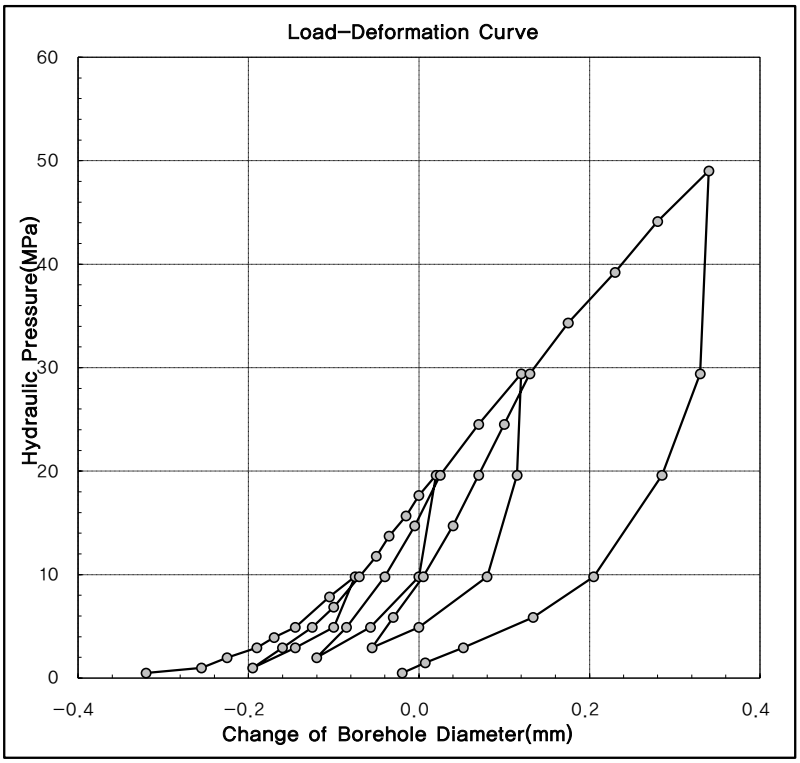
공 내 재 하 시 험

(Goodmanjack Test Sheet)

공 사 명		중앙선(도담~영천)복선전철 제5공구 지반조사						시험일자	2013. 08.
공 번	NTB-3	심도(m)	22.0	TCR/RQD	100/77	시험자	이종현	D =	1.11E+04 (MPa)
지 층	경 암	암 종	셰일			작성자		E =	3.49E+04 (MPa)

Presure (MPa)	LVDT Displacement Reading (mm)		
	Near (mm)	Far (mm)	⊿AVG (mm)
0.49	-0.36	-0.28	-0.320
0.98	-0.29	-0.22	-0.255
1.96	-0.24	-0.21	-0.225
2.94	-0.19	-0.19	-0.190
3.92	-0.16	-0.18	-0.170
4.90	-0.13	-0.16	-0.145
7.85	-0.08	-0.13	-0.105
9.81	-0.04	-0.11	-0.075
4.90	-0.07	-0.13	-0.100
2.94	-0.14	-0.15	-0.145
0.98	-0.23	-0.16	-0.195
2.94	-0.17	-0.15	-0.160
4.90	-0.11	-0.14	-0.125
6.86	-0.08	-0.12	-0.100
9.81	-0.03	-0.11	-0.070
11.77	-0.01	-0.09	-0.050
13.73	0.01	-0.08	-0.035
15.69	0.04	-0.07	-0.015
17.65	0.06	-0.06	0.000
19.61	0.08	-0.04	0.020
9.81	0.05	-0.05	0.000
4.90	-0.03	-0.08	-0.057
1.96	-0.13	-0.11	-0.120
4.90	-0.08	-0.09	-0.085
9.81	-0.01	-0.07	-0.040
14.71	0.04	-0.05	-0.005
19.61	0.08	-0.03	0.025
24.52	0.13	0.01	0.070
29.42	0.19	0.05	0.120
19.61	0.18	0.05	0.115
9.81	0.14	0.02	0.080
4.90	0.02	-0.02	0.000
2.94	-0.05	-0.06	-0.055
5.88	-0.01	-0.05	-0.030
9.81	0.04	-0.03	0.005
14.71	0.08	0.00	0.040
19.61	0.12	0.02	0.070
24.52	0.16	0.04	0.100
29.42	0.20	0.06	0.130
34.32	0.24	0.11	0.175
39.23	0.29	0.17	0.230
44.13	0.34	0.22	0.280
49.03	0.39	0.29	0.340
29.42	0.37	0.29	0.330
19.61	0.31	0.26	0.285
9.81	0.21	0.20	0.205
5.88	0.15	0.12	0.134
2.94	0.07	0.03	0.052
1.47	0.05	-0.03	0.008
0.49	0.01	-0.05	-0.020



Dc (Calculation Deformation Modulus) = 0.86×e×T*×[⊿P/(⊿D/D)]

e : efficiency of jack's hydraulic system = 0.93

[Coeffcient Dependent on Poission's Ratio] = 1.438

Poission's Ratio	0.10	0.20	0.25	0.30	0.33	0.40	0.50
T*	1.519	1.474	1.438	1.397	1.366	1.289	1.151

D : jack operating point = 76.200 (mm)

⊿P = $P_2 - P_1$ 44.13 − 11.77 = 32.361945 (MPa)

⊿D = $D_2 - D_1$ 0.280 − −0.050 = 0.330 (mm)

= 1.0197 (mm/100MPa)

Dc = 8.59E+03 (MPa) = 1.25E+06 (psi)

[* If Dc>1E+06(psi), Use Fallowing Correction Data for Determining E_{true}]

