

Figure 5.1. Virginia Tech Calibration Chamber (Not to Scale)

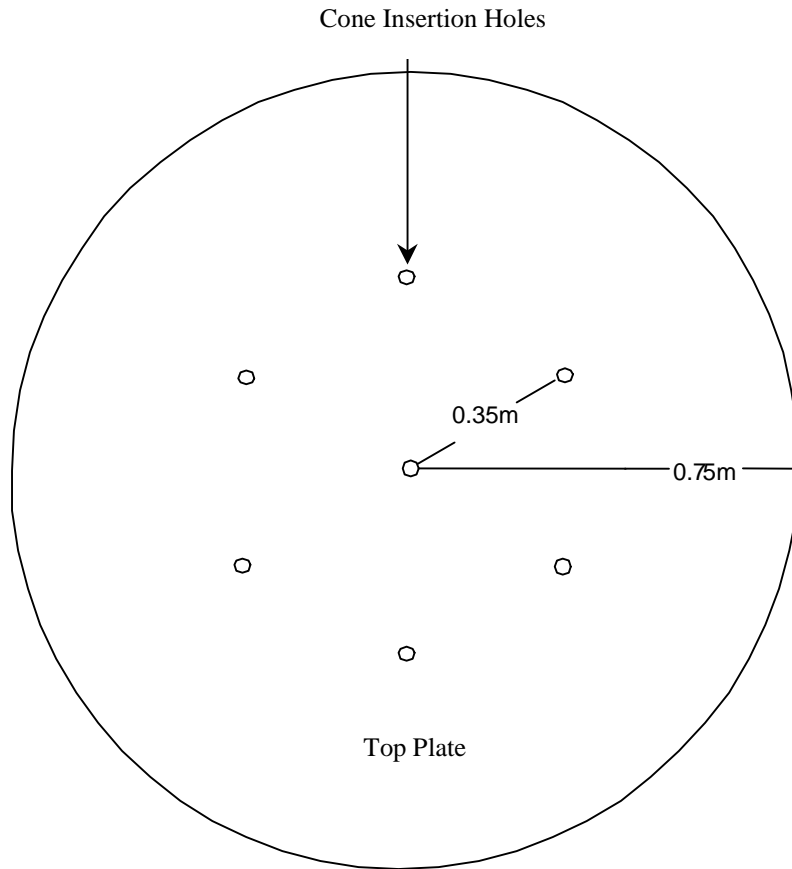


Figure 5.2 Plan View of Testing Locations in Virginia Tech Calibration Chamber

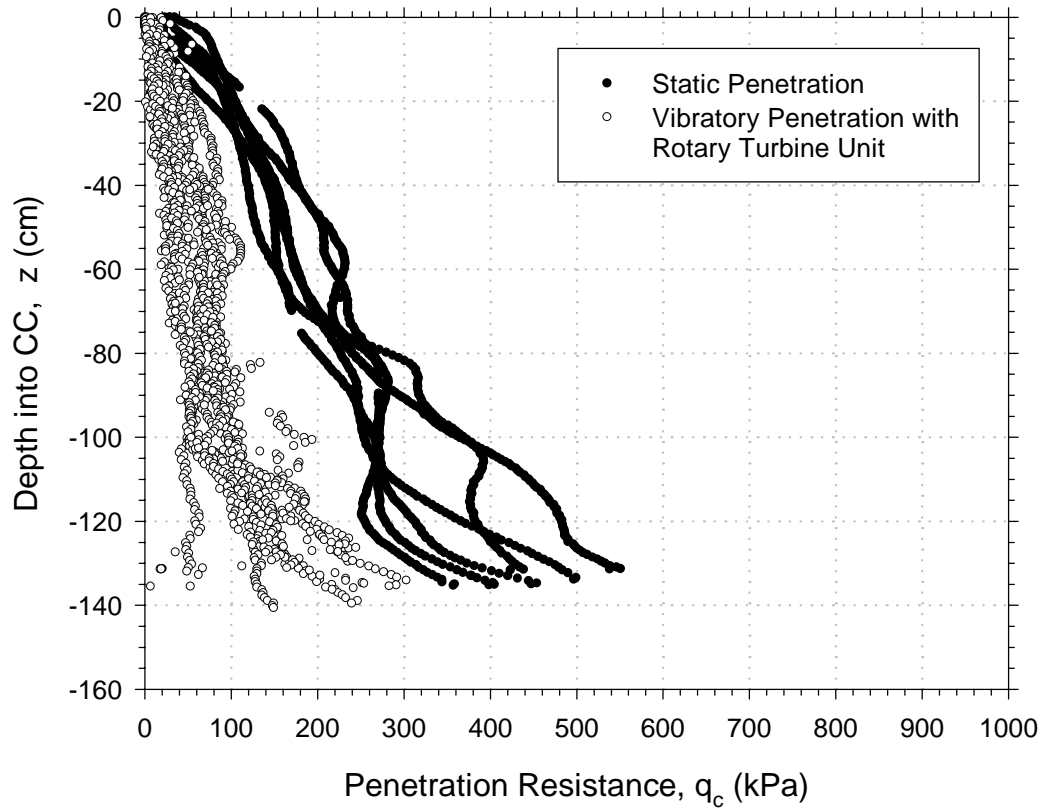
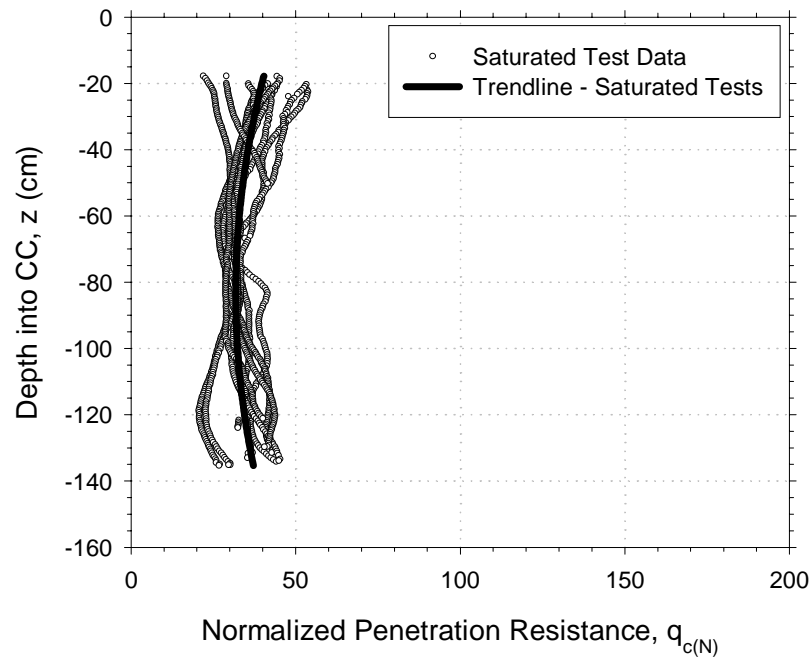
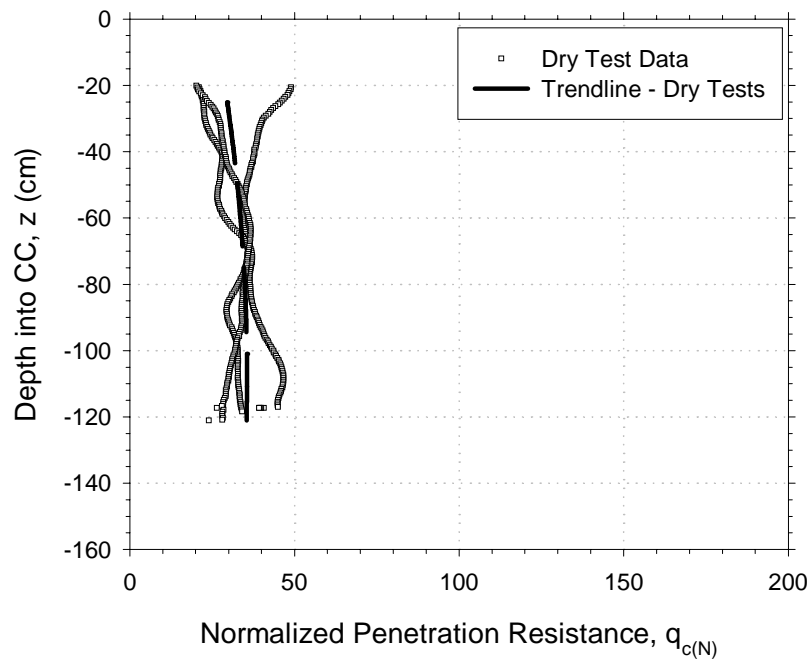


Figure 5.3 Penetration Test Results - Loose Sample at Low Stress Level Using the 10-cm^2 Cone Penetrometer

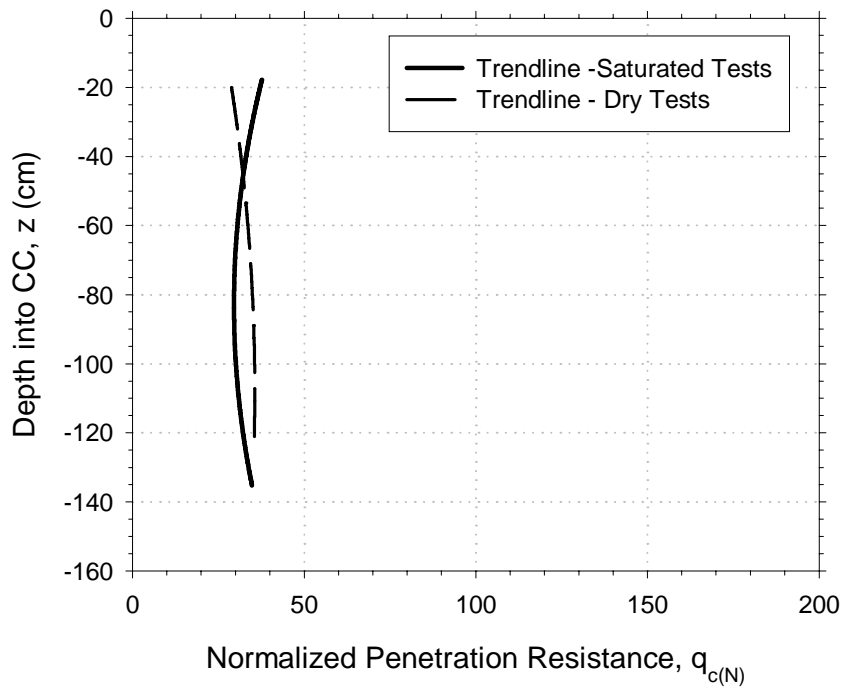


a)

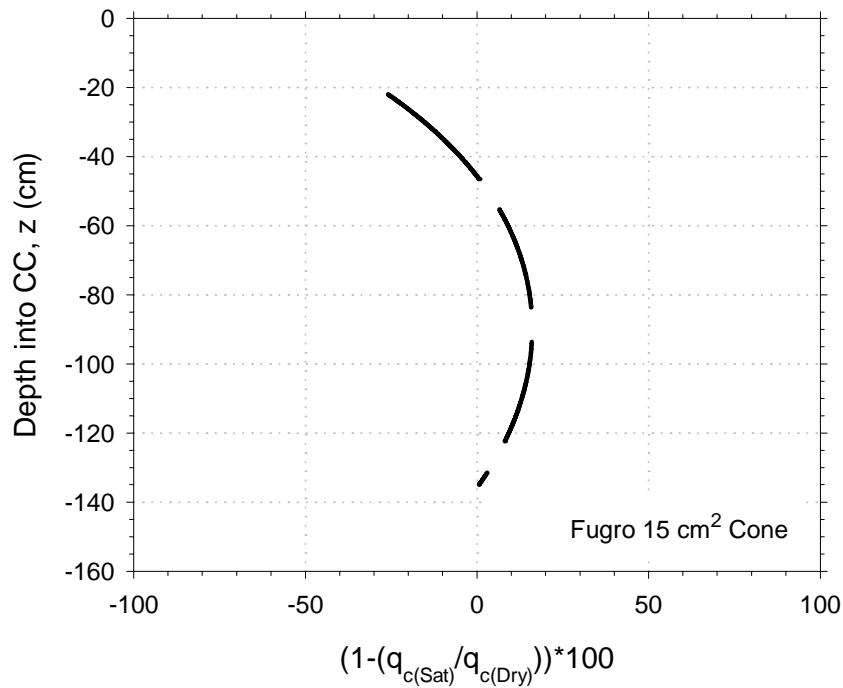


b)

Figure 5.4. Test Data and Regression Curves from Dry and Saturated Static Penetration Tests in Loose ($20 < D_r \% < 30$) Sand at Intermediate Stress Conditions



a)



b)

Figure 5.5 Comparison of Dry and Saturated Normalized Penetration Resistance Curves from Static Penetration Tests in Loose Samples at Intermediate Stress Levels

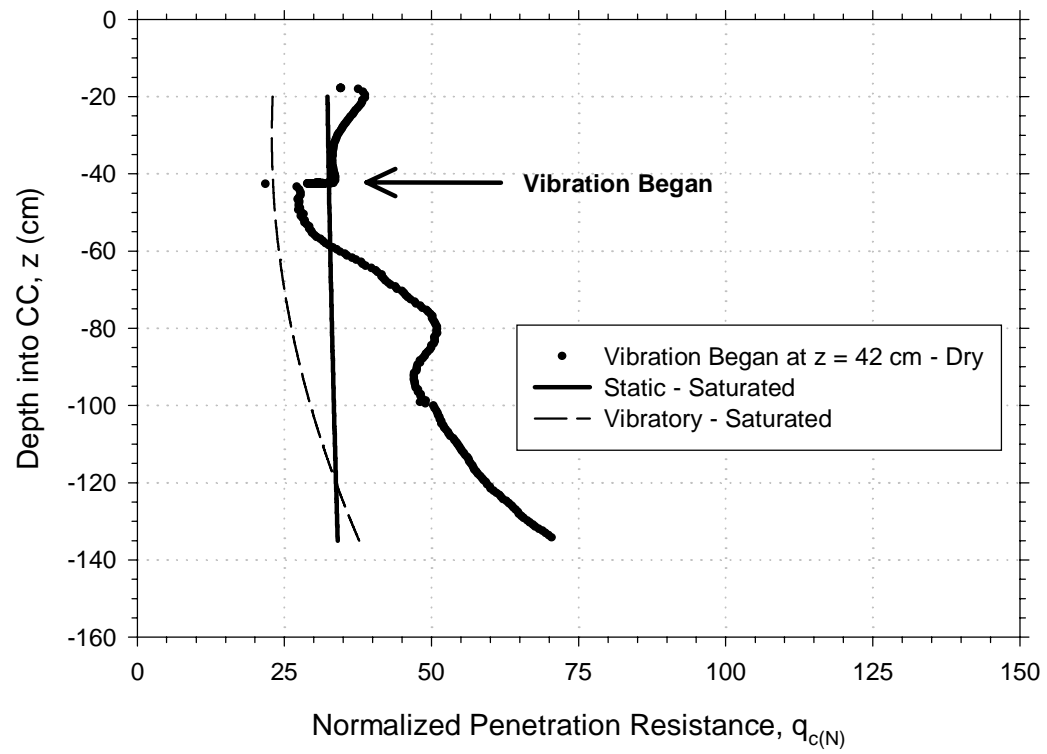
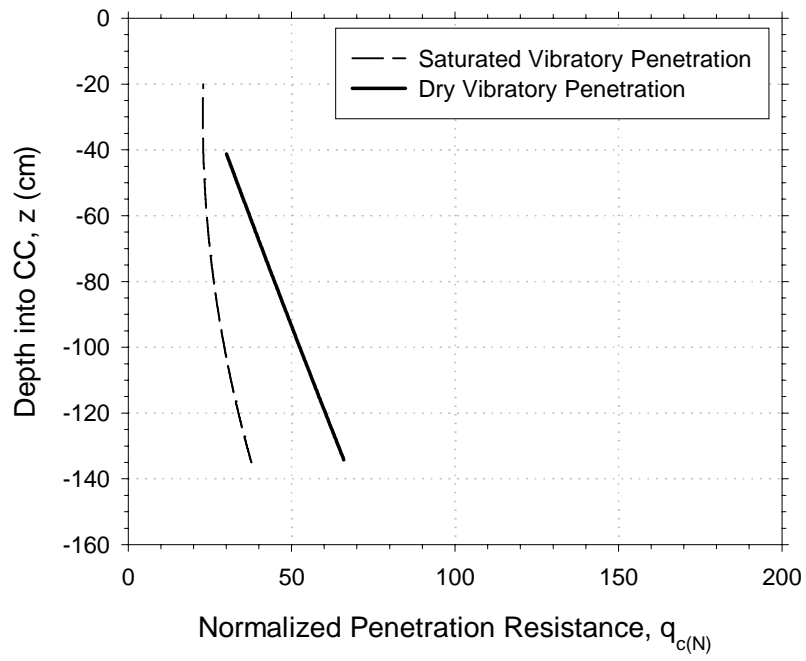
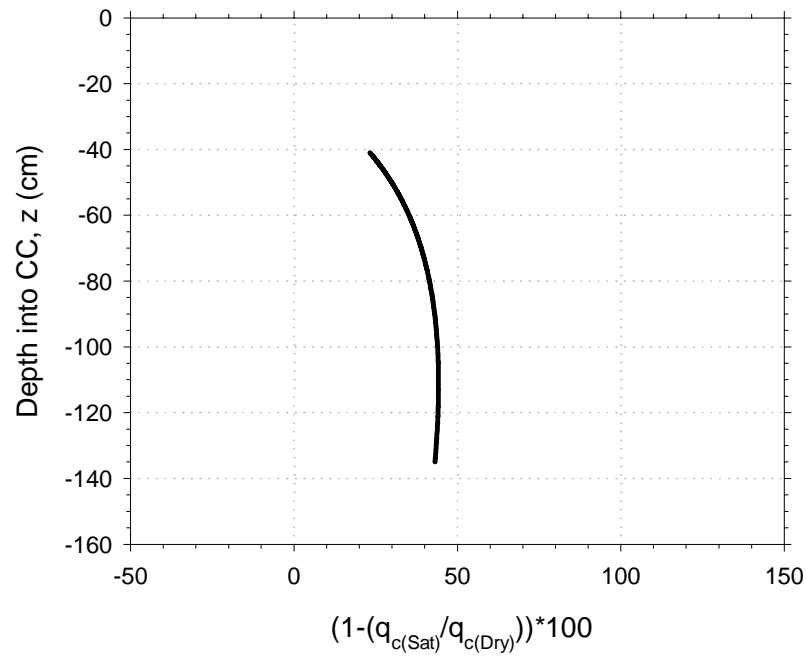


Figure 5.6 Normalized Penetration Resistance for Static and Vibratory Penetration Tests in Loose Samples at Intermediate Stress Levels



a)



b)

Figure 5.7 Comparison of Normalized Penetration Resistance from Vibratory Penetration Tests in Loose Sand at Intermediate Stress Levels

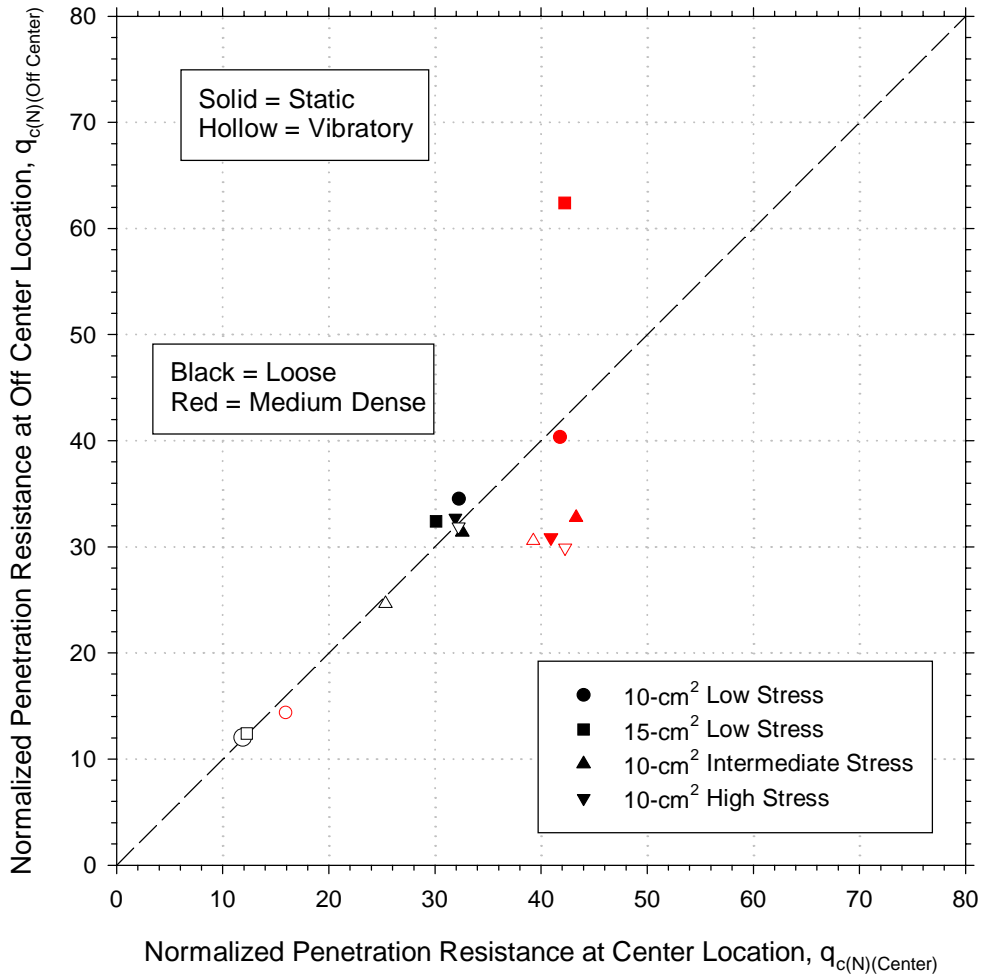
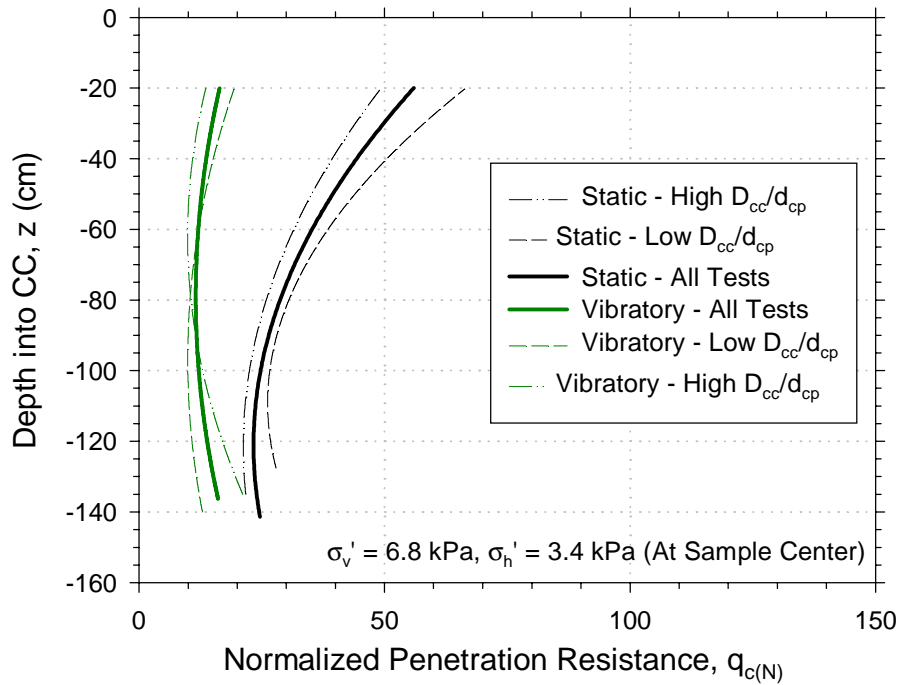
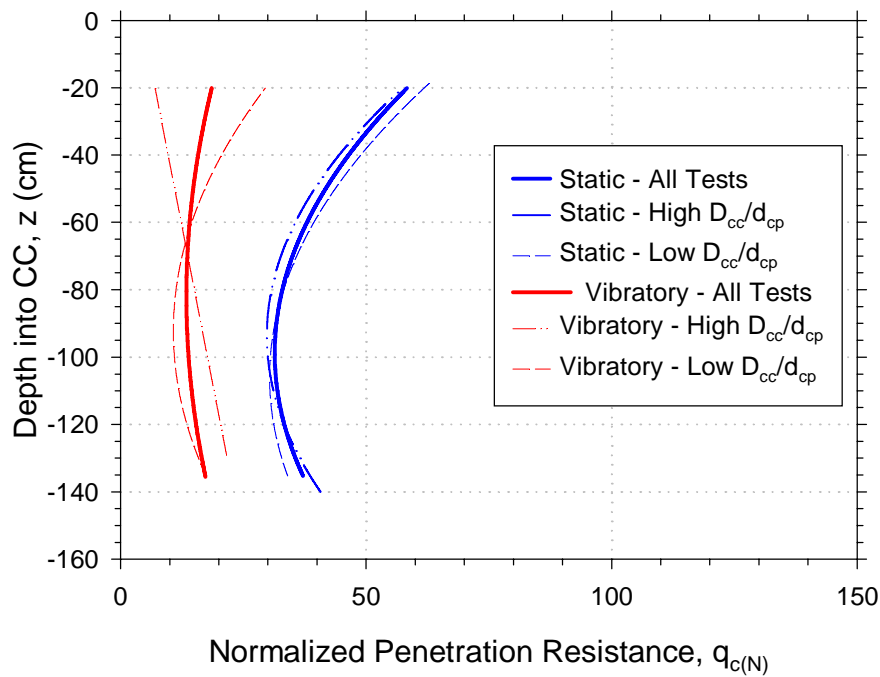


