

# One-Dimensional Consolidation Properties of Soils ASTM D-2435



Project: **BYU (Dr. Youd)**

Number: **M00399-003**

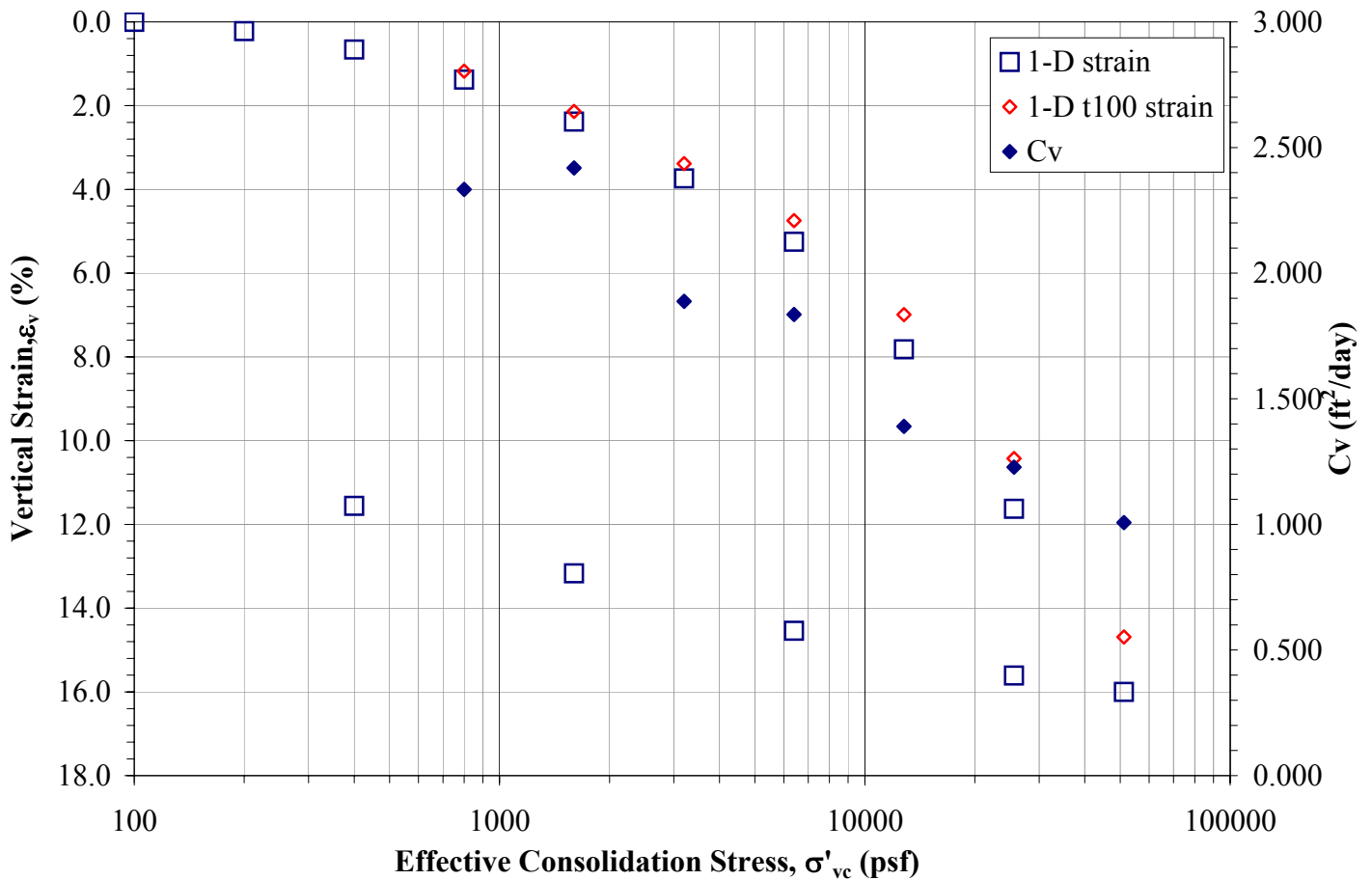
Sample: **WLA D-2**

Depth: **22-24.5**

	Initial	Final
Sample height, $H_0$ (in)	1.0000	0.8844
Sample Diameter, $D_0$ (in)	2.416	2.416
Moist unit weight (pcf)	123.0	133.4
Dry unit weight (pcf)	96.7	109.3
Moisture content (%)	27.3	22.1

$G_s$ (Determined)	2.822
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Stress (psf)	Dial (in)	1-D $\epsilon_v$ (%)	Hc (in)	Void ratio e	$C_v$ (ft /day)	1-D $t_{100}$ $\epsilon_v$ (%)
100	0.1292	0.00	1.0000	0.823		
200	0.1314	0.22	0.9978	0.819		
400	0.1358	0.66	0.9934	0.811		
800	0.1430	1.38	0.9862	0.798	2.334	1.178
1600	0.1530	2.38	0.9762	0.779	2.418	2.137
3200	0.1666	3.74	0.9626	0.755	1.888	3.385
6400	0.1817	5.25	0.9475	0.727	1.836	4.744
12800	0.2074	7.82	0.9218	0.680	1.390	6.990
25600	0.2455	11.63	0.8837	0.611	1.228	10.427
51200	0.2892	16.00	0.8400	0.531	1.007	14.689
25600	0.2853	15.61	0.8439	0.538		
6400	0.2746	14.54	0.8546	0.558		
1600	0.2609	13.17	0.8683	0.583		
400	0.2448	11.56	0.8844	0.612		