E_{calc}	0	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.9	1.0
1	1.2	1.3	1.5	1.7	1.9	2.1	2.4	2.6	2.9	3.1
2	3.4	3.7	4.0	4.3	4.7	5.1	5.6	6.0	6.5	7.0
3	7.6	8.2	9.0	9.7	10.6	11.5	12.5	13.4	14.3	15.3

Dt (True Deformation Modulus)

= 1.60E+06 (psi) **= 1.11E+04** (MPa)

Ec(Calculation Elastic Modulus)

⊿P = $P_2 - P_1$ = 24.52 − 4.90 = 19.6133 (MPa)

⊿D = $D_2 - D_1$ = 0.100 − 0.000 = 0.1 D_2 (mm)

Ec = 1.72E+04 (MPa) = 2.49E+06 (psi)

* Because Ec>1E+06(psi), Correction data use

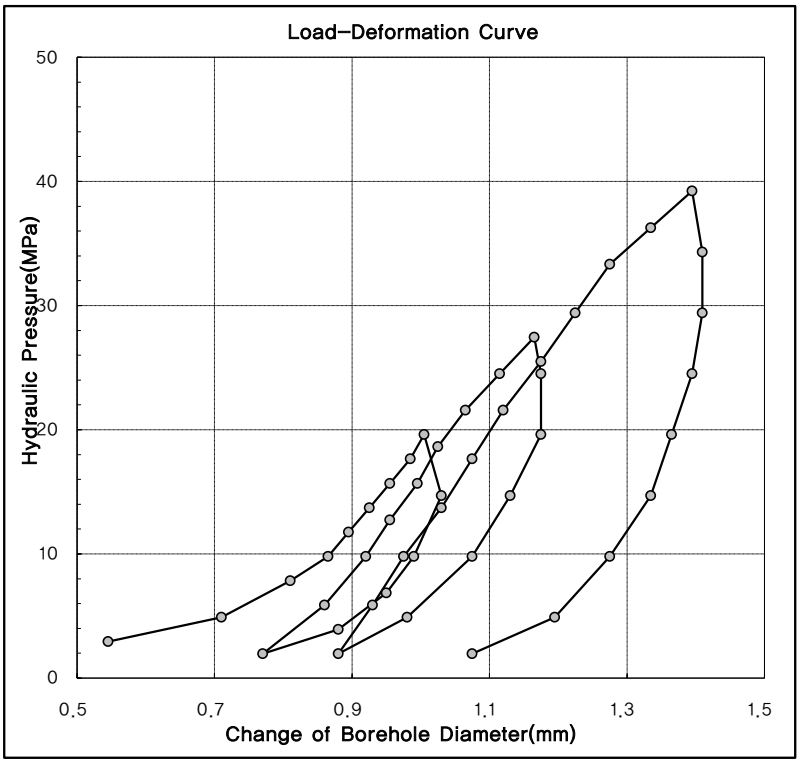
Et = 5.06E+06 (psi) **= 3.49E+04** (MPa)

공 내 재 하 시 험

(Goodmanjack Test Sheet)

공 사 명		중앙선(도담~영천)복선전철 제5공구 지반조사						시험일자	2014. 05.
공 번	NTB-4	심도(m)	12.0	TCR/RQD	100/52	시험자	이종현	D =	**4.86E+03** (MPa)
지 층	경암	암 종	셰일			작성자		E =	**6.88E+03** (MPa)

Presure (MPa)	LVDT Displacement Reading (mm)		
	Near (mm)	Far (mm)	⊿AVG (mm)
2.94	0.43	0.66	0.545
4.90	0.60	0.82	0.710
7.85	0.69	0.93	0.810
9.81	0.76	0.97	0.865
11.77	0.80	0.99	0.895
13.73	0.82	1.03	0.925
15.69	0.84	1.07	0.955
17.65	0.86	1.11	0.985
19.61	0.88	1.13	1.005
14.71	0.90	1.16	1.030
9.81	0.87	1.11	0.990
6.86	0.84	1.06	0.950
3.92	0.76	1.00	0.880
1.96	0.69	0.85	0.770
5.88	0.74	0.98	0.860
9.81	0.80	1.04	0.920
12.75	0.82	1.09	0.955
15.69	0.87	1.12	0.995
18.63	0.91	1.14	1.025
21.57	0.93	1.20	1.065
24.52	0.98	1.25	1.115
27.46	1.03	1.30	1.165
24.52	1.04	1.31	1.175
19.61	1.04	1.31	1.175
14.71	1.00	1.26	1.130
9.81	0.93	1.22	1.075
4.90	0.87	1.09	0.980
1.96	0.76	1.00	0.880
5.88	0.81	1.05	0.930
9.81	0.85	1.10	0.975
13.73	0.90	1.16	1.030
17.65	0.95	1.20	1.075
21.57	0.99	1.25	1.120
25.50	1.05	1.30	1.175
29.42	1.10	1.35	1.225
33.34	1.13	1.42	1.275
36.28	1.19	1.48	1.335
39.23	1.25	1.54	1.395
34.32	1.26	1.56	1.410
29.42	1.26	1.56	1.410
24.52	1.24	1.55	1.395
19.61	1.22	1.51	1.365
14.71	1.19	1.48	1.335
9.81	1.16	1.39	1.275
4.90	1.09	1.30	1.195
1.96	0.99	1.16	1.075



Dc (Calculation Deformation Modulus) = 0.86×e×T*×[⊿P/(⊿D/D)]

e : efficiency of jack's hydraulic system = 0.93

[Coeffcient Dependent on Poission's Ratio] = 1.438

Poission's Ratio	0.10	0.20	0.25	0.30	0.33	0.40	0.50
T*	1.519	1.474	1.438	1.397	1.366	1.289	1.151