Figure 5.8 Comparison of Penetration Resistance Values at Center and Off Center Locations for Different Test Conditions



(a) 10 cm² Cone



(b) 15 cm² Cone

Figure 5.9 Penetration Resistance of Loose ($20 < D_r < 30$) Samples at Low Stress Levels and Different Test Locations

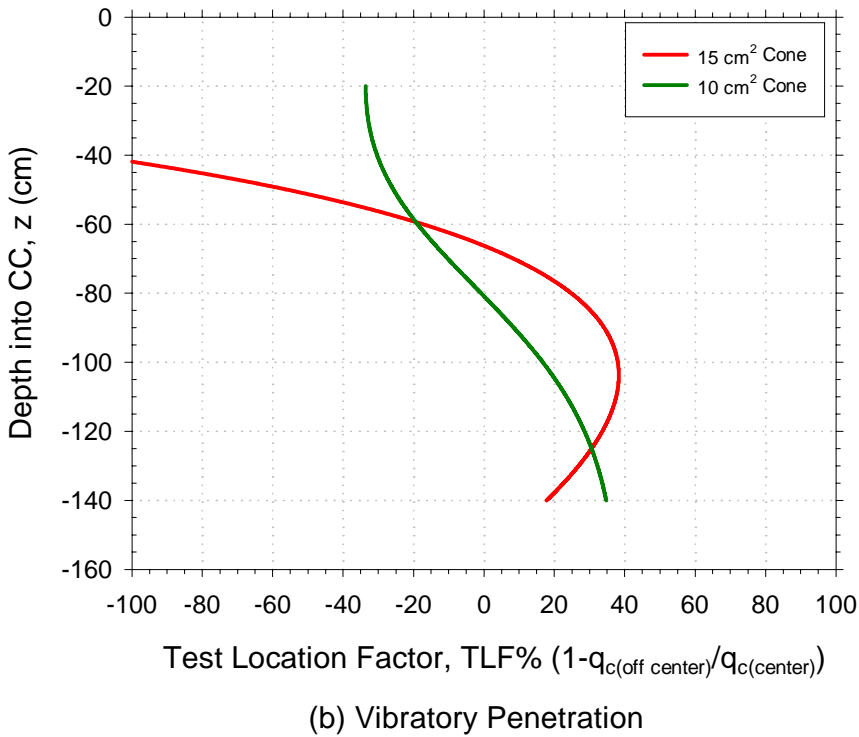
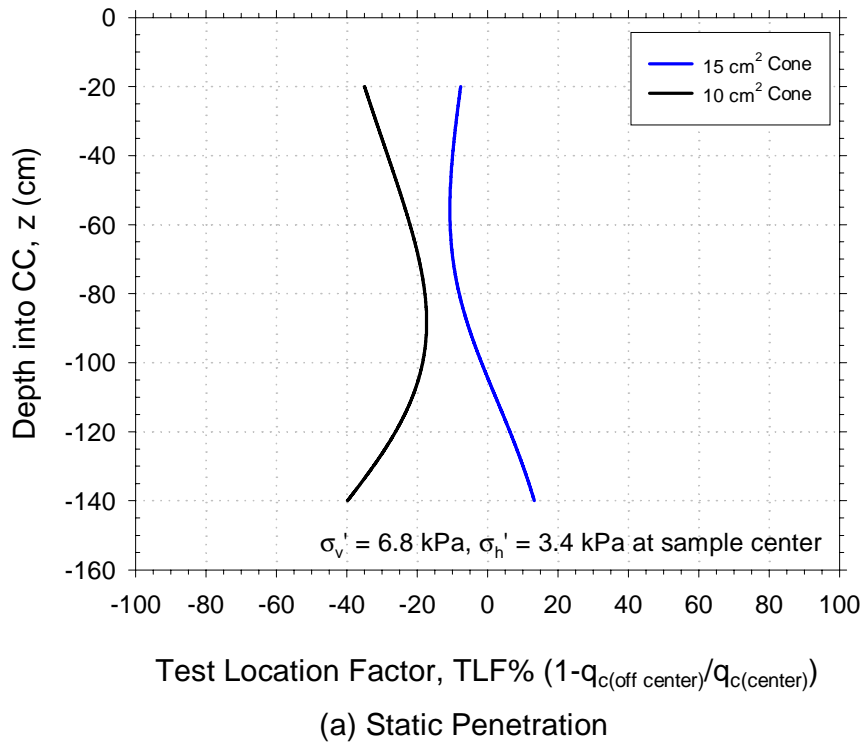
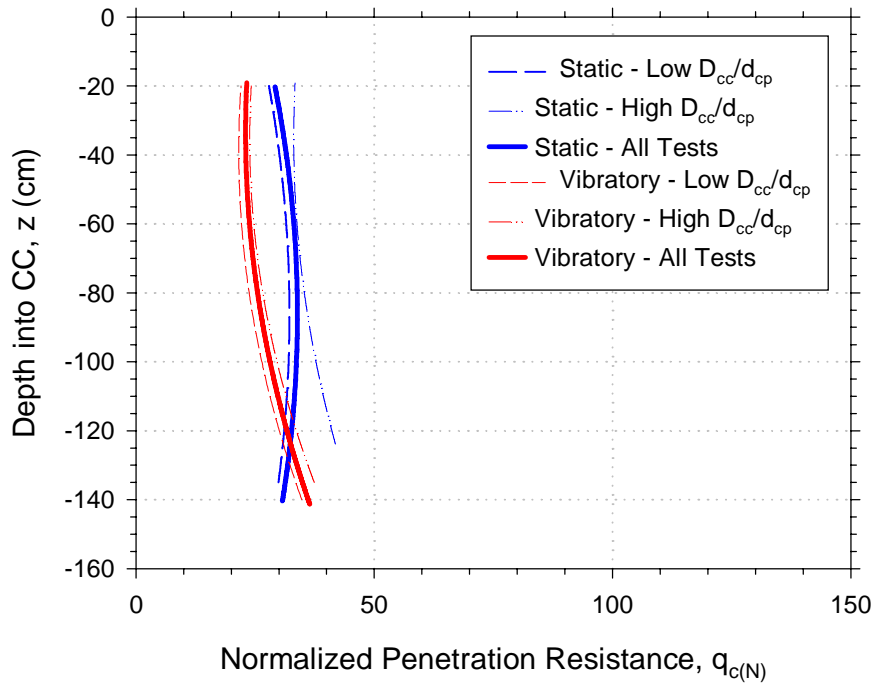
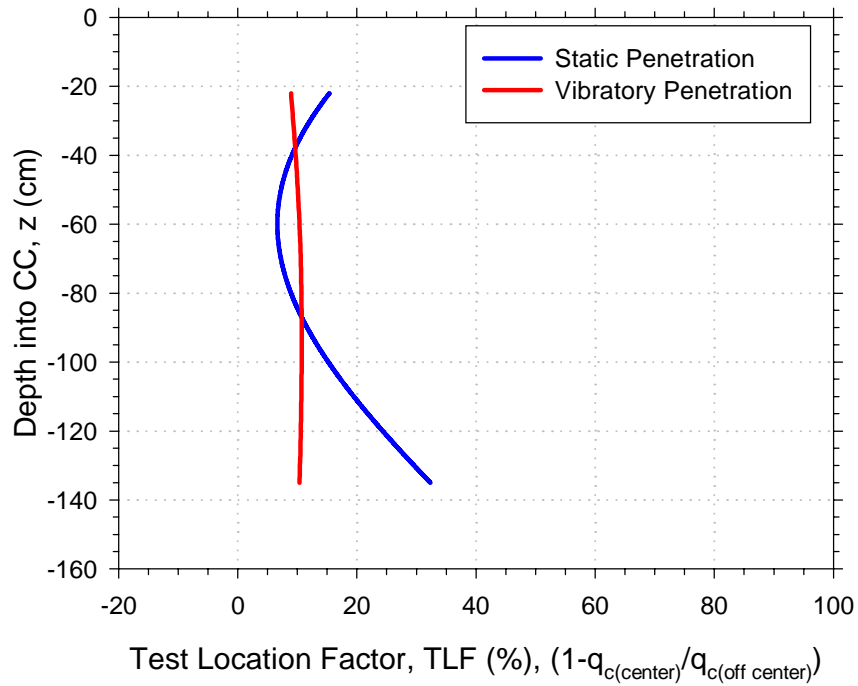


Figure 5.10 Effect of Test Location on Penetration Resistance Measurement for Different Cone Penetrometers in Loose Samples at Low Stresses

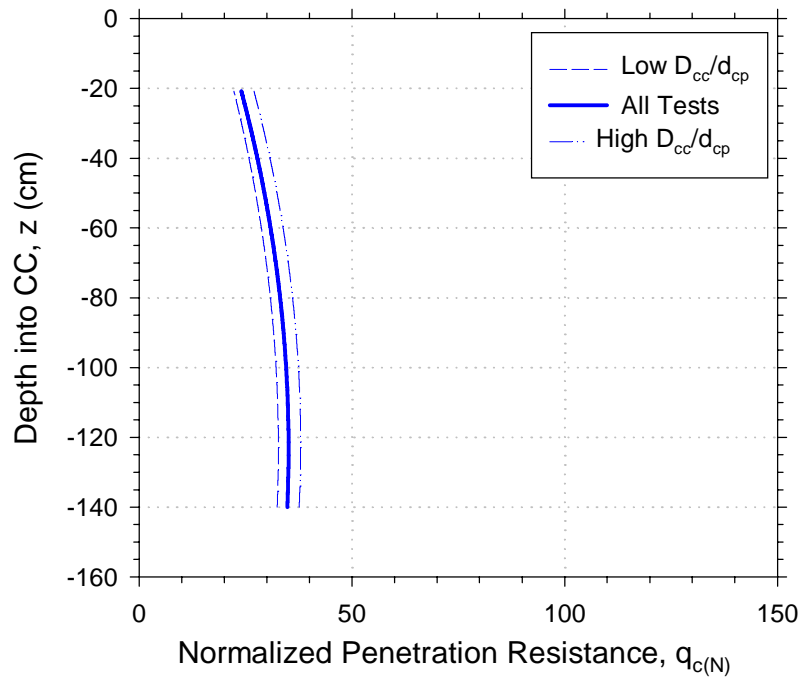


(a)

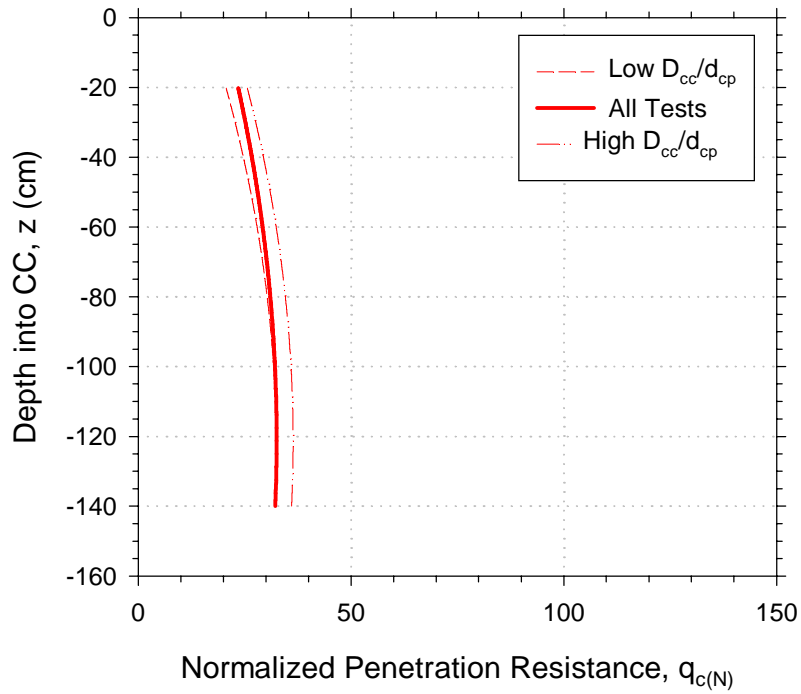


(b)

Figure 5.11 Normalized Penetration Resistance and TLF for Tests in Loose Samples at Intermediate Stress Conditions Using the 10-cm² Cone



(a) Static Penetration



(b) Vibratory Penetration

Figure 5.12 Normalized Penetration Resistance of Loose Samples at High Stress Levels Using the 10-cm² Cone

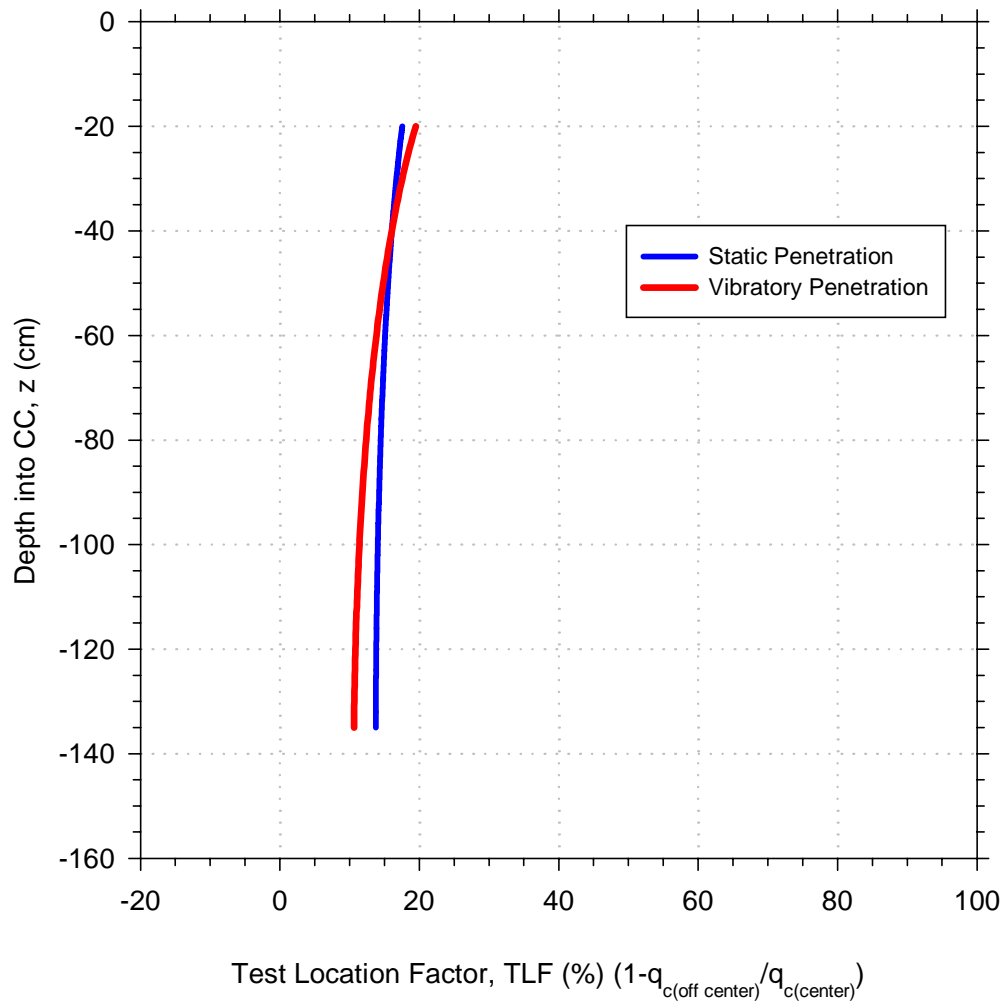
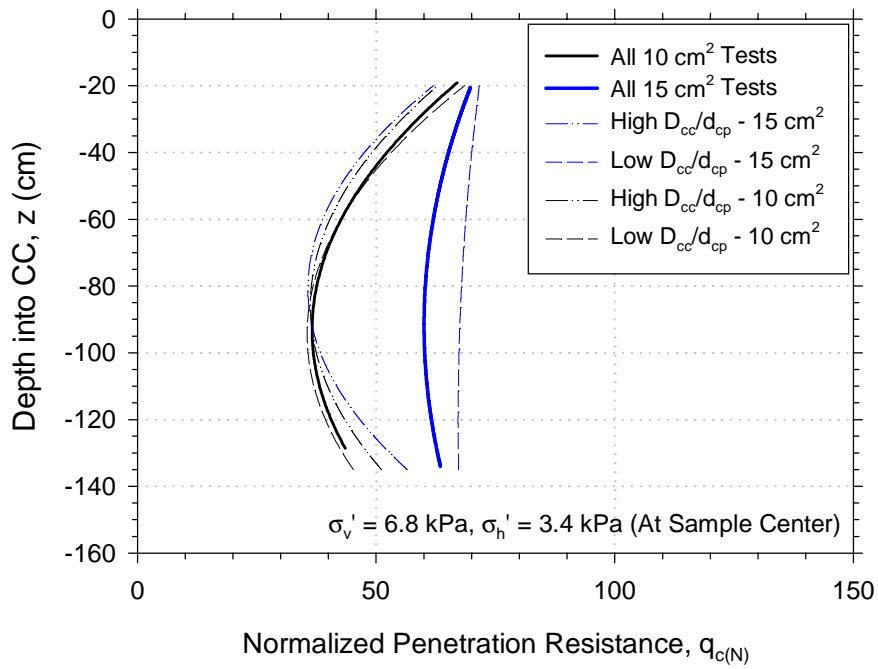
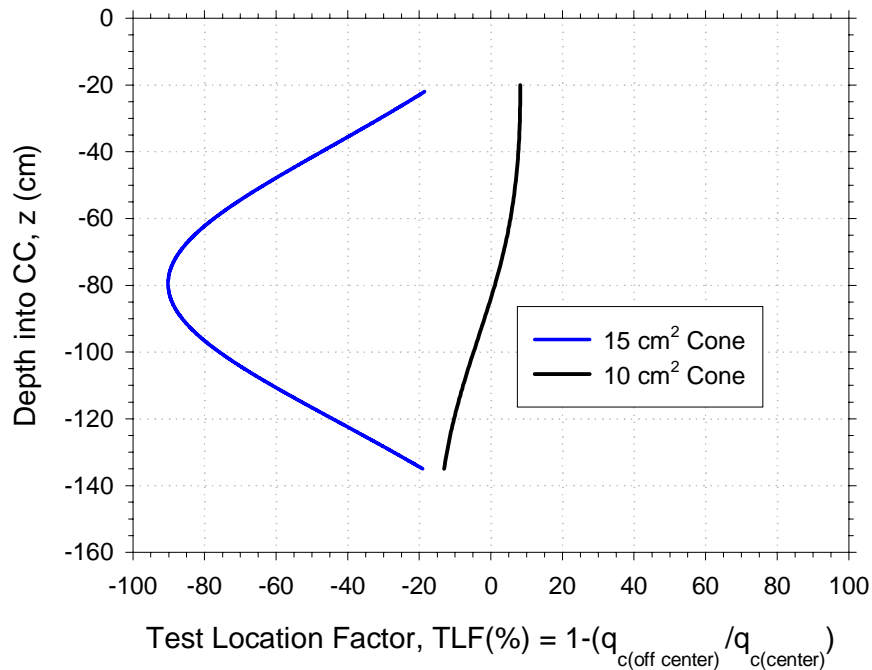


Figure 5.13 TLF for Tests Performed in Loose Samples at High Stress Levels with the 10-cm² Cone