Tested by: \_\_\_\_\_

Reviewed: \_\_\_\_\_

One-Dimensional Consolidation Time-Deformation Relationship



Project: BYU (Dr. Youd)

Number: M00399-003

Sample: WLA D-2

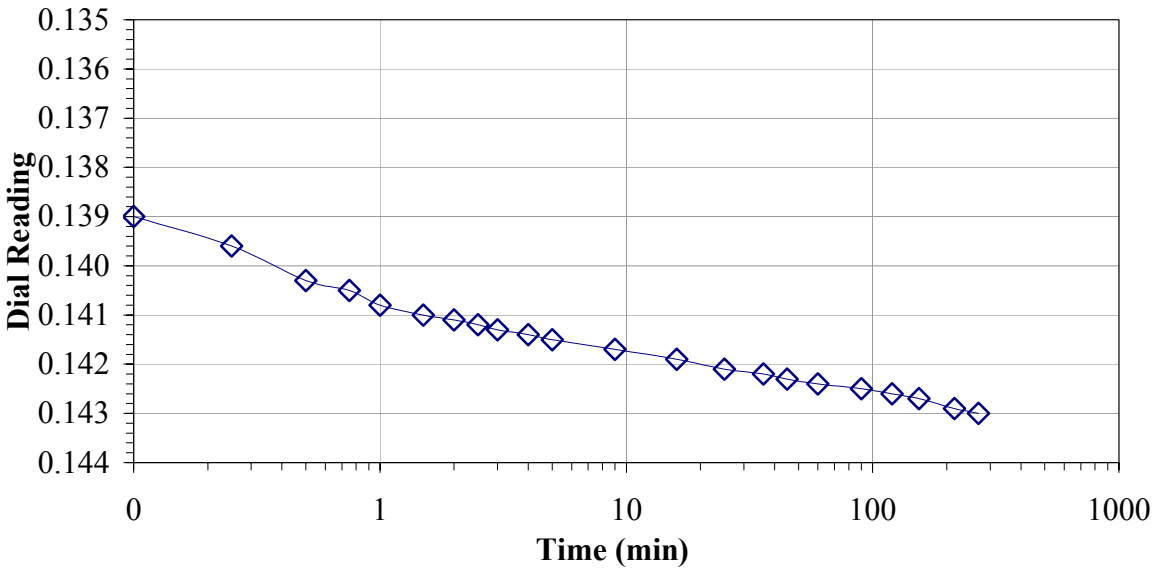
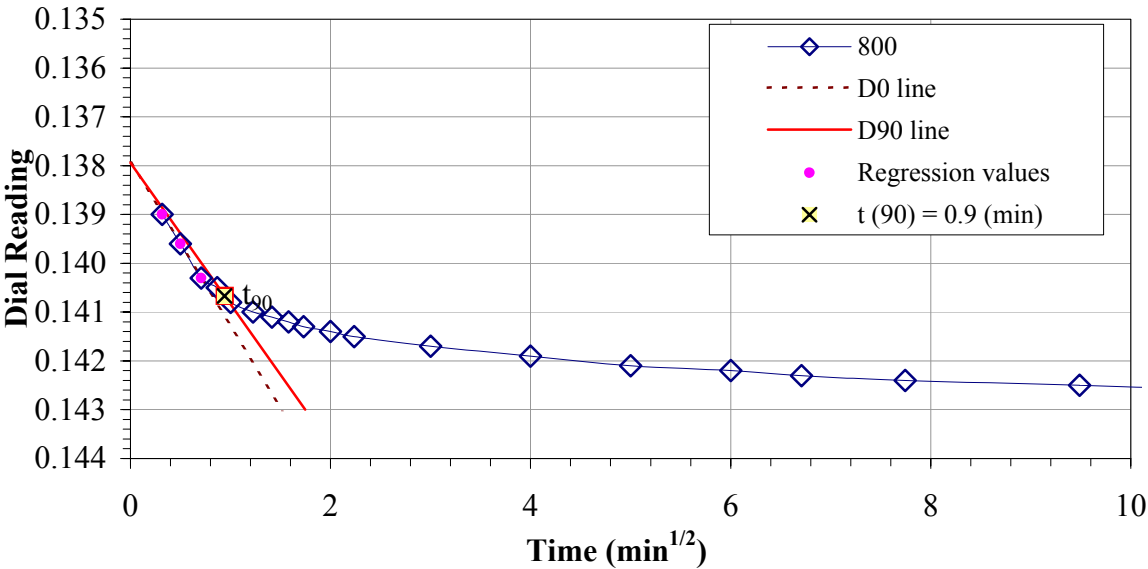
Depth: 22-24.5

Stress: 800 (psf)

