM	3.0	--	--	--	21.1	100	--	0	--	--	--	--	--	--	Vane shear
B	5/13 5:05 PM	6.7	5/20 9:26 AM	51.7	98.6	21.1	100	376.5	0	0.0	3.24	1.91	0.992	0.0	1818.3	
G	5/13 5:05 PM	6.7	5/20 9:43 AM	51.7	100.9	21.1	100	385.0	0	0.0	2.99	1.95	0.996	0.0	1818.1	
C	5/13 5:05 PM	13.8	5/27 11:17 AM	51.6	100.7	21.1	100	384.6	0	0.1	3.58	1.95	0.996	0.1	1827.1	
F	5/13 5:05 PM	13.8	5/27 11:36 AM	51.5	98.5	21.1	100	375.3	0	0.1	3.04	1.91	0.993	0.1	1832.4	
D	5/13 5:05 PM	27.9	6/10 2:41 PM	51.9	101.1	21.1	100	387.4	0	0.8	0.55	1.95	0.996	0.8	1813.7	
E	5/13 5:05 PM	27.9	6/10 2:56 PM	51.9	99.9	21.1	100	382.4	0	1.0	0.69	1.93	0.994	1.0	1811.3	
A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
J	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

Laboratory Mixing Data
Batch J-1

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Natural organic soil
Soil Solids Specific Gravity	2.562
Soil Water Content, w (%)	11.2%
Unit Weight, γ_{soil} (kg/m^3)	2214.5
Organic content (%)	2.97%

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	0.60
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	200
Weight of Slurry Water, $w_{w,slurry}$ (g)	280.0
Weight of Dry Cement, w_c (g)	460.0
Weight of Moist Soil, w_{soil} (g)	4095.3
Weight of Slurry (g)	740.0
Specific Gravity of Solids	2.63
water content of mix	0.17
Dry unit wt. of mix (kg/m^3)	1830.9

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	3778.0
Weight of Soil Water, $w_{w,soil}$ (g)	422.0
Total weight of soil used, W_t (g)	4200
Weight of Dry Cement, w_c (g)	464.6
Weight of Slurry Water, $w_{w,slurry}$ (g)	278.8
Soil Water Content, w (%)	11.17
Water:Cement Ratio, w:c	0.60
Cement Content, a_W (%)	12.30%
Cement Factor, α (kg/m3)	244.96
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	199.99
Volume Ratio, VR (%)	22.48
Total-Water-to-Cement Ratio, w_T:c	1.51

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	278.8
Volume Ratio, VR (%)	22.48
Total-Water-to-Cement Ratio, w_T:c	1.51
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	200.0

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	7/1 3:00 PM	3.0	7/4 3:45 PM	51.9	99.1	21.1	100	411.9	0	1.5	0.87	1.91	0.993	1.4	1966.5	
H	7/1 3:00 PM	3.0	7/4 4:04 PM	52.0	100.6	21.1	100	418.5	0	1.5	0.74	1.93	0.995	1.4	1955.8	
B	7/1 3:00 PM	7.0	7/8 2:33 PM	51.9	99.5	21.1	100	417.1	0	2.9	0.65	1.92	0.993	2.8	1979.3	
I	7/1 3:00 PM	7.0	7/8 3:00 PM	51.9	99.6	21.1	100	416.0	0	2.9	0.77	1.92	0.993	2.9	1971.1	
C	7/1 3:00 PM	13.9	7/15 11:38 AM	51.8	98.9	21.1	100	413.3	0	3.4	0.85	1.91	0.993	3.3	1979.7	
F	7/1 3:00 PM	13.9	7/15 11:52 AM	52.0	96.4	21.1	100	400.4	0	3.2	0.78	1.85	0.988	3.2	1953.5	
D	7/1 3:00 PM	27.8	7/29 11:10 AM	51.9	98.9	21.1	100	410.6	0	3.5	0.88	1.9	0.992	3.5	1959.0	
E	7/1 3:00 PM	27.9	7/29 11:24 AM	52.0	98.2	21.1	100	408.9	0	3.9	0.76	1.89	0.991	3.9	1961.2	
G	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
J	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

Laboratory Mixing Data
Batch J-2

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Natural organic soil
Soil Solids Specific Gravity	2.562
Soil Water Content, w (%)	11.2%
Unit Weight, γ_{soil} (kg/m^3)	2214.5
Organic content (%)	2.97%

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	0.60
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	275
Weight of Slurry Water, $w_{w,slurry}$ (g)	380.0
Weight of Dry Cement, w_c (g)	630.0
Weight of Moist Soil, w_{soil} (g)	3750.0
Weight of Slurry (g)	1010.0
Specific Gravity of Solids	2.65
water content of mix	0.19
Dry unit wt. of mix (kg/m^3)	1770.3

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	3418.2
Weight of Soil Water, $w_{w,soil}$ (g)	381.8
Total weight of soil used, W_t (g)	3800
Weight of Dry Cement, w_c (g)	631.0
Weight of Slurry Water, $w_{w,slurry}$ (g)	378.6
Soil Water Content, w (%)	11.17
Water:Cement Ratio, w:c	0.60
Cement Content, a_W (%)	18.46%
Cement Factor, α (kg/m3)	367.72
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	274.93
Volume Ratio, VR (%)	33.75
Total-Water-to-Cement Ratio, w_T:c	1.21

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	378.6
Volume Ratio, VR (%)	33.75
Total-Water-to-Cement Ratio, w_T:c	1.21
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	274.9

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	7/1 4:50 PM	3.0	7/4 4:18 PM	51.9	99.3	21.1	100	417.0	0	3.0	0.93	1.91	0.993	3.0	1983.9	
H	7/1 4:50 PM	3.0	7/4 4:31 PM	52.0	99.8	21.1	100	420.7	0	3.3	0.94	1.92	0.994	3.2	1983.0	
G	7/1 4:50 PM	7.0	7/8 3:40 PM	51.9	99.3	21.1	100	419.3	0	6.0	0.88	1.91	0.993	5.9	1998.7	
I	7/1 4:50 PM	7.0	7/8 3:40 PM	51.9	95.8	21.1	100	405.5	0	5.8	0.88	1.85	0.988	5.7	2003.2	
C	7/1 4:50 PM	13.8	7/15 12:04 PM	51.9	98.7	21.1	100	415.4	0	5.7	0.77	1.9	0.992	5.7	1988.5	
F	7/1 4:50 PM	13.8	7/15 12:20 PM	51.9	98.7	21.1	100	416.3	0	6.0	0.77	1.9	0.992	6.0	1993.7	
D	7/1 4:50 PM	27.8	7/29 11:47 AM	51.9	99.7	21.1	100	420.9	0	7.3	0.91	1.92	0.994	7.2	1995.7	
E	7/1 4:50 PM	27.8	7/29 11:57 AM	52.0	98.7	21.1	100	416.0	0	7.3	0.81	1.9	0.992	7.2	1982.6	
B	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
J	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

Laboratory Mixing Data
Batch J-3

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Natural organic soil
Soil Solids Specific Gravity	2.562
Soil Water Content, w (%)	11.2%
Unit Weight, γ_{soil} (kg/m^3)	2214.5
Organic content (%)	2.97%

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	0.60
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	350
Weight of Slurry Water, $w_{w,slurry}$ (g)	480.0
Weight of Dry Cement, w_c (g)	800.0
Weight of Moist Soil, w_{soil} (g)	3404.7
Weight of Slurry (g)	1280.0
Specific Gravity of Solids	2.68
water content of mix	0.21
Dry unit wt. of mix (kg/m^3)	1709.0

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	3058.4
Weight of Soil Water, $w_{w,soil}$ (g)	341.6
Total weight of soil used, W_t (g)	3400
Weight of Dry Cement, w_c (g)	792.3
Weight of Slurry Water, $w_{w,slurry}$ (g)	475.4
Soil Water Content, w (%)	11.17
Water:Cement Ratio, w:c	0.60
Cement Content, a_W (%)	25.91%
Cement Factor, α (kg/m3)	516.03
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	350.17
Volume Ratio, VR (%)	47.36
Total-Water-to-Cement Ratio, w_T:c	1.03

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	475.4
Volume Ratio, VR (%)	47.36
Total-Water-to-Cement Ratio, w_T:c	1.03
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	350.2

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	7/1 6:45 PM	2.9	7/4 4:45 PM	51.8	97.8	21.1	100	409.9	0	4.0	0.72	1.89	0.991	4.0	1986.7	
H	7/1 6:45 PM	2.9	7/4 5:07 PM	52.0	100.0	21.1	100	417.0	0	4.0	0.78	1.92	0.994	4.0	1965.4	
B	7/1 6:45 PM	6.9	7/8 4:04 PM	52.0	97.2	21.1	100	408.9	0	7.2	0.91	1.87	0.989	7.1	1977.4	
I	7/1 6:45 PM	6.9	7/8 4:29 PM	52.0	98.1	21.1	100	414.9	0	7.5	0.93	1.89	0.991	7.5	1991.6	
C	7/1 6:45 PM	13.7	7/15 12:34 PM	52.0	97.6	21.1	100	410.9	0	7.2	0.85	1.88	0.990	7.2	1978.2	
F	7/1 6:45 PM	13.8	7/15 12:47 PM	52.0	99.6	21.1	100	422.6	0	8.6	0.90	1.92	0.993	8.5	2000.5	
D	7/1 6:45 PM	27.7	7/29 12:14 PM	52.1	98.3	21.1	100	415.4	0	9.7	1.03	1.89	0.991	9.6	1984.5	
E	7/1 6:45 PM	27.7	7/29 12:24 PM	52.0	97.4	21.1	100	411.1	0	9.7	1.31	1.87	0.990	9.6	1985.8	
G	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
J	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

Laboratory Mixing Data
Batch J-4

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Natural organic soil
Soil Solids Specific Gravity	2.562
Soil Water Content, w (%)	11.2%
Unit Weight, γ_{soil} (kg/m^3)	2214.5
Organic content (%)	2.97%

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.00
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	125
Weight of Slurry Water, $w_{w,slurry}$ (g)	290.0
Weight of Dry Cement, w_c (g)	290.0
Weight of Moist Soil, w_{soil} (g)	4189.7
Weight of Slurry (g)	580.0
Specific Gravity of Solids	2.60
water content of mix	0.17
Dry unit wt. of mix (kg/m^3)	1788.5

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	3778.0
Weight of Soil Water, $w_{w,soil}$ (g)	422.0
Total weight of soil used, W_t (g)	4200
Weight of Dry Cement, w_c (g)	289.0
Weight of Slurry Water, $w_{w,slurry}$ (g)	289.0
Soil Water Content, w (%)	11.17
Water:Cement Ratio, w:c	1.00
Cement Content, a_W (%)	7.65%
Cement Factor, α (kg/m3)	152.38
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	126.89
Volume Ratio, VR (%)	20.08
Total-Water-to-Cement Ratio, w_T:c	2.46

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	289.0
Volume Ratio, VR (%)	20.08
Total-Water-to-Cement Ratio, w_T:c	2.46
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	126.9

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	7/2 1:45 PM	3.0	7/5 1:54 PM	51.8	100.2	21.1	100	402.7	0	0.3	2.21	1.93	0.995	0.3	1903.5	
H	7/2 1:45 PM	3.0	7/5 2:05 PM	51.8	99.8	21.1	100	412.6	0	0.4	2.07	1.93	0.994	0.4	1958.2	
B	7/2 1:45 PM	7.0	7/9 2:23 PM	51.8	99.3	21.1	100	400.6	0	0.9	0.50	1.92	0.993	0.9	1917.1	
G	7/2 1:45 PM	7.0	7/9 2:34 PM	51.8	99.4	21.1	100	408.5	0	1.1	0.60	1.92	0.993	1.1	1947.7	
C	7/2 1:45 PM	14.0	7/16 2:21 PM	51.8	99.2	21.1	100	404.6	0	1.0	0.91	1.92	0.993	1.0	1936.3	
F	7/2 1:45 PM	14.0	7/16 2:31 PM	52.0	99.4	21.1	100	406.0	0	1.0	0.79	1.91	0.993	1.0	1925.8	
I	7/2 1:45 PM	28.0	7/30 2:02 PM	51.8	99.6	21.1	100	409.1	0	1.2	0.84	1.92	0.994	1.2	1946.1	
J	7/2 1:45 PM	28.0	7/30 2:02 PM	51.8	99.7	21.1	100	410.6	0	1.0	1.36	1.92	0.994	1.0	1955.5	
D	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
E	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

Laboratory Mixing Data
Batch J-5

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Natural organic soil
Soil Solids Specific Gravity	2.562
Soil Water Content, w (%)	11.2%
Unit Weight, γ_{soil} (kg/m^3)	2214.5
Organic content (%)	2.97%

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.00
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	200
Weight of Slurry Water, $w_{w,slurry}$ (g)	460.0
Weight of Dry Cement, w_c (g)	460.0
Weight of Moist Soil, w_{soil} (g)	3693.9
Weight of Slurry (g)	920.0
Specific Gravity of Solids	2.63
water content of mix	0.22
Dry unit wt. of mix (kg/m^3)	1671.2

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	3328.2
Weight of Soil Water, $w_{w,soil}$ (g)	371.8
Total weight of soil used, W_t (g)	3700
Weight of Dry Cement, w_c (g)	453.7
Weight of Slurry Water, $w_{w,slurry}$ (g)	453.7
Soil Water Content, w (%)	11.17
Water:Cement Ratio, w:c	1.00
Cement Content, a_W (%)	13.63%
Cement Factor, α (kg/m3)	271.51
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	199.95
Volume Ratio, VR (%)	35.79
Total-Water-to-Cement Ratio, w_T:c	1.82

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	453.7
Volume Ratio, VR (%)	35.79
Total-Water-to-Cement Ratio, w_T:c	1.82
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	200.0

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	7/2 3:20 PM	3.0	7/5 2:21 PM	51.9	97.4	21.1	100	404.0	0	1.1	1.65	1.88	0.990	1.1	1960.2	
H	7/2 3:20 PM	3.0	7/5 2:37 PM	51.9	98.2	21.1	100	408.7	0	1.1	1.03	1.89	0.991	1.1	1964.1	
B	7/2 3:20 PM	7.0	7/9 2:52 PM	51.8	97.1	21.1	100	403.3	0	2.2	0.83	1.87	0.990	2.2	1970.1	
G	7/2 3:20 PM	7.0	7/9 3:06 PM	51.8	98.0	21.1	100	409.0	0	2.4	0.78	1.89	0.991	2.4	1976.8	
F	7/2 3:20 PM	14.0	7/16 2:54 PM	51.9	98.4	21.1	100	409.4	0	2.8	0.69	1.89	0.992	2.8	1962.9	
I	7/2 3:20 PM	14.0	7/16 3:14 PM	51.9	98.3	21.1	100	410.1	0	3.0	0.72	1.89	0.992	3.0	1975.1	
E	7/2 3:20 PM	28.0	7/30 2:49 PM	51.9	97.8	21.1	100	407.5	0	3.0	0.91	1.88	0.991	2.9	1968.9	
J	7/2 3:20 PM	28.0	7/30 3:03 PM	51.8	98.7	21.1	100	413.1	0	3.2	0.88	1.9	0.992	3.2	1985.8	
C	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
D	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

Laboratory Mixing Data
Batch J-6

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Natural organic soil
Soil Solids Specific Gravity	2.562
Soil Water Content, w (%)	11.2%
Unit Weight, γ_{soil} (kg/m^3)	2214.5
Organic content (%)	2.97%

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.00
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	275
Weight of Slurry Water, $w_{w,slurry}$ (g)	630.0
Weight of Dry Cement, w_c (g)	630.0
Weight of Moist Soil, w_{soil} (g)	3198.0
Weight of Slurry (g)	1260.0
Specific Gravity of Solids	2.67
water content of mix	0.27
Dry unit wt. of mix (kg/m^3)	1549.4

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2878.5
Weight of Soil Water, $w_{w,soil}$ (g)	321.5
Total weight of soil used, W_t (g)	3200
Weight of Dry Cement, w_c (g)	625.0
Weight of Slurry Water, $w_{w,slurry}$ (g)	625.0
Soil Water Content, w (%)	11.17
Water:Cement Ratio, w:c	1.00
Cement Content, a_W (%)	21.71%
Cement Factor, α (kg/m3)	432.51
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	275.47
Volume Ratio, VR (%)	57.01
Total-Water-to-Cement Ratio, w_T:c	1.51

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	625.0
Volume Ratio, VR (%)	57.01
Total-Water-to-Cement Ratio, w_T:c	1.51
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	275.5

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	7/2 5:00 PM	2.9	7/5 2:52 PM	52.0	96.6	21.1	100	410.3	0	1.9	0.69	1.86	0.989	1.8	1997.5	
H	7/2 5:00 PM	2.9	7/5 3:07 PM	51.8	97.0	21.1	100	411.2	0	1.9	0.89	1.87	0.990	1.9	2010.8	
B	7/2 5:00 PM	6.9	7/9 3:21 PM	51.9	95.8	21.1	100	408.1	0	3.6	0.89	1.85	0.988	3.5	2012.1	
G	7/2 5:00 PM	6.9	7/9 3:35 PM	52.0	96.0	21.1	100	408.4	0	3.9	0.84	1.85	0.988	3.8	2000.9	
F	7/2 5:00 PM	13.9	7/16 3:04 PM	51.9	95.9	21.1	100	408.6	0	5.0	0.77	1.85	0.988	4.9	2014.4	
I	7/2 5:00 PM	13.9	7/16 3:40 PM	51.9	96.6	21.1	100	411.4	0	5.2	0.79	1.86	0.989	5.1	2012.7	
E	7/2 5:00 PM	27.9	7/30 3:21 PM	52.0	96.5	21.1	100	412.8	0	5.7	0.88	1.86	0.988	5.6	2011.8	
J	7/2 5:00 PM	27.9	7/30 3:33 PM	52.0	96.2	21.1	100	408.5	0	5.8	0.88	1.85	0.988	5.7	2002.7	
C	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
D	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

Laboratory Mixing Data
Batch J-7

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Natural organic soil
Soil Solids Specific Gravity	2.562
Soil Water Content, w (%)	11.2%
Unit Weight, γ_{soil} (kg/m^3)	2214.5
Organic content (%)	2.97%

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.00
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	350
Weight of Slurry Water, $w_{w,slurry}$ (g)	800.0
Weight of Dry Cement, w_c (g)	800.0
Weight of Moist Soil, w_{soil} (g)	2702.1
Weight of Slurry (g)	1600.0
Specific Gravity of Solids	2.71
water content of mix	0.33
Dry unit wt. of mix (kg/m^3)	1428.4

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2428.7
Weight of Soil Water, $w_{w,soil}$ (g)	271.3
Total weight of soil used, W_t (g)	2700
Weight of Dry Cement, w_c (g)	792.9
Weight of Slurry Water, $w_{w,slurry}$ (g)	792.9
Soil Water Content, w (%)	11.17
Water:Cement Ratio, w:c	1.00
Cement Content, a_W (%)	32.64%
Cement Factor, α (kg/m3)	650.27
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	350.16
Volume Ratio, VR (%)	85.71
Total-Water-to-Cement Ratio, w_T:c	1.34

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	792.9
Volume Ratio, VR (%)	85.71
Total-Water-to-Cement Ratio, w_T:c	1.34
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	350.2

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
H	7/2 6:30 PM	2.9	7/5 3:38 PM	51.9	94.0	21.1	100	385.8	0	2.1	0.60	1.81	0.985	2.1	1941.6	
I	7/2 6:30 PM	2.9	7/5 3:54 PM	51.7	94.6	21.1	100	392.8	0	2.4	1.38	1.83	0.986	2.3	1975.1	
B	7/2 6:30 PM	6.9	7/9 3:49 PM	51.8	92.5	21.1	100	382.8	0	4.1	0.80	1.79	0.983	4.1	1964.3	
G	7/2 6:30 PM	6.9	7/9 4:03 PM	51.9	91.9	21.1	100	381.2	0	4.6	0.73	1.77	0.982	4.5	1958.9	
C	7/2 6:30 PM	13.9	7/16 3:32 PM	51.9	92.5	21.1	100	382.6	0	5.5	0.74	1.78	0.983	5.4	1953.1	
F	7/2 6:30 PM	13.9	7/16 3:49 PM	51.9	93.9	21.1	100	391.2	0	7.0	0.93	1.81	0.985	6.9	1967.3	
D	7/2 6:30 PM	27.9	7/30 3:45 PM	52.0	92.1	21.1	100	381.0	0	6.8	0.93	1.77	0.982	6.7	1950.8	
E	7/2 6:30 PM	27.9	7/30 3:58 PM	52.0	91.6	21.1	100	381.4	0	7.6	0.93	1.76	0.981	7.4	1962.1	
A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
J	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

Laboratory Mixing Data
Batch J-8

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Natural organic soil
Soil Solids Specific Gravity	2.562
Soil Water Content, w (%)	11.2%
Unit Weight, γ_{soil} (kg/m^3)	2214.5
Organic content (%)	2.97%

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.40
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	125
Weight of Slurry Water, $w_{w,slurry}$ (g)	400.0
Weight of Dry Cement, w_c (g)	290.0
Weight of Moist Soil, w_{soil} (g)	3938.8
Weight of Slurry (g)	690.0
Specific Gravity of Solids	2.61
water content of mix	0.21
Dry unit wt. of mix (kg/m^3)	1691.9

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	3598.1
Weight of Soil Water, $w_{w,soil}$ (g)	401.9
Total weight of soil used, W_t (g)	4000
Weight of Dry Cement, w_c (g)	287.4
Weight of Slurry Water, $w_{w,slurry}$ (g)	402.4
Soil Water Content, w (%)	11.17
Water:Cement Ratio, w:c	1.40
Cement Content, a_W (%)	7.99%
Cement Factor, α (kg/m3)	159.11
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	124.95
Volume Ratio, VR (%)	27.34
Total-Water-to-Cement Ratio, w_T:c	2.80

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	402.4
Volume Ratio, VR (%)	27.34
Total-Water-to-Cement Ratio, w_T:c	2.80
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	124.9

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	7/3 12:20 PM	3.1	7/6 3:24 PM	52.0	96.9	21.1	100	400.4	0	0.4	1.13	1.86	0.989	0.4	1949.1	
H	7/3 12:20 PM	3.1	7/6 3:40 PM	52.0	99.9	21.1	100	412.9	0	0.4	1.44	1.92	0.994	0.4	1947.2	
B	7/3 12:20 PM	6.9	7/10 10:20 AM	52.0	97.9	21.1	100	405.9	0	0.8	0.69	1.88	0.991	0.8	1951.9	
G	7/3 12:20 PM	6.9	7/10 10:42 AM	51.8	97.5	21.1	100	403.5	0	0.8	0.84	1.88	0.991	0.8	1967.2	
F	7/3 12:20 PM	13.9	7/17 10:41 AM	51.9	98.1	21.1	100	406.2	0	1.0	0.80	1.89	0.991	1.0	1954.1	
I	7/3 12:20 PM	13.9	7/17 10:53 AM	51.9	97.5	21.1	100	403.5	0	1.1	0.88	1.88	0.990	1.0	1956.1	
E	7/3 12:20 PM	28.3	7/31 8:42 PM	51.8	97.8	21.1	100	406.2	0	1.1	1.05	1.89	0.991	1.1	1973.2	
J	7/3 12:20 PM	28.4	7/31 8:52 PM	51.9	96.5	21.1	100	398.1	0	1.1	1.09	1.86	0.989	1.1	1948.8	
C	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
D	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

Laboratory Mixing Data
Batch J-9

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Natural organic soil
Soil Solids Specific Gravity	2.562
Soil Water Content, w (%)	11.2%
Unit Weight, γ_{soil} (kg/m^3)	2214.5
Organic content (%)	2.97%

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.40
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	200
Weight of Slurry Water, $w_{w,slurry}$ (g)	640.0
Weight of Dry Cement, w_c (g)	460.0
Weight of Moist Soil, w_{soil} (g)	3292.4
Weight of Slurry (g)	1100.0
Specific Gravity of Solids	2.64
water content of mix	0.28
Dry unit wt. of mix (kg/m^3)	1508.7

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2968.4
Weight of Soil Water, $w_{w,soil}$ (g)	331.6
Total weight of soil used, W_t (g)	3300
Weight of Dry Cement, w_c (g)	457.7
Weight of Slurry Water, $w_{w,slurry}$ (g)	640.8
Soil Water Content, w (%)	11.17
Water:Cement Ratio, w:c	1.40
Cement Content, a_W (%)	15.42%
Cement Factor, α (kg/m3)	307.14
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	201.04
Volume Ratio, VR (%)	52.77
Total-Water-to-Cement Ratio, w_T:c	2.12

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	640.8
Volume Ratio, VR (%)	52.77
Total-Water-to-Cement Ratio, w_T:c	2.12
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	201.0

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	7/3 2:00 PM	3.1	7/6 3:55 PM	51.8	95.5	21.1	100	400.4	0	1.0	0.77	1.84	0.987	1.0	1987.6	
H	7/3 2:00 PM	3.1	7/6 4:14 PM	52.0	96.2	21.1	100	403.6	0	1.0	0.94	1.85	0.988	1.0	1976.7	
B	7/3 2:00 PM	6.9	7/10 10:54 AM	51.8	96.5	21.1	100	407.1	0	1.8	0.71	1.86	0.989	1.8	1998.7	
G	7/3 2:00 PM	6.9	7/10 11:05 AM	52.0	96.4	21.1	100	406.5	0	1.8	0.71	1.85	0.988	1.8	1985.7	
C	7/3 2:00 PM	13.9	7/17 11:03 AM	51.9	96.3	21.1	100	406.3	0	2.1	0.86	1.86	0.988	2.1	1992.1	
F	7/3 2:00 PM	13.9	7/17 11:12 AM	51.9	96.7	21.1	100	407.4	0	2.1	0.97	1.86	0.989	2.1	1994.6	
D	7/3 2:00 PM	28.3	7/31 9:02 PM	51.9	95.7	21.1	100	404.2	0	2.5	0.86	1.84	0.988	2.5	1996.9	
E	7/3 2:00 PM	28.3	7/31 9:13 PM	51.8	95.7	21.1	100	403.1	0	2.3	0.82	1.85	0.988	2.3	2000.4	
I	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
J	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

Laboratory Mixing Data
Batch J-10

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Natural organic soil
Soil Solids Specific Gravity	2.562
Soil Water Content, w (%)	11.2%
Unit Weight, γ_{soil} (kg/m^3)	2214.5
Organic content (%)	2.97%

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.40
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	275
Weight of Slurry Water, $w_{w,slurry}$ (g)	880.0
Weight of Dry Cement, w_c (g)	630.0
Weight of Moist Soil, w_{soil} (g)	2646.0
Weight of Slurry (g)	1510.0
Specific Gravity of Solids	2.68
water content of mix	0.38
Dry unit wt. of mix (kg/m^3)	1330.1

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2428.7
Weight of Soil Water, $w_{w,soil}$ (g)	271.3
Total weight of soil used, W_t (g)	2700
Weight of Dry Cement, w_c (g)	635.6
Weight of Slurry Water, $w_{w,slurry}$ (g)	889.8
Soil Water Content, w (%)	11.17
Water:Cement Ratio, w:c	1.40
Cement Content, a_W (%)	26.17%
Cement Factor, α (kg/m3)	521.30
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	274.99
Volume Ratio, VR (%)	89.57
Total-Water-to-Cement Ratio, w_T:c	1.83

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	889.8
Volume Ratio, VR (%)	89.57
Total-Water-to-Cement Ratio, w_T:c	1.83
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	275.0

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	7/3 4:20 PM	3.0	7/6 4:34 PM	51.8	88.5	21.1	100	359.3	0	1.1	0.78	1.71	0.977	1.0	1924.3	
H	7/3 4:20 PM	3.0	7/6 4:50 PM	51.9	91.3	21.1	100	374.6	0	1.2	0.82	1.76	0.981	1.2	1939.7	
J	7/3 4:20 PM	3.0	7/6 5:04 PM	51.8	90.6	21.1	100	370.2	0	1.1	0.82	1.75	0.980	1.1	1937.1	
B	7/3 4:20 PM	6.8	7/10 11:19 AM	51.8	87.8	21.1	100	356.2	0	2.0	0.84	1.7	0.976	2.0	1928.6	
G	7/3 4:20 PM	6.8	7/10 11:31 AM	51.9	89.9	21.1	100	366.8	0	1.9	1.12	1.73	0.979	1.9	1926.4	
C	7/3 4:20 PM	13.8	7/17 11:22 AM	52.0	88.4	21.1	100	359.6	0	2.3	0.89	1.7	0.976	2.3	1915.0	
F	7/3 4:20 PM	13.8	7/17 11:33 AM	51.8	88.3	21.1	100	359.7	0	2.8	0.72	1.7	0.976	2.8	1932.0	
D	7/3 4:20 PM	28.2	7/31 9:24 PM	51.9	89.7	21.1	100	364.7	0	3.5	0.69	1.73	0.978	3.4	1920.8	
E	7/3 4:20 PM	28.2	7/31 9:34 PM	51.8	88.3	21.1	100	362.1	0	3.4	0.81	1.7	0.976	3.3	1944.9	
I	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

Laboratory Mixing Data
Batch J-11

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Natural organic soil
Soil Solids Specific Gravity	2.562
Soil Water Content, w (%)	11.2%
Unit Weight, γ_{soil} (kg/m^3)	2214.5
Organic content (%)	2.97%

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	0.60
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	125
Weight of Slurry Water, $w_{w,slurry}$ (g)	170.0
Weight of Dry Cement, w_c (g)	290.0
Weight of Moist Soil, w_{soil} (g)	4440.6
Weight of Slurry (g)	460.0
Specific Gravity of Solids	2.60
water content of mix	0.14
Dry unit wt. of mix (kg/m^3)	1891.2

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	4047.9
Weight of Soil Water, $w_{w,soil}$ (g)	452.1
Total weight of soil used, W_t (g)	4500
Weight of Dry Cement, w_c (g)	287.3
Weight of Slurry Water, $w_{w,slurry}$ (g)	172.4
Soil Water Content, w (%)	11.17
Water:Cement Ratio, w:c	0.60
Cement Content, a_W (%)	7.10%
Cement Factor, α (kg/m3)	141.38
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	125.14
Volume Ratio, VR (%)	12.98
Total-Water-to-Cement Ratio, w_T:c	2.17

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	172.4
Volume Ratio, VR (%)	12.98
Total-Water-to-Cement Ratio, w_T:c	2.17
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	125.1

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	8/24 3:00 PM	1.1	8/25 5:54 PM	51.7	73.3	21.1	100	287.5	0	0.3	0.77	1.42	0.953	0.2	1871.5	
B	8/24 3:00 PM	3.1	8/27 5:38 PM	51.7	101.7	21.1	100	399.9	0	0.4	0.85	1.97	0.997	0.4	1870.2	
C	8/24 3:00 PM	6.8	8/31 10:02 AM	51.7	101.6	21.1	100	400.8	0	0.7	1.03	1.96	0.997	0.7	1876.7	
D	8/24 3:00 PM	9.7	9/3 8:38 AM	51.8	101.7	21.1	100	402.7	0	0.8	0.77	1.96	0.997	0.8	1877.3	
E	8/24 3:00 PM	13.8	9/7 11:17 AM	51.8	101.6	21.1	100	401.8	0	0.9	0.91	1.96	0.997	0.9	1876.8	
F	8/24 3:00 PM	17.0	9/10 3:03 PM	51.8	101.1	21.1	100	405.4	0	0.9	1.60	1.95	0.996	0.8	1902.2	
G	8/24 3:00 PM	20.8	9/14 10:07 AM	51.8	101.7	21.1	100	403.1	0	0.9	0.99	1.96	0.997	0.9	1880.5	
H	8/24 3:00 PM	24.1	9/17 5:21 PM	51.6	101.4	21.1	100	405.0	0	0.9	0.92	1.97	0.997	0.9	1910.0	
I	8/24 3:00 PM	28.3	9/21 9:58 PM	51.9	100.6	21.1	100	400.3	0	1.0	0.91	1.94	0.995	1.0	1883.6	
J	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

Laboratory Mixing Data
Batch J-12

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Natural organic soil
Soil Solids Specific Gravity	2.562
Soil Water Content, w (%)	11.2%
Unit Weight, γ_{soil} (kg/m^3)	2214.5
Organic content (%)	2.97%

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.00
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	50
Weight of Slurry Water, $w_{w,slurry}$ (g)	120.0
Weight of Dry Cement, w_c (g)	120.0
Weight of Moist Soil, w_{soil} (g)	4685.6
Weight of Slurry (g)	240.0
Specific Gravity of Solids	2.58
water content of mix	0.14
Dry unit wt. of mix (kg/m^3)	1909.7

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	4317.7
Weight of Soil Water, $w_{w,soil}$ (g)	482.3
Total weight of soil used, W_t (g)	4800
Weight of Dry Cement, w_c (g)	118.7
Weight of Slurry Water, $w_{w,slurry}$ (g)	118.7
Soil Water Content, w (%)	11.17
Water:Cement Ratio, w:c	1.00
Cement Content, a_W (%)	2.75%
Cement Factor, α (kg/m3)	54.76
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	51.08
Volume Ratio, VR (%)	7.22
Total-Water-to-Cement Ratio, w_T:c	5.06

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	118.7
Volume Ratio, VR (%)	7.22
Total-Water-to-Cement Ratio, w_T:c	5.06
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	51.1

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	8/30 10:10 AM	1.0	8/31 10:33 AM	51.6	101.6	21.1	100	399.4	0	0.1	0.80	1.97	0.997	0.1	1877.1	
B	8/30 10:10 AM	3.1	9/2 1:11 PM	51.7	61.4	21.1	100	244.3	0	0.2	1.36	1.19	0.935	0.2	1892.7	
C	8/30 10:10 AM	7.1	9/6 1:09 PM	52.0	101.8	21.1	100	399.0	0	0.2	0.61	1.96	0.997	0.2	1846.4	
D	8/30 10:10 AM	10.3	9/9 4:57 PM	51.6	101.4	21.1	100	400.8	0	0.1	0.90	1.97	0.997	0.1	1888.3	
E	8/30 10:10 AM	14.1	9/13 11:50 AM	51.7	56.0	21.1	100	226.8	0	0.3	1.13	1.08	0.927	0.2	1926.0	
F	8/30 10:10 AM	17.2	9/16 2:13 PM	51.8	101.5	21.1	100	402.9	0	0.2	0.67	1.96	0.997	0.2	1883.8	
G	8/30 10:10 AM	21.0	9/20 10:17 AM	51.8	101.6	21.1	100	402.0	0	0.2	0.85	1.96	0.997	0.2	1876.8	
J	8/30 10:10 AM	24.3	9/23 6:21 PM	51.8	101.7	21.1	100	408.3	0	0.2	0.67	1.96	0.997	0.2	1903.4	
I	8/30 10:10 AM	28.4	9/27 6:50 PM	51.8	101.7	21.1	100	403.0	0	0.2	0.71	1.96	0.997	0.2	1881.5	
H	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

Laboratory Mixing Data
Batch J-13

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Natural organic soil
Soil Solids Specific Gravity	2.562
Soil Water Content, w (%)	11.2%
Unit Weight, γ_{soil} (kg/m^3)	2214.5
Organic content (%)	2.97%

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.40
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	50
Weight of Slurry Water, $w_{w,slurry}$ (g)	160.0
Weight of Dry Cement, w_c (g)	120.0
Weight of Moist Soil, w_{soil} (g)	4585.2
Weight of Slurry (g)	280.0
Specific Gravity of Solids	2.58
water content of mix	0.15
Dry unit wt. of mix (kg/m^3)	1869.6

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	4137.8
Weight of Soil Water, $w_{w,soil}$ (g)	462.2
Total weight of soil used, W_t (g)	4600
Weight of Dry Cement, w_c (g)	115.7
Weight of Slurry Water, $w_{w,slurry}$ (g)	162.0
Soil Water Content, w (%)	11.17
Water:Cement Ratio, w:c	1.40
Cement Content, a_W (%)	2.80%
Cement Factor, α (kg/m3)	55.70
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	50.83
Volume Ratio, VR (%)	9.57
Total-Water-to-Cement Ratio, w_T:c	5.39

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	162.0
Volume Ratio, VR (%)	9.57
Total-Water-to-Cement Ratio, w_T:c	5.39
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	50.8

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	8/24 6:15 PM	1.0	8/25 6:25 PM	51.7	101.6	21.1	100	412.2	0	0.1	1.50	1.96	0.997	0.1	1931.5	
B	8/24 6:15 PM	3.0	8/27 5:50 PM	51.7	71.7	21.1	100	295.2	0	0.3	1.53	1.39	0.951	0.2	1965.3	
J	8/24 6:15 PM	6.7	8/31 10:23 AM	51.8	101.6	21.1	100	415.0	0	0.2	0.91	1.96	0.997	0.2	1938.9	
D	8/24 6:15 PM	9.6	9/3 8:48 AM	51.8	76.4	21.1	100	316.8	0	0.3	0.80	1.47	0.958	0.3	1967.0	
E	8/24 6:15 PM	13.7	9/7 11:29 AM	51.6	75.3	21.1	100	310.0	0	0.3	0.80	1.46	0.957	0.3	1968.7	
F	8/24 6:15 PM	16.9	9/10 3:16 PM	51.7	52.8	21.1	100	289.4	0	0.3	1.27	1.02	0.922	0.2	2614.2	
G	8/24 6:15 PM	20.7	9/14 10:19 AM	51.8	101.8	21.1	100	414.7	0	0.2	0.94	1.97	0.997	0.2	1935.1	
H	8/24 6:15 PM	24.0	9/17 5:27 PM	51.7	101.6	21.1	100	417.0	0	0.3	0.72	1.97	0.997	0.3	1953.5	
I	8/24 6:15 PM	27.7	9/21 10:07 AM	51.8	74.1	21.1	100	304.2	0	0.3	0.76	1.43	0.954	0.3	1949.6	
C	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

Laboratory Mixing Data
Batch B-1

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Natural organic soil
Soil Solids Specific Gravity	2.542
Soil Water Content, w (%)	54.2%
Unit Weight, γ_{soil} (kg/m^3)	1648.6
Organic content (%)	5.48%

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	0.60
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	200
Weight of Slurry Water, $w_{w,slurry}$ (g)	280.0
Weight of Dry Cement, w_c (g)	460.0
Weight of Moist Soil, w_{soil} (g)	3048.9
Weight of Slurry (g)	740.0
Specific Gravity of Solids	2.66
water content of mix	0.55
Dry unit wt. of mix (kg/m^3)	1075.7

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2010.6
Weight of Soil Water, $w_{w,soil}$ (g)	1089.4
Total weight of soil used, W_t (g)	3100
Weight of Dry Cement, w_c (g)	460.8
Weight of Slurry Water, $w_{w,slurry}$ (g)	276.5
Soil Water Content, w (%)	54.18
Water:Cement Ratio, w:c	0.60
Cement Content, a_W (%)	22.92%
Cement Factor, α (kg/m3)	245.06
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	200.06
Volume Ratio, VR (%)	22.49
Total-Water-to-Cement Ratio, w_T:c	2.96

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	276.5
Volume Ratio, VR (%)	22.49
Total-Water-to-Cement Ratio, w_T:c	2.96
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	200.1

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	7/31 4:20 PM	2.9	8/3 2:44 PM	51.8	100.8	21.1	100	352.2	0	0.8	2.43	1.94	0.995	0.8	1656.0	
H	7/31 4:20 PM	2.9	8/3 3:00 PM	51.9	99.6	21.1	100	349.7	0	0.9	2.54	1.92	0.994	0.8	1661.9	
B	7/31 4:20 PM	6.9	8/7 2:22 PM	51.9	100.6	21.1	100	353.0	0	1.3	1.90	1.94	0.995	1.3	1659.4	
G	7/31 4:20 PM	6.9	8/7 2:33 PM	51.9	100.9	21.1	100	354.9	0	1.3	1.39	1.94	0.996	1.3	1663.3	
C	7/31 4:20 PM	13.9	8/14 3:01 PM	51.8	100.0	21.1	100	350.7	0	1.7	1.20	1.93	0.994	1.6	1661.5	
F	7/31 4:20 PM	14.0	8/14 3:15 PM	52.0	99.9	21.1	100	351.5	0	1.7	1.00	1.92	0.994	1.7	1656.4	
D	7/31 4:20 PM	28.0	8/28 3:25 PM	51.5	100.5	21.1	100	354.0	0	2.0	1.32	1.95	0.996	2.0	1689.3	
E	7/31 4:20 PM	28.0	8/28 3:36 PM	51.9	100.5	21.1	100	354.3	0	2.0	1.34	1.94	0.995	2.0	1669.3	
I	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
J	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

Laboratory Mixing Data
Batch B-2

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Natural organic soil
Soil Solids Specific Gravity	2.542
Soil Water Content, w (%)	54.2%
Unit Weight, γ_{soil} (kg/m^3)	1648.6
Organic content (%)	5.48%

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	0.60
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	275
Weight of Slurry Water, $w_{w,slurry}$ (g)	380.0
Weight of Dry Cement, w_c (g)	630.0
Weight of Moist Soil, w_{soil} (g)	2791.9
Weight of Slurry (g)	1010.0
Specific Gravity of Solids	2.70
water content of mix	0.56
Dry unit wt. of mix (kg/m^3)	1077.8

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	1848.5
Weight of Soil Water, $w_{w,soil}$ (g)	1001.5
Total weight of soil used, W_t (g)	2850
Weight of Dry Cement, w_c (g)	636.5
Weight of Slurry Water, $w_{w,slurry}$ (g)	381.9
Soil Water Content, w (%)	54.18
Water:Cement Ratio, w:c	0.60
Cement Content, a_W (%)	34.43%
Cement Factor, α (kg/m3)	368.20
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	275.19
Volume Ratio, VR (%)	33.80
Total-Water-to-Cement Ratio, w_T:c	2.17

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	381.9
Volume Ratio, VR (%)	33.80
Total-Water-to-Cement Ratio, w_T:c	2.17
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	275.2

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	7/31 5:10 PM	2.9	8/3 3:16 PM	51.8	100.5	21.1	100	354.4	0	1.5	1.53	1.94	0.995	1.5	1670.1	
H	7/31 5:10 PM	2.9	8/3 3:30 PM	51.9	100.4	21.1	100	353.4	0	1.5	1.17	1.93	0.995	1.5	1666.7	
B	7/31 5:10 PM	6.9	8/7 2:43 PM	51.8	100.5	21.1	100	354.5	0	2.3	1.03	1.94	0.995	2.3	1676.8	
G	7/31 5:10 PM	6.9	8/7 2:54 PM	51.9	100.4	21.1	100	355.2	0	2.3	1.39	1.93	0.995	2.3	1673.1	
C	7/31 5:10 PM	13.9	8/14 3:27 PM	52.0	99.5	21.1	100	351.4	0	2.9	0.95	1.91	0.993	2.8	1663.1	
F	7/31 5:10 PM	13.9	8/14 3:40 PM	51.9	99.9	21.1	100	353.4	0	2.9	0.91	1.92	0.994	2.9	1668.6	
D	7/31 5:10 PM	27.9	8/28 3:46 PM	51.8	100.2	21.1	100	355.1	0	3.2	1.36	1.93	0.995	3.1	1679.8	
E	7/31 5:10 PM	28.0	8/28 3:58 PM	51.8	100.1	21.1	100	354.1	0	3.3	1.23	1.93	0.995	3.3	1675.5	
I	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
J	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

Laboratory Mixing Data
Batch B-3

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Natural organic soil
Soil Solids Specific Gravity	2.542
Soil Water Content, w (%)	54.2%
Unit Weight, γ_{soil} (kg/m^3)	1648.6
Organic content (%)	5.48%

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	0.60
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	350
Weight of Slurry Water, $w_{w,slurry}$ (g)	480.0
Weight of Dry Cement, w_c (g)	800.0
Weight of Moist Soil, w_{soil} (g)	2534.8
Weight of Slurry (g)	1280.0
Specific Gravity of Solids	2.74
water content of mix	0.56
Dry unit wt. of mix (kg/m^3)	1079.8

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	1686.3
Weight of Soil Water, $w_{w,soil}$ (g)	913.7
Total weight of soil used, W_t (g)	2600
Weight of Dry Cement, w_c (g)	815.2
Weight of Slurry Water, $w_{w,slurry}$ (g)	489.1
Soil Water Content, w (%)	54.18
Water:Cement Ratio, w:c	0.60
Cement Content, a_W (%)	48.34%
Cement Factor, α (kg/m3)	516.91
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	350.58
Volume Ratio, VR (%)	47.45
Total-Water-to-Cement Ratio, w_T:c	1.72

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	489.1
Volume Ratio, VR (%)	47.45
Total-Water-to-Cement Ratio, w_T:c	1.72
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	350.6

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	7/31 6:30 PM	2.9	8/3 3:33 PM	51.8	100.5	21.1	100	356.6	0	2.3	1.26	1.94	0.995	2.3	1683.8	
H	7/31 6:30 PM	2.9	8/3 3:56 PM	51.8	100.7	21.1	100	356.8	0	2.3	1.20	1.94	0.995	2.3	1679.3	
B	7/31 6:30 PM	6.9	8/7 3:03 PM	52.0	100.4	21.1	100	357.3	0	3.6	0.94	1.93	0.994	3.6	1676.0	
G	7/31 6:30 PM	6.9	8/7 3:12 PM	51.9	100.5	21.1	100	357.1	0	3.5	0.97	1.94	0.995	3.5	1680.8	
C	7/31 6:30 PM	13.9	8/14 3:50 PM	52.0	100.1	21.1	100	355.8	0	4.2	1.05	1.93	0.994	4.1	1675.3	
F	7/31 6:30 PM	13.9	8/14 4:03 PM	51.8	100.6	21.1	100	357.7	0	4.2	1.15	1.94	0.995	4.2	1686.9	
D	7/31 6:30 PM	27.9	8/28 4:11 PM	52.0	100.4	21.1	100	357.2	0	4.6	1.16	1.93	0.995	4.6	1677.6	
I	7/31 6:30 PM	27.9	8/28 4:32 PM	51.9	100.6	21.1	100	359.2	0	4.7	1.28	1.94	0.995	4.6	1686.0	
E	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
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Laboratory Mixing Data
Batch B-4

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Natural organic soil
Soil Solids Specific Gravity	2.542
Soil Water Content, w (%)	54.2%
Unit Weight, γ_{soil} (kg/m^3)	1648.6
Organic content (%)	5.48%

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.00
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	125
Weight of Slurry Water, $w_{w,slurry}$ (g)	290.0
Weight of Dry Cement, w_c (g)	290.0
Weight of Moist Soil, w_{soil} (g)	3119.2
Weight of Slurry (g)	580.0
Specific Gravity of Solids	2.62
water content of mix	0.60
Dry unit wt. of mix (kg/m^3)	1019.9

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2075.5
Weight of Soil Water, $w_{w,soil}$ (g)	1124.5
Total weight of soil used, W_t (g)	3200
Weight of Dry Cement, w_c (g)	289.2
Weight of Slurry Water, $w_{w,slurry}$ (g)	289.2
Soil Water Content, w (%)	54.18
Water:Cement Ratio, w:c	1.00
Cement Content, a_W (%)	13.93%
Cement Factor, α (kg/m3)	148.97
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	124.52
Volume Ratio, VR (%)	19.63
Total-Water-to-Cement Ratio, w_T:c	4.89

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	289.2
Volume Ratio, VR (%)	19.63
Total-Water-to-Cement Ratio, w_T:c	4.89
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	124.5

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	8/1 12:40 PM	3.1	8/4 2:49 PM	51.7	99.3	21.1	100	337.4	0	0.4	3.12	1.92	0.994	0.4	1615.8	
H	8/1 12:40 PM	3.1	8/4 3:03 PM	51.9	100.2	21.1	100	342.5	0	0.4	3.36	1.93	0.995	0.4	1617.3	
B	8/1 12:40 PM	7.1	8/8 2:40 PM	51.9	100.2	21.1	100	343.2	0	0.5	2.55	1.93	0.995	0.5	1619.1	
G	8/1 12:40 PM	7.1	8/8 2:52 PM	51.8	100.2	21.1	100	342.7	0	0.6	2.61	1.94	0.995	0.6	1624.6	
C	8/1 12:40 PM	14.2	8/15 4:51 PM	51.9	100.2	21.1	100	343.7	0	0.7	2.33	1.93	0.994	0.7	1621.8	
F	8/1 12:40 PM	14.2	8/15 5:03 PM	51.8	100.6	21.1	100	344.1	0	0.7	2.17	1.94	0.995	0.7	1623.5	
D	8/1 12:40 PM	28.2	8/29 6:30 PM	51.9	99.7	21.1	100	342.9	0	0.8	1.86	1.92	0.994	0.8	1624.7	
E	8/1 12:40 PM	28.2	8/29 6:38 PM	51.8	100.5	21.1	100	345.1	0	0.8	1.02	1.94	0.995	0.8	1629.1	
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J	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

Laboratory Mixing Data
Batch B-5

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Natural organic soil
Soil Solids Specific Gravity	2.542
Soil Water Content, w (%)	54.2%
Unit Weight, γ_{soil} (kg/m^3)	1648.6
Organic content (%)	5.48%

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.00
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	200
Weight of Slurry Water, $w_{w,slurry}$ (g)	460.0
Weight of Dry Cement, w_c (g)	460.0
Weight of Moist Soil, w_{soil} (g)	2750.1
Weight of Slurry (g)	920.0
Specific Gravity of Solids	2.67
water content of mix	0.63
Dry unit wt. of mix (kg/m^3)	989.8

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	1901.7
Weight of Soil Water, $w_{w,soil}$ (g)	1030.3
Total weight of soil used, W_t (g)	2932
Weight of Dry Cement, w_c (g)	483.3
Weight of Slurry Water, $w_{w,slurry}$ (g)	483.3
Soil Water Content, w (%)	54.18
Water:Cement Ratio, w:c	1.00
Cement Content, a_W (%)	25.41%
Cement Factor, α (kg/m3)	271.76
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	200.09
Volume Ratio, VR (%)	35.82
Total-Water-to-Cement Ratio, w_T:c	3.13

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	483.3
Volume Ratio, VR (%)	35.82
Total-Water-to-Cement Ratio, w_T:c	3.13
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	200.1

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	8/1 1:50 PM	3.1	8/4 3:19 PM	51.8	100.5	21.1	100	341.2	0	0.7	2.19	1.94	0.995	0.7	1608.3	
H	8/1 1:50 PM	3.1	8/4 3:33 PM	51.9	100.2	21.1	100	341.4	0	0.7	2.42	1.93	0.994	0.7	1607.4	
B	8/1 1:50 PM	7.1	8/8 3:03 PM	51.8	100.5	21.1	100	342.7	0	1.1	1.76	1.94	0.995	1.1	1617.0	
G	8/1 1:50 PM	7.1	8/8 3:14 PM	51.9	100.4	21.1	100	342.3	0	1.1	1.24	1.93	0.995	1.0	1612.8	
F	8/1 1:50 PM	14.1	8/15 5:16 PM	51.9	100.0	21.1	100	341.2	0	1.3	1.28	1.93	0.994	1.3	1611.7	
I	8/1 1:50 PM	14.2	8/15 5:27 PM	51.8	100.2	21.1	100	341.8	0	1.3	1.28	1.93	0.995	1.3	1618.0	
E	8/1 1:50 PM	28.2	8/29 6:51 PM	51.9	100.2	21.1	100	342.5	0	1.6	0.90	1.93	0.994	1.6	1614.2	
J	8/1 1:50 PM	28.2	8/29 7:02 PM	51.8	100.3	21.1	100	342.0	0	1.6	0.78	1.94	0.995	1.6	1618.9	
C	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
D	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

Laboratory Mixing Data
Batch B-6

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Natural organic soil
Soil Solids Specific Gravity	2.542
Soil Water Content, w (%)	54.2%
Unit Weight, γ_{soil} (kg/m^3)	1648.6
Organic content (%)	5.48%

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.00
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	275
Weight of Slurry Water, $w_{w,slurry}$ (g)	630.0
Weight of Dry Cement, w_c (g)	630.0
Weight of Moist Soil, w_{soil} (g)	2380.9
Weight of Slurry (g)	1260.0
Specific Gravity of Solids	2.72
water content of mix	0.67
Dry unit wt. of mix (kg/m^3)	959.4

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	1589.1
Weight of Soil Water, $w_{w,soil}$ (g)	860.9
Total weight of soil used, W_t (g)	2450
Weight of Dry Cement, w_c (g)	642.8
Weight of Slurry Water, $w_{w,slurry}$ (g)	642.8
Soil Water Content, w (%)	54.18
Water:Cement Ratio, w:c	1.00
Cement Content, a_W (%)	40.45%
Cement Factor, α (kg/m3)	432.55
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	275.49
Volume Ratio, VR (%)	57.01
Total-Water-to-Cement Ratio, w_T:c	2.34

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	642.8
Volume Ratio, VR (%)	57.01
Total-Water-to-Cement Ratio, w_T:c	2.34
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	275.5

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
H	8/1 3:40 PM	3.0	8/4 4:02 PM	51.9	100.3	21.1	100	341.9	0	1.0	1.55	1.93	0.994	1.0	1610.9	
I	8/1 3:40 PM	3.0	8/4 4:17 PM	51.8	99.8	21.1	100	340.6	0	0.8	1.20	1.93	0.994	0.8	1616.5	
B	8/1 3:40 PM	7.0	8/8 3:27 PM	51.9	99.3	21.1	100	338.3	0	1.5	1.04	1.91	0.993	1.5	1607.9	
G	8/1 3:40 PM	7.0	8/8 3:38 PM	51.8	100.2	21.1	100	341.6	0	1.8	1.04	1.94	0.995	1.8	1619.8	
C	8/1 3:40 PM	14.1	8/15 5:40 PM	51.8	99.1	21.1	100	338.3	0	2.2	0.89	1.91	0.993	2.2	1617.9	
F	8/1 3:40 PM	14.1	8/15 5:52 PM	51.9	100.2	21.1	100	342.6	0	2.1	1.11	1.93	0.995	2.1	1618.6	
D	8/1 3:40 PM	28.1	8/29 7:14 PM	52.0	100.1	21.1	100	341.8	0	2.6	0.79	1.93	0.994	2.5	1607.8	
E	8/1 3:40 PM	28.2	8/29 7:26 PM	51.8	100.5	21.1	100	343.4	0	2.7	0.78	1.94	0.995	2.7	1622.3	
A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
J	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

Laboratory Mixing Data
Batch B-7

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Natural organic soil
Soil Solids Specific Gravity	2.542
Soil Water Content, w (%)	54.2%
Unit Weight, γ_{soil} (kg/m^3)	1648.6
Organic content (%)	5.48%

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.00
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	350
Weight of Slurry Water, $w_{w,slurry}$ (g)	800.0
Weight of Dry Cement, w_c (g)	800.0
Weight of Moist Soil, w_{soil} (g)	2011.7
Weight of Slurry (g)	1600.0
Specific Gravity of Solids	2.77
water content of mix	0.72
Dry unit wt. of mix (kg/m^3)	929.1

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	1329.6
Weight of Soil Water, $w_{w,soil}$ (g)	720.4
Total weight of soil used, W_t (g)	2050
Weight of Dry Cement, w_c (g)	809.0
Weight of Slurry Water, $w_{w,slurry}$ (g)	809.0
Soil Water Content, w (%)	54.18
Water:Cement Ratio, w:c	1.00
Cement Content, a_W (%)	60.84%
Cement Factor, α (kg/m3)	650.57
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	350.25
Volume Ratio, VR (%)	85.75
Total-Water-to-Cement Ratio, w_T:c	1.89

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	809.0
Volume Ratio, VR (%)	85.75
Total-Water-to-Cement Ratio, w_T:c	1.89
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	350.2

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	8/1 4:50 PM	3.0	8/4 4:29 PM	51.8	99.3	21.1	100	338.2	0	1.6	0.94	1.92	0.993	1.6	1615.3	
I	8/1 4:50 PM	3.0	8/4 4:56 PM	51.9	100.1	21.1	100	341.8	0	1.6	1.02	1.93	0.994	1.5	1616.5	
B	8/1 4:50 PM	7.0	8/8 3:50 PM	51.8	100.1	21.1	100	341.9	0	2.5	0.78	1.93	0.994	2.5	1618.1	
G	8/1 4:50 PM	7.0	8/8 4:02 PM	51.8	100.1	21.1	100	341.7	0	2.3	0.89	1.93	0.994	2.3	1618.0	
C	8/1 4:50 PM	14.0	8/15 6:01 PM	51.8	100.0	21.1	100	342.7	0	3.0	0.79	1.93	0.994	3.0	1623.2	
F	8/1 4:50 PM	14.1	8/15 6:09 PM	52.1	99.8	21.1	100	340.4	0	3.1	0.84	1.92	0.993	3.1	1601.8	
D	8/1 4:50 PM	28.1	8/29 7:37 PM	51.8	99.5	21.1	100	339.6	0	3.2	1.30	1.92	0.994	3.2	1616.3	
J	8/1 4:50 PM	28.1	8/29 7:58 PM	51.8	99.9	21.1	100	342.4	0	3.3	1.24	1.93	0.994	3.2	1624.6	
E	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
H	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

Laboratory Mixing Data
Batch B-8

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Natural organic soil
Soil Solids Specific Gravity	2.542
Soil Water Content, w (%)	54.2%
Unit Weight, γ_{soil} (kg/m^3)	1648.6
Organic content (%)	5.48%

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.40
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	125
Weight of Slurry Water, $w_{w,slurry}$ (g)	400.0
Weight of Dry Cement, w_c (g)	290.0
Weight of Moist Soil, w_{soil} (g)	2932.4
Weight of Slurry (g)	690.0
Specific Gravity of Solids	2.62
water content of mix	0.65
Dry unit wt. of mix (kg/m^3)	965.3

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	1945.8
Weight of Soil Water, $w_{w,soil}$ (g)	1054.2
Total weight of soil used, W_t (g)	3000
Weight of Dry Cement, w_c (g)	292.9
Weight of Slurry Water, $w_{w,slurry}$ (g)	410.0
Soil Water Content, w (%)	54.18
Water:Cement Ratio, w:c	1.40
Cement Content, a_W (%)	15.05%
Cement Factor, α (kg/m3)	160.95
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	126.08
Volume Ratio, VR (%)	27.65
Total-Water-to-Cement Ratio, w_T:c	5.00

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	410.0
Volume Ratio, VR (%)	27.65
Total-Water-to-Cement Ratio, w_T:c	5.00
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	126.1

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	8/2 12:40 PM	2.9	8/5 10:34 AM	51.8	100.6	21.1	100	337.1	0	0.3	3.59	1.94	0.995	0.3	1587.8	
H	8/2 12:40 PM	2.9	8/5 10:46 AM	51.9	100.7	21.1	100	338.1	0	0.3	3.44	1.94	0.995	0.3	1588.9	
B	8/2 12:40 PM	7.0	8/9 12:16 PM	51.9	99.6	21.1	100	335.6	0	0.5	3.27	1.92	0.994	0.5	1592.5	
G	8/2 12:40 PM	7.0	8/9 12:28 PM	52.0	99.7	21.1	100	336.1	0	0.5	3.31	1.92	0.994	0.5	1588.6	
C	8/2 12:40 PM	14.0	8/16 12:32 PM	51.9	100.4	21.1	100	338.7	0	0.6	2.44	1.93	0.995	0.6	1597.4	
F	8/2 12:40 PM	14.0	8/16 12:43 PM	51.9	99.7	21.1	100	336.0	0	0.6	2.48	1.92	0.994	0.6	1590.9	
D	8/2 12:40 PM	28.0	8/30 1:32 PM	51.9	99.2	21.1	100	333.8	0	0.7	2.47	1.91	0.993	0.7	1591.7	
E	8/2 12:40 PM	28.0	8/30 1:42 PM	51.8	100.2	21.1	100	338.2	0	0.7	2.47	1.93	0.995	0.7	1599.0	
I	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
J	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

Laboratory Mixing Data
Batch B-9

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Natural organic soil
Soil Solids Specific Gravity	2.542
Soil Water Content, w (%)	54.2%
Unit Weight, γ_{soil} (kg/m^3)	1648.6
Organic content (%)	5.48%

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.40
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	200
Weight of Slurry Water, $w_{w,slurry}$ (g)	640.0
Weight of Dry Cement, w_c (g)	460.0
Weight of Moist Soil, w_{soil} (g)	2451.2
Weight of Slurry (g)	1100.0
Specific Gravity of Solids	2.68
water content of mix	0.73
Dry unit wt. of mix (kg/m^3)	904.0

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	1621.5
Weight of Soil Water, $w_{w,soil}$ (g)	878.5
Total weight of soil used, W_t (g)	2500
Weight of Dry Cement, w_c (g)	462.0
Weight of Slurry Water, $w_{w,slurry}$ (g)	646.7
Soil Water Content, w (%)	54.18
Water:Cement Ratio, w:c	1.40
Cement Content, a_W (%)	28.49%
Cement Factor, α (kg/m3)	304.64
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	199.97
Volume Ratio, VR (%)	52.34
Total-Water-to-Cement Ratio, w_T:c	3.30

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	646.7
Volume Ratio, VR (%)	52.34
Total-Water-to-Cement Ratio, w_T:c	3.30
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	200.0

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	8/2 2:40 PM	2.8	8/5 11:01 AM	51.8	100.6	21.1	100	333.9	0	0.5	2.30	1.94	0.995	0.5	1572.3	
H	8/2 2:40 PM	2.9	8/5 11:16 AM	51.9	100.3	21.1	100	332.9	0	0.5	1.83	1.93	0.995	0.5	1569.7	
B	8/2 2:40 PM	6.9	8/9 12:40 PM	52.0	99.5	21.1	100	331.2	0	0.8	1.28	1.92	0.993	0.8	1568.6	
G	8/2 2:40 PM	6.9	8/9 12:50 PM	51.9	99.9	21.1	100	332.4	0	0.8	1.47	1.93	0.994	0.8	1573.3	
C	8/2 2:40 PM	13.9	8/16 12:53 PM	51.8	99.8	21.1	100	332.5	0	1.0	0.90	1.93	0.994	1.0	1577.7	
I	8/2 2:40 PM	14.0	8/16 1:37 PM	51.9	99.8	21.1	100	332.4	0	1.0	1.28	1.93	0.994	1.0	1575.6	
D	8/2 2:40 PM	28.0	8/30 1:54 PM	51.8	100.3	21.1	100	334.4	0	1.3	1.10	1.94	0.995	1.3	1583.3	
E	8/2 2:40 PM	28.0	8/30 2:04 PM	51.9	100.4	21.1	100	333.9	0	1.3	0.98	1.93	0.995	1.3	1570.1	
F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
J	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

Laboratory Mixing Data
Batch B-10

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Natural organic soil
Soil Solids Specific Gravity	2.542
Soil Water Content, w (%)	54.2%
Unit Weight, γ_{soil} (kg/m^3)	1648.6
Organic content (%)	5.48%

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.40
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	275
Weight of Slurry Water, $w_{w,slurry}$ (g)	880.0
Weight of Dry Cement, w_c (g)	630.0
Weight of Moist Soil, w_{soil} (g)	1969.9
Weight of Slurry (g)	1510.0
Specific Gravity of Solids	2.74
water content of mix	0.82
Dry unit wt. of mix (kg/m^3)	841.3

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	1329.6
Weight of Soil Water, $w_{w,soil}$ (g)	720.4
Total weight of soil used, W_t (g)	2050
Weight of Dry Cement, w_c (g)	649.0
Weight of Slurry Water, $w_{w,slurry}$ (g)	908.6
Soil Water Content, w (%)	54.18
Water:Cement Ratio, w:c	1.40
Cement Content, a_W (%)	48.81%
Cement Factor, α (kg/m3)	521.94
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	275.17
Volume Ratio, VR (%)	89.68
Total-Water-to-Cement Ratio, w_T:c	2.51

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	908.6
Volume Ratio, VR (%)	89.68
Total-Water-to-Cement Ratio, w_T:c	2.51
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	275.2

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	8/2 3:50 PM	2.8	8/5 11:27 AM	51.9	99.0	21.1	100	325.1	0	0.7	1.15	1.91	0.992	0.7	1549.5	
H	8/2 3:50 PM	2.8	8/5 11:40 AM	51.8	100.1	21.1	100	329.7	0	0.7	1.22	1.93	0.995	0.7	1563.9	
B	8/2 3:50 PM	6.9	8/9 1:01 PM	51.9	98.5	21.1	100	324.5	0	1.2	0.97	1.9	0.992	1.2	1557.3	
G	8/2 3:50 PM	6.9	8/9 1:11 PM	51.9	98.1	21.1	100	323.5	0	1.1	1.26	1.89	0.991	1.0	1558.5	
C	8/2 3:50 PM	13.9	8/16 1:17 PM	51.8	99.6	21.1	100	328.1	0	1.5	0.98	1.92	0.994	1.5	1564.2	
F	8/2 3:50 PM	13.9	8/16 1:27 PM	51.9	98.8	21.1	100	325.4	0	1.5	0.65	1.9	0.992	1.5	1554.9	
D	8/2 3:50 PM	27.9	8/30 2:14 PM	51.8	99.6	21.1	100	327.3	0	1.8	0.90	1.92	0.994	1.8	1558.9	
I	8/2 3:50 PM	27.9	8/30 2:37 PM	51.8	99.2	21.1	100	326.8	0	1.6	0.92	1.91	0.993	1.6	1560.5	
E	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
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Laboratory Mixing Data
Batch B-11

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Natural organic soil
Soil Solids Specific Gravity	2.542
Soil Water Content, w (%)	54.2%
Unit Weight, γ_{soil} (kg/m^3)	1648.6
Organic content (%)	5.48%

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	0.60
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	125
Weight of Slurry Water, $w_{w,slurry}$ (g)	170.0
Weight of Dry Cement, w_c (g)	290.0
Weight of Moist Soil, w_{soil} (g)	3306.0
Weight of Slurry (g)	460.0
Specific Gravity of Solids	2.61
water content of mix	0.55
Dry unit wt. of mix (kg/m^3)	1073.3

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2153.3
Weight of Soil Water, $w_{w,soil}$ (g)	1166.7
Total weight of soil used, W_t (g)	3320
Weight of Dry Cement, w_c (g)	285.4
Weight of Slurry Water, $w_{w,slurry}$ (g)	171.2
Soil Water Content, w (%)	54.18
Water:Cement Ratio, w:c	0.60
Cement Content, a_W (%)	13.25%
Cement Factor, α (kg/m3)	141.72
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	125.41
Volume Ratio, VR (%)	13.01
Total-Water-to-Cement Ratio, w_T:c	4.69

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	171.2
Volume Ratio, VR (%)	13.01
Total-Water-to-Cement Ratio, w_T:c	4.69
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	125.4

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	8/23 12:20 PM	1.1	8/24 2:12 PM	51.8	101.2	21.1	100	351.4	0	0.2	4.05	1.95	0.996	0.2	1650.4	
B	8/23 12:20 PM	2.9	8/26 10:46 AM	51.7	100.8	21.1	100	351.1	0	0.5	2.50	1.95	0.996	0.5	1660.9	
C	8/23 12:20 PM	7.3	8/30 7:03 PM	51.9	101.0	21.1	100	351.5	0	0.7	2.51	1.95	0.996	0.7	1644.9	
D	8/23 12:20 PM	10.0	9/2 12:32 PM	51.6	100.8	21.1	100	352.4	0	0.7	1.98	1.95	0.996	0.7	1668.7	
E	8/23 12:20 PM	14.0	9/6 12:40 PM	51.9	100.8	21.1	100	351.6	0	0.8	2.14	1.94	0.995	0.8	1646.3	
F	8/23 12:20 PM	17.2	9/9 4:27 PM	51.9	100.8	21.1	100	351.3	0	0.9	1.26	1.94	0.995	0.9	1647.7	
G	8/23 12:20 PM	20.9	9/13 11:07 AM	52.0	100.8	21.1	100	351.1	0	0.9	1.10	1.94	0.995	0.9	1642.3	
H	8/23 12:20 PM	24.1	9/16 1:36 PM	51.8	99.7	21.1	100	348.5	0	1.0	0.88	1.92	0.994	1.0	1657.7	
I	8/23 12:20 PM	27.9	9/20 9:46 AM	51.7	100.8	21.1	100	351.9	0	1.0	1.14	1.95	0.996	1.0	1662.7	
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Laboratory Mixing Data
Batch B-12

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Natural organic soil
Soil Solids Specific Gravity	2.542
Soil Water Content, w (%)	54.2%
Unit Weight, γ_{soil} (kg/m^3)	1648.6
Organic content (%)	5.48%

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.00
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	50
Weight of Slurry Water, $w_{w,slurry}$ (g)	120.0
Weight of Dry Cement, w_c (g)	120.0
Weight of Moist Soil, w_{soil} (g)	3488.4
Weight of Slurry (g)	240.0
Specific Gravity of Solids	2.57
water content of mix	0.56
Dry unit wt. of mix (kg/m^3)	1049.2

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2283.0
Weight of Soil Water, $w_{w,soil}$ (g)	1237.0
Total weight of soil used, W_t (g)	3520
Weight of Dry Cement, w_c (g)	114.8
Weight of Slurry Water, $w_{w,slurry}$ (g)	114.8
Soil Water Content, w (%)	54.18
Water:Cement Ratio, w:c	1.00
Cement Content, a_W (%)	5.03%
Cement Factor, α (kg/m3)	53.77
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	50.21
Volume Ratio, VR (%)	7.09
Total-Water-to-Cement Ratio, w_T:c	11.77

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	114.8
Volume Ratio, VR (%)	7.09
Total-Water-to-Cement Ratio, w_T:c	11.77
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	50.2

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	8/23 12:40 PM	1.1	8/24 2:26 PM	51.7	100.0	21.1	100	343.0	0	0.1	5.93	1.94	0.995	0.1	1635.8	
B	8/23 12:40 PM	2.9	8/26 10:57 AM	51.8	100.8	21.1	100	347.2	0	0.2	3.80	1.95	0.996	0.2	1636.4	
C	8/23 12:40 PM	7.3	8/30 7:14 PM	51.8	100.2	21.1	100	346.0	0	0.3	3.41	1.93	0.995	0.3	1635.9	
D	8/23 12:40 PM	10.0	9/2 12:43 PM	51.9	100.2	21.1	100	344.4	0	0.3	3.12	1.93	0.994	0.3	1625.1	
E	8/23 12:40 PM	14.0	9/6 12:50 PM	51.9	100.6	21.1	100	346.8	0	0.4	2.98	1.94	0.995	0.4	1630.3	
F	8/23 12:40 PM	17.2	9/9 4:37 PM	51.6	100.6	21.1	100	348.3	0	0.4	3.17	1.95	0.996	0.4	1655.9	
G	8/23 12:40 PM	20.9	9/13 11:21 AM	51.8	100.4	21.1	100	347.1	0	0.4	3.23	1.94	0.995	0.4	1640.2	
H	8/23 12:40 PM	24.0	9/16 1:48 PM	51.9	99.1	21.1	100	343.0	0	0.4	3.15	1.91	0.993	0.4	1634.3	
I	8/23 12:40 PM	27.9	9/20 9:55 AM	51.7	100.6	21.1	100	349.1	0	0.4	2.82	1.94	0.996	0.4	1650.3	
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Laboratory Mixing Data
Batch B-13

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Natural organic soil
Soil Solids Specific Gravity	2.542
Soil Water Content, w (%)	54.2%
Unit Weight, γ_{soil} (kg/m^3)	1648.6
Organic content (%)	5.48%

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.62

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	10
Water:Cement Ratio of Slurry, w:c	1.40
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	50
Weight of Slurry Water, $w_{w,slurry}$ (g)	160.0
Weight of Dry Cement, w_c (g)	120.0
Weight of Moist Soil, w_{soil} (g)	3413.7
Weight of Slurry (g)	280.0
Specific Gravity of Solids	2.57
water content of mix	0.58
Dry unit wt. of mix (kg/m^3)	1027.2

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	2231.2
Weight of Soil Water, $w_{w,soil}$ (g)	1208.8
Total weight of soil used, W_t (g)	3440
Weight of Dry Cement, w_c (g)	116.3
Weight of Slurry Water, $w_{w,slurry}$ (g)	162.8
Soil Water Content, w (%)	54.18
Water:Cement Ratio, w:c	1.40
Cement Content, a_W (%)	5.21%
Cement Factor, α (kg/m3)	55.74
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	50.87
Volume Ratio, VR (%)	9.58
Total-Water-to-Cement Ratio, w_T:c	11.79

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	0.0
Weight of Slurry Water**, $w_{w,slurry}$ (g)	162.8
Volume Ratio, VR (%)	9.58
Total-Water-to-Cement Ratio, w_T:c	11.79
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	50.9

SAMPLE DATA:

Sample ID	Time Molded (date / Time)	Curing Period (Days)	Time Tested (date/time)	Sample Size		Cure Conditions		Specimen wt. after cure (g)	Bleed Water (g)	Failure Conditions		Strength Adjustments			total unit weight (kg/m3)	Notes
				Diam. (mm)	Height (mm)	Temp (C)	Humidity (%)			Peak UCS (MPa)	Strain (%)	L/D ratio	Height Correction Factor	Adj. UCS (MPa)		
A	8/23 1:55 PM	1.0	8/24 2:39 PM	51.7	100.7	21.1	100	343.2	0	0.1	6.48	1.95	0.996	0.1	1626.0	
B	8/23 1:55 PM	2.9	8/26 11:11 AM	51.8	100.2	21.1	100	342.2	0	0.2	4.08	1.94	0.995	0.2	1623.1	
C	8/23 1:55 PM	7.2	8/30 7:27 PM	51.7	100.3	21.1	100	342.5	0	0.3	3.76	1.94	0.995	0.3	1623.6	
D	8/23 1:55 PM	10.0	9/2 12:55 PM	51.8	100.7	21.1	100	344.7	0	0.3	3.41	1.94	0.995	0.3	1625.5	
E	8/23 1:55 PM	14.0	9/6 1:00 PM	51.9	100.5	21.1	100	344.0	0	0.4	3.50	1.94	0.995	0.4	1617.9	
F	8/23 1:55 PM	17.1	9/9 4:50 PM	51.8	101.0	21.1	100	345.4	0	0.4	3.27	1.95	0.996	0.4	1625.5	
G	8/23 1:55 PM	20.9	9/13 11:35 AM	51.8	100.3	21.1	100	344.0	0	0.4	3.28	1.94	0.995	0.4	1626.4	
H	8/23 1:55 PM	24.0	9/16 2:02 PM	51.9	100.5	21.1	100	344.9	0	0.4	3.27	1.93	0.995	0.4	1619.8	
I	8/23 1:55 PM	27.8	9/20 10:06 AM	51.9	100.0	21.1	100	343.7	0	0.4	2.93	1.93	0.994	0.4	1624.7	
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Laboratory Mixing Data
Batch C-A

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil (CH)
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	65.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.6

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	1
Water:Cement Ratio of Slurry, w:c	0.60
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	350
Weight of Slurry Water, $w_{w,slurry}$ (g)	300.0
Weight of Dry Cement, w_c (g)	490.0
Weight of Moist Soil, w_{soil} (g)	1754.5
Weight of Slurry (g)	790.0
Specific Gravity of Solids	2.83
water content of mix	0.63
Dry unit wt. of mix (kg/m^3)	1276.4

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	1000
Weight of Soil Water, $w_{w,soil}$ (g)	650
Total weight of soil used, W_t (g)	1638.8
Weight of Dry Cement, w_c (g)	529.1
Weight of Slurry Water, $w_{w,slurry}$ (g)	317.5
Soil Water Content, w (%)	65.00
Water:Cement Ratio, w:c	0.60
Cement Content, a_W (%)	52.91%
Cement Factor, α (kg/m3)	600.41
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	387.09
Volume Ratio, VR (%)	55.11
Total-Water-to-Cement Ratio, w_T:c	1.82

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	#DIV/0!
Weight of Slurry Water**, $w_{w,slurry}$ (g)	#DIV/0!
Volume Ratio, VR (%)	#DIV/0!
Total-Water-to-Cement Ratio, w_T:c	#DIV/0!
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	#DIV/0!

Laboratory Mixing Data
Batch C-B

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil (CH)
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	65.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.6

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	1
Water:Cement Ratio of Slurry, w:c	1.00
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	350
Weight of Slurry Water, $w_{w,slurry}$ (g)	490.0
Weight of Dry Cement, w_c (g)	490.0
Weight of Moist Soil, w_{soil} (g)	1392.5
Weight of Slurry (g)	980.0
Specific Gravity of Solids	2.86
water content of mix	0.79
Dry unit wt. of mix (kg/m^3)	1276.4

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	800
Weight of Soil Water, $w_{w,soil}$ (g)	520
Total weight of soil used, W_t (g)	1312
Weight of Dry Cement, w_c (g)	532.3
Weight of Slurry Water, $w_{w,slurry}$ (g)	532.3
Soil Water Content, w (%)	65.00
Water:Cement Ratio, w:c	1.00
Cement Content, a_W (%)	66.54%
Cement Factor, α (kg/m3)	754.49
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	378.30
Volume Ratio, VR (%)	99.44
Total-Water-to-Cement Ratio, w_T:c	1.97

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	#DIV/0!
Weight of Slurry Water**, $w_{w,slurry}$ (g)	#DIV/0!
Volume Ratio, VR (%)	#DIV/0!
Total-Water-to-Cement Ratio, w_T:c	#DIV/0!
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	#DIV/0!

Laboratory Mixing Data
Batch C-C

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil (CH)
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	65.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.6

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	1
Water:Cement Ratio of Slurry, w:c	0.60
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	350
Weight of Slurry Water, $w_{w,slurry}$ (g)	300.0
Weight of Dry Cement, w_c (g)	490.0
Weight of Moist Soil, w_{soil} (g)	1754.5
Weight of Slurry (g)	790.0
Specific Gravity of Solids	2.83
water content of mix	0.63
Dry unit wt. of mix (kg/m^3)	1276.4

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	1000
Weight of Soil Water, $w_{w,soil}$ (g)	650
Total weight of soil used, W_t (g)	1640.8
Weight of Dry Cement, w_c (g)	527.9
Weight of Slurry Water, $w_{w,slurry}$ (g)	316.7
Soil Water Content, w (%)	65.00
Water:Cement Ratio, w:c	0.60
Cement Content, a_W (%)	52.79%
Cement Factor, α (kg/m3)	598.31
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	386.22
Volume Ratio, VR (%)	54.92
Total-Water-to-Cement Ratio, w_T:c	1.82

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	#DIV/0!
Weight of Slurry Water**, $w_{w,slurry}$ (g)	#DIV/0!
Volume Ratio, VR (%)	#DIV/0!
Total-Water-to-Cement Ratio, w_T:c	#DIV/0!
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	#DIV/0!

Laboratory Mixing Data
Batch C-D

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil (CH)
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	65.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.6

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	1
Water:Cement Ratio of Slurry, w:c	1.00
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	350
Weight of Slurry Water, $w_{w,slurry}$ (g)	490.0
Weight of Dry Cement, w_c (g)	490.0
Weight of Moist Soil, w_{soil} (g)	1392.5
Weight of Slurry (g)	980.0
Specific Gravity of Solids	2.86
water content of mix	0.79
Dry unit wt. of mix (kg/m^3)	1276.4

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	800
Weight of Soil Water, $w_{w,soil}$ (g)	520
Total weight of soil used, W_t (g)	1309.6
Weight of Dry Cement, w_c (g)	533.7
Weight of Slurry Water, $w_{w,slurry}$ (g)	533.7
Soil Water Content, w (%)	65.00
Water:Cement Ratio, w:c	1.00
Cement Content, a_W (%)	66.71%
Cement Factor, α (kg/m3)	757.86
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	379.14
Volume Ratio, VR (%)	99.89
Total-Water-to-Cement Ratio, w_T:c	1.97

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	#DIV/0!
Weight of Slurry Water**, $w_{w,slurry}$ (g)	#DIV/0!
Volume Ratio, VR (%)	#DIV/0!
Total-Water-to-Cement Ratio, w_T:c	#DIV/0!
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	#DIV/0!

Laboratory Mixing Data
Batch C-E

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil (CH)
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	65.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.6

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	1
Water:Cement Ratio of Slurry, w:c	1.00
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	350
Weight of Slurry Water, $w_{w,slurry}$ (g)	490.0
Weight of Dry Cement, w_c (g)	490.0
Weight of Moist Soil, w_{soil} (g)	1392.5
Weight of Slurry (g)	980.0
Specific Gravity of Solids	2.86
water content of mix	0.79
Dry unit wt. of mix (kg/m^3)	1276.4

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	800
Weight of Soil Water, $w_{w,soil}$ (g)	520
Total weight of soil used, W_t (g)	1312.6
Weight of Dry Cement, w_c (g)	532.5
Weight of Slurry Water, $w_{w,slurry}$ (g)	532.5
Soil Water Content, w (%)	65.00
Water:Cement Ratio, w:c	1.00
Cement Content, a_W (%)	66.56%
Cement Factor, α (kg/m3)	754.36
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	378.26
Volume Ratio, VR (%)	99.43
Total-Water-to-Cement Ratio, w_T:c	1.97

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	#DIV/0!
Weight of Slurry Water**, $w_{w,slurry}$ (g)	#DIV/0!
Volume Ratio, VR (%)	#DIV/0!
Total-Water-to-Cement Ratio, w_T:c	#DIV/0!
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	#DIV/0!

Laboratory Mixing Data
Batch C-F

Change only black text, red is calculated

Organization	Virginia Tech
Location	Blacksburg, VA
Conducted By	Hwanik Ju
Supervisor	Sherif Abdelaziz and George Filz

Soil Properties:

Soil Type	Artificial inorganic soil (CH)
Soil Solids Specific Gravity	2.66
Soil Water Content, w (%)	65.0%
Unit Weight, γ_{soil} (kg/m^3)	1859.7

Binder Properties:

Binder Type	Portland Cement (TypeI/II)
Specific Weight, G_c	3.15
Unit Weight, γ_c (kg/m3)	3148.6

Mixer Type / Model	Hobart Mixer, Dough Hook
Mixing Time (minutes) for:	
Soil	3 minutes
Soil/Cement	10 minutes
Blender Type / Model	Oster 14-Speed Blender
Mixing Time (minutes) for:	
Binder Slurry	3 minutes

Design Mix Values for Batch:

Number of Specimen, N	1
Water:Cement Ratio of Slurry, w:c	0.60
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	350
Weight of Slurry Water, $w_{w,slurry}$ (g)	300.0
Weight of Dry Cement, w_c (g)	490.0
Weight of Moist Soil, w_{soil} (g)	1754.5
Weight of Slurry (g)	790.0
Specific Gravity of Solids	2.83
water content of mix	0.63
Dry unit wt. of mix (kg/m^3)	1276.4

Actual Mix Values for batch:

As Mixed:

Weight of Soil Solids, w_s (g)	1000
Weight of Soil Water, $w_{w,soil}$ (g)	650
Total weight of soil used, W_t (g)	1638.7
Weight of Dry Cement, w_c (g)	531.1
Weight of Slurry Water, $w_{w,slurry}$ (g)	318.7
Soil Water Content, w (%)	65.00
Water:Cement Ratio, w:c	0.60
Cement Content, a_W (%)	53.11%
Cement Factor, α (kg/m3)	602.71
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	388.04
Volume Ratio, VR (%)	55.32
Total-Water-to-Cement Ratio, w_T:c	1.82

As Cured:

Weight of Bleed Water*, $w_{w,bleed}$ (g)	#DIV/0!
Weight of Slurry Water**, $w_{w,slurry}$ (g)	#DIV/0!
Volume Ratio, VR (%)	#DIV/0!
Total-Water-to-Cement Ratio, w_T:c	#DIV/0!
Cement Factor In-Place, $\alpha_{in\text{-}place}$ (kg/m^3)	#DIV/0!

Appendix B. Unconfined Compressive Strength (UCS) Test Data

- UCS test data for Chapter 2: Batch series R

- UCS test data for Chapter 3

  : Batch series

  1. T, S, and A: Constant temperature for short-term curing
  2. M: Constant temperature for short- and long-term curing
  3. L: Constant temperature for long-term curing
  4. D: Changing temperature for short-term curing

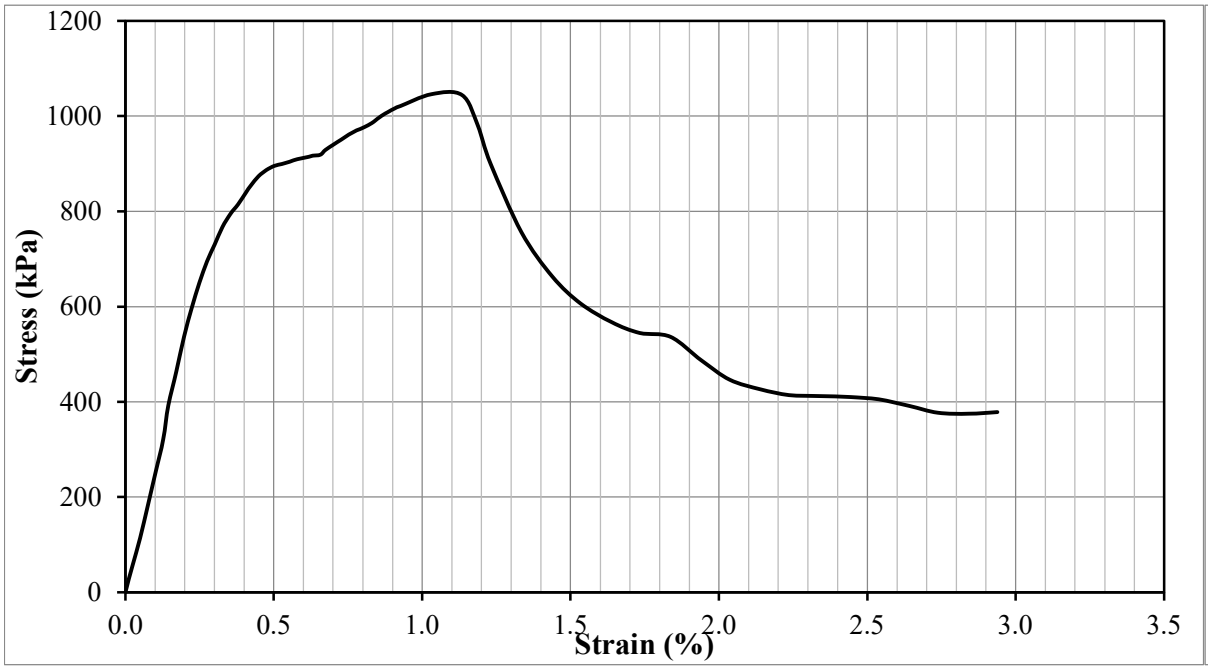
- UCS test data for Chapter 5

  : Batch series

  1. O: Cement-treated fabricated soil (FOS)
  2. J: Cement-treated natural organic soil 1 (NOS1)
  3. B: Cement-treated natural organic soil 2 (NOS2)

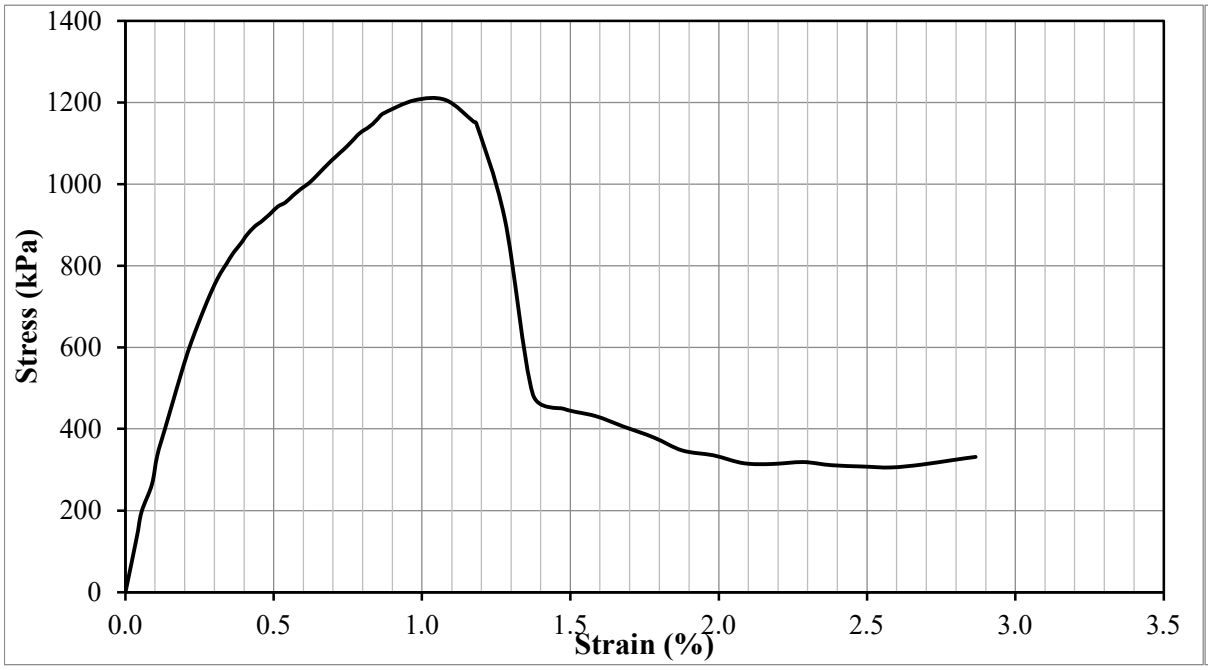
- UCS test data for Chapter 6: Batch series C

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	R-1-A	Initial Area:	2119.1	mm^2
Test Date:	11/30/2020	Weight:	378.8	g
Strain Rate:	1 %/min	Unit Weight:	1776	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	27.8	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Additional information		Demolded at 3 days		



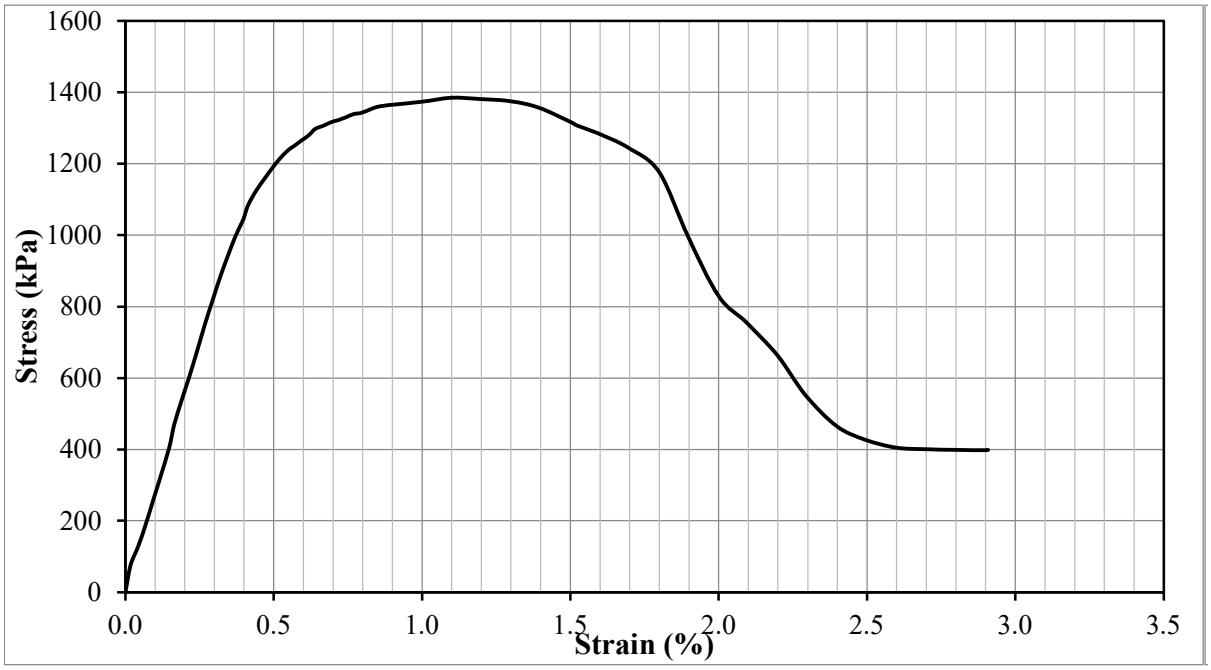
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,041	Strain at failure, εf :	1.03	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	R-1-J	Initial Area:	2123.2	mm^2
Test Date:	11/30/2020	Weight:	384.3	g
Strain Rate:	1 %/min	Unit Weight:	1784	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	27.8	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Additional information		Demolded at 3 days		



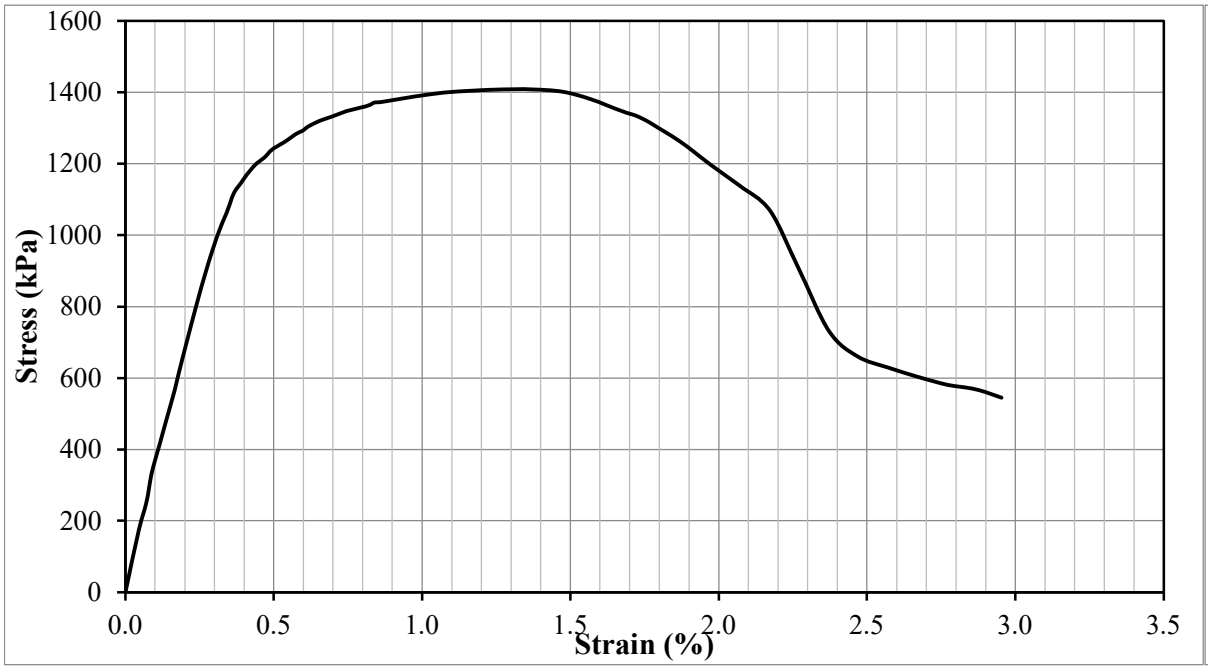
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,201	Strain at failure, εf :	1.08	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	R-1-B	Initial Area:	2117.0	mm^2
Test Date:	11/30/2020	Weight:	379.2	g
Strain Rate:	1 %/min	Unit Weight:	1786	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	27.8	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Additional information		Demolded at 7 days		



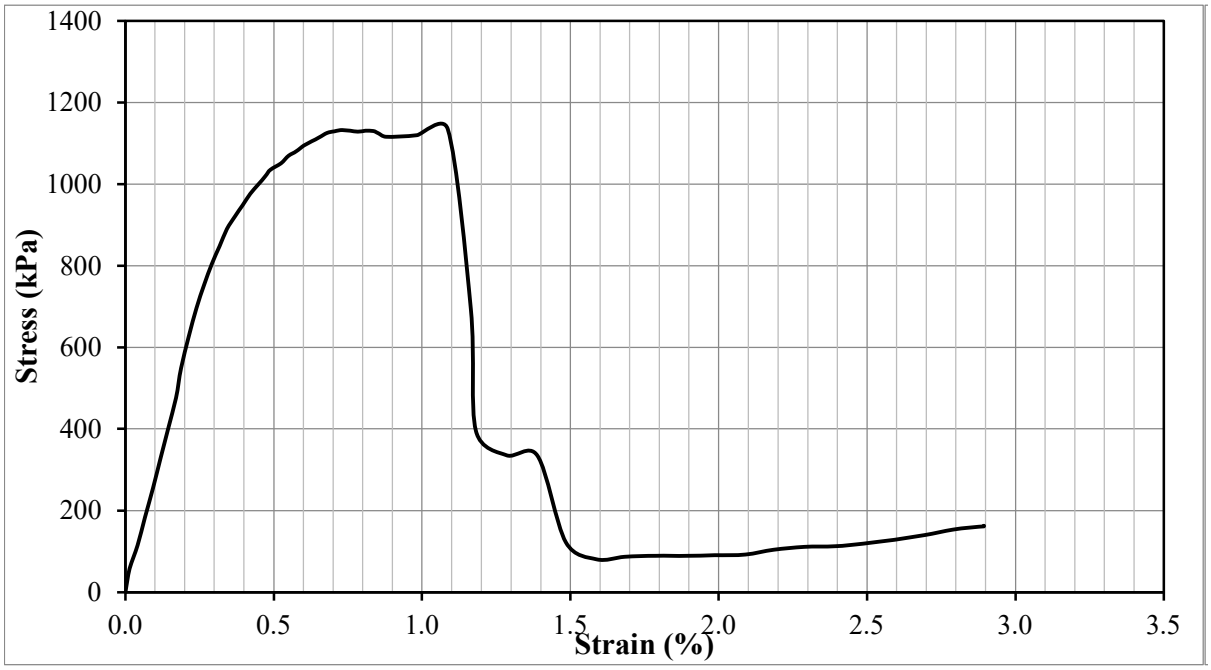
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,377	Strain at failure, εf :	1.10	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	R-1-I	Initial Area:	2119.1	mm^2
Test Date:	11/30/2020	Weight:	373.0	g
Strain Rate:	1 %/min	Unit Weight:	1786	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	27.4	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Additional information		Demolded at 7 days		



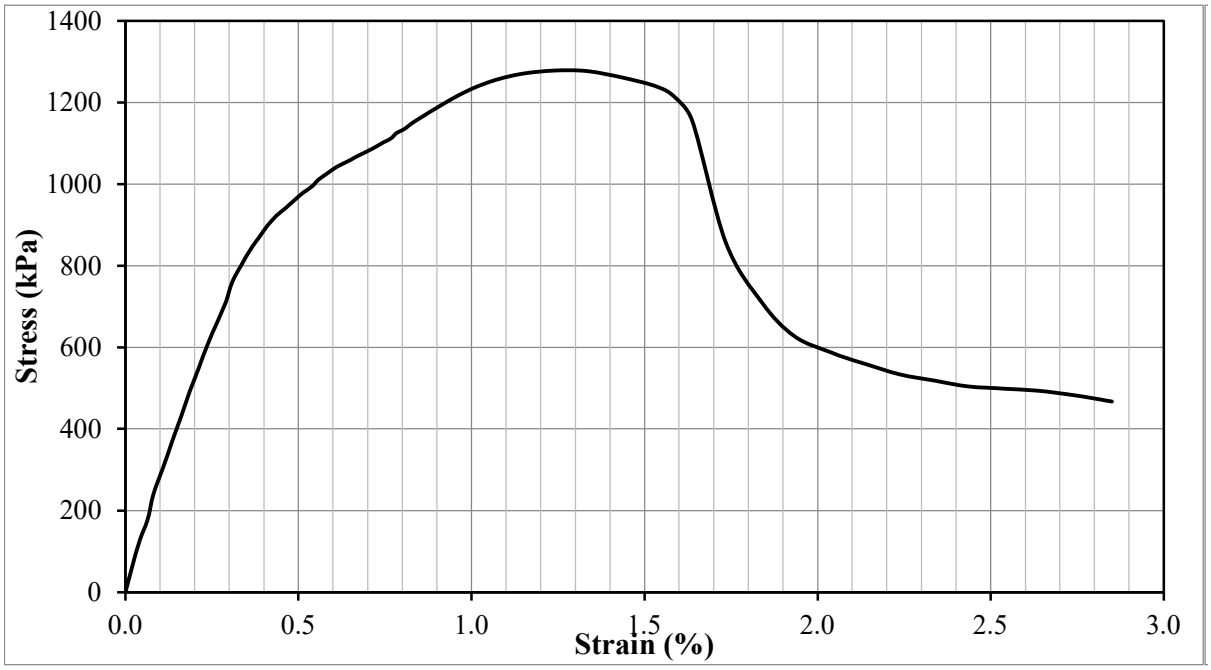
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,397	Strain at failure, εf :	1.37	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	R-1-C	Initial Area:	2117.0	mm^2
Test Date:	11/30/2020	Weight:	379.2	g
Strain Rate:	1 %/min	Unit Weight:	1783	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	27.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Additional information		Demolded at 14 days		



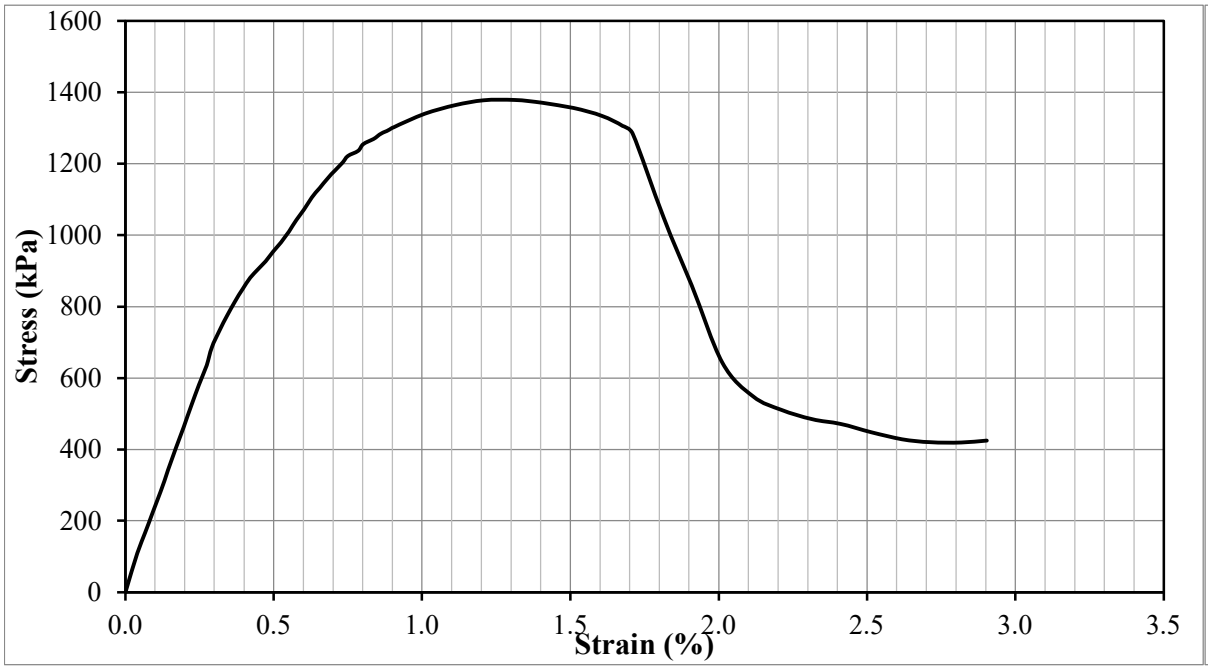
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,129	Strain at failure, εf :	1.09	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	R-1-H	Initial Area:	2123.2	mm^2
Test Date:	11/30/2020	Weight:	375.8	g
Strain Rate:	1 %/min	Unit Weight:	1776	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	27.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Additional information		Demolded at 14 days		



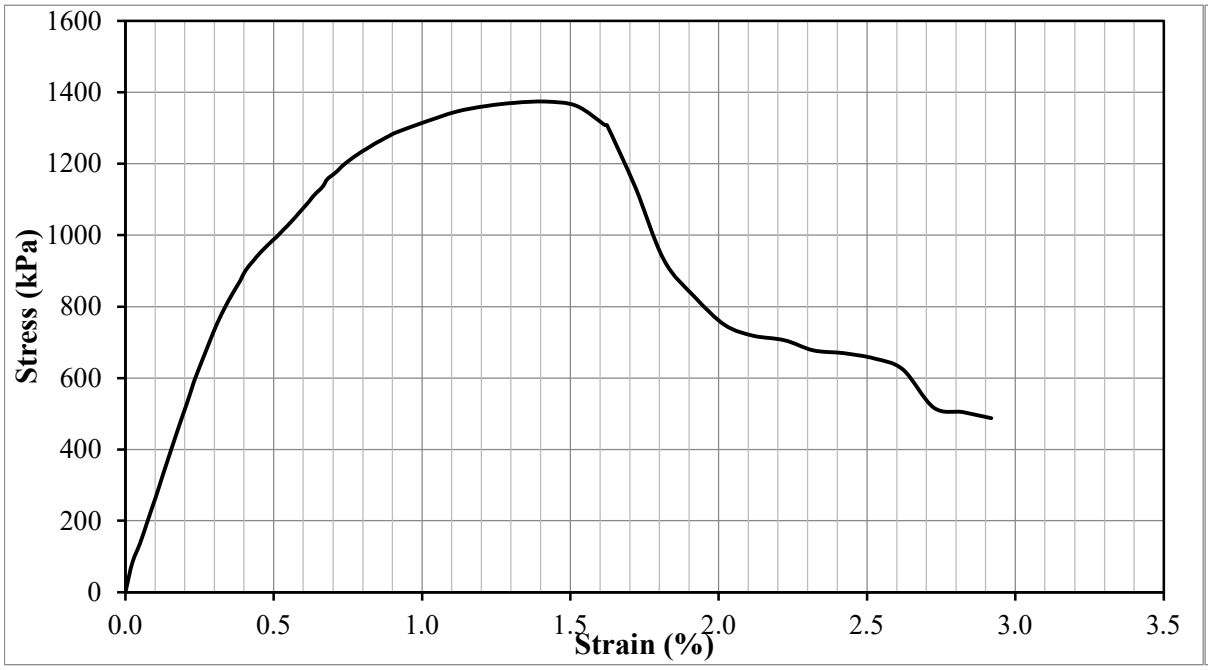
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,269	Strain at failure, εf :	1.24	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	R-1-D	Initial Area:	2114.9	mm^2
Test Date:	11/30/2020	Weight:	371.4	g
Strain Rate:	1 %/min	Unit Weight:	1780	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	27.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Additional information		Demolded at 21 days		



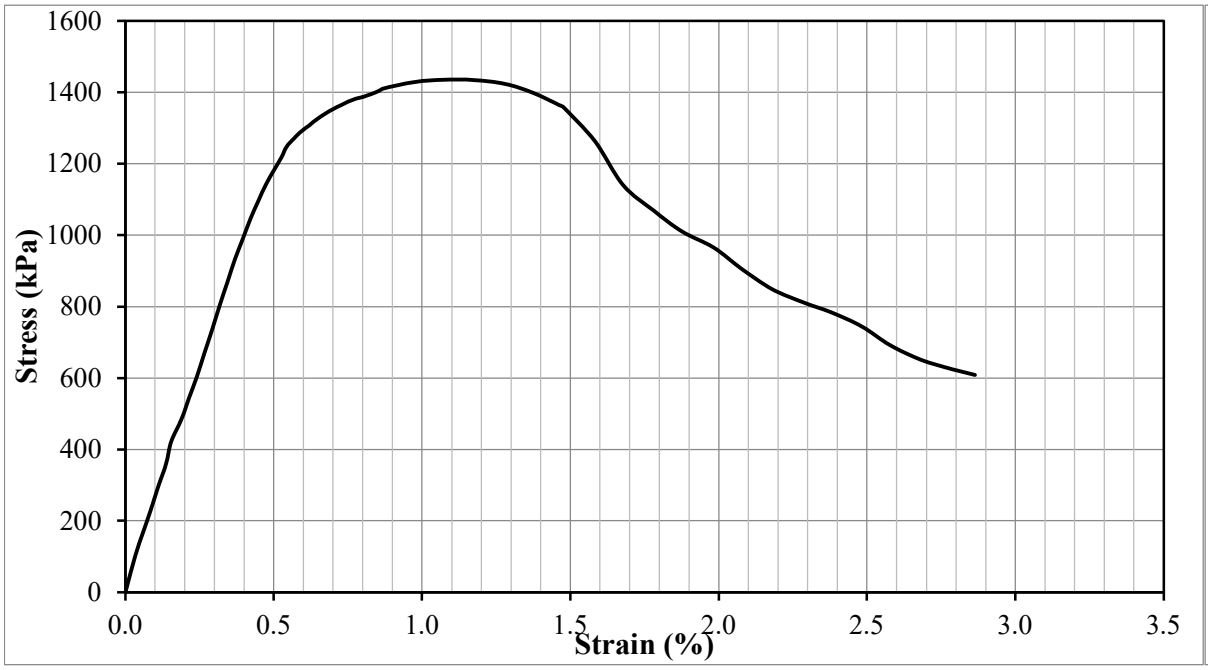
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,367	Strain at failure, εf :	1.31	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	R-1-G	Initial Area:	2119.1	mm^2
Test Date:	11/30/2020	Weight:	378.1	g
Strain Rate:	1 %/min	Unit Weight:	1781	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	27.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Additional information		Demolded at 21 days		



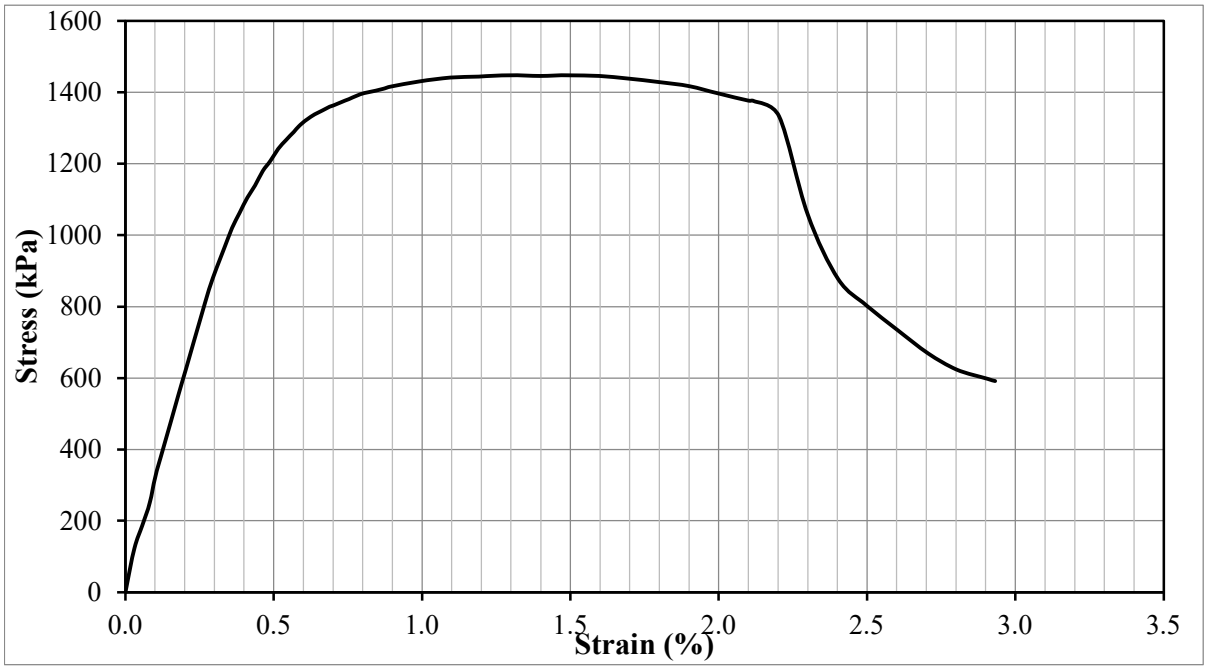
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,366	Strain at failure, εf :	1.42	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	R-1-E	Initial Area:	2119.1	mm^2
Test Date:	11/30/2020	Weight:	377.2	g
Strain Rate:	1 %/min	Unit Weight:	1781	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	27.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Additional information		Demolded at 28 days		



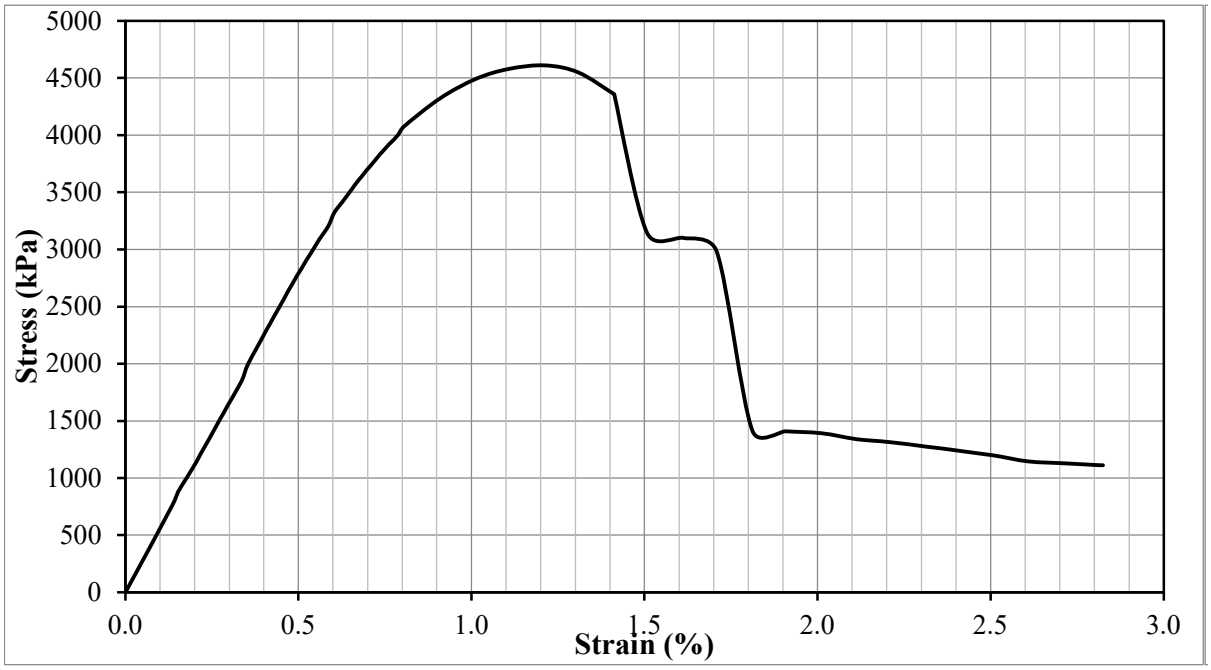
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,426	Strain at failure, εf :	1.07	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	R-1-F	Initial Area:	2119.1	mm^2
Test Date:	11/30/2020	Weight:	376.5	g
Strain Rate:	1 %/min	Unit Weight:	1779	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Additional information		Demolded at 28 days		



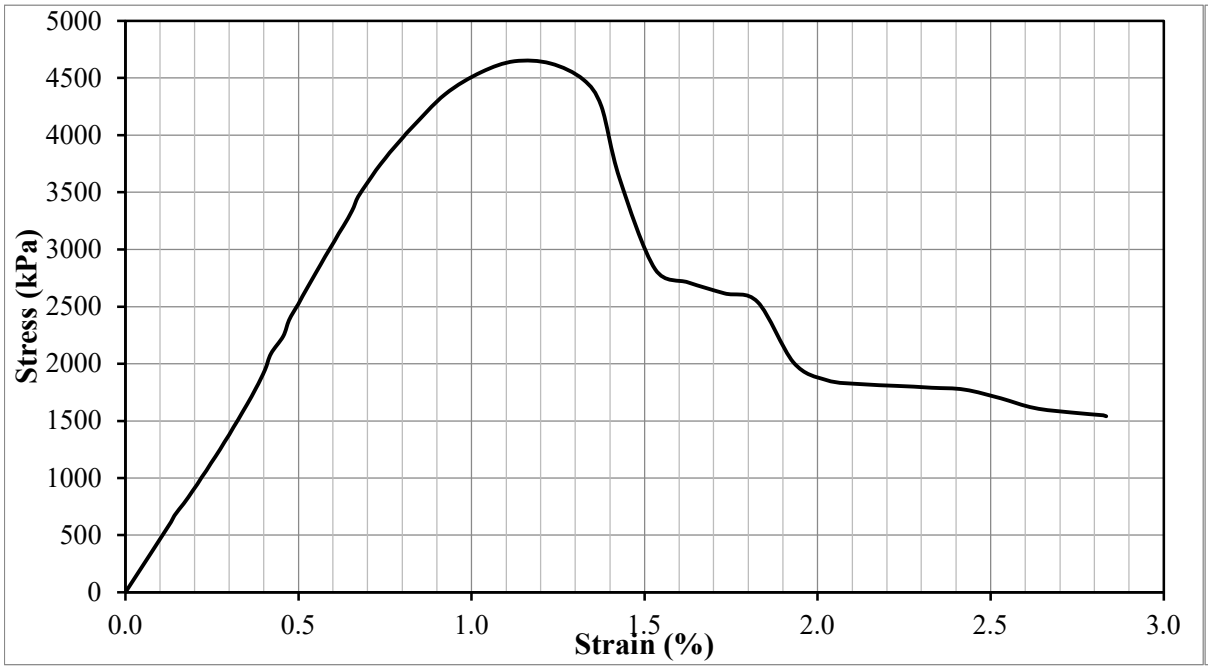
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,439	Strain at failure, εf :	1.49	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	R-2-A	Initial Area:	2114.9	mm^2
Test Date:	12/1/2020	Weight:	360.0	g
Strain Rate:	1 %/min	Unit Weight:	1711	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	27.8	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Additional information		Demolded at 3 days		



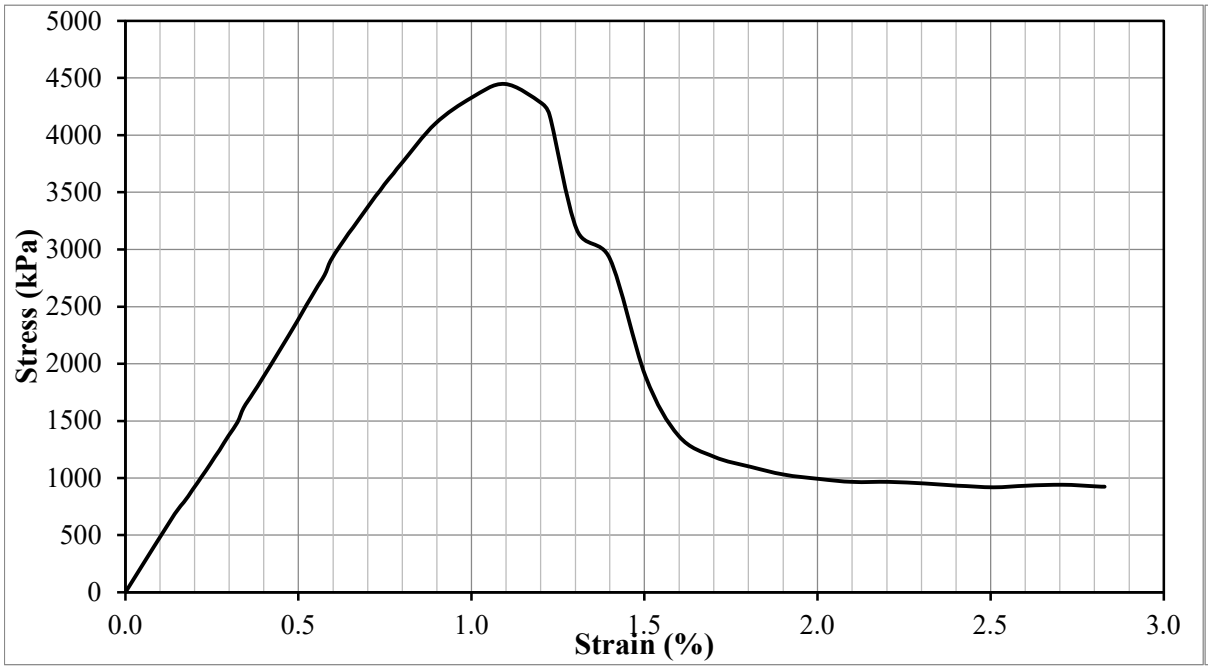
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,579	Strain at failure, εf :	1.21	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	R-2-J	Initial Area:	2127.4	mm^2
Test Date:	12/1/2020	Weight:	357.2	g
Strain Rate:	1 %/min	Unit Weight:	1699	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	27.8	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Additional information		Demolded at 3 days		



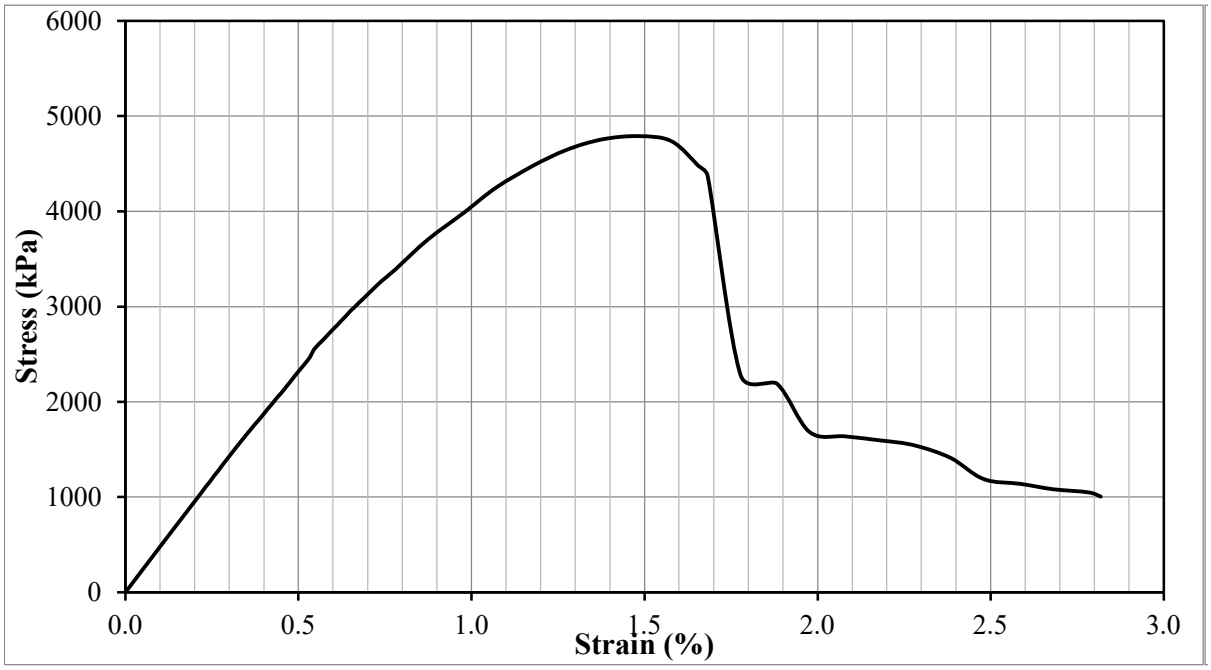
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,608	Strain at failure, εf :	1.12	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	R-2-B	Initial Area:	2117.0	mm^2
Test Date:	12/1/2020	Weight:	357.8	g
Strain Rate:	1 %/min	Unit Weight:	1702	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	27.8	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Additional information		Demolded at 7 days		



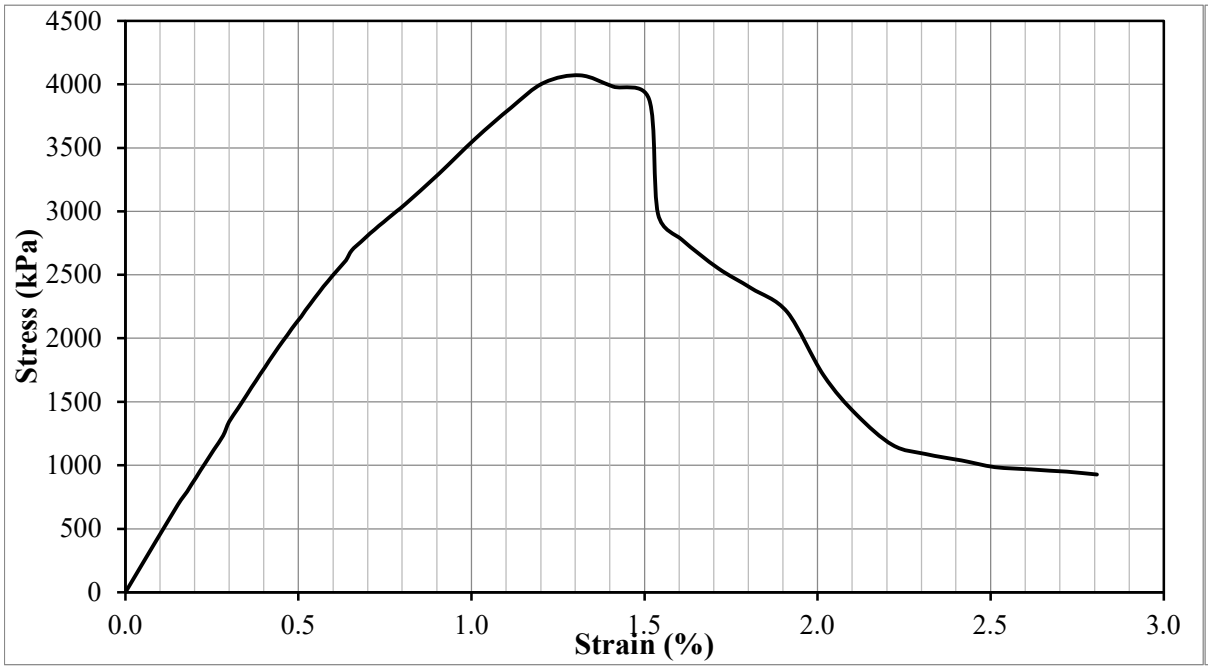
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,417	Strain at failure, εf :	1.10	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	R-2-I	Initial Area:	2121.1	mm^2
Test Date:	12/1/2020	Weight:	355.7	g
Strain Rate:	1 %/min	Unit Weight:	1707	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	27.8	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Additional information		Demolded at 7 days		



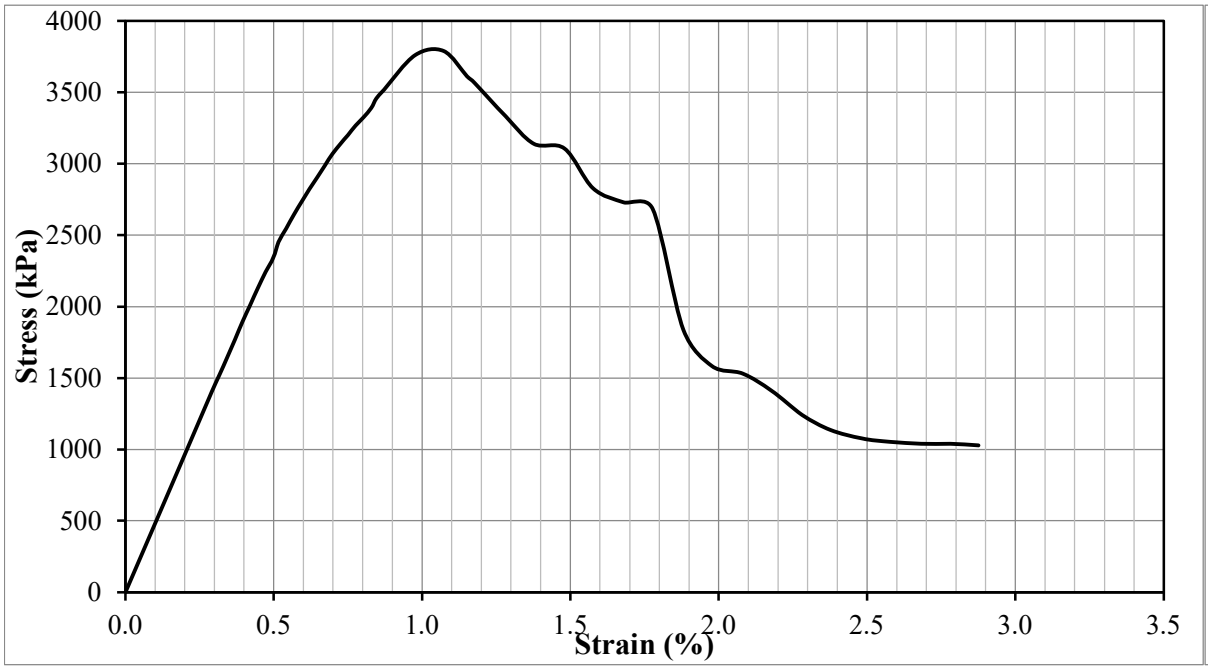
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,747	Strain at failure, εf :	1.48	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	R-2-C	Initial Area:	2117.0	mm^2
Test Date:	12/1/2020	Weight:	355.9	g
Strain Rate:	1 %/min	Unit Weight:	1709	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	27.8	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Additional information		Demolded at 14 days		



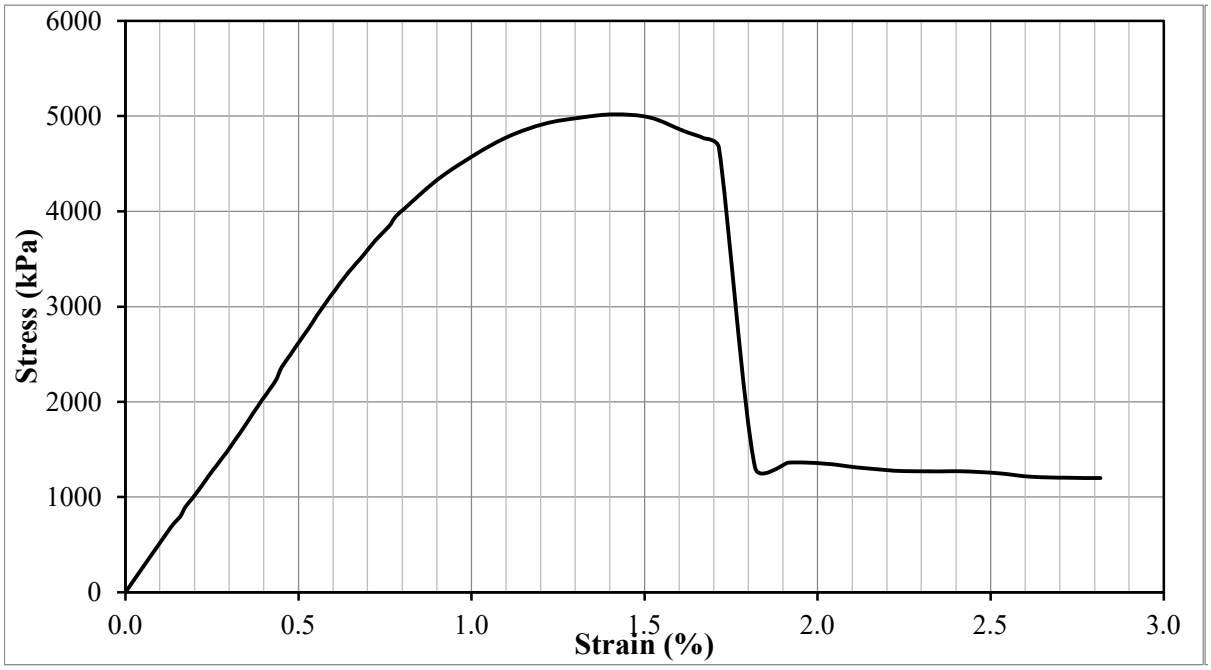
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,036	Strain at failure, εf :	1.31	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	R-2-H	Initial Area:	2123.2	mm^2
Test Date:	12/1/2020	Weight:	366.5	g
Strain Rate:	1 %/min	Unit Weight:	1707	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	27.8	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Additional information		Demolded at 14 days		



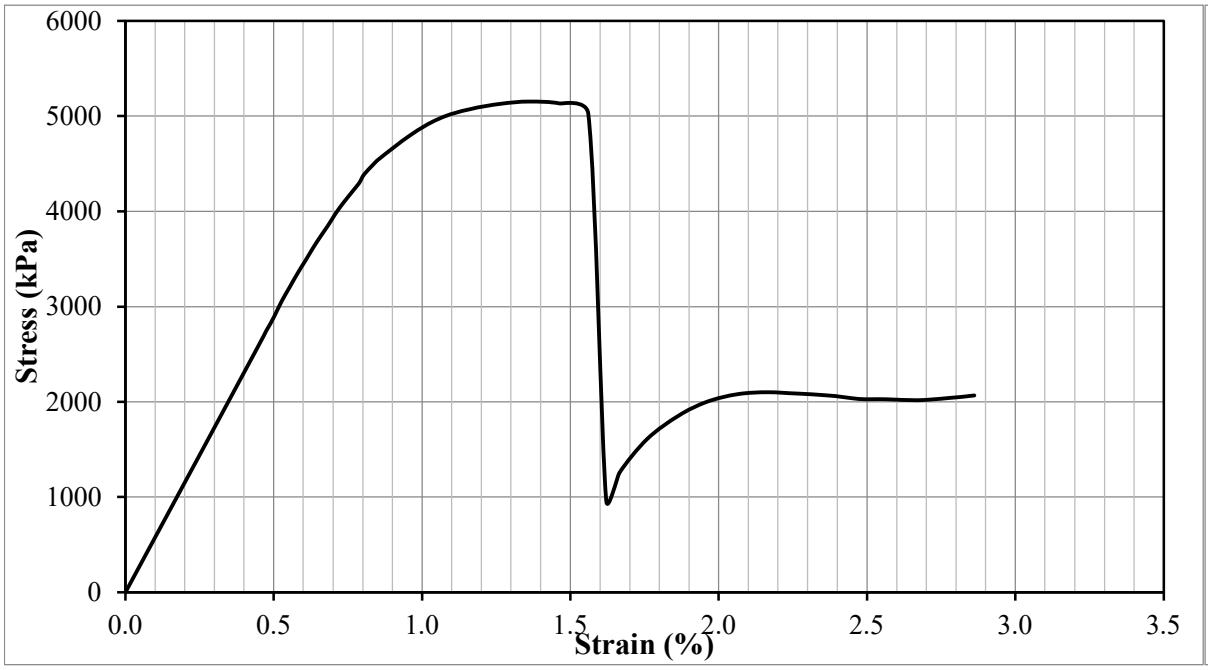
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,772	Strain at failure, εf :	1.07	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	96.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	R-2-D	Initial Area:	2121.1	mm^2
Test Date:	12/1/2020	Weight:	350.7	g
Strain Rate:	1 %/min	Unit Weight:	1706	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	27.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Additional information		Demolded at 21 days		



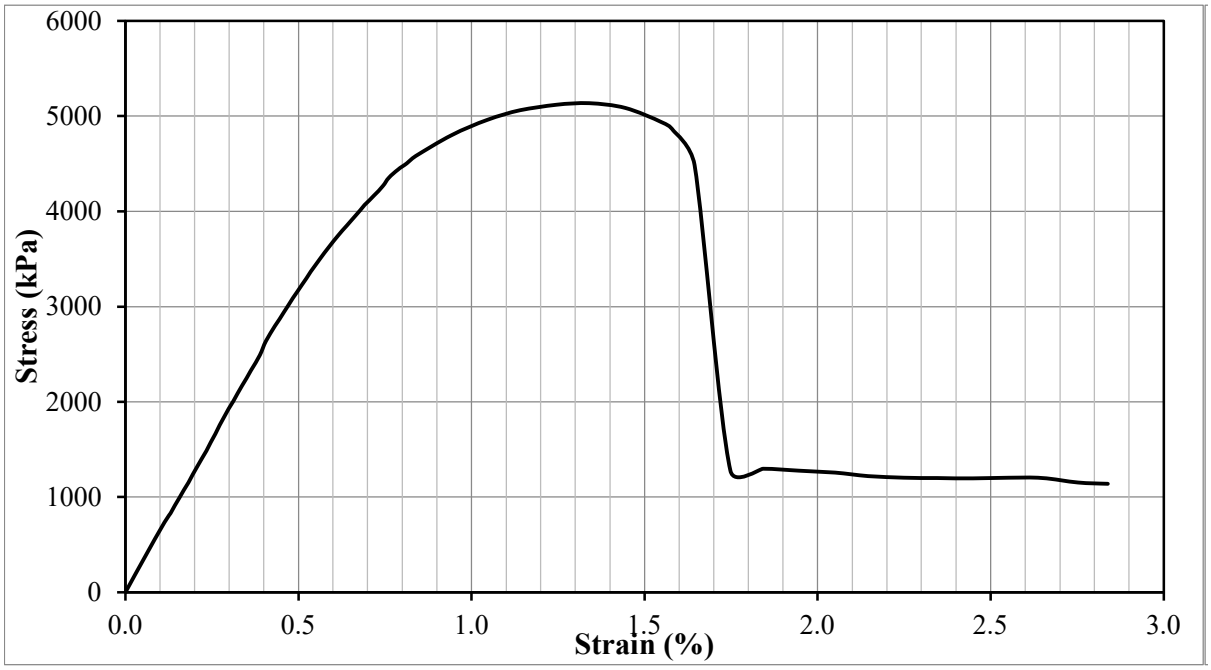
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,965	Strain at failure, εf :	1.41	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	95.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	R-2-G	Initial Area:	2119.1	mm^2
Test Date:	12/1/2020	Weight:	345.4	g
Strain Rate:	1 %/min	Unit Weight:	1706	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	27.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Additional information		Demolded at 21 days		



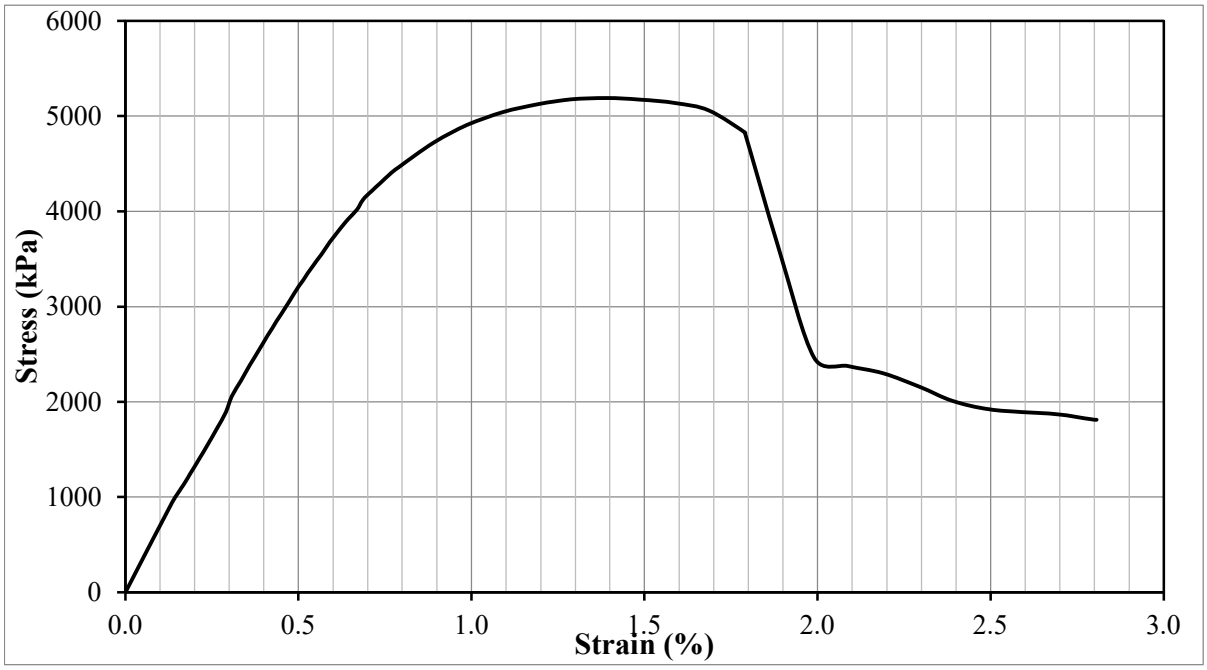
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,086	Strain at failure, εf :	1.36	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	R-2-E	Initial Area:	2123.2	mm^2
Test Date:	12/1/2020	Weight:	355.9	g
Strain Rate:	1 %/min	Unit Weight:	1712	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	27.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Additional information		Demolded at 28 days		



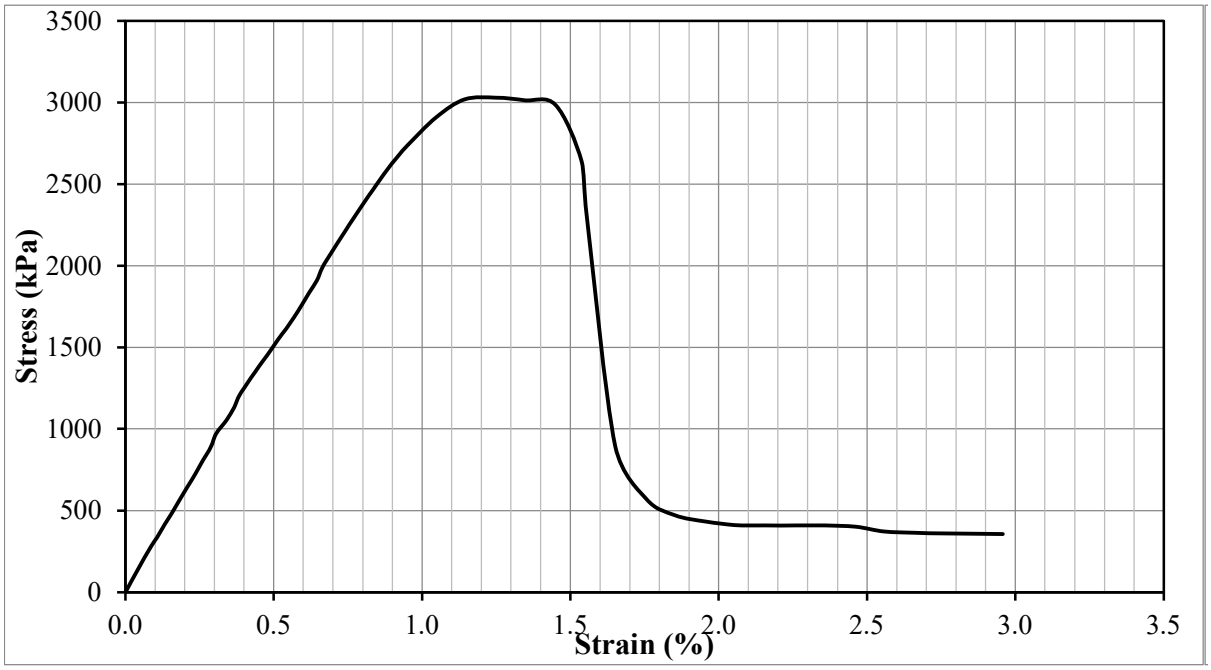
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,085	Strain at failure, εf :	1.34	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	R-2-F	Initial Area:	2123.2	mm^2
Test Date:	12/1/2020	Weight:	357.3	g
Strain Rate:	1 %/min	Unit Weight:	1712	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	27.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Additional information		Demolded at 28 days		



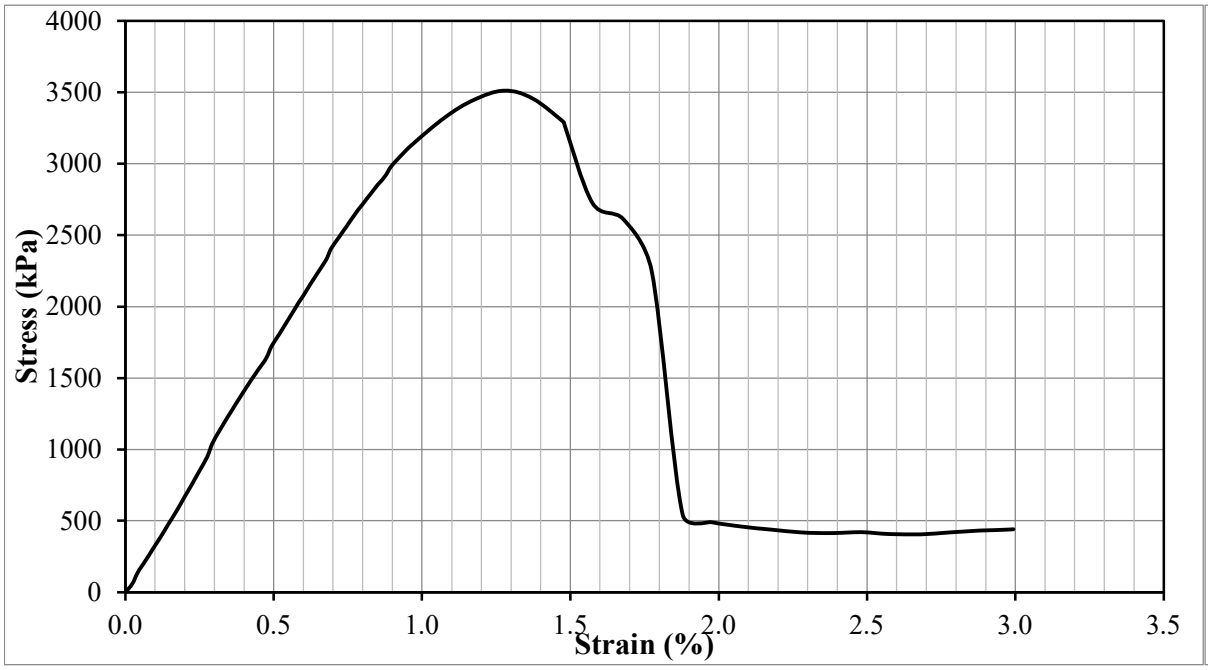
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,144	Strain at failure, εf :	1.39	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.1	mm
I.D.:	R-3-A	Initial Area:	2129.4	mm^2
Test Date:	12/20/2020	Weight:	372.7	g
Strain Rate:	1 %/min	Unit Weight:	1771	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	27.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45.0	°C
Additional information		Demolded at 3 days		



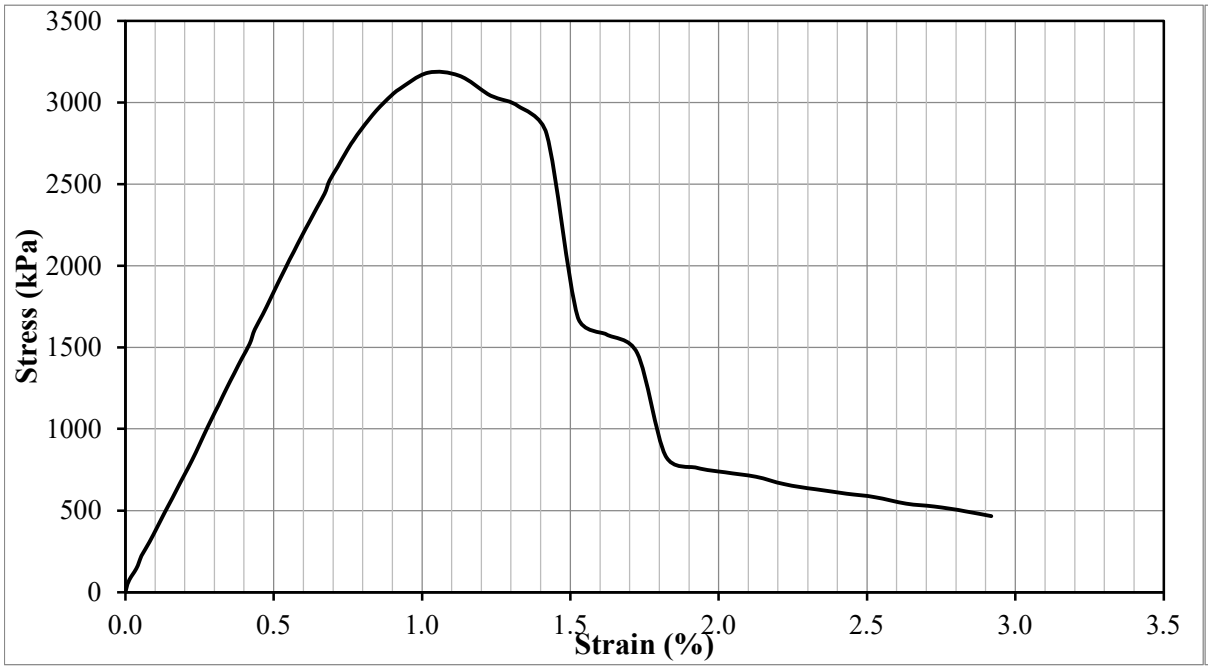
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,005	Strain at failure, εf :	1.25	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.1	mm
I.D.:	R-3-J	Initial Area:	2129.4	mm^2
Test Date:	12/20/2020	Weight:	370.0	g
Strain Rate:	1 %/min	Unit Weight:	1769	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	27.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45	°C
Additional information		Demolded at 3 days		



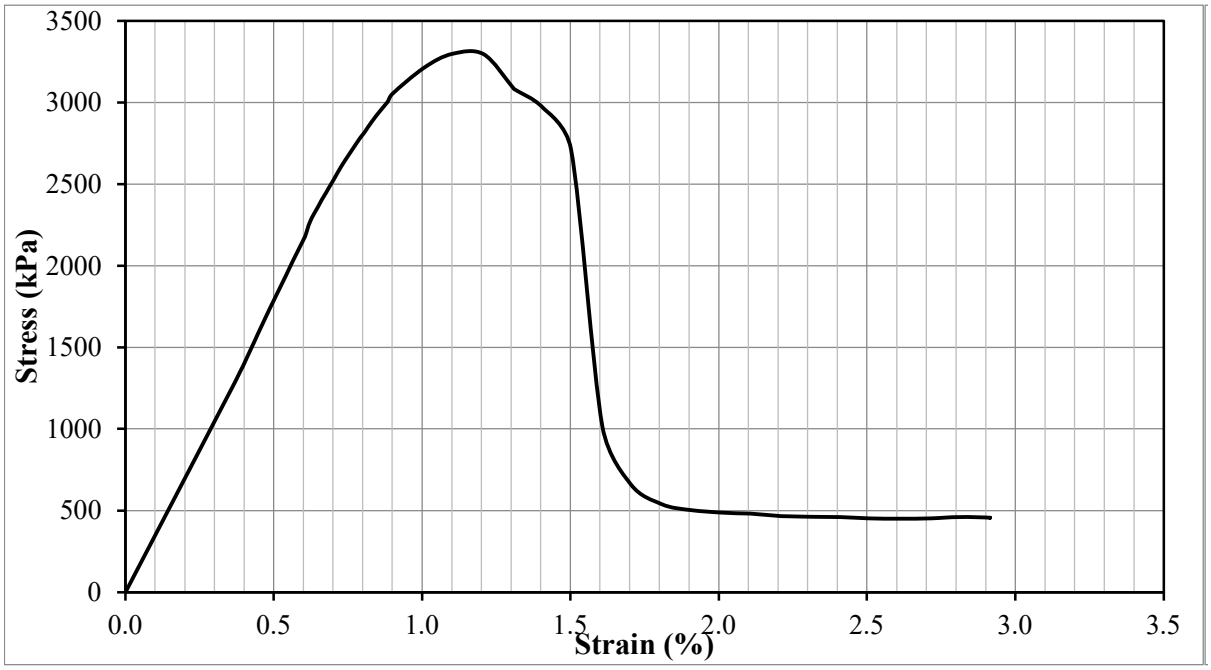
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,480	Strain at failure, εf :	1.28	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.1	mm
I.D.:	R-3-B	Initial Area:	2131.5	mm^2
Test Date:	12/20/2020	Weight:	371.2	g
Strain Rate:	1 %/min	Unit Weight:	1768	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	27.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45	°C
Additional information		Demolded at 7 days		



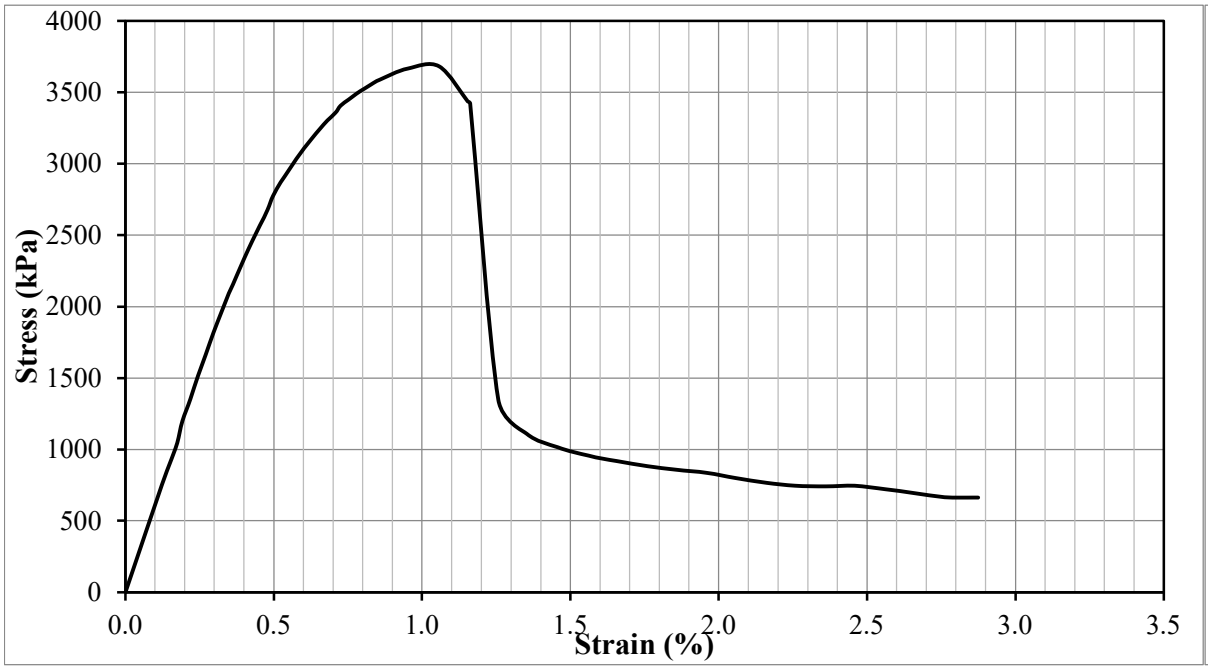
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,155	Strain at failure, εf :	1.02	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	R-3-I	Initial Area:	2123.2	mm^2
Test Date:	12/20/2020	Weight:	381.5	g
Strain Rate:	1 %/min	Unit Weight:	1772	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	27.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45	°C
Additional information		Demolded at 7 days		



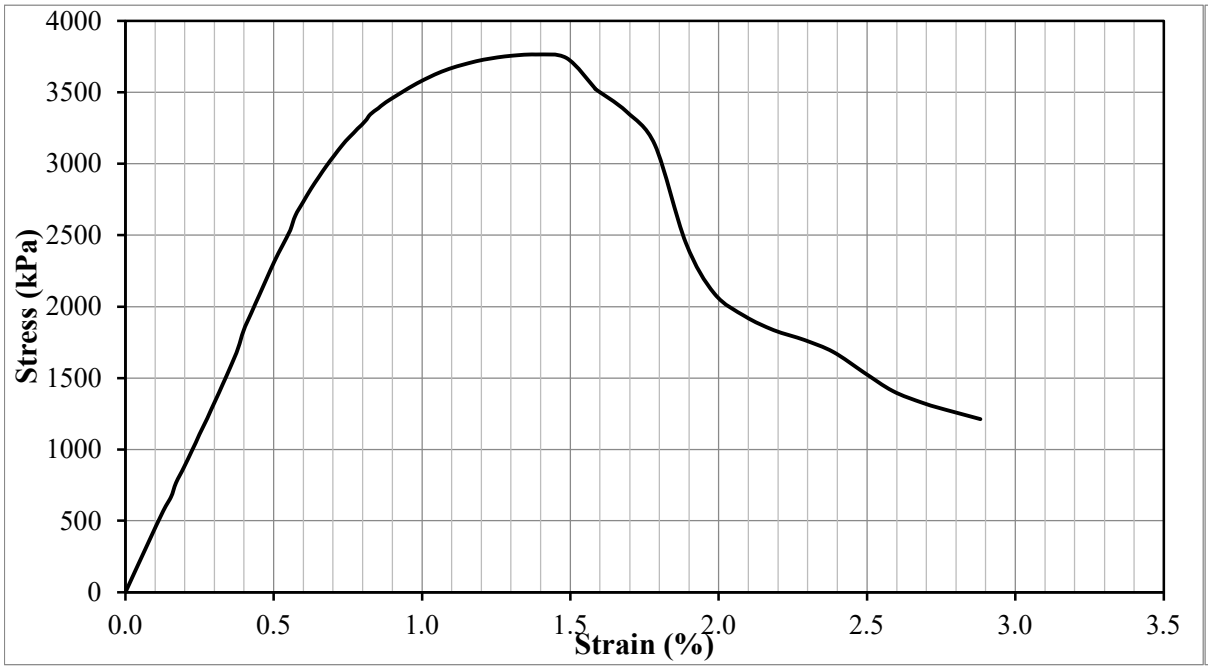
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,284	Strain at failure, εf :	1.10	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	R-3-C	Initial Area:	2125.3	mm^2
Test Date:	12/20/2020	Weight:	379.8	g
Strain Rate:	1 %/min	Unit Weight:	1774	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	27.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45	°C
Additional information		Demolded at 14 days		



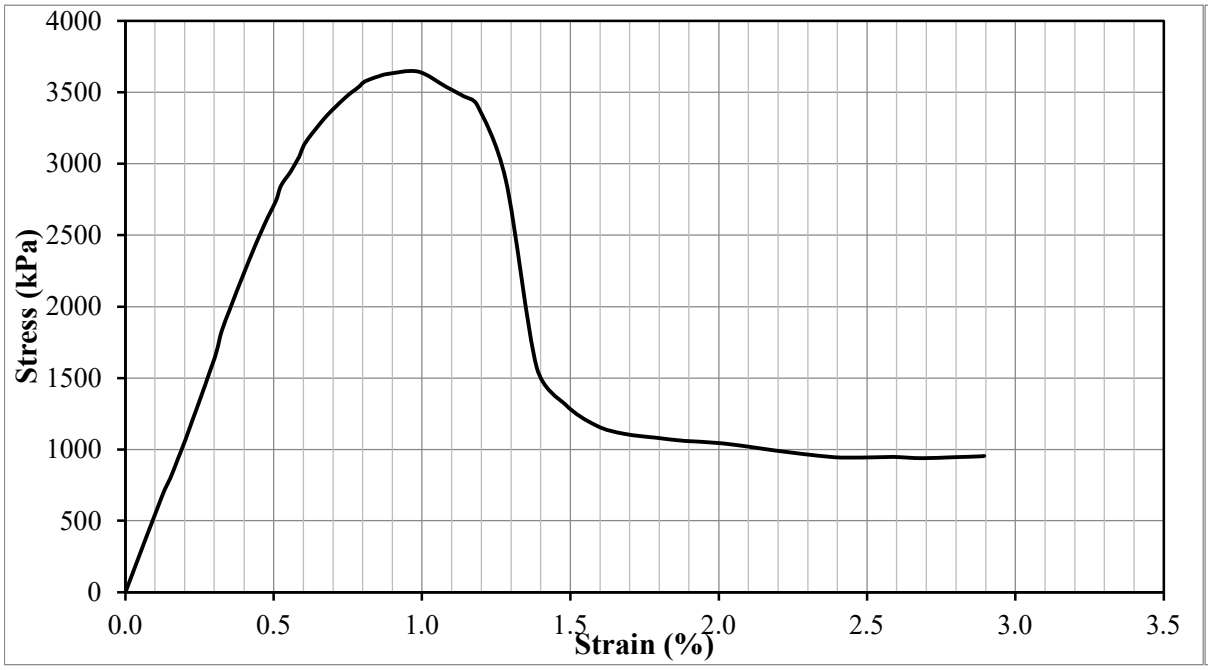
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,662	Strain at failure, εf :	1.06	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.1	mm
I.D.:	R-3-H	Initial Area:	2131.5	mm^2
Test Date:	12/20/2020	Weight:	376.9	g
Strain Rate:	1 %/min	Unit Weight:	1768	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	27.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45	°C
Additional information		Demolded at 14 days		



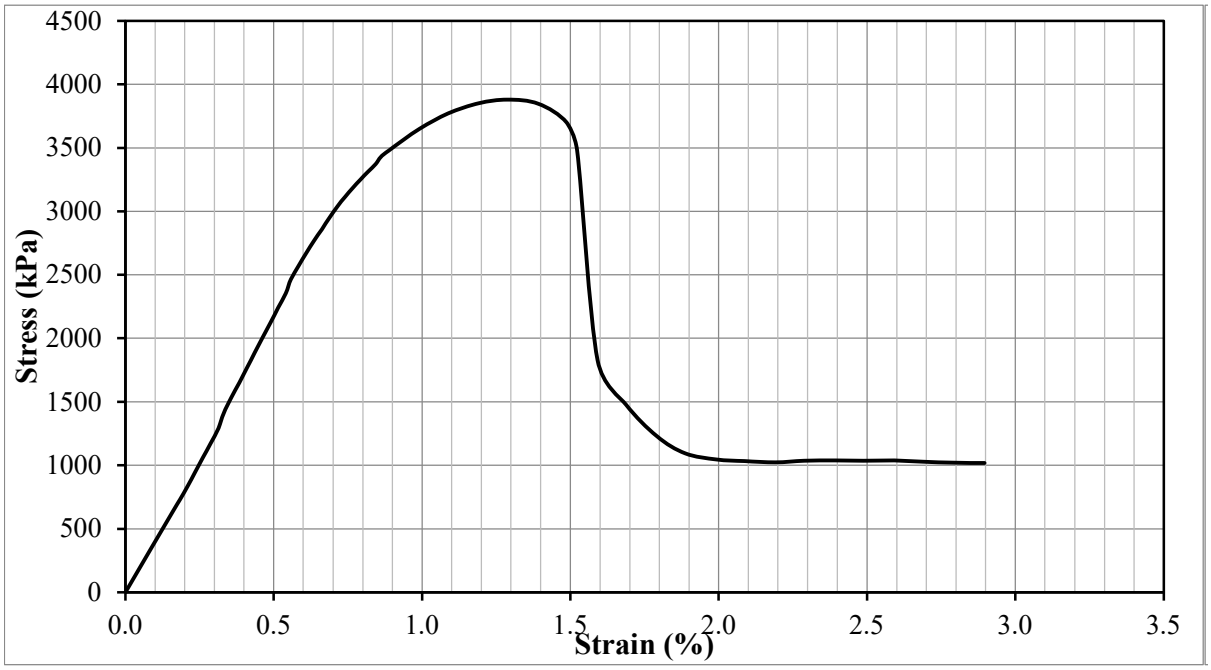
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,740	Strain at failure, εf :	1.38	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.1	mm
I.D.:	R-3-D	Initial Area:	2131.5	mm^2
Test Date:	12/20/2020	Weight:	381.4	g
Strain Rate:	1 %/min	Unit Weight:	1772	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45	°C
Additional information		Demolded at 21 days		



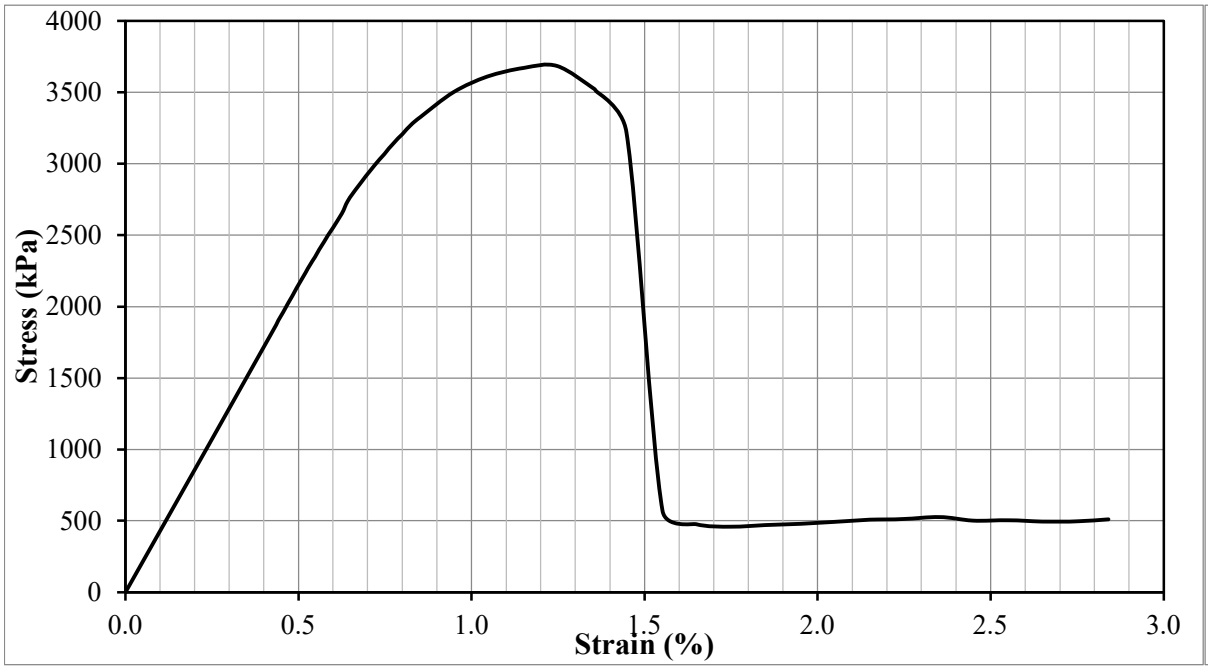
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,626	Strain at failure, εf :	0.99	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	R-3-G	Initial Area:	2127.4	mm^2
Test Date:	12/20/2020	Weight:	377.1	g
Strain Rate:	1 %/min	Unit Weight:	1765	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45	°C
Additional information		Demolded at 21 days		



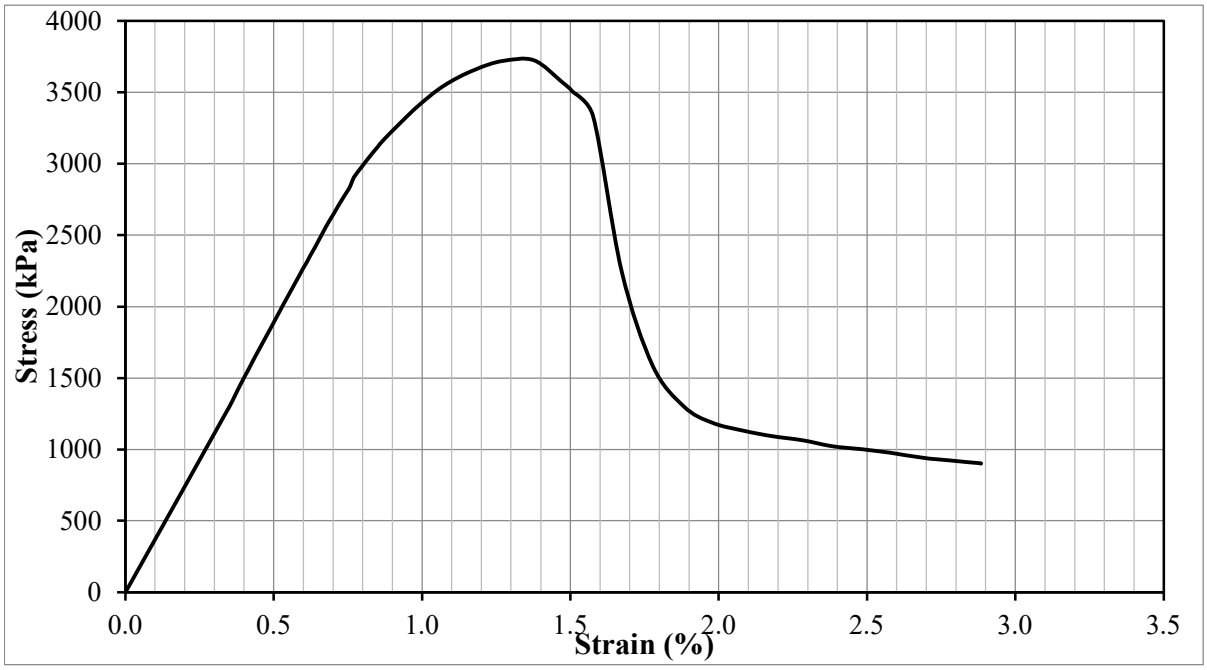
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,858	Strain at failure, εf :	1.29	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.1	mm
I.D.:	R-3-E	Initial Area:	2133.6	mm^2
Test Date:	12/20/2020	Weight:	383.8	g
Strain Rate:	1 %/min	Unit Weight:	1767	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45	°C
Additional information		Demolded at 28 days		



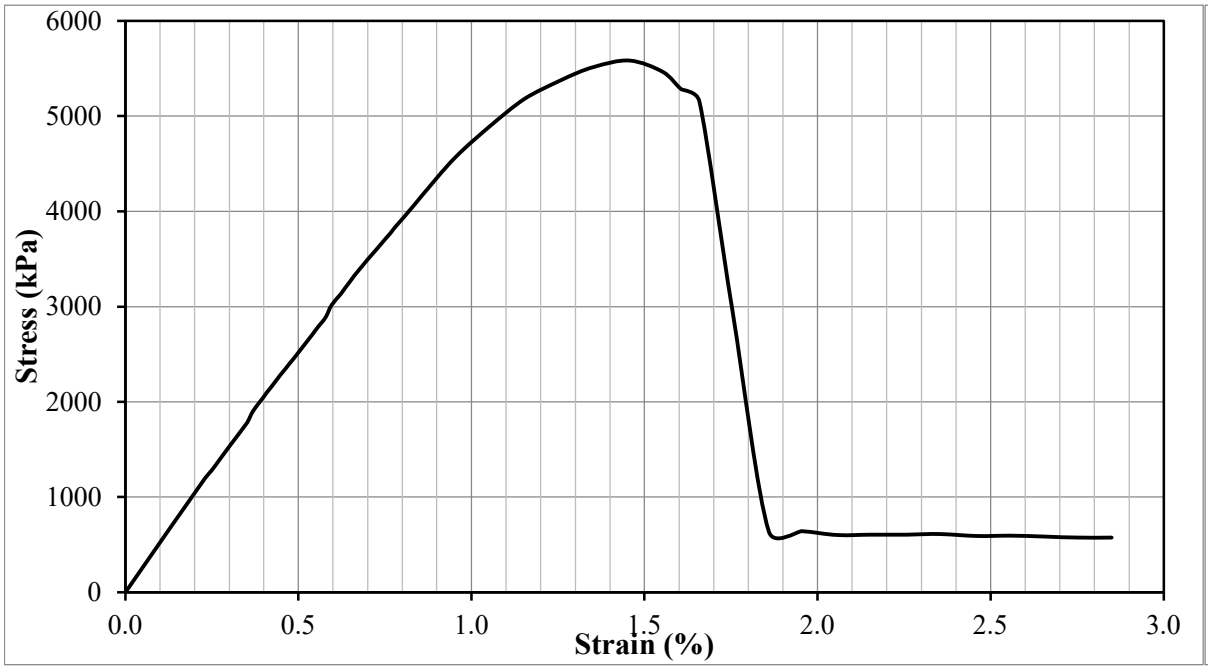
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,670	Strain at failure, εf :	1.25	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	R-3-F	Initial Area:	2119.1	mm^2
Test Date:	12/20/2020	Weight:	379.2	g
Strain Rate:	1 %/min	Unit Weight:	1775	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45	°C
Additional information		Demolded at 28 days		



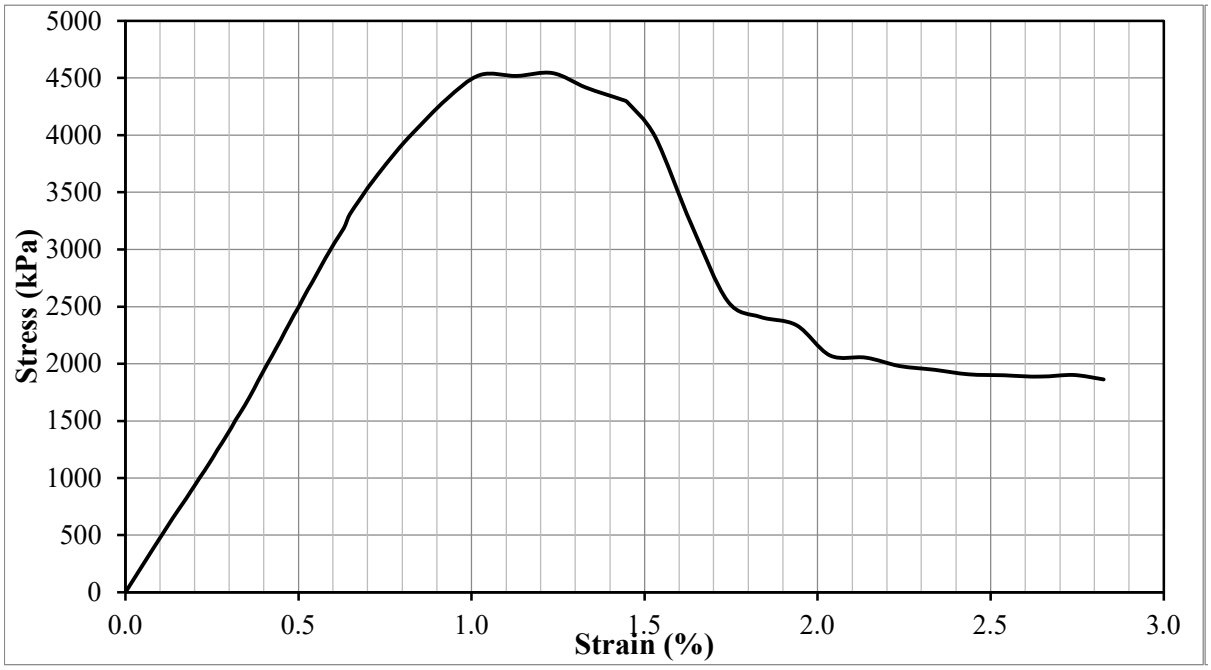
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,705	Strain at failure, εf :	1.38	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.3	mm
I.D.:	R-4-A	Initial Area:	2148.2	mm^2
Test Date:	1/17/2021	Weight:	362.5	g
Strain Rate:	1 %/min	Unit Weight:	1690	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	27.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45.0	°C
Additional information		Demolded at 3 days		



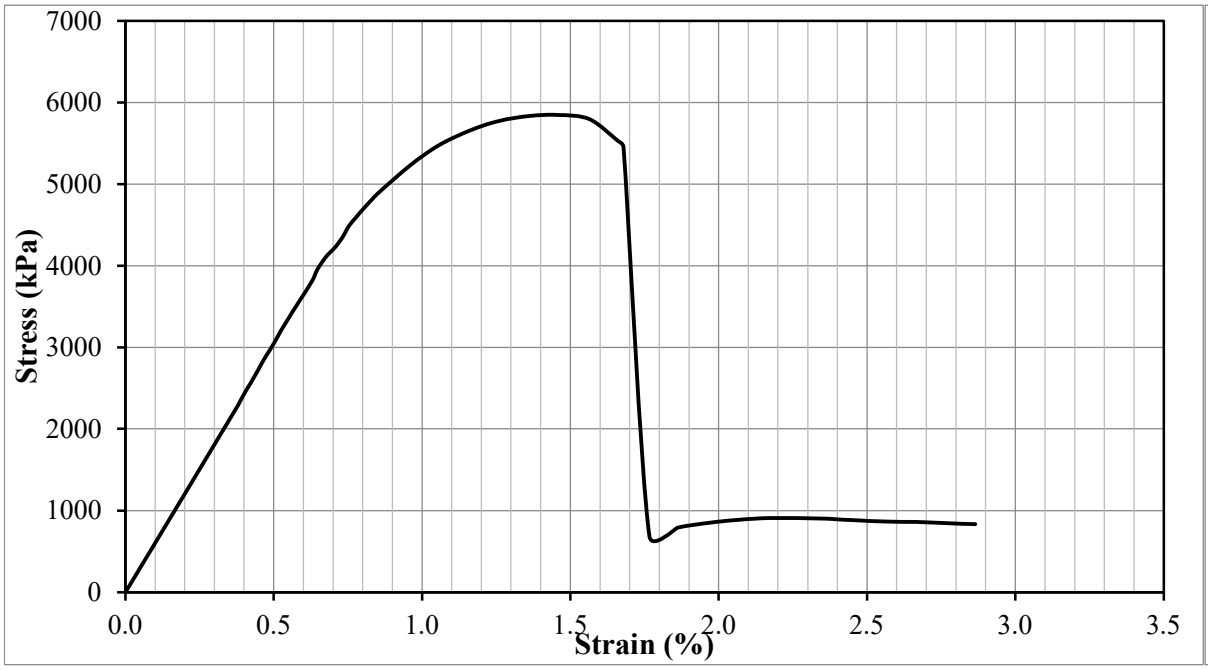
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,542	Strain at failure, εf :	1.46	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.2	mm
I.D.:	R-4-J	Initial Area:	2137.8	mm^2
Test Date:	1/17/2021	Weight:	368.2	g
Strain Rate:	1 %/min	Unit Weight:	1691	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	27.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45	°C
Additional information		Demolded at 3 days		



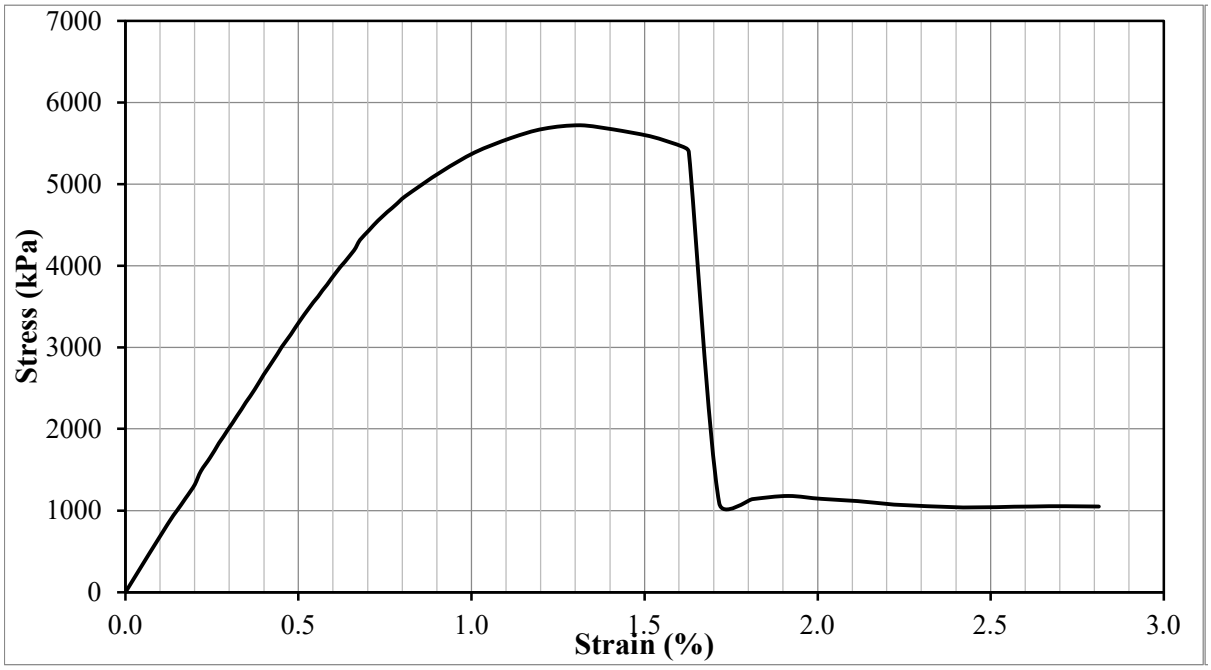
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,525	Strain at failure, εf :	1.23	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.1	mm
I.D.:	R-4-B	Initial Area:	2135.7	mm^2
Test Date:	1/17/2021	Weight:	355.6	g
Strain Rate:	1 %/min	Unit Weight:	1696	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	27.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45	°C
Additional information		Demolded at 7 days		



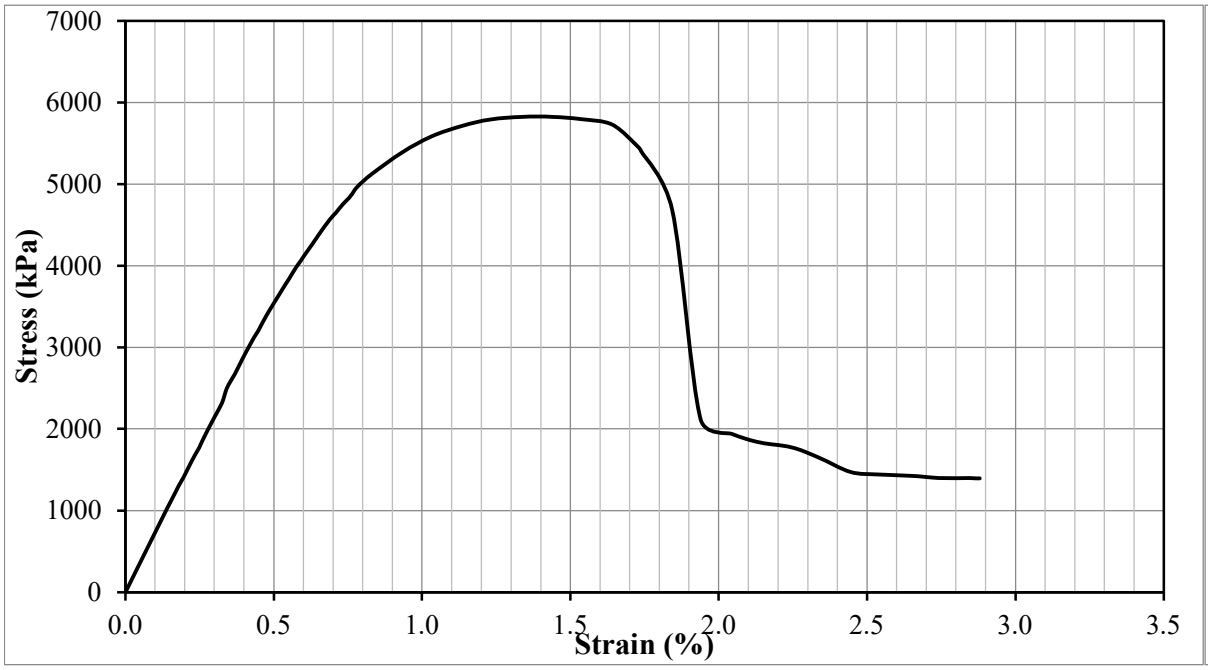
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,792	Strain at failure, εf :	1.46	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.2	mm
I.D.:	R-4-I	Initial Area:	2141.9	mm^2
Test Date:	1/17/2021	Weight:	359.0	g
Strain Rate:	1 %/min	Unit Weight:	1691	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	27.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45	°C
Additional information		Demolded at 7 days		



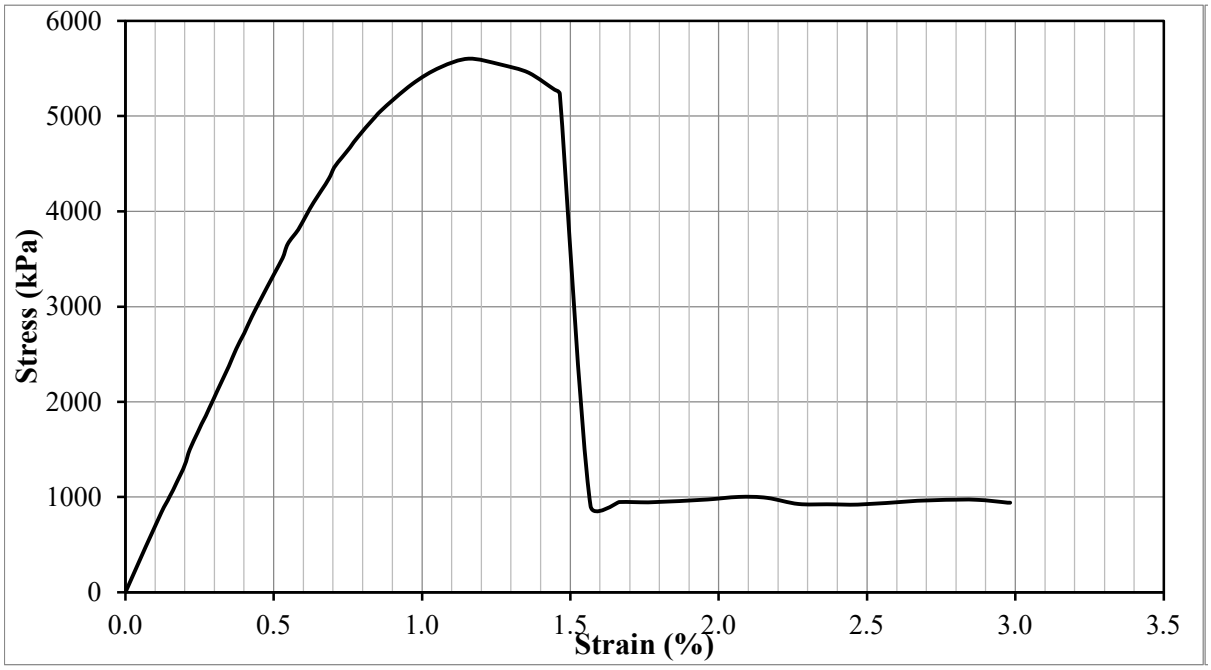
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,673	Strain at failure, εf :	1.31	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.1	mm
I.D.:	R-4-C	Initial Area:	2129.4	mm^2
Test Date:	1/17/2021	Weight:	362.9	g
Strain Rate:	1 %/min	Unit Weight:	1701	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	27.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45	°C
Additional information		Demolded at 14 days		



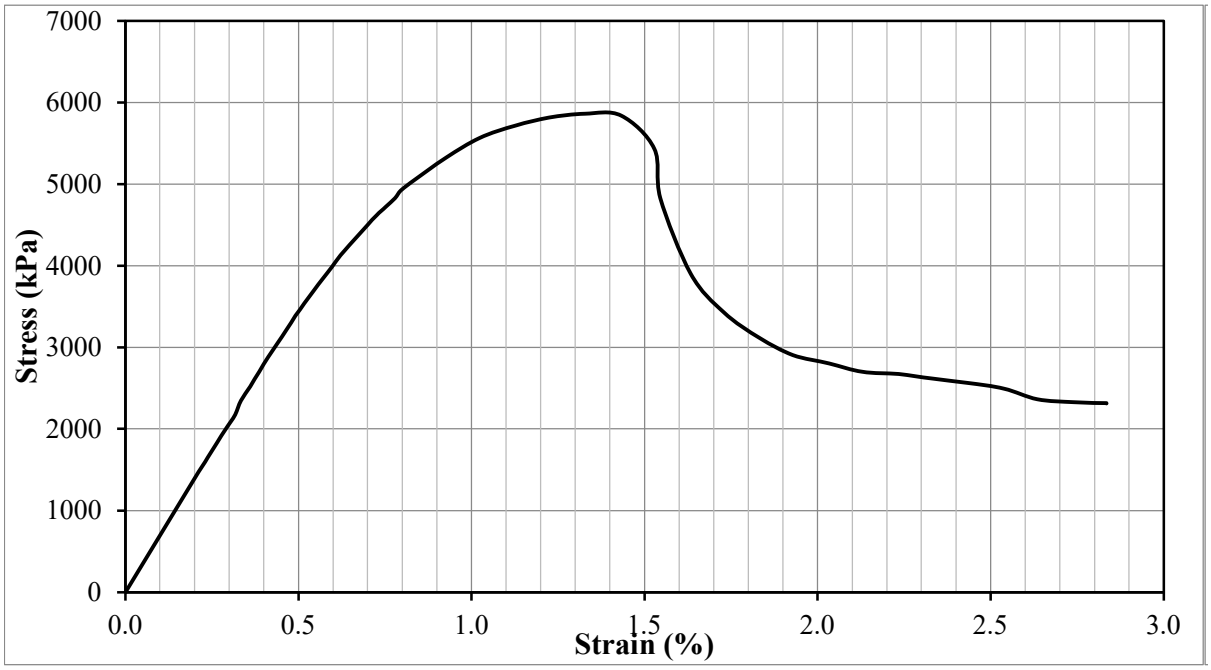
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,789	Strain at failure, εf :	1.34	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.1	mm
I.D.:	R-4-H	Initial Area:	2133.6	mm^2
Test Date:	1/17/2021	Weight:	359.9	g
Strain Rate:	1 %/min	Unit Weight:	1698	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	27.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45	°C
Additional information		Demolded at 14 days		



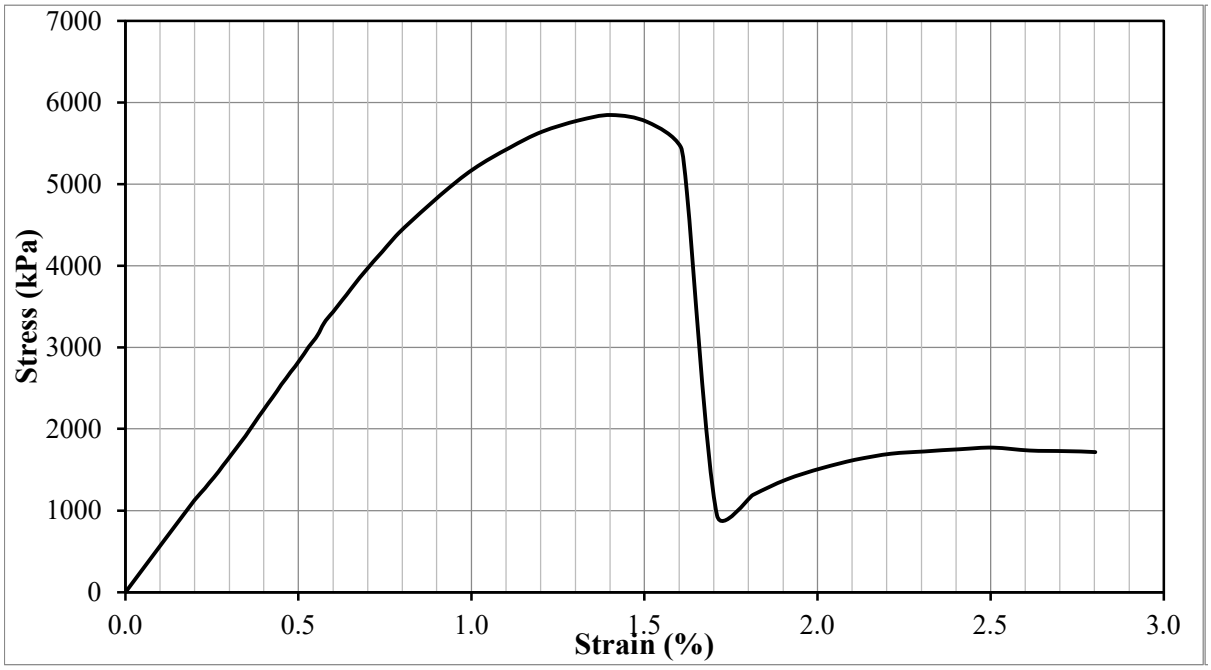
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,559	Strain at failure, εf :	1.16	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.1	mm
I.D.:	R-4-D	Initial Area:	2133.6	mm^2
Test Date:	1/17/2021	Weight:	358.4	g
Strain Rate:	1 %/min	Unit Weight:	1698	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	27.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45	°C
Additional information		Demolded at 21 days		



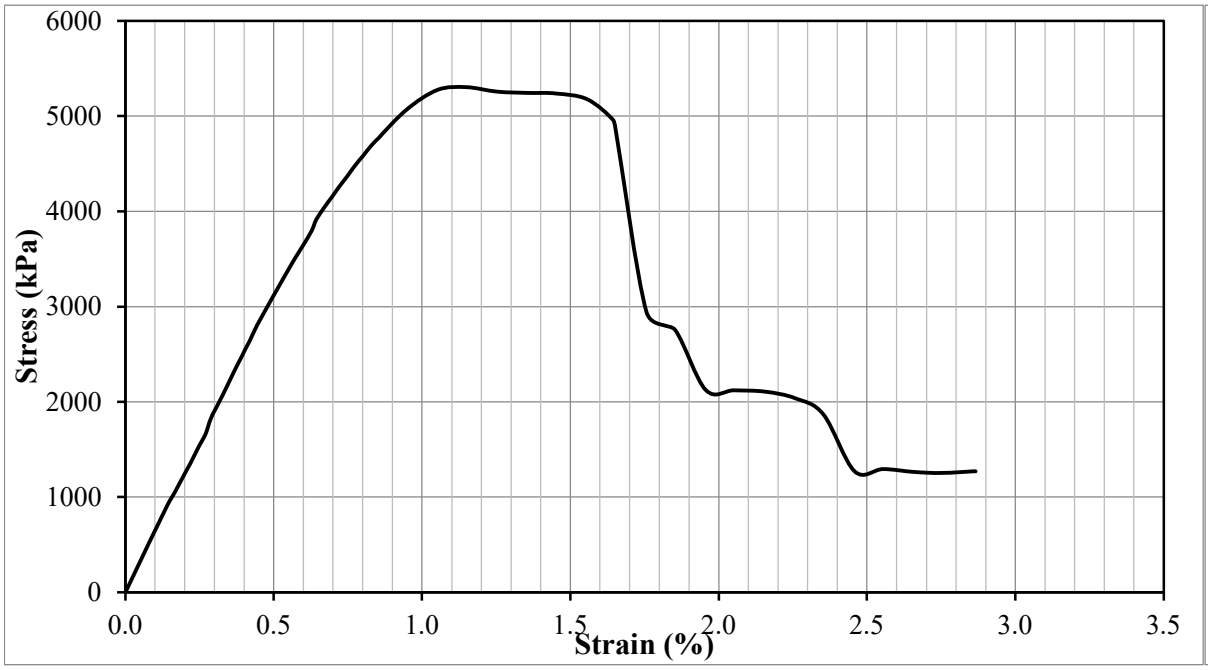
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,813	Strain at failure, εf :	1.33	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.1	mm
I.D.:	R-4-G	Initial Area:	2129.4	mm^2
Test Date:	1/17/2021	Weight:	350.7	g
Strain Rate:	1 %/min	Unit Weight:	1696	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45	°C
Additional information		Demolded at 21 days		



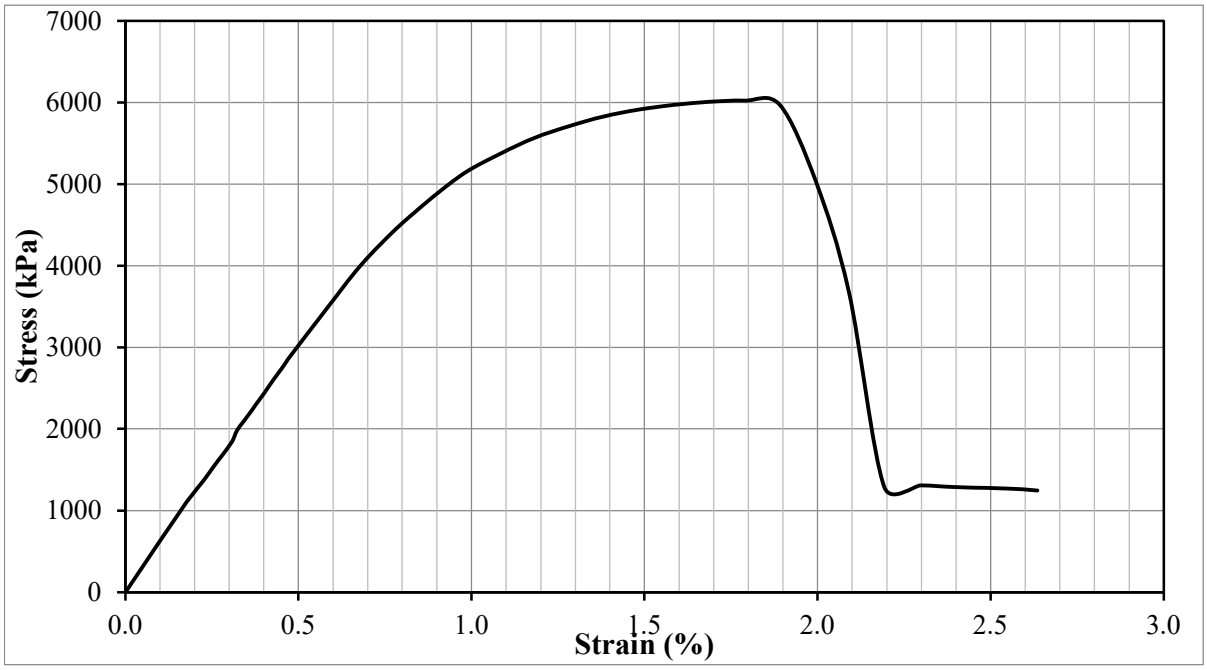
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,783	Strain at failure, εf :	1.40	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	R-4-E	Initial Area:	2123.2	mm^2
Test Date:	1/17/2021	Weight:	361.1	g
Strain Rate:	1 %/min	Unit Weight:	1696	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45	°C
Additional information		Demolded at 28 days		



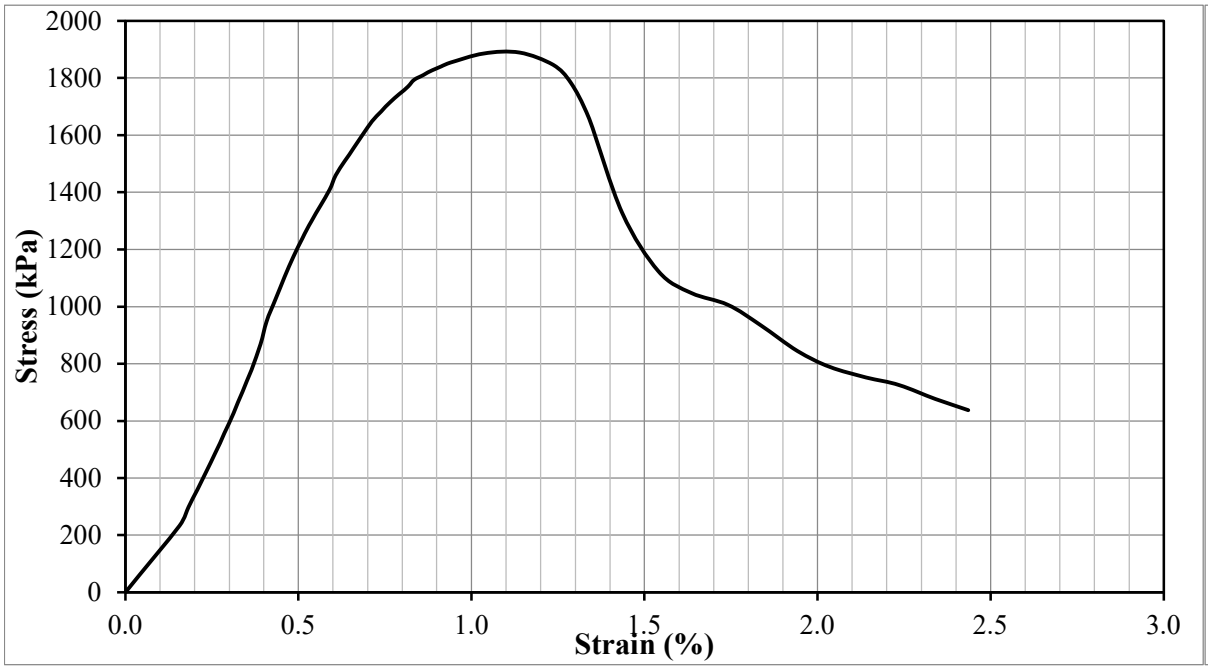
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,271	Strain at failure, εf :	1.15	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	93.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	R-4-F	Initial Area:	2121.1	mm^2
Test Date:	1/17/2021	Weight:	334.6	g
Strain Rate:	1 %/min	Unit Weight:	1693	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45	°C
Additional information		Demolded at 28 days		



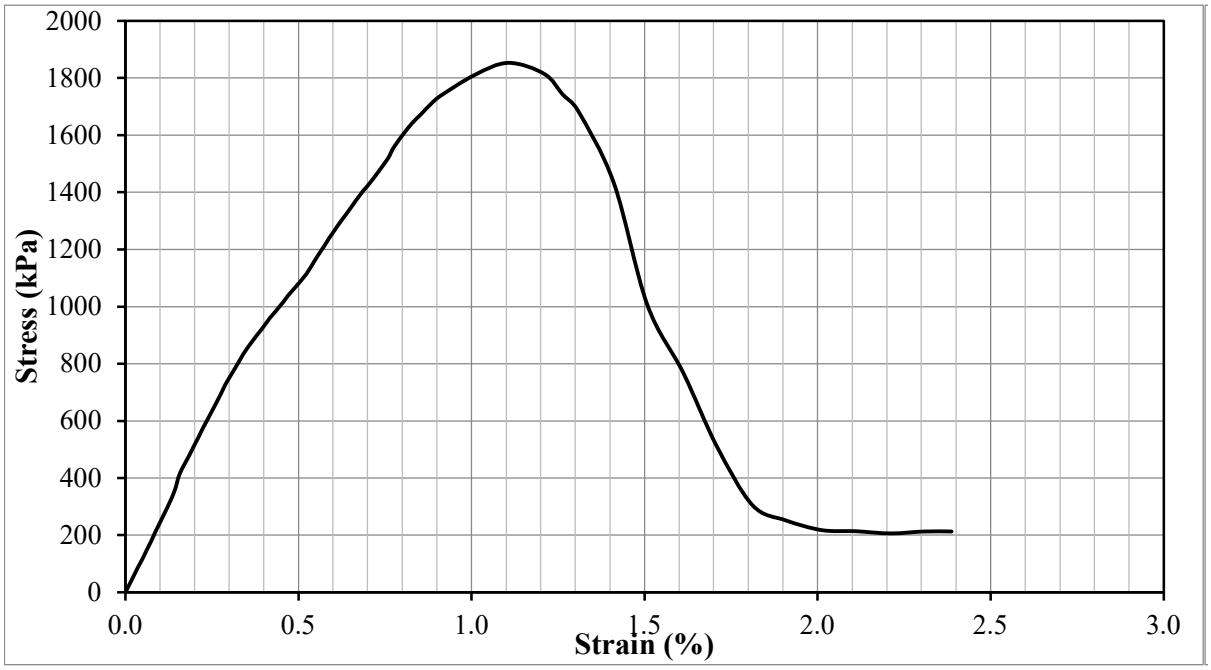
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,921	Strain at failure, εf :	1.79	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	R-5-A	Initial Area:	2117.0	mm^2
Test Date:	4/20/2021	Weight:	379.8	g
Strain Rate:	1 %/min	Unit Weight:	1782	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	179.8	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Additional information		Demolded at 7 days		



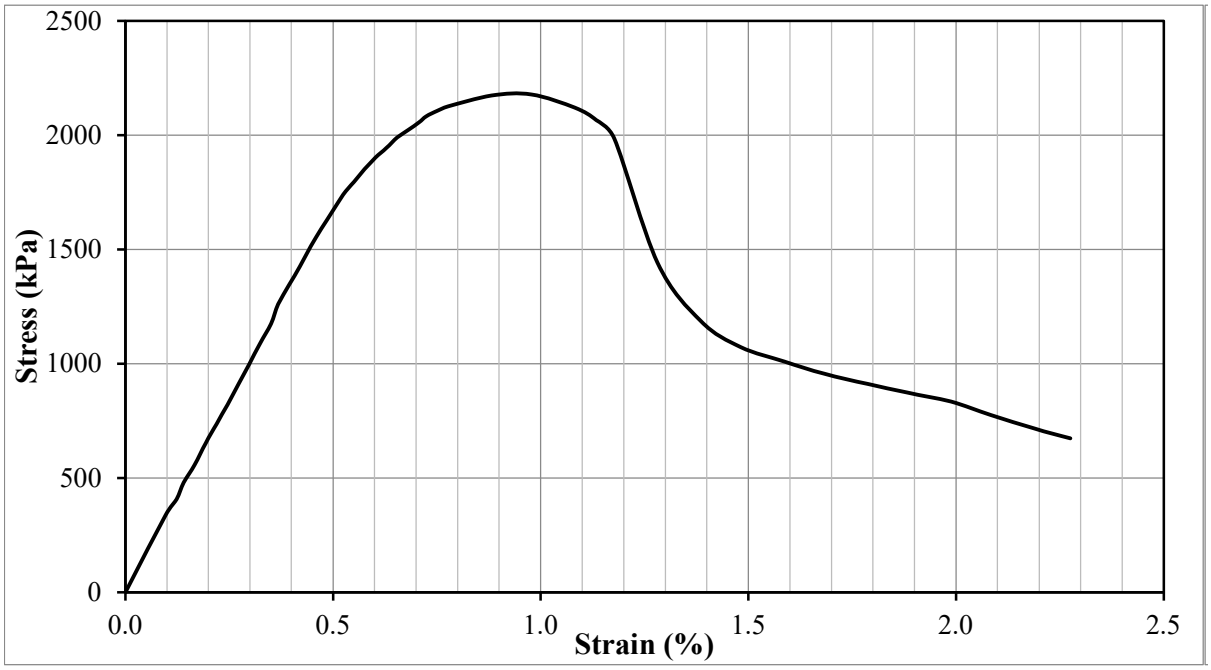
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,880	Strain at failure, εf :	1.14	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	R-5-H	Initial Area:	2121.1	mm^2
Test Date:	4/20/2021	Weight:	368.0	g
Strain Rate:	1 %/min	Unit Weight:	1774	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	179.8	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Additional information		Demolded at 7 days		



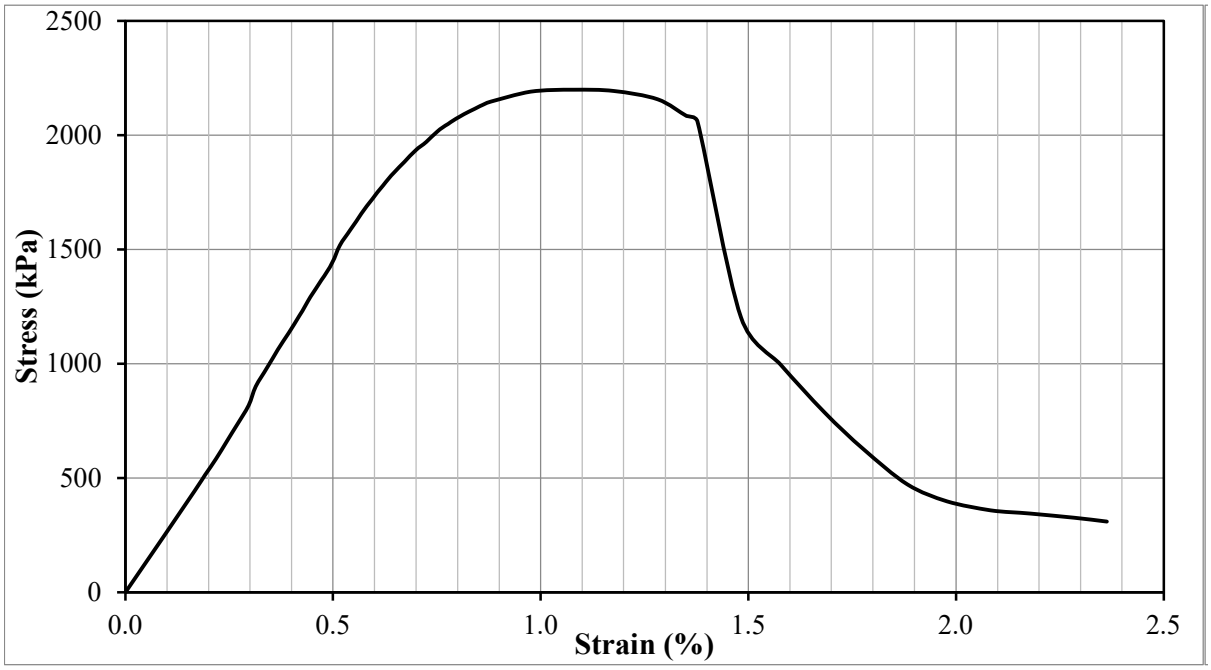
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,835	Strain at failure, εf :	1.11	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	R-5-C	Initial Area:	2127.4	mm^2
Test Date:	10/22/2021	Weight:	380.2	g
Strain Rate:	1 %/min	Unit Weight:	1764	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	364.7	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Additional information		Demolded at 7 days		



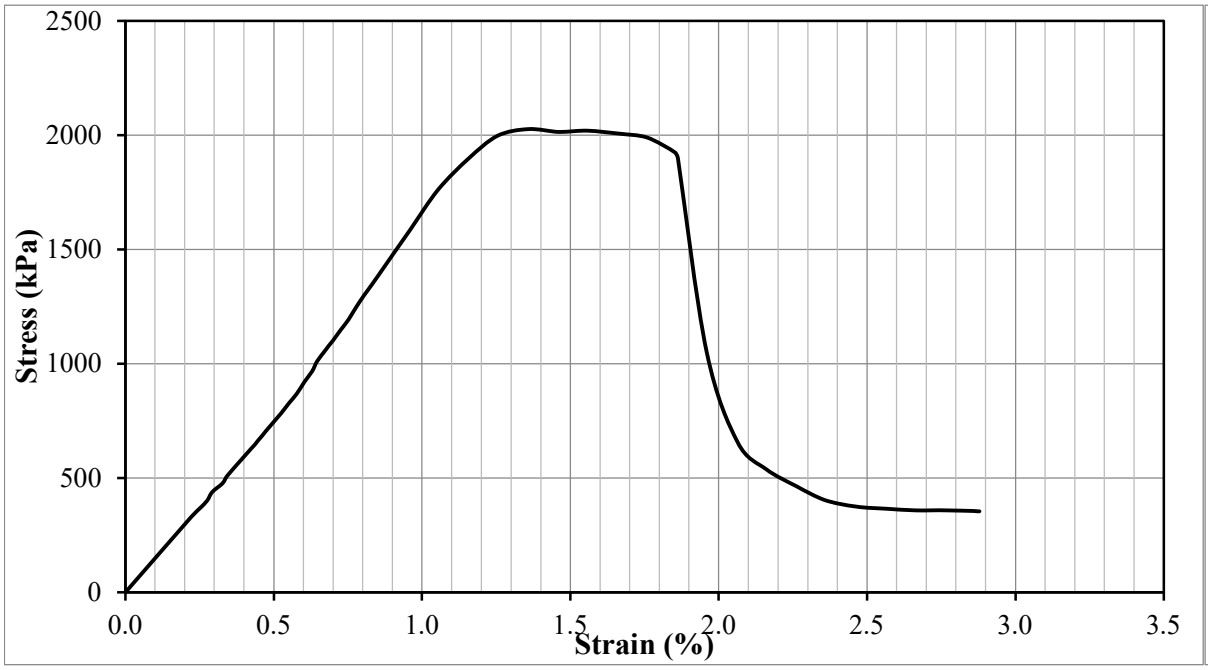
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,169	Strain at failure, εf :	0.98	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	R-5-F	Initial Area:	2123.2	mm^2
Test Date:	10/22/2021	Weight:	381.8	g
Strain Rate:	1 %/min	Unit Weight:	1777	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	364.7	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Additional information		Demolded at 7 days		



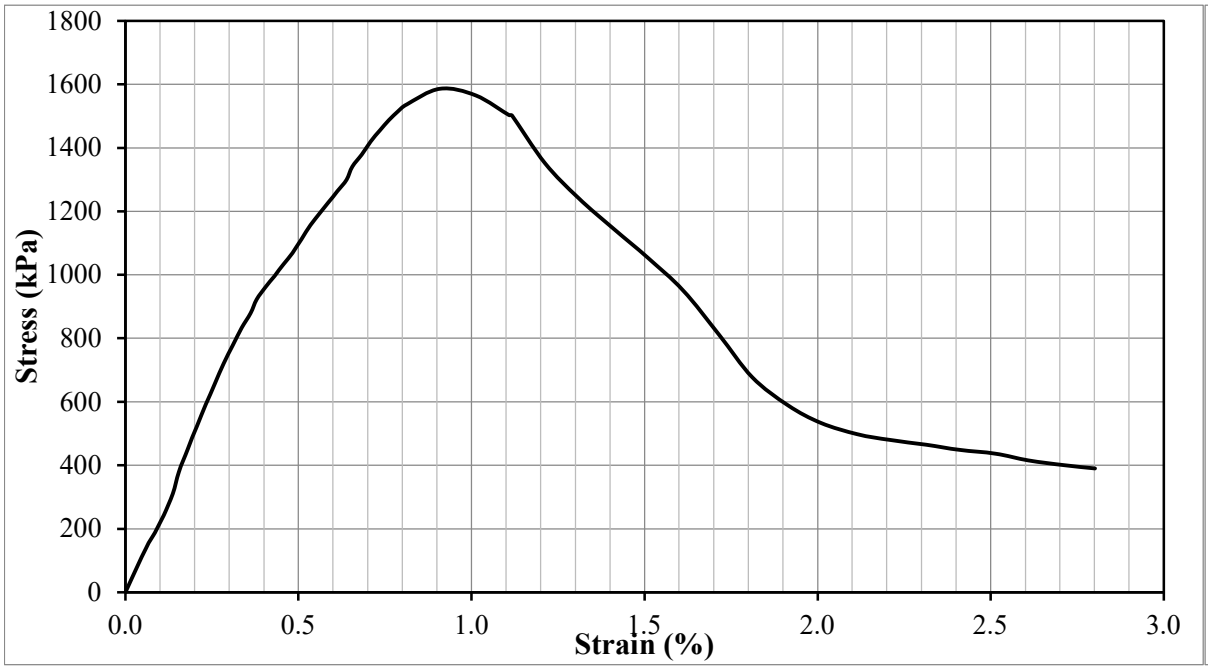
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,189	Strain at failure, εf :	1.08	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	R-5-J	Initial Area:	2121.1	mm^2
Test Date:	11/28/2021	Weight:	376.8	g
Strain Rate:	1 %/min	Unit Weight:	1780	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	402.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Additional information		Demolded at 7 days		



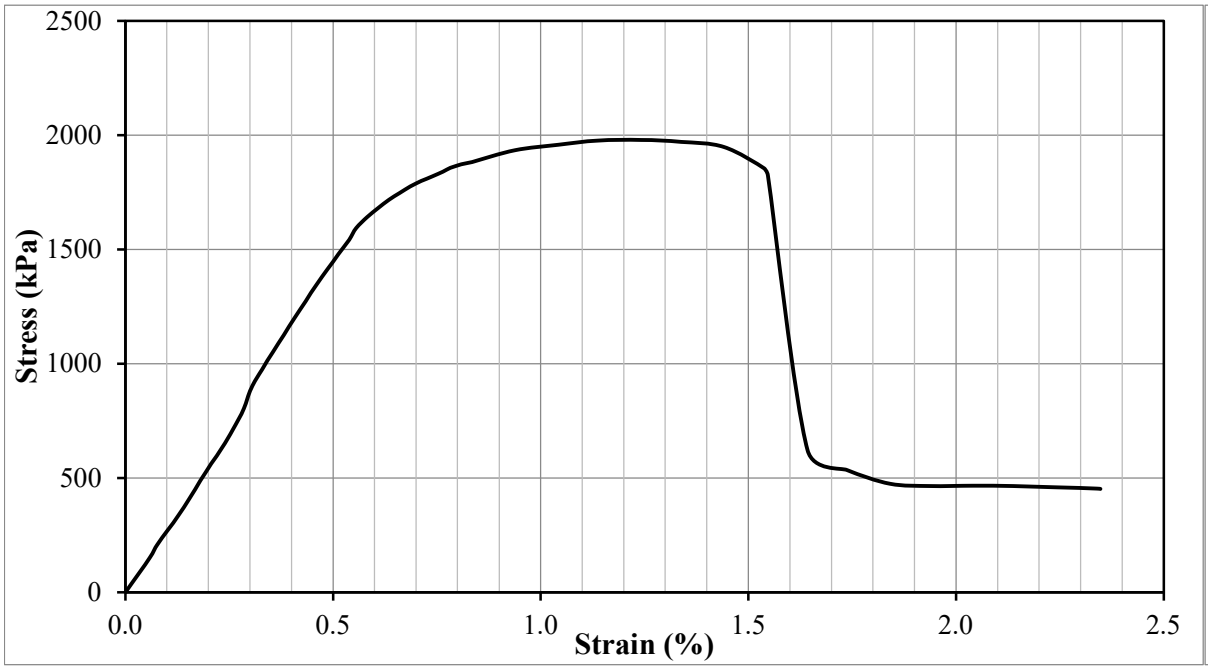
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,014	Strain at failure, εf :	1.36	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	R-5-B	Initial Area:	2123.2	mm^2
Test Date:	4/20/2021	Weight:	375.6	g
Strain Rate:	1 %/min	Unit Weight:	1786	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	179.8	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Additional information		Non-demolded		



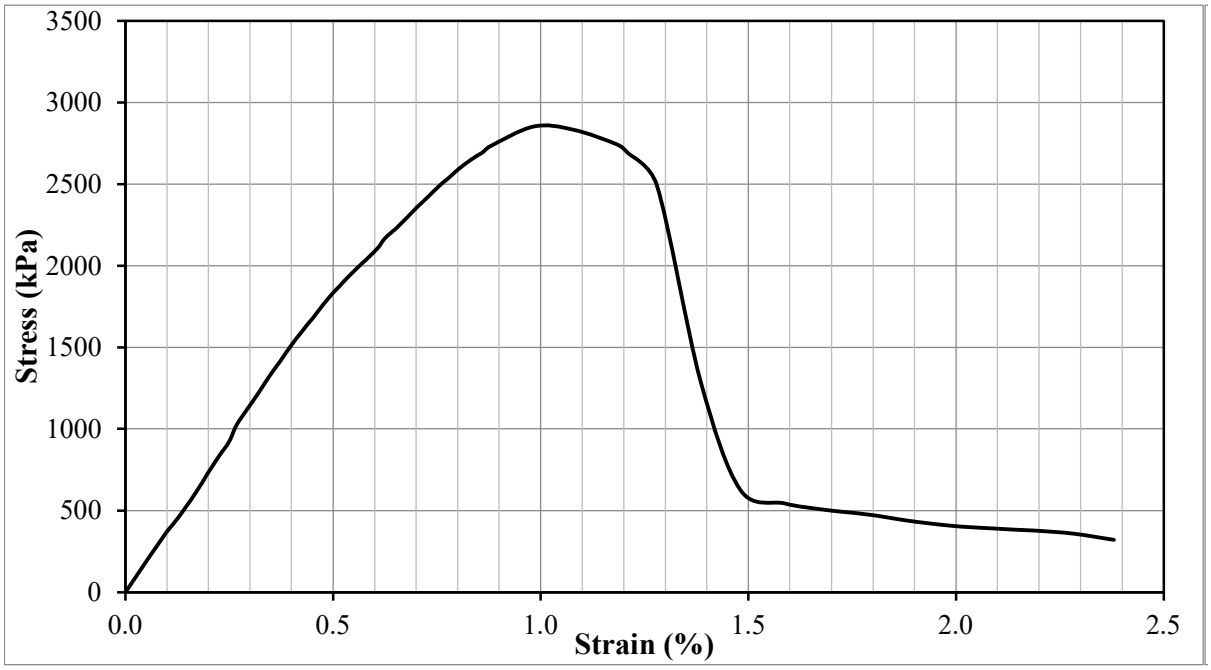
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,574	Strain at failure, εf :	0.91	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	R-5-G	Initial Area:	2110.8	mm^2
Test Date:	4/20/2021	Weight:	376.0	g
Strain Rate:	1 %/min	Unit Weight:	1793	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	179.8	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Additional information		Non-demolded		



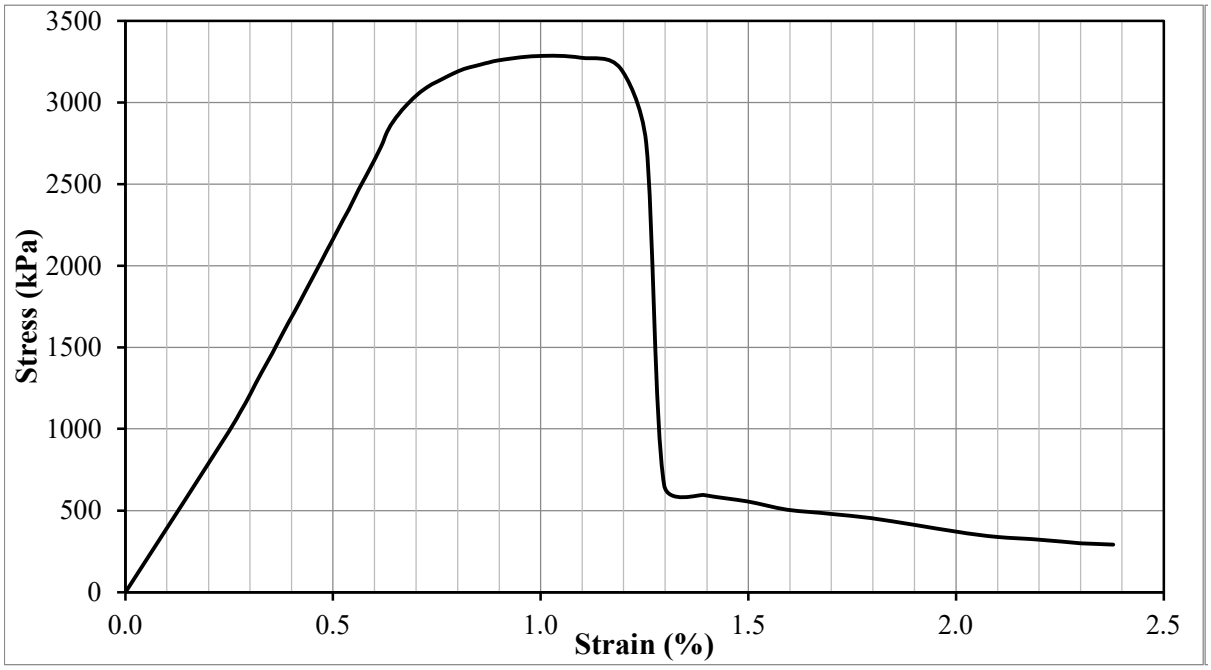
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,966	Strain at failure, εf :	1.24	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	R-5-D	Initial Area:	2119.1	mm^2
Test Date:	10/22/2021	Weight:	382.8	g
Strain Rate:	1 %/min	Unit Weight:	1790	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	364.7	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Additional information		Non-demolded		



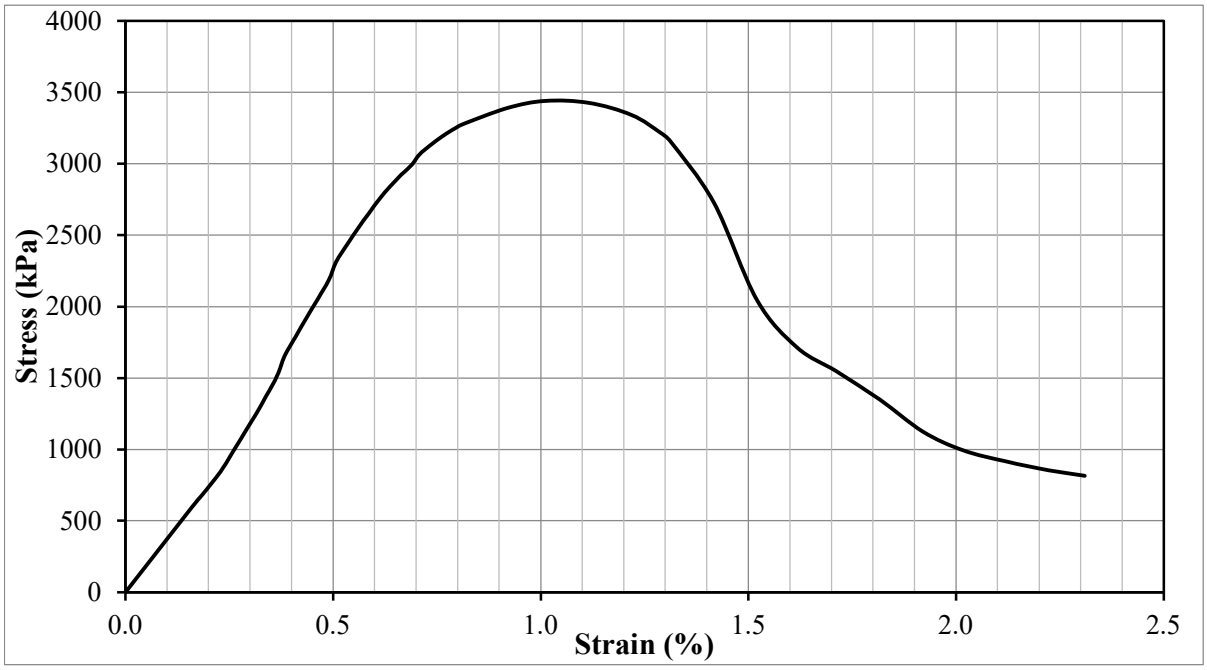
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,840	Strain at failure, εf :	0.98	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	R-5-E	Initial Area:	2119.1	mm^2
Test Date:	10/22/2021	Weight:	385.9	g
Strain Rate:	1 %/min	Unit Weight:	1790	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	364.7	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Additional information		Non-demolded		



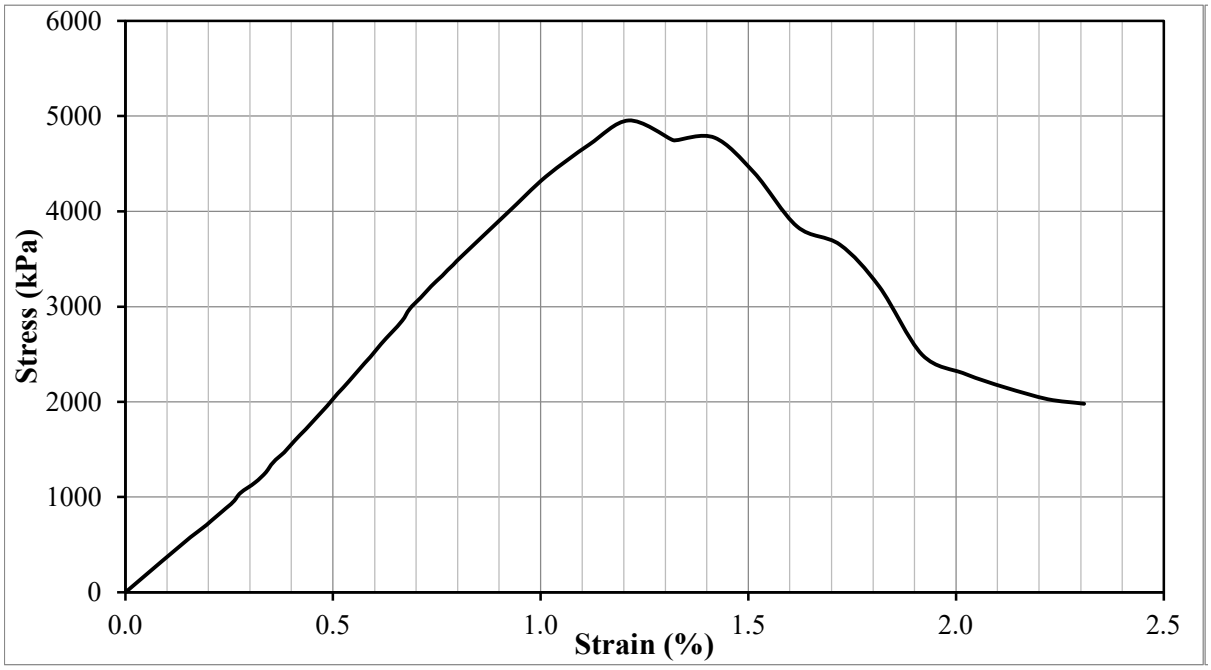
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,274	Strain at failure, εf :	0.99	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	R-5-I	Initial Area:	2104.6	mm^2
Test Date:	11/28/2021	Weight:	381.8	g
Strain Rate:	1 %/min	Unit Weight:	1803	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	402.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Additional information		Non-demolded		



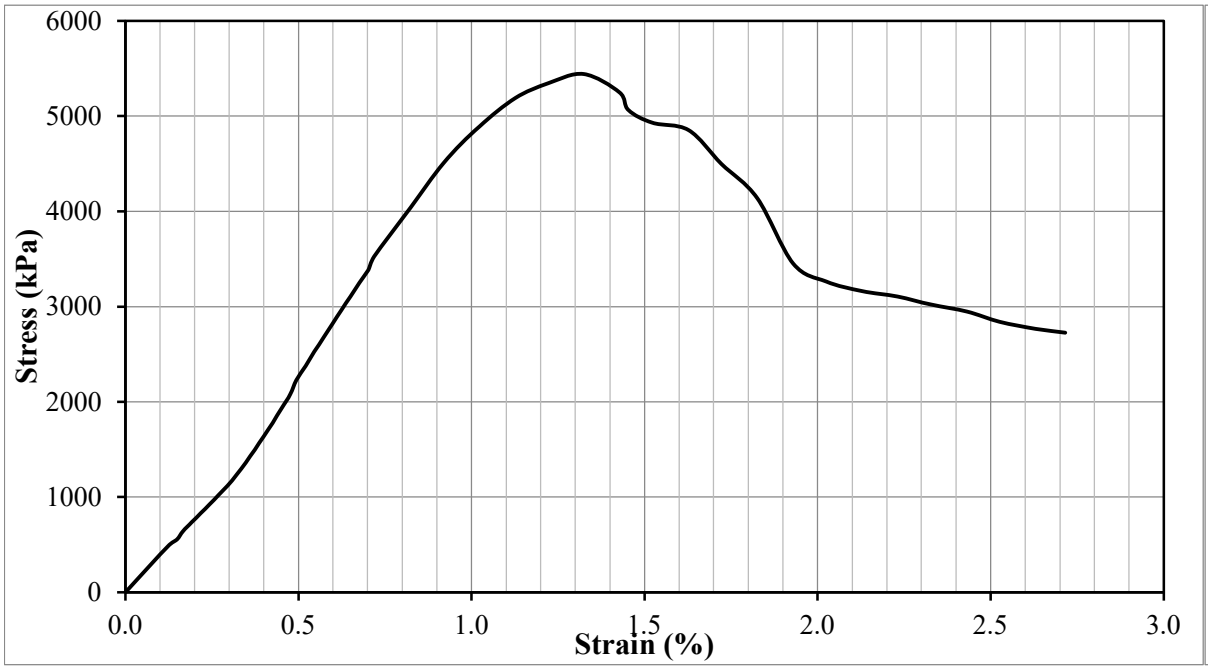
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,425	Strain at failure, εf :	1.01	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	R-6-A	Initial Area:	2123.2	mm^2
Test Date:	4/26/2021	Weight:	357.0	g
Strain Rate:	1 %/min	Unit Weight:	1691	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	180.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Additional information		Demolded at 7 days		



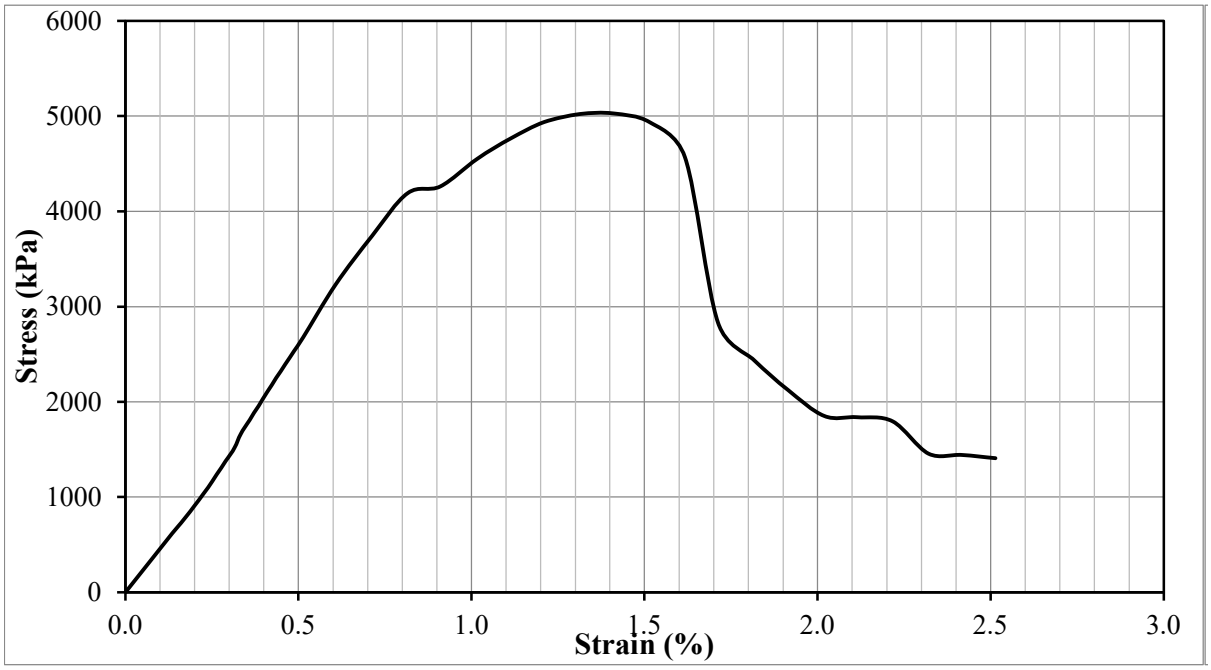
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,919	Strain at failure, εf :	1.21	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	94.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	R-6-H	Initial Area:	2110.8	mm^2
Test Date:	4/26/2021	Weight:	340.1	g
Strain Rate:	1 %/min	Unit Weight:	1699	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	180.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Additional information		Demolded at 7 days		



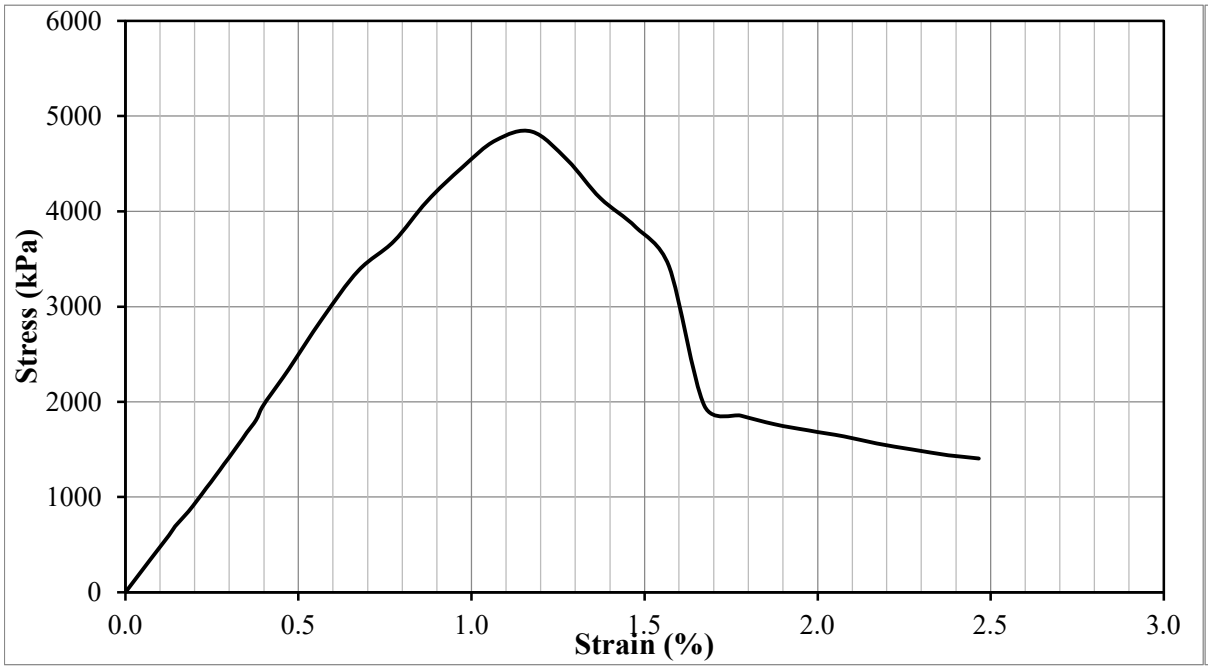
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,367	Strain at failure, εf :	1.32	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	R-6-C	Initial Area:	2127.4	mm^2
Test Date:	10/28/2021	Weight:	362.1	g
Strain Rate:	1 %/min	Unit Weight:	1693	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	364.6	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Additional information		Demolded at 7 days		



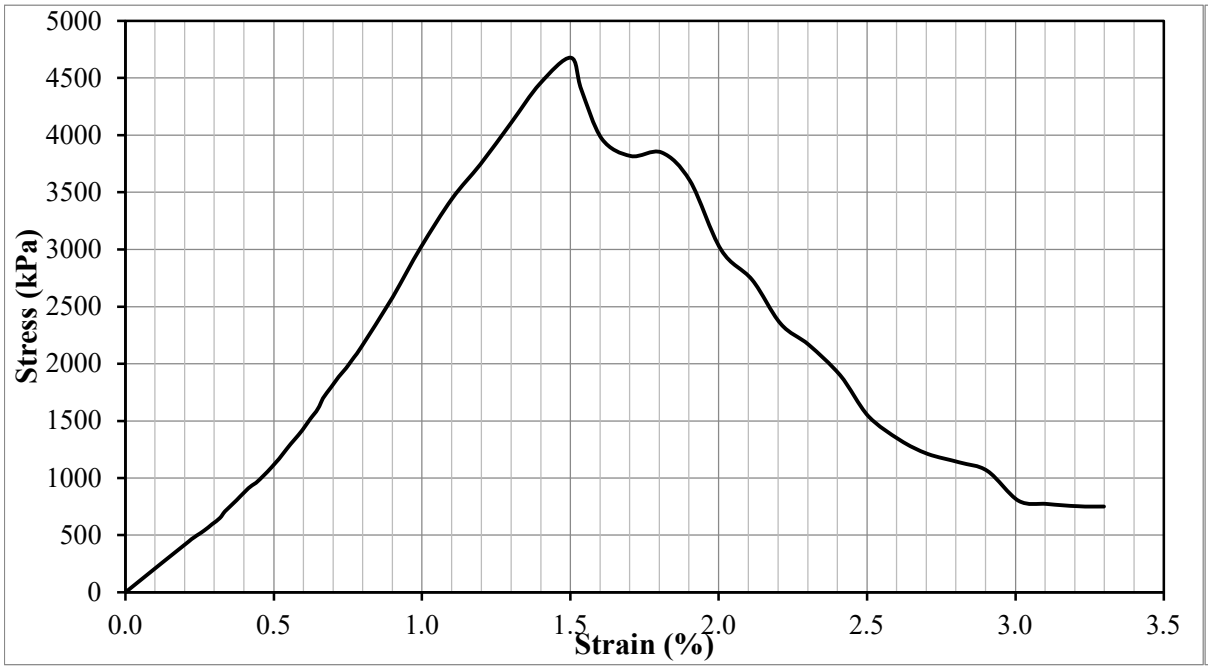
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,999	Strain at failure, εf :	1.41	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.1	mm
I.D.:	R-6-F	Initial Area:	2129.4	mm^2
Test Date:	10/28/2021	Weight:	363.9	g
Strain Rate:	1 %/min	Unit Weight:	1690	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	364.7	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Additional information		Demolded at 7 days		



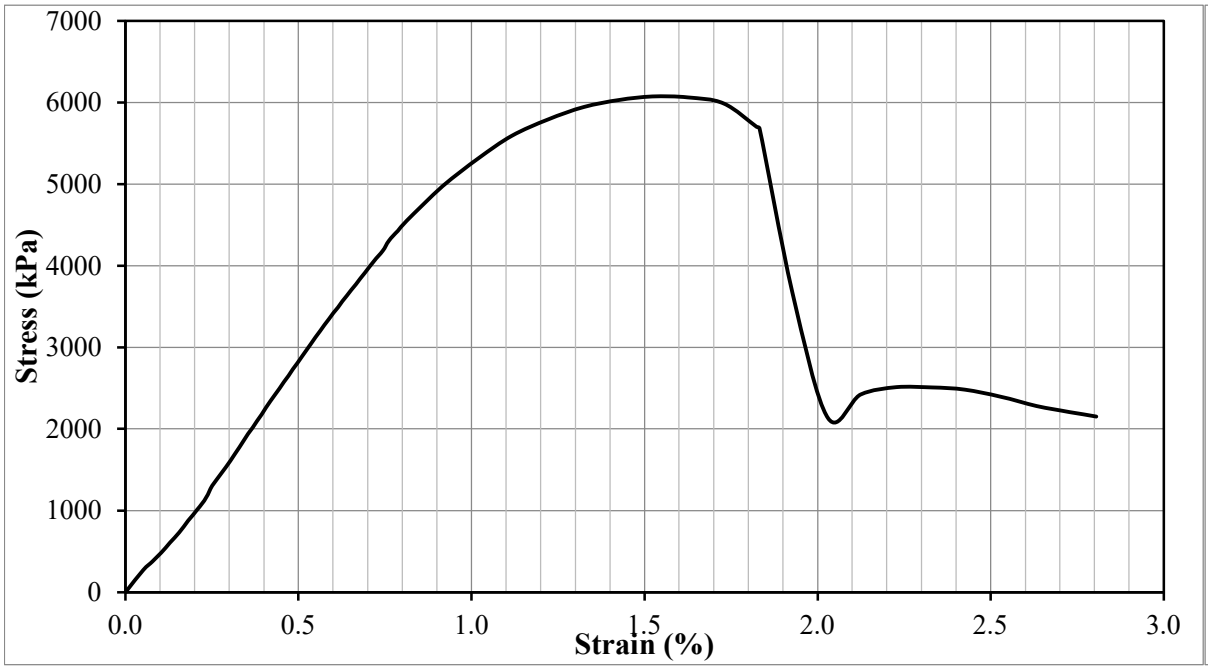
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,815	Strain at failure, εf :	1.17	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	R-6-J	Initial Area:	2123.2	mm^2
Test Date:	12/2/2021	Weight:	364.1	g
Strain Rate:	1 %/min	Unit Weight:	1698	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	399.6	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Additional information		Demolded at 7 days		



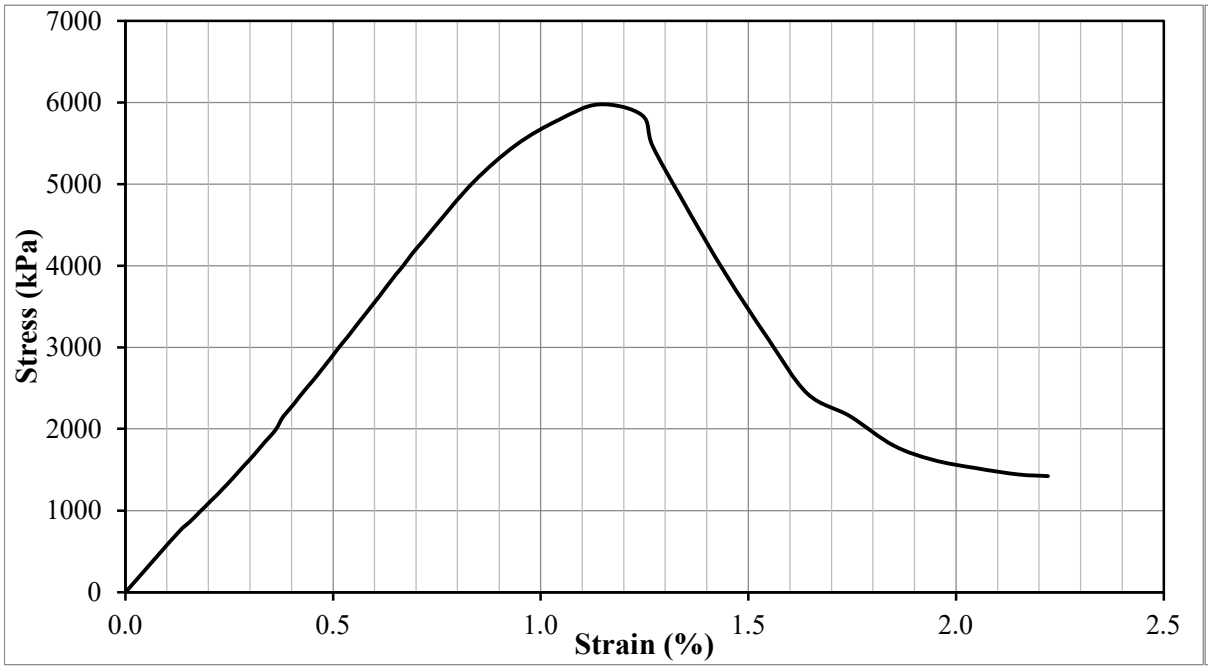
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,657	Strain at failure, εf :	1.50	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	96.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	R-6-B	Initial Area:	2125.3	mm^2
Test Date:	4/26/2021	Weight:	351.3	g
Strain Rate:	1 %/min	Unit Weight:	1706	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	180.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Additional information		Non-demolded		



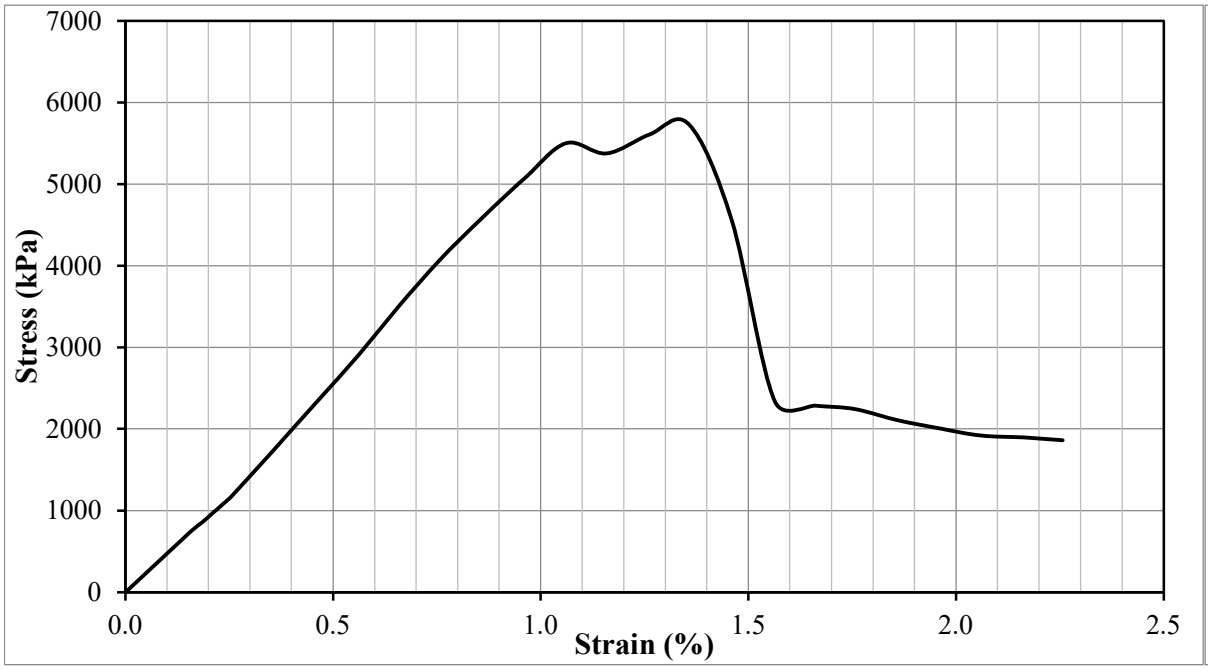
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	6,005	Strain at failure, εf :	1.52	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	R-6-G	Initial Area:	2117.0	mm^2
Test Date:	4/26/2021	Weight:	367.9	g
Strain Rate:	1 %/min	Unit Weight:	1716	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	180.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Additional information		Non-demolded		



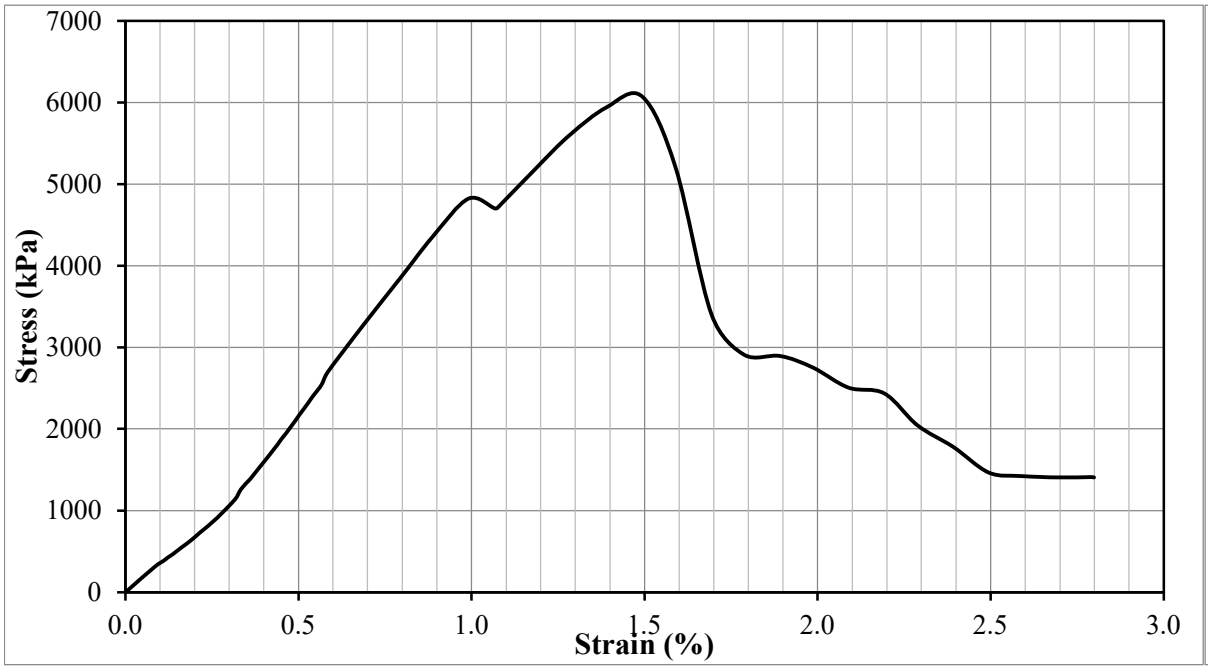
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,953	Strain at failure, εf :	1.14	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	R-6-D	Initial Area:	2125.3	mm^2
Test Date:	10/28/2021	Weight:	366.6	g
Strain Rate:	1 %/min	Unit Weight:	1712	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	364.7	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Additional information		Non-demolded		



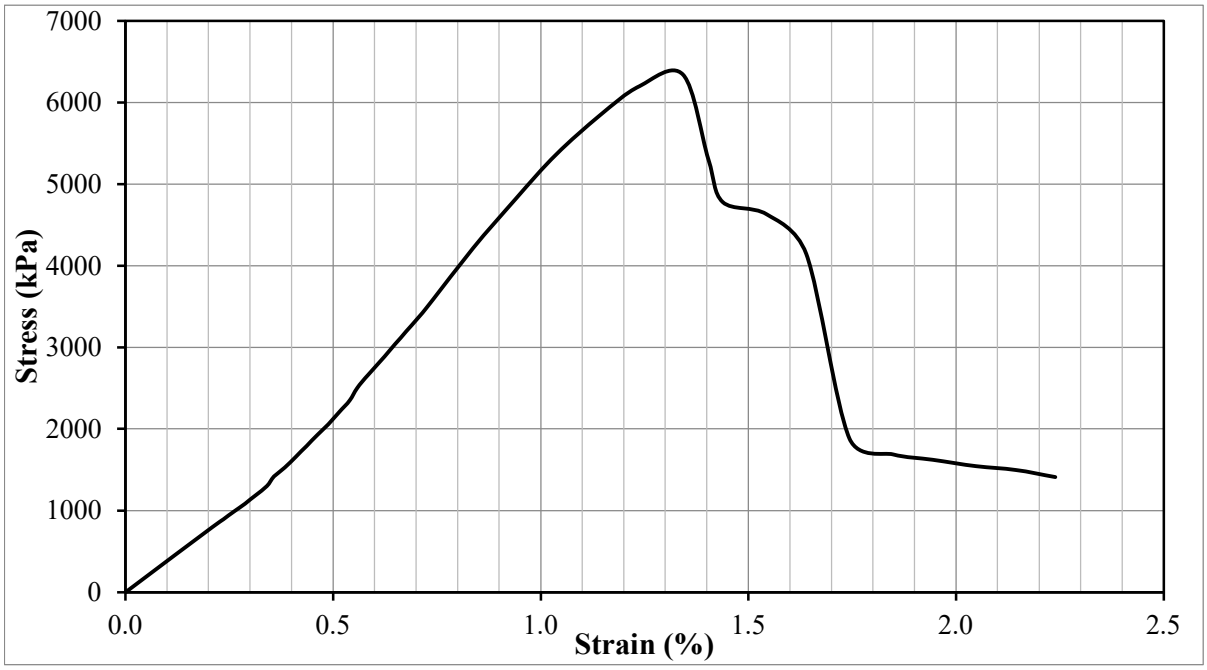
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,705	Strain at failure, εf :	1.36	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	R-6-E	Initial Area:	2121.1	mm^2
Test Date:	10/28/2021	Weight:	366.2	g
Strain Rate:	1 %/min	Unit Weight:	1716	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	364.7	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Additional information		Non-demolded		



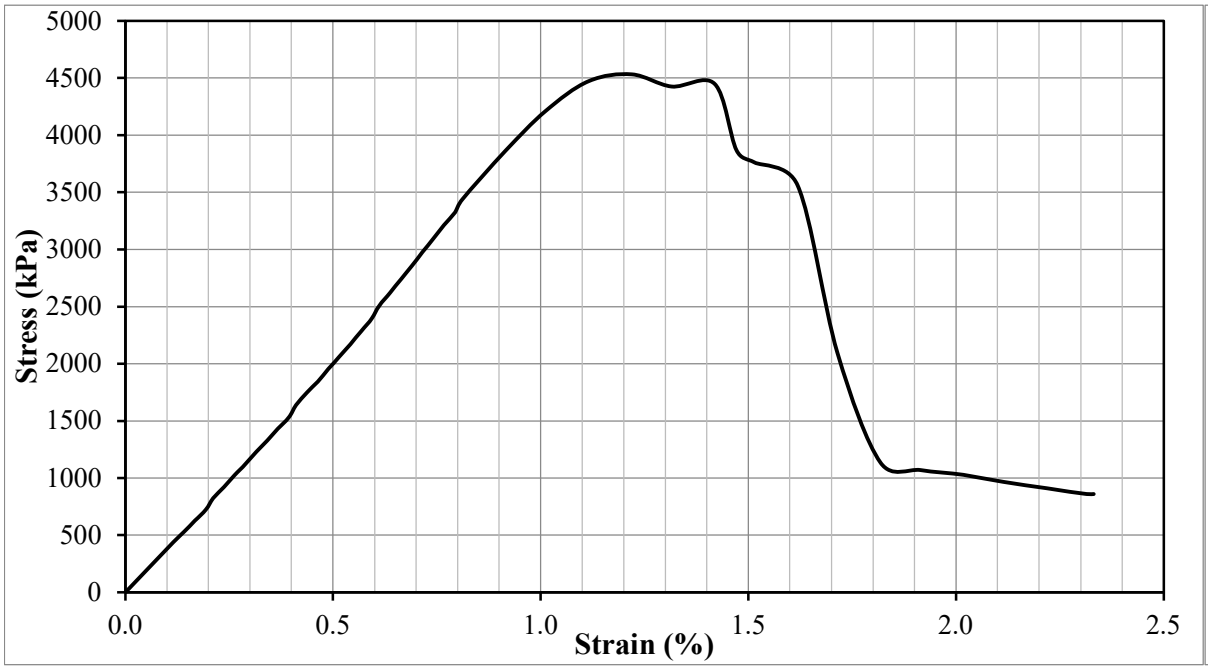
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	6,042	Strain at failure, εf :	1.49	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	R-6-I	Initial Area:	2112.9	mm^2
Test Date:	12/2/2021	Weight:	366.9	g
Strain Rate:	1 %/min	Unit Weight:	1724	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	400.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Additional information		Non-demolded		



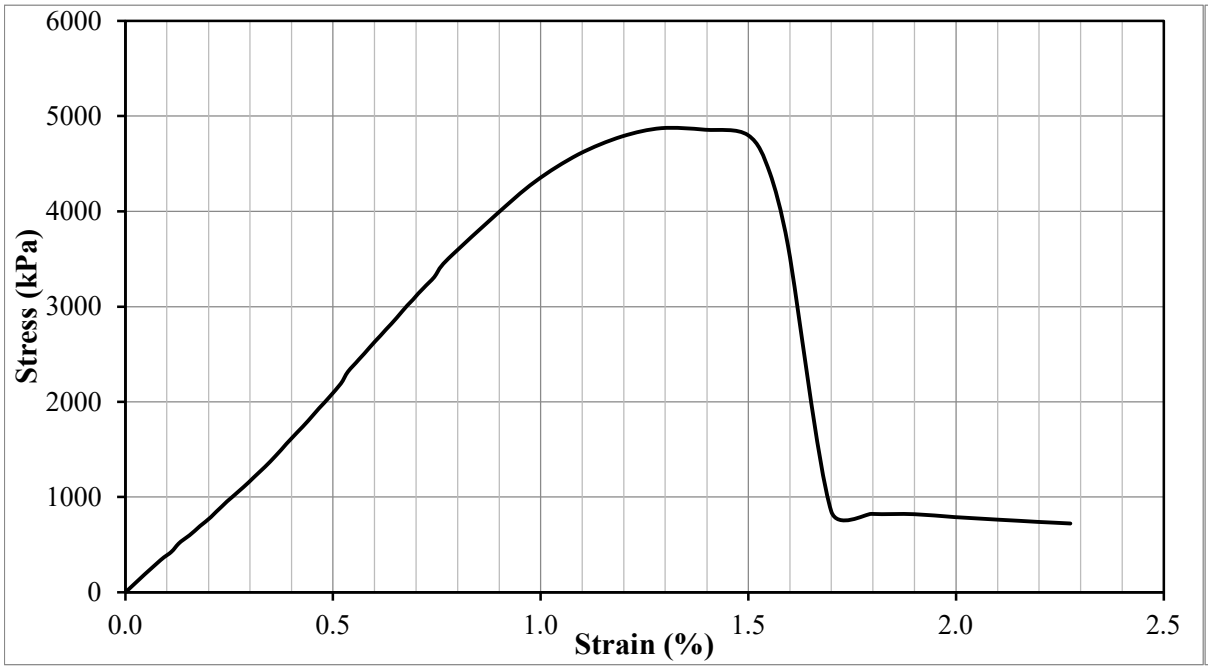
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	6,309	Strain at failure, εf :	1.34	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.1	mm
I.D.:	R-7-A	Initial Area:	2129.4	mm^2
Test Date:	5/17/2021	Weight:	377.1	g
Strain Rate:	1 %/min	Unit Weight:	1773	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	99.8	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45.0	°C
Additional information		Demolded at 7 days		



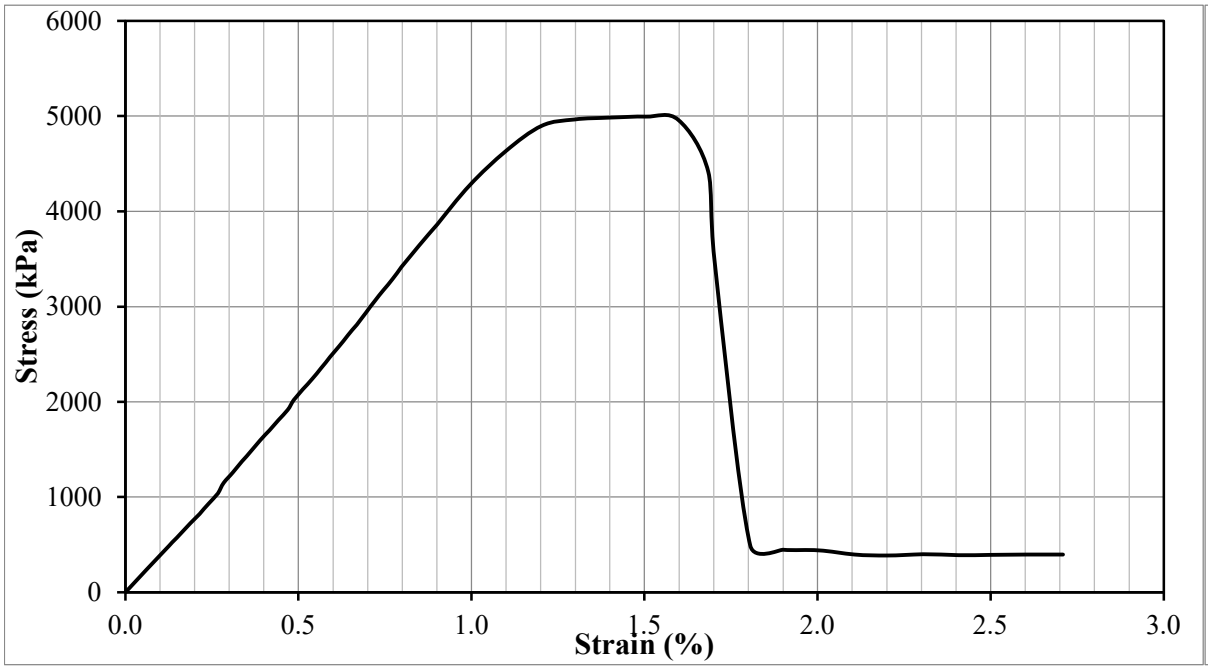
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,501	Strain at failure, εf :	1.22	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	R-7-J	Initial Area:	2123.2	mm^2
Test Date:	5/17/2021	Weight:	381.4	g
Strain Rate:	1 %/min	Unit Weight:	1778	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	99.8	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45	°C
Additional information		Demolded at 7 days		



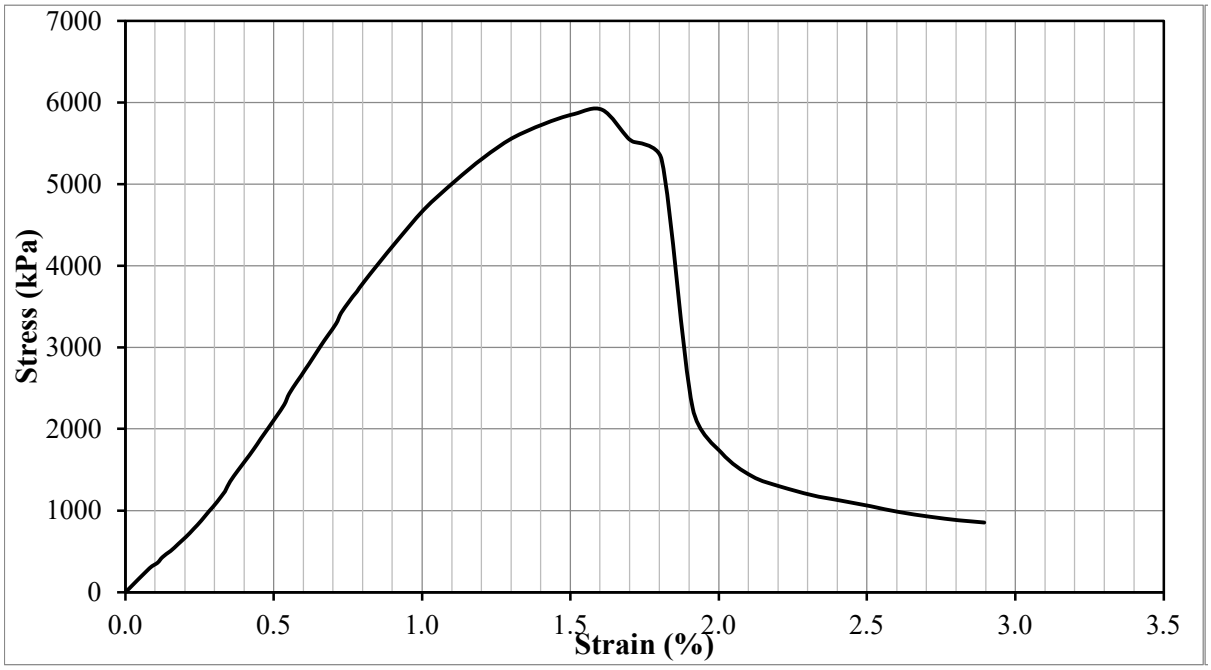
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,849	Strain at failure, εf :	1.29	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	R-7-B	Initial Area:	2127.4	mm^2
Test Date:	8/25/2021	Weight:	381.7	g
Strain Rate:	1 %/min	Unit Weight:	1781	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	199.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45	°C
Additional information		Demolded at 7 days		



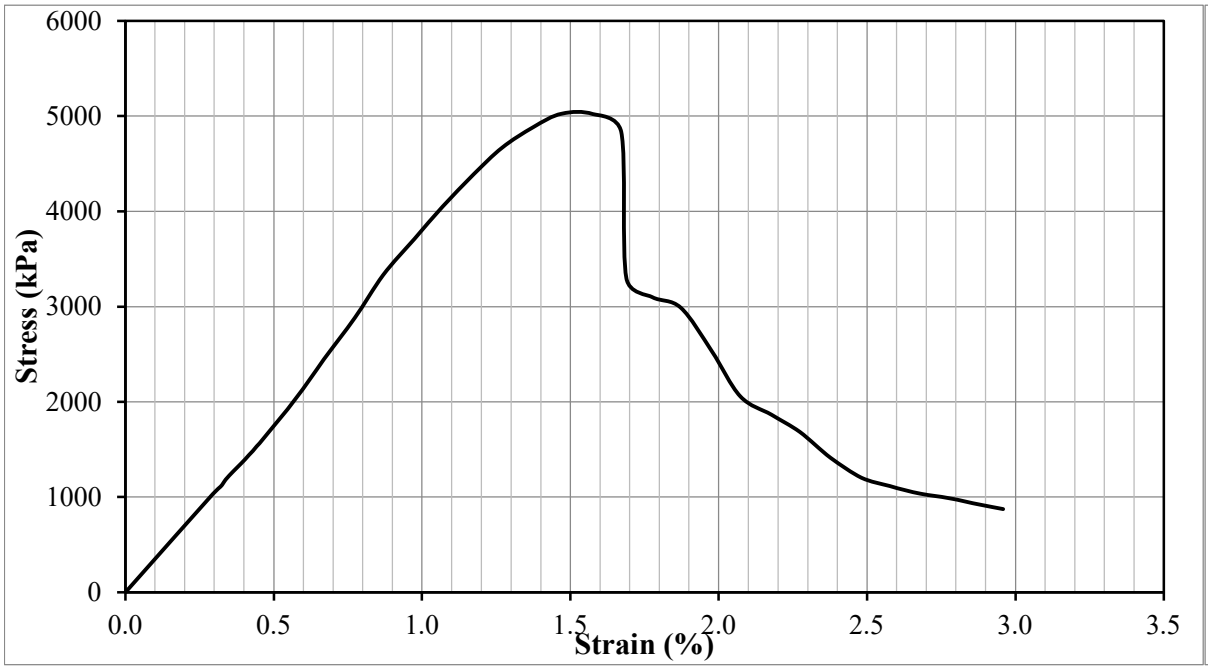
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,967	Strain at failure, εf :	1.50	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	R-7-I	Initial Area:	2125.3	mm^2
Test Date:	8/25/2021	Weight:	373.0	g
Strain Rate:	1 %/min	Unit Weight:	1779	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	199.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45	°C
Additional information		Demolded at 7 days		



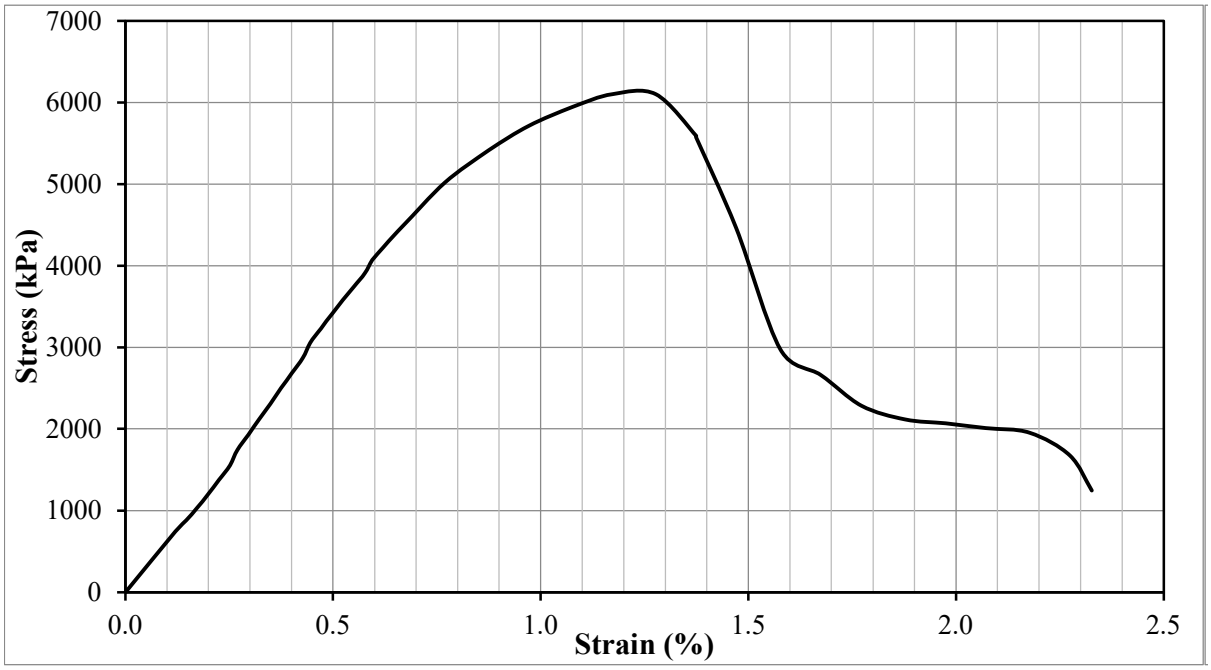
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,860	Strain at failure, εf :	1.61	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	R-7-C	Initial Area:	2123.2	mm^2
Test Date:	12/3/2021	Weight:	383.3	g
Strain Rate:	1 %/min	Unit Weight:	1784	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	299.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45	°C
Additional information		Demolded at 7 days		



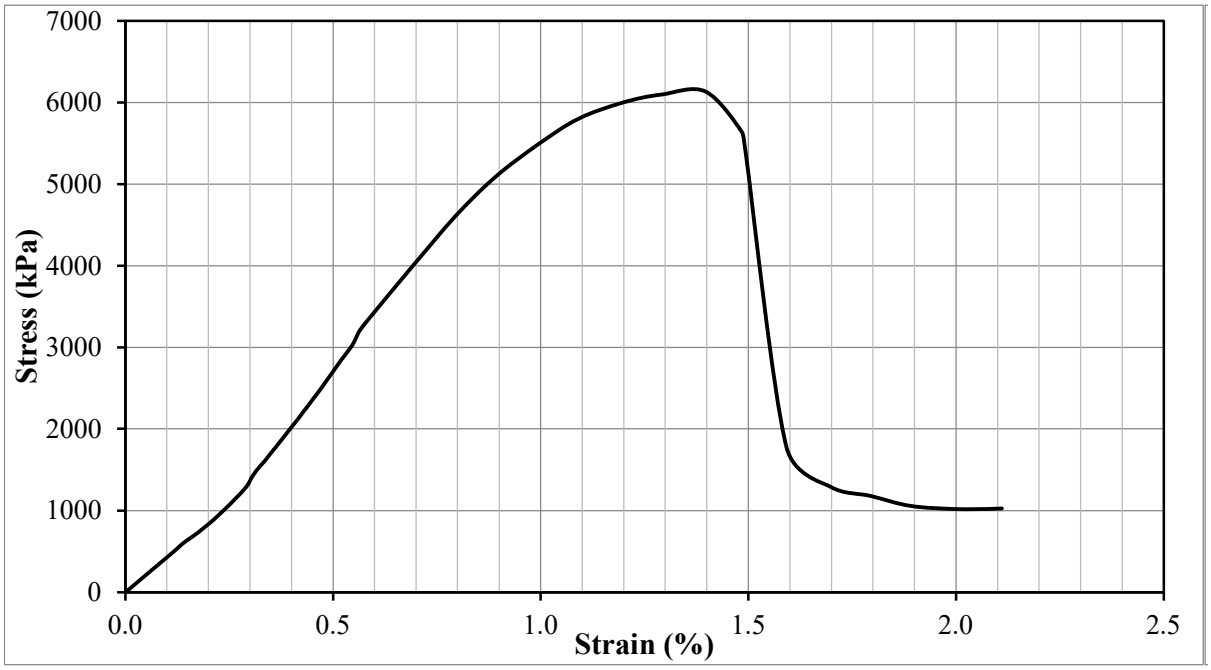
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,004	Strain at failure, εf :	1.47	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.1	mm
I.D.:	R-7-E	Initial Area:	2135.7	mm^2
Test Date:	3/13/2022	Weight:	382.2	g
Strain Rate:	1 %/min	Unit Weight:	1773	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	400.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45	°C
Additional information		Non-demolded		



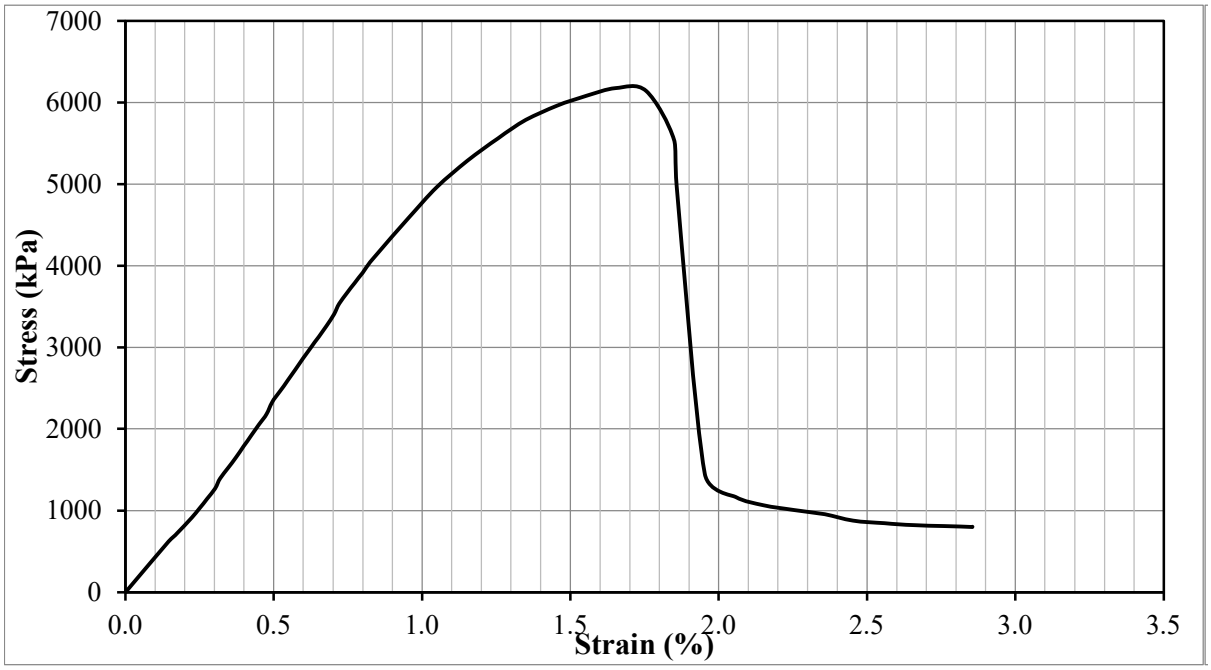
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	6,071	Strain at failure, εf :	1.17	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	R-7-F	Initial Area:	2127.4	mm^2
Test Date:	3/13/2022	Weight:	376.1	g
Strain Rate:	1 %/min	Unit Weight:	1782	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	400.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45	°C
Additional information		Non-demolded		



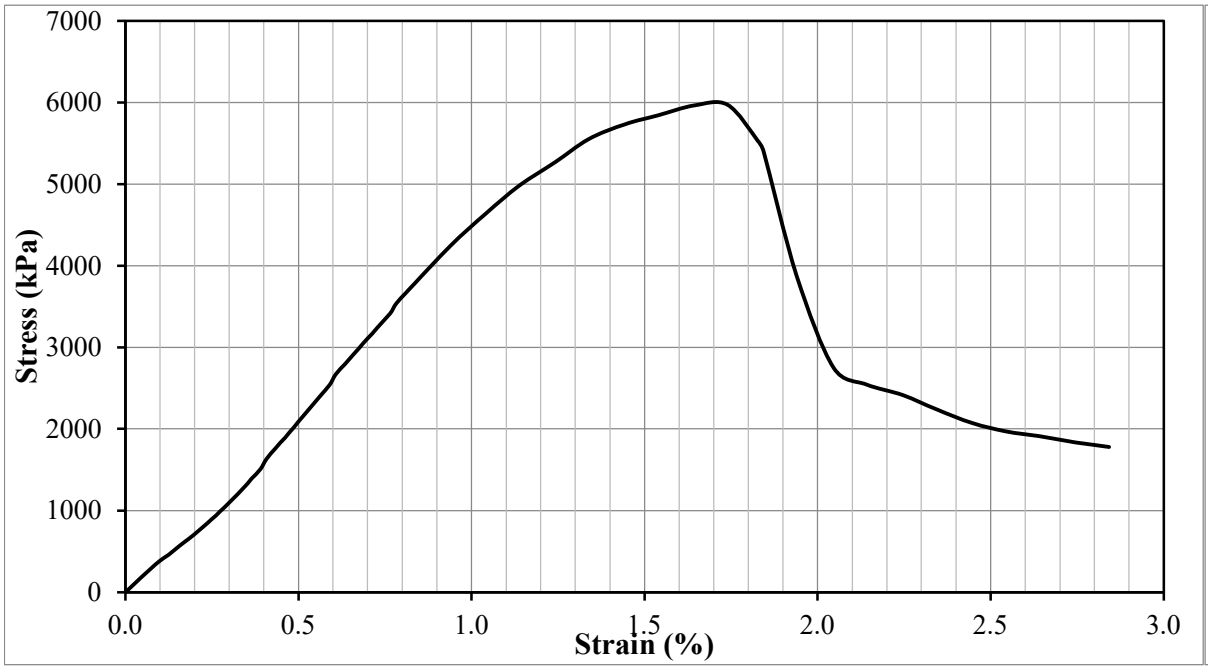
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	6,085	Strain at failure, εf :	1.40	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	R-7-D	Initial Area:	2110.8	mm^2
Test Date:	8/25/2021	Weight:	381.6	g
Strain Rate:	1 %/min	Unit Weight:	1795	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	200.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45	°C
Additional information		Non-demolded		



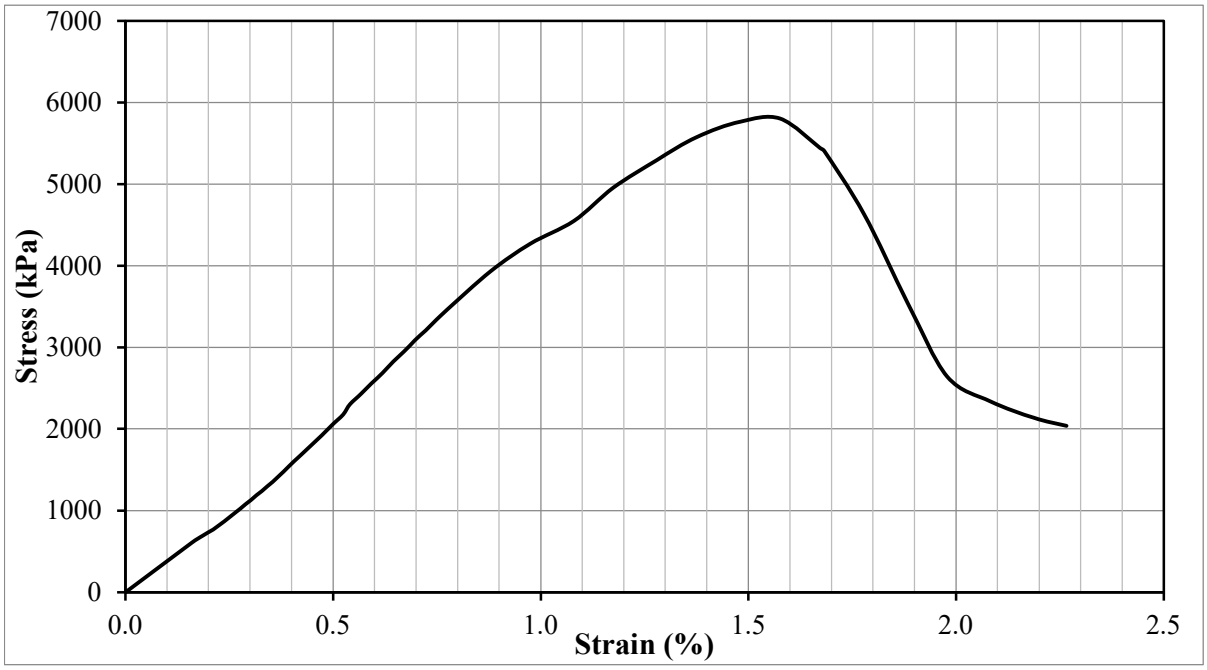
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	6,146	Strain at failure, εf :	1.65	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	R-7-G	Initial Area:	2112.9	mm^2
Test Date:	8/25/2021	Weight:	376.2	g
Strain Rate:	1 %/min	Unit Weight:	1791	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	200.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45	°C
Additional information		Non-demolded		



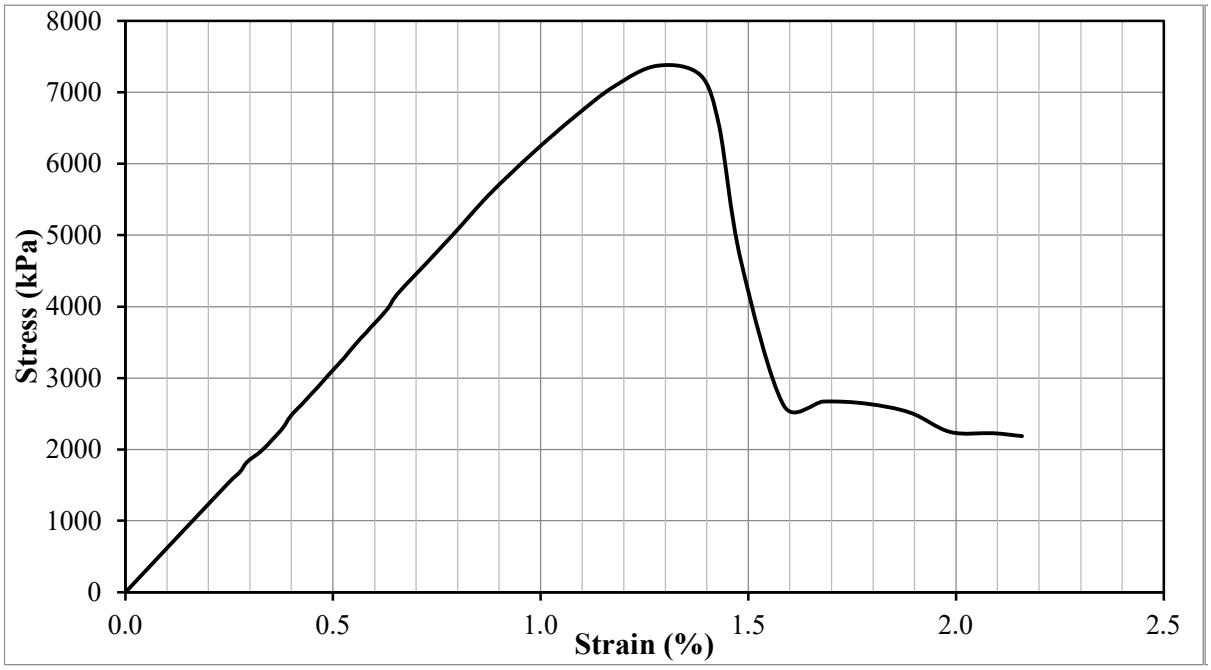
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,932	Strain at failure, εf :	1.74	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	R-7-H	Initial Area:	2125.3	mm^2
Test Date:	12/3/2021	Weight:	378.4	g
Strain Rate:	1 %/min	Unit Weight:	1778	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	299.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45	°C
Additional information		Non-demolded		



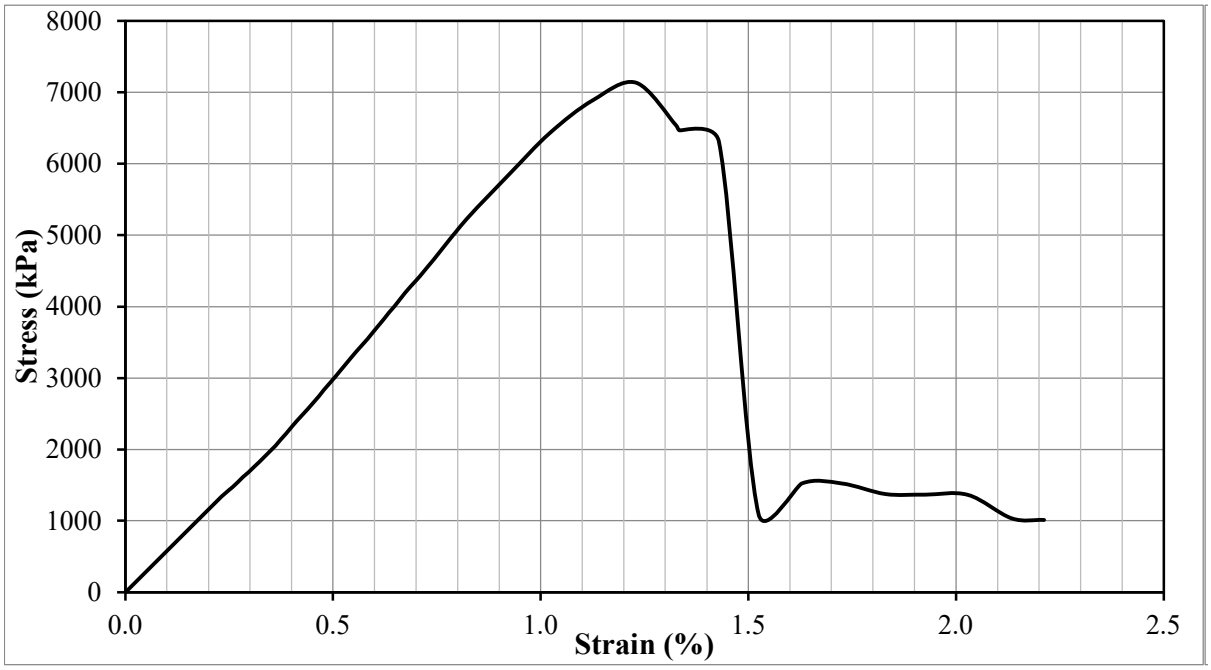
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,767	Strain at failure, εf :	1.58	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.1	mm
I.D.:	R-8-A	Initial Area:	2135.7	mm^2
Test Date:	5/18/2021	Weight:	363.8	g
Strain Rate:	1 %/min	Unit Weight:	1701	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	100.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45.0	°C
Additional information		Demolded at 7 days		



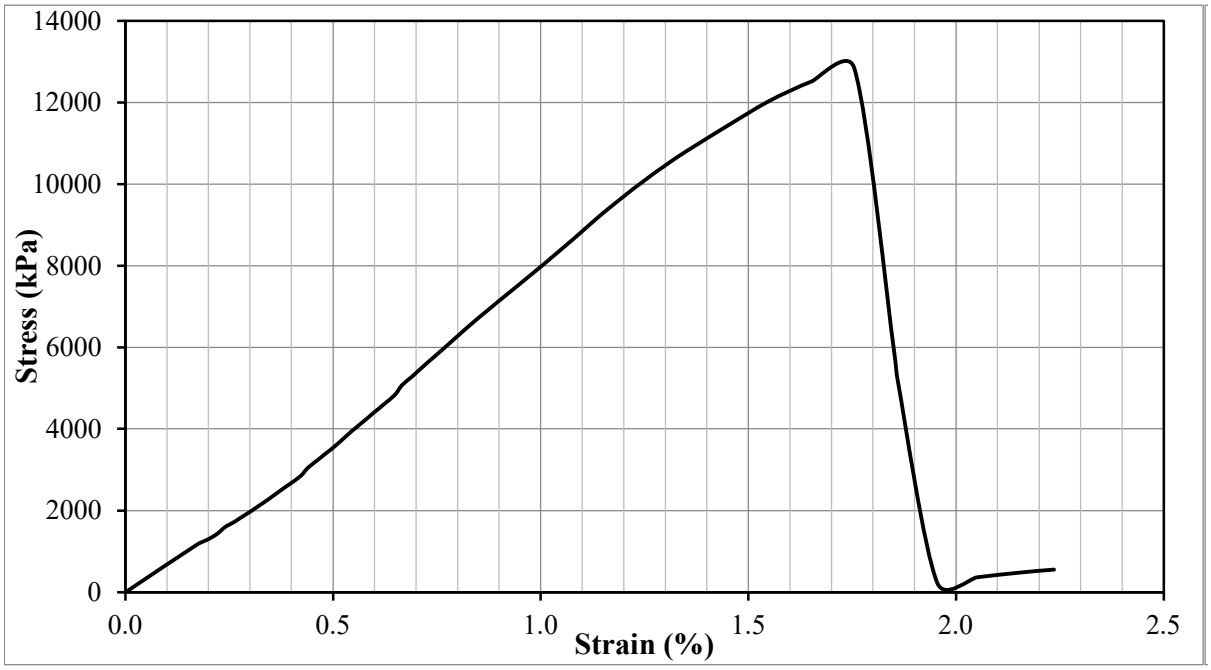
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	7,325	Strain at failure, εf :	1.28	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.1	mm
I.D.:	R-8-J	Initial Area:	2133.6	mm^2
Test Date:	5/18/2021	Weight:	367.1	g
Strain Rate:	1 %/min	Unit Weight:	1706	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	100.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45	°C
Additional information		Demolded at 7 days		



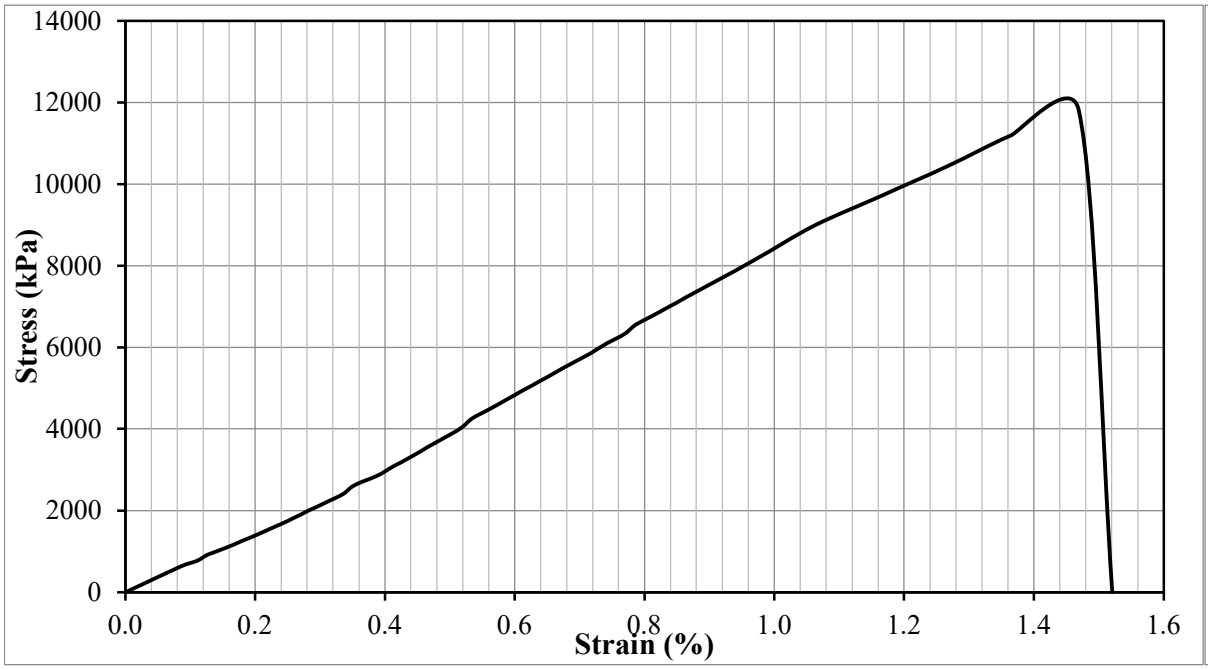
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	7,097	Strain at failure, εf :	1.23	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.2	mm
I.D.:	R-8-B	Initial Area:	2137.8	mm^2
Test Date:	8/26/2021	Weight:	355.5	g
Strain Rate:	1 %/min	Unit Weight:	1701	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	200.3	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45	°C
Additional information		Demolded at 7 days		



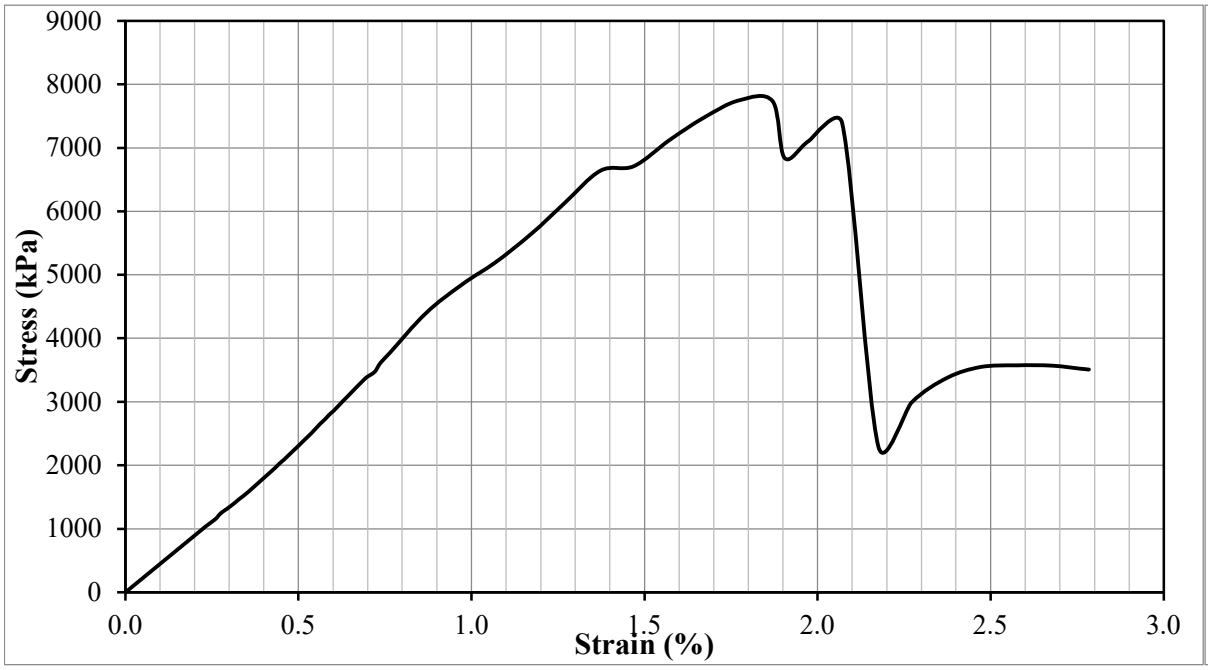
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	12,704	Strain at failure, εf :	1.76	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.1	mm
I.D.:	R-8-I	Initial Area:	2129.4	mm^2
Test Date:	8/26/2021	Weight:	365.7	g
Strain Rate:	1 %/min	Unit Weight:	1707	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	200.3	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45	°C
Additional information		Demolded at 7 days		



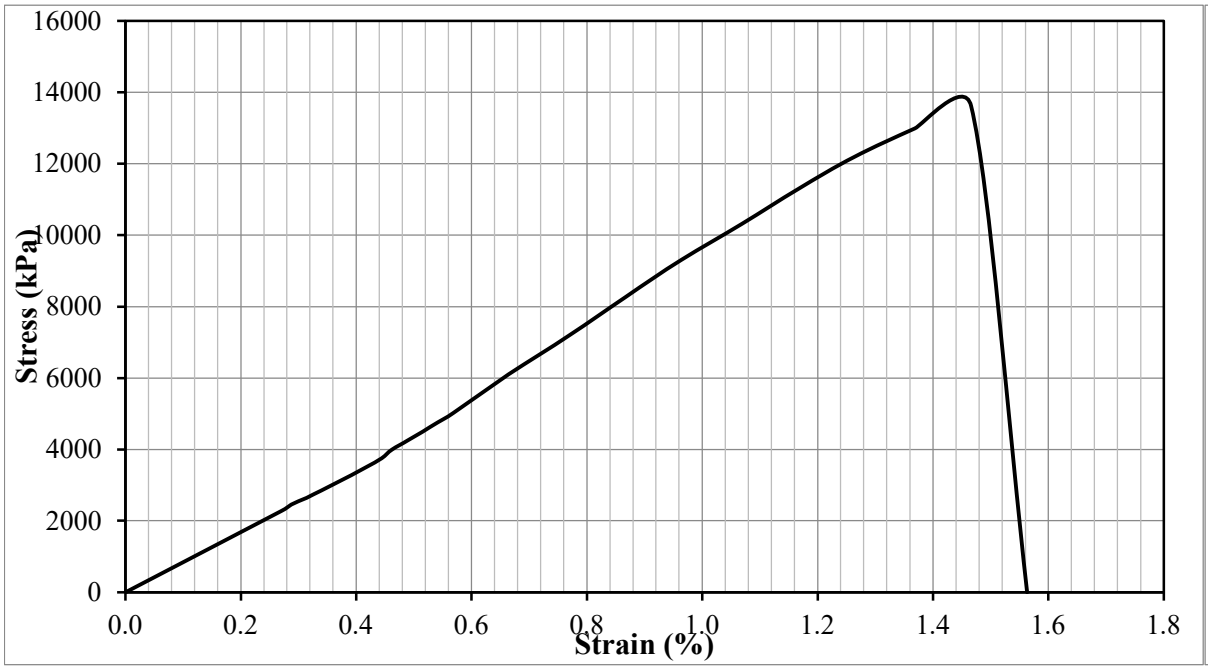
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	11,753	Strain at failure, εf :	1.47	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.1	mm
I.D.:	R-8-C	Initial Area:	2129.4	mm^2
Test Date:	12/4/2021	Weight:	358.6	g
Strain Rate:	1 %/min	Unit Weight:	1712	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	299.8	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45	°C
Additional information		Demolded at 7 days		



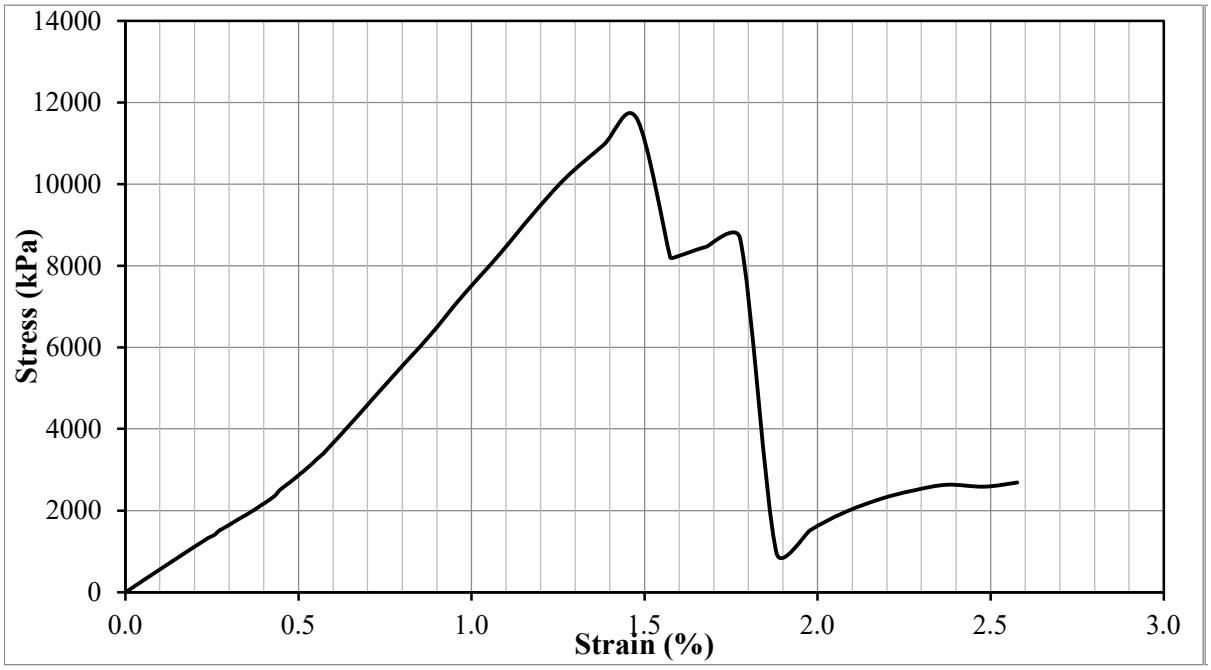
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	7,682	Strain at failure, εf :	1.77	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.2	mm
I.D.:	R-8-E	Initial Area:	2139.8	mm^2
Test Date:	3/14/2022	Weight:	363.5	g
Strain Rate:	1 %/min	Unit Weight:	1701	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	400.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45	°C
Additional information		Non-demolded		



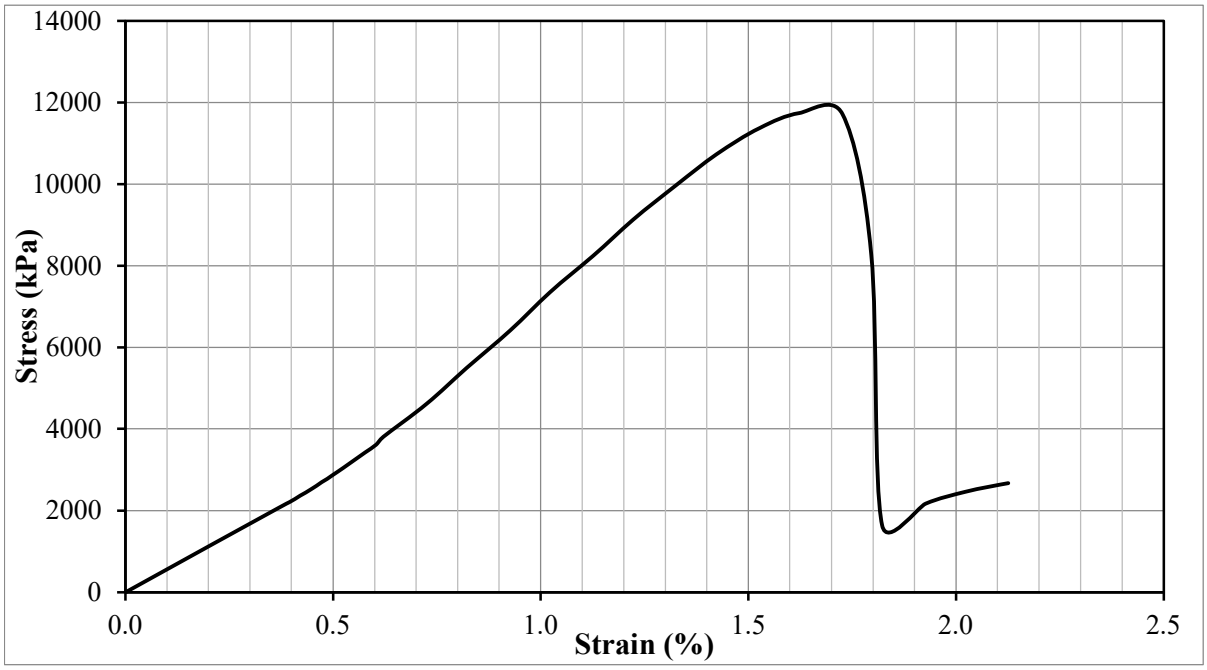
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	13,520	Strain at failure, εf :	1.47	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.2	mm
I.D.:	R-8-F	Initial Area:	2139.8	mm^2
Test Date:	3/14/2022	Weight:	360.3	g
Strain Rate:	1 %/min	Unit Weight:	1700	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	400.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45	°C
Additional information		Non-demolded		



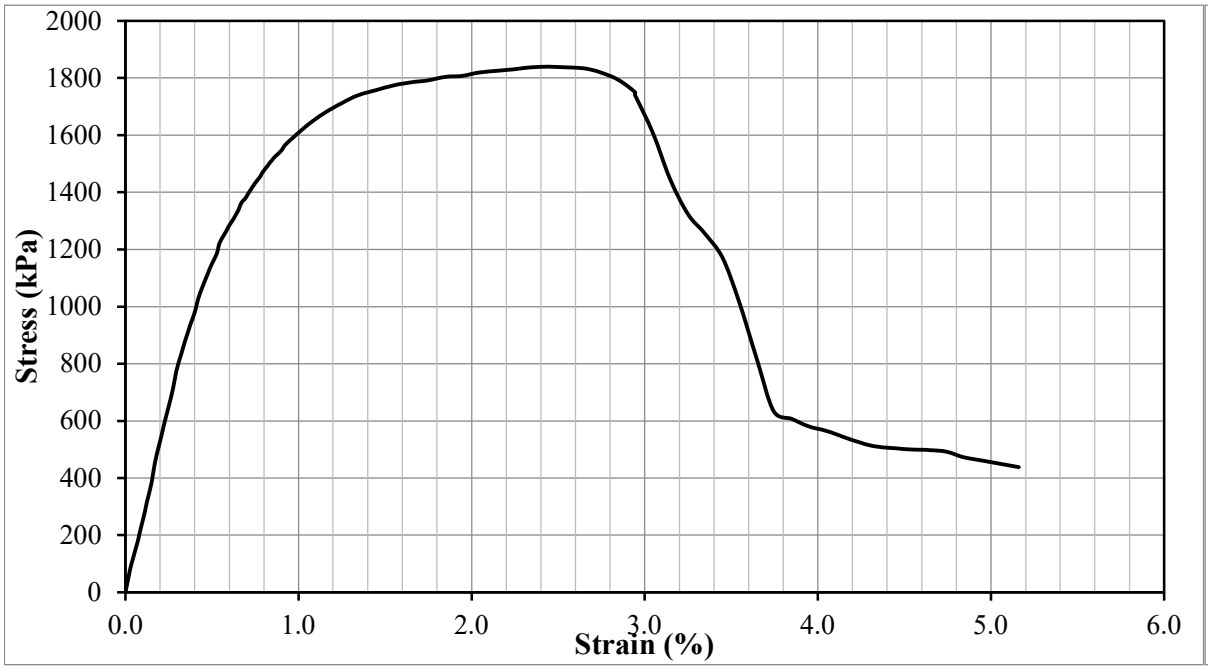
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	11,517	Strain at failure, εf :	1.48	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	R-8-H	Initial Area:	2125.3	mm^2
Test Date:	12/4/2021	Weight:	359.1	g
Strain Rate:	1 %/min	Unit Weight:	1704	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	299.8	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45	°C
Additional information		Non-demolded		



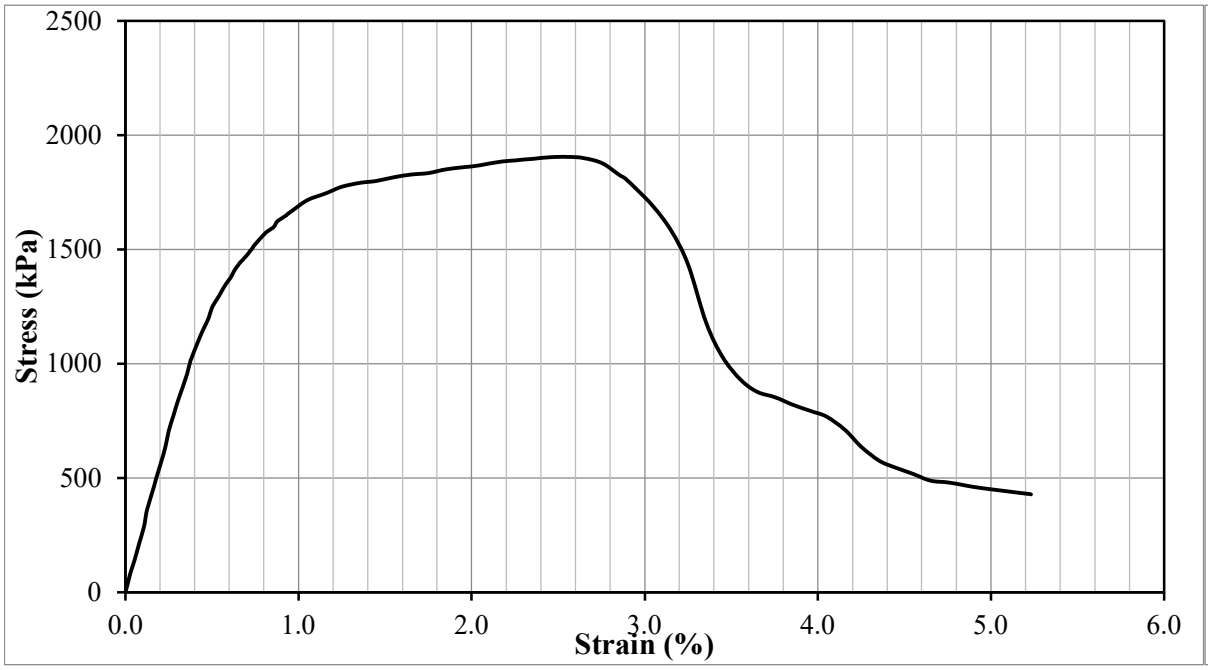
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	11,652	Strain at failure, εf :	1.62	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-1-A	Initial Area:	2110.8	mm^2
Test Date:	10/9/2017	Weight:	383.3	g
Strain Rate:	1 %/min	Unit Weight:	1803	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	2.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	25.0	°C
Additional information				



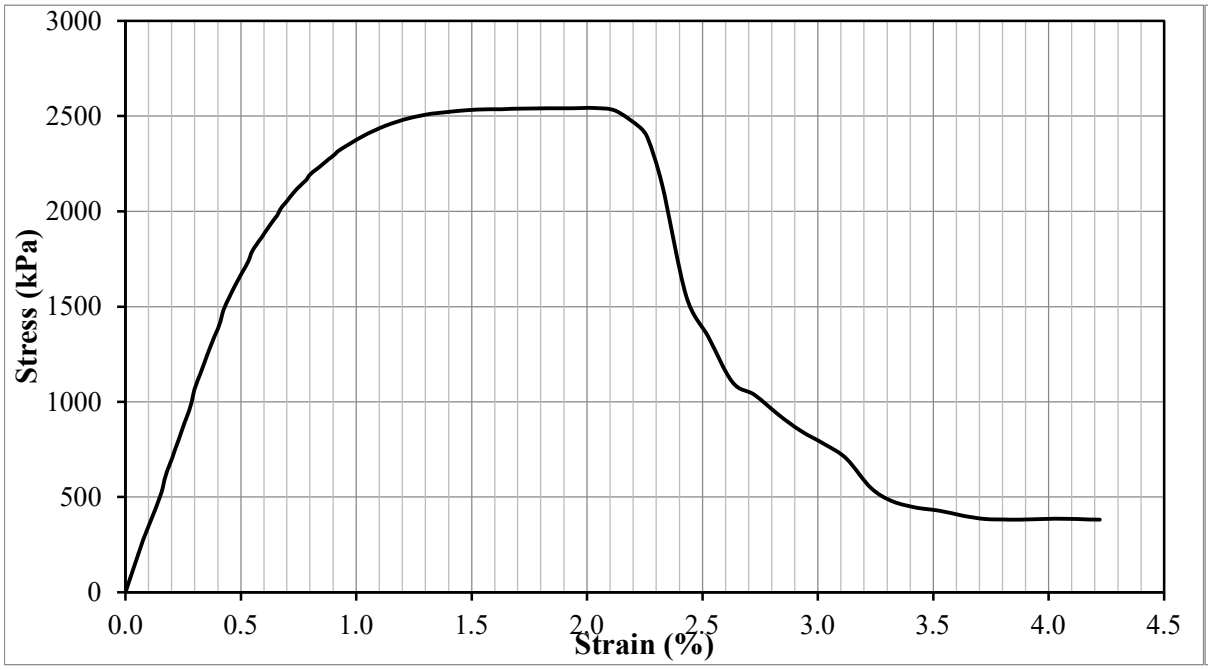
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,831	Strain at failure, εf :	2.45	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-1-H	Initial Area:	2110.8	mm^2
Test Date:	10/9/2017	Weight:	376.8	g
Strain Rate:	1 %/min	Unit Weight:	1812	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	2.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	25	°C
Additional information				



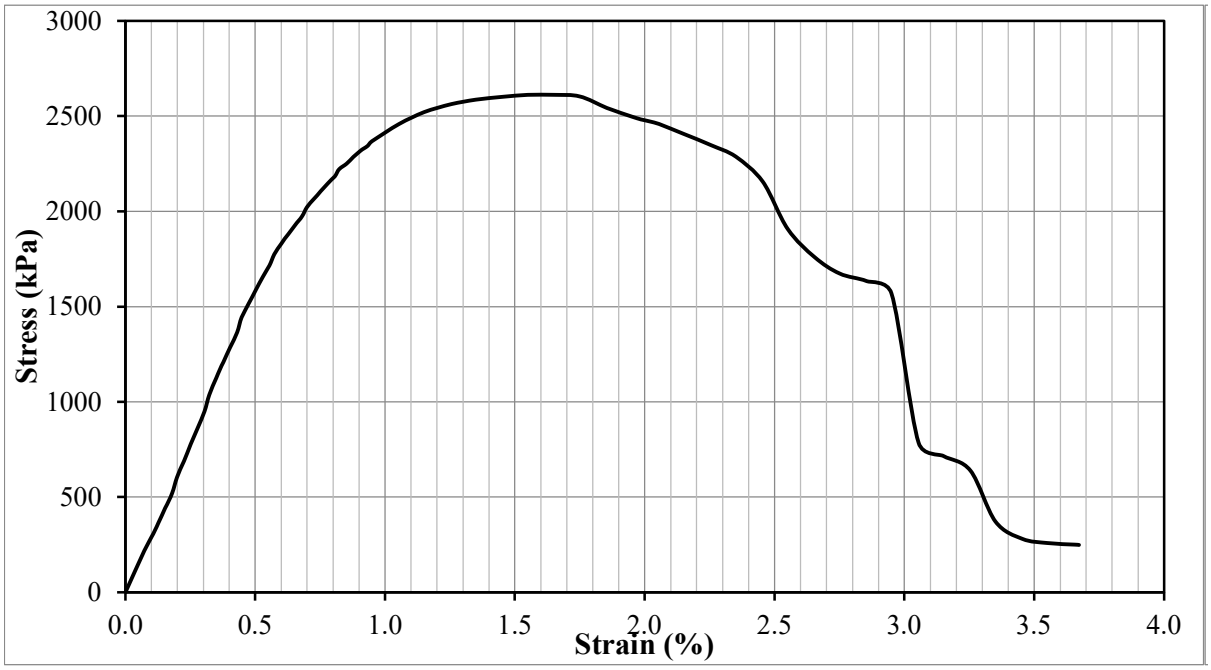
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,890	Strain at failure, εf :	2.55	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-1-B	Initial Area:	2106.6	mm^2
Test Date:	10/13/2017	Weight:	385.8	g
Strain Rate:	1 %/min	Unit Weight:	1816	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	7.0	days
$(w:c)_{slurry}$:	0.6	Curing temperature	25	°C
Additional information				



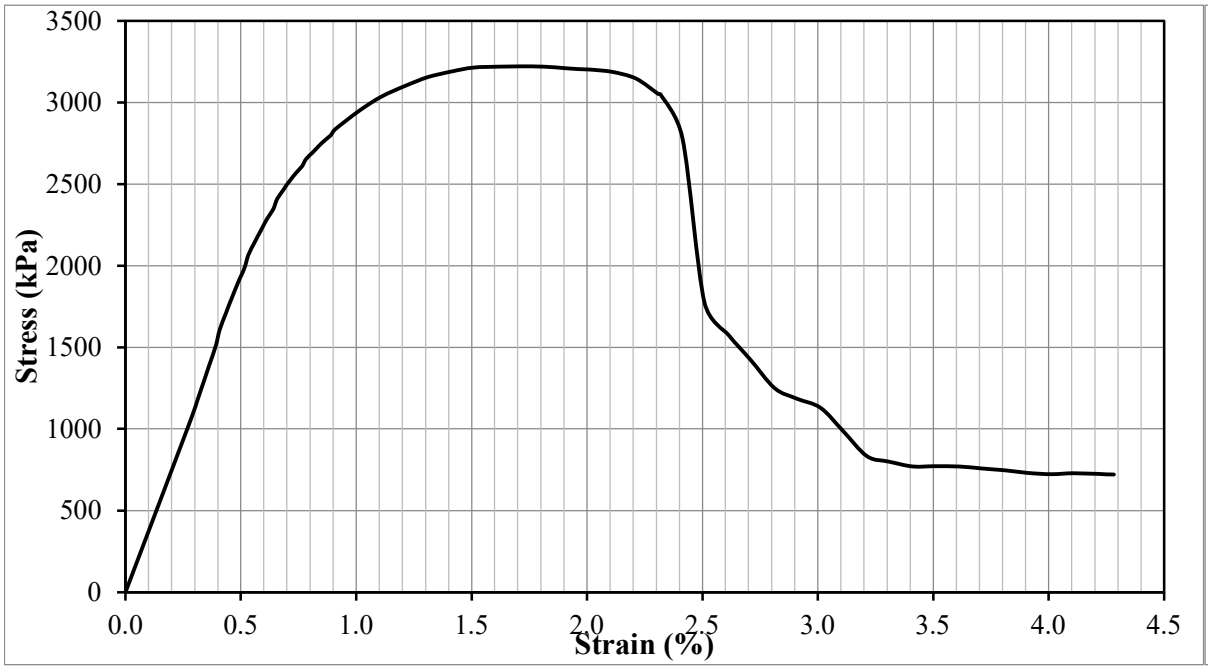
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,531	Strain at failure, εf :	2.03	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-1-G	Initial Area:	2108.7	mm^2
Test Date:	10/13/2017	Weight:	386.3	g
Strain Rate:	1 %/min	Unit Weight:	1816	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	7.0	days
$(w:c)_{slurry}$:	0.6	Curing temperature	25	°C
Additional information				



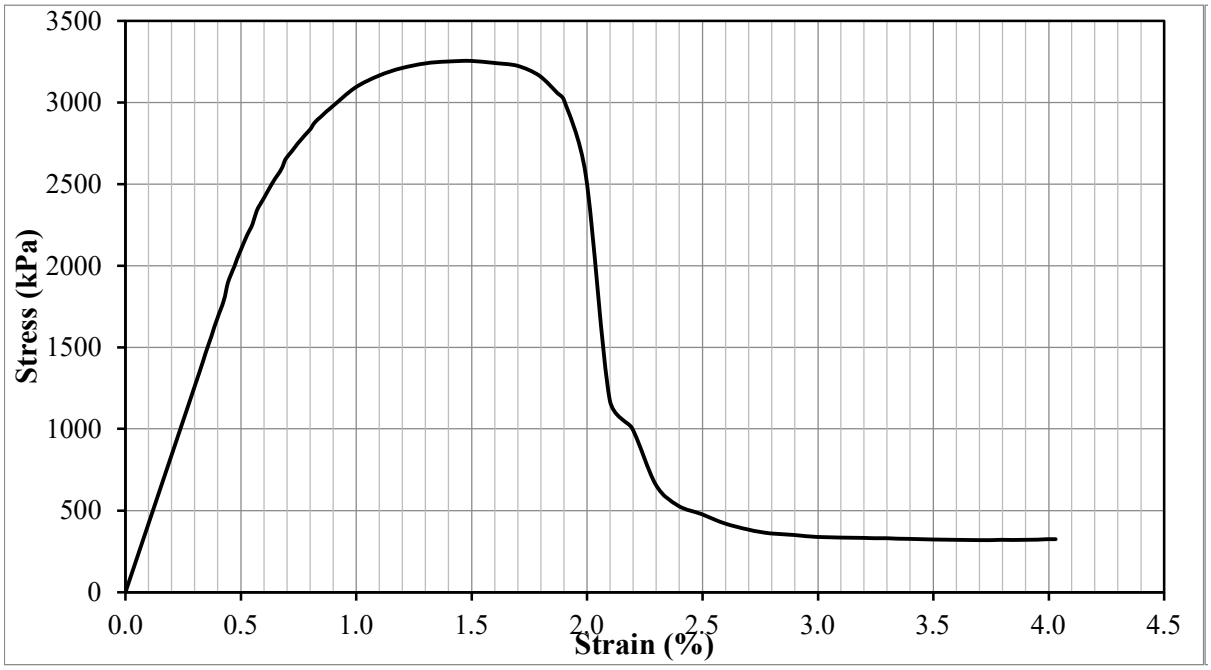
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,600	Strain at failure, εf :	1.55	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	95.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-1-C	Initial Area:	2110.8	mm^2
Test Date:	10/20/2017	Weight:	365.4	g
Strain Rate:	1 %/min	Unit Weight:	1808	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	13.8	days
$(w:c)_{slurry}$:	0.6	Curing temperature	25	°C
Additional information				



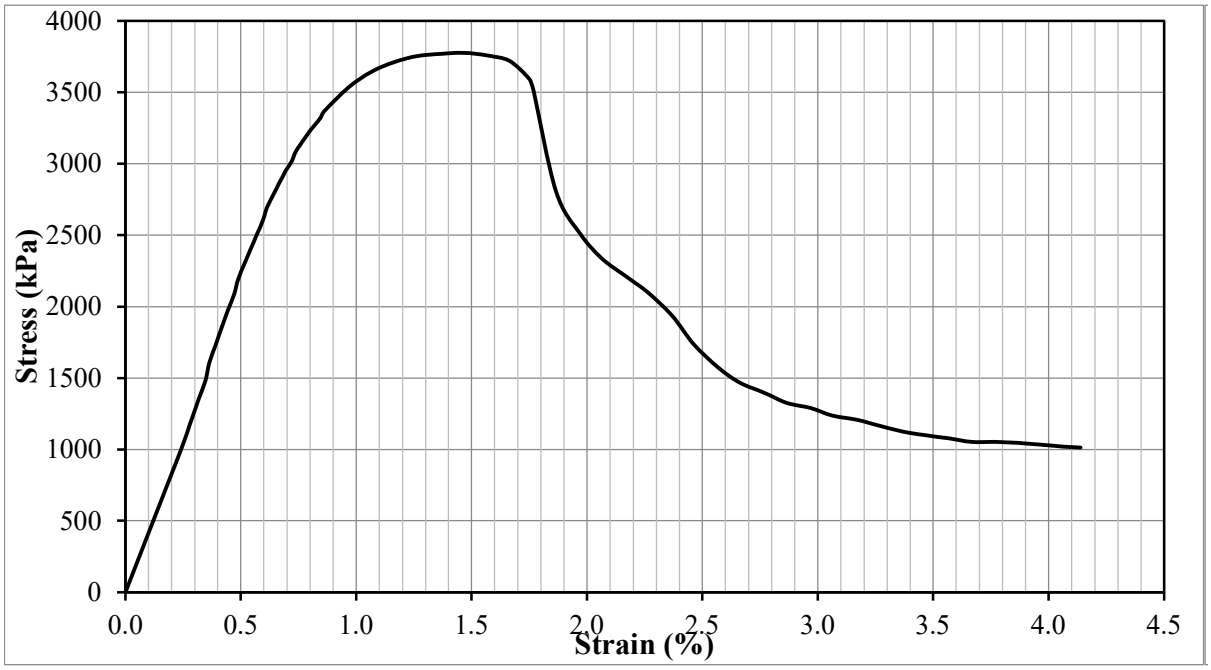
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,182	Strain at failure, εf :	1.71	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	T-1-F	Initial Area:	2114.9	mm^2
Test Date:	10/20/2017	Weight:	388.4	g
Strain Rate:	1 %/min	Unit Weight:	1811	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	13.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	25	°C
Additional information				



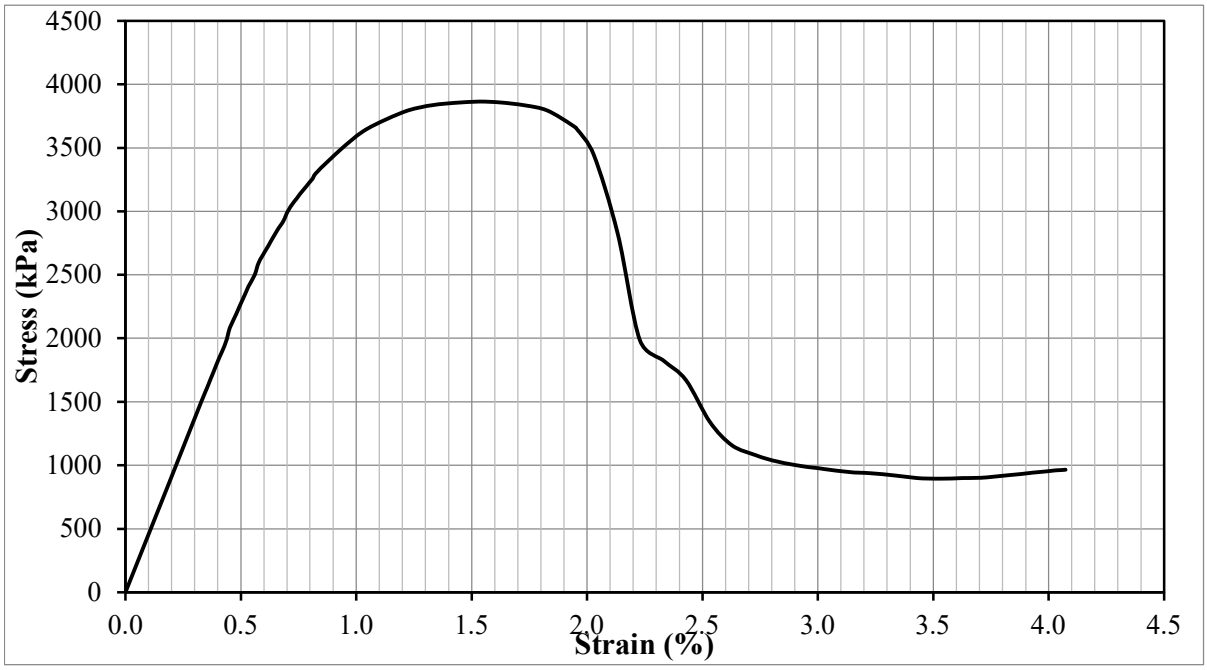
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,242	Strain at failure, εf :	1.50	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-1-D	Initial Area:	2108.7	mm^2
Test Date:	11/3/2017	Weight:	384.0	g
Strain Rate:	1 %/min	Unit Weight:	1816	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	27.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	25	°C
Additional information				



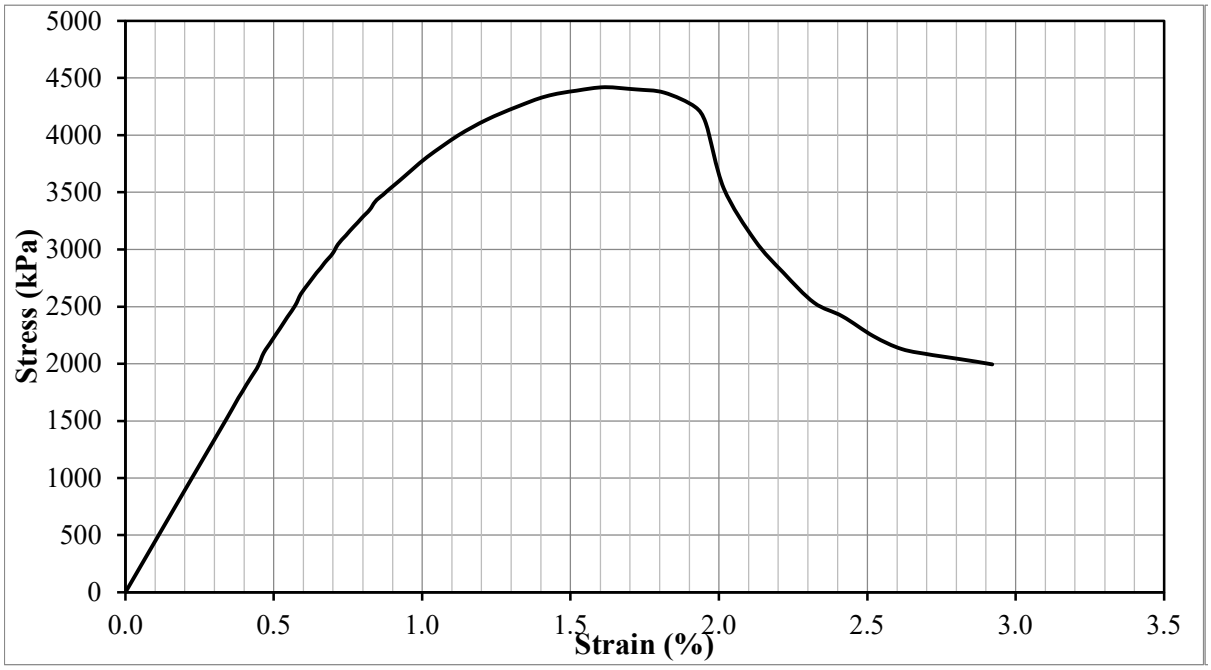
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,757	Strain at failure, εf :	1.46	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-1-E	Initial Area:	2106.6	mm^2
Test Date:	11/3/2017	Weight:	375.4	g
Strain Rate:	1 %/min	Unit Weight:	1814	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	28.0	days
$(w:c)_{slurry}$:	0.6	Curing temperature	25	°C
Additional information				



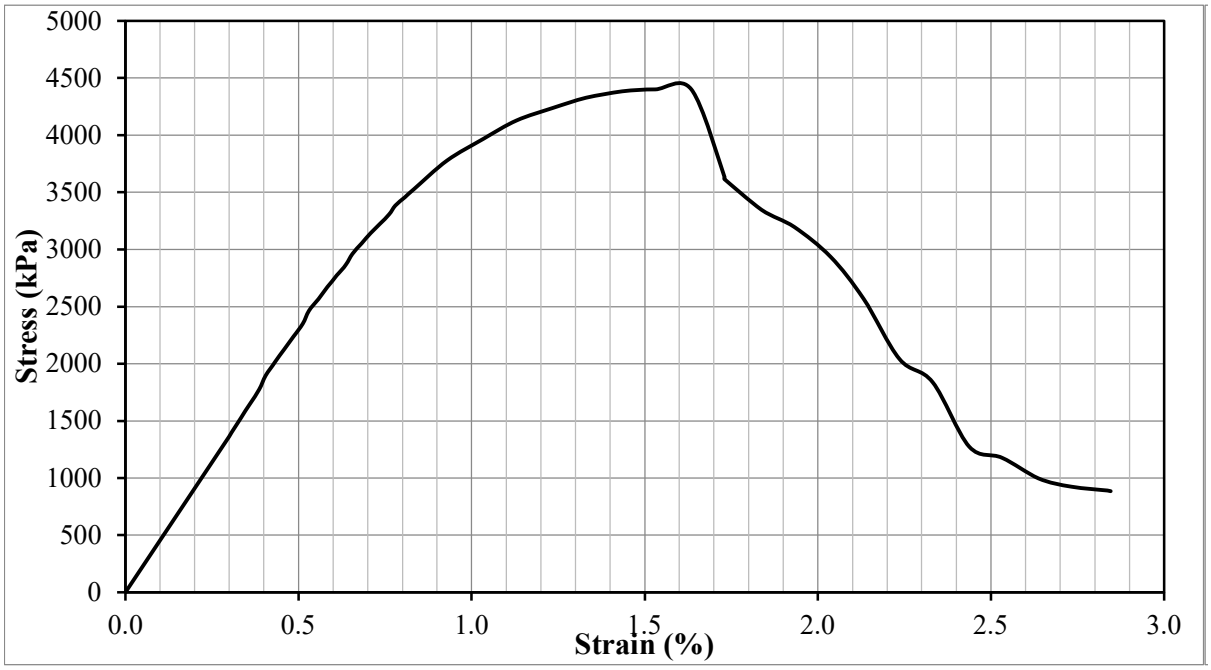
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,832	Strain at failure, εf :	1.53	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-2-H	Initial Area:	2106.6	mm^2
Test Date:	10/10/2017	Weight:	383.4	g
Strain Rate:	1 %/min	Unit Weight:	1817	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	2.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	25.0	°C
Additional information				



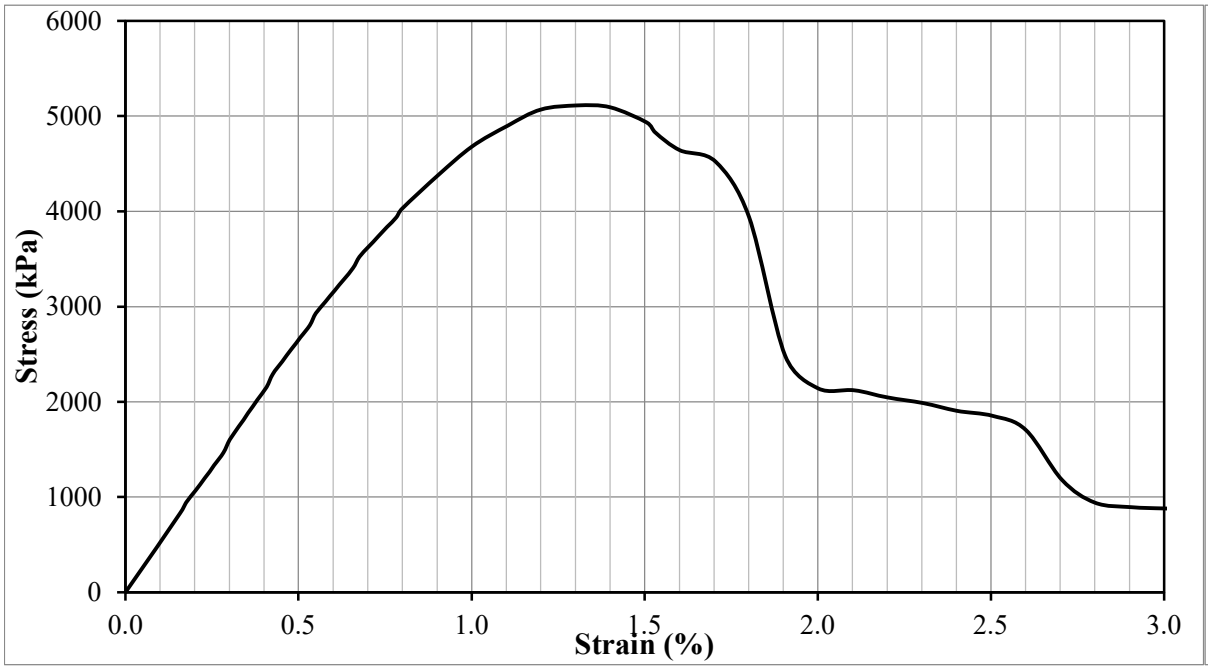
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,395	Strain at failure, εf :	1.62	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-2-I	Initial Area:	2110.8	mm^2
Test Date:	10/10/2017	Weight:	383.5	g
Strain Rate:	1 %/min	Unit Weight:	1812	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	2.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	25.0	°C
Additional information				



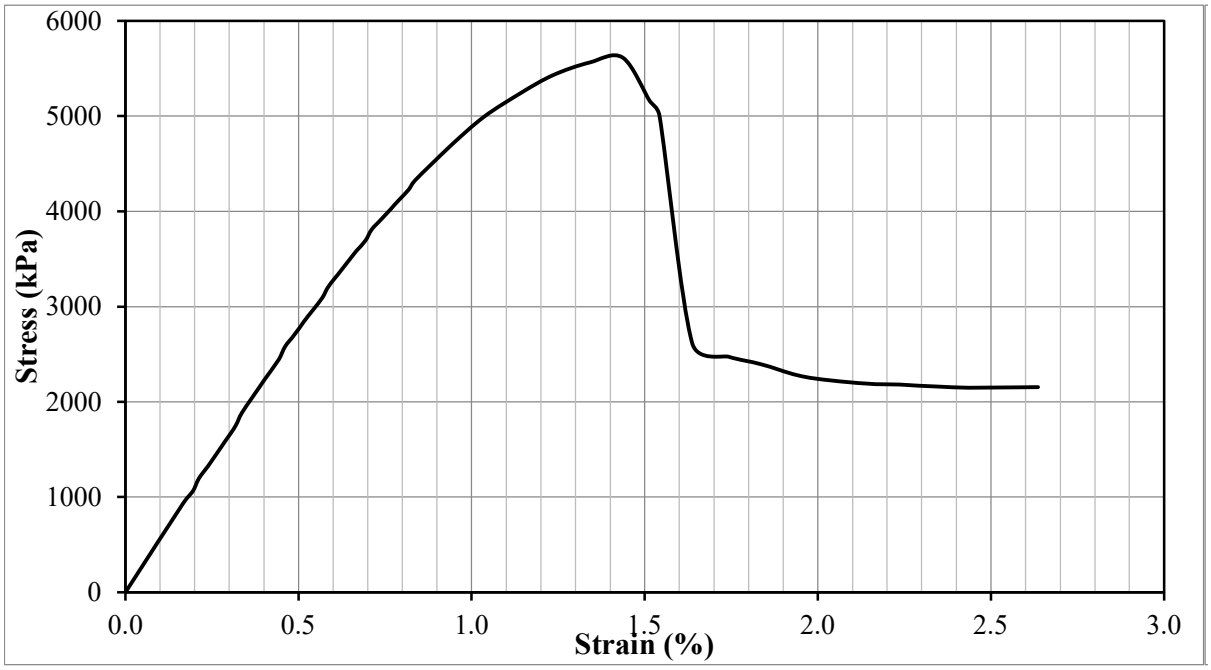
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,378	Strain at failure, εf :	1.53	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	96.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	T-2-B	Initial Area:	2117.0	mm^2
Test Date:	10/14/2017	Weight:	370.6	g
Strain Rate:	1 %/min	Unit Weight:	1808	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	7.0	days
$(w:c)_{slurry}$:	0.6	Curing temperature	25.0	°C
Additional information				



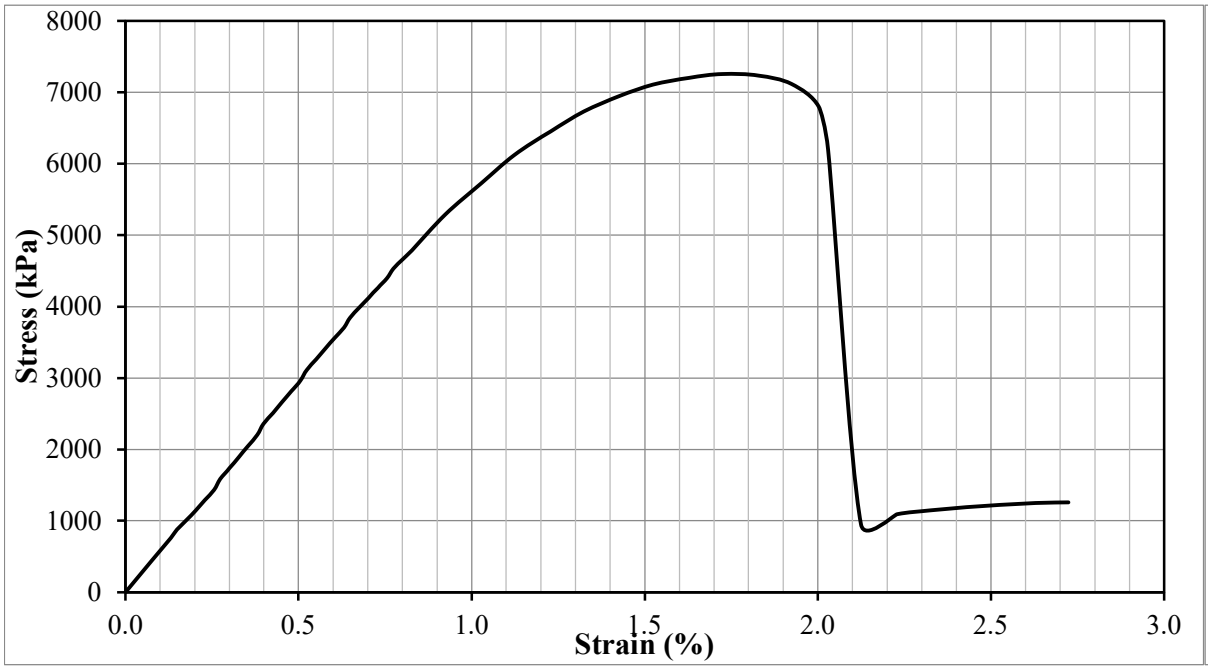
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,055	Strain at failure, εf :	1.31	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	T-2-G	Initial Area:	2114.9	mm^2
Test Date:	10/14/2017	Weight:	375.6	g
Strain Rate:	1 %/min	Unit Weight:	1814	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	7.0	days
$(w:c)_{slurry}$:	0.6	Curing temperature	25.0	°C
Additional information				



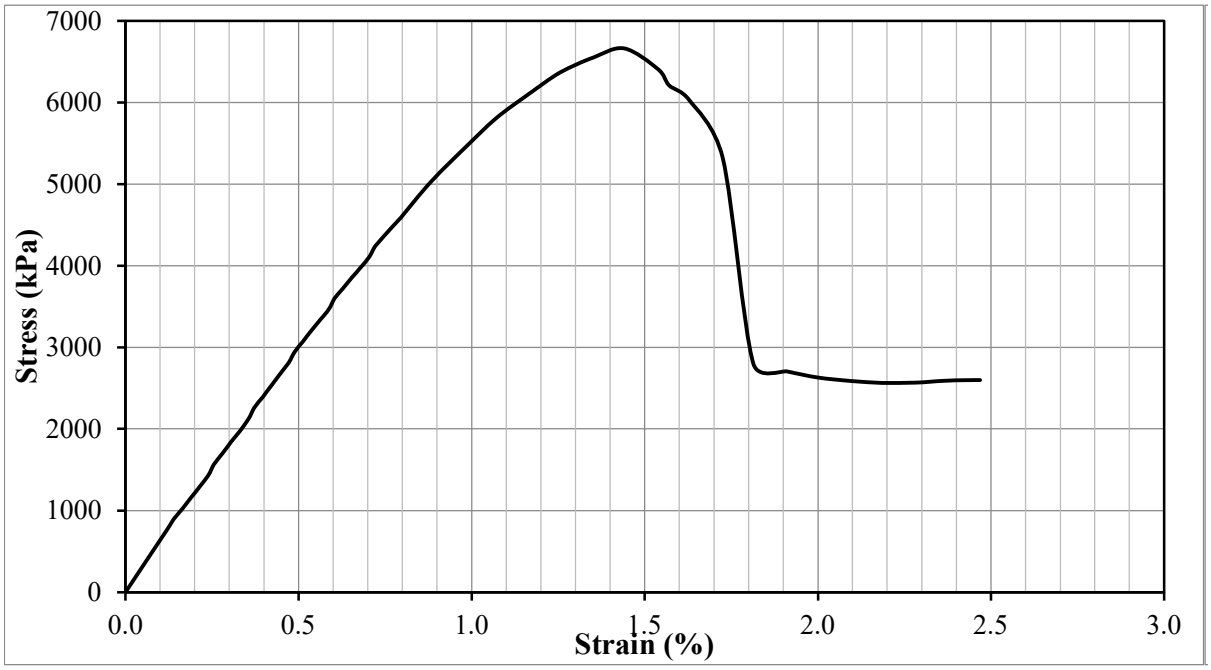
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,562	Strain at failure, εf :	1.44	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	95.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-2-C	Initial Area:	2106.6	mm^2
Test Date:	10/21/2017	Weight:	366.6	g
Strain Rate:	1 %/min	Unit Weight:	1818	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	14.1	days
$(w:c)_{slurry}$:	0.6	Curing temperature	25.0	°C
Additional information				



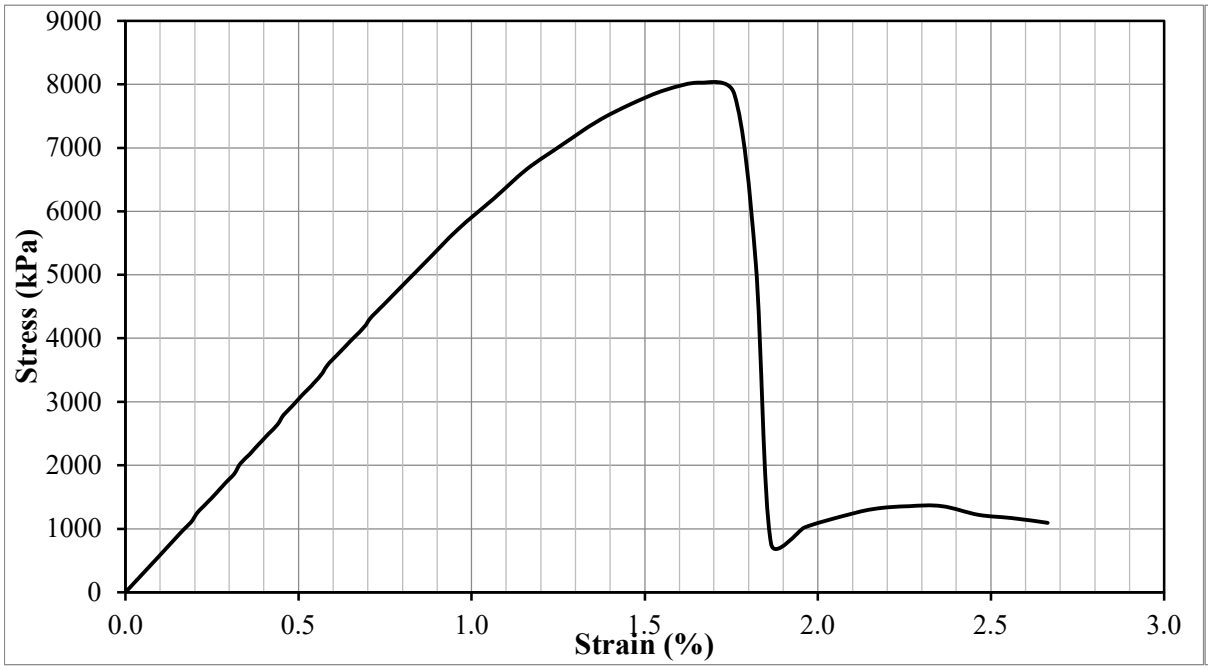
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	7,166	Strain at failure, εf :	1.72	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-2-F	Initial Area:	2110.8	mm^2
Test Date:	10/21/2017	Weight:	375.3	g
Strain Rate:	1 %/min	Unit Weight:	1815	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	14.2	days
$(w:c)_{slurry}$:	0.6	Curing temperature	25.0	°C
Additional information				



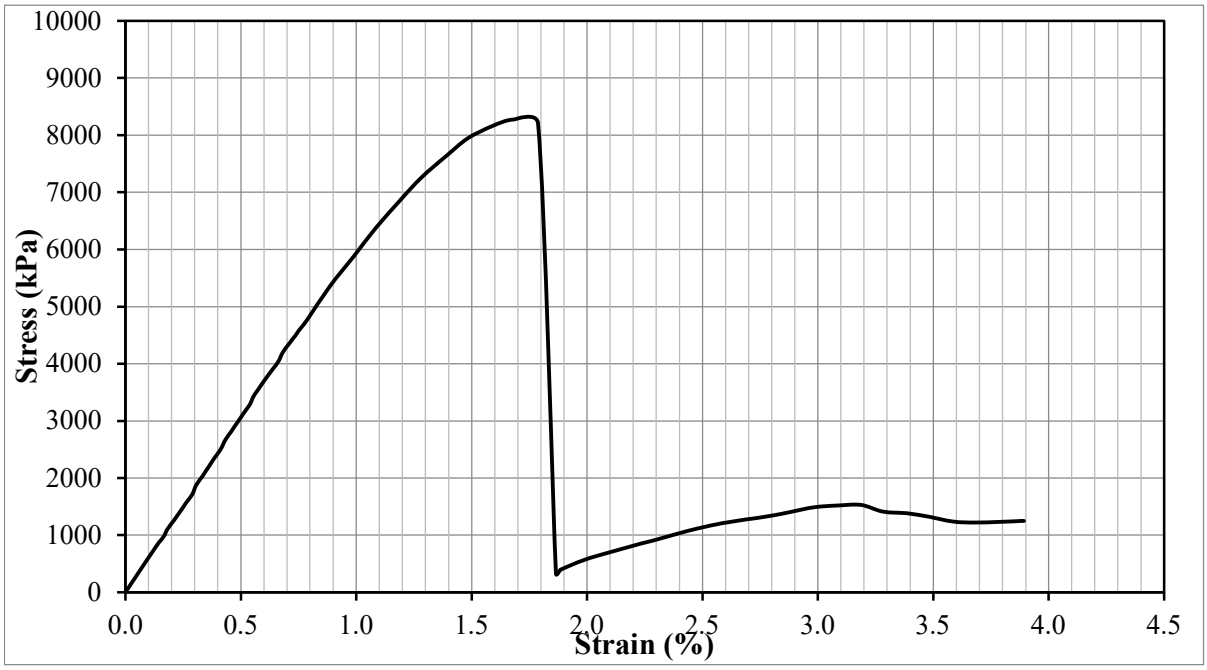
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	6,601	Strain at failure, εf :	1.44	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-2-D	Initial Area:	2106.6	mm^2
Test Date:	11/4/2017	Weight:	376.4	g
Strain Rate:	1 %/min	Unit Weight:	1822	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	28.0	days
$(w:c)_{slurry}$:	0.6	Curing temperature	25.0	°C
Additional information				



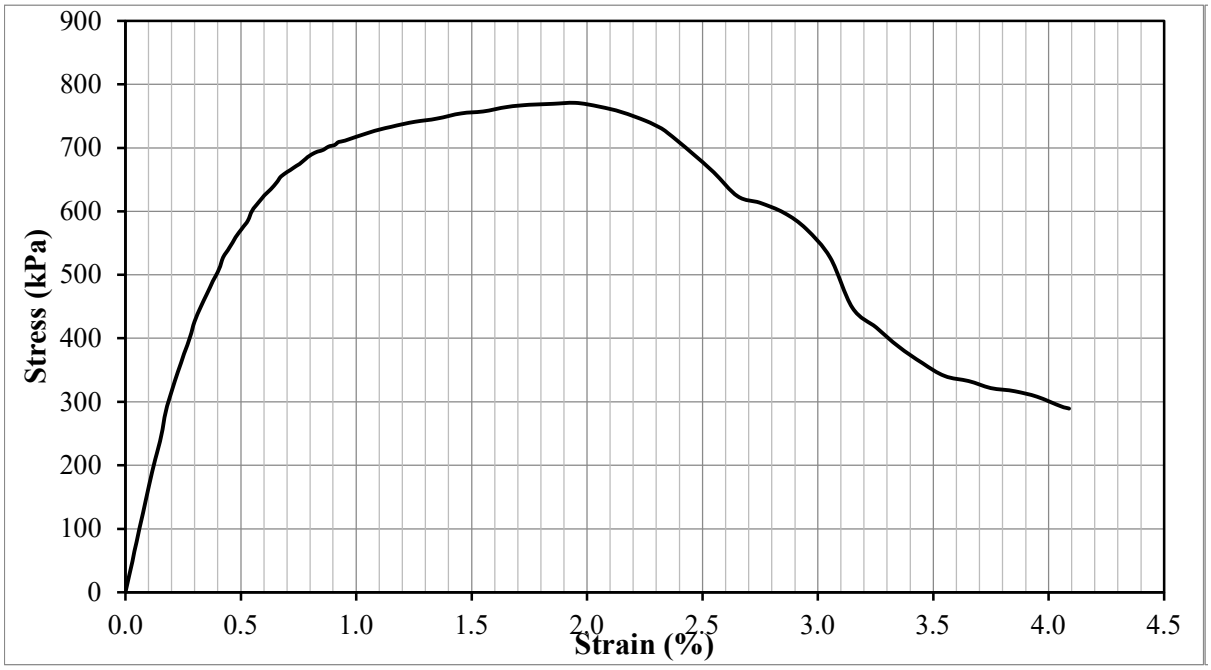
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	7,958	Strain at failure, εf :	1.66	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-2-E	Initial Area:	2110.8	mm^2
Test Date:	11/4/2017	Weight:	380.9	g
Strain Rate:	1 %/min	Unit Weight:	1820	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	28.0	days
$(w:c)_{slurry}$:	0.6	Curing temperature	25.0	°C
Additional information				



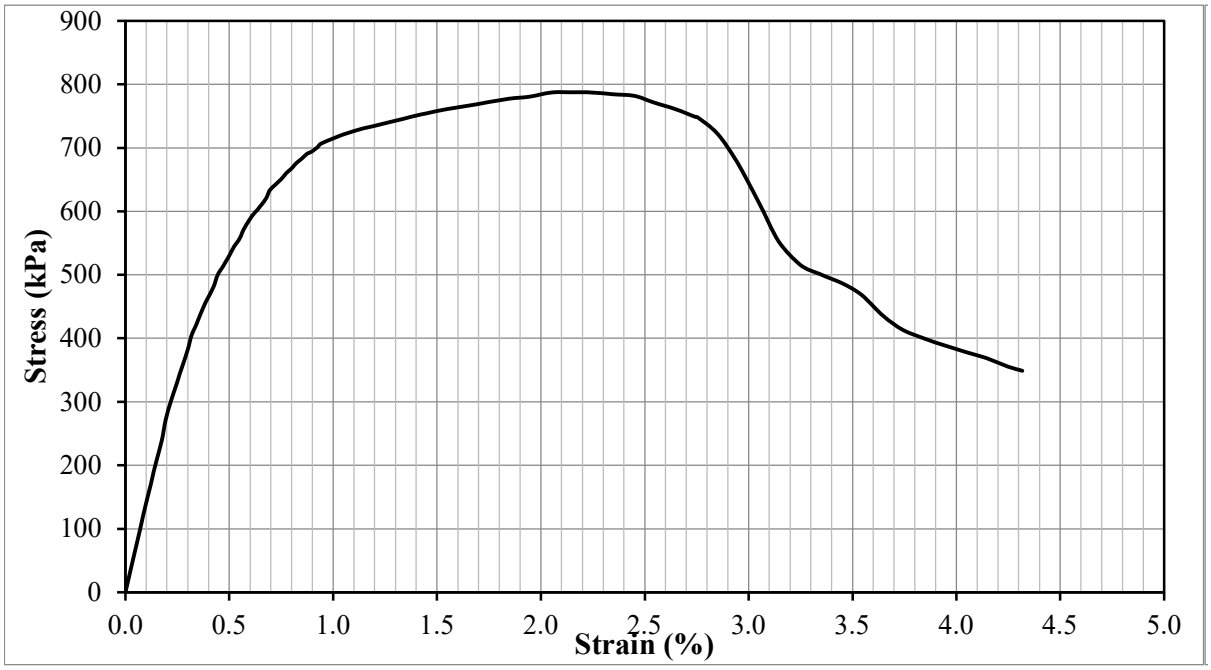
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	8,216	Strain at failure, εf :	1.68	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	95.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-3-A	Initial Area:	2104.6	mm^2
Test Date:	10/12/2017	Weight:	357.9	g
Strain Rate:	1 %/min	Unit Weight:	1781	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	3.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25.0	°C
Additional information				



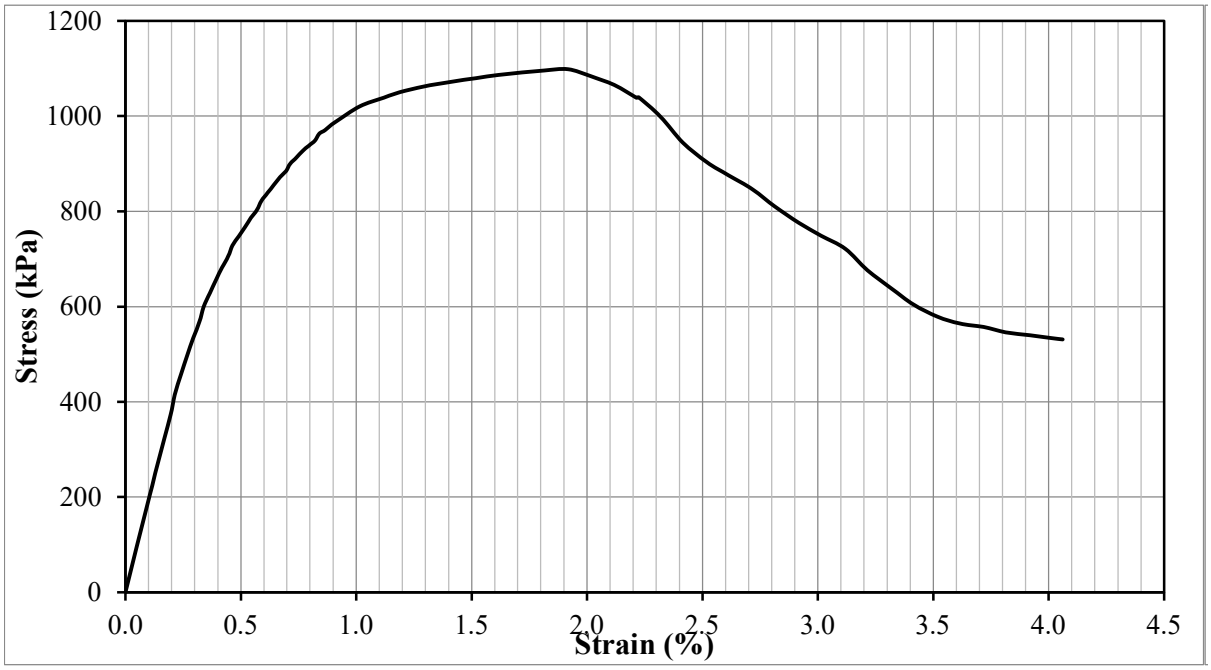
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	761	Strain at failure, εf :	1.95	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	89.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	T-3-H	Initial Area:	2112.9	mm^2
Test Date:	10/12/2017	Weight:	333.5	g
Strain Rate:	1 %/min	Unit Weight:	1766	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	3.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25.0	°C
Additional information				



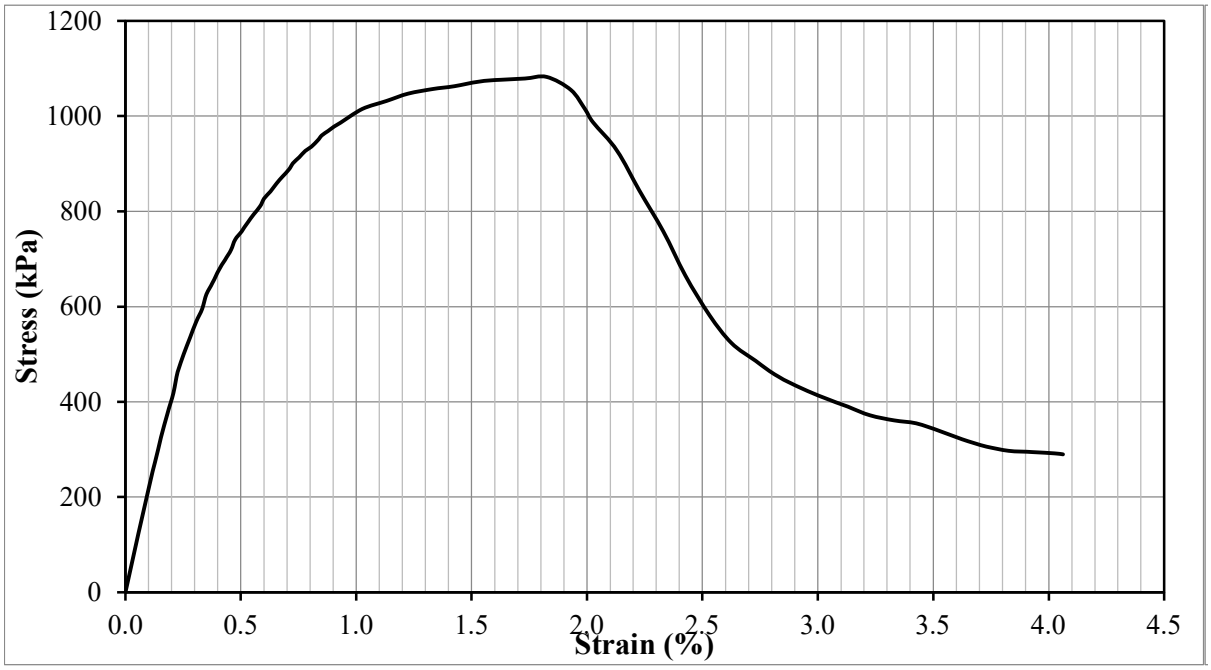
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	770	Strain at failure, εf :	2.14	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	94.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	T-3-B	Initial Area:	2112.9	mm^2
Test Date:	10/16/2017	Weight:	354.3	g
Strain Rate:	1 %/min	Unit Weight:	1778	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	6.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25.0	°C
Additional information				



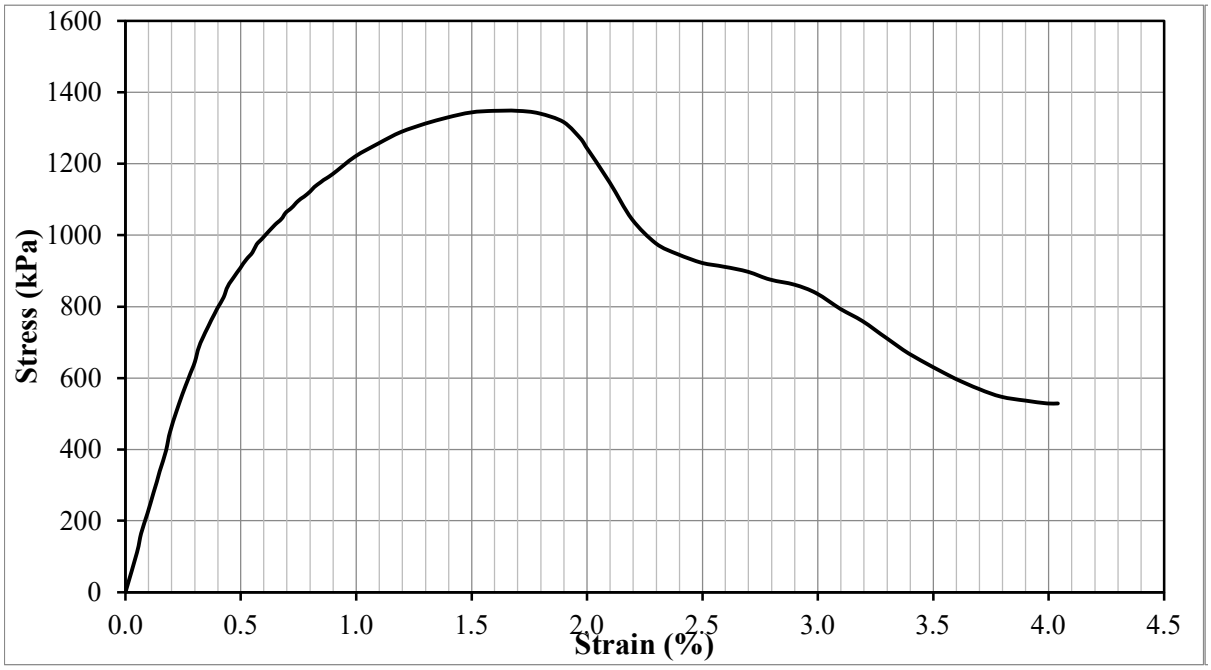
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,083	Strain at failure, εf :	1.92	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	93.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-3-G	Initial Area:	2106.6	mm^2
Test Date:	10/16/2017	Weight:	351.1	g
Strain Rate:	1 %/min	Unit Weight:	1780	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	6.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25.0	°C
Additional information				



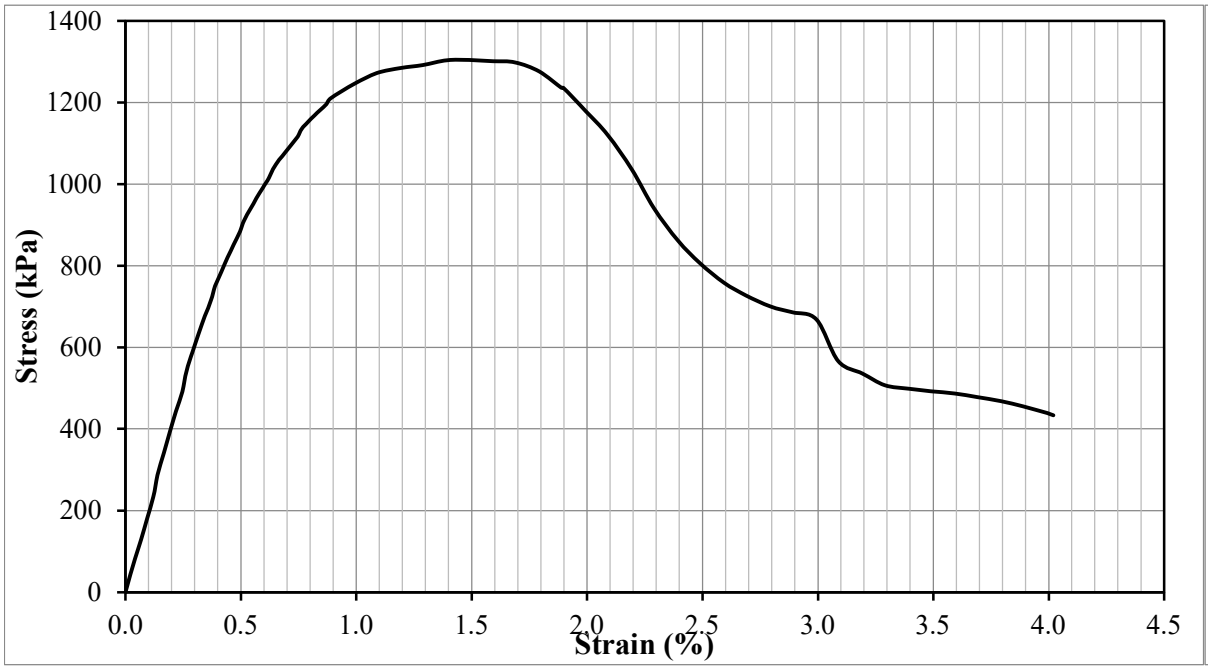
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,065	Strain at failure, εf :	1.83	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	95.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	T-3-C	Initial Area:	2112.9	mm^2
Test Date:	10/23/2017	Weight:	358.8	g
Strain Rate:	1 %/min	Unit Weight:	1773	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	13.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25.0	°C
Additional information				



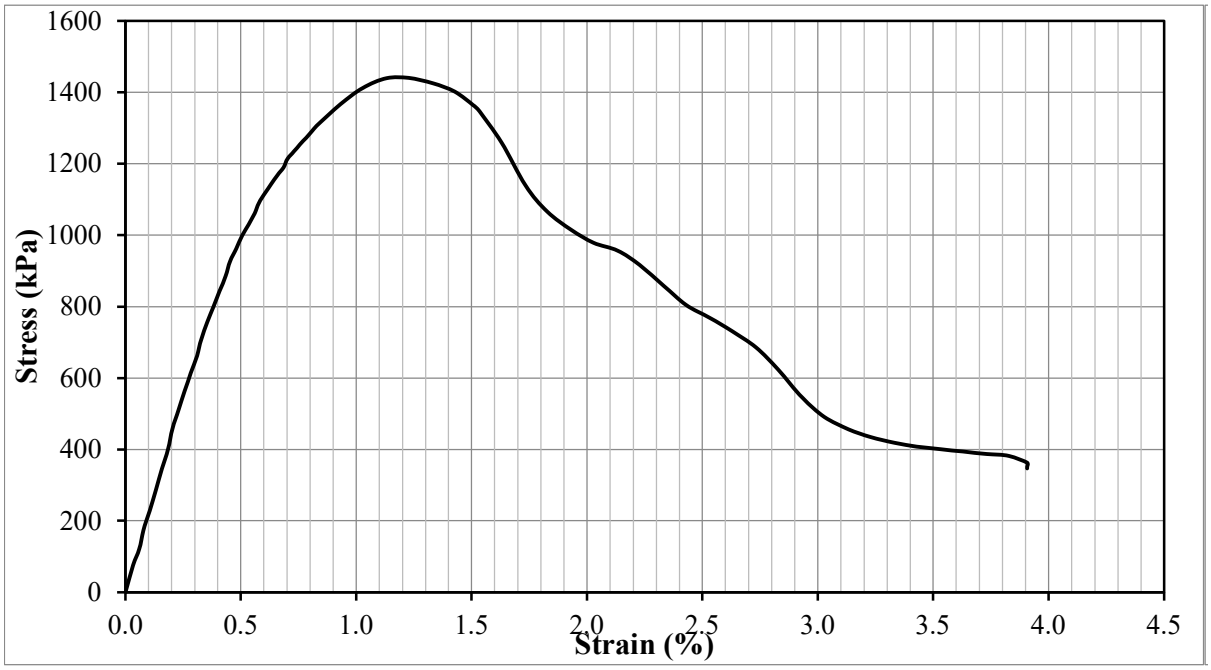
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,332	Strain at failure, εf :	1.70	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	92.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-3-F	Initial Area:	2108.7	mm^2
Test Date:	10/23/2017	Weight:	347.5	g
Strain Rate:	1 %/min	Unit Weight:	1777	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	14.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25.0	°C
Additional information				



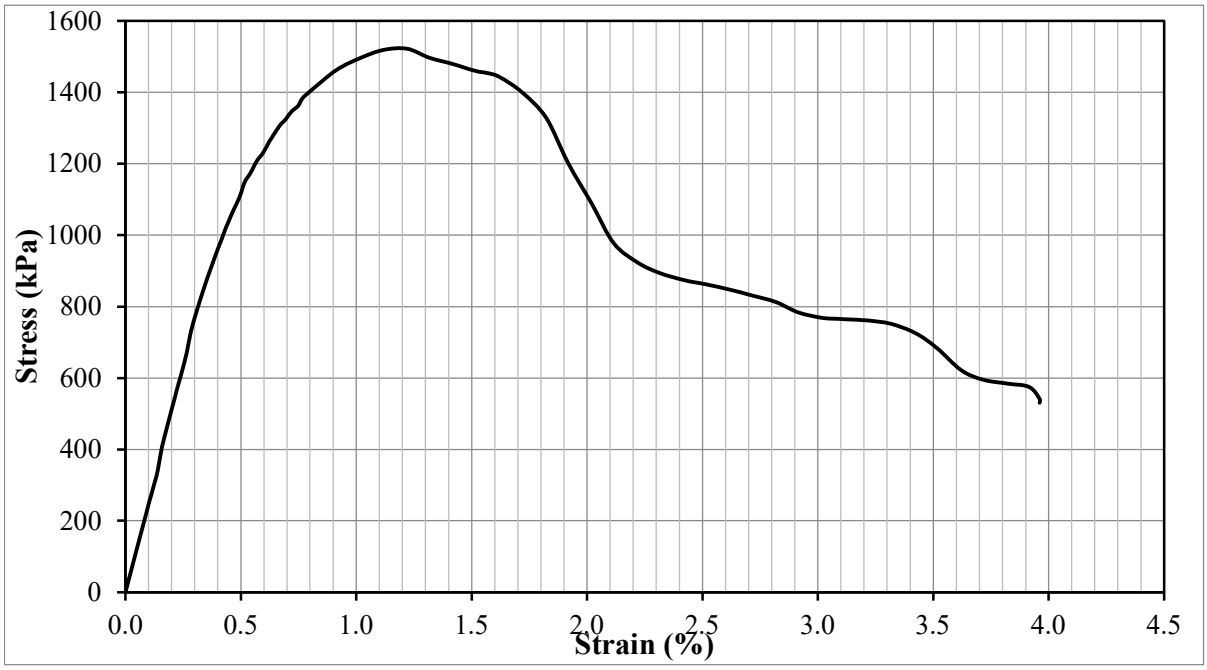
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,282	Strain at failure, εf :	1.49	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	90.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	T-3-D	Initial Area:	2112.9	mm^2
Test Date:	11/6/2017	Weight:	338.9	g
Strain Rate:	1 %/min	Unit Weight:	1779	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25.0	°C
Additional information				



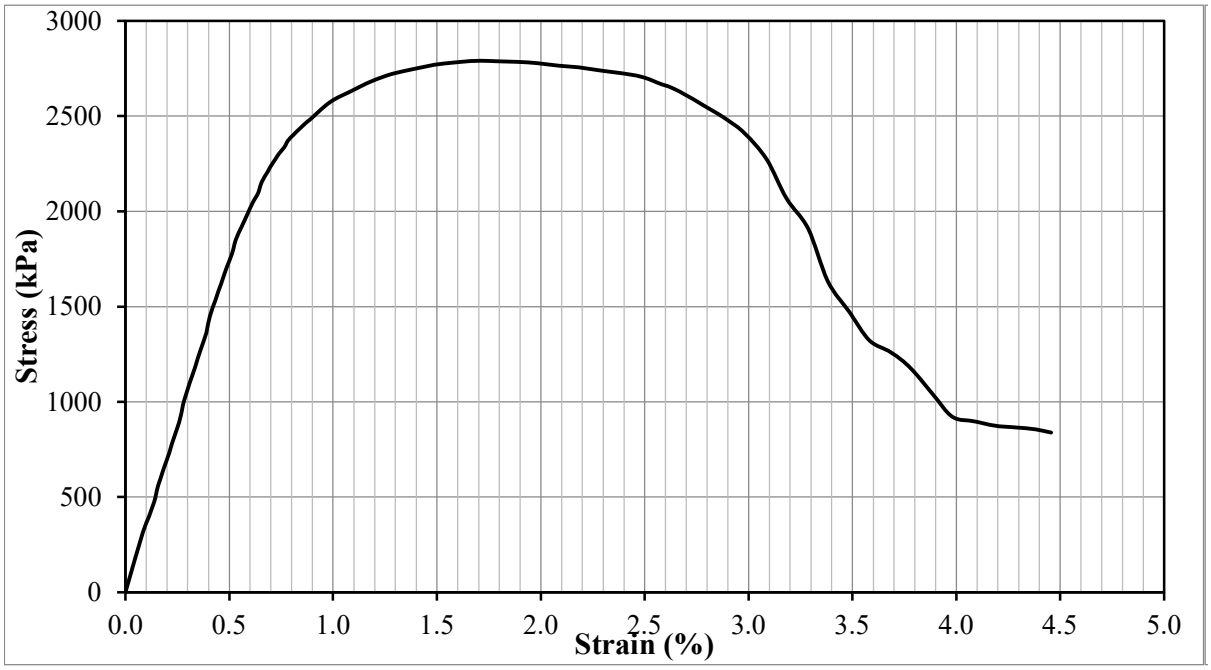
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,410	Strain at failure, εf :	1.23	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	93.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-3-E	Initial Area:	2106.6	mm^2
Test Date:	11/6/2017	Weight:	352.0	g
Strain Rate:	1 %/min	Unit Weight:	1782	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	28.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25.0	°C
Additional information				



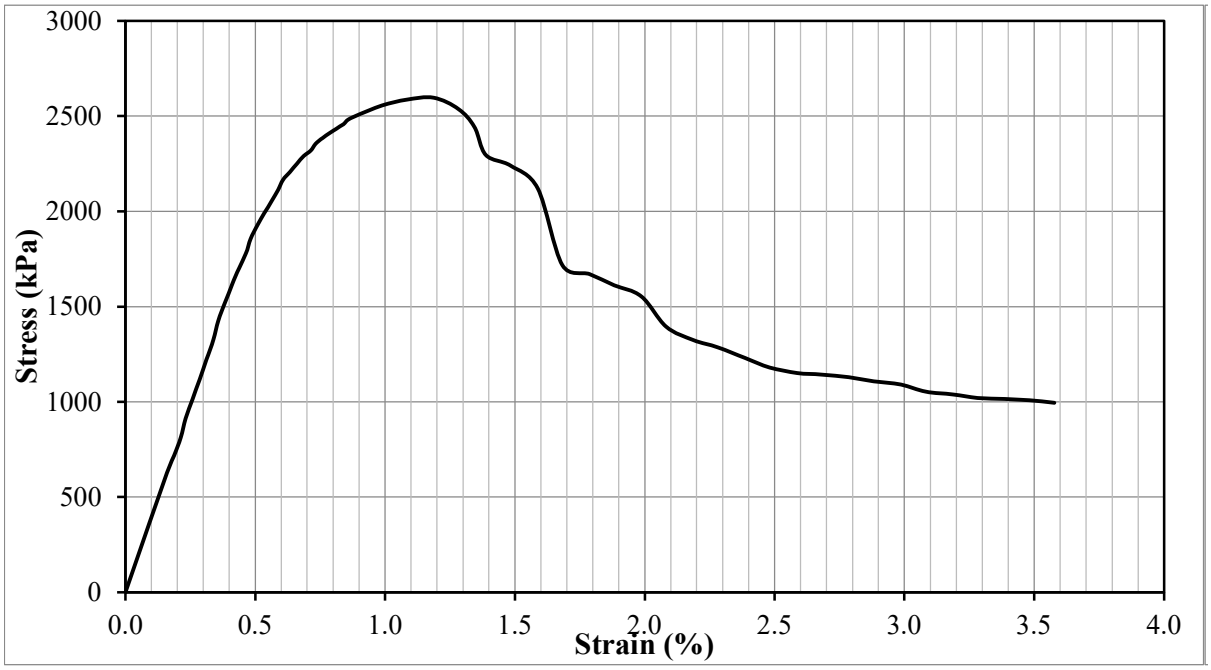
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,499	Strain at failure, εf :	1.22	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	96.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-4-A	Initial Area:	2108.7	mm^2
Test Date:	10/16/2017	Weight:	346.3	g
Strain Rate:	1 %/min	Unit Weight:	1705	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	3.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25.0	°C
Additional information				



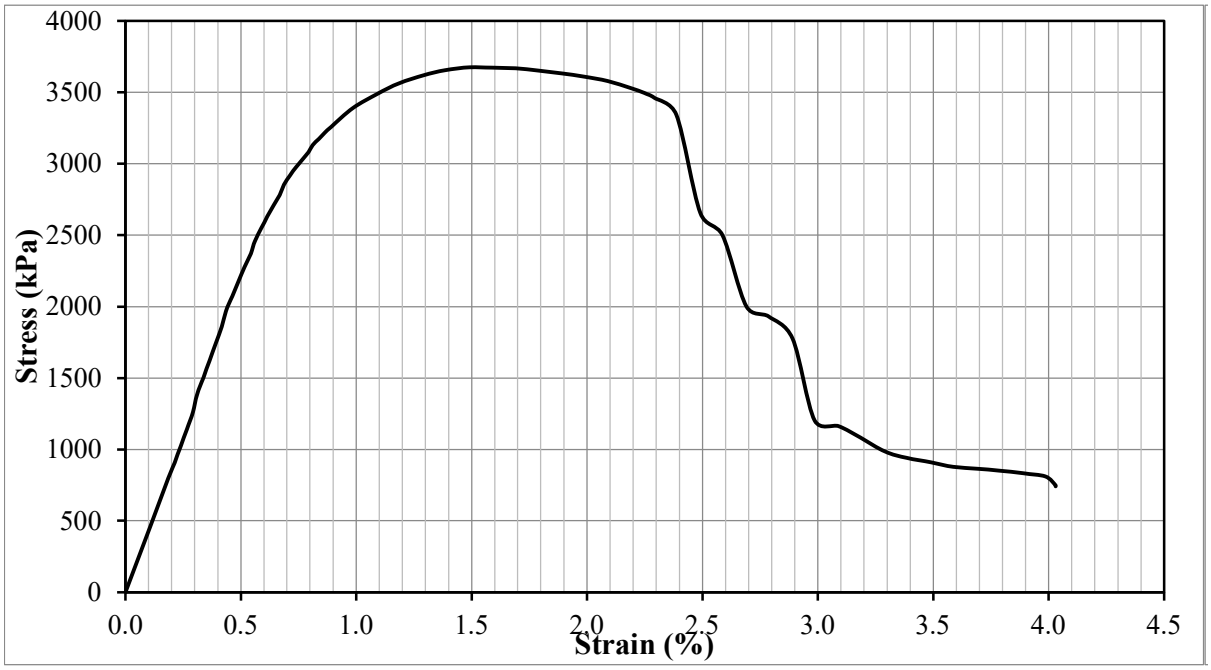
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,758	Strain at failure, εf :	1.69	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-4-H	Initial Area:	2108.7	mm^2
Test Date:	10/16/2017	Weight:	354.7	g
Strain Rate:	1 %/min	Unit Weight:	1705	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	3.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25.0	°C
Additional information				



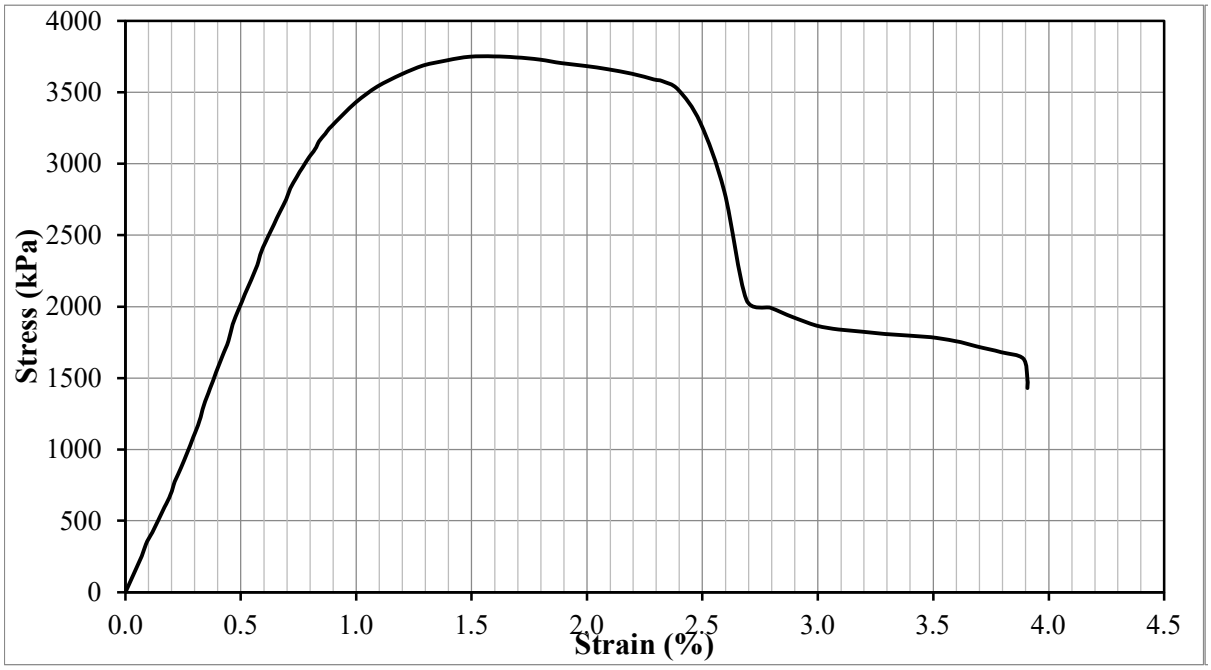
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,576	Strain at failure, εf :	1.19	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-4-B	Initial Area:	2108.7	mm^2
Test Date:	10/20/2017	Weight:	363.7	g
Strain Rate:	1 %/min	Unit Weight:	1711	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	6.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25.0	°C
Additional information				



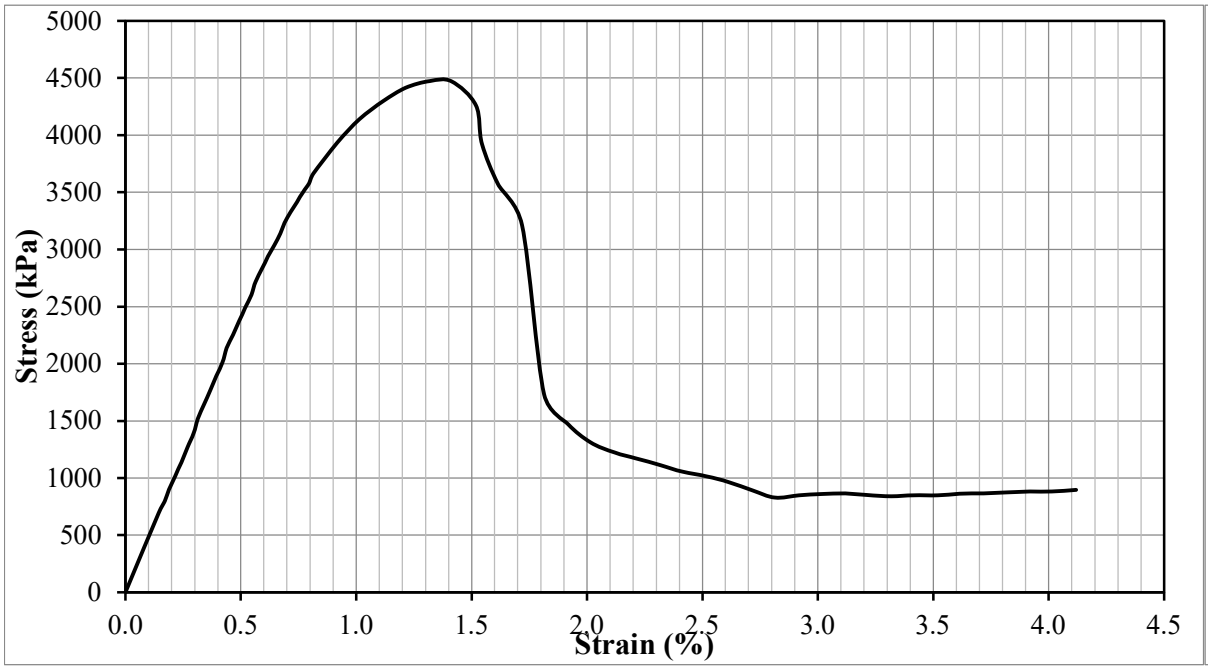
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,658	Strain at failure, εf :	1.49	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	94.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-4-G	Initial Area:	2108.7	mm^2
Test Date:	10/20/2017	Weight:	341.9	g
Strain Rate:	1 %/min	Unit Weight:	1708	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	7.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25.0	°C
Additional information				



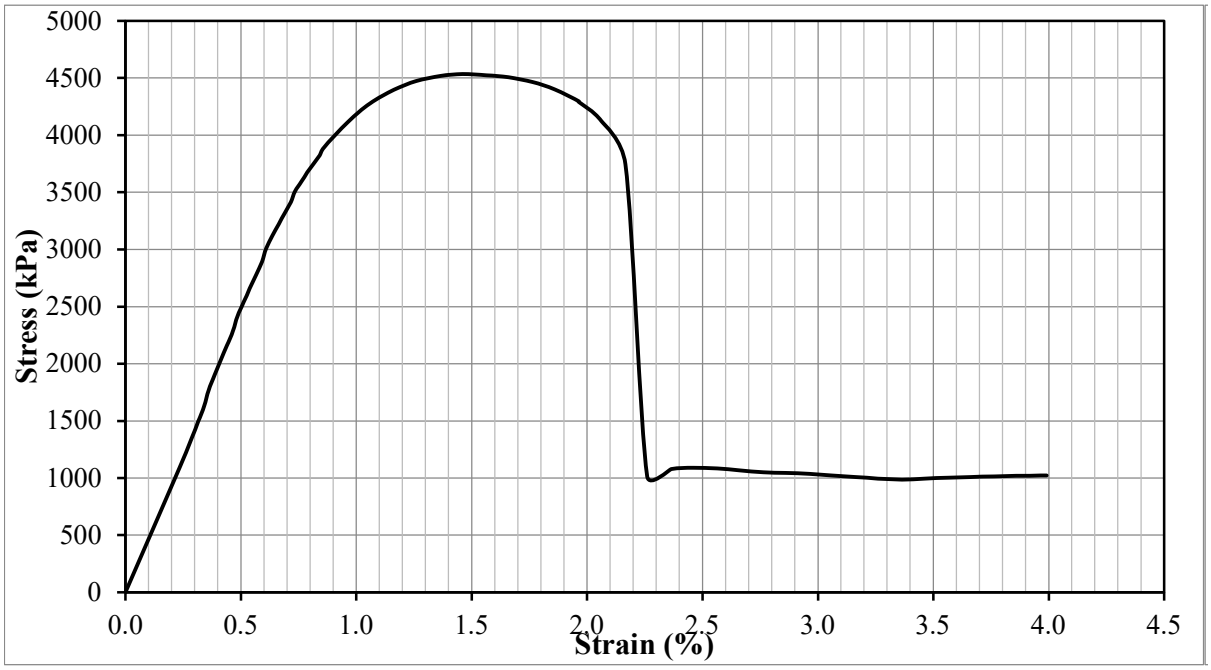
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,701	Strain at failure, εf :	1.60	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	93.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-4-C	Initial Area:	2108.7	mm^2
Test Date:	10/27/2017	Weight:	338.8	g
Strain Rate:	1 %/min	Unit Weight:	1712	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	14.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25.0	°C
Additional information				



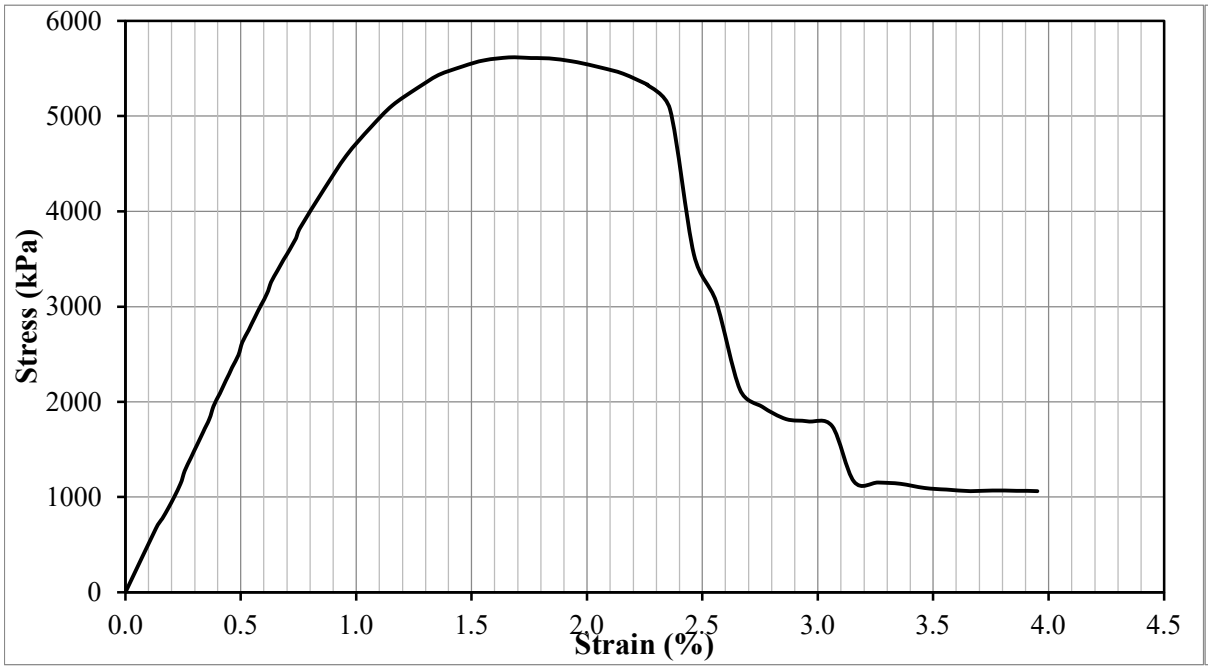
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,406	Strain at failure, εf :	1.32	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-4-F	Initial Area:	2110.8	mm^2
Test Date:	10/27/2017	Weight:	356.9	g
Strain Rate:	1 %/min	Unit Weight:	1708	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	14.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25.0	°C
Additional information				



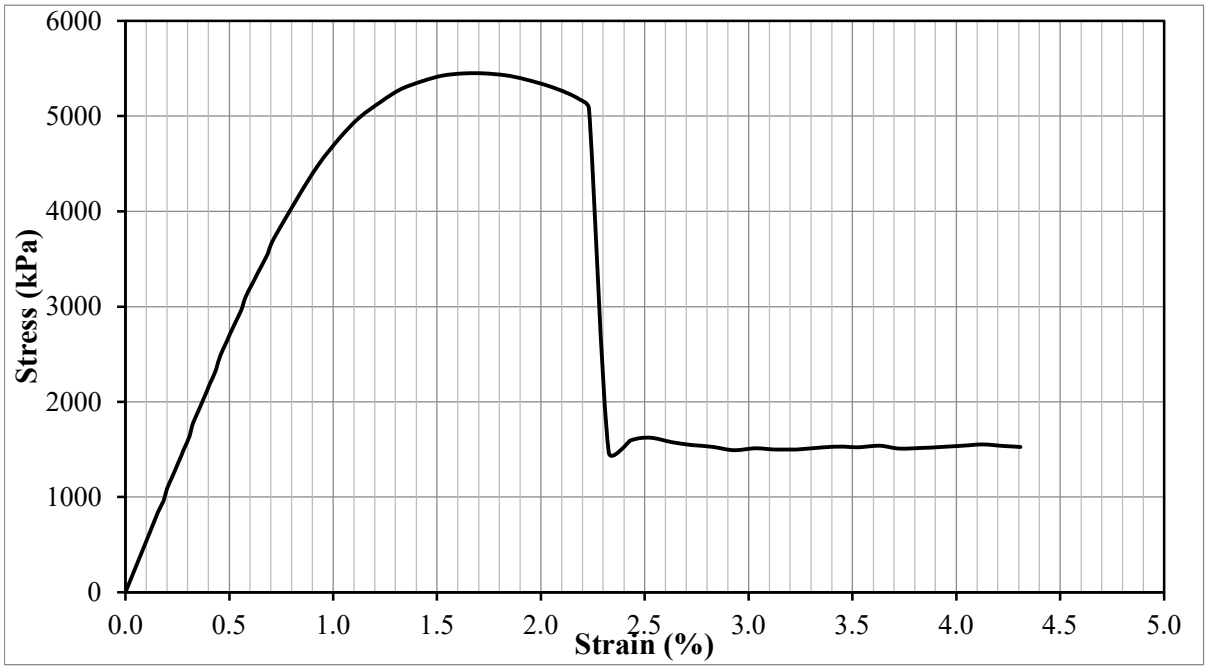
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,500	Strain at failure, εf :	1.46	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	95.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	T-4-D	Initial Area:	2102.5	mm^2
Test Date:	11/10/2017	Weight:	343.5	g
Strain Rate:	1 %/min	Unit Weight:	1714	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	27.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25.0	°C
Additional information				



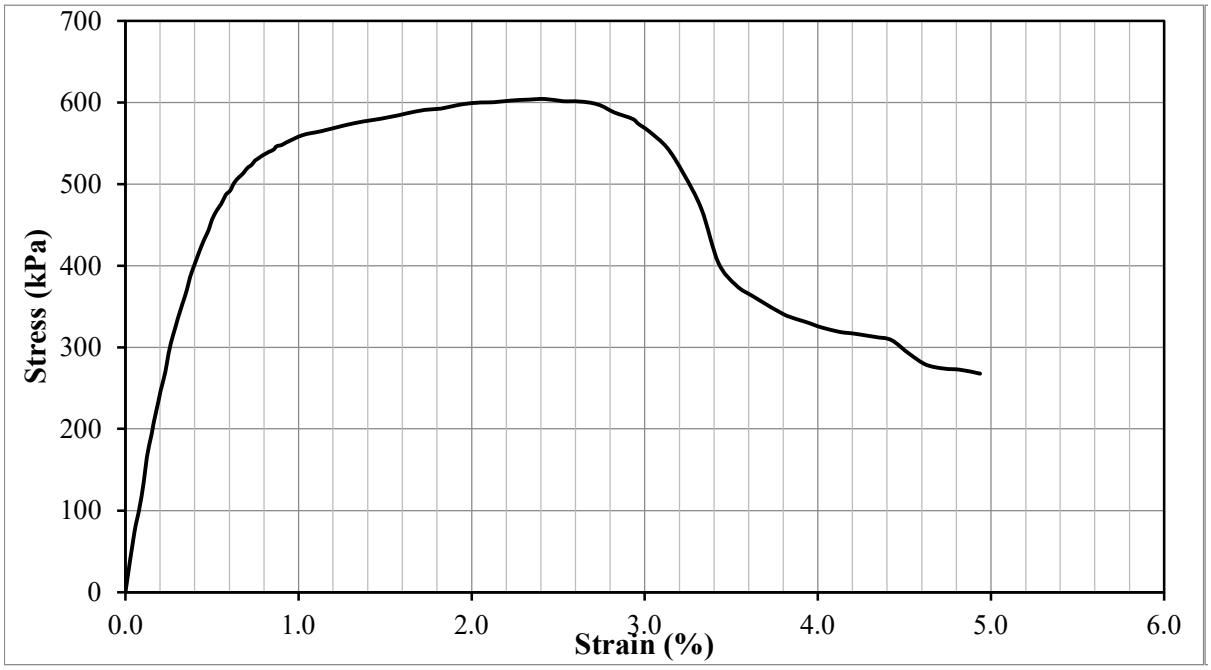
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,543	Strain at failure, εf :	1.66	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	96.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-4-E	Initial Area:	2106.6	mm^2
Test Date:	11/10/2017	Weight:	347.6	g
Strain Rate:	1 %/min	Unit Weight:	1713	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	27.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25.0	°C
Additional information				