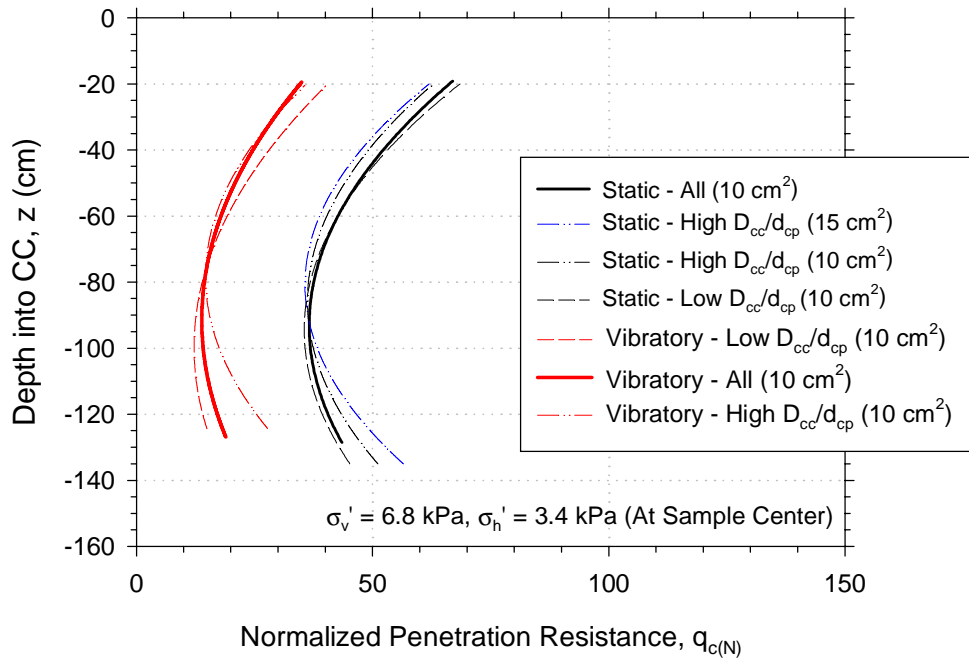


(a)

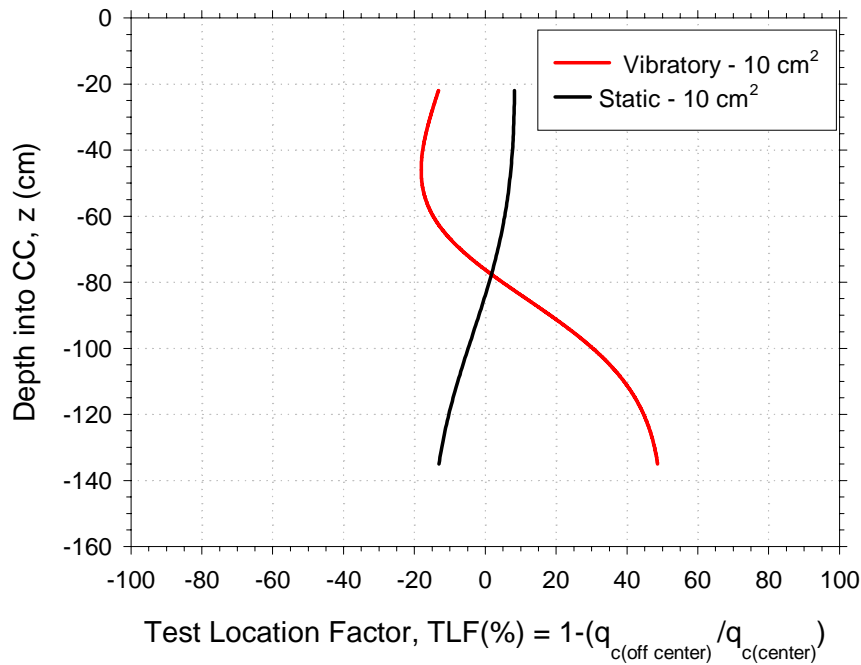


(b)

Figure 5.14 Normalized Penetration Resistance Measurements and TLF for Both Cones in Medium Dense Samples at Low Stress Levels

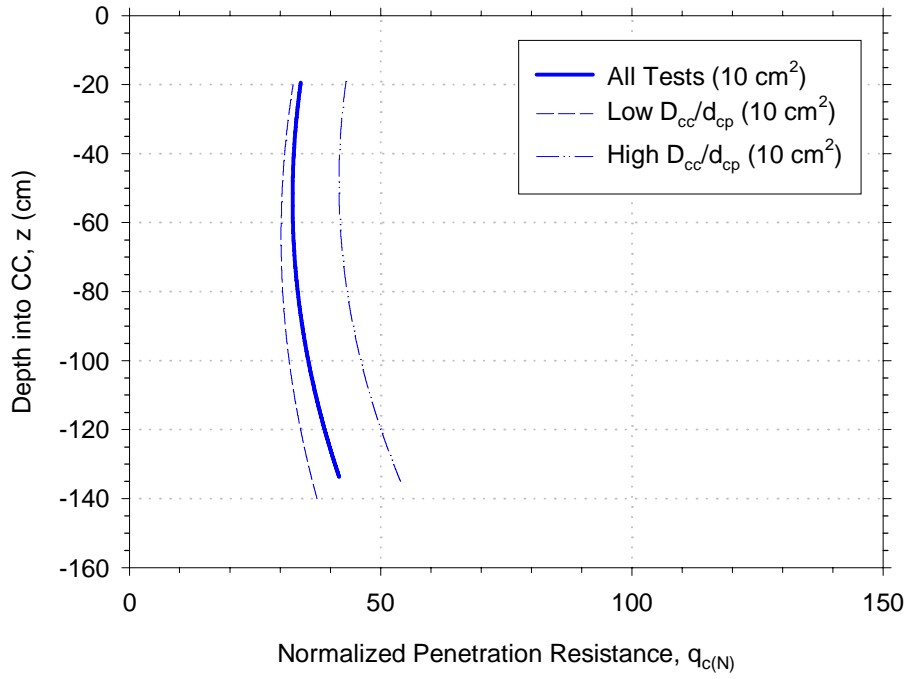


(a)

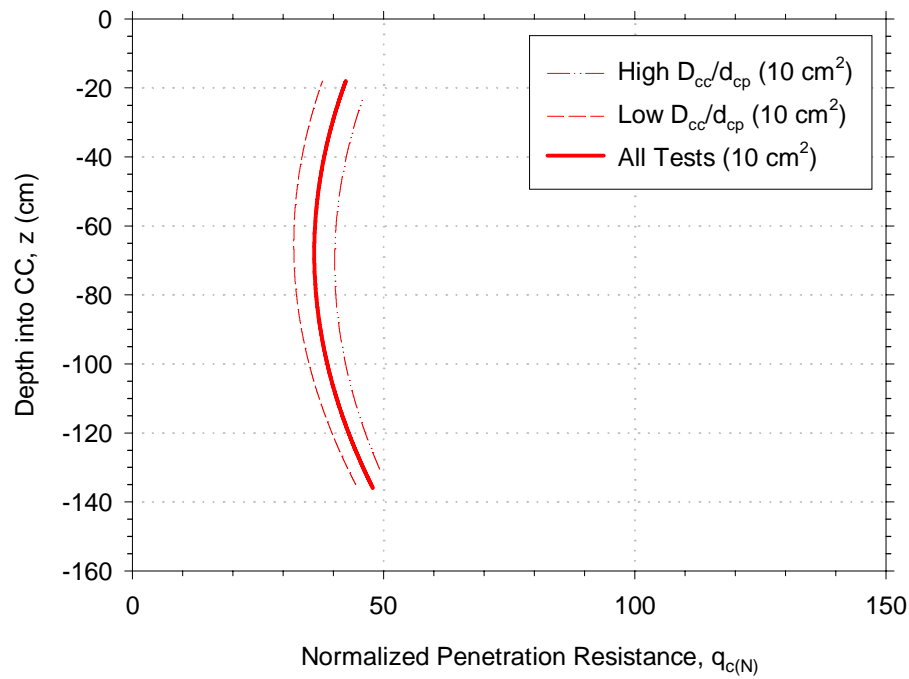


(b)

Figure 5.15 Normalized Penetration Resistance and TLF Curves for Tests in Medium Dense Samples at Low Stress Levels (10-cm² Cone)



a) Static Penetration



b) Vibratory Penetration

Figure 5.16 Normalized Penetration Resistance of Medium Dense Samples at Intermediate Stress Levels Using the 10-cm² Cone

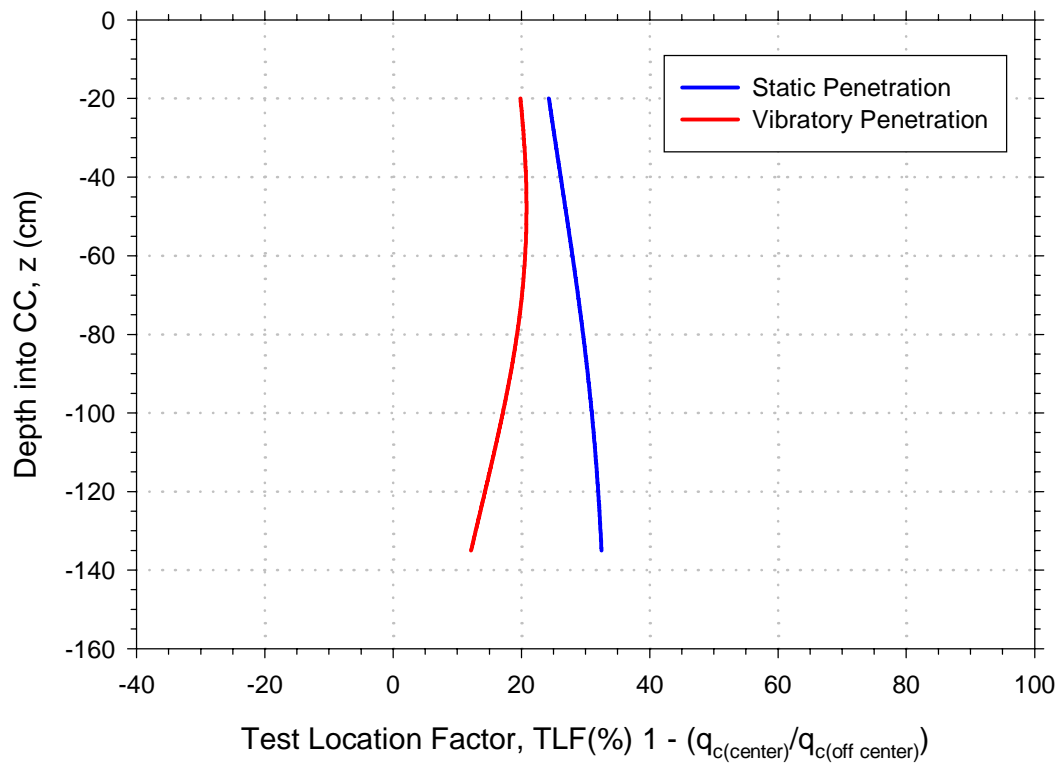
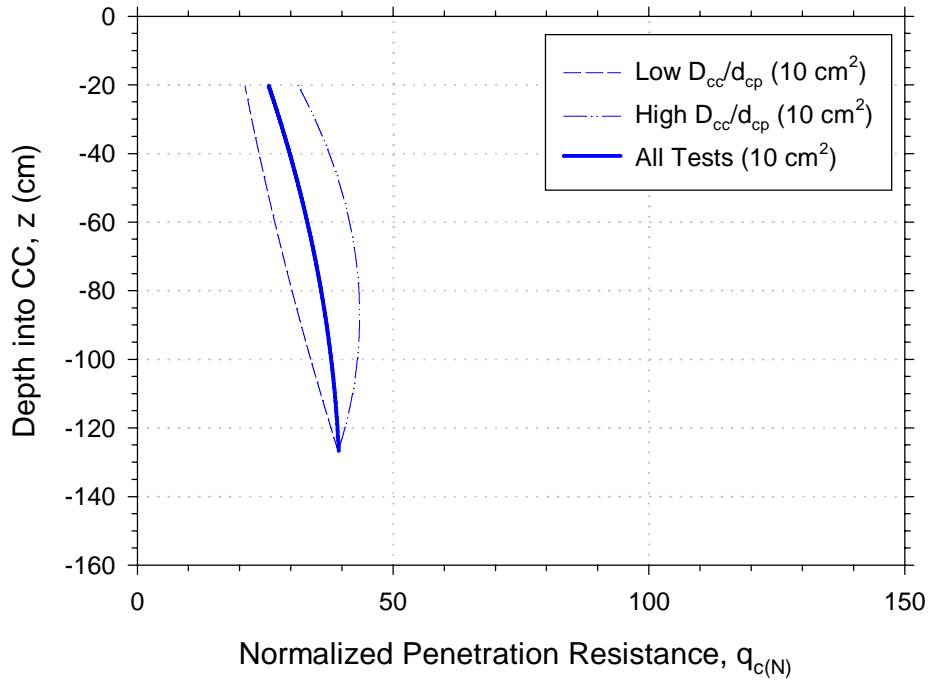
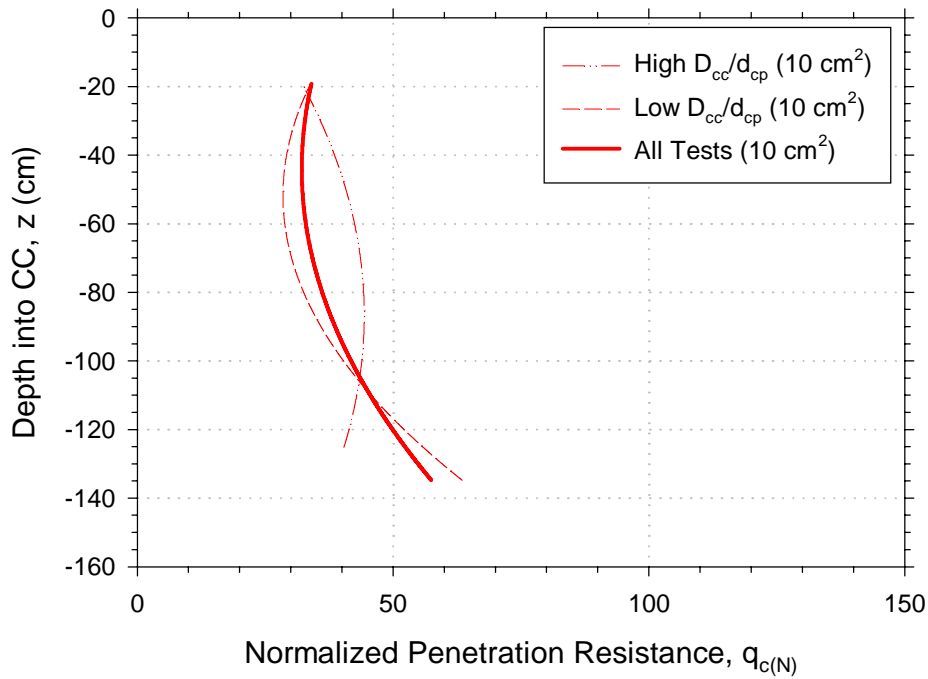


Figure 5.17 TLF for Tests Performed in Medium Dense Samples at Intermediate Stress Levels with the 10-cm² Cone



a) Static Penetration



b) Vibratory Penetration

Figure 5.18 Normalized Penetration Resistance of Medium Dense Samples at High Stress Levels Using the 10-cm² Cone Penetrometer

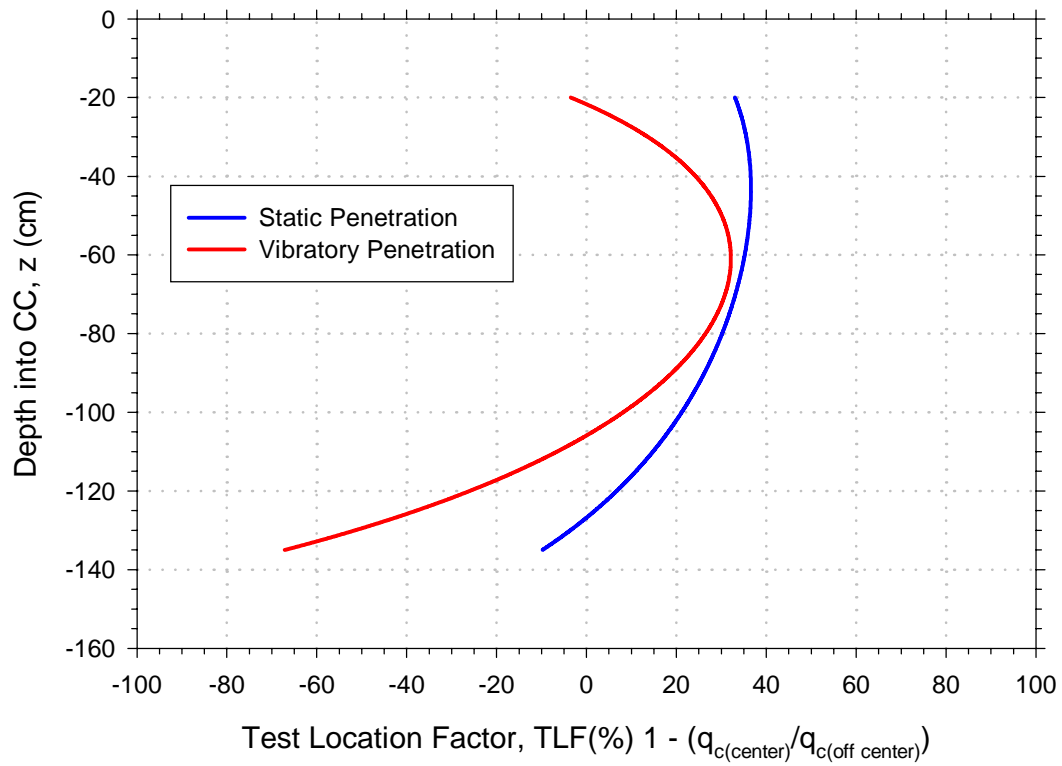
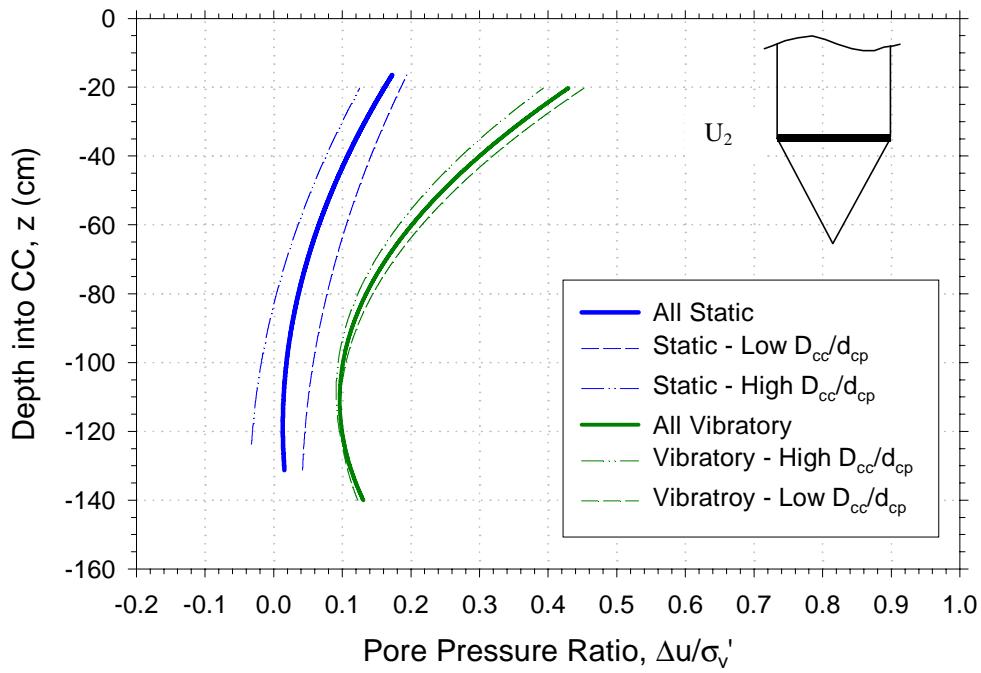
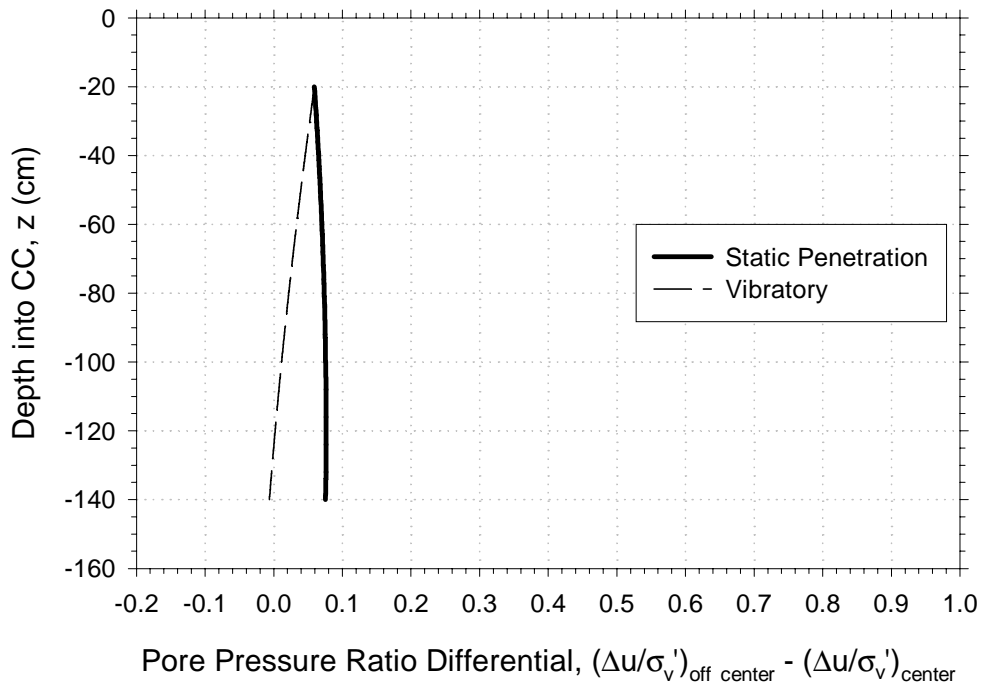


Figure 5.19 TLF for Tests Performed in Medium Dense Samples at High Stress Levels with the 10-cm² Cone Penetrometer