D : jack operating point = 76.200 (mm)

⊿P = $P_2 - P_1$ 39.23 − 9.81 = 29.41995 (MPa)

⊿D = $D_2 - D_1$ 1.395 − 0.865 = 0.530 (mm)

= 1.8015 (mm/100MPa)

Dc = 4.86E+03 (MPa) = 7.06E+05 (psi)

[* If Dc>1E+06(psi), Use Fallowing Correction Data for Determining E_{true}]

E_{calc}	0	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.9	1.0
1	1.2	1.3	1.5	1.7	1.9	2.1	2.4	2.6	2.9	3.1
2	3.4	3.7	4.0	4.3	4.7	5.1	5.6	6.0	6.5	7.0
3	7.6	8.2	9.0	9.7	10.6	11.5	12.5	13.4	14.3	15.3

Dt (True Deformation Modulus)

= 7.06E+05 (psi) **= 4.86E+03** (MPa)

Ec(Calculation Elastic Modulus)

⊿P = $P_2 - P_1$ = 29.42 − 9.81 = 19.6133 (MPa)

⊿D = $D_2 - D_1$ = 1.225 − 0.975 = 0.25 D_2 (mm)

Ec = 6.88E+03 (MPa) = 9.97E+05 (psi)

* Because Ec>1E+06(psi), Correction data use

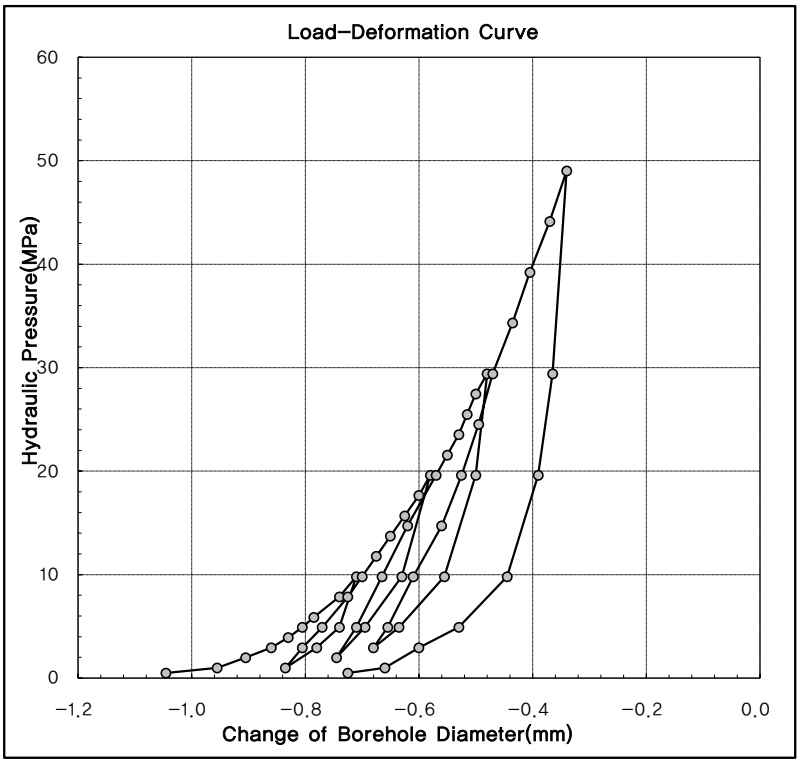
Et = 9.97E+05 (psi) **= 6.88E+03** (MPa)

공 내 재 하 시 험

(Goodmanjack Test Sheet)

공 사 명		중앙선(도담~영천)복선전철 제5공구 지반조사						시험일자	2014. 05.
공 번	NTB-5	심도(m)	10.0	TCR/RQD	100/82	시험자		D =	**1.00E+04** (MPa)
지 층	경 암	암 종	셰일			작성자		E =	**2.07E+04** (MPa)

Presure (MPa)	LVDT Displacement Reading (mm)		
	Near (mm)	Far (mm)	⊿AVG (mm)
0.49	-0.96	-1.13	-1.045
0.98	-0.92	-0.99	-0.955
1.96	-0.89	-0.92	-0.905
2.94	-0.86	-0.86	-0.860
3.92	-0.84	-0.82	-0.830
4.90	-0.82	-0.79	-0.805
5.88	-0.80	-0.77	-0.785
7.85	-0.76	-0.72	-0.740
9.81	-0.75	-0.67	-0.710
4.90	-0.79	-0.69	-0.740
2.94	-0.82	-0.74	-0.780
0.98	-0.87	-0.80	-0.835
2.94	-0.82	-0.79	-0.805
4.90	-0.79	-0.75	-0.770
7.85	-0.76	-0.69	-0.725
9.81	-0.74	-0.66	-0.700
11.77	-0.72	-0.63	-0.675
13.73	-0.70	-0.60	-0.650
15.69	-0.69	-0.56	-0.625
17.65	-0.67	-0.53	-0.600
19.61	-0.66	-0.50	-0.580
9.81	-0.74	-0.52	-0.630
4.90	-0.77	-0.62	-0.695
1.96	-0.77	-0.72	-0.745
4.90	-0.73	-0.69	-0.710
9.81	-0.70	-0.63	-0.665
14.71	-0.69	-0.55	-0.620
19.61	-0.65	-0.49	-0.570
21.57	-0.63	-0.47	-0.550
23.54	-0.62	-0.44	-0.530
25.50	-0.62	-0.41	-0.515
27.46	-0.60	-0.40	-0.500
29.42	-0.59	-0.37	-0.480
19.61	-0.61	-0.39	-0.500
9.81	-0.59	-0.52	-0.555
4.90	-0.64	-0.63	-0.635
2.94	-0.66	-0.70	-0.680
4.90	-0.63	-0.68	-0.655
9.81	-0.63	-0.59	-0.610
14.71	-0.60	-0.52	-0.560
19.61	-0.60	-0.45	-0.525
24.52	-0.59	-0.40	-0.495
29.42	-0.58	-0.36	-0.470
34.32	-0.57	-0.30	-0.435
39.23	-0.55	-0.26	-0.405
44.13	-0.53	-0.21	-0.370
49.03	-0.50	-0.18	-0.340
29.42	-0.52	-0.21	-0.365
19.61	-0.50	-0.28	-0.390
9.81	-0.49	-0.40	-0.445
4.90	-0.52	-0.54	-0.530
2.94	-0.59	-0.61	-0.600
0.98	-0.56	-0.76	-0.660
0.49	-0.57	-0.88	-0.725