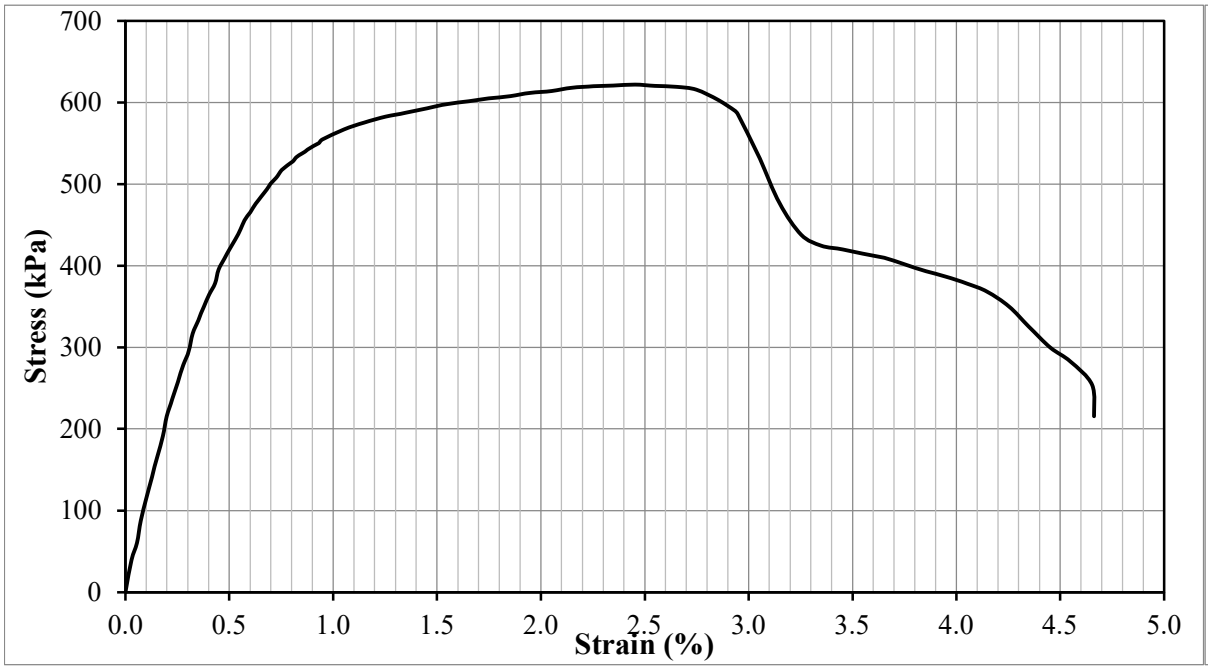
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,387	Strain at failure, εf :	1.63	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	91.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	T-5-A	Initial Area:	2096.3	mm^2
Test Date:	10/18/2017	Weight:	338.1	g
Strain Rate:	1 %/min	Unit Weight:	1757	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	3.0	days
$(w:c)_{slurry}$:	1.4	Curing temperature	25.0	°C
Additional information				



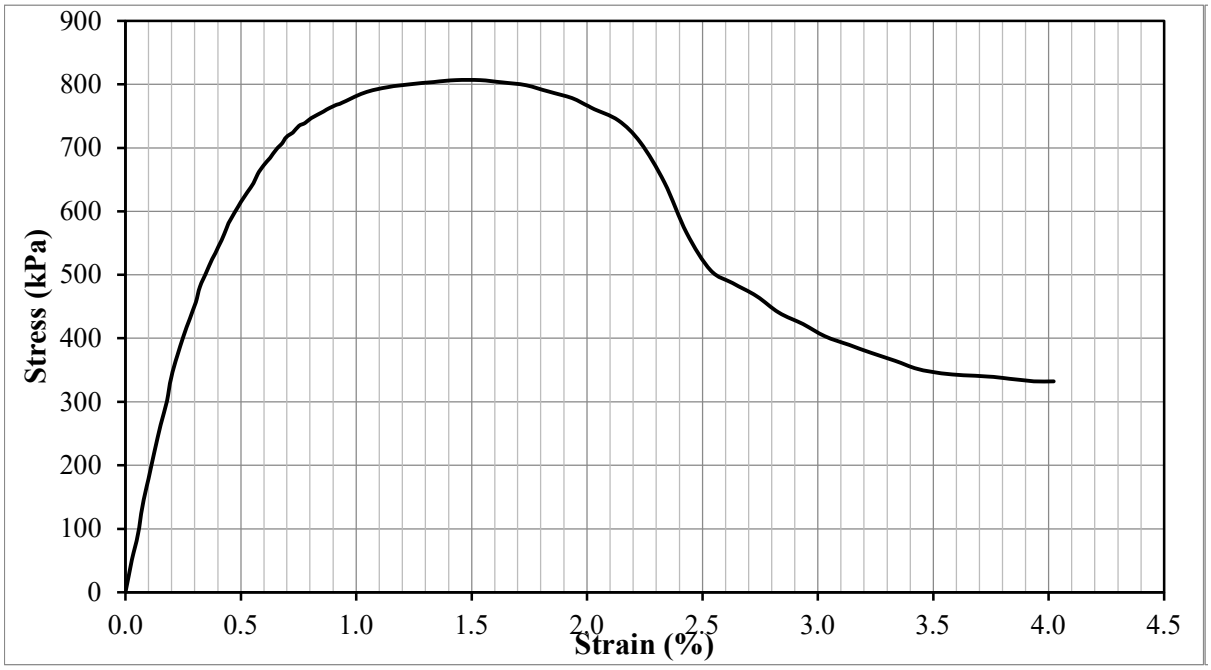
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	593	Strain at failure, εf :	2.42	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	91.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	T-5-H	Initial Area:	2100.5	mm^2
Test Date:	10/18/2017	Weight:	337.0	g
Strain Rate:	1 %/min	Unit Weight:	1753	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	3.0	days
$(w:c)_{slurry}$:	1.4	Curing temperature	25.0	°C
Additional information				



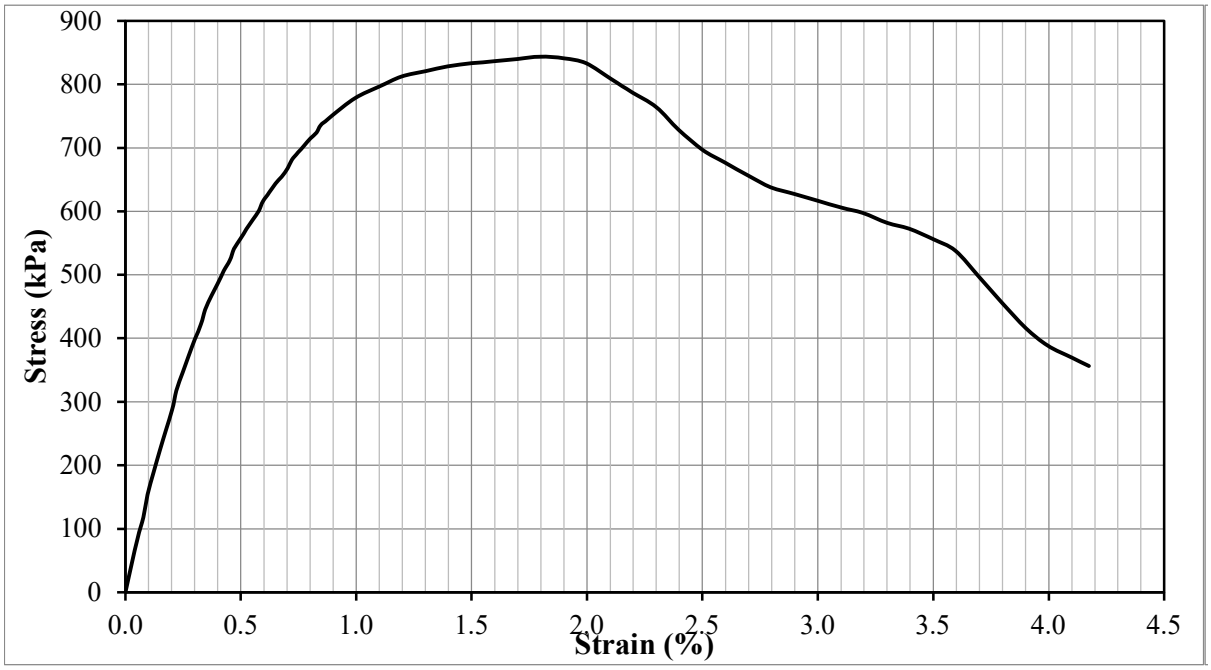
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	610	Strain at failure, εf :	2.45	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	90.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-5-B	Initial Area:	2104.6	mm^2
Test Date:	10/22/2017	Weight:	333.5	g
Strain Rate:	1 %/min	Unit Weight:	1751	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	6.9	days
$(w:c)_{slurry}$:	1.4	Curing temperature	25.0	°C
Additional information				



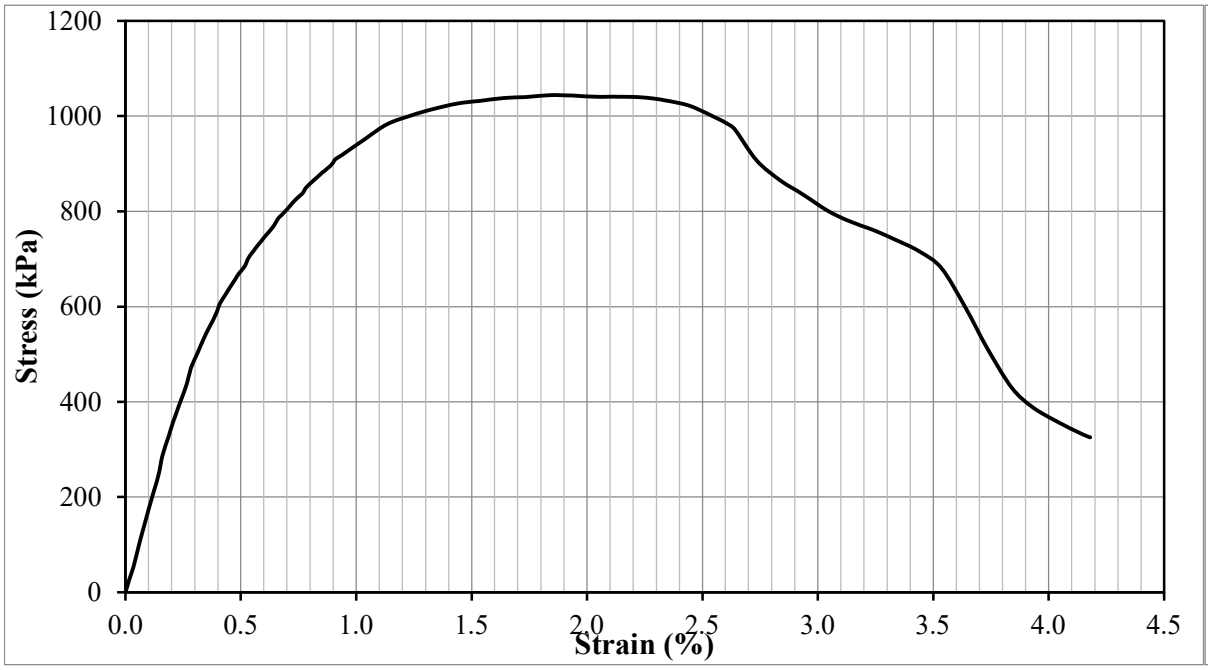
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	790	Strain at failure, εf :	1.43	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	T-5-G	Initial Area:	2100.5	mm^2
Test Date:	10/22/2017	Weight:	359.2	g
Strain Rate:	1 %/min	Unit Weight:	1751	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	6.9	days
$(w:c)_{slurry}$:	1.4	Curing temperature	25.0	°C
Additional information				



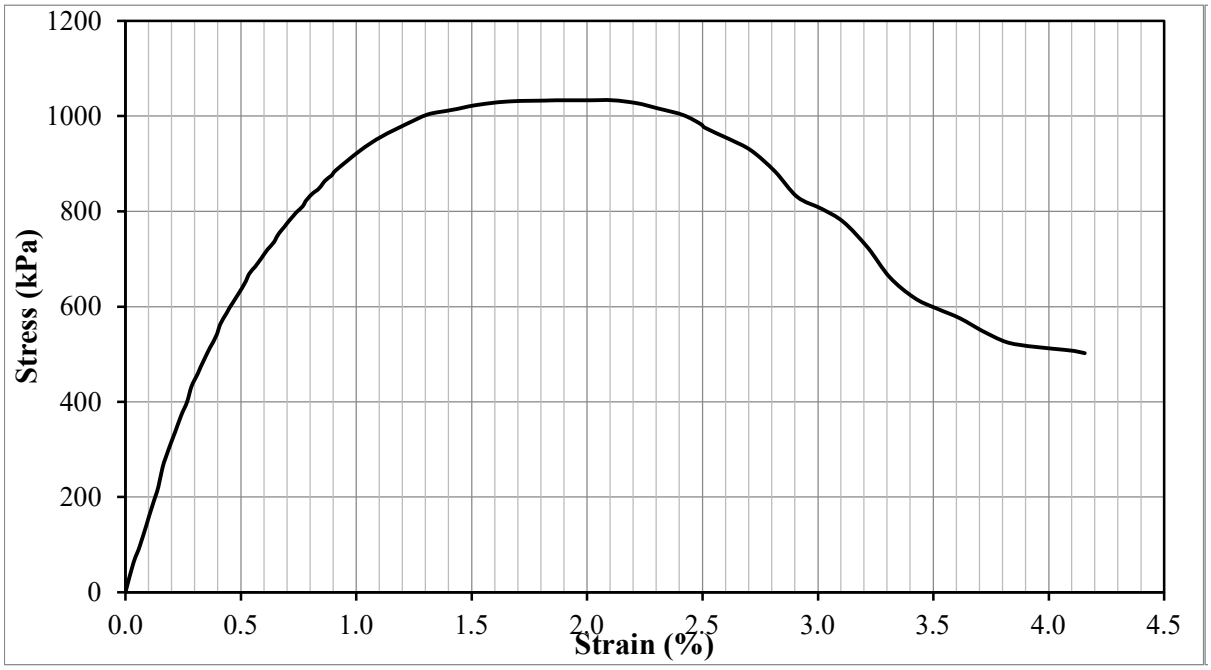
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	836	Strain at failure, εf :	1.80	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	95.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-5-C	Initial Area:	2104.6	mm^2
Test Date:	10/29/2017	Weight:	357.2	g
Strain Rate:	1 %/min	Unit Weight:	1770	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	14.0	days
$(w:c)_{slurry}$:	1.4	Curing temperature	25.0	°C
Additional information				



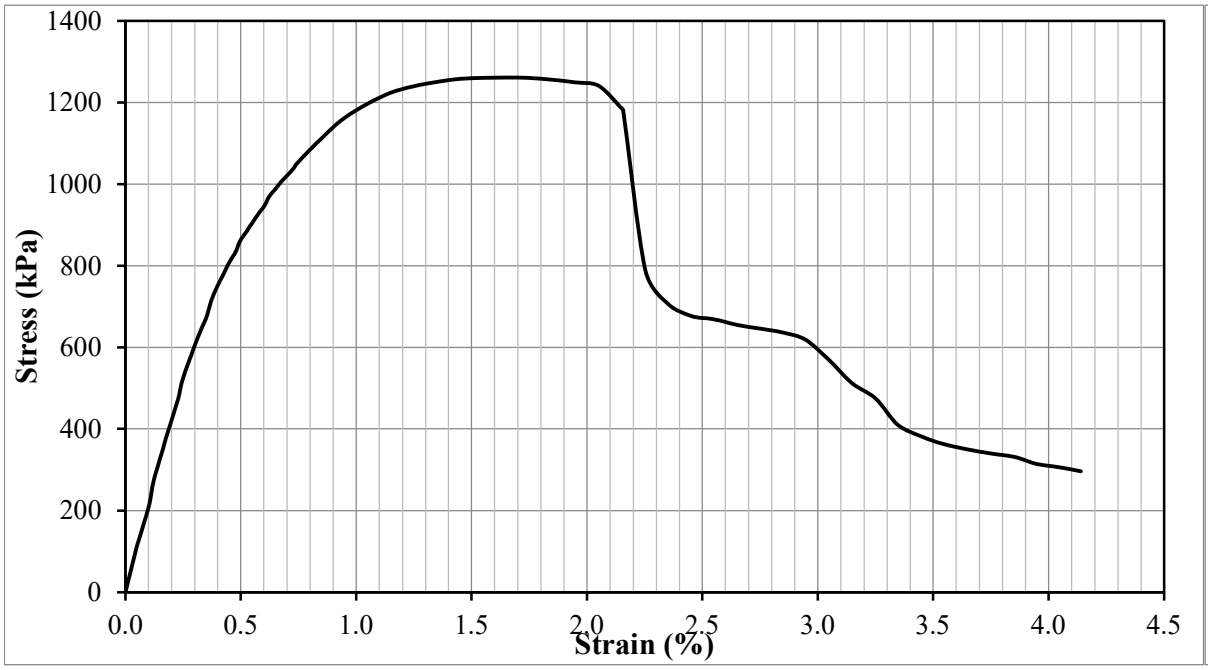
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,031	Strain at failure, εf :	1.84	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	93.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-5-F	Initial Area:	2106.6	mm^2
Test Date:	10/29/2017	Weight:	342.1	g
Strain Rate:	1 %/min	Unit Weight:	1743	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	14.0	days
$(w:c)_{slurry}$:	1.4	Curing temperature	25.0	°C
Additional information				



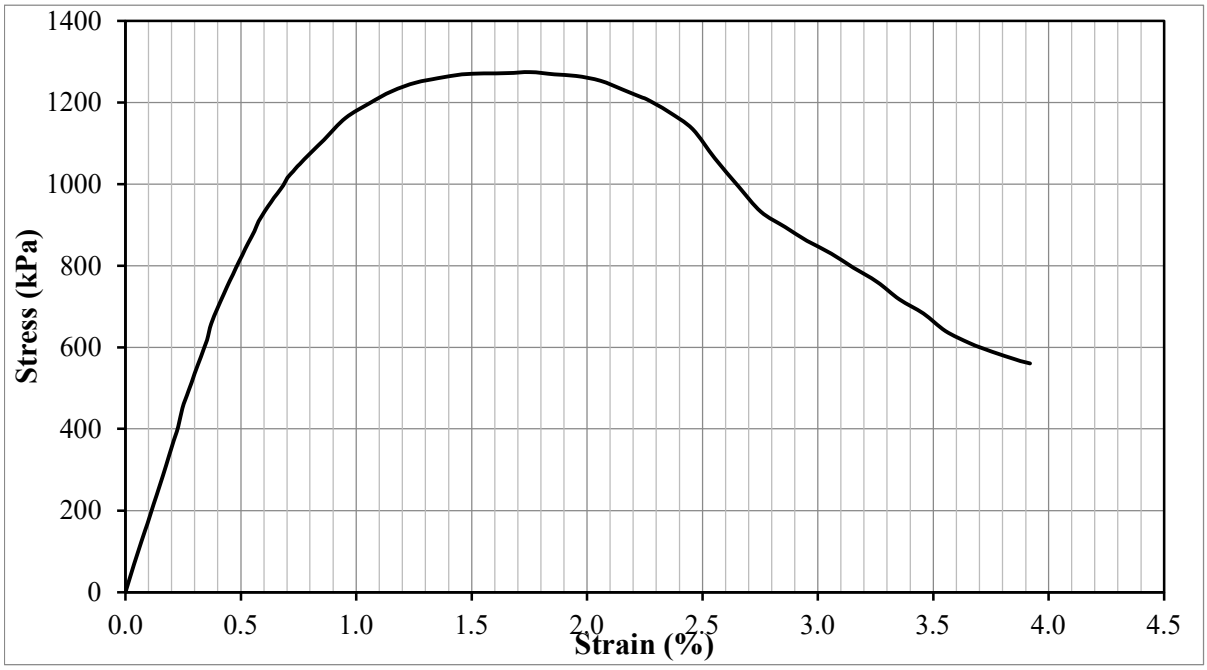
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,017	Strain at failure, εf :	1.91	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	95.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-5-D	Initial Area:	2106.6	mm^2
Test Date:	11/12/2017	Weight:	351.3	g
Strain Rate:	1 %/min	Unit Weight:	1747	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	28.1	days
$(w:c)_{slurry}$:	1.4	Curing temperature	25.0	°C
Additional information				



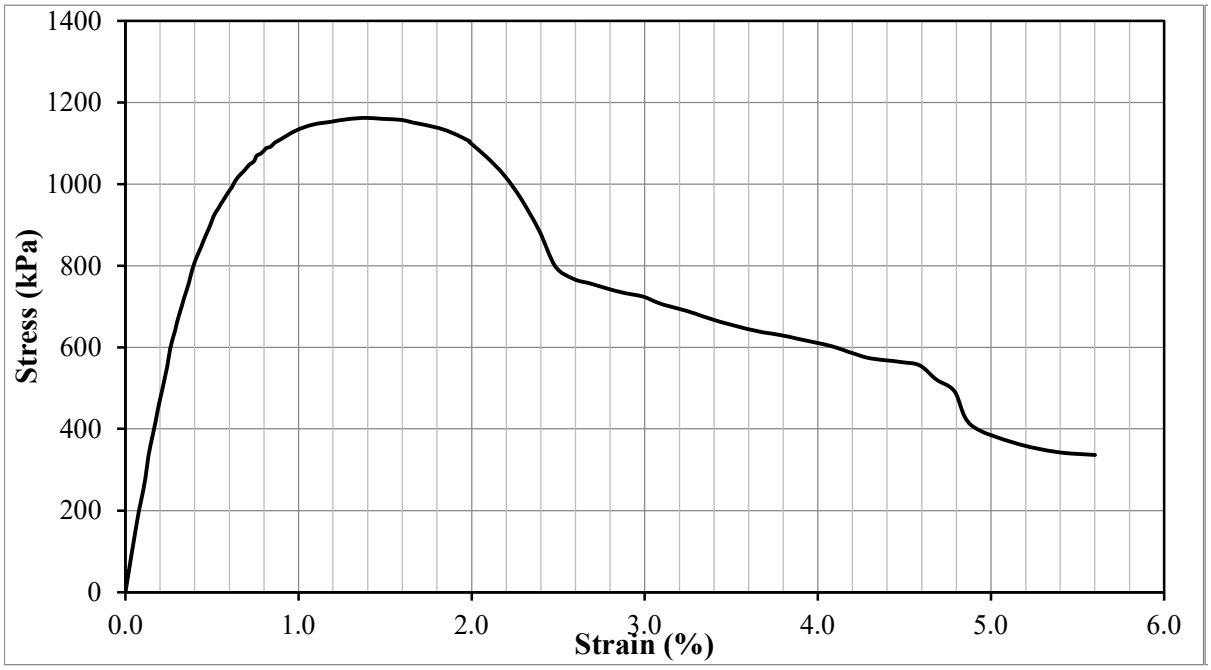
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,245	Strain at failure, εf :	1.65	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	94.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-5-E	Initial Area:	2106.6	mm^2
Test Date:	11/12/2017	Weight:	347.4	g
Strain Rate:	1 %/min	Unit Weight:	1748	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	28.1	days
$(w:c)_{slurry}$:	1.4	Curing temperature	25.0	°C
Additional information				



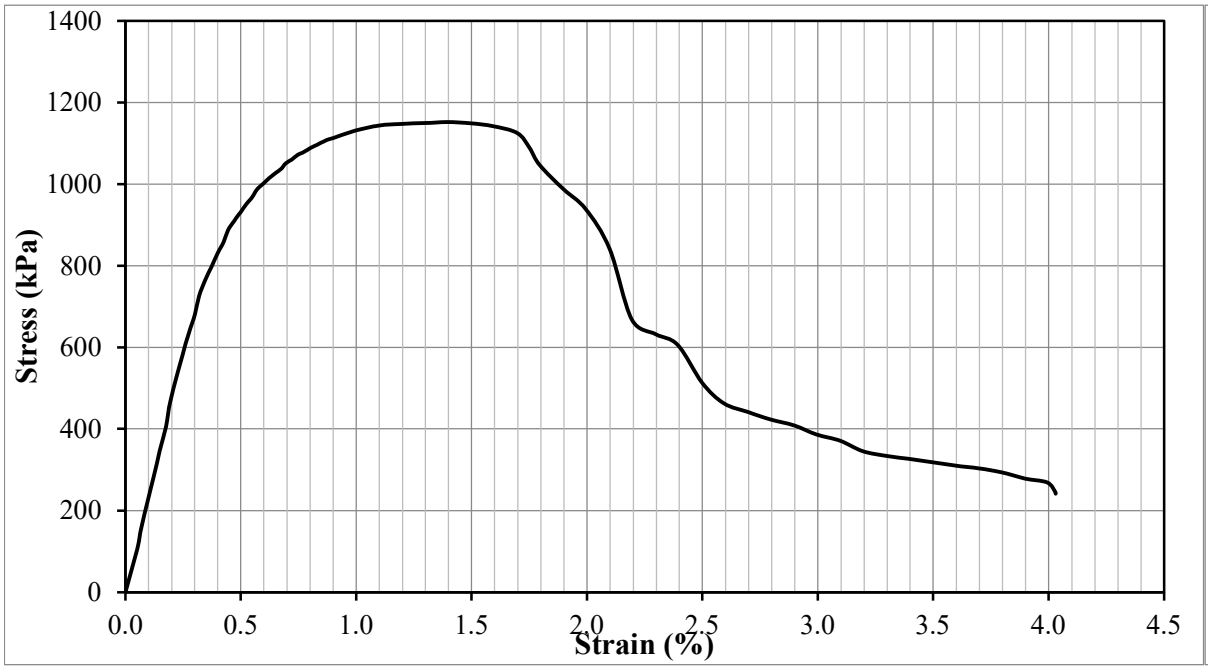
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,256	Strain at failure, εf :	1.75	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	93.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-6-A	Initial Area:	2106.6	mm^2
Test Date:	10/22/2017	Weight:	324.1	g
Strain Rate:	1 %/min	Unit Weight:	1641	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	3.0	days
$(w:c)_{slurry}$:	1.4	Curing temperature	25.0	°C
Additional information				



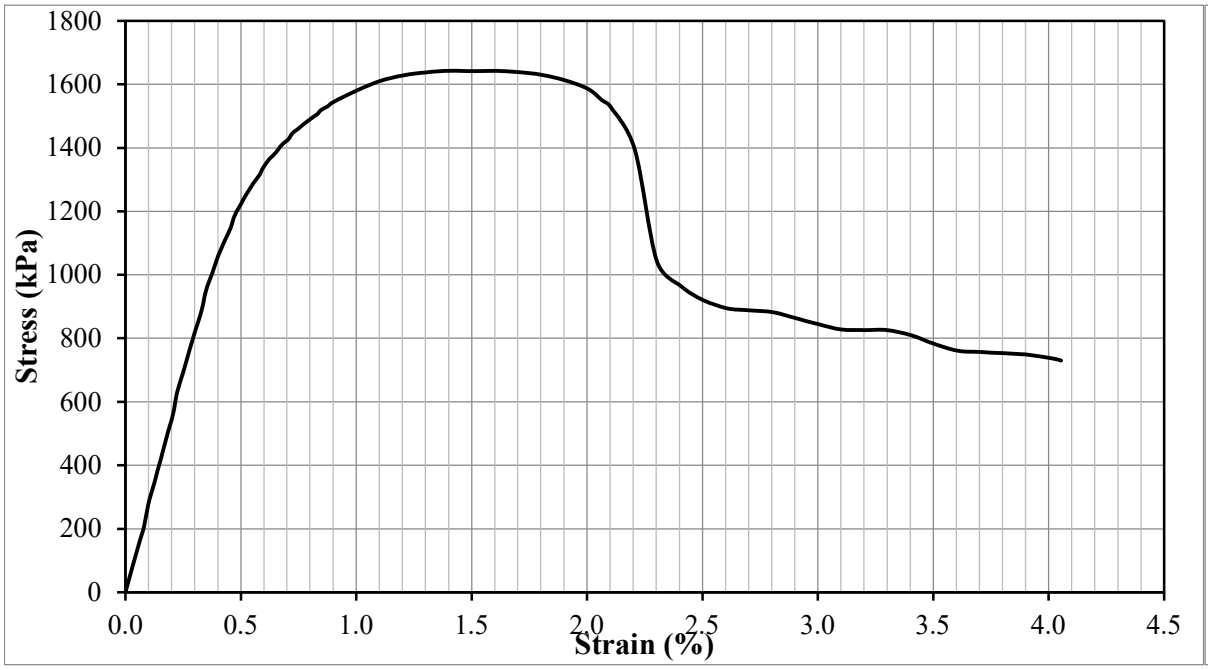
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,145	Strain at failure, εf :	1.39	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	92.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	T-6-H	Initial Area:	2114.9	mm^2
Test Date:	10/22/2017	Weight:	319.4	g
Strain Rate:	1 %/min	Unit Weight:	1638	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	3.0	days
$(w:c)_{slurry}$:	1.4	Curing temperature	25.0	°C
Additional information				



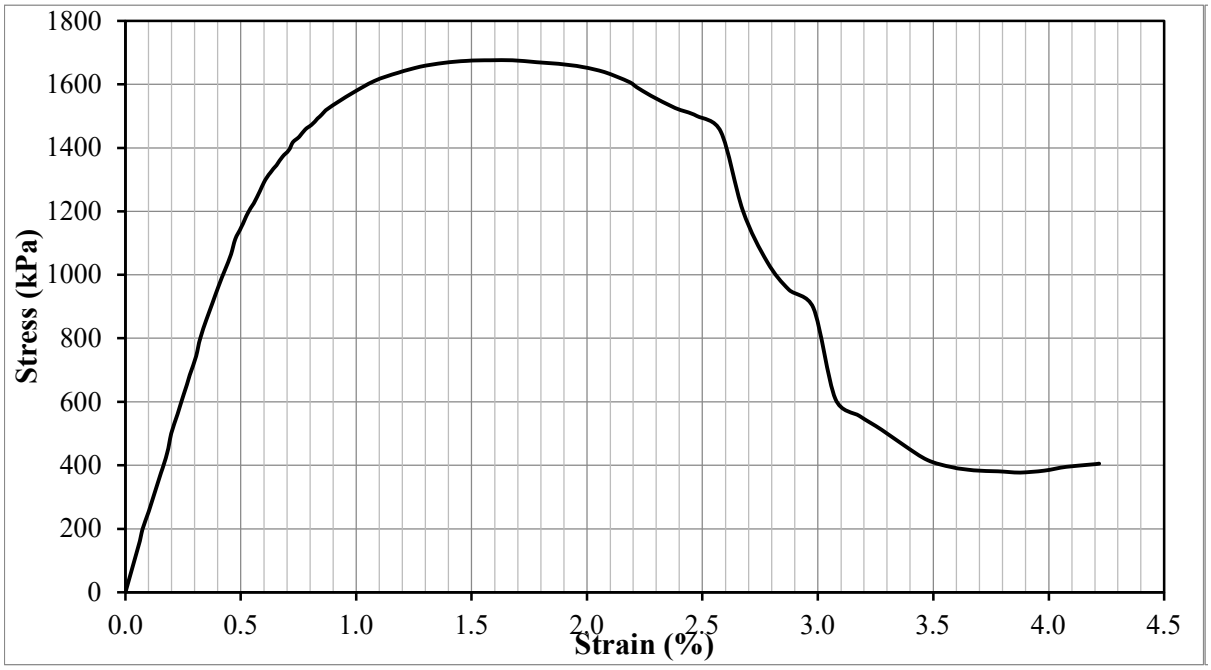
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,131	Strain at failure, εf :	1.39	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-6-B	Initial Area:	2104.6	mm^2
Test Date:	10/26/2017	Weight:	338.0	g
Strain Rate:	1 %/min	Unit Weight:	1645	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	7.0	days
$(w:c)_{slurry}$:	1.4	Curing temperature	25.0	°C
Additional information				



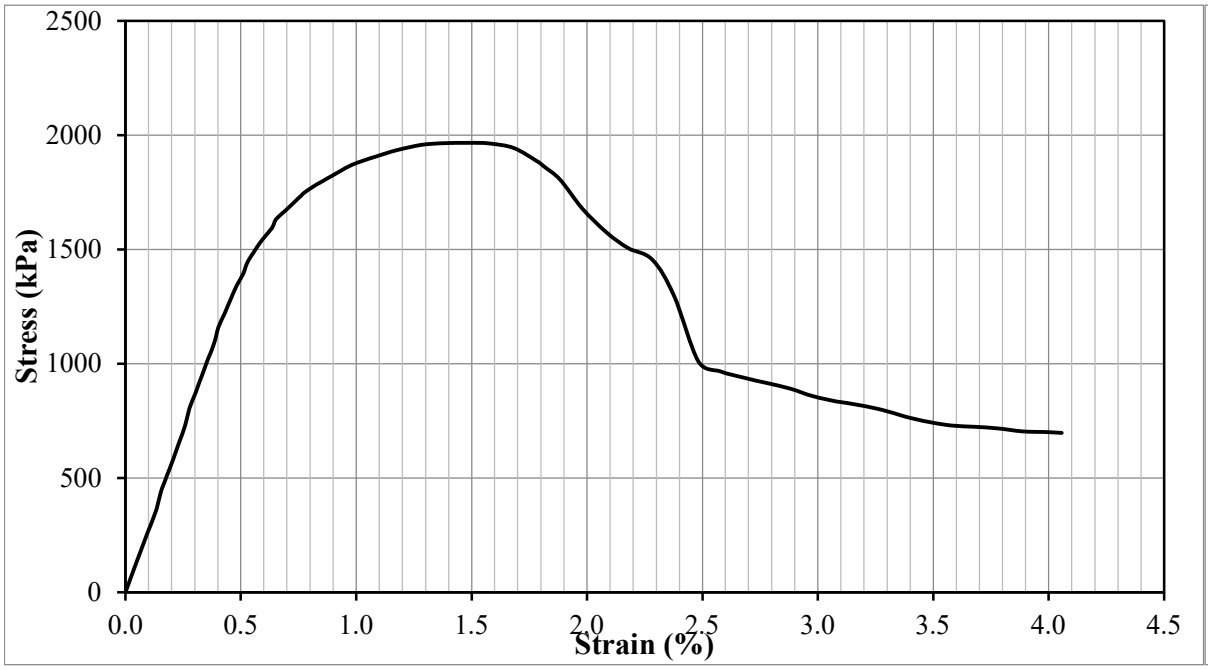
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,628	Strain at failure, εf :	1.41	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	94.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	T-6-G	Initial Area:	2102.5	mm^2
Test Date:	10/26/2017	Weight:	325.1	g
Strain Rate:	1 %/min	Unit Weight:	1646	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	7.0	days
$(w:c)_{slurry}$:	1.4	Curing temperature	25.0	°C
Additional information				



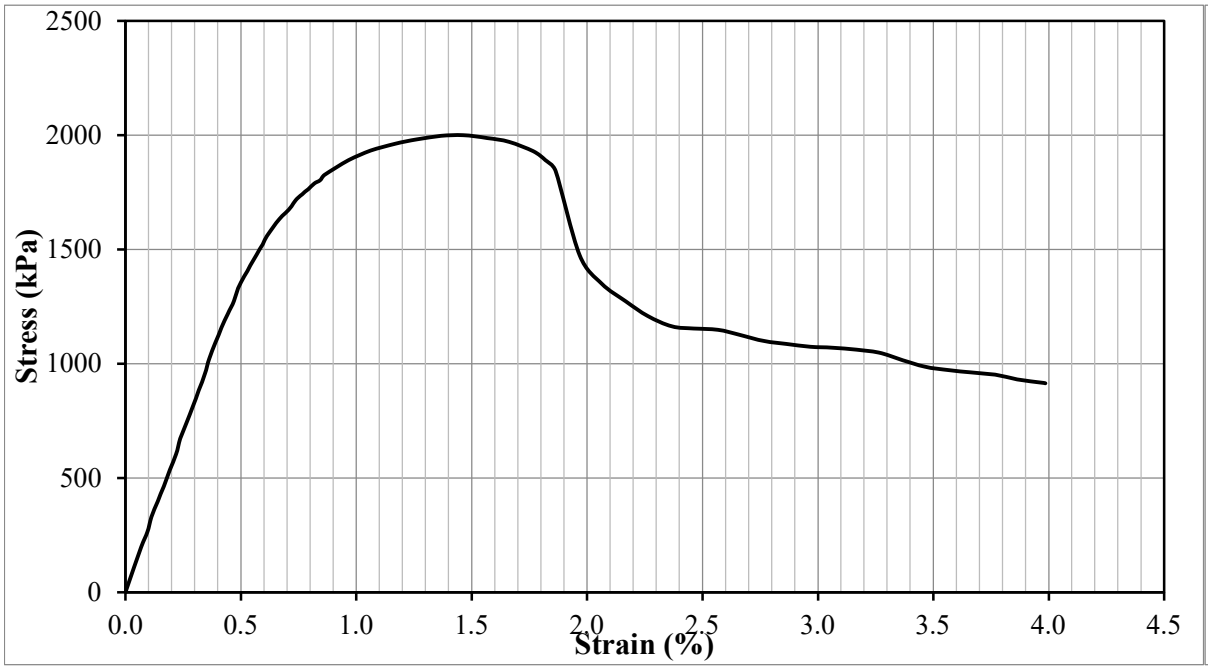
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,651	Strain at failure, εf :	1.58	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-6-C	Initial Area:	2104.6	mm^2
Test Date:	11/2/2017	Weight:	342.1	g
Strain Rate:	1 %/min	Unit Weight:	1646	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	13.9	days
$(w:c)_{slurry}$:	1.4	Curing temperature	25.0	°C
Additional information				



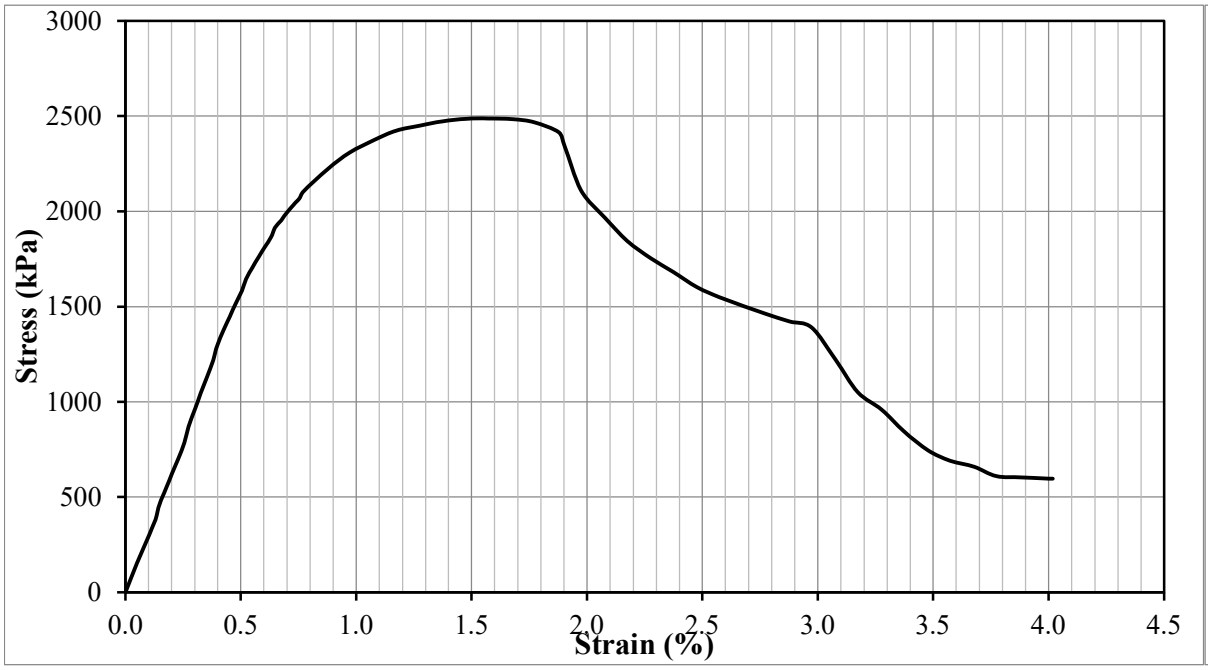
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,952	Strain at failure, εf :	1.48	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	93.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-6-F	Initial Area:	2106.6	mm^2
Test Date:	11/2/2017	Weight:	322.8	g
Strain Rate:	1 %/min	Unit Weight:	1642	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	13.9	days
$(w:c)_{slurry}$:	1.4	Curing temperature	25.0	°C
Additional information				



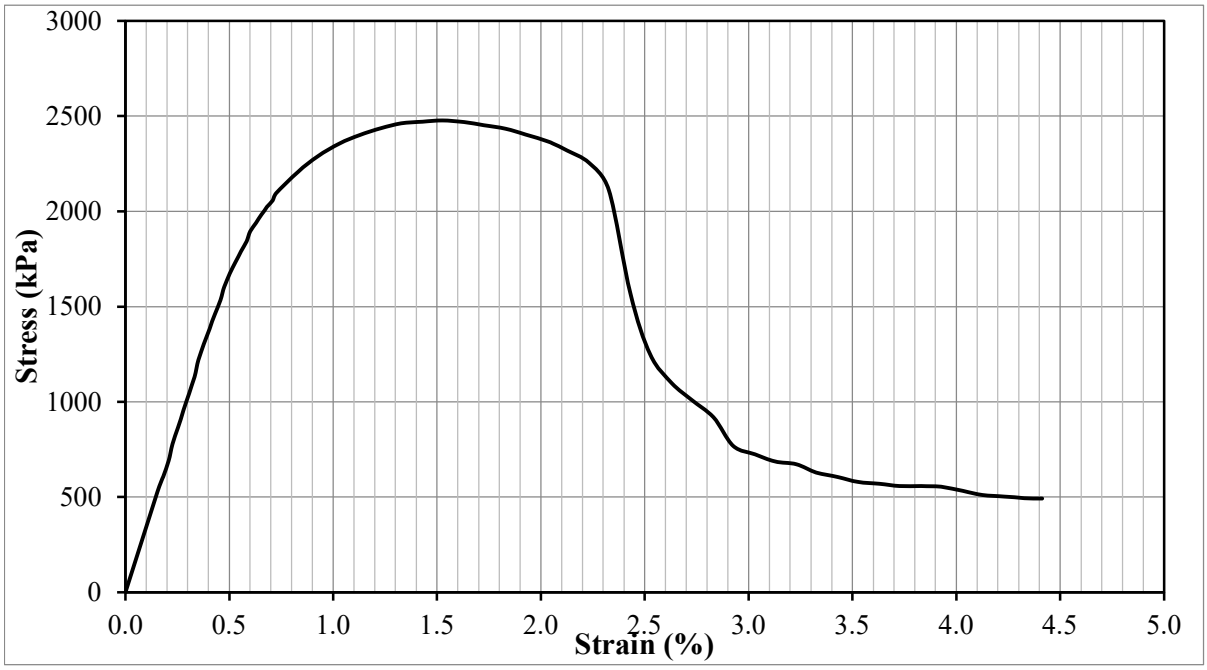
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,968	Strain at failure, εf :	1.46	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-6-D	Initial Area:	2106.6	mm^2
Test Date:	11/16/2017	Weight:	337.3	g
Strain Rate:	1 %/min	Unit Weight:	1641	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	28.1	days
$(w:c)_{slurry}$:	1.4	Curing temperature	25.0	°C
Additional information				



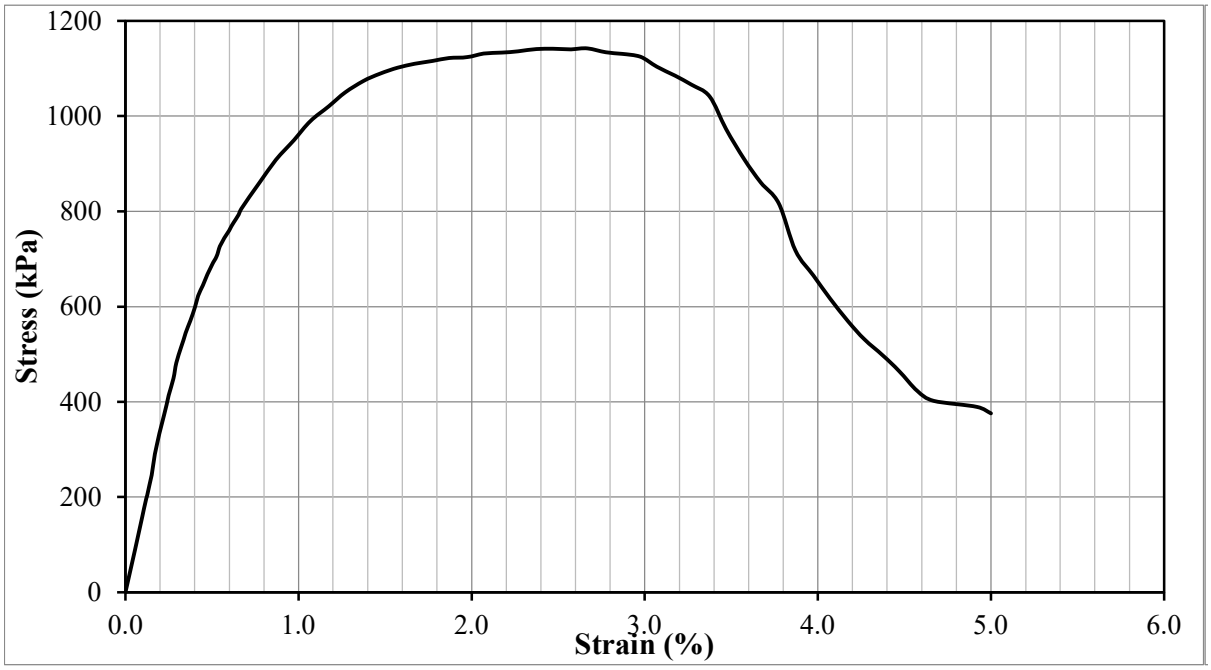
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,465	Strain at failure, εf :	1.57	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	T-6-E	Initial Area:	2100.5	mm^2
Test Date:	11/16/2017	Weight:	340.5	g
Strain Rate:	1 %/min	Unit Weight:	1647	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	28.2	days
$(w:c)_{slurry}$:	1.4	Curing temperature	25.0	°C
Additional information				



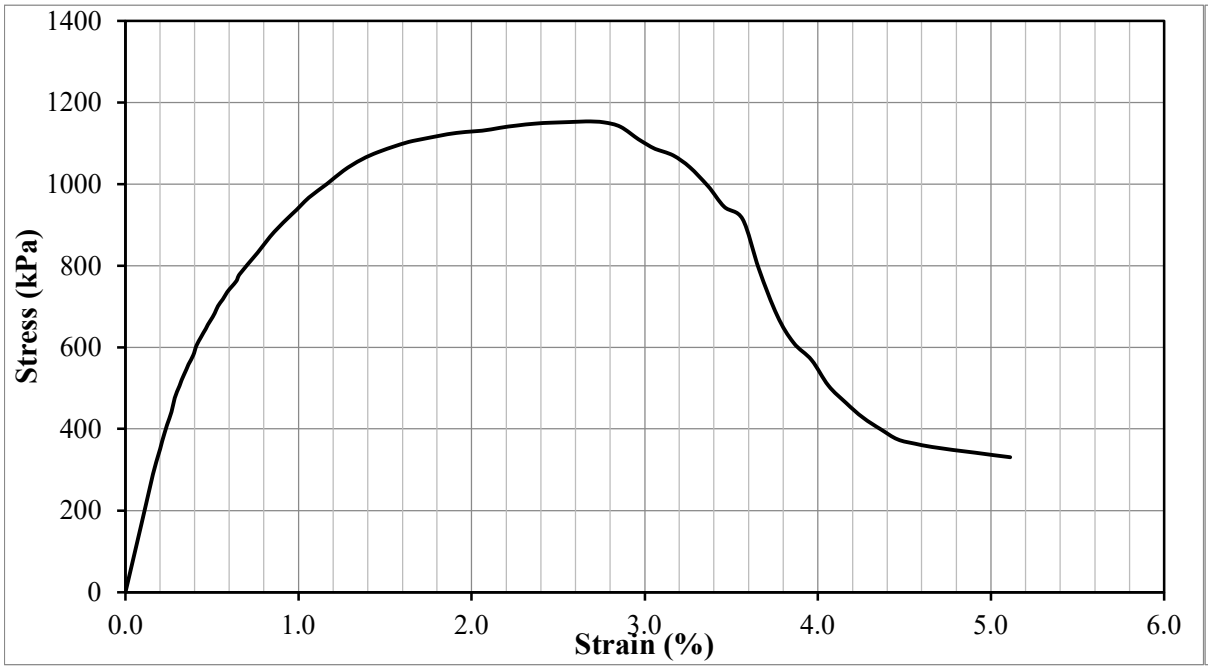
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,458	Strain at failure, εf :	1.53	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-7-A	Initial Area:	2104.6	mm^2
Test Date:	12/27/2017	Weight:	368.9	g
Strain Rate:	1 %/min	Unit Weight:	1780	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	3.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	35.0	°C
Additional information				



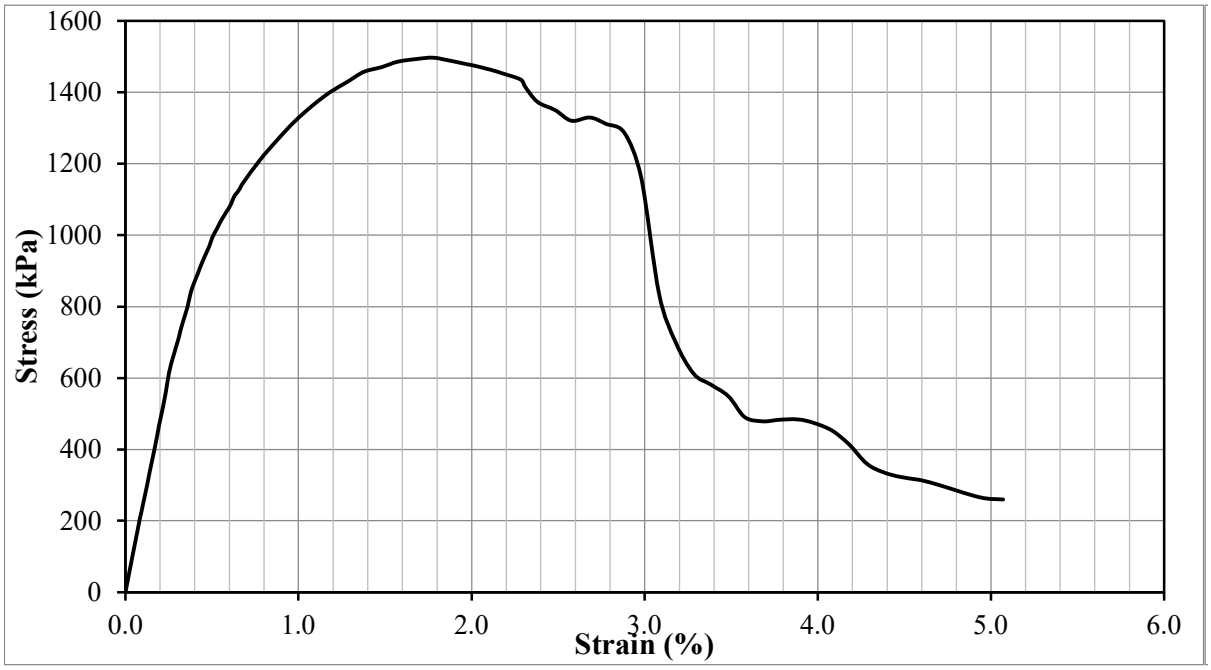
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,133	Strain at failure, εf :	2.67	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-7-H	Initial Area:	2110.8	mm^2
Test Date:	12/27/2017	Weight:	369.5	g
Strain Rate:	1 %/min	Unit Weight:	1773	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	3.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	35.0	°C
Additional information				



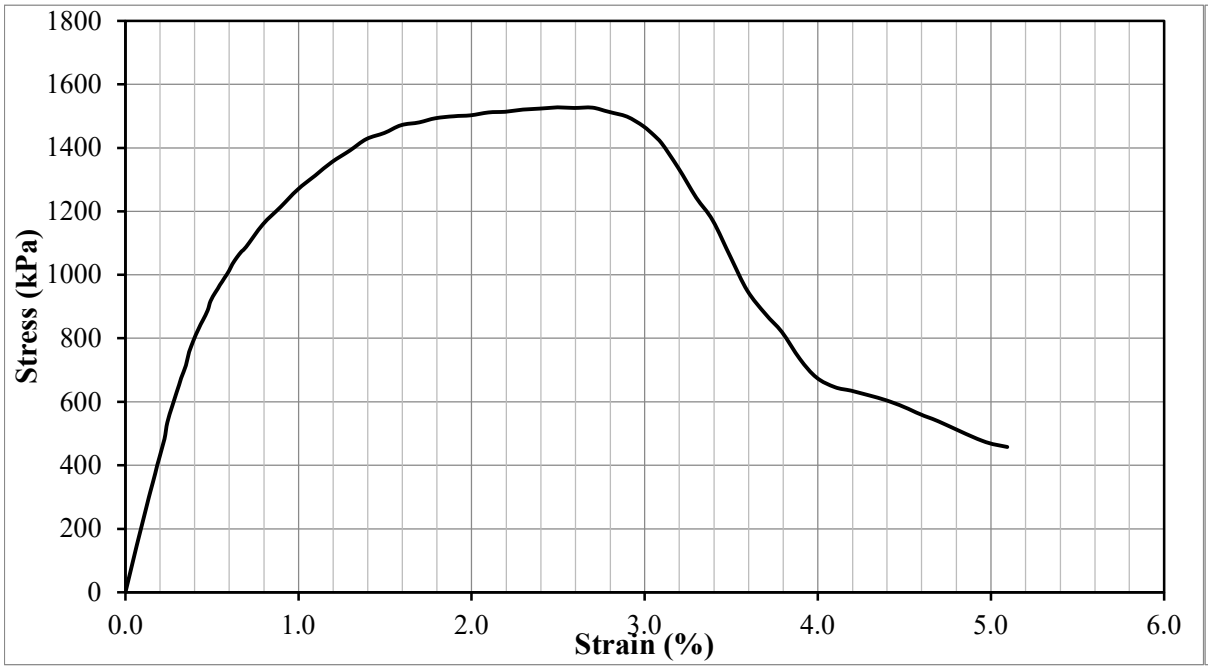
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,145	Strain at failure, εf :	2.66	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-7-B	Initial Area:	2104.6	mm^2
Test Date:	12/31/2017	Weight:	368.8	g
Strain Rate:	1 %/min	Unit Weight:	1781	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	7.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	35.0	°C
Additional information				



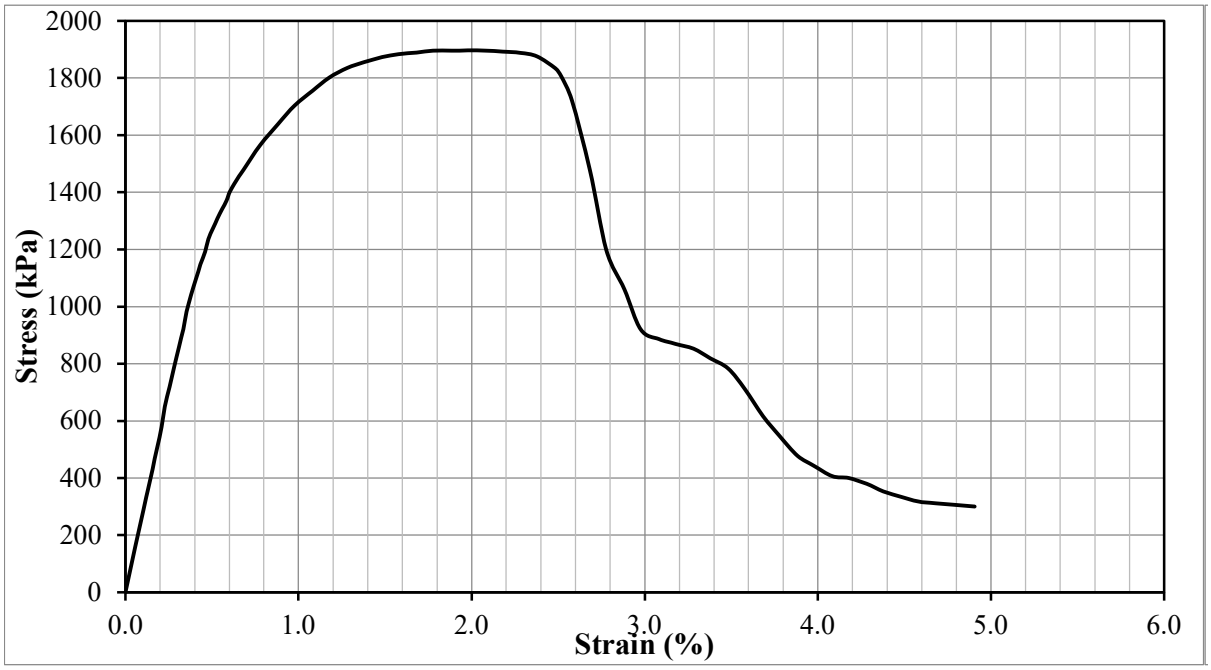
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,485	Strain at failure, εf :	1.78	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-7-G	Initial Area:	2106.6	mm^2
Test Date:	12/31/2017	Weight:	372.0	g
Strain Rate:	1 %/min	Unit Weight:	1779	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	7.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	35.0	°C
Additional information				



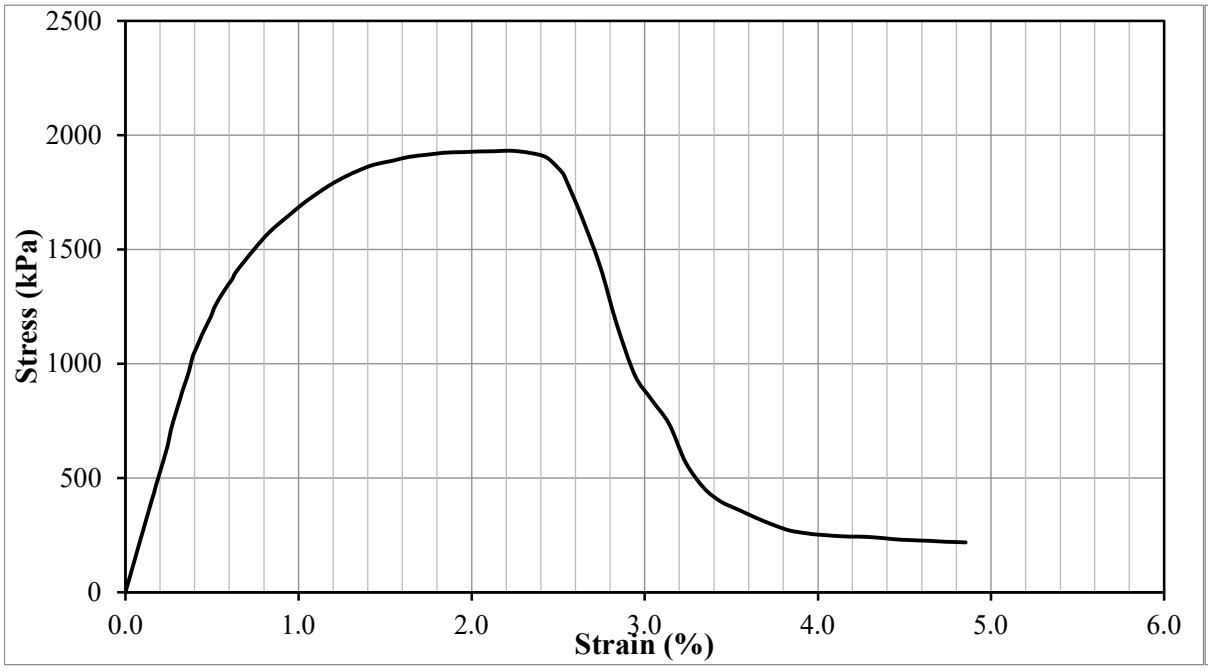
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,517	Strain at failure, εf :	2.50	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-7-C	Initial Area:	2108.7	mm^2
Test Date:	1/7/2018	Weight:	375.1	g
Strain Rate:	1 %/min	Unit Weight:	1785	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	14.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	35.0	°C
Additional information				



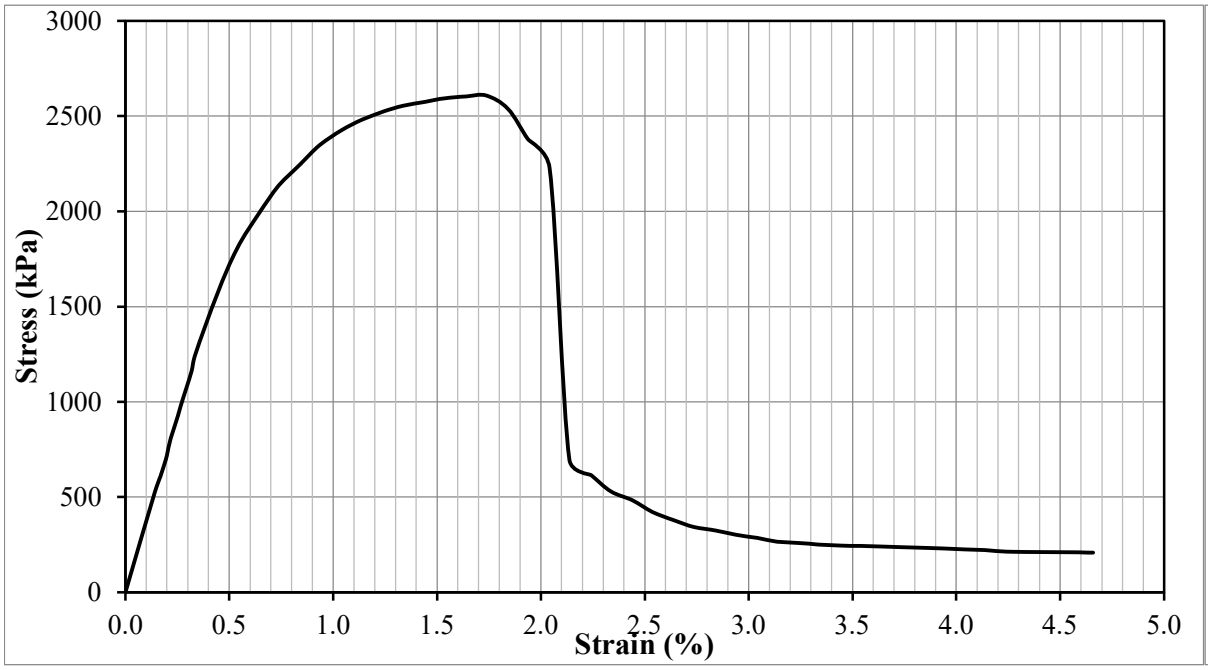
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,884	Strain at failure, εf :	1.98	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-7-F	Initial Area:	2110.8	mm^2
Test Date:	1/7/2018	Weight:	374.2	g
Strain Rate:	1 %/min	Unit Weight:	1780	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	14.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	35.0	°C
Additional information				



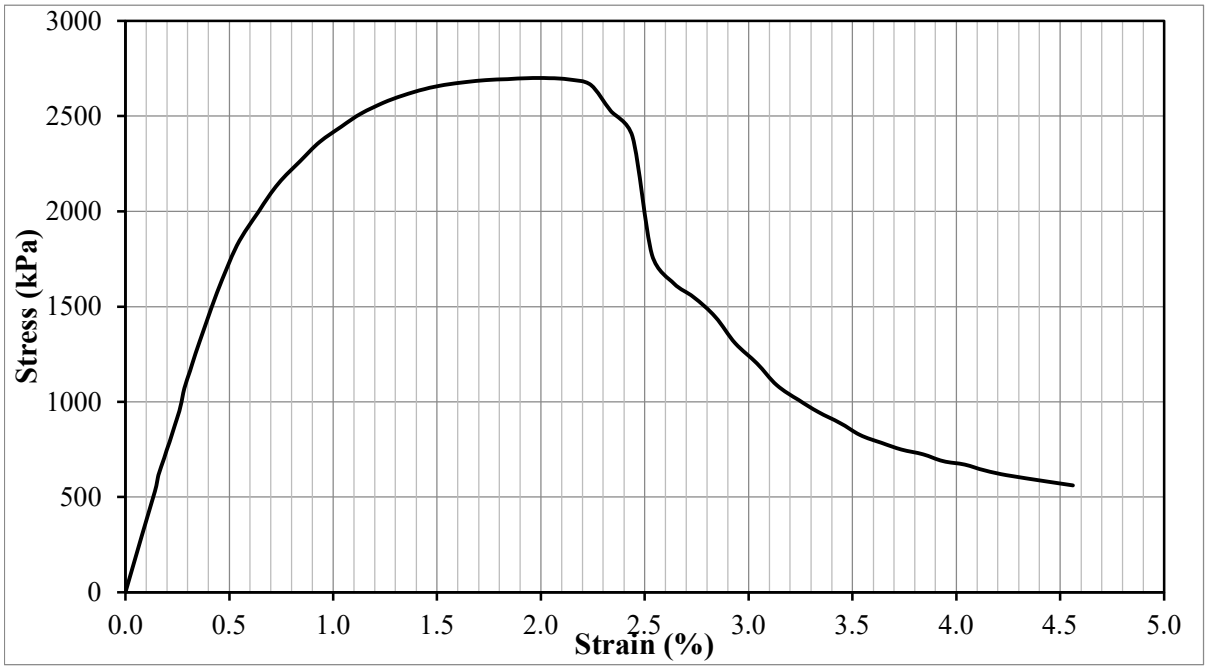
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,919	Strain at failure, εf :	2.24	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	T-7-D	Initial Area:	2112.9	mm^2
Test Date:	1/21/2018	Weight:	377.2	g
Strain Rate:	1 %/min	Unit Weight:	1778	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	35.0	°C
Additional information				



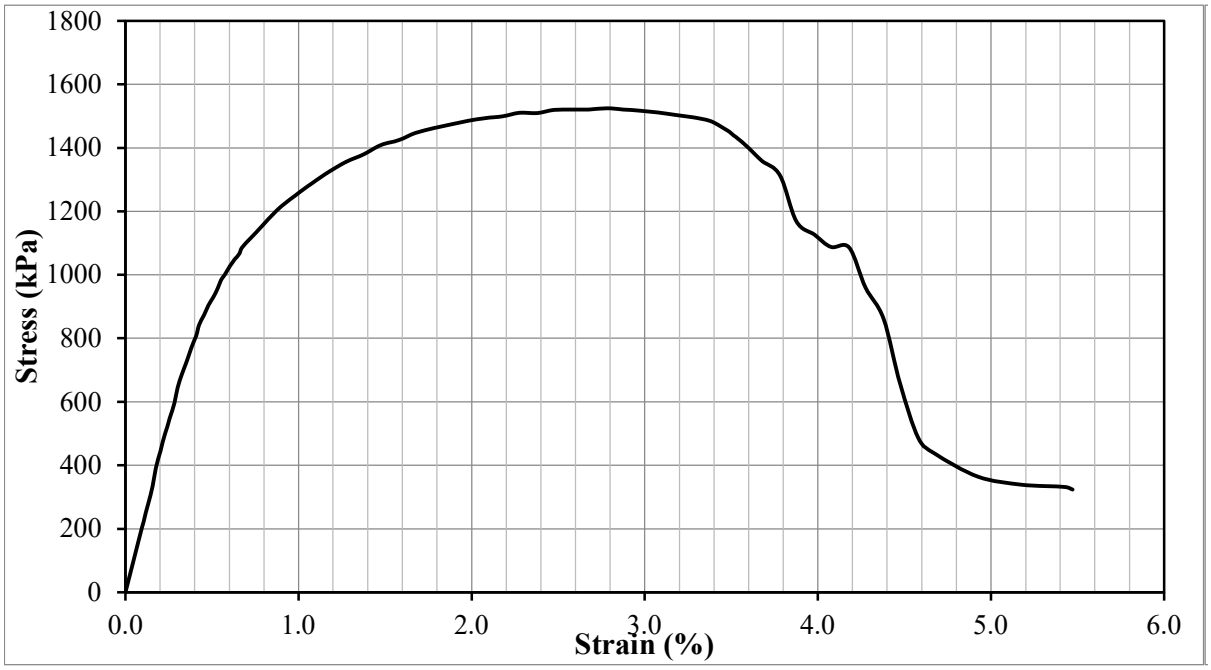
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,594	Strain at failure, εf :	1.74	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-7-E	Initial Area:	2110.8	mm^2
Test Date:	1/21/2018	Weight:	374.4	g
Strain Rate:	1 %/min	Unit Weight:	1777	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	35.0	°C
Additional information				



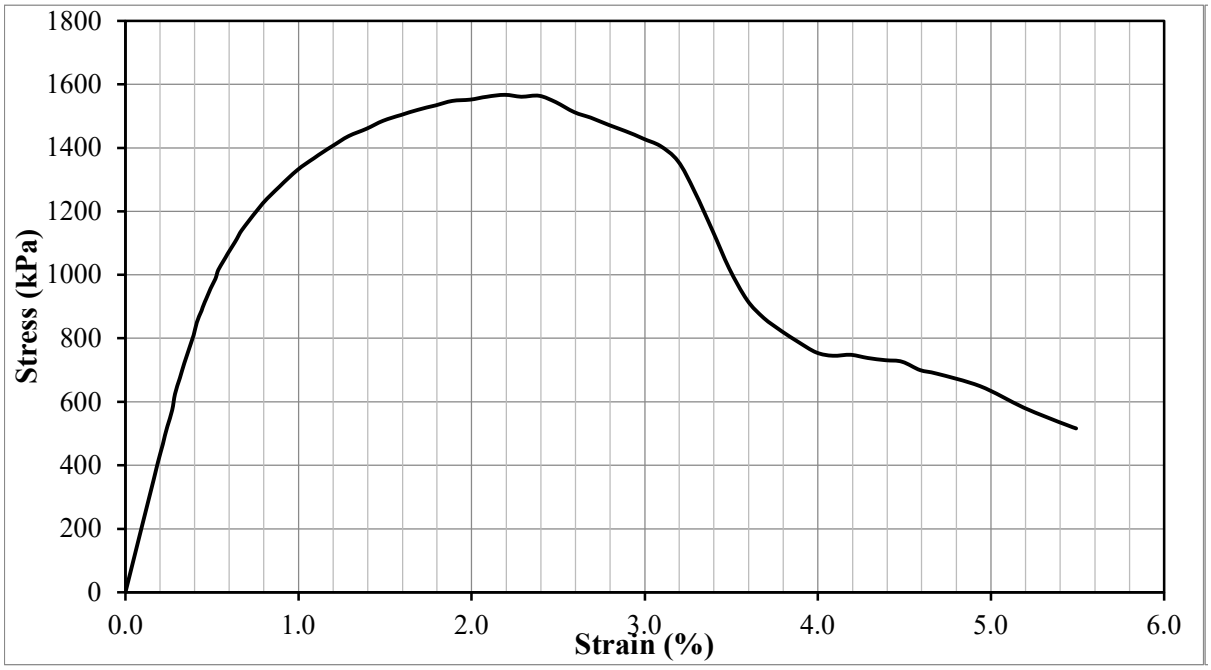
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,683	Strain at failure, εf :	2.04	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-8-A	Initial Area:	2110.8	mm^2
Test Date:	12/27/2017	Weight:	358.4	g
Strain Rate:	1 %/min	Unit Weight:	1746	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	3.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	35.0	°C
Additional information				



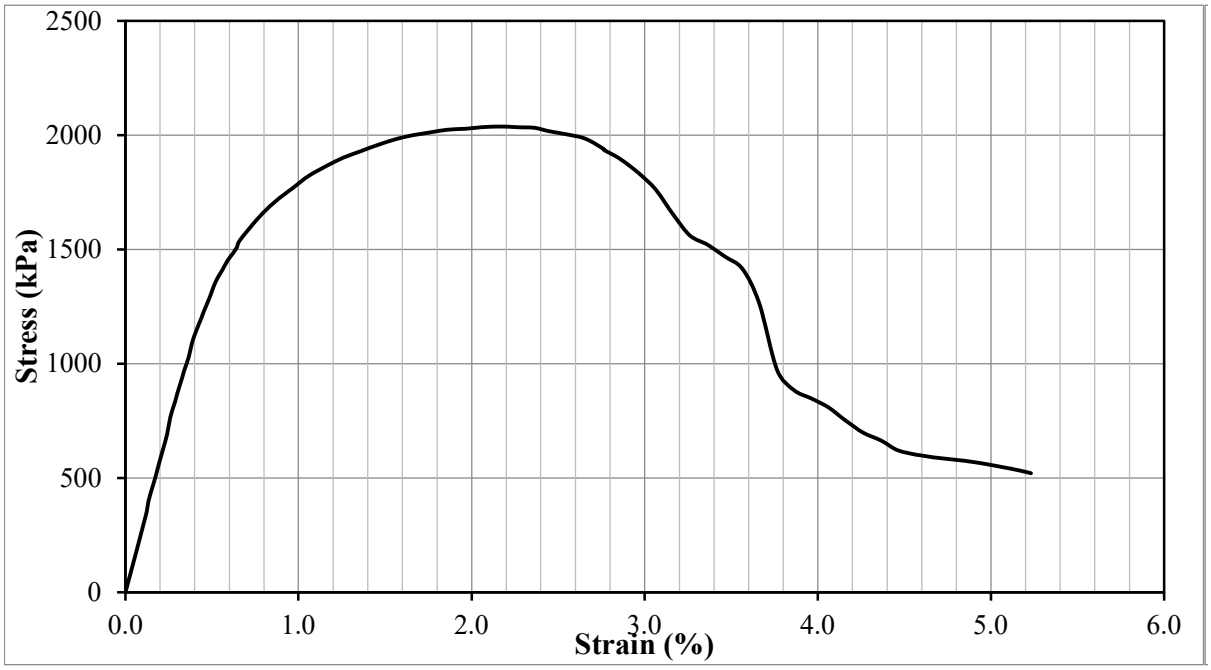
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,509	Strain at failure, εf :	2.78	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-8-H	Initial Area:	2108.7	mm^2
Test Date:	12/27/2017	Weight:	363.2	g
Strain Rate:	1 %/min	Unit Weight:	1750	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	3.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	35.0	°C
Additional information				



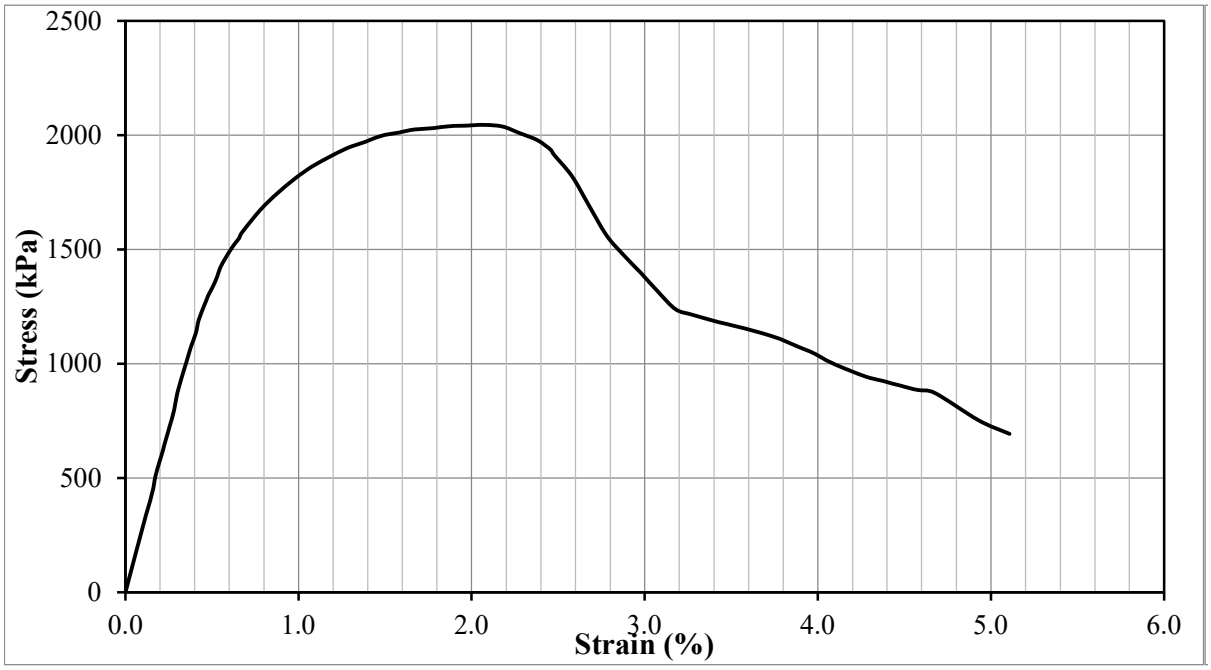
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,554	Strain at failure, εf :	2.19	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-8-B	Initial Area:	2110.8	mm^2
Test Date:	12/31/2017	Weight:	360.6	g
Strain Rate:	1 %/min	Unit Weight:	1749	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	6.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	35.0	°C
Additional information				



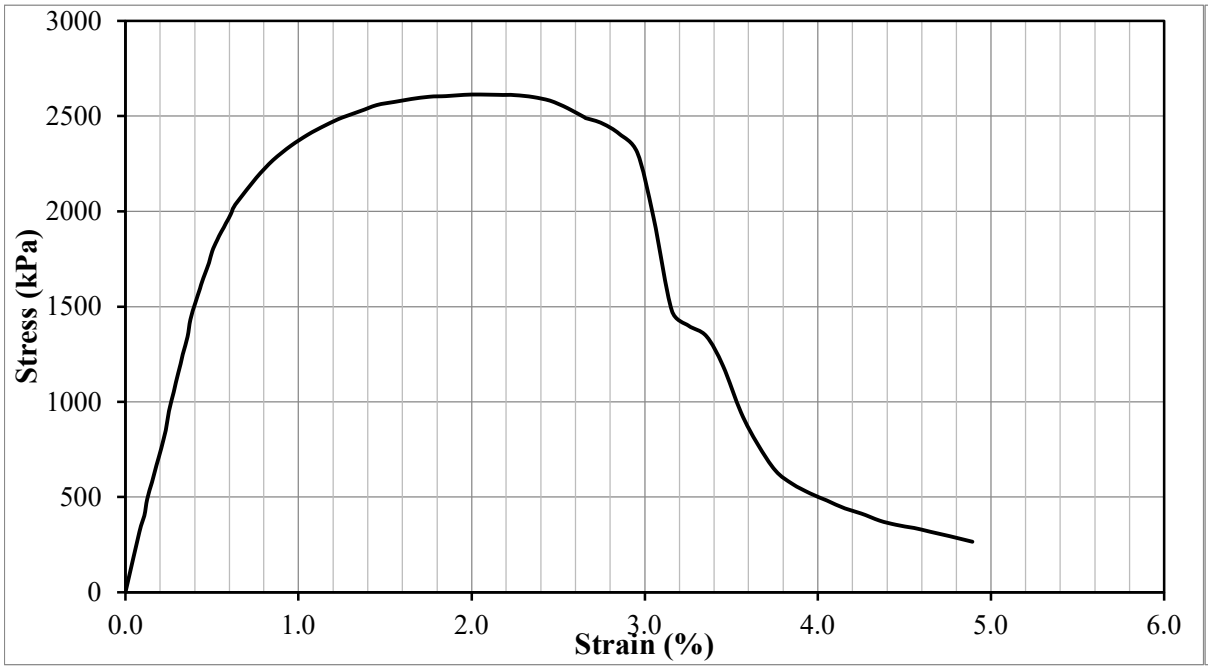
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,018	Strain at failure, εf :	2.17	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	T-8-G	Initial Area:	2114.9	mm^2
Test Date:	12/31/2017	Weight:	371.8	g
Strain Rate:	1 %/min	Unit Weight:	1753	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	7.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	35.0	°C
Additional information				



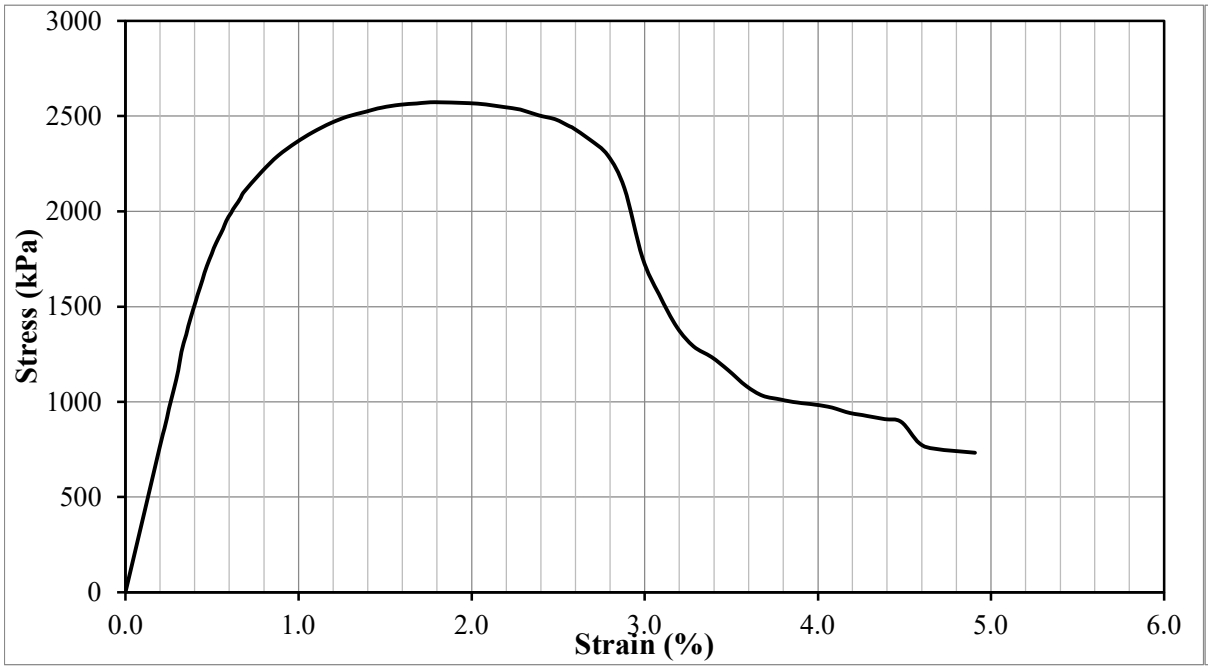
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,034	Strain at failure, εf :	2.07	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-8-C	Initial Area:	2108.7	mm^2
Test Date:	1/7/2018	Weight:	364.5	g
Strain Rate:	1 %/min	Unit Weight:	1752	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	14.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	35.0	°C
Additional information				



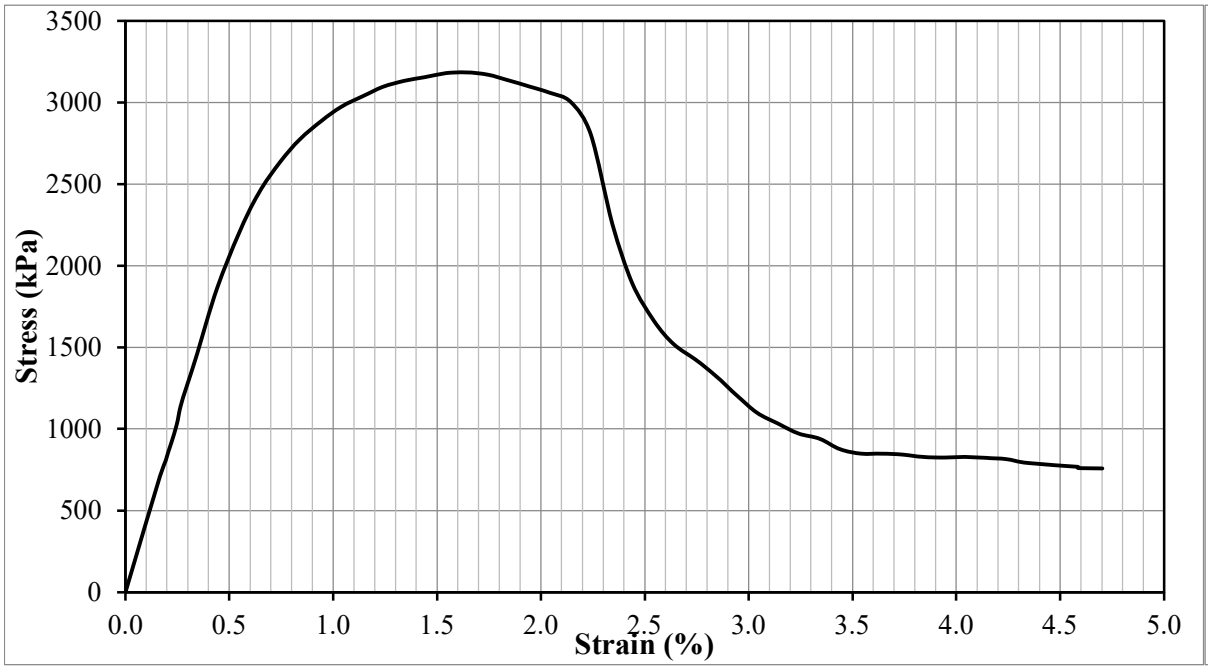
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,593	Strain at failure, εf :	2.05	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-8-F	Initial Area:	2110.8	mm^2
Test Date:	1/7/2018	Weight:	370.0	g
Strain Rate:	1 %/min	Unit Weight:	1753	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	14.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	35.0	°C
Additional information				



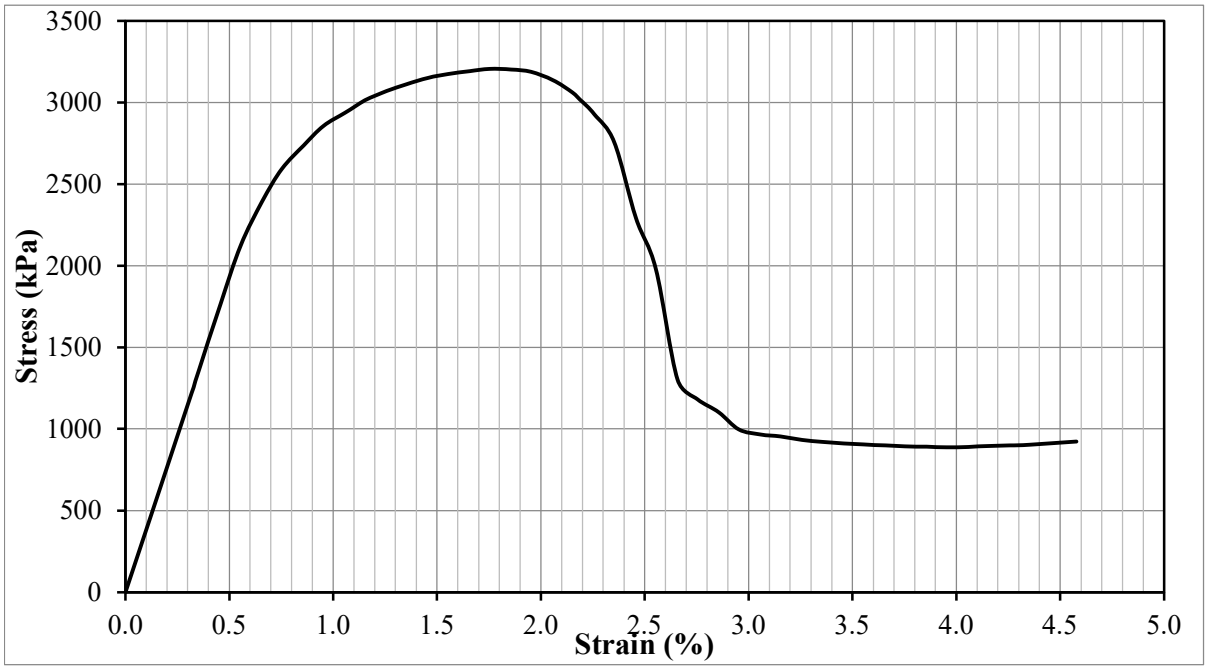
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,558	Strain at failure, εf :	1.79	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	T-8-D	Initial Area:	2112.9	mm^2
Test Date:	1/21/2018	Weight:	371.5	g
Strain Rate:	1 %/min	Unit Weight:	1757	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	35.0	°C
Additional information				



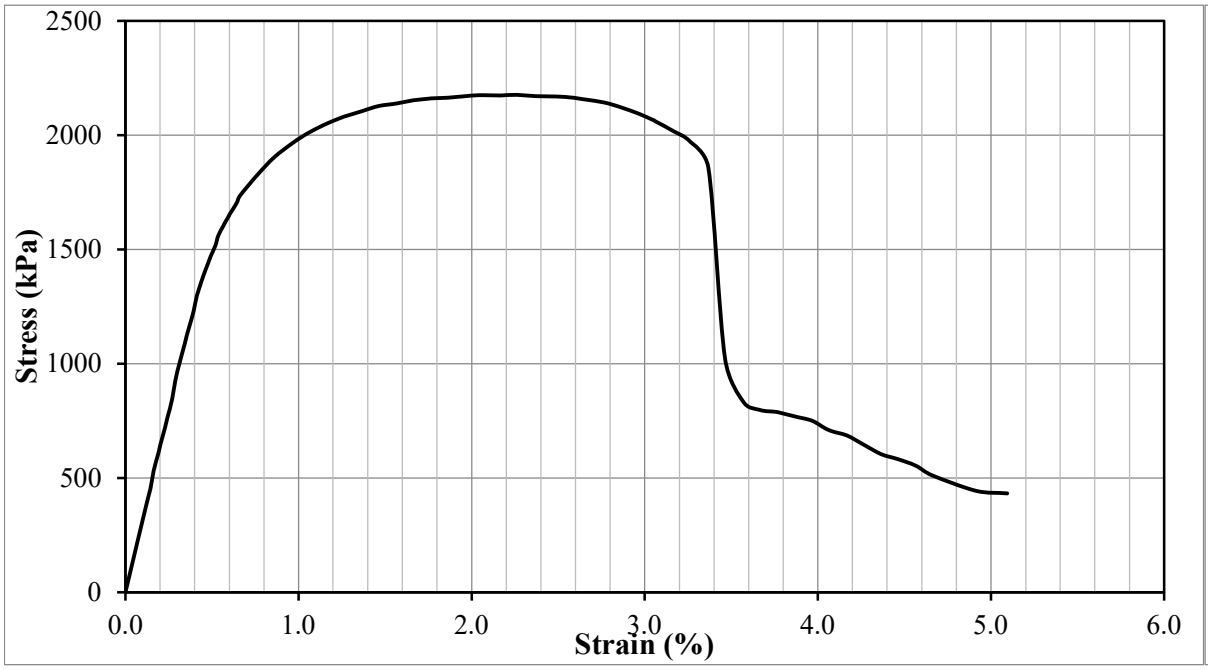
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,167	Strain at failure, εf :	1.64	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	T-8-E	Initial Area:	2114.9	mm^2
Test Date:	1/21/2018	Weight:	360.0	g
Strain Rate:	1 %/min	Unit Weight:	1750	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	35.0	°C
Additional information				



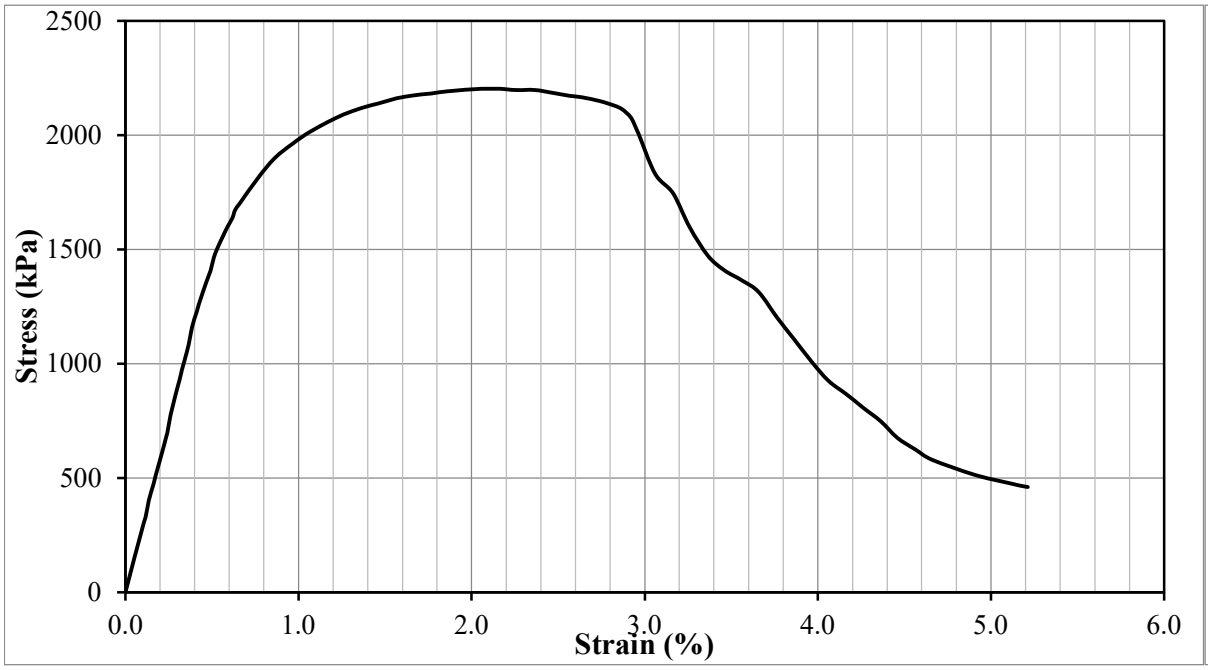
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,173	Strain at failure, εf :	1.75	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-9-A	Initial Area:	2110.8	mm^2
Test Date:	1/3/2018	Weight:	363.9	g
Strain Rate:	1 %/min	Unit Weight:	1725	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	2.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	35.0	°C
Additional information				



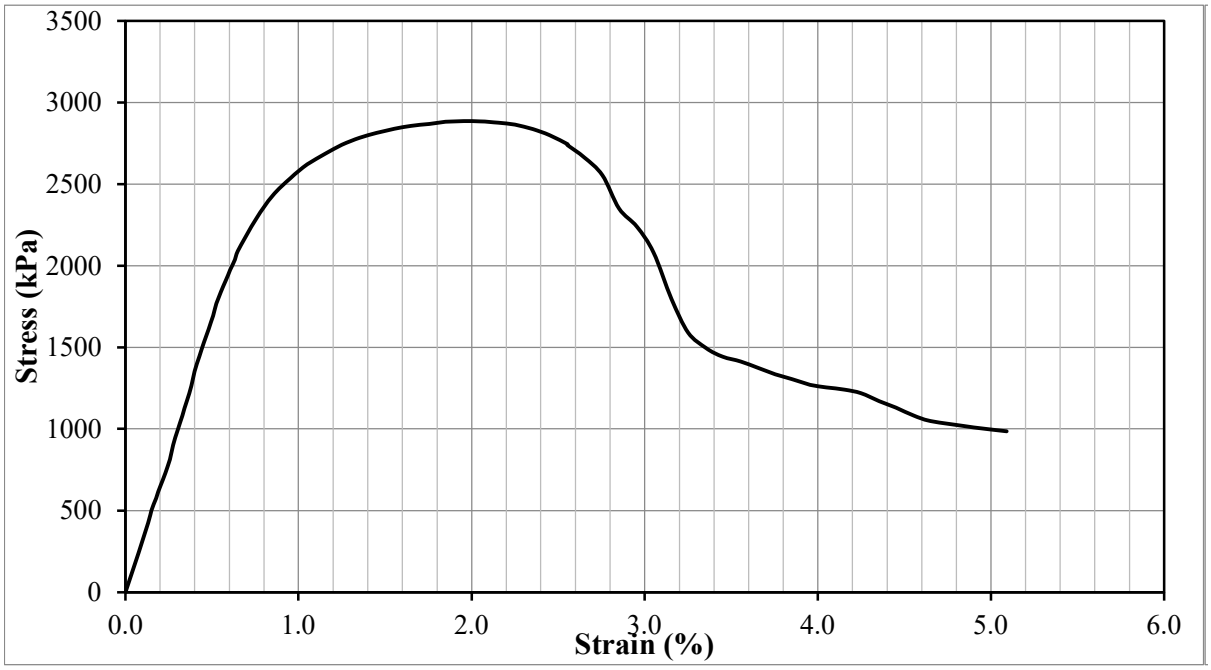
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,163	Strain at failure, εf :	2.26	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-9-H	Initial Area:	2110.8	mm^2
Test Date:	1/3/2018	Weight:	362.1	g
Strain Rate:	1 %/min	Unit Weight:	1724	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	2.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	35.0	°C
Additional information				



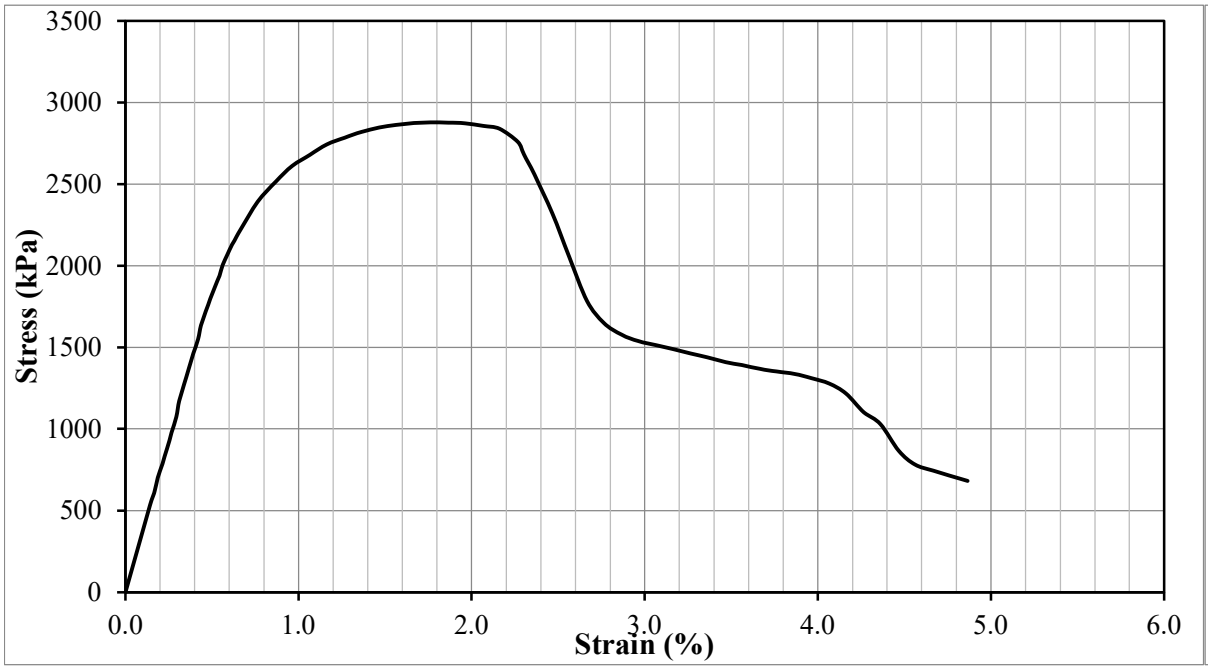
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,188	Strain at failure, εf :	2.06	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	91.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-9-B	Initial Area:	2110.8	mm^2
Test Date:	1/7/2018	Weight:	330.0	g
Strain Rate:	1 %/min	Unit Weight:	1719	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	6.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	35.0	°C
Additional information				



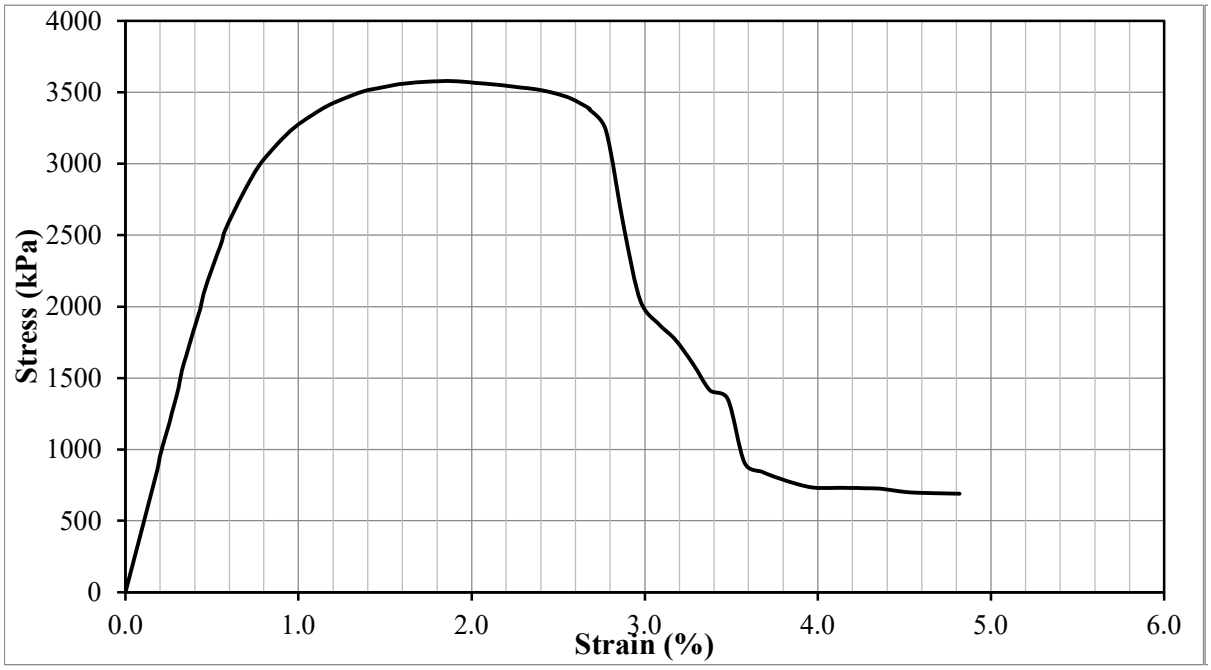
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,829	Strain at failure, εf :	1.95	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-9-G	Initial Area:	2108.7	mm^2
Test Date:	1/7/2018	Weight:	357.6	g
Strain Rate:	1 %/min	Unit Weight:	1731	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	6.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	35.0	°C
Additional information				



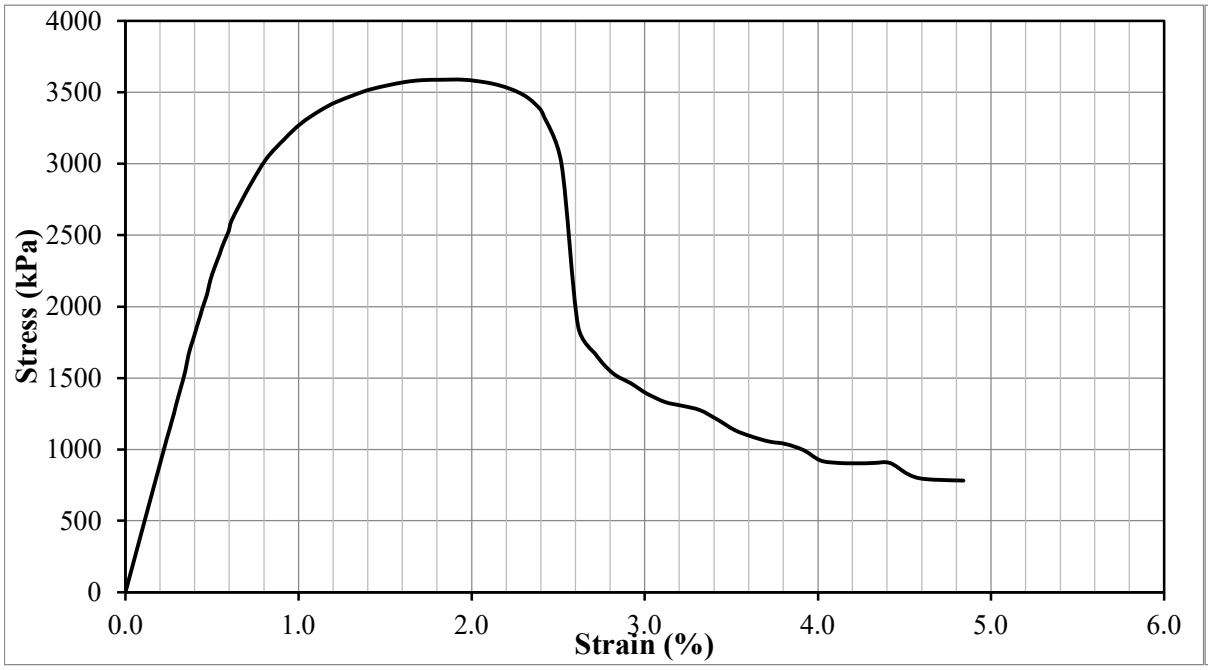
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,852	Strain at failure, εf :	1.76	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-9-C	Initial Area:	2110.8	mm^2
Test Date:	1/14/2018	Weight:	367.6	g
Strain Rate:	1 %/min	Unit Weight:	1731	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	13.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	35.0	°C
Additional information				



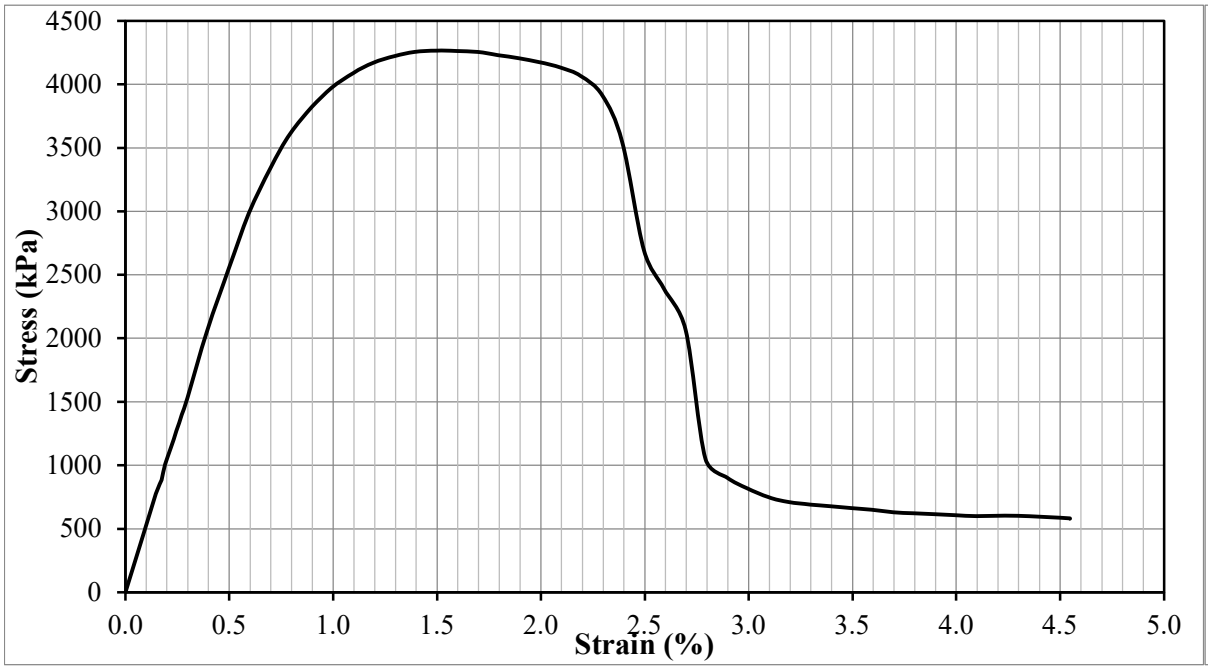
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,562	Strain at failure, εf :	1.88	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	96.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-9-F	Initial Area:	2110.8	mm^2
Test Date:	1/14/2018	Weight:	352.4	g
Strain Rate:	1 %/min	Unit Weight:	1727	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	14.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	35.0	°C
Additional information				



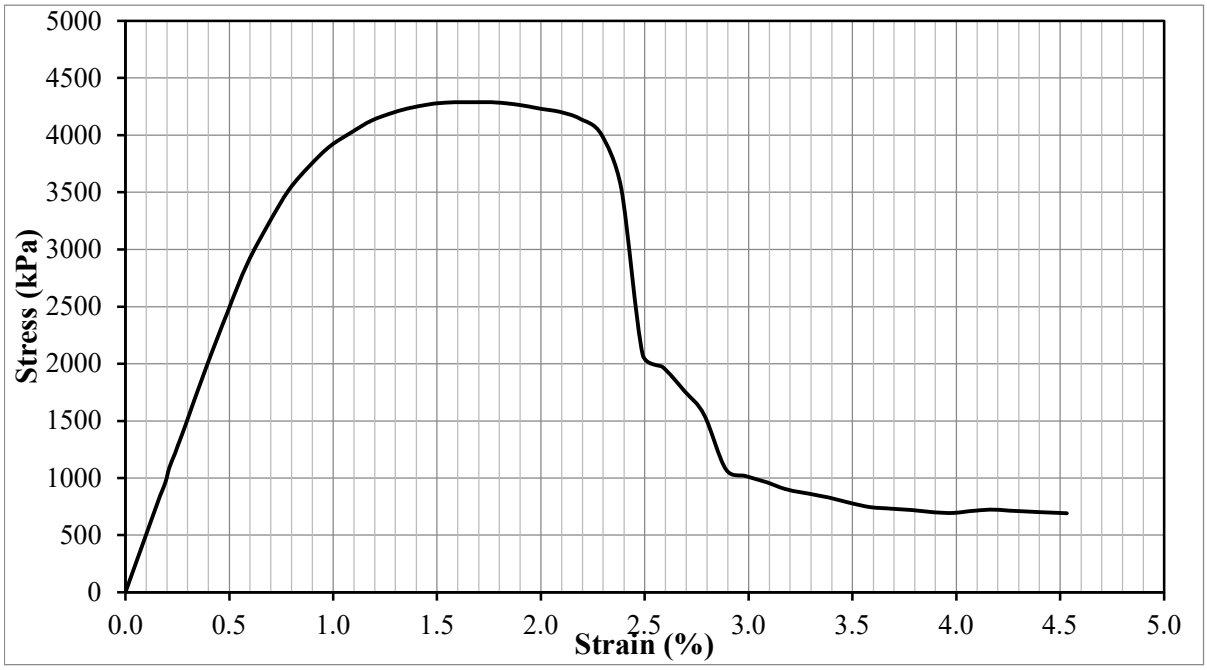
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,549	Strain at failure, εf :	1.92	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	T-9-D	Initial Area:	2112.9	mm^2
Test Date:	1/28/2018	Weight:	365.3	g
Strain Rate:	1 %/min	Unit Weight:	1733	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	35.0	°C
Additional information				



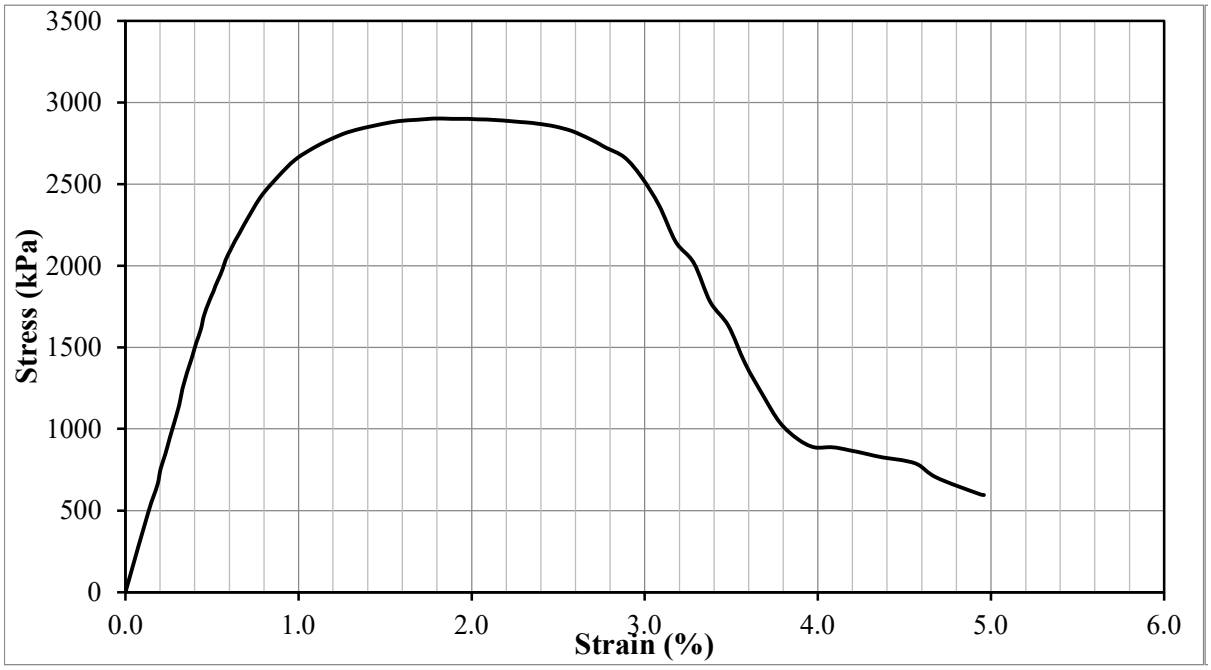
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,239	Strain at failure, εf :	1.50	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	T-9-E	Initial Area:	2114.9	mm^2
Test Date:	1/28/2018	Weight:	364.3	g
Strain Rate:	1 %/min	Unit Weight:	1732	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	35.0	°C
Additional information				



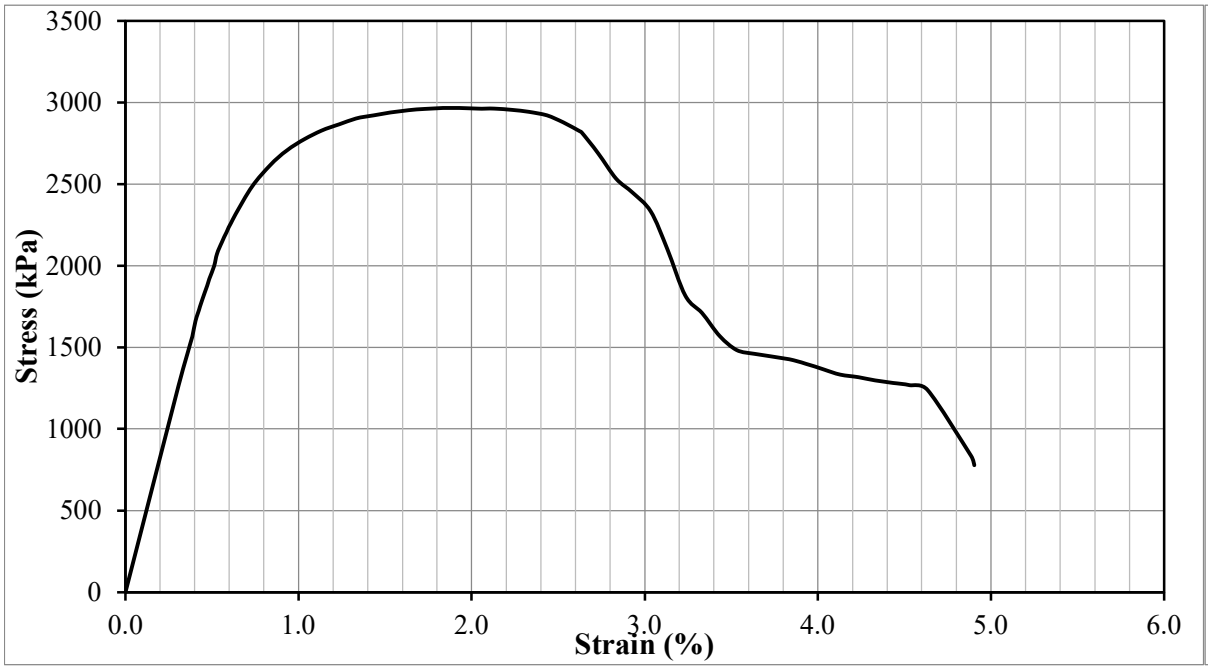
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,258	Strain at failure, εf :	1.59	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	T-10-A	Initial Area:	2114.9	mm^2
Test Date:	1/10/2018	Weight:	348.0	g
Strain Rate:	1 %/min	Unit Weight:	1692	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	3.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	35.0	°C
Additional information				



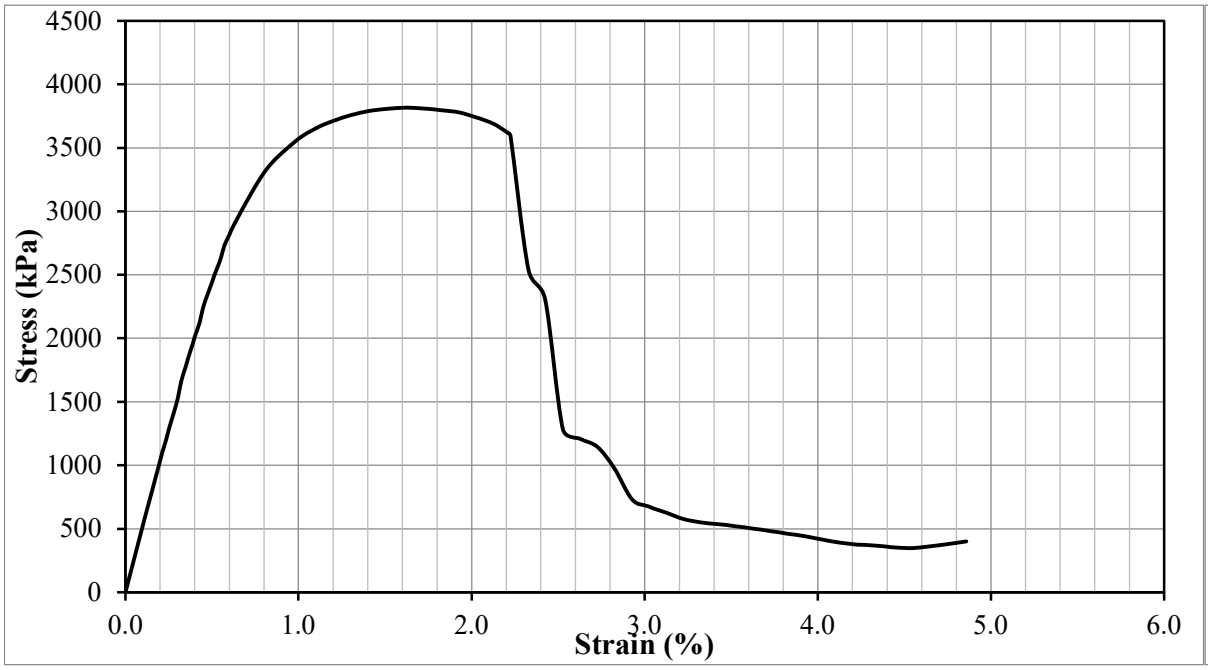
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,872	Strain at failure, εf :	1.78	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-10-H	Initial Area:	2106.6	mm^2
Test Date:	1/10/2018	Weight:	355.5	g
Strain Rate:	1 %/min	Unit Weight:	1696	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	3.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	35.0	°C
Additional information				



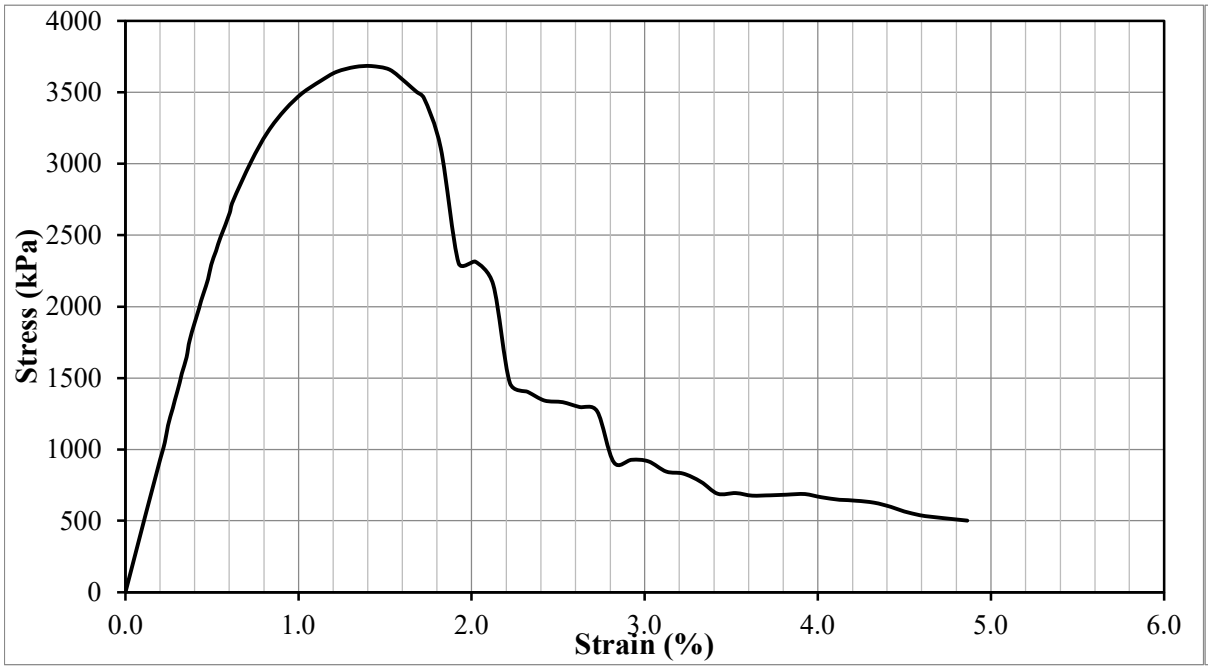
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,948	Strain at failure, εf :	1.93	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-10-B	Initial Area:	2108.7	mm^2
Test Date:	1/14/2018	Weight:	357.1	g
Strain Rate:	1 %/min	Unit Weight:	1700	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	7.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	35.0	°C
Additional information				



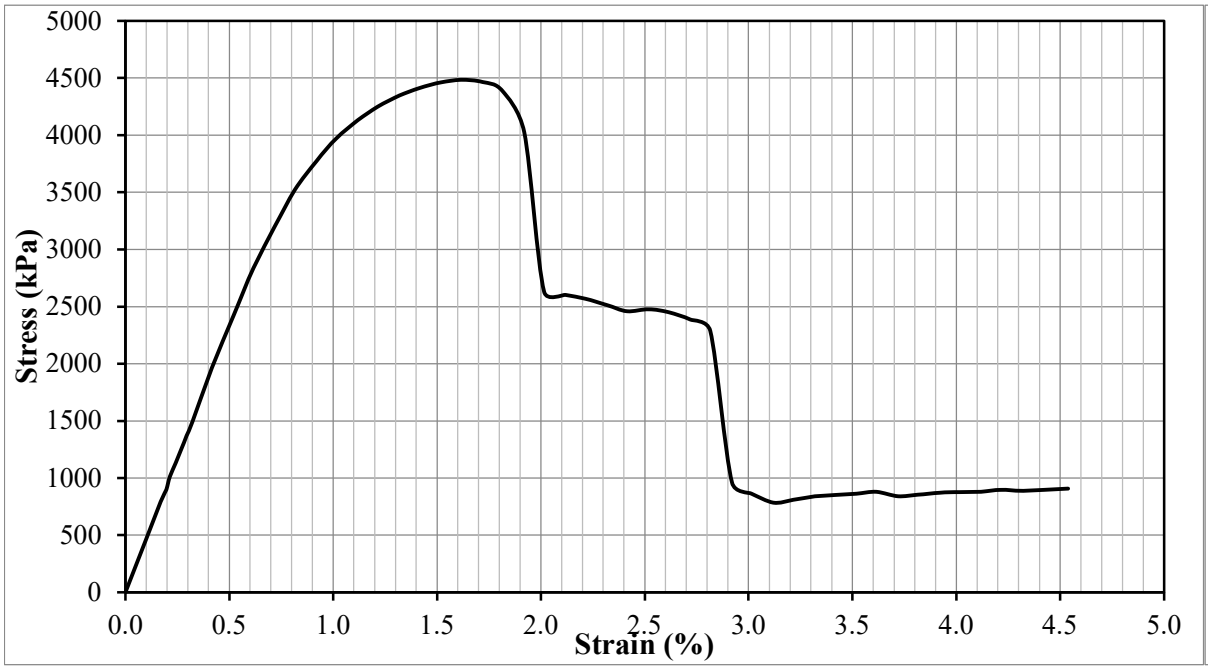
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,793	Strain at failure, εf :	1.62	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	T-10-G	Initial Area:	2114.9	mm^2
Test Date:	1/14/2018	Weight:	348.7	g
Strain Rate:	1 %/min	Unit Weight:	1691	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	7.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	35.0	°C
Additional information				



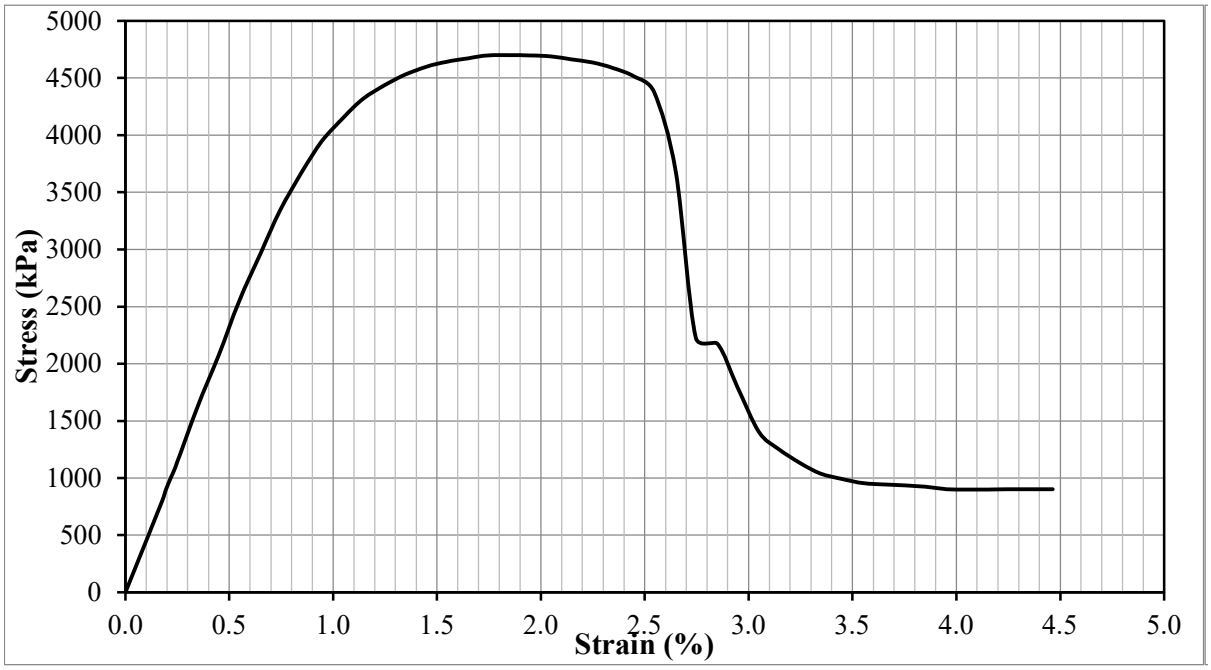
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,647	Strain at failure, εf :	1.42	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	T-10-C	Initial Area:	2112.9	mm^2
Test Date:	1/21/2018	Weight:	357.3	g
Strain Rate:	1 %/min	Unit Weight:	1698	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	14.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	35.0	°C
Additional information				



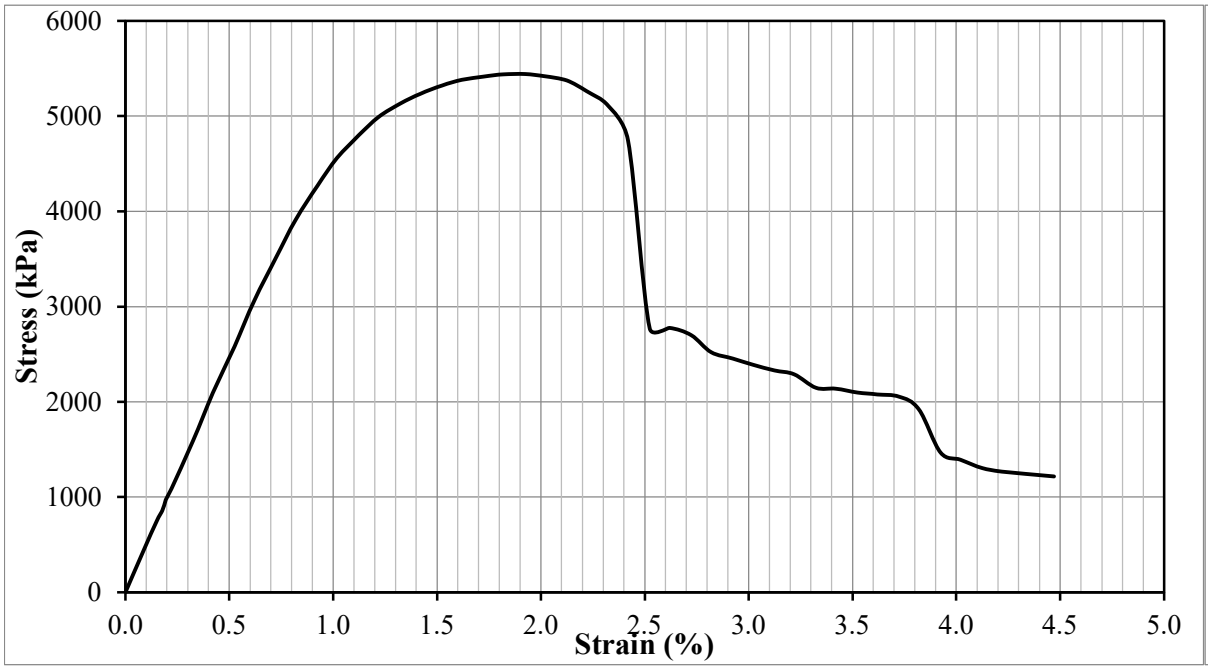
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,454	Strain at failure, εf :	1.61	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	90.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-10-F	Initial Area:	2106.6	mm^2
Test Date:	1/21/2018	Weight:	322.5	g
Strain Rate:	1 %/min	Unit Weight:	1695	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	14.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	35.0	°C
Additional information				



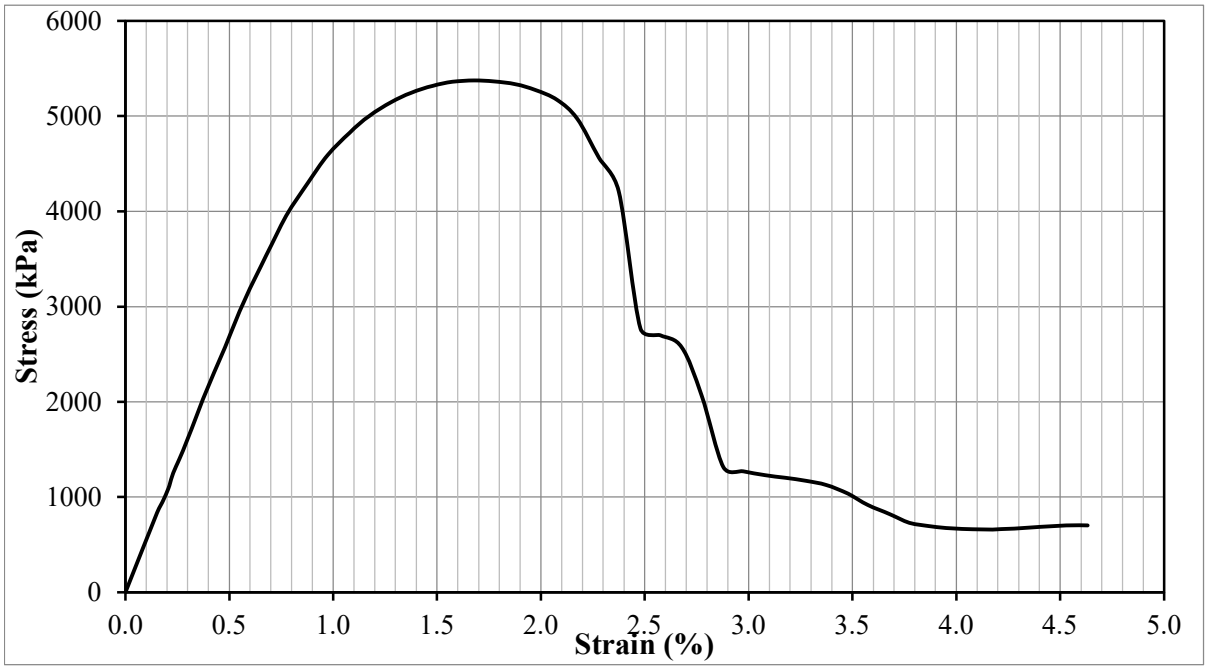
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,602	Strain at failure, εf :	1.85	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	91.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	T-10-D	Initial Area:	2114.9	mm^2
Test Date:	2/4/2018	Weight:	330.6	g
Strain Rate:	1 %/min	Unit Weight:	1701	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	28.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	35.0	°C
Additional information				



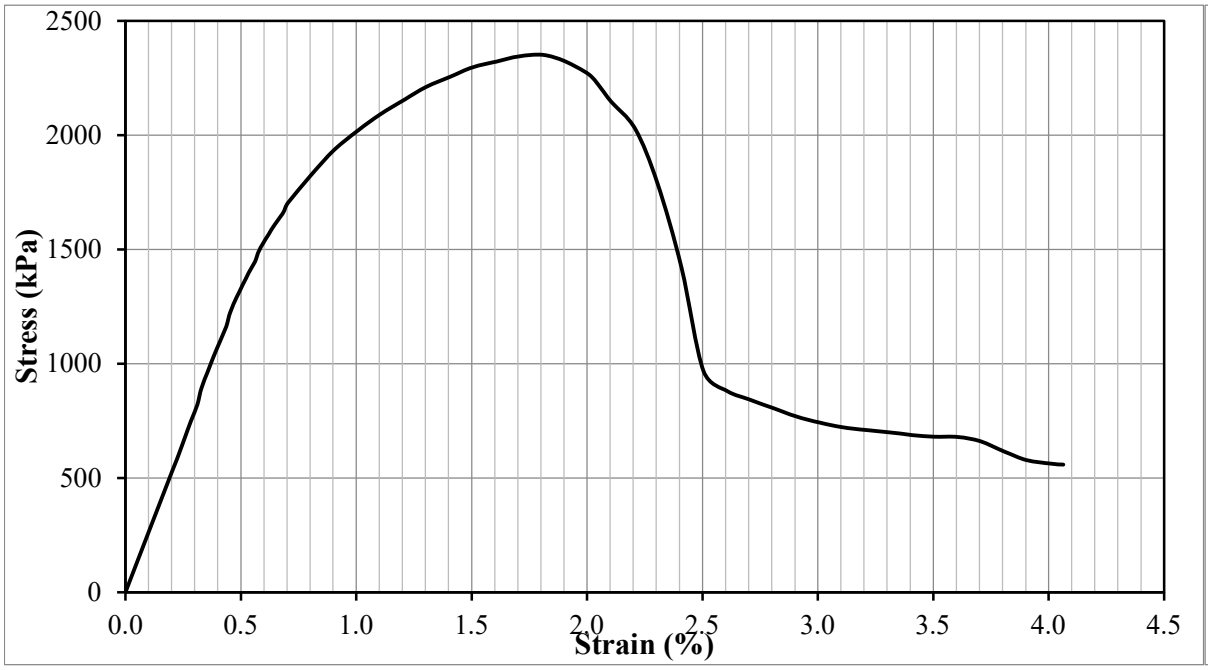
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,341	Strain at failure, εf :	1.92	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	T-10-E	Initial Area:	2112.9	mm^2
Test Date:	2/4/2018	Weight:	352.4	g
Strain Rate:	1 %/min	Unit Weight:	1703	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	28.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	35.0	°C
Additional information				



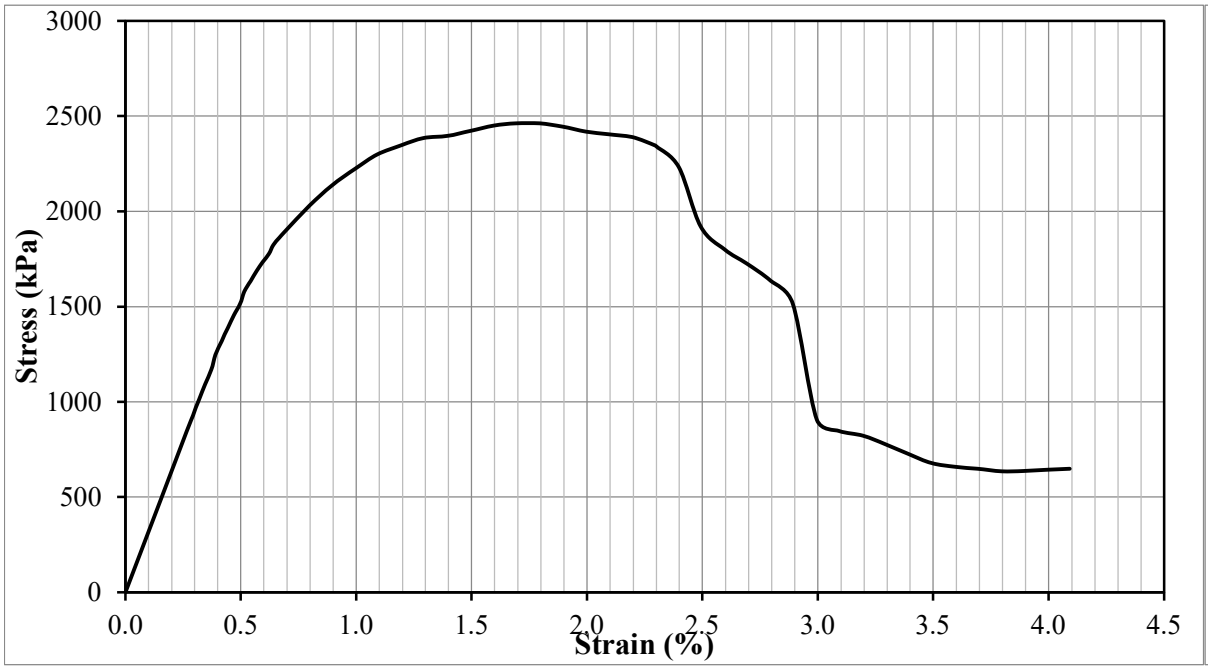
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,325	Strain at failure, εf :	1.68	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-11-A	Initial Area:	2108.7	mm^2
Test Date:	12/25/2017	Weight:	382.7	g
Strain Rate:	1 %/min	Unit Weight:	1806	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	3.0	days
$(w:c)_{slurry}$:	0.6	Curing temperature	45.0	°C
Additional information				



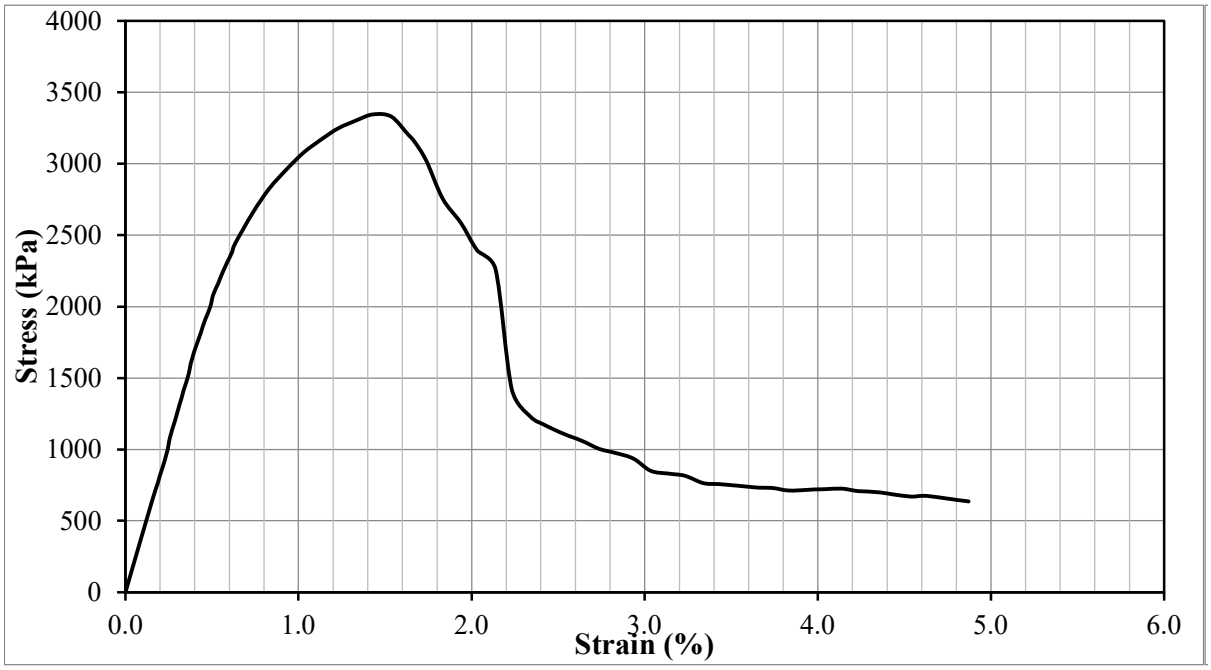
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,339	Strain at failure, εf :	1.81	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	96.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	T-11-H	Initial Area:	2114.9	mm^2
Test Date:	12/25/2017	Weight:	367.8	g
Strain Rate:	1 %/min	Unit Weight:	1799	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	3.0	days
$(w:c)_{slurry}$:	0.6	Curing temperature	45.0	°C
Additional information				



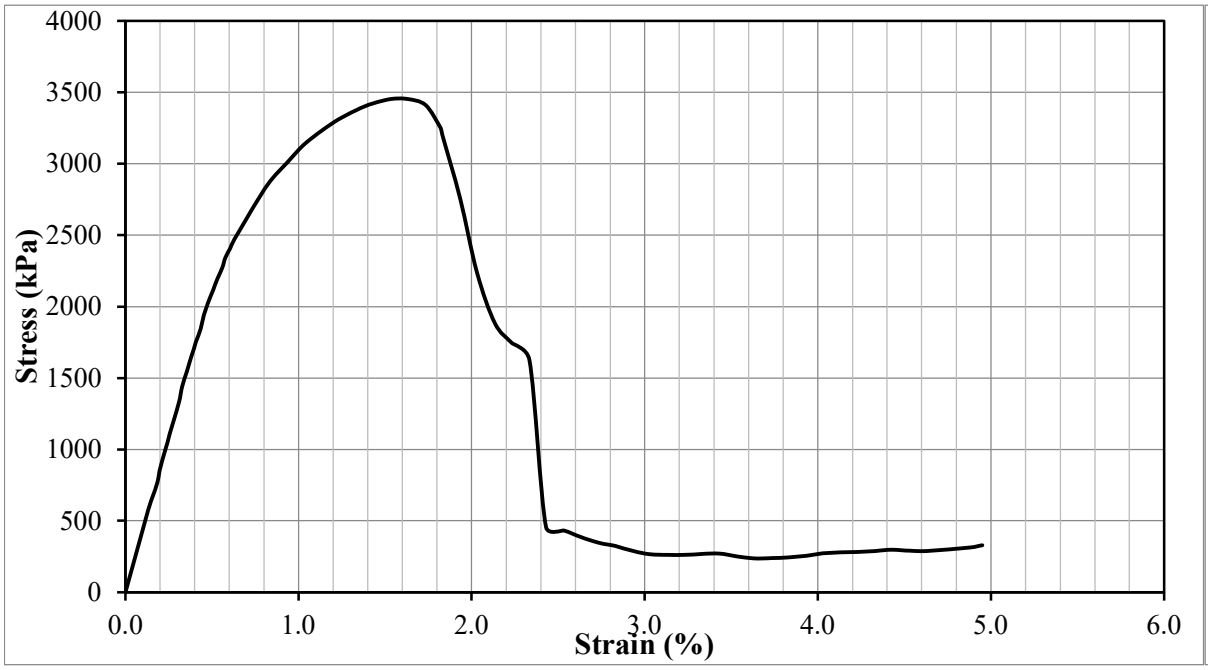
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,435	Strain at failure, εf :	1.69	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-11-B	Initial Area:	2110.8	mm^2
Test Date:	12/29/2017	Weight:	382.6	g
Strain Rate:	1 %/min	Unit Weight:	1804	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	7.1	days
$(w:c)_{slurry}$:	0.6	Curing temperature	45.0	°C
Additional information				



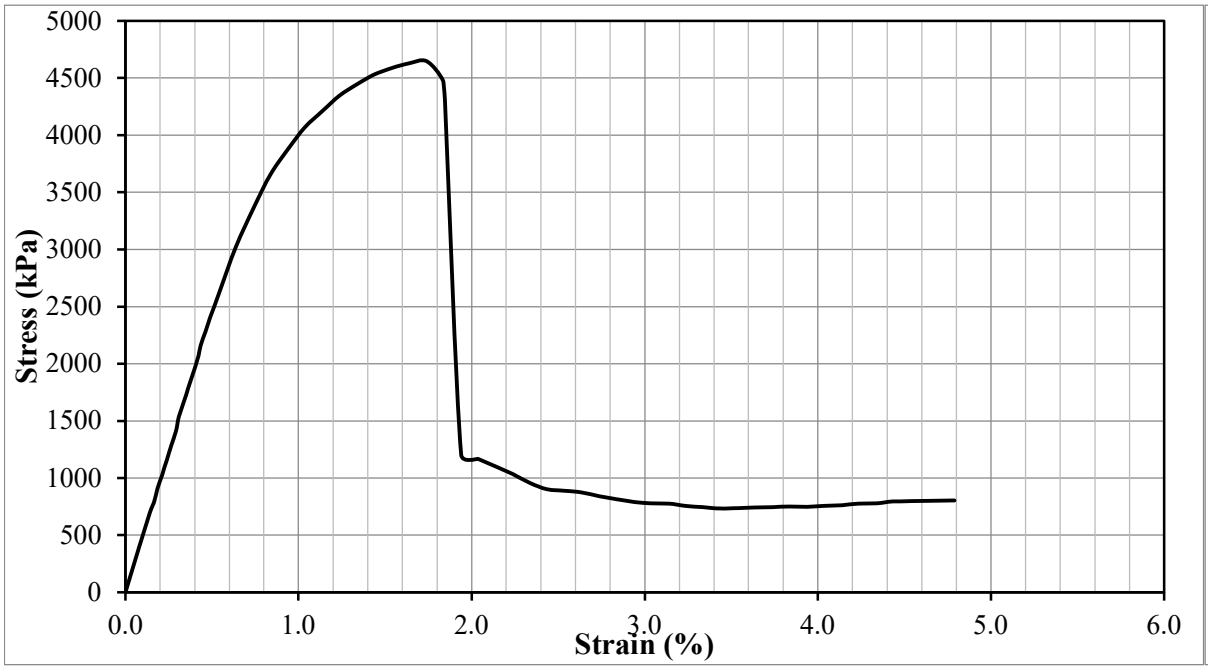
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,330	Strain at failure, εf :	1.43	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	T-11-G	Initial Area:	2114.9	mm^2
Test Date:	12/29/2017	Weight:	378.3	g
Strain Rate:	1 %/min	Unit Weight:	1806	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	7.1	days
$(w:c)_{slurry}$:	0.6	Curing temperature	45.0	°C
Additional information				



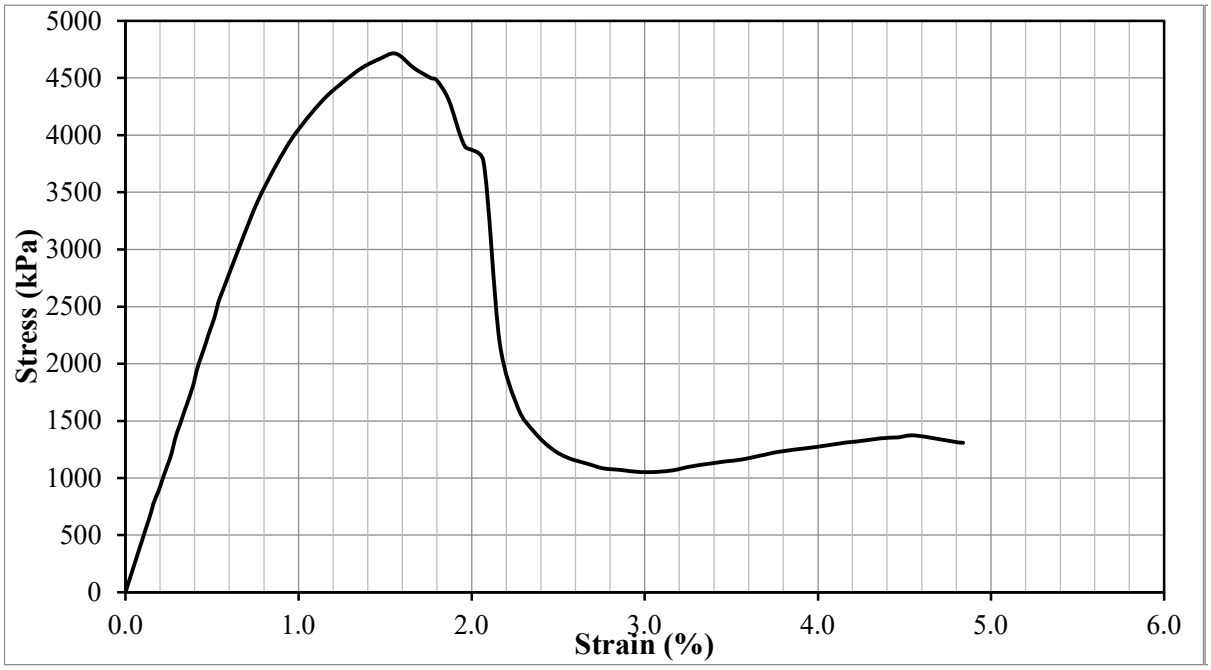
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,427	Strain at failure, εf :	1.63	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	T-11-F	Initial Area:	2119.1	mm^2
Test Date:	1/5/2018	Weight:	381.1	g
Strain Rate:	1 %/min	Unit Weight:	1806	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	14.0	days
$(w:c)_{slurry}$:	0.6	Curing temperature	45.0	°C
Additional information				



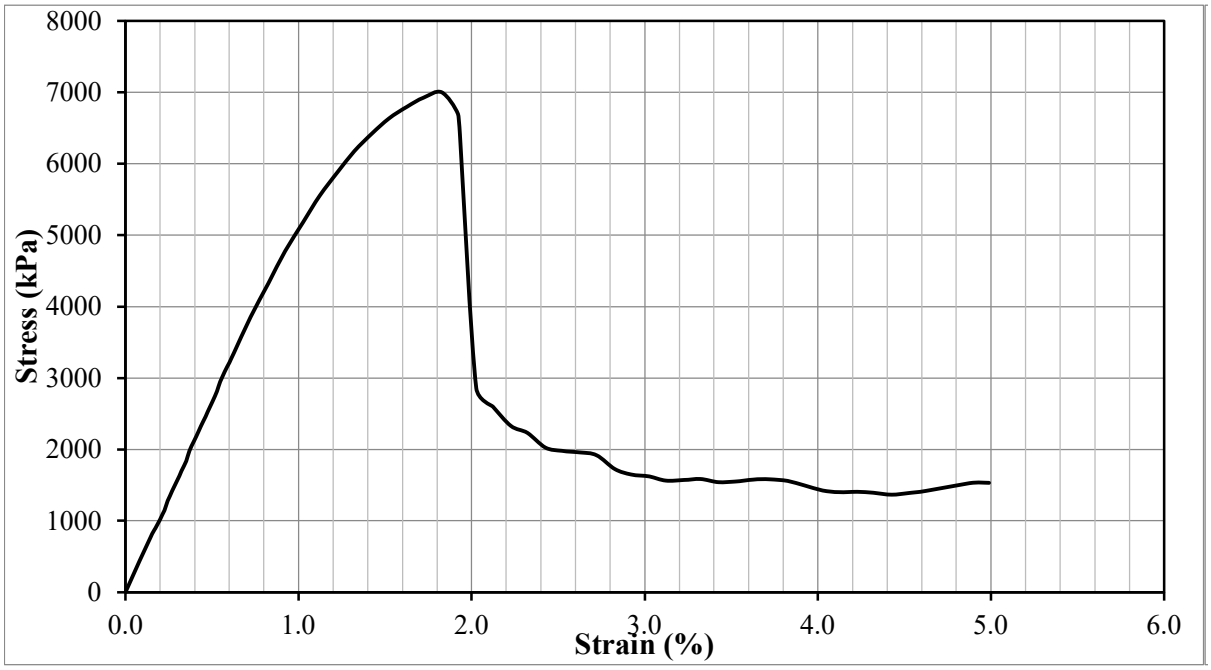
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,615	Strain at failure, εf :	1.74	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	93.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	T-11-I	Initial Area:	2114.9	mm^2
Test Date:	1/5/2018	Weight:	355.5	g
Strain Rate:	1 %/min	Unit Weight:	1804	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	14.0	days
$(w:c)_{slurry}$:	0.6	Curing temperature	45.0	°C
Additional information				



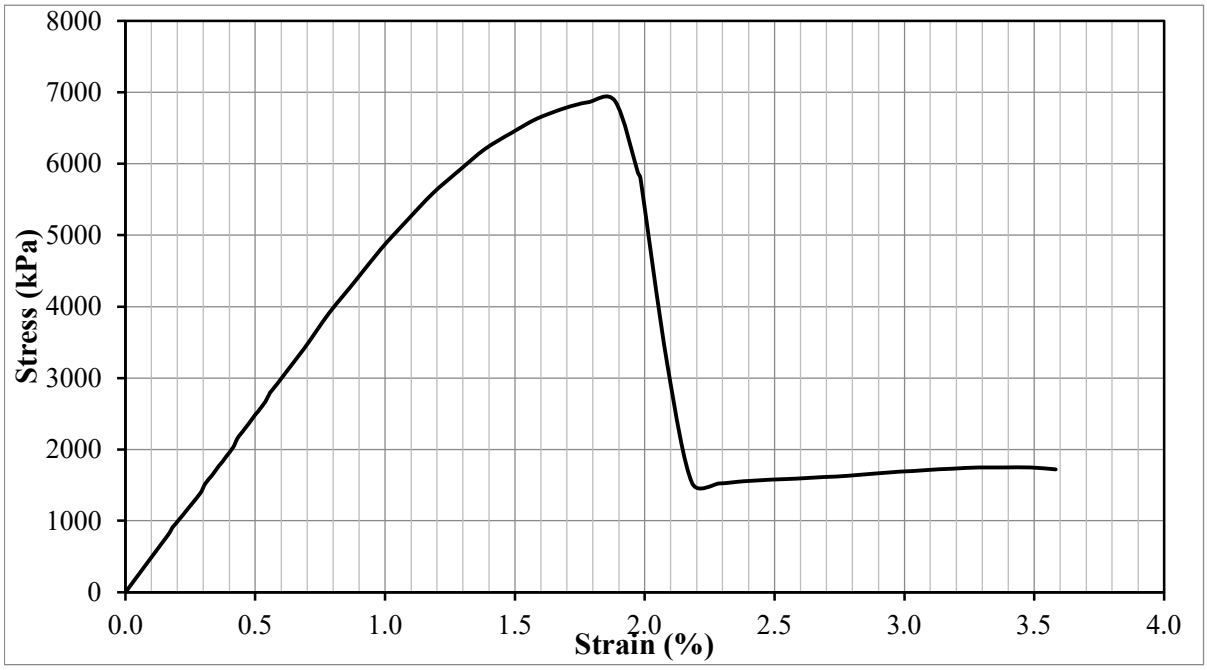
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,636	Strain at failure, εf :	1.56	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-11-D	Initial Area:	2108.7	mm^2
Test Date:	1/19/2018	Weight:	375.2	g
Strain Rate:	1 %/min	Unit Weight:	1811	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	28.1	days
$(w:c)_{slurry}$:	0.6	Curing temperature	45.0	°C
Additional information				



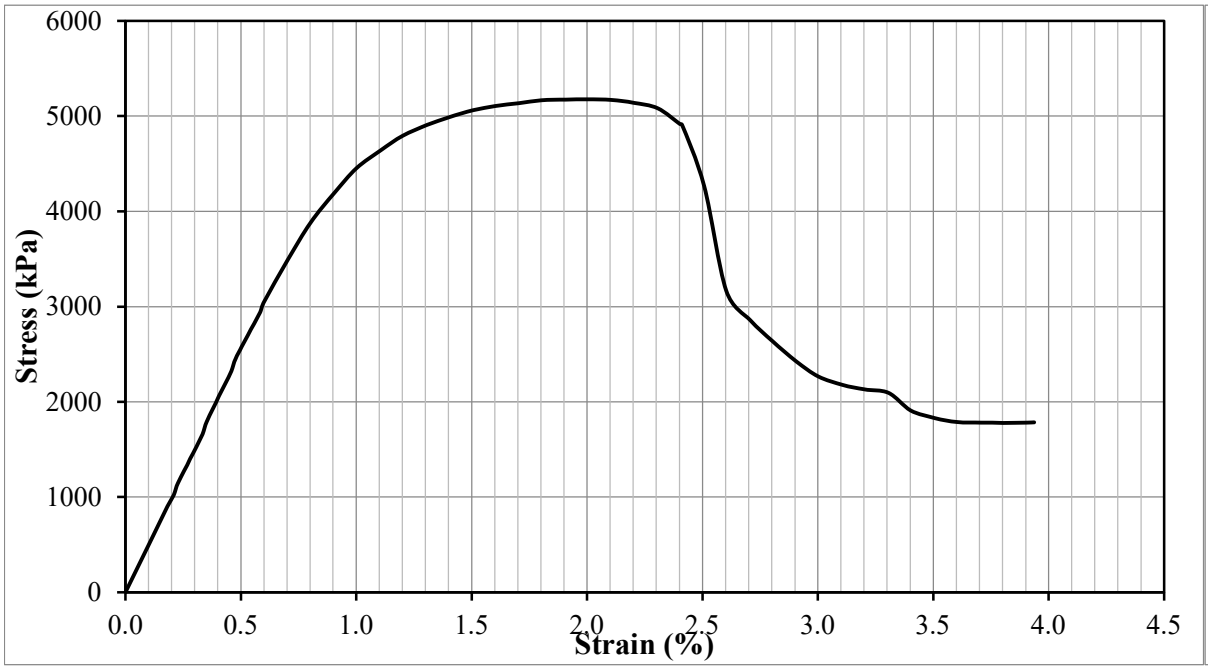
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	6,939	Strain at failure, εf :	1.83	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	91.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	T-11-E	Initial Area:	2114.9	mm^2
Test Date:	1/19/2018	Weight:	348.6	g
Strain Rate:	1 %/min	Unit Weight:	1802	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	28.1	days
$(w:c)_{slurry}$:	0.6	Curing temperature	45.0	°C
Additional information				



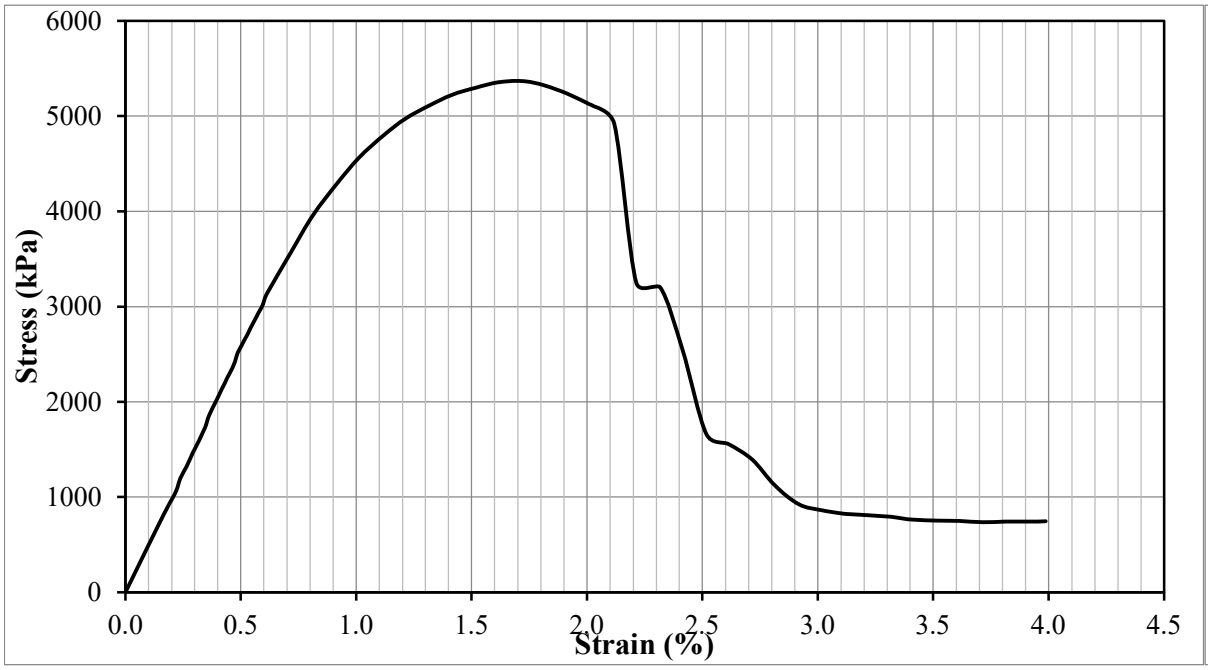
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	6,742	Strain at failure, εf :	1.89	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	T-12-A	Initial Area:	2123.2	mm^2
Test Date:	12/25/2017	Weight:	372.3	g
Strain Rate:	1 %/min	Unit Weight:	1786	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	3.0	days
$(w:c)_{slurry}$:	0.6	Curing temperature	45.0	°C
Additional information				



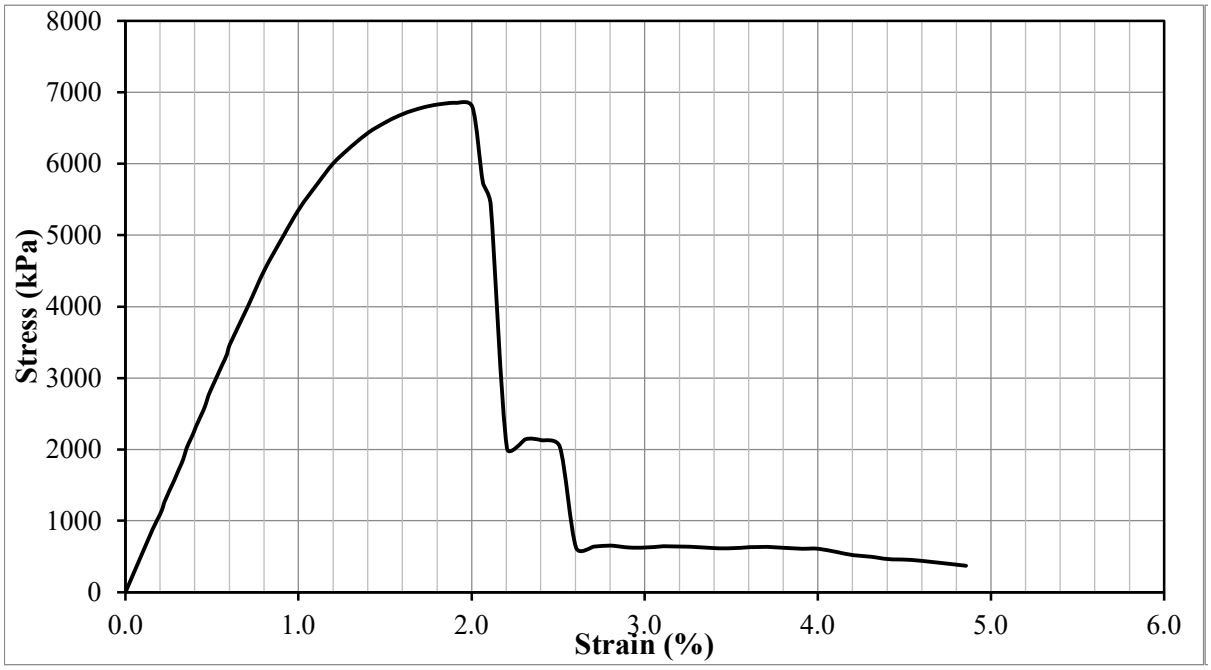
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,129	Strain at failure, εf :	2.00	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	T-12-J	Initial Area:	2114.9	mm^2
Test Date:	12/25/2017	Weight:	370.9	g
Strain Rate:	1 %/min	Unit Weight:	1795	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	3.0	days
$(w:c)_{slurry}$:	0.6	Curing temperature	45.0	°C
Additional information				



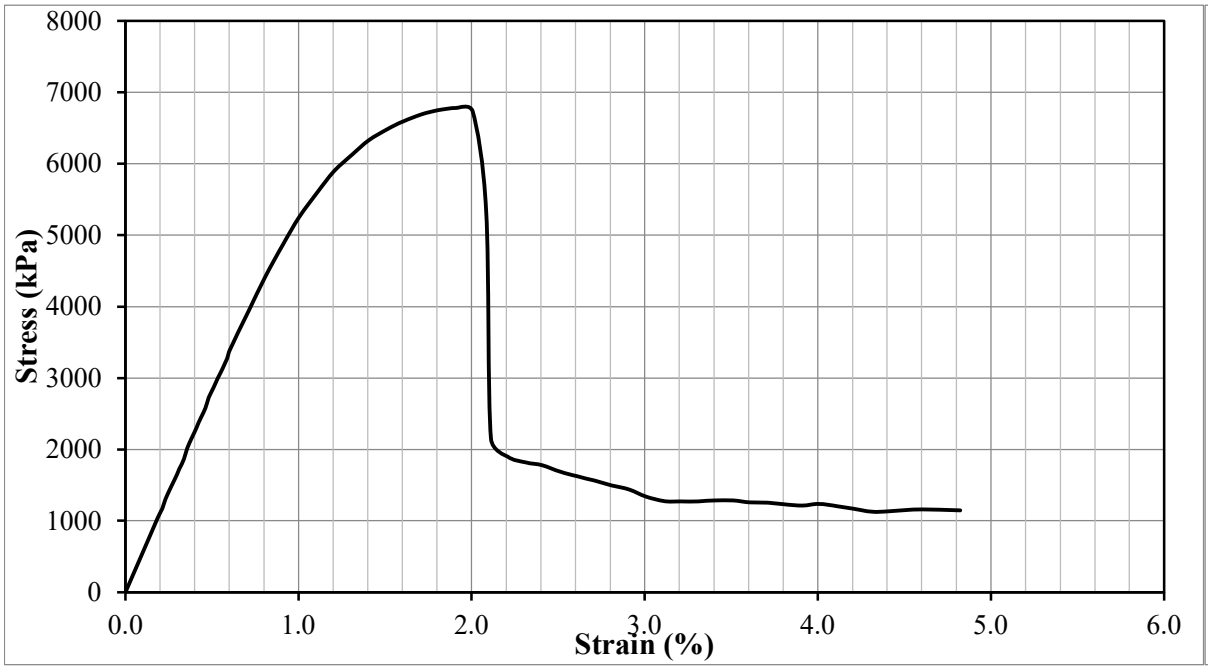
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,318	Strain at failure, εf :	1.72	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	T-12-B	Initial Area:	2119.1	mm^2
Test Date:	12/29/2017	Weight:	376.3	g
Strain Rate:	1 %/min	Unit Weight:	1795	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	7.1	days
$(w:c)_{slurry}$:	0.6	Curing temperature	45.0	°C
Additional information				



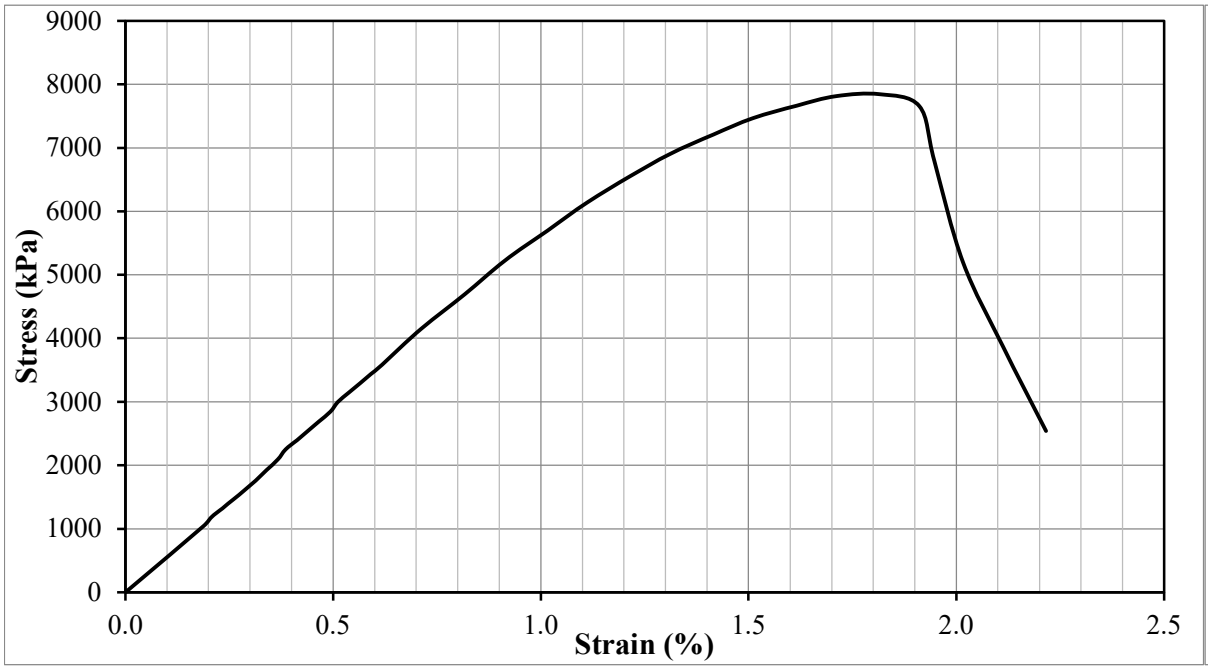
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	6,800	Strain at failure, εf :	1.91	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	T-12-G	Initial Area:	2117.0	mm^2
Test Date:	12/29/2017	Weight:	378.6	g
Strain Rate:	1 %/min	Unit Weight:	1799	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	7.1	days
$(w:c)_{slurry}$:	0.6	Curing temperature	45.0	°C
Additional information				



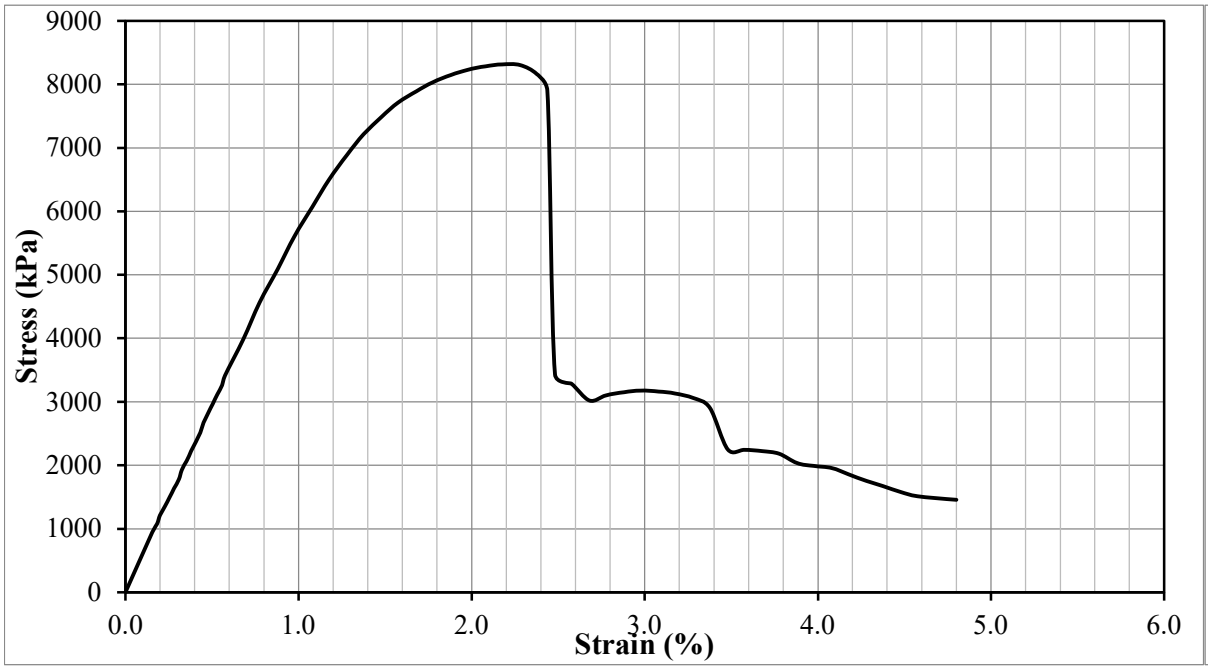
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	6,733	Strain at failure, εf :	1.91	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	T-12-C	Initial Area:	2117.0	mm^2
Test Date:	1/5/2018	Weight:	378.1	g
Strain Rate:	1 %/min	Unit Weight:	1801	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	14.0	days
$(w:c)_{slurry}$:	0.6	Curing temperature	45.0	°C
Additional information				



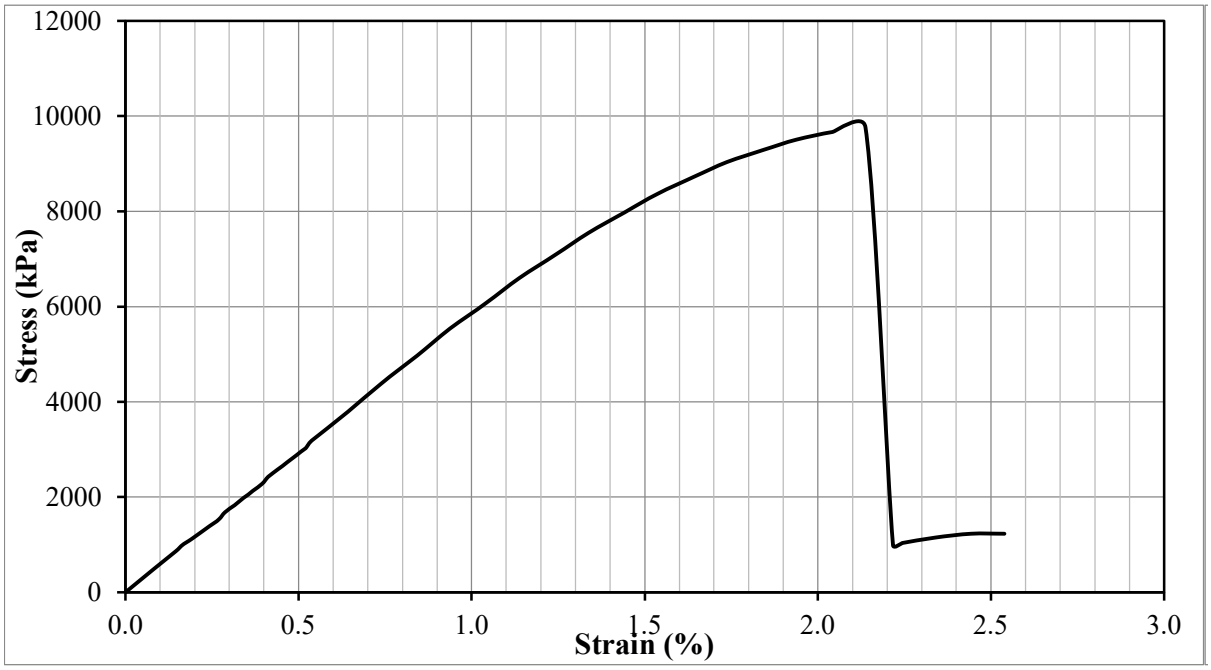
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	7,787	Strain at failure, εf :	1.82	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	T-12-F	Initial Area:	2119.1	mm^2
Test Date:	1/5/2018	Weight:	370.1	g
Strain Rate:	1 %/min	Unit Weight:	1793	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	14.0	days
$(w:c)_{slurry}$:	0.6	Curing temperature	45.0	°C
Additional information				



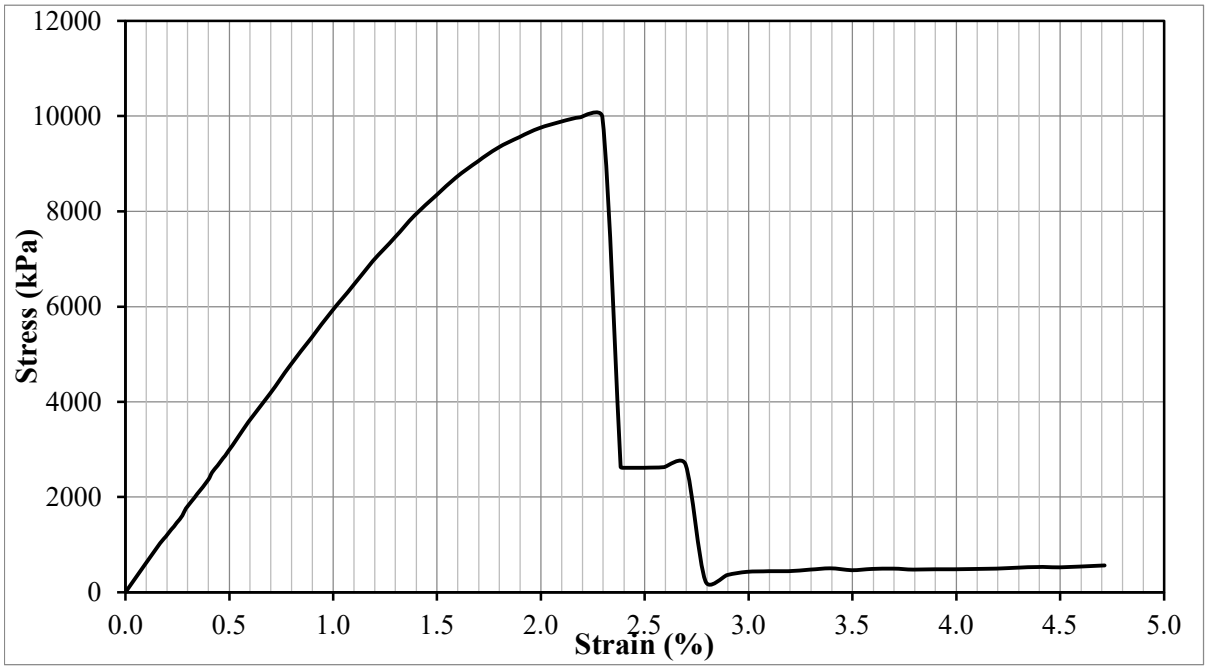
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	8,232	Strain at failure, εf :	2.18	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	T-12-D	Initial Area:	2123.2	mm^2
Test Date:	1/19/2018	Weight:	372.6	g
Strain Rate:	1 %/min	Unit Weight:	1795	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	28.1	days
$(w:c)_{slurry}$:	0.6	Curing temperature	45.0	°C
Additional information				



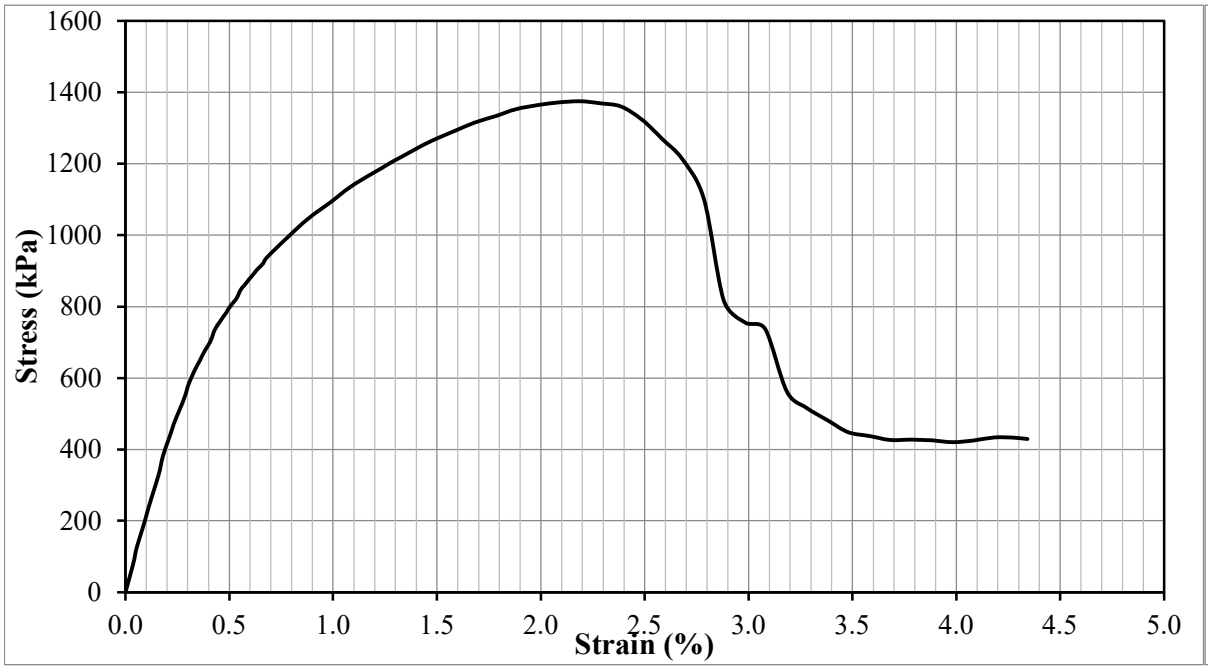
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	9,664	Strain at failure, εf :	2.14	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	T-12-E	Initial Area:	2119.1	mm^2
Test Date:	1/19/2018	Weight:	372.3	g
Strain Rate:	1 %/min	Unit Weight:	1799	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	28.1	days
$(w:c)_{slurry}$:	0.6	Curing temperature	45.0	°C
Additional information				



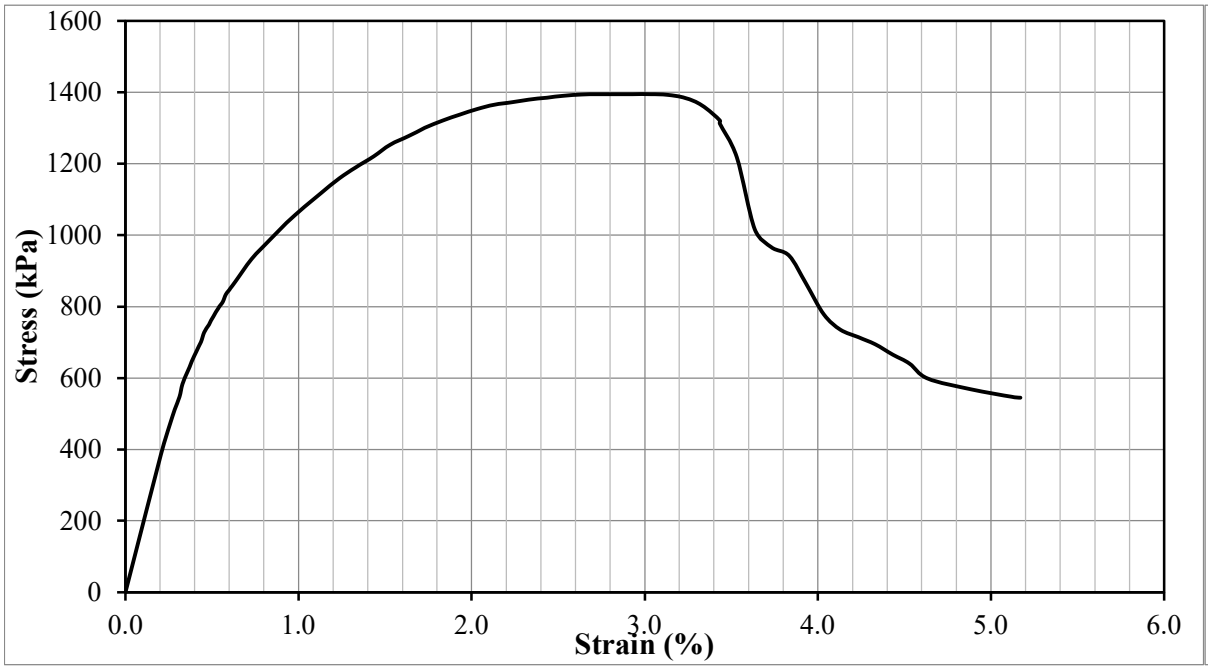
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	9,880	Strain at failure, εf :	2.19	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	T-13-A	Initial Area:	2114.9	mm^2
Test Date:	12/26/2017	Weight:	366.0	g
Strain Rate:	1 %/min	Unit Weight:	1764	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	3.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45.0	°C
Additional information				



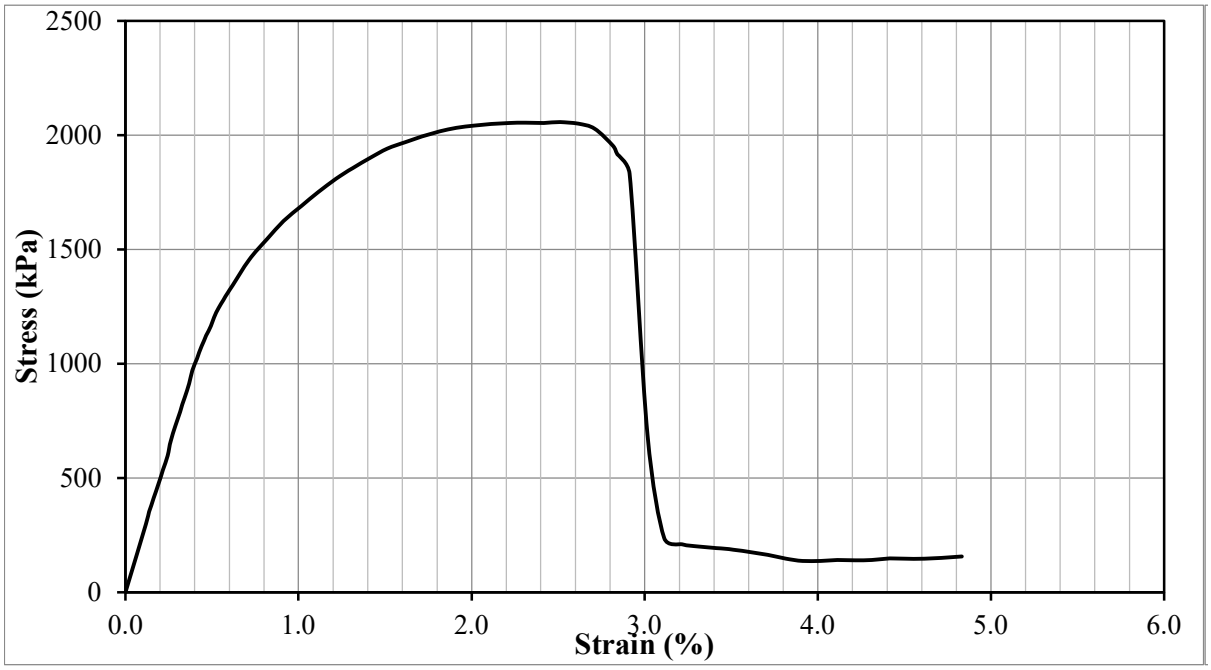
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,363	Strain at failure, εf :	2.18	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	96.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-13-H	Initial Area:	2110.8	mm^2
Test Date:	12/26/2017	Weight:	359.2	g
Strain Rate:	1 %/min	Unit Weight:	1770	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	3.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45.0	°C
Additional information				



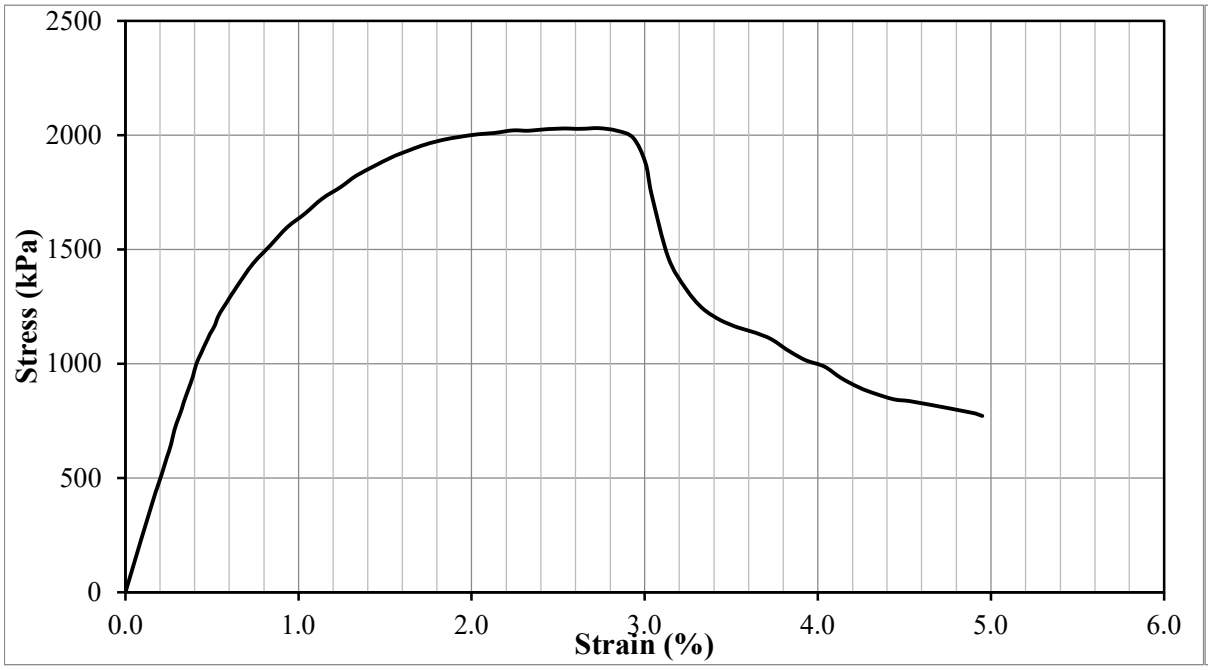
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,379	Strain at failure, εf :	3.03	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-13-B	Initial Area:	2106.6	mm^2
Test Date:	12/30/2017	Weight:	369.6	g
Strain Rate:	1 %/min	Unit Weight:	1778	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	7.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45.0	°C
Additional information				



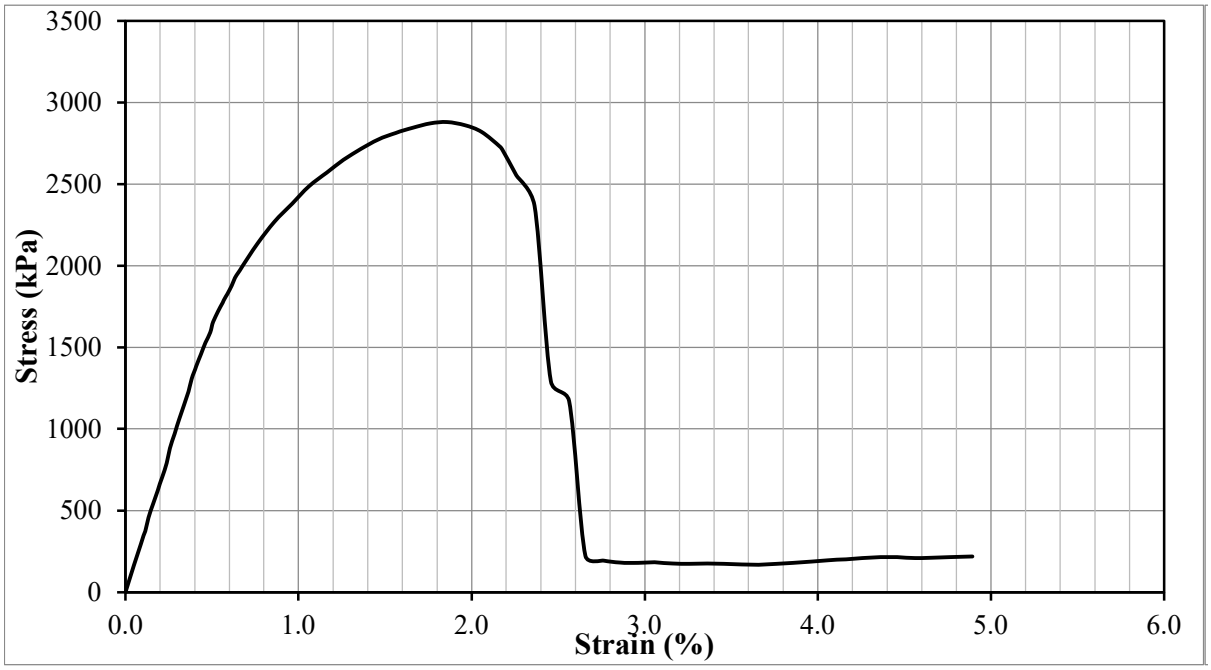
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,041	Strain at failure, εf :	2.51	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	T-13-G	Initial Area:	2114.9	mm^2
Test Date:	12/30/2017	Weight:	371.1	g
Strain Rate:	1 %/min	Unit Weight:	1766	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	7.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45.0	°C
Additional information				



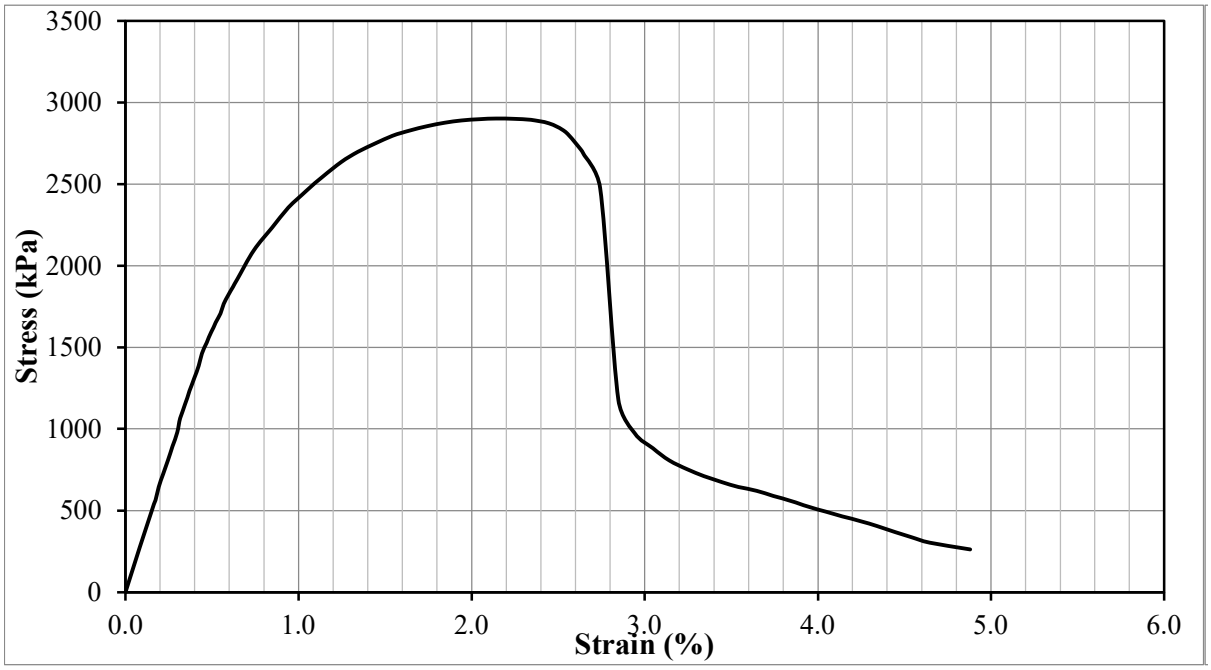
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,017	Strain at failure, εf :	2.73	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-13-C	Initial Area:	2110.8	mm^2
Test Date:	1/6/2018	Weight:	372.8	g
Strain Rate:	1 %/min	Unit Weight:	1775	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	14.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45.0	°C
Additional information				



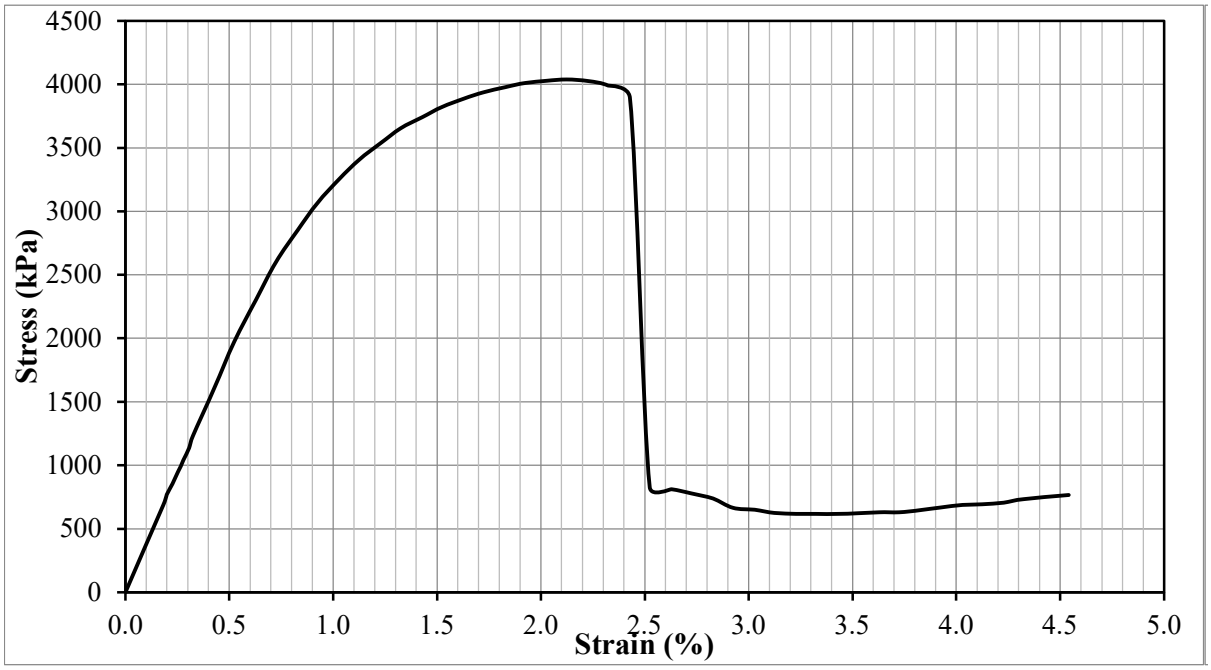
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,862	Strain at failure, εf :	1.86	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-13-F	Initial Area:	2108.7	mm^2
Test Date:	1/6/2018	Weight:	372.6	g
Strain Rate:	1 %/min	Unit Weight:	1777	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	14.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45.0	°C
Additional information				



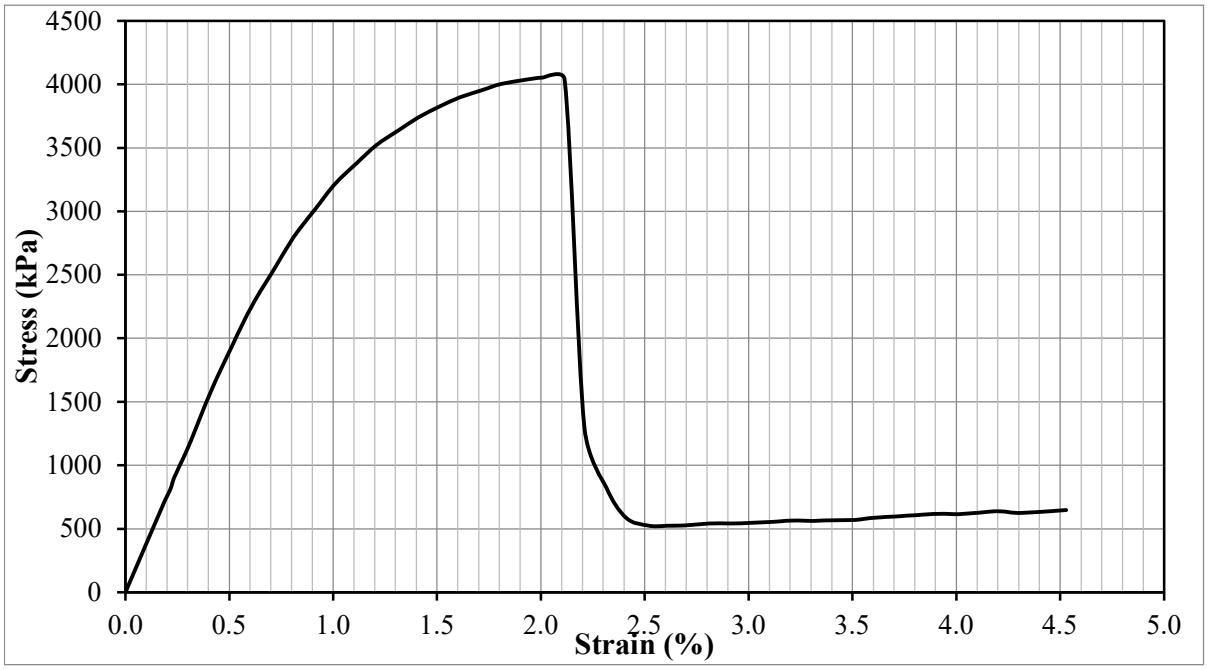
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,882	Strain at failure, εf :	2.14	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-13-D	Initial Area:	2108.7	mm^2
Test Date:	1/20/2018	Weight:	363.8	g
Strain Rate:	1 %/min	Unit Weight:	1775	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45.0	°C
Additional information				



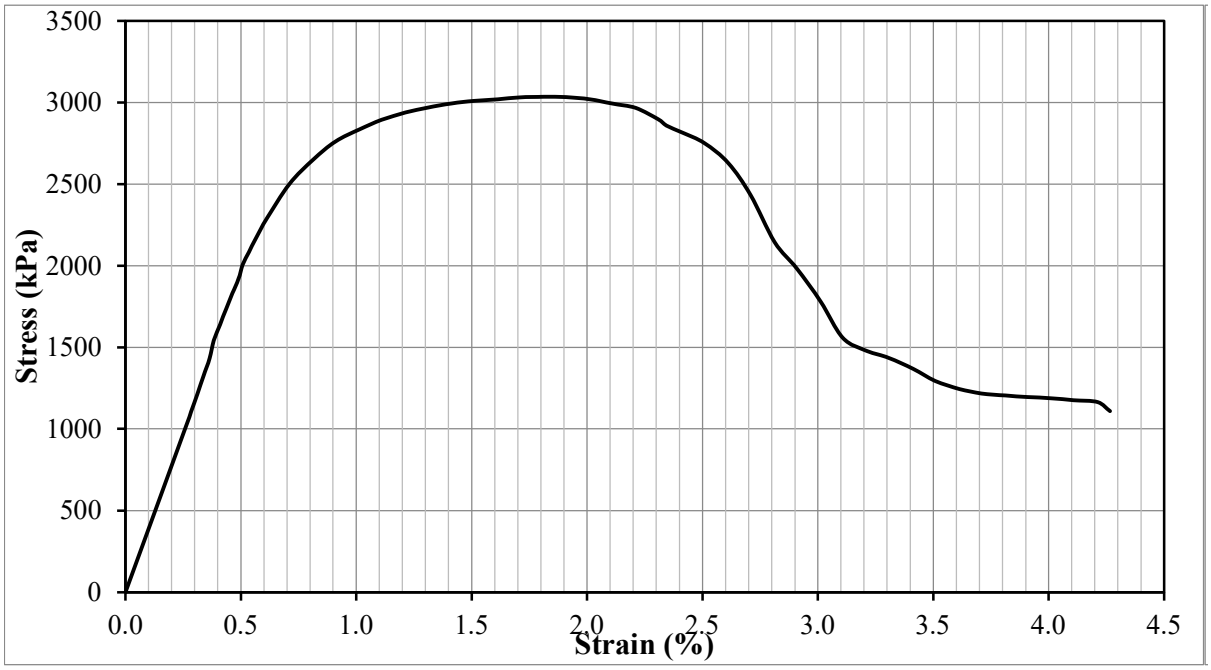
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,997	Strain at failure, εf :	2.12	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	T-13-E	Initial Area:	2112.9	mm^2
Test Date:	1/20/2018	Weight:	365.2	g
Strain Rate:	1 %/min	Unit Weight:	1769	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45.0	°C
Additional information				



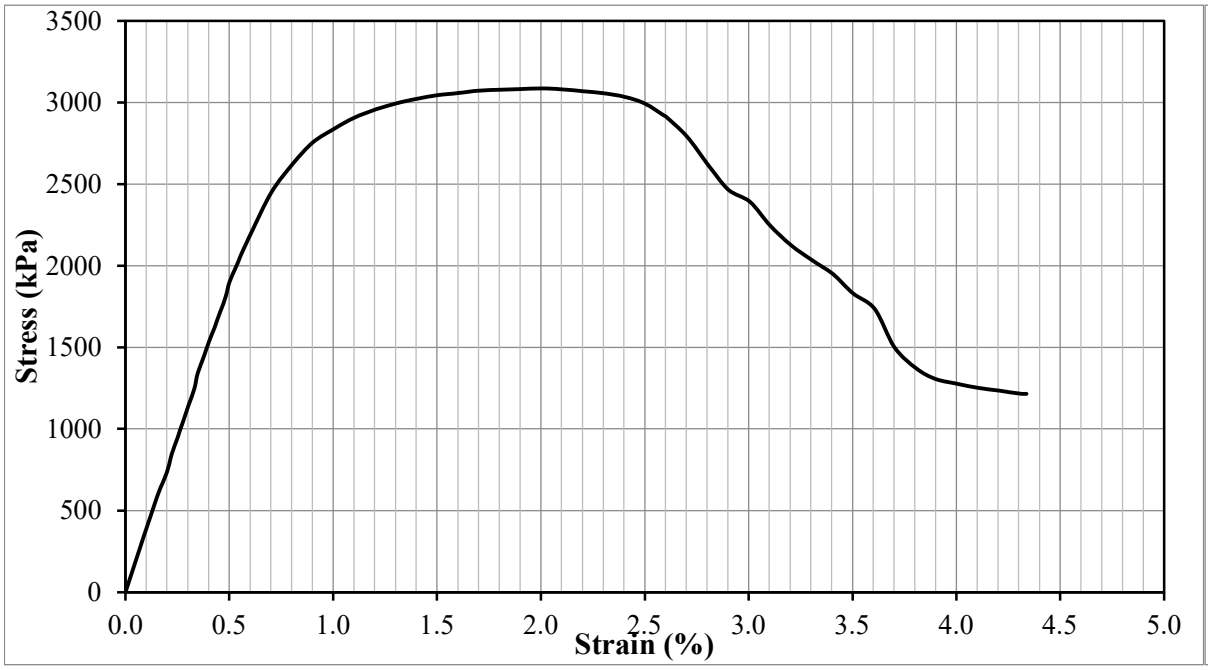
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,014	Strain at failure, εf :	2.01	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	96.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	T-14-A	Initial Area:	2117.0	mm^2
Test Date:	12/26/2017	Weight:	343.8	g
Strain Rate:	1 %/min	Unit Weight:	1689	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	2.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45.0	°C
Additional information				



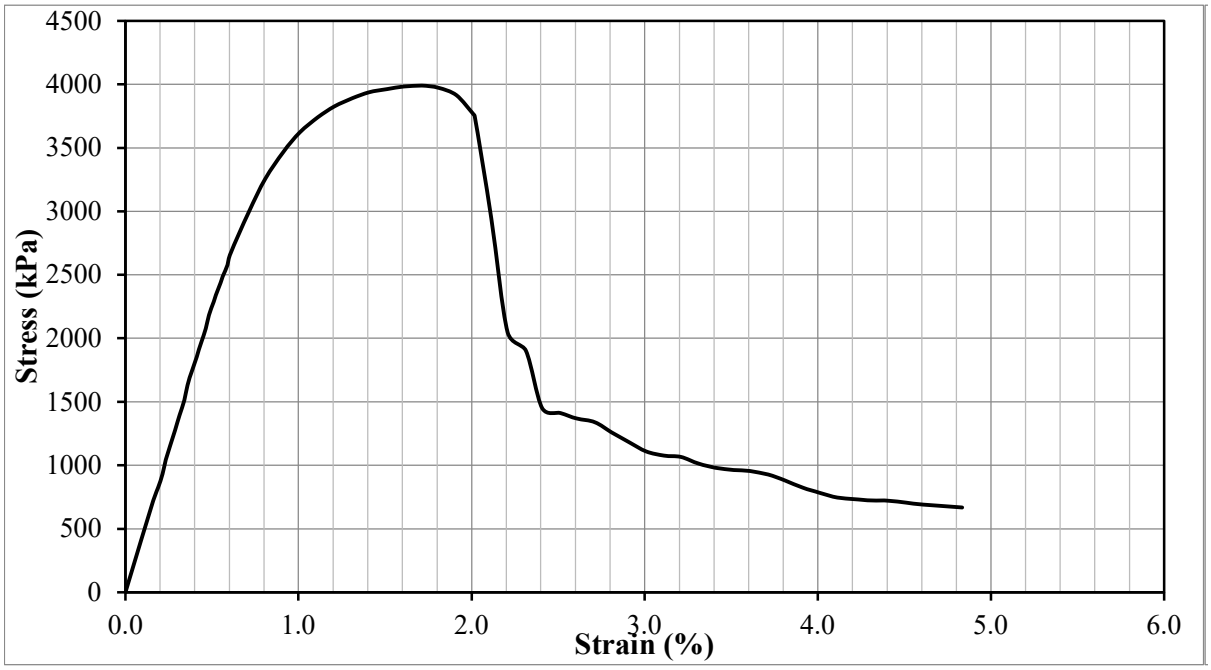
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,998	Strain at failure, εf :	1.81	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	93.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	T-14-H	Initial Area:	2117.0	mm^2
Test Date:	12/26/2017	Weight:	331.9	g
Strain Rate:	1 %/min	Unit Weight:	1676	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	3.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45.0	°C
Additional information				



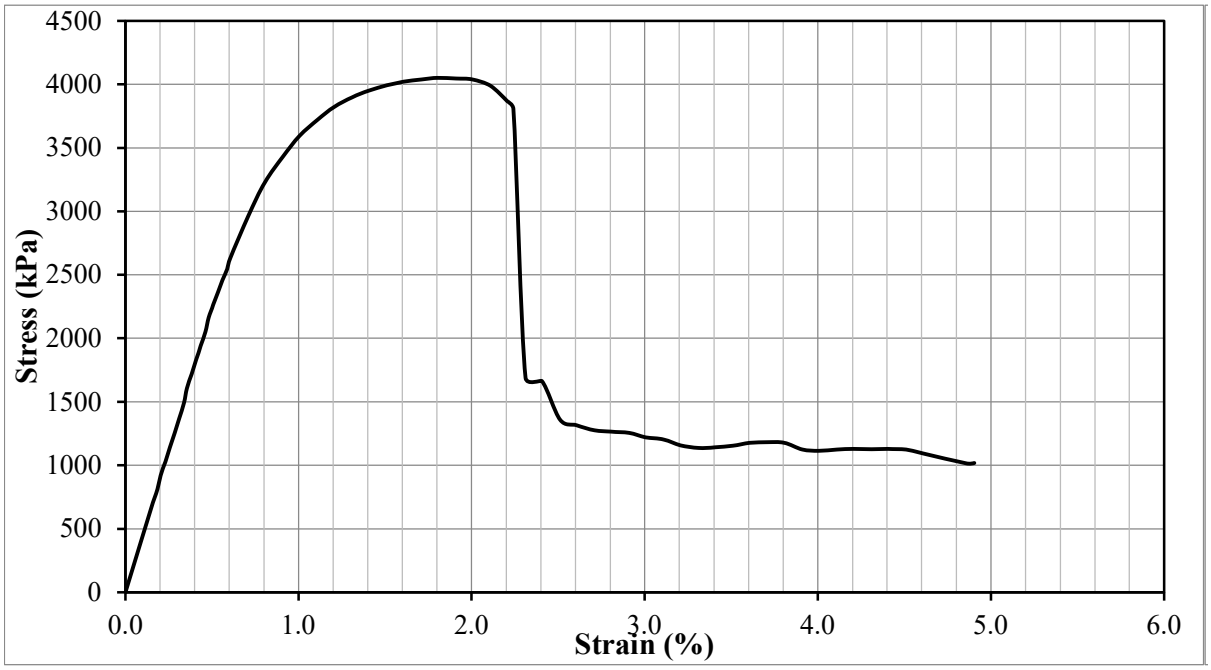
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,037	Strain at failure, εf :	2.01	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	T-14-B	Initial Area:	2112.9	mm^2
Test Date:	12/30/2017	Weight:	358.0	g
Strain Rate:	1 %/min	Unit Weight:	1700	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	6.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45.0	°C
Additional information				



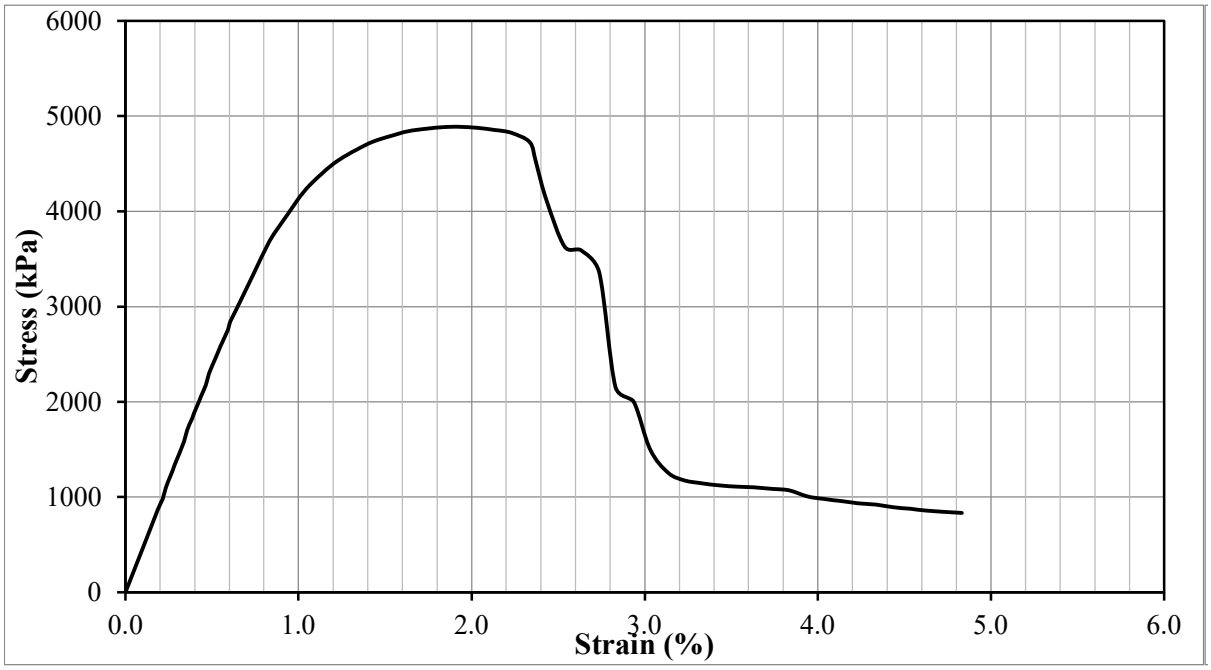
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,964	Strain at failure, εf :	1.71	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	T-14-G	Initial Area:	2112.9	mm^2
Test Date:	12/30/2017	Weight:	356.0	g
Strain Rate:	1 %/min	Unit Weight:	1693	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	7.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45.0	°C
Additional information				



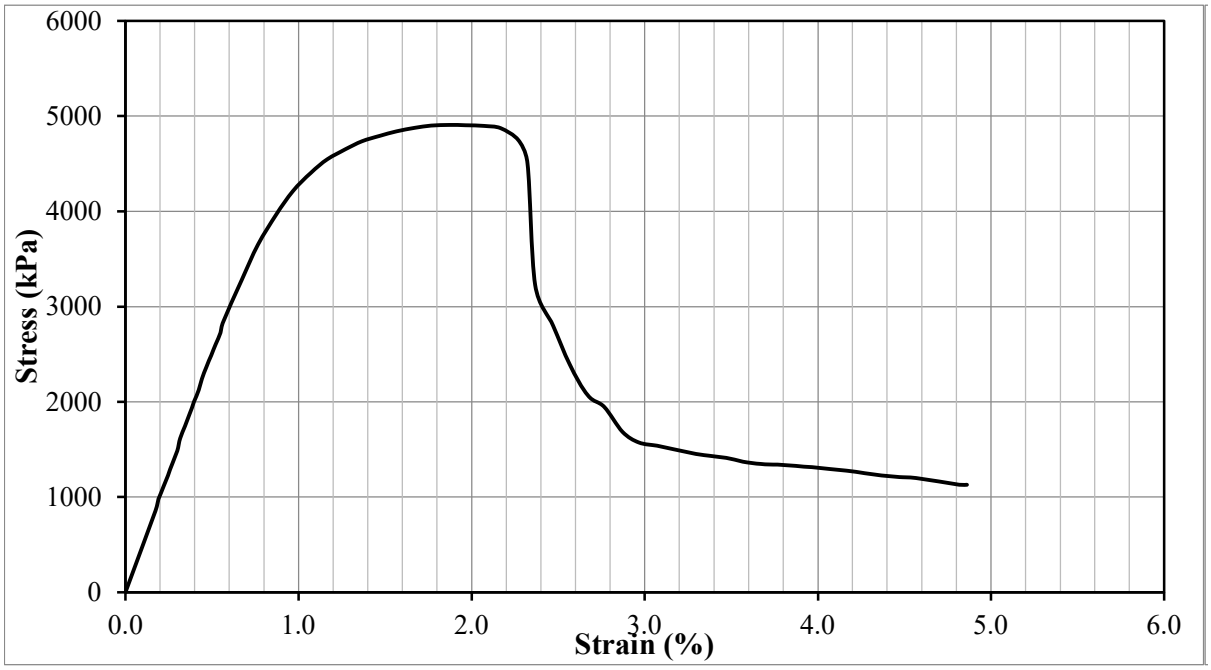
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,024	Strain at failure, εf :	1.81	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	96.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	T-14-C	Initial Area:	2114.9	mm^2
Test Date:	1/6/2018	Weight:	344.1	g
Strain Rate:	1 %/min	Unit Weight:	1689	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	13.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45.0	°C
Additional information				



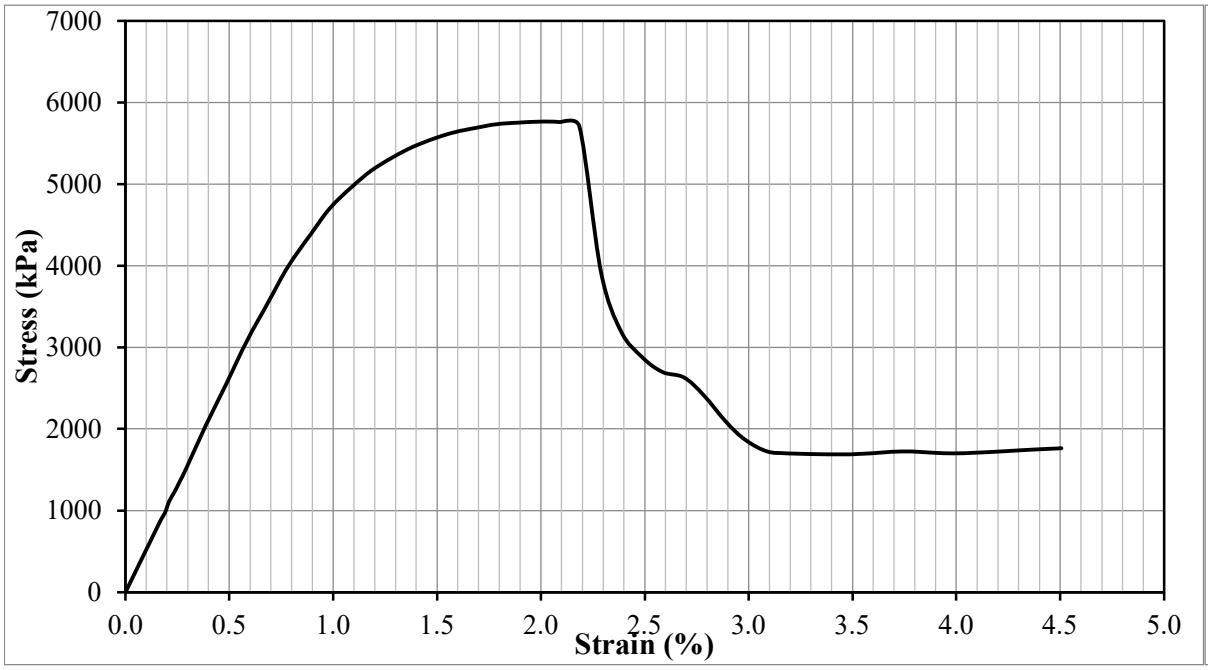
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,831	Strain at failure, εf :	1.94	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	T-14-F	Initial Area:	2119.1	mm^2
Test Date:	1/6/2018	Weight:	353.5	g
Strain Rate:	1 %/min	Unit Weight:	1691	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	13.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45.0	°C
Additional information				



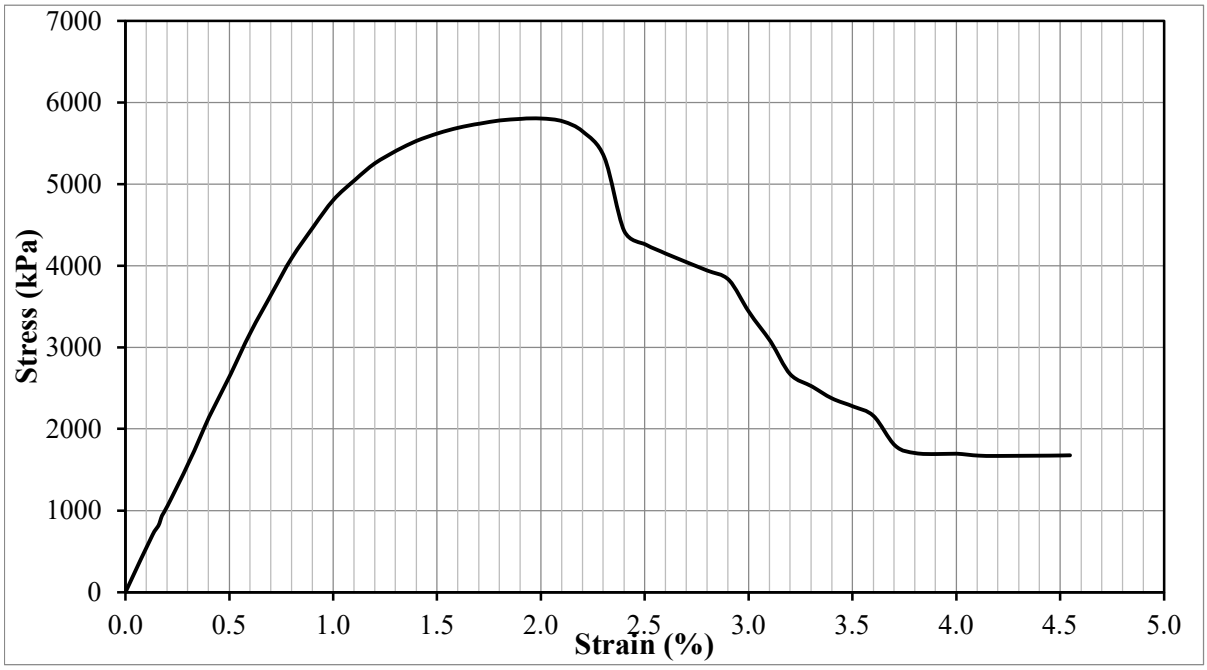
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,867	Strain at failure, εf :	1.87	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	T-14-D	Initial Area:	2123.2	mm^2
Test Date:	1/20/2018	Weight:	359.0	g
Strain Rate:	1 %/min	Unit Weight:	1694	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	27.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45.0	°C
Additional information				



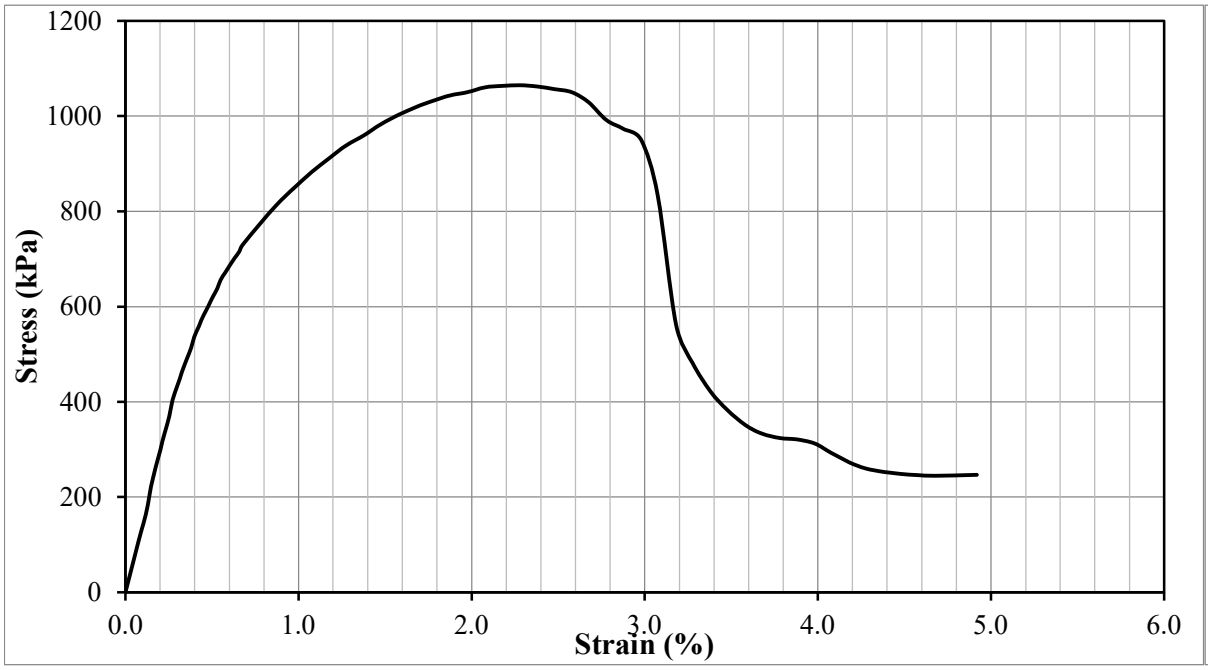
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,728	Strain at failure, εf :	1.98	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	T-14-E	Initial Area:	2117.0	mm^2
Test Date:	1/20/2018	Weight:	352.2	g
Strain Rate:	1 %/min	Unit Weight:	1695	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45.0	°C
Additional information				



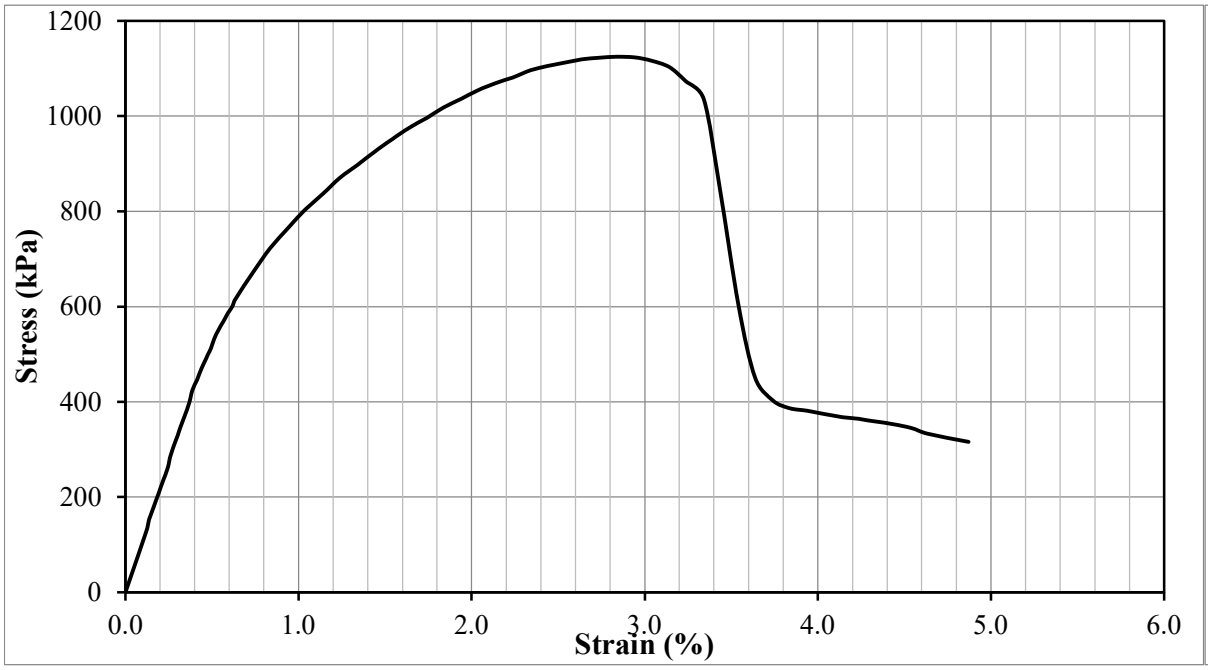
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,752	Strain at failure, εf :	2.00	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	T-15-A	Initial Area:	2119.1	mm^2
Test Date:	12/29/2017	Weight:	355.0	g
Strain Rate:	1 %/min	Unit Weight:	1726	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	3.0	days
$(w:c)_{slurry}$:	1.4	Curing temperature	45.0	°C
Additional information				



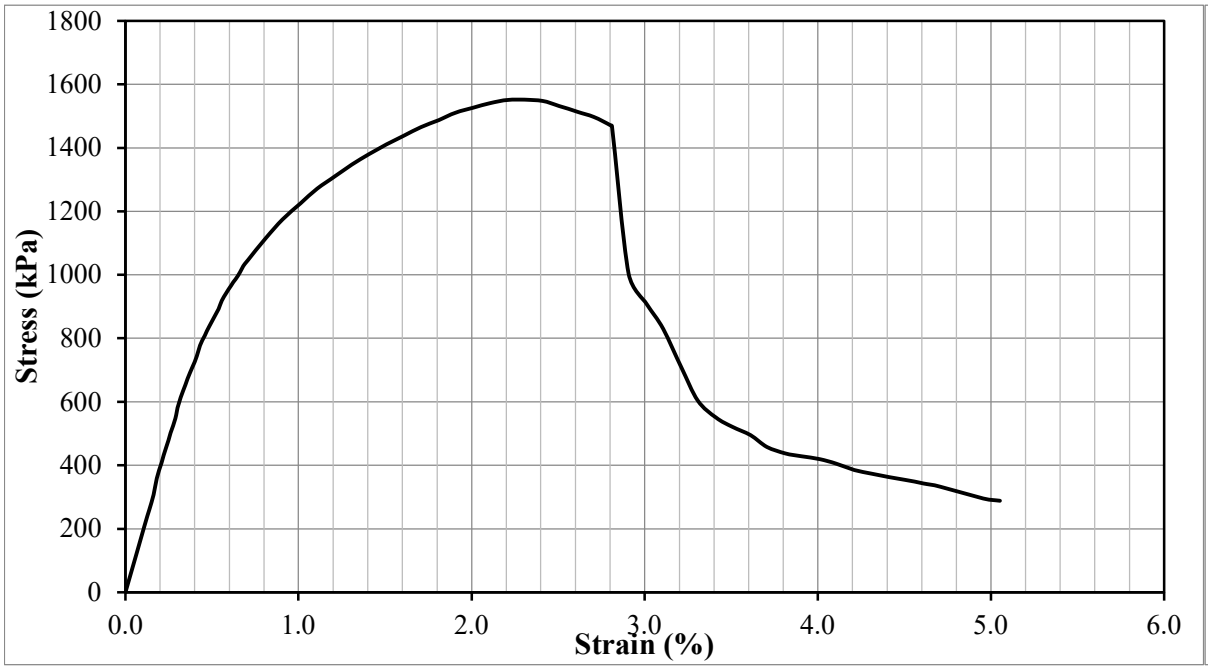
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,054	Strain at failure, εf :	2.28	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	95.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	T-15-H	Initial Area:	2114.9	mm^2
Test Date:	12/29/2017	Weight:	346.3	g
Strain Rate:	1 %/min	Unit Weight:	1723	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	3.0	days
$(w:c)_{slurry}$:	1.4	Curing temperature	45.0	°C
Additional information				



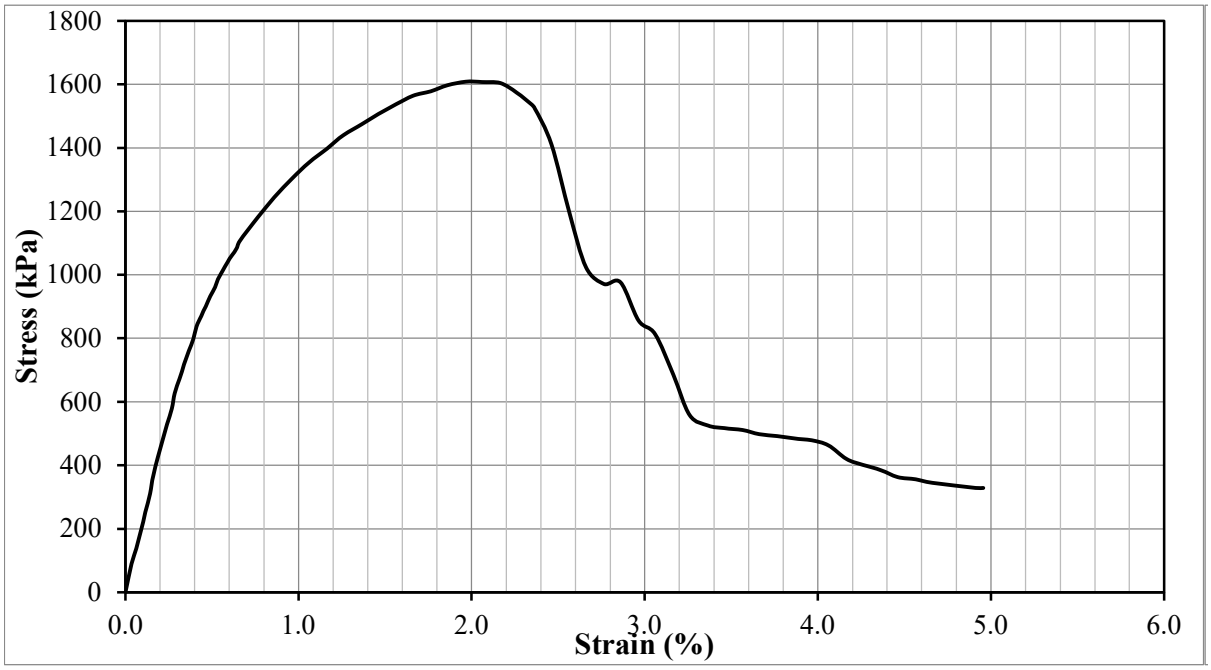
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,109	Strain at failure, εf :	2.84	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	96.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	T-15-B	Initial Area:	2112.9	mm^2
Test Date:	1/2/2018	Weight:	350.4	g
Strain Rate:	1 %/min	Unit Weight:	1727	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	7.0	days
$(w:c)_{slurry}$:	1.4	Curing temperature	45.0	°C
Additional information				



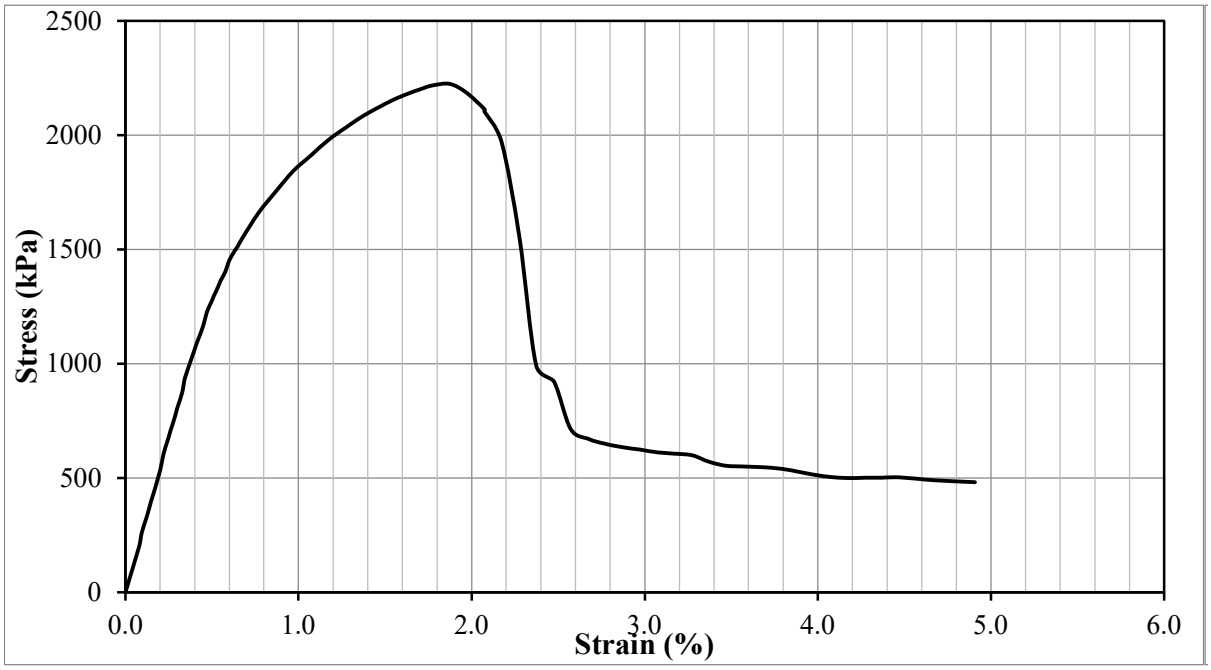
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,533	Strain at failure, εf :	2.31	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	T-15-G	Initial Area:	2112.9	mm^2
Test Date:	1/2/2018	Weight:	361.3	g
Strain Rate:	1 %/min	Unit Weight:	1736	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	7.0	days
$(w:c)_{slurry}$:	1.4	Curing temperature	45.0	°C
Additional information				



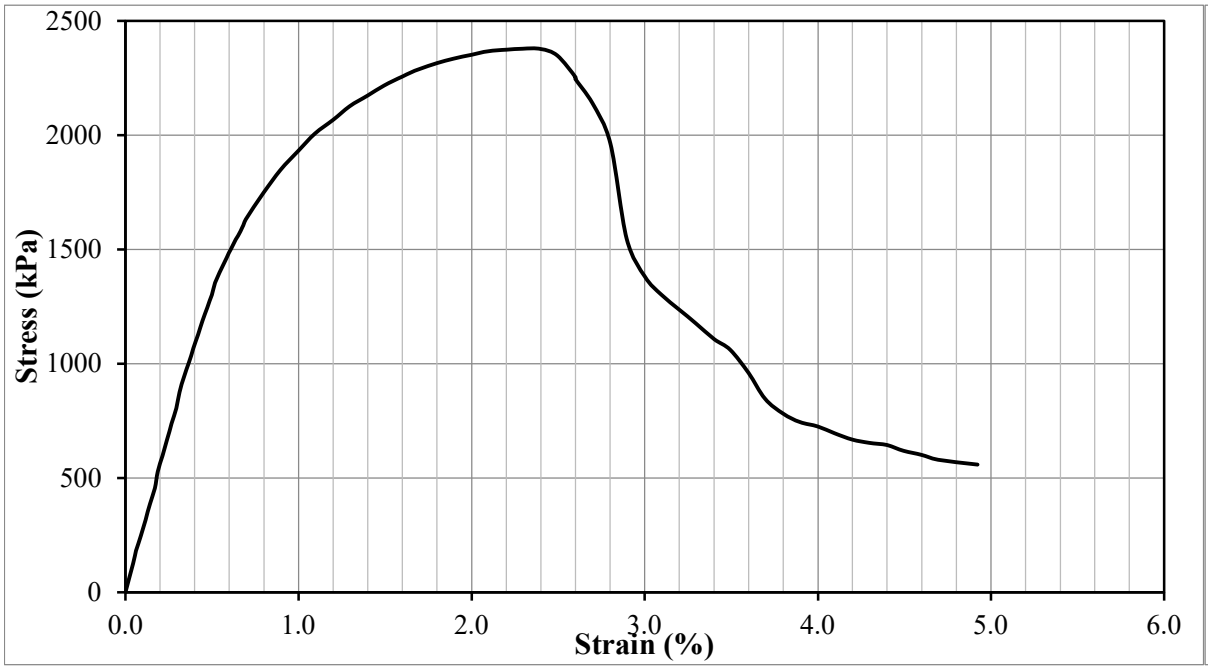
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,595	Strain at failure, εf :	1.97	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	T-15-C	Initial Area:	2112.9	mm^2
Test Date:	1/9/2018	Weight:	360.4	g
Strain Rate:	1 %/min	Unit Weight:	1737	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	14.0	days
$(w:c)_{slurry}$:	1.4	Curing temperature	45.0	°C
Additional information				



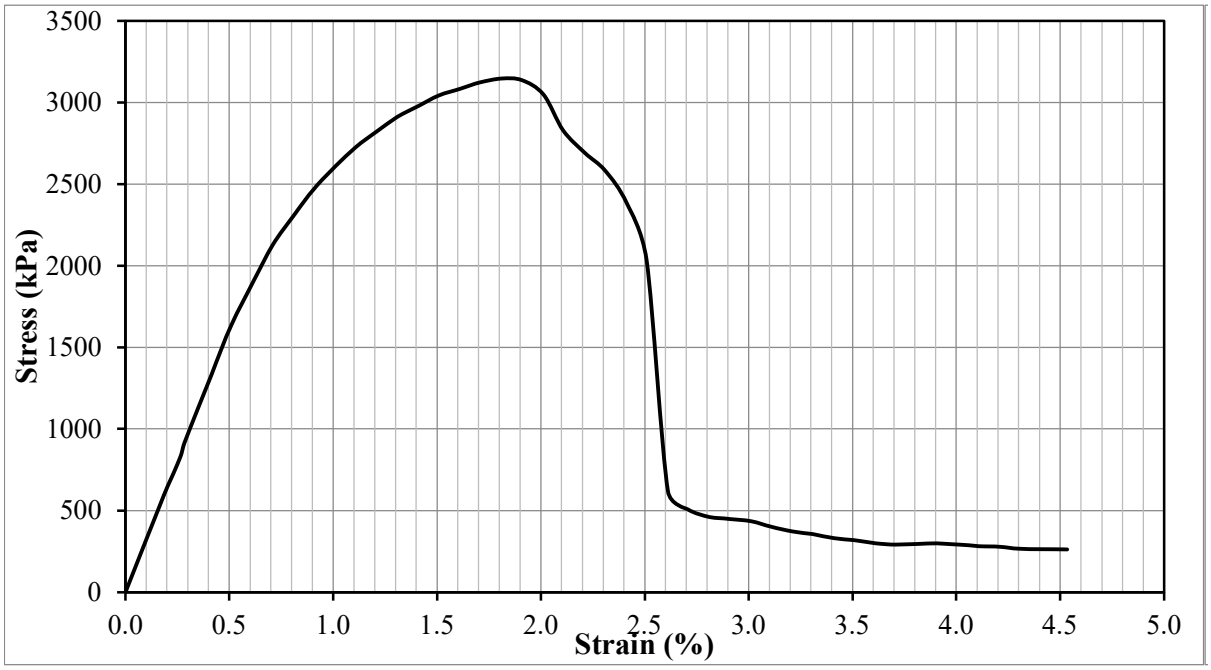
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,205	Strain at failure, εf :	1.87	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	T-15-F	Initial Area:	2114.9	mm^2
Test Date:	1/9/2018	Weight:	361.7	g
Strain Rate:	1 %/min	Unit Weight:	1734	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	14.0	days
$(w:c)_{slurry}$:	1.4	Curing temperature	45.0	°C
Additional information				



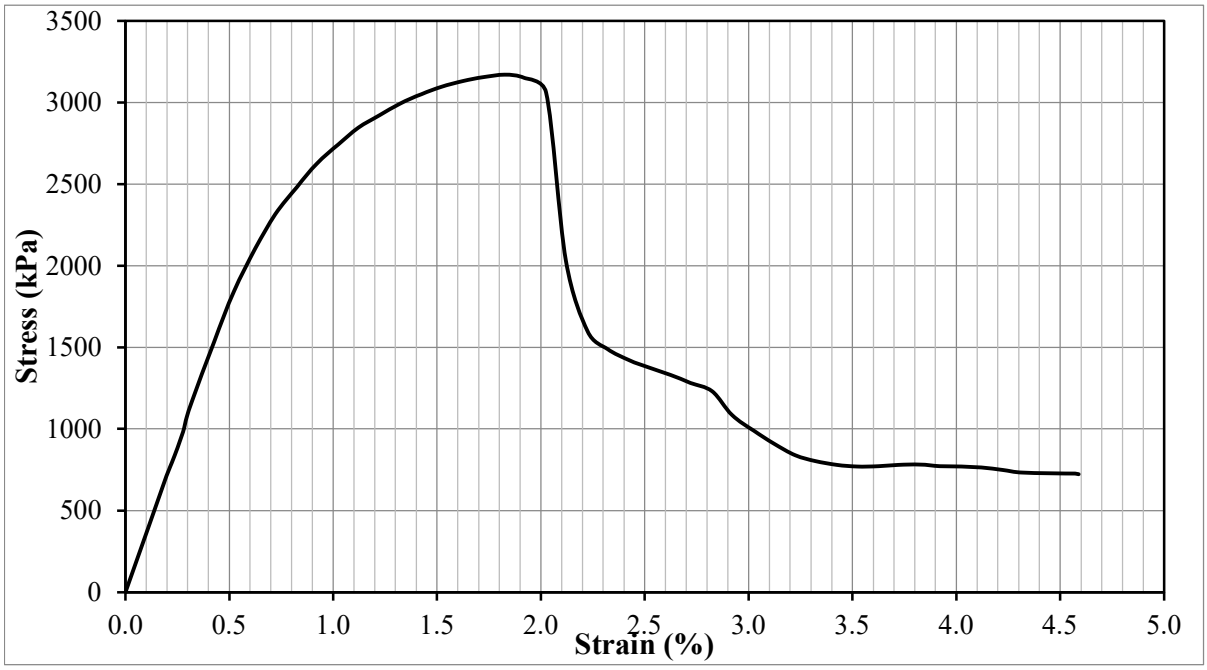
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,360	Strain at failure, εf :	2.30	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	94.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	T-15-D	Initial Area:	2114.9	mm^2
Test Date:	1/23/2018	Weight:	346.3	g
Strain Rate:	1 %/min	Unit Weight:	1731	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.4	Curing temperature	45.0	°C
Additional information				



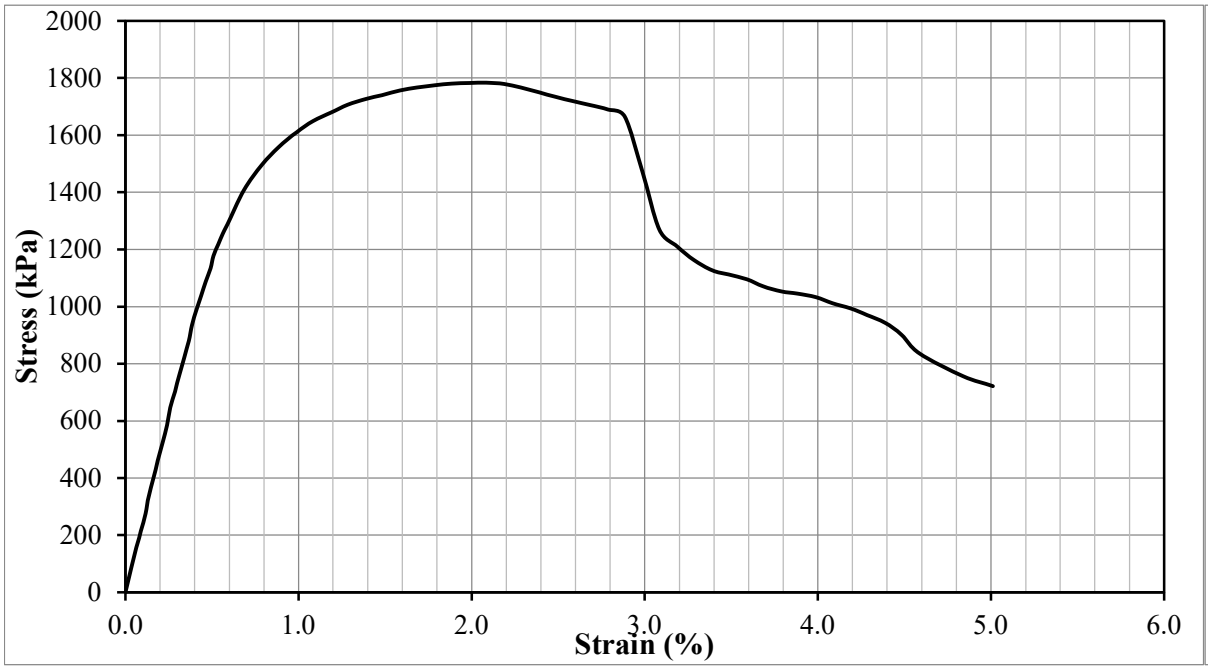
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,102	Strain at failure, εf :	1.81	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-15-E	Initial Area:	2104.6	mm^2
Test Date:	1/23/2018	Weight:	361.7	g
Strain Rate:	1 %/min	Unit Weight:	1744	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.4	Curing temperature	45.0	°C
Additional information				



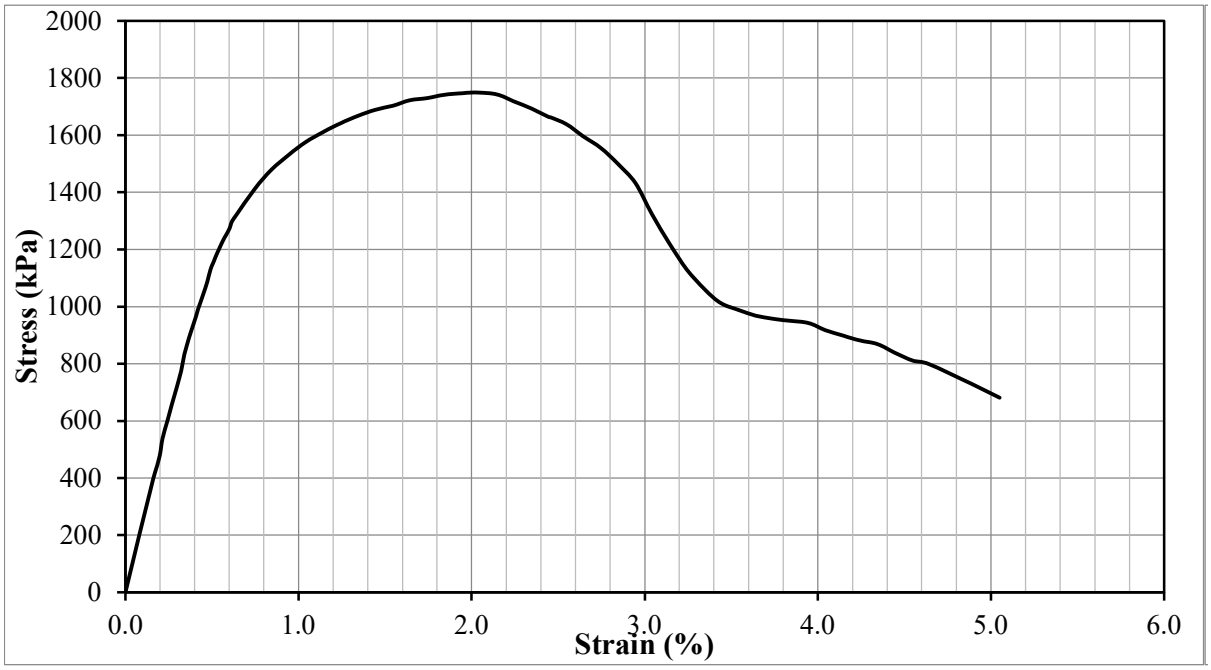
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,145	Strain at failure, εf :	1.82	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	91.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	T-16-A	Initial Area:	2112.9	mm^2
Test Date:	1/2/2018	Weight:	317.3	g
Strain Rate:	1 %/min	Unit Weight:	1637	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	3.0	days
$(w:c)_{slurry}$:	1.4	Curing temperature	45.0	°C
Additional information				



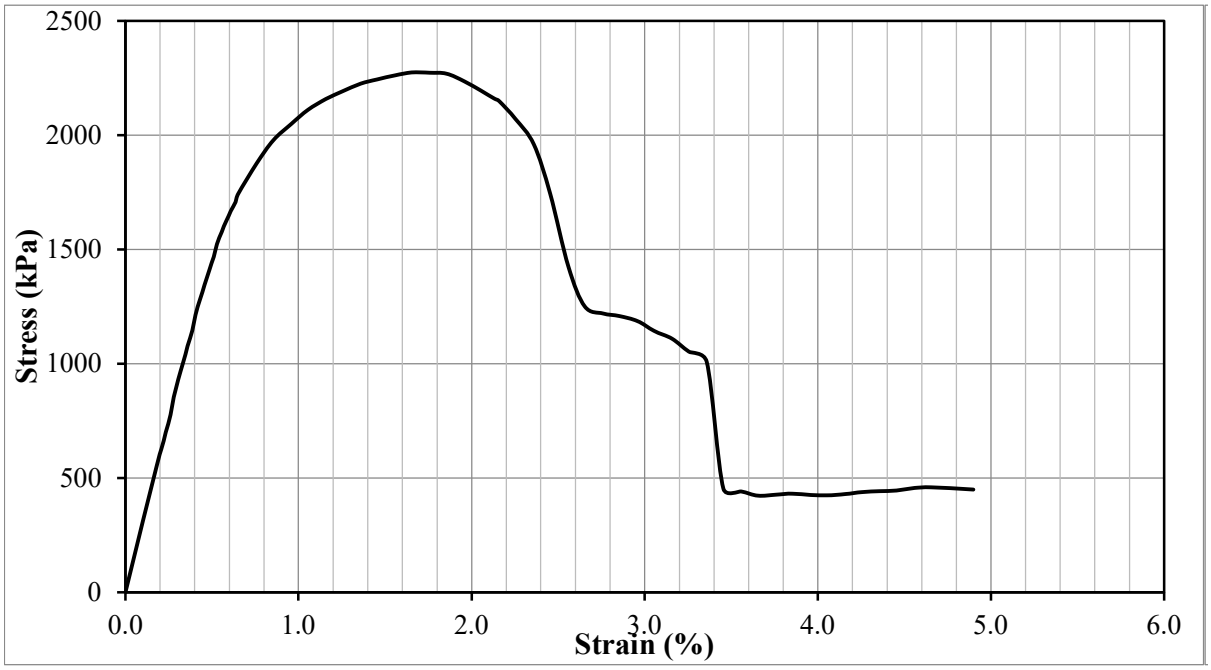
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,750	Strain at failure, εf :	2.08	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	95.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	T-16-H	Initial Area:	2114.9	mm^2
Test Date:	1/2/2018	Weight:	331.4	g
Strain Rate:	1 %/min	Unit Weight:	1641	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	3.0	days
$(w:c)_{slurry}$:	1.4	Curing temperature	45.0	°C
Additional information				



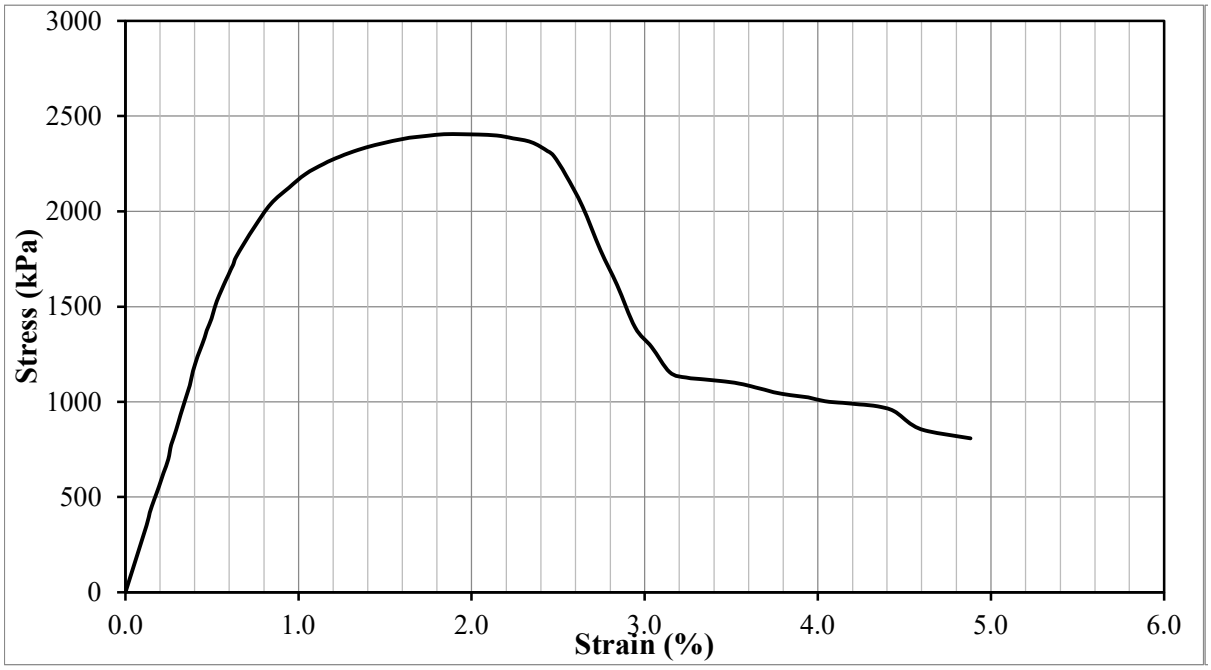
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,726	Strain at failure, εf :	2.04	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	96.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	T-16-B	Initial Area:	2119.1	mm^2
Test Date:	1/6/2018	Weight:	335.2	g
Strain Rate:	1 %/min	Unit Weight:	1643	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	6.9	days
$(w:c)_{slurry}$:	1.4	Curing temperature	45.0	°C
Additional information				



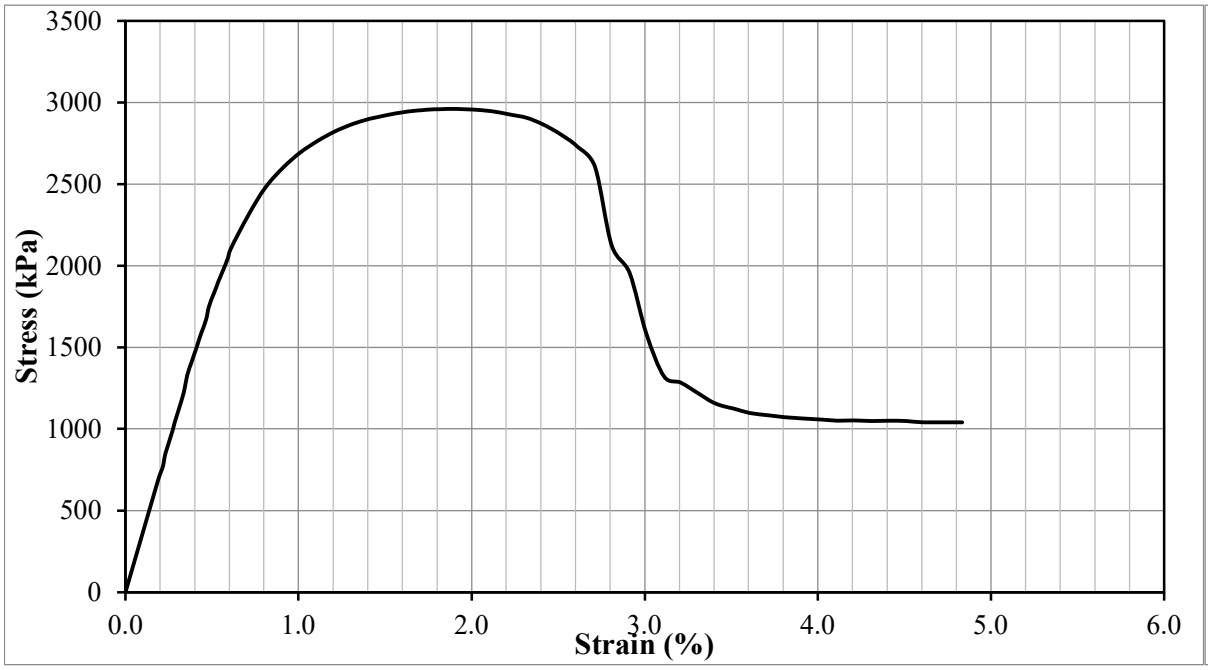
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,247	Strain at failure, εf :	1.65	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	93.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	T-16-G	Initial Area:	2112.9	mm^2
Test Date:	1/6/2018	Weight:	325.0	g
Strain Rate:	1 %/min	Unit Weight:	1647	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	7.0	days
$(w:c)_{slurry}$:	1.4	Curing temperature	45.0	°C
Additional information				



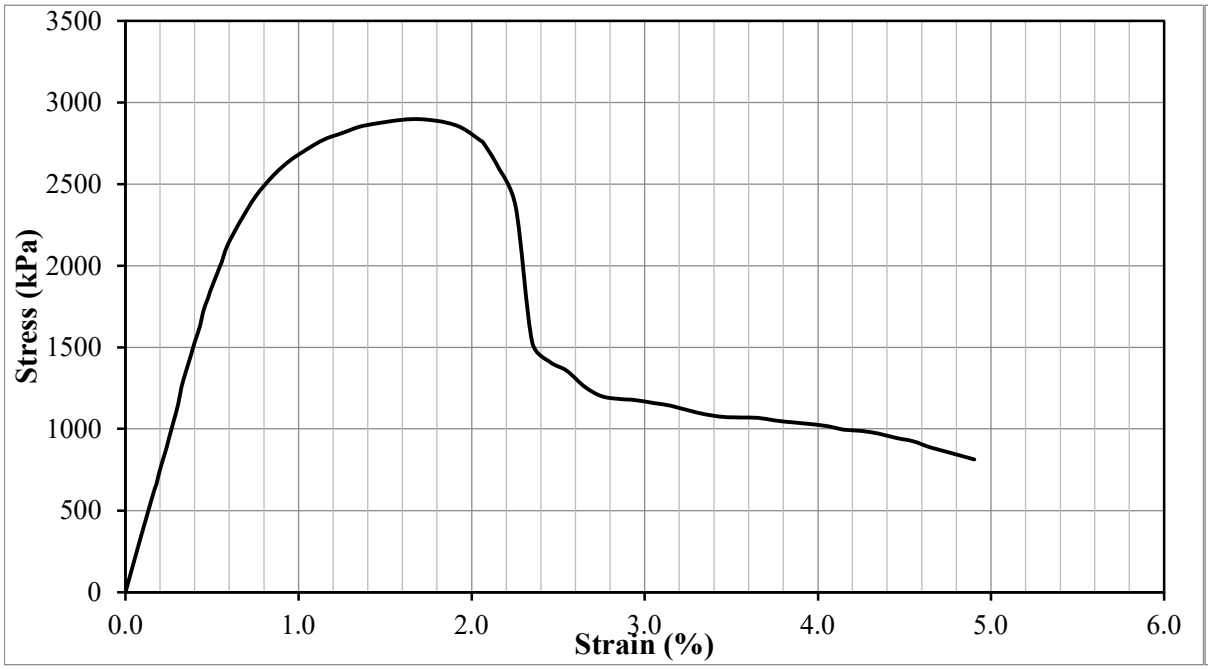
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,367	Strain at failure, εf :	1.94	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	92.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	T-16-C	Initial Area:	2112.9	mm^2
Test Date:	1/13/2018	Weight:	322.1	g
Strain Rate:	1 %/min	Unit Weight:	1649	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	13.9	days
$(w:c)_{slurry}$:	1.4	Curing temperature	45.0	°C
Additional information				



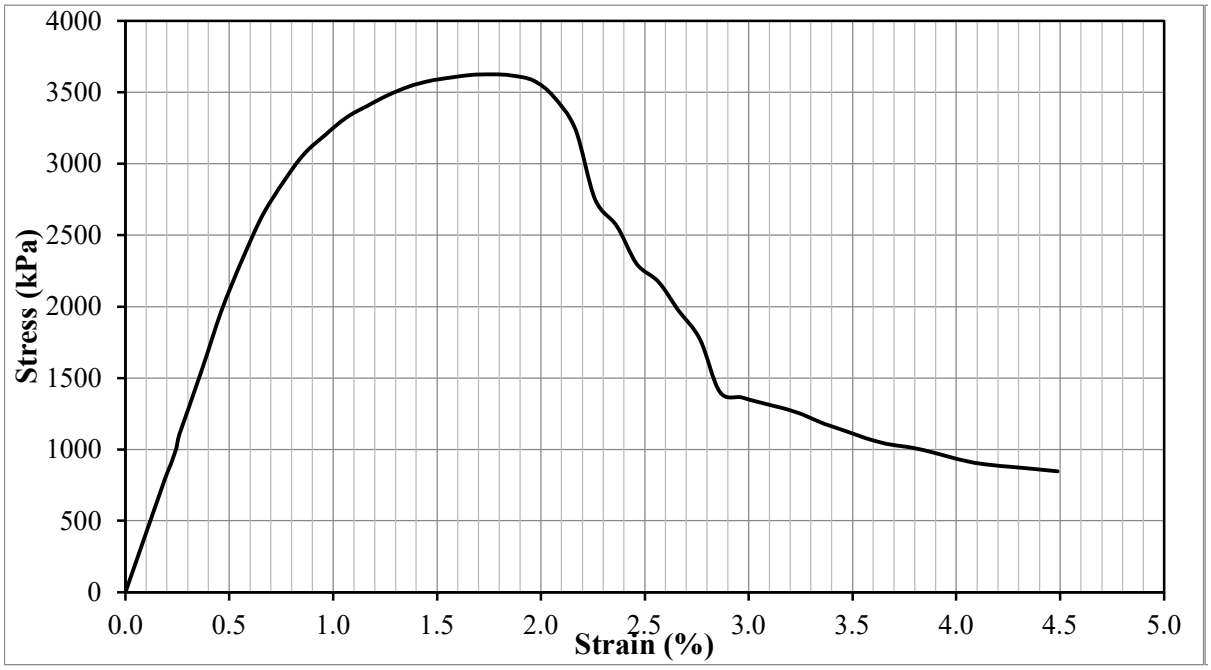
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,908	Strain at failure, εf :	1.91	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	T-16-F	Initial Area:	2117.0	mm^2
Test Date:	1/13/2018	Weight:	339.6	g
Strain Rate:	1 %/min	Unit Weight:	1646	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	14.0	days
$(w:c)_{slurry}$:	1.4	Curing temperature	45.0	°C
Additional information				



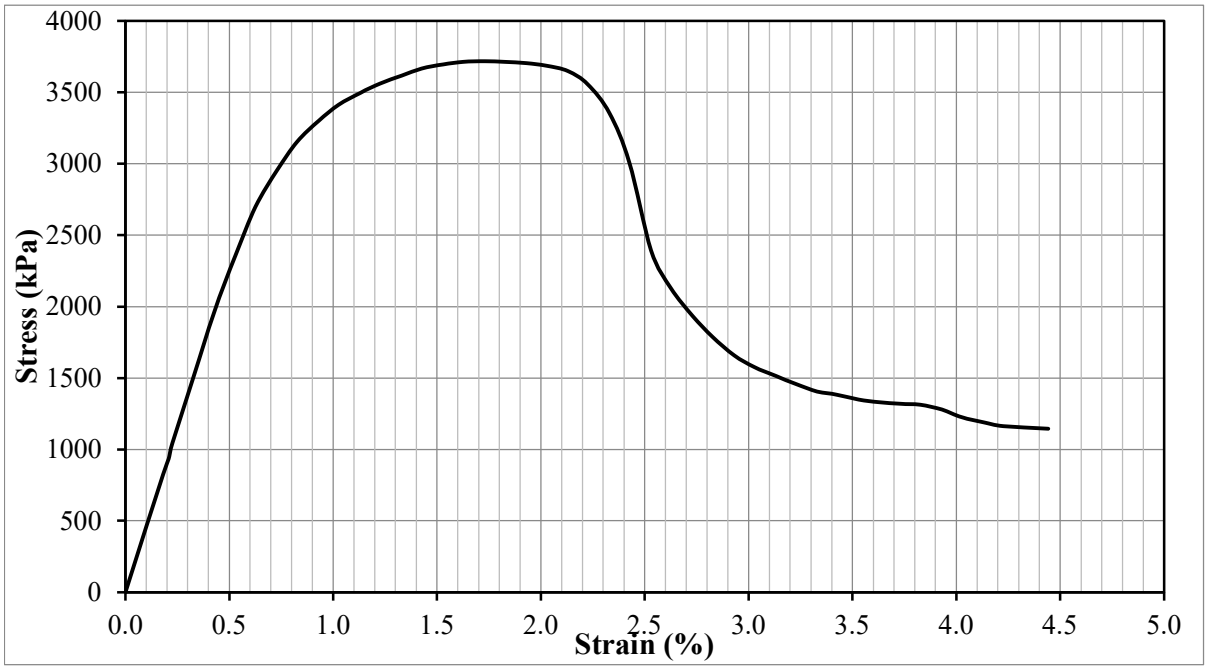
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,870	Strain at failure, εf :	1.65	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	94.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	T-16-D	Initial Area:	2119.1	mm^2
Test Date:	1/27/2018	Weight:	331.0	g
Strain Rate:	1 %/min	Unit Weight:	1648	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.4	Curing temperature	45.0	°C
Additional information				



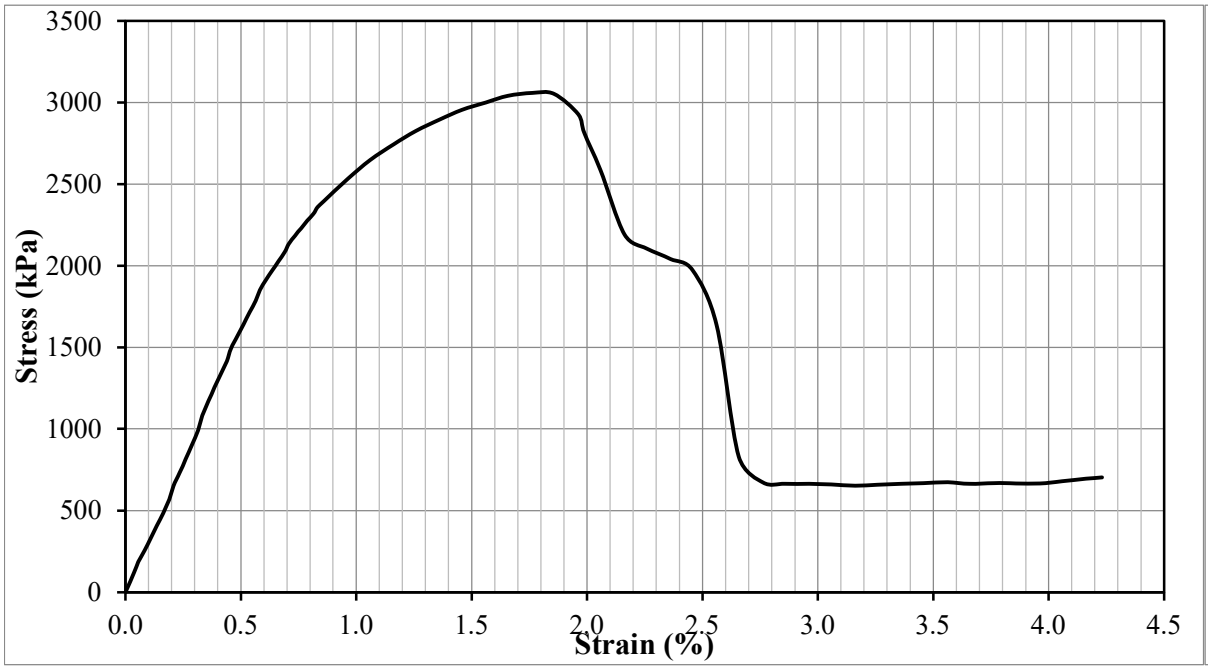
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,574	Strain at failure, εf :	1.77	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	93.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	T-16-E	Initial Area:	2112.9	mm^2
Test Date:	1/27/2018	Weight:	325.4	g
Strain Rate:	1 %/min	Unit Weight:	1652	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.4	Curing temperature	45.0	°C
Additional information				



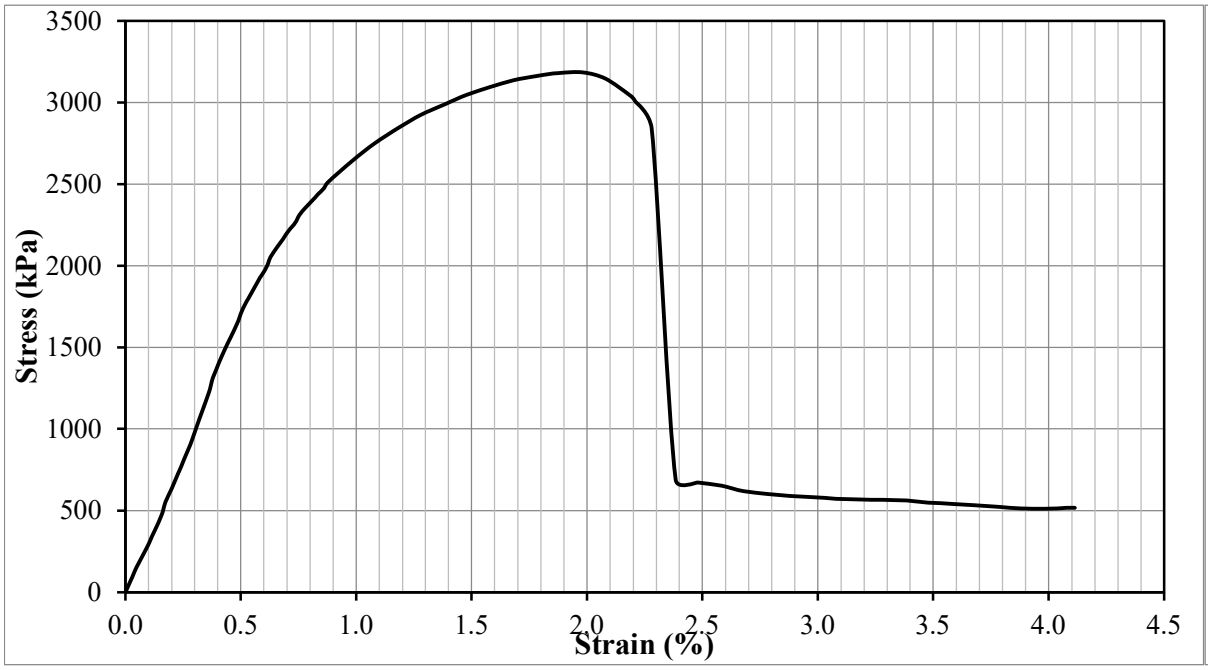
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,657	Strain at failure, εf :	1.73	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	95.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	T-17-A	Initial Area:	2123.2	mm^2
Test Date:	11/1/2017	Weight:	360.6	g
Strain Rate:	1 %/min	Unit Weight:	1780	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	2.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	55.0	°C
Additional information				



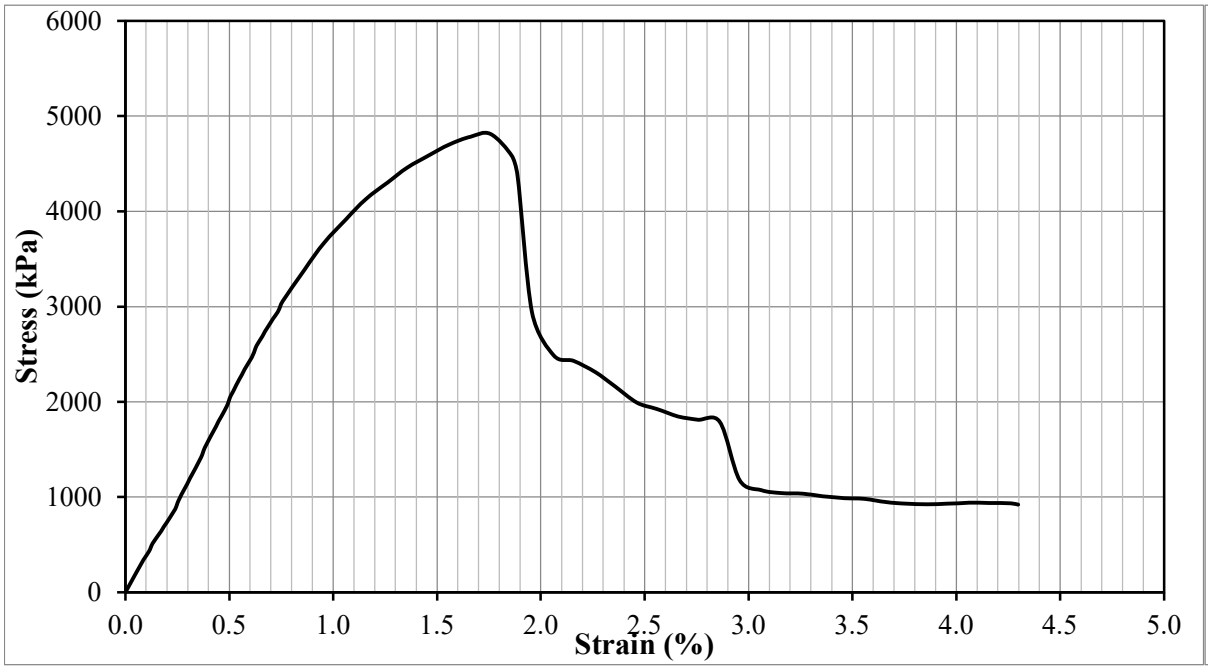
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,017	Strain at failure, εf :	1.76	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	T-17-H	Initial Area:	2125.3	mm^2
Test Date:	11/1/2017	Weight:	370.8	g
Strain Rate:	1 %/min	Unit Weight:	1779	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	2.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	55.0	°C
Additional information				



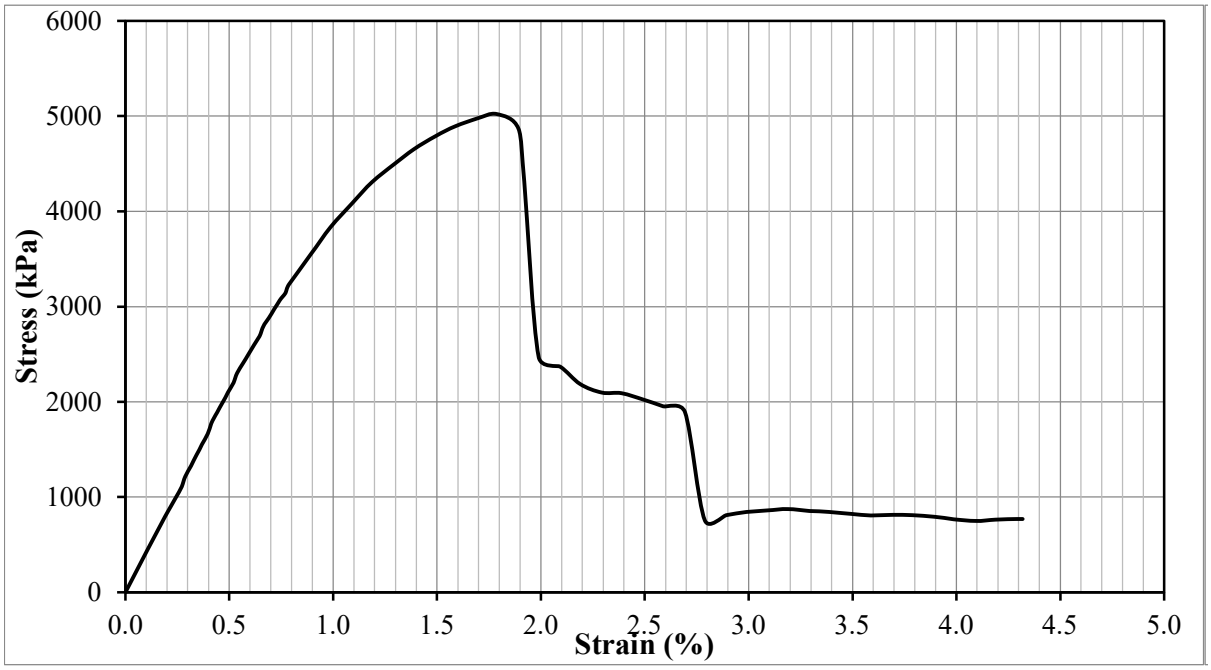
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,154	Strain at failure, εf :	1.98	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	96.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	T-17-B	Initial Area:	2114.9	mm^2
Test Date:	11/5/2017	Weight:	367.0	g
Strain Rate:	1 %/min	Unit Weight:	1794	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	7.1	days
$(w:c)_{slurry}$:	0.6	Curing temperature	55.0	°C
Additional information				



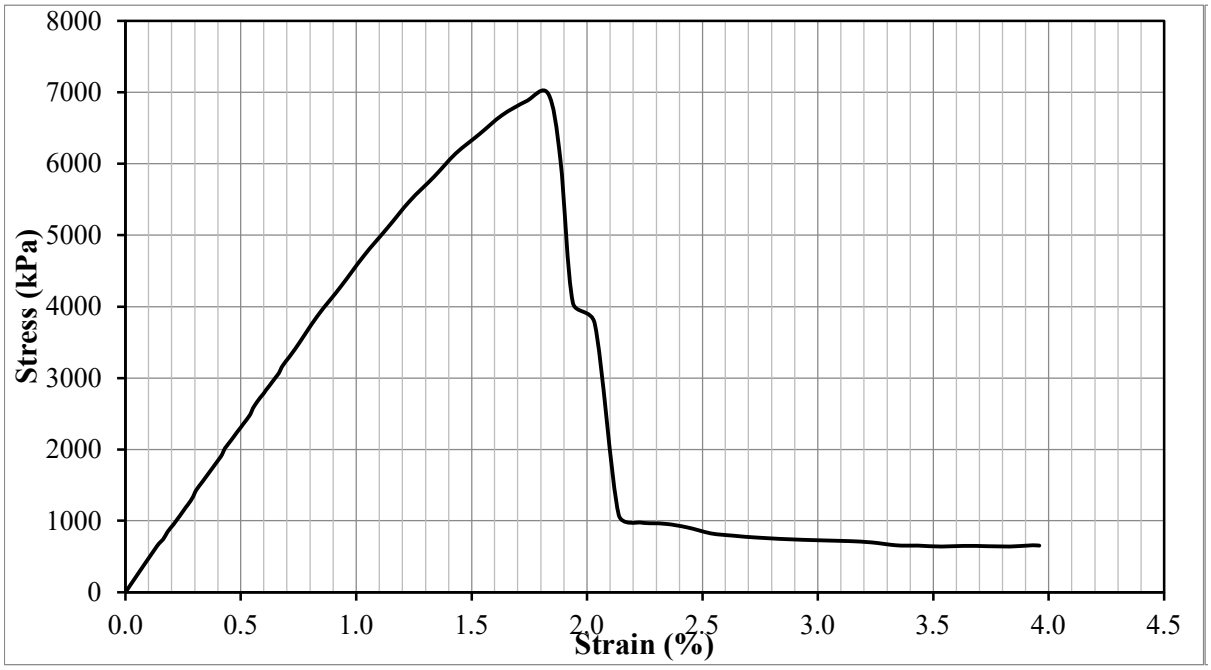
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,759	Strain at failure, εf :	1.76	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	T-17-G	Initial Area:	2123.2	mm^2
Test Date:	11/5/2017	Weight:	373.5	g
Strain Rate:	1 %/min	Unit Weight:	1793	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	7.2	days
$(w:c)_{slurry}$:	0.6	Curing temperature	55.0	°C
Additional information				



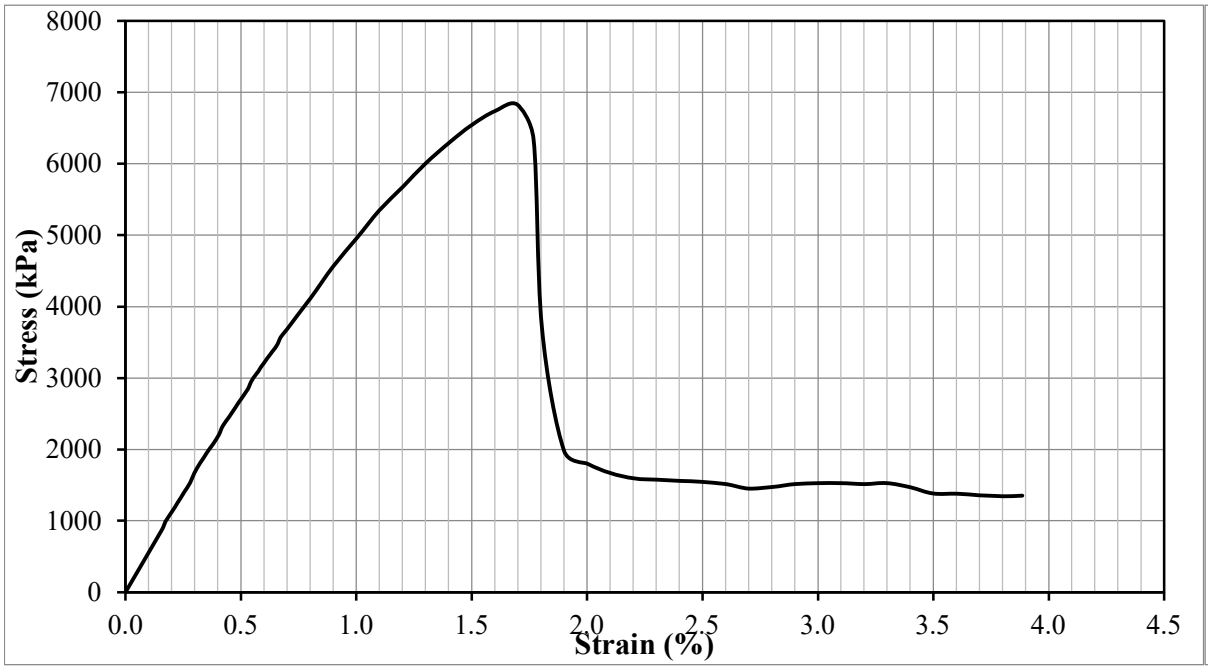
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,976	Strain at failure, εf :	1.79	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	96.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	T-17-C	Initial Area:	2121.1	mm^2
Test Date:	11/12/2017	Weight:	366.9	g
Strain Rate:	1 %/min	Unit Weight:	1794	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	13.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	55.0	°C
Additional information				



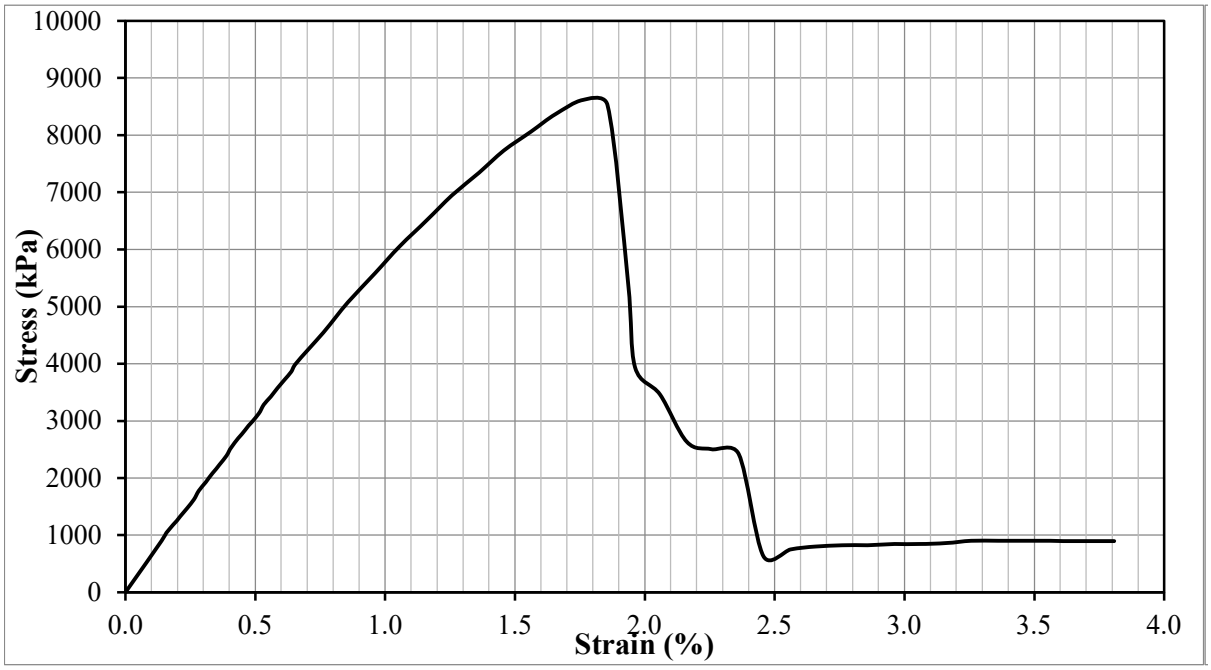
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	6,898	Strain at failure, εf :	1.83	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	T-17-J	Initial Area:	2125.3	mm^2
Test Date:	11/12/2017	Weight:	375.6	g
Strain Rate:	1 %/min	Unit Weight:	1792	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	13.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	55.0	°C
Additional information				



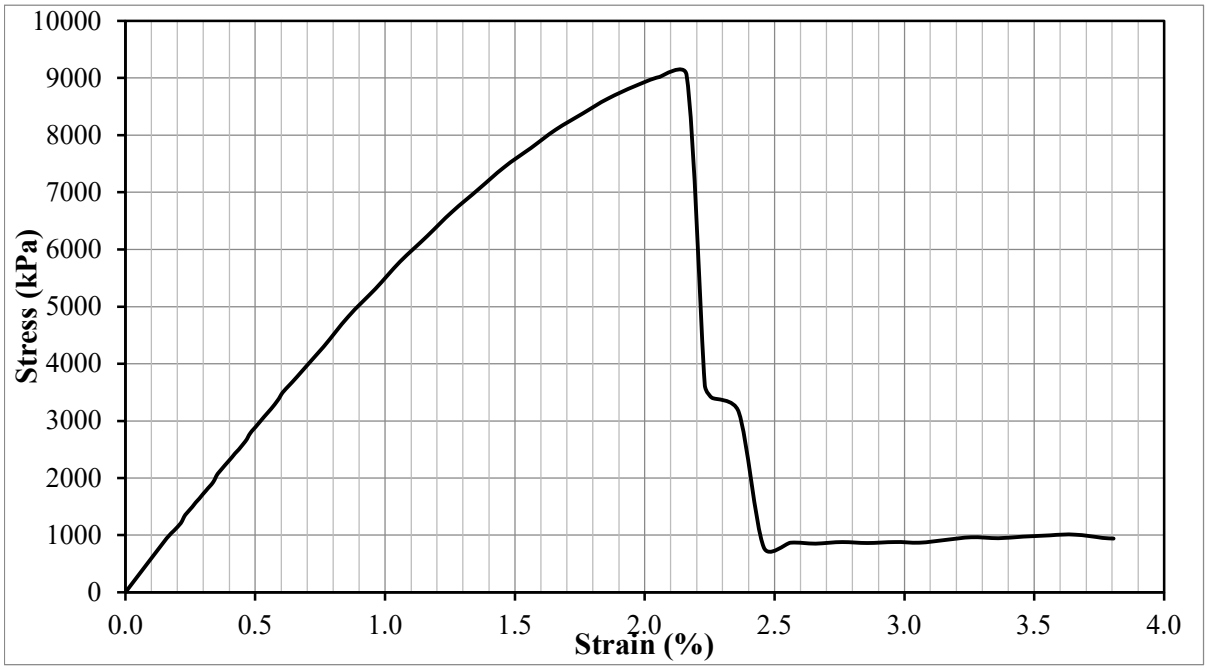
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	6,767	Strain at failure, εf :	1.70	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	T-17-D	Initial Area:	2119.1	mm^2
Test Date:	11/25/2017	Weight:	373.3	g
Strain Rate:	1 %/min	Unit Weight:	1798	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	27.1	days
$(w:c)_{slurry}$:	0.6	Curing temperature	55.0	°C
Additional information				



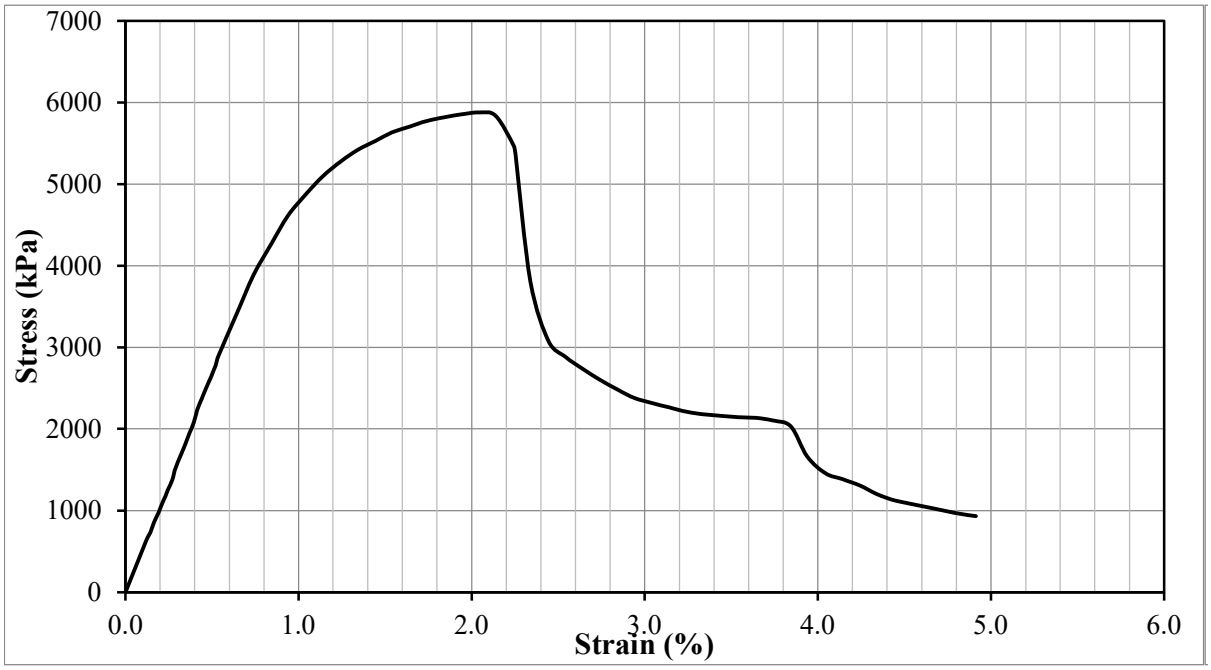
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	8,535	Strain at failure, εf :	1.76	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	96.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	T-17-E	Initial Area:	2127.4	mm^2
Test Date:	11/25/2017	Weight:	367.6	g
Strain Rate:	1 %/min	Unit Weight:	1792	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	27.1	days
$(w:c)_{slurry}$:	0.6	Curing temperature	55.0	°C
Additional information				



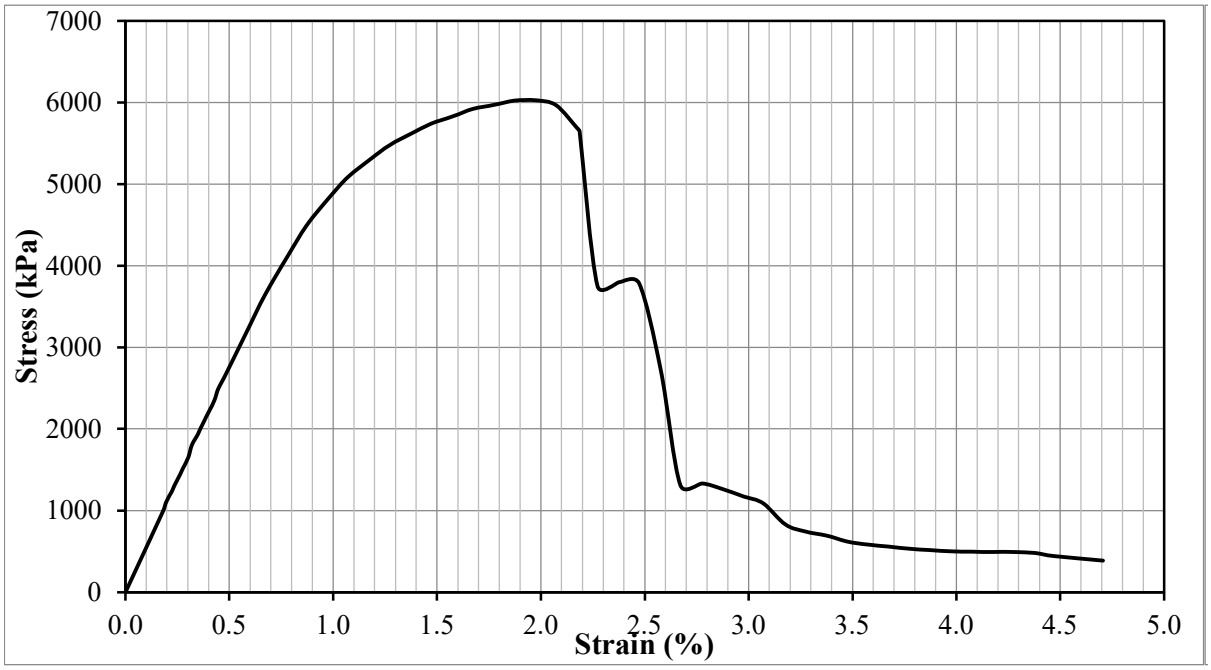
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	8,945	Strain at failure, εf :	2.16	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	T-18-A	Initial Area:	2114.9	mm^2
Test Date:	3/21/2018	Weight:	372.0	g
Strain Rate:	1 %/min	Unit Weight:	1787	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	3.0	days
$(w:c)_{slurry}$:	0.6	Curing temperature	55.0	°C
Additional information				



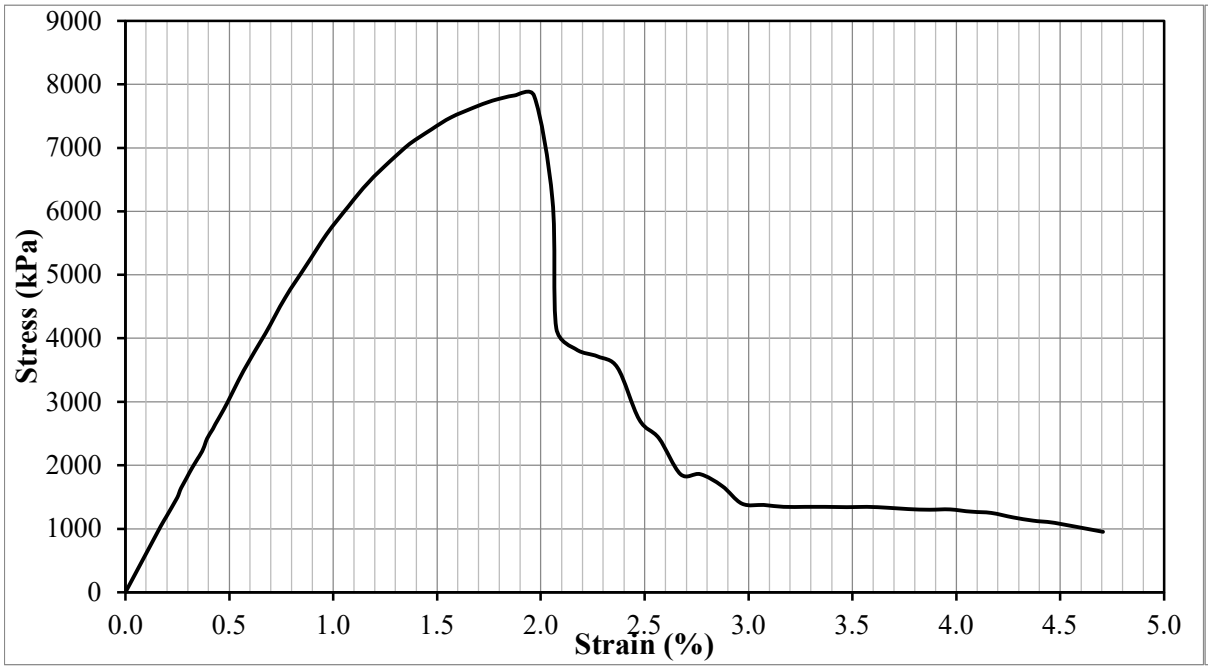
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,830	Strain at failure, εf :	2.04	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	T-18-H	Initial Area:	2117.0	mm^2
Test Date:	3/21/2018	Weight:	366.8	g
Strain Rate:	1 %/min	Unit Weight:	1778	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	3.1	days
$(w:c)_{slurry}$:	0.6	Curing temperature	55.0	°C
Additional information				



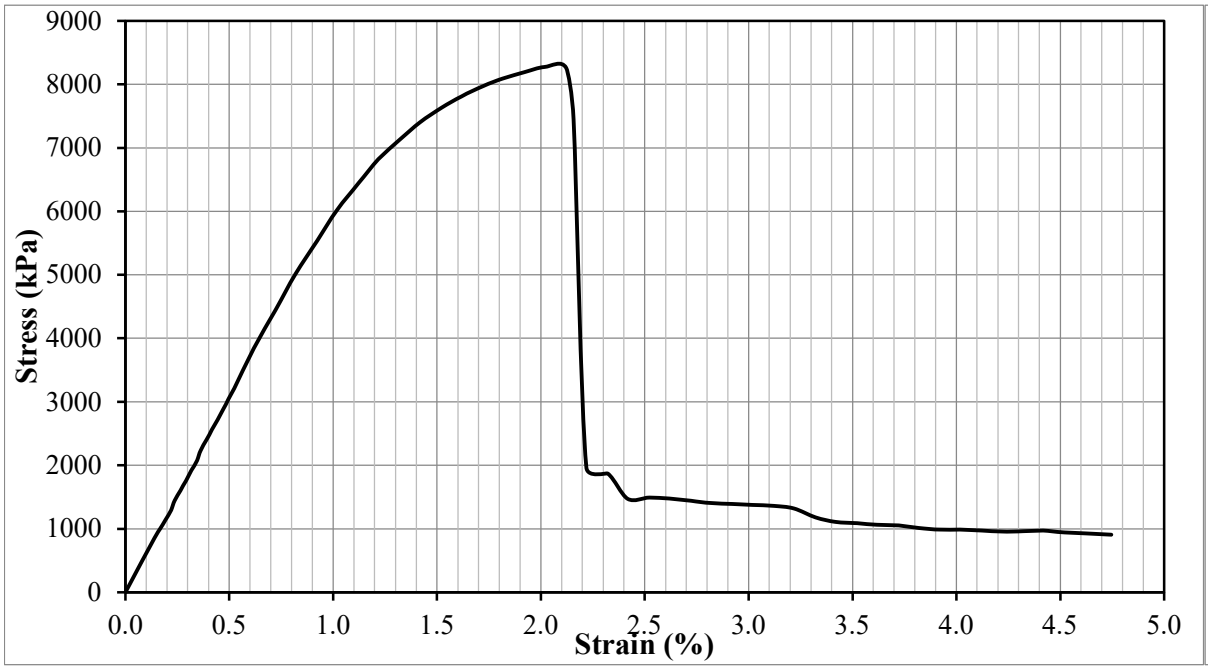
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,966	Strain at failure, εf :	1.98	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	T-18-B	Initial Area:	2121.1	mm^2
Test Date:	3/25/2018	Weight:	375.2	g
Strain Rate:	1 %/min	Unit Weight:	1792	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	7.0	days
$(w:c)_{slurry}$:	0.6	Curing temperature	55.0	°C
Additional information				



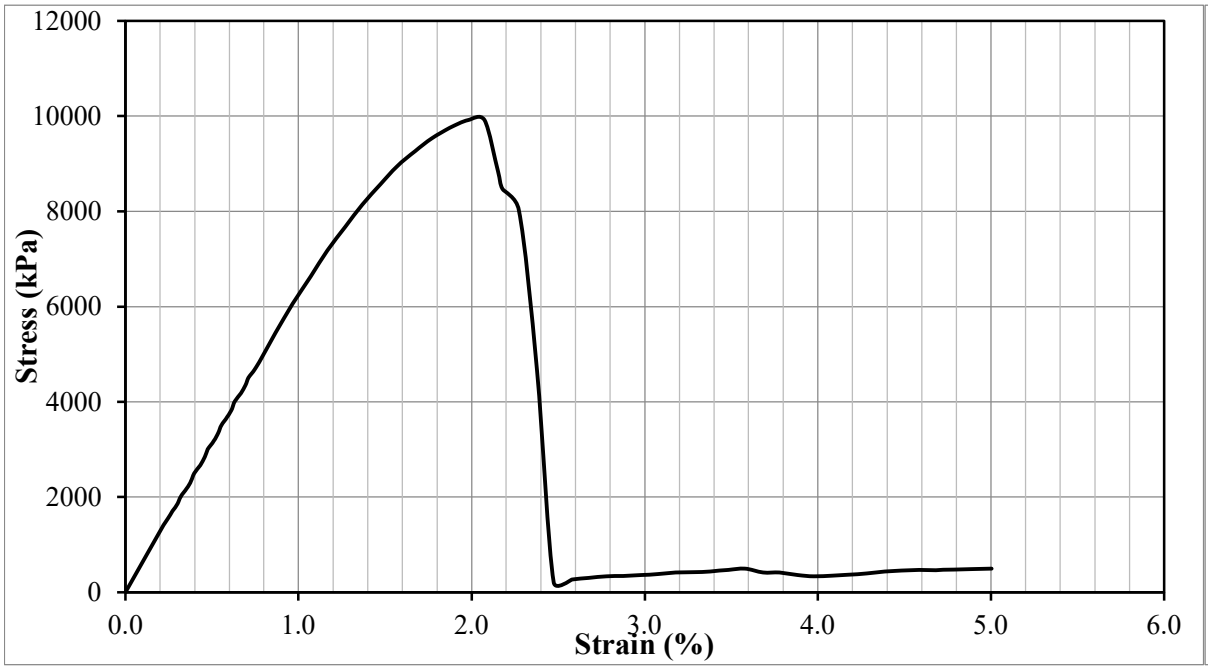
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	7,760	Strain at failure, εf :	1.87	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	T-18-G	Initial Area:	2119.1	mm^2
Test Date:	3/25/2018	Weight:	382.8	g
Strain Rate:	1 %/min	Unit Weight:	1790	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	7.0	days
$(w:c)_{slurry}$:	0.6	Curing temperature	55.0	°C
Additional information				



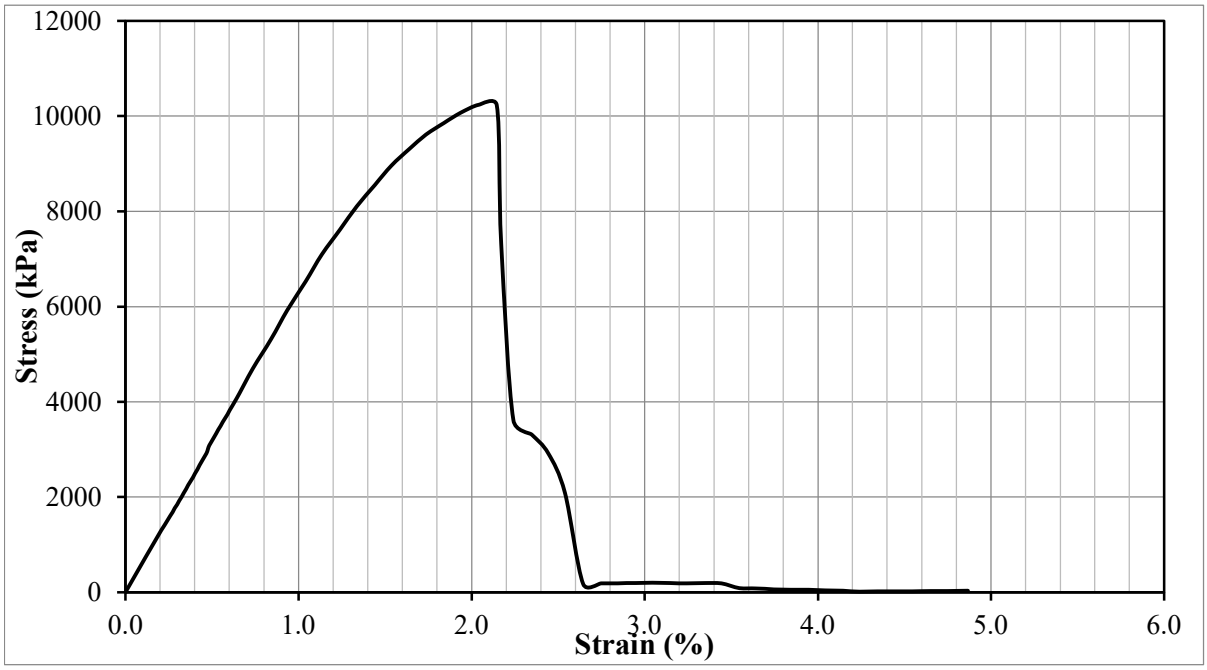
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	8,237	Strain at failure, εf :	2.02	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	T-18-F	Initial Area:	2123.2	mm^2
Test Date:	4/2/2018	Weight:	380.5	g
Strain Rate:	1 %/min	Unit Weight:	1797	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	14.7	days
$(w:c)_{slurry}$:	0.6	Curing temperature	55.0	°C
Additional information				



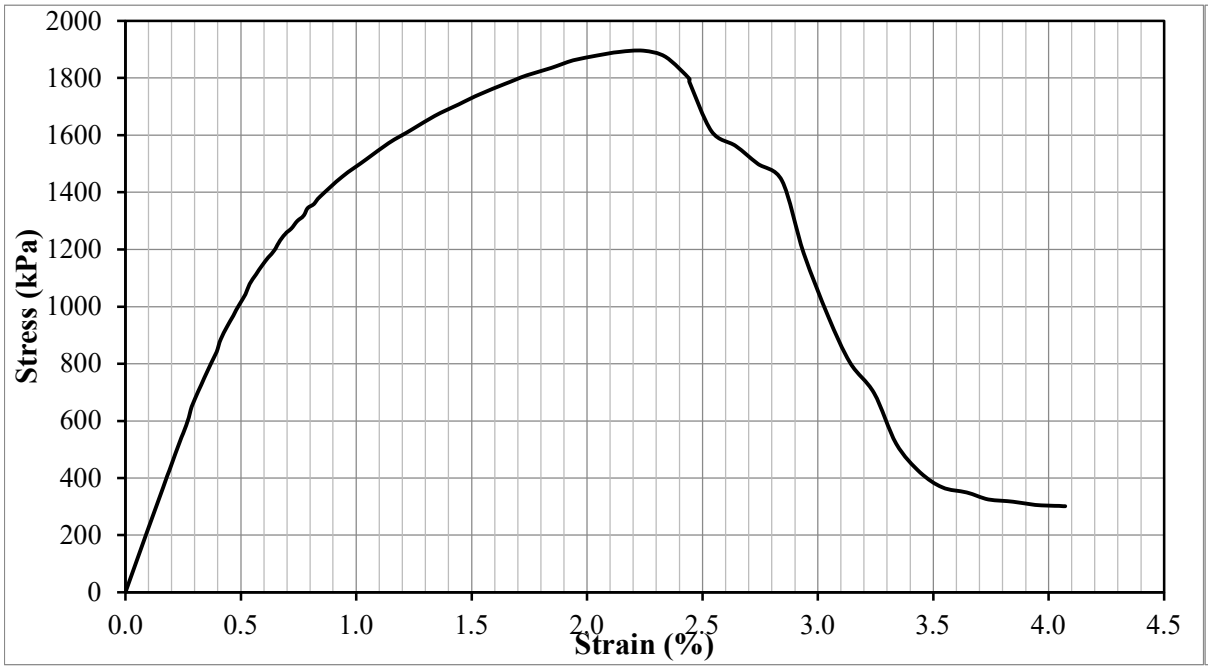
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	9,848	Strain at failure, εf :	1.98	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	T-18-I	Initial Area:	2123.2	mm^2
Test Date:	4/2/2018	Weight:	381.5	g
Strain Rate:	1 %/min	Unit Weight:	1801	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	14.7	days
$(w:c)_{slurry}$:	0.6	Curing temperature	55.0	°C
Additional information				



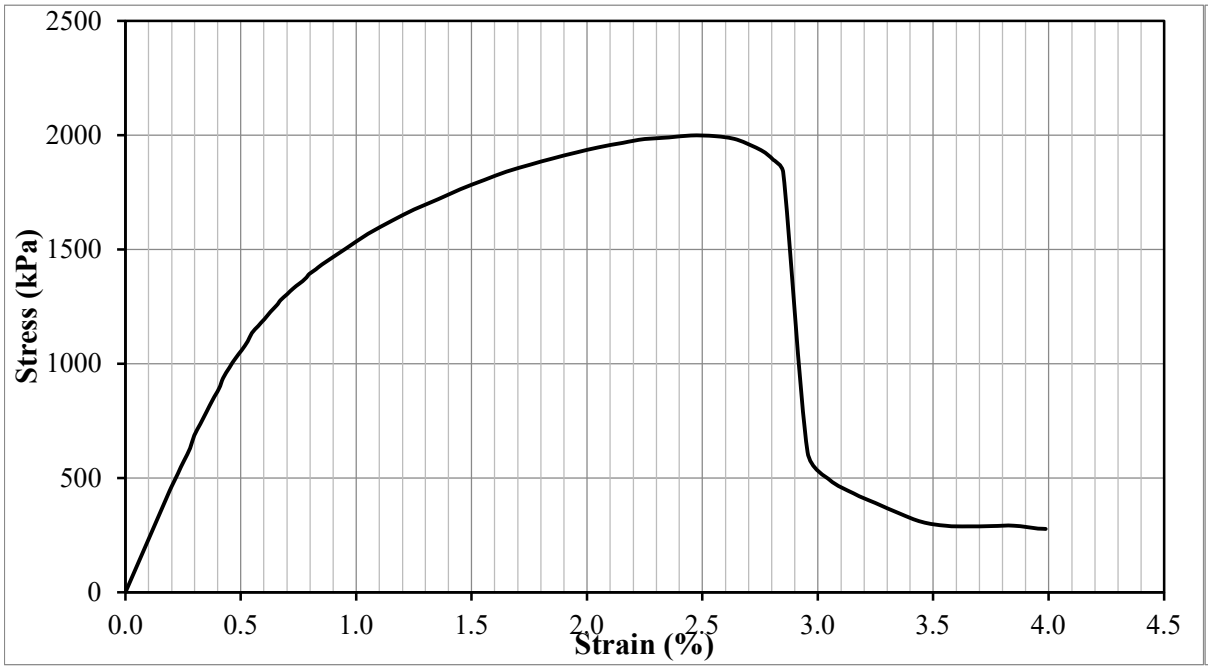
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	10,169	Strain at failure, εf :	2.04	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	94.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	T-19-A	Initial Area:	2112.9	mm^2
Test Date:	11/7/2017	Weight:	348.8	g
Strain Rate:	1 %/min	Unit Weight:	1756	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	3.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	55.0	°C
Additional information				



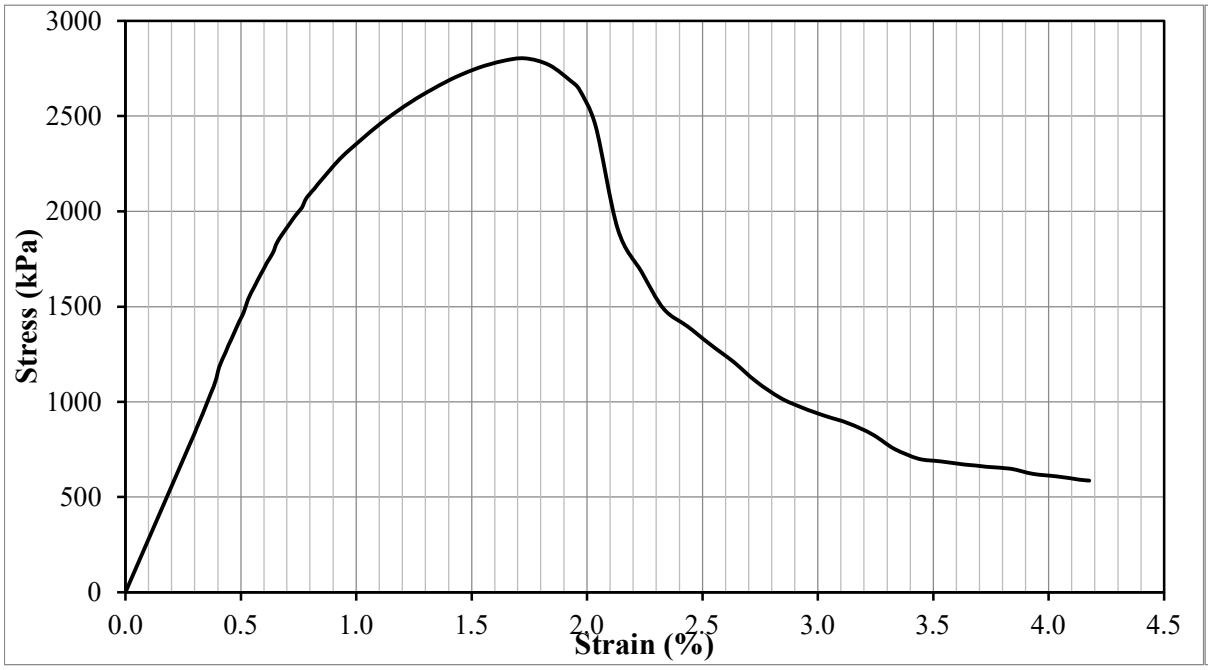
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,867	Strain at failure, εf :	2.24	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-19-H	Initial Area:	2108.7	mm^2
Test Date:	11/7/2017	Weight:	376.1	g
Strain Rate:	1 %/min	Unit Weight:	1767	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	3.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	55.0	°C
Additional information				



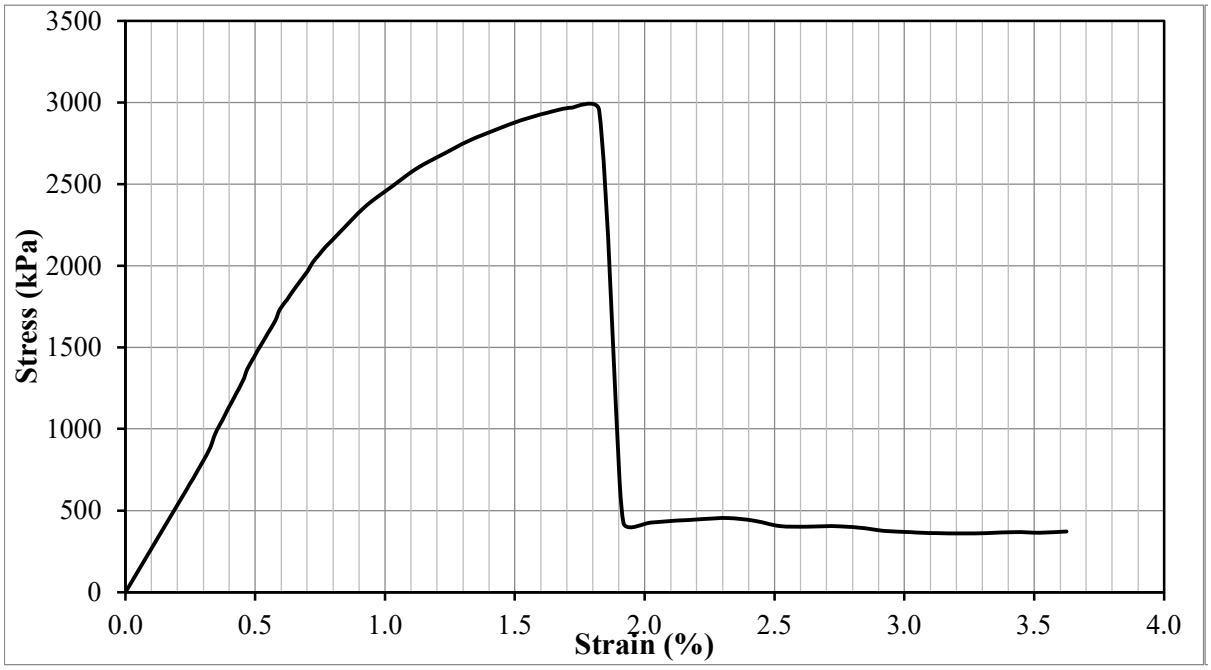
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,990	Strain at failure, εf :	2.45	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	95.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	T-19-B	Initial Area:	2121.1	mm^2
Test Date:	11/10/2017	Weight:	355.0	g
Strain Rate:	1 %/min	Unit Weight:	1754	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	6.8	days
$(w:c)_{slurry}$:	1.0	Curing temperature	55.0	°C
Additional information				



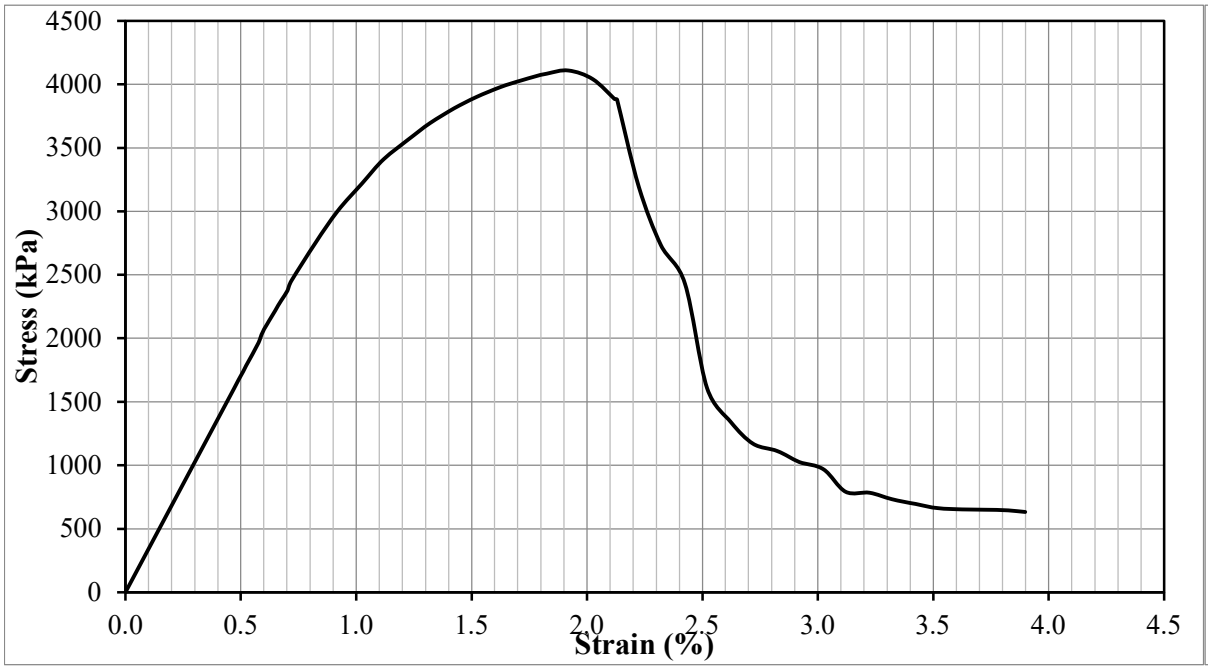
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,766	Strain at failure, εf :	1.73	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	T-19-G	Initial Area:	2117.0	mm^2
Test Date:	11/10/2017	Weight:	373.2	g
Strain Rate:	1 %/min	Unit Weight:	1766	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	6.8	days
$(w:c)_{slurry}$:	1.0	Curing temperature	55.0	°C
Additional information				



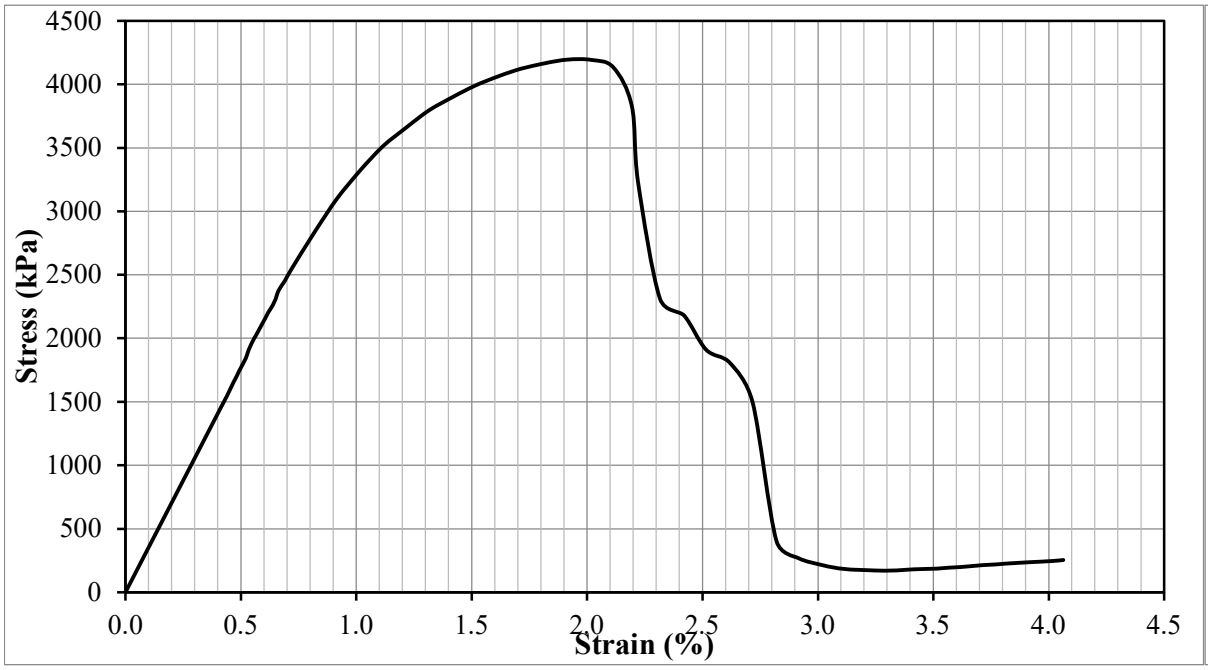
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,950	Strain at failure, εf :	1.72	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-19-C	Initial Area:	2106.6	mm^2
Test Date:	11/17/2017	Weight:	371.3	g
Strain Rate:	1 %/min	Unit Weight:	1775	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	14.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	55.0	°C
Additional information				



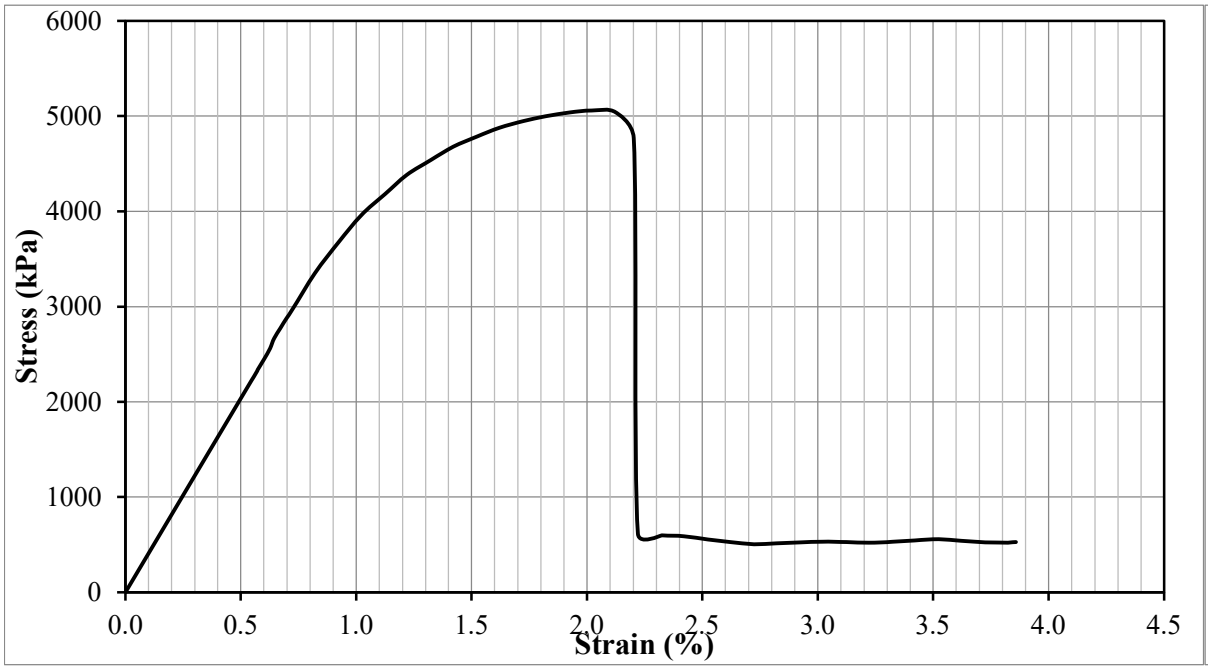
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,081	Strain at failure, εf :	1.92	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	93.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	T-19-F	Initial Area:	2114.9	mm^2
Test Date:	11/17/2017	Weight:	351.0	g
Strain Rate:	1 %/min	Unit Weight:	1768	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	14.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	55.0	°C
Additional information				



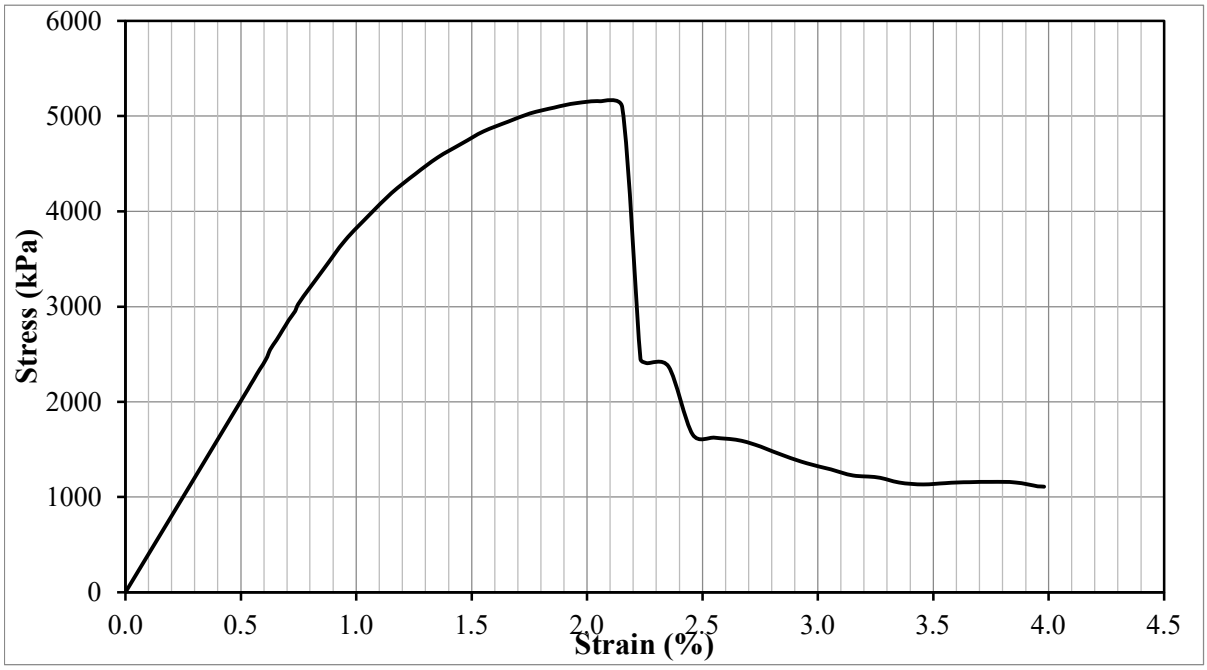
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,130	Strain at failure, εf :	1.92	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	T-19-D	Initial Area:	2121.1	mm^2
Test Date:	12/1/2017	Weight:	363.5	g
Strain Rate:	1 %/min	Unit Weight:	1767	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	55.0	°C
Additional information				



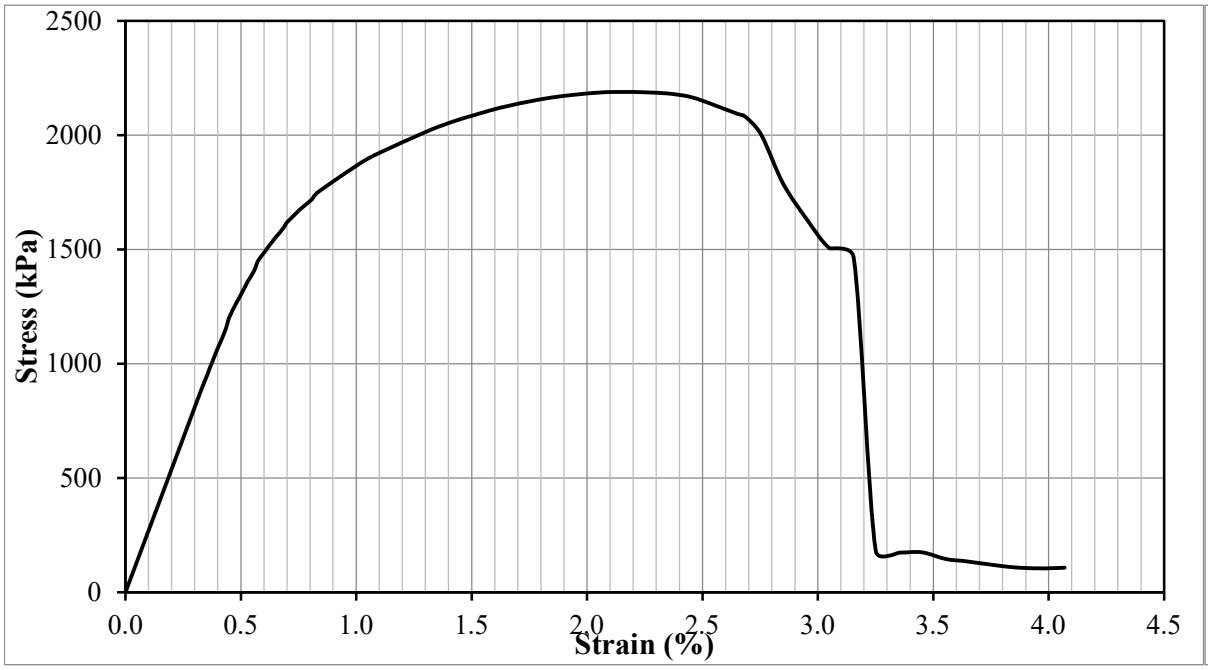
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,005	Strain at failure, εf :	2.02	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	T-19-E	Initial Area:	2121.1	mm^2
Test Date:	12/1/2017	Weight:	370.4	g
Strain Rate:	1 %/min	Unit Weight:	1765	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	55.0	°C
Additional information				



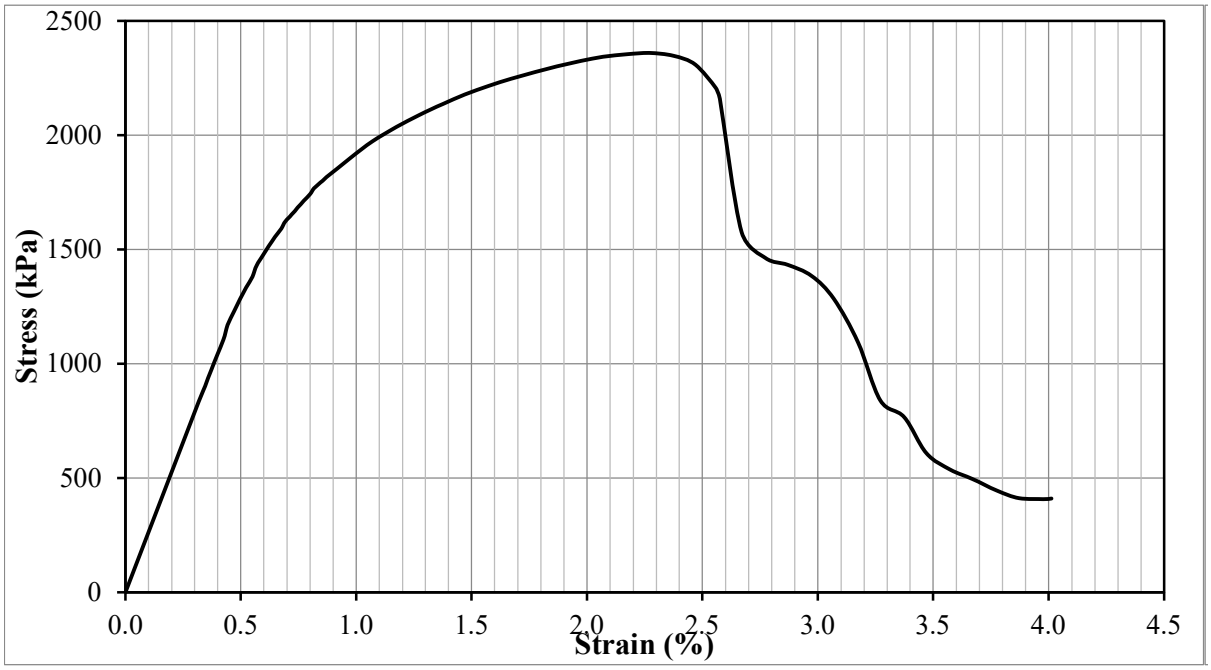
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,115	Strain at failure, εf :	2.06	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	T-20-A	Initial Area:	2119.1	mm^2
Test Date:	11/7/2017	Weight:	367.8	g
Strain Rate:	1 %/min	Unit Weight:	1736	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	3.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	55.0	°C
Additional information				



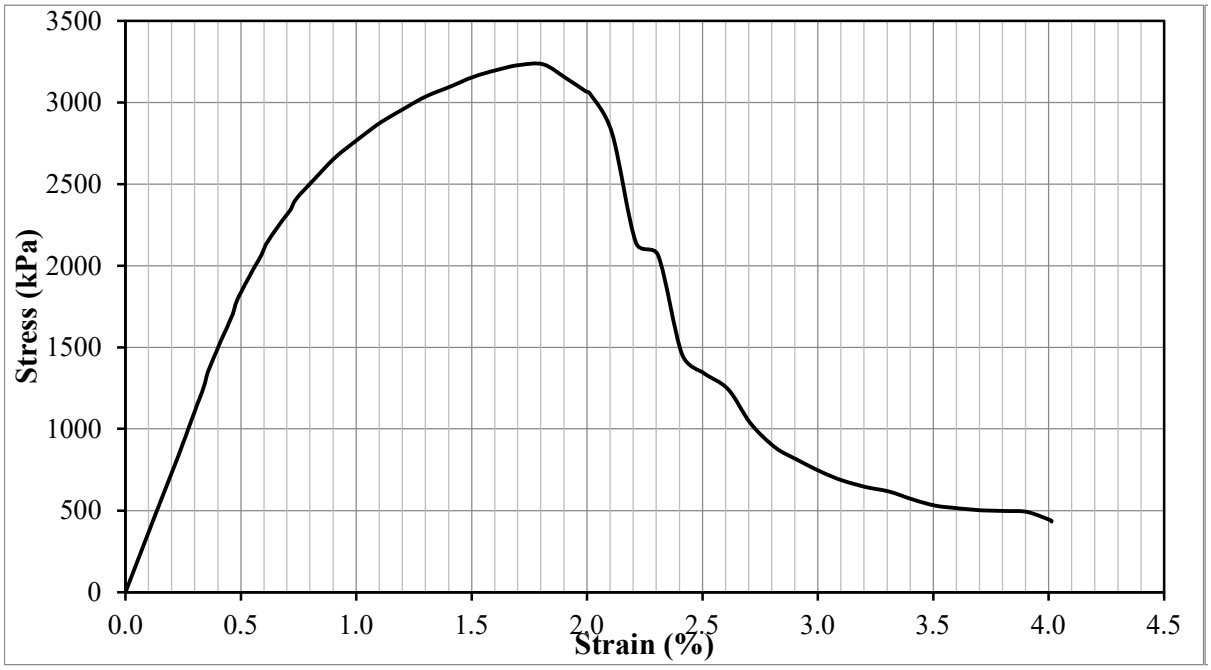
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,175	Strain at failure, εf :	2.15	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	T-20-J	Initial Area:	2125.3	mm^2
Test Date:	11/7/2017	Weight:	369.7	g
Strain Rate:	1 %/min	Unit Weight:	1734	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	3.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	55.0	°C
Additional information				



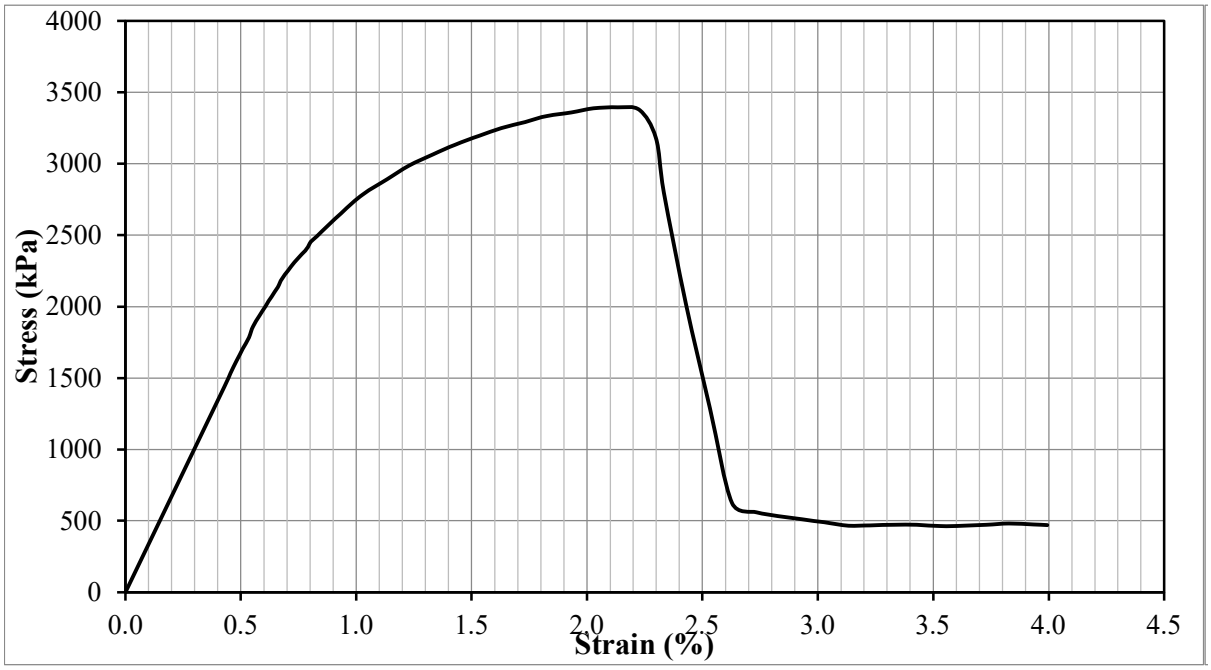
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,345	Strain at failure, εf :	2.27	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	T-20-B	Initial Area:	2119.1	mm^2
Test Date:	11/10/2017	Weight:	368.0	g
Strain Rate:	1 %/min	Unit Weight:	1736	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	6.8	days
$(w:c)_{slurry}$:	1.0	Curing temperature	55.0	°C
Additional information				



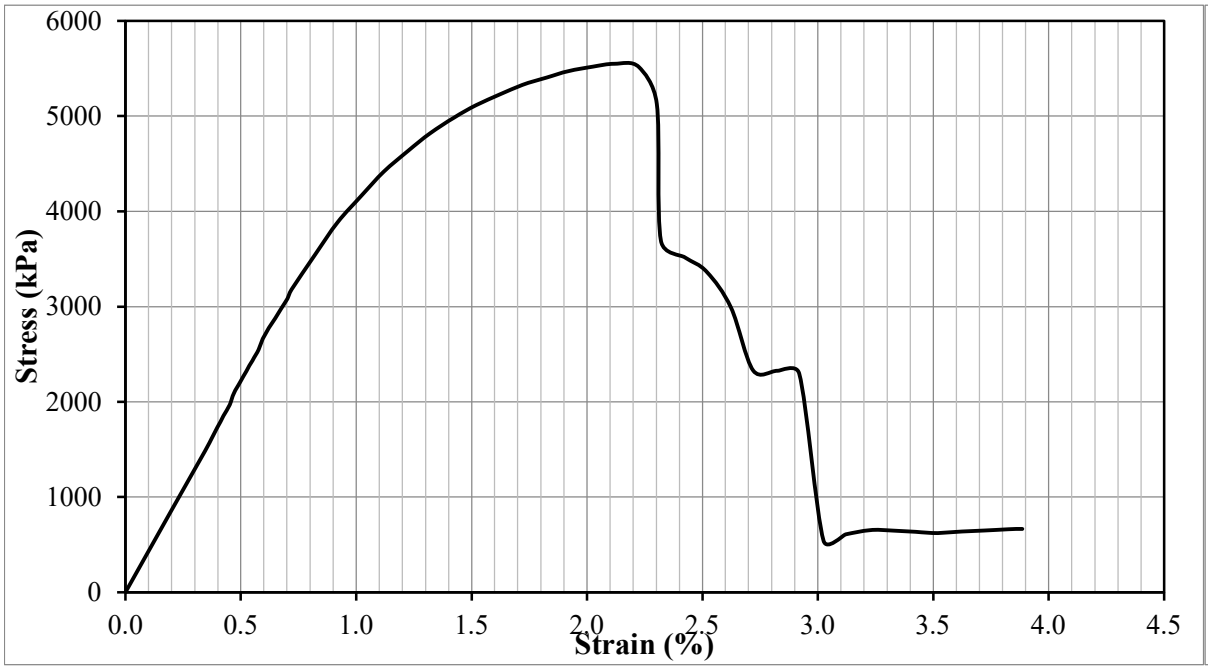
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,214	Strain at failure, εf :	1.81	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	T-20-G	Initial Area:	2125.3	mm^2
Test Date:	11/10/2017	Weight:	362.4	g
Strain Rate:	1 %/min	Unit Weight:	1734	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	6.8	days
$(w:c)_{slurry}$:	1.0	Curing temperature	55.0	°C
Additional information				



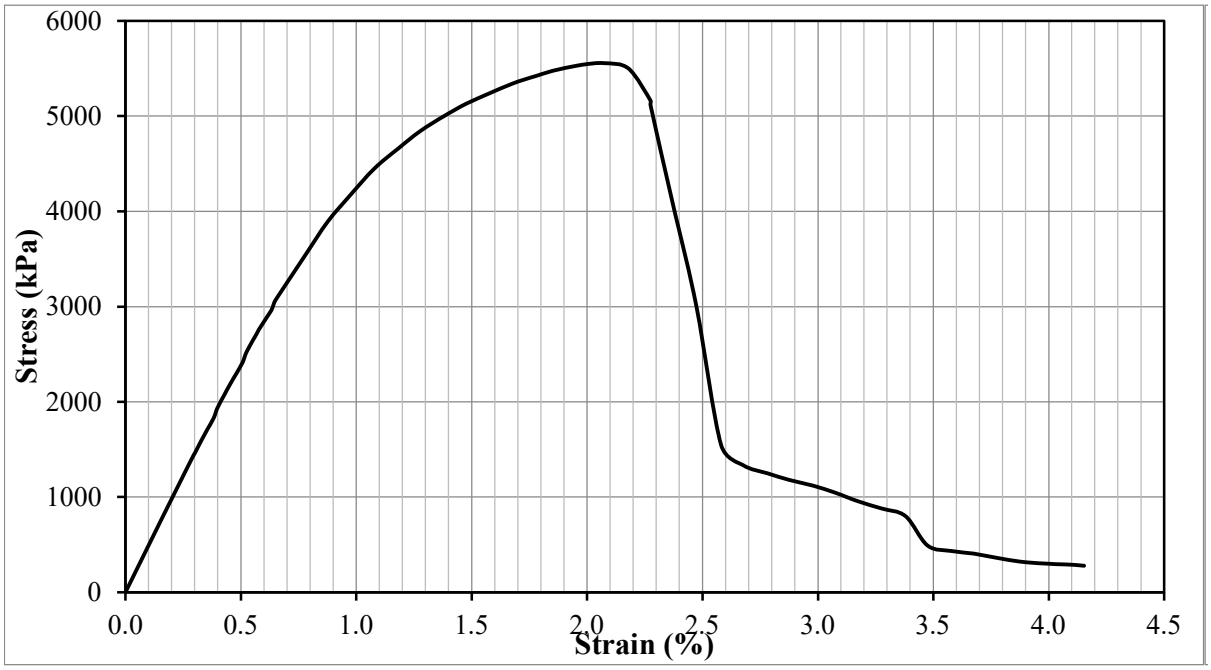
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,365	Strain at failure, εf :	2.13	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	T-20-C	Initial Area:	2119.1	mm^2
Test Date:	11/17/2017	Weight:	360.0	g
Strain Rate:	1 %/min	Unit Weight:	1740	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	14.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	55.0	°C
Additional information				



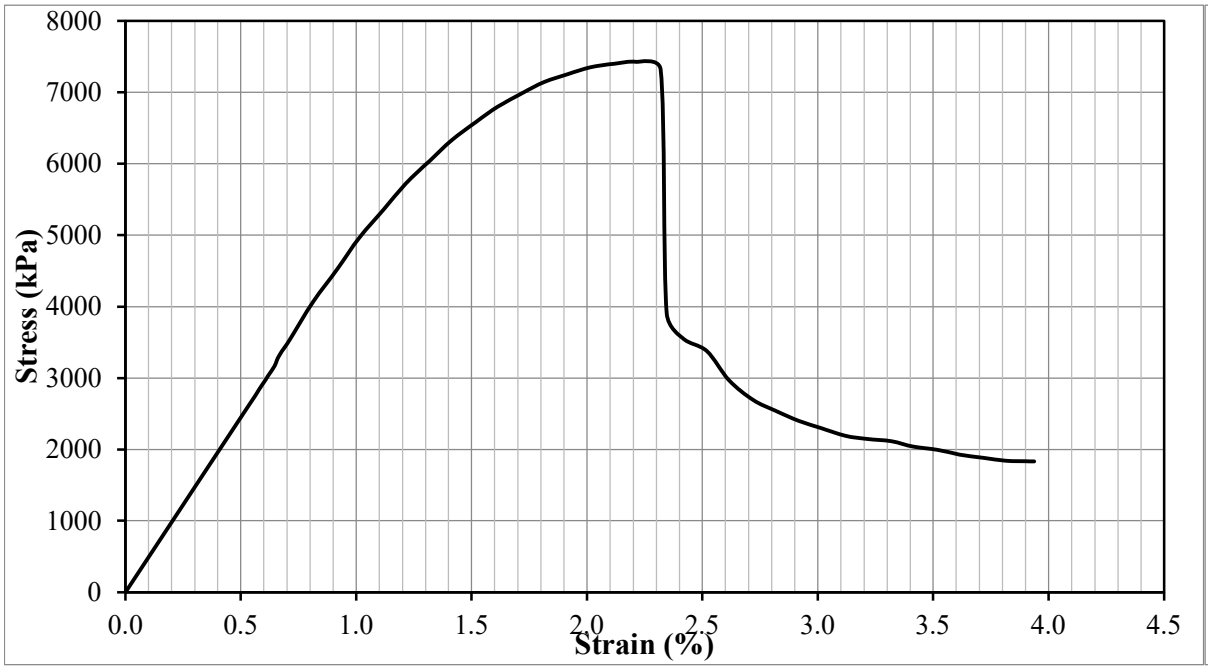
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,496	Strain at failure, εf :	2.12	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	95.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	T-20-F	Initial Area:	2123.2	mm^2
Test Date:	11/17/2017	Weight:	350.2	g
Strain Rate:	1 %/min	Unit Weight:	1734	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	14.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	55.0	°C
Additional information				



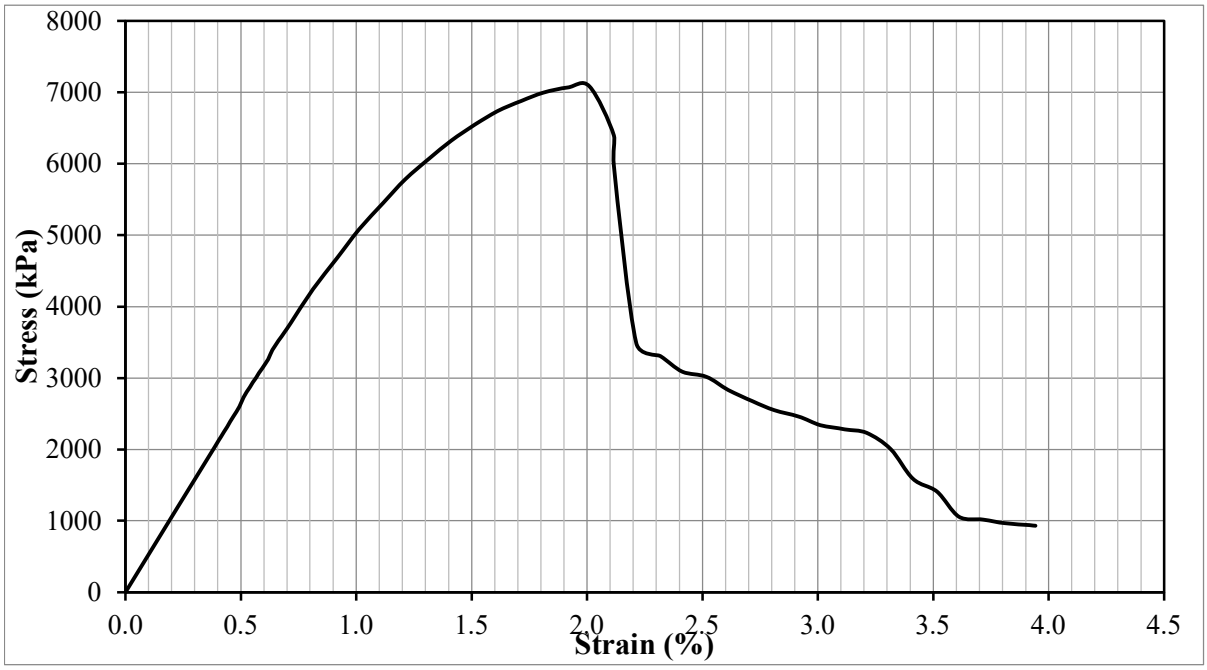
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,480	Strain at failure, εf :	2.08	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	T-20-D	Initial Area:	2123.2	mm^2
Test Date:	12/1/2017	Weight:	364.3	g
Strain Rate:	1 %/min	Unit Weight:	1743	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	55.0	°C
Additional information				



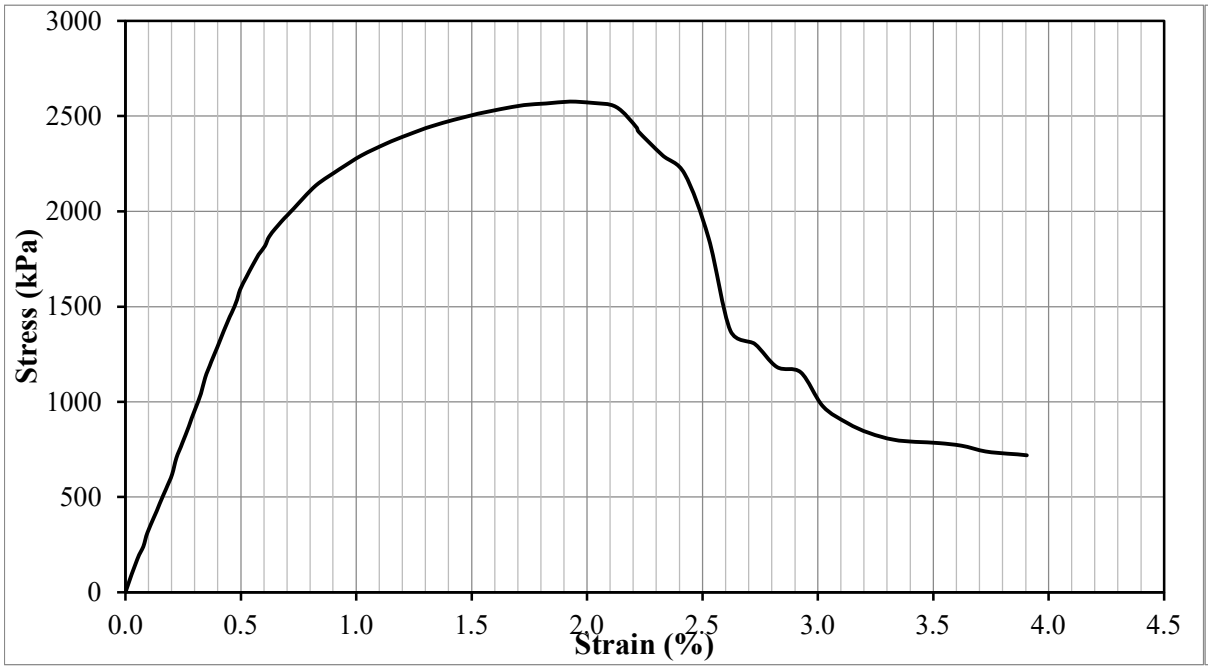
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	7,363	Strain at failure, εf :	2.21	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	T-20-E	Initial Area:	2121.1	mm^2
Test Date:	12/1/2017	Weight:	368.8	g
Strain Rate:	1 %/min	Unit Weight:	1746	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	55.0	°C
Additional information				



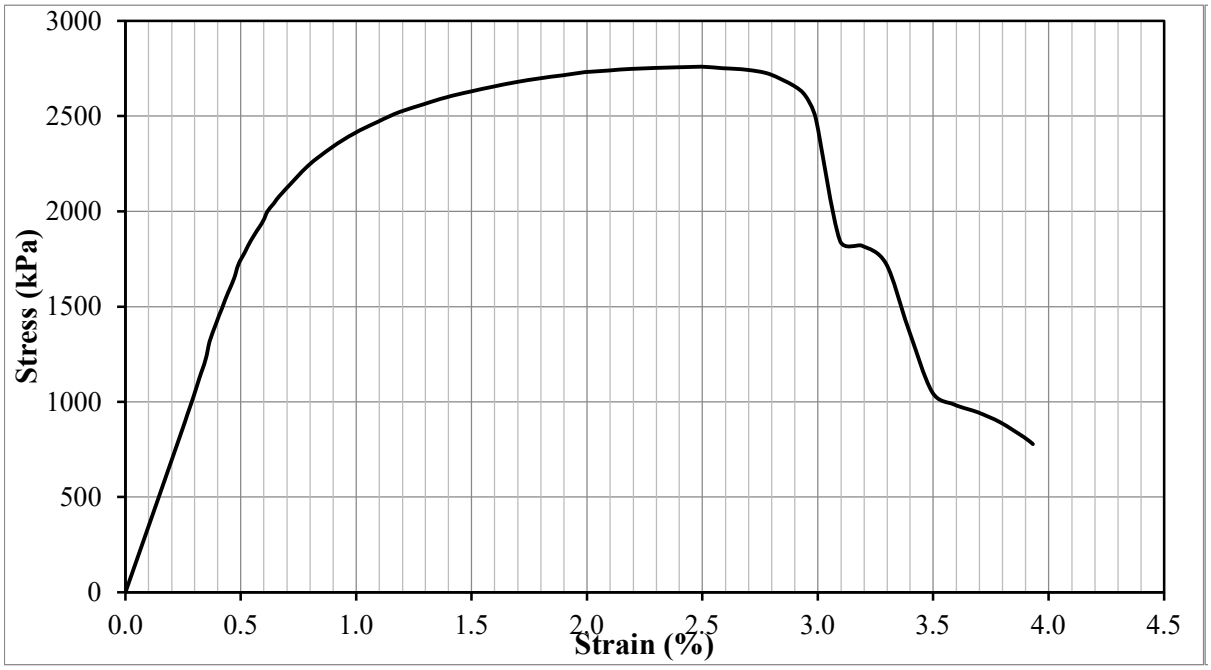
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	7,033	Strain at failure, εf :	2.01	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	T-21-A	Initial Area:	2123.2	mm^2
Test Date:	11/12/2017	Weight:	359.8	g
Strain Rate:	1 %/min	Unit Weight:	1707	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	3.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	55.0	°C
Additional information				



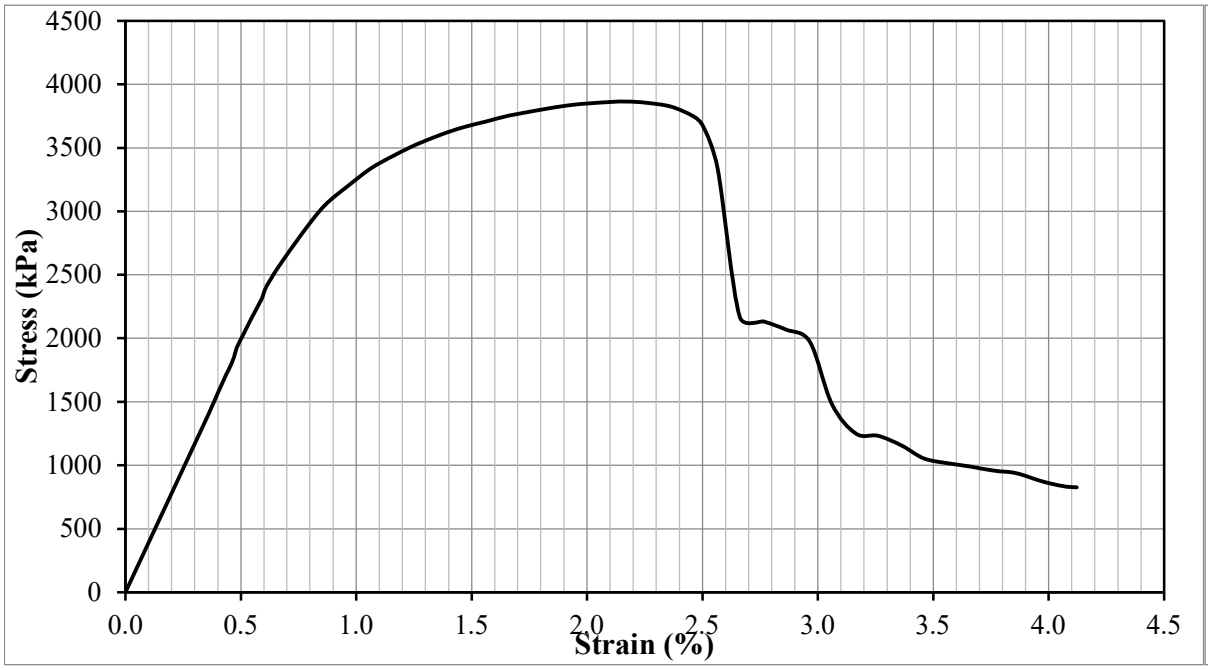
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,557	Strain at failure, εf :	1.93	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	T-21-H	Initial Area:	2125.3	mm^2
Test Date:	11/12/2017	Weight:	352.9	g
Strain Rate:	1 %/min	Unit Weight:	1697	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	3.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	55.0	°C
Additional information				



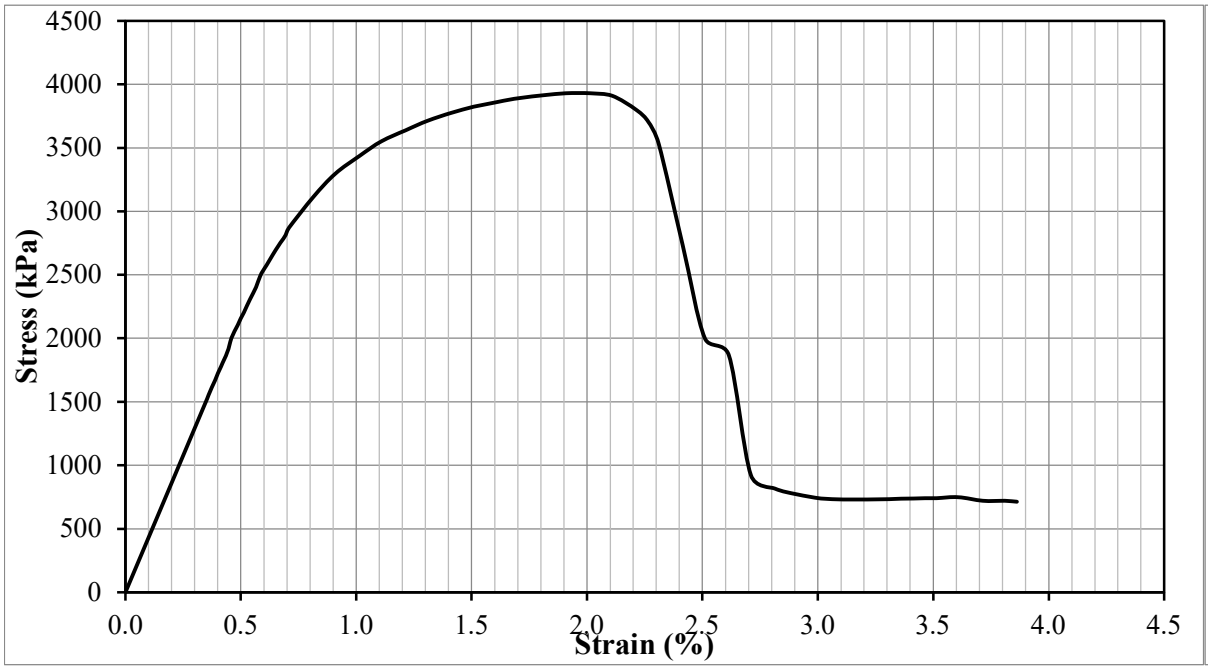
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,733	Strain at failure, εf :	2.49	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	T-21-B	Initial Area:	2125.3	mm^2
Test Date:	11/16/2017	Weight:	360.5	g
Strain Rate:	1 %/min	Unit Weight:	1703	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	7.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	55.0	°C
Additional information				



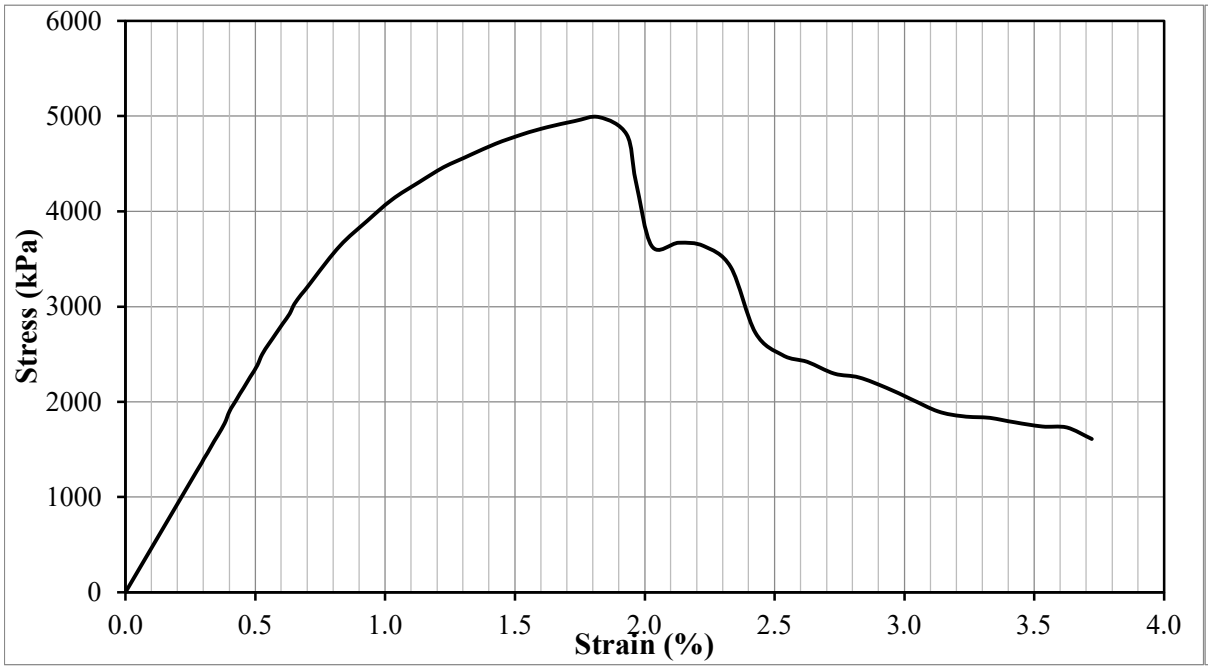
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,839	Strain at failure, εf :	2.16	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	96.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	T-21-G	Initial Area:	2125.3	mm^2
Test Date:	11/16/2017	Weight:	325.1	g
Strain Rate:	1 %/min	Unit Weight:	1578	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	7.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	55.0	°C
Additional information				



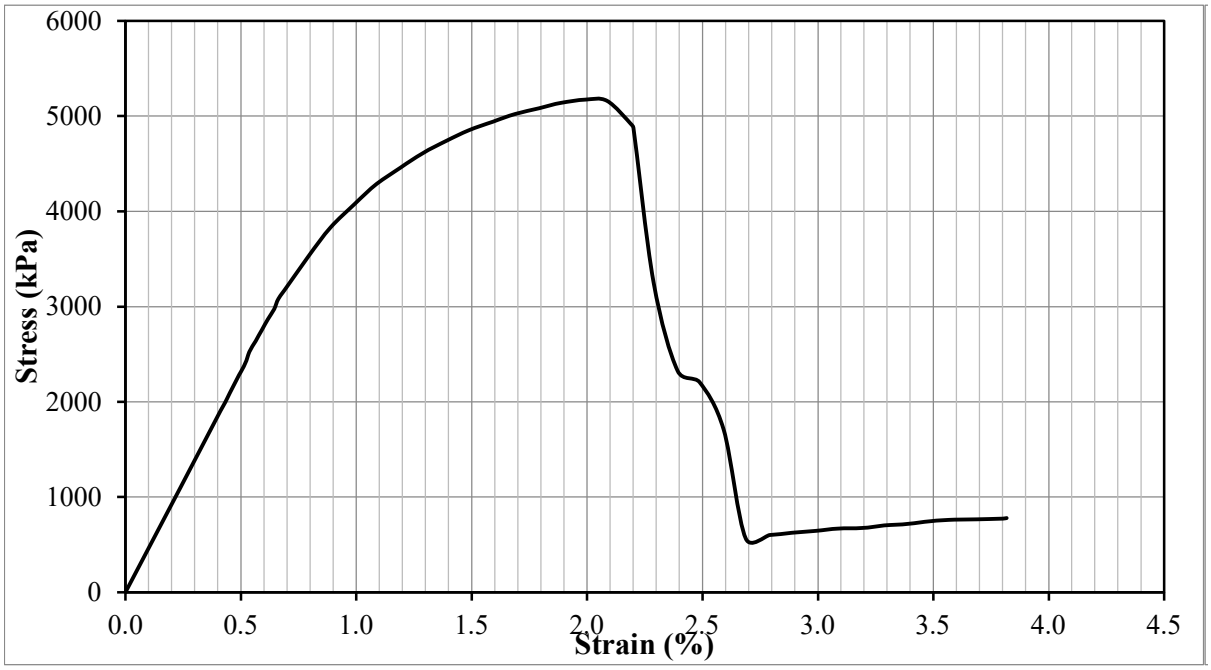
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,887	Strain at failure, εf :	1.91	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	T-21-C	Initial Area:	2121.1	mm^2
Test Date:	11/23/2017	Weight:	360.6	g
Strain Rate:	1 %/min	Unit Weight:	1719	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	14.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	55.0	°C
Additional information				



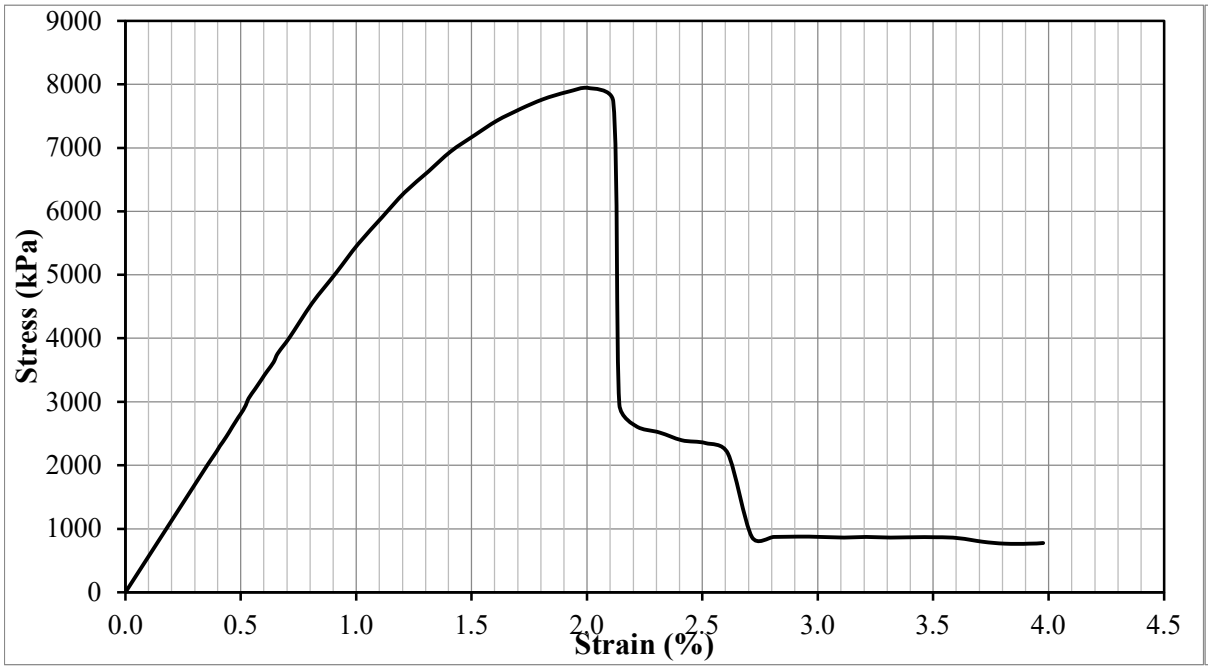
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,950	Strain at failure, εf :	1.83	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	T-21-F	Initial Area:	2123.2	mm^2
Test Date:	11/23/2017	Weight:	361.2	g
Strain Rate:	1 %/min	Unit Weight:	1712	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	14.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	55.0	°C
Additional information				



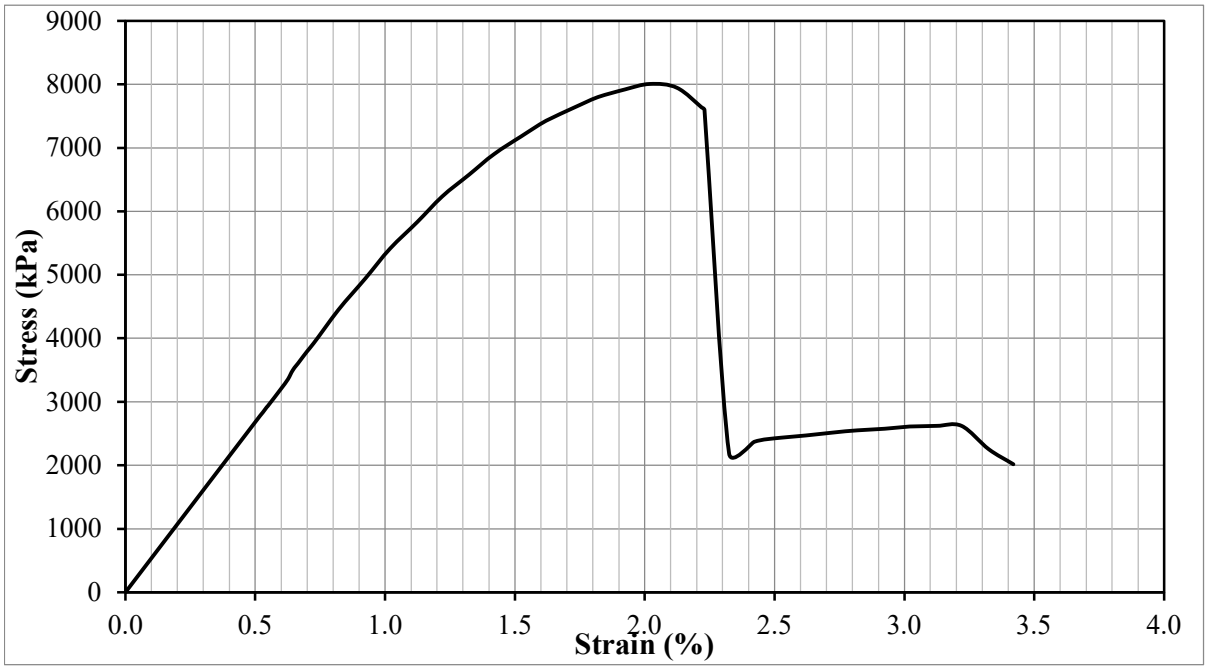
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,136	Strain at failure, εf :	1.99	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	T-21-D	Initial Area:	2127.4	mm^2
Test Date:	12/7/2017	Weight:	361.2	g
Strain Rate:	1 %/min	Unit Weight:	1713	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	55.0	°C
Additional information				



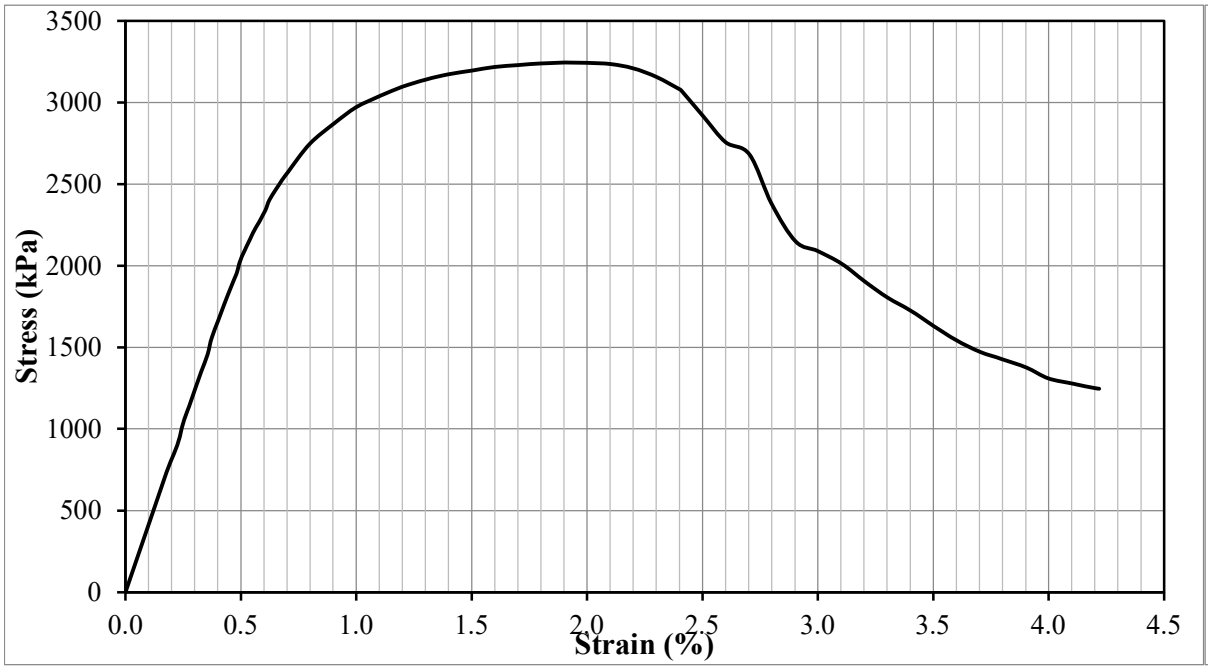
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	7,877	Strain at failure, εf :	2.01	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	T-21-E	Initial Area:	2125.3	mm^2
Test Date:	12/7/2017	Weight:	362.2	g
Strain Rate:	1 %/min	Unit Weight:	1717	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	55.0	°C
Additional information				



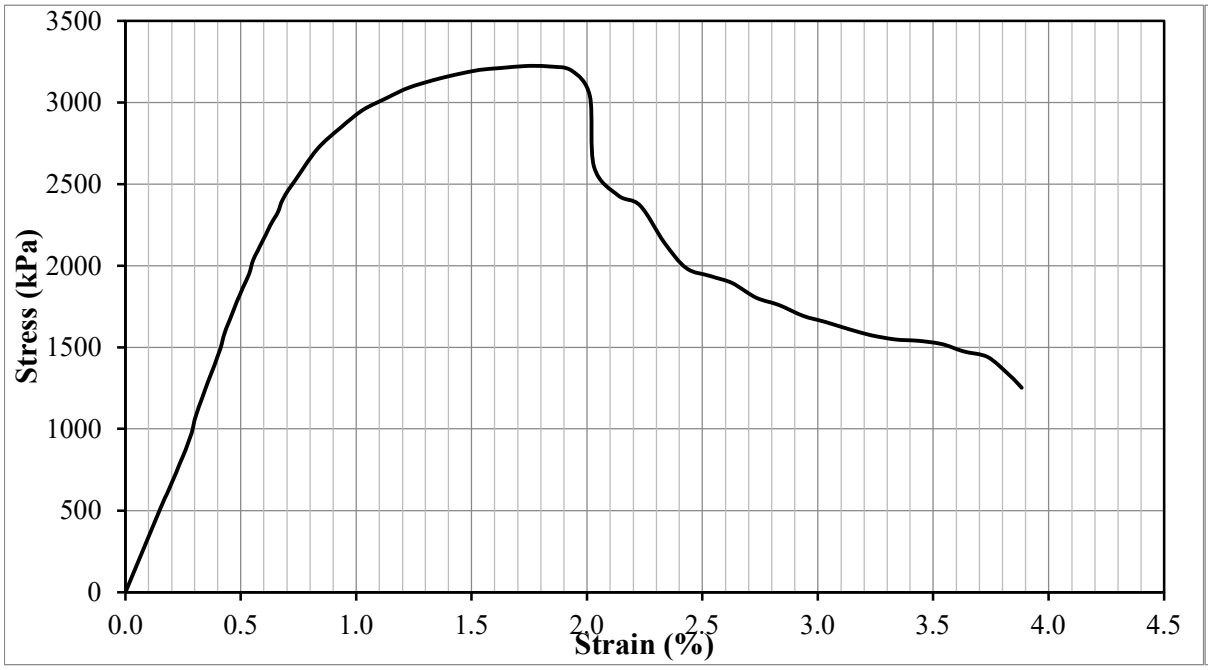
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	7,947	Strain at failure, εf :	2.02	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	94.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	T-22-A	Initial Area:	2125.3	mm^2
Test Date:	11/13/2017	Weight:	337.6	g
Strain Rate:	1 %/min	Unit Weight:	1673	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	3.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	55.0	°C
Additional information				



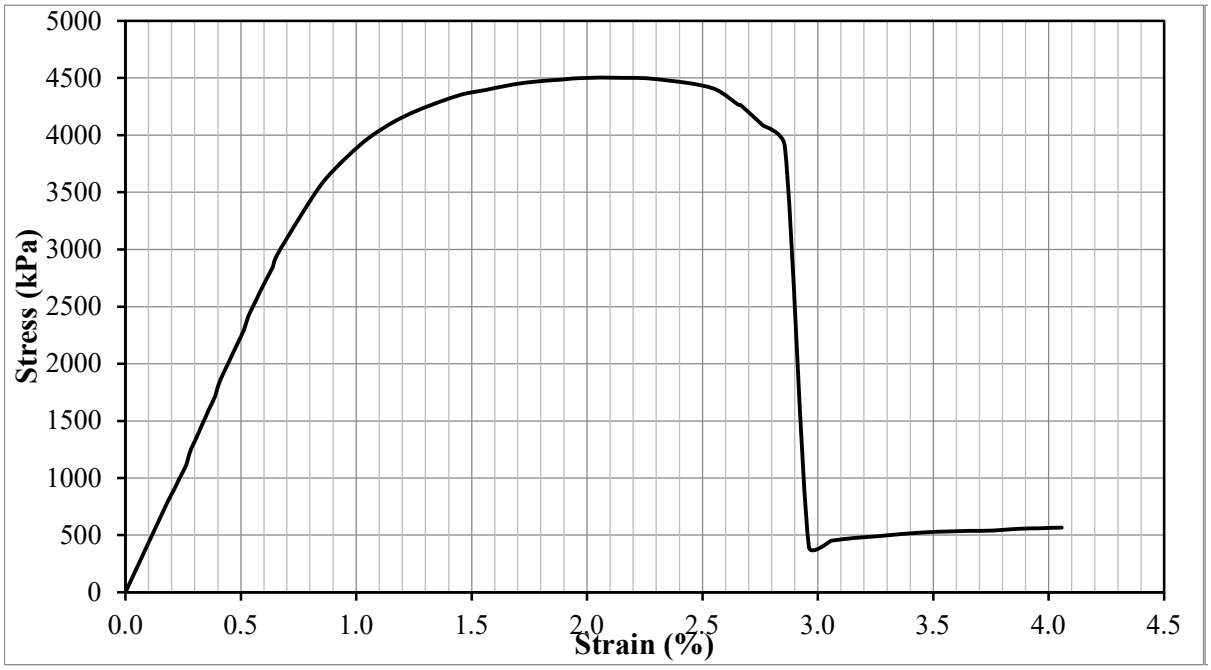
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,199	Strain at failure, εf :	1.90	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	T-22-H	Initial Area:	2127.4	mm^2
Test Date:	11/13/2017	Weight:	350.4	g
Strain Rate:	1 %/min	Unit Weight:	1674	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	3.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	55.0	°C
Additional information				



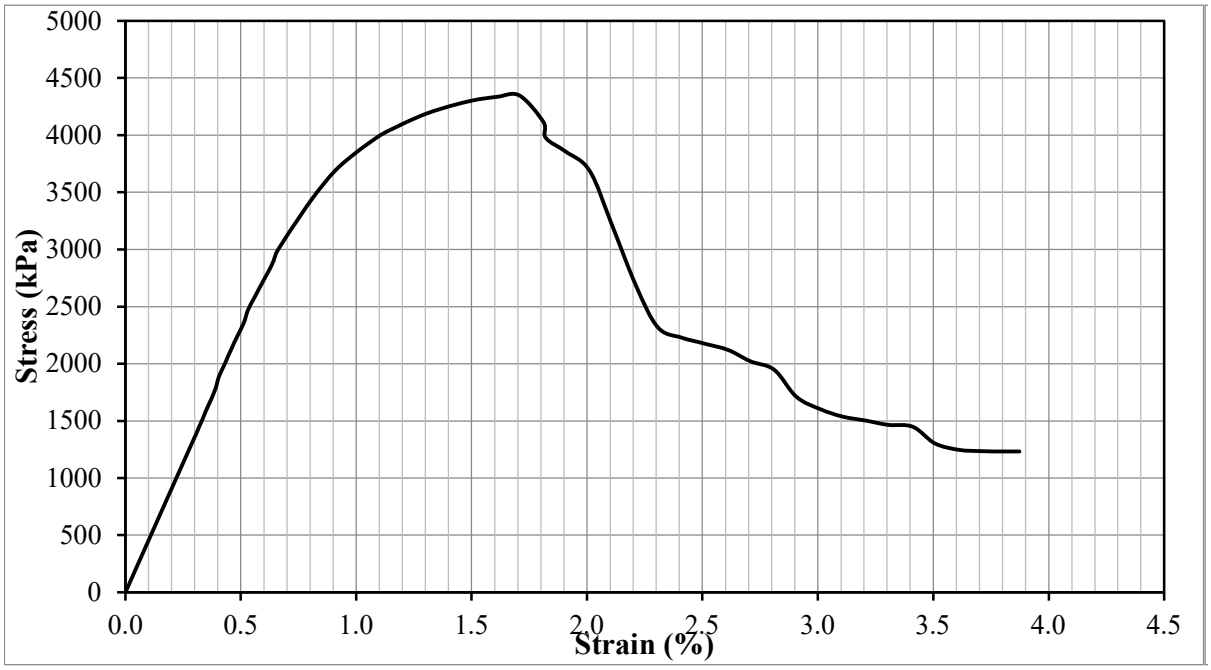
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,194	Strain at failure, εf :	1.73	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	94.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	T-22-B	Initial Area:	2123.2	mm^2
Test Date:	11/17/2017	Weight:	334.0	g
Strain Rate:	1 %/min	Unit Weight:	1663	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	7.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	55.0	°C
Additional information				



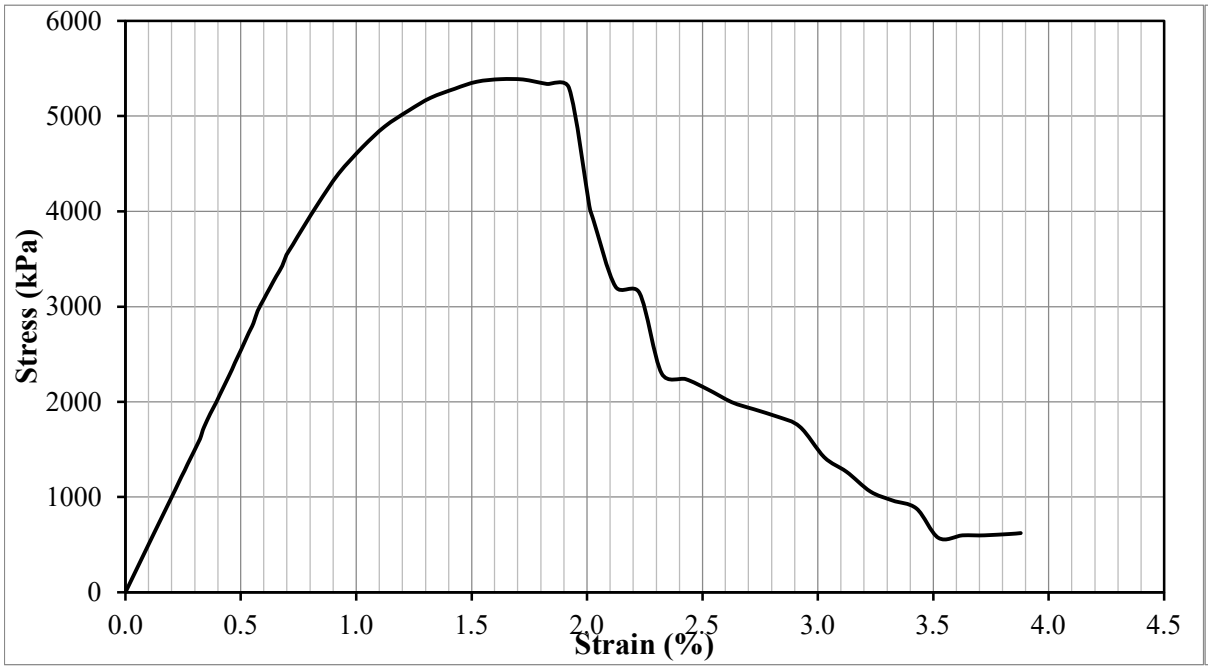
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,437	Strain at failure, εf :	2.06	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	T-22-G	Initial Area:	2123.2	mm^2
Test Date:	11/17/2017	Weight:	359.3	g
Strain Rate:	1 %/min	Unit Weight:	1679	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	7.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	55.0	°C
Additional information				



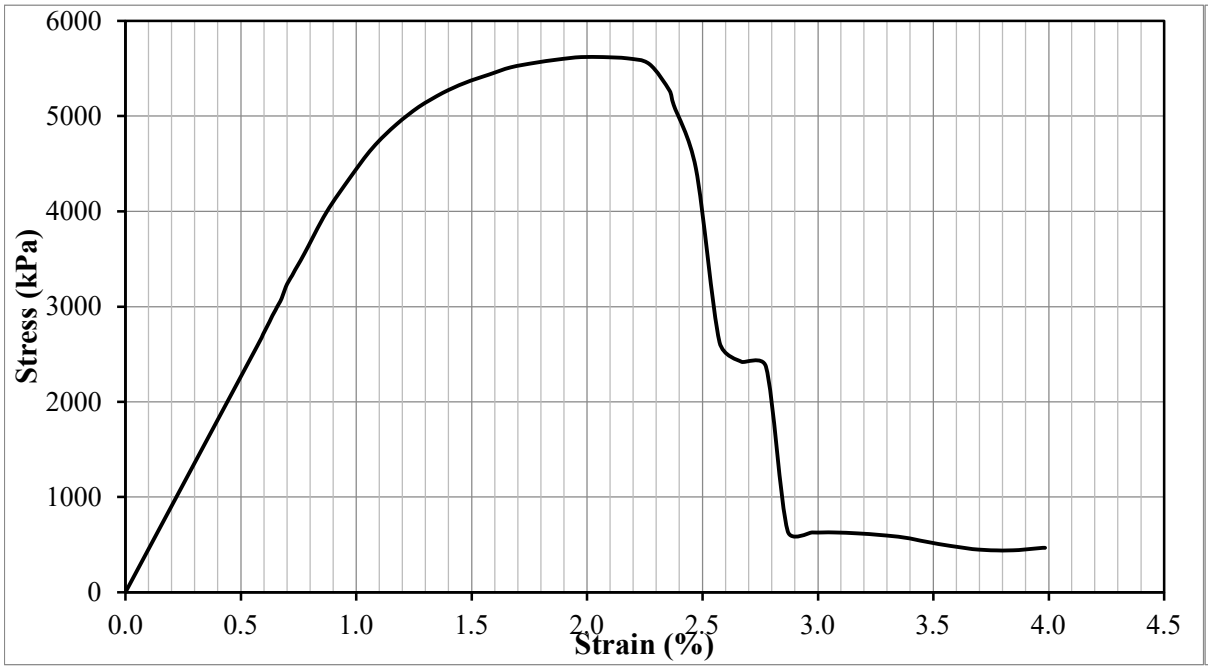
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,325	Strain at failure, εf :	1.71	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.1	mm
I.D.:	T-22-C	Initial Area:	2129.4	mm^2
Test Date:	11/24/2017	Weight:	345.2	g
Strain Rate:	1 %/min	Unit Weight:	1664	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	13.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	55.0	°C
Additional information				