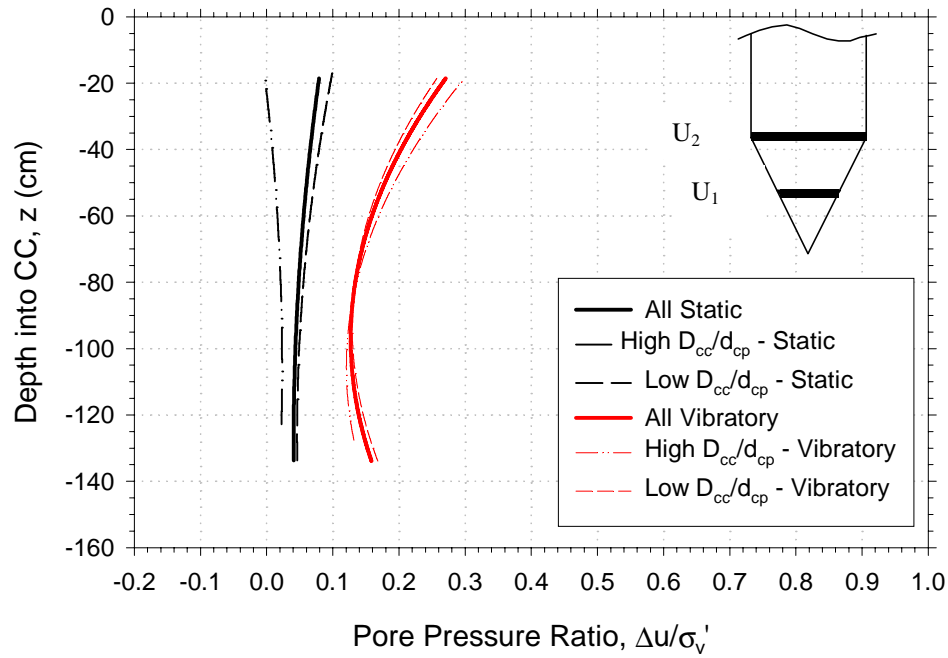


a)

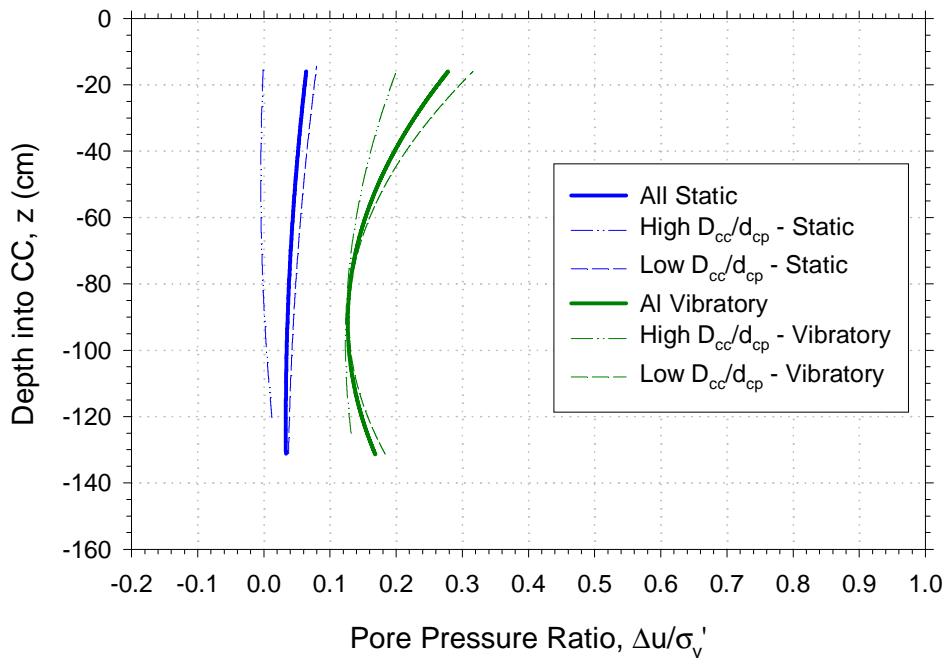


b)

Figure 5.20 Influence of Test Location on Pore Pressure Ratio for Static and Vibratory Tests in Loose Samples at Low Stress Levels Using the 10-cm² Cone



a) U_1 Location



b) U_2 Location

Figure 5.21 Pore Pressure Ratio for Static and Vibratory Tests in Loose Samples at Low Stress Levels and Different Test Locations Using the 15-cm² Cone

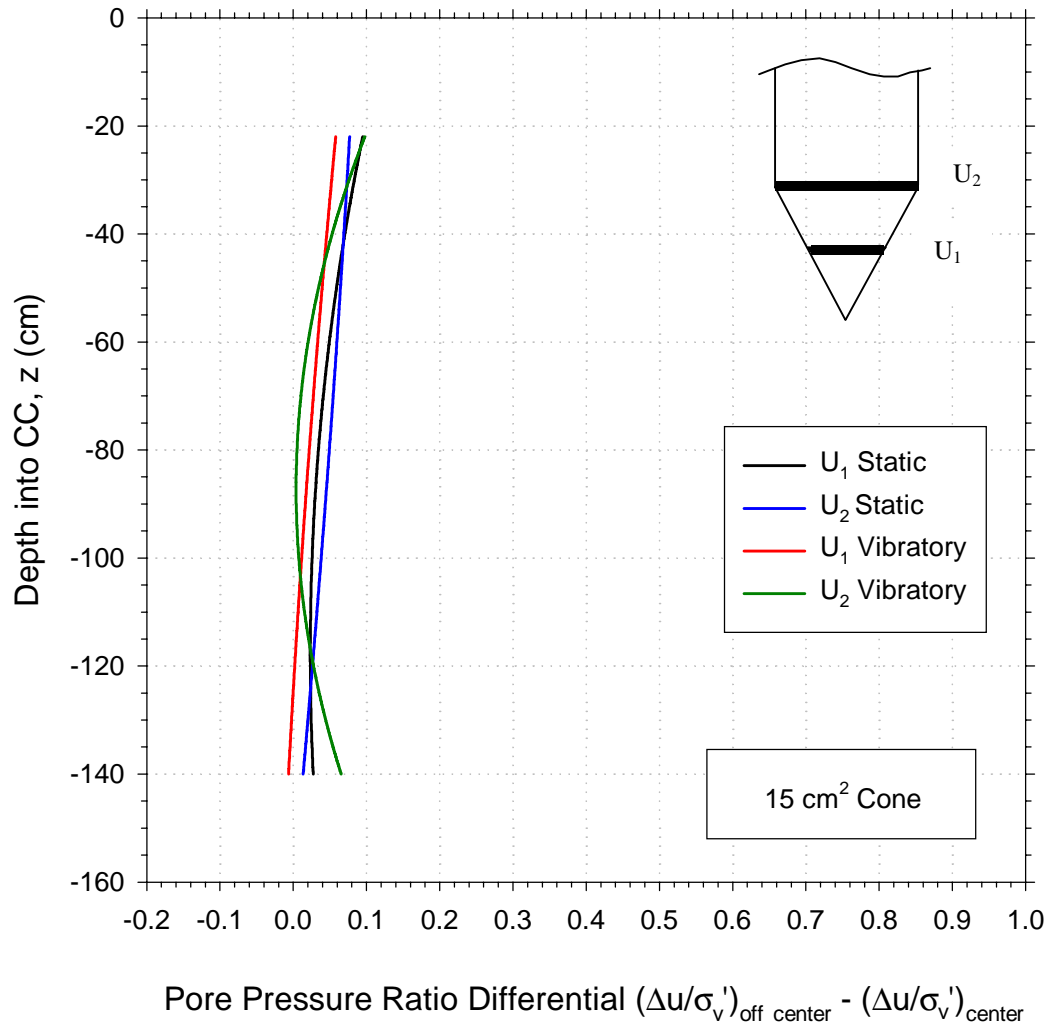
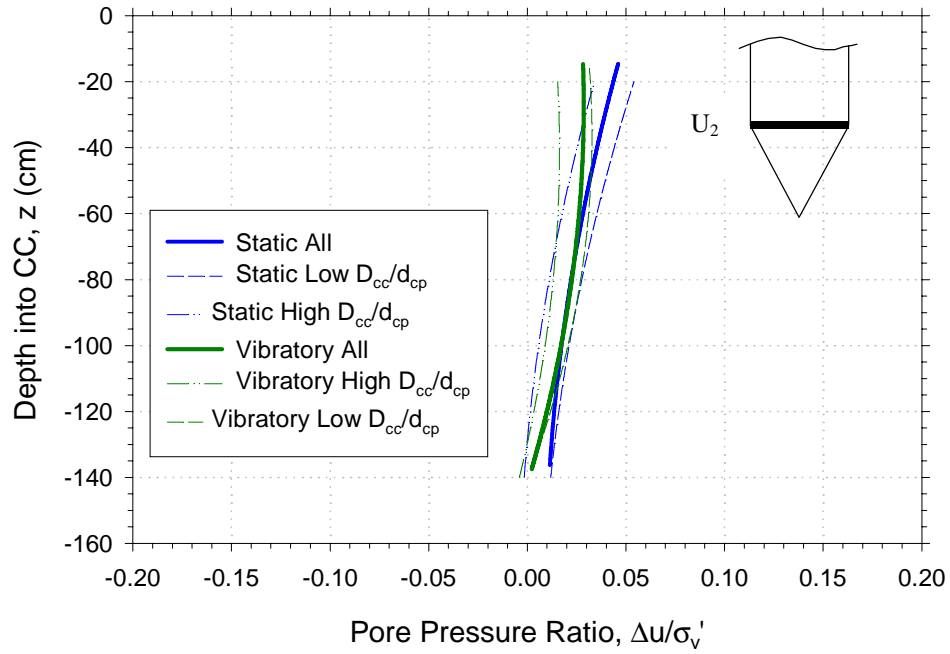
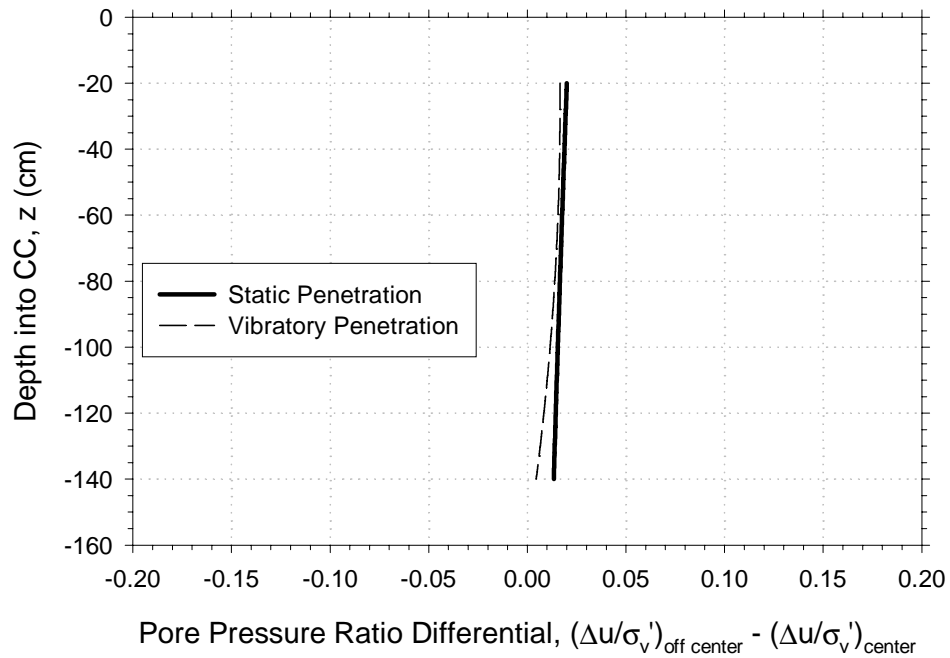


Figure 5.22 Variation in Pore Pressure Ratios at Different Test Locations for Static and Vibratory Tests in Loose Samples at Low Stress Levels Using the 15-cm² Cone

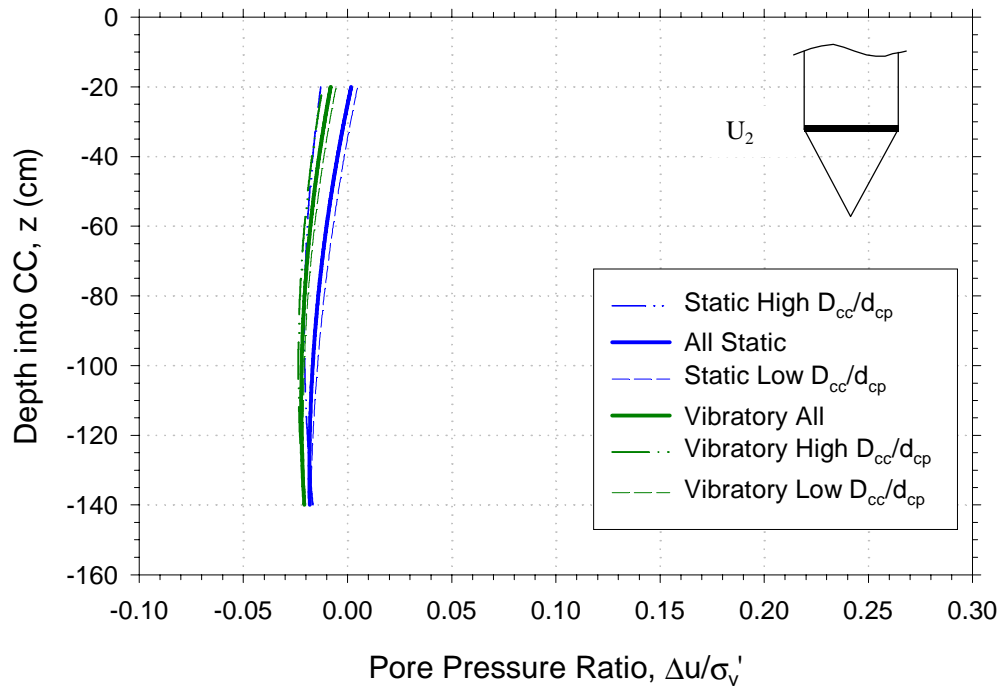


a)

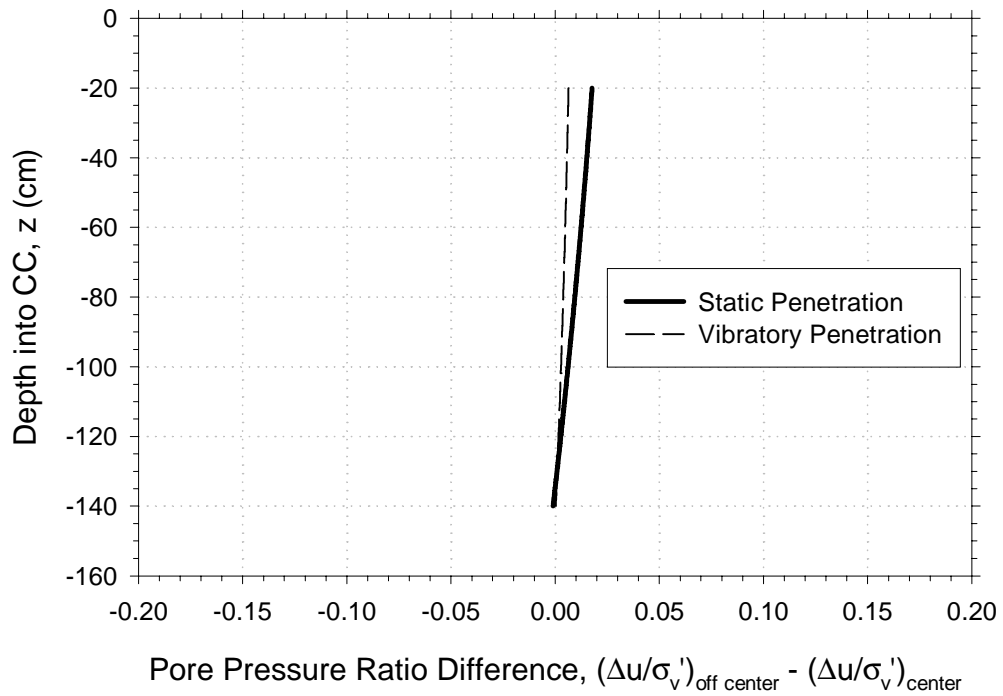


b)

Figure 5.23 Pore Pressure Ratio for Static and Vibratory Tests at Different Test Locations in Loose Samples at Intermediate Stress Levels Using 10-cm² Cone

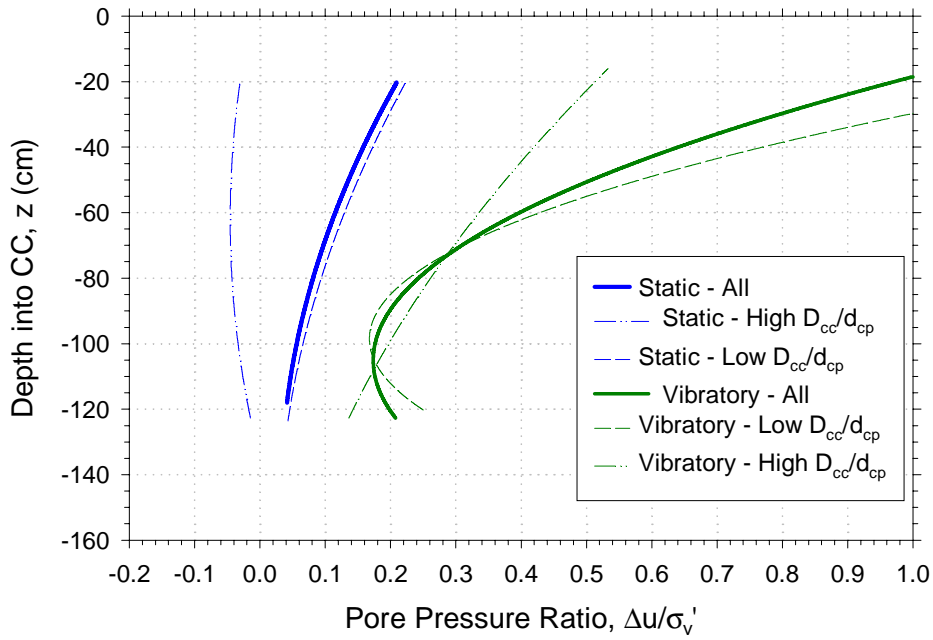


a)

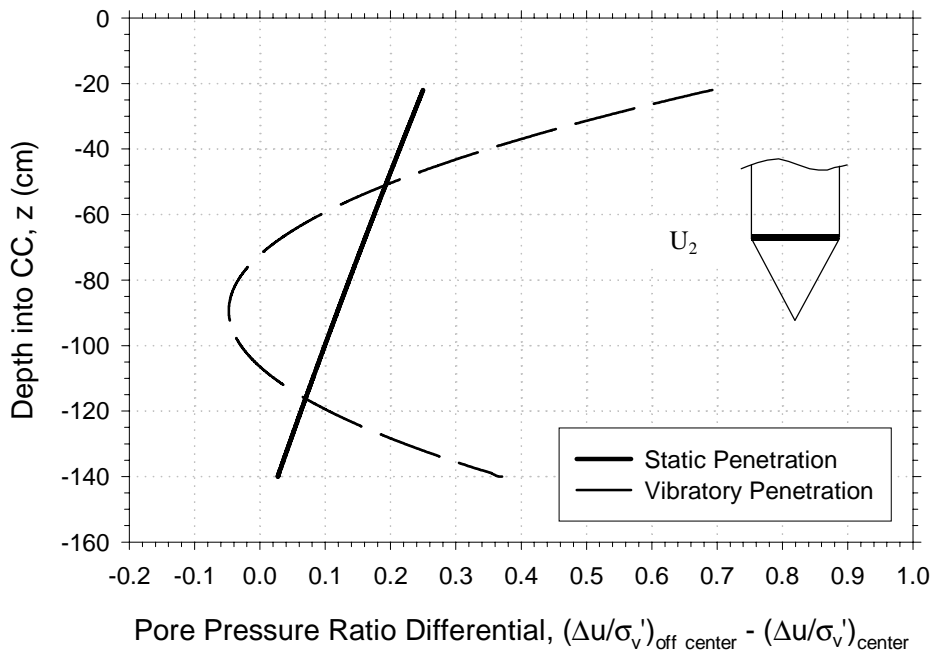


b)

Figure 5.24 Pore Pressure Ratio for Static and Vibratory Tests at Different Test Locations in Loose Samples at High Stress Levels Using 10-cm² Cone

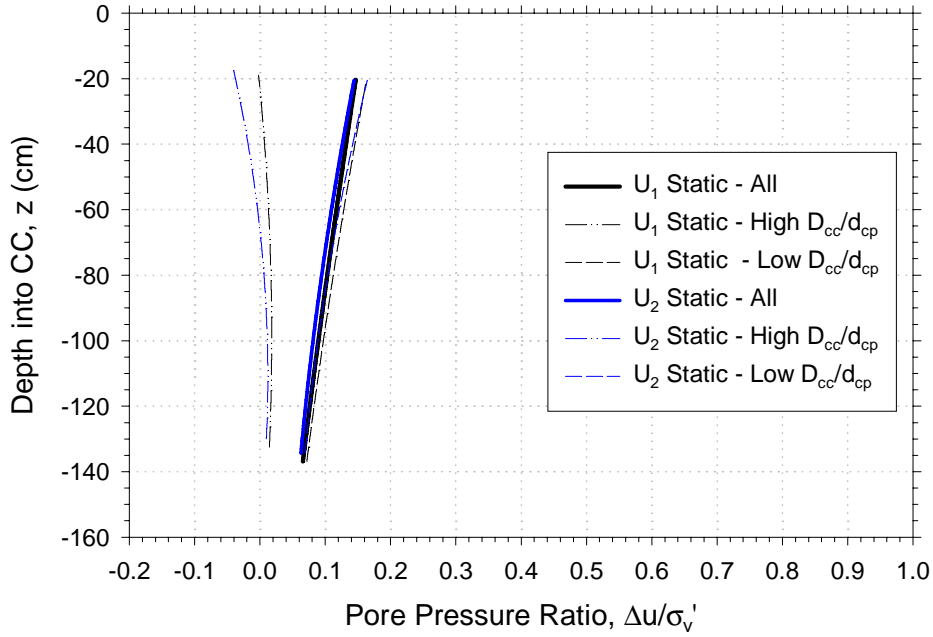


a)