Time rate consolidation data

Data Summary	
$H_{DR}$	= 0.4949 (in)
Slope of $t_{int}$ line	= 0.00333 (dial/min <sup>1/2</sup> )
Slope of $t_{90}$ line	= 0.00289 (dial/min <sup>1/2</sup> )
$D_0$	= 0.14 (dial)
$D(90)$	= 0.1407 (dial)
$D(100)$	= 0.14098 (dial)
$t(90)$	= 0.9 (min)
$C_v$	= 0.233 (in <sup>2</sup> /min)
$C_v$	= 2.33 (ft <sup>2</sup> /day)

Time (min)	Dial Reading (cc)
0	
0.1	0.139
0.25	0.1396
0.5	0.1403
0.75	0.1405
1	0.1408
1.5	0.141
2	0.1411
2.5	0.1412
3	0.1413
4	0.1414
5	0.1415
9	0.1417
16	0.1419
25	0.1421
36	0.1422
45	0.1423
60	0.1424
90	0.1425
120	0.1426
154	0.1427
215	0.1429
269	0.143



One-Dimensional Consolidation Time-Deformation Relationship

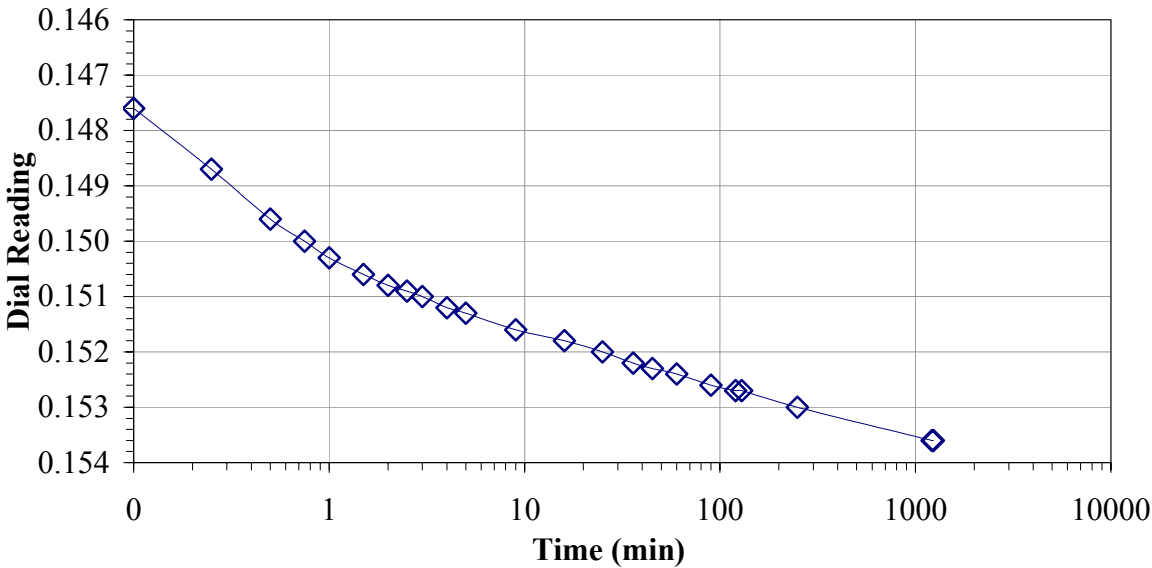
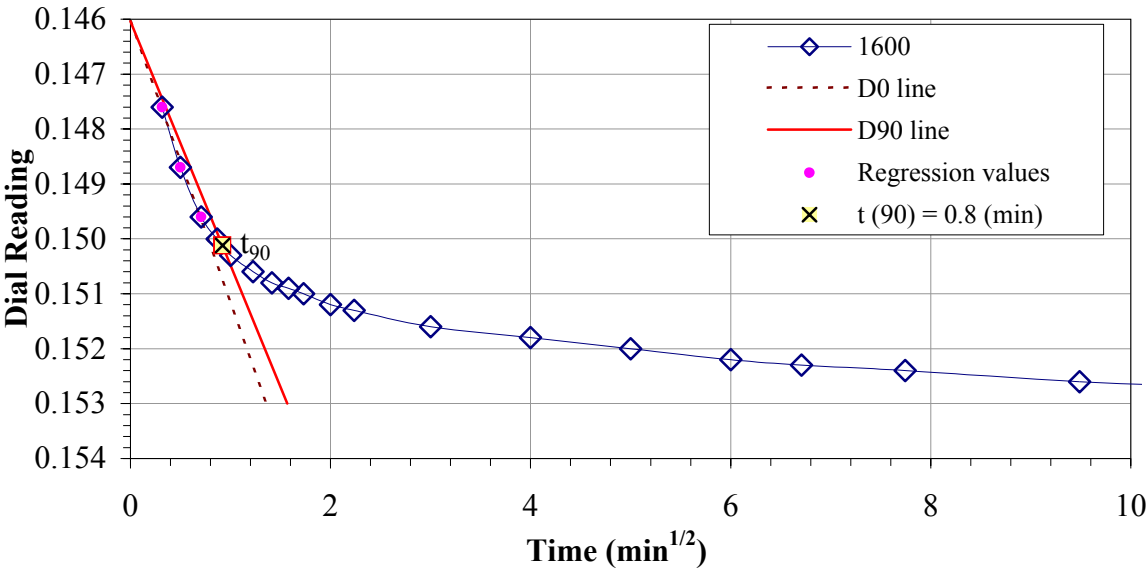
Project: BYU (Dr. Youd)  
Number: M00399-003  
Sample: WLA D-2  
Depth: 22-24.5  
Stress: 1600 (psf)