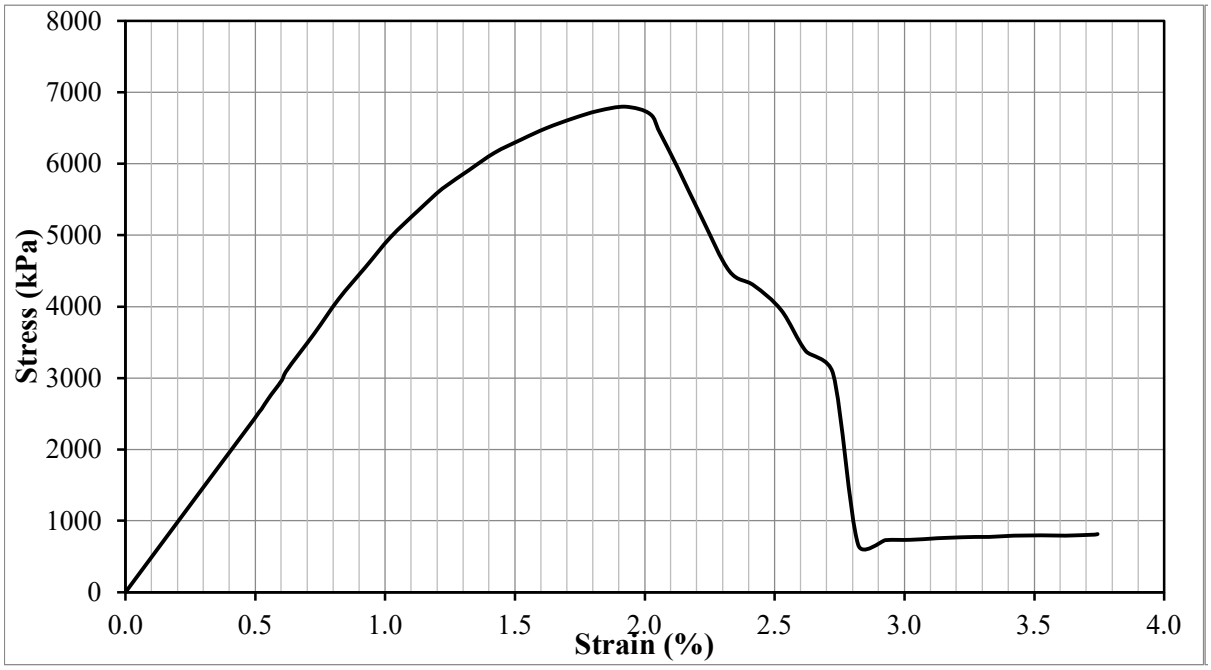
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,332	Strain at failure, εf :	1.63	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	T-22-F	Initial Area:	2123.2	mm^2
Test Date:	11/24/2017	Weight:	352.1	g
Strain Rate:	1 %/min	Unit Weight:	1684	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	13.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	55.0	°C
Additional information				



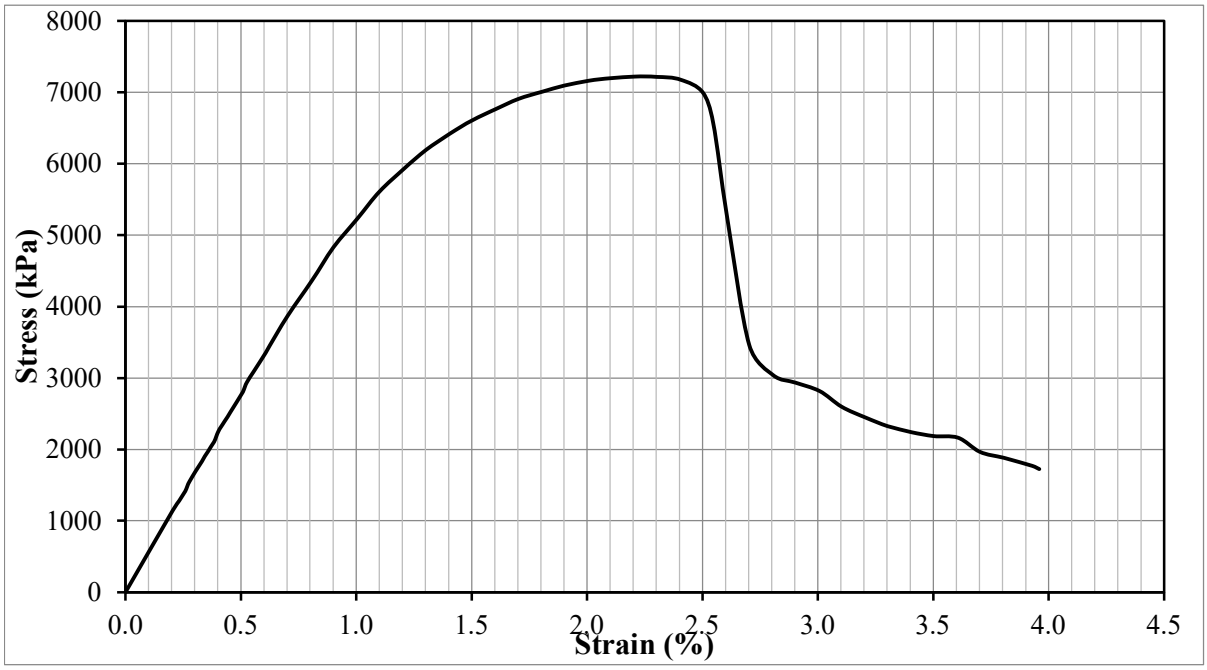
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,572	Strain at failure, εf :	1.97	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	94.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	T-22-D	Initial Area:	2123.2	mm^2
Test Date:	12/8/2017	Weight:	336.4	g
Strain Rate:	1 %/min	Unit Weight:	1681	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	27.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	55.0	°C
Additional information				



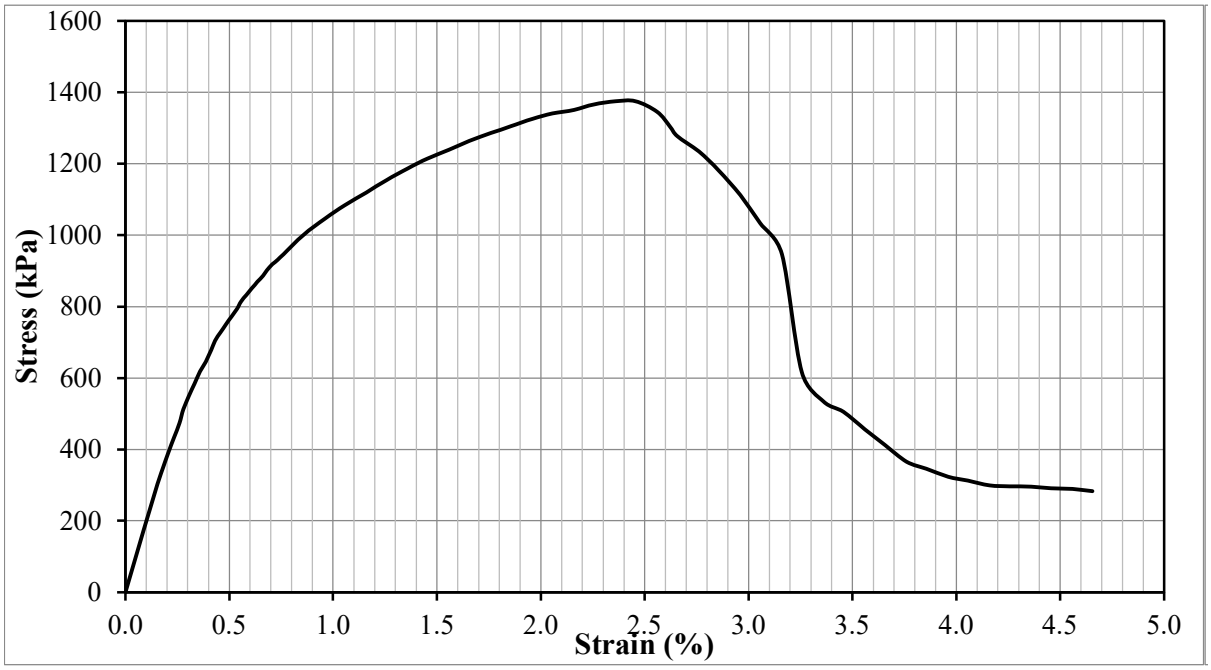
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	6,694	Strain at failure, εf :	1.93	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	94.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	T-22-E	Initial Area:	2123.2	mm^2
Test Date:	12/8/2017	Weight:	339.9	g
Strain Rate:	1 %/min	Unit Weight:	1688	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	27.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	55.0	°C
Additional information				



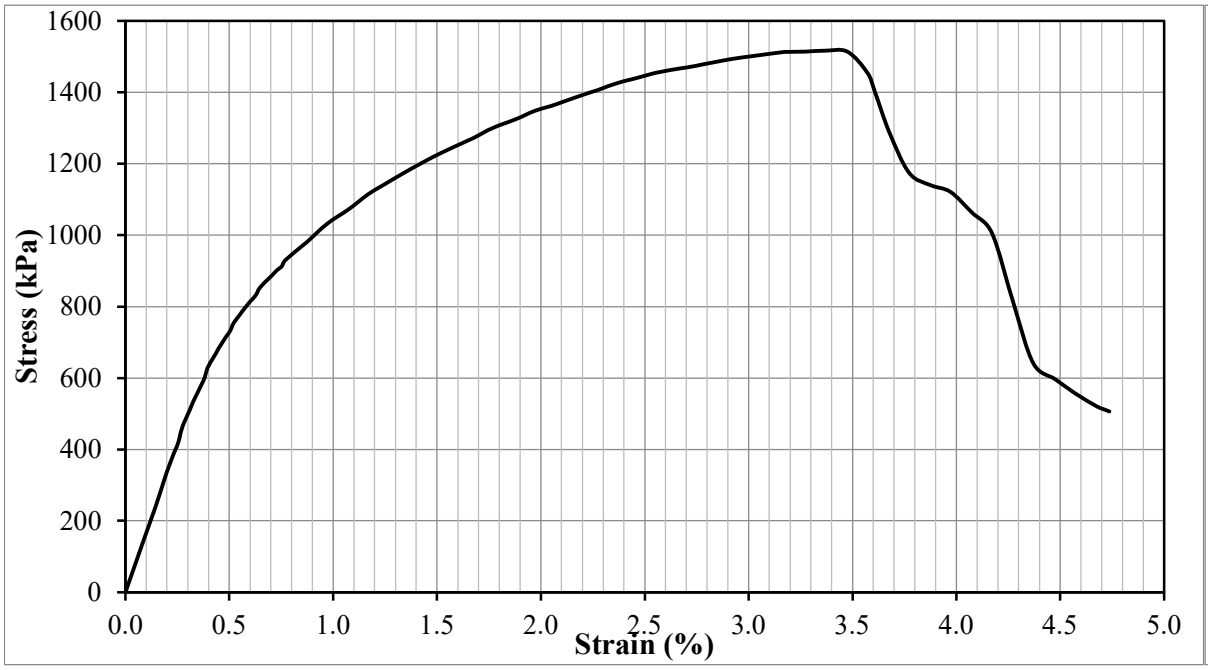
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	7,116	Strain at failure, εf :	2.21	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	96.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	T-23-A	Initial Area:	2121.1	mm^2
Test Date:	11/19/2017	Weight:	349.6	g
Strain Rate:	1 %/min	Unit Weight:	1715	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	2.9	days
$(w:c)_{slurry}$:	1.4	Curing temperature	55.0	°C
Additional information				



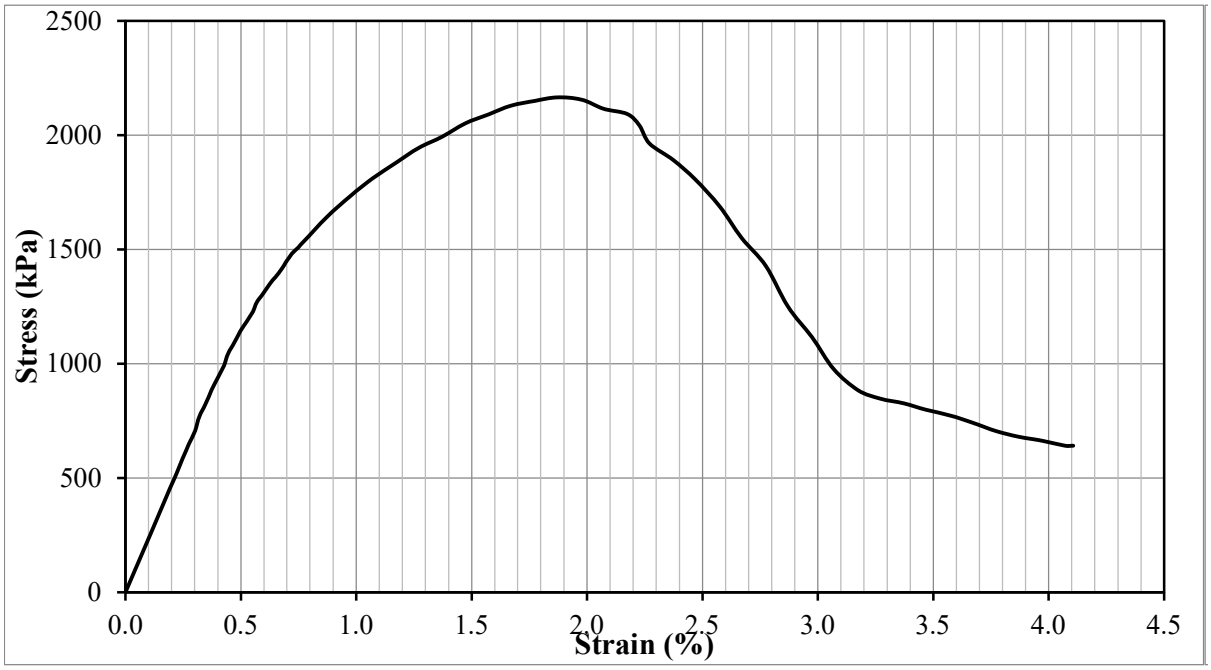
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,358	Strain at failure, εf :	2.46	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	96.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	T-23-H	Initial Area:	2121.1	mm^2
Test Date:	11/19/2017	Weight:	349.8	g
Strain Rate:	1 %/min	Unit Weight:	1705	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	2.9	days
$(w:c)_{slurry}$:	1.4	Curing temperature	55.0	°C
Additional information				



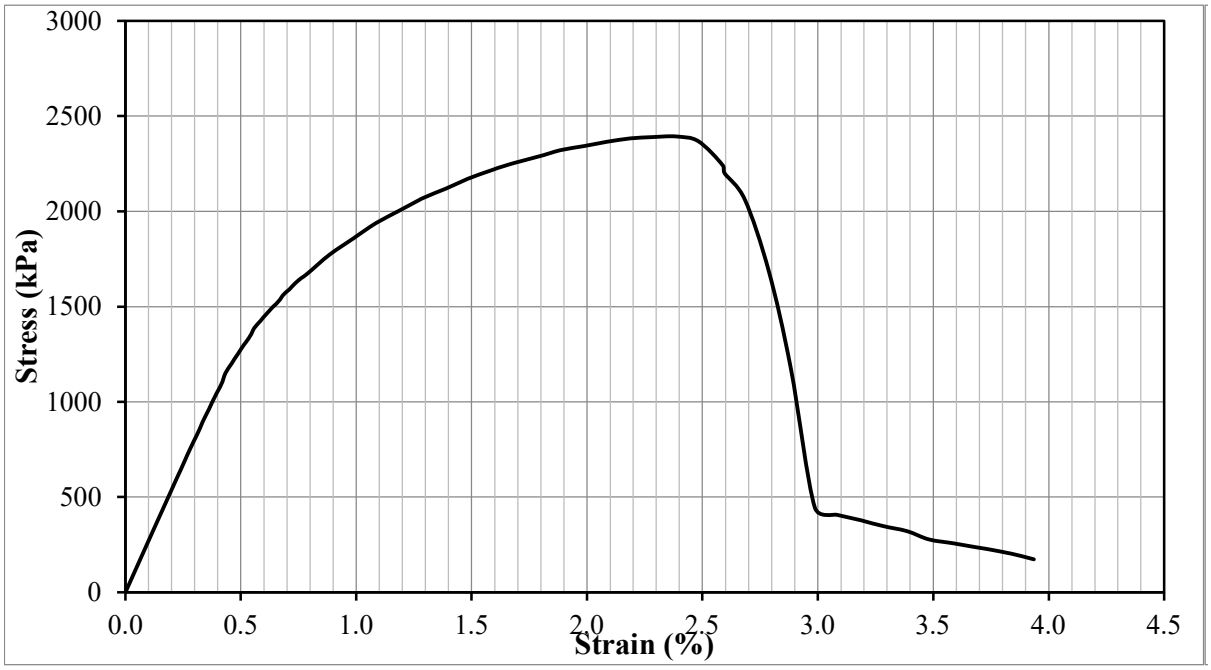
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,499	Strain at failure, εf :	3.37	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	T-23-B	Initial Area:	2127.4	mm^2
Test Date:	11/23/2017	Weight:	355.4	g
Strain Rate:	1 %/min	Unit Weight:	1713	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	6.9	days
$(w:c)_{slurry}$:	1.4	Curing temperature	55.0	°C
Additional information				



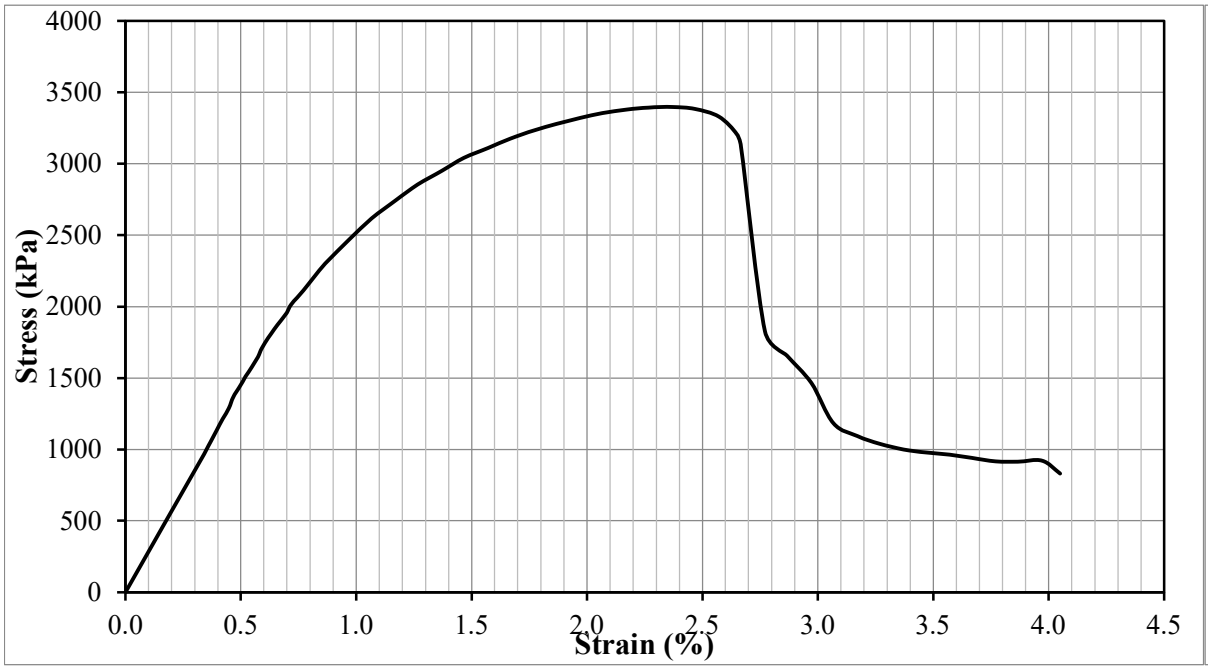
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,143	Strain at failure, εf :	1.87	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	T-23-G	Initial Area:	2123.2	mm^2
Test Date:	11/23/2017	Weight:	359.7	g
Strain Rate:	1 %/min	Unit Weight:	1716	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	6.9	days
$(w:c)_{slurry}$:	1.4	Curing temperature	55.0	°C
Additional information				



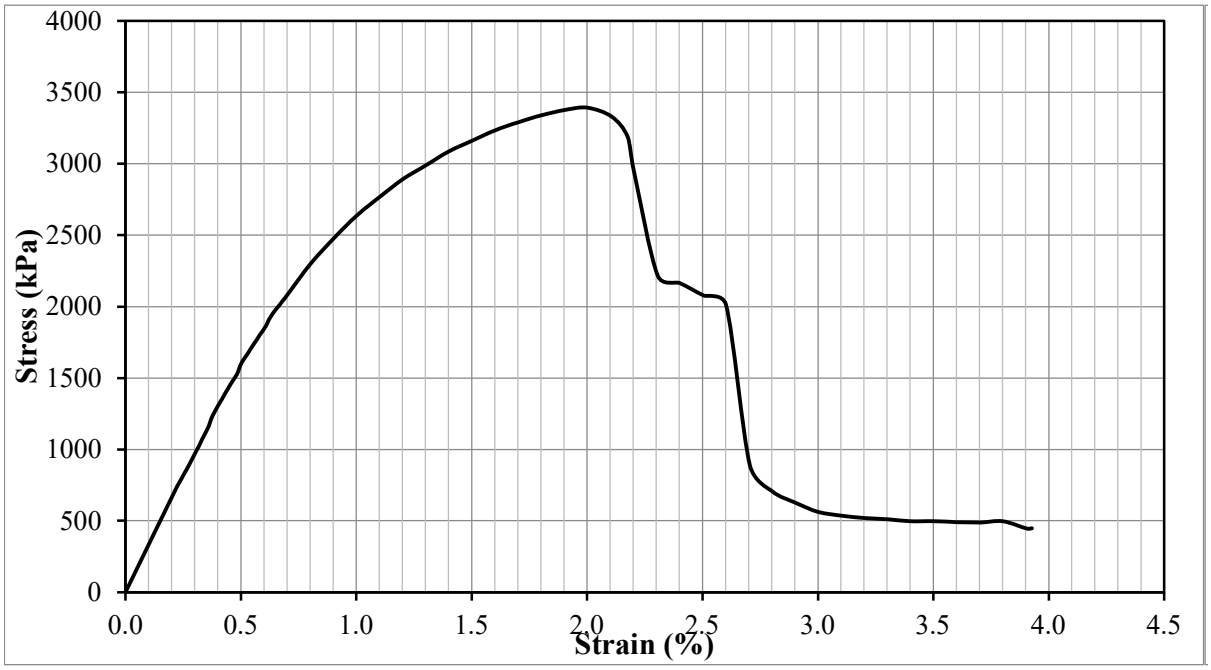
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,373	Strain at failure, εf :	2.39	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	94.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	T-23-C	Initial Area:	2125.3	mm^2
Test Date:	11/30/2017	Weight:	352.3	g
Strain Rate:	1 %/min	Unit Weight:	1762	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	13.9	days
$(w:c)_{slurry}$:	1.4	Curing temperature	55.0	°C
Additional information				



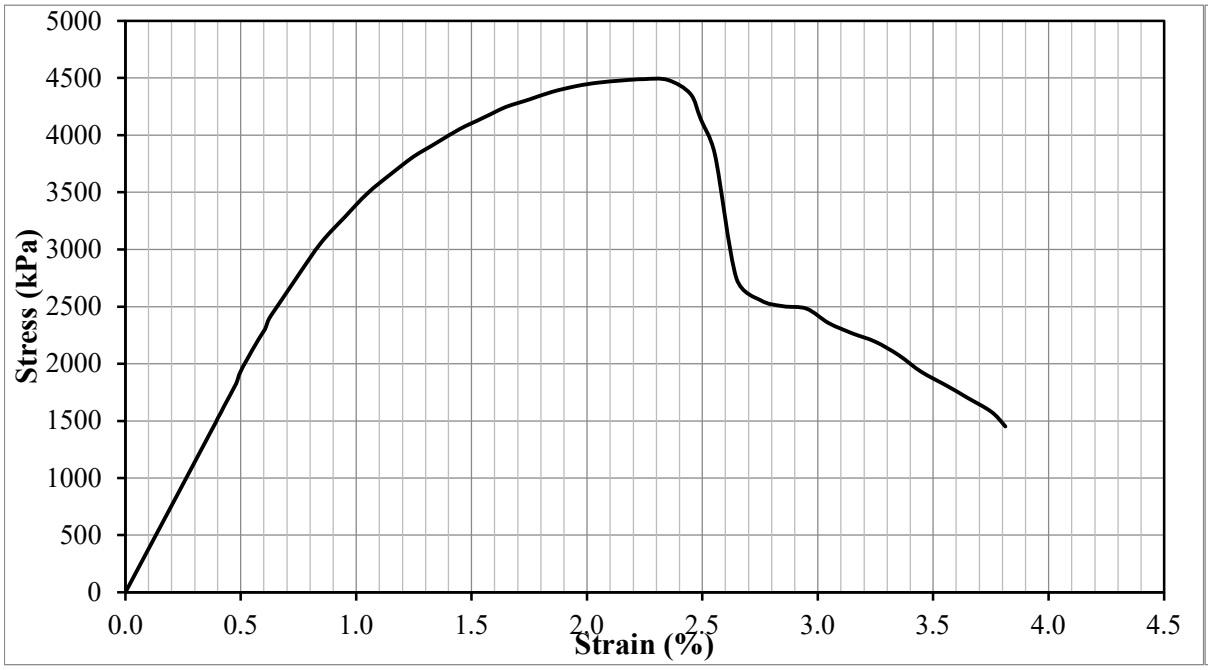
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,344	Strain at failure, εf :	2.37	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	T-23-F	Initial Area:	2112.9	mm^2
Test Date:	11/30/2017	Weight:	355.8	g
Strain Rate:	1 %/min	Unit Weight:	1722	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	14.0	days
$(w:c)_{slurry}$:	1.4	Curing temperature	55.0	°C
Additional information				



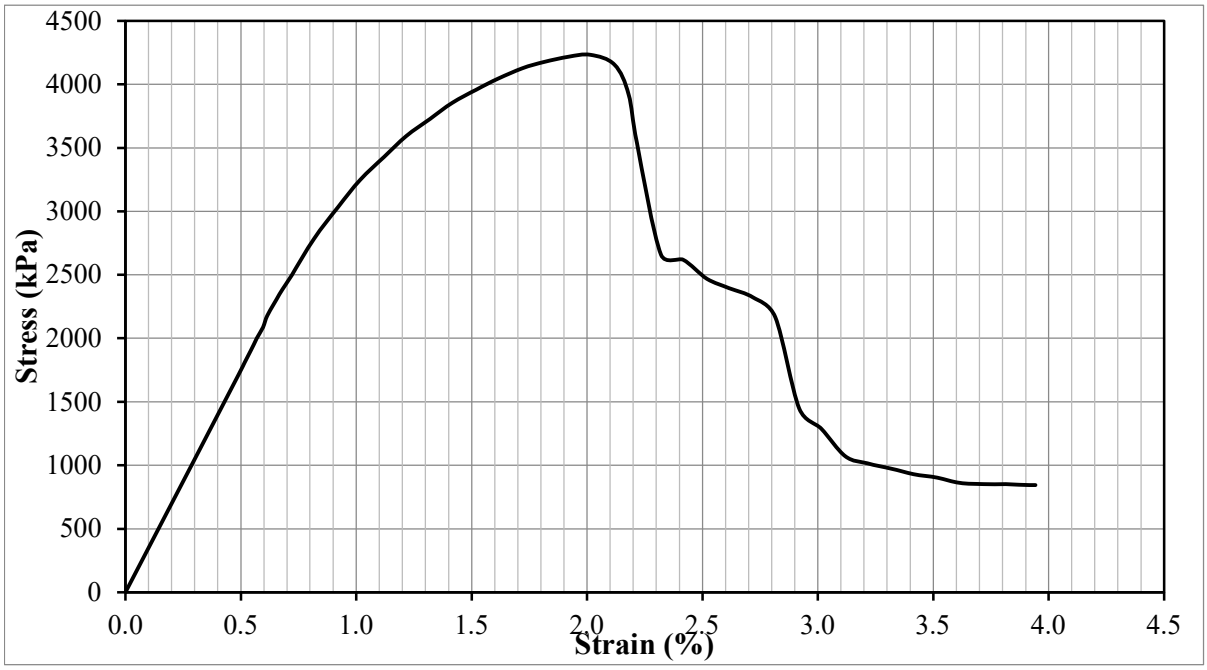
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,360	Strain at failure, εf :	2.00	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	94.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	T-23-D	Initial Area:	2117.0	mm^2
Test Date:	12/14/2017	Weight:	344.8	g
Strain Rate:	1 %/min	Unit Weight:	1728	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.4	Curing temperature	55.0	°C
Additional information				



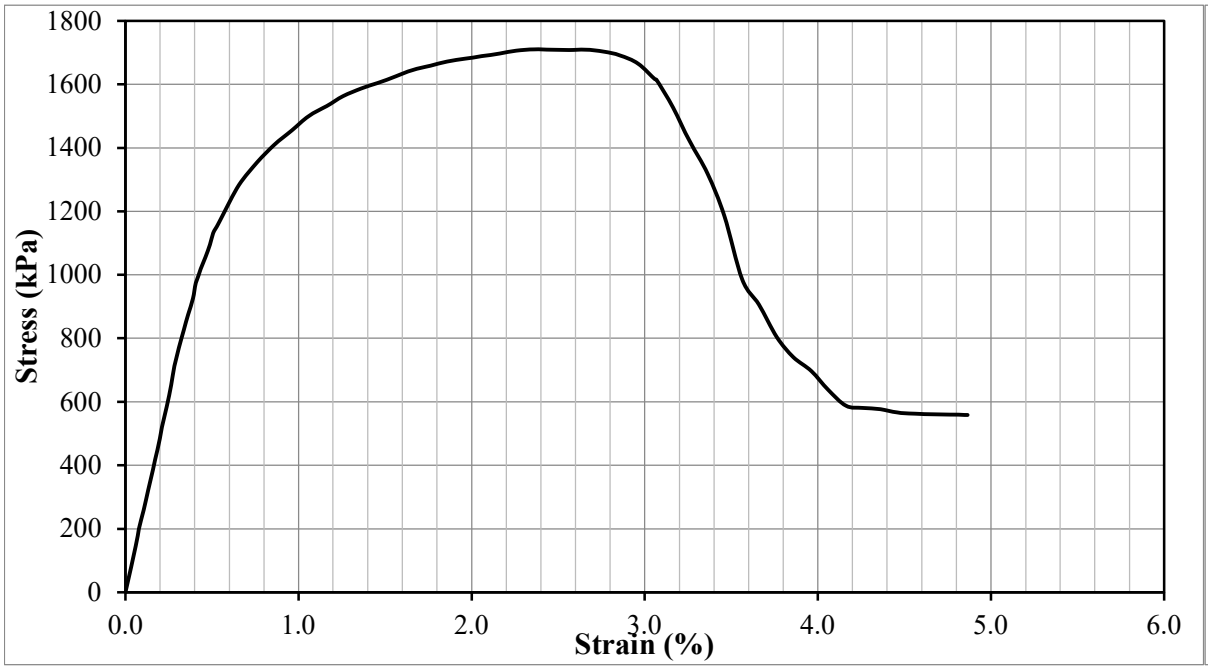
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,424	Strain at failure, εf :	2.25	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	T-23-E	Initial Area:	2119.1	mm^2
Test Date:	12/14/2017	Weight:	353.8	g
Strain Rate:	1 %/min	Unit Weight:	1722	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.4	Curing temperature	55.0	°C
Additional information				



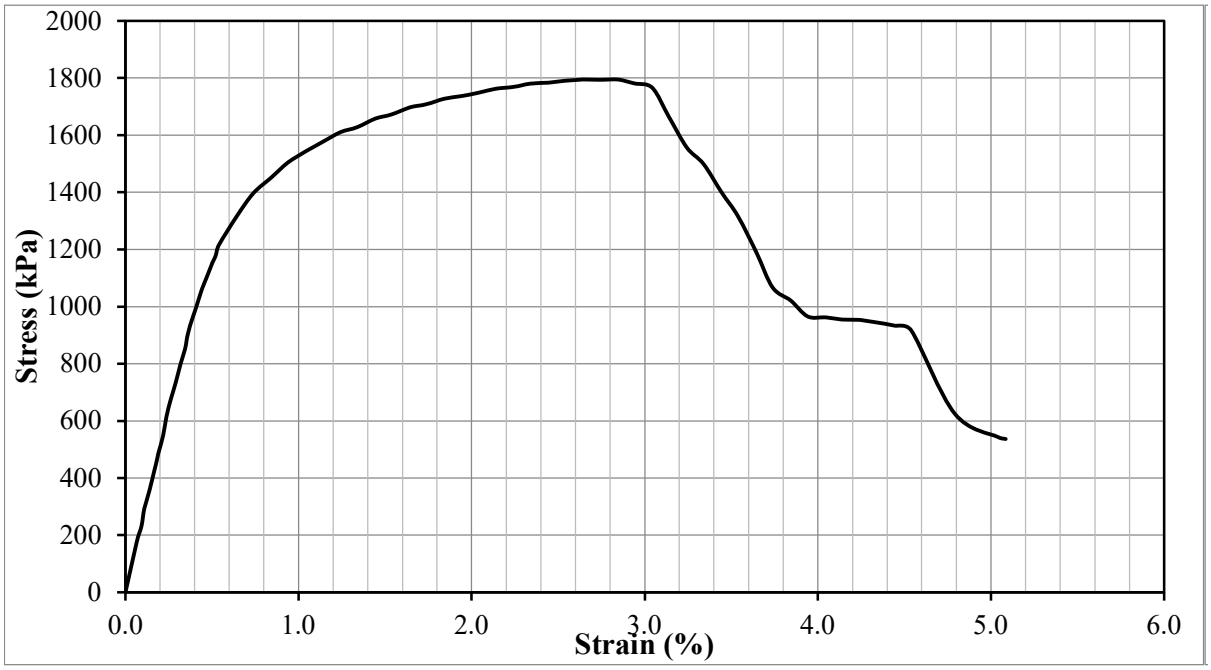
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,187	Strain at failure, εf :	2.02	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	T-24-A	Initial Area:	2123.2	mm^2
Test Date:	3/21/2018	Weight:	340.0	g
Strain Rate:	1 %/min	Unit Weight:	1624	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	3.0	days
$(w:c)_{slurry}$:	1.4	Curing temperature	55.0	°C
Additional information				



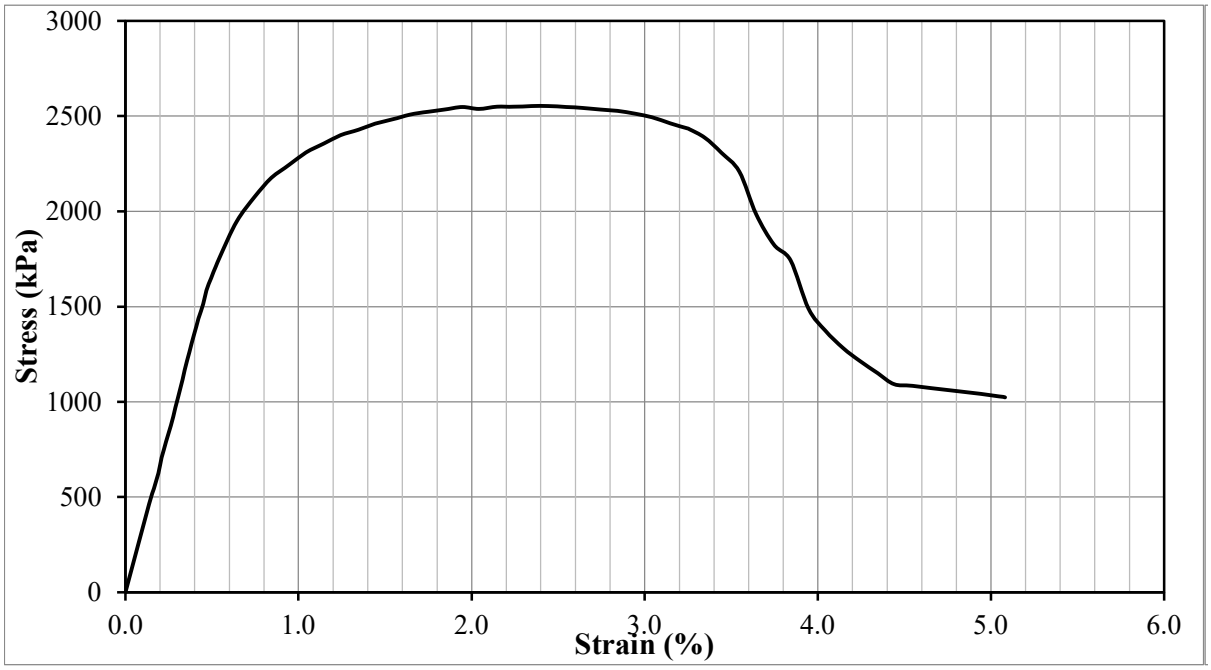
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,696	Strain at failure, εf :	2.36	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	T-24-H	Initial Area:	2117.0	mm^2
Test Date:	3/21/2018	Weight:	332.8	g
Strain Rate:	1 %/min	Unit Weight:	1613	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	3.0	days
$(w:c)_{slurry}$:	1.4	Curing temperature	55.0	°C
Additional information				



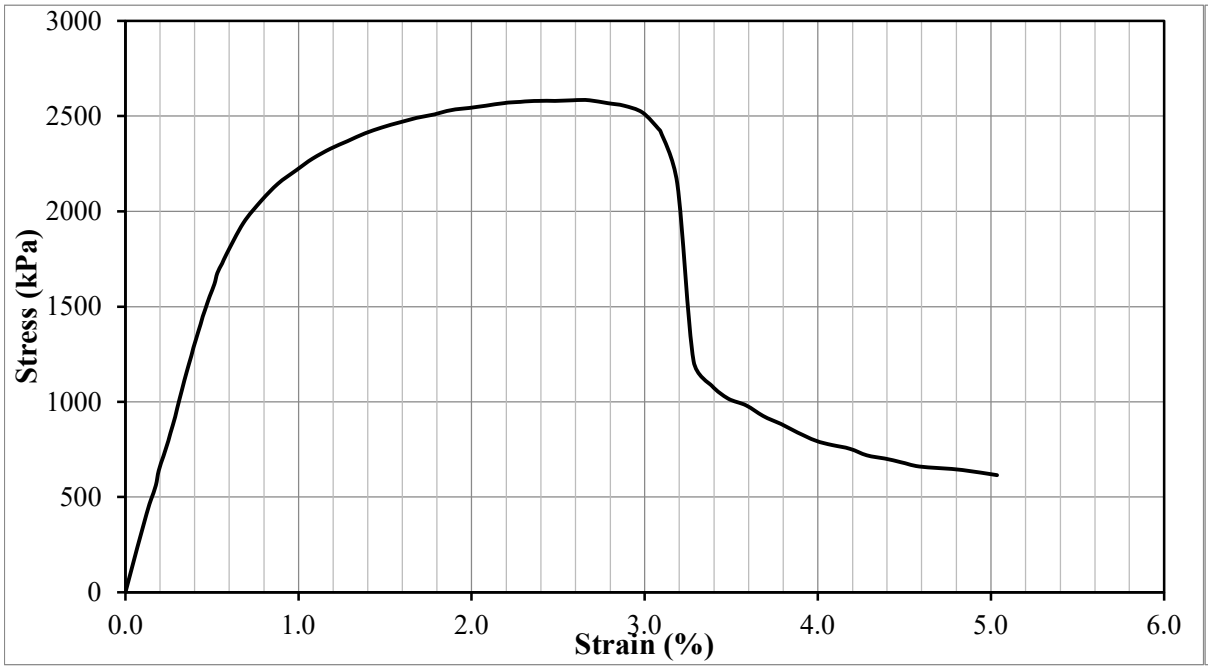
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,777	Strain at failure, εf :	2.64	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	T-24-B	Initial Area:	2119.1	mm^2
Test Date:	3/25/2018	Weight:	327.8	g
Strain Rate:	1 %/min	Unit Weight:	1559	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	7.0	days
$(w:c)_{slurry}$:	1.4	Curing temperature	55.0	°C
Additional information				



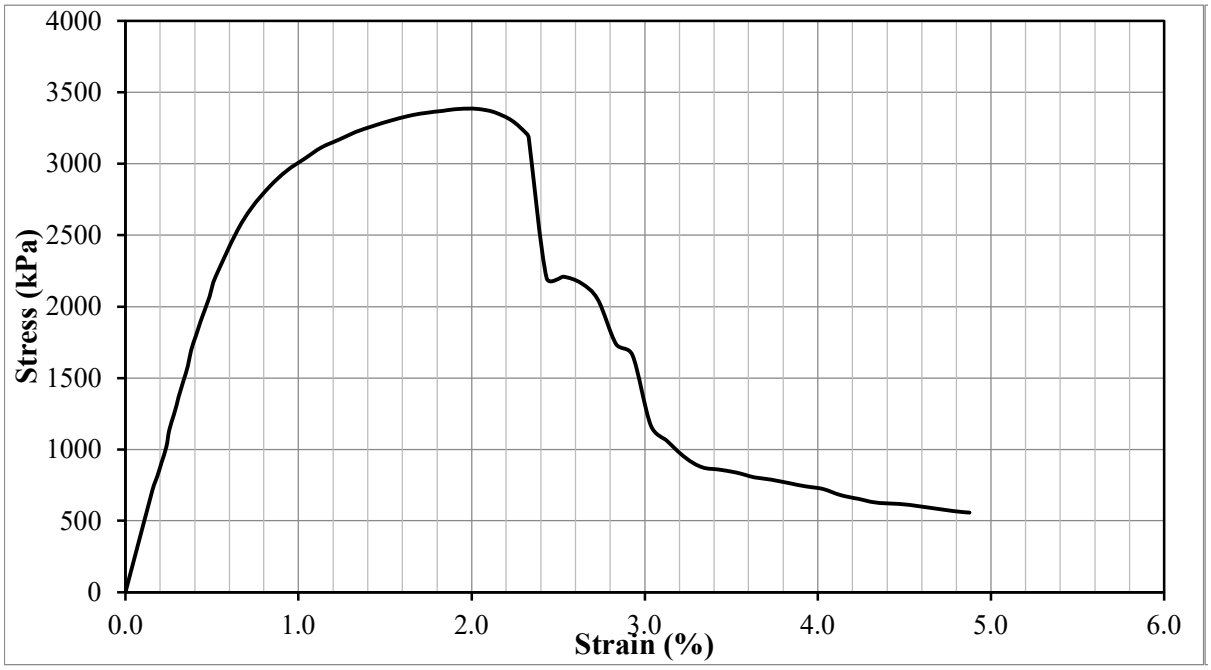
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,535	Strain at failure, εf :	2.44	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	T-24-G	Initial Area:	2123.2	mm^2
Test Date:	3/25/2018	Weight:	345.0	g
Strain Rate:	1 %/min	Unit Weight:	1624	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	7.0	days
$(w:c)_{slurry}$:	1.4	Curing temperature	55.0	°C
Additional information				



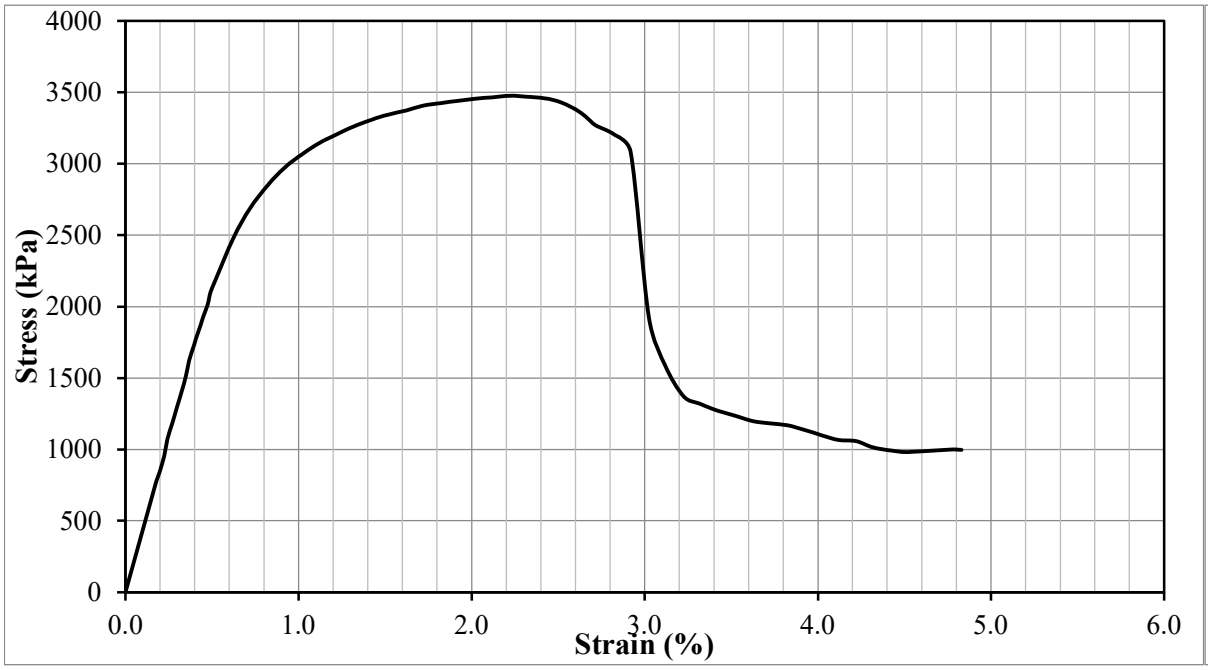
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,568	Strain at failure, εf :	2.59	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	T-24-C	Initial Area:	2125.3	mm^2
Test Date:	4/1/2018	Weight:	338.4	g
Strain Rate:	1 %/min	Unit Weight:	1621	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	13.9	days
$(w:c)_{slurry}$:	1.4	Curing temperature	55.0	°C
Additional information				



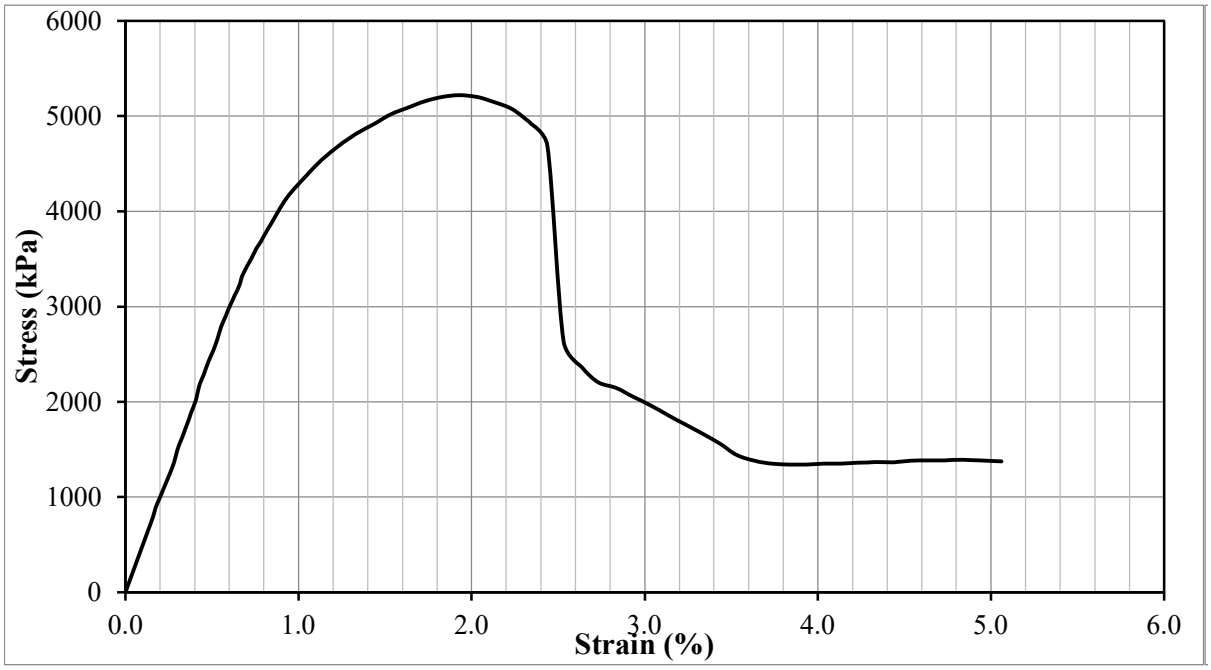
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,353	Strain at failure, εf :	1.93	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	T-24-F	Initial Area:	2125.3	mm^2
Test Date:	4/1/2018	Weight:	341.8	g
Strain Rate:	1 %/min	Unit Weight:	1627	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	14.0	days
$(w:c)_{slurry}$:	1.4	Curing temperature	55.0	°C
Additional information				



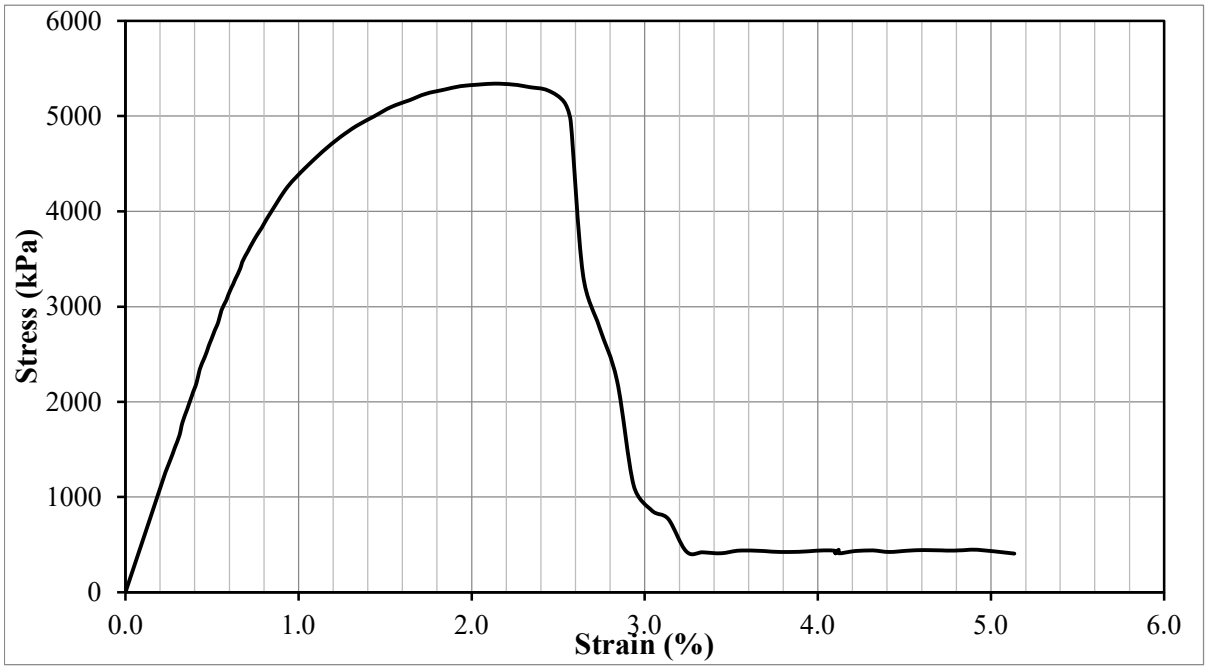
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,448	Strain at failure, εf :	2.22	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.1	mm
I.D.:	T-24-D	Initial Area:	2129.4	mm^2
Test Date:	4/15/2018	Weight:	337.7	g
Strain Rate:	1 %/min	Unit Weight:	1626	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.4	Curing temperature	55.0	°C
Additional information				



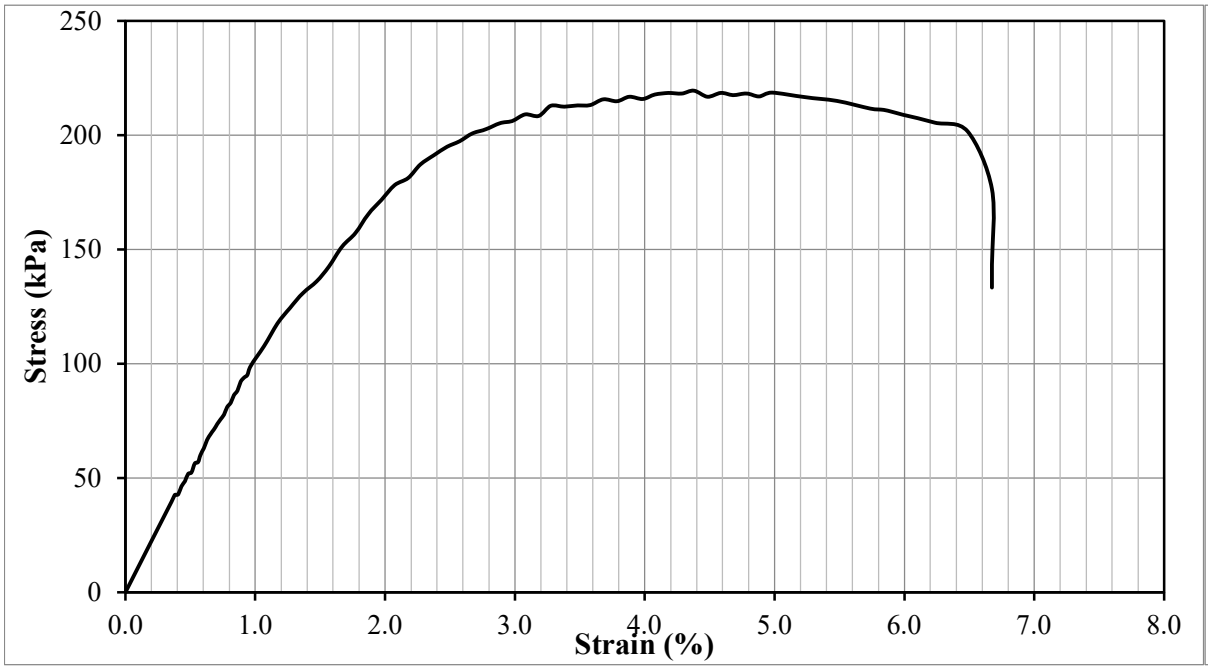
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,166	Strain at failure, εf :	1.93	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	T-24-E	Initial Area:	2119.1	mm^2
Test Date:	4/15/2018	Weight:	340.2	g
Strain Rate:	1 %/min	Unit Weight:	1635	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.4	Curing temperature	55.0	°C
Additional information				



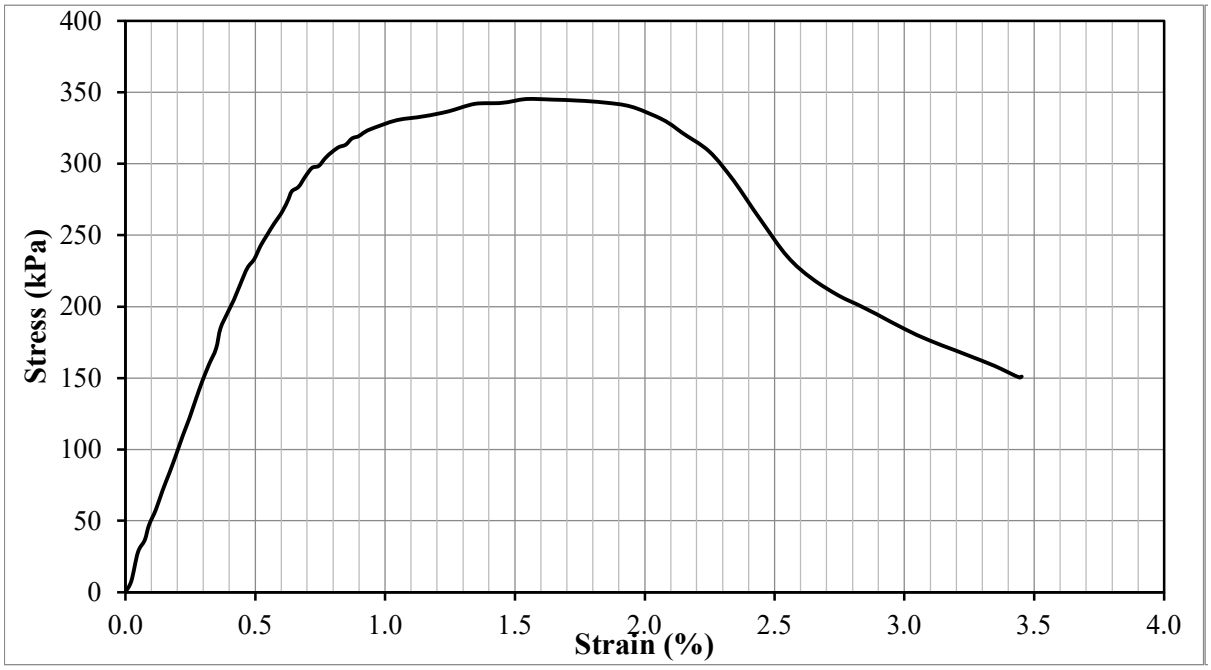
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,292	Strain at failure, εf :	2.13	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	94.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.5	mm
I.D.:	T-25-H	Initial Area:	2086.0	mm^2
Test Date:	4/1/2021	Weight:	351.9	g
Strain Rate:	1 %/min	Unit Weight:	1780	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	3.3	days
$(w:c)_{slurry}$:	0.6	Curing temperature	-5.0	°C
Additional information				



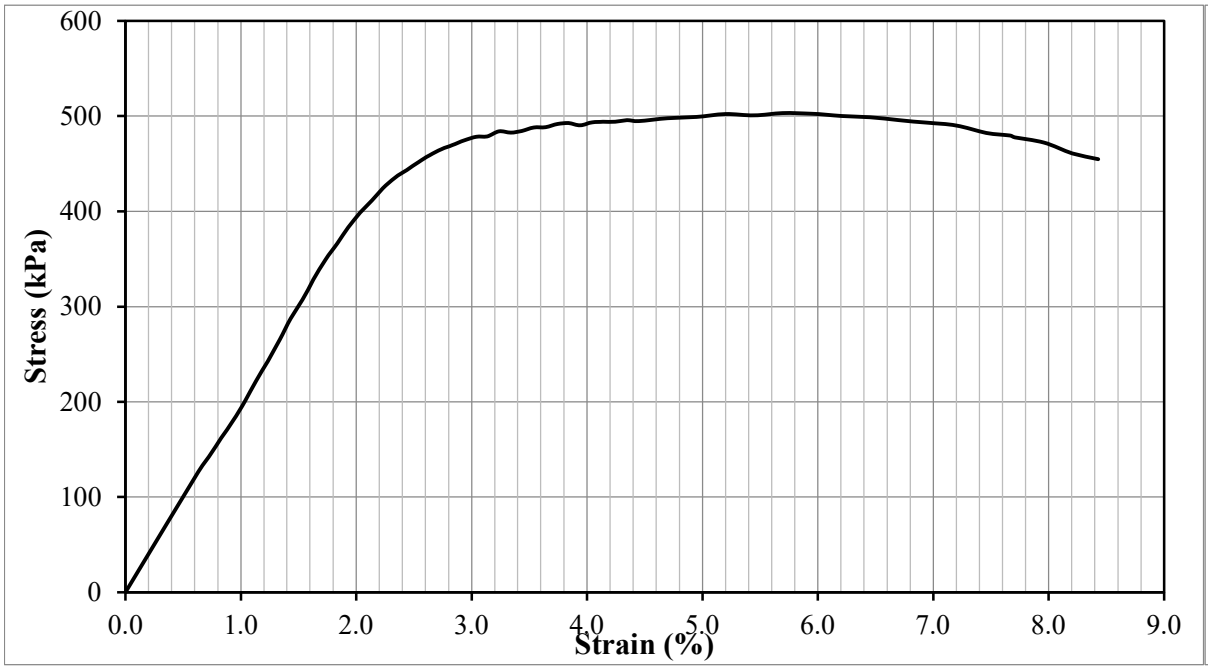
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	217	Strain at failure, εf :	4.38	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.6	mm
I.D.:	T-25-I	Initial Area:	2092.2	mm^2
Test Date:	4/1/2021	Weight:	386.4	g
Strain Rate:	1 %/min	Unit Weight:	1830	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	3.3	days
$(w:c)_{slurry}$:	0.6	Curing temperature	-5.0	°C
Additional information				



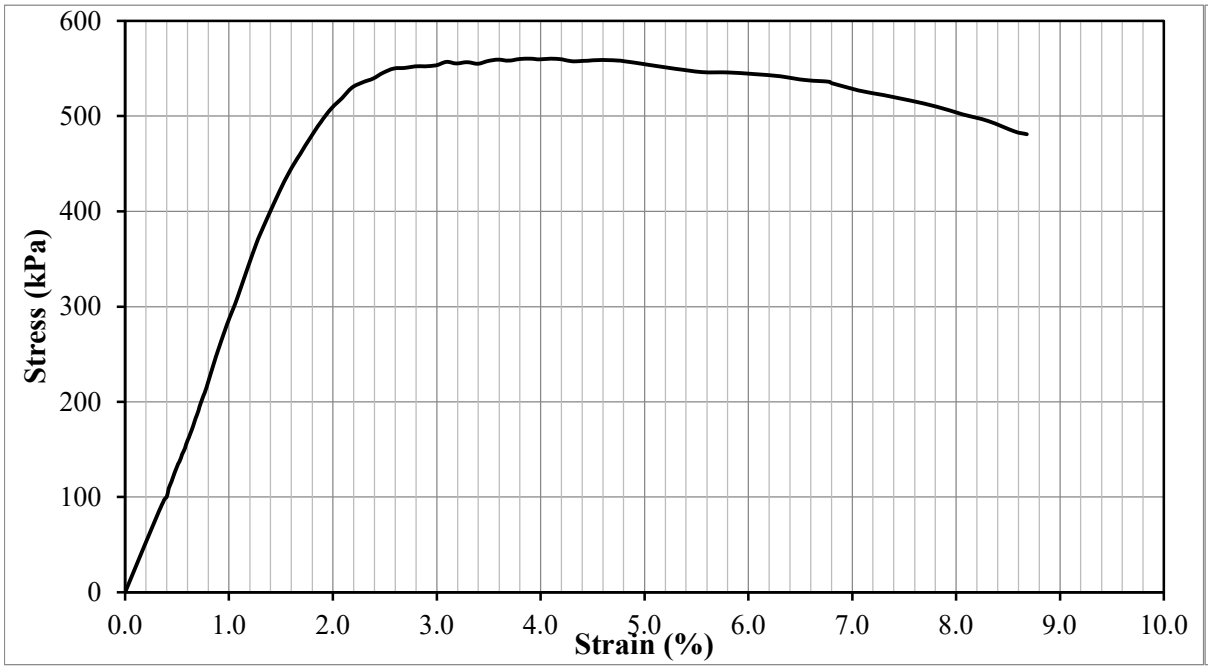
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	344	Strain at failure, εf :	1.54	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	102.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.3	mm
I.D.:	T-25-B	Initial Area:	2063.5	mm^2
Test Date:	4/5/2021	Weight:	382.9	g
Strain Rate:	1 %/min	Unit Weight:	1813	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	7.2	days
$(w:c)_{slurry}$:	0.6	Curing temperature	-5.0	°C
Additional information				



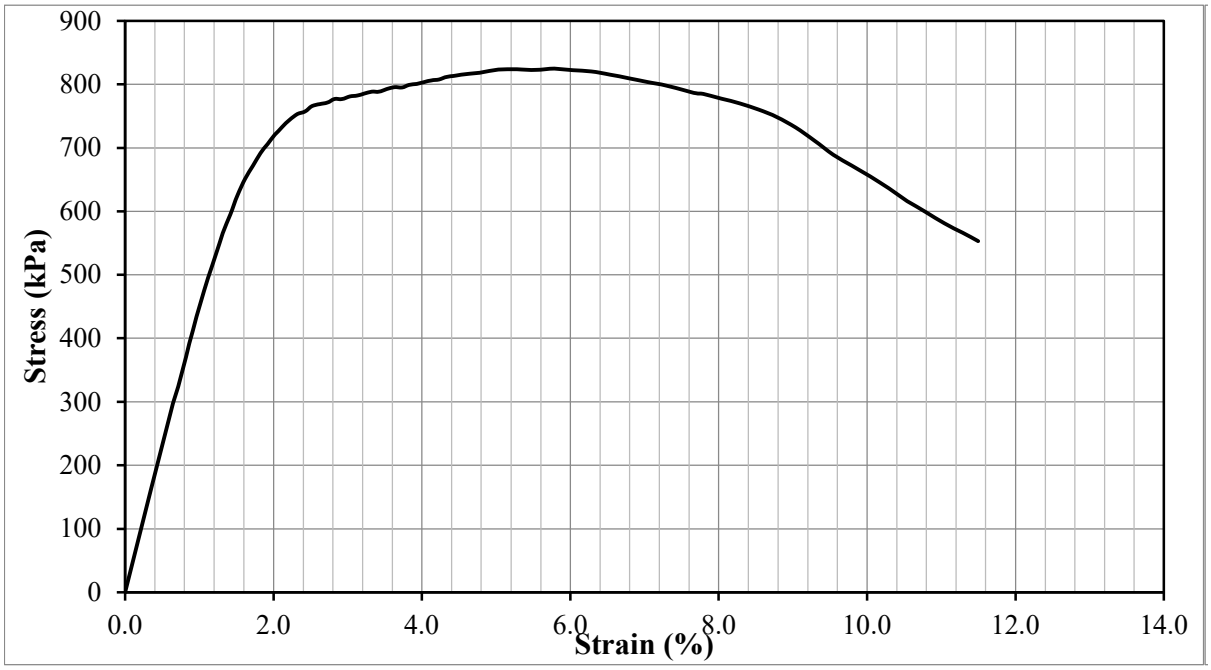
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	503	Strain at failure, εf :	5.70	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.5	mm
I.D.:	T-25-G	Initial Area:	2086.0	mm^2
Test Date:	4/5/2021	Weight:	377.9	g
Strain Rate:	1 %/min	Unit Weight:	1800	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	7.2	days
$(w:c)_{slurry}$:	0.6	Curing temperature	-5.0	°C
Additional information				



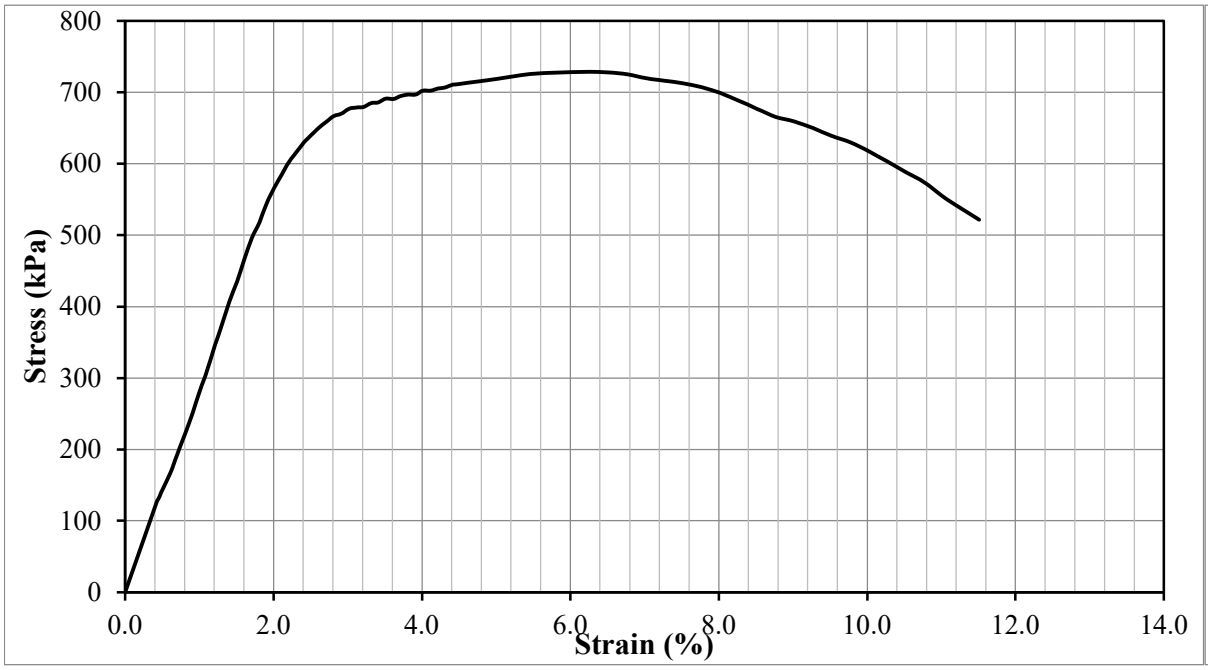
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	558	Strain at failure, εf :	4.10	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	T-25-C	Initial Area:	2098.4	mm^2
Test Date:	4/12/2021	Weight:	382.4	g
Strain Rate:	1 %/min	Unit Weight:	1792	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	14.0	days
$(w:c)_{slurry}$:	0.6	Curing temperature	-5.0	°C
Additional information				



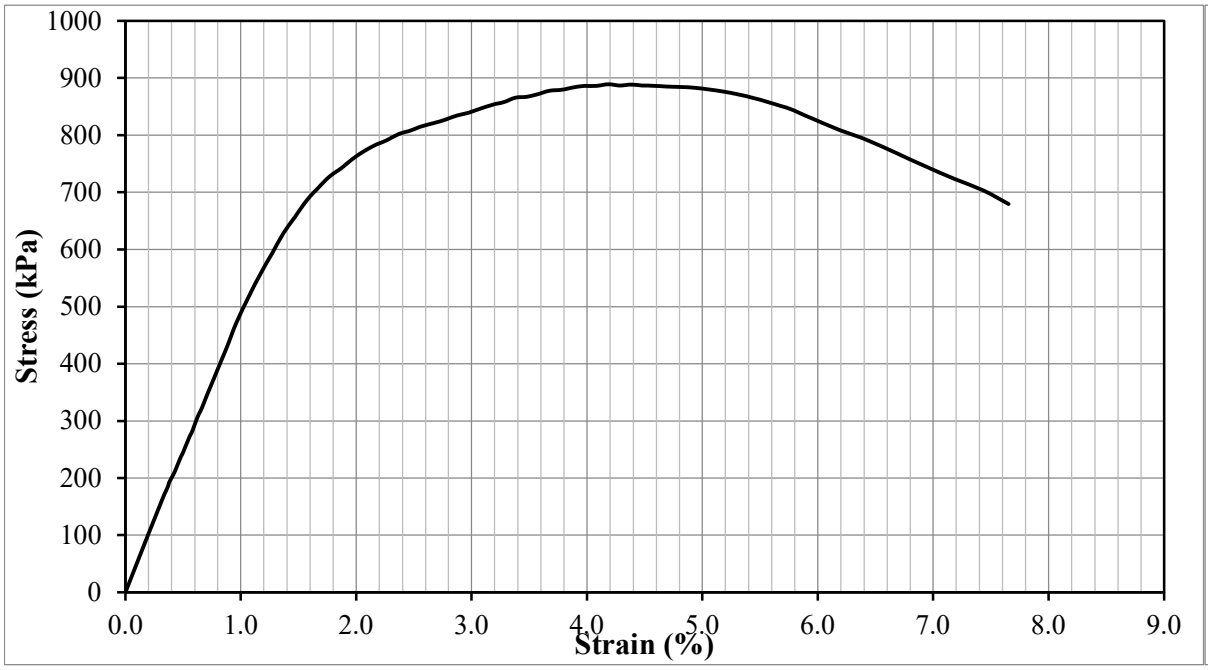
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	822	Strain at failure, εf :	5.79	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	102.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.5	mm
I.D.:	T-25-F	Initial Area:	2086.0	mm^2
Test Date:	4/12/2021	Weight:	383.3	g
Strain Rate:	1 %/min	Unit Weight:	1799	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	14.0	days
$(w:c)_{slurry}$:	0.6	Curing temperature	-5.0	°C
Additional information				



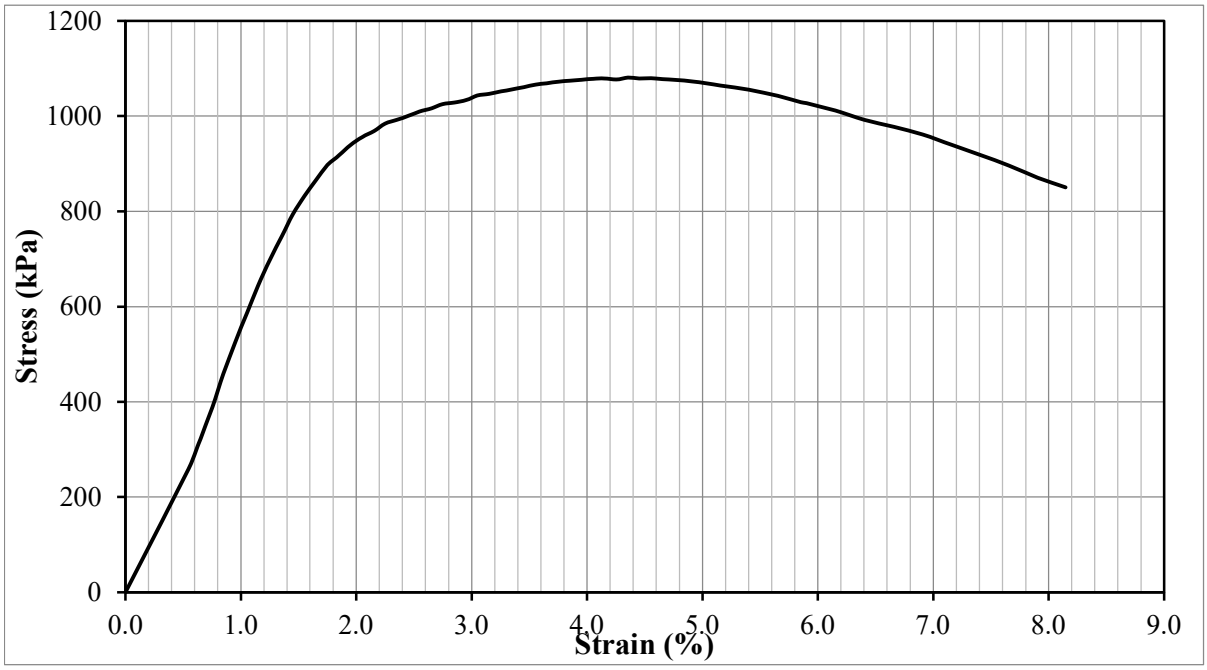
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	727	Strain at failure, εf :	6.26	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.4	mm
I.D.:	T-25-D	Initial Area:	2077.8	mm^2
Test Date:	4/26/2021	Weight:	377.6	g
Strain Rate:	1 %/min	Unit Weight:	1812	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	28.2	days
$(w:c)_{slurry}$:	0.6	Curing temperature	-5.0	°C
Additional information				



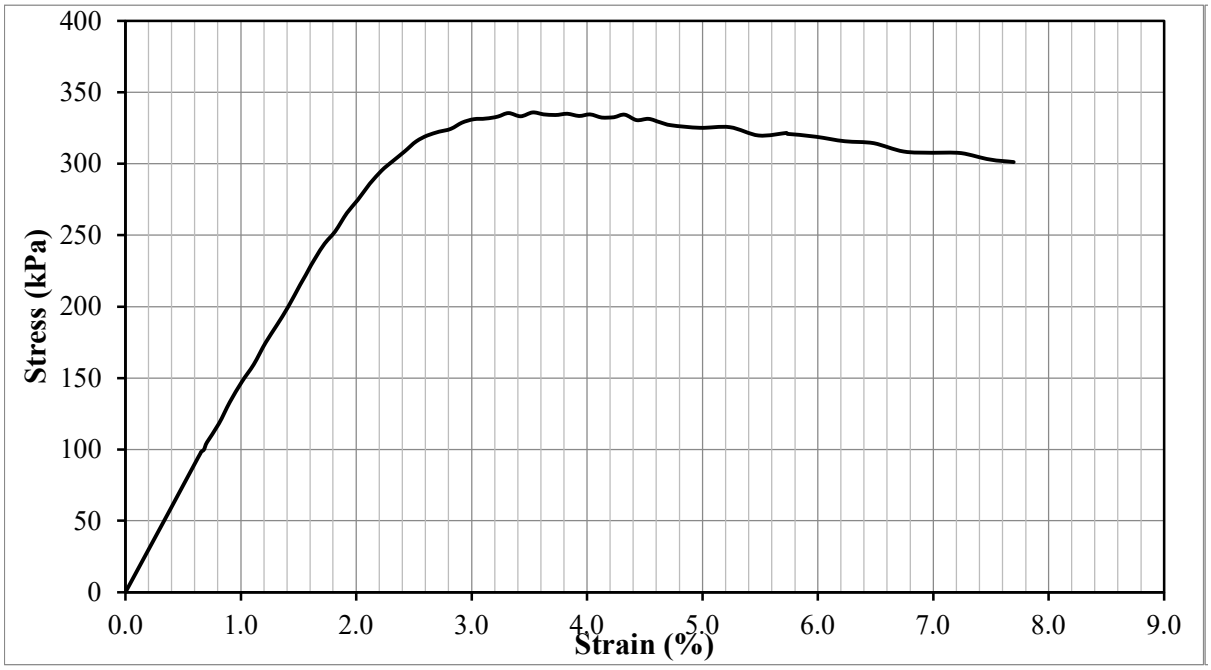
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	885	Strain at failure, εf :	4.19	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.6	mm
I.D.:	T-25-E	Initial Area:	2088.1	mm^2
Test Date:	4/26/2021	Weight:	380.3	g
Strain Rate:	1 %/min	Unit Weight:	1804	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	28.2	days
$(w:c)_{slurry}$:	0.6	Curing temperature	-5.0	°C
Additional information				



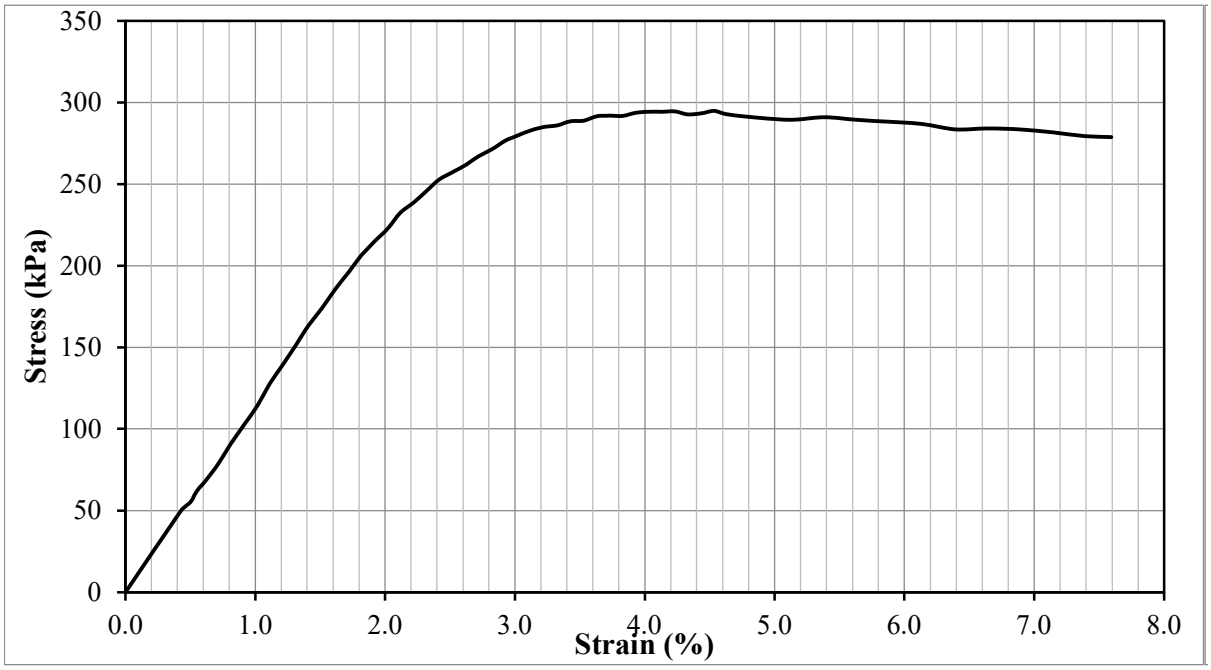
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,077	Strain at failure, εf :	4.36	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.6	mm
I.D.:	T-26-A	Initial Area:	2092.2	mm^2
Test Date:	4/2/2021	Weight:	374.7	g
Strain Rate:	1 %/min	Unit Weight:	1765	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	2.8	days
$(w:c)_{slurry}$:	1.0	Curing temperature	-5.0	°C
Additional information				



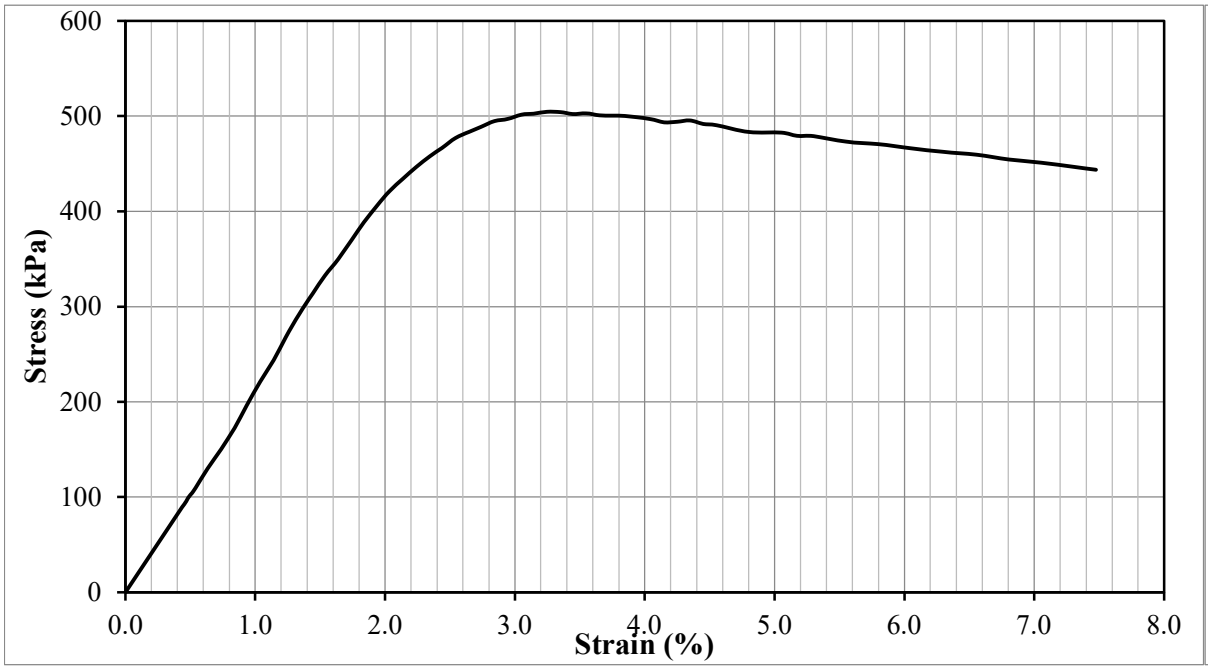
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	335	Strain at failure, εf :	3.53	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	50.9	mm
I.D.:	T-26-H	Initial Area:	2032.9	mm^2
Test Date:	4/2/2021	Weight:	356.3	g
Strain Rate:	1 %/min	Unit Weight:	1739	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	2.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	-5.0	°C
Additional information				



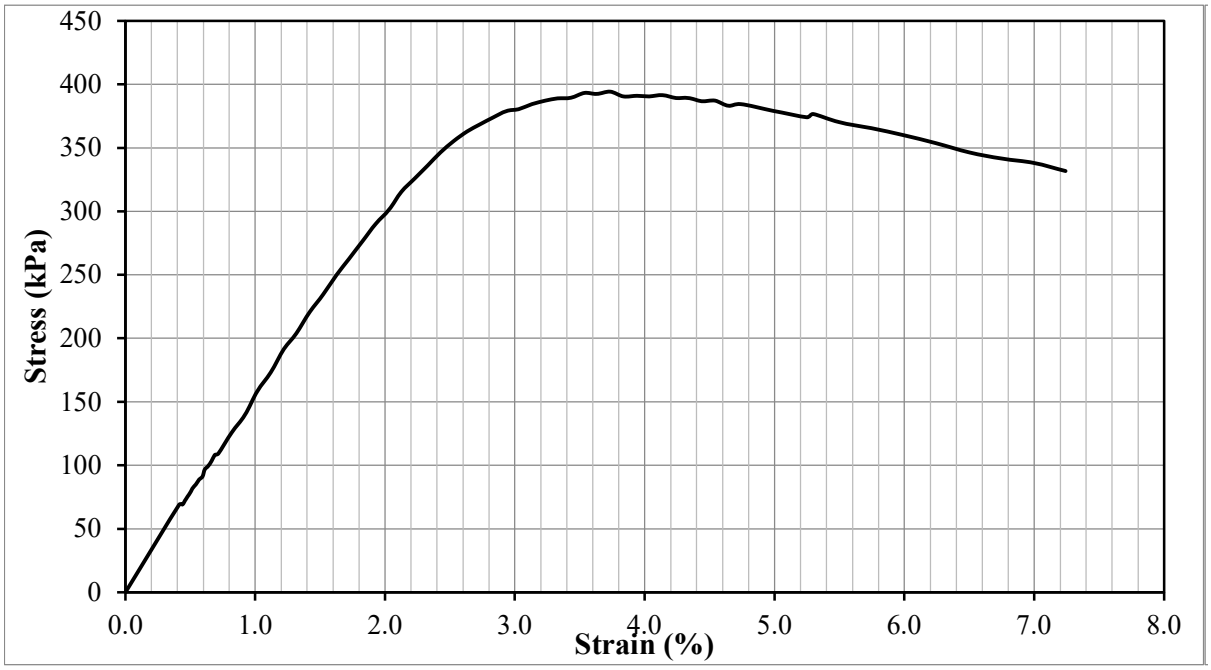
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	294	Strain at failure, εf :	4.53	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.3	mm
I.D.:	T-26-B	Initial Area:	2063.5	mm^2
Test Date:	4/6/2021	Weight:	378.2	g
Strain Rate:	1 %/min	Unit Weight:	1799	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	7.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	-5.0	°C
Additional information				



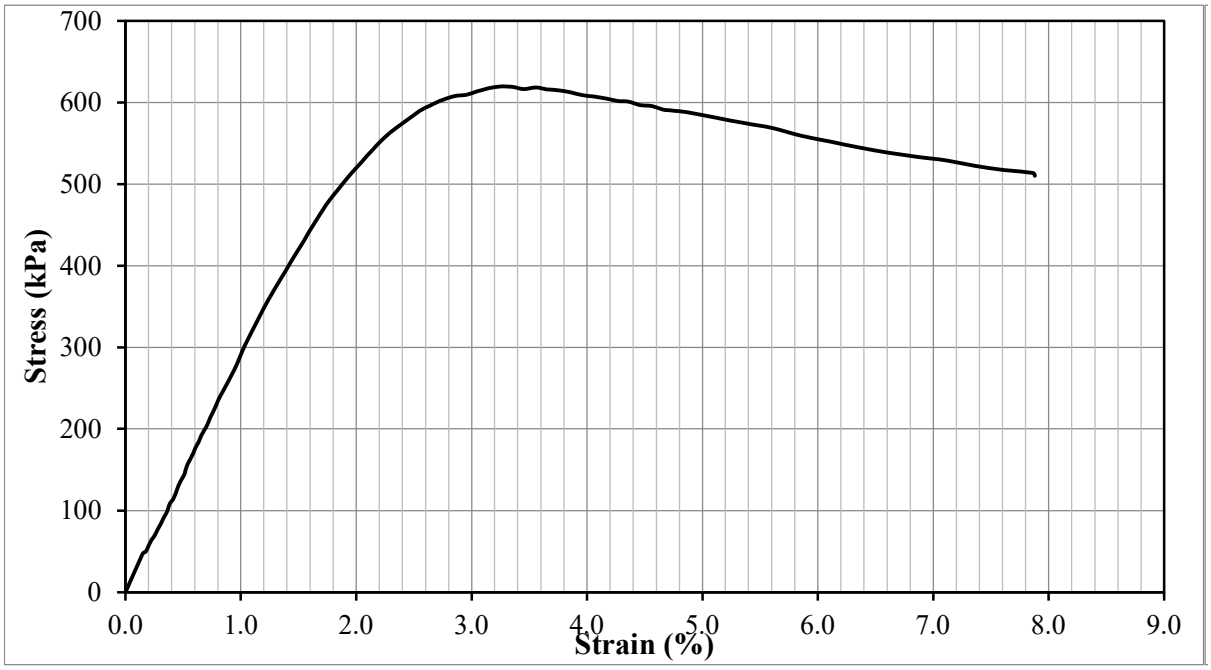
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	504	Strain at failure, εf :	3.25	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.1	mm
I.D.:	T-26-G	Initial Area:	2053.3	mm^2
Test Date:	4/6/2021	Weight:	374.5	g
Strain Rate:	1 %/min	Unit Weight:	1801	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	7.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	-5.0	°C
Additional information				



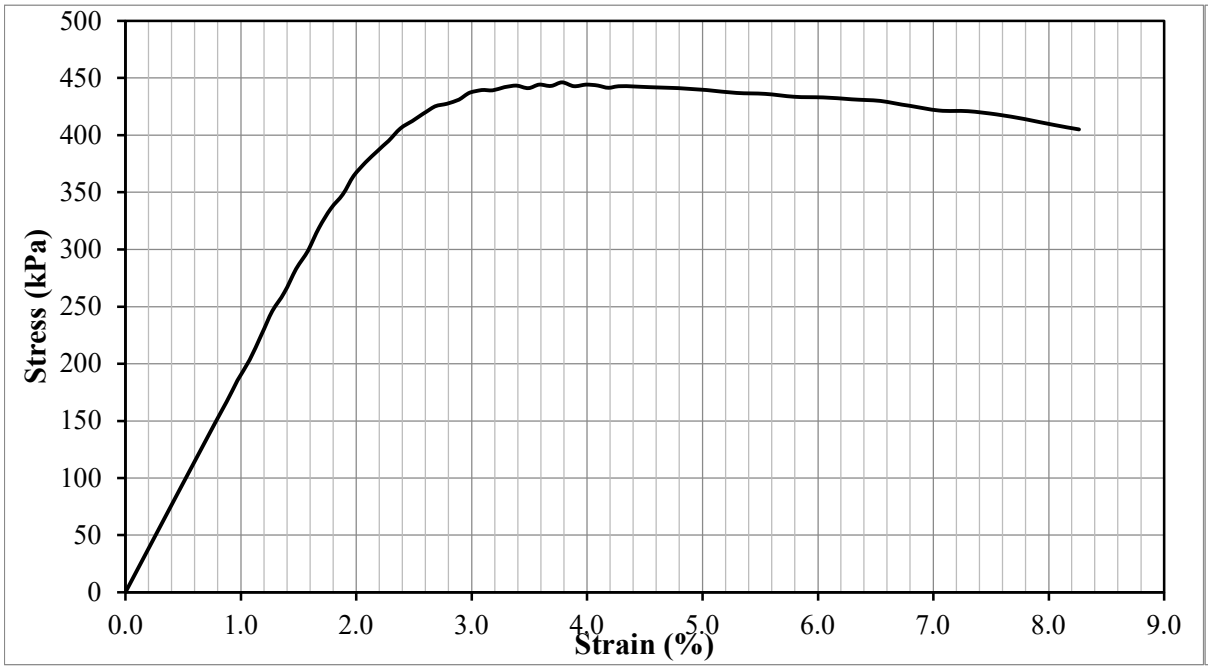
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	394	Strain at failure, εf :	3.73	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.3	mm
I.D.:	T-26-C	Initial Area:	2063.5	mm^2
Test Date:	4/13/2021	Weight:	376.0	g
Strain Rate:	1 %/min	Unit Weight:	1794	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	13.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	-5.0	°C
Additional information				



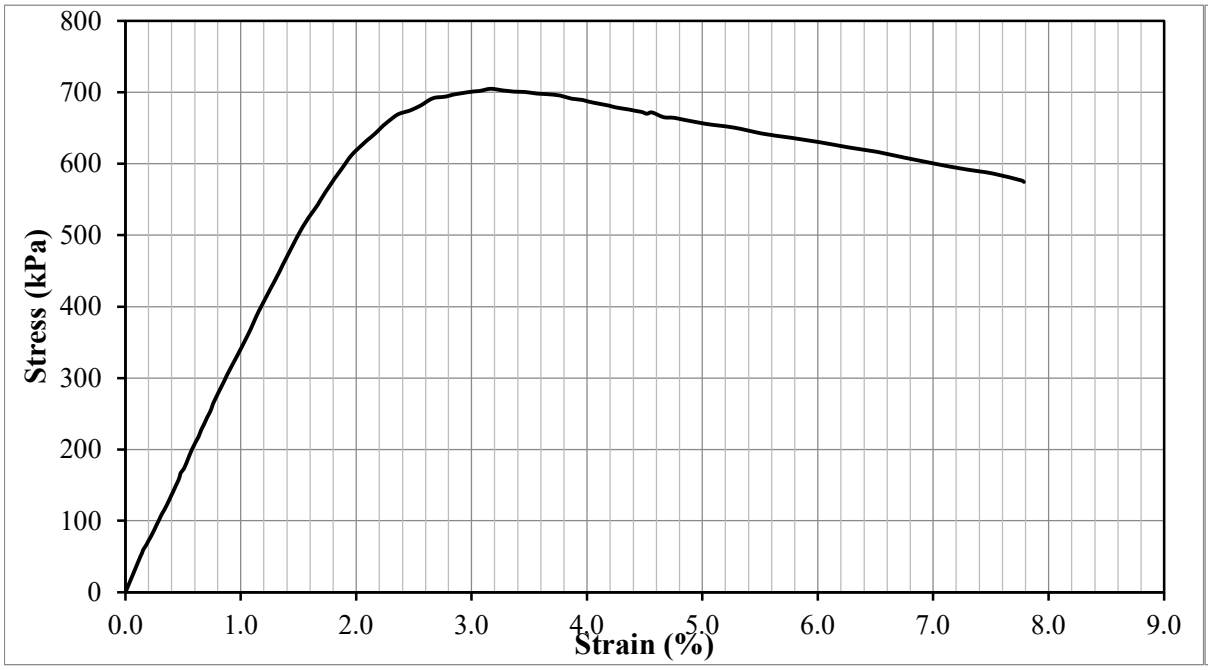
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	619	Strain at failure, εf :	3.25	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	102.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.3	mm
I.D.:	T-26-F	Initial Area:	2067.6	mm^2
Test Date:	4/13/2021	Weight:	376.5	g
Strain Rate:	1 %/min	Unit Weight:	1779	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	14.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	-5.0	°C
Additional information				



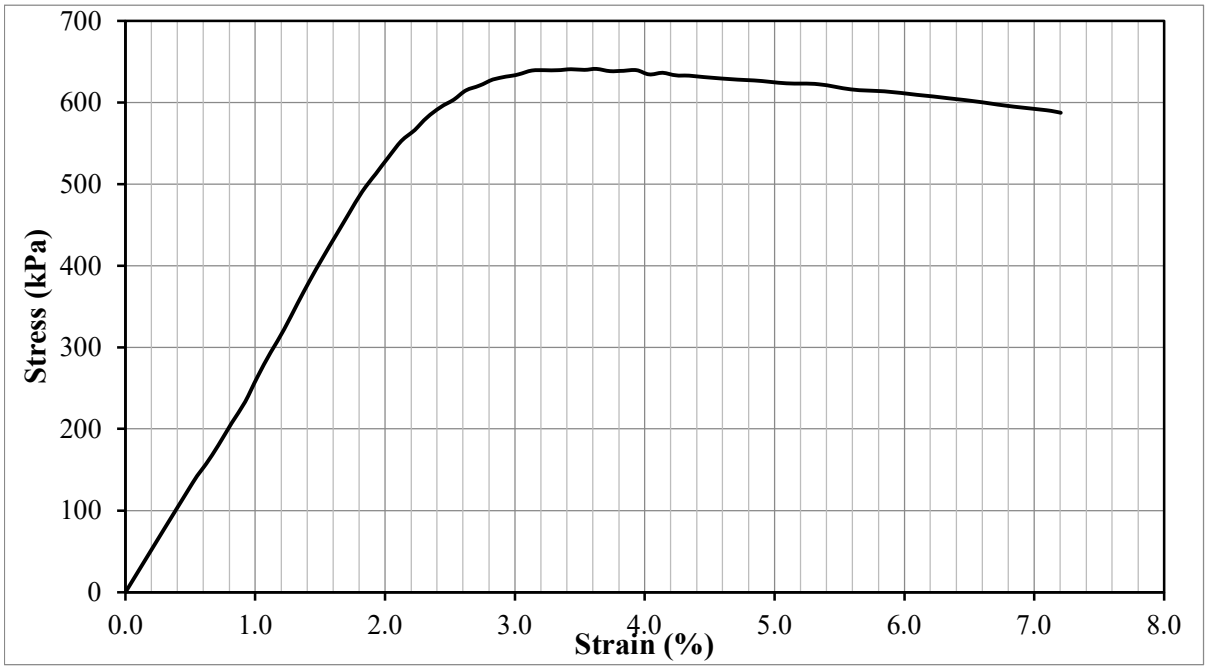
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	446	Strain at failure, εf :	3.78	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.3	mm
I.D.:	T-26-D	Initial Area:	2067.6	mm^2
Test Date:	4/27/2021	Weight:	370.8	g
Strain Rate:	1 %/min	Unit Weight:	1784	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	-5.0	°C
Additional information				



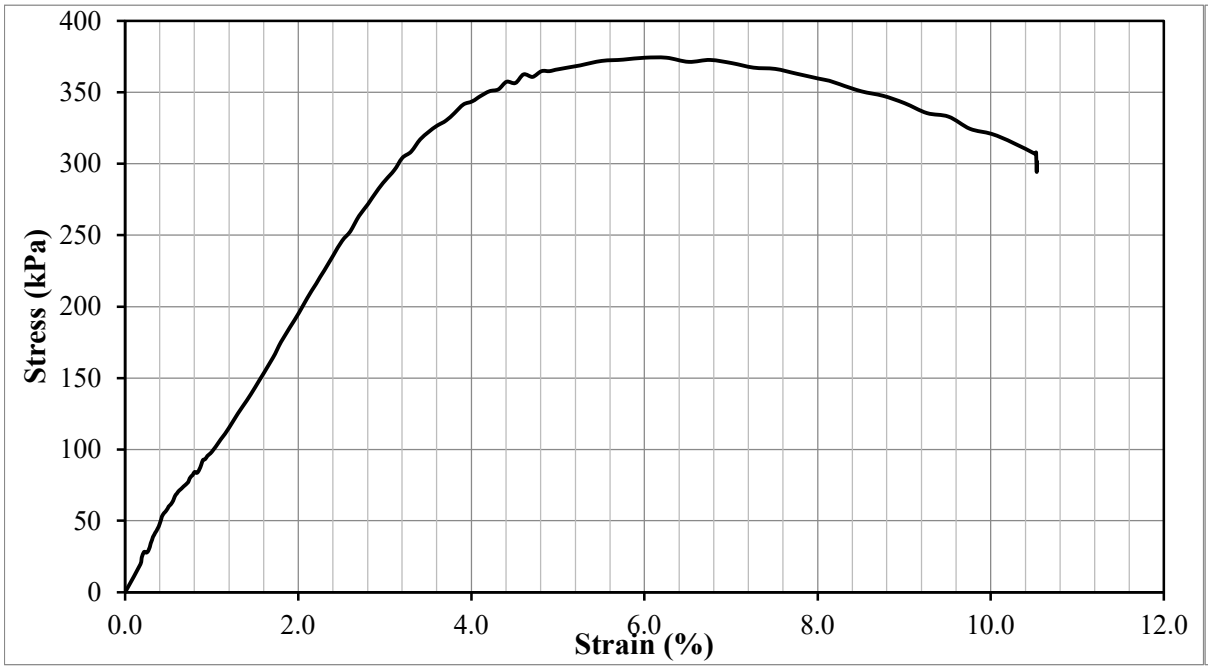
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	702	Strain at failure, εf :	3.16	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	102.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.2	mm
I.D.:	T-26-E	Initial Area:	2057.3	mm^2
Test Date:	4/27/2021	Weight:	376.4	g
Strain Rate:	1 %/min	Unit Weight:	1791	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	-5.0	°C
Additional information				



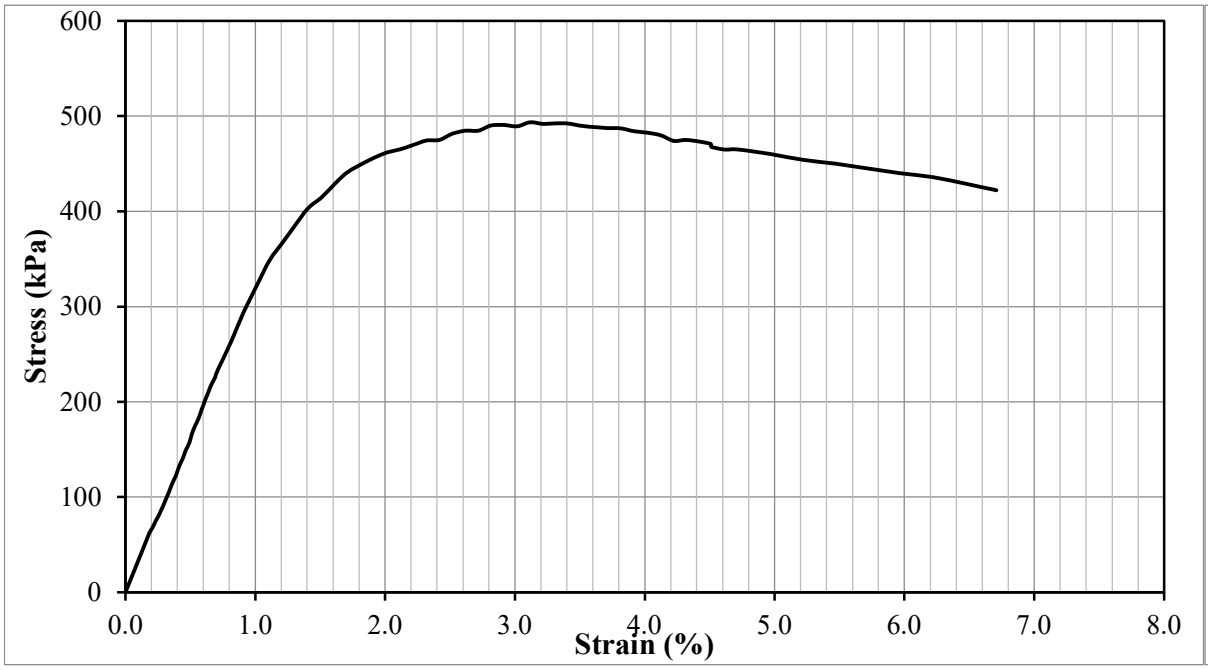
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	641	Strain at failure, εf :	3.63	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.3	mm
I.D.:	T-27-A	Initial Area:	2063.5	mm^2
Test Date:	4/3/2021	Weight:	344.2	g
Strain Rate:	1 %/min	Unit Weight:	1681	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	3.3	days
$(w:c)_{slurry}$:	1.0	Curing temperature	-5.0	°C
Additional information				



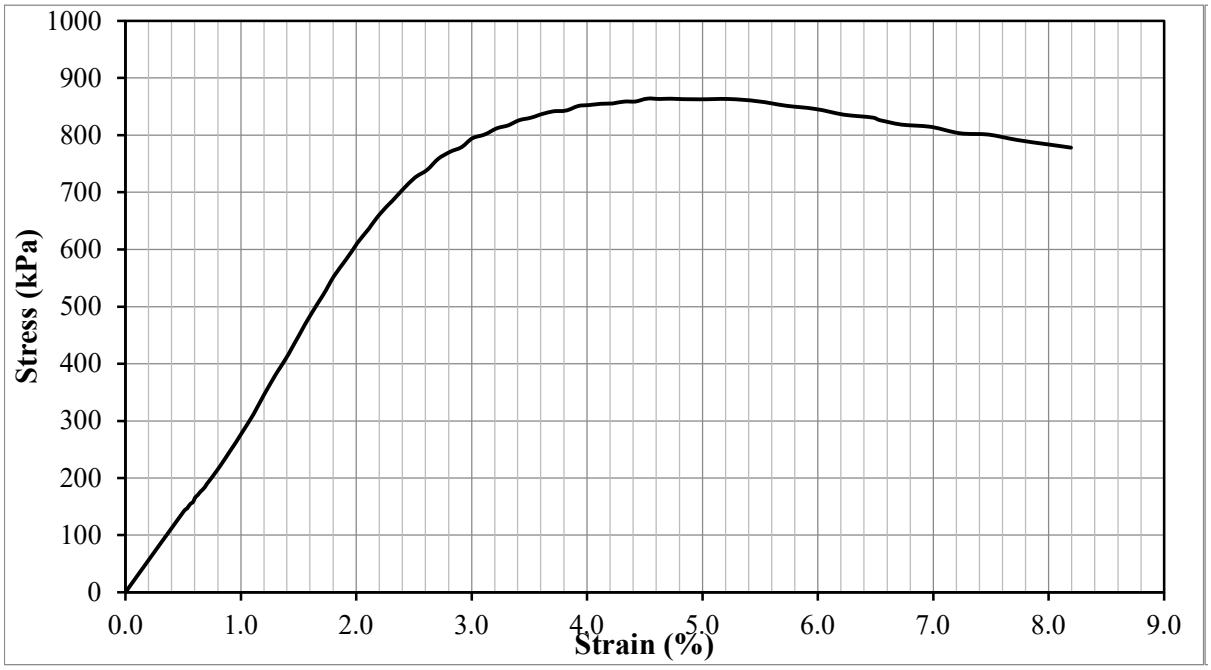
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	372	Strain at failure, εf :	6.00	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	96.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.4	mm
I.D.:	T-27-H	Initial Area:	2073.7	mm^2
Test Date:	4/3/2021	Weight:	340.0	g
Strain Rate:	1 %/min	Unit Weight:	1703	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	3.3	days
$(w:c)_{slurry}$:	1.0	Curing temperature	-5.0	°C
Additional information				



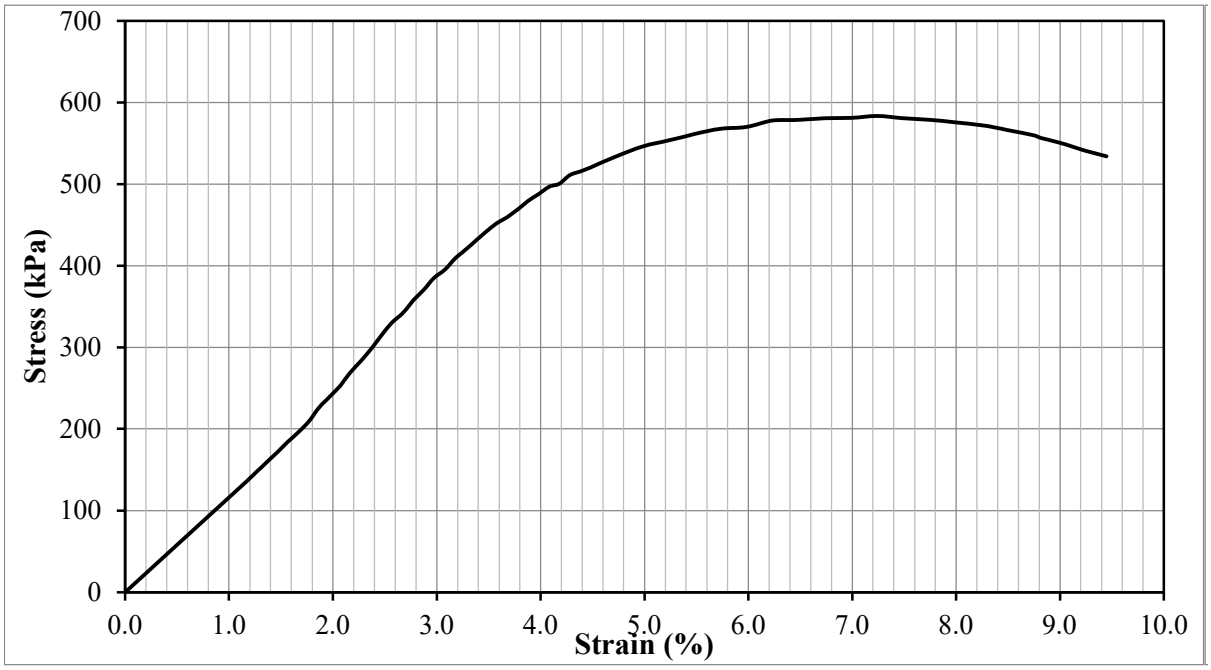
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	488	Strain at failure, εf :	3.11	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	102.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.3	mm
I.D.:	T-27-B	Initial Area:	2069.6	mm^2
Test Date:	4/7/2021	Weight:	358.1	g
Strain Rate:	1 %/min	Unit Weight:	1692	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	7.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	-5.0	°C
Additional information				



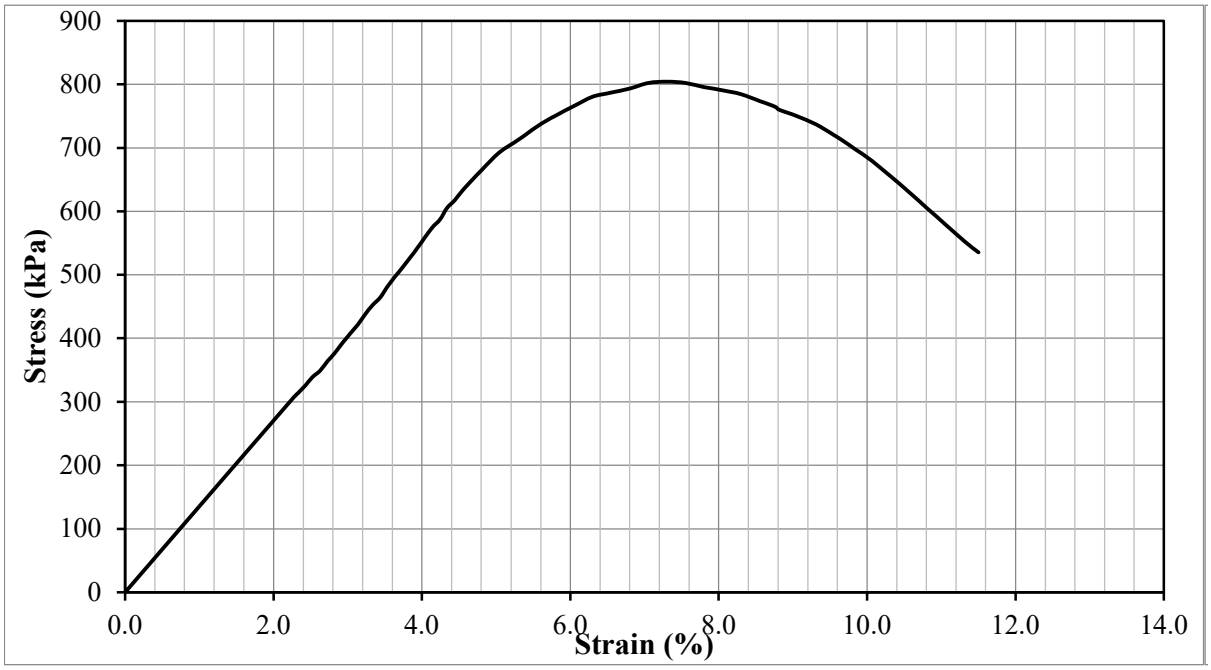
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	863	Strain at failure, εf :	4.52	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.2	mm
I.D.:	T-27-G	Initial Area:	2057.3	mm^2
Test Date:	4/7/2021	Weight:	352.2	g
Strain Rate:	1 %/min	Unit Weight:	1686	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	7.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	-5.0	°C
Additional information				



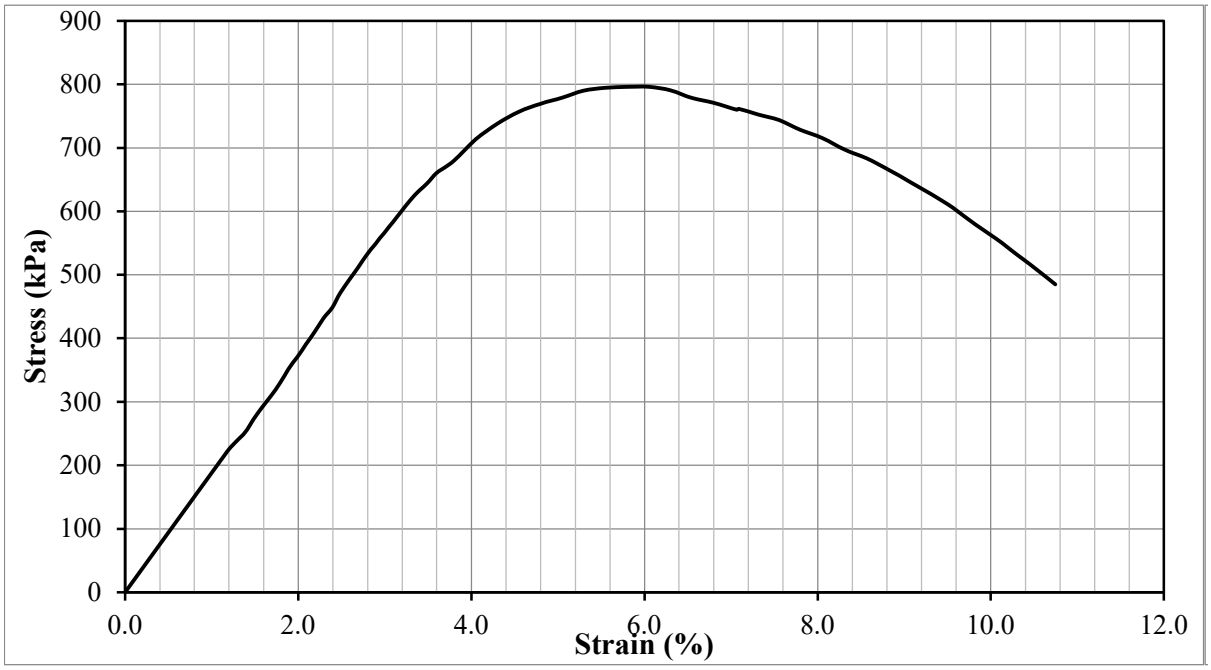
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	583	Strain at failure, εf :	7.24	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	103.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.5	mm
I.D.:	T-27-C	Initial Area:	2086.0	mm^2
Test Date:	4/14/2021	Weight:	358.6	g
Strain Rate:	1 %/min	Unit Weight:	1669	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	14.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	-5.0	°C
Additional information				



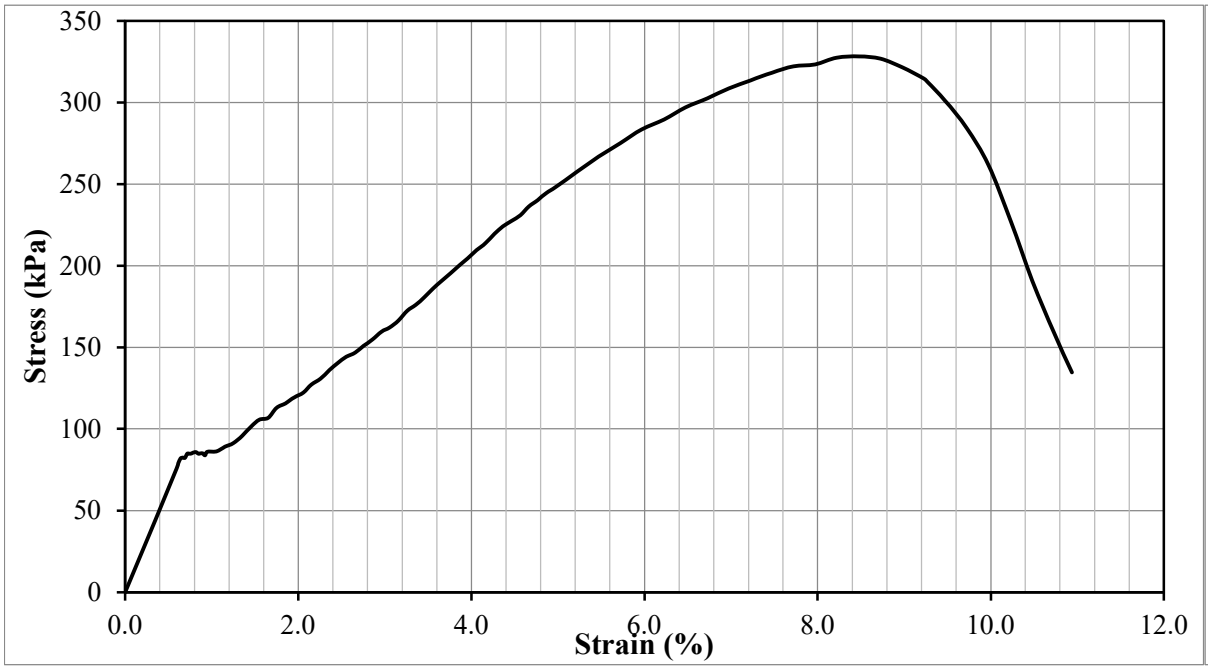
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	804	Strain at failure, εf :	7.30	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	102.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.6	mm
I.D.:	T-27-F	Initial Area:	2090.1	mm^2
Test Date:	4/14/2021	Weight:	355.9	g
Strain Rate:	1 %/min	Unit Weight:	1662	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	14.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	-5.0	°C
Additional information				



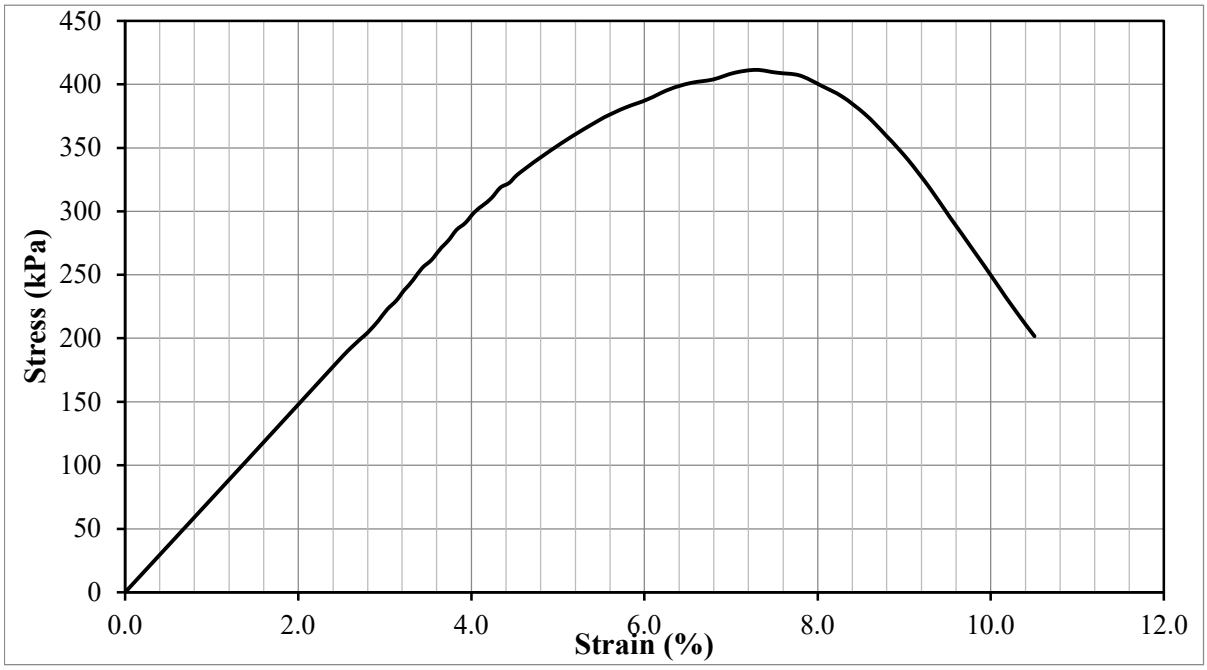
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	795	Strain at failure, εf :	5.80	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	102.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.2	mm
I.D.:	T-27-D	Initial Area:	2055.3	mm^2
Test Date:	4/28/2021	Weight:	358.2	g
Strain Rate:	1 %/min	Unit Weight:	1694	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	28.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	-5.0	°C
Additional information				



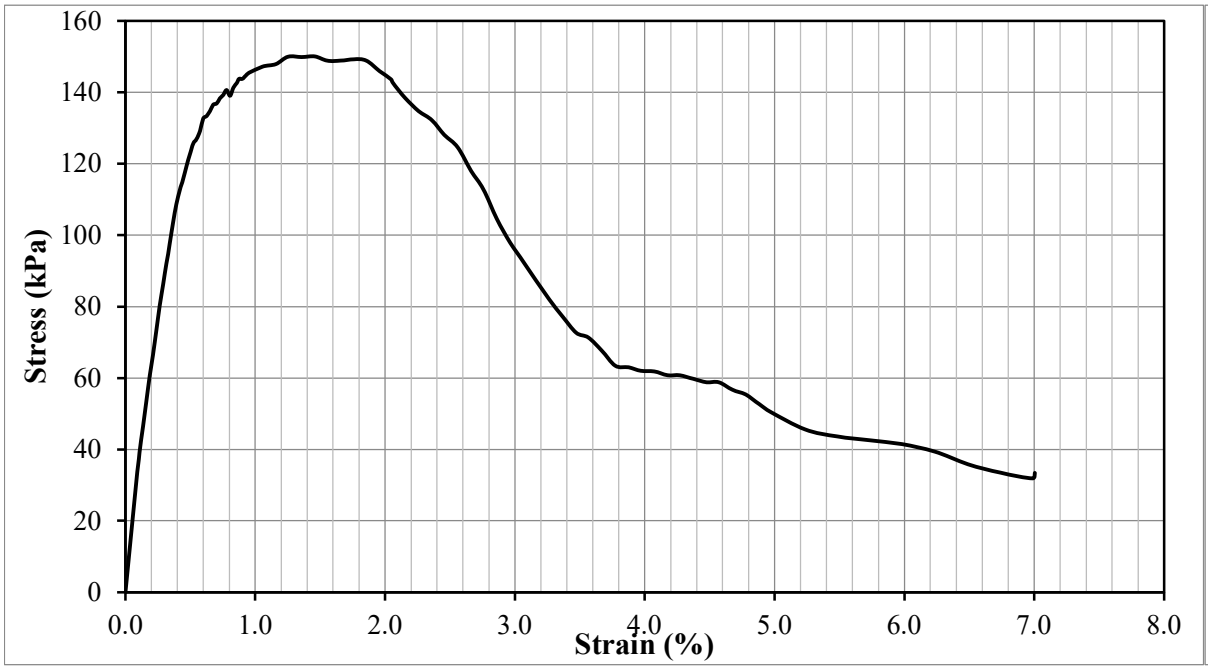
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	329	Strain at failure, εf :	8.48	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.3	mm
I.D.:	T-27-E	Initial Area:	2065.5	mm^2
Test Date:	4/28/2021	Weight:	349.3	g
Strain Rate:	1 %/min	Unit Weight:	1690	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	28.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	-5.0	°C
Additional information				



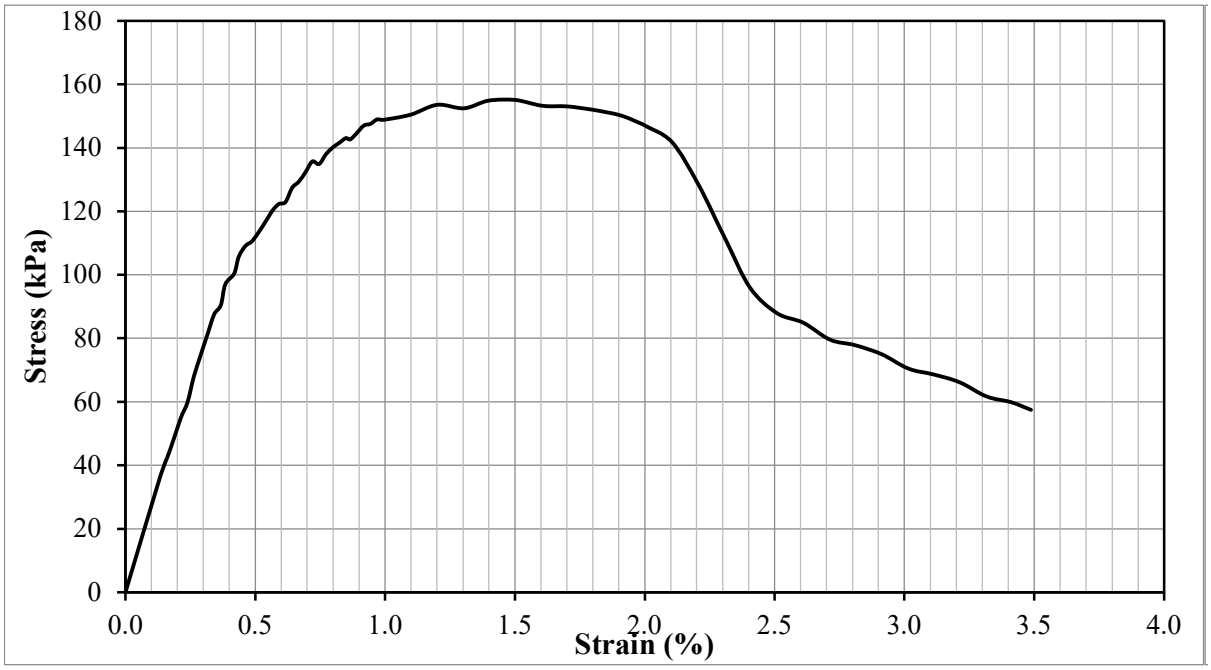
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	410	Strain at failure, εf :	7.29	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.6	mm
I.D.:	T-28-A	Initial Area:	2090.1	mm^2
Test Date:	4/4/2021	Weight:	346.0	g
Strain Rate:	1 %/min	Unit Weight:	1641	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	3.0	days
$(w:c)_{slurry}$:	1.4	Curing temperature	-5.0	°C
Additional information				



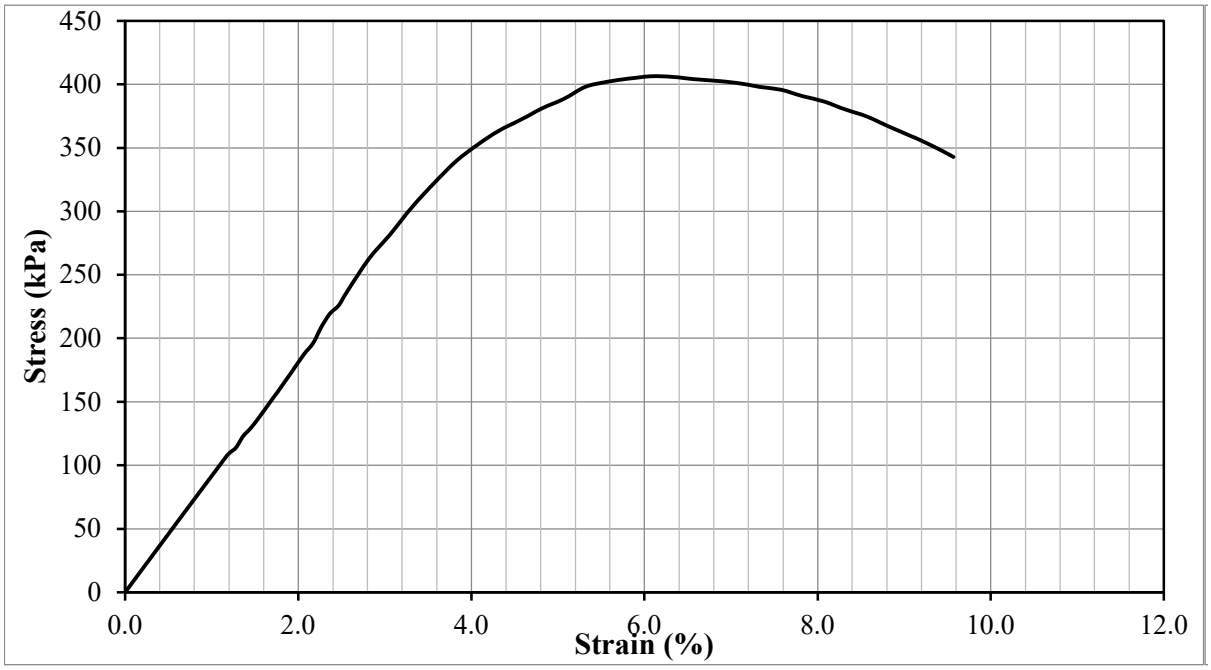
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	149	Strain at failure, εf :	1.46	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.6	mm
I.D.:	T-28-J	Initial Area:	2090.1	mm^2
Test Date:	4/4/2021	Weight:	345.7	g
Strain Rate:	1 %/min	Unit Weight:	1641	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	3.0	days
$(w:c)_{slurry}$:	1.4	Curing temperature	-5.0	°C
Additional information				



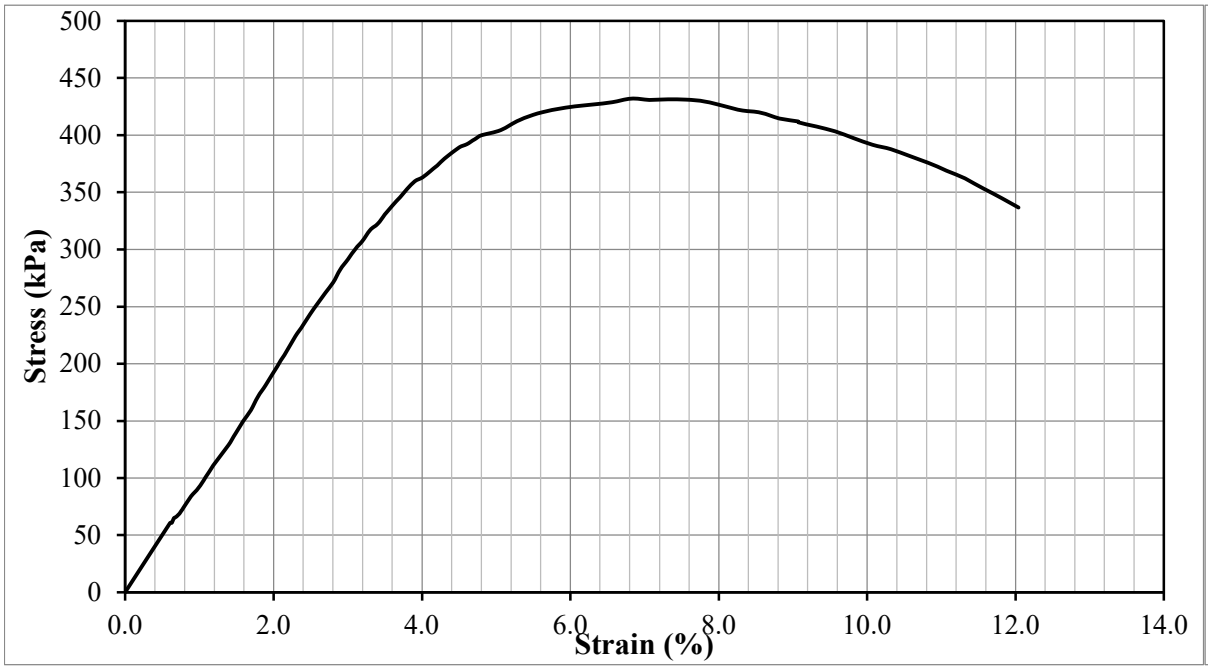
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	154	Strain at failure, εf :	1.50	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	50.8	mm
I.D.:	T-28-B	Initial Area:	2024.8	mm^2
Test Date:	4/8/2021	Weight:	347.8	g
Strain Rate:	1 %/min	Unit Weight:	1692	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	7.0	days
$(w:c)_{slurry}$:	1.4	Curing temperature	-5.0	°C
Additional information				



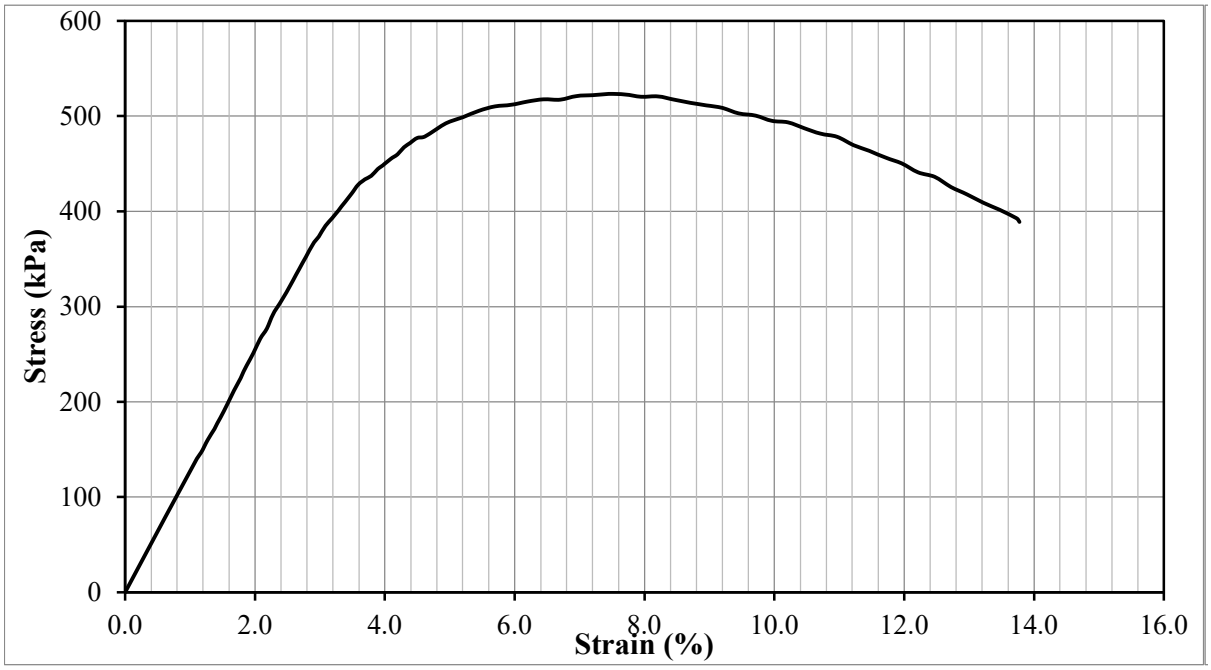
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	406	Strain at failure, εf :	6.07	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	102.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	50.9	mm
I.D.:	T-28-G	Initial Area:	2032.9	mm^2
Test Date:	4/8/2021	Weight:	347.0	g
Strain Rate:	1 %/min	Unit Weight:	1660	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	7.0	days
$(w:c)_{slurry}$:	1.4	Curing temperature	-5.0	°C
Additional information				



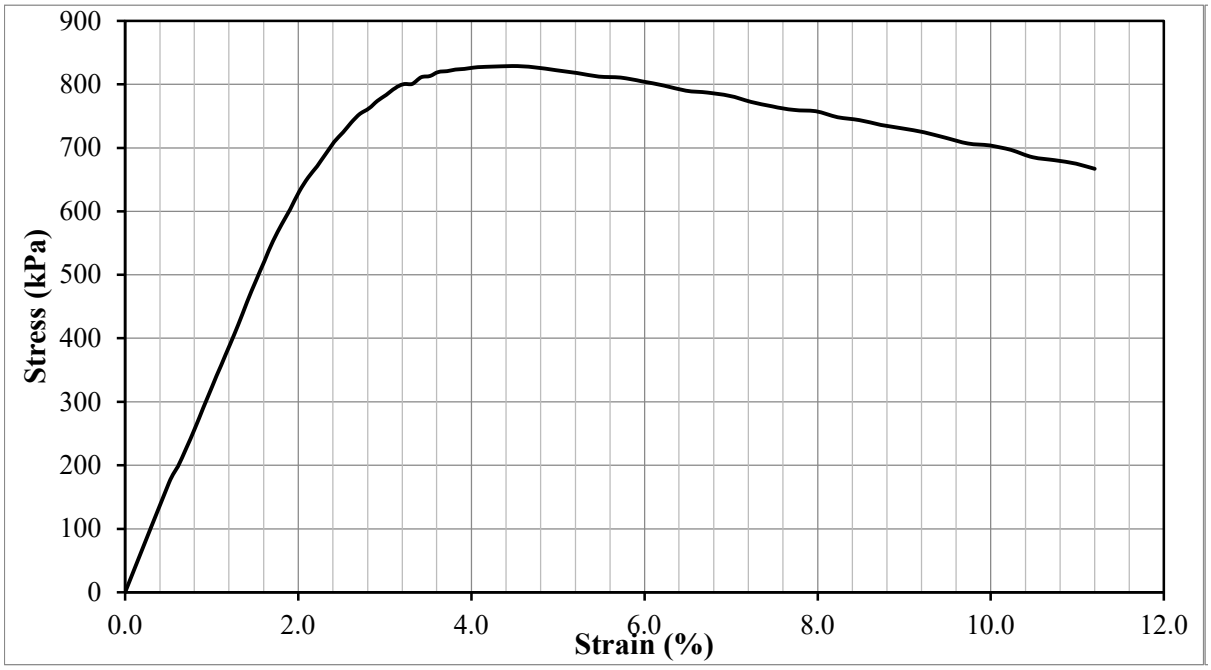
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	433	Strain at failure, εf :	6.82	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	102.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.3	mm
I.D.:	T-28-C	Initial Area:	2063.5	mm^2
Test Date:	4/15/2021	Weight:	348.8	g
Strain Rate:	1 %/min	Unit Weight:	1646	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	14.0	days
$(w:c)_{slurry}$:	1.4	Curing temperature	-5.0	°C
Additional information				



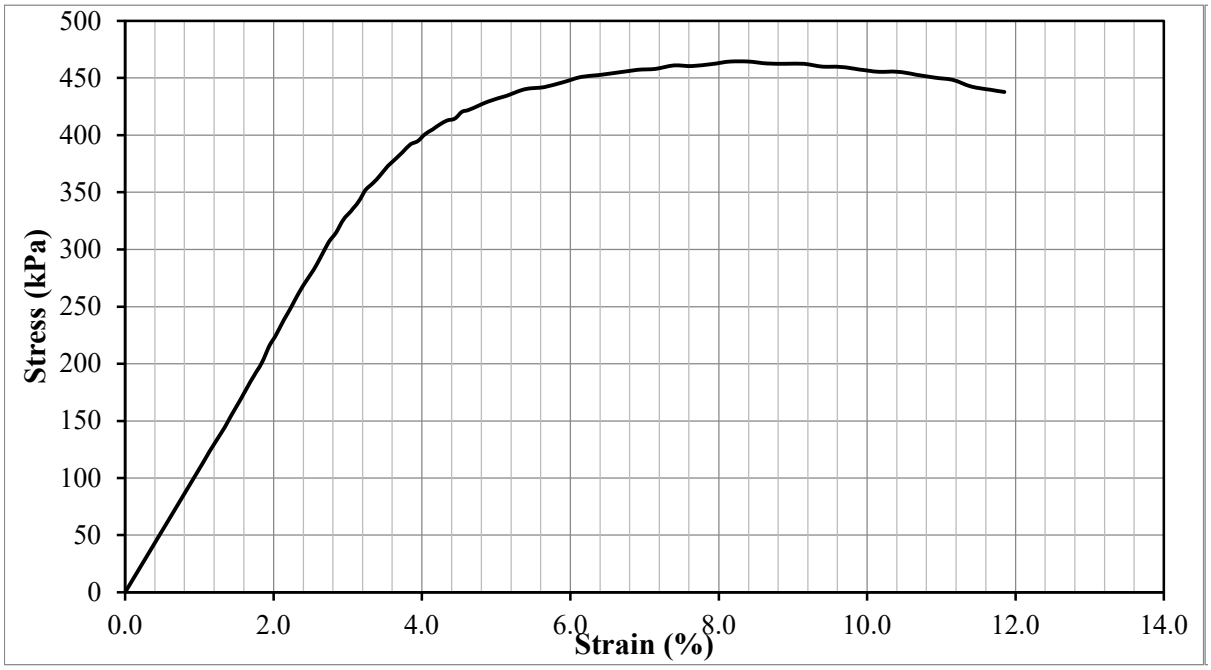
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	523	Strain at failure, εf :	7.45	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	102.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.4	mm
I.D.:	T-28-F	Initial Area:	2073.7	mm^2
Test Date:	4/15/2021	Weight:	341.0	g
Strain Rate:	1 %/min	Unit Weight:	1604	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	13.9	days
$(w:c)_{slurry}$:	1.4	Curing temperature	-5.0	°C
Additional information				



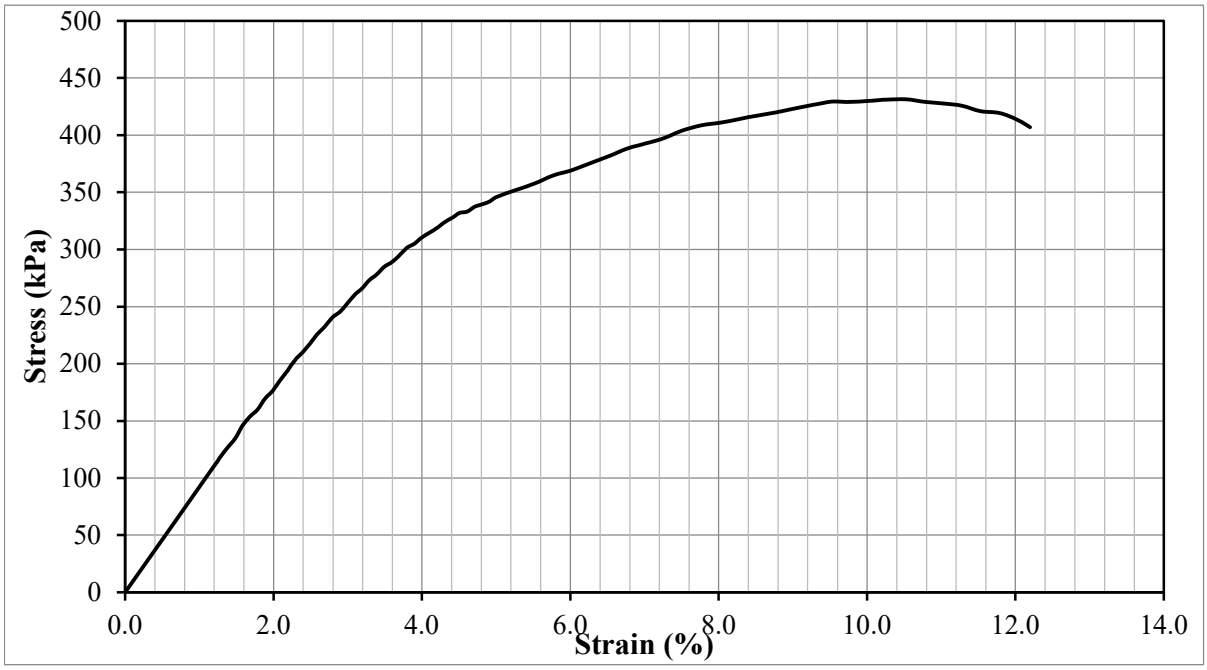
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	828	Strain at failure, εf :	4.47	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.3	mm
I.D.:	T-28-D	Initial Area:	2069.6	mm^2
Test Date:	4/29/2021	Weight:	335.3	g
Strain Rate:	1 %/min	Unit Weight:	1597	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	27.8	days
$(w:c)_{slurry}$:	1.4	Curing temperature	-5.0	°C
Additional information				



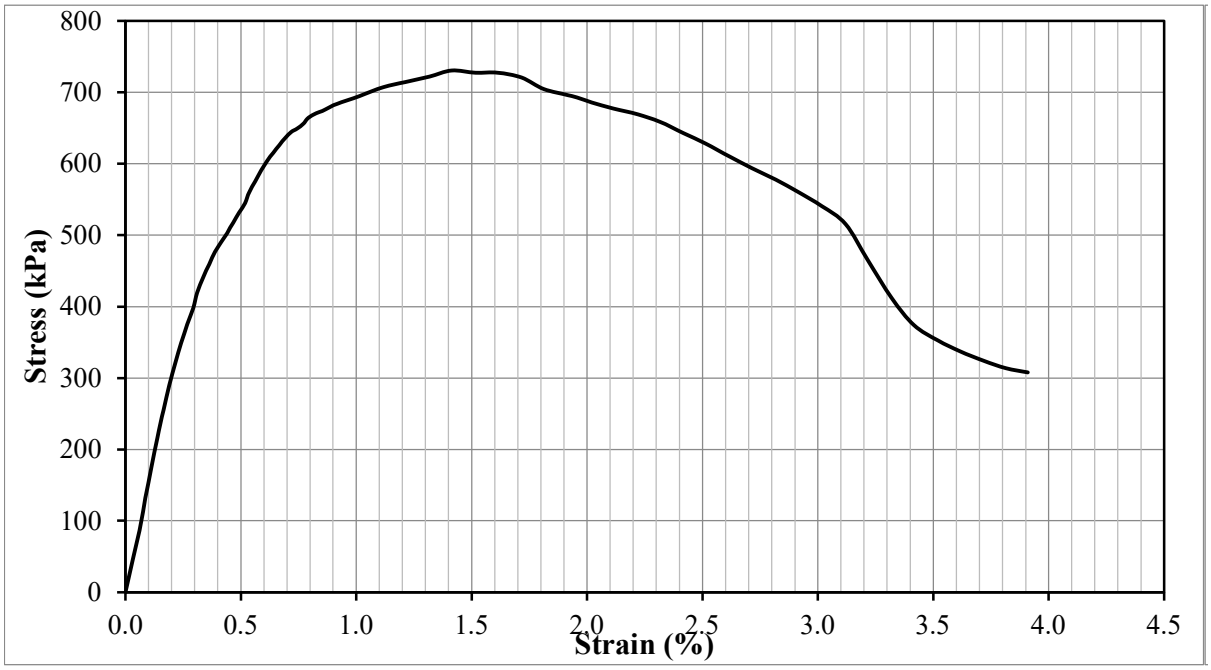
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	463	Strain at failure, εf :	8.15	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.0	mm
I.D.:	T-28-E	Initial Area:	2041.0	mm^2
Test Date:	4/29/2021	Weight:	338.7	g
Strain Rate:	1 %/min	Unit Weight:	1629	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	27.8	days
$(w:c)_{slurry}$:	1.4	Curing temperature	-5.0	°C
Additional information				



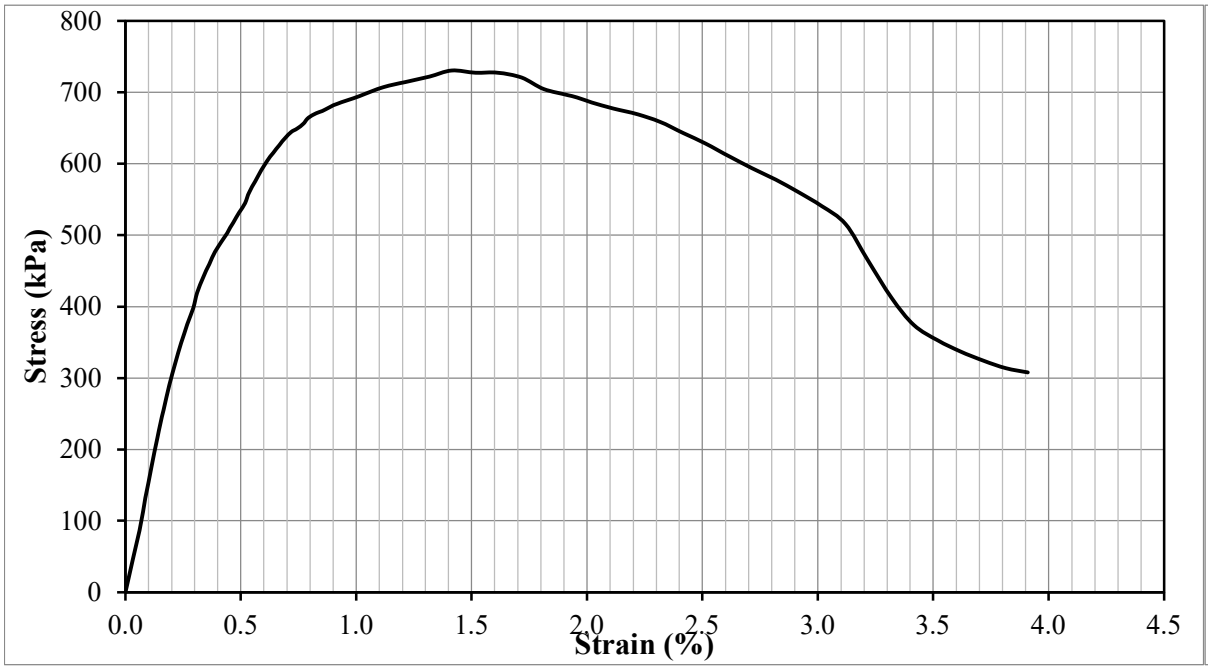
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	426	Strain at failure, εf :	9.52	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-29-A	Initial Area:	2108.7	mm^2
Test Date:	2/28/2021	Weight:	378.5	g
Strain Rate:	1 %/min	Unit Weight:	1811	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	2.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	5.0	°C
Additional information				



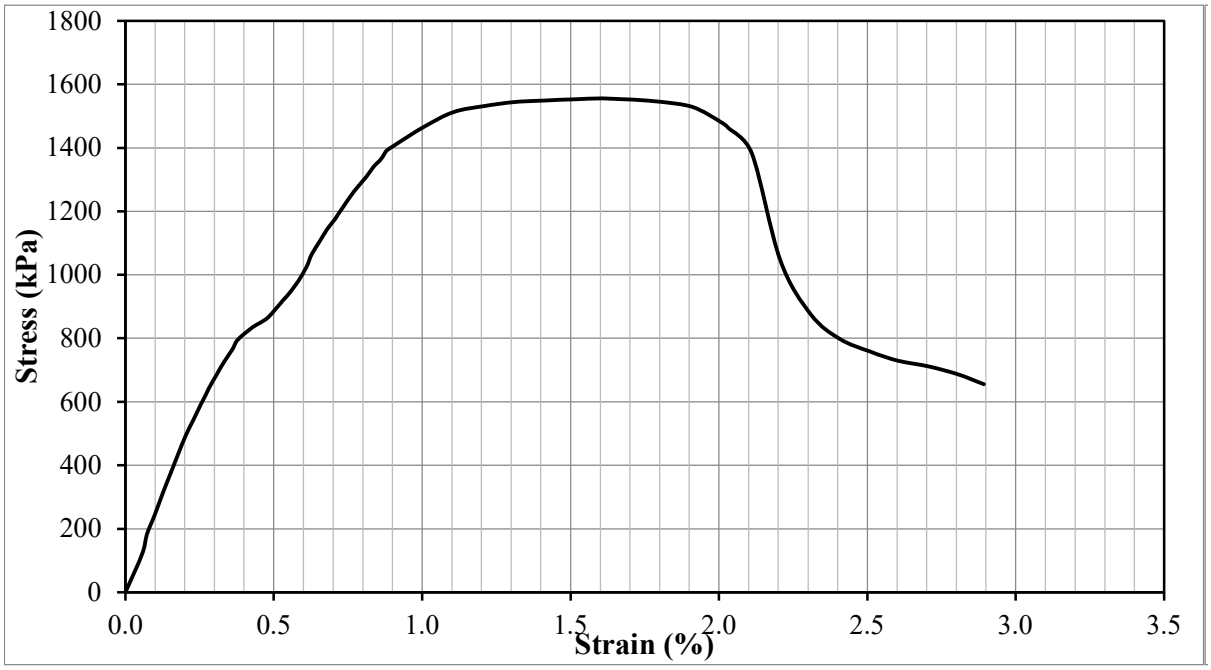
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	725	Strain at failure, εf :	1.41	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-29-H	Initial Area:	2110.8	mm^2
Test Date:	2/28/2021	Weight:	374.5	g
Strain Rate:	1 %/min	Unit Weight:	1811	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	2.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	5.0	°C
Additional information				



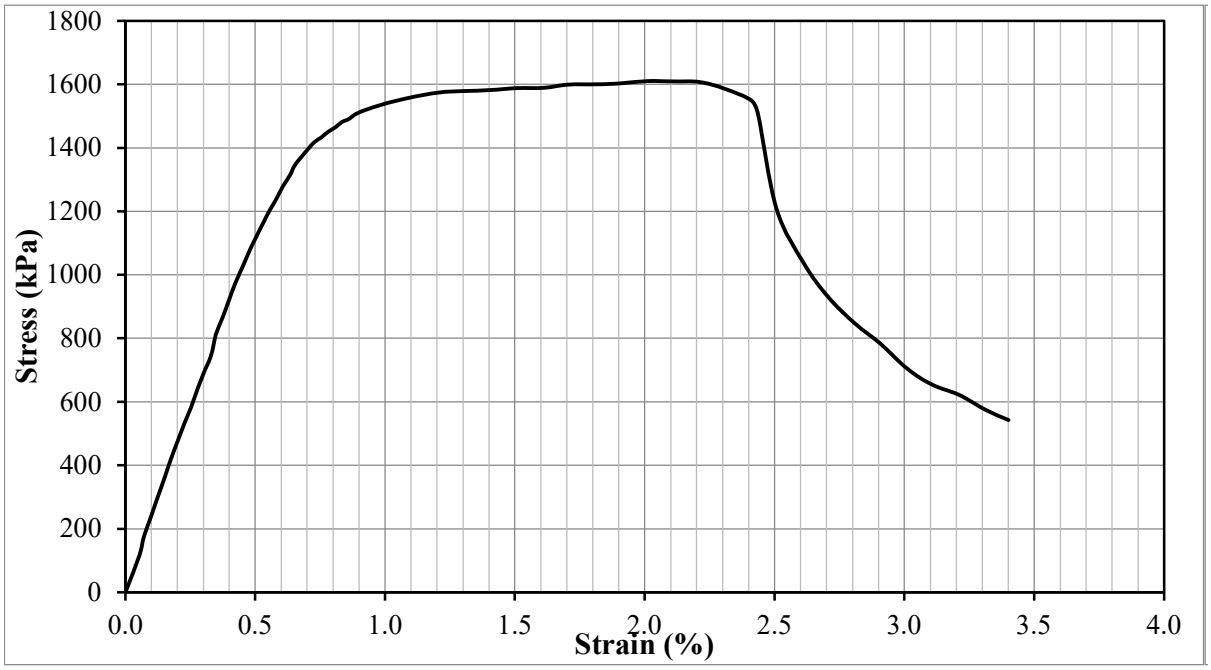
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	705	Strain at failure, εf :	1.62	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-29-B	Initial Area:	2104.6	mm^2
Test Date:	3/4/2021	Weight:	386.0	g
Strain Rate:	1 %/min	Unit Weight:	1817	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	6.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	5.0	°C
Additional information				



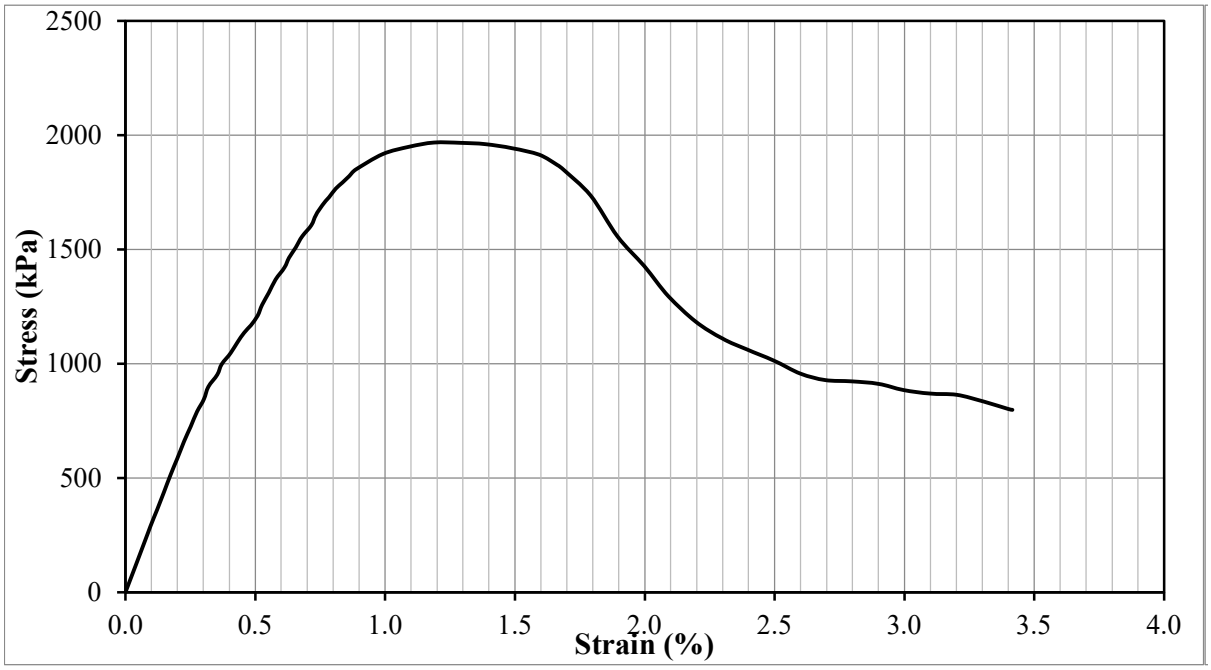
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,549	Strain at failure, εf :	1.61	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	T-29-G	Initial Area:	2102.5	mm^2
Test Date:	3/4/2021	Weight:	389.2	g
Strain Rate:	1 %/min	Unit Weight:	1824	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	6.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	5.0	°C
Additional information				



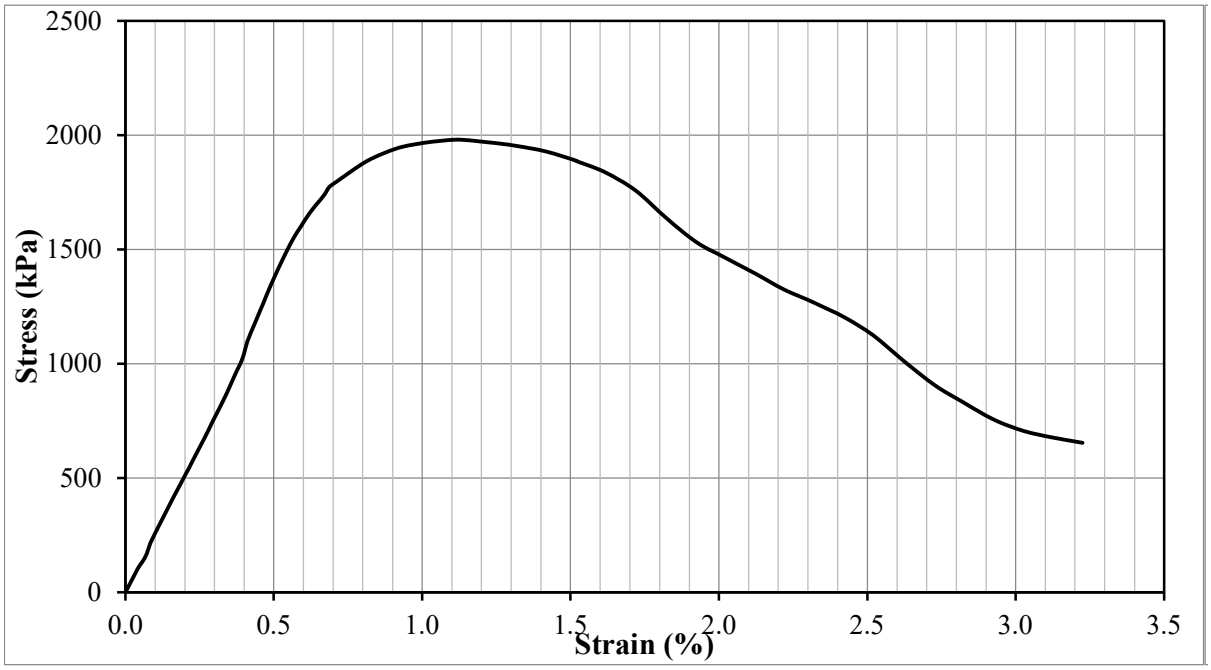
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,605	Strain at failure, εf :	2.01	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-29-C	Initial Area:	2108.7	mm^2
Test Date:	3/11/2021	Weight:	387.6	g
Strain Rate:	1 %/min	Unit Weight:	1813	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	13.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	5.0	°C
Additional information				



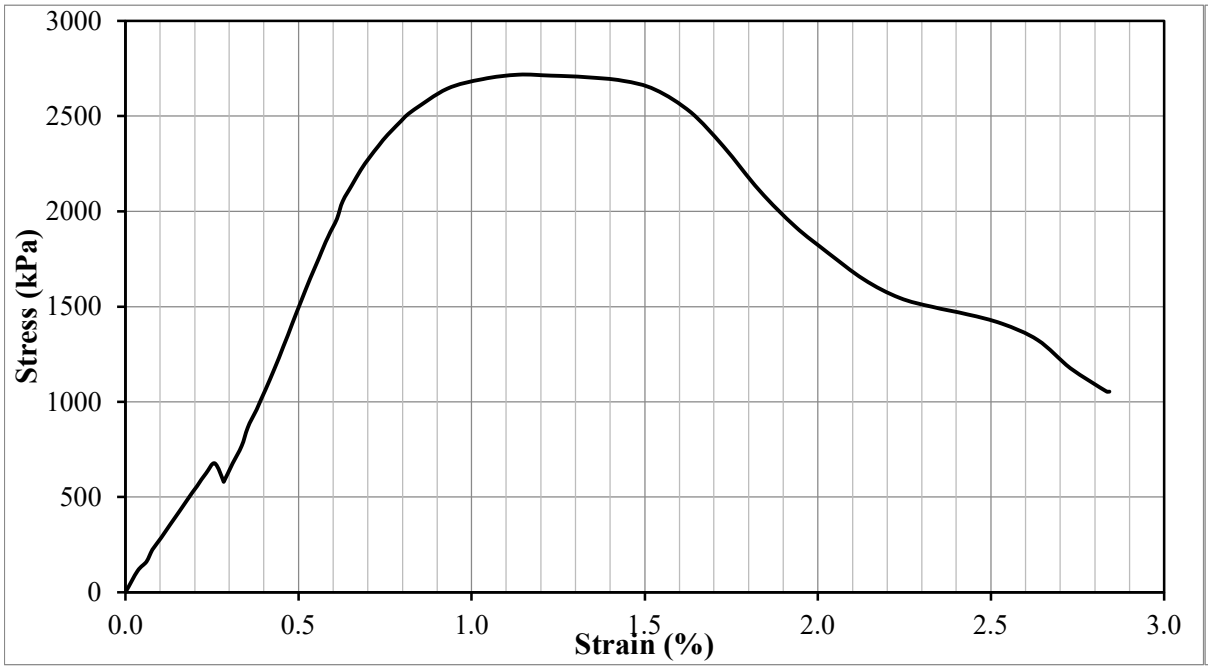
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,960	Strain at failure, εf :	1.19	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	T-29-F	Initial Area:	2100.5	mm^2
Test Date:	3/11/2021	Weight:	387.8	g
Strain Rate:	1 %/min	Unit Weight:	1822	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	13.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	5.0	°C
Additional information				



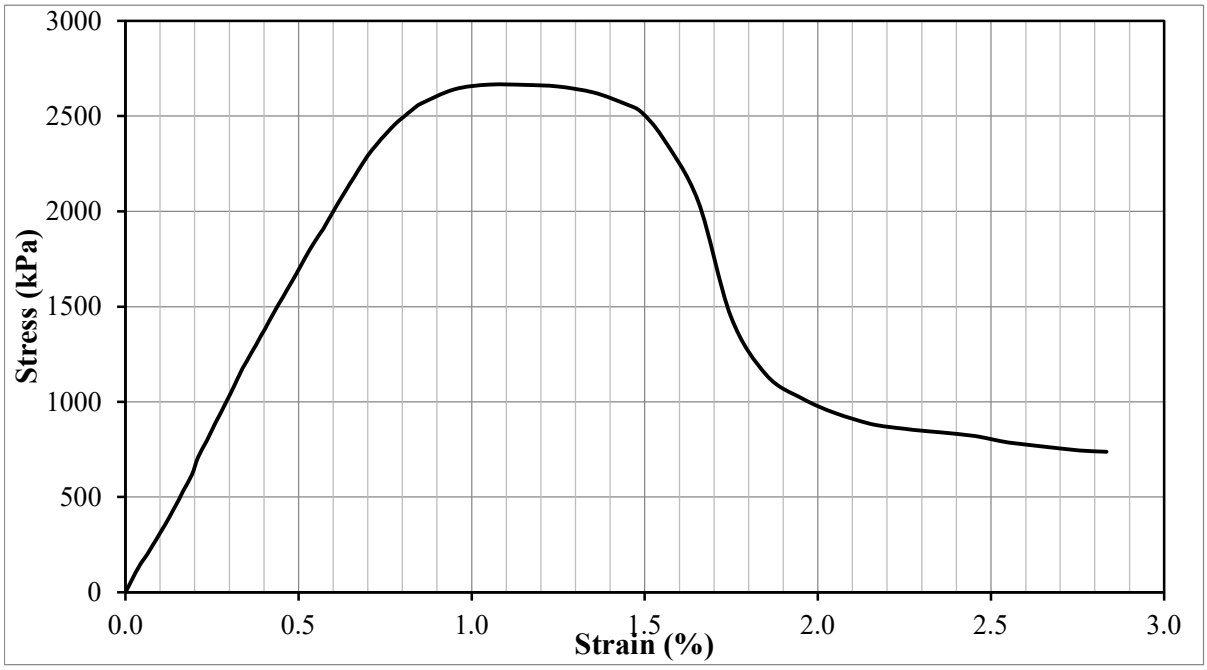
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,973	Strain at failure, εf :	1.12	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	T-29-D	Initial Area:	2102.5	mm^2
Test Date:	3/25/2021	Weight:	388.3	g
Strain Rate:	1 %/min	Unit Weight:	1820	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	28.1	days
$(w:c)_{slurry}$:	0.6	Curing temperature	5.0	°C
Additional information				



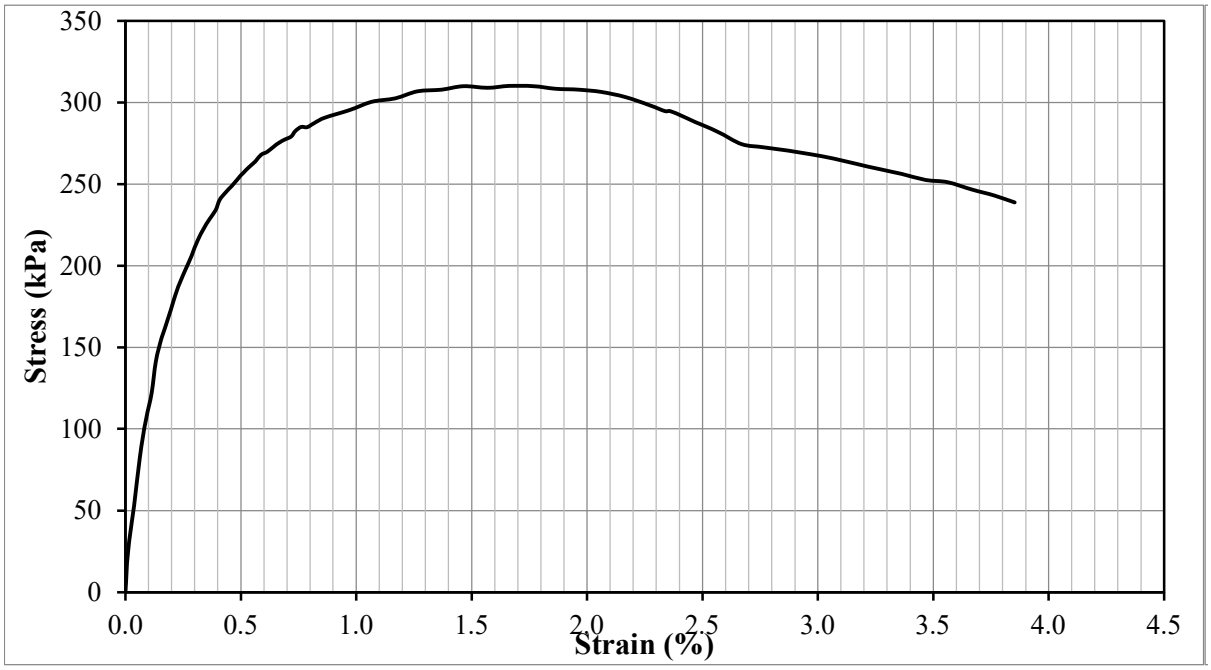
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,708	Strain at failure, εf :	1.14	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-29-E	Initial Area:	2104.6	mm^2
Test Date:	3/25/2021	Weight:	388.0	g
Strain Rate:	1 %/min	Unit Weight:	1821	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	28.1	days
$(w:c)_{slurry}$:	0.6	Curing temperature	5.0	°C
Additional information				



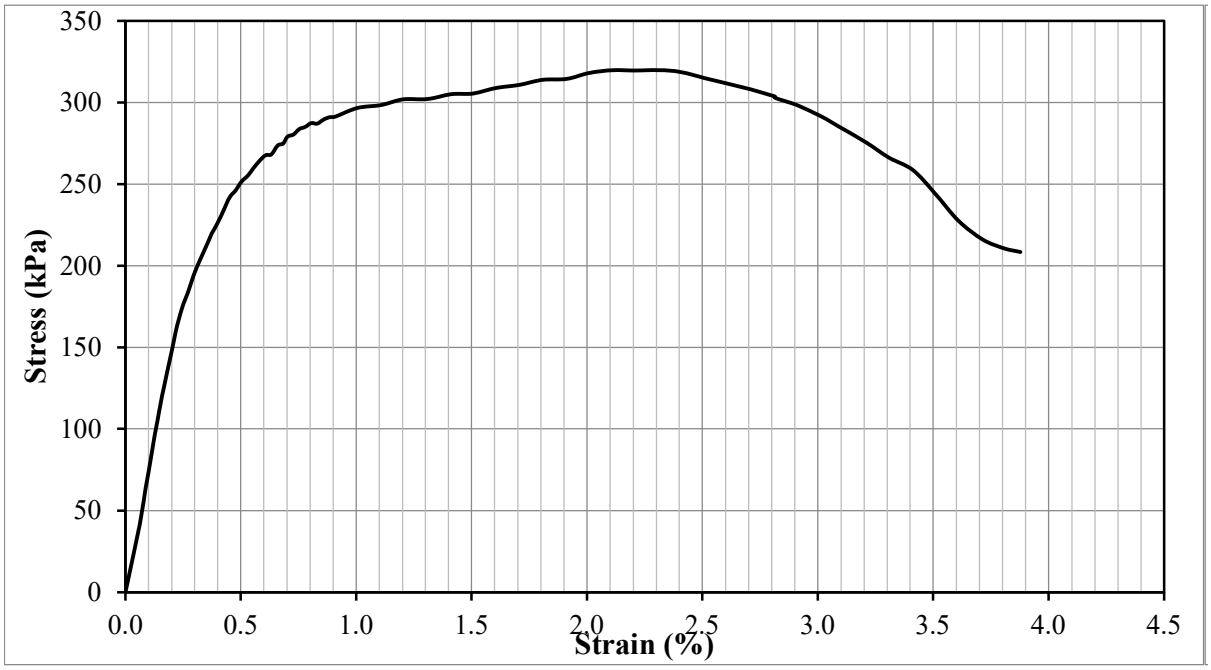
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,655	Strain at failure, εf :	1.05	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-30-A	Initial Area:	2106.6	mm^2
Test Date:	3/1/2021	Weight:	369.9	g
Strain Rate:	1 %/min	Unit Weight:	1777	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	3.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	5.0	°C
Additional information				



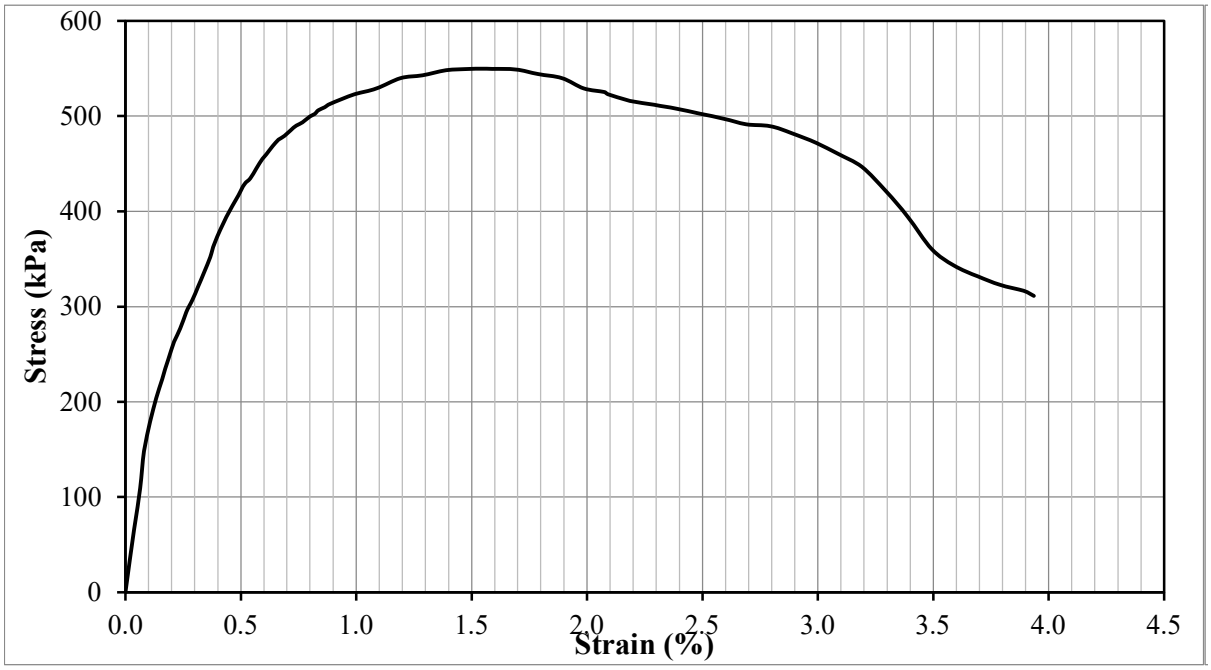
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	308	Strain at failure, εf :	1.66	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-30-H	Initial Area:	2104.6	mm^2
Test Date:	3/1/2021	Weight:	372.1	g
Strain Rate:	1 %/min	Unit Weight:	1780	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	3.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	5.0	°C
Additional information				



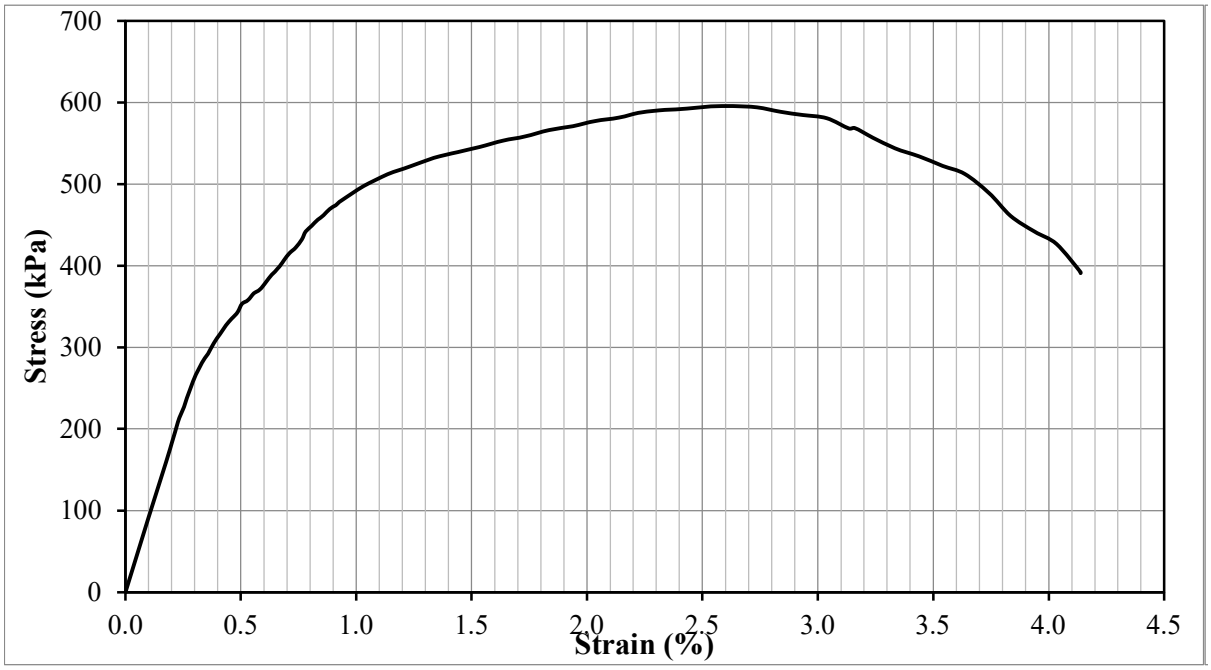
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	318	Strain at failure, εf :	2.31	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-30-B	Initial Area:	2104.6	mm^2
Test Date:	3/5/2021	Weight:	368.8	g
Strain Rate:	1 %/min	Unit Weight:	1781	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	7.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	5.0	°C
Additional information				



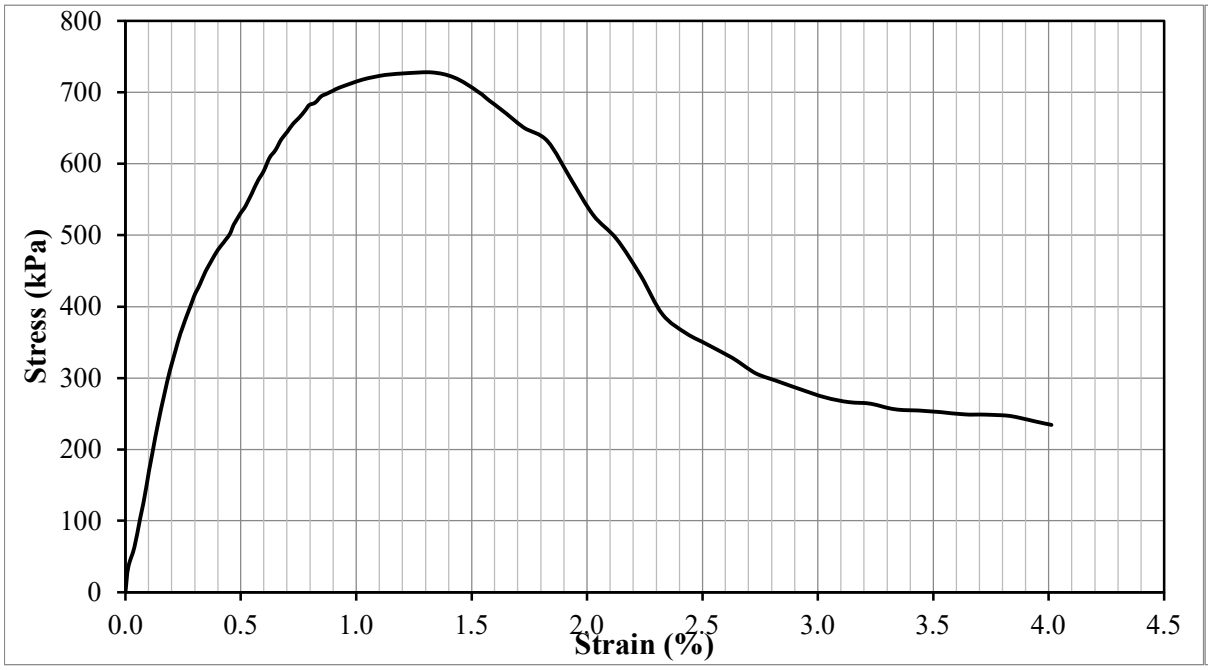
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	545	Strain at failure, εf :	1.59	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	T-30-G	Initial Area:	2117.0	mm^2
Test Date:	3/5/2021	Weight:	369.2	g
Strain Rate:	1 %/min	Unit Weight:	1775	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	7.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	5.0	°C
Additional information				



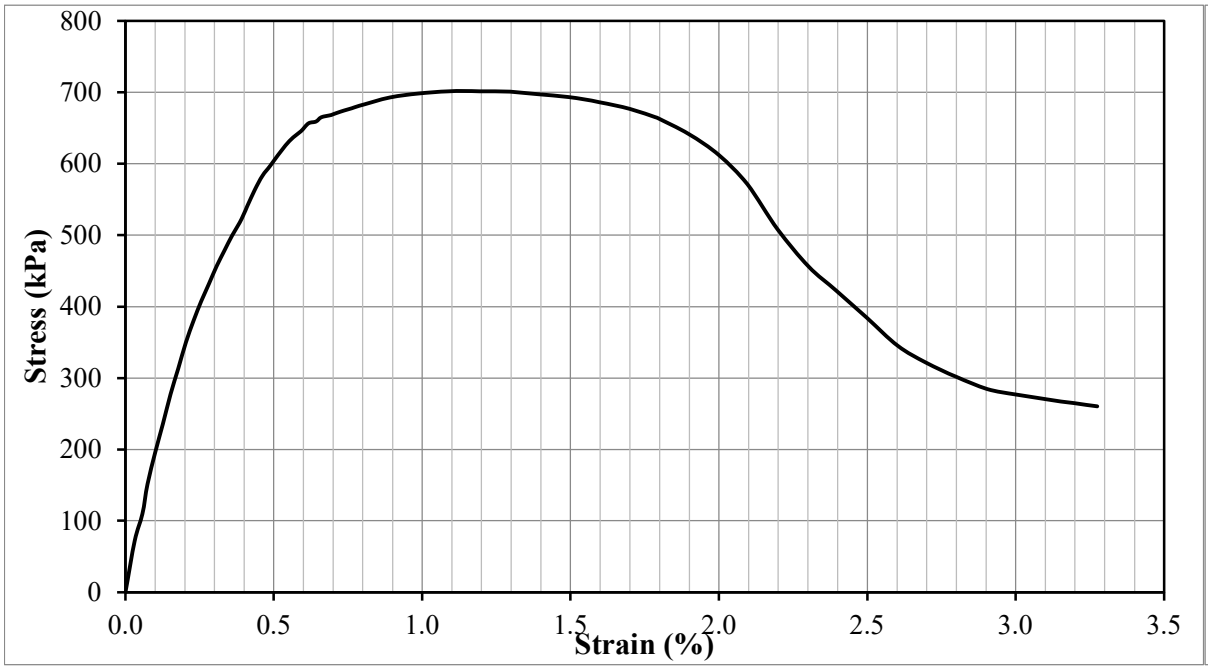
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	590	Strain at failure, εf :	2.63	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	T-30-C	Initial Area:	2112.9	mm^2
Test Date:	3/12/2021	Weight:	368.2	g
Strain Rate:	1 %/min	Unit Weight:	1775	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	14.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	5.0	°C
Additional information				



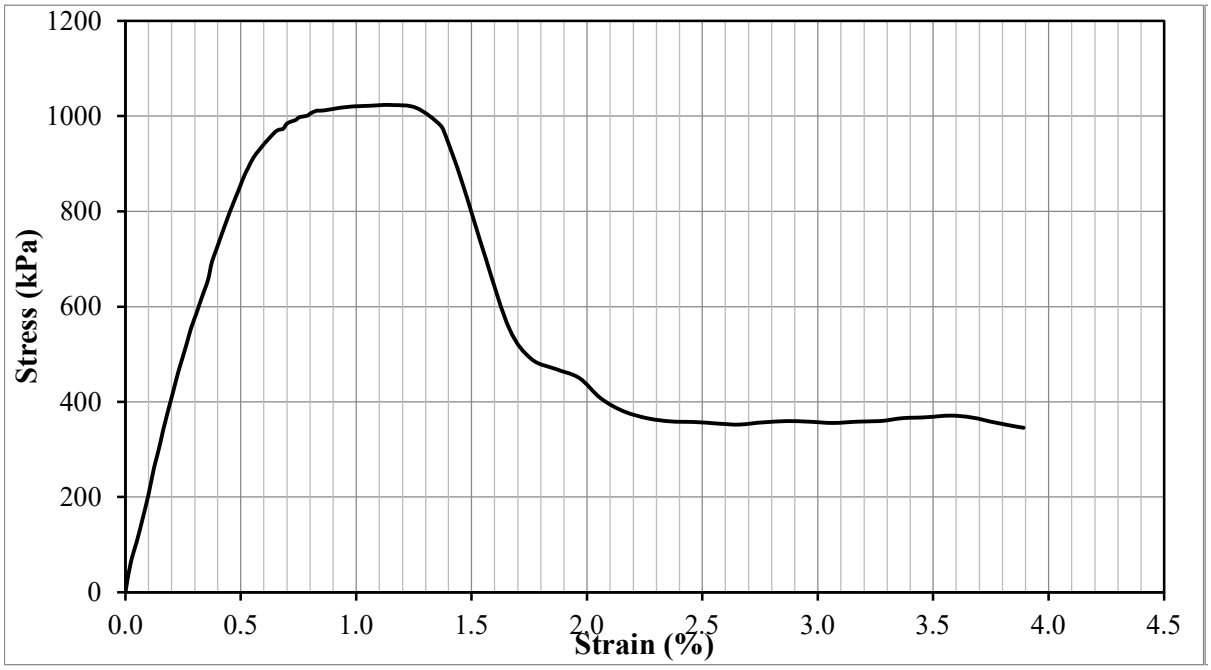
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	722	Strain at failure, εf :	1.33	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-30-F	Initial Area:	2104.6	mm^2
Test Date:	3/12/2021	Weight:	376.0	g
Strain Rate:	1 %/min	Unit Weight:	1785	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	14.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	5.0	°C
Additional information				



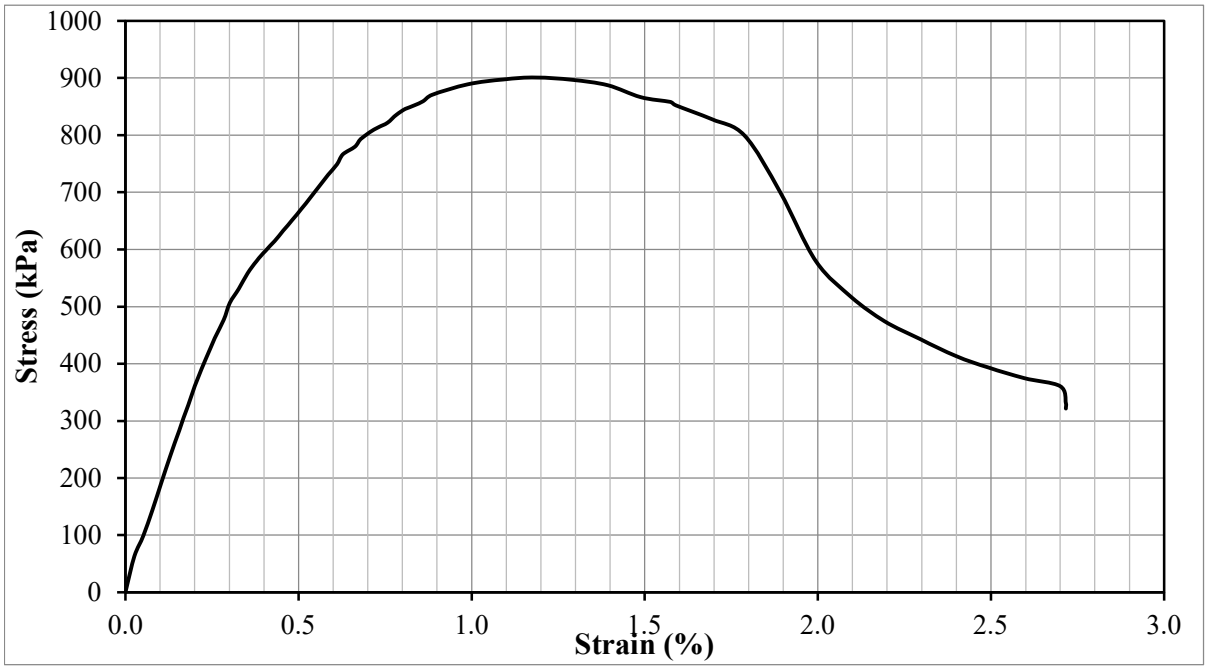
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	698	Strain at failure, εf :	1.19	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	T-30-D	Initial Area:	2098.4	mm^2
Test Date:	3/26/2021	Weight:	372.5	g
Strain Rate:	1 %/min	Unit Weight:	1793	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	5.0	°C
Additional information				



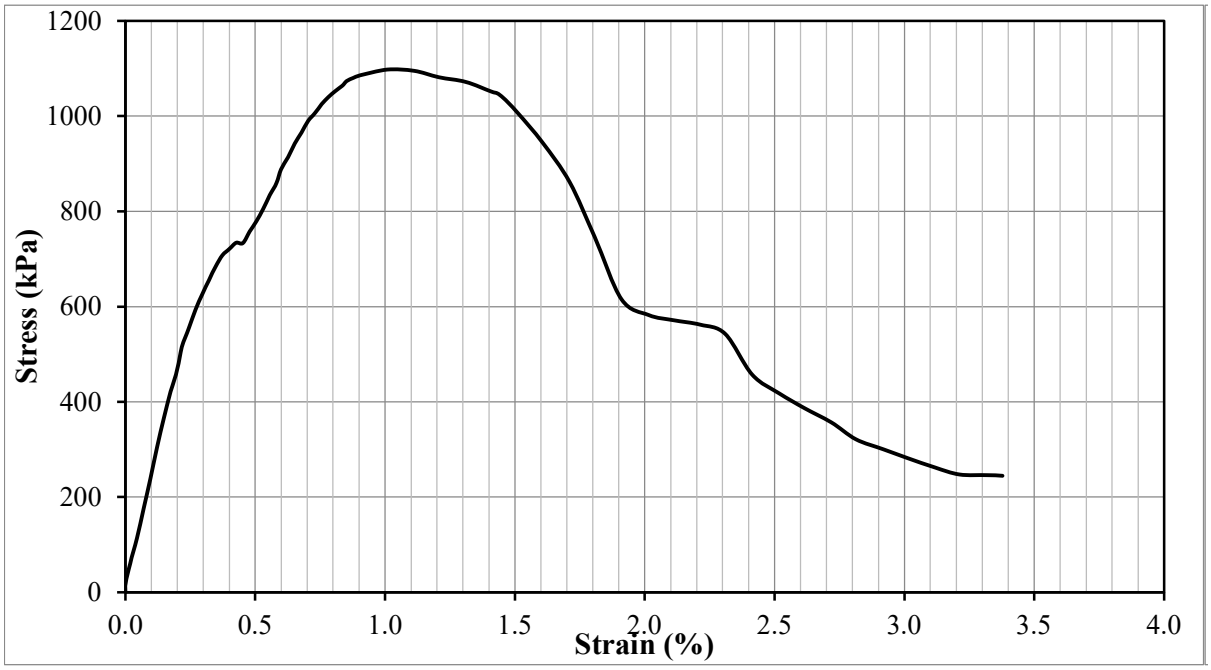
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,016	Strain at failure, εf :	1.16	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-30-E	Initial Area:	2106.6	mm^2
Test Date:	3/26/2021	Weight:	371.7	g
Strain Rate:	1 %/min	Unit Weight:	1783	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	5.0	°C
Additional information				



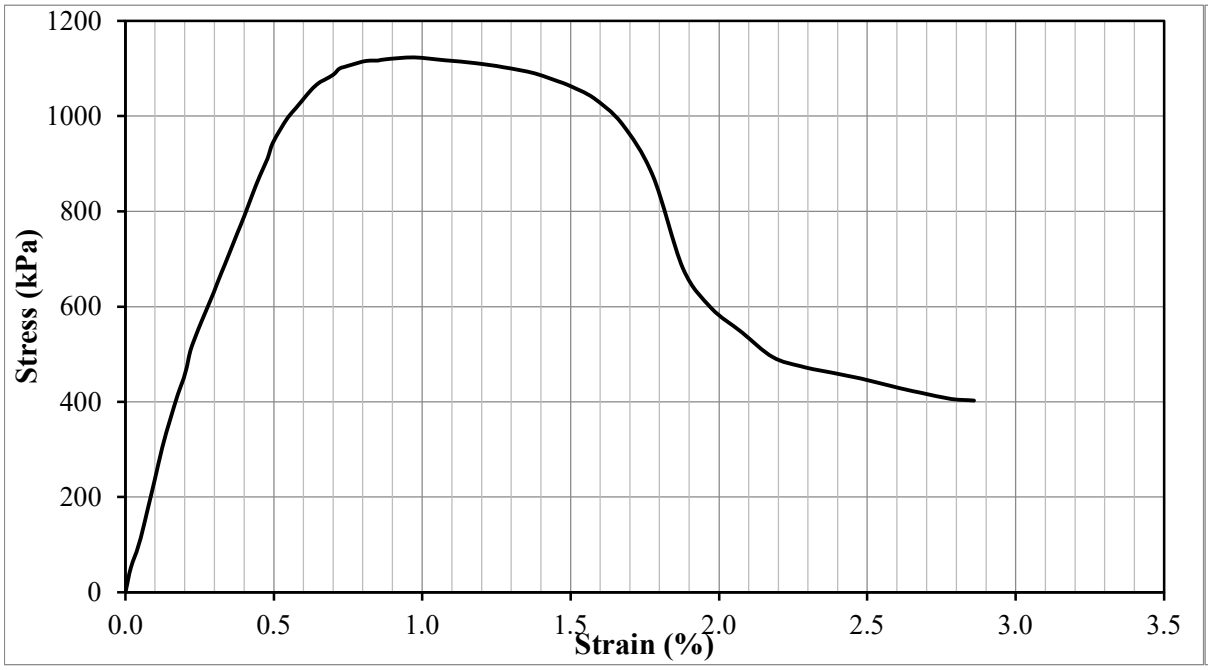
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	894	Strain at failure, εf :	1.19	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-31-A	Initial Area:	2104.6	mm^2
Test Date:	3/2/2021	Weight:	353.1	g
Strain Rate:	1 %/min	Unit Weight:	1716	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	2.8	days
$(w:c)_{slurry}$:	1.0	Curing temperature	5.0	°C
Additional information				



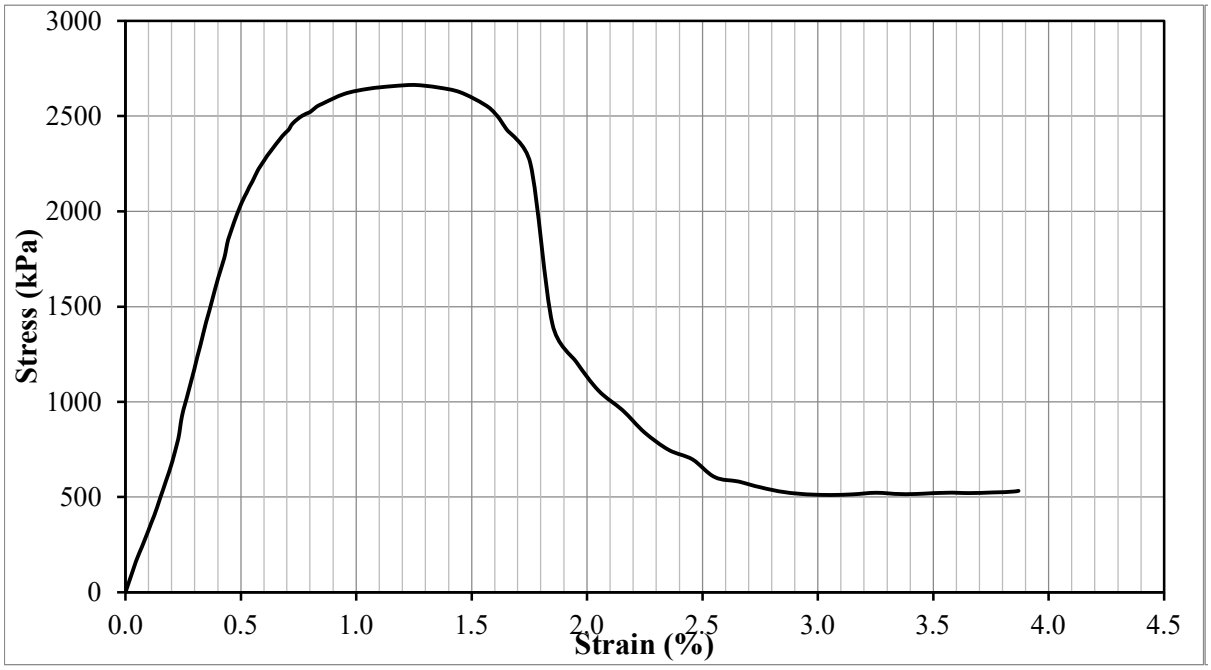
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,088	Strain at failure, εf :	1.01	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.6	mm
I.D.:	T-31-H	Initial Area:	2094.3	mm^2
Test Date:	3/2/2021	Weight:	361.7	g
Strain Rate:	1 %/min	Unit Weight:	1725	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	2.8	days
$(w:c)_{slurry}$:	1.0	Curing temperature	5.0	°C
Additional information				



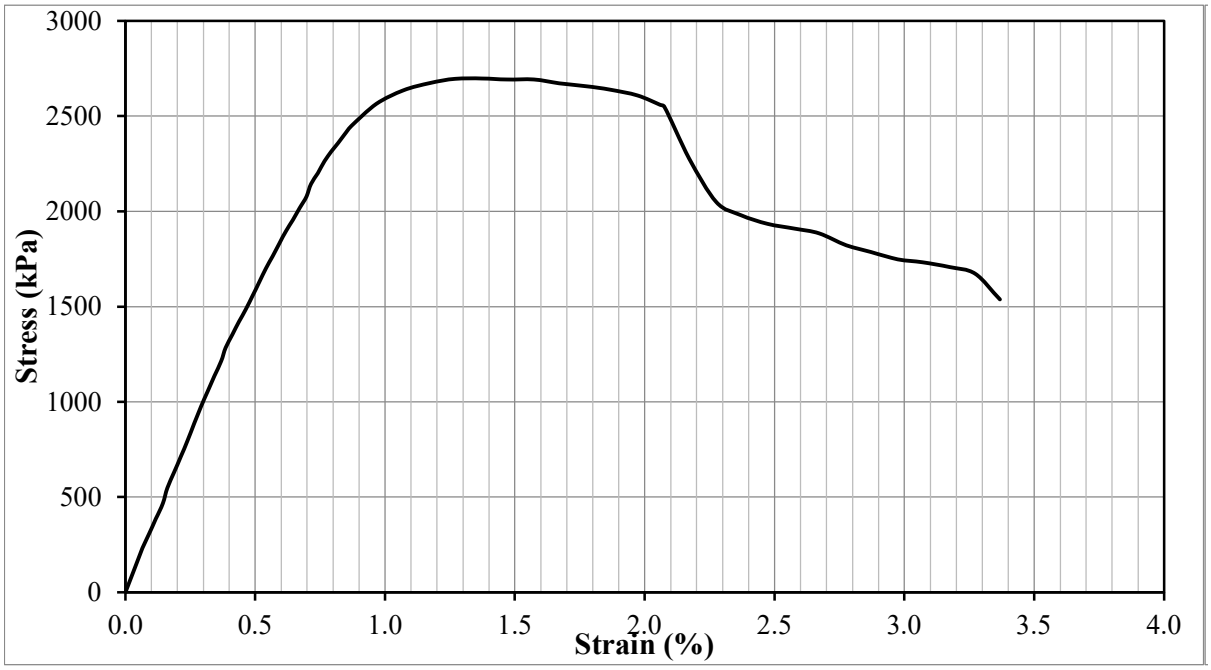
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,118	Strain at failure, εf :	0.97	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	T-31-B	Initial Area:	2102.5	mm^2
Test Date:	3/6/2021	Weight:	364.4	g
Strain Rate:	1 %/min	Unit Weight:	1717	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	6.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	5.0	°C
Additional information				



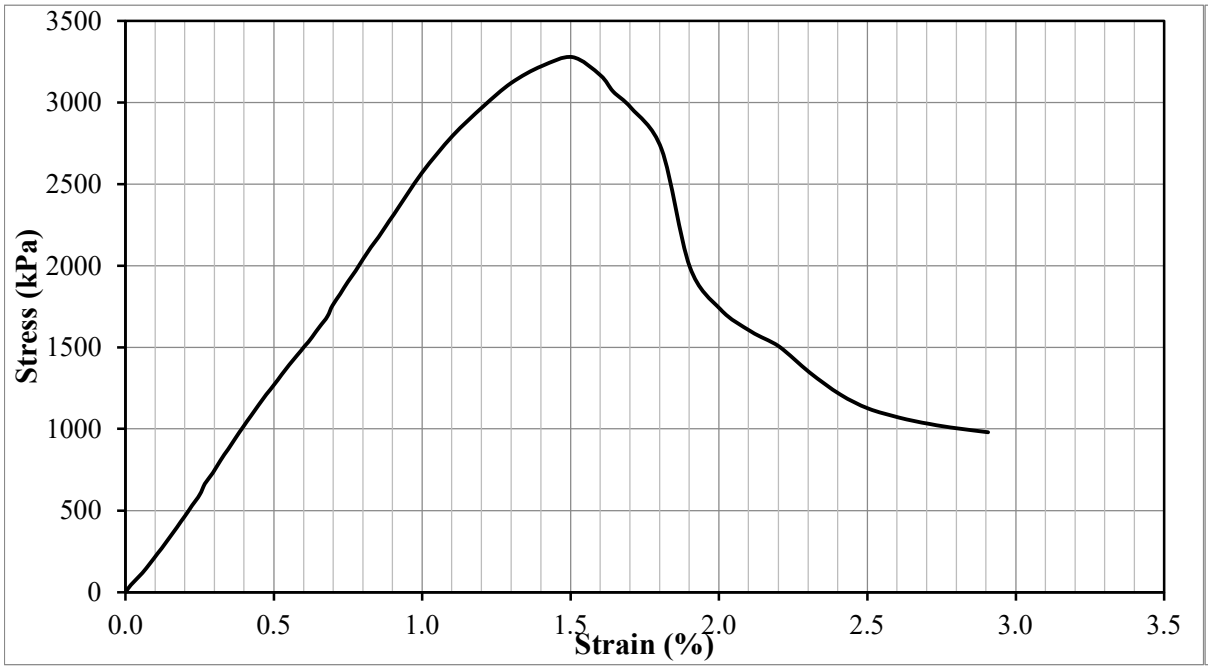
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,652	Strain at failure, εf :	1.25	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-31-G	Initial Area:	2104.6	mm^2
Test Date:	3/6/2021	Weight:	364.2	g
Strain Rate:	1 %/min	Unit Weight:	1713	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	6.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	5.0	°C
Additional information				



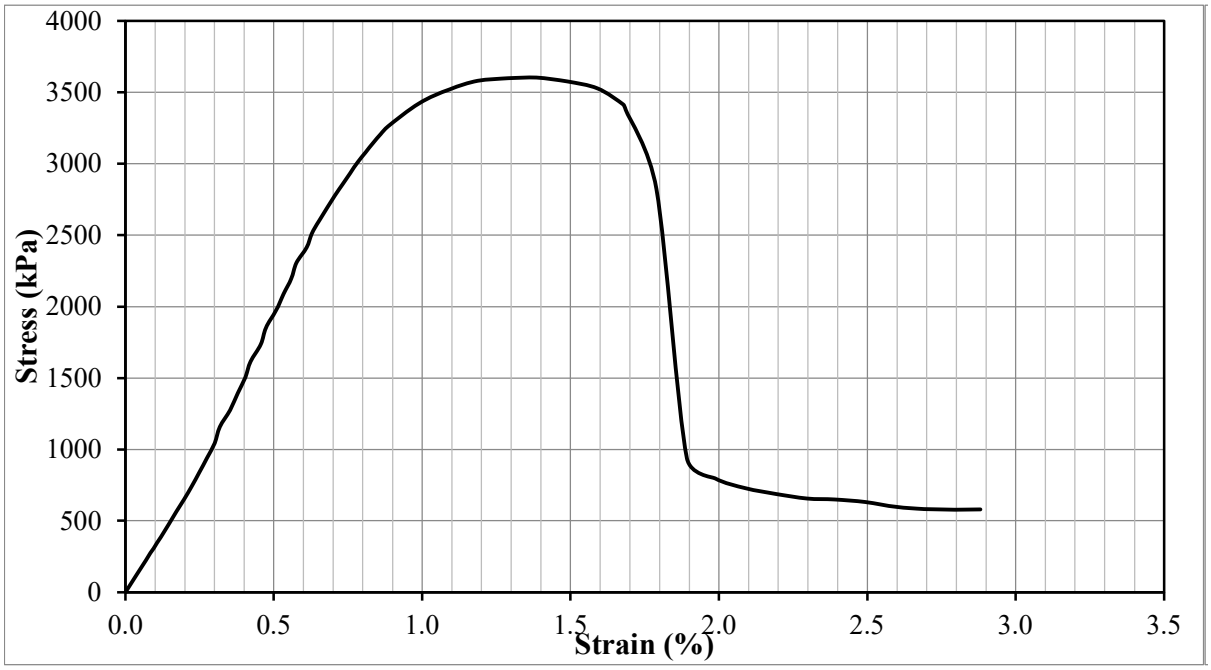
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,687	Strain at failure, εf :	1.37	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-31-C	Initial Area:	2106.6	mm^2
Test Date:	3/13/2021	Weight:	358.8	g
Strain Rate:	1 %/min	Unit Weight:	1710	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	13.6	days
$(w:c)_{slurry}$:	1.0	Curing temperature	5.0	°C
Additional information				



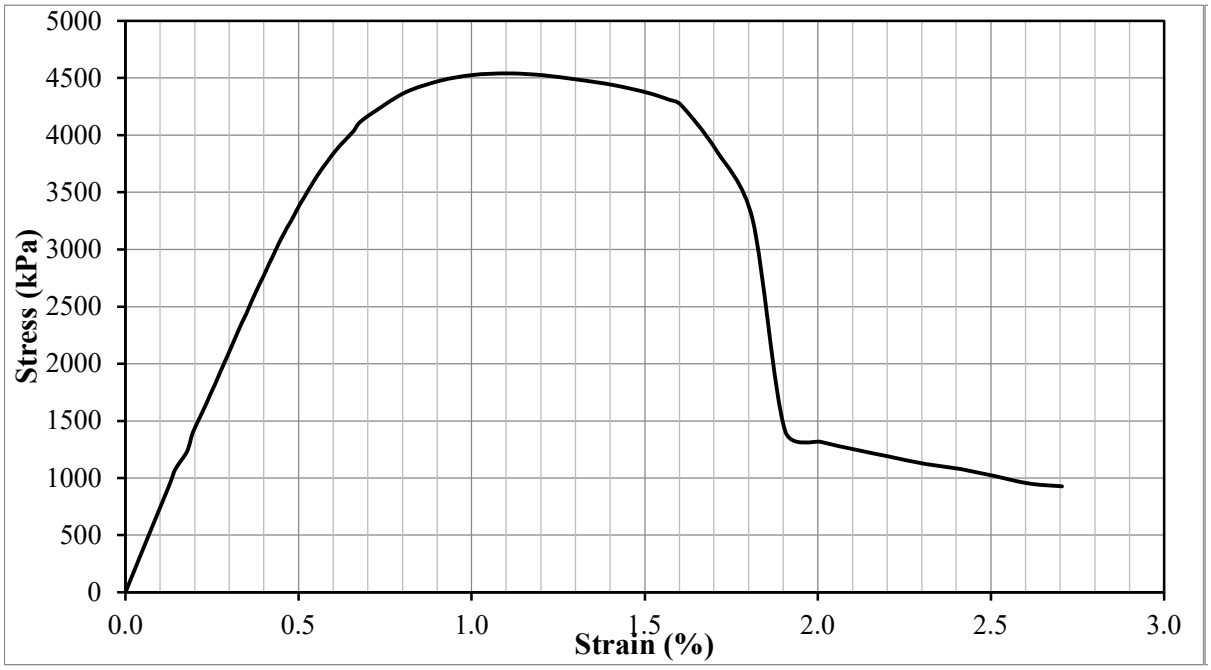
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,257	Strain at failure, εf :	1.51	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	T-31-F	Initial Area:	2100.5	mm^2
Test Date:	3/13/2021	Weight:	361.8	g
Strain Rate:	1 %/min	Unit Weight:	1717	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	13.6	days
$(w:c)_{slurry}$:	1.0	Curing temperature	5.0	°C
Additional information				



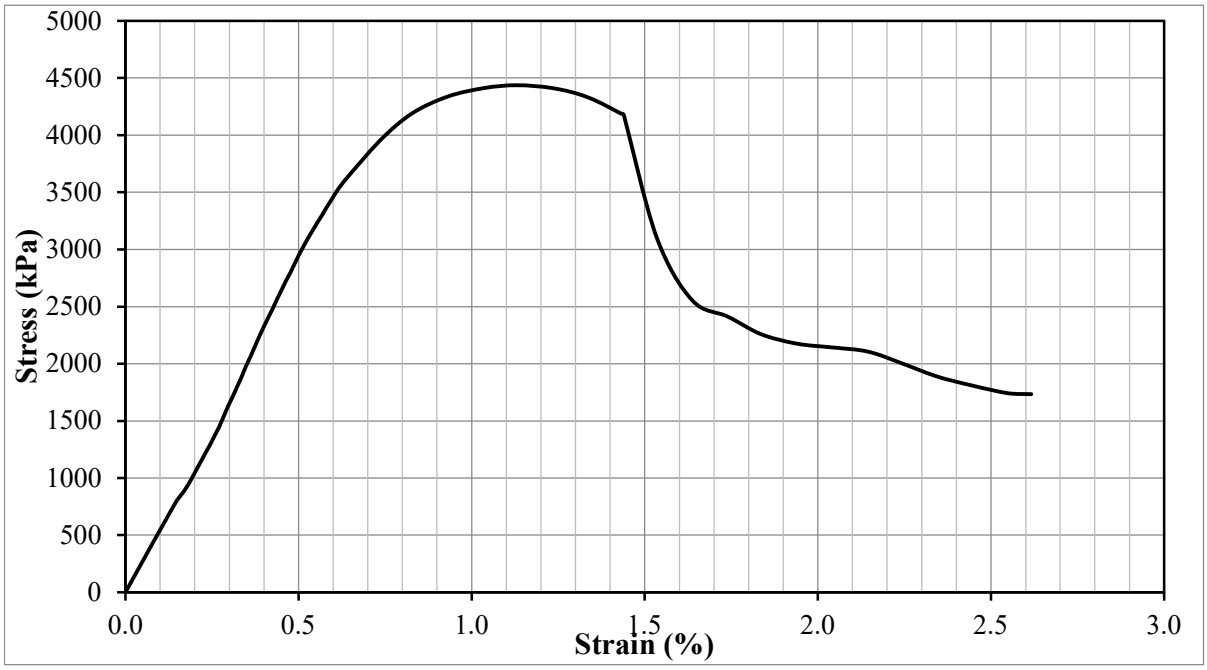
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,585	Strain at failure, εf :	1.39	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	T-31-D	Initial Area:	2102.5	mm^2
Test Date:	3/27/2021	Weight:	365.6	g
Strain Rate:	1 %/min	Unit Weight:	1718	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	27.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	5.0	°C
Additional information				



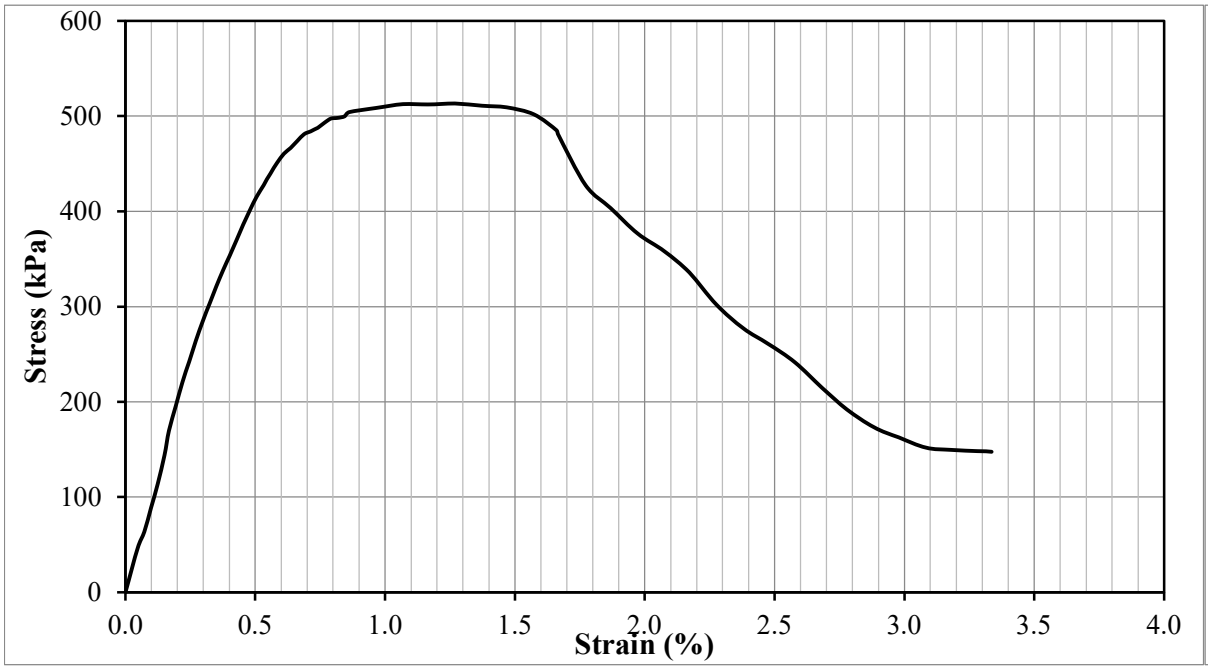
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,524	Strain at failure, εf :	1.11	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	T-31-E	Initial Area:	2102.5	mm^2
Test Date:	3/27/2021	Weight:	365.6	g
Strain Rate:	1 %/min	Unit Weight:	1718	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	27.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	5.0	°C
Additional information				



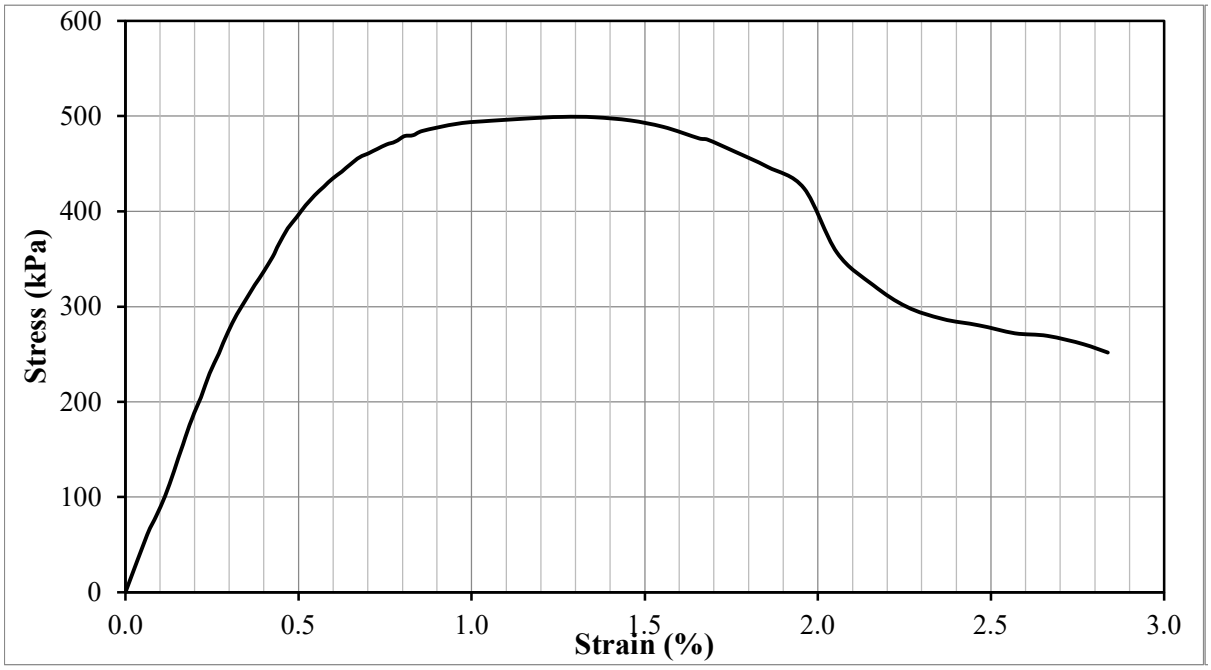
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,420	Strain at failure, εf :	1.13	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	95.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.6	mm
I.D.:	T-32-A	Initial Area:	2090.1	mm^2
Test Date:	3/3/2021	Weight:	333.3	g
Strain Rate:	1 %/min	Unit Weight:	1664	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	3.2	days
$(w:c)_{slurry}$:	1.4	Curing temperature	5.0	°C
Additional information				



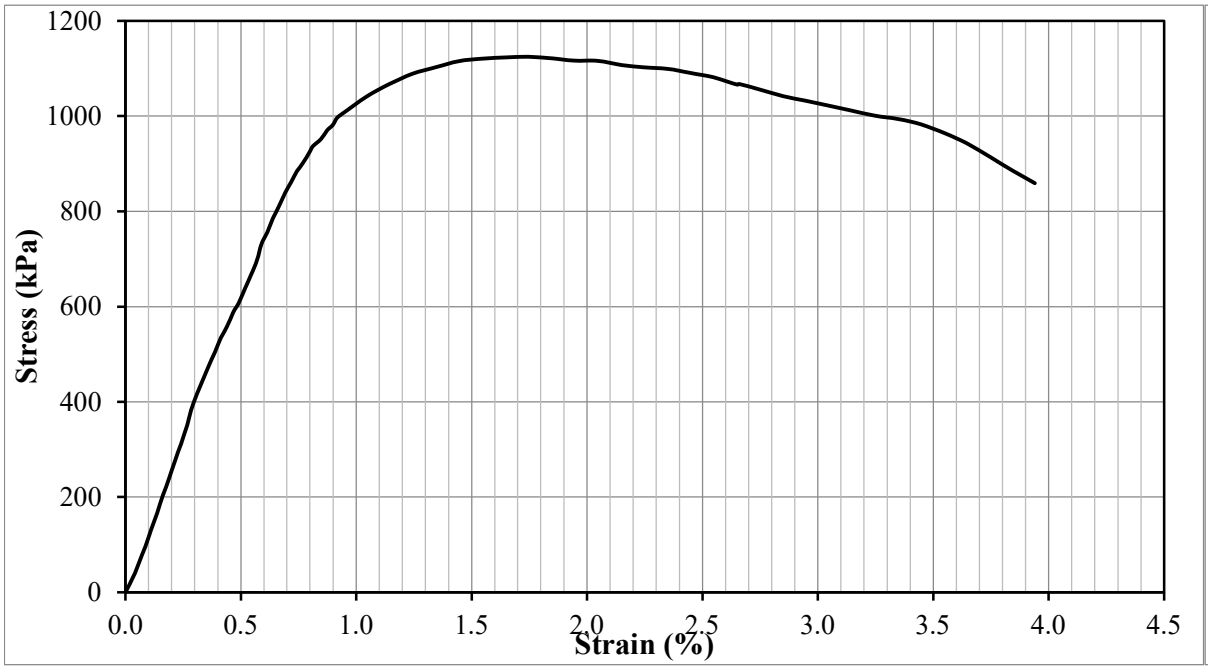
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	507	Strain at failure, εf :	1.27	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	94.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	T-32-H	Initial Area:	2098.4	mm^2
Test Date:	3/3/2021	Weight:	327.6	g
Strain Rate:	1 %/min	Unit Weight:	1658	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	3.2	days
$(w:c)_{slurry}$:	1.4	Curing temperature	5.0	°C
Additional information				



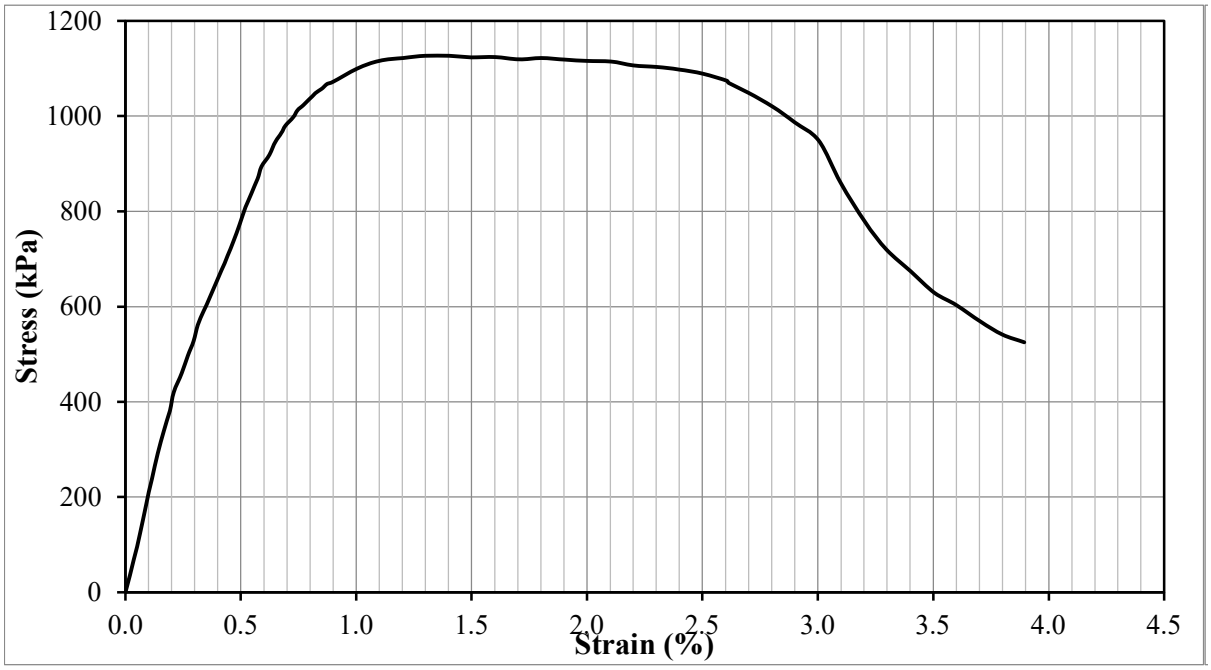
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	492	Strain at failure, εf :	1.26	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-32-B	Initial Area:	2106.6	mm^2
Test Date:	3/7/2021	Weight:	340.1	g
Strain Rate:	1 %/min	Unit Weight:	1650	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	7.2	days
$(w:c)_{slurry}$:	1.4	Curing temperature	5.0	°C
Additional information				



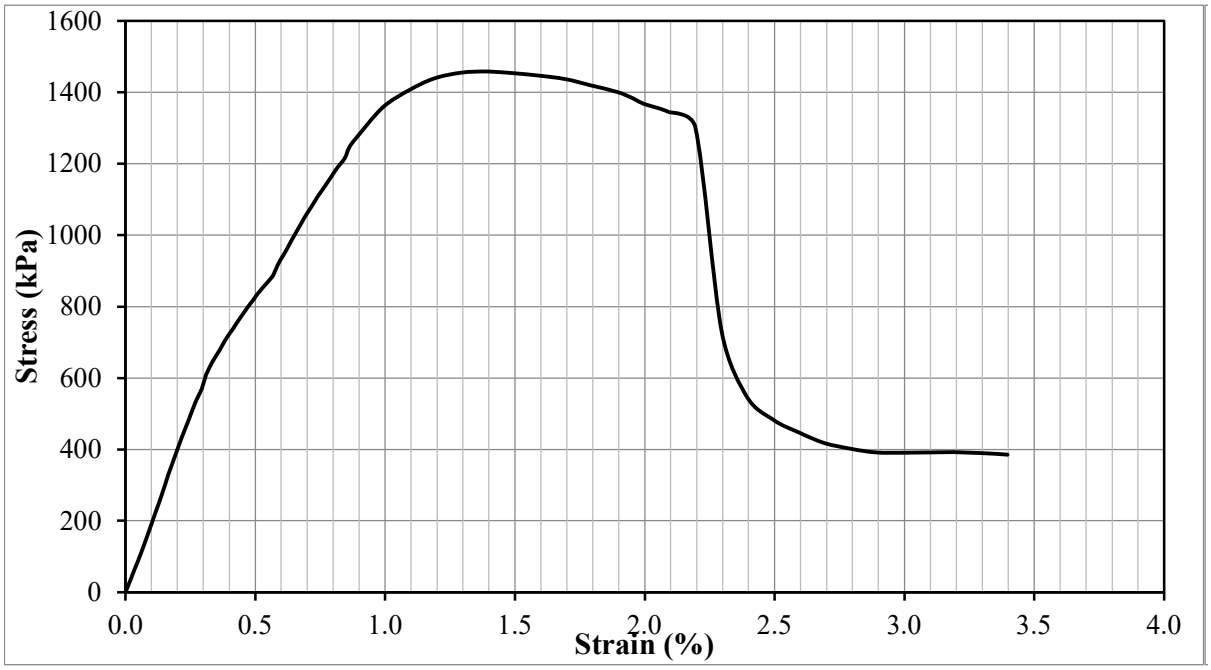
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,115	Strain at failure, εf :	1.74	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	96.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-32-G	Initial Area:	2108.7	mm^2
Test Date:	3/7/2021	Weight:	334.3	g
Strain Rate:	1 %/min	Unit Weight:	1646	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	7.2	days
$(w:c)_{slurry}$:	1.4	Curing temperature	5.0	°C
Additional information				



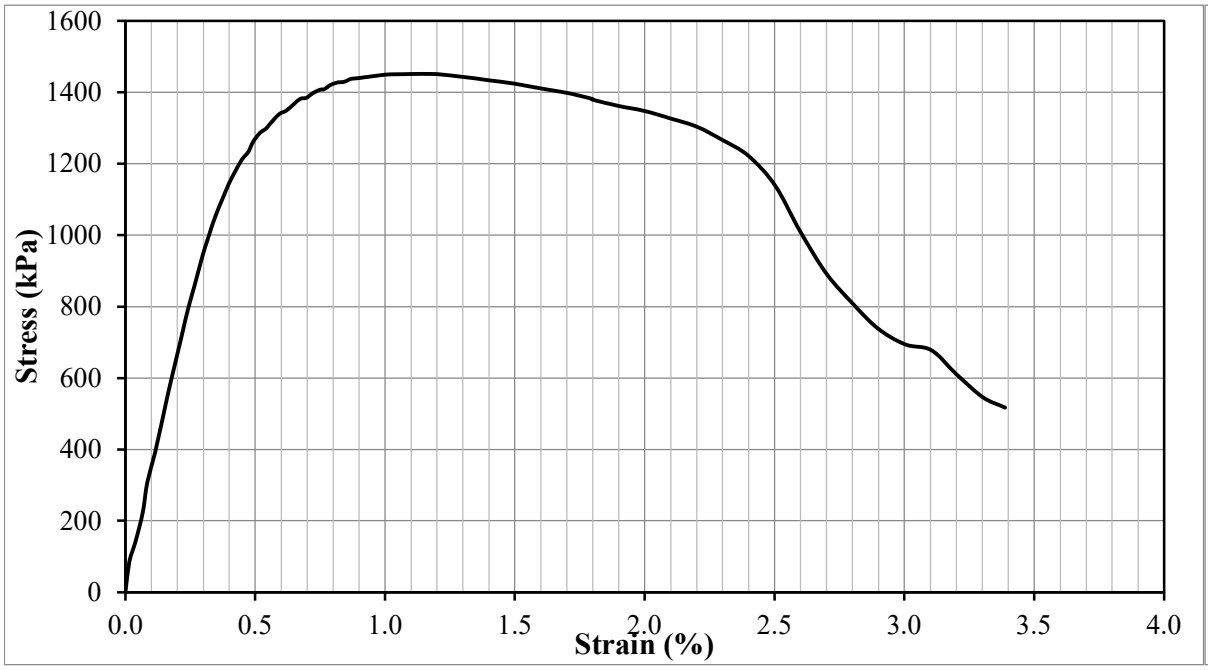
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,114	Strain at failure, εf :	1.30	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	96.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-32-C	Initial Area:	2104.6	mm^2
Test Date:	3/14/2021	Weight:	334.1	g
Strain Rate:	1 %/min	Unit Weight:	1652	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	14.2	days
$(w:c)_{slurry}$:	1.4	Curing temperature	5.0	°C
Additional information				



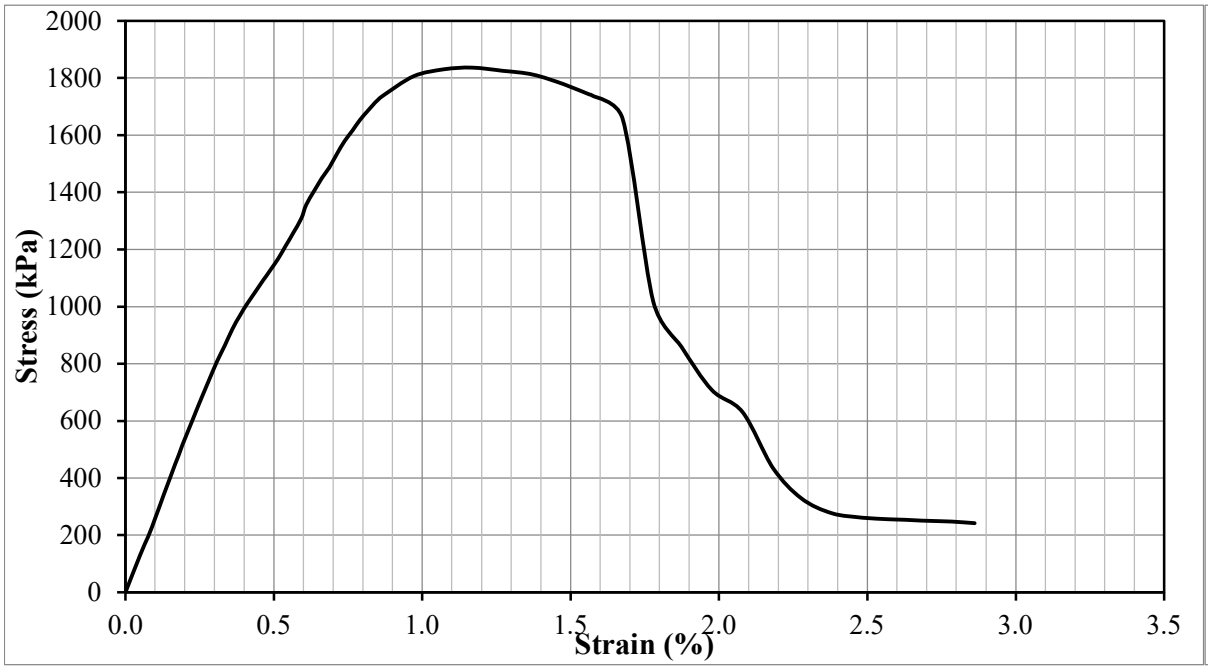
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,441	Strain at failure, εf :	1.39	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	T-32-F	Initial Area:	2102.5	mm^2
Test Date:	3/14/2021	Weight:	342.4	g
Strain Rate:	1 %/min	Unit Weight:	1655	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	14.2	days
$(w:c)_{slurry}$:	1.4	Curing temperature	5.0	°C
Additional information				



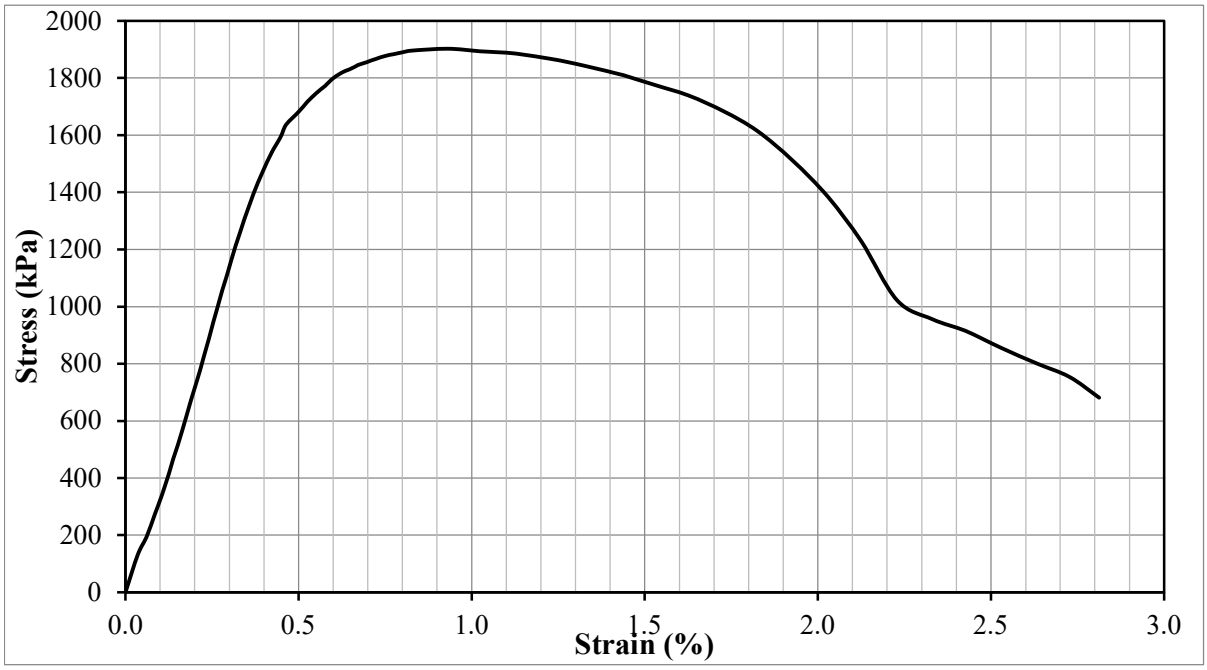
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,439	Strain at failure, εf :	1.09	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-32-D	Initial Area:	2104.6	mm^2
Test Date:	3/28/2021	Weight:	349.9	g
Strain Rate:	1 %/min	Unit Weight:	1677	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	28.3	days
$(w:c)_{slurry}$:	1.4	Curing temperature	5.0	°C
Additional information				



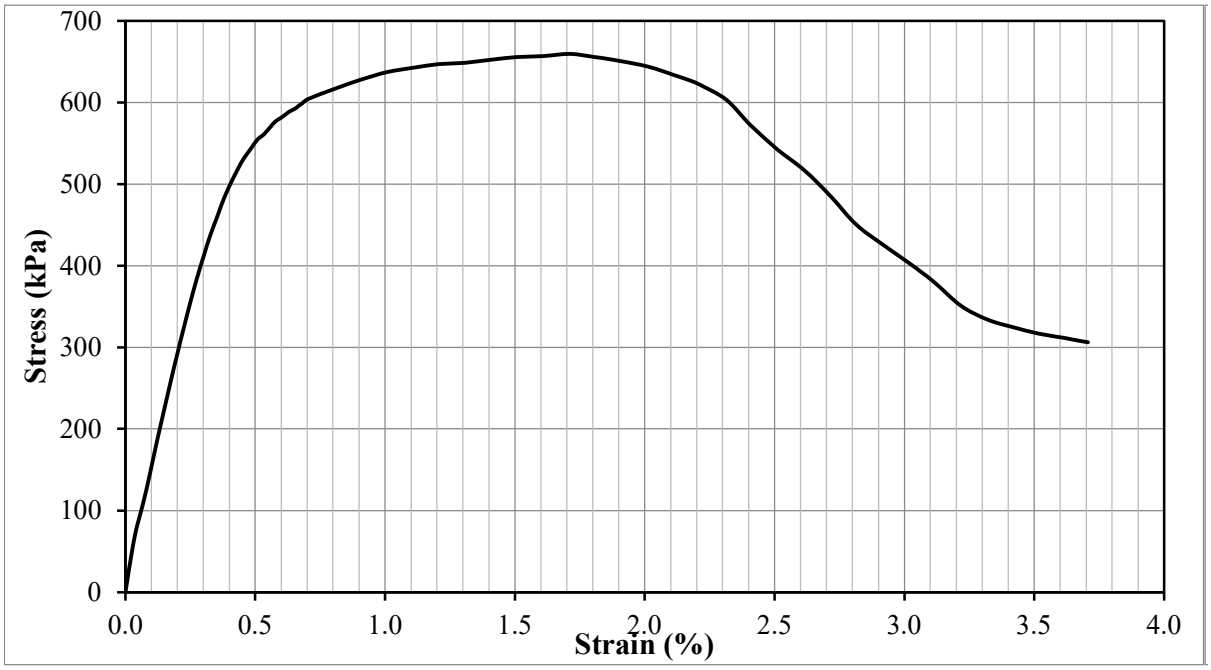
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,823	Strain at failure, εf :	1.17	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-32-E	Initial Area:	2110.8	mm^2
Test Date:	3/28/2021	Weight:	345.8	g
Strain Rate:	1 %/min	Unit Weight:	1631	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	28.3	days
$(w:c)_{slurry}$:	1.4	Curing temperature	5.0	°C
Additional information				



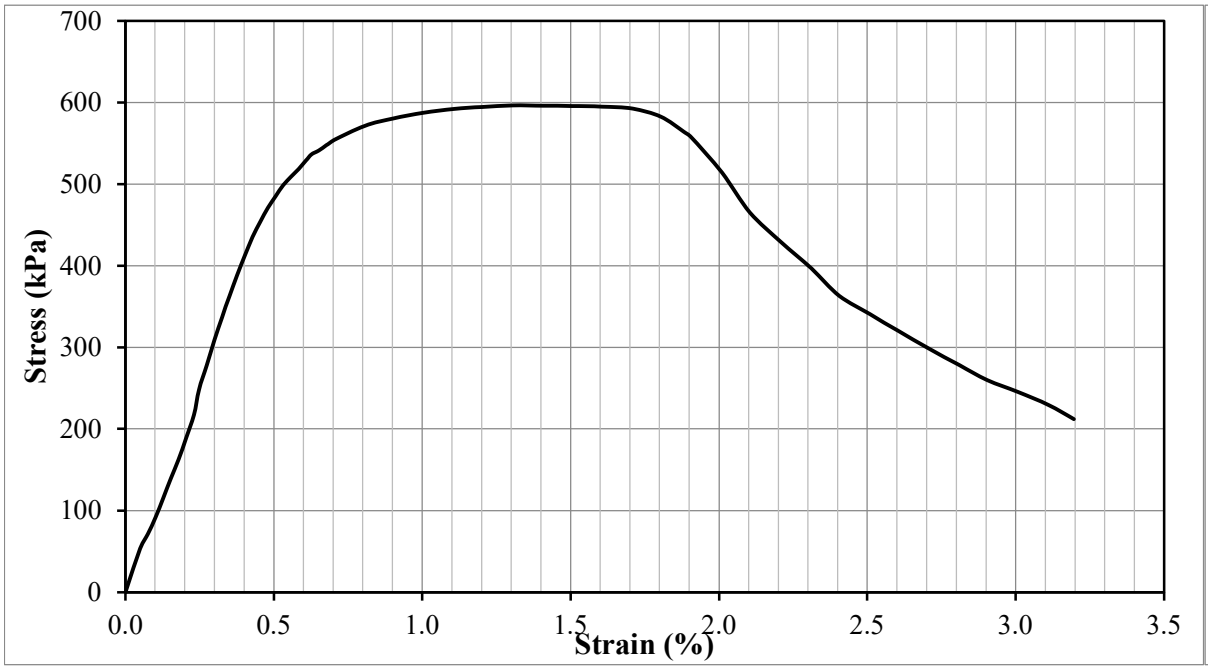
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,893	Strain at failure, εf :	0.93	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-33-A	Initial Area:	2104.6	mm^2
Test Date:	5/6/2021	Weight:	369.2	g
Strain Rate:	1 %/min	Unit Weight:	1800	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	2.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	0.0	°C
Additional information				



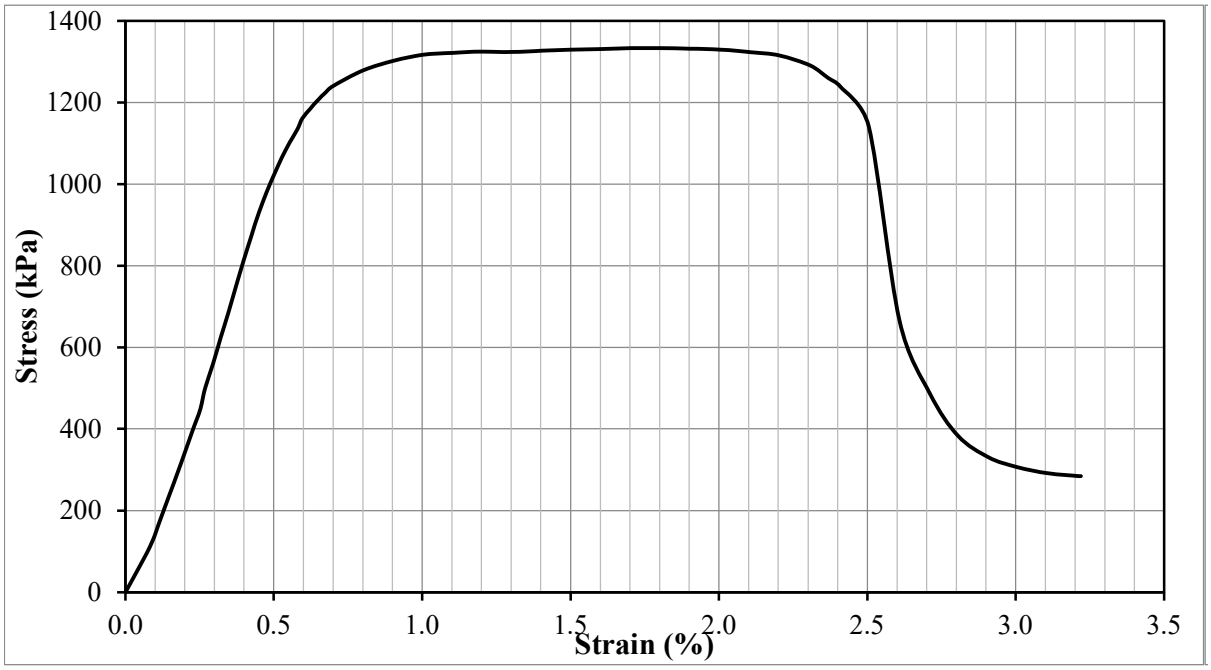
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	653	Strain at failure, εf :	1.71	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	T-33-H	Initial Area:	2100.5	mm^2
Test Date:	5/6/2021	Weight:	383.0	g
Strain Rate:	1 %/min	Unit Weight:	1807	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	2.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	0.0	°C
Additional information				



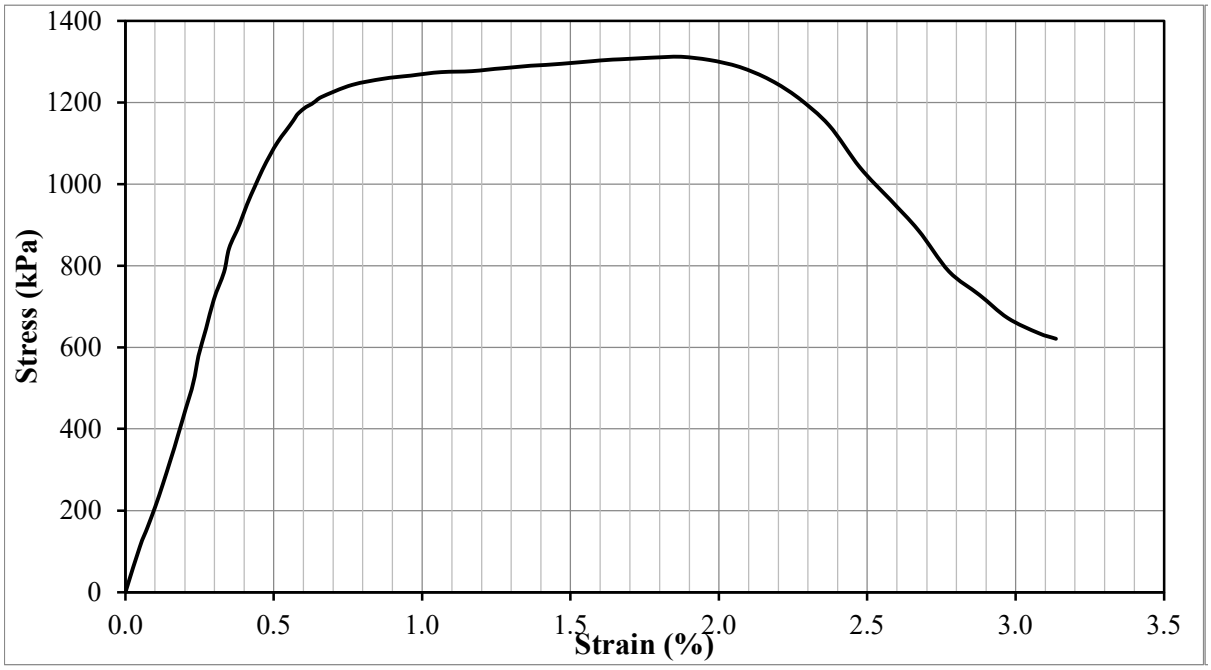
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	594	Strain at failure, εf :	1.31	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-33-B	Initial Area:	2106.6	mm^2
Test Date:	5/10/2021	Weight:	383.4	g
Strain Rate:	1 %/min	Unit Weight:	1809	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	7.1	days
$(w:c)_{slurry}$:	0.6	Curing temperature	0.0	°C
Additional information				



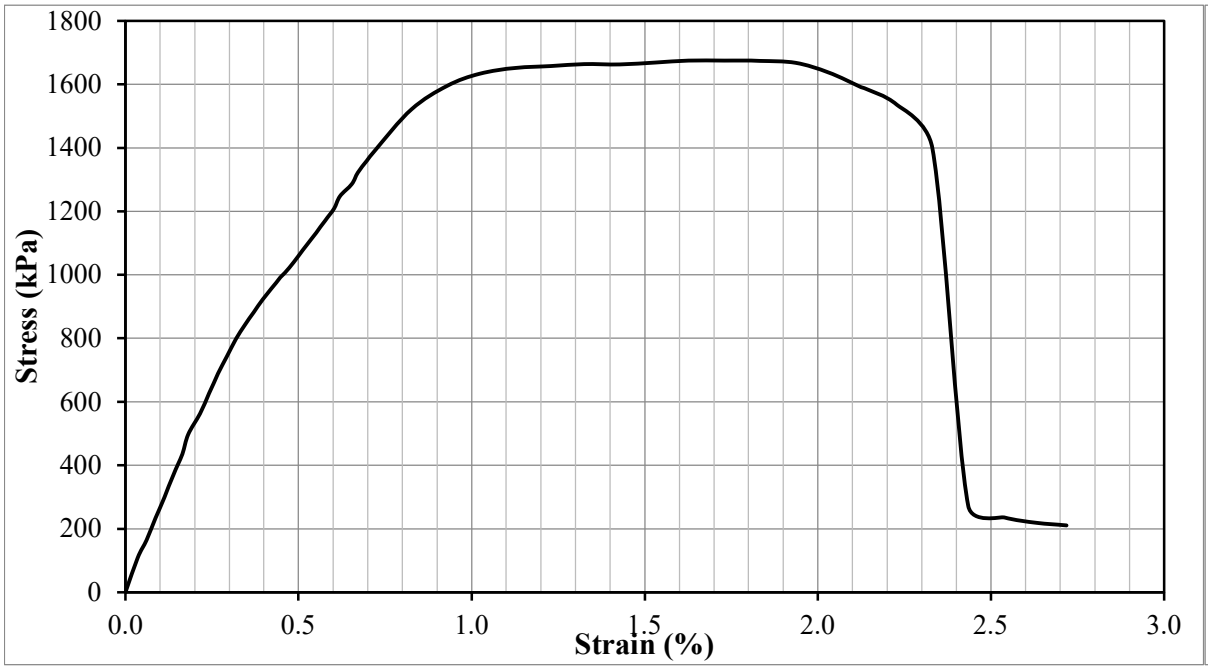
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,327	Strain at failure, εf :	1.80	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-33-G	Initial Area:	2106.6	mm^2
Test Date:	5/10/2021	Weight:	380.0	g
Strain Rate:	1 %/min	Unit Weight:	1804	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	7.1	days
$(w:c)_{slurry}$:	0.6	Curing temperature	0.0	°C
Additional information				



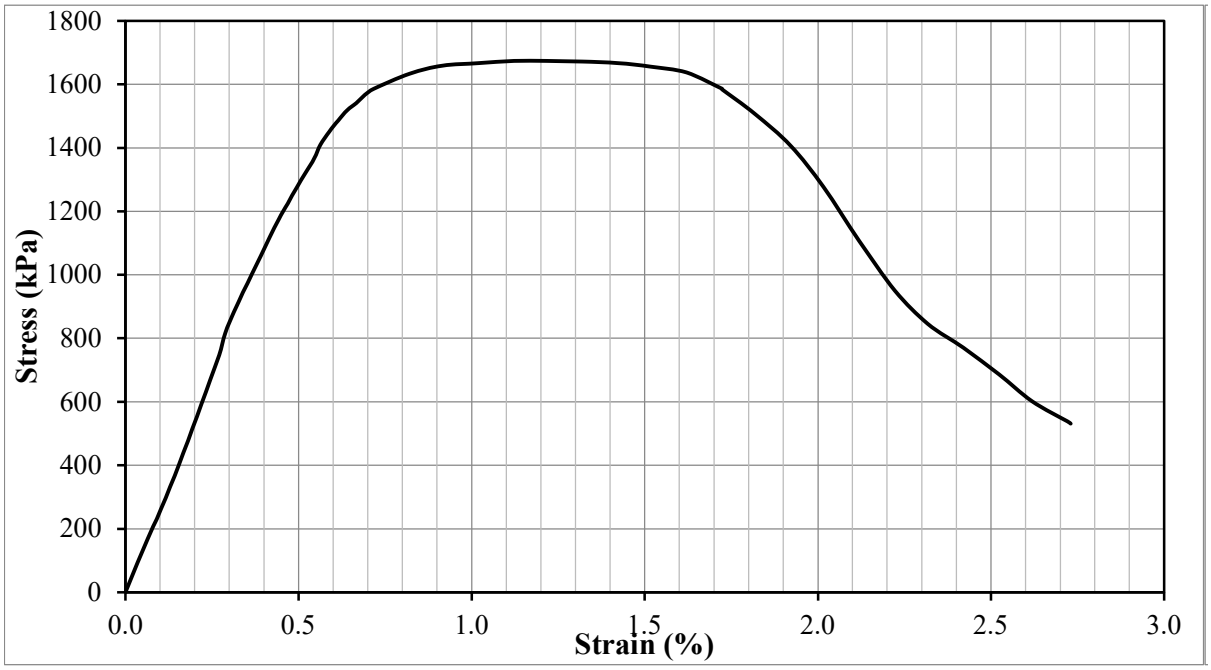
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,304	Strain at failure, εf :	1.87	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	T-33-C	Initial Area:	2100.5	mm^2
Test Date:	5/17/2021	Weight:	383.4	g
Strain Rate:	1 %/min	Unit Weight:	1818	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	13.8	days
$(w:c)_{slurry}$:	0.6	Curing temperature	0.0	°C
Additional information				



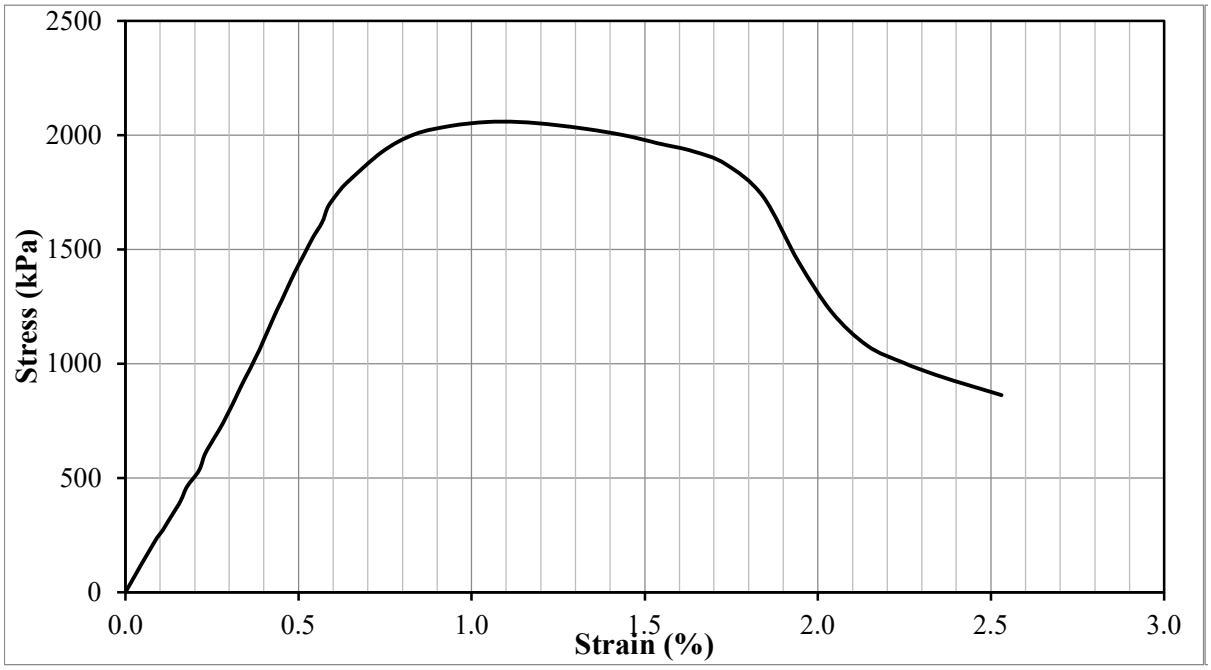
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,667	Strain at failure, εf :	1.63	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.5	mm
I.D.:	T-33-F	Initial Area:	2086.0	mm^2
Test Date:	5/17/2021	Weight:	381.3	g
Strain Rate:	1 %/min	Unit Weight:	1821	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	13.8	days
$(w:c)_{slurry}$:	0.6	Curing temperature	0.0	°C
Additional information				



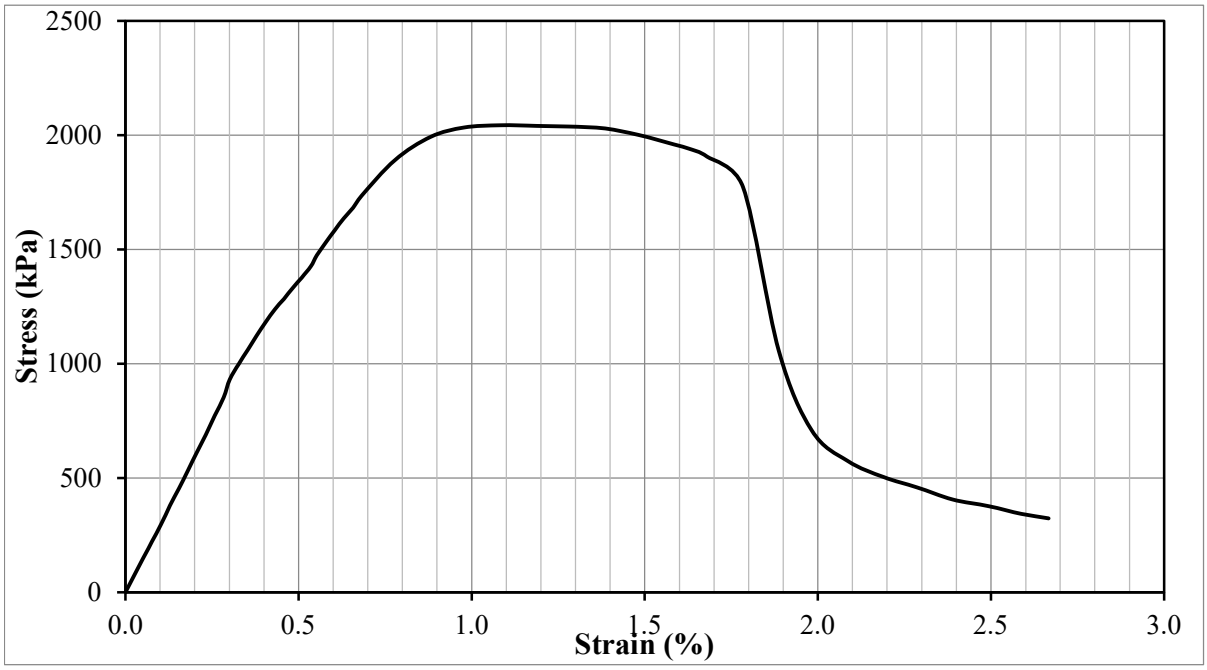
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,667	Strain at failure, εf :	1.12	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	T-33-D	Initial Area:	2100.5	mm^2
Test Date:	5/31/2021	Weight:	384.0	g
Strain Rate:	1 %/min	Unit Weight:	1813	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	28.0	days
$(w:c)_{slurry}$:	0.6	Curing temperature	0.0	°C
Additional information				



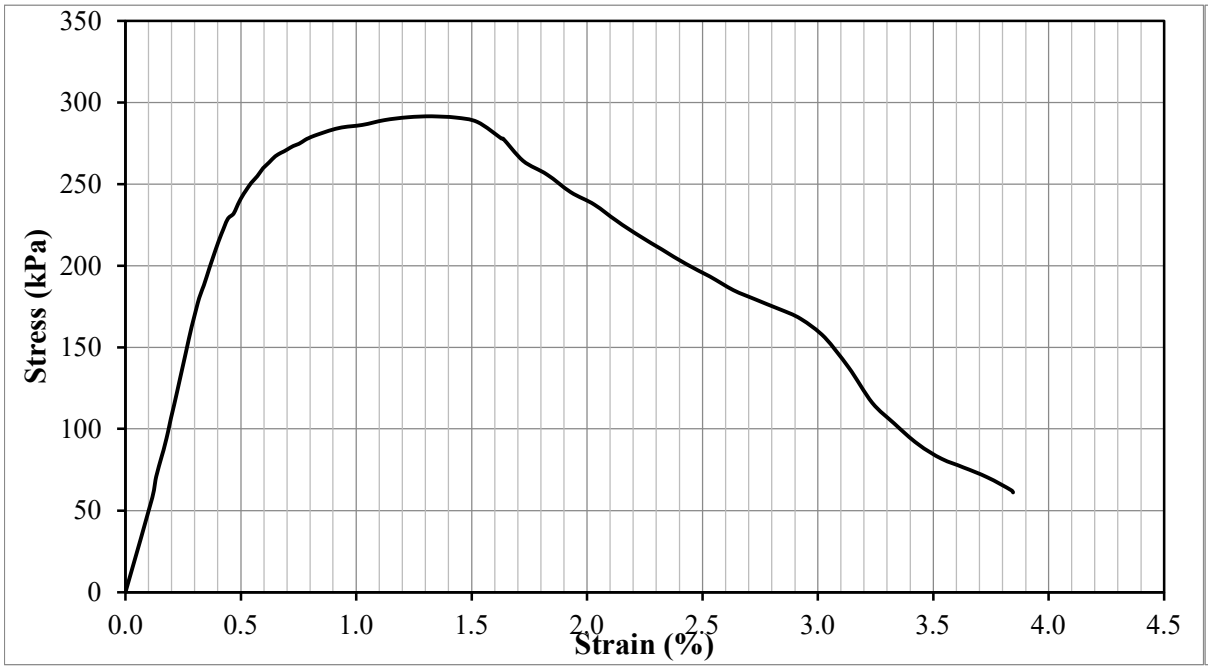
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,049	Strain at failure, εf :	1.14	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.6	mm
I.D.:	T-33-E	Initial Area:	2094.3	mm^2
Test Date:	5/31/2021	Weight:	382.7	g
Strain Rate:	1 %/min	Unit Weight:	1818	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	28.1	days
$(w:c)_{slurry}$:	0.6	Curing temperature	0.0	°C
Additional information				



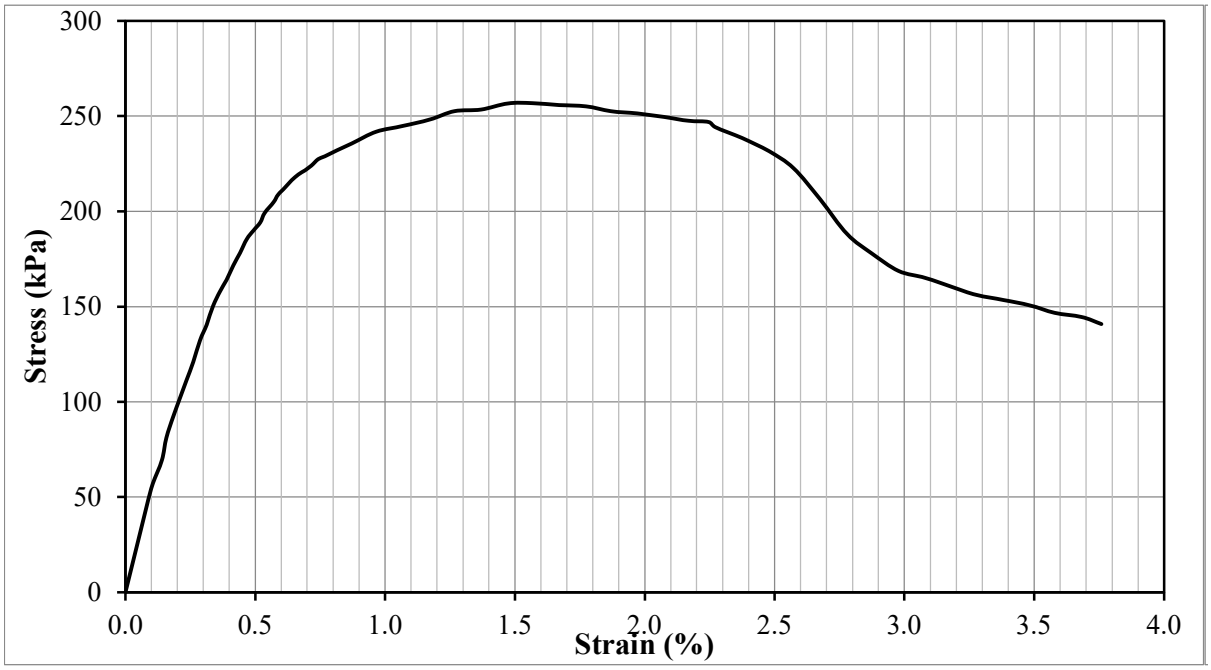
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,034	Strain at failure, εf :	1.08	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.6	mm
I.D.:	T-34-A	Initial Area:	2090.1	mm^2
Test Date:	5/7/2021	Weight:	378.9	g
Strain Rate:	1 %/min	Unit Weight:	1797	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	3.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	0.0	°C
Additional information				



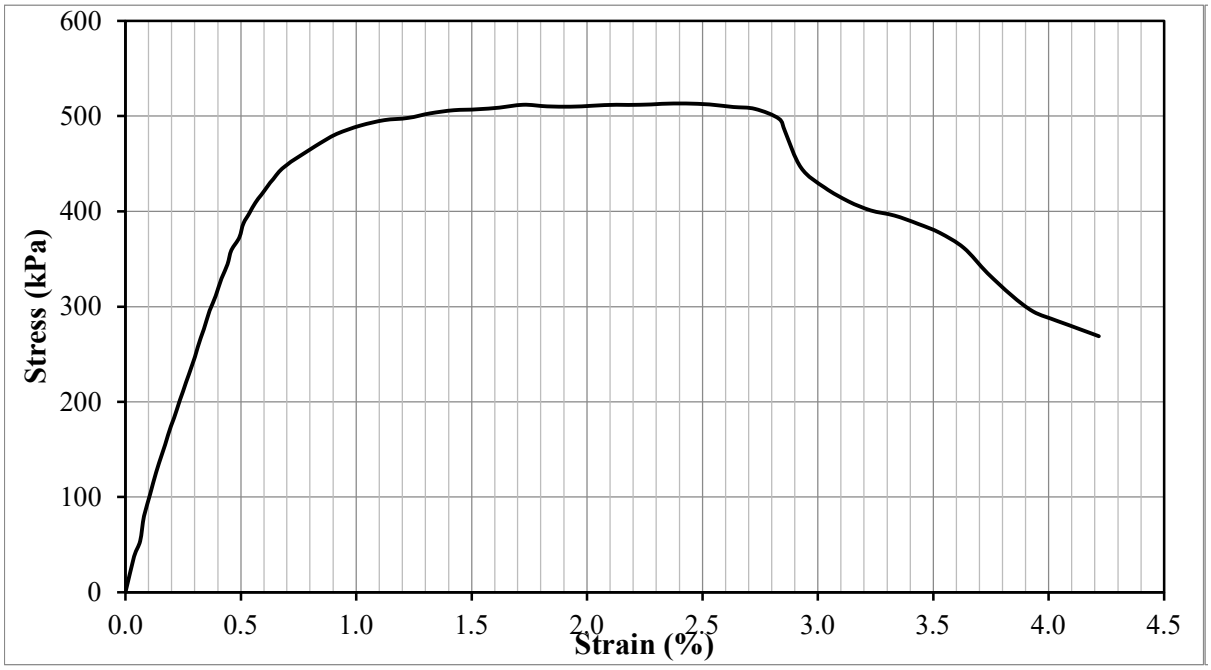
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	290	Strain at failure, εf :	1.33	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.6	mm
I.D.:	T-34-H	Initial Area:	2094.3	mm^2
Test Date:	5/7/2021	Weight:	371.6	g
Strain Rate:	1 %/min	Unit Weight:	1780	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	3.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	0.0	°C
Additional information				



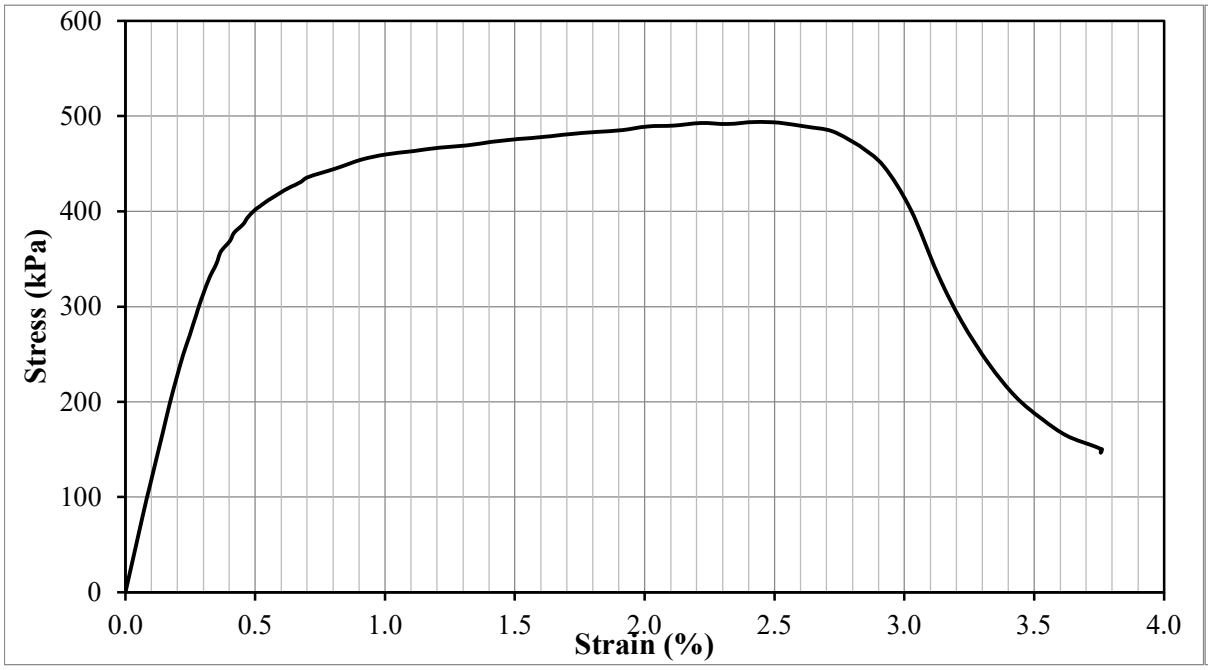
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	255	Strain at failure, εf :	1.57	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-34-B	Initial Area:	2106.6	mm^2
Test Date:	5/11/2021	Weight:	367.2	g
Strain Rate:	1 %/min	Unit Weight:	1776	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	6.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	0.0	°C
Additional information				



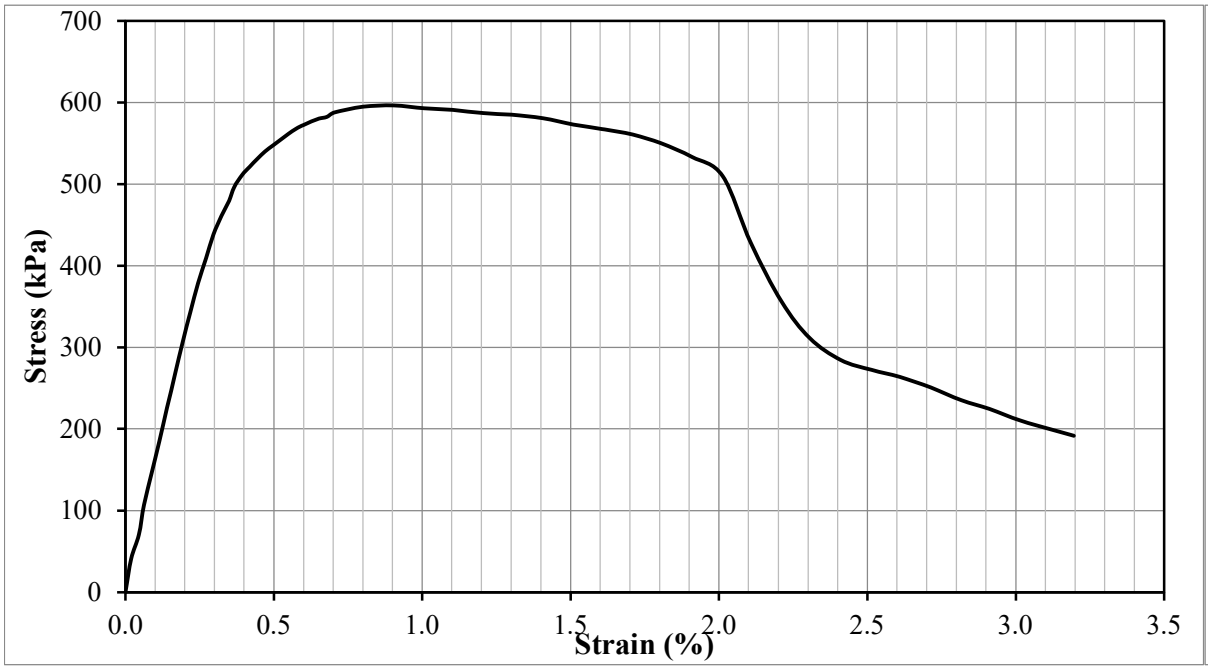
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	509	Strain at failure, εf :	2.43	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-34-G	Initial Area:	2104.6	mm^2
Test Date:	5/11/2021	Weight:	371.1	g
Strain Rate:	1 %/min	Unit Weight:	1774	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	6.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	0.0	°C
Additional information				



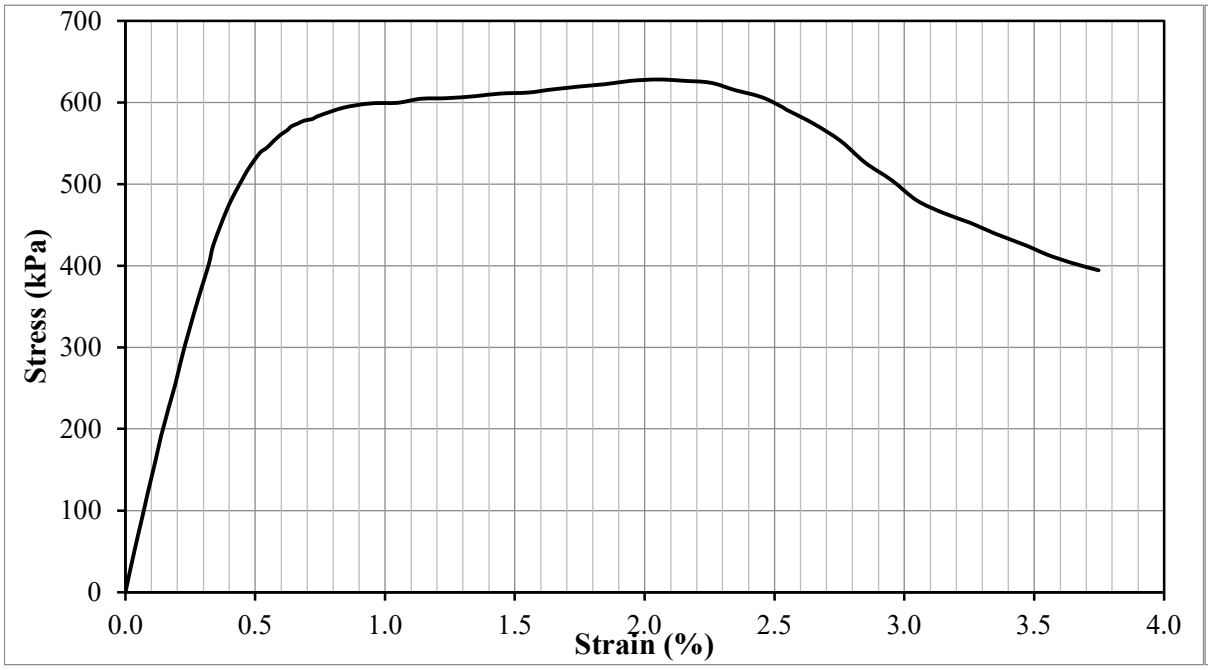
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	491	Strain at failure, εf :	2.42	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-34-C	Initial Area:	2110.8	mm^2
Test Date:	5/18/2021	Weight:	373.3	g
Strain Rate:	1 %/min	Unit Weight:	1777	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	14.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	0.0	°C
Additional information				



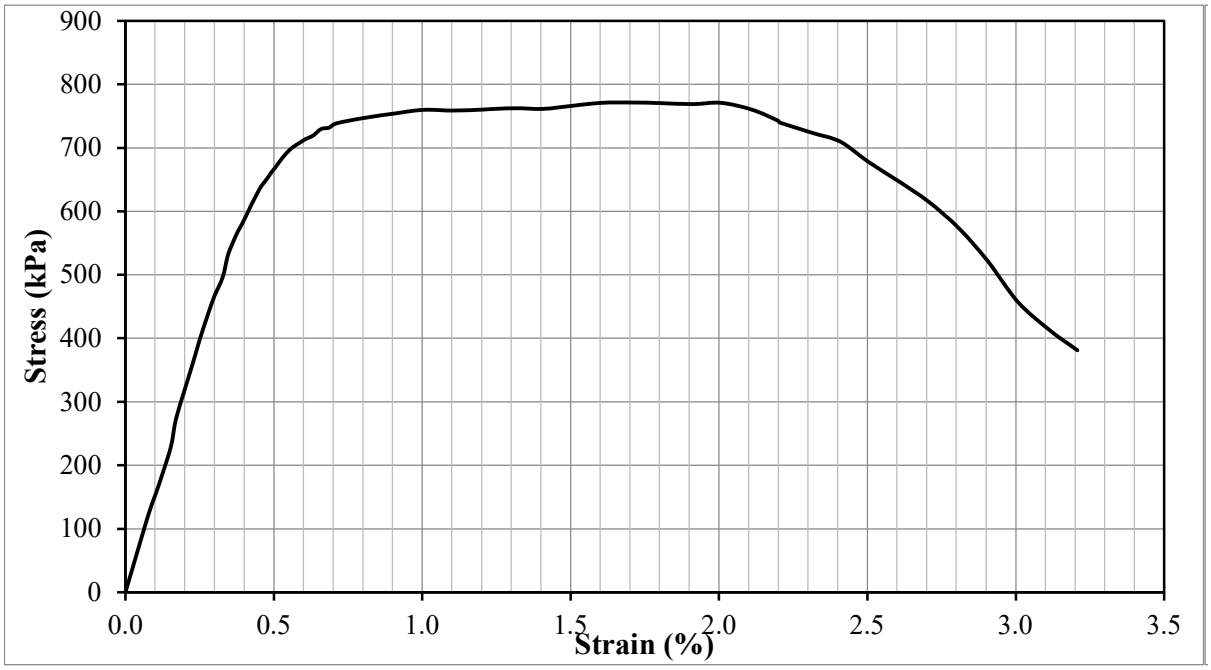
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	592	Strain at failure, εf :	0.90	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	T-34-F	Initial Area:	2102.5	mm^2
Test Date:	5/18/2021	Weight:	370.7	g
Strain Rate:	1 %/min	Unit Weight:	1777	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	14.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	0.0	°C
Additional information				



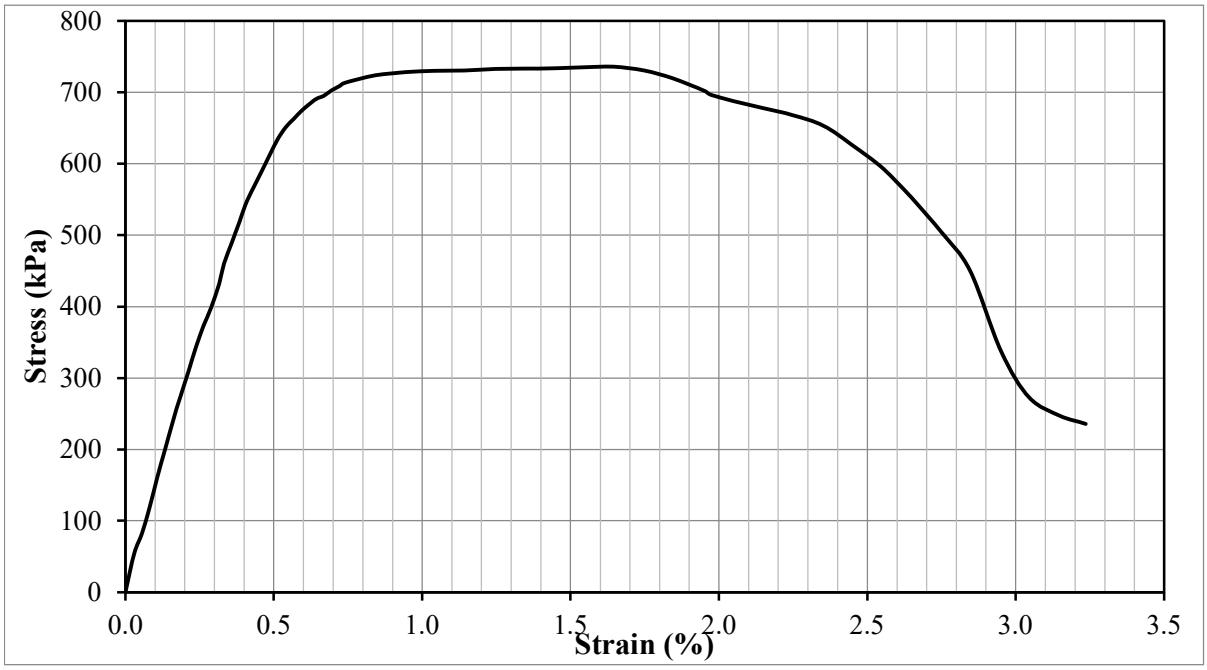
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	624	Strain at failure, εf :	2.05	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-34-D	Initial Area:	2110.8	mm^2
Test Date:	6/1/2021	Weight:	370.6	g
Strain Rate:	1 %/min	Unit Weight:	1778	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	0.0	°C
Additional information				



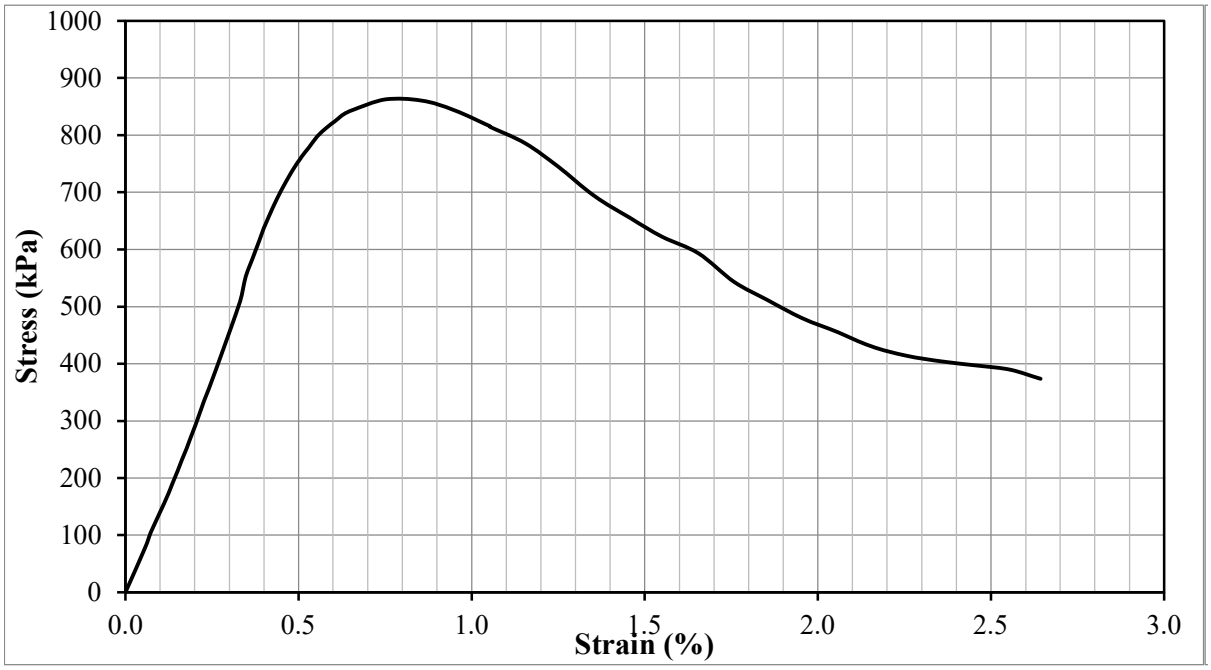
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	766	Strain at failure, εf :	1.71	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	T-34-E	Initial Area:	2102.5	mm^2
Test Date:	6/1/2021	Weight:	372.1	g
Strain Rate:	1 %/min	Unit Weight:	1775	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	0.0	°C
Additional information				



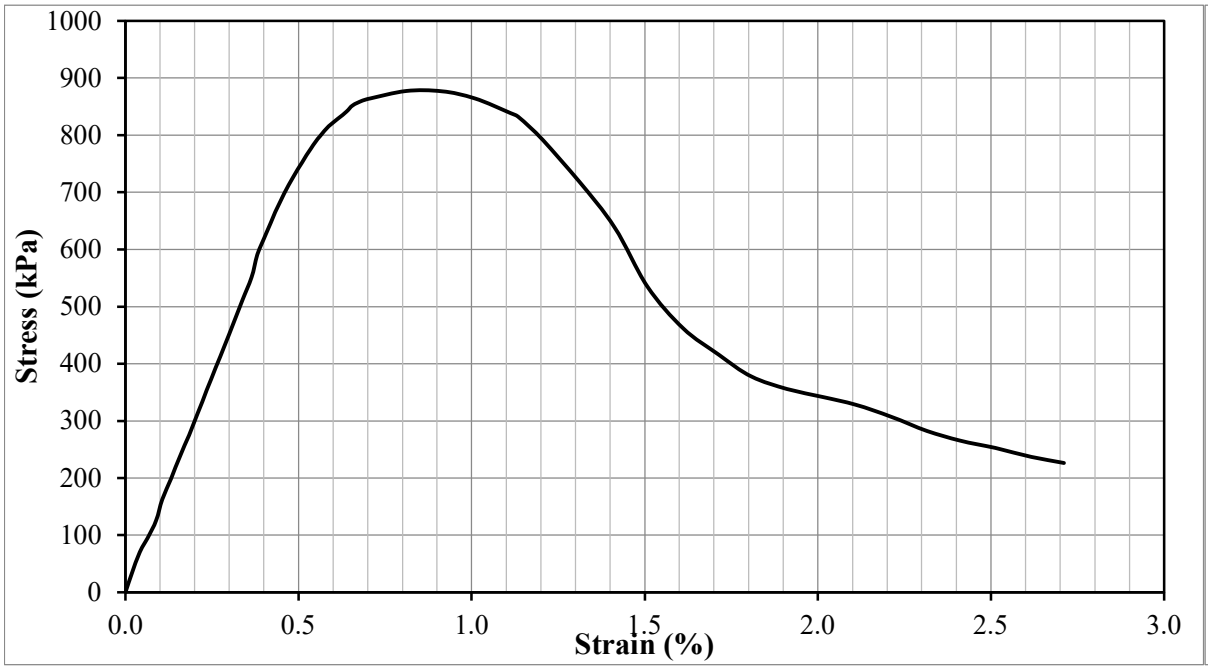
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	731	Strain at failure, εf :	1.65	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	89.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	T-35-A	Initial Area:	2102.5	mm^2
Test Date:	5/8/2021	Weight:	323.5	g
Strain Rate:	1 %/min	Unit Weight:	1714	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	3.2	days
$(w:c)_{slurry}$:	1.0	Curing temperature	0.0	°C
Additional information				



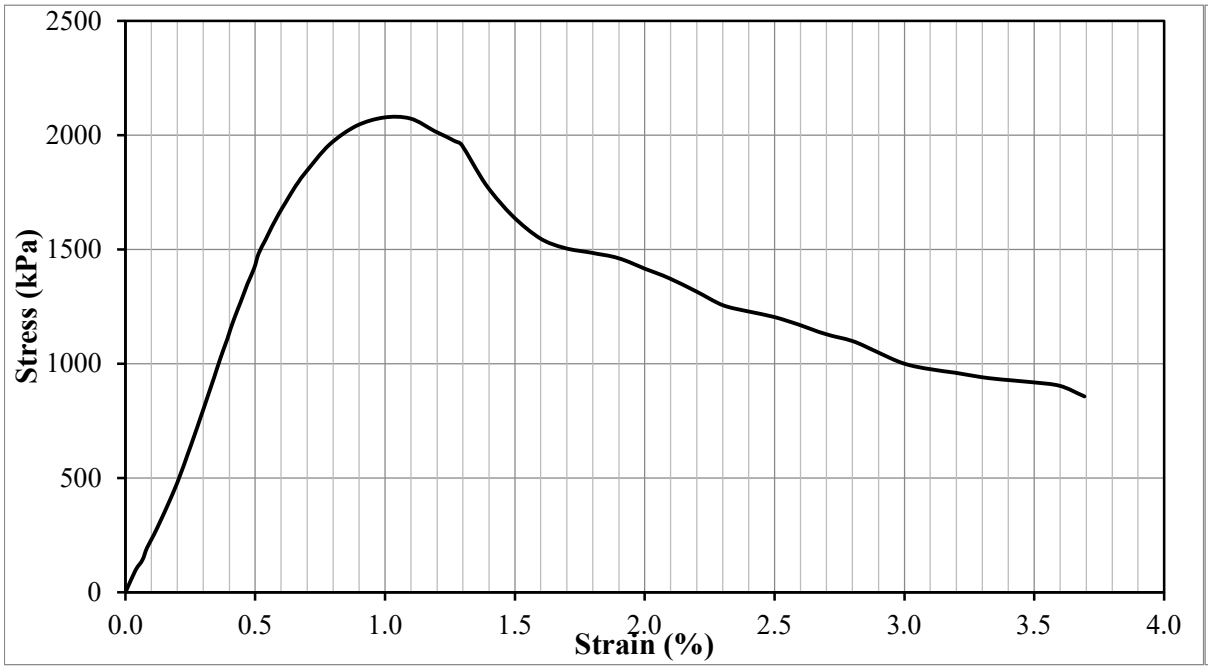
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	844	Strain at failure, εf :	0.75	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	T-35-H	Initial Area:	2098.4	mm^2
Test Date:	5/8/2021	Weight:	362.4	g
Strain Rate:	1 %/min	Unit Weight:	1715	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	3.2	days
$(w:c)_{slurry}$:	1.0	Curing temperature	0.0	°C
Additional information				



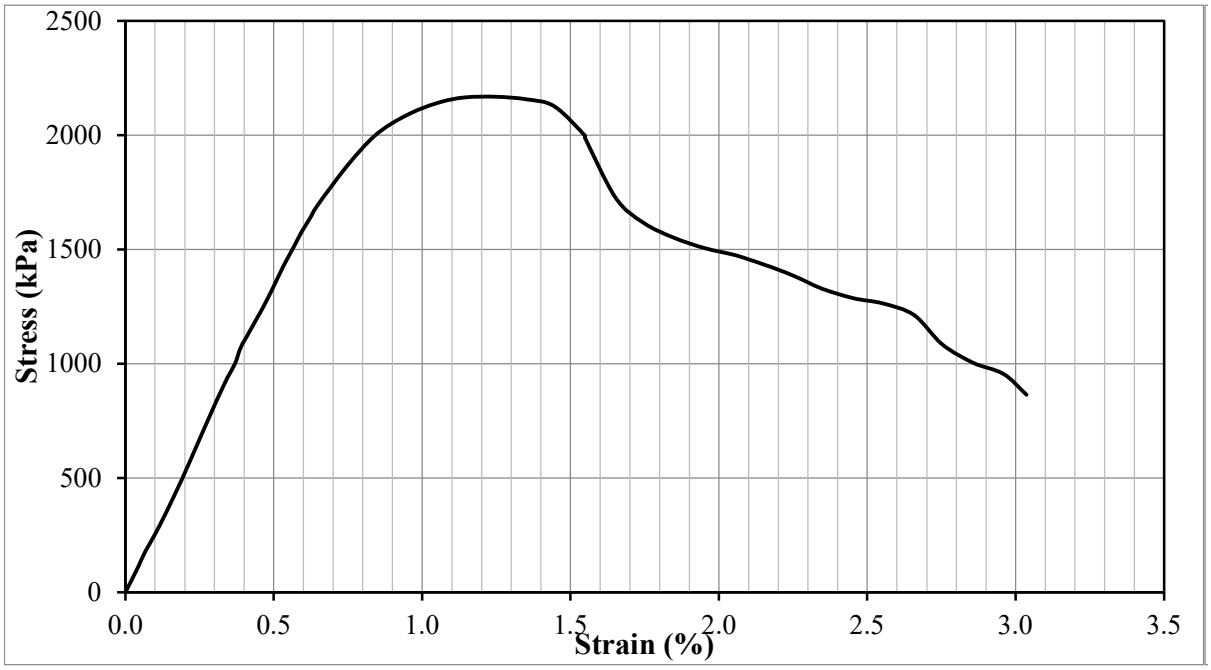
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	874	Strain at failure, εf :	0.81	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.6	mm
I.D.:	T-35-B	Initial Area:	2094.3	mm^2
Test Date:	5/12/2021	Weight:	359.4	g
Strain Rate:	1 %/min	Unit Weight:	1717	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	7.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	0.0	°C
Additional information				



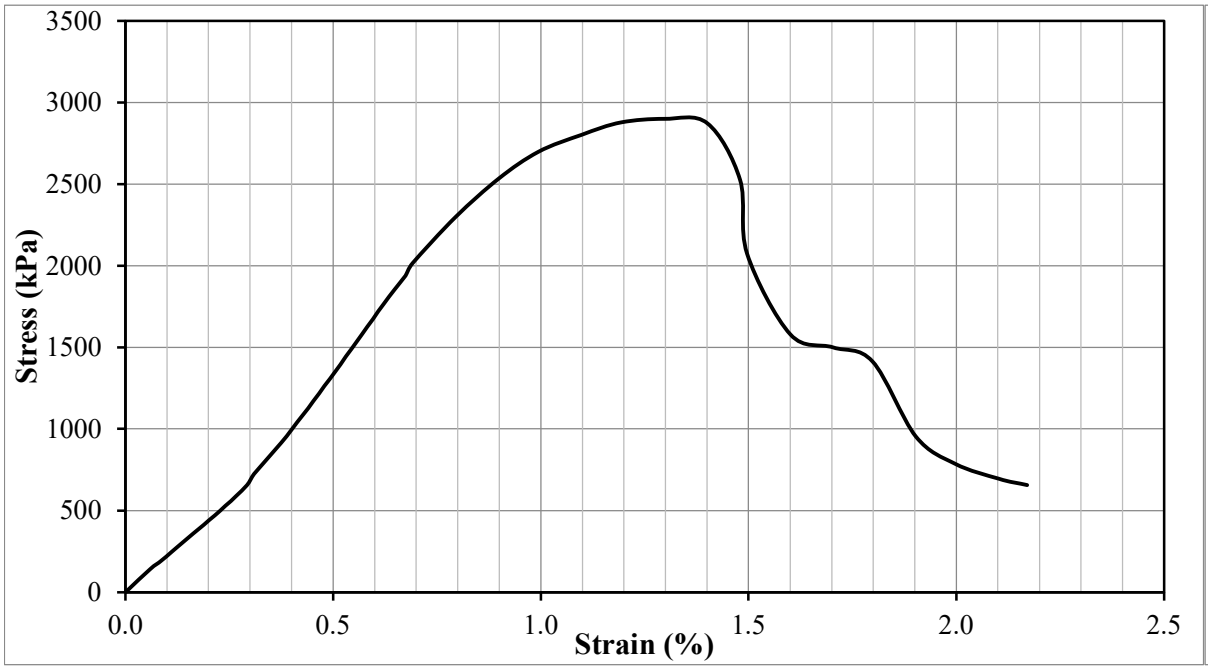
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,066	Strain at failure, εf :	0.99	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	T-35-G	Initial Area:	2096.3	mm^2
Test Date:	5/12/2021	Weight:	360.0	g
Strain Rate:	1 %/min	Unit Weight:	1716	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	7.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	0.0	°C
Additional information				



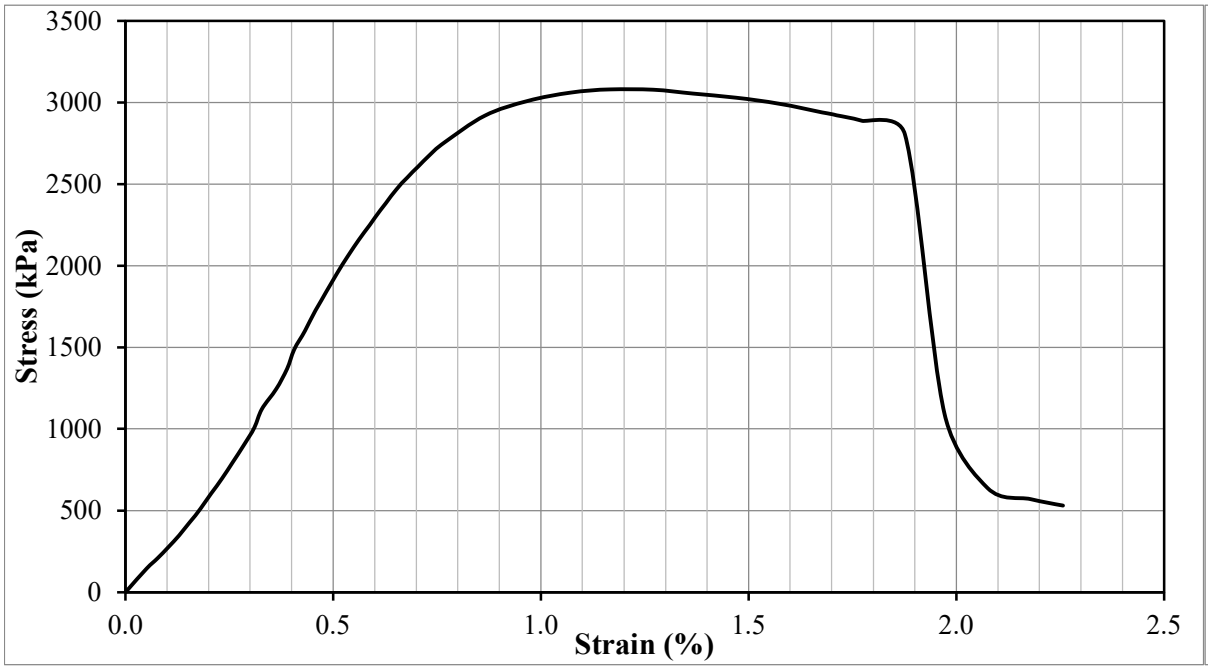
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,156	Strain at failure, εf :	1.25	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	T-35-C	Initial Area:	2102.5	mm^2
Test Date:	5/19/2021	Weight:	364.0	g
Strain Rate:	1 %/min	Unit Weight:	1710	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	14.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	0.0	°C
Additional information				



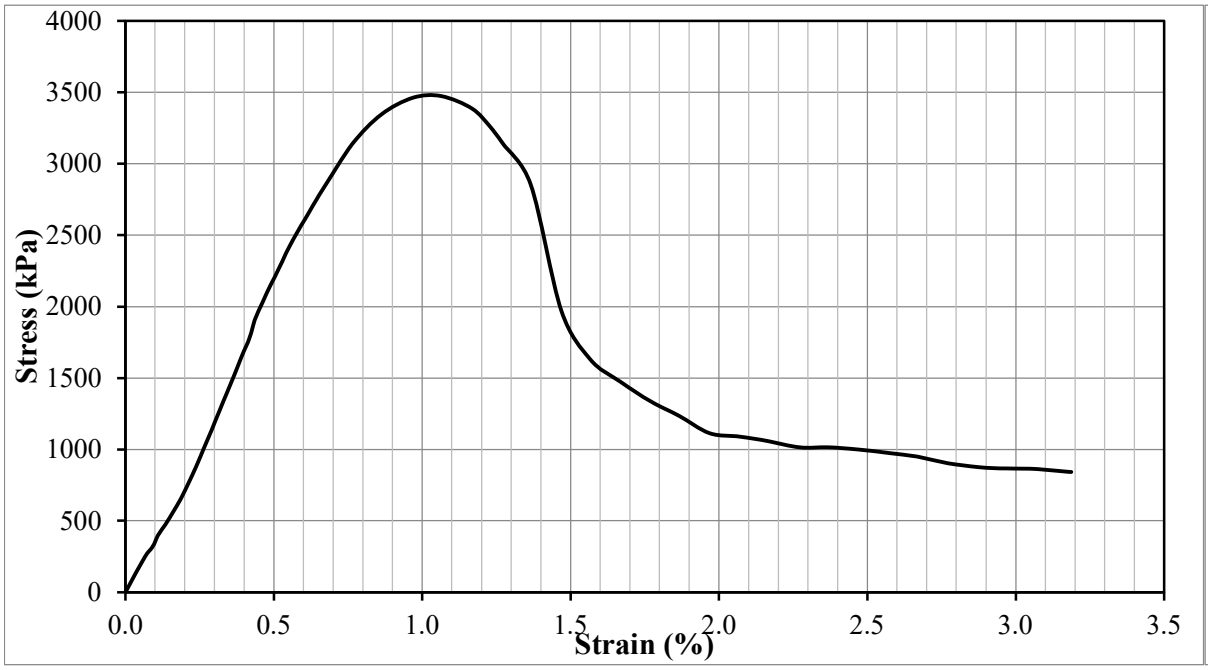
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,889	Strain at failure, εf :	1.30	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.1	mm
I.D.:	T-35-F	Initial Area:	2135.7	mm^2
Test Date:	5/19/2021	Weight:	361.1	g
Strain Rate:	1 %/min	Unit Weight:	1681	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	14.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	0.0	°C
Additional information				



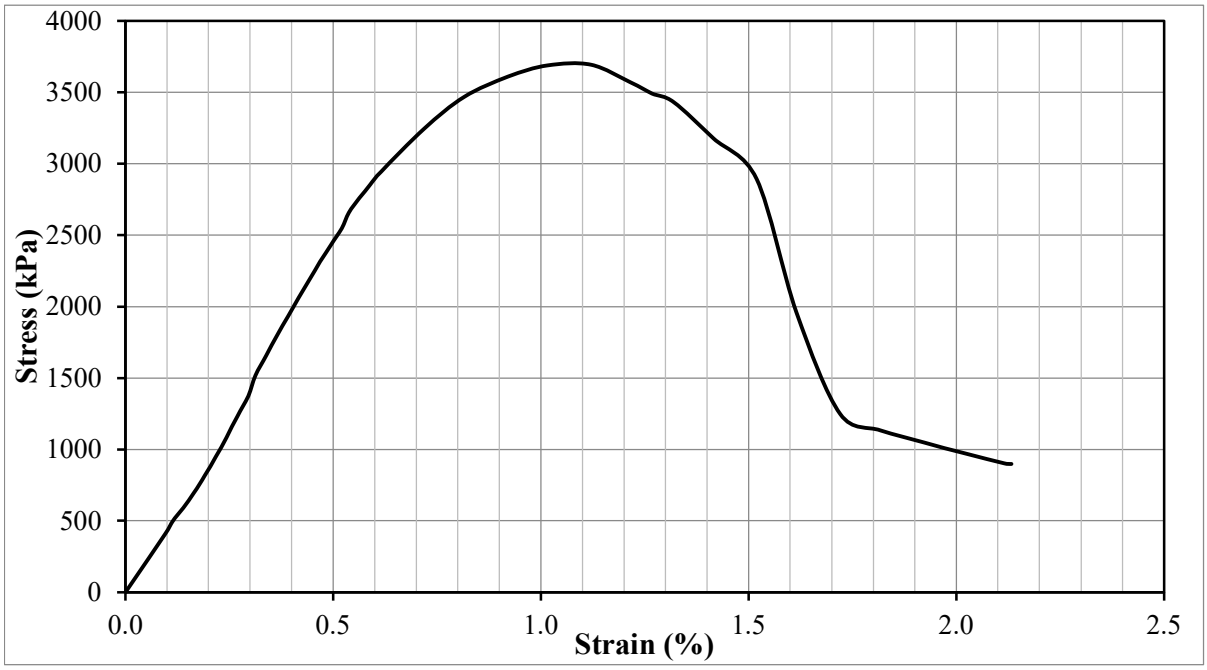
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,062	Strain at failure, εf :	1.17	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	T-35-D	Initial Area:	2096.3	mm^2
Test Date:	6/2/2021	Weight:	363.2	g
Strain Rate:	1 %/min	Unit Weight:	1716	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	0.0	°C
Additional information				



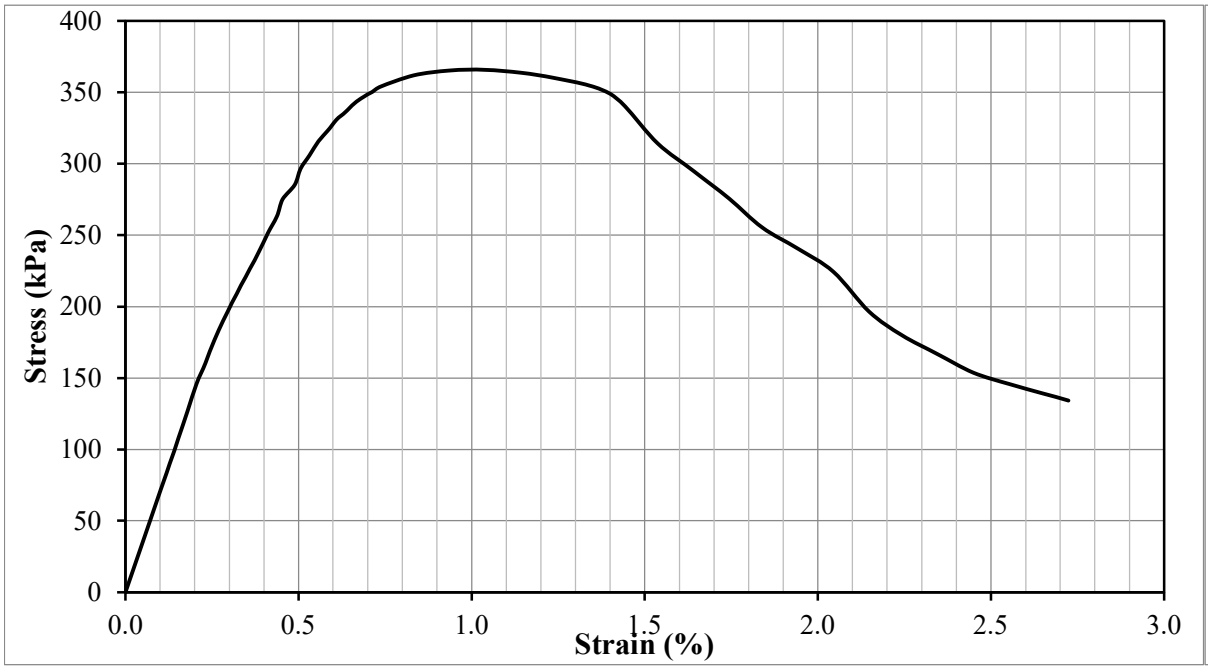
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,460	Strain at failure, εf :	1.07	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.6	mm
I.D.:	T-35-E	Initial Area:	2088.1	mm^2
Test Date:	6/2/2021	Weight:	362.6	g
Strain Rate:	1 %/min	Unit Weight:	1722	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	0.0	°C
Additional information				



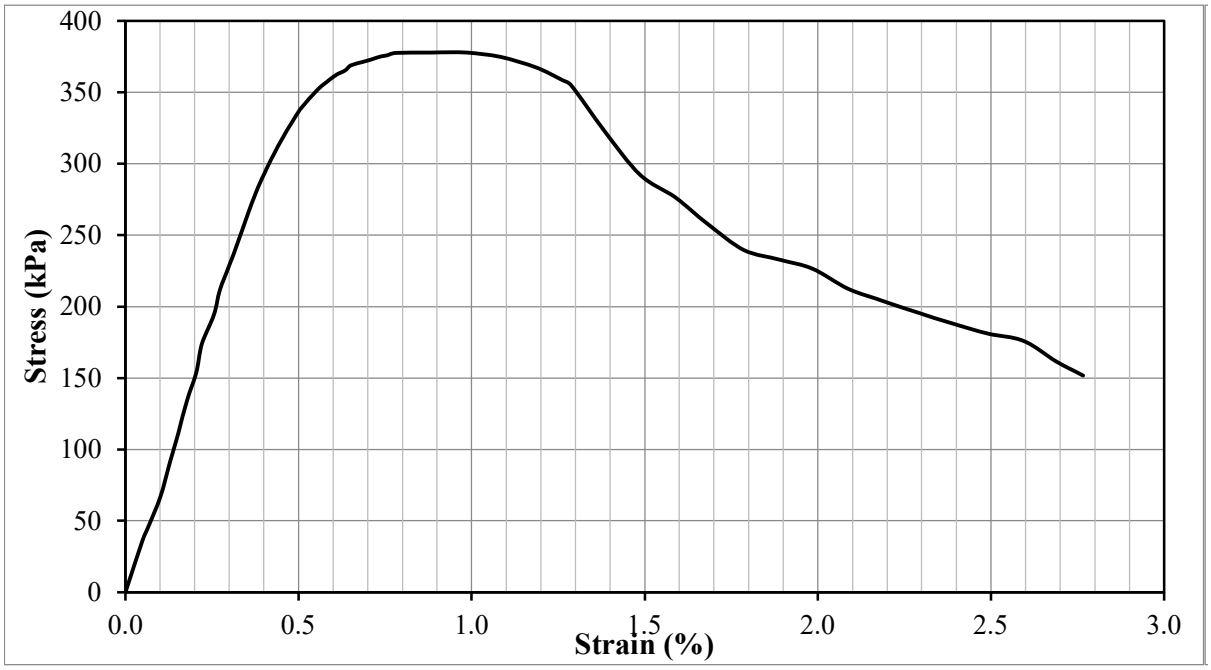
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,679	Strain at failure, εf :	1.12	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	T-36-A	Initial Area:	2098.4	mm^2
Test Date:	5/9/2021	Weight:	346.7	g
Strain Rate:	1 %/min	Unit Weight:	1651	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	3.1	days
$(w:c)_{slurry}$:	1.4	Curing temperature	0.0	°C
Additional information				



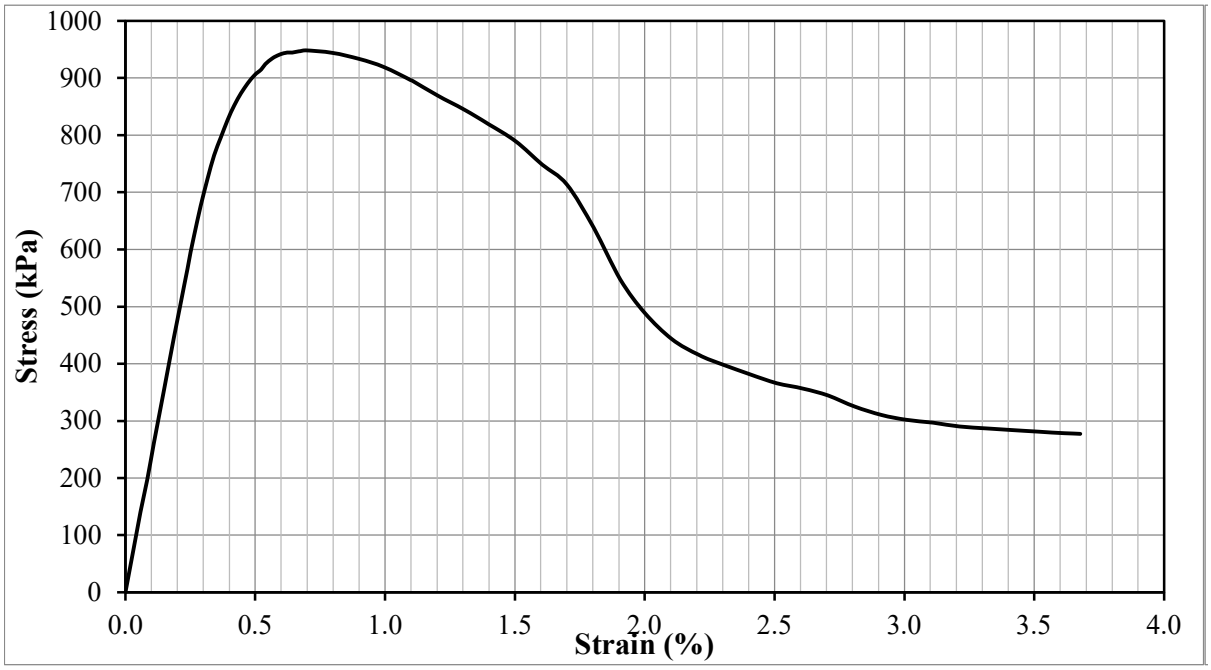
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	364	Strain at failure, εf :	1.04	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	T-36-H	Initial Area:	2098.4	mm^2
Test Date:	5/9/2021	Weight:	344.8	g
Strain Rate:	1 %/min	Unit Weight:	1654	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	3.1	days
$(w:c)_{slurry}$:	1.4	Curing temperature	0.0	°C
Additional information				



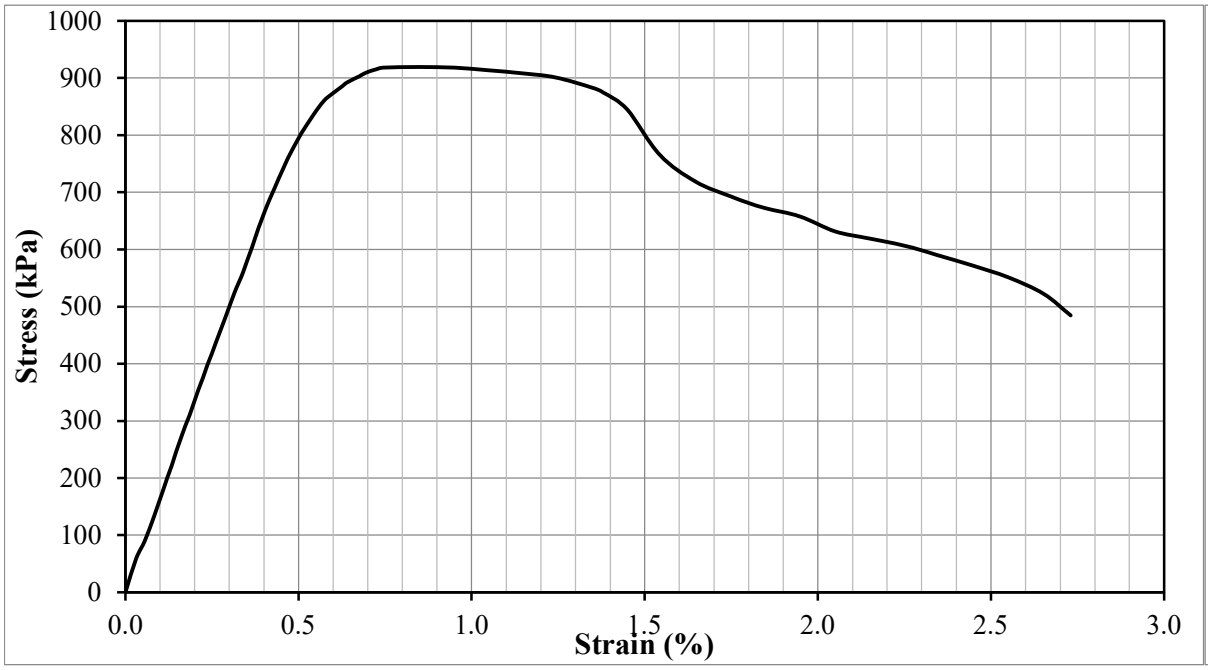
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	375	Strain at failure, εf :	0.88	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	T-36-B	Initial Area:	2096.3	mm^2
Test Date:	5/13/2021	Weight:	348.8	g
Strain Rate:	1 %/min	Unit Weight:	1650	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	7.1	days
$(w:c)_{slurry}$:	1.4	Curing temperature	0.0	°C
Additional information				



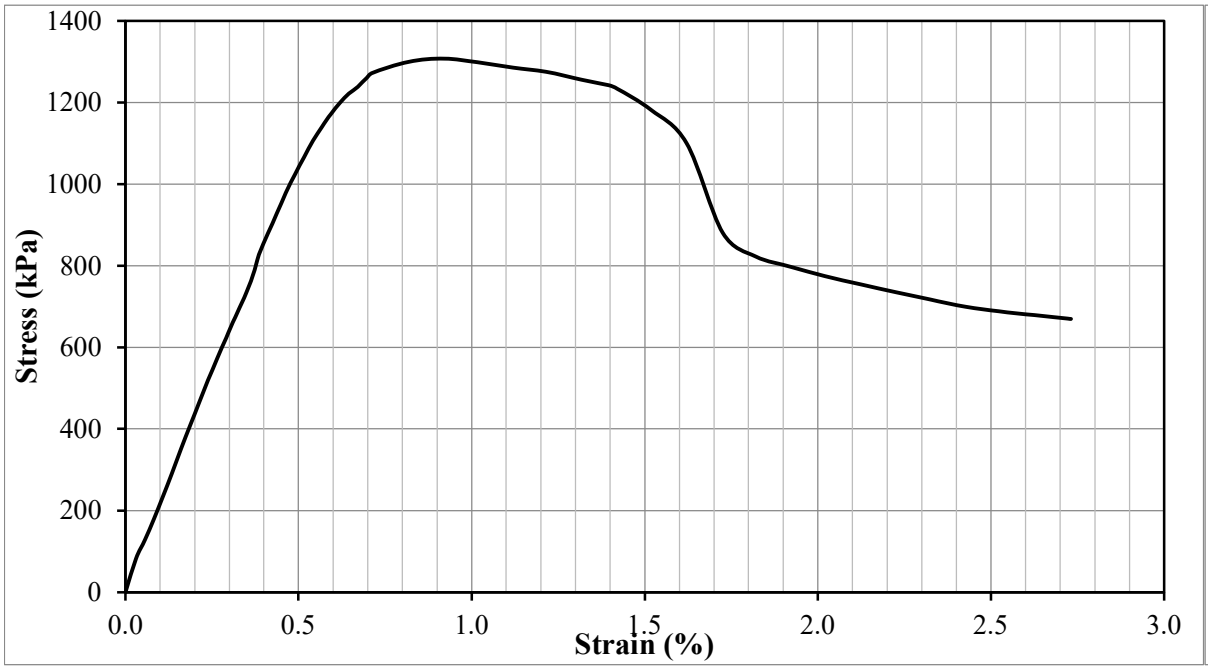
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	945	Strain at failure, εf :	0.69	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.6	mm
I.D.:	T-36-G	Initial Area:	2092.2	mm^2
Test Date:	5/13/2021	Weight:	348.6	g
Strain Rate:	1 %/min	Unit Weight:	1659	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	7.1	days
$(w:c)_{slurry}$:	1.4	Curing temperature	0.0	°C
Additional information				



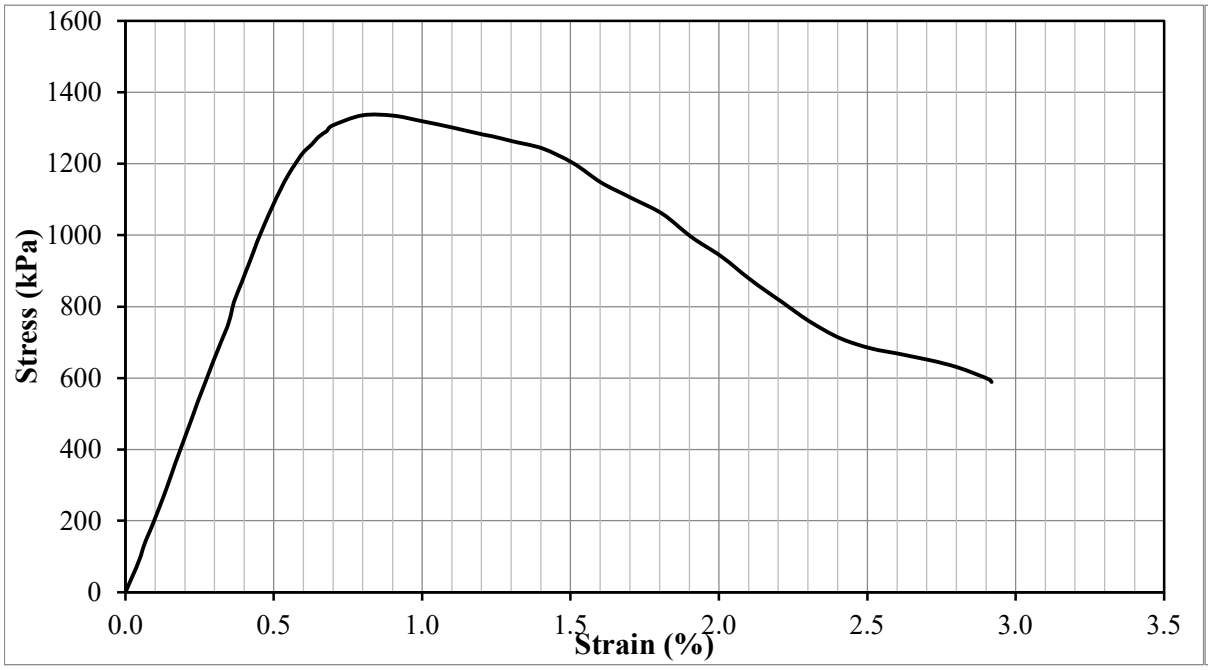
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	915	Strain at failure, εf :	0.85	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.6	mm
I.D.:	T-36-C	Initial Area:	2090.1	mm^2
Test Date:	5/20/2021	Weight:	347.6	g
Strain Rate:	1 %/min	Unit Weight:	1661	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	14.0	days
$(w:c)_{slurry}$:	1.4	Curing temperature	0.0	°C
Additional information				



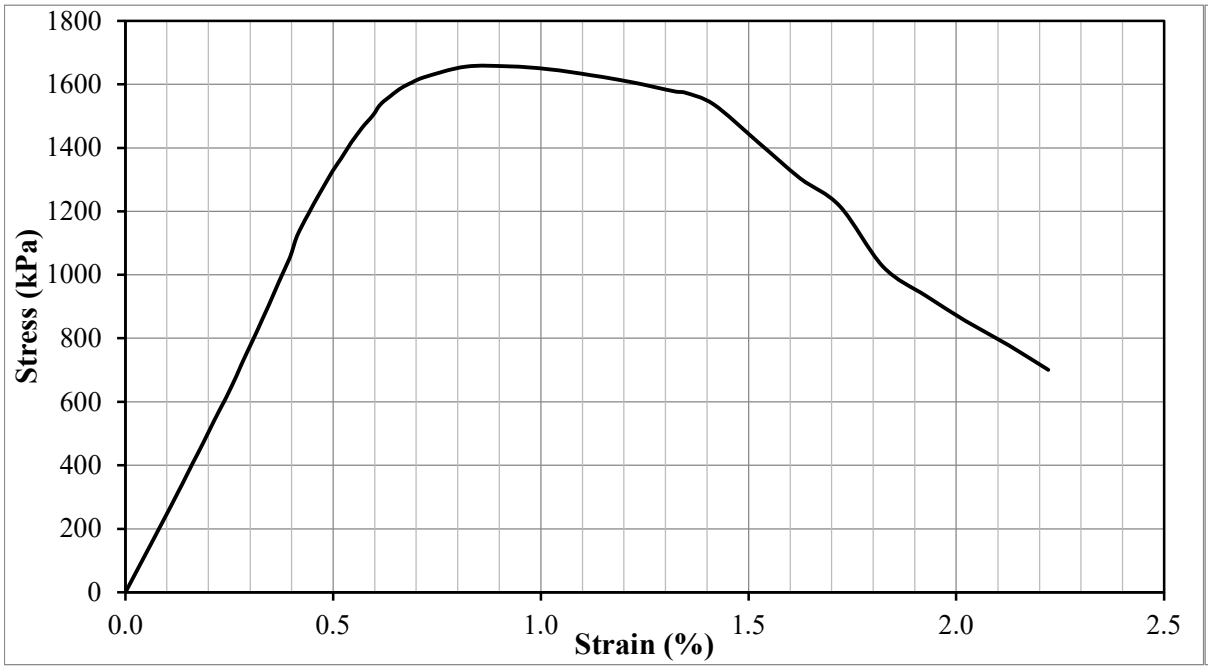
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,301	Strain at failure, εf :	0.92	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	T-36-F	Initial Area:	2098.4	mm^2
Test Date:	5/20/2021	Weight:	348.8	g
Strain Rate:	1 %/min	Unit Weight:	1655	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	14.0	days
$(w:c)_{slurry}$:	1.4	Curing temperature	0.0	°C
Additional information				



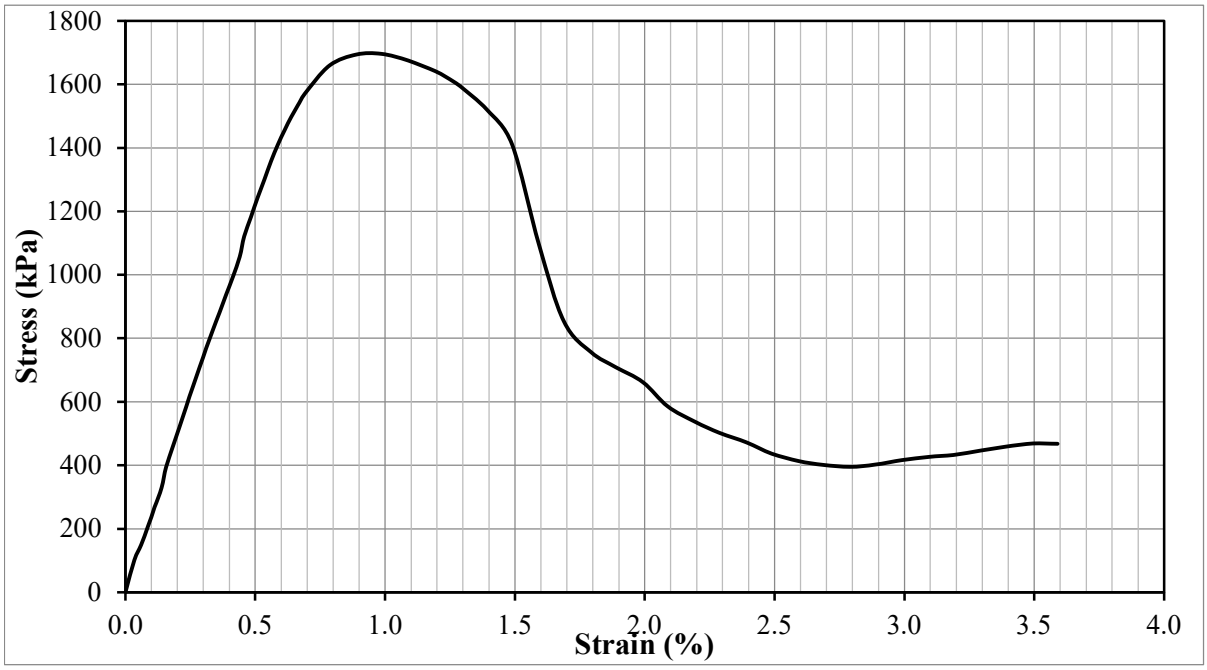
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,329	Strain at failure, εf :	0.80	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.6	mm
I.D.:	T-36-D	Initial Area:	2090.1	mm^2
Test Date:	6/3/2021	Weight:	348.2	g
Strain Rate:	1 %/min	Unit Weight:	1661	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	27.9	days
$(w:c)_{slurry}$:	1.4	Curing temperature	0.0	°C
Additional information				



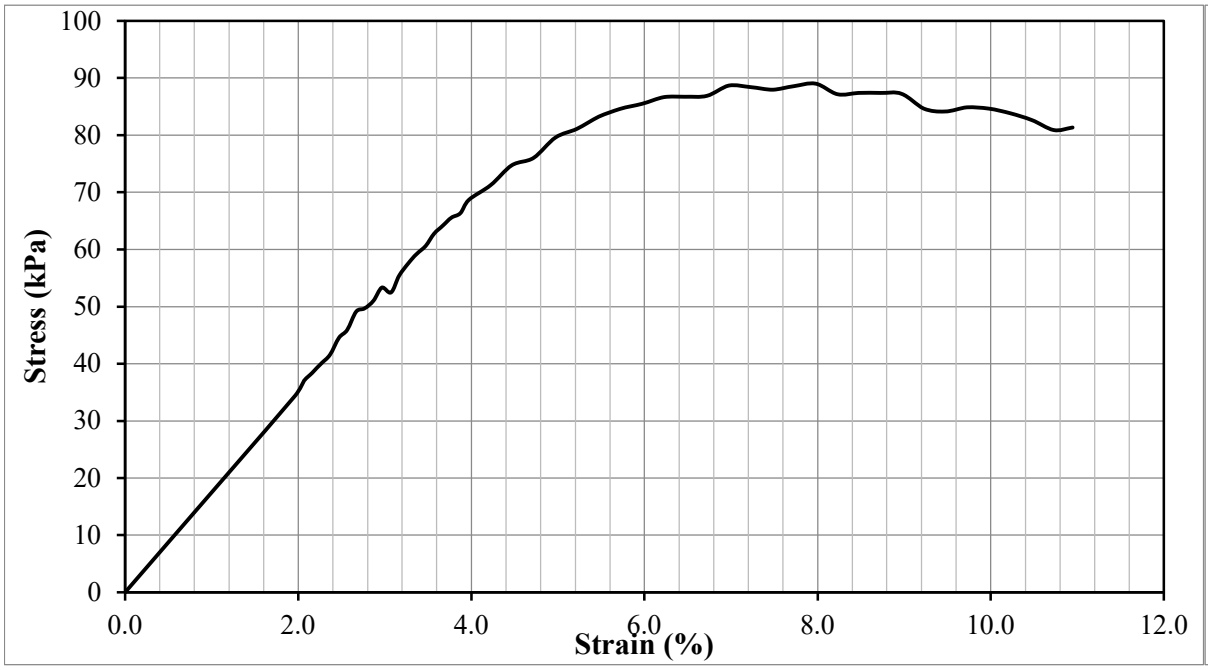
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,649	Strain at failure, εf :	0.92	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.5	mm
I.D.:	T-36-E	Initial Area:	2084.0	mm^2
Test Date:	6/3/2021	Weight:	349.5	g
Strain Rate:	1 %/min	Unit Weight:	1665	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.4	Curing temperature	0.0	°C
Additional information				



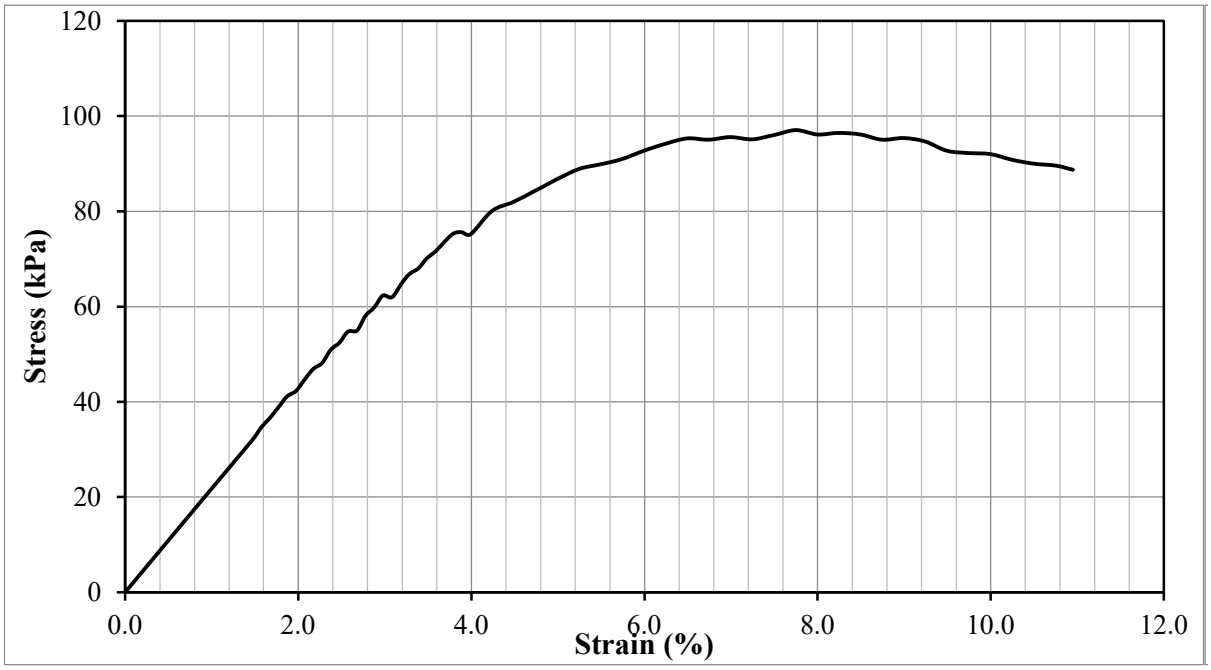
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,690	Strain at failure, εf :	0.99	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	104.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.1	mm
I.D.:	T-37-A	Initial Area:	2051.2	mm^2
Test Date:	5/11/2022	Weight:	381.8	g
Strain Rate:	1 %/min	Unit Weight:	1786	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	3.1	days
$(w:c)_{slurry}$:	0.6	Curing temperature	-10.0	°C
Additional information				



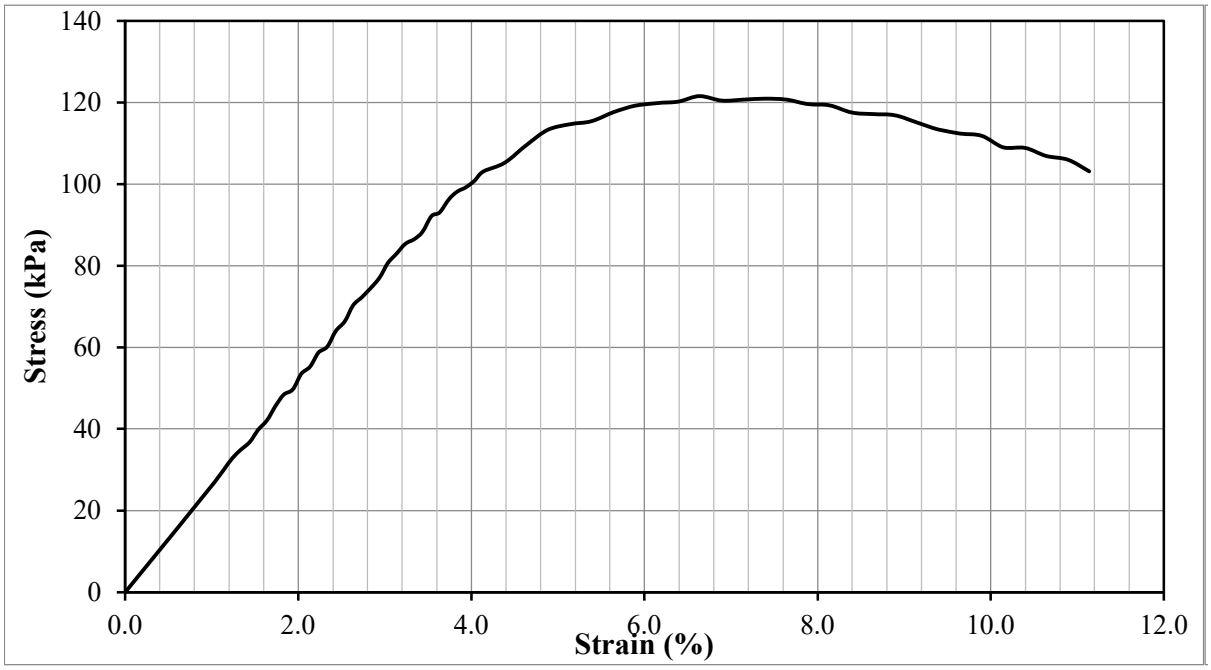
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	89	Strain at failure, εf :	7.98	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	103.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.2	mm
I.D.:	T-37-H	Initial Area:	2061.4	mm^2
Test Date:	5/11/2022	Weight:	380.2	g
Strain Rate:	1 %/min	Unit Weight:	1776	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	3.1	days
$(w:c)_{slurry}$:	0.6	Curing temperature	-10.0	°C
Additional information				



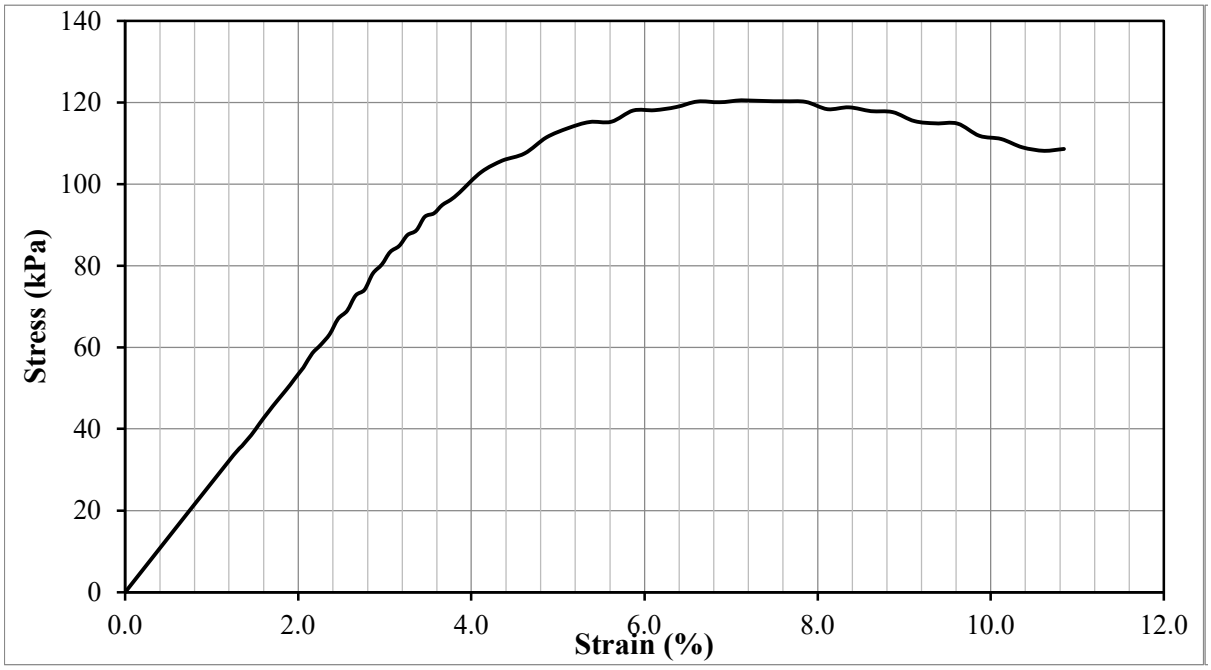
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	97	Strain at failure, εf :	7.74	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	103.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	T-37-B	Initial Area:	2098.4	mm^2
Test Date:	5/15/2022	Weight:	381.4	g
Strain Rate:	1 %/min	Unit Weight:	1751	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	6.8	days
$(w:c)_{slurry}$:	0.6	Curing temperature	-10.0	°C
Additional information				



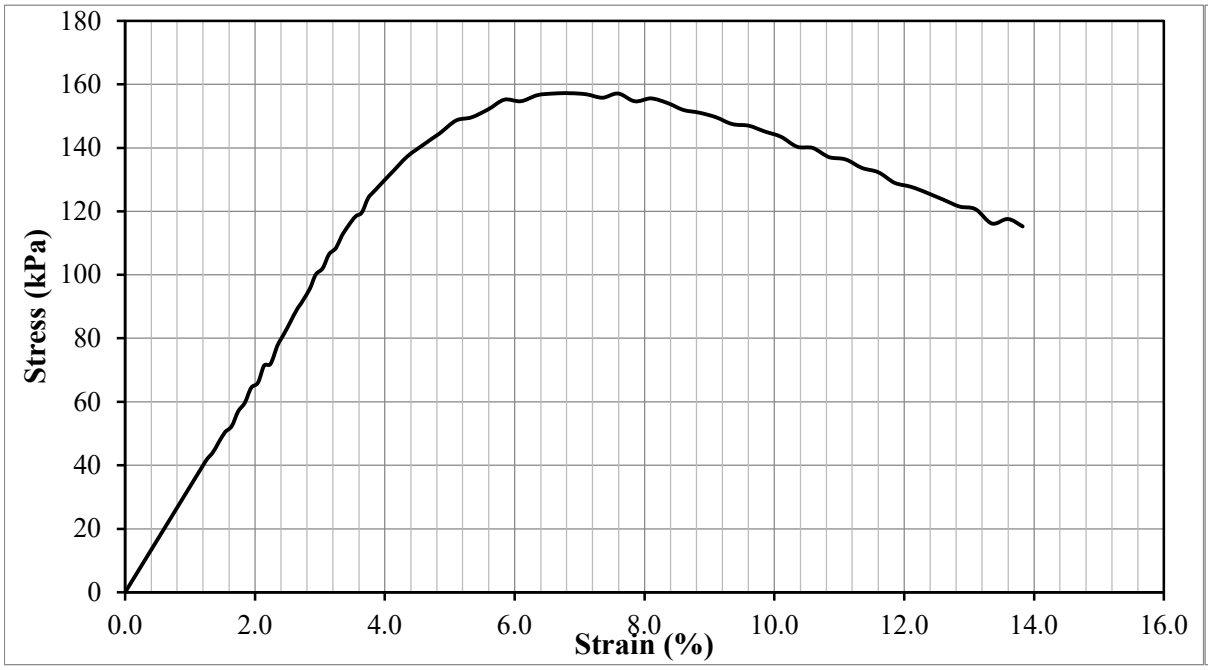
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	122	Strain at failure, εf :	6.64	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	104.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.3	mm
I.D.:	T-37-G	Initial Area:	2069.6	mm^2
Test Date:	5/15/2022	Weight:	382.7	g
Strain Rate:	1 %/min	Unit Weight:	1768	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	6.8	days
$(w:c)_{slurry}$:	0.6	Curing temperature	-10.0	°C
Additional information				



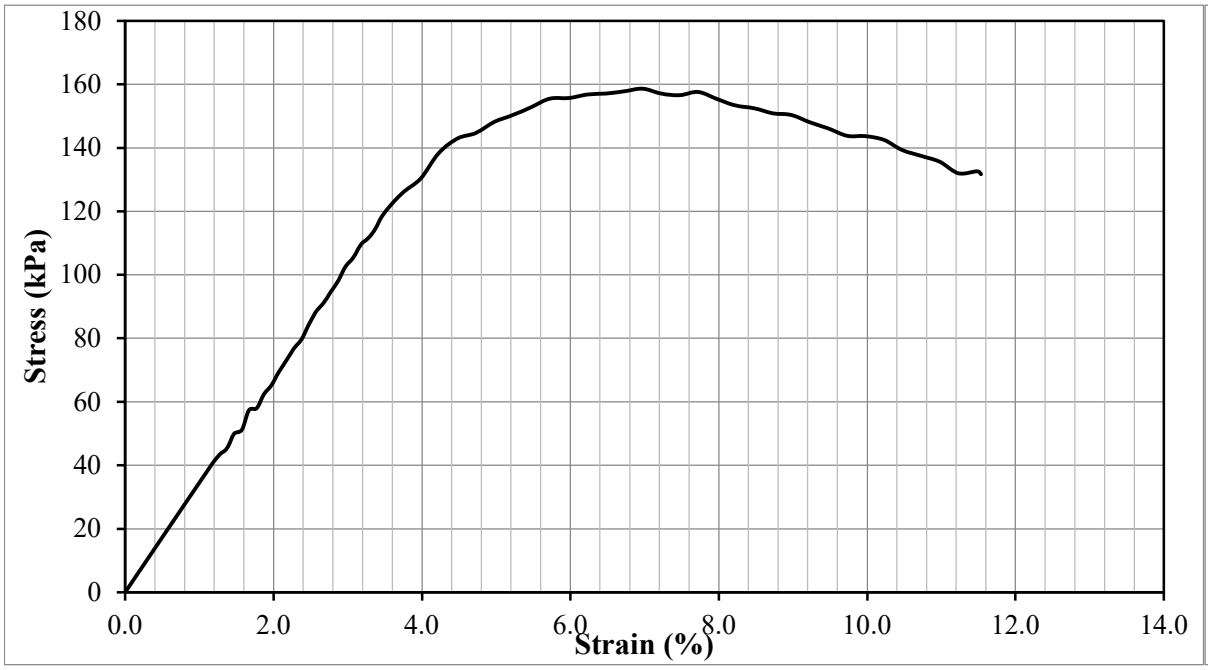
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	121	Strain at failure, εf :	7.12	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	103.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.4	mm
I.D.:	T-37-C	Initial Area:	2073.7	mm^2
Test Date:	5/22/2022	Weight:	381.2	g
Strain Rate:	1 %/min	Unit Weight:	1770	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	13.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	-10.0	°C
Additional information				



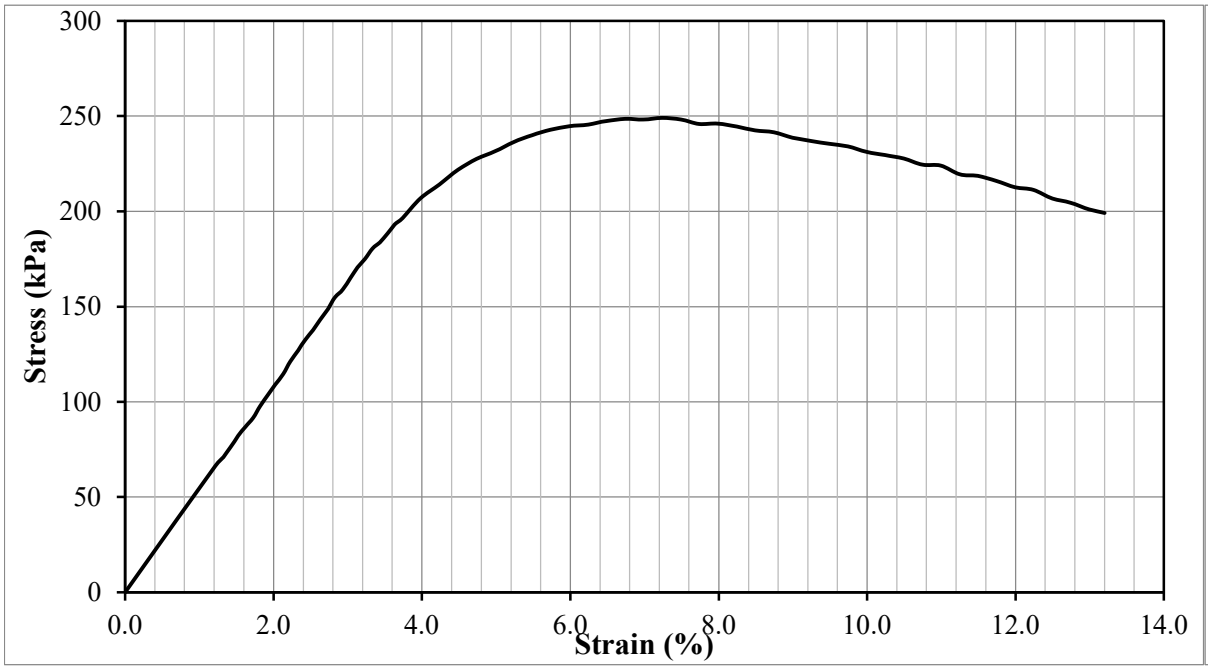
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	157	Strain at failure, εf :	6.85	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	104.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.5	mm
I.D.:	T-37-F	Initial Area:	2084.0	mm^2
Test Date:	5/22/2022	Weight:	381.5	g
Strain Rate:	1 %/min	Unit Weight:	1758	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	13.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	-10.0	°C
Additional information				



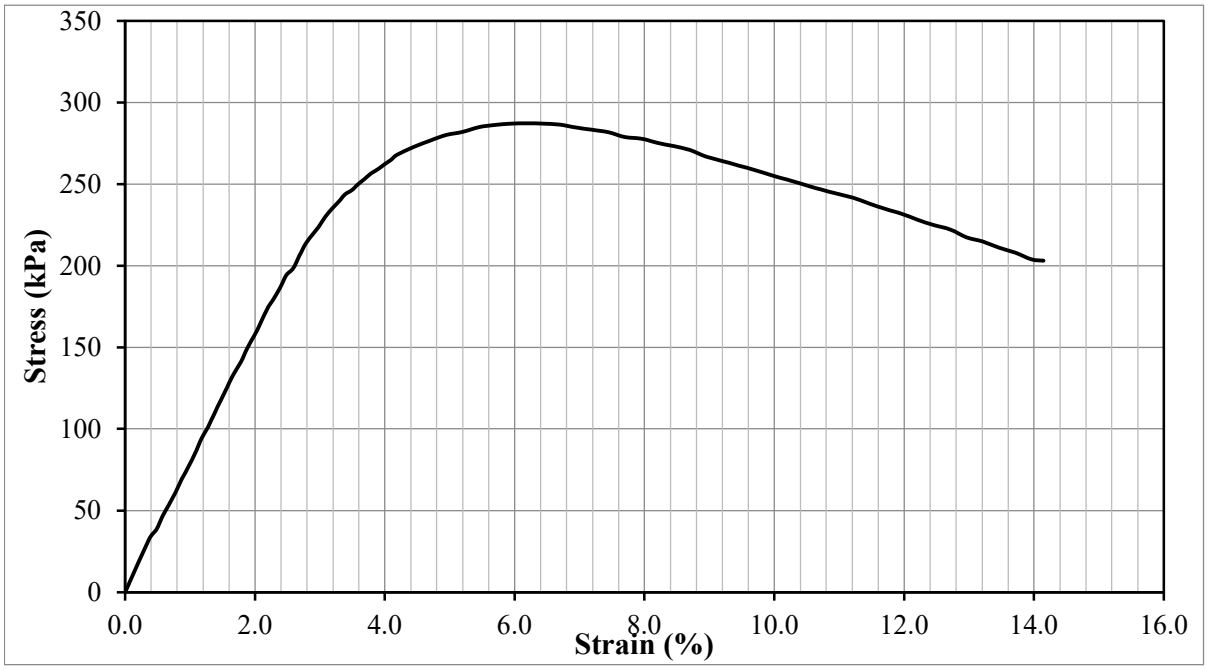
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	159	Strain at failure, εf :	6.98	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	104.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.5	mm
I.D.:	T-37-D	Initial Area:	2084.0	mm^2
Test Date:	6/5/2022	Weight:	382.8	g
Strain Rate:	1 %/min	Unit Weight:	1757	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	28.0	days
$(w:c)_{slurry}$:	0.6	Curing temperature	-10.0	°C
Additional information				



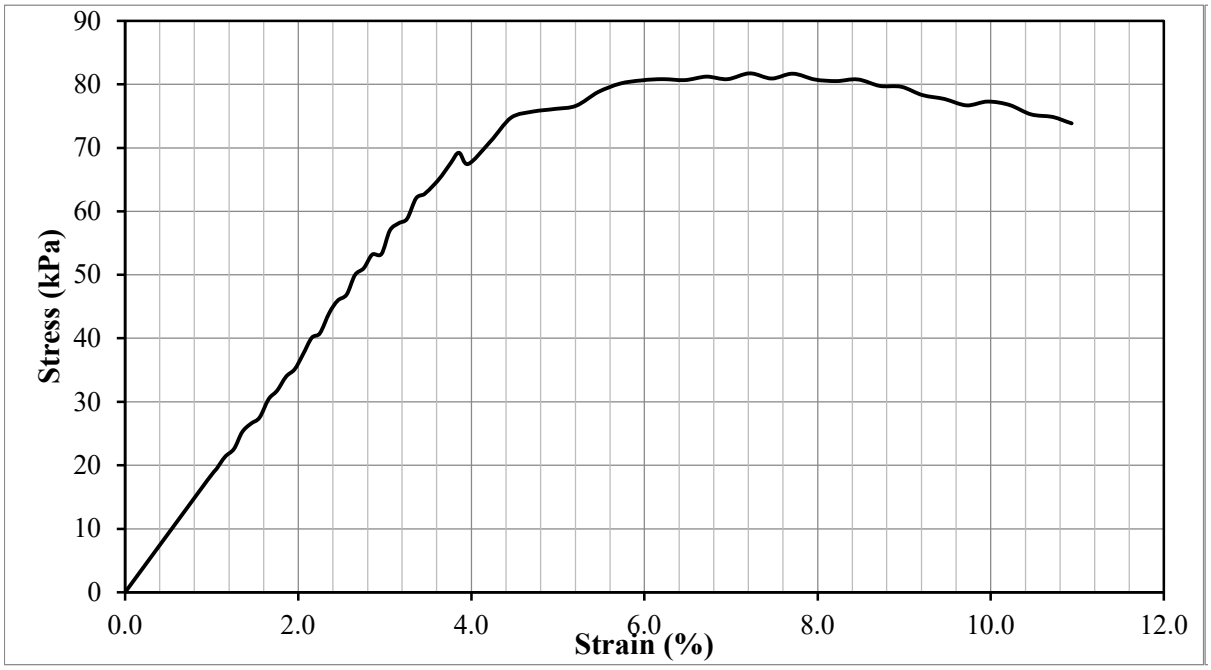
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	250	Strain at failure, εf :	7.24	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	104.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.5	mm
I.D.:	T-37-E	Initial Area:	2086.0	mm^2
Test Date:	6/5/2022	Weight:	382.9	g
Strain Rate:	1 %/min	Unit Weight:	1753	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	28.0	days
$(w:c)_{slurry}$:	0.6	Curing temperature	-10.0	°C
Additional information				



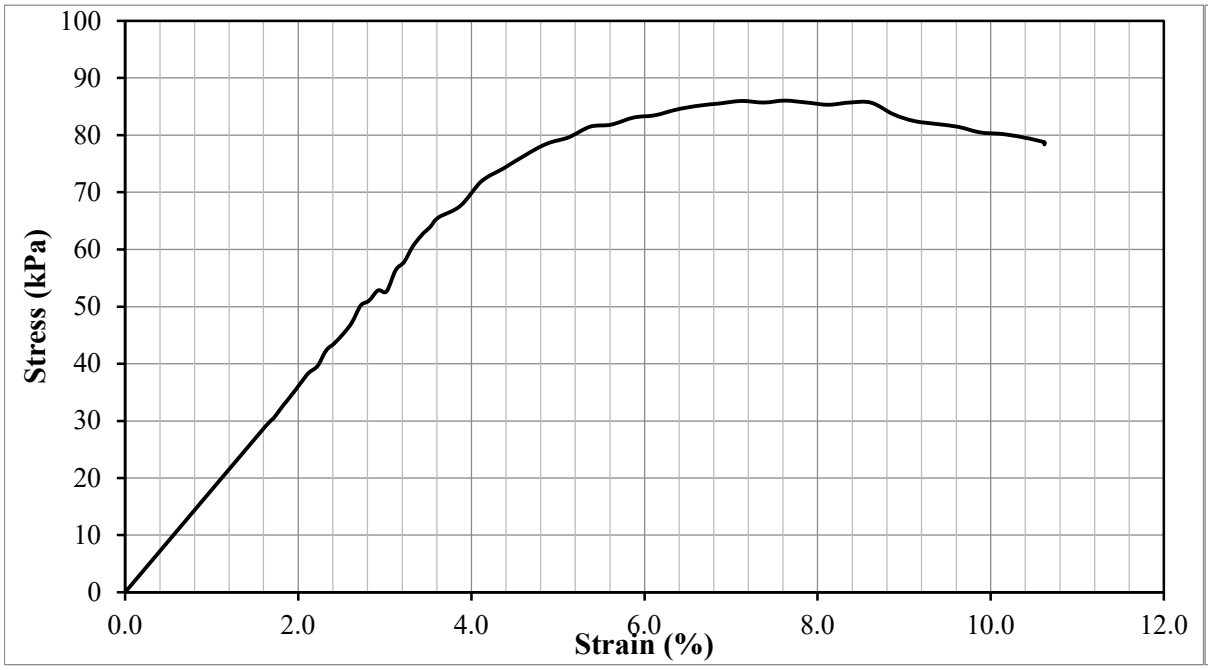
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	288	Strain at failure, εf :	6.20	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	105.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.7	mm
I.D.:	T-38-A	Initial Area:	2181.7	mm^2
Test Date:	5/11/2022	Weight:	385.6	g
Strain Rate:	1 %/min	Unit Weight:	1681	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	3.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	-10.0	°C
Additional information				



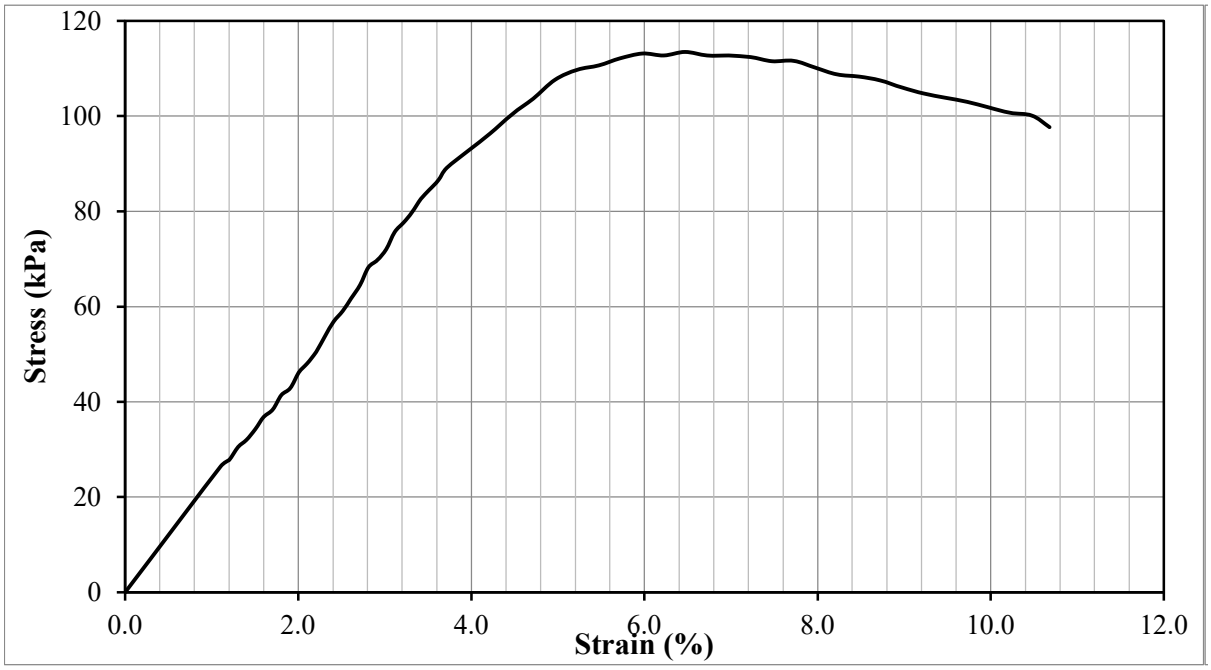
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	82	Strain at failure, εf :	7.22	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	104.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.2	mm
I.D.:	T-38-H	Initial Area:	2141.9	mm^2
Test Date:	5/11/2022	Weight:	373.7	g
Strain Rate:	1 %/min	Unit Weight:	1672	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	3.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	-10.0	°C
Additional information				



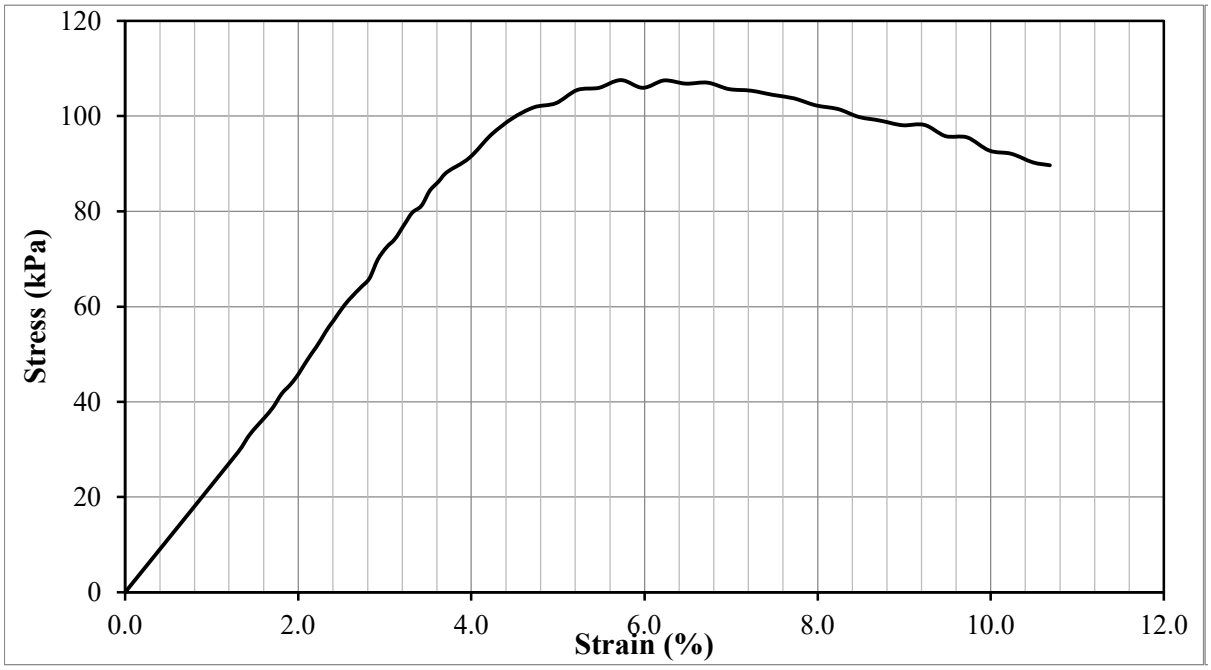
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	86	Strain at failure, εf :	7.62	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	104.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.5	mm
I.D.:	T-38-B	Initial Area:	2079.9	mm^2
Test Date:	5/15/2022	Weight:	376.2	g
Strain Rate:	1 %/min	Unit Weight:	1729	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	6.8	days
$(w:c)_{slurry}$:	1.0	Curing temperature	-10.0	°C
Additional information				



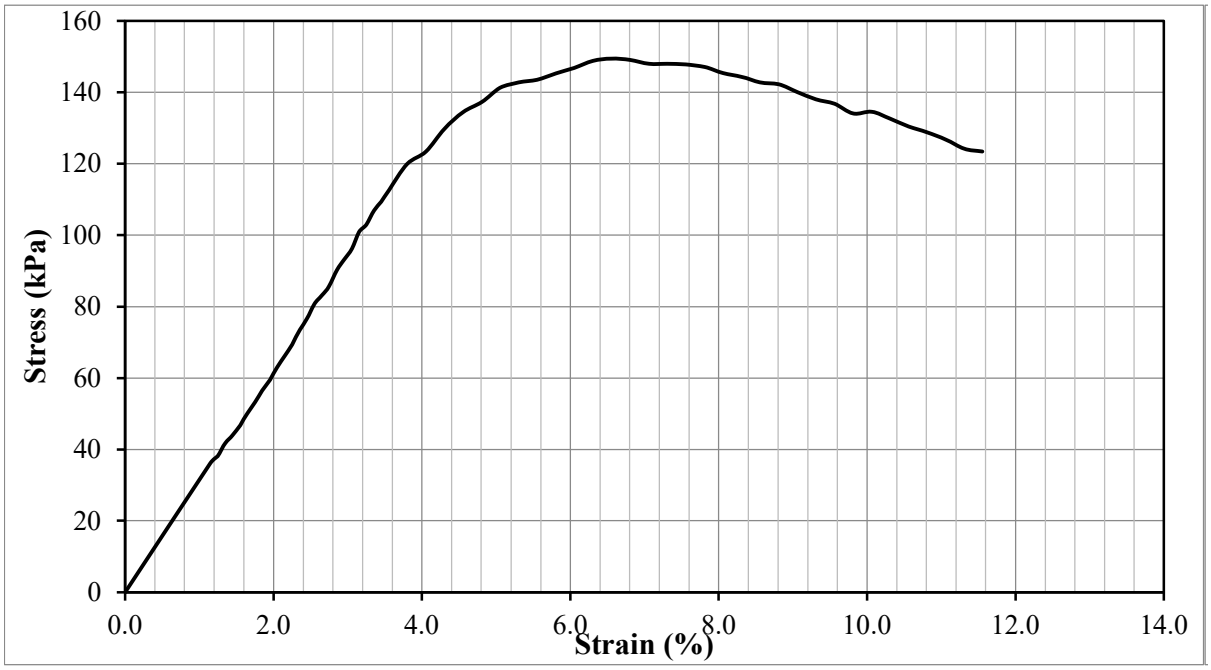
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	114	Strain at failure, εf :	6.47	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	104.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.1	mm
I.D.:	T-38-G	Initial Area:	2053.3	mm^2
Test Date:	5/15/2022	Weight:	375.4	g
Strain Rate:	1 %/min	Unit Weight:	1748	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	6.8	days
$(w:c)_{slurry}$:	1.0	Curing temperature	-10.0	°C
Additional information				



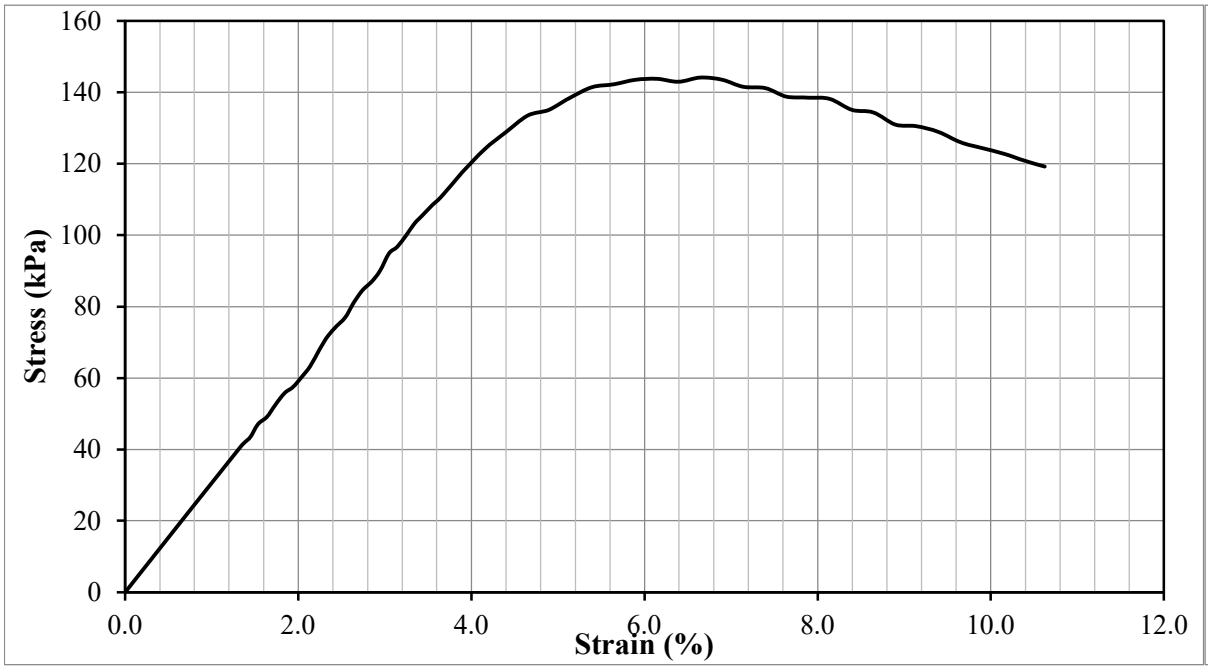
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	108	Strain at failure, εf :	5.73	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	105.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.4	mm
I.D.:	T-38-C	Initial Area:	2077.8	mm^2
Test Date:	5/22/2022	Weight:	377.3	g
Strain Rate:	1 %/min	Unit Weight:	1727	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	13.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	-10.0	°C
Additional information				



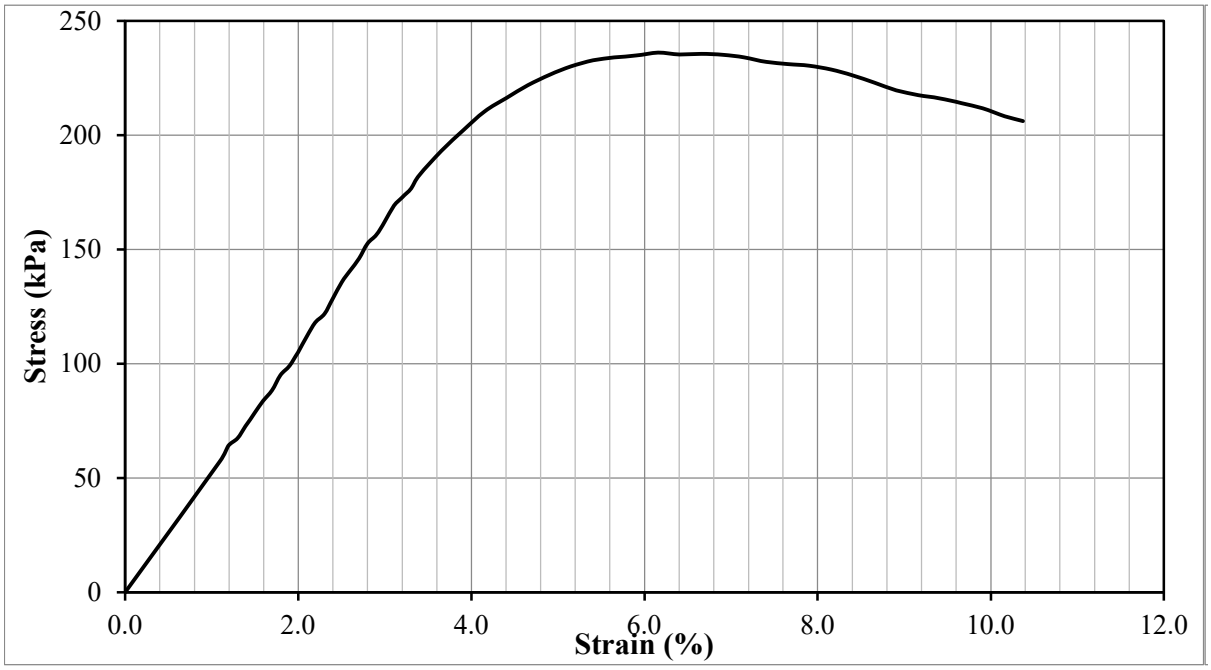
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	150	Strain at failure, εf :	6.55	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	105.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.4	mm
I.D.:	T-38-F	Initial Area:	2075.8	mm^2
Test Date:	5/22/2022	Weight:	375.7	g
Strain Rate:	1 %/min	Unit Weight:	1719	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	13.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	-10.0	°C
Additional information				



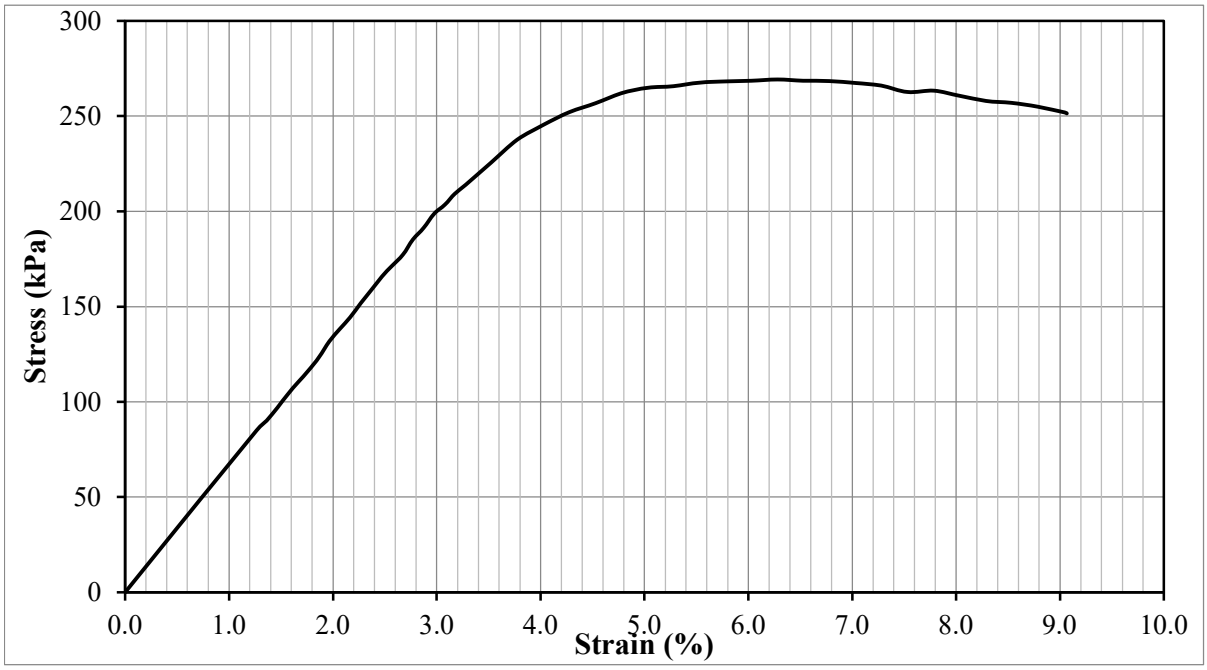
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	145	Strain at failure, εf :	6.64	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	104.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	T-38-E	Initial Area:	2098.4	mm^2
Test Date:	6/5/2022	Weight:	375.8	g
Strain Rate:	1 %/min	Unit Weight:	1708	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	-10.0	°C
Additional information				



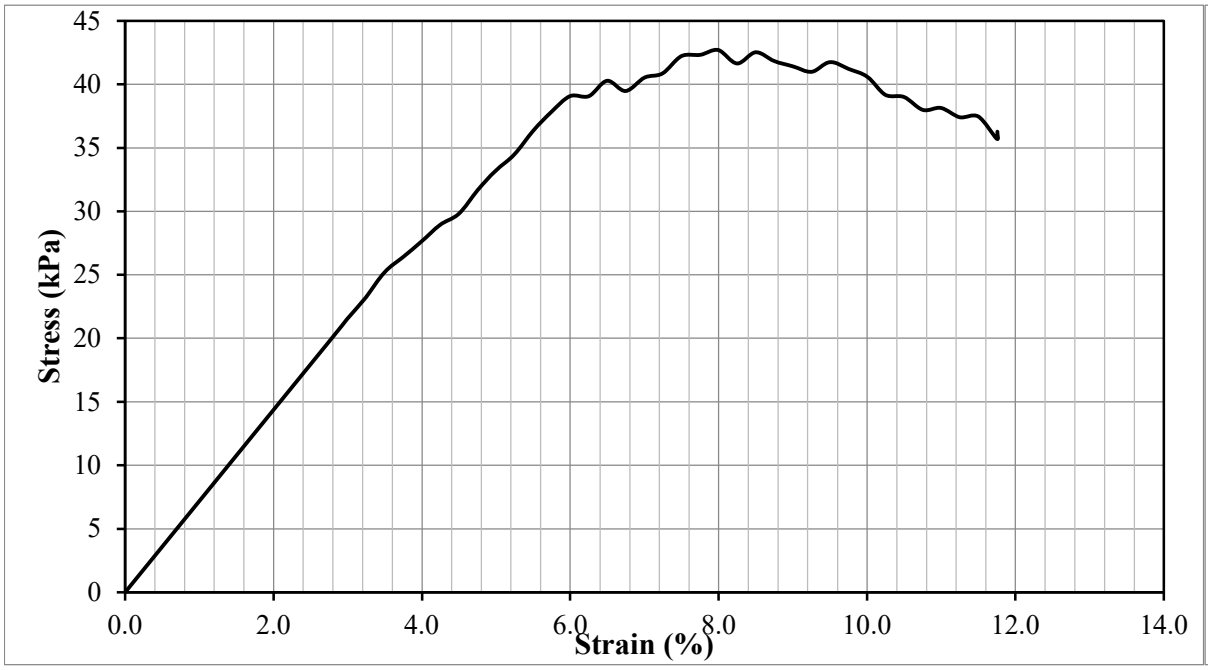
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	237	Strain at failure, εf :	6.16	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	105.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.5	mm
I.D.:	T-38-J	Initial Area:	2081.9	mm^2
Test Date:	6/5/2022	Weight:	377.7	g
Strain Rate:	1 %/min	Unit Weight:	1723	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	-10.0	°C
Additional information				



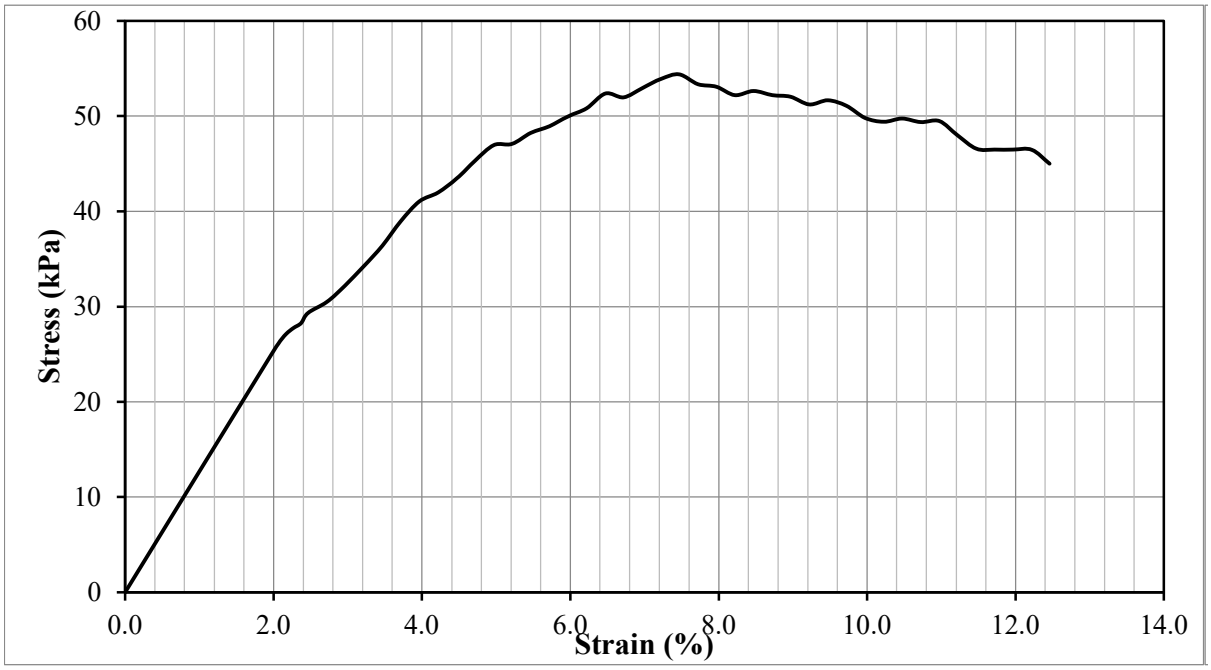
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	270	Strain at failure, εf :	6.28	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	107.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.1	mm
I.D.:	T-39-A	Initial Area:	2053.3	mm^2
Test Date:	5/14/2022	Weight:	362.3	g
Strain Rate:	1 %/min	Unit Weight:	1649	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	3.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	-10.0	°C
Additional information				



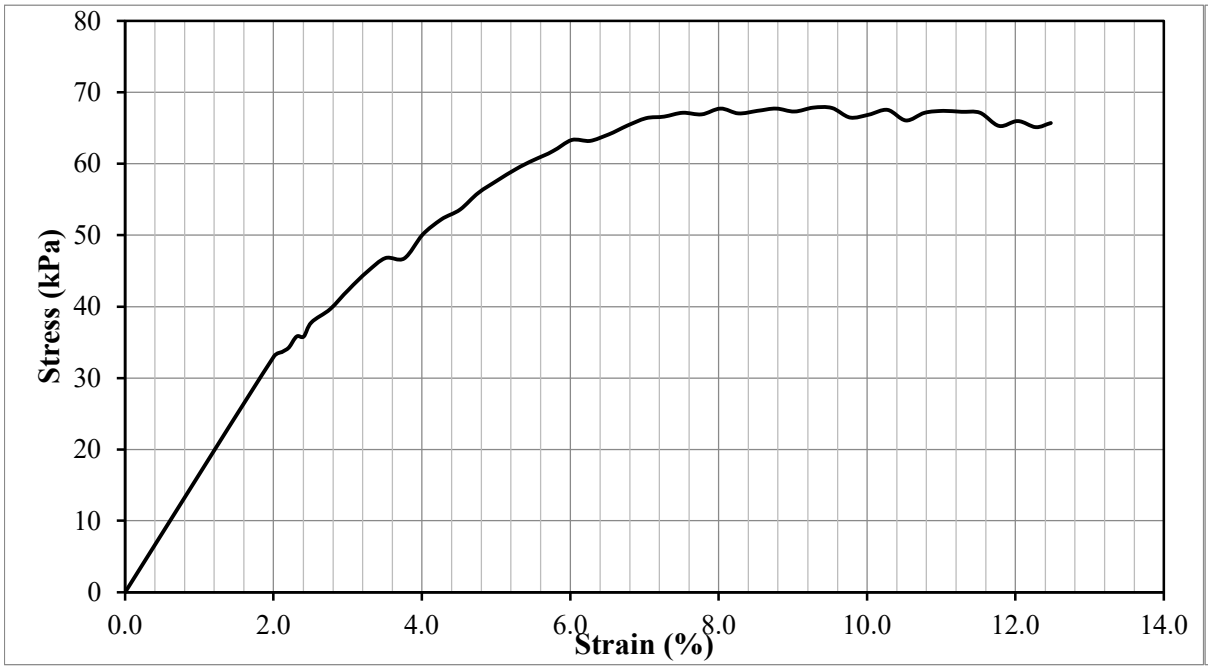
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	43	Strain at failure, εf :	7.99	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	107.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.3	mm
I.D.:	T-39-H	Initial Area:	2063.5	mm^2
Test Date:	5/14/2022	Weight:	361.6	g
Strain Rate:	1 %/min	Unit Weight:	1636	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	3.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	-10.0	°C
Additional information				



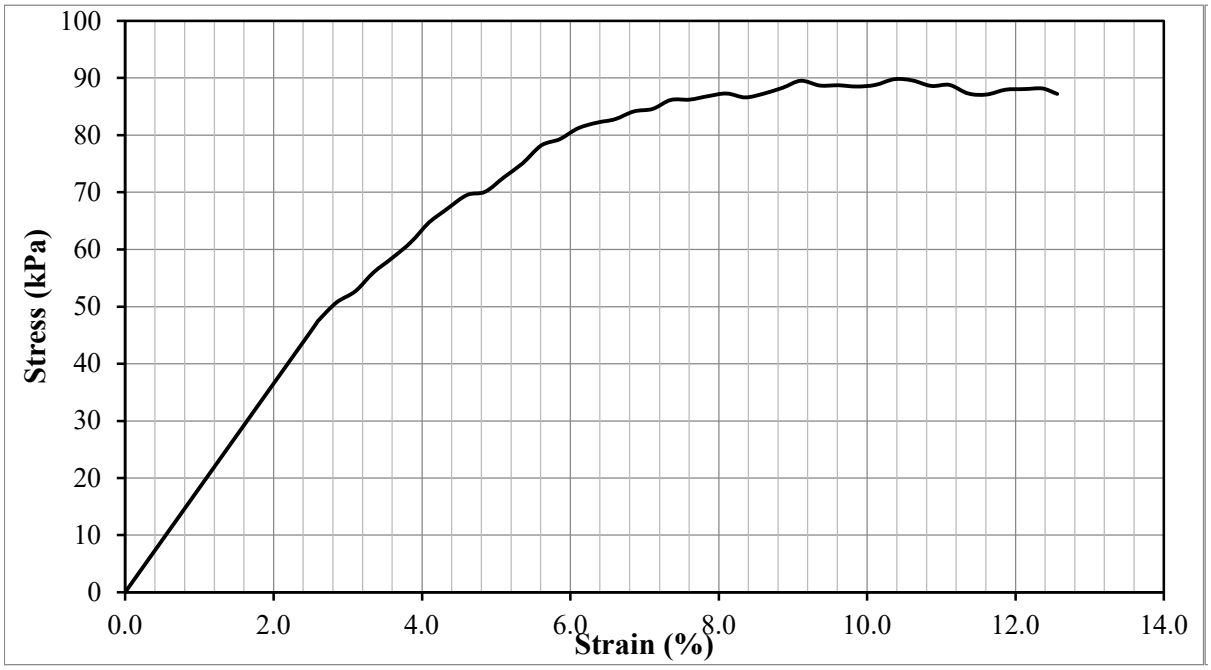
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	55	Strain at failure, εf :	7.47	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	107.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.5	mm
I.D.:	T-39-B	Initial Area:	2086.0	mm^2
Test Date:	5/18/2022	Weight:	362.4	g
Strain Rate:	1 %/min	Unit Weight:	1622	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	6.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	-10.0	°C
Additional information				



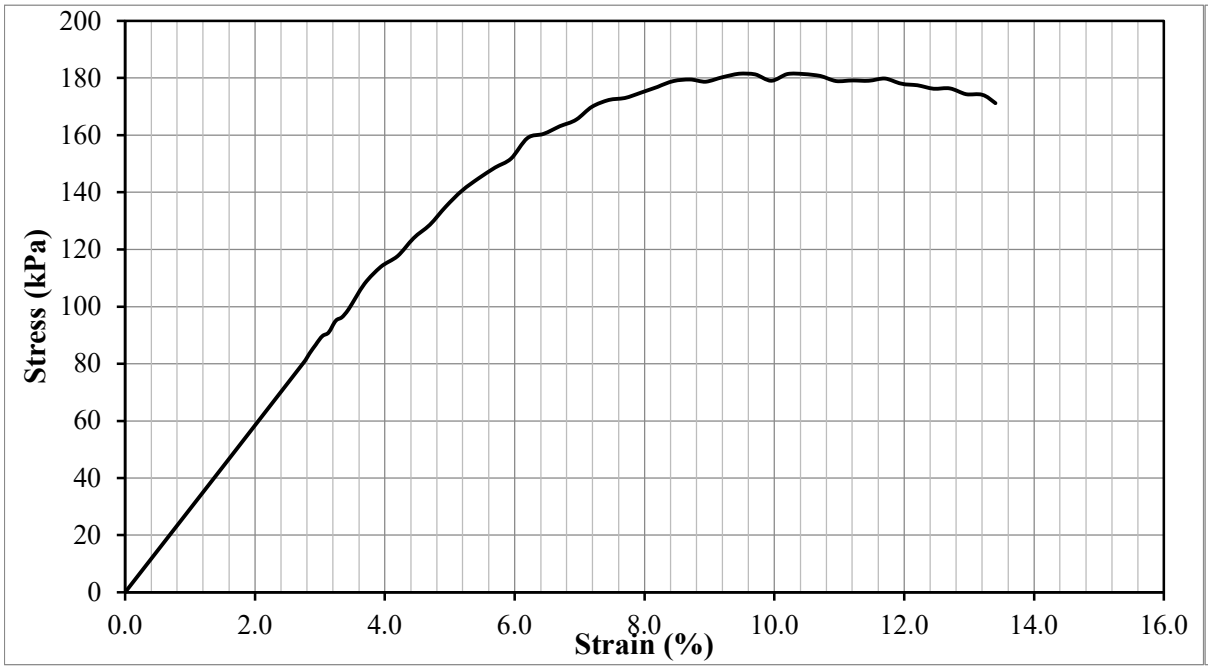
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	68	Strain at failure, εf :	9.27	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	107.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.2	mm
I.D.:	T-39-G	Initial Area:	2057.3	mm^2
Test Date:	5/18/2022	Weight:	362.8	g
Strain Rate:	1 %/min	Unit Weight:	1636	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	6.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	-10.0	°C
Additional information				



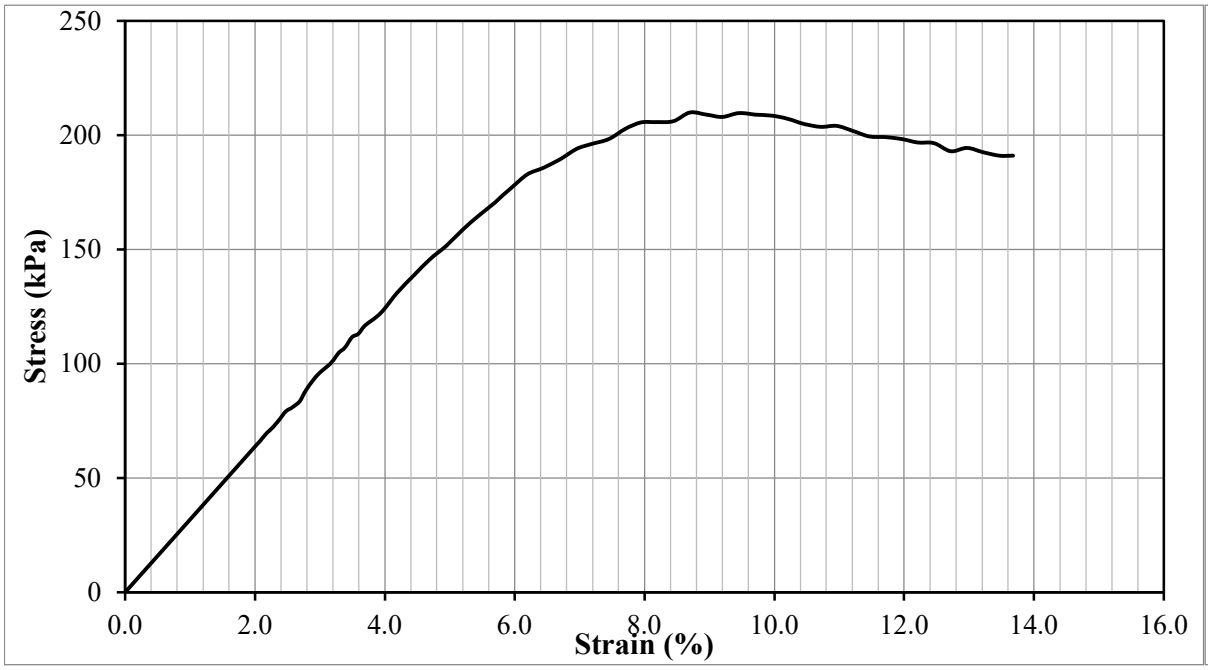
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	90	Strain at failure, εf :	9.11	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	107.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.5	mm
I.D.:	T-39-F	Initial Area:	2086.0	mm^2
Test Date:	5/25/2022	Weight:	362.8	g
Strain Rate:	1 %/min	Unit Weight:	1614	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	13.8	days
$(w:c)_{slurry}$:	1.0	Curing temperature	-10.0	°C
Additional information				



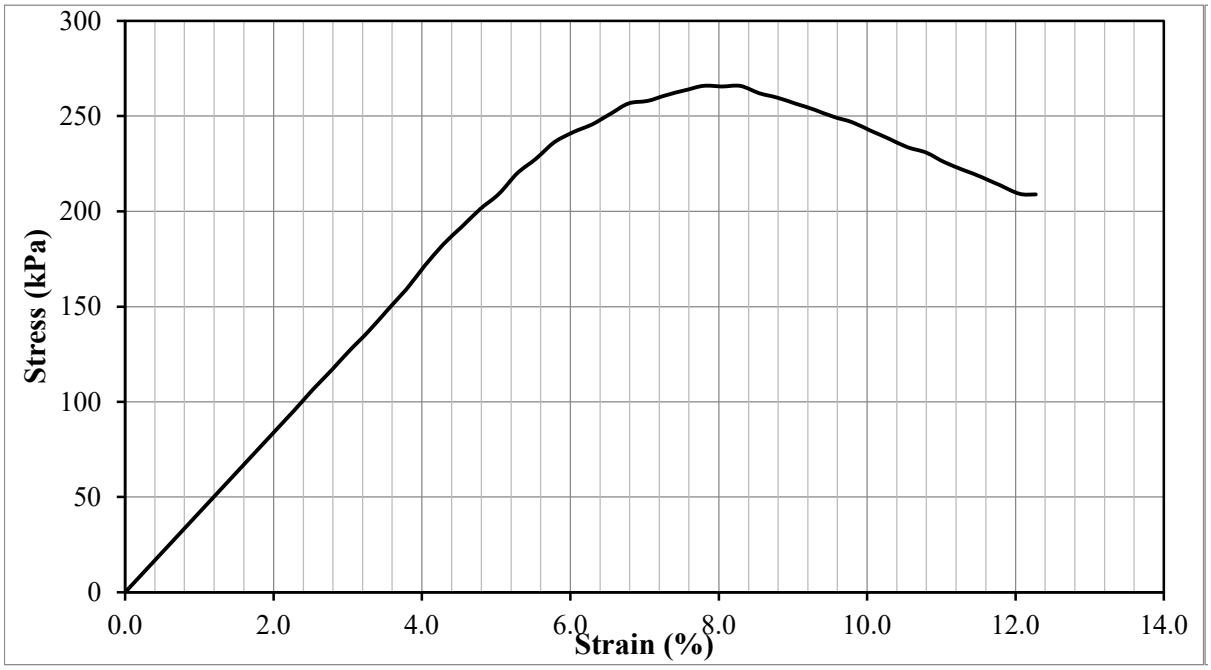
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	183	Strain at failure, εf :	9.45	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	108.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.6	mm
I.D.:	T-39-I	Initial Area:	2094.3	mm^2
Test Date:	5/25/2022	Weight:	363.3	g
Strain Rate:	1 %/min	Unit Weight:	1607	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	13.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	-10.0	°C
Additional information				



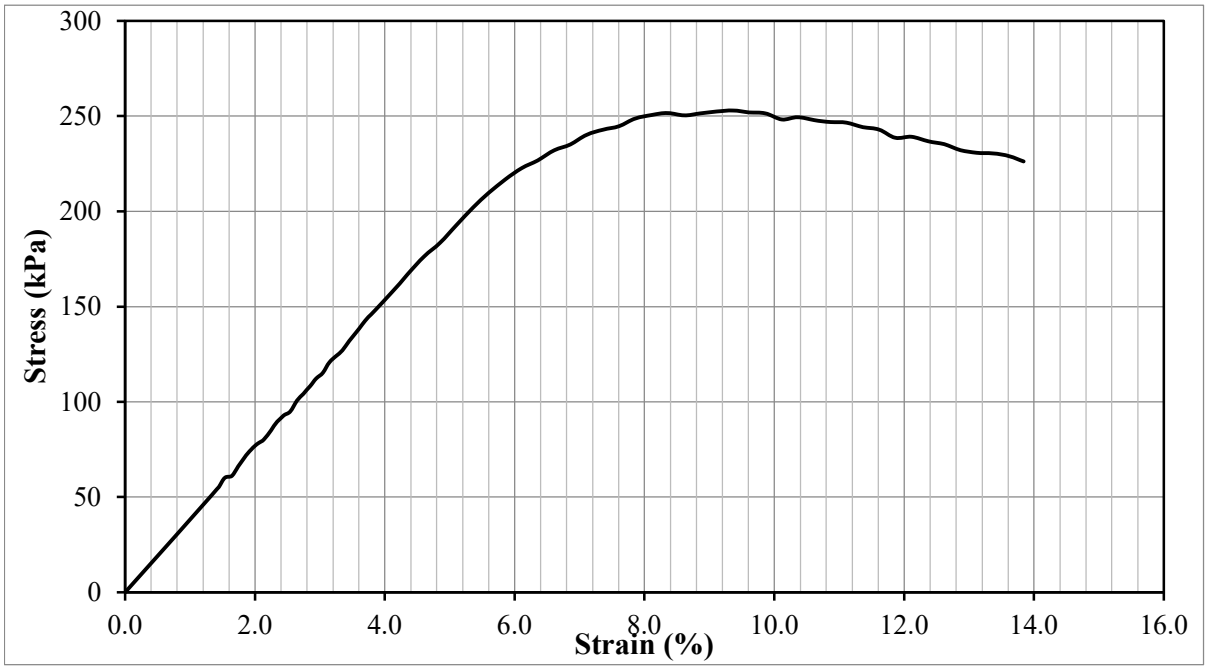
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	211	Strain at failure, εf :	8.70	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	107.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.1	mm
I.D.:	T-39-E	Initial Area:	2049.2	mm^2
Test Date:	6/8/2022	Weight:	362.2	g
Strain Rate:	1 %/min	Unit Weight:	1650	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	-10.0	°C
Additional information				



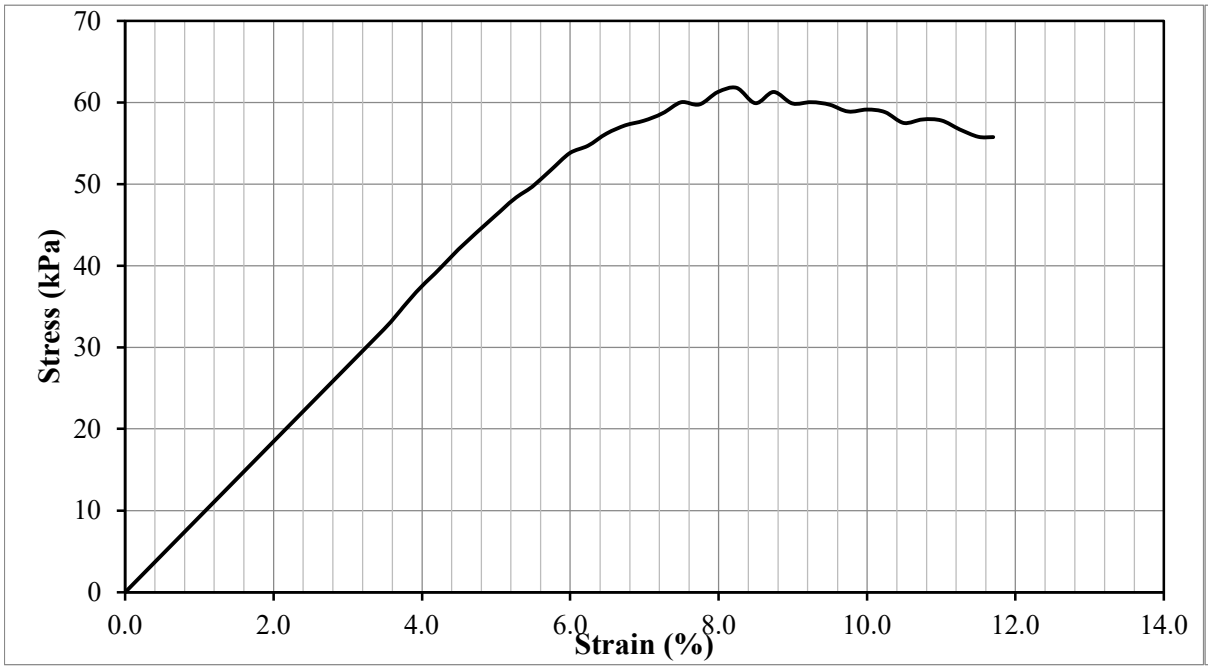
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	268	Strain at failure, εf :	7.79	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	106.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.2	mm
I.D.:	T-39-J	Initial Area:	2059.4	mm^2
Test Date:	6/8/2022	Weight:	361.9	g
Strain Rate:	1 %/min	Unit Weight:	1646	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	-10.0	°C
Additional information				