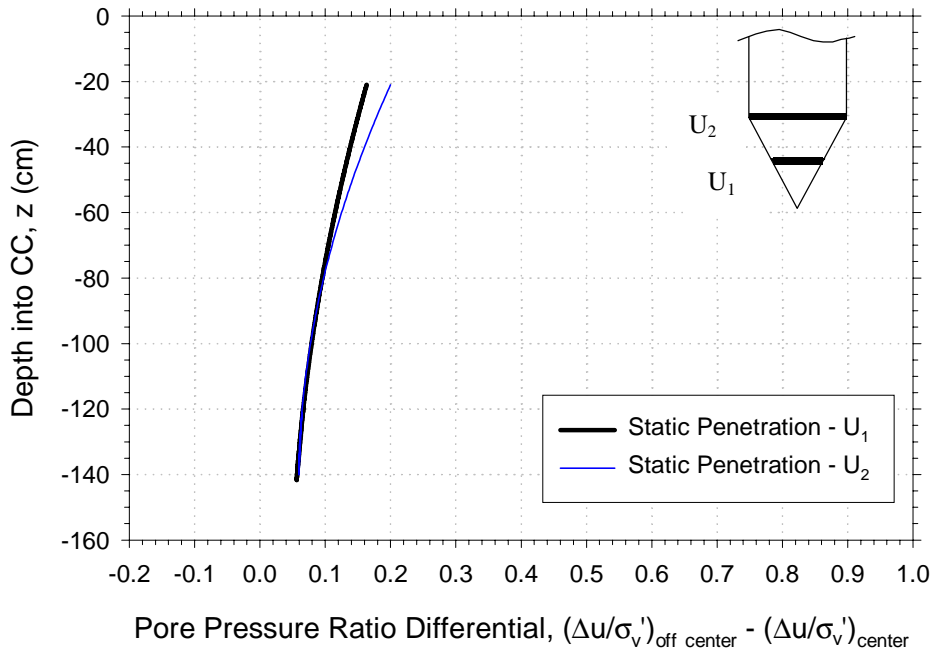


b)

Figure 5.25 Influence of Test Location on Pore Pressure Ratio for Static and Vibratory Tests in Medium Dense Samples at Low Stress Levels Using the 10-cm² Cone

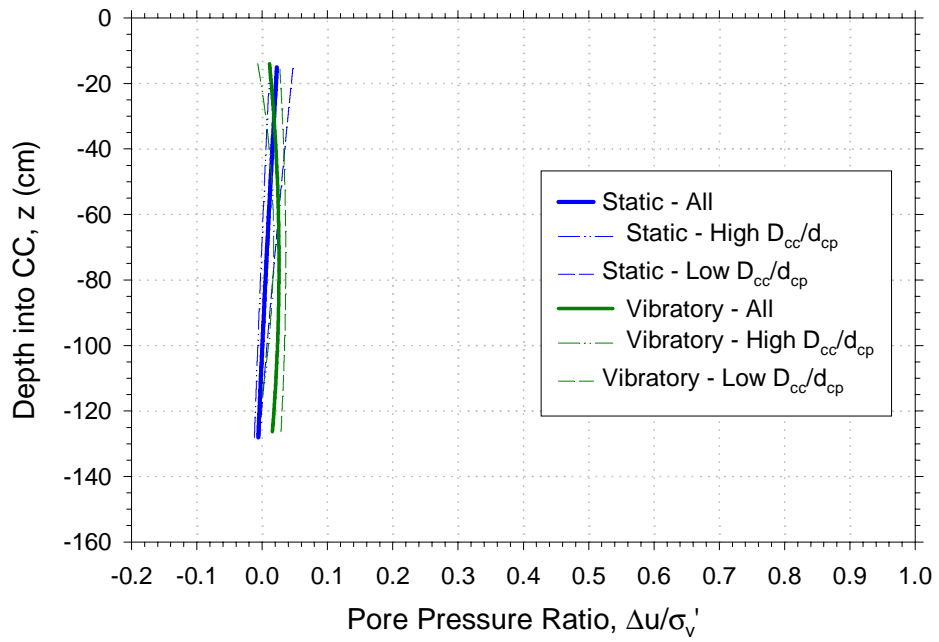


a)

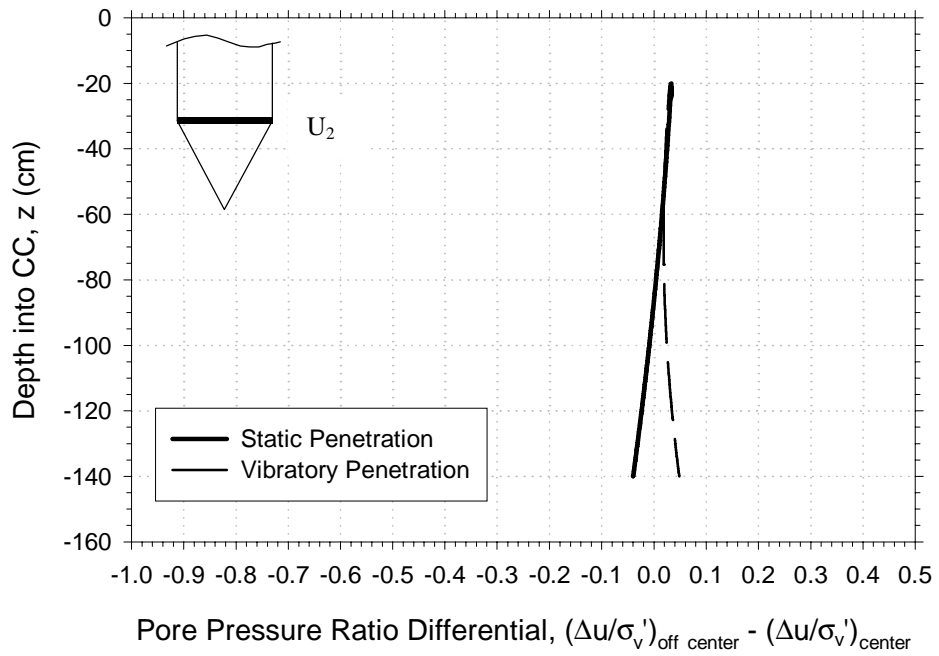


b)

Figure 5.26 Influence of Test Location on Pore Pressure Ratio for Static Tests in Medium Dense Samples at Low Stress Levels Using the 15-cm² Cone

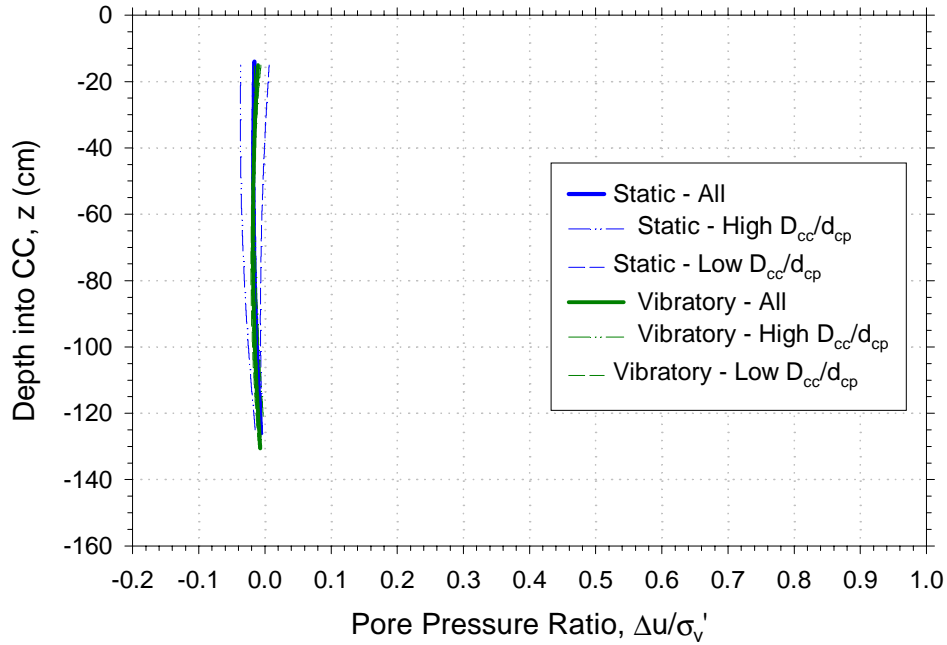


a)

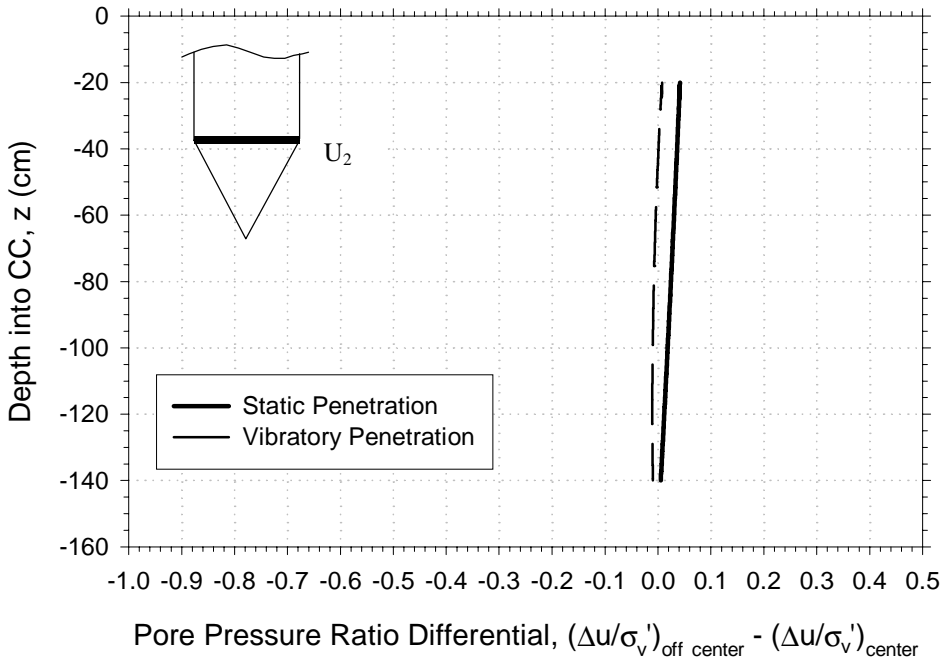


b)

Figure 5.27 Influence of Test Location on Pore Pressure Ratio for Static and Vibratory Tests in Medium Dense Samples at Intermediate Stress Levels Using the 10-cm² Cone

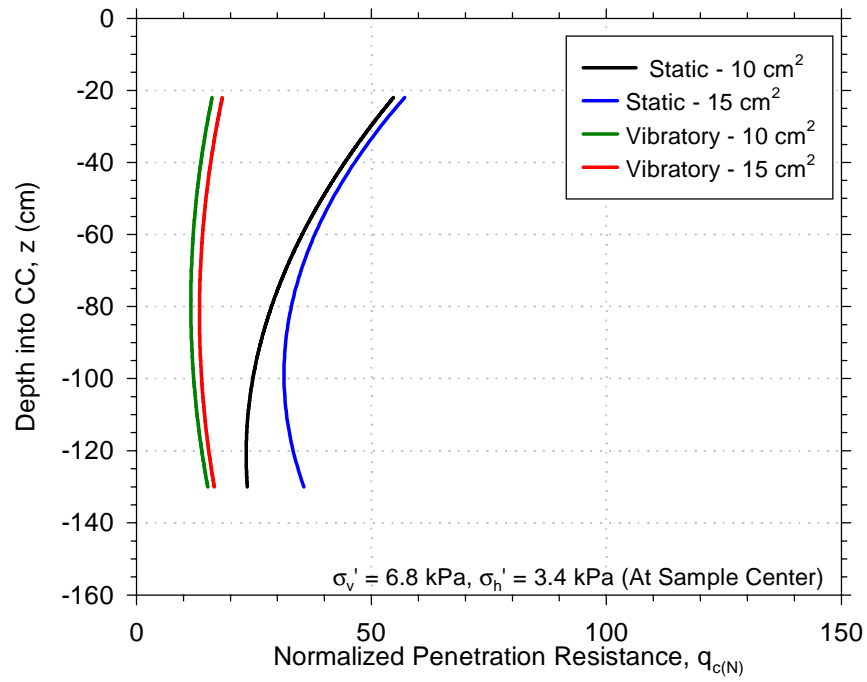


a)

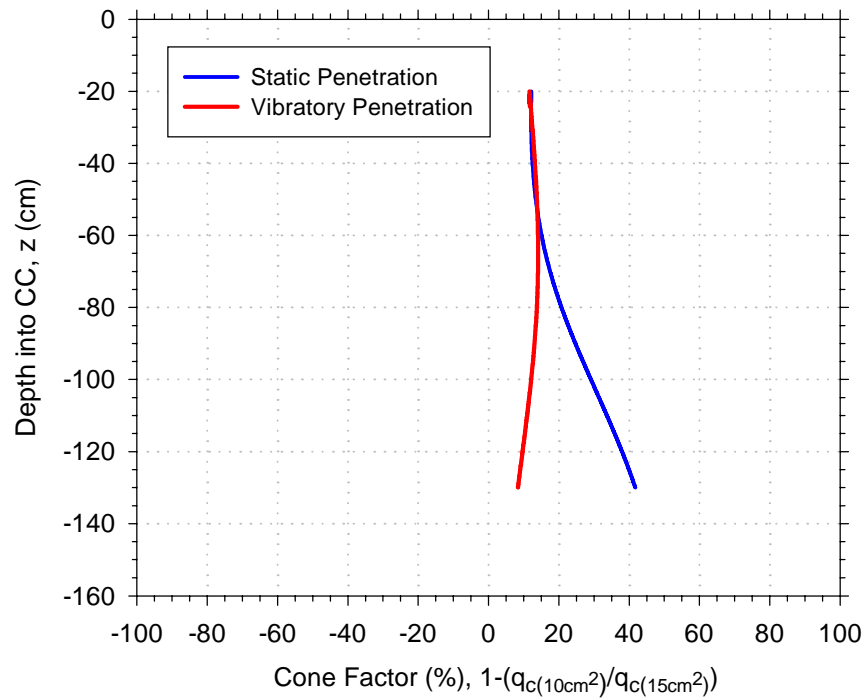


b)

Figure 5.28 Influence of Test Location on Pore Pressure Ratio for Static and Vibratory Tests in Medium Dense Samples at High Stress Levels Using the 10-cm² Cone



a)



b)

Figure 5.29 Normalized Penetration Resistance and Cone Factors for Both Cones in Loose Samples at Low Stress Levels

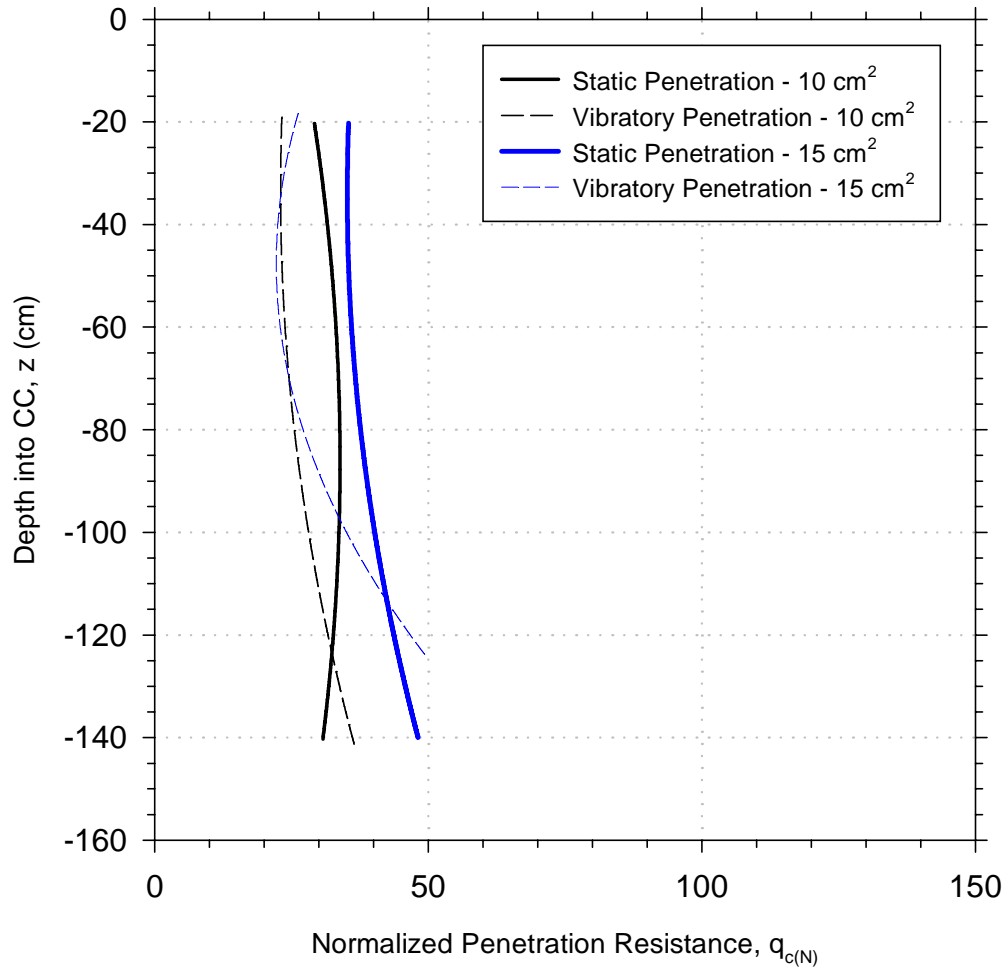


Figure 5.30 Normalized Penetration Resistance for Different Cones in Loose Samples at Intermediate Stress Conditions

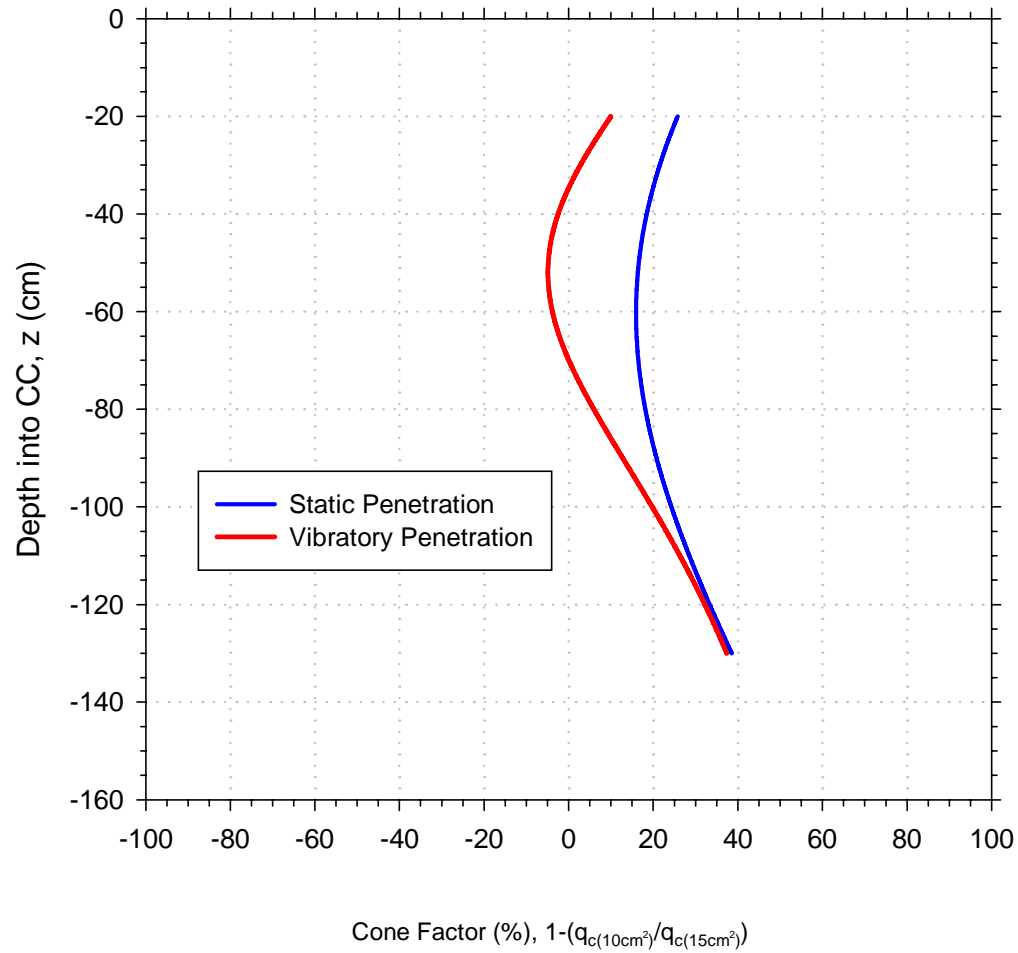
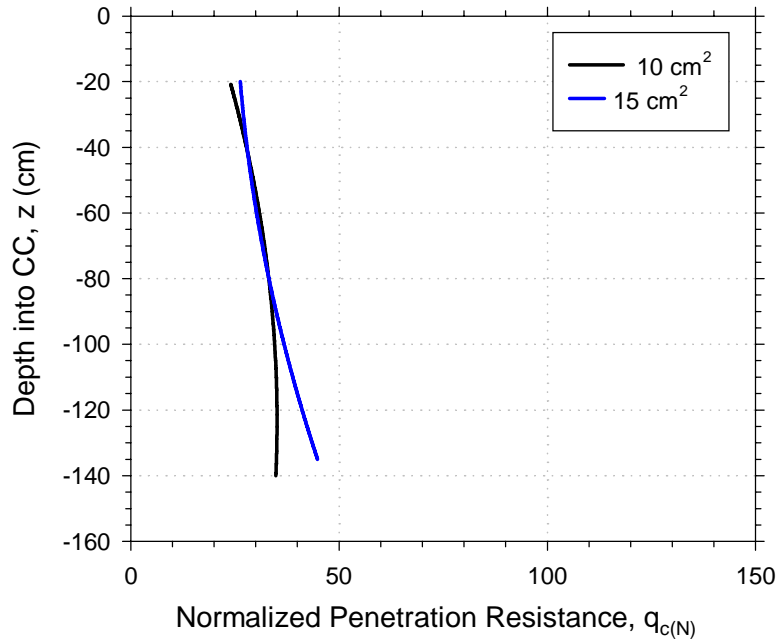
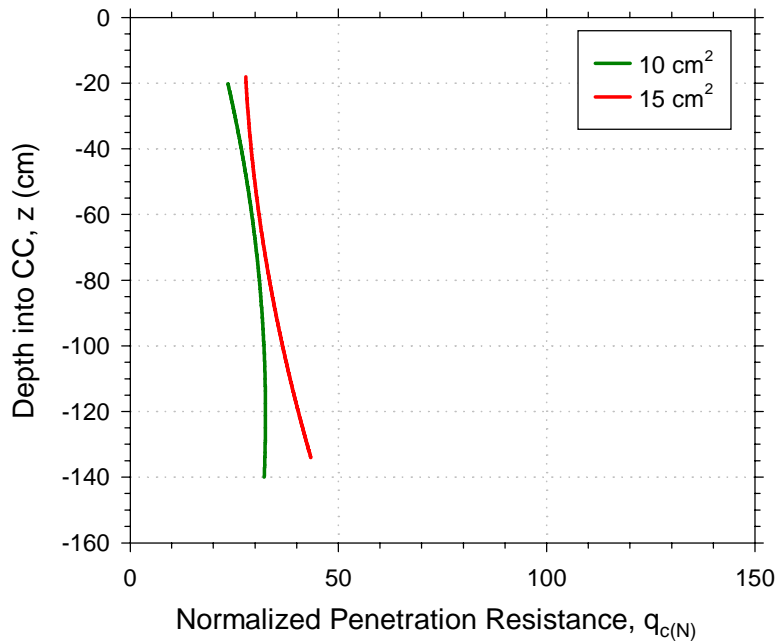


