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APPENDIX A. MATERIAL PROPERTIES

A.1 Aggregate

**Table A-1. Concrete Aggregate properties.
Coarse Aggregate Properties**

Gradation Particle Size	Percent Passing			VDOT Spec
	Gravel	Limestone	Diabase	
mm				
25	99	100	99	90-100
19	72	81	79	-
12.7	25	19	34	26-60
9.6	12	3	8	-
4.75	2	0	1	max 7
2.36	0	0	1	max 3
Unit Weight, kg	1673	1577	1752	
Dry Bulk s.g.	2.59	2.81	2.92	
Absorption, %	0.81	0.36	0.73	

Fine Aggregate Properties

Gradation Particle Size	Percent Passing			VDOT Spec
	FA _{Gravel}	FA _{Limestone}	FA _{Diabase}	
Mm				
9.6	100	100	100	min 100
4.75	99	97	99	94-100
2.36	90	80	83	80-100
1.18	78	70	68	49-85
0.6	46	53	42	25-59
0.3	17	16	12	8-26
0.15	2	2	4	max 10
0.075	0.54	0.40	2.0	-
Fineness Modulus	2.68	2.82	2.92	
Dry Bulk s.g.	2.55	2.59	2.53	
Absorption, %	0.75	0.48	1.04	

Section 1.

Note: Column aggregates are those used in the corresponding concrete mixtures.

A.2 Concrete mixture proportions

Table A-2. Class 35 (A4) Concrete mixtures calculated from VDOT Approved Mixtures, SSD (Quantities/Cubic Meter).

Constituents	Weight (Dry)					
	Gravel (G)	Limestone (LS)	Diabase (D)	Diabase / Fly Ash (DFA)	Diabase / Slag (DSG)	Diabase / Microsilica (DMS)
Cement, kg	288	288	289	245	144	268
Pozzolan or Slag , kg	0	0	0	58	144	20
Sand, kg	472	589	512	485	505	506
Aggregate, kg	832	784	864	864	864	864
FA water_{abs}, kg	3.4	2.8	5.3	5.3	5.3	5.3
CA water_{abs}, kg	6.8	2.8	6.4	6.4	6.4	6.4
Mix water, kg	121	130	125	125	125	125
Total water, kg	131	131	136.5	136.5	136.5	136.5
Daravair1000,ml	141	141	141	148	141	141
Daratard17, ml	658	658	659	692	659	659
Daracem19, ml	1880	1880	1883	1977	1883	1883
w/c ratio =	0.42	0.45	0.43	0.41	0.43	0.43
	15 % removal of cement, 20% replacement of Fly Ash			Daravair1000, 0.75 oz per 45 kg cement + pozzolan		
	40 % replacement of Slag			Daratard17, 3.5 oz per 45 kg cement + pozzolan Daracem19, 10 oz per 45 kg cement + pozzolan		

Table A-3. VDOT approved hydraulic cement mixture proportions for the Wilson Creek Bridge Project.

Dry Weight	
Constituents	No. 68 stone (ACCO Stone)
Cement, kg	380
Metakaolin, kg	29
Sand, kg	865
Aggregate, kg	961
FA water _{abs} , kg	2
CA water _{abs} , kg	5
Water, kg	315
MicroAir, ml	81
Polyheed 997, ml	1334
Rheobuild 1000, ml	6666
w/c ratio =	0.35

A.3 Fresh Concrete properties

Table A-4. Fresh concrete properties for all mixtures

Properties	BM	G	LS	D	DSG	DFA	DMS
Slump	125	178	152	90	76	140	178
Air content (%)	4	6.1	5.4	4	4.5	5.6	6
Temperature (°C)	28	27	24	27	26	26	27

APPENDIX B. CONCRETE COMPRESSIVE STRENGTH

B.1 Laboratory specimens

Table B-1. Concrete compressive strength, 7 and 28-days, Gravel specimens

Specimen	Age (days)	Compressive Strength (Mpa)	Compressive Strength
			average
G7W-CS7	7	28	
G28W-CS28-1	28	35	36
G28W-CS28-2	28	38	
G3B-CS28-1	28	36	36
G3B-CS28-2	28	37	
G7B-CS28-1	28	36	37
G7B-CS28-2	28	38	

Table B-2. Concrete compressive strength, 7 and 28-days, Limestone specimens

Specimen	Age (days)	Compressive Strength (Mpa)	Compressive Strength
			average
LS7W-CS7	7	33	
LS28W-CS28-1	28	44	43
LS28W-CS28-2	28	43	
LS3B-CS28-1	28	42	42
LS3B-CS28-2	28	42	
LS7B-CS28-1	28	45	45
LS7B-CS28-2	28	45	

Table B-3. Concrete compressive strength, 7 and 28-days, Diabase specimens

Specimen	Age (days)	Compressive Strength (Mpa)	Compressive Strength
			average
D7W-CS7	7	40	
D28W-CS28-1	28	50	48
D28W-CS28-2	28	45	
D3B-CS28-1	28	34	40
D3B-CS28-2	28	46	
D7B-CS28-1	28	48	46
D7B-CS28-2	28	44	

Table B-4. Concrete compressive strength, 7 and 28-days, Diabase Slag specimens

Specimen	Age (days)	Compressive Strength (Mpa)	
			average
DSG7W-CS7	7	29	
DSG28W-CS28-1	28	49	45
DSG28W-CS28-2	28	40	
DSG3B-CS28-1	28	35	38
DSG3B-CS28-2	28	41	
DSG7B-CS28-1	28	43	43
DSG7B-CS28-2	28	43	

Table B-5. Concrete compressive strength, 7 and 28-days, Diabase Fly Ash specimens

Specimen	Age (days)	Compressive Strength (Mpa)	
			average
DFA7W-CS7	7	28	
DFA28W-CS28-1	28	39	39
DFA28W-CS28-2	28	38	
DFA3B-CS28-1	28	36	36
DFA3B-CS28-2	28	36	
DFA7B-CS28-1	28	36	37
DFA7B-CS28-2	28	38	

Table B-6. Concrete compressive strength, 7 and 28-days, Diabase Micro-silica specimens

Specimen	Age (days)	Compressive Strength (Mpa)	
			average
DMS7W-CS7	7	38	
DMS28W-CS28-1	28	43	43
DMS28W-CS28-2	28	43	
DMS3B-CS28-1	28	46	46
DMS3B-CS28-2	28	45	
DMS7B-CS28-1	28	45	46
DMS7B-CS28-2	28	46	

B.2 Field Specimens

Table B-7. Concrete compressive strength, 7 and 28-days, Field specimens

Specimen	Age (Days)	Compressive Strength psi	
			Average
BM-A	7	47	
BM-A	7	50	49
BM-B	7	49	
BM-B	7	47	48
BM-A	28	61	
BM-A	28	63	62
BM-A	28	60	
BM-B	28	58	59

APPENDIX C. ASTM C 1202-97 MEASURES

C.1 Laboratory mixtures

Table C-1. Total charge passed results, Gravel Exposed Surface

Specimen	Test Age (Days)	Finished		Cut	
		Charge Passed (Coulombs)	Average (Coulombs)	Charge Passed (Coulombs)	Average (Coulombs)
G3W-P7-1	7	5774		5534	
G3W-P7-2	7	4779	5276	5464	5499
G7W-P7-1	7	5027		5085	
G7W-P7-2	7	5372	5200	5831	5458
G28W-P28-1	28	3650		3615	
G28W-P28-2	28	4070	3860	4149	3882
G3B-P28-1	28	4631		4778	
G3B-P28-2	28	3843	4237	4278	4528
G7B-P28-1	28	3618		5039	
G7B-P28-2	28	3913	3765	5014	5026
G91W-P91-1	91	2919		3101	
G3B-P91-1	91	3524		3540	
G7B-P91-1	91	3121	3323	3352	3446
G7B-P91-1	91	2954		3589	
G7B-P91-2	91	2968	2961	3323	3456
G7WA-P28	28	3767		3739	

Table C-2. Total charge passed results, Limestone Exposed Surface

Specimen	Test Age (Days)	Finished		Cut	
		Charge Passed (Coulombs)	Average (Coulombs)	Charge Passed (Coulombs)	Average (Coulombs)
LS3W-P7-1	7	8847		6752	
LS3W-P7-2	7	8560	8703	8579	7666
LS7W-P7-1	7	5989		5276	
LS7W-P7-2	7	5798	5894	5250	5263
LS28W-P28-1	28	3362		3446	
LS28W-P28-2	28	3302	3332	3125	3286
LS3B-P28-1	28	3735		3457	
LS3B-P28-2	28	3699	3717	4647	4052
LS7B-P28-1	28	3288		3487	
LS7B-P28-2	28	4492	3890	4326	3906
LS91W-P91-1	91	2139		2225	
LS91W-P91-2	91	2230	2185	2111	2168
LS3B-P91-1	91	2595		2404	
LS3B-P91-2	91	2647	2621	2513	2459
LS7B-P91-1	91	2365		3037	
LS7B-P91-2	91	2906	2635	3479	3258
LS7WA-P28	28*	2325		2044	

**Table C-3. Total charge passed results, Diabase
Exposed Surface**

Specimen	Test Age (Days)	Finished		Cut	
		Charge Passed (Coulombs)	Average (Coulombs)	Charge Passed (Coulombs)	Average (Coulombs)
D3W-P7-1	7	7680		6173	
D3W-P7-2	7	8099	7889	7459	6816
D7W-P7-1	7	6882		5750	
D7W-P7-2	7	5741	6311	4989	5369
D28W-P28-1	28	4088		4095	
D28W-P28-2	28	3280	3684	4493	4294
D3B-P28-1	28	4859		4473	
D3B-P28-2	28	4393	4626	4919	4696
D7B-P28-1	28	3709		4013	
D7B-P28-2	28	3783	3746	4429	4221
D91W-P91-1	91	3142		3074	3431
D91W-P91-2	91	3187	3164	3788	
D3B-P91-1	91	2326	2055	2772	2924
D7B-P91-1	91	1784		3076	
D7B-P91-1	91	1785	2306	2894	2987
D7B-P91-2	91	2827		3080	
D7WA-P28	28*	2543		3134	

Table C-4. Total charge passed results, Diabase-Slag Exposed Surface

Specimen	Test Age (Days)	Finished		Cut	
		Charge Passed (coulombs)	average (coulombs)	Charge Passed (coulombs)	average (coulombs)
DSG3W-P7-1	7	4907		4369	
DSG3W-P7-2	7	3683	4295	4052.66	4211
DSG7W-P7-1	7	4036		3679	
DSG7W-P7-2	7	3675	3855	4190	3934
DSG28W-P28-1	28	2259		2012	
DSG28W-P28-2	28	2140	2199	2146	2079
DSG3B-P28-1	28	2482		2170	
DSG3B-P28-2	28	2488	2485	2390	2280
DSG7B-P28-1	28	2467		2246	
DSG7B-P28-2	28	2246	2356	1937	2091
DSG91W-P91-1	91	1451		1687	
DSG91W-P91-2	91	1602	1526	1601	1644
DSG3B-P91-1	91	1842		1820	
DSG3B-P91-2	91	2303	2073	2699	2260
DSG7B-P91-1	91	1744		2027	
DSG7B-P91-2	91	1351	1547	1579	1803
DSG7WA-P28	28*	1238		1672	

**Table C-5. Total charge passed results, Diabase-Fly Ash
Exposed Surface**

Specimen	Test Age (days)	Finished		Cut	
		Charge Passed (coulombs)	average (coulombs)	Charge Passed (coulombs)	average (coulombs)
DFA3W-P7-1	7	8763		7813	
DFA3W-P7-2	7	8201	8482	7376	7595
DFA7W-P7-1	7	7910		7443	
DFA7W-P7-2	7	9063	8487	7410	7426
DFA28W-P28-1	28	4785		3492	
DFA28W-P28-2	28	4807	4796	4558	4025
DFA3B-P28-1	28	4230		2717	
DFA3B-P28-2	28	3748	3989	2645	2681
DFA7B-P28-1	28	3648		2900	
DFA7B-P28-2	28	2964	3306	2207	2554
DFA91W-P91-1	91	1222		1187	
DFA91W-P91-2	91	1110	1166	1016	1102
DFA3B-P91-1	91	1153		978	
DFA3B-P91-2	91	1085	1119	988	983
DFA7B-P91-1	91	1350		1120	
DFA7B-P91-2	91	1322	1336	1240	1180
DFA7WA-P28	28*	839		739	

**Table C-6. Total charge passed results, Diabase-Microsilica
Exposed Surface**

Specimen	Test Age (days)	Finished		Cut	
		Charge Passed (coulombs)	Average (coulombs)	Charge Passed (coulombs)	average (coulombs)
DMS3W-P7-1	7	4431		4779	
DMS3W-P7-2	7	4976	4704	5100	4939
DMS7W-P7-1	7	4880		4942	
DMS7W-P7-2	7	4674	4777	5121	5032
DMS28W-P28-1	28	2176		2170	
DMS28W-P28-2	28	2155	2166	2494	2332
DMS3B-P28-1	28	1813		1574	
DMS3B-P28-2	28	1971	1892	1459	1516
DMS7B-P28-1	28	1934		1539	
DMS7B-P28-2	28	1535	1735	1314	1427
DMS91W-P91-1	91	930		1124	
DMS91W-P91-2	91	1116	1023	1253	1188
DMS3B-P-91-1		1051		1137	
DMS3B-P-91-2	91	1279	1165	1199	1168
DMS7B-P91-1	P1	1126		1024	
DMS7B-P91-2	91	930	1028	1213	1119
DMS7WA-P28	28*	979		1014	

**Table C-7. Initial current results, Gravel
Exposed Surface**

Specimen	Test Age (Days)	Finished		Cut	
		Initial Charge (mA)	average (mA)	Initial Charge (mA)	average (Coulombs)
G3W-P7-1	7	196		212	
G3W-P7-2	7	163	179	198	205
G7W-P7-1	7	176		182	
G7W-P7-2	7	172	174	188	185
G28W-P28-1	28	149		152	
G28W-P28-2	28	153	151	156	154
G3B-P28-1	28	140		173	
G3B-P28-2	28	122	131	155	164
G7B-P28-1	28	132		167	
G7B-P28-2	28	129	130	168	168
G7WA-P28	28	147	147	152	152
G91W-P91-1	91	108		129	
G91W-P91-2	91	N/A	108	N/A	129
G3B-P91-1	91	115		143	
G7B-P91-1	91	107	111	128	136
G7B-P91-1	91	92		130	
G7B-P91-2	91	96	94	121	126