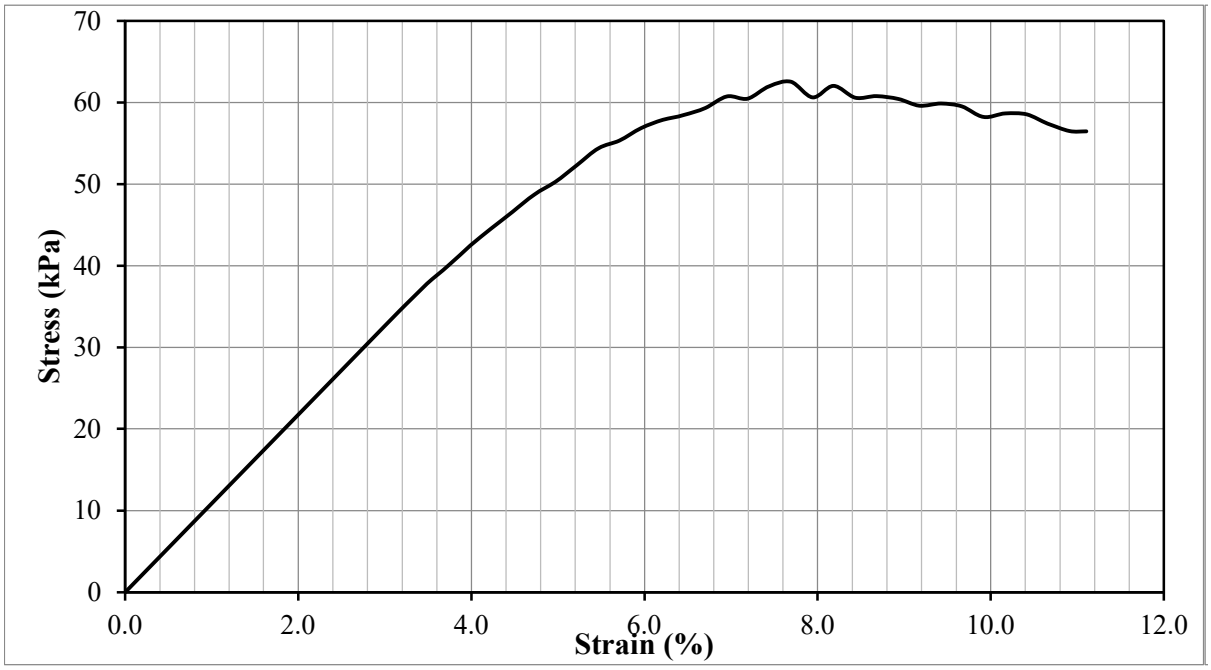
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	255	Strain at failure, εf :	9.36	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	105.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.4	mm
I.D.:	T-40-A	Initial Area:	2077.8	mm^2
Test Date:	5/14/2022	Weight:	345.0	g
Strain Rate:	1 %/min	Unit Weight:	1577	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	3.0	days
$(w:c)_{slurry}$:	1.4	Curing temperature	-10.0	°C
Additional information				



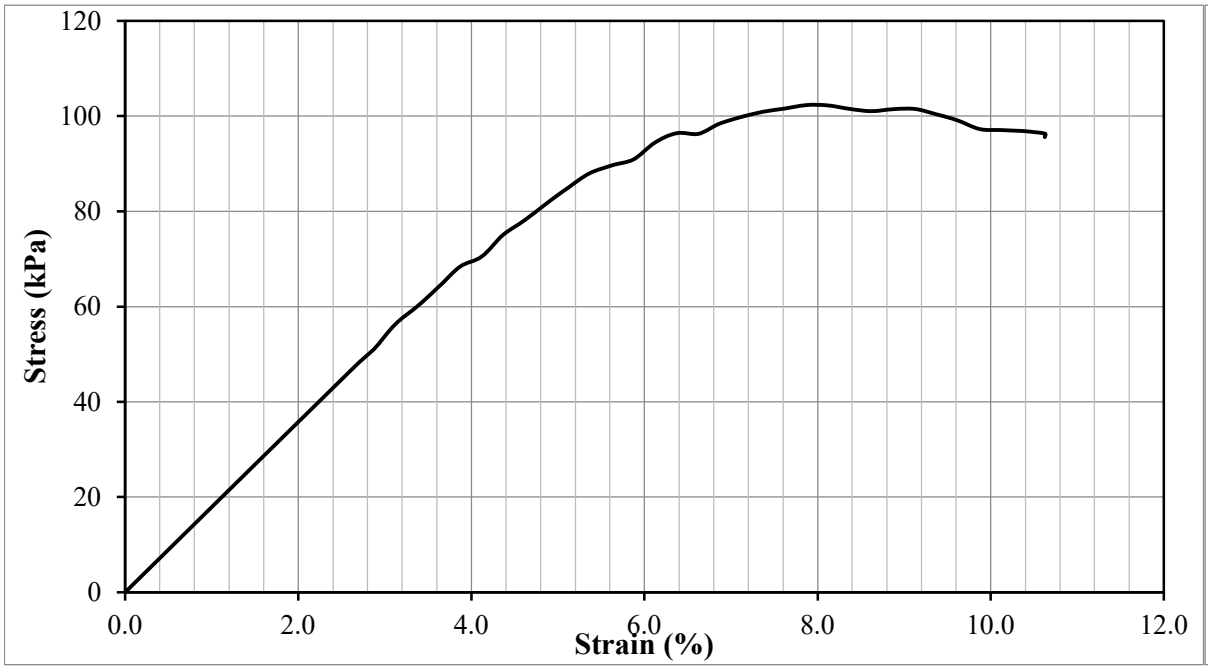
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	62	Strain at failure, εf :	8.24	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	106.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.3	mm
I.D.:	T-40-H	Initial Area:	2065.5	mm^2
Test Date:	5/14/2022	Weight:	348.1	g
Strain Rate:	1 %/min	Unit Weight:	1581	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	3.0	days
$(w:c)_{slurry}$:	1.4	Curing temperature	-10.0	°C
Additional information				



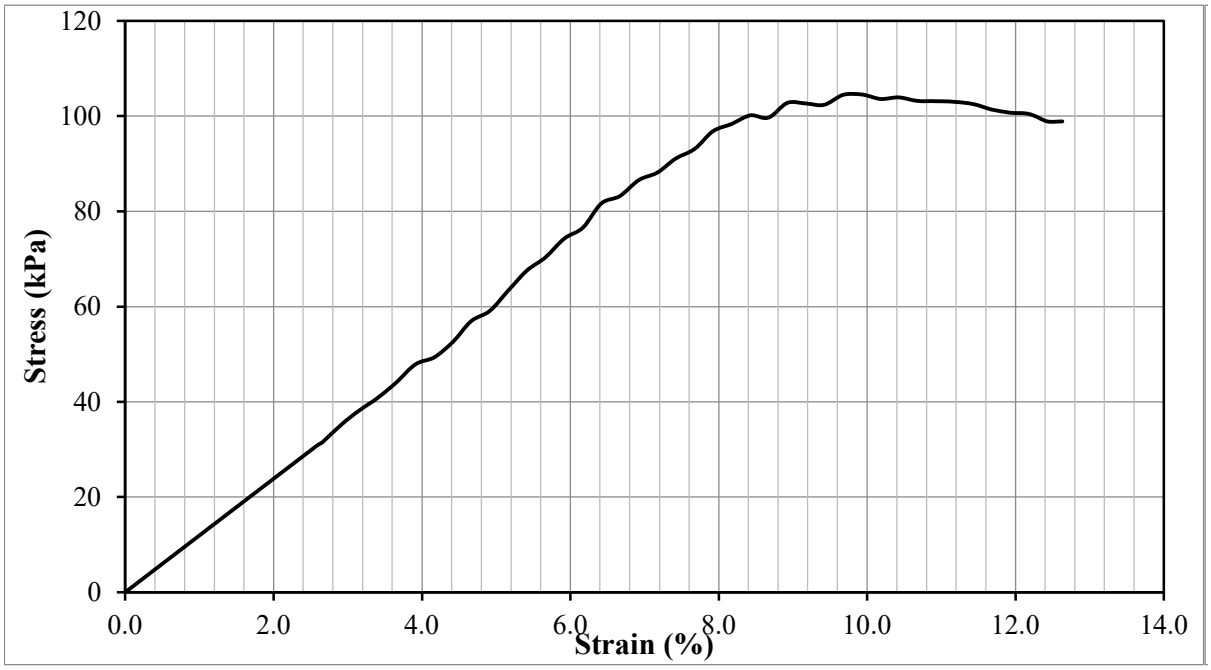
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	63	Strain at failure, εf :	7.69	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	107.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.2	mm
I.D.:	T-40-B	Initial Area:	2057.3	mm^2
Test Date:	5/18/2022	Weight:	349.2	g
Strain Rate:	1 %/min	Unit Weight:	1585	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	6.9	days
$(w:c)_{slurry}$:	1.4	Curing temperature	-10.0	°C
Additional information				



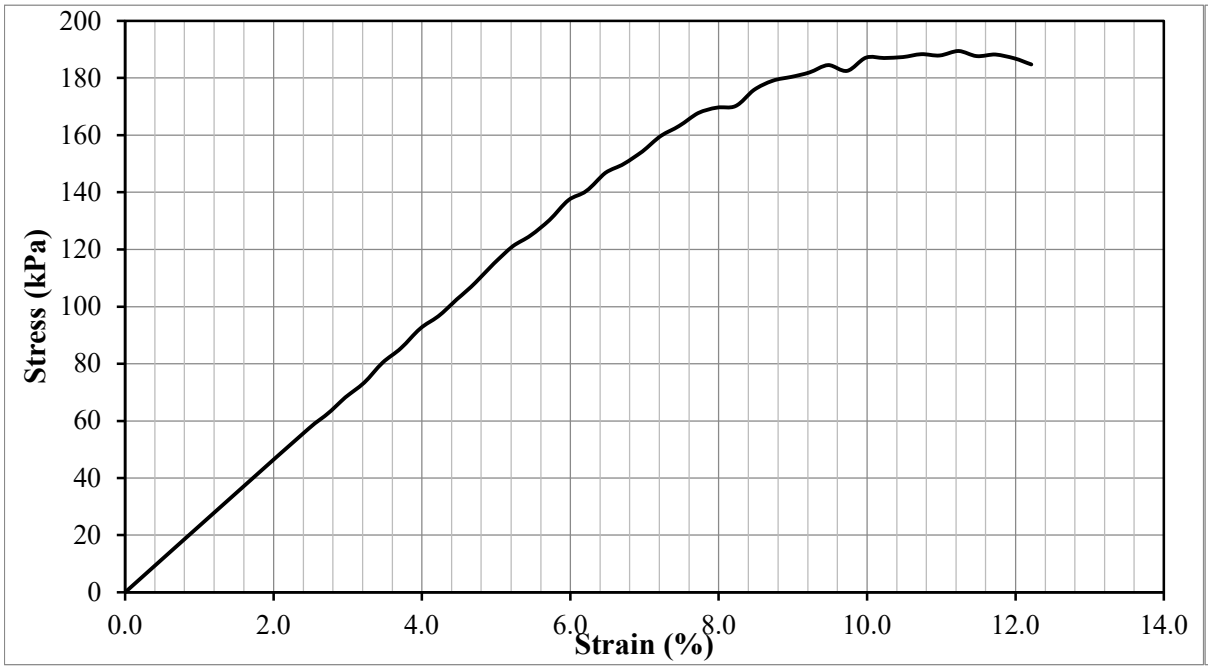
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	103	Strain at failure, εf :	7.87	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	107.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.5	mm
I.D.:	T-40-G	Initial Area:	2084.0	mm^2
Test Date:	5/18/2022	Weight:	349.2	g
Strain Rate:	1 %/min	Unit Weight:	1557	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	6.9	days
$(w:c)_{slurry}$:	1.4	Curing temperature	-10.0	°C
Additional information				



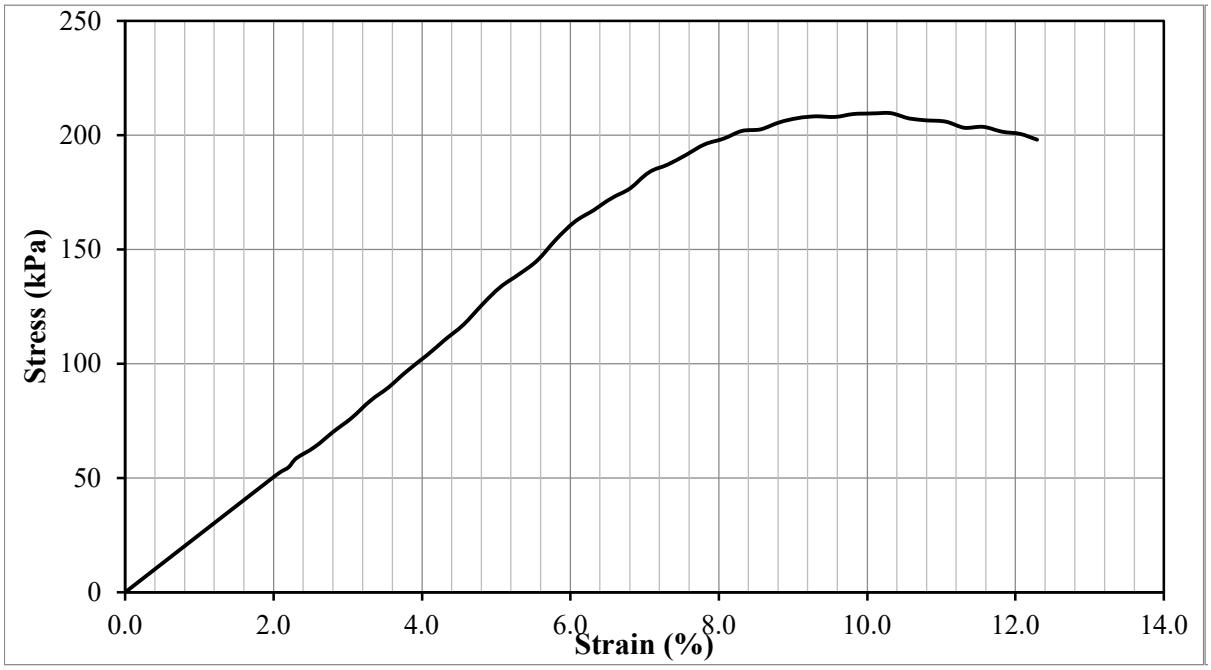
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	105	Strain at failure, εf :	9.93	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	107.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.3	mm
I.D.:	T-40-C	Initial Area:	2063.5	mm^2
Test Date:	5/25/2022	Weight:	349.5	g
Strain Rate:	1 %/min	Unit Weight:	1573	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	13.8	days
$(w:c)_{slurry}$:	1.4	Curing temperature	-10.0	°C
Additional information				



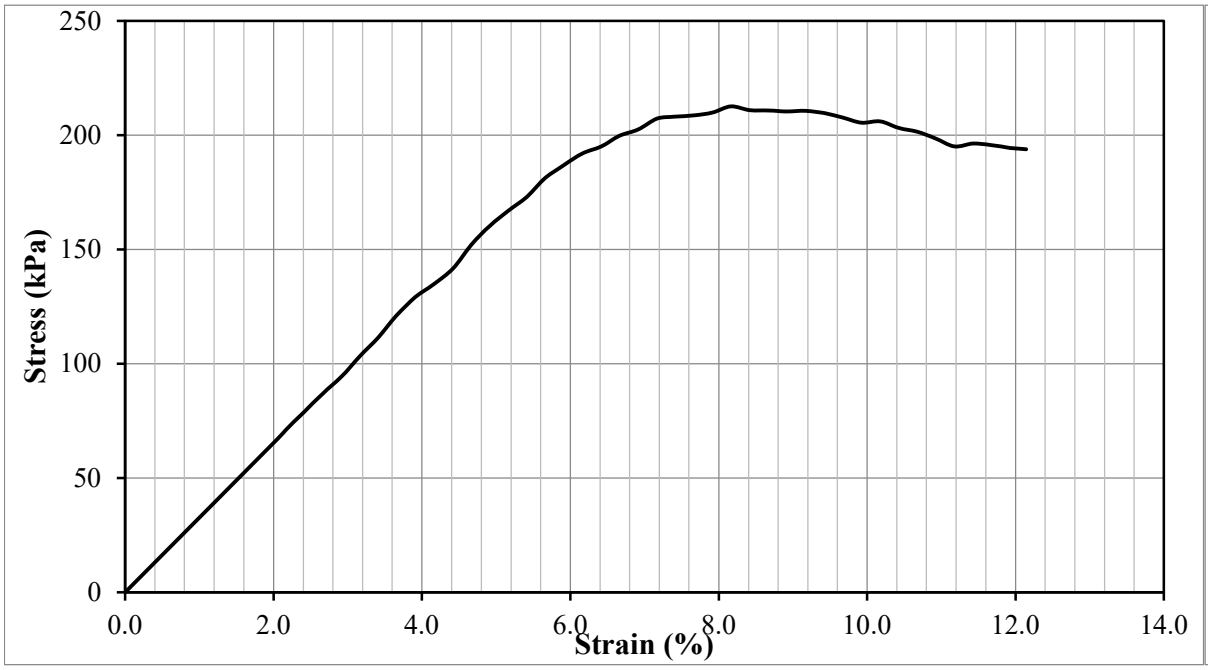
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	191	Strain at failure, εf :	11.23	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	107.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.1	mm
I.D.:	T-40-F	Initial Area:	2051.2	mm^2
Test Date:	5/25/2022	Weight:	349.7	g
Strain Rate:	1 %/min	Unit Weight:	1580	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	13.8	days
$(w:c)_{slurry}$:	1.4	Curing temperature	-10.0	°C
Additional information				



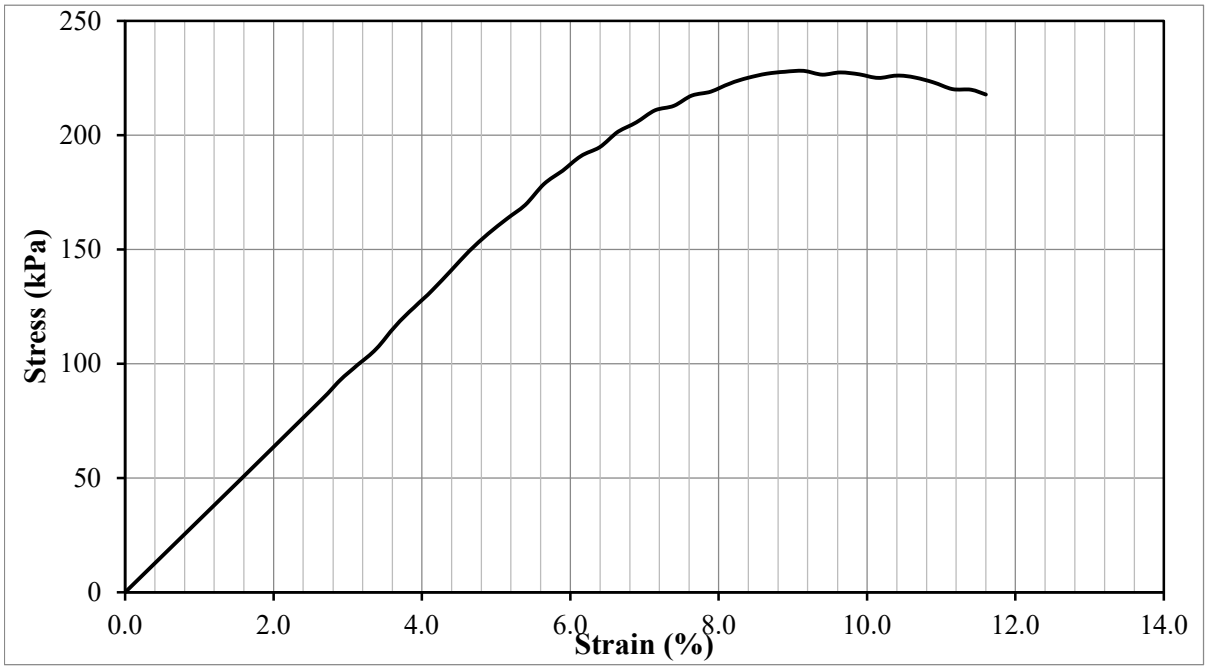
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	211	Strain at failure, εf :	10.32	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	107.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.5	mm
I.D.:	T-40-D	Initial Area:	2081.9	mm^2
Test Date:	6/8/2022	Weight:	350.0	g
Strain Rate:	1 %/min	Unit Weight:	1559	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.4	Curing temperature	-10.0	°C
Additional information				



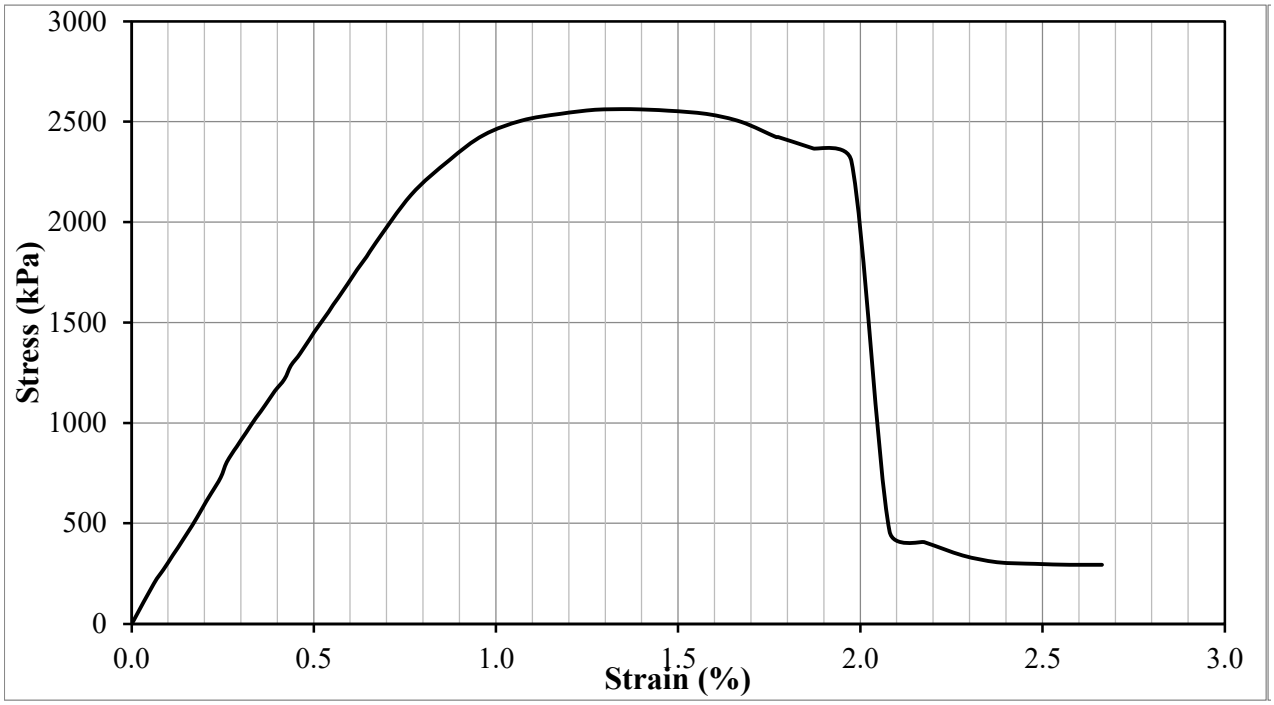
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	214	Strain at failure, εf :	8.17	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	108.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	T-40-E	Initial Area:	2104.6	mm^2
Test Date:	6/8/2022	Weight:	349.7	g
Strain Rate:	1 %/min	Unit Weight:	1538	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.4	Curing temperature	-10.0	°C
Additional information				



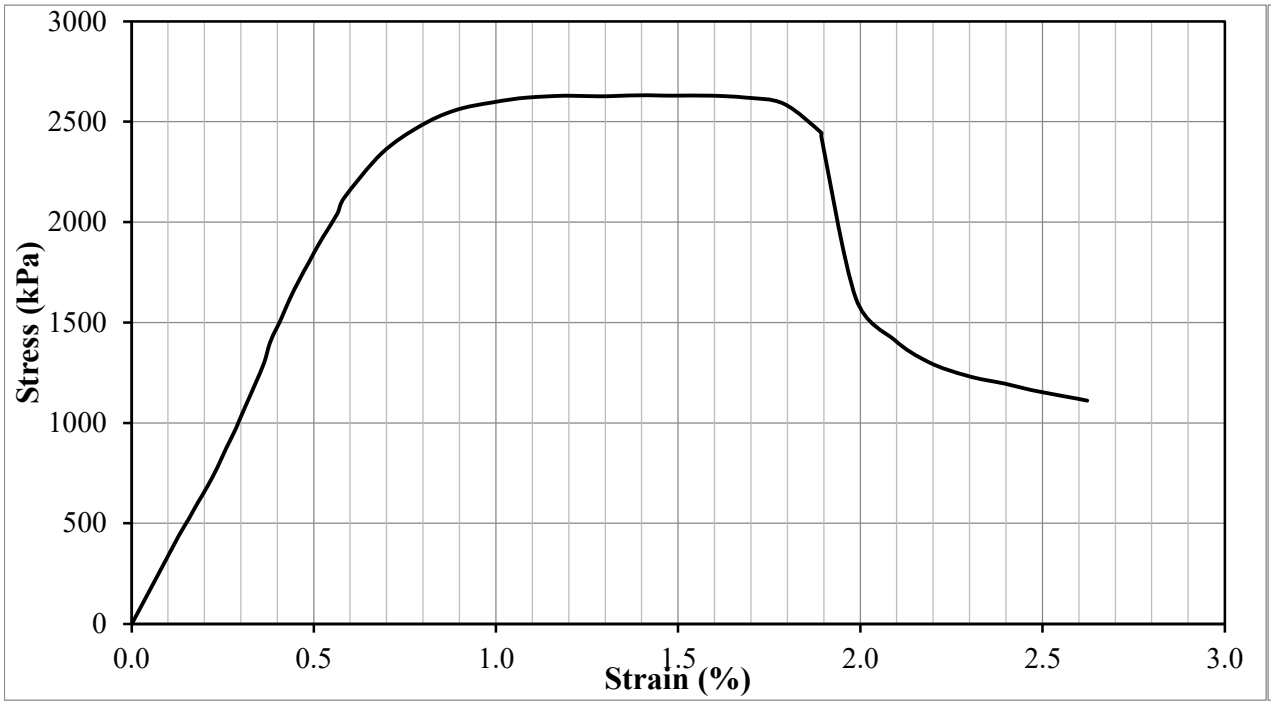
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	230	Strain at failure, εf :	9.14	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	S-1-A	Initial Area:	2112.9	mm^2
Test Date:	10/3/2021	Weight:	388.0	g
Strain Rate:	1 %/min	Unit Weight:	1809	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	3.1	days
$(w{:}c)_{slurry}$:	0.6	Curing temperature	25.0	°C
Additional information				



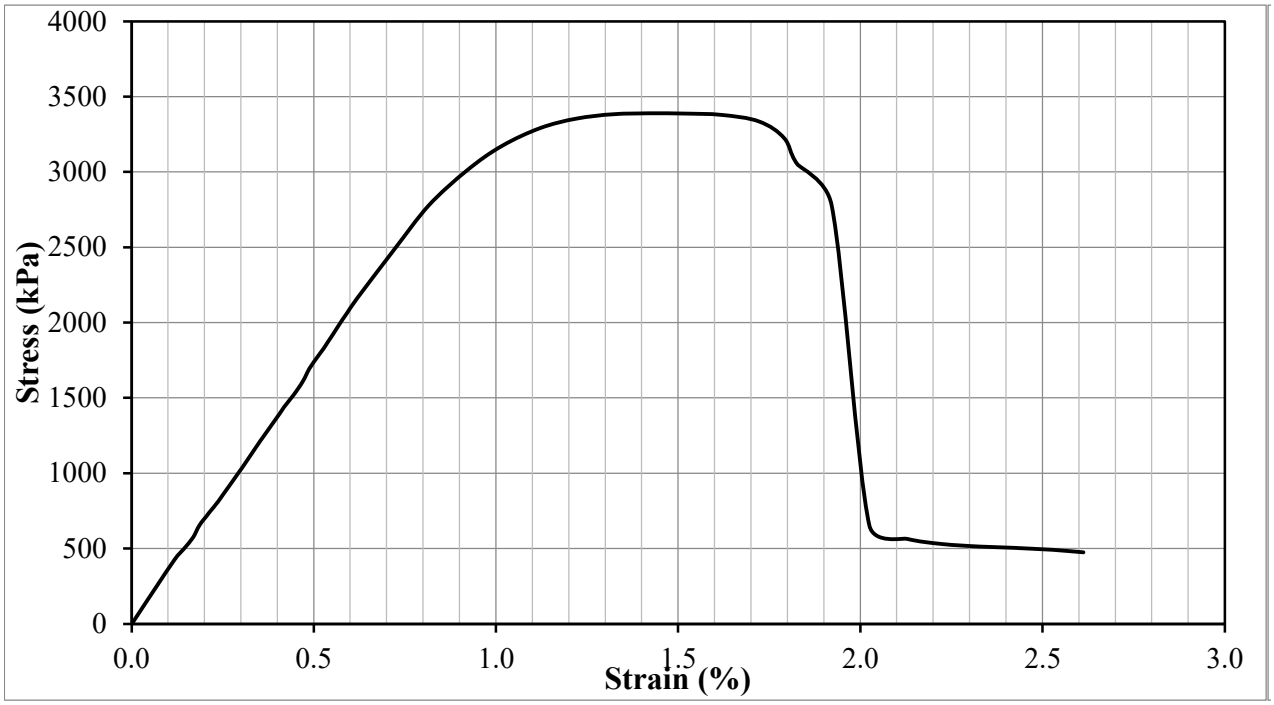
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,554	Strain at failure, εf :	1.37	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	S-1-H	Initial Area:	2112.9	mm^2
Test Date:	10/3/2021	Weight:	387.2	g
Strain Rate:	1 %/min	Unit Weight:	1812	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	3.1	days
$(w{:}c)_{slurry}$:	0.6	Curing temperature	25.0	°C
Additional information				



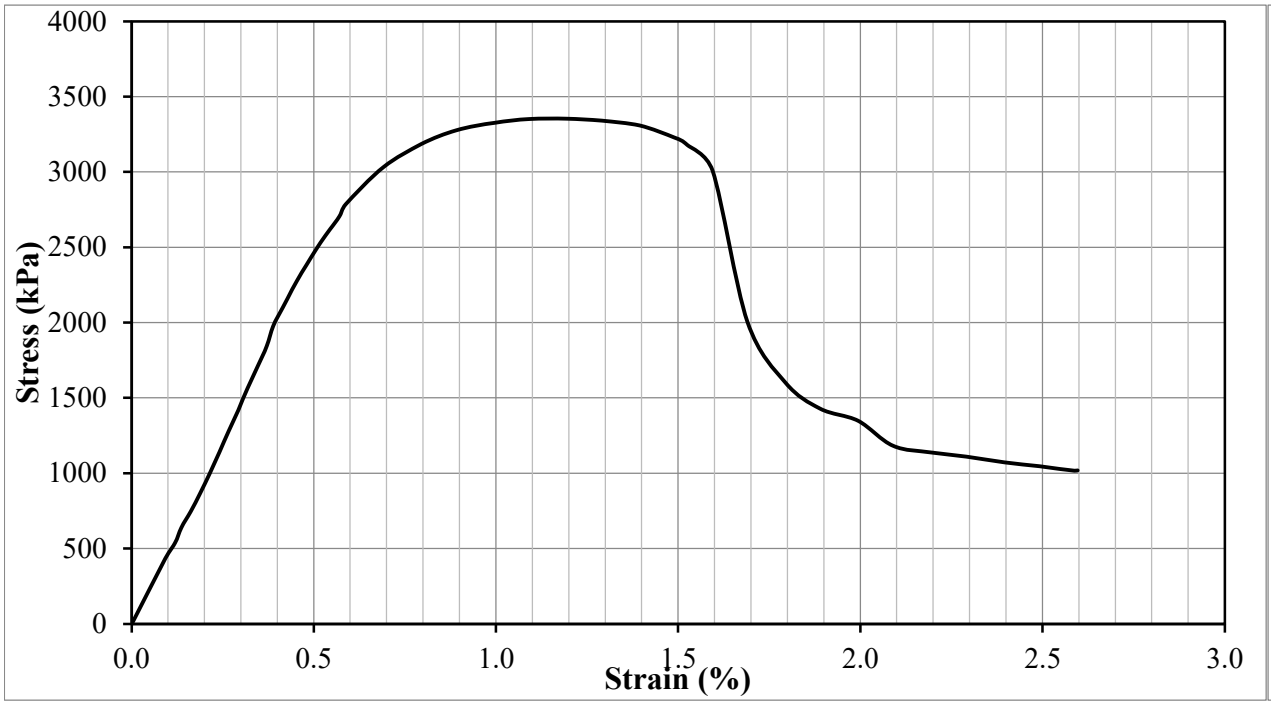
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,622	Strain at failure, εf :	1.39	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	S-1-B	Initial Area:	2121.1	mm^2
Test Date:	10/7/2021	Weight:	387.4	g
Strain Rate:	1 %/min	Unit Weight:	1807	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	7.0	days
$(w{:}c)_{slurry}$:	0.6	Curing temperature	25.0	°C
Additional information				



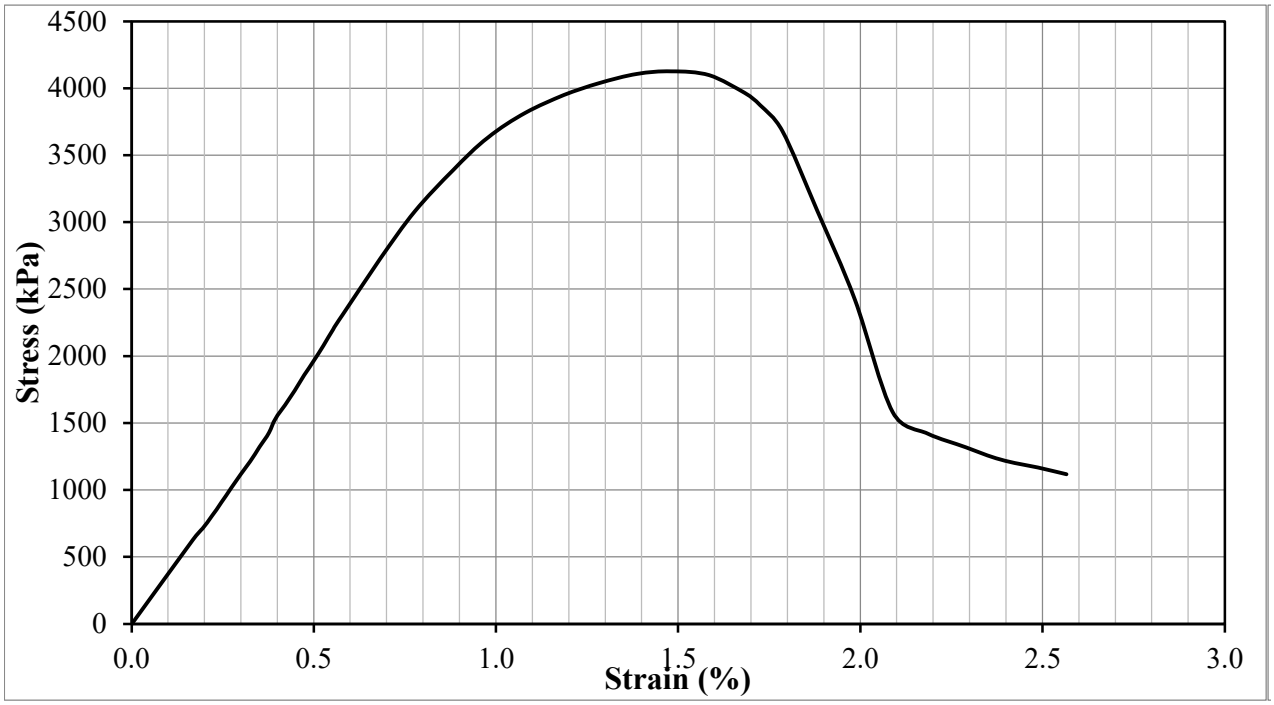
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,375	Strain at failure, εf :	1.42	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	S-1-G	Initial Area:	2119.1	mm^2
Test Date:	10/7/2021	Weight:	388.0	g
Strain Rate:	1 %/min	Unit Weight:	1808	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	7.0	days
$(w:c)_{slurry}$:	0.6	Curing temperature	25.0	°C
Additional information				



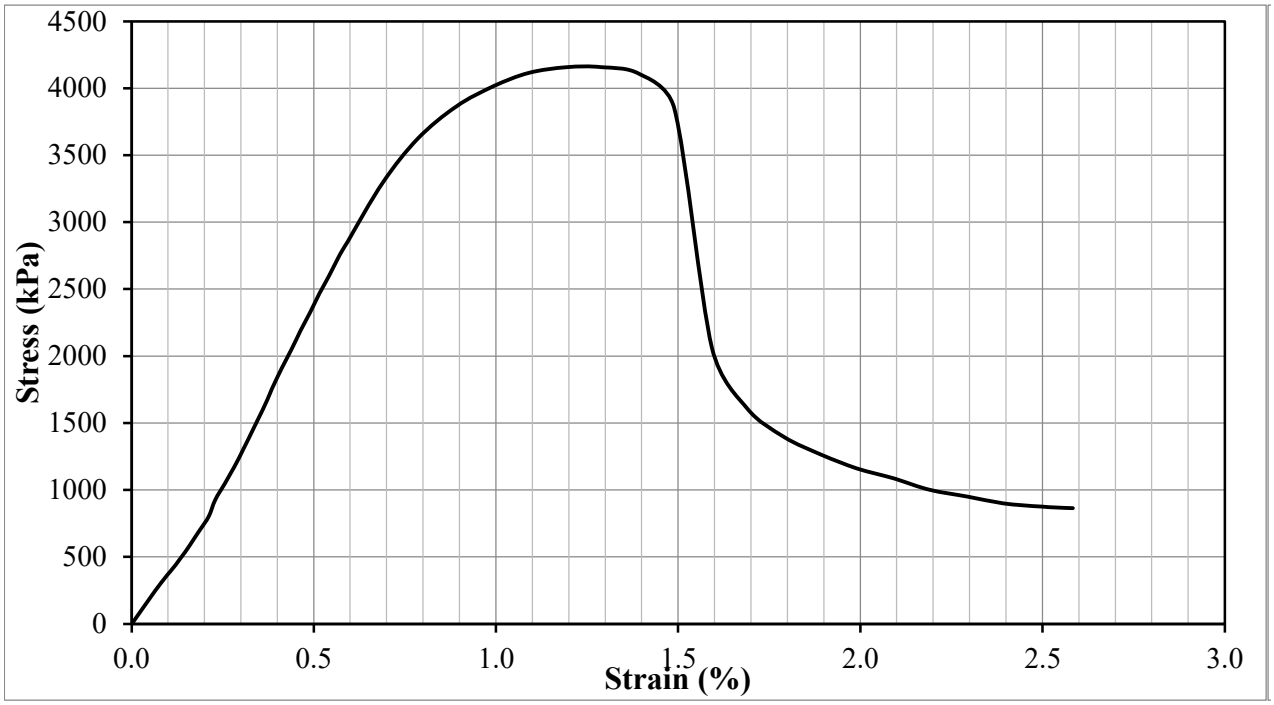
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,341	Strain at failure, εf :	1.20	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.5	mm
I.D.:	S-1-C	Initial Area:	2084.0	mm^2
Test Date:	10/14/2021	Weight:	381.5	g
Strain Rate:	1 %/min	Unit Weight:	1839	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	14.0	days
$(w{:}c)_{slurry}$:	0.6	Curing temperature	25.0	°C
Additional information				



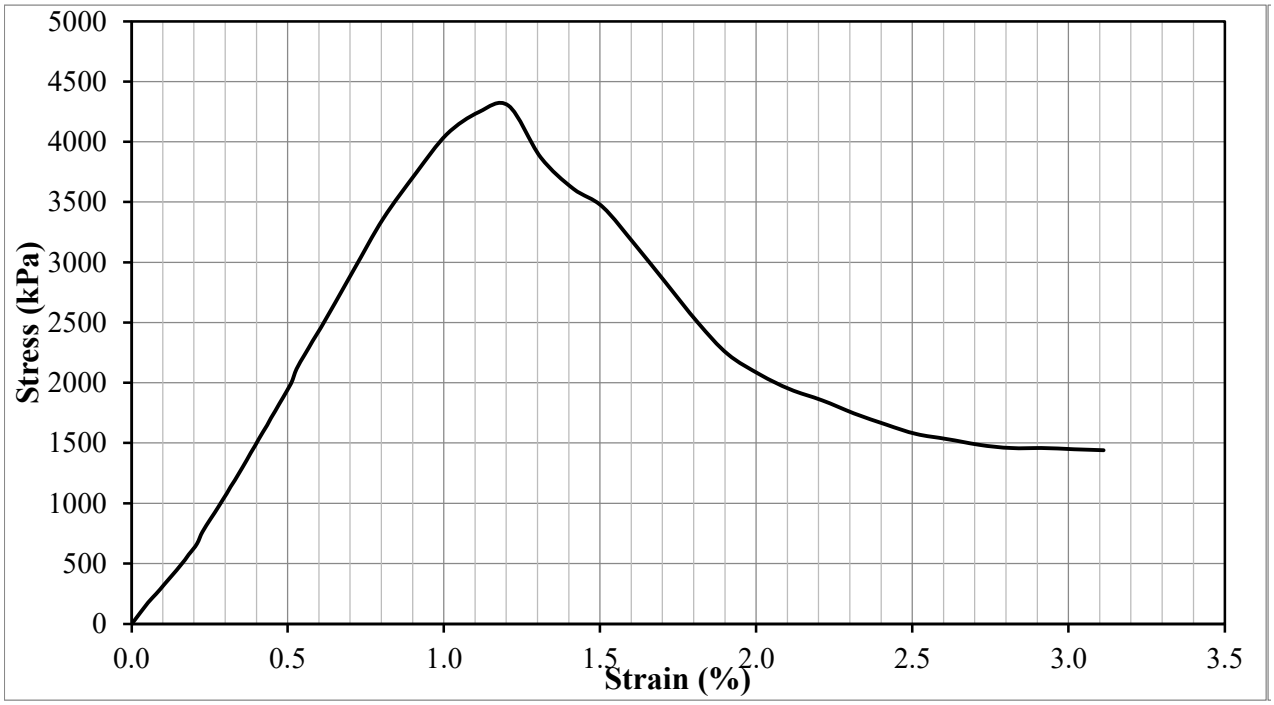
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,106	Strain at failure, εf :	1.48	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	S-1-F	Initial Area:	2106.6	mm^2
Test Date:	10/14/2021	Weight:	387.0	g
Strain Rate:	1 %/min	Unit Weight:	1814	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	14.0	days
$(w{:}c)_{slurry}$:	0.6	Curing temperature	25.0	°C
Additional information				



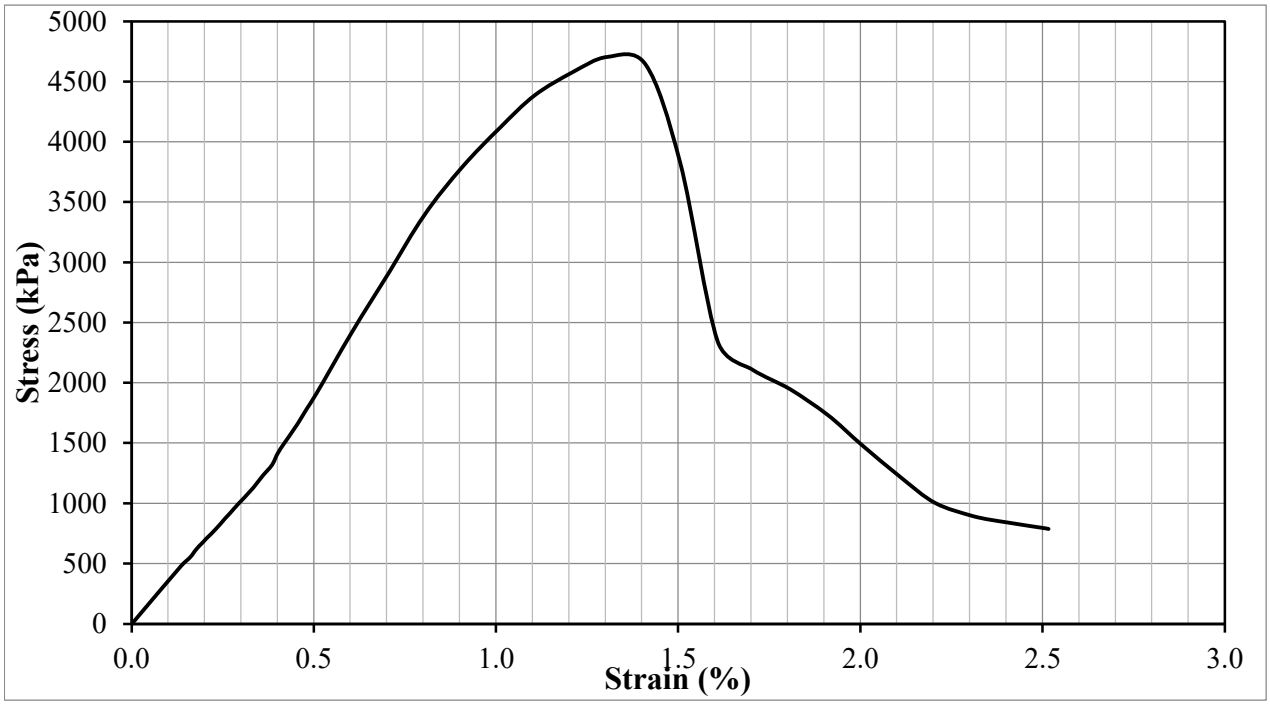
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,144	Strain at failure, εf :	1.29	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	S-1-D	Initial Area:	2114.9	mm^2
Test Date:	10/28/2021	Weight:	382.1	g
Strain Rate:	1 %/min	Unit Weight:	1806	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	27.8	days
$(w{:}c)_{slurry}$:	0.6	Curing temperature	25.0	°C
Additional information				



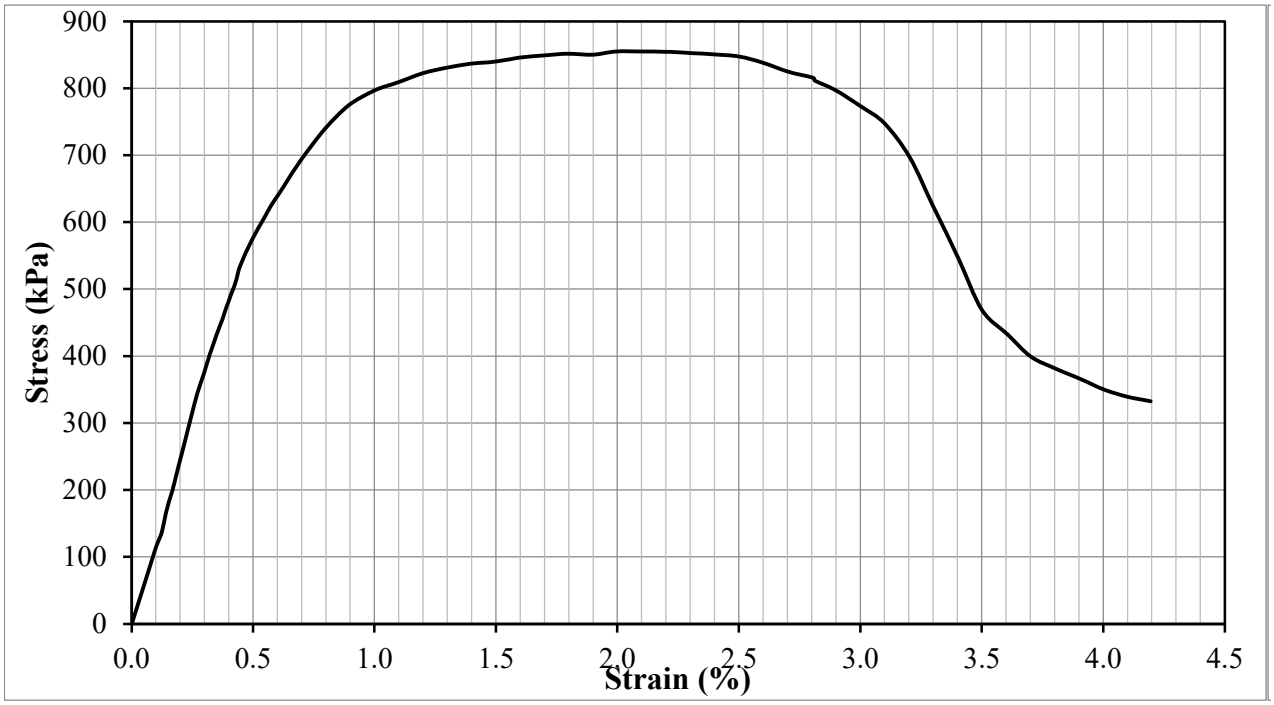
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,277	Strain at failure, εf :	1.21	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	S-1-E	Initial Area:	2117.0	mm^2
Test Date:	10/28/2021	Weight:	388.3	g
Strain Rate:	1 %/min	Unit Weight:	1807	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	27.8	days
$(w{:}c)_{slurry}$:	0.6	Curing temperature	25.0	°C
Additional information				



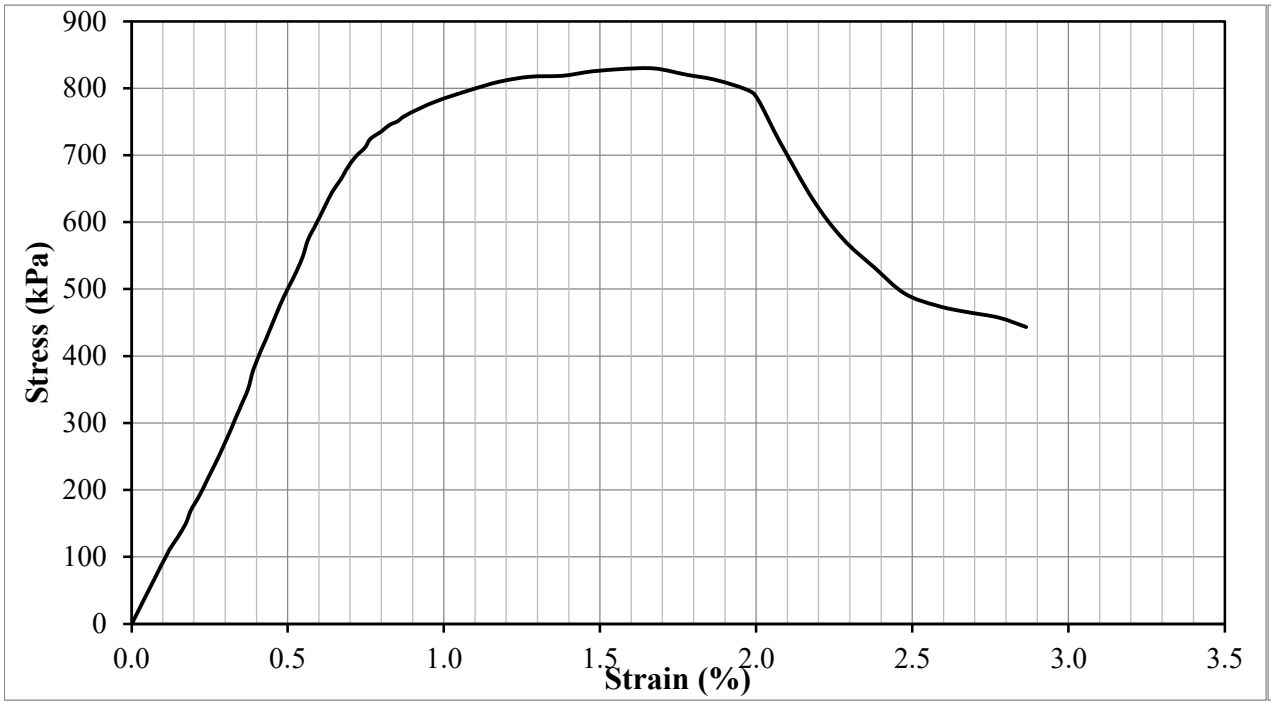
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,689	Strain at failure, εf :	1.31	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	S-2-A	Initial Area:	2108.7	mm^2
Test Date:	11/9/2021	Weight:	358.1	g
Strain Rate:	1 %/min	Unit Weight:	1698	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	3.4	days
$(w:c)_{slurry}$:	1.4	Curing temperature	25.0	°C
Additional information				



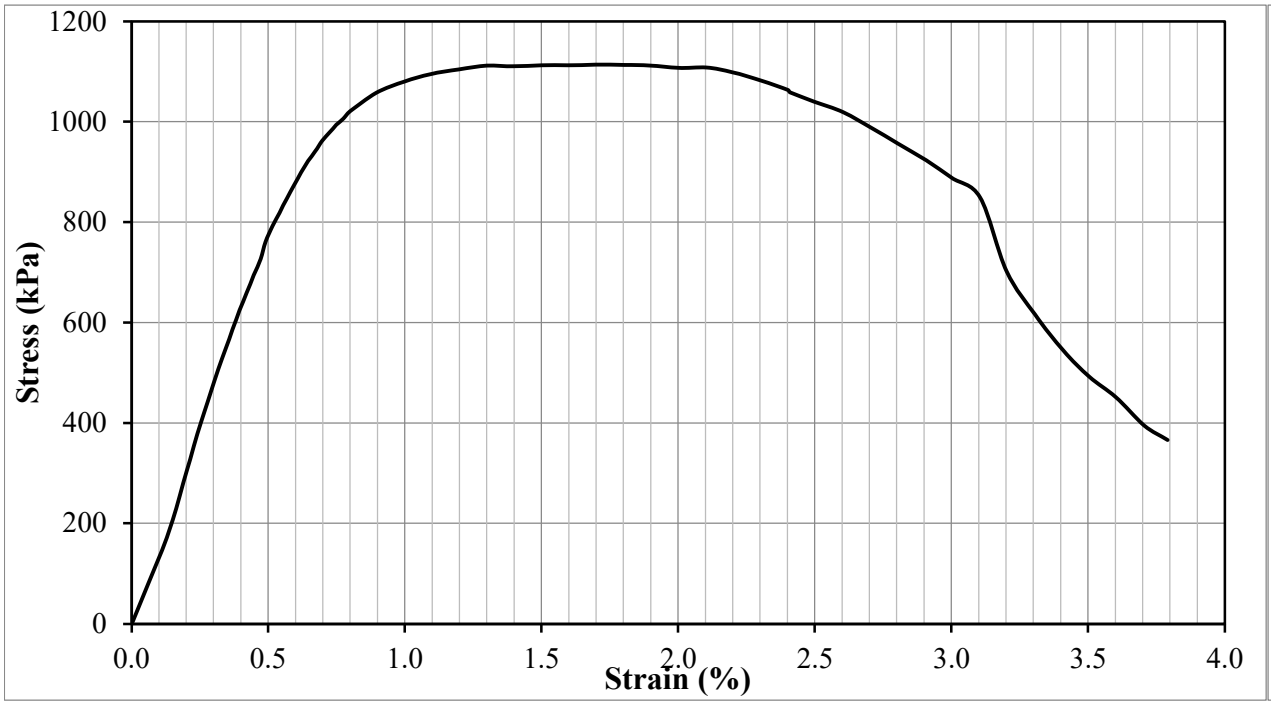
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	850	Strain at failure, εf :	2.00	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	S-2-H	Initial Area:	2102.5	mm^2
Test Date:	11/9/2021	Weight:	357.0	g
Strain Rate:	1 %/min	Unit Weight:	1681	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	3.4	days
$(w{:}c)_{slurry}$:	1.4	Curing temperature	25.0	°C
Additional information				



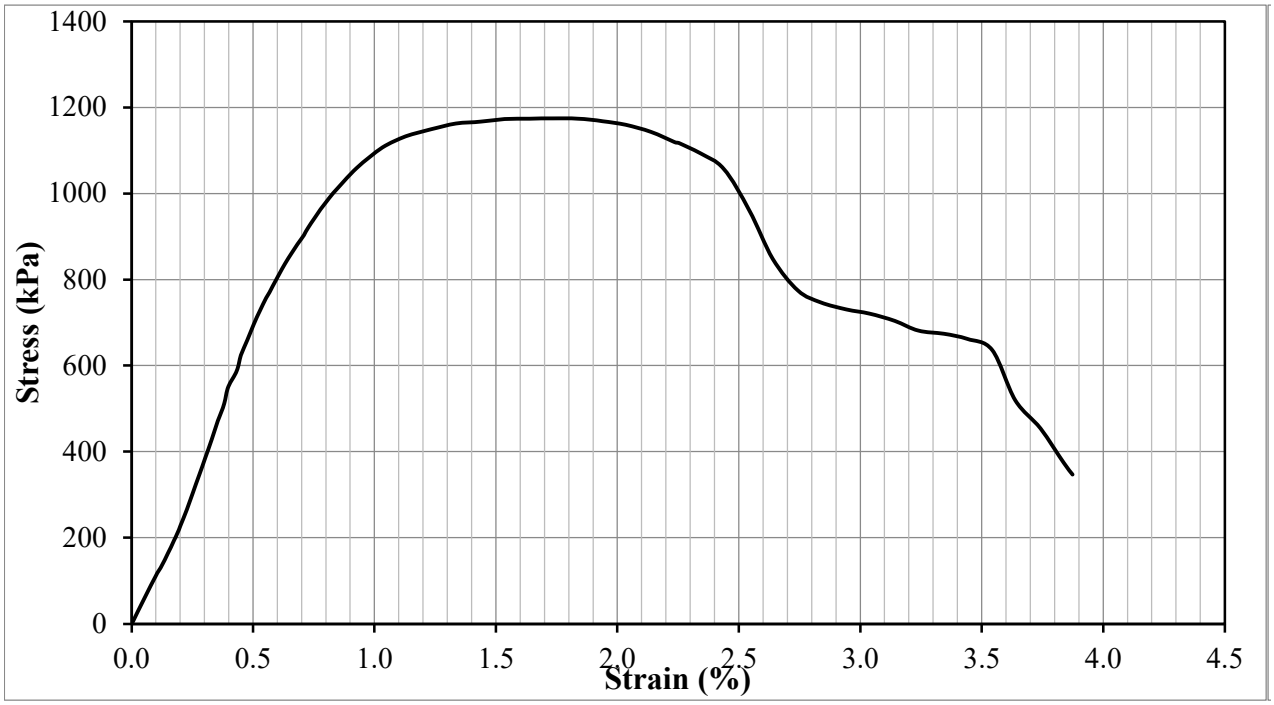
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	827	Strain at failure, εf :	1.67	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.6	mm
I.D.:	S-2-B	Initial Area:	2092.2	mm^2
Test Date:	11/13/2021	Weight:	357.5	g
Strain Rate:	1 %/min	Unit Weight:	1708	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	7.1	days
$(w{:}c)_{slurry}$:	1.4	Curing temperature	25.0	°C
Additional information				



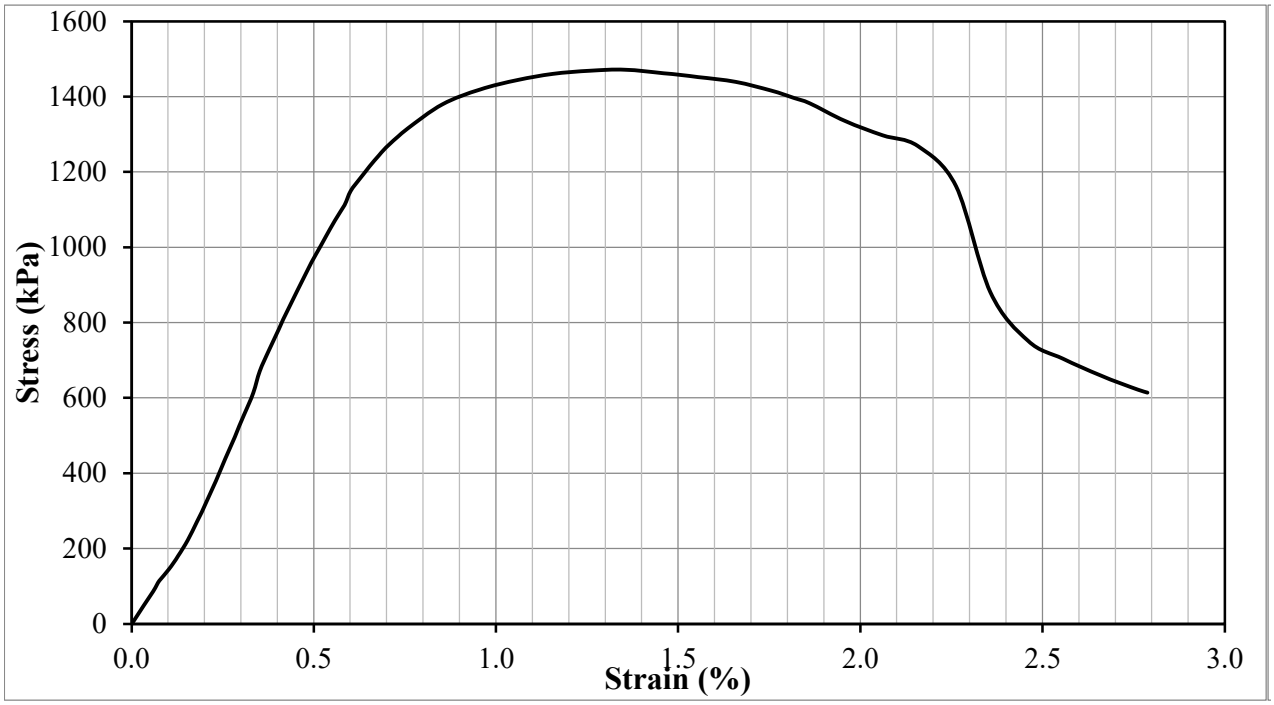
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,108	Strain at failure, εf :	1.70	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.2	mm
I.D.:	S-2-G	Initial Area:	2057.3	mm^2
Test Date:	11/13/2021	Weight:	355.0	g
Strain Rate:	1 %/min	Unit Weight:	1739	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	7.1	days
$(w{:}c)_{slurry}$:	1.4	Curing temperature	25.0	°C
Additional information				



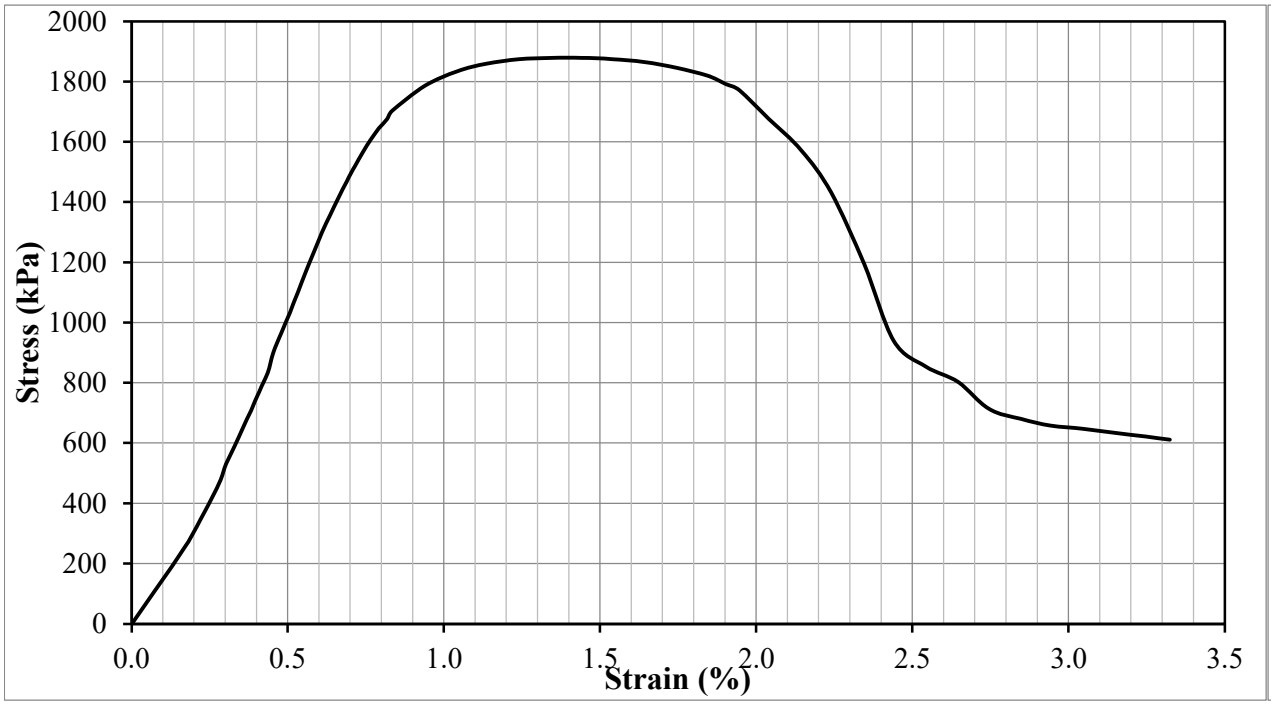
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,169	Strain at failure, εf :	1.73	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	S-2-C	Initial Area:	2119.1	mm^2
Test Date:	11/20/2021	Weight:	358.1	g
Strain Rate:	1 %/min	Unit Weight:	1690	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	14.2	days
$(w{:}c)_{slurry}$:	1.4	Curing temperature	25.0	°C
Additional information				



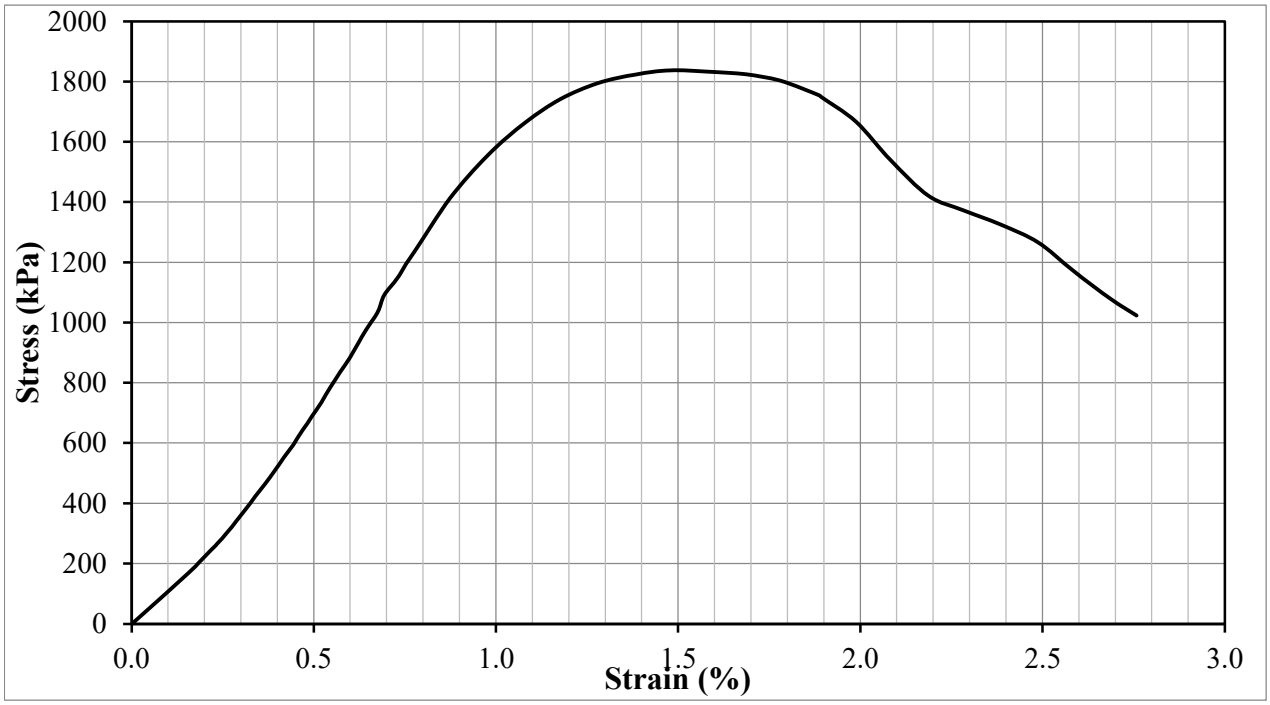
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,463	Strain at failure, εf :	1.35	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	S-2-D	Initial Area:	2110.8	mm^2
Test Date:	12/4/2021	Weight:	358.4	g
Strain Rate:	1 %/min	Unit Weight:	1693	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	28.0	days
$(w{:}c)_{slurry}$:	1.4	Curing temperature	25.0	°C
Additional information				



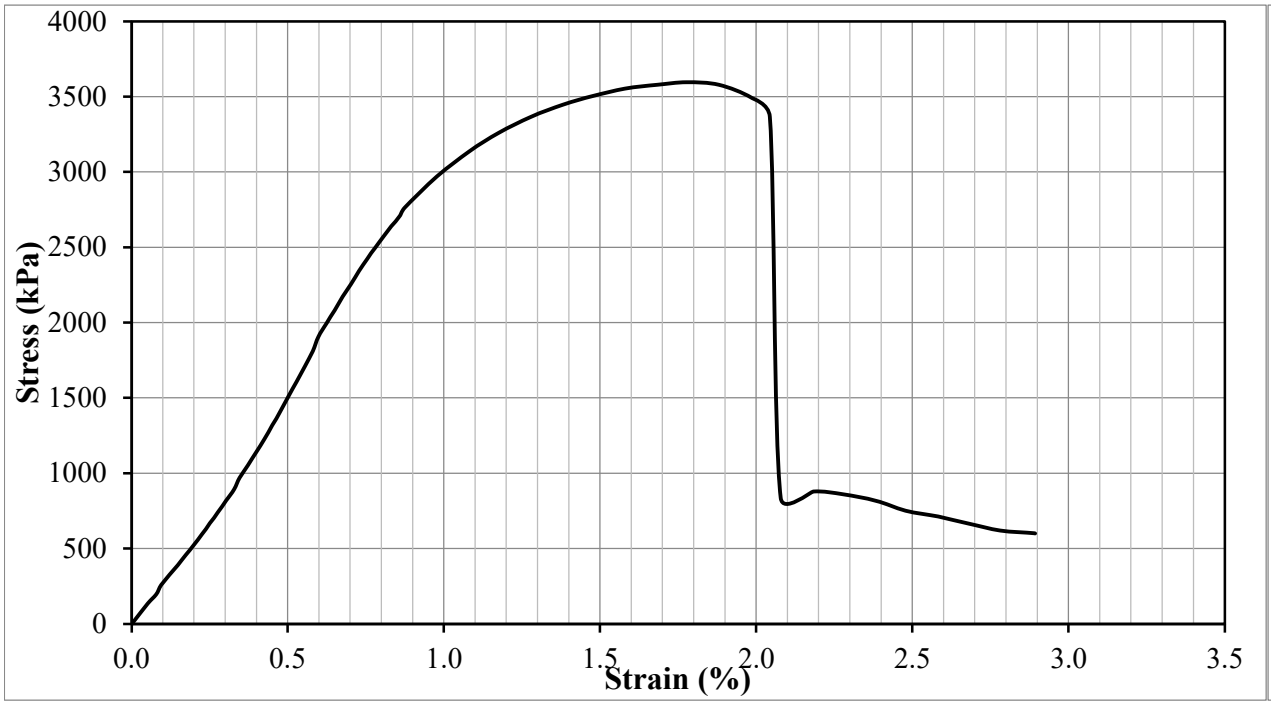
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,869	Strain at failure, εf :	1.44	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	S-2-E	Initial Area:	2106.6	mm^2
Test Date:	12/4/2021	Weight:	347.2	g
Strain Rate:	1 %/min	Unit Weight:	1697	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.4	Curing temperature	25.0	°C
Additional information				



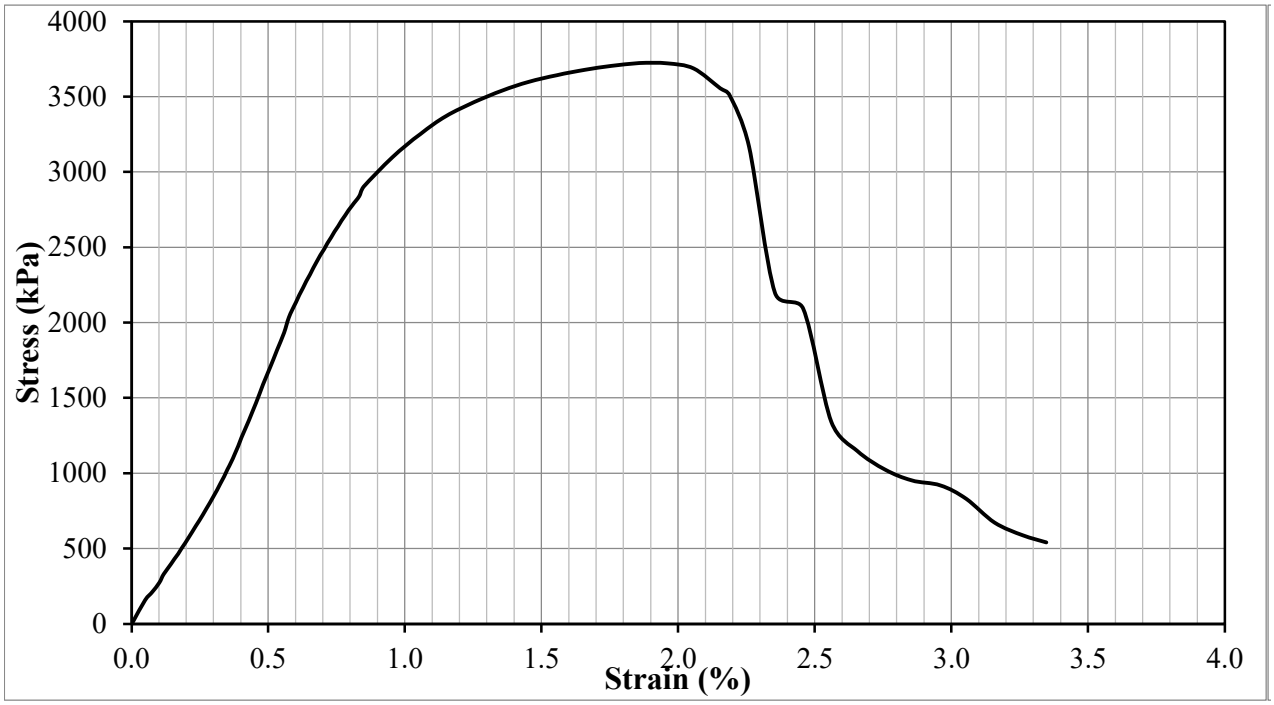
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,820	Strain at failure, εf :	1.48	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	S-3-H	Initial Area:	2123.2	mm^2
Test Date:	10/29/2020	Weight:	382.8	g
Strain Rate:	1 %/min	Unit Weight:	1793	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	3.1	days
$(w:c)_{slurry}$:	0.6	Curing temperature	45.0	°C
Additional information				



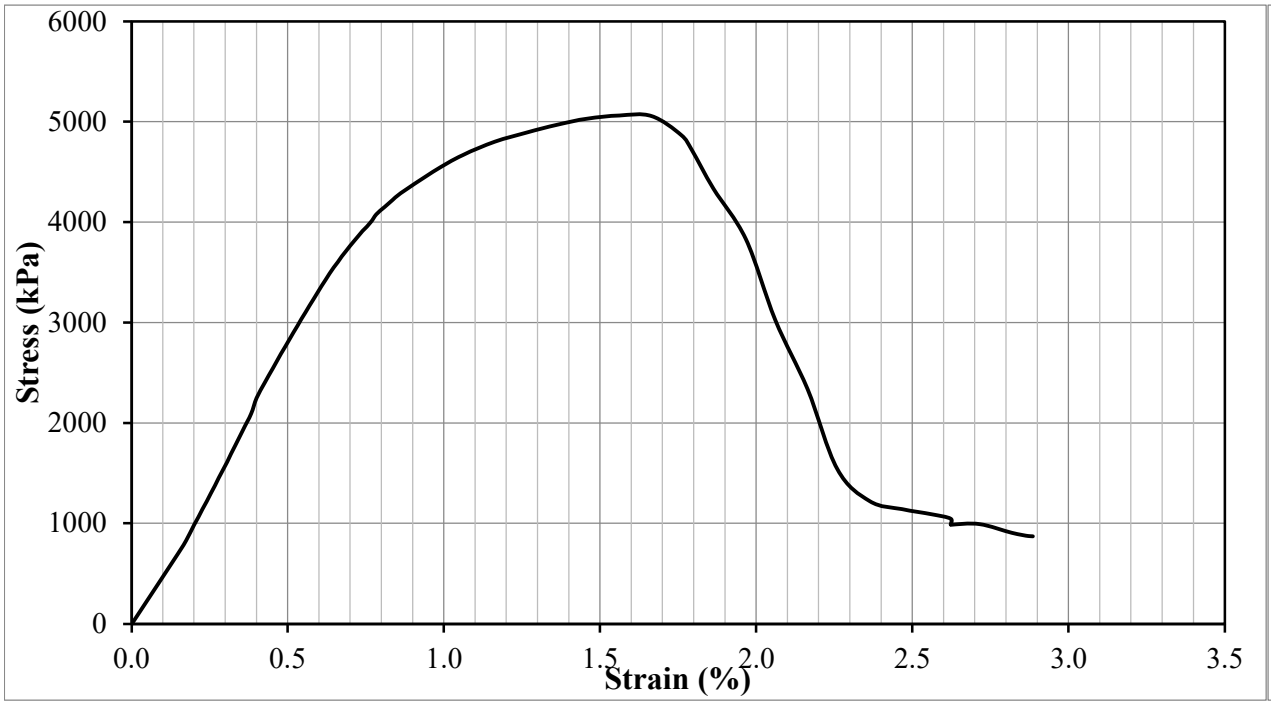
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,578	Strain at failure, εf :	1.78	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	S-3-I	Initial Area:	2125.3	mm^2
Test Date:	10/29/2020	Weight:	386.3	g
Strain Rate:	1 %/min	Unit Weight:	1793	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	3.2	days
$(w:c)_{slurry}$:	0.6	Curing temperature	45.0	°C
Additional information				



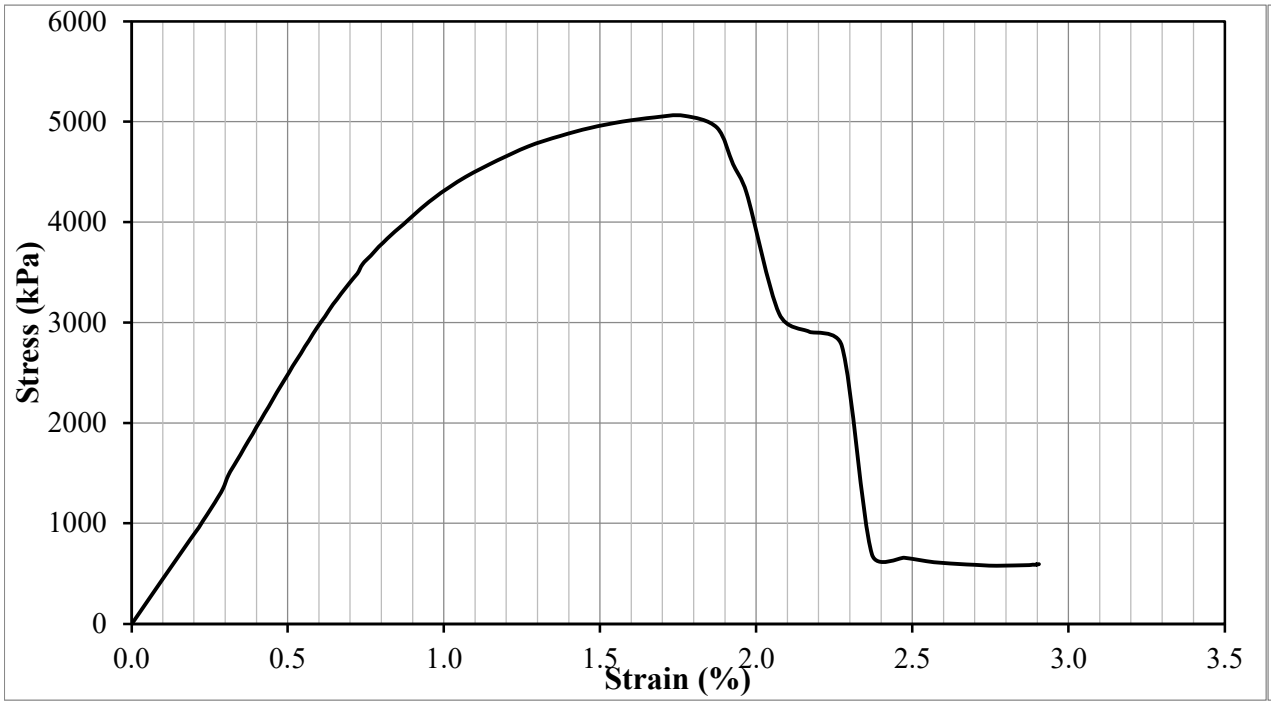
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,709	Strain at failure, εf :	1.86	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	S-3-B	Initial Area:	2123.2	mm^2
Test Date:	11/2/2020	Weight:	382.1	g
Strain Rate:	1 %/min	Unit Weight:	1799	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	7.0	days
$(w:c)_{slurry}$:	0.6	Curing temperature	45.0	°C
Additional information				



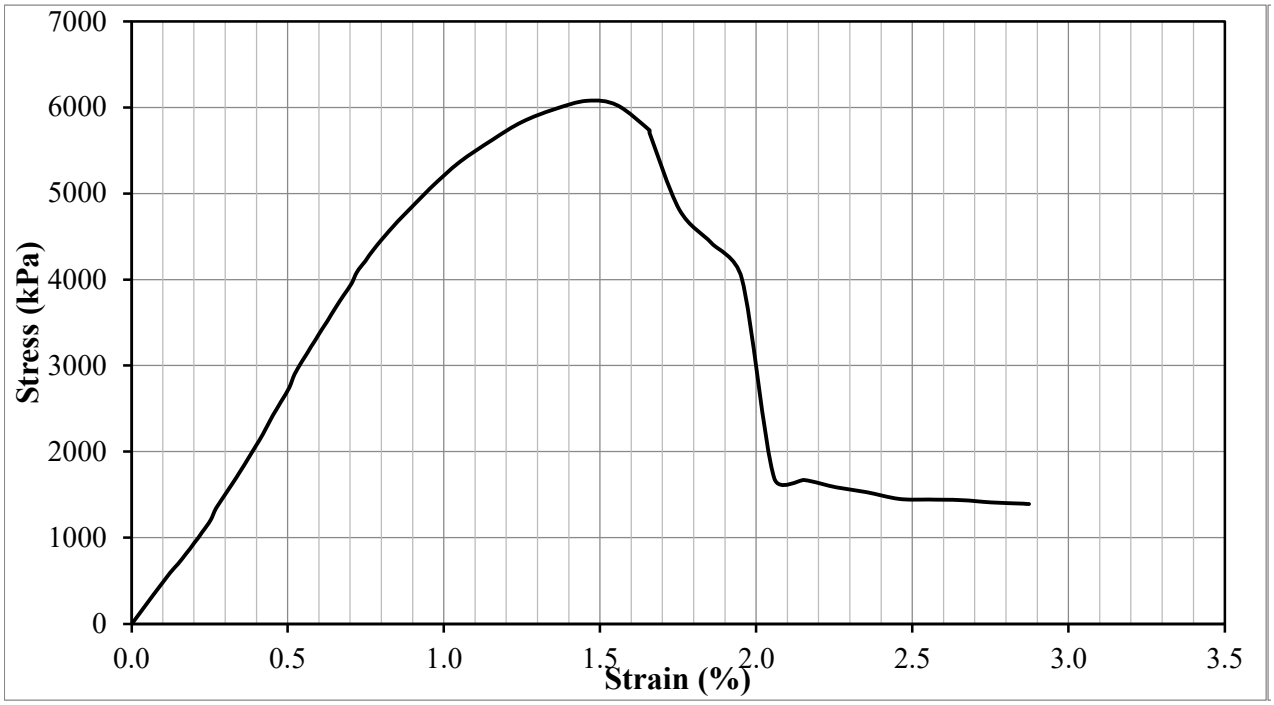
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,034	Strain at failure, εf :	1.56	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	S-3-G	Initial Area:	2123.2	mm^2
Test Date:	11/2/2020	Weight:	387.3	g
Strain Rate:	1 %/min	Unit Weight:	1798	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	7.0	days
$(w{:}c)_{slurry}$:	0.6	Curing temperature	45.0	°C
Additional information				



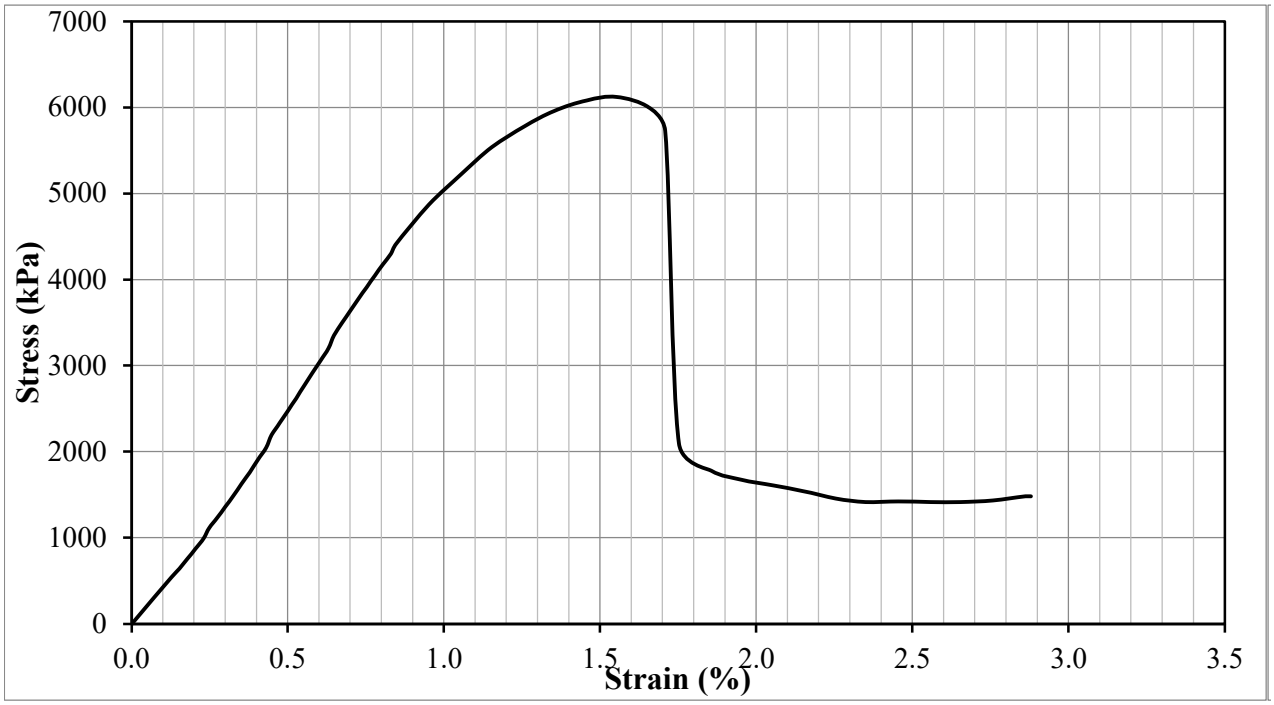
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,042	Strain at failure, εf :	1.77	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.1	mm
I.D.:	S-3-C	Initial Area:	2133.6	mm^2
Test Date:	11/9/2020	Weight:	388.6	g
Strain Rate:	1 %/min	Unit Weight:	1794	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	14.3	days
$(w{:}c)_{slurry}$:	0.6	Curing temperature	45.0	°C
Additional information				



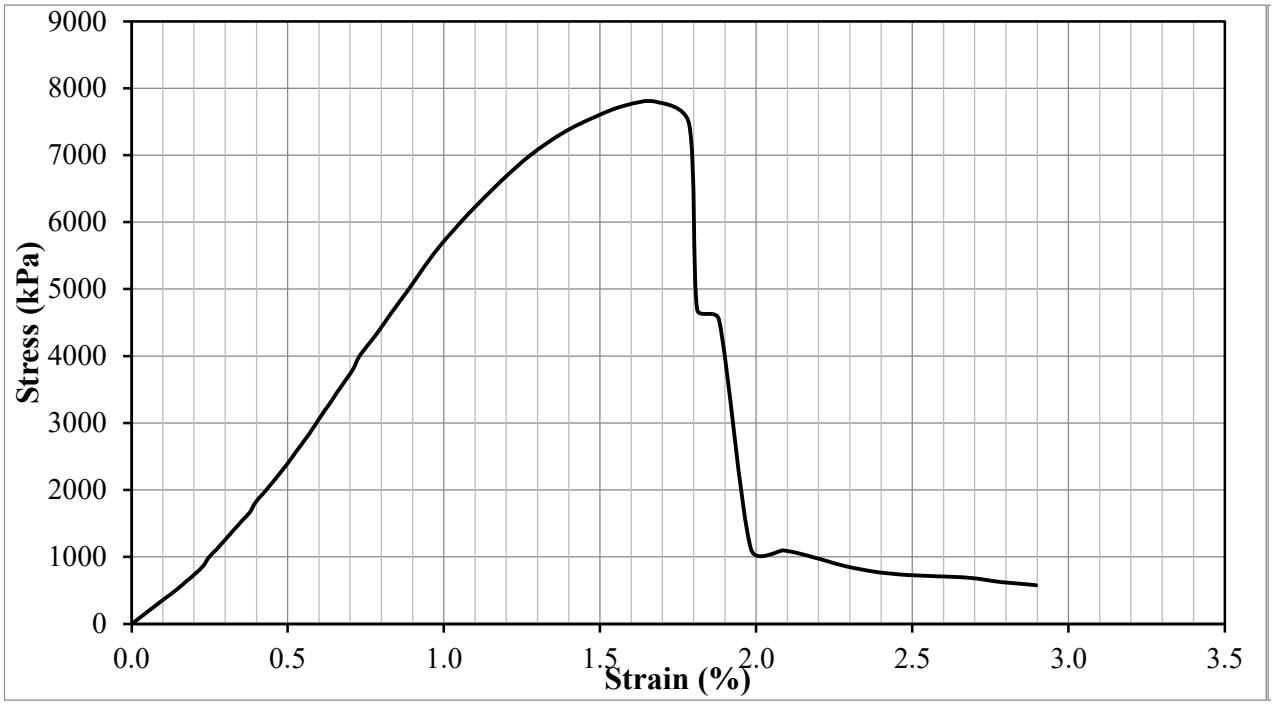
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	6,054	Strain at failure, εf :	1.46	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.1	mm
I.D.:	S-3-F	Initial Area:	2129.4	mm^2
Test Date:	11/9/2020	Weight:	388.5	g
Strain Rate:	1 %/min	Unit Weight:	1795	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	14.3	days
$(w{:}c)_{slurry}$:	0.6	Curing temperature	45.0	°C
Additional information				



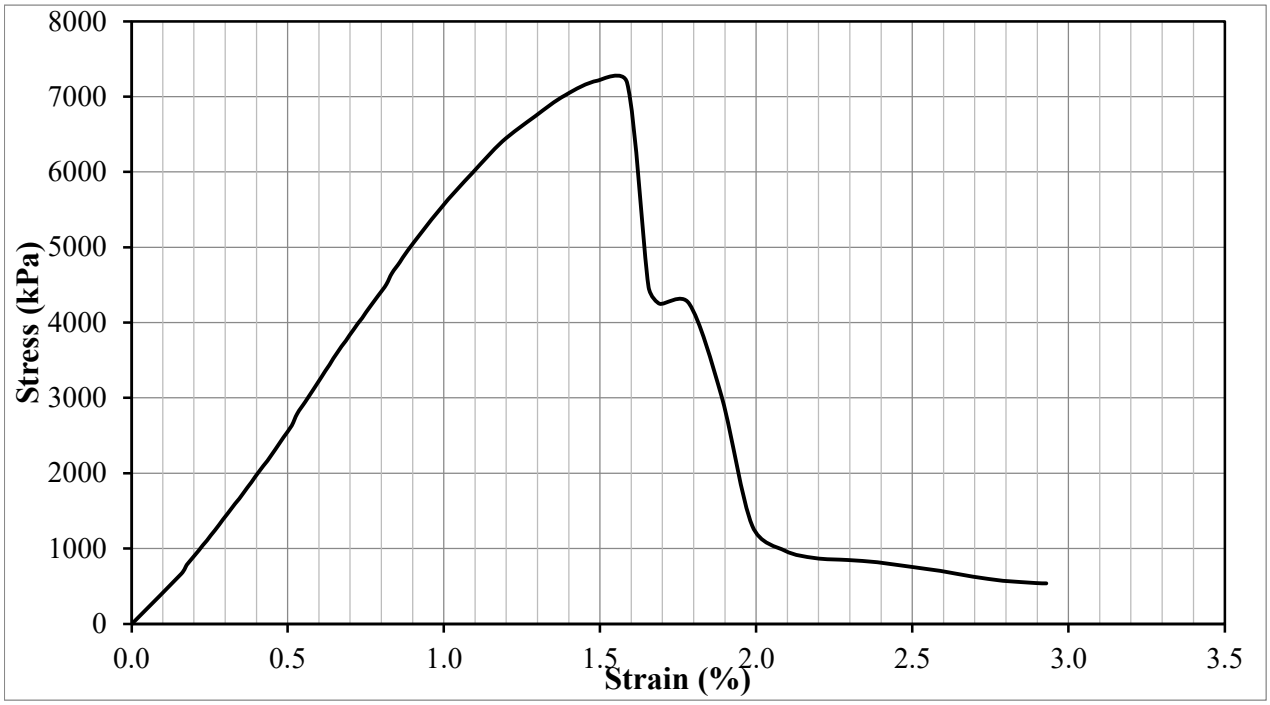
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	6,101	Strain at failure, εf :	1.55	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.2	mm
I.D.:	S-3-D	Initial Area:	2139.8	mm^2
Test Date:	11/23/2020	Weight:	388.5	g
Strain Rate:	1 %/min	Unit Weight:	1826	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	28.1	days
$(w:c)_{slurry}$:	0.6	Curing temperature	45.0	°C
Additional information				



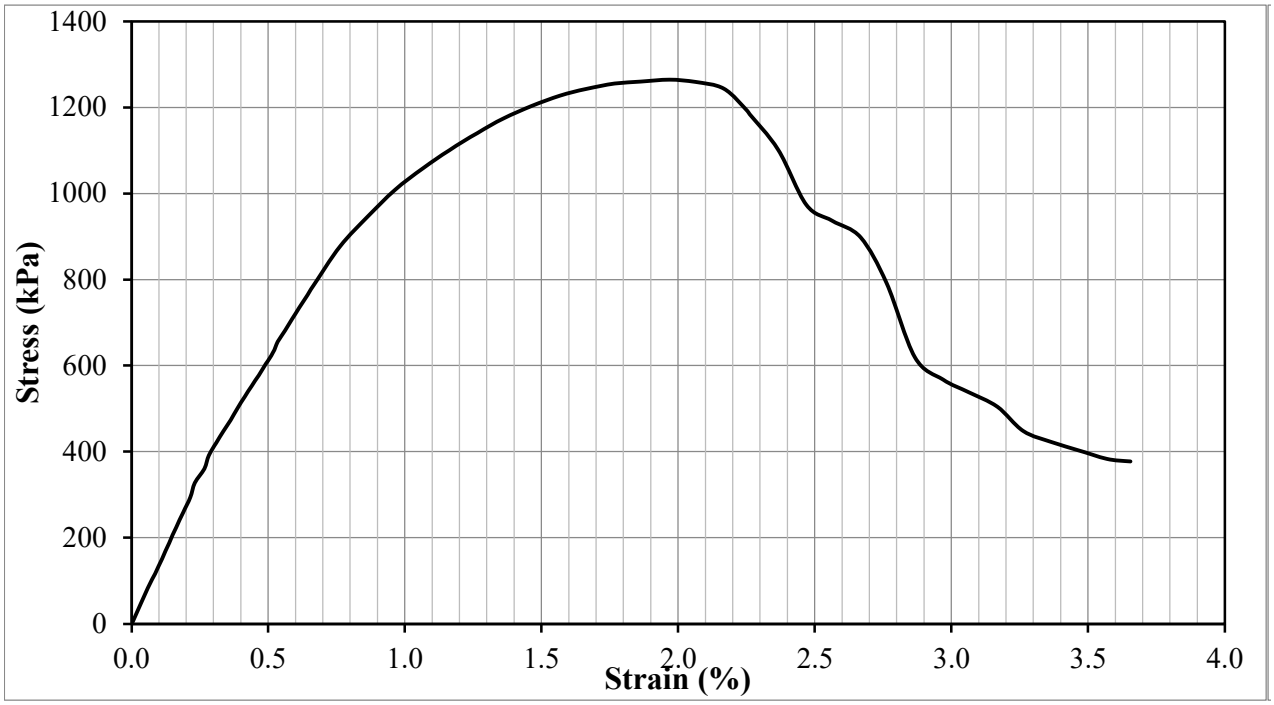
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	7,737	Strain at failure, εf :	1.68	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	S-3-E	Initial Area:	2123.2	mm^2
Test Date:	11/23/2020	Weight:	383.8	g
Strain Rate:	1 %/min	Unit Weight:	1792	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	28.1	days
$(w:c)_{slurry}$:	0.6	Curing temperature	45.0	°C
Additional information				



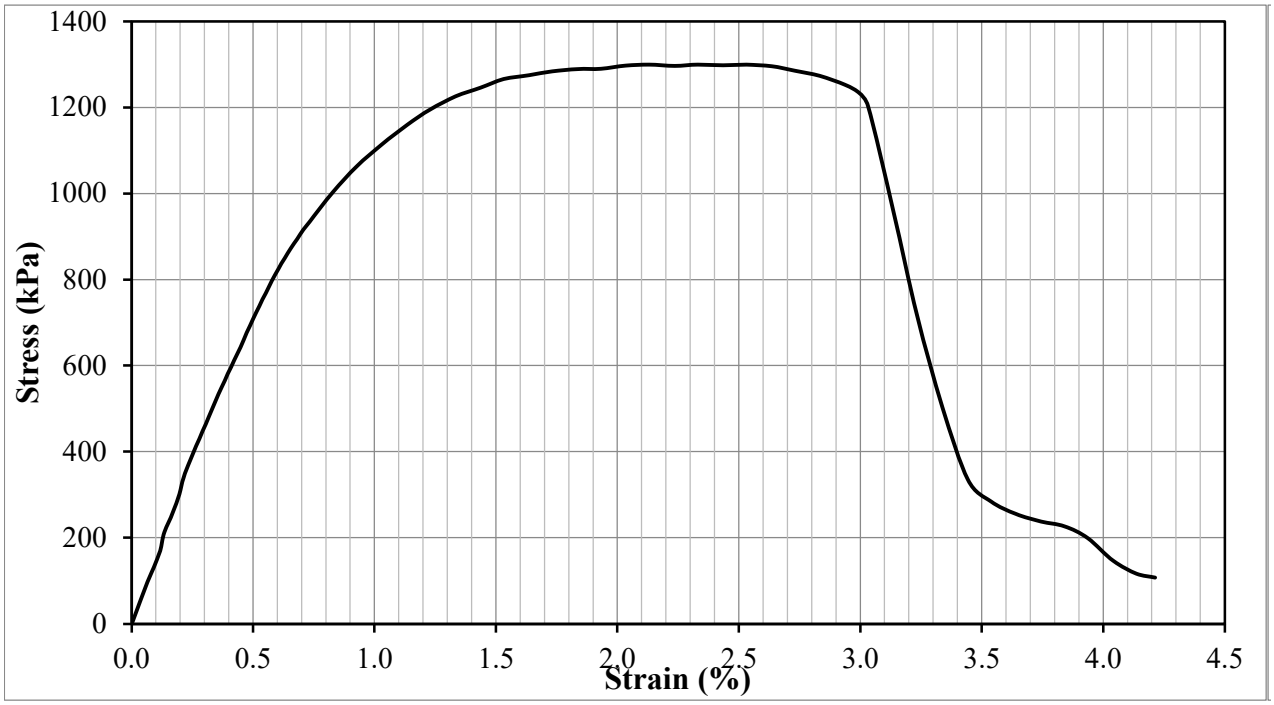
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	7,181	Strain at failure, εf :	1.49	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	S-4-A	Initial Area:	2112.9	mm^2
Test Date:	10/3/2021	Weight:	358.1	g
Strain Rate:	1 %/min	Unit Weight:	1698	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	3.3	days
$(w:c)_{slurry}$:	1.4	Curing temperature	45.0	°C
Additional information				



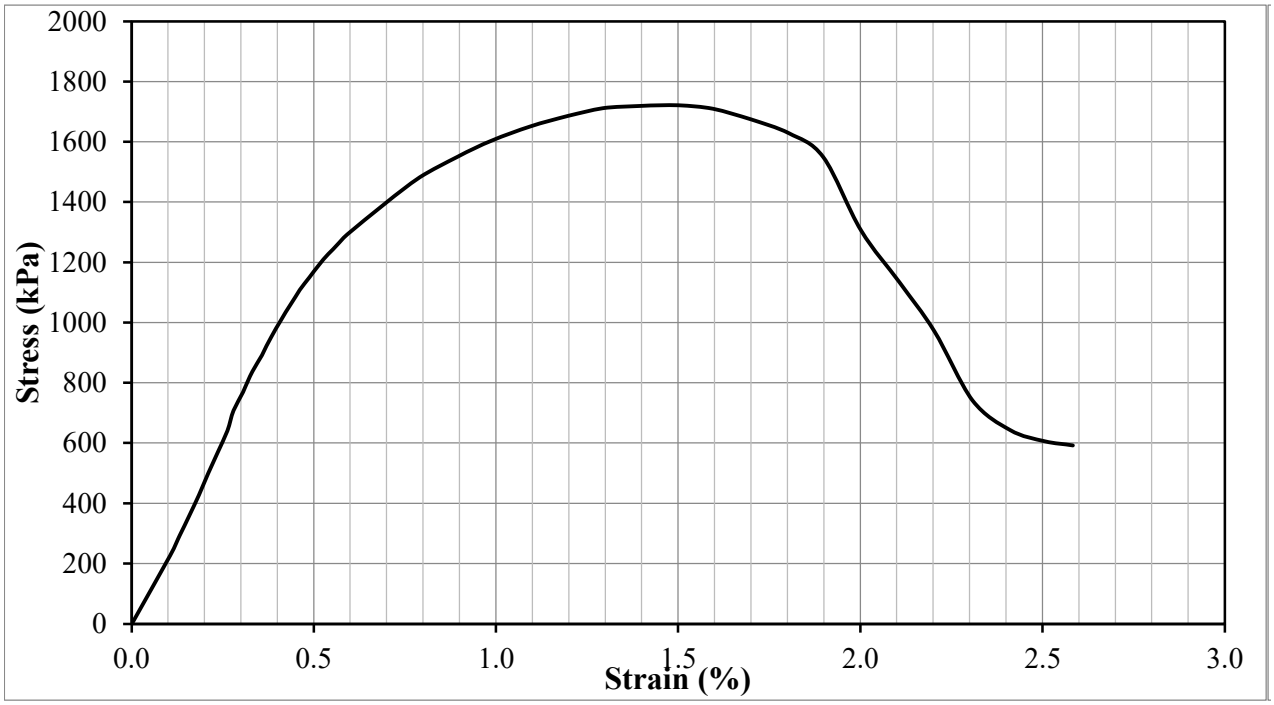
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,257	Strain at failure, εf :	1.97	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	S-4-H	Initial Area:	2123.2	mm^2
Test Date:	10/3/2021	Weight:	360.7	g
Strain Rate:	1 %/min	Unit Weight:	1693	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	3.3	days
$(w:c)_{slurry}$:	1.4	Curing temperature	45.0	°C
Additional information				



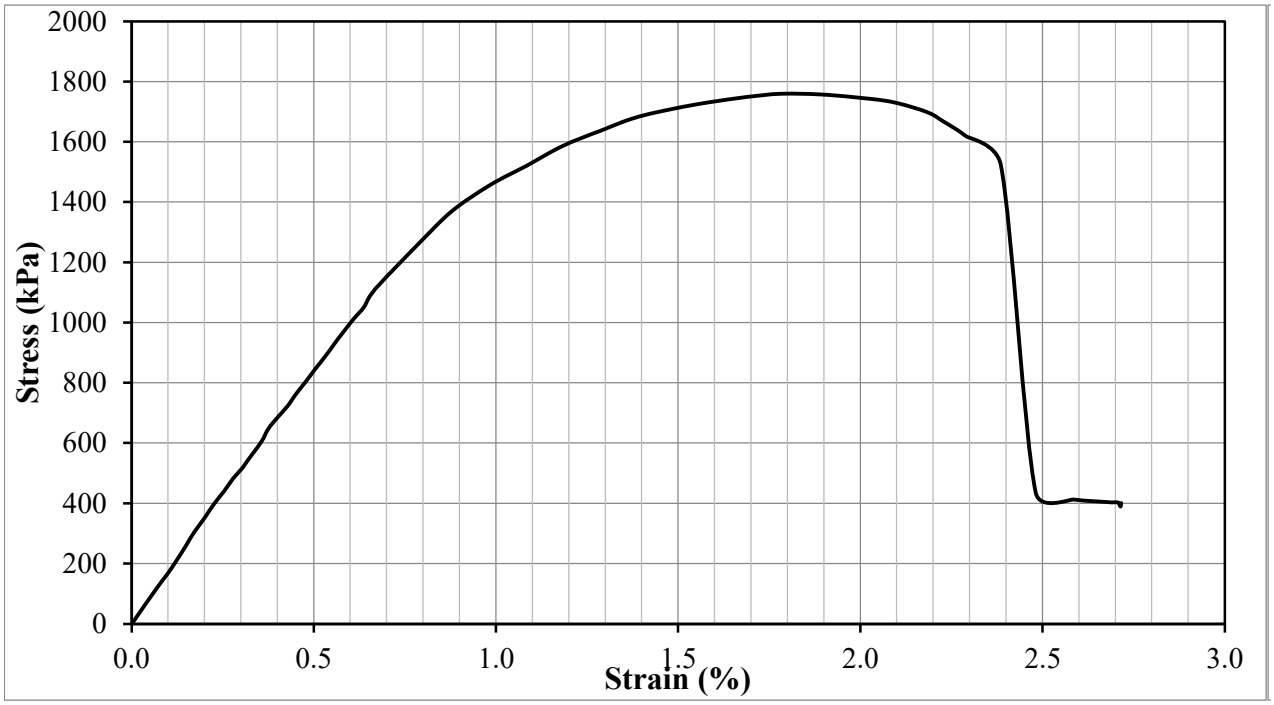
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,293	Strain at failure, εf :	2.33	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	S-4-B	Initial Area:	2110.8	mm^2
Test Date:	10/7/2021	Weight:	366.4	g
Strain Rate:	1 %/min	Unit Weight:	1725	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	7.2	days
$(w{:}c)_{slurry}$:	1.4	Curing temperature	45.0	°C
Additional information				



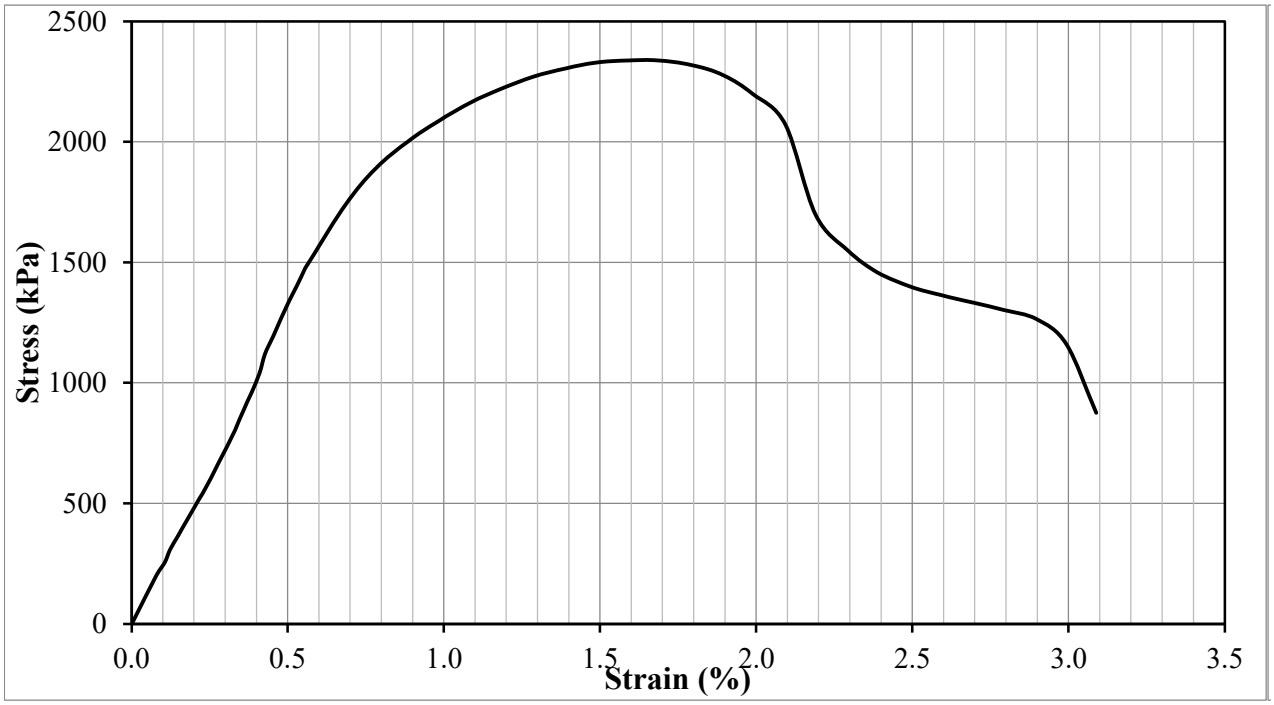
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,714	Strain at failure, εf :	1.50	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	S-4-G	Initial Area:	2123.2	mm^2
Test Date:	10/7/2021	Weight:	357.8	g
Strain Rate:	1 %/min	Unit Weight:	1677	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	7.2	days
$(w:c)_{slurry}$:	1.4	Curing temperature	45.0	°C
Additional information				



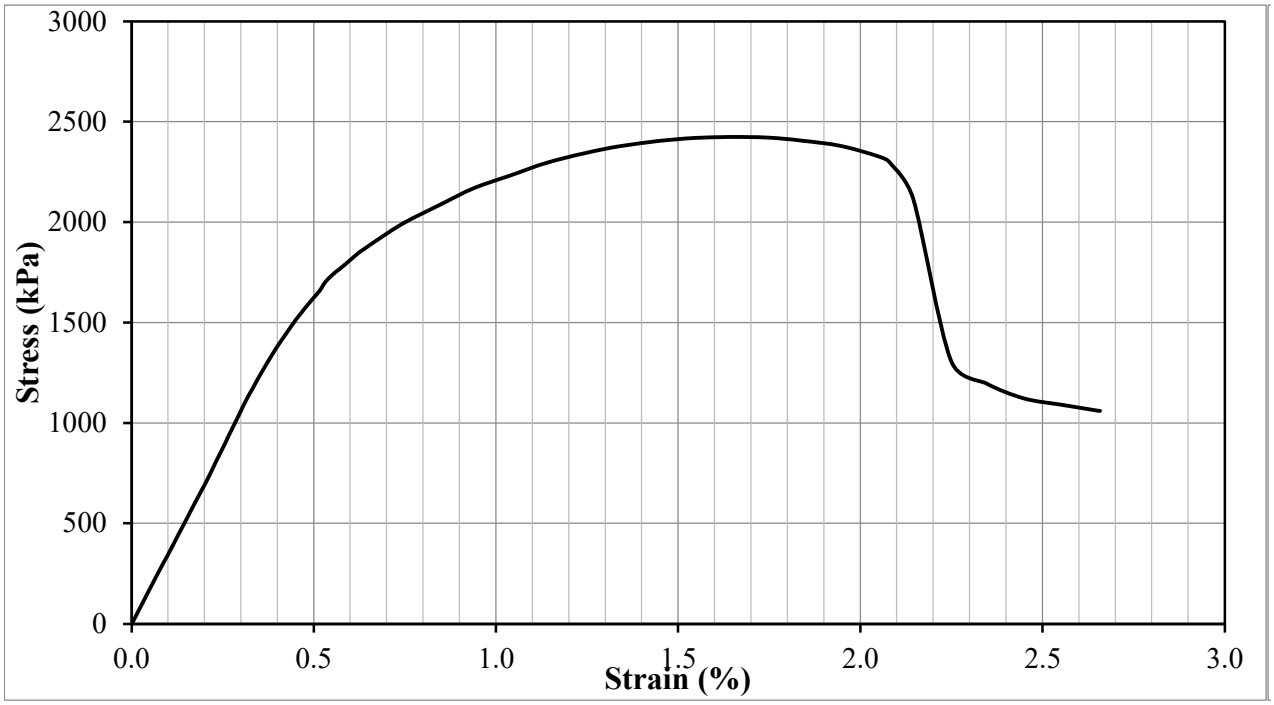
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,751	Strain at failure, εf :	1.78	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.6	mm
I.D.:	S-4-C	Initial Area:	2094.3	mm^2
Test Date:	10/14/2021	Weight:	362.4	g
Strain Rate:	1 %/min	Unit Weight:	1724	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	14.1	days
$(w:c)_{slurry}$:	1.4	Curing temperature	45.0	°C
Additional information				



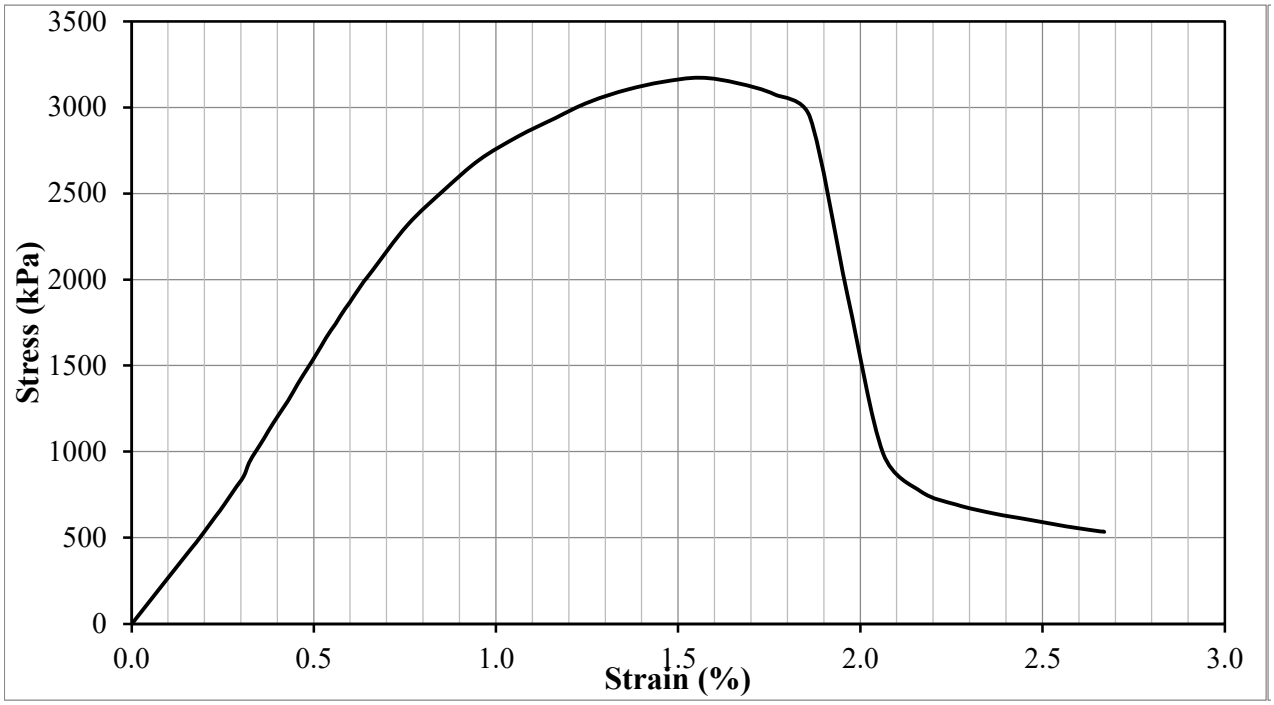
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,328	Strain at failure, εf :	1.69	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.6	mm
I.D.:	S-4-F	Initial Area:	2092.2	mm^2
Test Date:	10/14/2021	Weight:	363.3	g
Strain Rate:	1 %/min	Unit Weight:	1723	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	14.2	days
$(w:c)_{slurry}$:	1.4	Curing temperature	45.0	°C
Additional information				



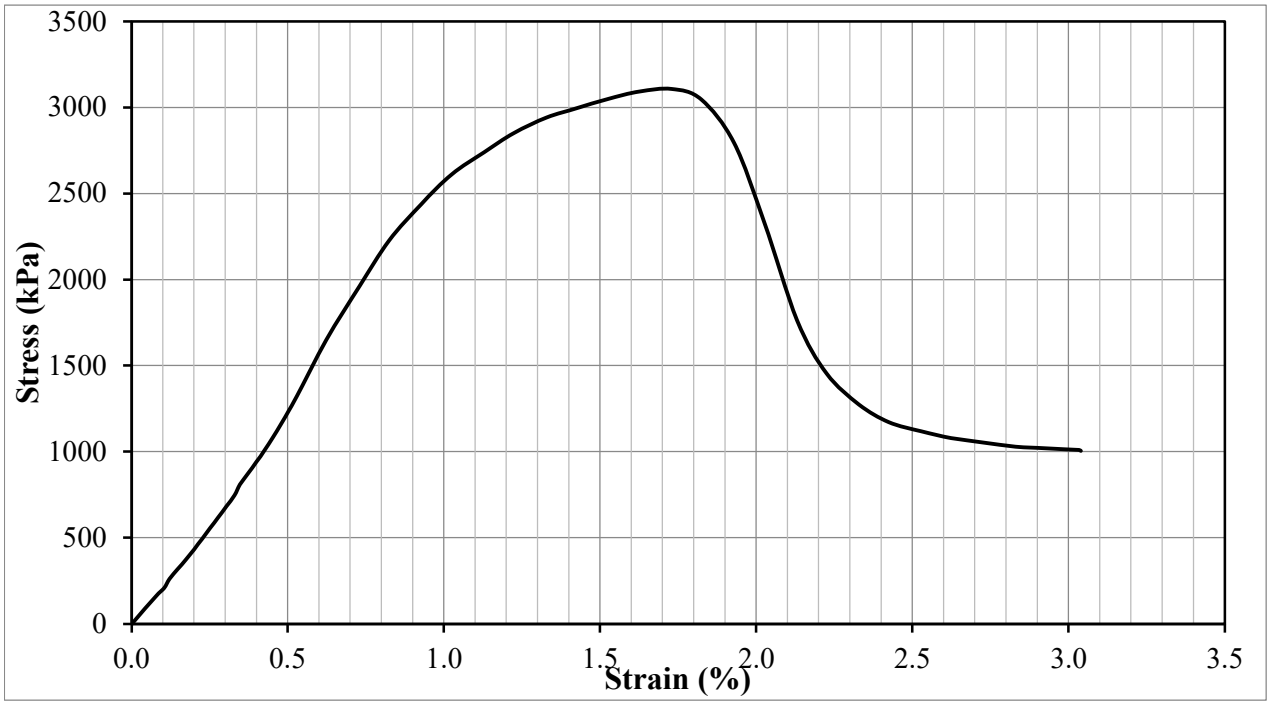
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,415	Strain at failure, εf :	1.64	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	S-4-D	Initial Area:	2121.1	mm^2
Test Date:	10/28/2021	Weight:	364.1	g
Strain Rate:	1 %/min	Unit Weight:	1695	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	27.9	days
$(w:c)_{slurry}$:	1.4	Curing temperature	45.0	°C
Additional information				



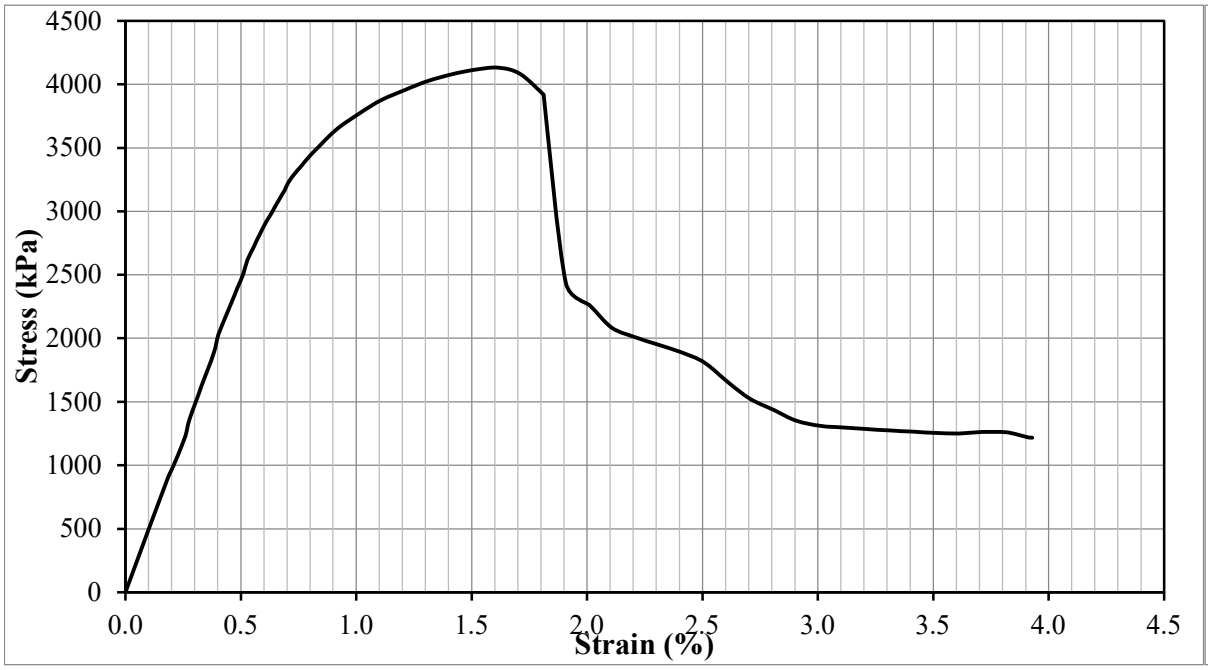
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,161	Strain at failure, εf :	1.56	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.1	mm
I.D.:	S-4-E	Initial Area:	2135.7	mm^2
Test Date:	10/28/2021	Weight:	361.0	g
Strain Rate:	1 %/min	Unit Weight:	1683	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	27.9	days
$(w{:}c)_{slurry}$:	1.4	Curing temperature	45.0	°C
Additional information				



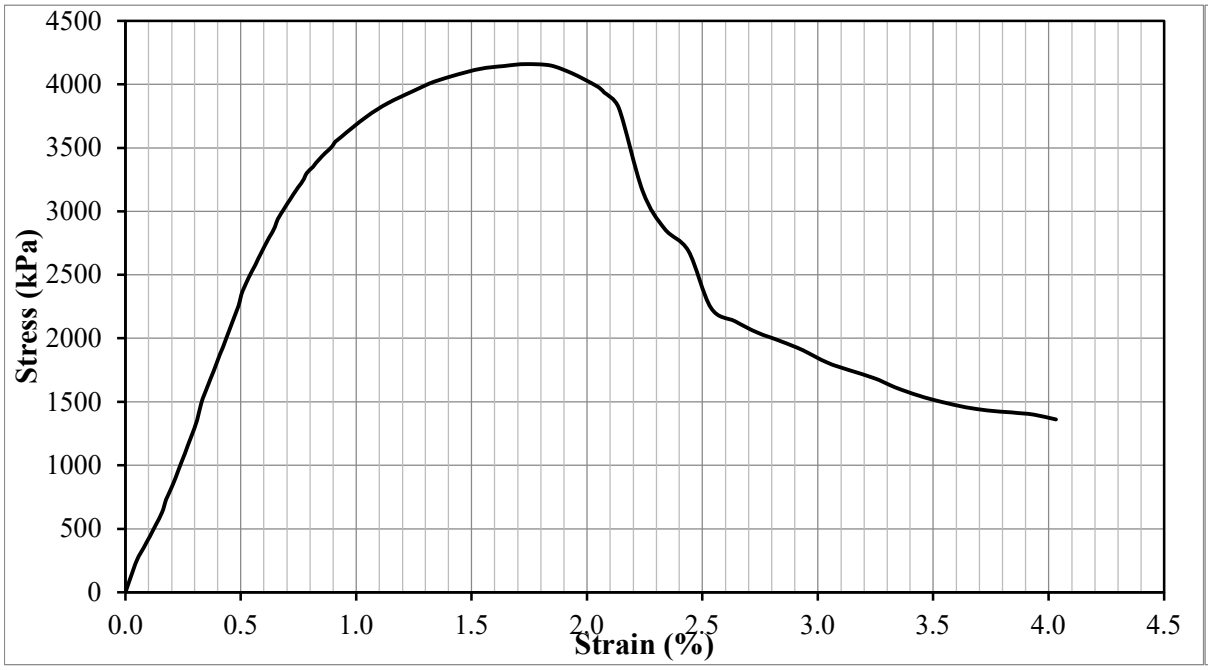
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,090	Strain at failure, εf :	1.73	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	A-1-A	Initial Area:	2127.4	mm^2
Test Date:	5/4/2019	Weight:	365.6	g
Strain Rate:	1 %/min	Unit Weight:	1723	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	14.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45.0	°C
Additional information				



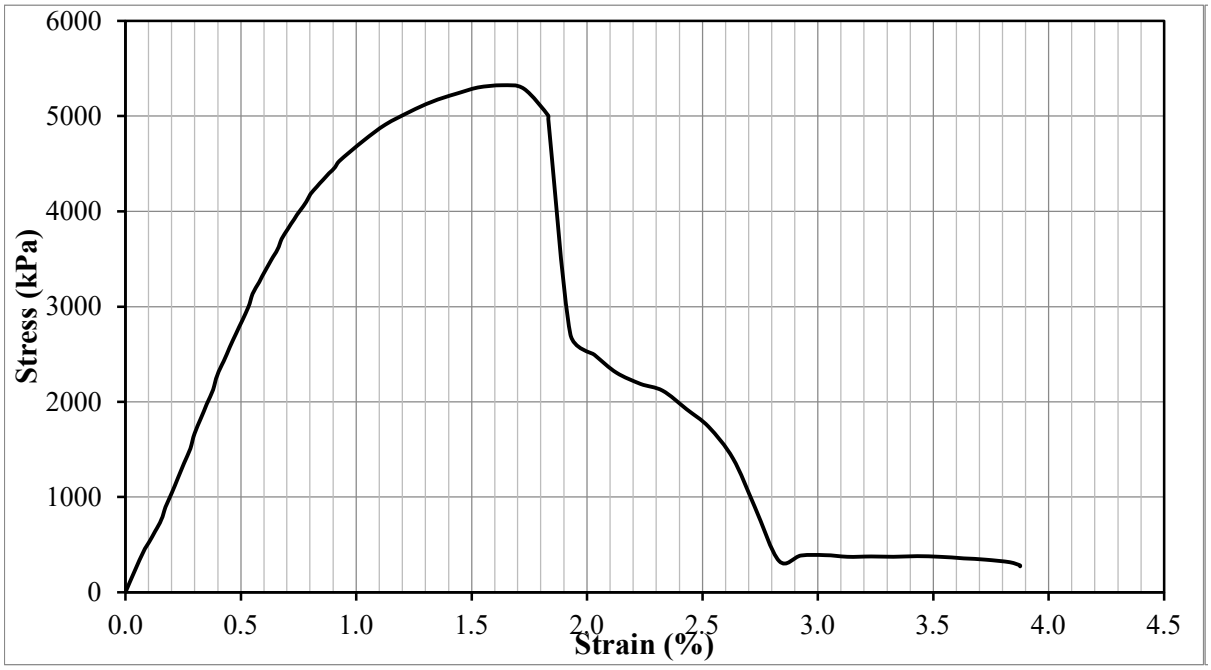
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,103	Strain at failure, εf :	1.61	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.2	mm
I.D.:	A-1-H	Initial Area:	2137.8	mm^2
Test Date:	5/4/2019	Weight:	363.8	g
Strain Rate:	1 %/min	Unit Weight:	1711	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	14.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45.0	°C
Additional information				



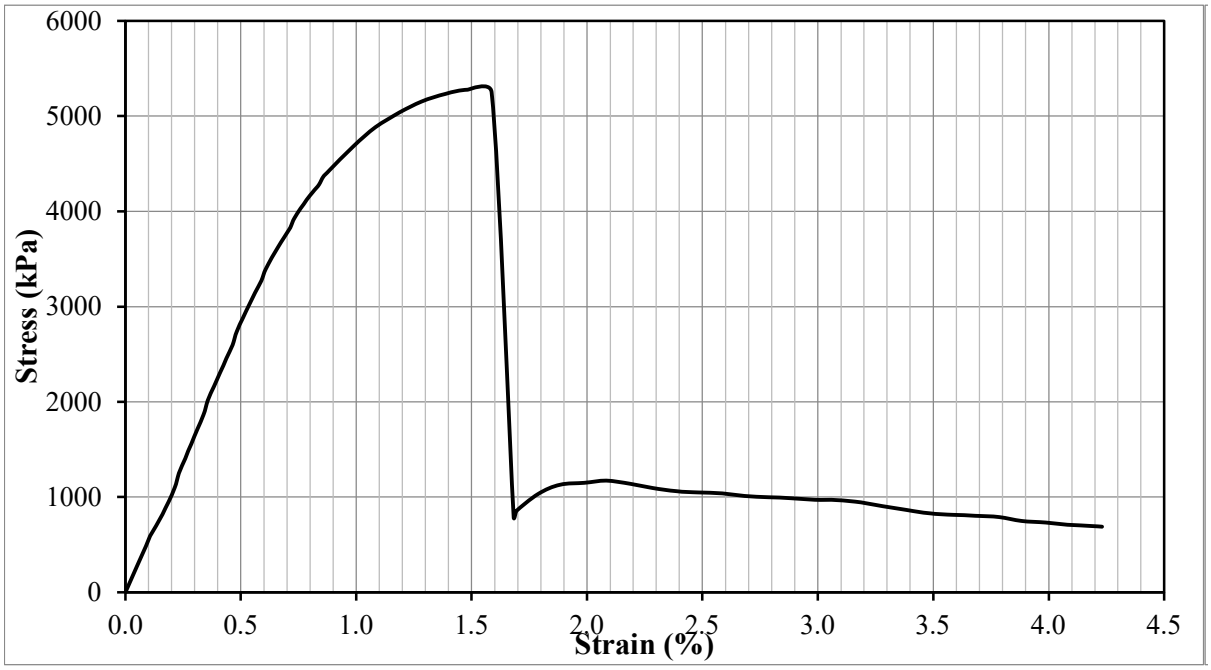
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,128	Strain at failure, εf :	1.74	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.1	mm
I.D.:	A-1-B	Initial Area:	2135.7	mm^2
Test Date:	5/18/2019	Weight:	364.5	g
Strain Rate:	1 %/min	Unit Weight:	1716	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45.0	°C
Additional information				



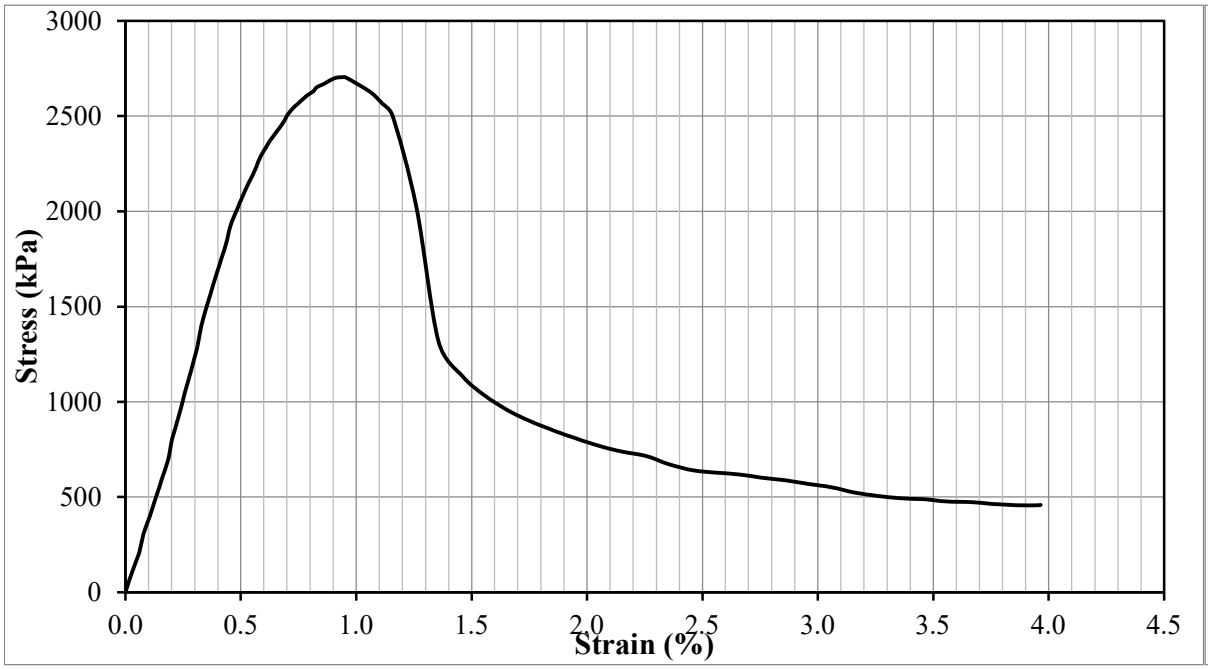
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,283	Strain at failure, εf :	1.63	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.2	mm
I.D.:	A-1-G	Initial Area:	2137.8	mm^2
Test Date:	5/18/2019	Weight:	357.5	g
Strain Rate:	1 %/min	Unit Weight:	1715	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45.0	°C
Additional information				



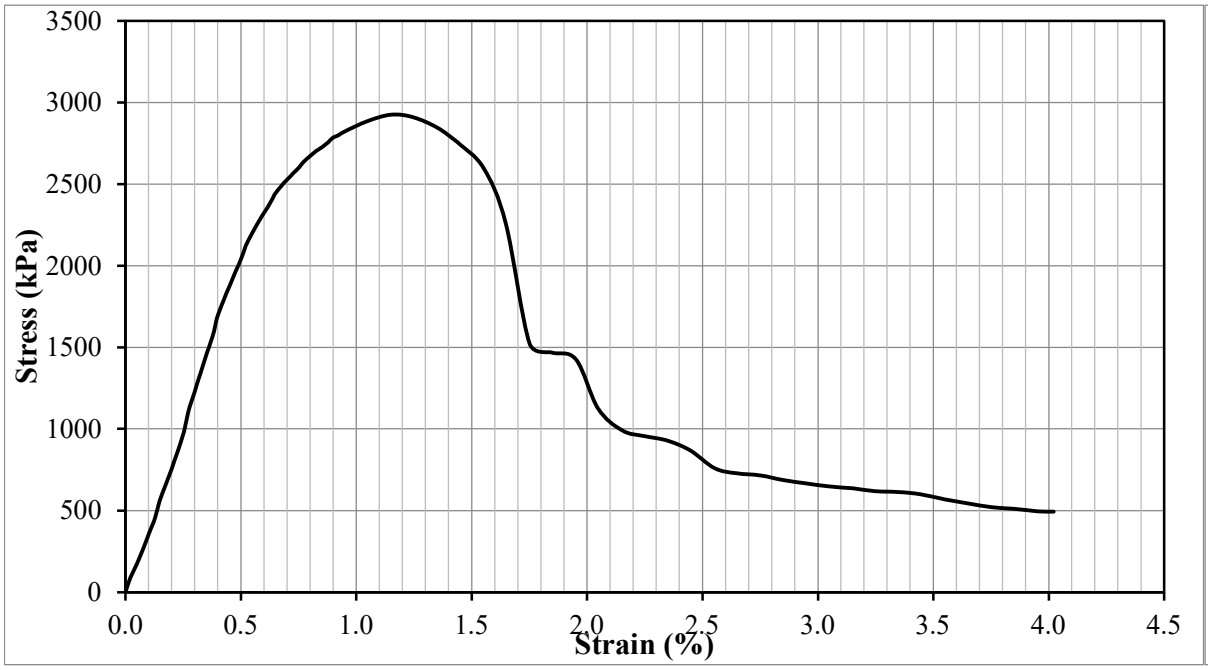
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,222	Strain at failure, εf :	1.48	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	A-1-C	Initial Area:	2112.9	mm^2
Test Date:	5/4/2019	Weight:	367.1	g
Strain Rate:	1 %/min	Unit Weight:	1737	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	14.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25.0	°C
Additional information				



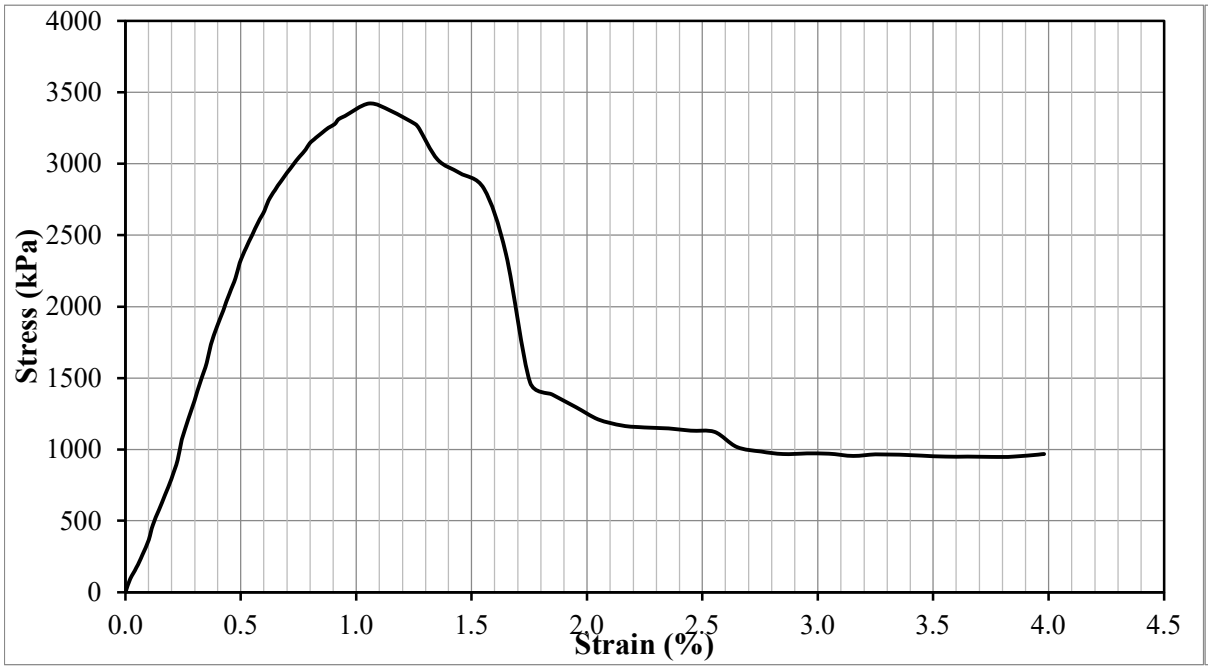
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,688	Strain at failure, εf :	0.94	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.4	mm
I.D.:	A-1-F	Initial Area:	2077.8	mm^2
Test Date:	5/4/2019	Weight:	360.2	g
Strain Rate:	1 %/min	Unit Weight:	1764	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	14.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25.0	°C
Additional information				



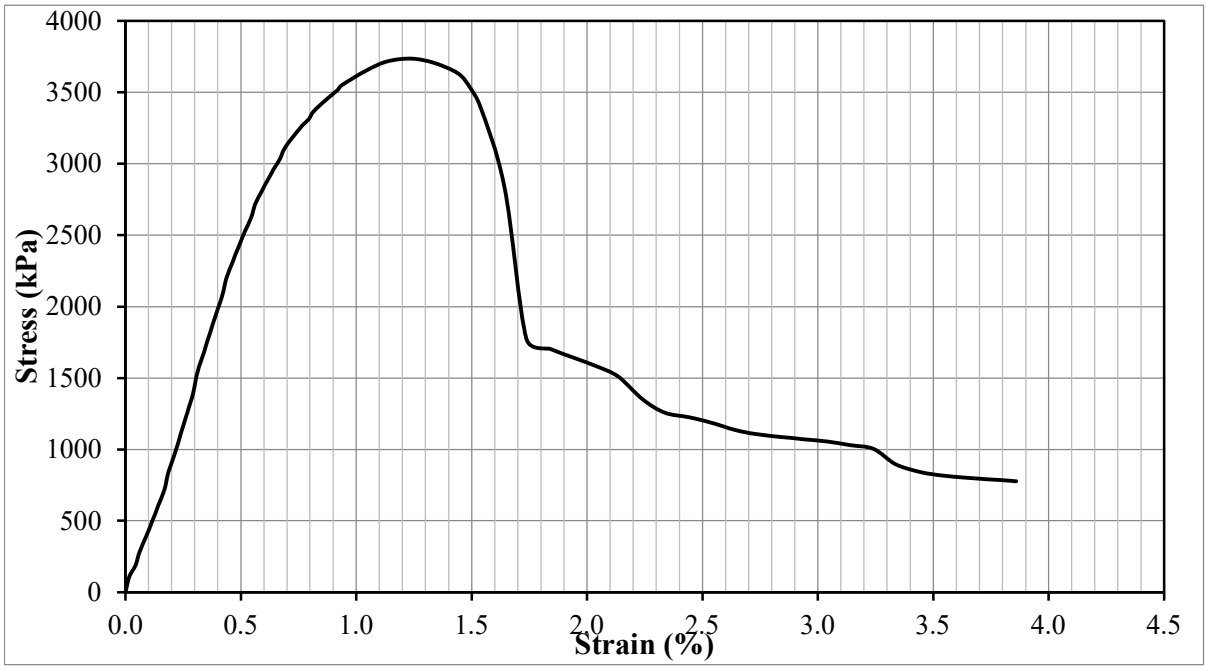
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,904	Strain at failure, εf :	1.15	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	A-1-D	Initial Area:	2123.2	mm^2
Test Date:	5/18/2019	Weight:	360.3	g
Strain Rate:	1 %/min	Unit Weight:	1727	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25.0	°C
Additional information				



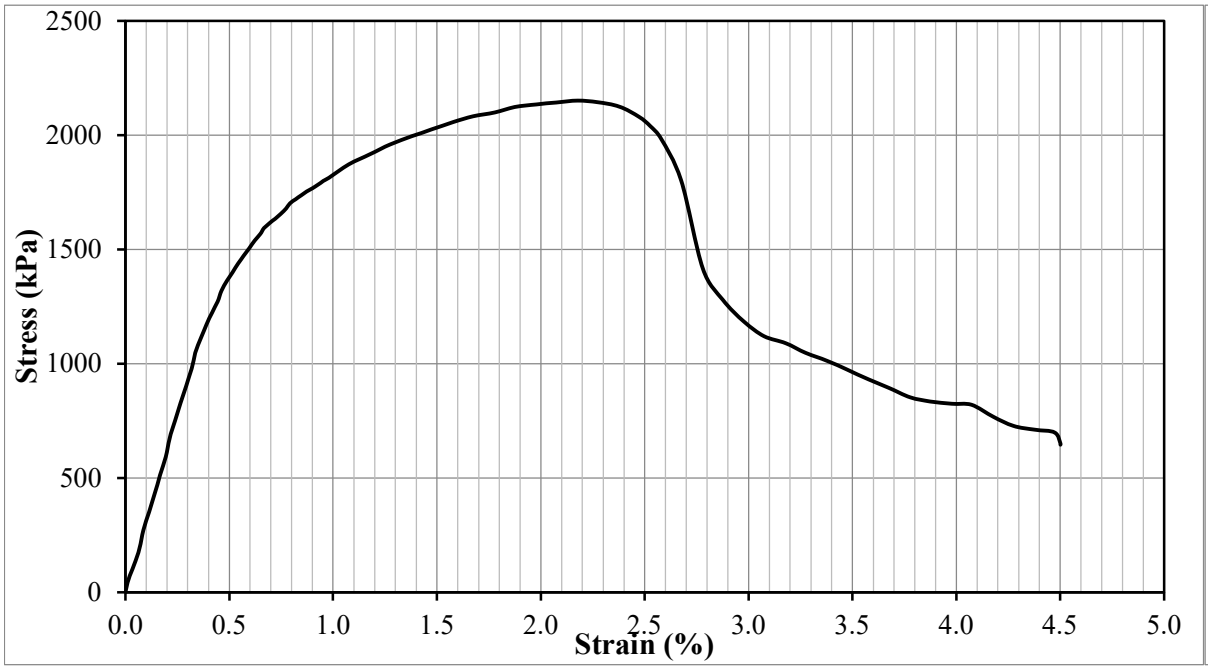
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,390	Strain at failure, εf :	1.05	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	A-1-E	Initial Area:	2108.7	mm^2
Test Date:	5/18/2019	Weight:	364.4	g
Strain Rate:	1 %/min	Unit Weight:	1736	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25.0	°C
Additional information				



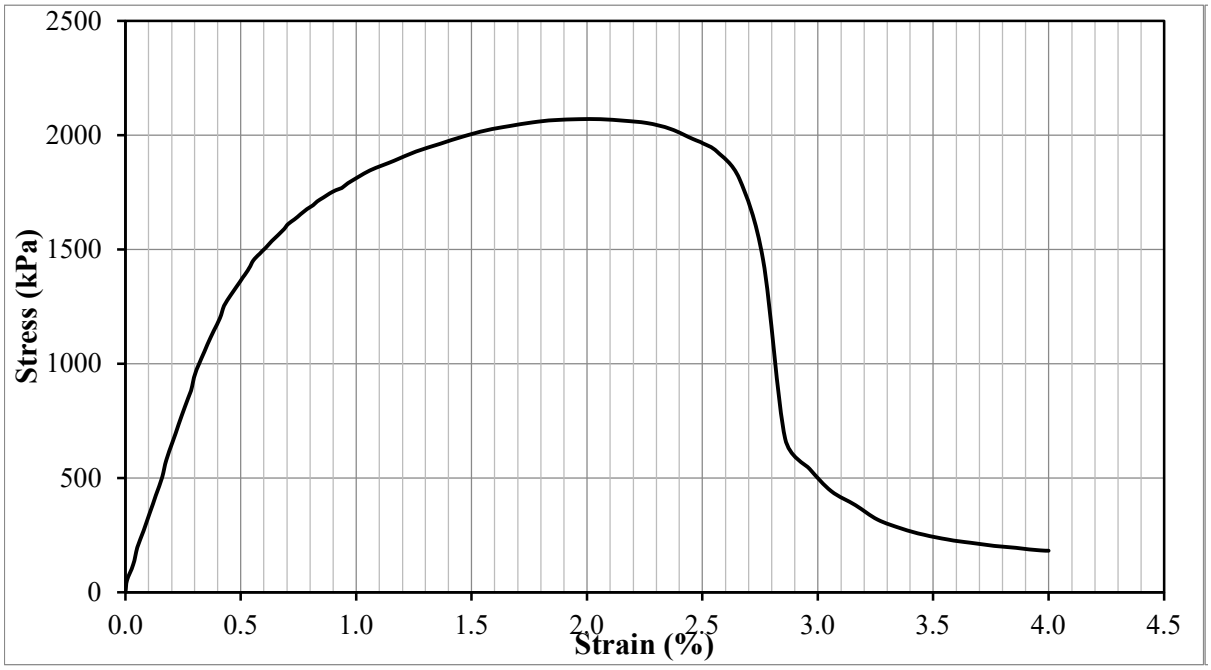
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,712	Strain at failure, εf :	1.24	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	A-2-H	Initial Area:	2123.2	mm^2
Test Date:	5/21/2019	Weight:	364.8	g
Strain Rate:	1 %/min	Unit Weight:	1711	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	2.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45.0	°C
Additional information				



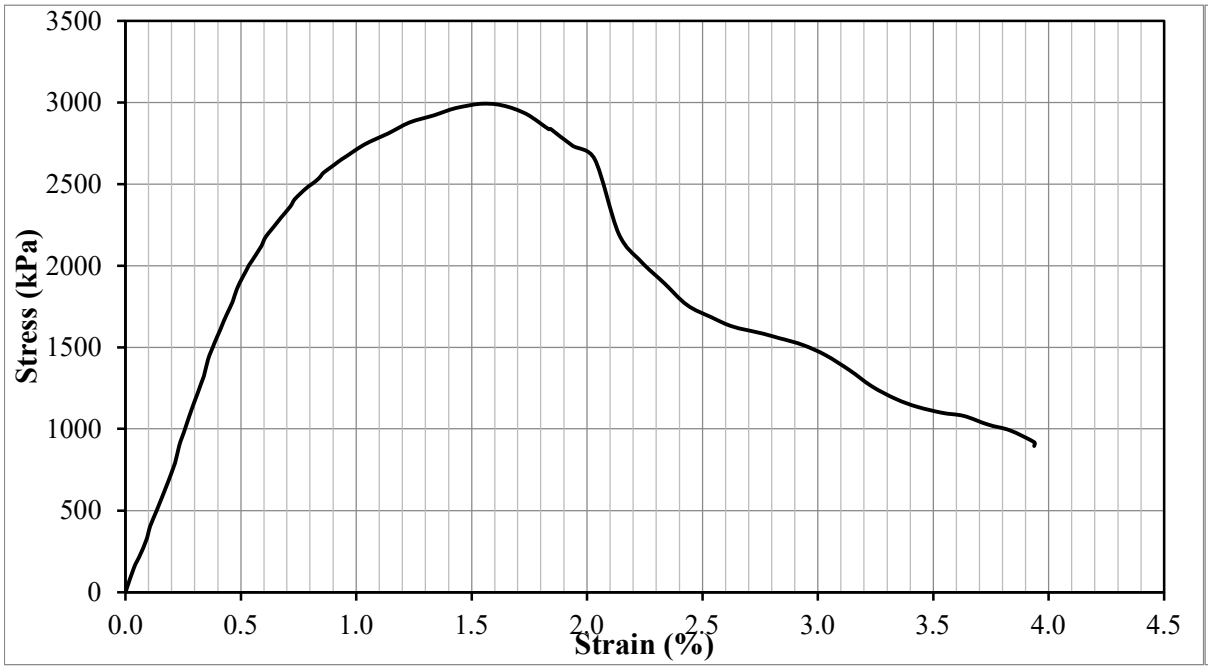
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,139	Strain at failure, εf :	2.18	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.2	mm
I.D.:	A-2-I	Initial Area:	2141.9	mm^2
Test Date:	5/21/2019	Weight:	365.5	g
Strain Rate:	1 %/min	Unit Weight:	1696	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	2.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45.0	°C
Additional information				



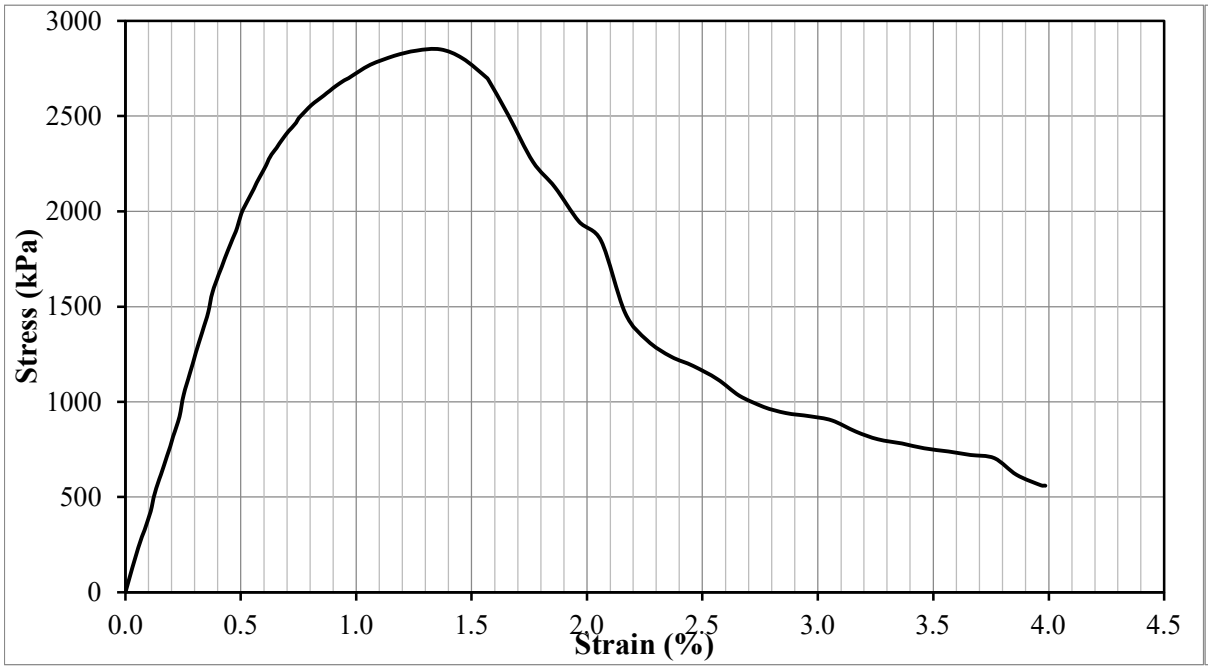
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,057	Strain at failure, εf :	2.06	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.1	mm
I.D.:	A-2-B	Initial Area:	2135.7	mm^2
Test Date:	5/25/2019	Weight:	360.1	g
Strain Rate:	1 %/min	Unit Weight:	1700	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	7.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45.0	°C
Additional information				



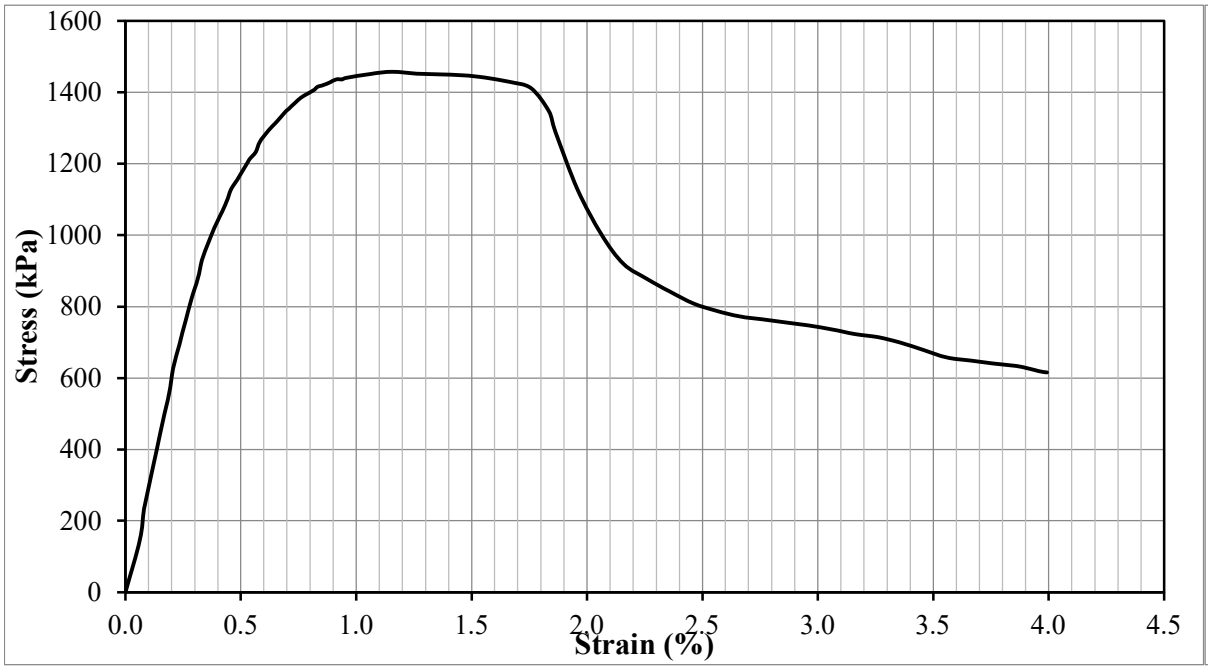
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,968	Strain at failure, εf :	1.54	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	A-2-G	Initial Area:	2125.3	mm^2
Test Date:	5/25/2019	Weight:	367.7	g
Strain Rate:	1 %/min	Unit Weight:	1718	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	7.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45.0	°C
Additional information				



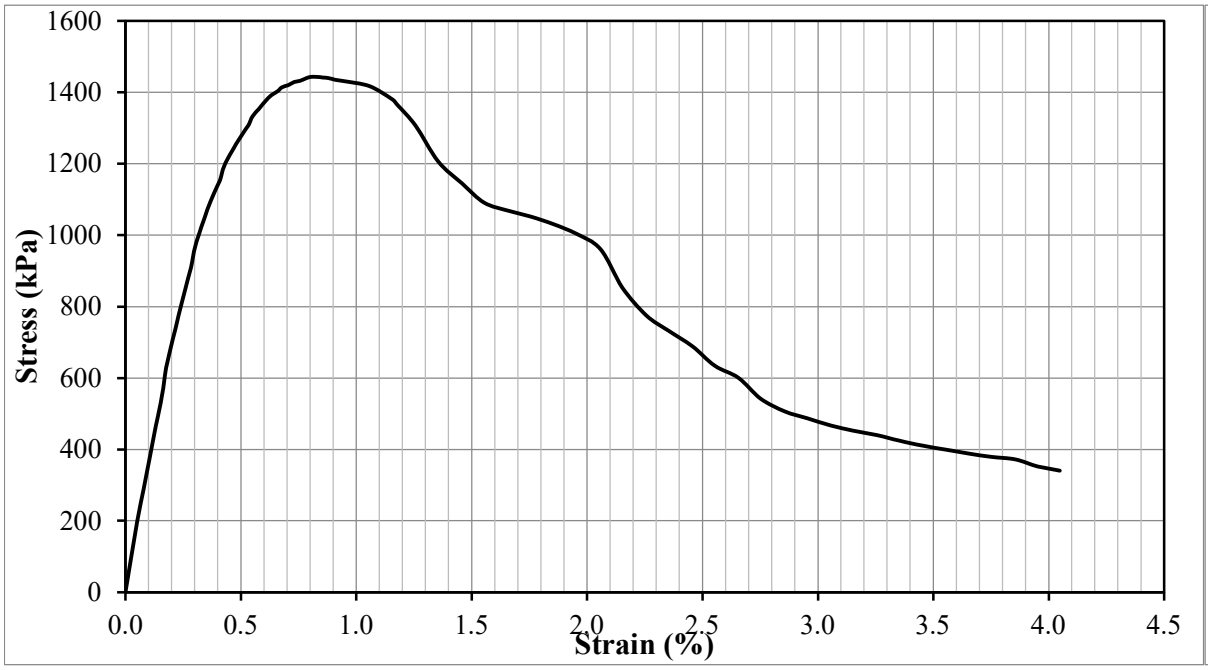
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,835	Strain at failure, εf :	1.37	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	93.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	A-2-C	Initial Area:	2125.3	mm^2
Test Date:	5/21/2019	Weight:	341.2	g
Strain Rate:	1 %/min	Unit Weight:	1720	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	2.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45.0	°C
Additional information				



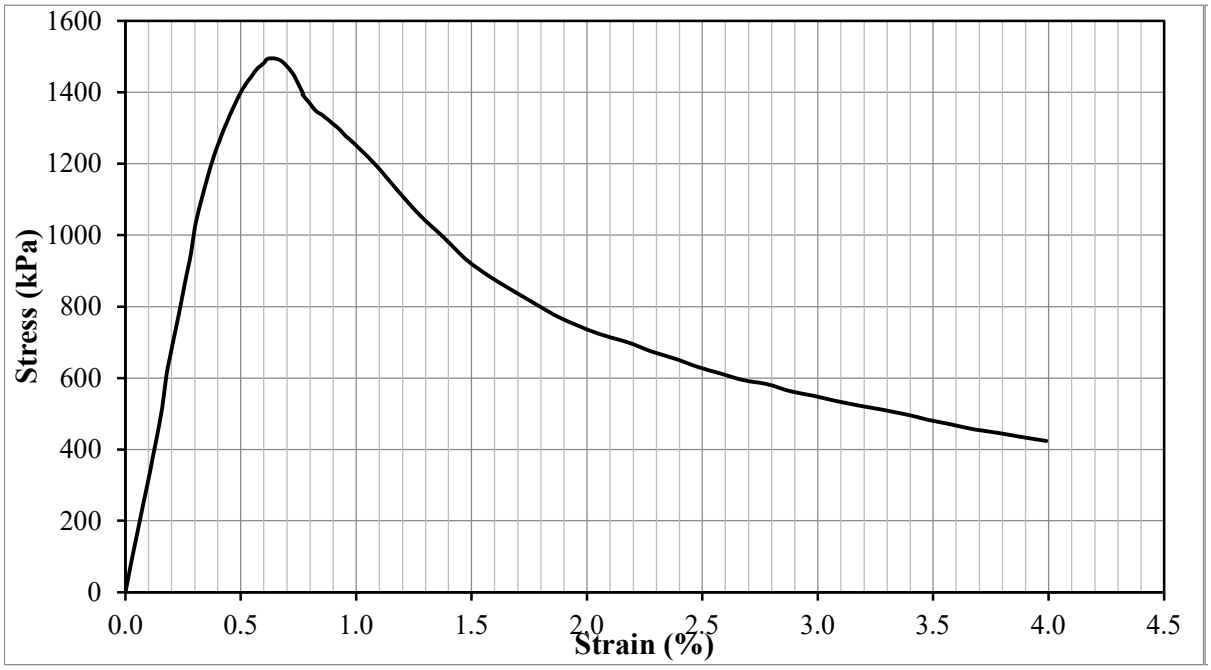
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,433	Strain at failure, εf :	1.16	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	A-2-F	Initial Area:	2119.1	mm^2
Test Date:	5/21/2019	Weight:	341.2	g
Strain Rate:	1 %/min	Unit Weight:	1616	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	2.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45.0	°C
Additional information				



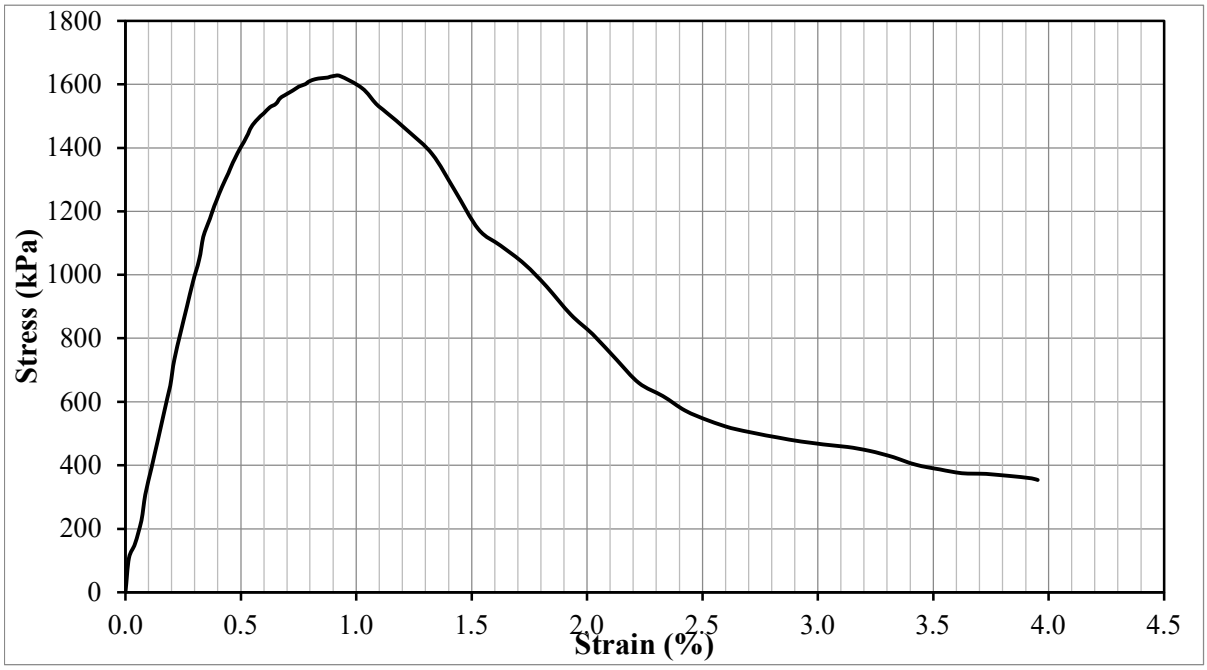
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,433	Strain at failure, εf :	0.83	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.1	mm
I.D.:	A-2-D	Initial Area:	2129.4	mm^2
Test Date:	5/25/2019	Weight:	355.5	g
Strain Rate:	1 %/min	Unit Weight:	1721	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	7.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45.0	°C
Additional information				



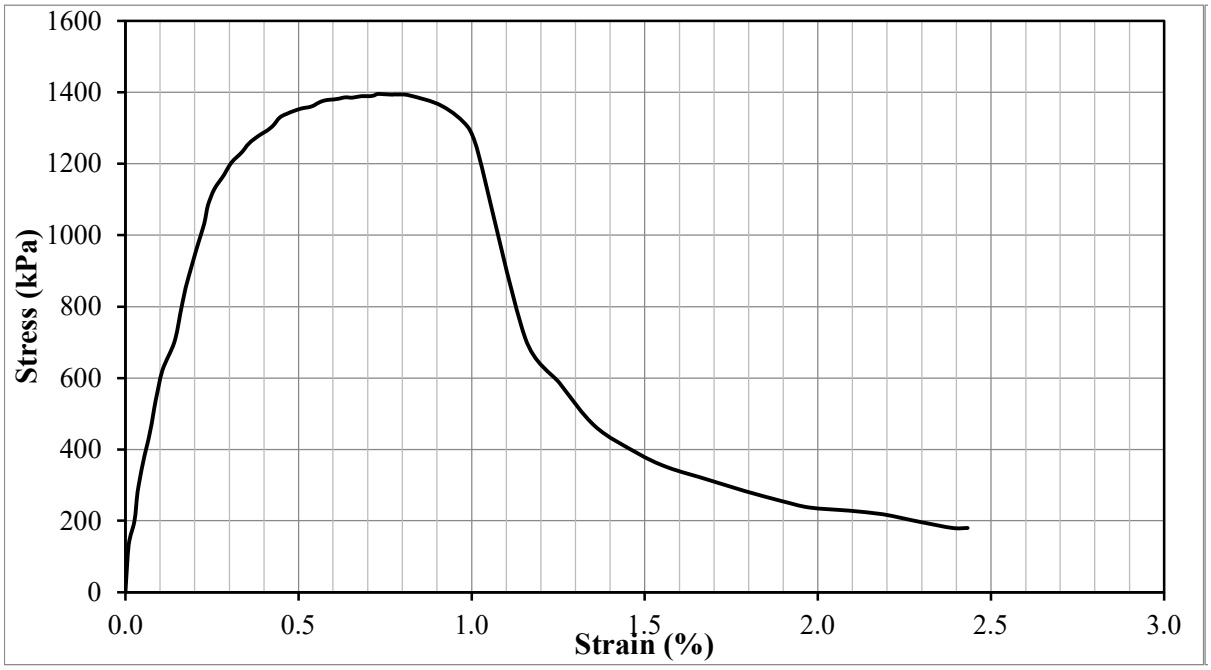
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,478	Strain at failure, εf :	0.64	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	A-2-E	Initial Area:	2123.2	mm^2
Test Date:	5/25/2019	Weight:	358.3	g
Strain Rate:	1 %/min	Unit Weight:	1729	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	7.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45.0	°C
Additional information				



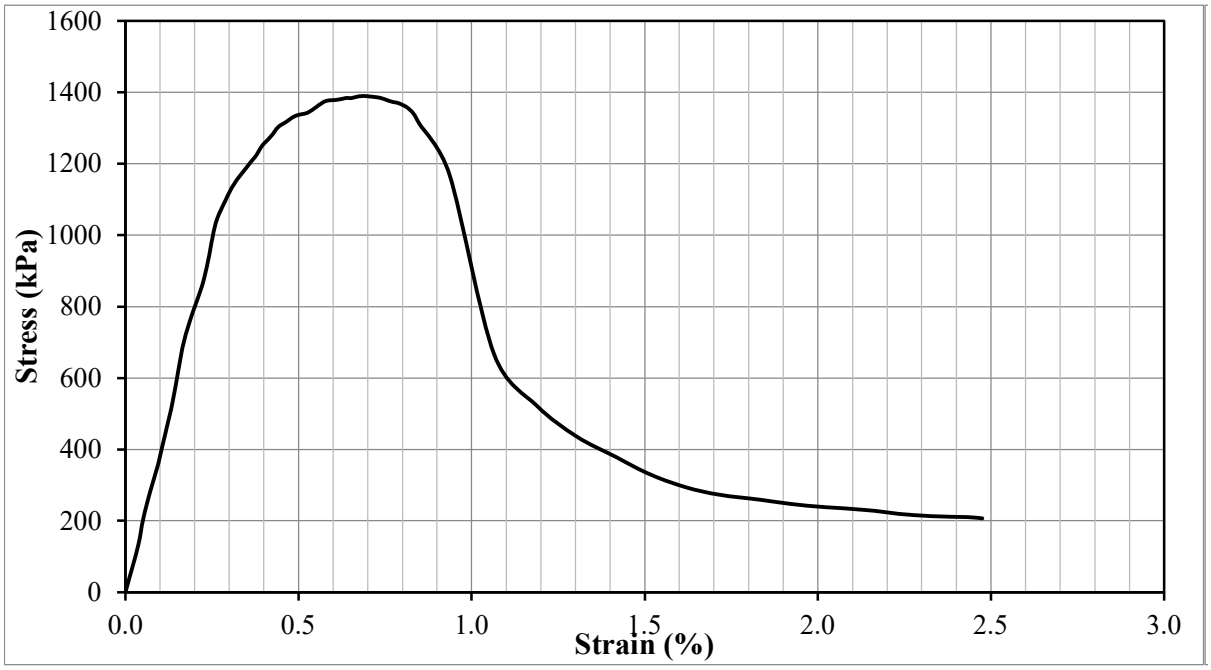
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,610	Strain at failure, εf :	0.93	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	M-1-A	Initial Area:	2121.1	mm^2
Test Date:	9/1/2020	Weight:	373.2	g
Strain Rate:	1 %/min	Unit Weight:	1759	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	7.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25.0	°C
Additional information				



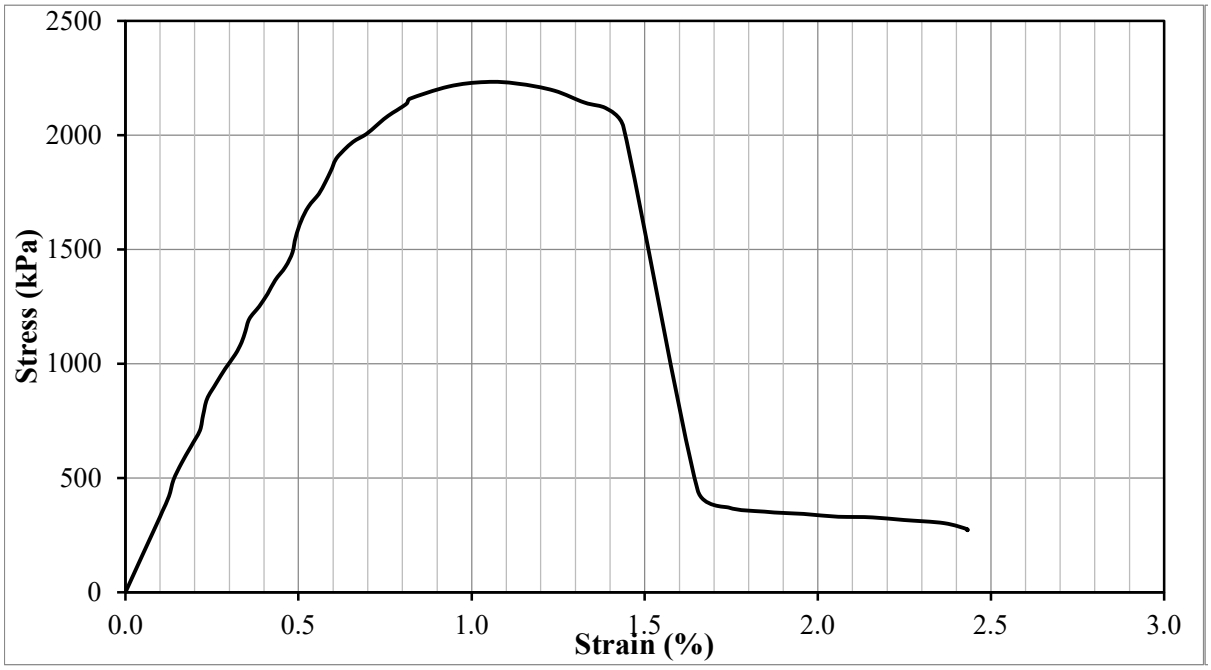
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,385	Strain at failure, εf :	0.88	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	M-1-H	Initial Area:	2125.3	mm^2
Test Date:	9/1/2020	Weight:	376.0	g
Strain Rate:	1 %/min	Unit Weight:	1759	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	7.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25.0	°C
Additional information				



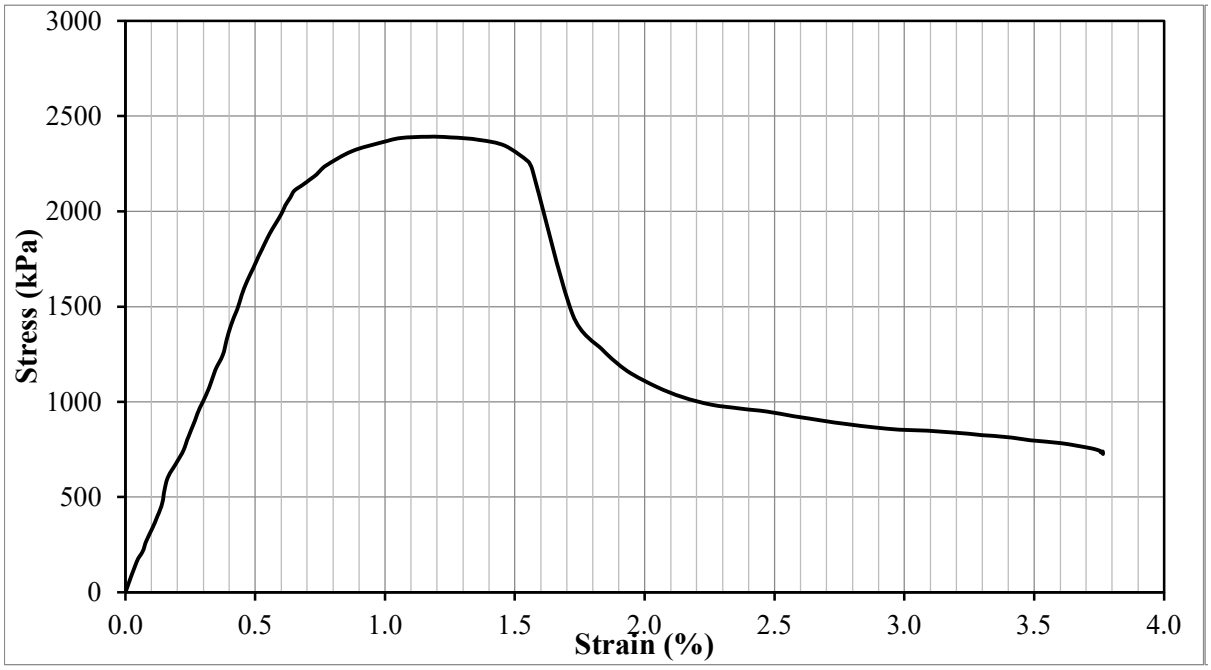
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,381	Strain at failure, εf :	0.77	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	M-1-B	Initial Area:	2125.3	mm^2
Test Date:	9/22/2020	Weight:	375.0	g
Strain Rate:	1 %/min	Unit Weight:	1756	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25.0	°C
Additional information				



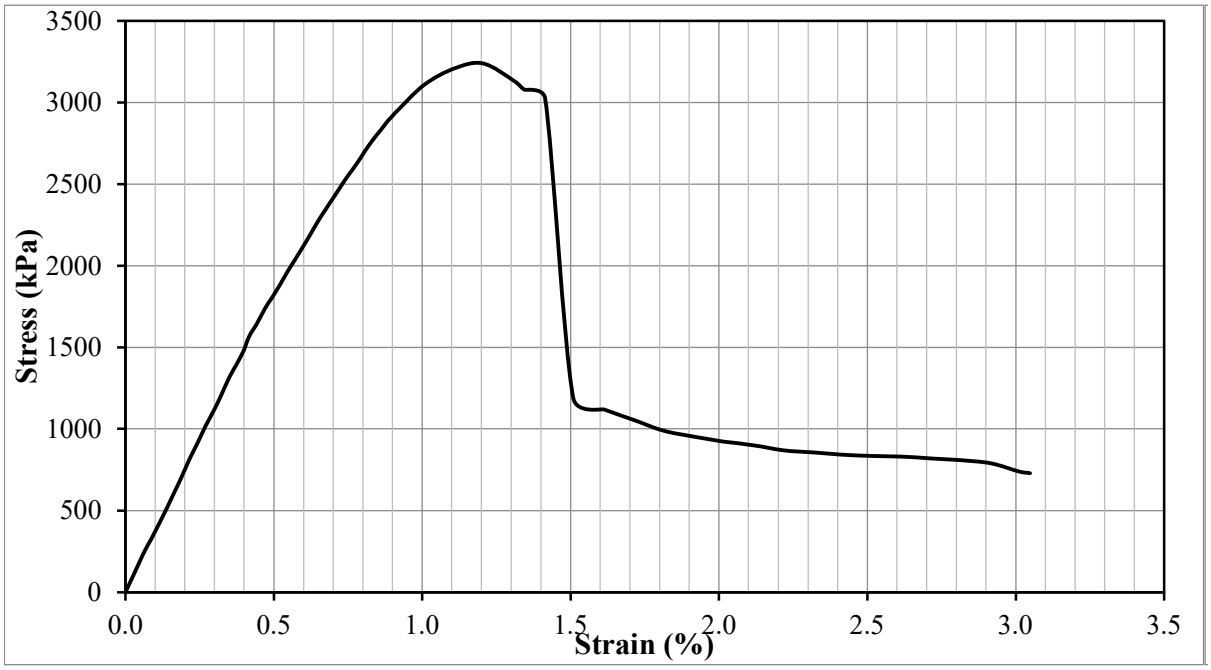
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,217	Strain at failure, εf :	1.20	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	M-1-G	Initial Area:	2123.2	mm^2
Test Date:	9/22/2020	Weight:	372.0	g
Strain Rate:	1 %/min	Unit Weight:	1755	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25.0	°C
Additional information				



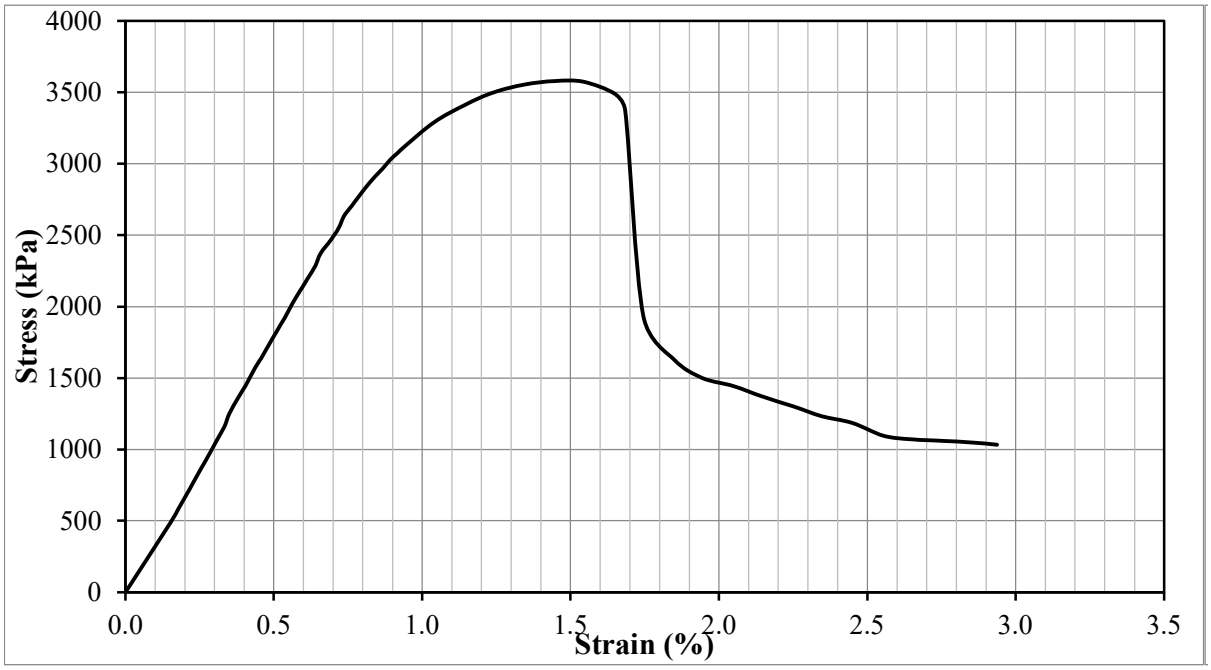
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,372	Strain at failure, εf :	1.33	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	M-1-C	Initial Area:	2123.2	mm^2
Test Date:	2/21/2021	Weight:	374.4	g
Strain Rate:	1 %/min	Unit Weight:	1762	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	180.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25.0	°C
Additional information				



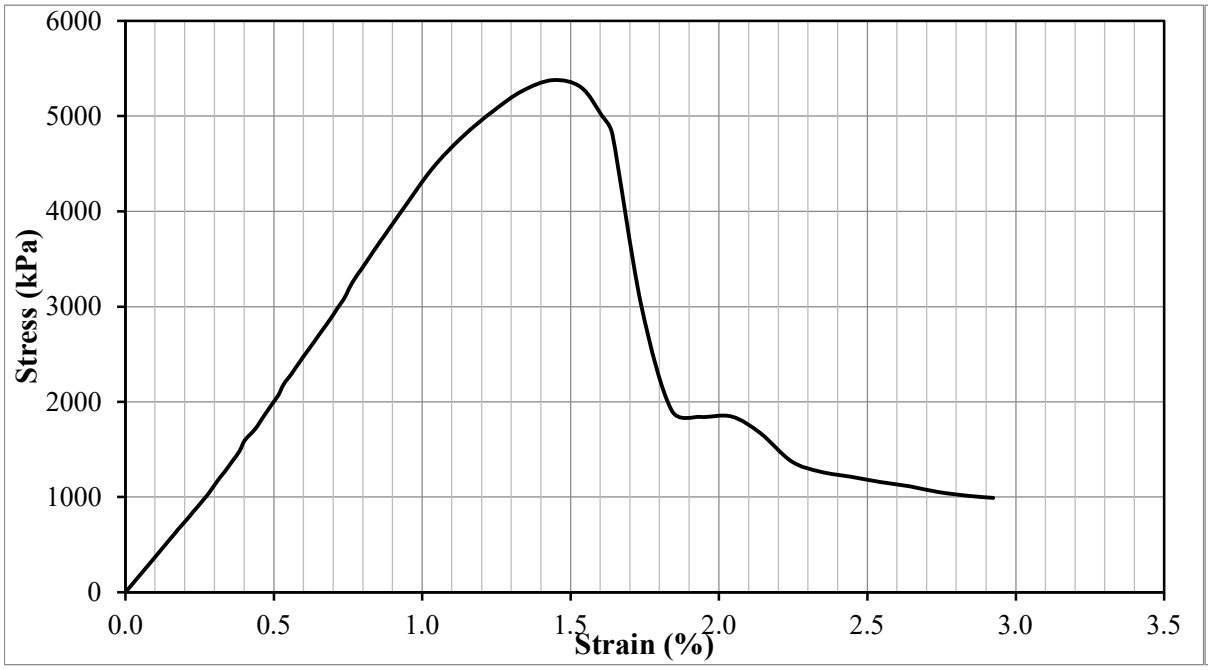
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,219	Strain at failure, εf :	1.21	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	M-1-F	Initial Area:	2125.3	mm^2
Test Date:	2/21/2021	Weight:	364.2	g
Strain Rate:	1 %/min	Unit Weight:	1752	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	180.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25.0	°C
Additional information				



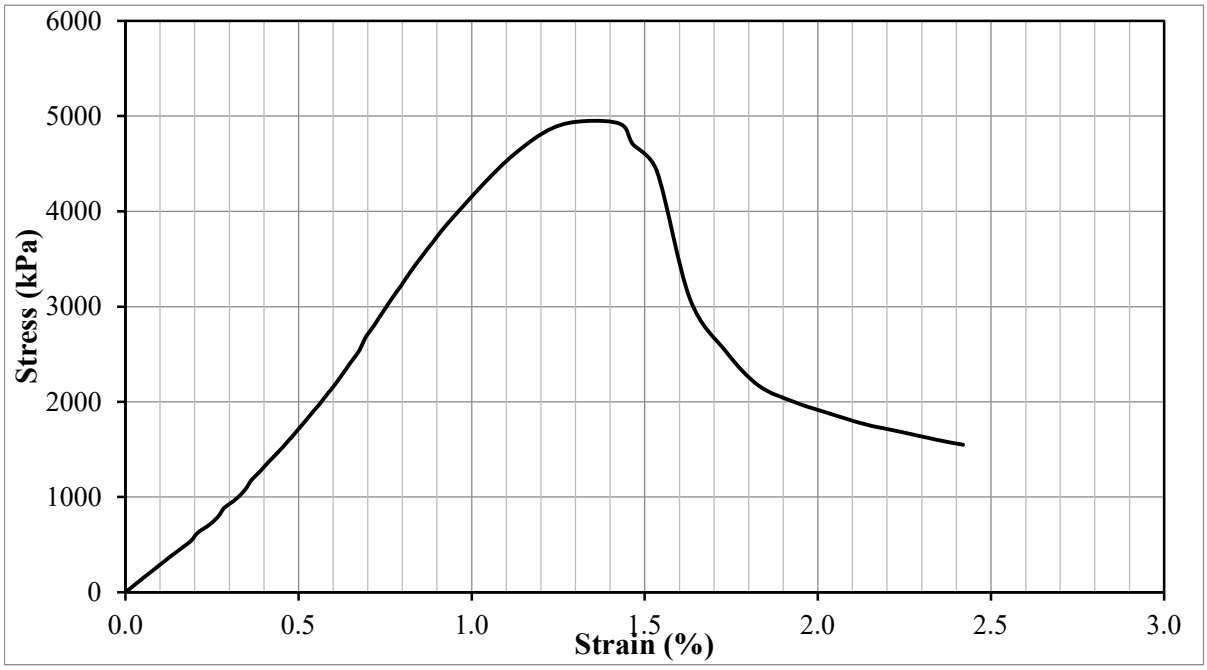
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,545	Strain at failure, εf :	1.45	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	M-1-D	Initial Area:	2123.2	mm^2
Test Date:	8/25/2021	Weight:	379.2	g
Strain Rate:	1 %/min	Unit Weight:	1761	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	364.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25.0	°C
Additional information				



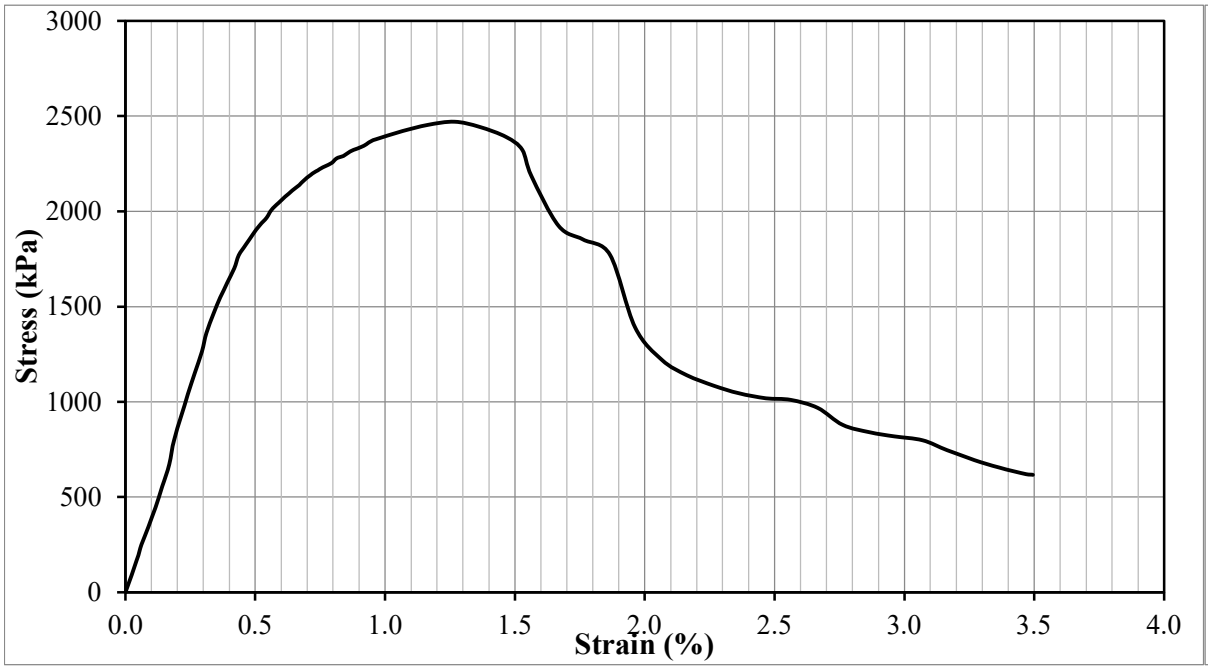
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,355	Strain at failure, εf :	1.44	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	M-1-E	Initial Area:	2119.1	mm^2
Test Date:	8/25/2021	Weight:	372.6	g
Strain Rate:	1 %/min	Unit Weight:	1765	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	364.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25.0	°C
Additional information				



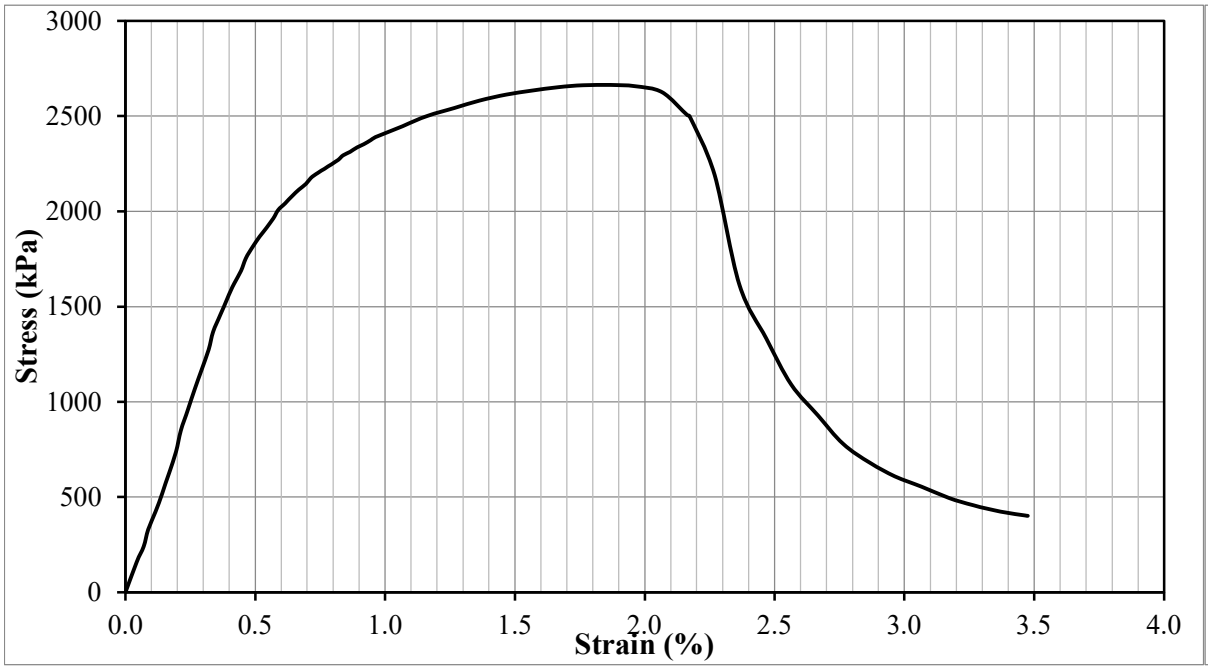
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,915	Strain at failure, εf :	1.33	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.1	mm
I.D.:	M-2-A	Initial Area:	2133.6	mm^2
Test Date:	9/1/2020	Weight:	376.0	g
Strain Rate:	1 %/min	Unit Weight:	1745	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	6.8	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45.0	°C
Additional information				



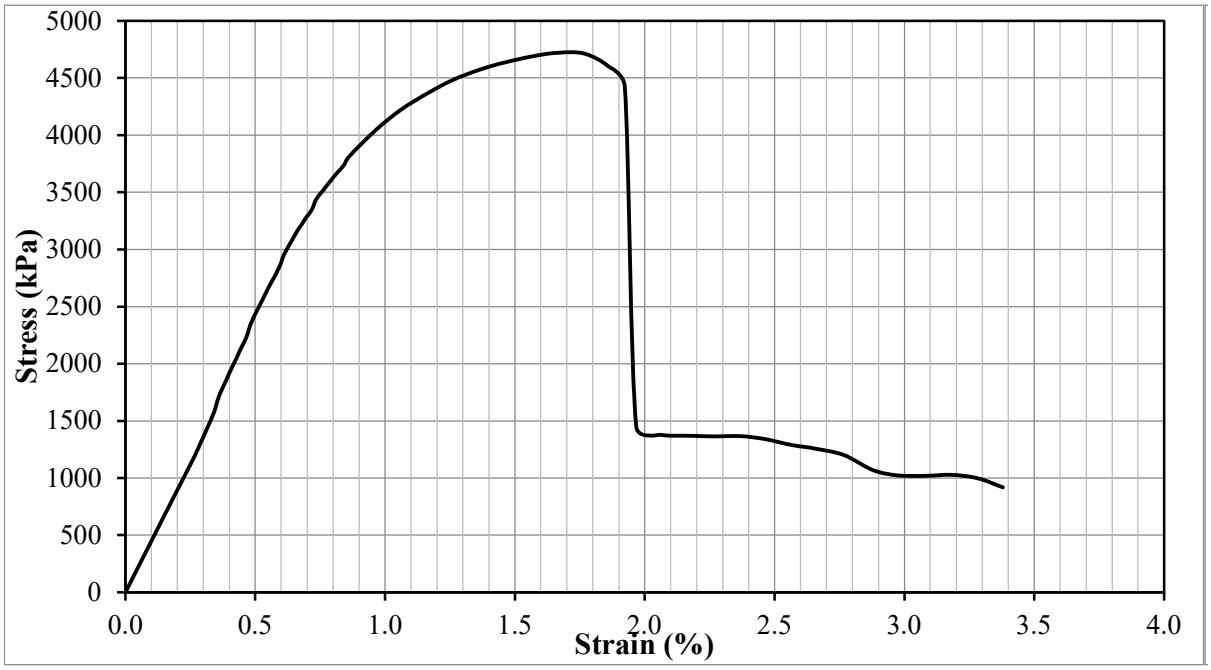
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,458	Strain at failure, εf :	1.27	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.1	mm
I.D.:	M-2-H	Initial Area:	2129.4	mm^2
Test Date:	9/1/2020	Weight:	367.1	g
Strain Rate:	1 %/min	Unit Weight:	1707	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	6.8	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45.0	°C
Additional information				



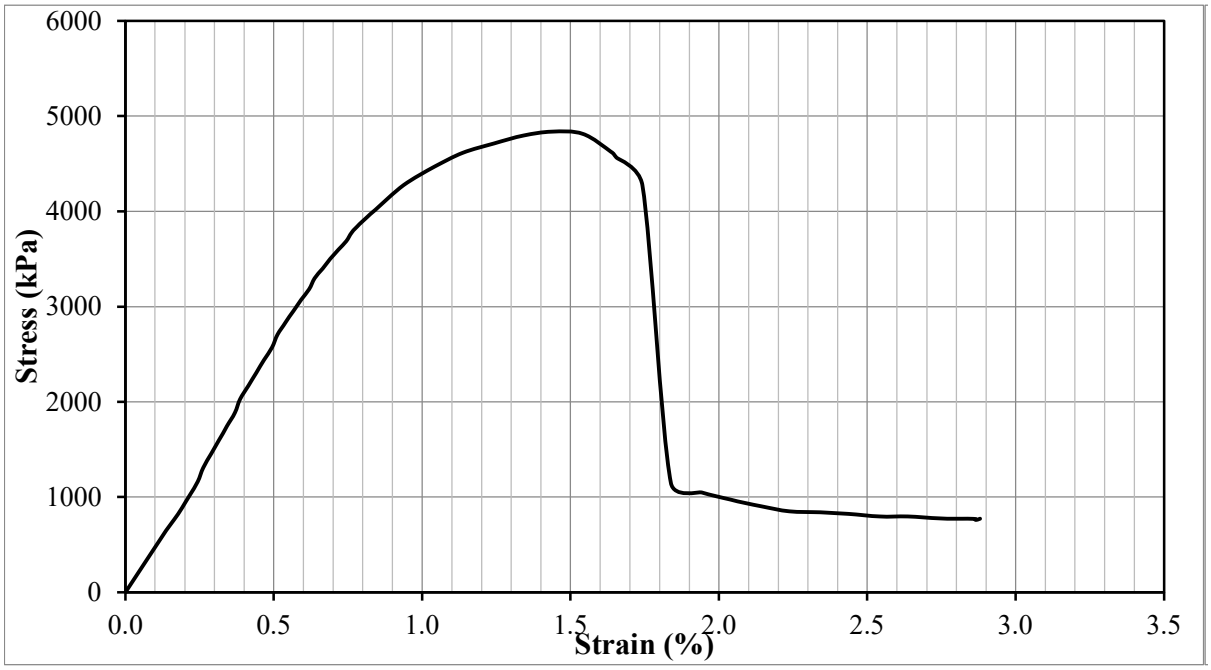
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,650	Strain at failure, εf :	1.87	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.1	mm
I.D.:	M-2-B	Initial Area:	2131.5	mm^2
Test Date:	9/22/2020	Weight:	367.1	g
Strain Rate:	1 %/min	Unit Weight:	1743	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	27.8	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45.0	°C
Additional information				



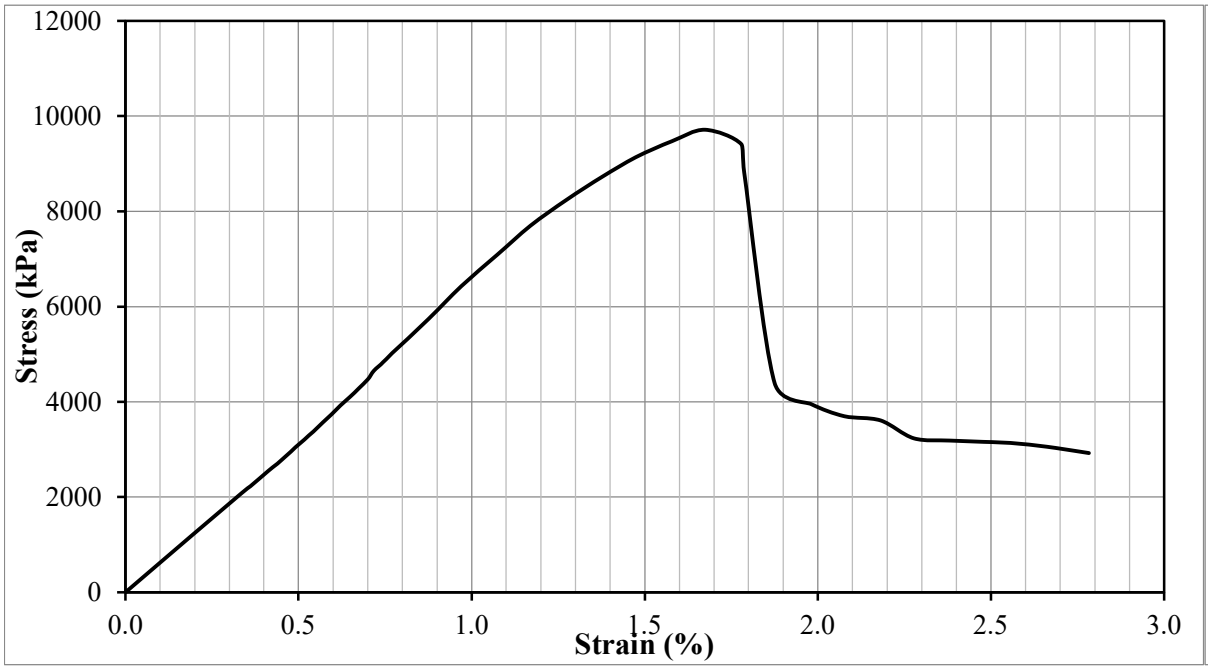
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,681	Strain at failure, εf :	1.66	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.1	mm
I.D.:	M-2-G	Initial Area:	2129.4	mm^2
Test Date:	9/22/2020	Weight:	370.0	g
Strain Rate:	1 %/min	Unit Weight:	1749	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	27.8	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45.0	°C
Additional information				



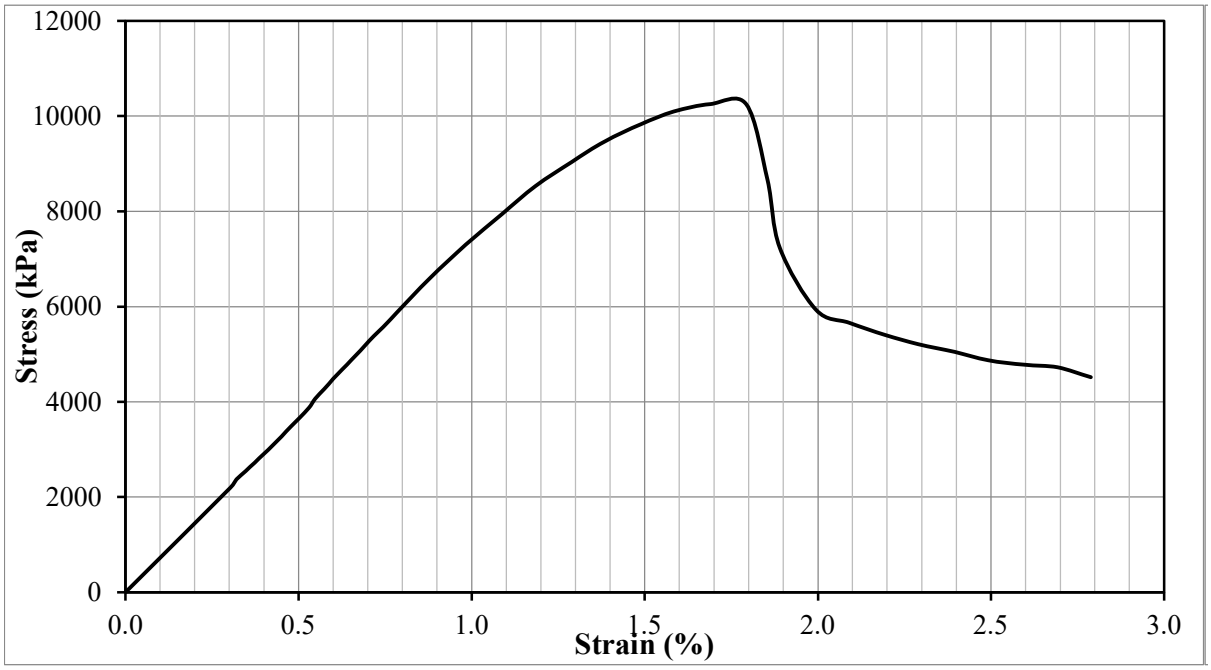
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,800	Strain at failure, εf :	1.44	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.1	mm
I.D.:	M-2-C	Initial Area:	2135.7	mm^2
Test Date:	2/21/2021	Weight:	360.8	g
Strain Rate:	1 %/min	Unit Weight:	1743	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	179.8	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45.0	°C
Additional information				



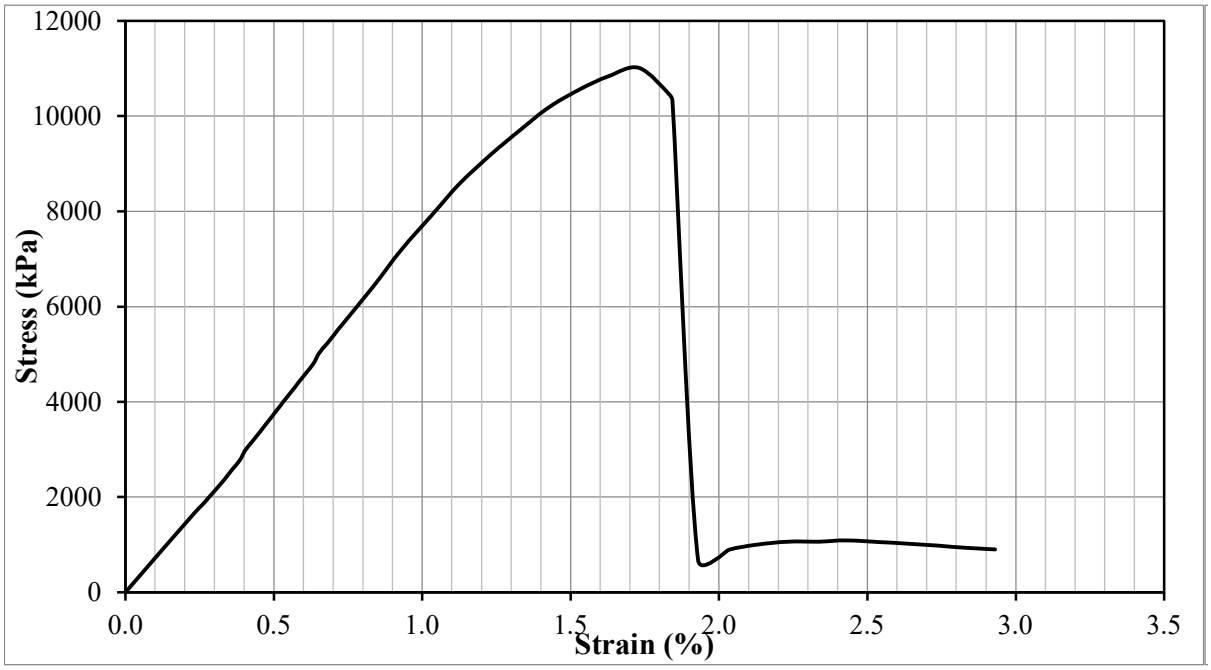
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	9,602	Strain at failure, εf :	1.67	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.1	mm
I.D.:	M-2-F	Initial Area:	2131.5	mm^2
Test Date:	2/21/2021	Weight:	370.8	g
Strain Rate:	1 %/min	Unit Weight:	1747	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	179.8	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45.0	°C
Additional information				



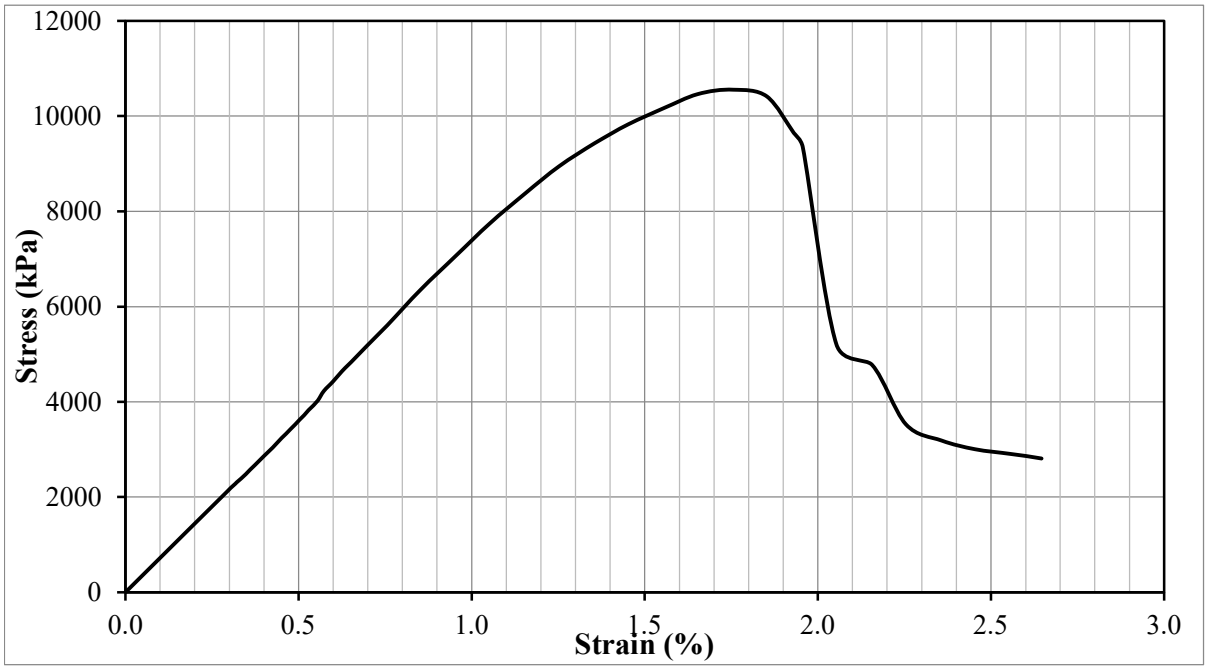
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	10,181	Strain at failure, εf :	1.69	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	M-2-D	Initial Area:	2127.4	mm^2
Test Date:	8/25/2021	Weight:	365.3	g
Strain Rate:	1 %/min	Unit Weight:	1753	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	364.7	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45.0	°C
Additional information				



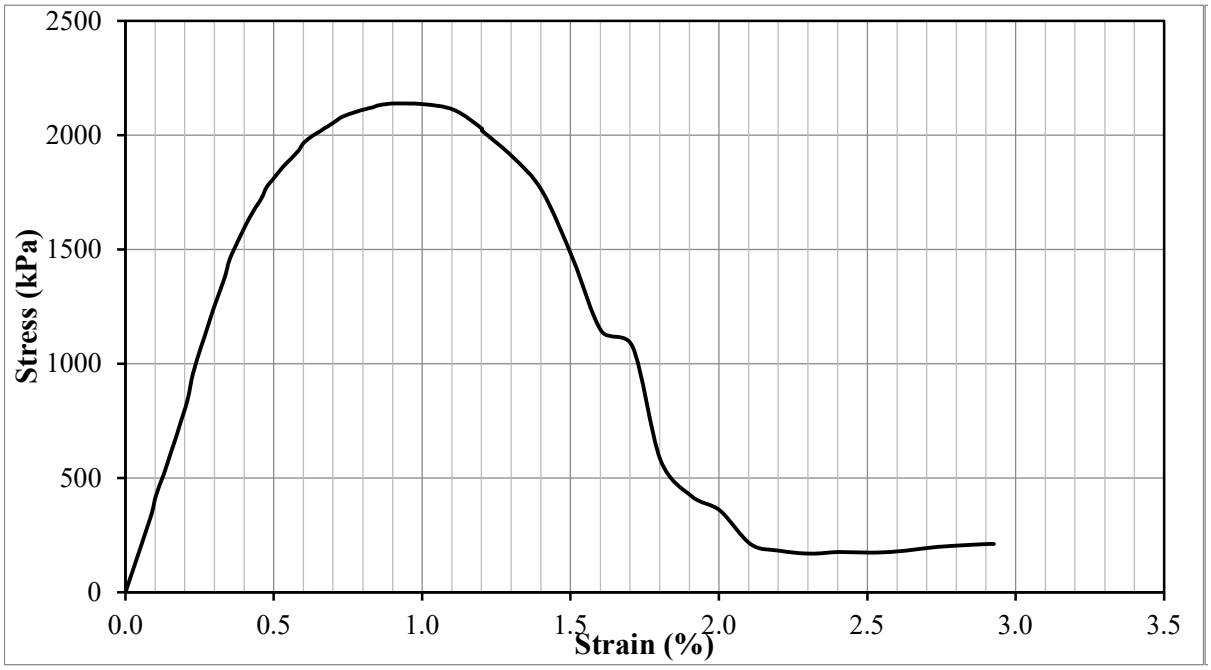
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	10,907	Strain at failure, εf :	1.73	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.2	mm
I.D.:	M-2-E	Initial Area:	2137.8	mm^2
Test Date:	8/25/2021	Weight:	367.3	g
Strain Rate:	1 %/min	Unit Weight:	1750	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	364.7	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45.0	°C
Additional information				



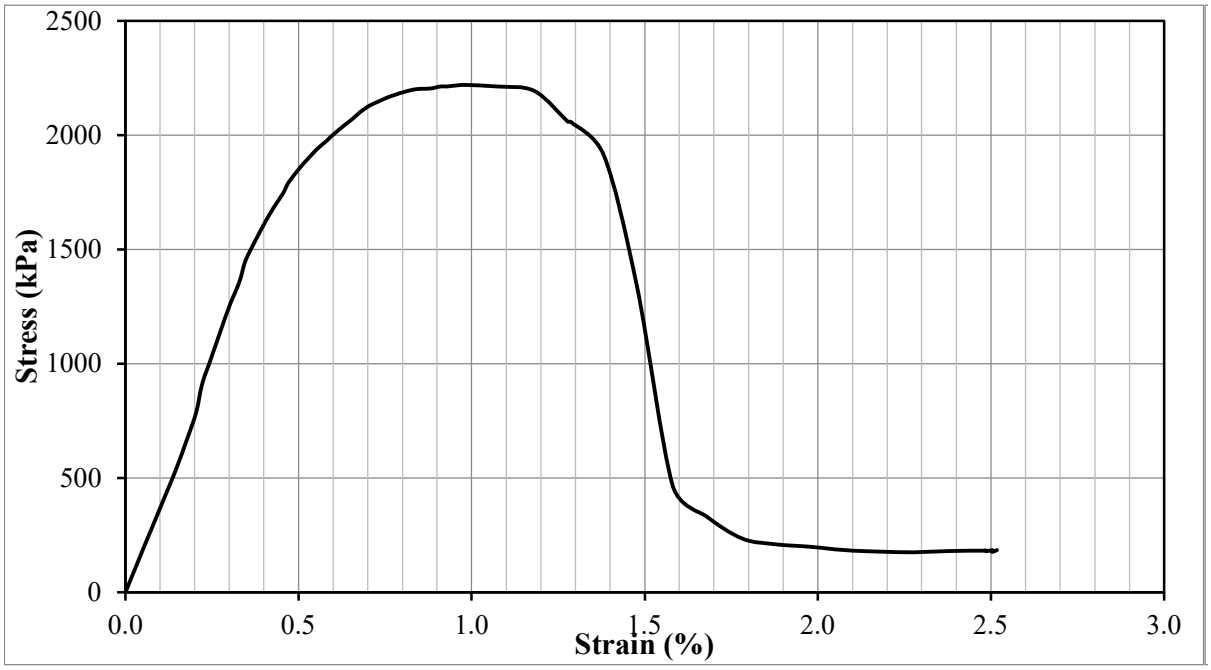
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	10,456	Strain at failure, εf :	1.76	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	M-3-A	Initial Area:	2123.2	mm^2
Test Date:	9/2/2020	Weight:	370.1	g
Strain Rate:	1 %/min	Unit Weight:	1736	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	7.2	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25.0	°C
Additional information				



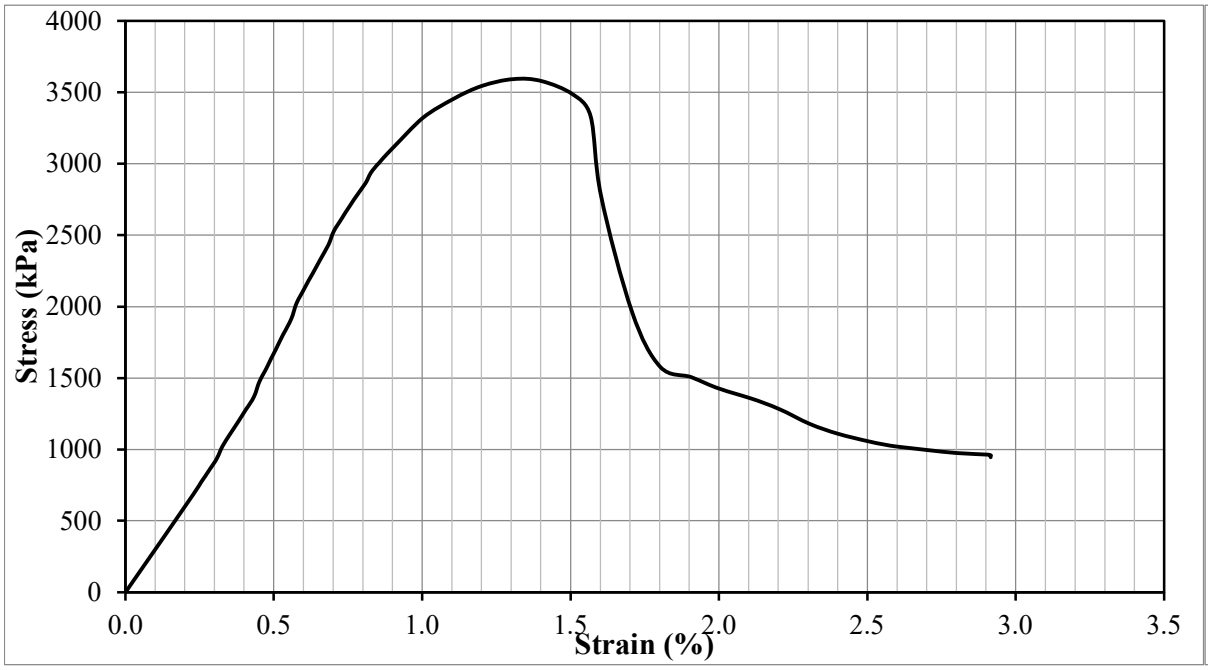
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,126	Strain at failure, εf :	0.91	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.1	mm
I.D.:	M-3-H	Initial Area:	2129.4	mm^2
Test Date:	9/2/2020	Weight:	373.4	g
Strain Rate:	1 %/min	Unit Weight:	1734	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	7.2	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25.0	°C
Additional information				



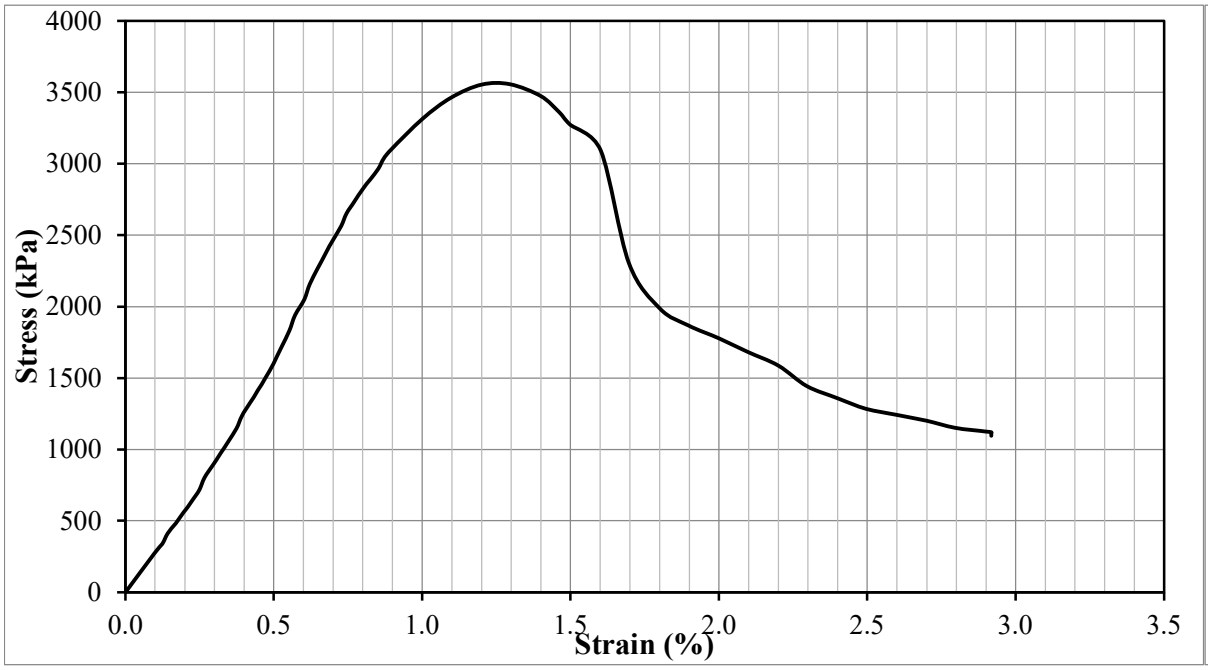
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,209	Strain at failure, εf :	0.98	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	M-3-B	Initial Area:	2117.0	mm^2
Test Date:	9/23/2020	Weight:	370.9	g
Strain Rate:	1 %/min	Unit Weight:	1742	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25.0	°C
Additional information				



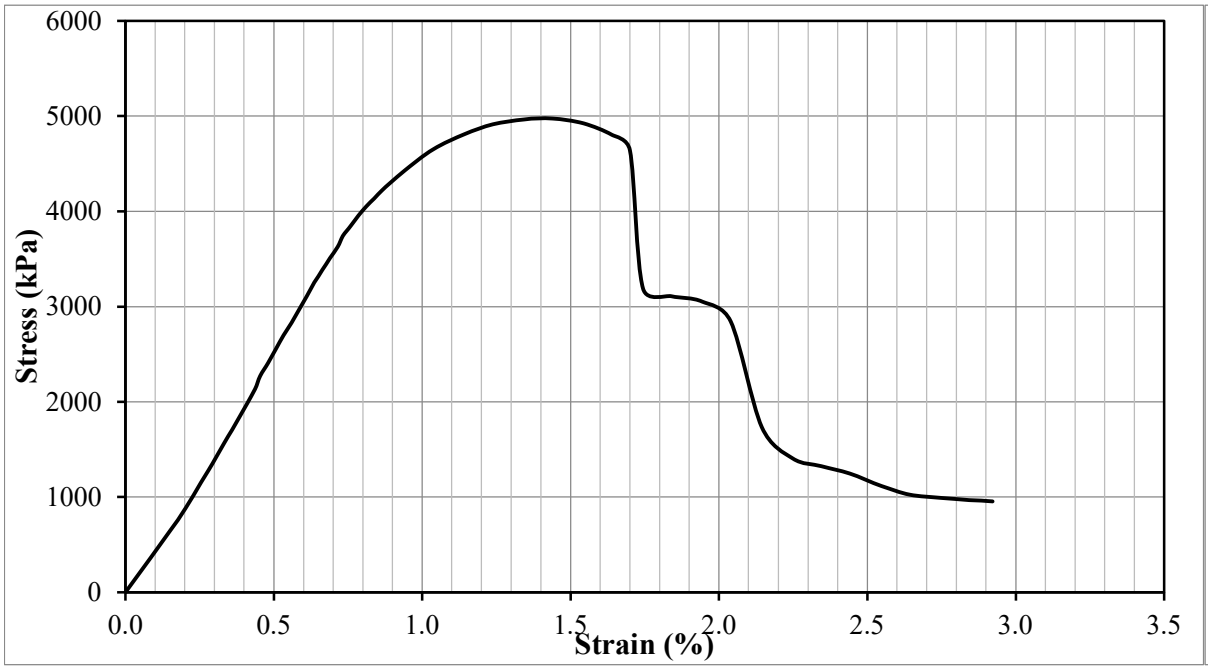
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,575	Strain at failure, εf :	1.31	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	M-3-G	Initial Area:	2125.3	mm^2
Test Date:	9/23/2020	Weight:	371.3	g
Strain Rate:	1 %/min	Unit Weight:	1736	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25.0	°C
Additional information				



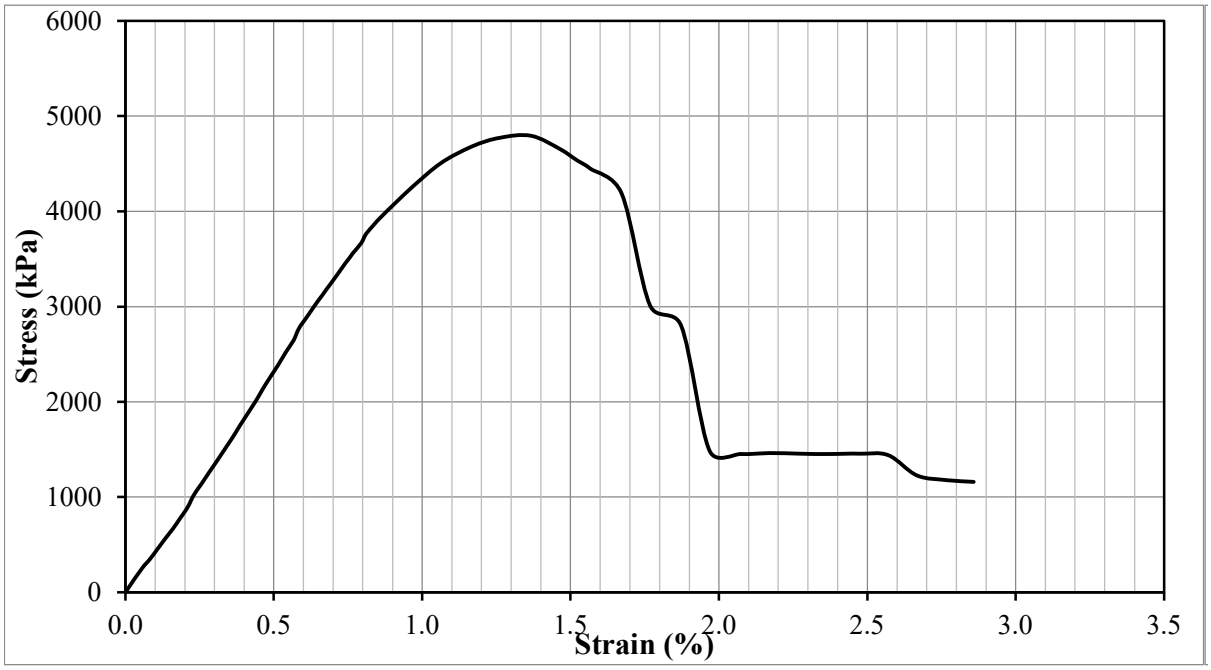
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,537	Strain at failure, εf :	1.30	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	M-3-C	Initial Area:	2127.4	mm^2
Test Date:	2/22/2021	Weight:	369.8	g
Strain Rate:	1 %/min	Unit Weight:	1734	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	180.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25.0	°C
Additional information				



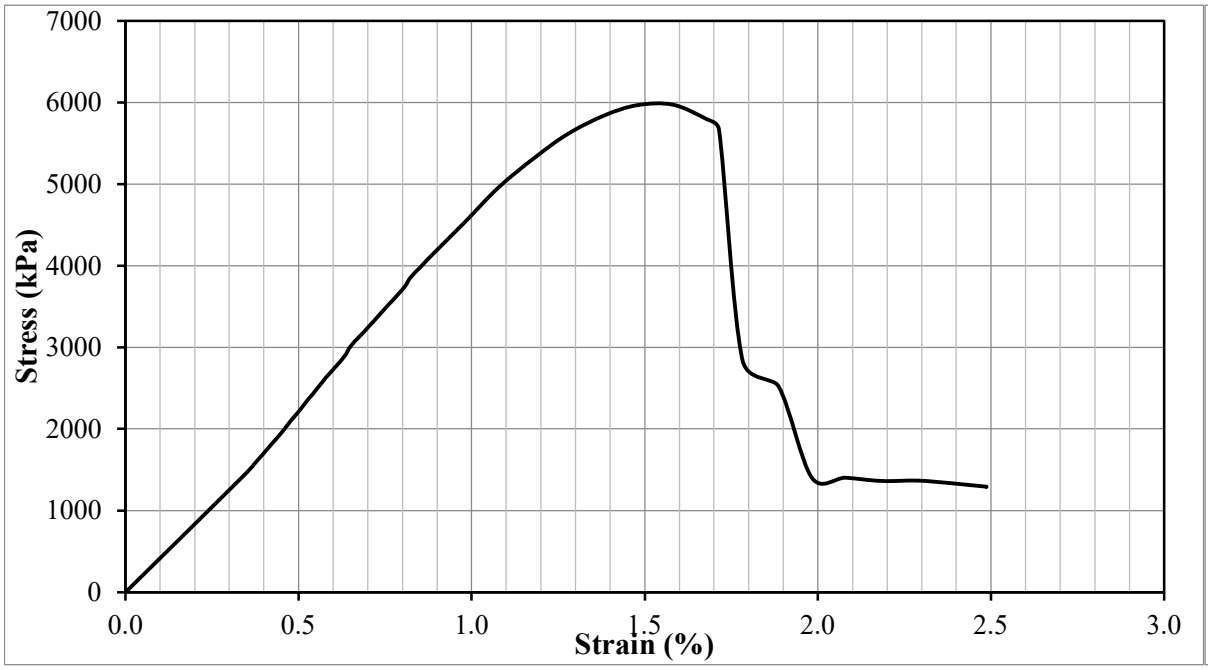
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,945	Strain at failure, εf :	1.44	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.1	mm
I.D.:	M-3-F	Initial Area:	2129.4	mm^2
Test Date:	2/22/2021	Weight:	369.7	g
Strain Rate:	1 %/min	Unit Weight:	1732	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	180.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25.0	°C
Additional information				



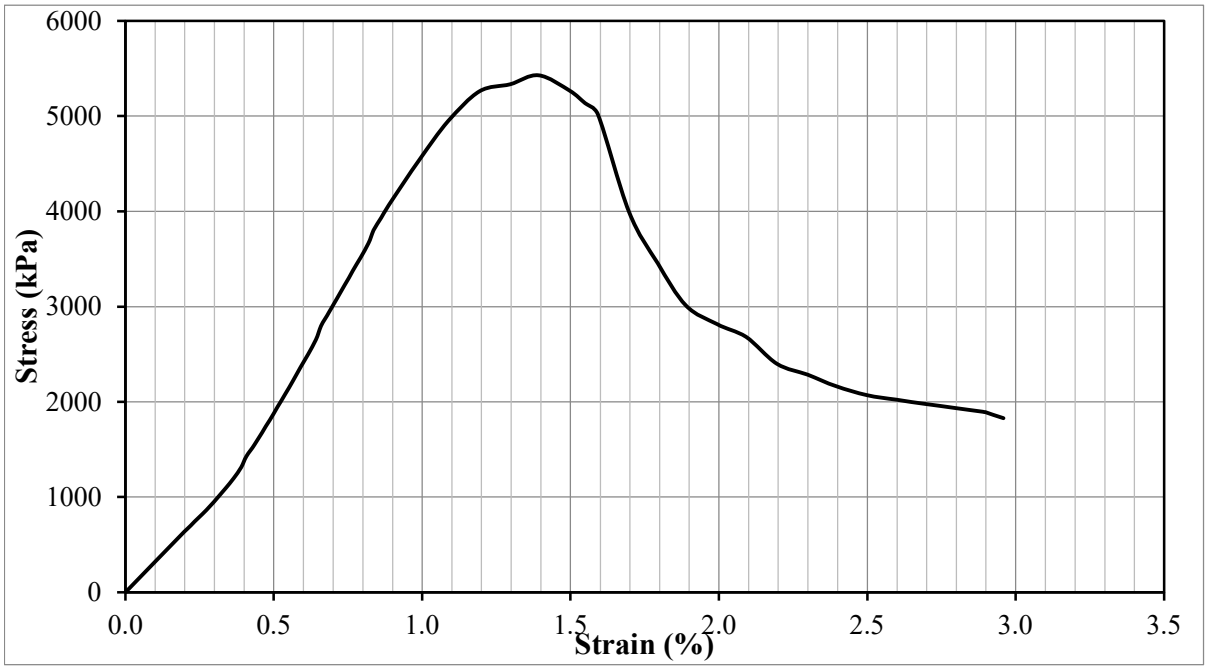
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,763	Strain at failure, εf :	1.37	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	M-3-D	Initial Area:	2123.2	mm^2
Test Date:	8/26/2021	Weight:	374.3	g
Strain Rate:	1 %/min	Unit Weight:	1742	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	365.2	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25.0	°C
Additional information				



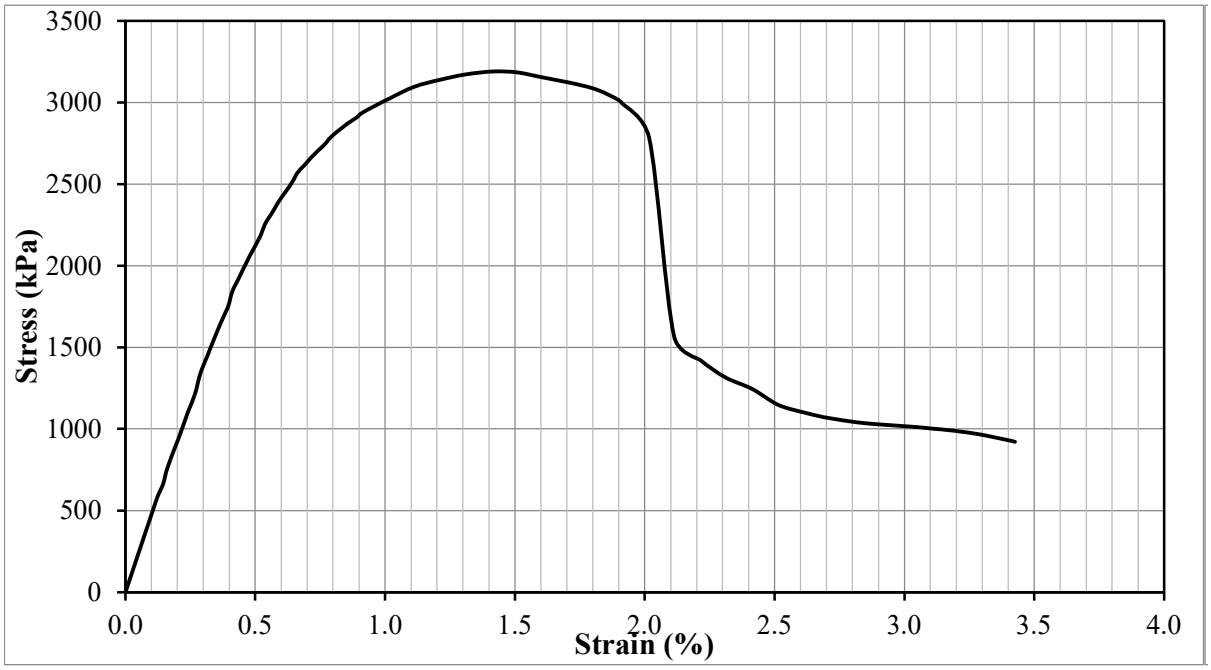
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,947	Strain at failure, εf :	1.58	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	M-3-E	Initial Area:	2123.2	mm^2
Test Date:	8/26/2021	Weight:	369.6	g
Strain Rate:	1 %/min	Unit Weight:	1743	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	365.2	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25.0	°C
Additional information				



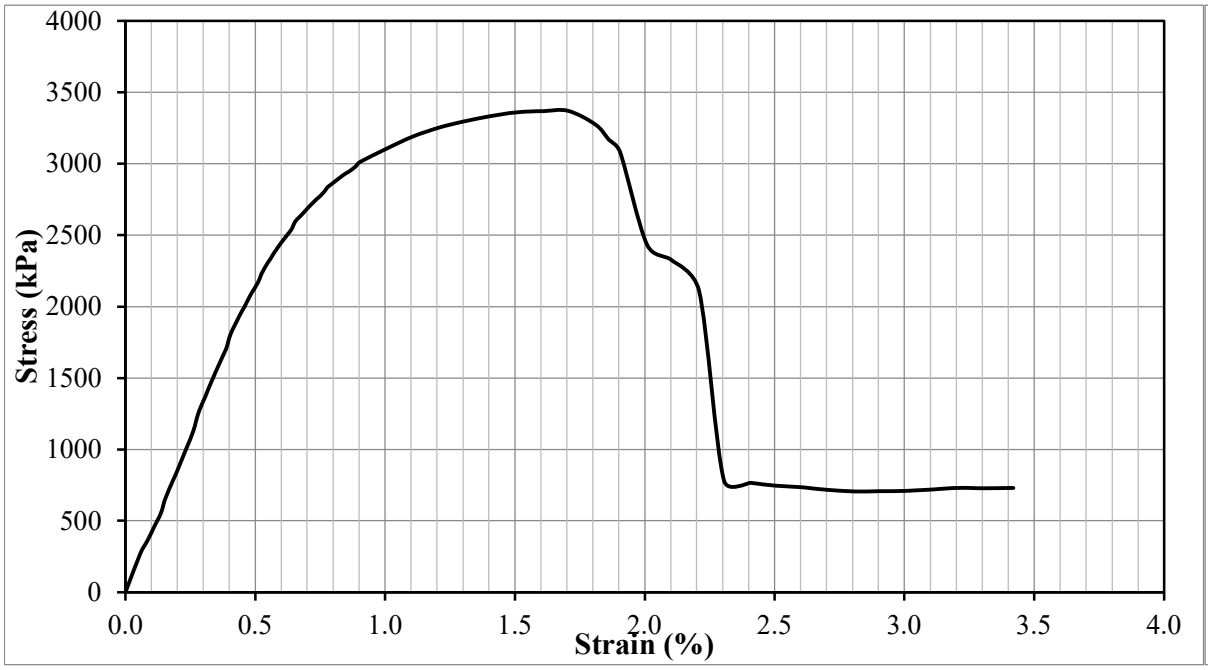
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,395	Strain at failure, εf :	1.39	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.1	mm
I.D.:	M-4-A	Initial Area:	2135.7	mm^2
Test Date:	9/2/2020	Weight:	365.5	g
Strain Rate:	1 %/min	Unit Weight:	1714	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	7.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45.0	°C
Additional information				



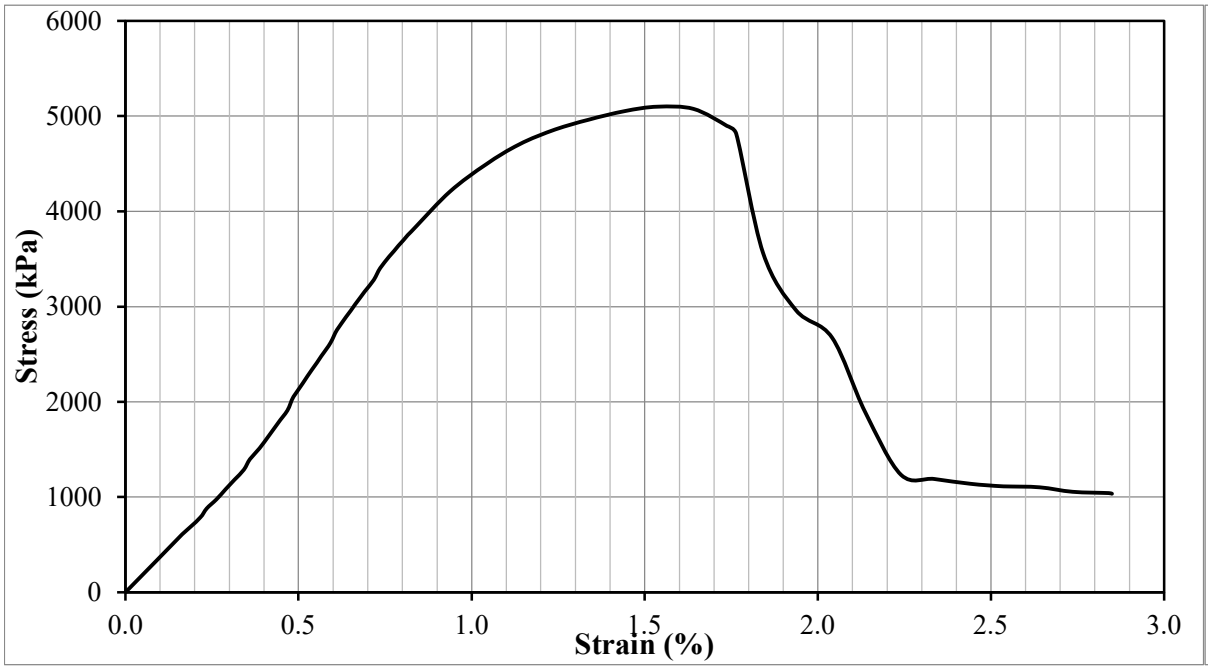
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,169	Strain at failure, εf :	1.42	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.1	mm
I.D.:	M-4-H	Initial Area:	2133.6	mm^2
Test Date:	9/2/2020	Weight:	363.0	g
Strain Rate:	1 %/min	Unit Weight:	1716	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	7.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45.0	°C
Additional information				



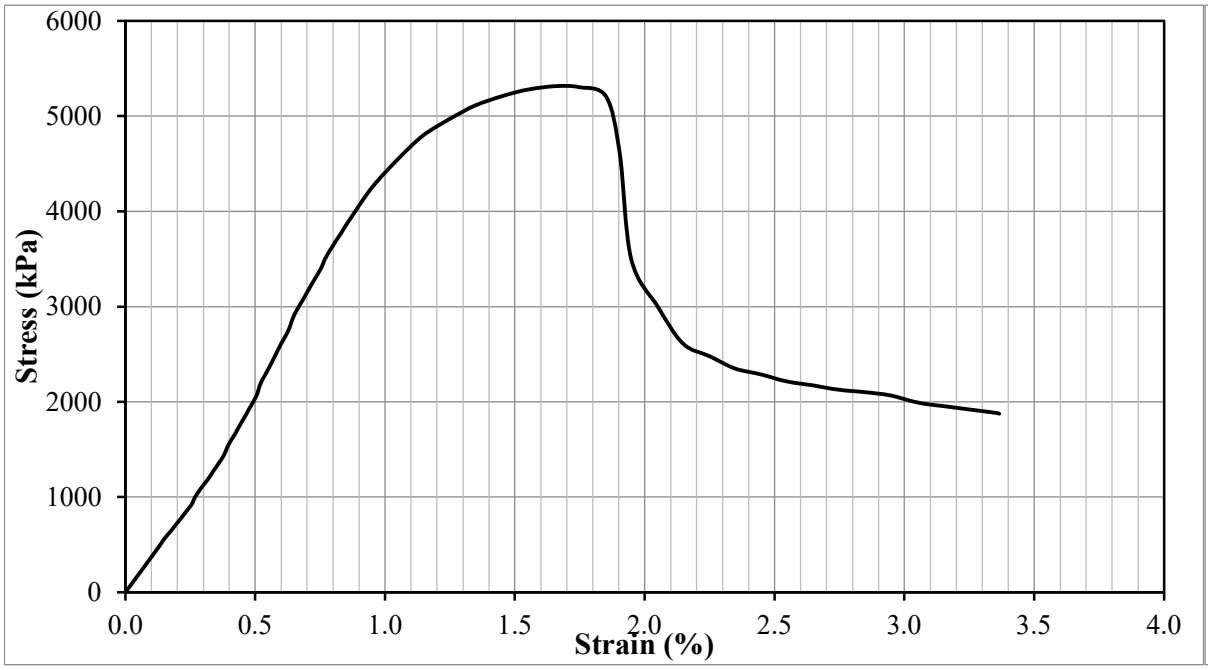
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,343	Strain at failure, εf :	1.70	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.2	mm
I.D.:	M-4-B	Initial Area:	2141.9	mm^2
Test Date:	9/23/2020	Weight:	363.7	g
Strain Rate:	1 %/min	Unit Weight:	1715	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	27.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45.0	°C
Additional information				



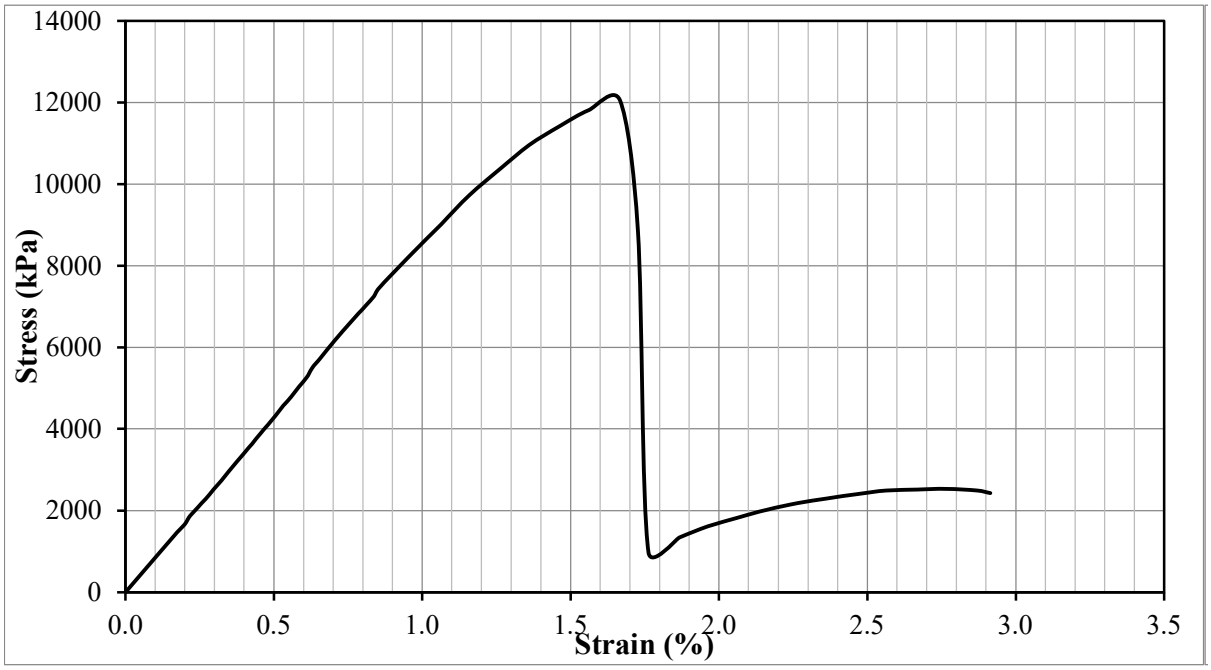
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,055	Strain at failure, εf :	1.54	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.1	mm
I.D.:	M-4-G	Initial Area:	2131.5	mm^2
Test Date:	9/23/2020	Weight:	362.2	g
Strain Rate:	1 %/min	Unit Weight:	1701	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	27.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45.0	°C
Additional information				



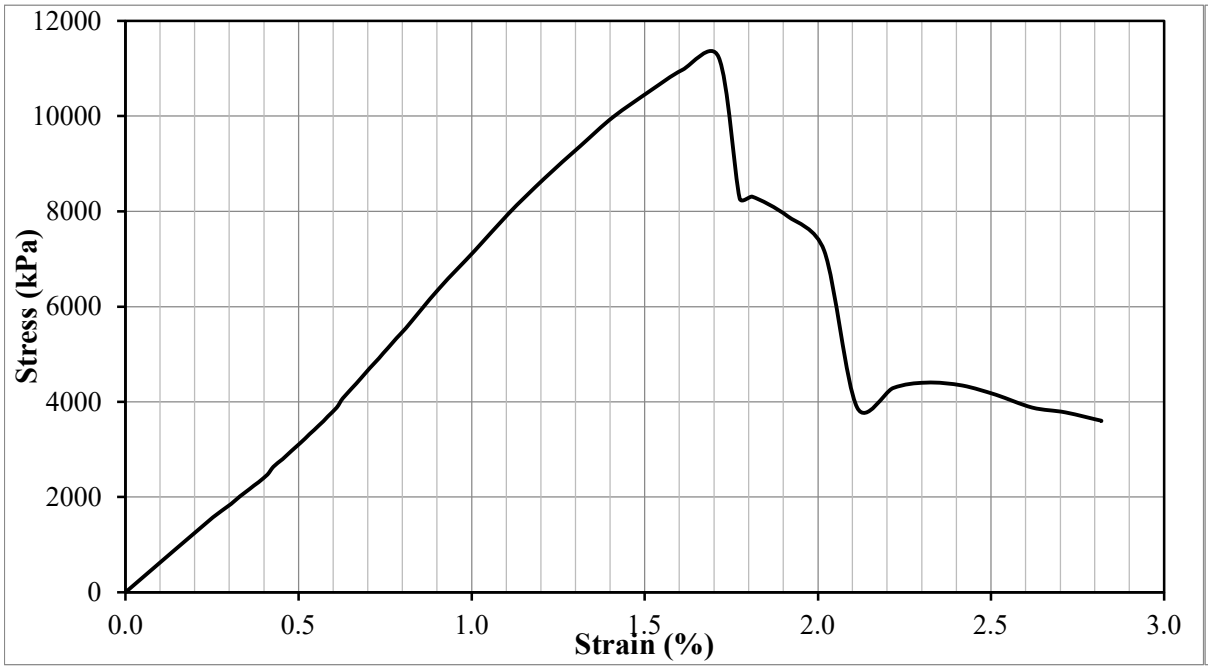
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,278	Strain at failure, εf :	1.65	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.2	mm
I.D.:	M-4-C	Initial Area:	2137.8	mm^2
Test Date:	2/22/2021	Weight:	360.8	g
Strain Rate:	1 %/min	Unit Weight:	1718	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	179.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45.0	°C
Additional information				



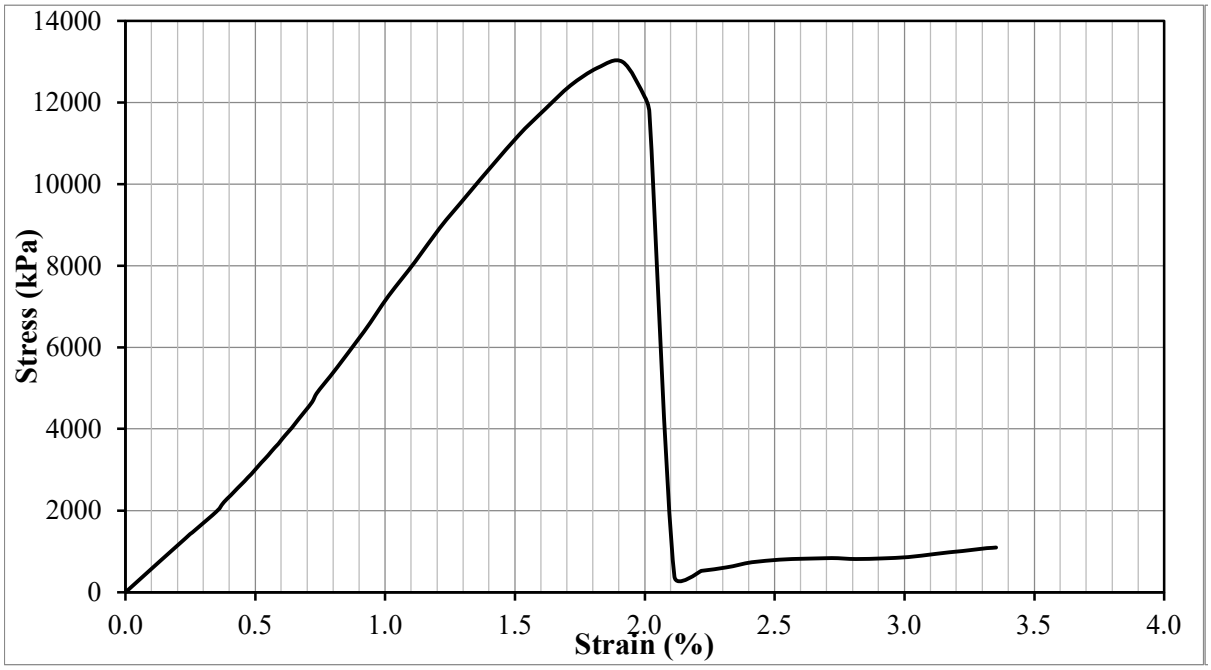
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	11,939	Strain at failure, εf :	1.67	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.2	mm
I.D.:	M-4-F	Initial Area:	2144.0	mm^2
Test Date:	2/22/2021	Weight:	363.2	g
Strain Rate:	1 %/min	Unit Weight:	1717	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	179.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45.0	°C
Additional information				



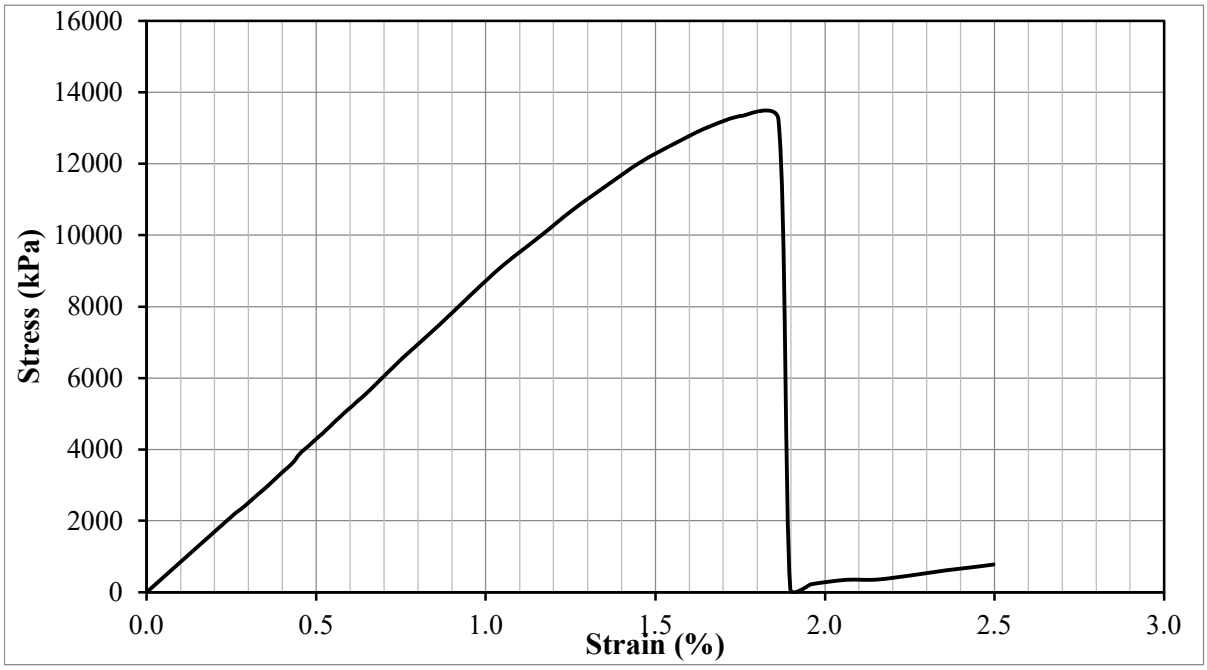
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	11,141	Strain at failure, εf :	1.71	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.1	mm
I.D.:	M-4-D	Initial Area:	2133.6	mm^2
Test Date:	8/26/2021	Weight:	367.2	g
Strain Rate:	1 %/min	Unit Weight:	1733	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	365.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45.0	°C
Additional information				



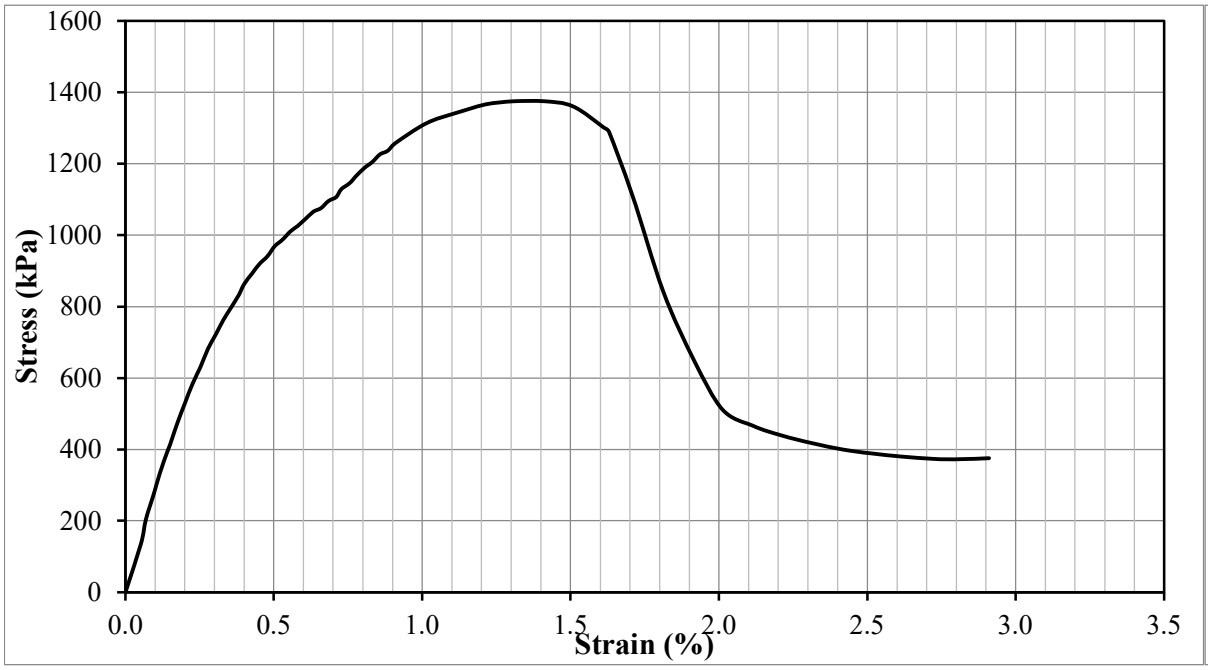
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	12,894	Strain at failure, εf :	1.91	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.1	mm
I.D.:	M-4-E	Initial Area:	2131.5	mm^2
Test Date:	8/26/2021	Weight:	365.4	g
Strain Rate:	1 %/min	Unit Weight:	1732	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	365.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45.0	°C
Additional information				



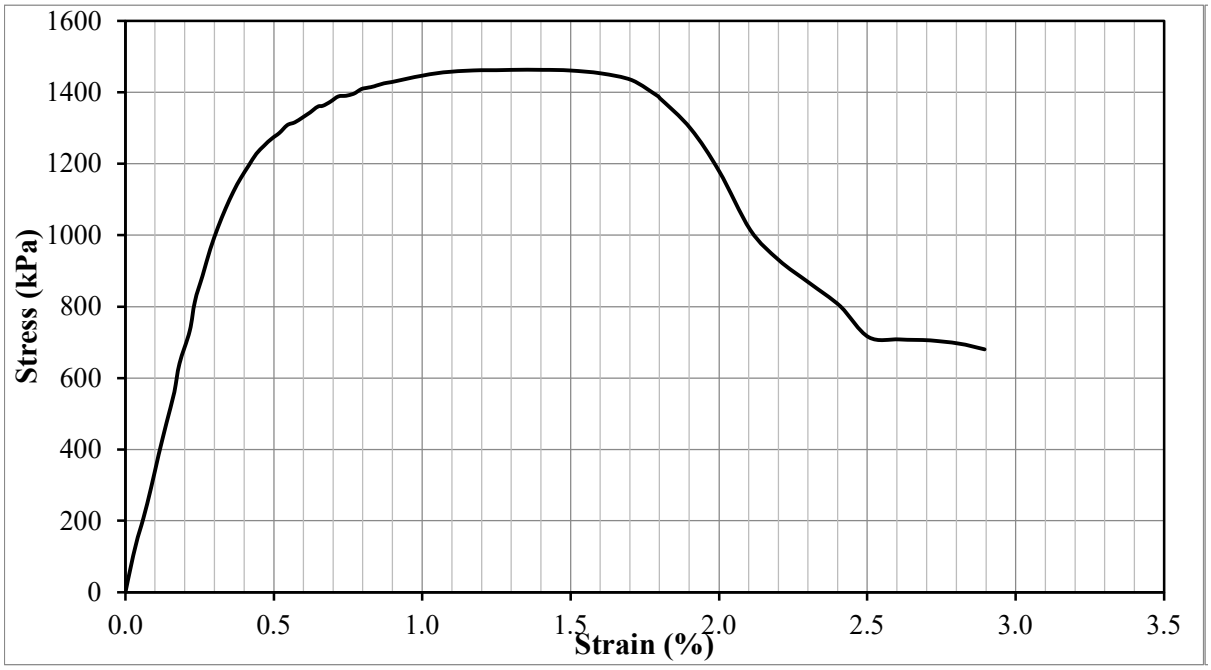
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	13,236	Strain at failure, εf :	1.76	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	M-5-B	Initial Area:	2123.2	mm^2
Test Date:	11/15/2020	Weight:	370.8	g
Strain Rate:	1 %/min	Unit Weight:	1785	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25.0	°C
Additional information				



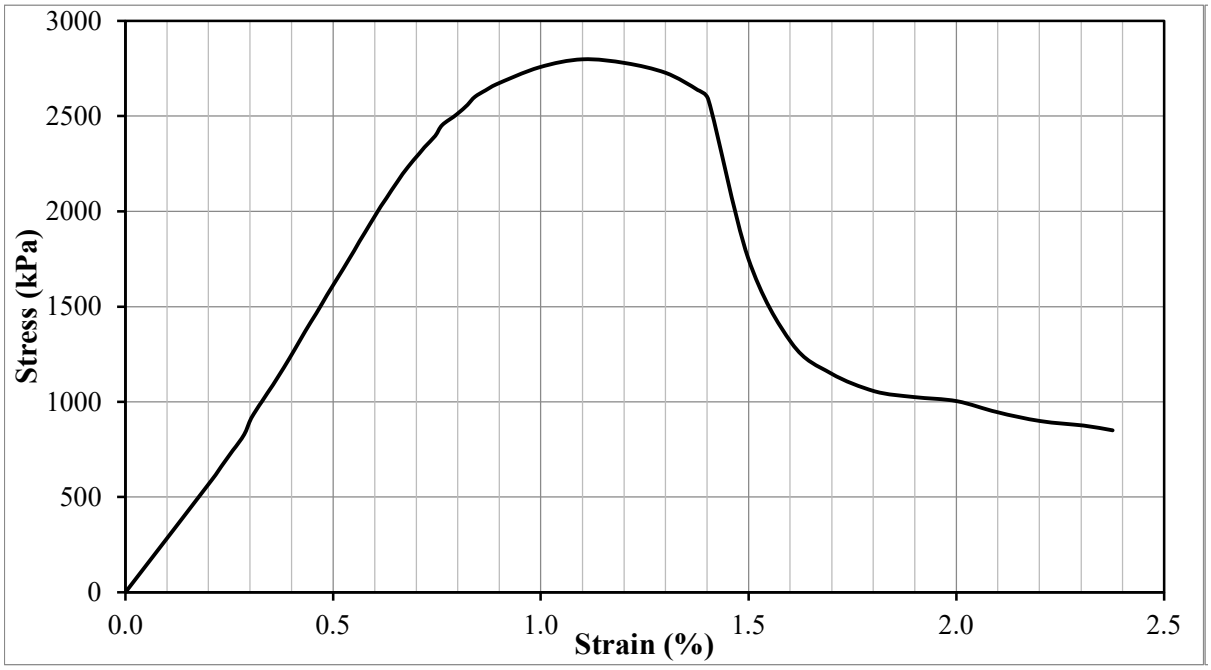
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,362	Strain at failure, εf :	1.41	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	M-5-G	Initial Area:	2119.1	mm^2
Test Date:	11/15/2020	Weight:	374.1	g
Strain Rate:	1 %/min	Unit Weight:	1785	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25.0	°C
Additional information				



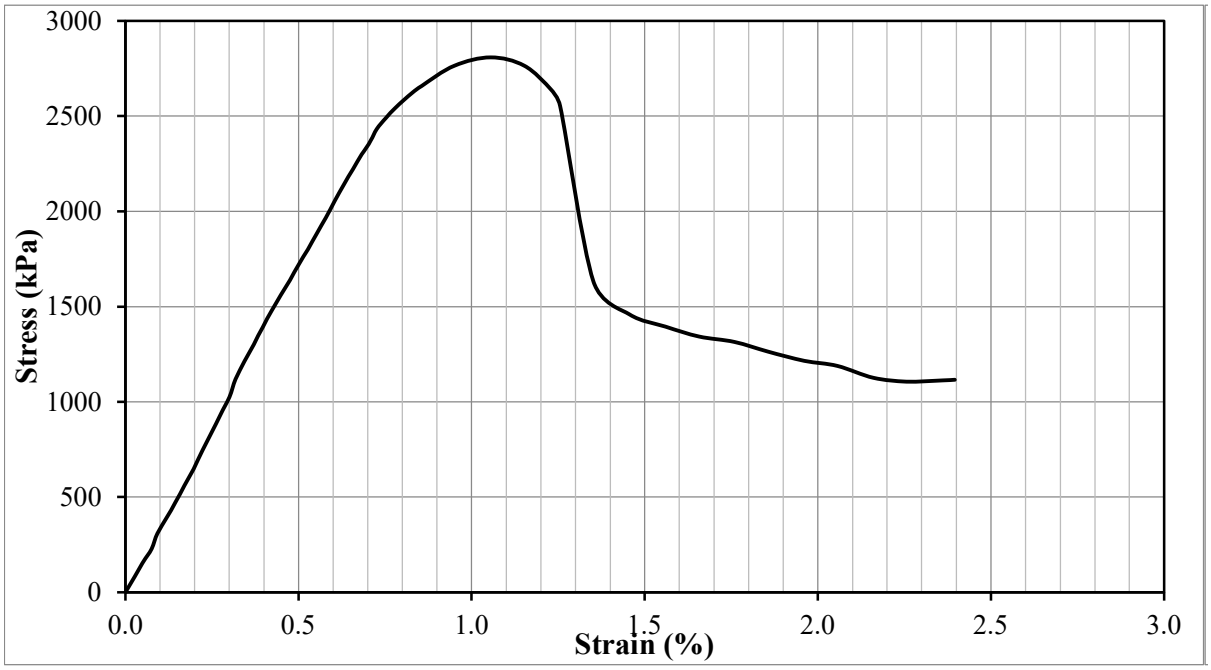
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,452	Strain at failure, εf :	1.40	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	M-5-C	Initial Area:	2121.1	mm^2
Test Date:	4/16/2021	Weight:	382.4	g
Strain Rate:	1 %/min	Unit Weight:	1778	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	179.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25.0	°C
Additional information				



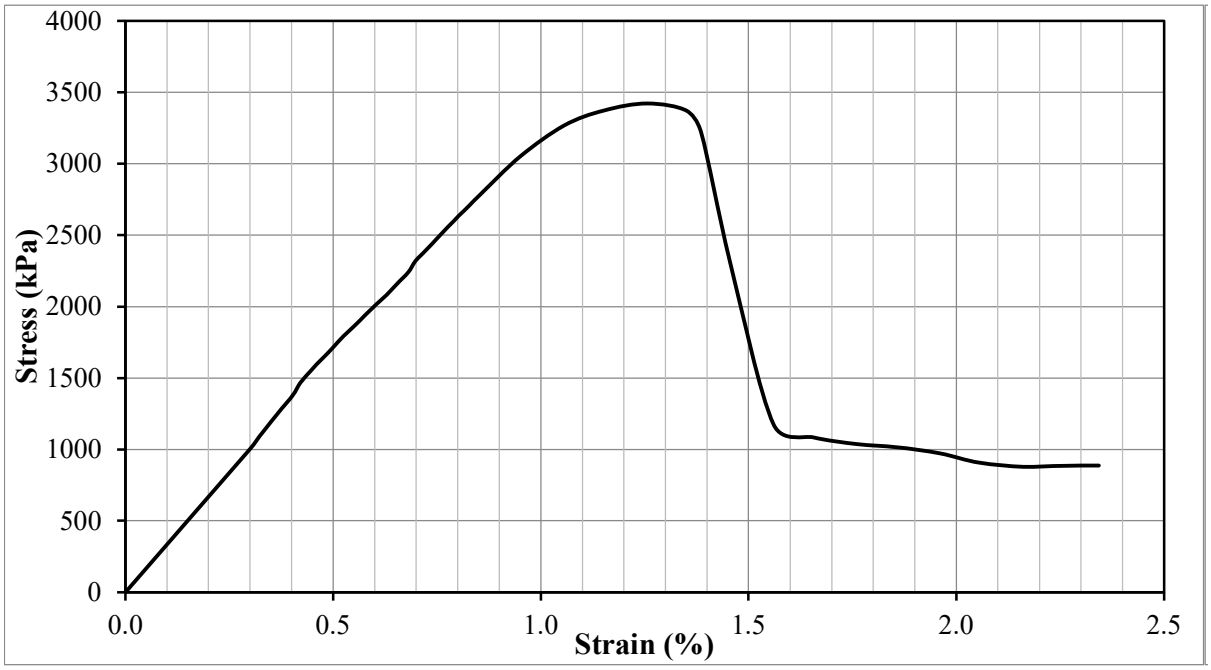
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,787	Strain at failure, εf :	1.10	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	M-5-F	Initial Area:	2114.9	mm^2
Test Date:	4/16/2021	Weight:	382.9	g
Strain Rate:	1 %/min	Unit Weight:	1790	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	180.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25.0	°C
Additional information				



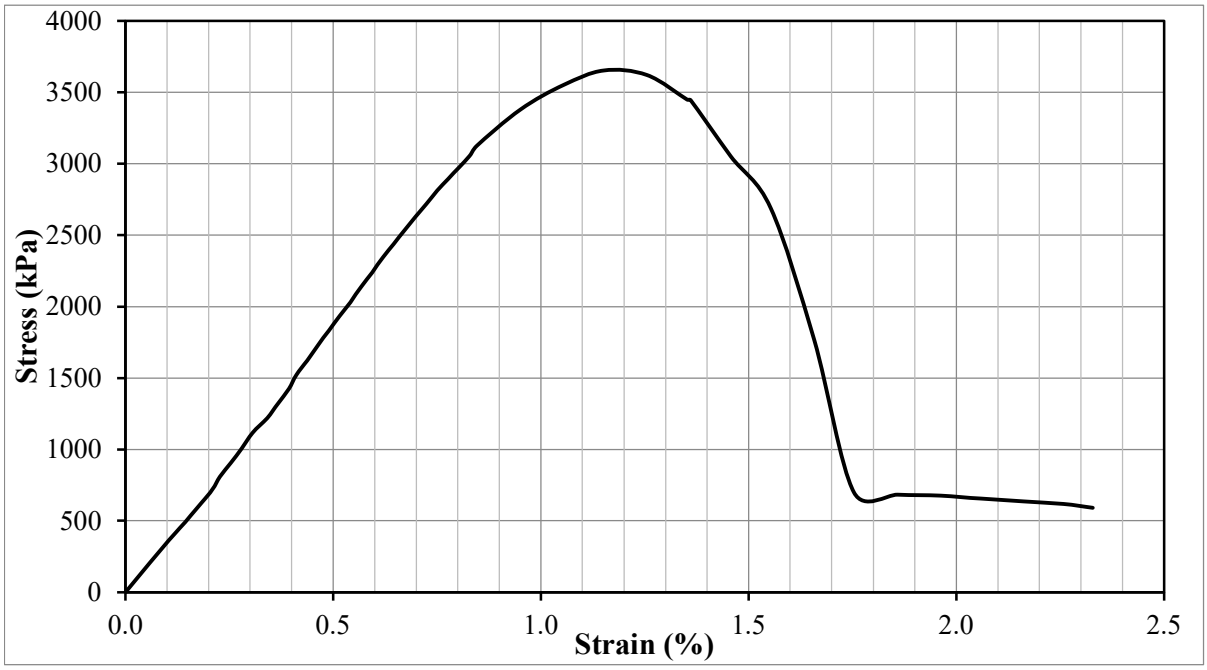
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,796	Strain at failure, εf :	1.06	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	M-5-D	Initial Area:	2114.9	mm^2
Test Date:	10/18/2021	Weight:	386.3	g
Strain Rate:	1 %/min	Unit Weight:	1795	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	364.7	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25.0	°C
Additional information				



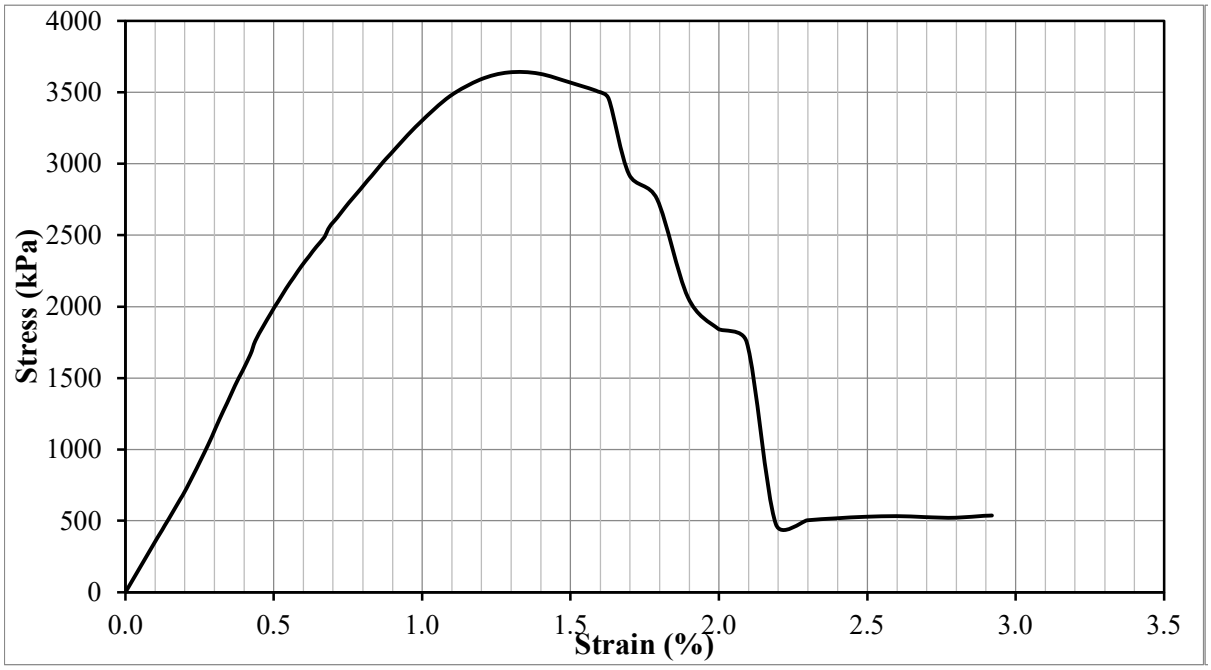
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,411	Strain at failure, εf :	1.26	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	96.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	M-5-E	Initial Area:	2119.1	mm^2
Test Date:	10/18/2021	Weight:	386.1	g
Strain Rate:	1 %/min	Unit Weight:	1884	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	364.8	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25.0	°C
Additional information				



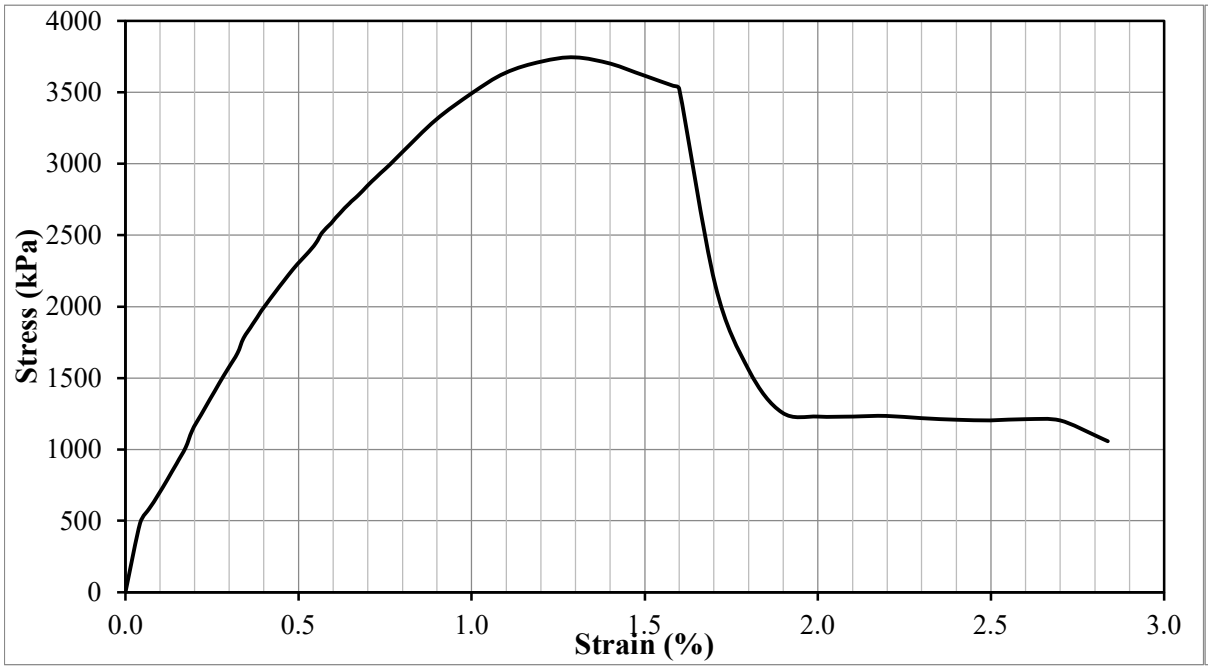
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,613	Strain at failure, εf :	1.15	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	M-6-A	Initial Area:	2121.1	mm^2
Test Date:	11/23/2020	Weight:	363.3	g
Strain Rate:	1 %/min	Unit Weight:	1711	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	7.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25.0	°C
Additional information				



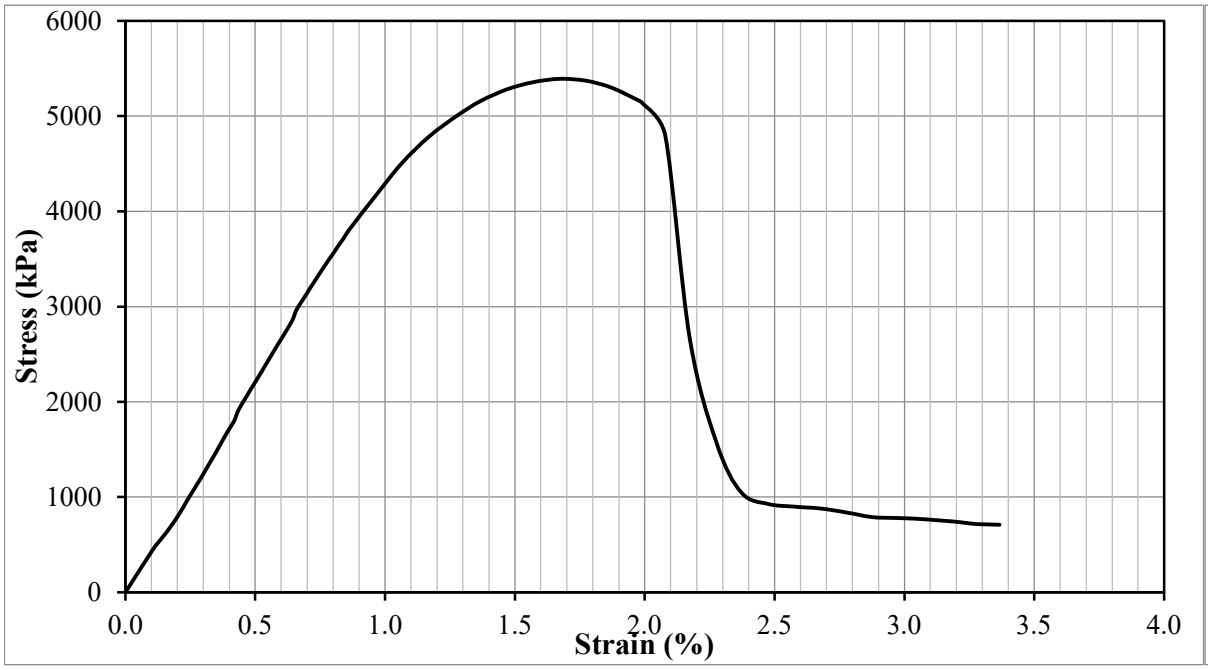
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,617	Strain at failure, εf :	1.29	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	M-6-H	Initial Area:	2114.9	mm^2
Test Date:	11/23/2020	Weight:	366.4	g
Strain Rate:	1 %/min	Unit Weight:	1713	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	7.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25.0	°C
Additional information				



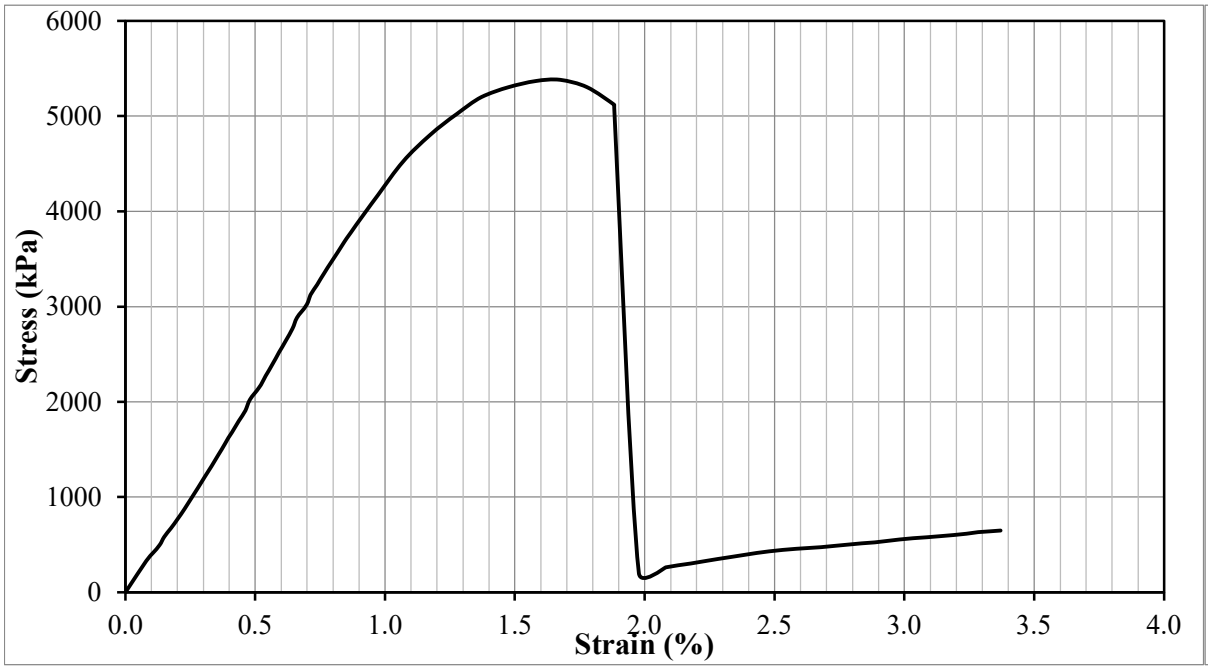
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,730	Strain at failure, εf :	1.30	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	M-6-B	Initial Area:	2123.2	mm^2
Test Date:	12/14/2020	Weight:	358.9	g
Strain Rate:	1 %/min	Unit Weight:	1711	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	28.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25.0	°C
Additional information				



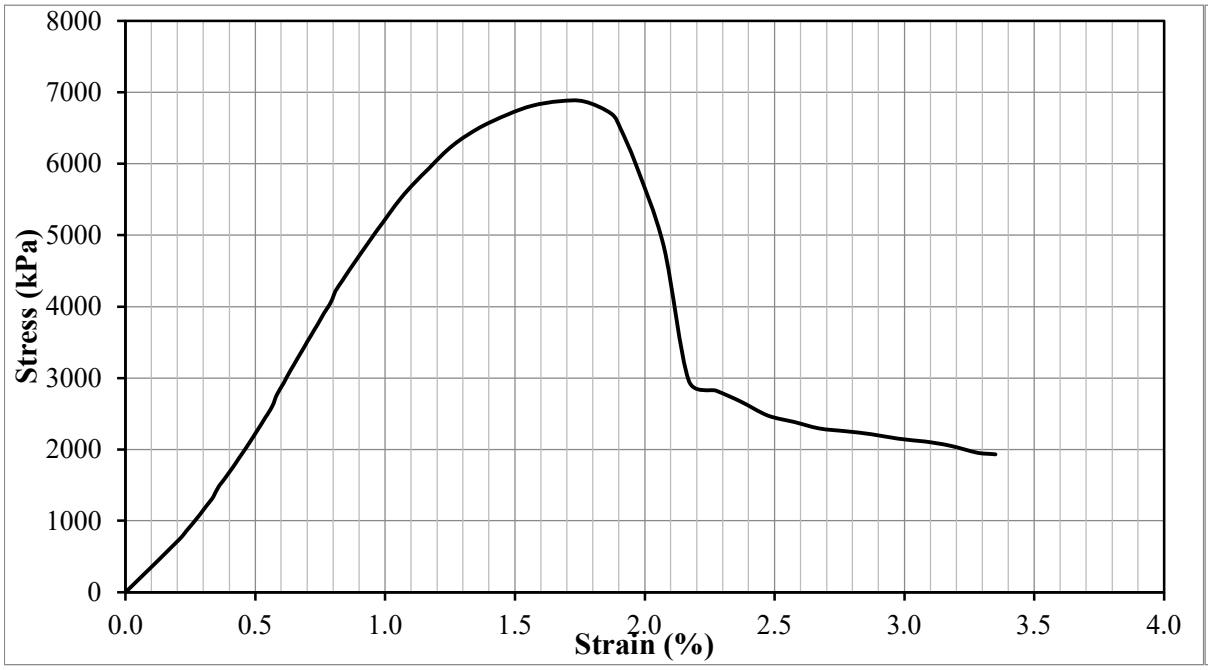
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,348	Strain at failure, εf :	1.67	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	95.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	M-6-G	Initial Area:	2123.2	mm^2
Test Date:	12/14/2020	Weight:	344.5	g
Strain Rate:	1 %/min	Unit Weight:	1707	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	28.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25.0	°C
Additional information				



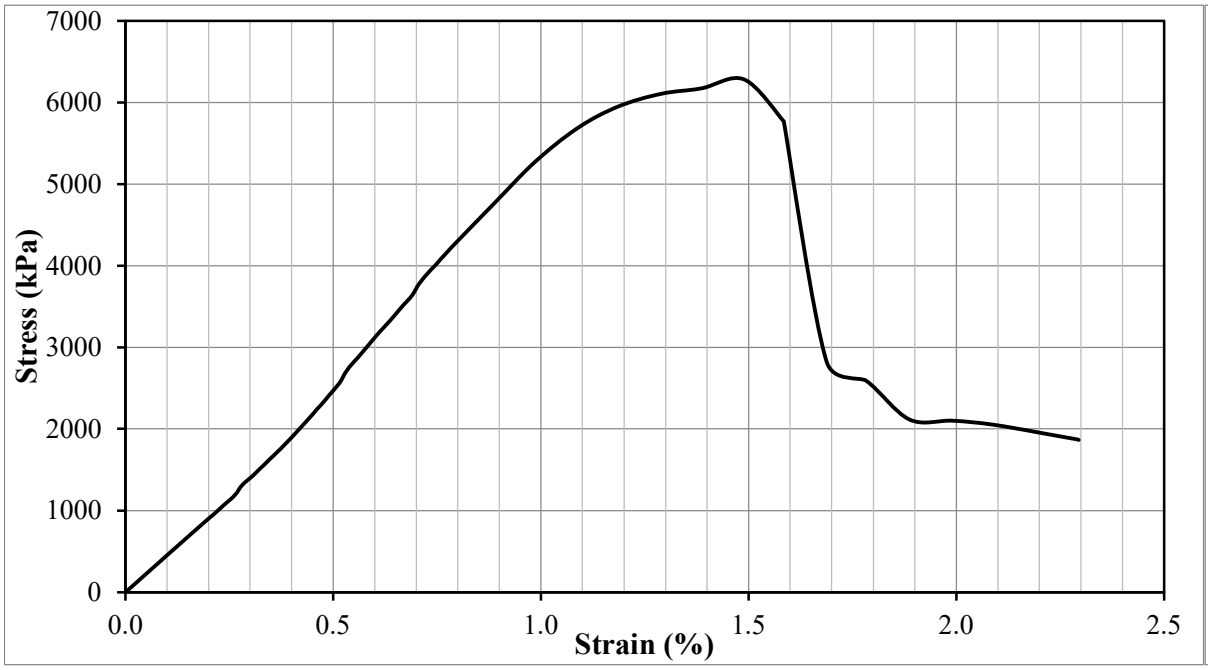
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,305	Strain at failure, εf :	1.67	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	M-6-C	Initial Area:	2117.0	mm^2
Test Date:	5/15/2021	Weight:	358.0	g
Strain Rate:	1 %/min	Unit Weight:	1712	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	180.2	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25.0	°C
Additional information				



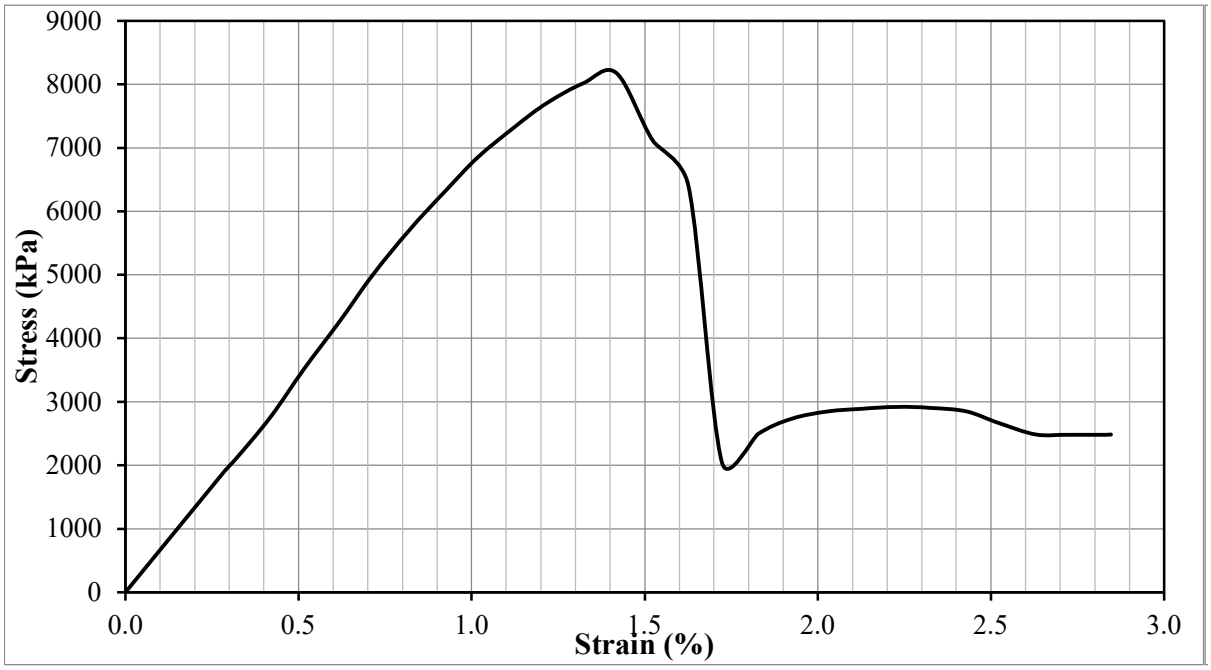
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	6,821	Strain at failure, εf :	1.67	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	M-6-F	Initial Area:	2125.3	mm^2
Test Date:	5/15/2021	Weight:	361.6	g
Strain Rate:	1 %/min	Unit Weight:	1710	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	180.2	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25.0	°C
Additional information				



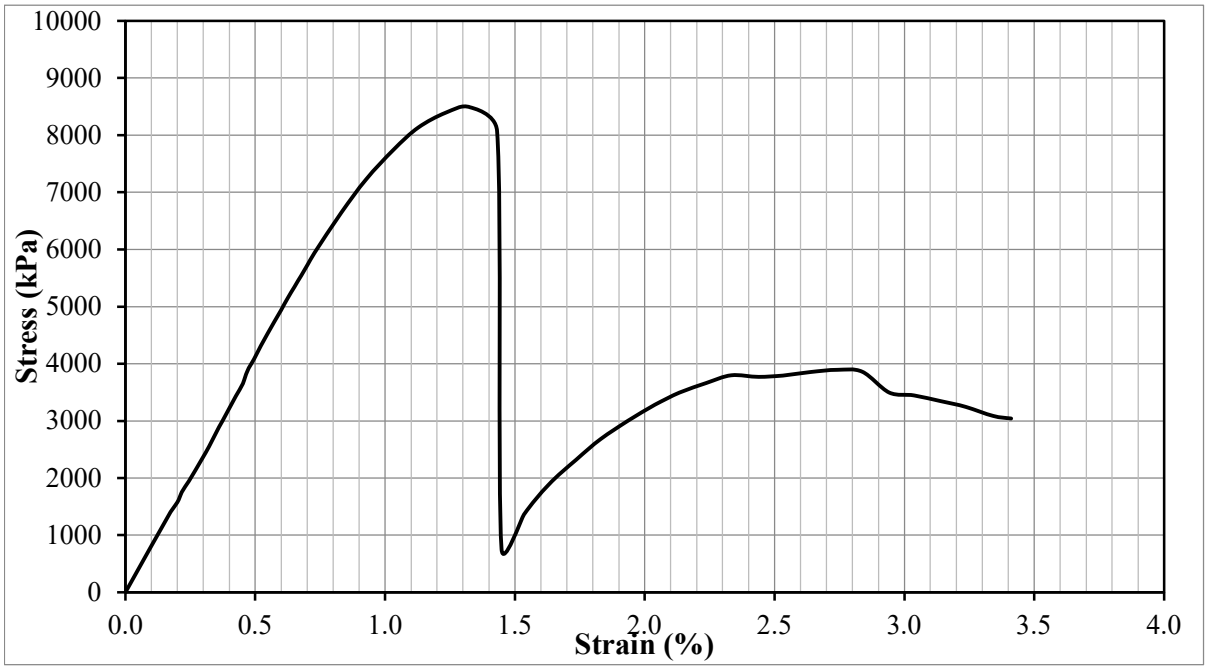
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	6,239	Strain at failure, εf :	1.49	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	M-6-D	Initial Area:	2110.8	mm^2
Test Date:	11/16/2021	Weight:	362.5	g
Strain Rate:	1 %/min	Unit Weight:	1725	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	364.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25.0	°C
Additional information				



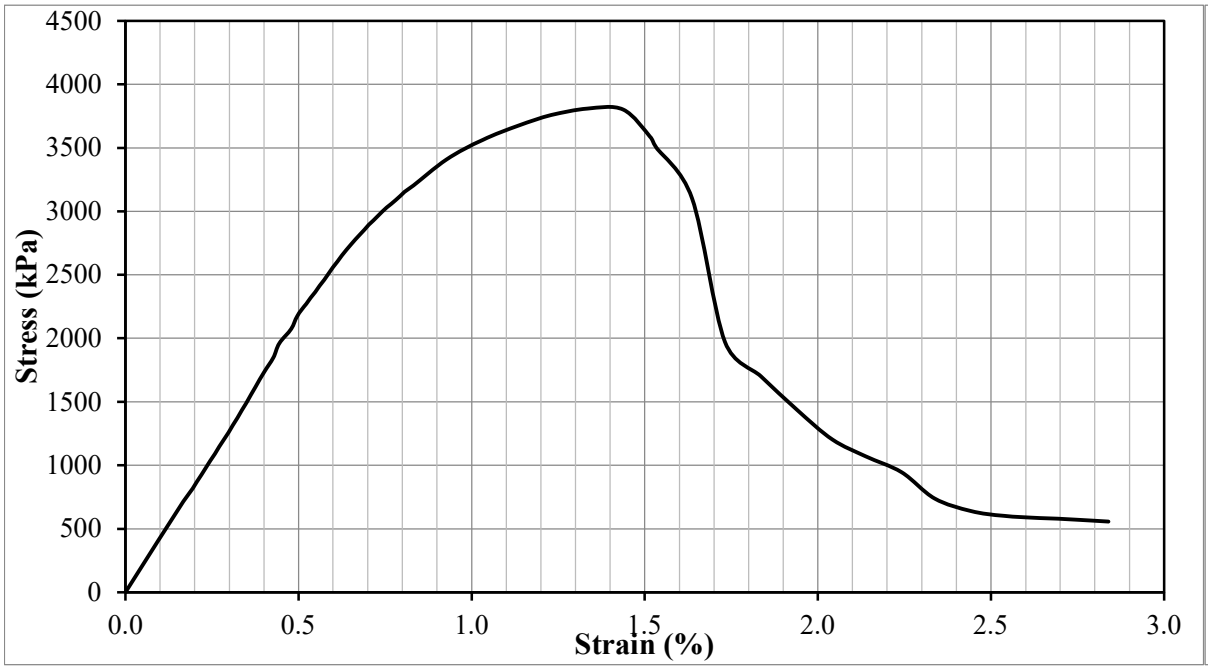
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	8,126	Strain at failure, εf :	1.42	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	M-6-E	Initial Area:	2112.9	mm^2
Test Date:	11/16/2021	Weight:	363.6	g
Strain Rate:	1 %/min	Unit Weight:	1726	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	364.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25.0	°C
Additional information				



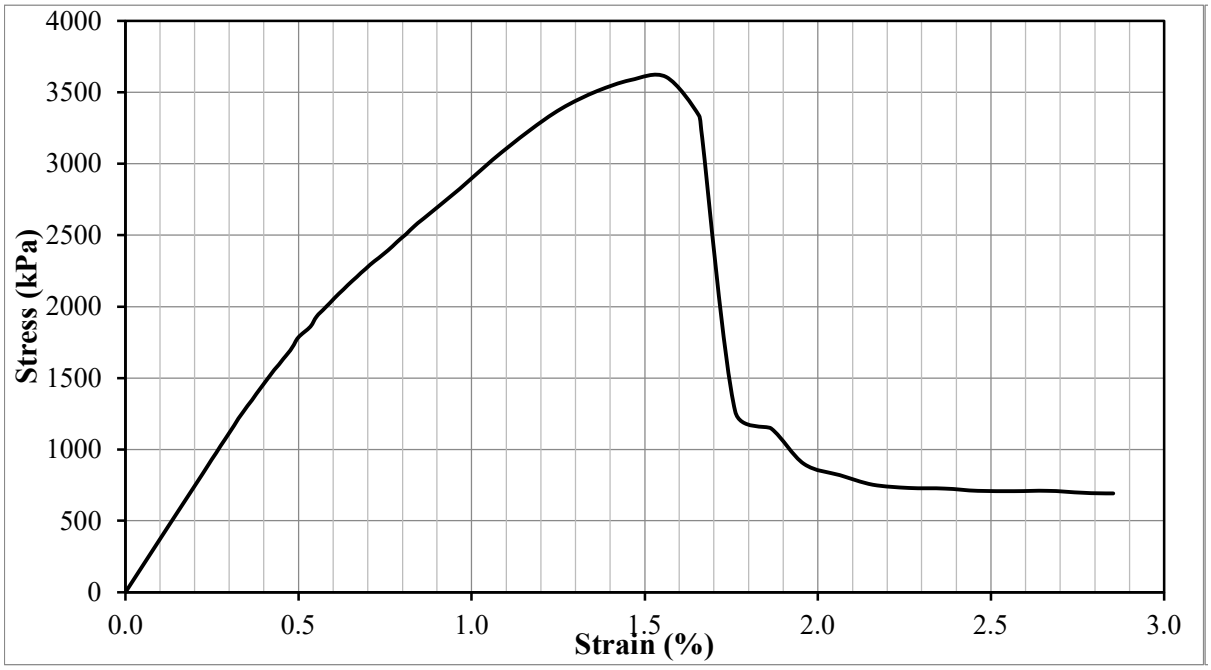
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	8,434	Strain at failure, εf :	1.33	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	M-7-B	Initial Area:	2127.4	mm^2
Test Date:	11/16/2020	Weight:	378.7	g
Strain Rate:	1 %/min	Unit Weight:	1774	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	28.4	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45.0	°C
Additional information				



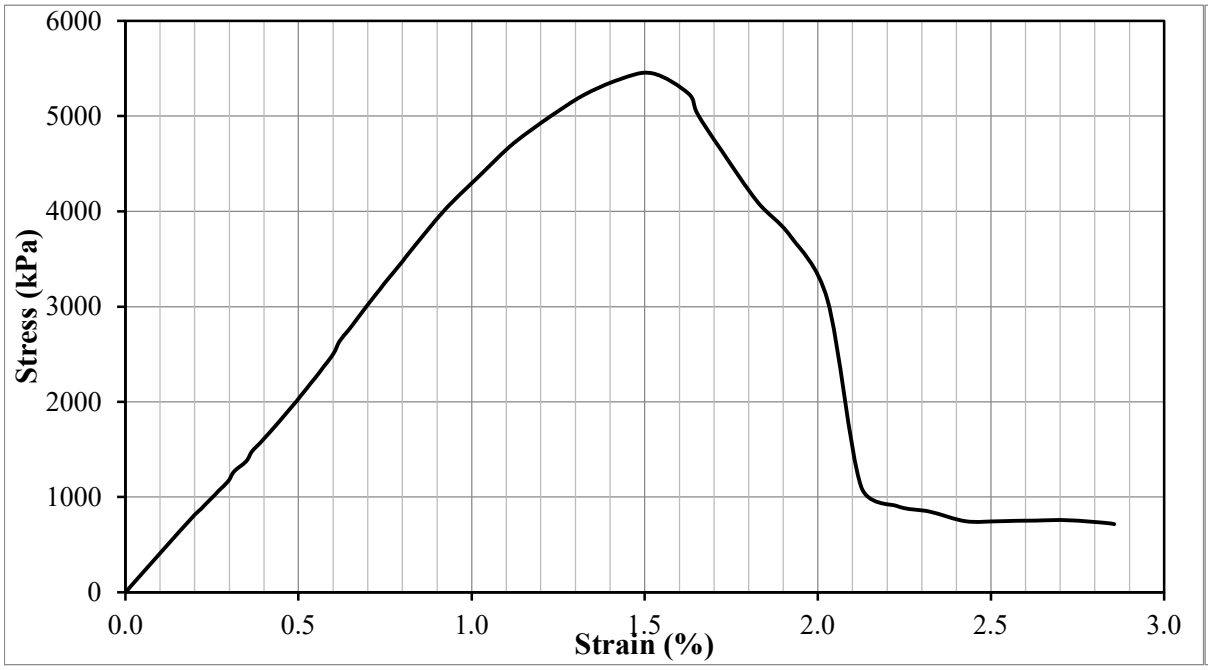
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,787	Strain at failure, εf :	1.33	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	M-7-G	Initial Area:	2121.1	mm^2
Test Date:	11/16/2020	Weight:	383.2	g
Strain Rate:	1 %/min	Unit Weight:	1775	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	28.4	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45.0	°C
Additional information				



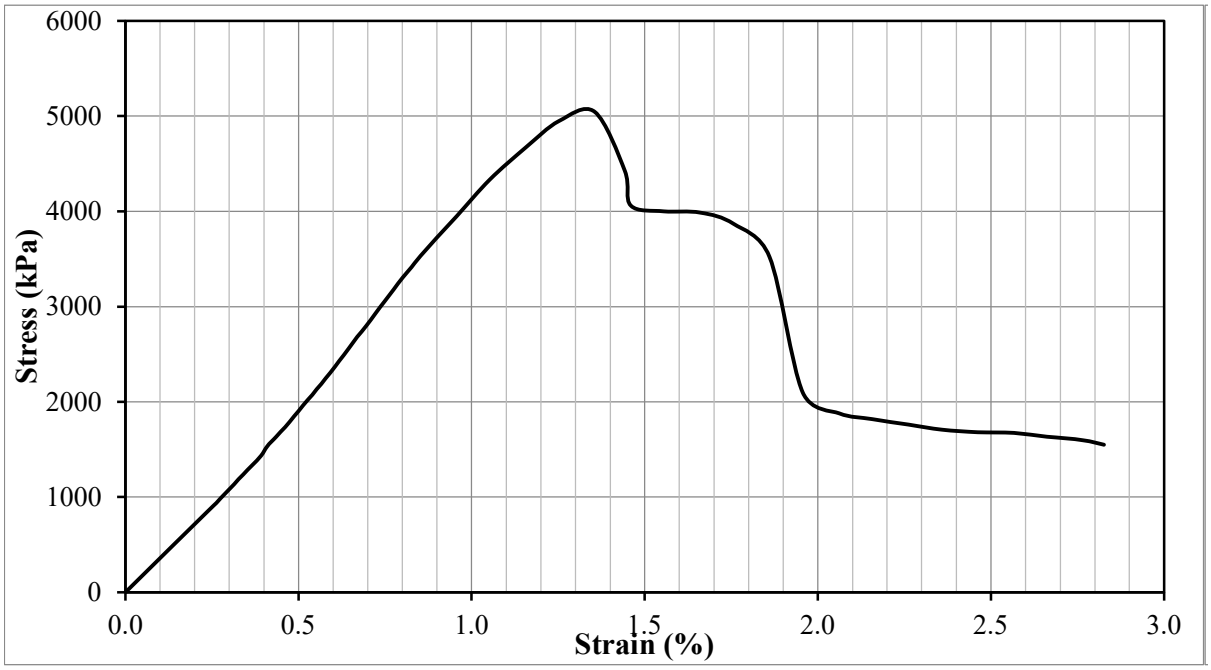
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,594	Strain at failure, εf :	1.56	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	M-7-C	Initial Area:	2121.1	mm^2
Test Date:	4/17/2021	Weight:	383.1	g
Strain Rate:	1 %/min	Unit Weight:	1785	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	180.2	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45.0	°C
Additional information				



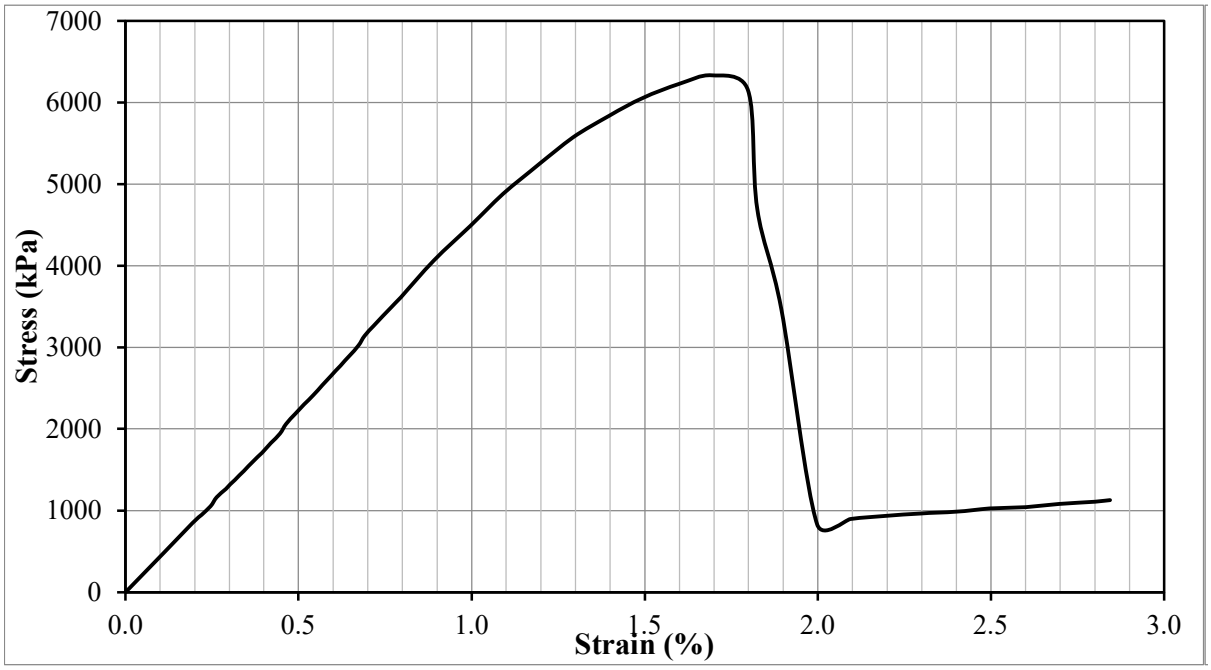
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,426	Strain at failure, εf :	1.52	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	M-7-F	Initial Area:	2123.2	mm^2
Test Date:	4/17/2021	Weight:	385.3	g
Strain Rate:	1 %/min	Unit Weight:	1787	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	180.2	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45.0	°C
Additional information				



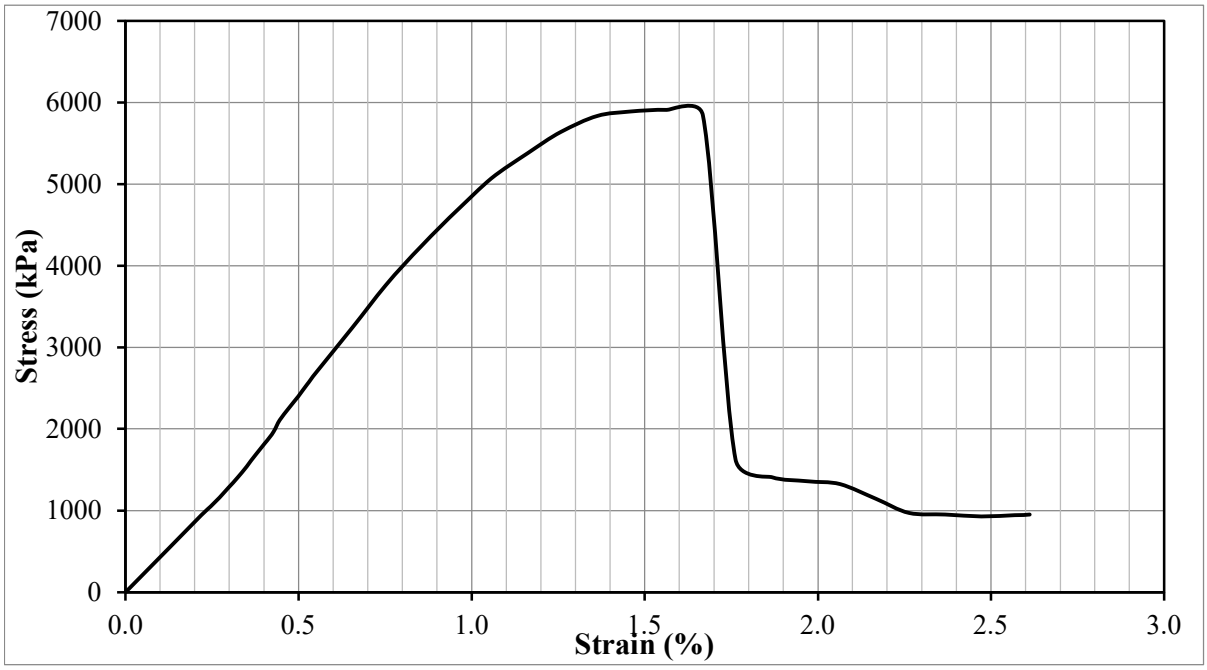
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,026	Strain at failure, εf :	1.36	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	M-7-D	Initial Area:	2123.2	mm^2
Test Date:	10/19/2021	Weight:	384.4	g
Strain Rate:	1 %/min	Unit Weight:	1790	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	365.2	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45.0	°C
Additional information				



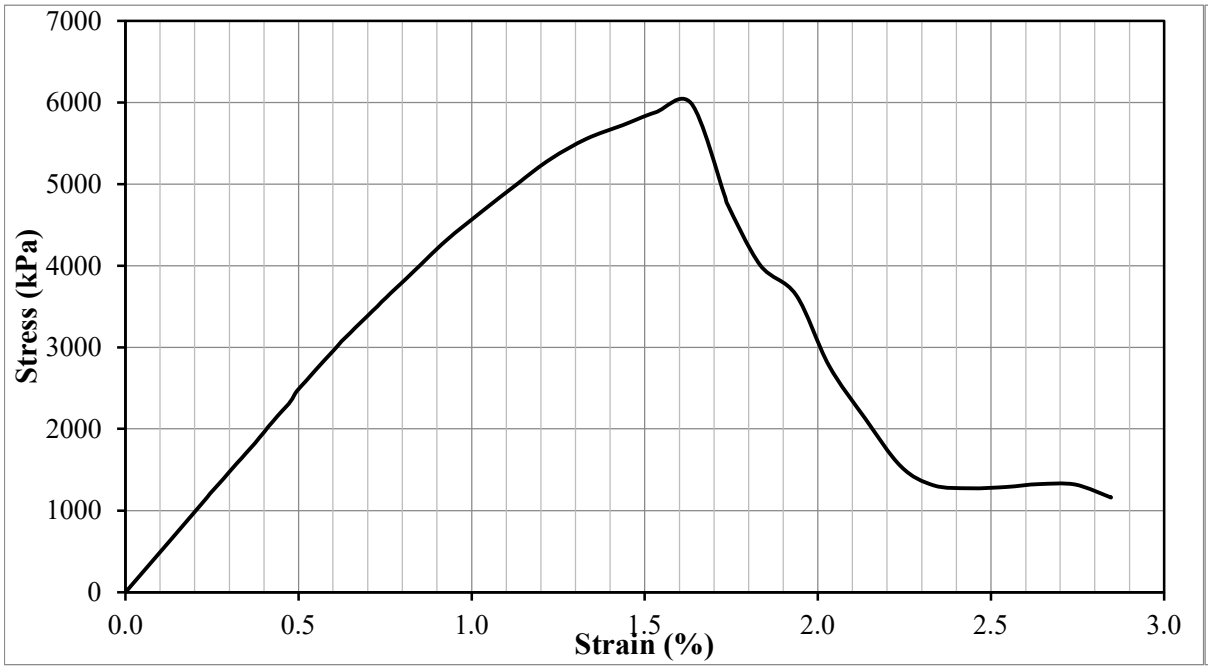
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	6,304	Strain at failure, εf :	1.69	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	M-7-E	Initial Area:	2108.7	mm^2
Test Date:	10/19/2021	Weight:	379.3	g
Strain Rate:	1 %/min	Unit Weight:	1800	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	365.2	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45.0	°C
Additional information				



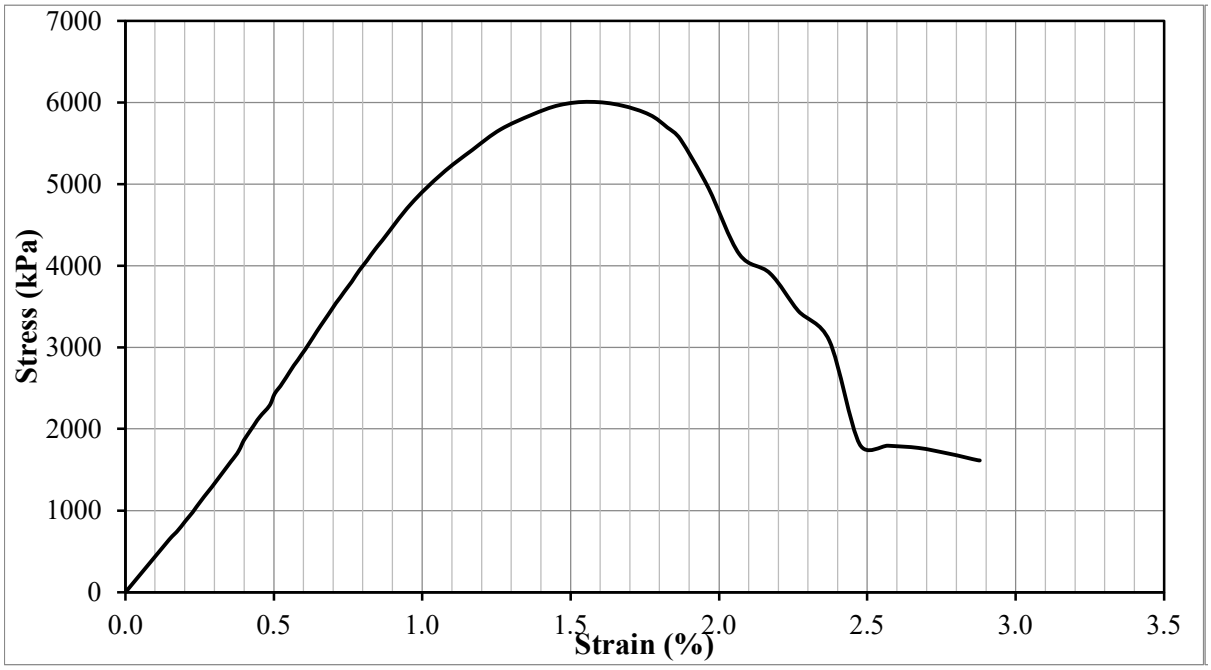
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,873	Strain at failure, εf :	1.56	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	96.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.1	mm
I.D.:	M-8-B	Initial Area:	2129.4	mm^2
Test Date:	11/16/2020	Weight:	346.5	g
Strain Rate:	1 %/min	Unit Weight:	1689	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	28.4	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45.0	°C
Additional information				



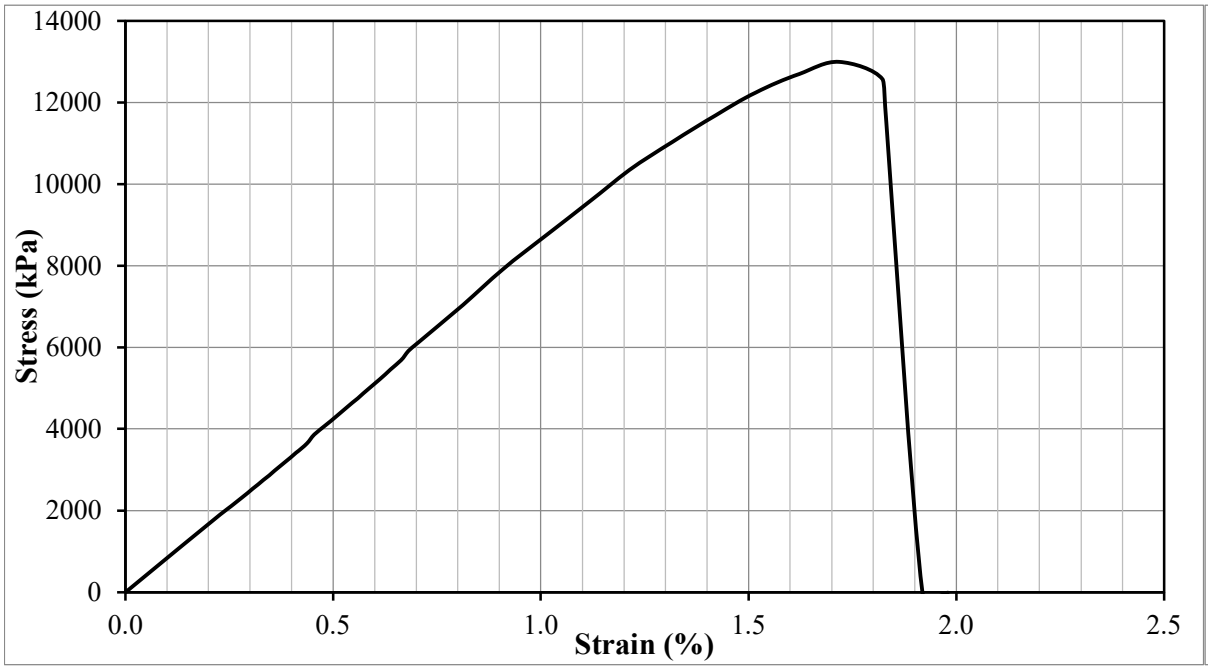
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,914	Strain at failure, εf :	1.63	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.1	mm
I.D.:	M-8-G	Initial Area:	2129.4	mm^2
Test Date:	11/16/2020	Weight:	352.2	g
Strain Rate:	1 %/min	Unit Weight:	1691	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	28.4	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45.0	°C
Additional information				



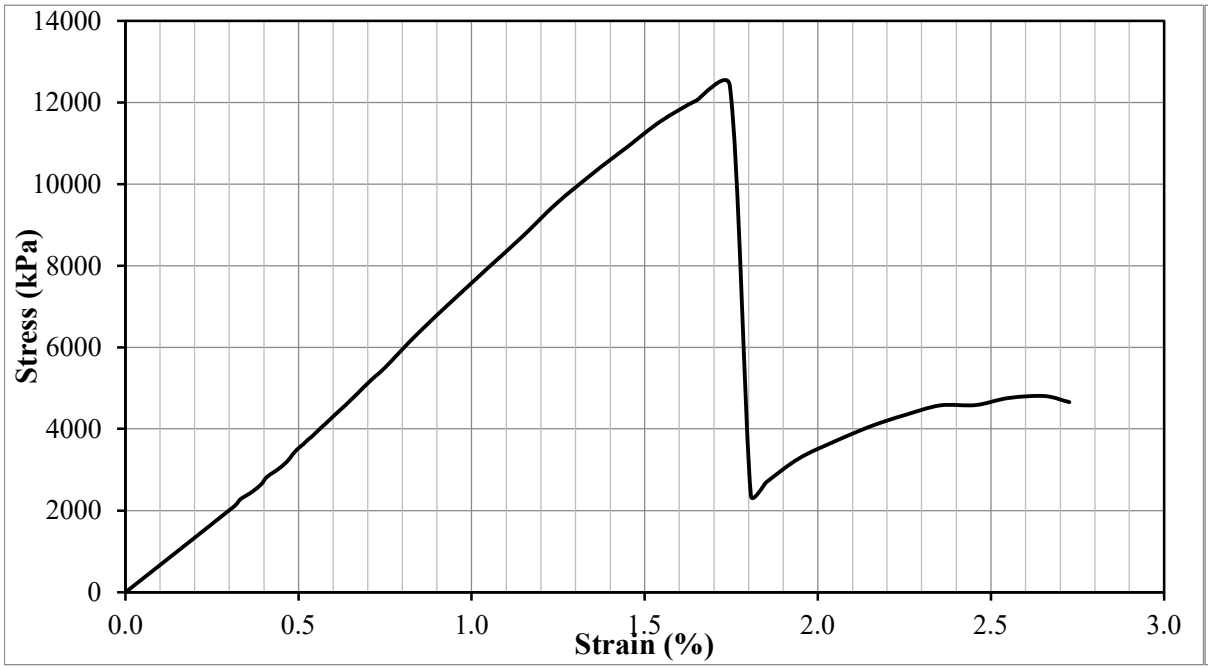
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,950	Strain at failure, εf :	1.57	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	96.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	M-8-C	Initial Area:	2125.3	mm^2
Test Date:	4/17/2021	Weight:	350.9	g
Strain Rate:	1 %/min	Unit Weight:	1708	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	180.2	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45.0	°C
Additional information				



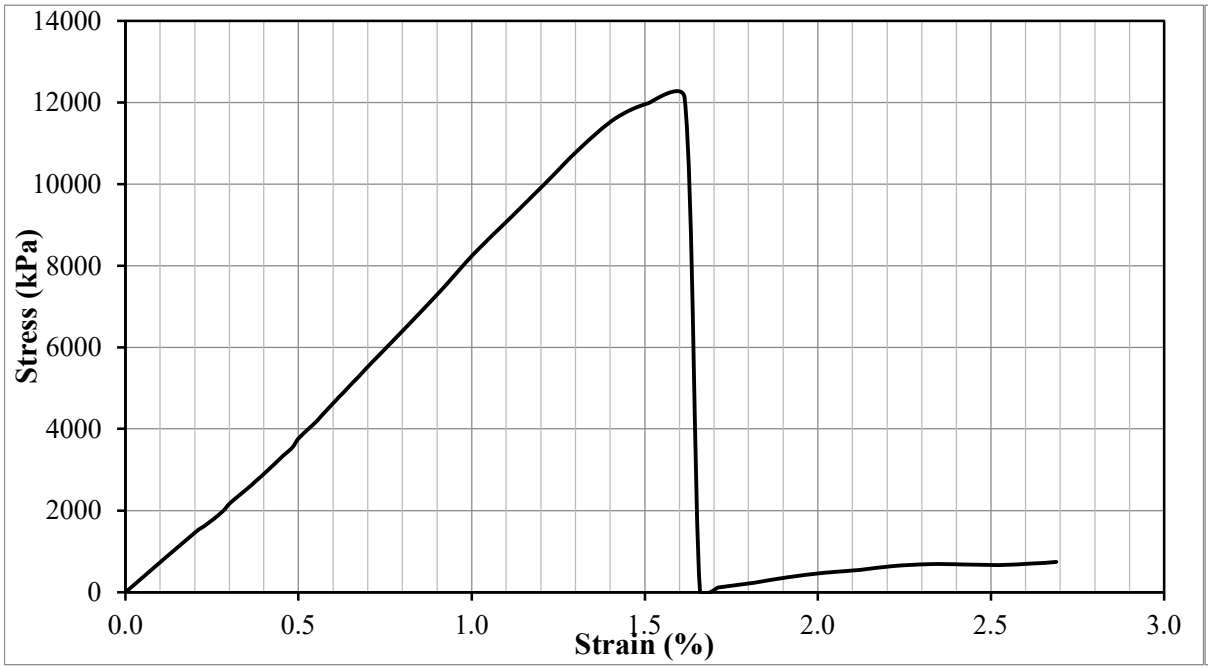
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	12,845	Strain at failure, εf :	1.72	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	96.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	M-8-F	Initial Area:	2123.2	mm^2
Test Date:	4/17/2021	Weight:	348.1	g
Strain Rate:	1 %/min	Unit Weight:	1709	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	180.2	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45.0	°C
Additional information				



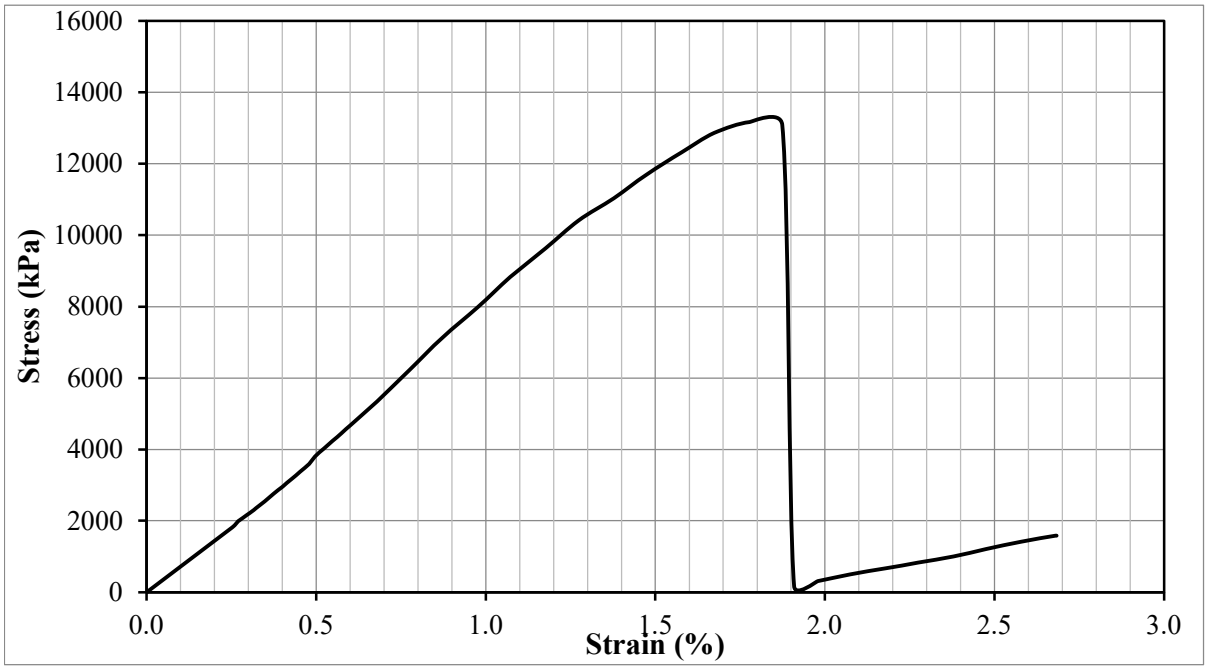
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	12,261	Strain at failure, εf :	1.75	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.1	mm
I.D.:	M-8-D	Initial Area:	2131.5	mm^2
Test Date:	10/19/2021	Weight:	367.4	g
Strain Rate:	1 %/min	Unit Weight:	1700	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	365.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45.0	°C
Additional information				



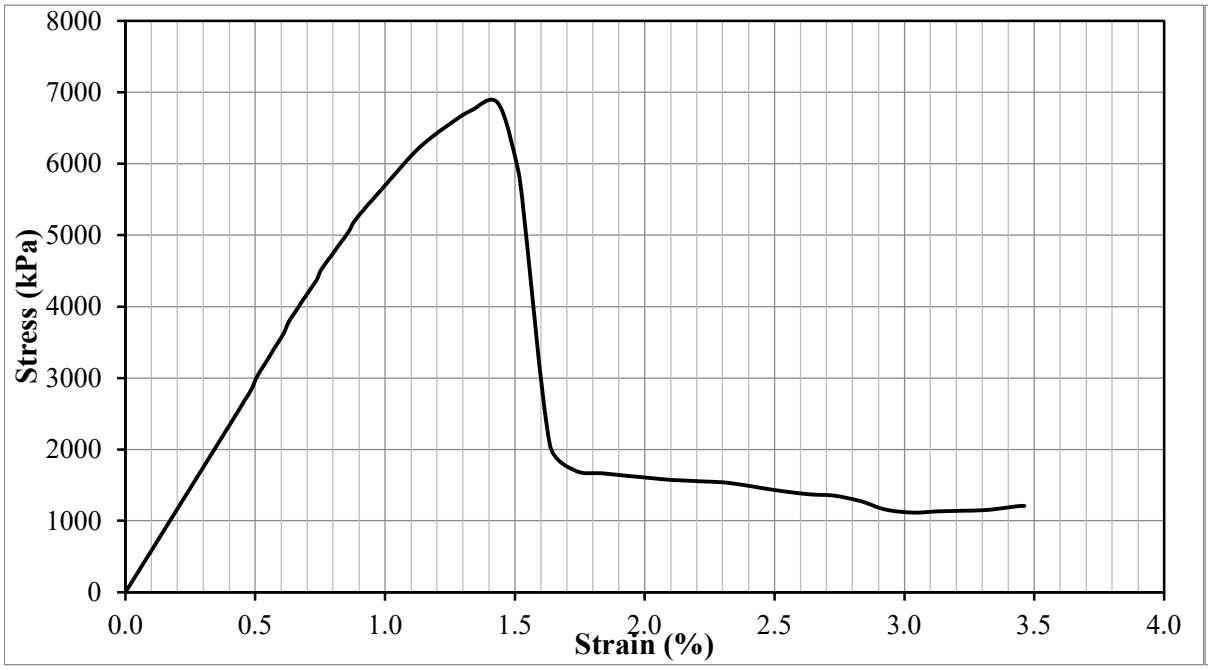
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	12,052	Strain at failure, εf :	1.62	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	M-8-E	Initial Area:	2127.4	mm^2
Test Date:	10/19/2021	Weight:	360.8	g
Strain Rate:	1 %/min	Unit Weight:	1705	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	365.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45.0	°C
Additional information				



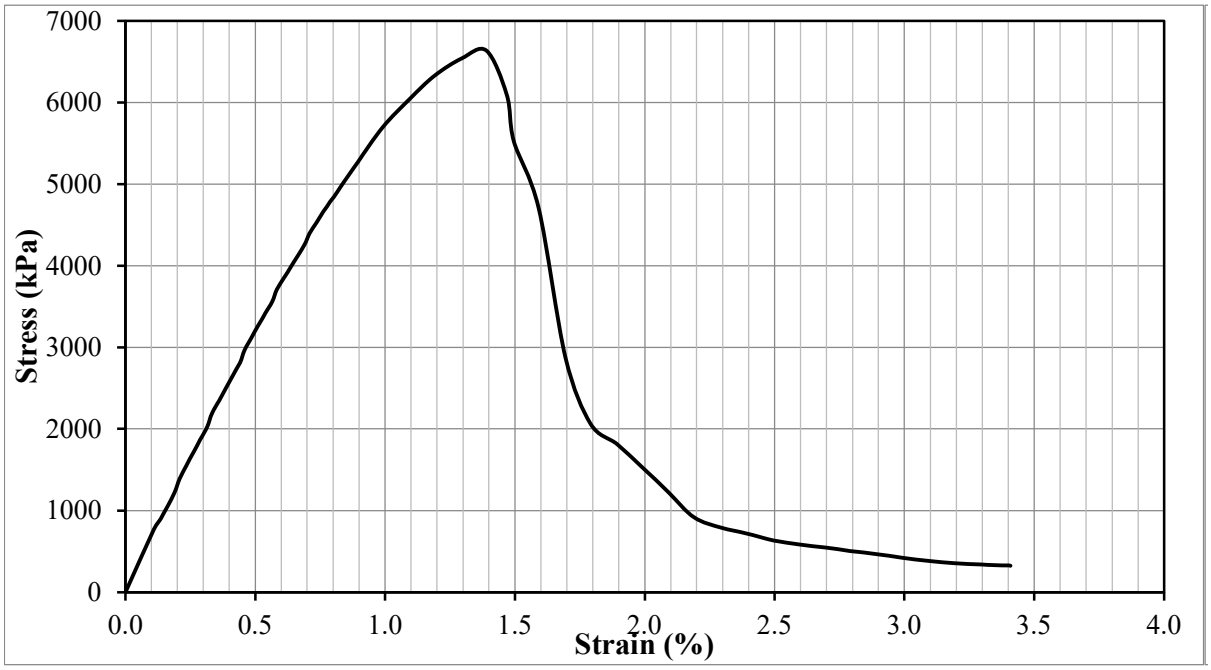
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	13,072	Strain at failure, εf :	1.78	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	L-1-A	Initial Area:	2106.6	mm^2
Test Date:	8/13/2019	Weight:	372.1	g
Strain Rate:	1 %/min	Unit Weight:	1774	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	179.5	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45.0	°C
Additional information				



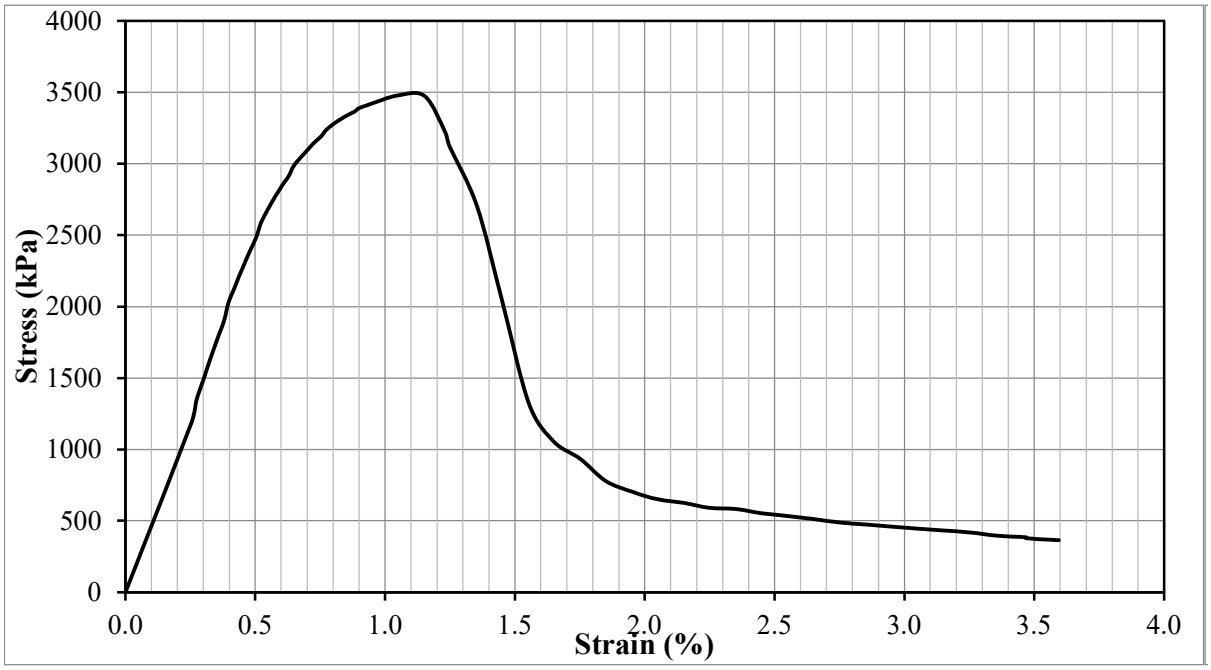
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	6,806	Strain at failure, εf :	1.43	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	L-1-H	Initial Area:	2108.7	mm^2
Test Date:	8/13/2019	Weight:	368.7	g
Strain Rate:	1 %/min	Unit Weight:	1772	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	179.5	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45.0	°C
Additional information				



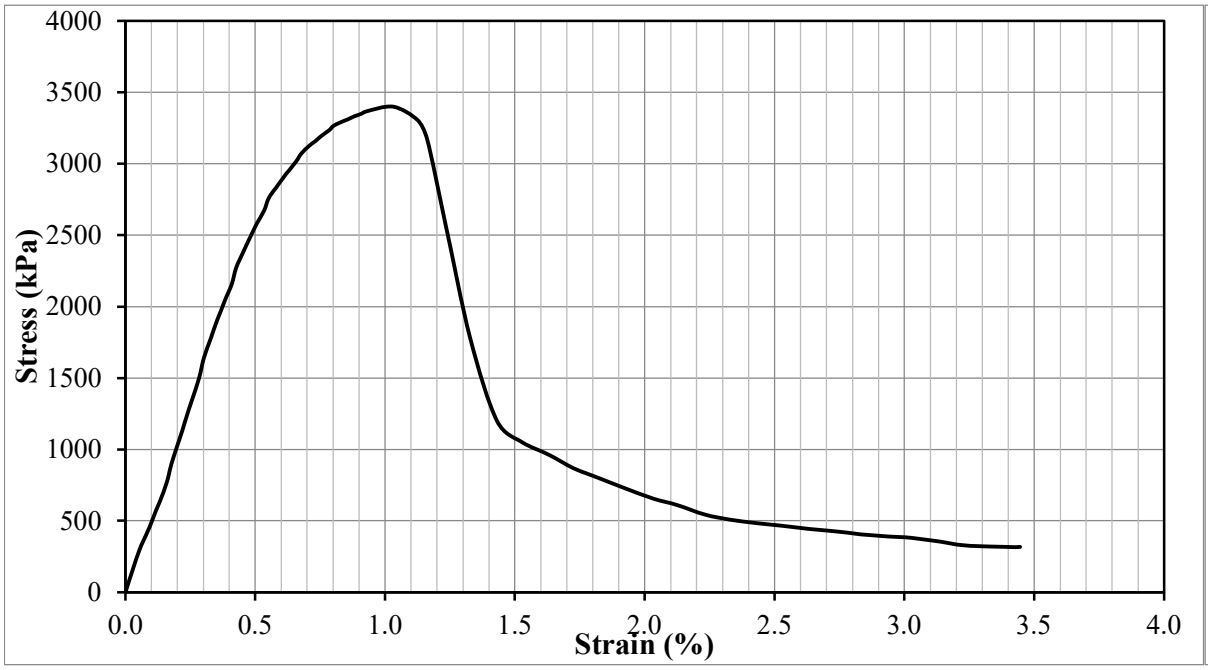
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	6,582	Strain at failure, εf :	1.39	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	L-1-B	Initial Area:	2112.9	mm^2
Test Date:	8/13/2019	Weight:	370.7	g
Strain Rate:	1 %/min	Unit Weight:	1765	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	179.5	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25.0	°C
Additional information				



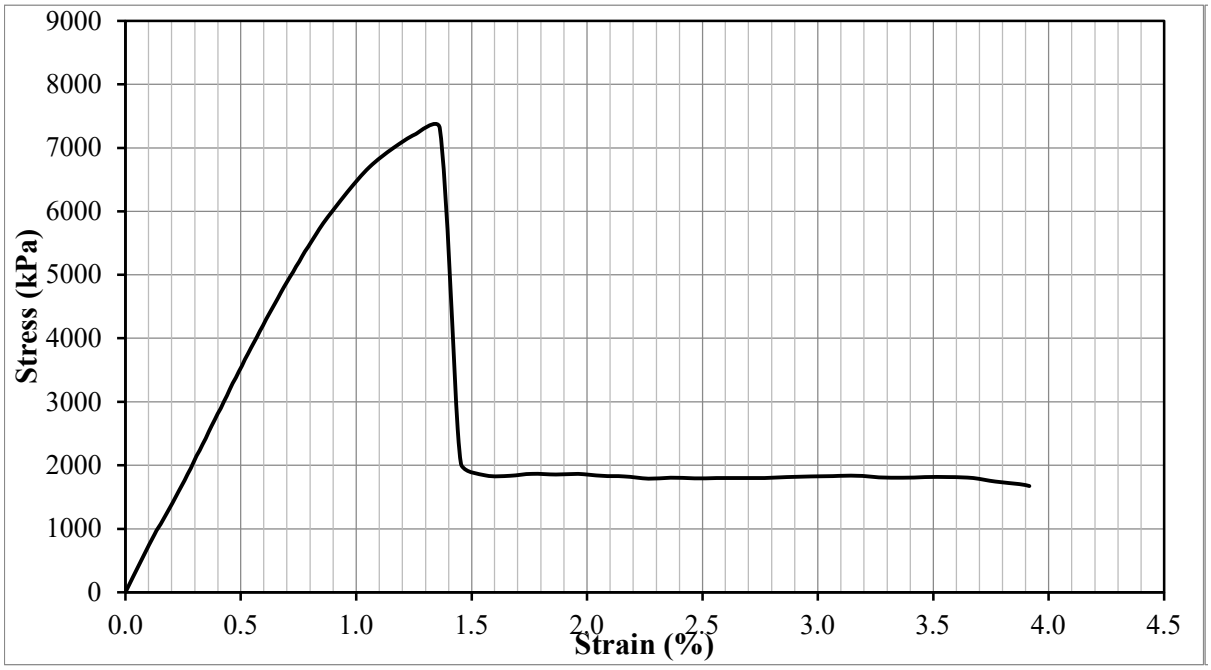
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,455	Strain at failure, εf :	1.05	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	L-1-F	Initial Area:	2100.5	mm^2
Test Date:	8/13/2019	Weight:	369.2	g
Strain Rate:	1 %/min	Unit Weight:	1777	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	179.5	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25.0	°C
Additional information				



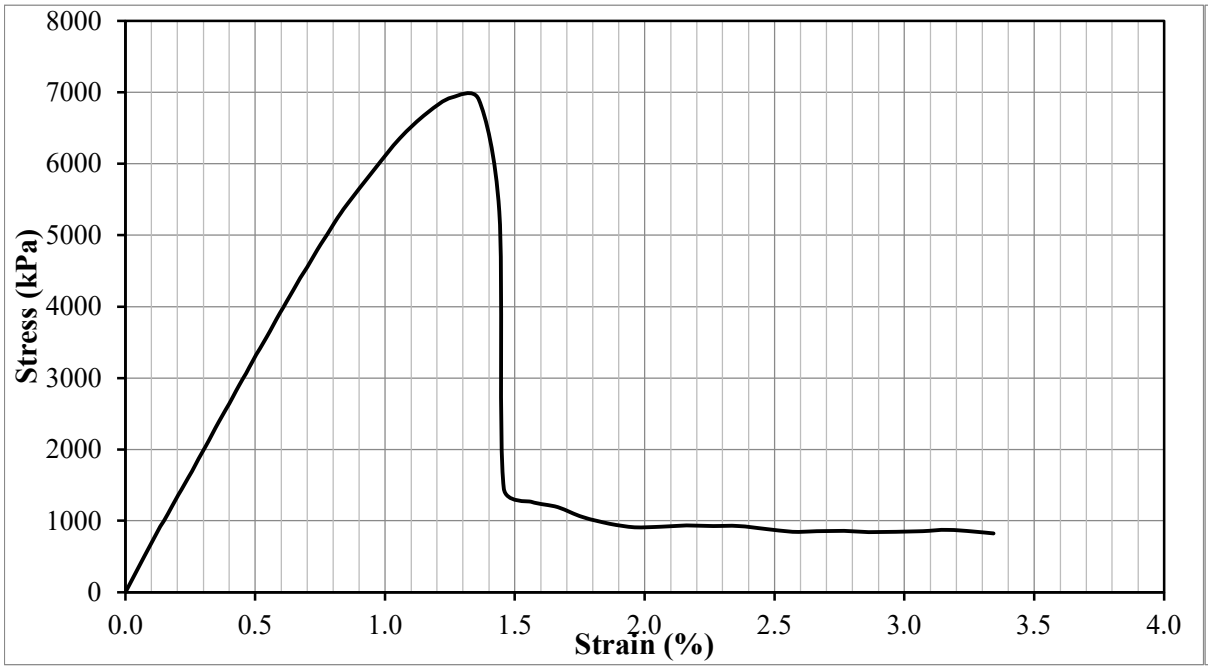
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,374	Strain at failure, εf :	1.03	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.2	mm
I.D.:	L-1-C	Initial Area:	2137.8	mm^2
Test Date:	3/20/2020	Weight:	376.5	g
Strain Rate:	1 %/min	Unit Weight:	1754	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	399.8	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45.0	°C
Additional information				



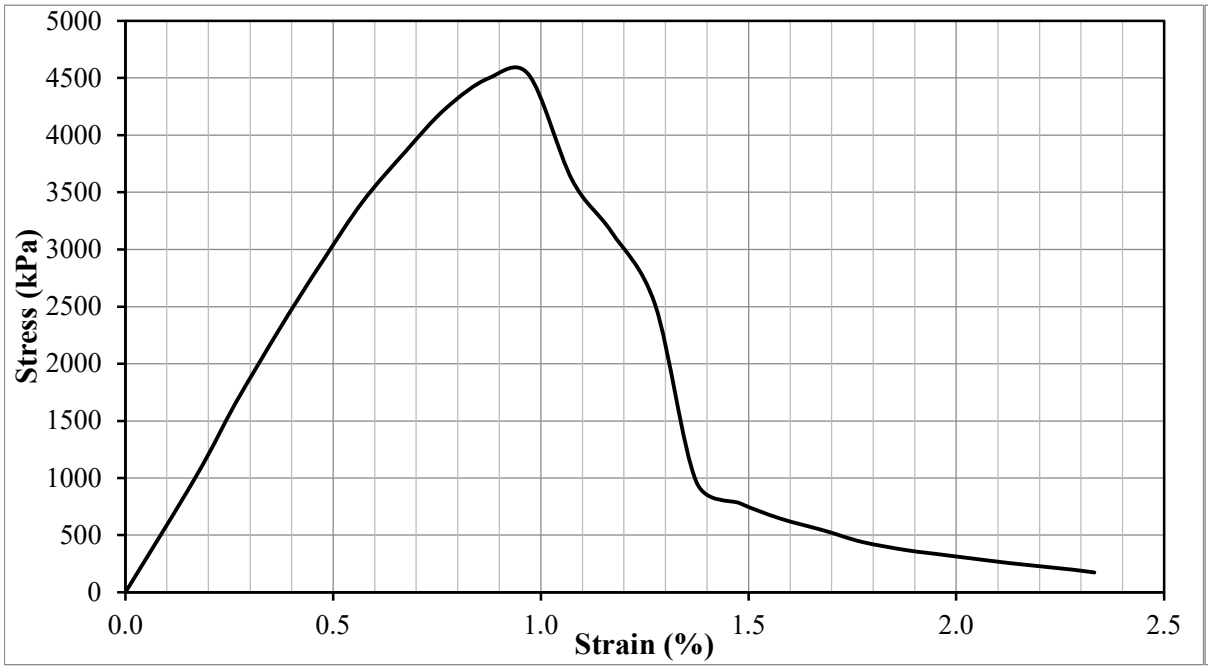
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	7,265	Strain at failure, εf :	1.36	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	L-1-G	Initial Area:	2119.1	mm^2
Test Date:	3/20/2020	Weight:	369.5	g
Strain Rate:	1 %/min	Unit Weight:	1766	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	399.8	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45.0	°C
Additional information				



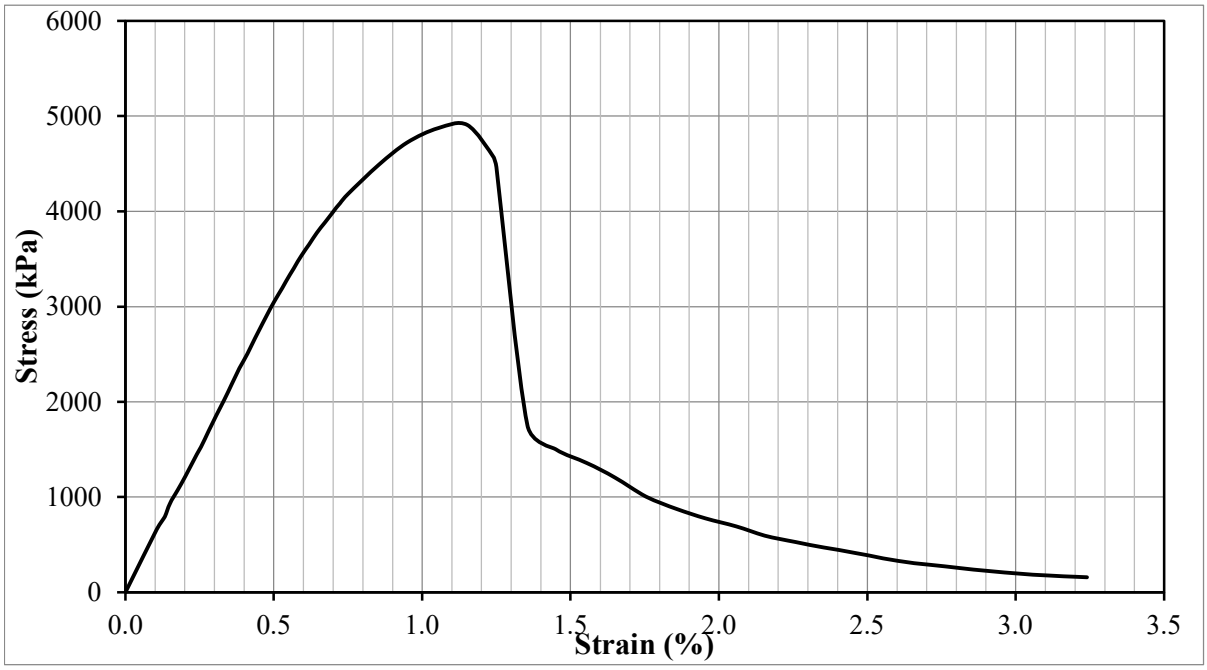
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	6,871	Strain at failure, εf :	1.26	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	L-1-D	Initial Area:	2108.7	mm^2
Test Date:	3/20/2020	Weight:	377.7	g
Strain Rate:	1 %/min	Unit Weight:	1776	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	399.8	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25.0	°C
Additional information				



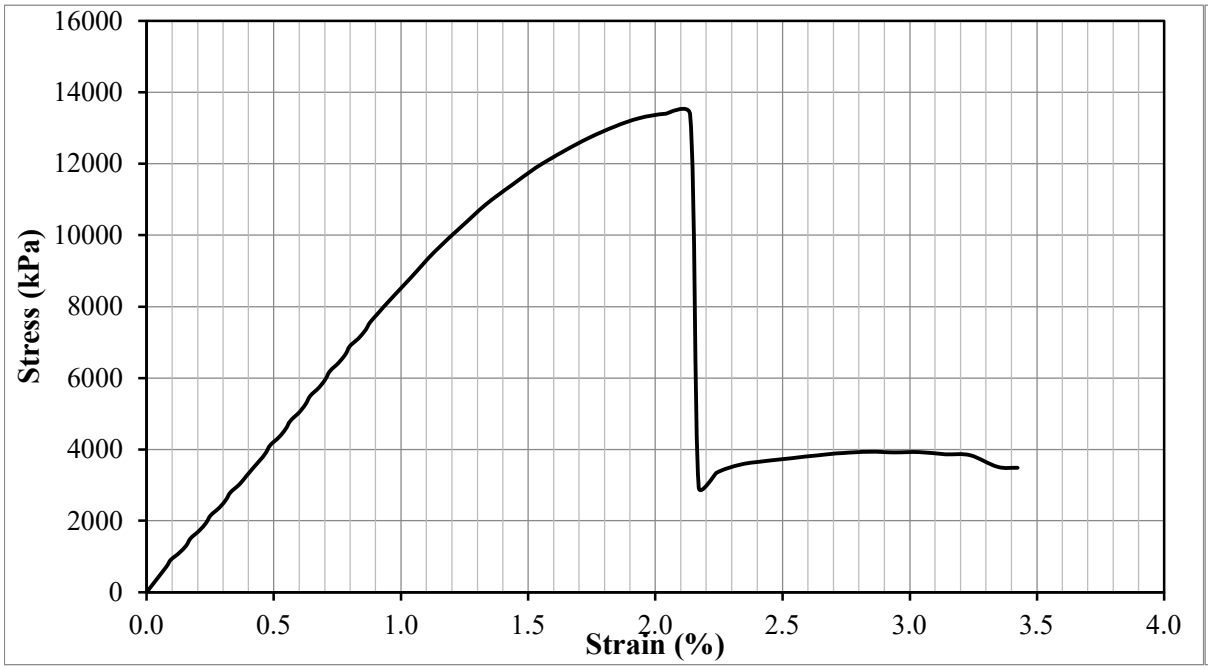
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,512	Strain at failure, εf :	0.97	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	L-1-E	Initial Area:	2108.7	mm^2
Test Date:	3/20/2020	Weight:	375.8	g
Strain Rate:	1 %/min	Unit Weight:	1773	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	399.8	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25.0	°C
Additional information				



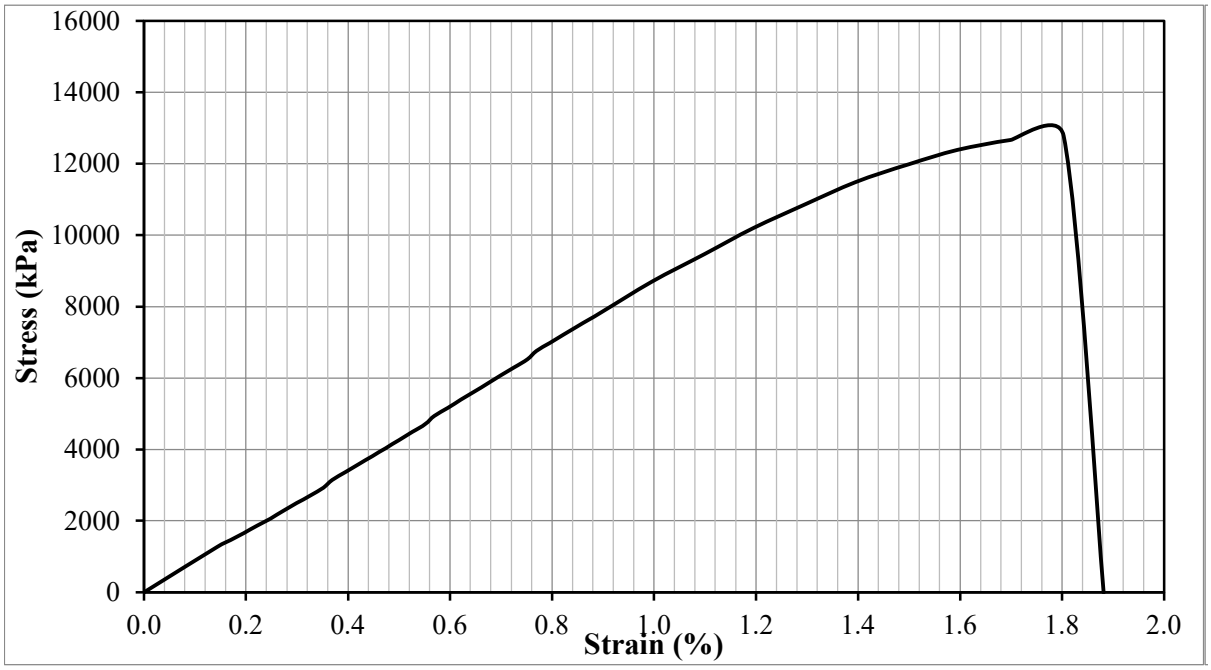
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,882	Strain at failure, εf :	1.15	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	95.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	L-2-H	Initial Area:	2121.1	mm^2
Test Date:	8/16/2019	Weight:	344.9	g
Strain Rate:	1 %/min	Unit Weight:	1698	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	181.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45.0	°C
Additional information				



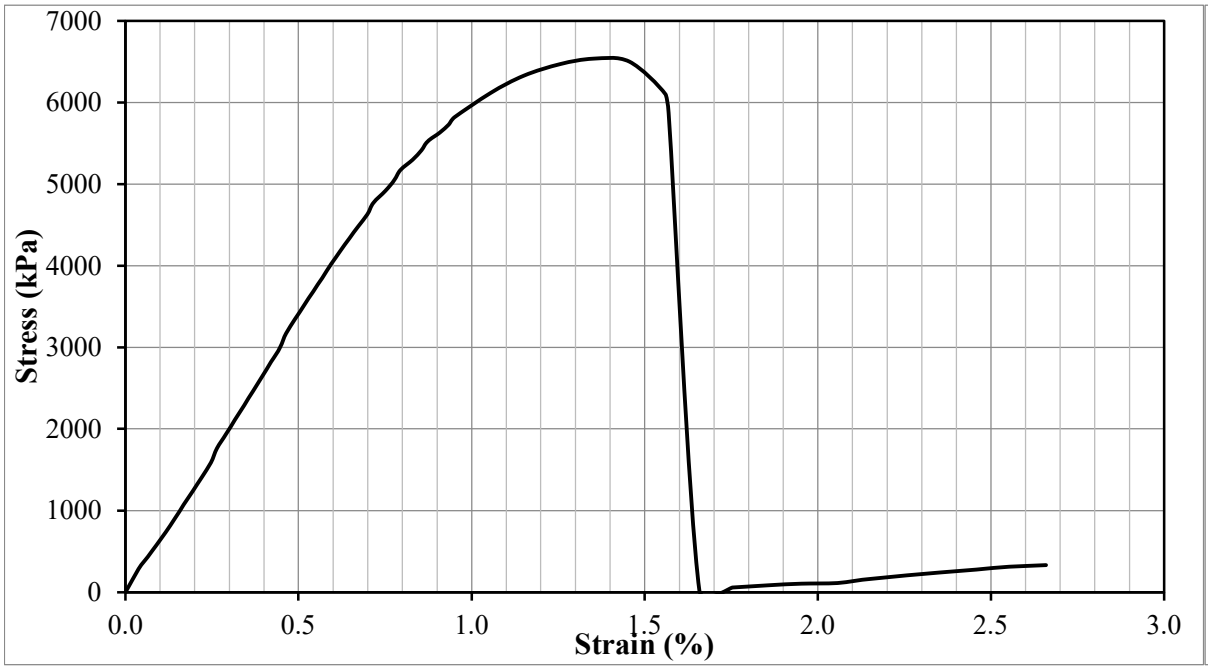
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	13,228	Strain at failure, εf :	2.04	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	L-2-I	Initial Area:	2117.0	mm^2
Test Date:	8/16/2019	Weight:	357.0	g
Strain Rate:	1 %/min	Unit Weight:	1701	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	181.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45.0	°C
Additional information				



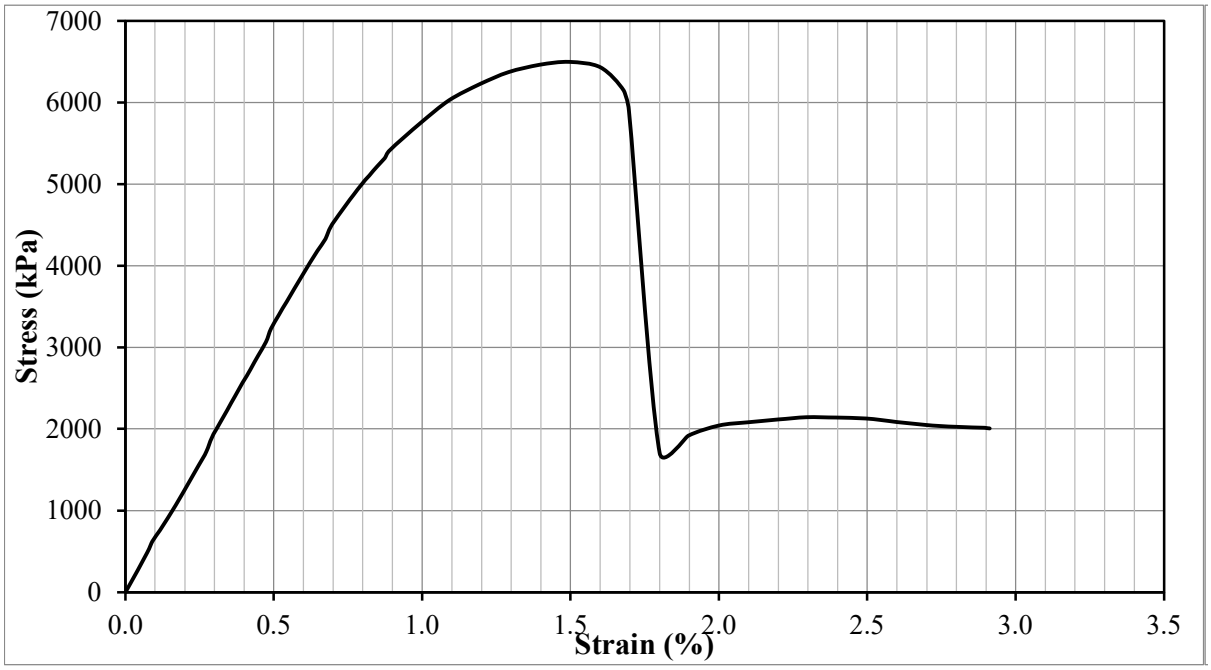
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	12,682	Strain at failure, εf :	1.80	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	L-2-B	Initial Area:	2104.6	mm^2
Test Date:	8/16/2019	Weight:	358.9	g
Strain Rate:	1 %/min	Unit Weight:	1712	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	181.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25.0	°C
Additional information				



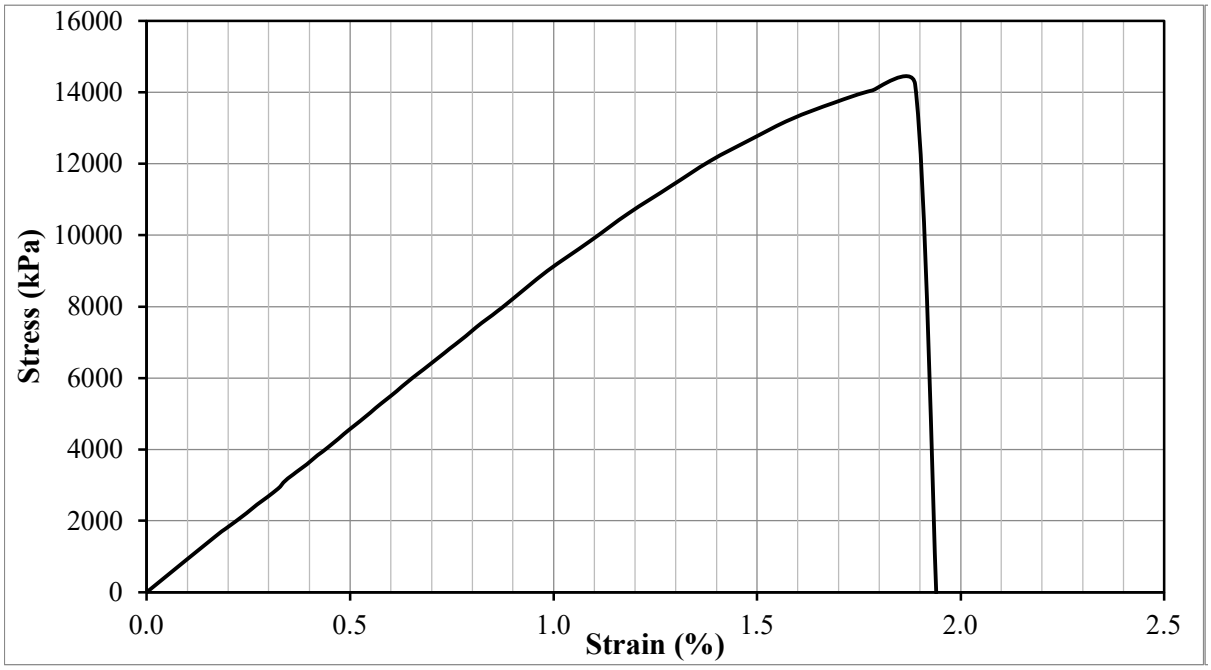
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	6,495	Strain at failure, εf :	1.35	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	96.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	L-2-F	Initial Area:	2106.6	mm^2
Test Date:	8/16/2019	Weight:	348.9	g
Strain Rate:	1 %/min	Unit Weight:	1710	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	181.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25.0	°C
Additional information				



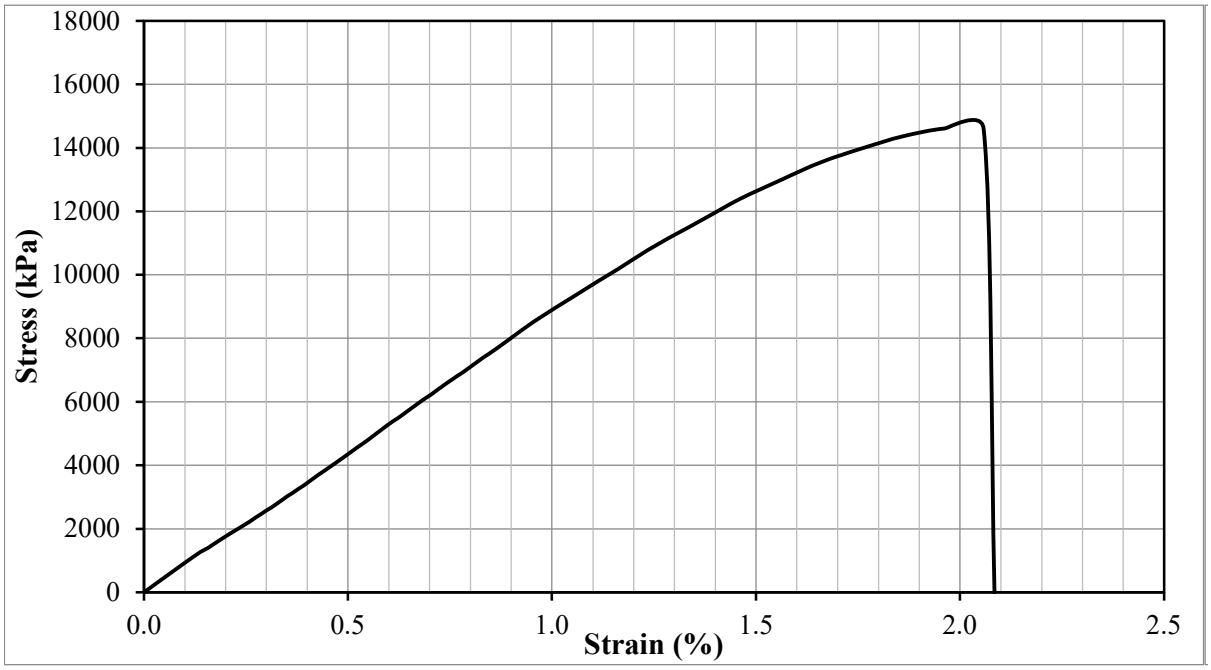
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	6,428	Strain at failure, εf :	1.50	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	L-2-C	Initial Area:	2123.2	mm^2
Test Date:	3/21/2020	Weight:	361.5	g
Strain Rate:	1 %/min	Unit Weight:	1695	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	399.8	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45.0	°C
Additional information				



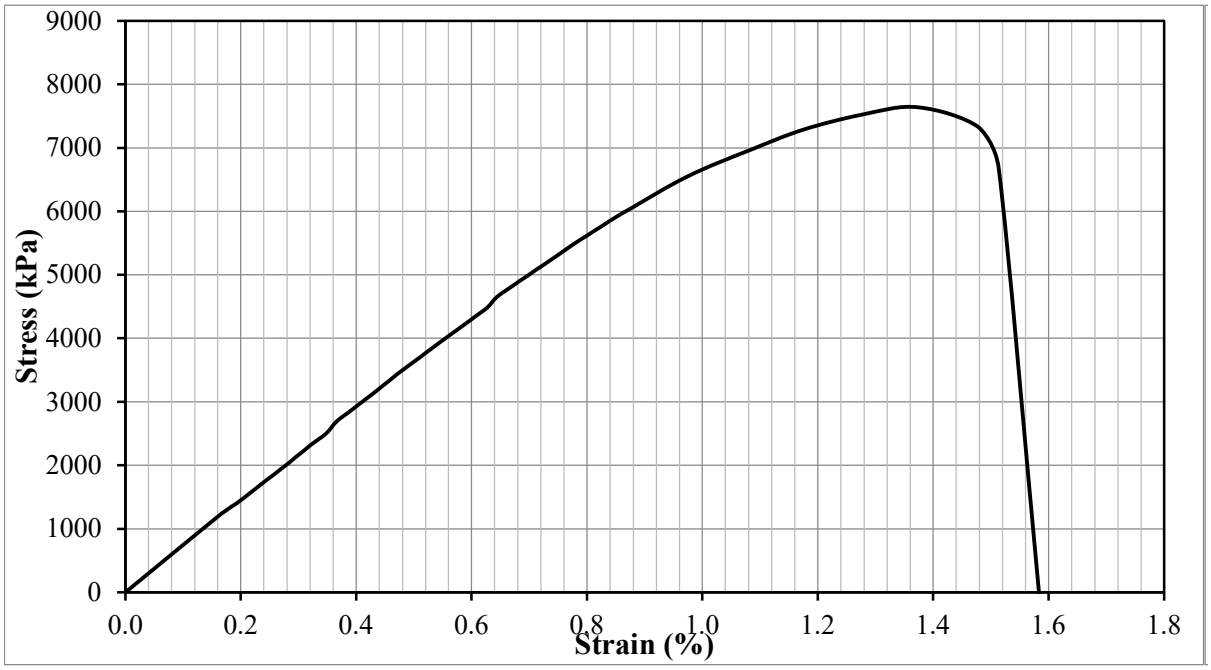
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	14,141	Strain at failure, εf :	1.89	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.1	mm
I.D.:	L-2-G	Initial Area:	2131.5	mm^2
Test Date:	3/21/2020	Weight:	354.8	g
Strain Rate:	1 %/min	Unit Weight:	1689	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	399.8	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45.0	°C
Additional information				



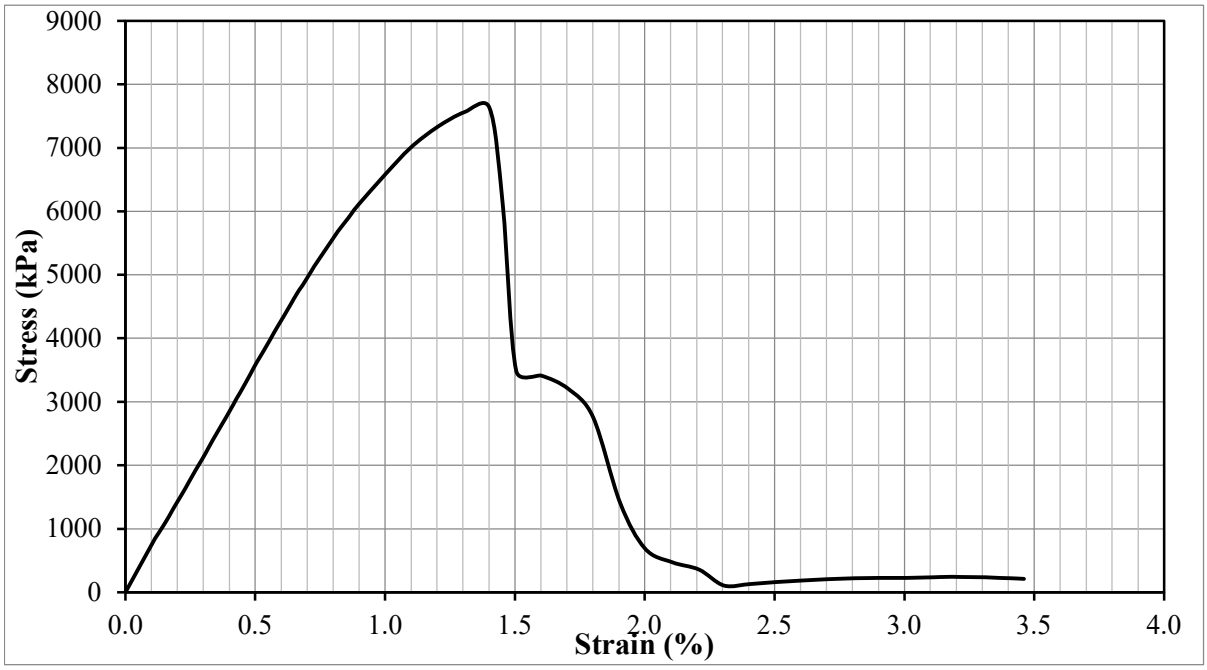
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	14,487	Strain at failure, εf :	1.96	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	L-2-D	Initial Area:	2108.7	mm^2
Test Date:	3/21/2020	Weight:	360.3	g
Strain Rate:	1 %/min	Unit Weight:	1710	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	399.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25.0	°C
Additional information				



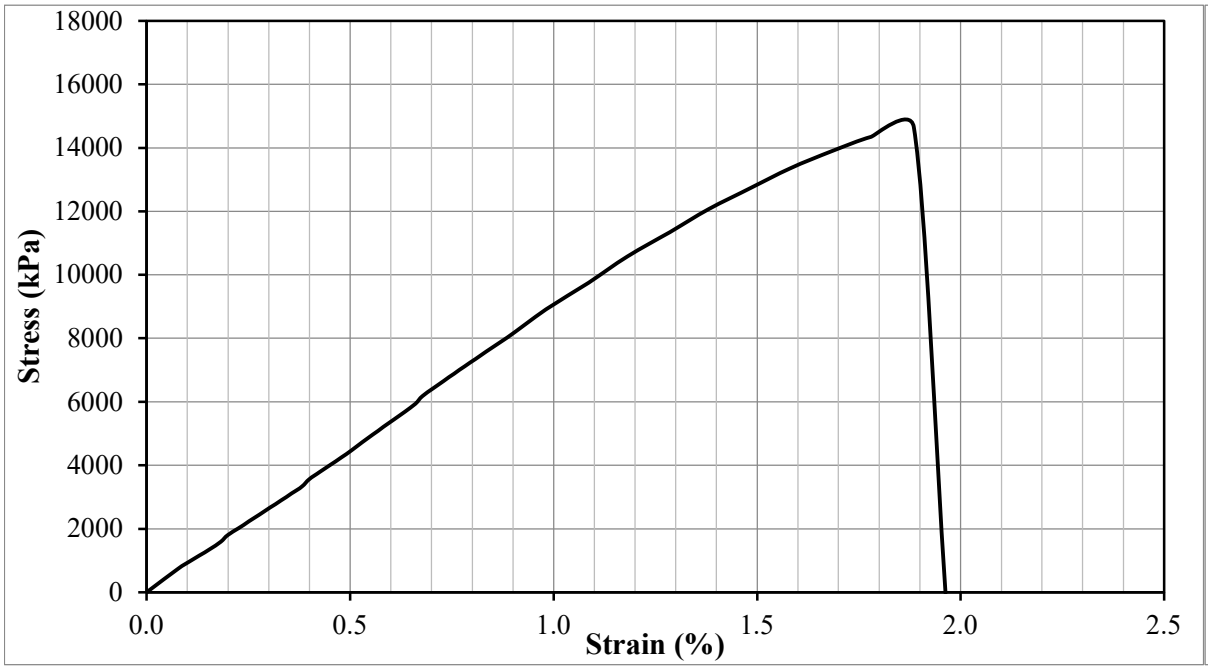
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	7,594	Strain at failure, εf :	1.37	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	L-2-E	Initial Area:	2108.7	mm^2
Test Date:	3/21/2020	Weight:	363.0	g
Strain Rate:	1 %/min	Unit Weight:	1710	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	399.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25.0	°C
Additional information				



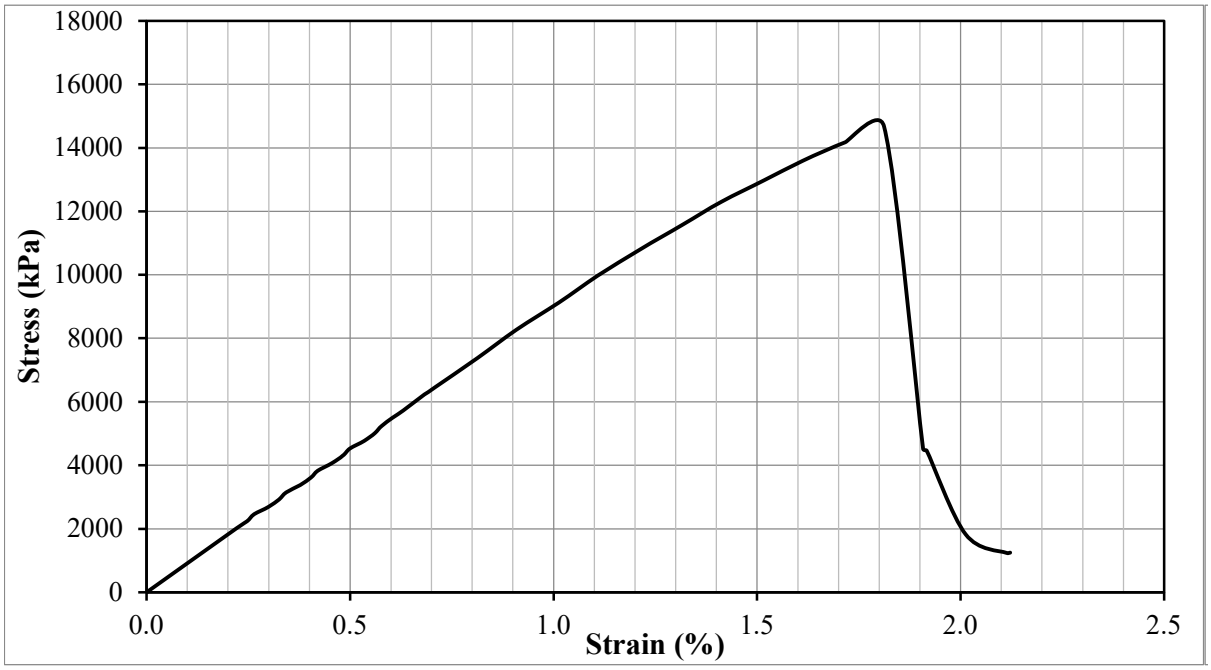
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	7,599	Strain at failure, εf :	1.40	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.1	mm
I.D.:	L-3-A	Initial Area:	2131.5	mm^2
Test Date:	8/26/2019	Weight:	372.3	g
Strain Rate:	1 %/min	Unit Weight:	1801	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	176.6	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45.0	°C
Additional information				



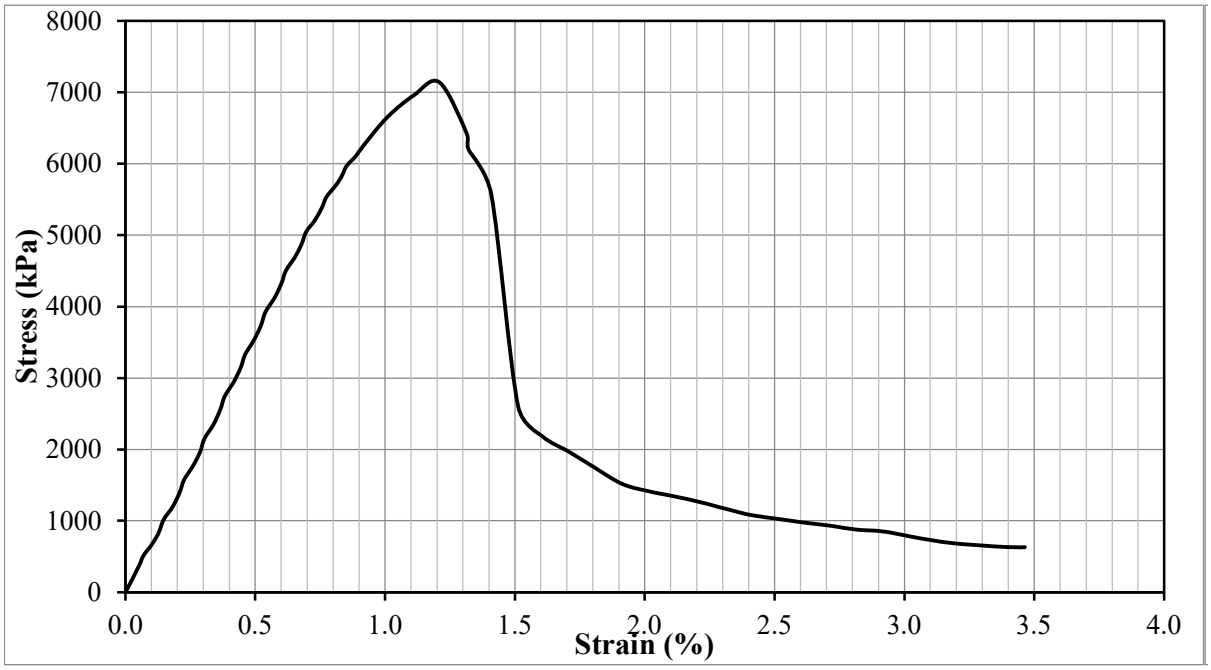
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	14,483	Strain at failure, εf :	1.88	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.1	mm
I.D.:	L-3-H	Initial Area:	2135.7	mm^2
Test Date:	8/26/2019	Weight:	379.3	g
Strain Rate:	1 %/min	Unit Weight:	1794	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	176.7	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45.0	°C
Additional information				



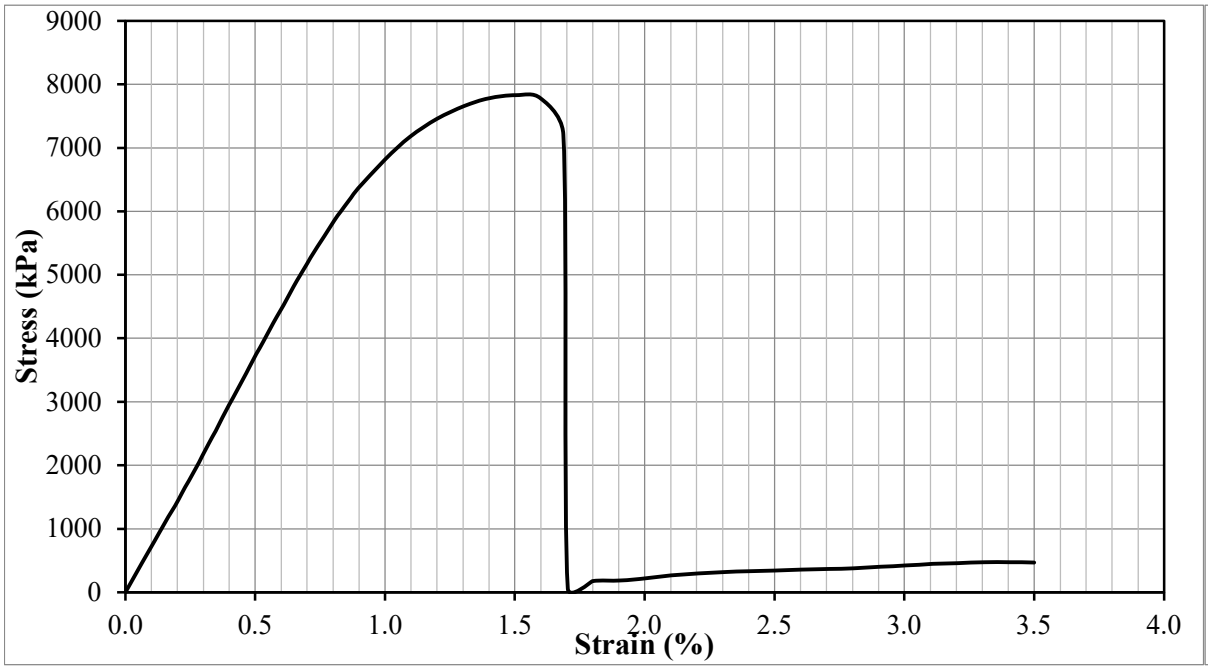
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	14,546	Strain at failure, εf :	1.81	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	L-3-B	Initial Area:	2119.1	mm^2
Test Date:	8/26/2019	Weight:	379.0	g
Strain Rate:	1 %/min	Unit Weight:	1805	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	176.7	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25.0	°C
Additional information				



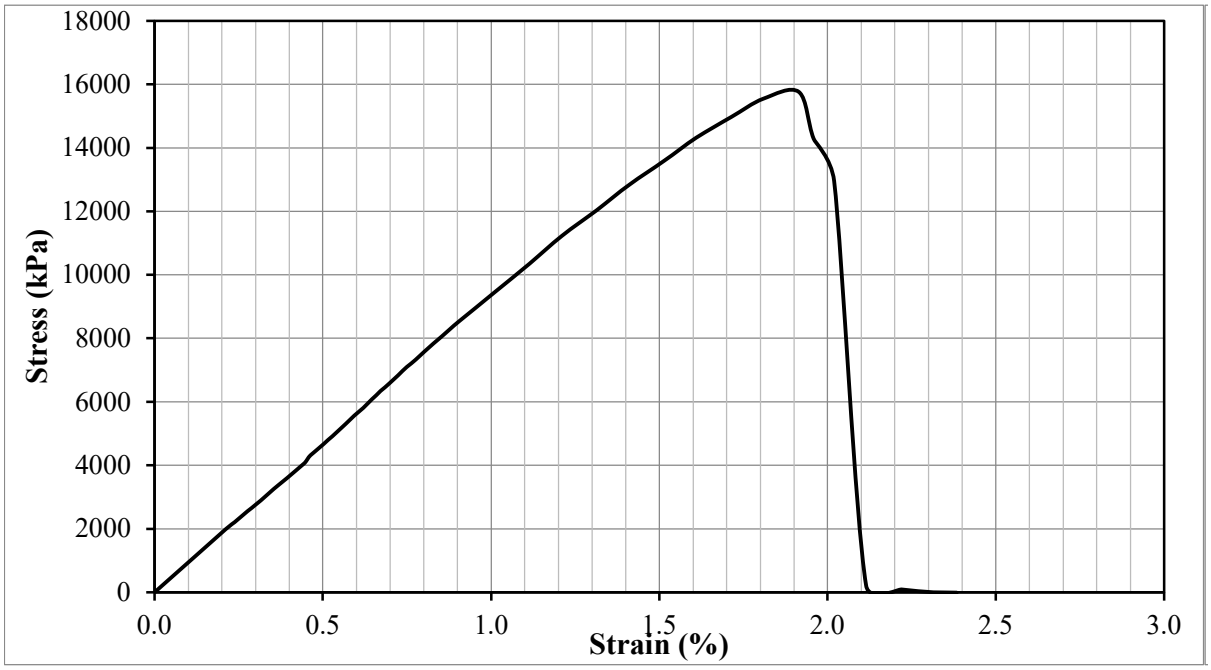
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	7,087	Strain at failure, εf :	1.21	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	L-3-G	Initial Area:	2123.2	mm^2
Test Date:	8/26/2019	Weight:	380.8	g
Strain Rate:	1 %/min	Unit Weight:	1799	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	176.7	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25.0	°C
Additional information				



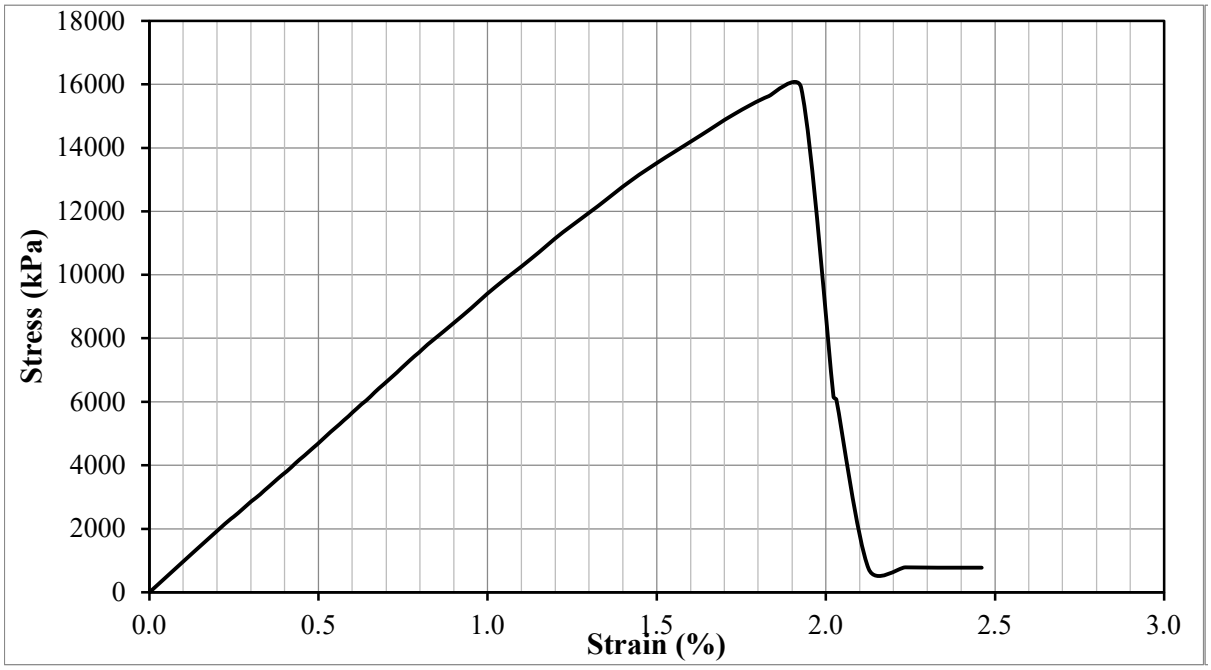
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	7,779	Strain at failure, εf :	1.50	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.1	mm
I.D.:	L-3-C	Initial Area:	2133.6	mm^2
Test Date:	4/1/2020	Weight:	376.2	g
Strain Rate:	1 %/min	Unit Weight:	1794	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	396.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45.0	°C
Additional information				



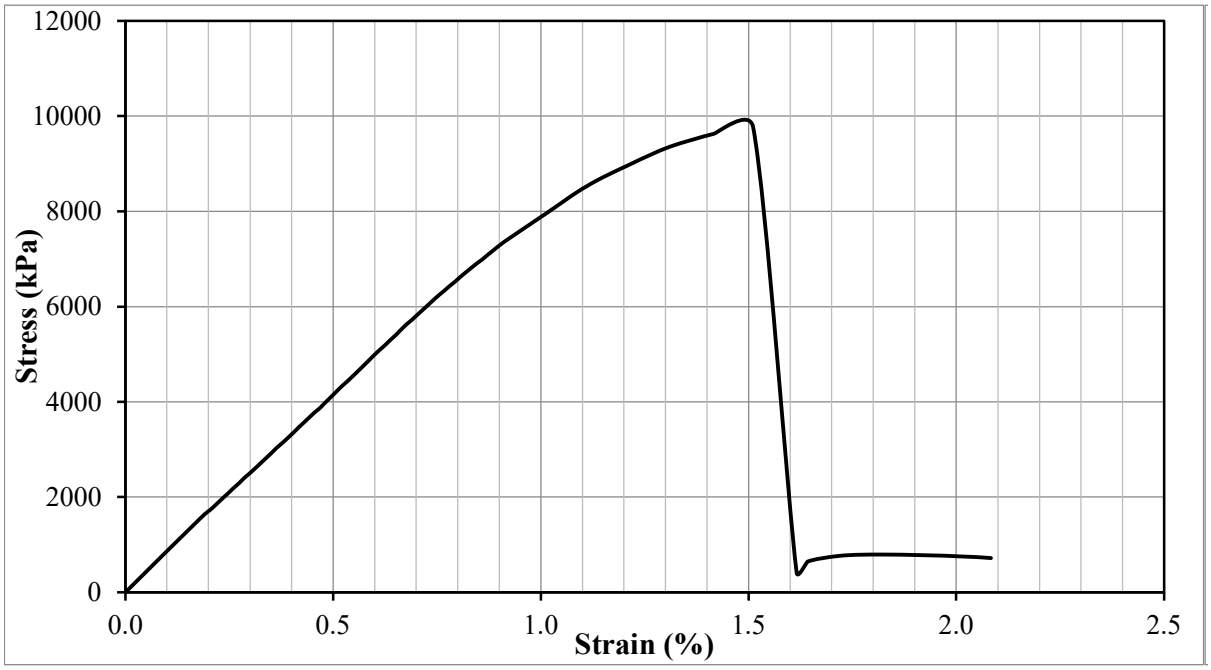
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	15,611	Strain at failure, εf :	1.91	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.1	mm
I.D.:	L-3-F	Initial Area:	2135.7	mm^2
Test Date:	4/1/2020	Weight:	381.6	g
Strain Rate:	1 %/min	Unit Weight:	1795	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	396.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	45.0	°C
Additional information				



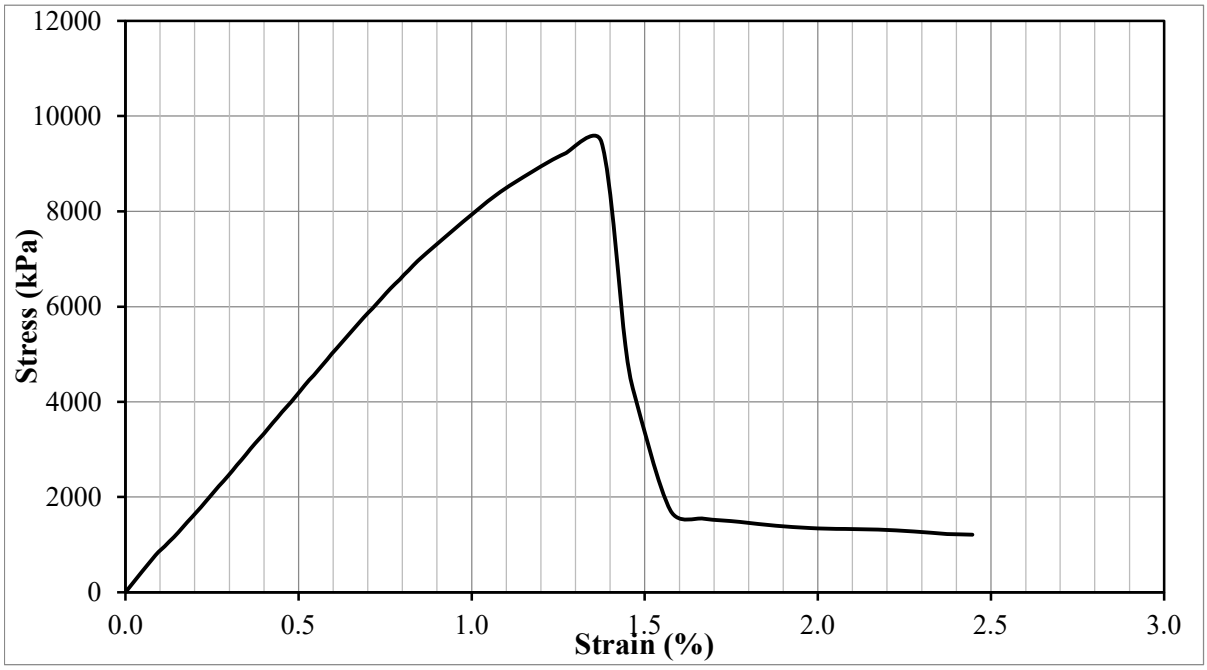
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	15,778	Strain at failure, εf :	1.93	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	L-3-D	Initial Area:	2125.3	mm^2
Test Date:	4/1/2020	Weight:	374.7	g
Strain Rate:	1 %/min	Unit Weight:	1803	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	396.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25.0	°C
Additional information				