Figure 5.31 Influence of Cone Diameter on Penetration Resistance for Tests Performed in Loose Samples at Intermediate Stress Levels



(a) Static Penetration



(b) Vibratory Penetration

Figure 5.32 Normalized Penetration Resistance of Loose Samples at High Stress Levels for Two Different Penetrometers

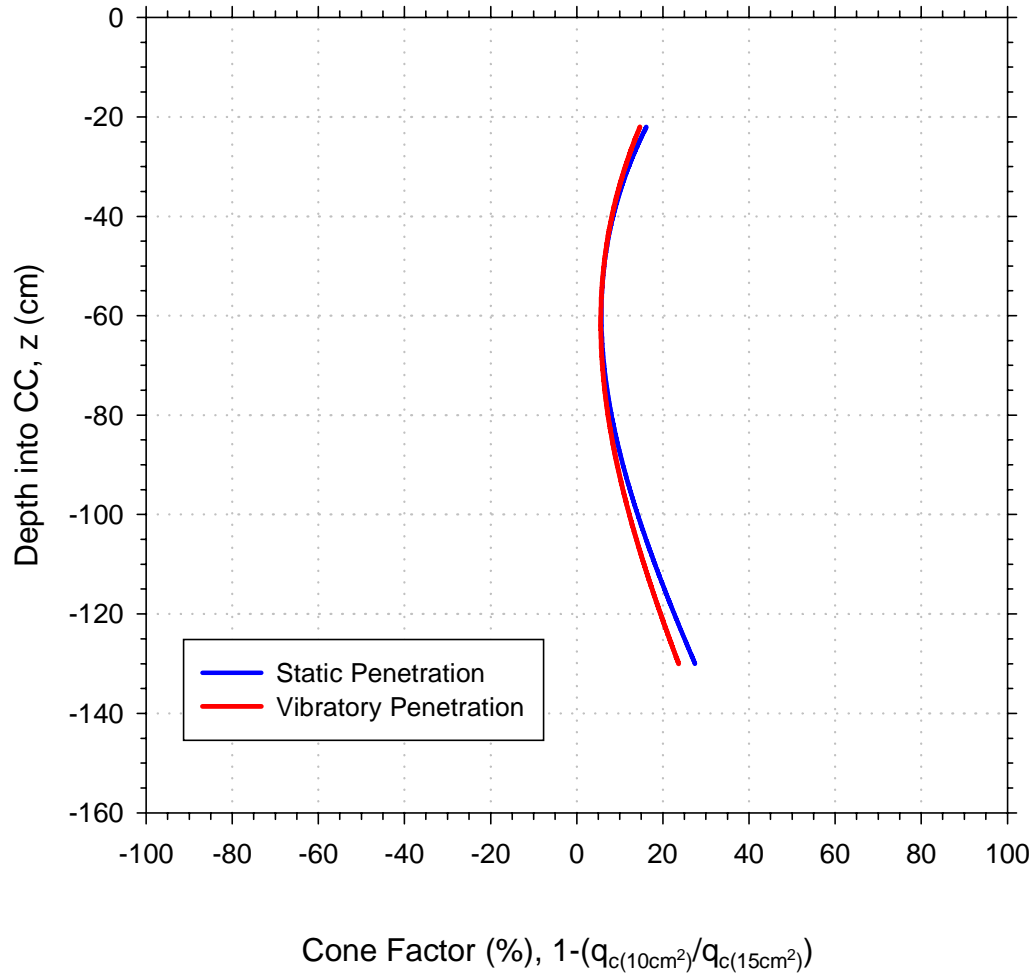
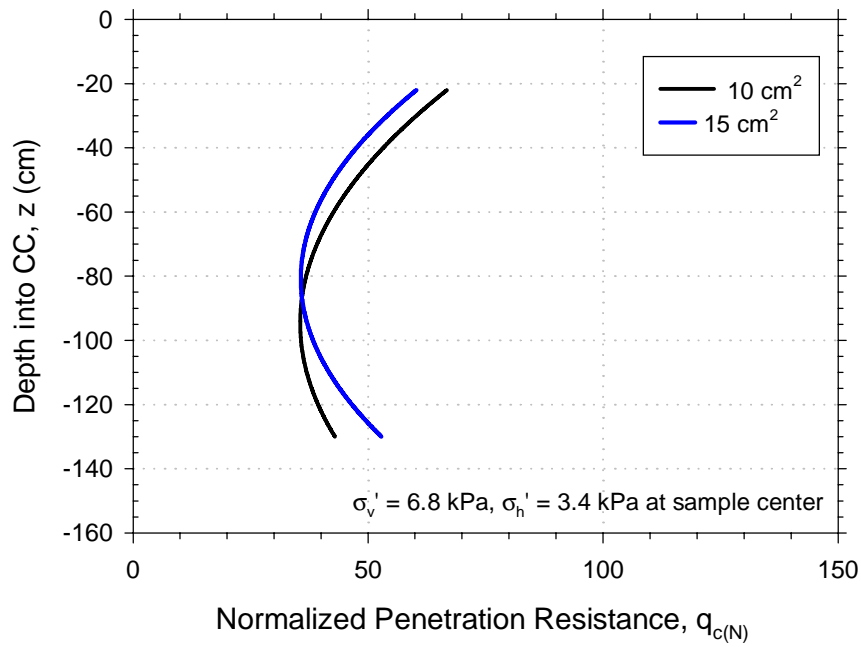
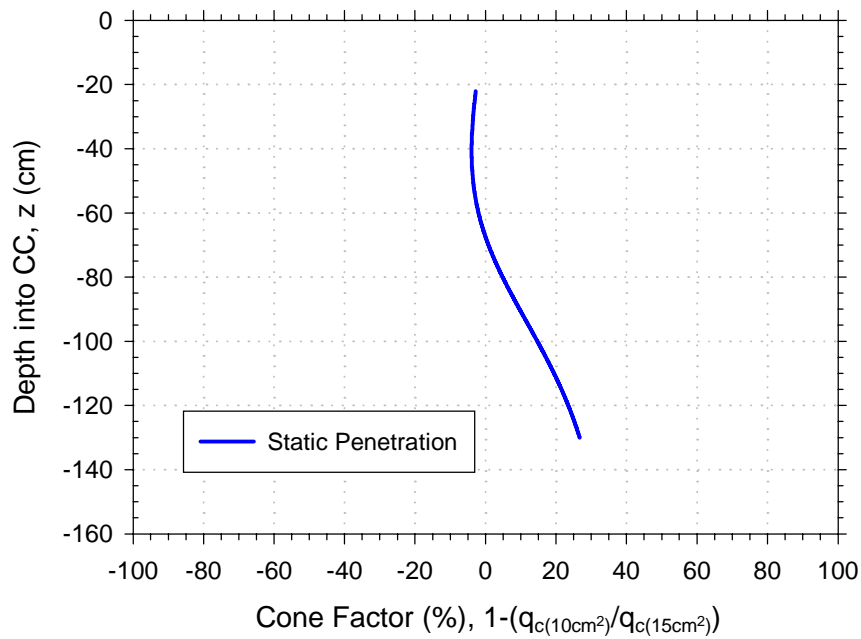


Figure 5.33 Influence of Cone Type on Penetration Resistance for Tests Performed in Loose Samples at High Stress Levels

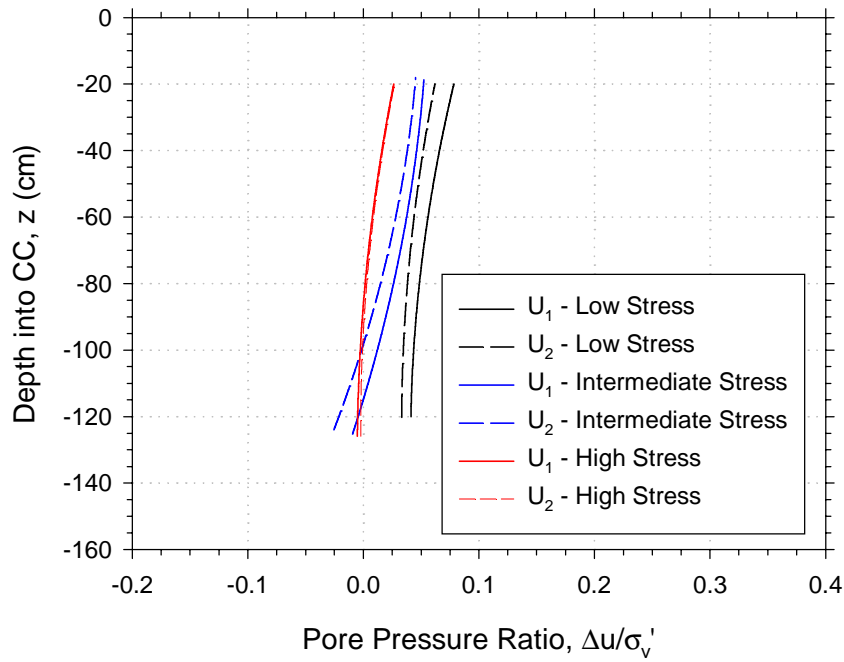


a)

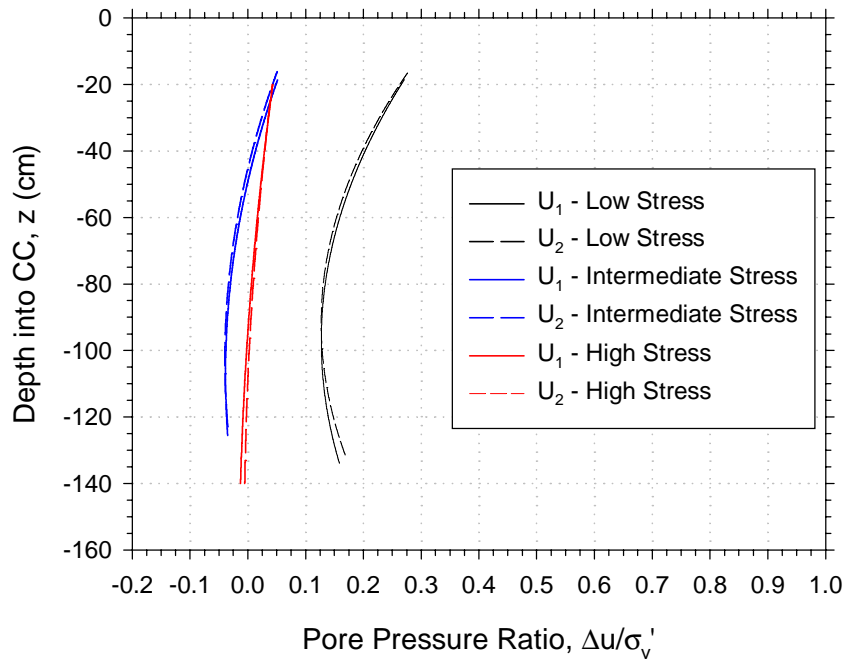


b)

Figure 5.34 Normalized Penetration Resistance and Cone Factor for Tests in Medium Dense Samples at Low Stress Levels



(a) Static Penetration



(b) Vibratory Penetration

Figure 5.35 Pore Pressure Ratio Measured at Different Transducer Locations During Penetration Tests in Loose Samples at Different Stress Levels

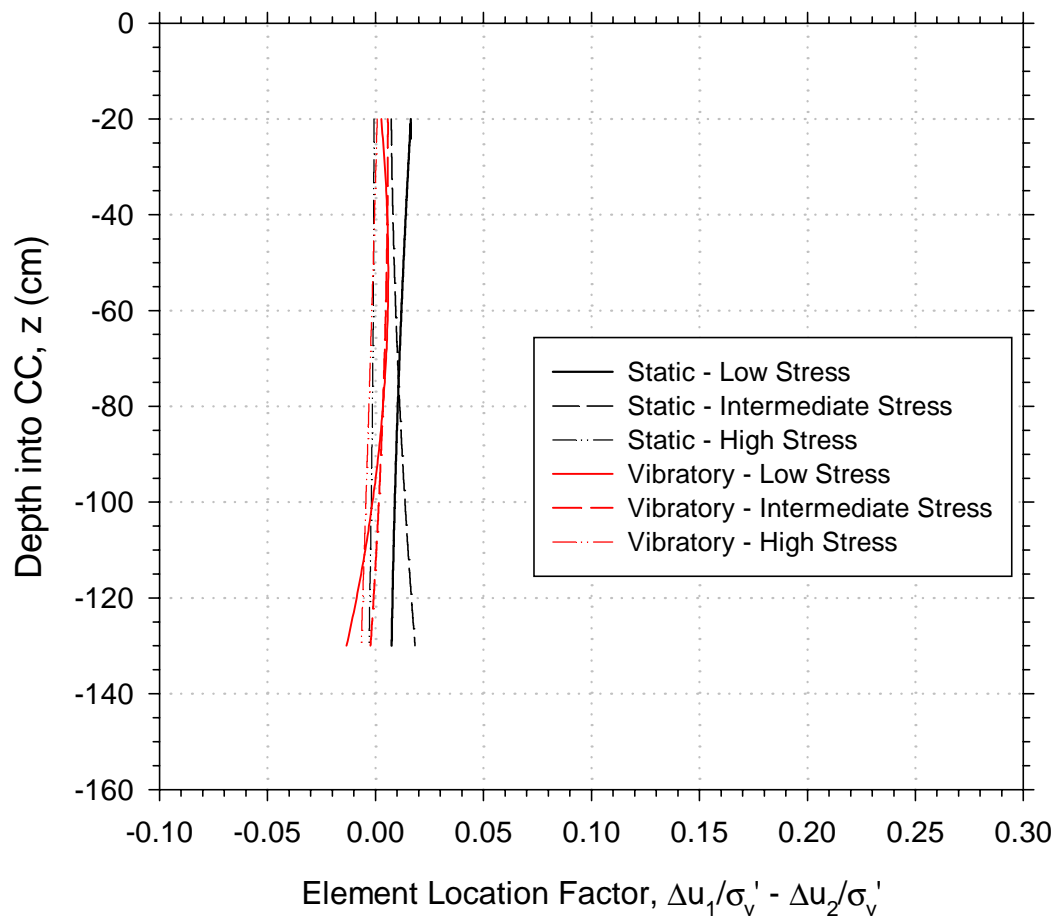
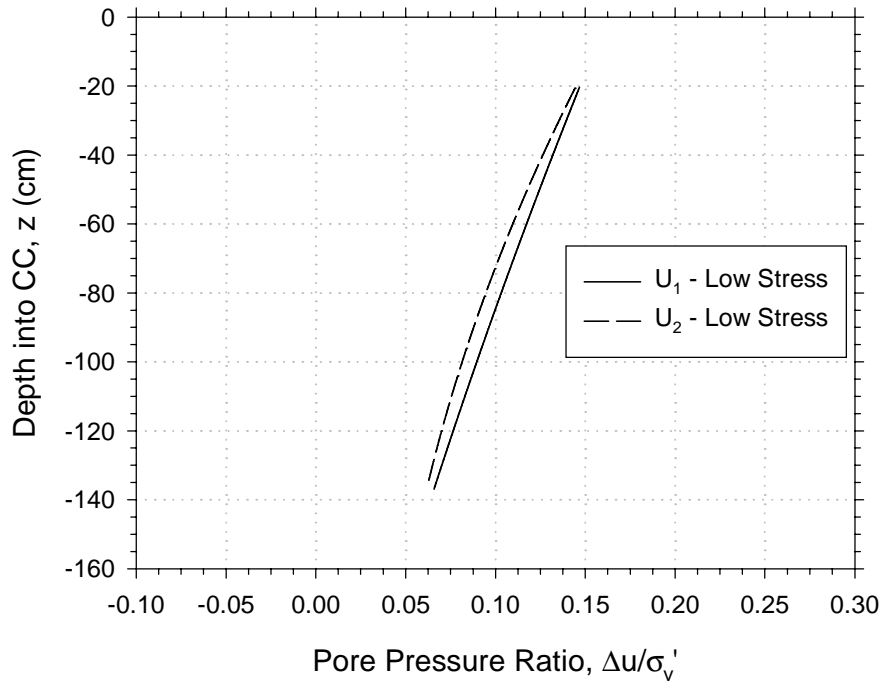
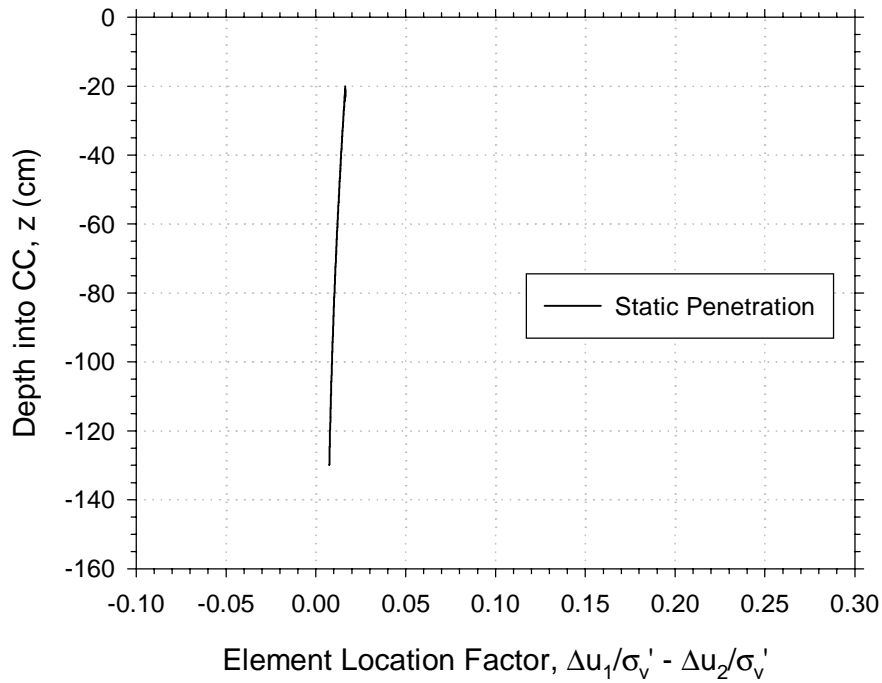


Figure 5.36 Difference in Pore Pressure Ratios Measured at During Static and Vibratory Penetration in Loose Samples at All Stress Levels

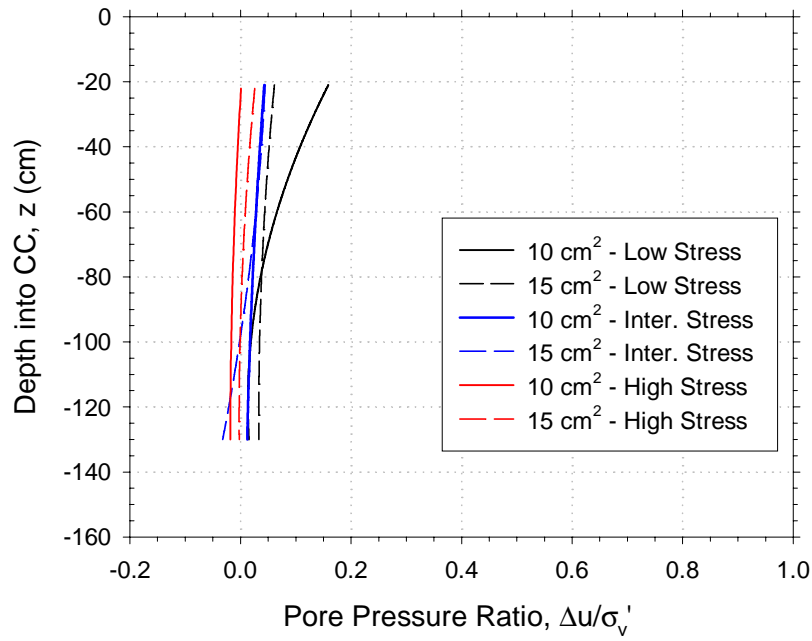


(a)

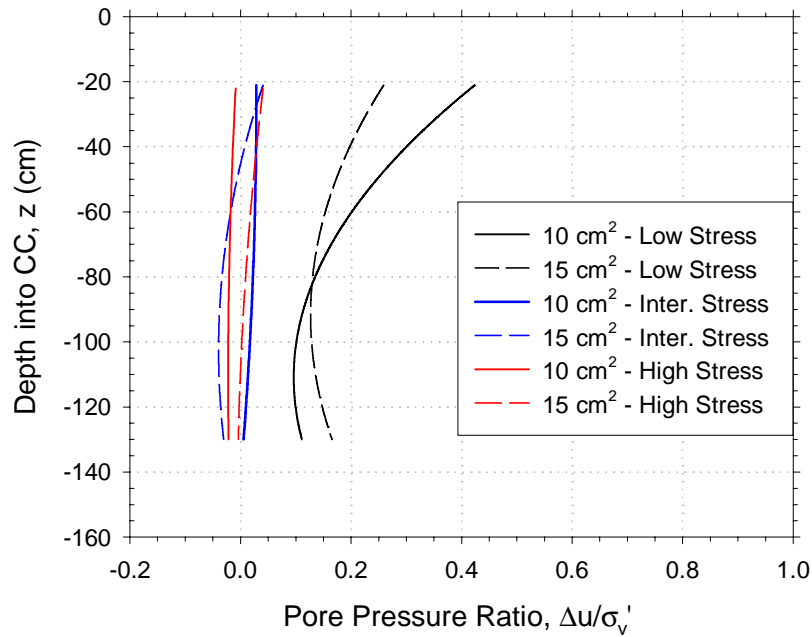


(b)

Figure 5.37 Difference in Pore Pressure Ratios Measured During Static Penetration in Medium Dense Samples at Low Stress Levels



(a) Static Penetration



(b) Vibratory Penetration

Figure 5.38 Pore Pressure Ratios with Depth for Static and Vibratory Penetration Tests in Loose Samples at All Stress Levels