**Table C-8. Initial current results, Limestone
Exposed Surface**

Specimen	Test Age (Days)	Finished		Cut	
		Initial Charge (mA)	average (mA)	Initial Charge (mA)	average (Coulombs)
LS3W-P7-1	7	244		230	
LS3W-P7-2	7	245	244	247.14	239
LS7W-P7-1	7	195		197	
LS7W-P7-2	7	184	190	189	193
LS28W-P28-1	28	118		117	
LS28W-P28-2	28	86	102	82	100
LS3B-P28-1	28	118		140	
LS3B-P28-2	28	107	112	160	150
LS7B-P28-1	28	113		131	
LS7B-P28-2	28	131	122	150	141
LS7WA-P28	28	113	113	131	131
LS91W-P91-1	91	70		84	
LS91W-P91-2	91	73	71	76	80
LS3B-P91-1	91	83		97	
LS3B-P91-2	91	88	85	95	96
LS7B-P91-1	91	82		111	
LS7B-P91-2	91	92	87	122	117

Table C-9. Initial current results, Diabase.
Exposed Surface

Specimen	Test Age (Days)	Finished		Cut	
		Initial Charge (mA)	average (mA)	Initial Charge (mA)	average (mA)
D3W-P7-1	7	229		220	
D3W-P7-2	7	139	184	244.47	232
D7W-P7-1	7	223		175	
D7W-P7-2	7	188	206	191	183
D28W-P28-1	28	144		153	
D28W-P28-2	28	122	133	157	155
D3B-P28-1	28	152		169	
D3B-P28-2	28	139	145	166	168
D7B-P28-1	28	120		153	
D7B-P28-2	28	109	114	155	154
D7WA-P28	28	90	90	120	120
D91W-P91-1	91	110		124	
D91W-P91-2	91	112	111	135	129
D3B-P91-1	91	78		103	
D7B-P91-1	91	64	71	104	103
D7B-P91-1	91	58		109	
D7B-P91-2	91	78	68	104	107

**Table C-10. Initial current results, Diabase-Slag
Exposed Surface**

Specimen	Test Age (Days)	Finished		Cut	
		Initial Current (mA)	average (mA)	Initial Current (mA)	average (mA)
DSG3W-P7-1	7	180		182	
DSG3W-P7-2	7	132	156	153	167
DSG7W-P7-1	7	138		145	
DSG7W-P7-2	7	133	136	153	149
DSG28W-P28-1	28	85		88	
DSG28W-P28-2	28	84	84	84	86
DSG3B-P28-1	28	85		93	
DSG3B-P28-2	28	86	85	98	95
DSG7B-P28-1	28	87		85	
DSG7B-P28-2	28	68	77	84	85
DSG7WA-P28	28	50	50	68	68
DSG91W-P91-1	91	55		67	
DSG91W-P91-2	91	59	57	63	65
DSG3B-P91-1	91	58		77	
DSG3B-P91-2	91	71	64	101	89
DSG7B-P91-1	91	55		76	
DSG7B-P91-2	91	43	49	58	67

**Table C-11. Initial current results, Diabase-Fly Ash
Exposed Surface**

Specimen	Test Age (Days)	Finished		Cut	
		Initial Current (mA)	average (mA)	Initial Current (mA)	average (mA)
DFA3W-P7-1	7	245		229.39	
DFA3W-P7-2	7	218	231	229.74	230
DFA7W-P7-1	7	237		233	
DFA7W-P7-2	7	251	244	218	226
DFA28W-P28-1	28	161		131	
DFA28W-P28-2	28	147	154	143	137
DFA3B-P28-1	28	118		95	
DFA3B-P28-2	28	100	109	86	91
DFA7B-P28-1	28	103		98	
DFA7B-P28-2	28	88	95	76	87
DFA7WA-P28	28	34	34	30	30
DFA91W-P91-1	91	43		44	
DFA91W-P91-2	91	36	39	37	40
DFA3B-P91-1	91	42		42	
DFA3B-P91-2	91	41	42	42	42
DFA7B-P91-1	91	50		48	
DFA7B-P91-2	91	48	49	51	49

**Table C-12. Initial current results, Diabase-Microsilica
Exposed Surface**

Specimen	Test Age (Days)	Finished		Cut	
		Initial Current (mA)	average (mA)	Initial Current (mA)	average (mA)
DMS3W-P7-1	7	147		169	
DMS3W-P7-2	7	151	149	173.15	171
DMS7W-P7-1	7	153		158	
DMS7W-P7-2	7	146	150	166	162
DMS28W-P28-1	28	79		83	
DMS28W-P28-2	28	79	79	91	87
DMS3B-P28-1	28	59		59	
DMS3B-P28-2	28	64	62	54	57
DMS7B-P28-1	28	64		58	
DMS7B-P28-2	28	53	58	48	53
DMS7WA-P28	28	37	37	38	38
DMS91W-P91-1	91	35		41	
DMS91W-P91-2	91	41	38	45	43
DMS3B-P-91-1		36		41	
DMS3B-P-91-2	91	41	38	45	43
DMS7B-P91-1	P1	48		48	
DMS7B-P91-2	91	64	56	48	48

C.2 Field Specimens

**Table C-13. Total charge passed results, field mixture
Exposed Surface**

Specimen	Test Age (Days)	Finished		Cut	
		Charge Passed (coulombs)	average (Coulombs)	Charge Passed (coulombs)	average (Coulombs)
BM-A1	7	2397	2397	2227	2227
BM-B1	7	2002	2002	1843	1843
BM-A2	28	2156		1762	
BM-A3	28	1602	1879	1636	1699
BM-B2	28	1628		1358	
BM-B3	28	1453	1541	1472	1415
BM-A4	42	1232	1232	1438	1438
BM-B5	42	918	918	1239	1239

**Table C-14. Initial current results, field mixture
Exposed Surface**

Specimen	Test Age (Days)	Finished		Cut	
		Initial Current (mA)	average (mA)	Initial Current (mA)	average (mA)
BM-A1	7	95	95	91	91
BM-B1	7	81	81	78	78
BM-A2	28	81		74	
BM-A3	28	67	74	65	70
BM-B2	28	63		63	
BM-B3	28	55	59	58	61
BM-A4	42	42	42	59	59
BM-B5	42	35	53	52	52

APPENDIX D. ELECTRICAL RESISTIVITY

D.1 . Slab Resistivity

D.1.1 Figures

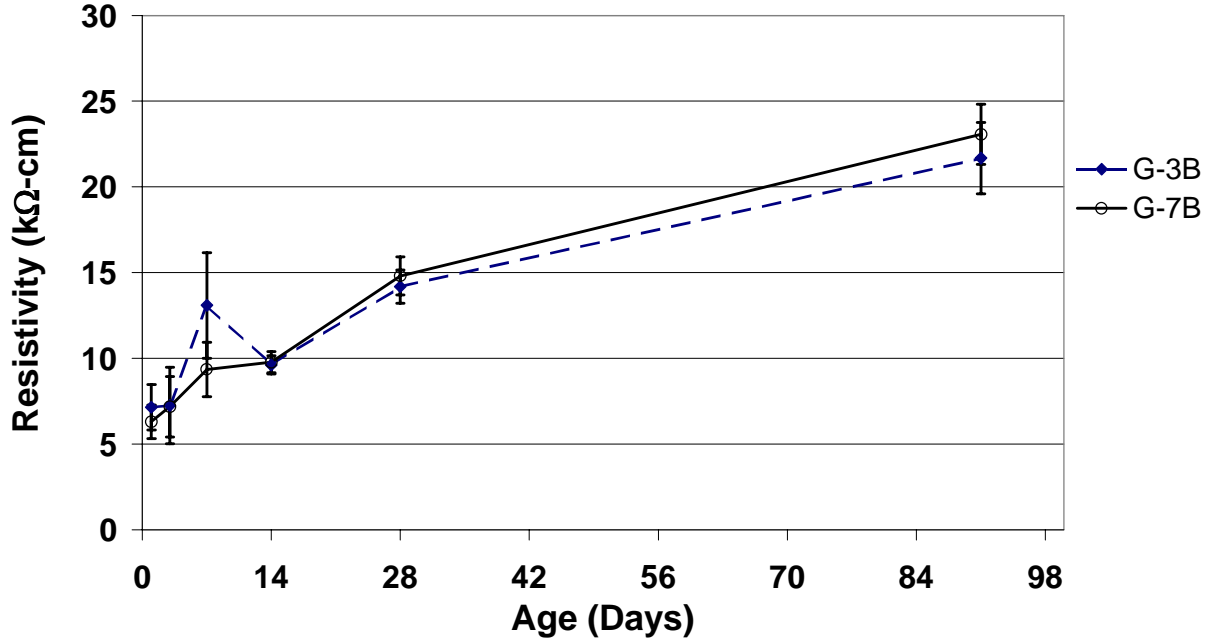


Figure D-1. Electrical resistivity of slab specimens vs. age, mixture G.

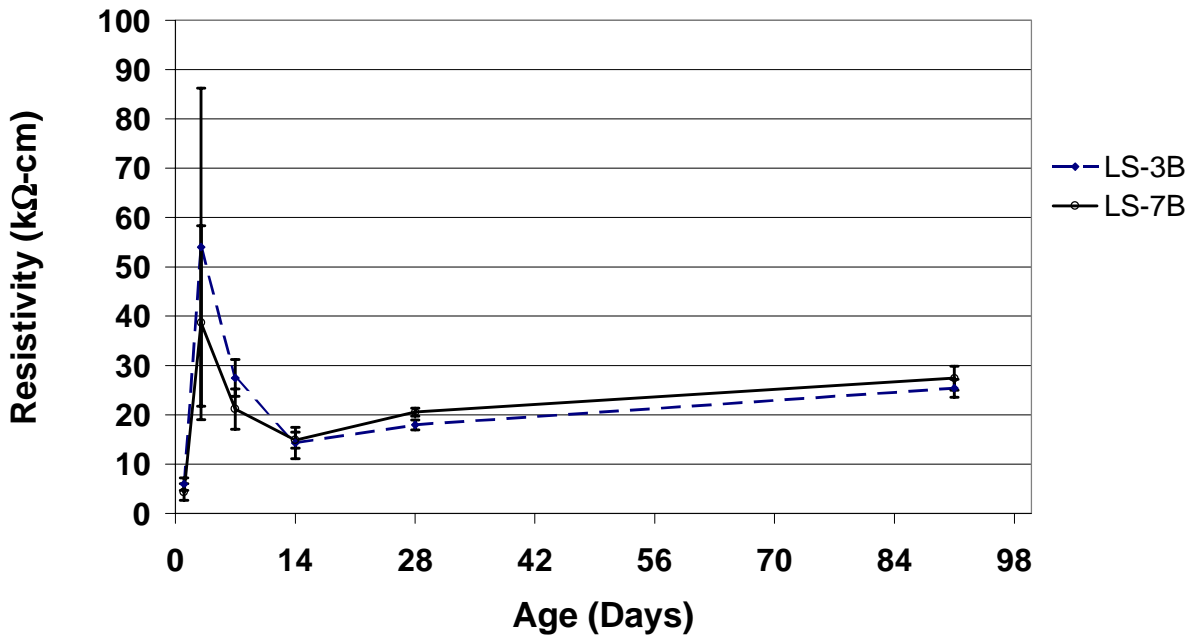


Figure D-2. Electrical resistivity of slab specimens vs. age, mixture LS

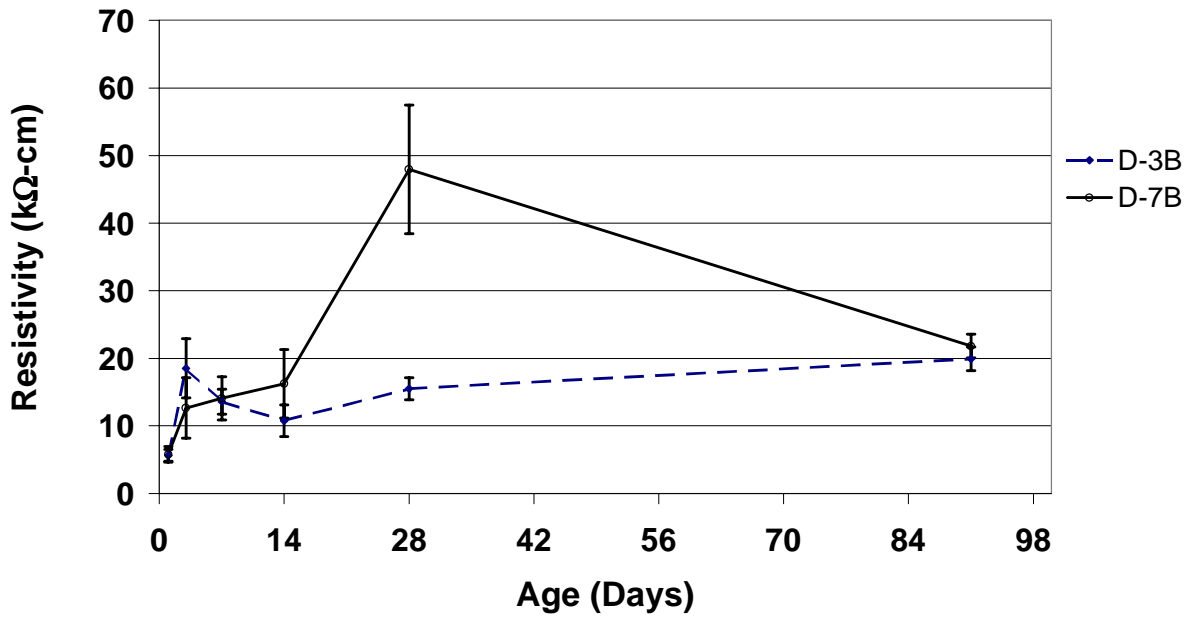


Figure D-3. (a) Electrical resistivity of slab specimens vs. age, mixture D.