Time rate consolidation data

Data Summary	
$H_{DR}$	= 0.4906 (in)
Slope of $t_{int}$ line	= 0.0051 (dial/min <sup>1/2</sup> )
Slope of $t_{90}$ line	= 0.00444 (dial/min <sup>1/2</sup> )
$D_0$	= 0.15 (dial)
$D(90)$	= 0.1501 (dial)
$D(100)$	= 0.15057 (dial)
$t(90)$	= 0.8 (min)
$C_v$	= 0.242 (in <sup>2</sup> /min)
$C_v$	= 2.42 (ft <sup>2</sup> /day)

Time (min)	Dial Reading (cc)
0	
0.1	0.1476
0.25	0.1487
0.5	0.1496
0.75	0.15
1	0.1503
1.5	0.1506
2	0.1508
2.5	0.1509
3	0.151
4	0.1512
5	0.1513
9	0.1516
16	0.1518
25	0.152
36	0.1522
45	0.1523
60	0.1524
90	0.1526
120	0.1527
129	0.1527
249	0.153
1215	0.1536
1233	0.1536



One-Dimensional Consolidation Time-Deformation Relationship



Project: BYU (Dr. Youd)

Number: M00399-003

Sample: WLA D-2

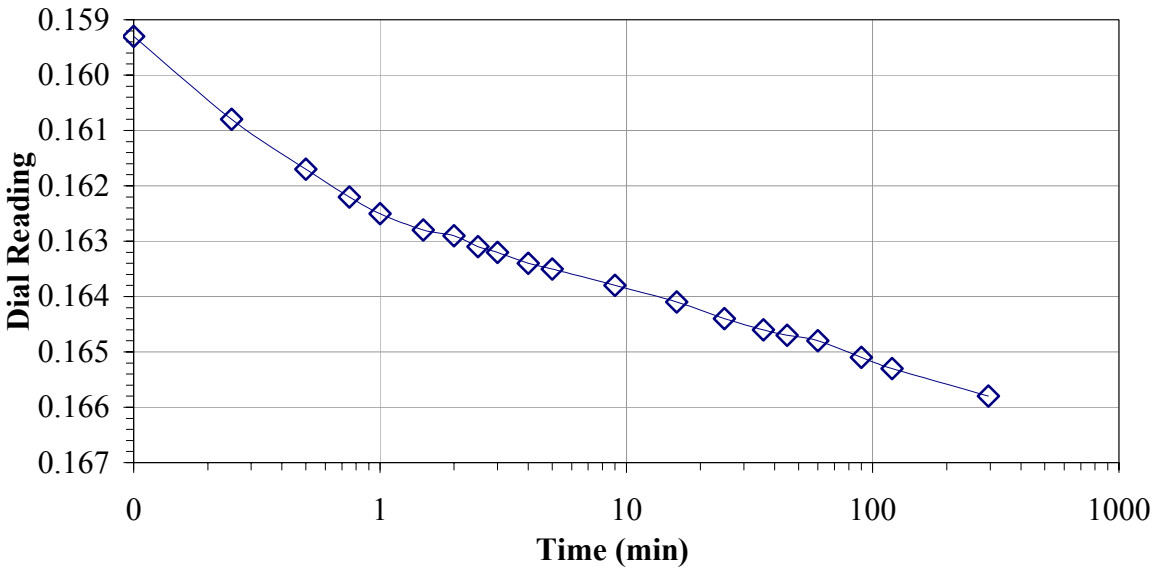
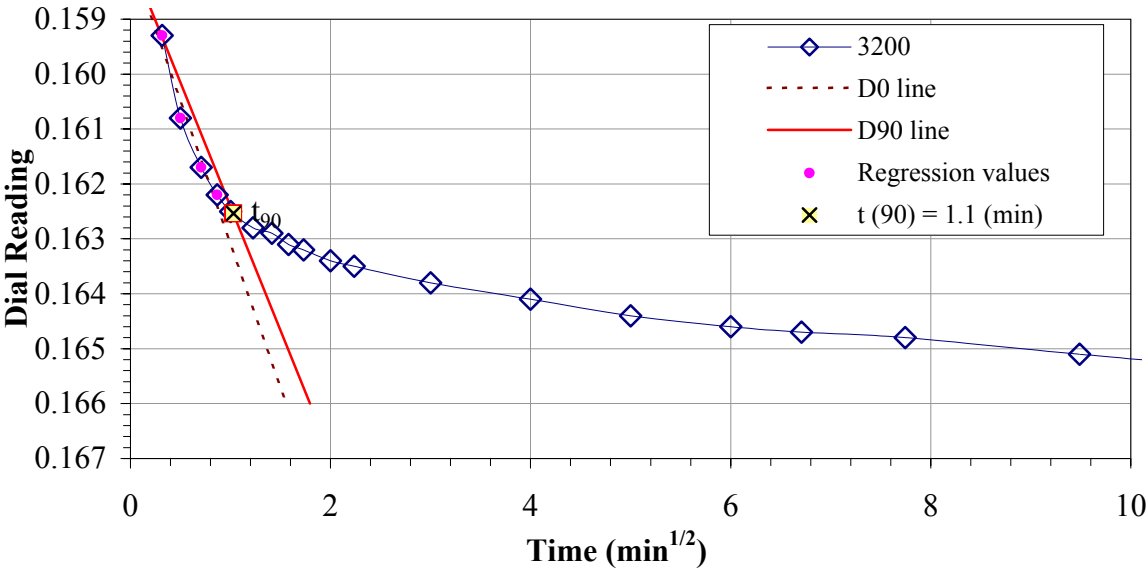
Depth: 22-24.5