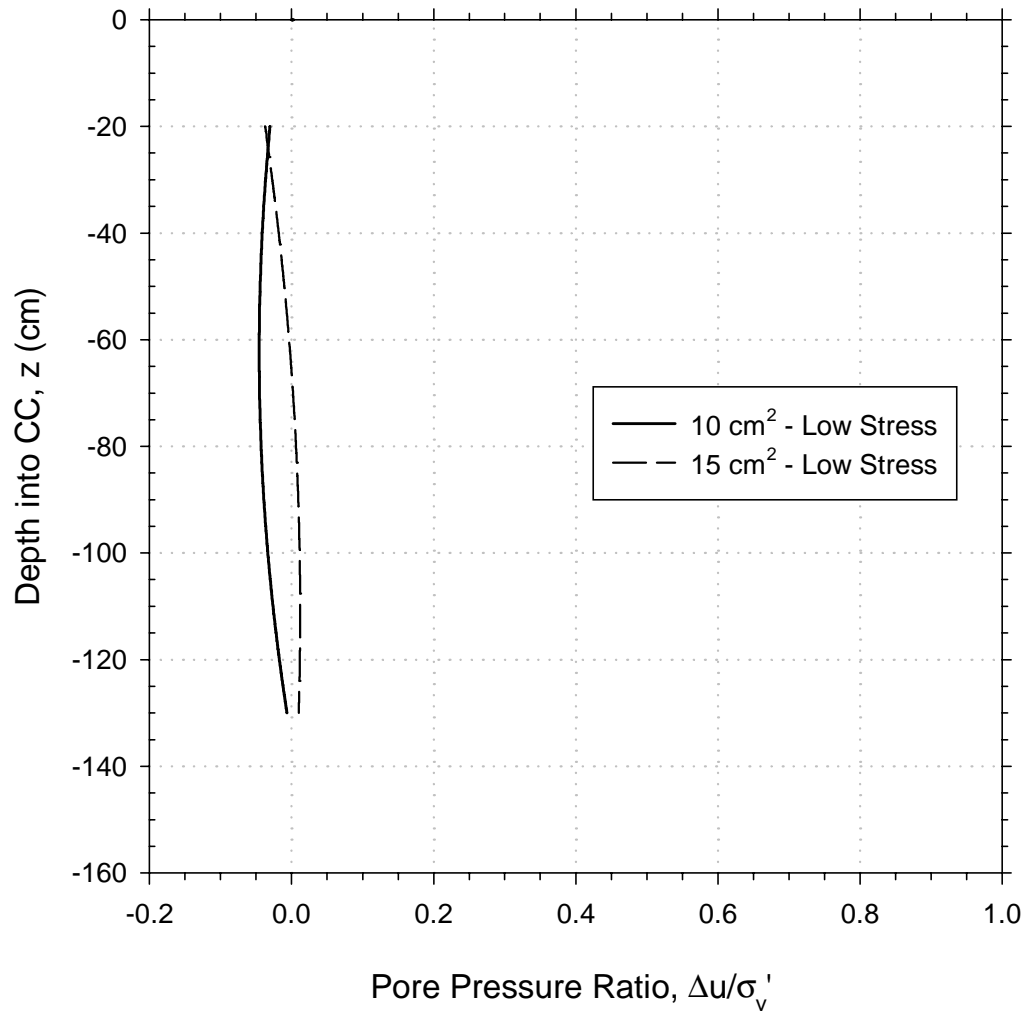
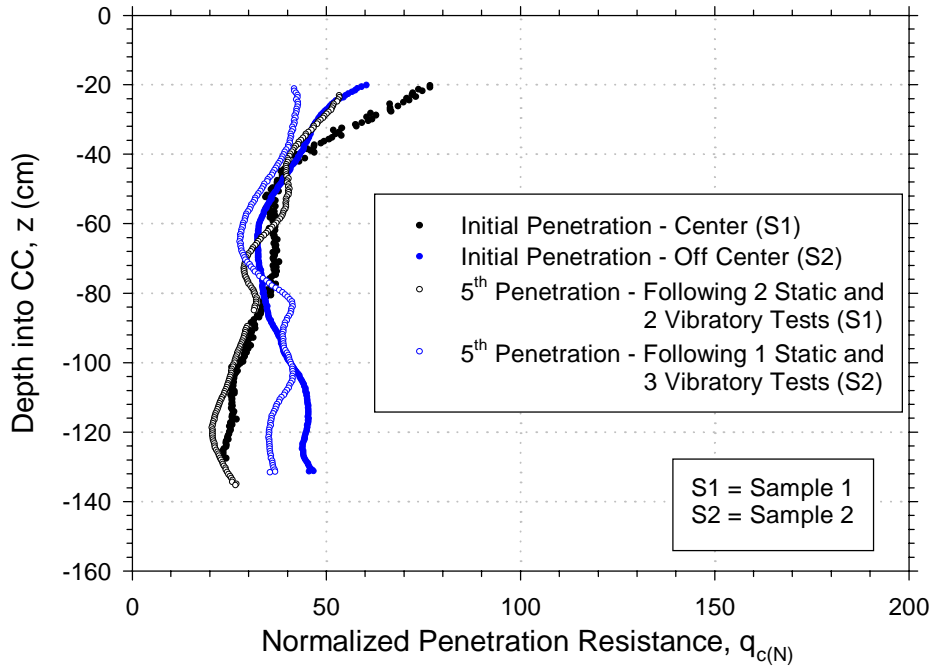
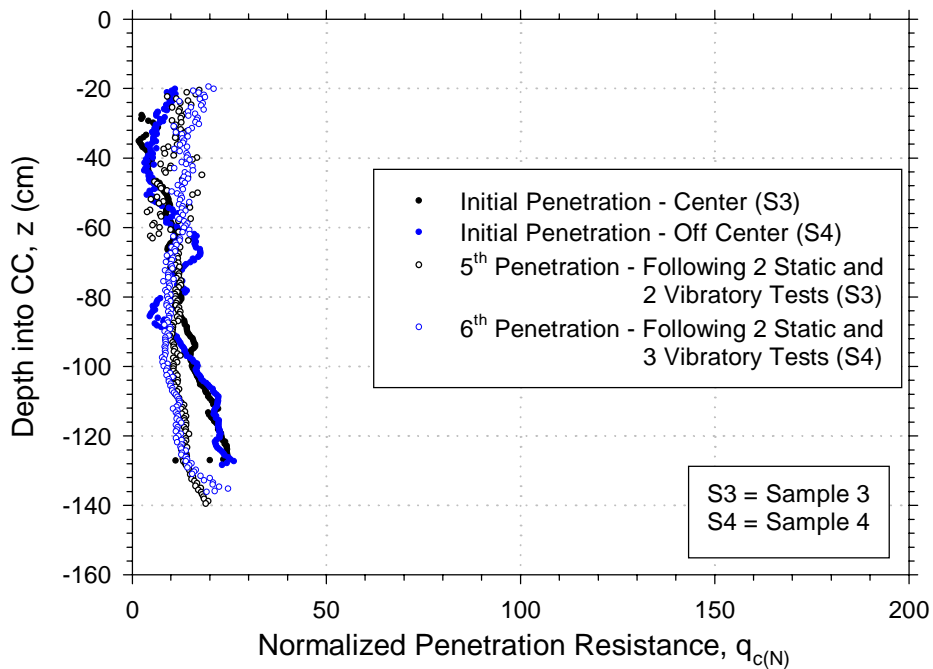


Figure 5.39 Pore Pressure Ratios with Depth for Static Penetration Tests in Medium Dense Samples at All Stress Levels

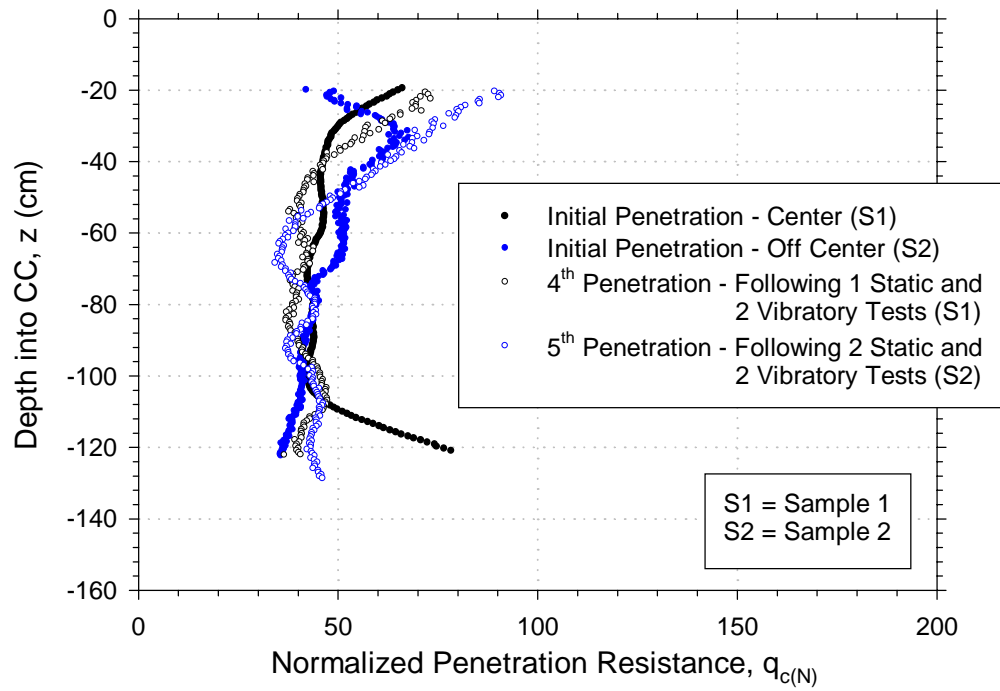


a) Static Penetration Test Results

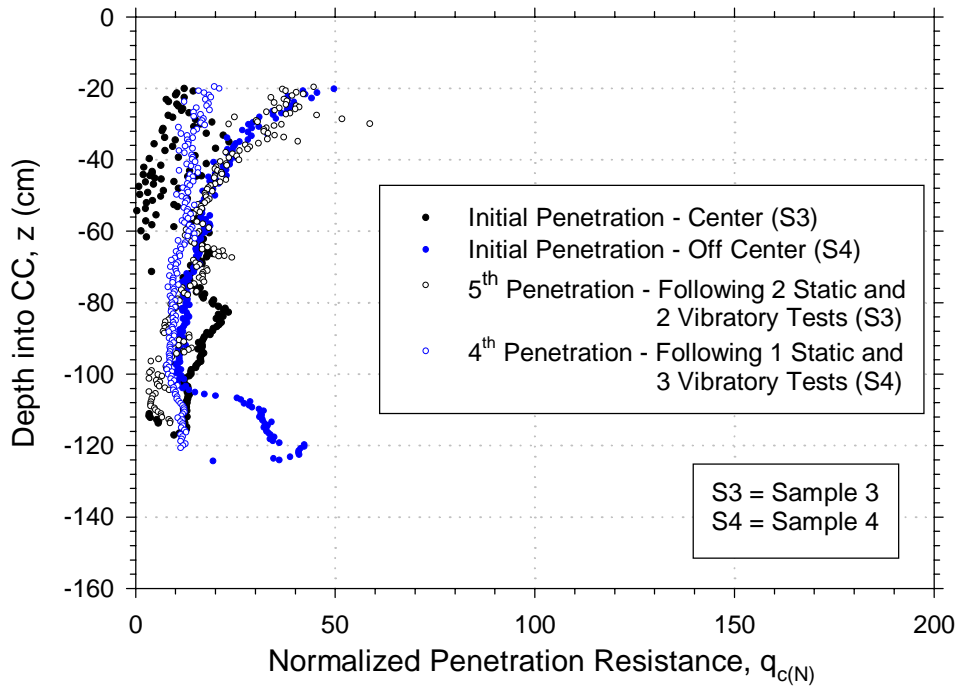


b) Vibratory Penetration Test Results

Figure 5.40 Effect of Testing Order on Penetration Resistance Ratio for Tests in Loose Samples at Low Stress Levels

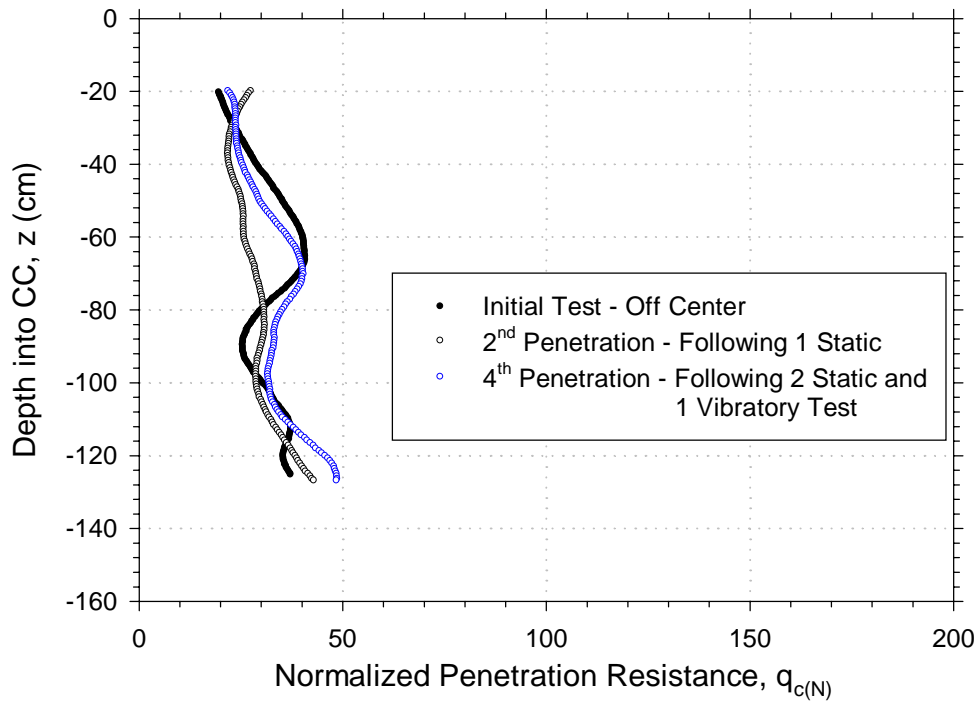


a) Static Penetration

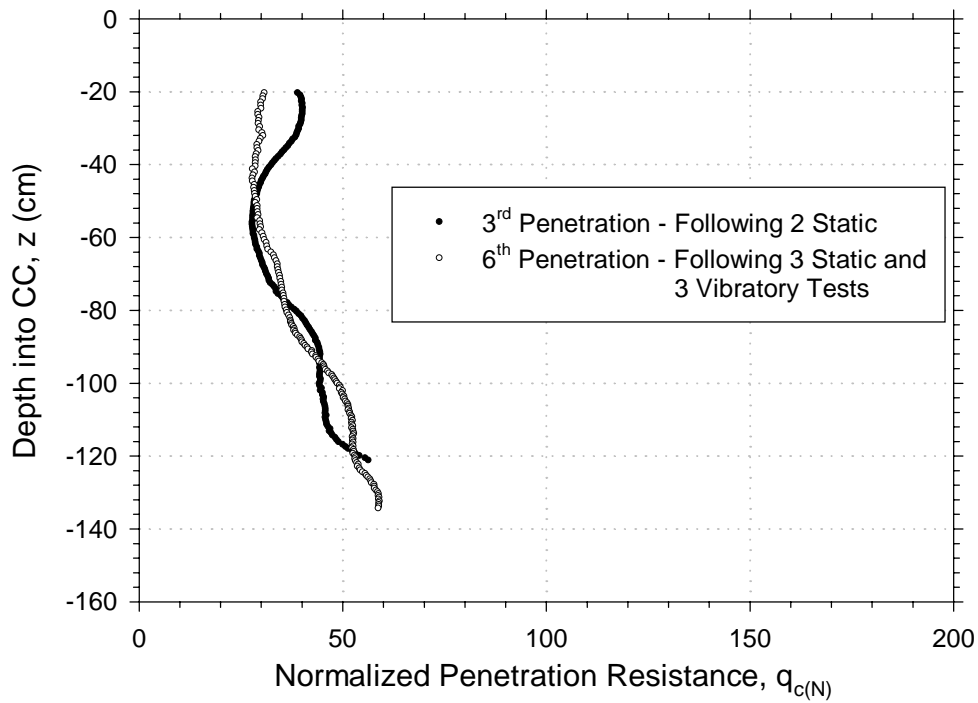


b) Vibratory Penetration

Figure 5.41 Effect of Testing Order on Penetration Resistance Ratio for Static Tests in Medium Dense Samples at Low Stress Levels



a) Static Penetration



b) Vibratory Penetration

Figure 5.42 Effect of Testing Order on Penetration Resistance Ratio for Static Tests in Medium Dense Samples at High Stress Levels

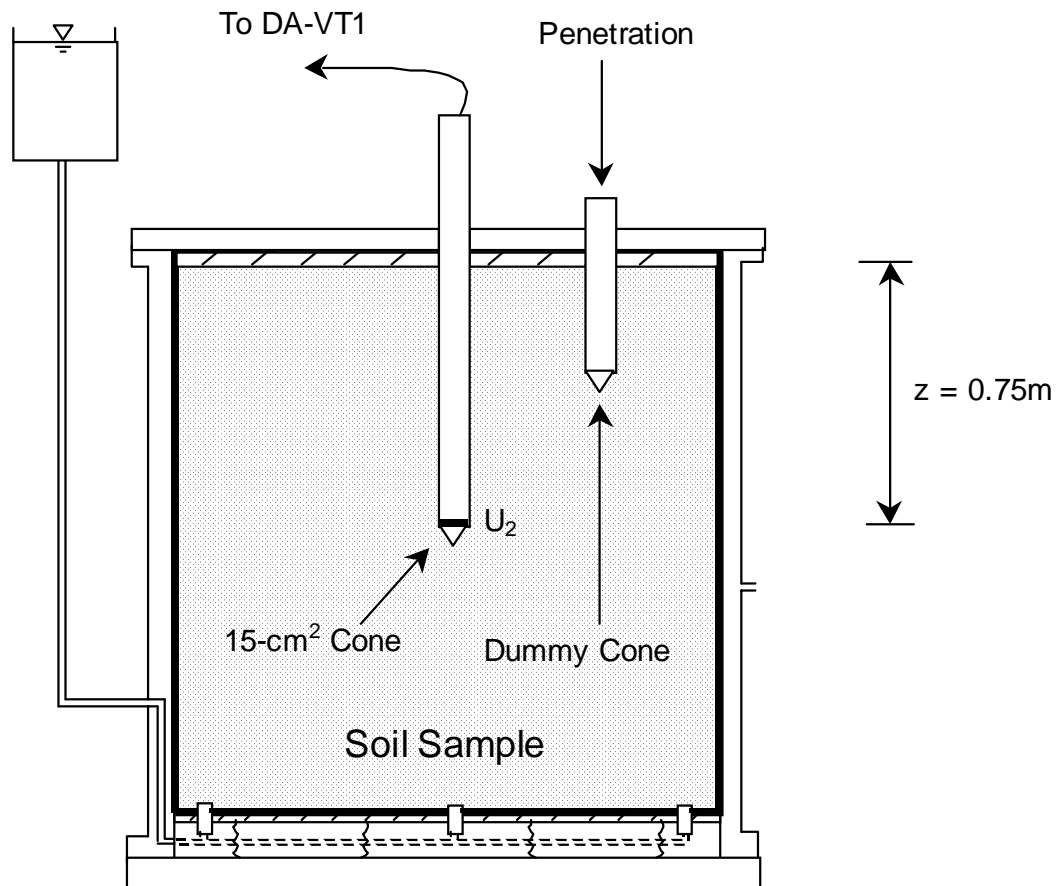
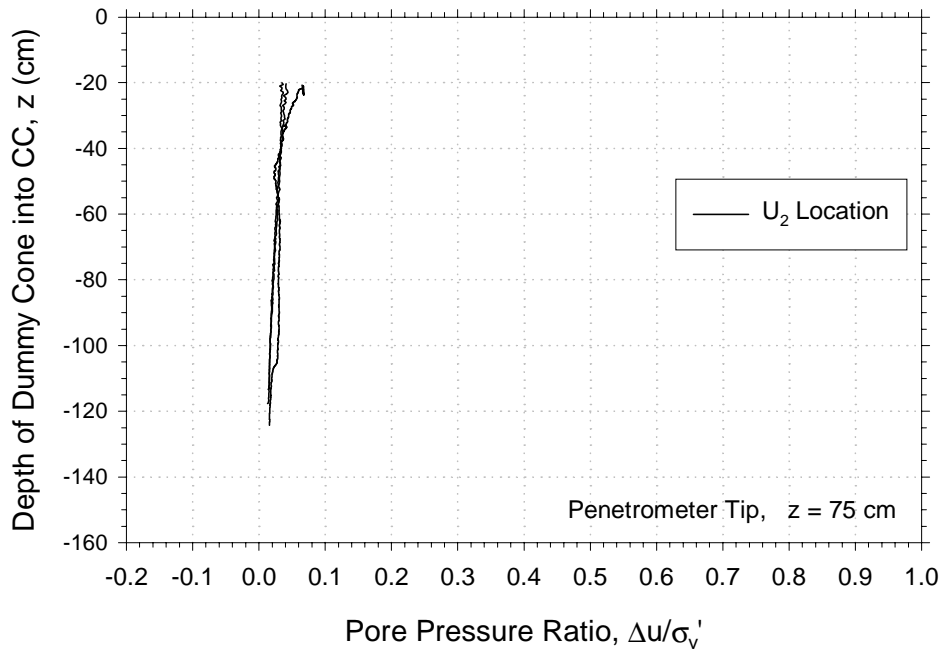
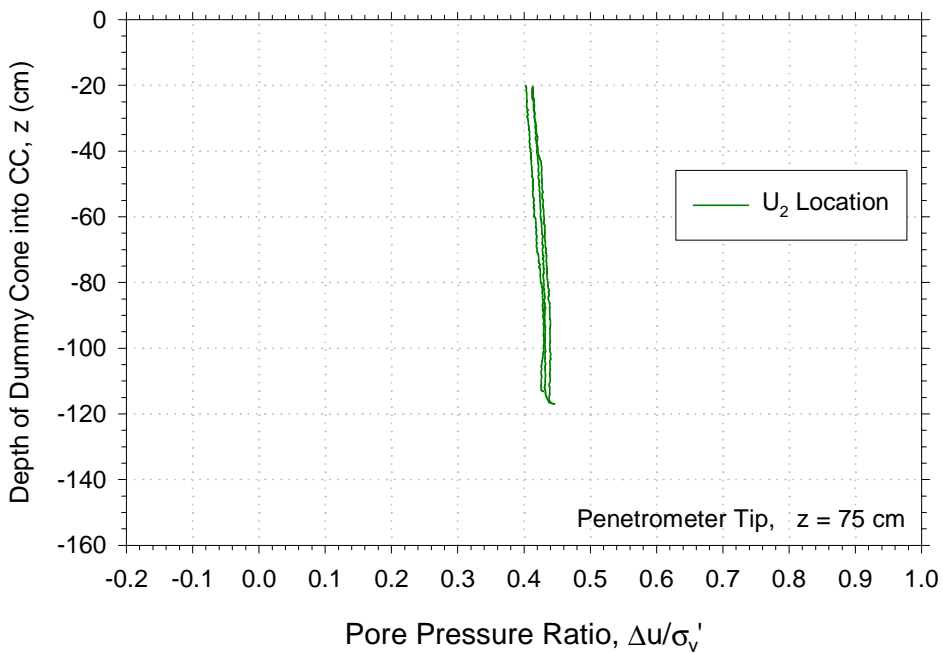