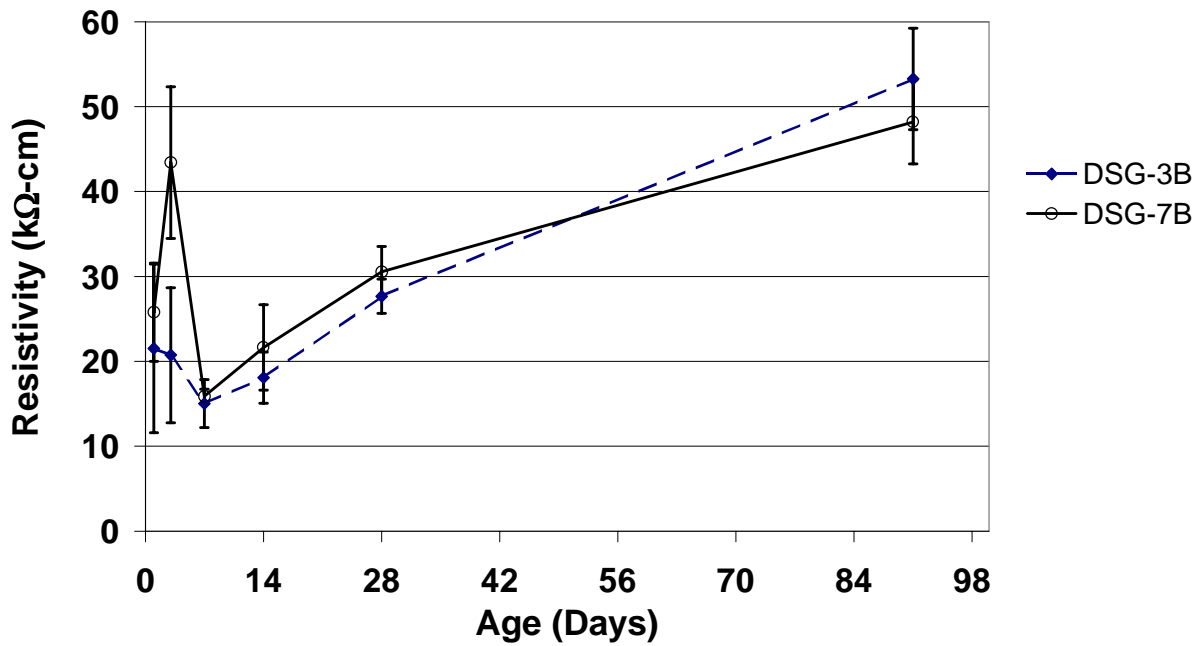


Figure D-4. Electrical resistivity of slab specimens vs. age, mixture DSG.

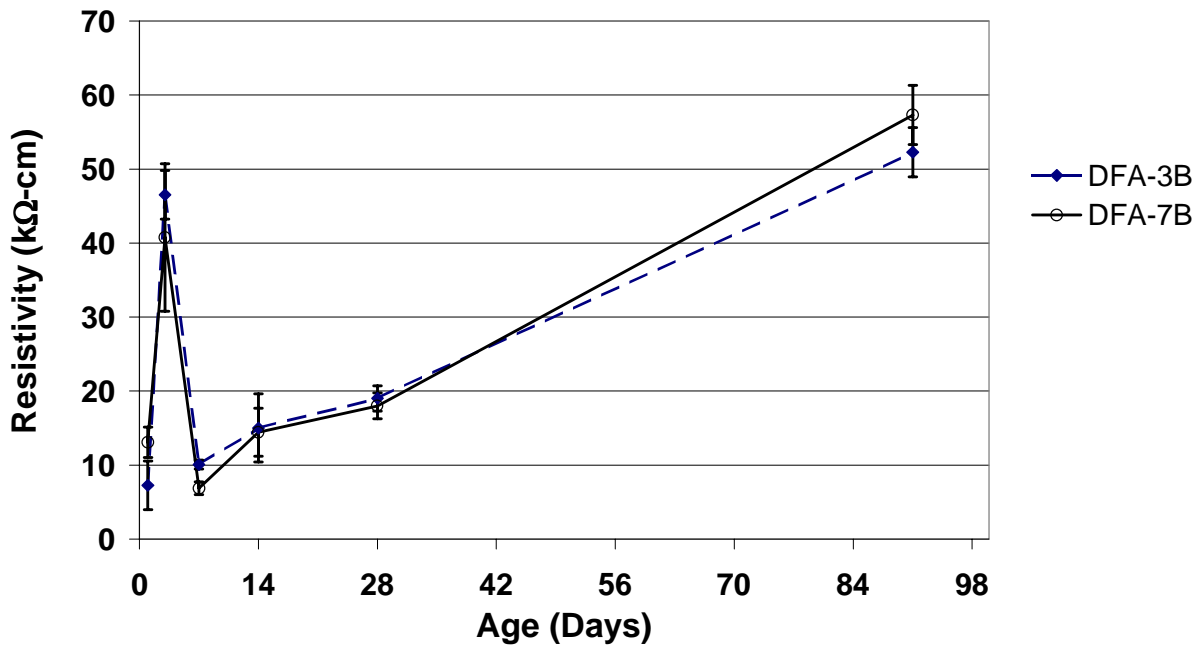


Figure D-5. Electrical resistivity of slab specimens vs. age, mixture DFA.

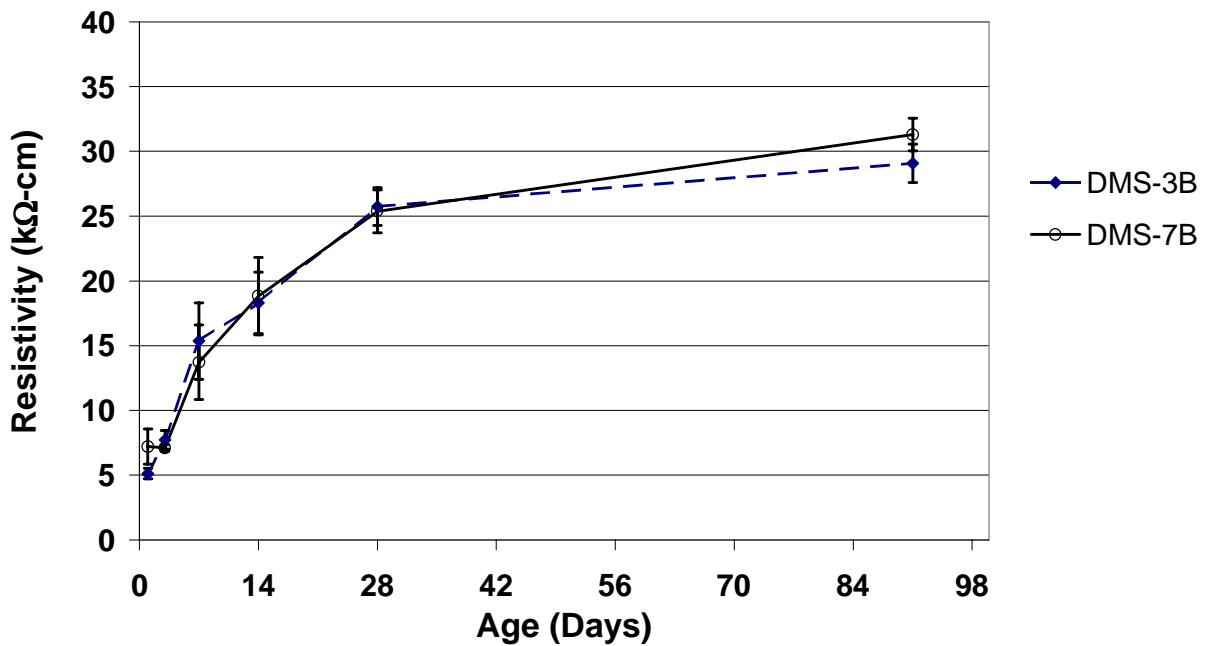


Figure D-6. Electrical resistivity of slab specimens vs. age, mixture DMS.

D.1.2 Summary statistics

Table D-1. Individual resistivity measurements for Gravel slab specimens.
Electrical Resistivity (kΩ-cm)

	Test Age (Days)											
	1		3		7		14		28		91	
	3B	7B	3B	7B	3B	7B	3B	7B	3B	7B	3B	7B
	4.79	4.47	3.51	3.19	6.70	7.02	6.38	7.66	9.57	11.17	12.76	14.36
	4.79	4.79	4.47	5.74	7.02	7.02	7.98	7.98	10.53	11.48	14.04	17.23
	6.06	4.79	4.79	5.74	7.66	7.34	7.98	8.29	10.53	11.80	14.04	18.18
	6.06	4.79	4.79	5.74	7.98	7.34	7.98	8.29	11.48	11.80	15.31	18.18
	6.06	5.74	4.79	6.06	7.98	7.34	8.29	8.29	12.12	12.12	15.63	18.18
	6.06	6.06	4.79	6.06	7.98	7.34	8.61	8.29	12.44	12.76	15.95	18.18
	6.38	6.06	6.38	6.38	7.98	7.34	8.93	8.61	12.76	12.76	17.23	19.14
	6.38	6.38	7.66	6.70	8.29	7.66	9.25	8.61	12.76	12.76	18.18	19.78
	7.66	6.38	7.98	7.34	8.29	7.66	9.25	8.61	12.76	12.76	19.14	20.74
	7.98	7.02	10.21	8.29	8.29	7.98	9.25	8.61	12.76	12.76	20.10	21.37
	11.80	9.57	10.21	8.93	8.29	7.98	9.57	8.61	12.76	13.40	20.42	21.37
	11.80	9.57	17.55	15.95	8.29	7.98	9.57	9.25	13.40	13.40	20.74	21.69
					9.25	7.98	9.57	9.57	14.04	13.40	21.37	22.97
					9.57	7.98	9.57	9.57	14.04	14.04	21.69	23.93
					9.57	7.98	9.57	9.89	14.36	14.36	22.97	24.56
					9.57	8.29	9.57	9.89	14.36	14.36	22.97	24.88
					9.57	8.29	9.57	10.21	14.36	15.63	22.97	24.88
					10.21	8.61	9.89	10.21	15.95	15.95	23.93	25.20
					12.76	8.61	10.21	10.53	15.95	16.27	24.25	25.20
					17.87	8.61	10.21	10.85	15.95	17.23	25.84	25.52
					19.14	8.93	10.21	11.17	16.27	17.55	26.48	25.84
					22.33	9.25	10.85	11.17	16.91	17.55	27.12	26.48
					26.16	12.76	11.17	11.48	16.91	19.14	28.71	27.44
					26.80	13.08	11.48	11.80	17.55	19.46	29.03	30.63
					27.76	15.95	12.44	12.44	19.14	20.42	30.63	31.90
					35.09	26.80	12.76	14.36	19.14	20.74	32.22	31.90
n	12	12	12	12	26	26	26	26	26	26	26	26
Mean	7.15	6.30	7.26	7.18	13.09	9.35	9.62	9.78	14.18	14.81	21.68	23.07
σ	2.36	1.72	3.94	3.12	8.01	4.13	1.39	1.61	2.55	2.89	5.41	4.57
σ²	5.58	2.96	15.55	9.71	64.09	17.03	1.94	2.59	6.50	8.38	29.24	20.84
Cov (%)	33.03	27.32	54.33	43.40	61.15	44.14	14.49	16.45	17.97	19.55	24.94	19.79
+ 95% CL	8.49	7.27	9.49	8.94	16.17	11.37	10.30	10.57	15.43	16.23	24.33	25.30
- 95% CL	5.82	5.33	5.03	5.42	10.02	7.76	9.08	9.16	13.20	13.70	19.60	21.31

Table D-2. Individual resistivity measurements for Limestone slab specimens.
Electrical Resistivity (kΩ-cm)

		Test Age (Days)											
		1		3		7		14		28		91	
		3B	7B	3B	7B	3B	7B	3B	7B	3B	7B	3B	7B
		2.87	1.60	16.59	3.19	14.04	5.10	8.29	10.53	14.04	15.95	17.55	19.14
		3.19	1.60	17.55	3.19	17.23	16.91	9.57	10.85	14.36	16.27	19.14	19.46
		3.19	2.55	17.87	3.83	22.33	17.87	11.17	12.44	14.36	16.91	19.78	20.42
		4.79	2.55	17.87	16.91	25.52	18.50	11.80	14.04	14.99	17.55	20.42	21.06
		4.79	2.87	23.93	27.12	27.12	19.78	12.76	14.36	15.31	17.87	20.74	21.69
		6.06	2.87	30.63	30.31	28.71	19.78	13.08	14.68	15.63	18.82	21.37	22.33
		6.38	3.19	31.90	41.47	28.71	20.10	14.04	14.68	15.95	18.82	21.37	22.97
		6.70	3.83	32.22	44.66	32.86	23.29	14.36	15.31	15.95	19.78	21.37	23.93
		6.70	5.42	54.23	47.85	33.18	23.93	14.36	16.27	16.27	19.78	22.33	24.56
		7.98	6.38	63.80	54.23	33.18	23.93	15.31	16.59	16.59	20.10	22.97	25.52
		8.93	7.02	153.13	63.80	33.18	30.63	16.27	17.87	17.55	20.42	23.29	25.52
		9.89	11.96	188.22	127.61	33.50	34.14	30.31	20.74	17.55	20.74	24.25	26.16
										17.55	20.74	25.20	27.12
										17.87	21.06	25.84	27.12
										18.18	21.69	26.16	27.12
										18.18	22.01	27.12	27.44
										19.46	22.33	27.12	27.44
										19.78	22.33	27.44	28.71
										19.78	22.33	27.44	29.35
										19.78	22.33	29.03	29.35
										19.78	22.33	29.03	29.99
										19.78	22.33	29.67	31.90
										21.06	22.65	30.63	33.82
										21.69	22.65	30.95	34.77
										22.01	22.97	34.77	38.28
										22.97	23.29	35.09	47.85
n		12	12	12	12	12	12	12	12	26	26	26	26
Mean		5.96	4.32	53.99	38.68	27.46	21.16	14.28	14.86	17.94	20.54	25.39	27.42
σ		2.28	2.98	56.96	34.80	6.62	7.24	5.56	2.87	2.53	2.20	4.68	6.31
σ²		5.21	8.91	3244	1211	43.81	52.41	30.87	8.22	6.39	4.85	21.93	39.83
Cov (%)		38.31	69.08	105.50	89.96	24.10	34.21	38.92	19.30	14.10	10.73	18.45	23.01
+ 95% CL		7.25	6.01	86.22	58.37	31.21	25.26	17.42	16.48	18.91	21.39	27.19	29.85
- 95% CL		4.66	2.63	21.77	18.99	23.72	17.07	11.13	13.24	16.97	19.69	23.59	25.00

Table D-3. Individual resistivity measurements for Diabase slab specimens.