Dc (Calculation Deformation Modulus) = 0.86×e×T*×[⊿P/(⊿D/D)]

e : efficiency of jack's hydraulic system = 0.93

[Coeffcient Dependent on Poission's Ratio] = 1.438

Poission's Ratio	0.10	0.20	0.25	0.30	0.33	0.40	0.50
T*	1.519	1.474	1.438	1.397	1.366	1.289	1.151

D : jack operating point = 76.200 (mm)

⊿P = $P_2 - P_1$ 49.03 − 3.92 = 45.11059 (MPa)

⊿D = $D_2 - D_1$ −0.340 − −0.830 = 0.490 (mm)

= 1.0862 (mm/100MPa)

Dc = 8.07E+03 (MPa) = 1.17E+06 (psi)

[* If Dc>1E+06(psi), Use Fallowing Correction Data for Determining E_{true}]

E_{calc}	0	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.9	1.0
1	1.2	1.3	1.5	1.7	1.9	2.1	2.4	2.6	2.9	3.1
2	3.4	3.7	4.0	4.3	4.7	5.1	5.6	6.0	6.5	7.0
3	7.6	8.2	9.0	9.7	10.6	11.5	12.5	13.4	14.3	15.3

Dt (True Deformation Modulus)

= 1.45E+06 (psi) **= 1.00E+04** (MPa)

Ec(Calculation Elastic Modulus)

⊿P = $P_2 - P_1$ = 4.90 − 27.46 = −22.5553 (MPa)

⊿D = $D_2 - D_1$ = −0.655 − −0.500 = −0.155 D_2 (mm)

Ec = 1.28E+04 (MPa) = 1.85E+06 (psi)

* Because Ec>1E+06(psi), Correction data use

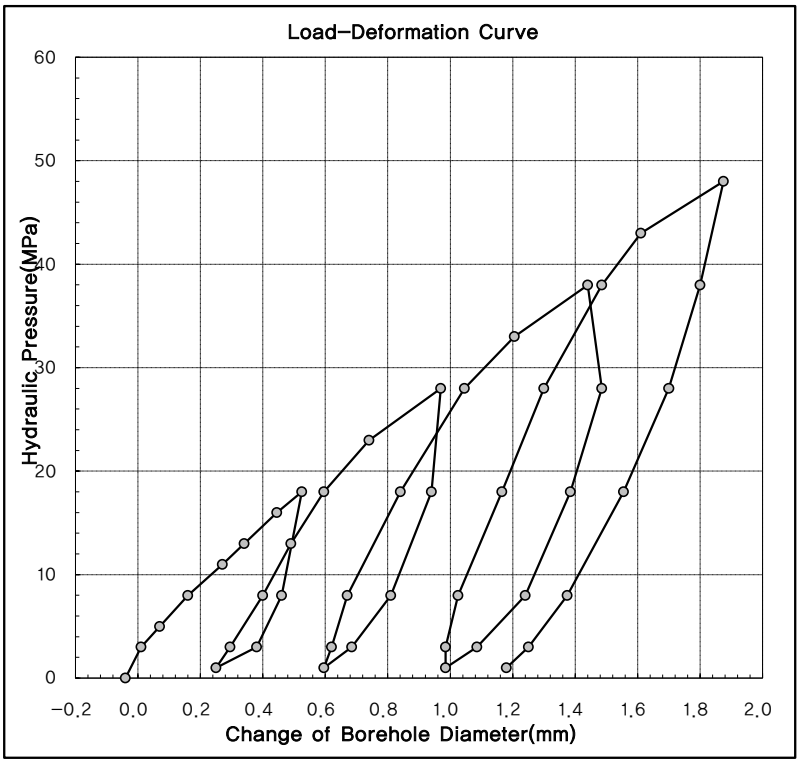
Et = 3.00E+06 (psi) **= 2.07E+04** (MPa)

공 내 재 하 시 험

(Goodmanjack Test Sheet)

공 사 명		중앙선(도담~영천)복선전철 제5공구 지반조사						시험일자	2014. 06. 02
공 번	NTB-16	심도(m)	27.5	TCR/RQD	98/25	시험자	이종현	D =	1.95E+03 (MPa)
지 층	연 암	암 종	셰일			작성자	박상우	E =	3.79E+03 (MPa)