Stress: 3200 (psf)

Time rate consolidation data

Data Summary	
$H_{DR}$	= 0.4847 (in)
Slope of $t_{int}$ line	= 0.00519 (dial/min <sup>1/2</sup> )
Slope of $t_{90}$ line	= 0.00451 (dial/min <sup>1/2</sup> )
$D_0$	= 0.16 (dial)
$D(90)$	= 0.1625 (dial)
$D(100)$	= 0.16305 (dial)
$t(90)$	= 1.1 (min)
$C_v$	= 0.189 (in <sup>2</sup> /min)
$C_v$	= 1.89 (ft <sup>2</sup> /day)

Time (min)	Dial Reading (cc)
0	
0.1	0.1593
0.25	0.1608
0.5	0.1617
0.75	0.1622
1	0.1625
1.5	0.1628
2	0.1629
2.5	0.1631
3	0.1632
4	0.1634
5	0.1635
9	0.1638
16	0.1641
25	0.1644
36	0.1646
45	0.1647
60	0.1648
90	0.1651
120	0.1653
295	0.1658



One-Dimensional Consolidation Time-Deformation Relationship

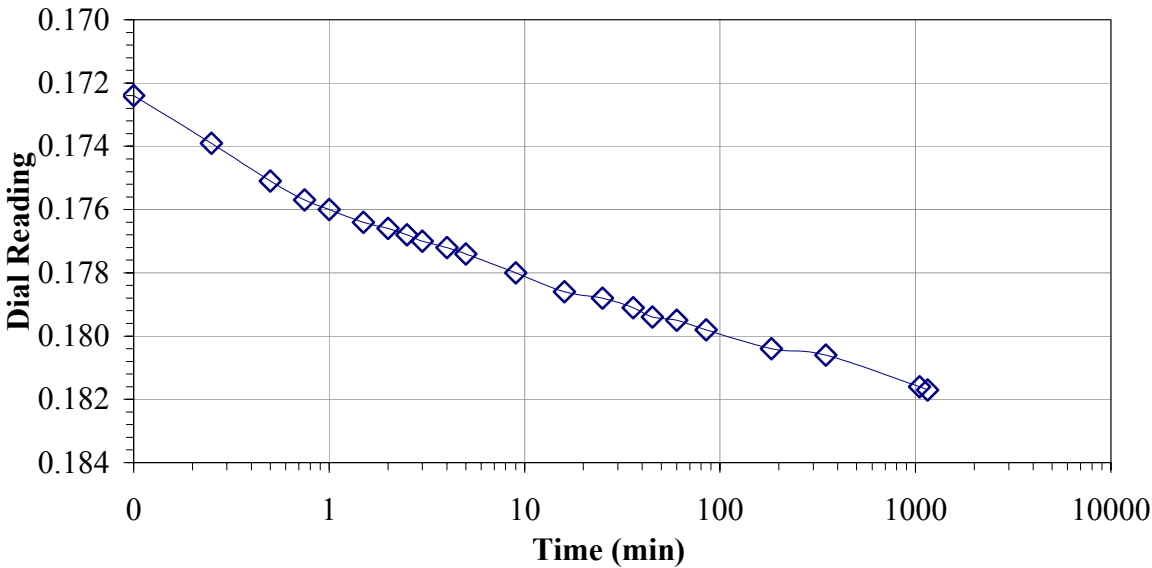
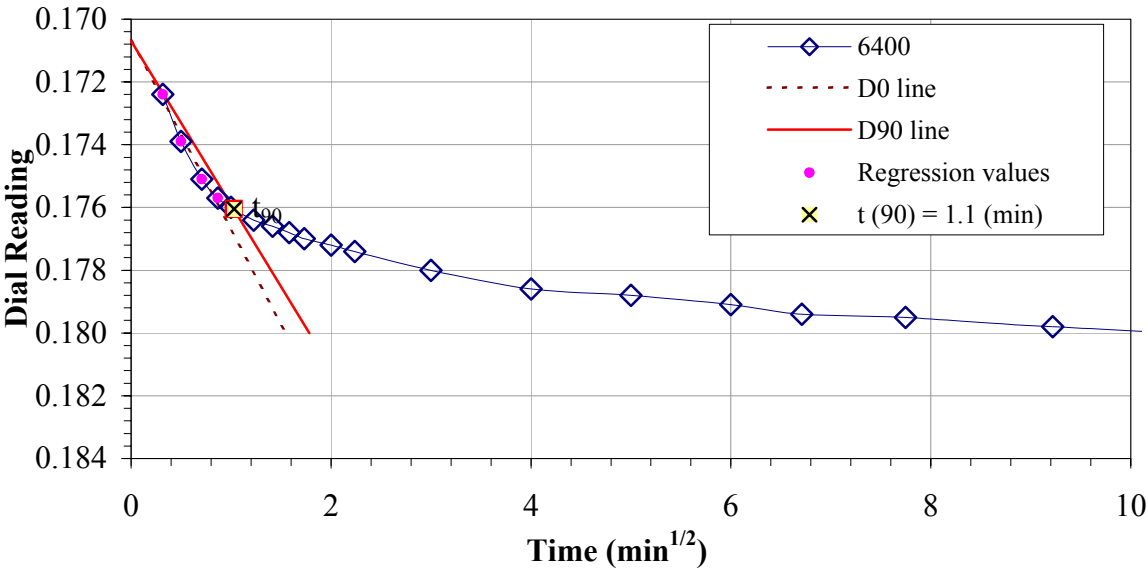
Project: BYU (Dr. Youd)  
Number: M00399-003  
Sample: WLA D-2  
Depth: 22-24.5  
Stress: 6400 (psf)