Electrical Resistivity (kΩ-cm)

Test Age (Days)

	1		3		7		14		28		91	
	3B	7B	3B	7B	3B	7B	3B	7B	3B	7B	3B	7B
	3.51	3.19	3.83	3.51	9.57	1.40	4.47	5.10	9.25	12.12	6.38	13.08
	4.47	4.47	11.17	4.79	10.85	9.89	4.79	7.02	11.17	13.08	15.31	15.95
	4.47	4.47	12.76	6.38	10.85	10.21	6.70	7.34	11.80	17.55	15.95	16.59
	4.79	4.79	14.36	7.98	11.80	10.53	8.93	9.25	11.80	22.01	15.95	17.23
	5.10	4.79	15.95	10.21	11.80	14.04	9.57	9.57	11.80	22.33	16.59	17.55
	5.42	4.79	16.27	10.85	11.80	14.04	9.89	15.31	12.44	23.61	17.55	17.87
	5.74	5.74	19.14	11.17	11.80	14.36	10.53	16.27	12.76	24.25	17.55	17.87
	5.74	5.74	22.01	11.17	14.68	15.63	13.08	16.59	12.76	27.12	17.55	17.87
	6.06	6.06	22.65	12.76	15.95	17.55	14.68	23.93	13.08	28.39	17.55	19.14
	6.38	6.70	23.93	20.42	16.27	17.87	14.68	25.52	13.08	28.39	18.82	19.46
	6.70	7.66	28.39	22.33	17.23	20.42	15.31	28.39	13.72	29.35	19.14	19.46
	9.57	11.17	31.90	30.31	20.42	22.97	16.59	30.63	14.36	35.09	19.14	20.42
									14.36	51.04	19.46	21.37
									14.68	57.42	19.78	22.33
									14.68	60.61	19.78	22.33
									15.63	63.80	20.42	22.97
									15.63	63.80	20.74	23.61
									16.27	63.80	21.37	23.93
									16.27	63.80	21.37	24.25
									17.23	63.80	21.37	25.52
									17.55	63.80	22.65	25.52
									18.50	76.57	25.52	27.12
									19.46	79.76	25.52	28.39
									22.33	82.95	25.84	28.39
									25.52	86.14	28.07	28.71
									27.12	86.14	28.71	30.31
n	12	12	12	12	12	12	12	12	26	26	26	26
Mean	5.66	5.80	18.53	12.65	13.59	14.07	10.77	16.24	15.51	47.95	19.93	21.82
σ	1.53	2.06	7.79	7.90	3.27	5.67	4.14	8.96	4.28	24.78	4.60	4.57
σ²	2.33	4.23	60.69	62.37	10.70	32.17	17.10	80.23	18.29	614.29	21.15	20.87
Cov (%)	26.98	35.51	42.04	62.41	24.08	40.30	38.41	55.14	27.57	51.69	23.08	20.94
+ 95% CL	6.53	6.96	22.94	17.12	15.44	17.28	13.11	21.31	17.15	57.48	21.69	23.57
- 95% CL	4.80	4.63	14.12	8.19	11.73	10.87	8.43	11.18	13.87	38.42	18.16	20.06

Table D-4. Individual resistivity measurements for Diabase Slag slab specimens.
Electrical Resistivity (kΩ-cm)

		Test Age (Days)											
		1		3		7		14		28		91	
		3B	7B	3B	7B	3B	7B	3B	7B	3B	7B	3B	7B
		3.51	7.98	8.93	24.56	7.34	13.72	9.57	3.16	19.78	17.55	41.47	33.18
		5.74	12.76	9.25	25.52	7.66	14.04	9.57	12.76	20.74	21.37	44.66	38.28
		6.06	17.55	9.57	27.44	11.17	14.36	13.72	16.27	21.37	25.52	44.66	44.66
		7.98	22.33	12.76	28.71	11.48	14.36	14.36	16.59	23.61	29.99	44.66	47.85
		8.29	25.84	13.08	31.90	14.04	14.36	14.68	19.14	23.61	30.31	51.04	47.85
		17.55	27.12	14.04	44.66	14.36	16.27	17.23	19.14	25.84	31.90	54.23	51.04
		19.14	27.12	17.23	47.85	15.63	16.27	17.55	21.69	28.71	31.90	57.42	54.23
		23.93	27.12	17.55	47.85	15.95	16.27	20.42	22.97	28.71	31.90	60.61	54.23
		25.84	29.99	19.14	54.23	19.14	16.27	22.01	24.25	31.26	32.22	63.80	54.23
		35.09	31.90	31.58	54.23	20.42	17.55	22.33	27.12	31.58	33.50	67.00	57.42
		47.85	31.90	47.85	60.61	20.74	17.55	26.80	31.90	31.90	34.77	67.00	60.61
		57.42	47.85	47.85	73.38	22.33	19.46	28.71	44.66	31.90	35.09	73.38	67.00
										34.14	44.66	73.38	67.00
										22.33	20.74	31.90	31.90
										24.88	22.33	32.22	33.50
										24.88	23.93	35.09	38.28
										26.80	25.52	47.85	38.28
										27.12	29.03	47.85	41.47
										27.44	29.35	51.04	41.47
										28.39	30.31	54.23	44.66
										28.71	33.82	57.42	44.66
										28.71	35.09	60.61	44.66
										29.67	35.09	60.61	47.85
										30.31	35.09	63.80	47.85
										31.90	35.09	63.80	57.42
										35.09	38.28	35.09	63.80
n		12	12	12	12	12	12	12	12	26	26	26	26
Mean		21.53	25.79	20.74	43.41	15.02	15.87	18.08	21.64	27.67	30.55	53.26	48.21
σ		17.54	10.23	14.07	15.81	5.00	1.76	6.17	10.27	4.13	6.08	12.18	10.07
σ²		307	104	197	249	25.05	3.09	38.03	105	17.05	36.94	148	101.40
Cov (%)		81.44	39.67	67.83	36.41	33.32	11.08	34.11	47.48	14.92	19.89	22.86	20.89
+ 95% CL		31.46	31.58	28.70	52.36	17.85	16.73	21.10	26.67	29.69	33.53	59.23	53.14
- 95% CL		11.61	20.00	12.78	34.47	12.19	15.01	15.06	16.60	25.65	27.57	47.30	43.28

Table D-5. Individual resistivity measurements for Diabase Fly Ash slab specimens.
Electrical Resistivity (kΩ-cm)

		Test Age (Days)											
		1		3		7		14		28		91	
		3B	7B	3B	7B	3B	7B	3B	7B	3B	7B	3B	7B
		6.06	1.91	29.67	19.14	5.74	7.66	3.19	6.06	1.60	12.76	41.47	31.90
		6.06	3.19	35.09	28.71	5.74	7.98	3.19	6.38	14.68	13.40	44.66	38.28
		7.98	3.19	38.28	28.71	5.74	7.98	7.98	7.66	14.68	13.40	47.85	38.28
		9.57	4.79	38.28	38.28	5.74	9.57	9.57	13.40	15.95	13.72	51.04	38.28
		11.17	6.06	38.28	38.28	6.38	10.53	10.53	15.95	15.95	14.36	51.04	44.66
		11.17	6.38	38.28	41.47	6.70	10.53	13.40	15.95	15.95	14.36	51.04	44.66
		12.44	7.02	38.28	54.23	6.70	10.53	14.36	15.95	16.27	15.95	51.04	44.66
		12.44	9.57	44.66	54.23	7.34	10.53	16.27	16.27	16.27	16.27	51.04	44.66
		17.23	9.57	44.66	54.23	7.66	10.85	19.14	18.18	16.27	16.59	54.23	47.85
		19.14	10.85	47.85	54.23	7.66	10.85	21.37	18.82	17.23	16.59	54.23	47.85
		19.14	11.80	47.85	63.80	7.98	11.17	27.12	22.33	17.55	17.23	54.23	47.85
		24.56	12.76	47.85	82.95	8.93	12.76	27.12	22.97	17.55	17.55	54.23	47.85
										17.55	18.82	54.23	51.04
										18.18	19.14	57.42	51.04
										18.18	19.14	57.42	54.23
										18.82	19.46	57.42	54.23
										18.82	19.78	60.61	57.42
										19.14	20.74	60.61	57.42
										19.78	20.74	60.61	57.42
										20.42	21.37	63.80	60.61
										20.74	22.97	63.80	63.80
										22.33	23.29	63.80	63.80
										22.33	23.93	63.80	67.00
										22.33	25.20	67.00	67.00
										22.33	28.71	70.19	67.00
										27.12	29.03	82.95	70.19
n		12	12	12	12	12	12	12	12	26	26	26	26
Mean		13.08	7.26	40.76	46.52	6.86	10.08	14.44	14.99	18.00	19.02	57.30	52.27
σ		5.78	3.63	5.78	17.60	1.06	1.52	8.15	5.70	4.43	4.52	8.63	10.41
σ²		33.42	13.14	33.38	309.88	1.12	2.30	66.36	32.46	19.66	20.43	74.48	108.35
Cov (%)		44.20	49.95	14.18	37.84	15.43	15.06	56.43	38.00	24.63	23.77	15.06	19.91
+ 95% CL		16.35	9.31	44.02	56.48	7.46	10.93	19.04	18.22	19.70	20.76	60.62	56.27
- 95% CL		9.81	5.21	37.49	36.56	6.26	9.22	9.83	11.77	16.30	17.28	53.98	48.27

Table D-6. Individual resistivity measurements for Diabase Micro-silica slab specimens.
Electrical Resistivity (kΩ-cm)

		Test Age (Days)											
		1		3		7		14		28		91	
		3.83	3.51	5.74	5.74	6.38	6.38	11.17	10.85	18.18	17.55	17.87	25.52
		3.83	3.83	5.74	6.38	7.02	6.38	12.76	12.76	20.74	20.74	25.52	30.31
		3.83	3.83	6.06	6.38	7.66	6.38	12.76	12.76	21.69	20.74	30.31	35.09
		4.15	4.47	6.06	6.38	7.66	6.38	12.76	13.08	22.01	20.74	28.71	35.09
		4.47	4.47	6.38	6.38	7.98	6.38	14.04	13.08	22.33	21.69	31.90	29.35
		4.47	4.47	6.38	6.38	7.98	6.70	14.36	14.04	22.33	21.69	35.09	35.09
		4.47	4.79	6.38	6.70	7.98	7.02	14.36	14.36	22.33	22.01	38.28	38.28
		4.47	4.79	6.38	6.70	9.57	7.02	14.36	14.36	23.29	22.33	28.71	27.12
		4.47	4.79	6.38	6.70	10.53	7.02	14.36	14.36	23.29	22.97	29.35	30.31
		4.47	5.10	7.02	6.70	11.17	9.25	14.36	14.36	23.93	22.97	27.44	29.35
		4.79	5.10	7.34	6.70	12.44	9.57	14.68	15.95	25.52	23.61	22.65	31.90
		4.79	5.10	7.34	7.02	12.76	9.57	15.31	15.95	26.16	23.93	30.63	31.90
		4.79	5.74	7.66	7.02	15.31	10.21	15.95	15.95	26.16	24.25	31.90	31.90
		4.79	5.74	7.66	7.02	16.27	10.53	15.95	16.27	26.80	24.56	31.90	31.58
		5.10	5.74	7.66	7.02	17.55	13.40	16.27	16.91	27.12	24.56	30.31	35.09
		5.10	6.06	7.66	7.02	17.55	14.36	17.87	17.55	27.12	24.56	31.90	28.39
		5.10	6.70	7.98	7.34	17.87	16.59	18.18	18.50	27.12	25.84	29.35	31.90
		5.10	7.98	7.98	7.66	17.87	16.59	18.50	19.14	28.39	27.12	29.35	31.90
		5.74	8.61	8.29	7.66	18.82	18.18	19.14	19.78	28.39	28.71	28.39	31.26
		5.74	9.89	8.29	7.66	20.42	20.42	19.14	20.74	29.03	28.71	27.12	33.50
		5.74	10.21	8.61	7.66	20.74	20.42	22.33	22.97	29.03	30.63	25.84	31.58
		5.74	10.53	8.93	7.98	23.61	21.37	25.52	23.93	30.31	30.95	28.71	31.90
		6.06	12.76	8.93	7.98	26.48	24.56	28.71	23.93	31.58	31.90	31.58	27.12
		6.38	14.36	9.25	7.98	31.58	27.12	29.67	28.39	31.90	31.90	25.84	24.25
		7.66	14.36	10.21	7.98	35.09	27.44	31.58	31.58	32.54	31.90	28.71	28.71
		7.98	14.36	14.68	8.61	11.17	27.44	31.90	47.85	22.01	33.18	28.71	35.09
		26	26	26	26	26	26	26	26	26	26	26	26
n		5.12	7.20	7.73	7.10	15.36	13.72	18.31	18.82	25.74	25.37	29.08	31.29
Mean		1.05	3.53	1.84	0.69	7.68	7.45	6.15	7.78	3.79	4.32	3.86	3.29
σ		1.10	12.48	3.38	0.48	58.94	55.55	37.81	60.54	14.34	18.66	14.92	10.83
σ²		20.53	49.04	23.79	9.72	49.97	54.33	33.59	41.34	14.71	17.02	13.28	10.52
Cov (%)		5.52	8.56	8.44	7.37	18.31	16.58	20.67	21.81	27.20	27.03	30.57	32.55
+ 95% CL		4.71	5.84	7.02	6.84	12.41	10.85	15.94	15.83	24.29	23.71	27.60	30.02
- 95% CL		3.83	3.51	5.74	5.74	6.38	6.38	11.17	10.85	18.18	17.55	1.48	1.26

D.2 . Cylinder Resistivity

D.2.1 Figures

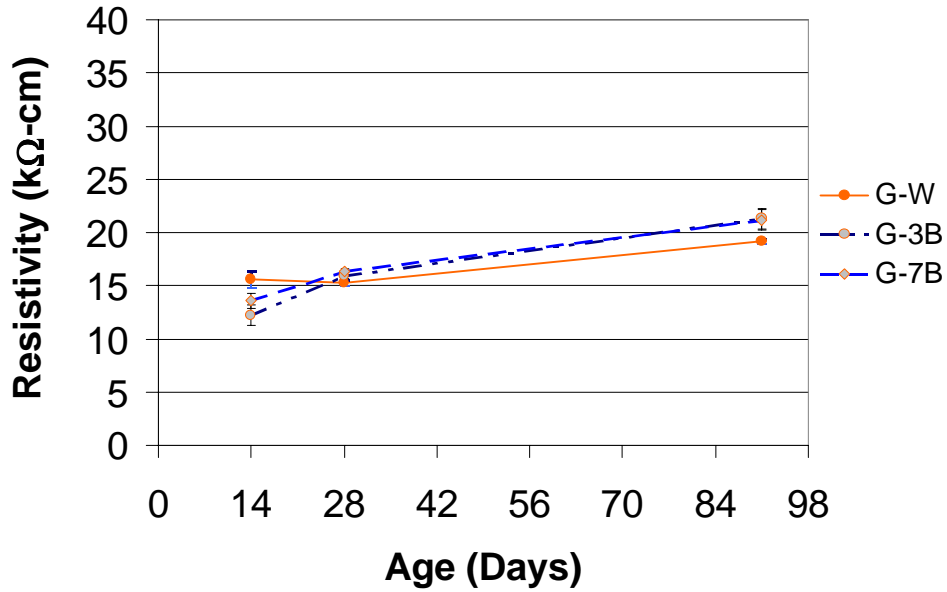


Figure D-7. Electrical resistivity of cylinder specimens vs. age, mixture G

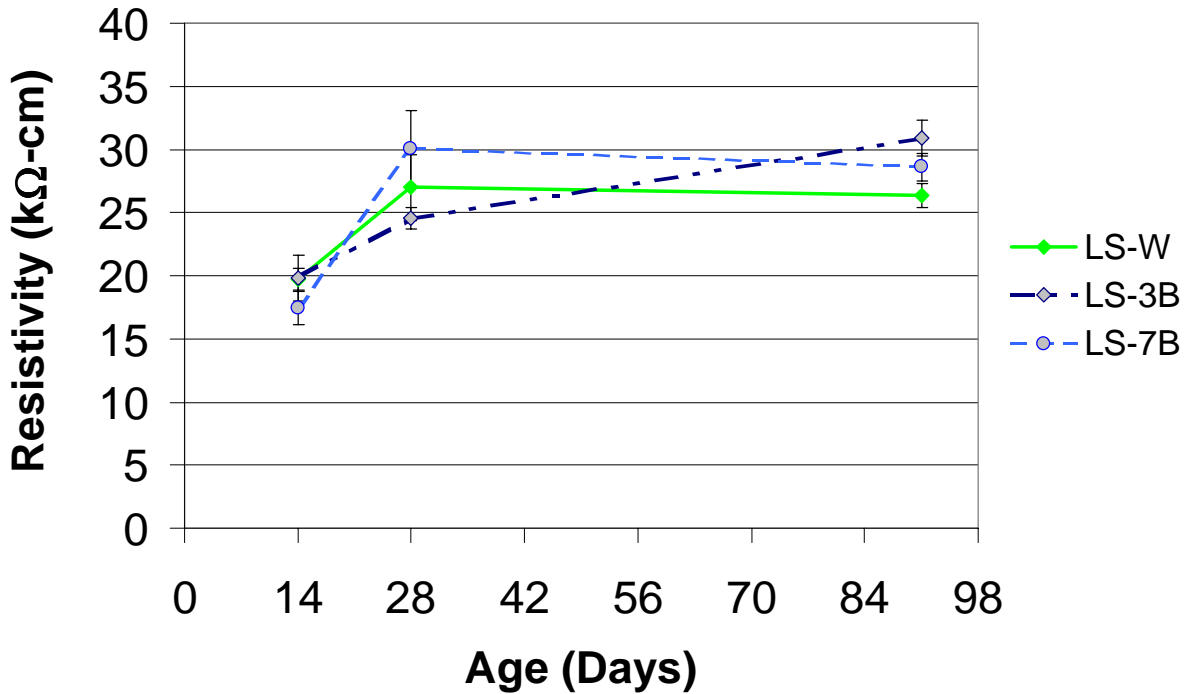


Figure D-8. Electrical resistivity of cylinder specimens vs. age, mixture LS.