Presure (MPa)	LVDT Displacement Reading (mm)		
	Near (mm)	Far (mm)	⊿AVG (mm)
0.00	-0.15	0.07	-0.040
3.00	-0.10	0.12	0.010
5.00	0.00	0.14	0.070
8.00	0.13	0.19	0.160
11.00	0.27	0.27	0.270
13.00	0.36	0.32	0.340
16.00	0.50	0.39	0.445
18.00	0.62	0.43	0.525
8.00	0.50	0.42	0.460
3.00	0.35	0.41	0.380
1.00	0.12	0.38	0.250
3.00	0.20	0.39	0.295
8.00	0.40	0.40	0.400
13.00	0.55	0.43	0.490
18.00	0.70	0.49	0.595
23.00	0.85	0.63	0.740
28.00	1.16	0.78	0.970
18.00	1.11	0.77	0.940
8.00	0.94	0.68	0.810
3.00	0.78	0.59	0.685
1.00	0.65	0.54	0.595
3.00	0.69	0.55	0.620
8.00	0.78	0.56	0.670
18.00	1.01	0.67	0.840
28.00	1.25	0.84	1.045
33.00	1.43	0.98	1.205
38.00	1.68	1.20	1.440
28.00	1.80	1.17	1.485
18.00	1.70	1.07	1.385
8.00	1.55	0.93	1.240
3.00	1.36	0.81	1.085
1.00	1.22	0.75	0.985
3.00	1.22	0.75	0.985
8.00	1.28	0.77	1.025
18.00	1.40	0.93	1.165
28.00	1.51	1.09	1.300
38.00	1.70	1.27	1.485
43.00	1.80	1.42	1.610
48.00	2.08	1.67	1.875
38.00	2.00	1.60	1.800
28.00	1.90	1.50	1.700
18.00	1.75	1.36	1.555
8.00	1.57	1.18	1.375
3.00	1.44	1.06	1.250
1.00	1.37	0.99	1.180



Dc (Calculation Deformation Modulus) = 0.86×e×T*×[⊿P/(⊿D/D)]

e : efficiency of jack's hydraulic system = 0.93

[Coeffcient Dependent on Poission's Ratio] = 1.438

Poission's Ratio	0.10	0.20	0.25	0.30	0.33	0.40	0.50
T*	1.519	1.474	1.438	1.397	1.366	1.289	1.151

D : jack operating point = 76.200 (mm)

⊿P = $P_2 - P_1$ 48.00 − 18.00 = 30 (MPa)

⊿D = $D_2 - D_1$ 1.875 − 0.525 = 1.350 (mm)

= 4.5000 (mm/100MPa)

Dc = 1.95E+03 (MPa) = 2.82E+05 (psi)

[* If Dc>1E+06(psi), Use Fallowing Correction Data for Determining E_{true}]

E_{calc}	0	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.9	1.0
1	1.2	1.3	1.5	1.7	1.9	2.1	2.4	2.6	2.9	3.1
2	3.4	3.7	4.0	4.3	4.7	5.1	5.6	6.0	6.5	7.0
3	7.6	8.2	9.0	9.7	10.6	11.5	12.5	13.4	14.3	15.3

Dt (True Deformation Modulus)

= 2.82E+05 (psi) **= 1.95E+03** (MPa)

Ec(Calculation Elastic Modulus)

⊿P = $P_2 - P_1$ = 43.00 − 3.00 = 40 (MPa)

⊿D = $D_2 - D_1$ = 1.610 − 0.685 = 0.925 D_2 (mm)

Ec = 3.79E+03 (MPa) = 5.50E+05 (psi)

* Because Ec>1E+06(psi), Correction data use

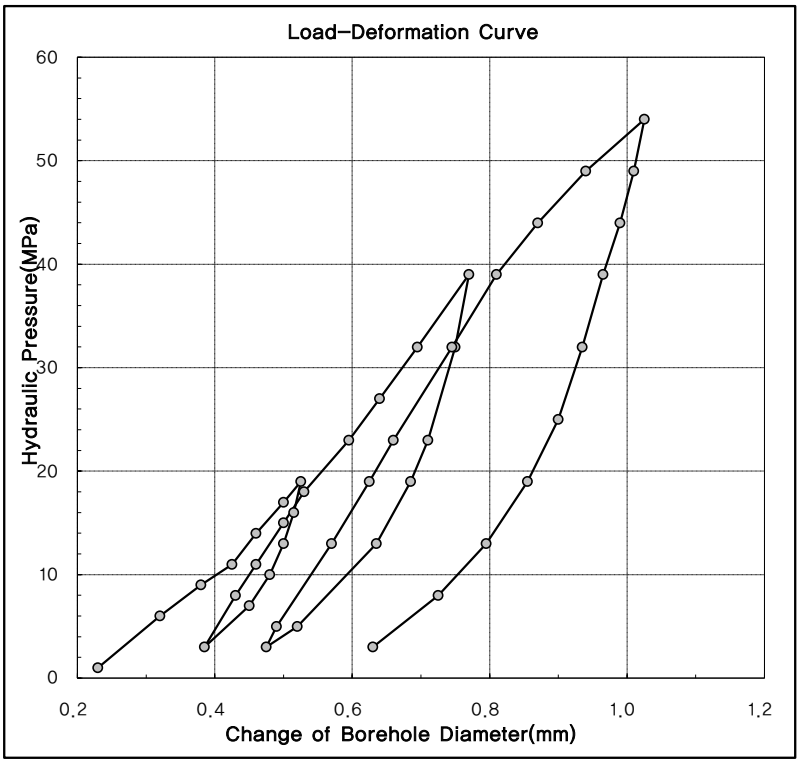
Et = 5.50E+05 (psi) **= 3.79E+03** (MPa)

공 내 재 하 시 험

(Goodmanjack Test Sheet)

공 사 명		중앙선(도담~영천)복선전철 제5공구 지반조사						시험일자	2014. 06. 13
공 번	NTB-24	심도(m)	18.3	TCR/RQD	100/51	시험자	이종현	D =	**6.28E+03** (MPa)
지 층	경암	암 종	셰일			작성자	박상우	E =	**8.23E+03** (MPa)