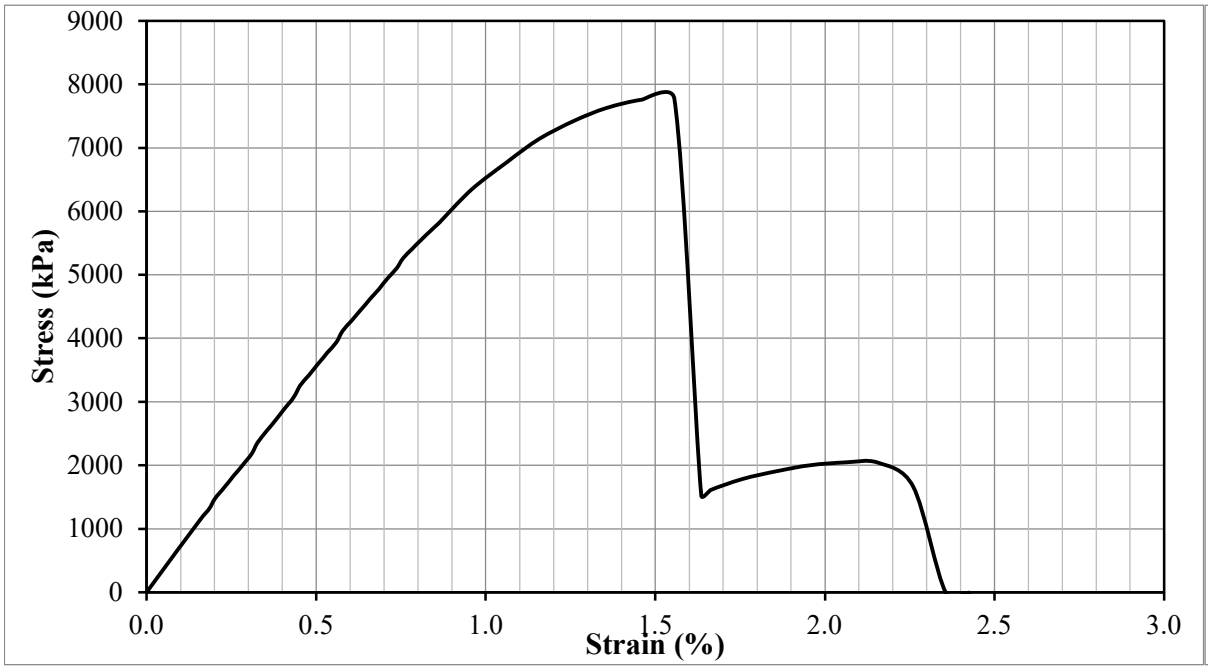
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	9,671	Strain at failure, εf :	1.51	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.1	mm
I.D.:	L-3-E	Initial Area:	2129.4	mm^2
Test Date:	4/1/2020	Weight:	378.9	g
Strain Rate:	1 %/min	Unit Weight:	1800	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	396.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25.0	°C
Additional information				



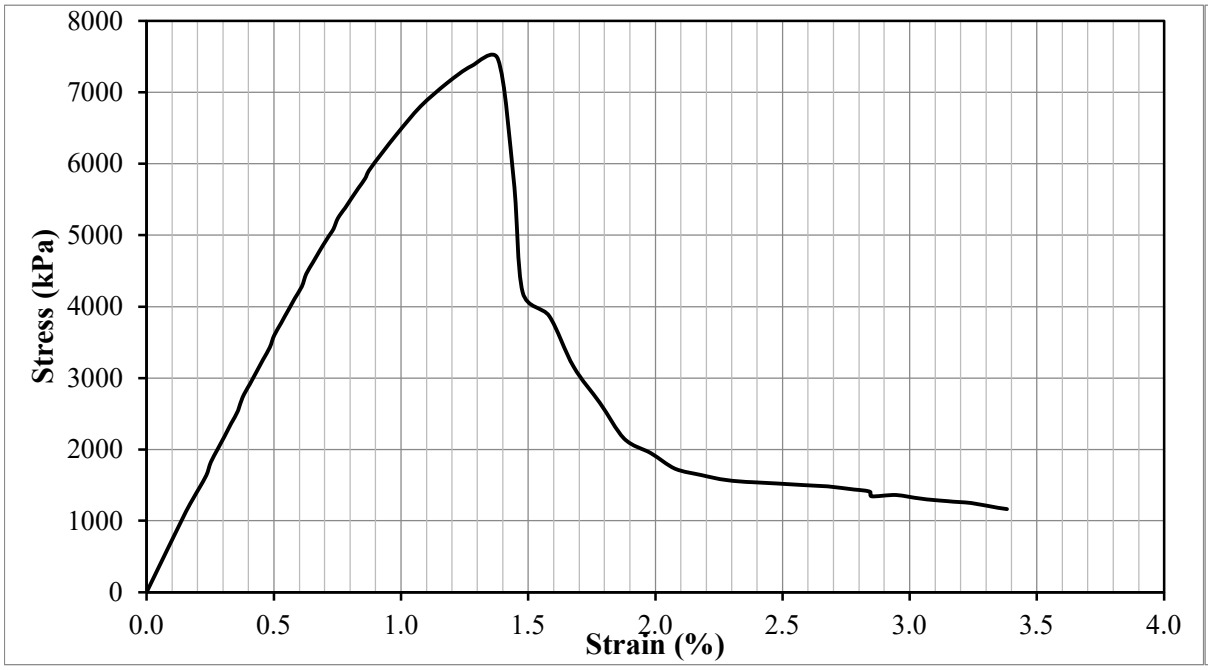
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	9,381	Strain at failure, εf :	1.37	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.1	mm
I.D.:	L-4-A	Initial Area:	2131.5	mm^2
Test Date:	8/30/2019	Weight:	357.9	g
Strain Rate:	1 %/min	Unit Weight:	1685	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	179.6	days
$(w:c)_{slurry}$:	1.4	Curing temperature	45.0	°C
Additional information				



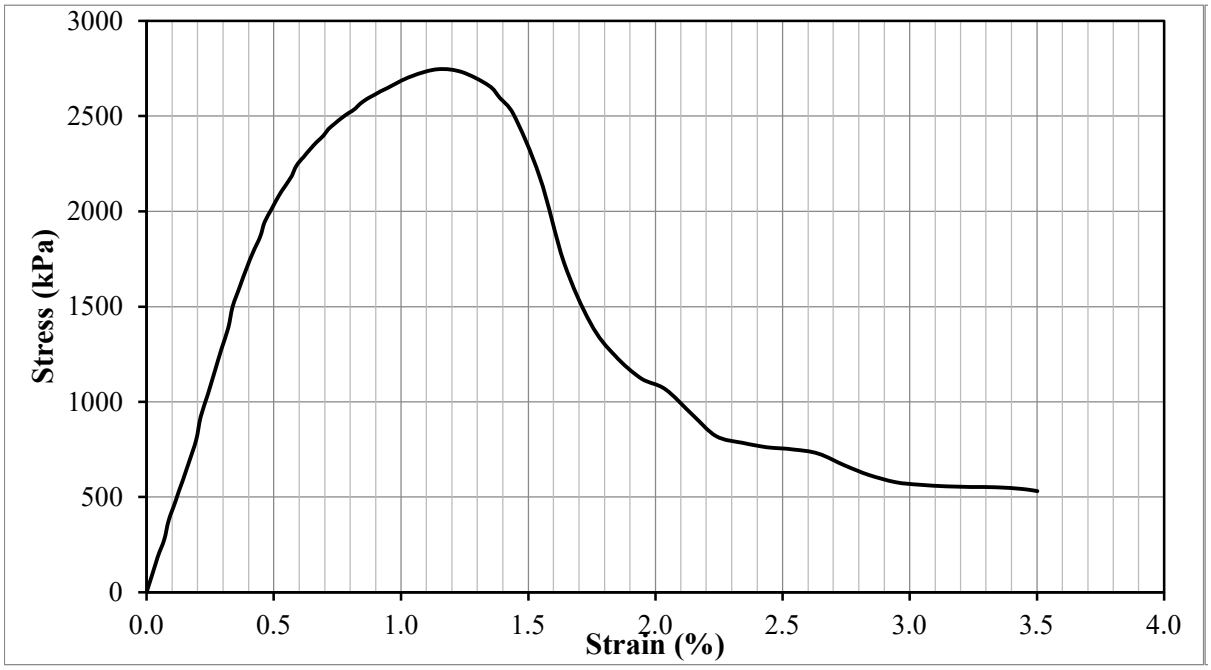
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	7,713	Strain at failure, εf :	1.56	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.2	mm
I.D.:	L-4-H	Initial Area:	2137.8	mm^2
Test Date:	8/30/2019	Weight:	359.5	g
Strain Rate:	1 %/min	Unit Weight:	1680	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	179.6	days
$(w:c)_{slurry}$:	1.4	Curing temperature	45.0	°C
Additional information				



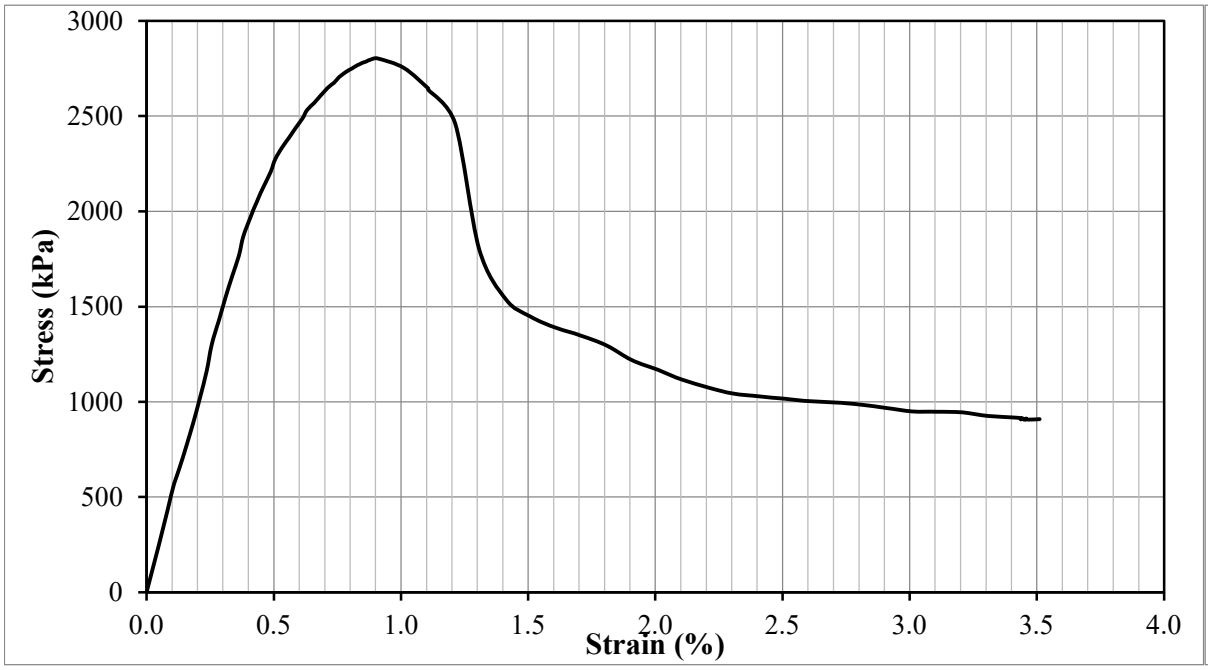
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	7,413	Strain at failure, εf :	1.38	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	96.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	L-4-B	Initial Area:	2123.2	mm^2
Test Date:	8/30/2019	Weight:	345.7	g
Strain Rate:	1 %/min	Unit Weight:	1694	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	179.5	days
$(w:c)_{slurry}$:	1.4	Curing temperature	25.0	°C
Additional information				



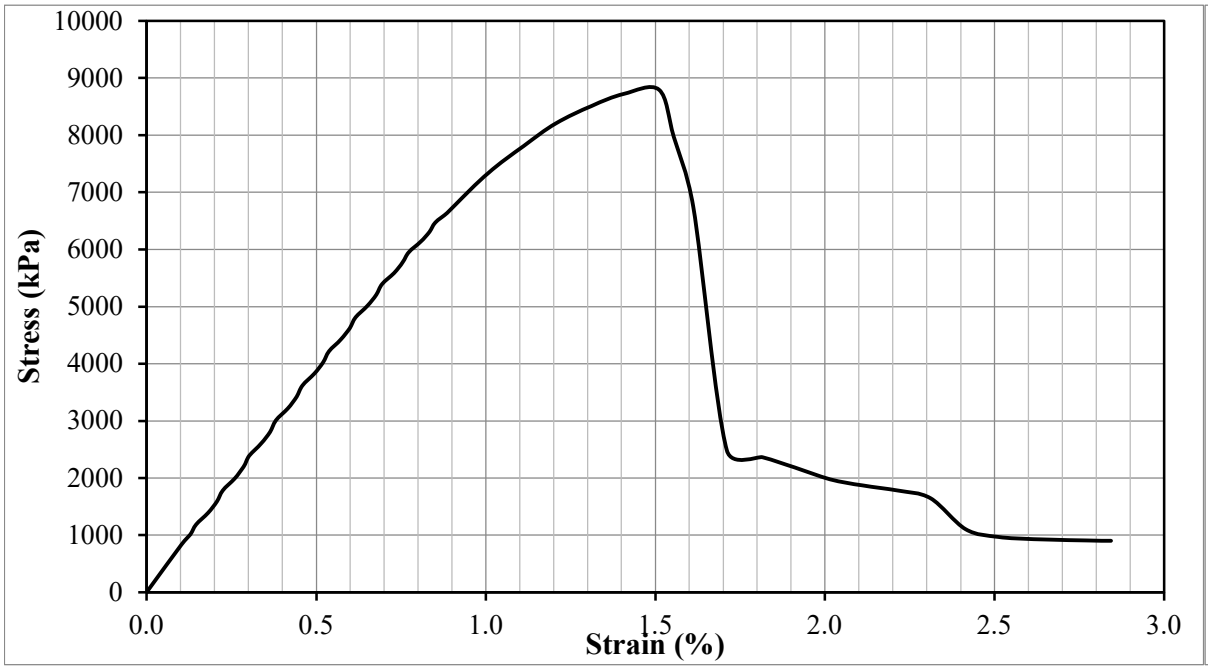
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,712	Strain at failure, εf :	1.15	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	L-4-G	Initial Area:	2123.2	mm^2
Test Date:	8/30/2019	Weight:	356.1	g
Strain Rate:	1 %/min	Unit Weight:	1697	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	179.6	days
$(w:c)_{slurry}$:	1.4	Curing temperature	25.0	°C
Additional information				



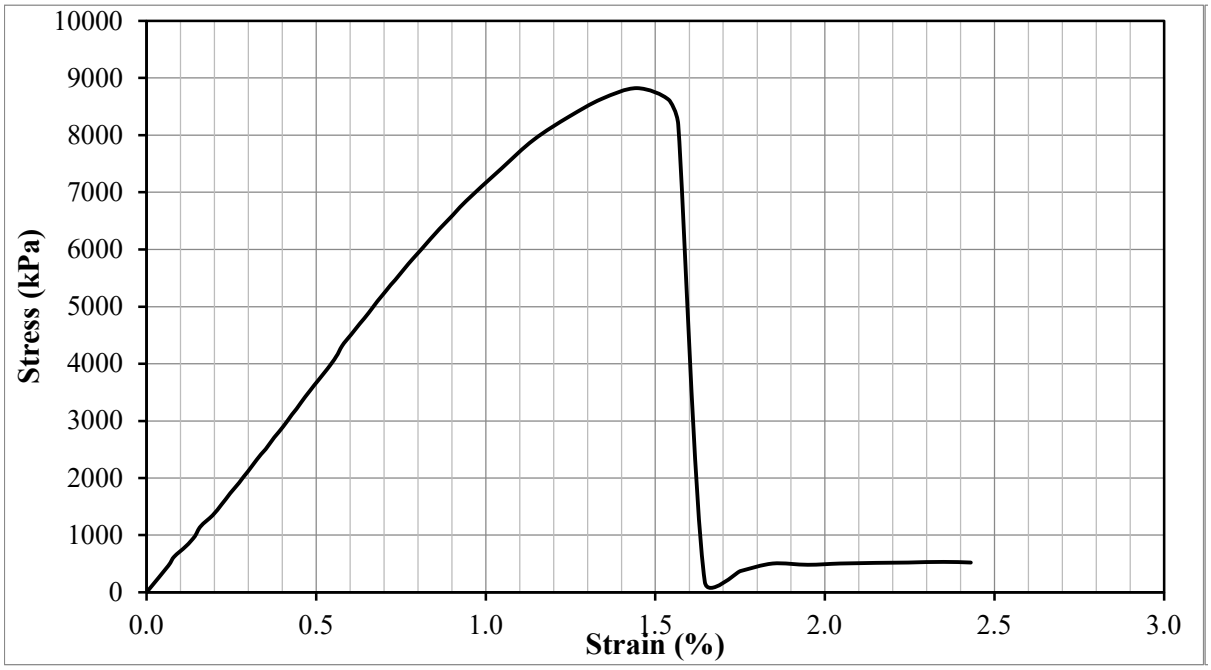
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,780	Strain at failure, εf :	0.91	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.1	mm
I.D.:	L-4-C	Initial Area:	2131.5	mm^2
Test Date:	4/1/2020	Weight:	357.4	g
Strain Rate:	1 %/min	Unit Weight:	1686	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	395.0	days
$(w:c)_{slurry}$:	1.4	Curing temperature	45.0	°C
Additional information				



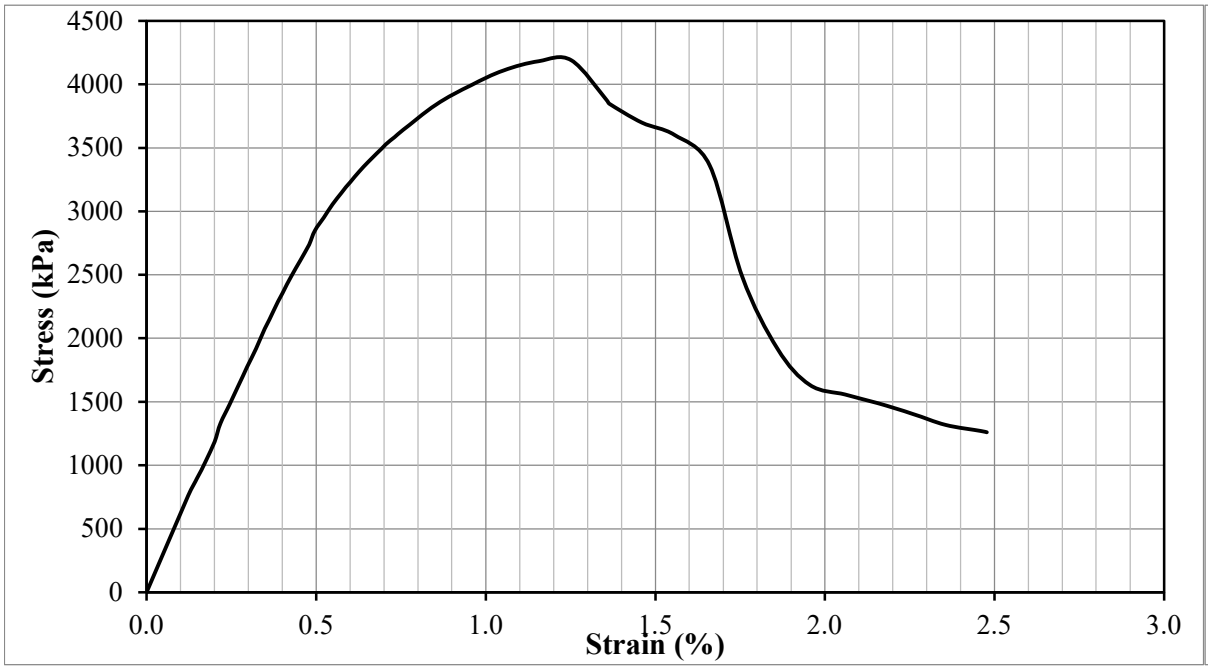
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	8,730	Strain at failure, εf :	1.51	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.1	mm
I.D.:	L-4-F	Initial Area:	2133.6	mm^2
Test Date:	4/1/2020	Weight:	356.9	g
Strain Rate:	1 %/min	Unit Weight:	1684	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	395.0	days
$(w:c)_{slurry}$:	1.4	Curing temperature	45.0	°C
Additional information				



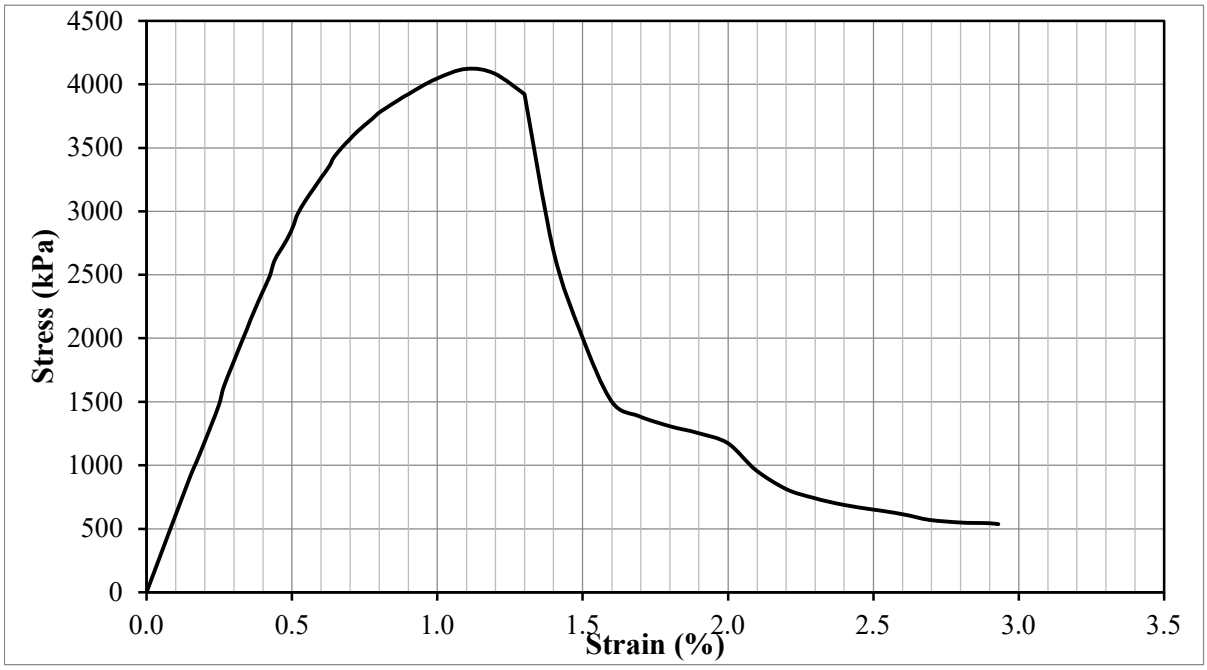
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	8,754	Strain at failure, εf :	1.45	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	L-4-D	Initial Area:	2125.3	mm^2
Test Date:	4/1/2020	Weight:	354.3	g
Strain Rate:	1 %/min	Unit Weight:	1690	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	395.0	days
$(w:c)_{slurry}$:	1.4	Curing temperature	25.0	°C
Additional information				



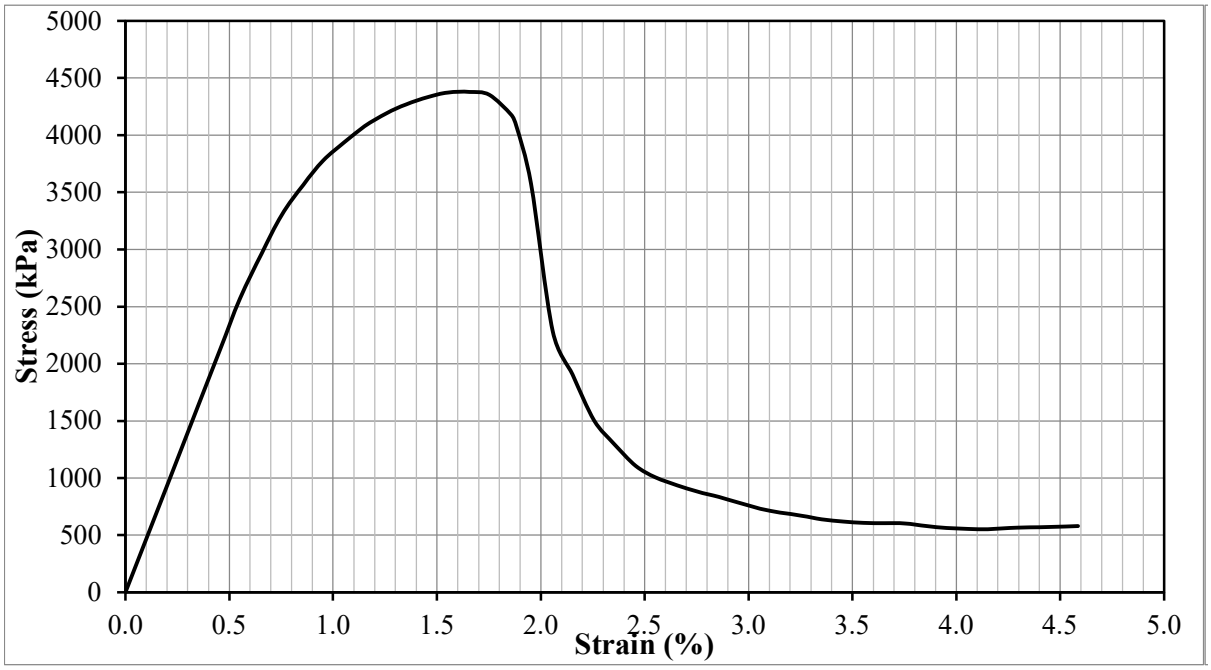
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,156	Strain at failure, εf :	1.25	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	L-4-E	Initial Area:	2123.2	mm^2
Test Date:	4/1/2020	Weight:	359.6	g
Strain Rate:	1 %/min	Unit Weight:	1694	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	395.0	days
$(w:c)_{slurry}$:	1.4	Curing temperature	25.0	°C
Additional information				



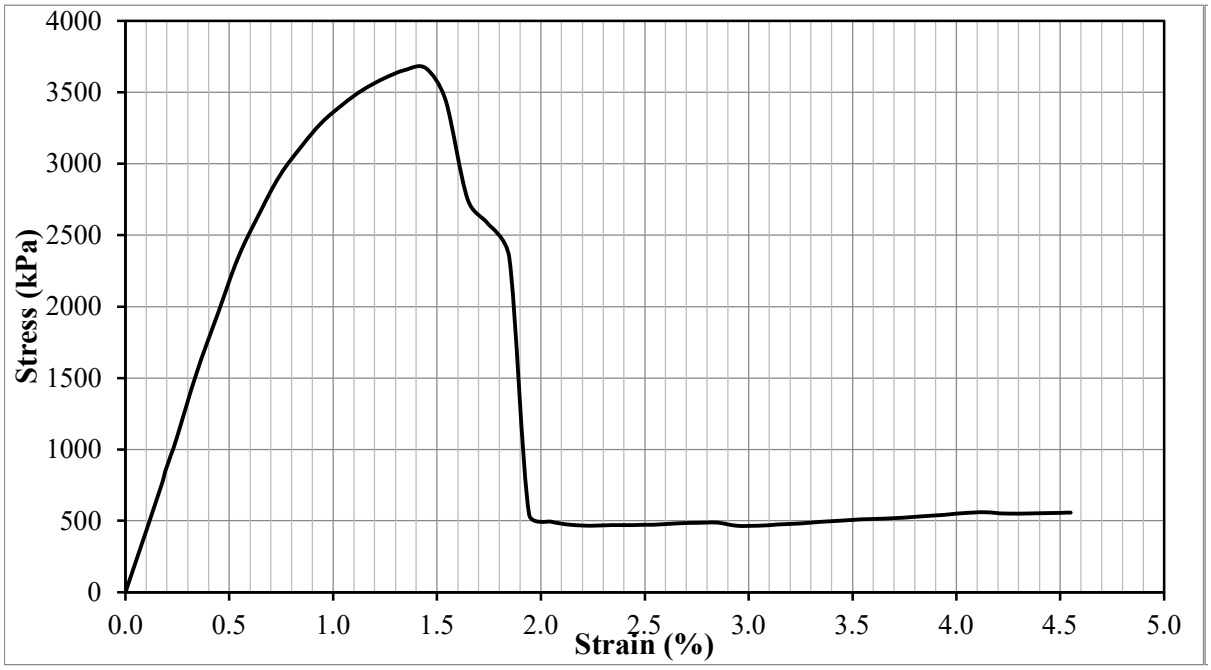
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,097	Strain at failure, εf :	1.10	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	D-1-D2	Initial Area:	2106.6	mm^2
Test Date:	3/14/2018	Weight:	375.2	g
Strain Rate:	1 %/min	Unit Weight:	1780	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25&45	°C
Additional information		25C 7d - 45C 21d		



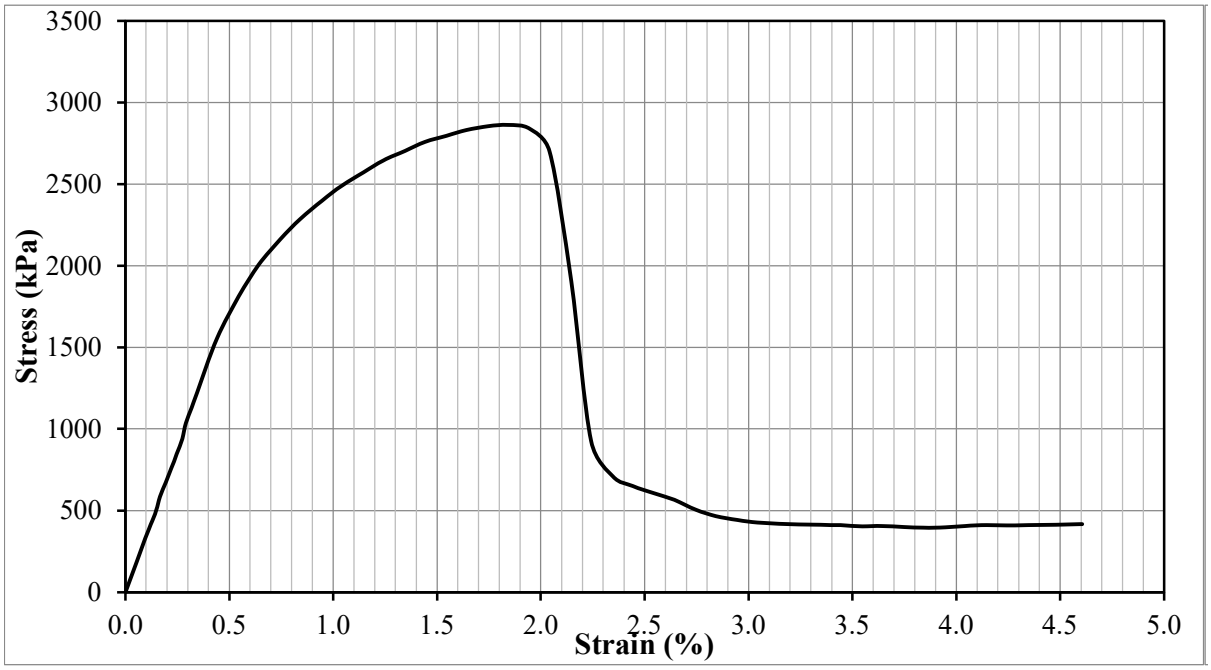
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,355	Strain at failure, εf :	1.66	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	D-1-C2	Initial Area:	2106.6	mm^2
Test Date:	3/14/2018	Weight:	373.4	g
Strain Rate:	1 %/min	Unit Weight:	1780	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25&45	°C
Additional information		25C 14d - 45C 14d		



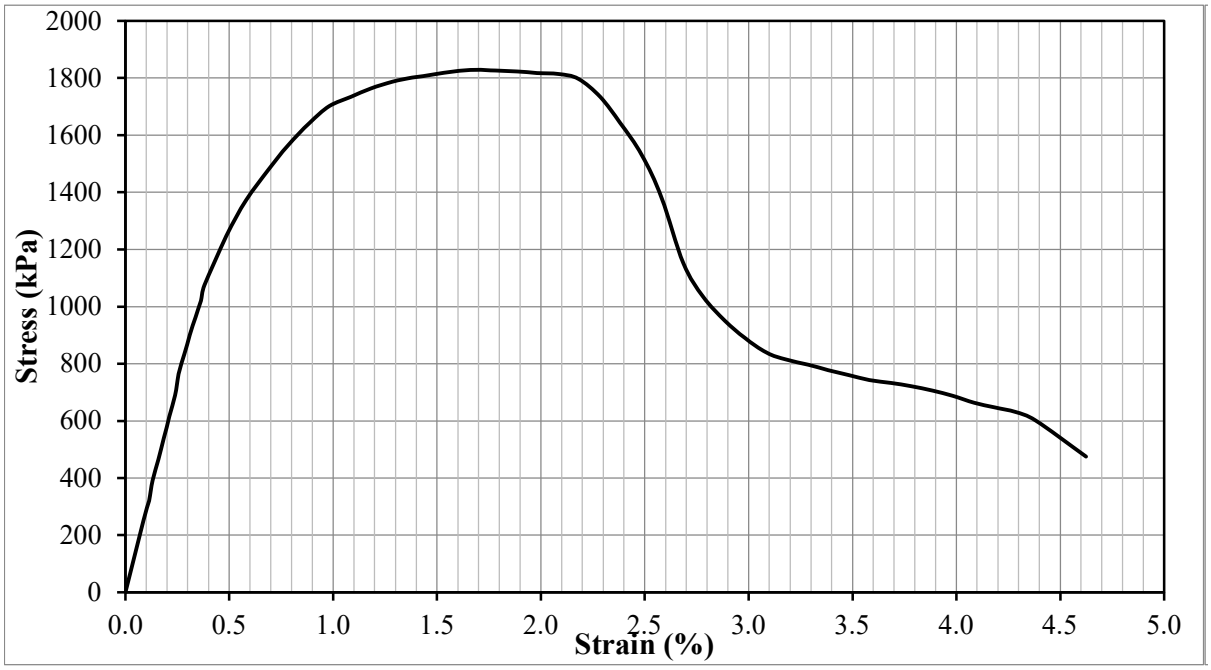
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,644	Strain at failure, εf :	1.45	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	D-1-B2	Initial Area:	2106.6	mm^2
Test Date:	3/14/2018	Weight:	371.0	g
Strain Rate:	1 %/min	Unit Weight:	1775	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25&45	°C
Additional information		25C 21d - 45C 7d		



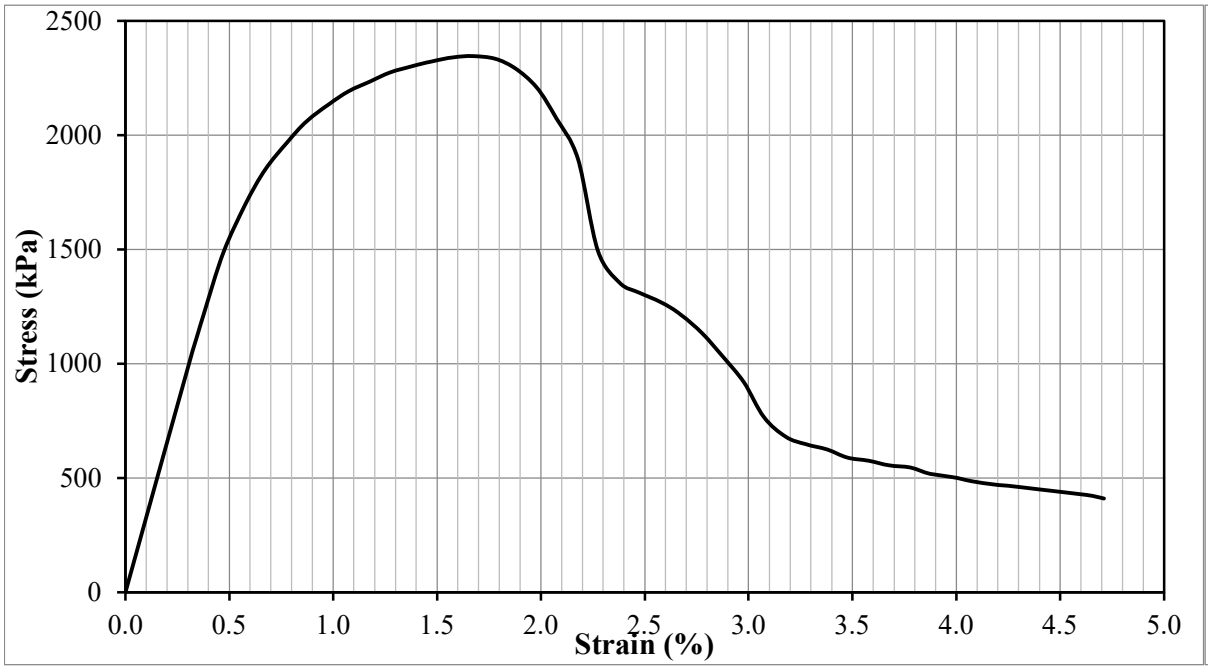
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,843	Strain at failure, εf :	1.84	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	96.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	D-1-A	Initial Area:	2106.6	mm^2
Test Date:	3/14/2018	Weight:	363.4	g
Strain Rate:	1 %/min	Unit Weight:	1785	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	28.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25&45	°C
Additional information		25C 28d - 45C 0d		



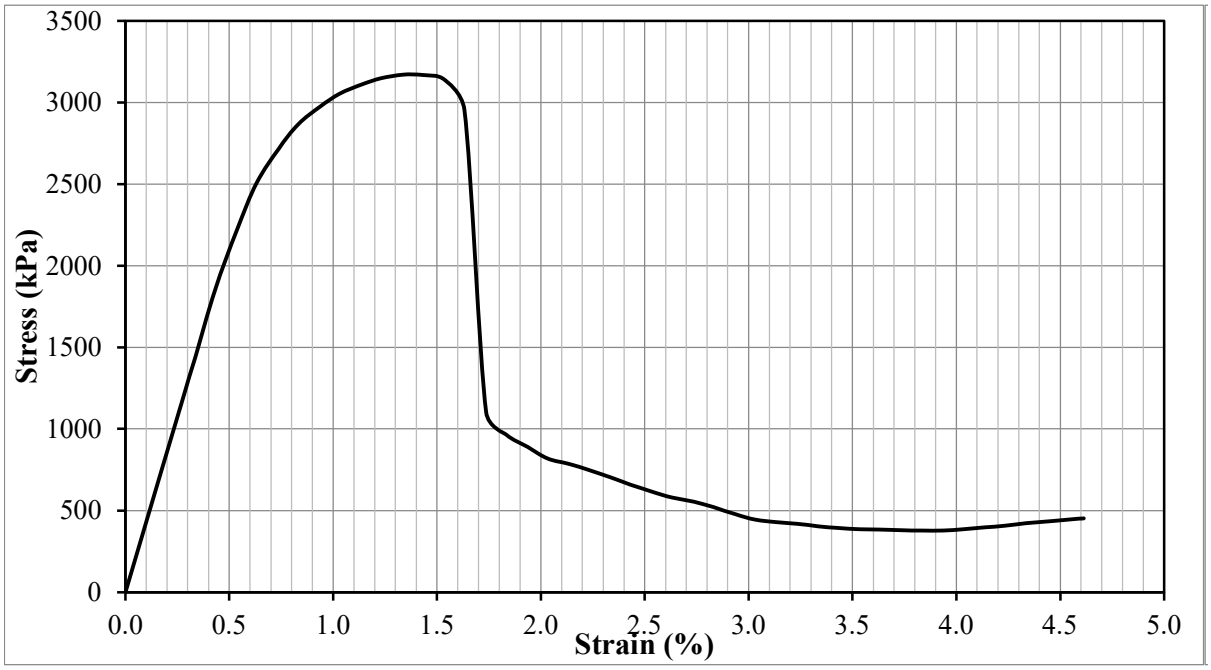
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,809	Strain at failure, εf :	1.69	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	96.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	D-1-B1	Initial Area:	2110.8	mm^2
Test Date:	3/14/2018	Weight:	363.1	g
Strain Rate:	1 %/min	Unit Weight:	1780	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	28.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25&45	°C
Additional information		45C 7d - 25C 21d		



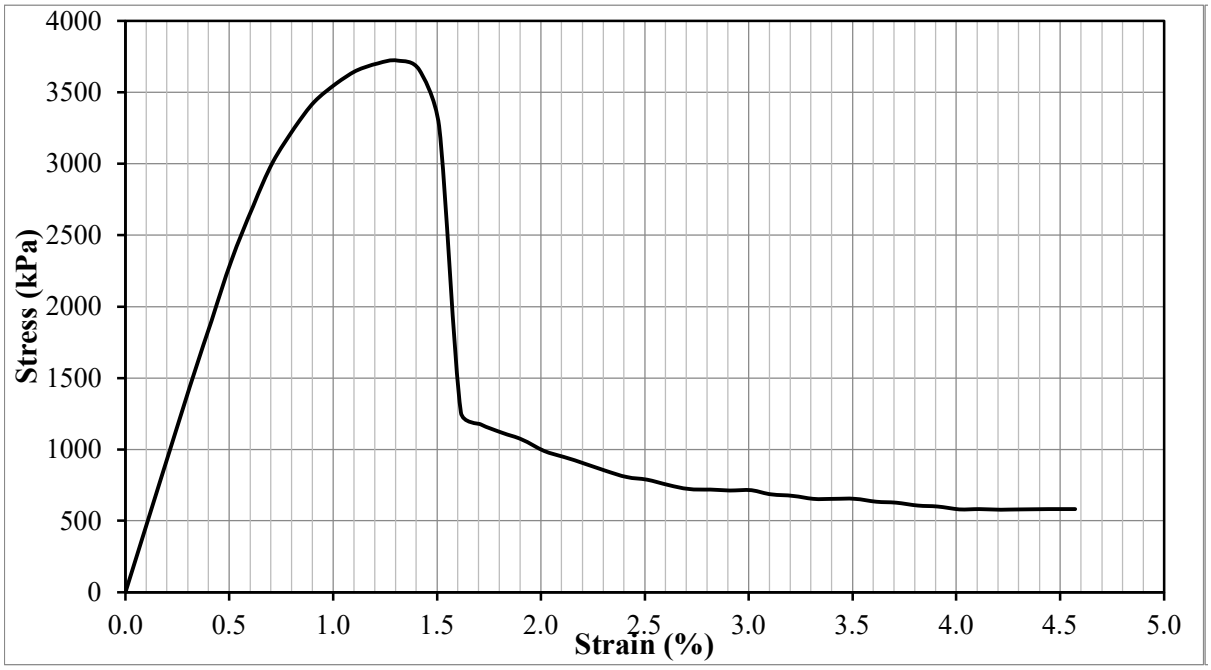
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,320	Strain at failure, εf :	1.67	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	96.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	D-1-C1	Initial Area:	2121.1	mm^2
Test Date:	3/14/2018	Weight:	363.3	g
Strain Rate:	1 %/min	Unit Weight:	1778	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	28.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25&45	°C
Additional information		45C 14d - 25C 14d		



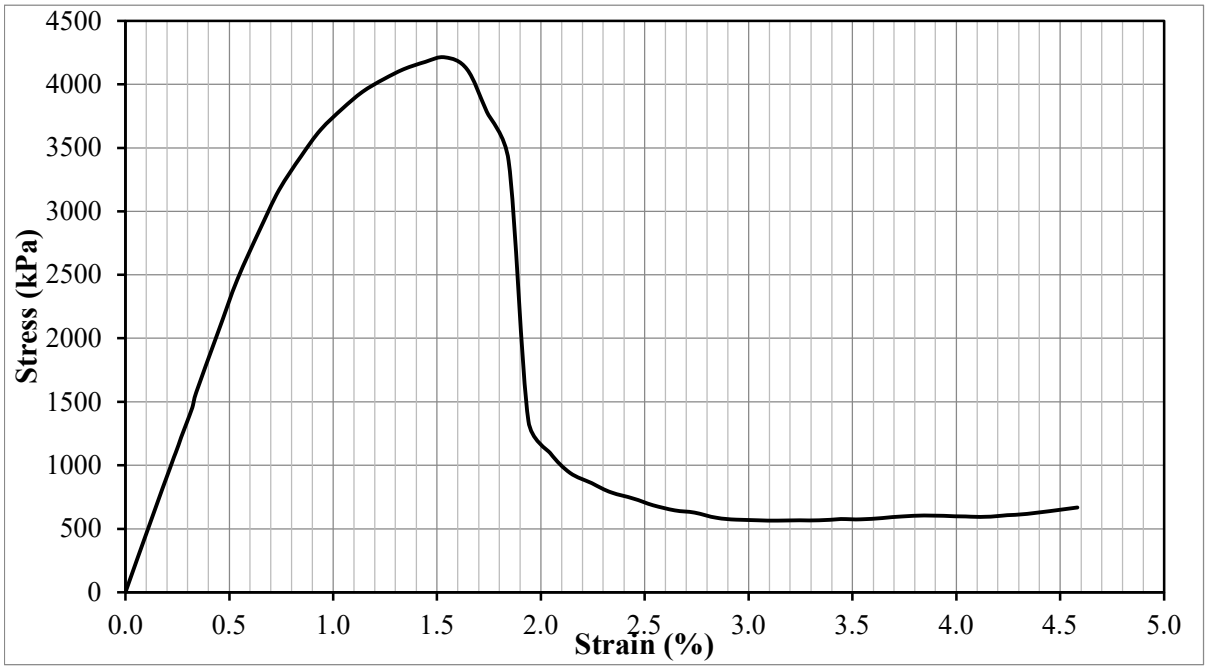
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,133	Strain at failure, εf :	1.34	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	D-1-D1	Initial Area:	2114.9	mm^2
Test Date:	3/14/2018	Weight:	377.6	g
Strain Rate:	1 %/min	Unit Weight:	1783	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	28.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25&45	°C
Additional information		45C 21d - 25C 7d		



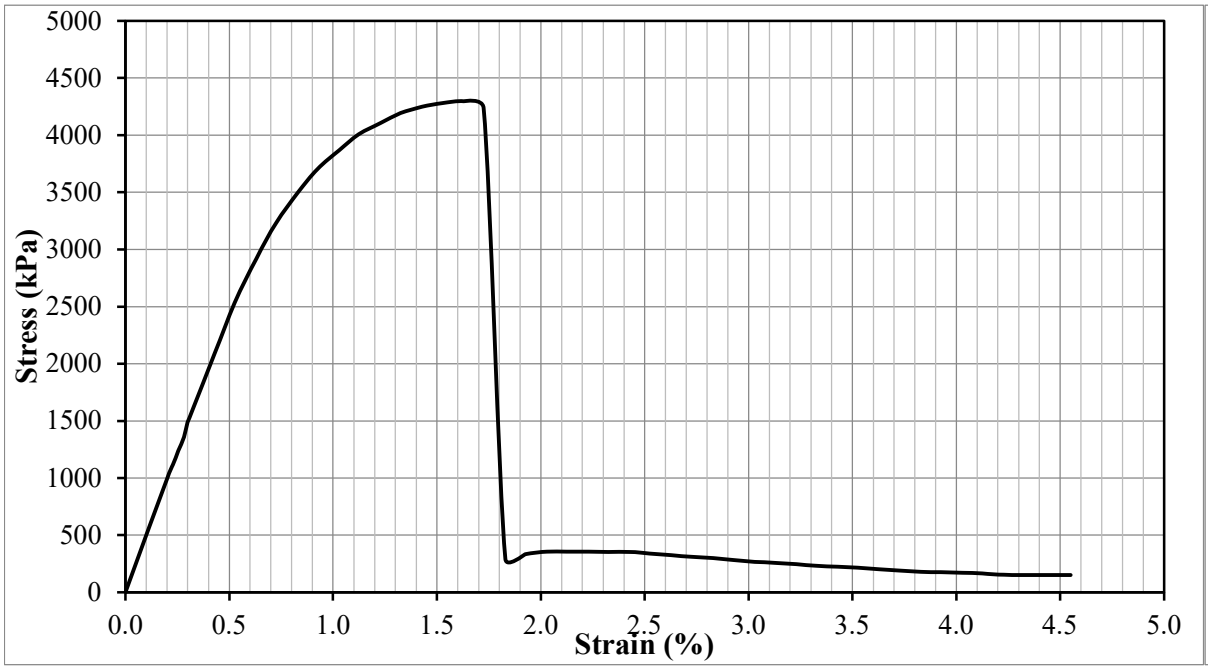
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,701	Strain at failure, εf :	1.31	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	D-1-E	Initial Area:	2117.0	mm^2
Test Date:	3/14/2018	Weight:	376.0	g
Strain Rate:	1 %/min	Unit Weight:	1770	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	28.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25&45	°C
Additional information		45C 28d - 25C 0d		



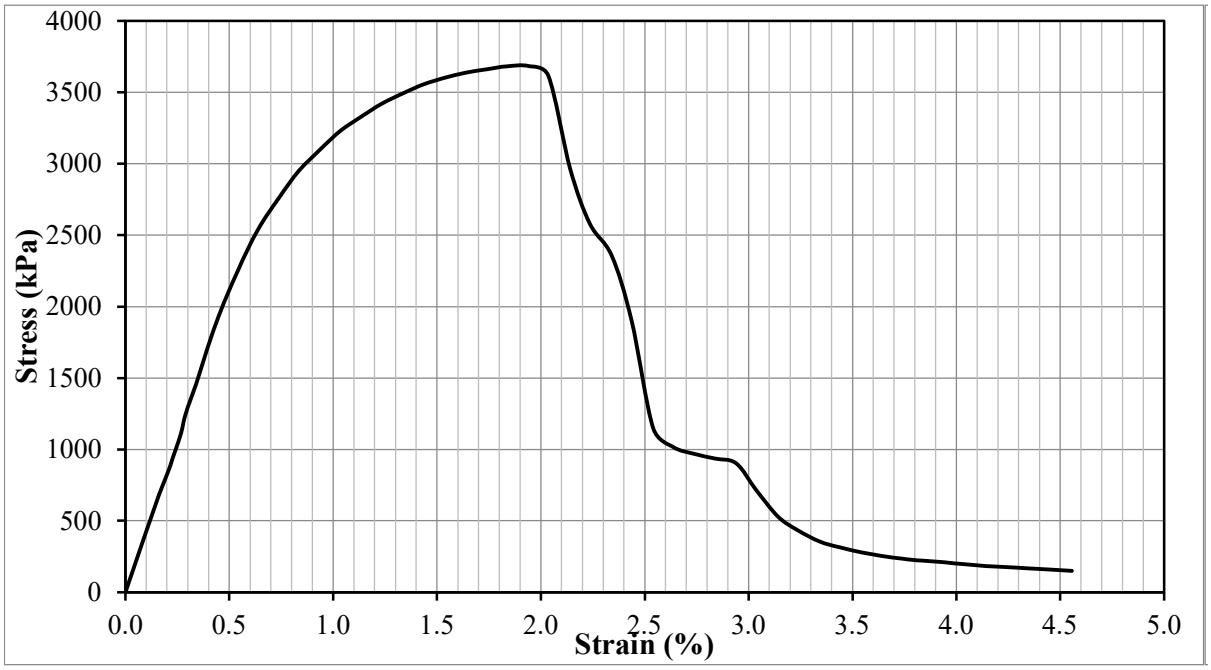
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,190	Strain at failure, εf :	1.54	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	D-2-D2	Initial Area:	2102.5	mm^2
Test Date:	3/15/2018	Weight:	370.0	g
Strain Rate:	1 %/min	Unit Weight:	1774	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	27.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25&45	°C
Additional information		25C 7d - 45C 21d		



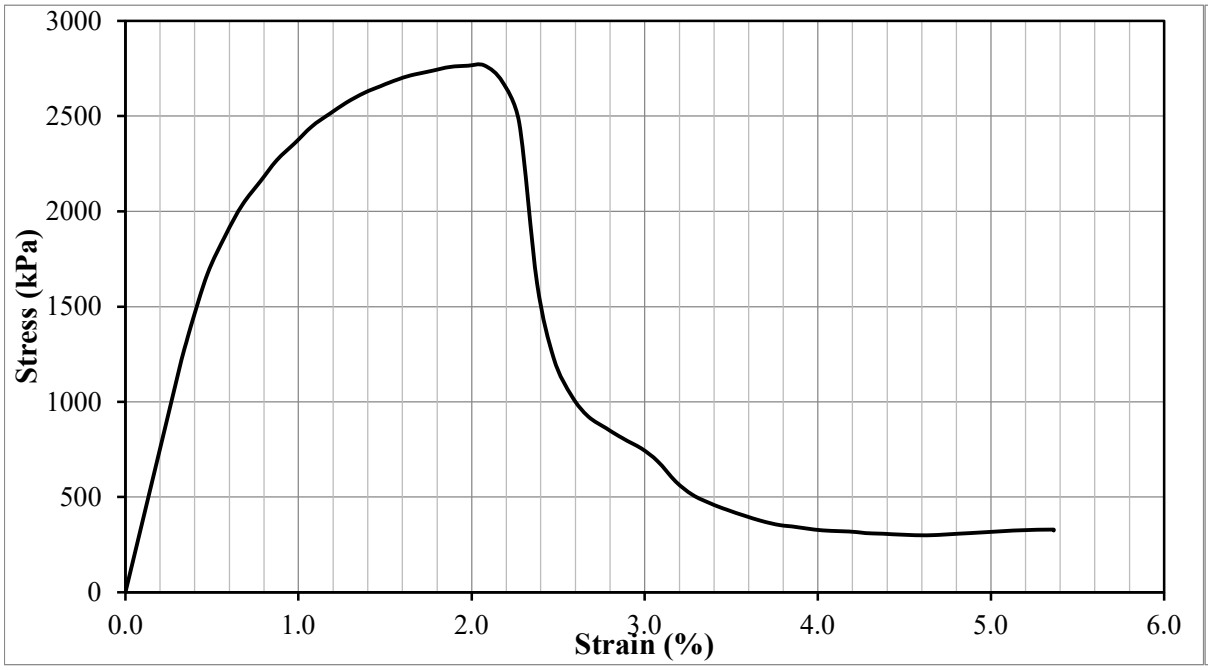
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,267	Strain at failure, εf :	1.63	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	D-2-C2	Initial Area:	2100.5	mm^2
Test Date:	3/15/2018	Weight:	372.3	g
Strain Rate:	1 %/min	Unit Weight:	1780	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	27.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25&45	°C
Additional information		25C 14d - 45C 14d		



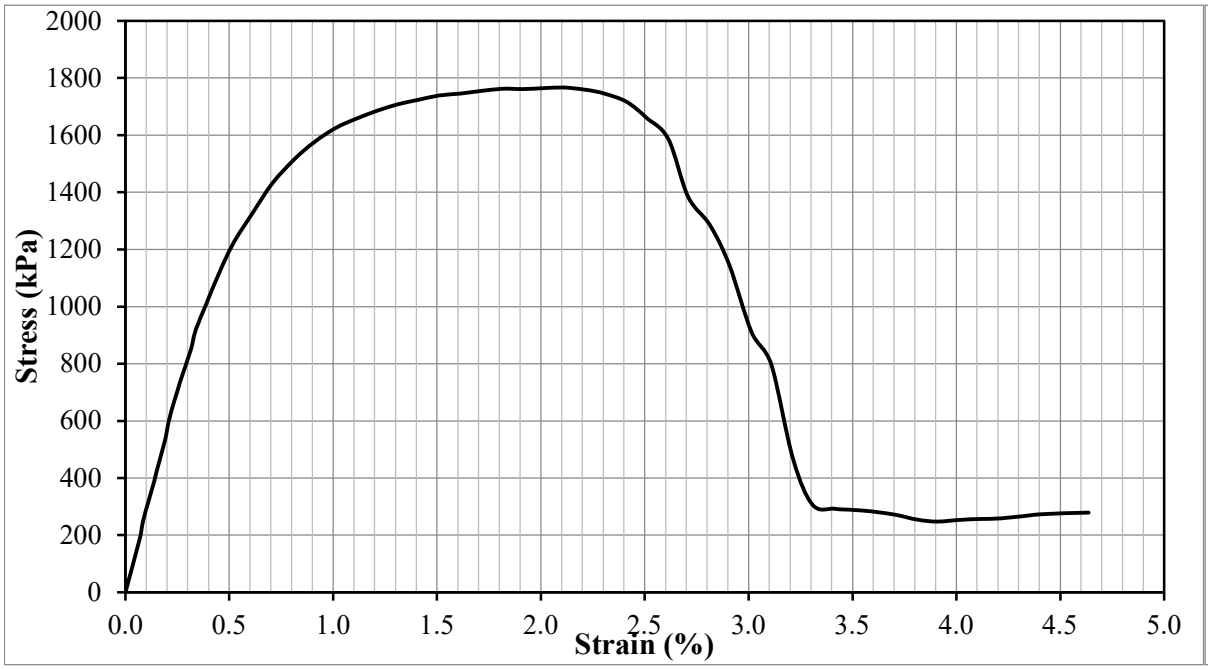
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,662	Strain at failure, εf :	1.94	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	D-2-B2	Initial Area:	2104.6	mm^2
Test Date:	3/15/2018	Weight:	374.5	g
Strain Rate:	1 %/min	Unit Weight:	1776	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25&45	°C
Additional information		25C 21d - 45C 7d		



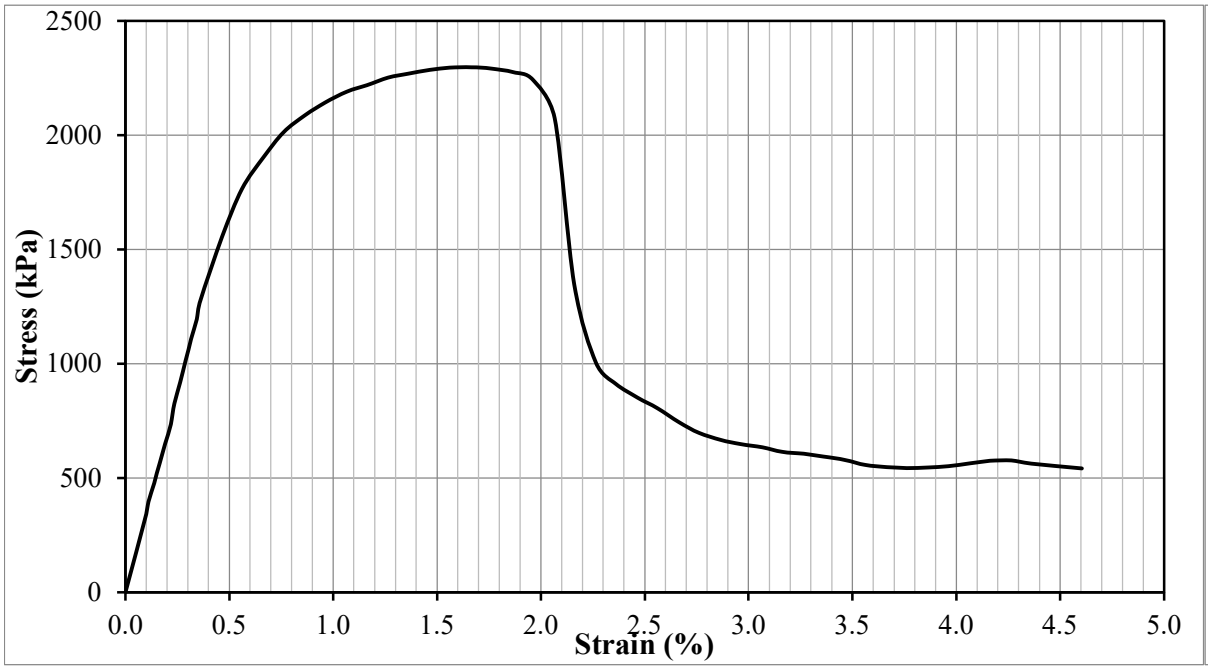
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,751	Strain at failure, εf :	2.07	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	D-2-A	Initial Area:	2100.5	mm^2
Test Date:	3/15/2018	Weight:	370.1	g
Strain Rate:	1 %/min	Unit Weight:	1785	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25&45	°C
Additional information		25C 28d - 45C 0d		



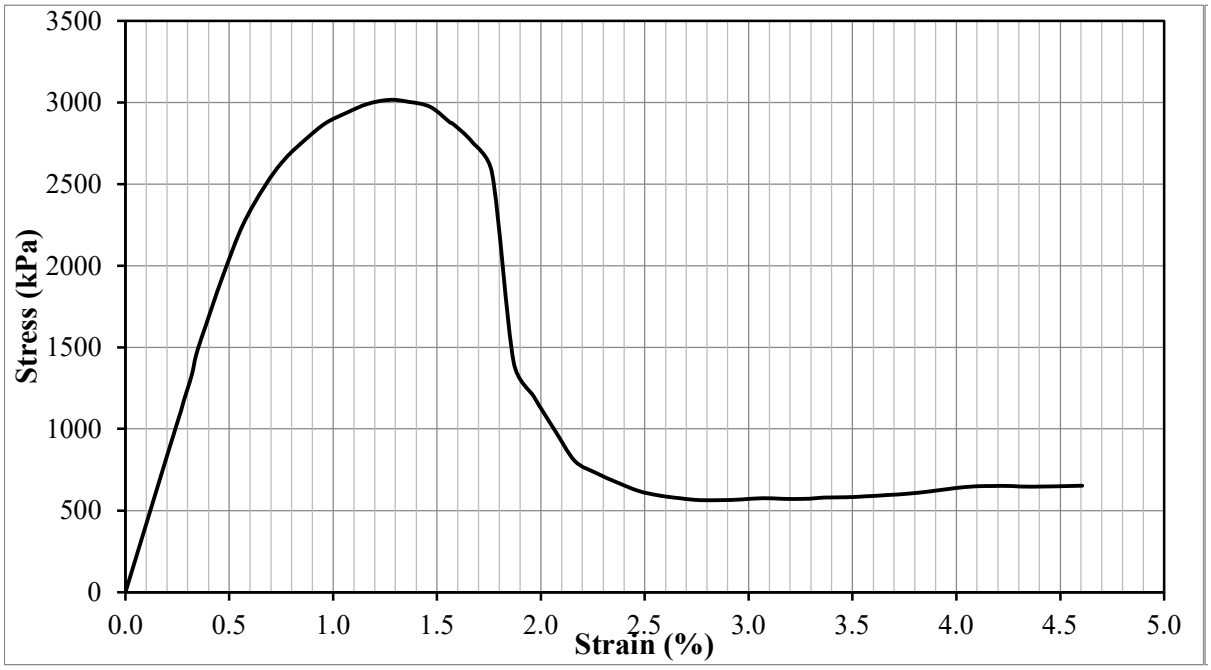
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,753	Strain at failure, εf :	2.11	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	D-2-B1	Initial Area:	2114.9	mm^2
Test Date:	3/15/2018	Weight:	369.0	g
Strain Rate:	1 %/min	Unit Weight:	1775	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25&45	°C
Additional information		45C 7d - 25C 21d		



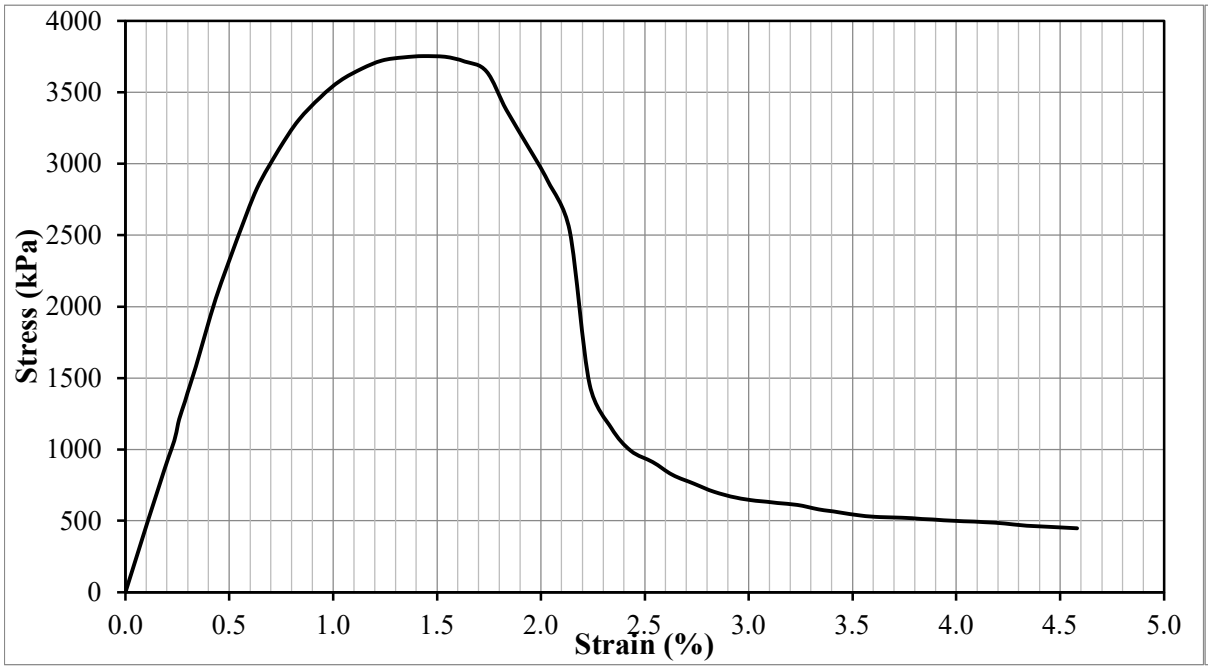
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,277	Strain at failure, εf :	1.67	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	D-2-C1	Initial Area:	2117.0	mm^2
Test Date:	3/15/2018	Weight:	374.0	g
Strain Rate:	1 %/min	Unit Weight:	1776	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25&45	°C
Additional information		45C 14d - 25C 14d		



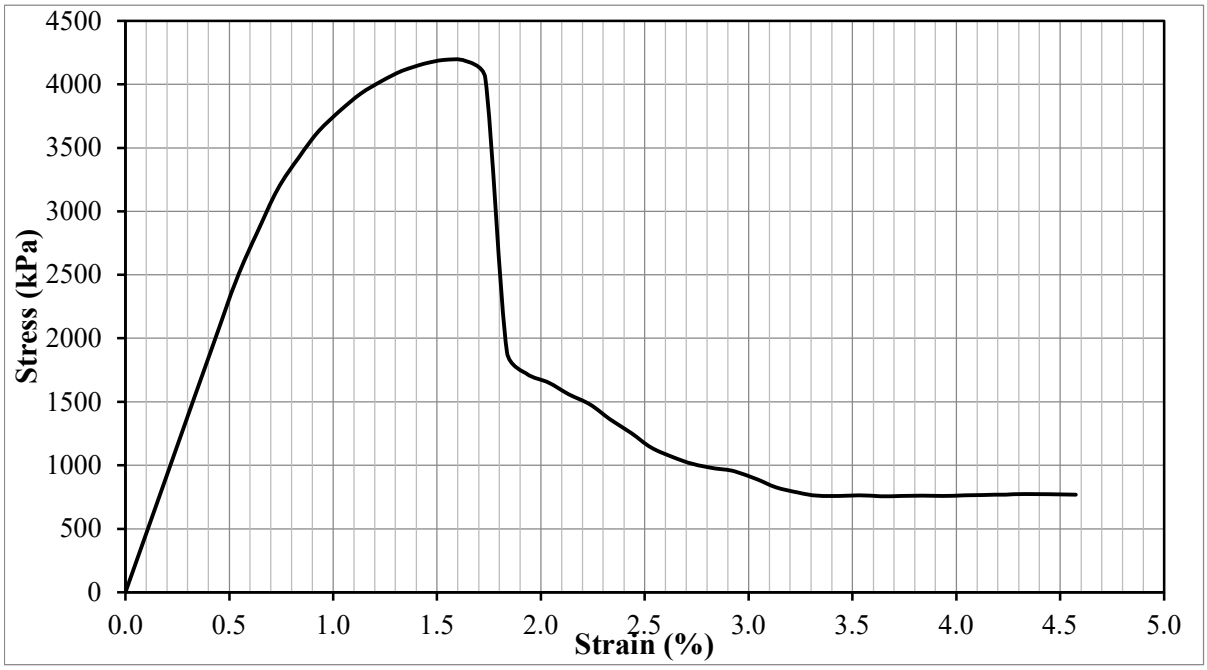
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,996	Strain at failure, εf :	1.27	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	D-2-D1	Initial Area:	2117.0	mm^2
Test Date:	3/15/2018	Weight:	365.3	g
Strain Rate:	1 %/min	Unit Weight:	1779	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25&45	°C
Additional information		45C 21d - 25C 7d		



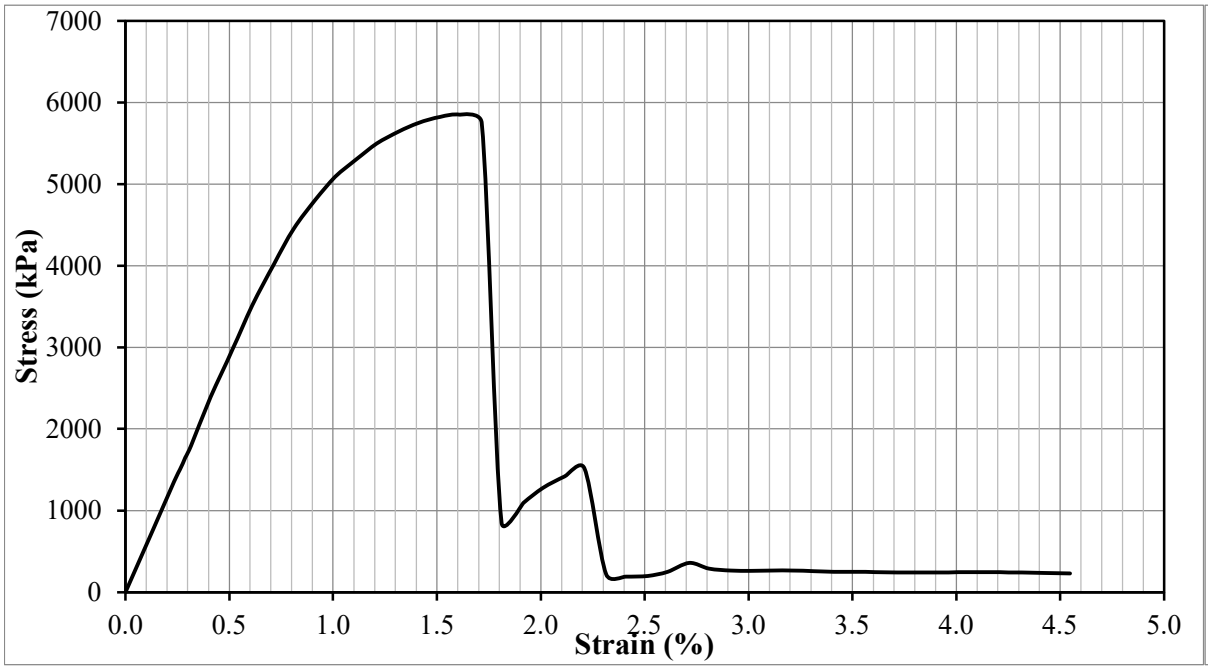
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,713	Strain at failure, εf :	1.43	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	D-2-E	Initial Area:	2112.9	mm^2
Test Date:	3/15/2018	Weight:	373.4	g
Strain Rate:	1 %/min	Unit Weight:	1770	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25&45	°C
Additional information		45C 28d - 25C 0d		



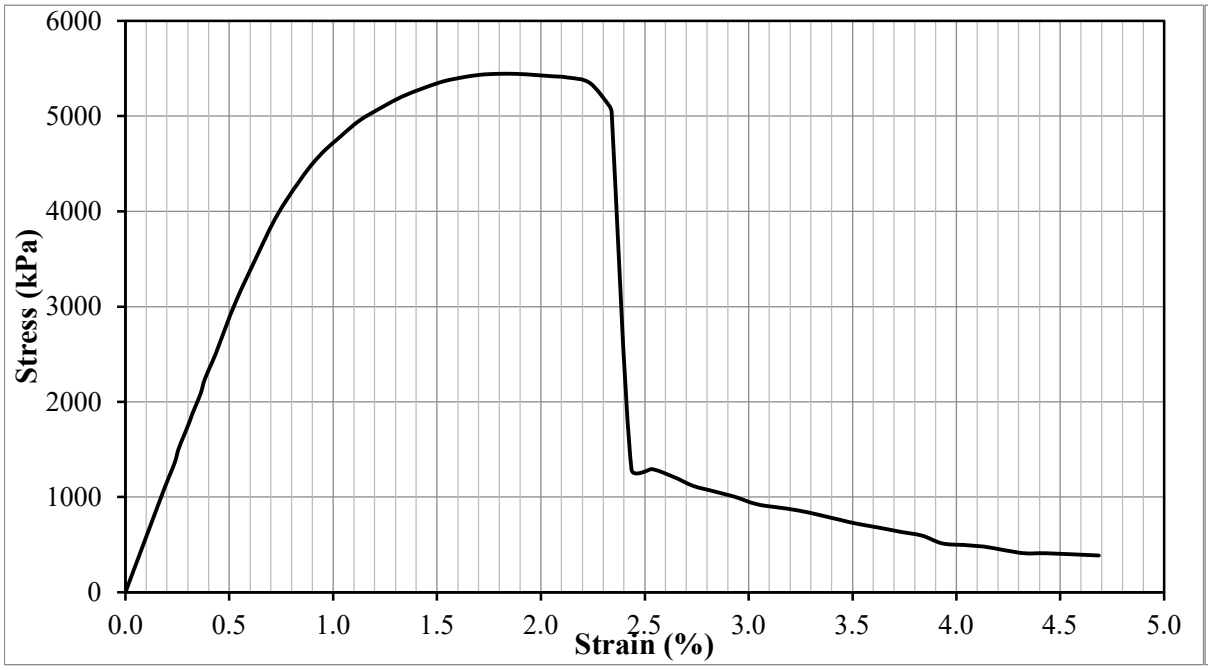
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,166	Strain at failure, εf :	1.53	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	D-3-D2	Initial Area:	2112.9	mm^2
Test Date:	3/16/2018	Weight:	366.1	g
Strain Rate:	1 %/min	Unit Weight:	1732	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25&45	°C
Additional information		25C 7d - 45C 21d		



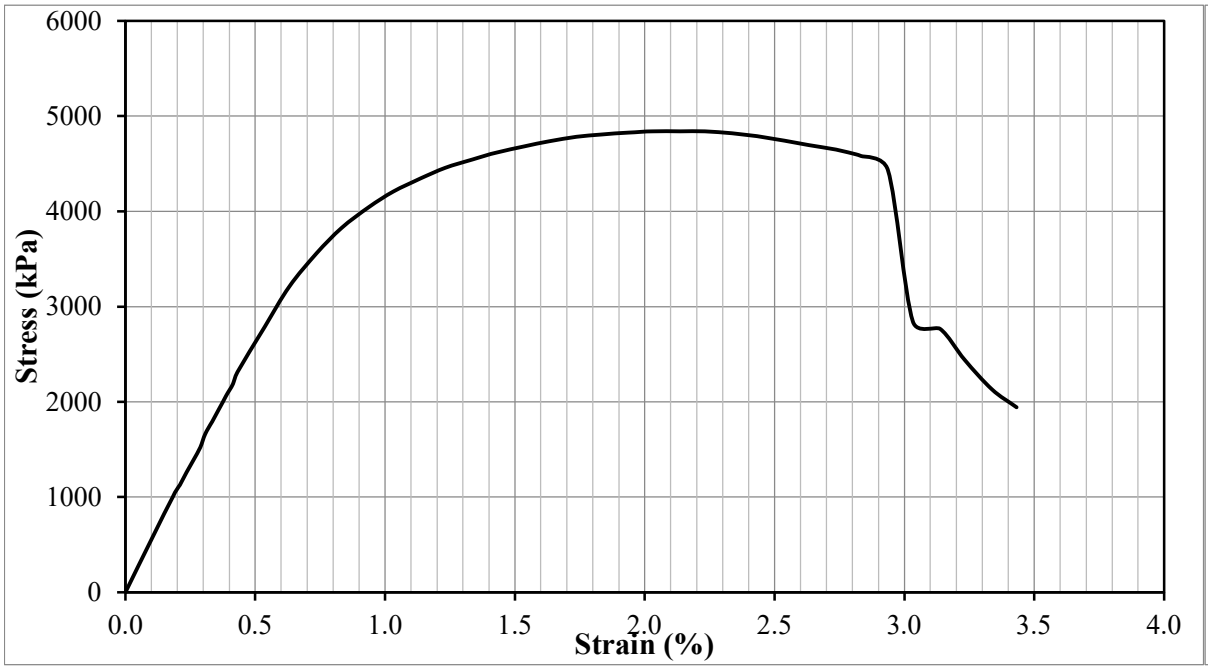
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,817	Strain at failure, εf :	1.61	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	D-3-C2	Initial Area:	2110.8	mm^2
Test Date:	3/16/2018	Weight:	367.5	g
Strain Rate:	1 %/min	Unit Weight:	1734	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25&45	°C
Additional information		25C 14d - 45C 14d		



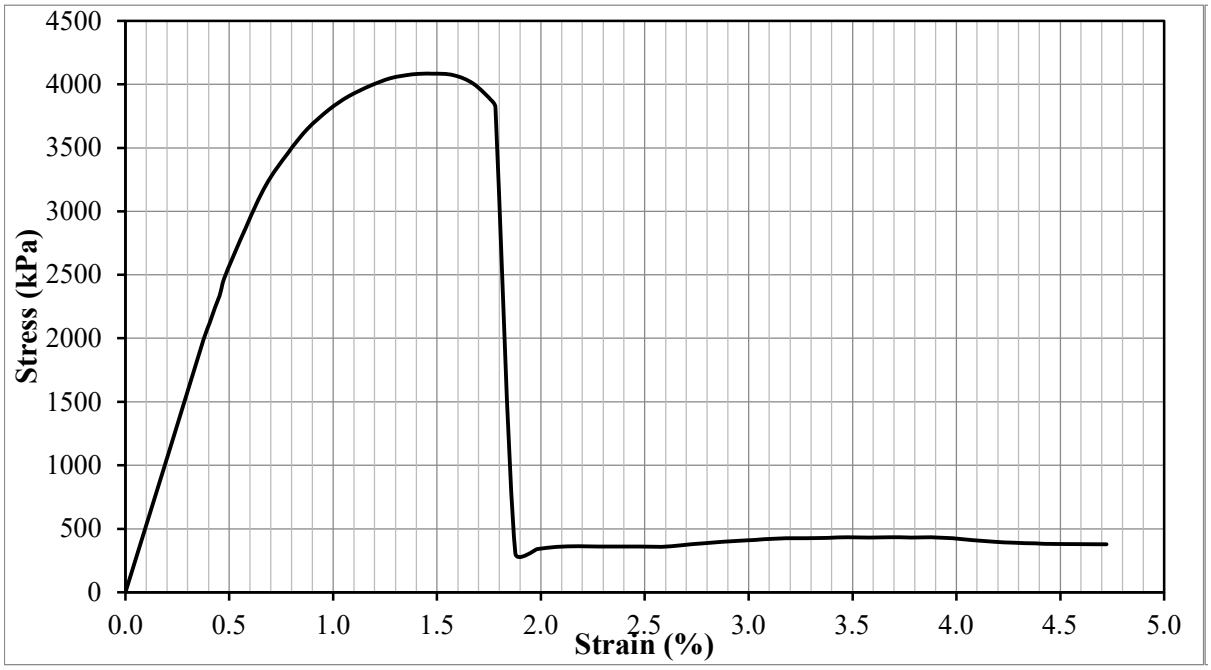
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,416	Strain at failure, εf :	1.84	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	D-3-B2	Initial Area:	2110.8	mm^2
Test Date:	3/16/2018	Weight:	354.8	g
Strain Rate:	1 %/min	Unit Weight:	1721	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25&45	°C
Additional information		25C 21d - 45C 7d		



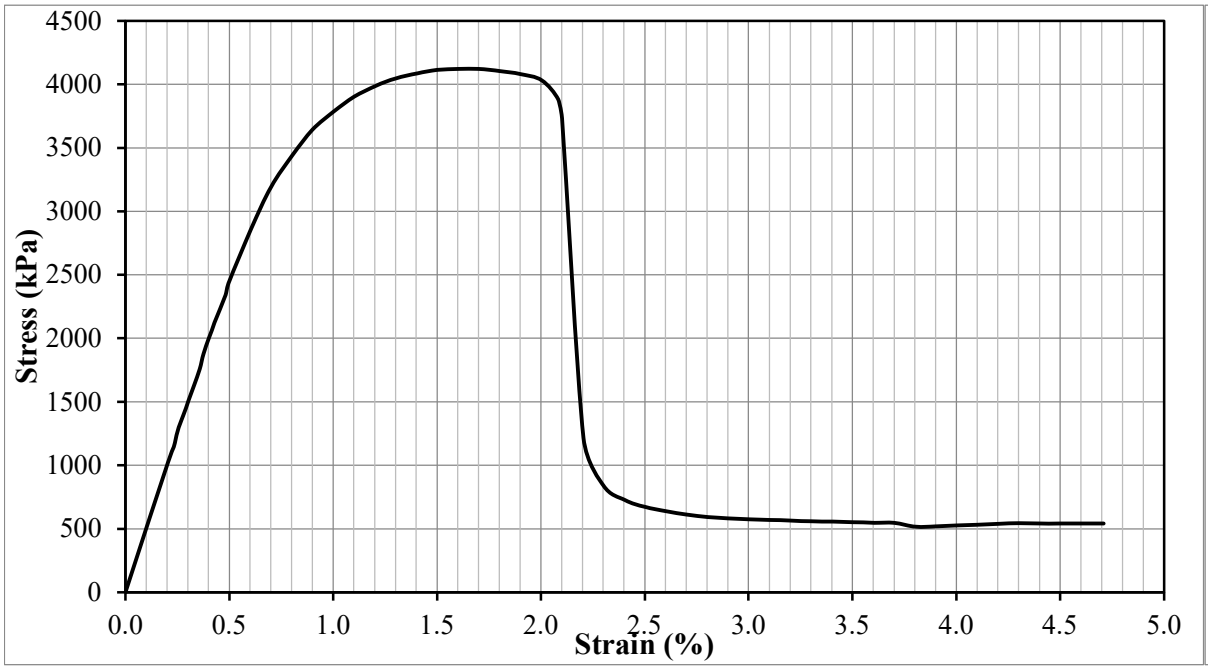
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,796	Strain at failure, εf :	2.03	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	D-3-A	Initial Area:	2110.8	mm^2
Test Date:	3/16/2018	Weight:	366.6	g
Strain Rate:	1 %/min	Unit Weight:	1741	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	28.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25&45	°C
Additional information		25C 28d - 45C 0d		



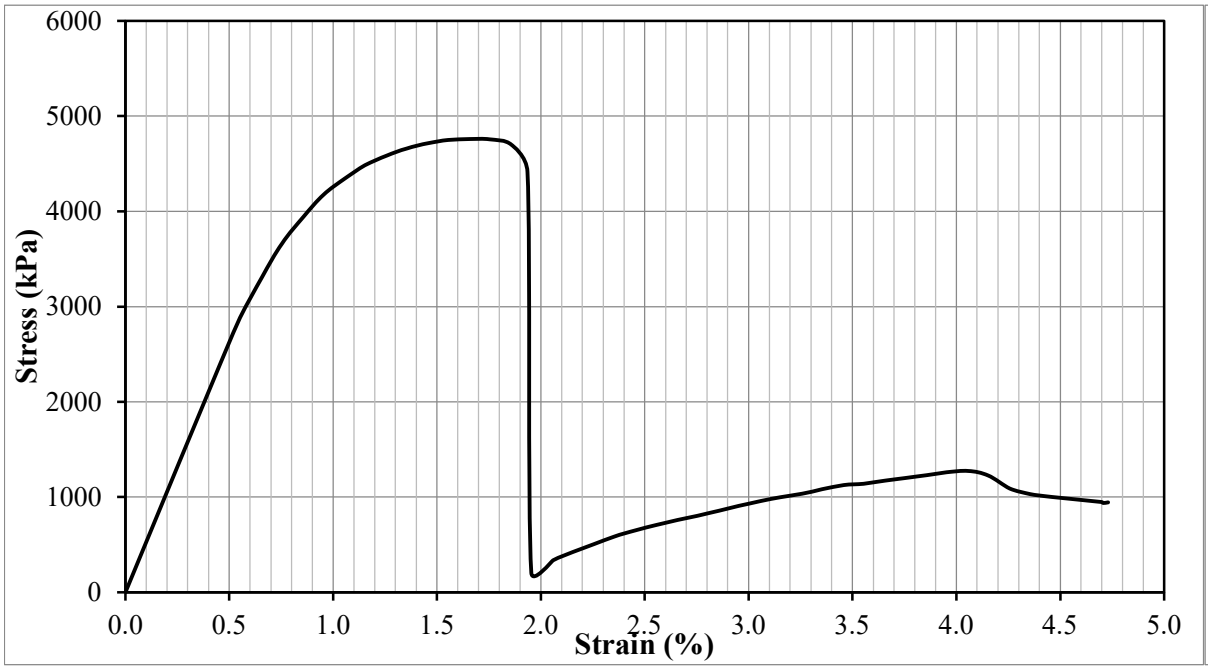
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,059	Strain at failure, εf :	1.48	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	D-3-B1	Initial Area:	2121.1	mm^2
Test Date:	3/16/2018	Weight:	365.1	g
Strain Rate:	1 %/min	Unit Weight:	1729	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	28.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25&45	°C
Additional information		45C 7d - 25C 21d		



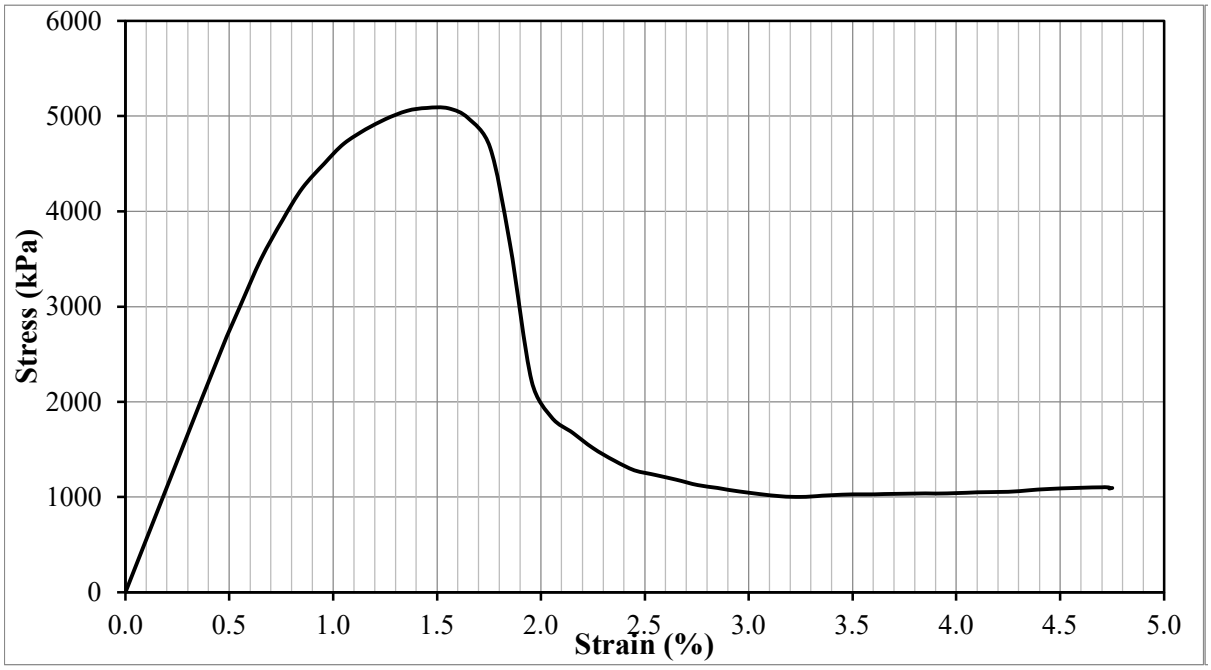
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,094	Strain at failure, εf :	1.70	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	D-3-C1	Initial Area:	2114.9	mm^2
Test Date:	3/16/2018	Weight:	367.0	g
Strain Rate:	1 %/min	Unit Weight:	1741	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	28.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25&45	°C
Additional information		45C 14d - 25C 14d		



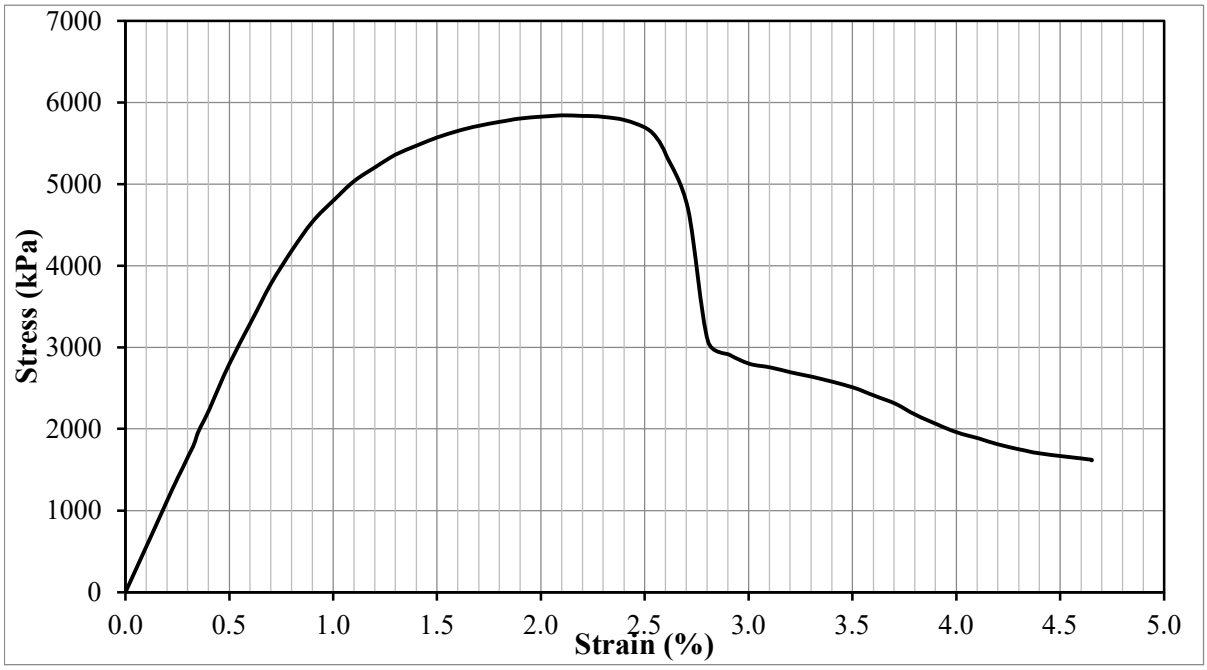
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,727	Strain at failure, εf :	1.66	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	D-3-D1	Initial Area:	2112.9	mm^2
Test Date:	3/16/2018	Weight:	368.8	g
Strain Rate:	1 %/min	Unit Weight:	1738	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	28.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25&45	°C
Additional information		45C 21d - 25C 7d		



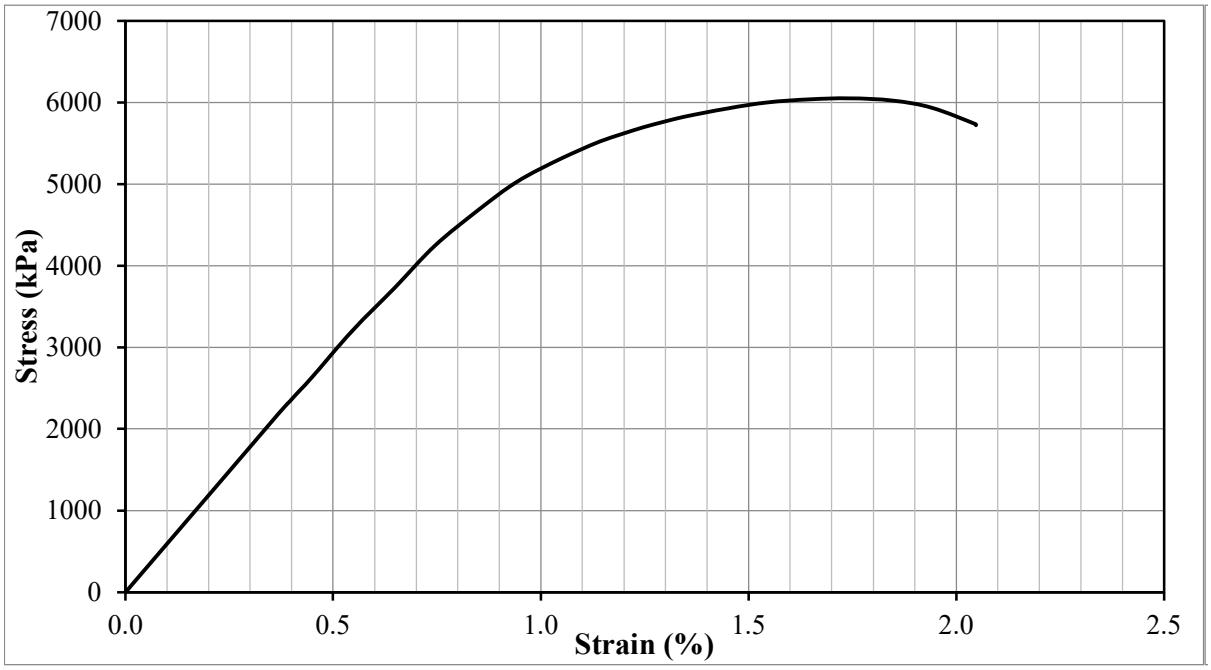
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,060	Strain at failure, εf :	1.45	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	D-3-E	Initial Area:	2117.0	mm^2
Test Date:	3/16/2018	Weight:	365.3	g
Strain Rate:	1 %/min	Unit Weight:	1729	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	28.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25&45	°C
Additional information		45C 28d - 25C 0d		



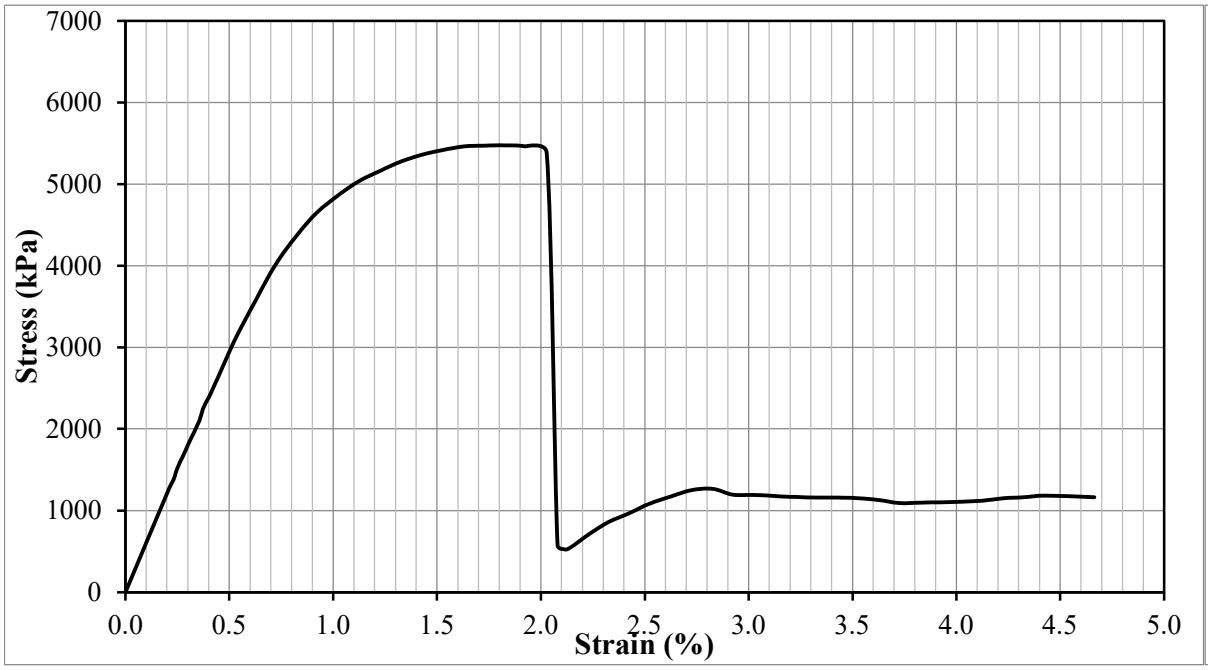
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,804	Strain at failure, εf :	2.10	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	D-4-D2	Initial Area:	2112.9	mm^2
Test Date:	3/17/2018	Weight:	365.6	g
Strain Rate:	1 %/min	Unit Weight:	1731	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25&45	°C
Additional information		25C 7d - 45C 21d		



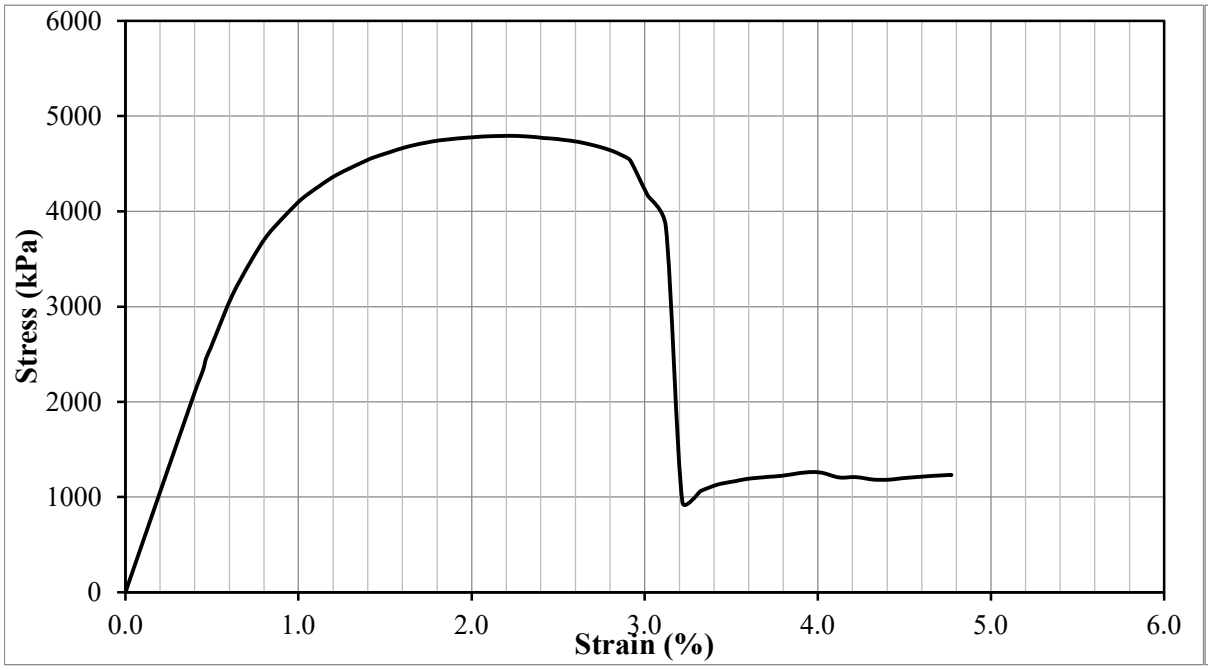
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	6,016	Strain at failure, εf :	1.74	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	D-4-C2	Initial Area:	2106.6	mm^2
Test Date:	3/17/2018	Weight:	362.8	g
Strain Rate:	1 %/min	Unit Weight:	1734	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25&45	°C
Additional information		25C 14d - 45C 14d		



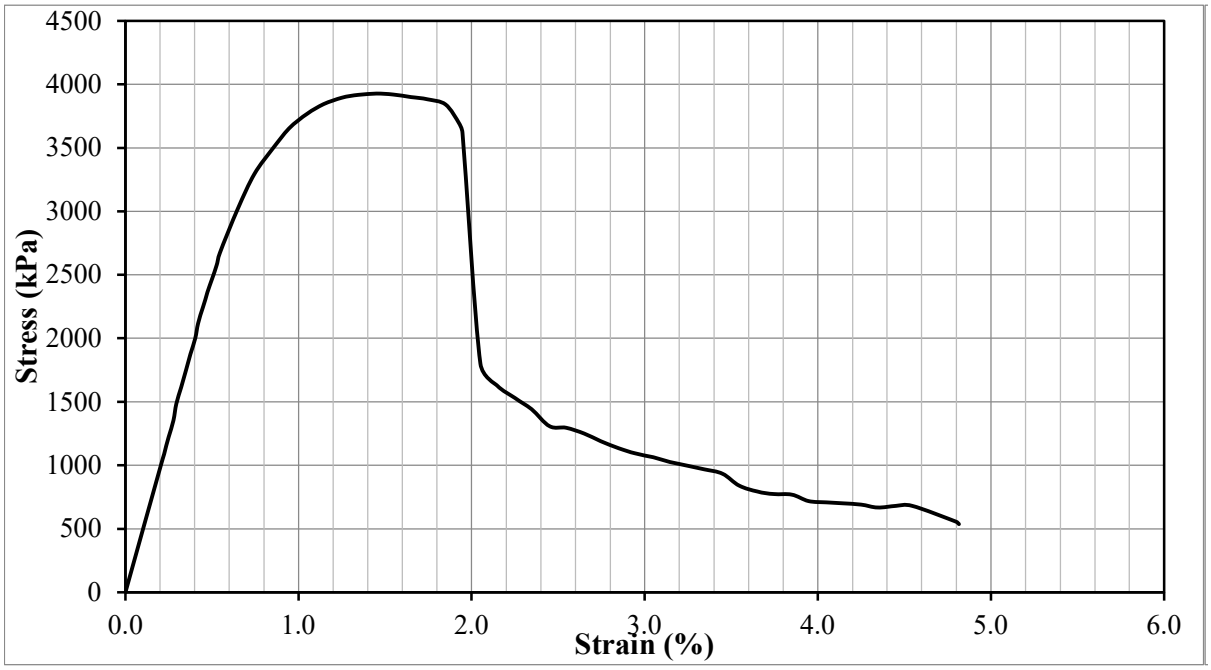
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,438	Strain at failure, εf :	1.83	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	D-4-B2	Initial Area:	2108.7	mm^2
Test Date:	3/17/2018	Weight:	359.8	g
Strain Rate:	1 %/min	Unit Weight:	1730	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25&45	°C
Additional information		25C 21d - 45C 7d		



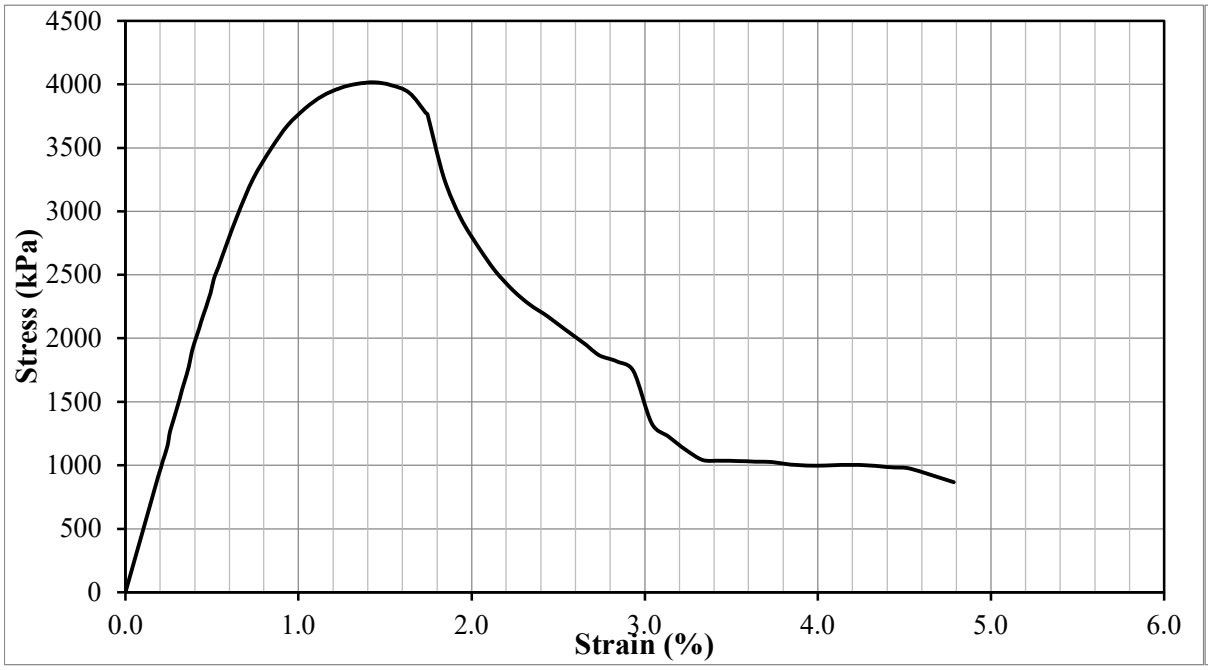
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,755	Strain at failure, εf :	2.22	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	D-4-A	Initial Area:	2108.7	mm^2
Test Date:	3/17/2018	Weight:	369.7	g
Strain Rate:	1 %/min	Unit Weight:	1745	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25&45	°C
Additional information		25C 28d - 45C 0d		



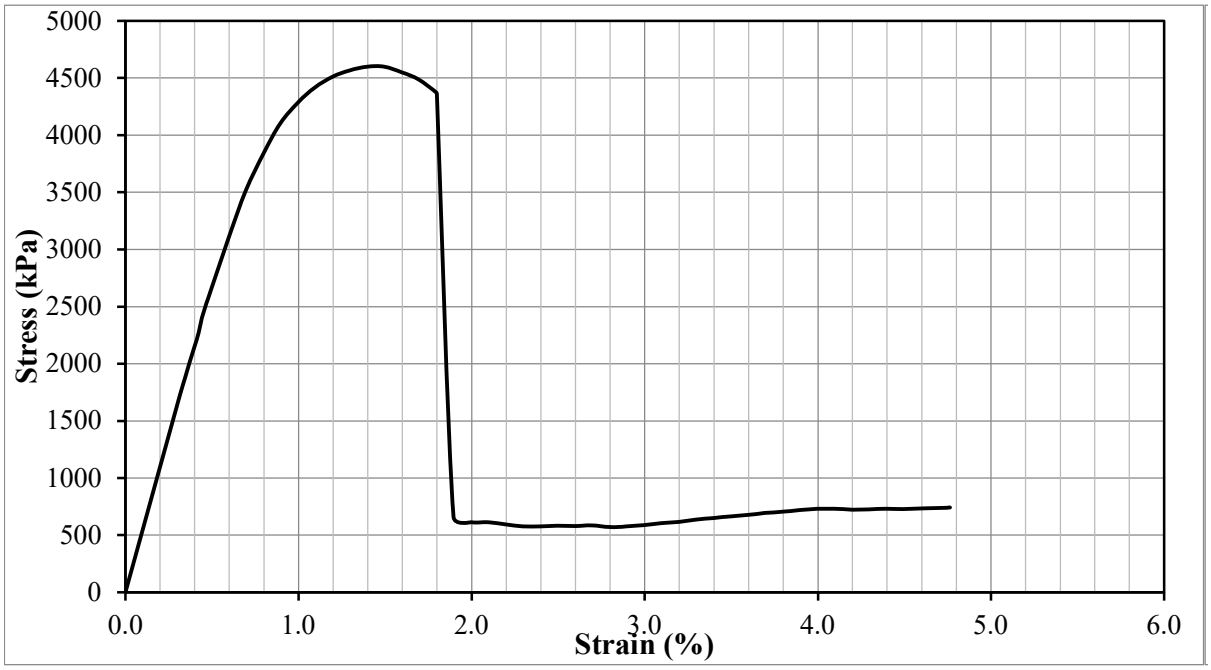
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,907	Strain at failure, εf :	1.45	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	D-4-B1	Initial Area:	2117.0	mm^2
Test Date:	3/17/2018	Weight:	367.4	g
Strain Rate:	1 %/min	Unit Weight:	1738	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25&45	°C
Additional information		45C 7d - 25C 21d		



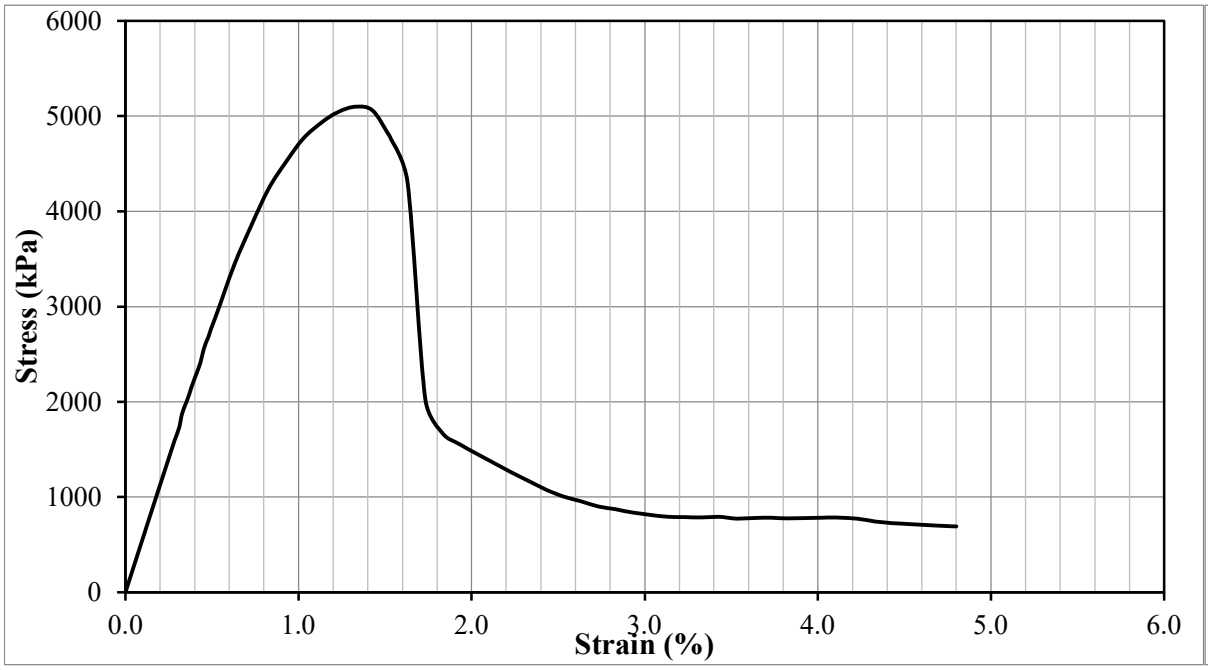
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,991	Strain at failure, εf :	1.44	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	D-4-C1	Initial Area:	2110.8	mm^2
Test Date:	3/17/2018	Weight:	366.4	g
Strain Rate:	1 %/min	Unit Weight:	1742	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	28.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25&45	°C
Additional information		45C 14d - 25C 14d		



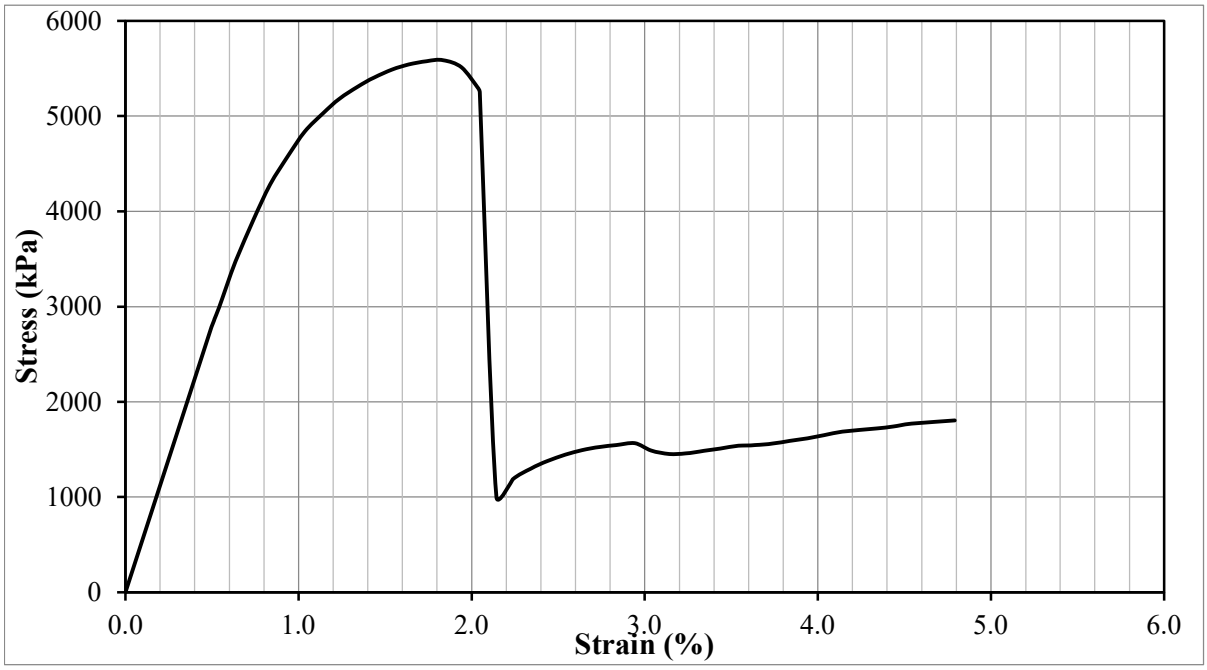
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,569	Strain at failure, εf :	1.49	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	D-4-D1	Initial Area:	2121.1	mm^2
Test Date:	3/17/2018	Weight:	367.2	g
Strain Rate:	1 %/min	Unit Weight:	1739	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	28.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25&45	°C
Additional information		45C 21d - 25C 7d		



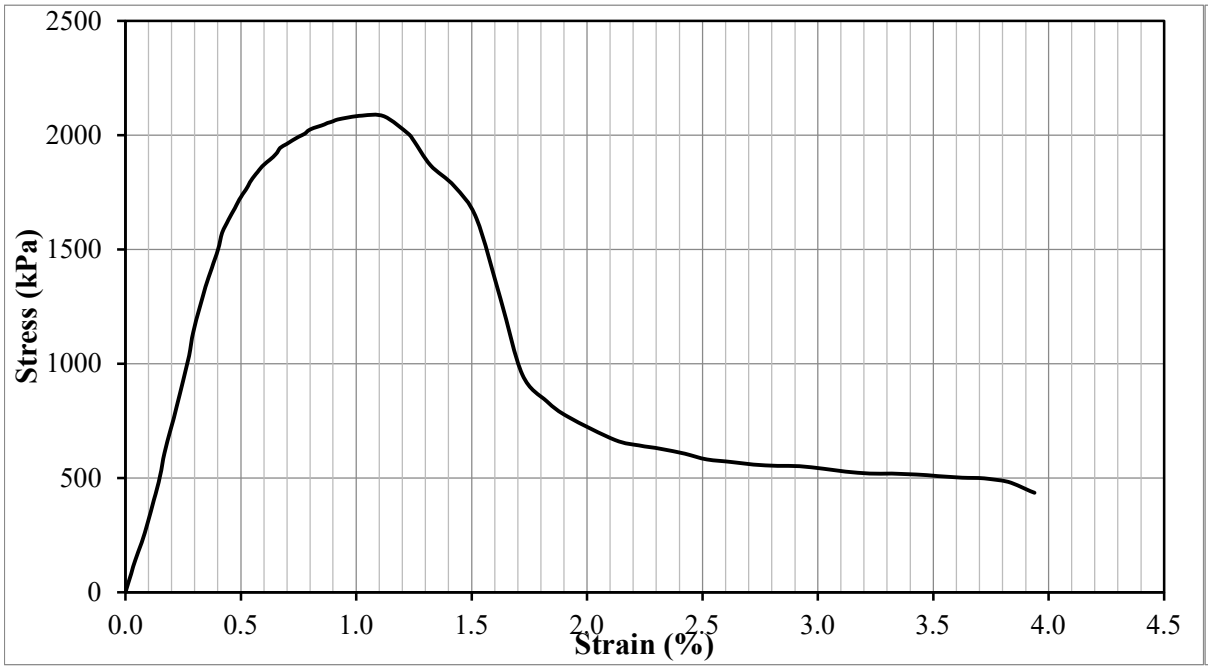
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,065	Strain at failure, εf :	1.33	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	D-4-E	Initial Area:	2117.0	mm^2
Test Date:	3/17/2018	Weight:	365.3	g
Strain Rate:	1 %/min	Unit Weight:	1730	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	28.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25&45	°C
Additional information		45C 28d - 25C 0d		



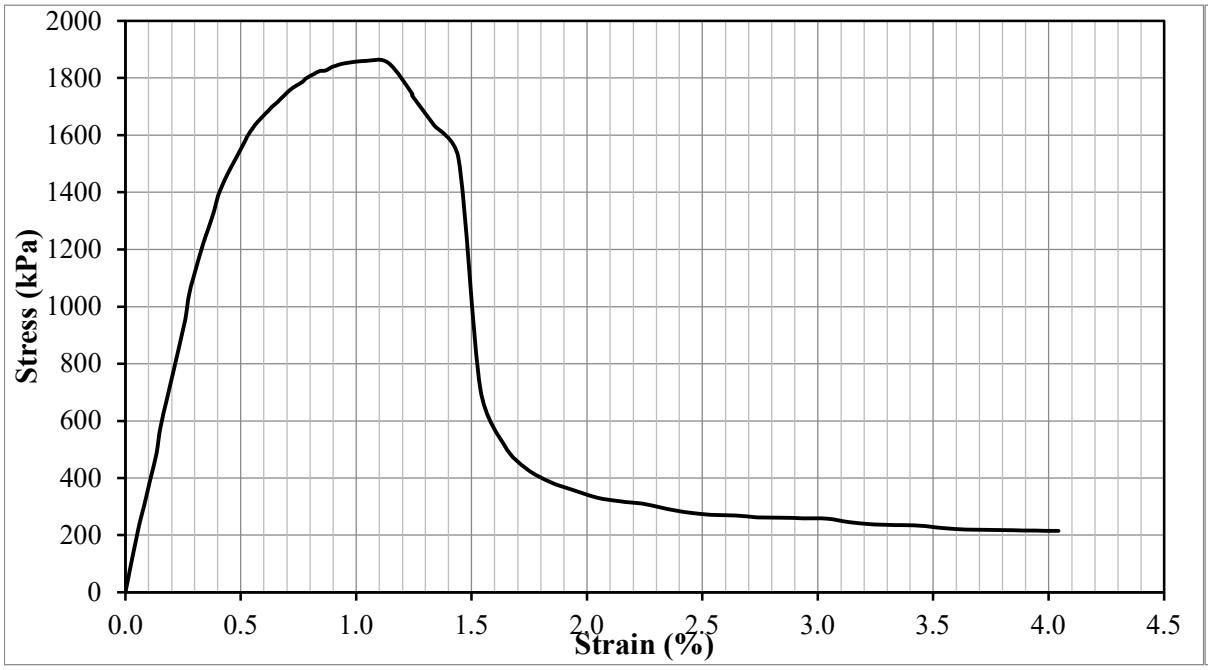
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,552	Strain at failure, εf :	1.84	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	D-5-A	Initial Area:	2127.4	mm^2
Test Date:	6/10/2019	Weight:	372.5	g
Strain Rate:	1 %/min	Unit Weight:	1773	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	14.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25&45	°C
Additional information		45C 7d - 25C 7d		



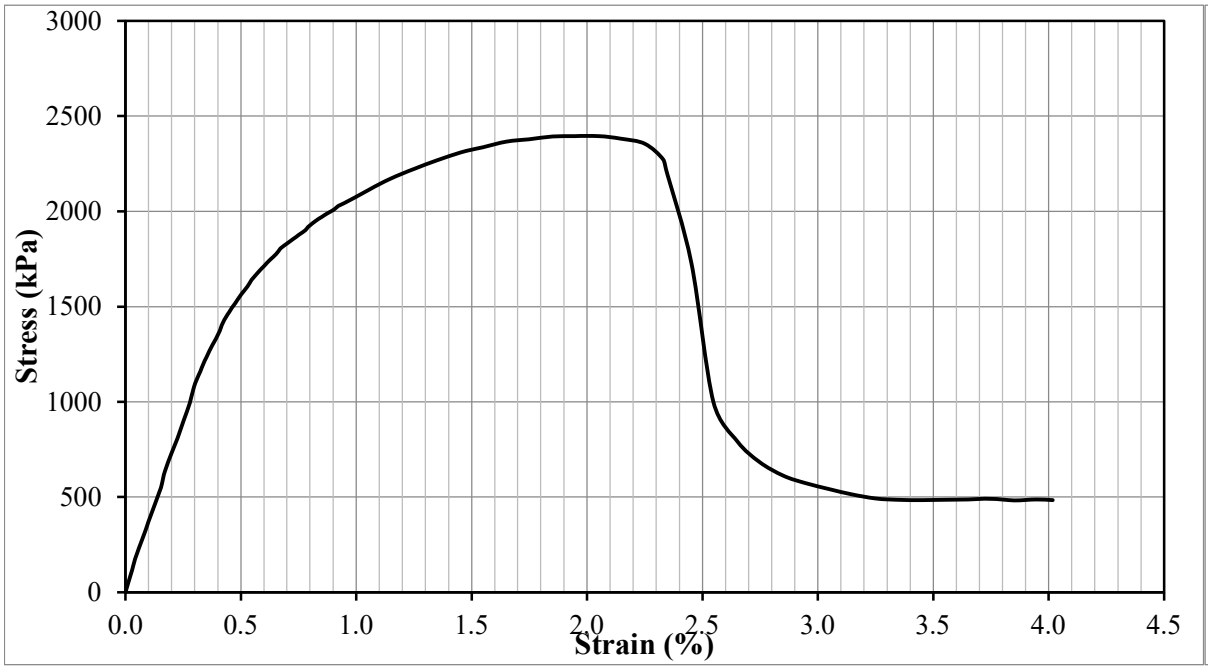
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,068	Strain at failure, εf :	1.02	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.1	mm
I.D.:	D-5-H	Initial Area:	2135.7	mm^2
Test Date:	6/10/2019	Weight:	369.6	g
Strain Rate:	1 %/min	Unit Weight:	1763	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	14.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25&45	°C
Additional information		45C 7d - 25C 7d		



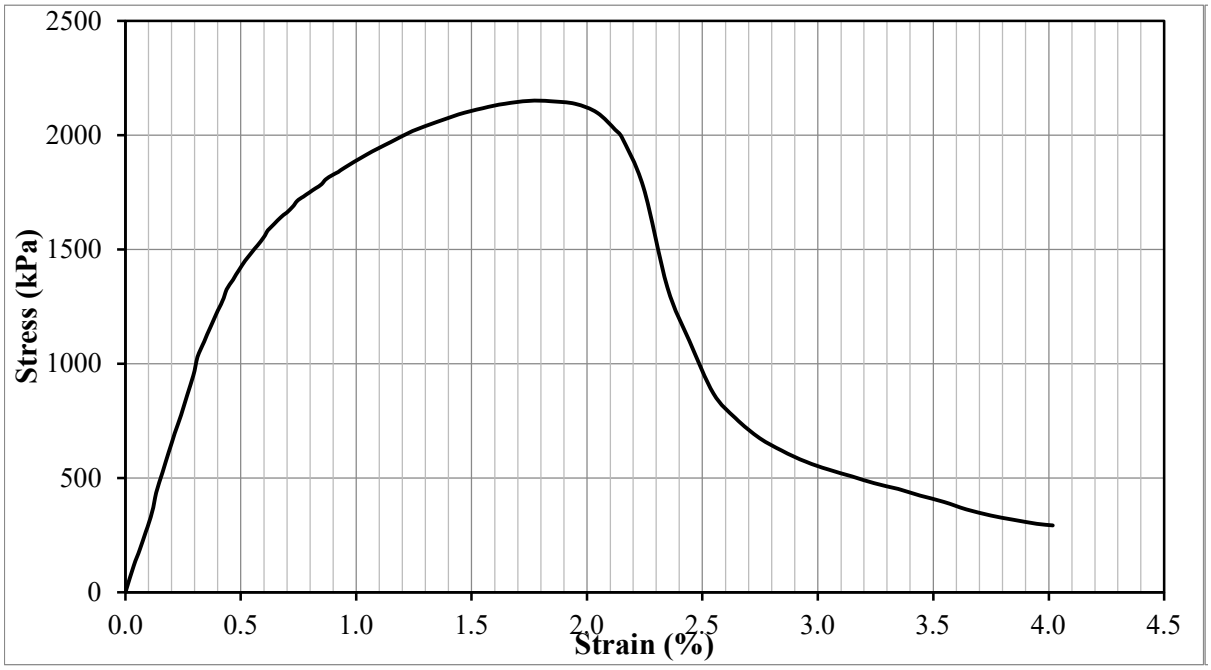
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,842	Strain at failure, εf :	1.04	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	D-5-B	Initial Area:	2110.8	mm^2
Test Date:	6/10/2019	Weight:	370.3	g
Strain Rate:	1 %/min	Unit Weight:	1767	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	14.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25&45	°C
Additional information		25C 7d - 45C 7d		



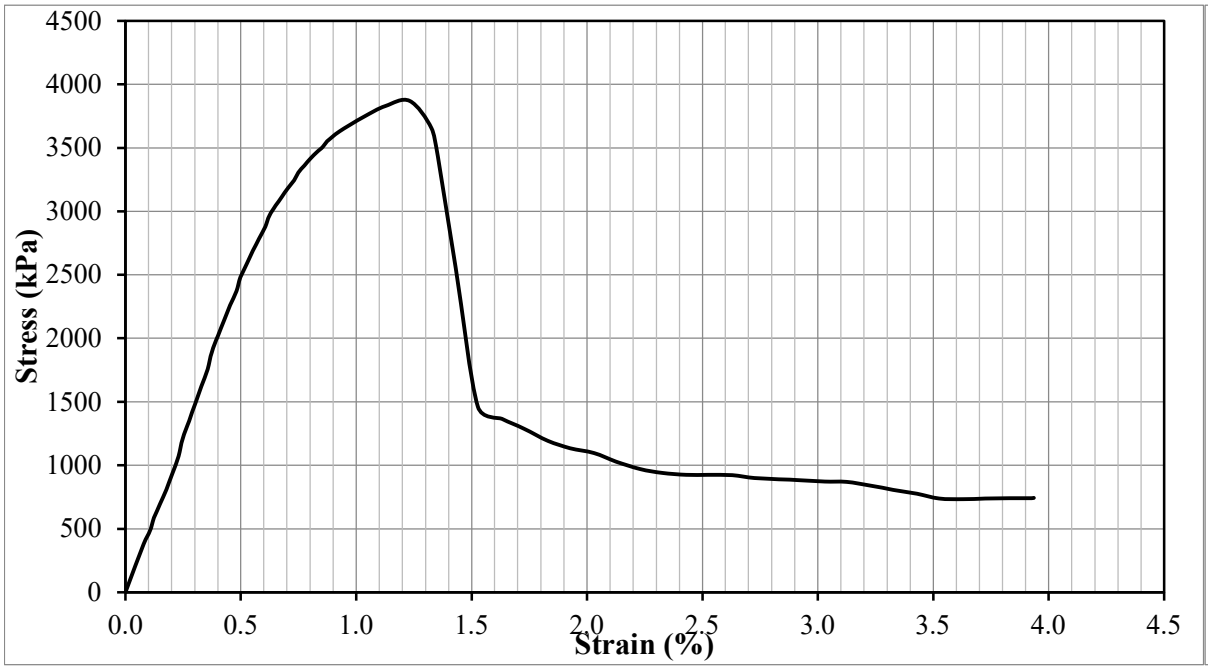
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,379	Strain at failure, εf :	1.95	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	D-5-G	Initial Area:	2117.0	mm^2
Test Date:	6/10/2019	Weight:	367.0	g
Strain Rate:	1 %/min	Unit Weight:	1753	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	14.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25&45	°C
Additional information		25C 7d - 45C 7d		



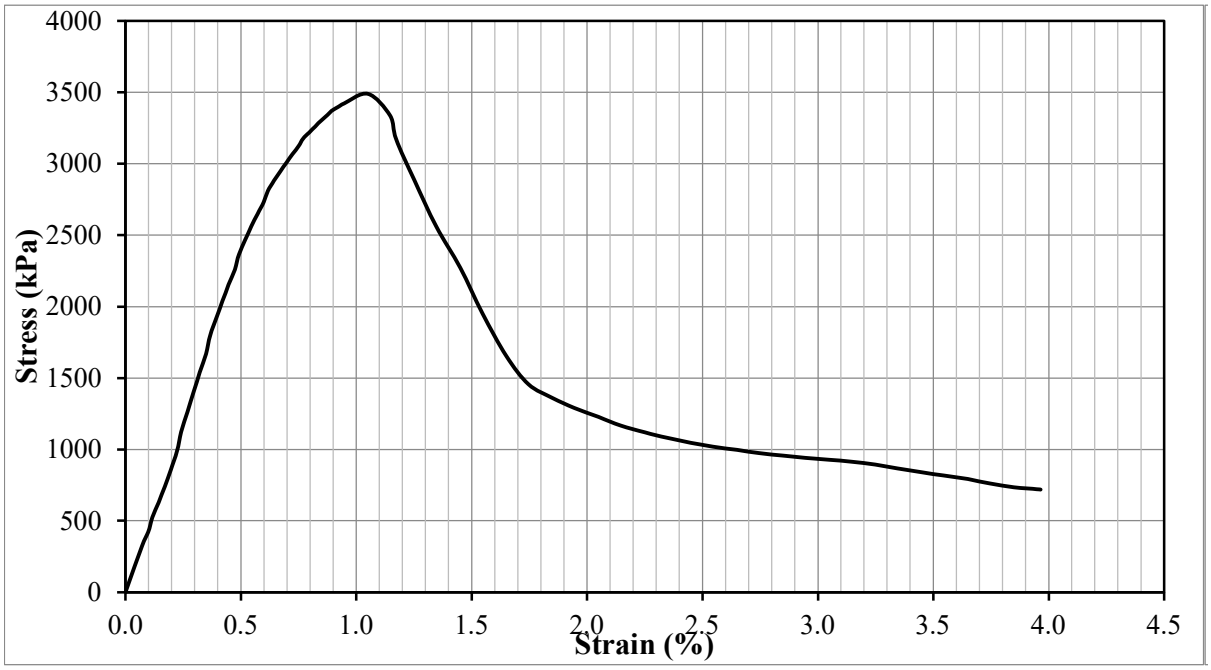
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,134	Strain at failure, εf :	1.75	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.1	mm
I.D.:	D-5-C	Initial Area:	2131.5	mm^2
Test Date:	6/17/2019	Weight:	375.2	g
Strain Rate:	1 %/min	Unit Weight:	1755	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	21.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25&45	°C
Additional information		45C 7d - 25C 14d		



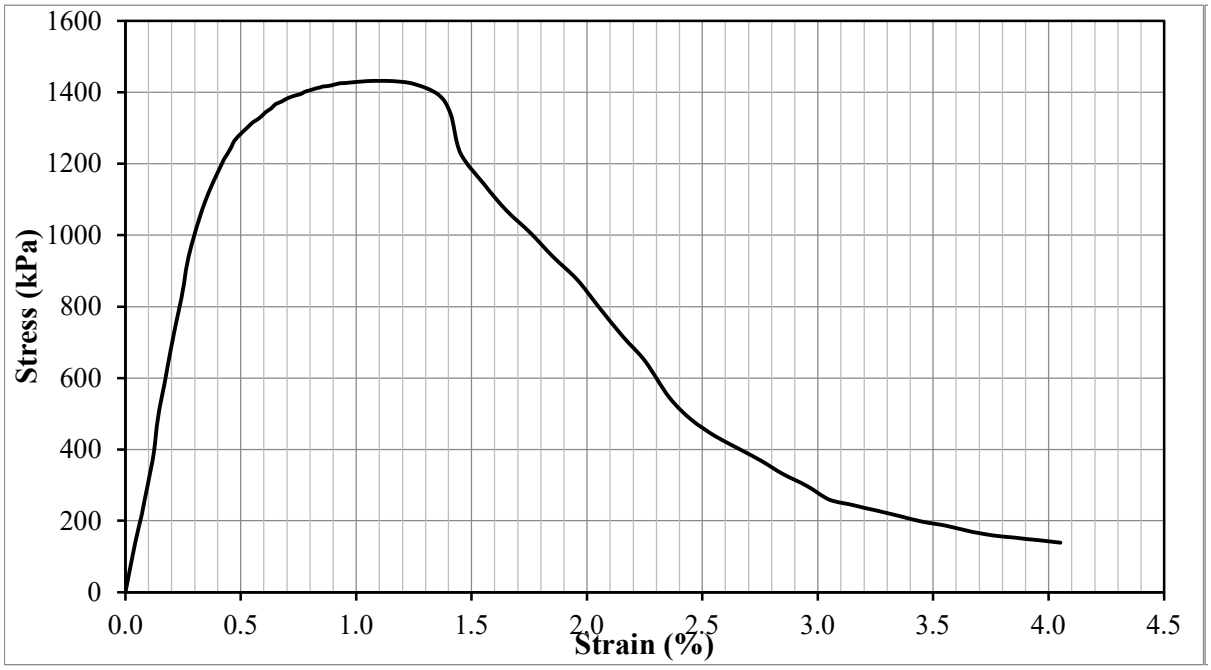
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,846	Strain at failure, εf :	1.23	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.1	mm
I.D.:	D-5-F	Initial Area:	2135.7	mm^2
Test Date:	6/17/2019	Weight:	376.9	g
Strain Rate:	1 %/min	Unit Weight:	1754	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	21.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25&45	°C
Additional information		45C 7d - 25C 14d		



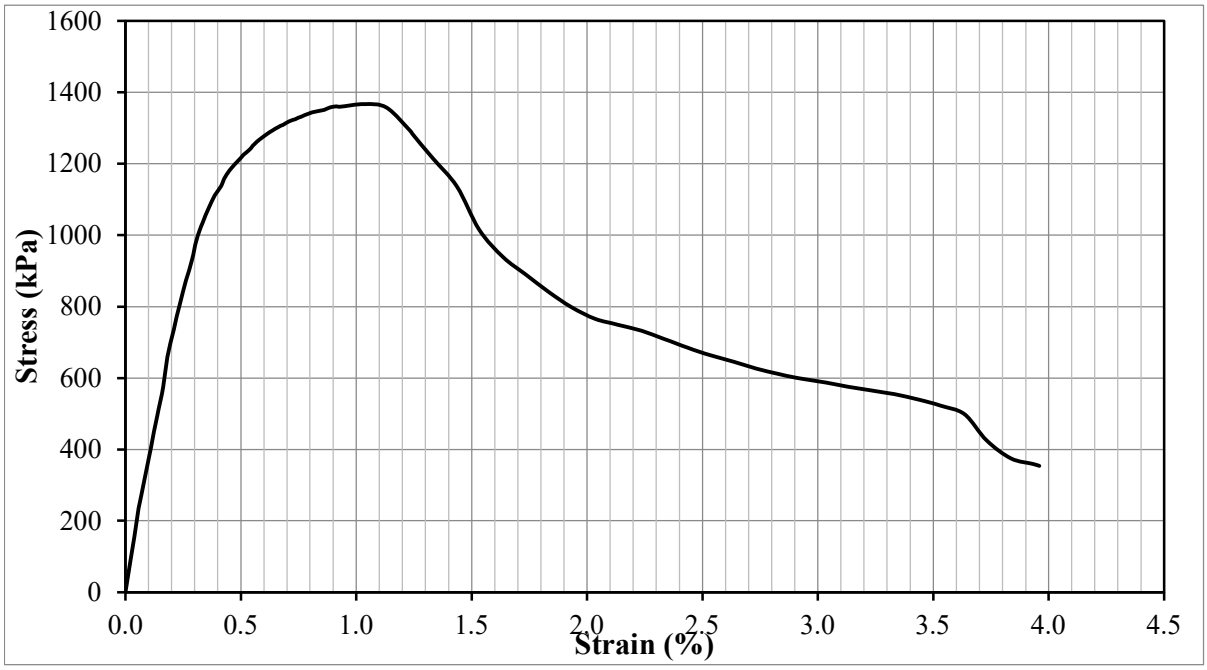
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,469	Strain at failure, εf :	1.05	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	D-5-D	Initial Area:	2127.4	mm^2
Test Date:	6/17/2019	Weight:	375.8	g
Strain Rate:	1 %/min	Unit Weight:	1763	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	21.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25&45	°C
Additional information		25C 7d - 45C 14d		



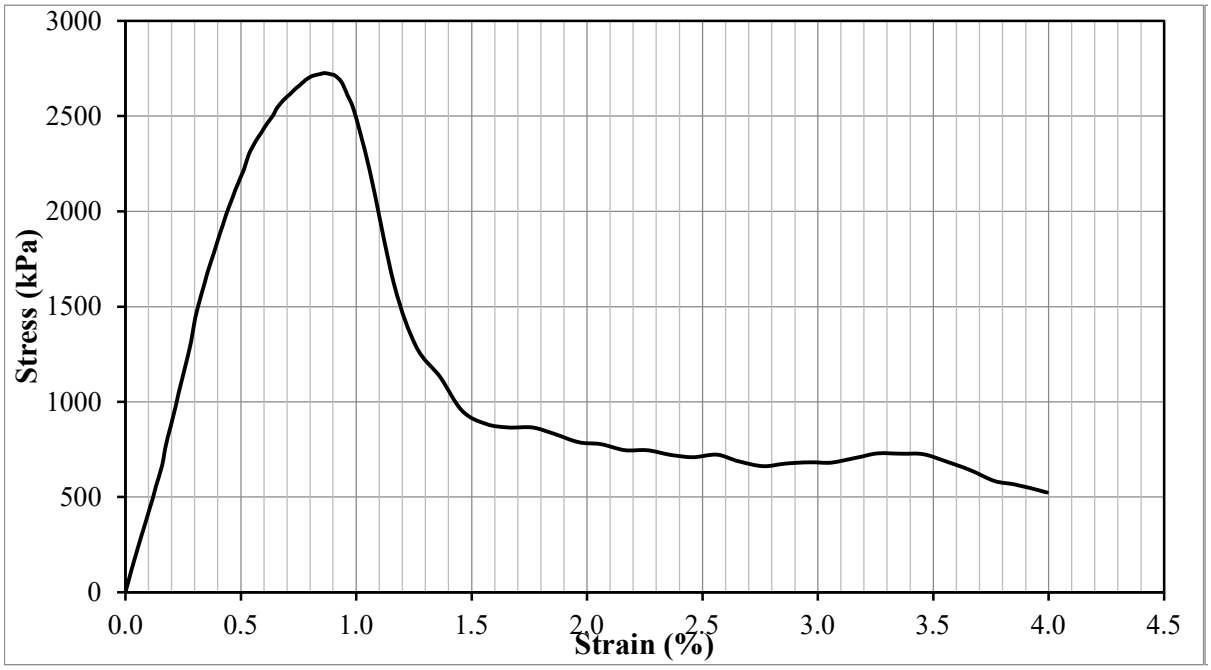
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,423	Strain at failure, εf :	1.05	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	D-5-E	Initial Area:	2123.2	mm^2
Test Date:	6/17/2019	Weight:	372.1	g
Strain Rate:	1 %/min	Unit Weight:	1769	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	21.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25&45	°C
Additional information		25C 7d - 45C 14d		



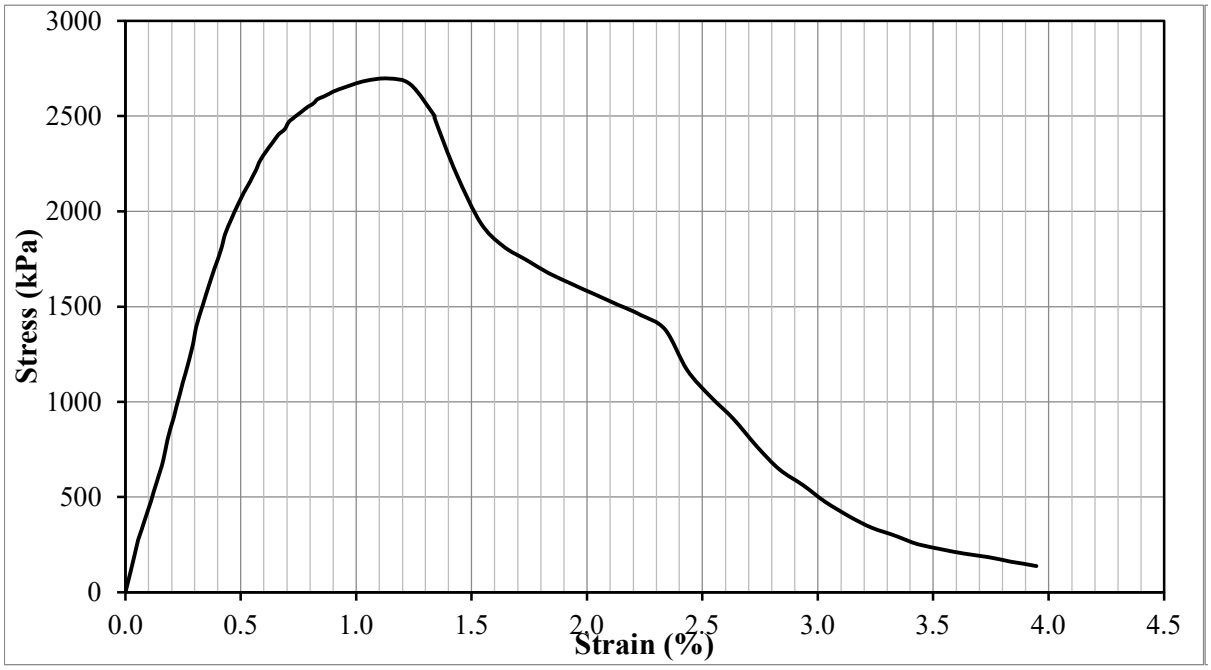
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,357	Strain at failure, εf :	1.04	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.1	mm
I.D.:	D-6-A	Initial Area:	2131.5	mm^2
Test Date:	7/10/2019	Weight:	366.4	g
Strain Rate:	1 %/min	Unit Weight:	1764	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	20.8	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25&45	°C
Additional information		45C 14d - 25C 7d		



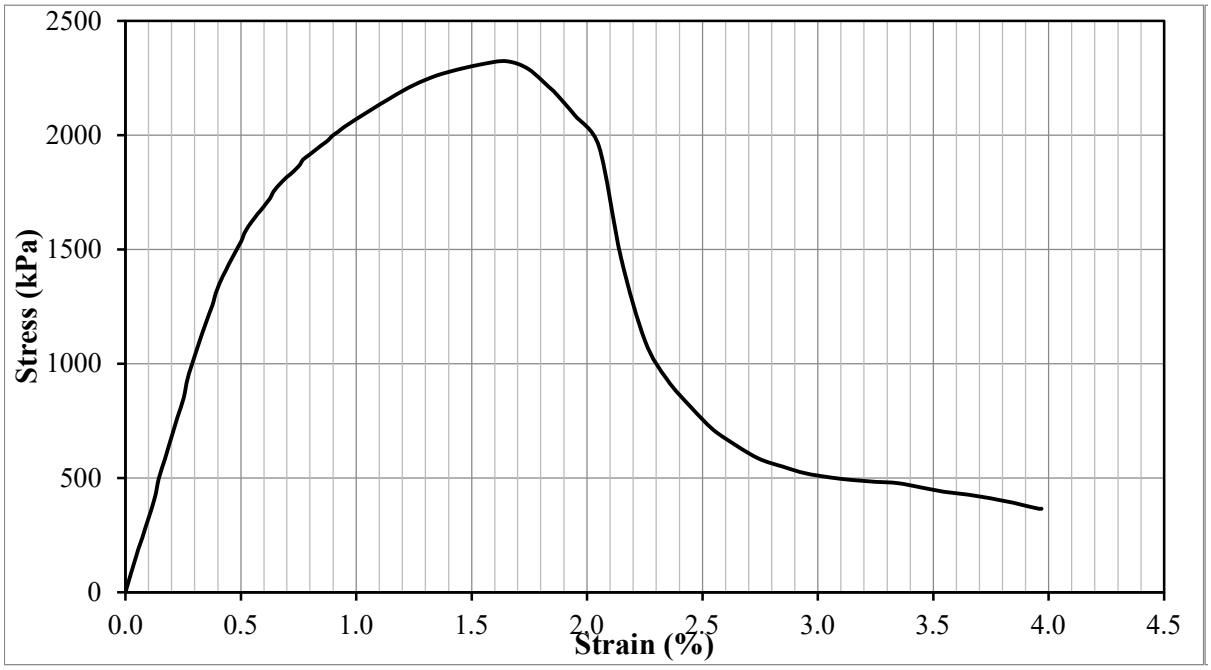
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,698	Strain at failure, εf :	0.86	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.1	mm
I.D.:	D-6-H	Initial Area:	2135.7	mm^2
Test Date:	7/10/2019	Weight:	364.9	g
Strain Rate:	1 %/min	Unit Weight:	1752	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	20.8	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25&45	°C
Additional information		45C 14d - 25C 7d		



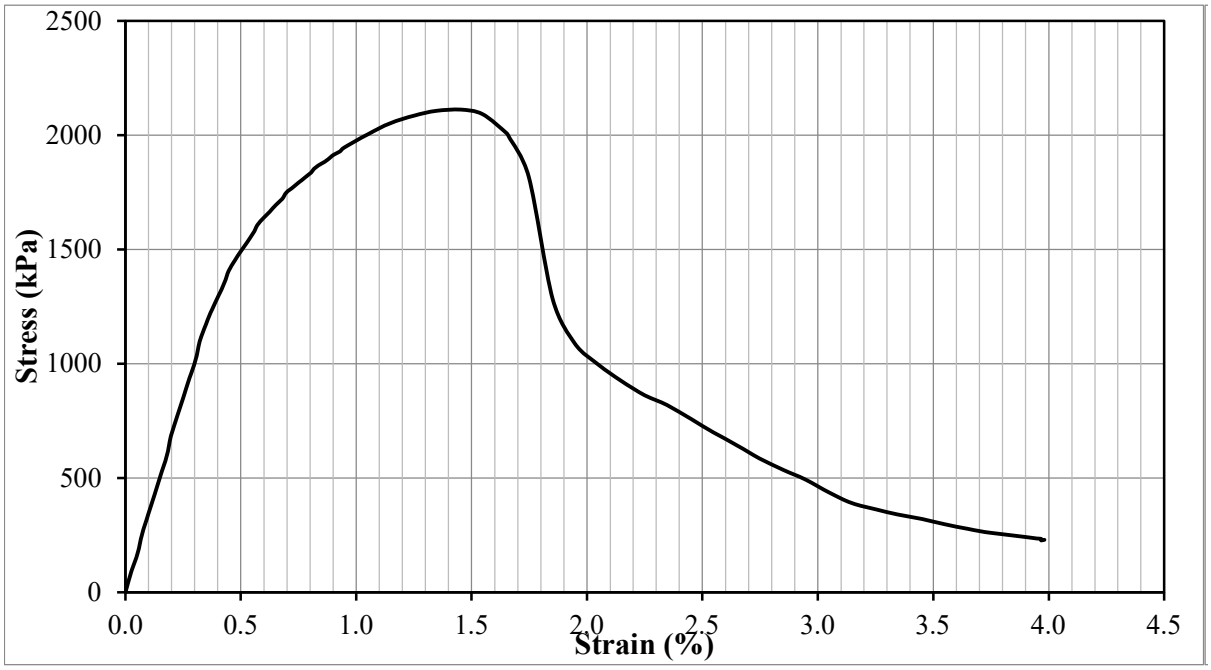
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,669	Strain at failure, εf :	1.14	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	D-6-B	Initial Area:	2123.2	mm^2
Test Date:	7/10/2019	Weight:	370.3	g
Strain Rate:	1 %/min	Unit Weight:	1760	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	20.8	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25&45	°C
Additional information		25C 14d - 45C 7d		



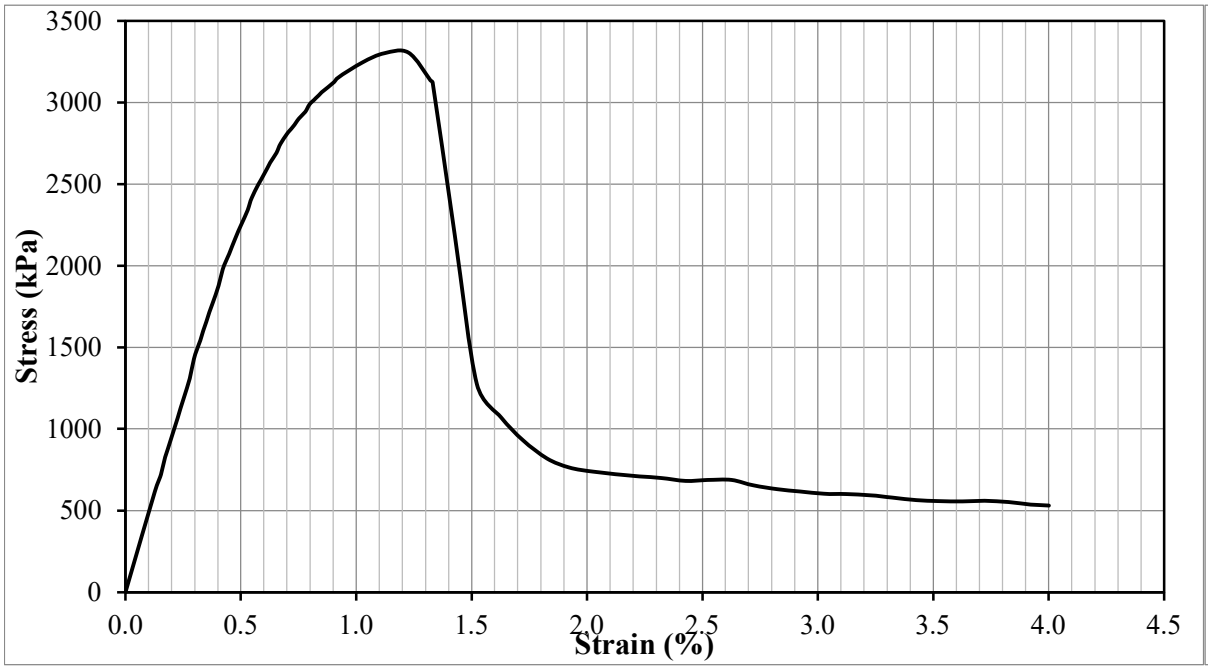
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,306	Strain at failure, εf :	1.65	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	D-6-G	Initial Area:	2121.1	mm^2
Test Date:	7/10/2019	Weight:	374.5	g
Strain Rate:	1 %/min	Unit Weight:	1755	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	20.8	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25&45	°C
Additional information		25C 14d - 45C 7d		



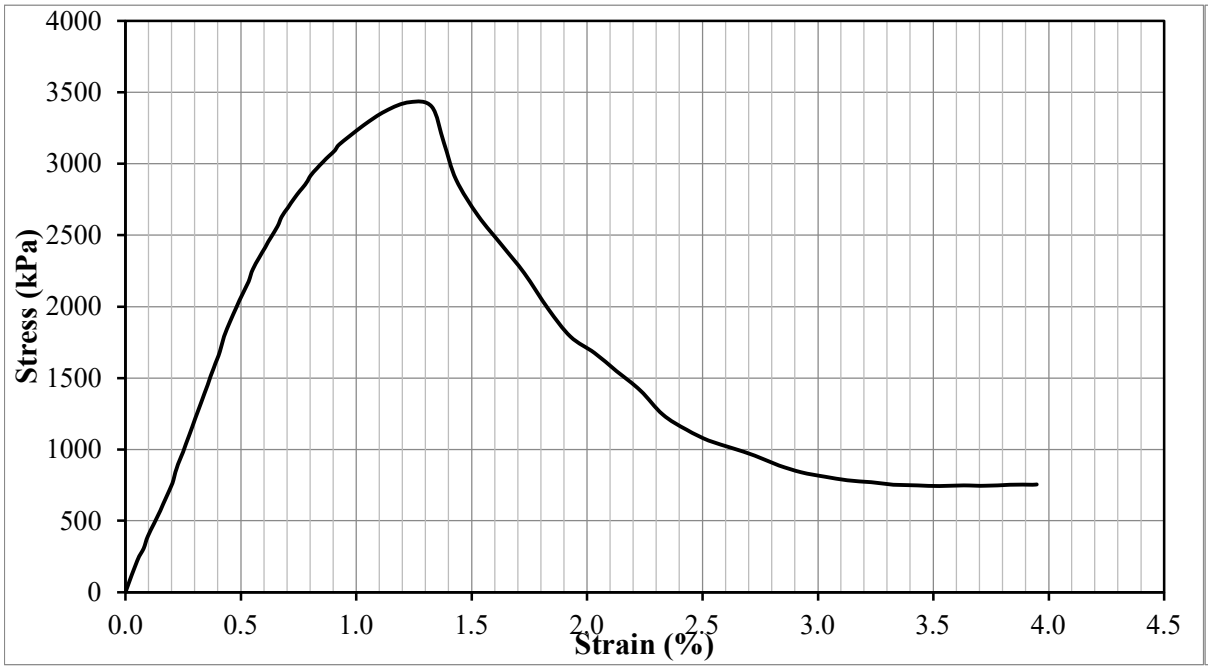
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,101	Strain at failure, εf :	1.45	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	D-6-I	Initial Area:	2125.3	mm^2
Test Date:	7/10/2019	Weight:	379.5	g
Strain Rate:	1 %/min	Unit Weight:	1760	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	20.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25&45	°C
Additional information		45C 21d - 25C 0d		



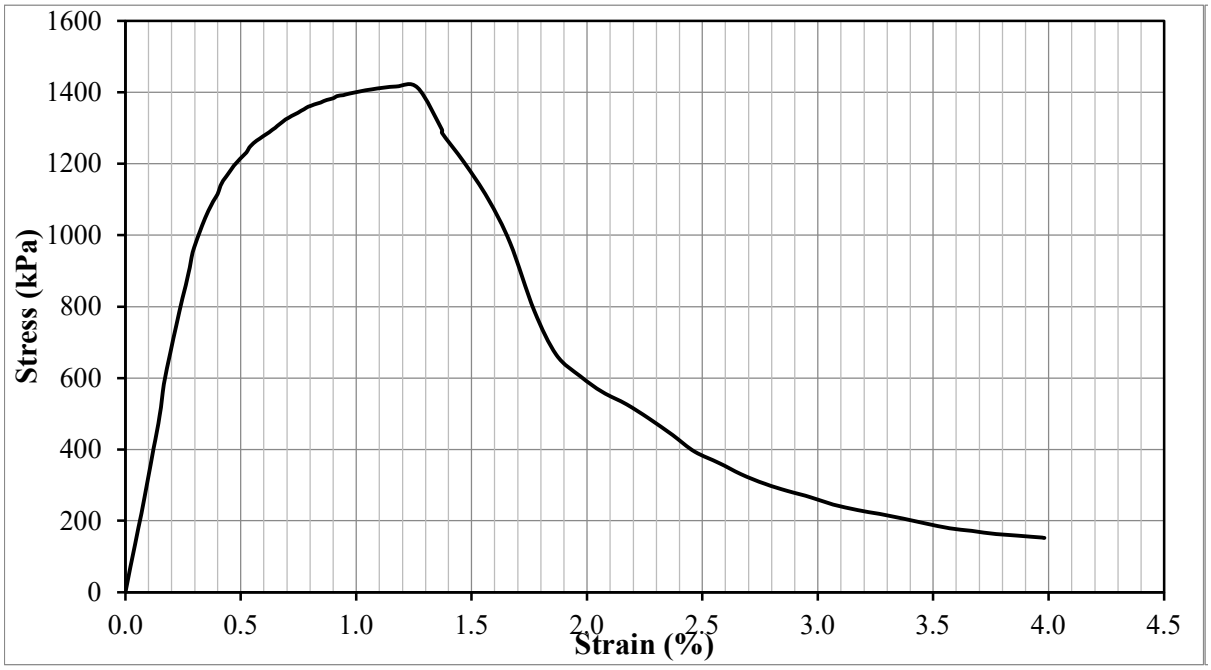
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,292	Strain at failure, εf :	1.23	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.1	mm
I.D.:	D-6-F	Initial Area:	2131.5	mm^2
Test Date:	7/10/2019	Weight:	373.7	g
Strain Rate:	1 %/min	Unit Weight:	1749	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	20.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25&45	°C
Additional information		45C 21d - 25C 0d		



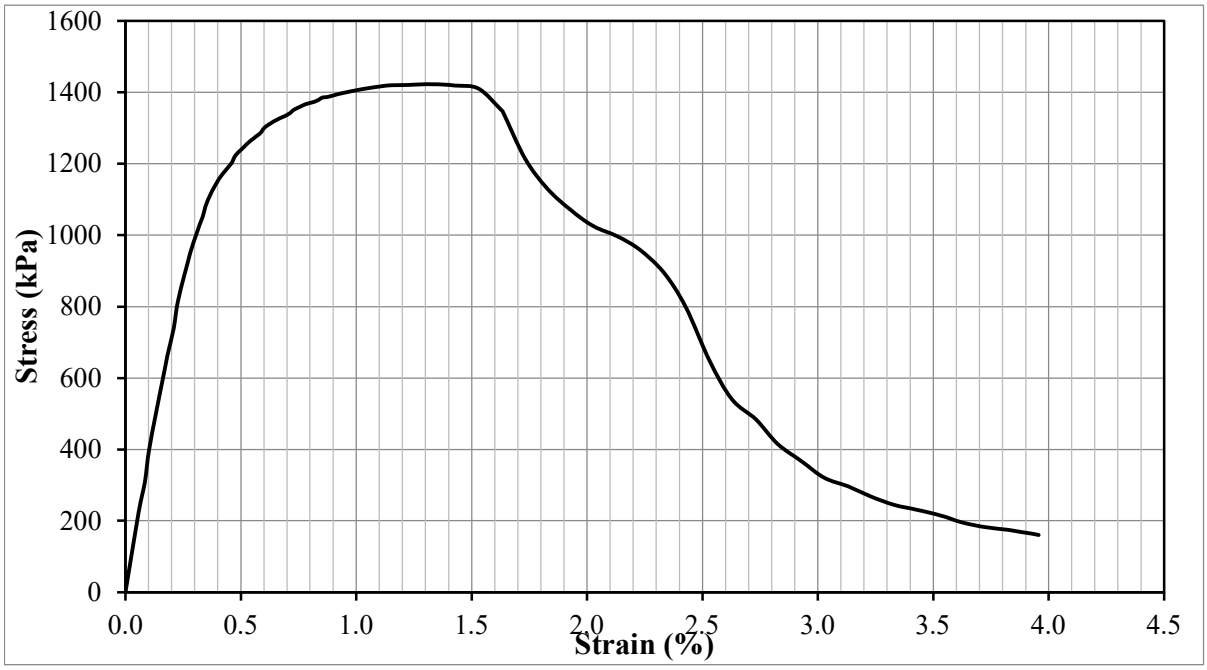
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,410	Strain at failure, εf :	1.23	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	D-6-D	Initial Area:	2123.2	mm^2
Test Date:	7/10/2019	Weight:	375.1	g
Strain Rate:	1 %/min	Unit Weight:	1767	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	20.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25&45	°C
Additional information		25C 21d - 45C 0d		



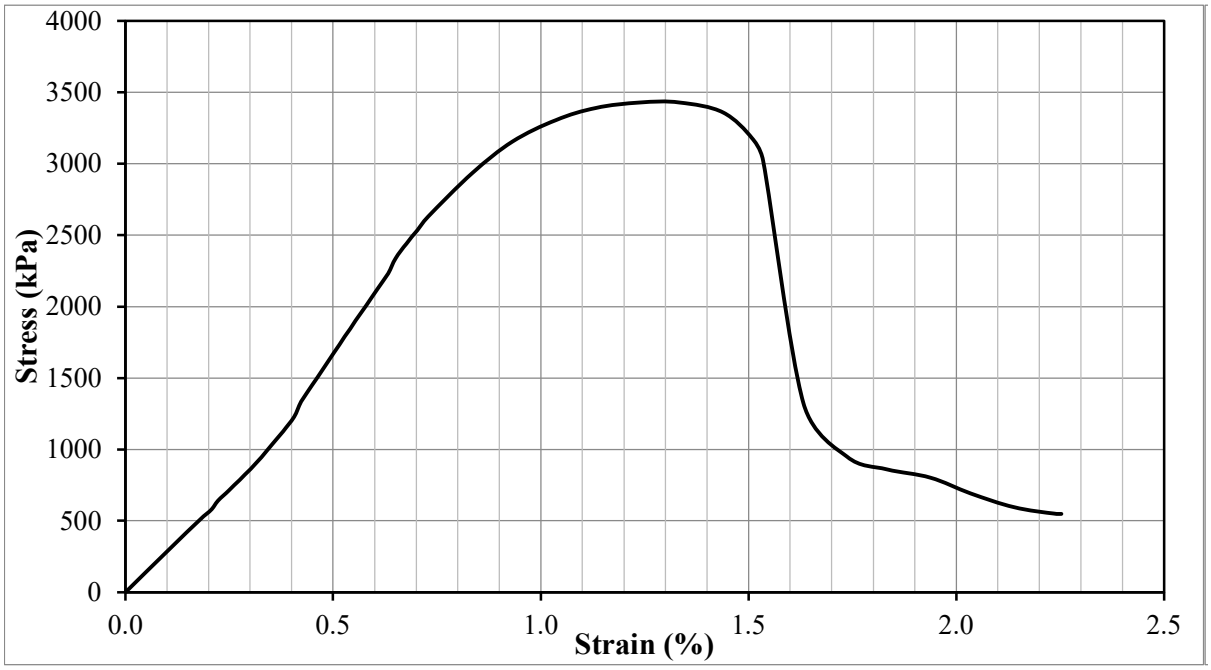
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,407	Strain at failure, εf :	1.17	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	D-6-E	Initial Area:	2114.9	mm^2
Test Date:	7/10/2019	Weight:	377.2	g
Strain Rate:	1 %/min	Unit Weight:	1773	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	20.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25&45	°C
Additional information		25C 21d - 45C 0d		



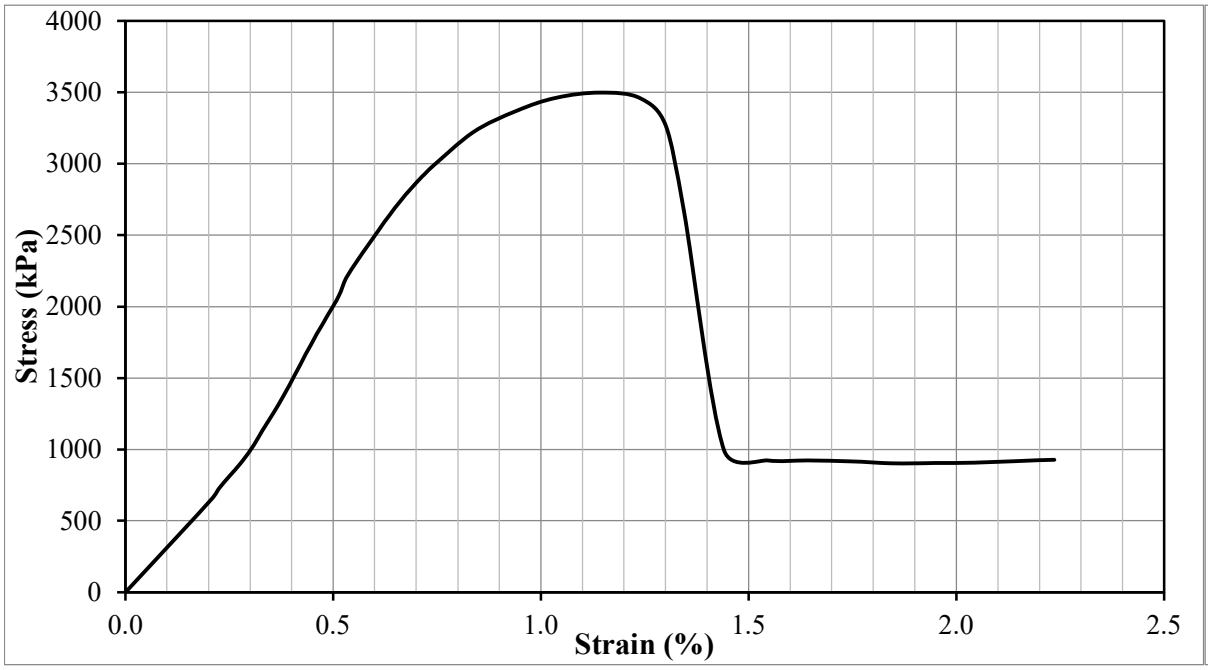
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,416	Strain at failure, εf :	1.33	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.1	mm
I.D.:	D-7-A	Initial Area:	2129.4	mm^2
Test Date:	3/18/2022	Weight:	368.7	g
Strain Rate:	1 %/min	Unit Weight:	1723	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	14.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25&45	°C
Additional information		45C 7d - 25C 7d		



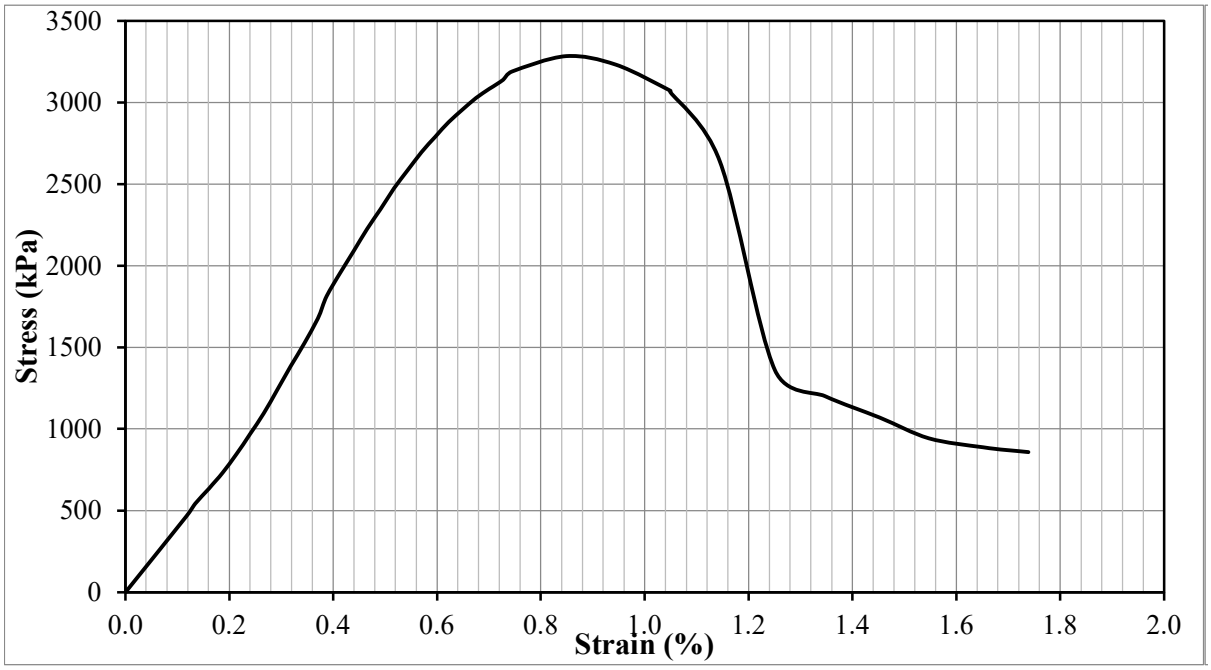
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,410	Strain at failure, εf :	1.33	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	D-7-H	Initial Area:	2123.2	mm^2
Test Date:	3/18/2022	Weight:	369.0	g
Strain Rate:	1 %/min	Unit Weight:	1728	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	14.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25&45	°C
Additional information		45C 7d - 25C 7d		



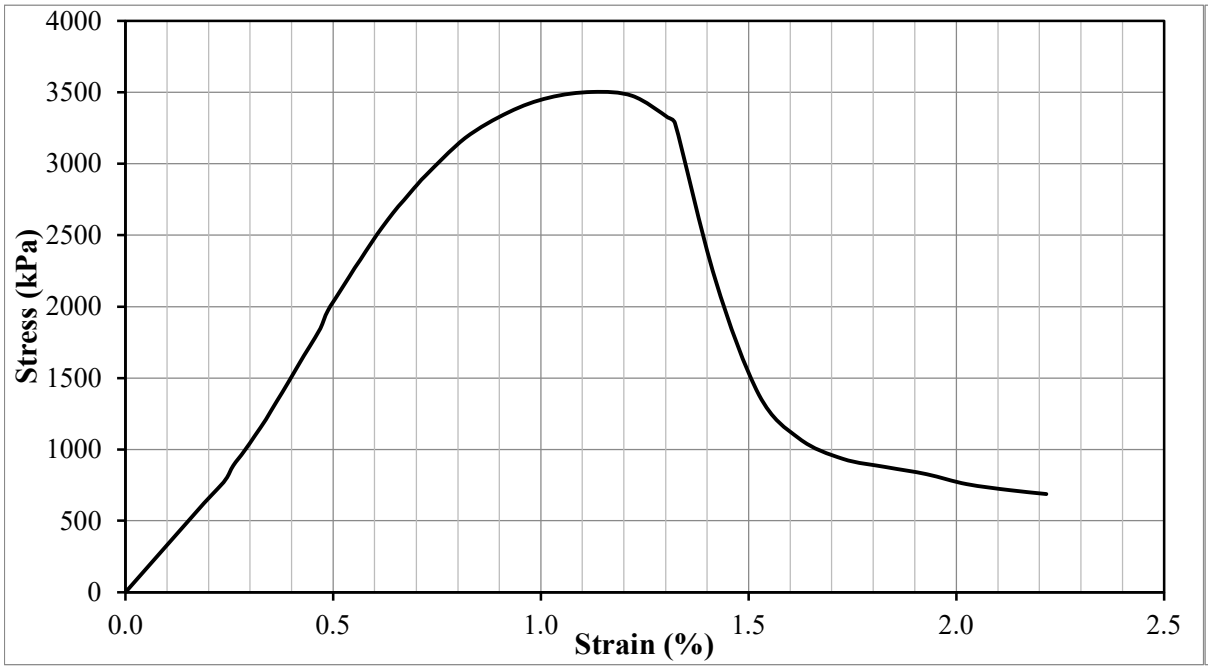
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,479	Strain at failure, εf :	1.14	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	D-7-B	Initial Area:	2123.2	mm^2
Test Date:	3/25/2022	Weight:	369.6	g
Strain Rate:	1 %/min	Unit Weight:	1726	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	21.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25&45	°C
Additional information		45C 7d - 25C 14d		



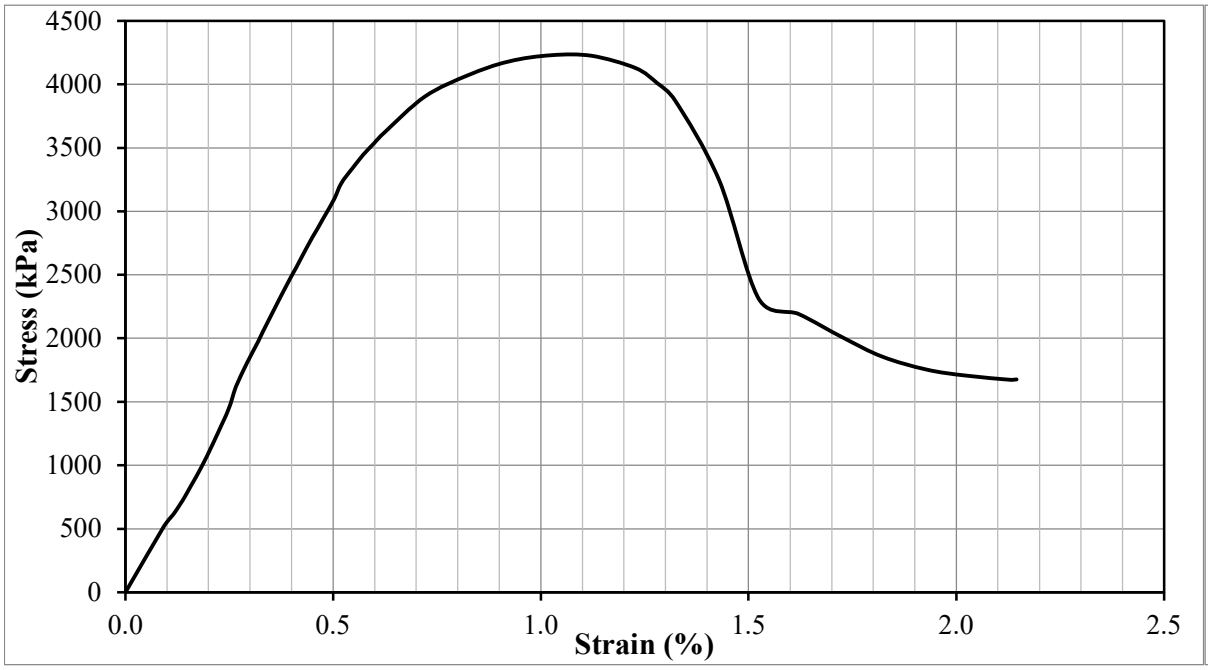
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,267	Strain at failure, εf :	0.85	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	D-7-G	Initial Area:	2127.4	mm^2
Test Date:	3/25/2022	Weight:	371.4	g
Strain Rate:	1 %/min	Unit Weight:	1729	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	21.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25&45	°C
Additional information		45C 7d - 25C 14d		



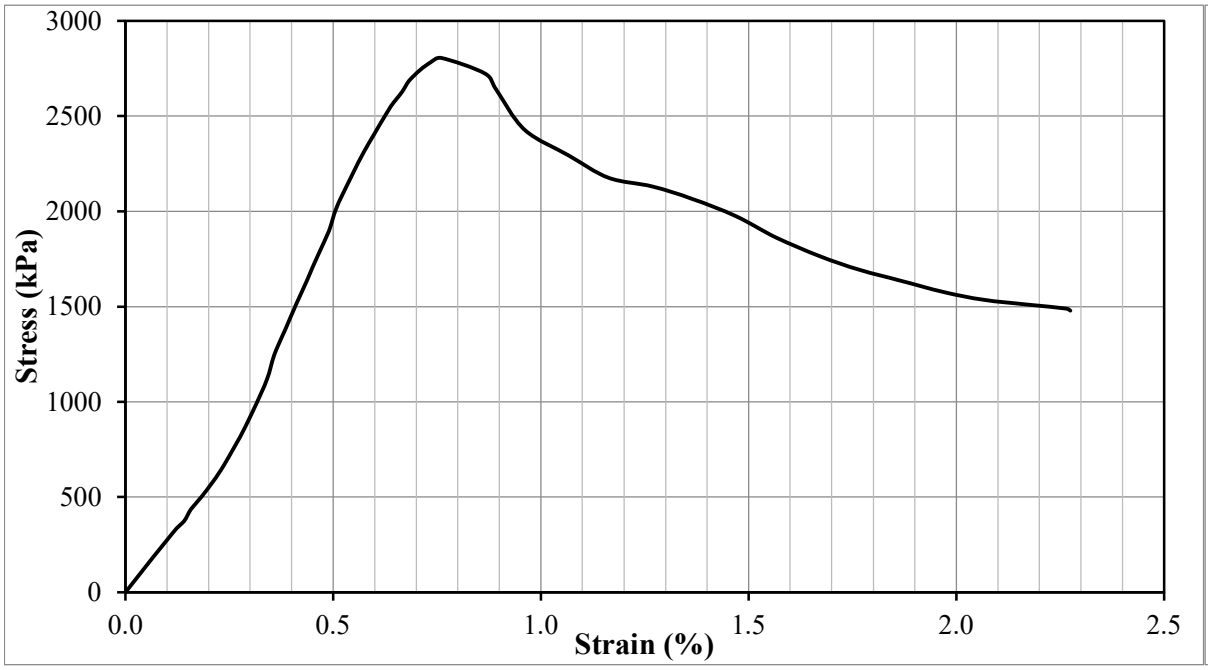
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,484	Strain at failure, εf :	1.12	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	D-7-C	Initial Area:	2123.2	mm^2
Test Date:	3/25/2022	Weight:	370.9	g
Strain Rate:	1 %/min	Unit Weight:	1732	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	21.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25&45	°C
Additional information		45C 14d - 25C 7d		



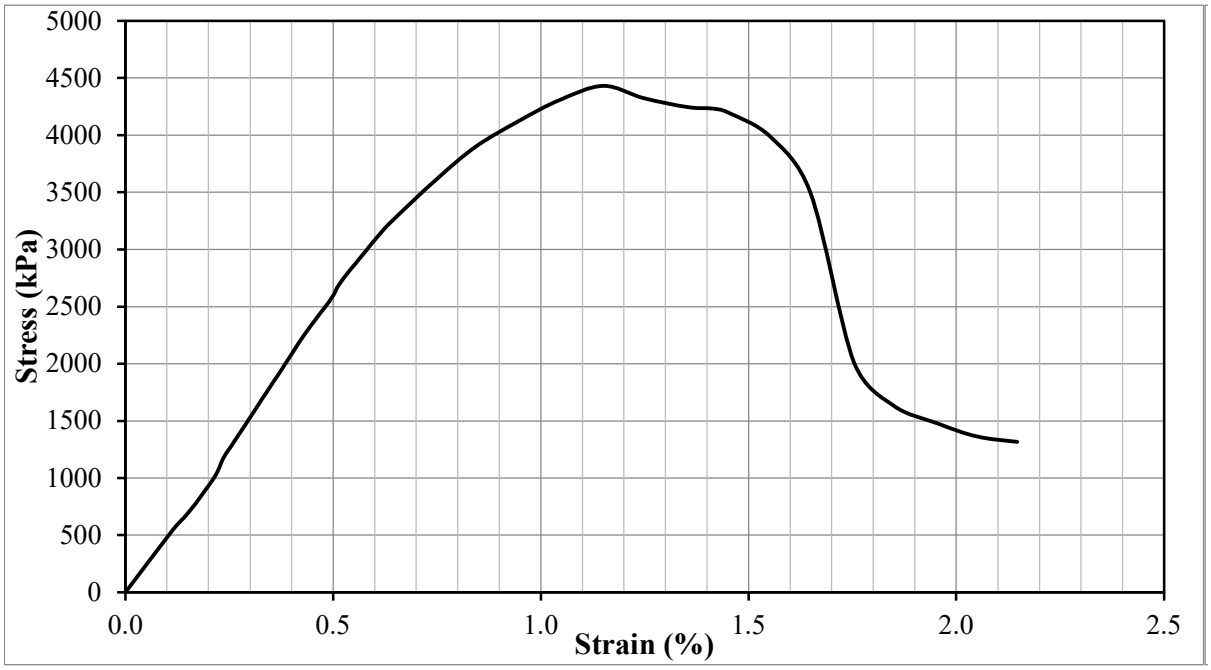
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,210	Strain at failure, εf :	1.03	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	D-7-F	Initial Area:	2121.1	mm^2
Test Date:	3/25/2022	Weight:	370.8	g
Strain Rate:	1 %/min	Unit Weight:	1731	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	21.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25&45	°C
Additional information		45C 14d - 25C 7d		



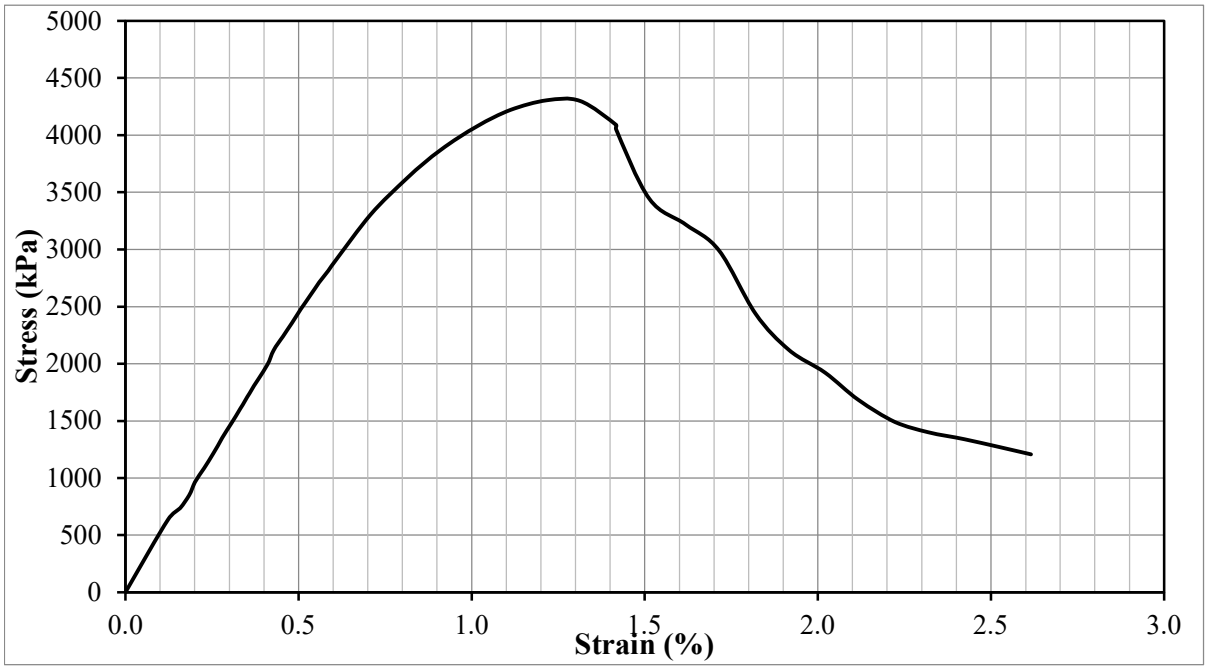
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,792	Strain at failure, εf :	0.76	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	D-7-D	Initial Area:	2123.2	mm^2
Test Date:	3/25/2022	Weight:	367.7	g
Strain Rate:	1 %/min	Unit Weight:	1721	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	21.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25&45	°C
Additional information		45C 21d - 25C 0d		



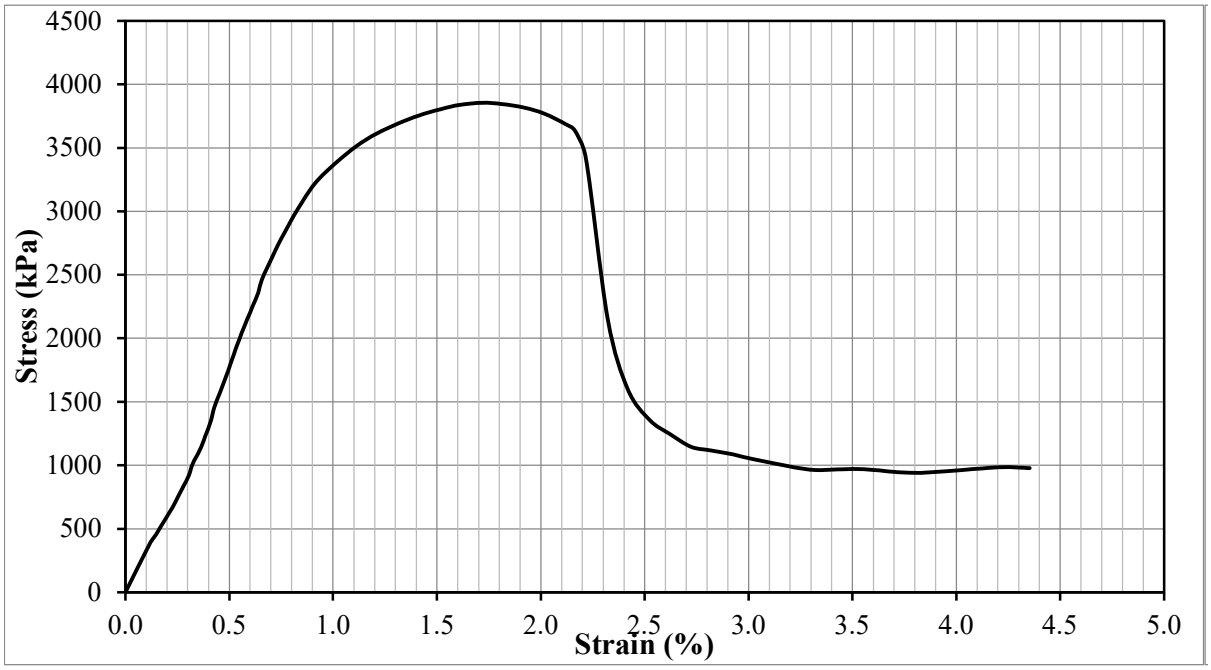
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,408	Strain at failure, εf :	1.15	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	D-7-E	Initial Area:	2117.0	mm^2
Test Date:	3/25/2022	Weight:	368.3	g
Strain Rate:	1 %/min	Unit Weight:	1725	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	21.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25&45	°C
Additional information		45C 21d - 25C 0d		



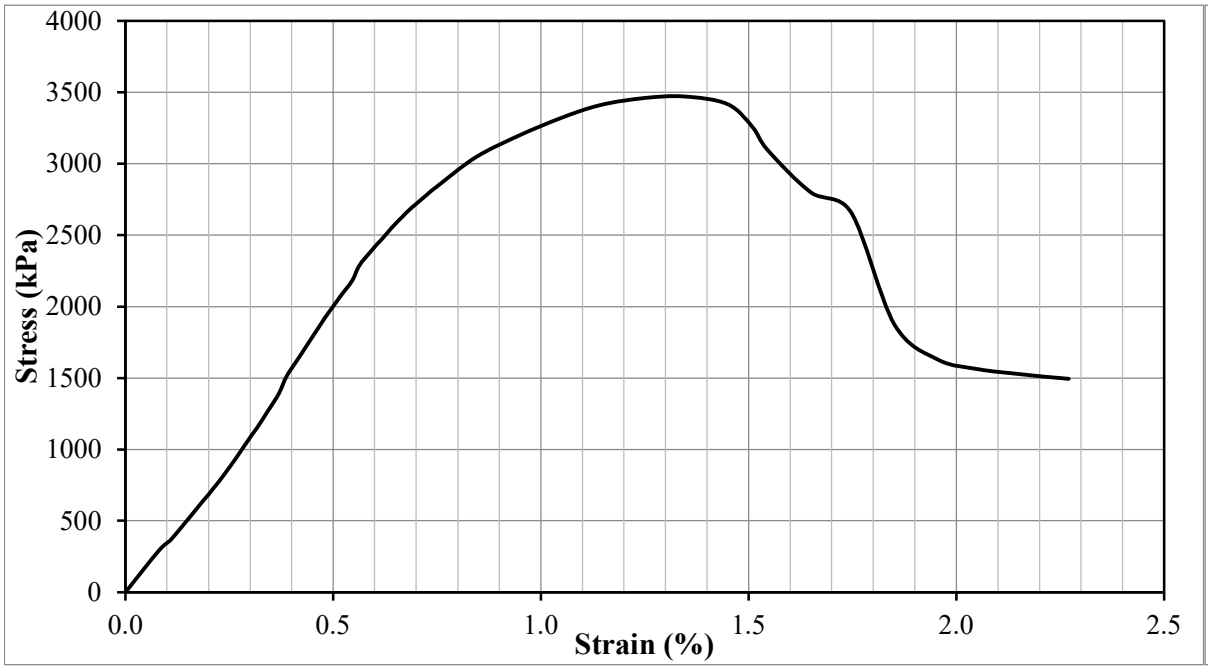
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,284	Strain at failure, εf :	1.22	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	D-8-A	Initial Area:	2110.8	mm^2
Test Date:	3/19/2022	Weight:	368.2	g
Strain Rate:	1 %/min	Unit Weight:	1728	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	13.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25&45	°C
Additional information		25C 7d - 45C 7d		



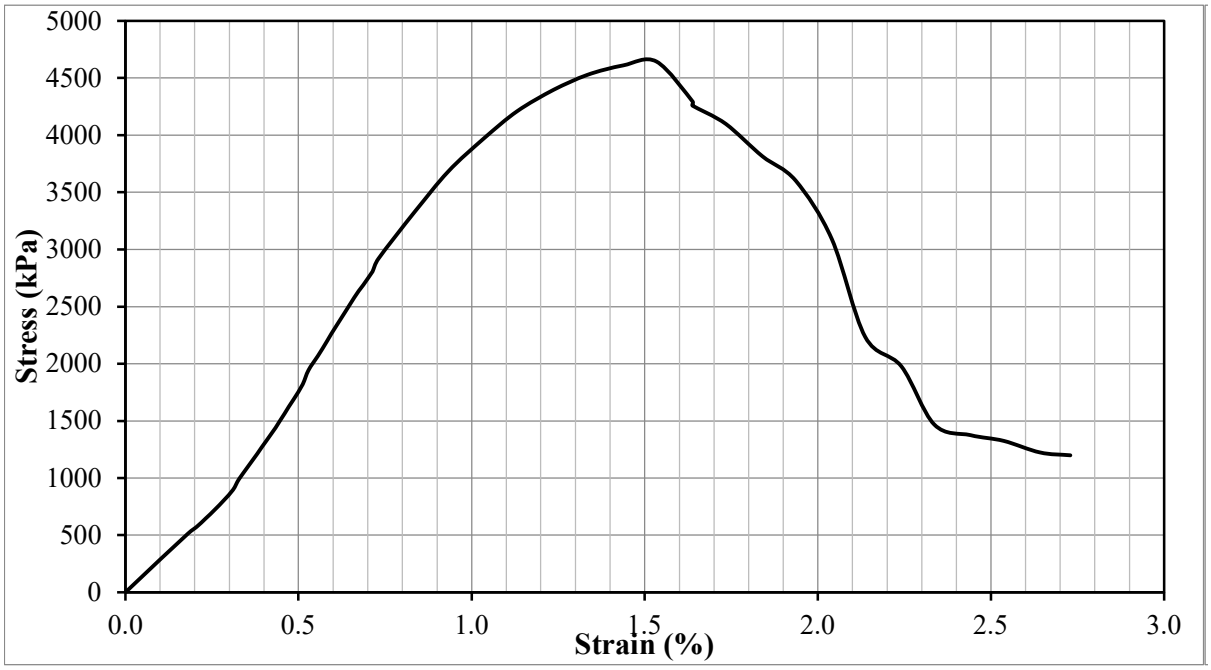
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,838	Strain at failure, εf :	1.72	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	D-8-H	Initial Area:	2106.6	mm^2
Test Date:	3/19/2022	Weight:	367.3	g
Strain Rate:	1 %/min	Unit Weight:	1732	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	13.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25&45	°C
Additional information		25C 7d - 45C 7d		



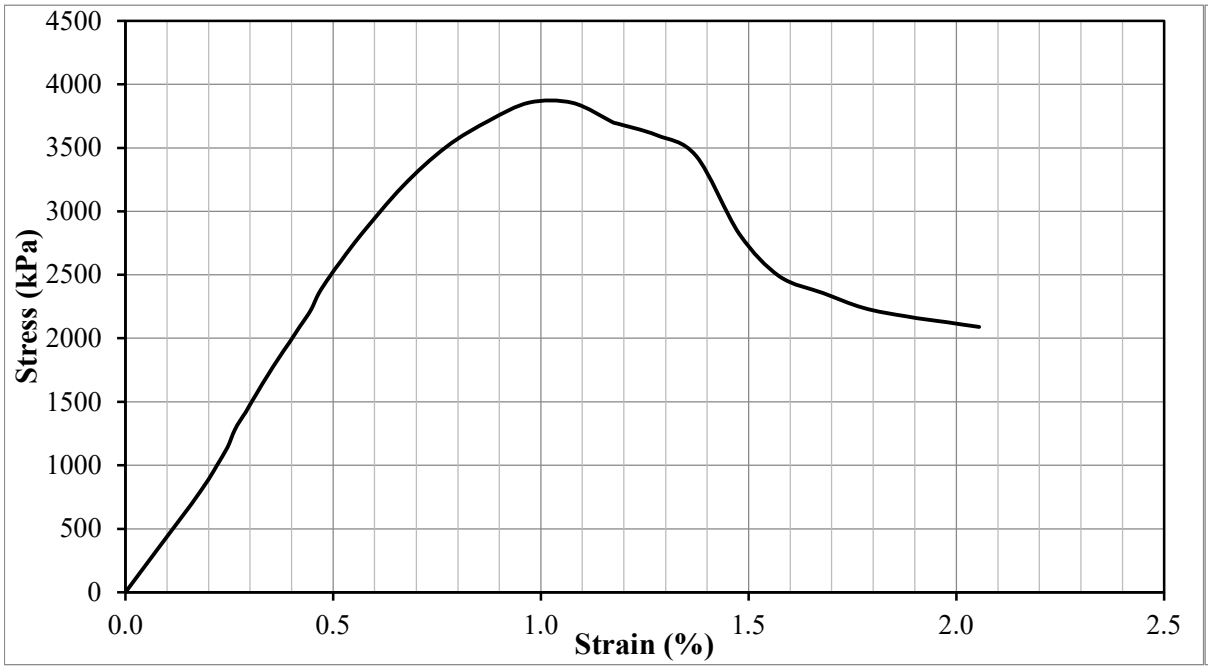
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,455	Strain at failure, εf :	1.34	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	D-8-B	Initial Area:	2110.8	mm^2
Test Date:	3/26/2022	Weight:	368.1	g
Strain Rate:	1 %/min	Unit Weight:	1731	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	21.2	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25&45	°C
Additional information		25C 7d - 45C 14d		



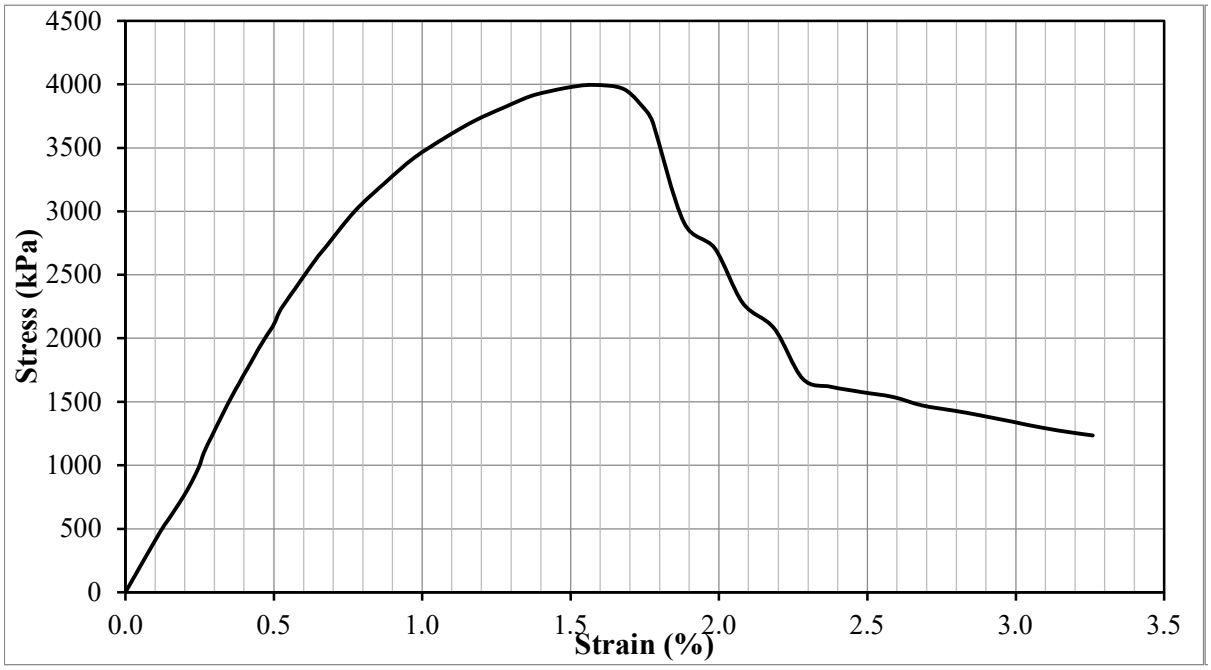
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,622	Strain at failure, εf :	1.53	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	D-8-G	Initial Area:	2114.9	mm^2
Test Date:	3/26/2022	Weight:	366.5	g
Strain Rate:	1 %/min	Unit Weight:	1729	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	21.2	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25&45	°C
Additional information		25C 7d - 45C 14d		



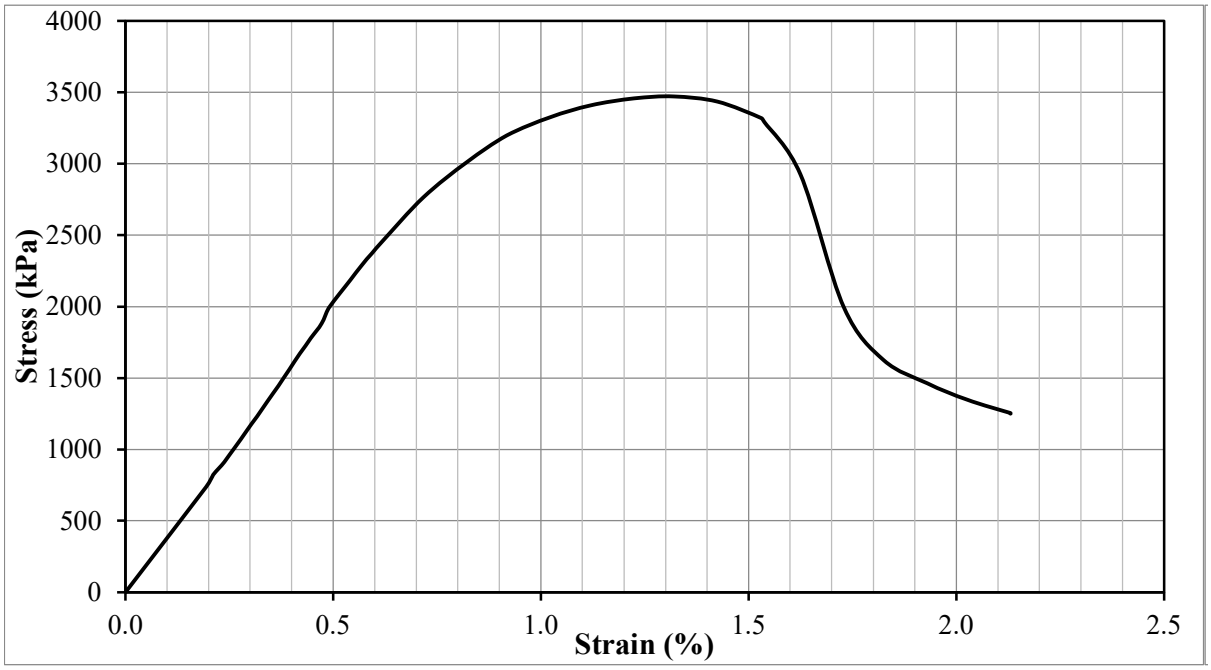
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,834	Strain at failure, εf :	0.97	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	D-8-C	Initial Area:	2117.0	mm^2
Test Date:	3/26/2022	Weight:	363.6	g
Strain Rate:	1 %/min	Unit Weight:	1725	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	21.2	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25&45	°C
Additional information		25C 14d - 45C 7d		



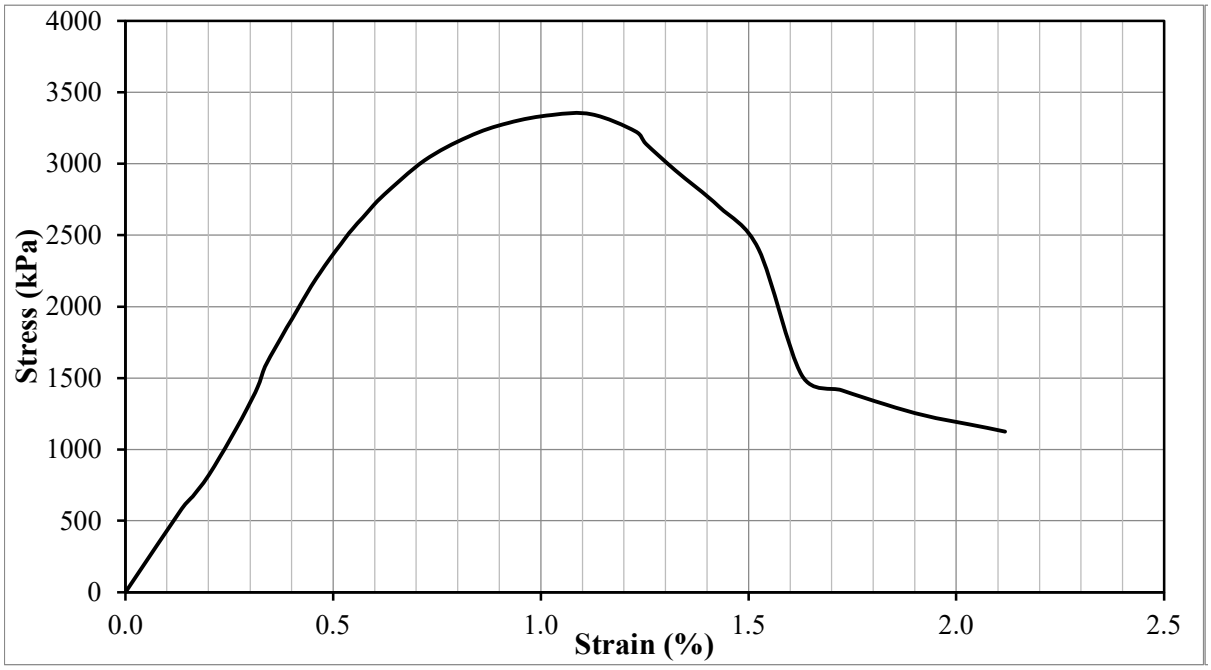
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,969	Strain at failure, εf :	1.58	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	D-8-F	Initial Area:	2110.8	mm^2
Test Date:	3/26/2022	Weight:	372.4	g
Strain Rate:	1 %/min	Unit Weight:	1763	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	21.2	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25&45	°C
Additional information		25C 14d - 45C 7d		



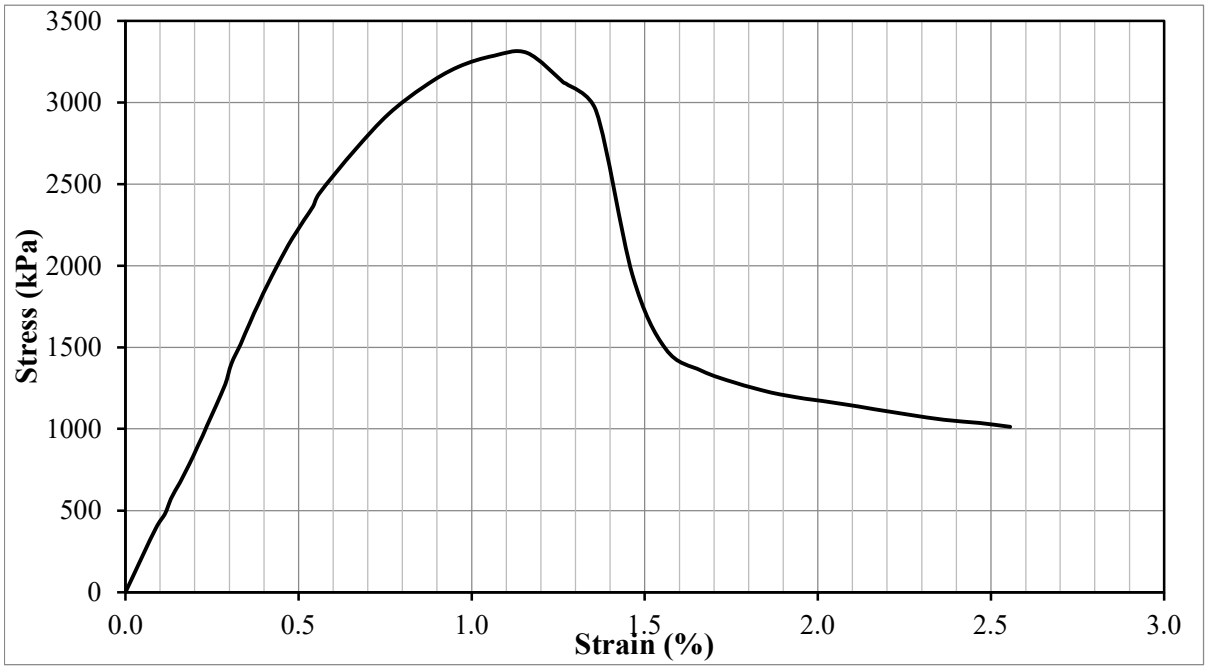
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,451	Strain at failure, εf :	1.32	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	D-8-D	Initial Area:	2110.8	mm^2
Test Date:	3/26/2022	Weight:	368.4	g
Strain Rate:	1 %/min	Unit Weight:	1735	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	21.2	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25&45	°C
Additional information		25C 21d - 45C 0d		



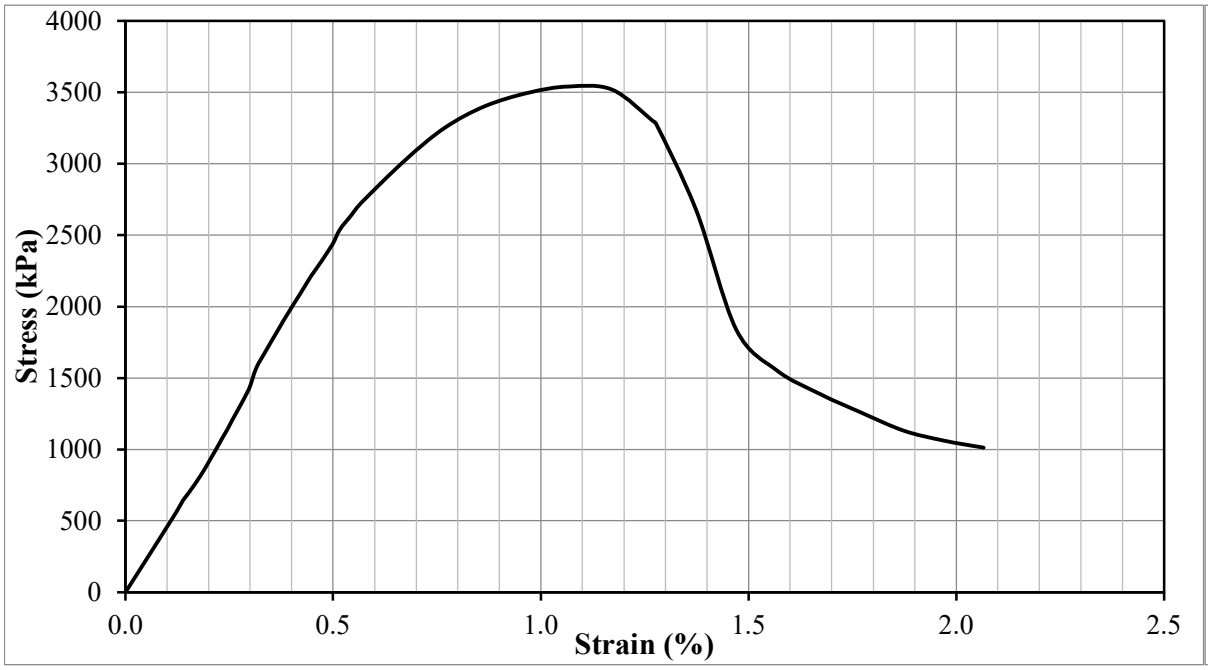
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,330	Strain at failure, εf :	1.12	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	D-8-E	Initial Area:	2112.9	mm^2
Test Date:	3/26/2022	Weight:	368.0	g
Strain Rate:	1 %/min	Unit Weight:	1733	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	21.2	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25&45	°C
Additional information		25C 21d - 45C 0d		



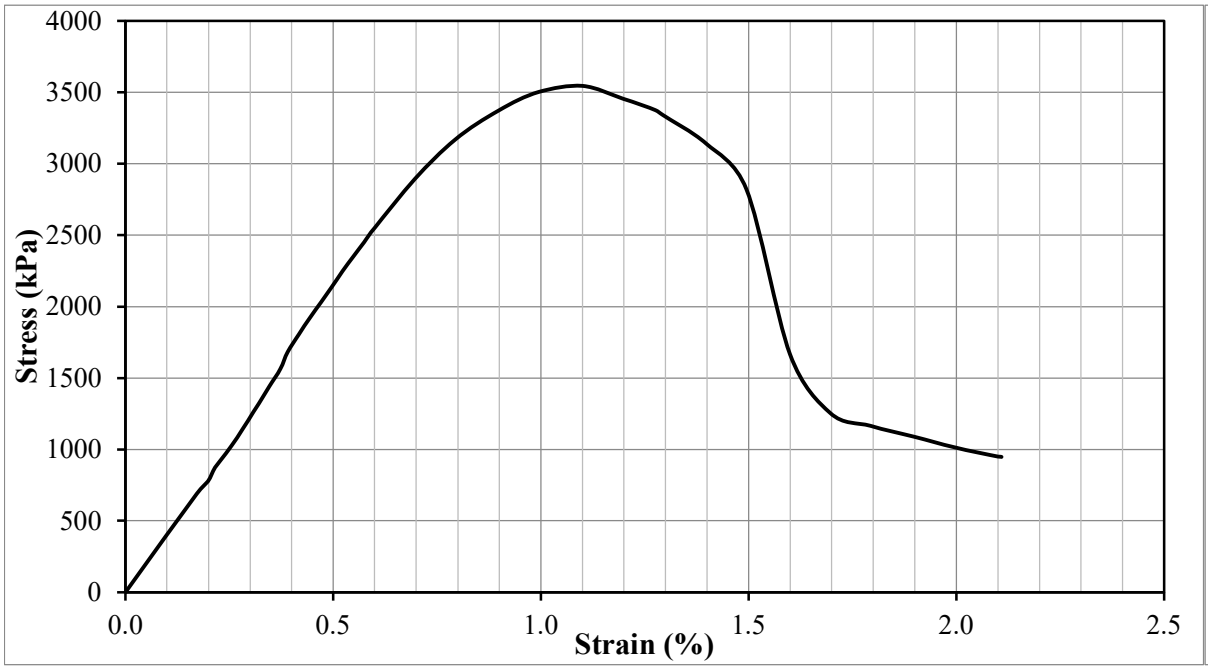
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,287	Strain at failure, εf :	1.16	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	D-9-A	Initial Area:	2104.6	mm^2
Test Date:	4/20/2022	Weight:	376.2	g
Strain Rate:	1 %/min	Unit Weight:	1776	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	20.8	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25&45	°C
Additional information		25C 7d - 45C 14d		



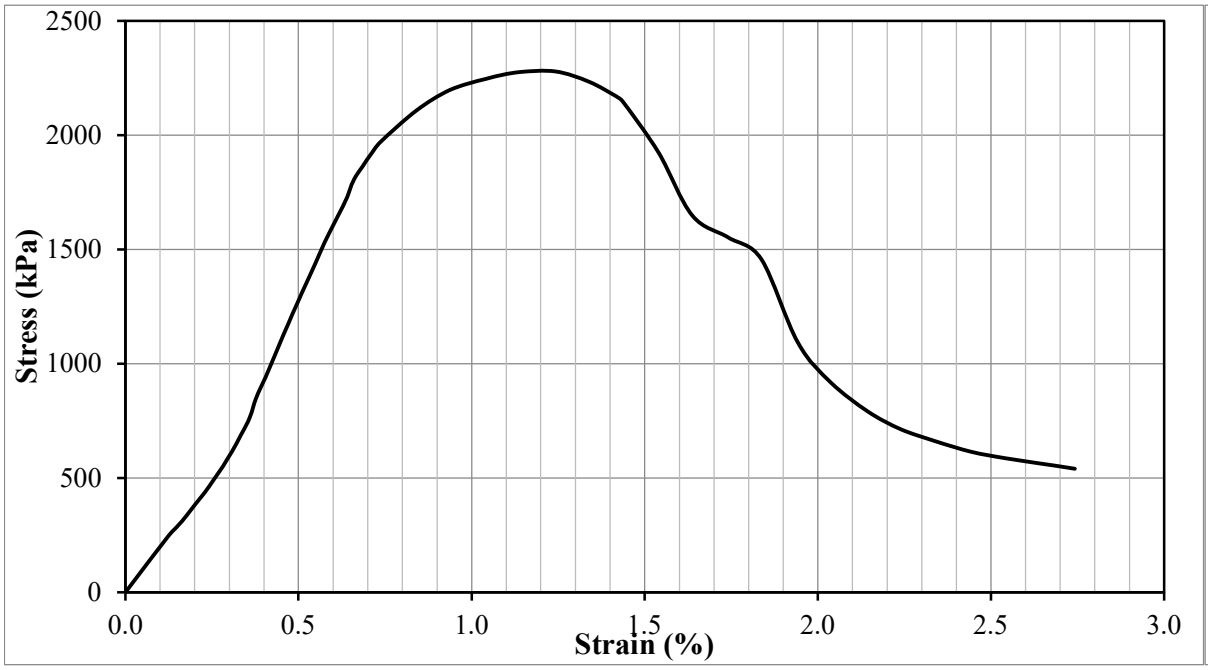
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,524	Strain at failure, εf :	1.07	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	D-9-F	Initial Area:	2100.5	mm^2
Test Date:	4/20/2022	Weight:	376.2	g
Strain Rate:	1 %/min	Unit Weight:	1780	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	20.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25&45	°C
Additional information		25C 7d - 45C 14d		



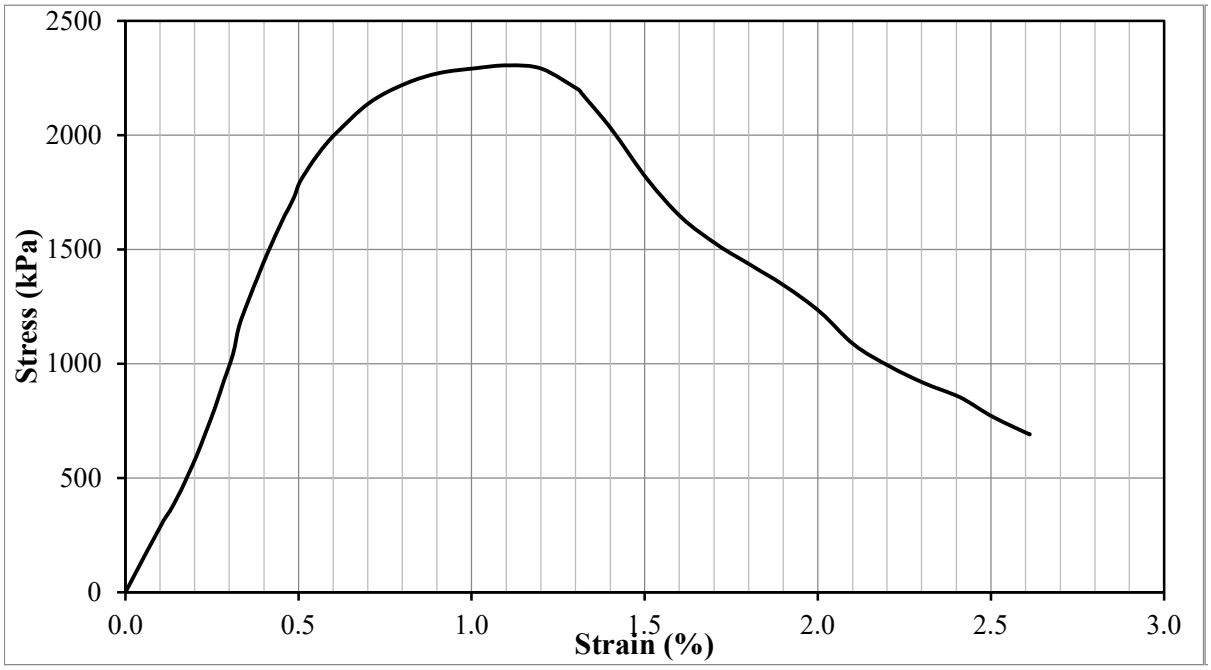
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,528	Strain at failure, εf :	1.10	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	D-9-B	Initial Area:	2119.1	mm^2
Test Date:	4/20/2022	Weight:	372.9	g
Strain Rate:	1 %/min	Unit Weight:	1766	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	20.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25&45	°C
Additional information		45C 7d - 25C 14d		



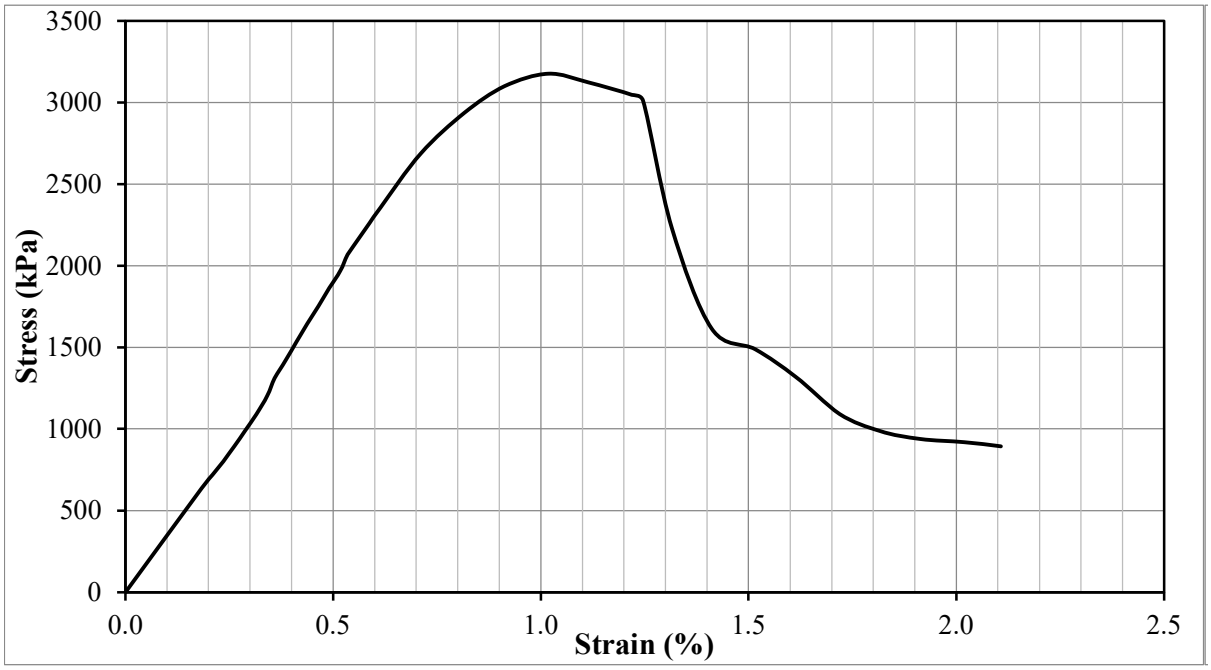
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,264	Strain at failure, εf :	1.24	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	D-9-E	Initial Area:	2114.9	mm^2
Test Date:	4/20/2022	Weight:	375.5	g
Strain Rate:	1 %/min	Unit Weight:	1775	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	20.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25&45	°C
Additional information		45C 7d - 25C 14d		



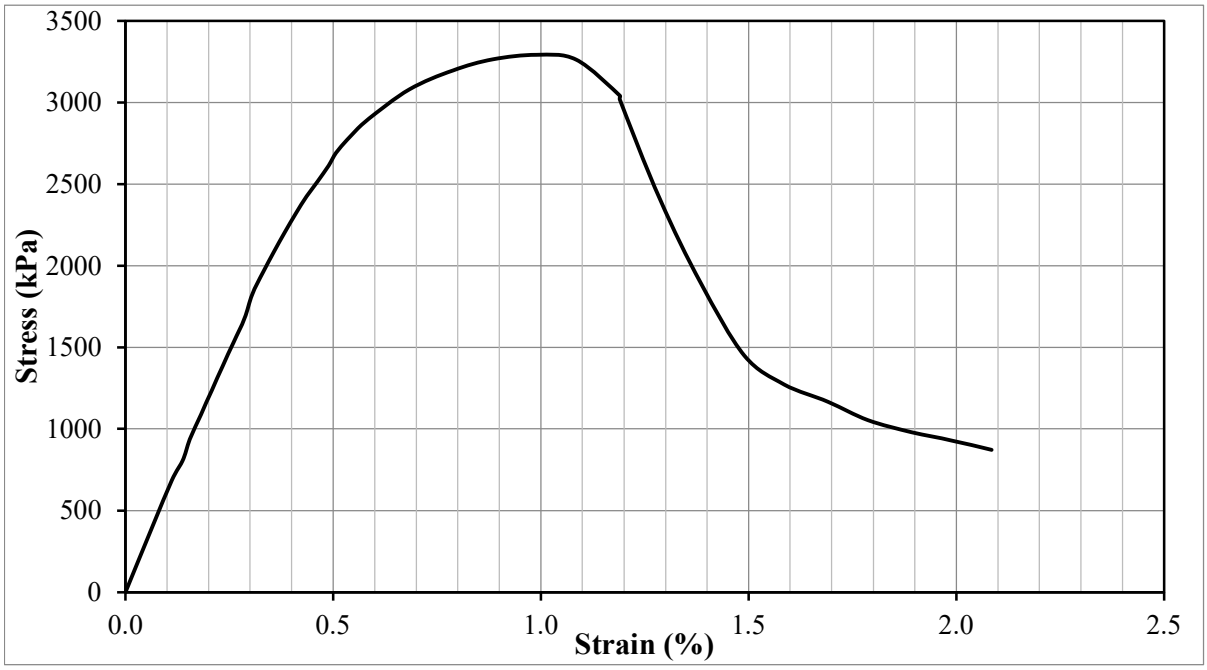
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,292	Strain at failure, εf :	1.11	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	D-9-C	Initial Area:	2117.0	mm^2
Test Date:	4/20/2022	Weight:	376.7	g
Strain Rate:	1 %/min	Unit Weight:	1772	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	20.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25&45	°C
Additional information		45C 14d - 25C 7d		



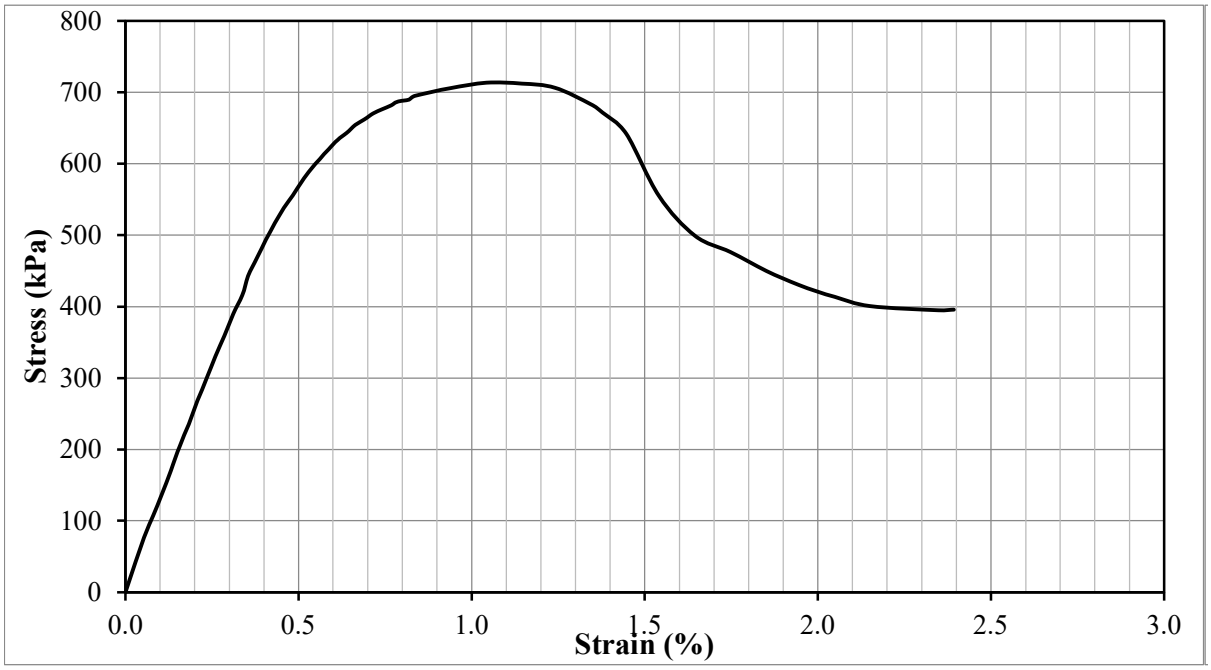
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,159	Strain at failure, εf :	1.02	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	D-9-D	Initial Area:	2117.0	mm^2
Test Date:	4/20/2022	Weight:	378.0	g
Strain Rate:	1 %/min	Unit Weight:	1773	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	20.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	25&45	°C
Additional information		45C 14d - 25C 7d		



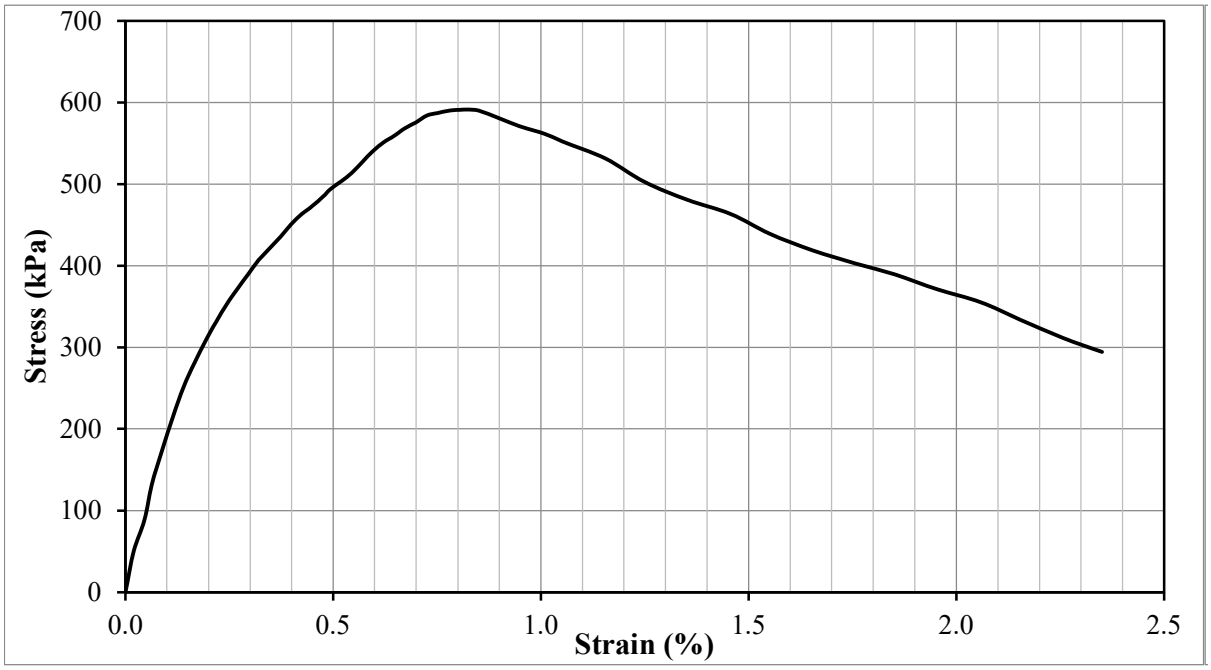
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,276	Strain at failure, εf :	0.99	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-1-A	Initial Area:	2104.6	mm^2
Test Date:	4/4/2021	Weight:	382.1	g
Strain Rate:	1 %/min	Unit Weight:	1810	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	2.8	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



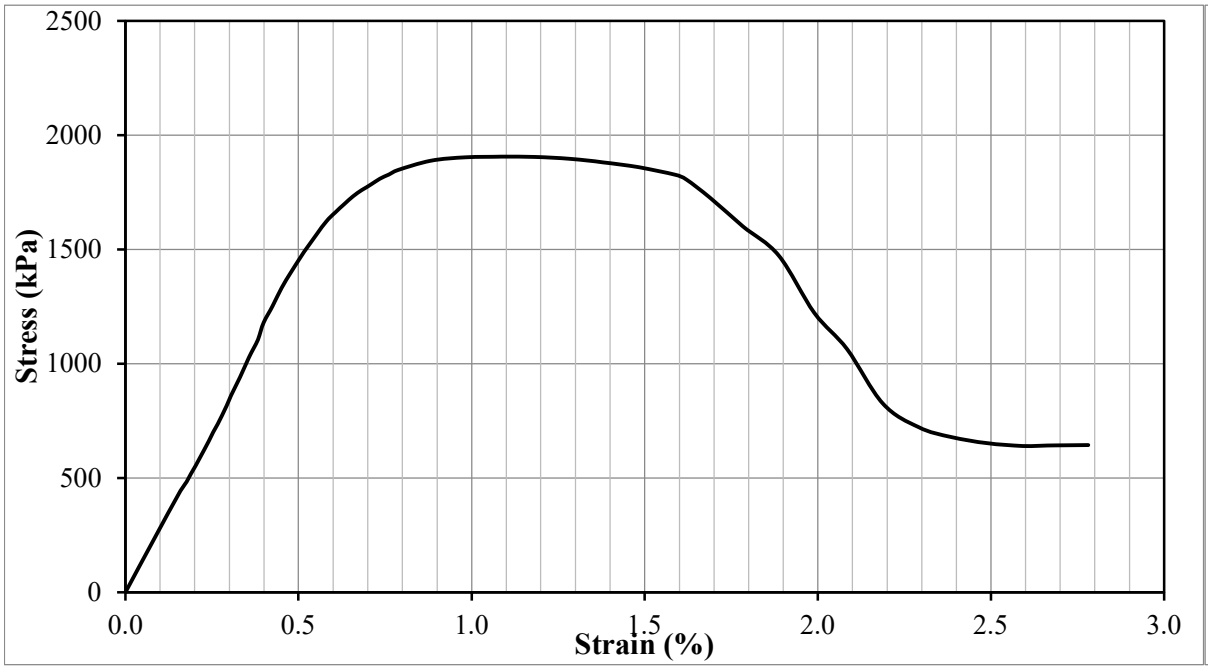
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	710	Strain at failure, εf :	1.04	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-1-H	Initial Area:	2110.8	mm^2
Test Date:	4/4/2021	Weight:	379.1	g
Strain Rate:	1 %/min	Unit Weight:	1807	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	2.8	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



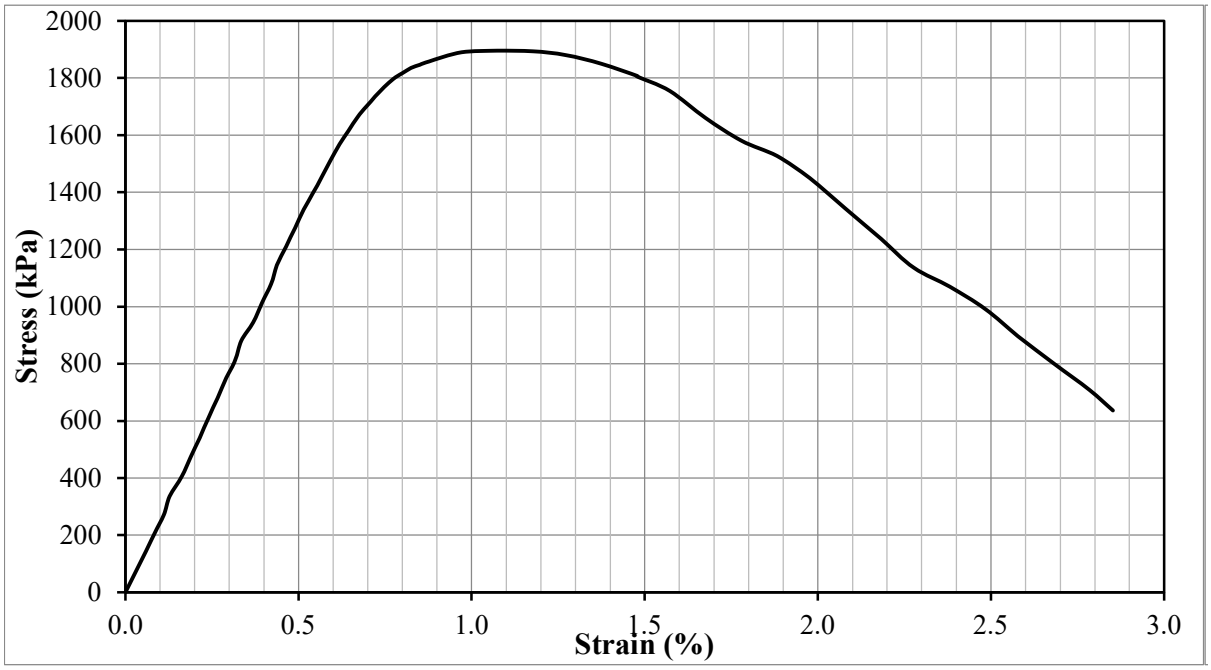
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	587	Strain at failure, εf :	0.83	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-1-B	Initial Area:	2106.6	mm^2
Test Date:	4/8/2021	Weight:	382.3	g
Strain Rate:	1 %/min	Unit Weight:	1813	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	6.7	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



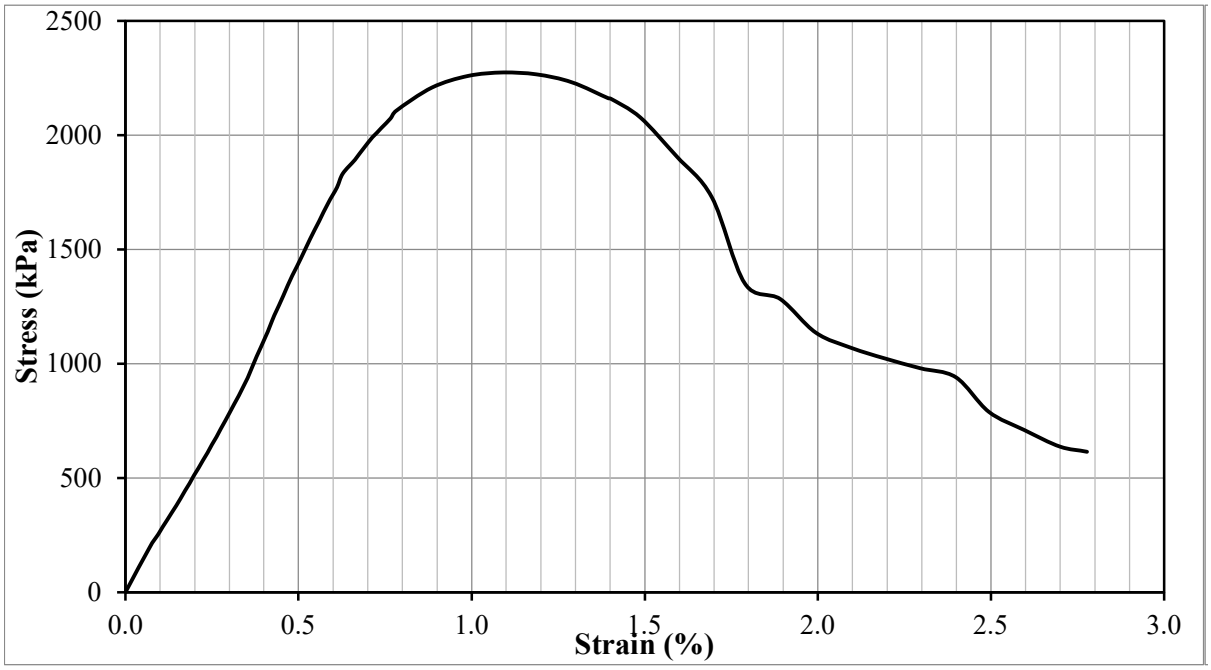
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,895	Strain at failure, εf :	1.09	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-1-G	Initial Area:	2114.9	mm^2
Test Date:	4/8/2021	Weight:	387.6	g
Strain Rate:	1 %/min	Unit Weight:	1811	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	6.8	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



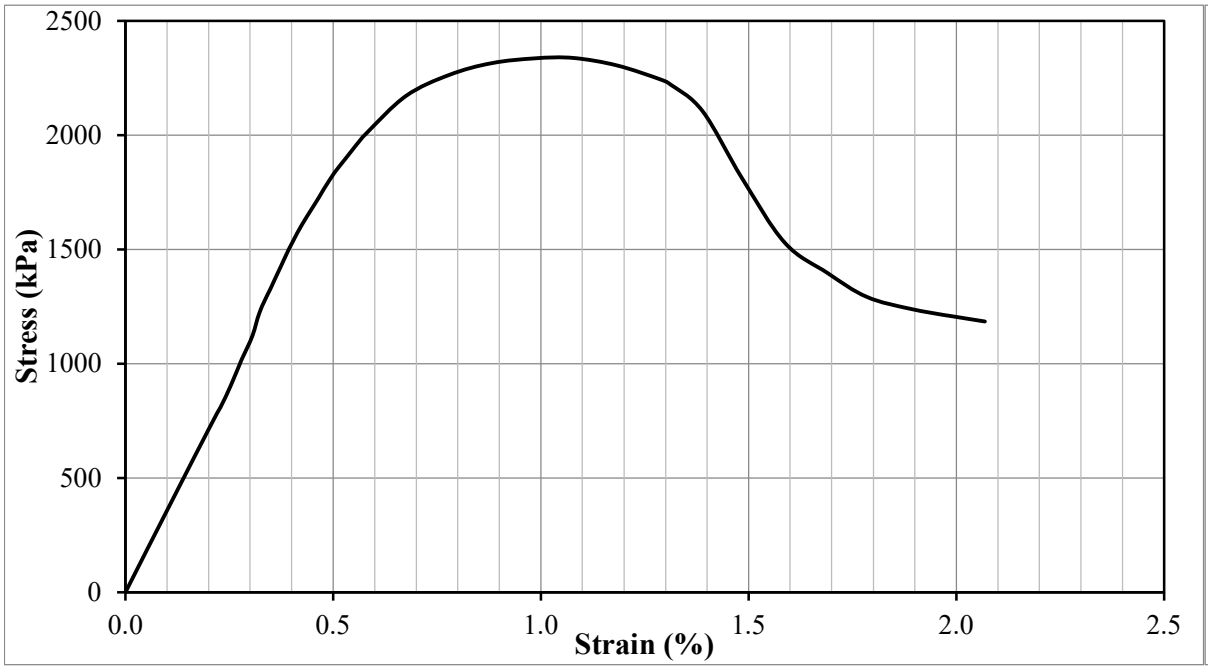
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,888	Strain at failure, εf :	1.07	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.6	mm
I.D.:	O-1-C	Initial Area:	2092.2	mm^2
Test Date:	4/15/2021	Weight:	383.5	g
Strain Rate:	1 %/min	Unit Weight:	1831	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	13.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



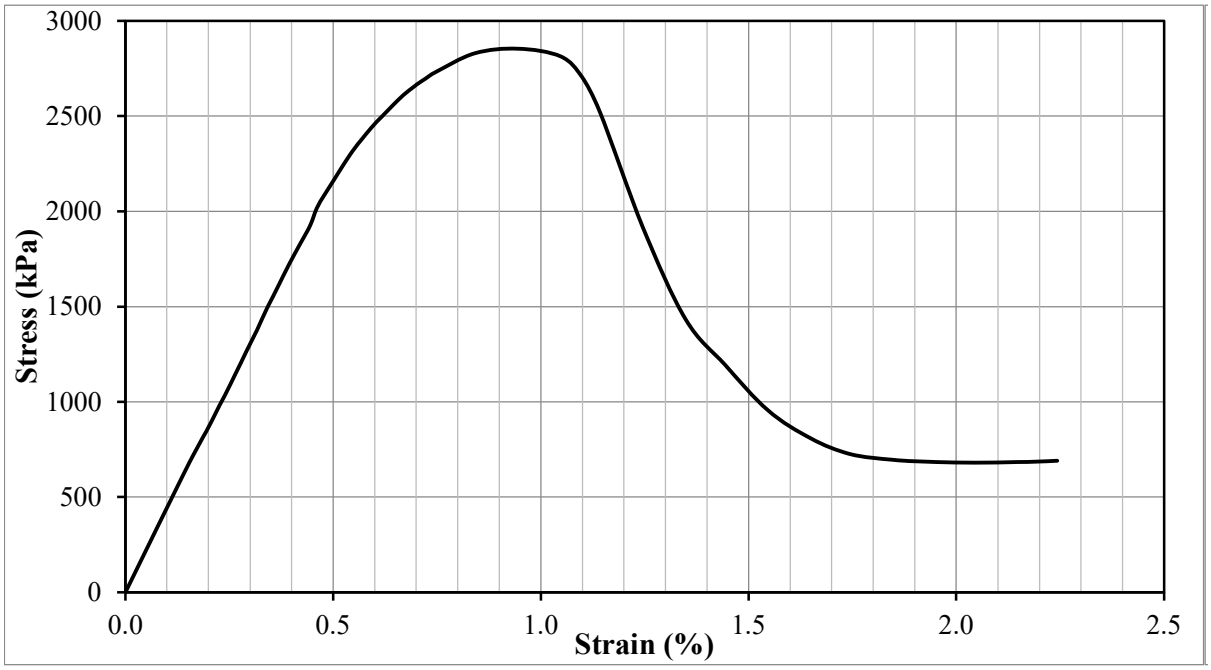
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,263	Strain at failure, εf :	1.09	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	O-1-F	Initial Area:	2102.5	mm^2
Test Date:	4/15/2021	Weight:	386.8	g
Strain Rate:	1 %/min	Unit Weight:	1826	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	13.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



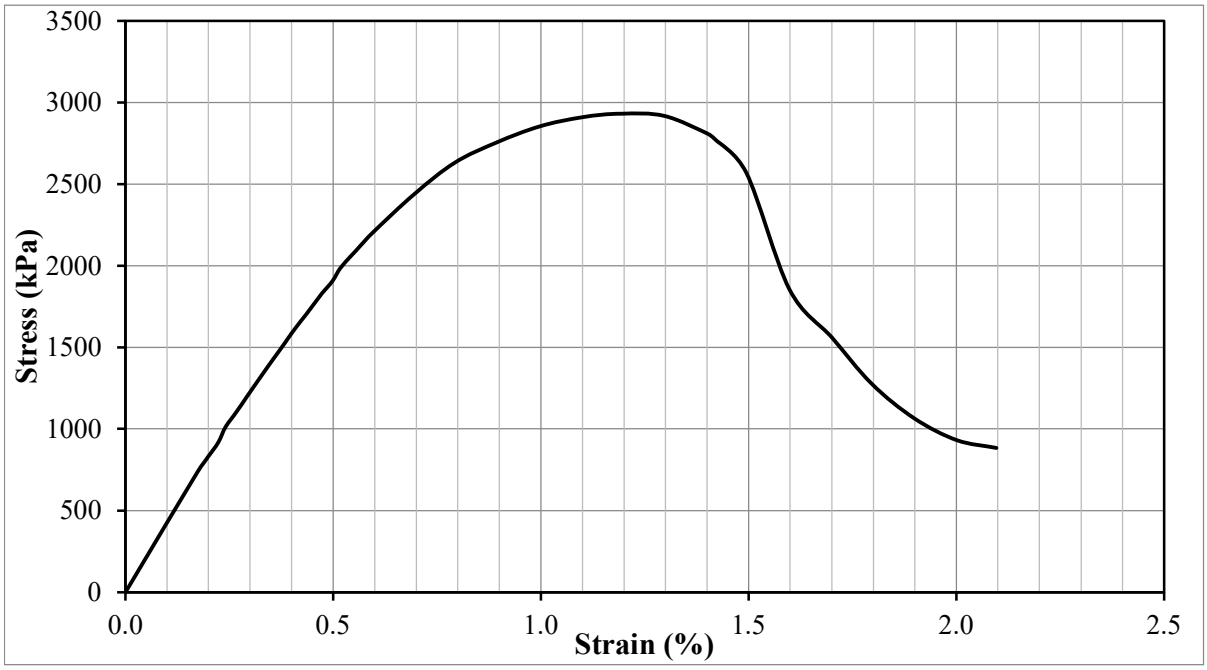
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,327	Strain at failure, εf :	1.08	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-1-D	Initial Area:	2108.7	mm^2
Test Date:	4/29/2021	Weight:	385.3	g
Strain Rate:	1 %/min	Unit Weight:	1818	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	27.5	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



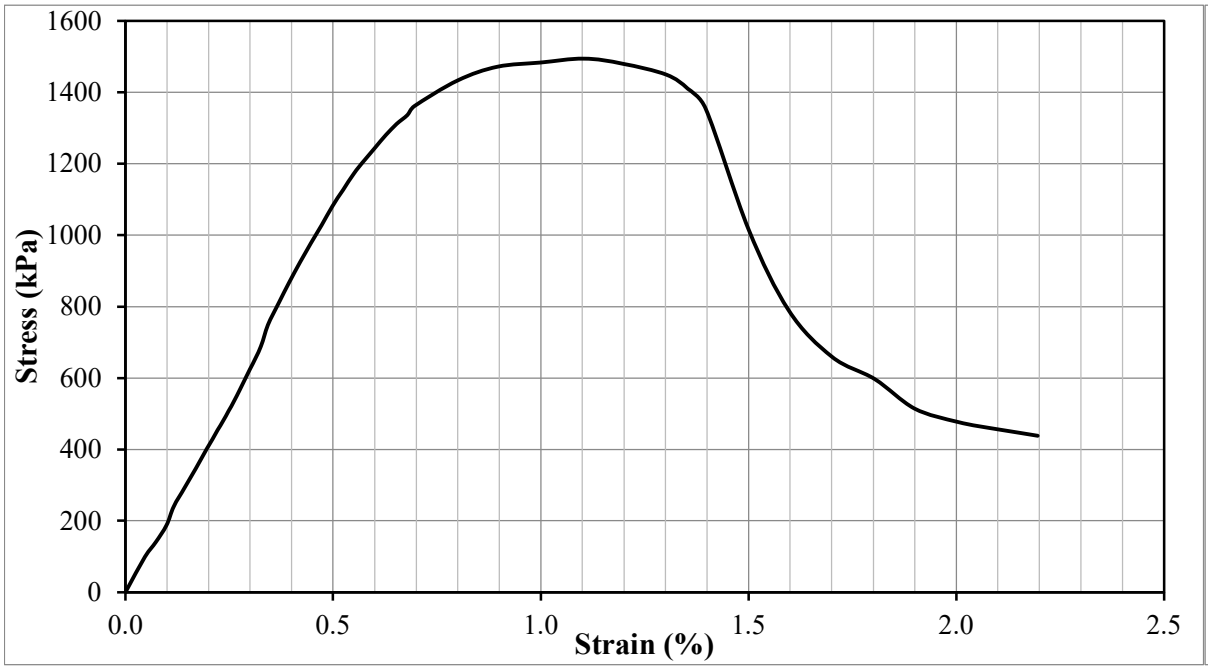
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,840	Strain at failure, εf :	0.94	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-1-I	Initial Area:	2110.8	mm^2
Test Date:	4/29/2021	Weight:	377.3	g
Strain Rate:	1 %/min	Unit Weight:	1813	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	27.5	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



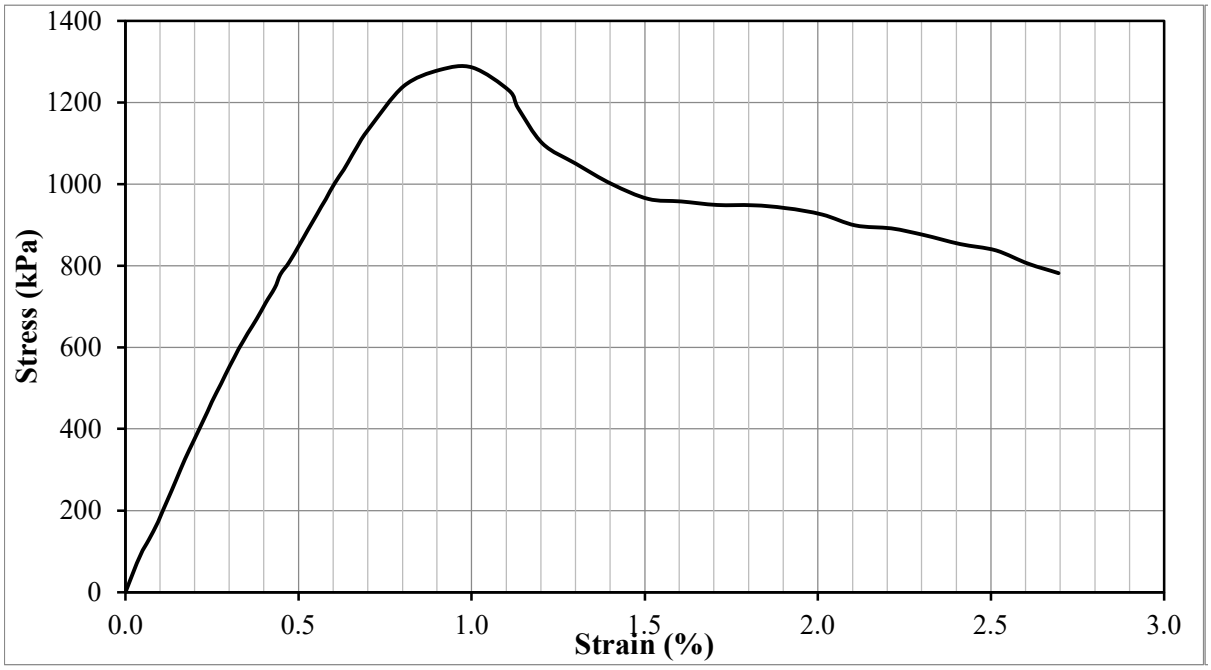
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,909	Strain at failure, εf :	1.19	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.1	mm
I.D.:	O-2-A	Initial Area:	2135.7	mm^2
Test Date:	5/30/2021	Weight:	379.8	g
Strain Rate:	1 %/min	Unit Weight:	1772	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	3.2	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



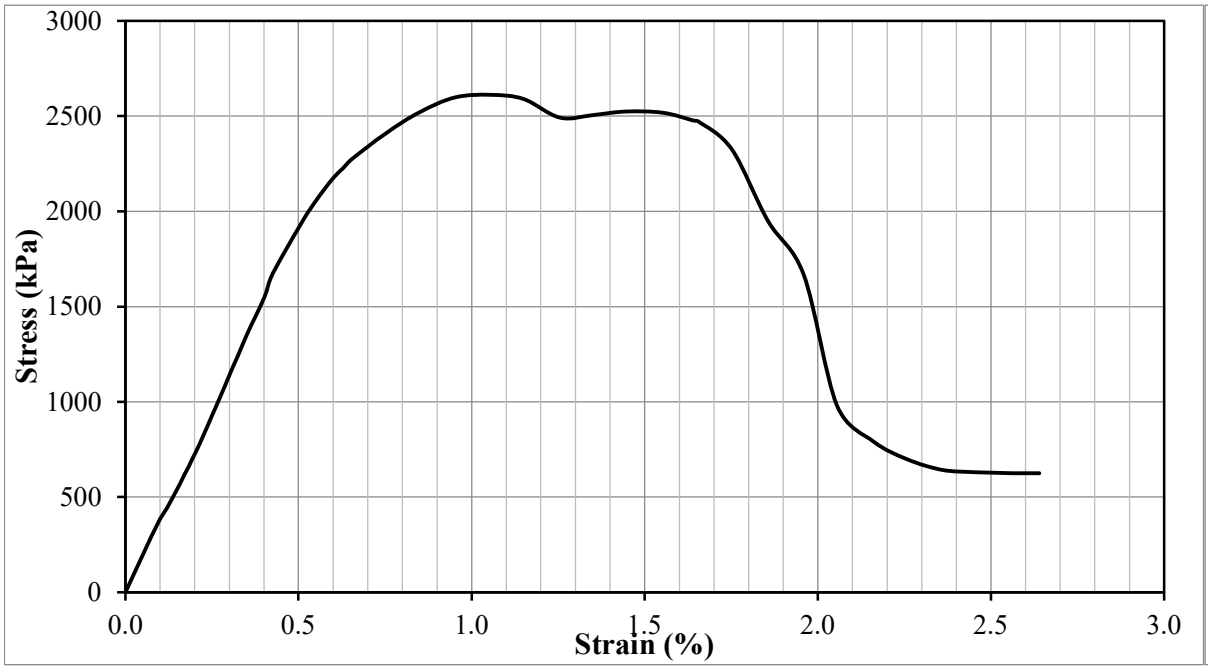
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,485	Strain at failure, εf :	1.10	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-2-H	Initial Area:	2108.7	mm^2
Test Date:	5/30/2021	Weight:	381.9	g
Strain Rate:	1 %/min	Unit Weight:	1795	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	3.2	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



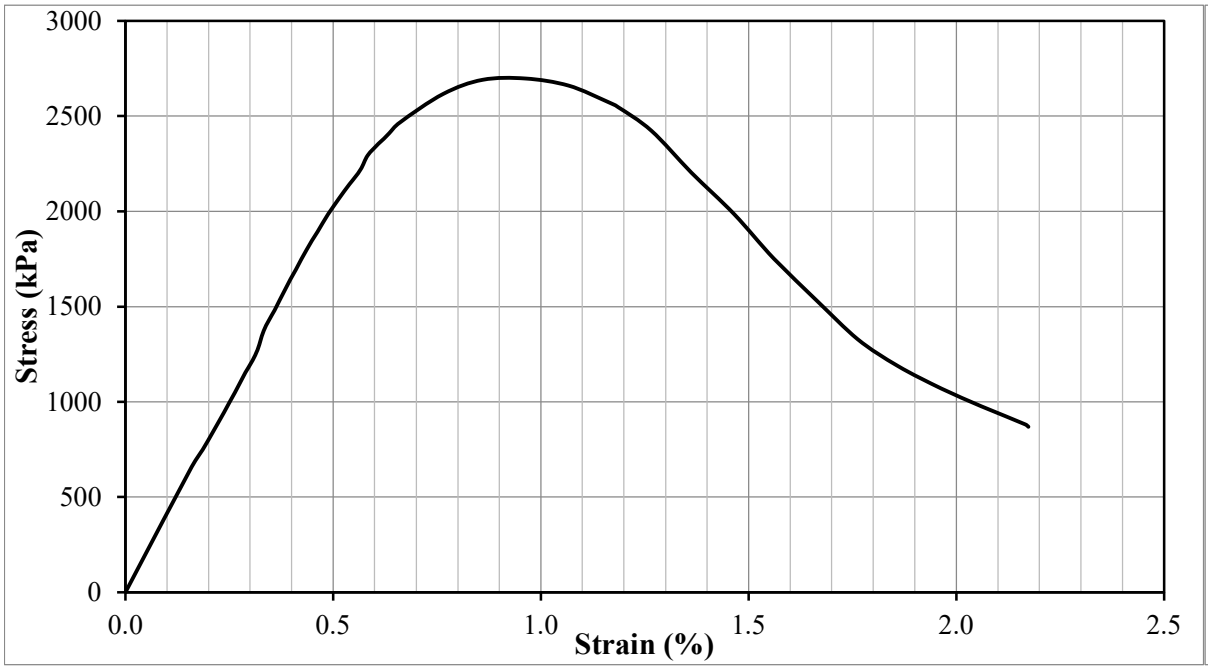
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,280	Strain at failure, εf :	1.00	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.6	mm
I.D.:	O-2-B	Initial Area:	2092.2	mm^2
Test Date:	6/3/2021	Weight:	374.3	g
Strain Rate:	1 %/min	Unit Weight:	1815	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	7.0	days
$(w{:}c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



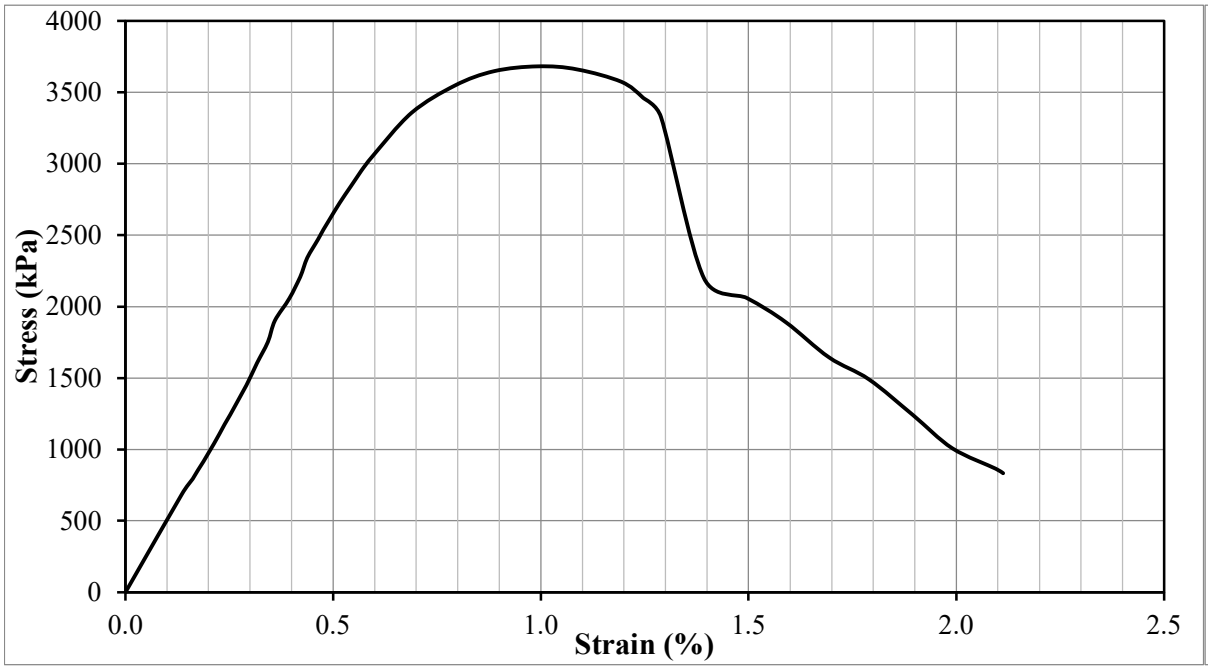
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,592	Strain at failure, εf :	1.06	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	O-2-G	Initial Area:	2121.1	mm^2
Test Date:	6/3/2021	Weight:	384.3	g
Strain Rate:	1 %/min	Unit Weight:	1795	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	7.0	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



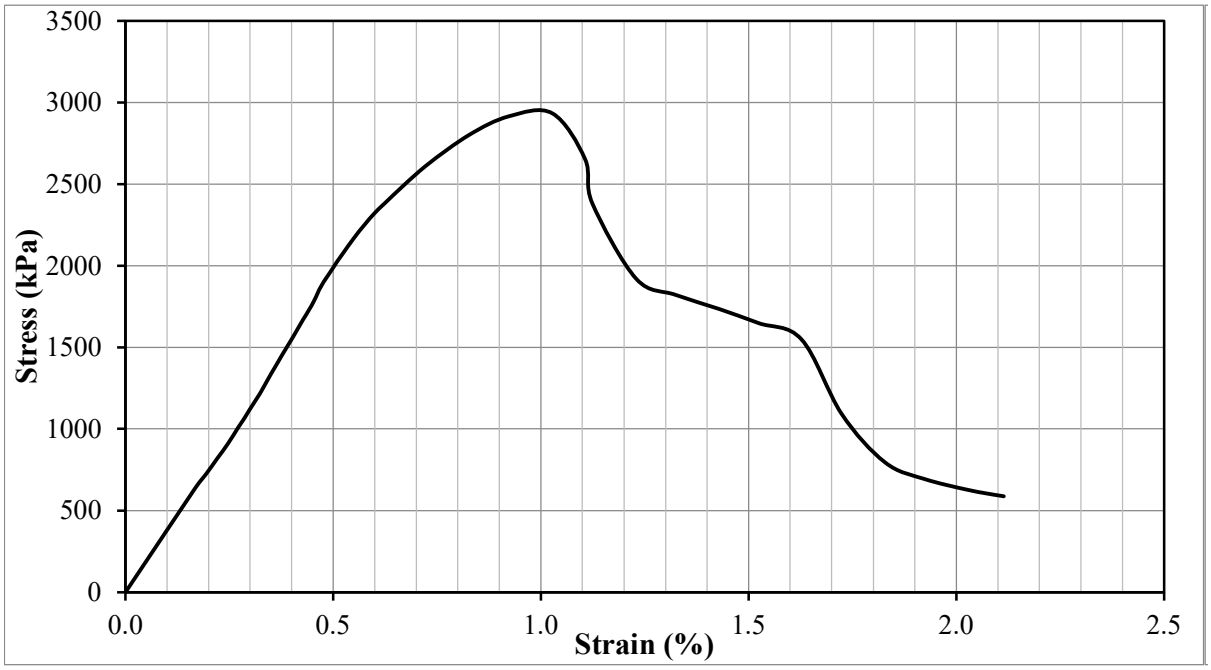
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,684	Strain at failure, εf :	0.96	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-2-C	Initial Area:	2110.8	mm^2
Test Date:	6/10/2021	Weight:	383.8	g
Strain Rate:	1 %/min	Unit Weight:	1801	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	13.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



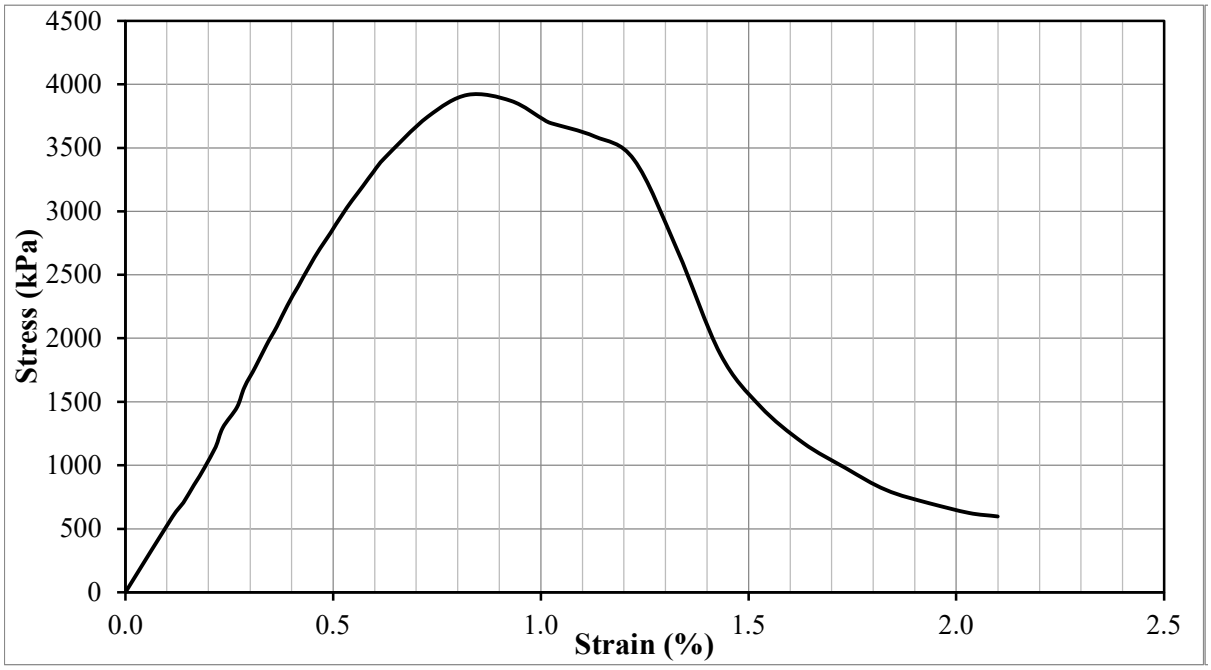
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,665	Strain at failure, εf :	0.99	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-2-F	Initial Area:	2112.9	mm^2
Test Date:	6/10/2021	Weight:	377.0	g
Strain Rate:	1 %/min	Unit Weight:	1798	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	14.0	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



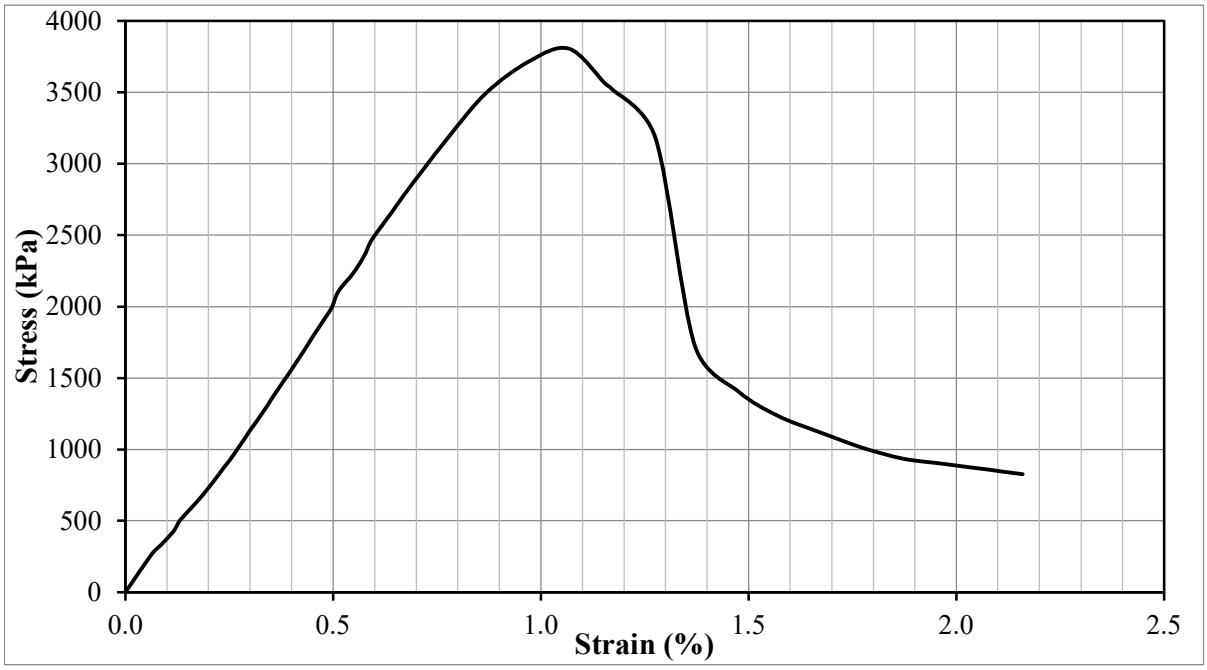
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,913	Strain at failure, εf :	1.03	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-2-D	Initial Area:	2110.8	mm^2
Test Date:	6/24/2021	Weight:	372.5	g
Strain Rate:	1 %/min	Unit Weight:	1744	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	27.7	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



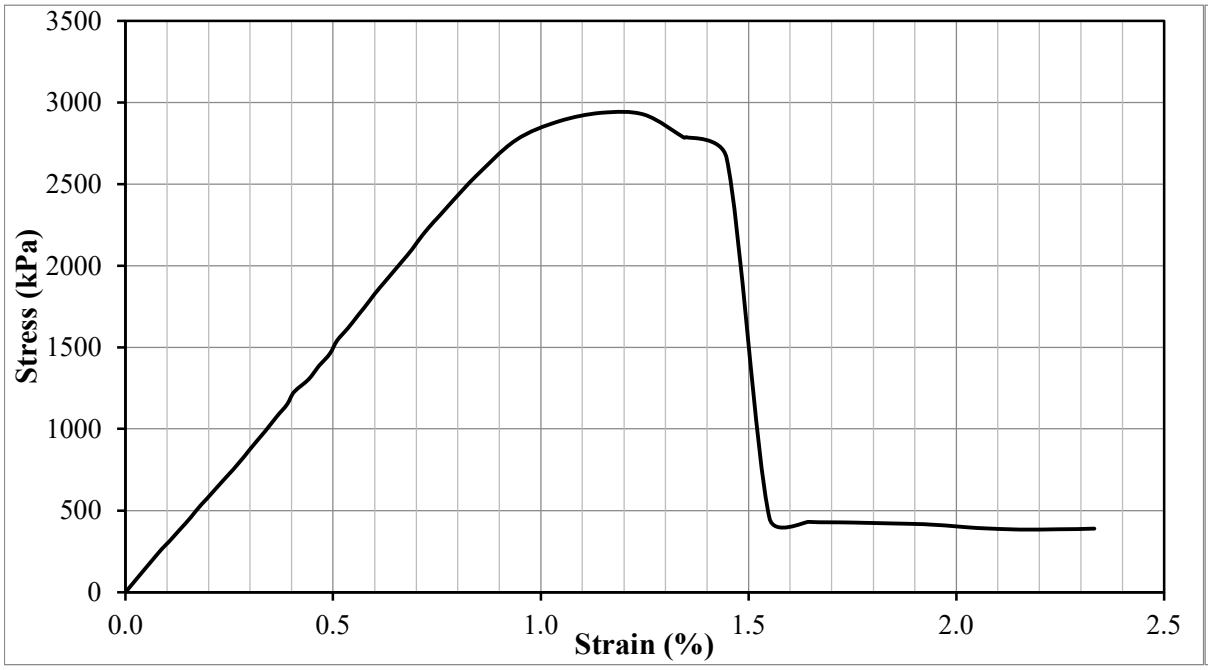
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,902	Strain at failure, εf :	0.82	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-2-E	Initial Area:	2106.6	mm^2
Test Date:	6/24/2021	Weight:	368.7	g
Strain Rate:	1 %/min	Unit Weight:	1735	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	27.8	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



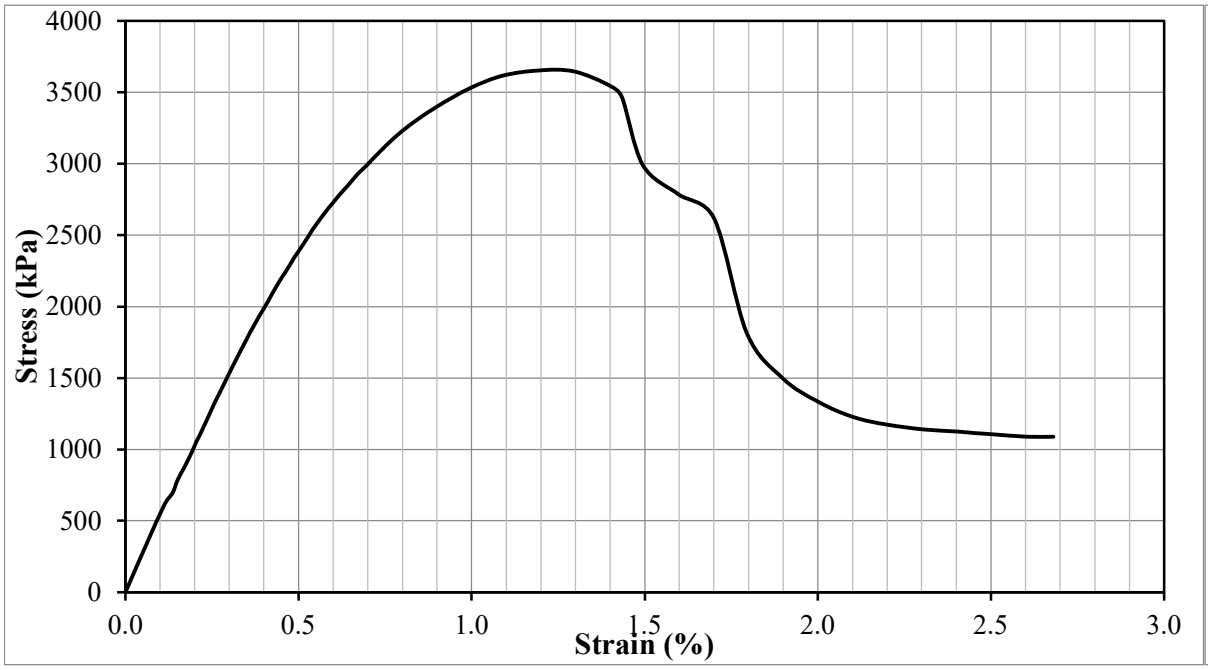
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,789	Strain at failure, εf :	1.07	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-3-A	Initial Area:	2104.6	mm^2
Test Date:	4/11/2021	Weight:	380.5	g
Strain Rate:	1 %/min	Unit Weight:	1817	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	3.3	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



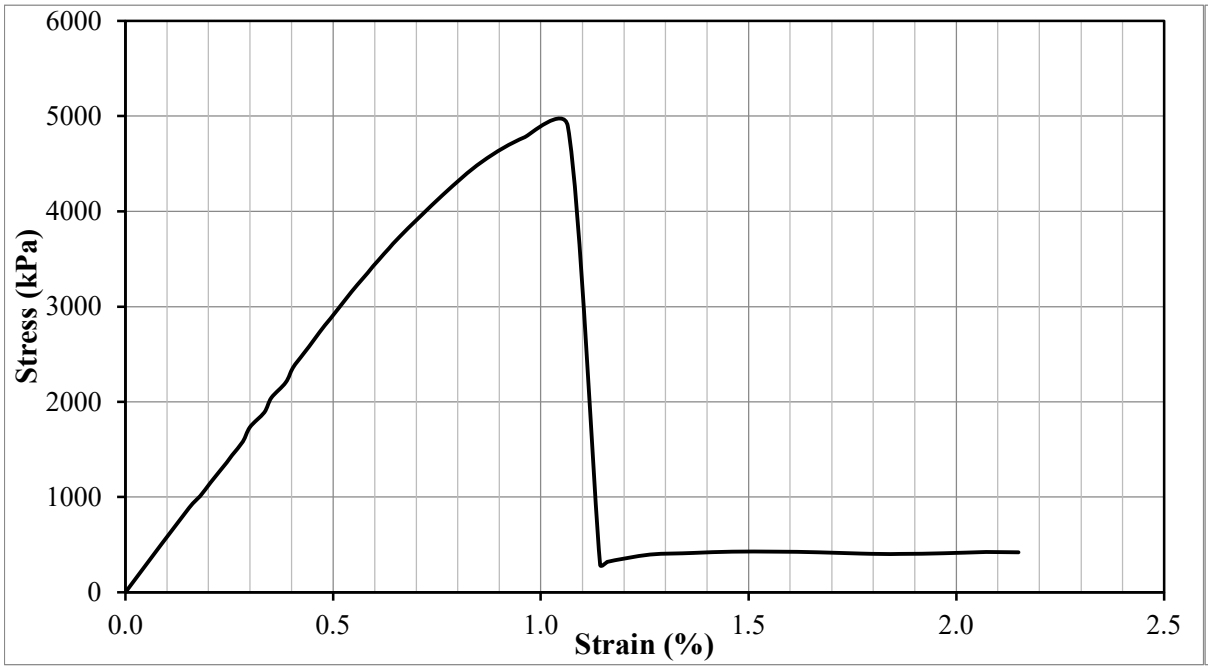
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,918	Strain at failure, εf :	1.15	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-3-H	Initial Area:	2117.0	mm^2
Test Date:	4/11/2021	Weight:	376.4	g
Strain Rate:	1 %/min	Unit Weight:	1816	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	3.3	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



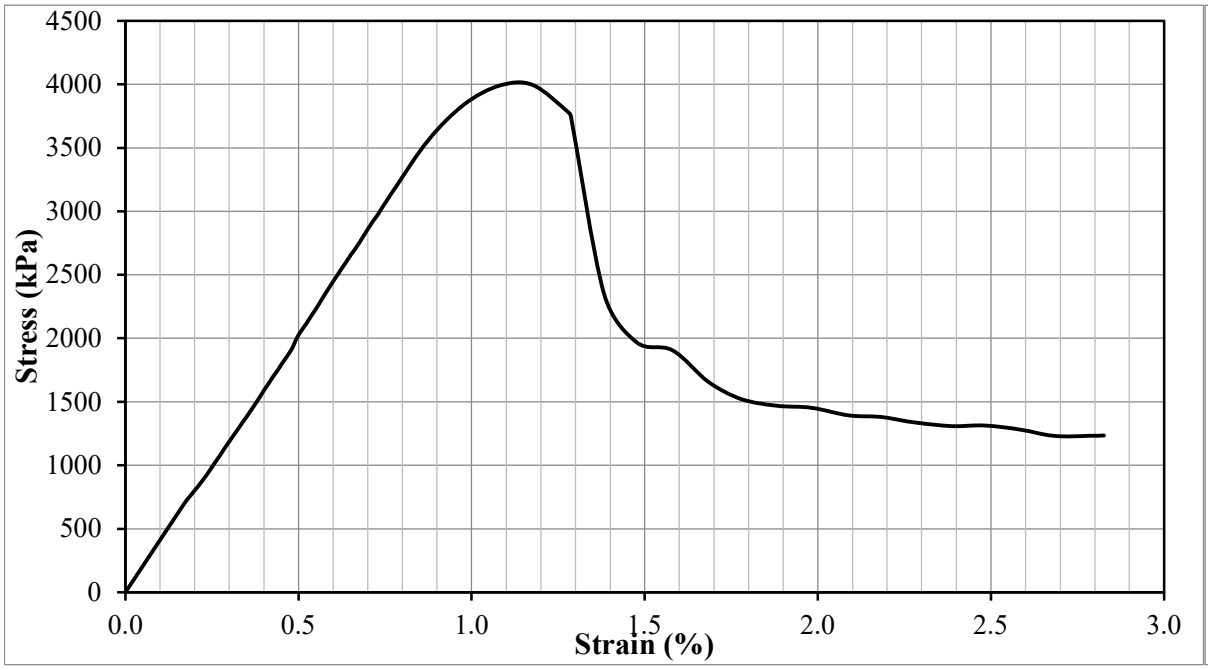
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,619	Strain at failure, εf :	1.19	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-3-B	Initial Area:	2110.8	mm^2
Test Date:	4/15/2021	Weight:	382.4	g
Strain Rate:	1 %/min	Unit Weight:	1820	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	6.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



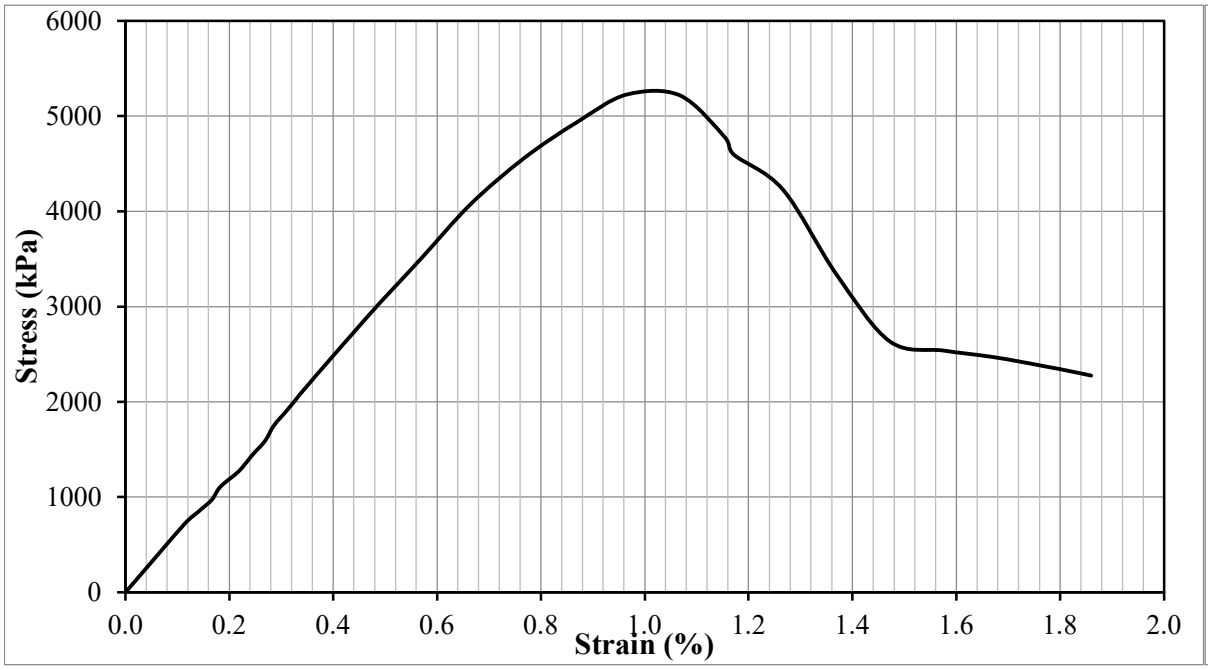
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,863	Strain at failure, εf :	1.06	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	O-3-G	Initial Area:	2123.2	mm^2
Test Date:	4/15/2021	Weight:	380.2	g
Strain Rate:	1 %/min	Unit Weight:	1781	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	6.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



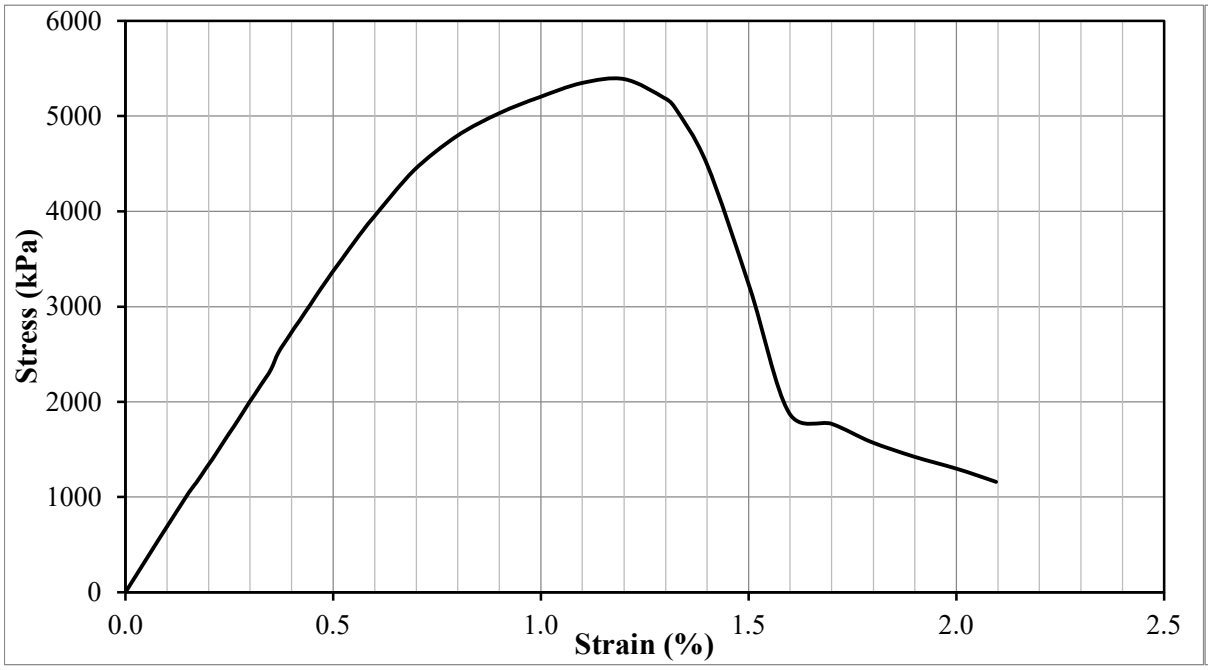
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,975	Strain at failure, εf :	1.18	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-3-C	Initial Area:	2112.9	mm^2
Test Date:	4/22/2021	Weight:	389.9	g
Strain Rate:	1 %/min	Unit Weight:	1825	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	13.8	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



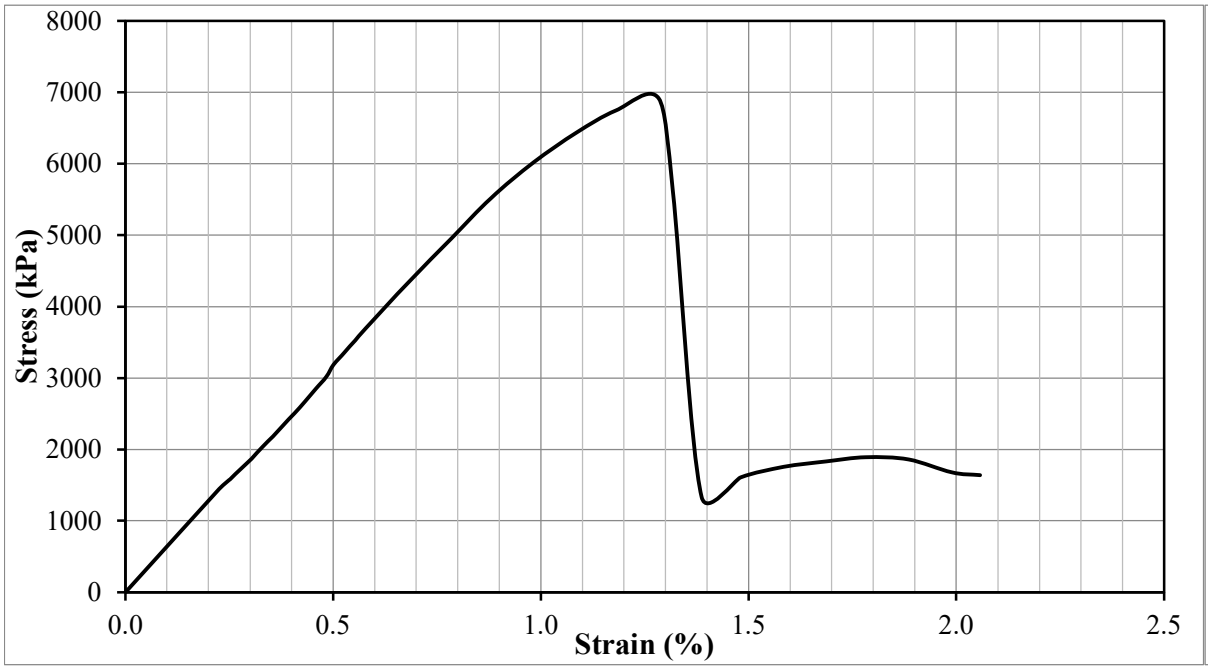
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,204	Strain at failure, εf :	0.97	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-3-F	Initial Area:	2112.9	mm^2
Test Date:	4/22/2021	Weight:	386.3	g
Strain Rate:	1 %/min	Unit Weight:	1824	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	13.8	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



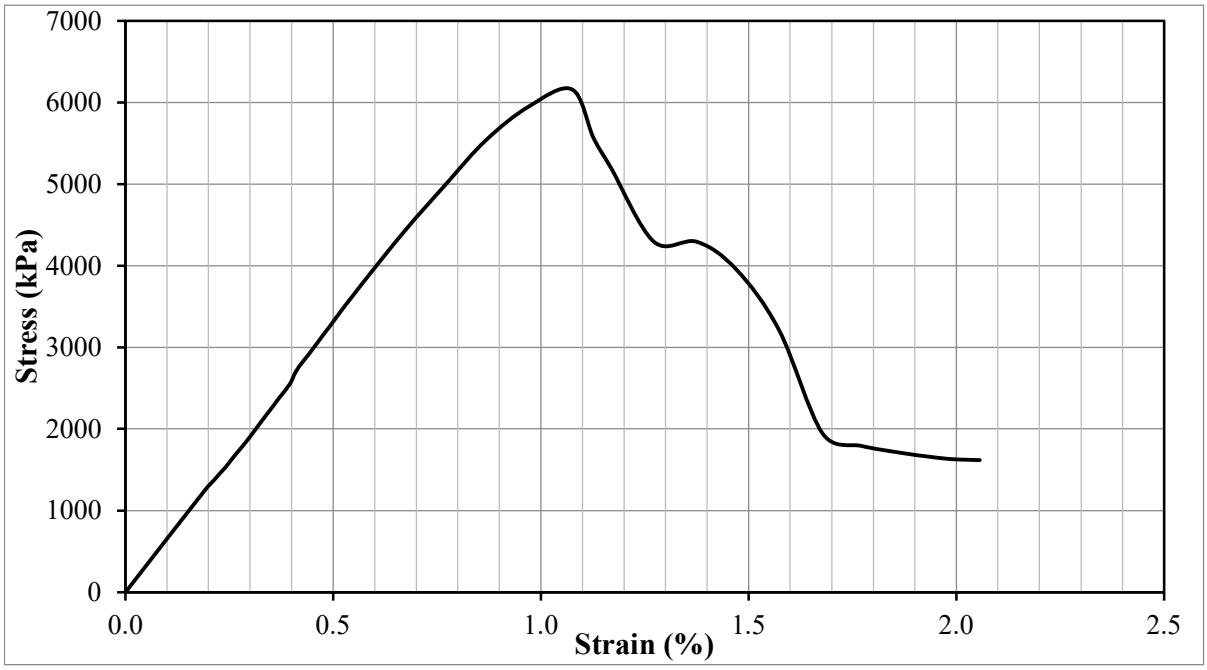
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,358	Strain at failure, εf :	1.20	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-3-E	Initial Area:	2119.1	mm^2
Test Date:	5/6/2021	Weight:	380.3	g
Strain Rate:	1 %/min	Unit Weight:	1821	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	28.1	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



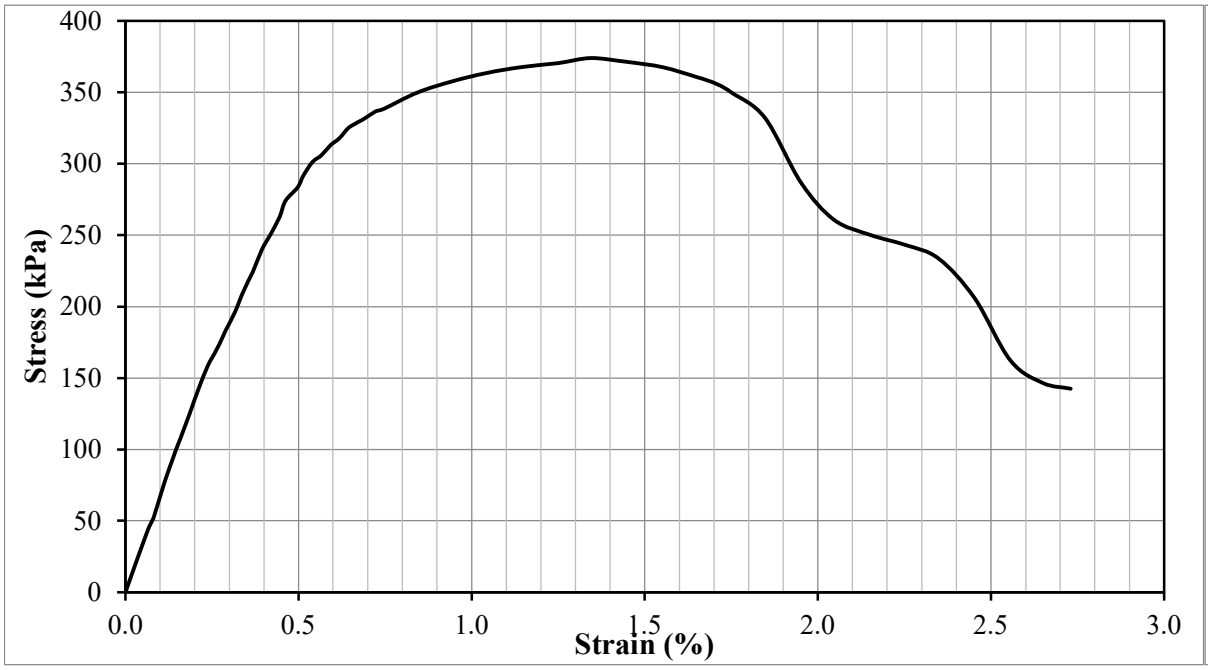
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	6,858	Strain at failure, εf :	1.28	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-3-I	Initial Area:	2117.0	mm^2
Test Date:	5/6/2021	Weight:	380.2	g
Strain Rate:	1 %/min	Unit Weight:	1823	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	28.1	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



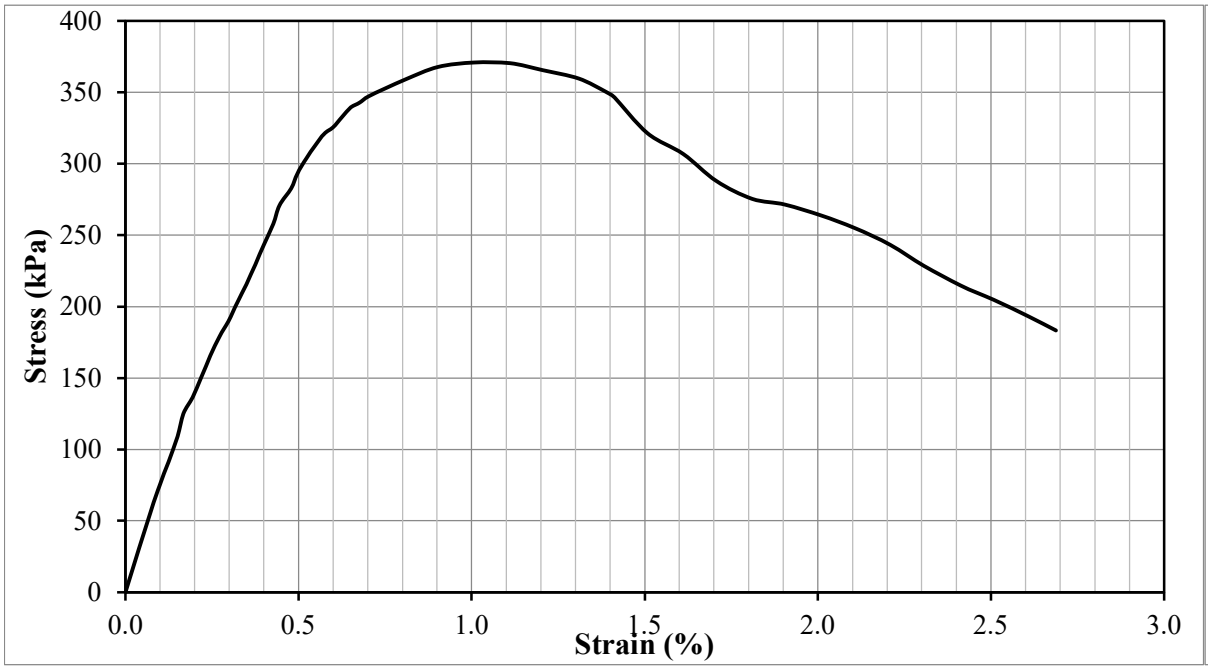
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	6,110	Strain at failure, εf :	1.07	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-4-A	Initial Area:	2106.6	mm^2
Test Date:	5/30/2021	Weight:	364.2	g
Strain Rate:	1 %/min	Unit Weight:	1770	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	3.1	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



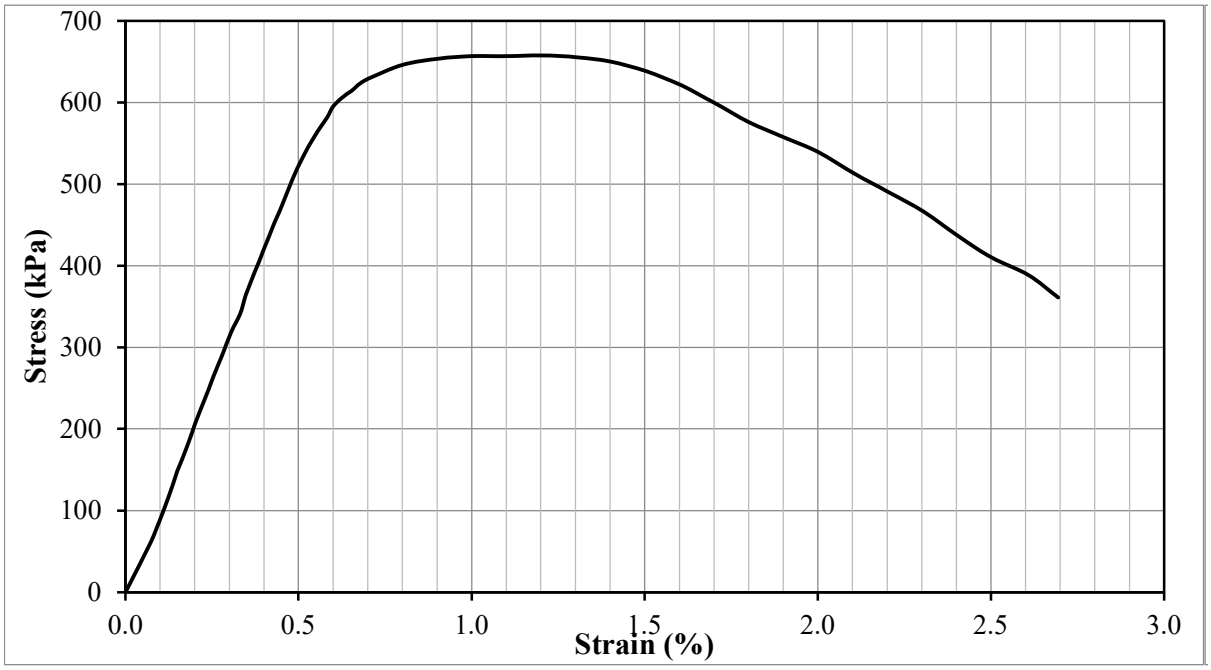
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	370	Strain at failure, εf :	1.35	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-4-H	Initial Area:	2104.6	mm^2
Test Date:	5/30/2021	Weight:	369.2	g
Strain Rate:	1 %/min	Unit Weight:	1770	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	3.1	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



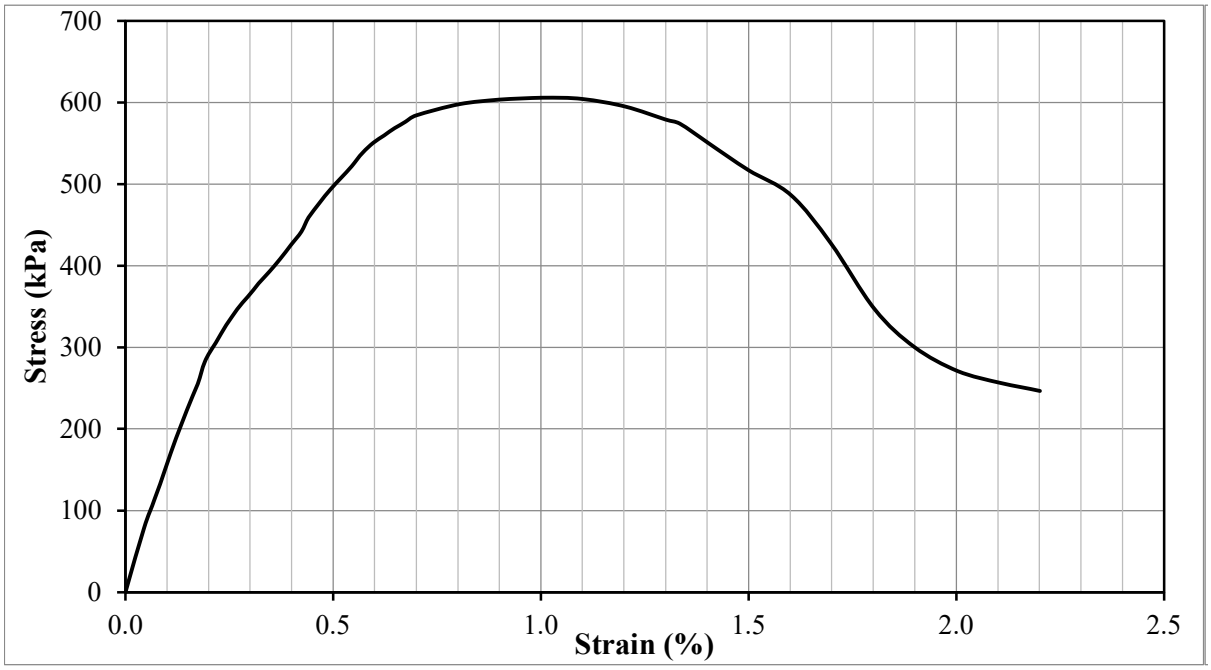
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	368	Strain at failure, εf :	1.01	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-4-B	Initial Area:	2110.8	mm^2
Test Date:	6/3/2021	Weight:	369.1	g
Strain Rate:	1 %/min	Unit Weight:	1767	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	6.9	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



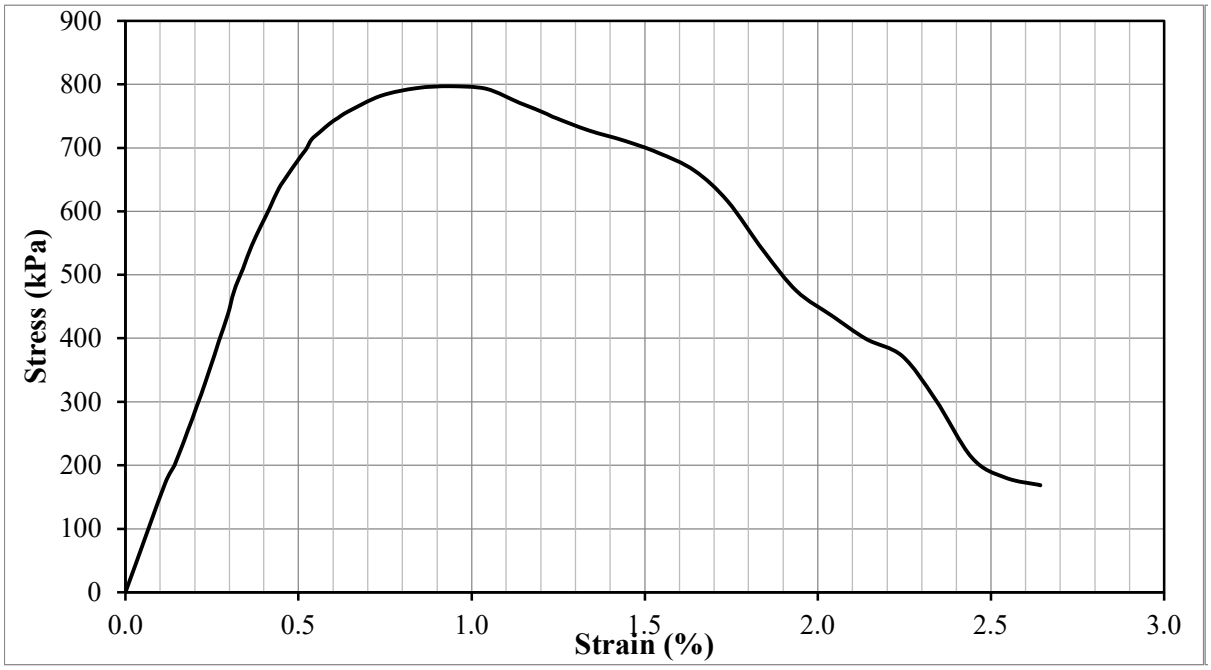
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	653	Strain at failure, εf :	1.20	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-4-G	Initial Area:	2108.7	mm^2
Test Date:	6/3/2021	Weight:	371.4	g
Strain Rate:	1 %/min	Unit Weight:	1770	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	6.9	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



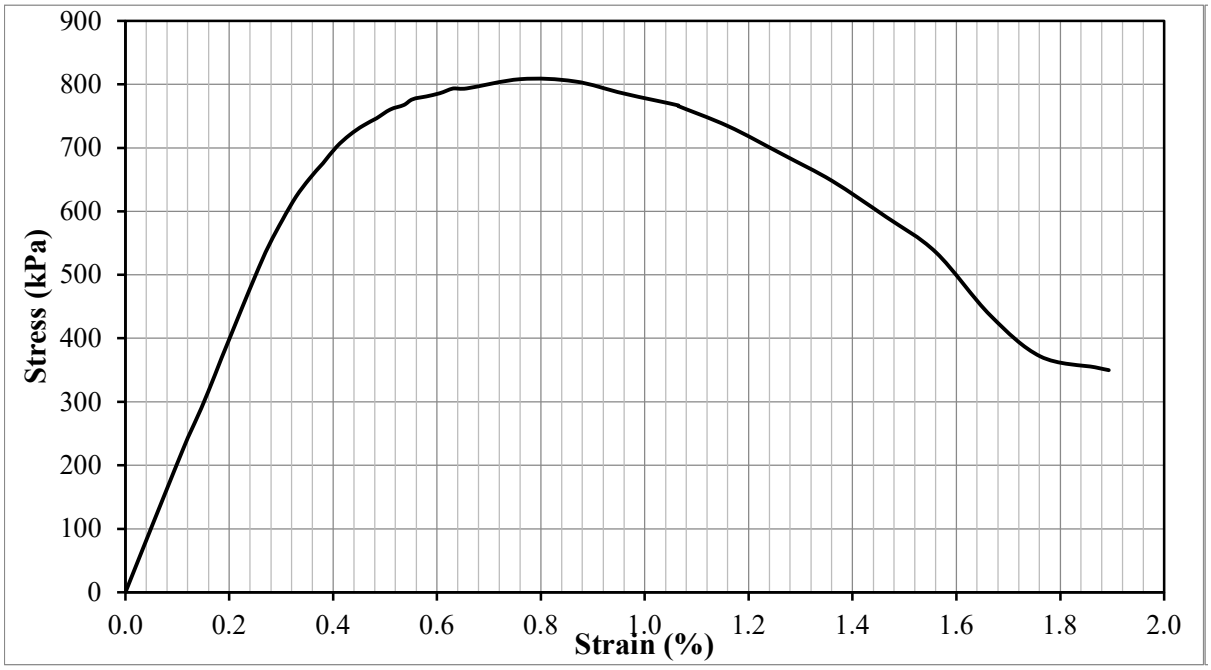
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	602	Strain at failure, εf :	1.00	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-4-C	Initial Area:	2110.8	mm^2
Test Date:	6/10/2021	Weight:	368.7	g
Strain Rate:	1 %/min	Unit Weight:	1773	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	13.9	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



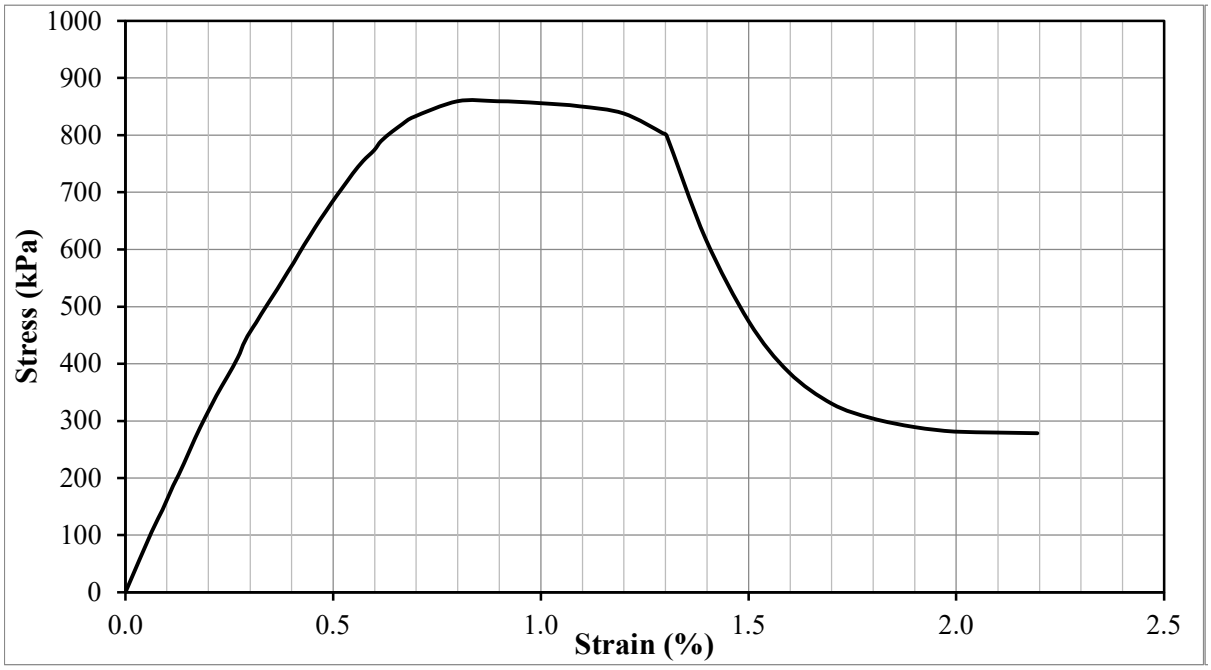
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	790	Strain at failure, εf :	0.94	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	O-4-F	Initial Area:	2098.4	mm^2
Test Date:	6/10/2021	Weight:	365.1	g
Strain Rate:	1 %/min	Unit Weight:	1780	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	13.9	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



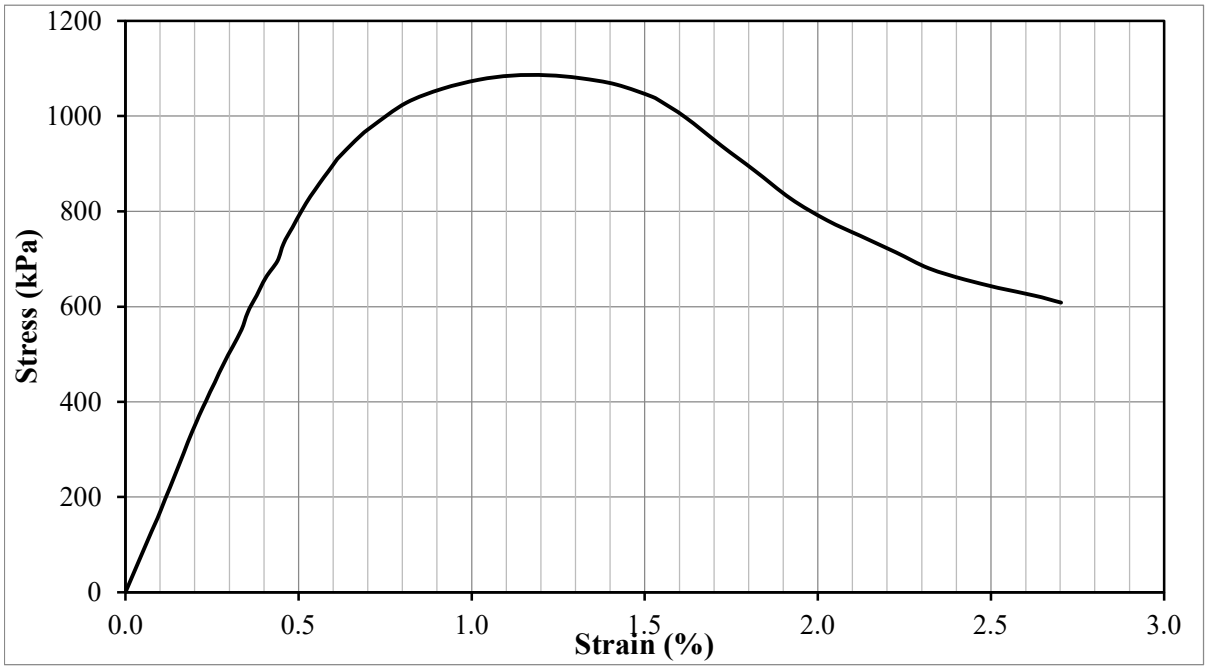
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	801	Strain at failure, εf :	0.76	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-4-D	Initial Area:	2117.0	mm^2
Test Date:	6/24/2021	Weight:	385.4	g
Strain Rate:	1 %/min	Unit Weight:	1824	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	27.8	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



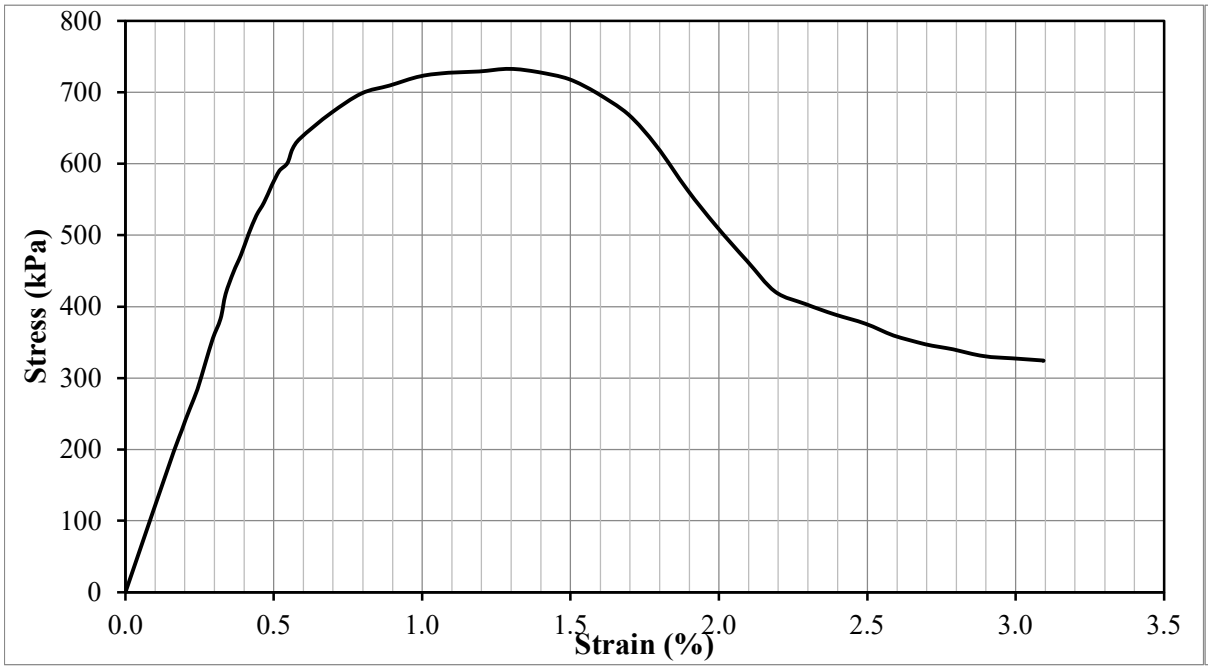
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	854	Strain at failure, εf :	0.90	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	O-4-E	Initial Area:	2121.1	mm^2
Test Date:	6/24/2021	Weight:	383.9	g
Strain Rate:	1 %/min	Unit Weight:	1835	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	27.8	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



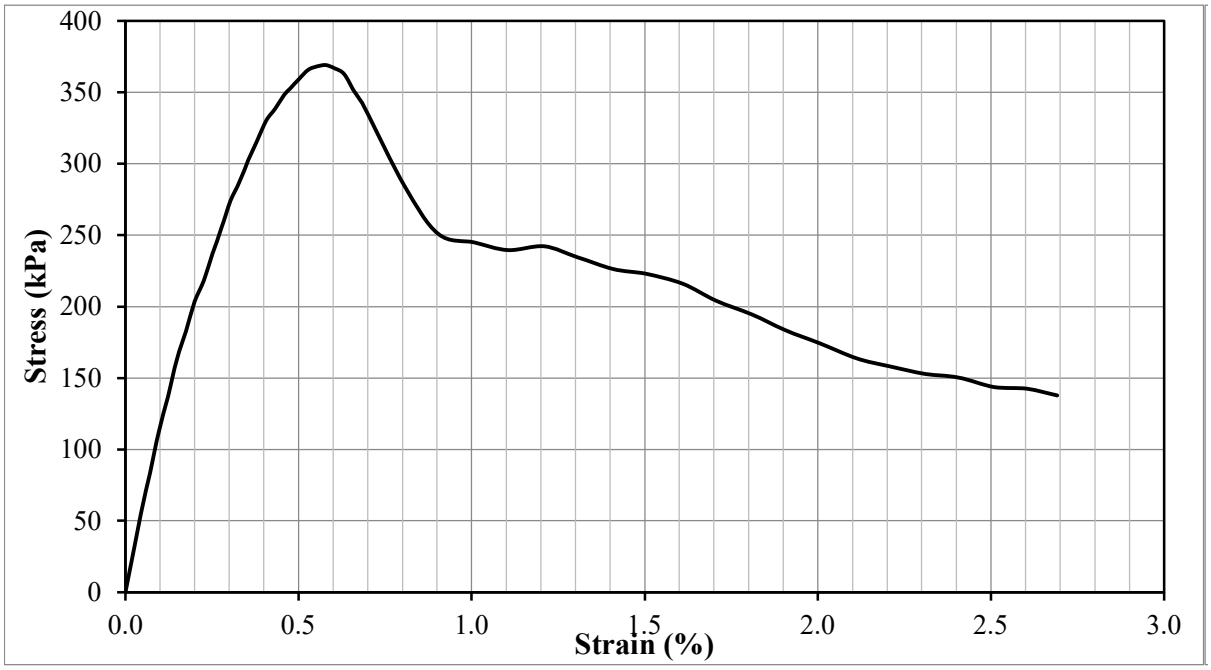
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,077	Strain at failure, εf :	1.22	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-5-A	Initial Area:	2108.7	mm^2
Test Date:	5/31/2021	Weight:	362.0	g
Strain Rate:	1 %/min	Unit Weight:	1744	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	3.3	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



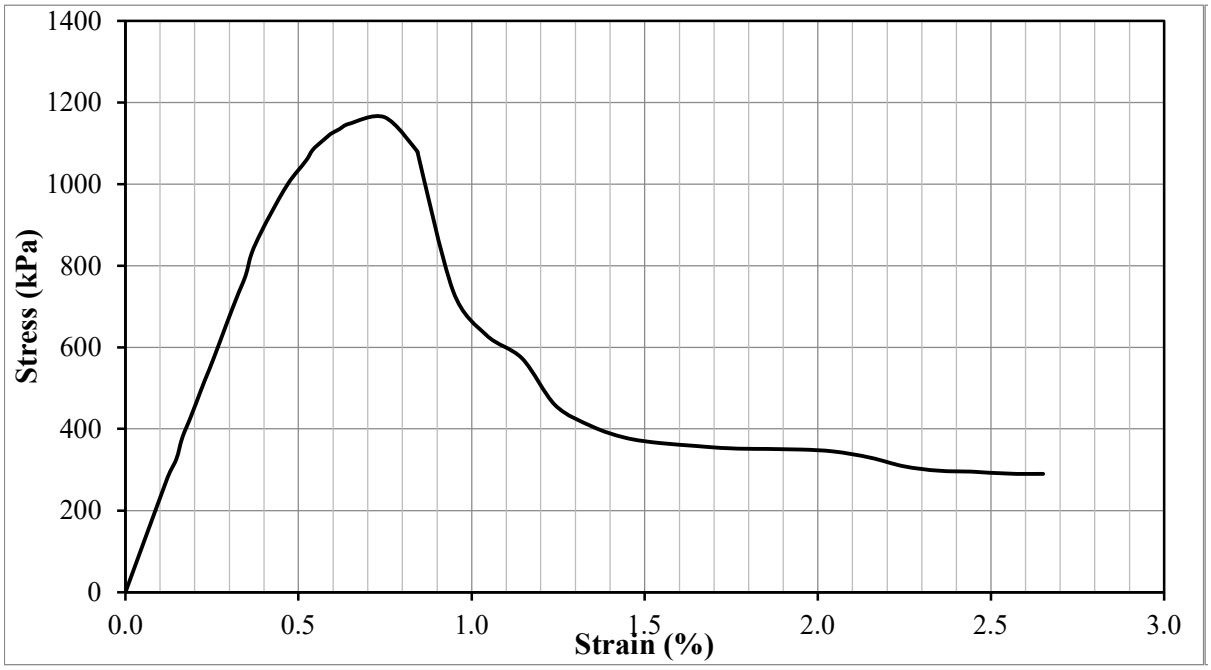
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	727	Strain at failure, εf :	1.30	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-5-H	Initial Area:	2110.8	mm^2
Test Date:	5/31/2021	Weight:	357.2	g
Strain Rate:	1 %/min	Unit Weight:	1740	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	3.3	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



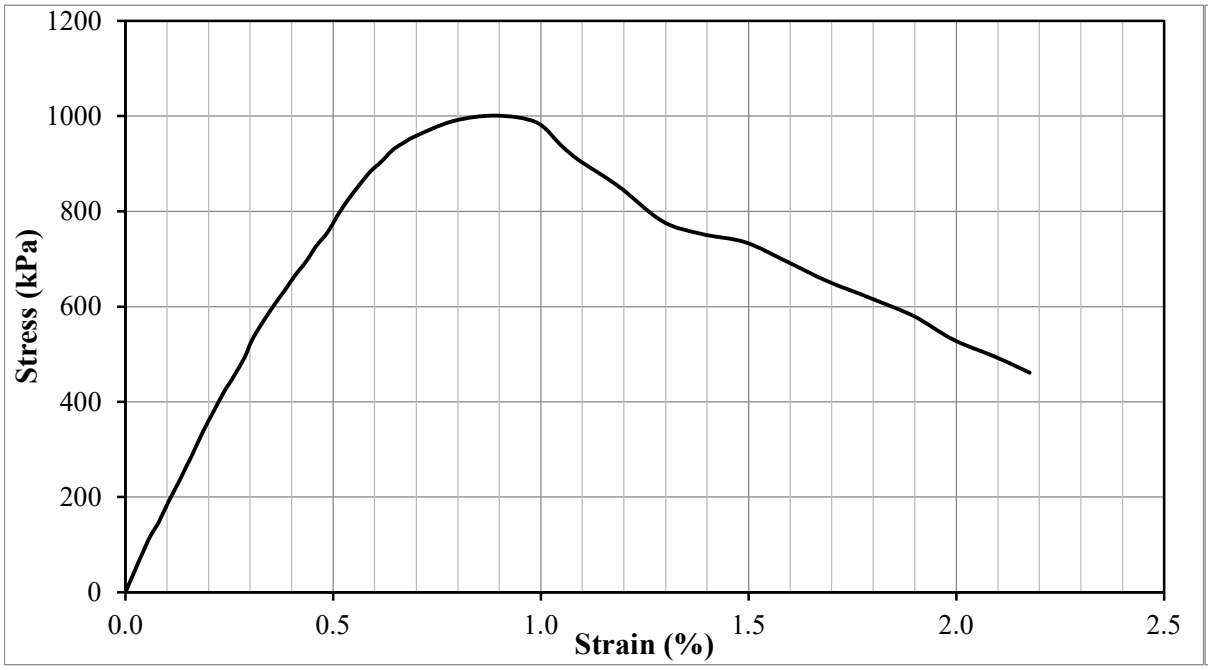
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	365	Strain at failure, εf :	0.58	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	O-5-B	Initial Area:	2100.5	mm^2
Test Date:	6/4/2021	Weight:	368.5	g
Strain Rate:	1 %/min	Unit Weight:	1758	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	7.4	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



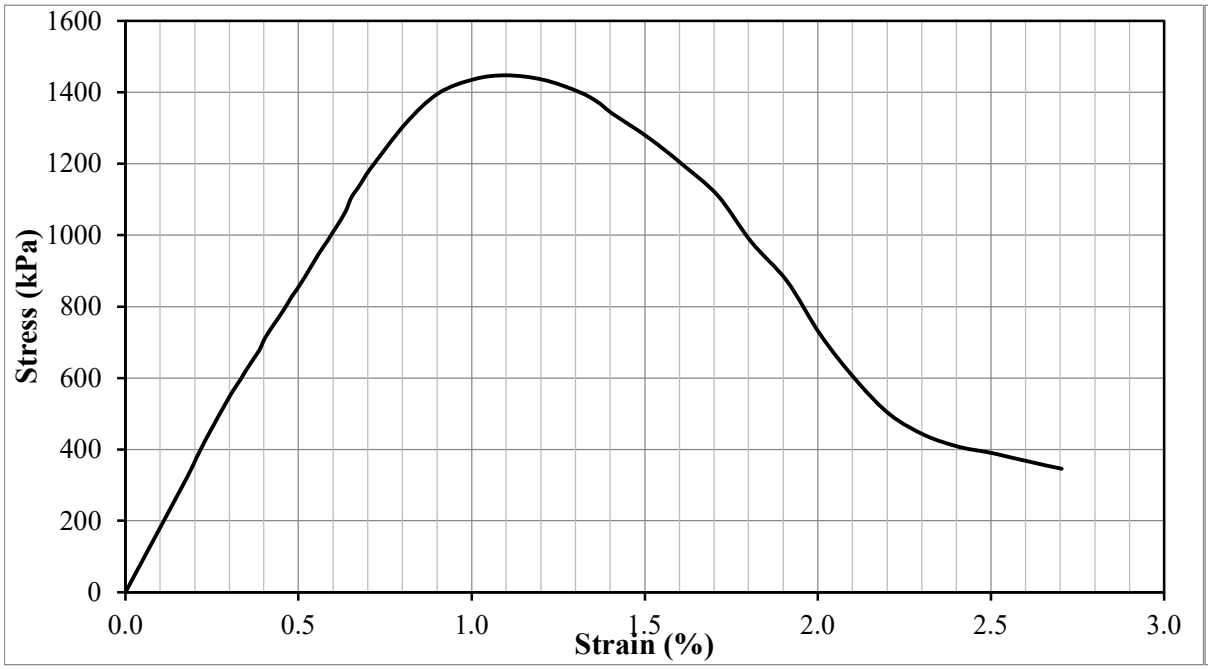
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,157	Strain at failure, εf :	0.75	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	O-5-G	Initial Area:	2121.1	mm^2
Test Date:	6/4/2021	Weight:	360.7	g
Strain Rate:	1 %/min	Unit Weight:	1735	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	7.4	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



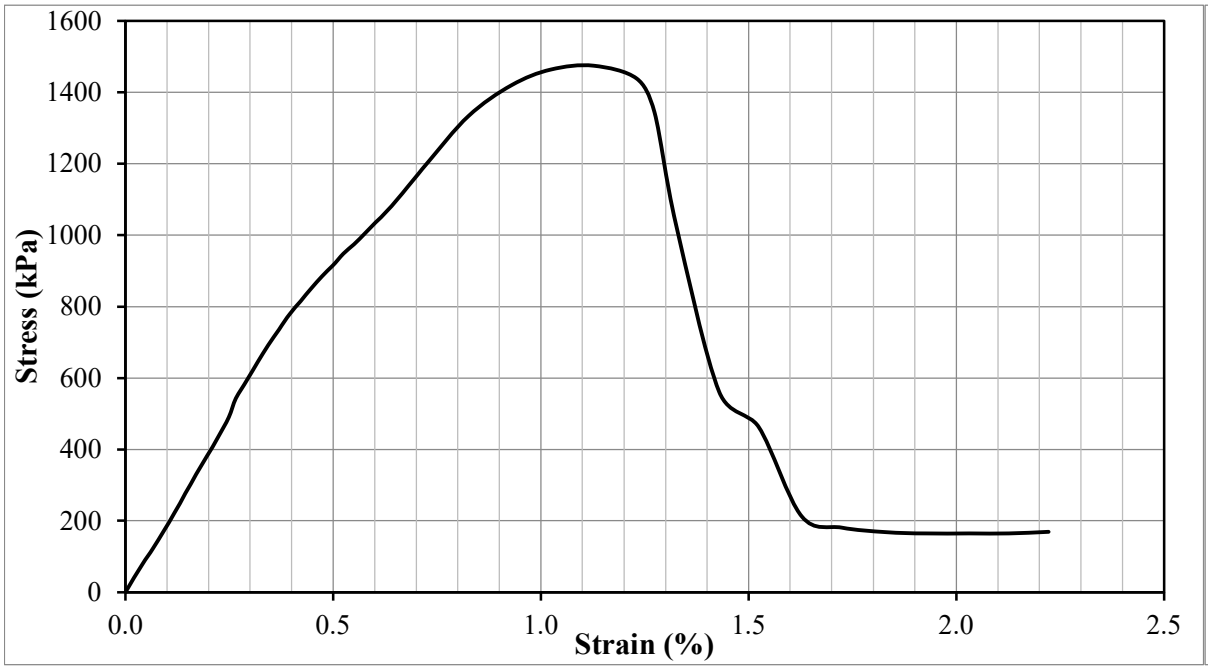
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	992	Strain at failure, εf :	0.89	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-5-C	Initial Area:	2112.9	mm^2
Test Date:	6/11/2021	Weight:	367.5	g
Strain Rate:	1 %/min	Unit Weight:	1746	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	14.5	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



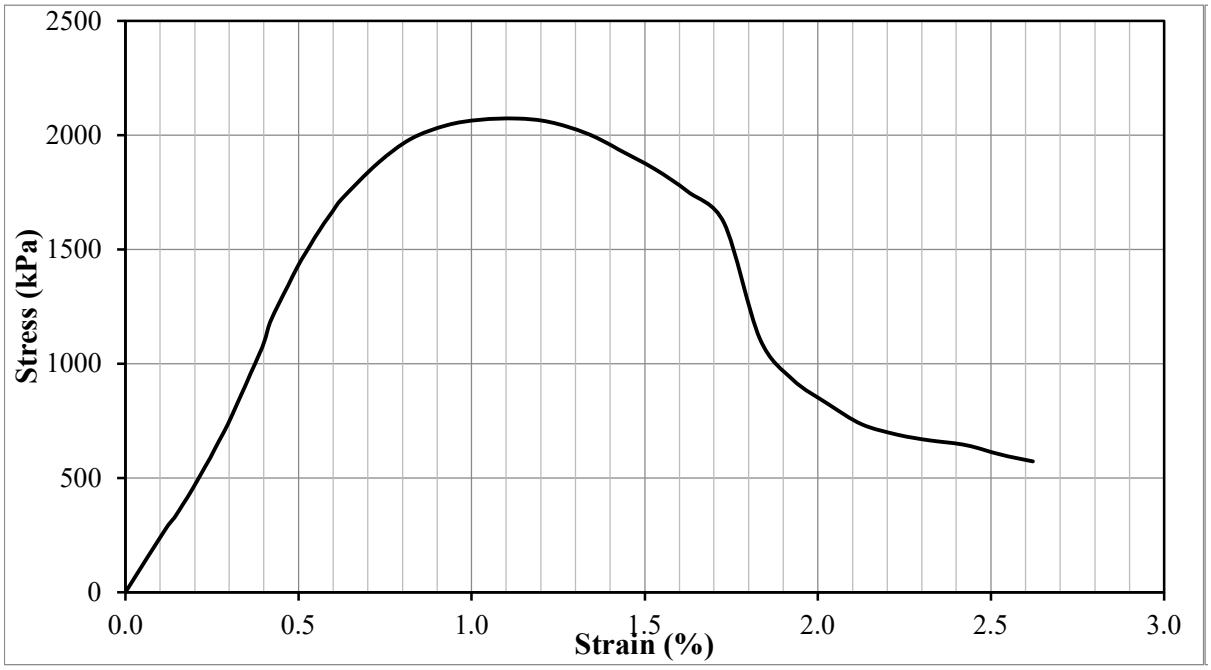
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,438	Strain at failure, εf :	1.10	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	O-5-F	Initial Area:	2123.2	mm^2
Test Date:	6/11/2021	Weight:	367.9	g
Strain Rate:	1 %/min	Unit Weight:	1739	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	14.5	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



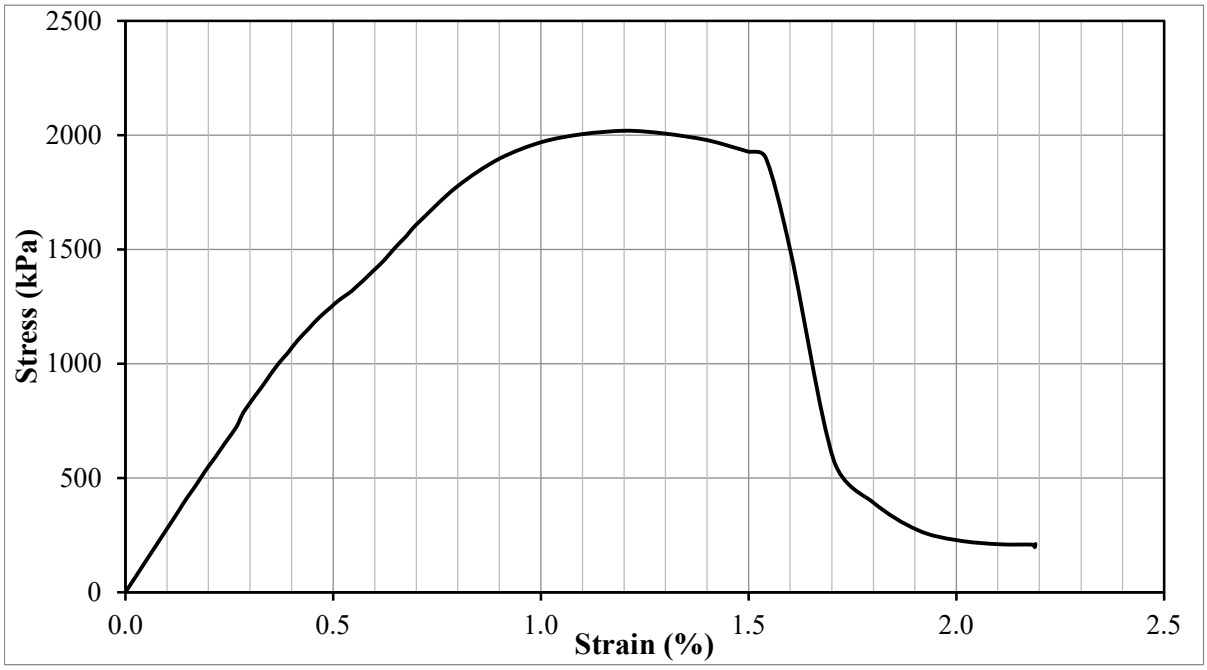
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,464	Strain at failure, εf :	1.13	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-5-D	Initial Area:	2119.1	mm^2
Test Date:	6/25/2021	Weight:	371.0	g
Strain Rate:	1 %/min	Unit Weight:	1738	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	28.1	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



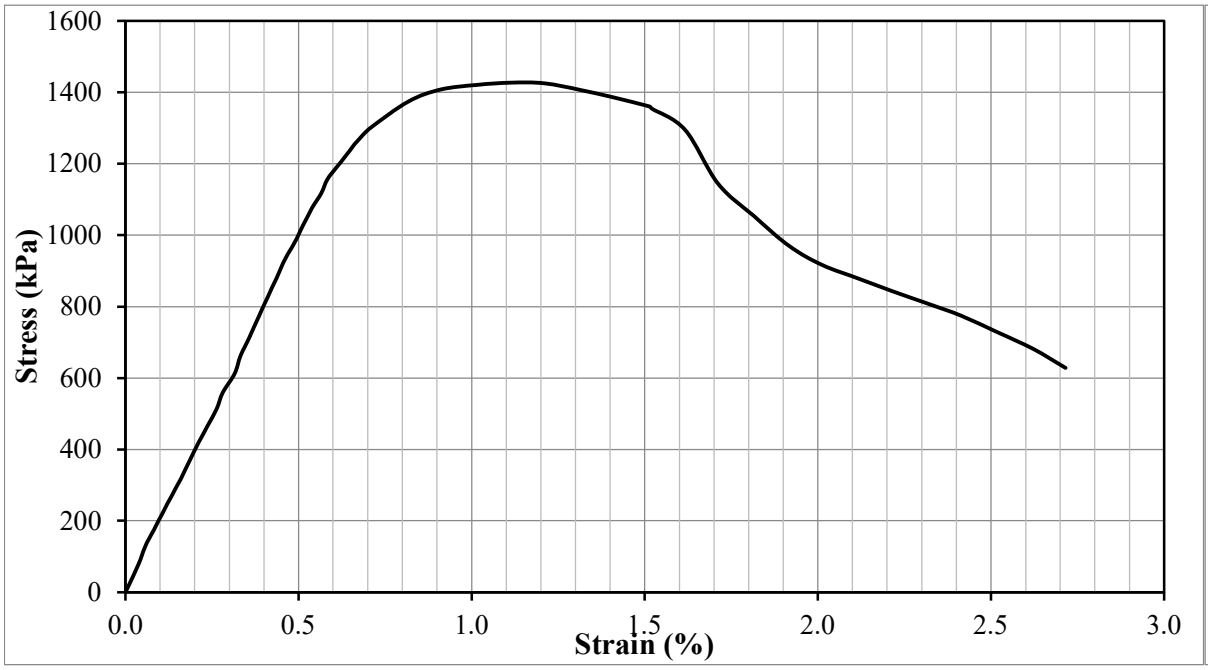
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,062	Strain at failure, εf :	1.13	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-5-E	Initial Area:	2108.7	mm^2
Test Date:	6/25/2021	Weight:	367.0	g
Strain Rate:	1 %/min	Unit Weight:	1748	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	28.1	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



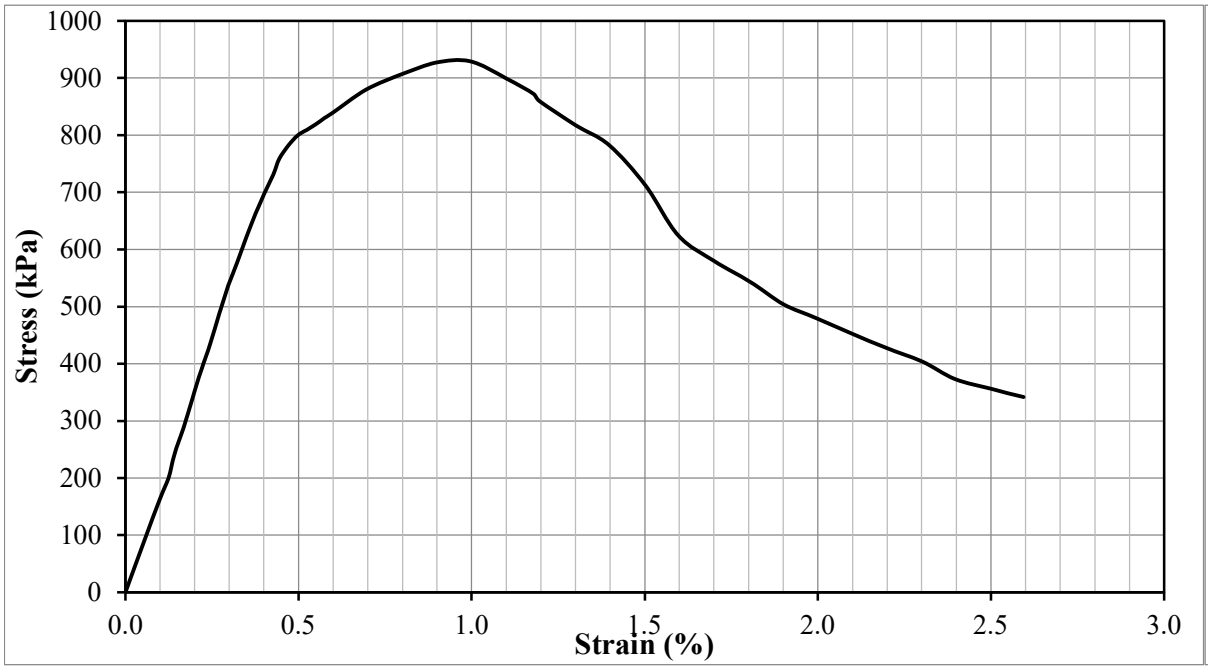
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,006	Strain at failure, εf :	1.20	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-6-A	Initial Area:	2106.6	mm^2
Test Date:	5/31/2021	Weight:	362.4	g
Strain Rate:	1 %/min	Unit Weight:	1737	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	3.2	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



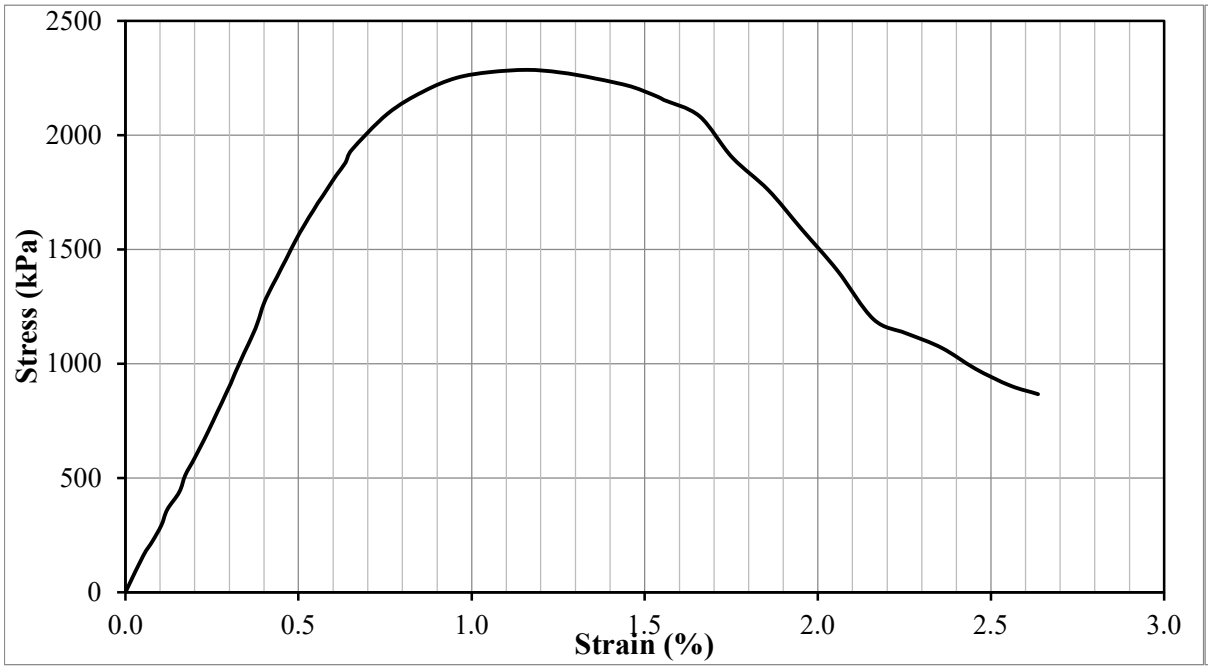
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,417	Strain at failure, εf :	1.11	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-6-H	Initial Area:	2112.9	mm^2
Test Date:	5/31/2021	Weight:	360.1	g
Strain Rate:	1 %/min	Unit Weight:	1729	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	3.2	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



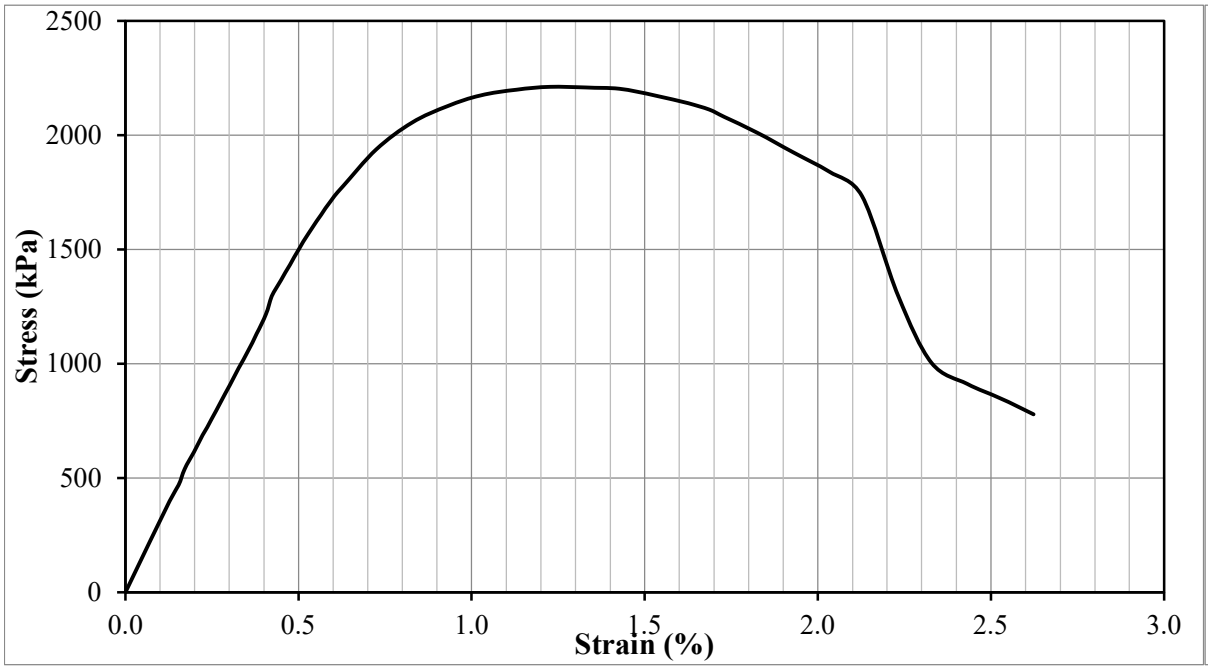
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	922	Strain at failure, εf :	1.00	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-6-B	Initial Area:	2117.0	mm^2
Test Date:	6/4/2021	Weight:	368.5	g
Strain Rate:	1 %/min	Unit Weight:	1729	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	7.4	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



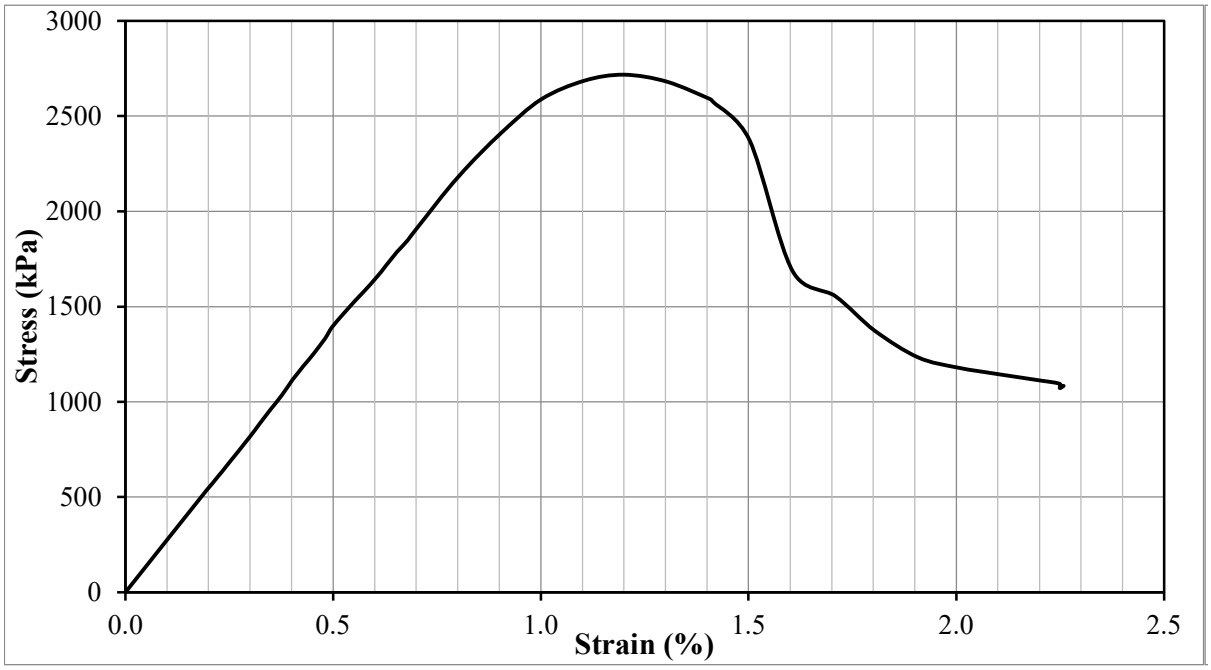
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,274	Strain at failure, εf :	1.16	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	O-6-G	Initial Area:	2121.1	mm^2
Test Date:	6/4/2021	Weight:	365.8	g
Strain Rate:	1 %/min	Unit Weight:	1722	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	7.4	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



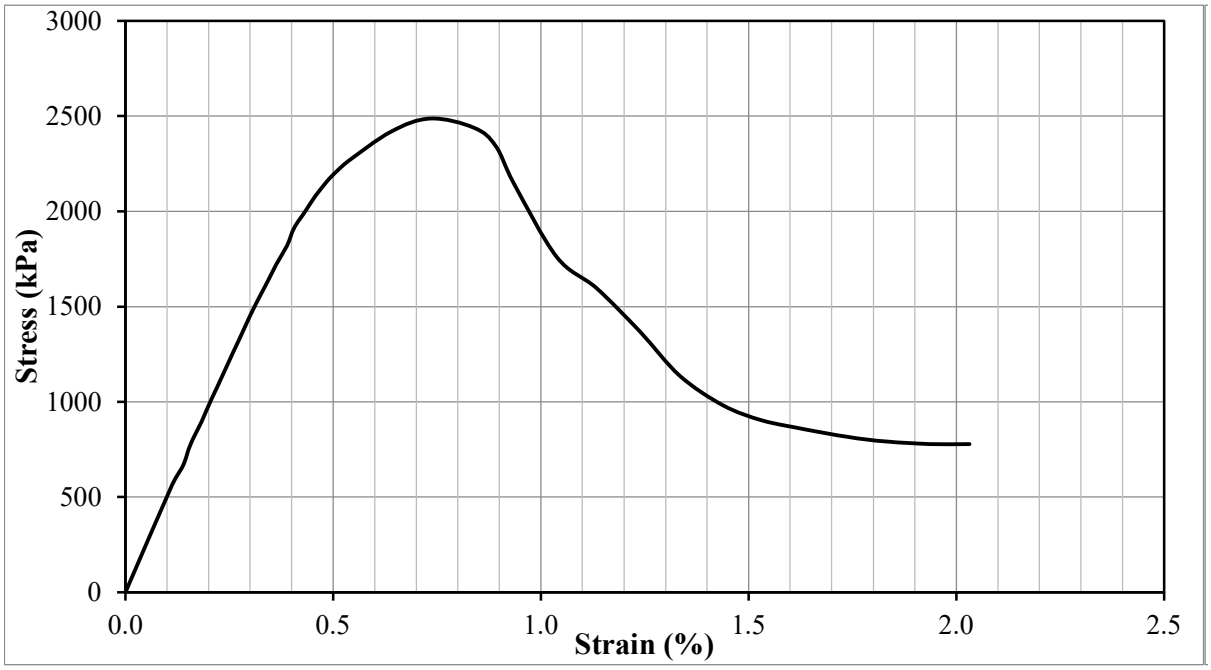
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,199	Strain at failure, εf :	1.23	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-6-C	Initial Area:	2112.9	mm^2
Test Date:	6/11/2021	Weight:	365.3	g
Strain Rate:	1 %/min	Unit Weight:	1734	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	13.9	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



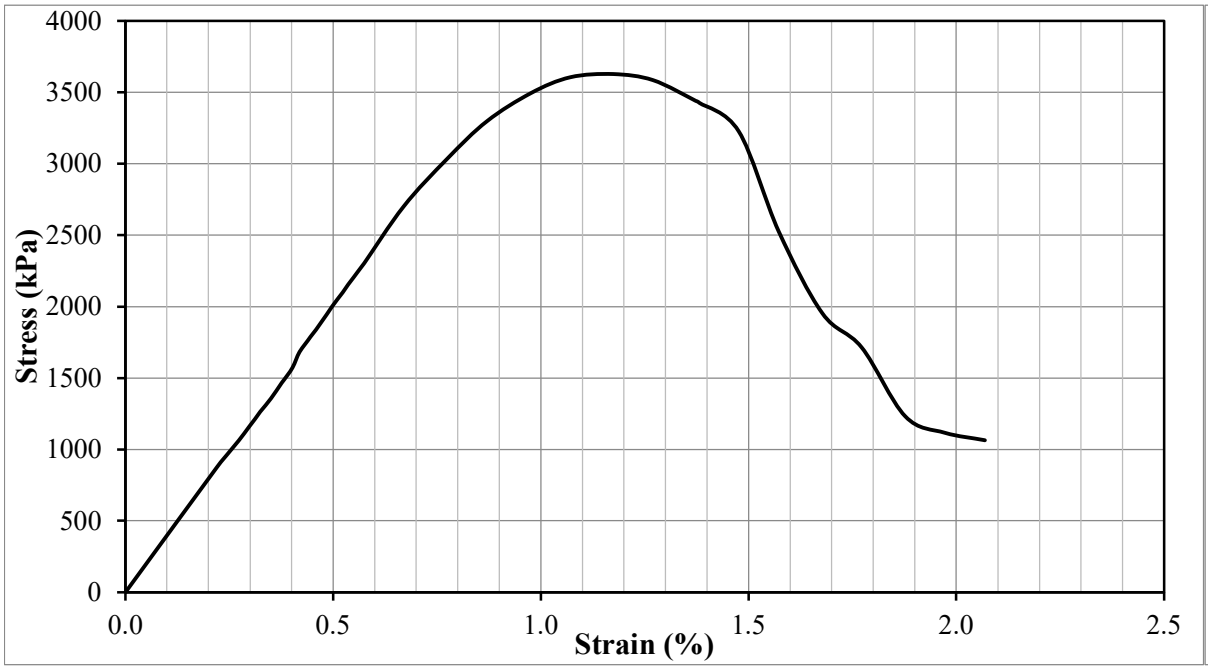
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,700	Strain at failure, εf :	1.20	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-6-F	Initial Area:	2114.9	mm^2
Test Date:	6/11/2021	Weight:	367.6	g
Strain Rate:	1 %/min	Unit Weight:	1731	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	13.9	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



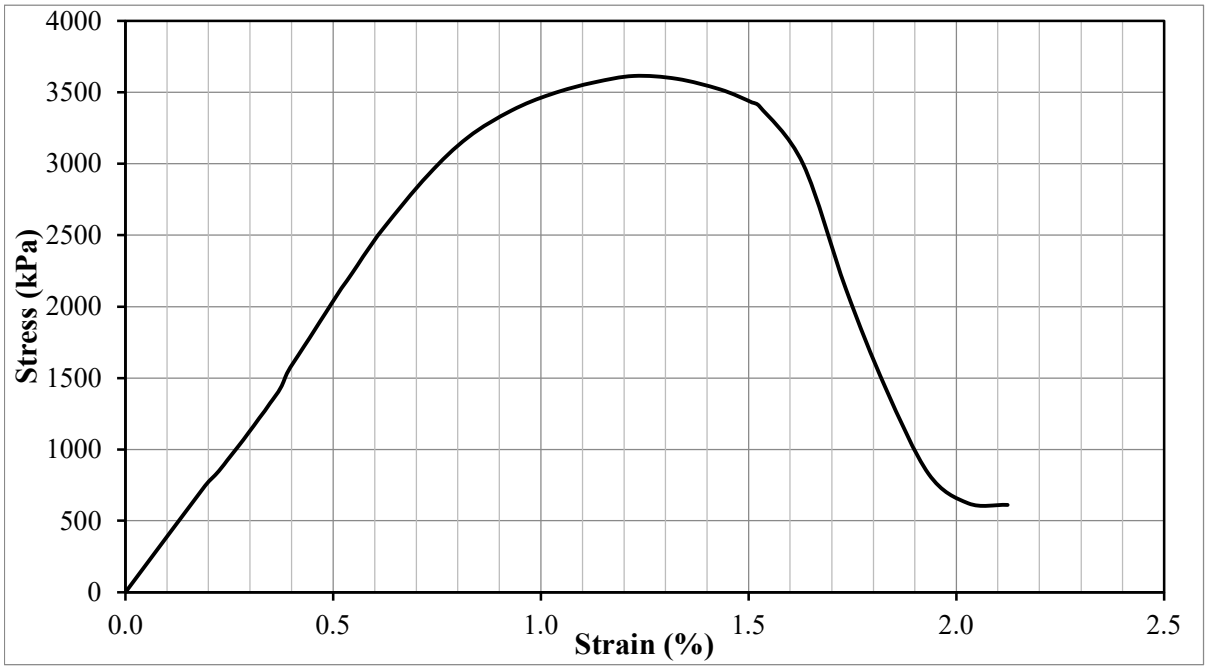
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,474	Strain at failure, εf :	0.73	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-6-D	Initial Area:	2108.7	mm^2
Test Date:	6/25/2021	Weight:	370.0	g
Strain Rate:	1 %/min	Unit Weight:	1740	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	28.1	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



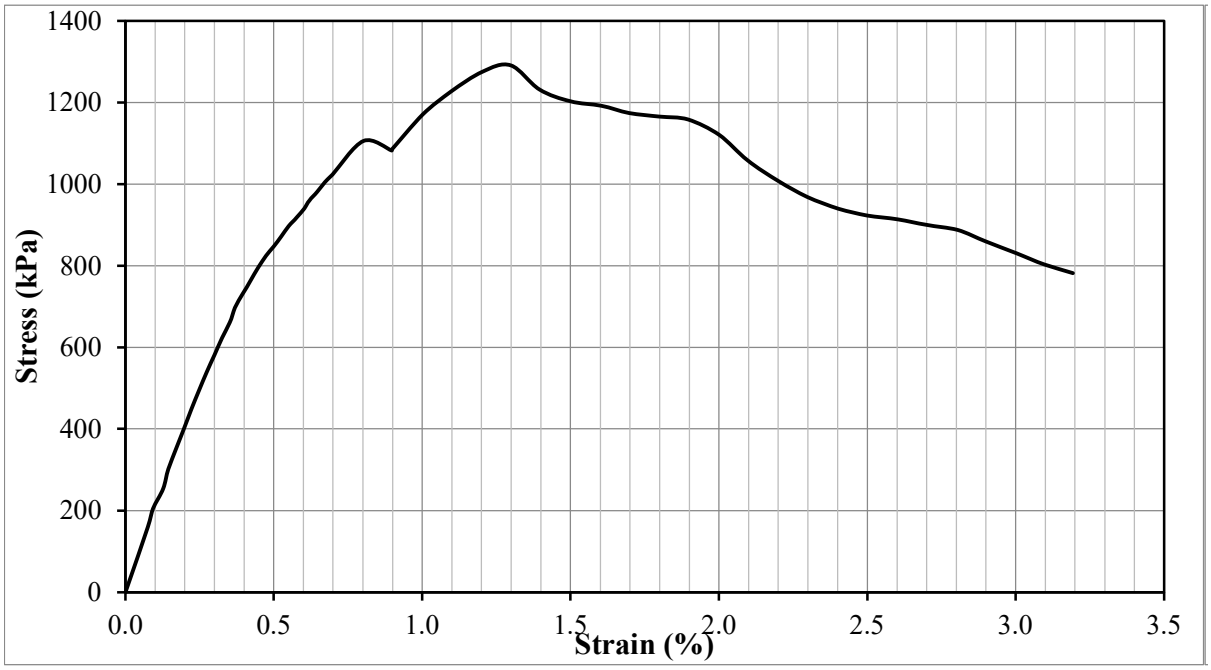
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,611	Strain at failure, εf :	1.17	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	O-6-E	Initial Area:	2123.2	mm^2
Test Date:	6/25/2021	Weight:	368.9	g
Strain Rate:	1 %/min	Unit Weight:	1725	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	28.1	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



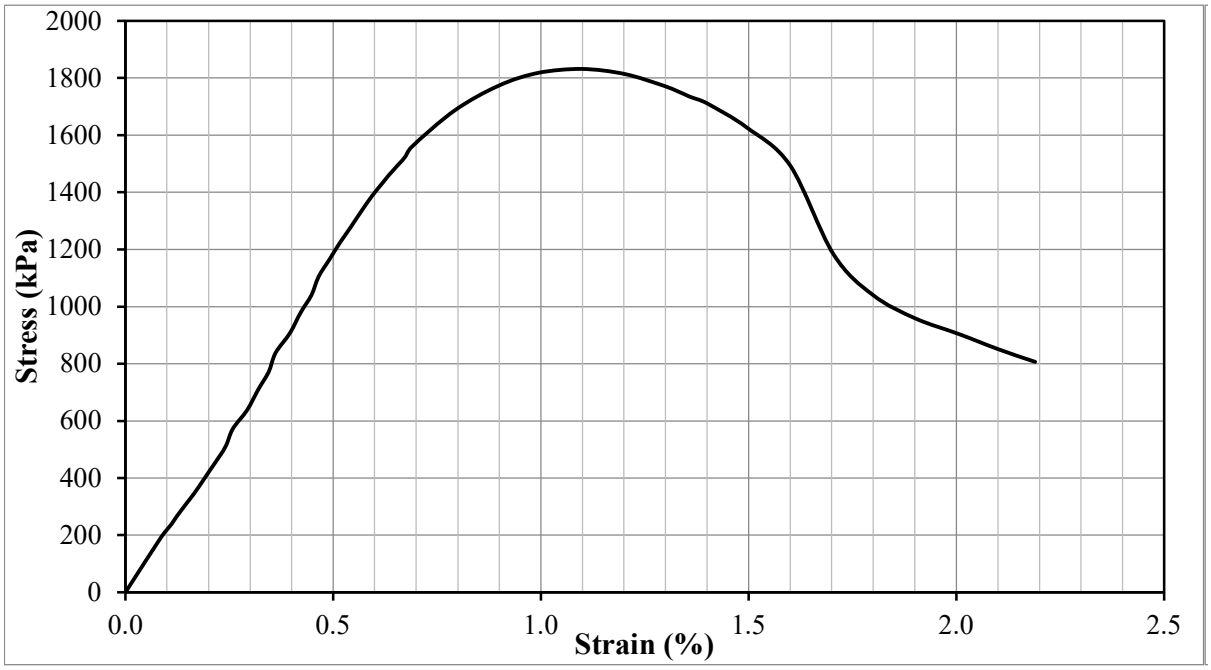
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,595	Strain at failure, εf :	1.22	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-7-A	Initial Area:	2104.6	mm^2
Test Date:	6/3/2021	Weight:	354.3	g
Strain Rate:	1 %/min	Unit Weight:	1703	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	2.7	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



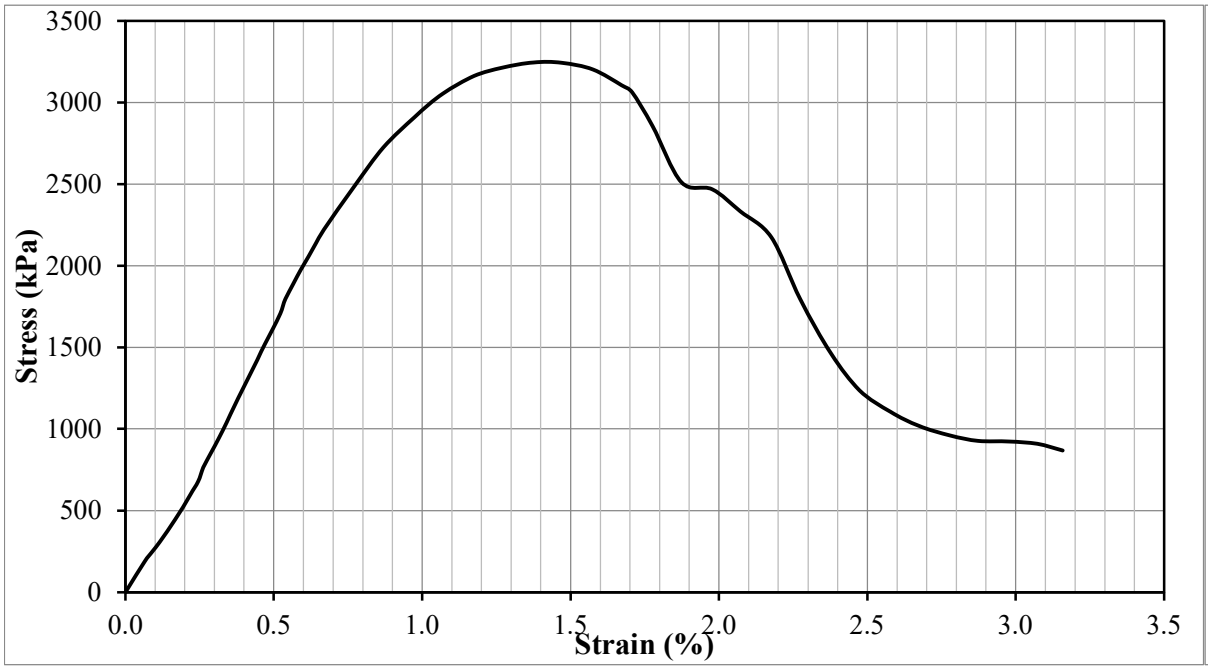
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,282	Strain at failure, εf :	1.30	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-7-H	Initial Area:	2112.9	mm^2
Test Date:	6/3/2021	Weight:	358.7	g
Strain Rate:	1 %/min	Unit Weight:	1702	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	2.7	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



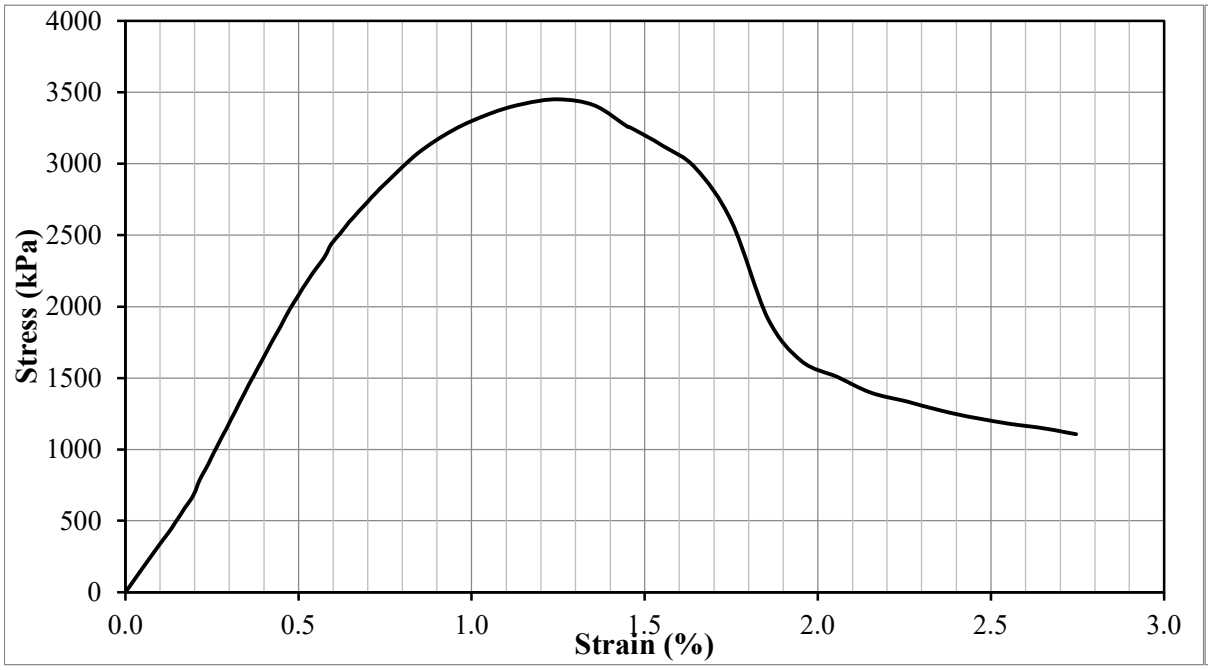
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,820	Strain at failure, εf :	1.10	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-7-B	Initial Area:	2110.8	mm^2
Test Date:	6/7/2021	Weight:	349.6	g
Strain Rate:	1 %/min	Unit Weight:	1706	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	6.9	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



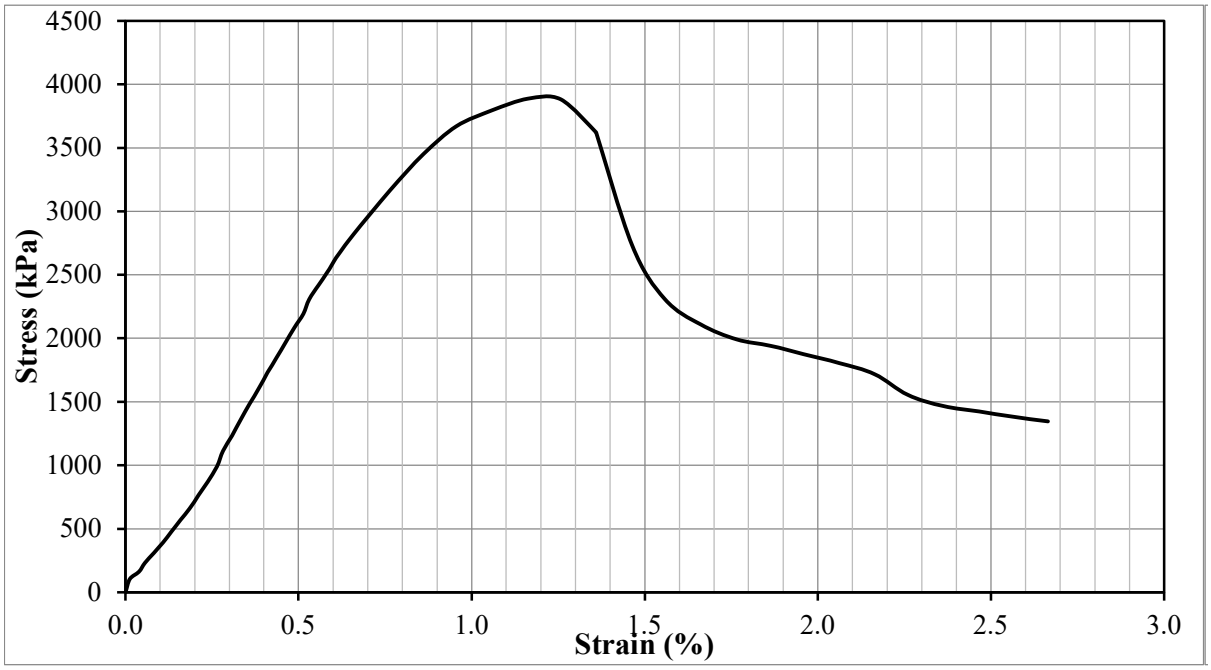
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,212	Strain at failure, εf :	1.38	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	95.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-7-G	Initial Area:	2112.9	mm^2
Test Date:	6/7/2021	Weight:	344.6	g
Strain Rate:	1 %/min	Unit Weight:	1706	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	6.9	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



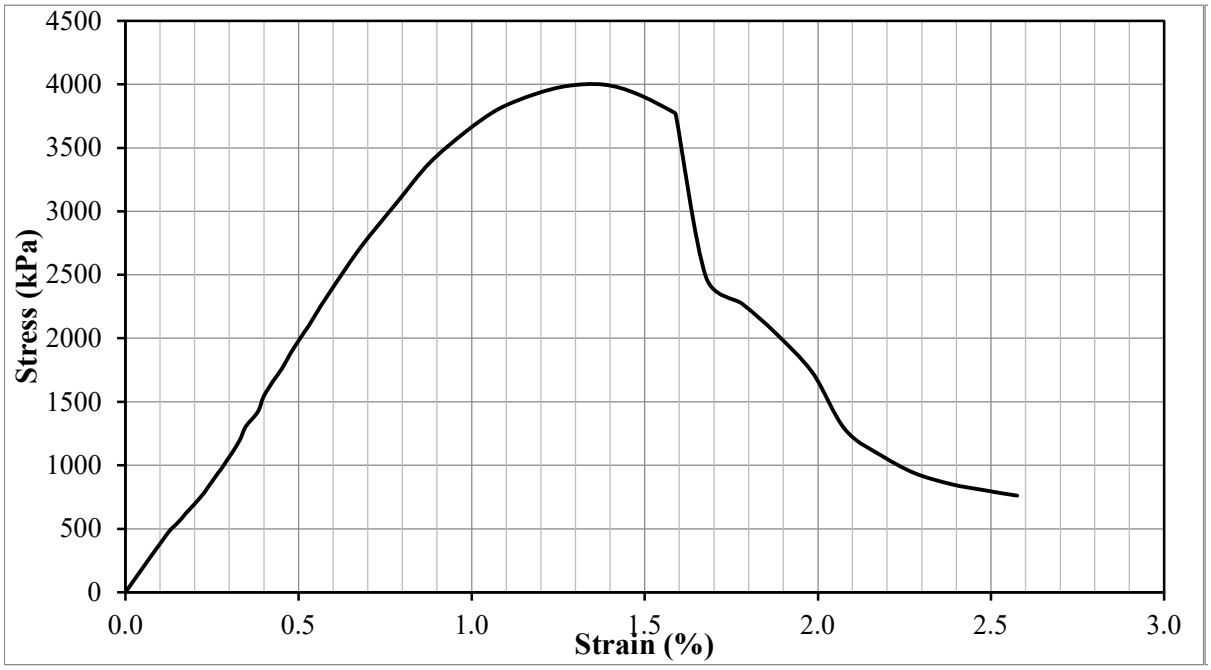
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,407	Strain at failure, εf :	1.25	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	O-7-C	Initial Area:	2125.3	mm^2
Test Date:	6/14/2021	Weight:	351.2	g
Strain Rate:	1 %/min	Unit Weight:	1698	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	13.6	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



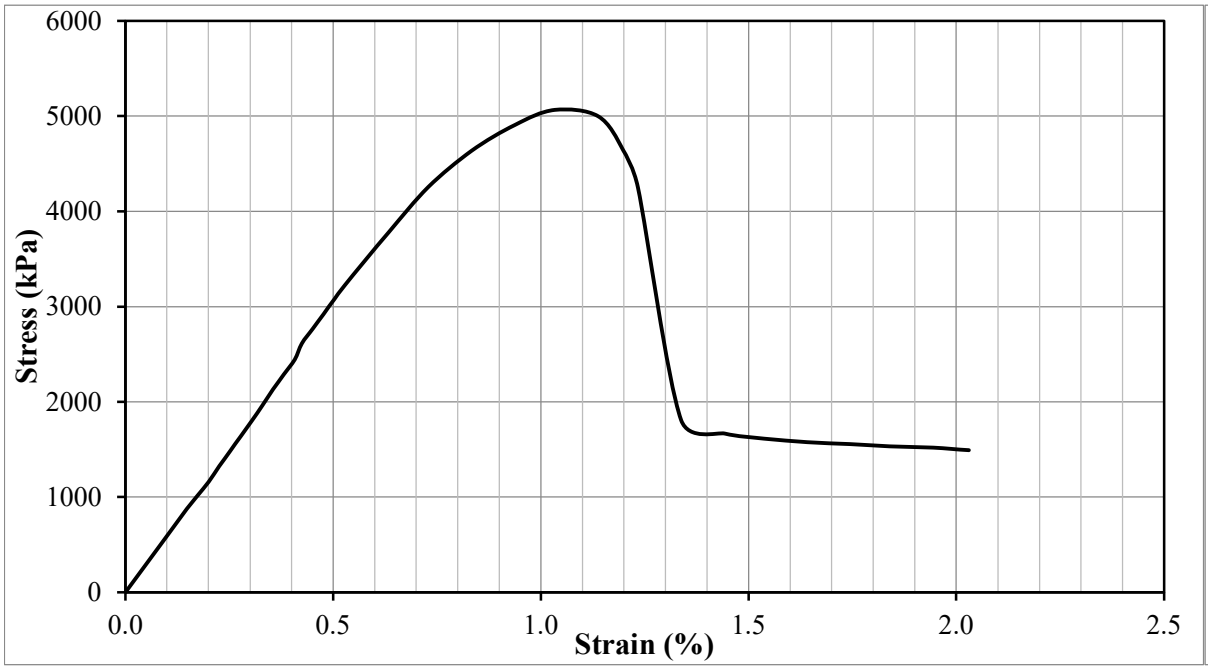
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,845	Strain at failure, εf :	1.16	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	O-7-F	Initial Area:	2125.3	mm^2
Test Date:	6/14/2021	Weight:	356.2	g
Strain Rate:	1 %/min	Unit Weight:	1700	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	13.6	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



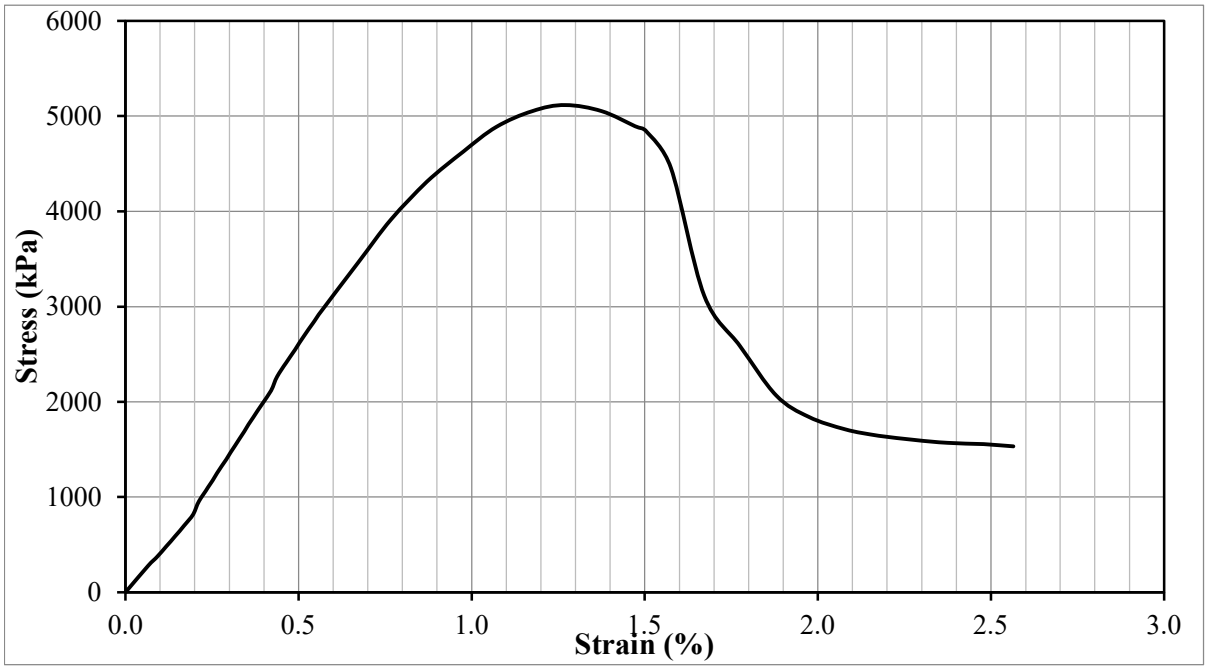
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,965	Strain at failure, εf :	1.38	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-7-D	Initial Area:	2117.0	mm^2
Test Date:	6/28/2021	Weight:	364.9	g
Strain Rate:	1 %/min	Unit Weight:	1705	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	27.5	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



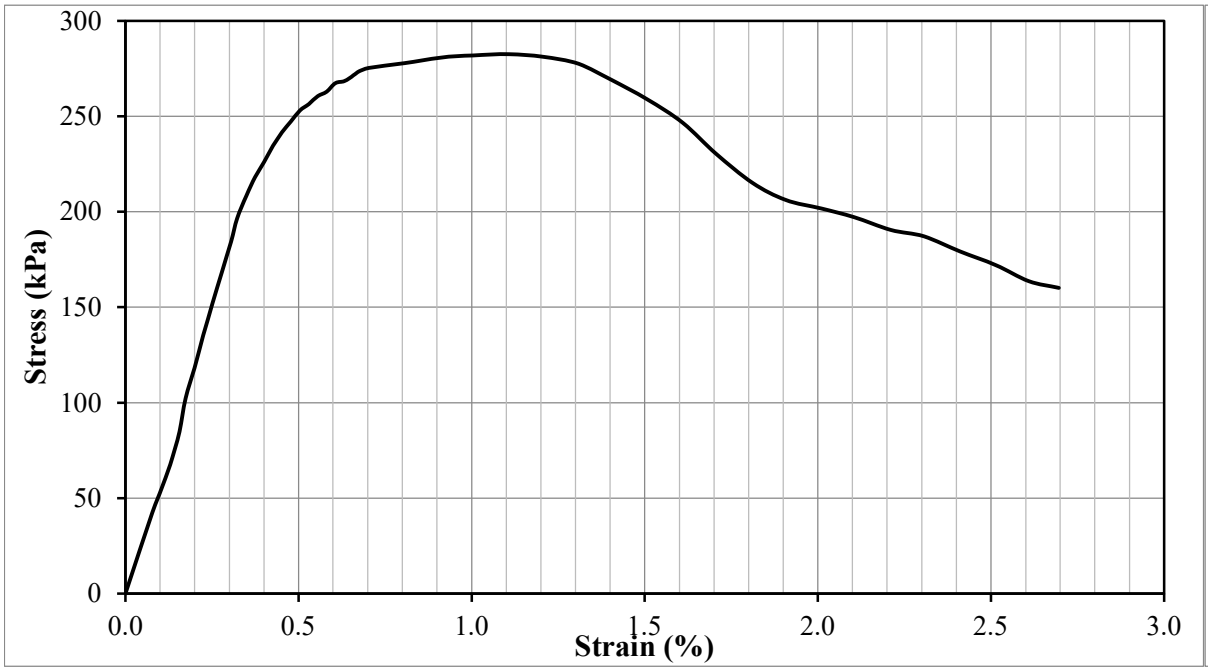
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,042	Strain at failure, εf :	1.03	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-7-E	Initial Area:	2114.9	mm^2
Test Date:	6/28/2021	Weight:	364.1	g
Strain Rate:	1 %/min	Unit Weight:	1708	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	27.5	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



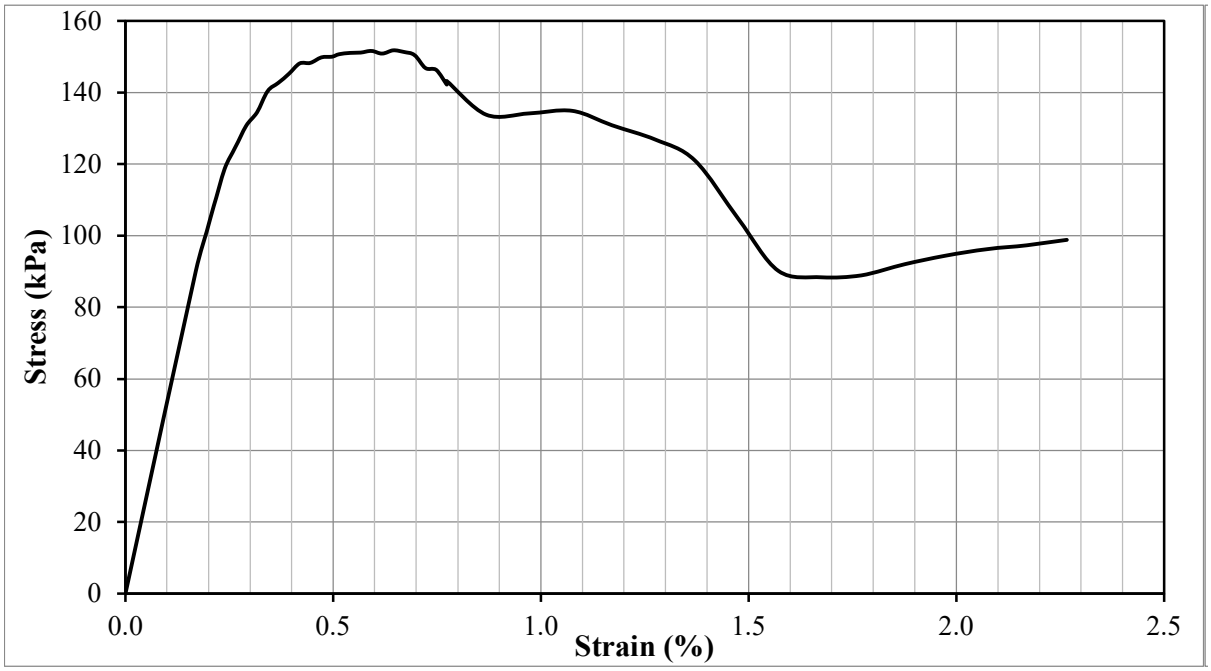
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,093	Strain at failure, εf :	1.27	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-8-A	Initial Area:	2108.7	mm^2
Test Date:	6/3/2021	Weight:	363.1	g
Strain Rate:	1 %/min	Unit Weight:	1737	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	2.7	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



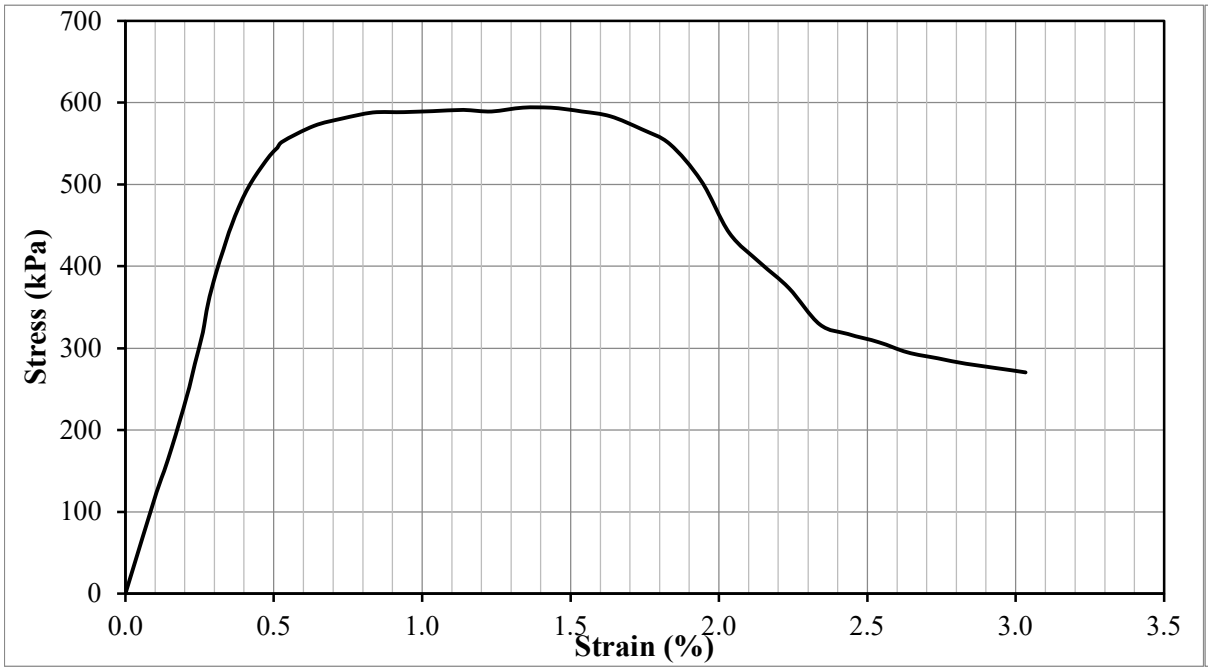
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	281	Strain at failure, εf :	1.11	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	O-8-H	Initial Area:	2121.1	mm^2
Test Date:	6/3/2021	Weight:	359.0	g
Strain Rate:	1 %/min	Unit Weight:	1727	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	2.7	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



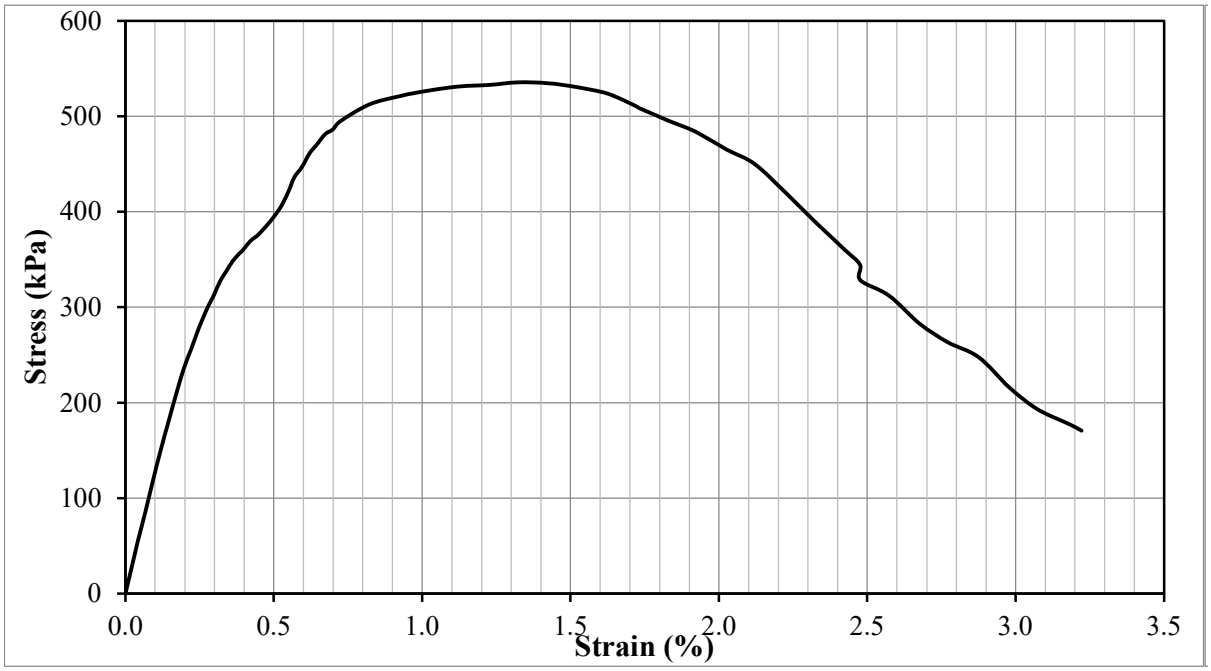
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	150	Strain at failure, εf :	0.64	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-8-B	Initial Area:	2106.6	mm^2
Test Date:	6/7/2021	Weight:	358.0	g
Strain Rate:	1 %/min	Unit Weight:	1741	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	6.9	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



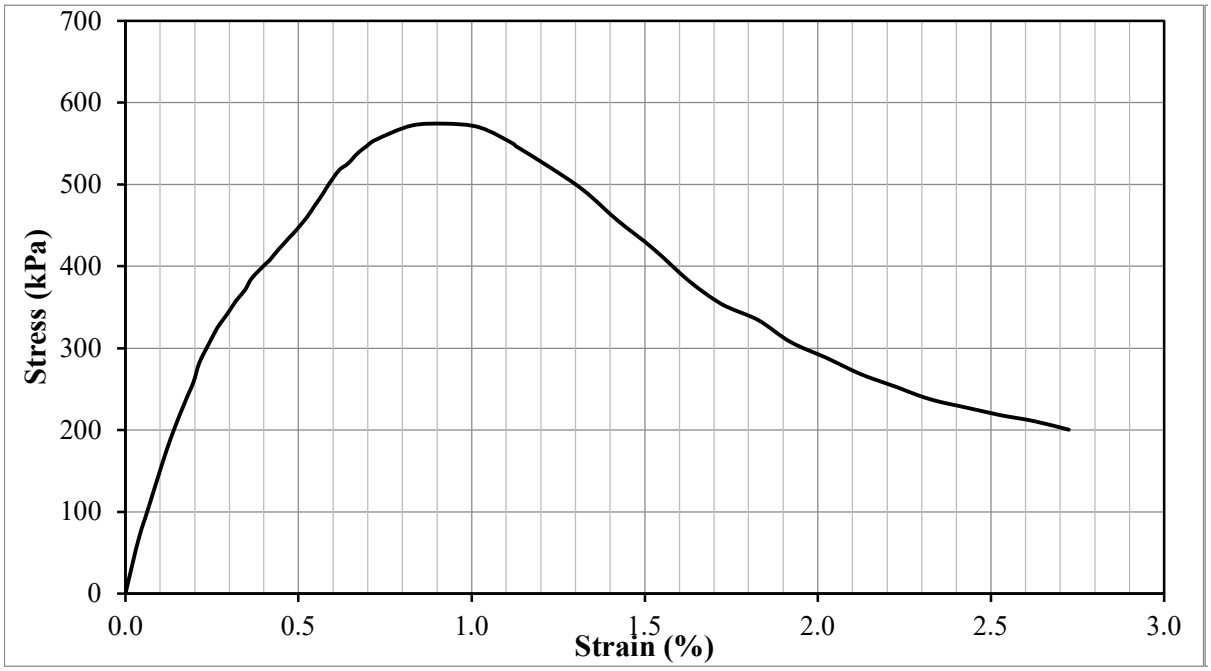
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	588	Strain at failure, εf :	1.34	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-8-G	Initial Area:	2117.0	mm^2
Test Date:	6/7/2021	Weight:	360.6	g
Strain Rate:	1 %/min	Unit Weight:	1733	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	6.8	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



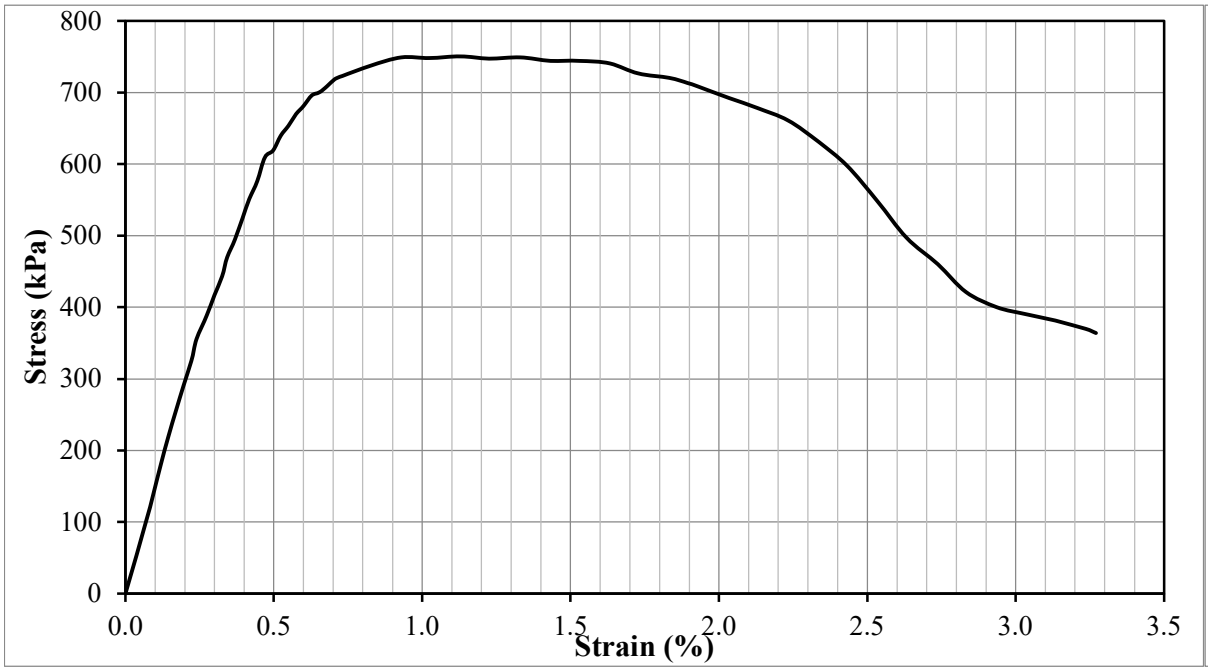
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	531	Strain at failure, εf :	1.32	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-8-C	Initial Area:	2117.0	mm^2
Test Date:	6/14/2021	Weight:	365.7	g
Strain Rate:	1 %/min	Unit Weight:	1736	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	13.6	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



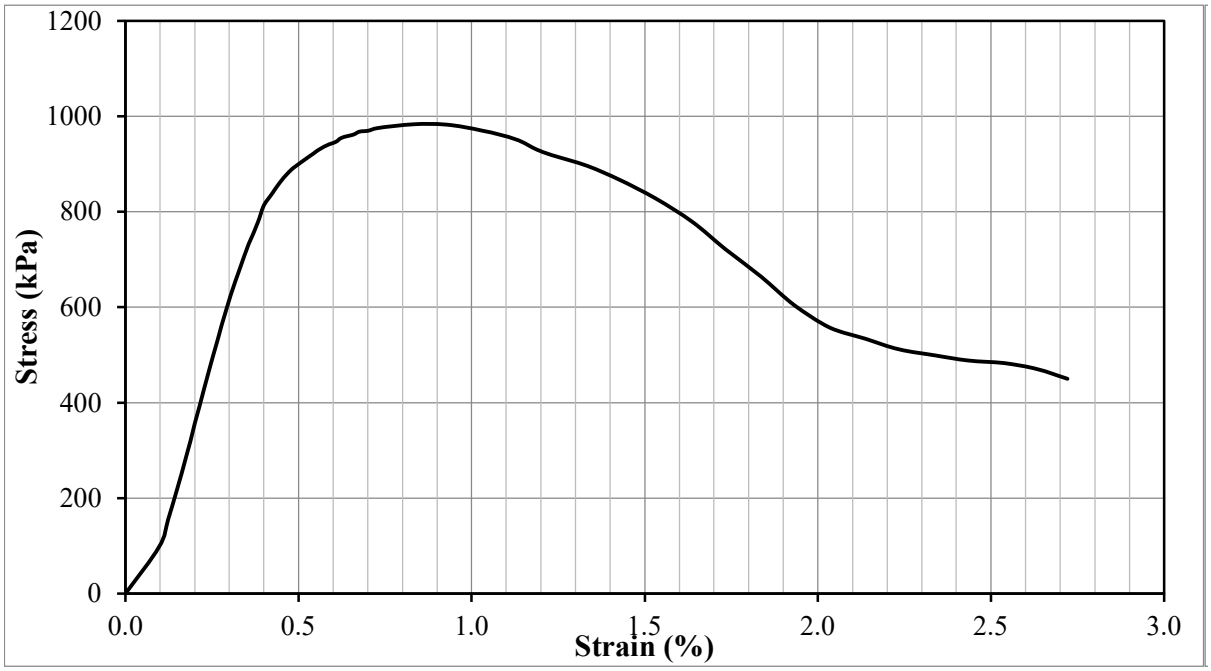
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	570	Strain at failure, εf :	0.92	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-8-F	Initial Area:	2119.1	mm^2
Test Date:	6/14/2021	Weight:	365.1	g
Strain Rate:	1 %/min	Unit Weight:	1734	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	13.6	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