Figure 5.43 Schematic of Calibration Chamber During Dummy Cone Penetration Tests

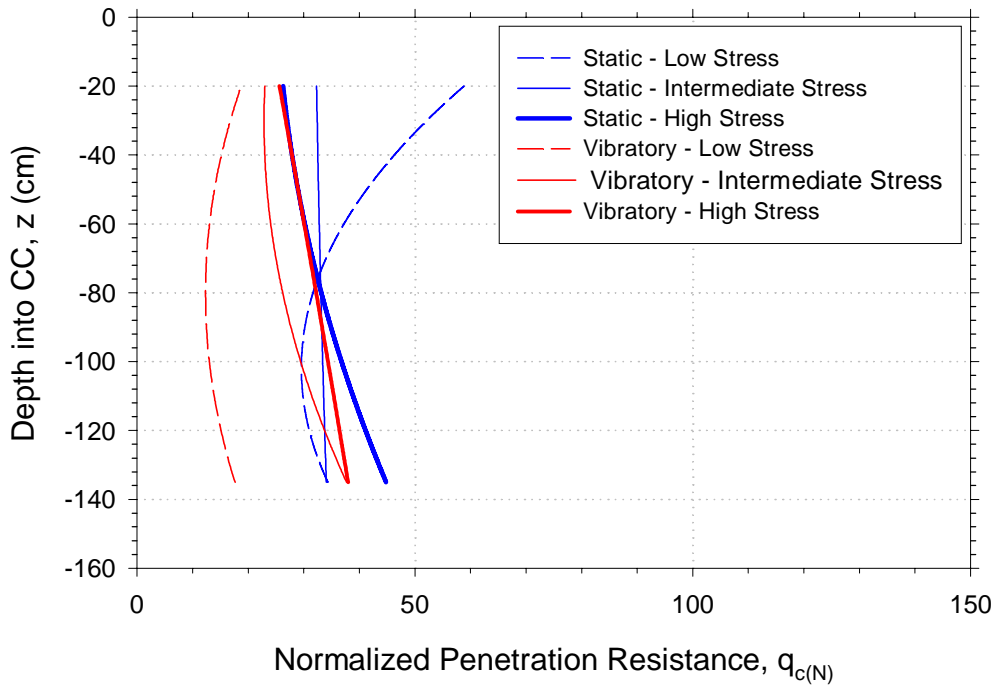


a) Static Penetration

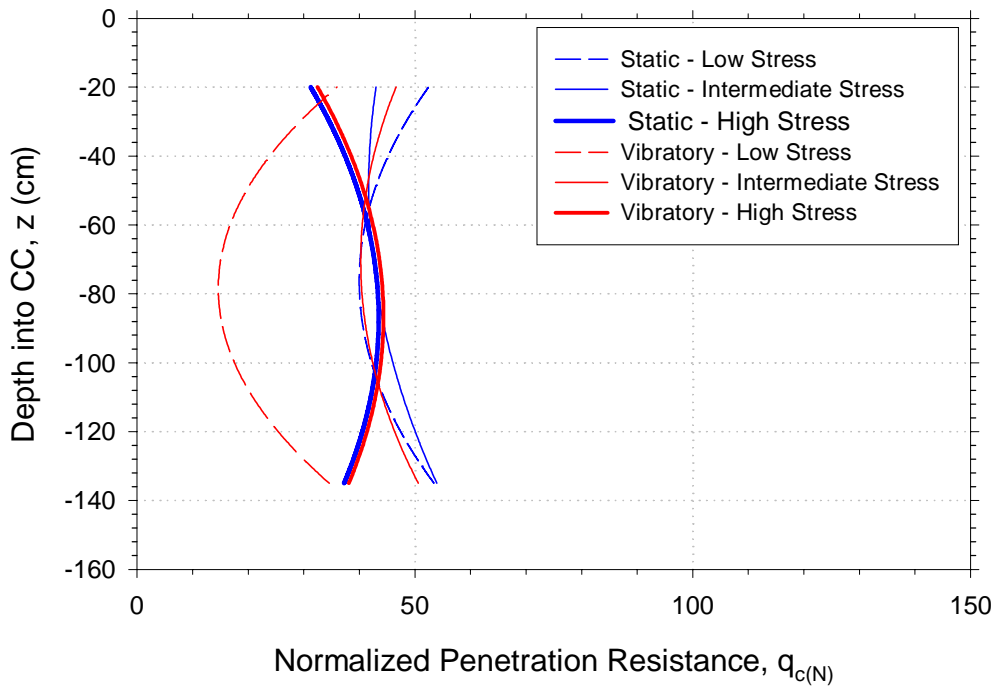


b) Vibratory Penetration

Figure 5.44 Pore Pressure Ratio versus Depth For Dummy Cone Tests in Loose Samples at Low Stress Levels

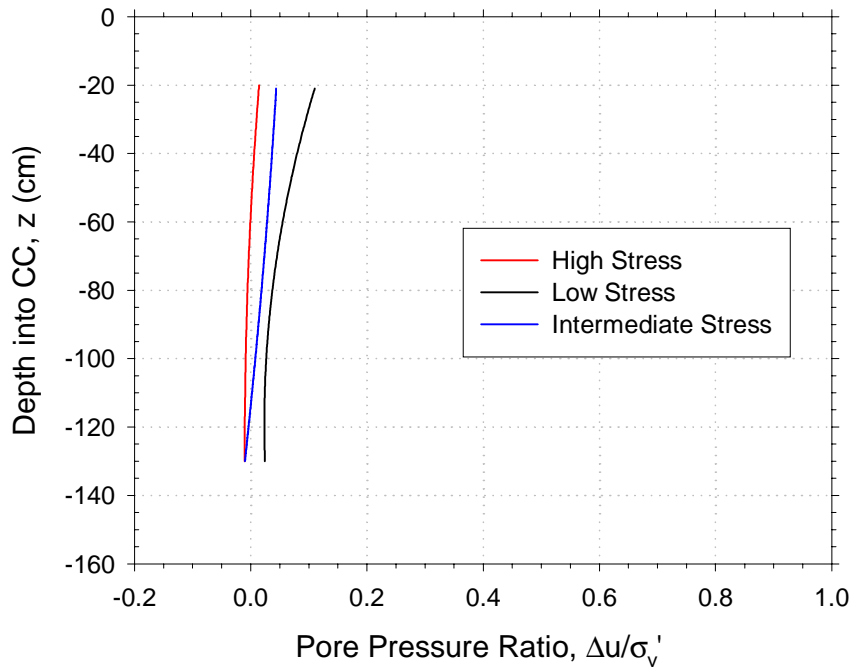


a) Loose

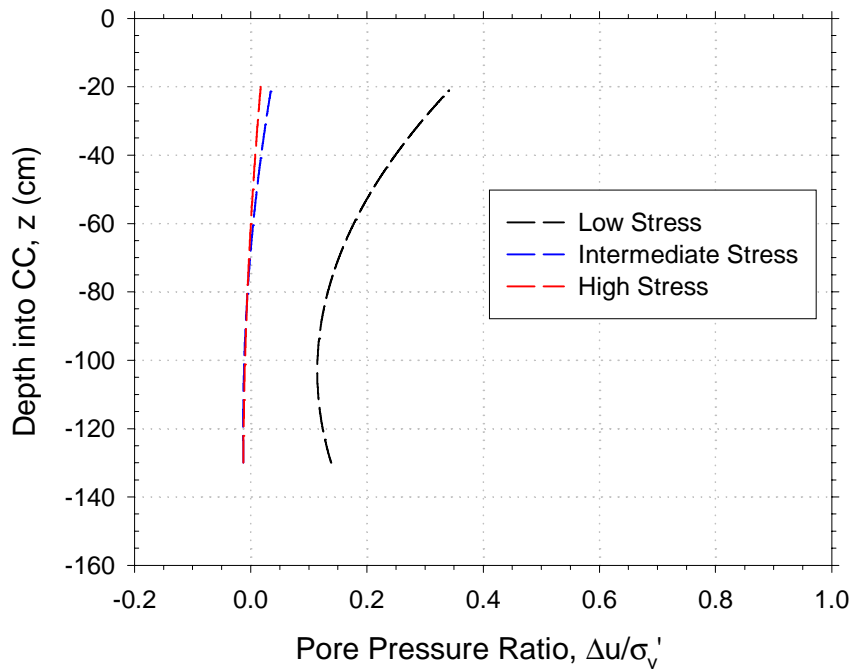


b) Medium Dense

Figure 5.45 Normalized Penetration Resistance versus Depth for All Stress and Density Conditions

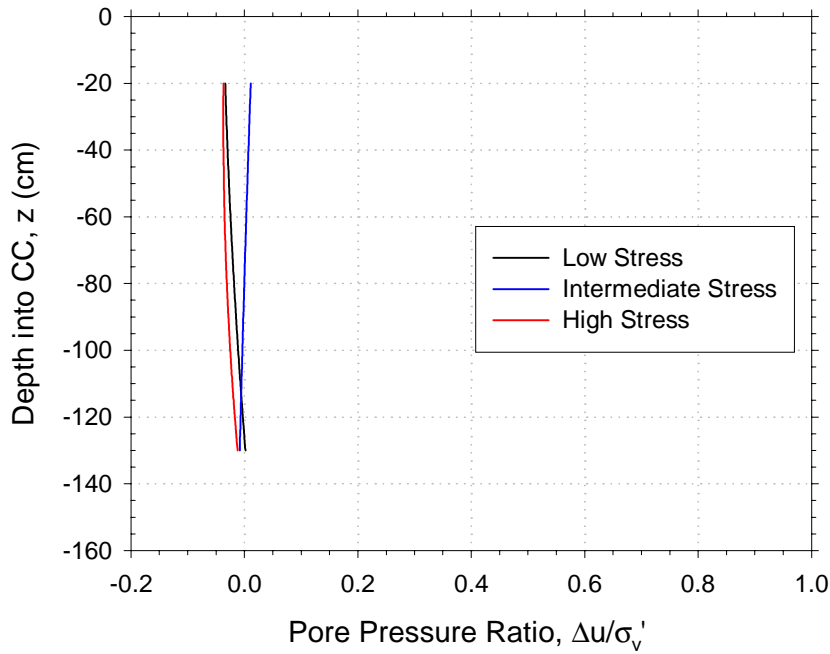


(a) Static Penetration

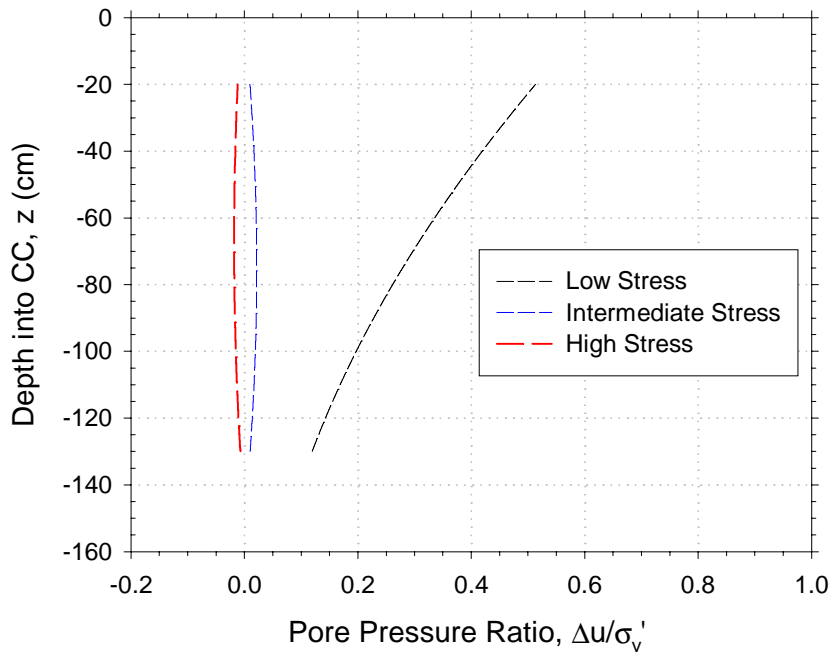


(b) Vibratory Penetration

Figure 5.46 Representative Pore Pressure Ratios with Depth for Static and Vibratory Penetration Tests in Loose Samples at All Stress Levels



(a) Static Penetration



(b) Vibratory Penetration

Figure 5.47 Representative Pore Pressure Ratios with Depth for Static and Vibratory Penetration Tests in Medium Dense Samples at All Stress Levels

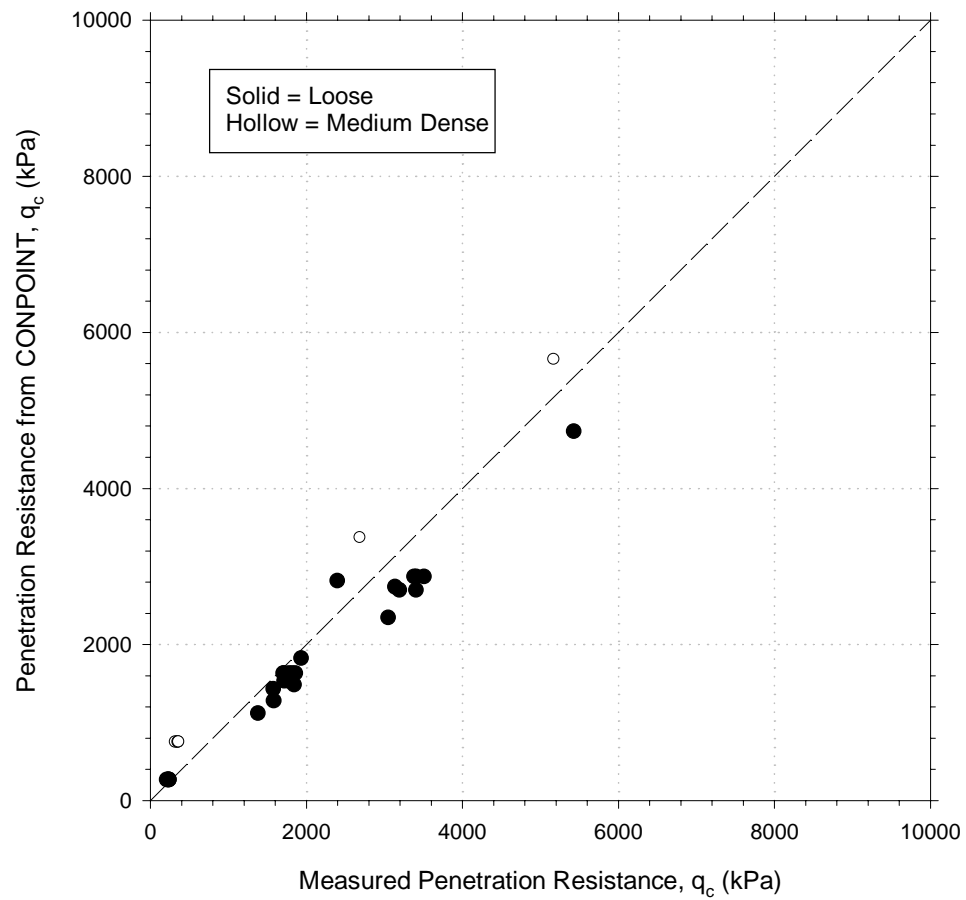


Figure 5.48 Comparison of Measured Penetration Resistance Values to Those Estimated Using Cavity Expansion Theory

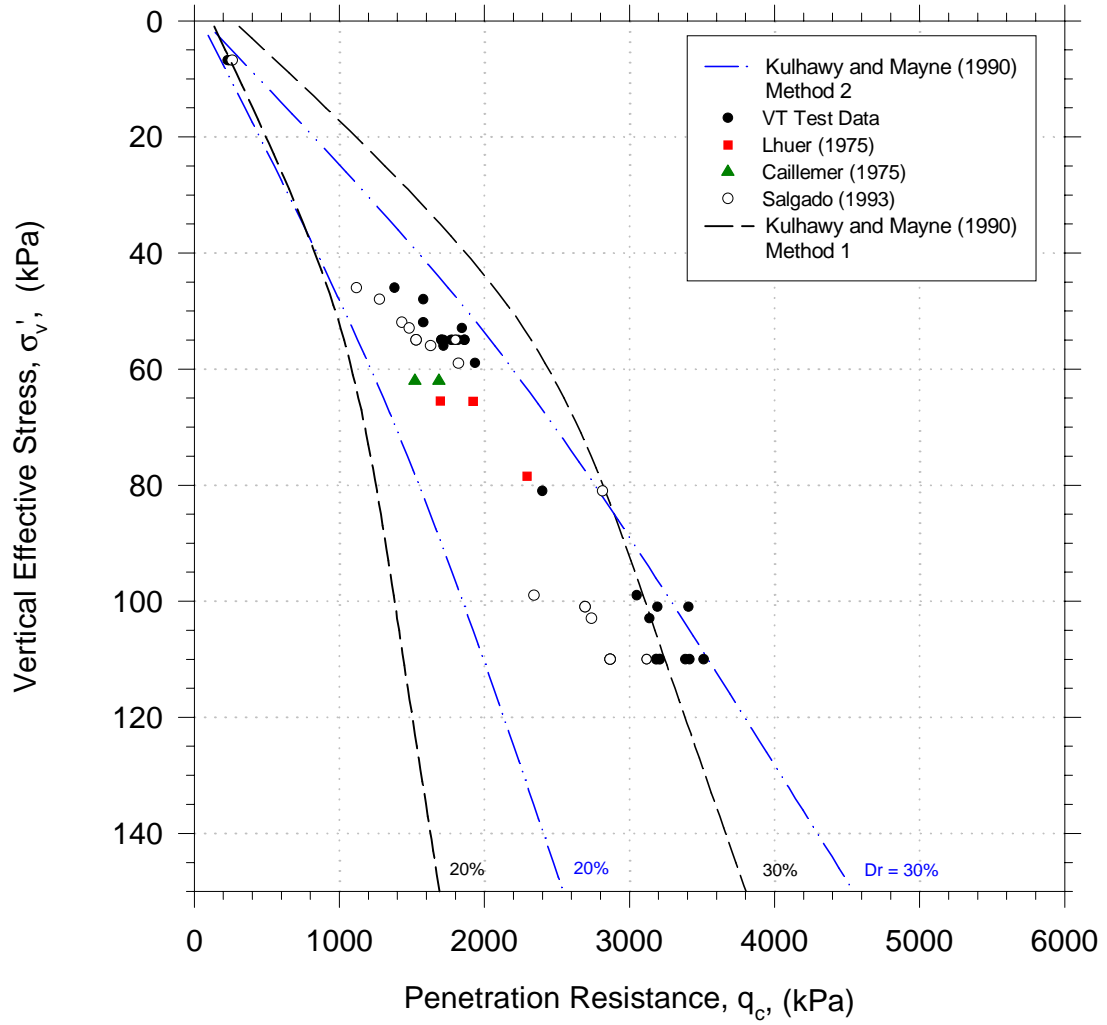


Figure 5.49 Comparison of Calibration Test Data with Penetration Resistance Estimations for Loose Samples

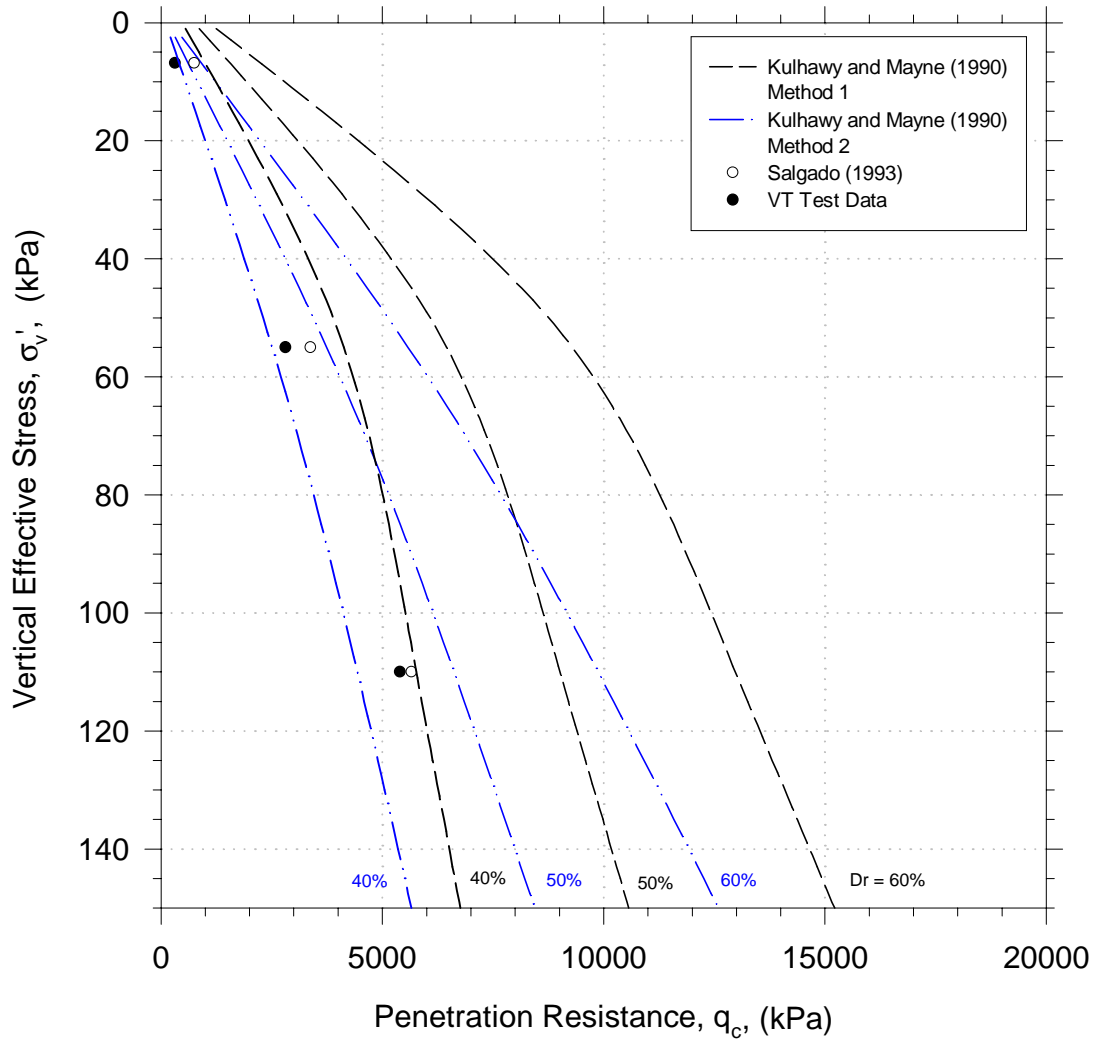


Figure 5.50 Comparison of Calibration Test Data with Penetration Resistance Estimations for Medium Dense Samples