Presure (MPa)	LVDT Displacement Reading (mm)		
	Near (mm)	Far (mm)	⊿AVG (mm)
1.00	0.22	0.24	0.230
6.00	0.36	0.28	0.320
9.00	0.41	0.35	0.380
11.00	0.42	0.43	0.425
14.00	0.45	0.47	0.460
17.00	0.51	0.49	0.500
19.00	0.55	0.50	0.525
16.00	0.54	0.49	0.515
13.00	0.53	0.47	0.500
10.00	0.51	0.45	0.480
7.00	0.49	0.41	0.450
3.00	0.45	0.32	0.385
8.00	0.47	0.39	0.430
11.00	0.49	0.43	0.460
15.00	0.52	0.48	0.500
18.00	0.54	0.52	0.530
23.00	0.61	0.58	0.595
27.00	0.66	0.62	0.640
32.00	0.70	0.69	0.695
39.00	0.75	0.79	0.770
32.00	0.73	0.77	0.750
23.00	0.72	0.70	0.710
19.00	0.69	0.68	0.685
13.00	0.63	0.64	0.635
5.00	0.57	0.47	0.520
3.00	0.53	0.42	0.475
5.00	0.54	0.44	0.490
13.00	0.58	0.56	0.570
19.00	0.60	0.65	0.625
23.00	0.64	0.68	0.660
32.00	0.70	0.79	0.745
39.00	0.74	0.88	0.810
44.00	0.78	0.96	0.870
49.00	0.89	0.99	0.940
54.00	0.93	1.12	1.025
49.00	0.92	1.10	1.010
44.00	0.90	1.08	0.990
39.00	0.87	1.06	0.965
32.00	0.85	1.02	0.935
25.00	0.83	0.97	0.900
19.00	0.79	0.92	0.855
13.00	0.75	0.84	0.795
8.00	0.73	0.72	0.725
3.00	0.66	0.60	0.630



Dc (Calculation Deformation Modulus) = 0.86×e×T*×[⊿P/(⊿D/D)]

e : efficiency of jack's hydraulic system = 0.93

[Coeffcient Dependent on Poission's Ratio] = 1.438

Poission's Ratio	0.10	0.20	0.25	0.30	0.33	0.40	0.50
T*	1.519	1.474	1.438	1.397	1.366	1.289	1.151

D : jack operating point = 76.200 (mm)

⊿P = $P_2 - P_1$ 54.00 − 11.00 = 43 (MPa)

⊿D = $D_2 - D_1$ 1.025 − 0.425 = 0.600 (mm)

= 1.3953 (mm/100MPa)

Dc = 6.28E+03 (MPa) = 9.11E+05 (psi)

[* If Dc>1E+06(psi), Use Fallowing Correction Data for Determining E_{true}]

E_{calc}	0	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.9	1.0
1	1.2	1.3	1.5	1.7	1.9	2.1	2.4	2.6	2.9	3.1
2	3.4	3.7	4.0	4.3	4.7	5.1	5.6	6.0	6.5	7.0
3	7.6	8.2	9.0	9.7	10.6	11.5	12.5	13.4	14.3	15.3

Dt (True Deformation Modulus)

= 9.11E+05 (psi) **= 6.28E+03** (MPa)

Ec(Calculation Elastic Modulus)

⊿P = $P_2 - P_1$ = 54.00 − 10.00 = 44 (MPa)

⊿D = $D_2 - D_1$ = 1.025 − 0.480 = 0.545 D_2 (mm)

Ec = 7.08E+03 (MPa) = 1.03E+06 (psi)

* Because Ec>1E+06(psi), Correction data use

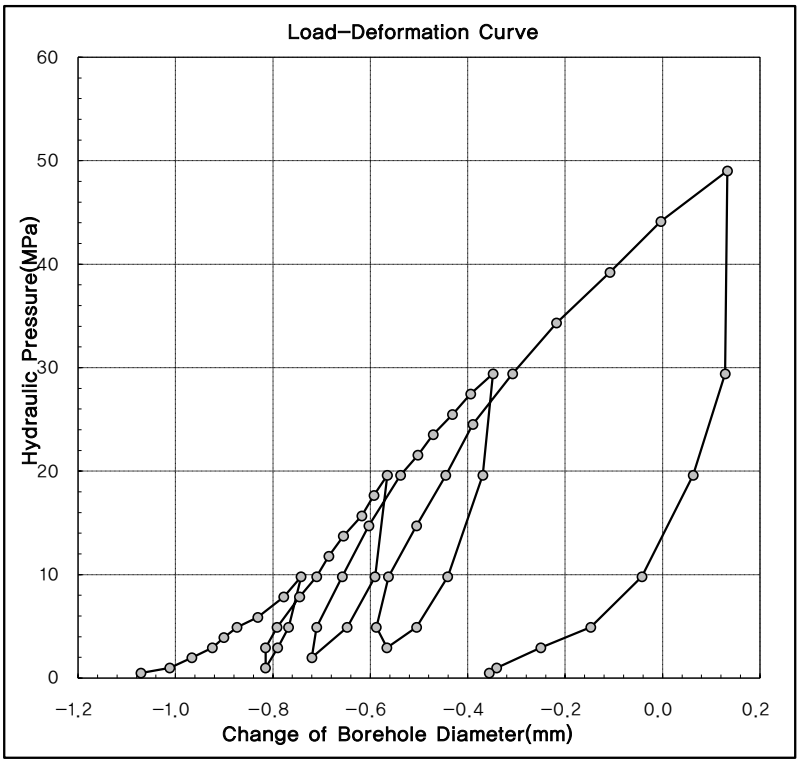
Et = 1.19E+06 (psi) **= 8.23E+03** (MPa)