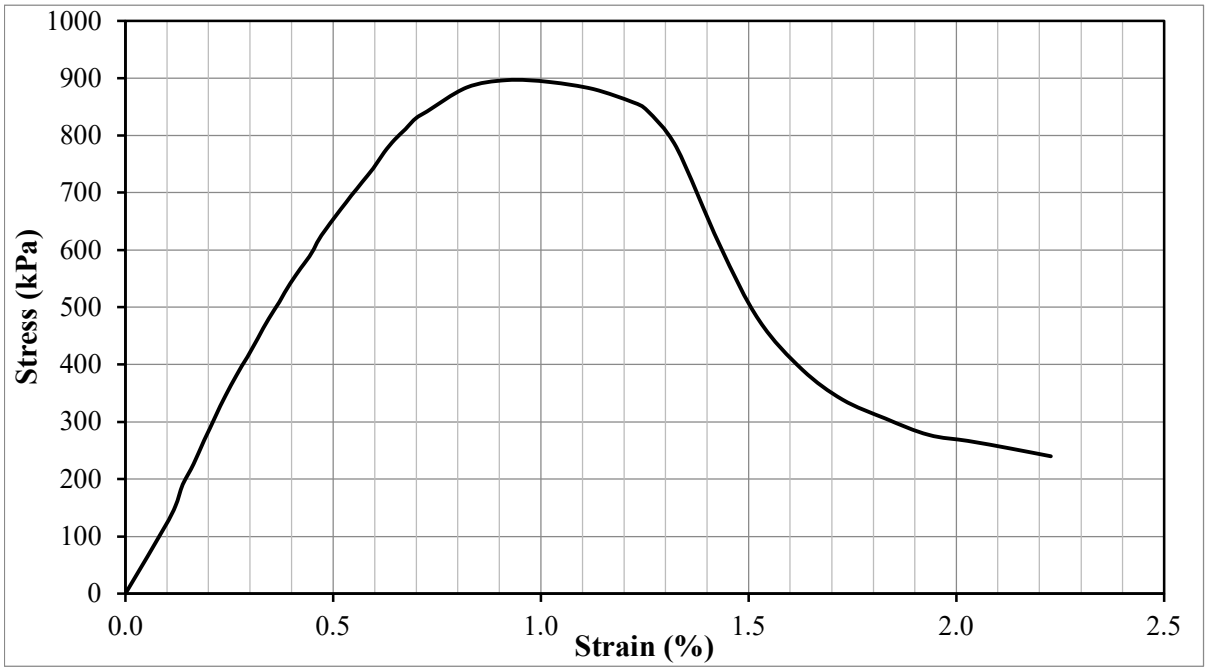
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	745	Strain at failure, εf :	1.13	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	O-8-D	Initial Area:	2100.5	mm^2
Test Date:	6/28/2021	Weight:	365.1	g
Strain Rate:	1 %/min	Unit Weight:	1743	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	27.5	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



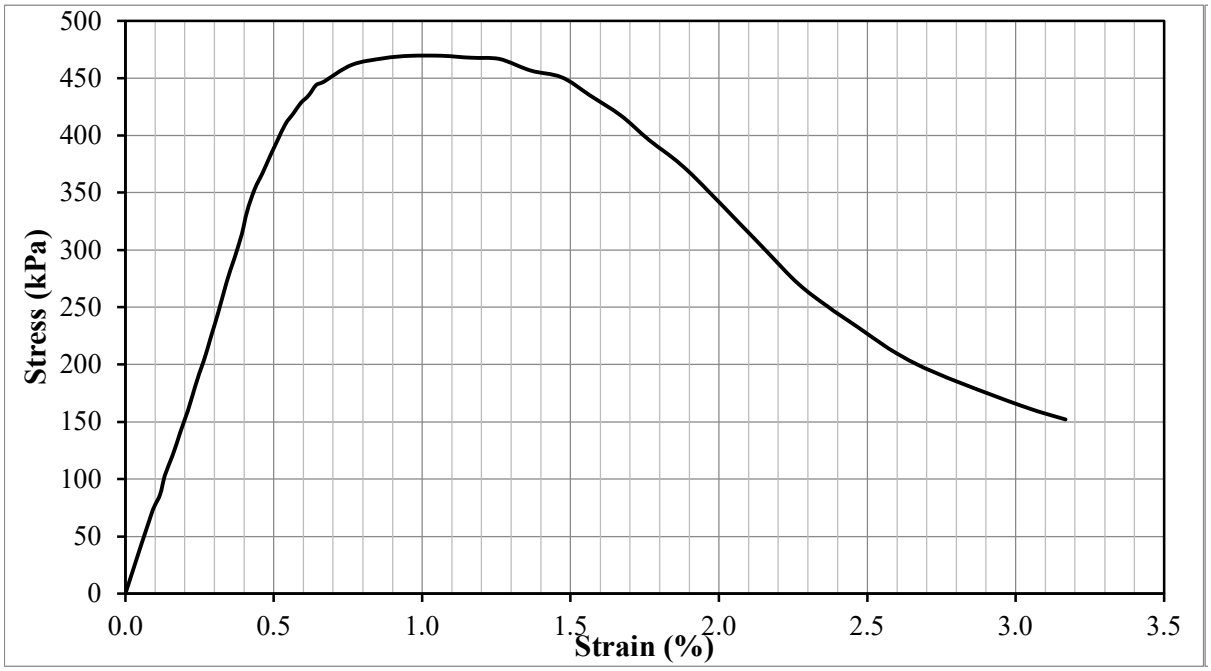
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	978	Strain at failure, εf :	0.83	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-8-E	Initial Area:	2114.9	mm^2
Test Date:	6/28/2021	Weight:	371.0	g
Strain Rate:	1 %/min	Unit Weight:	1744	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	27.5	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



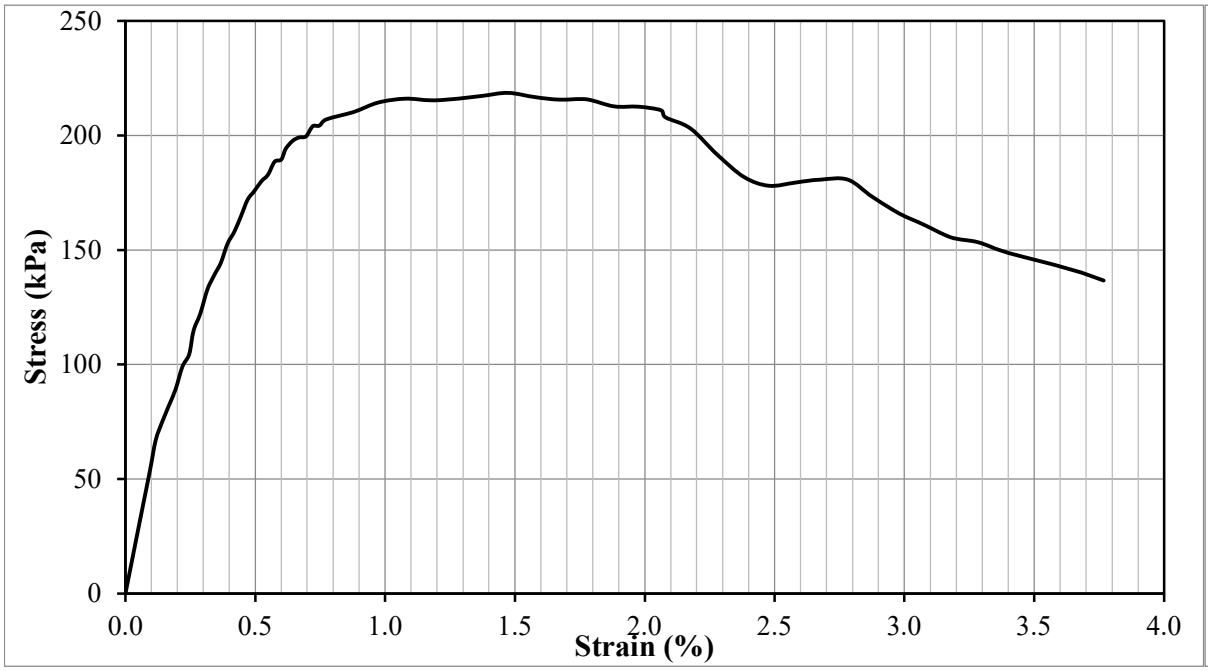
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	892	Strain at failure, εf :	0.92	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-9-A	Initial Area:	2112.9	mm^2
Test Date:	6/8/2021	Weight:	357.9	g
Strain Rate:	1 %/min	Unit Weight:	1688	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	2.8	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



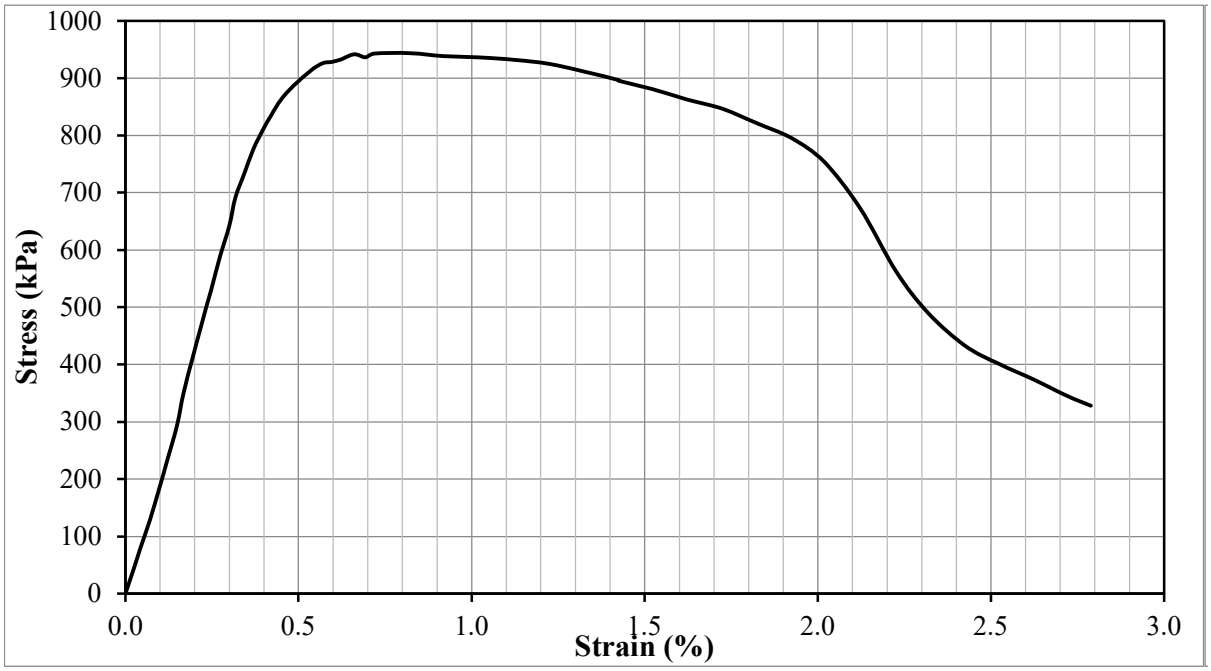
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	467	Strain at failure, εf :	1.07	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-9-H	Initial Area:	2114.9	mm^2
Test Date:	6/8/2021	Weight:	344.7	g
Strain Rate:	1 %/min	Unit Weight:	1681	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	2.8	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



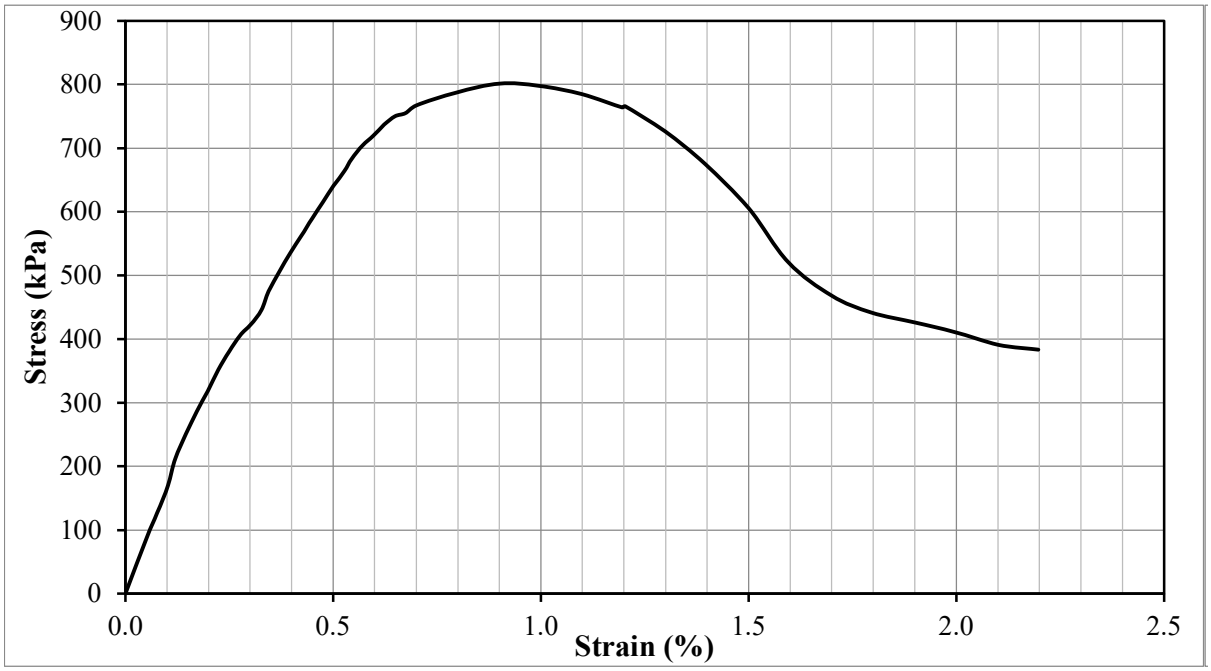
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	216	Strain at failure, εf :	1.47	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	O-9-B	Initial Area:	2123.2	mm^2
Test Date:	6/12/2021	Weight:	353.5	g
Strain Rate:	1 %/min	Unit Weight:	1687	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	6.7	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



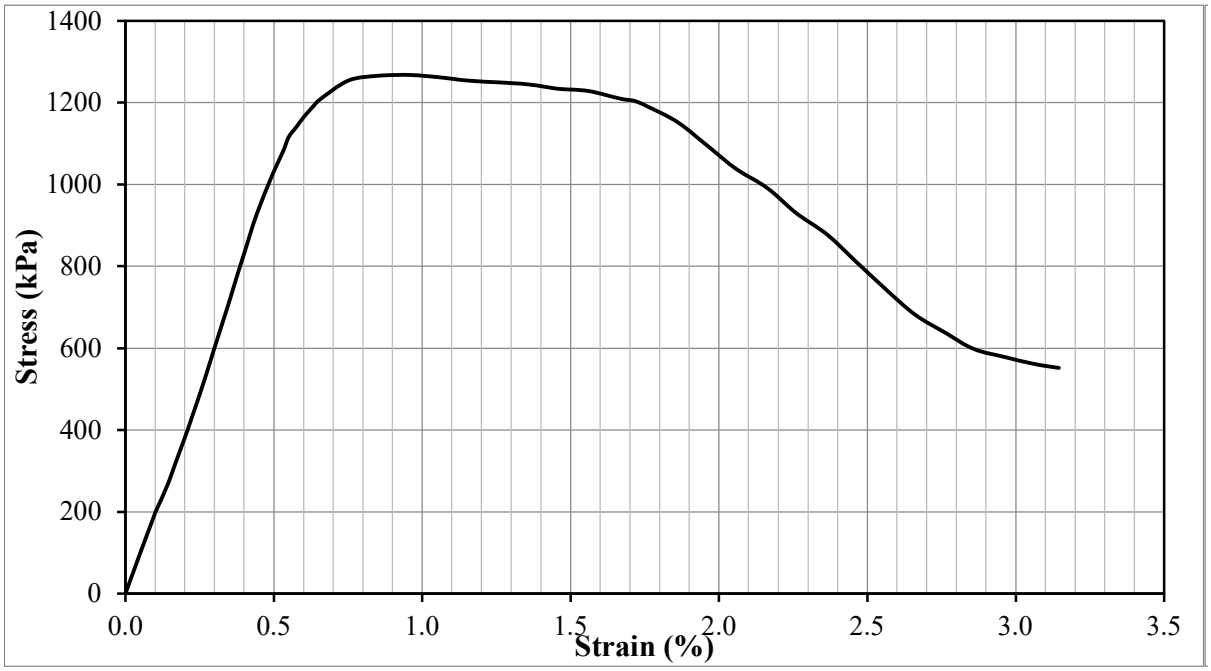
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	936	Strain at failure, εf :	0.82	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	96.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-9-G	Initial Area:	2110.8	mm^2
Test Date:	6/12/2021	Weight:	345.8	g
Strain Rate:	1 %/min	Unit Weight:	1694	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	6.8	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



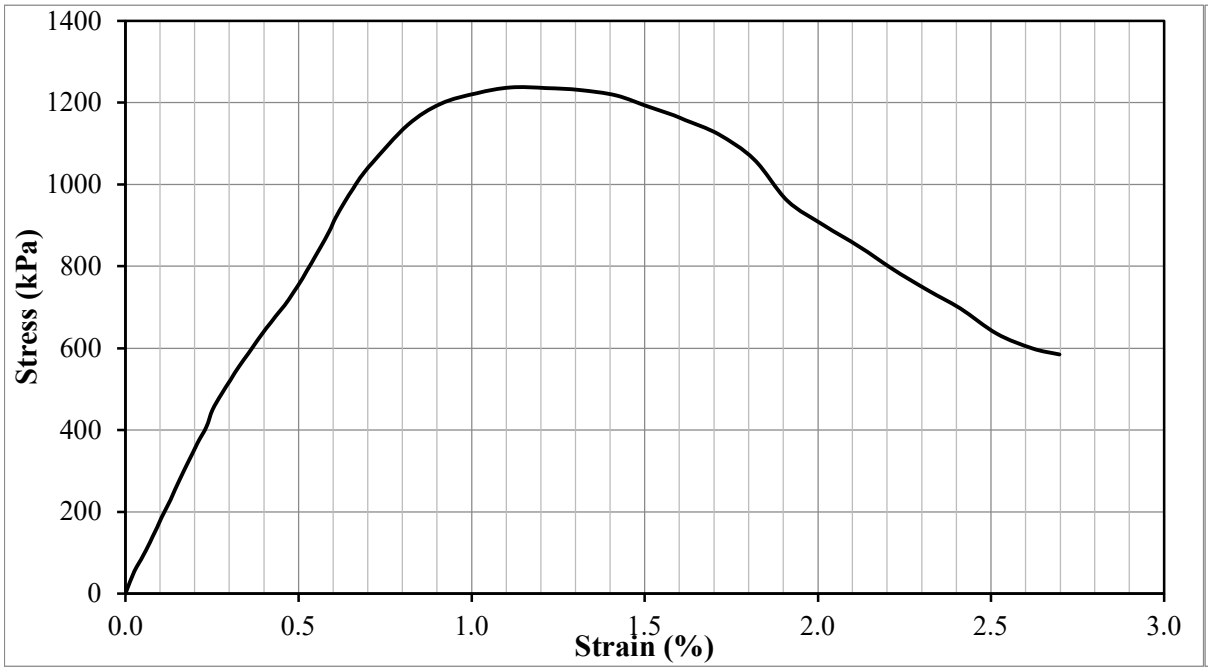
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	793	Strain at failure, εf :	0.90	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-9-C	Initial Area:	2106.6	mm^2
Test Date:	6/19/2021	Weight:	355.8	g
Strain Rate:	1 %/min	Unit Weight:	1701	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	14.0	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



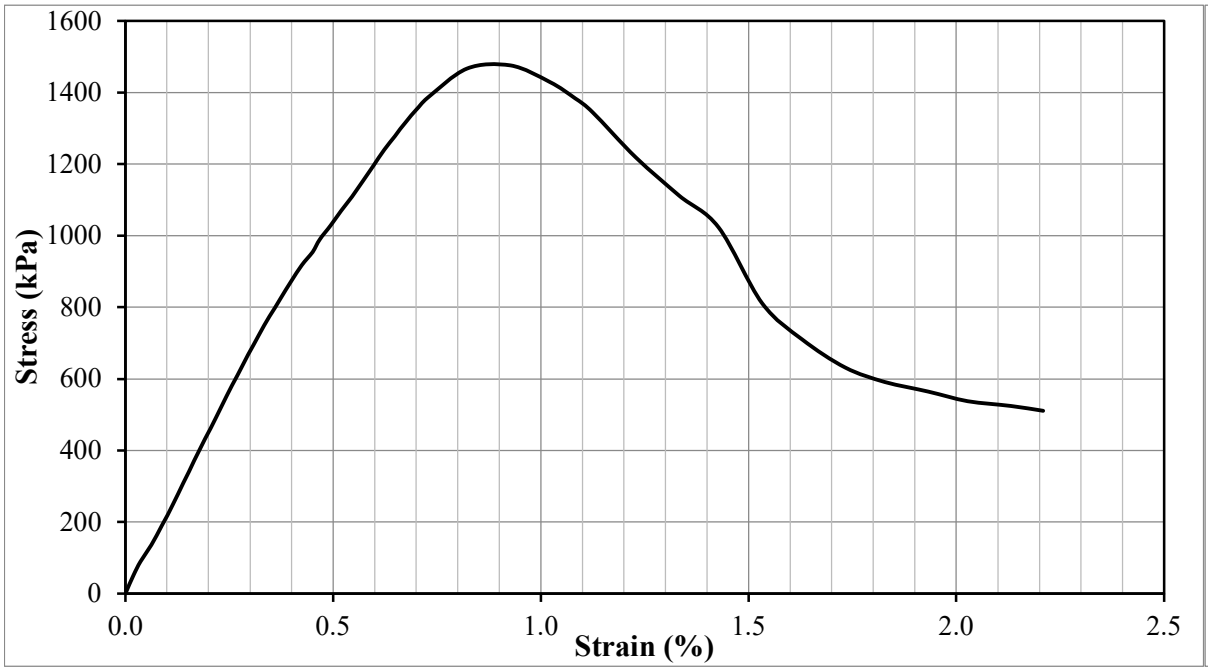
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,259	Strain at failure, εf :	0.96	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-9-F	Initial Area:	2108.7	mm^2
Test Date:	6/19/2021	Weight:	350.8	g
Strain Rate:	1 %/min	Unit Weight:	1699	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	14.0	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



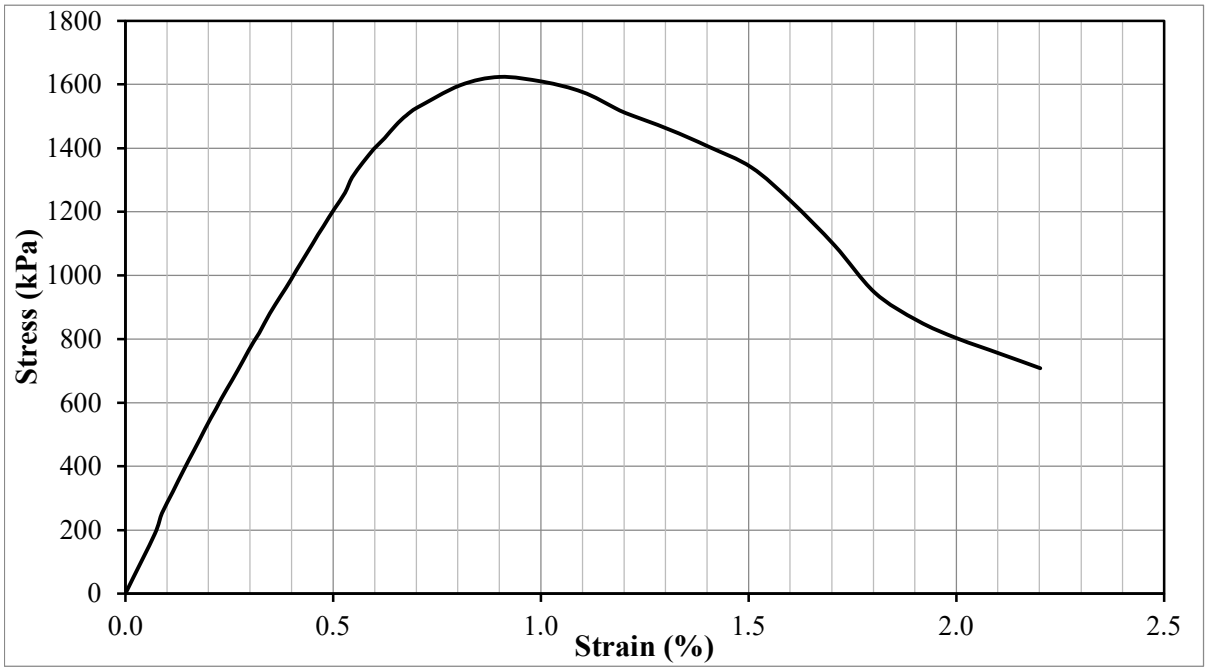
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,226	Strain at failure, εf :	1.11	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-9-D	Initial Area:	2108.7	mm^2
Test Date:	7/3/2021	Weight:	356.8	g
Strain Rate:	1 %/min	Unit Weight:	1699	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	27.9	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



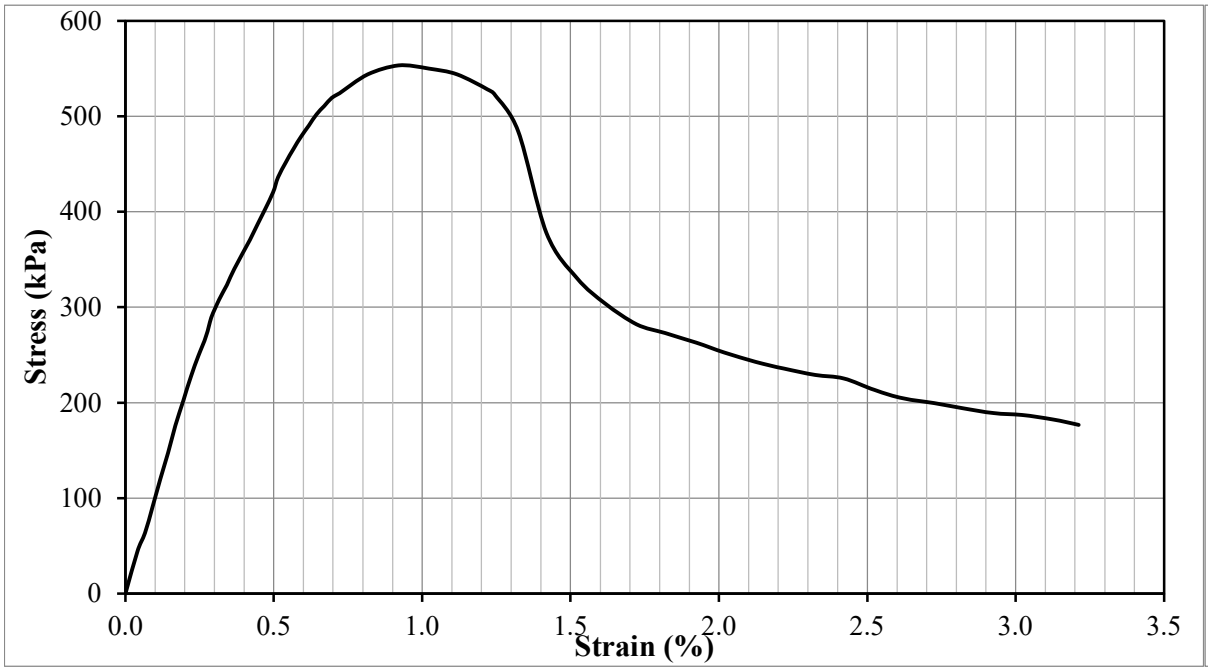
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,466	Strain at failure, εf :	0.93	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-9-E	Initial Area:	2106.6	mm^2
Test Date:	7/3/2021	Weight:	359.2	g
Strain Rate:	1 %/min	Unit Weight:	1702	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	27.9	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



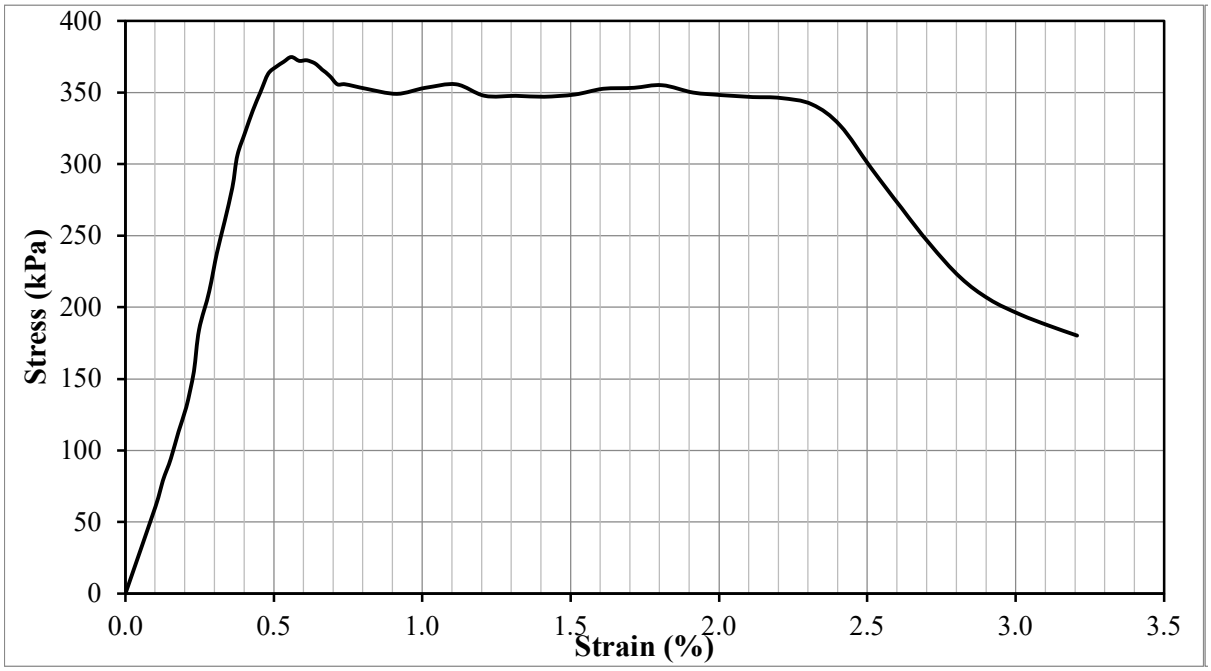
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,615	Strain at failure, εf :	0.90	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	96.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	O-10-A	Initial Area:	2125.3	mm^2
Test Date:	6/8/2021	Weight:	331.0	g
Strain Rate:	1 %/min	Unit Weight:	1622	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	2.8	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



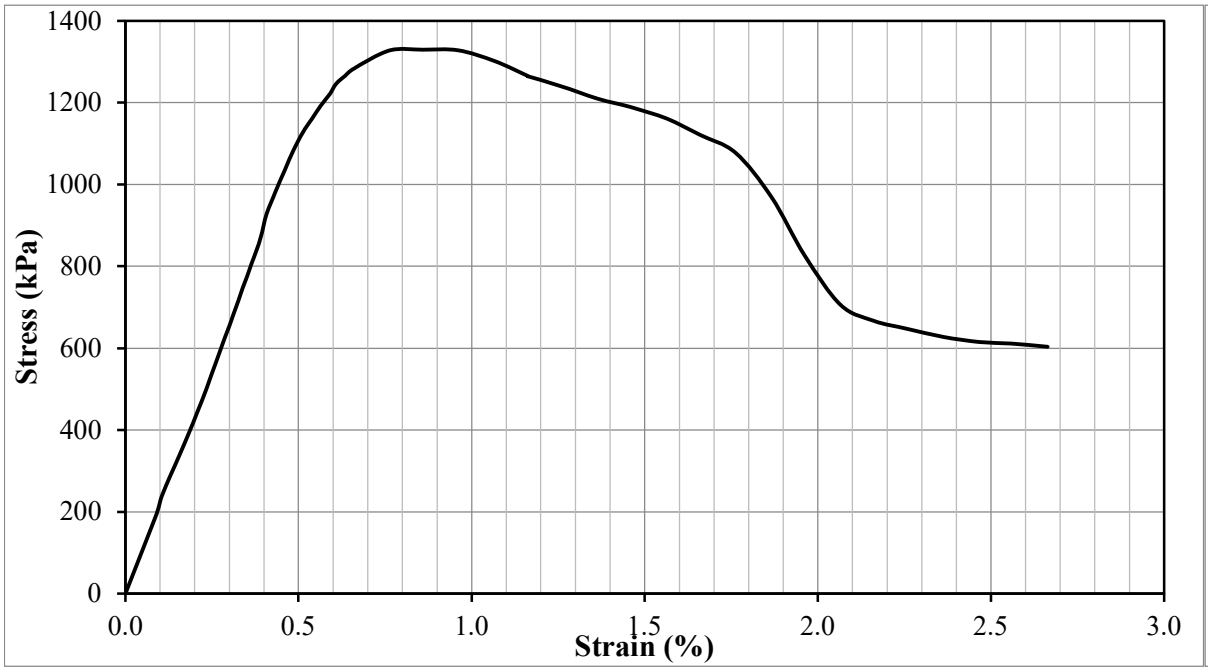
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	546	Strain at failure, εf :	0.92	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	O-10-H	Initial Area:	2125.3	mm^2
Test Date:	6/8/2021	Weight:	346.6	g
Strain Rate:	1 %/min	Unit Weight:	1622	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	2.8	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



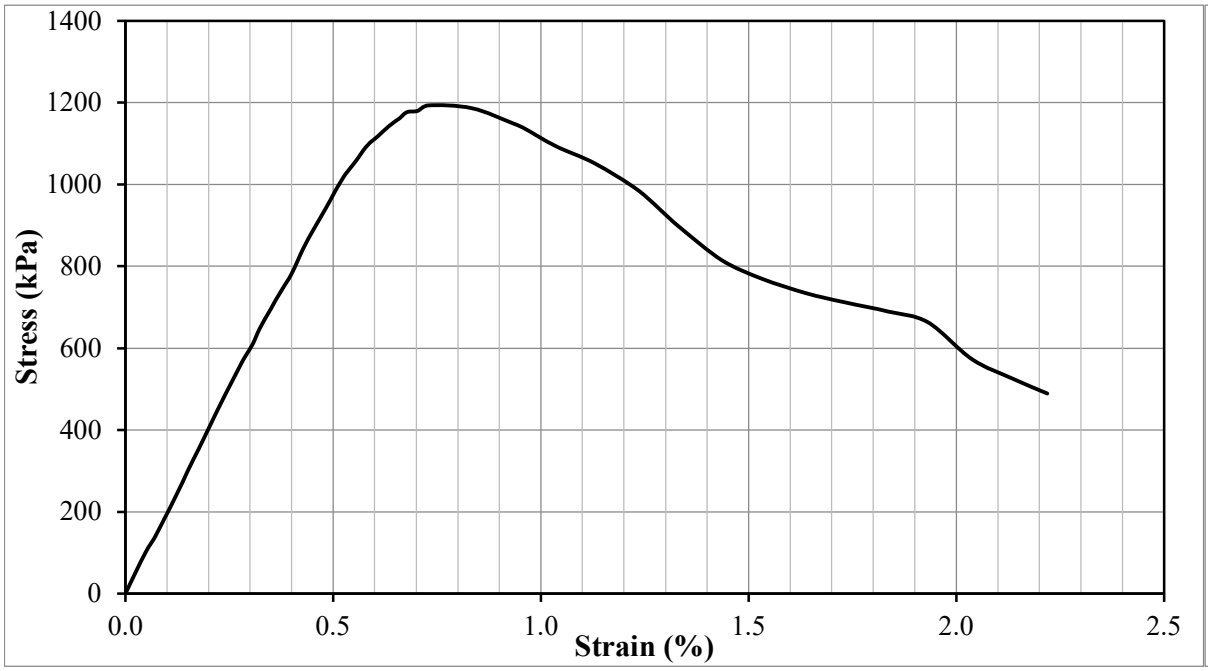
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	373	Strain at failure, εf :	0.56	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-10-B	Initial Area:	2119.1	mm^2
Test Date:	6/12/2021	Weight:	344.0	g
Strain Rate:	1 %/min	Unit Weight:	1633	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	6.7	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



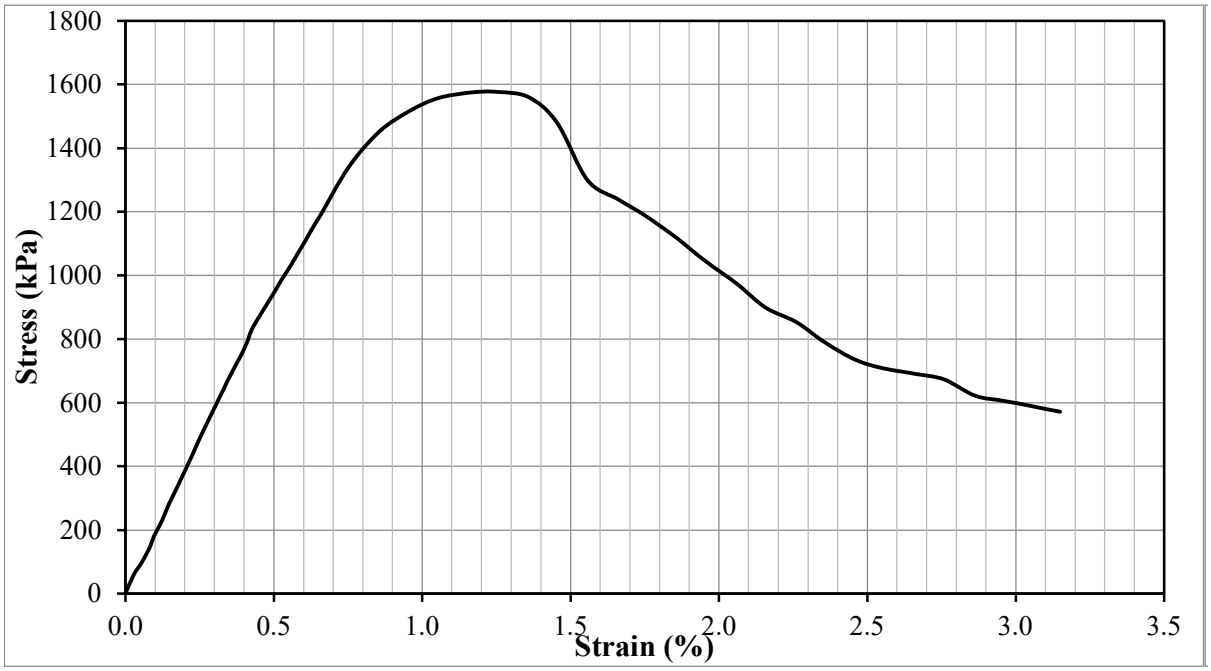
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,320	Strain at failure, εf :	0.86	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-10-G	Initial Area:	2108.7	mm^2
Test Date:	6/12/2021	Weight:	336.3	g
Strain Rate:	1 %/min	Unit Weight:	1642	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	6.7	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



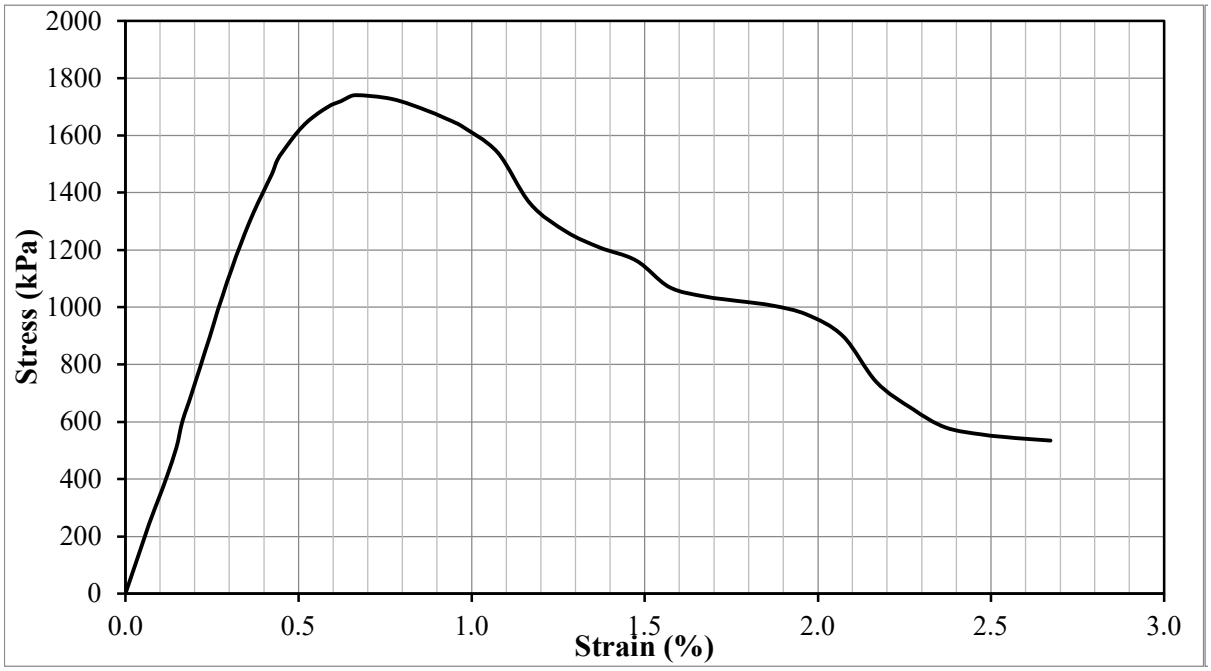
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,181	Strain at failure, εf :	0.73	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-10-C	Initial Area:	2119.1	mm^2
Test Date:	6/19/2021	Weight:	338.7	g
Strain Rate:	1 %/min	Unit Weight:	1635	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	13.9	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



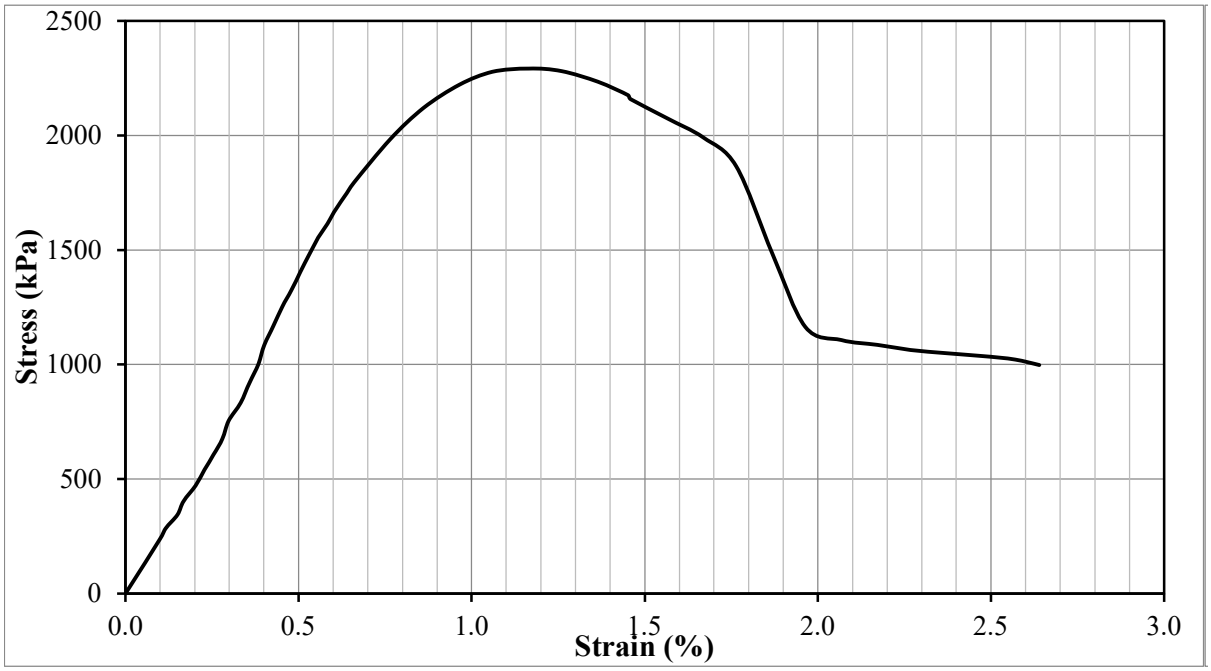
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,562	Strain at failure, εf :	1.25	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-10-F	Initial Area:	2106.6	mm^2
Test Date:	6/19/2021	Weight:	343.8	g
Strain Rate:	1 %/min	Unit Weight:	1644	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	13.9	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



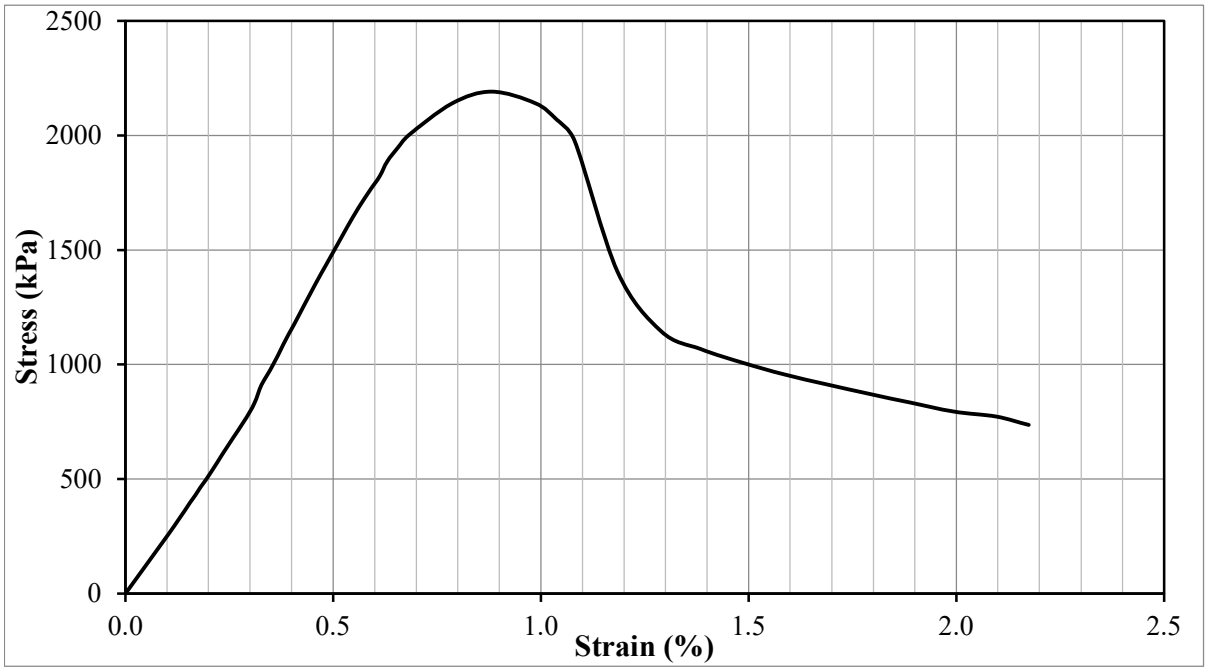
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,729	Strain at failure, εf :	0.67	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-10-D	Initial Area:	2110.8	mm^2
Test Date:	7/3/2021	Weight:	337.4	g
Strain Rate:	1 %/min	Unit Weight:	1636	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	27.8	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



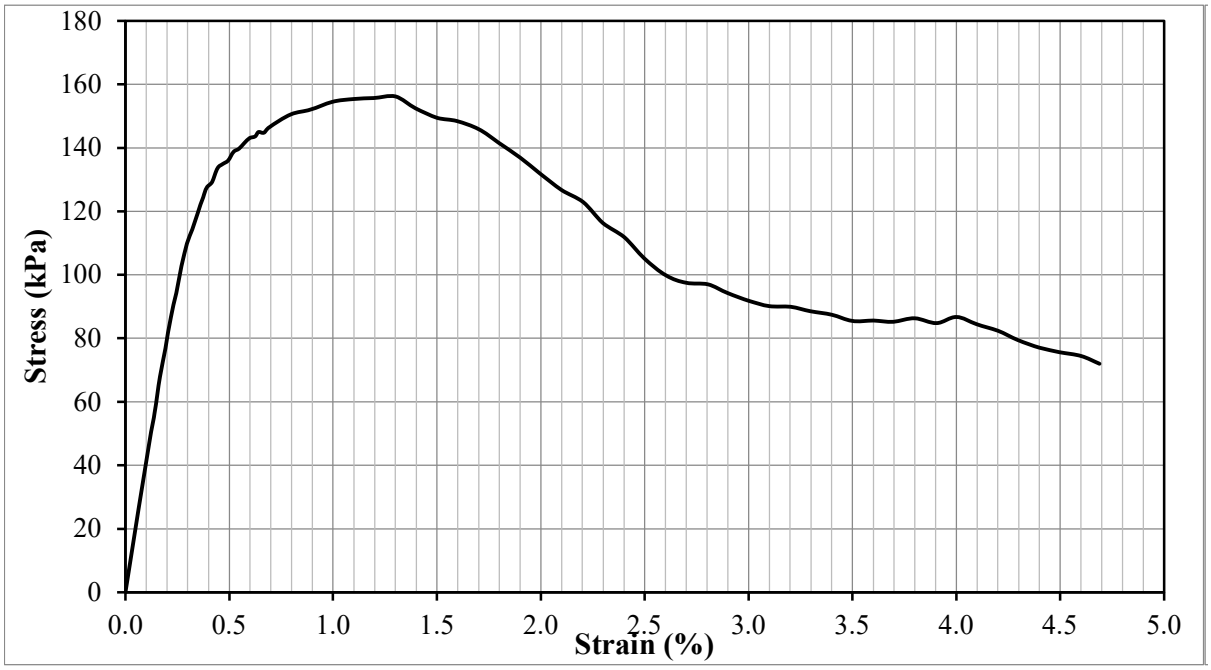
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,271	Strain at failure, εf :	1.16	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-10-E	Initial Area:	2106.6	mm^2
Test Date:	7/3/2021	Weight:	347.9	g
Strain Rate:	1 %/min	Unit Weight:	1646	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	27.8	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



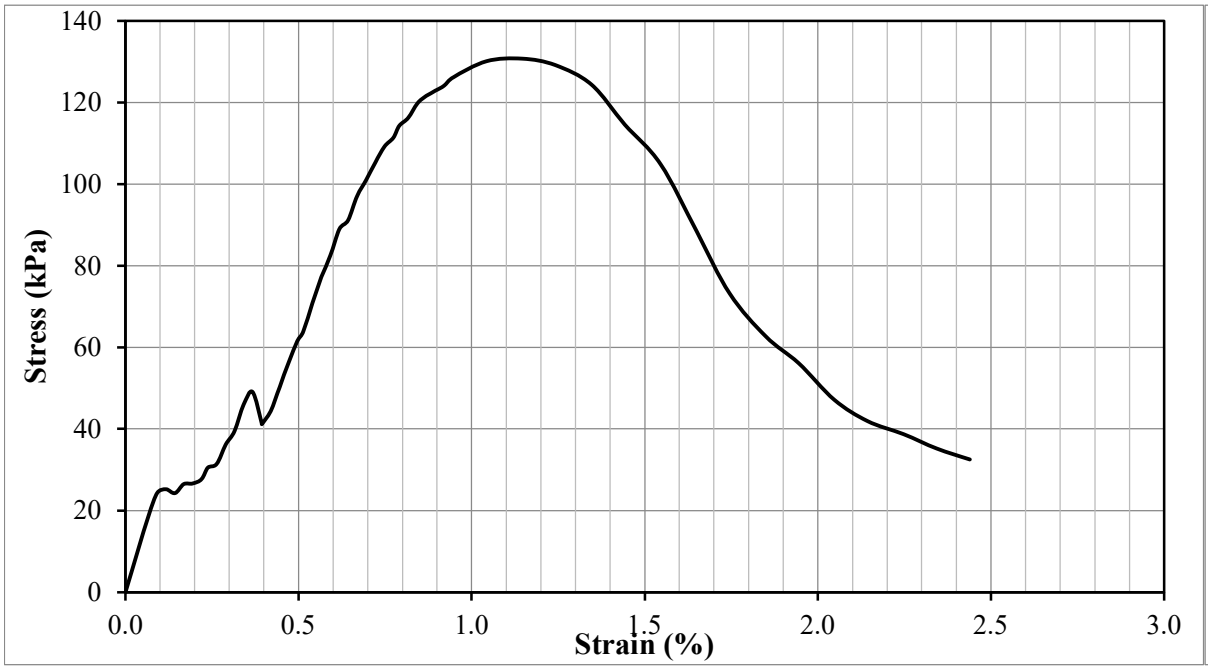
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,180	Strain at failure, εf :	0.88	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-11-A	Initial Area:	2110.8	mm^2
Test Date:	6/25/2021	Weight:	363.1	g
Strain Rate:	1 %/min	Unit Weight:	1745	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	100	Curing Period	2.7	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



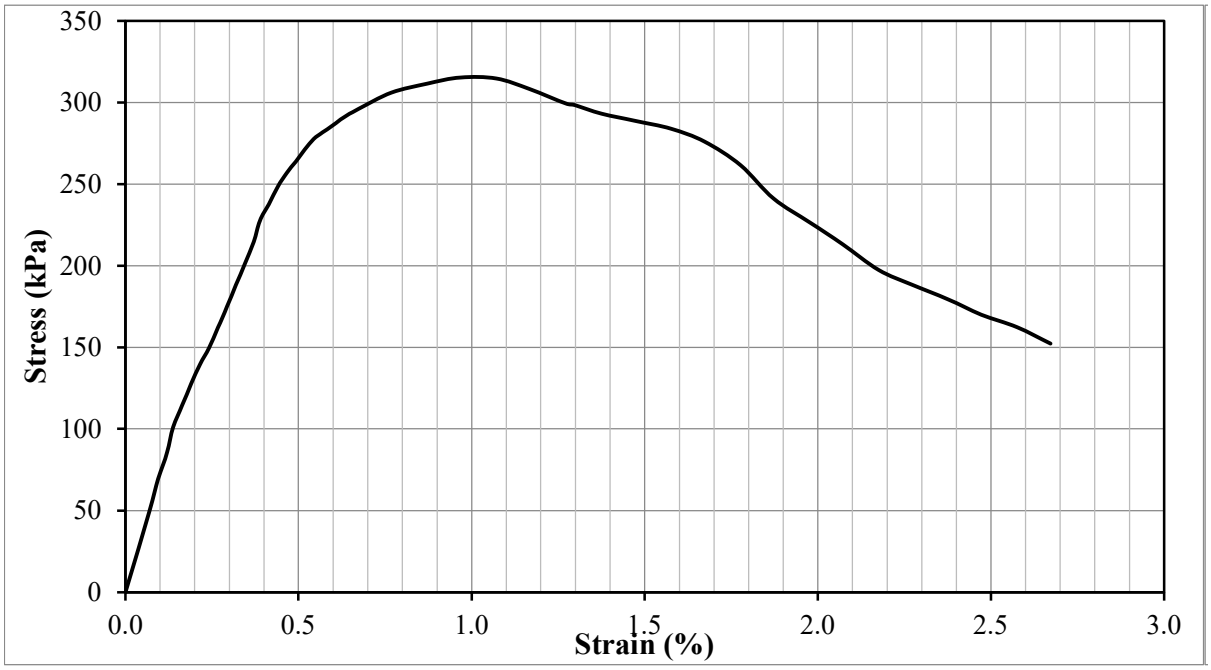
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	155	Strain at failure, εf :	1.30	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-11-H	Initial Area:	2108.7	mm^2
Test Date:	6/25/2021	Weight:	365.7	g
Strain Rate:	1 %/min	Unit Weight:	1742	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	100	Curing Period	2.7	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



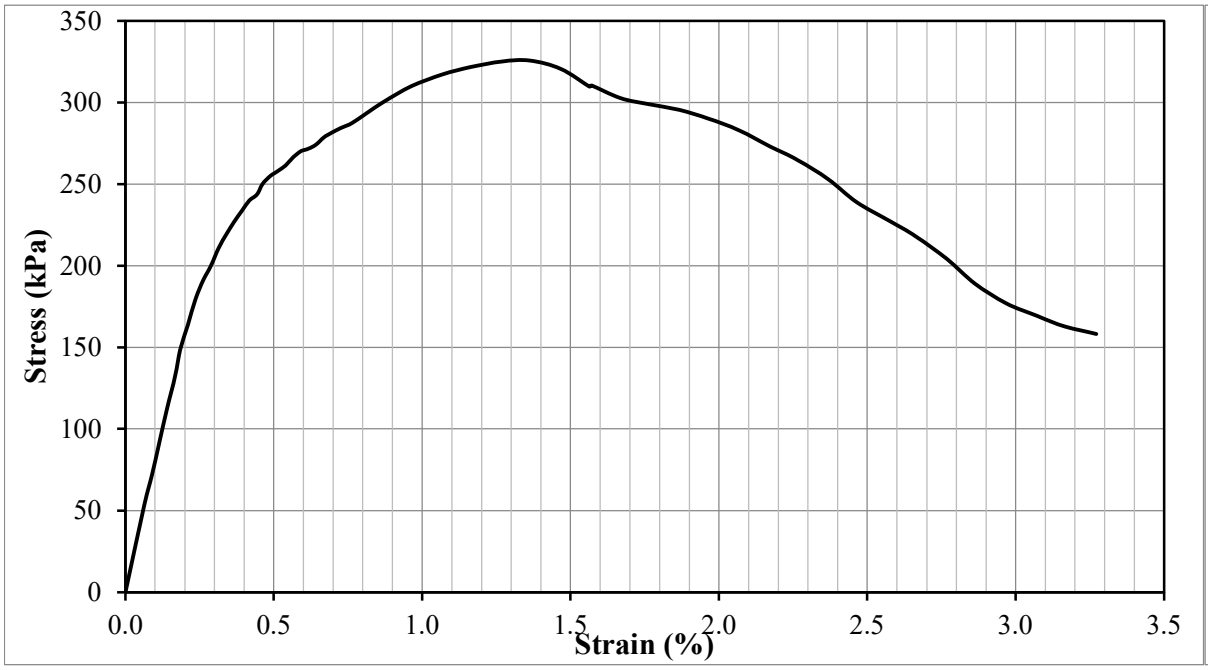
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	130	Strain at failure, εf :	1.15	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-11-B	Initial Area:	2106.6	mm^2
Test Date:	6/29/2021	Weight:	366.9	g
Strain Rate:	1 %/min	Unit Weight:	1751	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	100	Curing Period	6.8	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



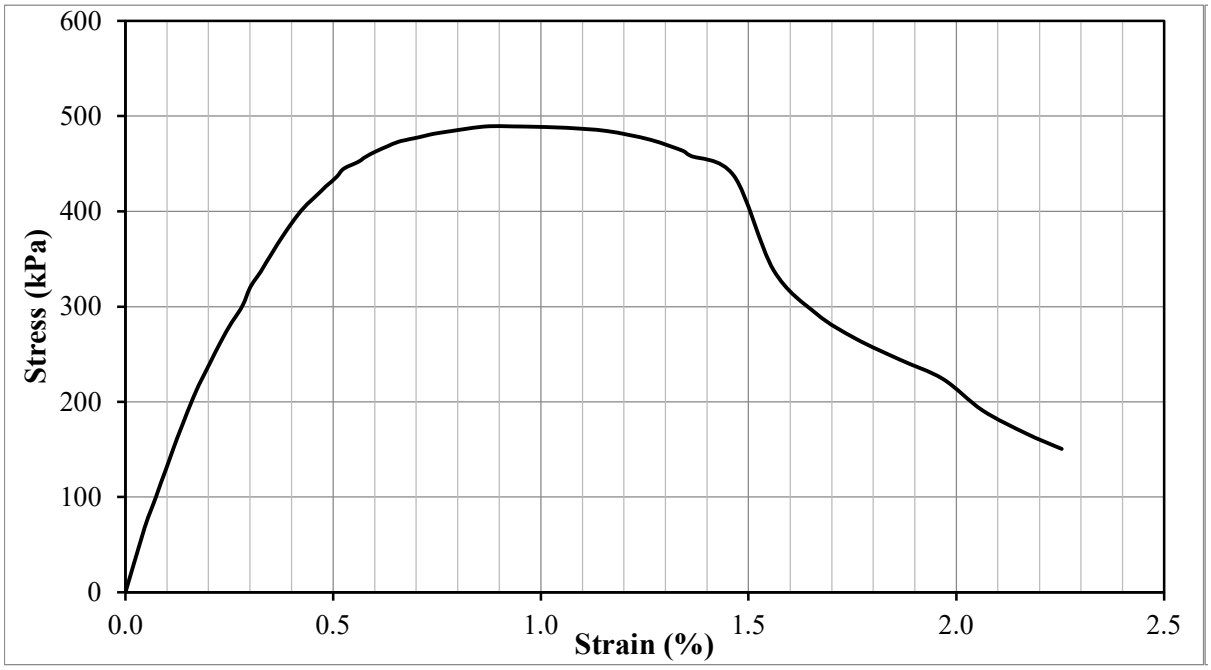
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	313	Strain at failure, εf :	0.97	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-11-G	Initial Area:	2104.6	mm^2
Test Date:	6/29/2021	Weight:	365.0	g
Strain Rate:	1 %/min	Unit Weight:	1753	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	100	Curing Period	6.8	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



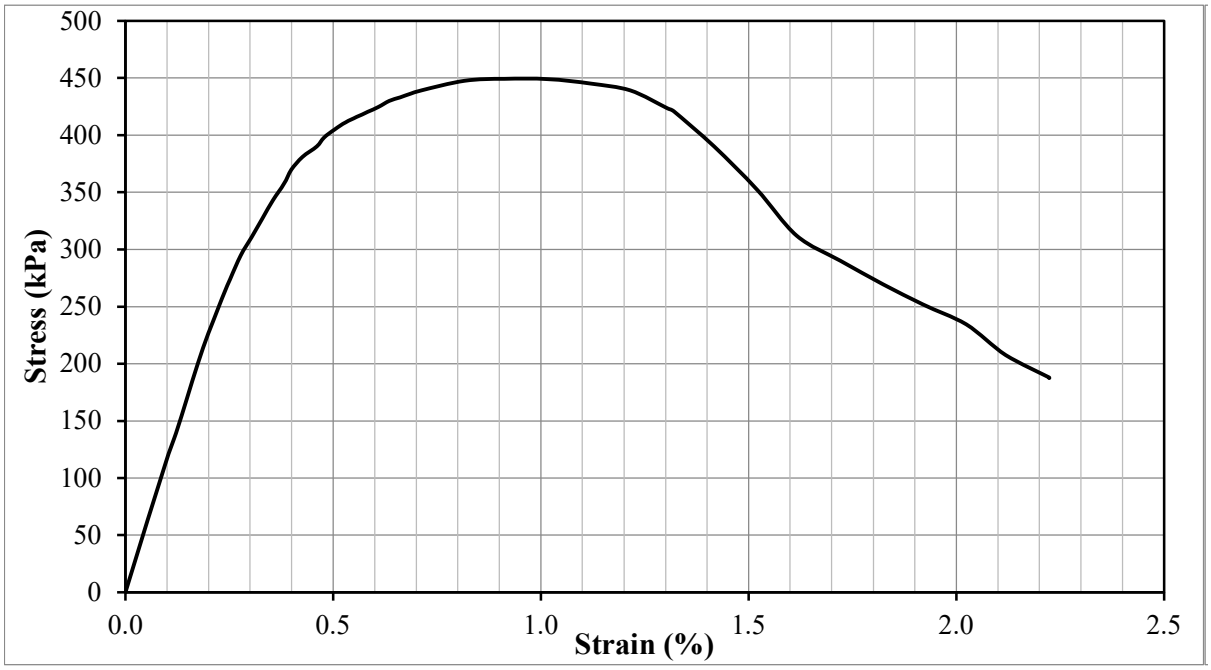
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	323	Strain at failure, εf :	1.36	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	O-11-C	Initial Area:	2100.5	mm^2
Test Date:	7/6/2021	Weight:	368.1	g
Strain Rate:	1 %/min	Unit Weight:	1754	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	100	Curing Period	13.9	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



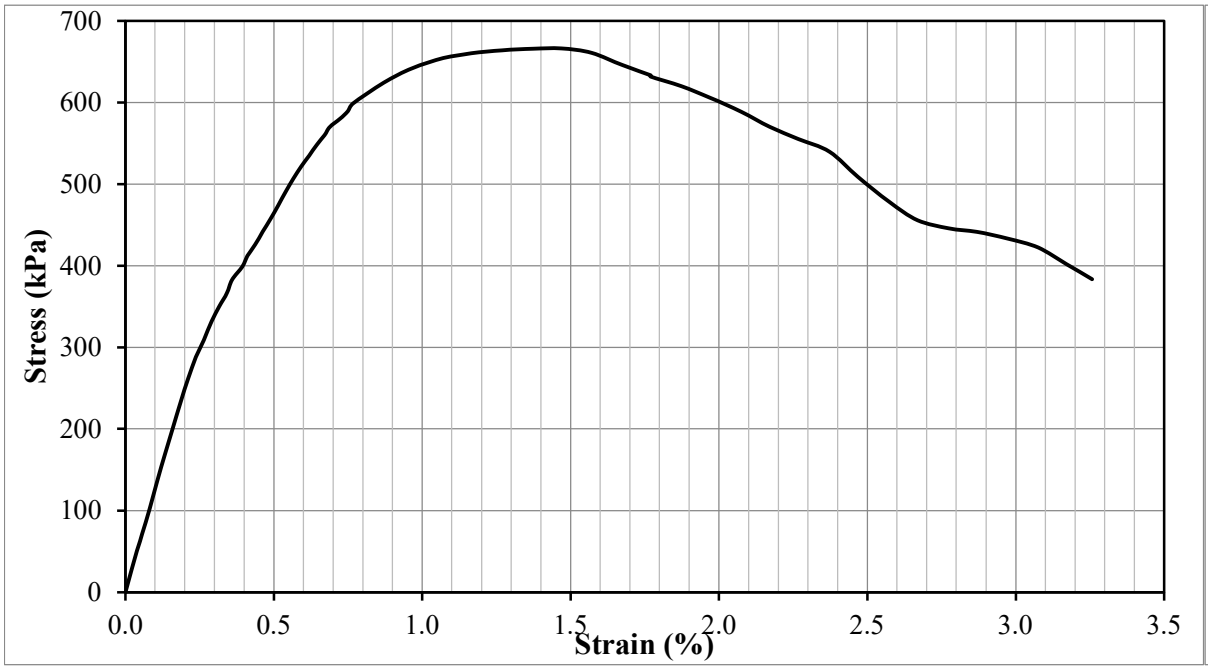
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	486	Strain at failure, εf :	0.96	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-11-F	Initial Area:	2108.7	mm^2
Test Date:	7/6/2021	Weight:	369.1	g
Strain Rate:	1 %/min	Unit Weight:	1750	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	100	Curing Period	13.9	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



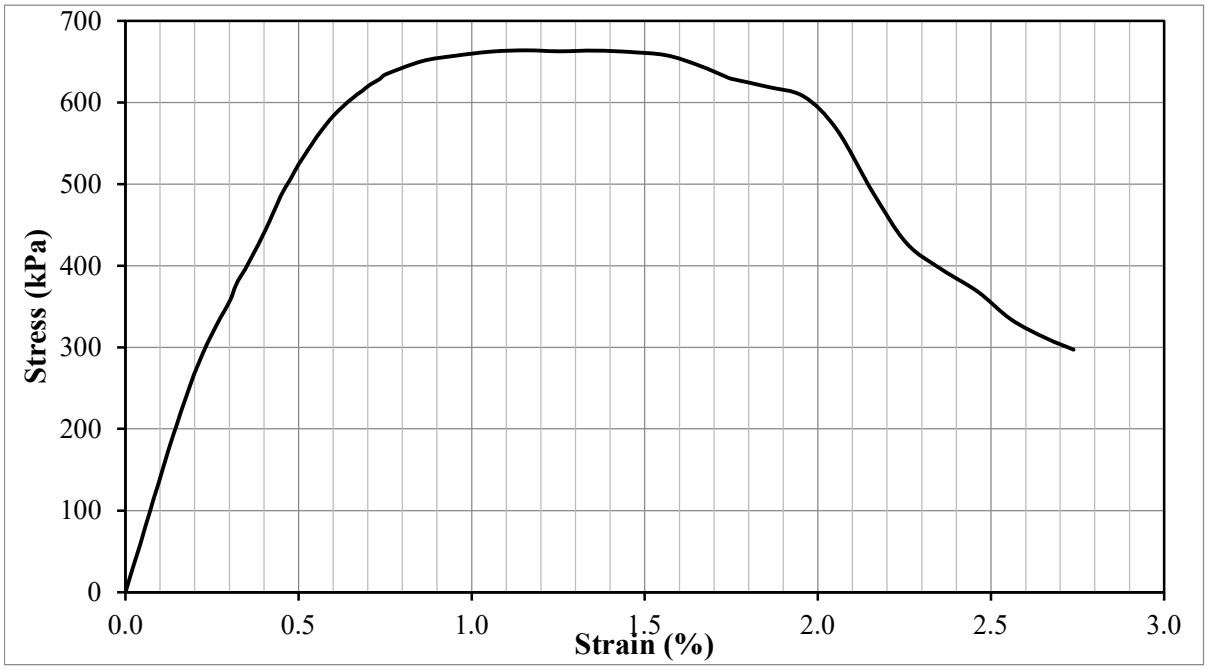
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	447	Strain at failure, εf :	0.91	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-11-F	Initial Area:	2112.9	mm^2
Test Date:	7/20/2021	Weight:	364.5	g
Strain Rate:	1 %/min	Unit Weight:	1746	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	100	Curing Period	27.9	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



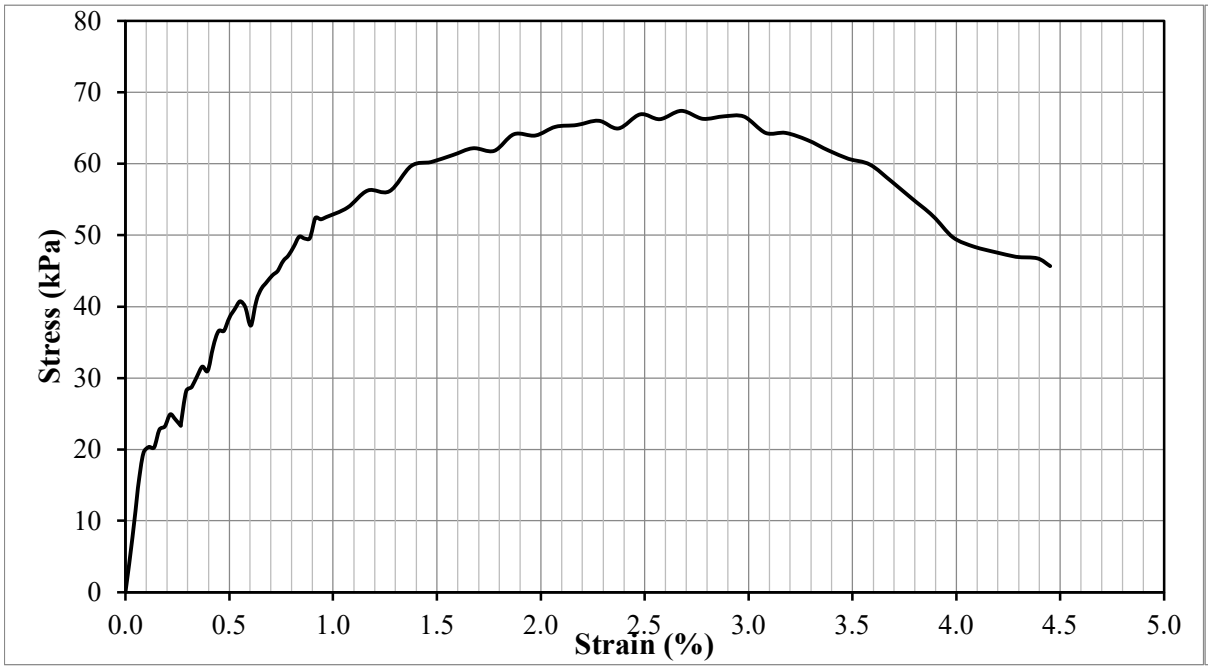
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	661	Strain at failure, εf :	1.47	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-11-E	Initial Area:	2106.6	mm^2
Test Date:	7/20/2021	Weight:	367.8	g
Strain Rate:	1 %/min	Unit Weight:	1753	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	100	Curing Period	27.9	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.200%		



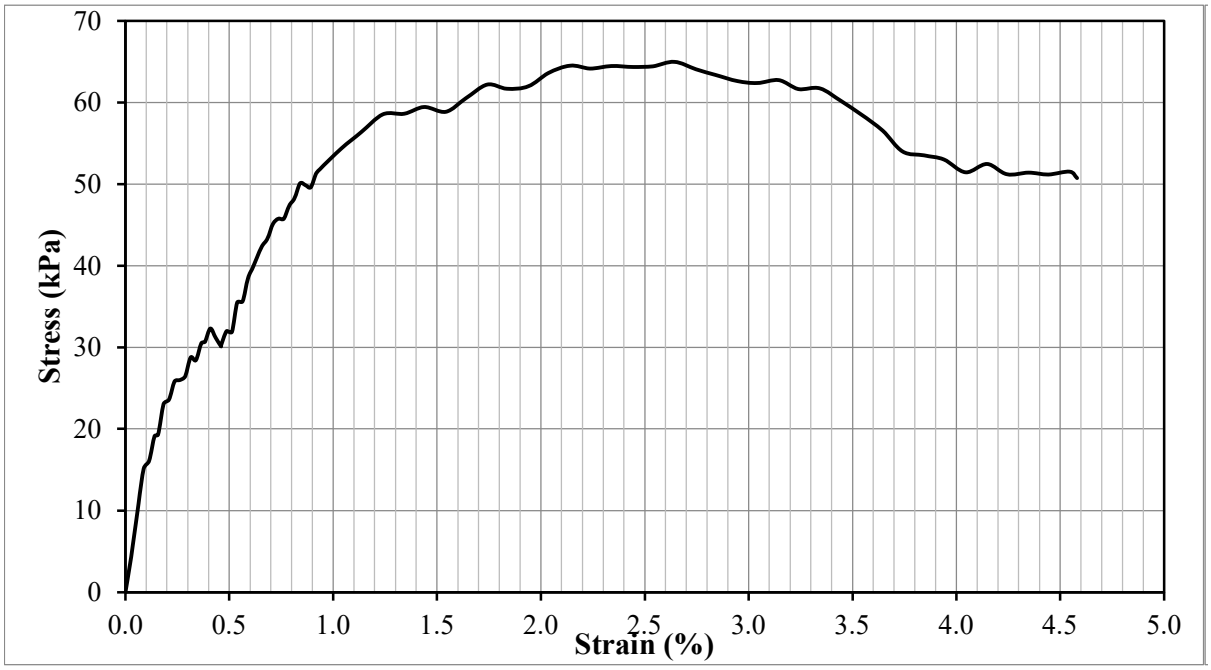
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	660	Strain at failure, εf :	1.16	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.6	mm
I.D.:	O-12-A	Initial Area:	2088.1	mm^2
Test Date:	6/23/2021	Weight:	387.4	g
Strain Rate:	1 %/min	Unit Weight:	1822	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	250	Curing Period	2.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.250%		



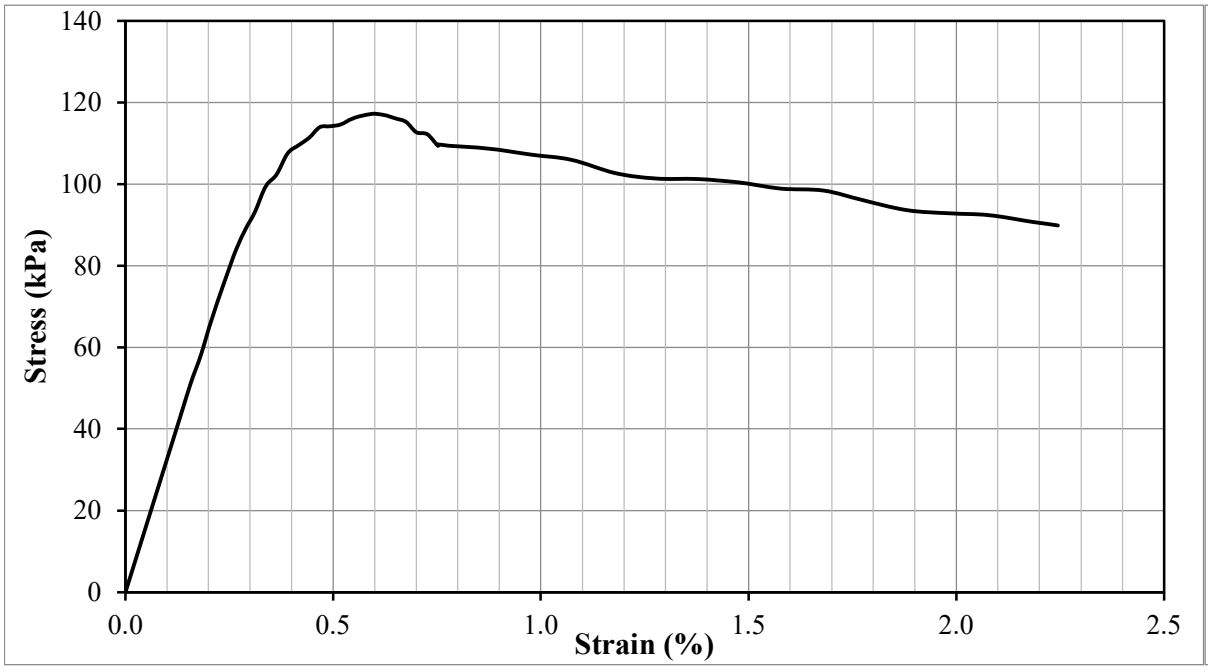
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	67	Strain at failure, εf :	2.68	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	O-12-H	Initial Area:	2100.5	mm^2
Test Date:	6/23/2021	Weight:	387.9	g
Strain Rate:	1 %/min	Unit Weight:	1817	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	250	Curing Period	2.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.250%		



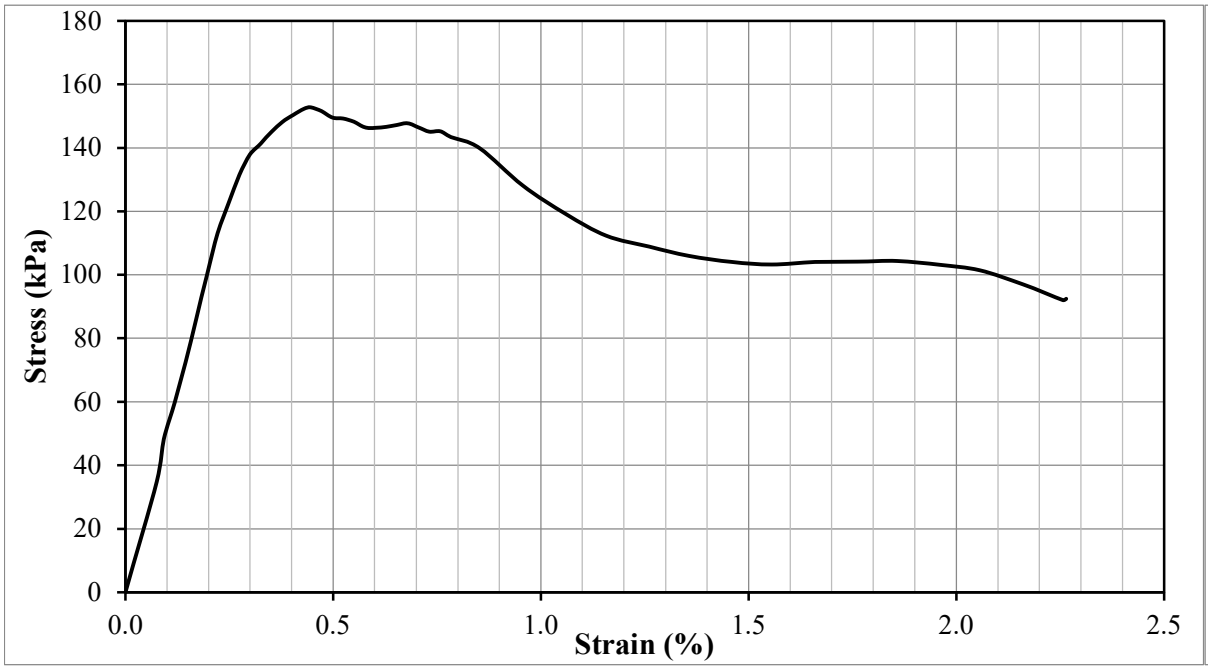
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	65	Strain at failure, εf :	2.64	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	O-12-B	Initial Area:	2096.3	mm^2
Test Date:	6/27/2021	Weight:	377.6	g
Strain Rate:	1 %/min	Unit Weight:	1824	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	250	Curing Period	6.7	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.250%		



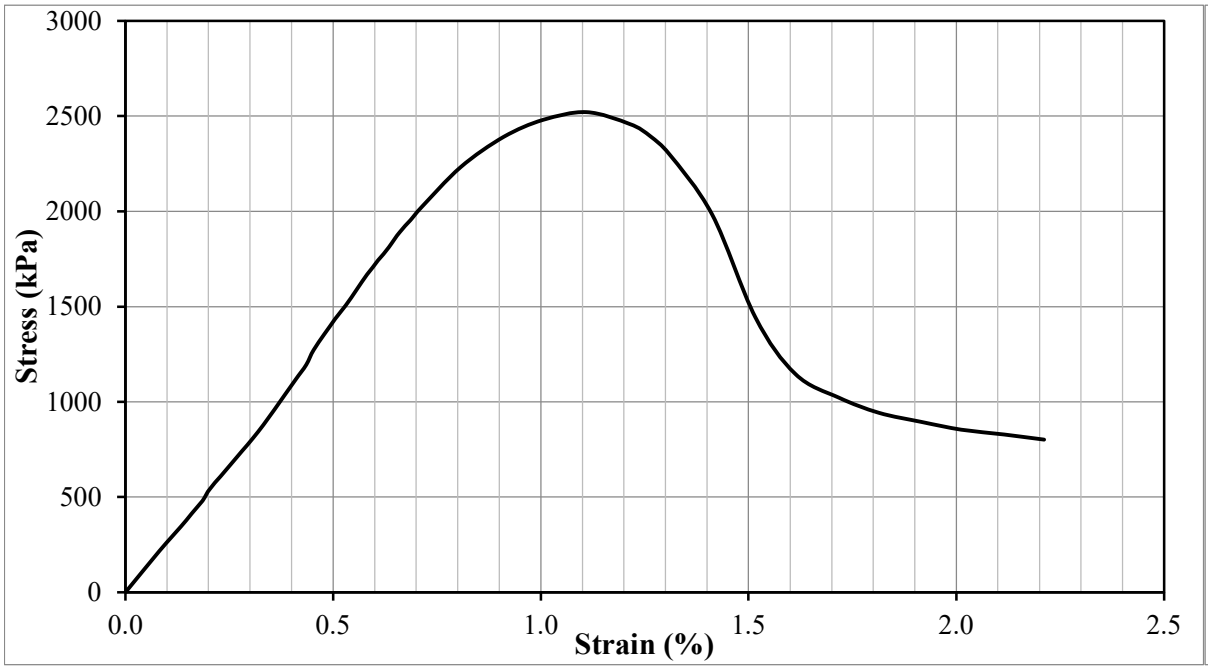
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	116	Strain at failure, εf :	0.60	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	O-12-G	Initial Area:	2100.5	mm^2
Test Date:	6/27/2021	Weight:	385.0	g
Strain Rate:	1 %/min	Unit Weight:	1821	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	250	Curing Period	6.7	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.250%		



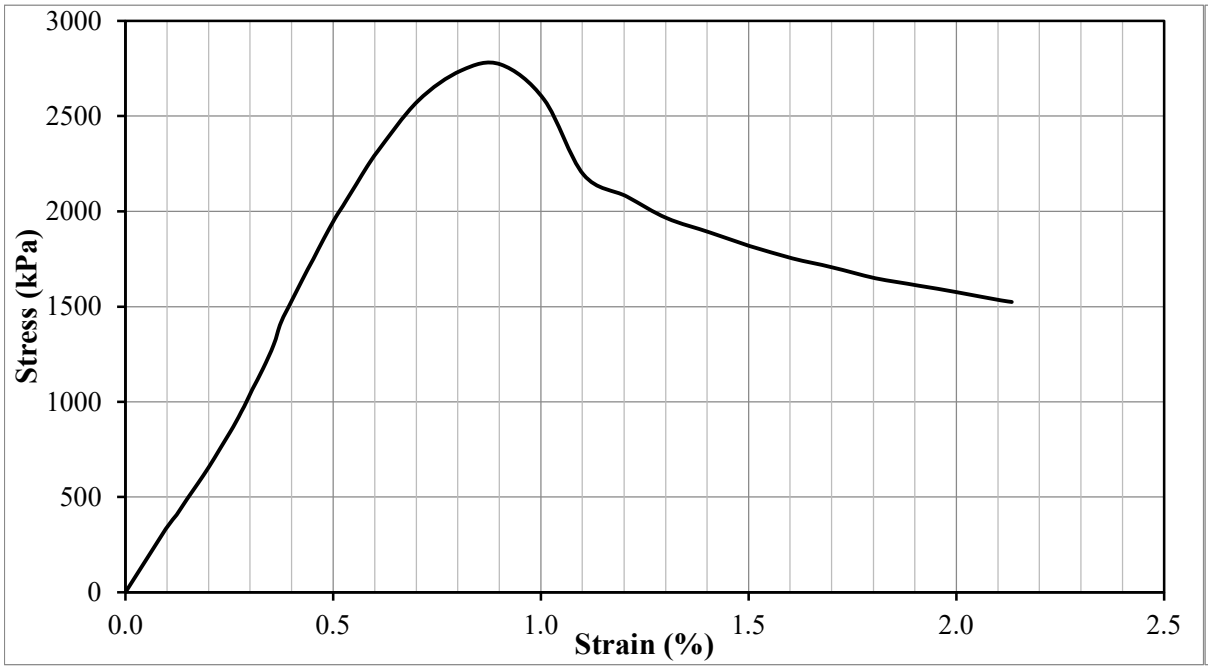
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	152	Strain at failure, εf :	0.45	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	O-12-C	Initial Area:	2100.5	mm^2
Test Date:	7/4/2021	Weight:	385.9	g
Strain Rate:	1 %/min	Unit Weight:	1820	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	250	Curing Period	13.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.250%		



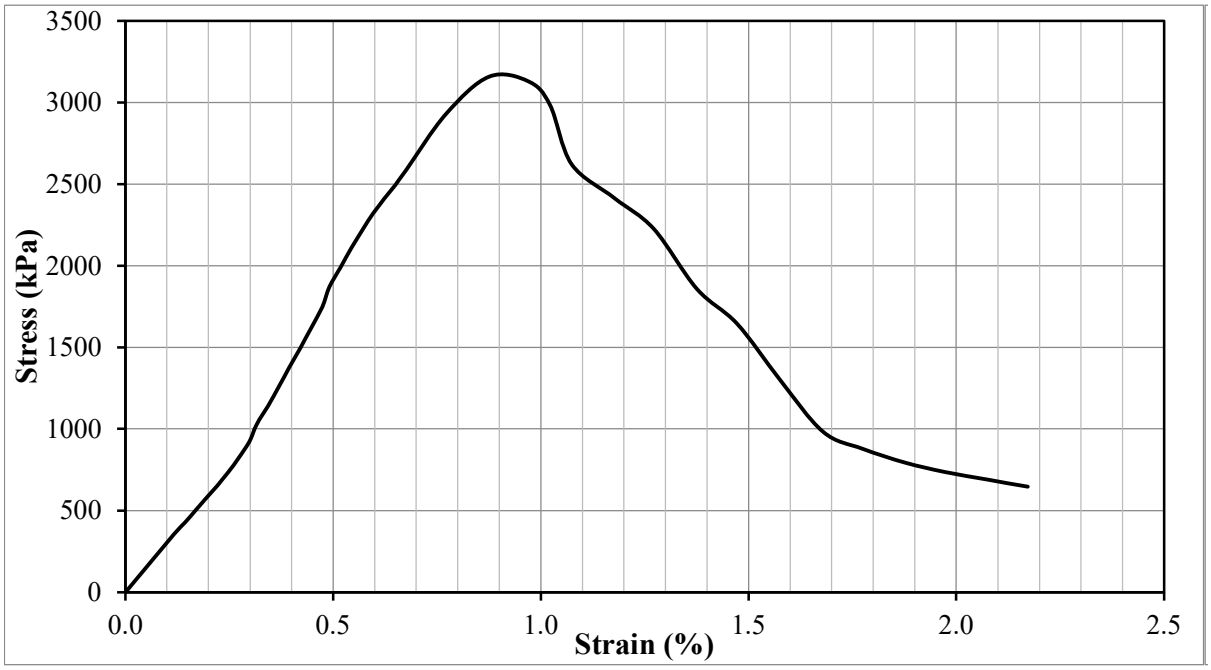
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,511	Strain at failure, εf :	1.11	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	O-12-I	Initial Area:	2123.2	mm^2
Test Date:	7/4/2021	Weight:	383.3	g
Strain Rate:	1 %/min	Unit Weight:	1804	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	250	Curing Period	13.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.250%		



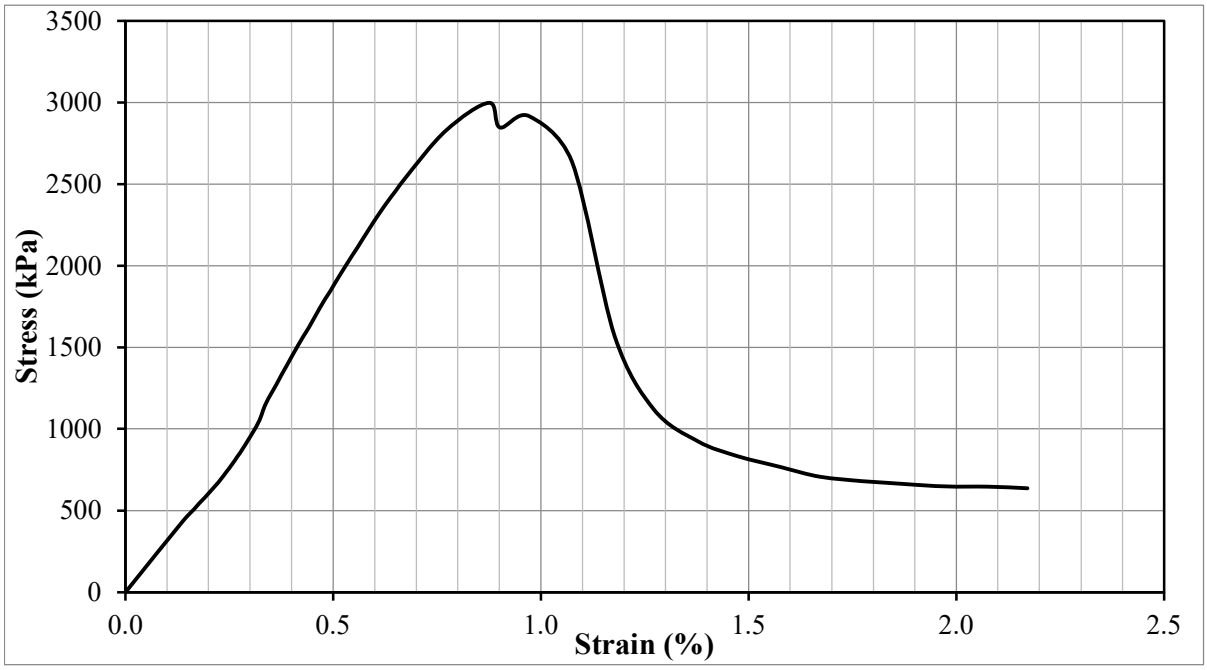
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,755	Strain at failure, εf :	0.90	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-12-E	Initial Area:	2104.6	mm^2
Test Date:	7/18/2021	Weight:	387.4	g
Strain Rate:	1 %/min	Unit Weight:	1824	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	250	Curing Period	27.8	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.250%		



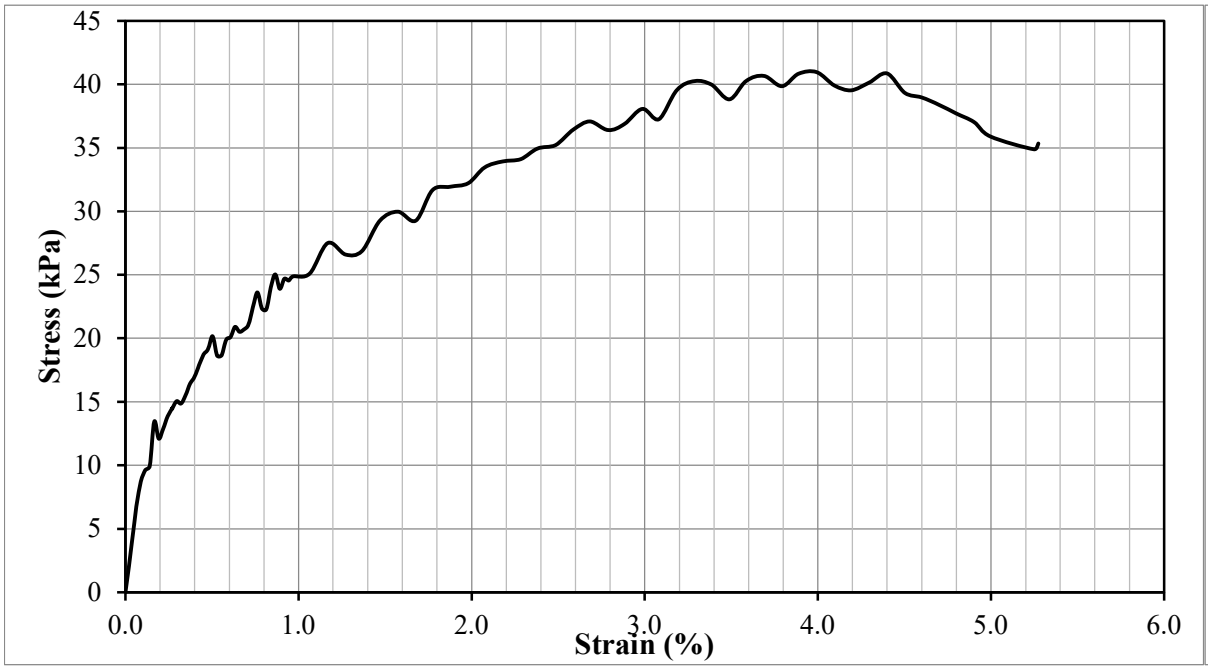
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,146	Strain at failure, εf :	0.88	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-12-J	Initial Area:	2108.7	mm^2
Test Date:	7/18/2021	Weight:	387.7	g
Strain Rate:	1 %/min	Unit Weight:	1819	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	250	Curing Period	27.8	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.250%		



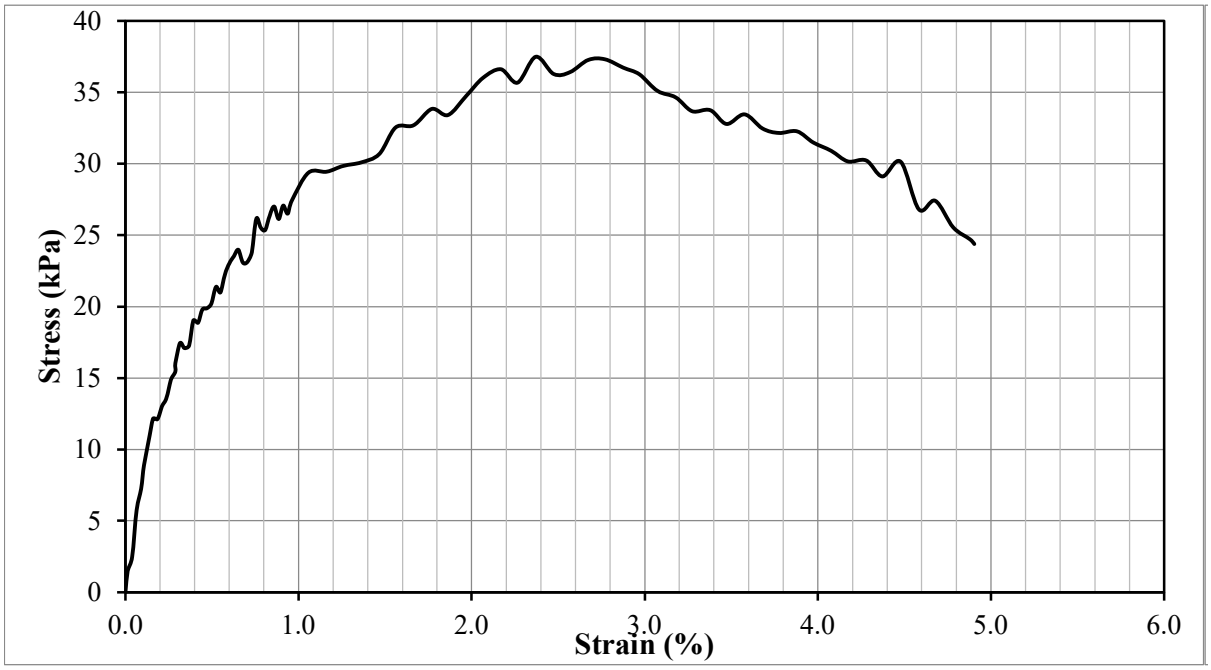
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,986	Strain at failure, εf :	0.88	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-13-A	Initial Area:	2110.8	mm^2
Test Date:	6/23/2021	Weight:	384.1	g
Strain Rate:	1 %/min	Unit Weight:	1802	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	300	Curing Period	2.8	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.250%		



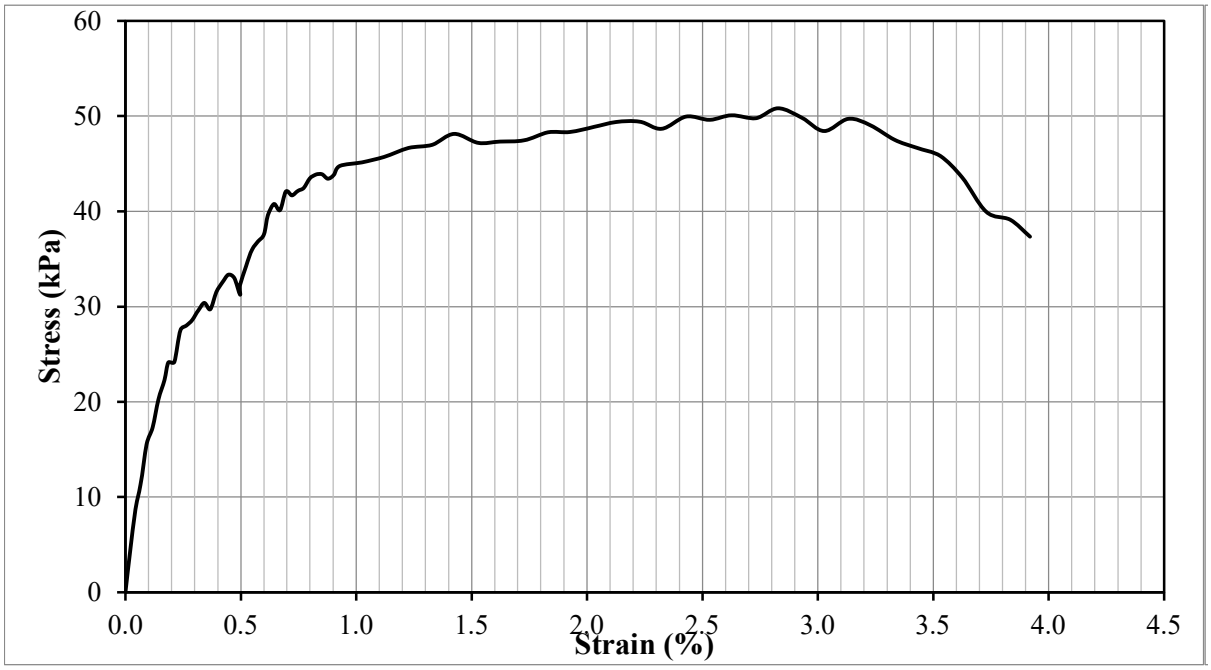
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	41	Strain at failure, εf :	3.99	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	O-13-H	Initial Area:	2102.5	mm^2
Test Date:	6/23/2021	Weight:	385.5	g
Strain Rate:	1 %/min	Unit Weight:	1807	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	300	Curing Period	2.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.250%		



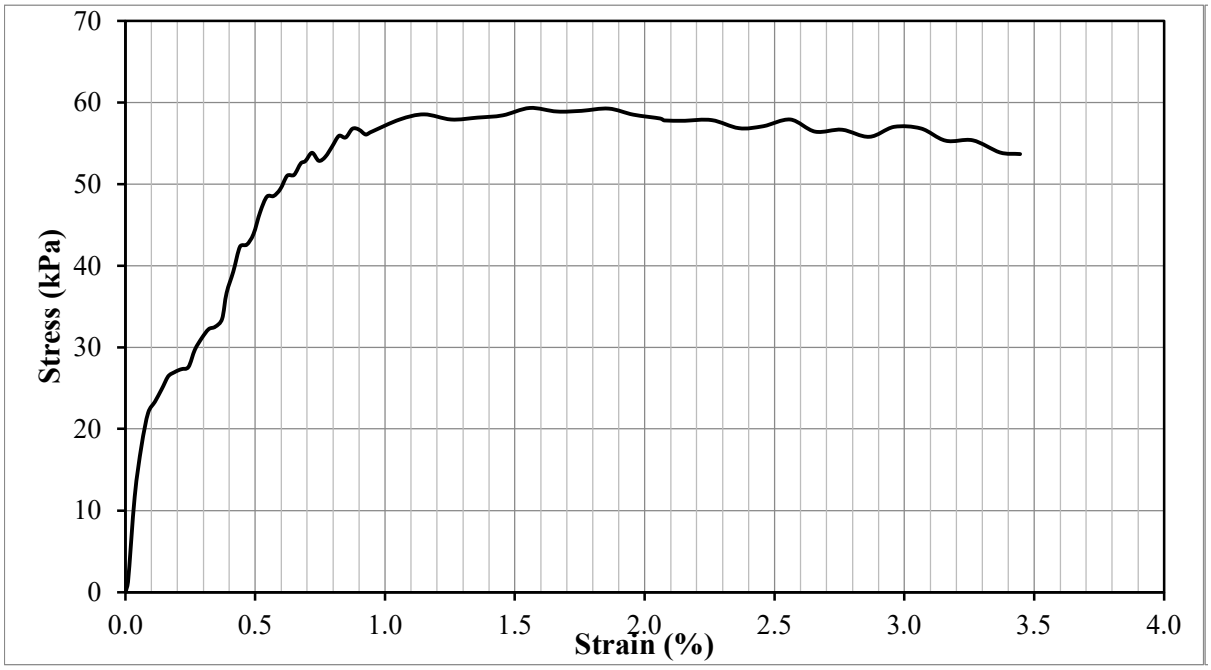
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	37	Strain at failure, εf :	2.37	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	O-13-B	Initial Area:	2102.5	mm^2
Test Date:	6/27/2021	Weight:	379.2	g
Strain Rate:	1 %/min	Unit Weight:	1809	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	300	Curing Period	6.7	days
$(w{:}c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.250%		



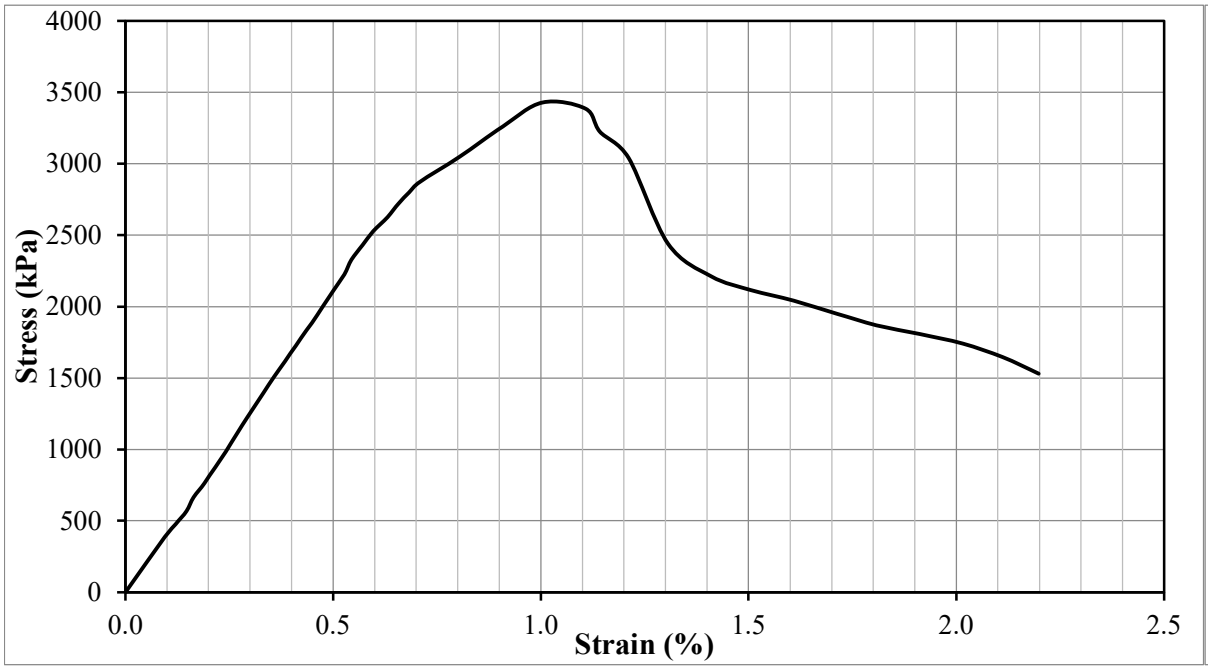
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	51	Strain at failure, εf :	2.83	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-13-G	Initial Area:	2112.9	mm^2
Test Date:	6/27/2021	Weight:	377.1	g
Strain Rate:	1 %/min	Unit Weight:	1793	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	300	Curing Period	6.7	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.250%		



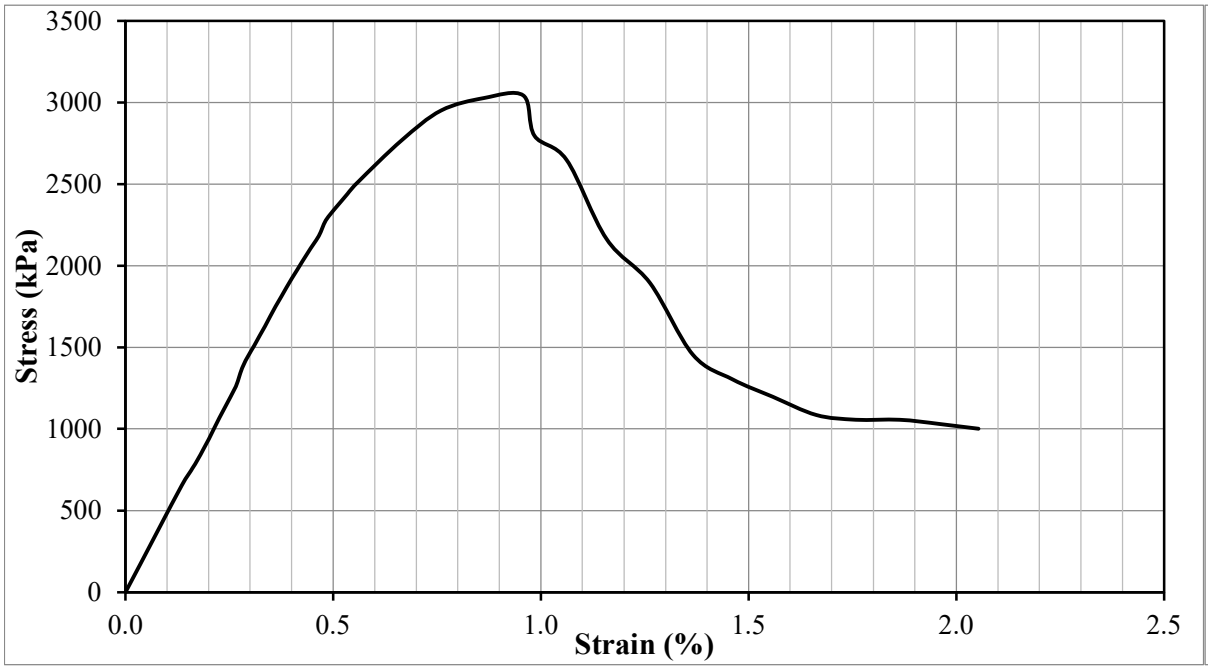
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	59	Strain at failure, εf :	1.56	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	O-13-C	Initial Area:	2100.5	mm^2
Test Date:	7/4/2021	Weight:	375.4	g
Strain Rate:	1 %/min	Unit Weight:	1819	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	300	Curing Period	13.8	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.250%		



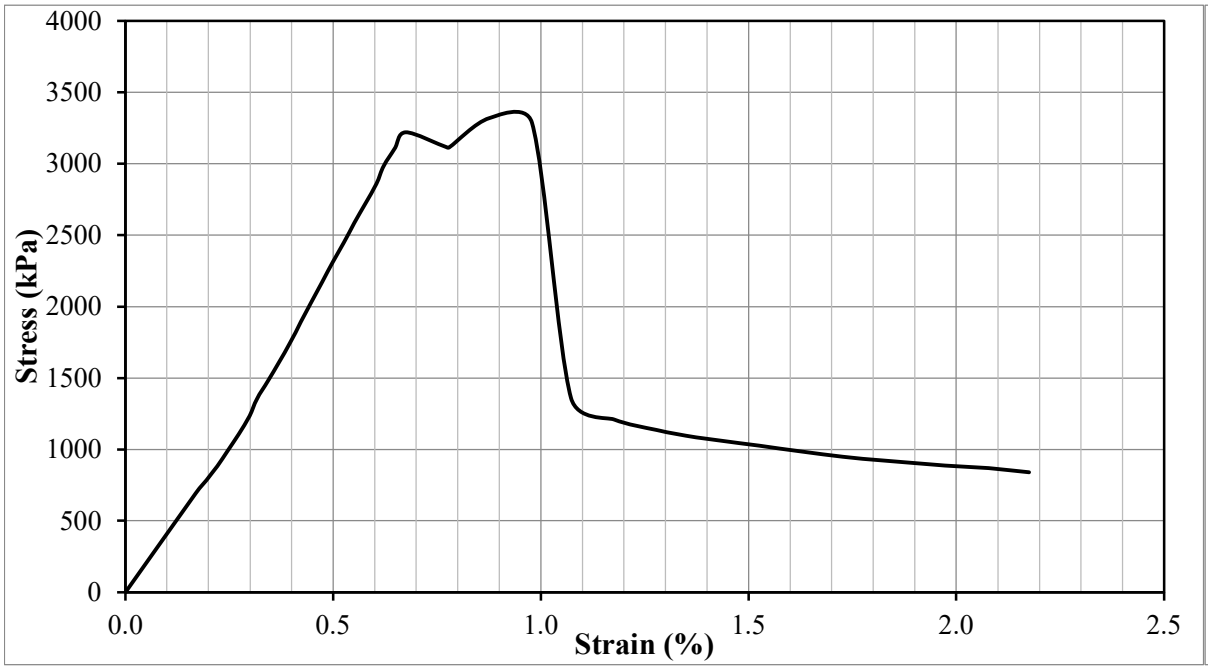
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,401	Strain at failure, εf :	1.00	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-13-I	Initial Area:	2110.8	mm^2
Test Date:	7/4/2021	Weight:	384.1	g
Strain Rate:	1 %/min	Unit Weight:	1816	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	300	Curing Period	13.8	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.250%		



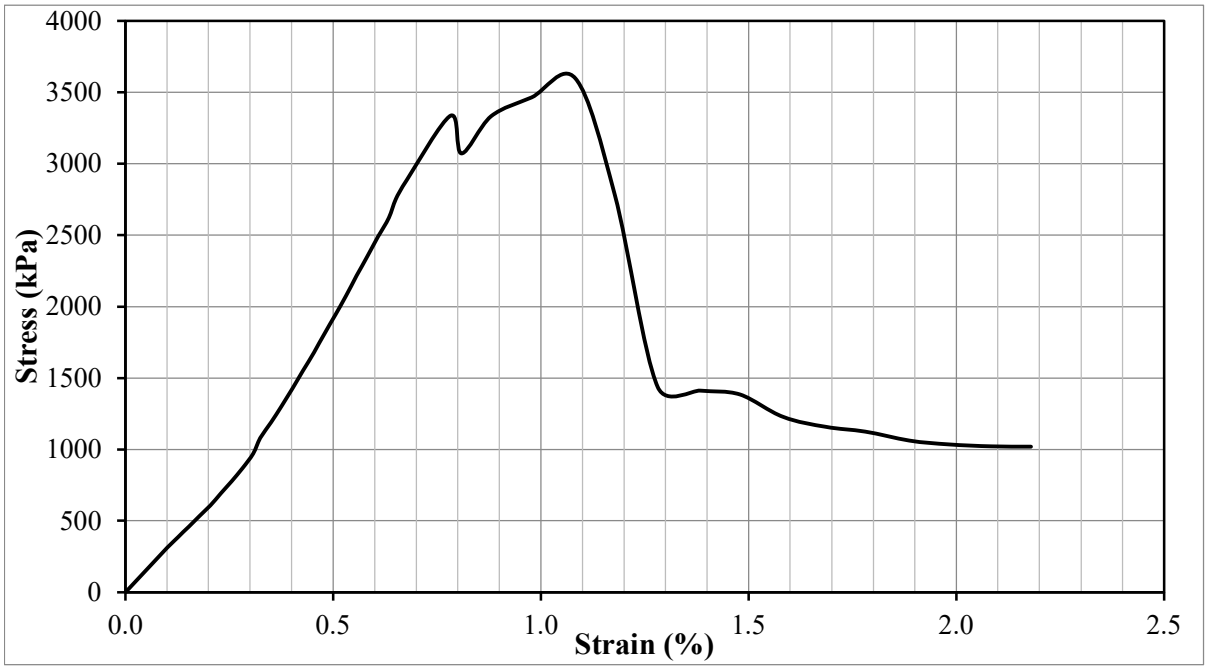
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,026	Strain at failure, εf :	0.96	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	O-13-D	Initial Area:	2121.1	mm^2
Test Date:	7/18/2021	Weight:	382.3	g
Strain Rate:	1 %/min	Unit Weight:	1801	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	300	Curing Period	27.7	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.250%		



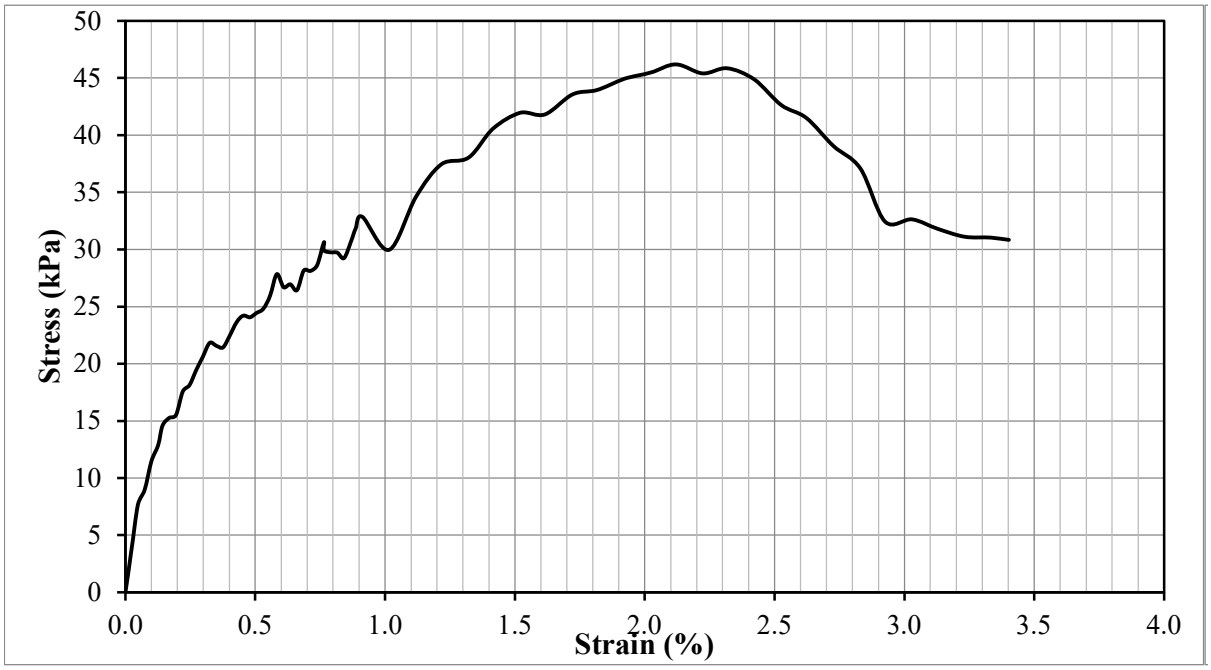
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,298	Strain at failure, εf :	0.88	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-13-J	Initial Area:	2104.6	mm^2
Test Date:	7/18/2021	Weight:	386.4	g
Strain Rate:	1 %/min	Unit Weight:	1820	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	300	Curing Period	27.7	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.250%		



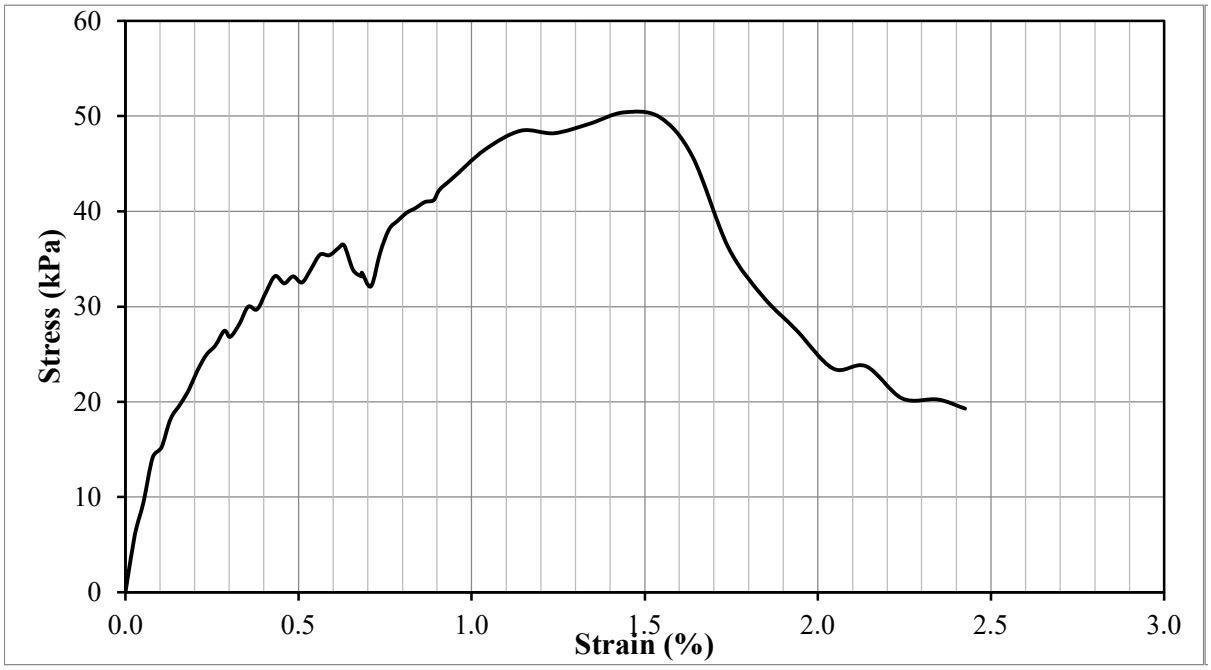
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,582	Strain at failure, εf :	1.08	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	O-14-A	Initial Area:	2102.5	mm^2
Test Date:	6/26/2021	Weight:	380.3	g
Strain Rate:	1 %/min	Unit Weight:	1801	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	400	Curing Period	3.1	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.300%		



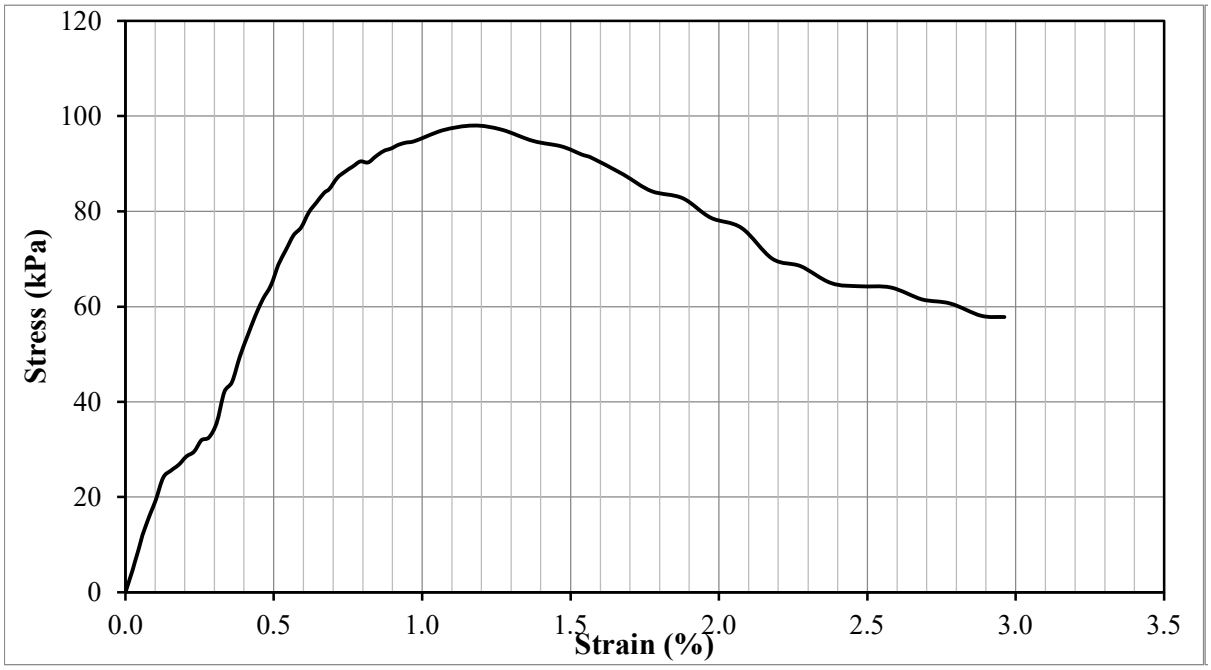
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	46	Strain at failure, εf :	2.12	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	O-14-H	Initial Area:	2098.4	mm^2
Test Date:	6/26/2021	Weight:	379.9	g
Strain Rate:	1 %/min	Unit Weight:	1809	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	400	Curing Period	3.1	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.300%		



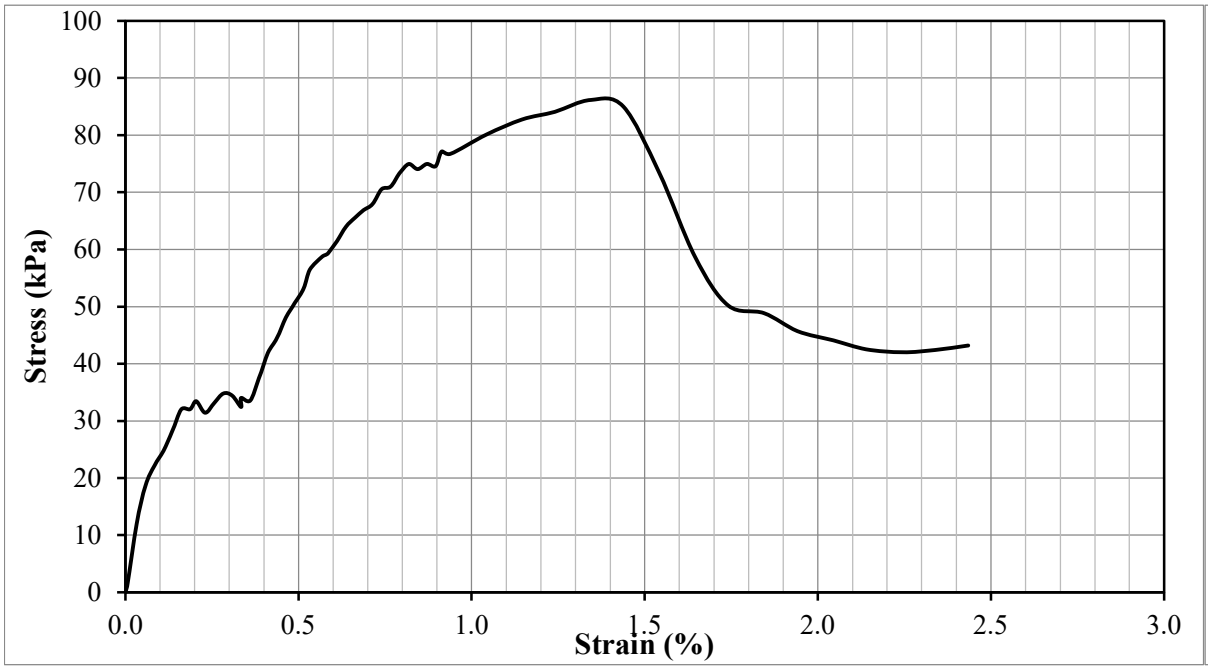
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	50	Strain at failure, εf :	1.44	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.6	mm
I.D.:	O-14-B	Initial Area:	2088.1	mm^2
Test Date:	6/30/2021	Weight:	382.8	g
Strain Rate:	1 %/min	Unit Weight:	1821	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	400	Curing Period	6.7	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.300%		



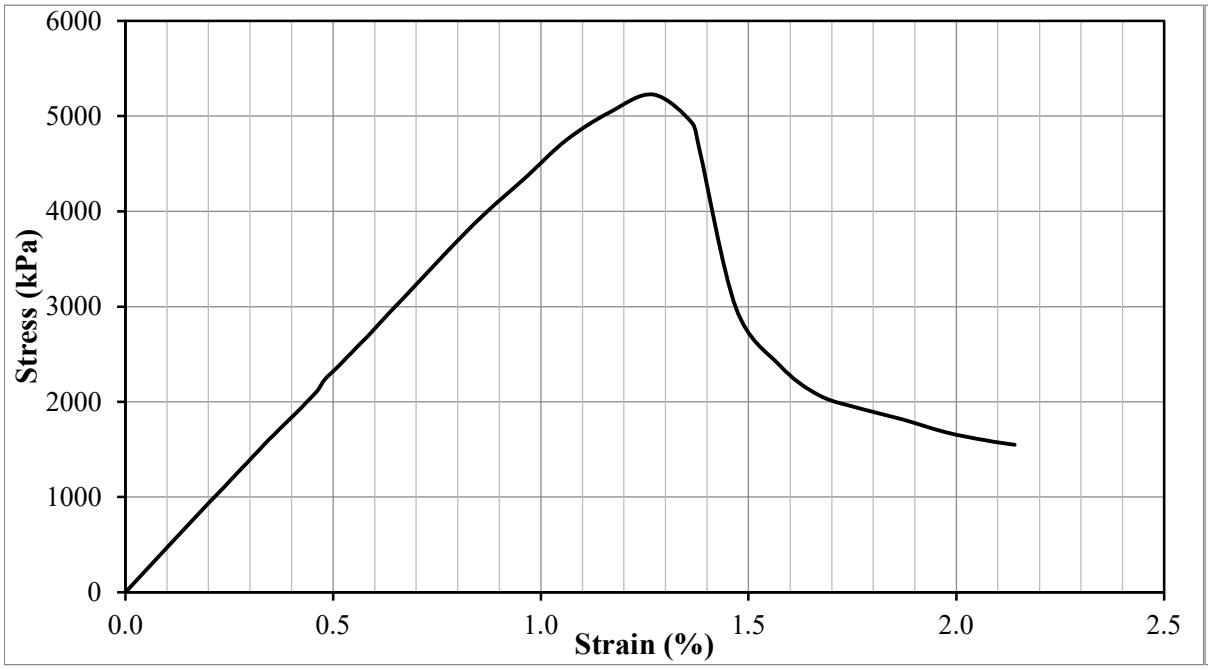
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	98	Strain at failure, εf :	1.17	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.6	mm
I.D.:	O-14-G	Initial Area:	2090.1	mm^2
Test Date:	6/30/2021	Weight:	383.0	g
Strain Rate:	1 %/min	Unit Weight:	1818	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	400	Curing Period	6.7	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.300%		



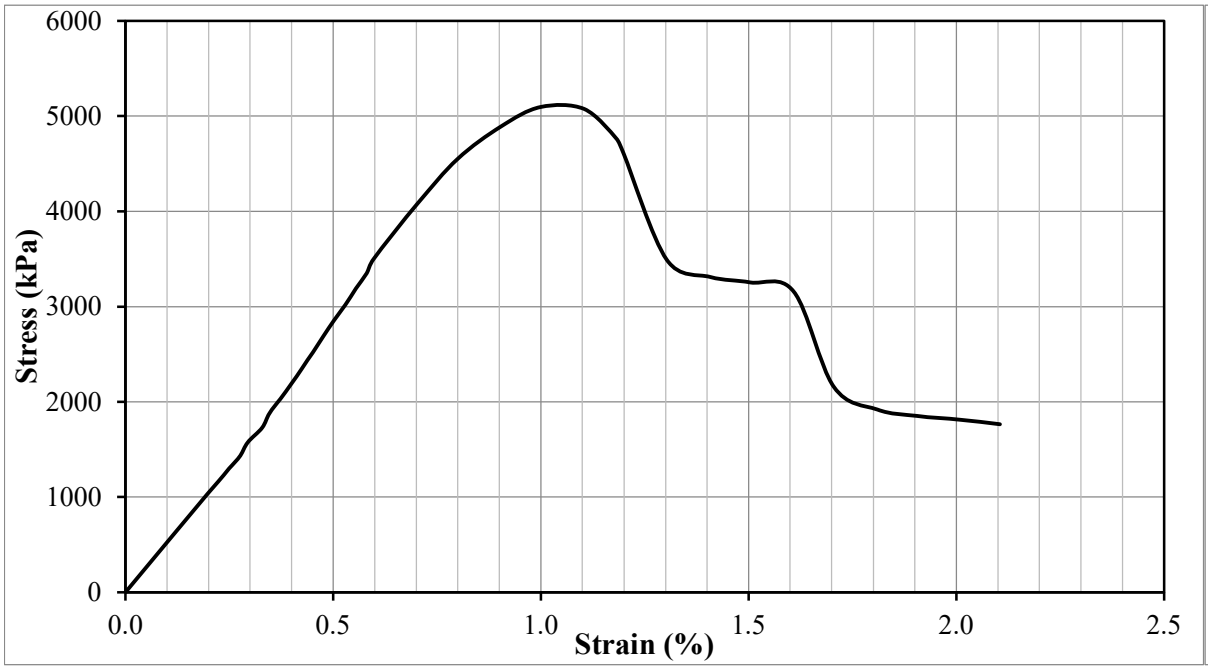
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	86	Strain at failure, εf :	1.34	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-14-F	Initial Area:	2112.9	mm^2
Test Date:	7/7/2021	Weight:	385.8	g
Strain Rate:	1 %/min	Unit Weight:	1812	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	400	Curing Period	13.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.300%		



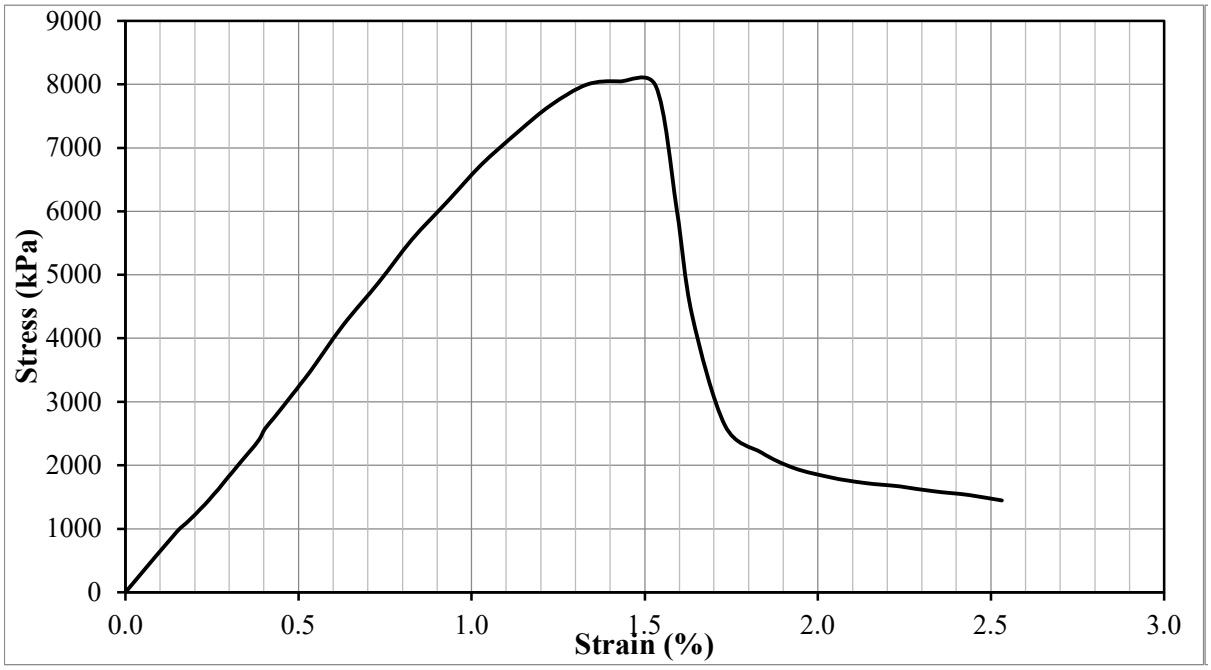
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,202	Strain at failure, εf :	1.27	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-14-I	Initial Area:	2114.9	mm^2
Test Date:	7/7/2021	Weight:	387.4	g
Strain Rate:	1 %/min	Unit Weight:	1811	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	400	Curing Period	13.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.300%		



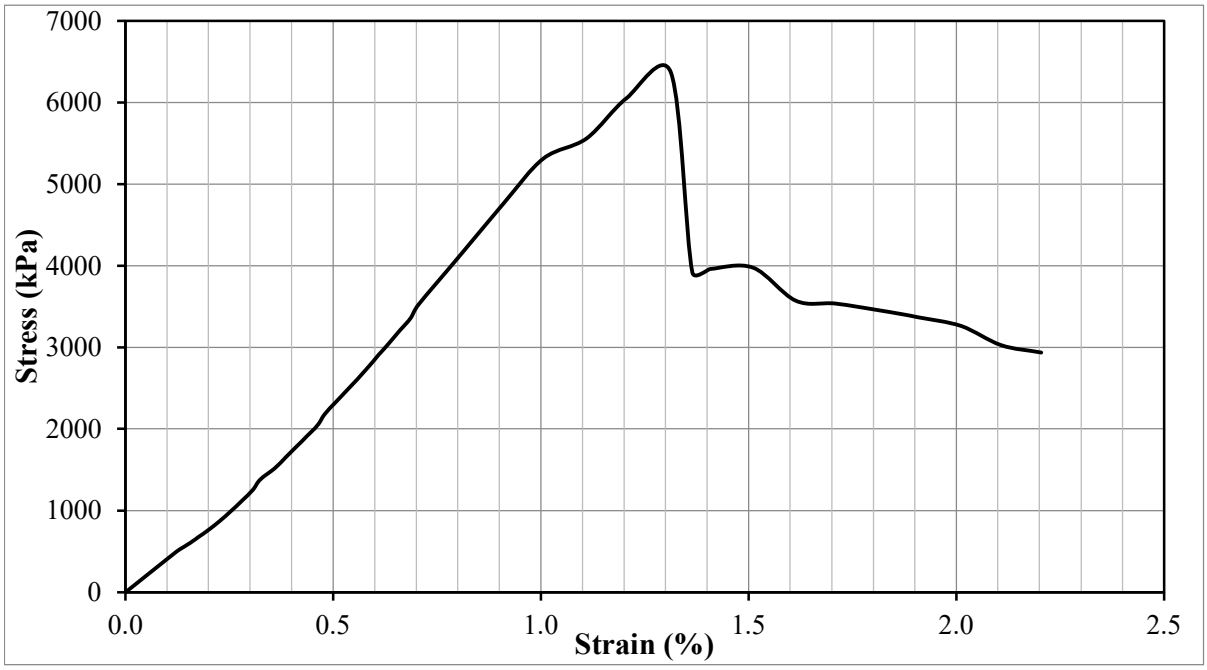
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,075	Strain at failure, εf :	1.00	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-14-E	Initial Area:	2108.7	mm^2
Test Date:	7/21/2021	Weight:	378.2	g
Strain Rate:	1 %/min	Unit Weight:	1817	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	400	Curing Period	27.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.300%		



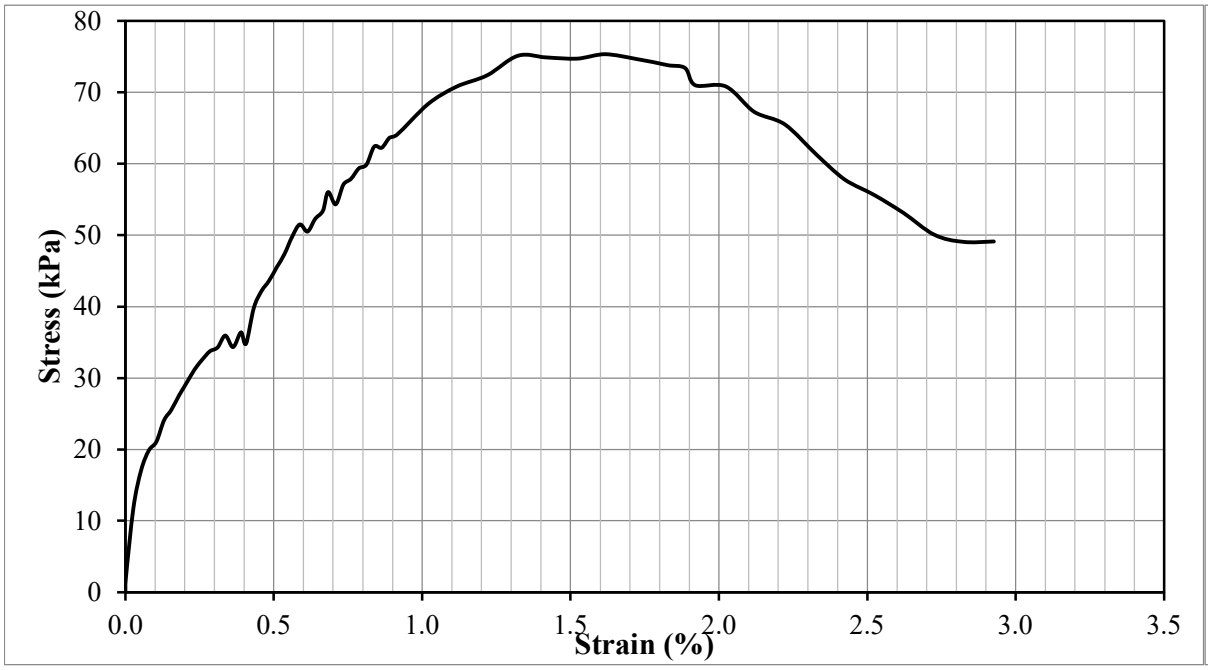
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	7,984	Strain at failure, εf :	1.43	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-14-J	Initial Area:	2114.9	mm^2
Test Date:	7/21/2021	Weight:	381.0	g
Strain Rate:	1 %/min	Unit Weight:	1815	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	400	Curing Period	27.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.300%		



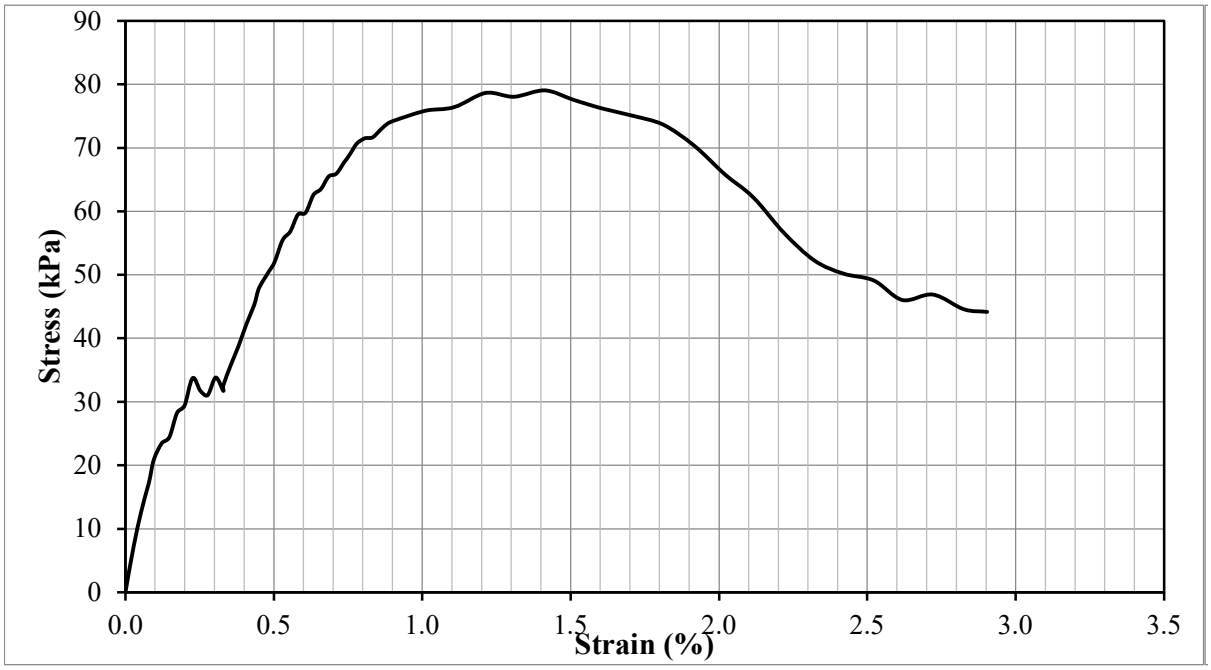
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	6,322	Strain at failure, εf :	1.31	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-15-A	Initial Area:	2117.0	mm^2
Test Date:	6/26/2021	Weight:	380.3	g
Strain Rate:	1 %/min	Unit Weight:	1796	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	450	Curing Period	2.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.300%		



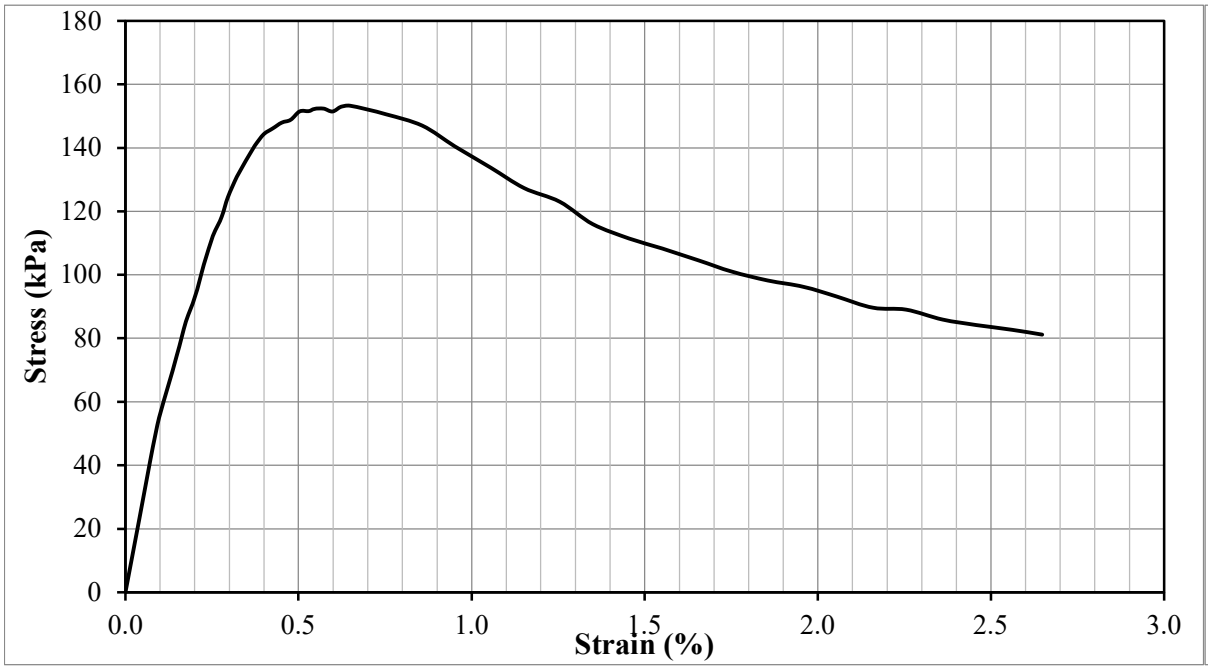
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	75	Strain at failure, εf :	1.62	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-15-H	Initial Area:	2108.7	mm^2
Test Date:	6/26/2021	Weight:	379.9	g
Strain Rate:	1 %/min	Unit Weight:	1773	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	450	Curing Period	2.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.300%		



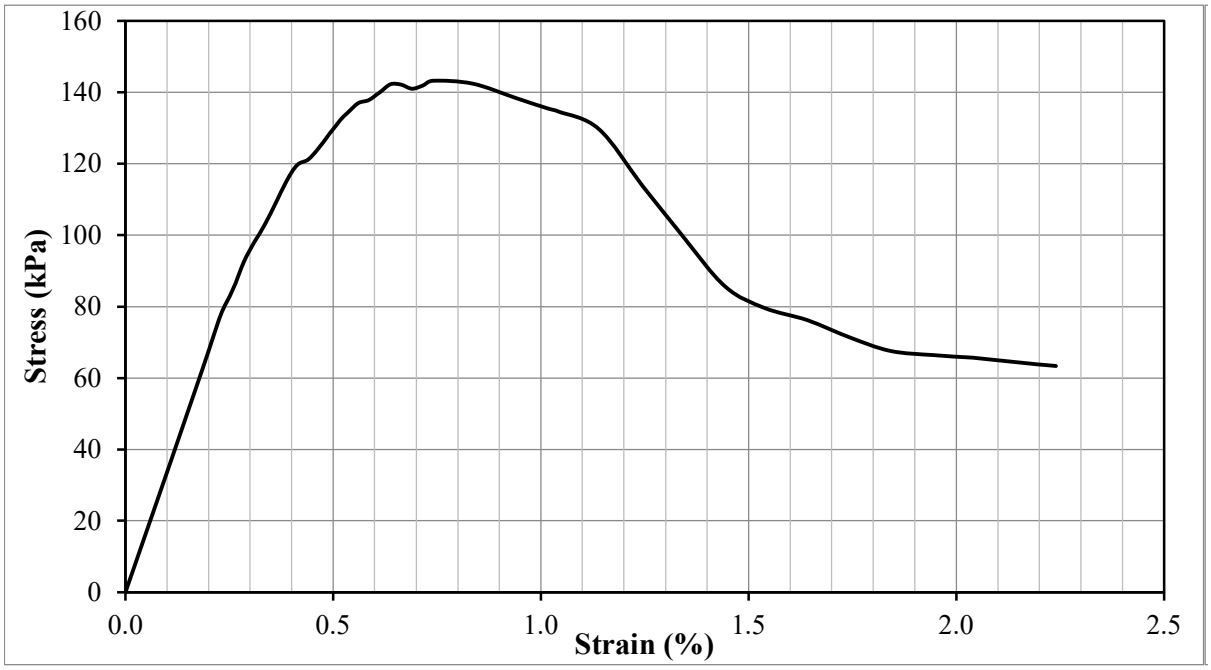
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	79	Strain at failure, εf :	1.41	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.6	mm
I.D.:	O-15-B	Initial Area:	2094.3	mm^2
Test Date:	6/30/2021	Weight:	376.5	g
Strain Rate:	1 %/min	Unit Weight:	1816	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	450	Curing Period	6.5	days
$(w{:}c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.300%		



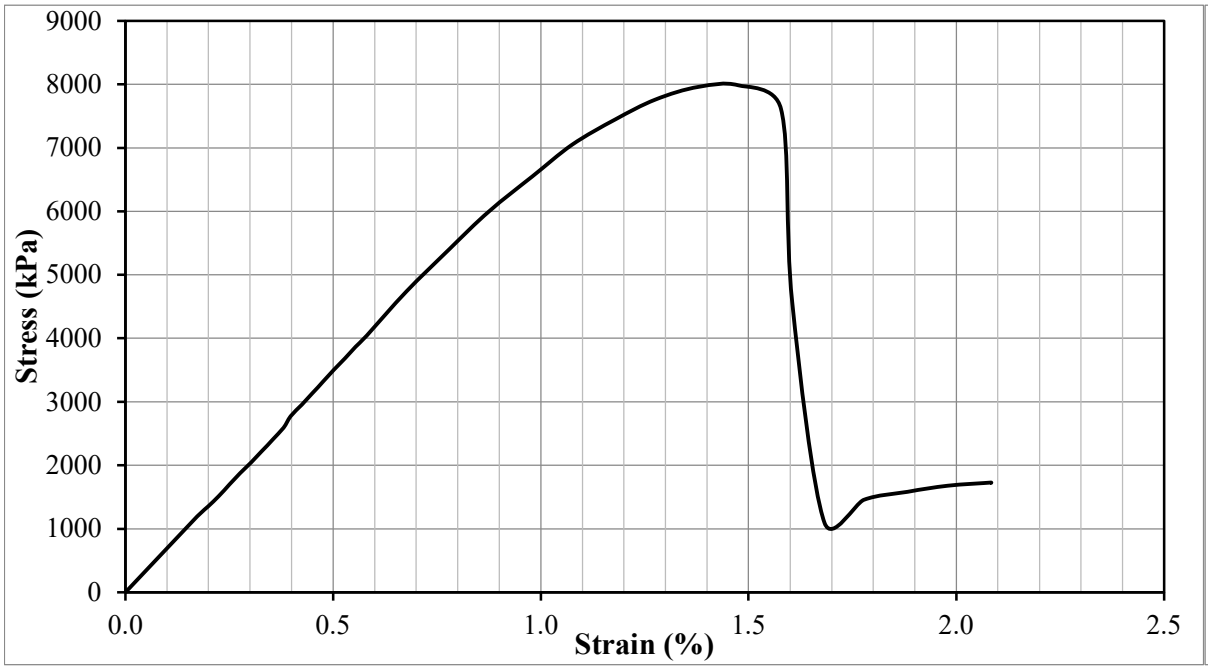
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	152	Strain at failure, εf :	0.65	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	O-15-G	Initial Area:	2098.4	mm^2
Test Date:	6/30/2021	Weight:	381.1	g
Strain Rate:	1 %/min	Unit Weight:	1811	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	450	Curing Period	6.5	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.300%		



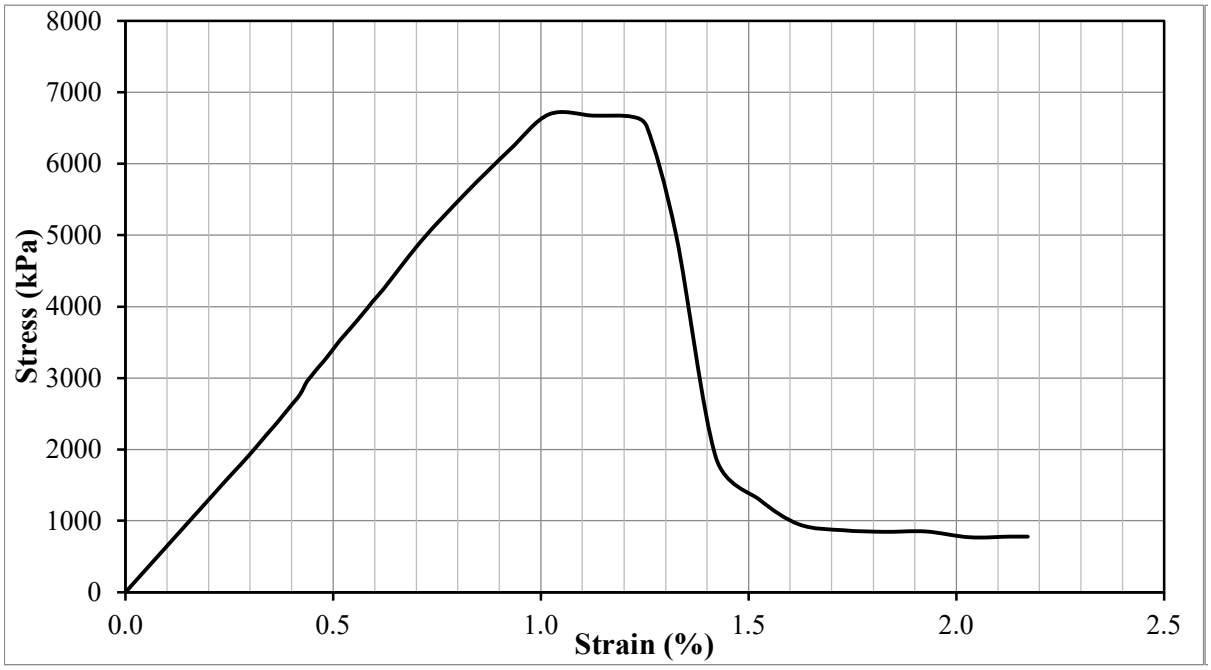
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	143	Strain at failure, εf :	0.74	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-15-C	Initial Area:	2117.0	mm^2
Test Date:	7/7/2021	Weight:	381.9	g
Strain Rate:	1 %/min	Unit Weight:	1809	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	450	Curing Period	13.8	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.300%		



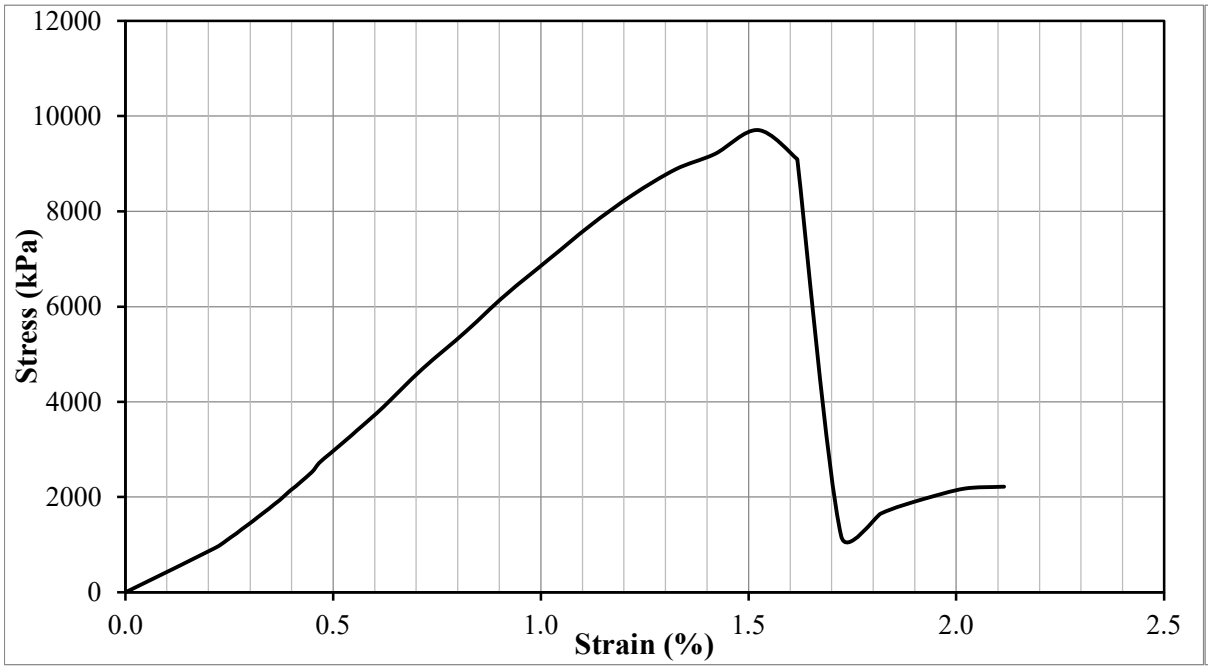
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	7,932	Strain at failure, εf :	1.47	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-15-F	Initial Area:	2112.9	mm^2
Test Date:	7/7/2021	Weight:	388.4	g
Strain Rate:	1 %/min	Unit Weight:	1818	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	450	Curing Period	13.8	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.300%		



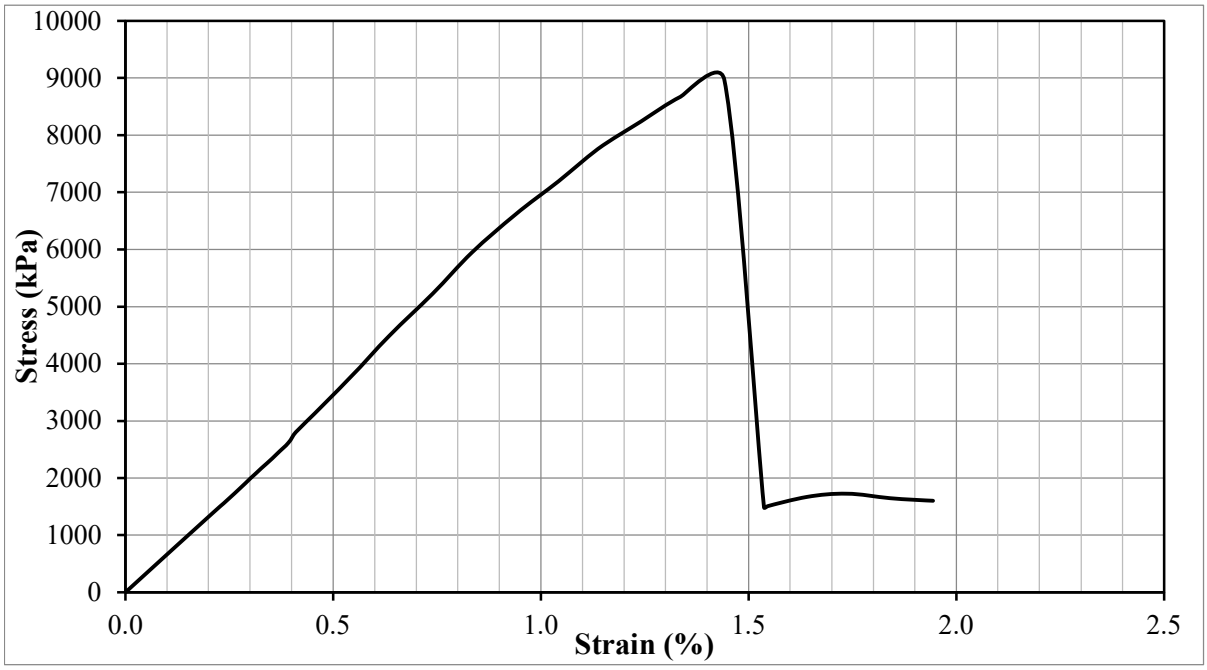
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	6,663	Strain at failure, εf :	1.02	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	O-15-D	Initial Area:	2125.3	mm^2
Test Date:	7/21/2021	Weight:	384.0	g
Strain Rate:	1 %/min	Unit Weight:	1807	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	450	Curing Period	27.7	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.300%		



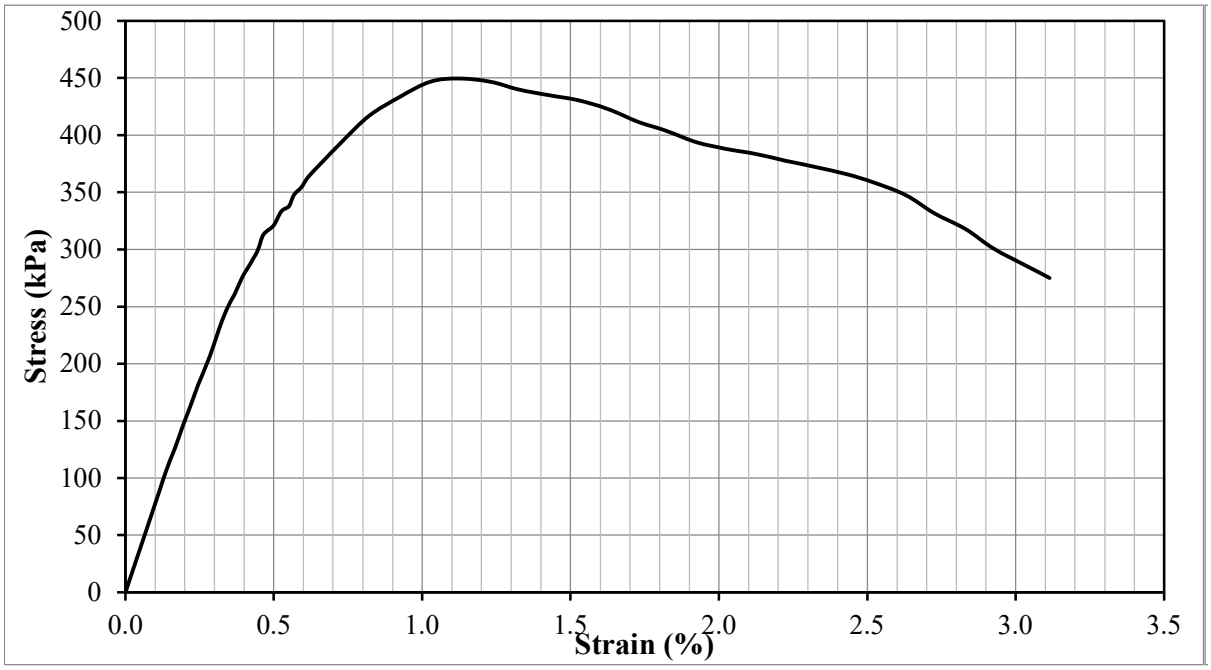
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	9,648	Strain at failure, εf :	1.52	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-15-E	Initial Area:	2114.9	mm^2
Test Date:	7/21/2021	Weight:	376.3	g
Strain Rate:	1 %/min	Unit Weight:	1810	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	450	Curing Period	27.7	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.300%		



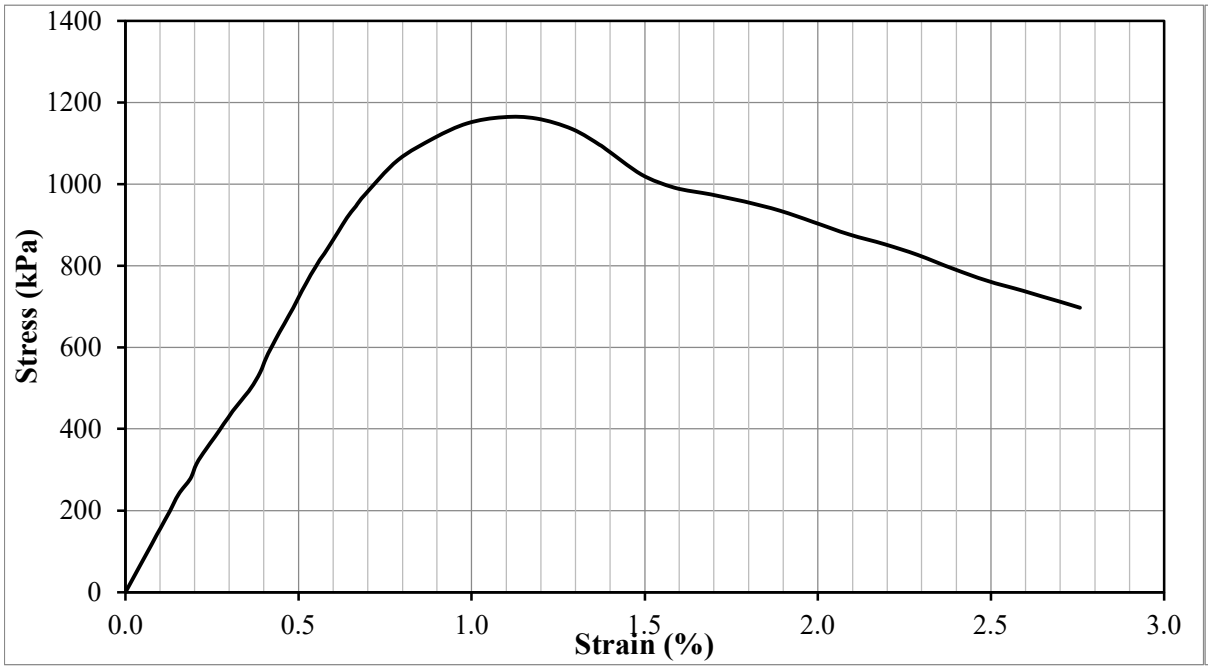
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	8,894	Strain at failure, εf :	1.44	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-16-A	Initial Area:	2106.6	mm^2
Test Date:	8/29/2021	Weight:	369.2	g
Strain Rate:	1 %/min	Unit Weight:	1753	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	3.2	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.225%		



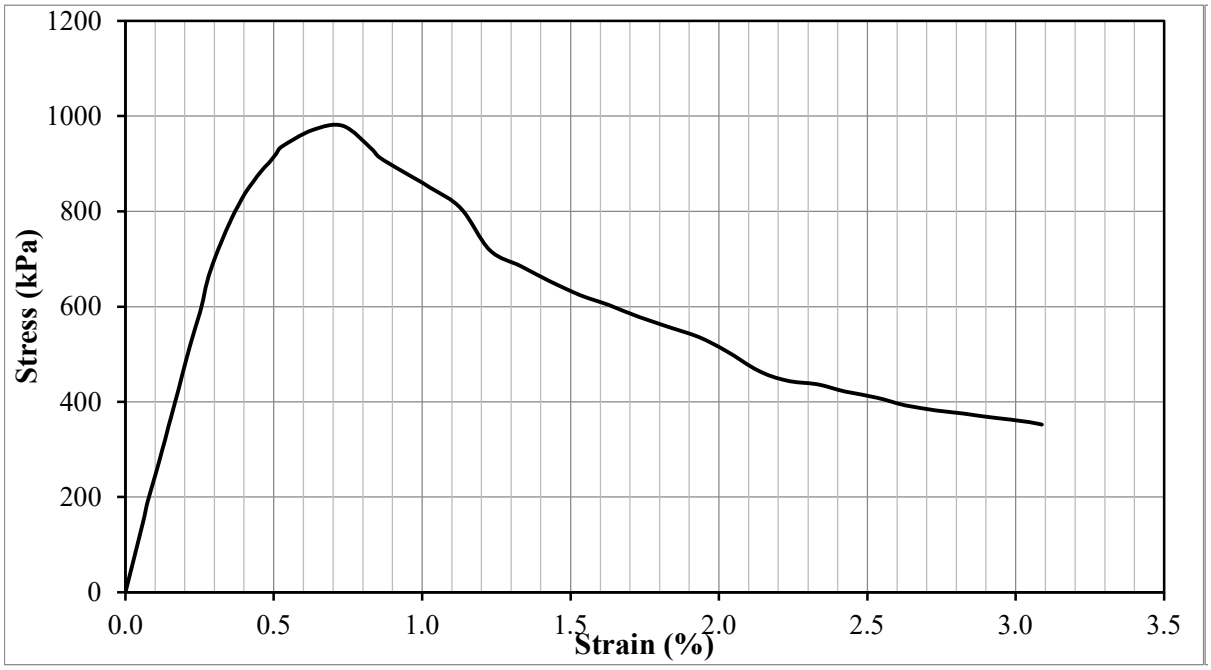
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	447	Strain at failure, εf :	1.12	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	O-16-B	Initial Area:	2098.4	mm^2
Test Date:	9/2/2021	Weight:	374.0	g
Strain Rate:	1 %/min	Unit Weight:	1766	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	6.9	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.225%		



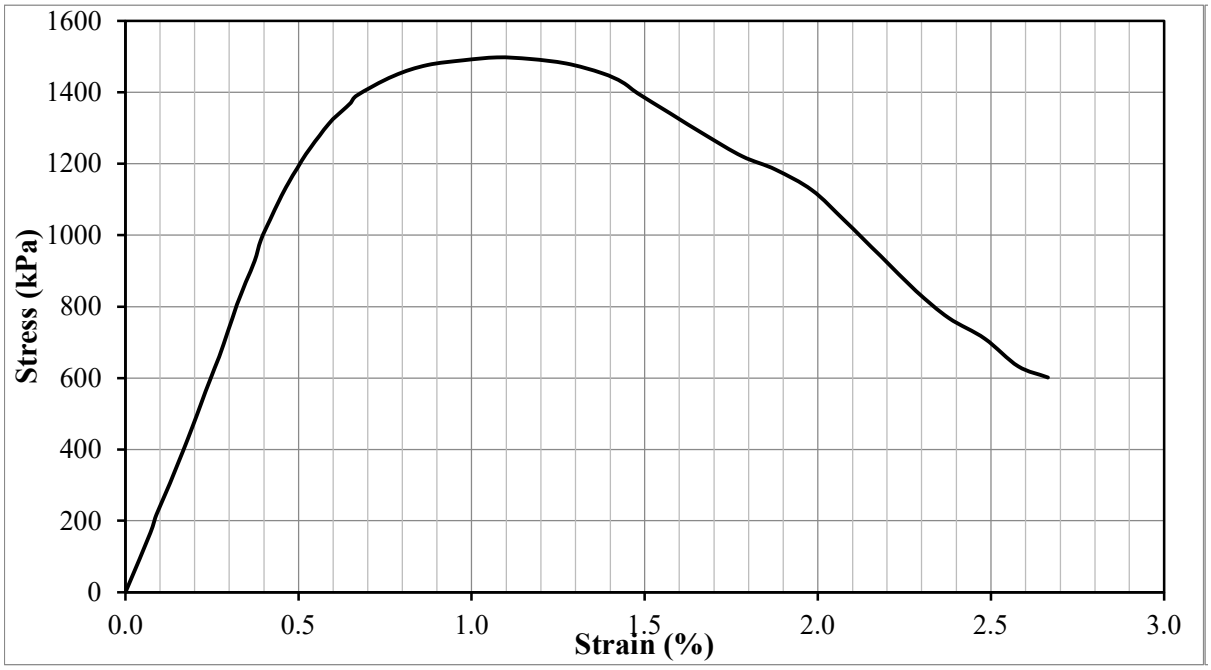
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,159	Strain at failure, εf :	1.09	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-16-C	Initial Area:	2104.6	mm^2
Test Date:	9/2/2021	Weight:	370.8	g
Strain Rate:	1 %/min	Unit Weight:	1759	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	6.9	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.225%		



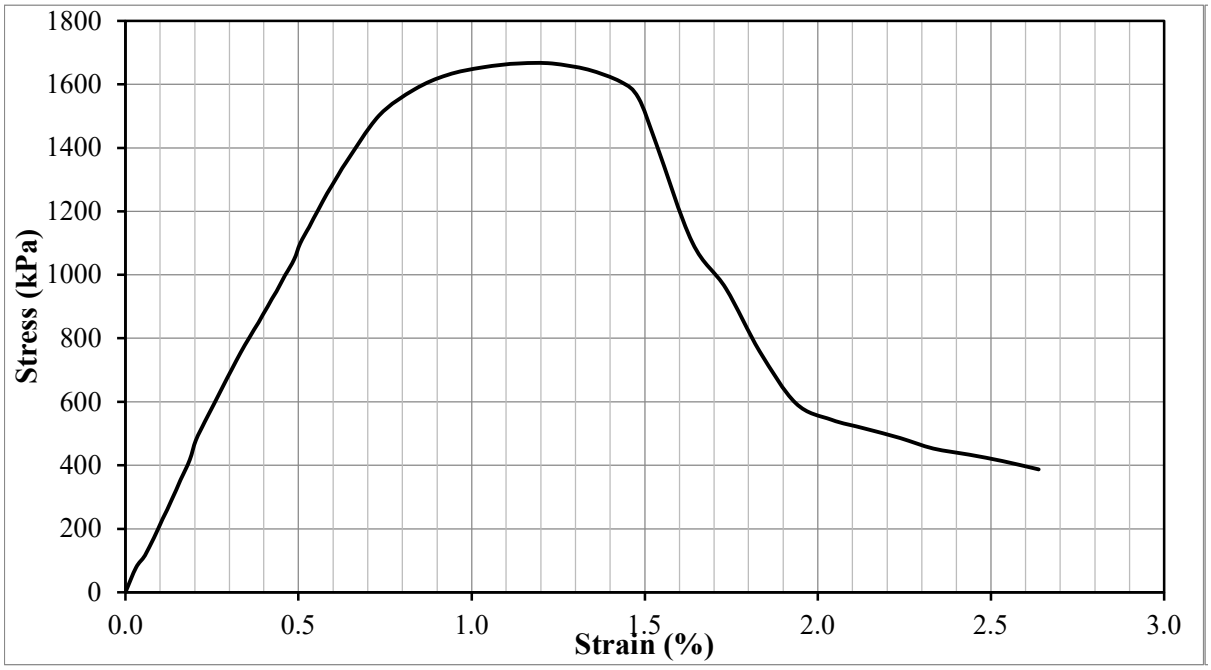
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	974	Strain at failure, εf :	0.73	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-16-D	Initial Area:	2117.0	mm^2
Test Date:	9/5/2021	Weight:	374.2	g
Strain Rate:	1 %/min	Unit Weight:	1751	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	10.0	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.225%		



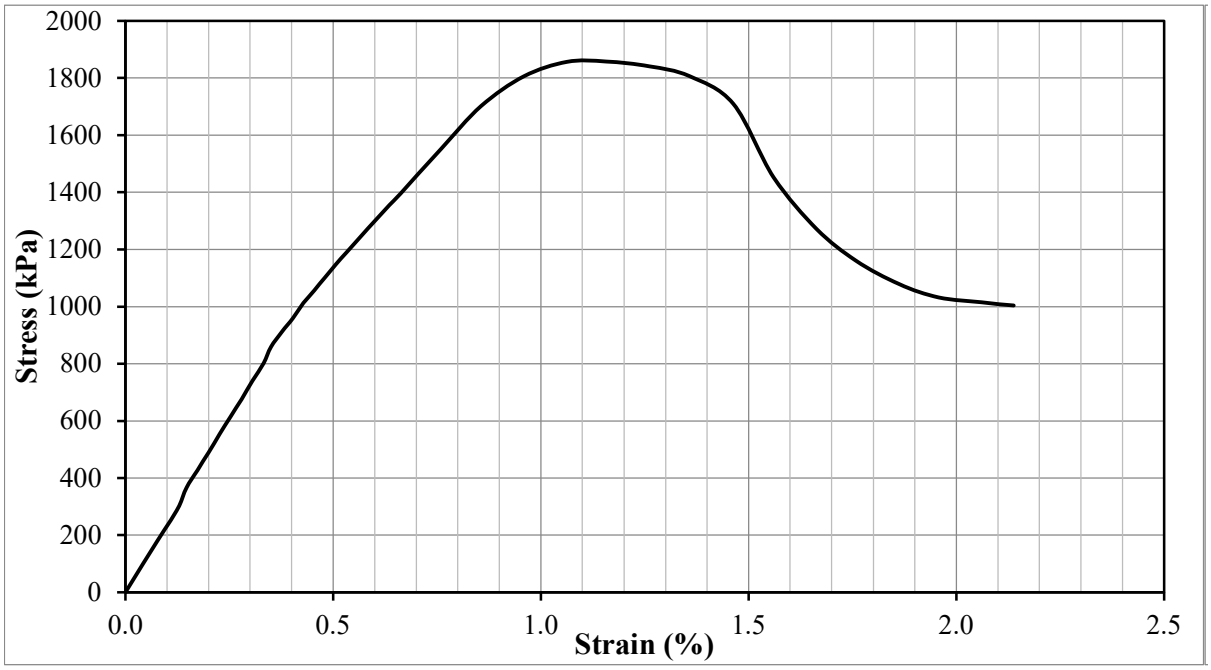
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,491	Strain at failure, εf :	1.07	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-16-E	Initial Area:	2114.9	mm^2
Test Date:	9/9/2021	Weight:	372.2	g
Strain Rate:	1 %/min	Unit Weight:	1751	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	13.8	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.225%		



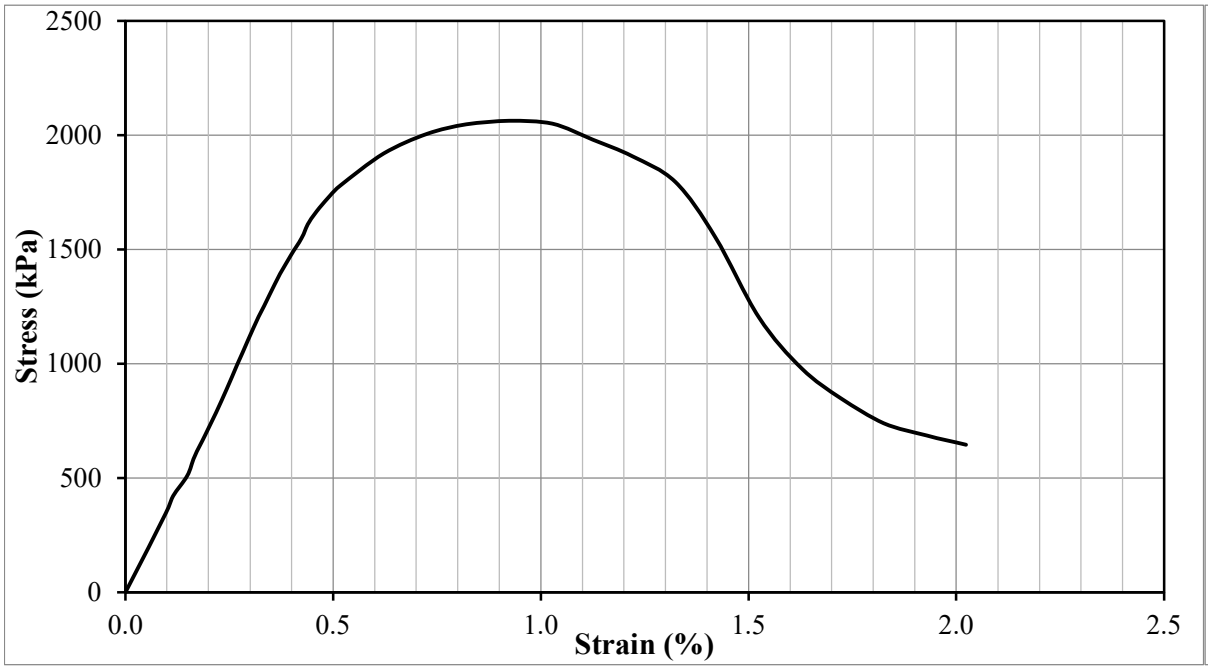
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,658	Strain at failure, εf :	1.14	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-16-F	Initial Area:	2108.7	mm^2
Test Date:	9/12/2021	Weight:	375.3	g
Strain Rate:	1 %/min	Unit Weight:	1762	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	16.8	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.225%		



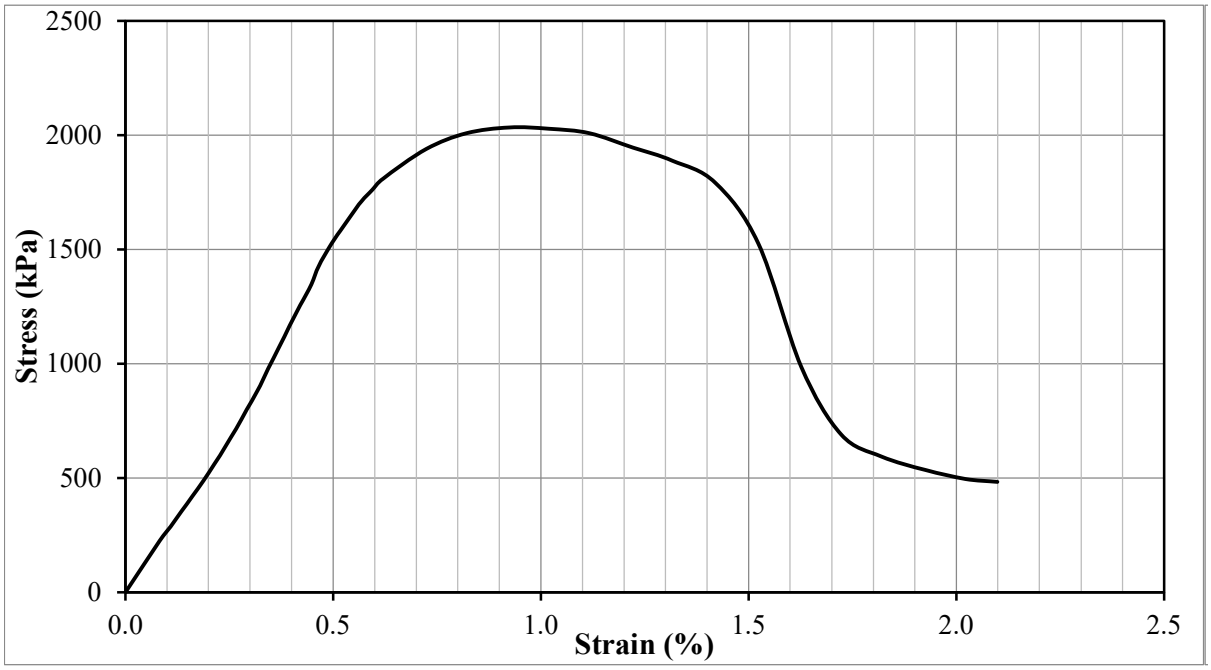
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,850	Strain at failure, εf :	1.16	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-16-G	Initial Area:	2112.9	mm^2
Test Date:	9/16/2021	Weight:	374.9	g
Strain Rate:	1 %/min	Unit Weight:	1759	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	20.9	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.225%		



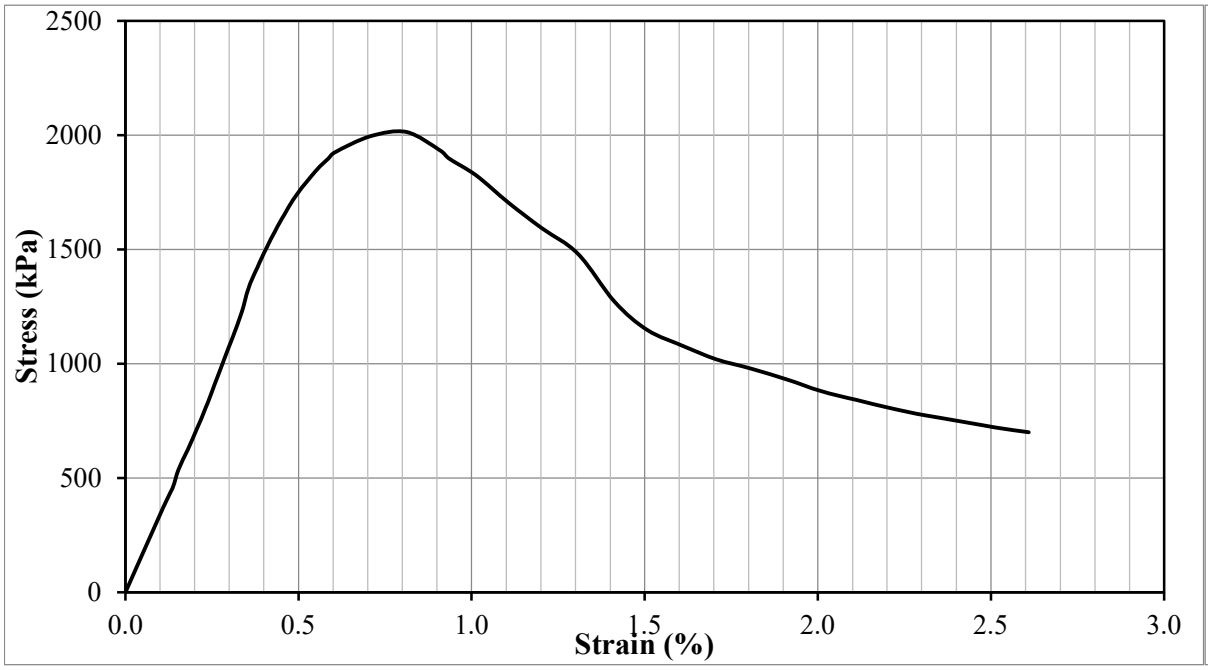
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,053	Strain at failure, εf :	0.92	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-16-H	Initial Area:	2119.1	mm^2
Test Date:	9/19/2021	Weight:	372.8	g
Strain Rate:	1 %/min	Unit Weight:	1748	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	24.0	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.225%		



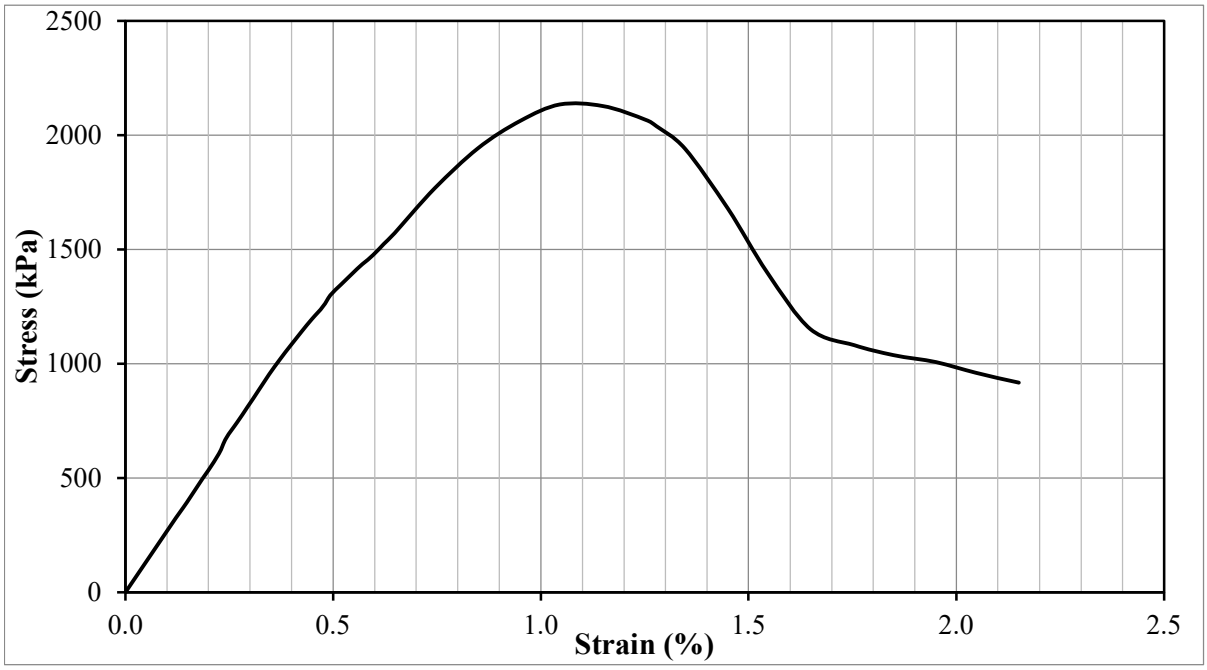
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,024	Strain at failure, εf :	0.92	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	O-16-I	Initial Area:	2121.1	mm^2
Test Date:	9/23/2021	Weight:	371.4	g
Strain Rate:	1 %/min	Unit Weight:	1748	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	27.7	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.225%		



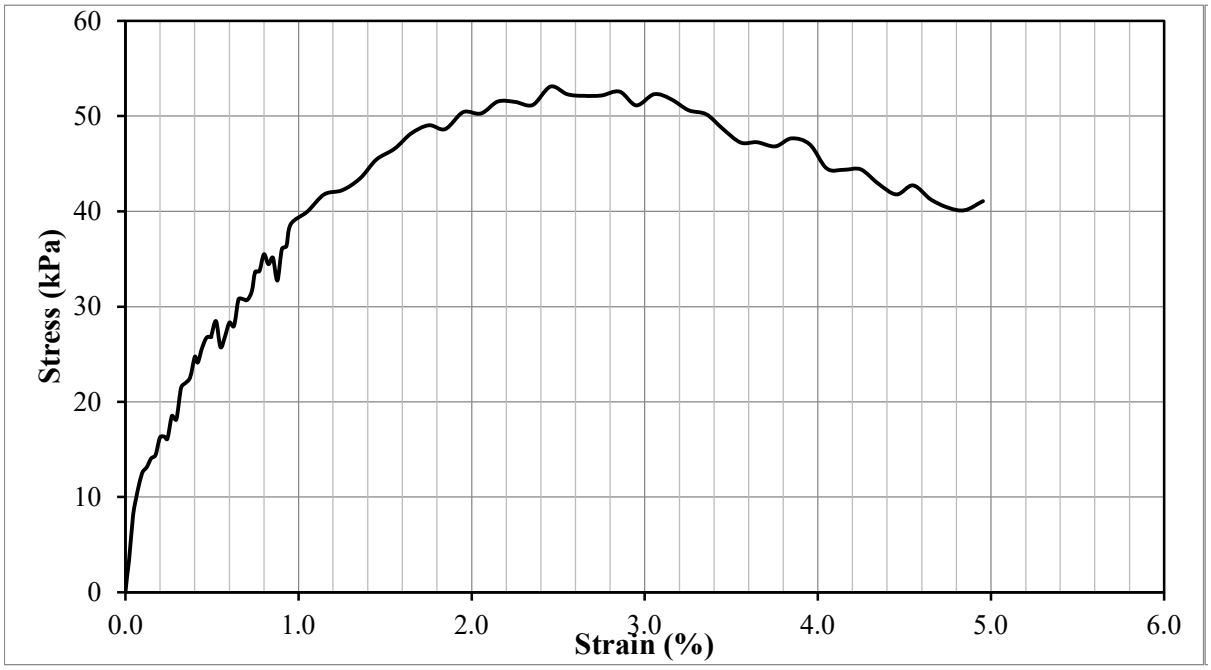
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,002	Strain at failure, εf :	0.81	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-16-J	Initial Area:	2104.6	mm^2
Test Date:	9/23/2021	Weight:	374.7	g
Strain Rate:	1 %/min	Unit Weight:	1769	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	27.7	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.225%		



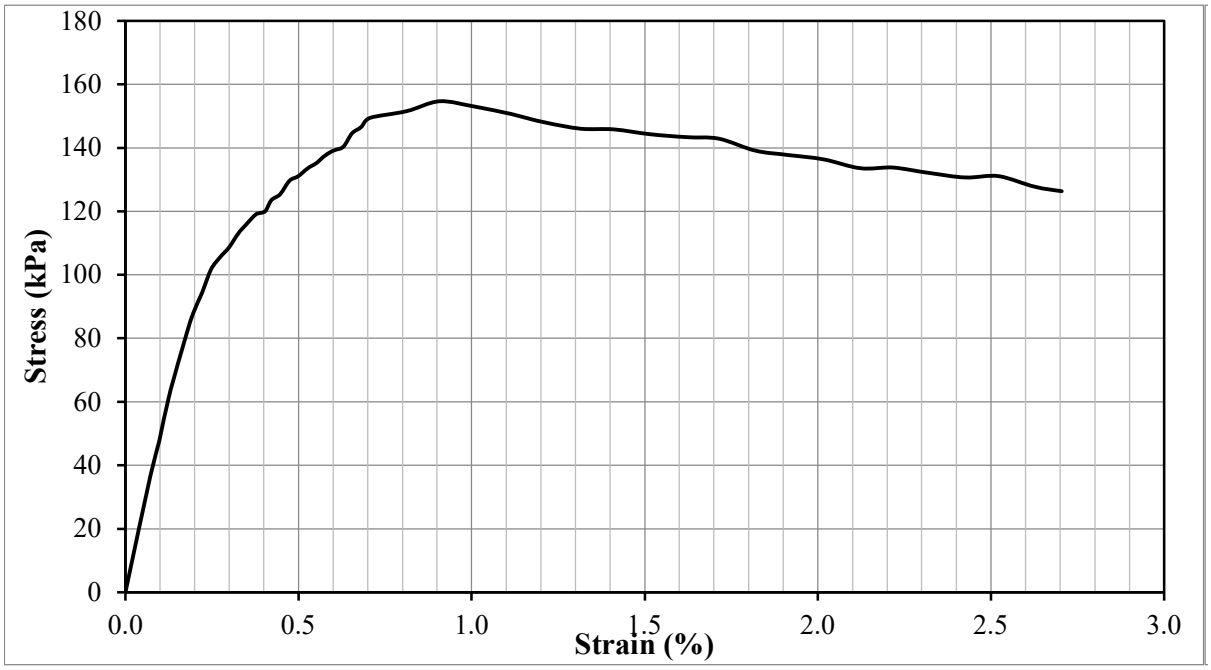
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,124	Strain at failure, εf :	1.05	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	96.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.4	mm
I.D.:	O-17-A	Initial Area:	2077.8	mm^2
Test Date:	8/29/2021	Weight:	354.7	g
Strain Rate:	1 %/min	Unit Weight:	1772	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	3.2	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.250%		



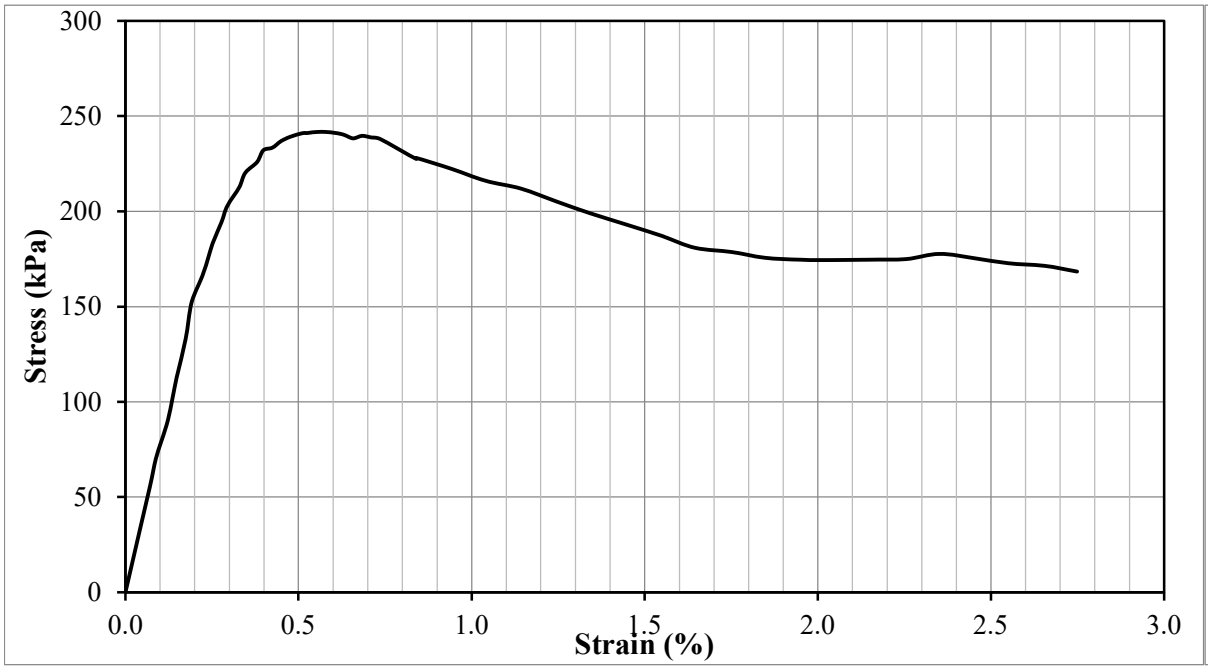
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	53	Strain at failure, εf :	2.46	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	O-17-B	Initial Area:	2098.4	mm^2
Test Date:	9/2/2021	Weight:	367.4	g
Strain Rate:	1 %/min	Unit Weight:	1758	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	7.0	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.250%		



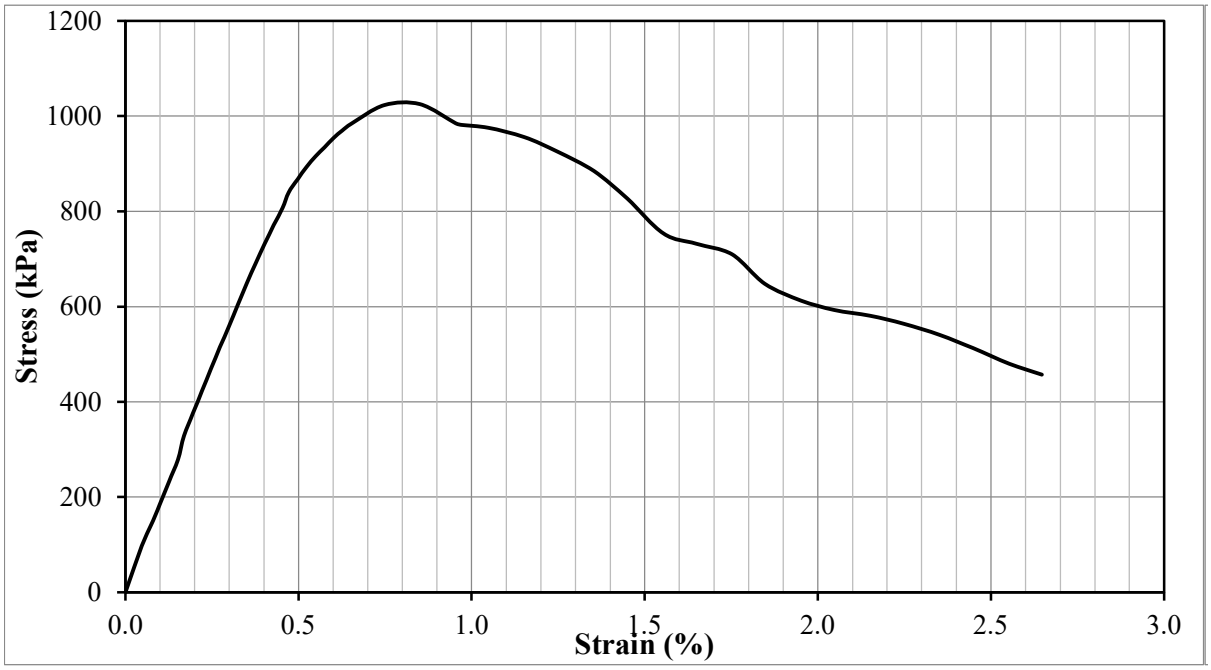
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	154	Strain at failure, εf :	0.91	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-17-C	Initial Area:	2108.7	mm^2
Test Date:	9/2/2021	Weight:	369.8	g
Strain Rate:	1 %/min	Unit Weight:	1748	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	7.0	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.250%		



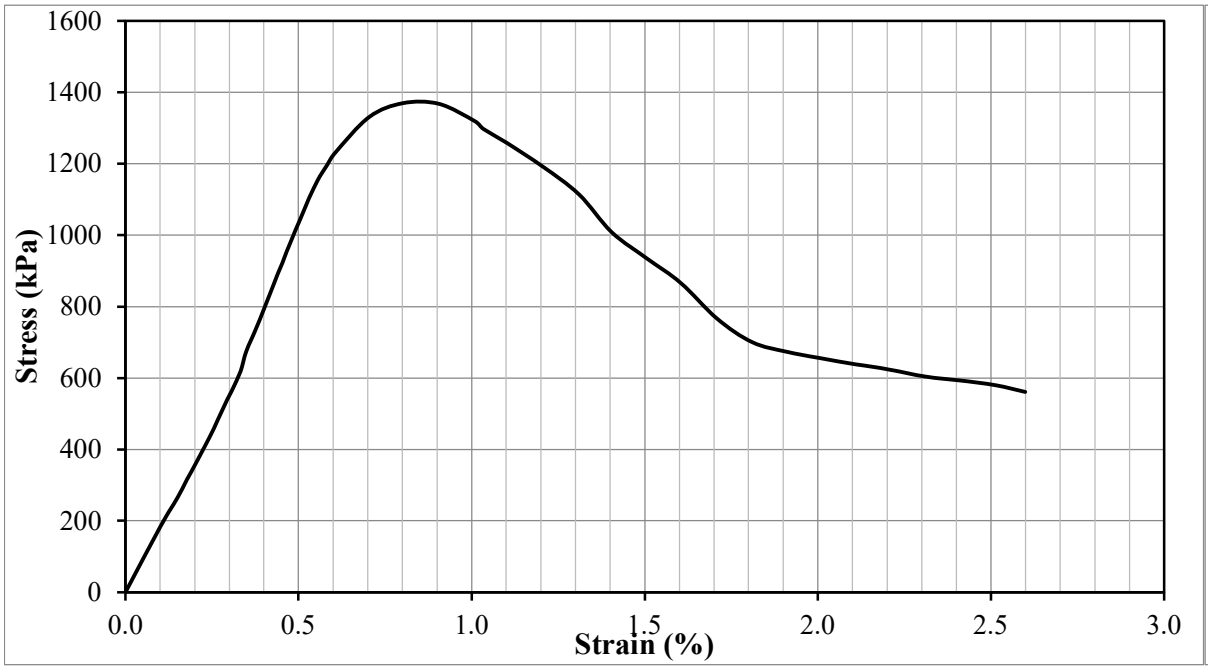
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	240	Strain at failure, εf :	0.55	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	O-17-D	Initial Area:	2102.5	mm^2
Test Date:	9/5/2021	Weight:	366.5	g
Strain Rate:	1 %/min	Unit Weight:	1753	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	10.0	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.250%		



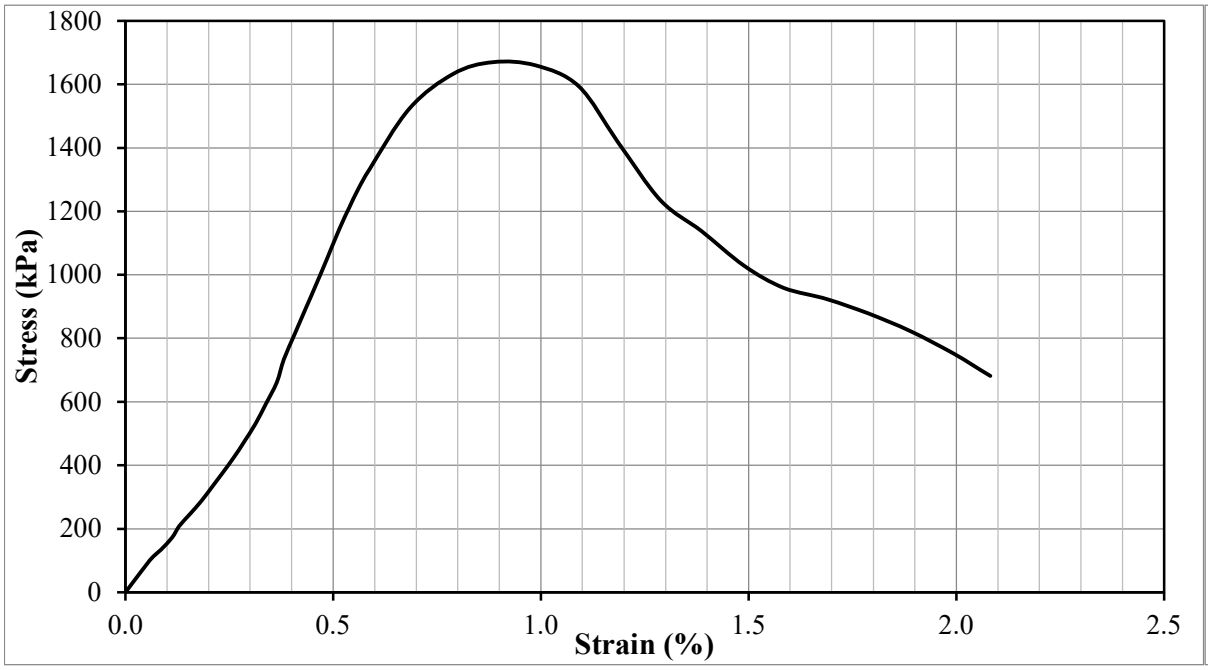
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,018	Strain at failure, εf :	0.85	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-17-E	Initial Area:	2112.9	mm^2
Test Date:	9/9/2021	Weight:	372.3	g
Strain Rate:	1 %/min	Unit Weight:	1757	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	13.8	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.250%		



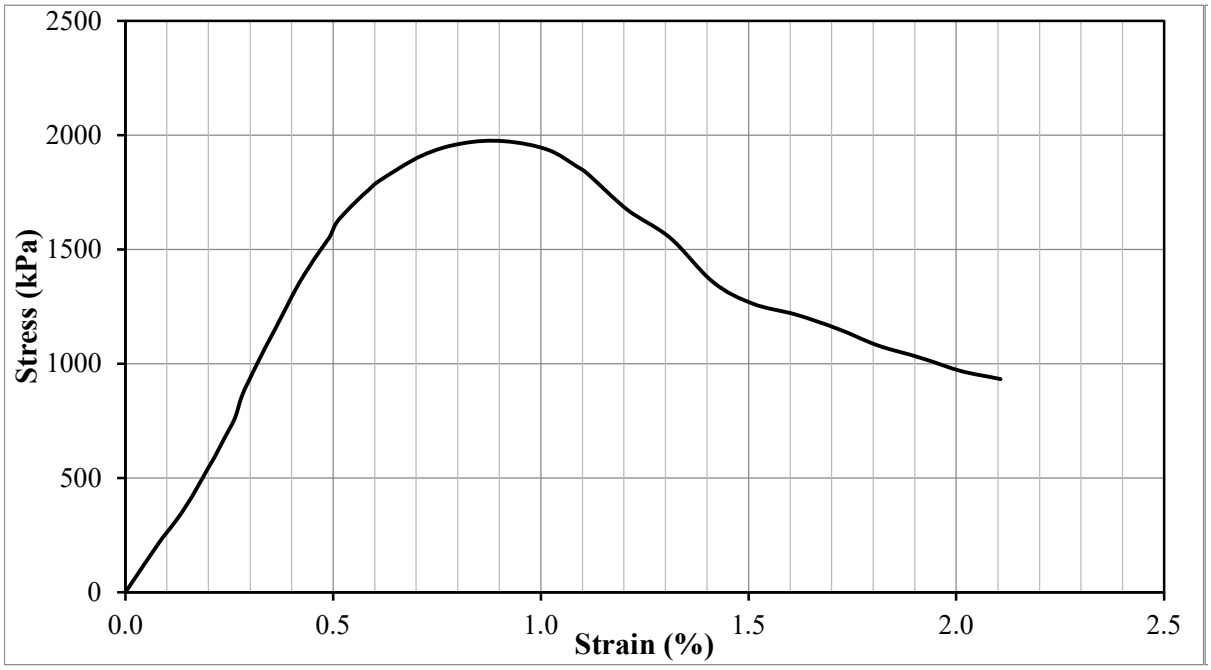
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,362	Strain at failure, εf :	0.80	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-17-F	Initial Area:	2108.7	mm^2
Test Date:	9/12/2021	Weight:	373.1	g
Strain Rate:	1 %/min	Unit Weight:	1760	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	16.8	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.250%		



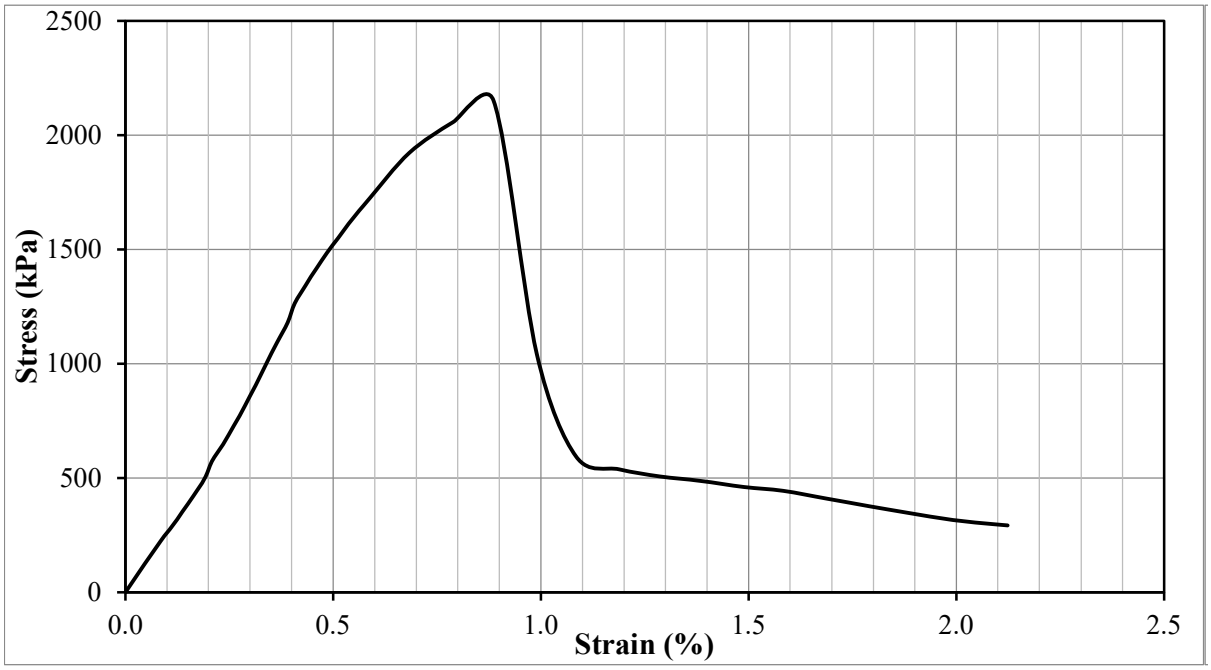
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,662	Strain at failure, εf :	0.88	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-17-G	Initial Area:	2117.0	mm^2
Test Date:	9/16/2021	Weight:	373.6	g
Strain Rate:	1 %/min	Unit Weight:	1749	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	20.9	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.250%		



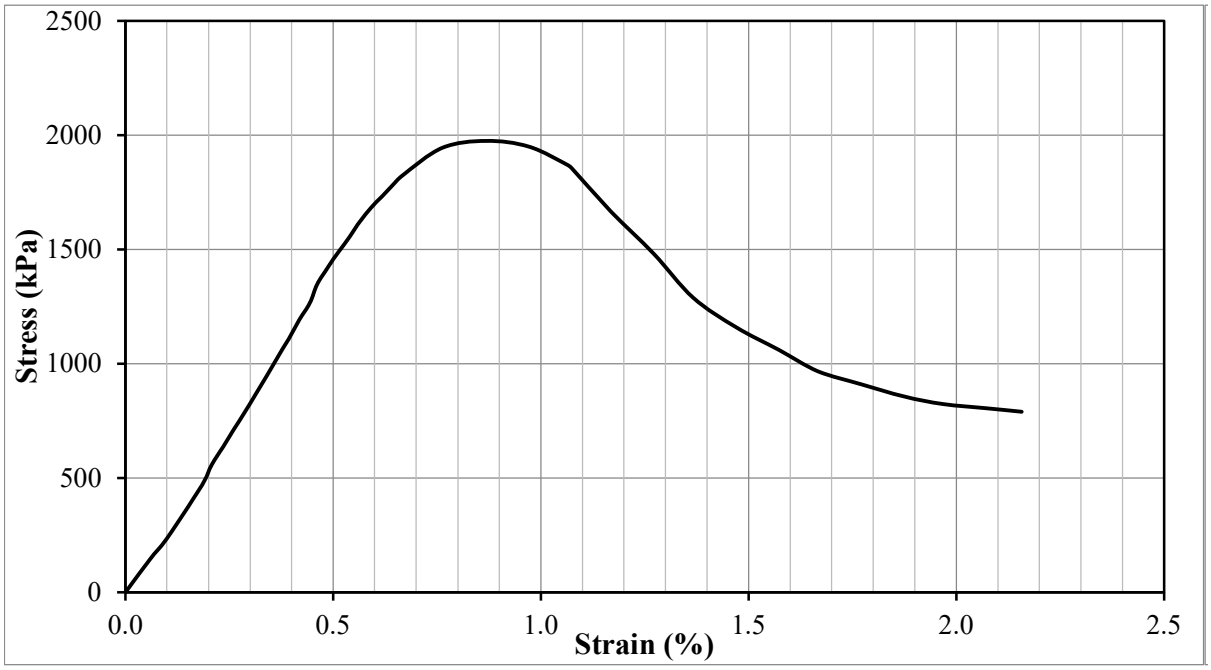
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,965	Strain at failure, εf :	0.91	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.5	mm
I.D.:	O-17-H	Initial Area:	2081.9	mm^2
Test Date:	9/19/2021	Weight:	369.9	g
Strain Rate:	1 %/min	Unit Weight:	1779	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	24.0	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.250%		



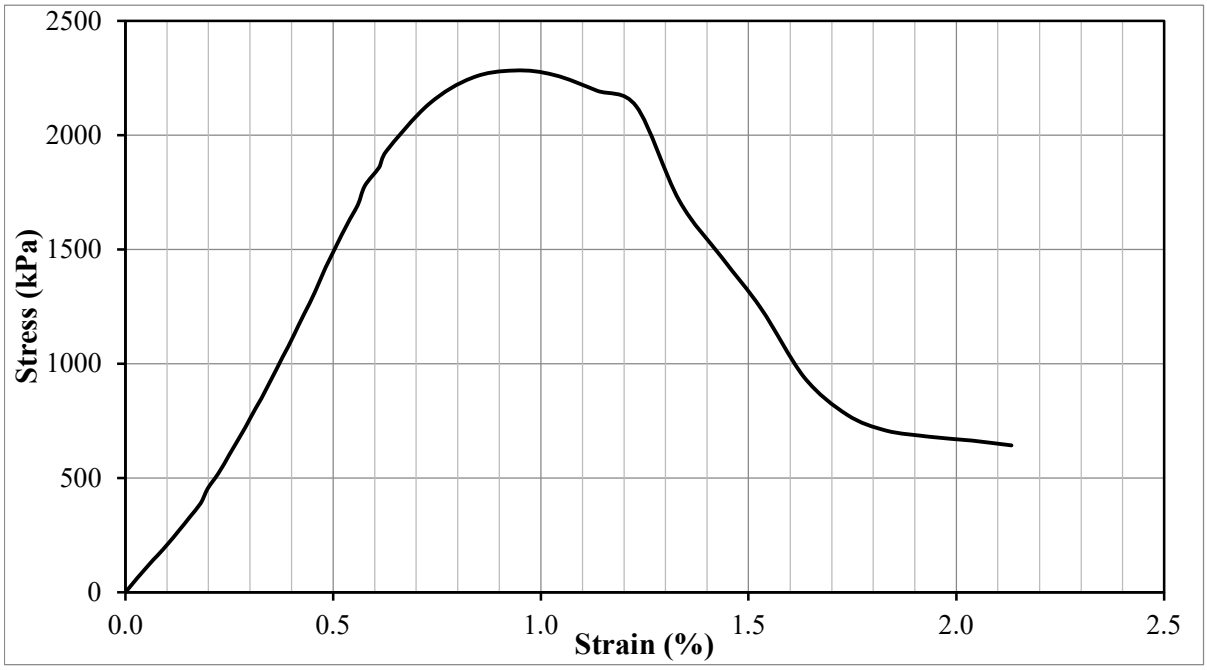
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,140	Strain at failure, εf :	0.89	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-17-I	Initial Area:	2114.9	mm^2
Test Date:	9/23/2021	Weight:	374.2	g
Strain Rate:	1 %/min	Unit Weight:	1754	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	27.8	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.250%		



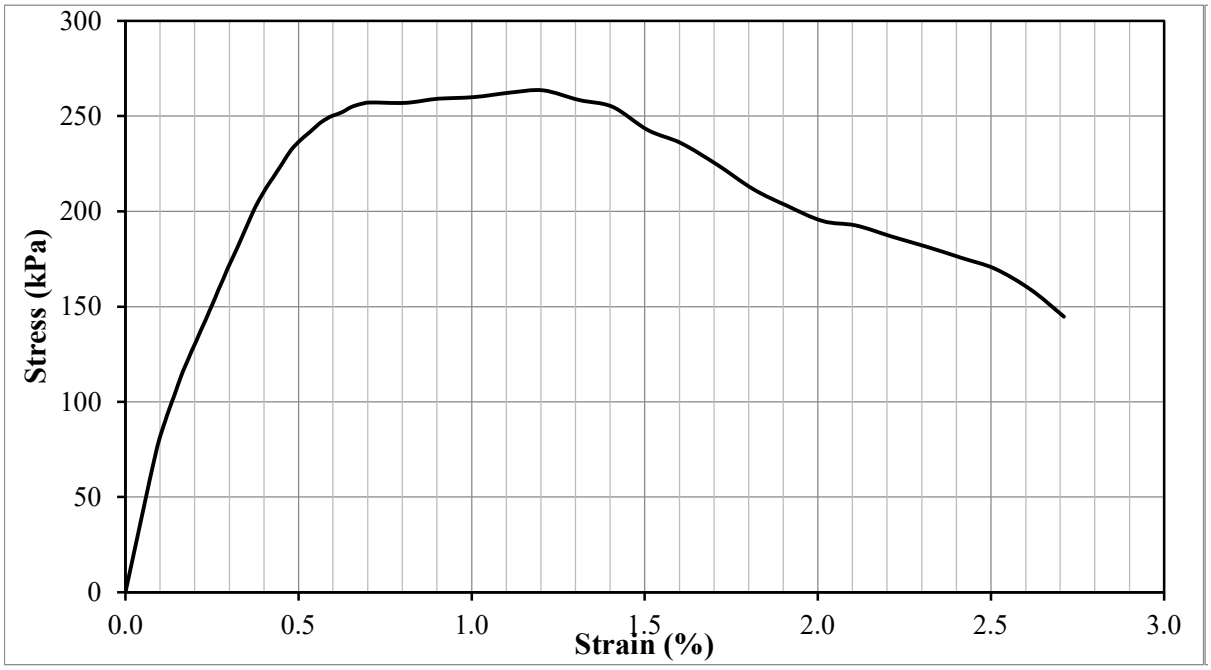
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,966	Strain at failure, εf :	0.87	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-17-J	Initial Area:	2106.6	mm^2
Test Date:	9/23/2021	Weight:	371.1	g
Strain Rate:	1 %/min	Unit Weight:	1762	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	27.8	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.250%		



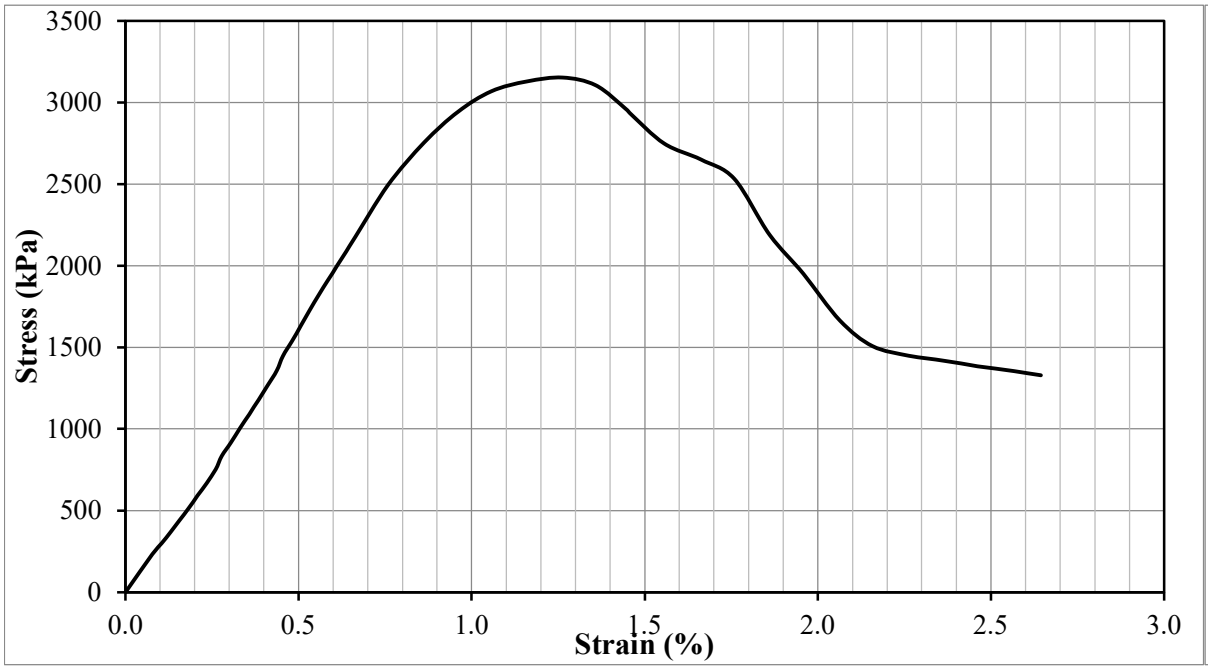
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,270	Strain at failure, εf :	0.94	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	O-18-A	Initial Area:	2098.4	mm^2
Test Date:	8/31/2021	Weight:	353.8	g
Strain Rate:	1 %/min	Unit Weight:	1710	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	2.8	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.250%		



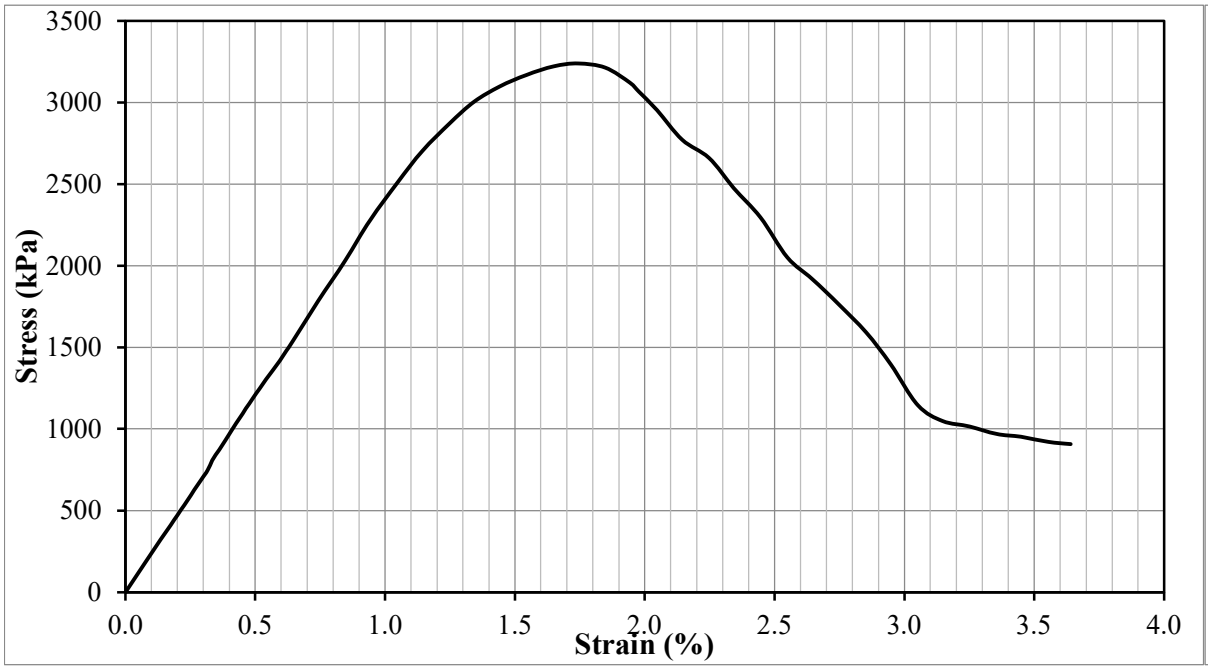
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	262	Strain at failure, εf :	1.21	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-18-B	Initial Area:	2110.8	mm^2
Test Date:	9/4/2021	Weight:	363.6	g
Strain Rate:	1 %/min	Unit Weight:	1714	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	7.1	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.250%		



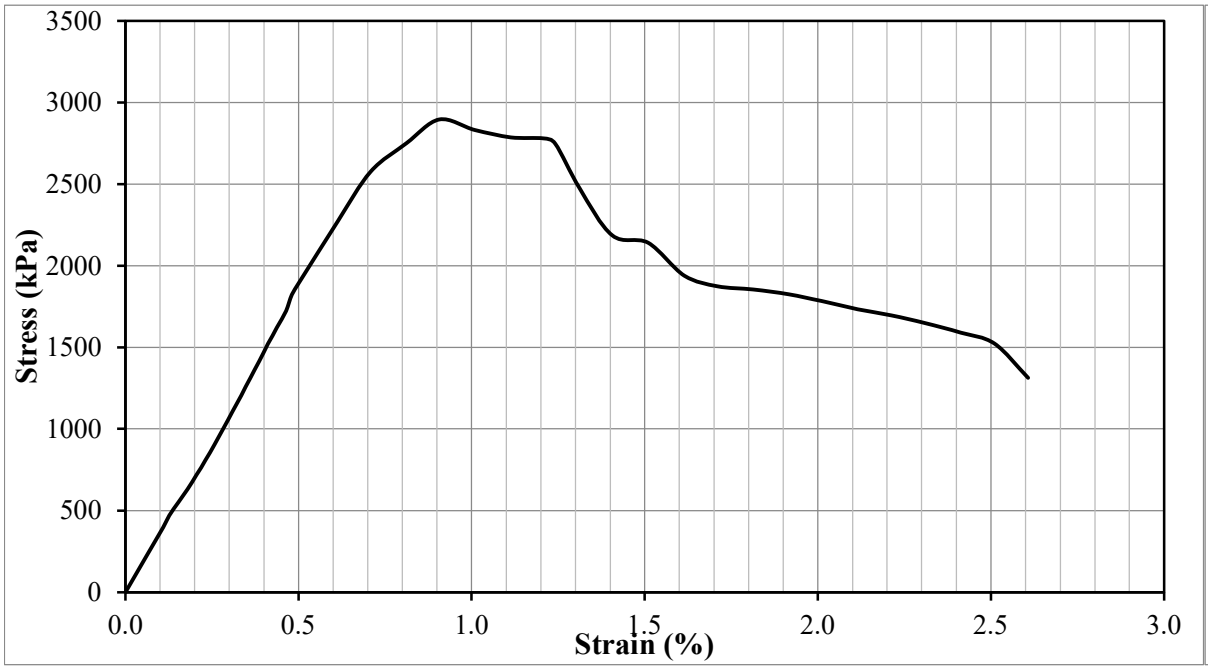
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,136	Strain at failure, εf :	1.26	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	95.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-18-C	Initial Area:	2119.1	mm^2
Test Date:	9/4/2021	Weight:	345.8	g
Strain Rate:	1 %/min	Unit Weight:	1701	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	7.1	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.250%		



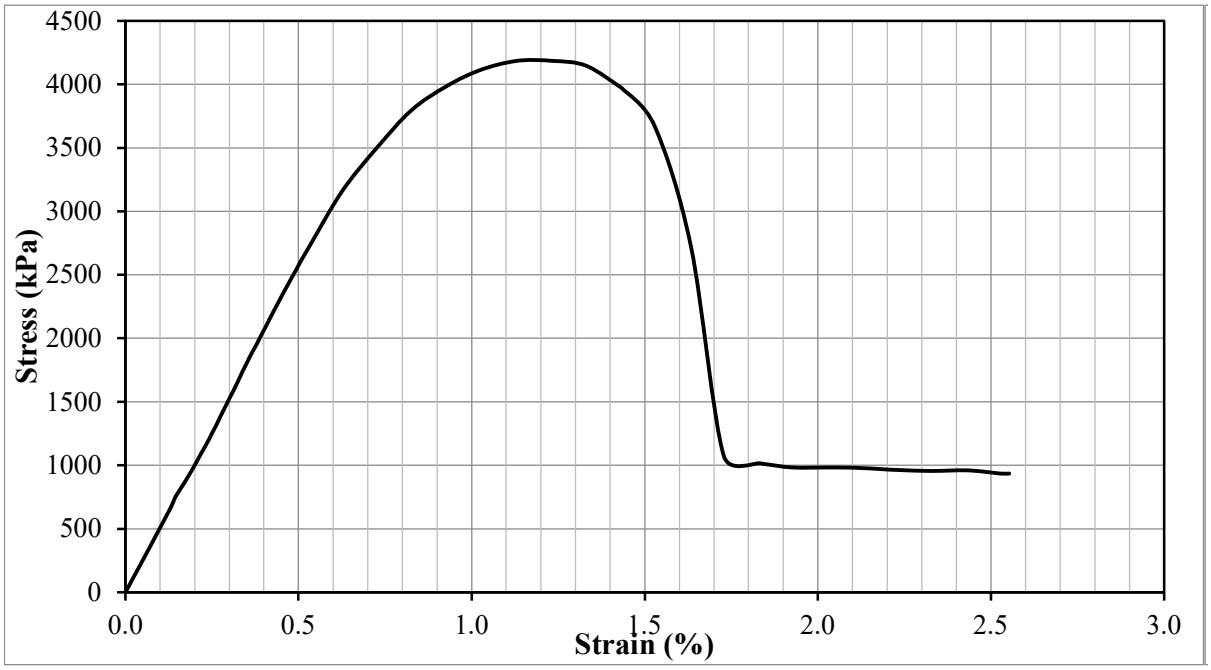
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,199	Strain at failure, εf :	1.74	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-18-D	Initial Area:	2117.0	mm^2
Test Date:	9/7/2021	Weight:	356.0	g
Strain Rate:	1 %/min	Unit Weight:	1706	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	10.0	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.250%		



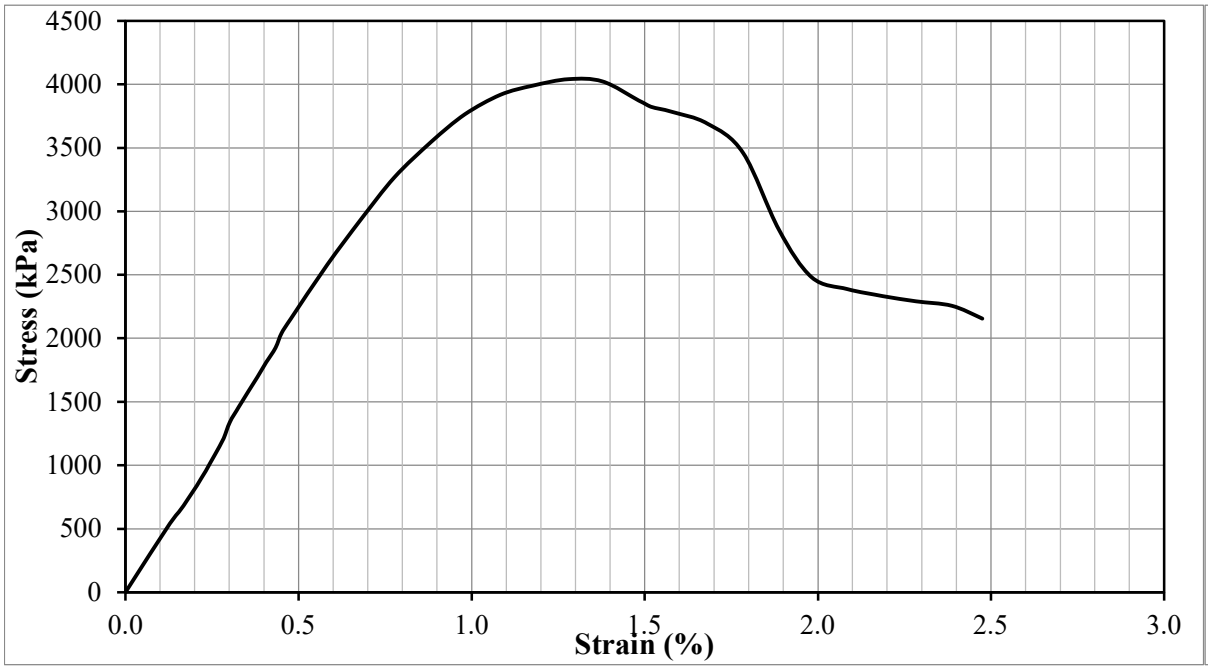
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,871	Strain at failure, εf :	0.91	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-18-E	Initial Area:	2108.7	mm^2
Test Date:	9/11/2021	Weight:	364.1	g
Strain Rate:	1 %/min	Unit Weight:	1717	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	14.2	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.250%		



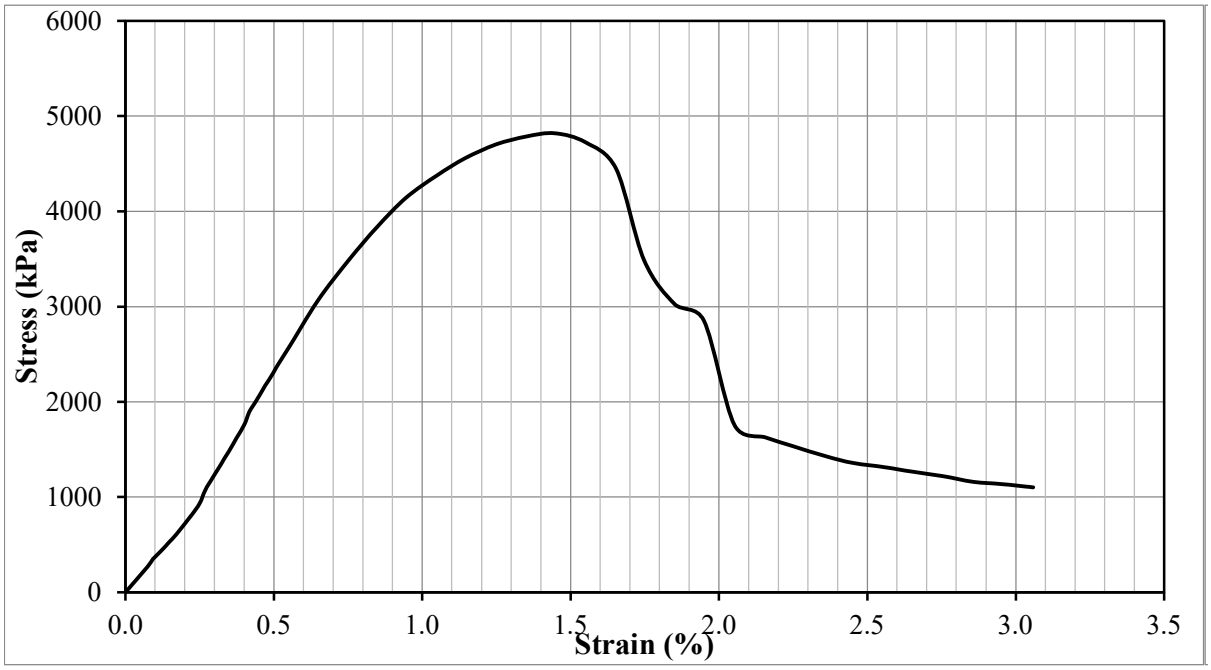
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,165	Strain at failure, εf :	1.23	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	O-18-F	Initial Area:	2123.2	mm^2
Test Date:	9/14/2021	Weight:	355.1	g
Strain Rate:	1 %/min	Unit Weight:	1702	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	17.0	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.250%		



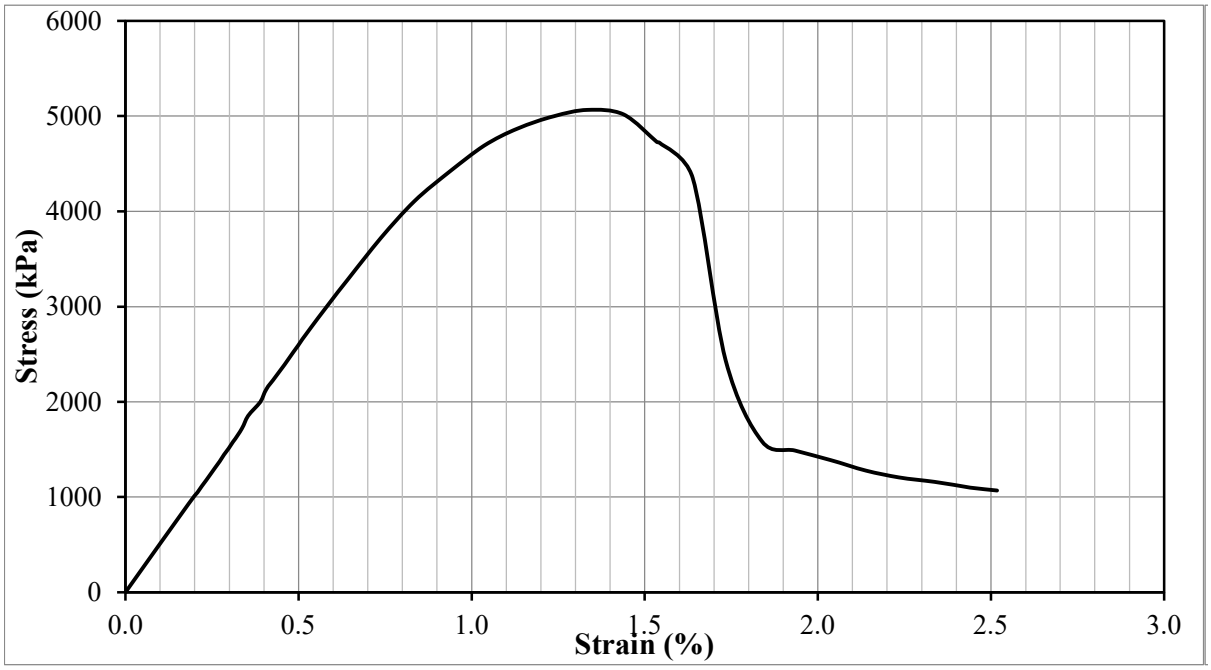
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,005	Strain at failure, εf :	1.28	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-18-G	Initial Area:	2112.9	mm^2
Test Date:	9/18/2021	Weight:	350.4	g
Strain Rate:	1 %/min	Unit Weight:	1711	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	21.0	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.250%		



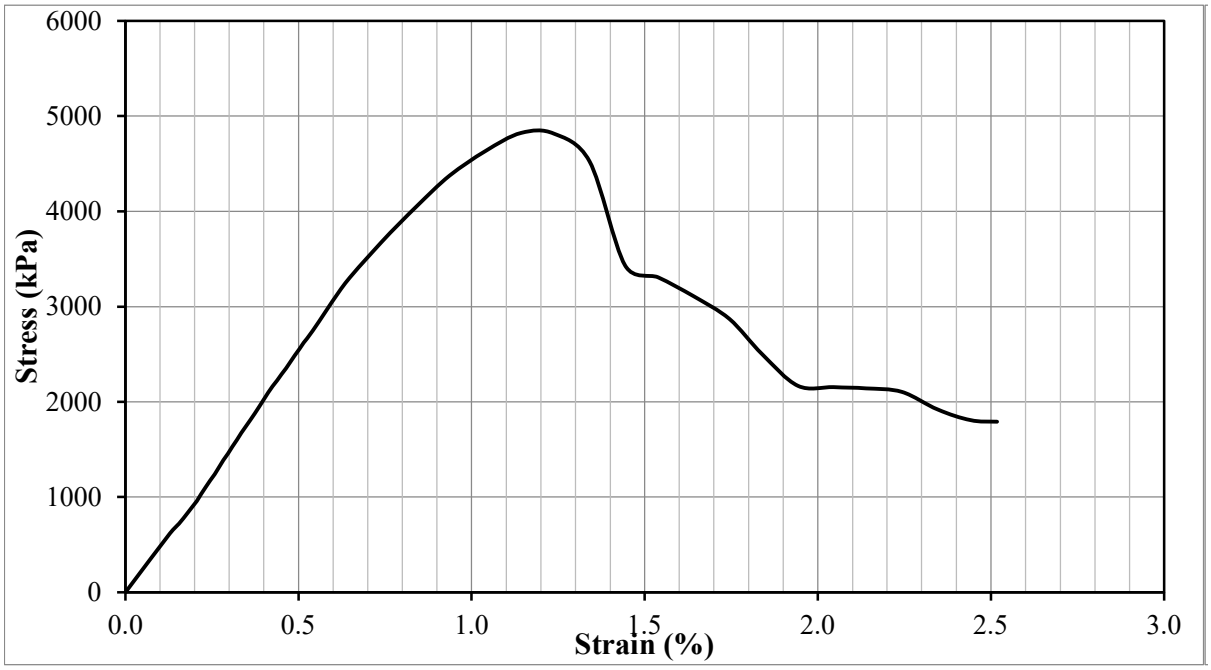
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,770	Strain at failure, εf :	1.45	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	O-18-H	Initial Area:	2123.2	mm^2
Test Date:	9/21/2021	Weight:	353.3	g
Strain Rate:	1 %/min	Unit Weight:	1684	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	23.9	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.250%		



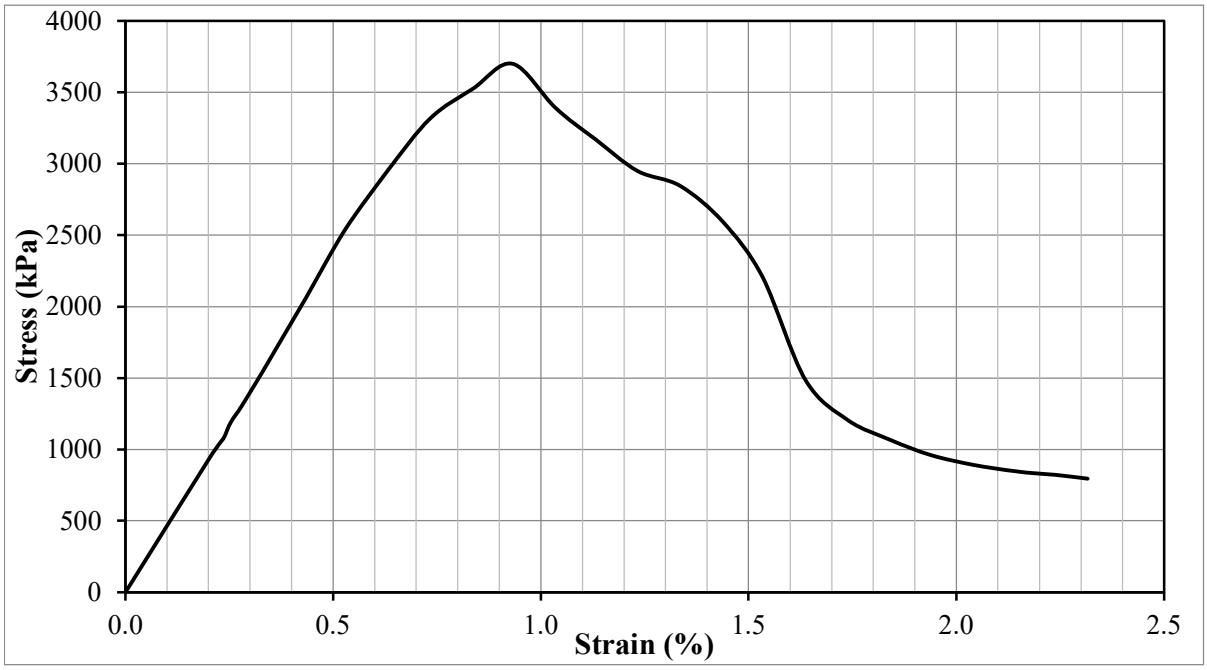
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,023	Strain at failure, εf :	1.33	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	96.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-18-I	Initial Area:	2114.9	mm^2
Test Date:	9/25/2021	Weight:	347.2	g
Strain Rate:	1 %/min	Unit Weight:	1707	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	28.0	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.250%		



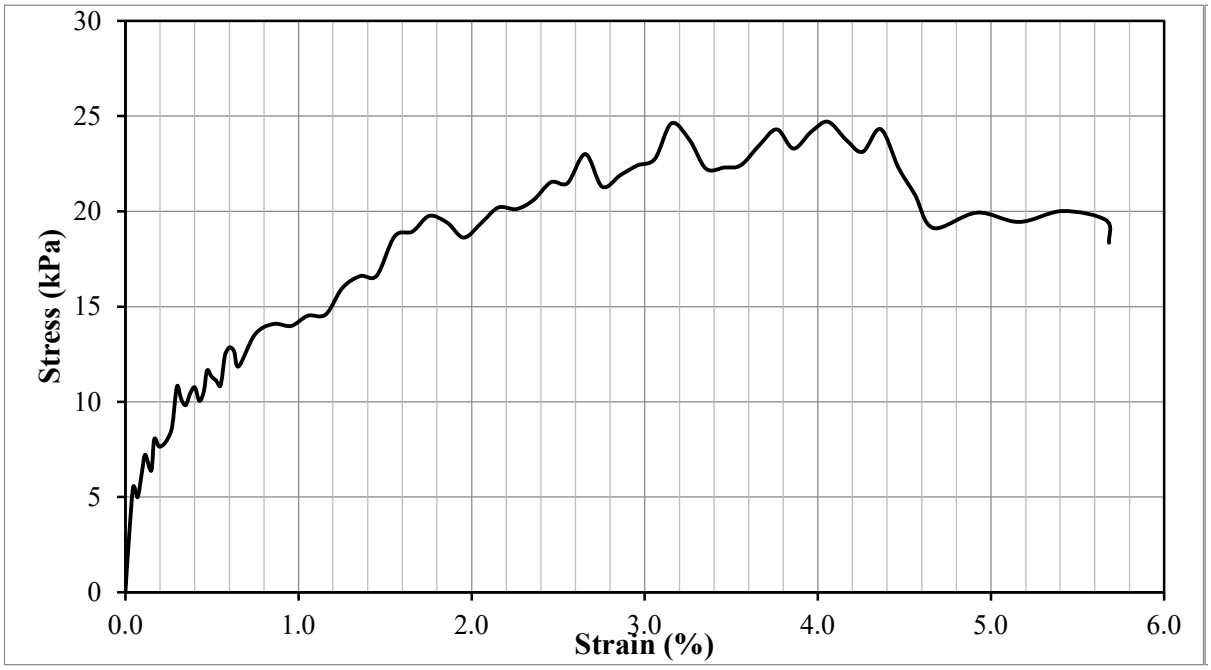
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,765	Strain at failure, εf :	1.14	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-18-J	Initial Area:	2110.8	mm^2
Test Date:	9/25/2021	Weight:	363.8	g
Strain Rate:	1 %/min	Unit Weight:	1716	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	28.1	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.250%		



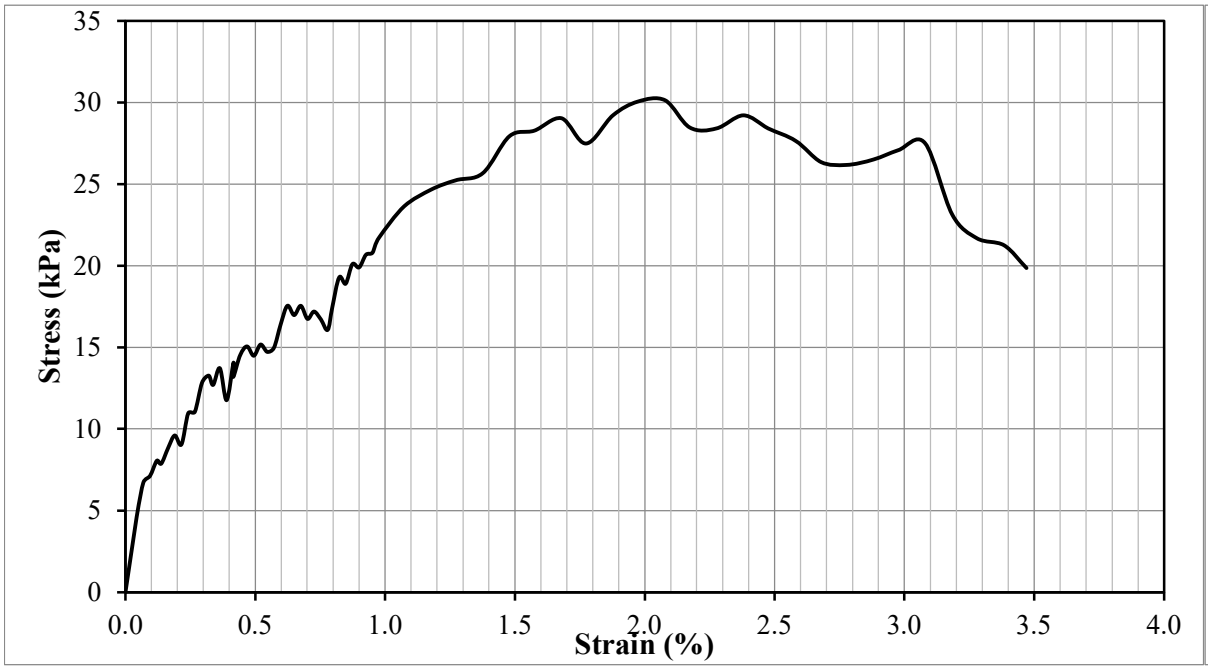
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,681	Strain at failure, εf :	0.93	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.3	mm
I.D.:	O-19-A	Initial Area:	2063.5	mm^2
Test Date:	8/31/2021	Weight:	366.6	g
Strain Rate:	1 %/min	Unit Weight:	1751	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	2.7	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.300%		



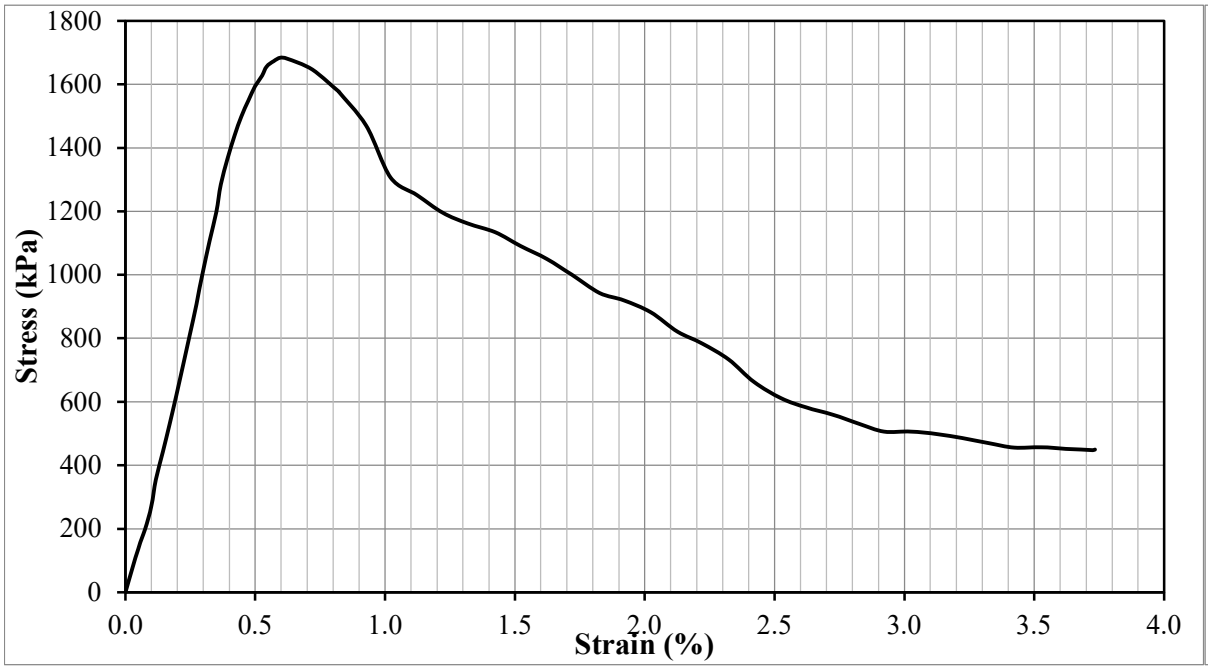
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	25	Strain at failure, εf :	4.06	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.5	mm
I.D.:	O-19-C	Initial Area:	2086.0	mm^2
Test Date:	9/4/2021	Weight:	374.0	g
Strain Rate:	1 %/min	Unit Weight:	1761	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	7.0	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.300%		



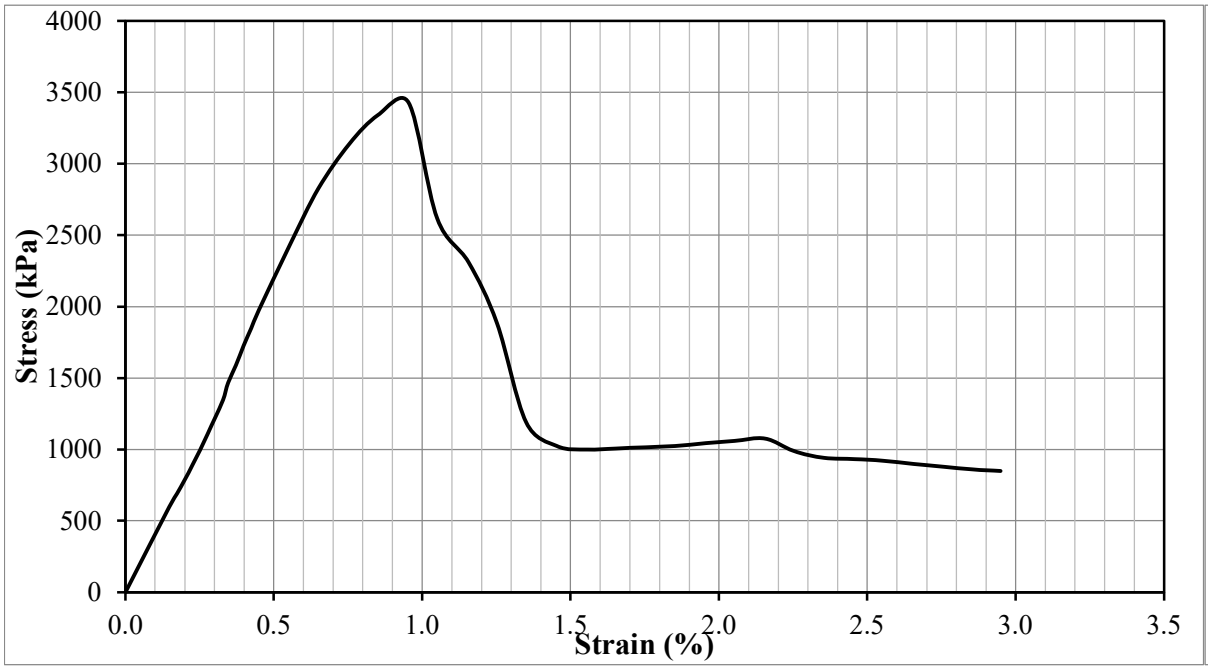
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	30	Strain at failure, εf :	2.08	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-19-D	Initial Area:	2106.6	mm^2
Test Date:	9/7/2021	Weight:	364.0	g
Strain Rate:	1 %/min	Unit Weight:	1714	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	9.9	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.300%		



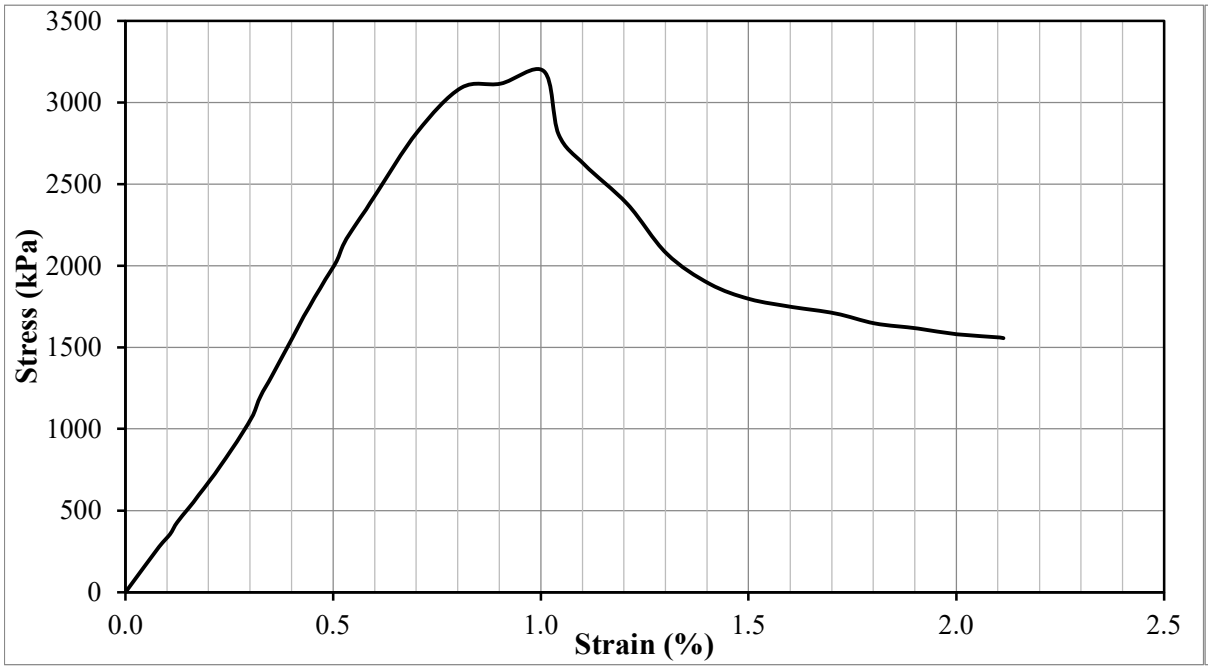
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,676	Strain at failure, εf :	0.60	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-19-E	Initial Area:	2112.9	mm^2
Test Date:	9/11/2021	Weight:	363.9	g
Strain Rate:	1 %/min	Unit Weight:	1713	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	14.2	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.300%		



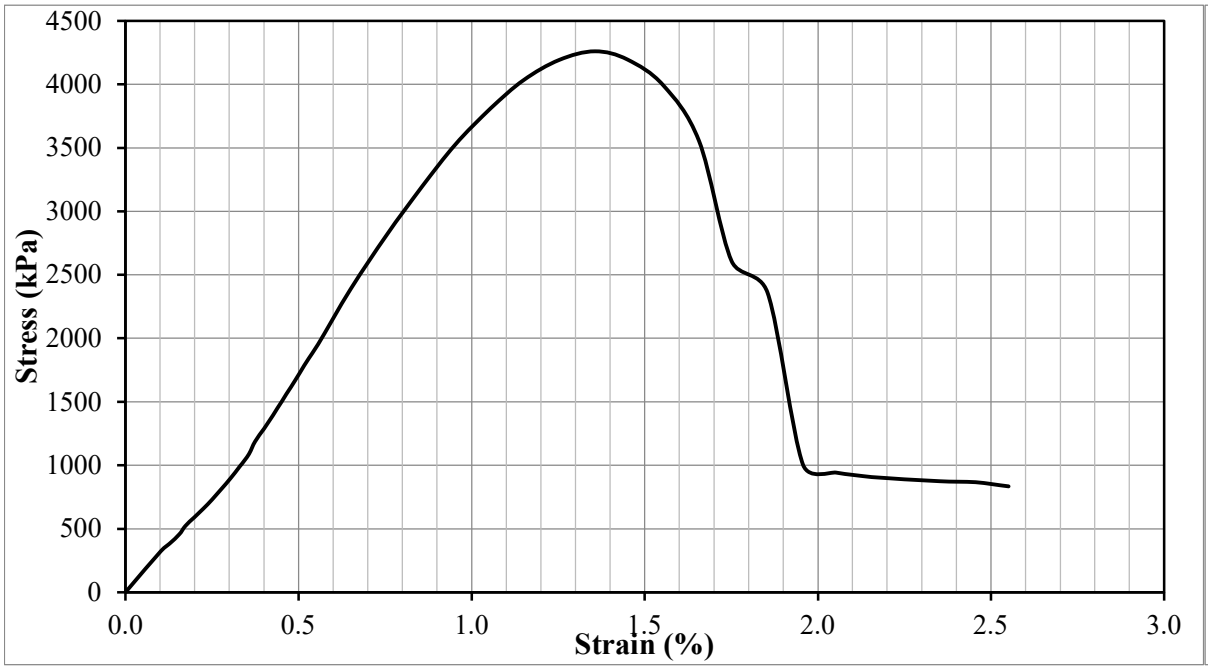
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,409	Strain at failure, εf :	0.96	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-19-F	Initial Area:	2108.7	mm^2
Test Date:	9/14/2021	Weight:	353.2	g
Strain Rate:	1 %/min	Unit Weight:	1715	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	16.9	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.300%		



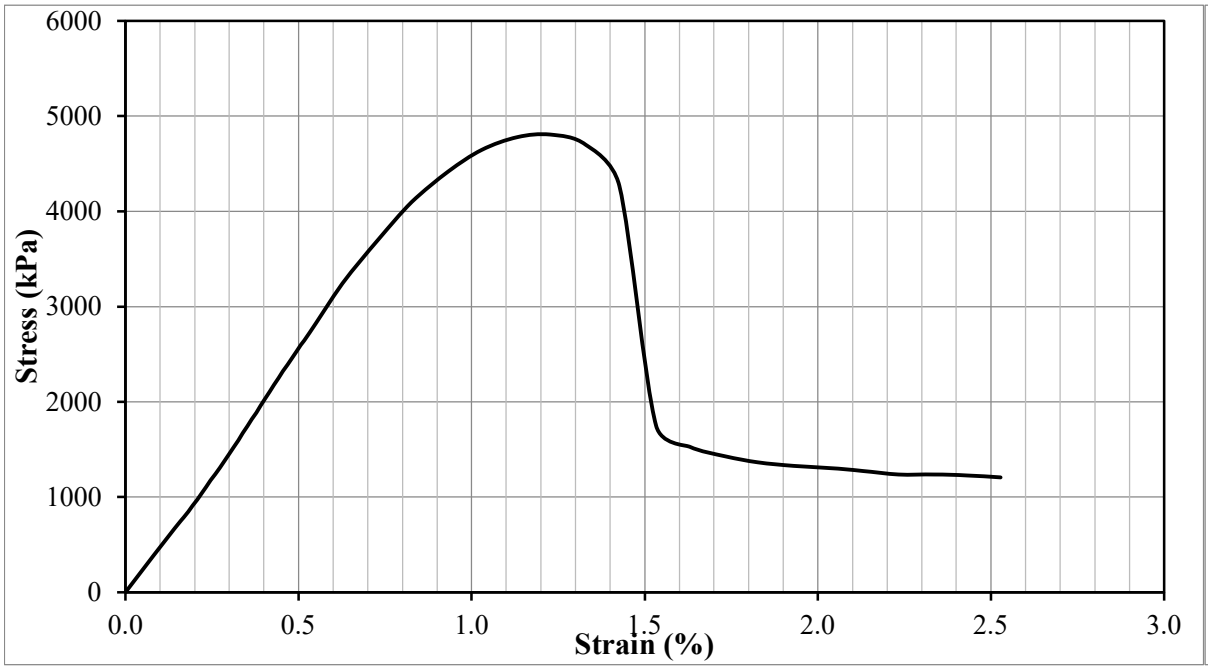
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,162	Strain at failure, εf :	1.01	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-19-G	Initial Area:	2112.9	mm^2
Test Date:	9/18/2021	Weight:	365.7	g
Strain Rate:	1 %/min	Unit Weight:	1714	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	21.0	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.300%		



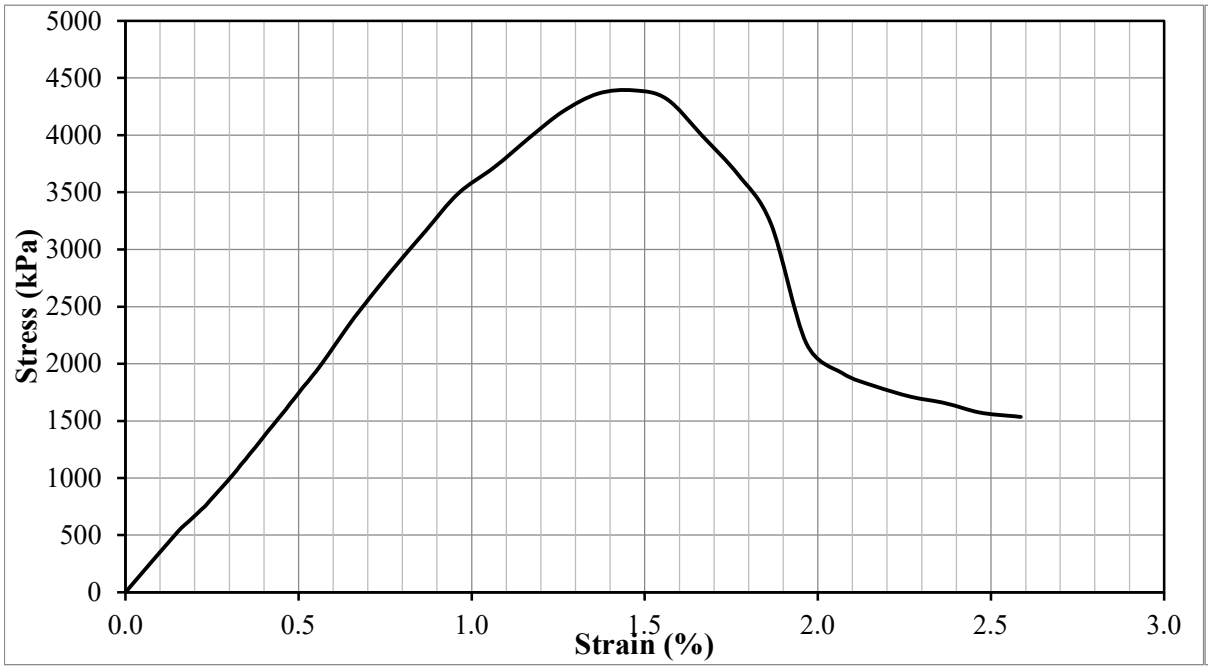
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,241	Strain at failure, εf :	1.36	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-19-H	Initial Area:	2112.9	mm^2
Test Date:	9/21/2021	Weight:	362.8	g
Strain Rate:	1 %/min	Unit Weight:	1717	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	23.9	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.300%		



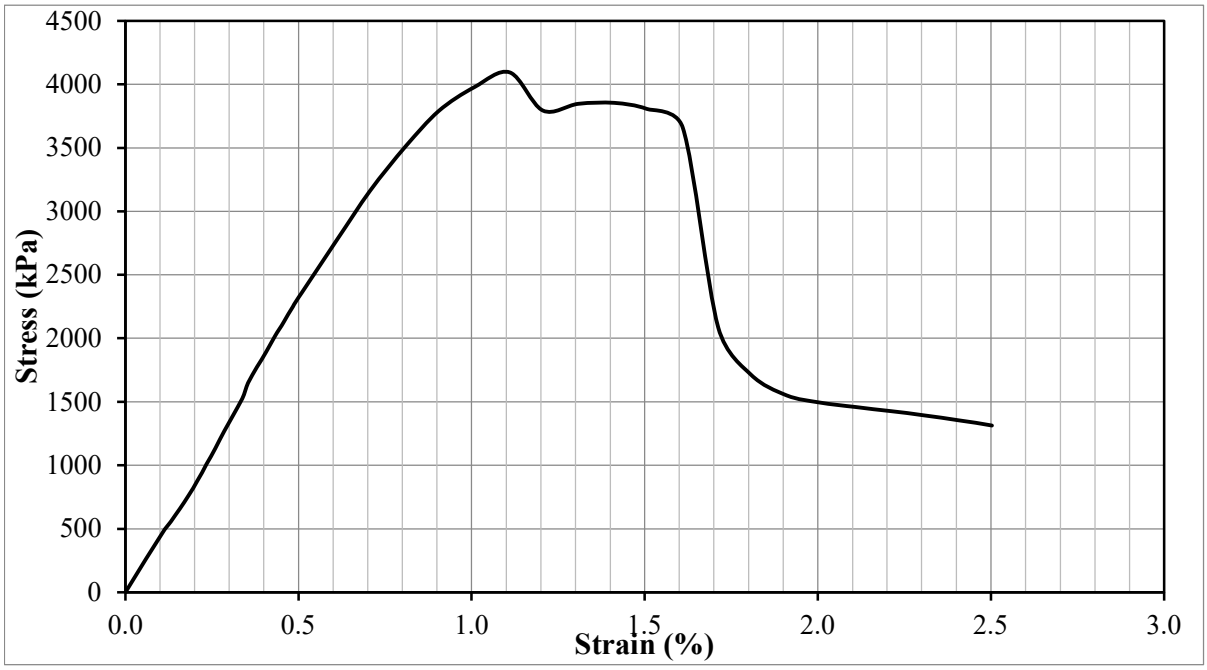
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,777	Strain at failure, εf :	1.23	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	94.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.6	mm
I.D.:	O-19-I	Initial Area:	2090.1	mm^2
Test Date:	9/25/2021	Weight:	343.8	g
Strain Rate:	1 %/min	Unit Weight:	1738	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	28.0	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.300%		



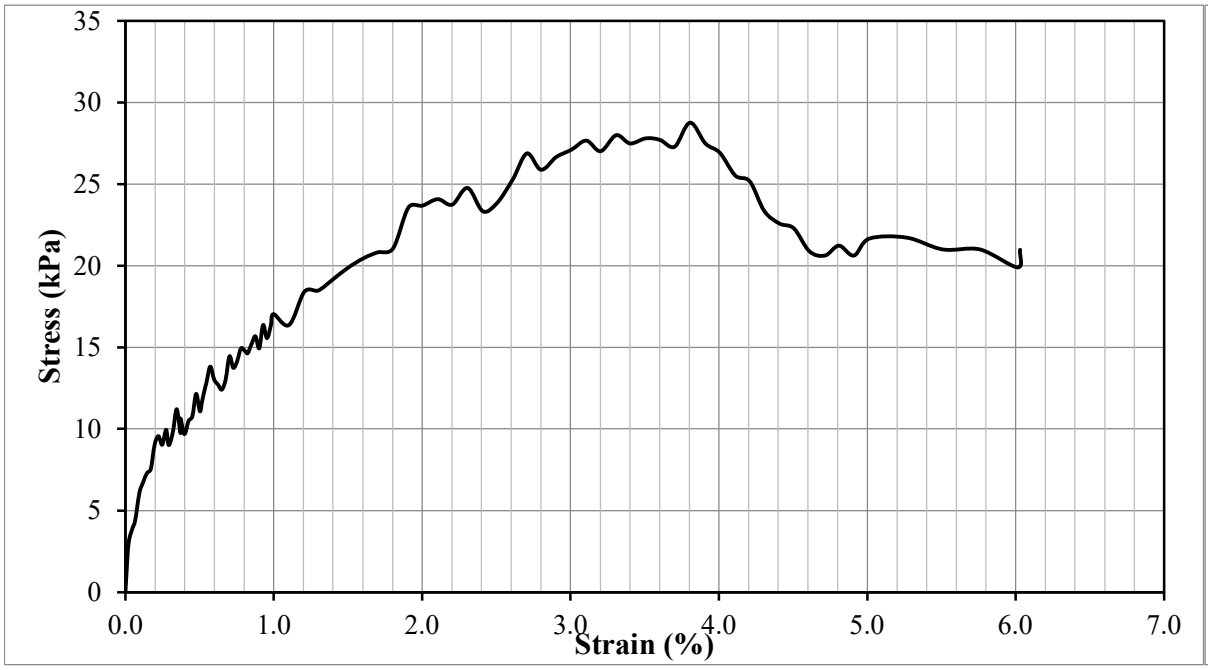
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,333	Strain at failure, εf :	1.47	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-19-J	Initial Area:	2119.1	mm^2
Test Date:	9/25/2021	Weight:	354.7	g
Strain Rate:	1 %/min	Unit Weight:	1708	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	28.0	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.300%		



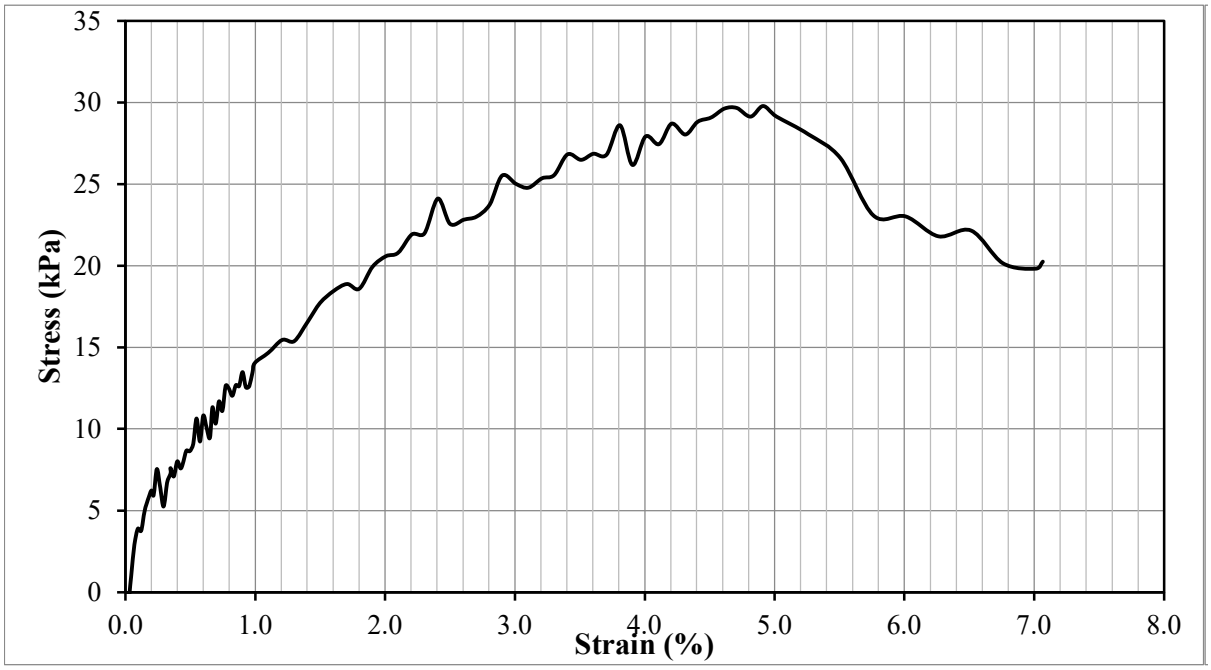
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,055	Strain at failure, εf :	1.11	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.6	mm
I.D.:	O-20-B	Initial Area:	2090.1	mm^2
Test Date:	9/6/2021	Weight:	363.6	g
Strain Rate:	1 %/min	Unit Weight:	1714	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	7.0	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.350%		



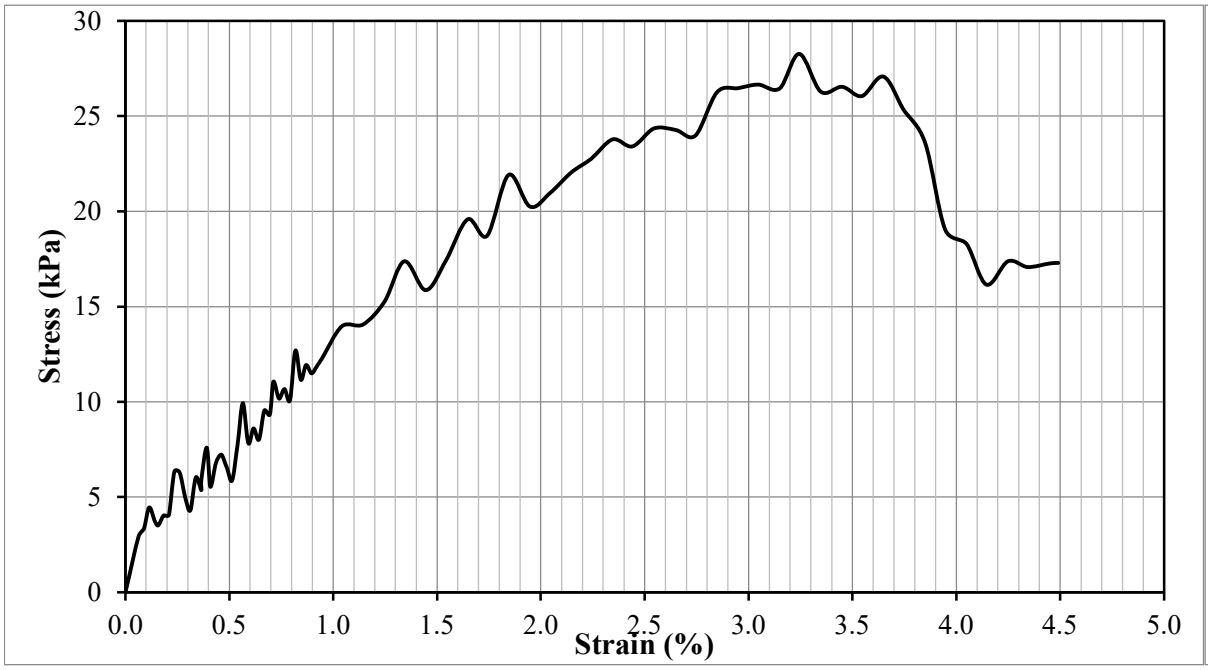
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	29	Strain at failure, εf :	3.80	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	102.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.1	mm
I.D.:	O-20-C	Initial Area:	2053.3	mm^2
Test Date:	9/6/2021	Weight:	366.5	g
Strain Rate:	1 %/min	Unit Weight:	1742	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	7.0	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.350%		



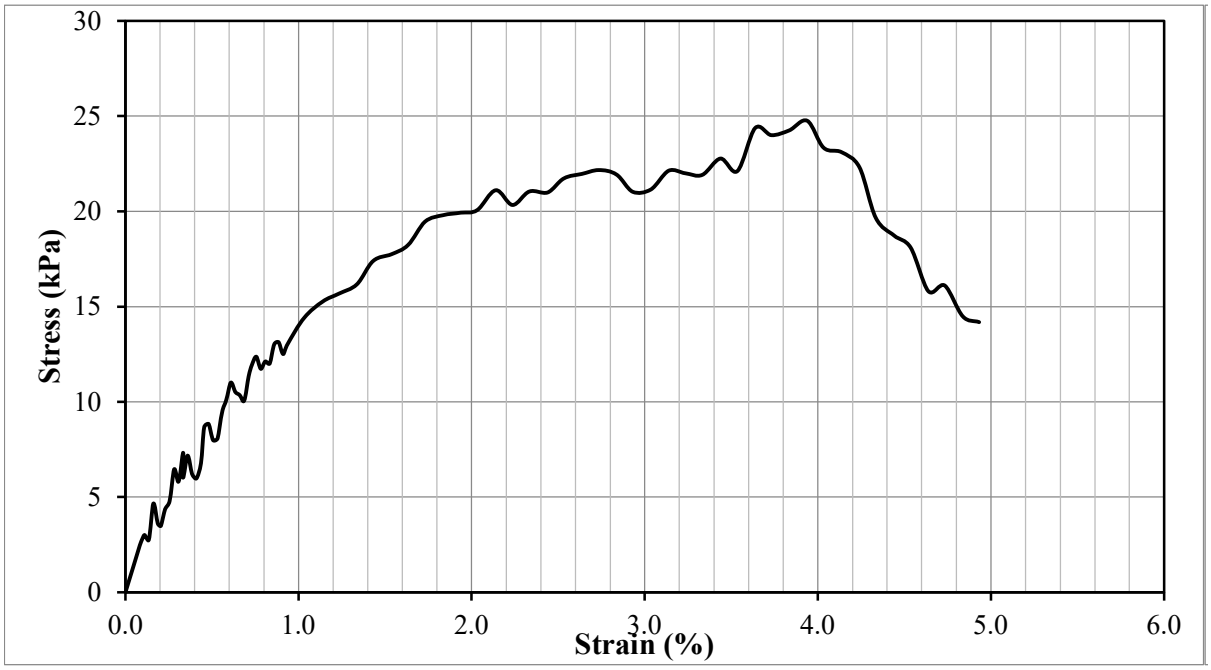
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	30	Strain at failure, εf :	4.91	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.1	mm
I.D.:	O-20-D	Initial Area:	2047.1	mm^2
Test Date:	9/9/2021	Weight:	365.9	g
Strain Rate:	1 %/min	Unit Weight:	1756	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	10.1	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.350%		



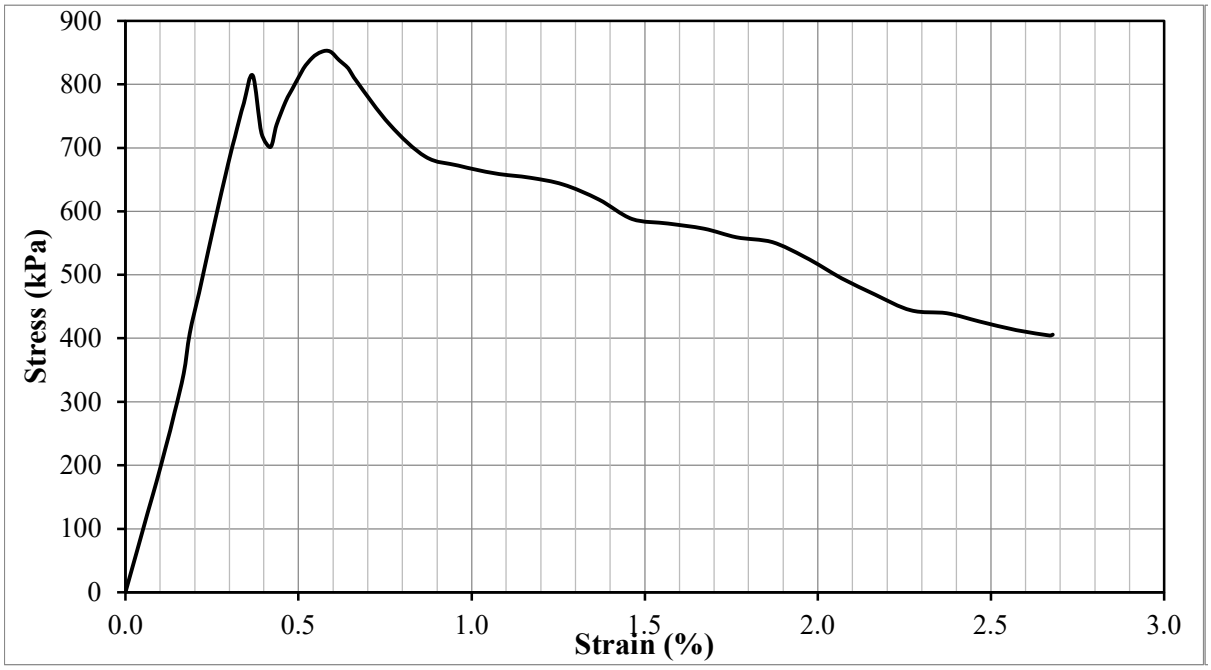
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	28	Strain at failure, εf :	3.24	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	O-20-E	Initial Area:	2096.3	mm^2
Test Date:	9/13/2021	Weight:	357.2	g
Strain Rate:	1 %/min	Unit Weight:	1675	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	14.0	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.350%		



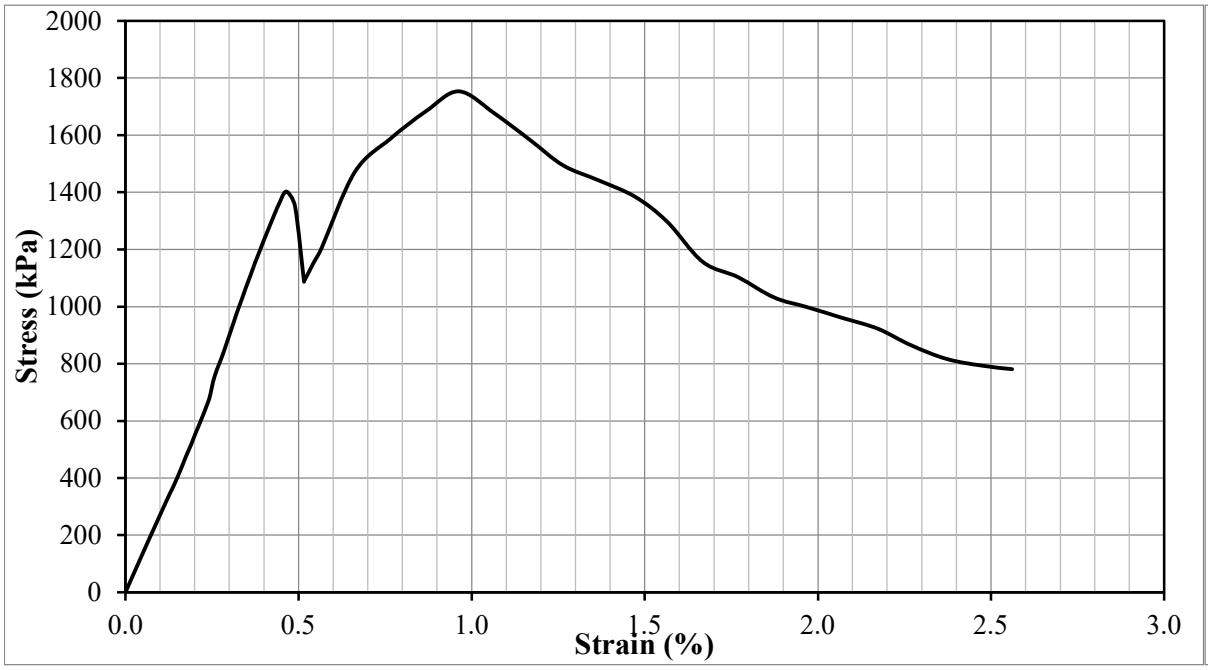
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	25	Strain at failure, εf :	3.94	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	O-20-G	Initial Area:	2123.2	mm^2
Test Date:	9/20/2021	Weight:	361.0	g
Strain Rate:	1 %/min	Unit Weight:	1697	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	21.1	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.350%		



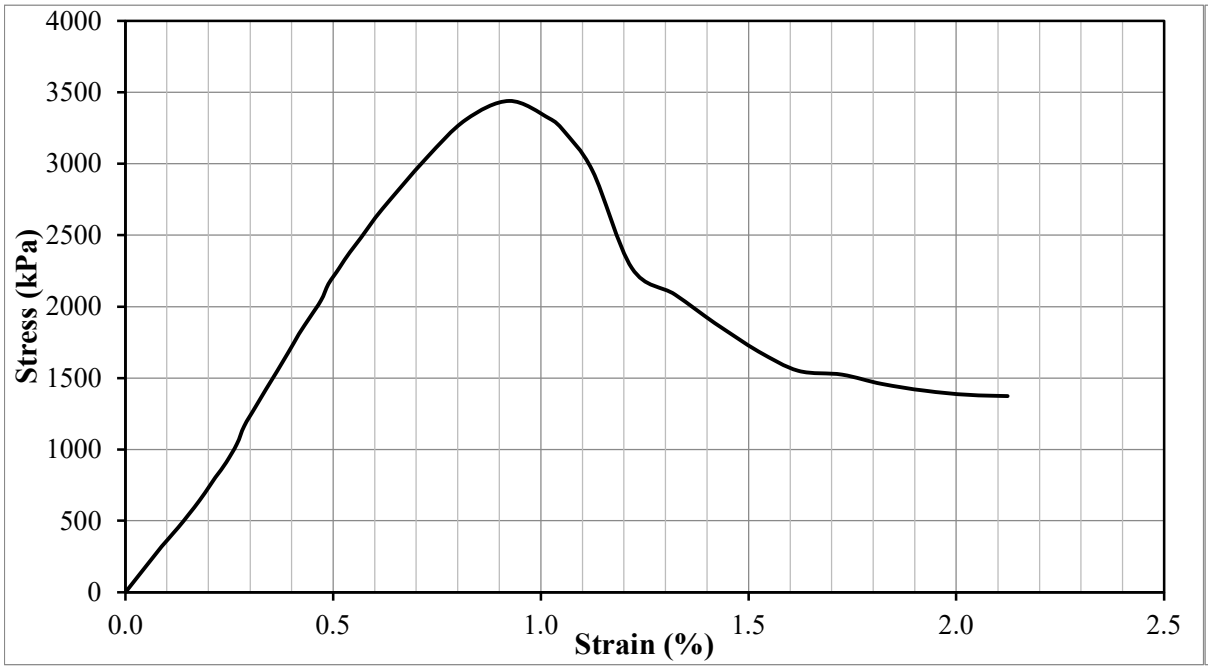
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	847	Strain at failure, εf :	0.59	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-20-H	Initial Area:	2112.9	mm^2
Test Date:	9/23/2021	Weight:	358.5	g
Strain Rate:	1 %/min	Unit Weight:	1703	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	24.0	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.350%		



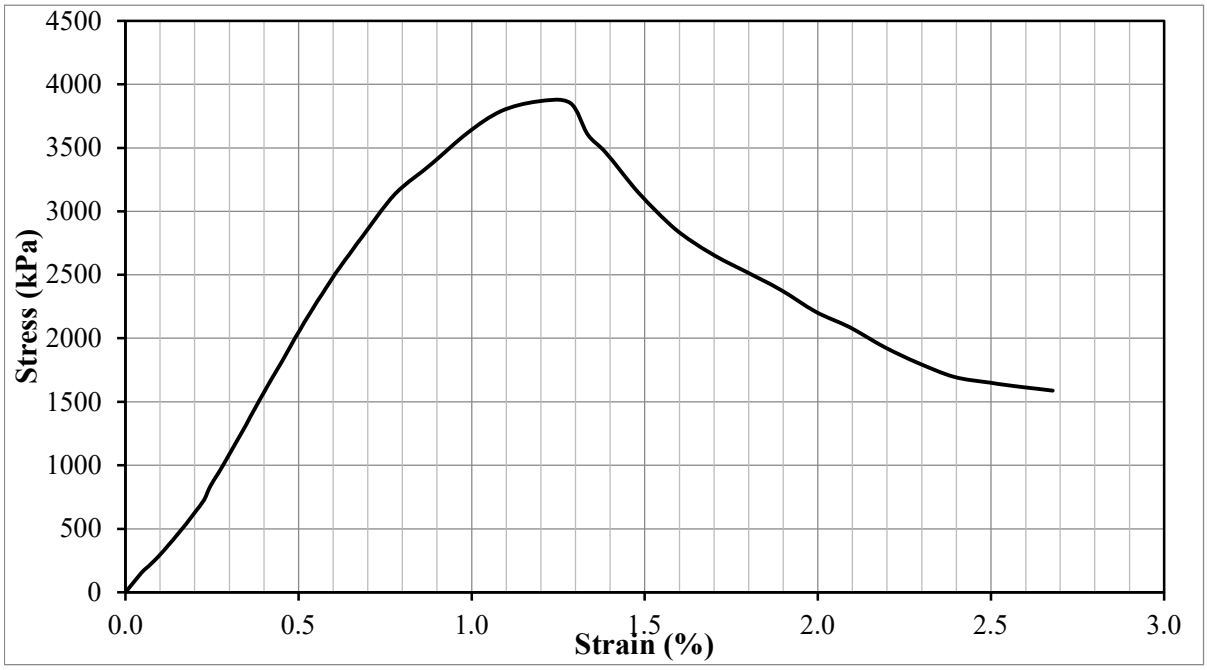
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,742	Strain at failure, εf :	0.96	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	O-20-I	Initial Area:	2100.5	mm^2
Test Date:	9/27/2021	Weight:	364.1	g
Strain Rate:	1 %/min	Unit Weight:	1738	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	27.9	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.350%		



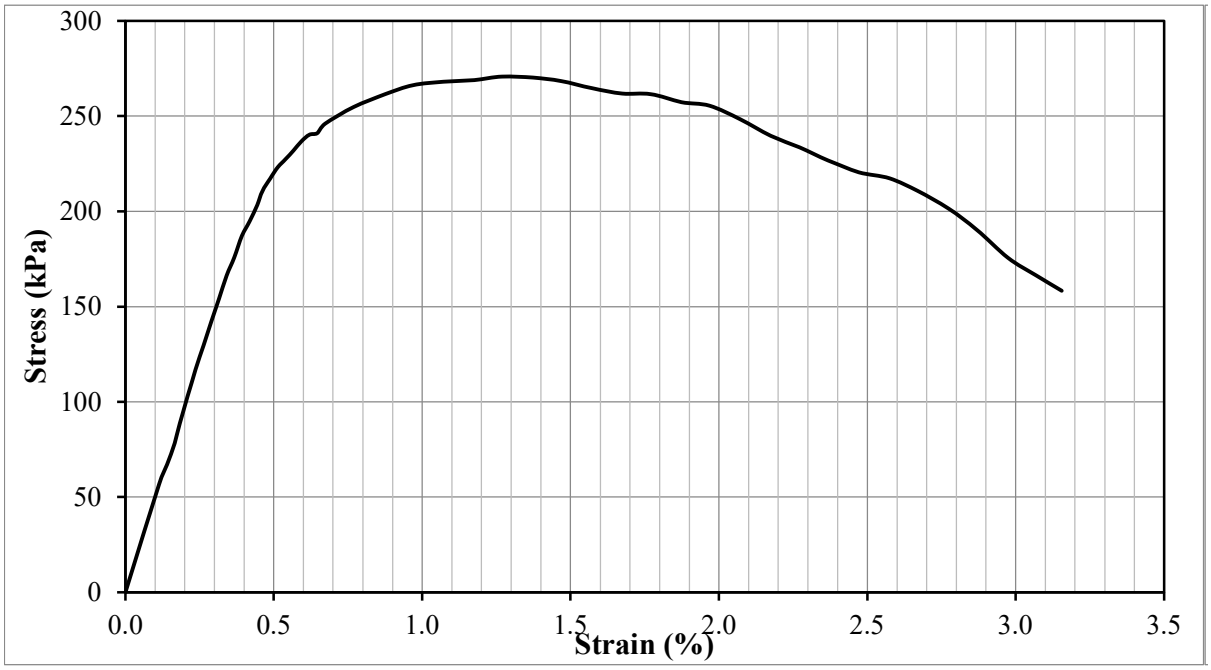
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,419	Strain at failure, εf :	0.92	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-20-J	Initial Area:	2104.6	mm^2
Test Date:	9/27/2021	Weight:	361.6	g
Strain Rate:	1 %/min	Unit Weight:	1715	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	27.9	days
$(w:c)_{slurry}$:	1	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.350%		



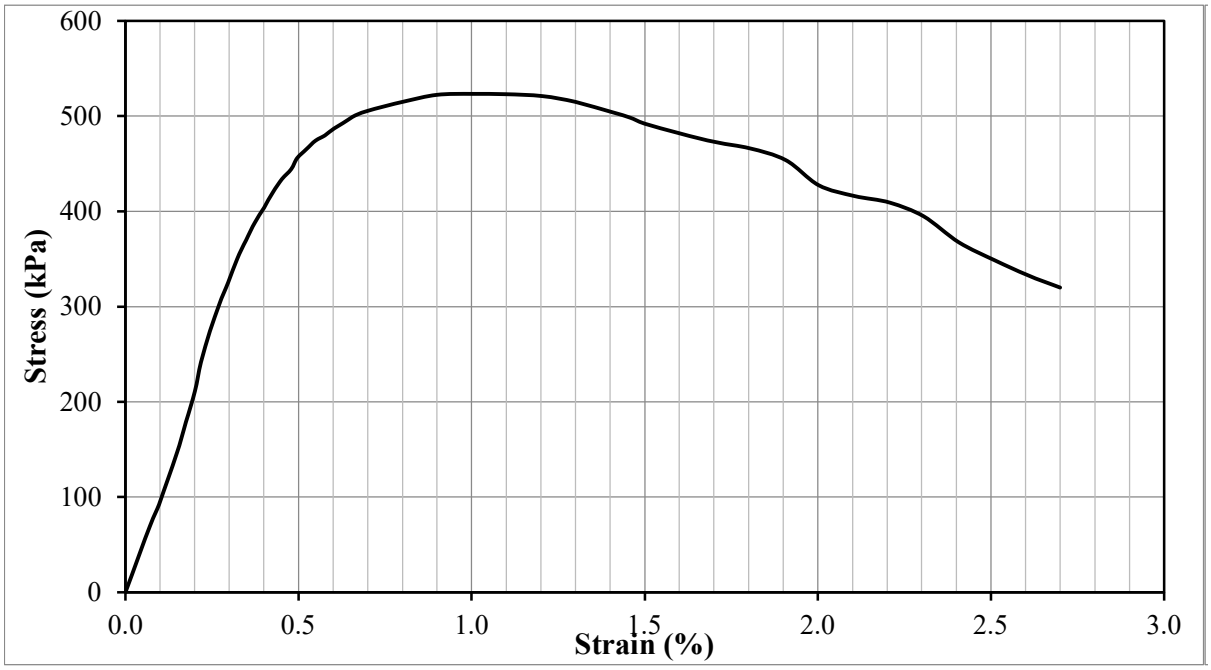
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,843	Strain at failure, εf :	1.19	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	O-21-A	Initial Area:	2100.5	mm^2
Test Date:	9/5/2021	Weight:	368.3	g
Strain Rate:	1 %/min	Unit Weight:	1751	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	3.0	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.225%		



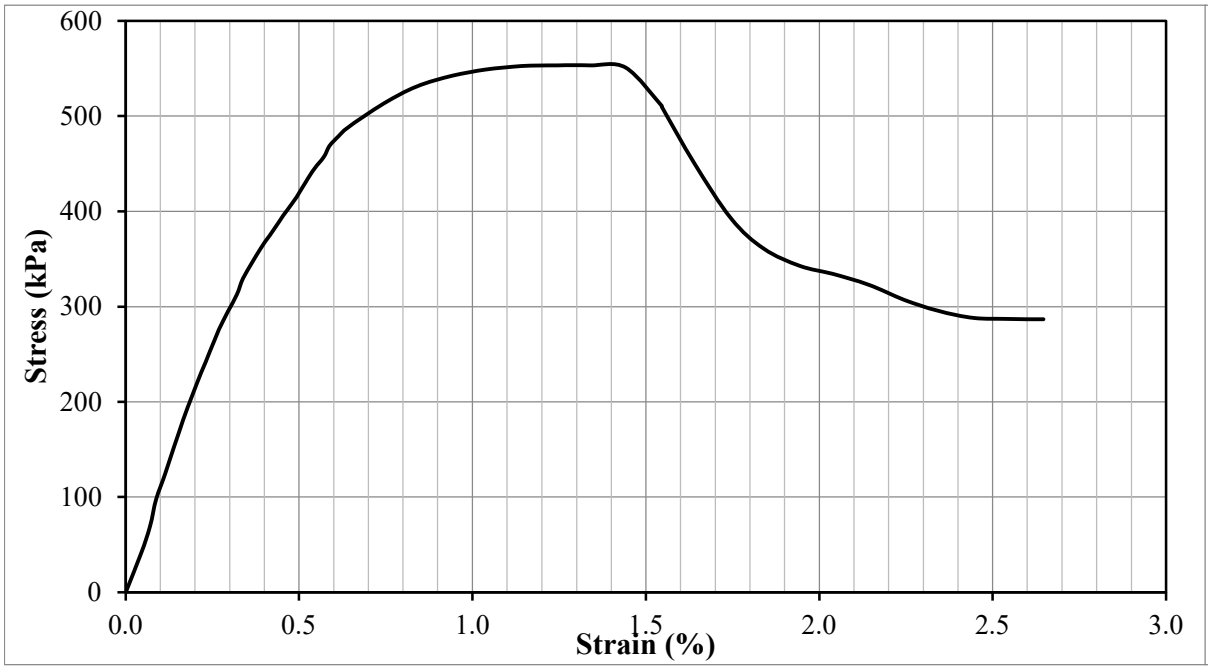
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	269	Strain at failure, εf :	1.27	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-21-B	Initial Area:	2104.6	mm^2
Test Date:	9/9/2021	Weight:	369.9	g
Strain Rate:	1 %/min	Unit Weight:	1746	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	6.9	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.225%		



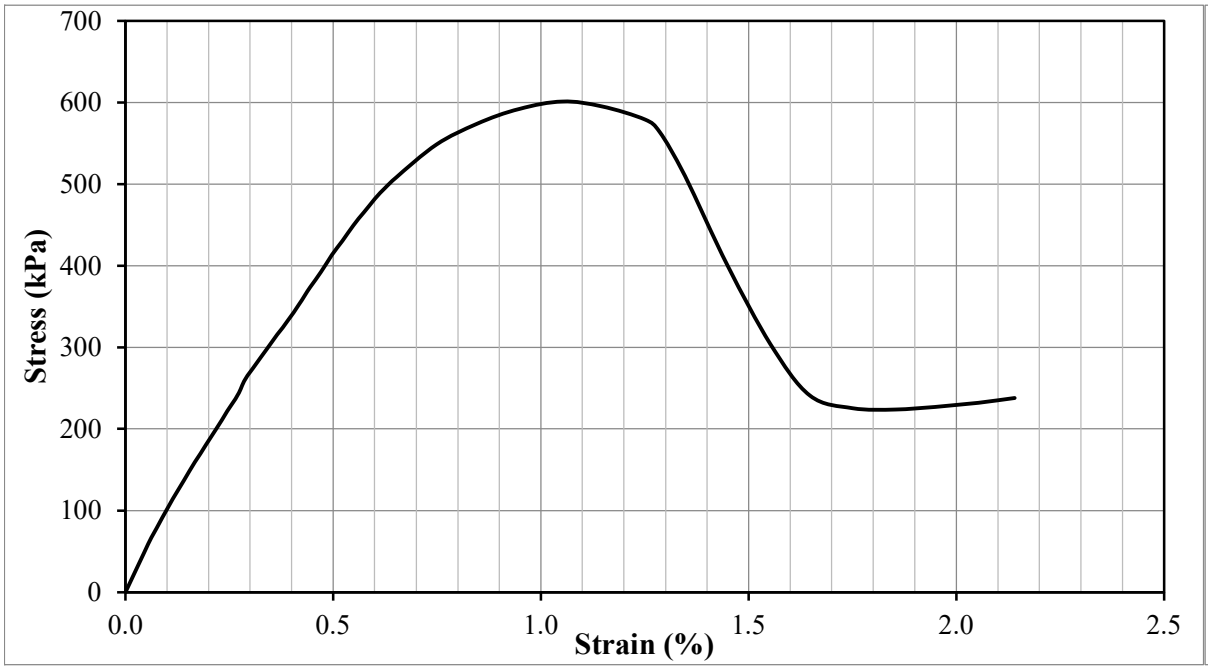
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	521	Strain at failure, εf :	1.00	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-21-C	Initial Area:	2117.0	mm^2
Test Date:	9/9/2021	Weight:	365.5	g
Strain Rate:	1 %/min	Unit Weight:	1734	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	6.9	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.225%		



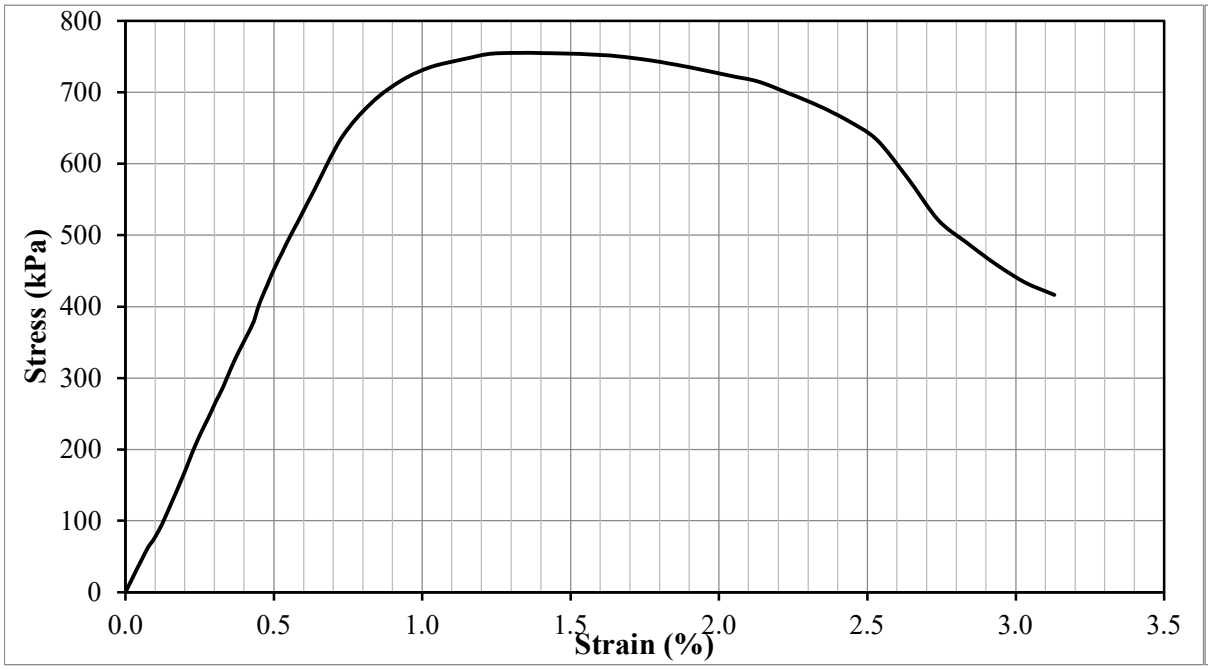
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	550	Strain at failure, εf :	1.24	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	O-21-D	Initial Area:	2100.5	mm^2
Test Date:	9/12/2021	Weight:	361.0	g
Strain Rate:	1 %/min	Unit Weight:	1745	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	9.7	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.225%		



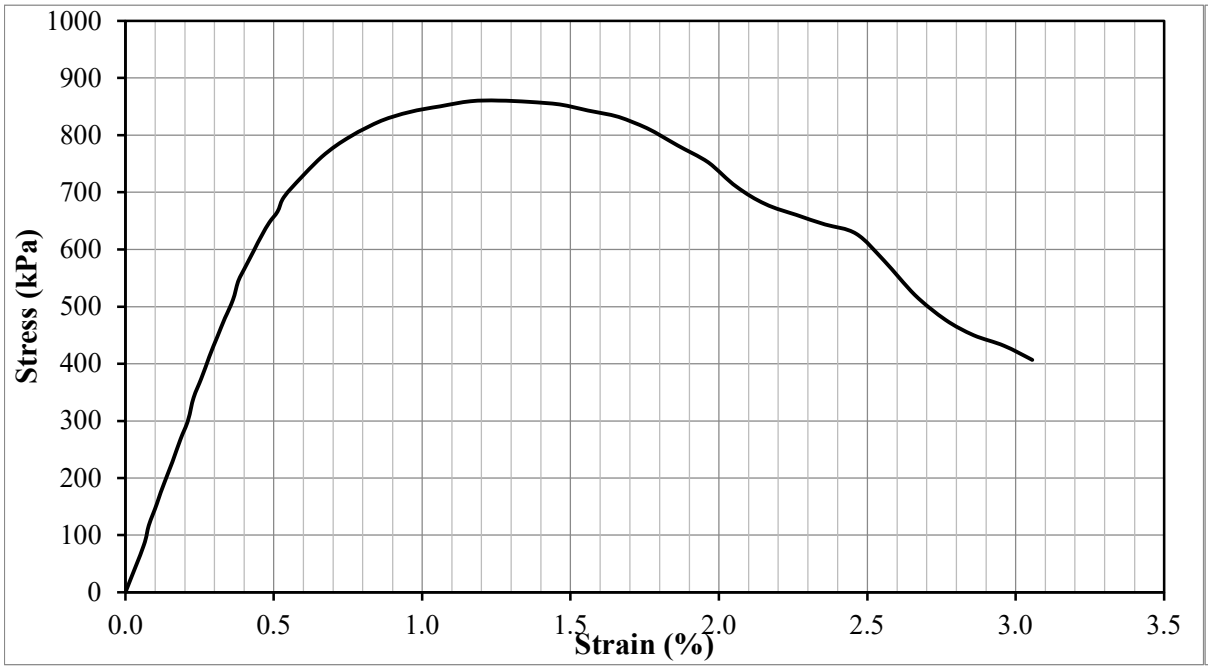
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	597	Strain at failure, εf :	1.05	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-21-E	Initial Area:	2104.6	mm^2
Test Date:	9/16/2021	Weight:	369.7	g
Strain Rate:	1 %/min	Unit Weight:	1745	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	13.9	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.225%		



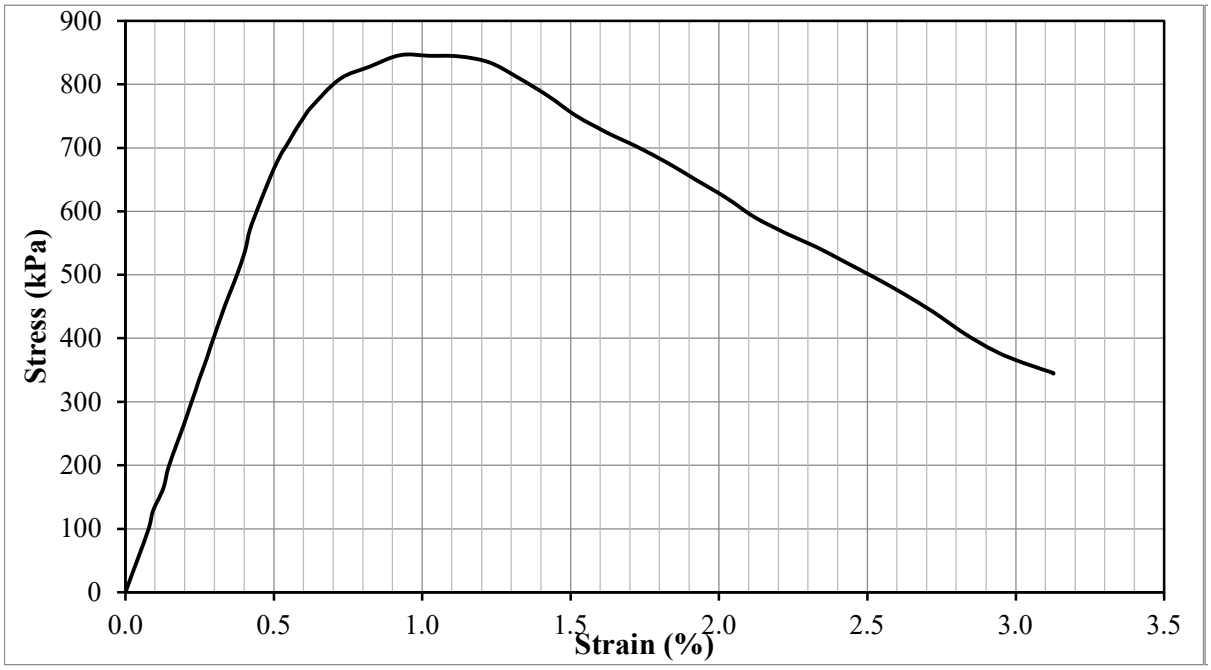
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	752	Strain at failure, εf :	1.33	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	O-21-F	Initial Area:	2102.5	mm^2
Test Date:	9/19/2021	Weight:	366.6	g
Strain Rate:	1 %/min	Unit Weight:	1744	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	16.9	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.225%		



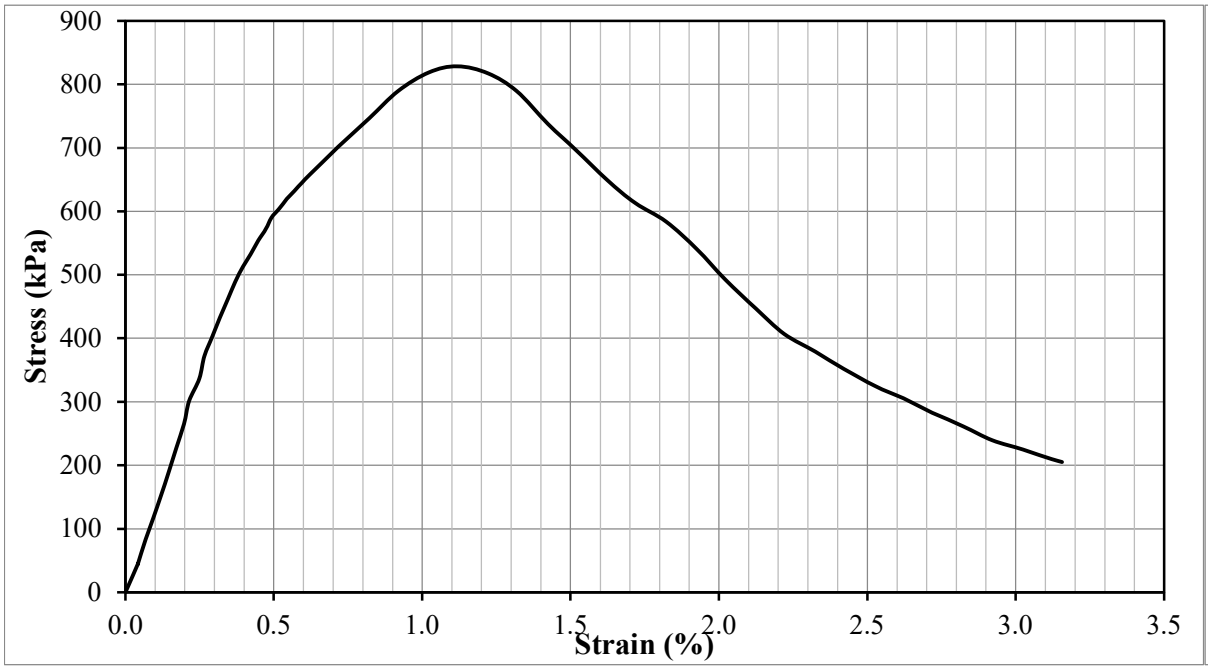
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	856	Strain at failure, εf :	1.26	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-21-G	Initial Area:	2104.6	mm^2
Test Date:	9/23/2021	Weight:	368.5	g
Strain Rate:	1 %/min	Unit Weight:	1748	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	20.9	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.225%		



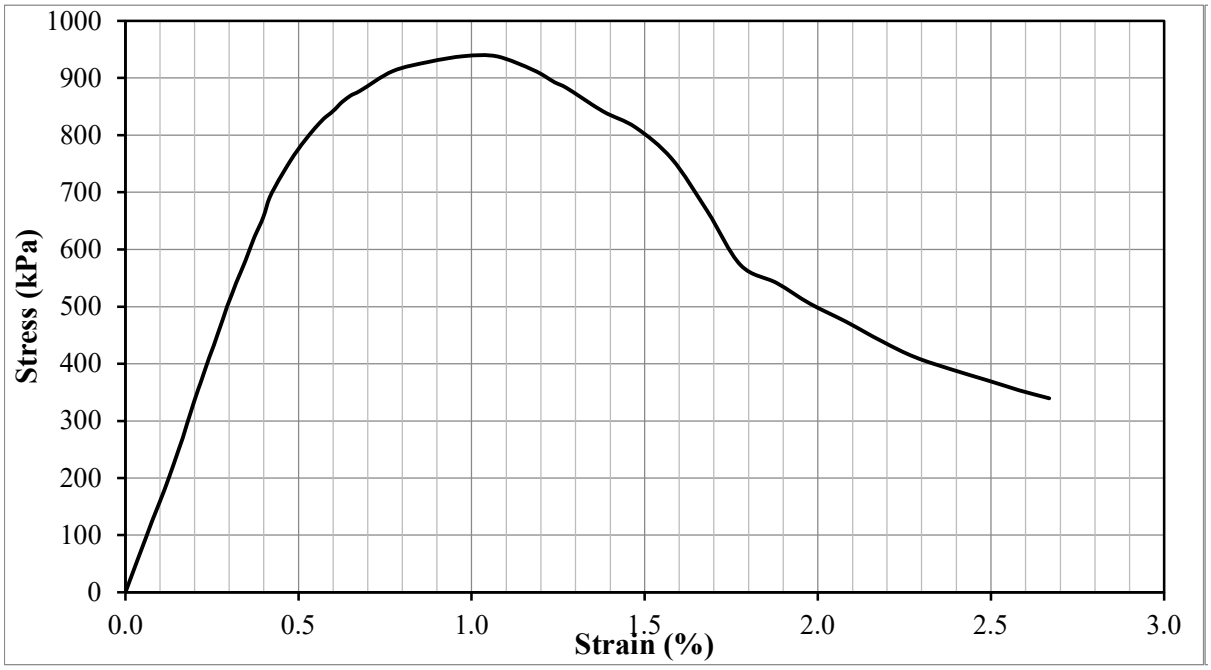
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	842	Strain at failure, εf :	0.93	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	O-21-H	Initial Area:	2102.5	mm^2
Test Date:	9/26/2021	Weight:	363.2	g
Strain Rate:	1 %/min	Unit Weight:	1747	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	23.9	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.225%		



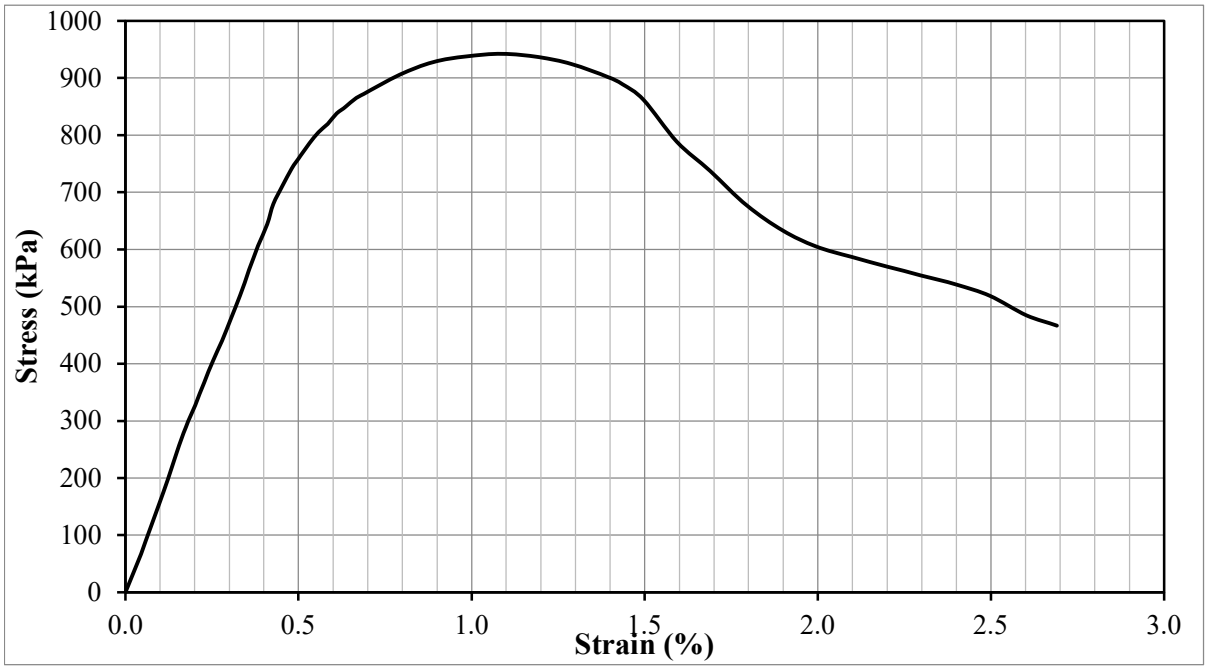
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	822	Strain at failure, εf :	1.12	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	96.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-21-I	Initial Area:	2108.7	mm^2
Test Date:	9/30/2021	Weight:	354.4	g
Strain Rate:	1 %/min	Unit Weight:	1744	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	27.9	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.225%		



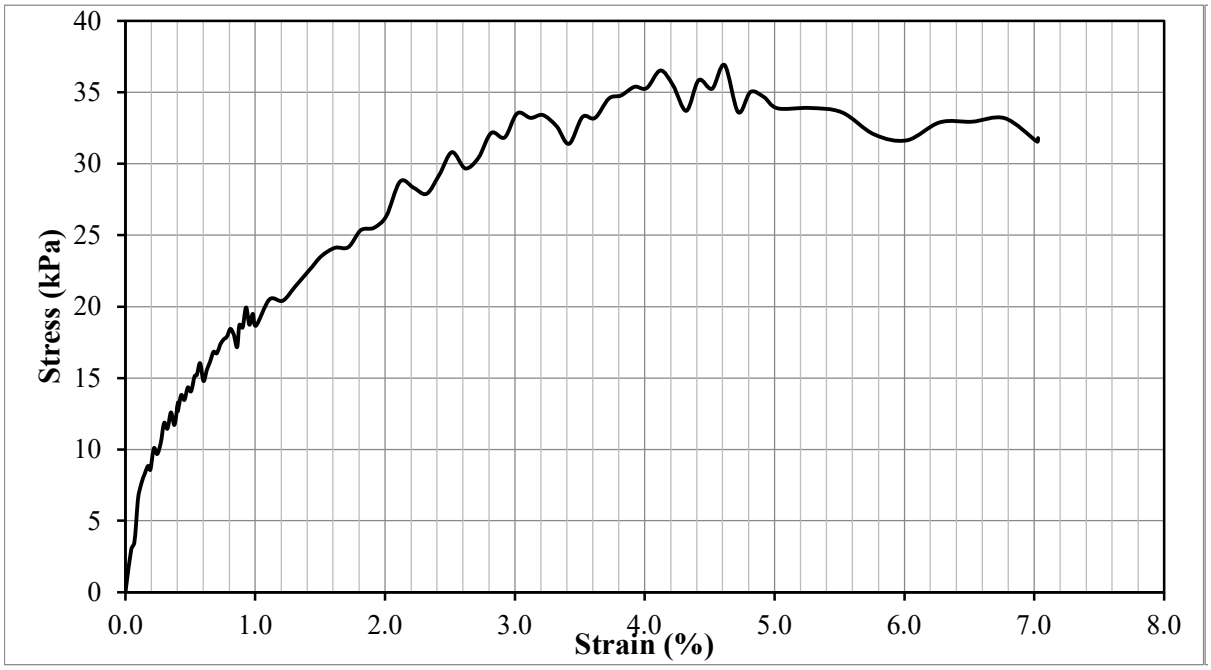
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	928	Strain at failure, εf :	0.98	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-21-J	Initial Area:	2117.0	mm^2
Test Date:	9/30/2021	Weight:	366.5	g
Strain Rate:	1 %/min	Unit Weight:	1739	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	27.9	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.225%		



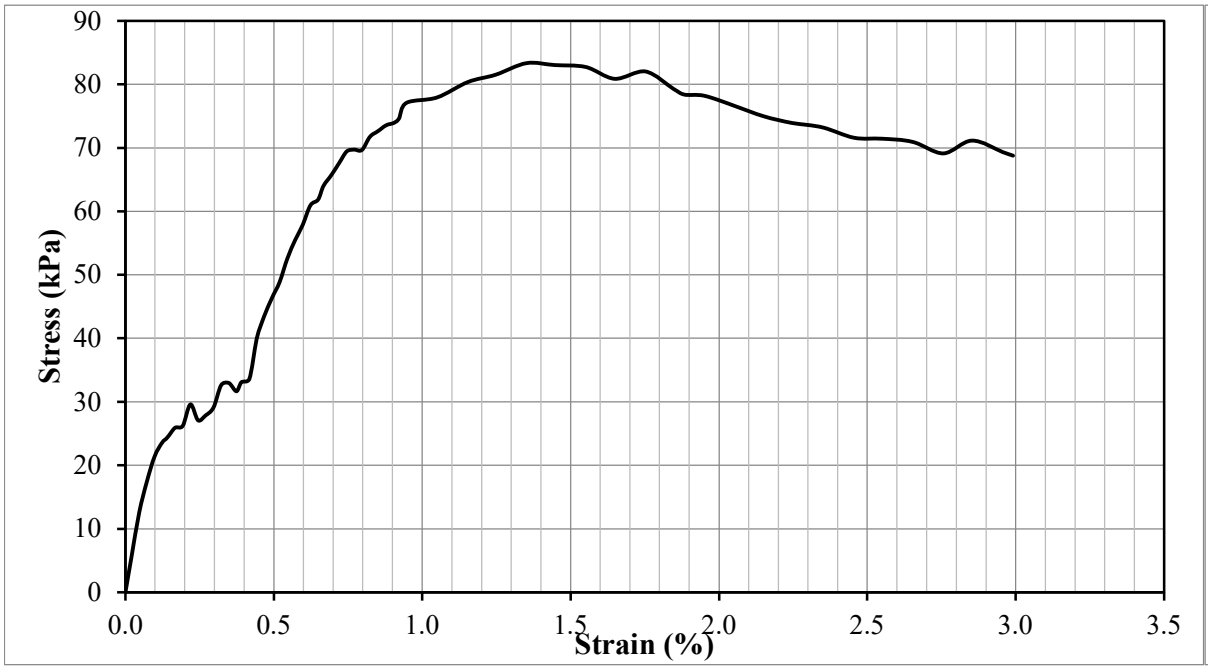
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	936	Strain at failure, εf :	1.09	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.5	mm
I.D.:	O-22-A	Initial Area:	2084.0	mm^2
Test Date:	9/5/2021	Weight:	372.0	g
Strain Rate:	1 %/min	Unit Weight:	1755	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	2.9	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.250%		



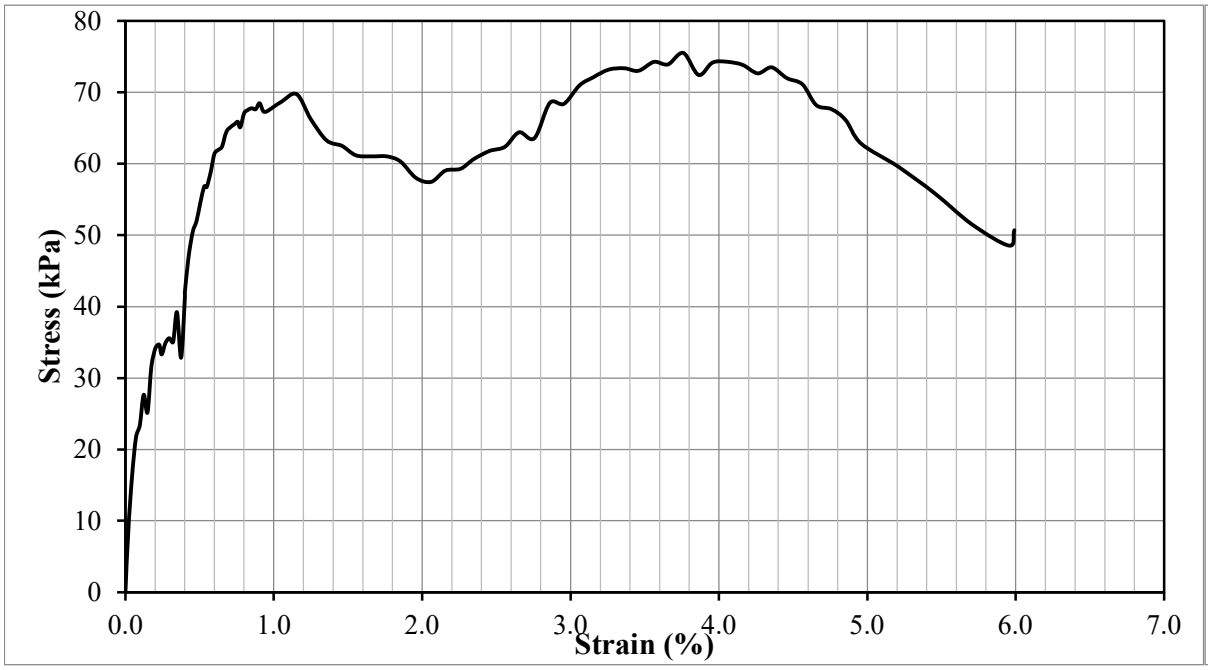
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	37	Strain at failure, εf :	4.61	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	O-22-B	Initial Area:	2096.3	mm^2
Test Date:	9/9/2021	Weight:	369.4	g
Strain Rate:	1 %/min	Unit Weight:	1750	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	6.9	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.250%		



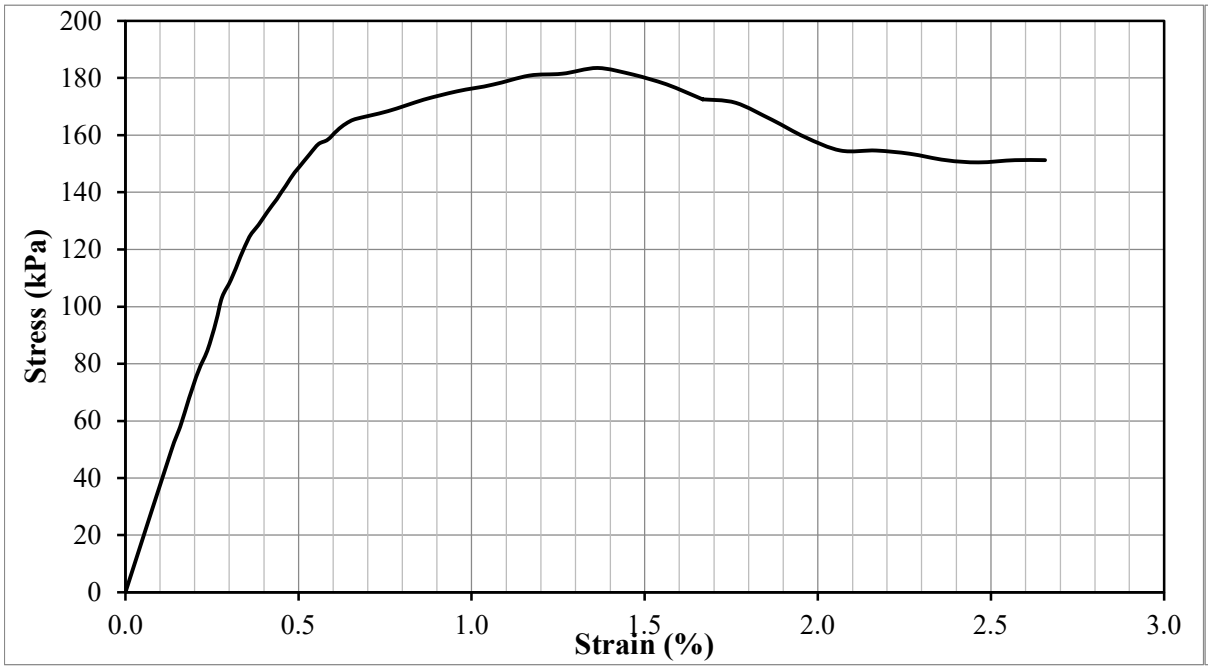
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	83	Strain at failure, εf :	1.35	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.6	mm
I.D.:	O-22-C	Initial Area:	2094.3	mm^2
Test Date:	9/9/2021	Weight:	371.4	g
Strain Rate:	1 %/min	Unit Weight:	1751	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	6.9	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.250%		



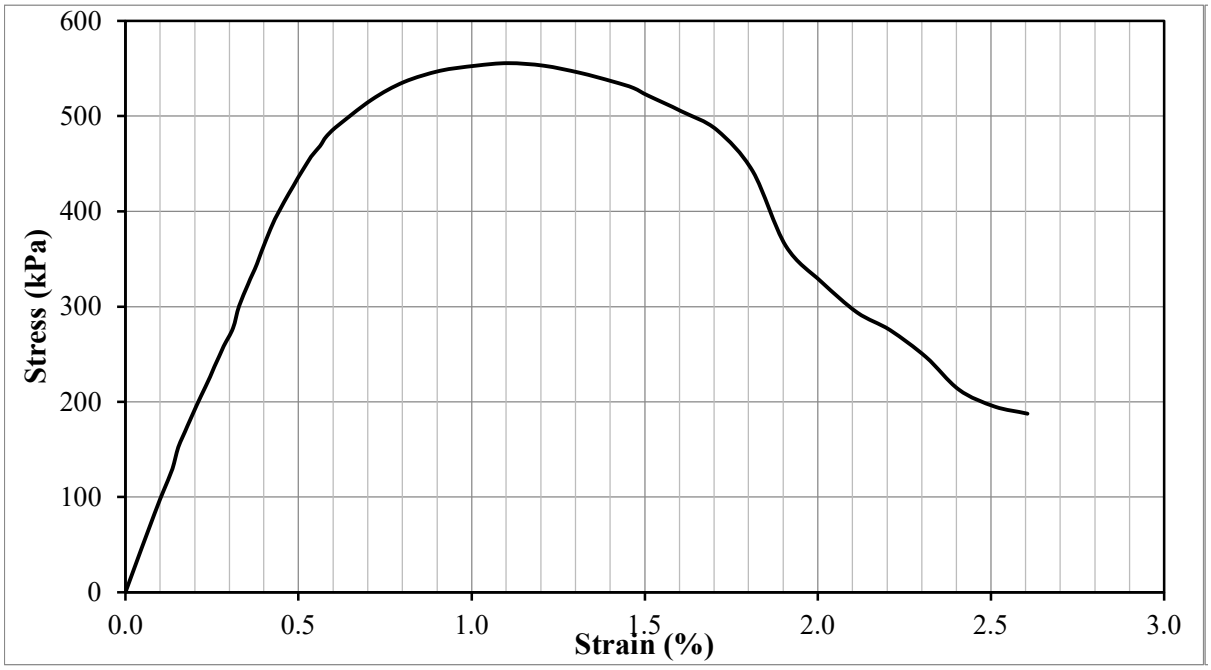
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	75	Strain at failure, εf :	3.76	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-22-D	Initial Area:	2108.7	mm^2
Test Date:	9/12/2021	Weight:	370.3	g
Strain Rate:	1 %/min	Unit Weight:	1739	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	9.7	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.250%		



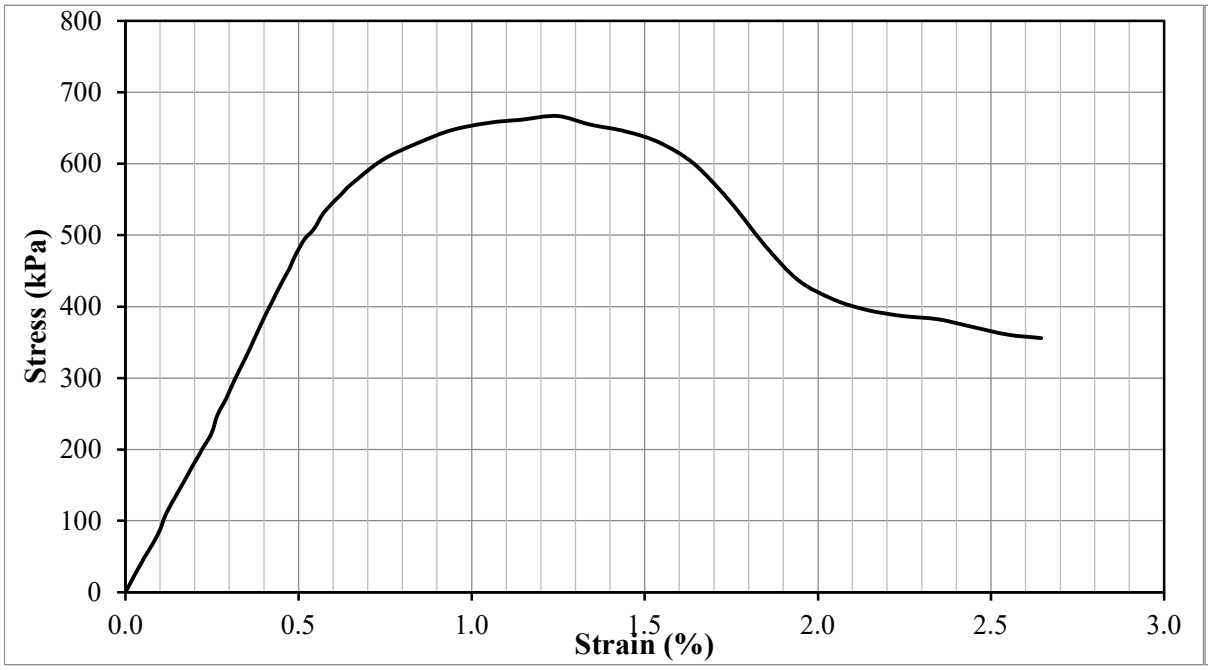
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	183	Strain at failure, εf :	1.36	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-22-E	Initial Area:	2114.9	mm^2
Test Date:	9/16/2021	Weight:	368.1	g
Strain Rate:	1 %/min	Unit Weight:	1733	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	13.9	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.250%		



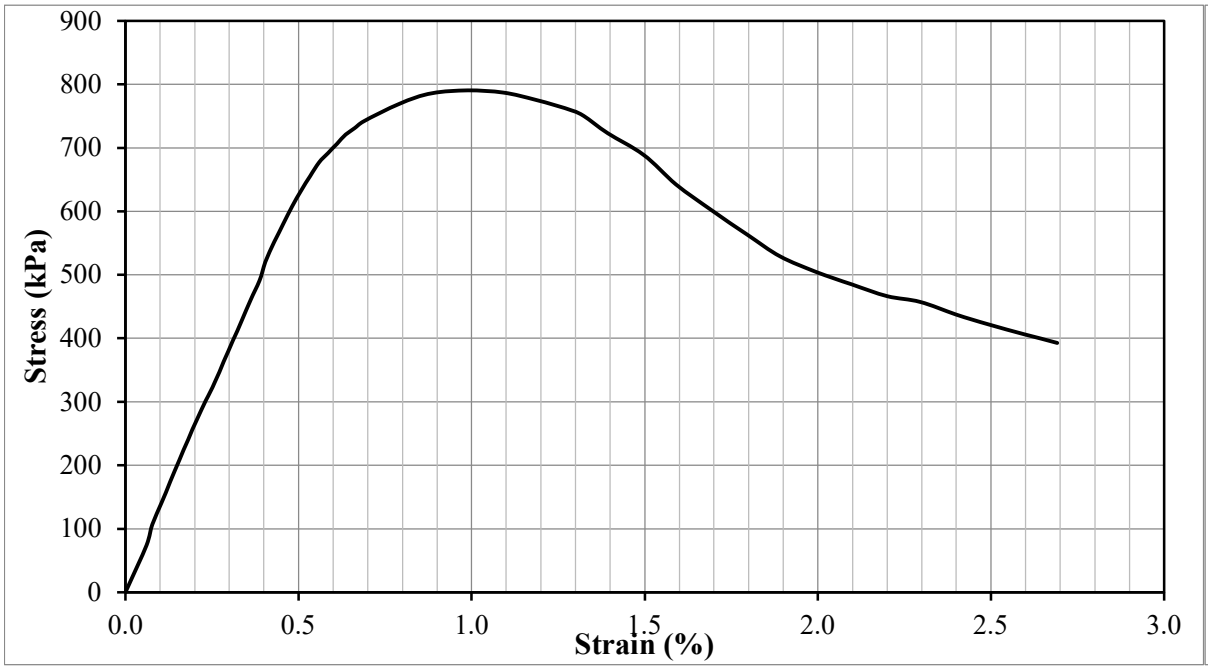
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	553	Strain at failure, εf :	1.11	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	O-22-F	Initial Area:	2098.4	mm^2
Test Date:	9/19/2021	Weight:	357.3	g
Strain Rate:	1 %/min	Unit Weight:	1746	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	16.9	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.250%		



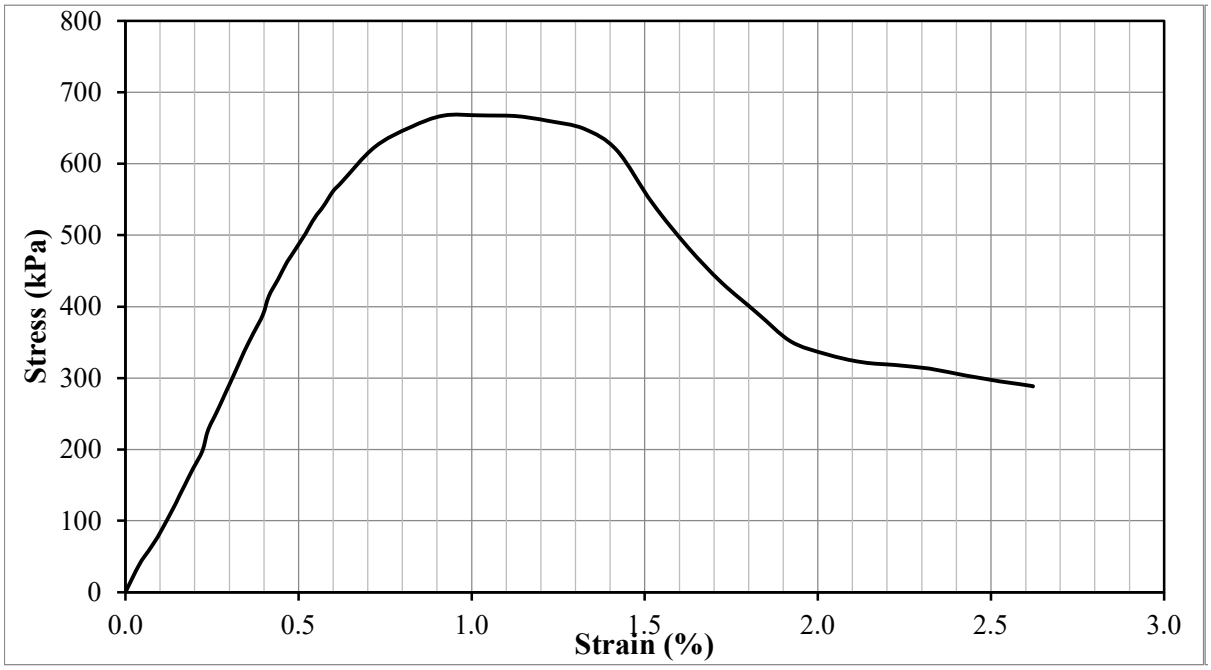
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	661	Strain at failure, εf :	1.25	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	O-22-G	Initial Area:	2100.5	mm^2
Test Date:	9/23/2021	Weight:	367.0	g
Strain Rate:	1 %/min	Unit Weight:	1749	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	20.8	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.250%		



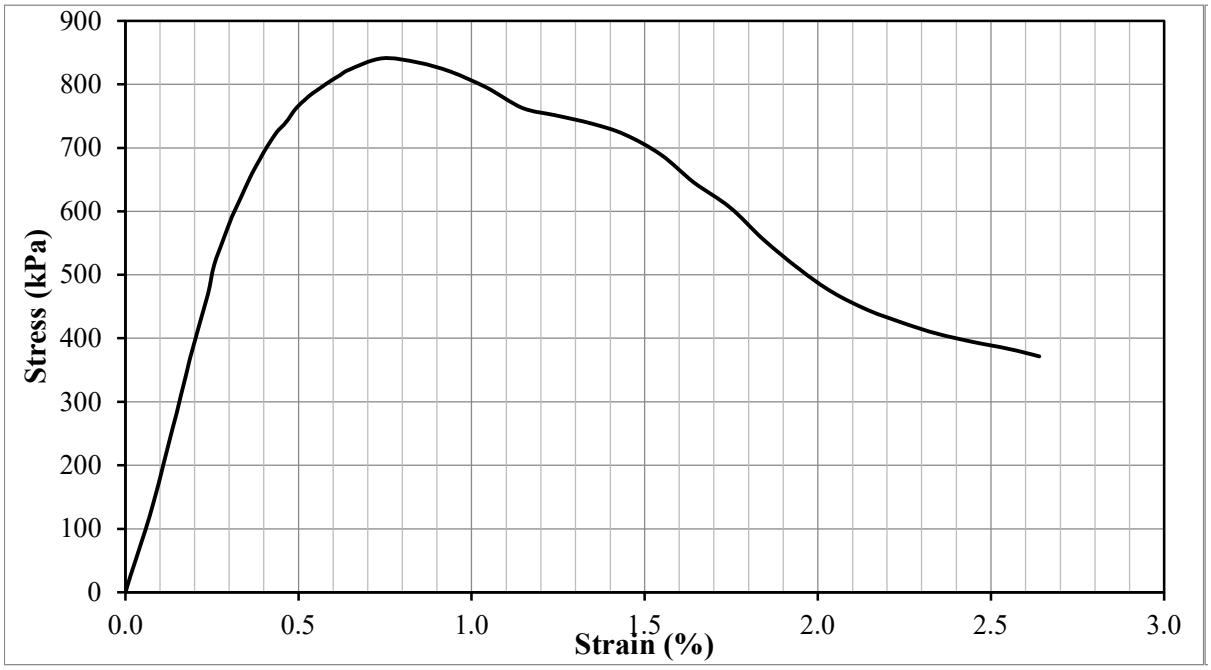
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	786	Strain at failure, εf :	0.99	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-22-H	Initial Area:	2110.8	mm^2
Test Date:	9/26/2021	Weight:	365.4	g
Strain Rate:	1 %/min	Unit Weight:	1740	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	23.8	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.250%		



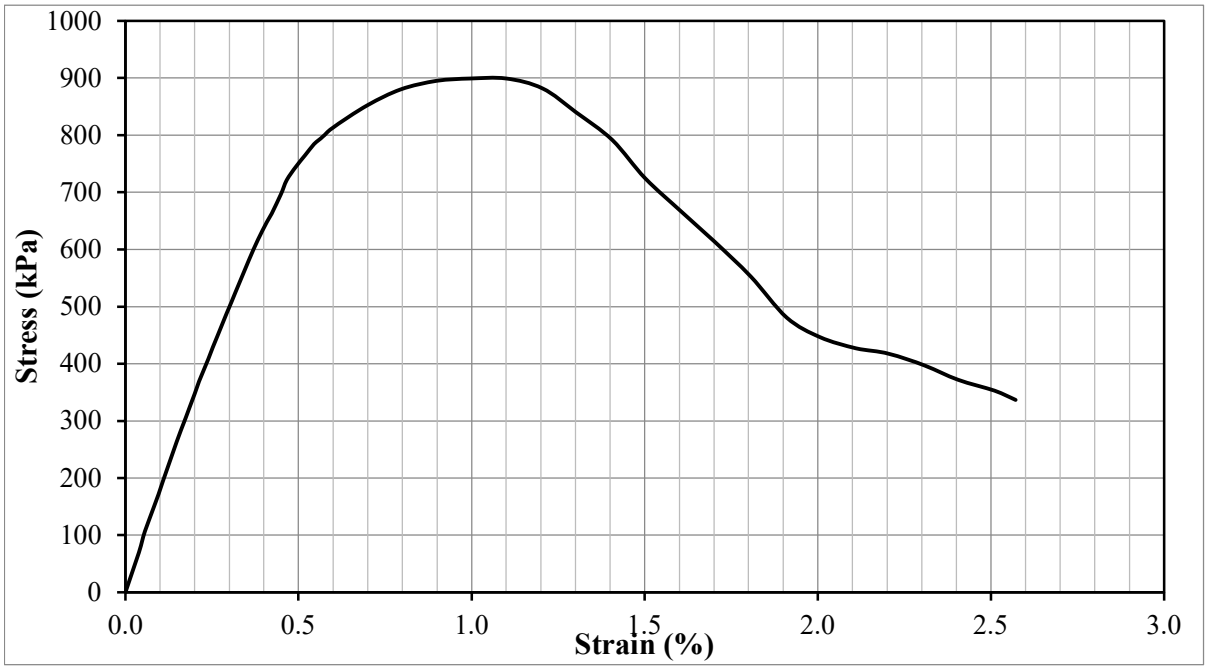
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	663	Strain at failure, εf :	1.02	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-22-I	Initial Area:	2110.8	mm^2
Test Date:	9/30/2021	Weight:	366.4	g
Strain Rate:	1 %/min	Unit Weight:	1741	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	27.9	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.250%		



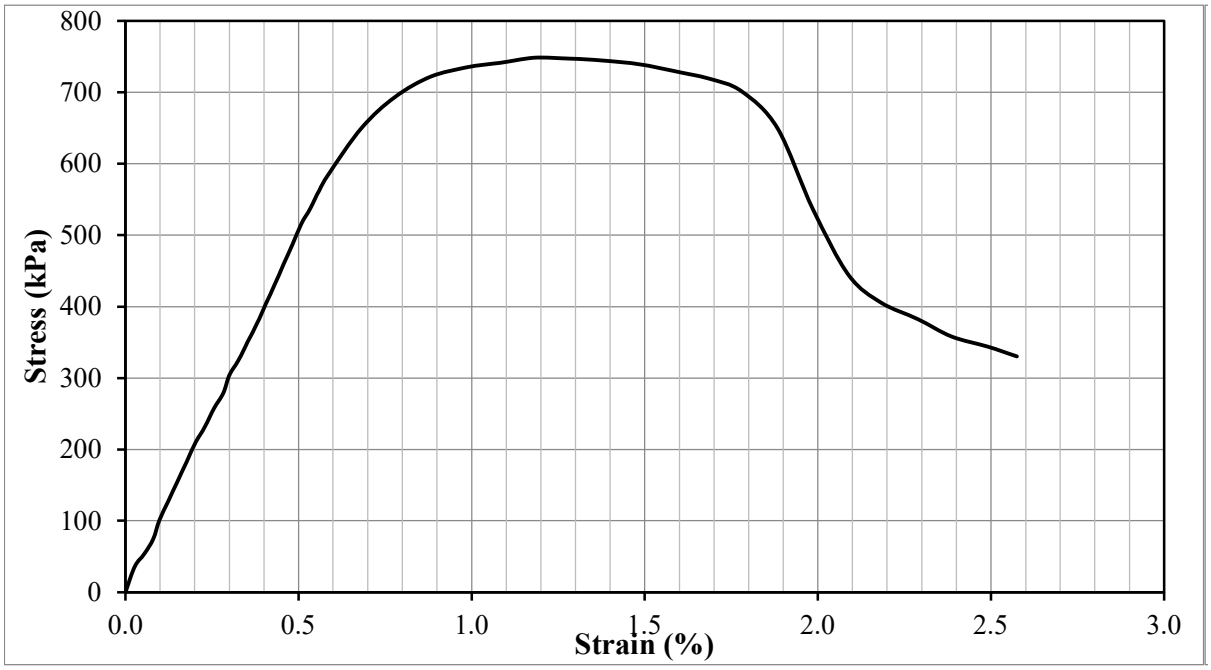
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	836	Strain at failure, εf :	0.74	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-22-J	Initial Area:	2110.8	mm^2
Test Date:	9/30/2021	Weight:	361.5	g
Strain Rate:	1 %/min	Unit Weight:	1743	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	27.9	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.250%		



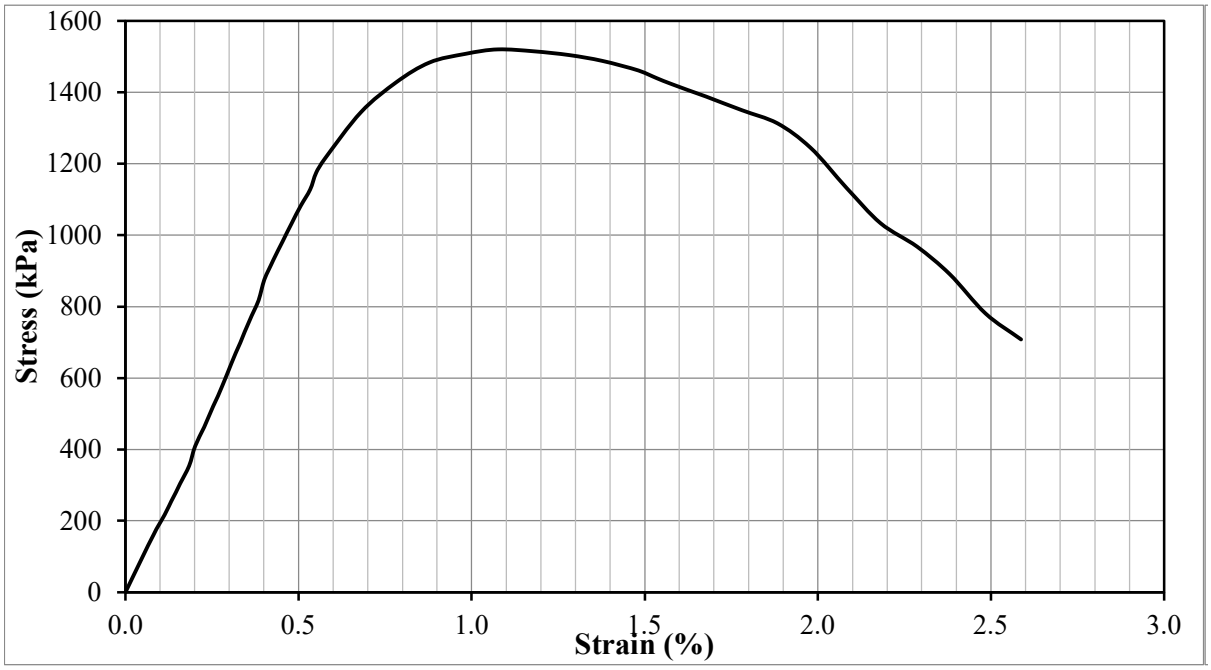
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	892	Strain at failure, εf :	1.00	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	93.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-23-A	Initial Area:	2112.9	mm^2
Test Date:	9/7/2021	Weight:	323.5	g
Strain Rate:	1 %/min	Unit Weight:	1634	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	2.9	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.230%		



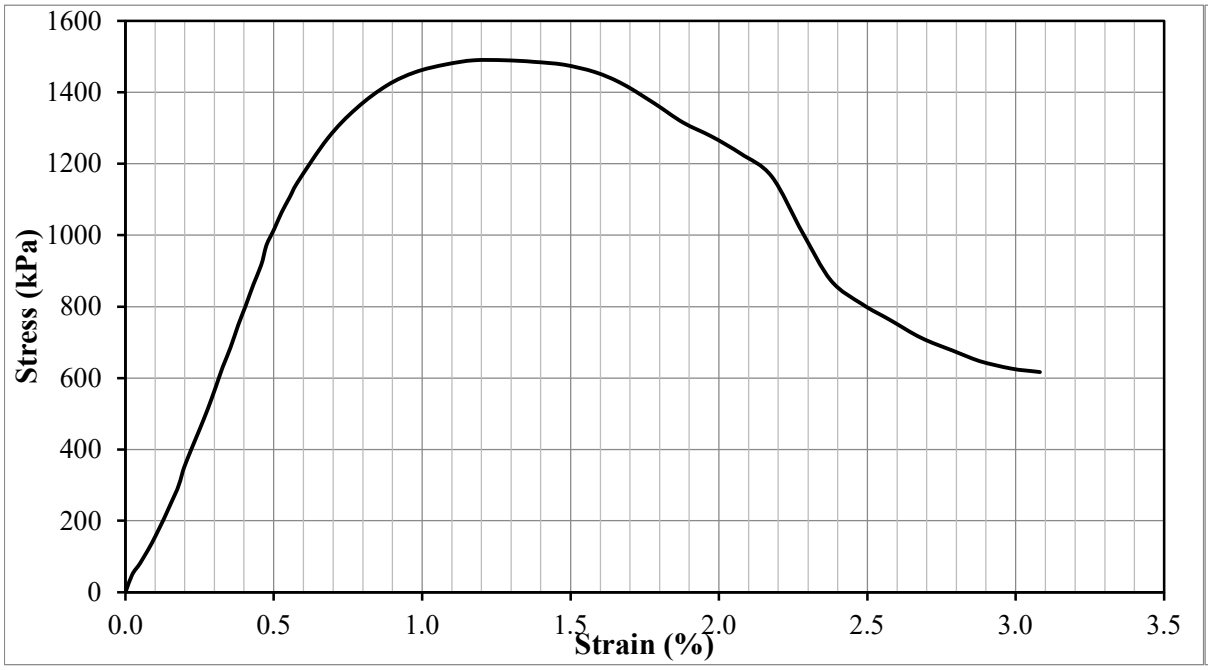
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	737	Strain at failure, εf :	1.18	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	96.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-23-B	Initial Area:	2112.9	mm^2
Test Date:	9/11/2021	Weight:	332.6	g
Strain Rate:	1 %/min	Unit Weight:	1638	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	7.1	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.230%		



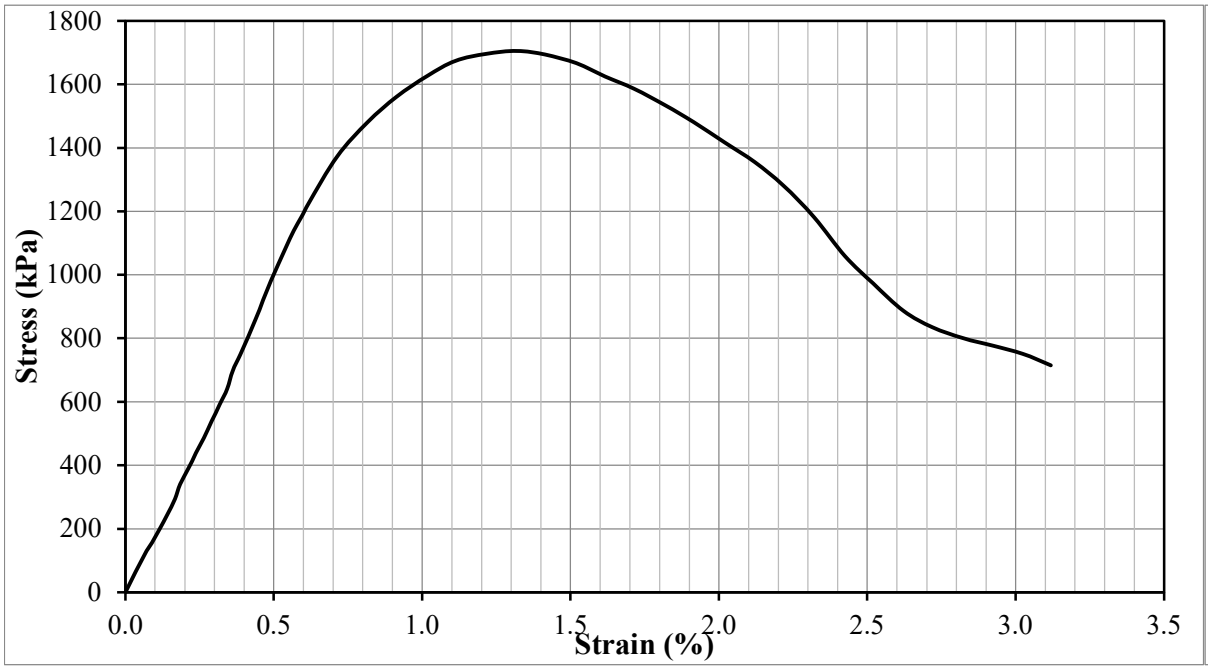
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,502	Strain at failure, εf :	1.08	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-23-C	Initial Area:	2110.8	mm^2
Test Date:	9/11/2021	Weight:	338.2	g
Strain Rate:	1 %/min	Unit Weight:	1638	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	7.2	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.230%		



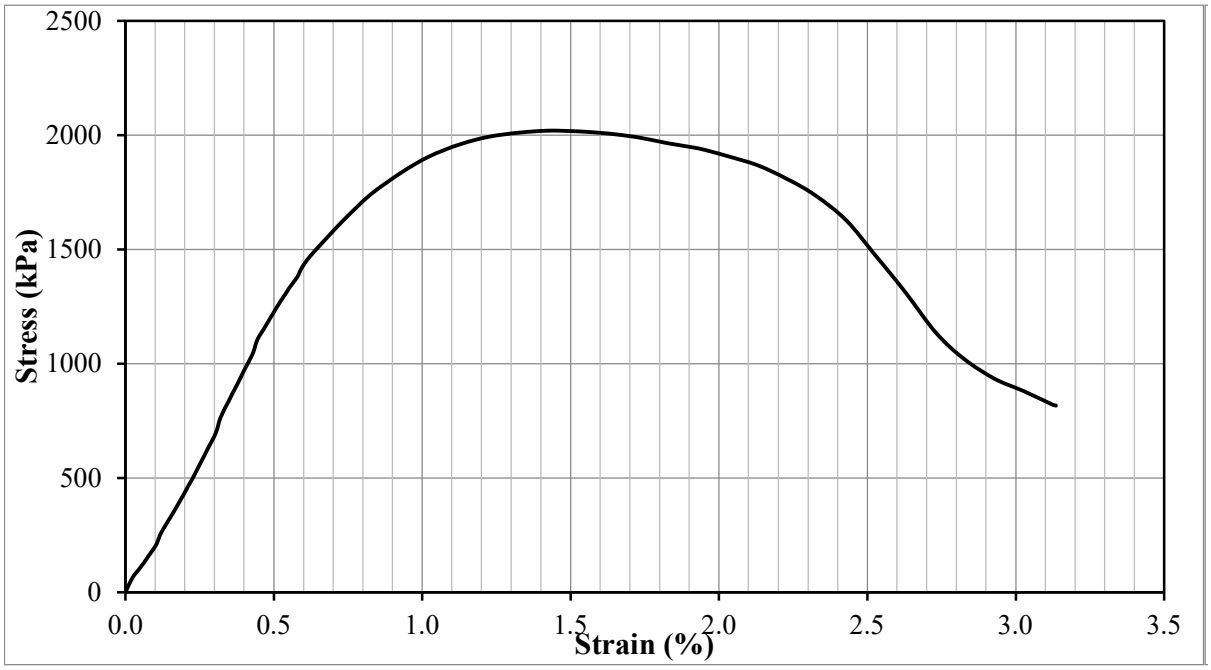
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,476	Strain at failure, εf :	1.17	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	96.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	O-23-D	Initial Area:	2098.4	mm^2
Test Date:	9/14/2021	Weight:	333.1	g
Strain Rate:	1 %/min	Unit Weight:	1649	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	9.9	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.230%		



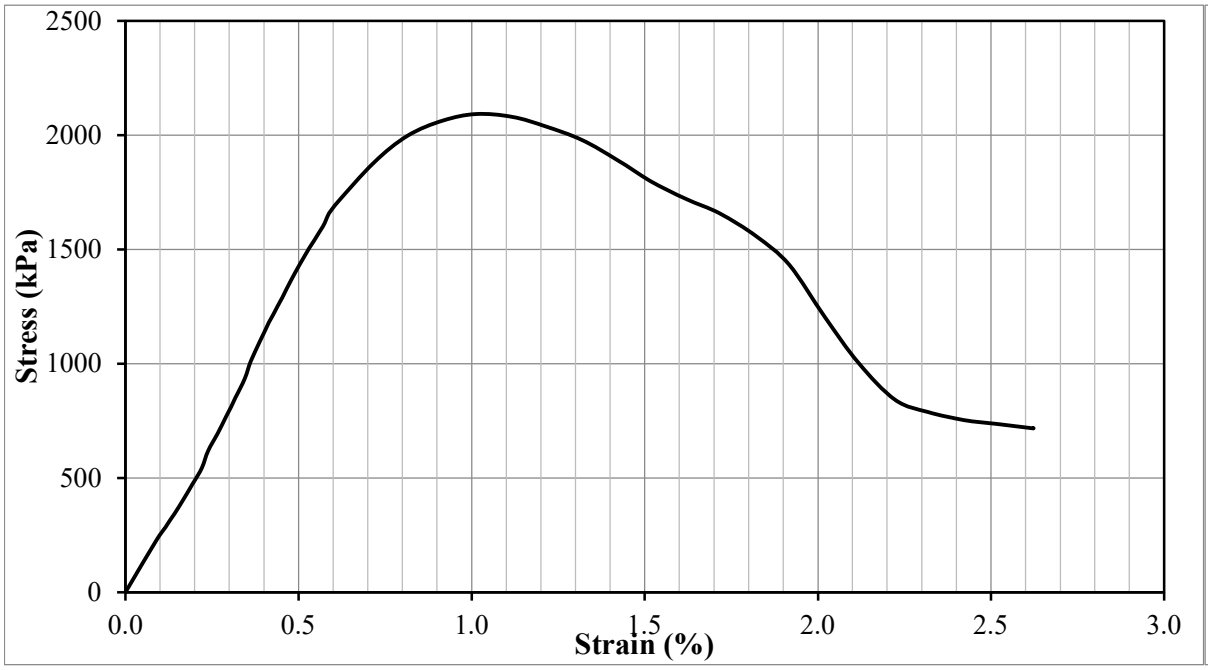
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,686	Strain at failure, εf :	1.32	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	93.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-23-E	Initial Area:	2119.1	mm^2
Test Date:	9/18/2021	Weight:	320.8	g
Strain Rate:	1 %/min	Unit Weight:	1628	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	13.9	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.230%		



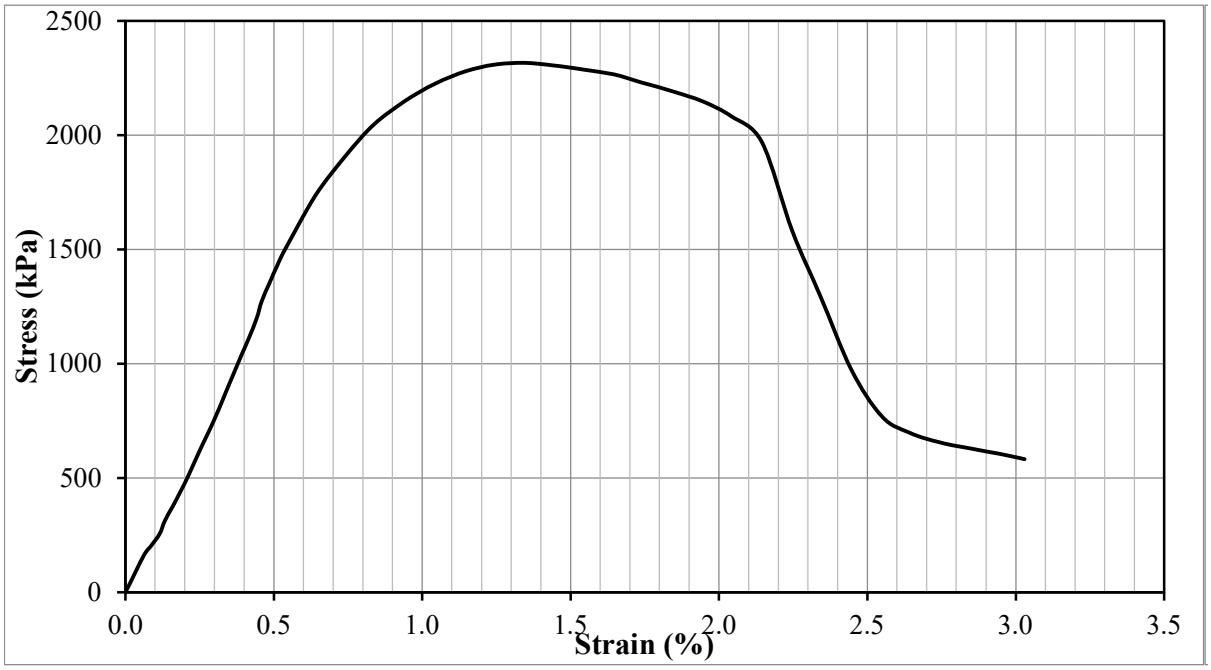
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,985	Strain at failure, εf :	1.42	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-23-F	Initial Area:	2110.8	mm^2
Test Date:	9/21/2021	Weight:	342.0	g
Strain Rate:	1 %/min	Unit Weight:	1641	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	16.8	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.230%		



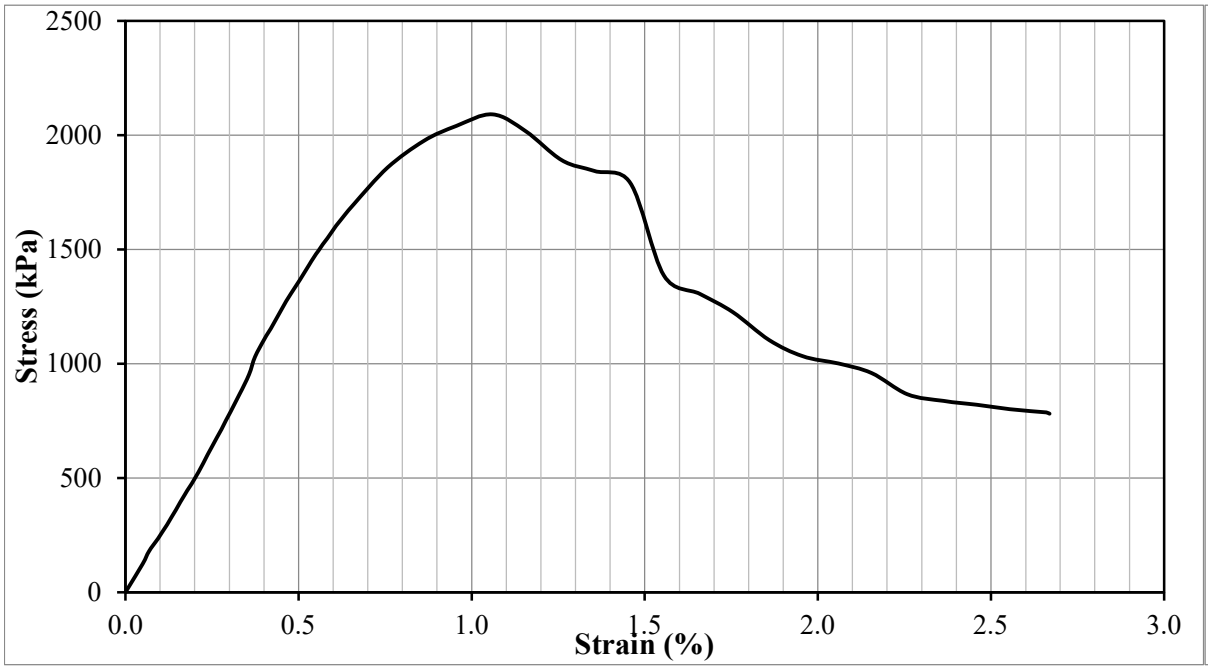
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,076	Strain at failure, εf :	1.01	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	95.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-23-G	Initial Area:	2108.7	mm^2
Test Date:	9/25/2021	Weight:	328.2	g
Strain Rate:	1 %/min	Unit Weight:	1637	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	21.0	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.230%		



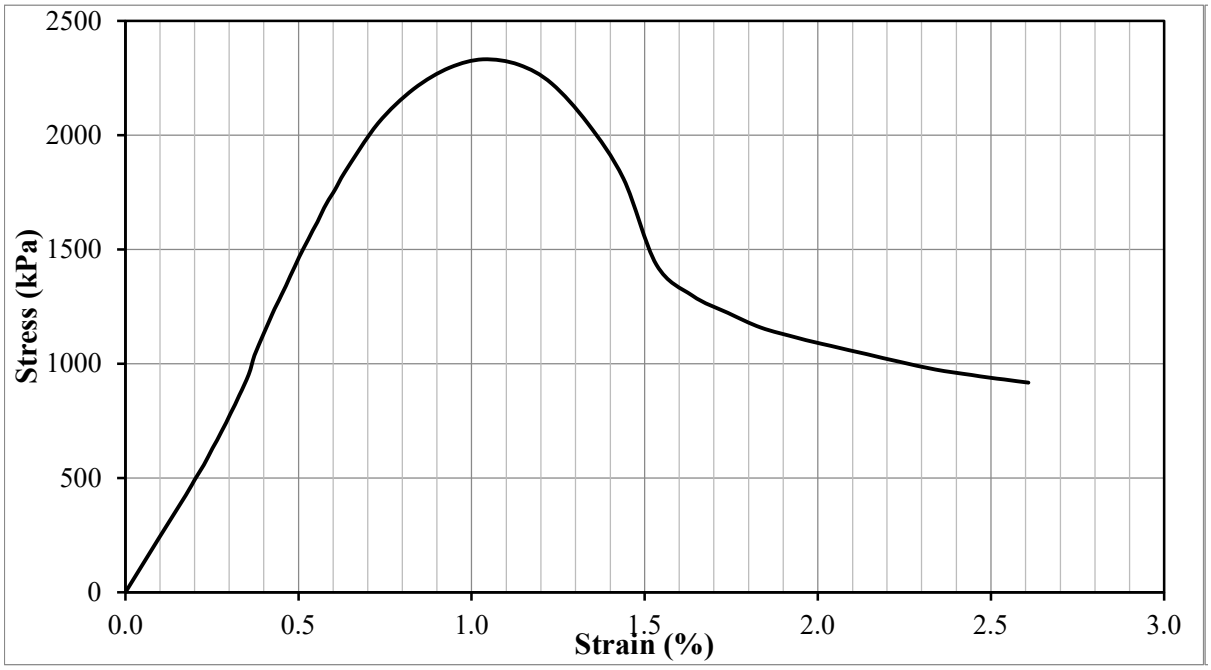
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,285	Strain at failure, εf :	1.34	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-23-H	Initial Area:	2119.1	mm^2
Test Date:	9/28/2021	Weight:	336.3	g
Strain Rate:	1 %/min	Unit Weight:	1633	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	23.8	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.230%		



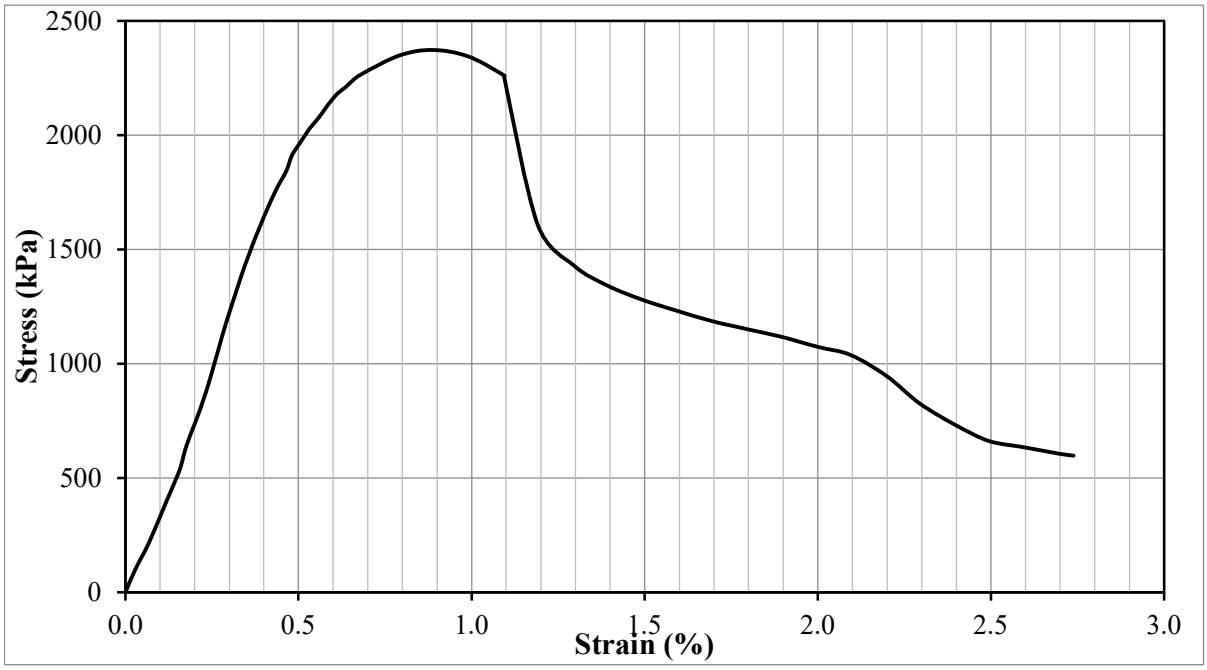
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,069	Strain at failure, εf :	1.06	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-23-I	Initial Area:	2108.7	mm^2
Test Date:	10/2/2021	Weight:	341.8	g
Strain Rate:	1 %/min	Unit Weight:	1641	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	27.9	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.230%		



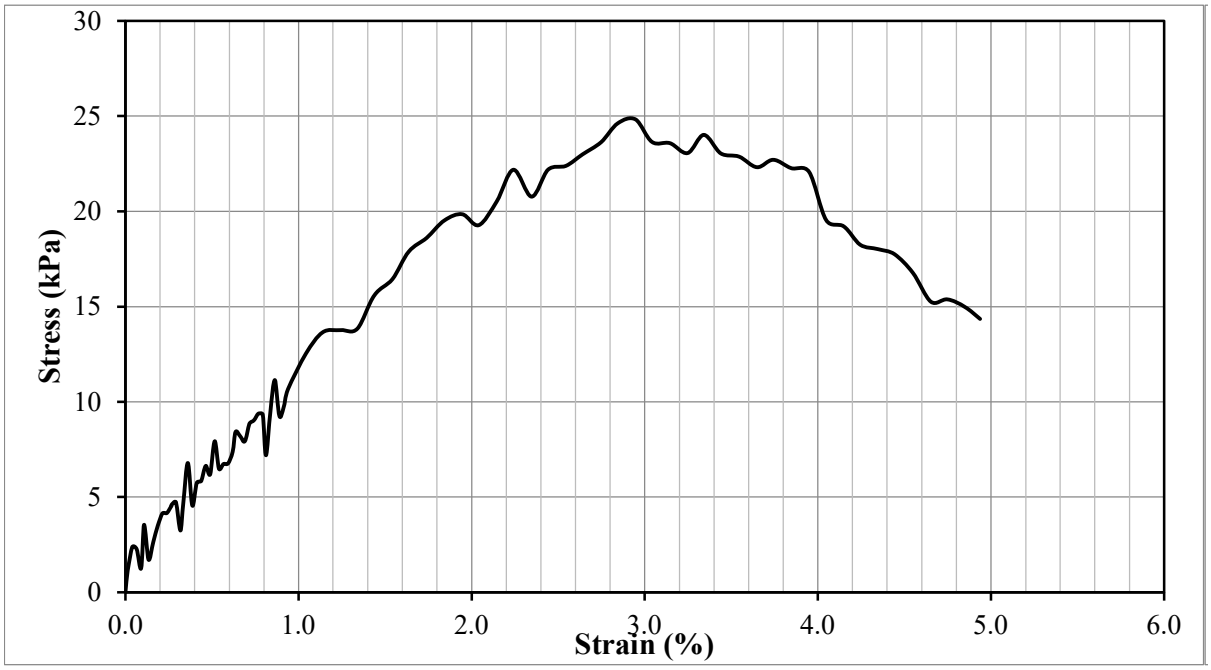
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,313	Strain at failure, εf :	1.03	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-23-J	Initial Area:	2112.9	mm^2
Test Date:	10/2/2021	Weight:	340.3	g
Strain Rate:	1 %/min	Unit Weight:	1644	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	27.9	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.230%		



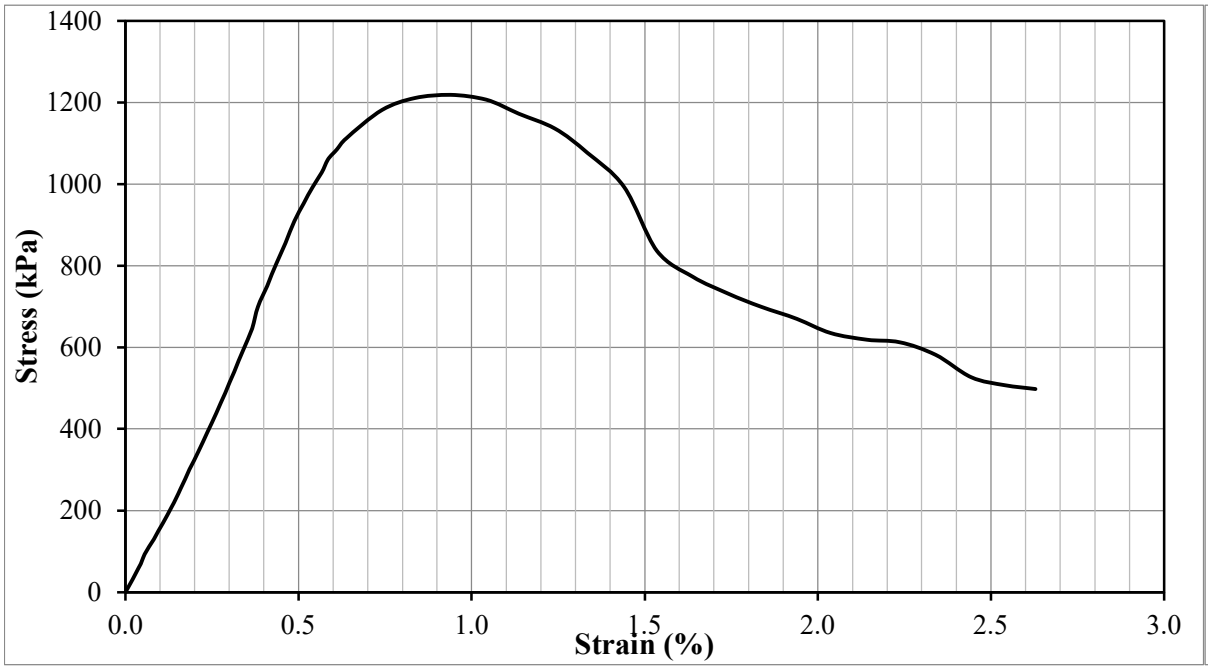
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,351	Strain at failure, εf :	0.89	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.3	mm
I.D.:	O-24-A	Initial Area:	2067.6	mm^2
Test Date:	9/9/2021	Weight:	349.7	g
Strain Rate:	1 %/min	Unit Weight:	1661	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	3.1	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.260%		



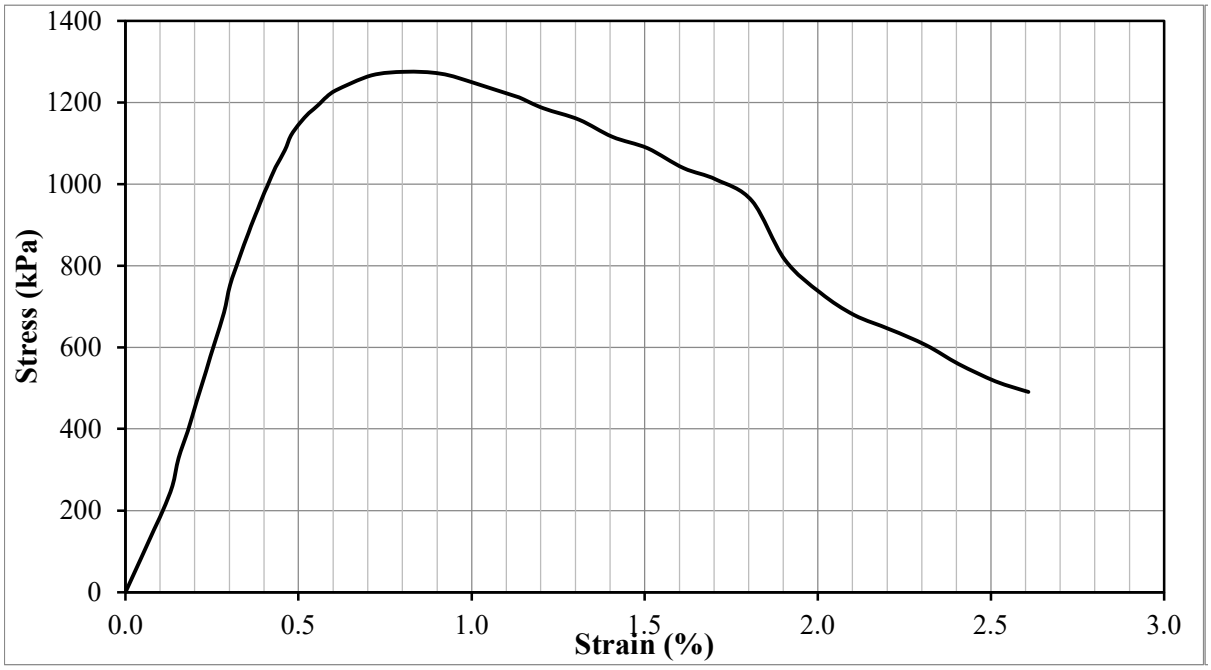
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	25	Strain at failure, εf :	2.95	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-24-B	Initial Area:	2110.8	mm^2
Test Date:	9/13/2021	Weight:	346.1	g
Strain Rate:	1 %/min	Unit Weight:	1640	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	6.9	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.260%		



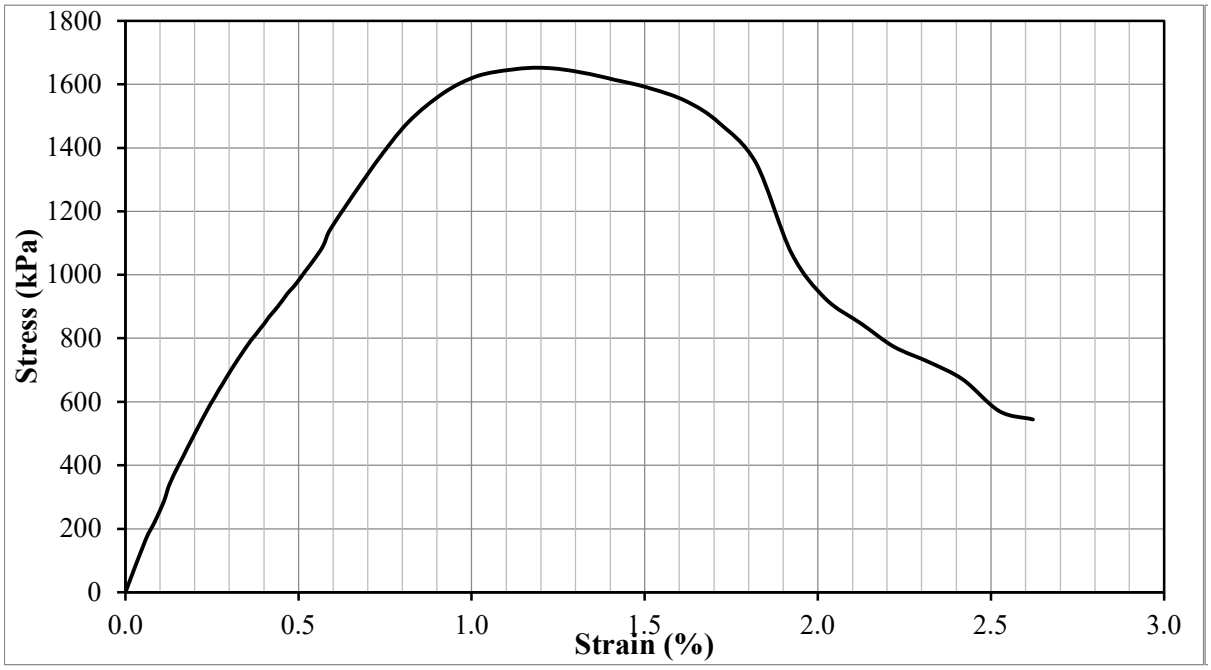
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,211	Strain at failure, εf :	0.94	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-24-C	Initial Area:	2114.9	mm^2
Test Date:	9/13/2021	Weight:	347.2	g
Strain Rate:	1 %/min	Unit Weight:	1638	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	6.9	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.260%		



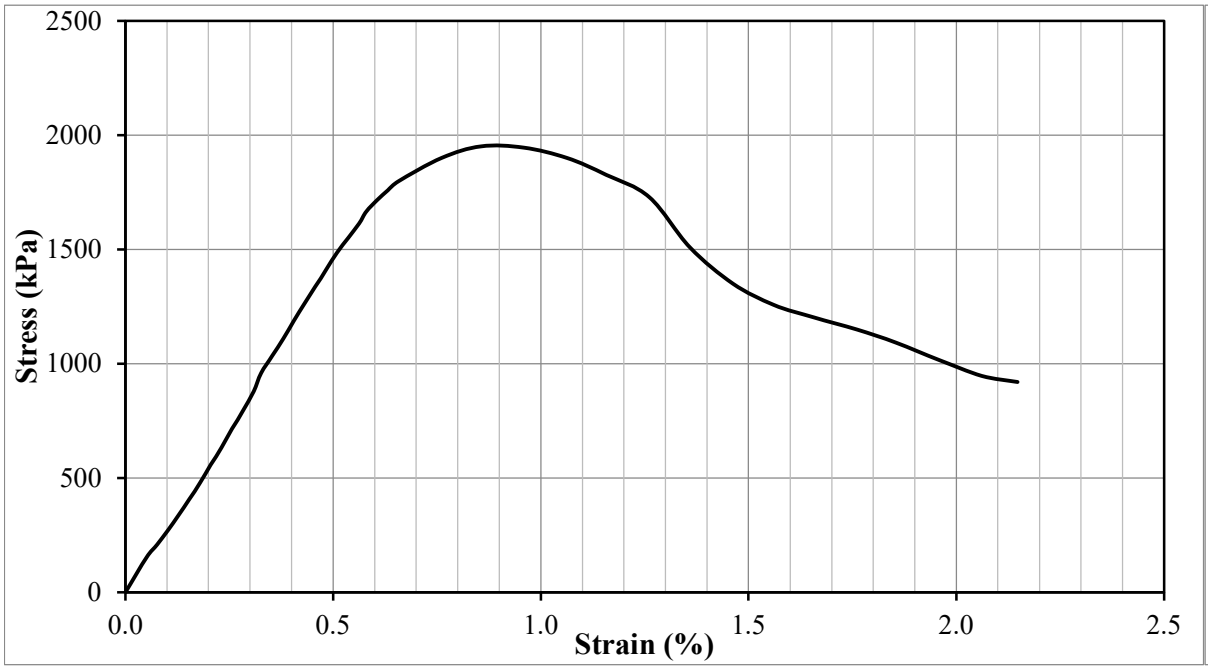
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,268	Strain at failure, εf :	0.81	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-24-D	Initial Area:	2114.9	mm^2
Test Date:	9/16/2021	Weight:	342.6	g
Strain Rate:	1 %/min	Unit Weight:	1634	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	10.1	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.260%		



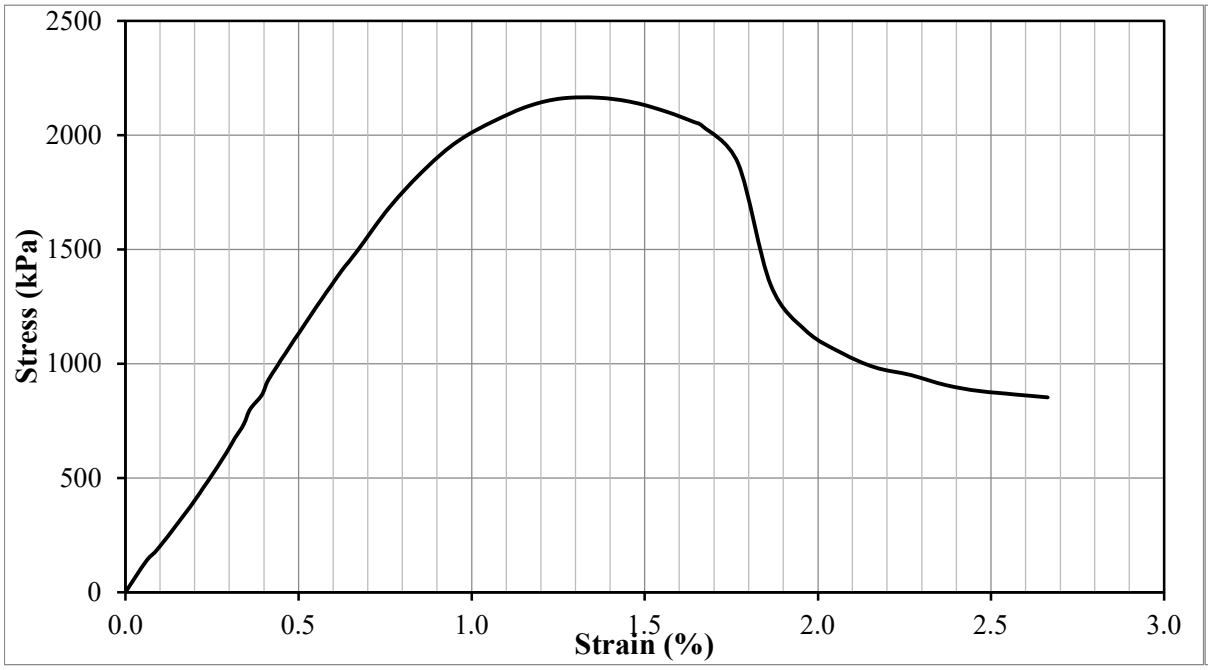
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,640	Strain at failure, εf :	1.21	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-24-E	Initial Area:	2108.7	mm^2
Test Date:	9/20/2021	Weight:	347.0	g
Strain Rate:	1 %/min	Unit Weight:	1643	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	14.1	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.260%		



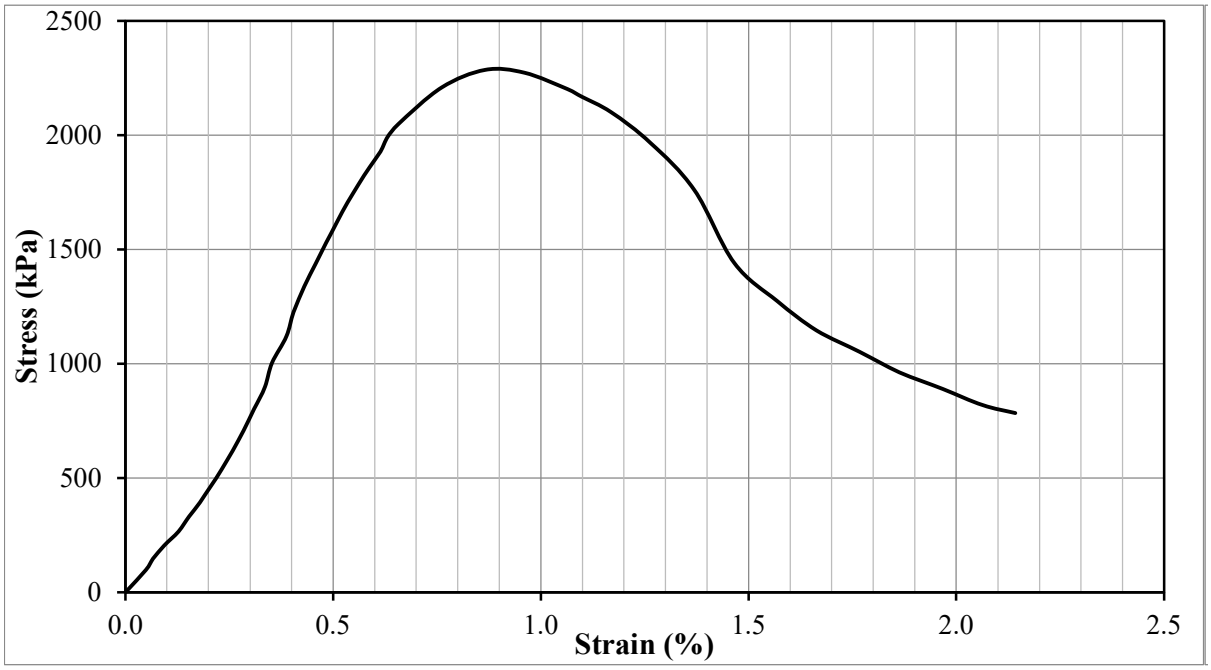
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,940	Strain at failure, εf :	0.86	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	96.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-24-F	Initial Area:	2108.7	mm^2
Test Date:	9/23/2021	Weight:	332.8	g
Strain Rate:	1 %/min	Unit Weight:	1640	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	17.1	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.260%		



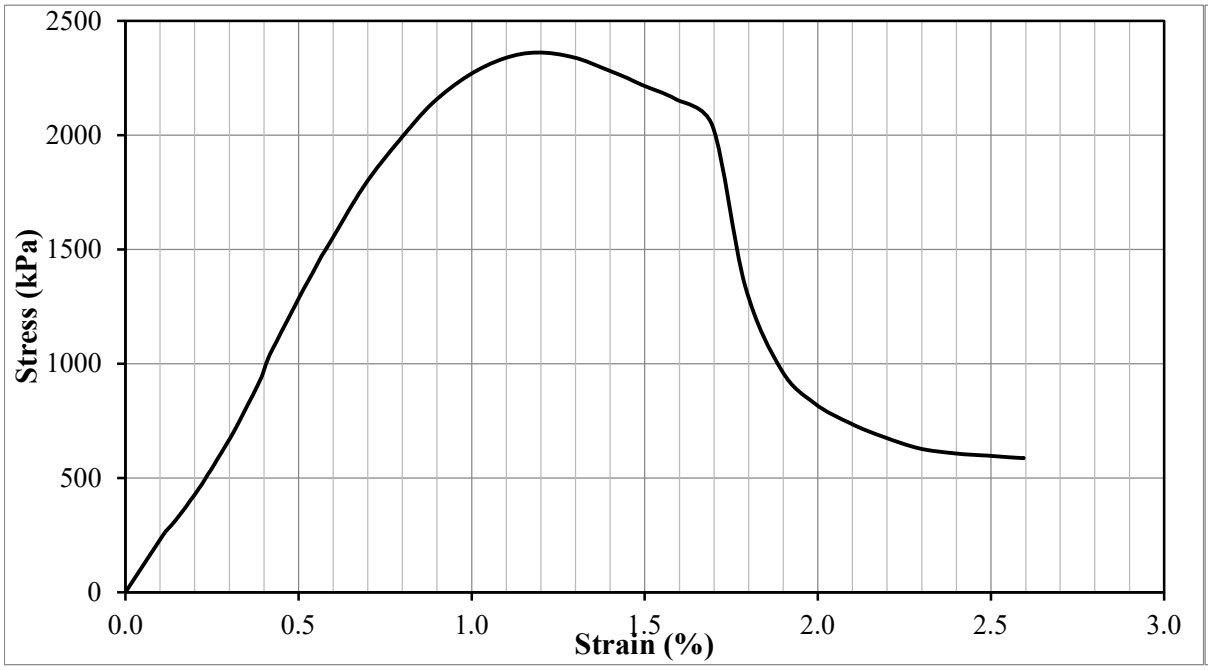
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,139	Strain at failure, εf :	1.37	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-24-G	Initial Area:	2108.7	mm^2
Test Date:	9/27/2021	Weight:	346.5	g
Strain Rate:	1 %/min	Unit Weight:	1646	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	20.9	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.260%		