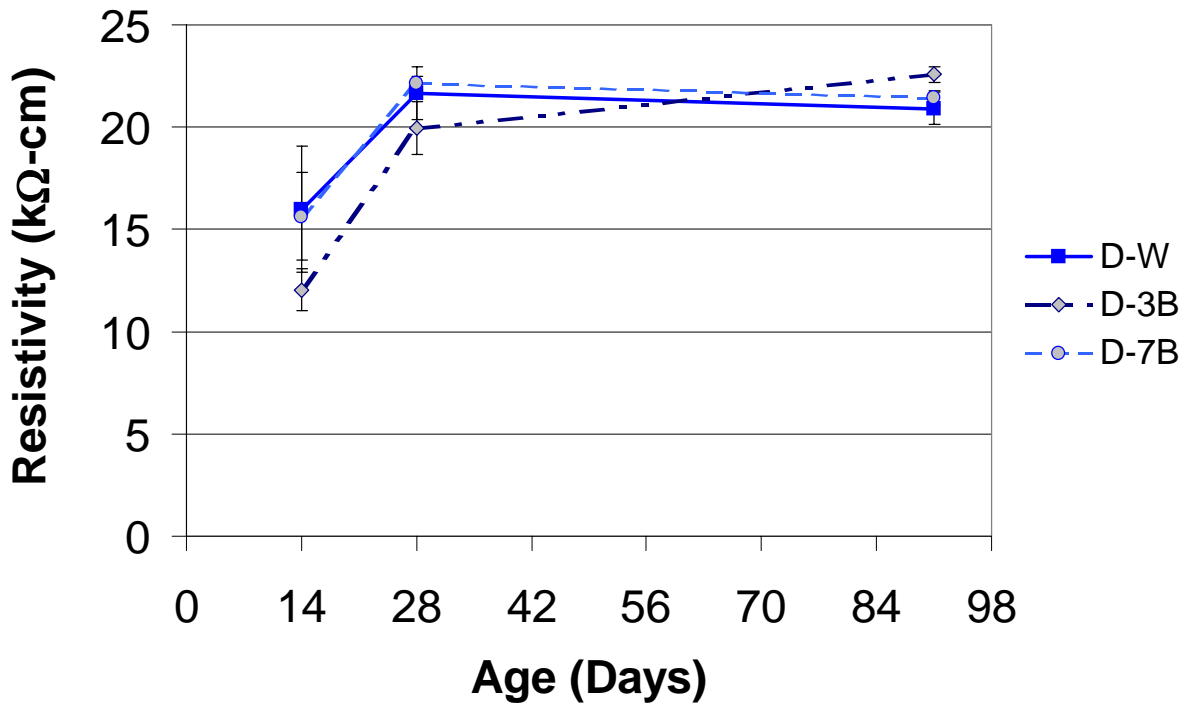


Figure D-9. Electrical resistivity of cylinder specimens vs. age, mixture D.

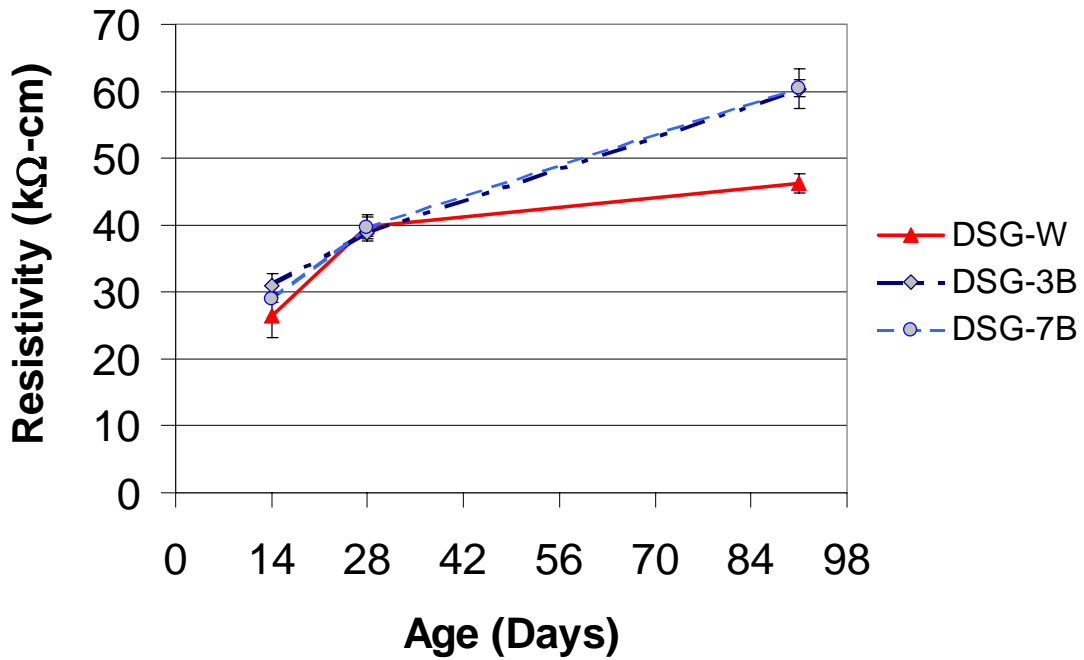


Figure D-10. Electrical resistivity of cylinder specimens vs. age, mixture DSG.

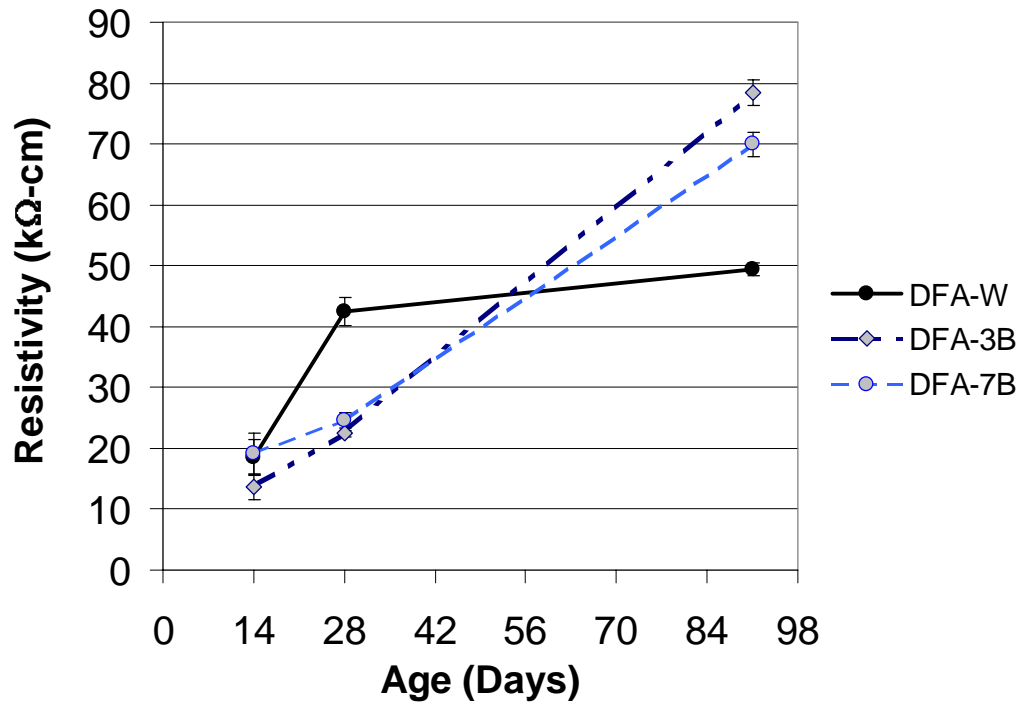


Figure D-11. Electrical resistivity of cylinder specimens vs. age, mixture DFA.

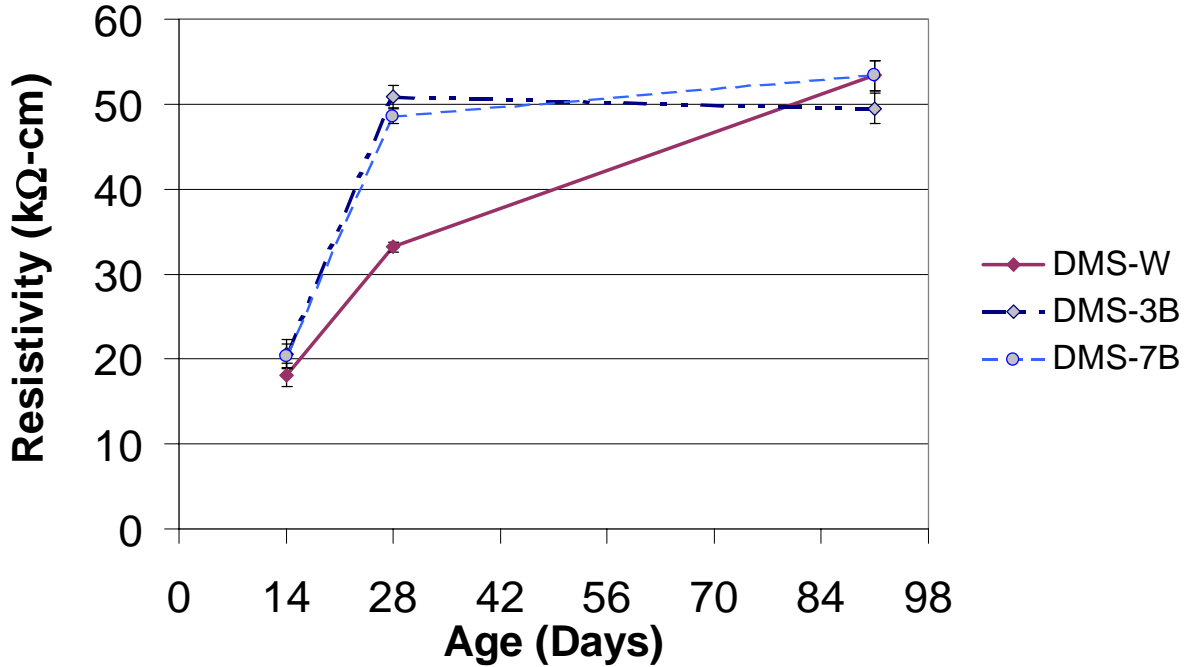


Figure D-12. Electrical resistivity of cylinder specimens vs. age, mixture DMS.

D.2.2 Summary Statistics

Table D-7. Individual resistivity measurements for Gravel cylinder specimens.
Electrical Resistivity (kΩ-cm)