Time rate consolidation data

Time (min)	Dial Reading (cc)
0	
0.1	0.1724
0.25	0.1739
0.5	0.1751
0.75	0.1757
1	0.176
1.5	0.1764
2	0.1766
2.5	0.1768
3	0.177
4	0.1772
5	0.1774
9	0.178
16	0.1786
25	0.1788
36	0.1791
45	0.1794
60	0.1795
85	0.1798
183	0.1804
348	0.1806
1048	0.1816
1155	0.1817

Data Summary	
$H_{DR}$	= 0.4775 (in)
Slope of $t_{int}$ line	= 0.006 (dial/min <sup>1/2</sup> )
Slope of $t_{90}$ line	= 0.00522 (dial/min <sup>1/2</sup> )
$D_0$	= 0.17 (dial)
$D(90)$	= 0.1760 (dial)
$D(100)$	= 0.17664 (dial)
$t(90)$	= 1.1 (min)
$C_v$	= 0.184 (in <sup>2</sup> /min)
$C_v$	= 1.84 (ft <sup>2</sup> /day)



One-Dimensional Consolidation Time-Deformation Relationship

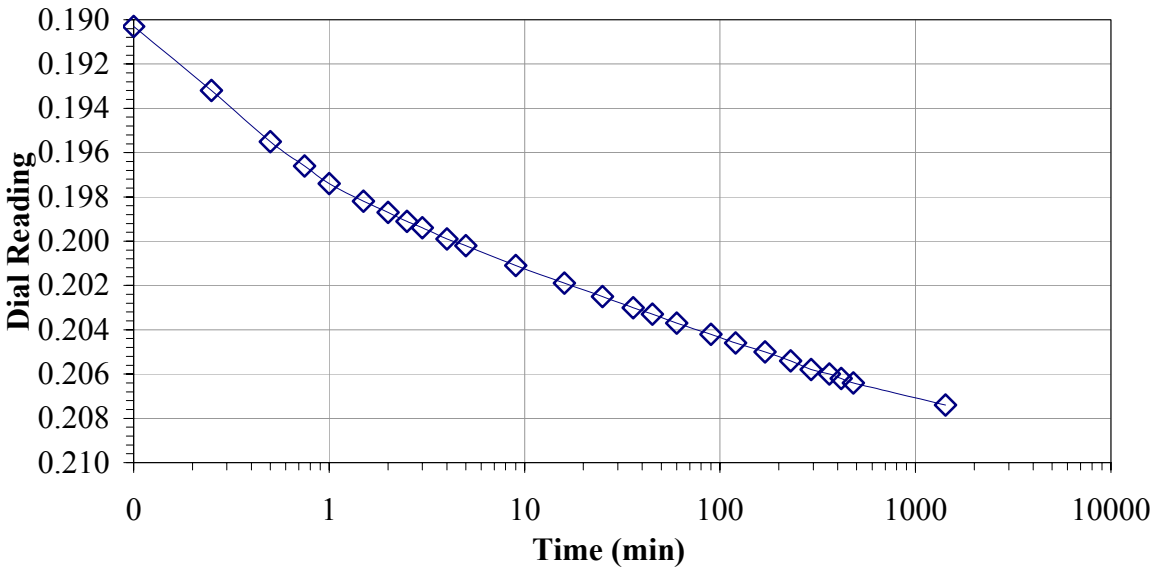
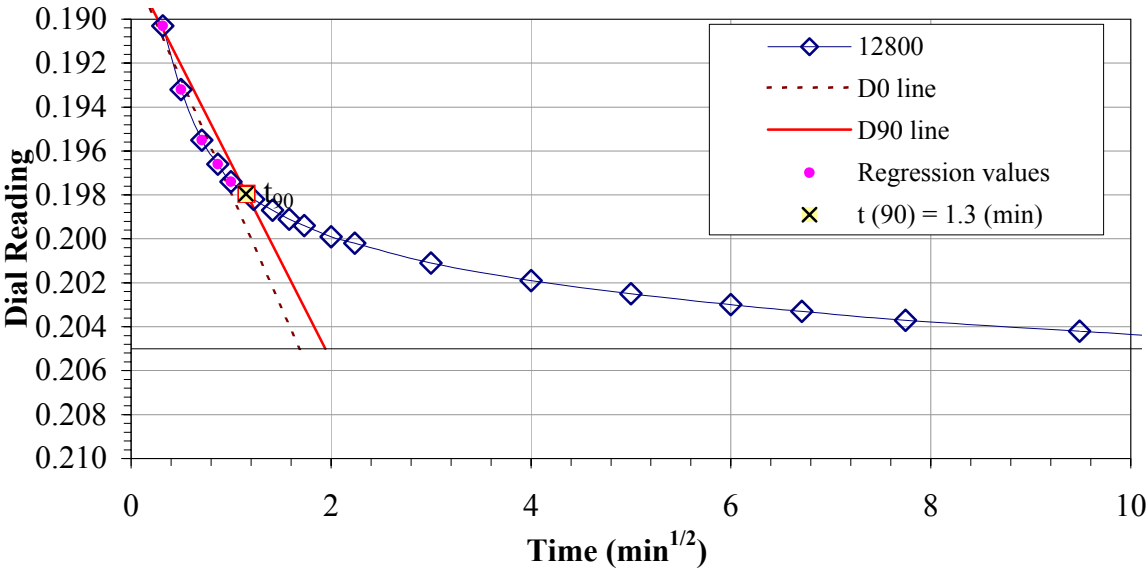