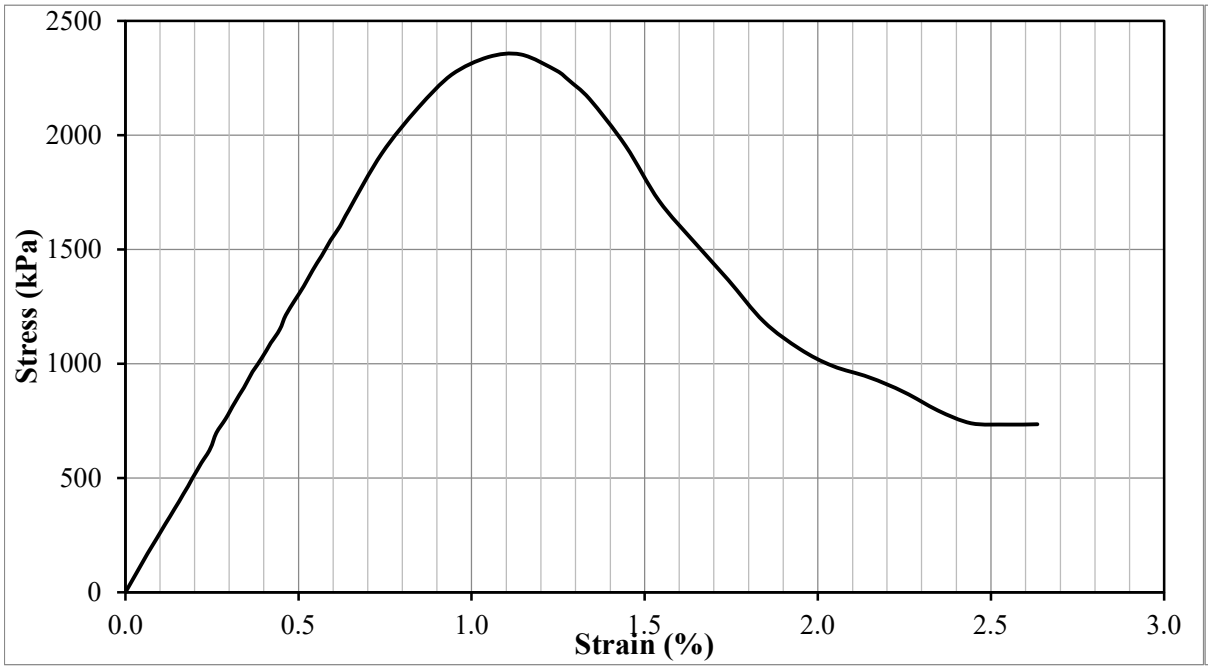
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,272	Strain at failure, εf :	0.87	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-24-H	Initial Area:	2112.9	mm^2
Test Date:	9/30/2021	Weight:	339.5	g
Strain Rate:	1 %/min	Unit Weight:	1637	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	24.2	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.260%		



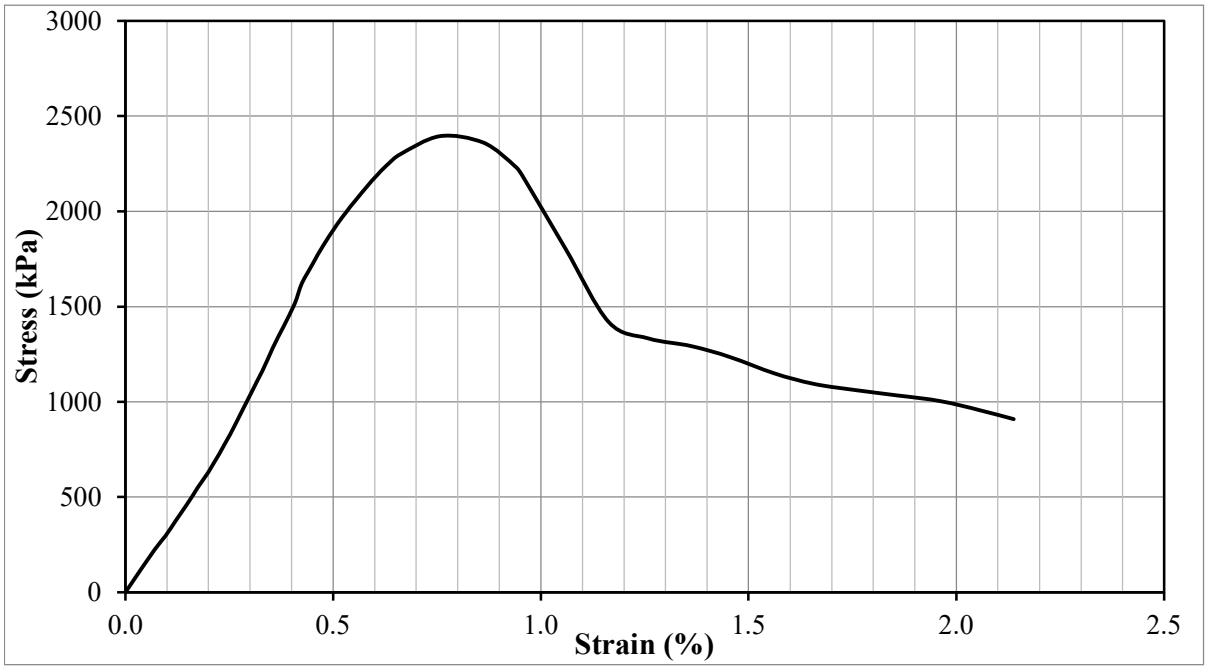
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,341	Strain at failure, εf :	1.19	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	94.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-24-I	Initial Area:	2117.0	mm^2
Test Date:	10/4/2021	Weight:	329.8	g
Strain Rate:	1 %/min	Unit Weight:	1654	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	27.9	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.260%		



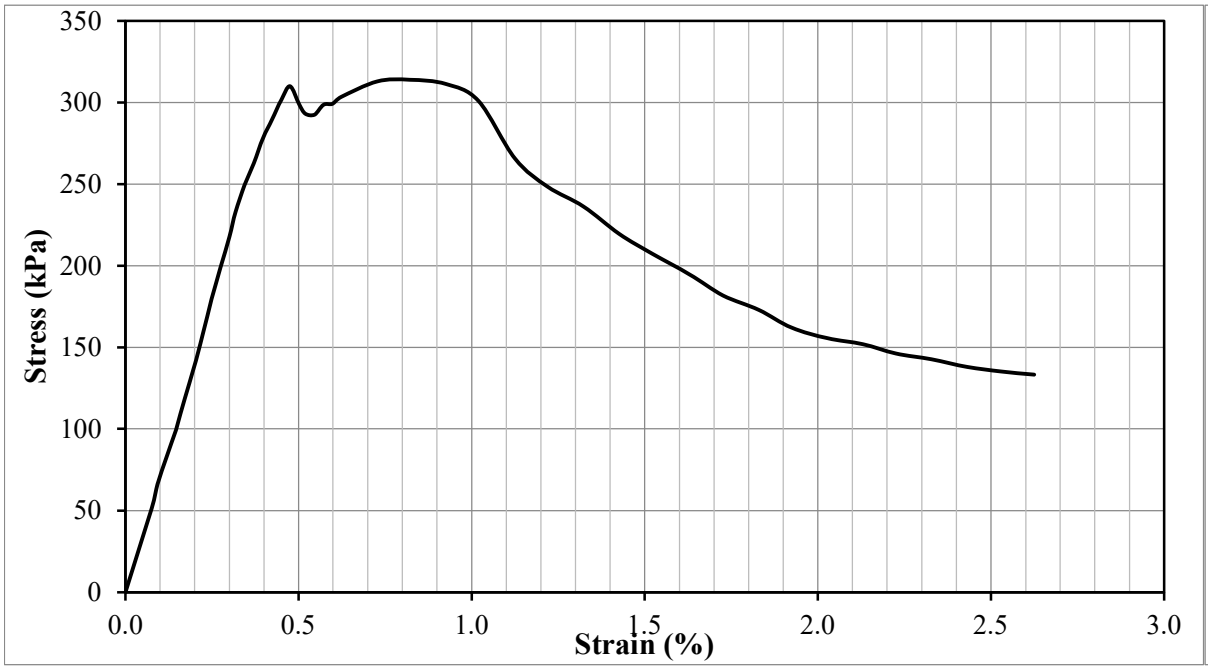
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,318	Strain at failure, εf :	1.14	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-24-J	Initial Area:	2119.1	mm^2
Test Date:	10/4/2021	Weight:	355.0	g
Strain Rate:	1 %/min	Unit Weight:	1668	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	27.9	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.260%		



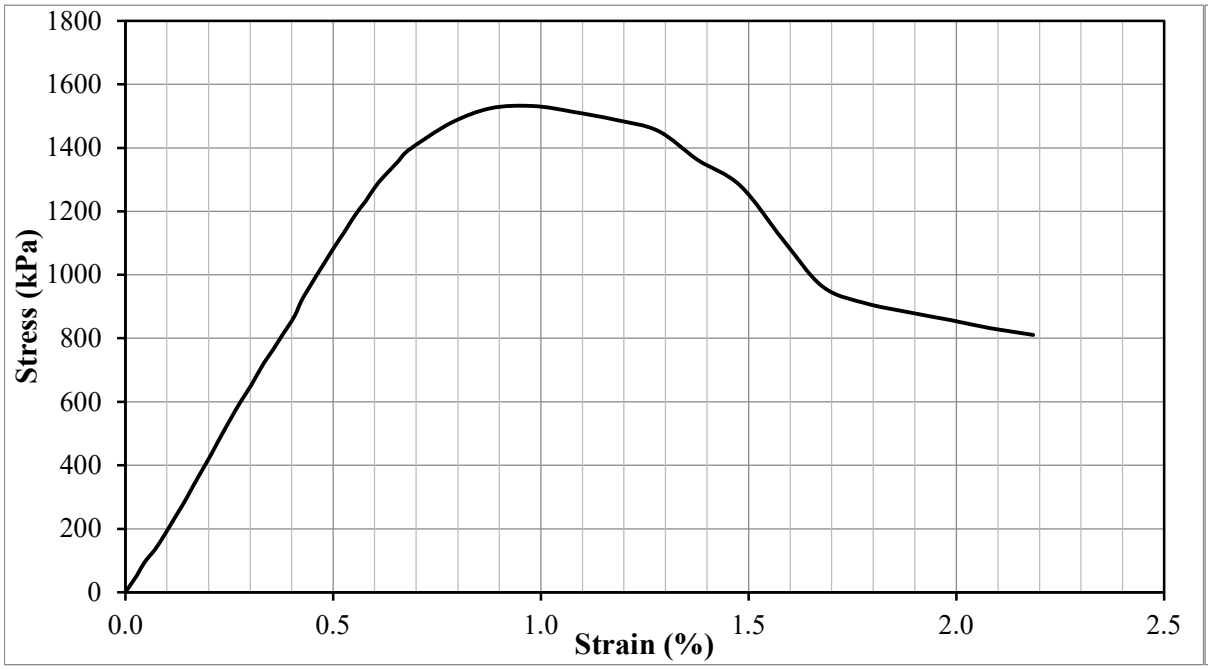
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,382	Strain at failure, εf :	0.76	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	96.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-25-E	Initial Area:	2112.9	mm^2
Test Date:	9/20/2021	Weight:	331.4	g
Strain Rate:	1 %/min	Unit Weight:	1630	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	14.0	days
$(w{:}c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.300%		



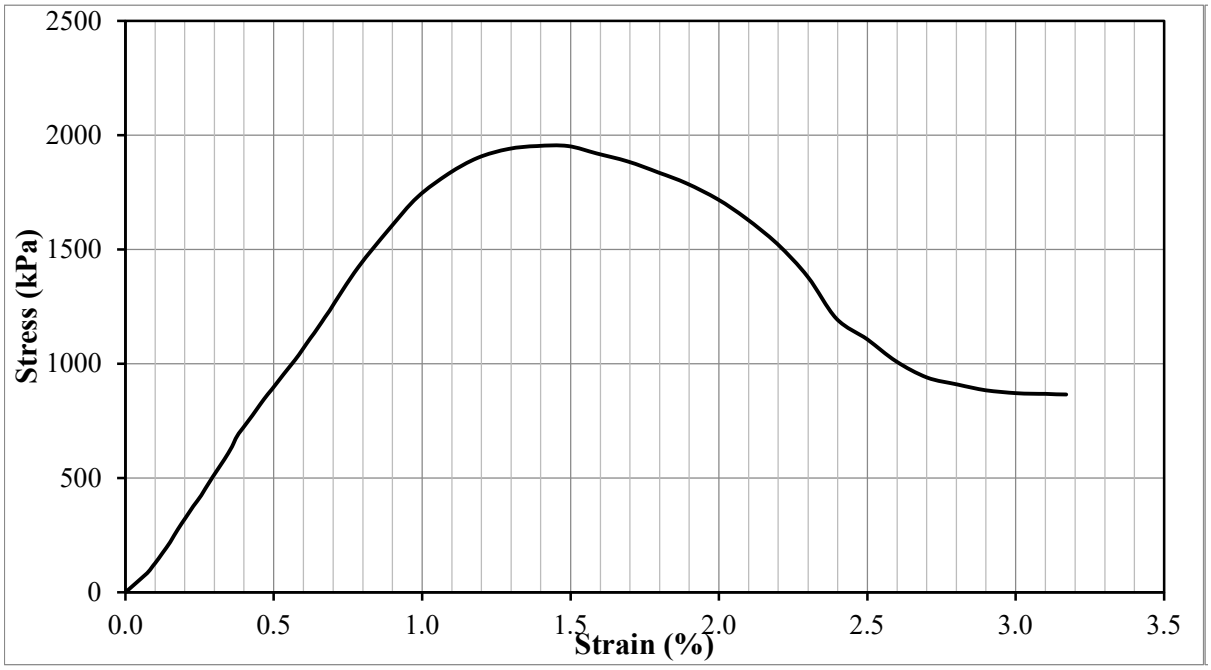
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	310	Strain at failure, εf :	0.82	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	96.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-25-F	Initial Area:	2112.9	mm^2
Test Date:	9/23/2021	Weight:	335.7	g
Strain Rate:	1 %/min	Unit Weight:	1639	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	17.0	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.300%		



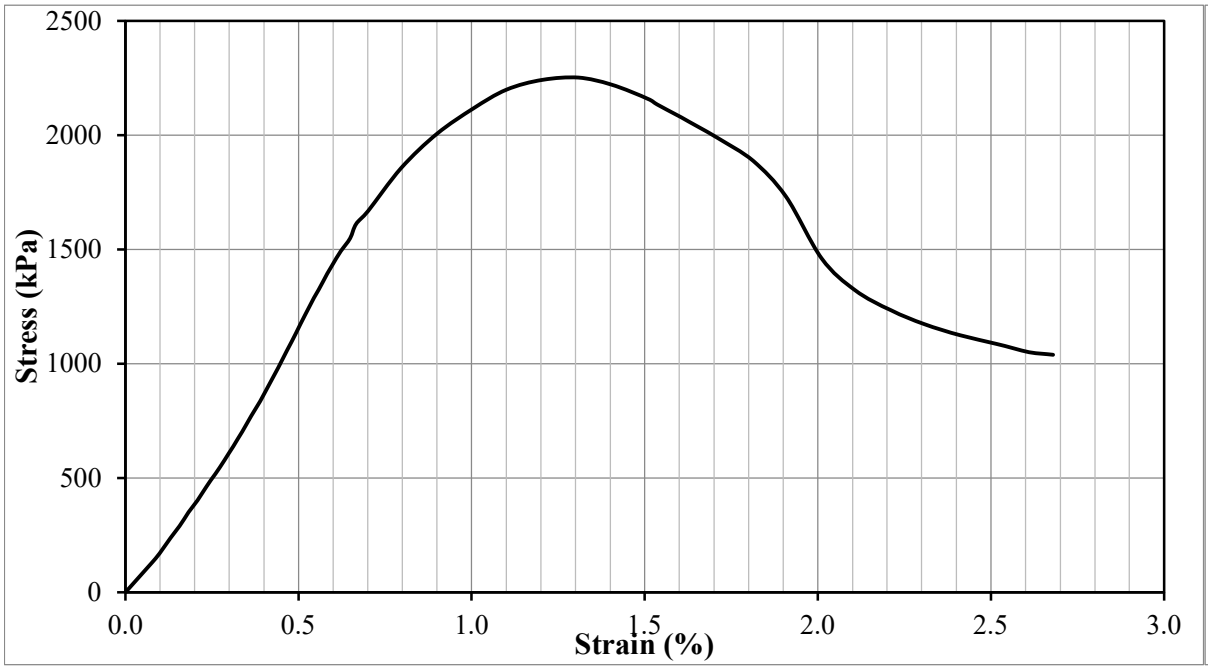
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,515	Strain at failure, εf :	0.98	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	95.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-25-G	Initial Area:	2112.9	mm^2
Test Date:	9/27/2021	Weight:	328.3	g
Strain Rate:	1 %/min	Unit Weight:	1635	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	20.9	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.300%		



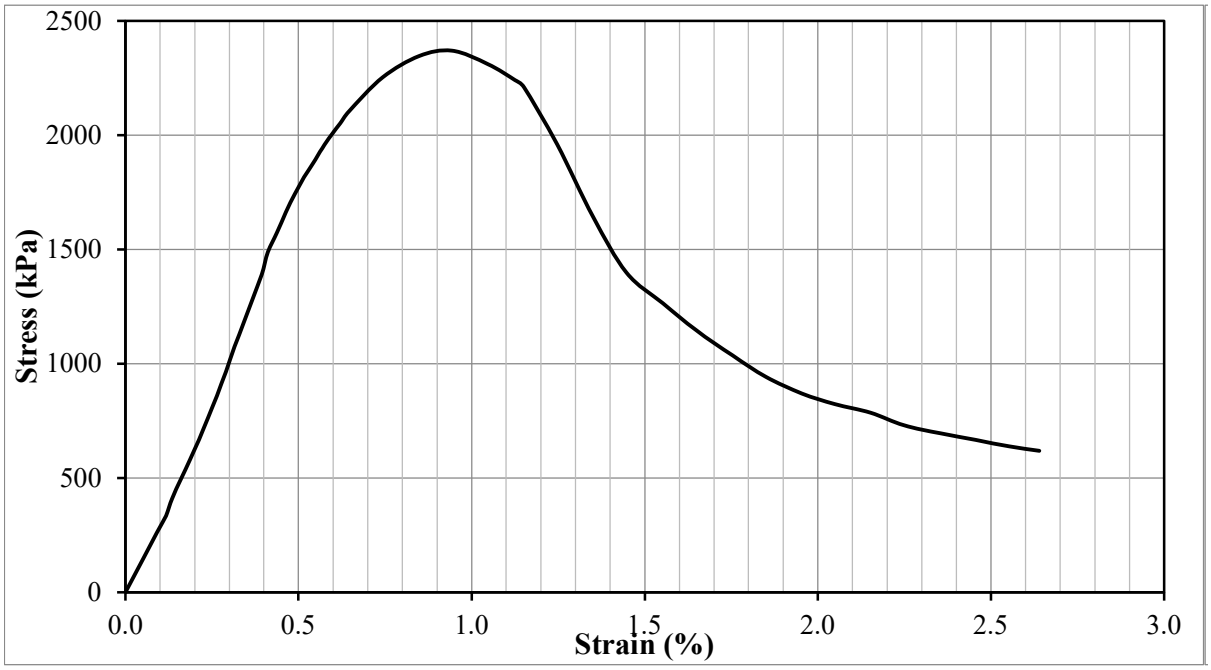
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,926	Strain at failure, εf :	1.39	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	96.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-25-H	Initial Area:	2117.0	mm^2
Test Date:	9/30/2021	Weight:	333.3	g
Strain Rate:	1 %/min	Unit Weight:	1636	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	24.1	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.300%		



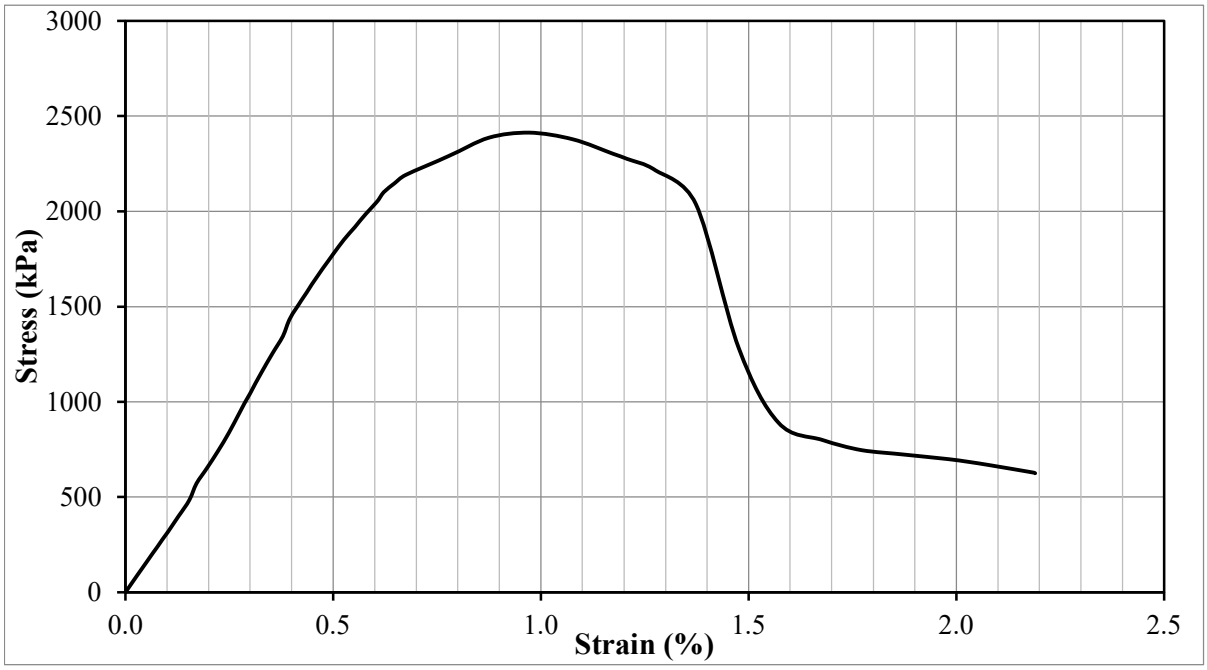
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,225	Strain at failure, εf :	1.31	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	O-25-I	Initial Area:	2121.1	mm^2
Test Date:	10/4/2021	Weight:	340.5	g
Strain Rate:	1 %/min	Unit Weight:	1633	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	27.8	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.300%		



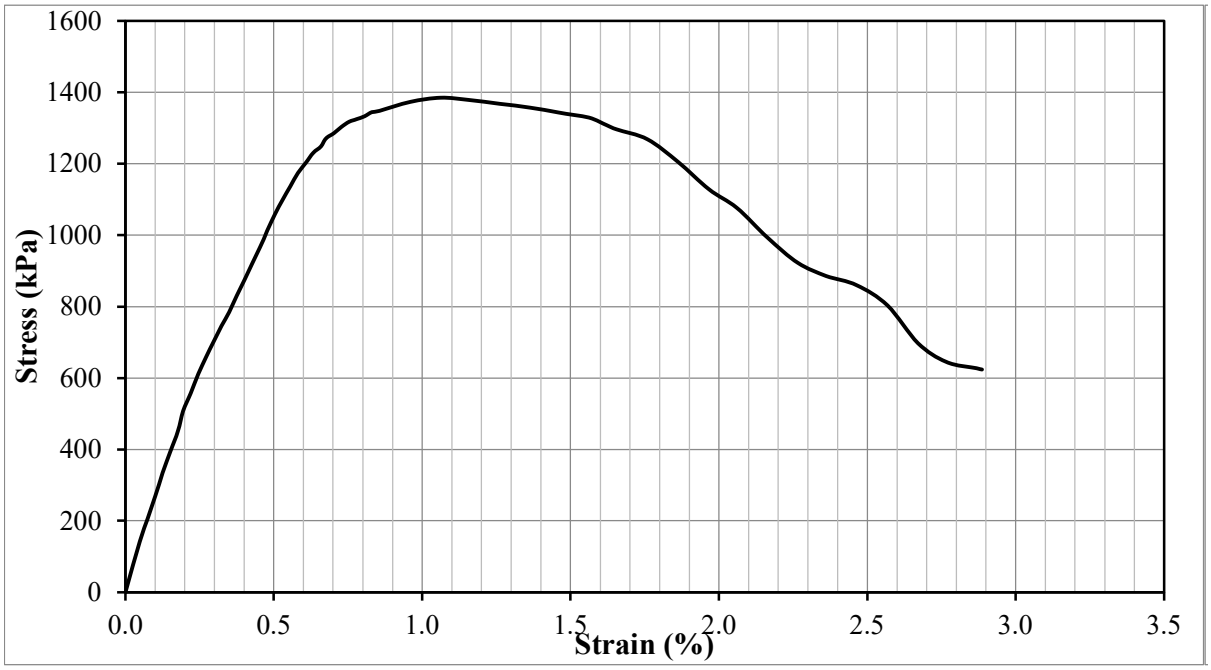
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,349	Strain at failure, εf :	0.94	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-25-J	Initial Area:	2110.8	mm^2
Test Date:	10/4/2021	Weight:	346.3	g
Strain Rate:	1 %/min	Unit Weight:	1644	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	27.8	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.300%		



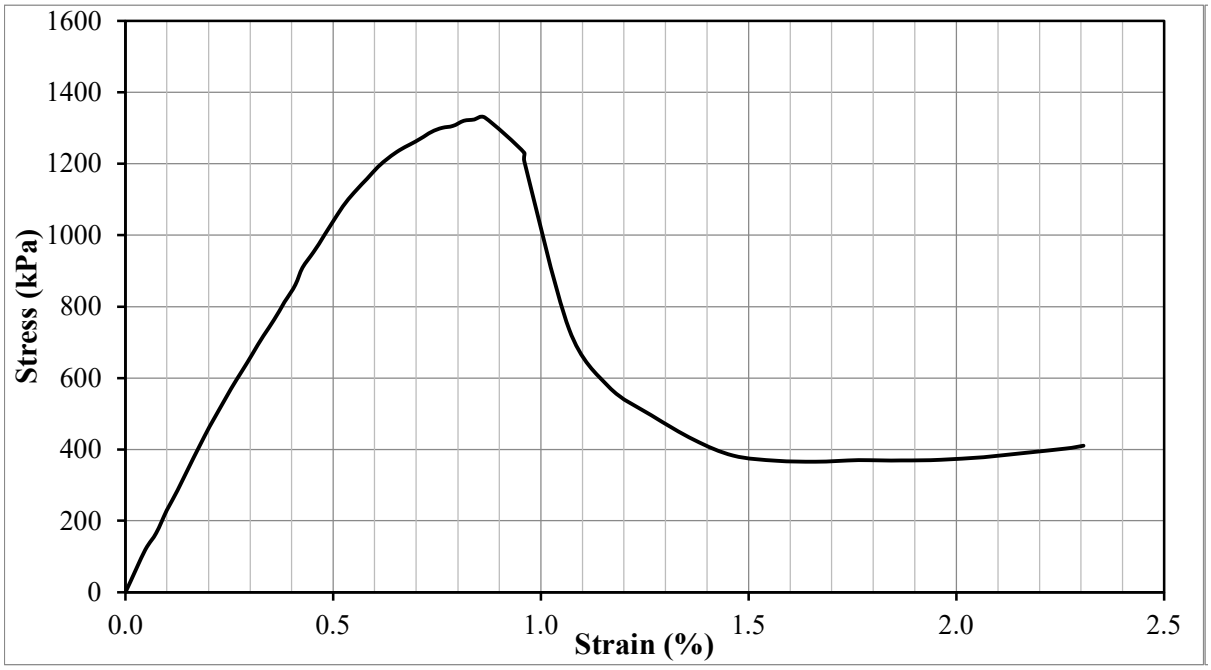
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,398	Strain at failure, εf :	0.97	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-27-A	Initial Area:	2104.6	mm^2
Test Date:	3/26/2021	Weight:	391.1	g
Strain Rate:	1 %/min	Unit Weight:	1831	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	2.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.100%		



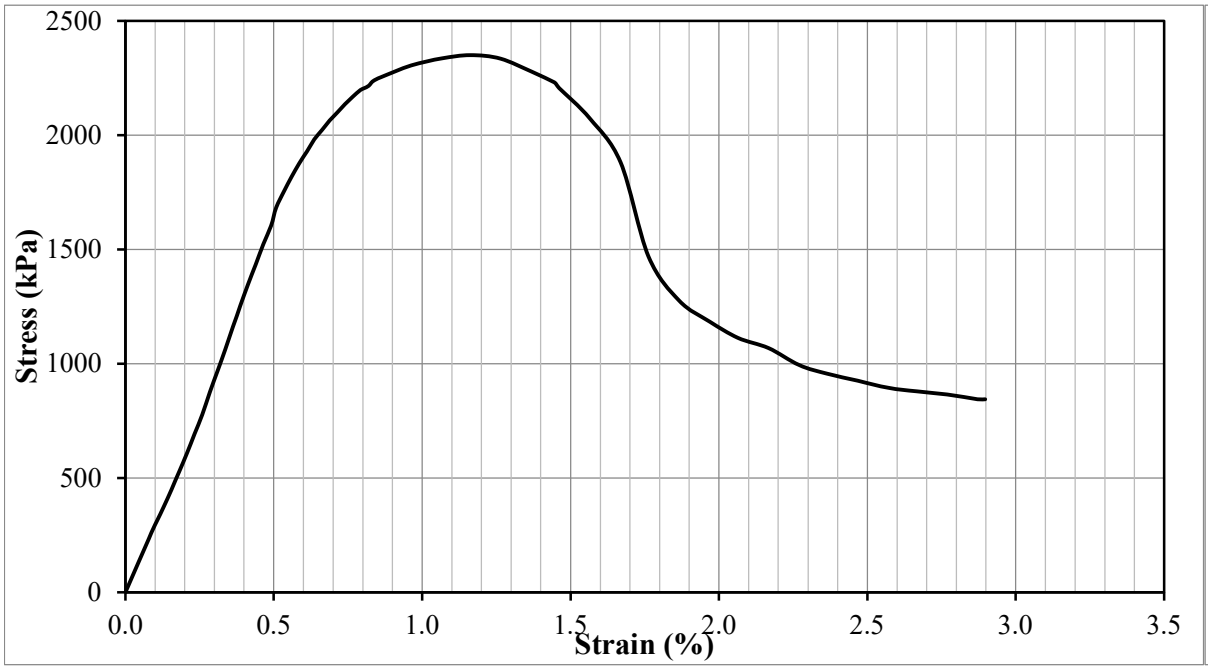
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,380	Strain at failure, εf :	1.06	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-27-H	Initial Area:	2106.6	mm^2
Test Date:	3/26/2021	Weight:	389.1	g
Strain Rate:	1 %/min	Unit Weight:	1828	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	2.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.100%		



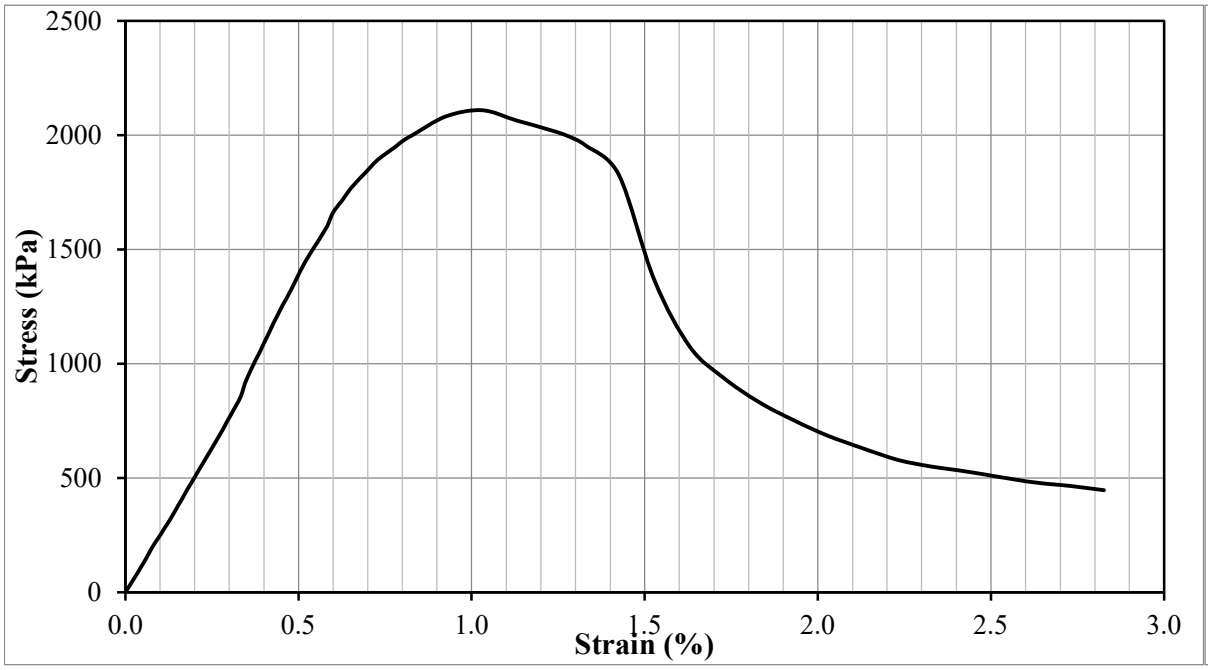
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,323	Strain at failure, εf :	0.87	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-27-B	Initial Area:	2117.0	mm^2
Test Date:	3/30/2021	Weight:	393.5	g
Strain Rate:	1 %/min	Unit Weight:	1825	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	7.1	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.100%		



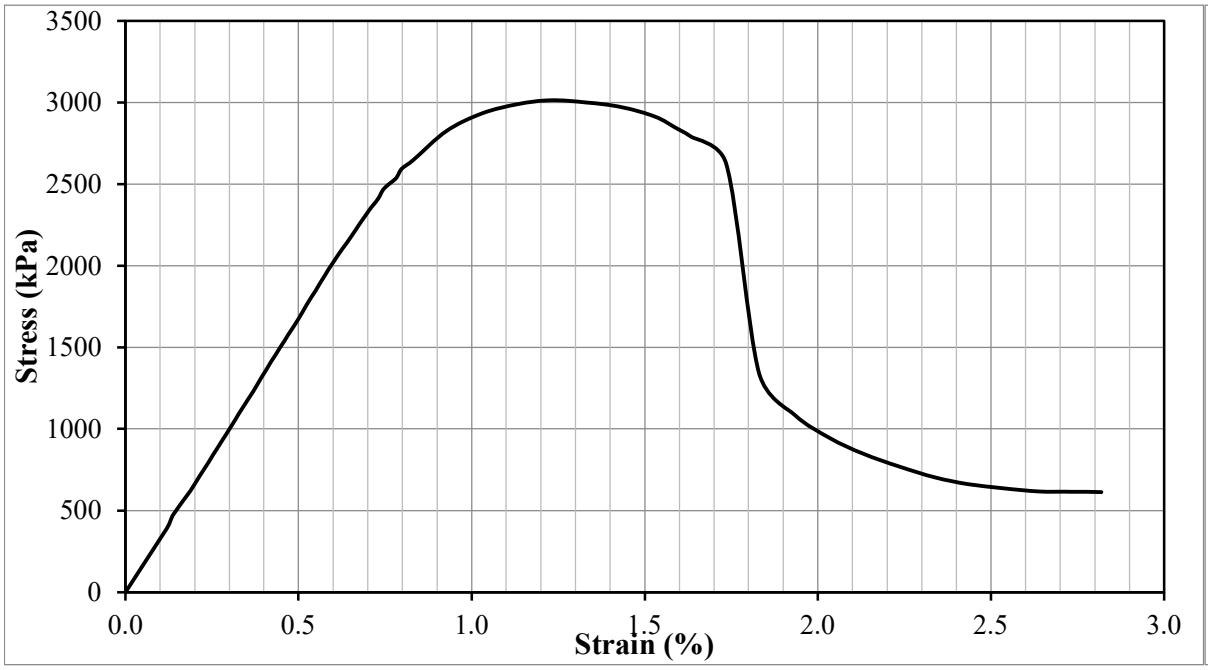
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,343	Strain at failure, εf :	1.16	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-27-G	Initial Area:	2112.9	mm^2
Test Date:	3/30/2021	Weight:	390.7	g
Strain Rate:	1 %/min	Unit Weight:	1828	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	7.1	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.100%		



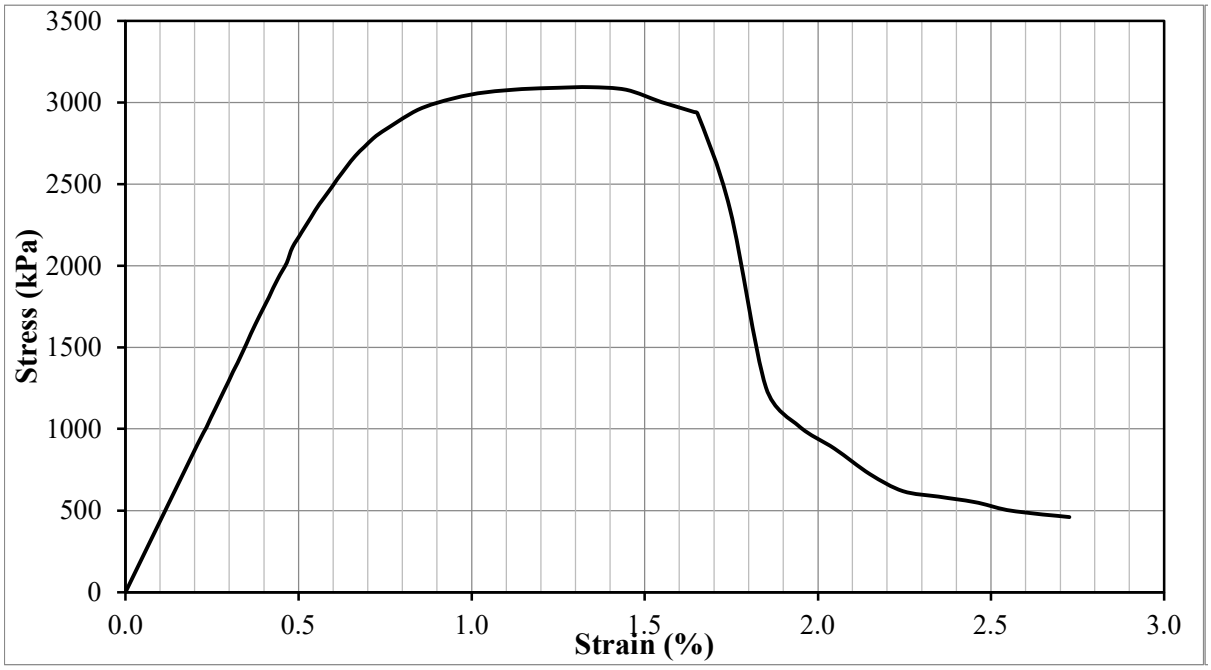
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,101	Strain at failure, εf :	1.03	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	O-27-C	Initial Area:	2100.5	mm^2
Test Date:	4/6/2021	Weight:	389.6	g
Strain Rate:	1 %/min	Unit Weight:	1838	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	14.0	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.100%		



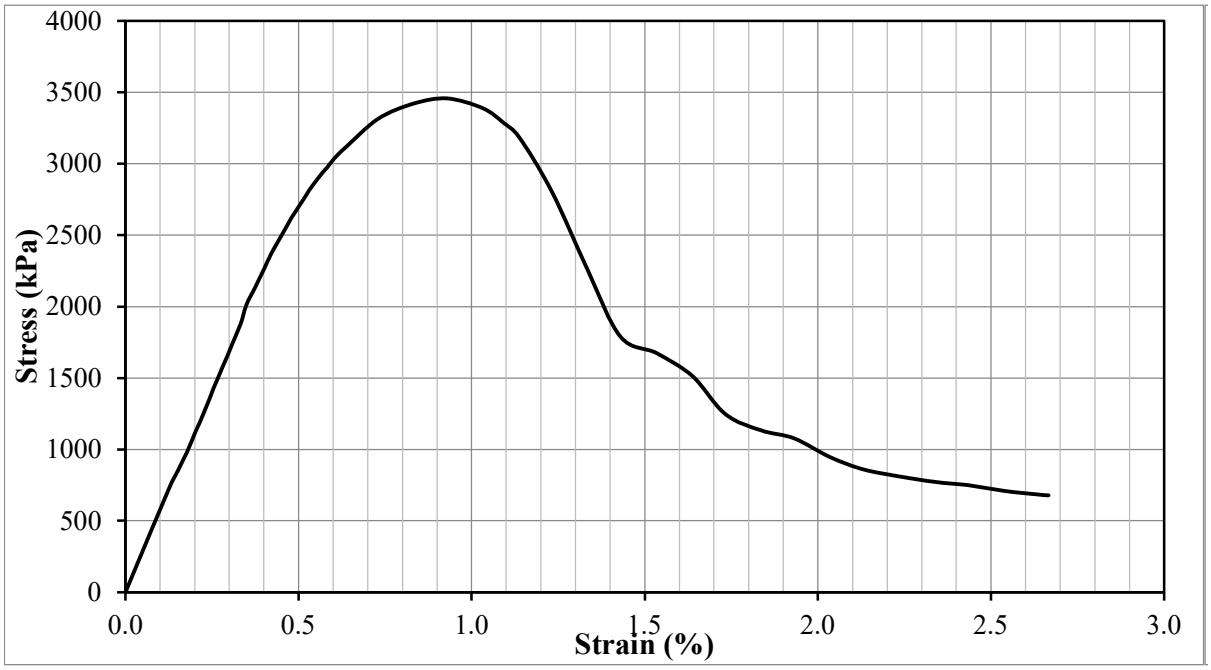
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,002	Strain at failure, εf :	1.23	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-27-F	Initial Area:	2110.8	mm^2
Test Date:	4/6/2021	Weight:	392.4	g
Strain Rate:	1 %/min	Unit Weight:	1832	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	14.0	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.100%		



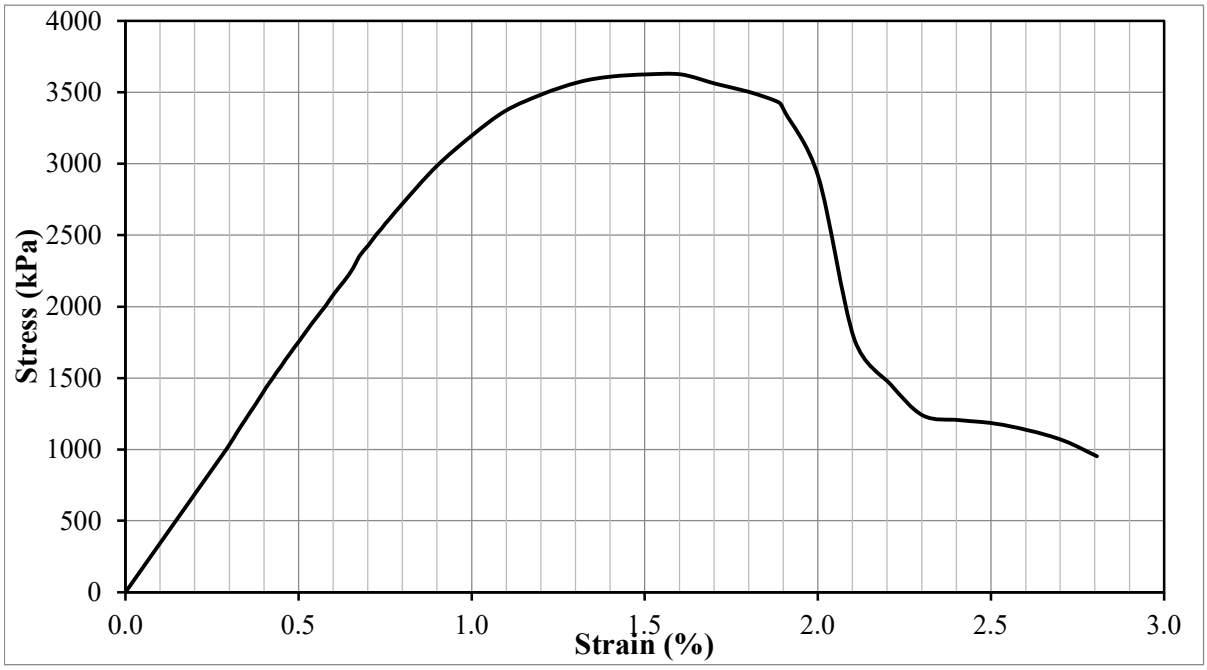
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,083	Strain at failure, εf :	1.34	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-27-D	Initial Area:	2104.6	mm^2
Test Date:	4/20/2021	Weight:	393.3	g
Strain Rate:	1 %/min	Unit Weight:	1839	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	27.8	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.100%		



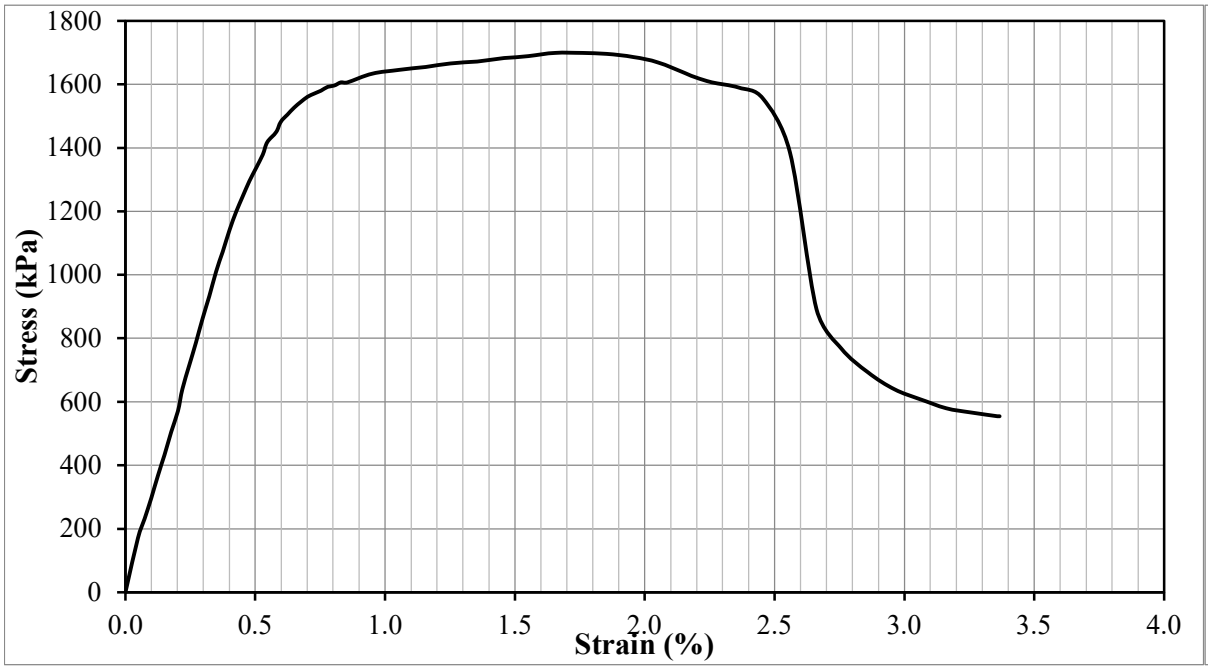
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,447	Strain at failure, εf :	0.93	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	O-27-D	Initial Area:	2121.1	mm^2
Test Date:	4/20/2021	Weight:	387.3	g
Strain Rate:	1 %/min	Unit Weight:	1823	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	27.8	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.100%		



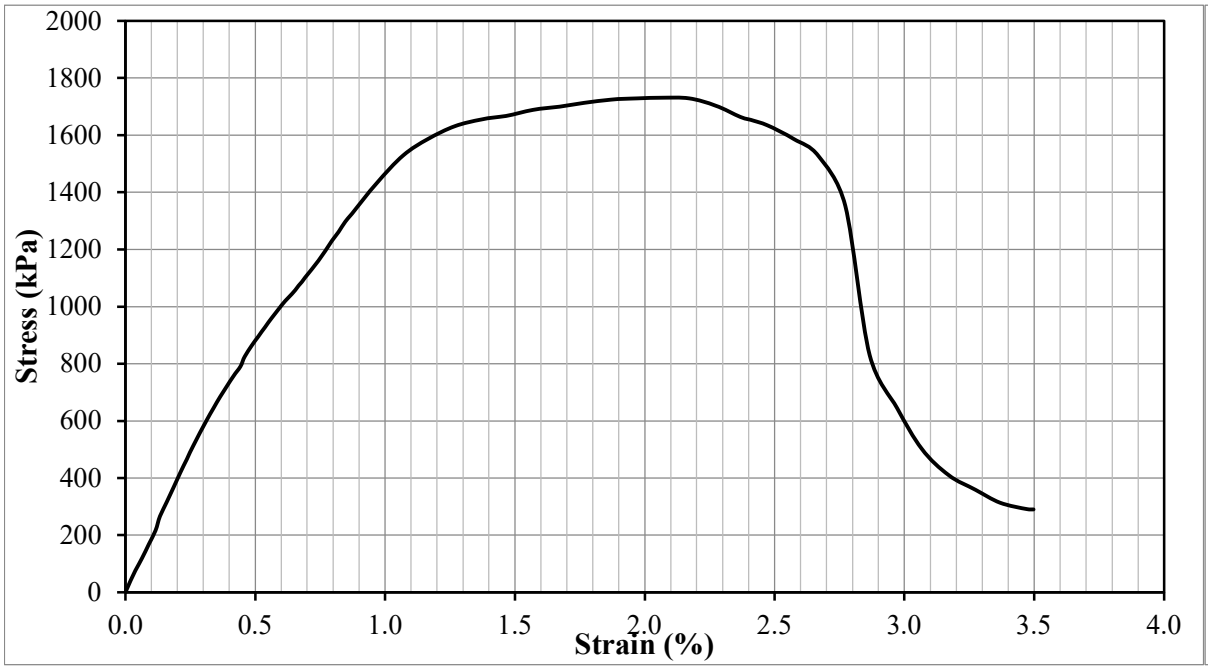
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,603	Strain at failure, εf :	1.51	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-28-A	Initial Area:	2119.1	mm^2
Test Date:	3/27/2021	Weight:	390.2	g
Strain Rate:	1 %/min	Unit Weight:	1815	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	3.1	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.050%		



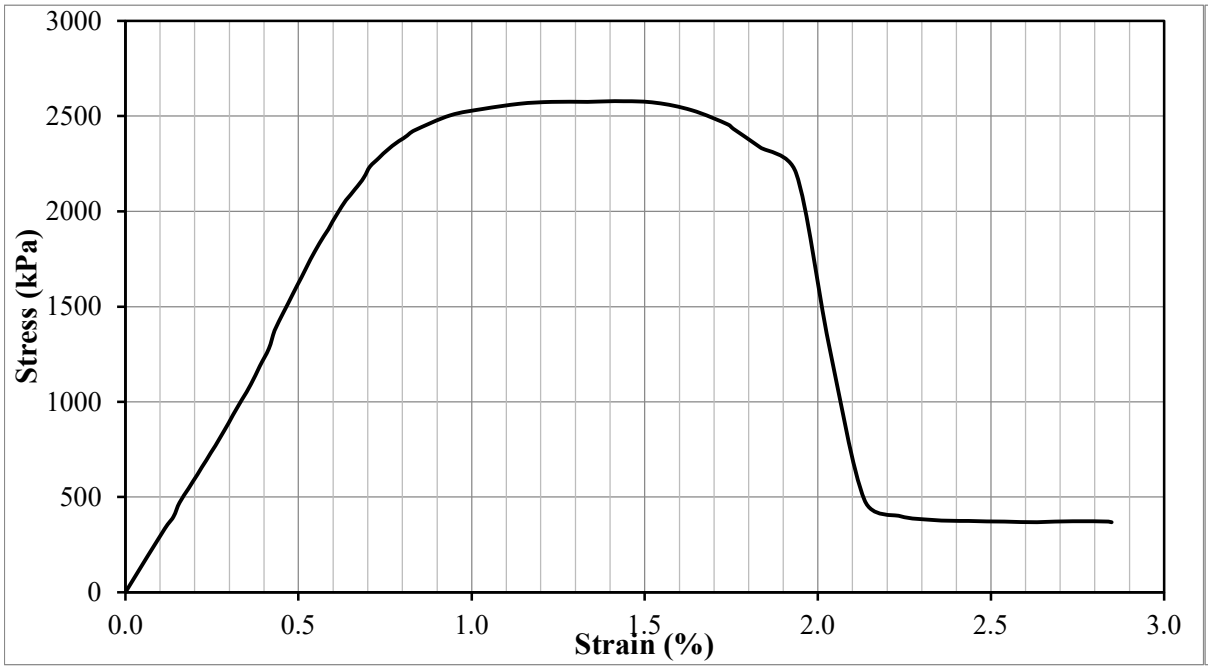
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,693	Strain at failure, εf :	1.66	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-28-H	Initial Area:	2112.9	mm^2
Test Date:	3/27/2021	Weight:	385.7	g
Strain Rate:	1 %/min	Unit Weight:	1823	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	3.1	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.050%		



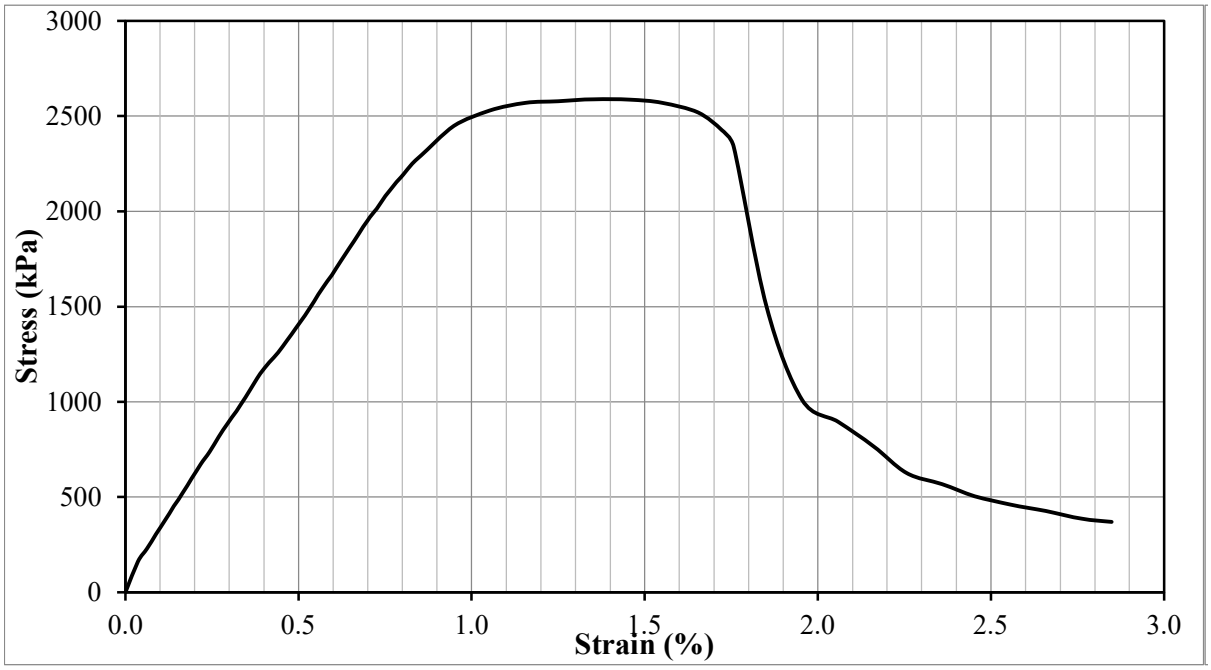
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,721	Strain at failure, εf :	2.07	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-28-B	Initial Area:	2114.9	mm^2
Test Date:	3/31/2021	Weight:	390.1	g
Strain Rate:	1 %/min	Unit Weight:	1826	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	7.2	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.050%		



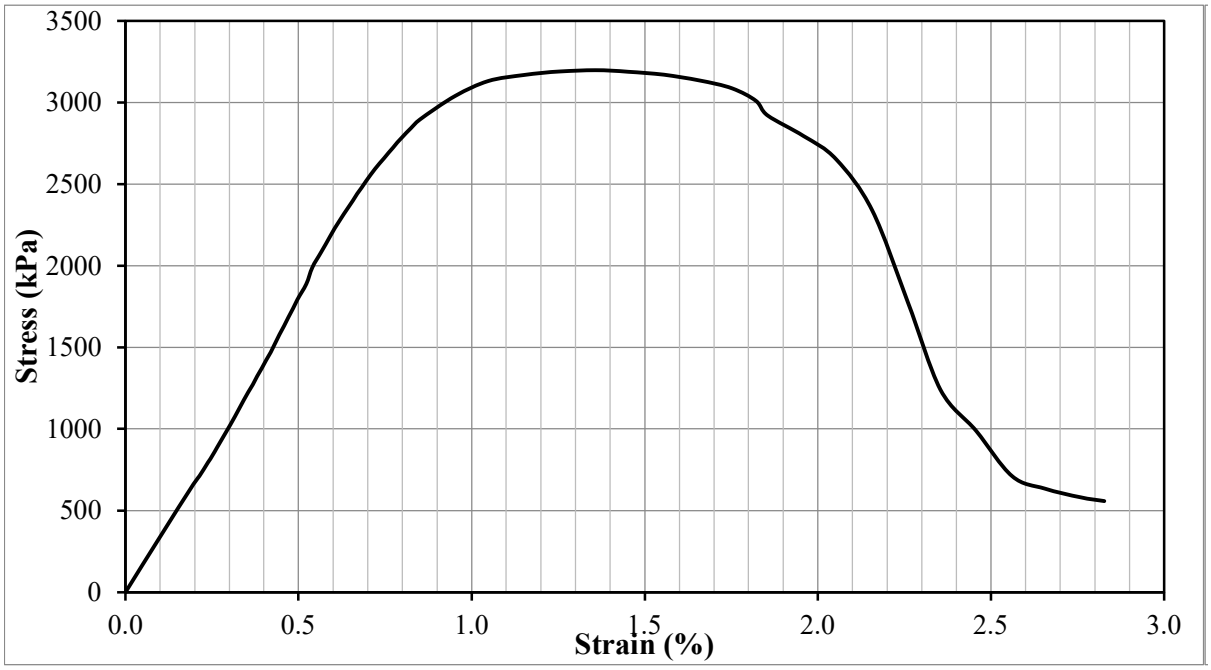
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,567	Strain at failure, εf :	1.44	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-28-G	Initial Area:	2112.9	mm^2
Test Date:	3/31/2021	Weight:	391.9	g
Strain Rate:	1 %/min	Unit Weight:	1830	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	7.2	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.050%		



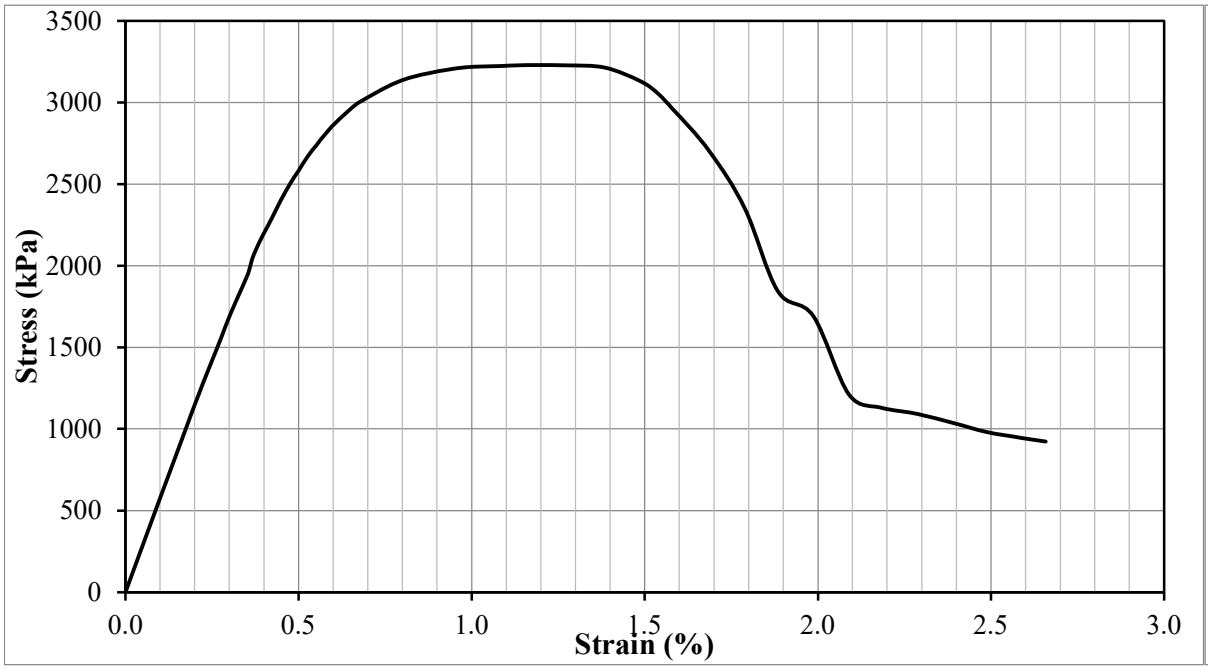
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,579	Strain at failure, εf :	1.35	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-28-C	Initial Area:	2114.9	mm^2
Test Date:	4/7/2021	Weight:	390.8	g
Strain Rate:	1 %/min	Unit Weight:	1823	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	13.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.050%		



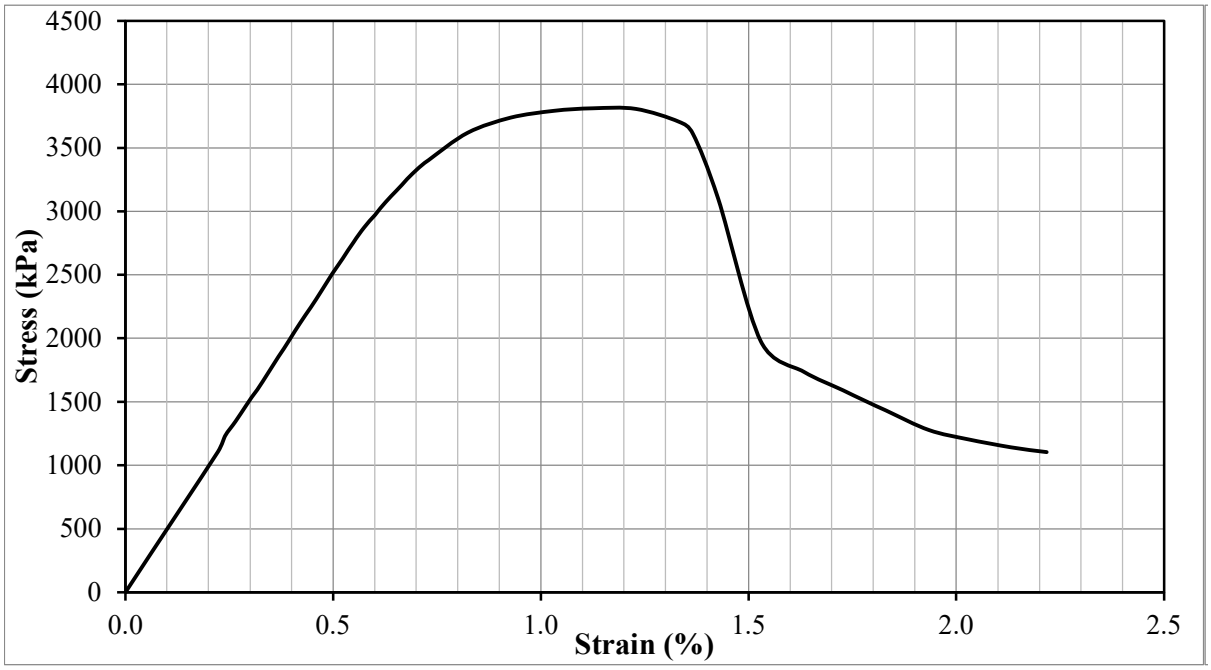
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,185	Strain at failure, εf :	1.36	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-28-F	Initial Area:	2119.1	mm^2
Test Date:	4/7/2021	Weight:	392.2	g
Strain Rate:	1 %/min	Unit Weight:	1822	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	13.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.050%		



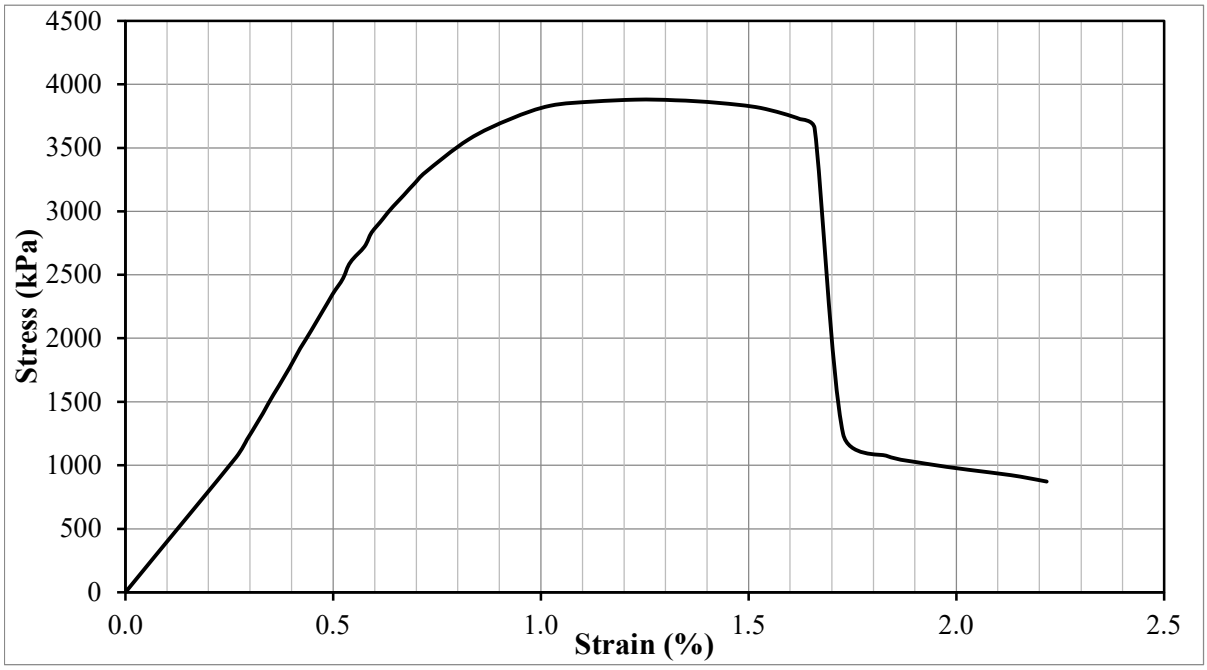
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,217	Strain at failure, εf :	1.18	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-28-D	Initial Area:	2114.9	mm^2
Test Date:	4/21/2021	Weight:	392.3	g
Strain Rate:	1 %/min	Unit Weight:	1826	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	28.2	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.050%		



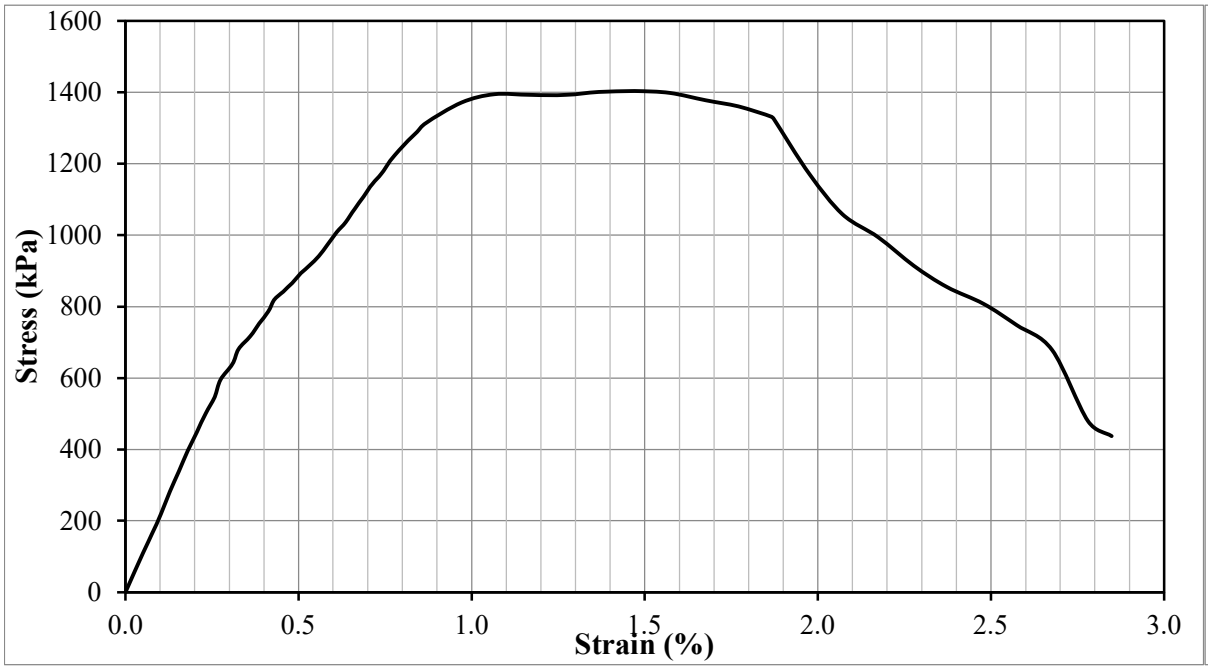
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,798	Strain at failure, εf :	1.13	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	O-28-E	Initial Area:	2121.1	mm^2
Test Date:	4/21/2021	Weight:	390.9	g
Strain Rate:	1 %/min	Unit Weight:	1821	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	28.2	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.050%		



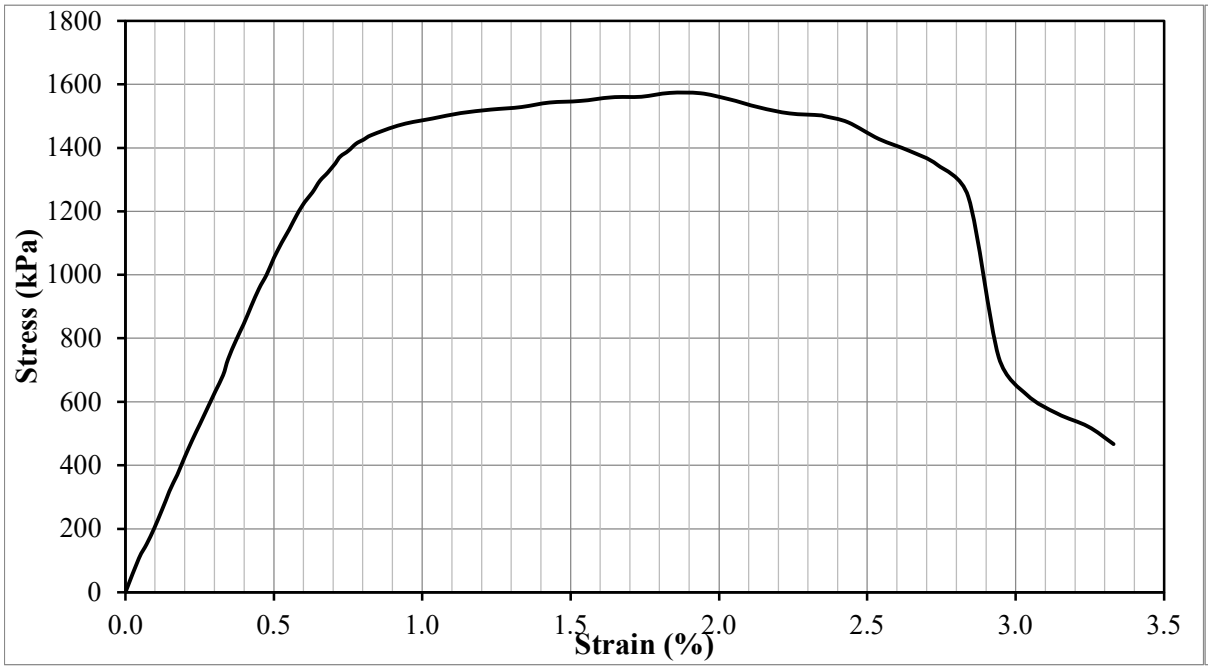
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,863	Strain at failure, εf :	1.23	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-29-A	Initial Area:	2114.9	mm^2
Test Date:	3/28/2021	Weight:	388.8	g
Strain Rate:	1 %/min	Unit Weight:	1819	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	2.8	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.025%		



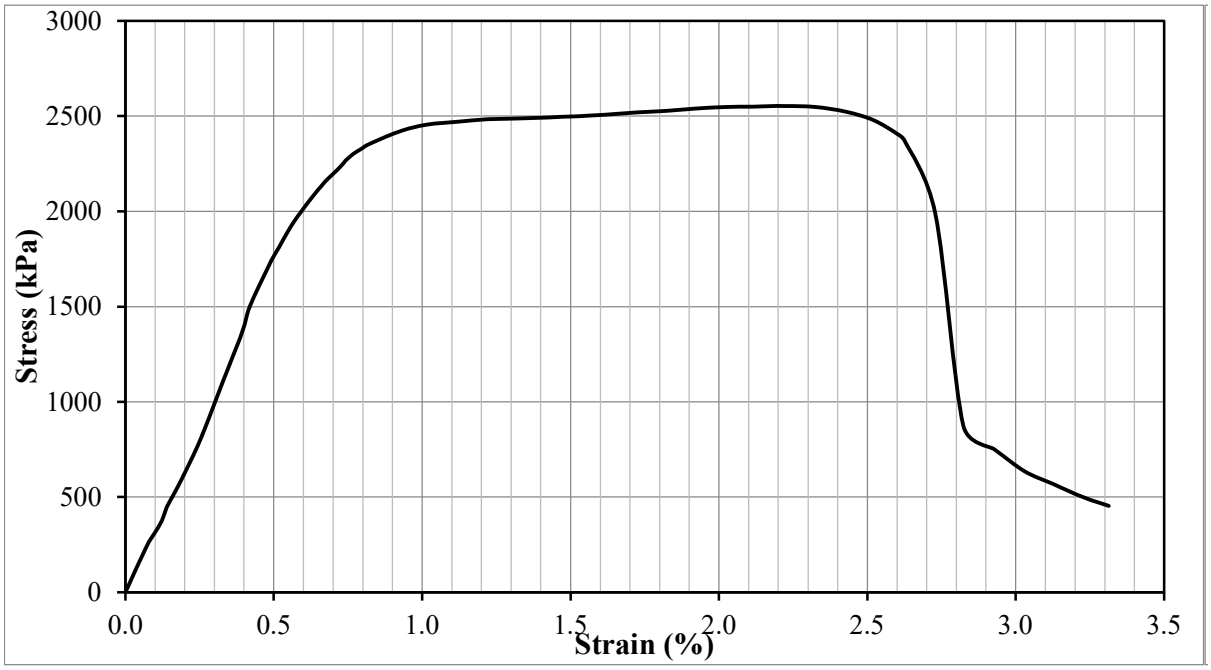
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,397	Strain at failure, εf :	1.47	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-29-H	Initial Area:	2108.7	mm^2
Test Date:	3/28/2021	Weight:	391.1	g
Strain Rate:	1 %/min	Unit Weight:	1831	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	2.8	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.025%		



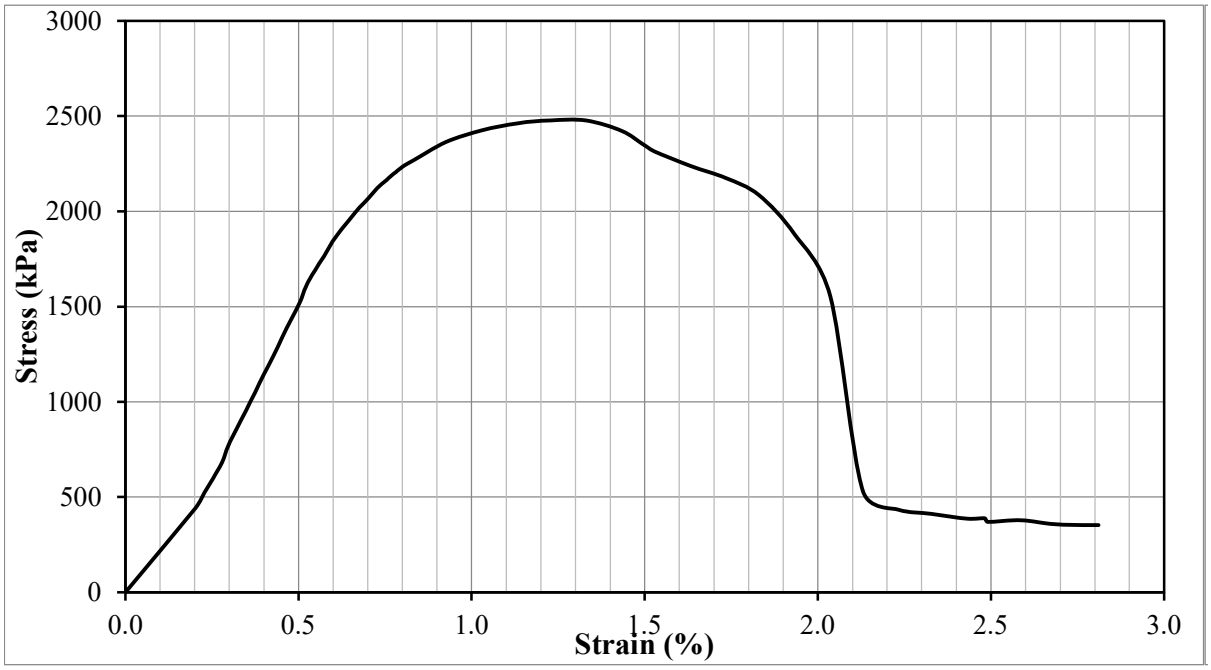
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,567	Strain at failure, εf :	1.83	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-29-B	Initial Area:	2119.1	mm^2
Test Date:	4/1/2021	Weight:	391.9	g
Strain Rate:	1 %/min	Unit Weight:	1821	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	7.0	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.025%		



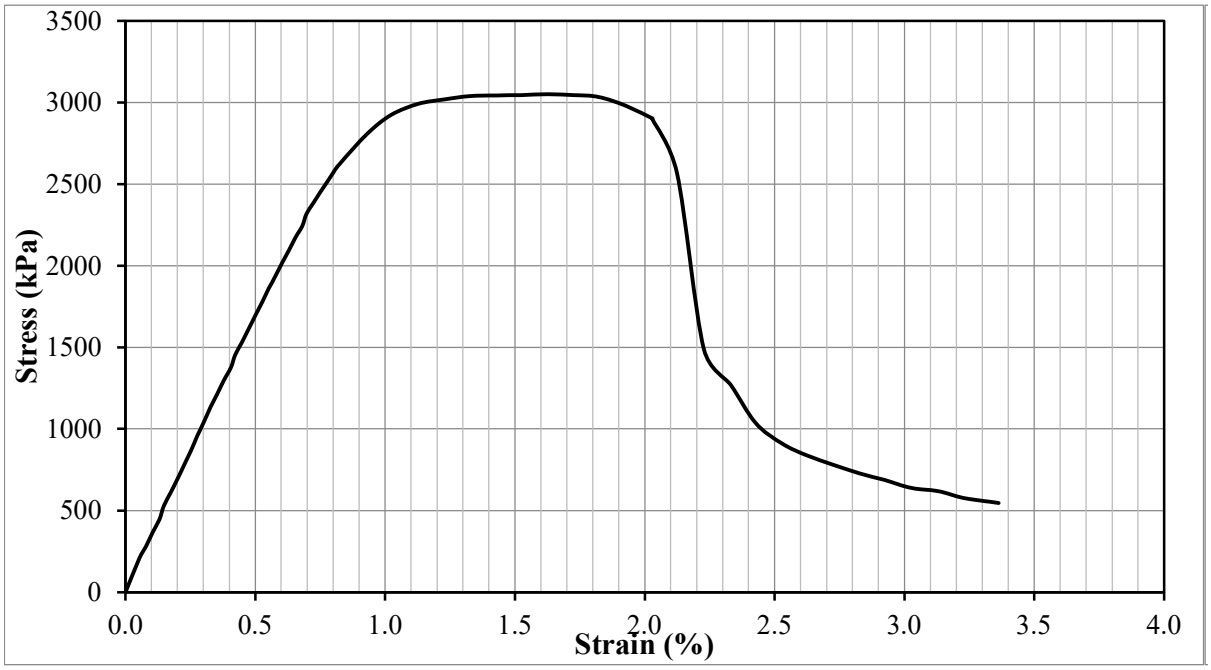
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,544	Strain at failure, εf :	2.22	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-29-G	Initial Area:	2117.0	mm^2
Test Date:	4/1/2021	Weight:	391.8	g
Strain Rate:	1 %/min	Unit Weight:	1823	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	7.0	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.025%		



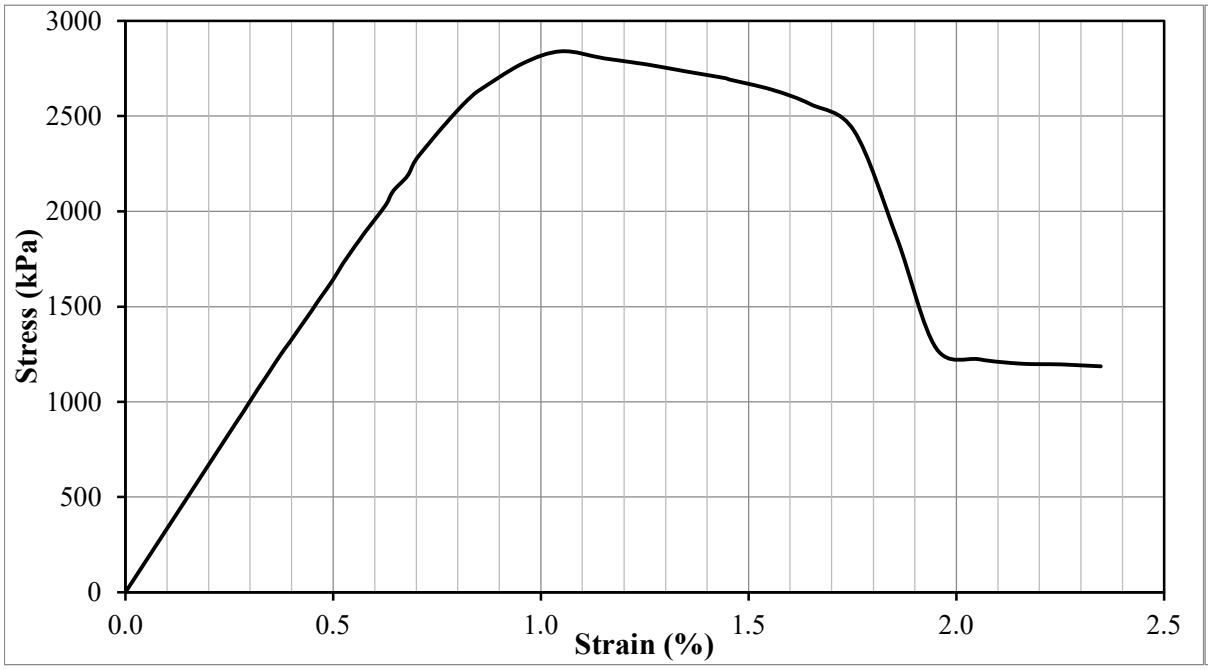
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,469	Strain at failure, εf :	1.23	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-29-C	Initial Area:	2119.1	mm^2
Test Date:	4/8/2021	Weight:	392.4	g
Strain Rate:	1 %/min	Unit Weight:	1824	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	13.7	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.025%		



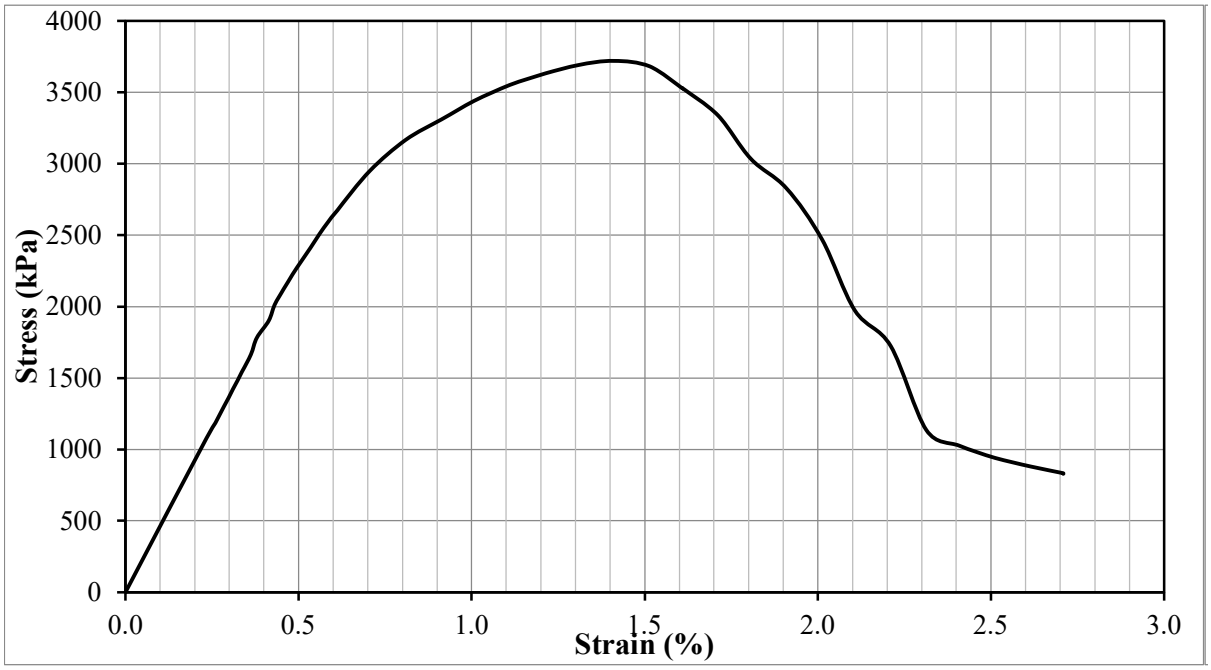
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,038	Strain at failure, εf :	1.63	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-29-F	Initial Area:	2117.0	mm^2
Test Date:	4/8/2021	Weight:	393.4	g
Strain Rate:	1 %/min	Unit Weight:	1825	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	13.7	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.025%		



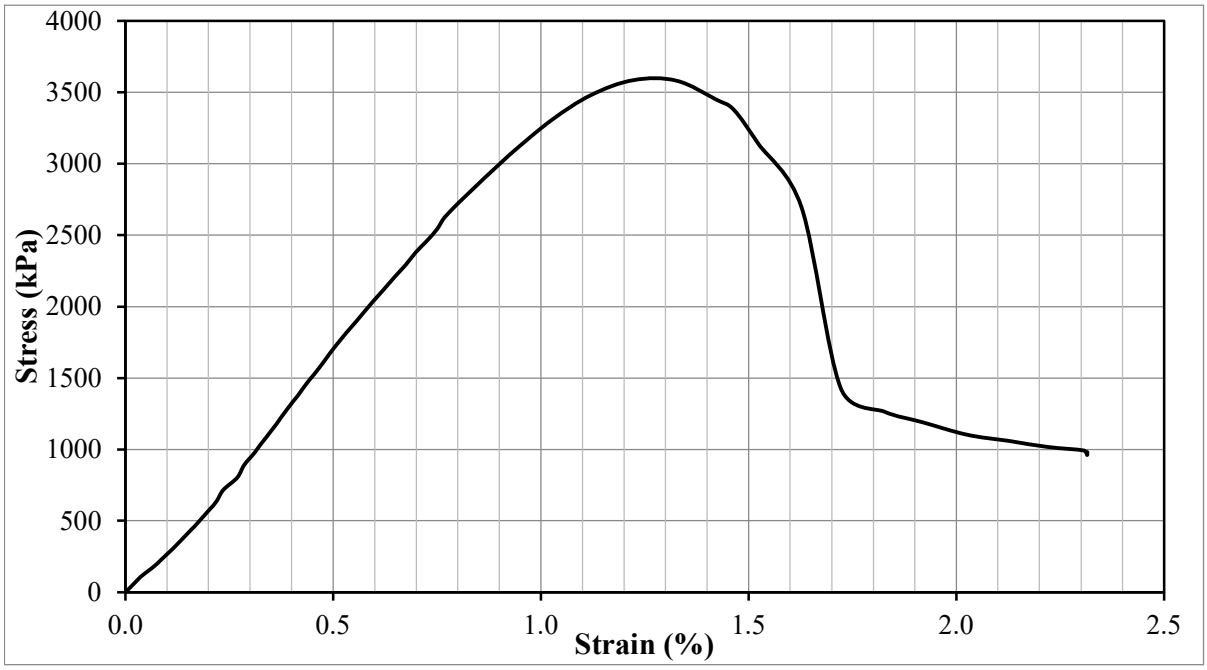
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,831	Strain at failure, εf :	1.05	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-29-D	Initial Area:	2112.9	mm^2
Test Date:	4/22/2021	Weight:	382.1	g
Strain Rate:	1 %/min	Unit Weight:	1827	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	27.4	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.025%		



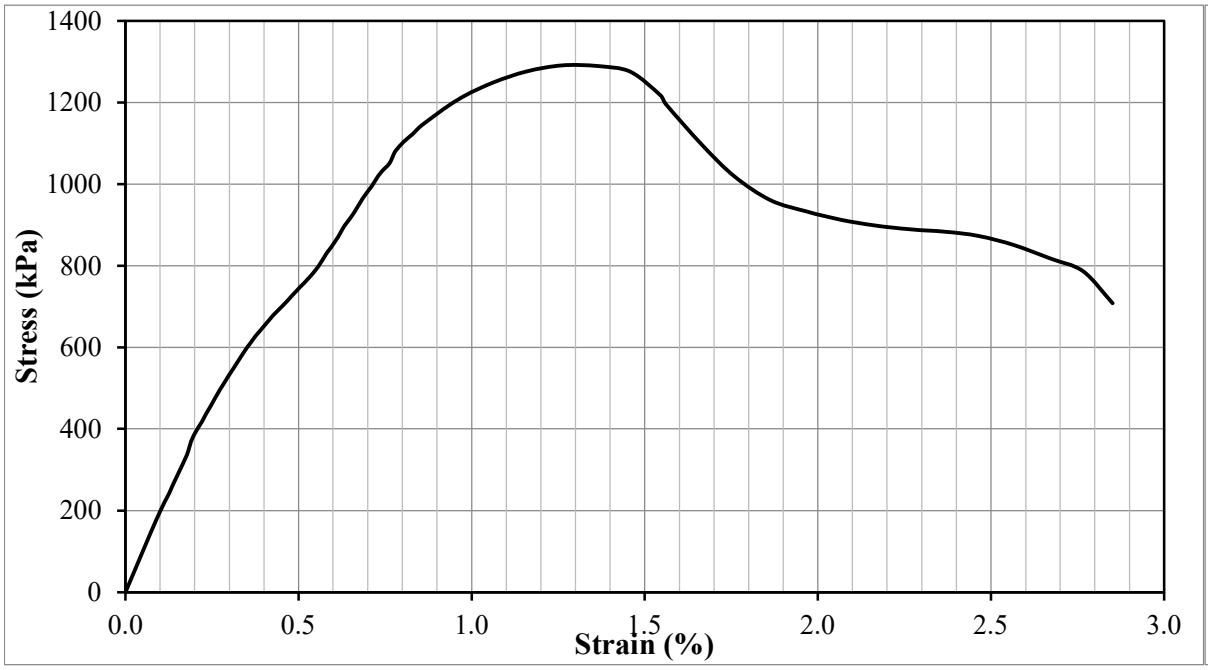
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,693	Strain at failure, εf :	1.41	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-29-E	Initial Area:	2104.6	mm^2
Test Date:	4/22/2021	Weight:	393.2	g
Strain Rate:	1 %/min	Unit Weight:	1838	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	27.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.025%		



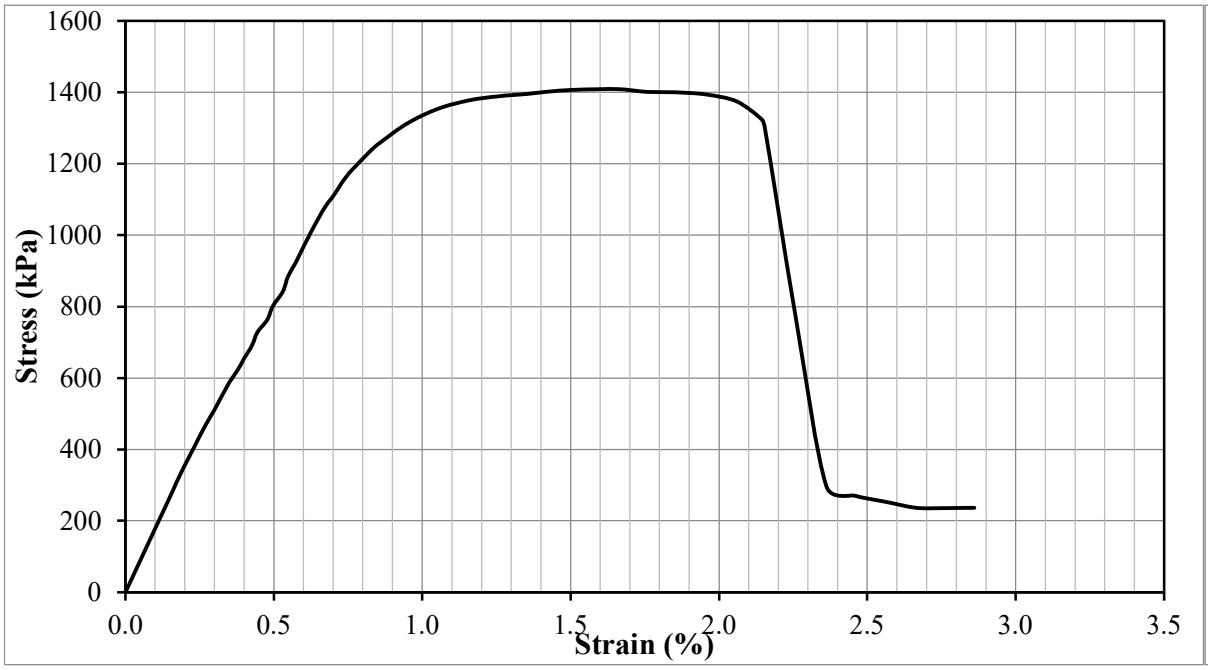
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,575	Strain at failure, εf :	1.22	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-30-A	Initial Area:	2104.6	mm^2
Test Date:	4/3/2021	Weight:	387.0	g
Strain Rate:	1 %/min	Unit Weight:	1819	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	2.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.150%		



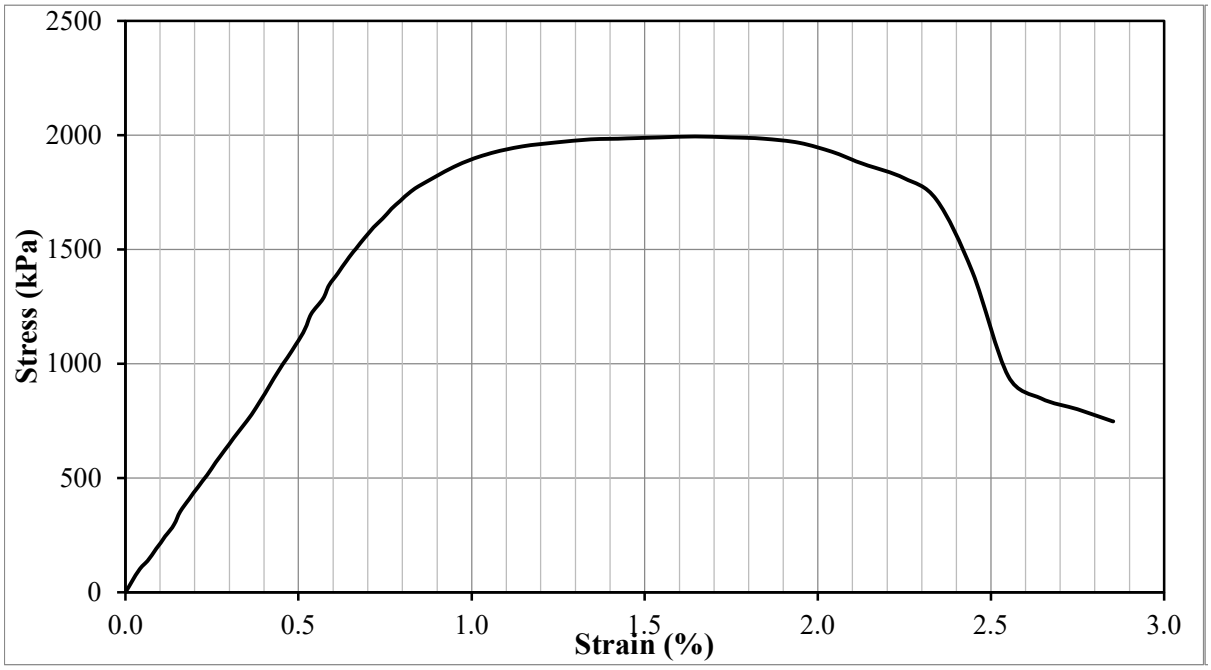
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,286	Strain at failure, εf :	1.26	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-30-H	Initial Area:	2110.8	mm^2
Test Date:	4/3/2021	Weight:	387.1	g
Strain Rate:	1 %/min	Unit Weight:	1816	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	2.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.150%		



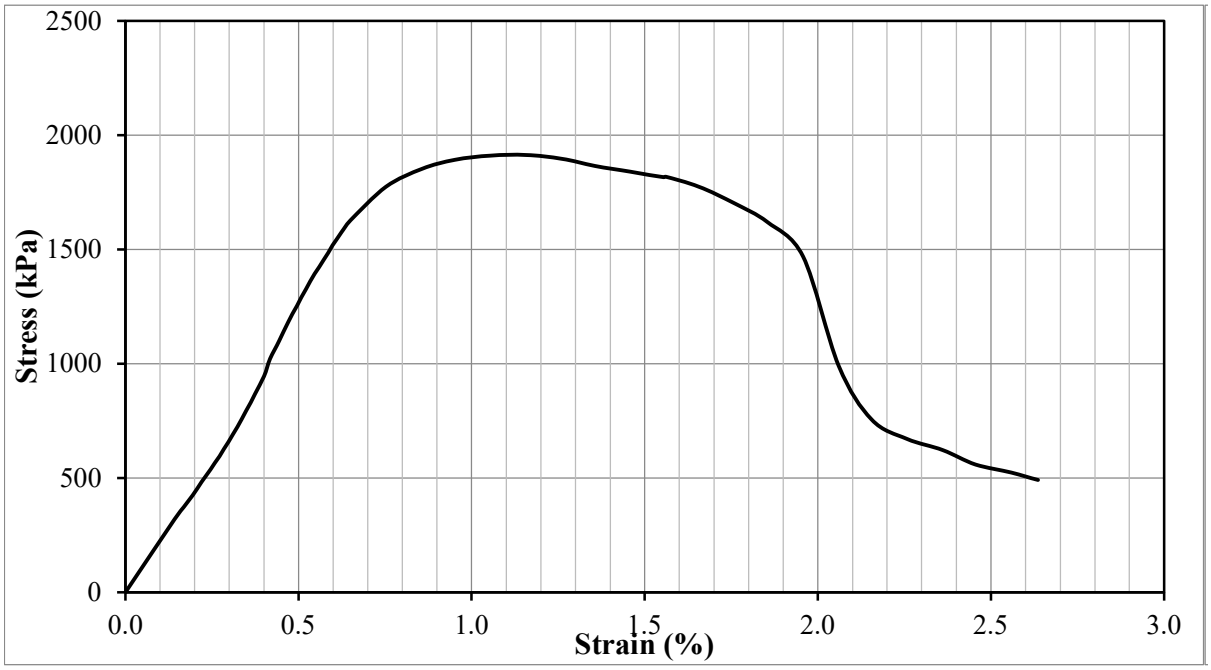
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,403	Strain at failure, εf :	1.66	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-30-B	Initial Area:	2106.6	mm^2
Test Date:	4/7/2021	Weight:	386.7	g
Strain Rate:	1 %/min	Unit Weight:	1823	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	6.6	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.150%		



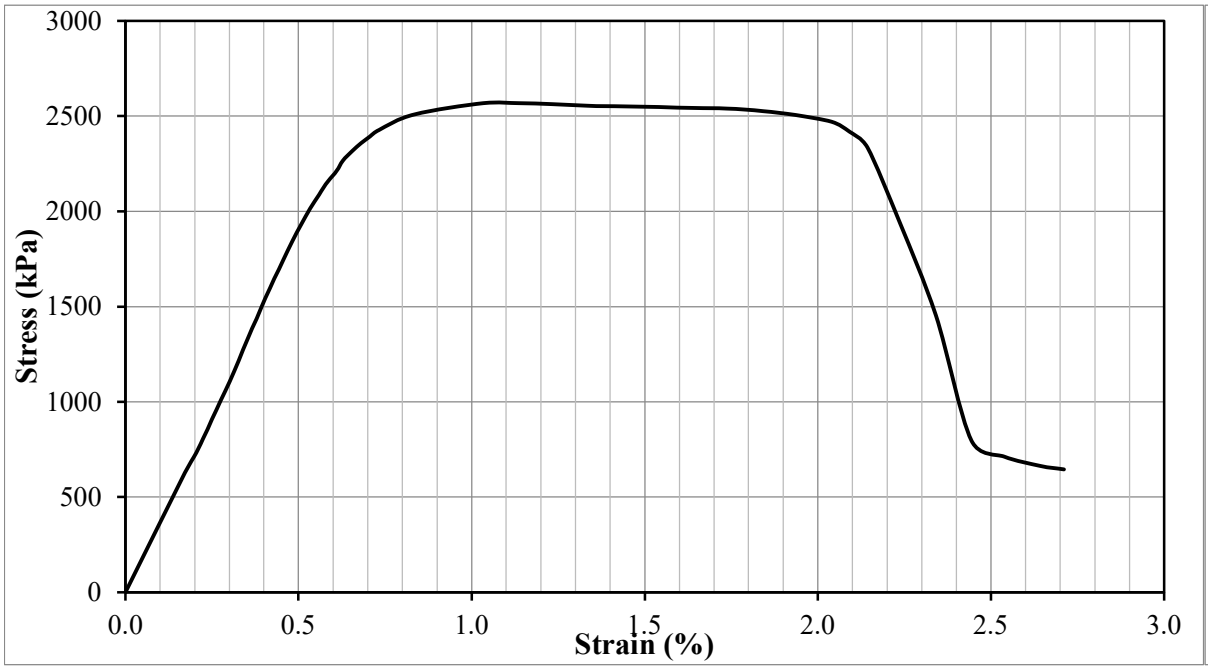
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,985	Strain at failure, εf :	1.65	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-30-G	Initial Area:	2112.9	mm^2
Test Date:	4/7/2021	Weight:	386.8	g
Strain Rate:	1 %/min	Unit Weight:	1816	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	6.6	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.150%		



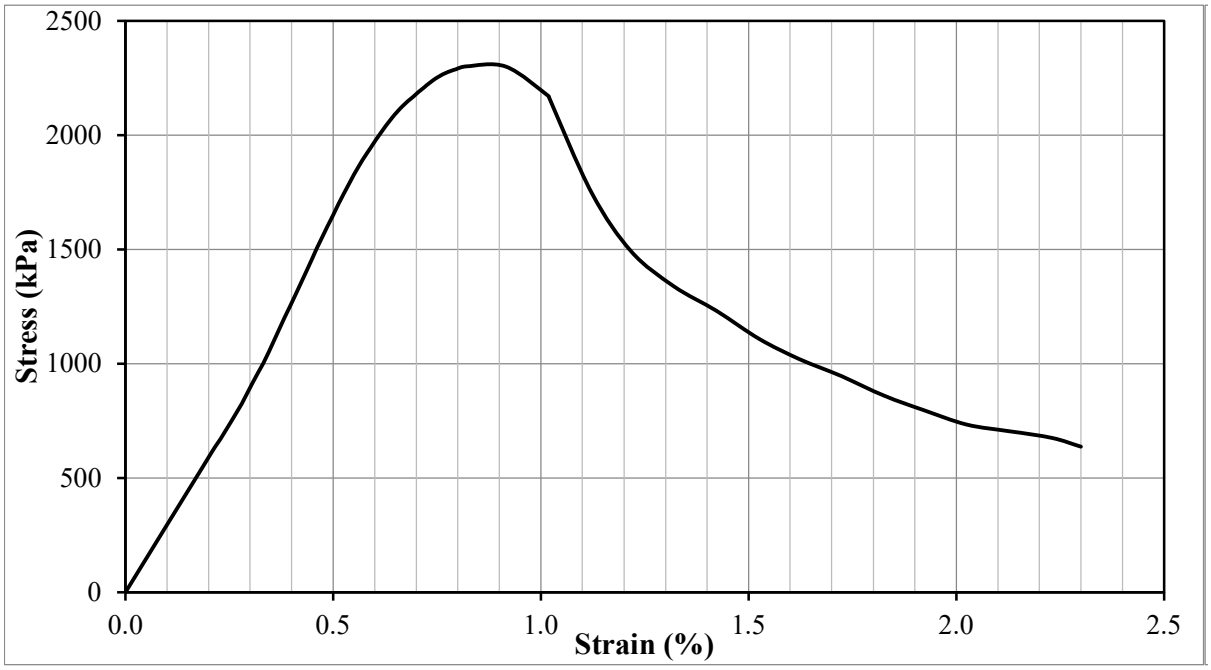
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,905	Strain at failure, εf :	1.16	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-30-C	Initial Area:	2112.9	mm^2
Test Date:	4/14/2021	Weight:	386.8	g
Strain Rate:	1 %/min	Unit Weight:	1814	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	13.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.150%		



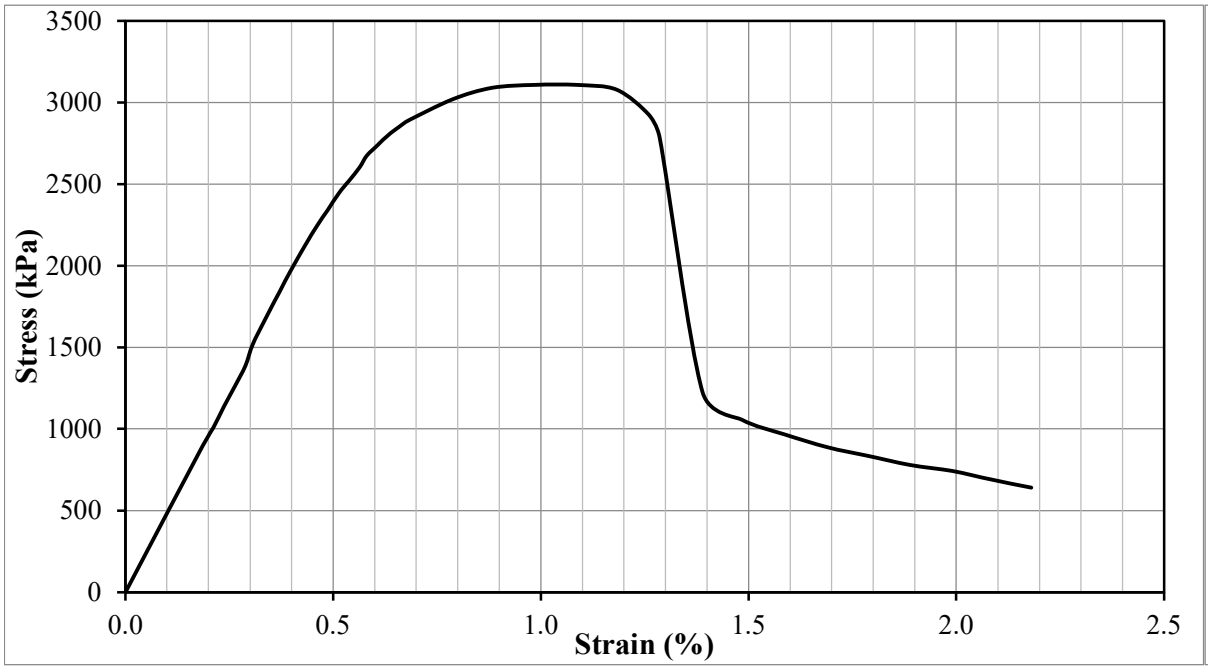
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,556	Strain at failure, εf :	1.14	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-30-F	Initial Area:	2108.7	mm^2
Test Date:	4/14/2021	Weight:	386.6	g
Strain Rate:	1 %/min	Unit Weight:	1819	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	13.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.150%		



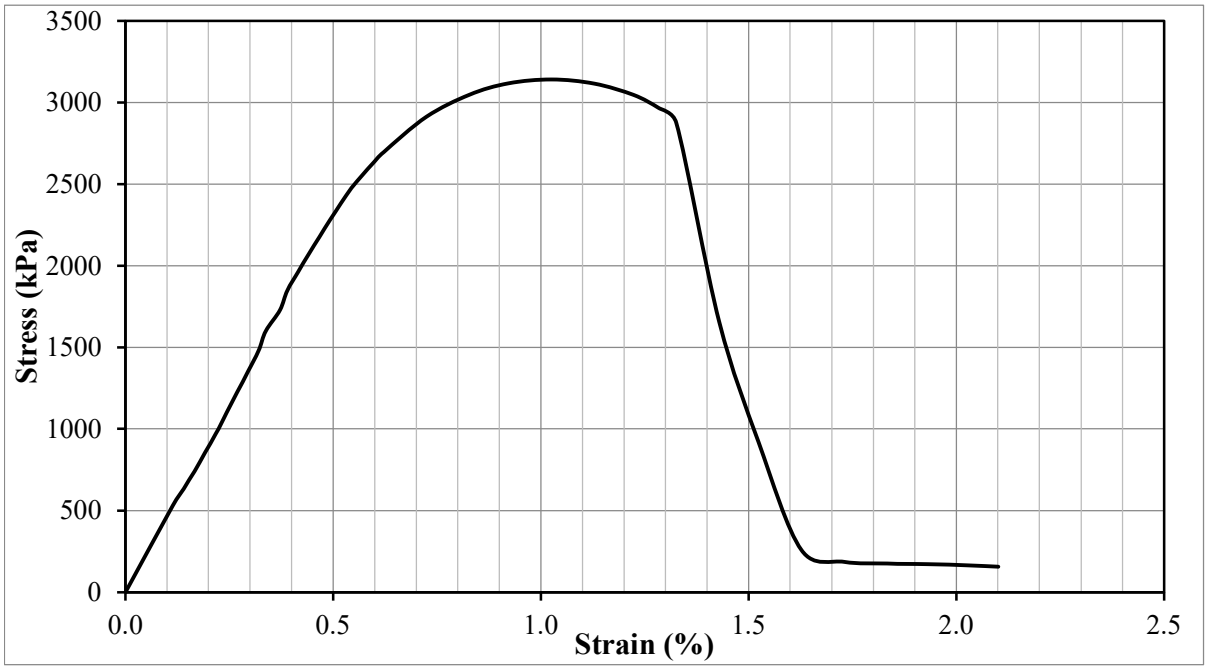
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,291	Strain at failure, εf :	0.82	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	O-30-D	Initial Area:	2123.2	mm^2
Test Date:	4/28/2021	Weight:	388.5	g
Strain Rate:	1 %/min	Unit Weight:	1806	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	27.8	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.150%		



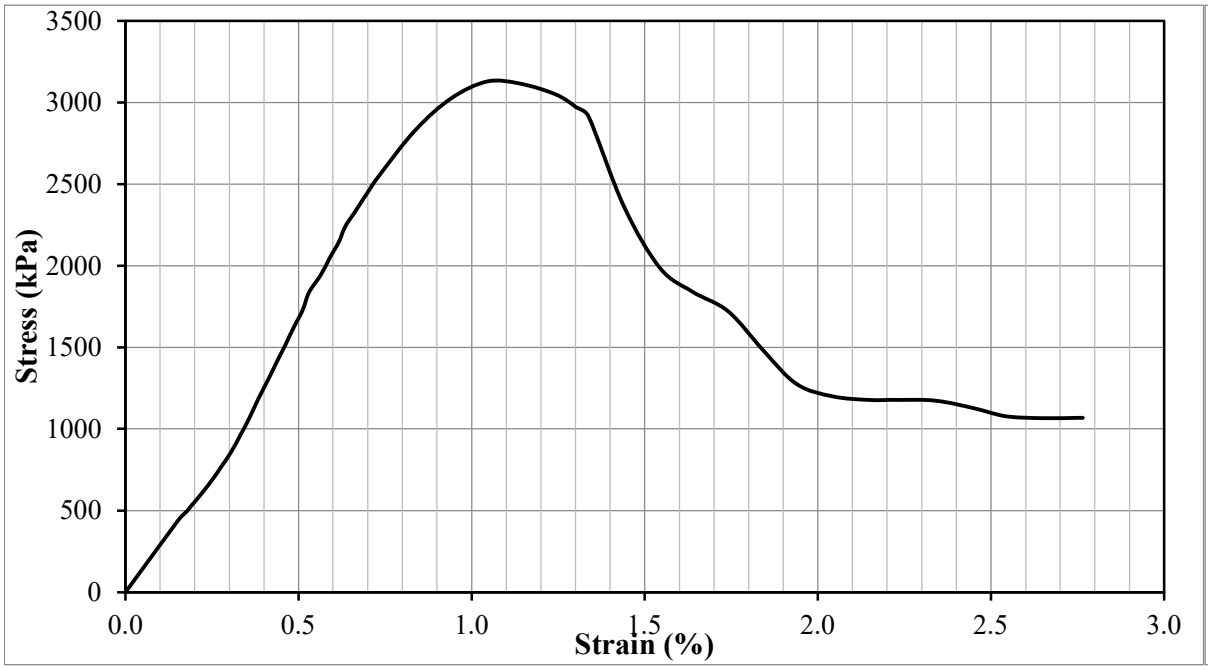
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,095	Strain at failure, εf :	0.99	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-30-E	Initial Area:	2110.8	mm^2
Test Date:	4/28/2021	Weight:	386.9	g
Strain Rate:	1 %/min	Unit Weight:	1818	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	27.8	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.150%		



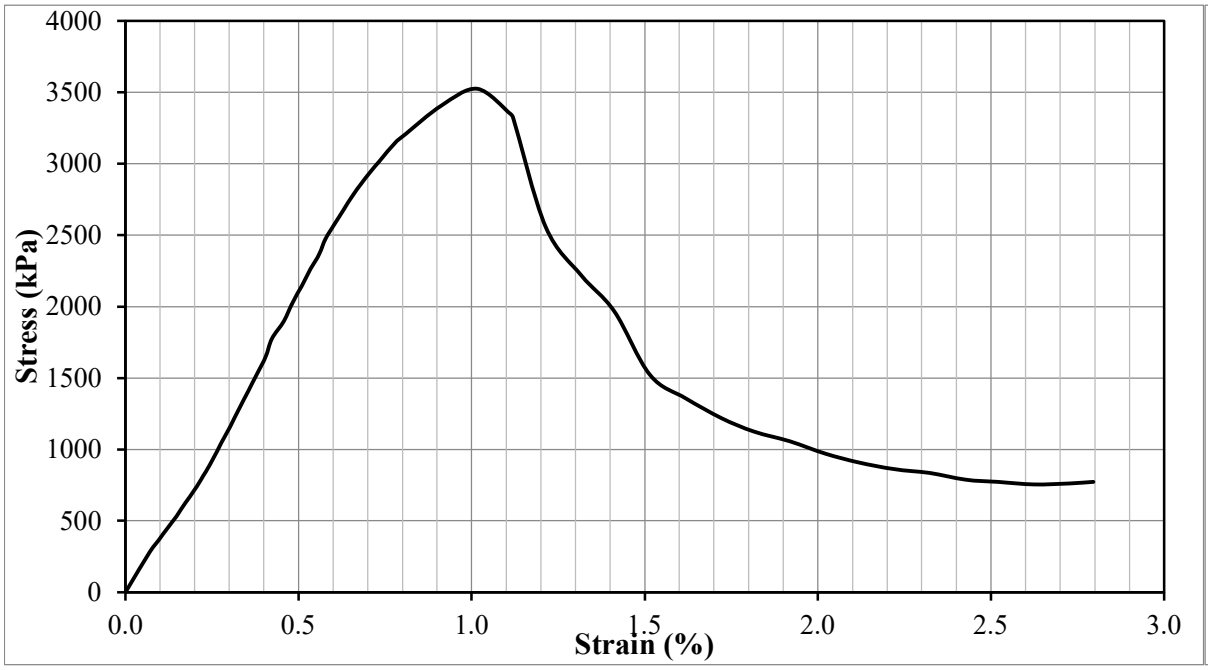
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,126	Strain at failure, εf :	1.03	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	O-32-A	Initial Area:	2125.3	mm^2
Test Date:	4/11/2021	Weight:	387.0	g
Strain Rate:	1 %/min	Unit Weight:	1806	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	3.0	days
$(w{:}c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.250%		



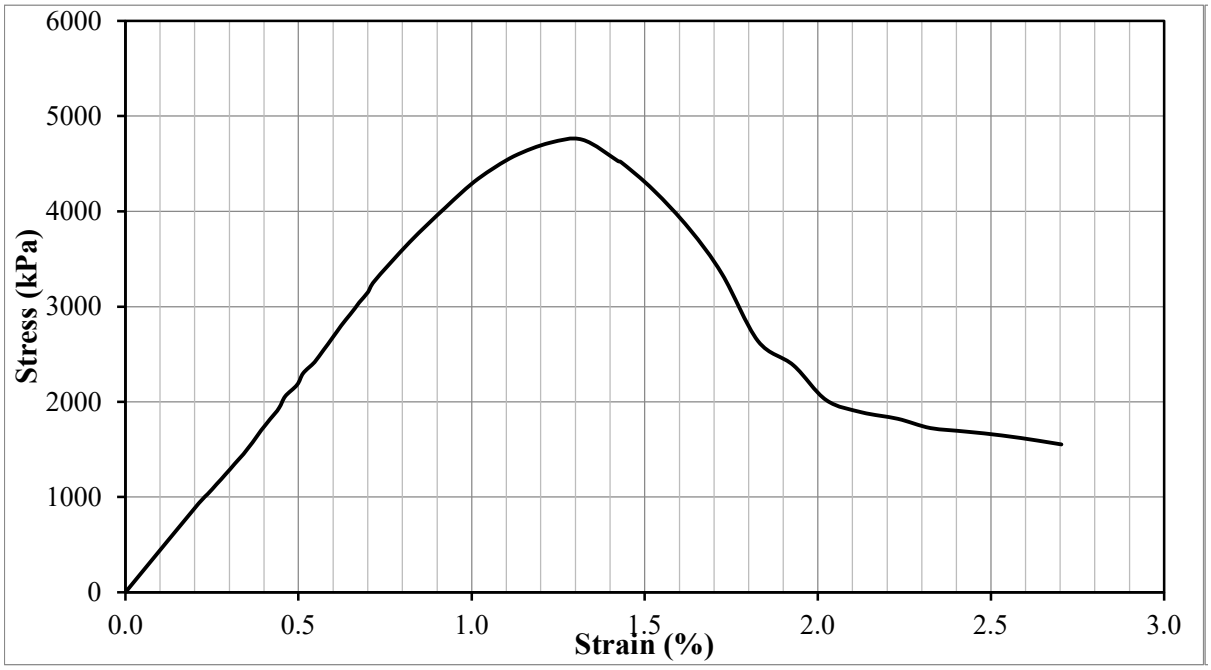
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,113	Strain at failure, εf :	1.05	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-32-H	Initial Area:	2110.8	mm^2
Test Date:	4/11/2021	Weight:	382.3	g
Strain Rate:	1 %/min	Unit Weight:	1820	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	3.0	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.250%		



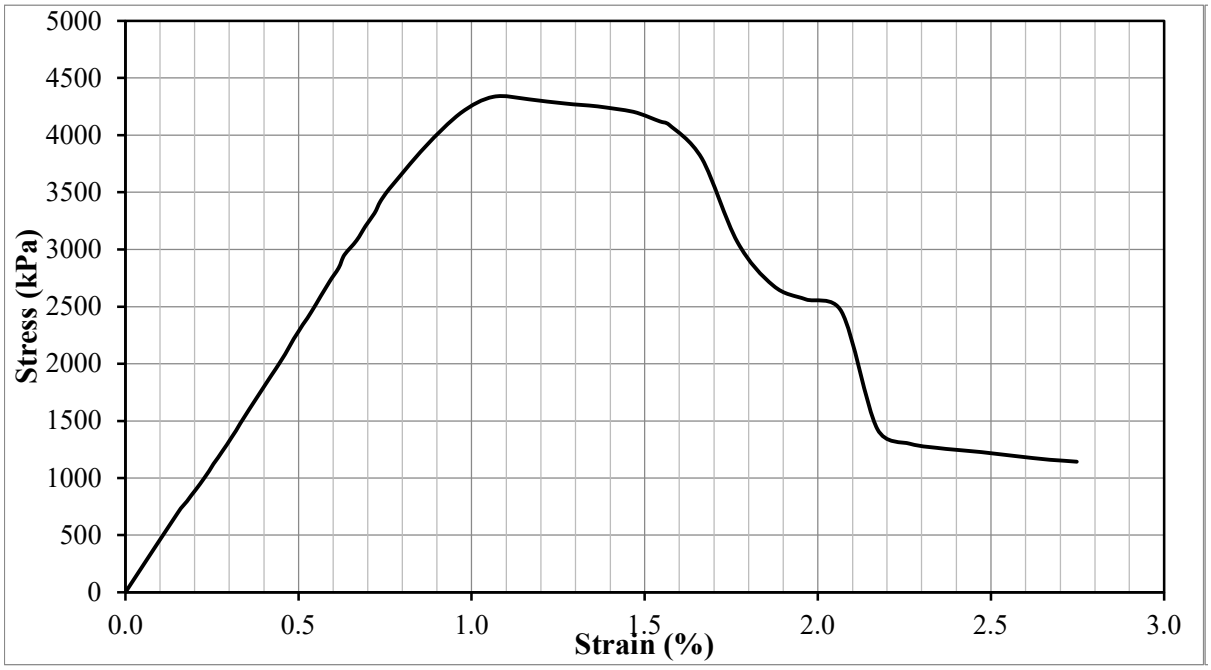
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,501	Strain at failure, εf :	1.02	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	O-32-B	Initial Area:	2104.6	mm^2
Test Date:	4/15/2021	Weight:	380.2	g
Strain Rate:	1 %/min	Unit Weight:	1826	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	6.7	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.250%		



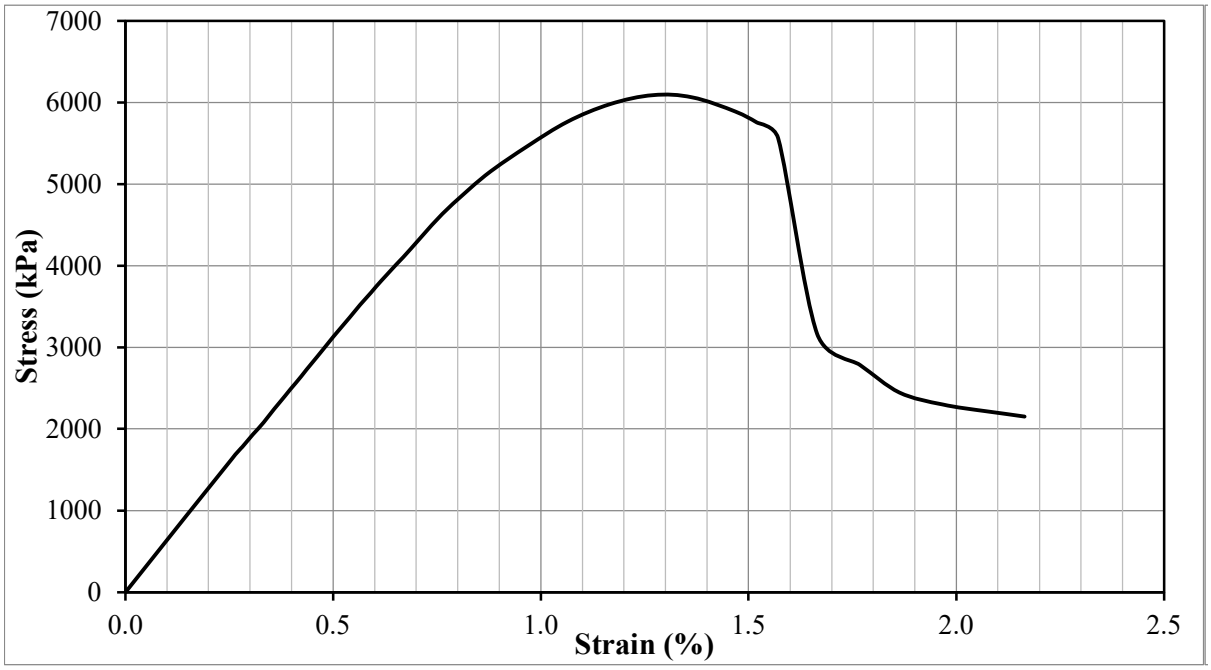
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,719	Strain at failure, εf :	1.32	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-32-G	Initial Area:	2119.1	mm^2
Test Date:	4/15/2021	Weight:	381.7	g
Strain Rate:	1 %/min	Unit Weight:	1818	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	6.7	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.250%		



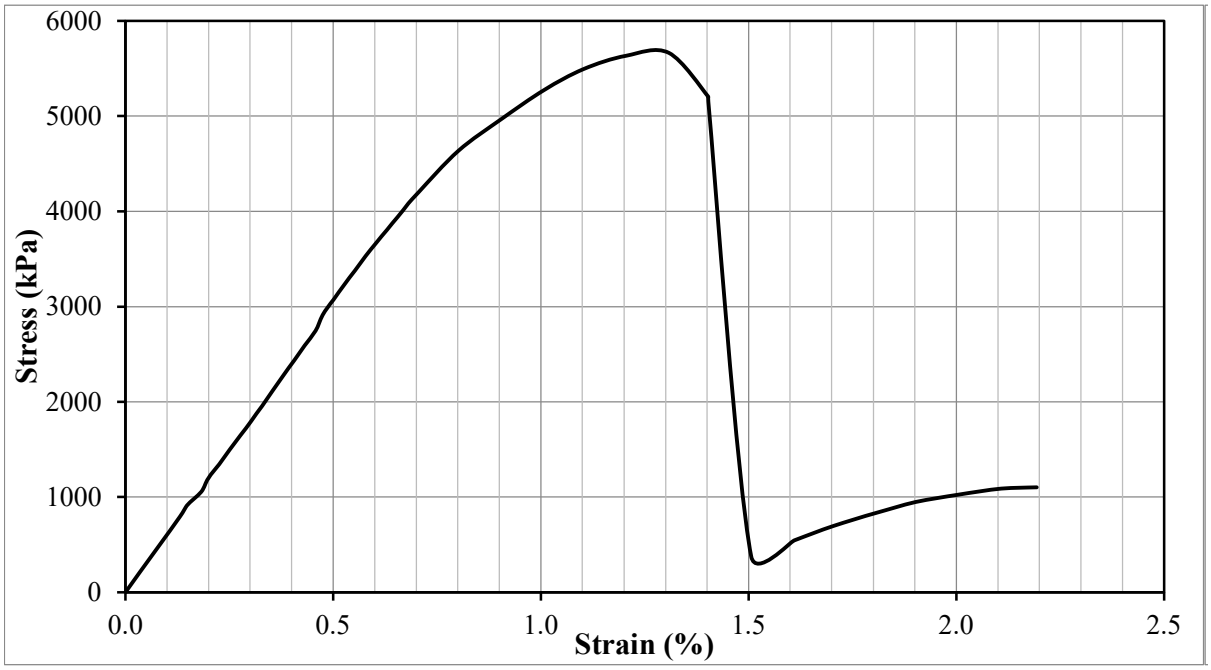
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,304	Strain at failure, εf :	1.06	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	O-32-C	Initial Area:	2102.5	mm^2
Test Date:	4/22/2021	Weight:	380.2	g
Strain Rate:	1 %/min	Unit Weight:	1827	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	13.6	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.250%		



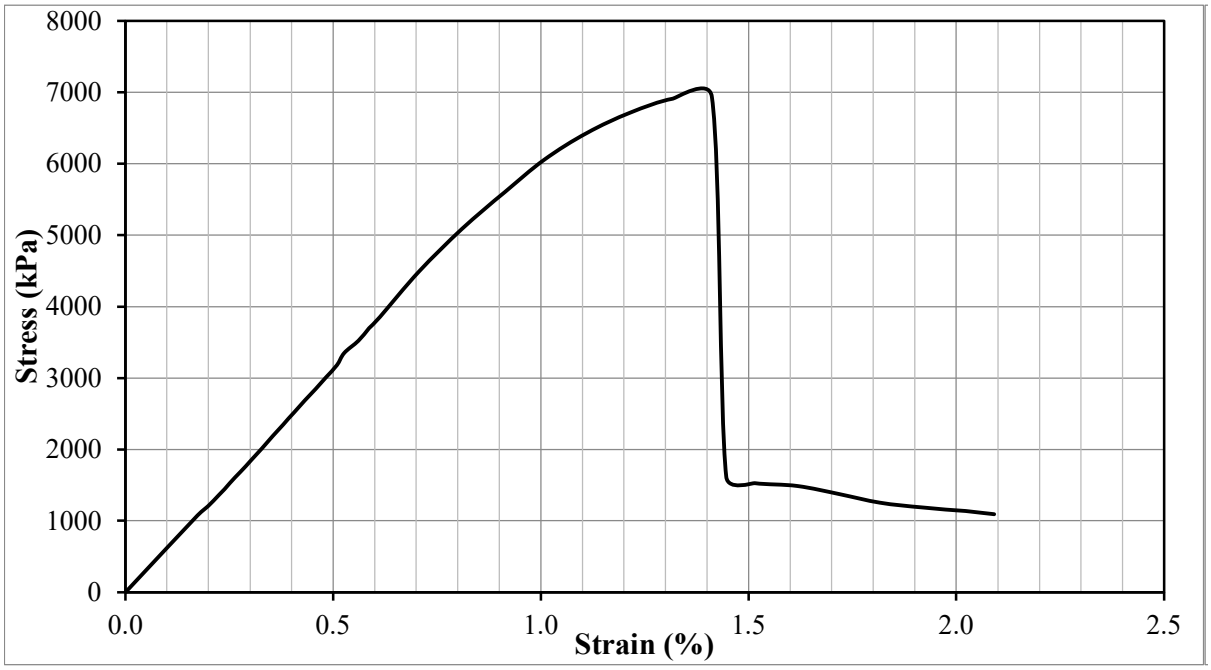
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	6,048	Strain at failure, εf :	1.27	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-32-F	Initial Area:	2117.0	mm^2
Test Date:	4/22/2021	Weight:	382.0	g
Strain Rate:	1 %/min	Unit Weight:	1819	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	13.6	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.250%		



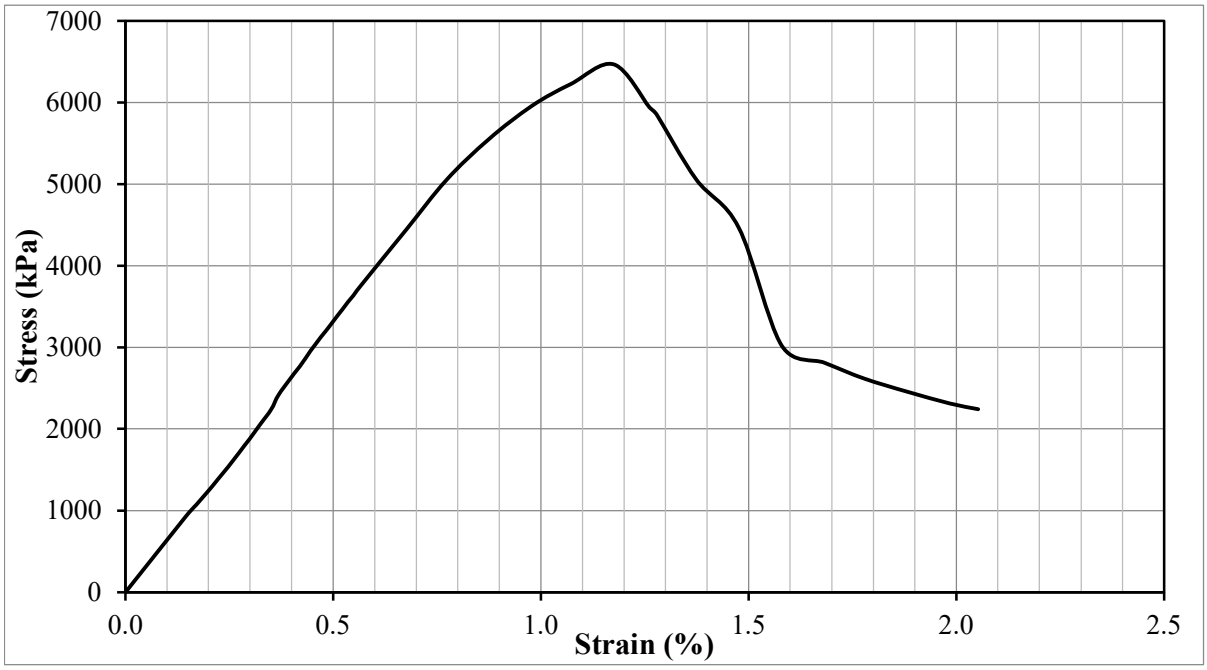
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,622	Strain at failure, εf :	1.31	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	O-32-D	Initial Area:	2121.1	mm^2
Test Date:	5/6/2021	Weight:	381.6	g
Strain Rate:	1 %/min	Unit Weight:	1819	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	27.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.250%		



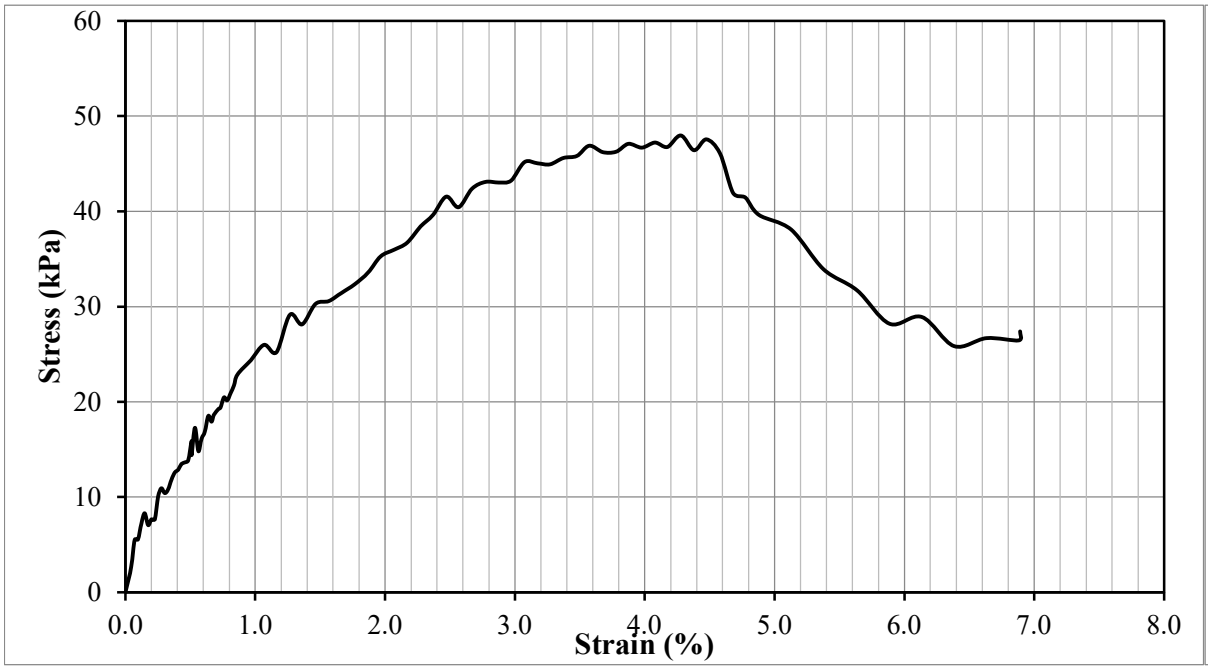
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	6,884	Strain at failure, εf :	1.41	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-32-I	Initial Area:	2114.9	mm^2
Test Date:	5/6/2021	Weight:	382.8	g
Strain Rate:	1 %/min	Unit Weight:	1808	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	27.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.250%		



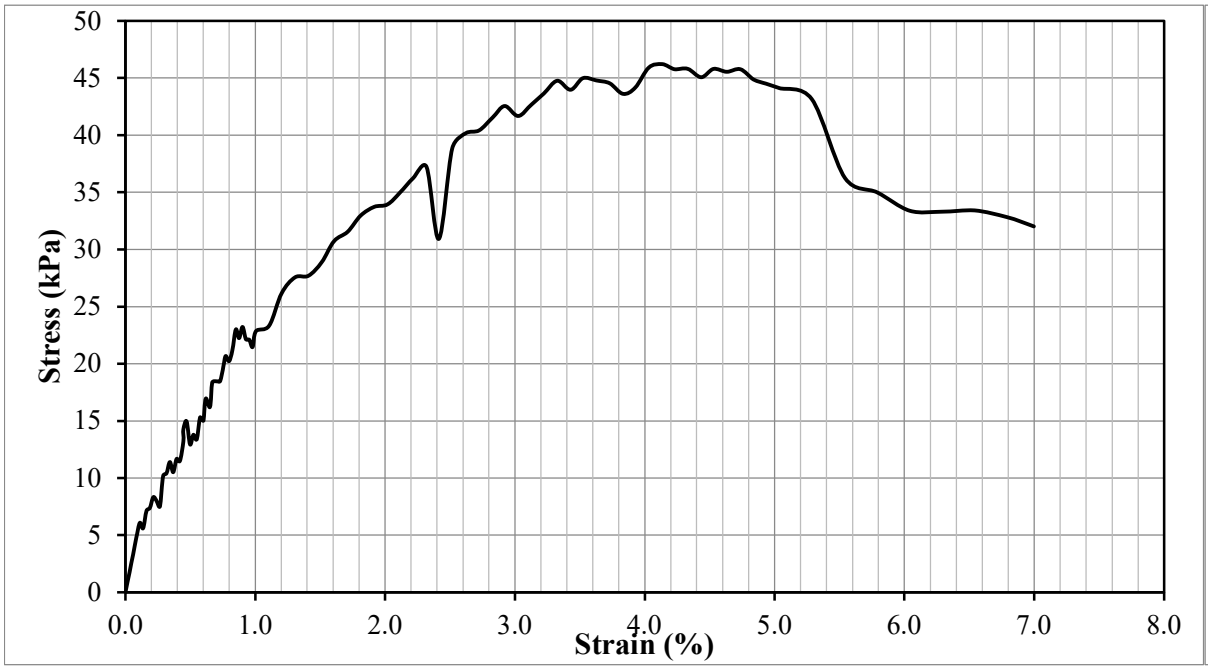
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	6,431	Strain at failure, εf :	1.18	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.5	mm
I.D.:	O-33-A	Initial Area:	2086.0	mm^2
Test Date:	5/16/2021	Weight:	386.0	g
Strain Rate:	1 %/min	Unit Weight:	1823	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	3.0	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.250%		



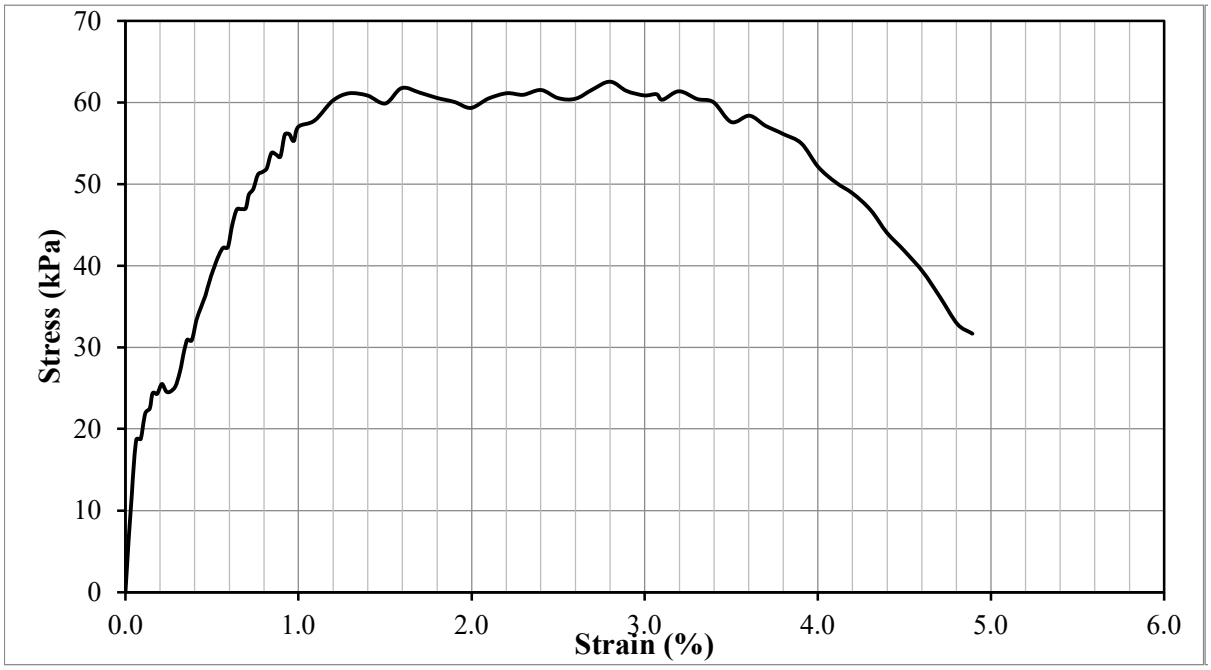
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	48	Strain at failure, εf :	4.28	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.3	mm
I.D.:	O-33-H	Initial Area:	2069.6	mm^2
Test Date:	5/16/2021	Weight:	390.3	g
Strain Rate:	1 %/min	Unit Weight:	1851	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	3.0	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.250%		



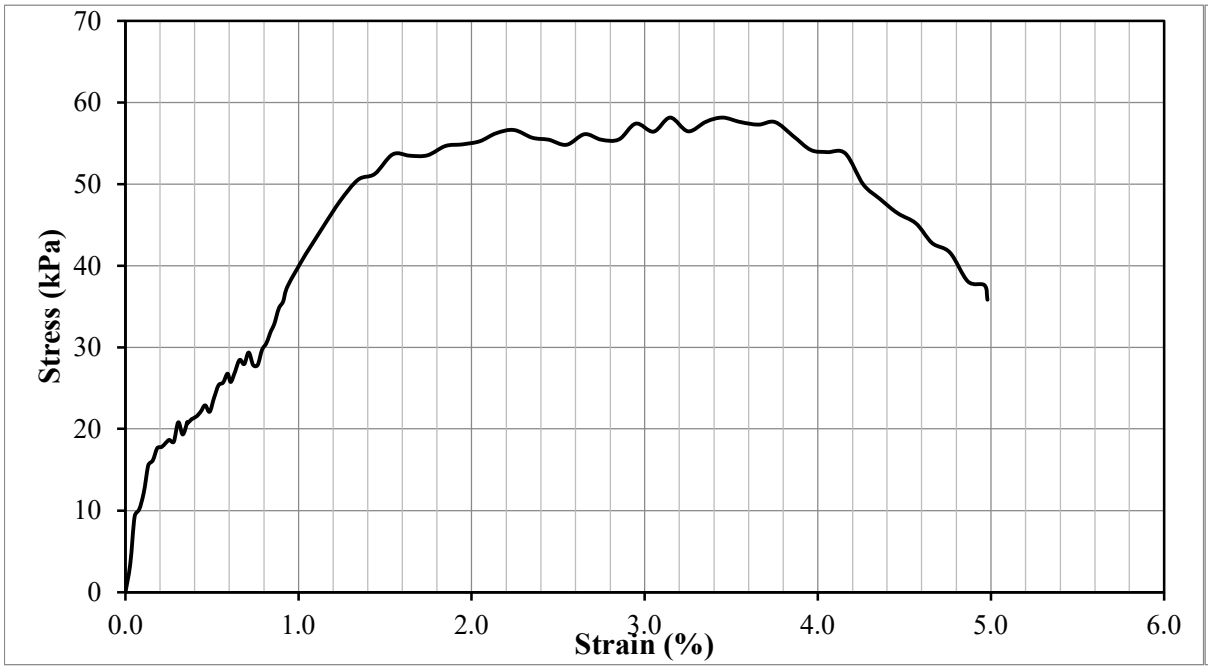
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	46	Strain at failure, εf :	4.13	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	94.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	O-33-B	Initial Area:	2098.4	mm^2
Test Date:	5/20/2021	Weight:	362.5	g
Strain Rate:	1 %/min	Unit Weight:	1824	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	6.8	days
$(w{:}c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.250%		



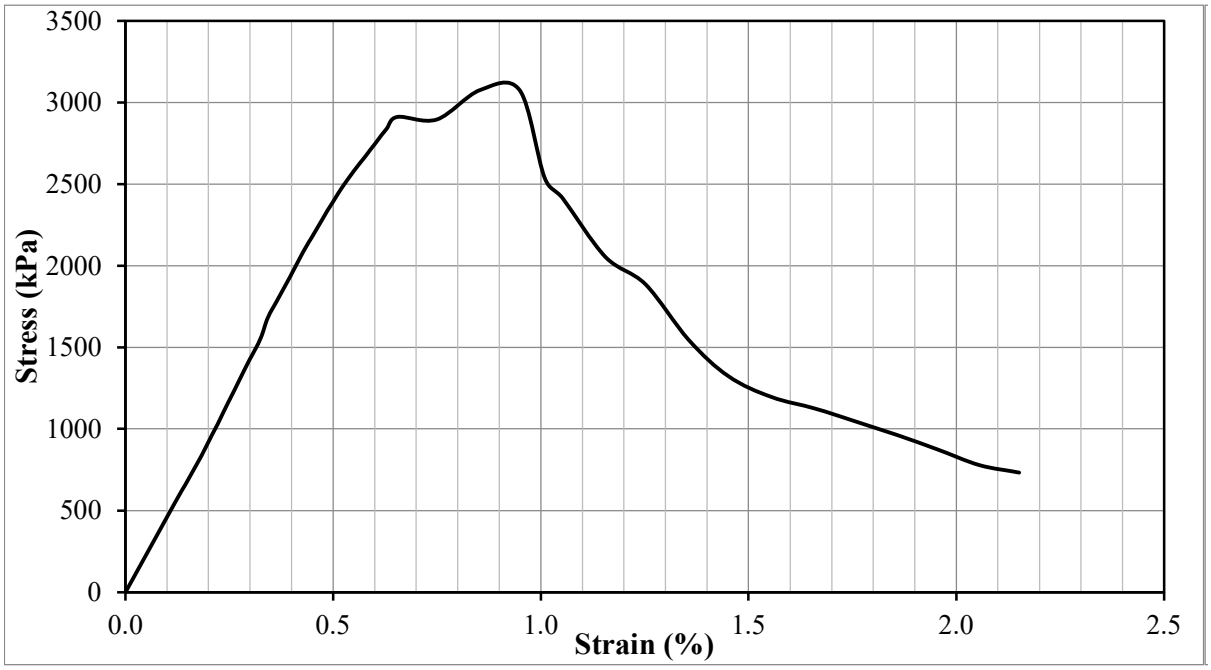
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	62	Strain at failure, εf :	2.80	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	O-33-G	Initial Area:	2096.3	mm^2
Test Date:	5/20/2021	Weight:	380.9	g
Strain Rate:	1 %/min	Unit Weight:	1819	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	6.8	days
$(w{:}c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.250%		



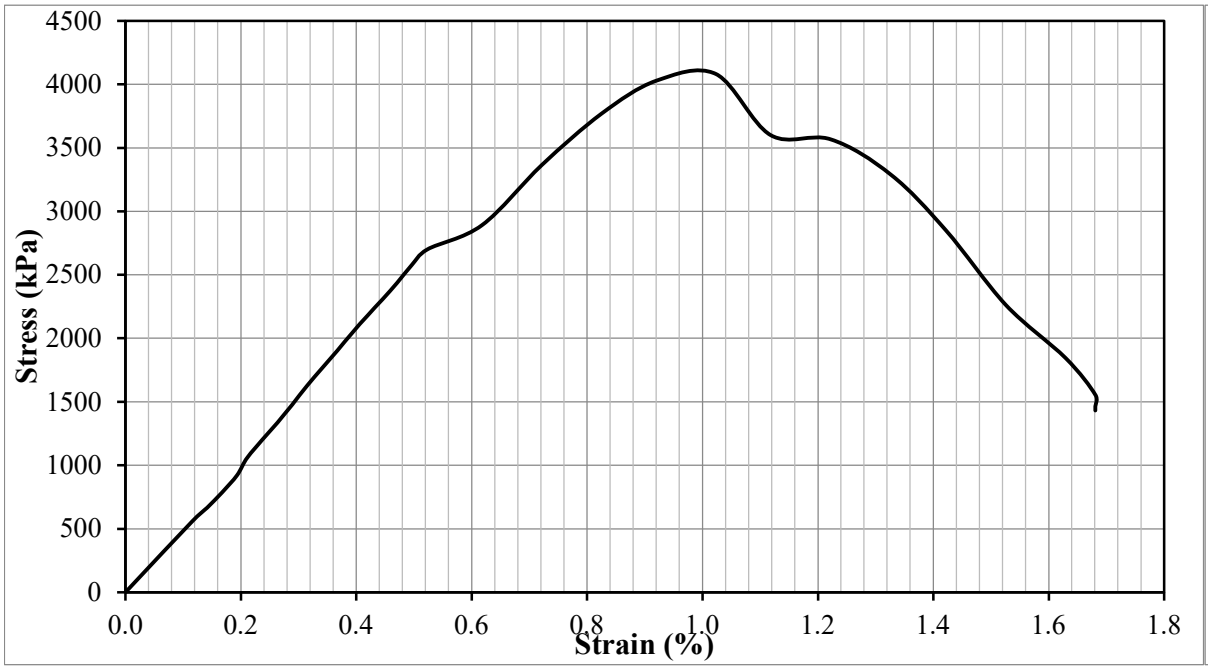
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	58	Strain at failure, εf :	3.45	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-33-C	Initial Area:	2112.9	mm^2
Test Date:	5/27/2021	Weight:	380.7	g
Strain Rate:	1 %/min	Unit Weight:	1811	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	13.8	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.250%		



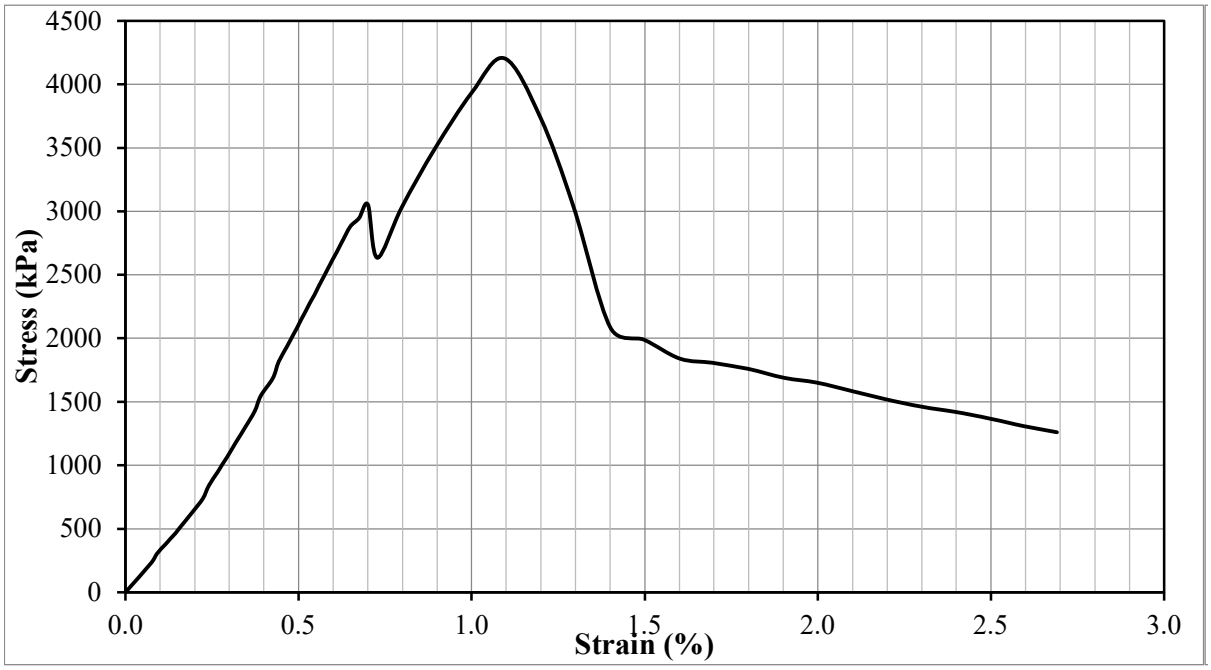
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,056	Strain at failure, εf :	0.85	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-33-F	Initial Area:	2114.9	mm^2
Test Date:	5/27/2021	Weight:	380.8	g
Strain Rate:	1 %/min	Unit Weight:	1821	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	13.8	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.250%		



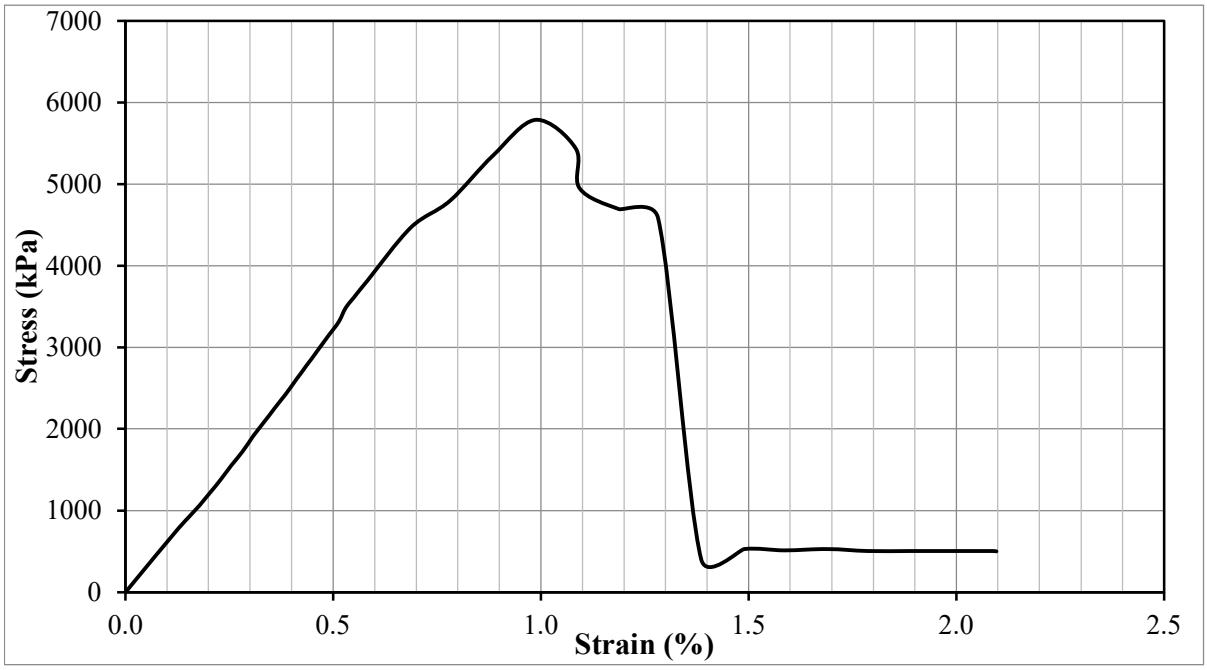
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,049	Strain at failure, εf :	1.02	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-33-D	Initial Area:	2114.9	mm^2
Test Date:	6/12/2021	Weight:	380.3	g
Strain Rate:	1 %/min	Unit Weight:	1817	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	28.0	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.250%		



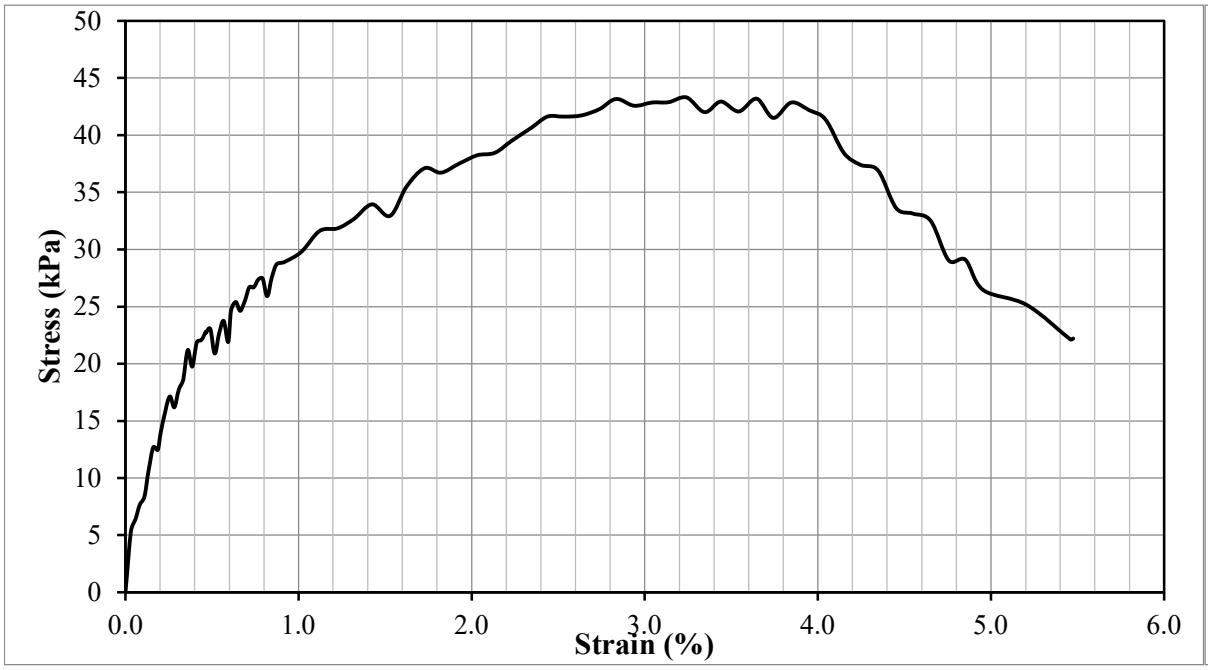
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,174	Strain at failure, εf :	1.09	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-33-I	Initial Area:	2117.0	mm^2
Test Date:	6/12/2021	Weight:	381.4	g
Strain Rate:	1 %/min	Unit Weight:	1821	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	28.0	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.250%		



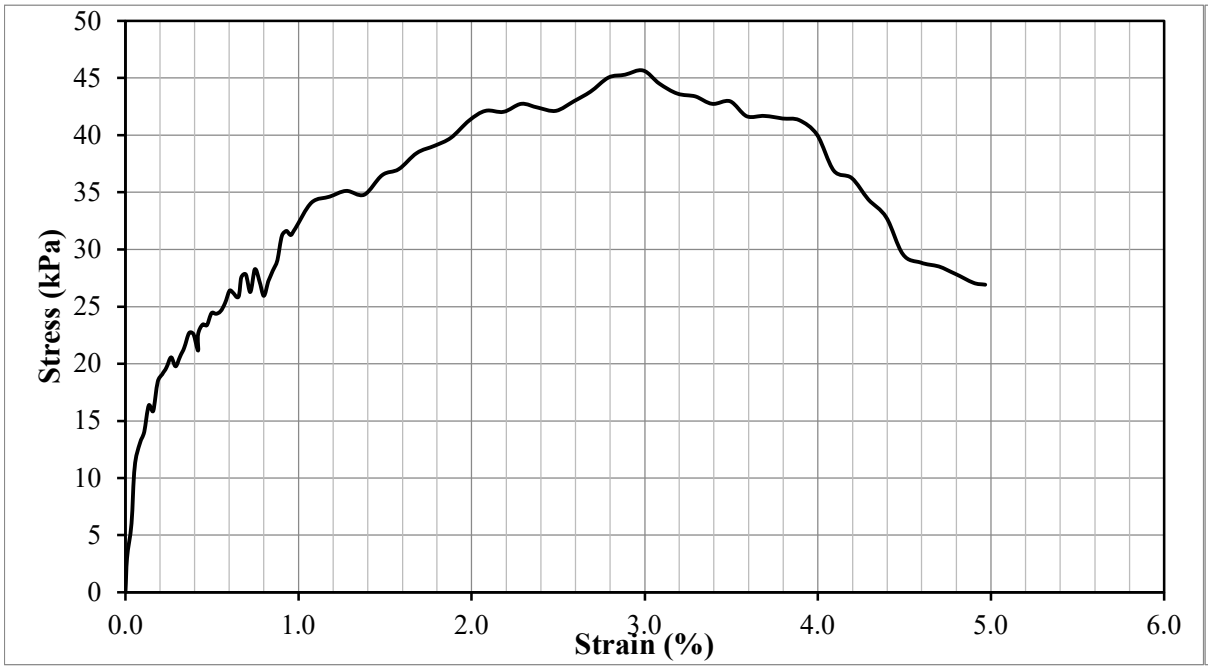
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,742	Strain at failure, εf :	0.99	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	O-34-B	Initial Area:	2100.5	mm^2
Test Date:	5/20/2021	Weight:	376.5	g
Strain Rate:	1 %/min	Unit Weight:	1818	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	6.7	days
$(w{:}c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.300%		



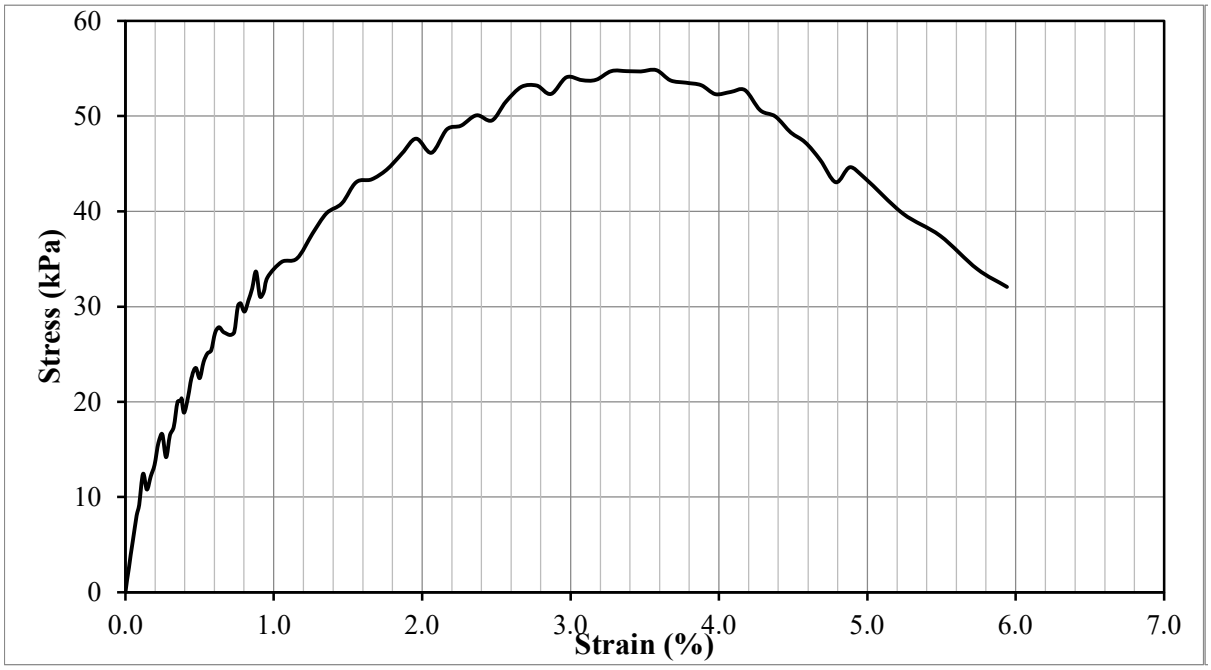
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	43	Strain at failure, εf :	3.24	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	O-34-G	Initial Area:	2098.4	mm^2
Test Date:	5/20/2021	Weight:	385.0	g
Strain Rate:	1 %/min	Unit Weight:	1818	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	6.7	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.300%		



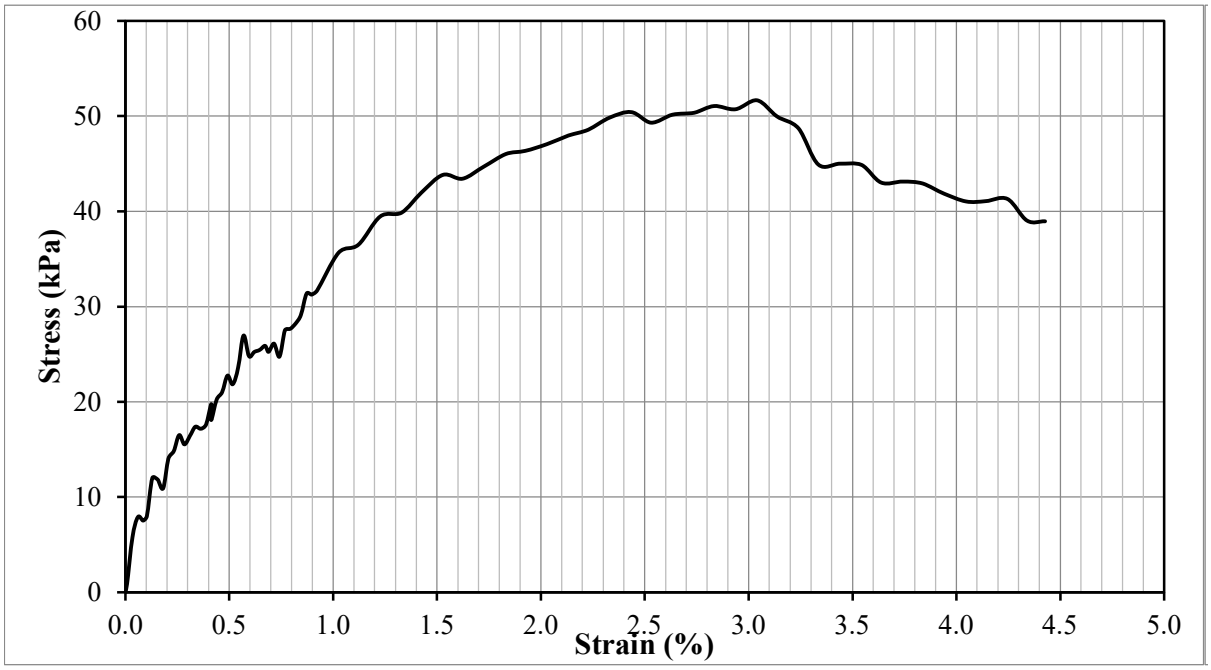
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	45	Strain at failure, εf :	2.99	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.6	mm
I.D.:	O-34-C	Initial Area:	2090.1	mm^2
Test Date:	5/27/2021	Weight:	384.6	g
Strain Rate:	1 %/min	Unit Weight:	1827	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	13.8	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.300%		



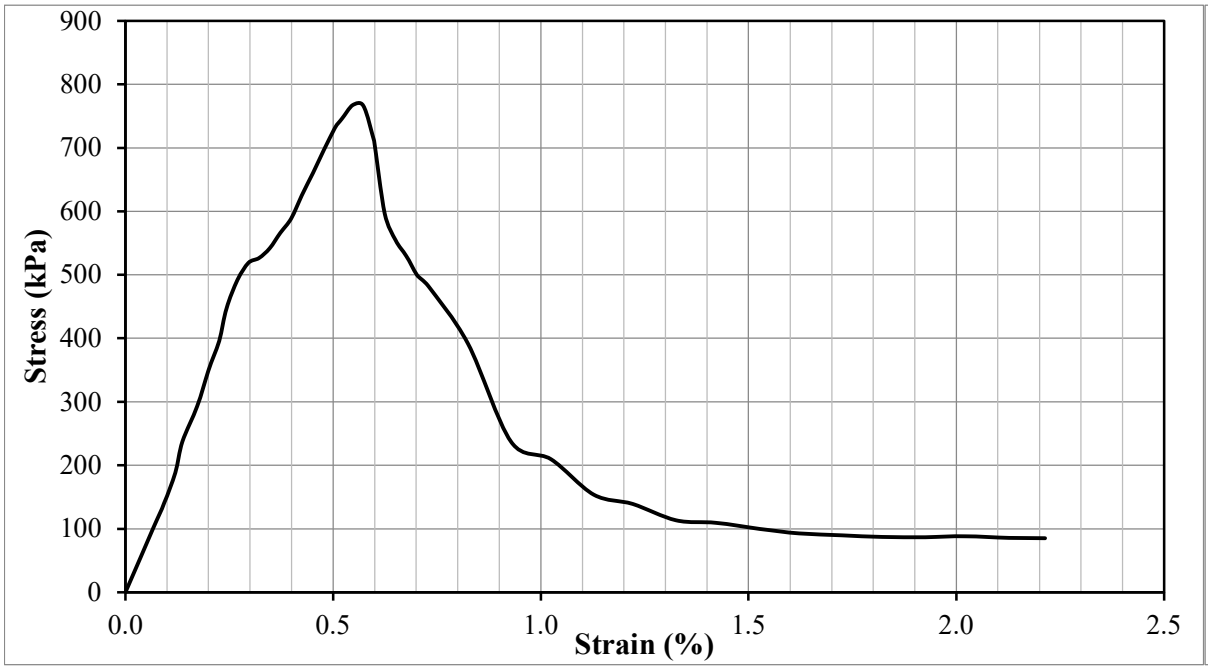
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	55	Strain at failure, εf :	3.58	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.5	mm
I.D.:	O-34-F	Initial Area:	2079.9	mm^2
Test Date:	5/27/2021	Weight:	375.3	g
Strain Rate:	1 %/min	Unit Weight:	1832	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	13.8	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.300%		



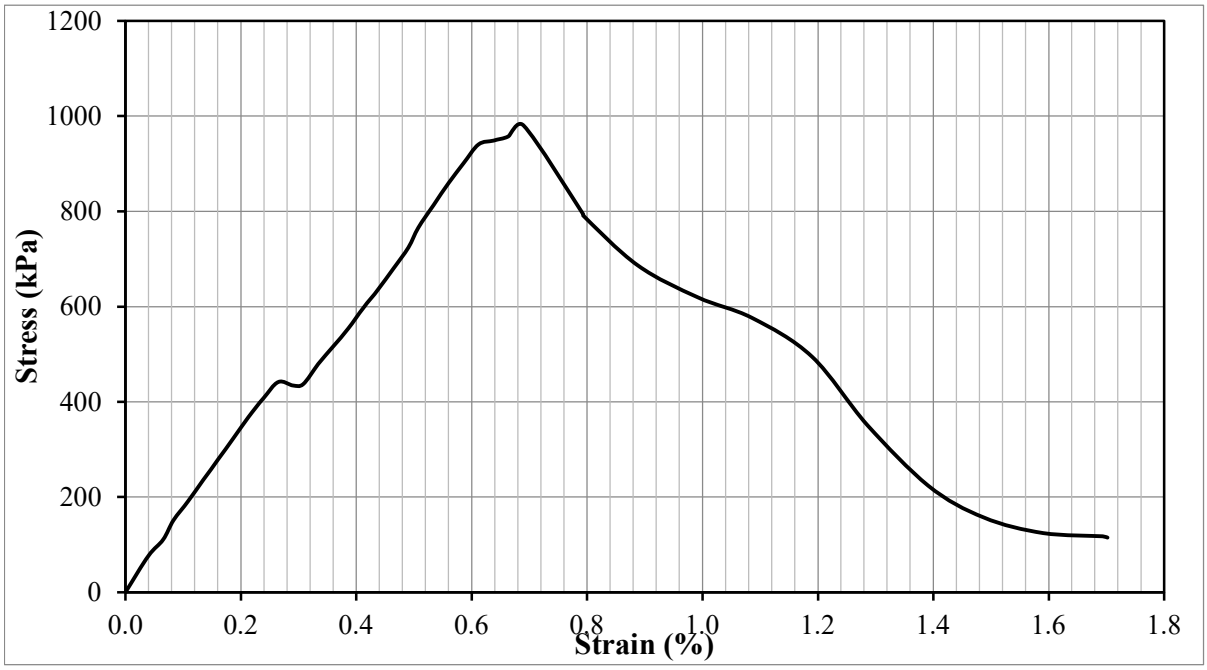
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	51	Strain at failure, εf :	3.04	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-34-D	Initial Area:	2112.9	mm^2
Test Date:	6/10/2021	Weight:	387.4	g
Strain Rate:	1 %/min	Unit Weight:	1814	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	27.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.300%		



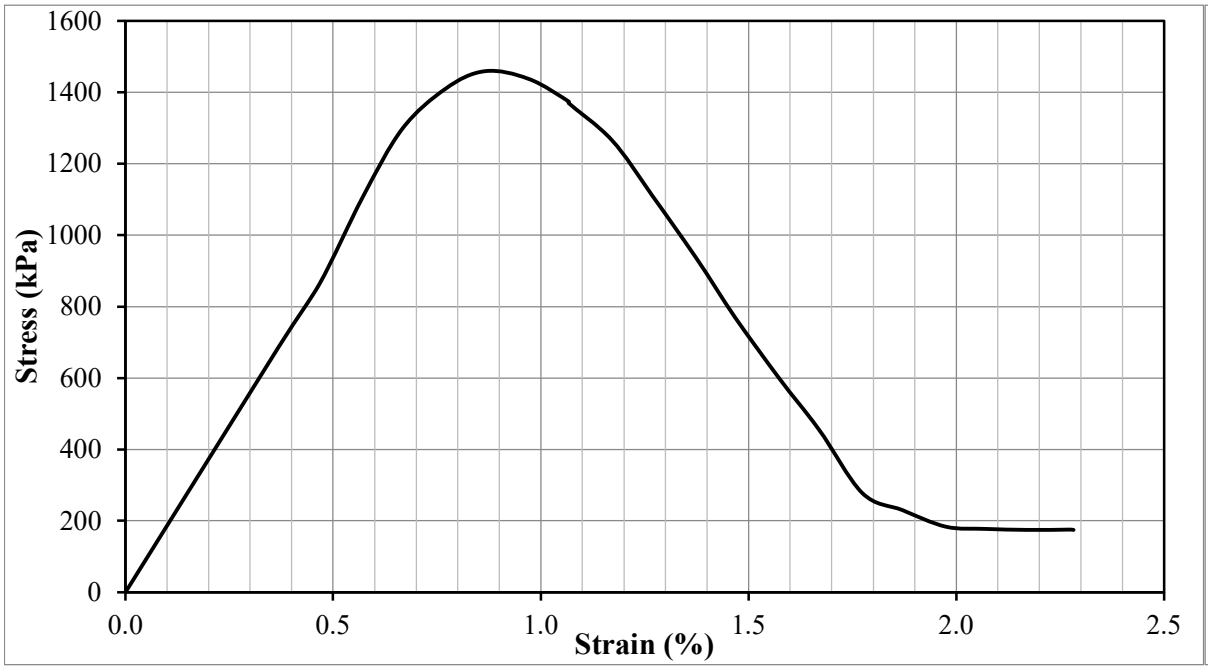
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	764	Strain at failure, εf :	0.55	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	O-34-E	Initial Area:	2112.9	mm^2
Test Date:	6/10/2021	Weight:	382.4	g
Strain Rate:	1 %/min	Unit Weight:	1811	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	27.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Tannic acid concentration by base soil (%)		0.300%		



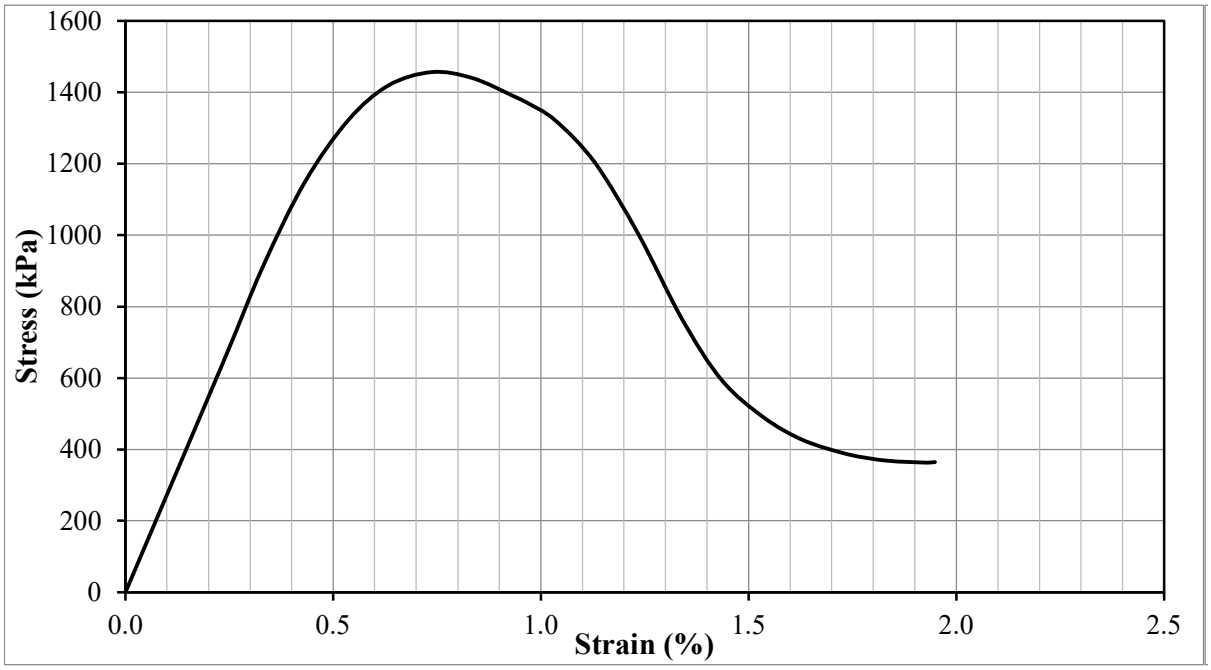
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	974	Strain at failure, εf :	0.69	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	J-1-A	Initial Area:	2112.9	mm^2
Test Date:	7/4/2022	Weight:	411.9	g
Strain Rate:	1 %/min	Unit Weight:	1966	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	3.0	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



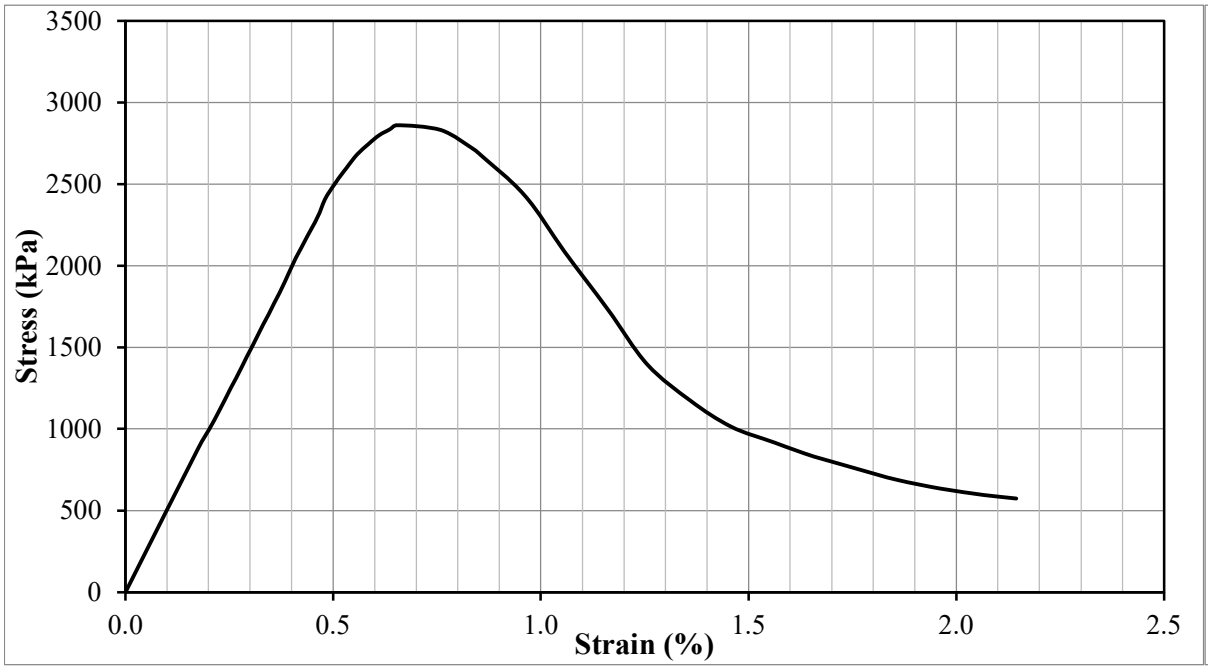
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,448	Strain at failure, εf :	0.87	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	J-1-H	Initial Area:	2127.4	mm^2
Test Date:	7/4/2022	Weight:	418.5	g
Strain Rate:	1 %/min	Unit Weight:	1956	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	3.0	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



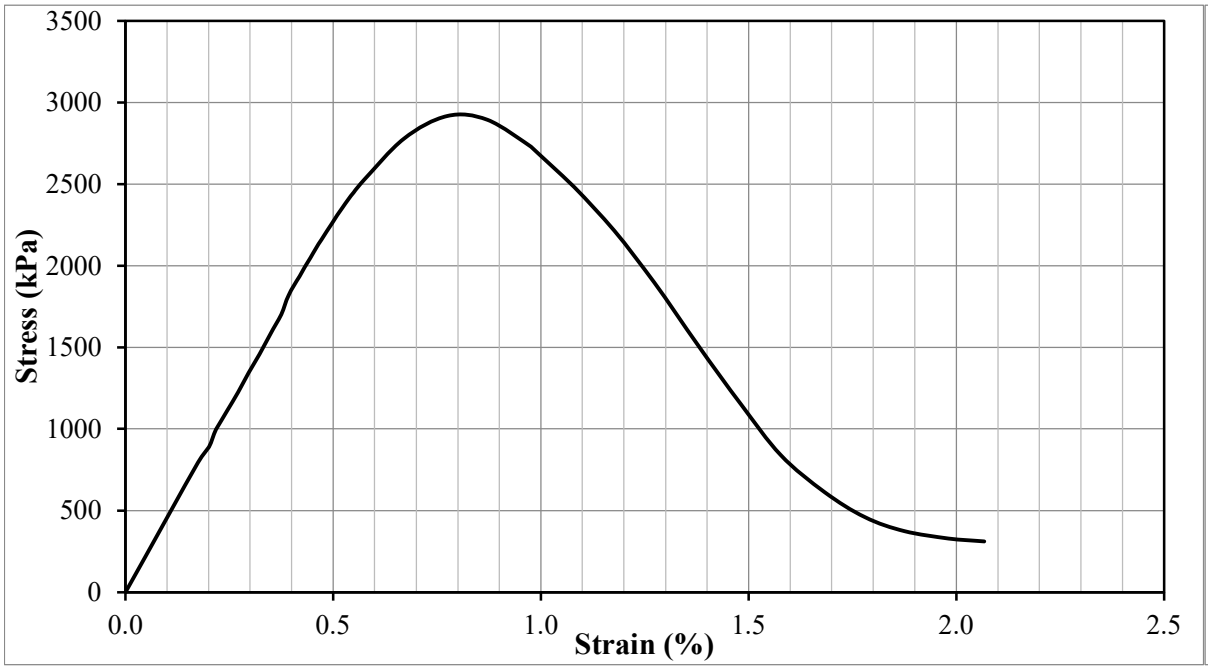
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,449	Strain at failure, εf :	0.74	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	J-1-B	Initial Area:	2117.0	mm^2
Test Date:	7/8/2022	Weight:	417.1	g
Strain Rate:	1 %/min	Unit Weight:	1979	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	7.0	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



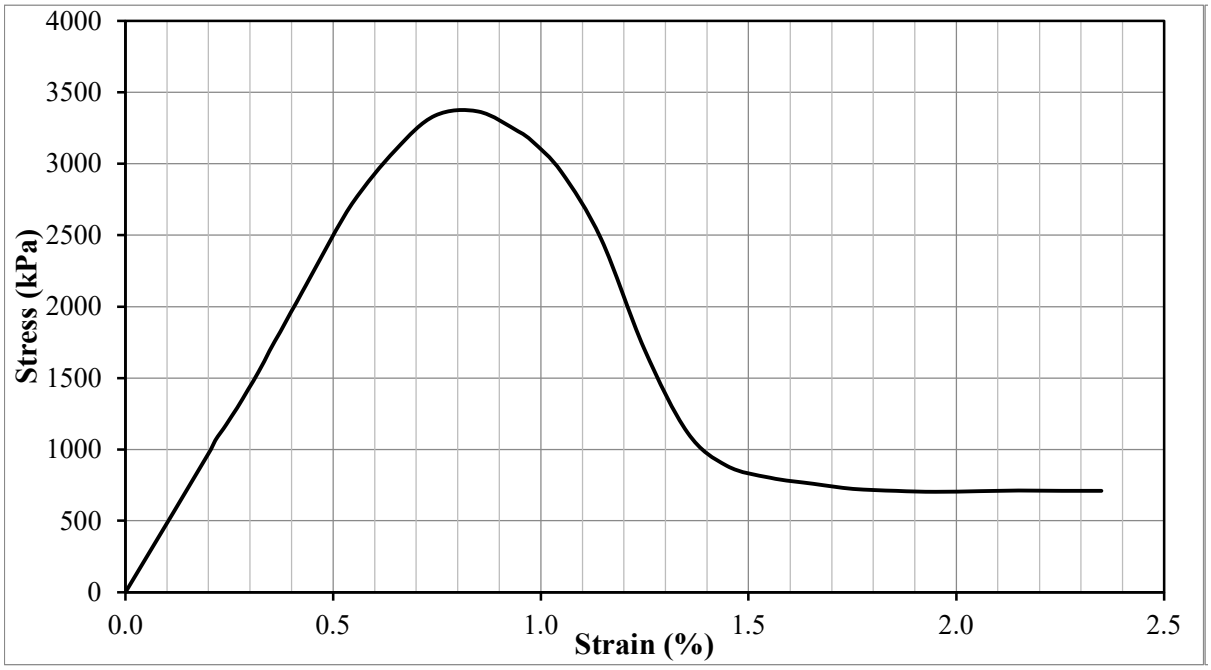
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,842	Strain at failure, εf :	0.65	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	J-1-I	Initial Area:	2119.1	mm^2
Test Date:	7/8/2022	Weight:	416.0	g
Strain Rate:	1 %/min	Unit Weight:	1971	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	7.0	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



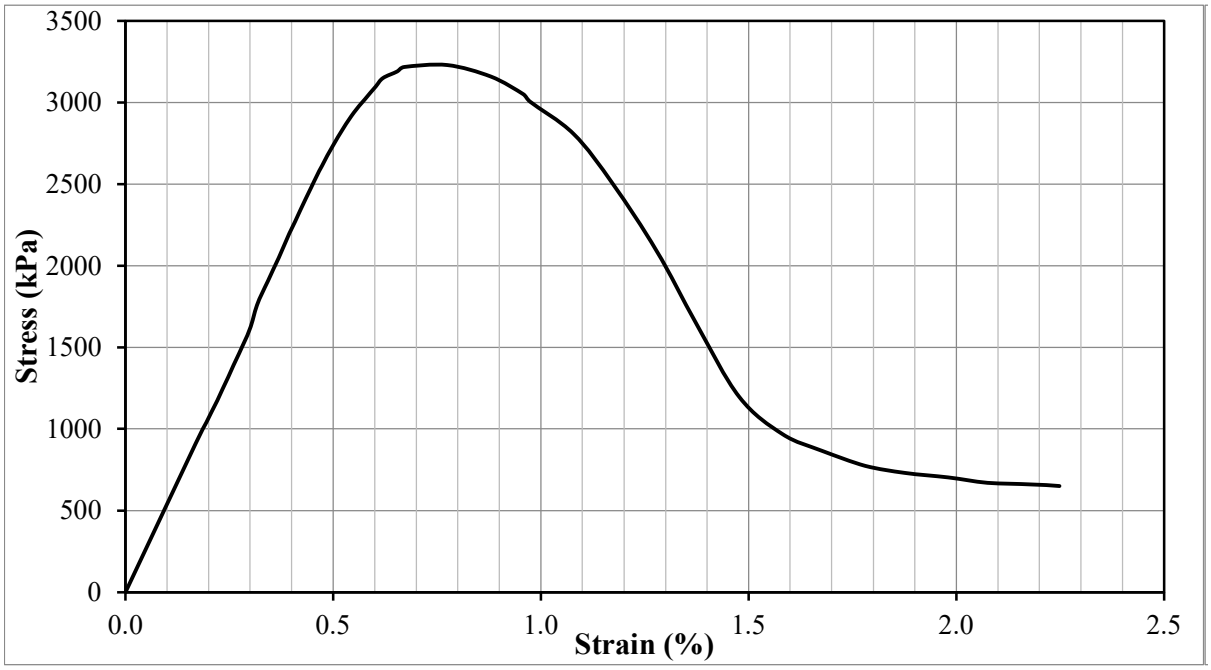
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,898	Strain at failure, εf :	0.77	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	J-1-C	Initial Area:	2110.8	mm^2
Test Date:	7/15/2022	Weight:	413.3	g
Strain Rate:	1 %/min	Unit Weight:	1980	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	13.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



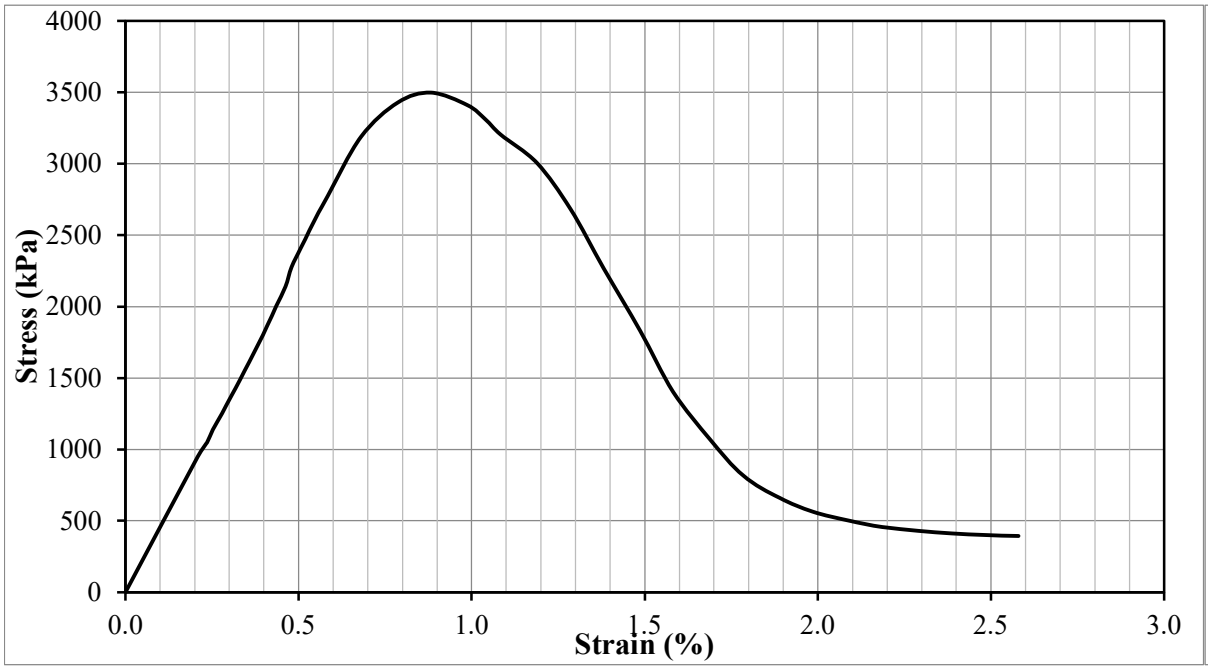
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,341	Strain at failure, εf :	0.85	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	96.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	J-1-F	Initial Area:	2125.3	mm^2
Test Date:	7/15/2022	Weight:	400.4	g
Strain Rate:	1 %/min	Unit Weight:	1953	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	13.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



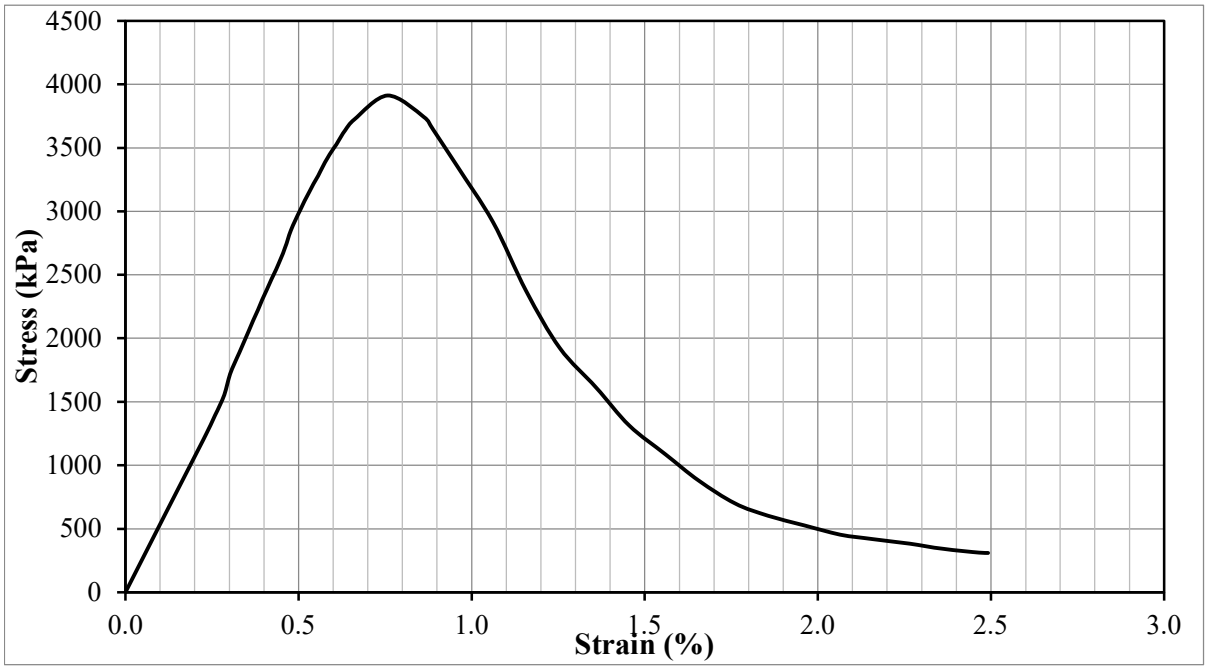
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,191	Strain at failure, εf :	0.78	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	J-1-D	Initial Area:	2119.1	mm^2
Test Date:	7/29/2022	Weight:	410.6	g
Strain Rate:	1 %/min	Unit Weight:	1959	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	27.8	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



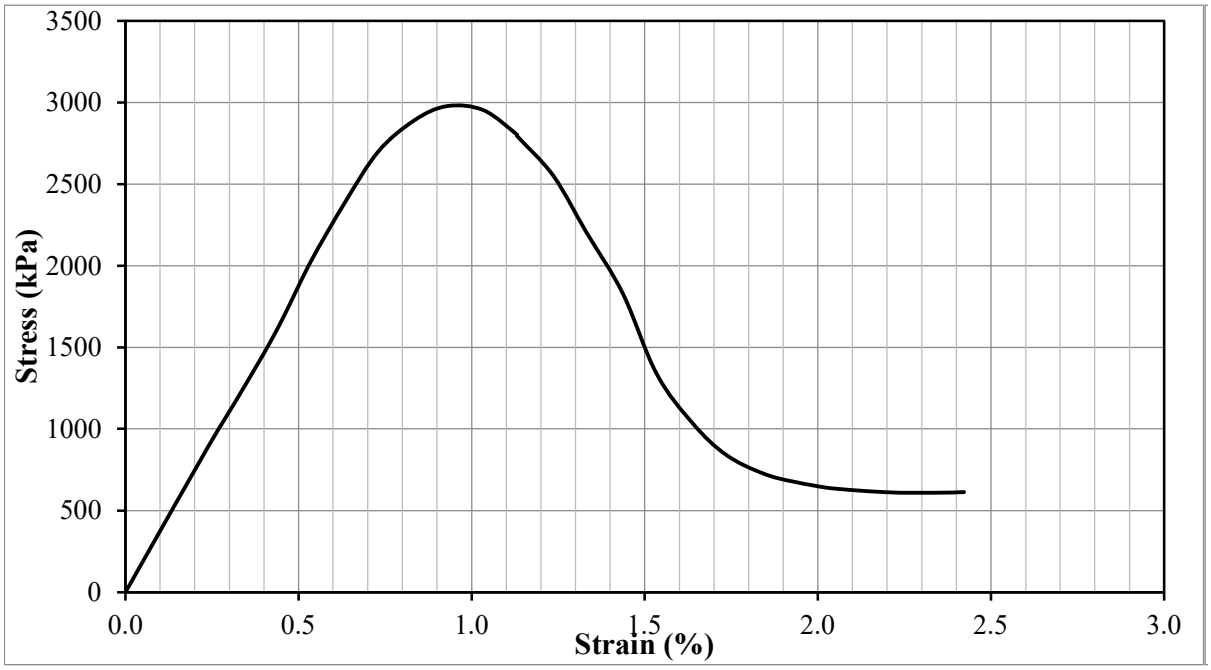
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,470	Strain at failure, εf :	0.88	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	J-1-E	Initial Area:	2123.2	mm^2
Test Date:	7/29/2022	Weight:	408.9	g
Strain Rate:	1 %/min	Unit Weight:	1961	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	27.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



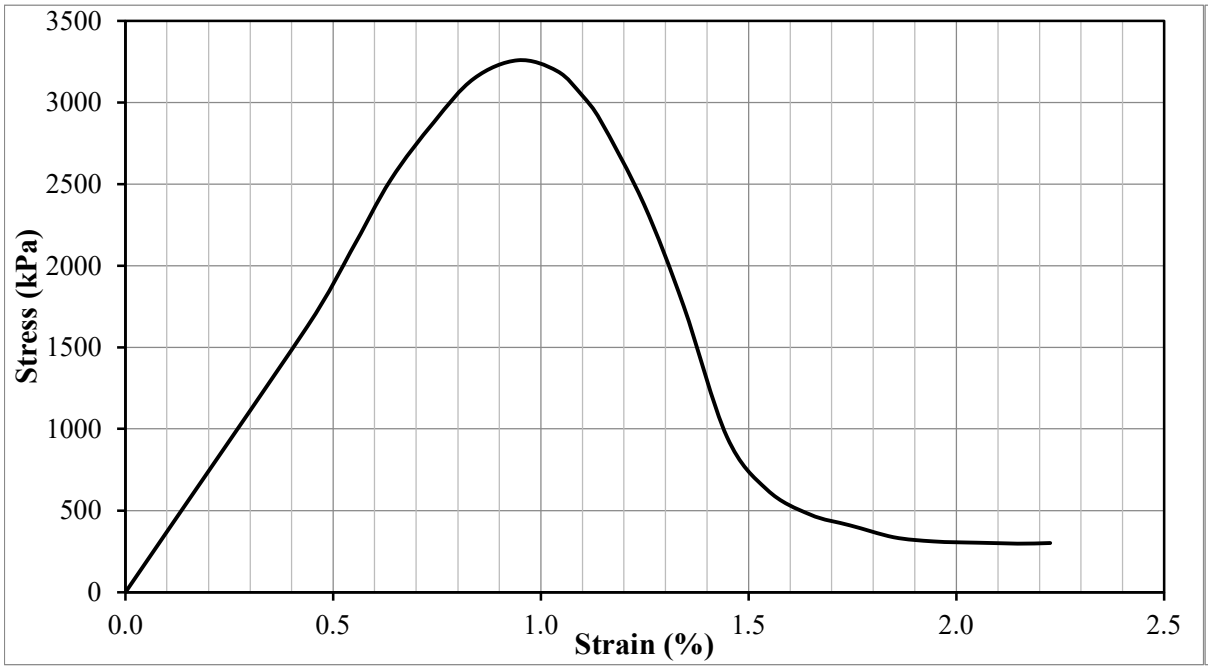
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,876	Strain at failure, εf :	0.76	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	J-2-A	Initial Area:	2117.0	mm^2
Test Date:	7/4/2022	Weight:	417.0	g
Strain Rate:	1 %/min	Unit Weight:	1984	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	3.0	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



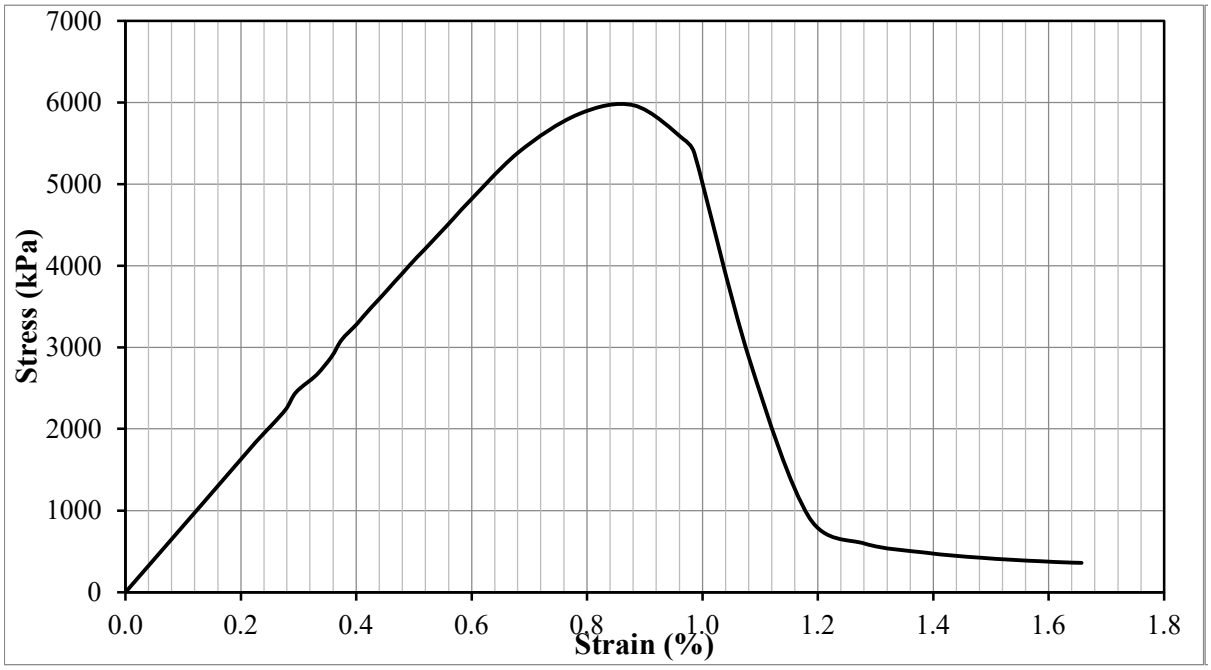
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,957	Strain at failure, εf :	0.93	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	J-2-H	Initial Area:	2125.3	mm^2
Test Date:	7/4/2022	Weight:	420.7	g
Strain Rate:	1 %/min	Unit Weight:	1983	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	3.0	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



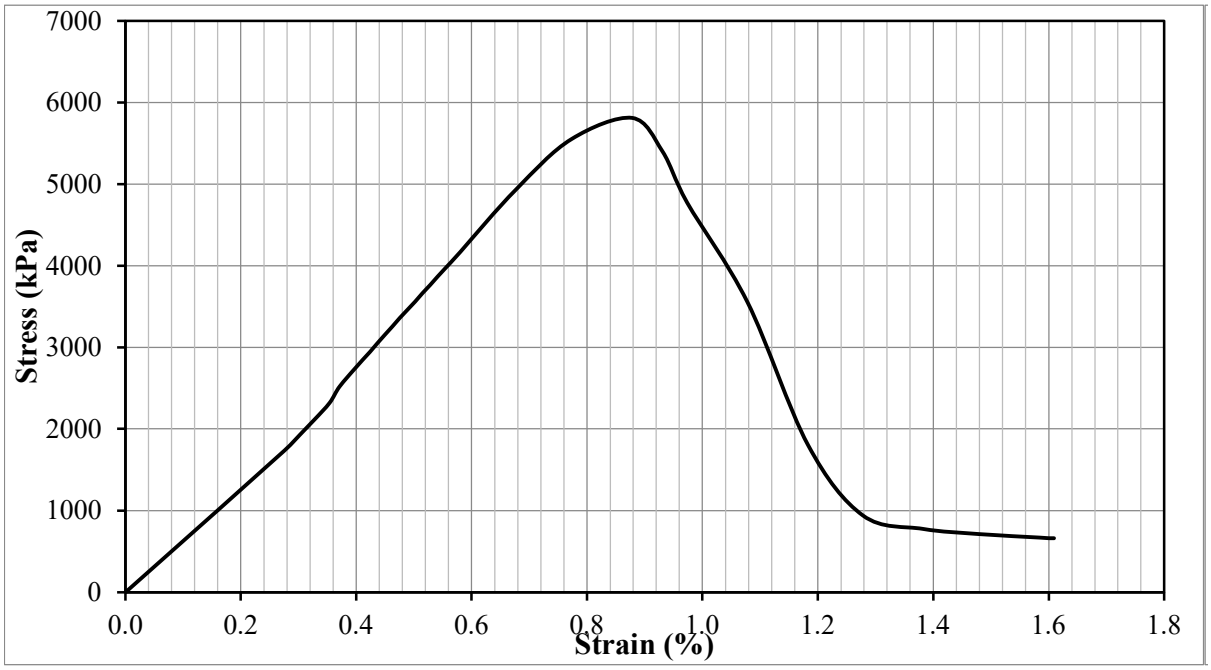
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,237	Strain at failure, εf :	0.94	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	J-2-G	Initial Area:	2112.9	mm^2
Test Date:	7/8/2022	Weight:	419.3	g
Strain Rate:	1 %/min	Unit Weight:	1999	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	7.0	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



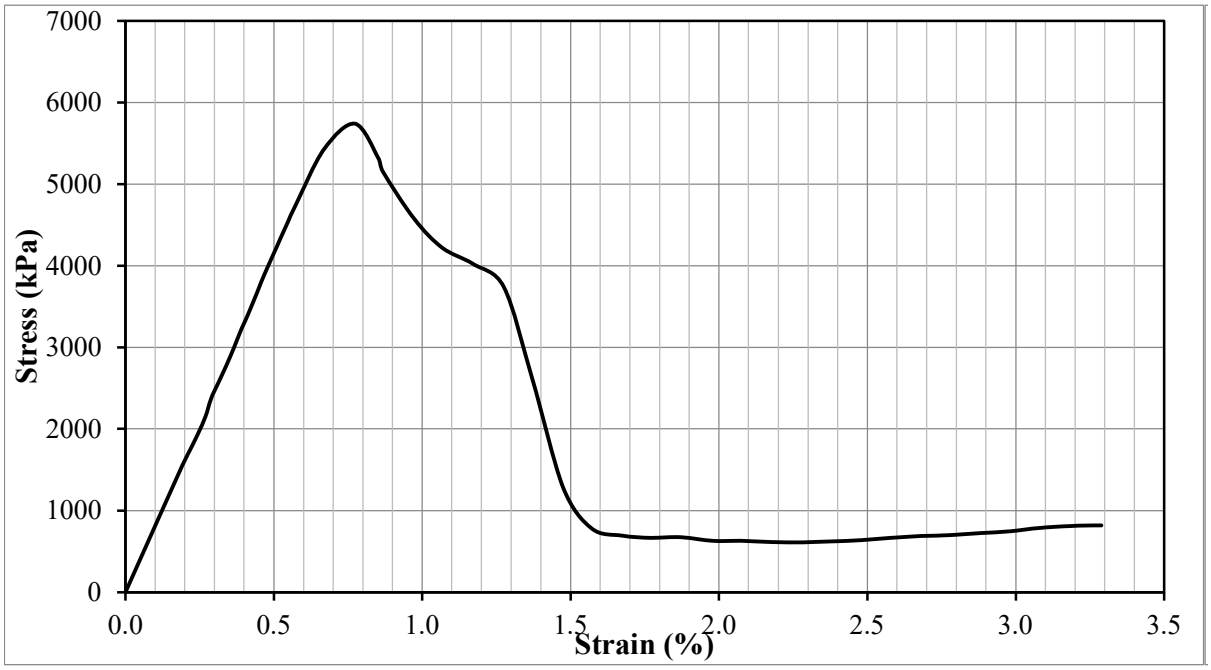
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,923	Strain at failure, εf :	0.88	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	95.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	J-2-I	Initial Area:	2112.9	mm^2
Test Date:	7/8/2022	Weight:	405.5	g
Strain Rate:	1 %/min	Unit Weight:	2003	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	7.0	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



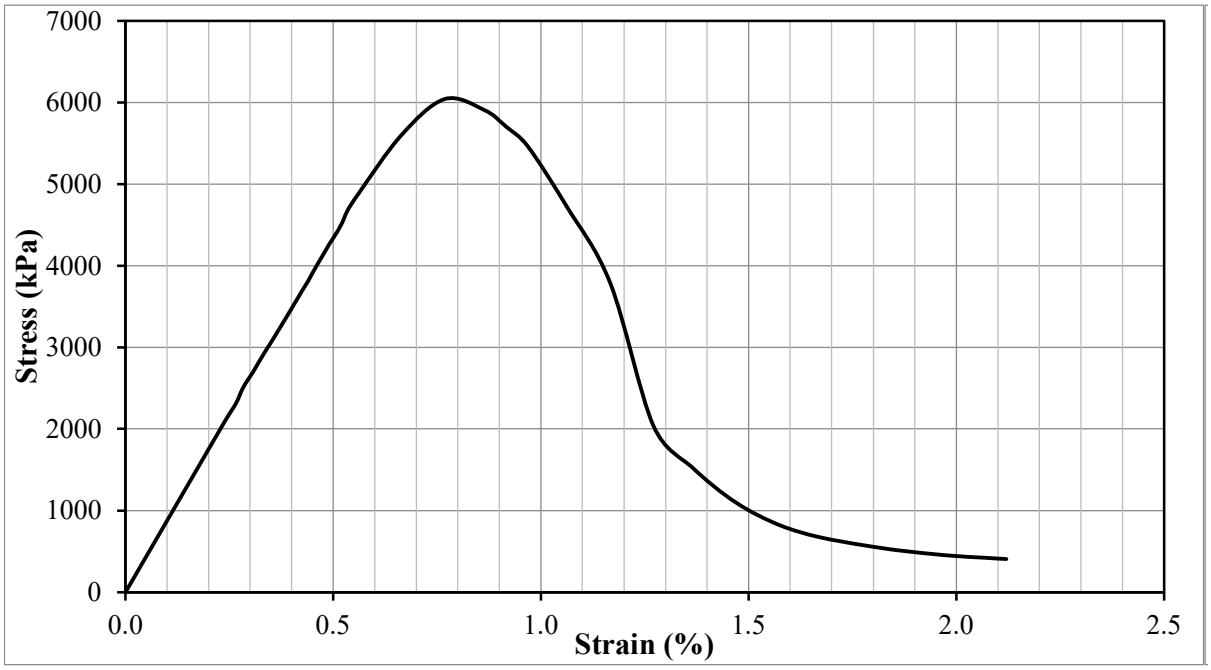
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,738	Strain at failure, εf :	0.88	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	J-2-C	Initial Area:	2117.0	mm^2
Test Date:	7/15/2022	Weight:	415.4	g
Strain Rate:	1 %/min	Unit Weight:	1988	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	13.8	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



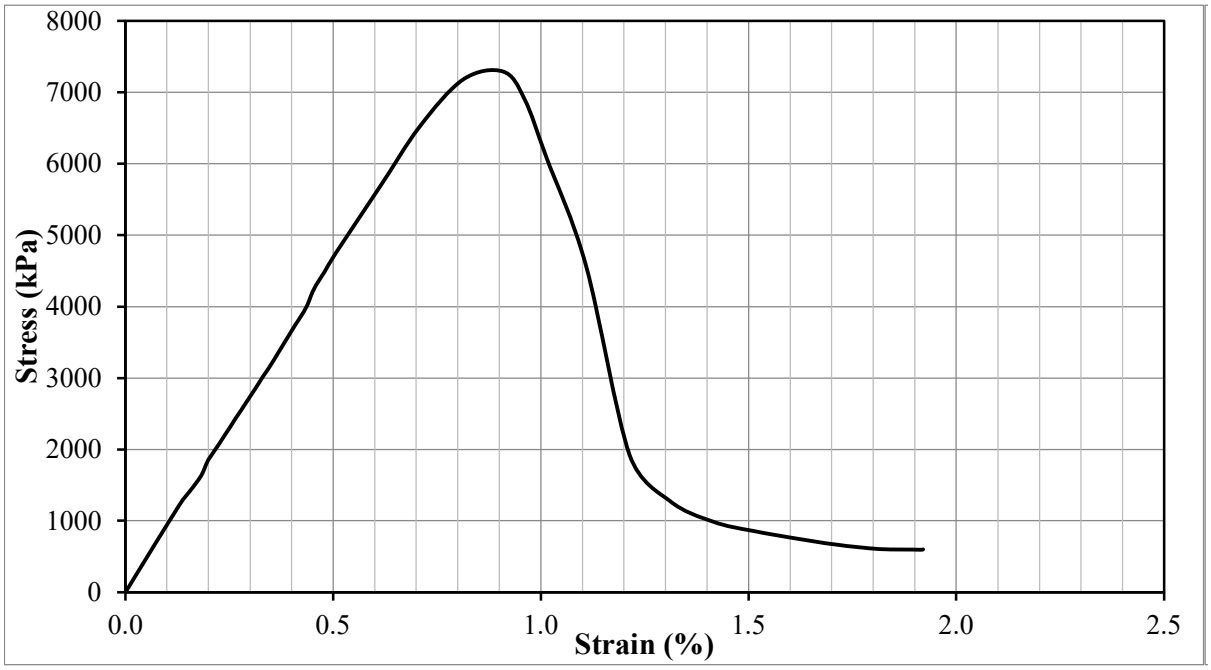
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,694	Strain at failure, εf :	0.77	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	J-2-F	Initial Area:	2114.9	mm^2
Test Date:	7/15/2022	Weight:	416.3	g
Strain Rate:	1 %/min	Unit Weight:	1994	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	13.8	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



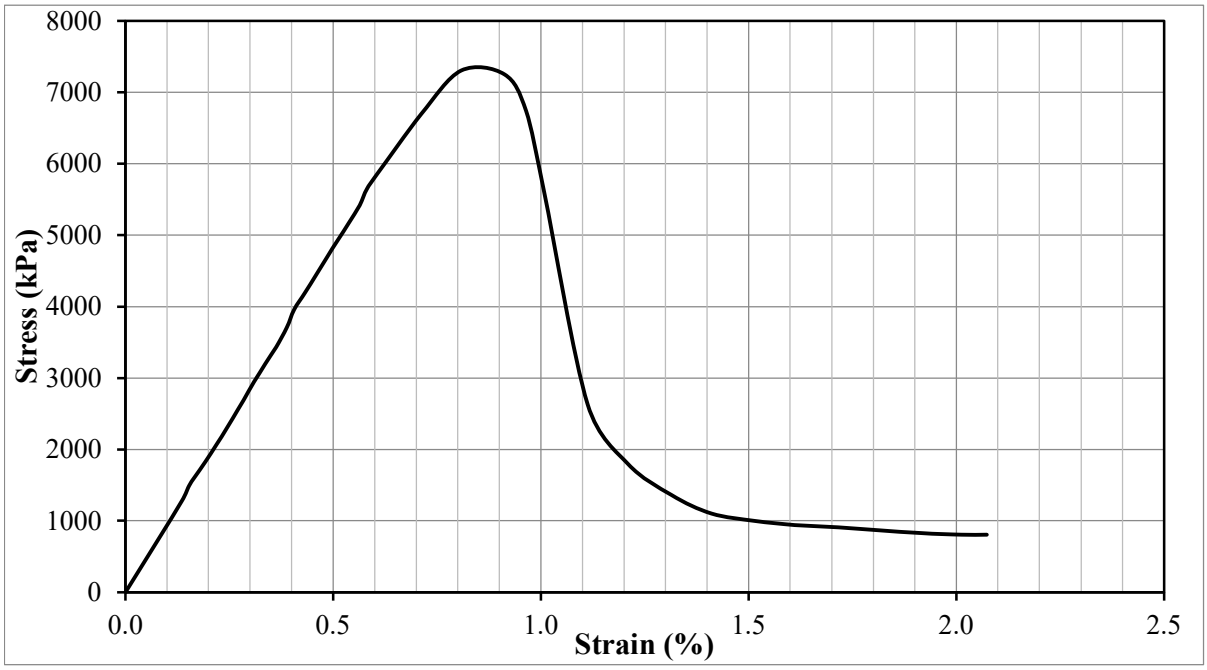
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,995	Strain at failure, εf :	0.77	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	J-2-D	Initial Area:	2114.9	mm^2
Test Date:	7/29/2022	Weight:	420.9	g
Strain Rate:	1 %/min	Unit Weight:	1996	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	27.8	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



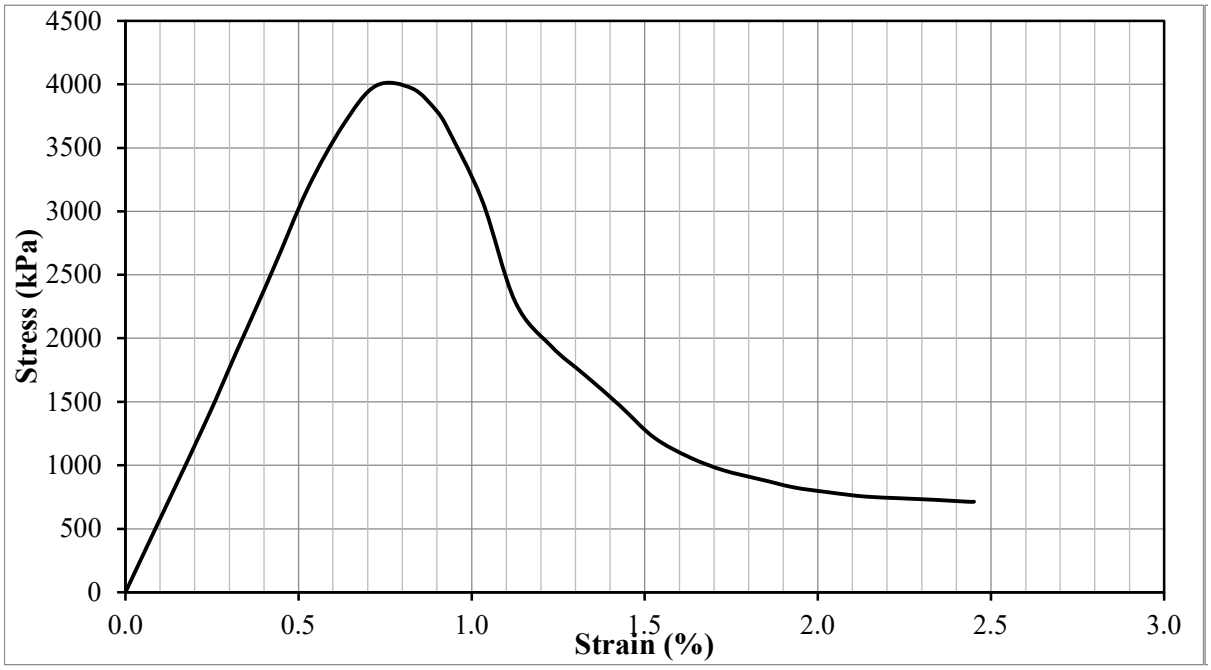
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	7,245	Strain at failure, εf :	0.91	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	J-2-E	Initial Area:	2125.3	mm^2
Test Date:	7/29/2022	Weight:	416.0	g
Strain Rate:	1 %/min	Unit Weight:	1983	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	27.8	days
$(w{:}c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



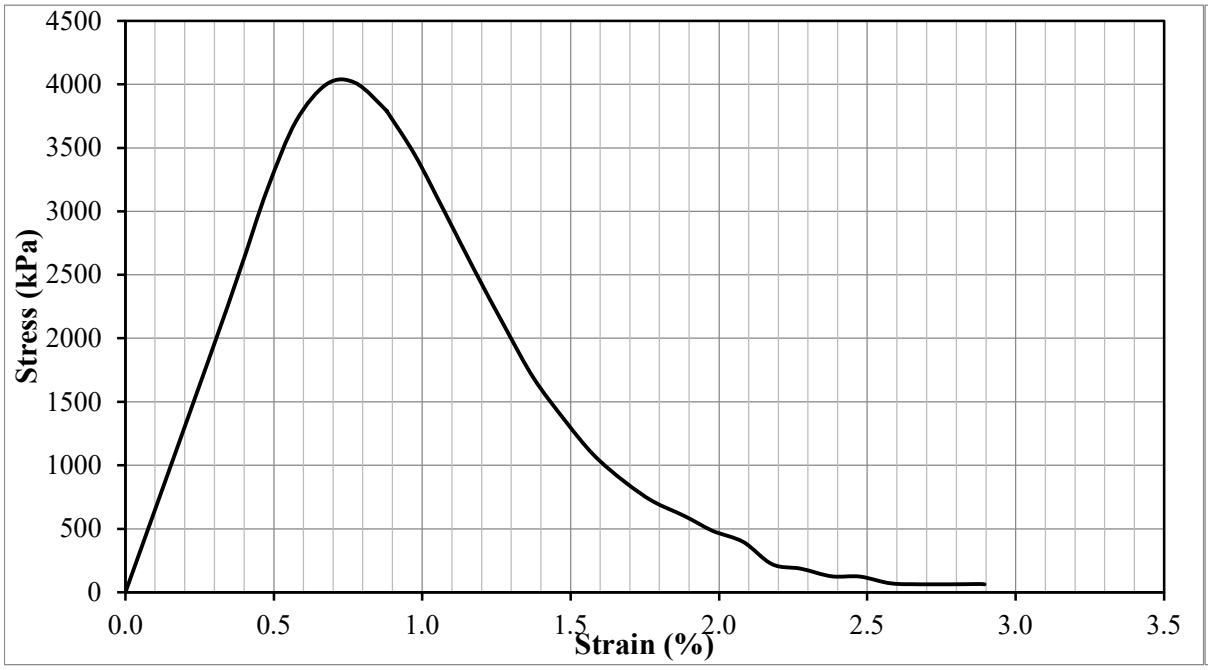
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	7,242	Strain at failure, εf :	0.81	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	J-3-A	Initial Area:	2108.7	mm^2
Test Date:	7/4/2022	Weight:	409.9	g
Strain Rate:	1 %/min	Unit Weight:	1987	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	2.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



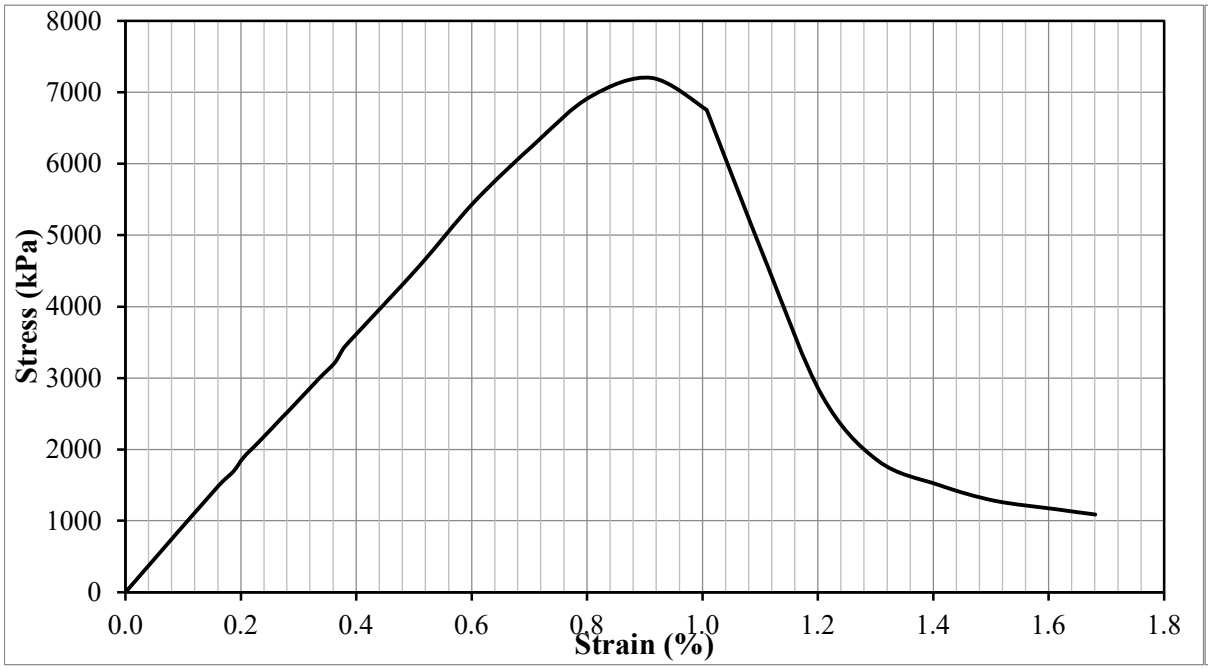
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,955	Strain at failure, εf :	0.72	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	J-3-H	Initial Area:	2121.1	mm^2
Test Date:	7/4/2022	Weight:	419.0	g
Strain Rate:	1 %/min	Unit Weight:	1975	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	2.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



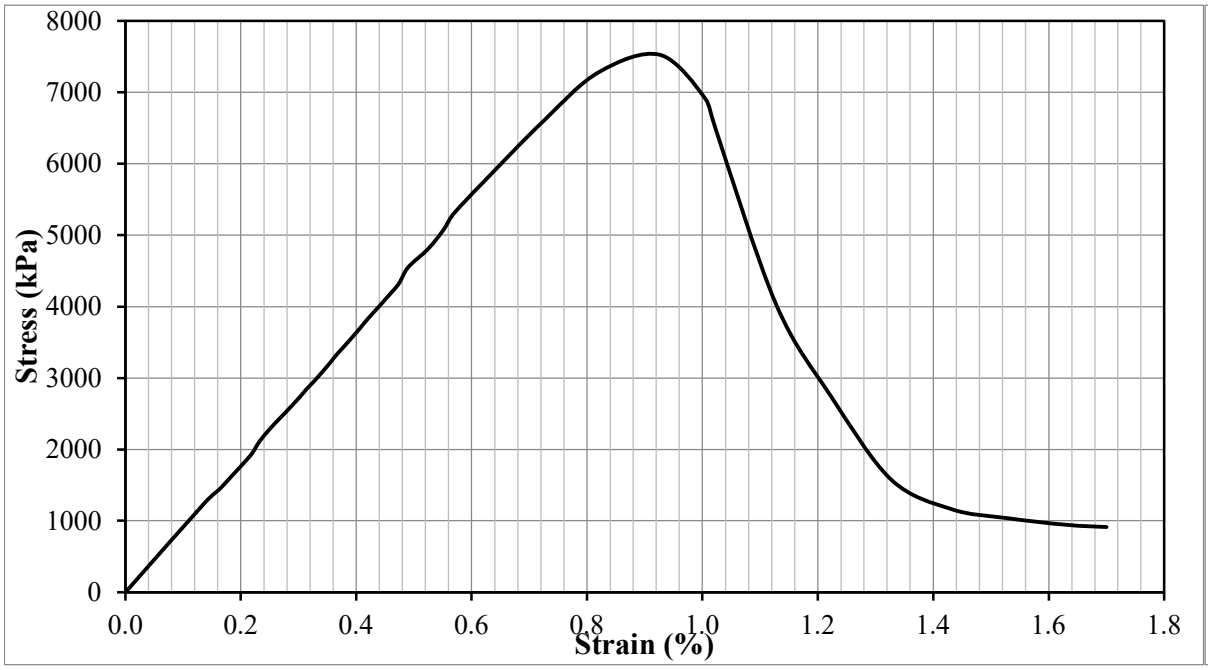
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,985	Strain at failure, εf :	0.78	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	J-3-B	Initial Area:	2127.4	mm^2
Test Date:	7/8/2022	Weight:	408.9	g
Strain Rate:	1 %/min	Unit Weight:	1977	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	6.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



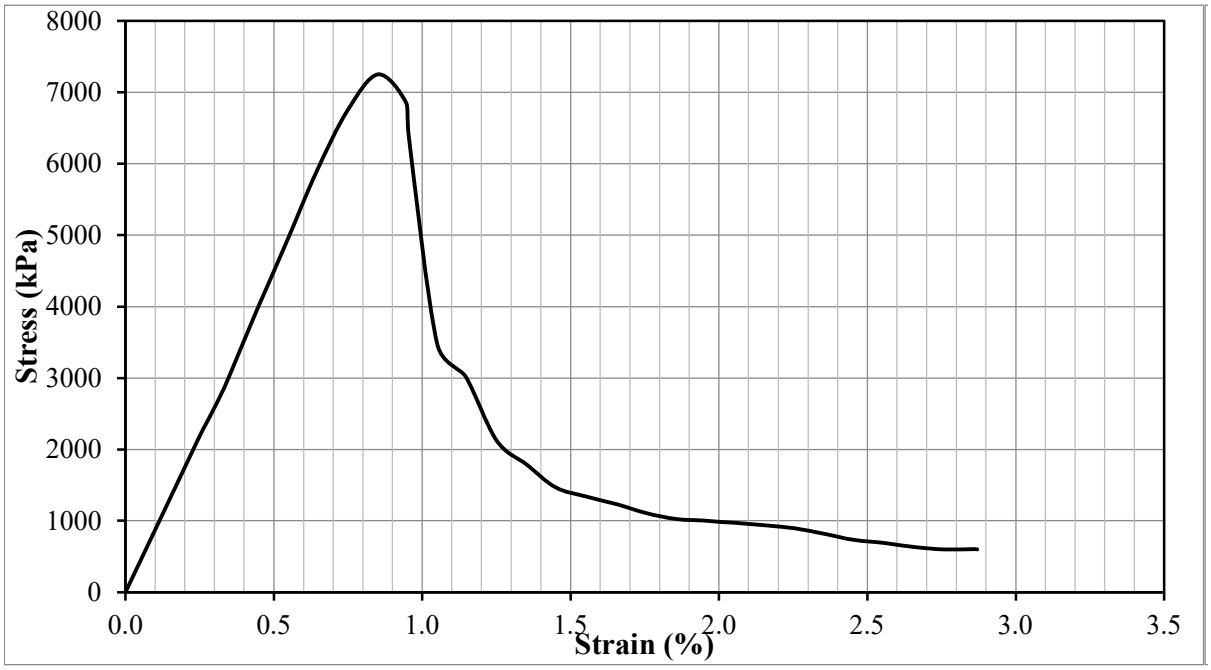
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	7,126	Strain at failure, εf :	0.91	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	J-3-I	Initial Area:	2123.2	mm^2
Test Date:	7/8/2022	Weight:	414.9	g
Strain Rate:	1 %/min	Unit Weight:	1992	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	6.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



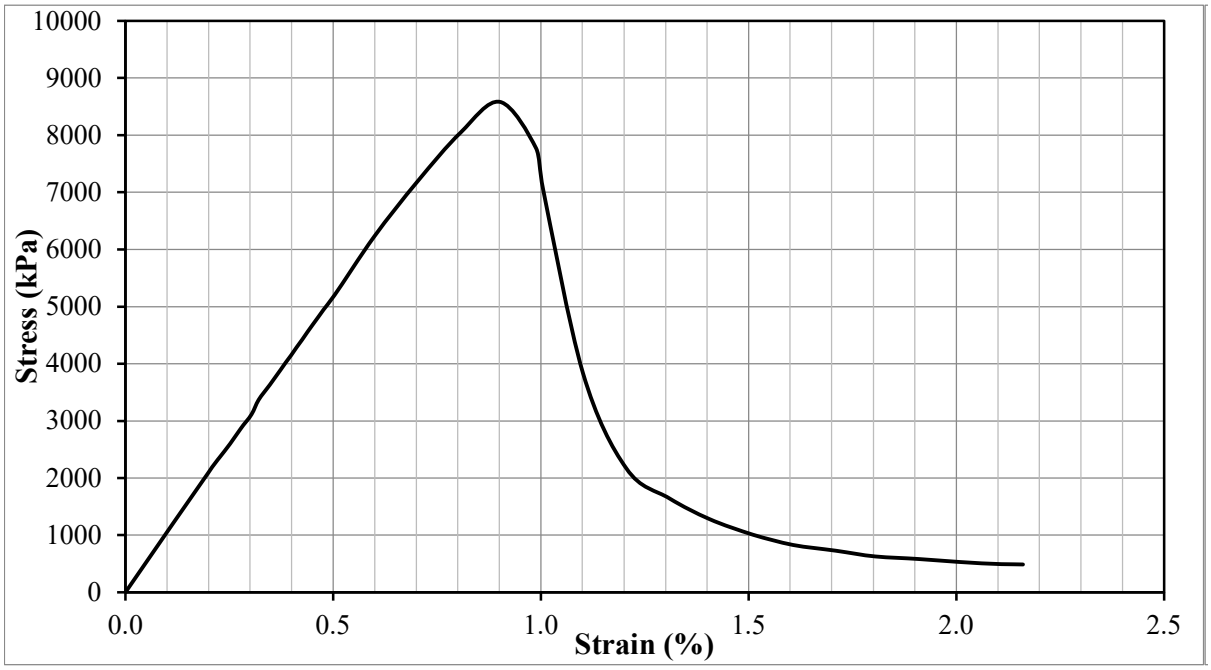
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	7,456	Strain at failure, εf :	0.93	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	J-3-C	Initial Area:	2127.4	mm^2
Test Date:	7/15/2022	Weight:	410.9	g
Strain Rate:	1 %/min	Unit Weight:	1978	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	13.7	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



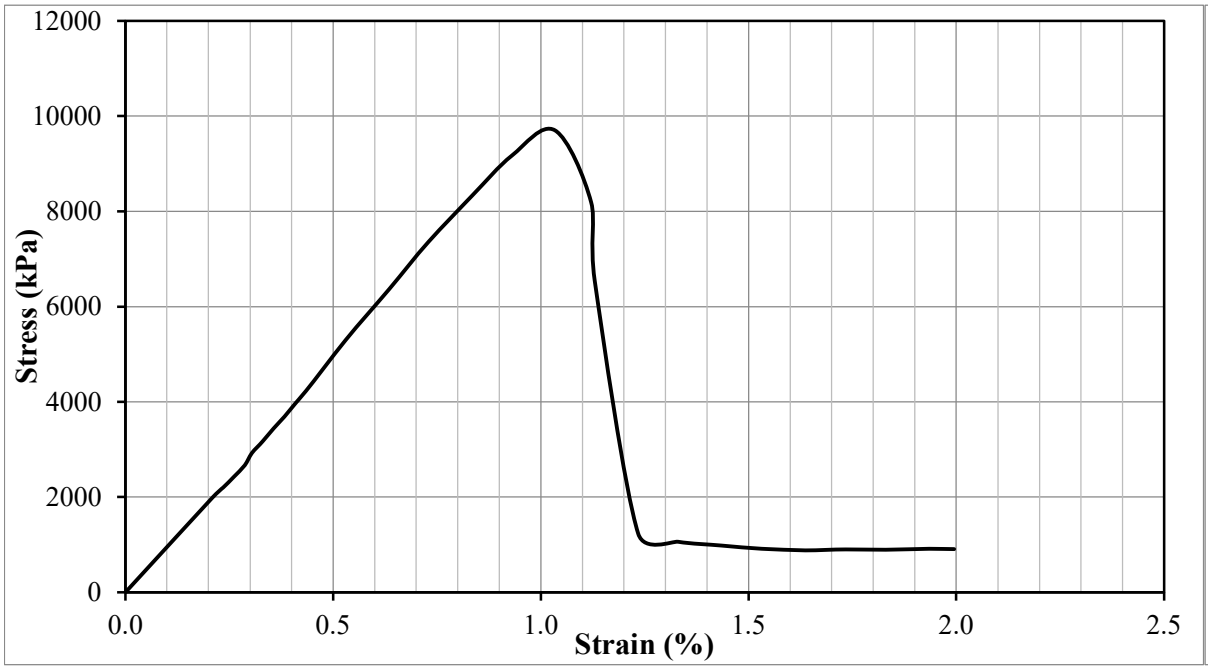
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	7,177	Strain at failure, εf :	0.85	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	J-3-F	Initial Area:	2121.1	mm^2
Test Date:	7/15/2022	Weight:	422.6	g
Strain Rate:	1 %/min	Unit Weight:	2000	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	13.8	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



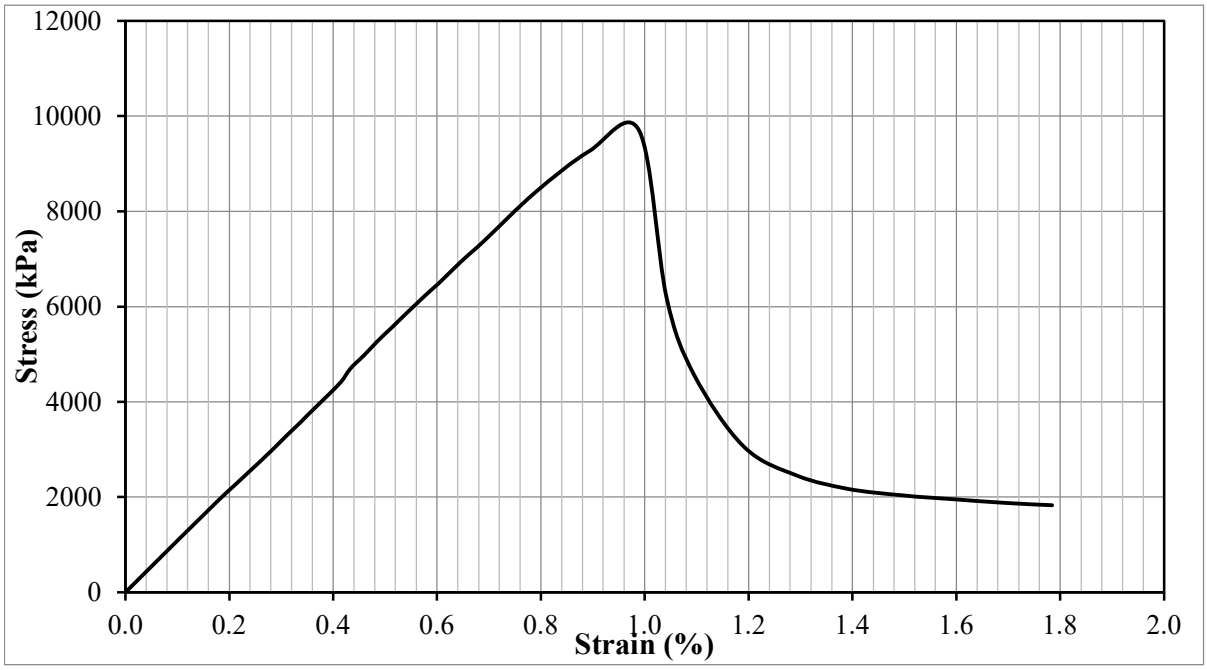
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	8,524	Strain at failure, εf :	0.90	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.1	mm
I.D.:	J-3-D	Initial Area:	2129.4	mm^2
Test Date:	7/29/2022	Weight:	415.4	g
Strain Rate:	1 %/min	Unit Weight:	1985	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	27.7	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



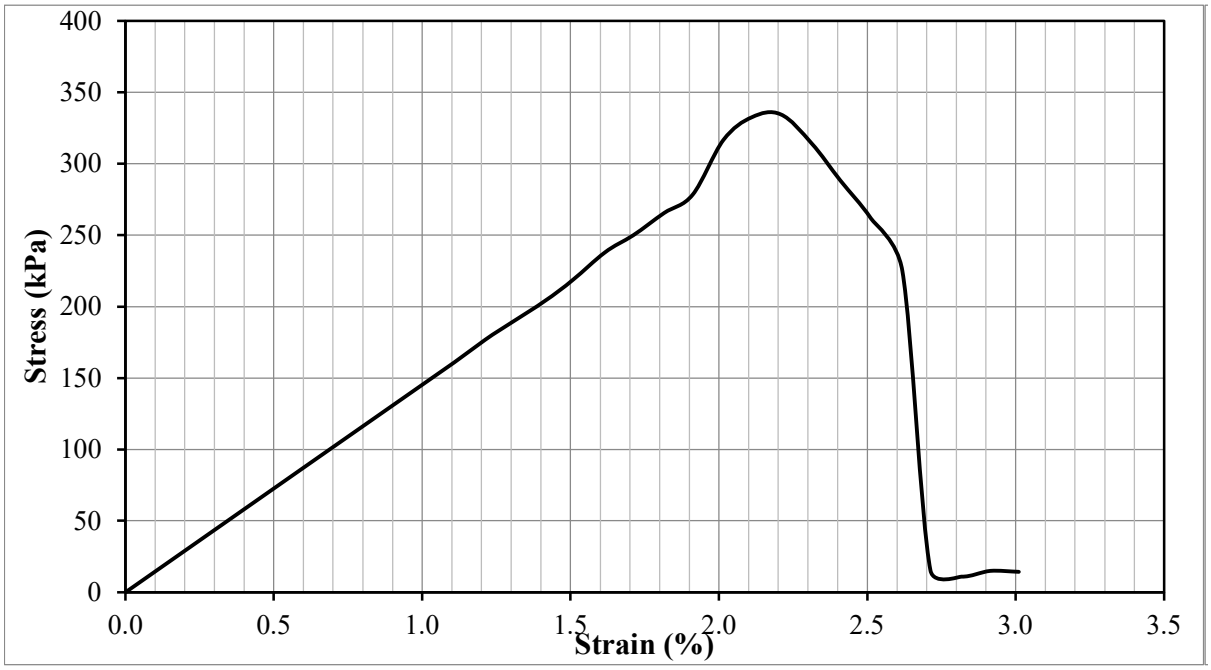
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	9,615	Strain at failure, εf :	1.03	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	J-3-E	Initial Area:	2125.3	mm^2
Test Date:	7/29/2022	Weight:	411.1	g
Strain Rate:	1 %/min	Unit Weight:	1986	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	27.7	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



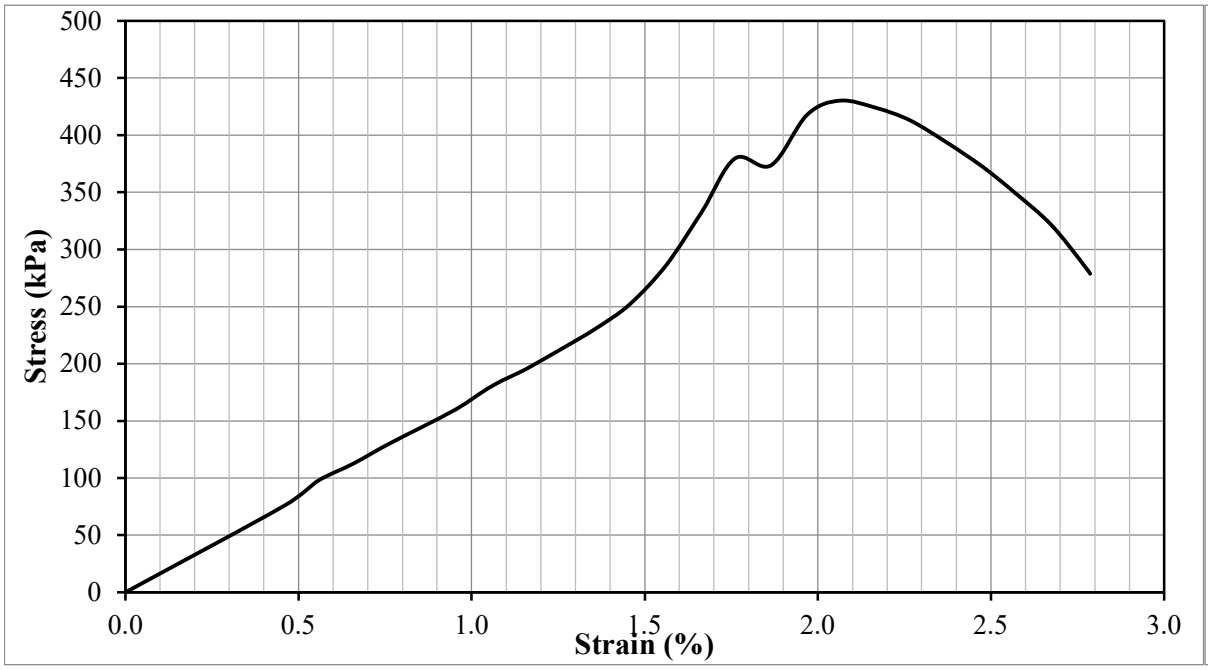
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	9,595	Strain at failure, εf :	0.99	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	J-4-A	Initial Area:	2110.8	mm^2
Test Date:	7/5/2022	Weight:	402.7	g
Strain Rate:	1 %/min	Unit Weight:	1903	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	3.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



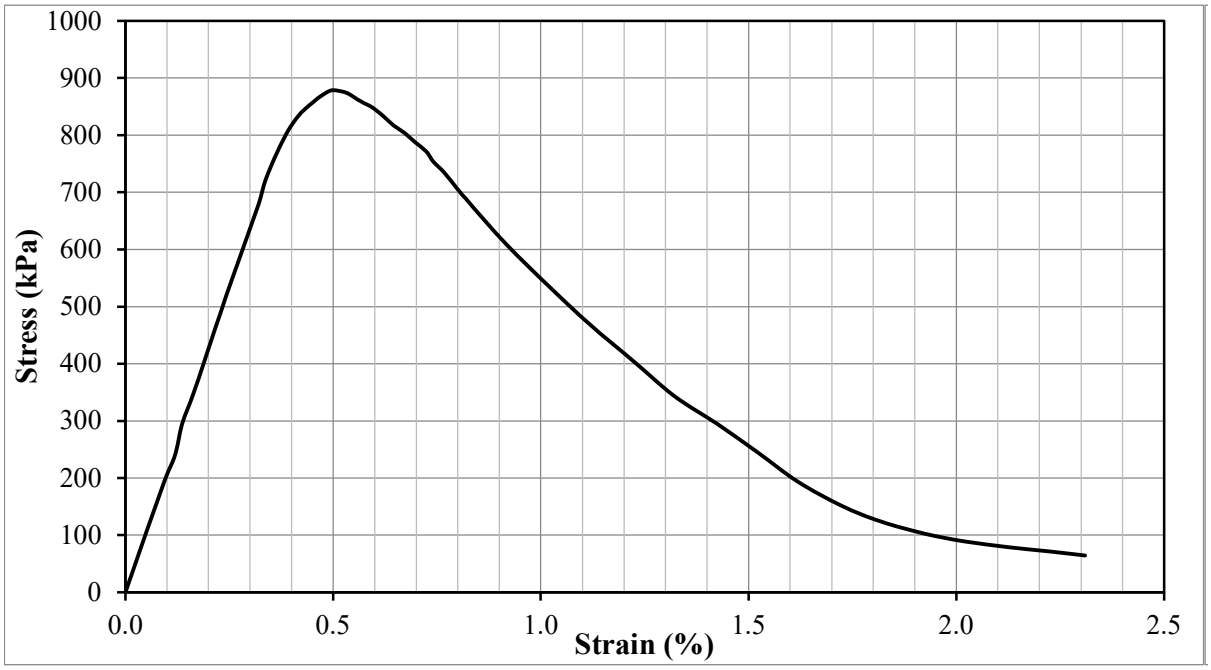
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	333	Strain at failure, εf :	2.21	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	J-4-H	Initial Area:	2110.8	mm^2
Test Date:	7/5/2022	Weight:	412.6	g
Strain Rate:	1 %/min	Unit Weight:	1958	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	3.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



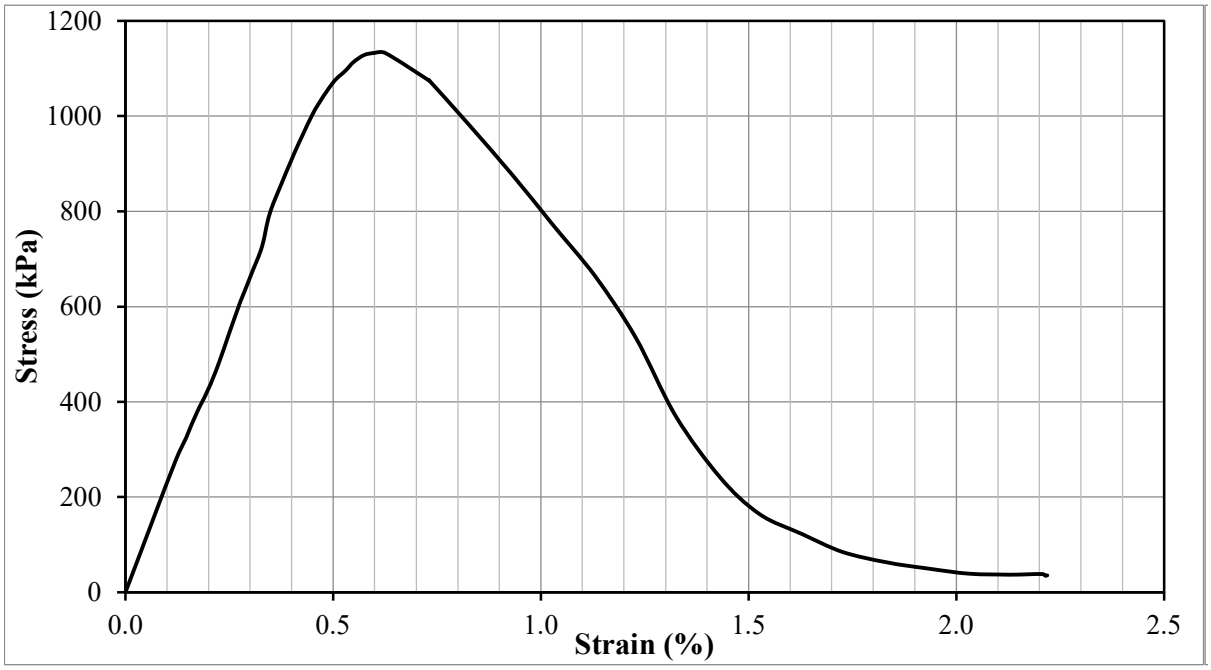
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	428	Strain at failure, εf :	2.07	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	J-4-B	Initial Area:	2104.6	mm^2
Test Date:	7/9/2022	Weight:	400.6	g
Strain Rate:	1 %/min	Unit Weight:	1917	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	7.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



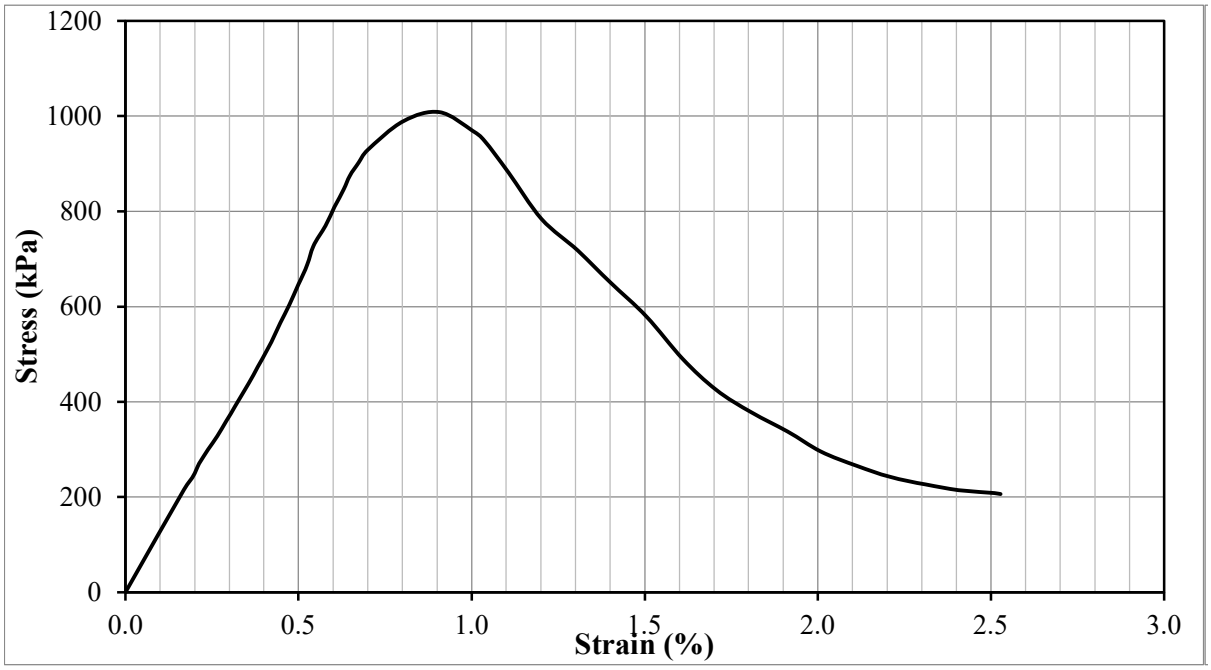
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	872	Strain at failure, εf :	0.50	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	J-4-G	Initial Area:	2110.8	mm^2
Test Date:	7/9/2022	Weight:	408.5	g
Strain Rate:	1 %/min	Unit Weight:	1948	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	7.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



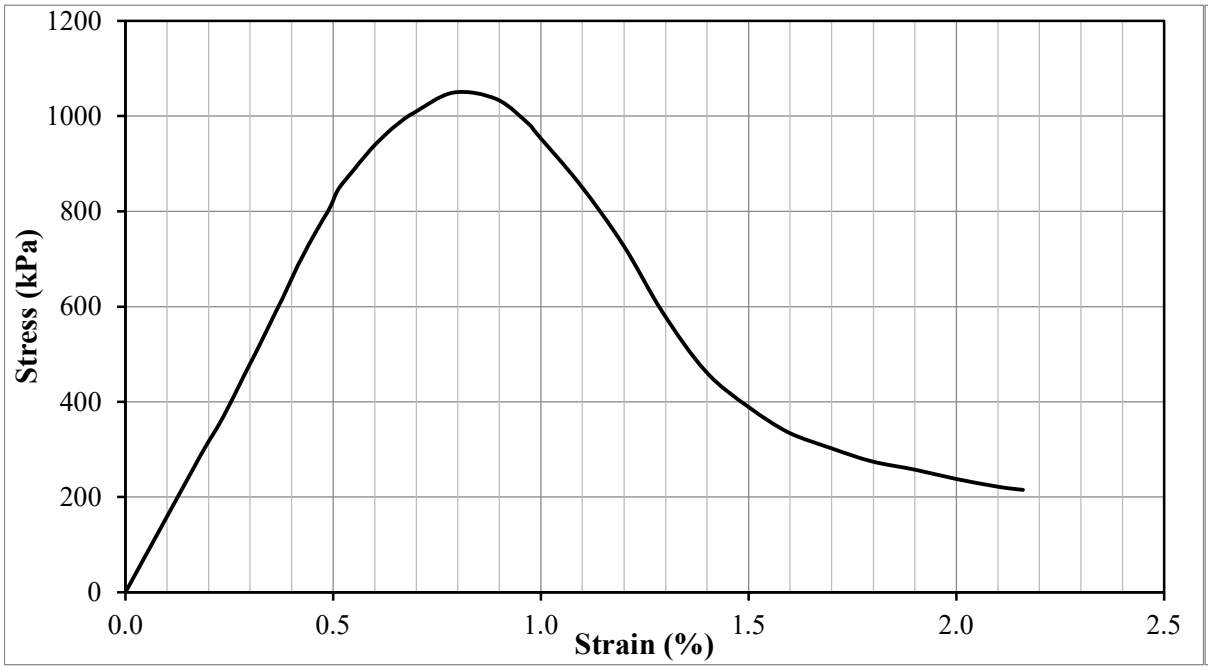
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,125	Strain at failure, εf :	0.60	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	J-4-C	Initial Area:	2106.6	mm^2
Test Date:	7/16/2022	Weight:	404.6	g
Strain Rate:	1 %/min	Unit Weight:	1936	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	14.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



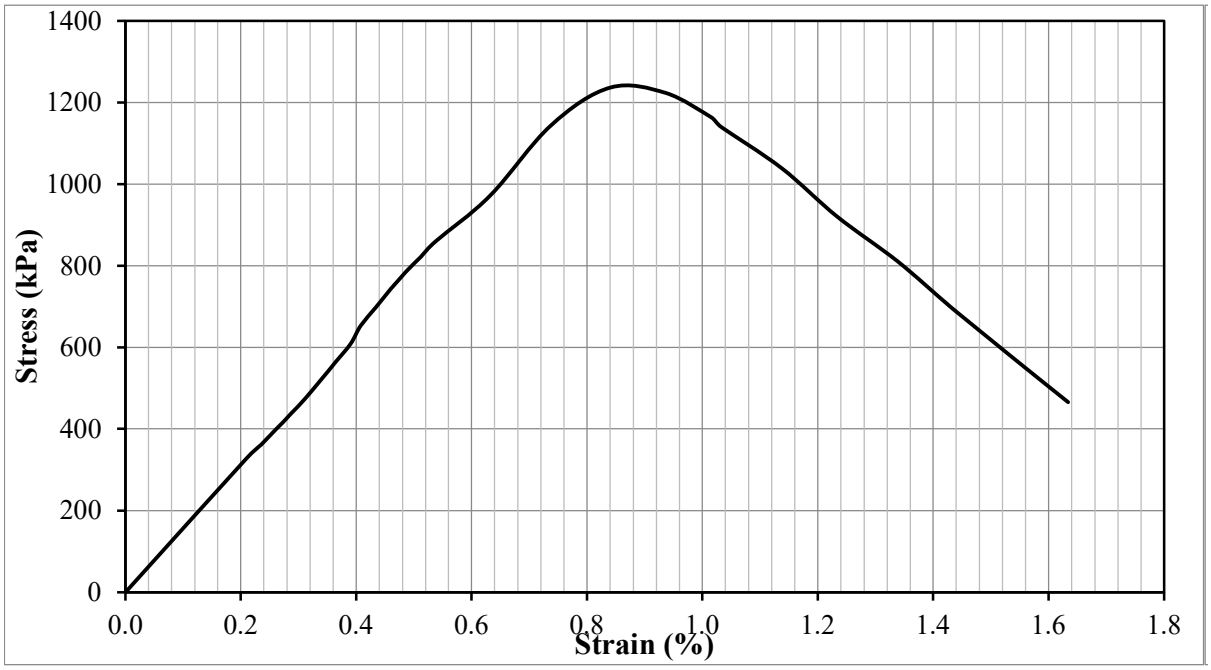
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,001	Strain at failure, εf :	0.91	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	J-4-F	Initial Area:	2121.1	mm^2
Test Date:	7/16/2022	Weight:	406.0	g
Strain Rate:	1 %/min	Unit Weight:	1926	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	14.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



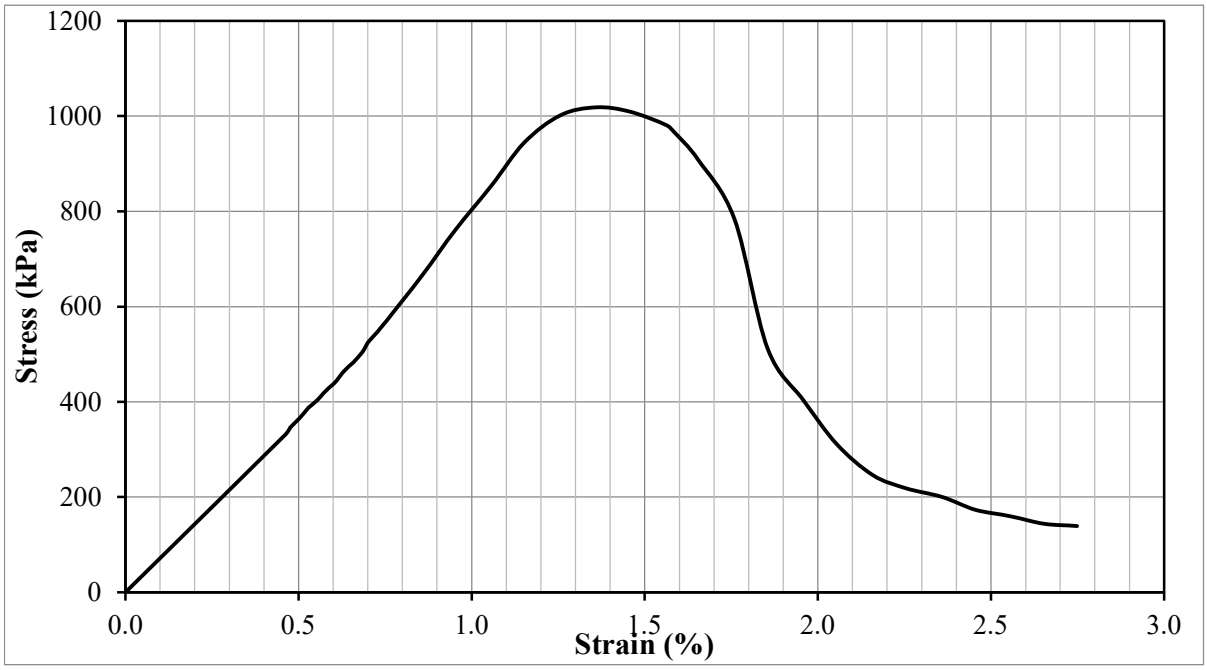
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,042	Strain at failure, εf :	0.79	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	J-4-I	Initial Area:	2110.8	mm^2
Test Date:	7/30/2022	Weight:	409.1	g
Strain Rate:	1 %/min	Unit Weight:	1946	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



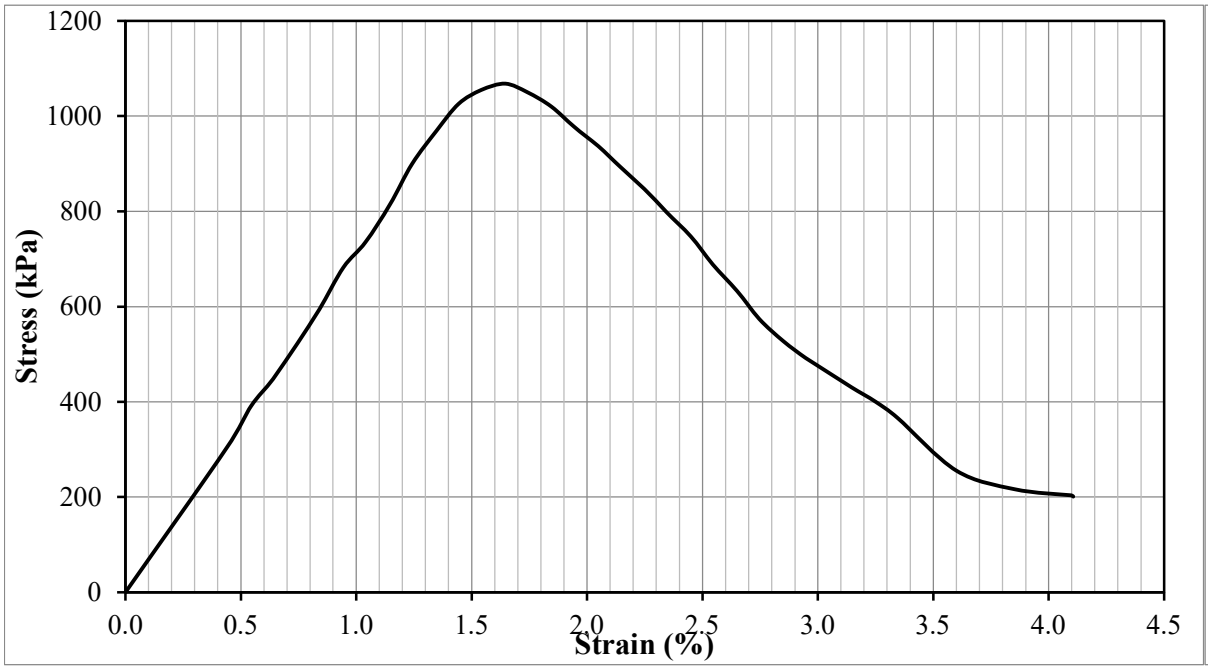
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,229	Strain at failure, εf :	0.84	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	J-4-J	Initial Area:	2106.6	mm^2
Test Date:	7/30/2022	Weight:	410.6	g
Strain Rate:	1 %/min	Unit Weight:	1956	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



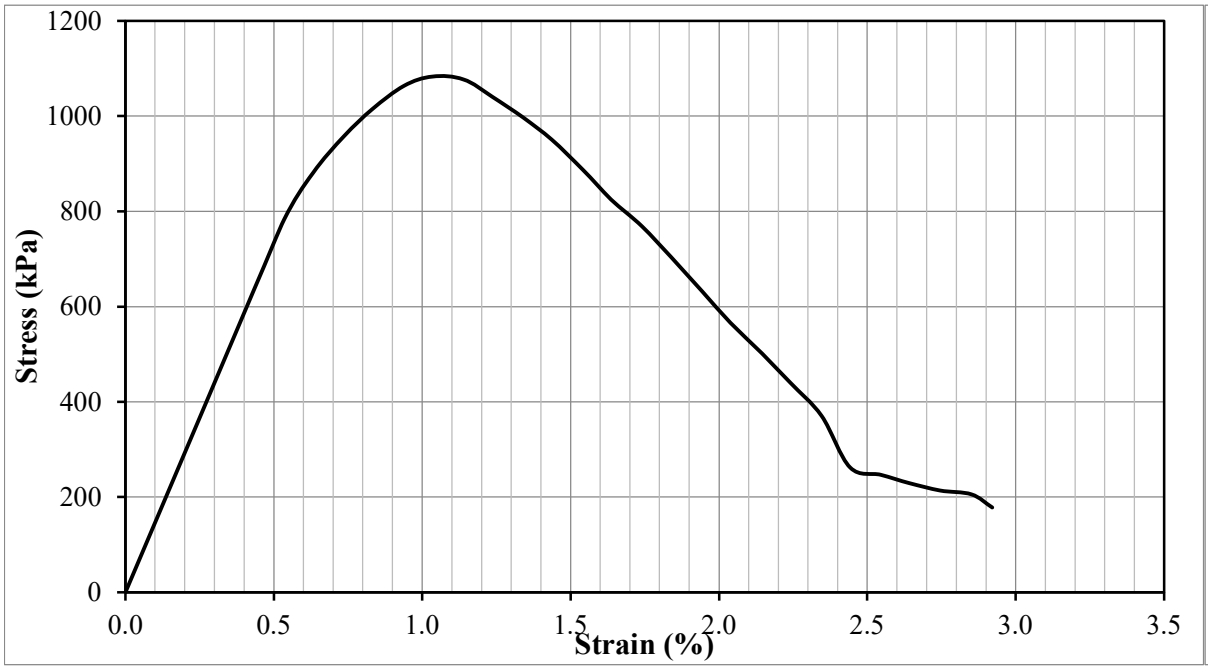
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,012	Strain at failure, εf :	1.36	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	J-5-A	Initial Area:	2117.0	mm^2
Test Date:	7/5/2022	Weight:	404.0	g
Strain Rate:	1 %/min	Unit Weight:	1960	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	3.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



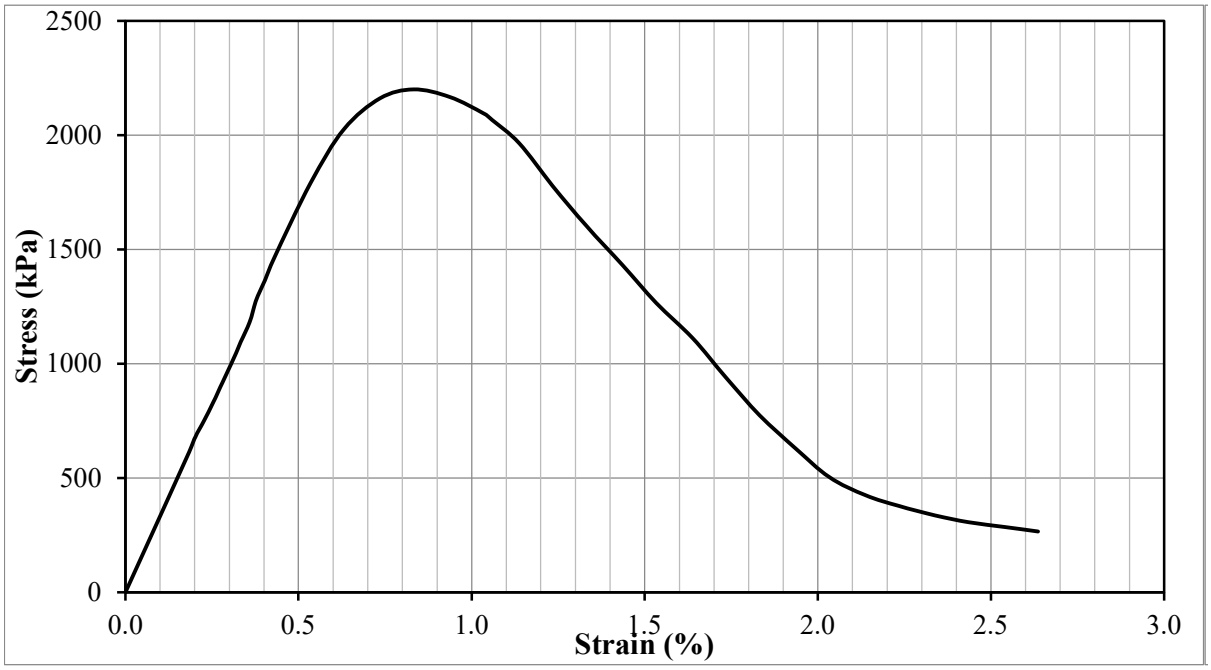
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,057	Strain at failure, εf :	1.65	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	J-5-H	Initial Area:	2119.1	mm^2
Test Date:	7/5/2022	Weight:	408.7	g
Strain Rate:	1 %/min	Unit Weight:	1964	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	3.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



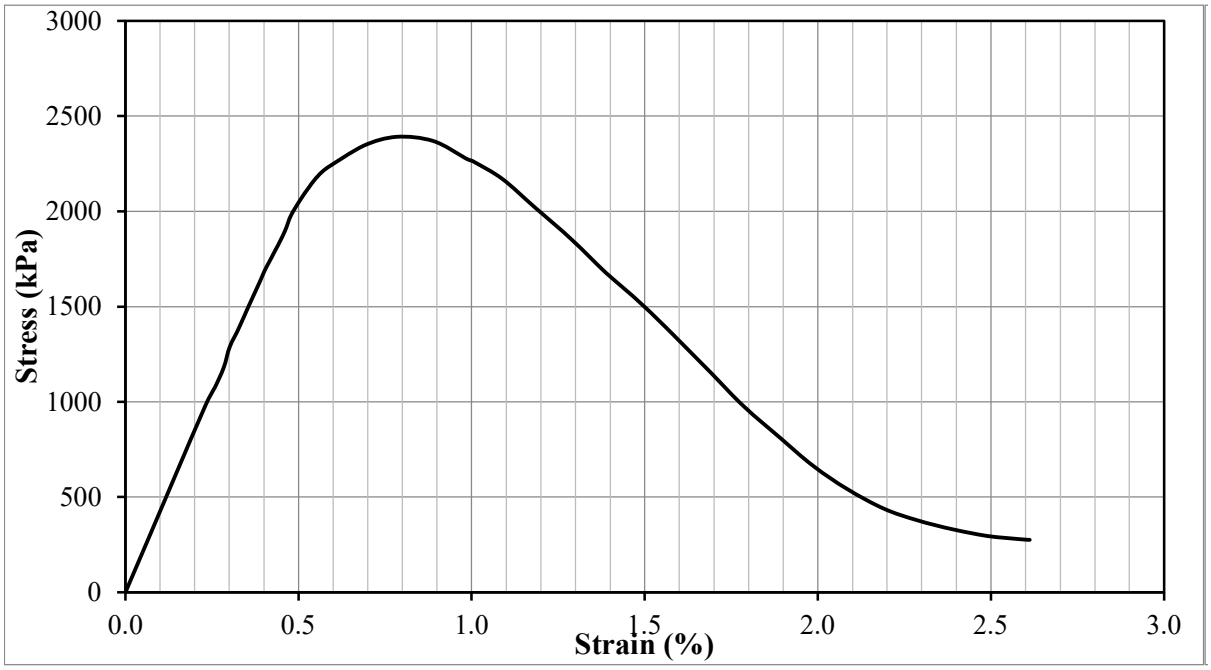
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,074	Strain at failure, εf :	1.03	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	J-5-B	Initial Area:	2108.7	mm^2
Test Date:	7/9/2022	Weight:	403.3	g
Strain Rate:	1 %/min	Unit Weight:	1970	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	7.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



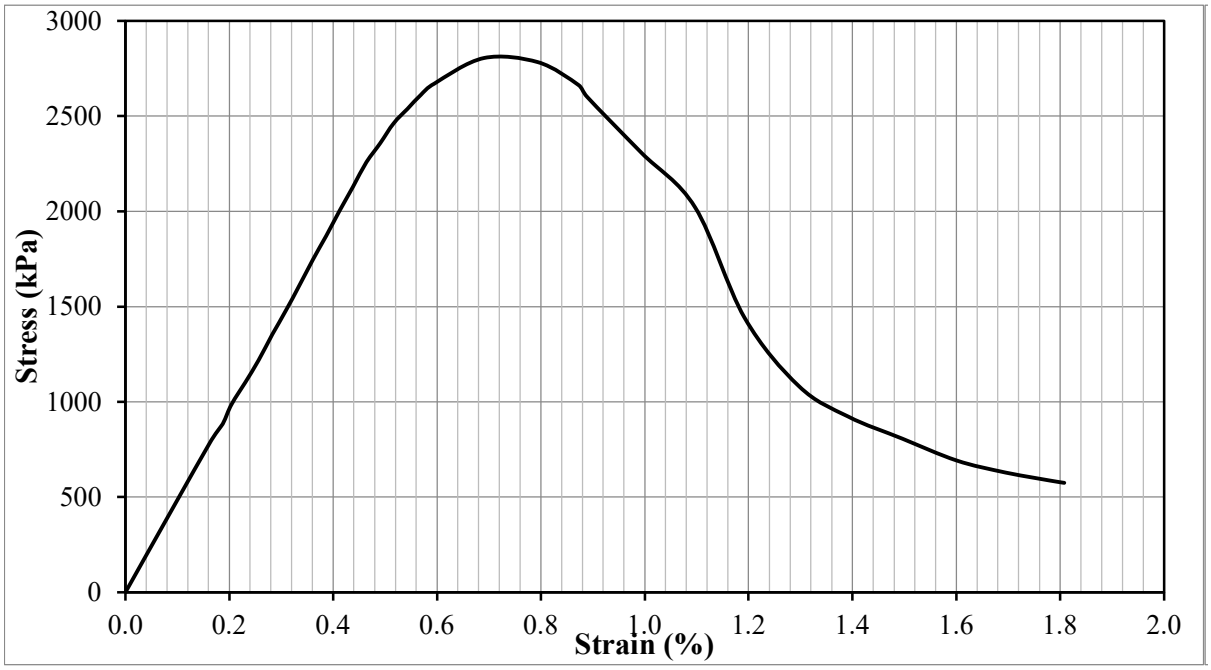
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,178	Strain at failure, εf :	0.83	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	J-5-G	Initial Area:	2110.8	mm^2
Test Date:	7/9/2022	Weight:	409.0	g
Strain Rate:	1 %/min	Unit Weight:	1977	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	7.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



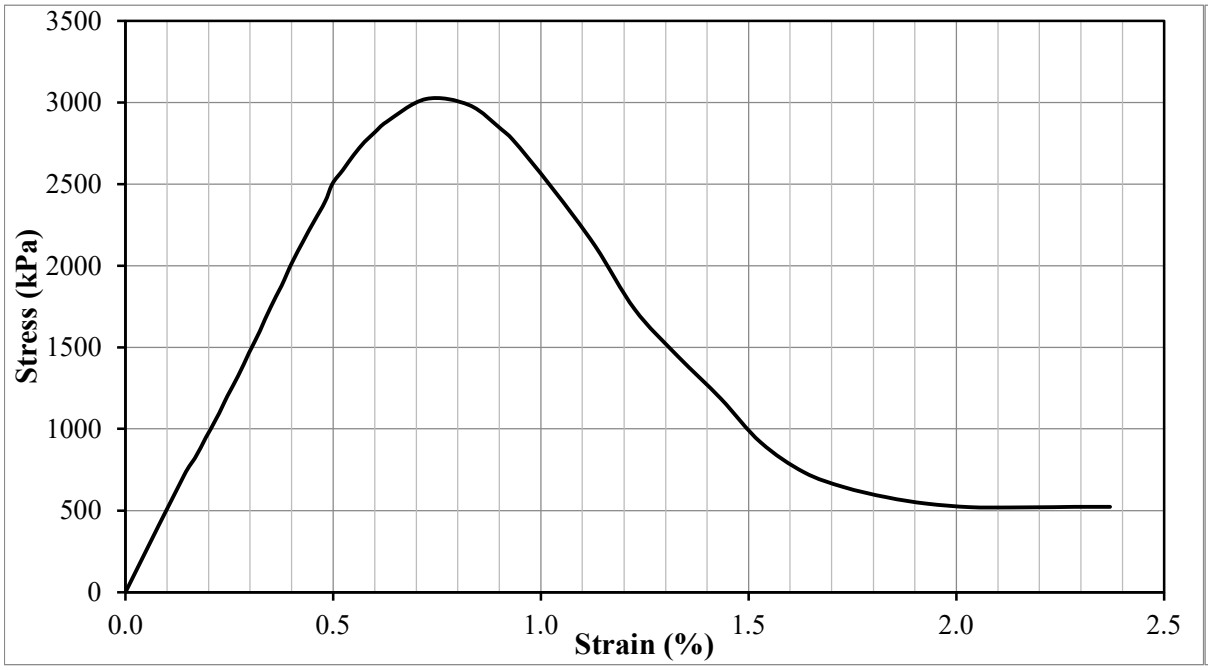
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,370	Strain at failure, εf :	0.78	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	J-5-F	Initial Area:	2119.1	mm^2
Test Date:	7/16/2022	Weight:	409.4	g
Strain Rate:	1 %/min	Unit Weight:	1963	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	14.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



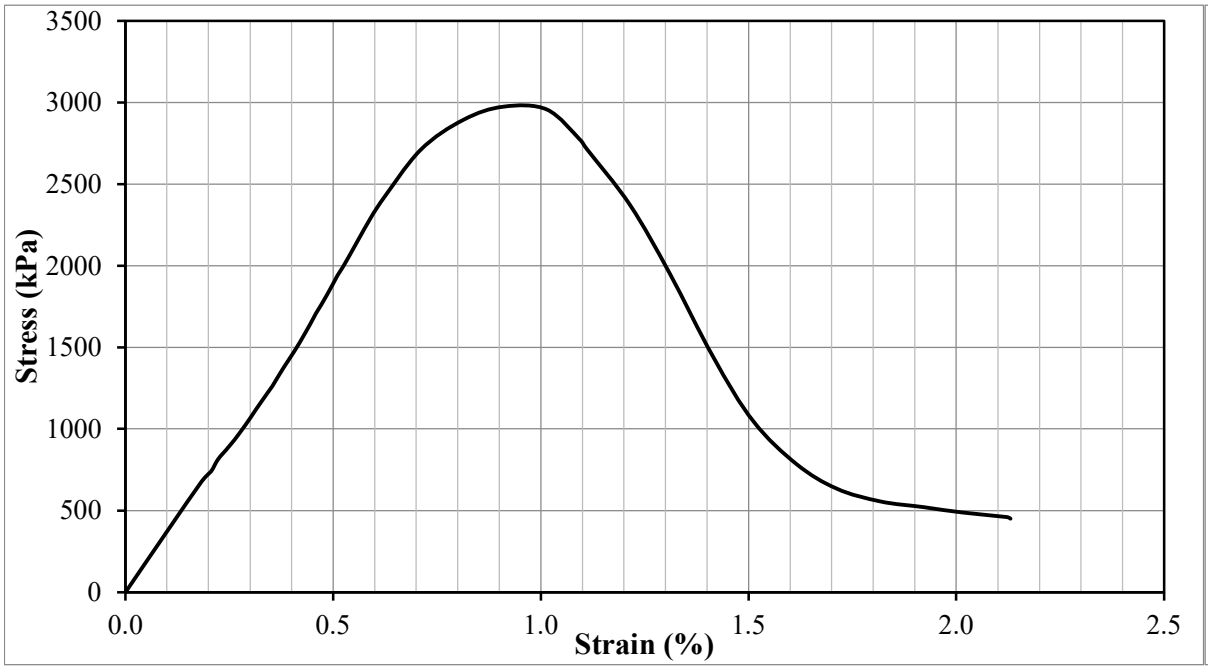
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,781	Strain at failure, εf :	0.69	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	J-5-I	Initial Area:	2112.9	mm^2
Test Date:	7/16/2022	Weight:	410.1	g
Strain Rate:	1 %/min	Unit Weight:	1975	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	14.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



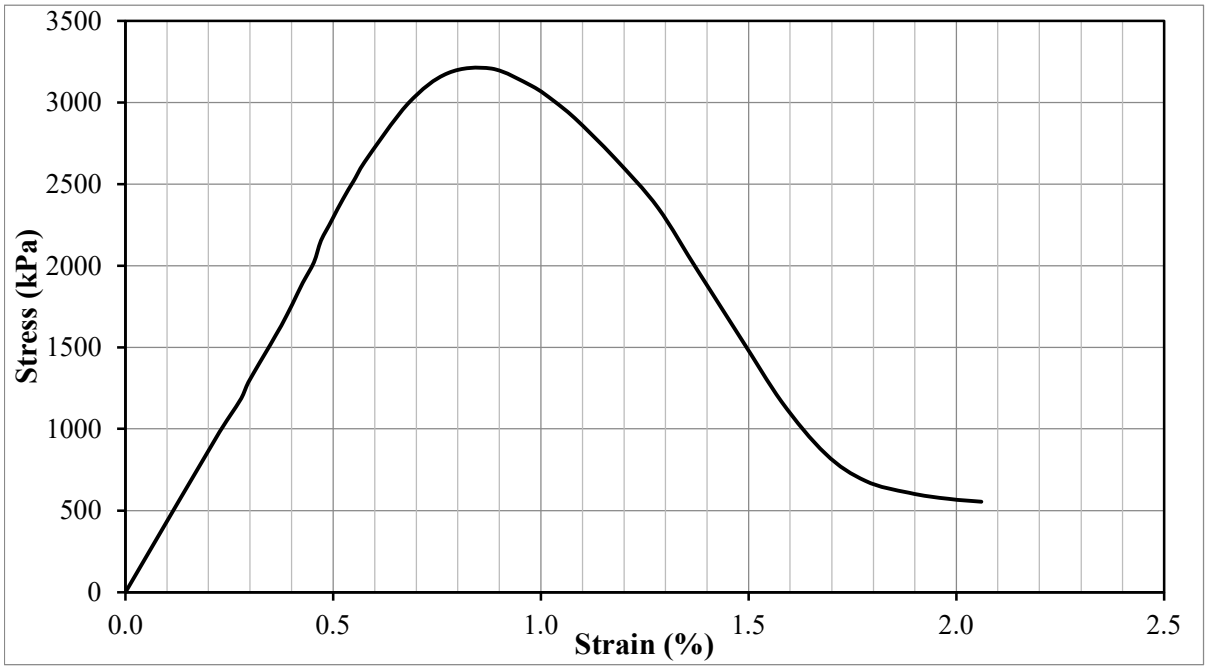
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,995	Strain at failure, εf :	0.72	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	J-5-E	Initial Area:	2117.0	mm^2
Test Date:	7/30/2022	Weight:	407.5	g
Strain Rate:	1 %/min	Unit Weight:	1969	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



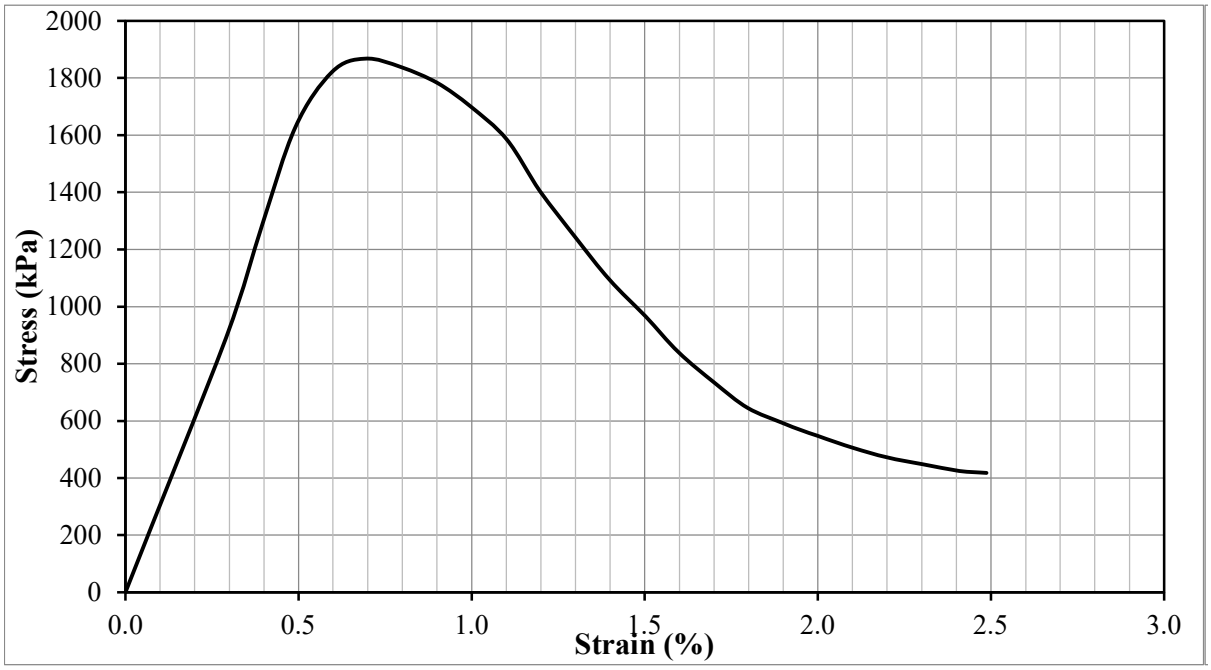
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,947	Strain at failure, εf :	0.91	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	J-5-J	Initial Area:	2108.7	mm^2
Test Date:	7/30/2022	Weight:	413.1	g
Strain Rate:	1 %/min	Unit Weight:	1986	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



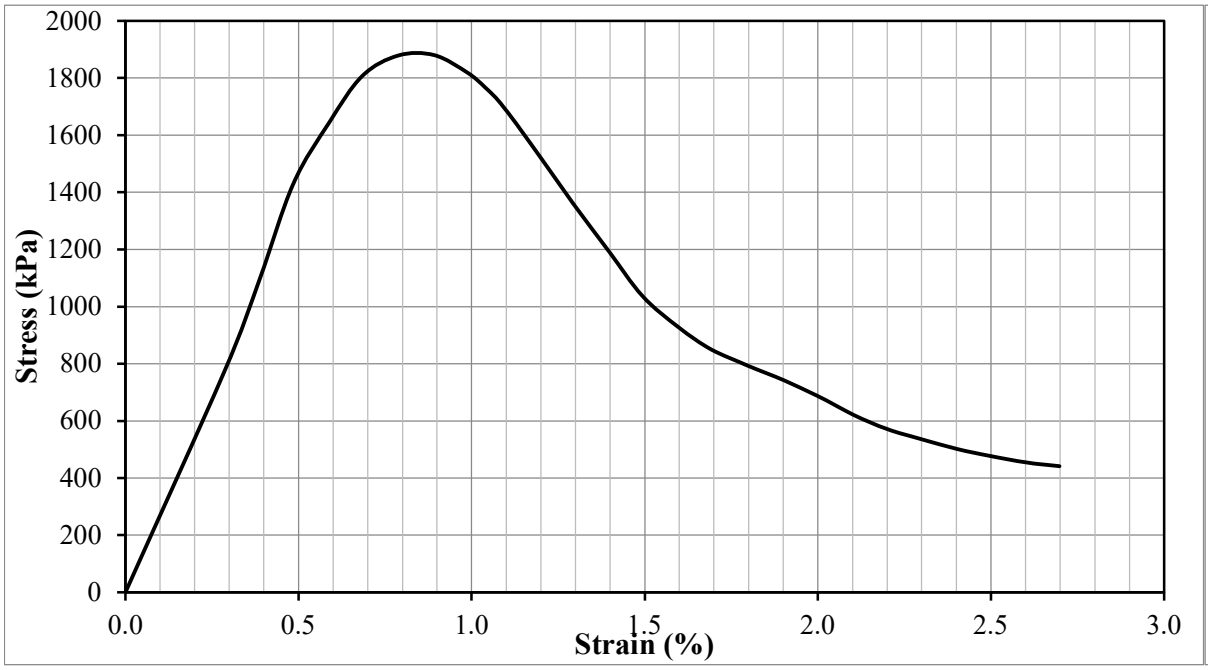
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,182	Strain at failure, εf :	0.88	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	96.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	J-6-A	Initial Area:	2125.3	mm^2
Test Date:	7/5/2022	Weight:	410.3	g
Strain Rate:	1 %/min	Unit Weight:	1998	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	2.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



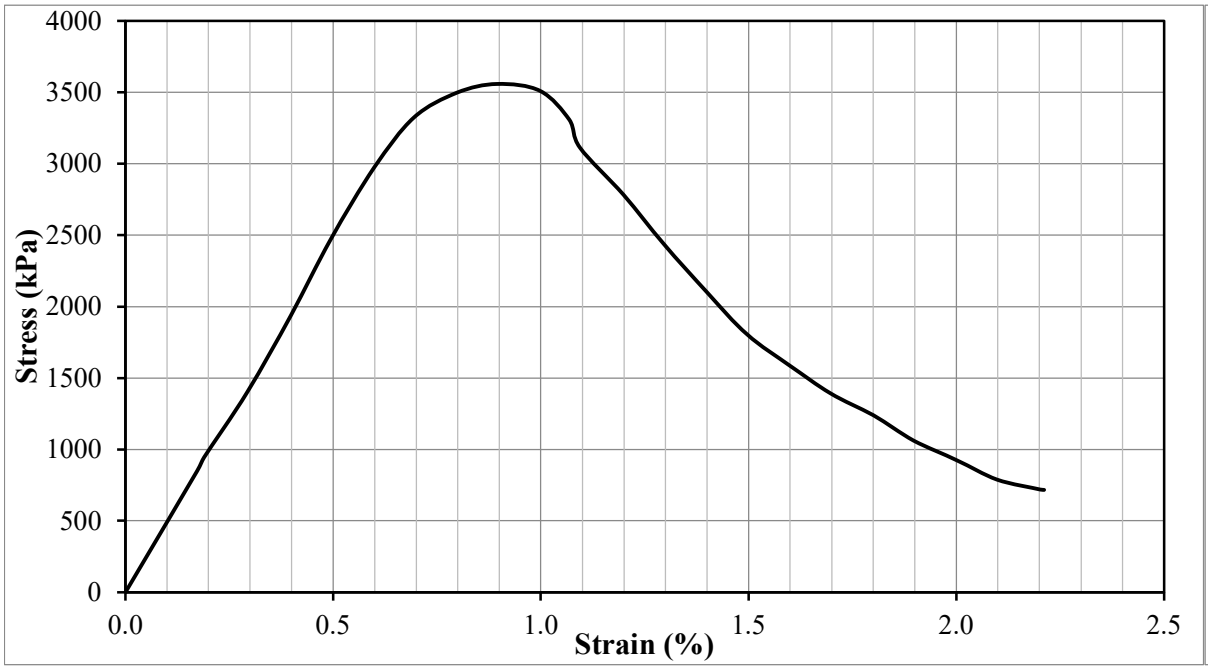
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,846	Strain at failure, εf :	0.69	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	J-6-H	Initial Area:	2108.7	mm^2
Test Date:	7/5/2022	Weight:	411.2	g
Strain Rate:	1 %/min	Unit Weight:	2011	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	2.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



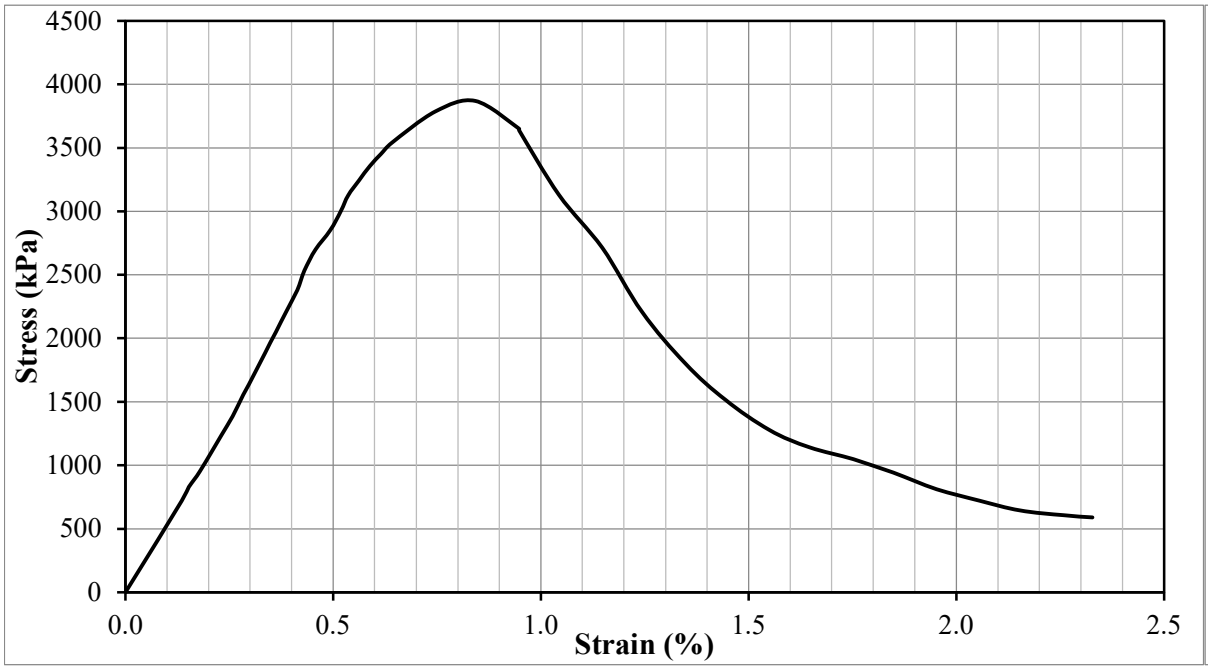
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,860	Strain at failure, εf :	0.89	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	95.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	J-6-B	Initial Area:	2117.0	mm^2
Test Date:	7/9/2022	Weight:	408.1	g
Strain Rate:	1 %/min	Unit Weight:	2012	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	6.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



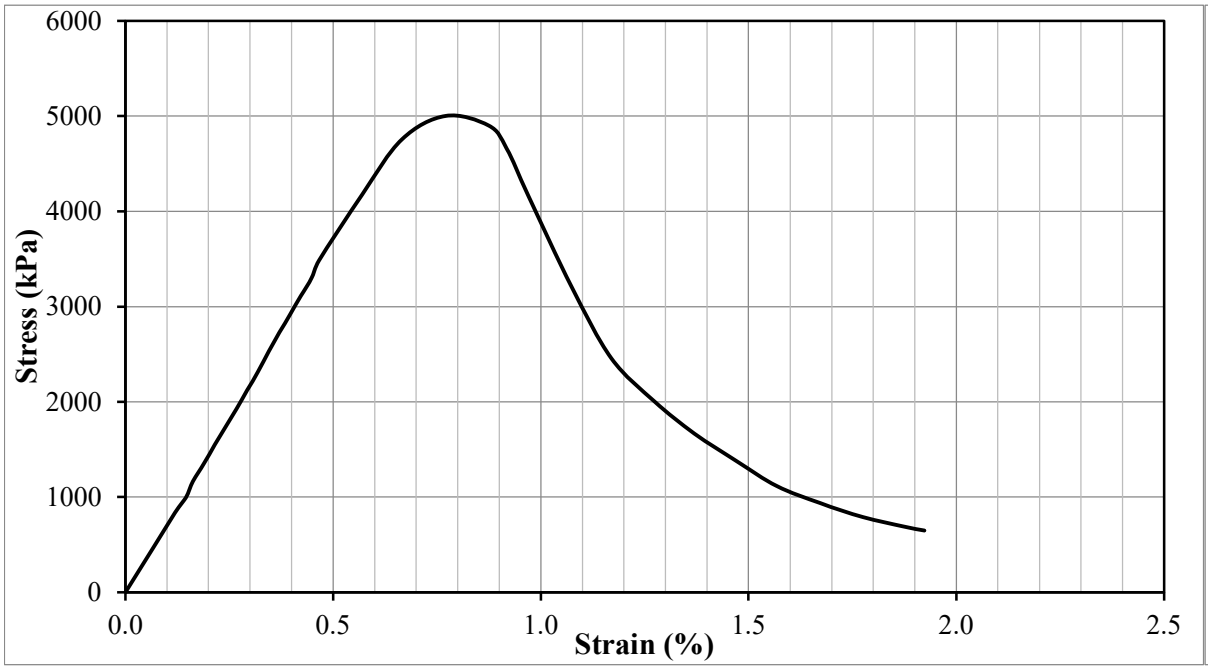
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,514	Strain at failure, εf :	0.89	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	96.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	J-6-G	Initial Area:	2125.3	mm^2
Test Date:	7/9/2022	Weight:	408.4	g
Strain Rate:	1 %/min	Unit Weight:	2001	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	6.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



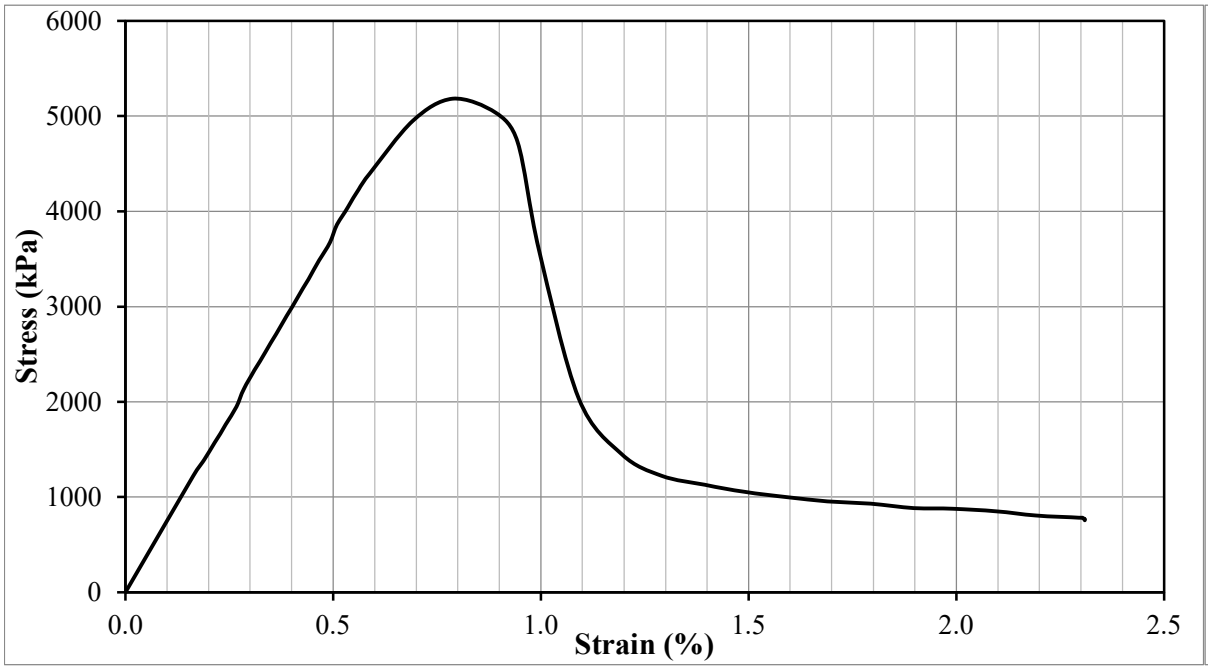
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,822	Strain at failure, εf :	0.84	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	95.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	J-6-C	Initial Area:	2114.9	mm^2
Test Date:	7/16/2022	Weight:	408.6	g
Strain Rate:	1 %/min	Unit Weight:	2014	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	13.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



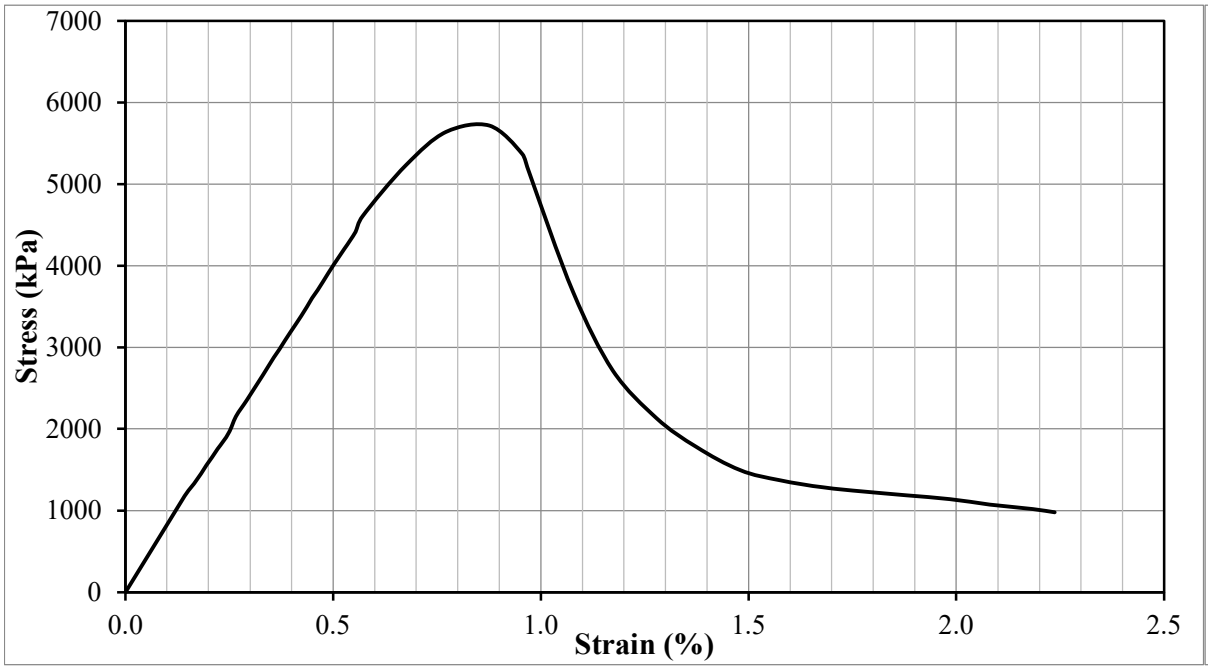
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,942	Strain at failure, εf :	0.77	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	96.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	J-6-I	Initial Area:	2114.9	mm^2
Test Date:	7/16/2022	Weight:	411.4	g
Strain Rate:	1 %/min	Unit Weight:	2013	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	13.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



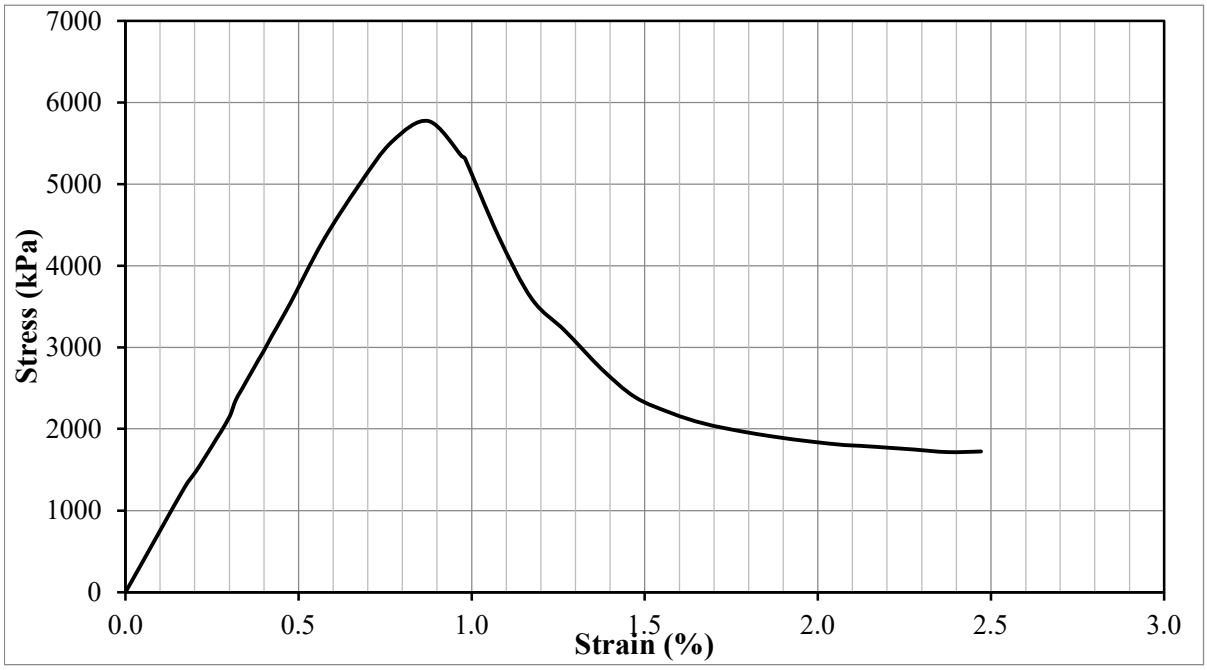
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,124	Strain at failure, εf :	0.79	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	96.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	J-6-E	Initial Area:	2125.3	mm^2
Test Date:	7/30/2022	Weight:	412.8	g
Strain Rate:	1 %/min	Unit Weight:	2012	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	27.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



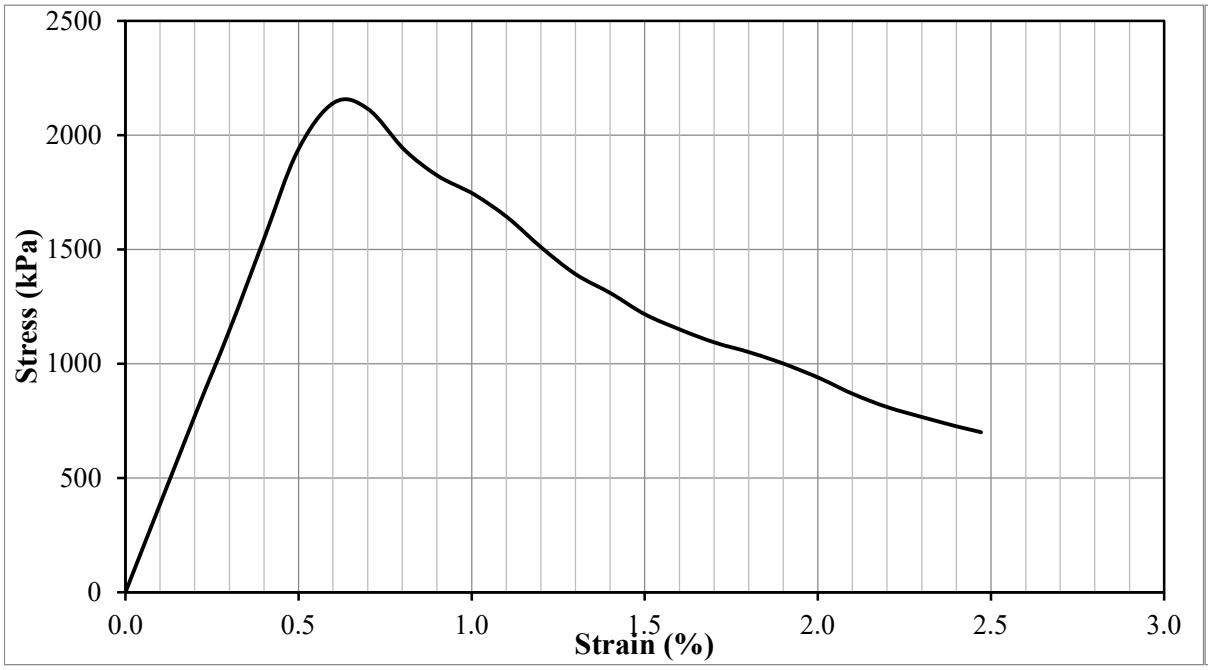
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,649	Strain at failure, εf :	0.88	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	96.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	J-6-J	Initial Area:	2121.1	mm^2
Test Date:	7/30/2022	Weight:	408.5	g
Strain Rate:	1 %/min	Unit Weight:	2003	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	27.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



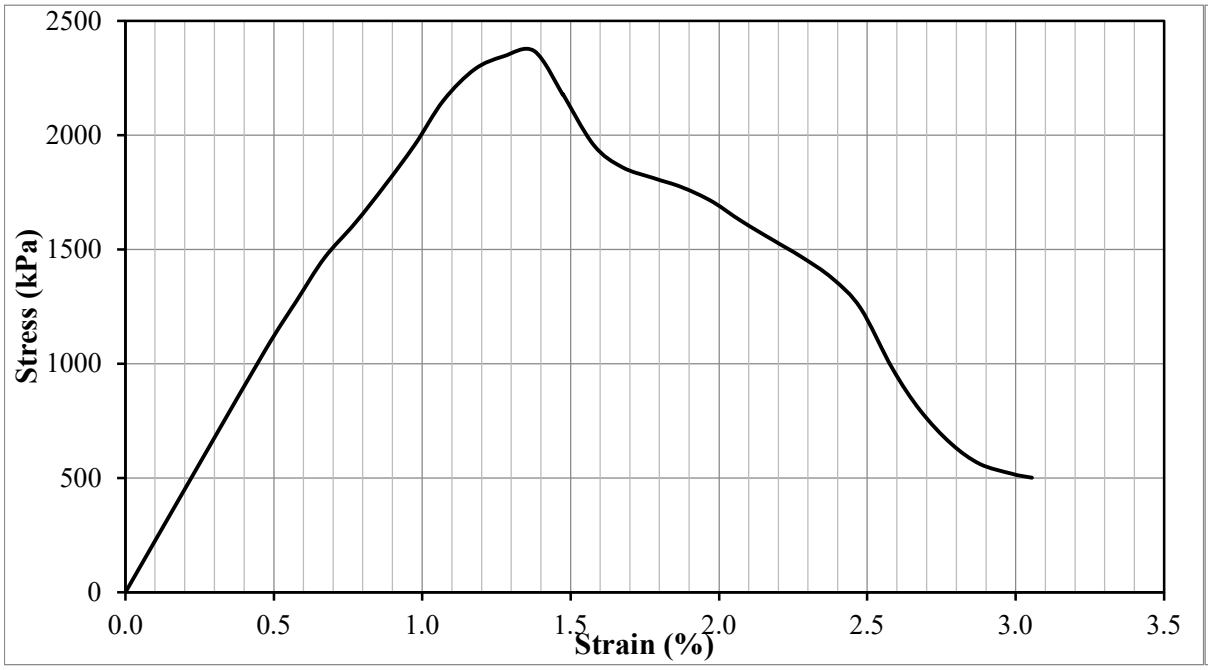
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,704	Strain at failure, εf :	0.88	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	94.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	J-7-H	Initial Area:	2114.9	mm^2
Test Date:	7/5/2022	Weight:	385.8	g
Strain Rate:	1 %/min	Unit Weight:	1942	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	2.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



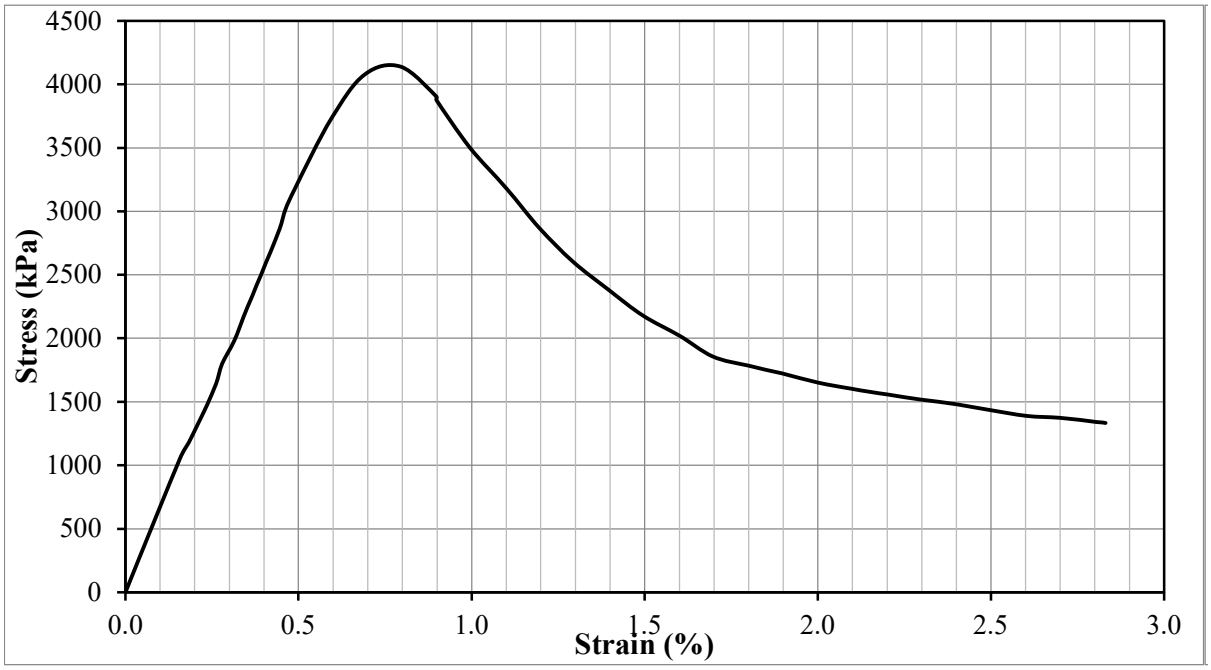
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,110	Strain at failure, εf :	0.60	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	94.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	J-7-I	Initial Area:	2102.5	mm^2
Test Date:	7/5/2022	Weight:	392.8	g
Strain Rate:	1 %/min	Unit Weight:	1975	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	2.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



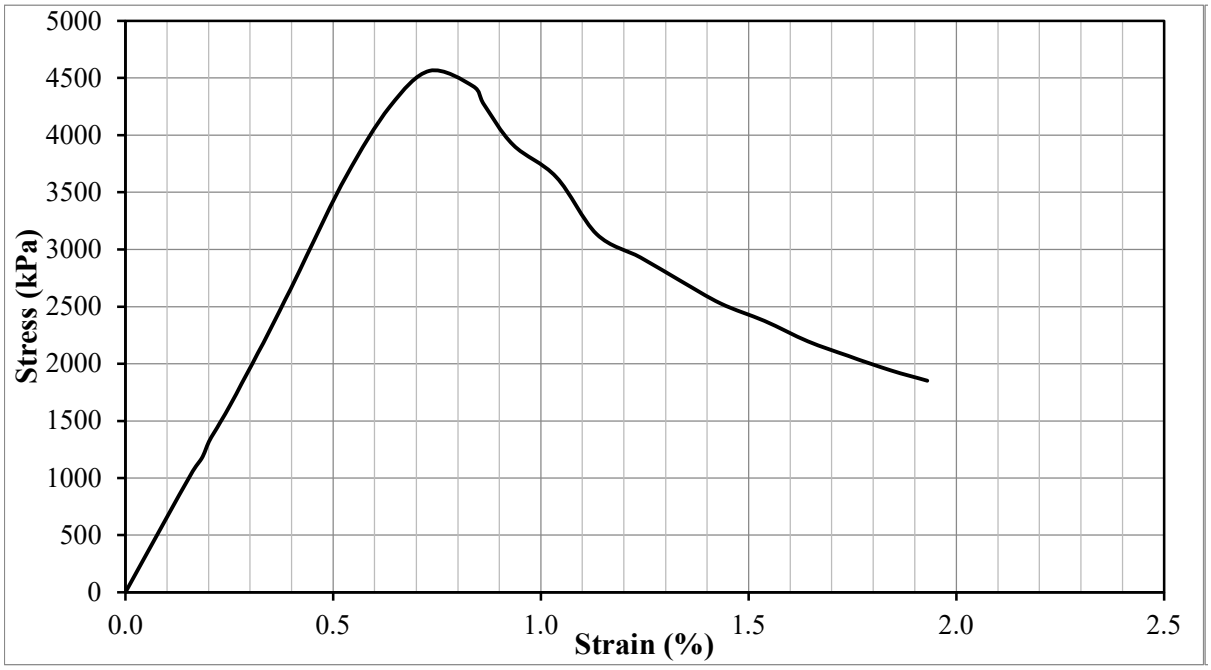
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,335	Strain at failure, εf :	1.38	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	92.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	J-7-B	Initial Area:	2106.6	mm^2
Test Date:	7/9/2022	Weight:	382.8	g
Strain Rate:	1 %/min	Unit Weight:	1964	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	6.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



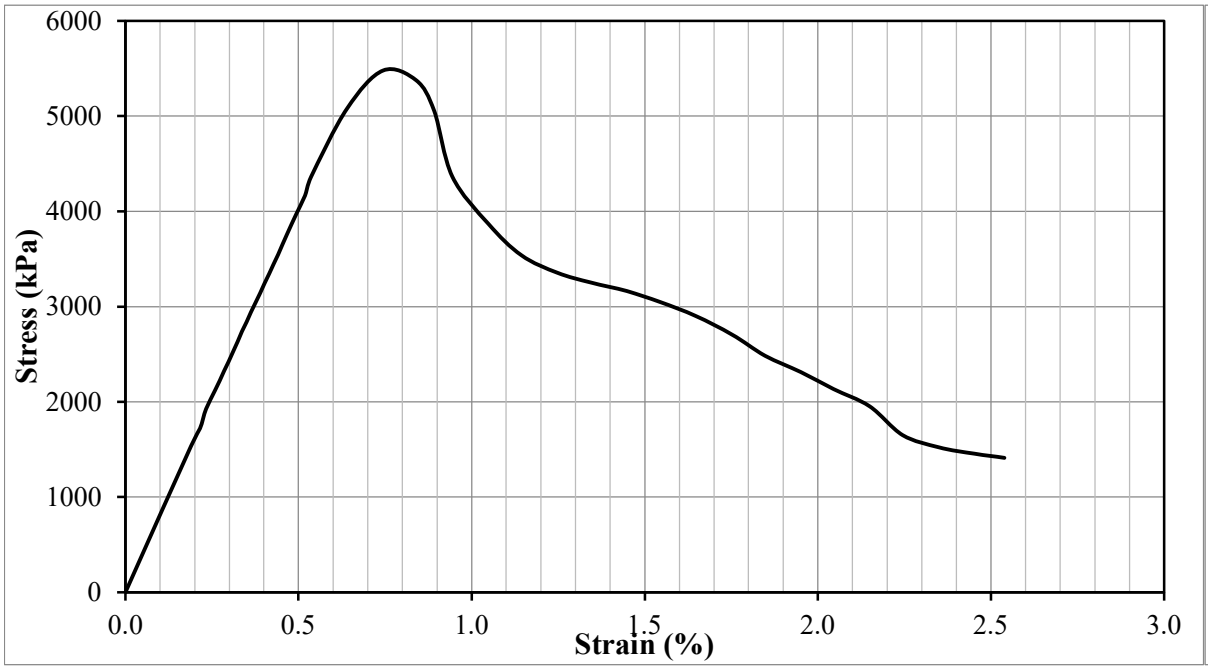
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,069	Strain at failure, εf :	0.80	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	91.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	J-7-G	Initial Area:	2117.0	mm^2
Test Date:	7/9/2022	Weight:	381.2	g
Strain Rate:	1 %/min	Unit Weight:	1959	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	6.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



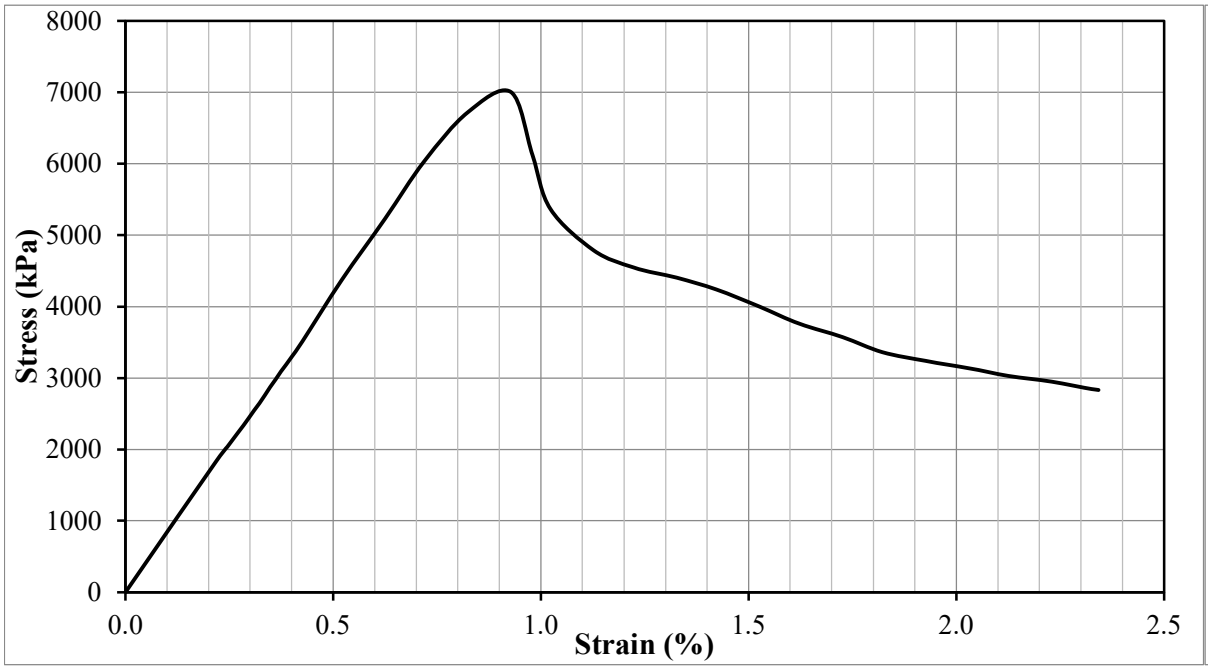
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,478	Strain at failure, εf :	0.73	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	92.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	J-7-C	Initial Area:	2117.0	mm^2
Test Date:	7/16/2022	Weight:	382.6	g
Strain Rate:	1 %/min	Unit Weight:	1953	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	13.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



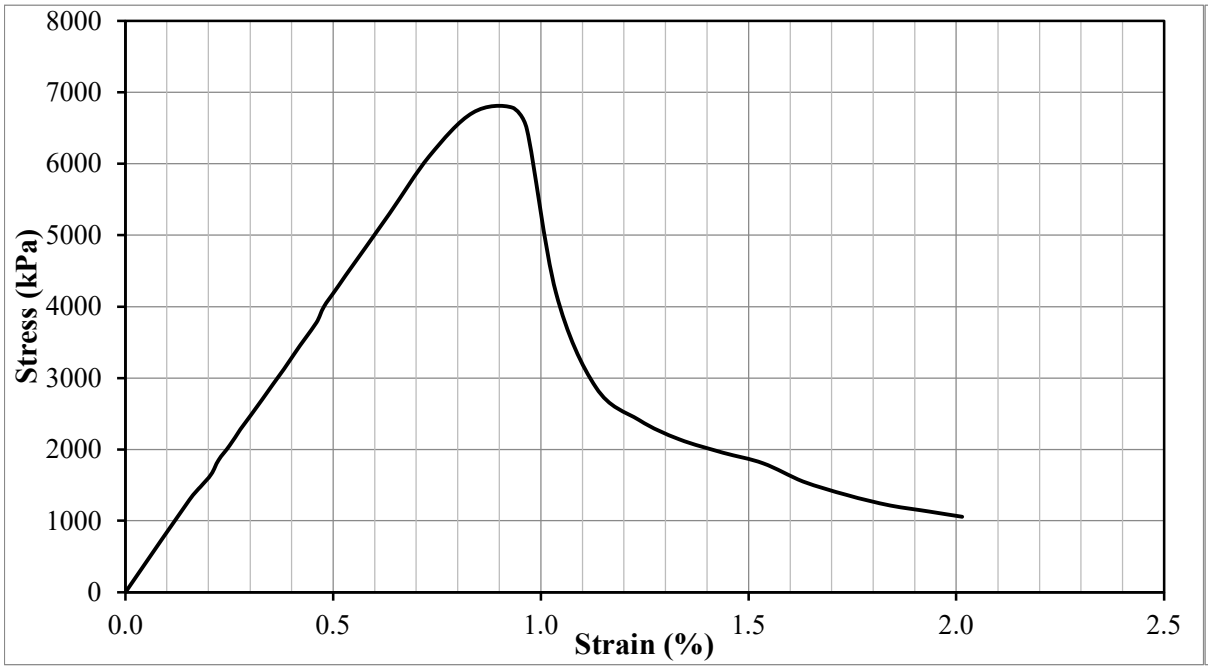
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	5,383	Strain at failure, εf :	0.74	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	93.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	J-7-F	Initial Area:	2117.0	mm^2
Test Date:	7/16/2022	Weight:	391.2	g
Strain Rate:	1 %/min	Unit Weight:	1967	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	13.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



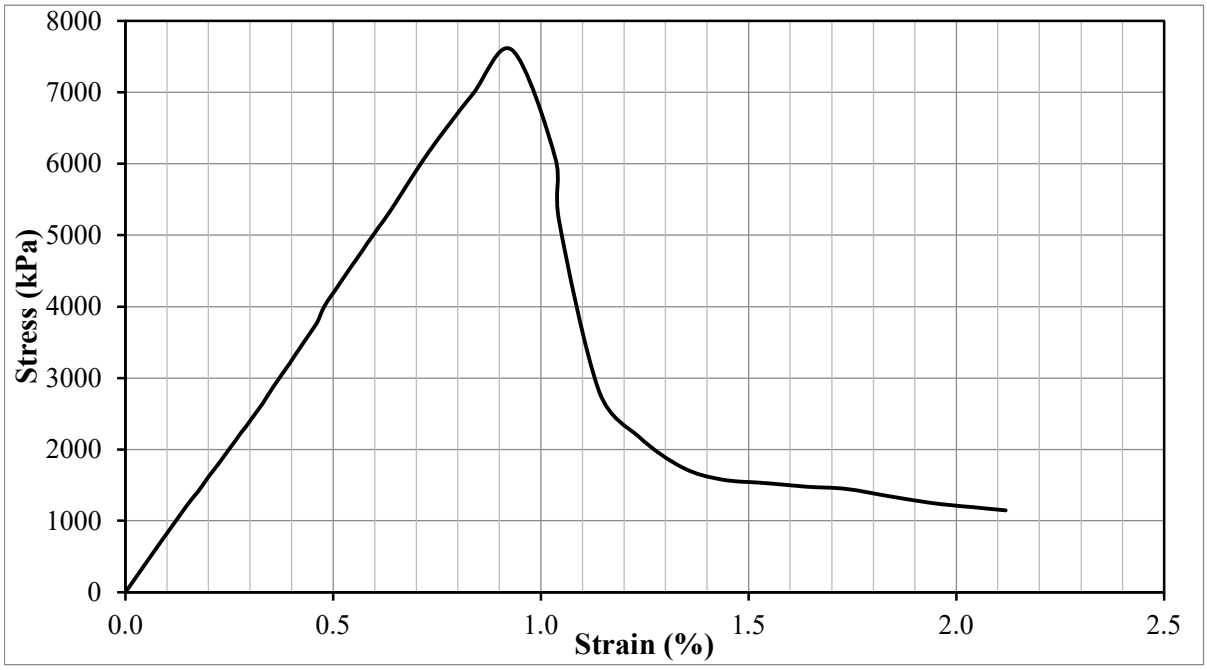
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	6,896	Strain at failure, εf :	0.93	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	92.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	J-7-D	Initial Area:	2121.1	mm^2
Test Date:	7/30/2022	Weight:	381.0	g
Strain Rate:	1 %/min	Unit Weight:	1951	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	27.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



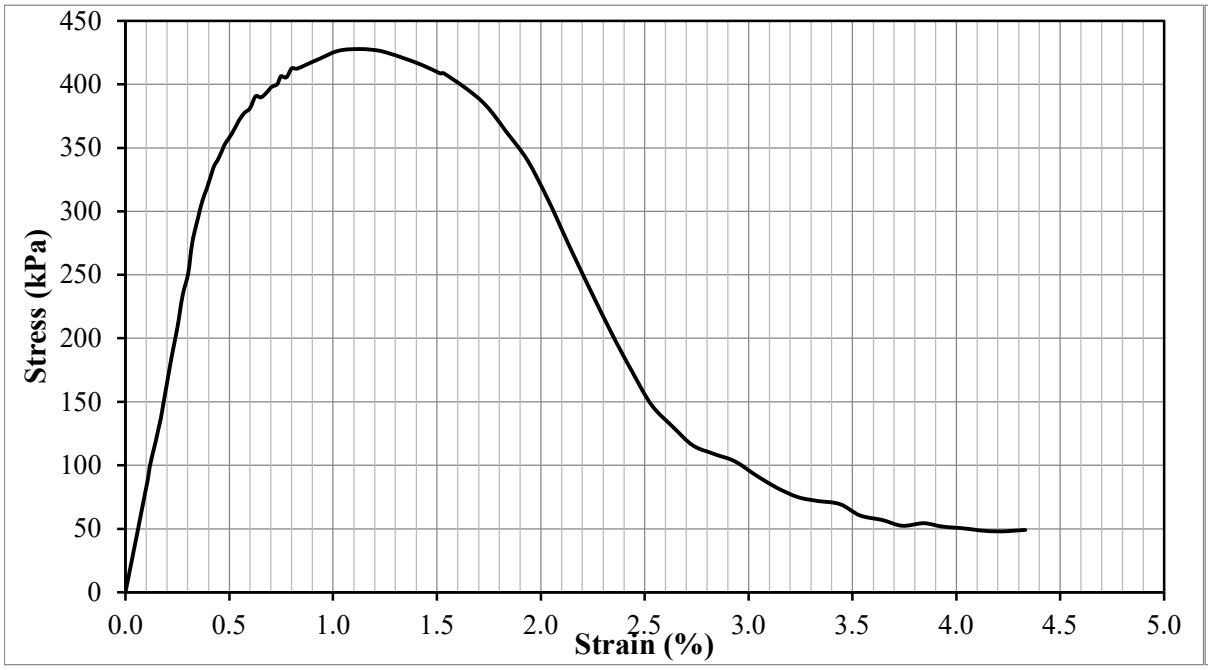
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	6,662	Strain at failure, εf :	0.93	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	91.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	J-7-E	Initial Area:	2121.1	mm^2
Test Date:	7/30/2022	Weight:	381.4	g
Strain Rate:	1 %/min	Unit Weight:	1962	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	27.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



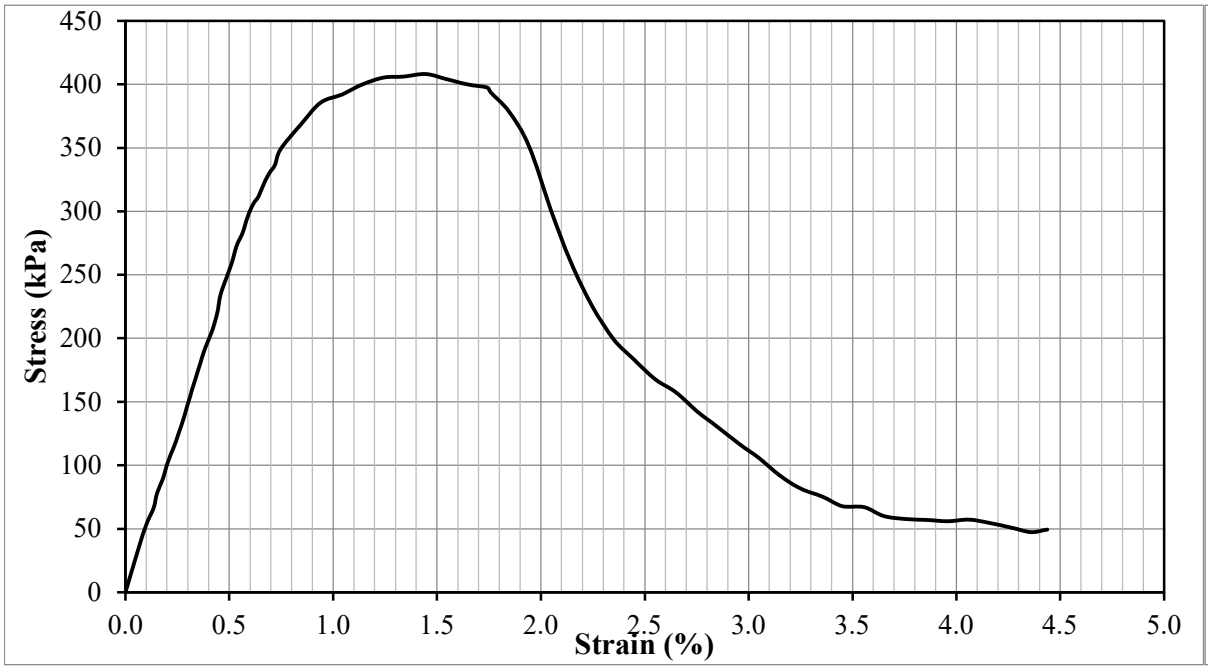
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	7,449	Strain at failure, εf :	0.93	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	96.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	J-8-A	Initial Area:	2121.1	mm^2
Test Date:	7/6/2022	Weight:	400.4	g
Strain Rate:	1 %/min	Unit Weight:	1949	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	3.1	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



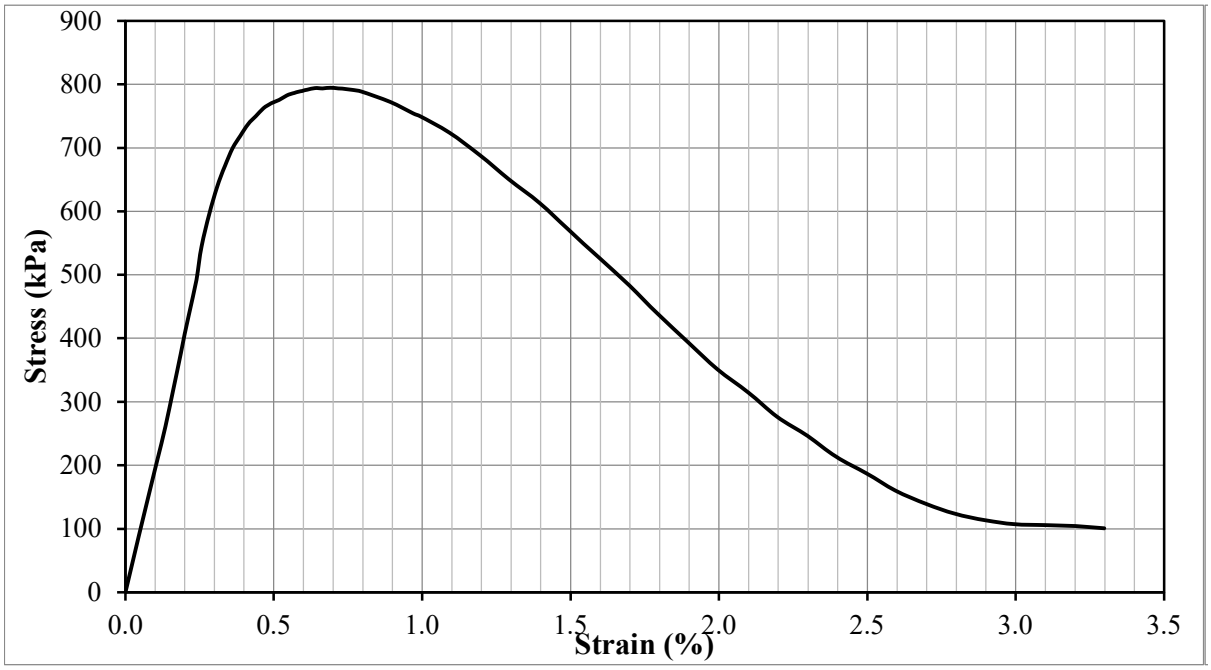
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	423	Strain at failure, εf :	1.13	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	J-8-H	Initial Area:	2123.2	mm^2
Test Date:	7/6/2022	Weight:	412.9	g
Strain Rate:	1 %/min	Unit Weight:	1947	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	3.1	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



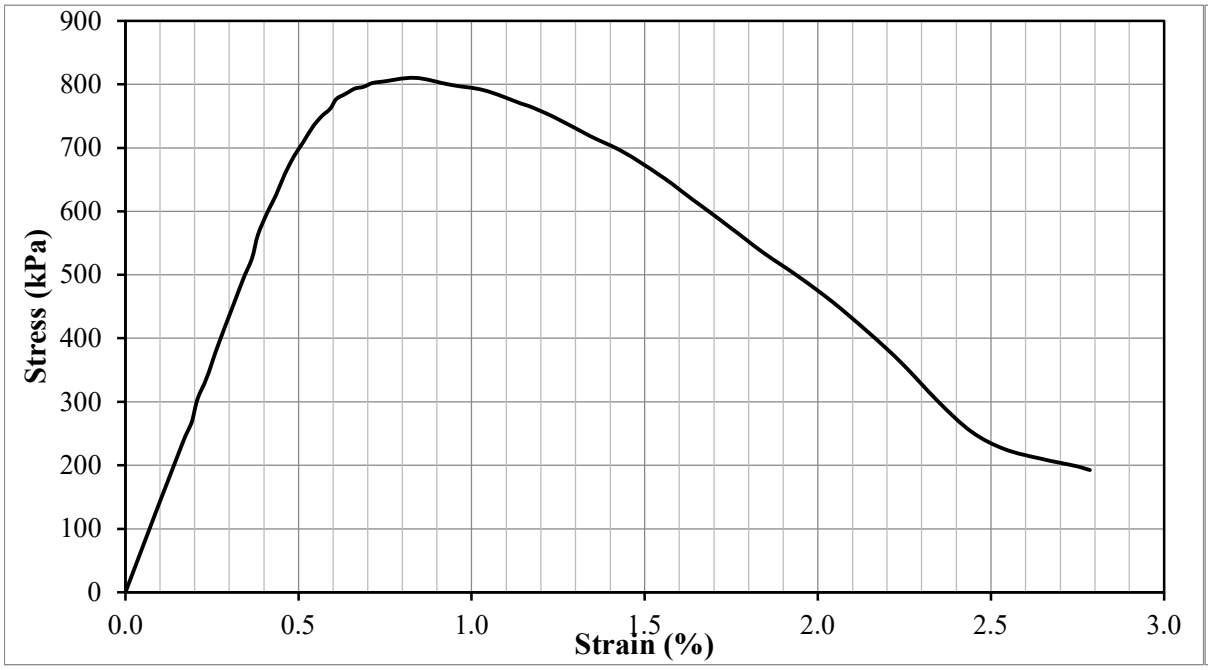
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	406	Strain at failure, εf :	1.44	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	J-8-B	Initial Area:	2123.2	mm^2
Test Date:	7/10/2022	Weight:	405.9	g
Strain Rate:	1 %/min	Unit Weight:	1952	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	6.9	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



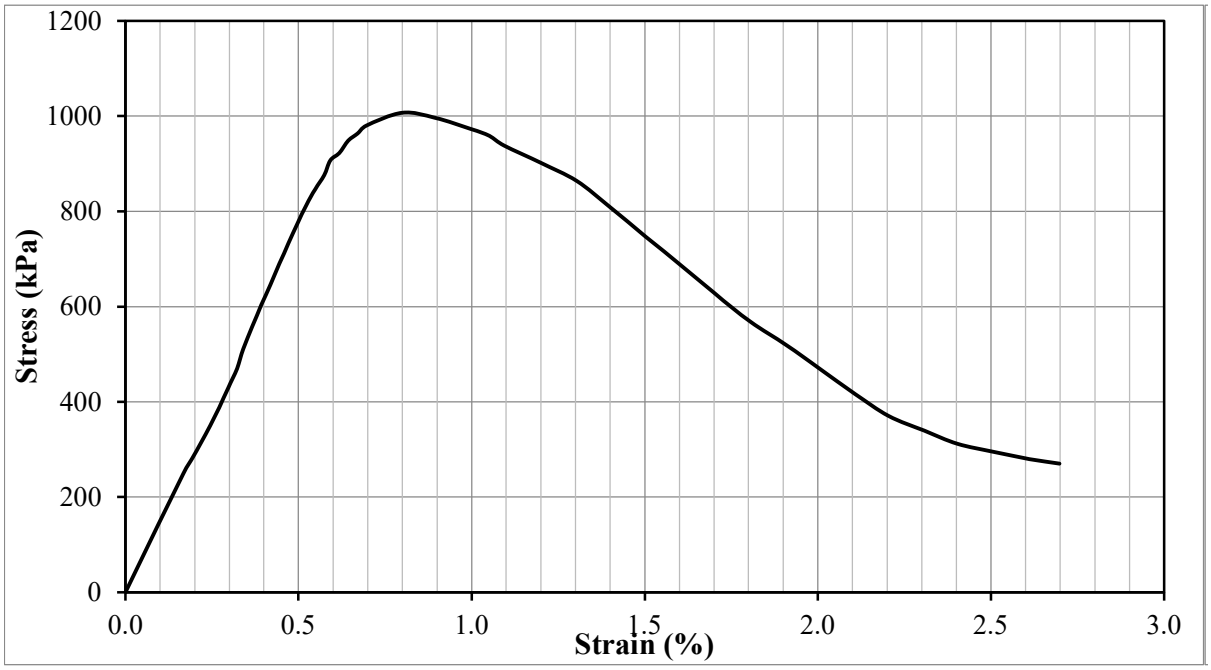
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	787	Strain at failure, εf :	0.69	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	J-8-G	Initial Area:	2104.6	mm^2
Test Date:	7/10/2022	Weight:	403.5	g
Strain Rate:	1 %/min	Unit Weight:	1967	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	6.9	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



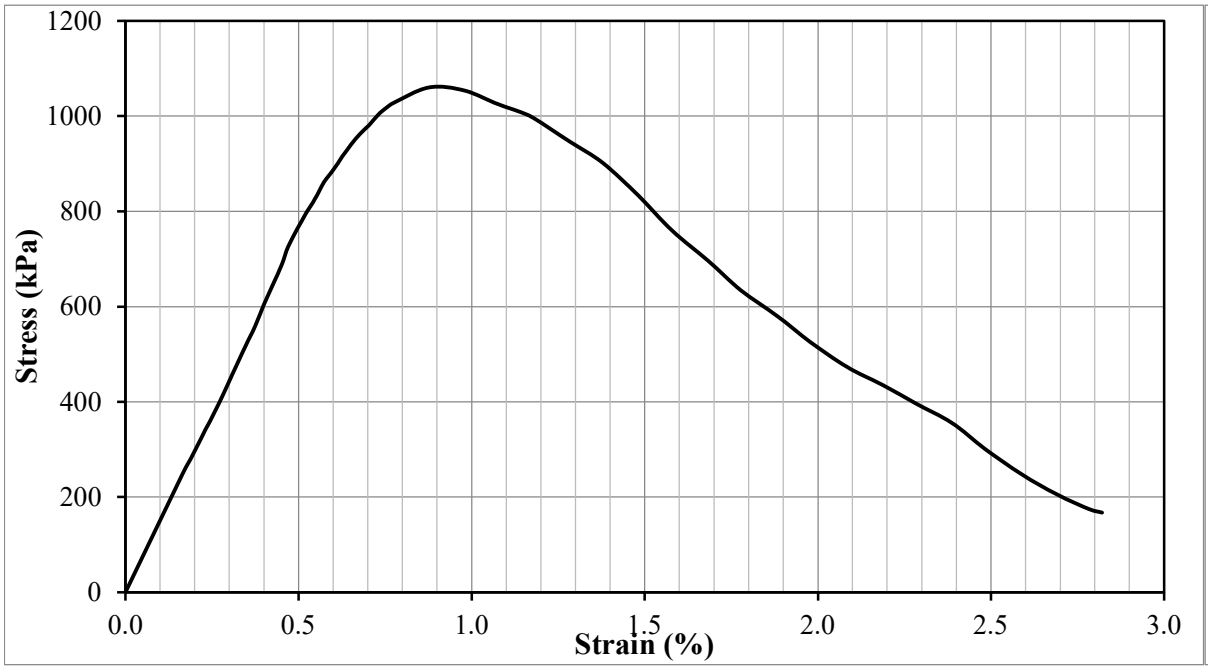
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	803	Strain at failure, εf :	0.84	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	J-8-C	Initial Area:	2119.1	mm^2
Test Date:	7/17/2022	Weight:	406.2	g
Strain Rate:	1 %/min	Unit Weight:	1954	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	13.9	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



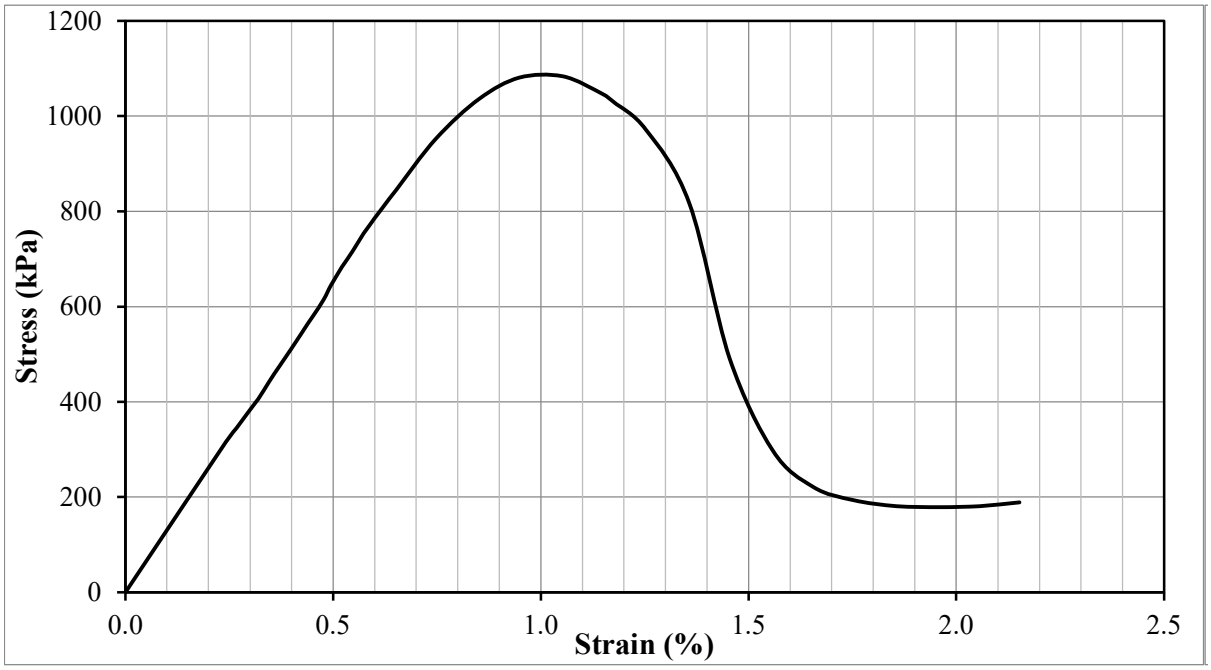
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	998	Strain at failure, εf :	0.80	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	J-8-F	Initial Area:	2114.9	mm^2
Test Date:	7/17/2022	Weight:	403.5	g
Strain Rate:	1 %/min	Unit Weight:	1956	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	13.9	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



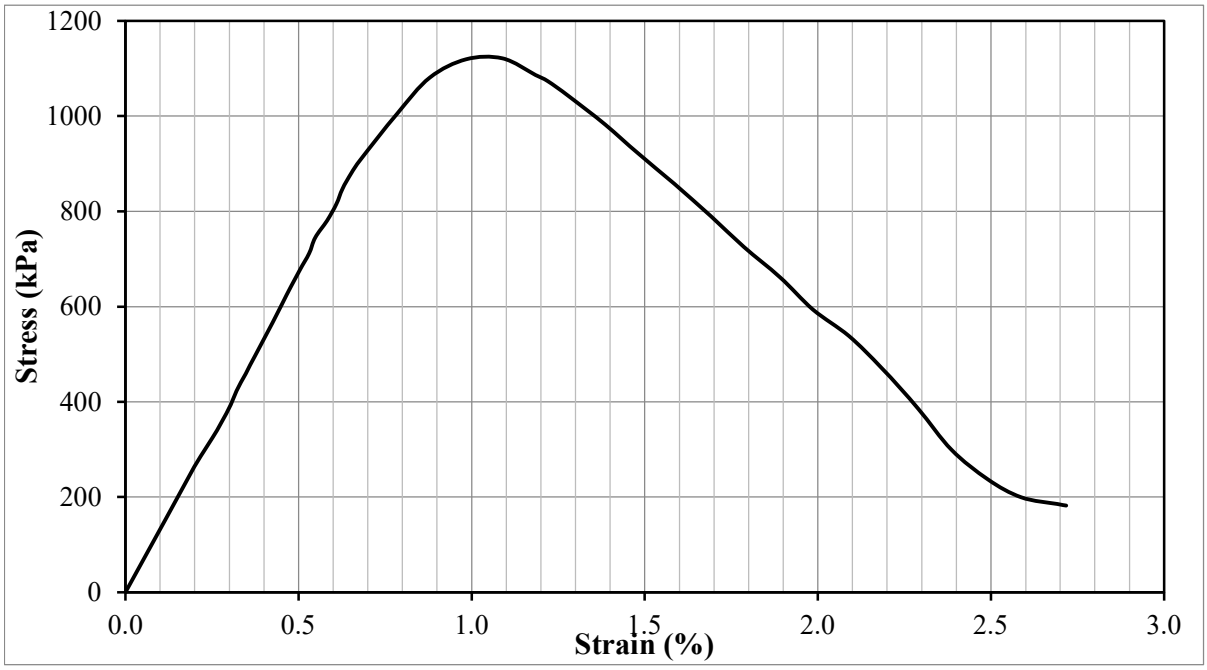
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,050	Strain at failure, εf :	0.88	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	J-8-D	Initial Area:	2104.6	mm^2
Test Date:	7/31/2022	Weight:	406.2	g
Strain Rate:	1 %/min	Unit Weight:	1973	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	28.3	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



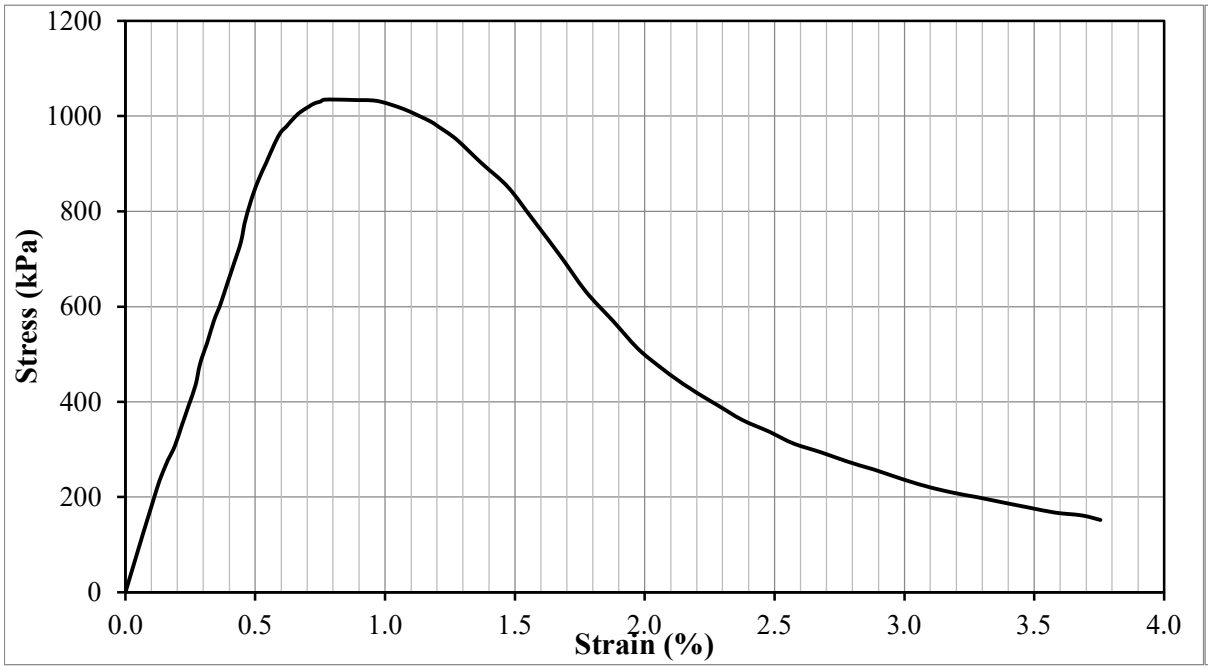
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,074	Strain at failure, εf :	1.05	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	96.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	J-8-E	Initial Area:	2117.0	mm^2
Test Date:	7/31/2022	Weight:	398.1	g
Strain Rate:	1 %/min	Unit Weight:	1949	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	28.4	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



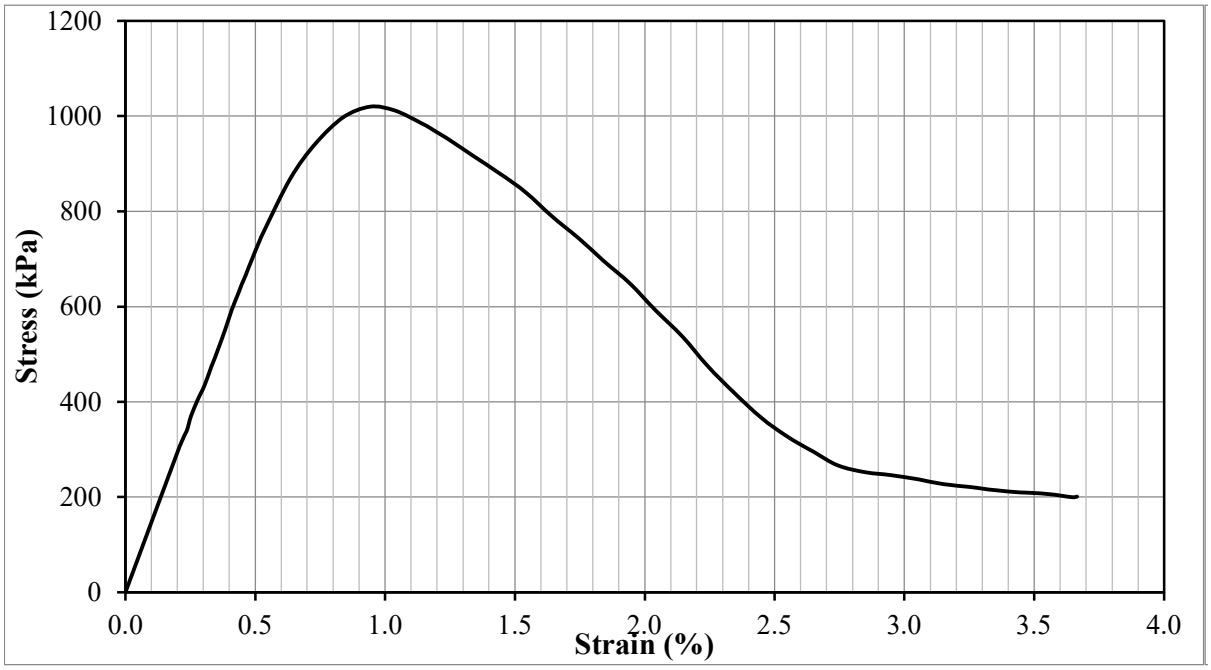
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,108	Strain at failure, εf :	1.09	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	95.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	J-9-A	Initial Area:	2108.7	mm^2
Test Date:	7/6/2022	Weight:	400.4	g
Strain Rate:	1 %/min	Unit Weight:	1988	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	3.1	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



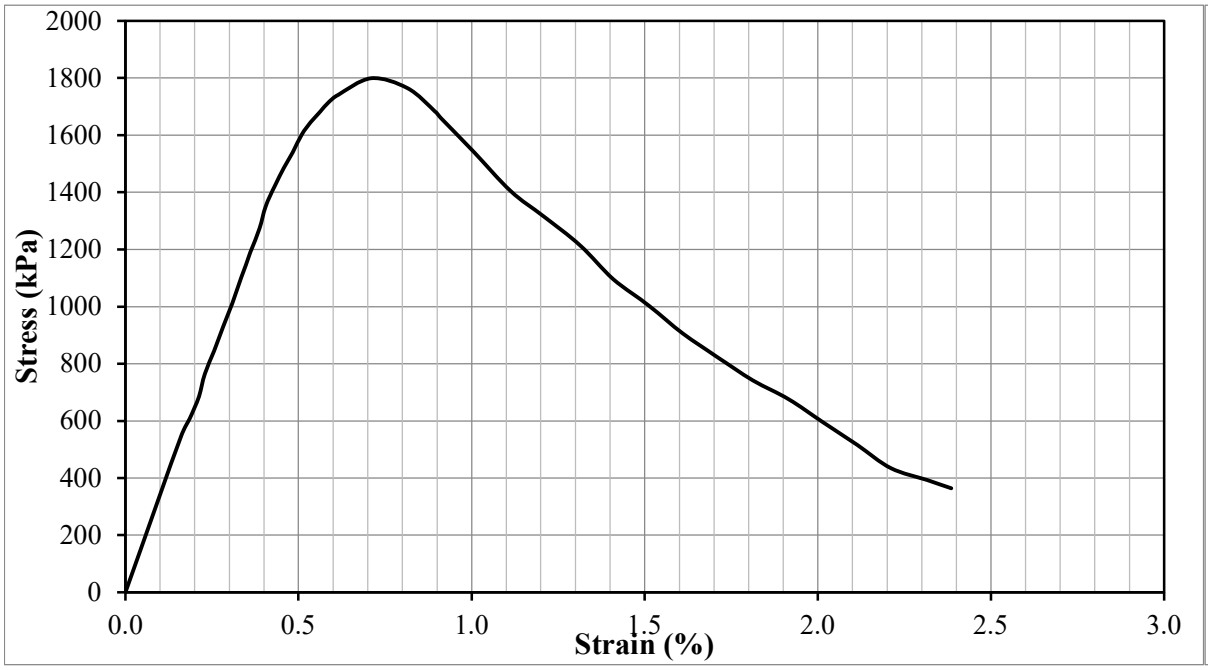
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,022	Strain at failure, εf :	0.77	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	96.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	J-9-H	Initial Area:	2123.2	mm^2
Test Date:	7/6/2022	Weight:	403.6	g
Strain Rate:	1 %/min	Unit Weight:	1977	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	3.1	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



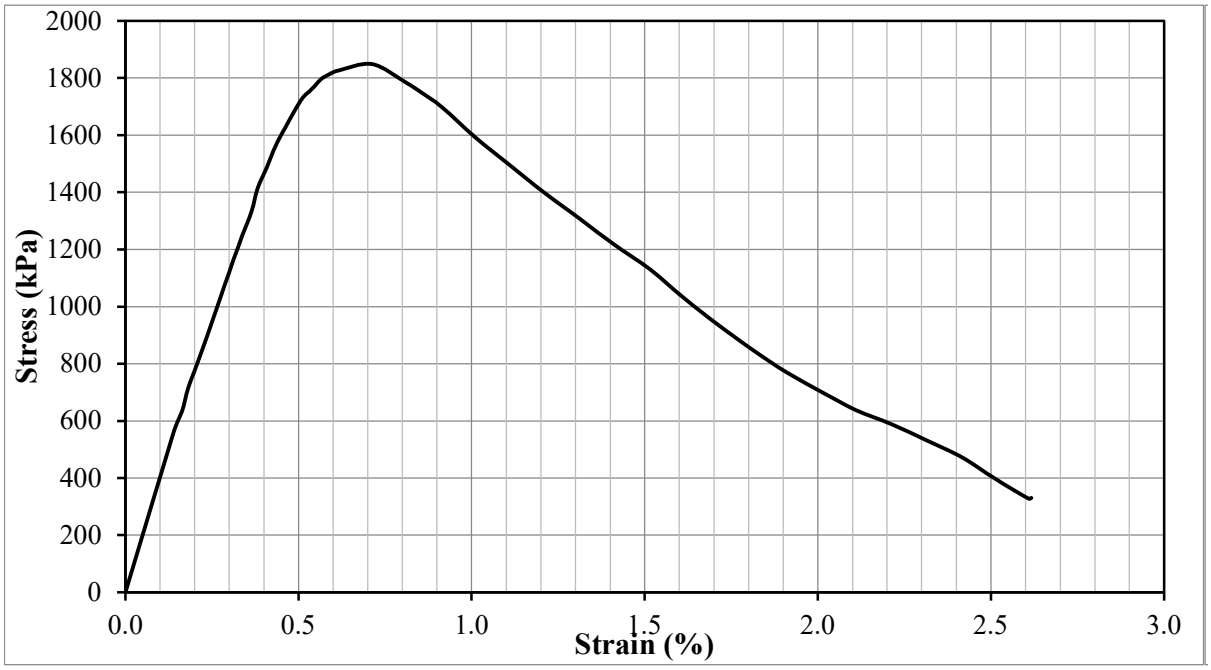
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,007	Strain at failure, εf :	0.94	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	96.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	J-9-B	Initial Area:	2110.8	mm^2
Test Date:	7/10/2022	Weight:	407.1	g
Strain Rate:	1 %/min	Unit Weight:	1999	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	6.9	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



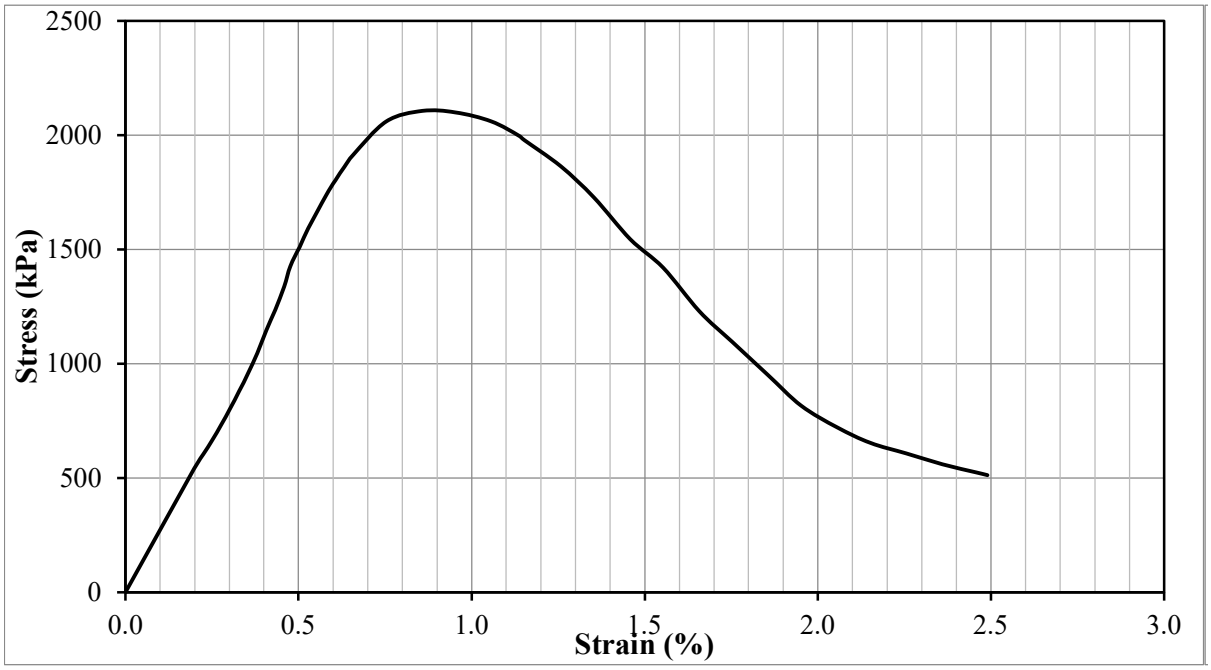
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,779	Strain at failure, εf :	0.71	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	96.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	J-9-G	Initial Area:	2123.2	mm^2
Test Date:	7/10/2022	Weight:	406.5	g
Strain Rate:	1 %/min	Unit Weight:	1986	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	6.9	days
$(w{:}c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



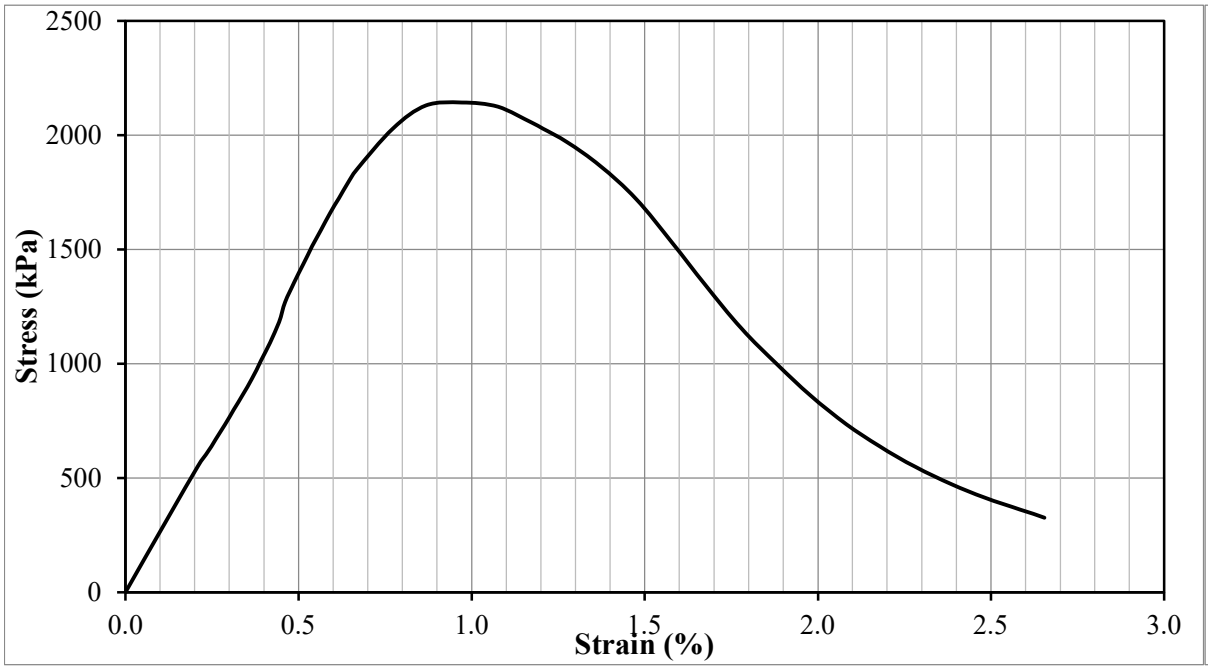
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,827	Strain at failure, εf :	0.71	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	96.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	J-9-C	Initial Area:	2117.0	mm^2
Test Date:	7/17/2022	Weight:	406.3	g
Strain Rate:	1 %/min	Unit Weight:	1992	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	13.9	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



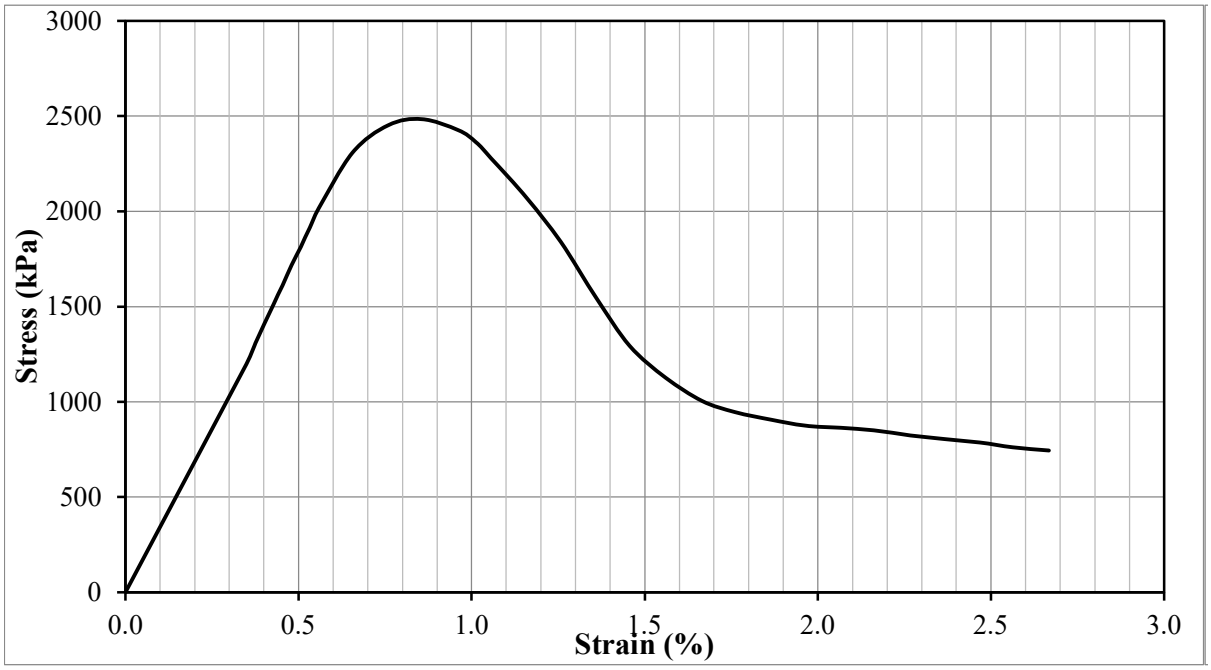
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,081	Strain at failure, εf :	0.86	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	96.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	J-9-F	Initial Area:	2112.9	mm^2
Test Date:	7/17/2022	Weight:	407.4	g
Strain Rate:	1 %/min	Unit Weight:	1995	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	13.9	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



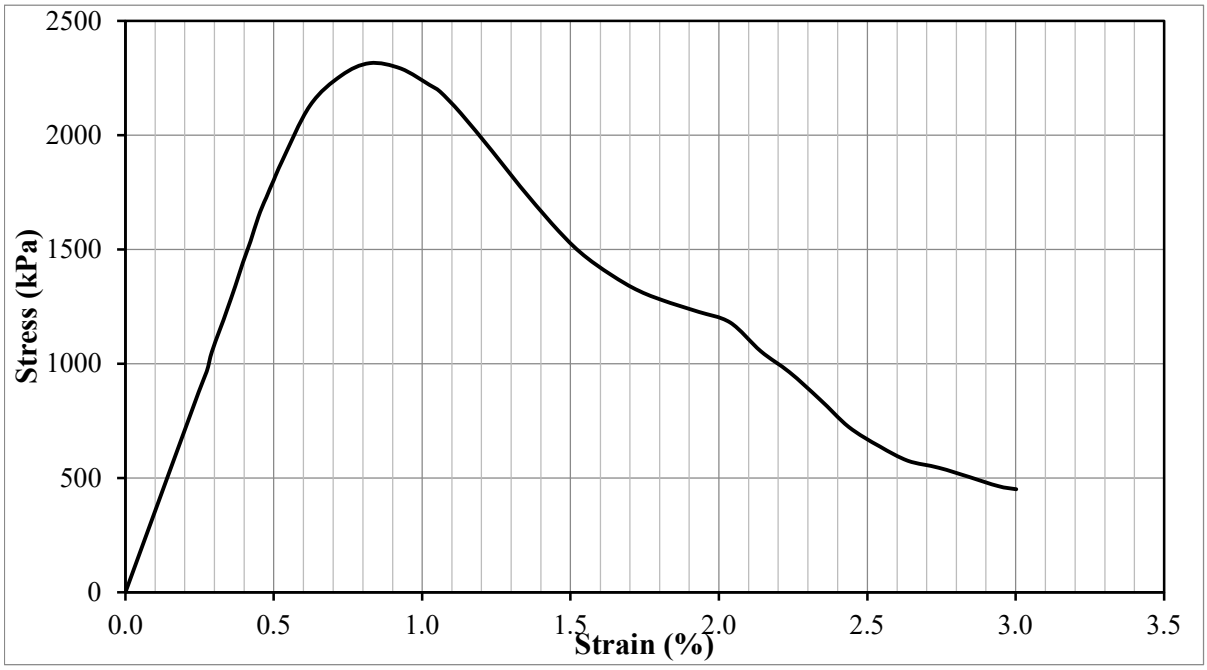
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,120	Strain at failure, εf :	0.97	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	95.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	J-9-D	Initial Area:	2114.9	mm^2
Test Date:	7/31/2022	Weight:	404.2	g
Strain Rate:	1 %/min	Unit Weight:	1997	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	28.3	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



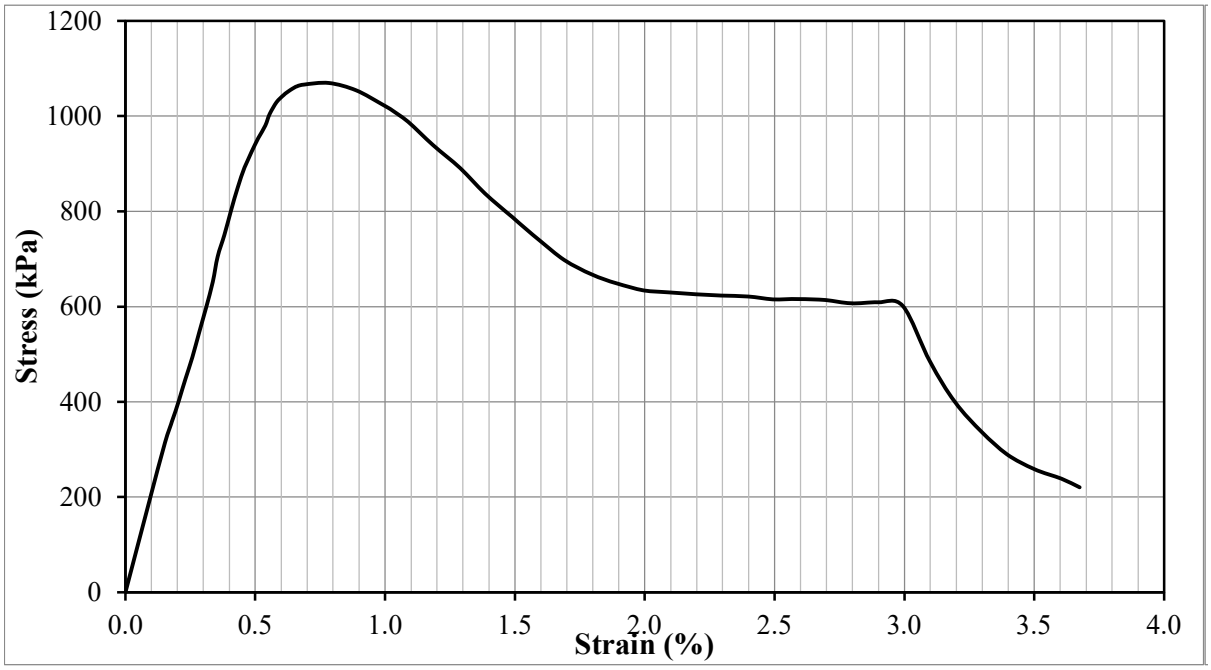
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,453	Strain at failure, εf :	0.86	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	95.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	J-9-E	Initial Area:	2106.6	mm^2
Test Date:	7/31/2022	Weight:	403.1	g
Strain Rate:	1 %/min	Unit Weight:	2000	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	28.3	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



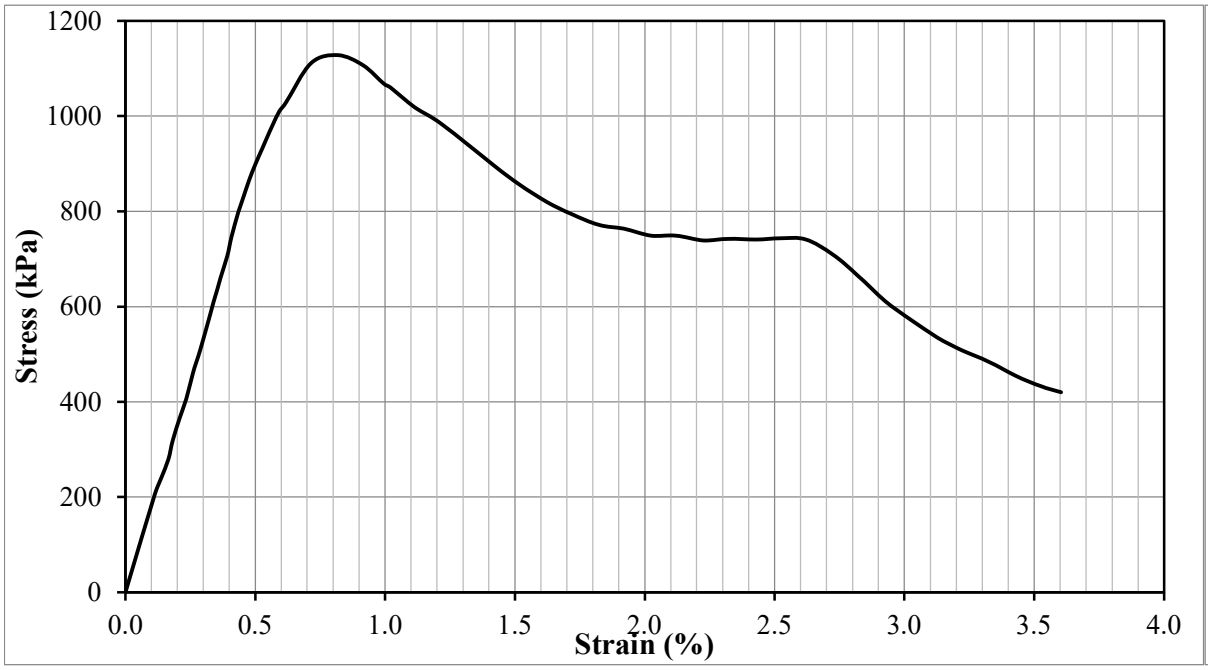
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,286	Strain at failure, εf :	0.82	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	88.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	J-10-A	Initial Area:	2108.7	mm^2
Test Date:	7/6/2022	Weight:	359.3	g
Strain Rate:	1 %/min	Unit Weight:	1924	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	3.0	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



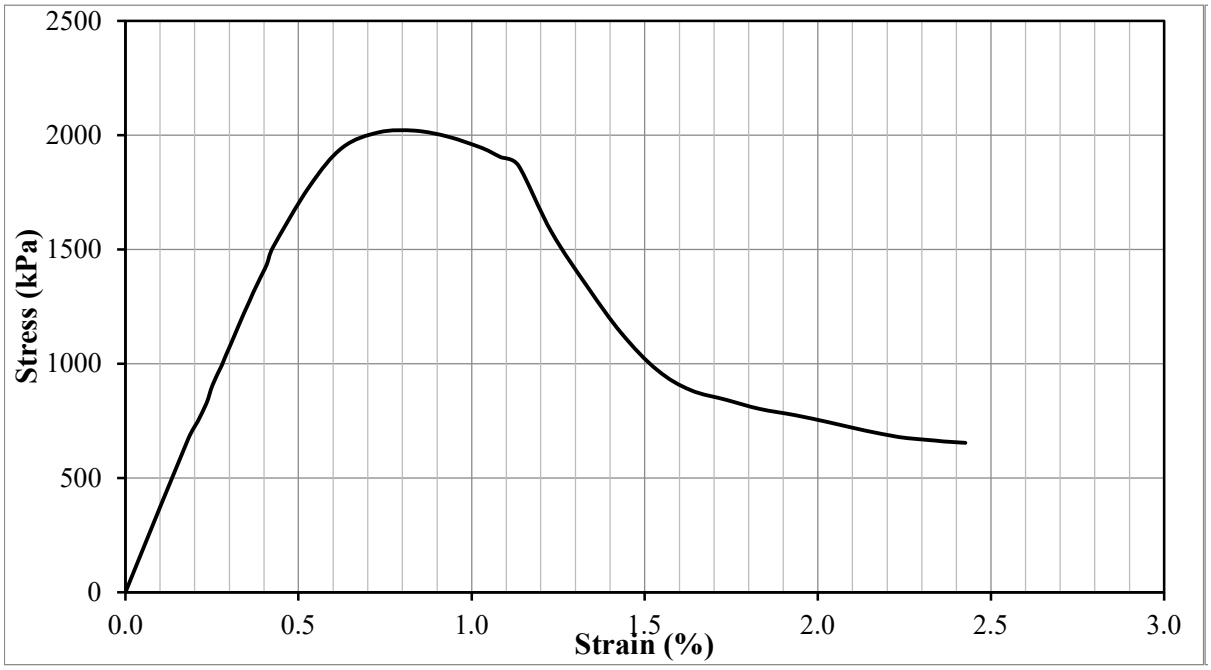
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,044	Strain at failure, εf :	0.78	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	90.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	J-10-J	Initial Area:	2108.7	mm^2
Test Date:	7/6/2022	Weight:	370.2	g
Strain Rate:	1 %/min	Unit Weight:	1937	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	3.0	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



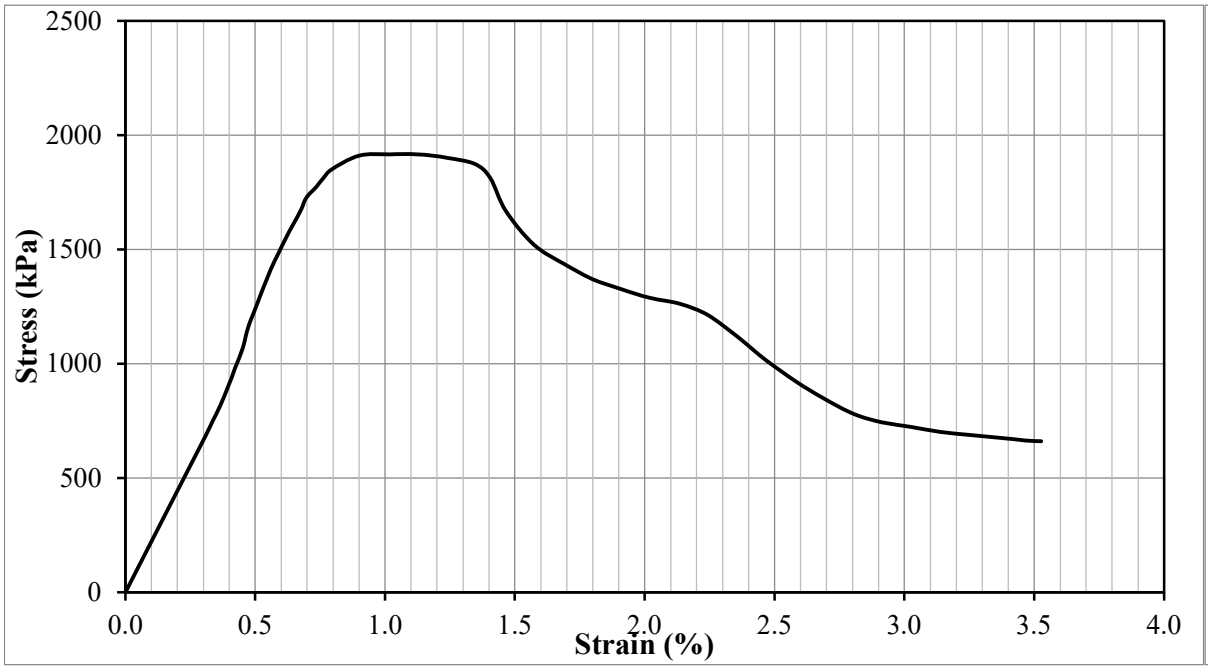
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,105	Strain at failure, εf :	0.82	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	87.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	J-10-B	Initial Area:	2104.6	mm^2
Test Date:	7/10/2022	Weight:	356.2	g
Strain Rate:	1 %/min	Unit Weight:	1929	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	6.8	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



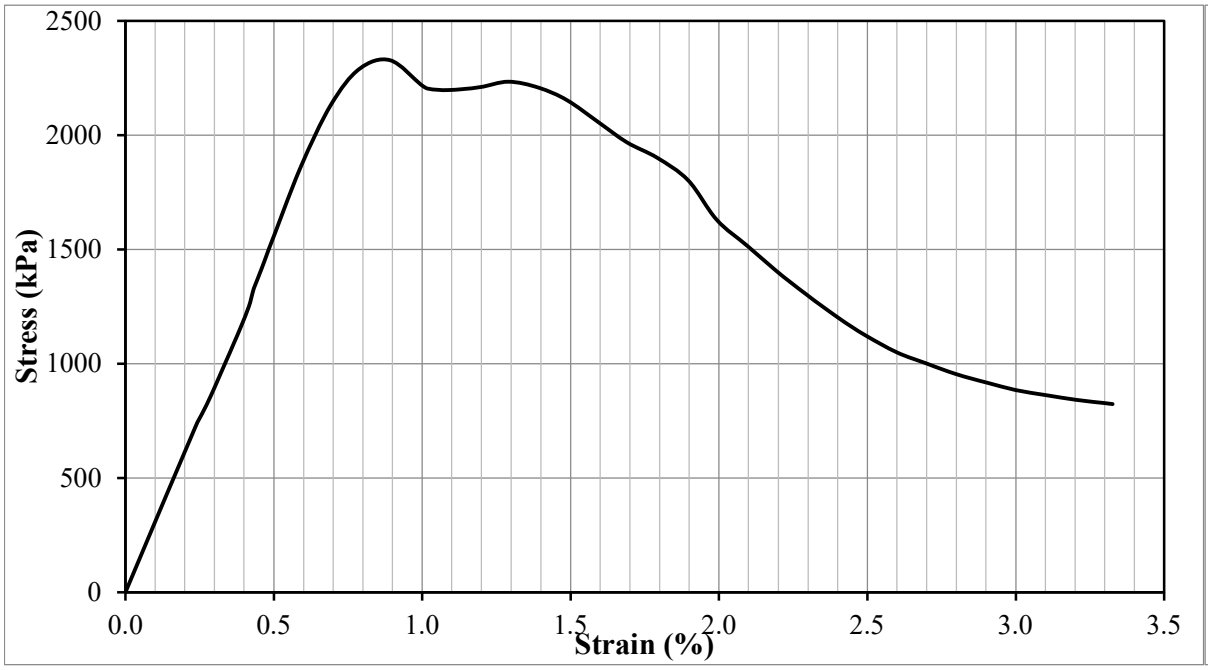
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,970	Strain at failure, εf :	0.84	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	89.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	J-10-G	Initial Area:	2117.0	mm^2
Test Date:	7/10/2022	Weight:	366.8	g
Strain Rate:	1 %/min	Unit Weight:	1926	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	6.8	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



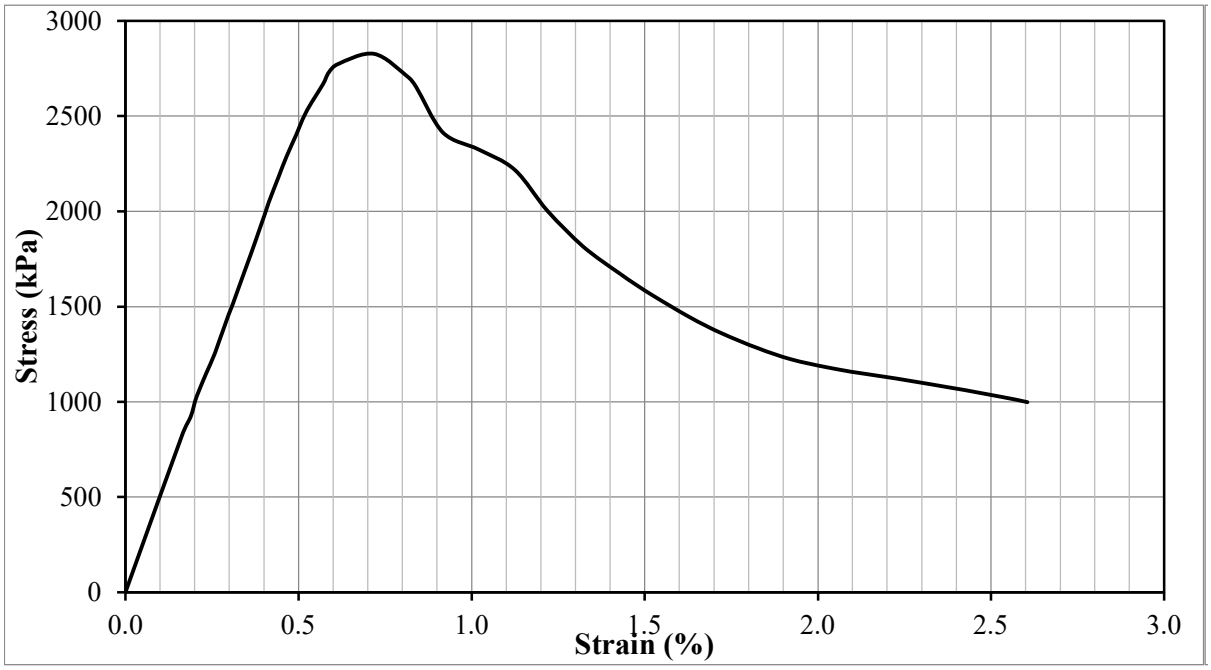
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,875	Strain at failure, εf :	1.12	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	88.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	J-10-C	Initial Area:	2123.2	mm^2
Test Date:	7/17/2022	Weight:	359.6	g
Strain Rate:	1 %/min	Unit Weight:	1915	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	13.8	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



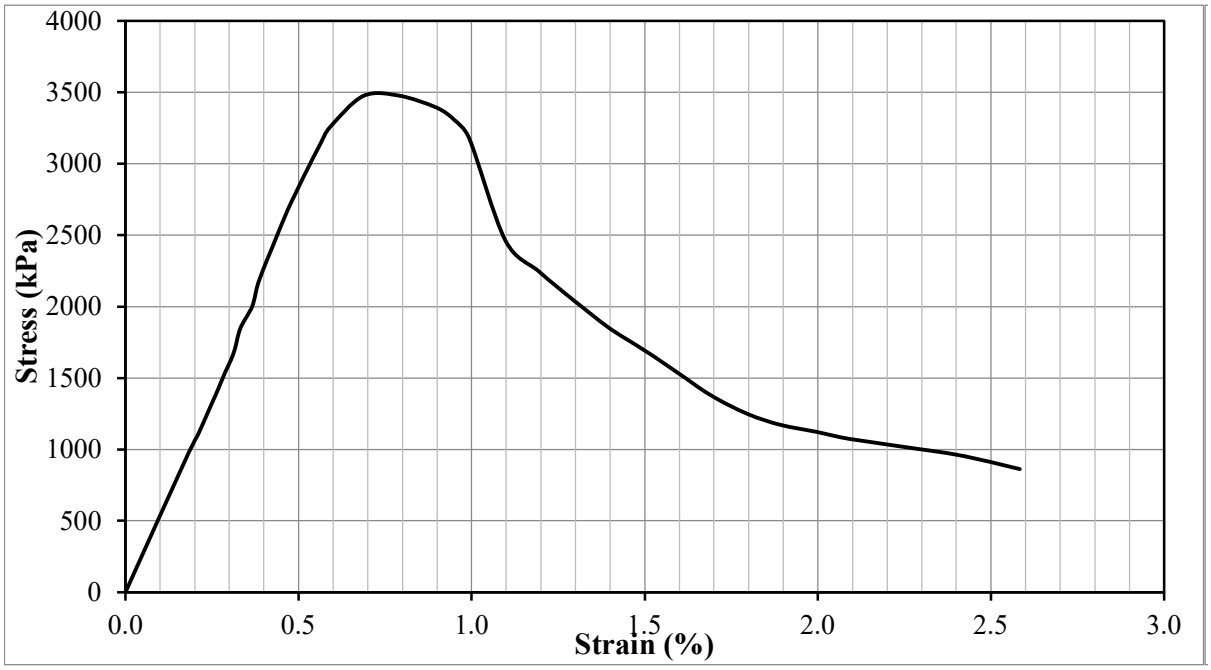
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,272	Strain at failure, εf :	0.89	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	88.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	J-10-F	Initial Area:	2108.7	mm^2
Test Date:	7/17/2022	Weight:	359.7	g
Strain Rate:	1 %/min	Unit Weight:	1932	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	13.8	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



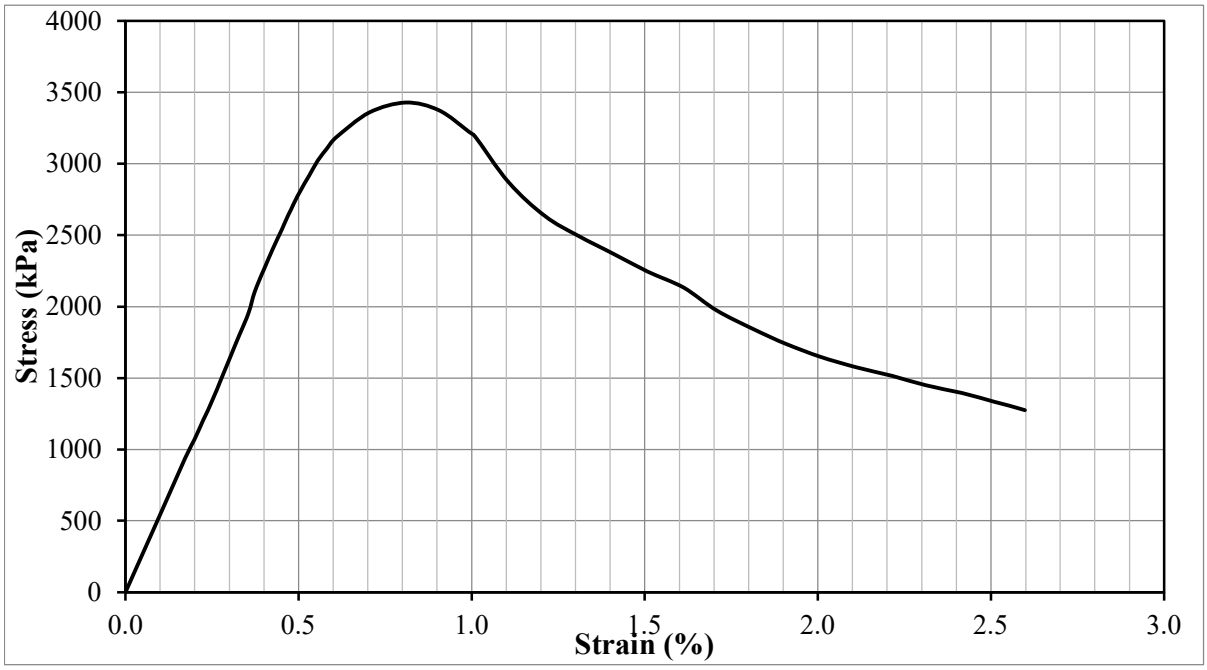
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,760	Strain at failure, εf :	0.72	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	89.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	J-10-D	Initial Area:	2117.0	mm^2
Test Date:	7/31/2022	Weight:	364.7	g
Strain Rate:	1 %/min	Unit Weight:	1921	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	28.2	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