공 내 재 하 시 험

(Goodmanjack Test Sheet)

공 사 명		중앙선(도담~영천)복선전철 제5공구 지반조사						시험일자	2014. 06.
공 번	NTB-25	심도(m)	15.0	TCR/RQD	100/36	시험자	이종현	D =	**2.39E+03** (MPa)
지 층	연암	암 종	셰일			작성자		E =	**1.45E+04** (MPa)

Presure (MPa)	LVDT Displacement Reading (mm)		
	Near (mm)	Far (mm)	⊿AVG (mm)
0.49	-0.54	-1.60	-1.071
0.98	-0.63	-1.39	-1.012
1.96	-0.63	-1.30	-0.966
2.94	-0.59	-1.26	-0.924
3.92	-0.57	-1.23	-0.900
4.90	-0.55	-1.20	-0.874
5.88	-0.51	-1.16	-0.831
7.85	-0.46	-1.10	-0.778
9.81	-0.41	-1.08	-0.742
4.90	-0.46	-1.08	-0.768
2.94	-0.51	-1.07	-0.790
0.98	-0.56	-1.07	-0.815
2.94	-0.57	-1.07	-0.815
4.90	-0.51	-1.08	-0.791
7.85	-0.45	-1.04	-0.745
9.81	-0.40	-1.02	-0.710
11.77	-0.37	-1.00	-0.685
13.73	-0.34	-0.97	-0.655
15.69	-0.31	-0.93	-0.618
17.65	-0.28	-0.91	-0.593
19.61	-0.25	-0.88	-0.565
9.81	-0.29	-0.89	-0.590
4.90	-0.39	-0.91	-0.648
1.96	-0.50	-0.94	-0.720
4.90	-0.47	-0.95	-0.710
9.81	-0.37	-0.95	-0.658
14.71	-0.30	-0.91	-0.603
19.61	-0.25	-0.83	-0.538
21.57	-0.22	-0.78	-0.502
23.54	-0.20	-0.75	-0.471
25.50	-0.17	-0.70	-0.431
27.46	-0.13	-0.66	-0.394
29.42	-0.10	-0.60	-0.348
19.61	-0.12	-0.62	-0.369
9.81	-0.21	-0.68	-0.441
4.90	-0.31	-0.71	-0.505
2.94	-0.40	-0.73	-0.566
4.90	-0.44	-0.74	-0.588
9.81	-0.32	-0.81	-0.563
14.71	-0.19	-0.82	-0.505
19.61	-0.14	-0.75	-0.445
24.52	-0.12	-0.66	-0.390
29.42	-0.09	-0.53	-0.308
34.32	-0.01	-0.43	-0.218
39.23	0.05	-0.27	-0.108
44.13	0.14	-0.15	-0.004
49.03	0.23	0.04	0.133
29.42	0.22	0.04	0.129
19.61	0.13	0.00	0.063
9.81	-0.01	-0.08	-0.043
4.90	-0.12	-0.18	-0.148
2.94	-0.22	-0.28	-0.250
0.98	-0.36	-0.33	-0.341
0.49	-0.38	-0.33	-0.356



Dc (Calculation Deformation Modulus) = 0.86×e×T*×[⊿P/(⊿D/D)]

e : efficiency of jack's hydraulic system = 0.93

[Coeffcient Dependent on Poission's Ratio] = 1.438

Poission's Ratio	0.10	0.20	0.25	0.30	0.33	0.40	0.50
T*	1.519	1.474	1.438	1.397	1.366	1.289	1.151

D : jack operating point = 76.200 (mm)

⊿P = $P_2 - P_1$ 14.71 − 3.92 = 10.787315 (MPa)

⊿D = $D_2 - D_1$ −0.505 − −0.900 = 0.395 (mm)

= 3.6622 (mm/100MPa)

Dc = 2.39E+03 (MPa) = 3.47E+05 (psi)

[* If Dc>1E+06(psi), Use Fallowing Correction Data for Determining E_{true}]

E_{calc}	0	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.9	1.0
1	1.2	1.3	1.5	1.7	1.9	2.1	2.4	2.6	2.9	3.1
2	3.4	3.7	4.0	4.3	4.7	5.1	5.6	6.0	6.5	7.0
3	7.6	8.2	9.0	9.7	10.6	11.5	12.5	13.4	14.3	15.3

Dt (True Deformation Modulus)

= 3.47E+05 (psi) **= 2.39E+03** (MPa)

Ec(Calculation Elastic Modulus)

⊿P = $P_2 - P_1$ = 4.90 − 27.46 = −22.5553 (MPa)

⊿D = $D_2 - D_1$ = −0.588 − −0.394 = −0.1935 D_2 (mm)

Ec = 1.02E+04 (MPa) = 1.48E+06 (psi)