Project: BYU (Dr. Youd)  
Number: M00399-003  
Sample: WLA D-2  
Depth: 22-24.5  
Stress: 12800 (psf)

Time rate consolidation data

Data Summary	
$H_{DR}$	= 0.4673 (in)
Slope of $t_{int}$ line	= 0.01028 (dial/min <sup>1/2</sup> )
Slope of $t_{90}$ line	= 0.00894 (dial/min <sup>1/2</sup> )
$D_0$	= 0.19 (dial)
$D(90)$	= 0.1979 (dial)
$D(100)$	= 0.1991 (dial)
$t(90)$	= 1.3 (min)
$C_v$	= 0.139 (in <sup>2</sup> /min)
$C_v$	= 1.39 (ft <sup>2</sup> /day)

Time (min)	Dial Reading (cc)
0	
0.1	0.1903
0.25	0.1932
0.5	0.1955
0.75	0.1966
1	0.1974
1.5	0.1982
2	0.1987
2.5	0.1991
3	0.1994
4	0.1999
5	0.2002
9	0.2011
16	0.2019
25	0.2025
36	0.203
45	0.2033
60	0.2037
90	0.2042
120	0.2046
170	0.205
230	0.2054
292	0.2058
362	0.206
416	0.2062
480	0.2064
1423	0.2074



One-Dimensional Consolidation Time-Deformation Relationship



Project: BYU (Dr. Youd)