	Test Age (Days)														
	7	14			28				91						
	Sat	W	3B	7B	W	3B	7B	W	3B	7B	W	3B	7B		
10.21	14.68	7.02	9.57	12.76	14.68	13.40	12.76	13.40	14.36	16.91	8.29	20.42	9.57	21.06	
11.48	14.68	7.34	10.21	13.40	14.68	14.36	14.36	15.95	14.68	17.55	11.17	20.74	10.53	21.37	
11.48	14.99	8.61	10.85	14.04	14.68	14.36	14.36	16.27	14.68	18.18	11.48	21.06	11.17	21.37	
11.48	14.99	9.25	11.17	14.04	14.68	14.68	15.31	16.59	14.99	18.18	14.04	21.37	12.44	21.37	
11.80	14.99	9.57	11.17	14.04	14.99	14.99	15.63	16.59	14.99	18.50	14.36	21.69	12.76	21.37	
12.12	14.99	9.89	11.80	14.36	14.99	15.31	15.63	16.59	14.99	18.82	17.55	22.01	19.14	21.69	
12.12	15.31	10.53	12.44	14.36	14.99	15.31	15.95	16.59	14.99	18.82	18.50	22.01	19.78	22.01	
12.44	15.31	10.85	12.44	14.36	15.31	15.31	15.95	16.91	15.31	18.82	18.50	22.01	19.78	22.33	
12.44	15.31	11.17	13.08	14.36	15.63	15.63	15.95	16.91	15.31	18.82	18.82	22.33	19.78	22.33	
12.44	15.31	11.17	13.72	14.68	15.63	15.63	15.95	16.91	15.63	18.82	19.78	22.33	20.42	22.33	
12.44	15.31	11.17	13.72	14.68	15.63	15.63	16.27	16.91	15.63	19.14	20.74	22.65	20.74	22.33	
12.44	15.63	11.48	13.72	14.99	15.95	15.63	16.27	17.23	15.63	19.14	20.74	22.97	21.06	22.33	
12.44	15.63	12.44	13.72	14.99	15.95	15.63	16.27	17.23	15.63	19.14	21.06	22.97	21.06	22.65	
12.44	15.63	13.72	13.72	14.99	15.95	15.95	16.27	17.23	15.63	19.14	21.37	22.97	21.37	22.65	
12.44	15.63	13.72	14.36	14.99	15.95	15.95	16.59	17.23	15.95	19.46	22.33	23.29	21.37	22.65	
12.44	15.63	14.04	14.36	14.99	15.95	15.95	16.59	17.55	15.95	19.46	22.33	23.29	21.37	22.97	
12.44	15.63	14.04	14.36	14.99	15.95	15.95	16.59	17.55	15.95	19.78	22.33	23.29	21.69	22.97	
12.76	15.95	14.36	14.68	15.31	15.95	15.95	16.59	17.55	15.95	19.78	22.33	23.61	22.01	23.29	
12.76	15.95	14.36	14.68	15.31	15.95	15.95	16.91	17.55	15.95	19.78	22.33	23.61	22.33	23.29	
12.76	15.95	14.36	14.68	15.31	15.95	16.27	16.91	17.55	15.95	19.78	22.65	23.61	22.33	23.61	
12.76	15.95	14.36	14.99	15.63	15.95	16.27	16.91	17.55	15.95	19.78	22.65	23.93	22.33	23.61	
12.76	15.95	14.68	15.31	15.63	15.95	16.27	16.91	17.55	15.95	19.78	22.65	24.88	22.65	23.61	
12.76	15.95	14.68	15.95	15.95	15.95	16.27	16.91	17.87	15.95	20.10	22.65	24.88	22.97	23.93	
13.08	16.27	14.99	15.95	15.95	16.27	16.91	16.91	18.18	15.95	20.10	23.29	24.88	23.29	24.25	
13.08	16.59	14.99	16.27	15.95	17.23	17.55	17.55	18.18	15.95	20.42	23.61	25.20	23.29	25.52	
22.33	17.23	15.31	16.27	15.95	17.55	17.55	18.82	18.50	16.27	20.42	23.93	25.52	23.93	25.52	
n	26	26	26	26	26	26	26	26	26	26	26	26	26	26	
Mean	12.70	15.60	12.23	13.58	14.85	15.71	15.72	16.20	17.08	15.55	19.18	19.60	22.98	19.58	22.79
σ	2.06	0.58	2.53	1.88	0.81	0.71	0.91	1.14	0.96	0.51	0.85	4.30	1.38	4.32	1.18
σ²	4.23	0.34	6.41	3.55	0.65	0.51	0.84	1.31	0.93	0.27	0.72	18.45	1.92	18.69	1.39
Cov (%)	16.20	3.72	20.69	13.87	5.44	4.54	5.81	7.05	5.65	3.31	4.42	21.92	6.03	22.07	5.18
+ 95% CL	13.49	15.82	13.21	14.31	15.16	15.98	16.07	16.64	17.45	15.74	19.50	21.25	23.51	21.24	23.24
- 95% CL	11.91	15.37	11.26	12.86	14.54	15.43	15.37	15.76	16.71	15.35	18.85	17.94	22.45	17.92	22.33

Table D-8. Individual resistivity measurements for Limestone cylinder specimens.
Electrical Resistivity (kΩ-cm)

Test Age (Days)													
7	14			28						91			
Sat	W	3B	7B	W	3B	7B	W	3B	7B	W	3B	7B	
5.10	17.55	12.76	15.63	19.14	13.40	20.74	13.72	21.06	20.42	22.65	23.93	22.33	
16.91	17.55	16.91	15.95	19.14	14.99	20.74	20.42	21.37	20.42	22.97	26.16	23.29	
17.87	18.50	17.55	15.95	19.46	15.95	22.33	21.06	21.69	20.74	23.61	26.80	25.52	
18.50	19.14	17.87	15.95	19.46	17.55	22.33	22.01	22.01	20.74	23.61	26.80	25.52	
19.78	19.14	19.78	15.95	19.78	18.82	22.33	22.01	22.33	20.74	23.61	27.12	25.84	
19.78	19.46	20.74	15.95	19.78	19.46	23.29	22.01	22.33	20.74	23.93	27.12	26.16	
20.10	19.78	20.74	15.95	20.10	19.78	23.61	22.33	22.33	20.74	23.93	27.12	27.12	
23.29	20.10	20.74	16.27	20.10	21.06	23.61	23.29	22.33	20.74	23.93	27.76	27.44	
23.93	20.74	20.74	19.14	20.10	25.52	23.93	23.29	22.33	21.06	24.25	28.07	27.44	
23.93	20.74	21.37	19.46	20.74	30.31	23.93	23.61	22.65	21.06	25.20	28.07	28.07	
30.63	20.74	23.93	20.74	20.74	31.90	23.93	23.61	24.25	21.06	25.20	28.71	28.07	
34.14	22.97	24.25	22.33	20.74	31.90	23.93	23.61	25.52	21.37	25.52	28.71	28.07	
				20.74	31.90	24.25	23.93	26.16	22.33	25.84	29.67	28.71	
				20.74	31.90	24.56	23.93	28.07	31.90	26.48	31.58	28.71	
				20.74	31.90	24.88	23.93	28.71	31.90	27.12	31.90	29.67	
				21.37	35.09	25.20	23.93	29.35	31.90	27.12	34.45	29.99	
				22.33	35.09	25.52	23.93	29.99	31.90	27.12	34.77	29.99	
				22.33	35.09	26.16	23.93	29.99	31.90	27.44	34.77	29.99	
				22.97	35.09	27.12	24.88	29.99	35.09	28.39	34.77	29.99	
				22.97	35.09	27.12	25.52	31.58	35.09	28.39	34.77	29.99	
				23.93	38.28	27.44	25.84	32.22	38.28	28.71	34.77	30.63	
				27.12	38.28	27.76	25.84	33.50	47.85	28.71	35.09	31.58	
				28.71	44.66	28.07	26.16	35.09	47.85	28.71	35.09	31.58	
				33.50	44.66	28.39	26.16	44.66	47.85	30.31	35.09	31.58	
				35.09	51.04	29.03	31.90	54.23	51.04	30.31	35.09	31.58	
				35.09	57.42	30.95	34.45	63.80	60.61	31.26	35.09	35.09	
n	12	12	12	12	26	26	26	26	26	26	26	26	
Mean	21.16	19.70	19.78	17.44	22.96	31.01	25.04	24.05	29.52	30.59	26.32	30.90	28.61
σ	7.24	1.52	3.16	2.33	4.85	11.27	2.58	3.66	10.38	11.90	2.50	3.80	2.82
σ²	52.41	2.32	9.96	5.43	23.53	127.10	6.66	13.37	107.75	141.50	6.27	14.47	7.94
Cov (%)	34.21	7.72	15.95	13.36	21.13	36.36	10.31	15.20	35.16	38.89	9.51	12.31	9.85
+ 95% CL	25.26	20.56	21.56	18.76	24.82	35.34	26.04	25.45	33.51	35.16	27.28	32.36	29.70
- 95% CL	17.07	18.84	17.99	16.12	21.09	26.67	24.05	22.64	25.53	26.02	25.36	29.43	27.53

Table D-9. Individual resistivity measurements for Diabase cylinder specimens.

Electrical Resistivity (kΩ-cm)

Test Age (Days)

	7				14				28				91			
	W	W	3B	7B	W	W	3B	7B	W	W	3B	7B	W	W	3B	7B
	1.40	7.34	9.57	10.85	18.50	15.95	5.74	18.82	20.42	19.78	17.55	20.74	20.42	19.78	19.78	
	9.89	11.17	10.53	11.48	19.78	15.95	7.66	18.82	20.42	20.74	17.55	21.06	20.42	20.10	19.78	
	10.21	11.17	10.53	12.76	19.78	16.27	9.57	19.14	20.74	20.74	18.82	21.06	20.42	20.10	19.78	
	10.53	13.72	10.85	12.76	19.78	17.55	9.89	19.14	20.74	20.74	19.14	21.06	20.74	20.42	19.78	
	14.04	14.36	11.48	12.76	20.74	17.55	12.76	19.14	20.74	20.74	19.78	21.69	21.06	20.74	19.78	
	14.04	15.63	11.48	13.72	20.74	17.55	19.14	19.46	21.06	21.06	20.10	21.69	21.06	20.74	19.78	
	14.36	16.27	11.80	15.31	21.06	17.87	19.78	19.78	21.37	21.37	20.10	21.69	21.06	21.06	19.78	
	15.63	16.59	12.12	17.87	21.06	17.87	20.10	19.78	21.37	21.69	20.10	21.69	21.06	21.06	19.78	
	17.55	17.23	12.44	18.82	21.06	18.18	20.42	19.78	21.37	21.69	20.10	22.01	21.06	21.06	20.42	
	17.87	17.87	13.08	18.82	21.37	18.50	20.74	19.78	21.37	21.69	20.10	22.33	21.37	21.06	20.42	
	20.42	21.69	15.31	20.10	21.37	18.50	20.74	19.78	21.69	22.01	20.10	22.33	21.69	21.37	20.42	
	22.97	28.71	15.31	22.33	21.37	18.82	21.06	20.10	21.69	22.01	20.10	22.33	21.69	21.37	20.42	
					21.69	18.82	21.06	20.10	22.01	22.33	20.42	22.33	22.01	21.37	20.74	
					22.97	18.82	21.06	20.10	22.33	22.33	20.42	22.97	22.01	21.69	20.74	
					24.25	18.82	21.06	20.10	22.33	22.33	20.42	22.97	22.33	21.69	21.06	
					24.56	18.82	21.37	20.42	22.33	22.33	20.74	23.29	22.33	22.01	21.37	
					24.88	18.82	21.37	20.42	22.33	22.33	20.74	23.61	22.33	22.33	21.37	
					27.44	18.82	21.37	20.42	22.97	22.33	20.74	23.93	22.97	22.33	22.01	
					27.76	19.14	21.69	20.74	22.97	22.33	21.69	23.93	22.97	22.33	22.33	
					28.07	19.46	21.69	20.74	22.97	22.65	21.69	23.93	22.97	22.33	22.33	
					28.71	19.78	22.01	20.74	23.29	22.65	22.33	24.25	23.61	22.33	22.33	
					28.71	19.78	22.01	21.06	23.29	22.97	22.33	24.56	23.61	22.65	22.33	
					31.58	19.78	22.33	21.06	23.61	23.29	22.65	24.56	24.25	22.97	22.65	
					32.86	20.10	22.97	21.37	23.93	23.29	23.93	24.56	24.88	22.97	22.65	
					35.09	21.69	23.61	21.37	23.93	23.61	24.88	25.20	24.88	24.25	23.29	
					35.09	22.01	41.47	21.37	27.12	23.61	27.12	25.52	25.20	24.25	23.93	
n	12.00	12.00	12.00	12.00	26.00	26.00	26.00	26.00	26.00	26.00	26.00	26.00	26.00	26.00	26.00	26.00
Mean	14.07	15.98	12.04	15.63	24.63	18.66	19.72	20.14	22.25	22.02	20.91	22.90	22.25	21.71	21.12	
σ	5.67	5.47	1.80	3.80	4.97	1.46	6.73	0.78	1.46	0.98	2.08	1.40	1.45	1.16	1.28	
σ²	32.17	29.93	3.22	14.43	24.72	2.12	45.25	0.61	2.15	0.96	4.34	1.96	2.11	1.34	1.63	
Cov (%)	40.30	34.24	14.91	24.30	20.19	7.80	34.12	3.86	6.59	4.44	9.97	6.11	6.53	5.33	6.04	
+ 95% CL	17.28	19.07	13.06	17.78	26.54	19.22	22.30	20.43	22.81	22.40	21.71	23.43	22.80	22.15	21.61	
- 95% CL	10.87	12.88	11.03	13.48	22.72	18.10	17.13	19.84	21.68	21.65	20.11	22.36	21.69	21.26	20.63	

Table D-10. Individual resistivity measurements for Diabase Slag cylinder specimens.

Electrical Resistivity (kΩ-cm)

Test Age (Days)

	Test Age (Days)												
	7	14			28						91		
	W	W	3B	7B	W	3B	7B	W	3B	7B	W	3B	7B
13.72	10.21	27.12	27.12	31.90	35.09	35.09	35.09	34.77	35.09	41.47	54.23	54.23	
14.04	22.01	27.76	27.12	31.90	38.28	35.09	35.09	35.09	35.09	41.47	54.23	54.23	
14.36	26.16	27.76	28.71	31.90	38.28	38.28	35.09	35.09	35.09	41.47	54.23	57.42	
14.36	27.12	28.71	28.71	31.90	38.28	38.28	35.09	35.09	38.28	41.47	54.23	57.42	
14.36	27.44	29.35	28.71	32.86	38.28	41.47	38.28	35.09	38.28	41.47	54.23	60.61	
16.27	27.44	31.90	28.71	35.09	41.47	41.47	38.28	35.09	38.28	41.47	54.23	60.61	
16.27	28.71	31.90	29.03	35.09	41.47	41.47	38.28	38.28	38.28	41.47	57.42	60.61	
16.27	28.71	31.90	29.35	35.09	44.66	44.66	38.28	38.28	38.28	44.66	57.42	60.61	
16.27	28.71	31.90	29.35	35.09	47.85	44.66	38.28	38.28	38.28	44.66	57.42	60.61	
17.55	28.71	31.90	30.31	38.28	47.85	44.66	38.28	38.28	38.28	44.66	57.42	60.61	
17.55	29.35	33.50	30.31	38.28	47.85	44.66	38.28	38.28	41.47	44.66	57.42	60.61	
19.46	33.82	38.28	31.26	38.28	47.85	44.66	41.47	38.28	44.66	44.66	60.61	63.80	
				44.66	47.85	44.66	41.47	38.28	73.38	47.85	63.80	63.80	
				38.28	35.09	35.09	31.90	31.90	35.09	47.85	54.23	54.23	
				38.28	35.09	35.09	35.09	35.09	38.28	47.85	57.42	57.42	
				38.28	35.09	38.28	35.09	35.09	38.28	47.85	57.42	57.42	
				38.28	38.28	38.28	35.09	35.09	38.28	47.85	60.61	60.61	
				38.28	38.28	38.28	35.09	35.09	38.28	47.85	60.61	60.61	
				41.47	38.28	38.28	38.28	37.01	41.47	47.85	60.61	60.61	
				41.47	38.28	38.28	38.28	38.28	41.47	47.85	60.61	63.80	
				41.47	38.28	38.28	38.28	38.28	41.47	47.85	63.80	63.80	
				41.47	38.28	38.28	38.28	38.28	44.66	47.85	63.80	63.80	
				44.66	38.28	38.28	38.28	38.28	47.85	51.04	63.80	63.80	
				47.85	38.28	41.47	38.28	38.28	60.61	51.04	67.00	63.80	
				47.85	41.47	41.47	41.47	38.28	60.61	54.23	70.19	63.80	
				57.42	41.47	43.39	44.66	38.28	42.11	54.23	92.52	63.80	
n	12	12	12	12	26	26	26	26	26	26	26	26	26
Mean	15.87	26.53	31.00	29.06	39.06	40.37	40.07	37.67	36.75	42.36	46.26	60.37	60.49
σ	1.76	5.79	3.13	1.21	5.96	4.32	3.34	2.71	1.84	9.09	3.85	7.86	3.19
σ²	3.09	33.55	9.77	1.47	35.57	18.68	11.14	7.34	3.40	82.66	14.86	61.82	10.16
Cov (%)	11.08	21.83	10.08	4.17	15.27	10.71	8.33	7.19	5.02	21.46	8.33	13.02	5.27
+ 95% CL	16.87	29.81	32.77	29.74	41.35	42.03	41.36	38.71	37.46	45.85	47.74	63.39	61.72
- 95% CL	14.88	23.26	29.23	28.37	36.76	38.71	38.79	36.63	36.04	38.86	44.78	57.35	59.27