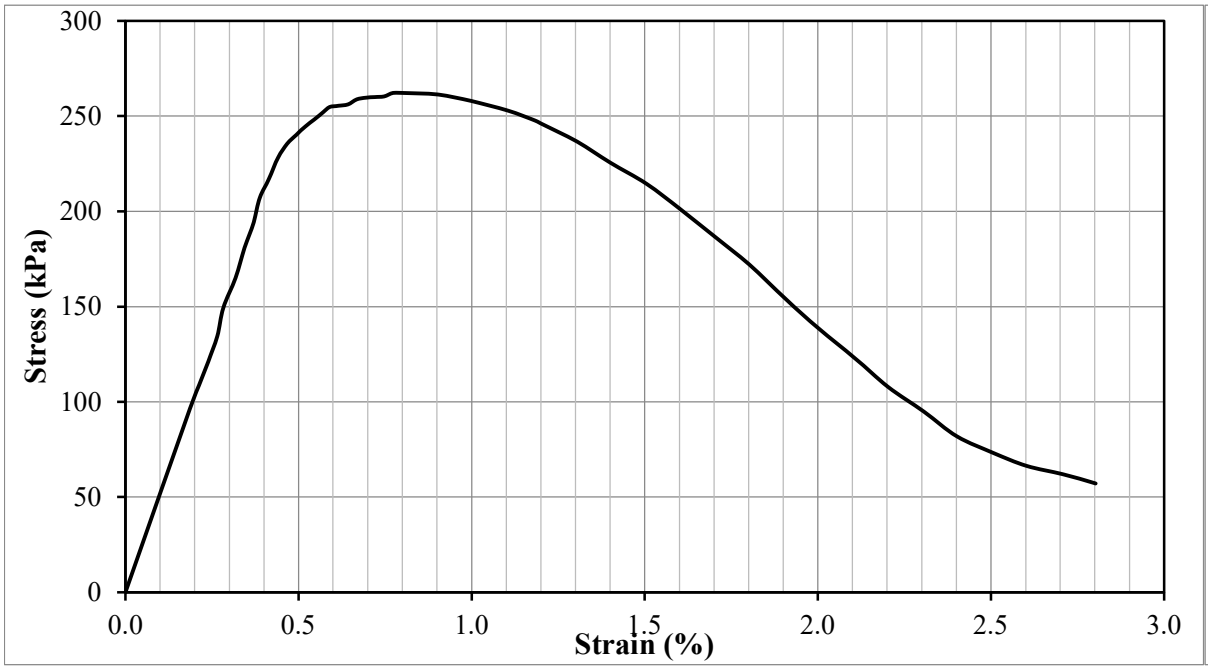
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,400	Strain at failure, εf :	0.69	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	88.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	J-10-E	Initial Area:	2110.8	mm^2
Test Date:	7/31/2022	Weight:	362.1	g
Strain Rate:	1 %/min	Unit Weight:	1934	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	28.2	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



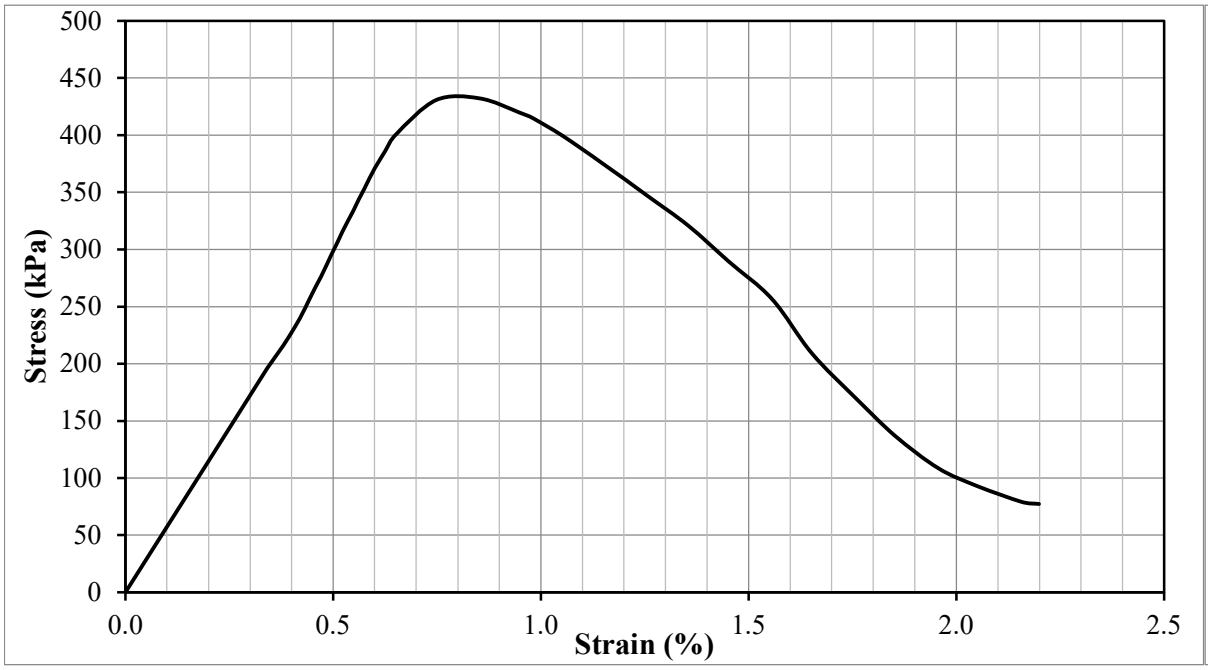
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,348	Strain at failure, εf :	0.81	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	73.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	J-11-A	Initial Area:	2096.3	mm^2
Test Date:	8/25/2022	Weight:	287.5	g
Strain Rate:	1 %/min	Unit Weight:	1872	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	1.1	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



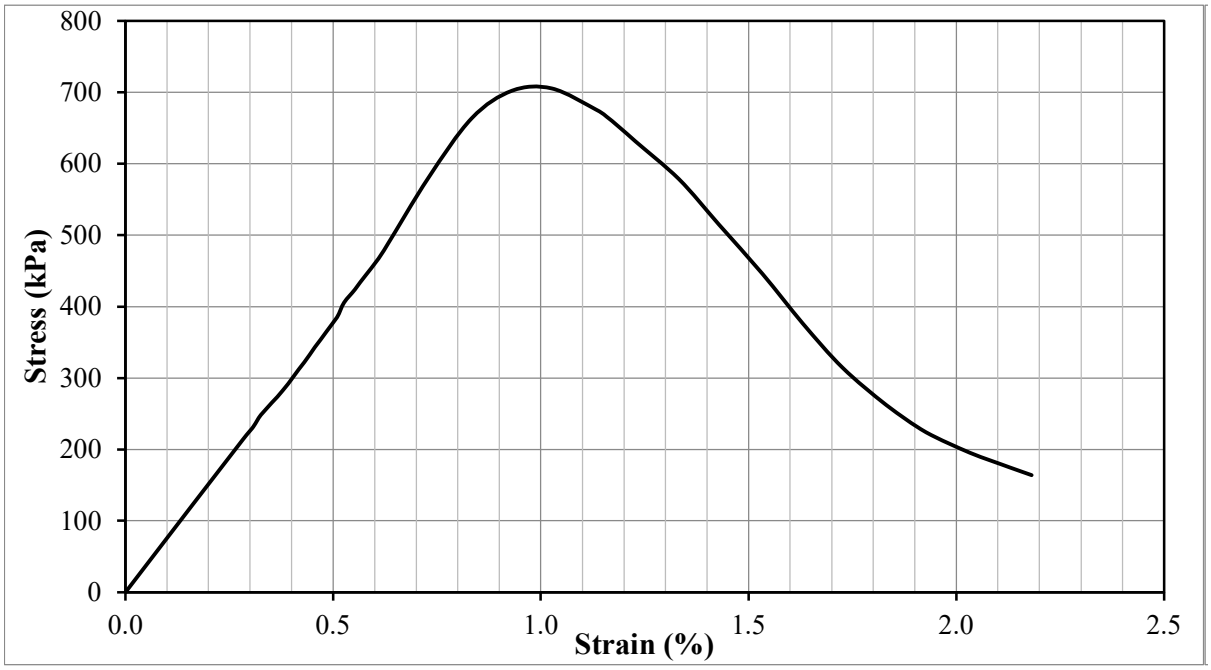
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	250	Strain at failure, εf :	0.77	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	J-11-B	Initial Area:	2102.5	mm^2
Test Date:	8/27/2022	Weight:	399.9	g
Strain Rate:	1 %/min	Unit Weight:	1870	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	3.1	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



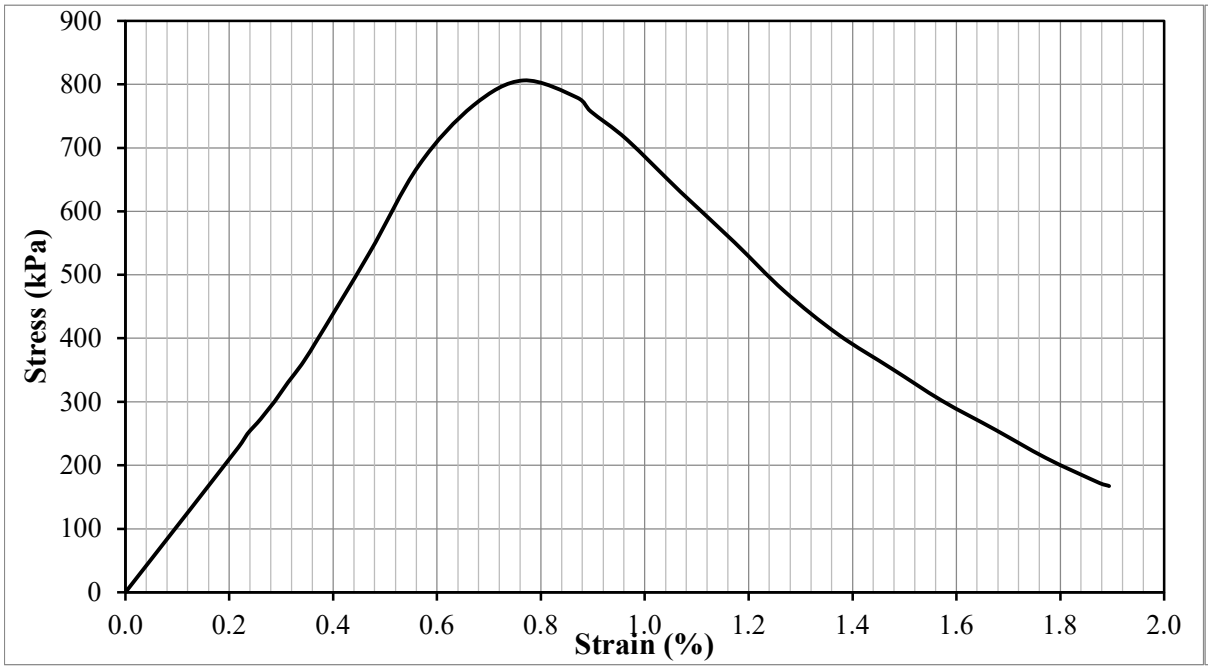
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	431	Strain at failure, εf :	0.85	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	J-11-C	Initial Area:	2102.5	mm^2
Test Date:	8/31/2022	Weight:	400.8	g
Strain Rate:	1 %/min	Unit Weight:	1877	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	6.8	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



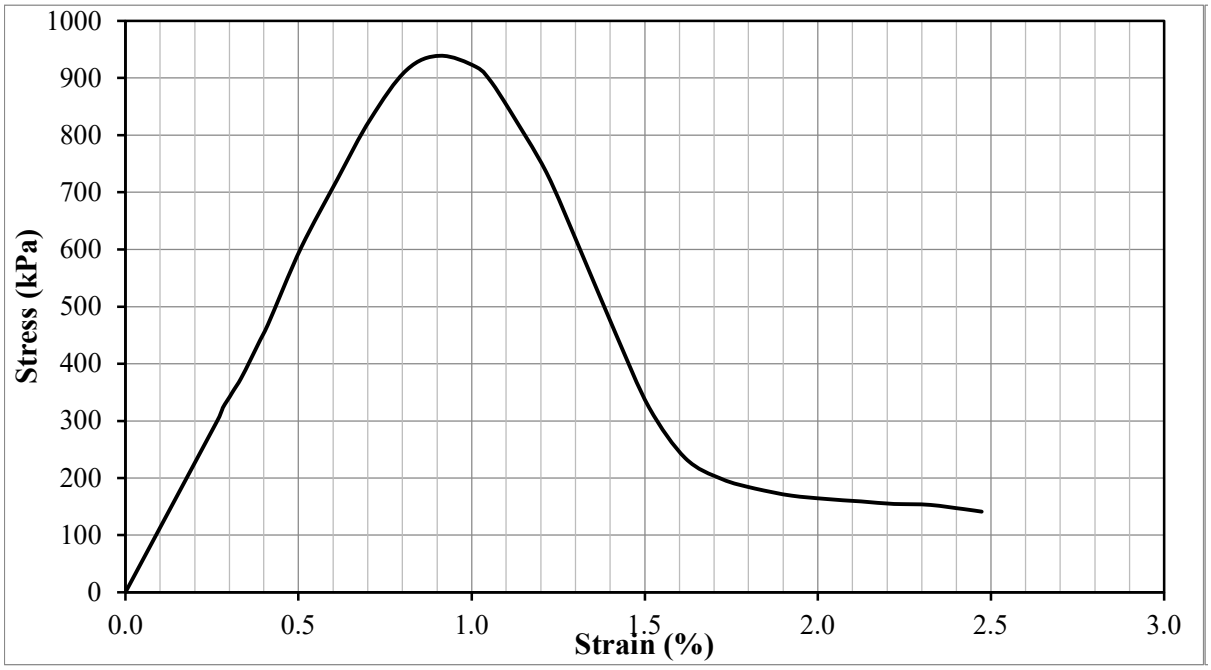
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	703	Strain at failure, εf :	1.03	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	J-11-D	Initial Area:	2108.7	mm^2
Test Date:	9/3/2022	Weight:	402.7	g
Strain Rate:	1 %/min	Unit Weight:	1877	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	9.7	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



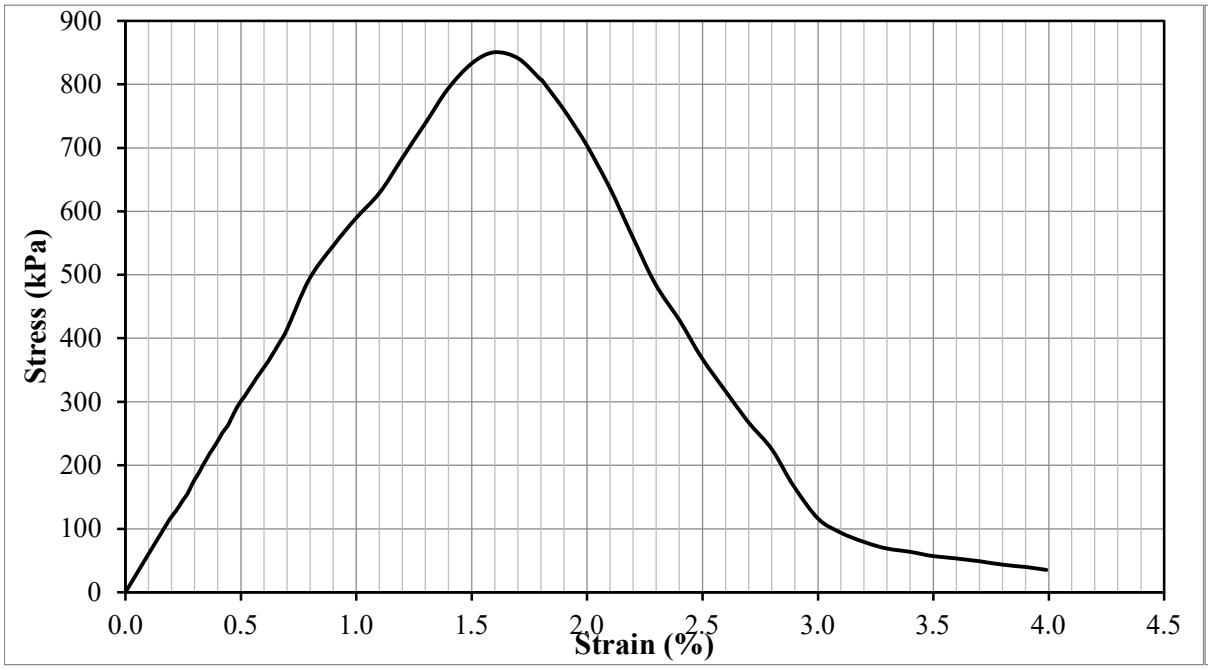
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	804	Strain at failure, εf :	0.77	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	J-11-E	Initial Area:	2106.6	mm^2
Test Date:	9/7/2022	Weight:	401.8	g
Strain Rate:	1 %/min	Unit Weight:	1877	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	13.8	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



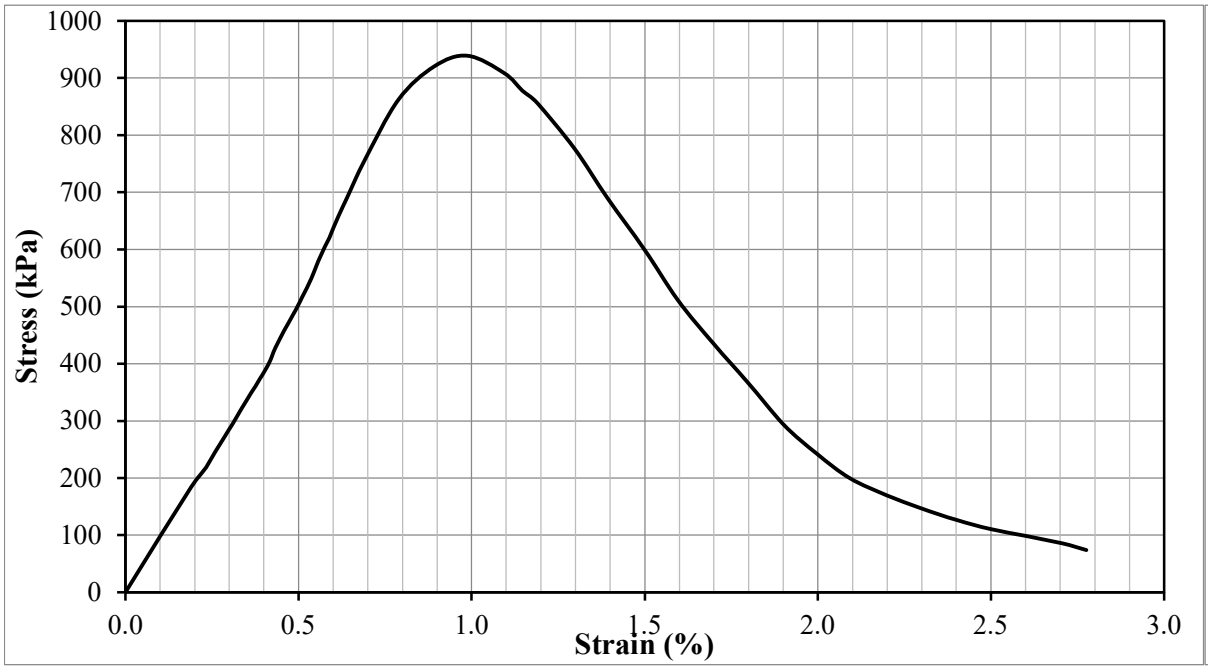
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	936	Strain at failure, εf :	0.91	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	J-11-F	Initial Area:	2108.7	mm^2
Test Date:	9/10/2022	Weight:	405.4	g
Strain Rate:	1 %/min	Unit Weight:	1902	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	17.0	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



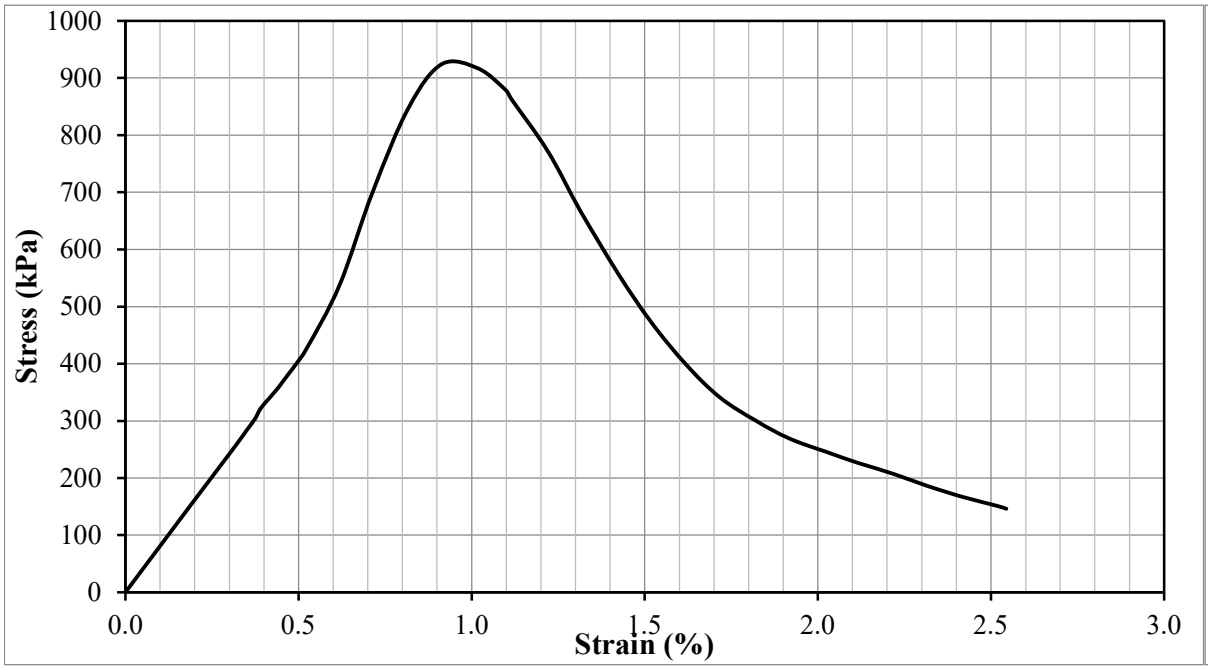
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	847	Strain at failure, εf :	1.60	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	J-11-G	Initial Area:	2108.7	mm^2
Test Date:	9/14/2022	Weight:	403.1	g
Strain Rate:	1 %/min	Unit Weight:	1881	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	20.8	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



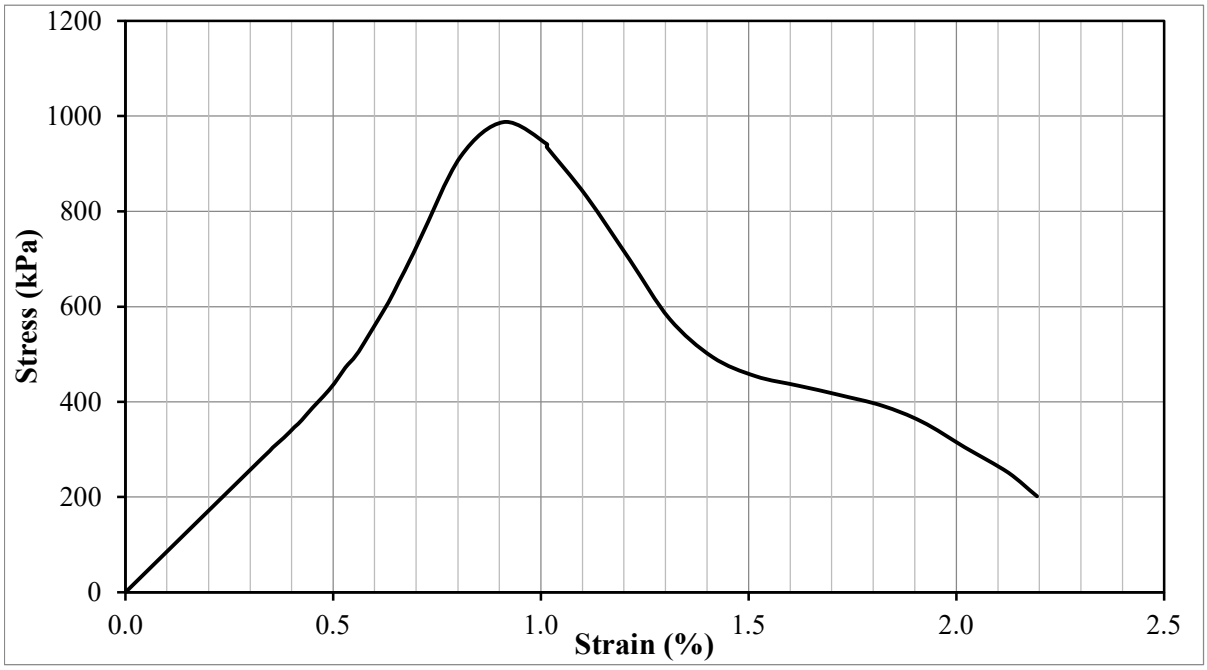
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	936	Strain at failure, εf :	0.99	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.6	mm
I.D.:	J-11-H	Initial Area:	2090.1	mm^2
Test Date:	9/17/2022	Weight:	405.0	g
Strain Rate:	1 %/min	Unit Weight:	1910	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	24.1	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



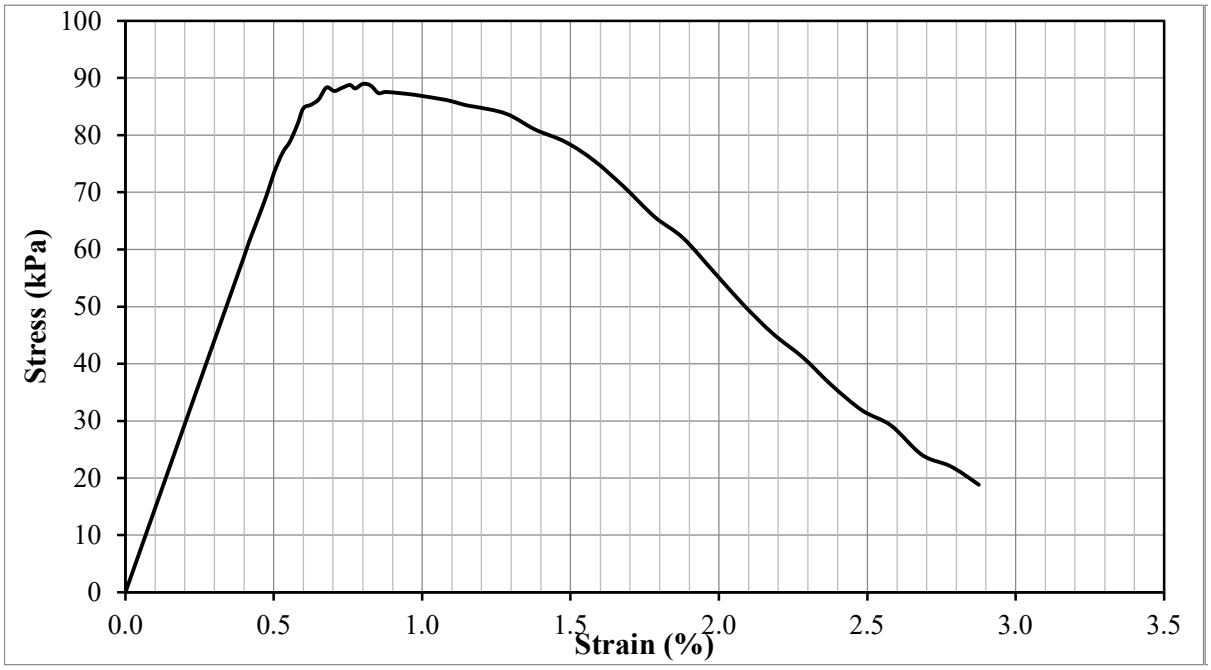
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	922	Strain at failure, εf :	0.92	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	J-11-I	Initial Area:	2112.9	mm^2
Test Date:	9/21/2022	Weight:	400.3	g
Strain Rate:	1 %/min	Unit Weight:	1884	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	28.3	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



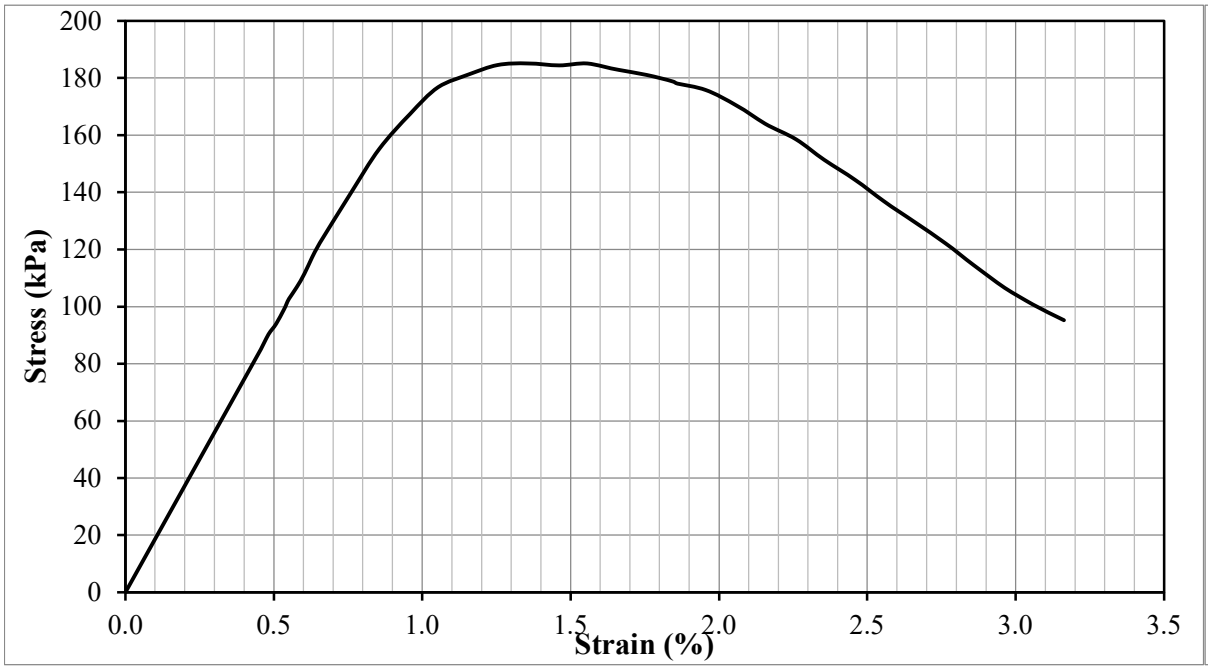
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	983	Strain at failure, εf :	0.91	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.6	mm
I.D.:	J-12-A	Initial Area:	2094.3	mm^2
Test Date:	8/31/2022	Weight:	399.4	g
Strain Rate:	1 %/min	Unit Weight:	1877	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	50	Curing Period	1.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



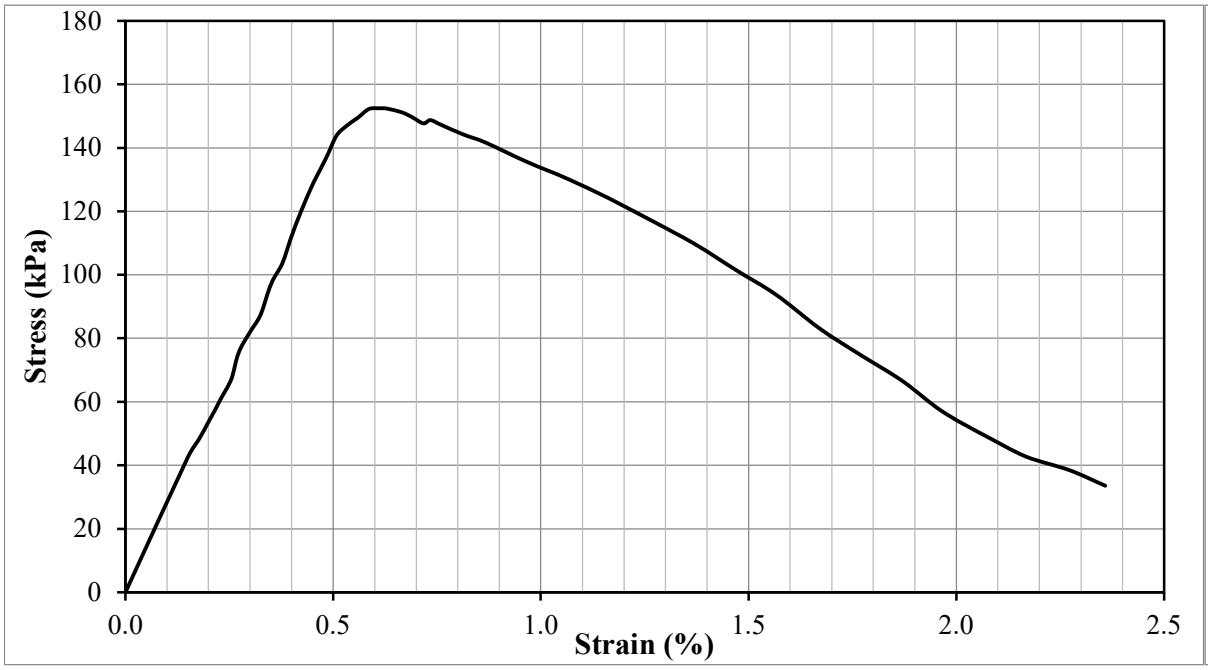
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	89	Strain at failure, εf :	0.80	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	61.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	J-12-B	Initial Area:	2102.5	mm^2
Test Date:	9/2/2022	Weight:	244.3	g
Strain Rate:	1 %/min	Unit Weight:	1893	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	50	Curing Period	3.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



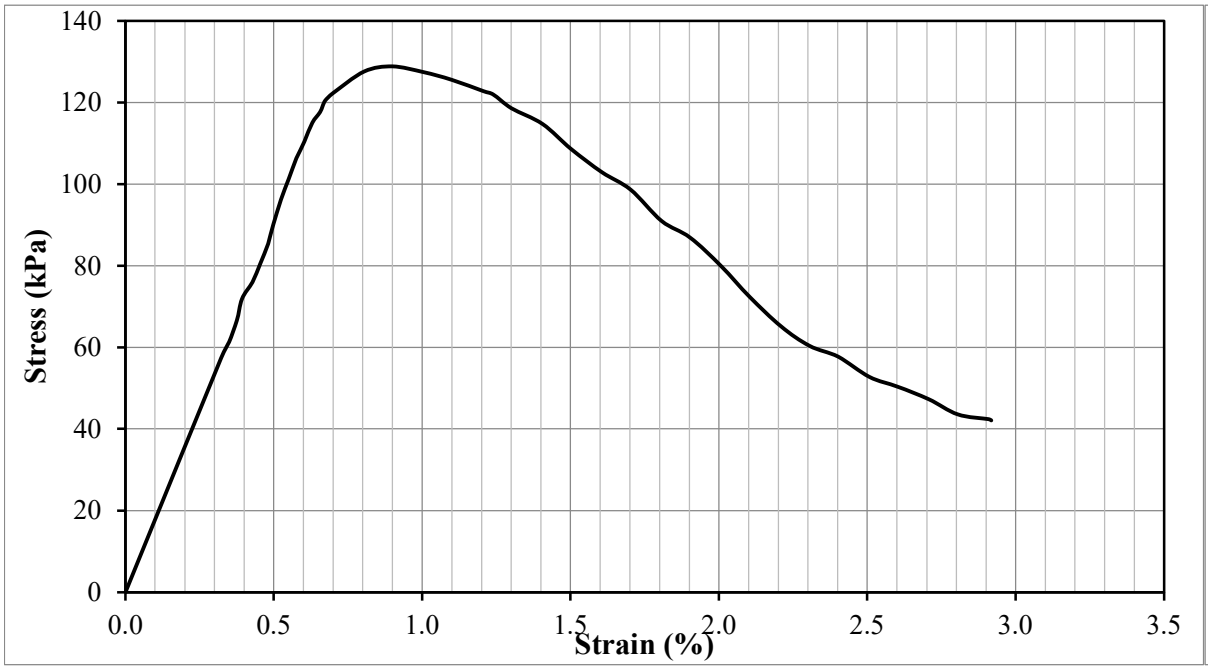
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	173	Strain at failure, εf :	1.36	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	J-12-C	Initial Area:	2123.2	mm^2
Test Date:	9/6/2022	Weight:	399.0	g
Strain Rate:	1 %/min	Unit Weight:	1846	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	50	Curing Period	7.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



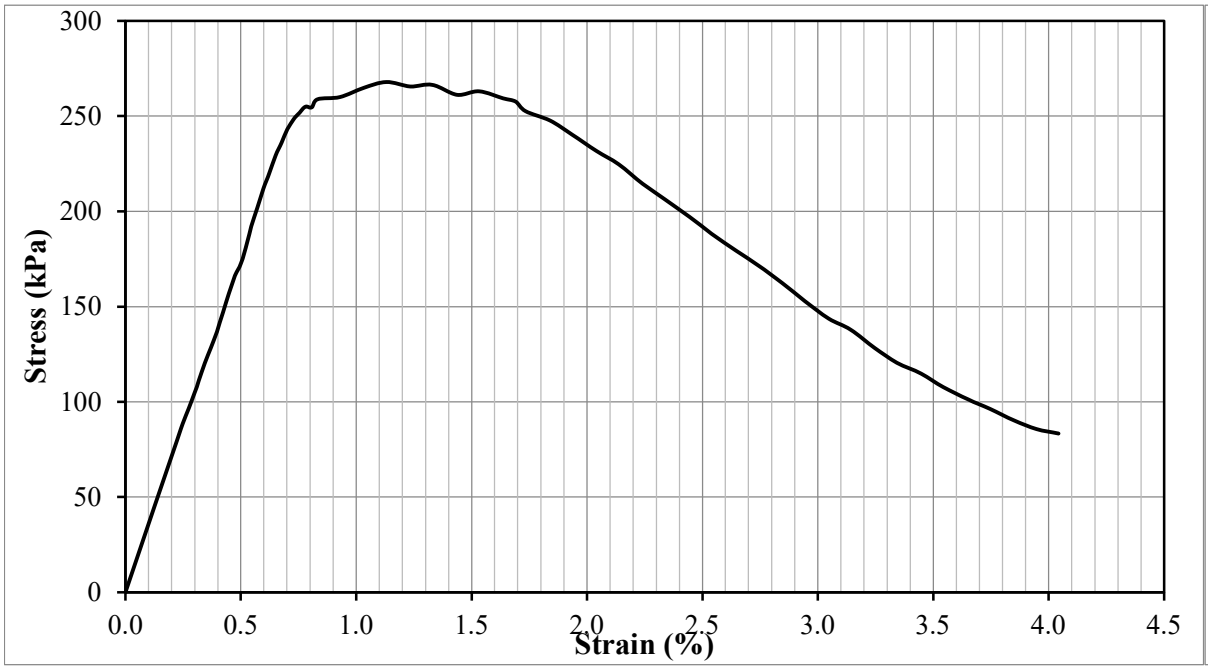
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	152	Strain at failure, εf :	0.61	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.6	mm
I.D.:	J-12-D	Initial Area:	2092.2	mm^2
Test Date:	9/9/2022	Weight:	400.8	g
Strain Rate:	1 %/min	Unit Weight:	1888	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	50	Curing Period	10.3	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



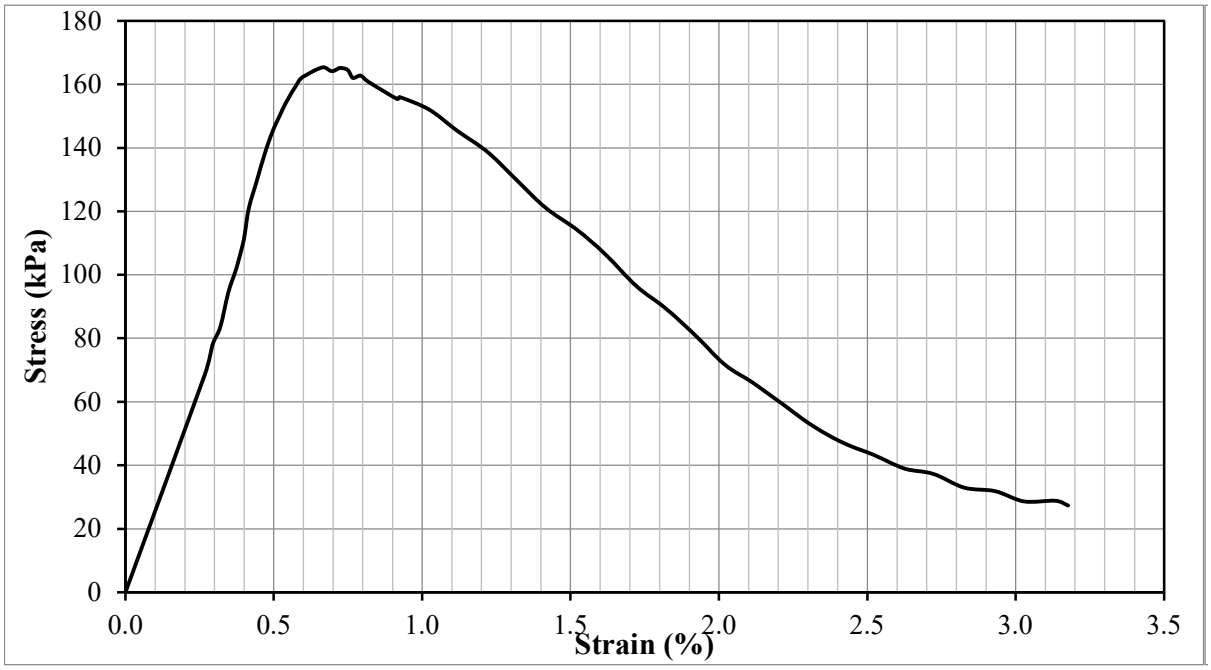
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	128	Strain at failure, εf :	0.90	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	56.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	J-12-E	Initial Area:	2102.5	mm^2
Test Date:	9/13/2022	Weight:	226.8	g
Strain Rate:	1 %/min	Unit Weight:	1926	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	50	Curing Period	14.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



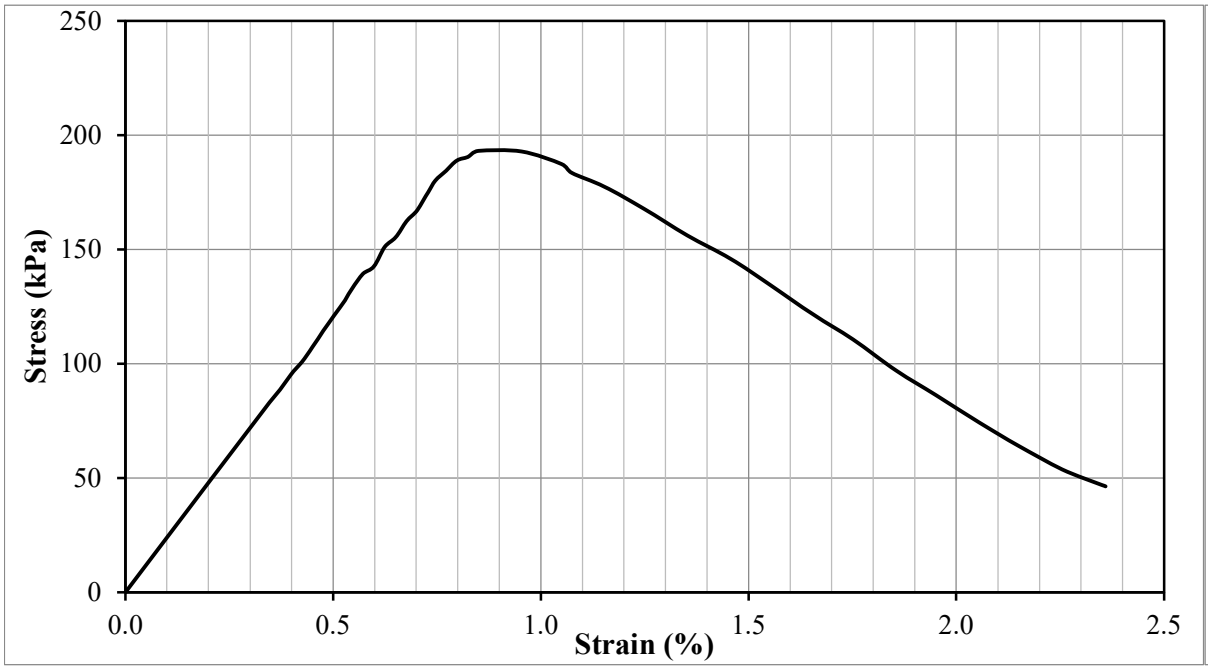
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	248	Strain at failure, εf :	1.13	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	J-12-F	Initial Area:	2106.6	mm^2
Test Date:	9/16/2022	Weight:	402.9	g
Strain Rate:	1 %/min	Unit Weight:	1884	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	50	Curing Period	17.2	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



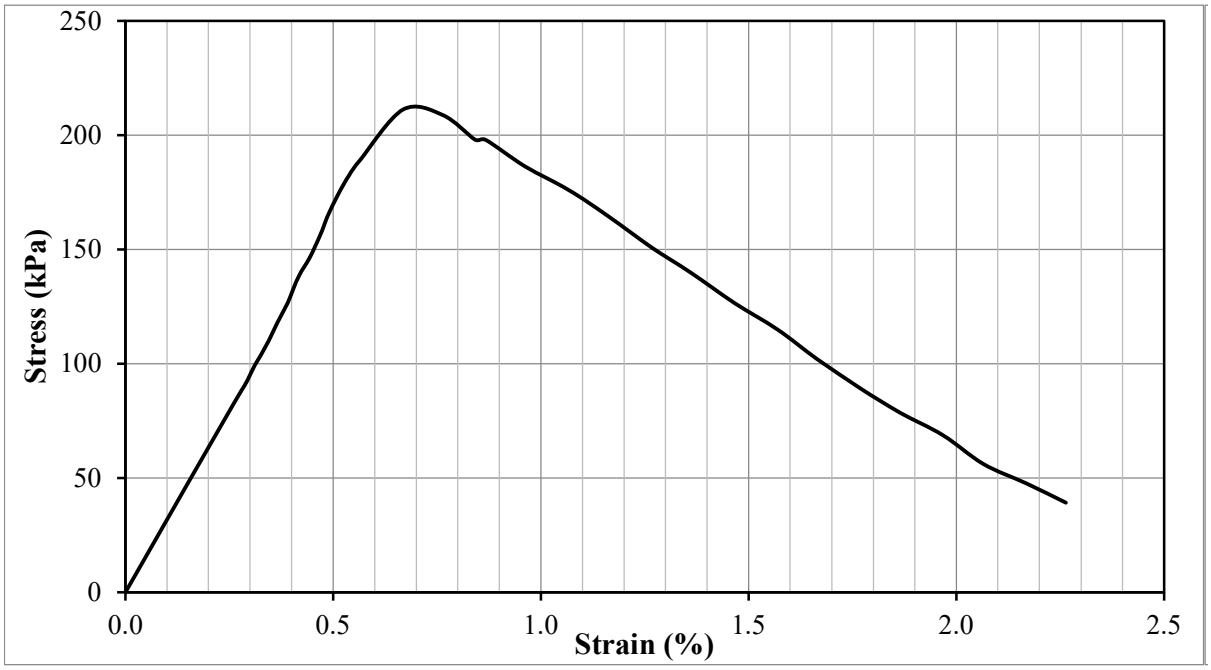
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	165	Strain at failure, εf :	0.67	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	J-12-G	Initial Area:	2108.7	mm^2
Test Date:	9/20/2022	Weight:	402.0	g
Strain Rate:	1 %/min	Unit Weight:	1877	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	50	Curing Period	21.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



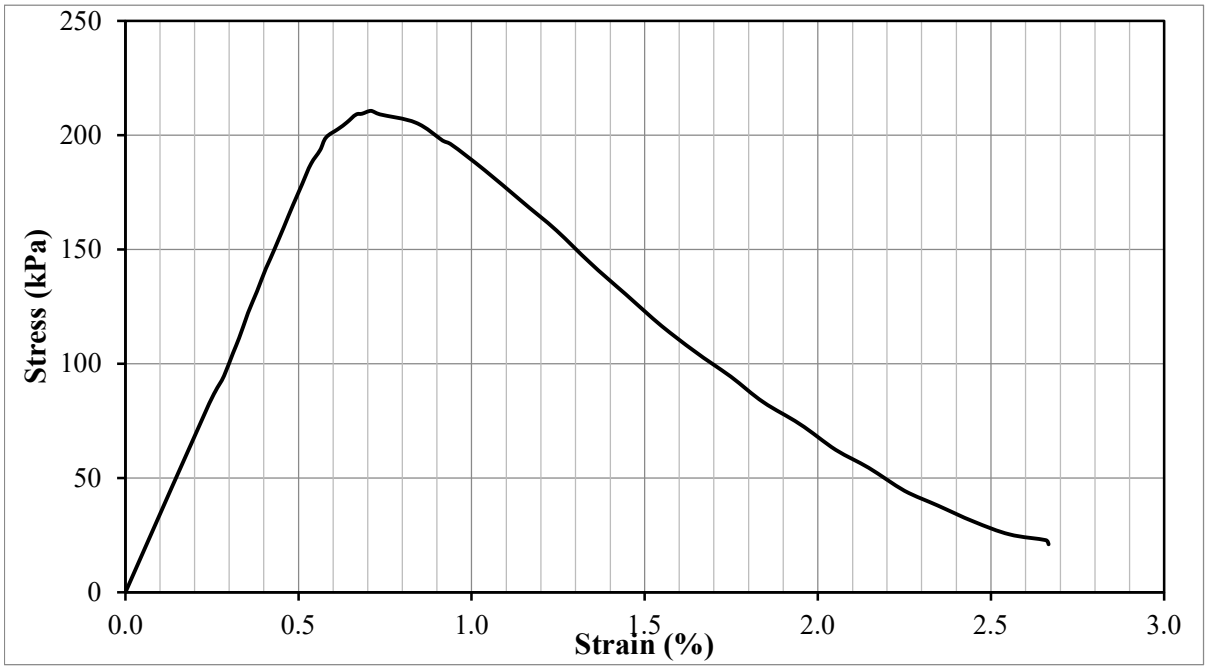
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	192	Strain at failure, εf :	0.85	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	J-12-J	Initial Area:	2108.7	mm^2
Test Date:	9/23/2022	Weight:	408.3	g
Strain Rate:	1 %/min	Unit Weight:	1903	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	50	Curing Period	24.3	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



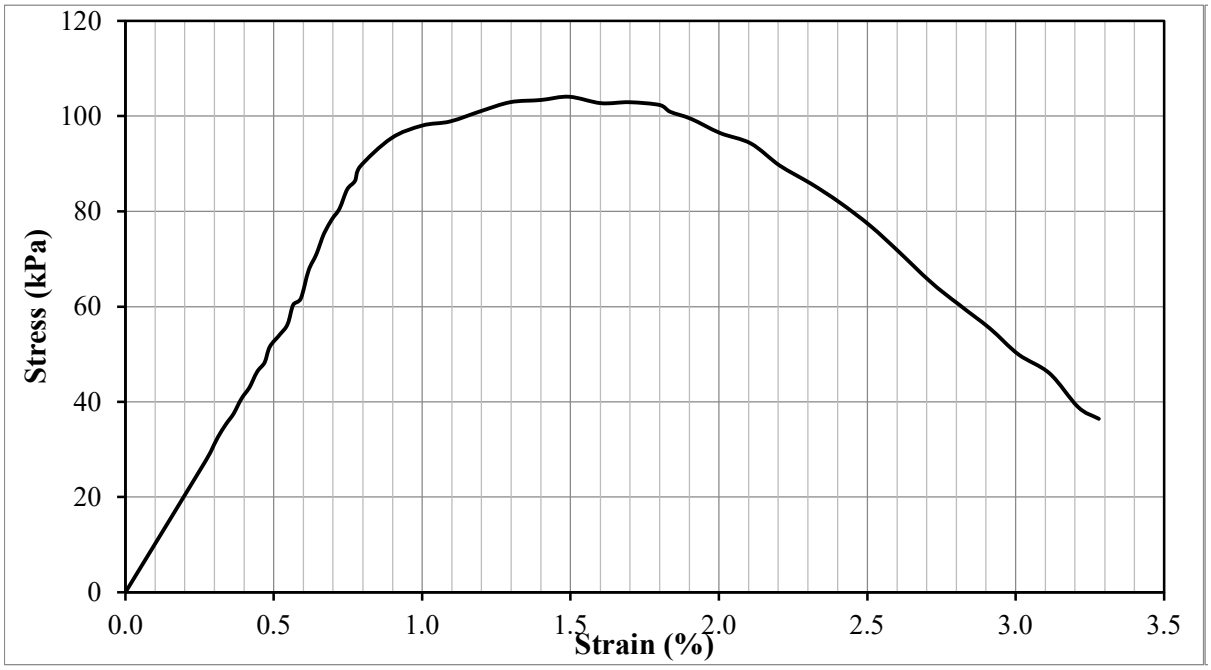
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	210	Strain at failure, εf :	0.67	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	J-12-I	Initial Area:	2106.6	mm^2
Test Date:	9/27/2022	Weight:	403.0	g
Strain Rate:	1 %/min	Unit Weight:	1881	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	50	Curing Period	28.4	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



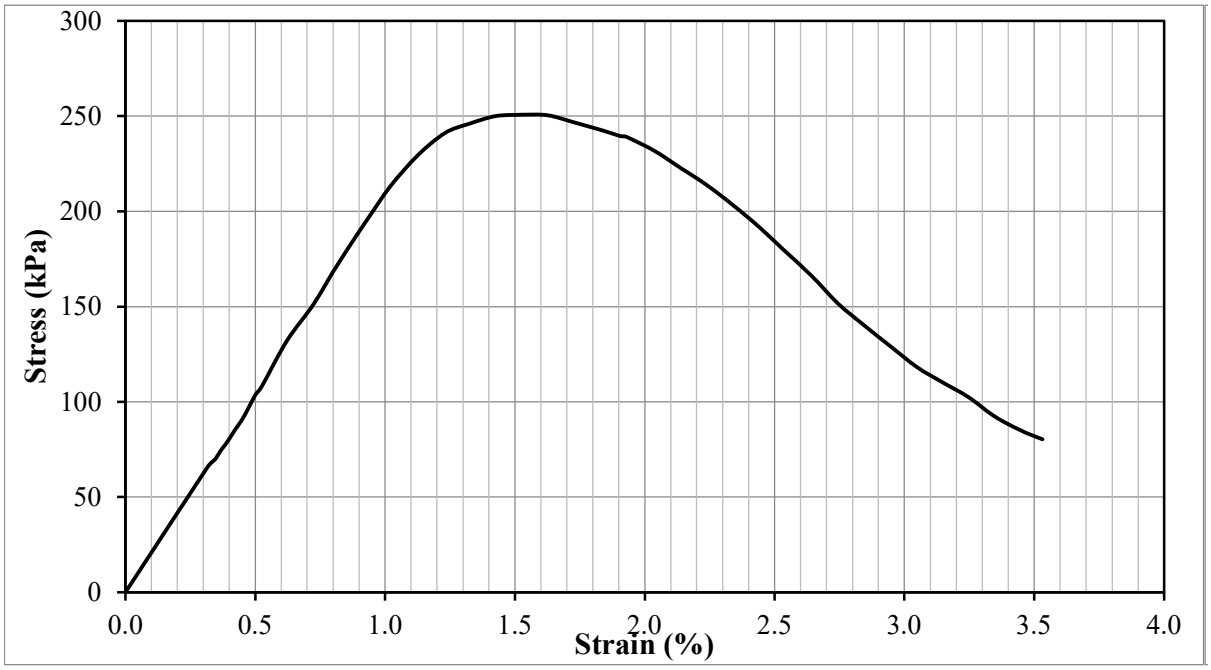
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	210	Strain at failure, εf :	0.71	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	J-13-A	Initial Area:	2100.5	mm^2
Test Date:	8/25/2022	Weight:	412.2	g
Strain Rate:	1 %/min	Unit Weight:	1932	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	50	Curing Period	1.0	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



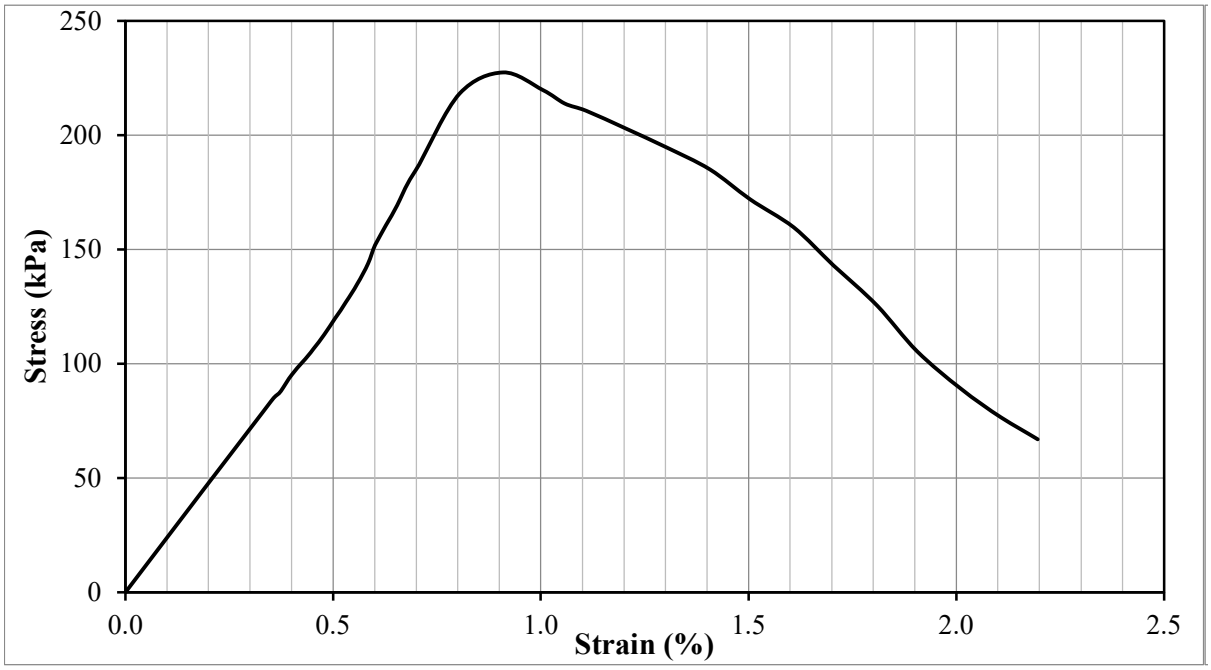
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	104	Strain at failure, εf :	1.50	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	71.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	J-13-B	Initial Area:	2096.3	mm^2
Test Date:	8/27/2022	Weight:	295.2	g
Strain Rate:	1 %/min	Unit Weight:	1965	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	50	Curing Period	3.0	days
$(w{:}c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



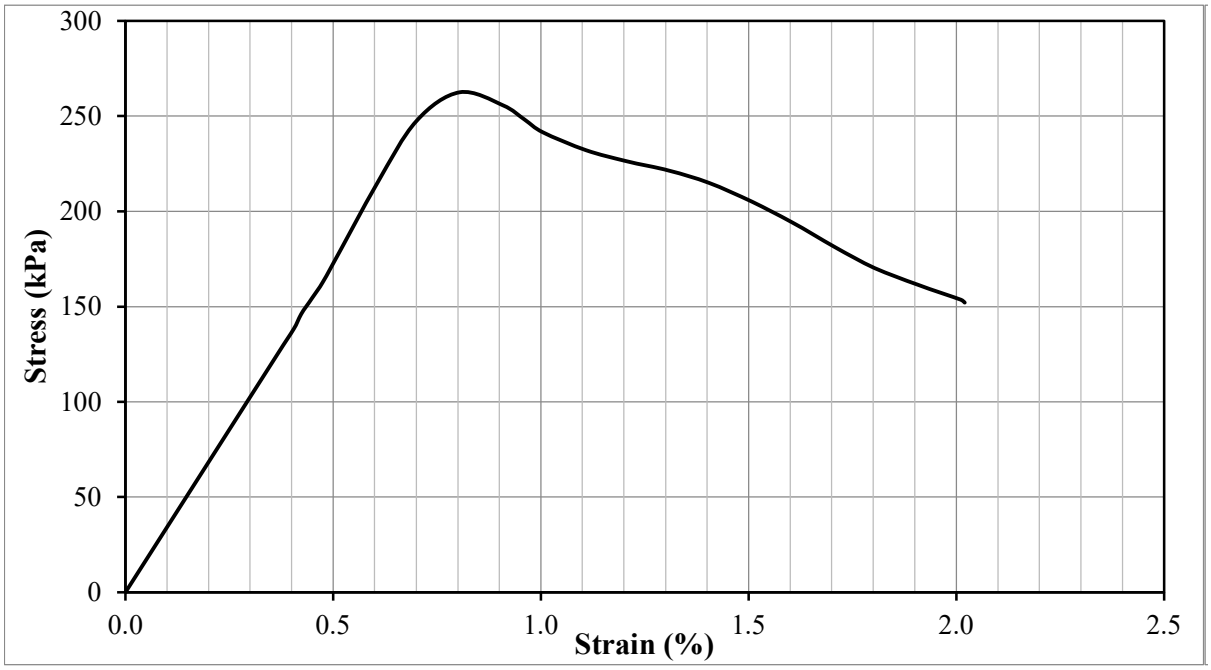
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	238	Strain at failure, εf :	1.53	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	J-13-J	Initial Area:	2106.6	mm^2
Test Date:	8/31/2022	Weight:	415.0	g
Strain Rate:	1 %/min	Unit Weight:	1939	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	50	Curing Period	6.7	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



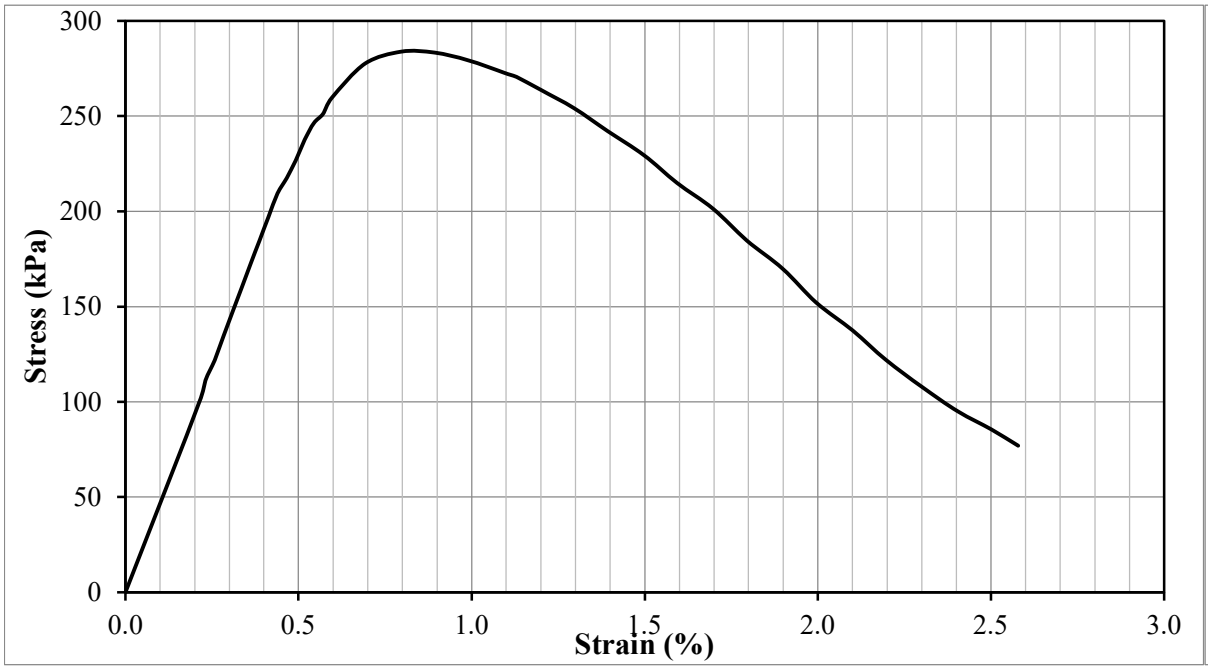
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	227	Strain at failure, εf :	0.91	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	76.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	J-13-D	Initial Area:	2108.7	mm^2
Test Date:	9/3/2022	Weight:	316.8	g
Strain Rate:	1 %/min	Unit Weight:	1967	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	50	Curing Period	9.6	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



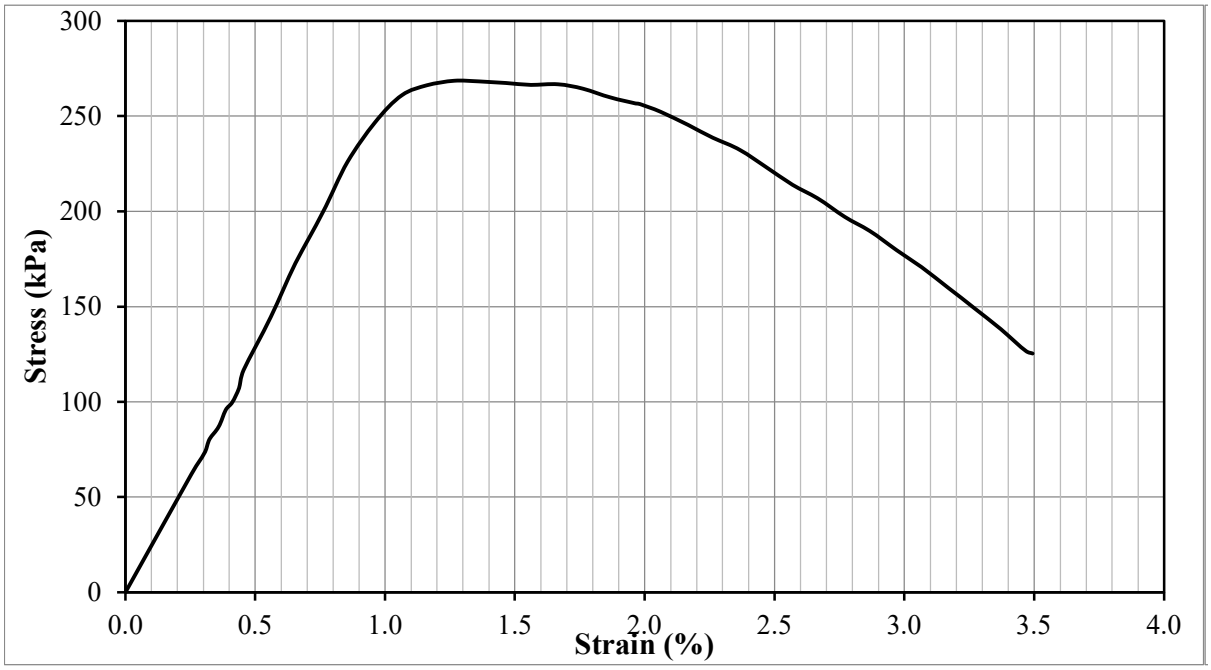
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	251	Strain at failure, εf :	0.80	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	75.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.6	mm
I.D.:	J-13-E	Initial Area:	2090.1	mm^2
Test Date:	9/7/2022	Weight:	310.0	g
Strain Rate:	1 %/min	Unit Weight:	1969	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	50	Curing Period	13.7	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



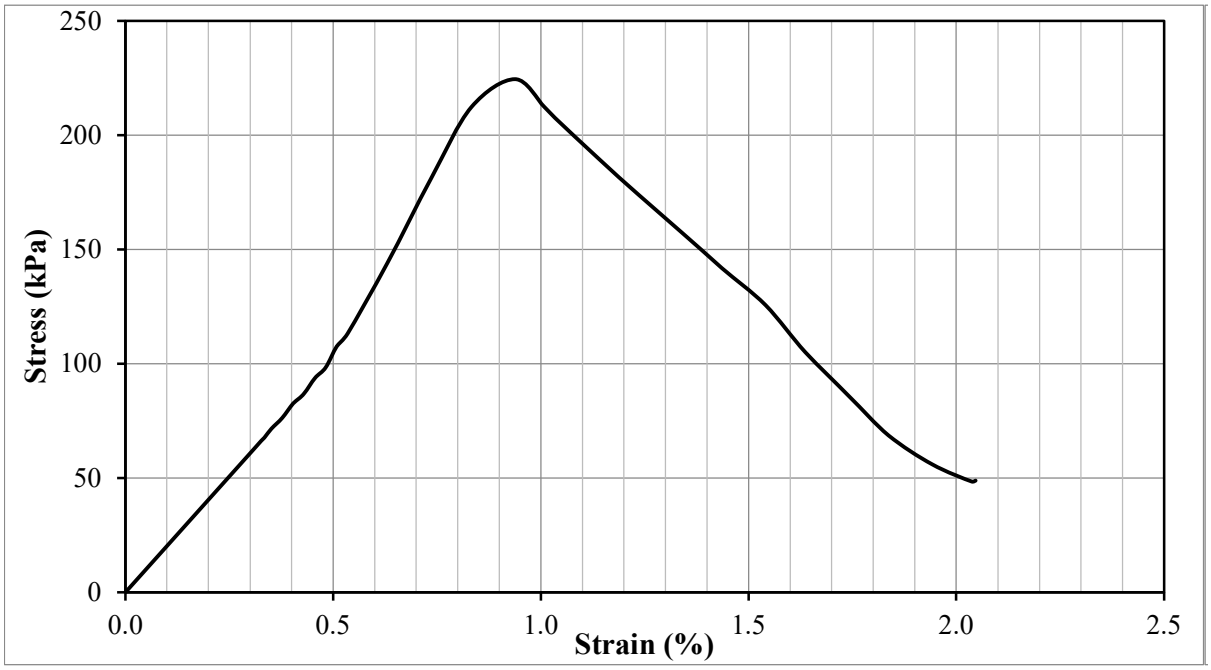
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	272	Strain at failure, εf :	0.80	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	52.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	J-13-F	Initial Area:	2098.4	mm^2
Test Date:	9/10/2022	Weight:	289.4	g
Strain Rate:	1 %/min	Unit Weight:	2614	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	50	Curing Period	16.9	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



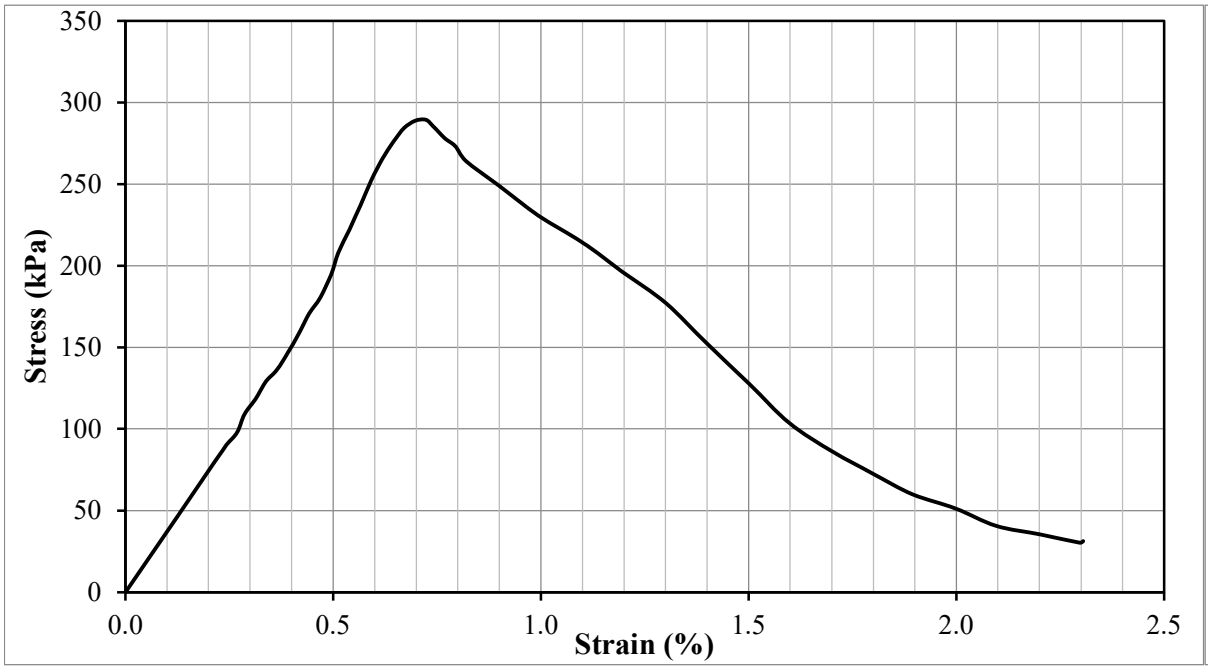
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	248	Strain at failure, εf :	1.27	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	J-13-G	Initial Area:	2104.6	mm^2
Test Date:	9/14/2022	Weight:	414.7	g
Strain Rate:	1 %/min	Unit Weight:	1935	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	50	Curing Period	20.7	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



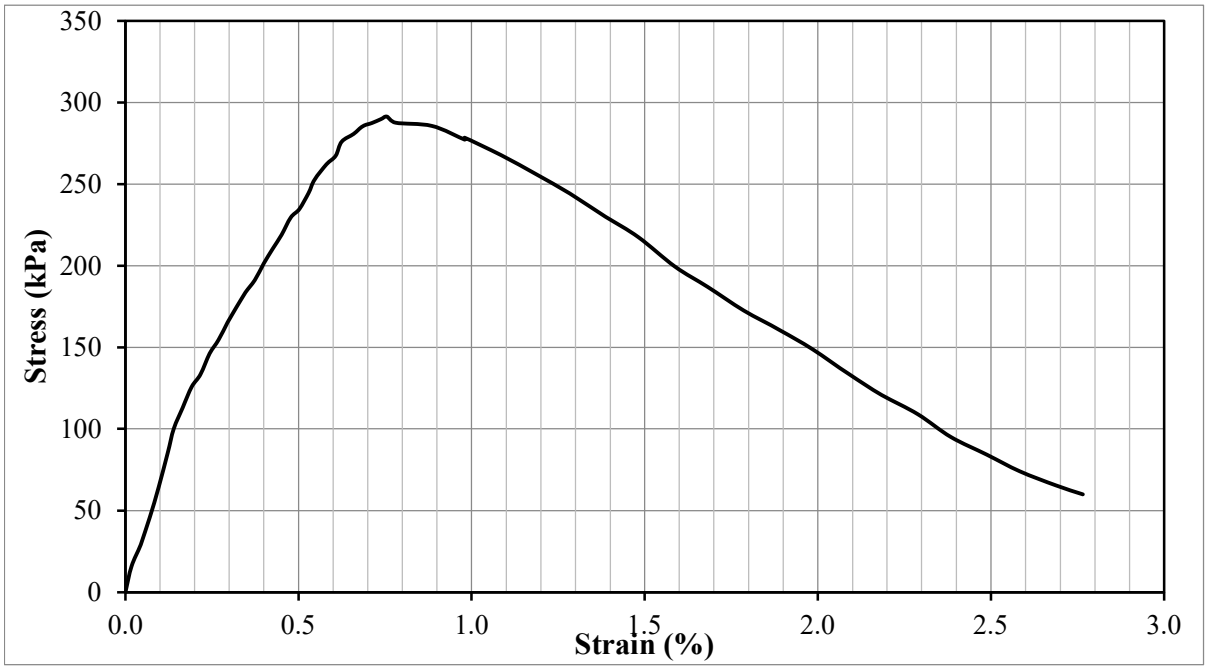
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	224	Strain at failure, εf :	0.94	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	J-13-H	Initial Area:	2100.5	mm^2
Test Date:	9/17/2022	Weight:	417.0	g
Strain Rate:	1 %/min	Unit Weight:	1954	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	50	Curing Period	24.0	days
$(w{:}c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



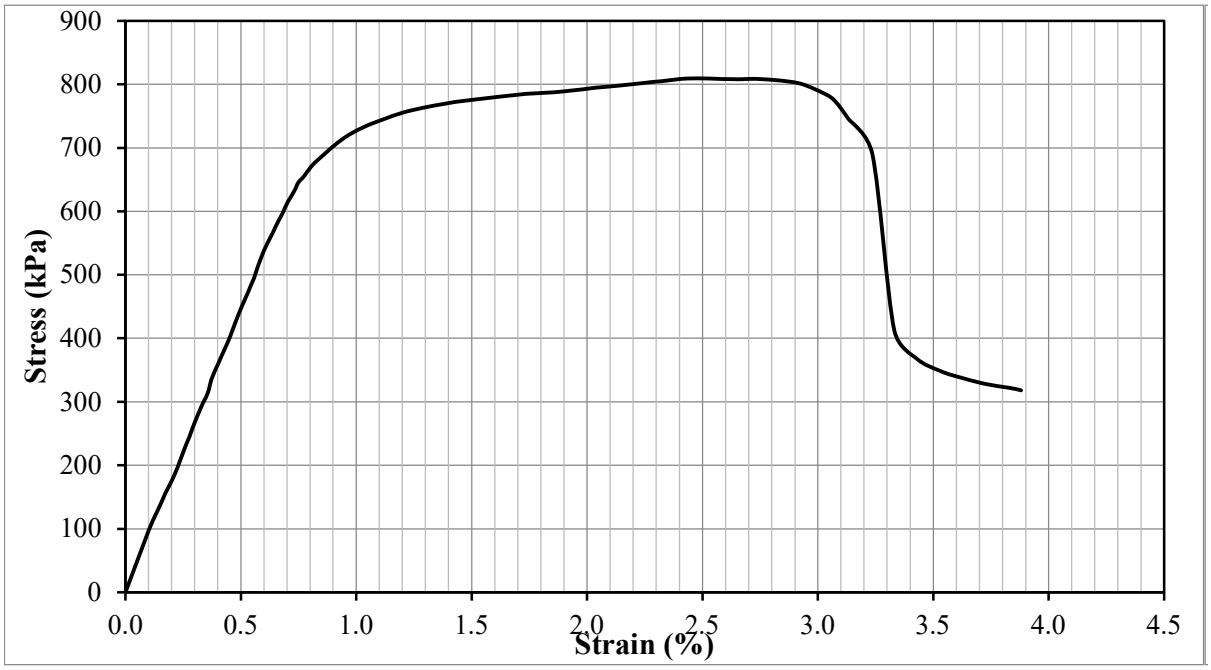
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	288	Strain at failure, εf :	0.72	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	74.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	J-13-I	Initial Area:	2106.6	mm^2
Test Date:	9/21/2022	Weight:	304.2	g
Strain Rate:	1 %/min	Unit Weight:	1950	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	50	Curing Period	27.7	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Organic content of base soil (%)		2.97		



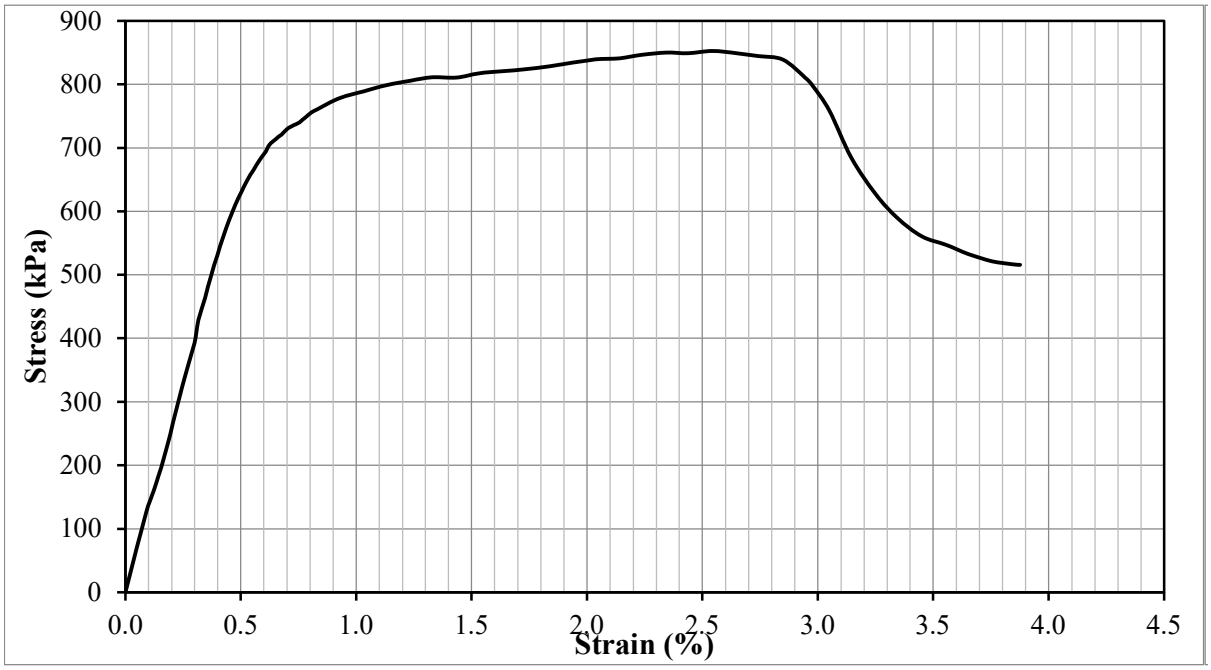
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	278	Strain at failure, εf :	0.76	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	B-1-A	Initial Area:	2110.8	mm^2
Test Date:	8/3/2022	Weight:	352.2	g
Strain Rate:	1 %/min	Unit Weight:	1656	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	2.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



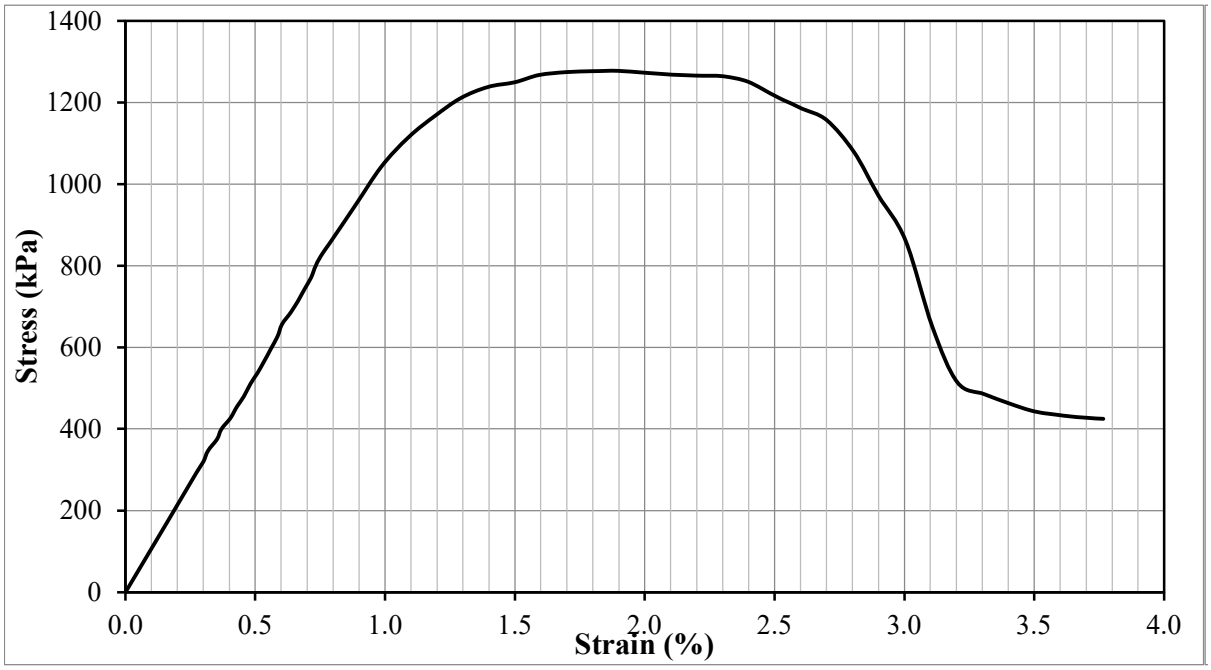
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	805	Strain at failure, εf :	2.43	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	B-1-H	Initial Area:	2112.9	mm^2
Test Date:	8/3/2022	Weight:	349.7	g
Strain Rate:	1 %/min	Unit Weight:	1662	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	2.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



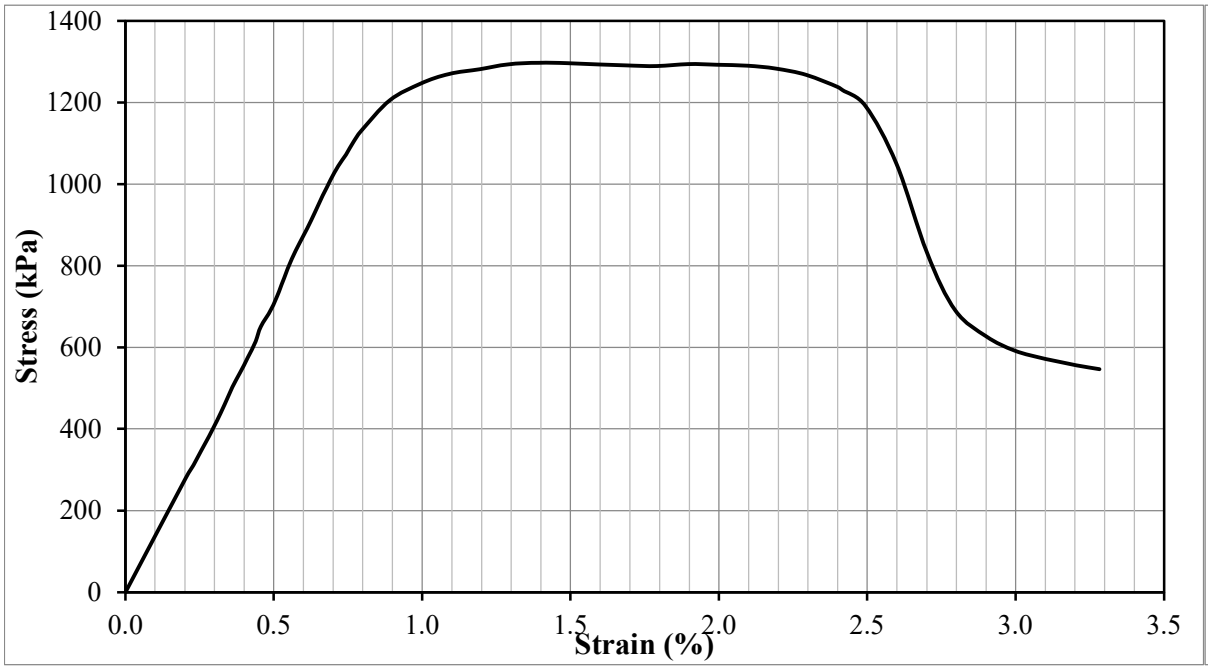
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	847	Strain at failure, εf :	2.54	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	B-1-B	Initial Area:	2114.9	mm^2
Test Date:	8/7/2022	Weight:	353.0	g
Strain Rate:	1 %/min	Unit Weight:	1659	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	6.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



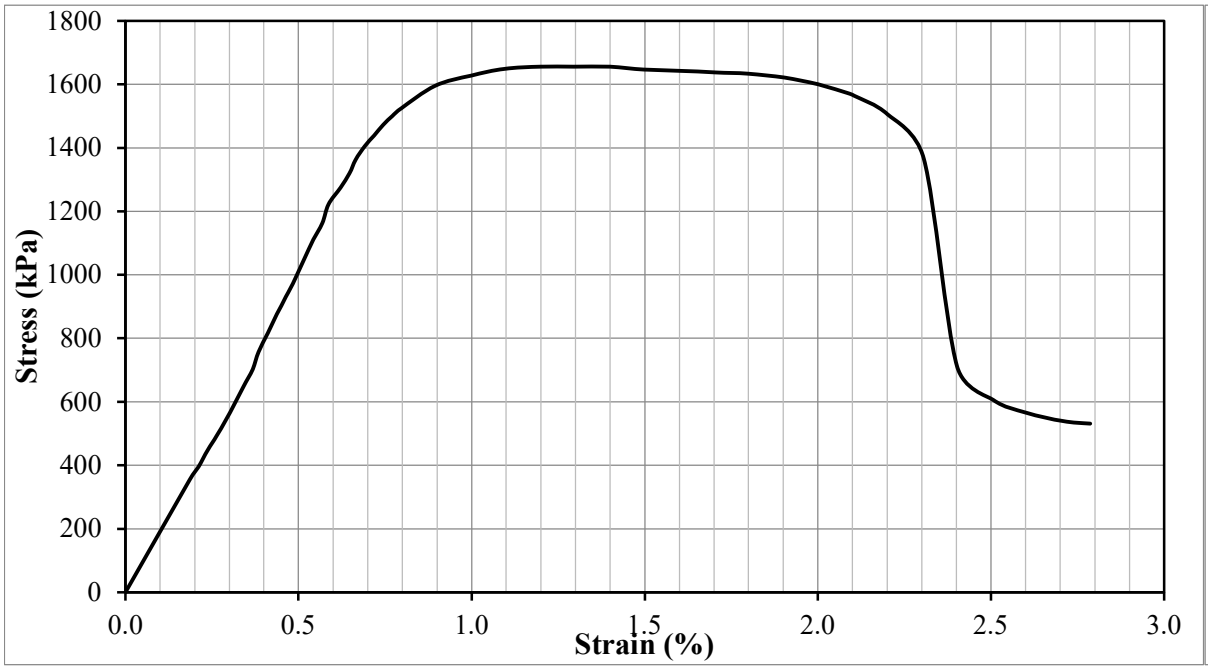
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,271	Strain at failure, εf :	1.90	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	B-1-G	Initial Area:	2114.9	mm^2
Test Date:	8/7/2022	Weight:	354.9	g
Strain Rate:	1 %/min	Unit Weight:	1663	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	6.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



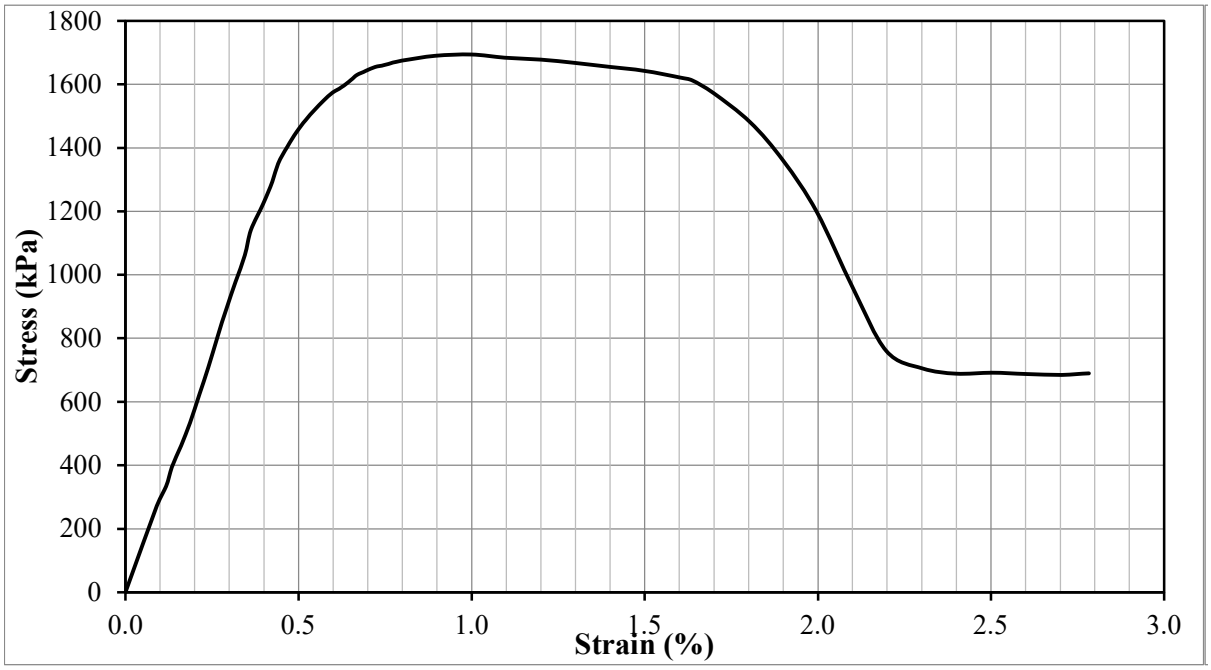
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,291	Strain at failure, εf :	1.39	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	B-1-C	Initial Area:	2110.8	mm^2
Test Date:	8/14/2022	Weight:	350.7	g
Strain Rate:	1 %/min	Unit Weight:	1661	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	13.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



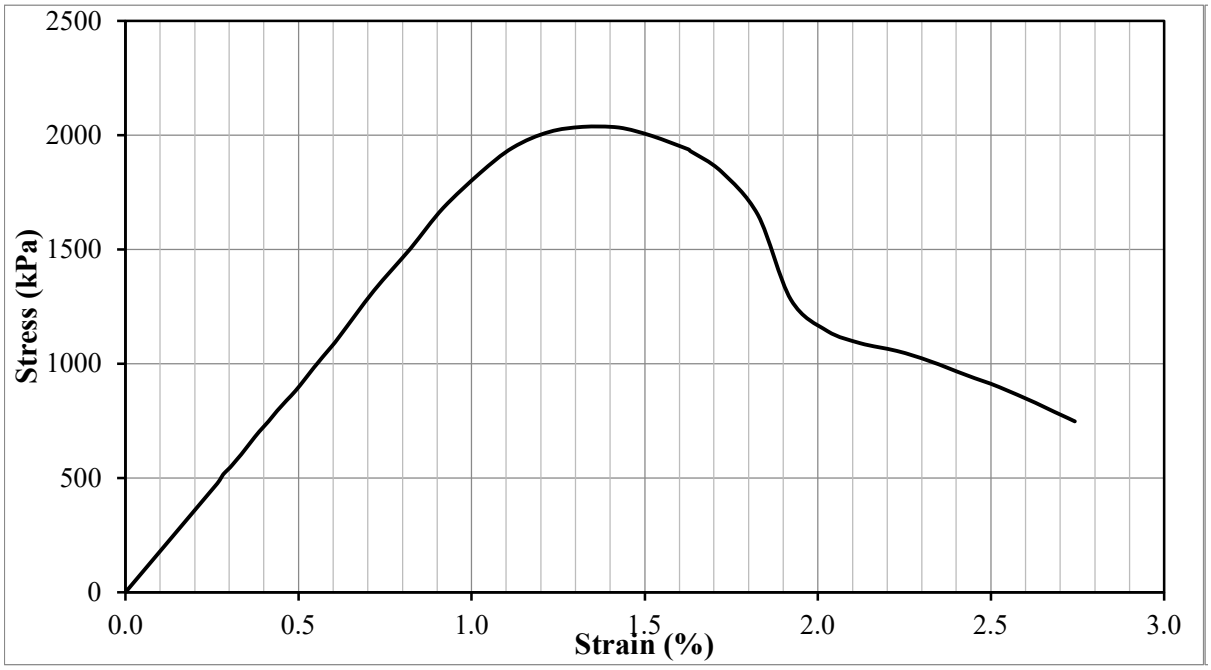
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,646	Strain at failure, εf :	1.20	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	B-1-F	Initial Area:	2123.2	mm^2
Test Date:	8/14/2022	Weight:	351.5	g
Strain Rate:	1 %/min	Unit Weight:	1656	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	14.0	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



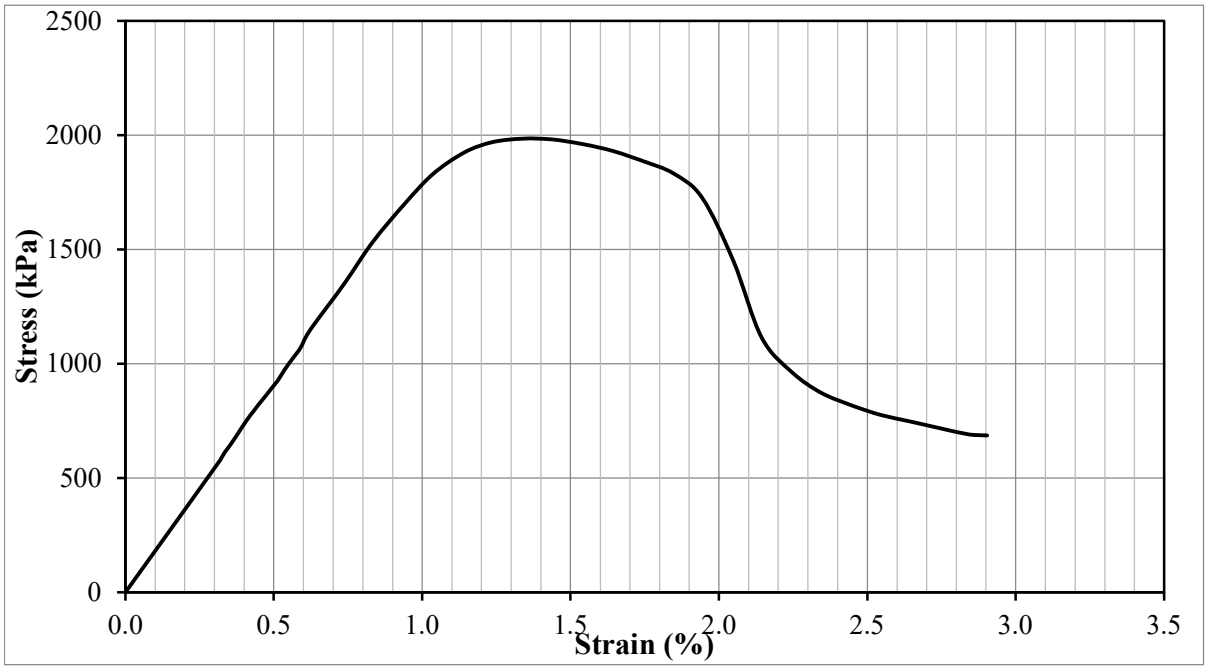
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,683	Strain at failure, εf :	1.00	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.5	mm
I.D.:	B-1-D	Initial Area:	2086.0	mm^2
Test Date:	8/28/2022	Weight:	354.0	g
Strain Rate:	1 %/min	Unit Weight:	1689	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	28.0	days
$(w{:}c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



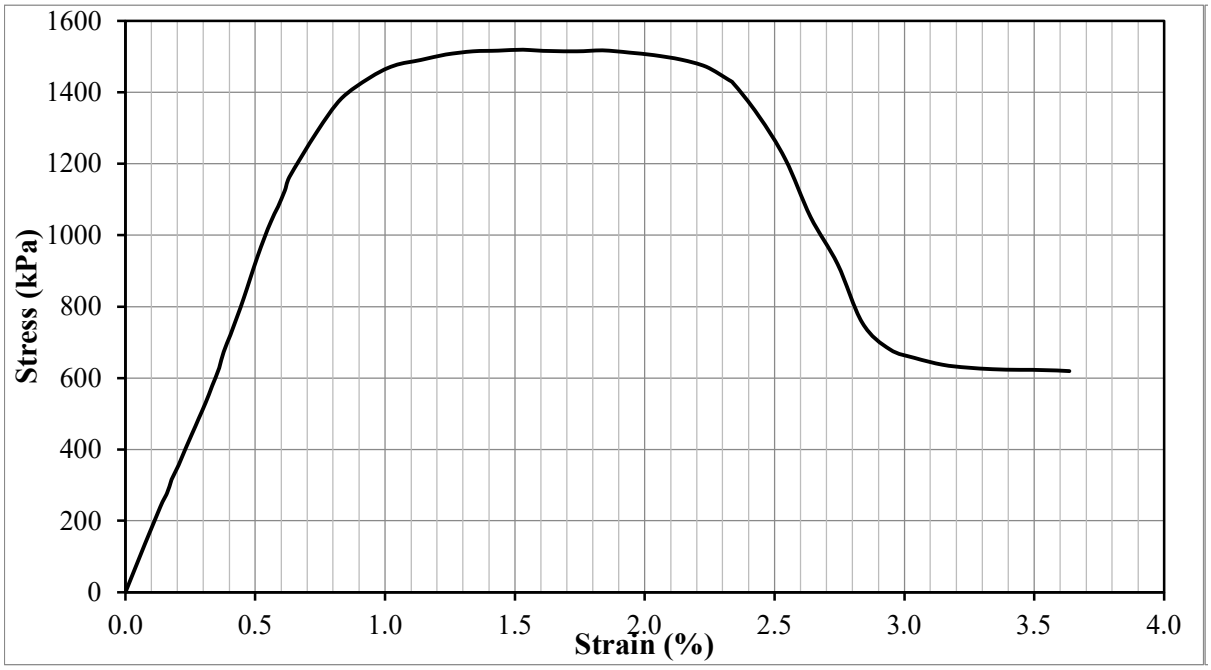
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,027	Strain at failure, εf :	1.32	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	B-1-E	Initial Area:	2112.9	mm^2
Test Date:	8/28/2022	Weight:	354.3	g
Strain Rate:	1 %/min	Unit Weight:	1669	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	28.0	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



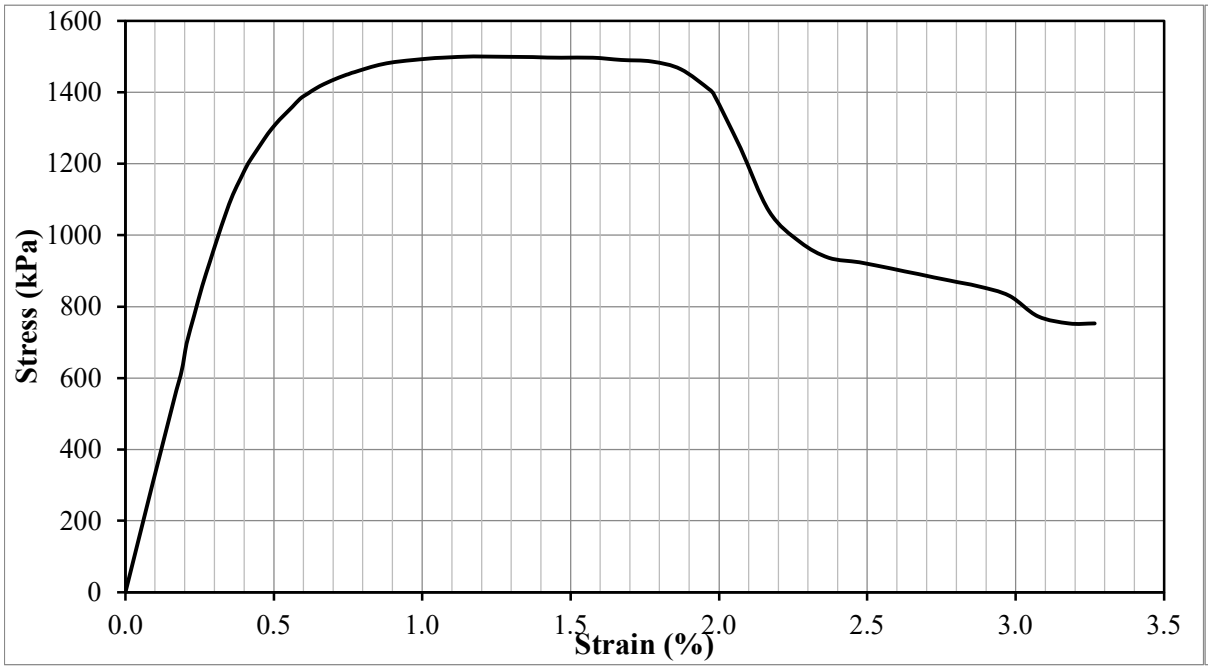
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,974	Strain at failure, εf :	1.34	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	B-2-A	Initial Area:	2110.8	mm^2
Test Date:	8/3/2022	Weight:	354.4	g
Strain Rate:	1 %/min	Unit Weight:	1670	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	2.9	days
$(w{:}c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



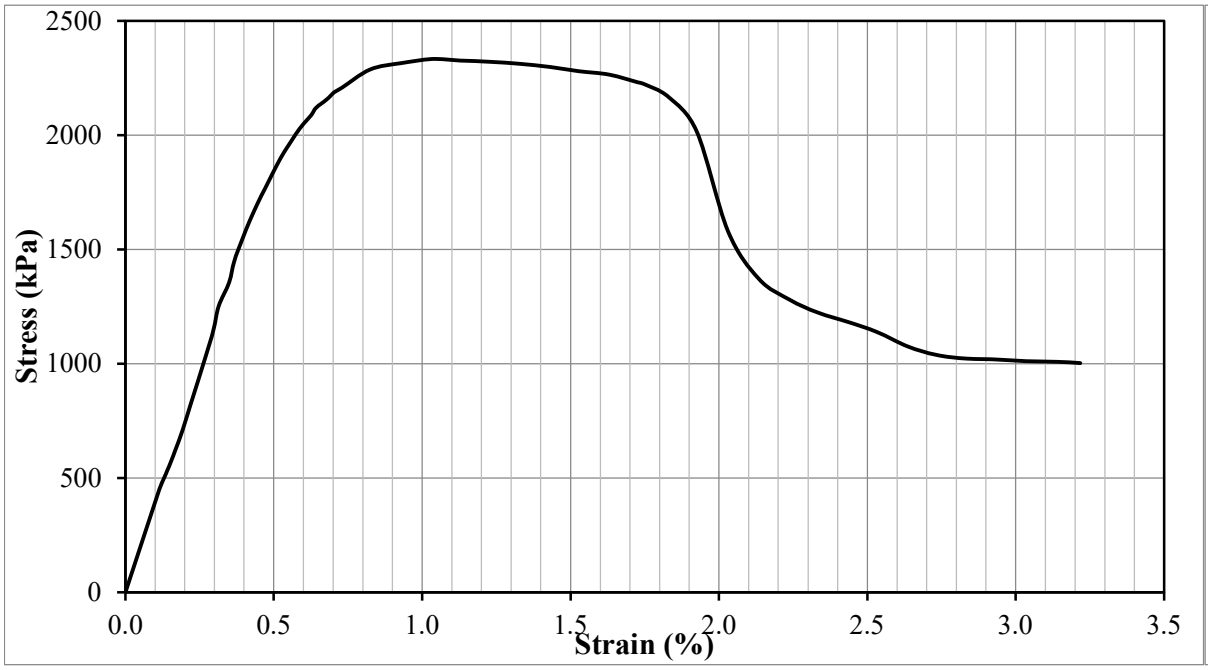
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,511	Strain at failure, εf :	1.53	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	B-2-H	Initial Area:	2112.9	mm^2
Test Date:	8/3/2022	Weight:	353.4	g
Strain Rate:	1 %/min	Unit Weight:	1667	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	2.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



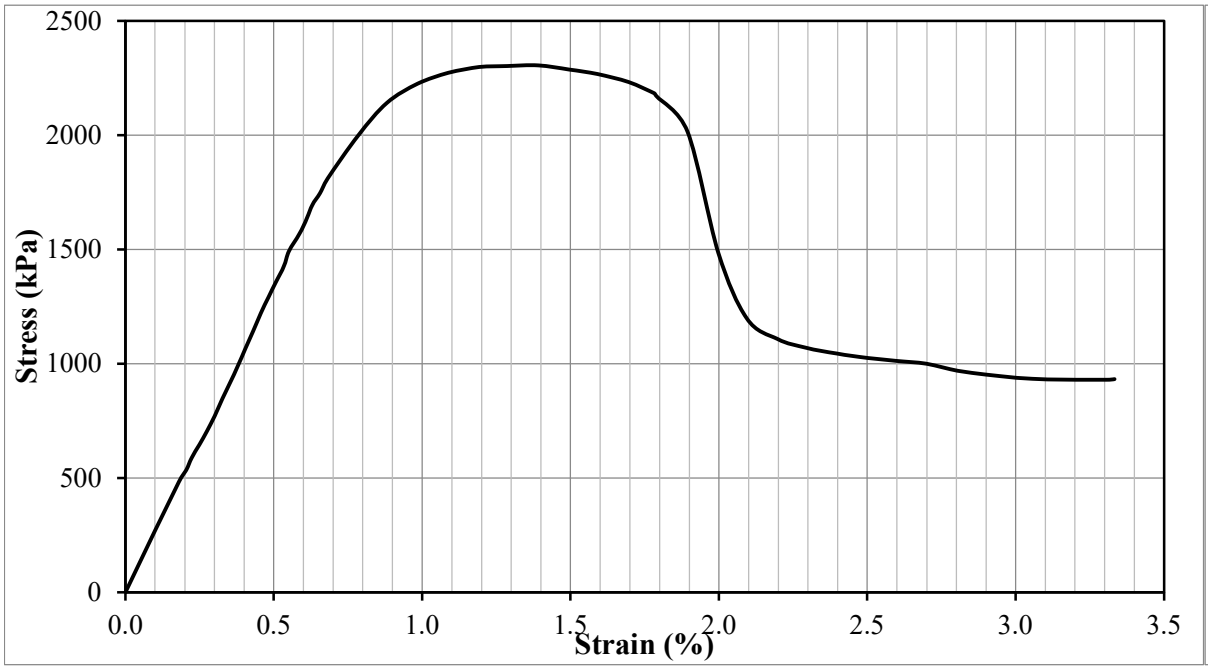
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,492	Strain at failure, εf :	1.17	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	B-2-B	Initial Area:	2104.6	mm^2
Test Date:	8/7/2022	Weight:	354.5	g
Strain Rate:	1 %/min	Unit Weight:	1677	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	6.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



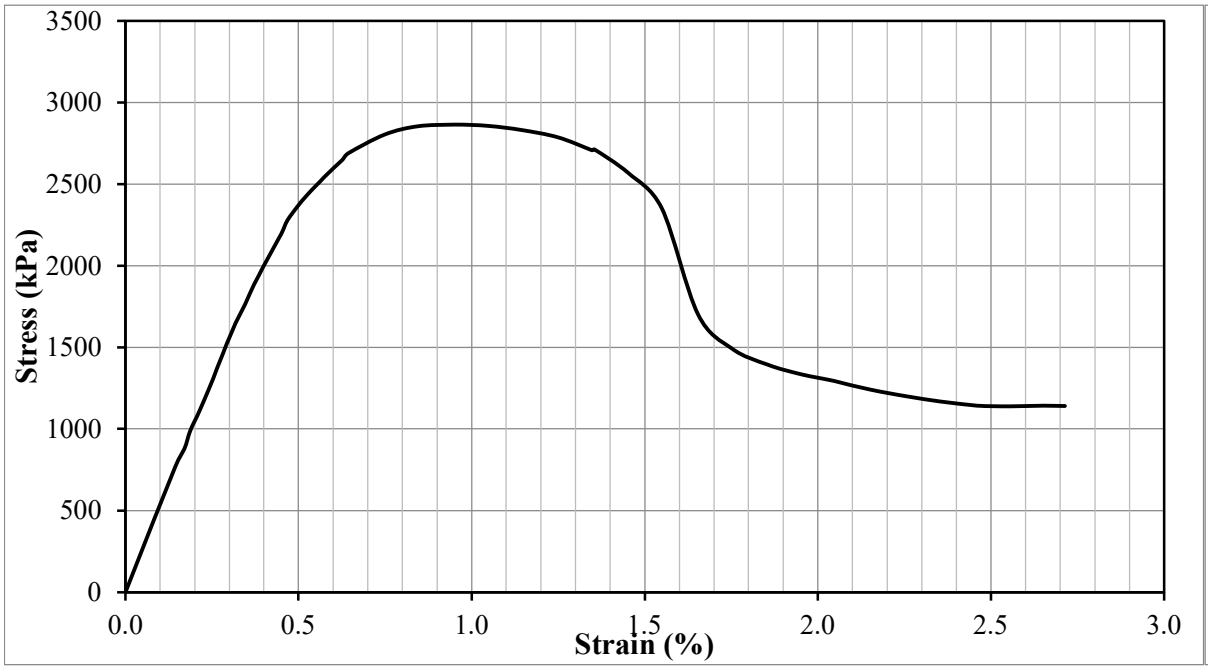
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,321	Strain at failure, εf :	1.03	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	B-2-G	Initial Area:	2114.9	mm^2
Test Date:	8/7/2022	Weight:	355.2	g
Strain Rate:	1 %/min	Unit Weight:	1673	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	6.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



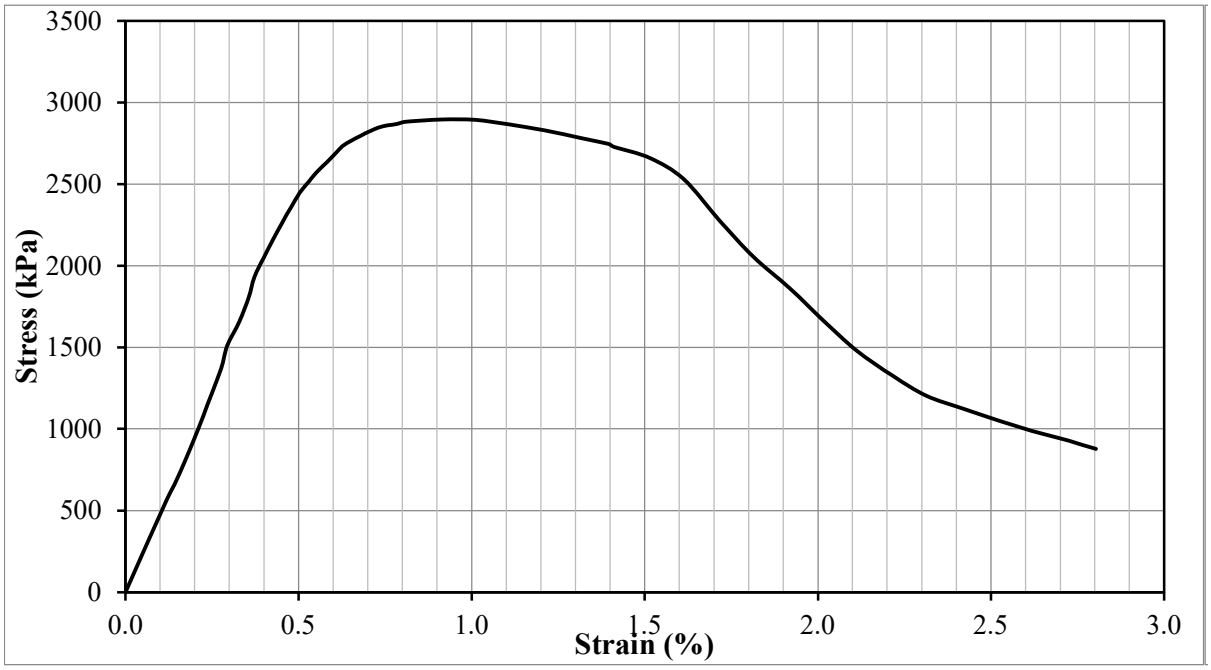
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,293	Strain at failure, εf :	1.39	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	B-2-C	Initial Area:	2123.2	mm^2
Test Date:	8/14/2022	Weight:	351.4	g
Strain Rate:	1 %/min	Unit Weight:	1663	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	13.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



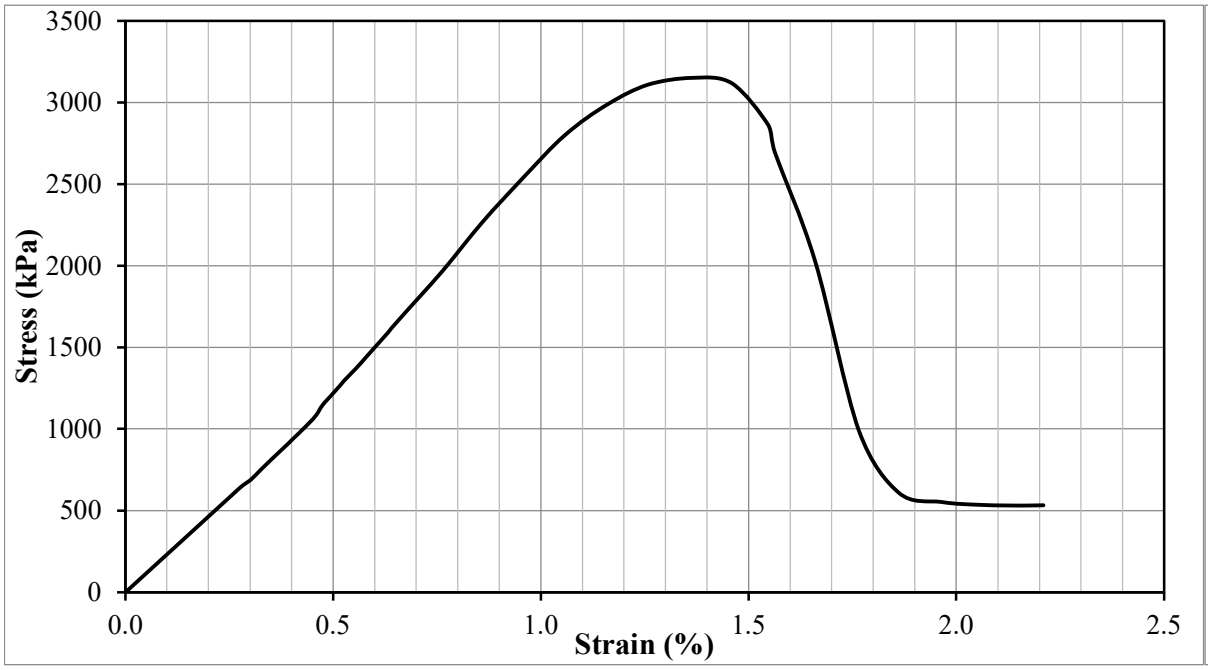
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,844	Strain at failure, εf :	0.95	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	B-2-F	Initial Area:	2119.1	mm^2
Test Date:	8/14/2022	Weight:	353.4	g
Strain Rate:	1 %/min	Unit Weight:	1669	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	13.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



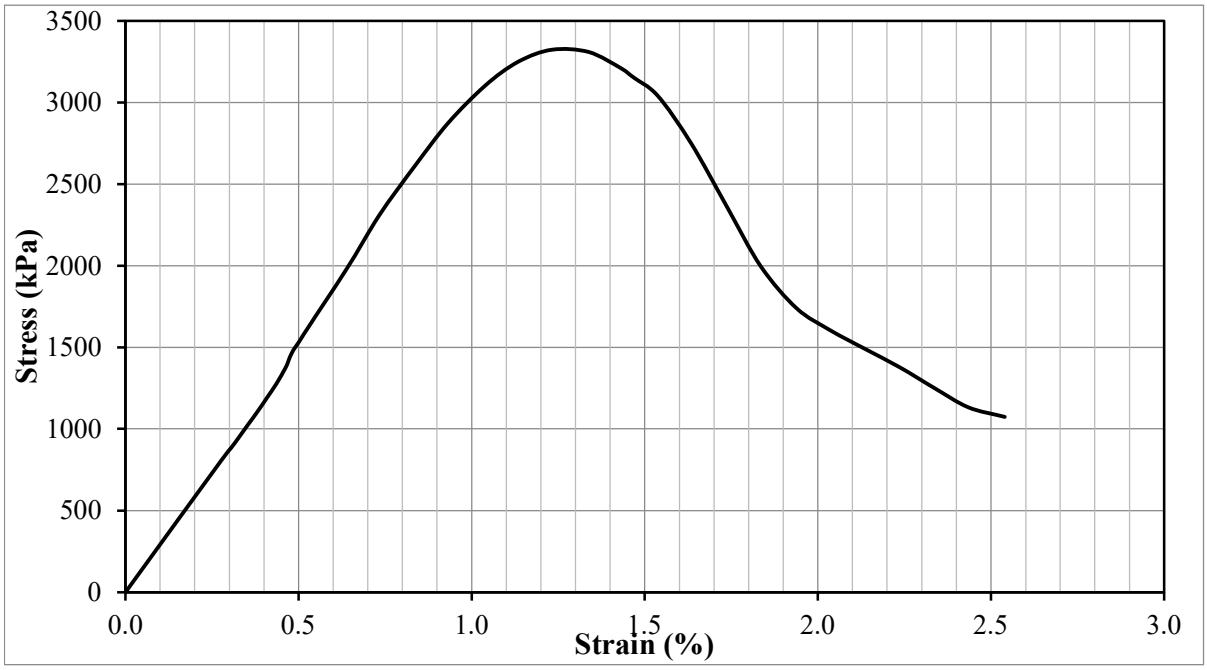
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,878	Strain at failure, εf :	0.91	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	B-2-D	Initial Area:	2110.8	mm^2
Test Date:	8/28/2022	Weight:	355.1	g
Strain Rate:	1 %/min	Unit Weight:	1680	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	27.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



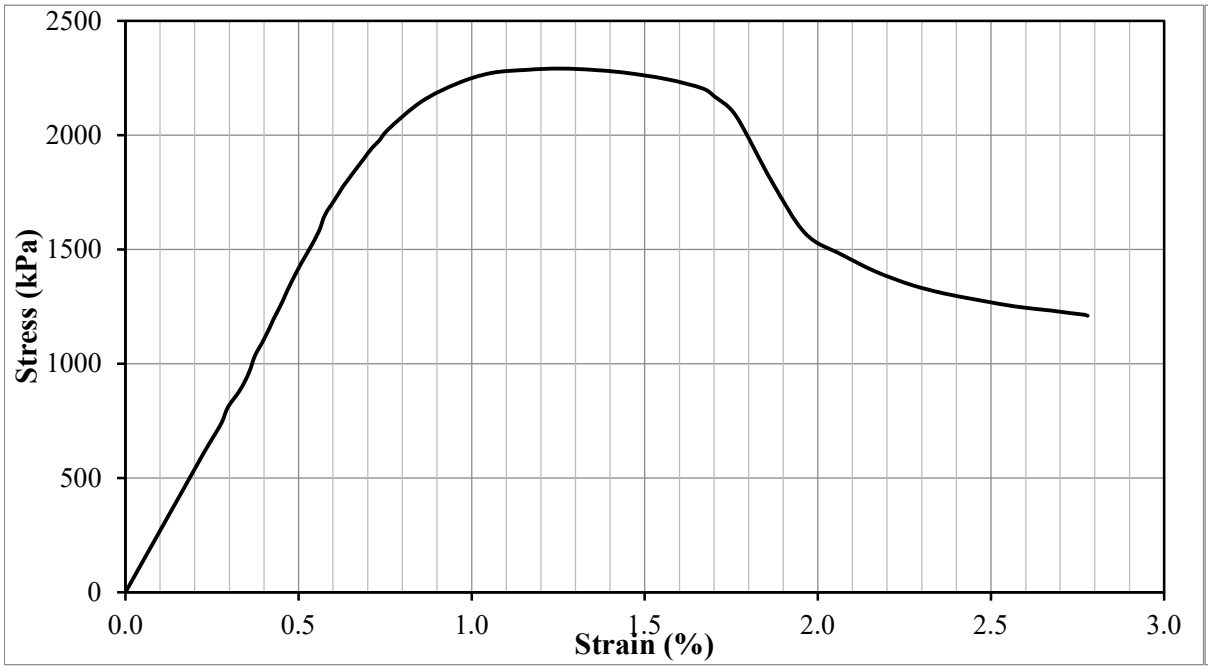
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,133	Strain at failure, εf :	1.36	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	B-2-E	Initial Area:	2110.8	mm^2
Test Date:	8/28/2022	Weight:	354.1	g
Strain Rate:	1 %/min	Unit Weight:	1675	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	28.0	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



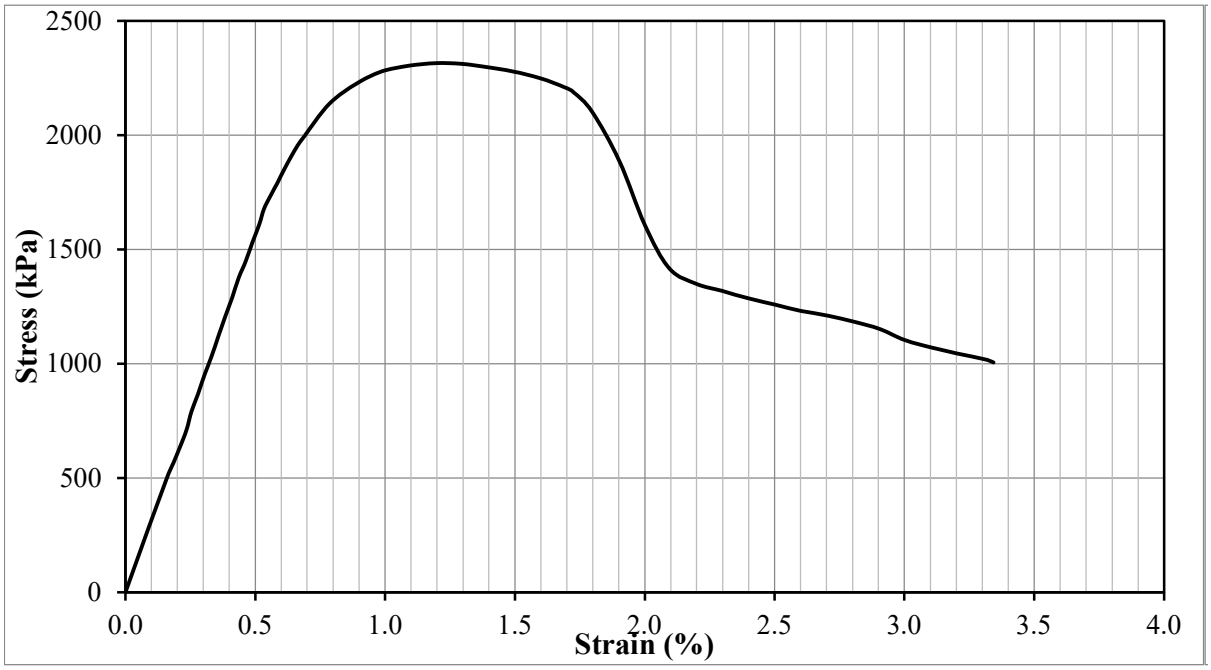
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,304	Strain at failure, εf :	1.23	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	B-3-A	Initial Area:	2106.6	mm^2
Test Date:	8/3/2022	Weight:	356.6	g
Strain Rate:	1 %/min	Unit Weight:	1684	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	2.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



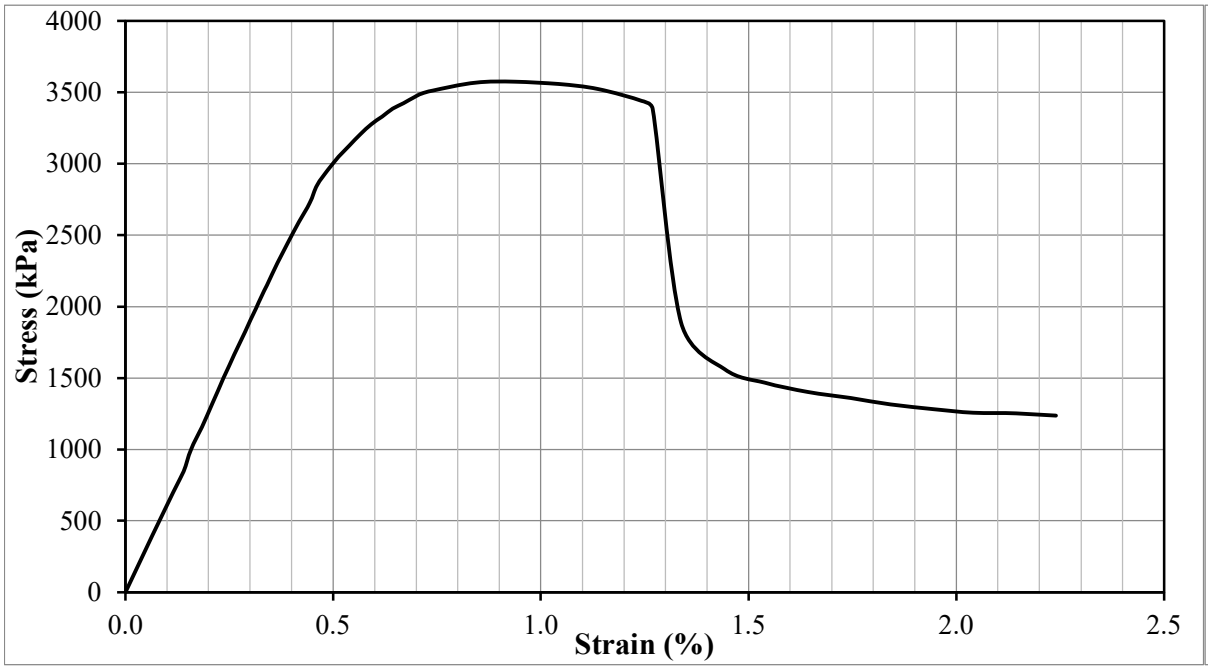
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,280	Strain at failure, εf :	1.26	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	B-3-H	Initial Area:	2110.8	mm^2
Test Date:	8/3/2022	Weight:	356.8	g
Strain Rate:	1 %/min	Unit Weight:	1679	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	2.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



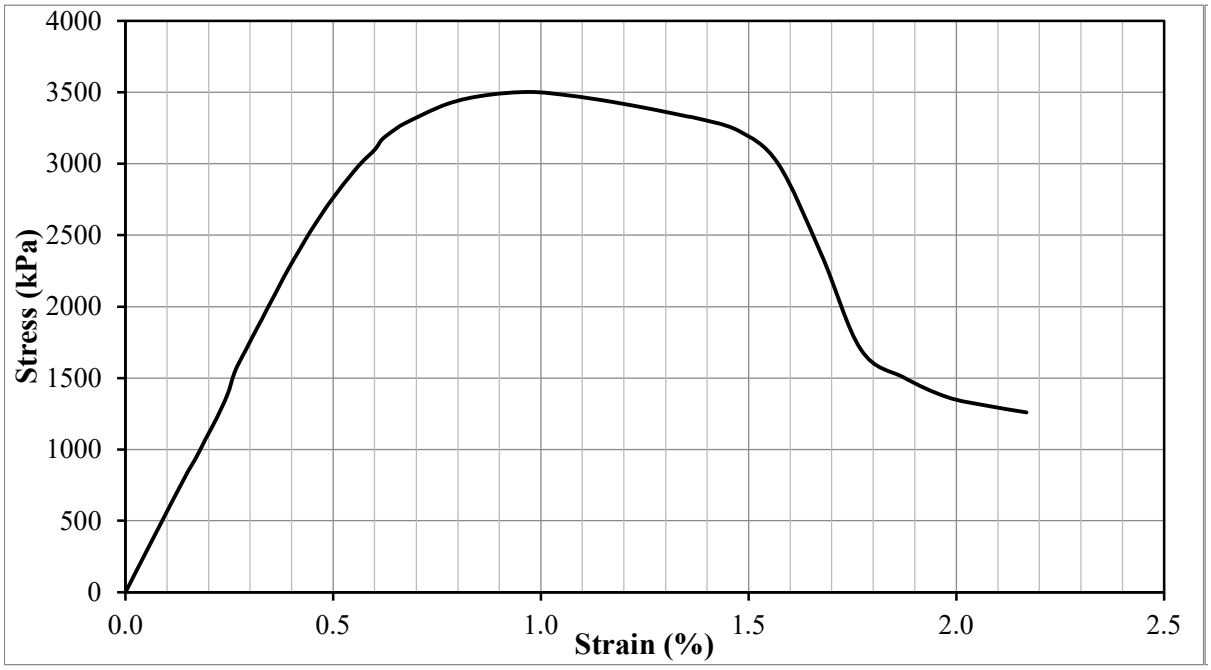
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,304	Strain at failure, εf :	1.20	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	B-3-B	Initial Area:	2123.2	mm^2
Test Date:	8/7/2022	Weight:	357.3	g
Strain Rate:	1 %/min	Unit Weight:	1676	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	6.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



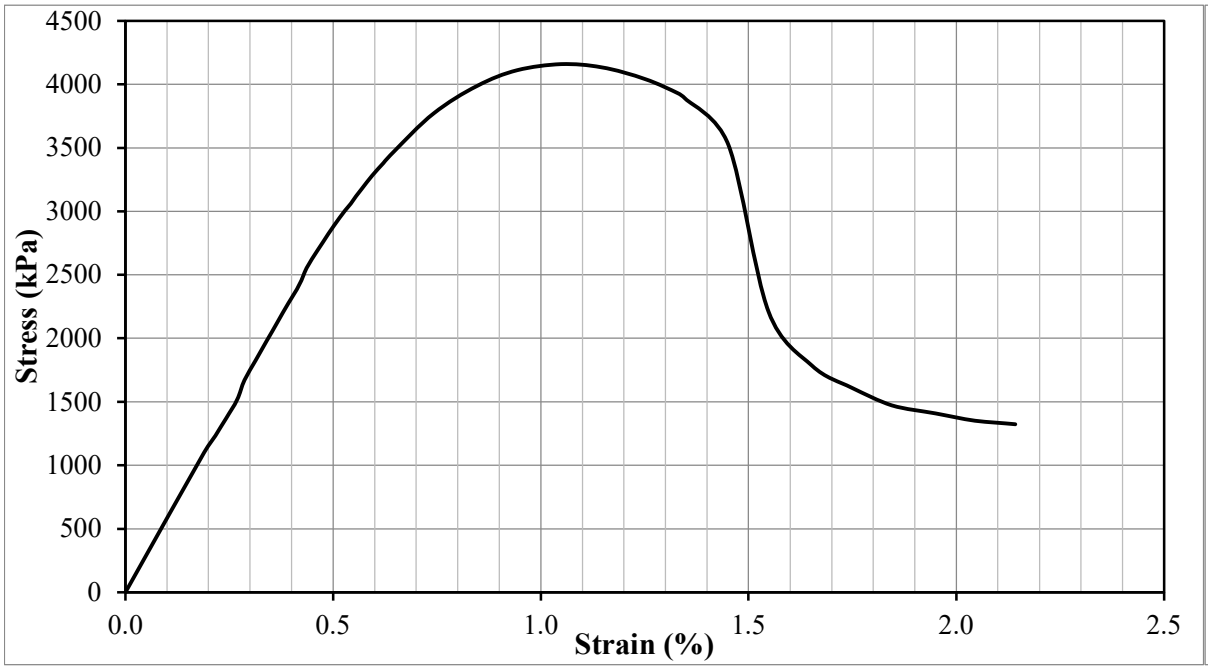
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,554	Strain at failure, εf :	0.94	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	B-3-G	Initial Area:	2114.9	mm^2
Test Date:	8/7/2022	Weight:	357.1	g
Strain Rate:	1 %/min	Unit Weight:	1681	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	6.9	days
$(w{:}c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



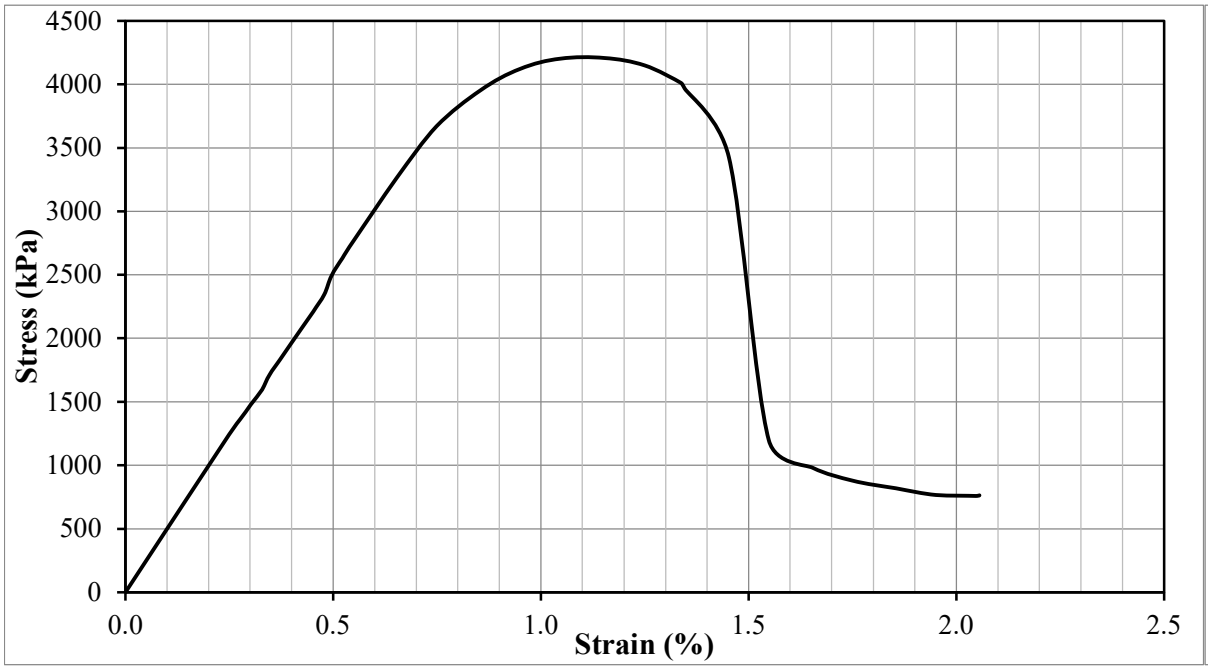
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,483	Strain at failure, εf :	0.97	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	B-3-C	Initial Area:	2121.1	mm^2
Test Date:	8/14/2022	Weight:	355.8	g
Strain Rate:	1 %/min	Unit Weight:	1675	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	13.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



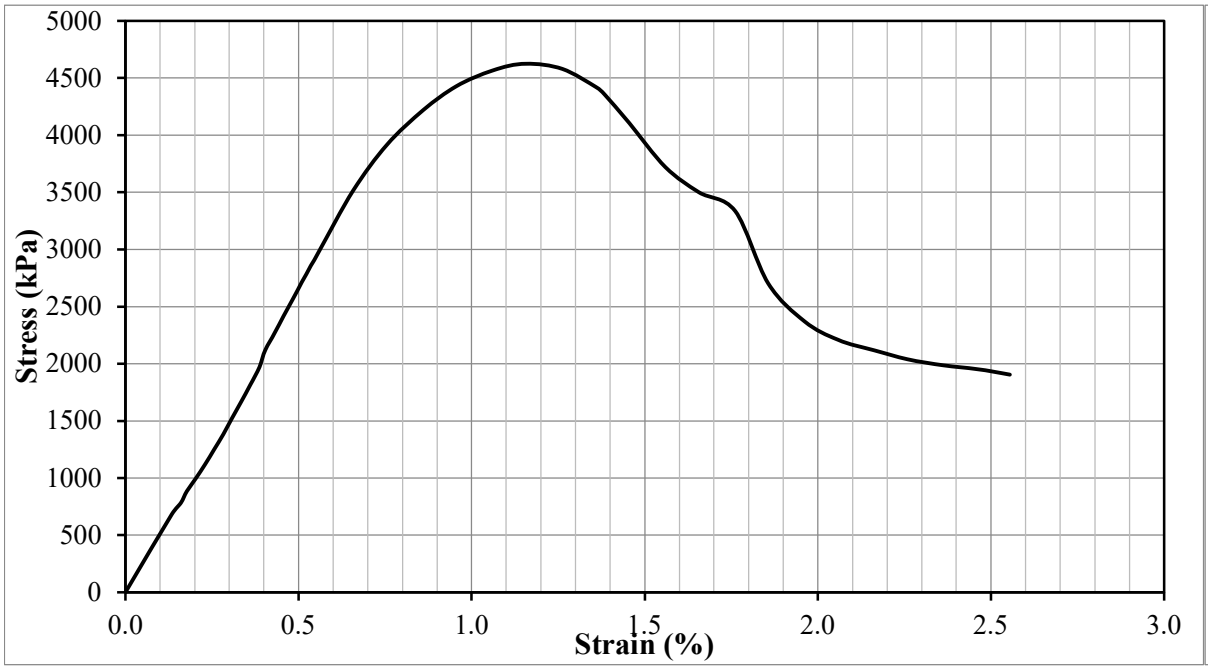
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,134	Strain at failure, εf :	1.05	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	B-3-F	Initial Area:	2108.7	mm^2
Test Date:	8/14/2022	Weight:	357.7	g
Strain Rate:	1 %/min	Unit Weight:	1687	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	13.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



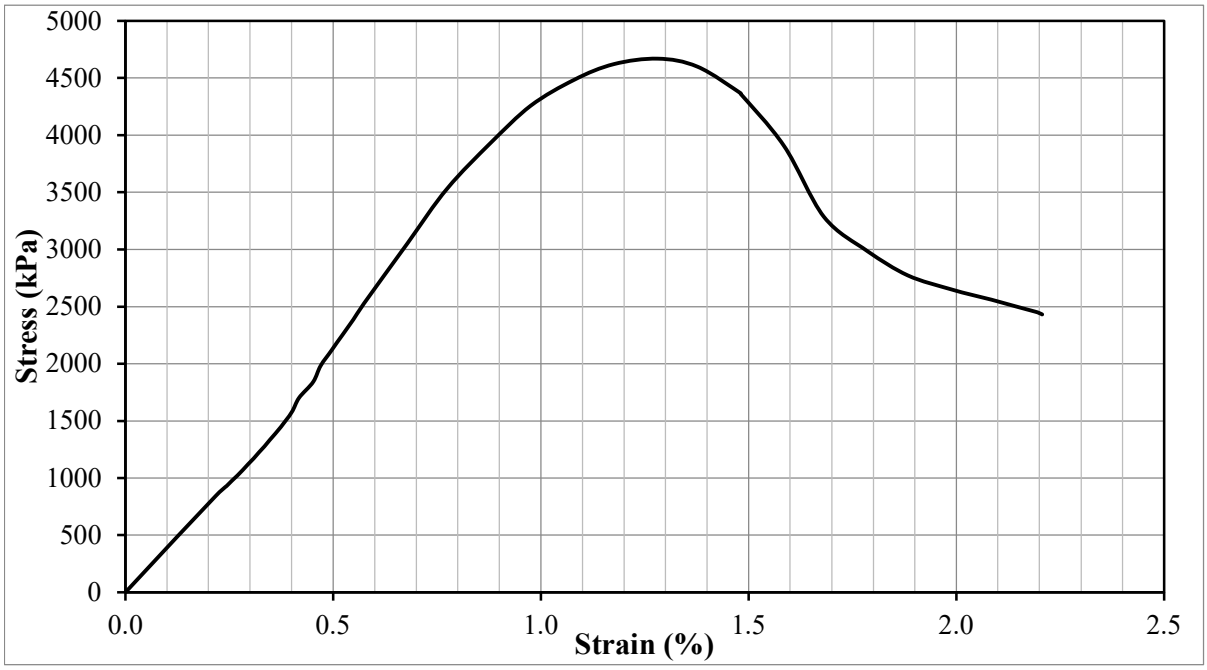
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,187	Strain at failure, εf :	1.15	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	B-3-D	Initial Area:	2121.1	mm^2
Test Date:	8/28/2022	Weight:	357.2	g
Strain Rate:	1 %/min	Unit Weight:	1678	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	27.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



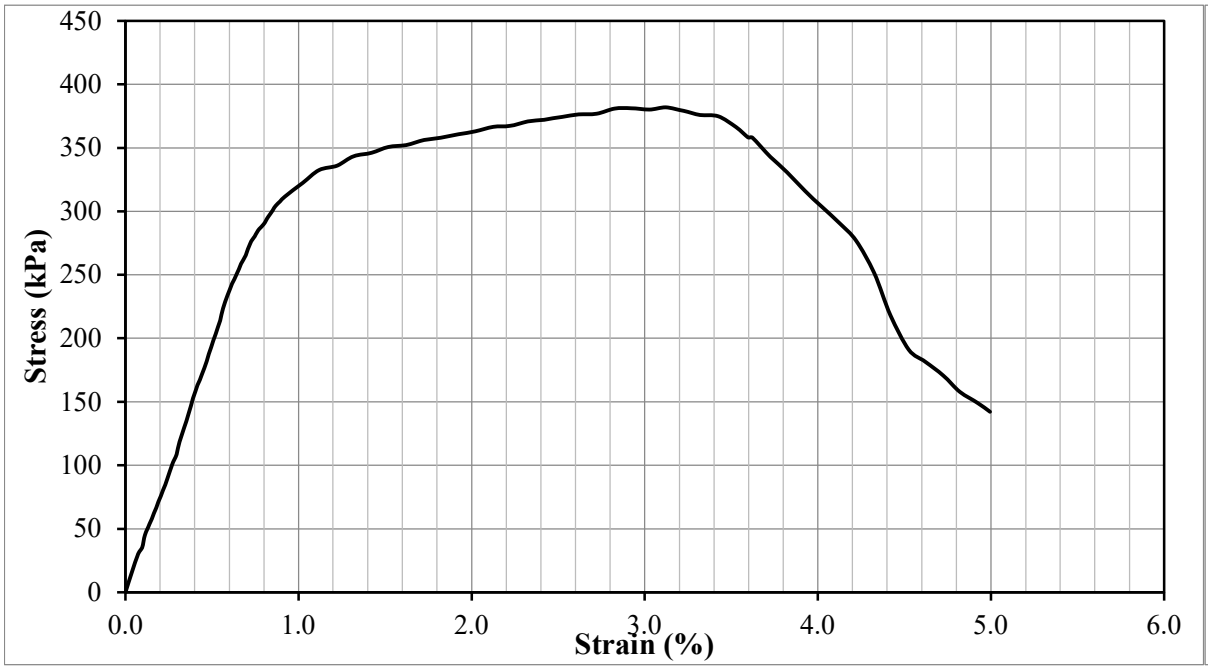
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,600	Strain at failure, εf :	1.16	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	B-3-I	Initial Area:	2117.0	mm^2
Test Date:	8/28/2022	Weight:	359.2	g
Strain Rate:	1 %/min	Unit Weight:	1686	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	27.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



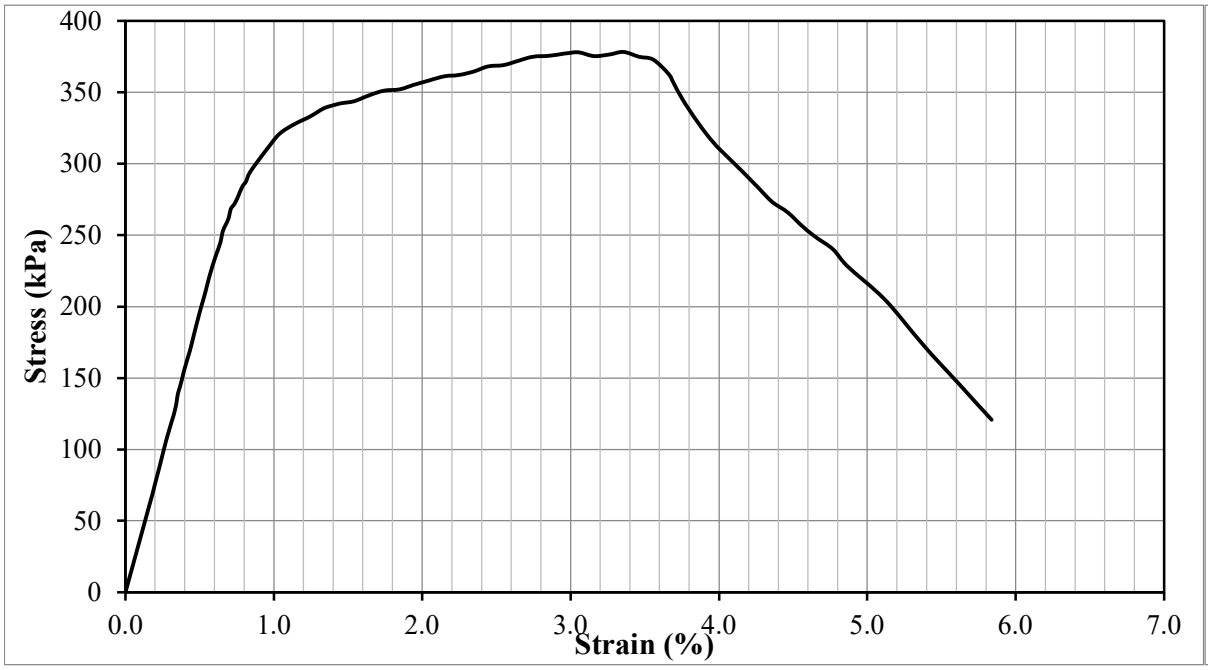
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	4,646	Strain at failure, εf :	1.28	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	B-4-A	Initial Area:	2102.5	mm^2
Test Date:	8/4/2022	Weight:	337.4	g
Strain Rate:	1 %/min	Unit Weight:	1616	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	3.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



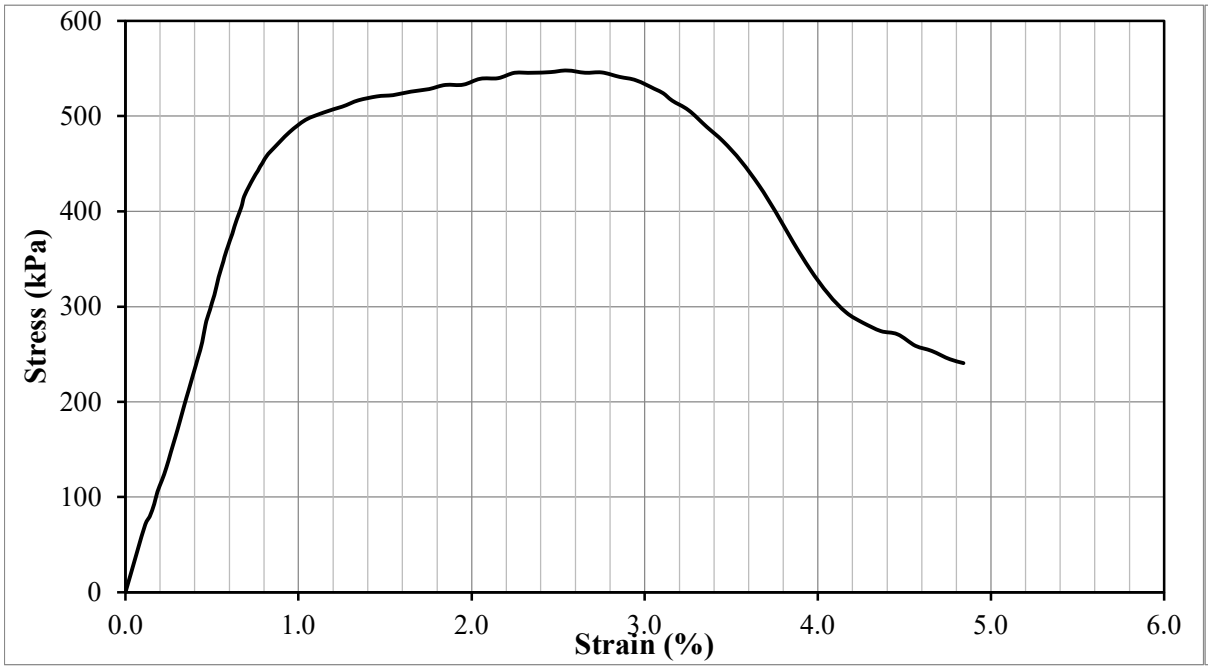
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	379	Strain at failure, εf :	3.12	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	B-4-H	Initial Area:	2112.9	mm^2
Test Date:	8/4/2022	Weight:	342.5	g
Strain Rate:	1 %/min	Unit Weight:	1617	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	3.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



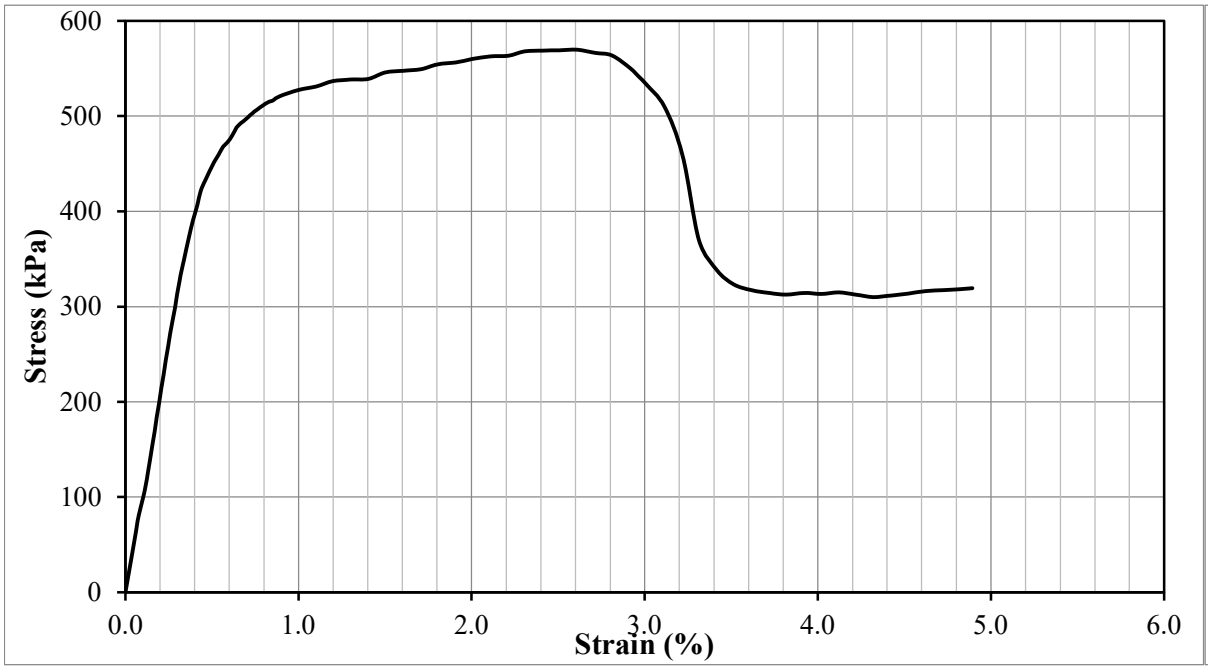
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	376	Strain at failure, εf :	3.36	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	B-4-B	Initial Area:	2114.9	mm^2
Test Date:	8/8/2022	Weight:	343.2	g
Strain Rate:	1 %/min	Unit Weight:	1619	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	7.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



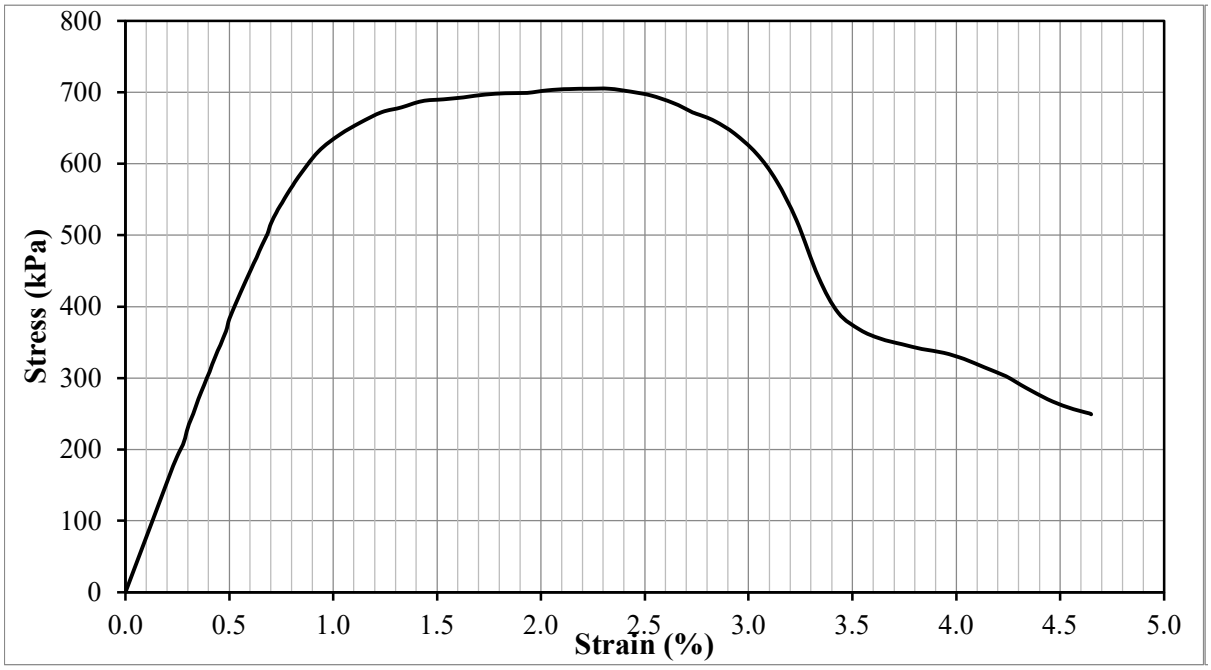
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	545	Strain at failure, εf :	2.55	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	B-4-G	Initial Area:	2104.6	mm^2
Test Date:	8/8/2022	Weight:	342.7	g
Strain Rate:	1 %/min	Unit Weight:	1625	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	7.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



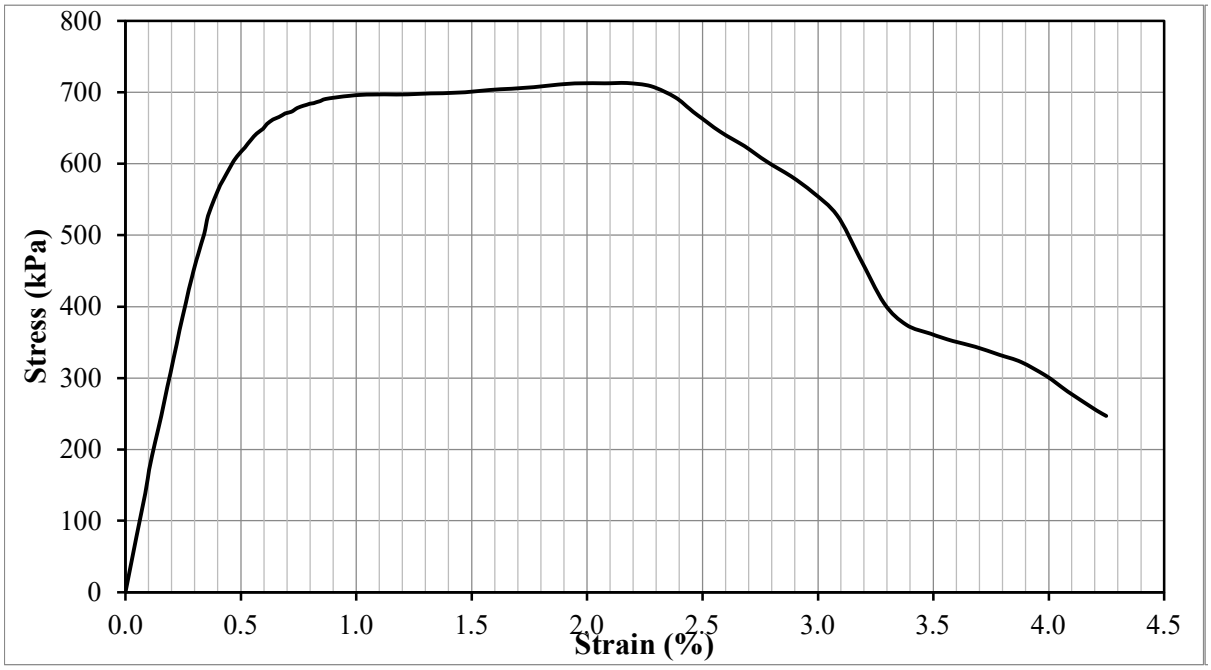
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	567	Strain at failure, εf :	2.61	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	B-4-C	Initial Area:	2114.9	mm^2
Test Date:	8/15/2022	Weight:	343.7	g
Strain Rate:	1 %/min	Unit Weight:	1622	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	14.2	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



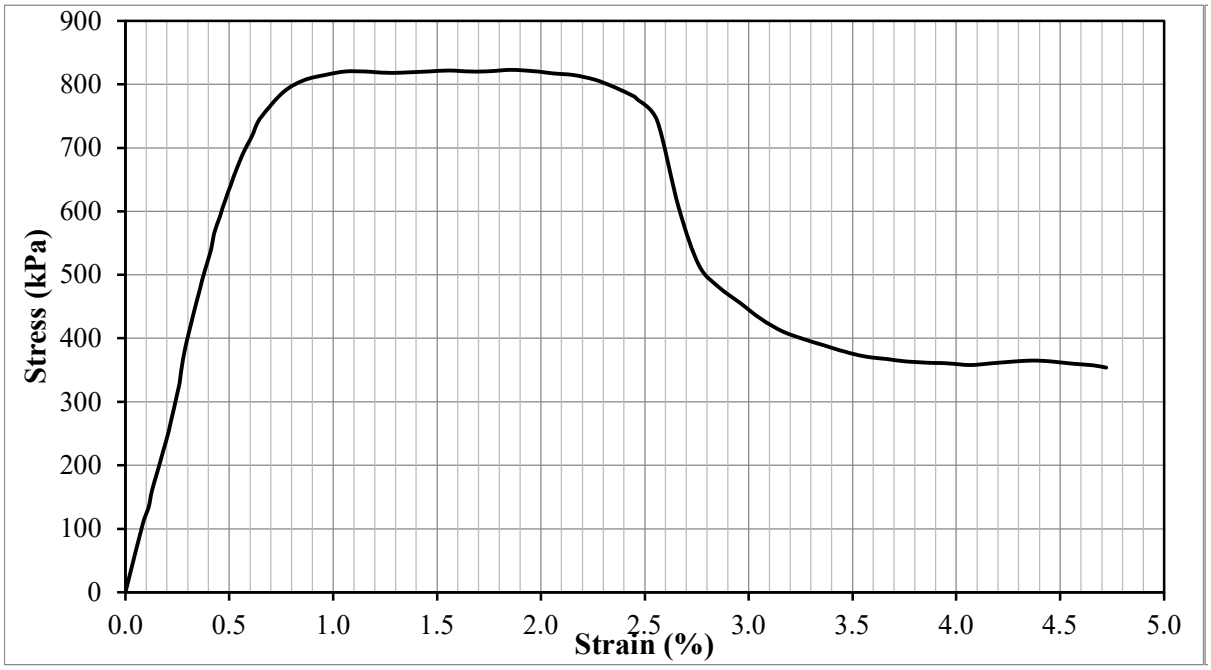
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	701	Strain at failure, εf :	2.33	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	B-4-F	Initial Area:	2106.6	mm^2
Test Date:	8/15/2022	Weight:	344.1	g
Strain Rate:	1 %/min	Unit Weight:	1624	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	14.2	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



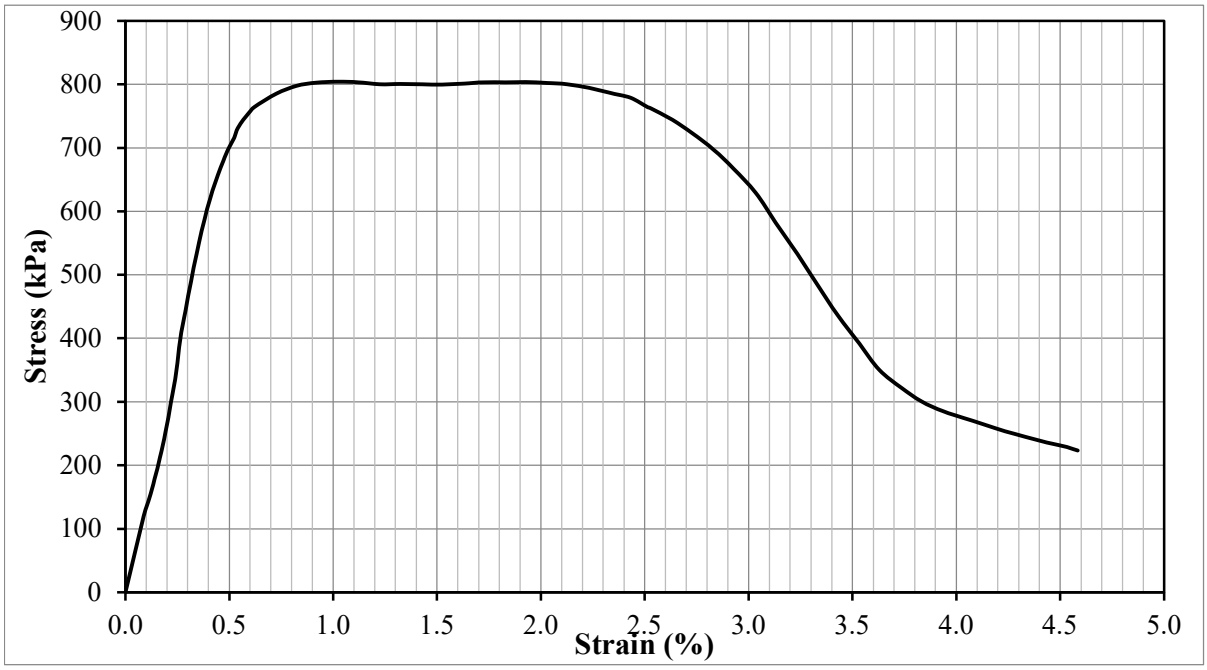
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	710	Strain at failure, εf :	2.17	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	B-4-D	Initial Area:	2117.0	mm^2
Test Date:	8/29/2022	Weight:	342.9	g
Strain Rate:	1 %/min	Unit Weight:	1625	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	28.2	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



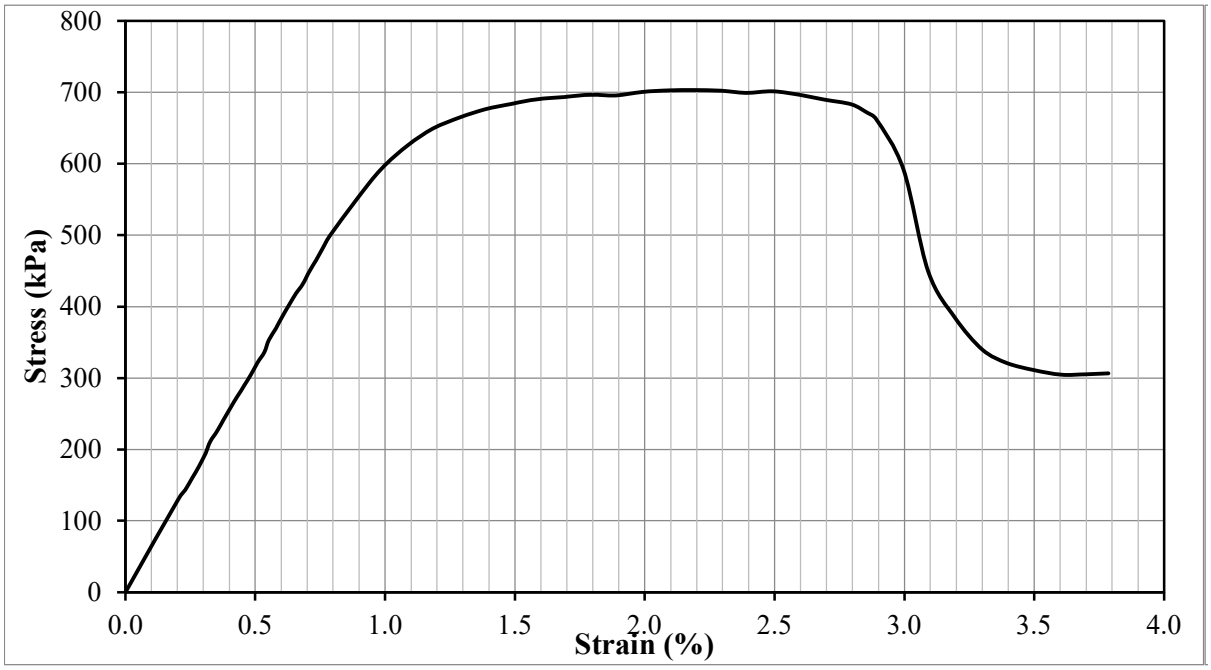
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	818	Strain at failure, εf :	1.86	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	B-4-E	Initial Area:	2108.7	mm^2
Test Date:	8/29/2022	Weight:	345.1	g
Strain Rate:	1 %/min	Unit Weight:	1629	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	28.2	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



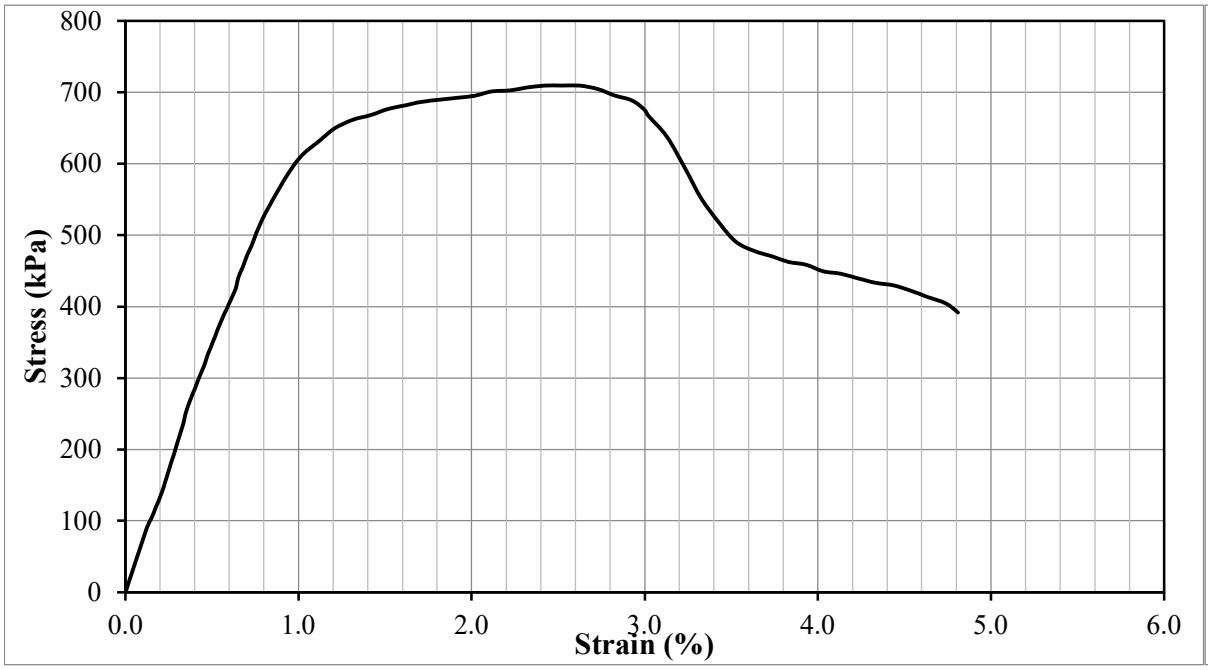
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	800	Strain at failure, εf :	1.02	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	B-5-A	Initial Area:	2110.8	mm^2
Test Date:	8/4/2022	Weight:	341.2	g
Strain Rate:	1 %/min	Unit Weight:	1608	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	3.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



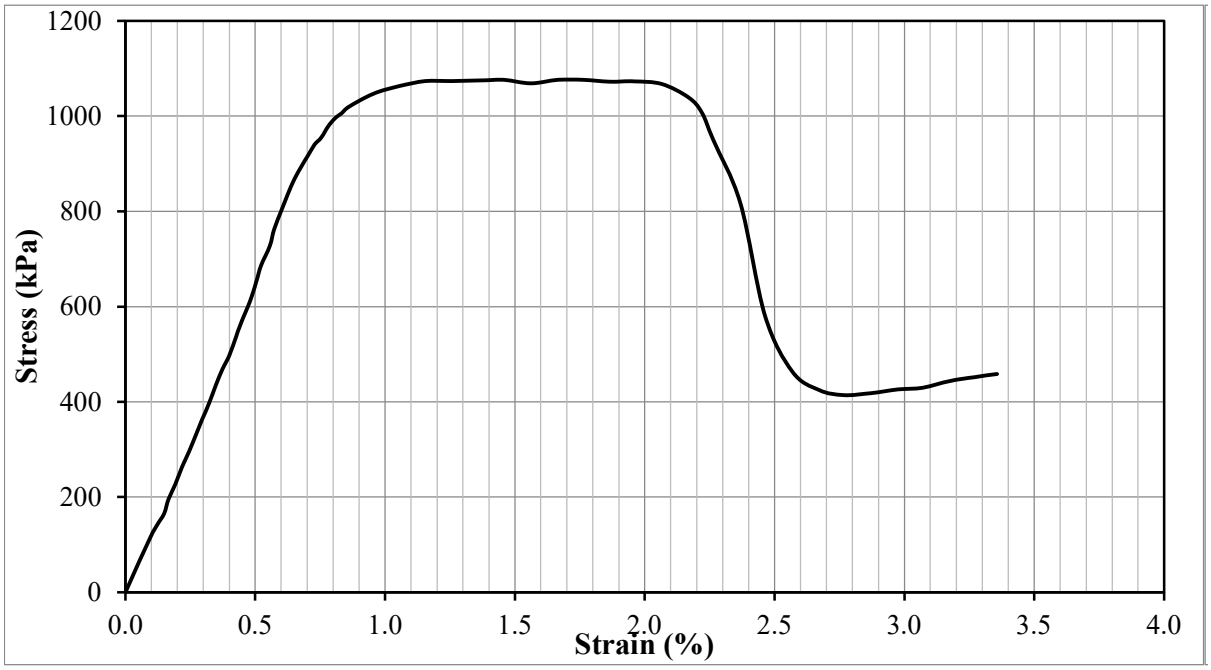
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	700	Strain at failure, εf :	2.19	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	B-5-H	Initial Area:	2119.1	mm^2
Test Date:	8/4/2022	Weight:	341.4	g
Strain Rate:	1 %/min	Unit Weight:	1607	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	3.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



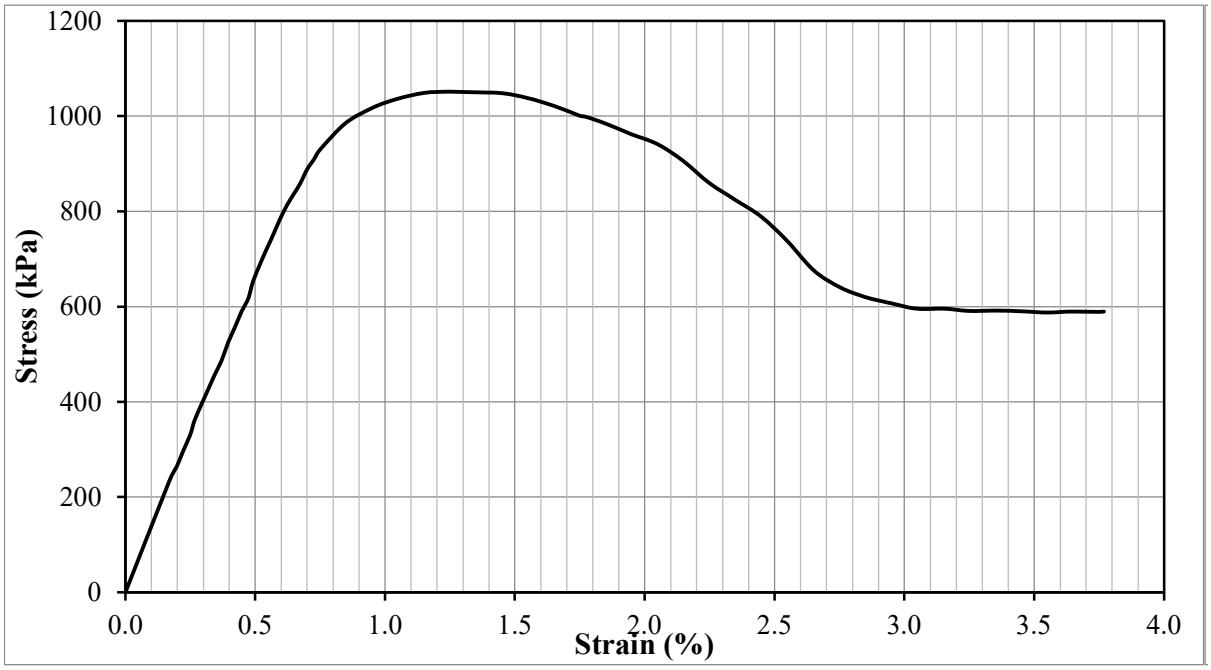
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	705	Strain at failure, εf :	2.42	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	B-5-B	Initial Area:	2108.7	mm^2
Test Date:	8/8/2022	Weight:	342.7	g
Strain Rate:	1 %/min	Unit Weight:	1617	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	7.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



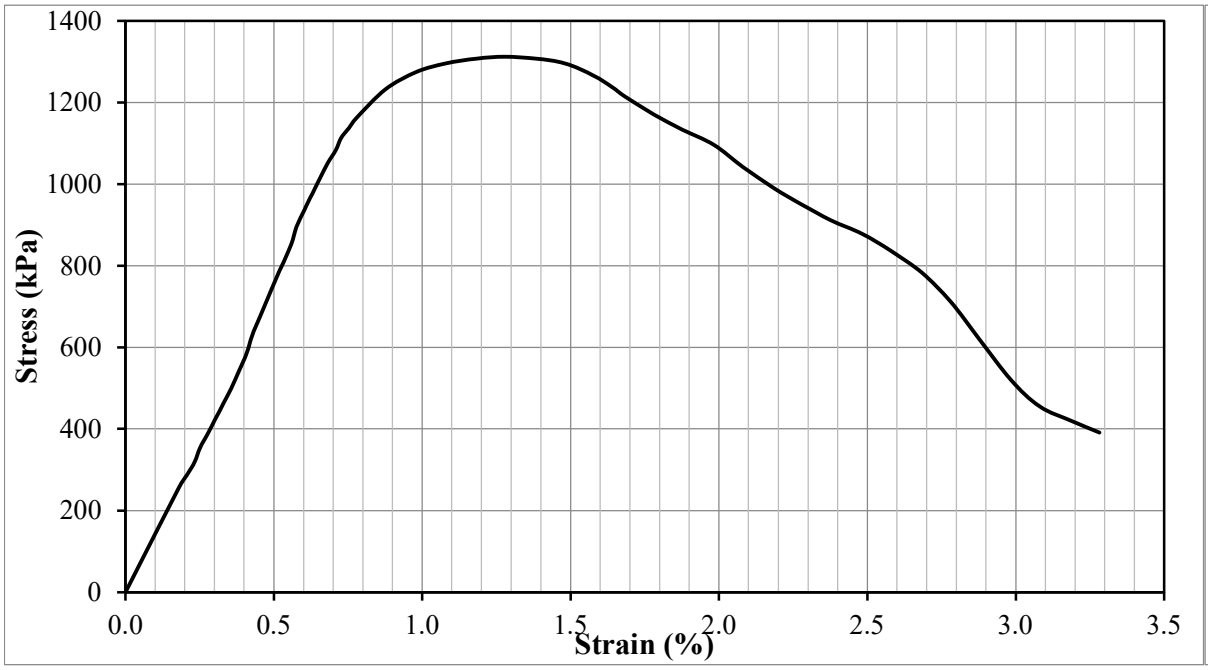
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,071	Strain at failure, εf :	1.76	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	B-5-G	Initial Area:	2114.9	mm^2
Test Date:	8/8/2022	Weight:	342.3	g
Strain Rate:	1 %/min	Unit Weight:	1613	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	7.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



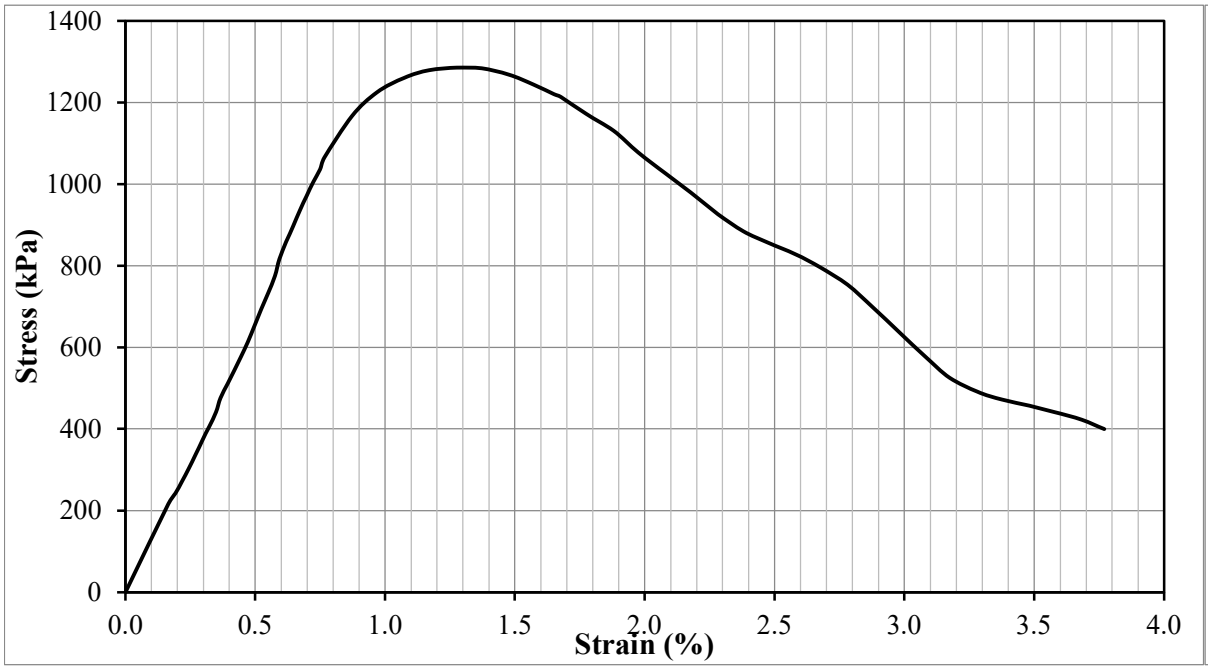
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,045	Strain at failure, εf :	1.24	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	B-5-C	Initial Area:	2117.0	mm^2
Test Date:	8/15/2022	Weight:	341.2	g
Strain Rate:	1 %/min	Unit Weight:	1612	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	14.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



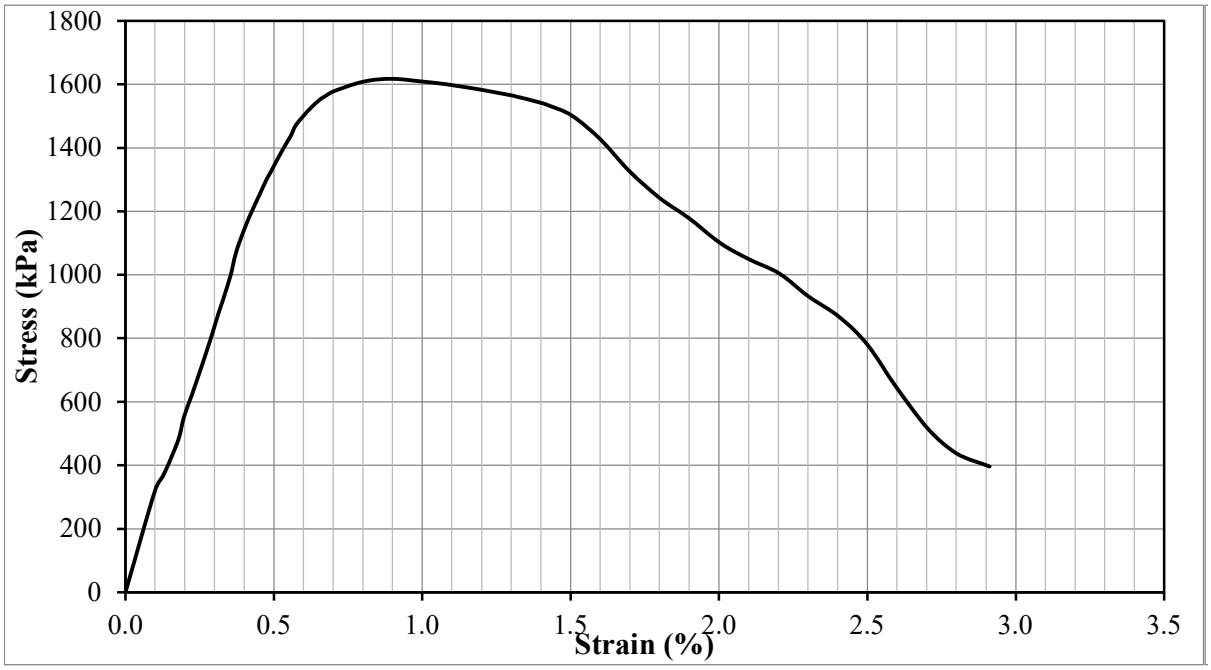
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,304	Strain at failure, εf :	1.28	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	B-5-F	Initial Area:	2108.7	mm^2
Test Date:	8/15/2022	Weight:	341.8	g
Strain Rate:	1 %/min	Unit Weight:	1618	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	14.2	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



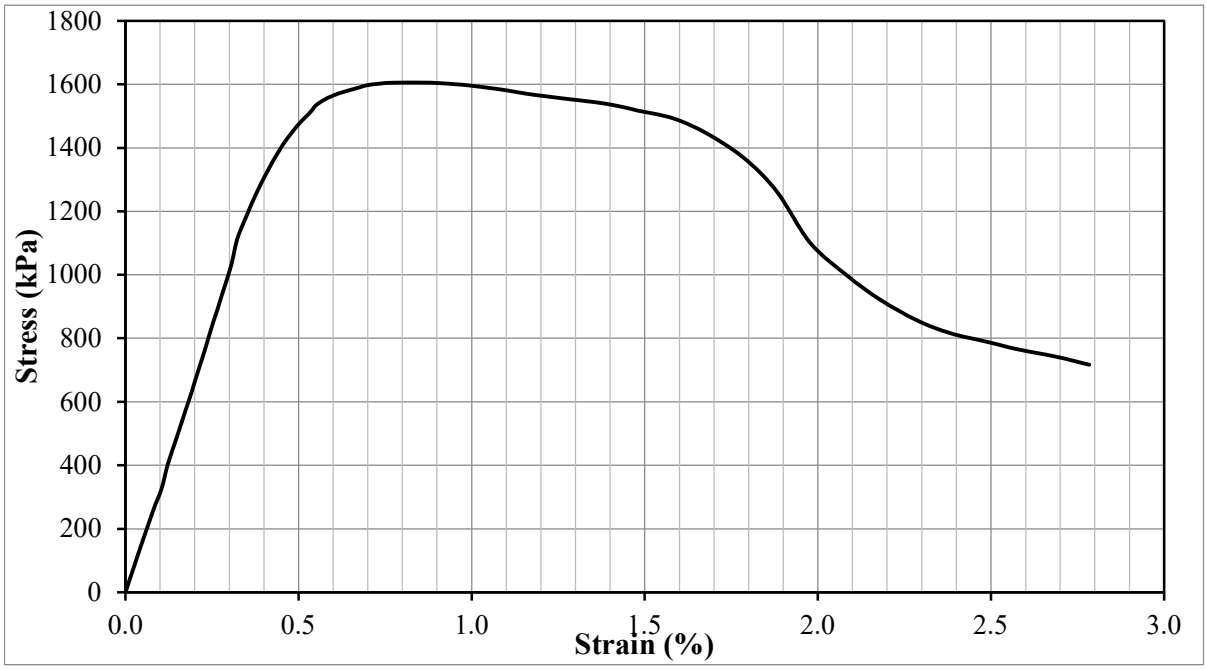
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,278	Strain at failure, εf :	1.28	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	B-5-D	Initial Area:	2117.0	mm^2
Test Date:	8/29/2022	Weight:	342.5	g
Strain Rate:	1 %/min	Unit Weight:	1614	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	28.2	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



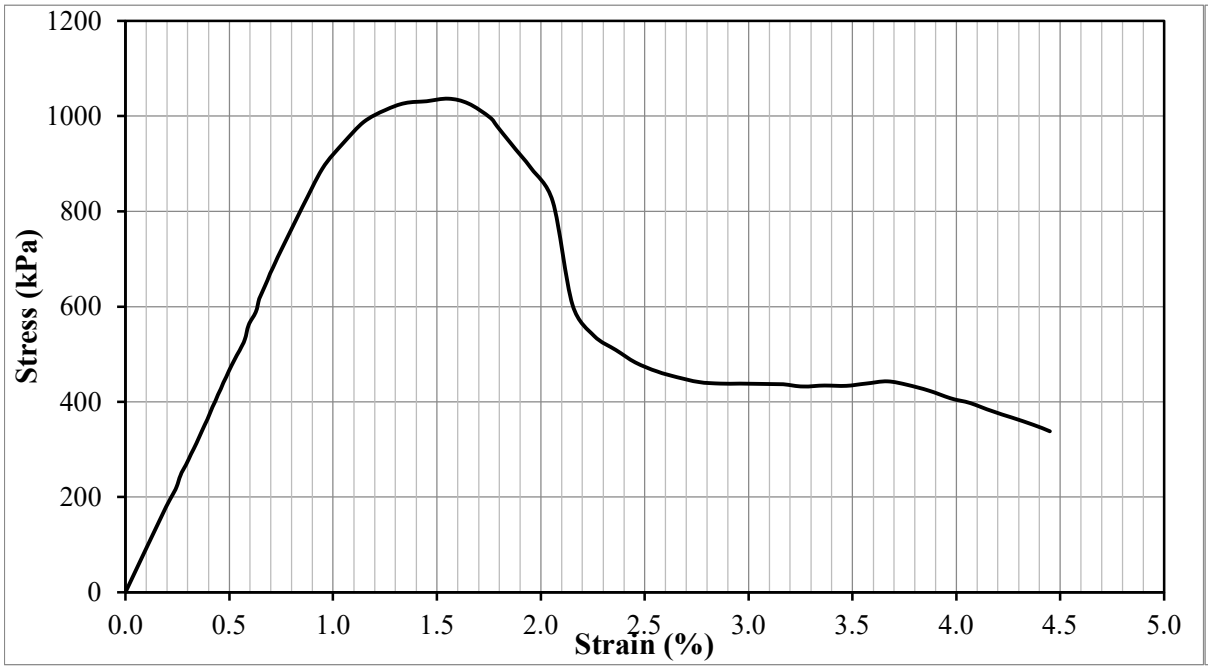
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,608	Strain at failure, εf :	0.90	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	B-5-E	Initial Area:	2106.6	mm^2
Test Date:	8/29/2022	Weight:	342.0	g
Strain Rate:	1 %/min	Unit Weight:	1619	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	28.2	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



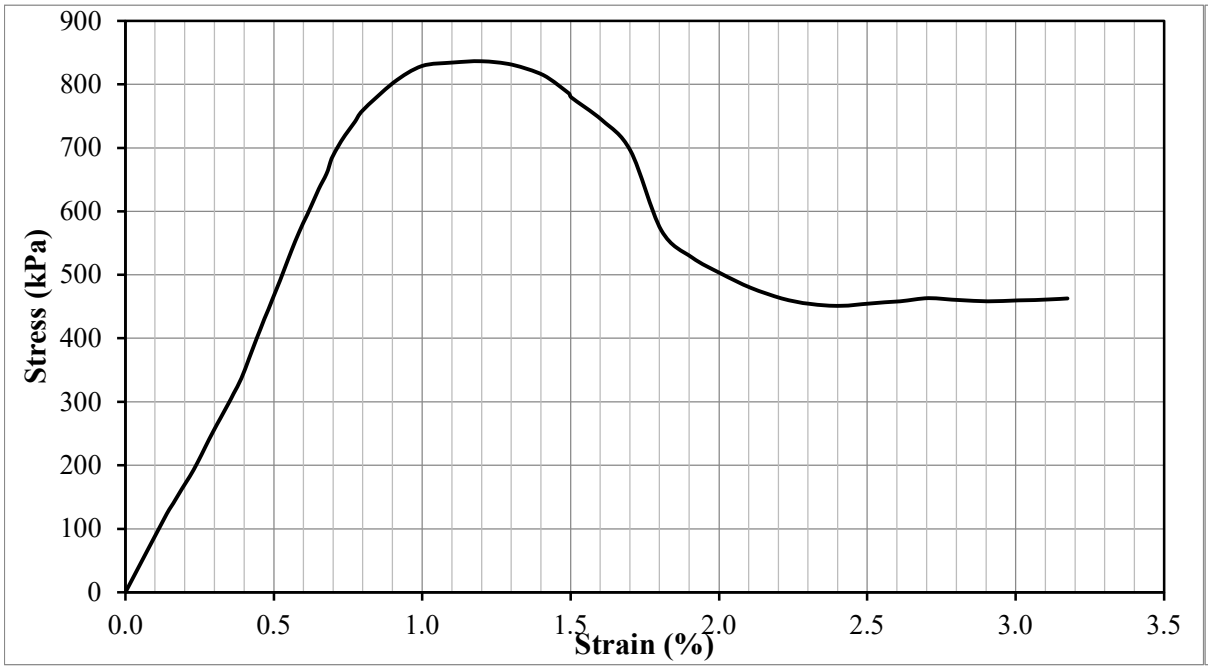
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,597	Strain at failure, εf :	0.78	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	B-6-H	Initial Area:	2117.0	mm^2
Test Date:	8/4/2022	Weight:	341.9	g
Strain Rate:	1 %/min	Unit Weight:	1611	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	3.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



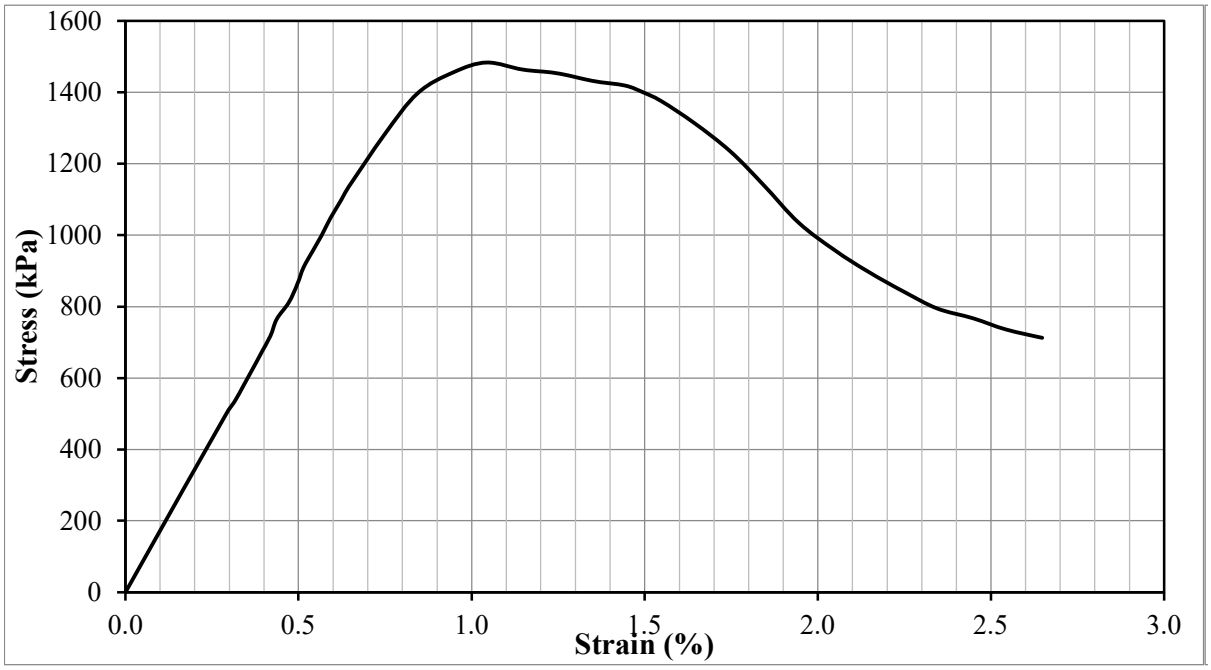
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,031	Strain at failure, εf :	1.55	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	B-6-I	Initial Area:	2110.8	mm^2
Test Date:	8/4/2022	Weight:	340.6	g
Strain Rate:	1 %/min	Unit Weight:	1616	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	3.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



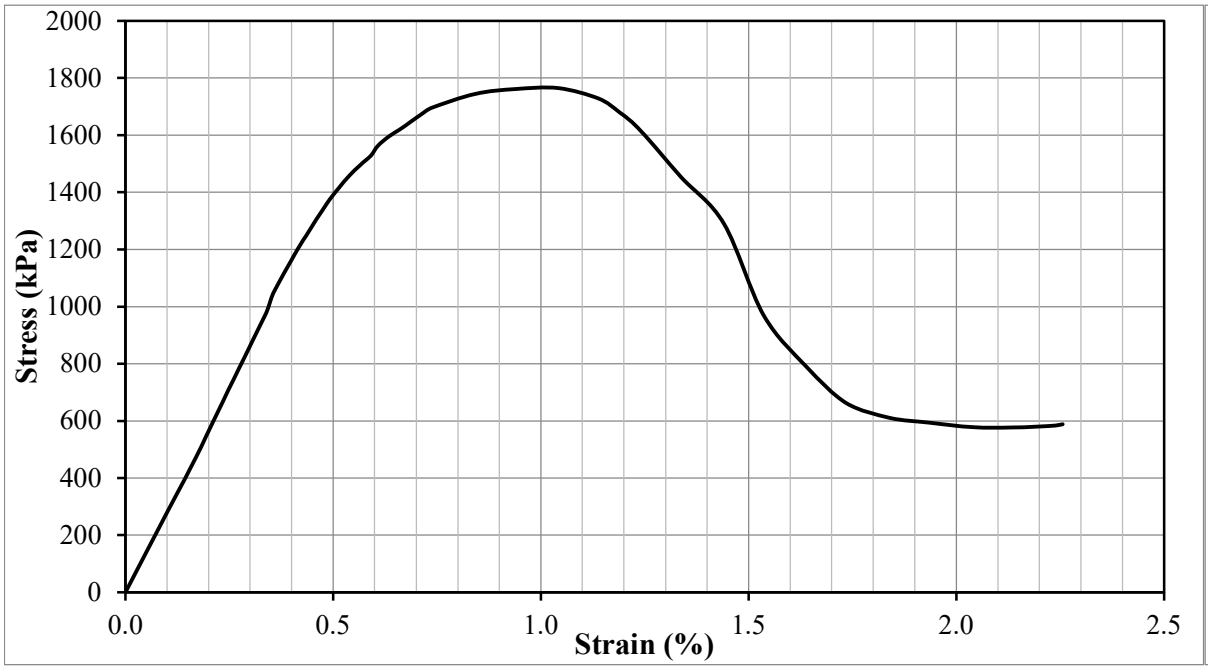
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	831	Strain at failure, εf :	1.20	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	B-6-B	Initial Area:	2119.1	mm^2
Test Date:	8/8/2022	Weight:	338.3	g
Strain Rate:	1 %/min	Unit Weight:	1608	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	7.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



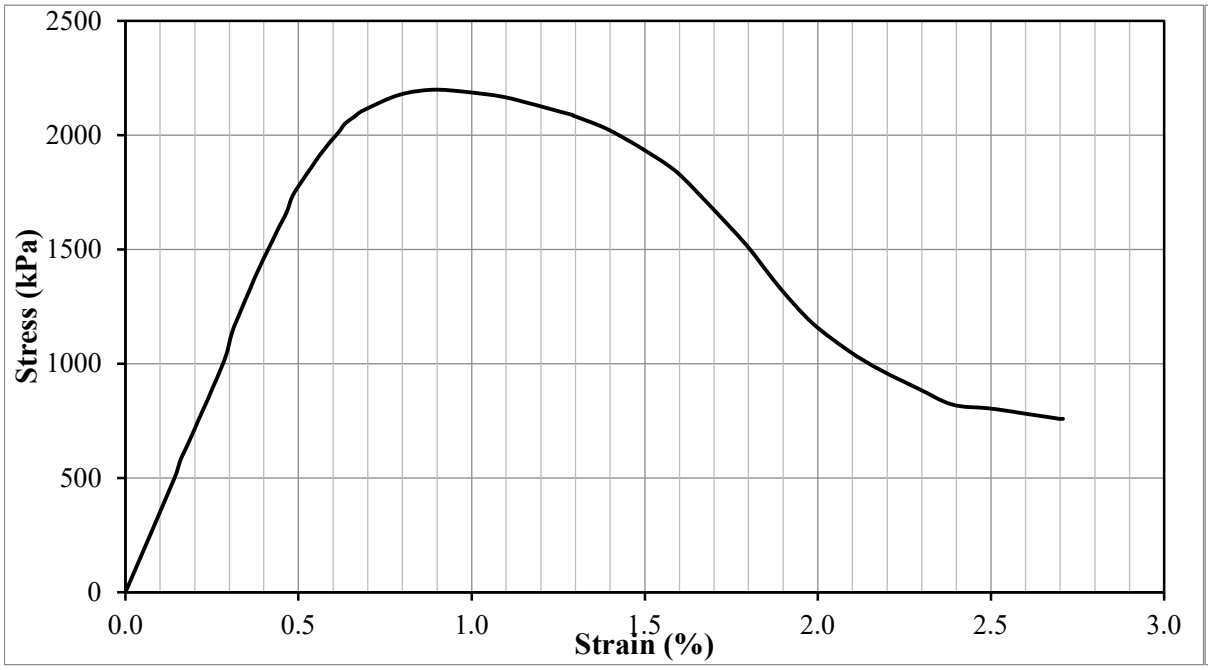
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,473	Strain at failure, εf :	1.04	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	B-6-G	Initial Area:	2104.6	mm^2
Test Date:	8/8/2022	Weight:	341.6	g
Strain Rate:	1 %/min	Unit Weight:	1620	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	7.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



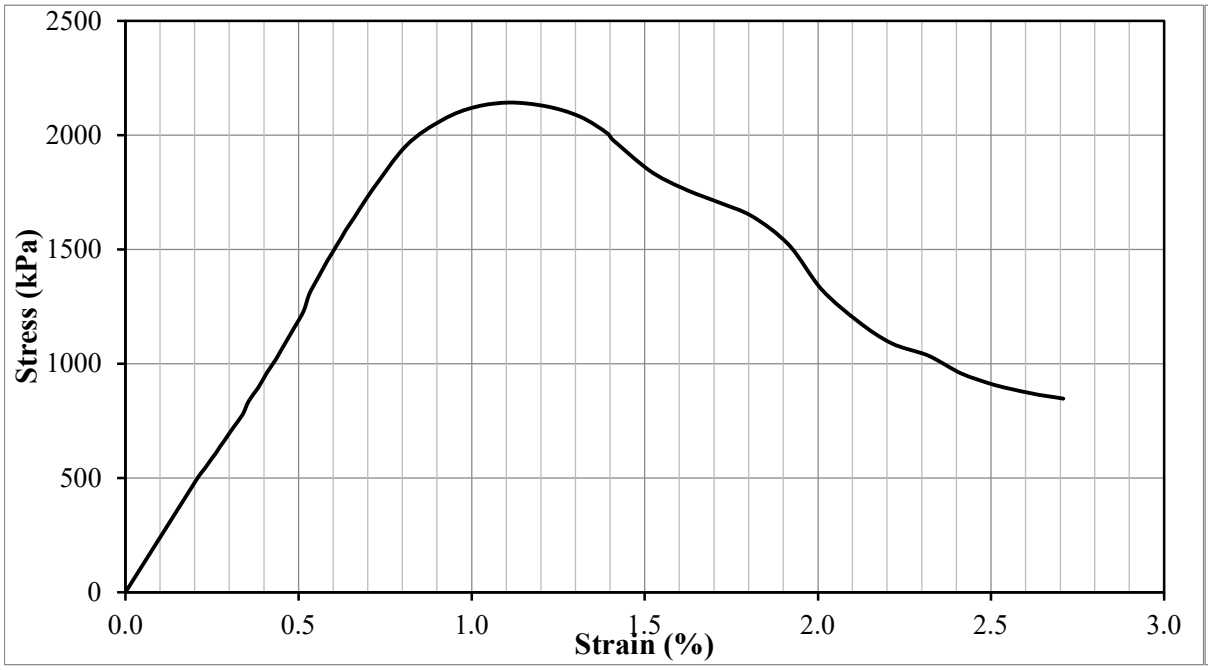
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,755	Strain at failure, εf :	1.04	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	B-6-C	Initial Area:	2110.8	mm^2
Test Date:	8/15/2022	Weight:	338.3	g
Strain Rate:	1 %/min	Unit Weight:	1618	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	14.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



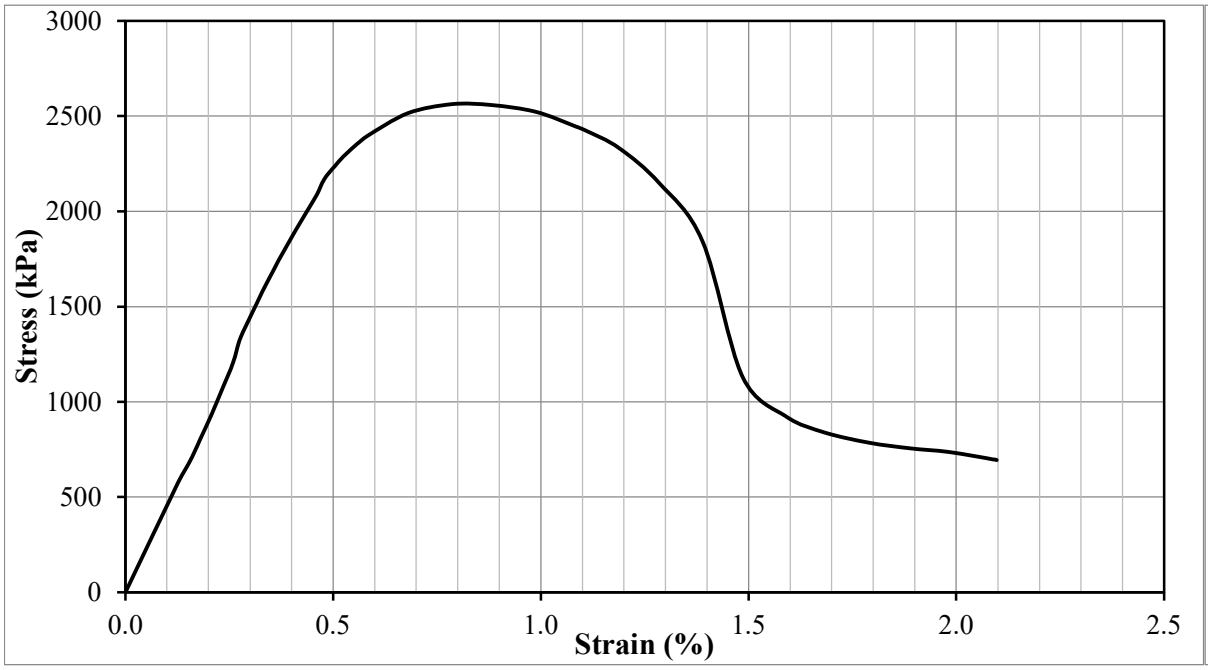
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,182	Strain at failure, εf :	0.89	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	B-6-F	Initial Area:	2112.9	mm^2
Test Date:	8/15/2022	Weight:	342.6	g
Strain Rate:	1 %/min	Unit Weight:	1619	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	14.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



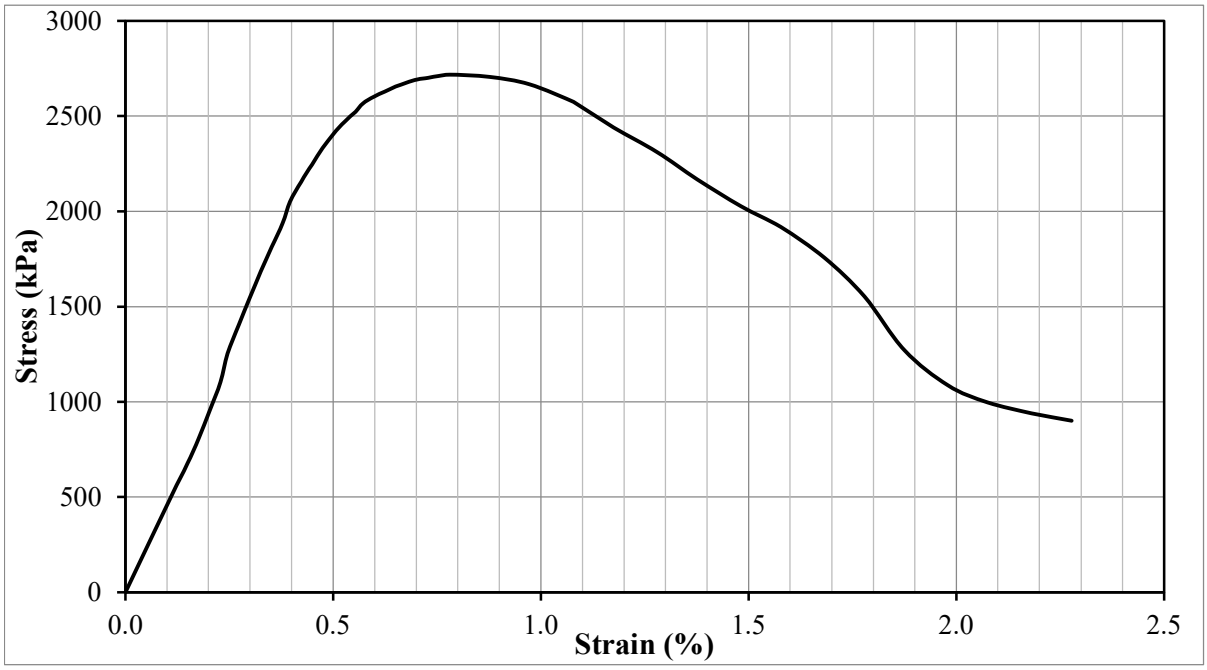
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,130	Strain at failure, εf :	1.11	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	B-6-D	Initial Area:	2123.2	mm^2
Test Date:	8/29/2022	Weight:	341.8	g
Strain Rate:	1 %/min	Unit Weight:	1608	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	28.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



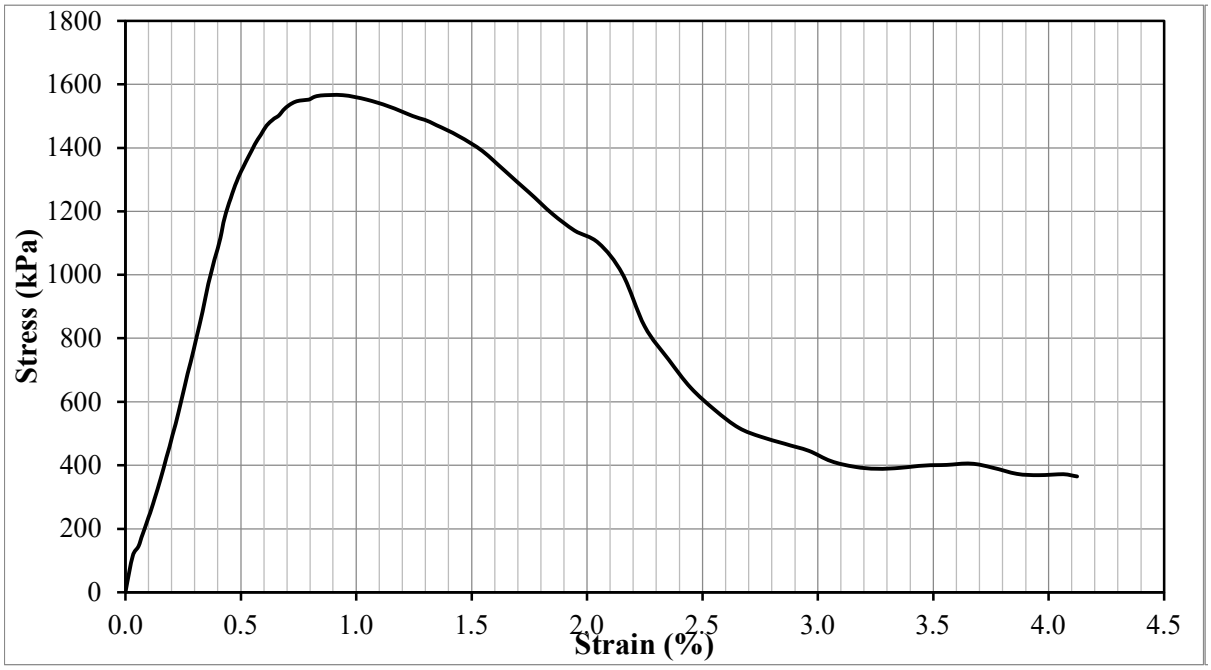
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,547	Strain at failure, εf :	0.79	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	B-6-E	Initial Area:	2106.6	mm^2
Test Date:	8/29/2022	Weight:	343.4	g
Strain Rate:	1 %/min	Unit Weight:	1622	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	28.2	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



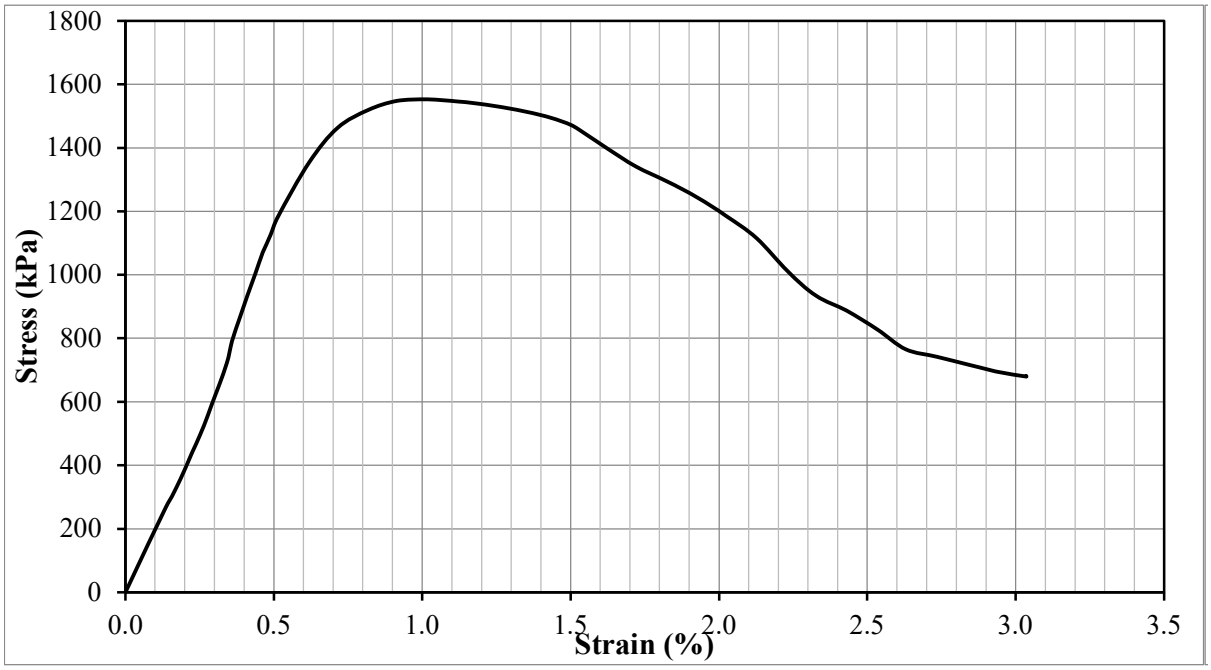
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,704	Strain at failure, εf :	0.78	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	B-7-A	Initial Area:	2108.7	mm^2
Test Date:	8/4/2022	Weight:	338.2	g
Strain Rate:	1 %/min	Unit Weight:	1615	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	3.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



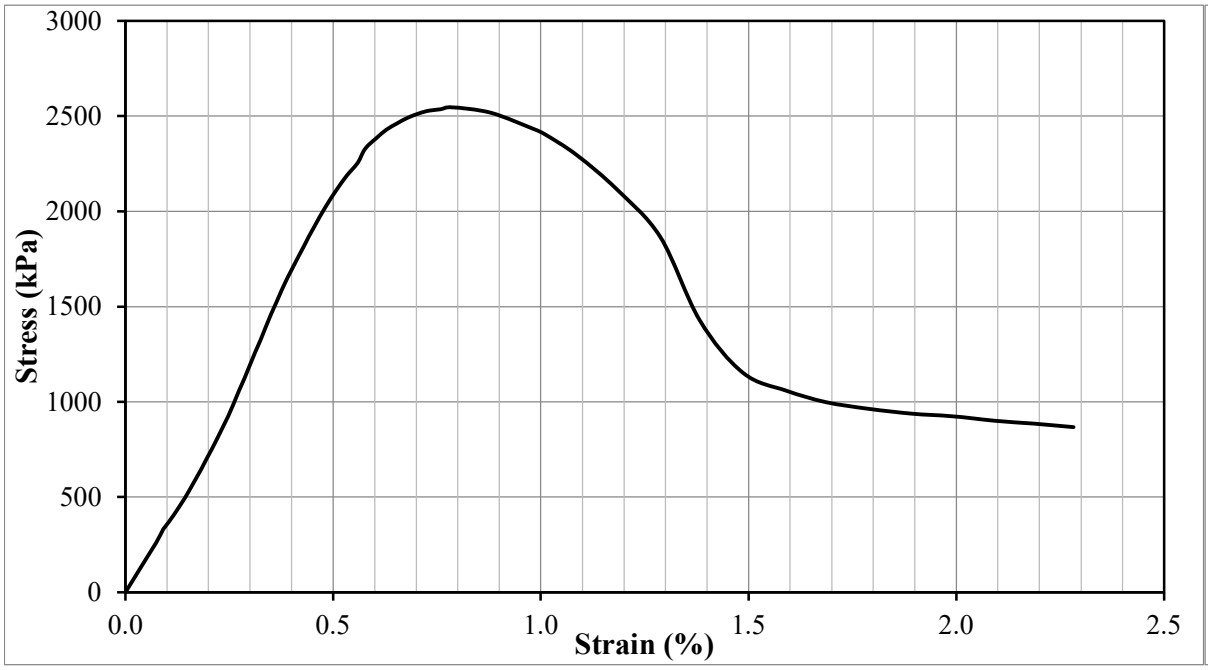
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,555	Strain at failure, εf :	0.94	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	B-7-I	Initial Area:	2112.9	mm^2
Test Date:	8/4/2022	Weight:	341.8	g
Strain Rate:	1 %/min	Unit Weight:	1616	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	3.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



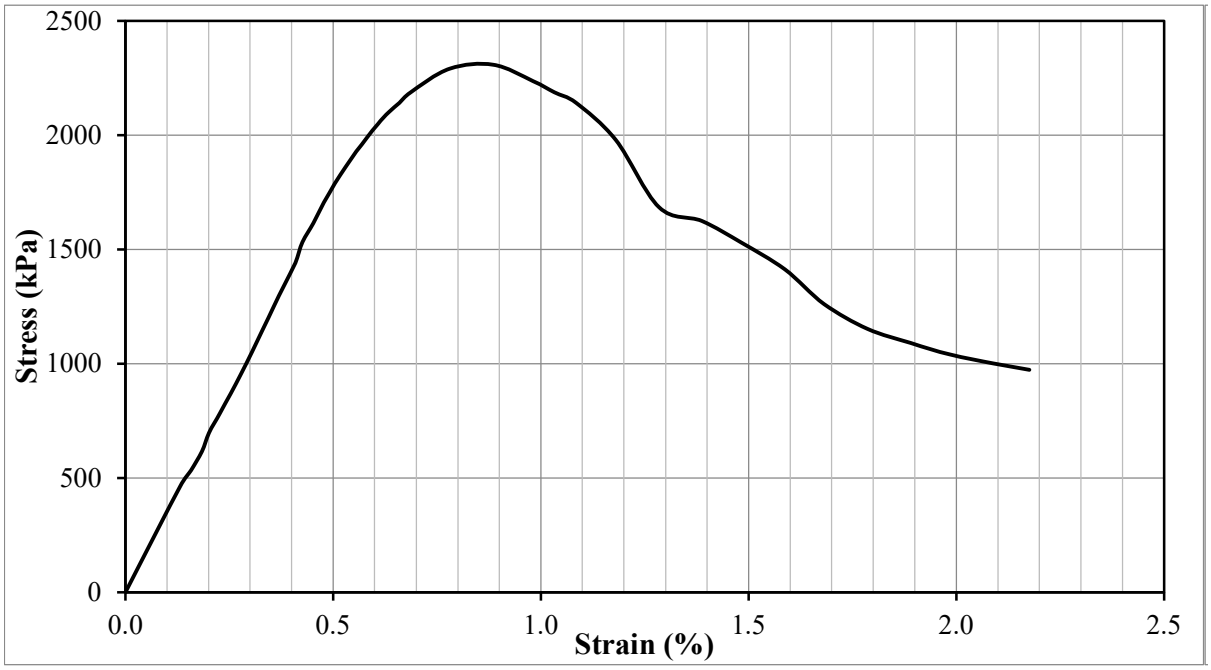
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,543	Strain at failure, εf :	1.02	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	B-7-B	Initial Area:	2110.8	mm^2
Test Date:	8/8/2022	Weight:	341.9	g
Strain Rate:	1 %/min	Unit Weight:	1618	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	7.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



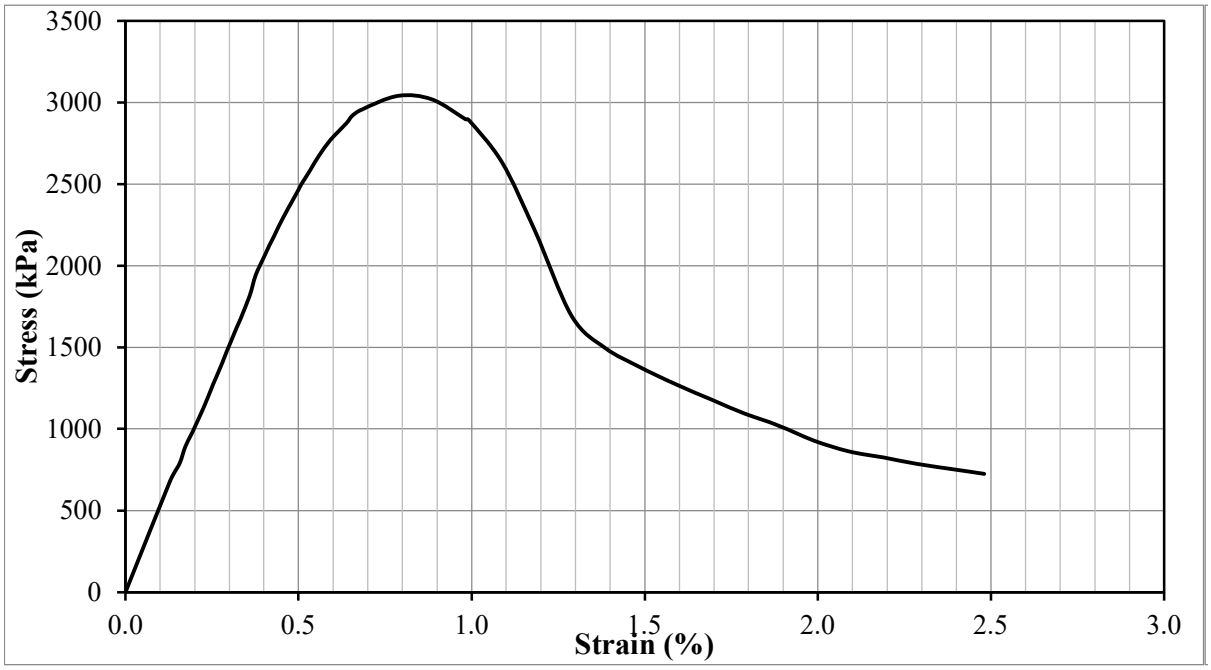
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,532	Strain at failure, εf :	0.78	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	B-7-G	Initial Area:	2110.8	mm^2
Test Date:	8/8/2022	Weight:	341.7	g
Strain Rate:	1 %/min	Unit Weight:	1618	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	7.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



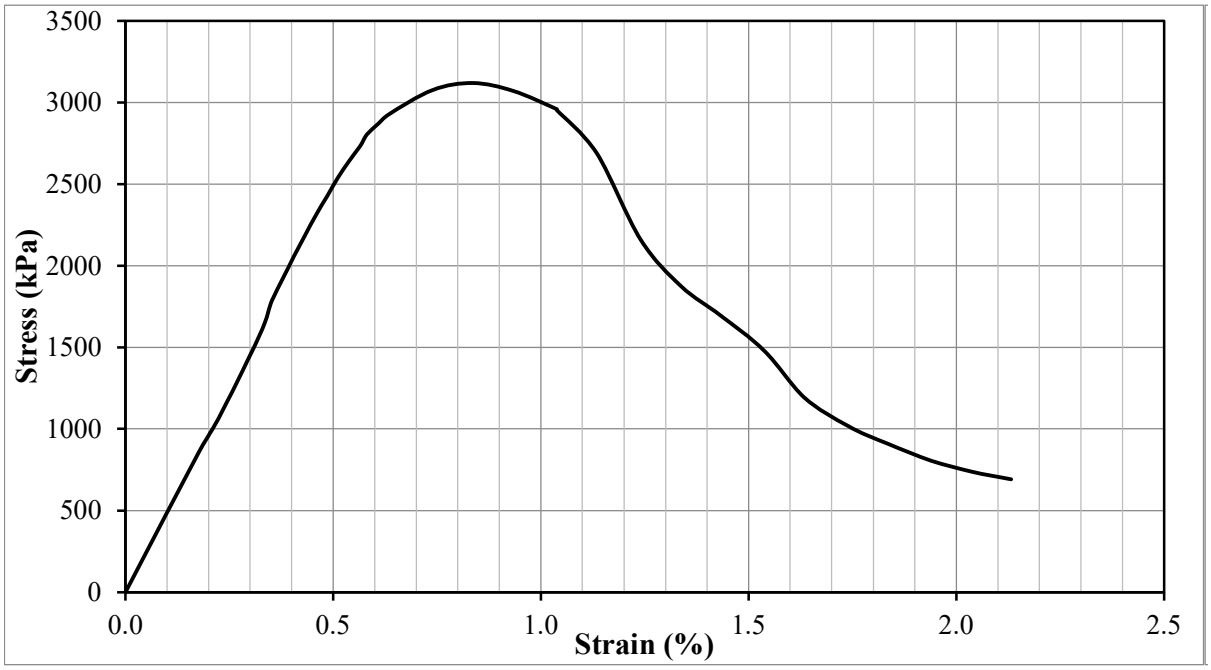
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	2,295	Strain at failure, εf :	0.89	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	B-7-C	Initial Area:	2110.8	mm^2
Test Date:	8/15/2022	Weight:	342.7	g
Strain Rate:	1 %/min	Unit Weight:	1623	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	14.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



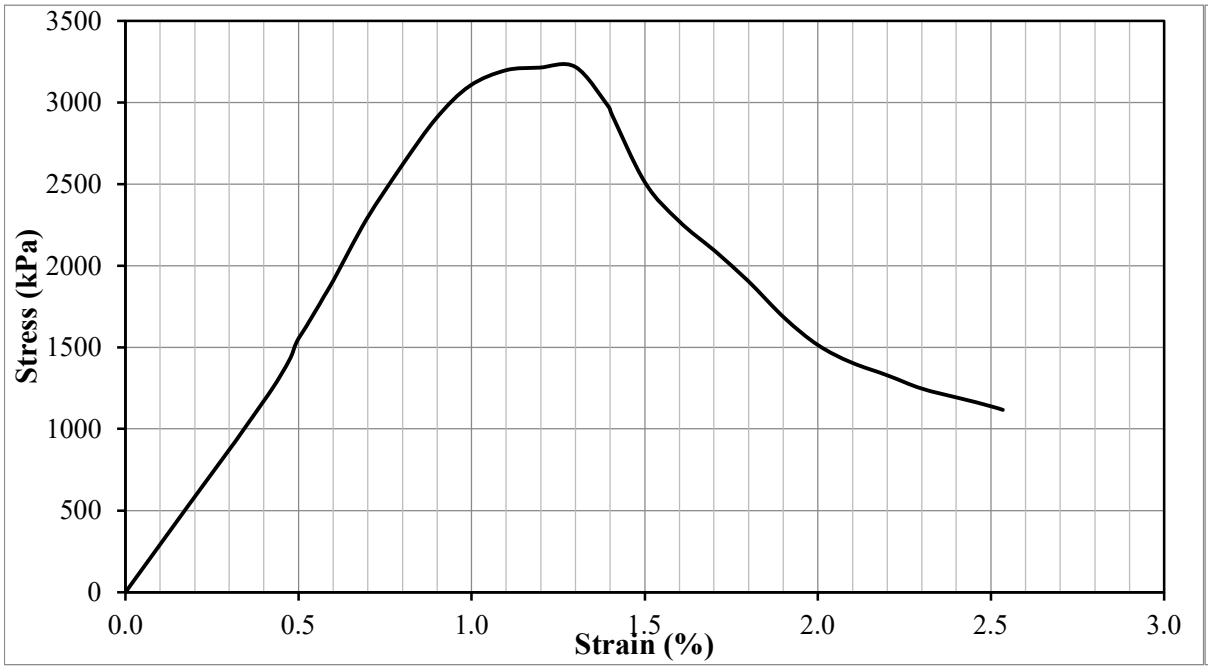
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,024	Strain at failure, εf :	0.79	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.1	mm
I.D.:	B-7-F	Initial Area:	2129.4	mm^2
Test Date:	8/15/2022	Weight:	340.4	g
Strain Rate:	1 %/min	Unit Weight:	1602	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	14.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



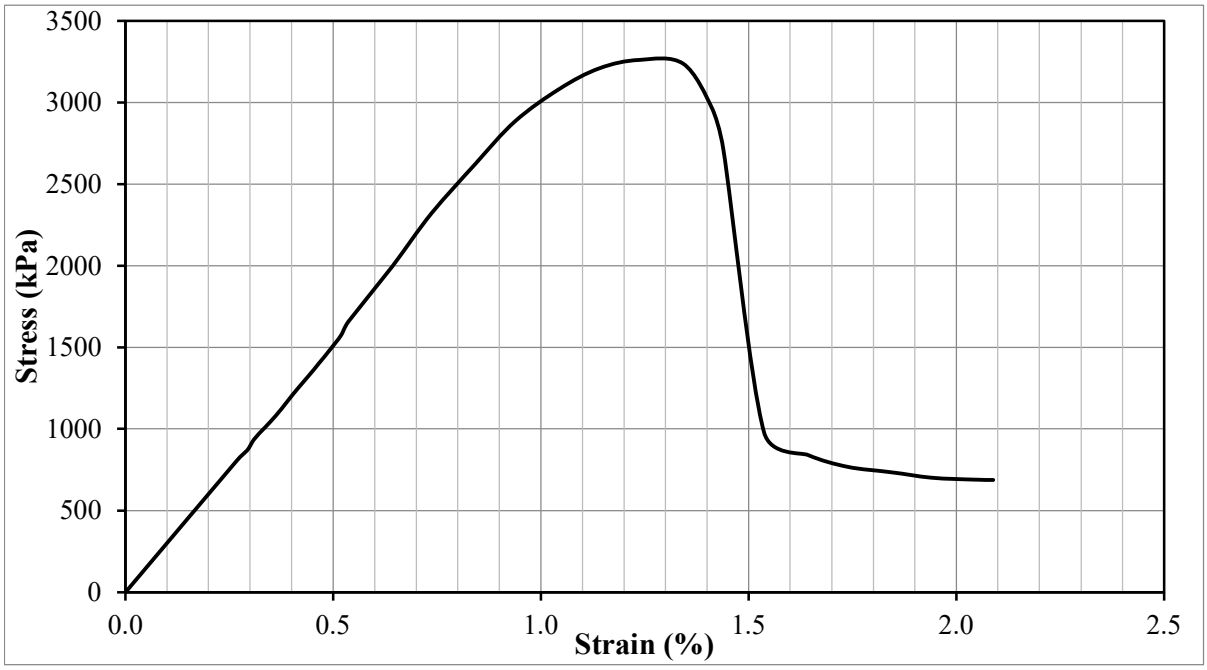
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,098	Strain at failure, εf :	0.84	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	B-7-D	Initial Area:	2110.8	mm^2
Test Date:	8/29/2022	Weight:	339.6	g
Strain Rate:	1 %/min	Unit Weight:	1616	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	28.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



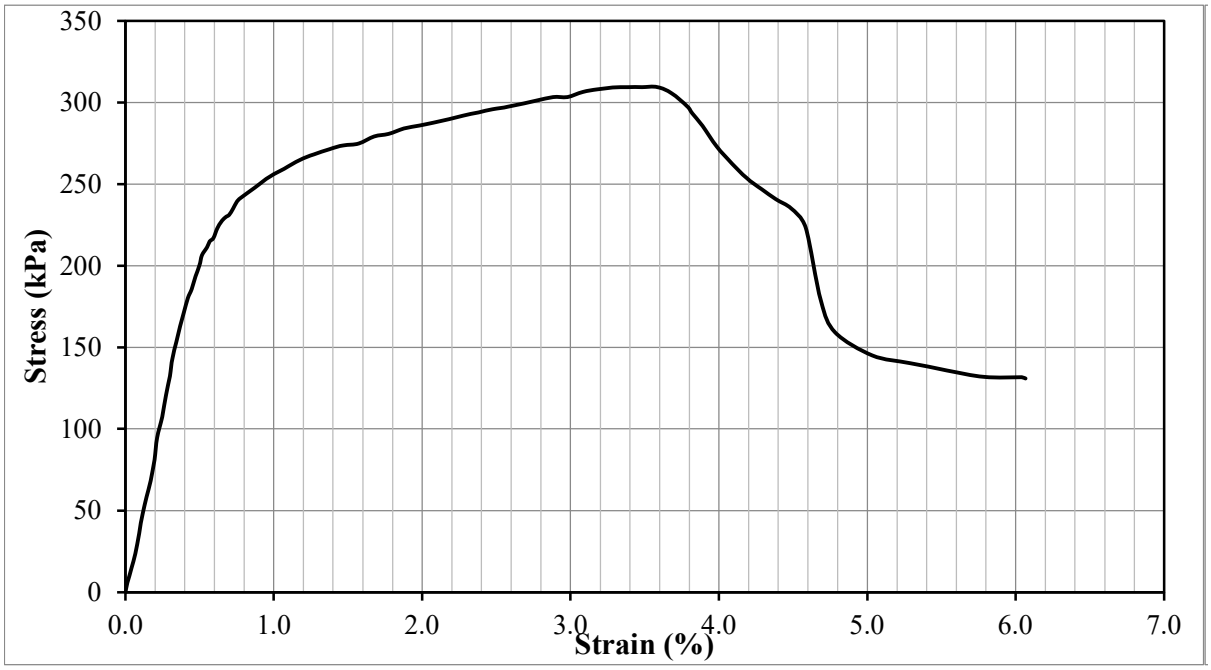
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,197	Strain at failure, εf :	1.30	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	B-7-J	Initial Area:	2108.7	mm^2
Test Date:	8/29/2022	Weight:	342.4	g
Strain Rate:	1 %/min	Unit Weight:	1625	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350	Curing Period	28.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



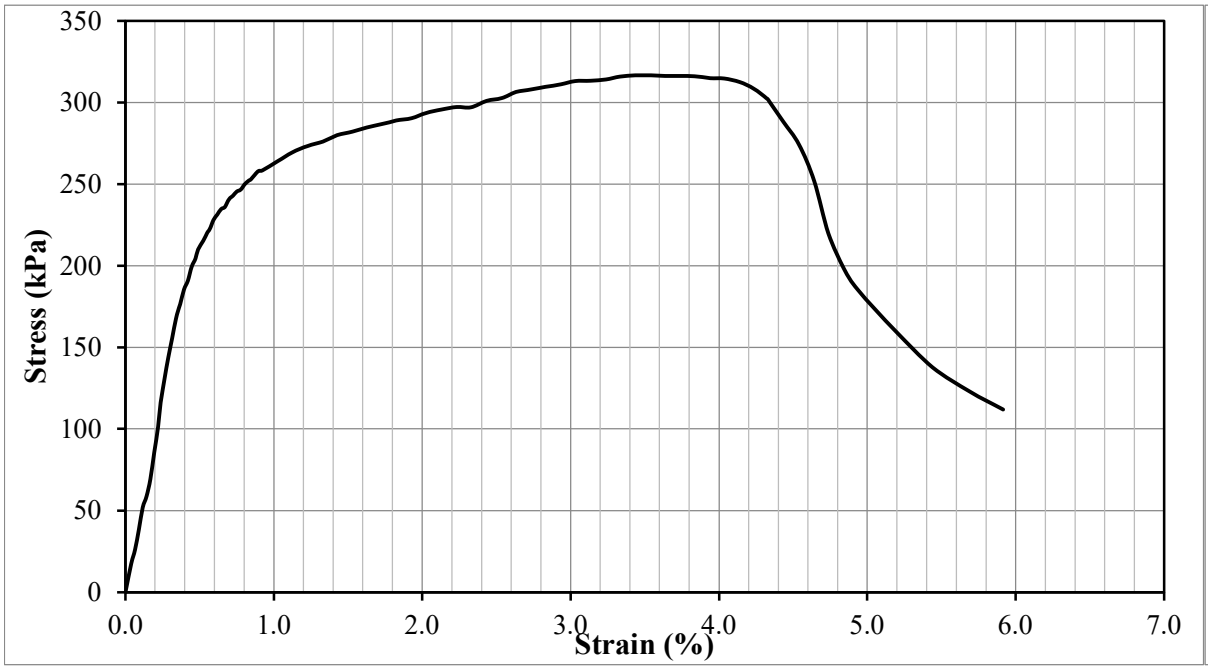
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	3,242	Strain at failure, εf :	1.24	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	B-8-A	Initial Area:	2110.8	mm^2
Test Date:	8/5/2022	Weight:	337.1	g
Strain Rate:	1 %/min	Unit Weight:	1588	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	2.9	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



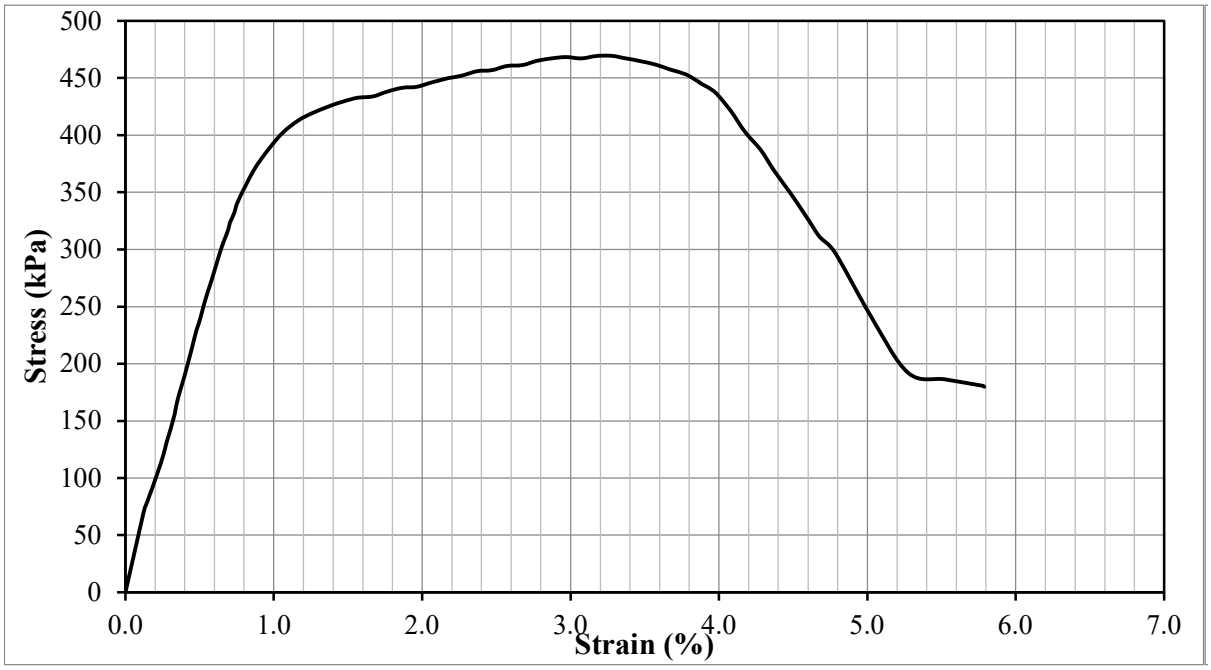
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	308	Strain at failure, εf :	3.59	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	B-8-H	Initial Area:	2112.9	mm^2
Test Date:	8/5/2022	Weight:	338.1	g
Strain Rate:	1 %/min	Unit Weight:	1589	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	2.9	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



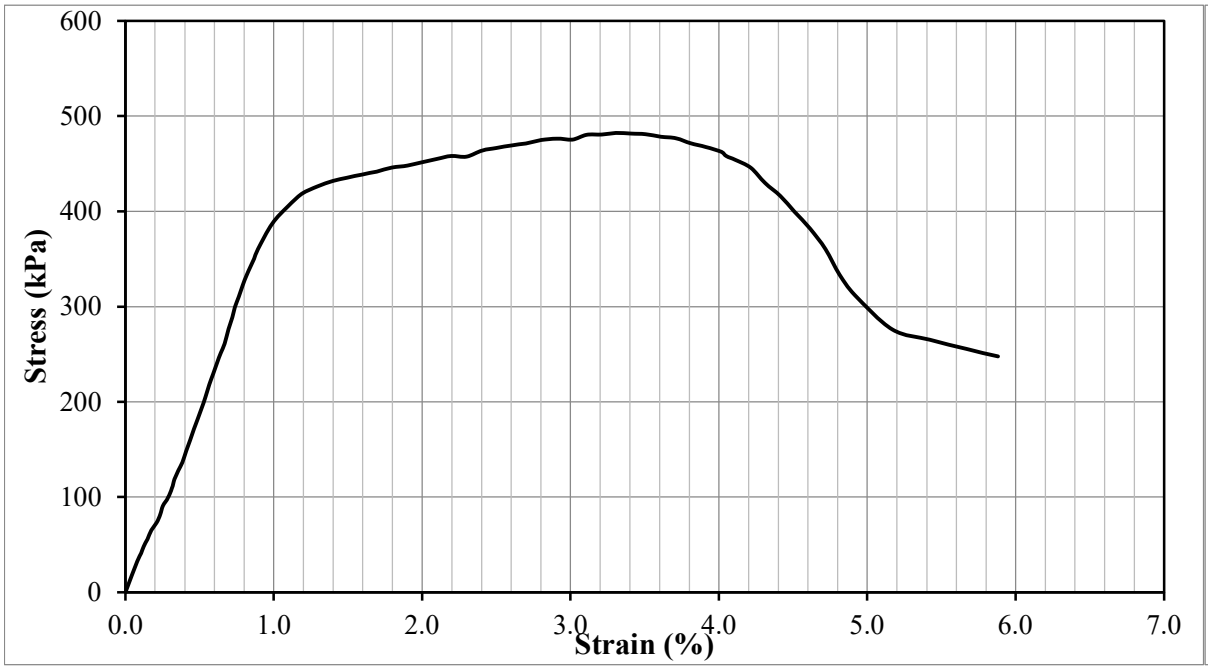
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	315	Strain at failure, εf :	3.44	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	B-8-B	Initial Area:	2114.9	mm^2
Test Date:	8/9/2022	Weight:	335.6	g
Strain Rate:	1 %/min	Unit Weight:	1592	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	7.0	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



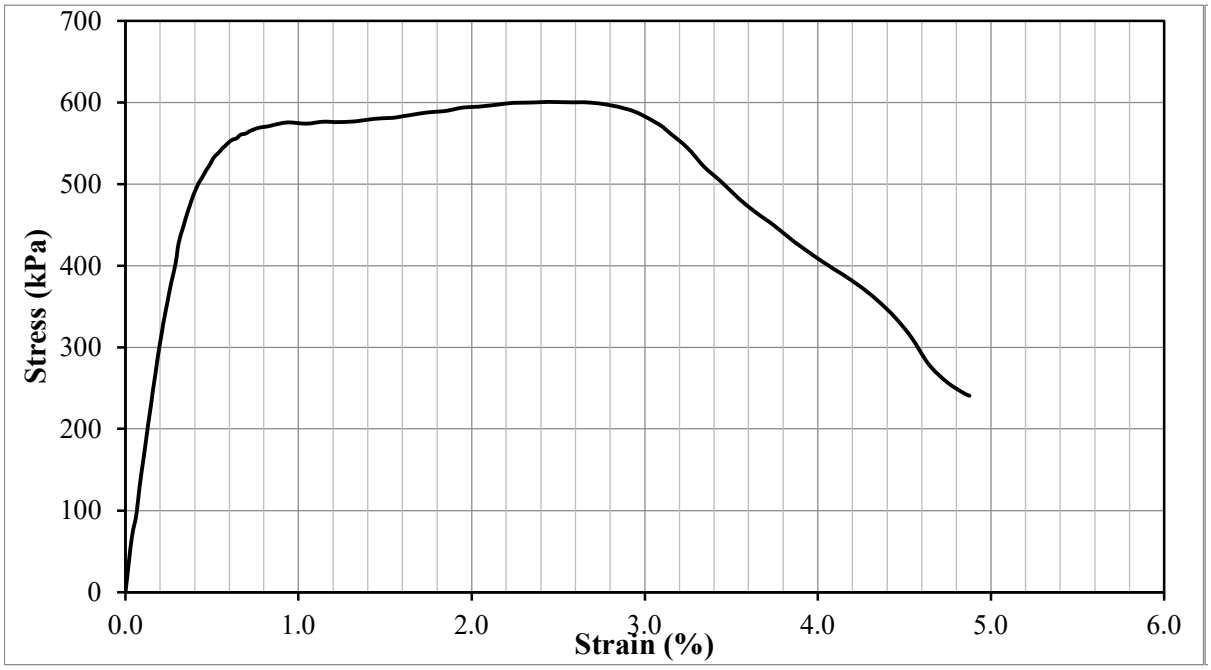
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	466	Strain at failure, εf :	3.27	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	B-8-G	Initial Area:	2121.1	mm^2
Test Date:	8/9/2022	Weight:	336.1	g
Strain Rate:	1 %/min	Unit Weight:	1589	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	7.0	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



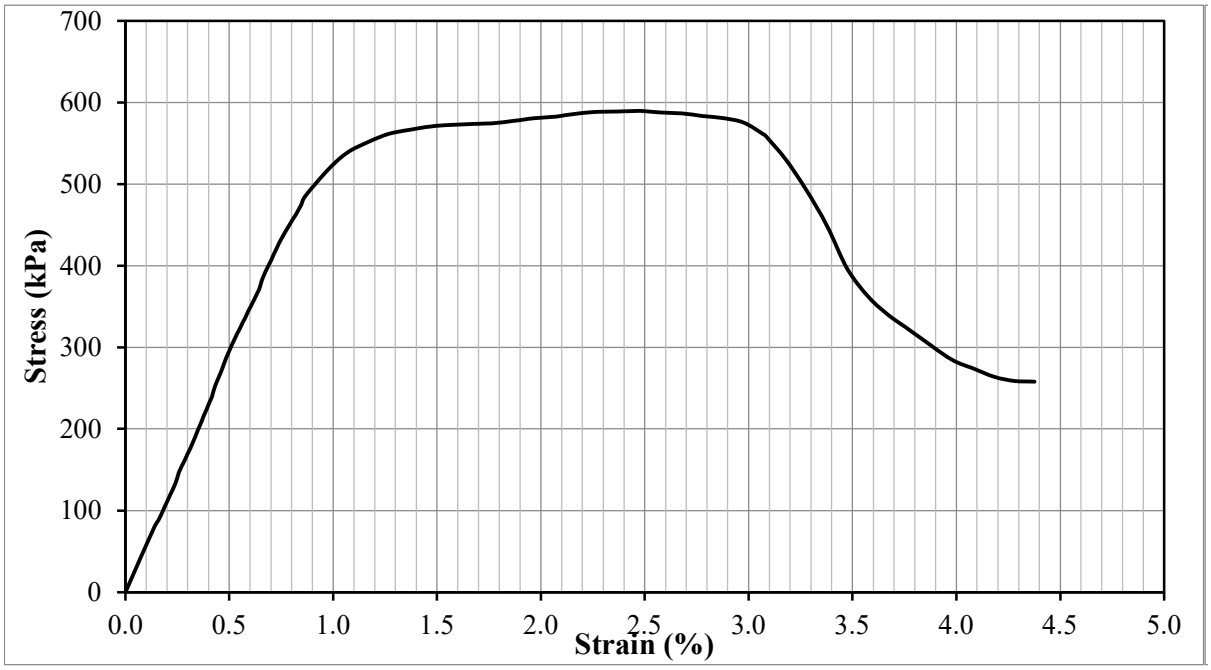
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	479	Strain at failure, εf :	3.31	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	B-8-C	Initial Area:	2112.9	mm^2
Test Date:	8/16/2022	Weight:	338.7	g
Strain Rate:	1 %/min	Unit Weight:	1597	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	14.0	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



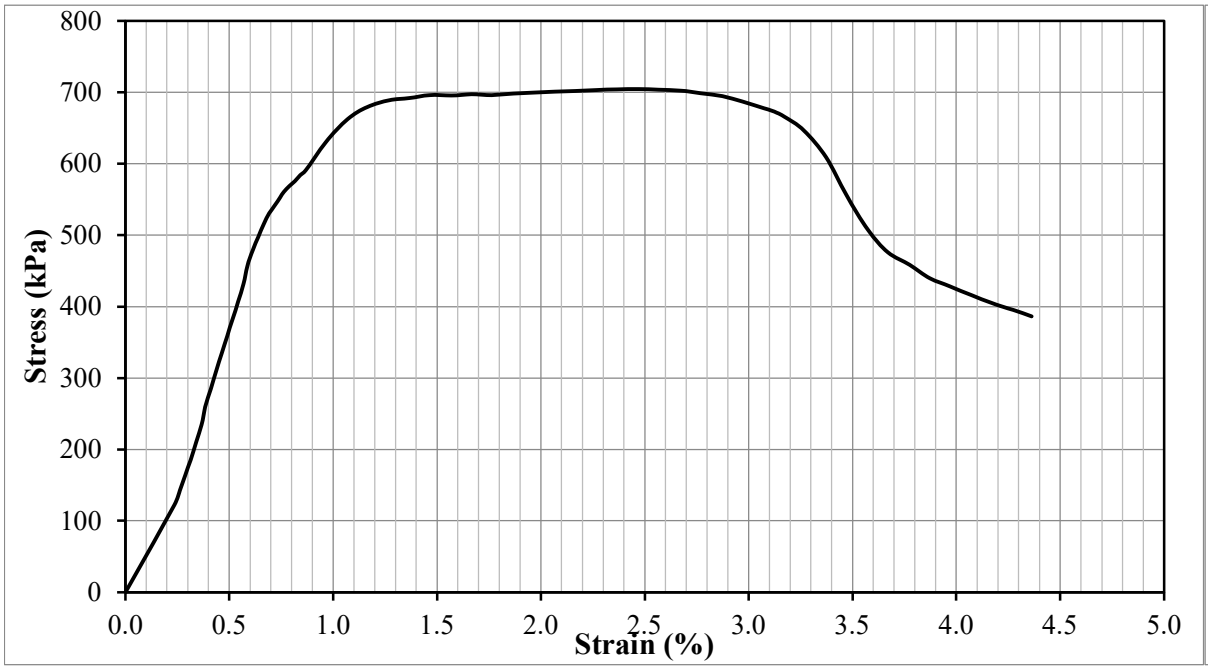
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	598	Strain at failure, εf :	2.44	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	B-8-F	Initial Area:	2119.1	mm^2
Test Date:	8/16/2022	Weight:	336.0	g
Strain Rate:	1 %/min	Unit Weight:	1591	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	14.0	days
$(w{:}c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



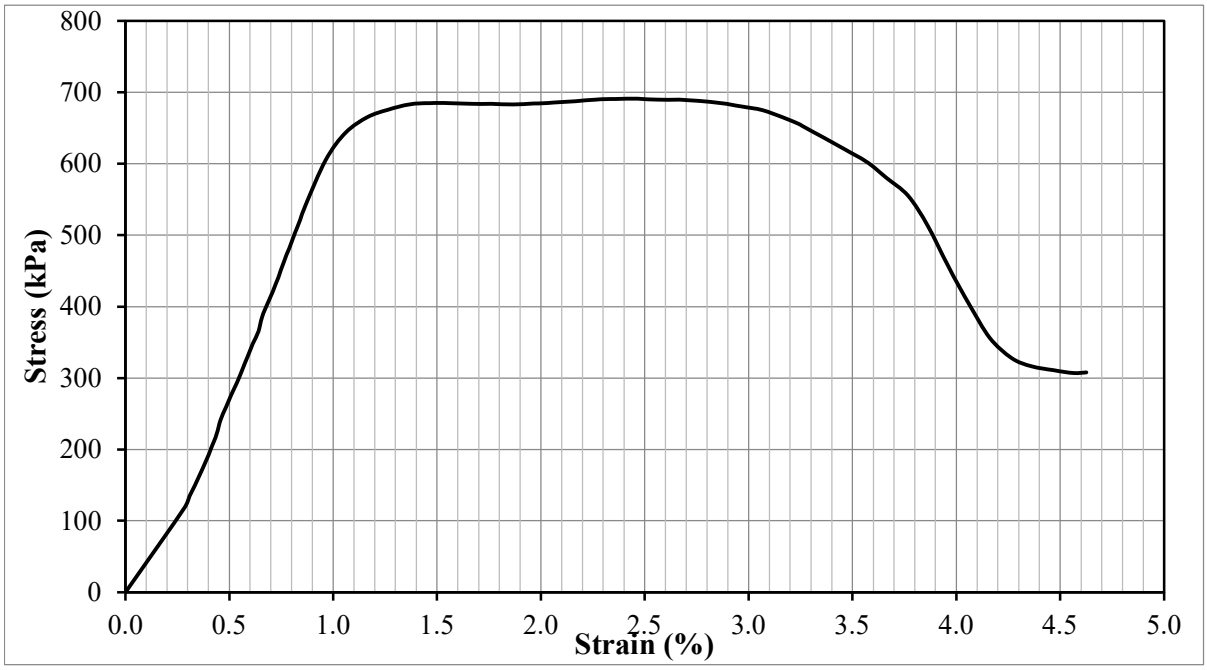
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	586	Strain at failure, εf :	2.48	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	B-8-D	Initial Area:	2114.9	mm^2
Test Date:	8/30/2022	Weight:	333.8	g
Strain Rate:	1 %/min	Unit Weight:	1592	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



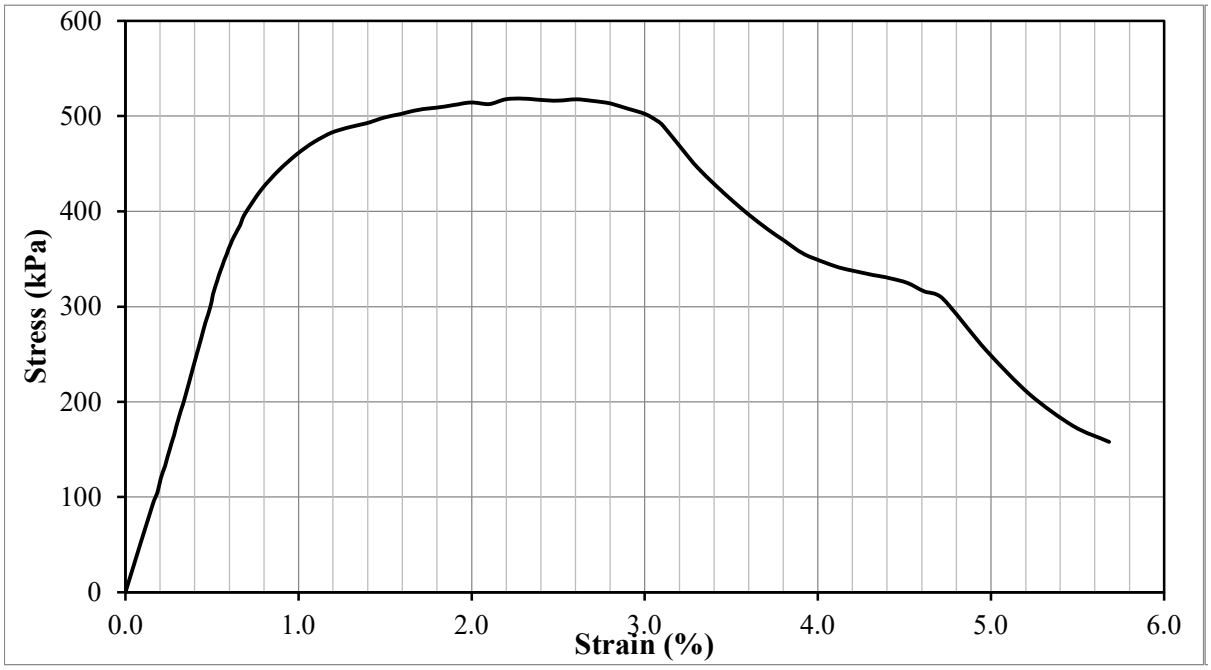
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	699	Strain at failure, εf :	2.47	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	B-8-E	Initial Area:	2110.8	mm^2
Test Date:	8/30/2022	Weight:	338.2	g
Strain Rate:	1 %/min	Unit Weight:	1599	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	28.0	days
$(w{:}c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



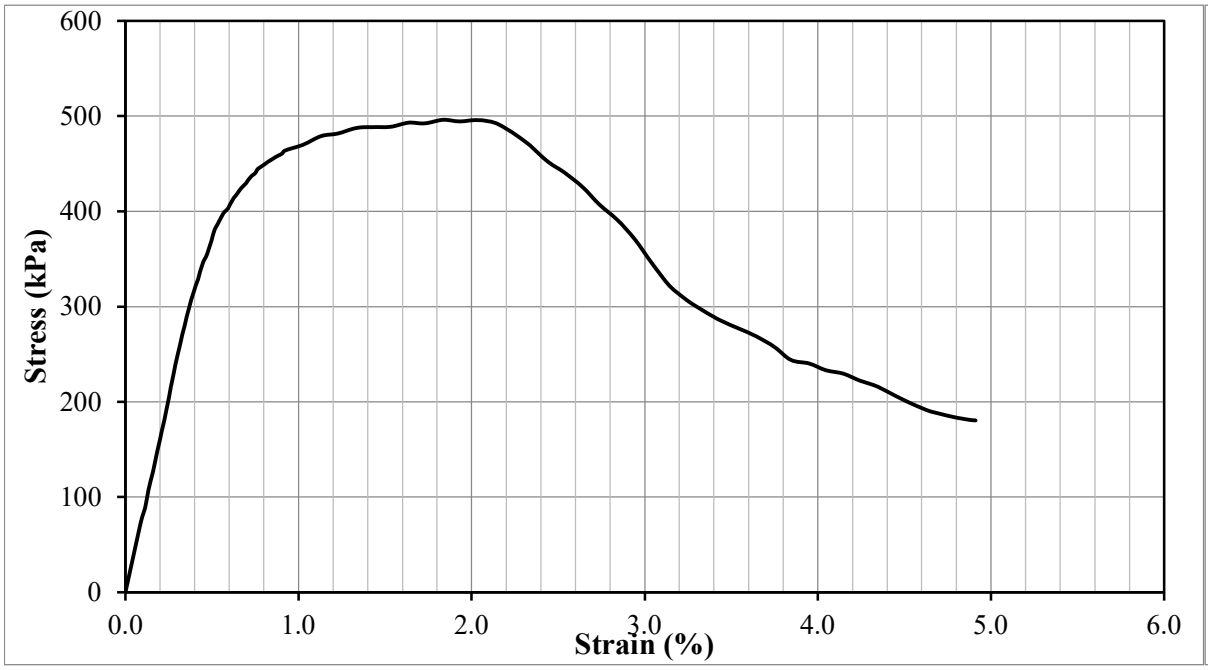
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	687	Strain at failure, εf :	2.47	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	B-9-A	Initial Area:	2110.8	mm^2
Test Date:	8/5/2022	Weight:	333.9	g
Strain Rate:	1 %/min	Unit Weight:	1572	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	2.8	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



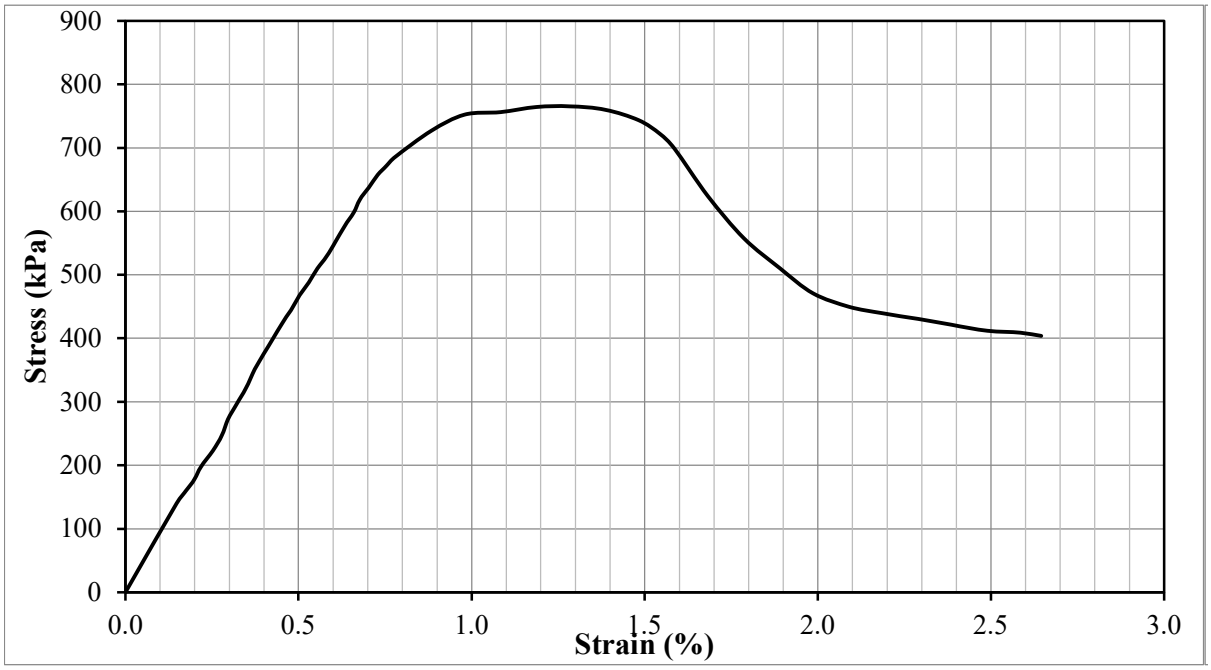
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	516	Strain at failure, εf :	2.30	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	B-9-H	Initial Area:	2114.9	mm^2
Test Date:	8/5/2022	Weight:	332.9	g
Strain Rate:	1 %/min	Unit Weight:	1570	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	2.9	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



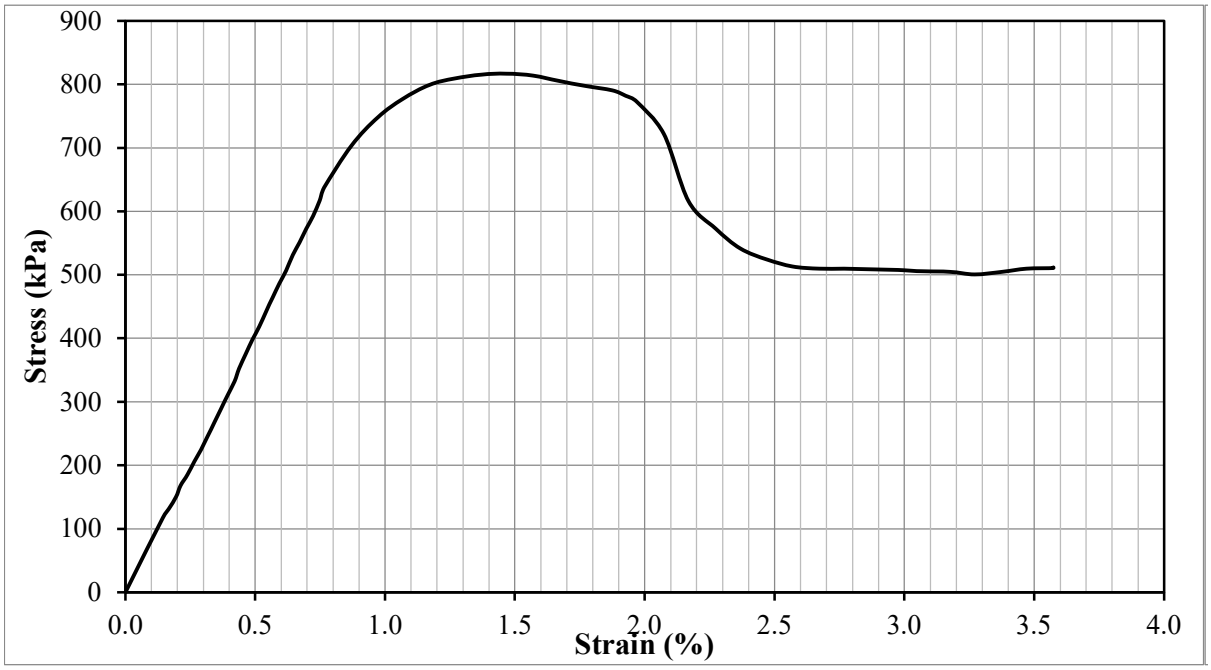
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	493	Strain at failure, εf :	1.83	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	B-9-B	Initial Area:	2121.1	mm^2
Test Date:	8/9/2022	Weight:	331.2	g
Strain Rate:	1 %/min	Unit Weight:	1569	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	6.9	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



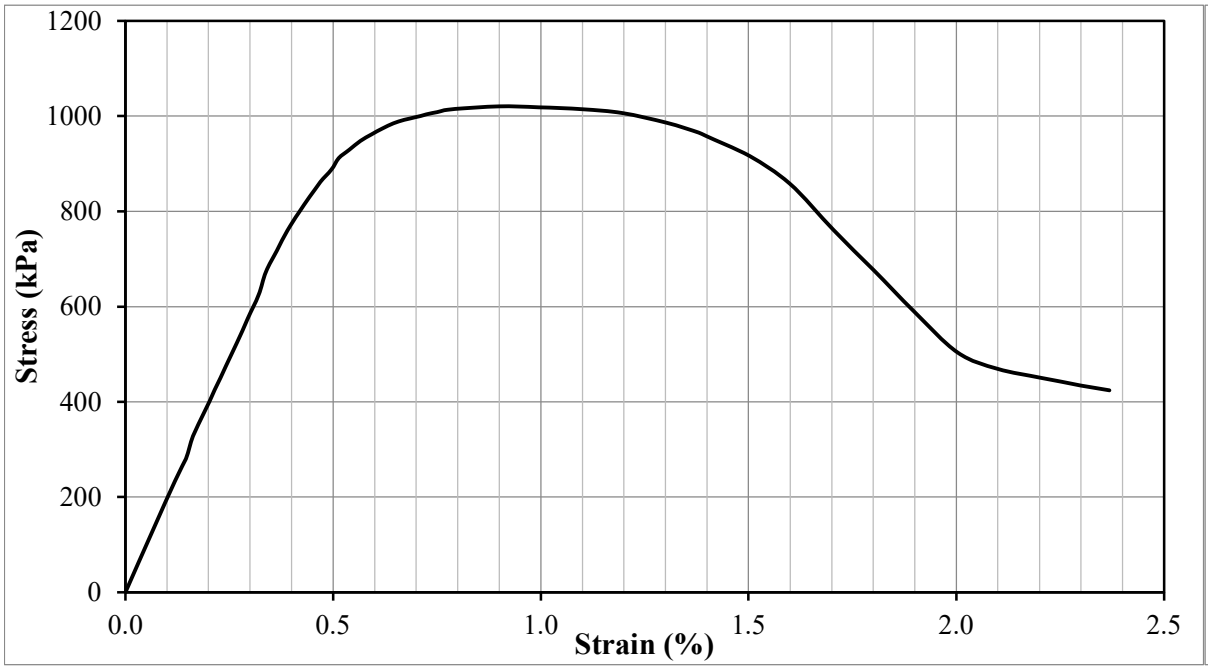
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	760	Strain at failure, εf :	1.28	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	B-9-G	Initial Area:	2114.9	mm^2
Test Date:	8/9/2022	Weight:	332.4	g
Strain Rate:	1 %/min	Unit Weight:	1573	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	6.9	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



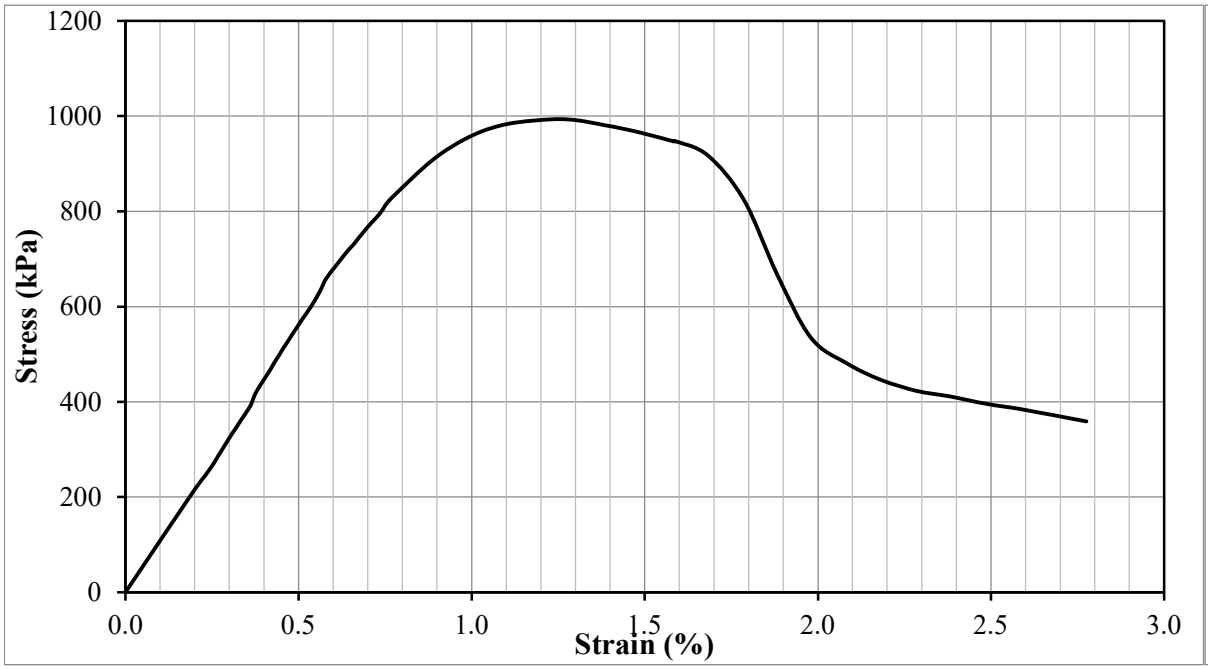
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	812	Strain at failure, εf :	1.47	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	B-9-C	Initial Area:	2110.8	mm^2
Test Date:	8/16/2022	Weight:	332.5	g
Strain Rate:	1 %/min	Unit Weight:	1578	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	13.9	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



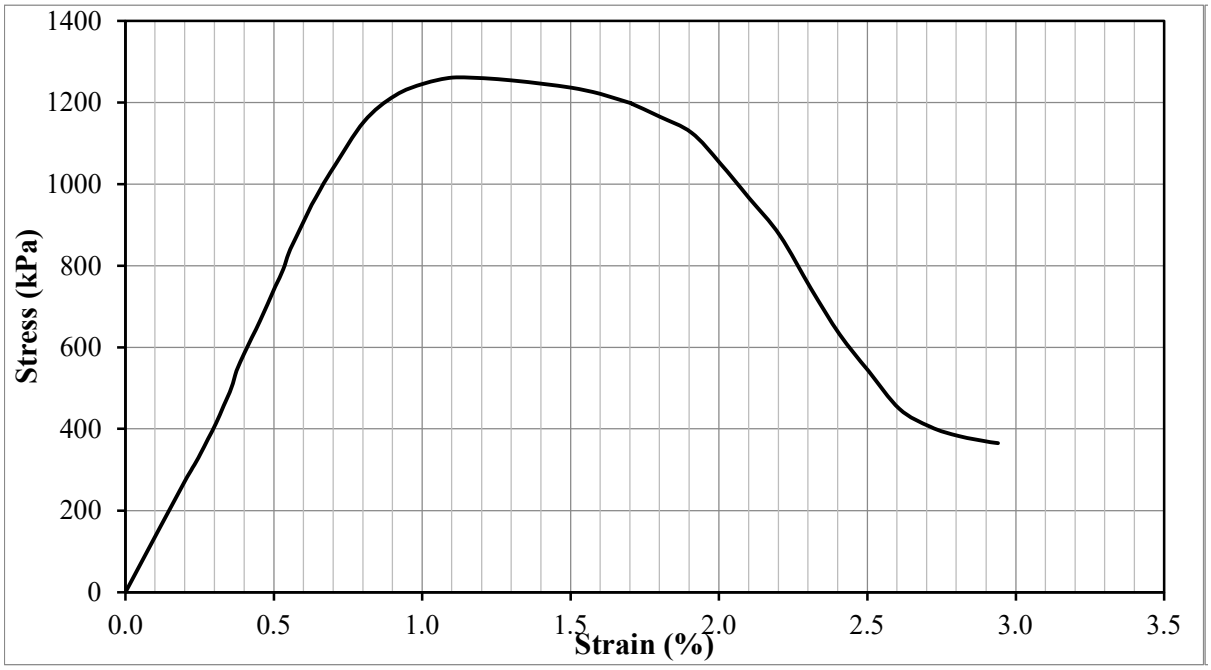
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,014	Strain at failure, εf :	0.90	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	B-9-I	Initial Area:	2112.9	mm^2
Test Date:	8/16/2022	Weight:	332.4	g
Strain Rate:	1 %/min	Unit Weight:	1576	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	14.0	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



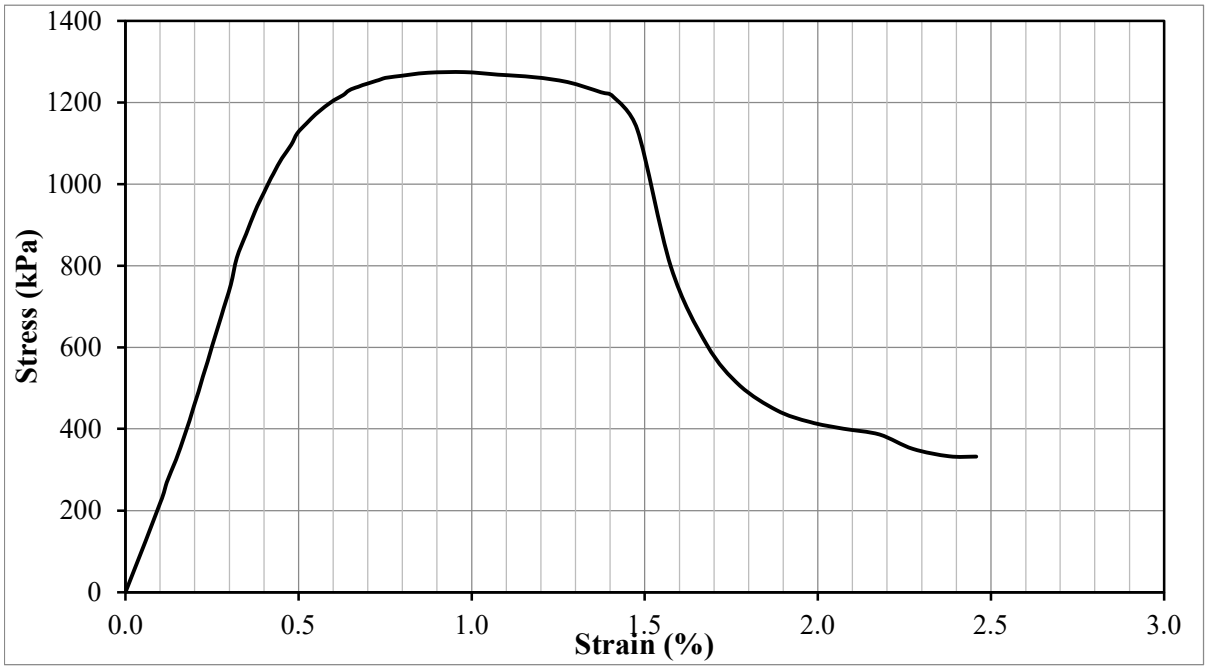
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	987	Strain at failure, εf :	1.28	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	B-9-D	Initial Area:	2106.6	mm^2
Test Date:	8/30/2022	Weight:	334.4	g
Strain Rate:	1 %/min	Unit Weight:	1583	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



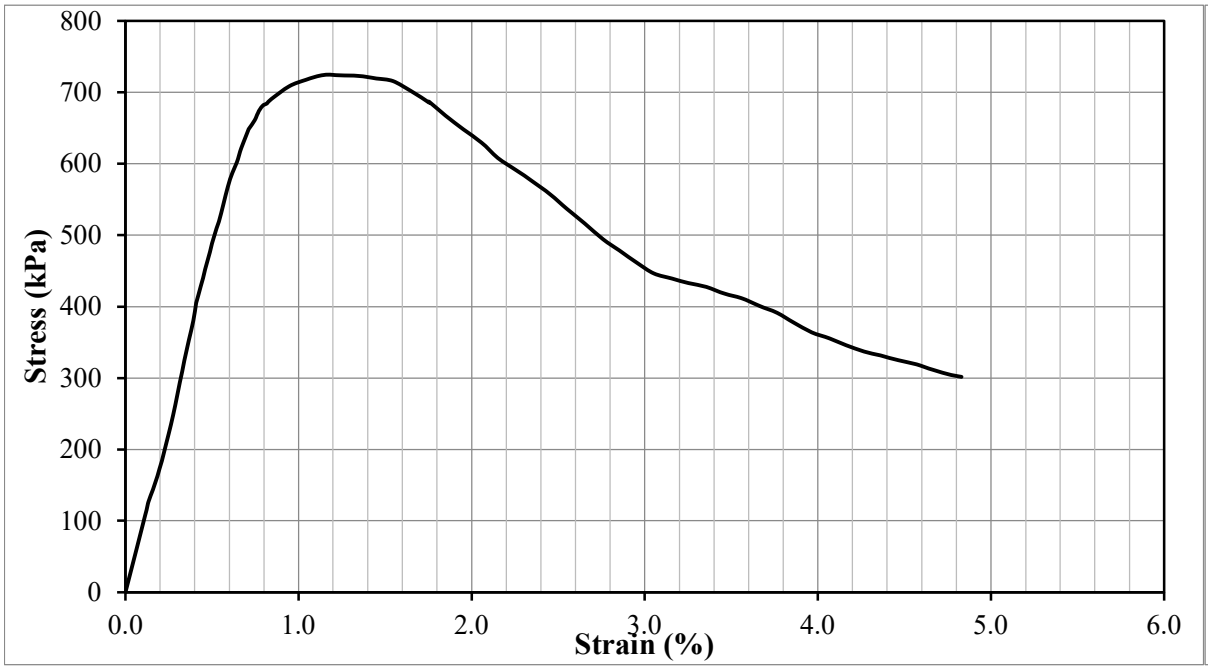
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,254	Strain at failure, εf :	1.10	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	B-9-E	Initial Area:	2119.1	mm^2
Test Date:	8/30/2022	Weight:	333.9	g
Strain Rate:	1 %/min	Unit Weight:	1570	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	200	Curing Period	28.0	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



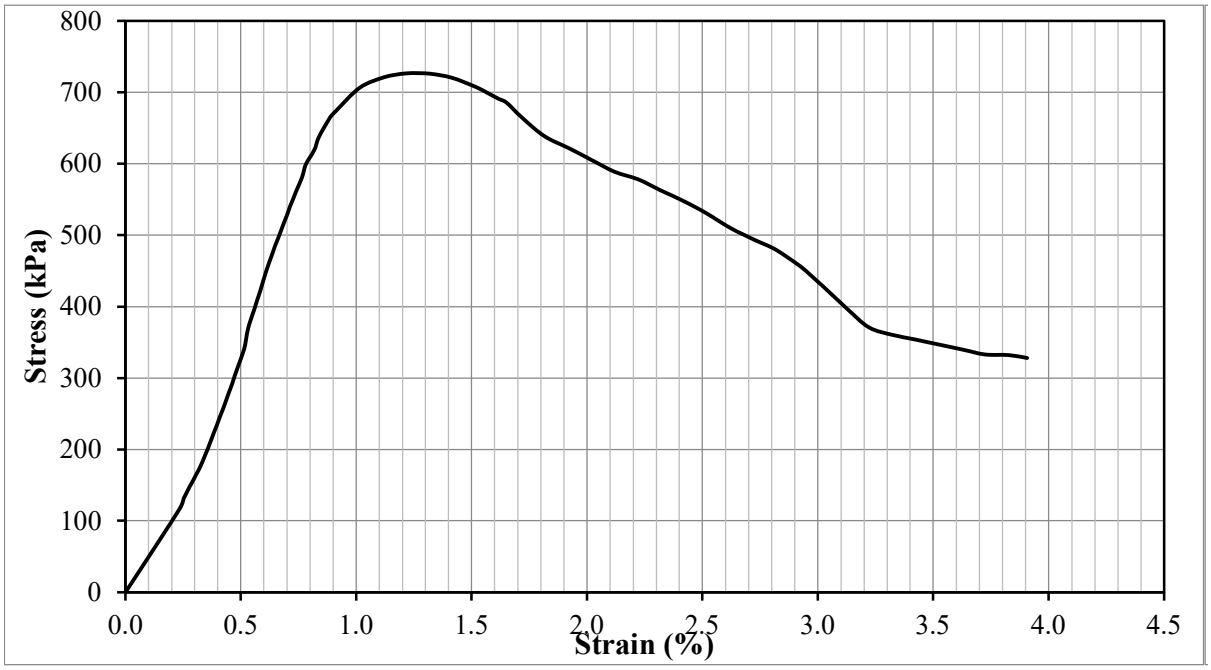
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,268	Strain at failure, εf :	0.98	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	B-10-A	Initial Area:	2119.1	mm^2
Test Date:	8/5/2022	Weight:	325.1	g
Strain Rate:	1 %/min	Unit Weight:	1550	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	2.8	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



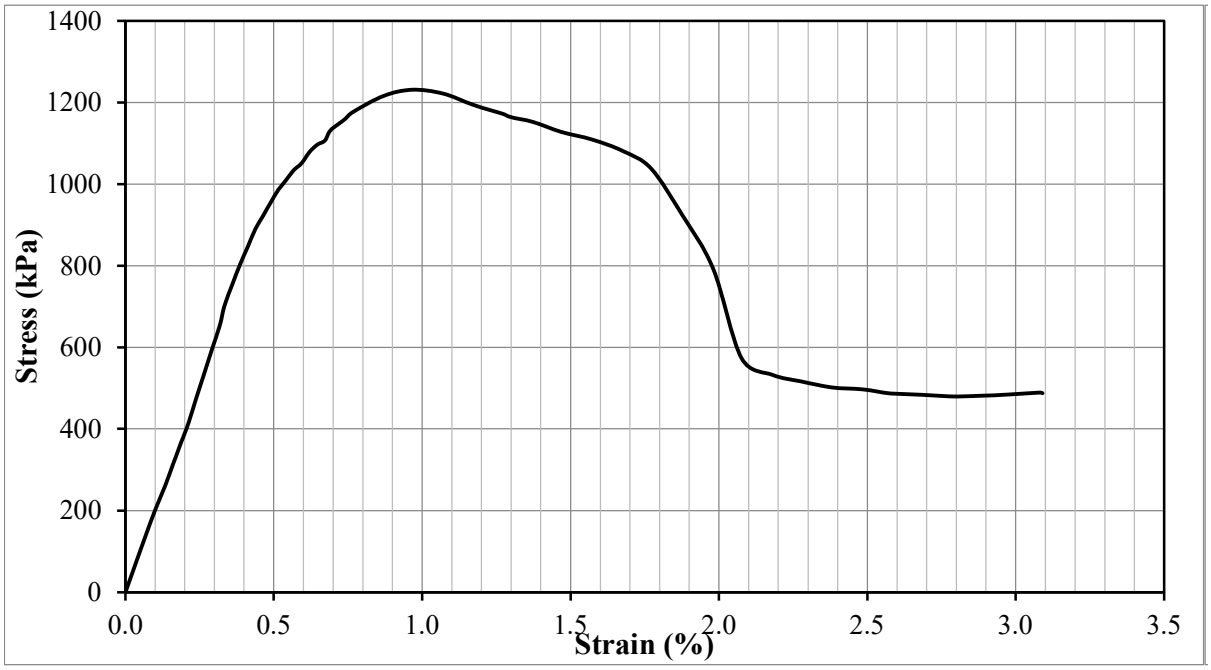
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	719	Strain at failure, εf :	1.15	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	B-10-H	Initial Area:	2106.6	mm^2
Test Date:	8/5/2022	Weight:	329.7	g
Strain Rate:	1 %/min	Unit Weight:	1564	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	2.8	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



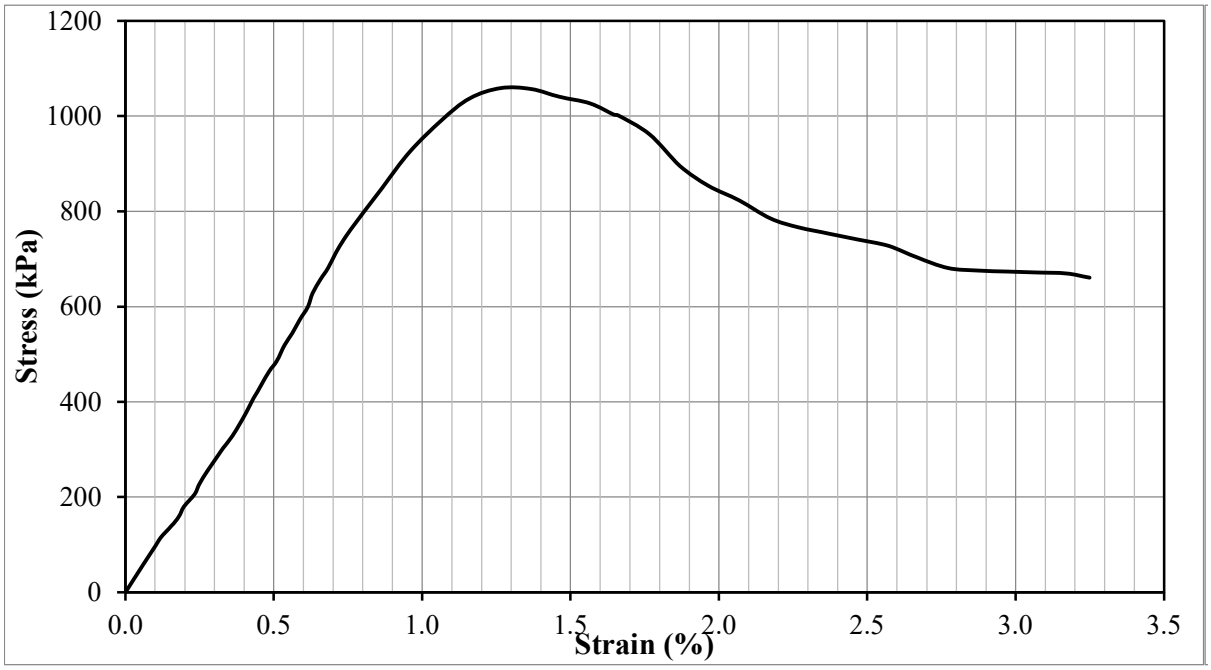
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	722	Strain at failure, εf :	1.22	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	B-10-B	Initial Area:	2114.9	mm^2
Test Date:	8/9/2022	Weight:	324.5	g
Strain Rate:	1 %/min	Unit Weight:	1557	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	6.9	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



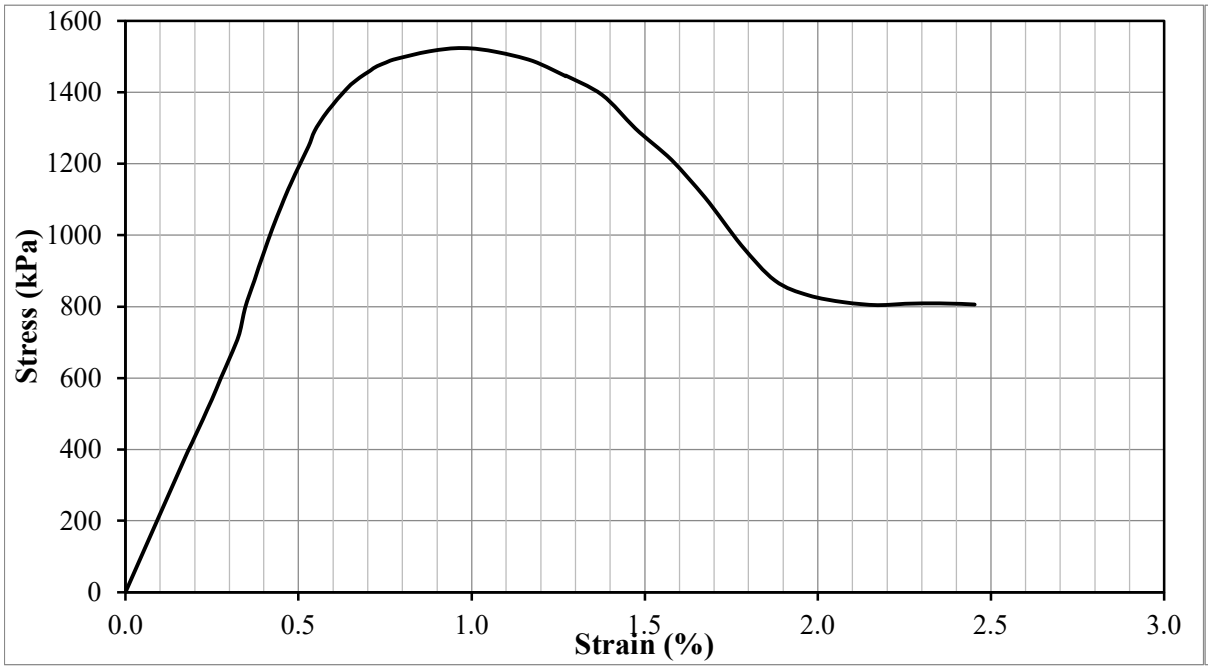
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,221	Strain at failure, εf :	0.97	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	B-10-G	Initial Area:	2114.9	mm^2
Test Date:	8/9/2022	Weight:	323.5	g
Strain Rate:	1 %/min	Unit Weight:	1559	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	6.9	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



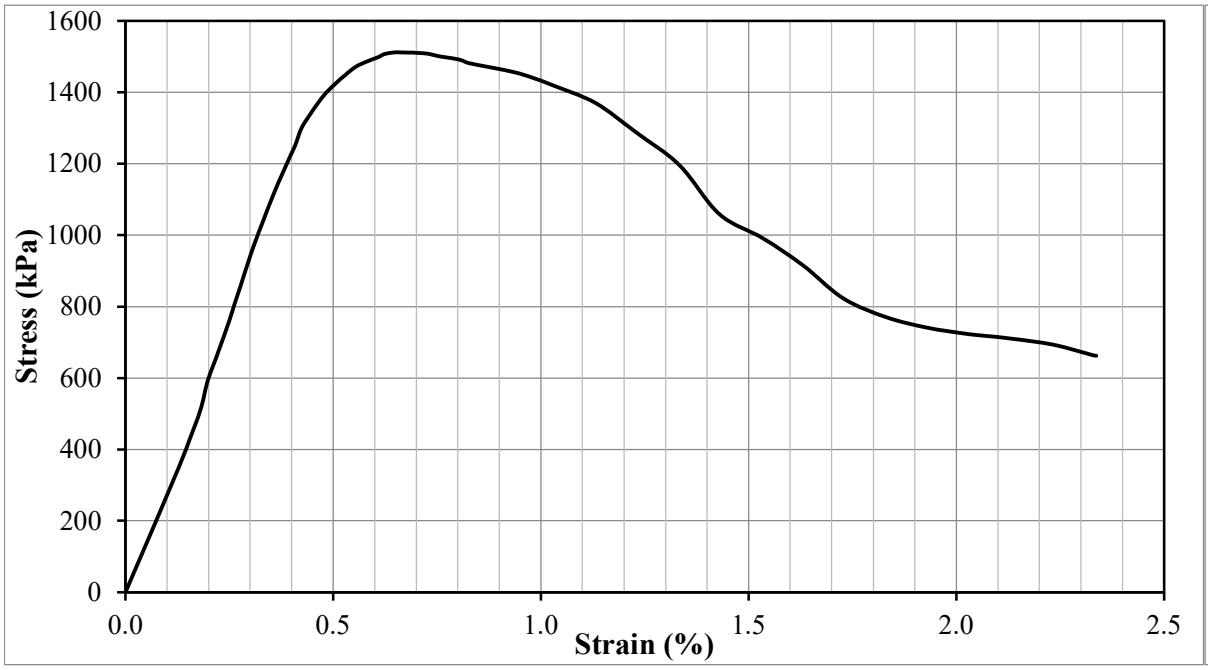
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,049	Strain at failure, εf :	1.26	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	B-10-C	Initial Area:	2106.6	mm^2
Test Date:	8/16/2022	Weight:	328.1	g
Strain Rate:	1 %/min	Unit Weight:	1564	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	13.9	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



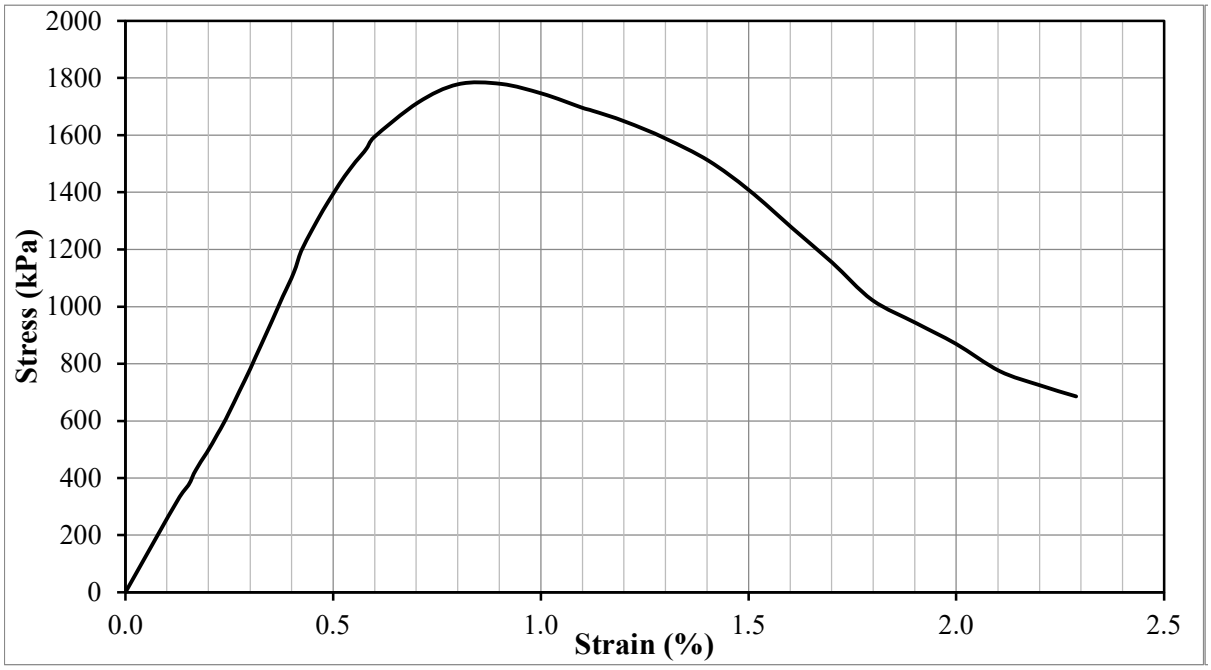
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,514	Strain at failure, εf :	0.98	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	98.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	B-10-F	Initial Area:	2119.1	mm^2
Test Date:	8/16/2022	Weight:	325.4	g
Strain Rate:	1 %/min	Unit Weight:	1555	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	13.9	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



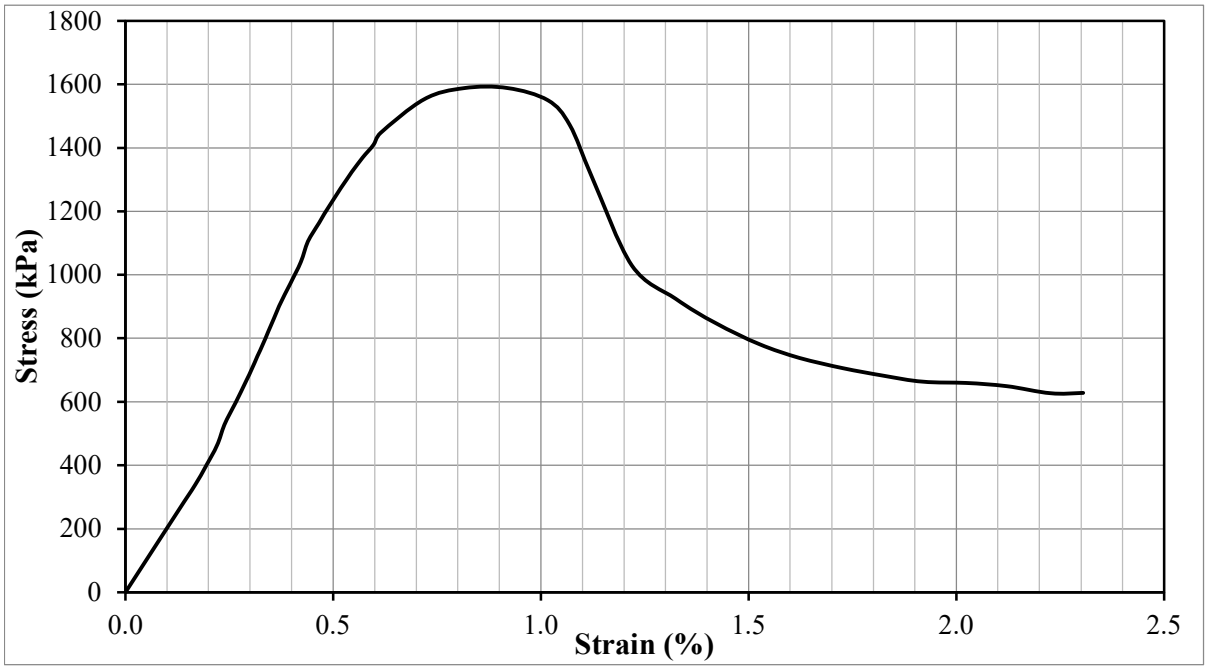
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,500	Strain at failure, εf :	0.65	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	B-10-D	Initial Area:	2108.7	mm^2
Test Date:	8/30/2022	Weight:	327.3	g
Strain Rate:	1 %/min	Unit Weight:	1559	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	27.9	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



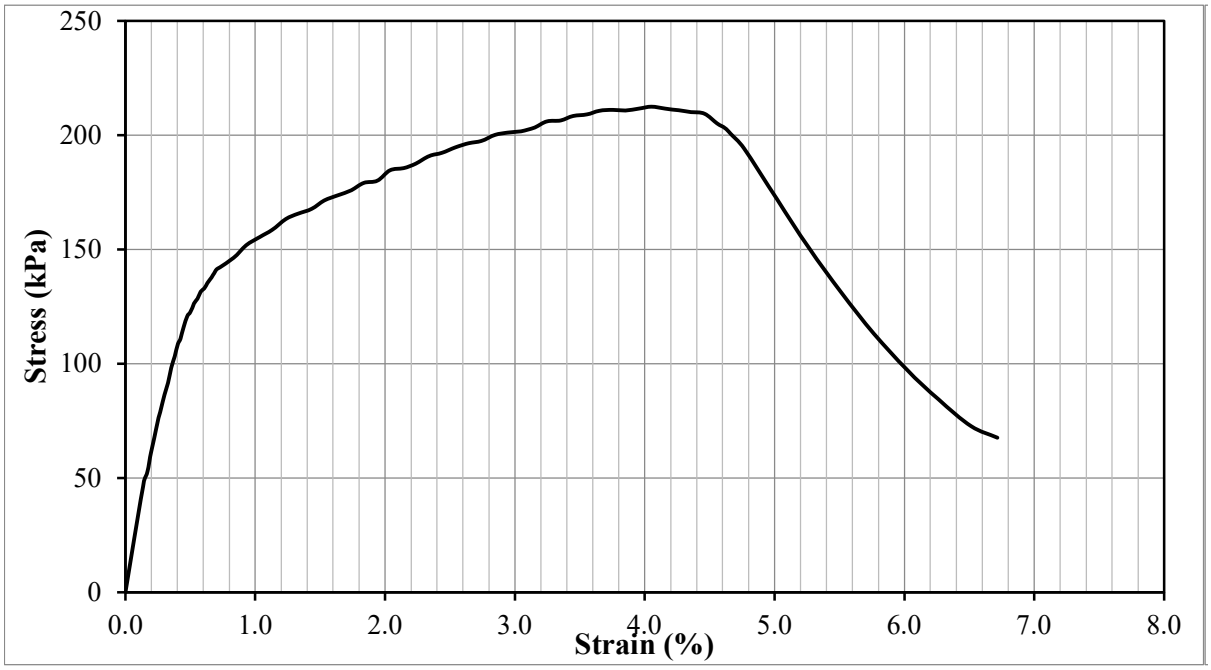
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,768	Strain at failure, εf :	0.90	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	B-10-E	Initial Area:	2110.8	mm^2
Test Date:	8/30/2022	Weight:	326.8	g
Strain Rate:	1 %/min	Unit Weight:	1561	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	275	Curing Period	27.9	days
$(w{:}c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



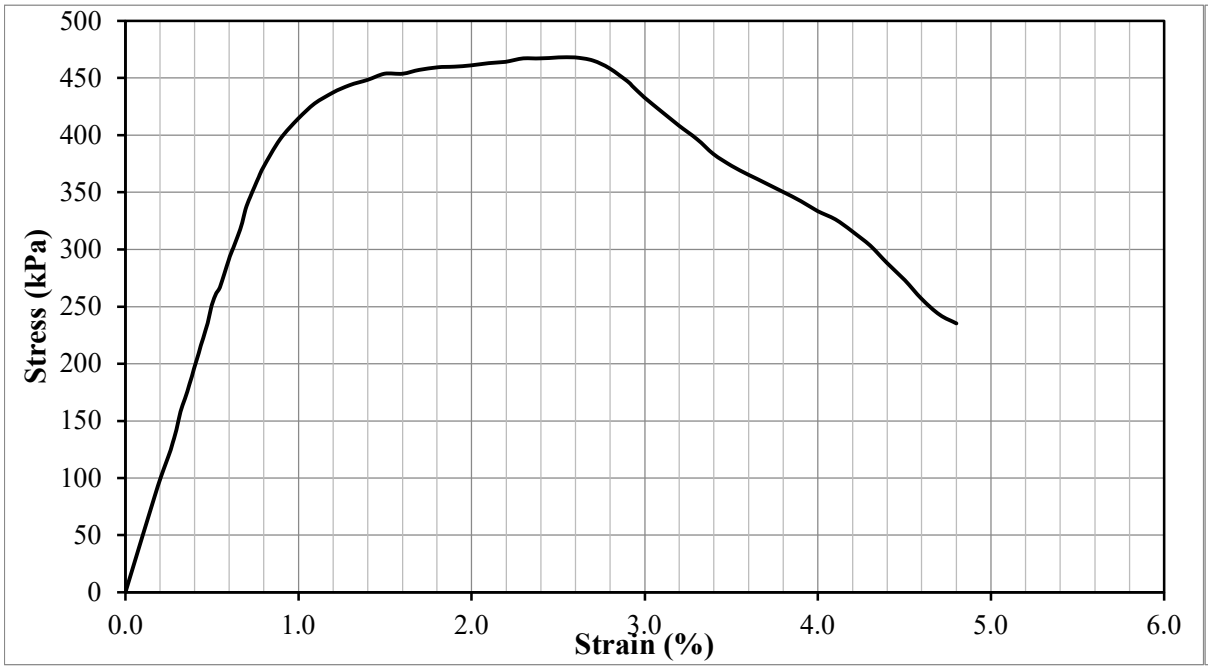
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	1,577	Strain at failure, εf :	0.92	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	B-11-A	Initial Area:	2104.6	mm^2
Test Date:	8/24/2022	Weight:	351.4	g
Strain Rate:	1 %/min	Unit Weight:	1650	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	1.1	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



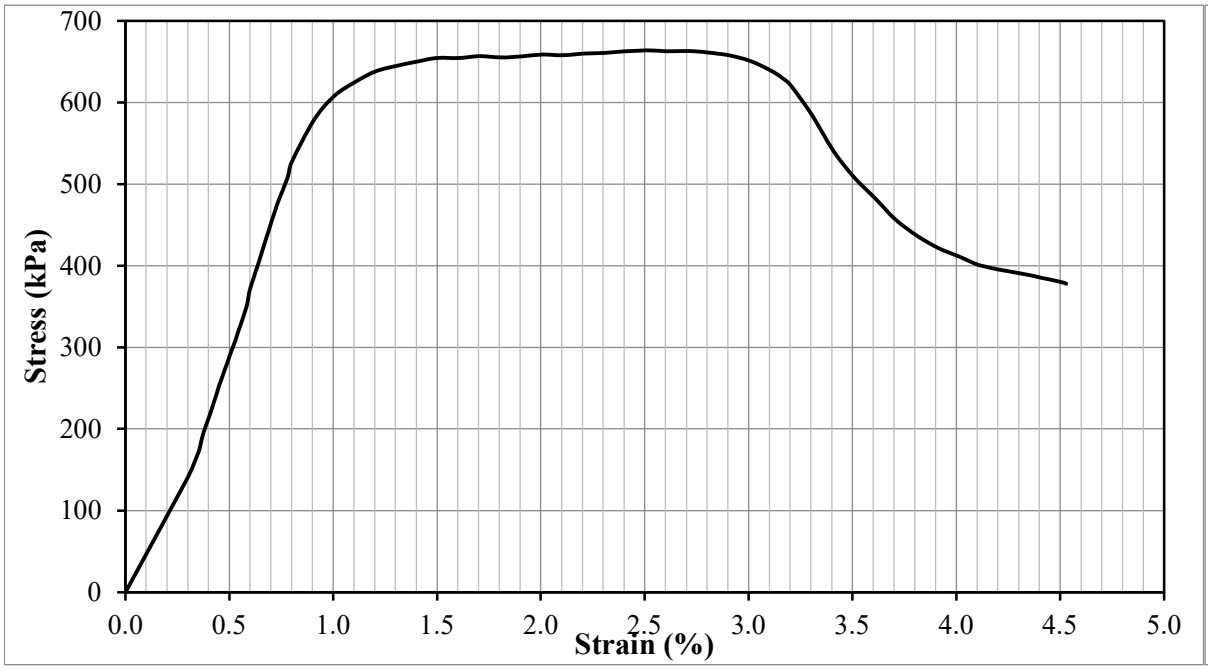
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	212	Strain at failure, εf :	4.05	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	B-11-B	Initial Area:	2096.3	mm^2
Test Date:	8/26/2022	Weight:	351.1	g
Strain Rate:	1 %/min	Unit Weight:	1661	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	2.9	days
$(w{:}c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



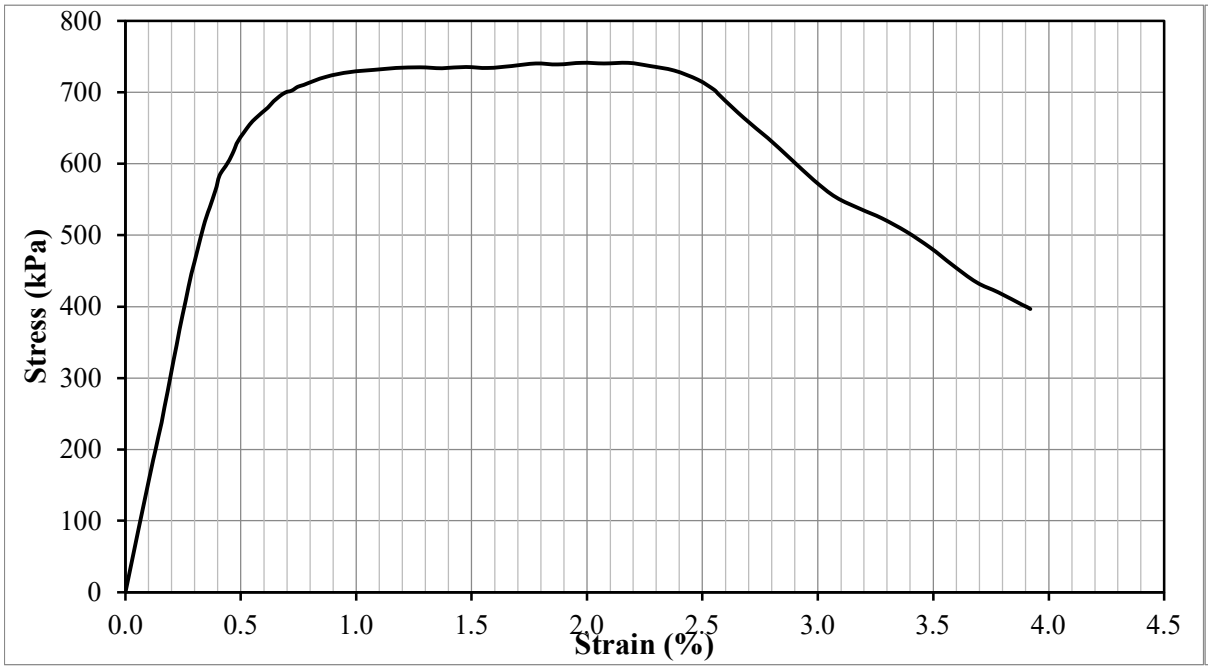
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	466	Strain at failure, εf :	2.50	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	B-11-C	Initial Area:	2114.9	mm^2
Test Date:	8/30/2022	Weight:	351.5	g
Strain Rate:	1 %/min	Unit Weight:	1645	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	7.3	days
$(w{:}c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



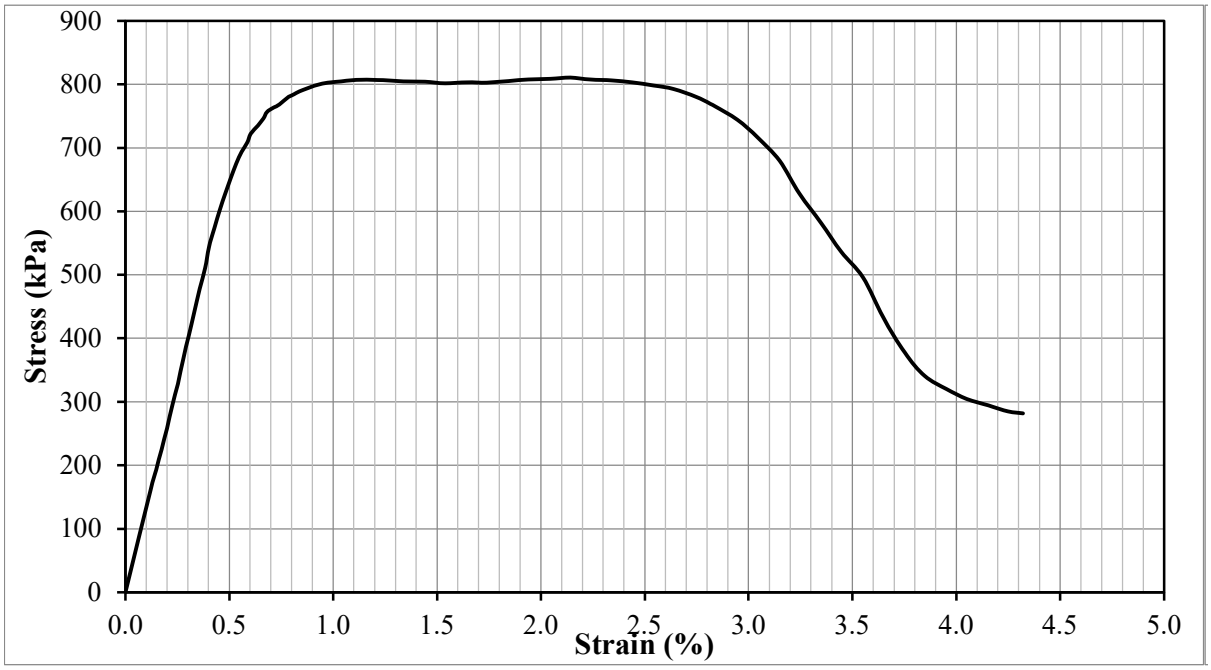
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	661	Strain at failure, εf :	2.51	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.6	mm
I.D.:	B-11-D	Initial Area:	2094.3	mm^2
Test Date:	9/2/2022	Weight:	352.4	g
Strain Rate:	1 %/min	Unit Weight:	1669	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	10.0	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



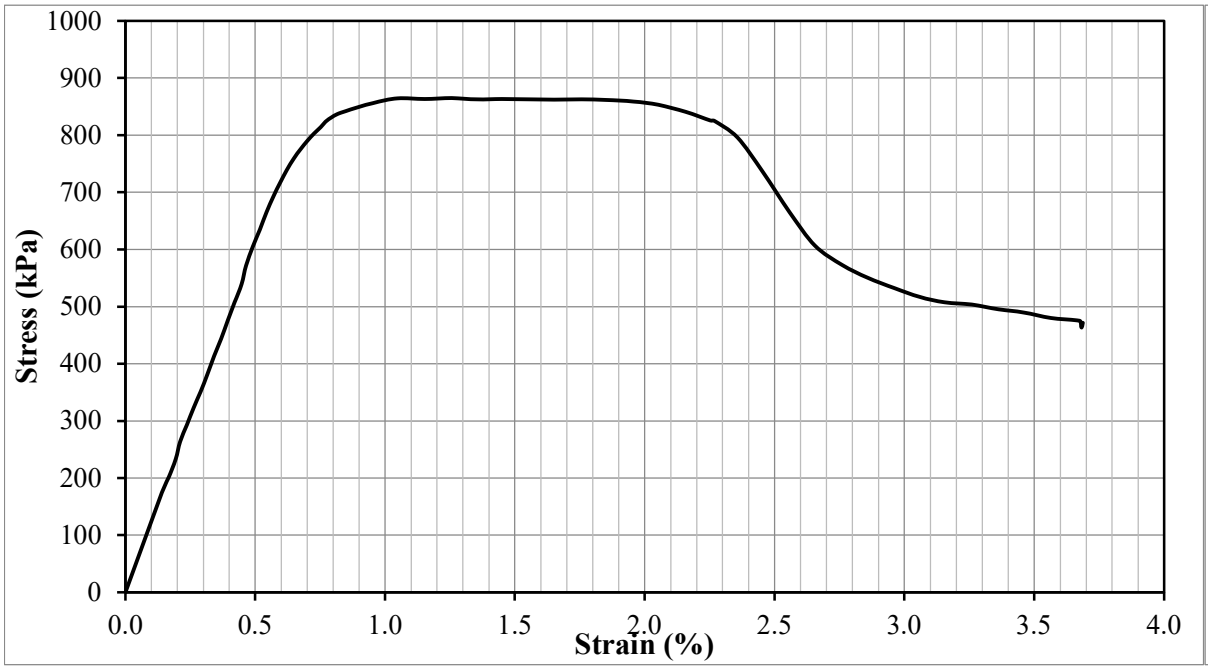
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	738	Strain at failure, εf :	1.98	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	B-11-E	Initial Area:	2119.1	mm^2
Test Date:	9/6/2022	Weight:	351.6	g
Strain Rate:	1 %/min	Unit Weight:	1646	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	14.0	days
$(w{:}c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



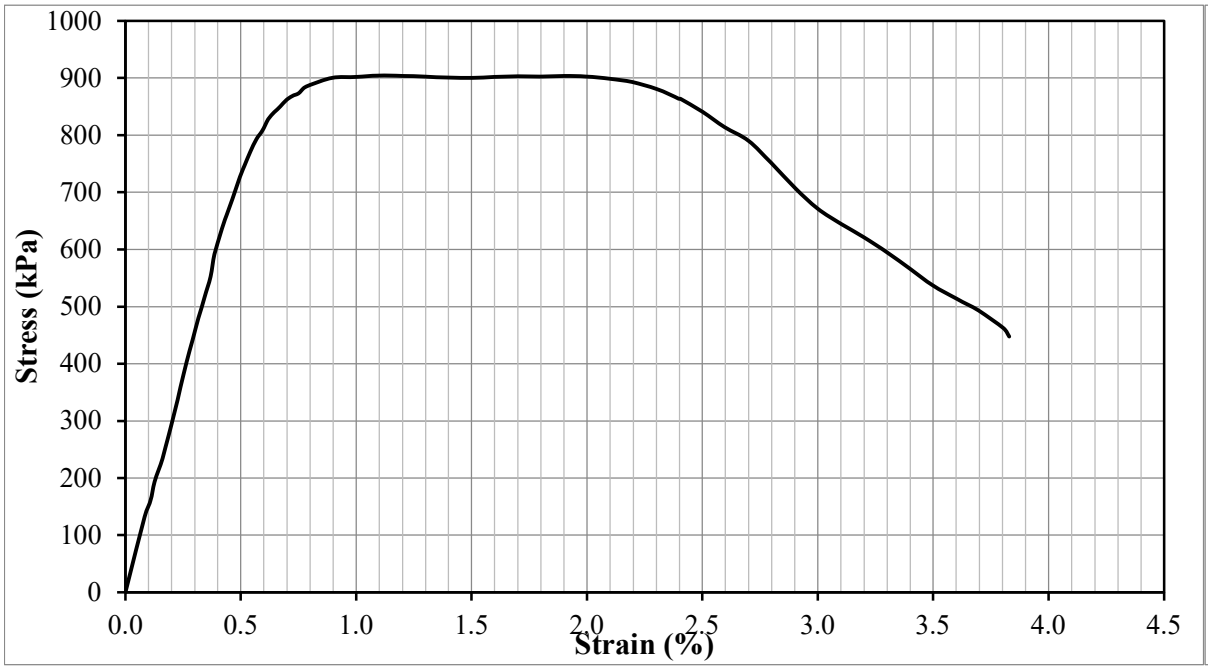
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	807	Strain at failure, εf :	2.14	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	B-11-F	Initial Area:	2114.9	mm^2
Test Date:	9/9/2022	Weight:	351.3	g
Strain Rate:	1 %/min	Unit Weight:	1648	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	17.2	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



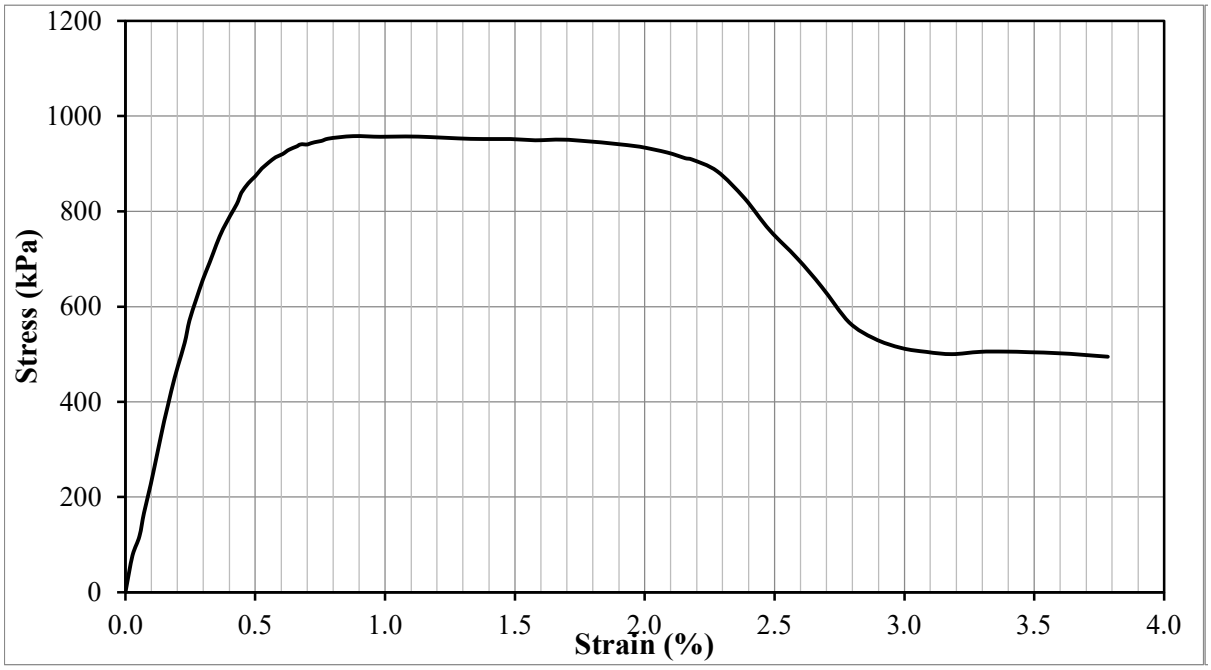
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	861	Strain at failure, εf :	1.26	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	52.0	mm
I.D.:	B-11-G	Initial Area:	2121.1	mm^2
Test Date:	9/13/2022	Weight:	351.1	g
Strain Rate:	1 %/min	Unit Weight:	1642	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	20.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



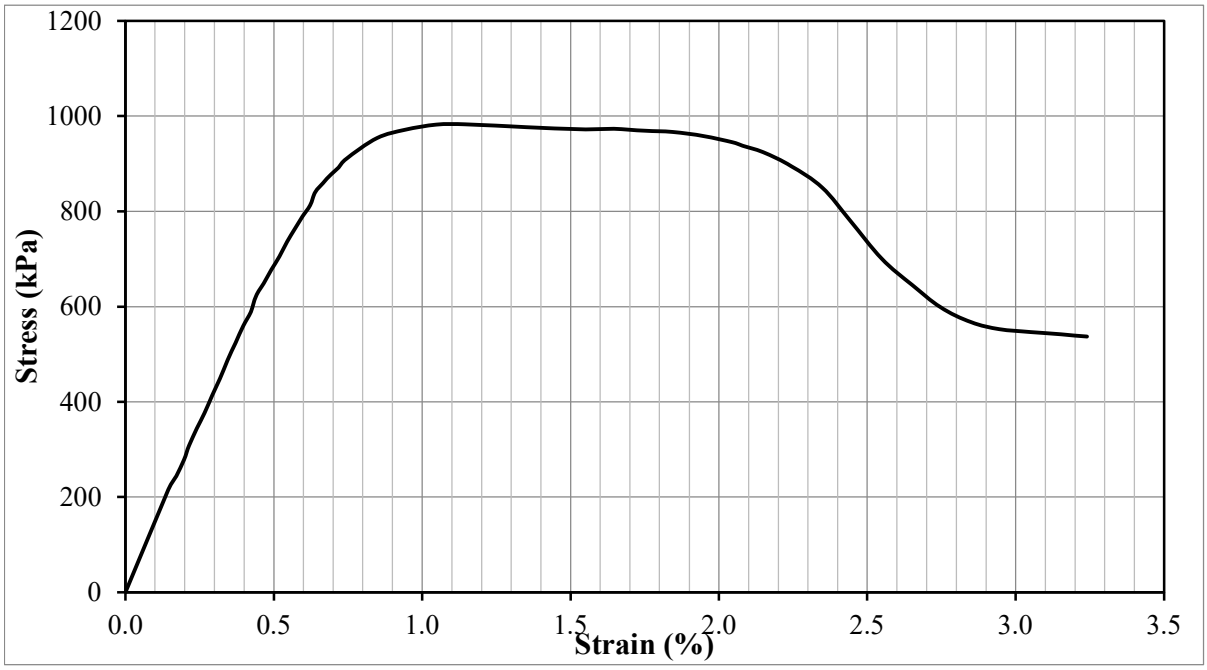
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	900	Strain at failure, εf :	1.10	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	B-11-H	Initial Area:	2108.7	mm^2
Test Date:	9/16/2022	Weight:	348.5	g
Strain Rate:	1 %/min	Unit Weight:	1658	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	24.1	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



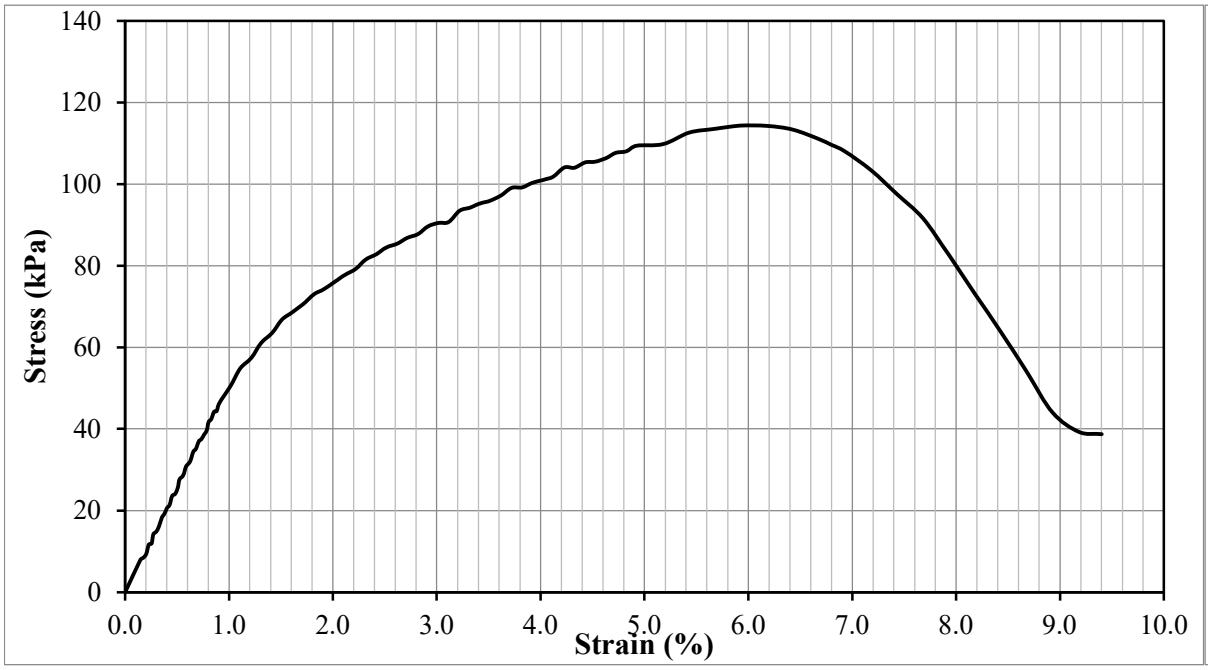
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	952	Strain at failure, εf :	0.88	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	B-11-I	Initial Area:	2100.5	mm^2
Test Date:	9/20/2022	Weight:	351.9	g
Strain Rate:	1 %/min	Unit Weight:	1663	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	125	Curing Period	27.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



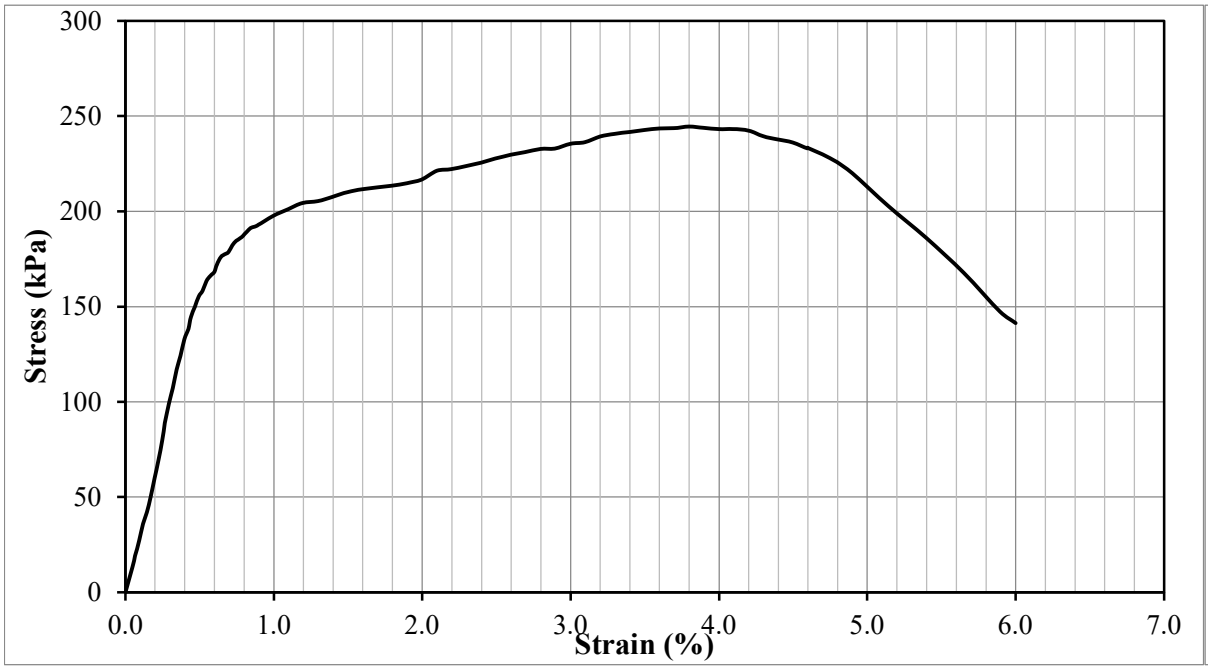
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	979	Strain at failure, εf :	1.14	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	B-12-A	Initial Area:	2096.3	mm^2
Test Date:	8/24/2022	Weight:	343.0	g
Strain Rate:	1 %/min	Unit Weight:	1636	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	50	Curing Period	1.1	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



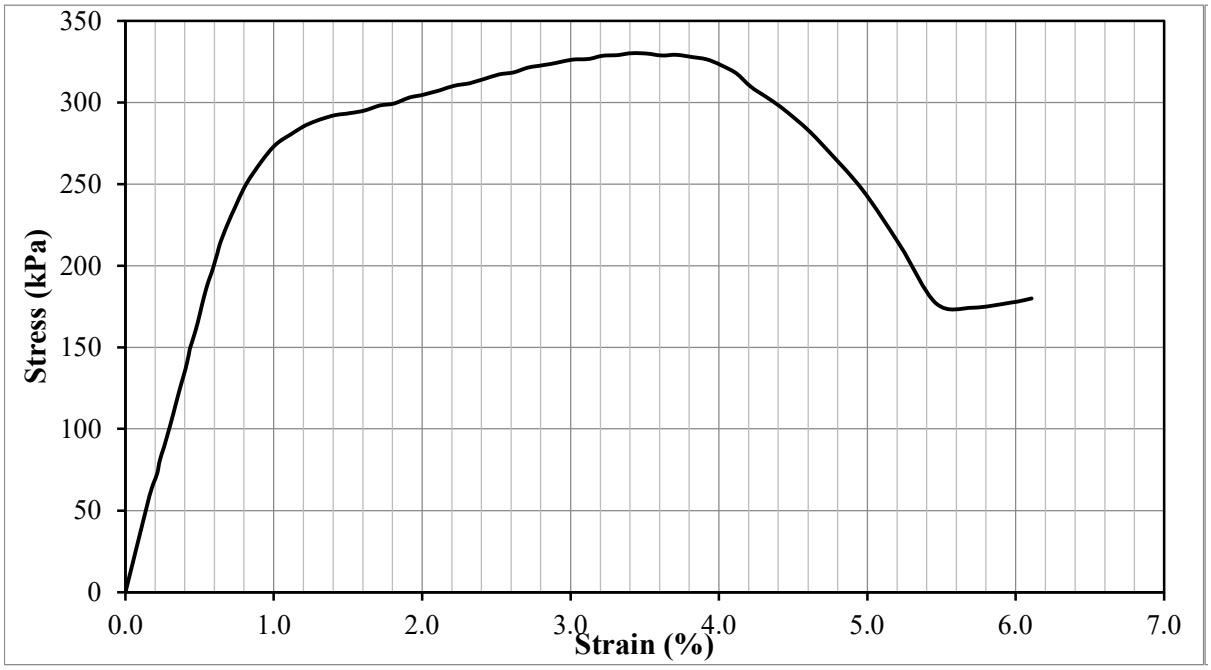
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	114	Strain at failure, εf :	5.93	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	B-12-B	Initial Area:	2104.6	mm^2
Test Date:	8/26/2022	Weight:	347.2	g
Strain Rate:	1 %/min	Unit Weight:	1636	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	50	Curing Period	2.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



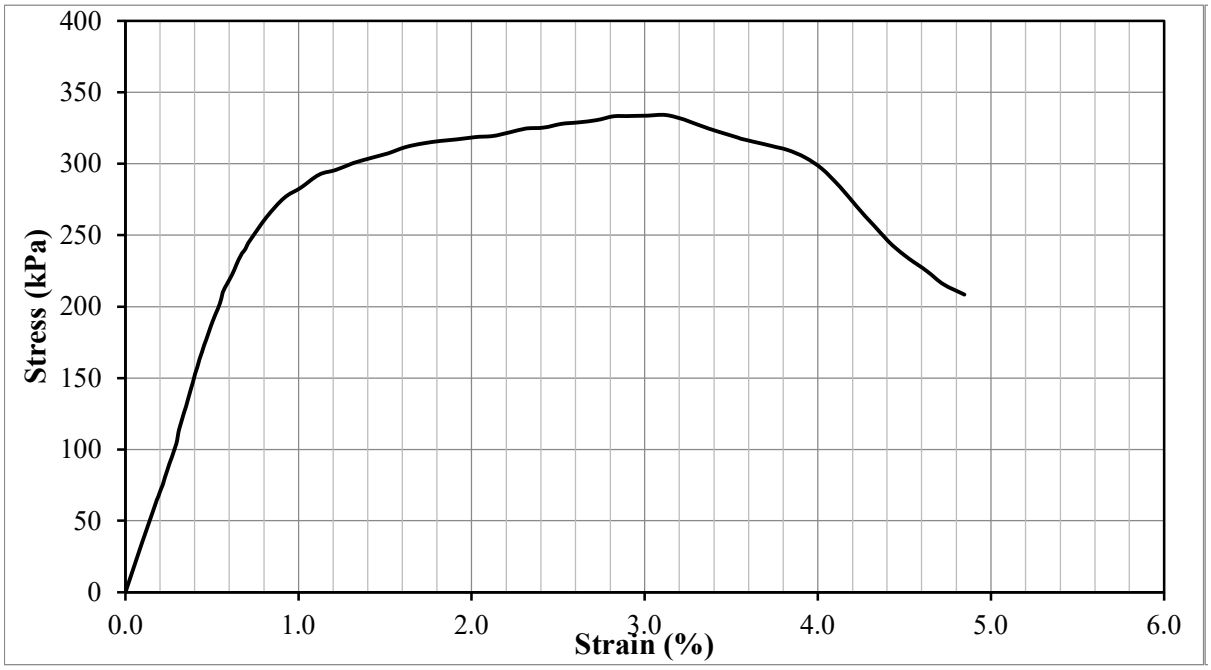
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	243	Strain at failure, εf :	3.80	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	B-12-C	Initial Area:	2110.8	mm^2
Test Date:	8/30/2022	Weight:	346.0	g
Strain Rate:	1 %/min	Unit Weight:	1636	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	50	Curing Period	7.3	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



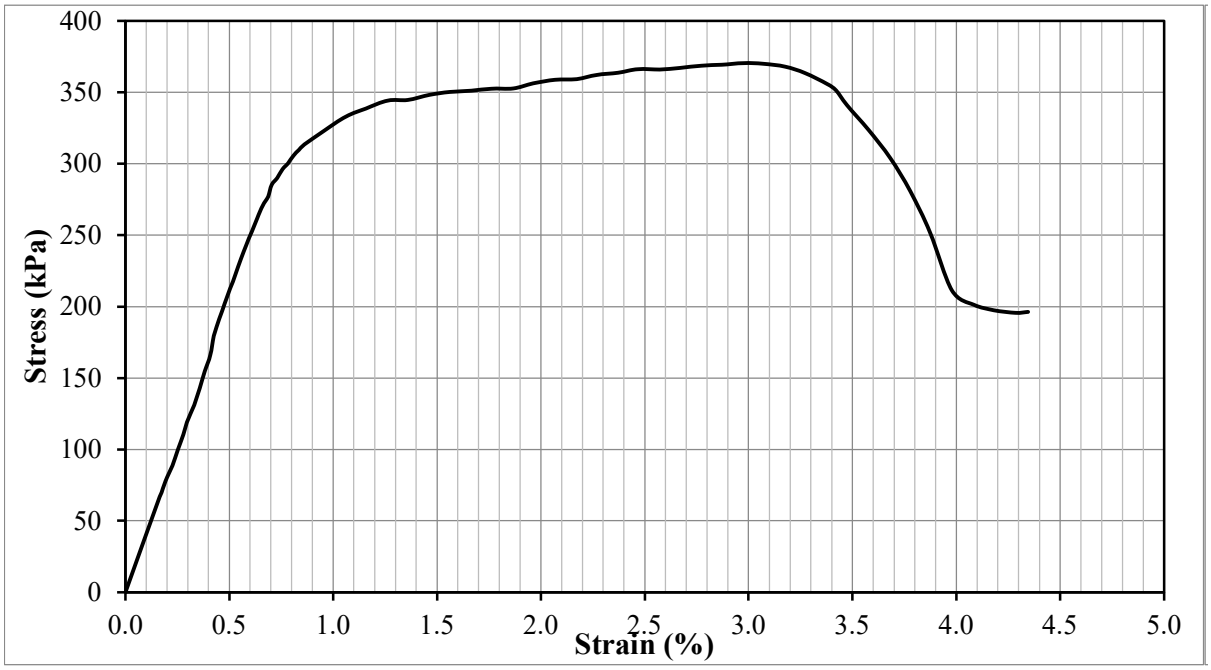
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	328	Strain at failure, εf :	3.41	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	B-12-D	Initial Area:	2114.9	mm^2
Test Date:	9/2/2022	Weight:	344.4	g
Strain Rate:	1 %/min	Unit Weight:	1625	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	50	Curing Period	10.0	days
$(w{:}c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



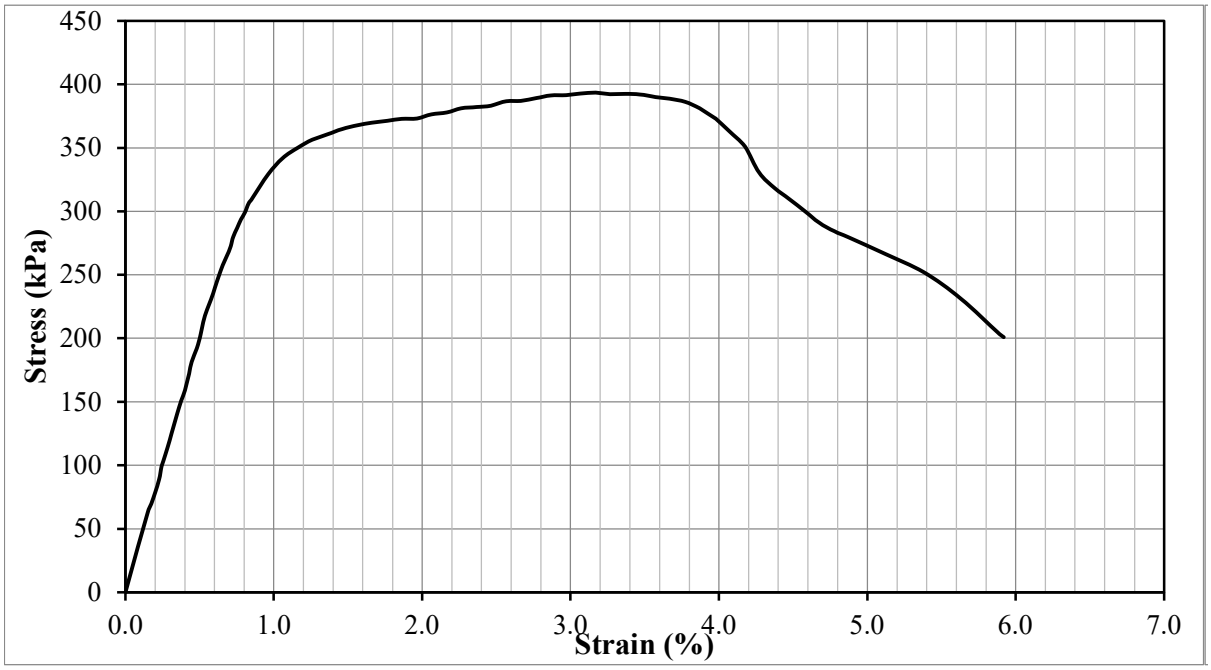
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	332	Strain at failure, εf :	3.12	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	B-12-E	Initial Area:	2114.9	mm^2
Test Date:	9/6/2022	Weight:	346.8	g
Strain Rate:	1 %/min	Unit Weight:	1630	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	50	Curing Period	14.0	days
$(w{:}c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



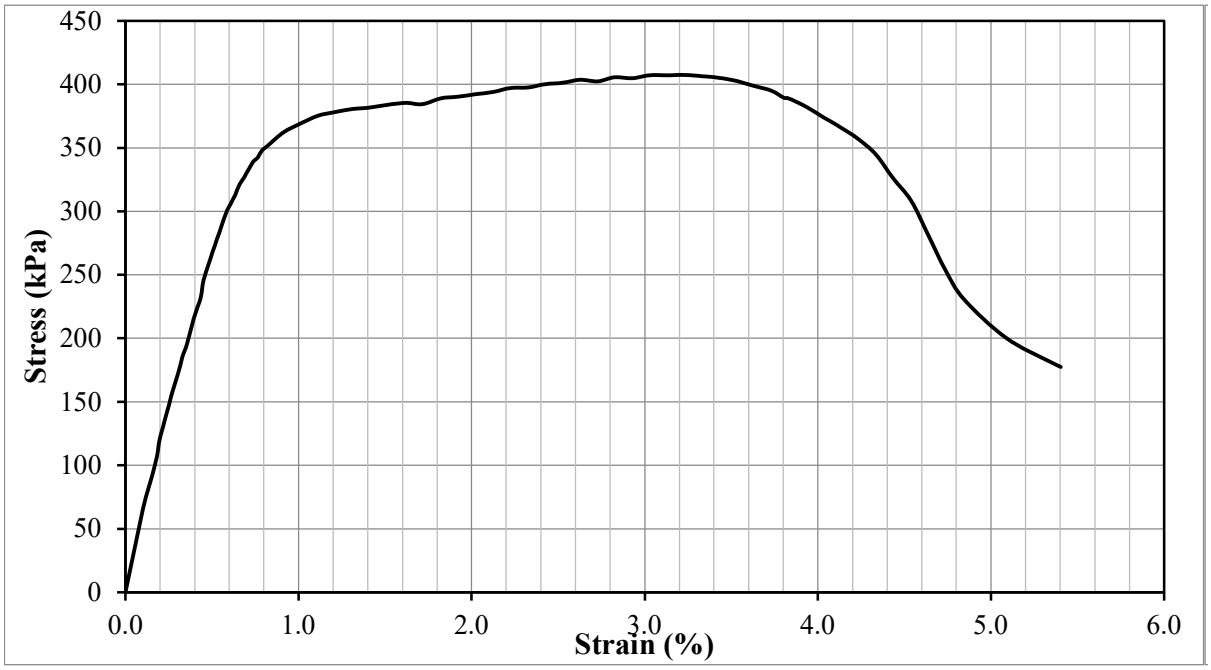
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	369	Strain at failure, εf :	2.98	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.6	mm
I.D.:	B-12-F	Initial Area:	2090.1	mm^2
Test Date:	9/9/2022	Weight:	348.3	g
Strain Rate:	1 %/min	Unit Weight:	1656	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	50	Curing Period	17.2	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



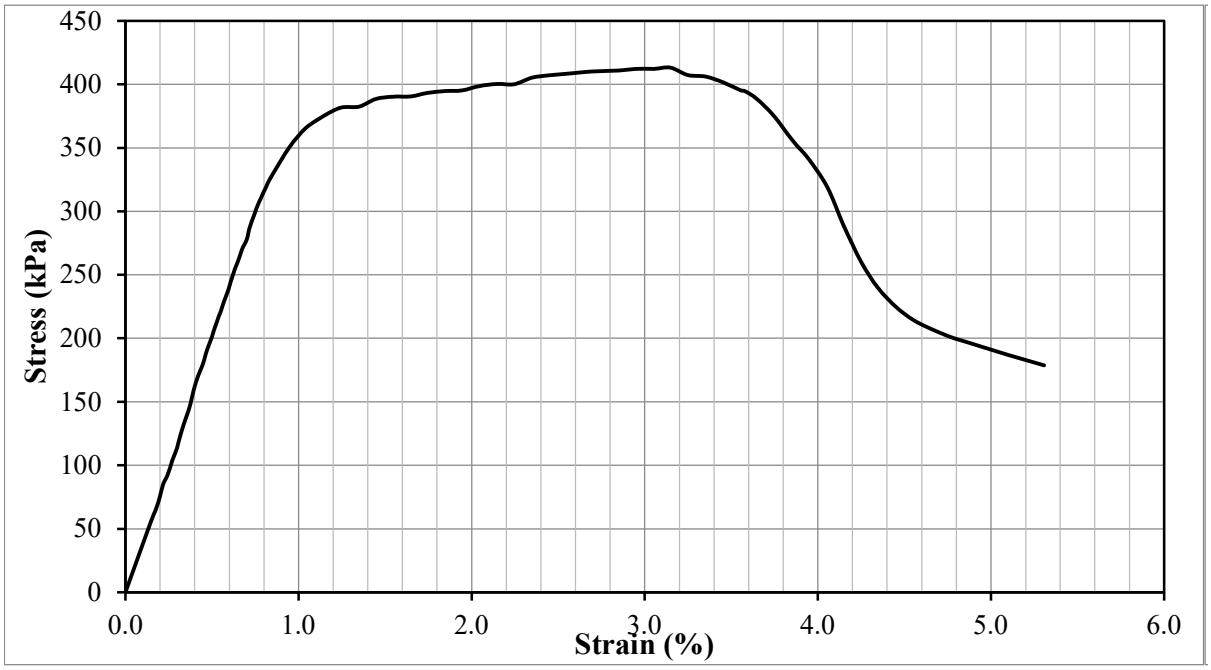
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	392	Strain at failure, εf :	3.17	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.4	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	B-12-G	Initial Area:	2108.7	mm^2
Test Date:	9/13/2022	Weight:	347.1	g
Strain Rate:	1 %/min	Unit Weight:	1640	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	50	Curing Period	20.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



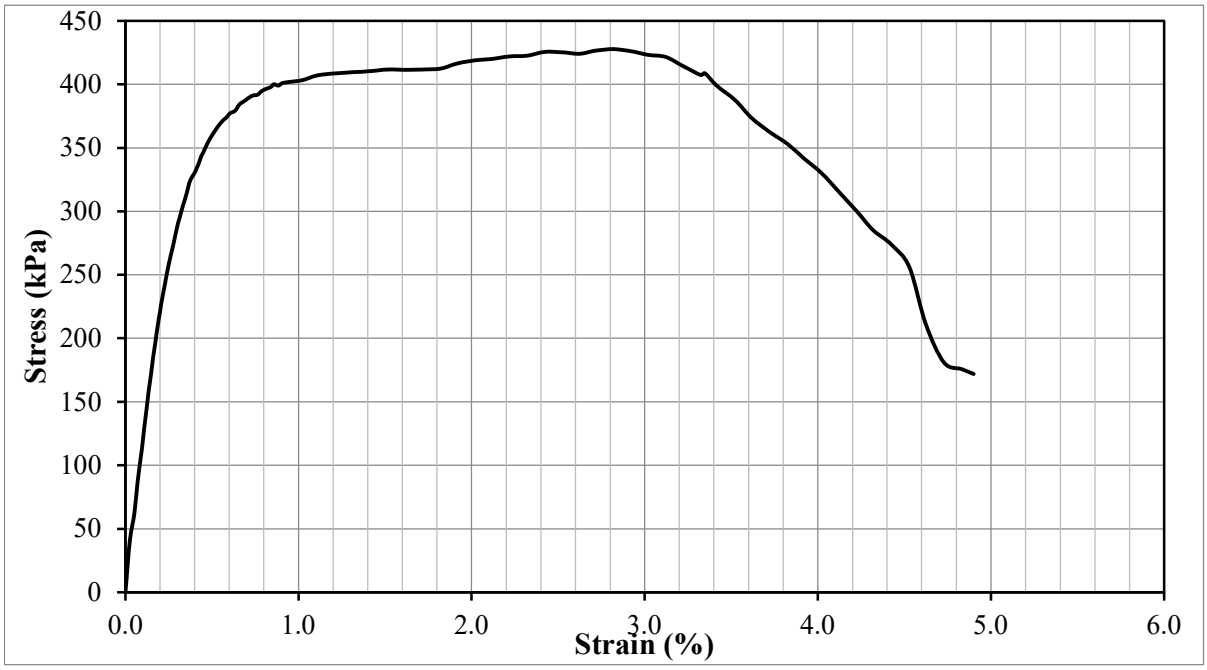
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	405	Strain at failure, εf :	3.23	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	99.1	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	B-12-H	Initial Area:	2117.0	mm^2
Test Date:	9/16/2022	Weight:	343.0	g
Strain Rate:	1 %/min	Unit Weight:	1634	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	50	Curing Period	24.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



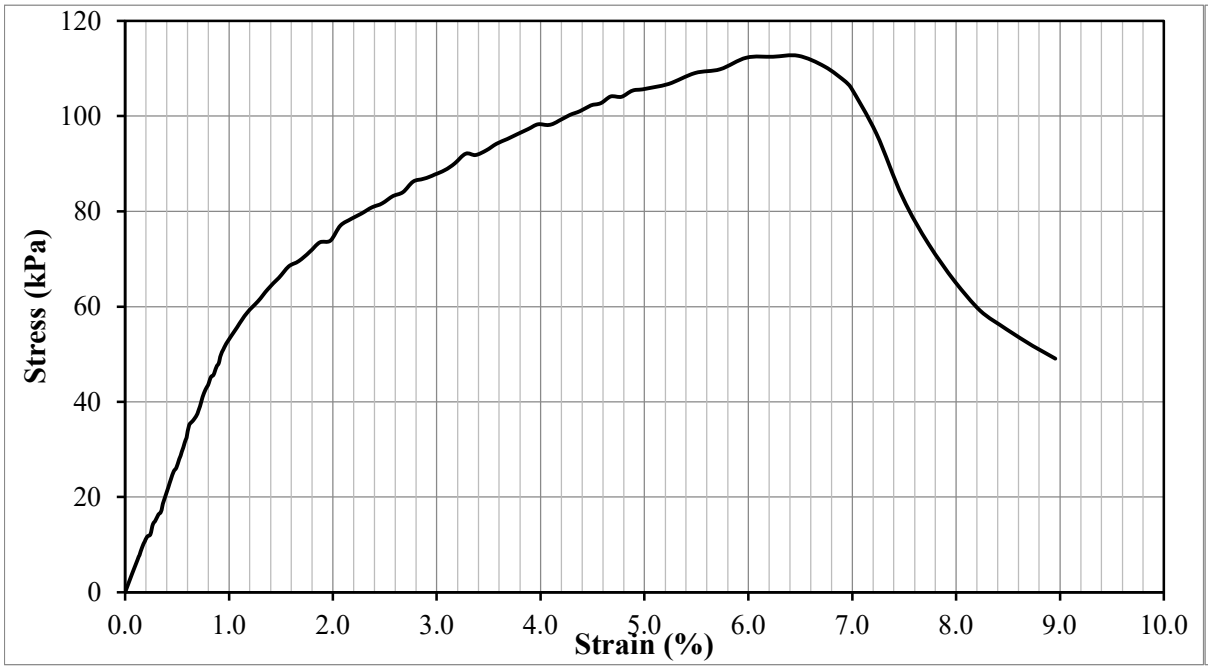
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	410	Strain at failure, εf :	3.15	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	B-12-I	Initial Area:	2102.5	mm^2
Test Date:	9/20/2022	Weight:	349.1	g
Strain Rate:	1 %/min	Unit Weight:	1650	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	50	Curing Period	27.9	days
$(w:c)_{slurry}$:	1.0	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



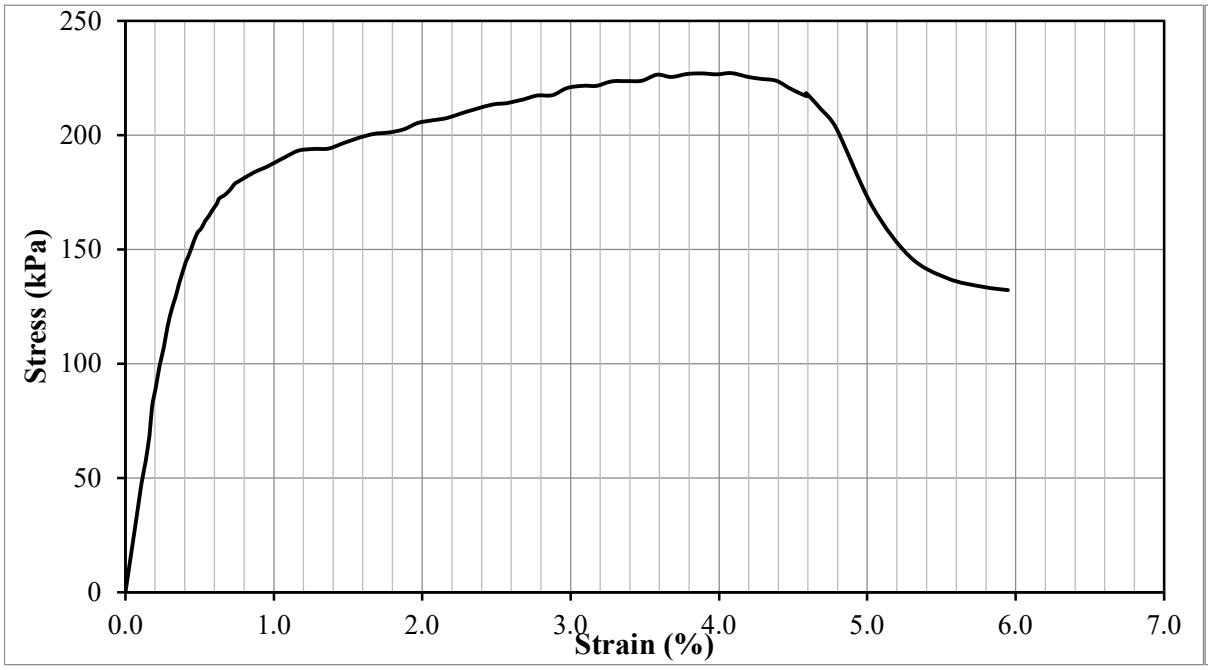
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	426	Strain at failure, εf :	2.82	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	B-13-A	Initial Area:	2096.3	mm^2
Test Date:	8/24/2022	Weight:	343.2	g
Strain Rate:	1 %/min	Unit Weight:	1626	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	50	Curing Period	1.0	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



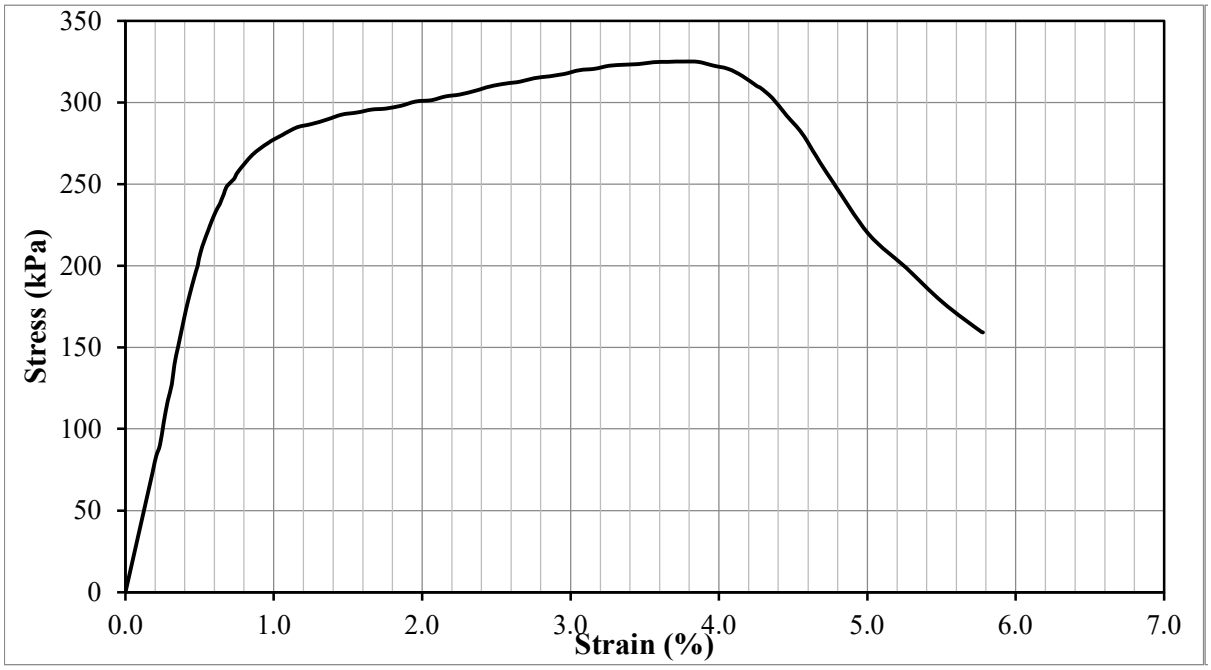
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	112	Strain at failure, εf :	6.48	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	B-13-B	Initial Area:	2104.6	mm^2
Test Date:	8/26/2022	Weight:	342.2	g
Strain Rate:	1 %/min	Unit Weight:	1623	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	50	Curing Period	2.9	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



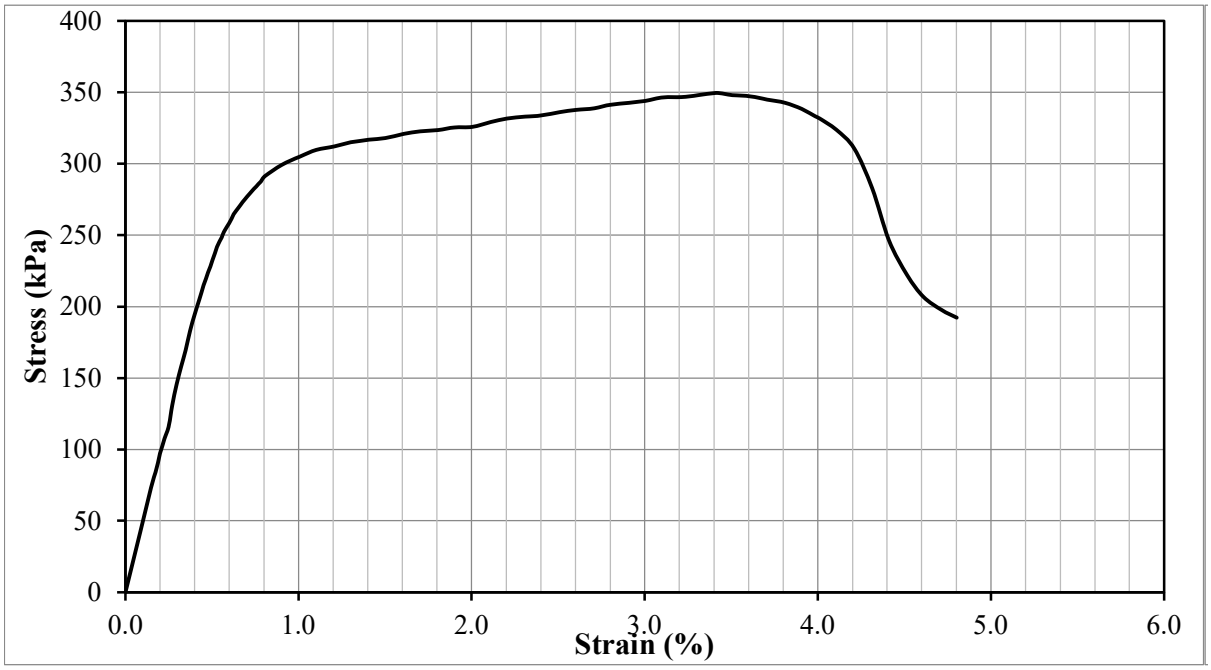
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	226	Strain at failure, εf :	4.08	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.7	mm
I.D.:	B-13-C	Initial Area:	2102.5	mm^2
Test Date:	8/30/2022	Weight:	342.5	g
Strain Rate:	1 %/min	Unit Weight:	1624	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	50	Curing Period	7.2	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



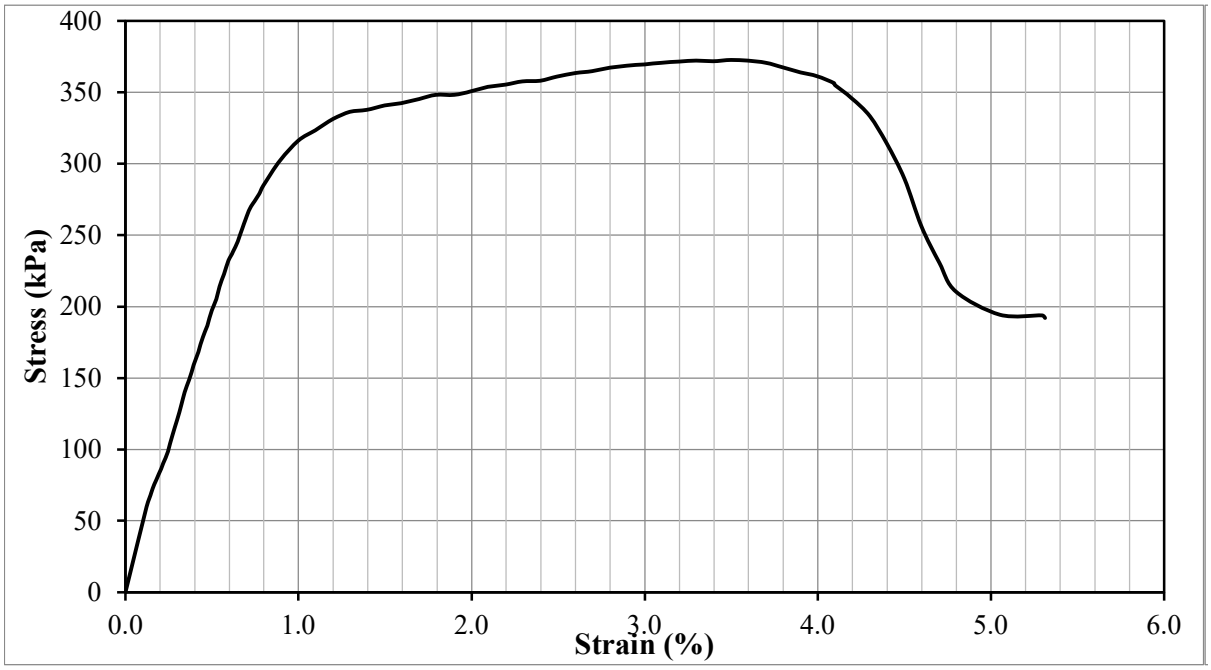
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	323	Strain at failure, εf :	3.76	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	B-13-D	Initial Area:	2106.6	mm^2
Test Date:	9/2/2022	Weight:	344.7	g
Strain Rate:	1 %/min	Unit Weight:	1626	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	50	Curing Period	10.0	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



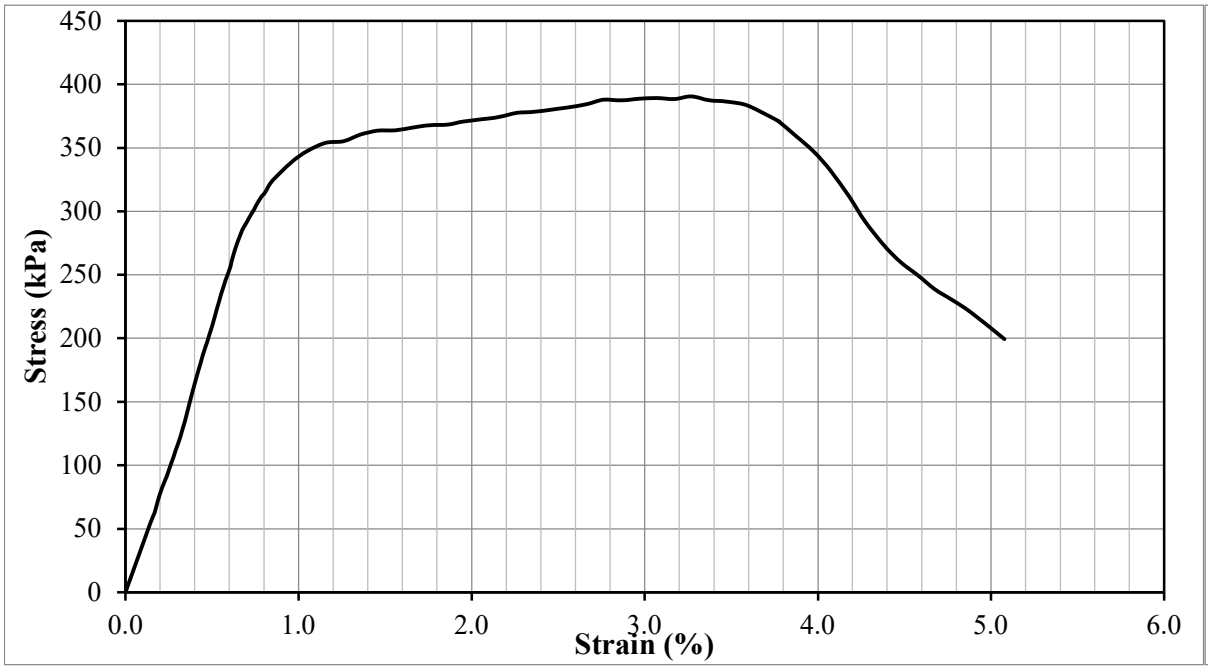
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	348	Strain at failure, εf :	3.41	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	B-13-E	Initial Area:	2114.9	mm^2
Test Date:	9/6/2022	Weight:	344.0	g
Strain Rate:	1 %/min	Unit Weight:	1618	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	50	Curing Period	14.0	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



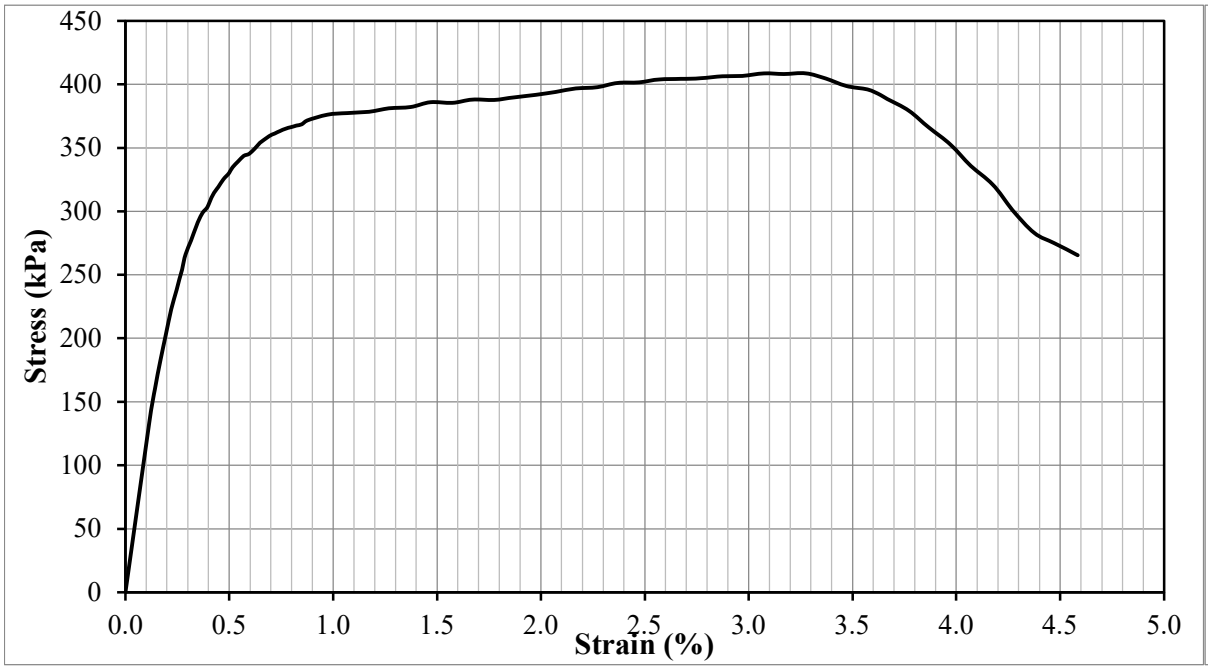
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	371	Strain at failure, εf :	3.50	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	101.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	B-13-F	Initial Area:	2104.6	mm^2
Test Date:	9/9/2022	Weight:	345.4	g
Strain Rate:	1 %/min	Unit Weight:	1625	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	50	Curing Period	17.1	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



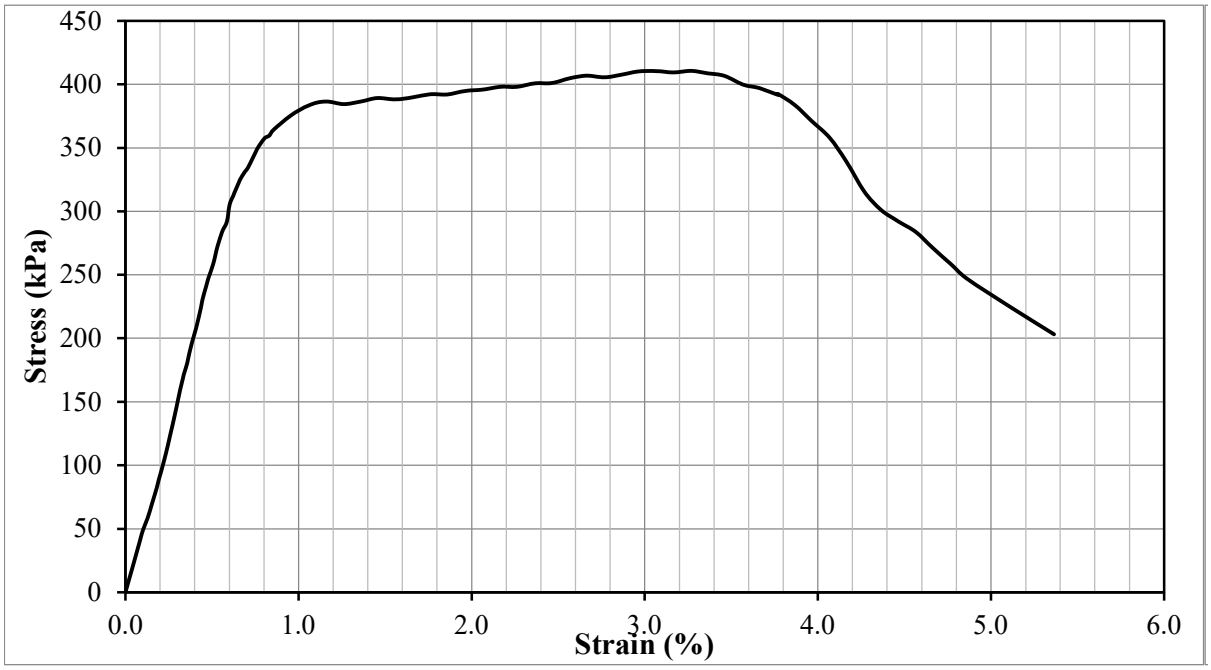
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	389	Strain at failure, εf :	3.27	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.3	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.8	mm
I.D.:	B-13-G	Initial Area:	2108.7	mm^2
Test Date:	9/13/2022	Weight:	344.0	g
Strain Rate:	1 %/min	Unit Weight:	1626	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	50	Curing Period	20.9	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



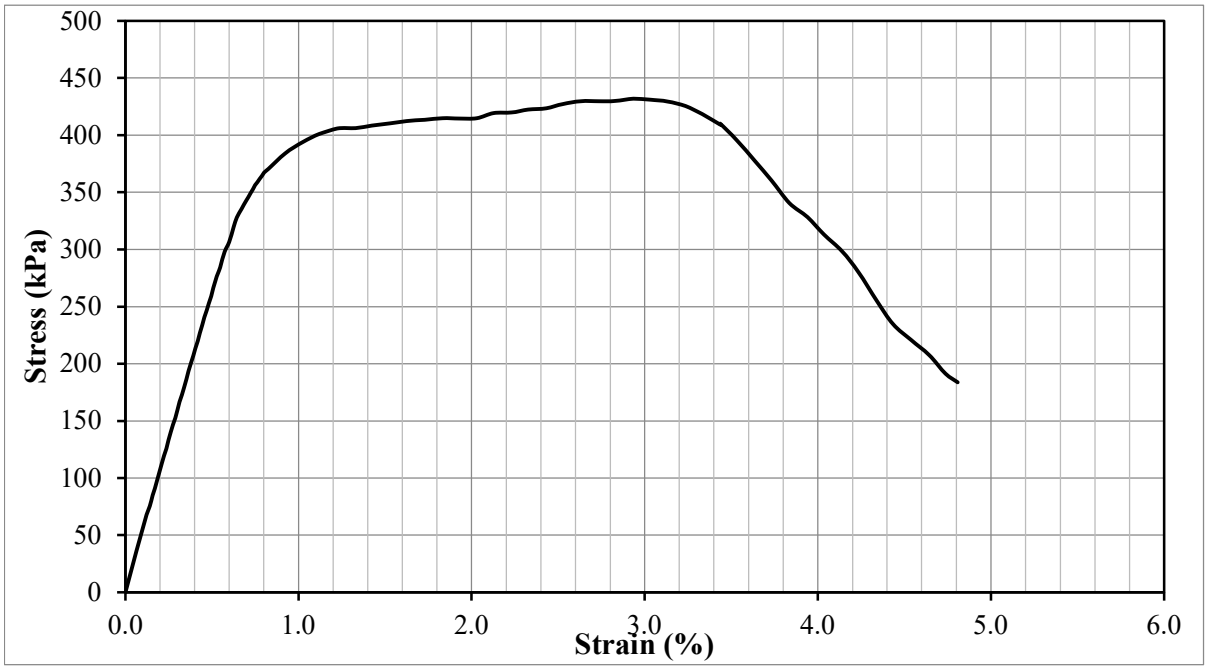
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	407	Strain at failure, εf :	3.28	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	B-13-H	Initial Area:	2119.1	mm^2
Test Date:	9/16/2022	Weight:	344.9	g
Strain Rate:	1 %/min	Unit Weight:	1620	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	50	Curing Period	24.0	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



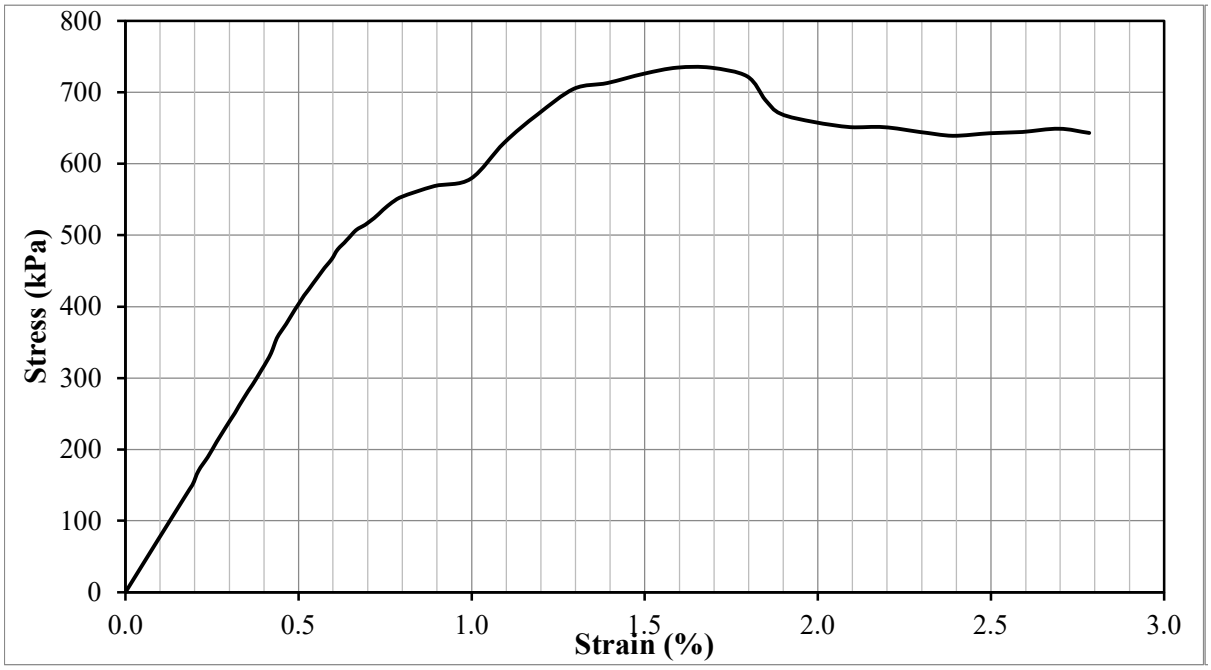
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	408	Strain at failure, εf :	3.27	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	100.0	mm
Tested by:	Hwanik Ju	Initial Diameter:	51.9	mm
I.D.:	B-13-I	Initial Area:	2114.9	mm^2
Test Date:	9/20/2022	Weight:	343.7	g
Strain Rate:	1 %/min	Unit Weight:	1625	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	50	Curing Period	27.8	days
$(w:c)_{slurry}$:	1.4	Curing temperature	21.1	°C
Organic content of base soil (%)		5.50		



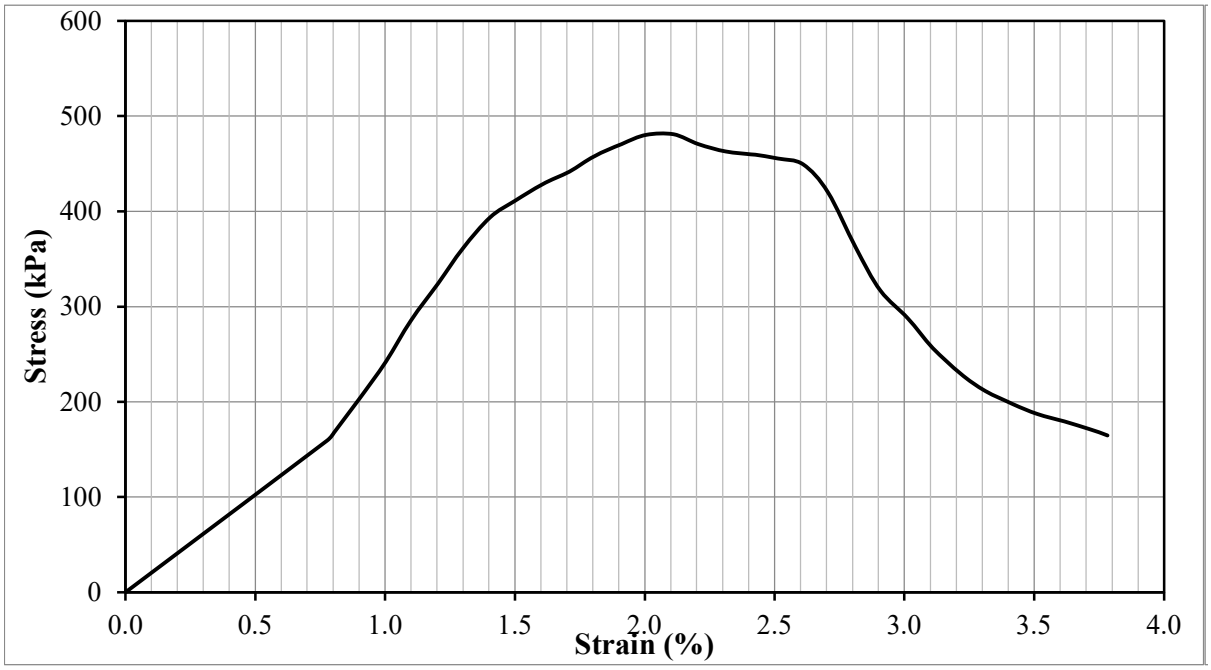
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	429	Strain at failure, εf :	2.93	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	97.2	mm
Tested by:	Hwanik Ju	Initial Diameter:	72.8	mm
I.D.:	C-A	Initial Area:	4167.9	mm^2
Test Date:	12/8/2022	Weight:	846.5	g
Strain Rate:	1 %/min	Unit Weight:	2089	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350.0	Curing Period	2.8	days
$(w:c)_{slurry}$:	0.6	Curing temperature	350.0	°C
Additional information				



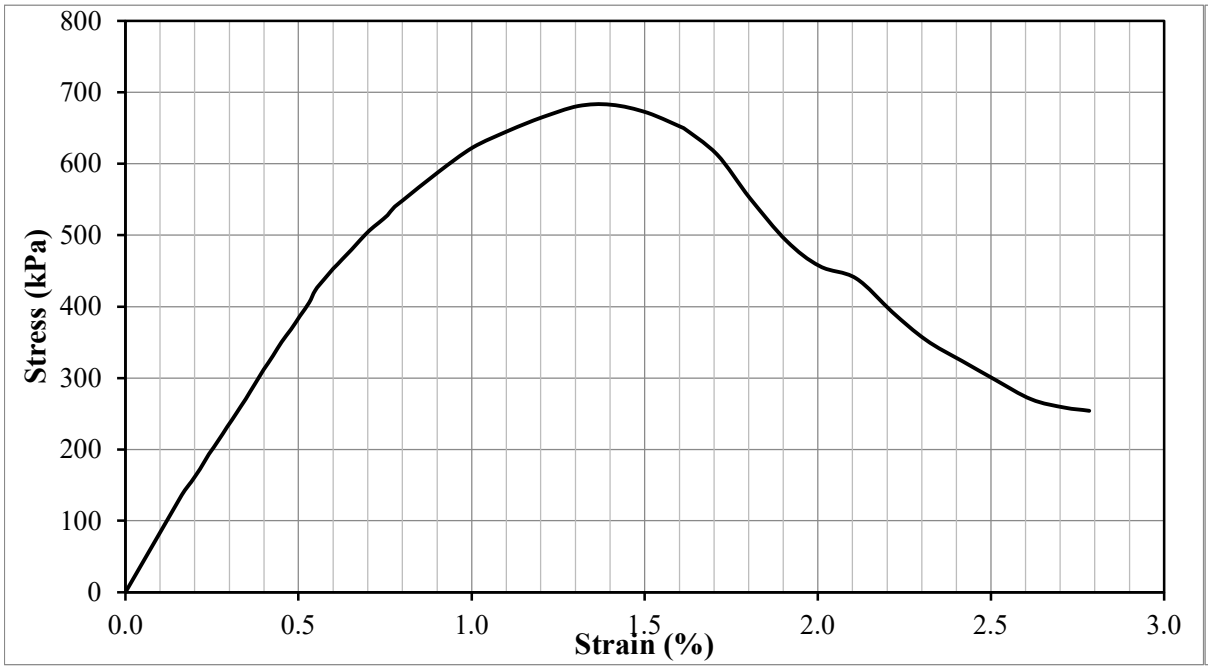
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	695	Strain at failure, εf :	1.59	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	152.5	mm
Tested by:	Hwanik Ju	Initial Diameter:	73.2	mm
I.D.:	C-B	Initial Area:	4208.7	mm^2
Test Date:	12/12/2022	Weight:	1002.3	g
Strain Rate:	1 %/min	Unit Weight:	1562	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350.0	Curing Period	3.0	days
$(w:c)_{slurry}$:	1.0	Curing temperature	350.0	°C
Additional information				



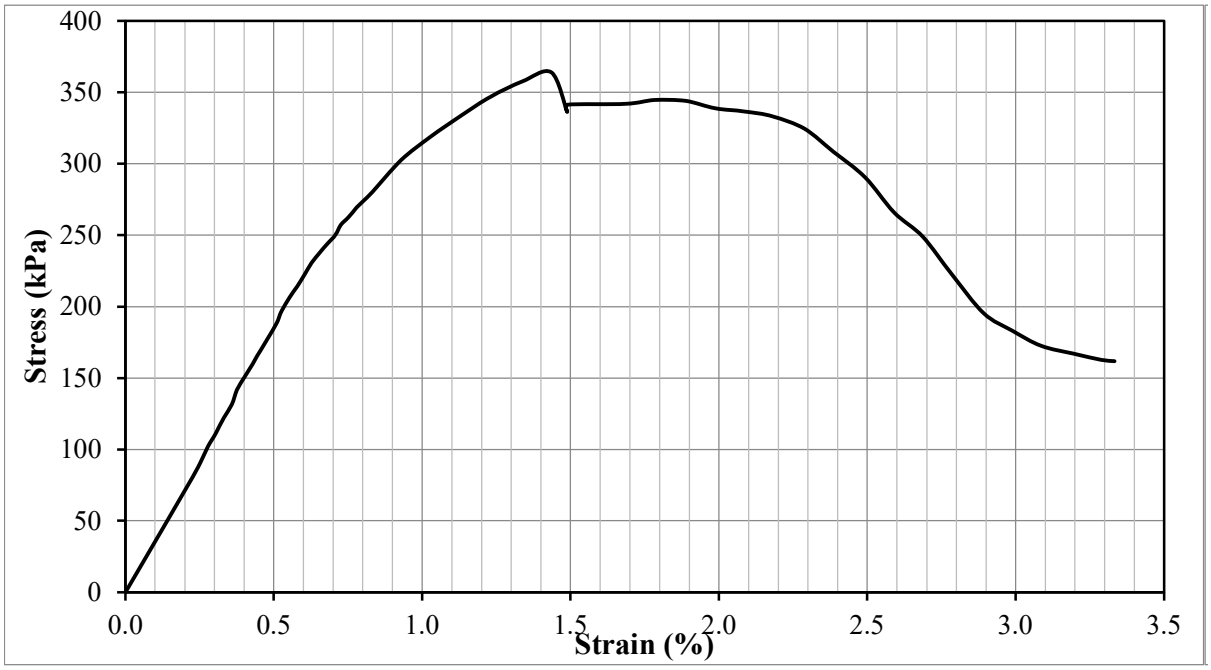
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	484	Strain at failure, εf :	2.11	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	160.9	mm
Tested by:	Hwanik Ju	Initial Diameter:	73.2	mm
I.D.:	C-C	Initial Area:	4205.8	mm^2
Test Date:	12/25/2022	Weight:	1110.5	g
Strain Rate:	1 %/min	Unit Weight:	1641	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350.0	Curing Period	2.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	350.0	°C
Additional information				



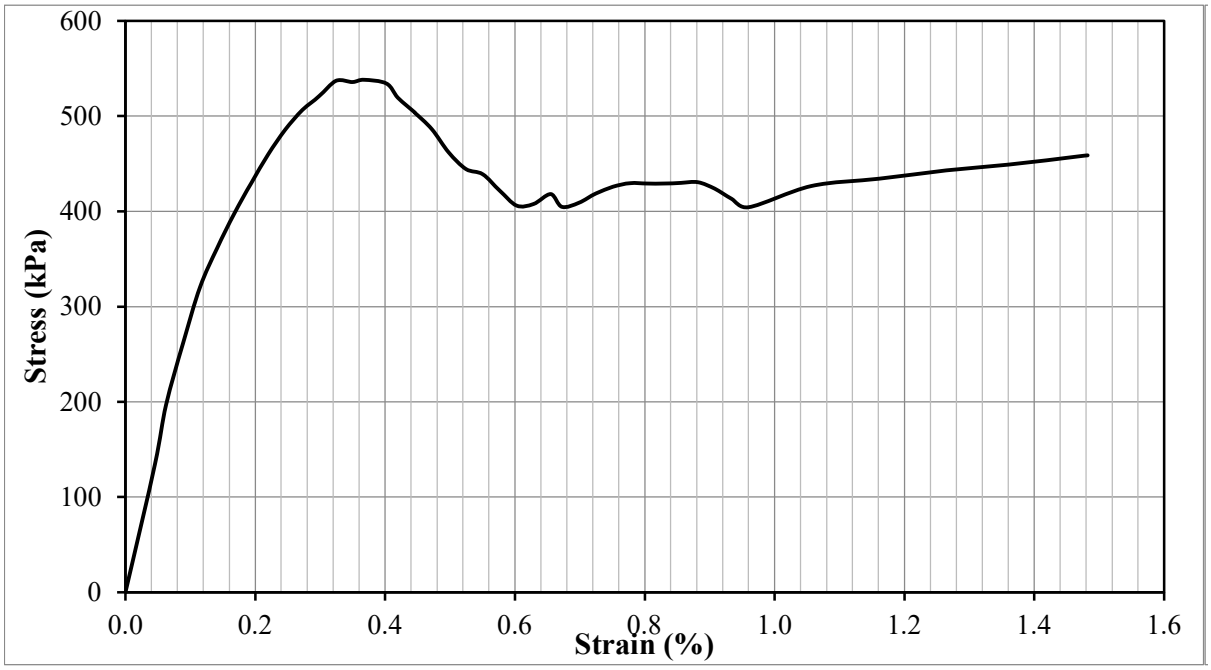
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	693	Strain at failure, εf :	1.40	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	132.6	mm
Tested by:	Hwanik Ju	Initial Diameter:	73.2	mm
I.D.:	C-D	Initial Area:	4205.8	mm^2
Test Date:	12/28/2022	Weight:	860.6	g
Strain Rate:	1 %/min	Unit Weight:	1543	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350.0	Curing Period	2.8	days
$(w:c)_{slurry}$:	1.0	Curing temperature	350.0	°C
Additional information				



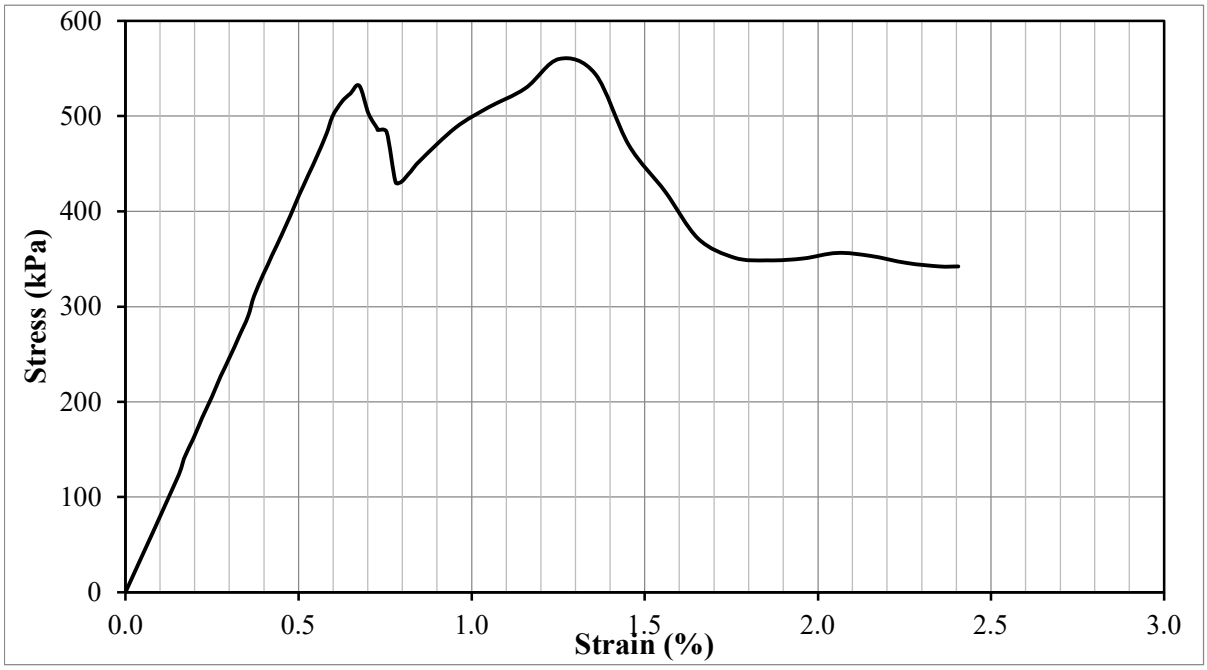
Test Result				
Peak deviator stress (kPa) (w/ Height correction)	358	Strain at failure, εf :	1.44	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	243.7	mm
Tested by:	Hwanik Ju	Initial Diameter:	73.3	mm
I.D.:	C-E	Initial Area:	4223.3	mm^2
Test Date:	11/11/2022	Weight:	1255.1	g
Strain Rate:	1 %/min	Unit Weight:	1219	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350.0	Curing Period	3.2	days
$(w:c)_{slurry}$:	1.0	Curing temperature	350.0	°C
Additional information				



Test Result				
Peak deviator stress (kPa) (w/ Height correction)	595	Strain at failure, εf :	0.37	%
Additional information				

Test Information		Specimen Information		
Type of Test:	UCS Test	Initial Height:	150.8	mm
Tested by:	Hwanik Ju	Initial Diameter:	73.2	mm
I.D.:	C-F	Initial Area:	4208.7	mm^2
Test Date:	12/31/2022	Weight:	1026.7	g
Strain Rate:	1 %/min	Unit Weight:	1618	kg/m^3
Mixture Proportion		**Curing Condition**		
$\alpha_{in\text{-}place}$ (kg/m^3):	350.0	Curing Period	2.9	days
$(w:c)_{slurry}$:	0.6	Curing temperature	350.0	°C
Additional information				



Test Result				
Peak deviator stress (kPa) (w/ Height correction)	563	Strain at failure, εf :	1.25	%
Additional information				

Appendix C. Laboratory Miniature Vane Shear Test Data

- Laboratory miniature vane shear test data for Chapter 5
  : Batch series O (Cement-treated fabricated organic soil, FOS)

Laboratory Miniature Vane Shear Test Result (ASTM D4648)

Sample: Cement-treated fabricated organic soil with tannic acid (FOS)

Curing tempeature: 21.1 °C

Vane size: 0.5" x 0.5" (12.7mm x 12.7mm)

Spring No.: 1

Sample ID	w:c	$\alpha_{in\text{-}place}$ (kg/m^3)	TA by soil (%)	Curing time (days)	Initial reading (degree)	Final reading (degree)	Change in angle (degree)	T (N-m)	s_u (kPa)	q_u (kPa)
O-20-A	1.0	350	0.35%	3	43	52	9	0.014296904	3.3	6.7
O-20-F	1.0	350	0.35%	17	38	99	61	0.096901237	22.6	45.2
O-25-A	1.4	275	0.30%	3	130	150	20	0.031770897	7.4	14.8
O-25-B	1.4	275	0.30%	7	220	260	40	0.063541794	14.8	29.6
O-25-C	1.4	275	0.30%	7	39	79	40	0.063541794	14.8	29.6
O-25-D	1.4	275	0.30%	10	41	88	47	0.074661608	17.4	34.8
O-26-B	0.6	200	0.25%	7	186	227	41	0.065130339	15.2	30.4
O-26-G	0.6	200	0.25%	7	176	231	55	0.087369967	20.4	40.7
O-26-C	0.6	200	0.25%	14	253	321	68	0.108021051	25.2	50.4
O-26-F	0.6	200	0.25%	14	163	241	78	0.123906499	28.9	57.8
O-26-D	0.6	200	0.25%	28	73	172	99	0.157265941	36.7	73.3
O-26-E	0.6	200	0.25%	28	163	263	100	0.158854486	37.0	74.1
O-31-A	0.6	352	0.38%	3	72	99	27	0.042890711	10.0	20.0
O-31-H	0.6	352	0.38%	3	251	280	29	0.046067801	10.7	21.5
O-31-G	0.6	352	0.38%	7	163	282	119	0.189036839	44.1	88.1
O-31-I	0.6	352	0.38%	7	75	193	118	0.187448294	43.7	87.4
O-31-C	0.6	352	0.38%	14	73	211	138	0.219219191	51.1	102.2
O-31-F	0.6	352	0.38%	14	166	304	138	0.219219191	51.1	102.2
O-31-D	0.6	352	0.38%	28	72	273	201	0.319297517	74.4	148.9
O-31-E	0.6	352	0.38%	28	72	256	184	0.292292255	68.1	136.3
O-34-H	0.6	354	0.30%	3	74	158	84	0.133437768	31.1	62.2
O-34-I	0.6	354	0.30%	3	163	250	87	0.138203403	32.2	64.4