Number: M00399-003

Sample: WLA D-2

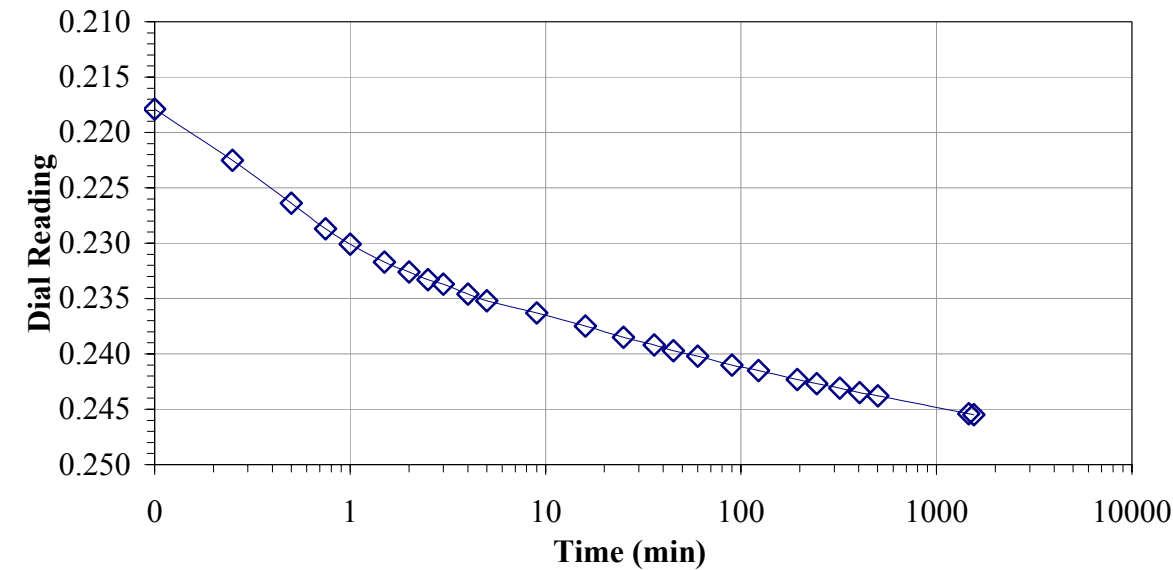
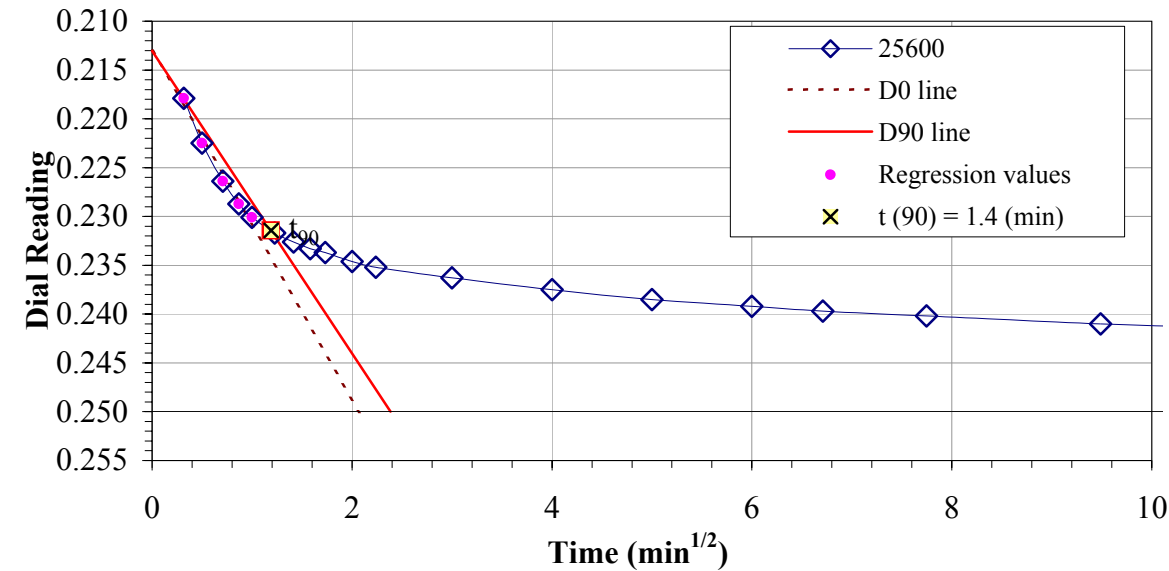
Depth: 22-24.5

Stress: 25600 (psf)

Time rate consolidation data

Data Summary	
$H_{DR}$	= 0.4514 (in)
Slope of $t_{int}$ line	= 0.01783 (dial/min <sup>1/2</sup> )
Slope of $t_{90}$ line	= 0.0155 (dial/min <sup>1/2</sup> )
$D_0$	= 0.21 (dial)
$D(90)$	= 0.2314 (dial)
$D(100)$	= 0.23347 (dial)
$t(90)$	= 1.4 (min)
$C_v$	= 0.123 (in <sup>2</sup> /min)
$C_v$	= 1.23 (ft <sup>2</sup> /day)

Time (min)	Dial Reading (cc)
0	
0.1	0.2179
0.25	0.2225
0.5	0.2264
0.75	0.2287
1	0.2301
1.5	0.2317
2	0.2326
2.5	0.2333
3	0.2337
4	0.2346
5	0.2352
9	0.2363
16	0.2375
25	0.2385
36	0.2392
45	0.2397
60	0.2402
90	0.241
123	0.2415
194	0.2423
244	0.2427
320	0.2431
404	0.2435
502	0.2438
1462	0.2454
1551	0.2455



One-Dimensional Consolidation Time-Deformation Relationship



Project: BYU (Dr. Youd)

Number: M00399-003

Sample: WLA D-2

Depth: 22-24.5

Stress: 51200 (psf)

Time rate consolidation data

Data Summary	
$H_{DR}$	= 0.4309 (in)
Slope of $t_{int}$ line	= 0.01997 (dial/min <sup>1/2</sup> )
Slope of $t_{90}$ line	= 0.01737 (dial/min <sup>1/2</sup> )
$D_0$	= 0.25 (dial)
$D(90)$	= 0.2737 (dial)
$D(100)$	= 0.27609 (dial)
$t(90)$	= 1.6 (min)
$C_v$	= 0.101 (in <sup>2</sup> /min)
$C_v$	= 1.01 (ft <sup>2</sup> /day)

Time (min)	Dial Reading (cc)
0	
0.1	0.2578
0.25	0.2622
0.5	0.2667
0.75	0.2694
1	0.2714
1.5	0.2735
2	0.2748
2.5	0.2758
3	0.2764
4	0.2773
5	0.278
9	0.2795
16	0.2809
25	0.2818
36	0.2826
45	0.283
60	0.2836
90	0.2845
151	0.2855
207	0.2861
271	0.2866
390	0.2872
1277	0.2892
1303	0.2892