Table D-11. Individual resistivity measurements for Diabase Fly Ash cylinder specimens.
Electrical Resistivity (kΩ-cm)

Test Age (Days)													
7	14			28						91			
W	W	3B	7B	W	3B	7B	W	3B	7B	W	3B	7B	
7.66	9.57	7.98	14.36	17.55	38.28	20.42	16.59	14.68	19.78	44.66	63.80	63.80	
7.98	12.76	7.98	15.31	17.55	38.28	19.14	19.14	14.68	22.33	47.85	70.19	63.80	
7.98	14.04	8.61	15.63	19.14	41.47	21.37	22.33	14.68	22.97	47.85	73.38	63.80	
9.57	15.95	12.76	15.95	31.90	41.47	21.06	22.65	17.71	22.97	47.85	73.38	63.80	
10.53	15.95	13.08	15.95	35.09	41.47	20.42	22.65	17.87	22.97	47.85	73.38	67.00	
10.53	19.14	14.36	16.27	35.09	41.47	20.74	22.65	18.18	22.97	47.85	73.38	67.00	
10.53	19.78	14.68	16.59	35.09	41.47	20.74	22.97	20.10	23.61	47.85	76.57	67.00	
10.53	19.78	14.68	16.59	35.09	41.47	20.74	22.97	22.33	23.61	47.85	76.57	67.00	
10.85	19.78	14.68	19.14	35.09	44.66	22.33	23.61	22.97	23.61	47.85	76.57	67.00	
10.85	25.20	17.55	20.74	38.28	44.66	22.97	23.61	22.97	23.93	47.85	76.57	67.00	
11.17	25.20	18.18	28.71	38.28	47.85	22.97	23.61	25.52	23.93	47.85	76.57	67.00	
12.76	25.52	19.46	33.50	38.28	47.85	22.33	23.93	25.52	23.93	47.85	76.57	67.00	
				38.28	47.85	20.74	23.93	26.16	23.93	47.85	76.57	67.00	
				41.47	47.85	20.74	23.93	26.48	23.93	47.85	79.76	67.00	
				41.47	47.85	20.74	23.93	27.12	23.93	47.85	79.76	67.00	
				41.47	47.85	22.33	24.25	27.12	23.93	51.04	79.76	70.19	
				41.47	47.85	20.10	24.25	27.76	23.93	51.04	82.95	70.19	
				41.47	47.85	20.74	24.56	27.76	23.93	51.04	82.95	70.19	
				44.66	47.85	22.33	24.56	27.76	23.93	51.04	82.95	73.38	
				44.66	47.85	23.93	24.88	28.71	24.25	51.04	82.95	76.57	
				44.66	51.04	21.06	24.88	28.71	24.25	51.04	82.95	76.57	
				44.66	51.04	22.01	24.88	29.99	24.25	51.04	82.95	76.57	
				47.85	51.04	22.33	25.20	29.99	25.52	51.04	82.95	76.57	
				47.85	54.23	21.37	25.52	31.90	25.52	51.04	82.95	76.57	
				51.04	54.23	21.37	25.52	34.14	27.12	54.23	86.14	76.57	
				44.66	60.61	20.74	26.16	44.66	27.44	57.42	86.14	82.95	
n	12	12	12	12	26	26	26	26	26	26	26	26	
Mean	10.08	18.56	13.66	19.06	38.16	46.75	21.37	23.58	25.21	23.94	49.45	78.41	69.94
σ	1.52	5.13	3.86	5.97	8.76	5.26	1.07	1.99	6.75	1.44	2.59	5.27	5.26
σ²	2.30	26.37	14.91	35.61	76.72	27.64	1.14	3.95	45.58	2.06	6.72	27.82	27.62
Cov (%)	15.06	27.67	28.26	31.30	22.95	11.25	4.99	8.43	26.78	6.00	5.24	6.73	7.51
+ 95% CL	10.93	21.46	15.85	22.44	41.53	48.77	21.78	24.35	27.80	24.49	50.44	80.43	71.96
- 95% CL	9.22	15.65	11.48	15.69	34.79	44.73	20.96	22.82	22.61	23.39	48.45	76.38	67.92

Table D-12. Individual resistivity measurements for Diabase Micro-silica cylinder specimens.

Electrical Resistivity (kΩ-cm)

	Test Age (Days)												
	7	14			28						91		
	W	W	3B	7B	W	3B	7B	W	3B	7B	W	3B	7B
11.80	13.08	13.08	13.40	31.90	31.90	47.85	41.47	44.66	41.47	47.85	47.85	57.42	
11.80	13.72	12.76	13.40	31.90	31.90	47.85	44.66	44.66	44.66	51.04	29.99	57.42	
11.80	13.72	16.59	14.36	31.90	31.90	47.85	44.66	44.66	44.66	51.04	51.04	54.23	
11.80	14.04	16.59	15.95	31.90	31.90	51.04	44.66	44.66	44.66	47.85	51.04	51.04	
12.12	14.36	16.59	15.95	31.90	31.90	51.04	44.66	44.66	44.66	51.04	51.04	51.04	
12.12	14.99	17.23	16.91	31.90	31.90	51.04	44.66	47.85	44.66	51.04	51.04	51.04	
12.12	15.31	17.55	17.55	31.90	31.90	51.04	44.66	47.85	44.66	51.04	54.23	51.04	
12.44	15.95	17.55	17.55	31.90	31.90	51.04	47.85	47.85	44.66	51.04	47.85	51.04	
12.44	15.95	19.46	19.46	31.90	31.90	51.04	47.85	47.85	44.66	51.04	47.85	51.04	
12.44	15.95	19.46	19.46	31.90	31.90	51.04	47.85	47.85	47.85	51.04	47.85	47.85	
12.44	15.95	19.78	19.46	31.90	31.90	51.04	47.85	47.85	47.85	47.85	47.85	54.23	
12.76	16.27	20.10	19.46	31.90	31.90	51.04	47.85	47.85	51.04	51.04	54.23	57.42	
12.76	16.27	20.10	20.10	31.90	31.90	54.23	47.85	47.85	51.04	47.85	51.04	57.42	
12.76	16.59	20.42	20.42	31.90	31.90	54.23	47.85	47.85	51.04	51.04	51.04	54.23	
12.76	17.55	20.42	21.69	31.90	31.90	54.23	47.85	47.85	51.04	51.04	54.23	51.04	
12.76	19.14	20.42	22.01	31.90	31.90	54.23	47.85	47.85	51.04	54.23	47.85	54.23	
12.76	19.78	20.42	22.01	31.90	31.90	54.23	47.85	47.85	51.04	54.23	51.04	54.23	
12.76	20.10	21.37	22.33	35.09	35.09	54.23	47.85	47.85	51.04	63.80	47.85	57.42	
12.76	20.74	22.33	22.33	35.09	35.09	54.23	51.04	51.04	51.04	63.80	54.23	54.23	
12.76	21.37	22.33	22.97	35.09	35.09	54.23	51.04	51.04	51.04	57.42	47.85	54.23	
13.08	22.33	23.93	23.61	35.09	35.09	54.23	51.04	51.04	51.04	57.42	47.85	51.04	
13.40	22.33	25.52	23.93	35.09	35.09	54.23	51.04	51.04	51.04	57.42	51.04	51.04	
13.40	22.33	25.84	25.20	35.09	35.09	54.23	51.04	51.04	54.23	54.23	47.85	47.85	
13.40	23.93	25.84	25.52	35.09	35.09	54.23	51.04	51.04	54.23	57.42	47.85	51.04	
18.18	23.93	30.31	25.84	35.09	35.09	57.42	63.80	51.04	54.23	60.61	51.04	47.85	
12.76	24.25	30.31	25.84	35.09	44.66	57.42	70.19	51.04	54.23	54.23	54.23	54.23	
n	26	26	26	26	26	26	26	26	26	26	26	26	
Mean	12.79	18.07	20.63	20.26	33.01	33.37	52.64	49.08	48.22	48.96	53.38	49.50	52.88
σ	1.20	3.60	4.41	3.78	1.55	2.74	2.59	5.92	2.27	3.82	4.56	4.66	3.0162
σ²	1.44	12.97	19.42	14.32	2.40	7.52	6.72	35.07	5.15	14.61	20.81	21.76	9.10
Cov (%)	9.39	19.93	21.36	18.68	4.69	8.21	4.92	12.07	4.71	7.81	8.55	9.42	5.70
+ 95% CL	13.25	19.46	22.32	21.71	33.60	34.43	53.64	51.36	49.09	50.43	55.13	51.29	54.04
- 95% CL	12.32	16.69	18.93	18.80	32.41	32.32	51.64	46.80	47.35	47.49	51.62	47.70	51.73

D.3 Field Data

Table D-13. Individual resistivity measurements for bridge mix slab specimens
Electrical Resistivity (kΩ-cm)

	Test Age (Days)															
	7		14		14		28		42		42		91		91	
	LA	LB	LA	LB	FA	FB	LA	LB	LA	LB	FA	FB	LA	LB	FA	FB
	7.02	7.98	13.40	19.14	12.76	7.98	6.06	14.36	23.29	20.74	13.72	14.36	23.61	20.74	17.55	19.78
	7.66	7.98	15.31	20.74	13.40	12.76	12.76	18.18	23.61	22.33	15.95	14.36	24.25	22.33	20.74	19.78
	9.89	10.85	15.95	20.74	14.04	16.59	13.40	21.06	23.93	23.93	16.27	17.55	25.52	22.97	20.74	20.42
	15.31	11.17	16.59	20.74	15.31	17.23	13.72	22.33	24.25	23.93	17.87	18.18	25.84	22.97	22.33	22.65
	22.65	13.08	17.55	20.74	15.31	19.14	14.04	22.65	24.25	23.93	19.78	18.82	26.16	23.29	22.97	23.29
	25.52	15.95	17.55	20.74	15.95	19.14	14.36	22.97	25.20	25.20	20.10	19.46	26.80	23.61	23.61	23.93
	27.44	28.71	17.87	21.37	16.59	20.10	14.36	26.80	25.52	25.52	20.74	20.74	27.44	24.88	25.52	23.93
	28.39	31.90	18.18	22.33	17.55	20.42	14.99	28.39	26.16	31.26	20.74	21.06	27.76	27.12	25.52	25.20
	28.71	32.86	18.82	22.33	17.55	20.42	14.99	28.39	28.39	31.90	21.69	21.69	28.71	27.44	25.84	25.52
	31.58	34.77	22.01	24.88	17.55	20.74	16.91	29.99	28.71	35.09	22.97	22.01	29.03	28.07	26.48	26.48
	31.58	38.28	22.01	25.20	17.87	21.06	17.23	30.31	28.71	35.09	23.93	22.33	29.03	29.35	26.80	26.80
	34.77	41.47	28.71	25.52	18.50	21.37	17.87	35.09	29.67	34.45	23.93	22.33	29.67	30.63	28.71	28.07
					19.78	22.01			30.31	38.28	24.25	22.65			29.03	28.07
									25.84	32.54						
									35.09	31.90						
									22.01	31.90						
									27.44	28.39						
									23.29	29.03						
									34.14	29.99						
									29.03	34.14						
									25.52	34.45						
									25.52	34.45						
									29.35	31.90						
									25.52	32.54						
									19.46	27.12						
									22.33	27.12						
n	12	12	12	12	13	13	12	12	26	26	13	13	12	12	13	13
Mean	22.54	22.92	18.66	22.04	16.32	18.38	14.22	25.04	26.41	29.89	20.15	19.66	26.98	25.28	24.29	24.15
σ	9.97	12.83	4.02	2.08	2.09	4.00	3.02	5.82	3.60	4.67	3.36	2.88	1.96	3.13	3.36	2.91
σ²	99.38	164.52	16.13	4.34	4.36	15.97	9.13	33.93	12.96	21.77	11.31	8.30	3.86	9.81	11.28	8.45
Cov (%)	44.22	55.97	21.52	9.45	12.79	21.74	21.25	23.26	13.64	15.61	16.69	14.66	7.28	12.39	13.82	12.04
+ 95% CL	28.18	30.17	20.94	23.22	17.34	20.34	15.93	27.90	28.17	32.18	21.80	21.07	27.95	26.82	25.94	25.57
- 95% CL	16.90	15.66	16.39	20.86	15.30	16.42	12.51	22.19	24.64	27.60	18.50	18.24	26.02	23.75	22.65	22.72

Table D-14. Individual resistivity measurements for bridge mix cylinder specimens, saturated conditions.

Electrical Resistivity (kΩ-cm)

	Test Age (Days)					
	7		28		42	
	A	B	A	B	A	B
	17.55	7.98	35.09	35.09	38.28	41.47
	17.55	7.98	35.09	35.09	38.28	41.47
	18.18	10.85	35.09	35.09	41.47	44.66
	19.78	11.17	38.28	41.47	41.47	44.66
	19.78	13.08	38.28	41.47	44.66	44.66
	19.78	15.95	41.47	47.85	44.66	44.66
	20.42	28.71	44.66	47.85	44.66	47.85
	25.52	31.90	47.85	47.85	44.66	47.85
	29.99	32.86	47.85	47.85	44.66	47.85
	34.77	34.77	51.04	47.85	47.85	47.85
	35.09	38.28	54.23	51.04	47.85	47.85
	38.28	41.47	54.23	63.80	47.85	47.85
			57.42	73.38	47.85	47.85
					51.04	47.85
					51.04	47.85
					54.23	47.85
					54.23	47.85
					54.23	47.85
					54.23	47.85
					57.42	47.85
					57.42	47.85
					57.42	47.85
					60.61	47.85
					60.61	47.85
					60.61	47.85
					60.61	47.85
					67.00	79.76
n	12	12	13	13	26	26
Mean	24.72	22.92	43.60	45.20	50.80	48.10
σ	7.74	12.83	7.37	8.26	7.81	6.75
σ²	59.85	164.52	54.28	68.16	61.00	45.53
Cov (%)	31.29	55.97	16.90	18.27	15.38	14.03
+ 95% CL	29.10	30.17	47.60	49.68	54.63	51.41
- 95% CL	20.35	15.66	39.59	40.71	49.78	46.14

Table D-15. Individual resistivity measurements for deck sections
Electrical Resistivity (kΩ-cm)

	Test Age (Days)				
	14	42		91	
	Deck A	Deck A	Deck B	Deck A	Deck B
	15.95	7.98	7.66	22.97	22.65
	17.23	10.85	8.61	23.29	23.61
	17.23	13.40	12.44	23.93	26.16
	17.55	13.72	14.68	24.88	26.80
	17.87	13.72	16.27	25.52	26.80
	17.87	13.72	17.55	26.16	27.76
	17.87	16.27	18.18	26.80	28.39
	18.18	16.59	18.82	26.80	28.39
	18.82	17.23	19.14	28.71	29.99
	19.14	17.55	19.14	29.03	31.26
	20.42	17.87	20.10	29.03	31.58
	20.74	19.14	20.10	29.99	31.90
	22.01	19.78	20.42	31.26	32.22
	22.33	19.78	22.65	31.58	35.09
	23.61	24.88	22.97	38.28	38.28
	24.25	27.12	23.61	38.92	38.92
	24.25	31.90	27.12	41.47	41.47
	47.85	38.28	31.58	44.66	41.47
n	18	18	18	18	18
Mean	21.29	18.88	18.95	30.18	31.26
σ	7.12	7.53	5.88	6.48	5.75
σ²	50.72	56.63	34.56	42.04	33.04
Cov (%)	33.46	39.87	31.03	21.48	18.38
+ 95% CL	24.78	22.56	21.83	33.36	34.08
- 95% CL	17.80	15.19	16.07	27.01	28.45
	3.49	3.69	2.88	3.18	2.82

APPENDIX E. SURFACE AIR FLOW

E.1 Laboratory Mixtures

Table E-1. Surface Air Flow measurements for Gravel specimens, at 28-days.

3B				7B			
Pressure (mm Hg)			Flow	Pressure (mm Hg)			Flow
Start	Finish	Delta	(ml/min)	Start	Finish	Delta	(ml/min)
727	727	0	15	729	727	2	14
729	728	1	14	729	727	2	7
730	727	3	25	729	727	2	8
730	728	2	13	728	728	0	21
729	727	2	17	728	728	0	13
729	727	2	17	729	729	0	21
729	728	1	9	728	727	1	15
729	728	1	9	729	727	2	24
730	727	3	18	730	728	2	29
730	727	3	12	730	729	1	17
n		10		n		10	
Mean		15		Mean		17	
Std. Dev		4.65		Std. Dev		7.01	
Variance		21.6		Variance		49.12	
Cov		31.4		Cov		41.4	
+ 95% CL		17		+ 95% CL		20	
- 95% CL		12		- 95% CL		14	

Table E-2. Surface Air Flow measurements for Gravel specimens, at 91-days

3B				7B			
Pressure (mm Hg)			Flow	Pressure (mm Hg)			Flow
Start	Finish	Delta	(ml/min)	Start	Finish	Delta	(ml/min)
727	725	2	9	729	726	3	24
727	724	3	16	729	726	3	30
726	725	1	13	729	726	3	26
727	725	2	20	730	727	3	14
728	726	2	19	729	727	2	23
727	725	2	35	729	728	1	11
727	725	2	22	729	727	2	49
726	726	0	26	729	728	1	30
726	725	1	31	729	727	2	30
727	724	3	33	729	727	2	21
n		10		n		10	
Mean		22		Mean		26	
Std. Dev		8.92		Std. Dev		10.33	
Variance		79.51		Variance		106.65	
Cov		39.91		Cov		40.17	
+ 95% CL		27		+ 95% CL		31	
- 95% CL		18		- 95% CL		21	

Table E-3. Surface Air Flow measurements for Limestone specimens, at 28-days.

3B				7B			
Pressure (mm Hg)			Flow	Pressure (mm Hg)			Flow
Start	Finish	Delta	(ml/min)	Start	Finish	Delta	(ml/min)
733.1	727.5	5.6	42	731.6	726.5	5.1	39
732.9	726.5	6.4	46	732.2	725.1	7.1	48
732.6	725.3	7.3	50	732.5	725.2	7.3	36
732.5	726.6	5.9	44	731.6	725.2	6.4	49
732.4	725.3	7.1	47	734	725.3	8.7	42
734	727	7	17	734	726.5	7.5	50
736	727.4	8.6	13	734.4	726.9	7.5	36
733	727.5	5.5	21	734	730.4	3.6	33
733.5	726.8	6.7	34	734	733.1	0.9	17
732.6	727	5.6	36	734	725.5	8.5	54
n		10		n		10	
Mean		35		Mean		40	
Std. Dev		13.32		Std. Dev		10.77	
Variance		177.5		Variance		115.94	
Cov		38.07		Cov		26.65	
+ 95% CL		41.53		+ 95% CL		45.68	
- 95% CL		28.47		- 95% CL		35.12	

Table E-4. Surface Air Flow measurements for Limestone specimens, at 91-days.

3B				7B			
Pressure (mm Hg)			Flow	Pressure (mm Hg)			Flow
Start	Finish	Delta	(ml/min)	Start	Finish	Delta	(ml/min)
731	730	1	27	731	727	4	40
733	728	5	29	733	728	5	38
732	728	4	19	731	727	4	27
731	729	2	21	730	729	1	33
730	728	2	20	730	729	1	16
730	727	3	23	730	729	1	32
730	729	1	13	730	729	1	13
731	728	3	38	729	726	3	17
730	728	2	35	730	726	4	36
730	728	2	29	730	727	3	46
n		10		n		10	
Mean		25.51		Mean		29.925	
Std. Dev		7.602897		Std. Dev		11.1619	
Variance		57.80404		Variance		124.588	
Cov		29.8036		Cov		37.29957	
+ 95% CL		29.24		+ 95% CL		35.39	
- 95% CL		21.78		- 95% CL		24.46	

Table E-5. Surface Air Flow measurements for Diabase specimens, at 28-days.

3B		7B	
Pressure (mm Hg)	Flow	Pressure (mm Hg)	Flow

Start	Finish	Delta	(ml/min)	Start	Finish	Delta	(ml/min)
730	731	1	6.28	734	729	5	45.72
731	730	1	9.46	734	732	2	12.23
730	728	2	29.2	734	730	4	26.02
730	730	0	8.42	733	731	2	32.68
732	730	2	8.75	731	731	0	24.57
732	730	2	8.36	733	733	0	50
730	729	1	16.81	733	730	3	29.63
730	729	1	10.95	734	729	5	20.68
730	729	1	14.31	734	730	4	16.86
730	728	2	25.42	734	731	3	20
	n	10			n	10	
	Mean	13.8			Mean	27.839	
	Std. Dev	7.811			Std. Dev	12.14889	
	Variance	61.01			Variance	147.5954	
	Cov	56.62			Cov	43.6398	
	+ 95% CL	17.62			+ 95% CL	33.79	
	- 95% CL	9.97			- 95% CL	21.89	

Table E-6. Surface Air Flow measurements for Diabase specimens, at 91-days.

3B				7B			
Pressure (mm Hg)			Flow	Pressure (mm Hg)			Flow
Start	Finish	Delta	(ml/min)	Start	Finish	Delta	(ml/min)
731	732	1	25	737	733	4	40
732	728	4	24	736	733	3	36
730	728	2	31	736	733	3	22
730	729	1	35	737	734	3	16
732	730	2	15	736	733	3	40
731	730	1	38	736	734	2	31
730	729	1	40	735	734	1	16
730	729	1	17	735	732	3	23
730	729	1	21	734	732	2	34
730	729	1	13	734	731	3	29
	n	10			n	10	
	Mean	26			Mean	29	
	Std. Dev	9.70			Std. Dev	9.04	
	Variance	94.14			Variance	81.63	
	Cov	37.55			Cov	31.43	
	+ 95% CL	31			+ 95% CL	33	
	- 95% CL	21			- 95% CL	24	

Table E-7. Surface Air Flow measurements for Diabase Slag cement specimens, at 91-days.

3B				7B			
Pressure (mm Hg)			Flow	Pressure (mm Hg)			Flow
Start	Finish	Delta	(ml/min)	Start	Finish	Delta	(ml/min)
737	732	5	17	737	733	4	37

737	733	4	24	738	733	5	17
738	734	4	19	738	733	5	19
737	733	4	11	738	734	4	30
738	735	3	34	739	736	3	27
737	734	3	20	737	734	3	19
737	734	3	22	737	734	3	21
737	735	2	28	737	734	3	28
737	732	5	43	737	734	3	18
736	733	3	23	737	734	3	17
n				n			
Mean				Mean			
Std. Dev				Std. Dev			
Variance				Variance			
Cov				Cov			
+ 95% CL				+ 95% CL			
- 95% CL				- 95% CL			

Table E-8. Surface Air Flow measurements for Diabase Fly Ash specimens, at 91-days.

3B				7B			
Pressure (mm Hg)		Flow		Pressure (mm Hg)		Flow	
Start	Finish	Delta	(ml/min)	Start	Finish	Delta	(ml/min)
734	733	1	33	736	732	4	29
734	732	2	25	735	733	2	8
735	731	4	20	735	732	3	16
734	731	3	23	735	730	5	20
734	733	1	6	736	732	4	17
733	730	3	21	735	730	5	21
735	730	5	30	735	732	3	24
735	731	4	22	735	731	4	30
735	732	3	13	736	732	4	34
735	733	2	28	734	730	4	26
n				n			
Mean				Mean			
Std. Dev				Std. Dev			
Variance				Variance			
Cov				Cov			
+ 95% CL				+ 95% CL			
- 95% CL				- 95% CL			

Table E-9. Surface Air Flow measurements for Diabase micro-silica specimens, at 91-days.

3B				7B			
Pressure (mm Hg)		Flow		Pressure (mm Hg)		Flow	
Start	Finish	Delta	(ml/min)	Start	Finish	Delta	(ml/min)
734	734	0	31	736	733	3	19
734	733	1	40	736	733	3	10
735	733	2	36	736	733	3	23

733	733	0	30	735	733	2	46
734	732	2	13	735	734	1	33
733	732	1	21	736	734	2	28
733	733	0	32	737	734	3	22
733	732	1	39	736	733	3	35
733	732	1	18	737	733	4	17
733	733	0	23	737	733	4	21
	n	10			n	10	
	Mean	28.30			Mean	25.48	
	Std. Dev	9.09			Std. Dev	10.28	
	Variance	82.71			Variance	105.76	
	Cov	32.14			Cov	40.36	
	+ 95% CL	33			+ 95% CL	31	
	- 95% CL	24			- 95% CL	20	

E.2 Field Specimens

Table E-10. Surface Air Flow measurements for lab-cured field slabs, at 28-days.

A				B			
Pressure (mm Hg)			Flow	Pressure (mm Hg)			Flow
Start	Finish	Delta	(ml/min)	Start	Finish	Delta	(ml/min)
728	725	3	9	725	725	0	28
728	726	2	12	726	725	1	28
729	725	4	20	727	724	3	26
730	725	5	42	726	725	1	19
728	725	3	39	725	725	0	12
728	724	4	28	725	725	0	11
730	725	5	26	725	724	1	17
727	727	0	28	726	724	2	36
727	726	1	20	727	725	2	20
726	725	1	16	727	725	2	14
	n	10			n	10	
	Mean	24			Mean	21	
	Std. Dev	10.86			Std. Dev	8.04	
	Variance	117.89			Variance	64.63	
	Cov	45.22			Cov	38.16	
	+ 95% CL	29			+ 95% CL	25	
	- 95% CL	19			- 95% CL	17	

Table E-11. Surface Air Flow measurements for lab-cured field slabs, at 91-days.

A				B			
Pressure (mm Hg)		Flow		Pressure (mm Hg)		Flow	
719	716	3	27	721	718	3	40
720	716	4	25	721	720	1	37
719	717	2	7	721	720	1	20
719	717	2	19	721	719	2	18
718	717	1	31	720	718	2	13
717	717	0	28	722	718	4	19
720	717	3	36	721	718	3	27
717	714	3	48	721	718	3	28
718	713	5	22	722	719	3	16
718	713	5	27	722	718	4	18
n				n			
10				10			
Mean				Mean			
27.13				23.60			
Std. Dev				Std. Dev			
10.76				9.11			
Variance				Variance			
115.84				82.99			
Cov				Cov			
39.68				38.61			
+ 95% CL				+ 95% CL			
32				28			
- 95% CL				- 95% CL			
22				19			

Table E-12. Surface Air Flow measurements for Bridge Deck Sections, at 14-days.

A			
Pressure (mm Hg)		Flow	
740	738	2	19
739	736	3	21
741	737	4	28
739	736	3	25
739	736	3	32
739	735	4	50
739	732	7	53
739	737	2	21
740	738	2	13
740	737	2	16
n			
10			
Mean			
28			
Std. Dev			
13.81			
Variance			
190.82			
Cov			
49.69			
+ 95% CL			
35			
- 95% CL			
21			

Table E-13. Surface Air Flow measurements for Bridge Deck Sections, at 42-days.

A				B			
Pressure (mm Hg)		Flow		Pressure (mm Hg)		Flow	
735	732	4	31	734	733	1	7
737	733	4	19	734	733	1	16
735	733	2	26	734	734	0	18
733	733	0	19	734	734	0	11
734	732	2	27	734	734	0	6
734	734	1	16	735	734	1	13
733	733	0	20	735	733	3	21
734	732	2	8	735	733	2	26
734	735	1	11	735	734	1	9
				735	733	2	16
	n	9			n	10	
	Mean	19.66			Mean	14.25	
	Std. Dev	7.40			Std. Dev	6.27	
	Variance	54.73			Variance	39.34	
	Cov	37.64			Cov	44.03	
	+ 95% CL	23			+ 95% CL	17	
	- 95% CL	16			- 95% CL	11	
735	732	4	31	734	733	1	7

Table E-14. Surface Air Flow measurements for Bridge Deck Sections, at 91-days.

A				B			
Pressure (mm Hg)		Flow		Pressure (mm Hg)		Flow	
739	735	4	28	734	733	1	32
740	736	4	27	734	733	1	28
740	737	3	22	734	734	0	30
738	735	3	28	734	734	0	28
740	735	5	32	734	734	0	20
738	737	1	15	735	734	1	34
739	736	3	22	735	733	3	19
739	735	4	30	735	733	2	22
739	735	4	30	735	734	1	20
739	738	1	28	735	733	2	30
	n	10			n	10	
	Mean	26			Mean	26	
	Std. Dev	4.92			Std. Dev	5.32	
	Variance	24.21			Variance	28.32	
	Cov	18.81			Cov	20.23	
	+ 95% CL	29			+ 95% CL	29	
	- 95% CL	24			- 95% CL	24	