* Because Ec>1E+06(psi), Correction data use

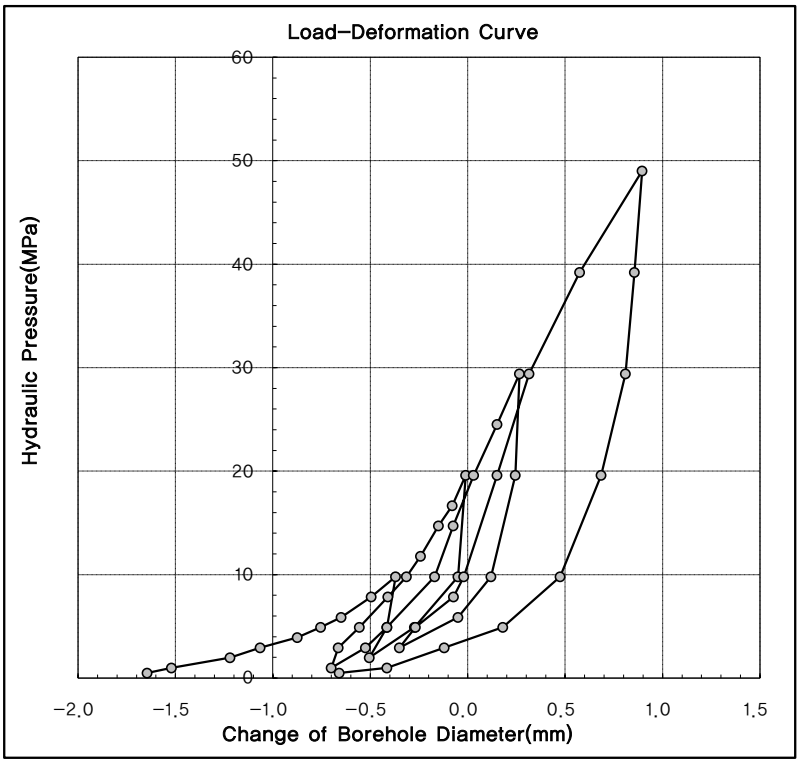
Et = 2.10E+06 (psi) **= 1.45E+04** (MPa)

공 내 재 하 시 험

(Goodmanjack Test Sheet)

공 사 명		중앙선(도담~영천)복선전철 제5공구 지반조사						시험일자	2014. 06.
공 번	NTB-26	심도(m)	7.0	TCR/RQD	100/30	시험자	이종현	D =	**2.23E+03** (MPa)
지 층	연암	암 종	셰일			작성자		E =	**5.65E+03** (MPa)

Presure (MPa)	LVDT Displacement Reading (mm)		
	Near (mm)	Far (mm)	⊿AVG (mm)
0.49	-2.10	-1.19	-1.645
0.98	-2.01	-1.03	-1.520
1.96	-1.88	-0.56	-1.220
2.94	-1.72	-0.41	-1.065
3.92	-1.45	-0.30	-0.875
4.90	-1.27	-0.24	-0.755
5.88	-1.09	-0.21	-0.650
7.85	-0.86	-0.13	-0.495
9.81	-0.68	-0.06	-0.370
4.90	-0.77	-0.06	-0.415
2.94	-0.96	-0.09	-0.524
0.98	-1.28	-0.12	-0.700
2.94	-1.22	-0.11	-0.664
4.90	-1.03	-0.08	-0.555
7.85	-0.77	-0.05	-0.409
9.81	-0.63	0.00	-0.315
11.77	-0.51	0.03	-0.242
14.71	-0.37	0.07	-0.150
16.67	-0.27	0.11	-0.080
19.61	-0.17	0.15	-0.010
9.81	-0.25	0.15	-0.050
4.90	-0.64	0.09	-0.273
1.96	-1.07	0.06	-0.505
4.90	-0.91	0.08	-0.415
9.81	-0.46	0.12	-0.170
14.71	-0.29	0.14	-0.075
19.61	-0.13	0.19	0.030
24.52	0.03	0.27	0.150
29.42	0.17	0.36	0.265
19.61	0.12	0.37	0.245
9.81	-0.07	0.31	0.120
5.88	-0.35	0.25	-0.050
2.94	-0.92	0.22	-0.350
4.90	-0.77	0.23	-0.269
7.85	-0.40	0.26	-0.072
9.81	-0.36	0.32	-0.020
19.61	-0.02	0.32	0.150
29.42	0.22	0.41	0.315
39.23	0.53	0.62	0.575
49.03	0.88	0.91	0.895
39.23	0.81	0.90	0.856
29.42	0.72	0.90	0.810
19.61	0.54	0.83	0.685
9.81	0.26	0.69	0.475
4.90	-0.18	0.54	0.180
2.94	-0.72	0.48	-0.120
0.98	-1.26	0.43	-0.415
0.49	-1.73	0.41	-0.660



Dc (Calculation Deformation Modulus) = 0.86×e×T*×[⊿P/(⊿D/D)]

e : efficiency of jack's hydraulic system = 0.93

[Coeffcient Dependent on Poission's Ratio] = 1.438

Poission's Ratio	0.10	0.20	0.25	0.30	0.33	0.40	0.50
T*	1.519	1.474	1.438	1.397	1.366	1.289	1.151

D : jack operating point = 76.200 (mm)

⊿P = $P_2 - P_1$ 49.03 − 3.92 = 45.11059 (MPa)

⊿D = $D_2 - D_1$ 0.895 − −0.875 = 1.770 (mm)

= 3.9237 (mm/100MPa)

Dc = 2.23E+03 (MPa) = 3.24E+05 (psi)

[* If Dc>1E+06(psi), Use Fallowing Correction Data for Determining E_{true}]

E_{calc}	0	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.9	1.0
1	1.2	1.3	1.5	1.7	1.9	2.1	2.4	2.6	2.9	3.1
2	3.4	3.7	4.0	4.3	4.7	5.1	5.6	6.0	6.5	7.0
3	7.6	8.2	9.0	9.7	10.6	11.5	12.5	13.4	14.3	15.3

Dt (True Deformation Modulus)

= 3.24E+05 (psi) **= 2.23E+03** (MPa)

Ec(Calculation Elastic Modulus)

⊿P = $P_2 - P_1$ = 29.42 − 5.88 = 23.53596 (MPa)

⊿D = $D_2 - D_1$ = 0.315 − −0.050 = 0.365 D_2 (mm)

Ec = 5.65E+03 (MPa) = 8.20E+05 (psi)

* Because Ec>1E+06(psi), Correction data use

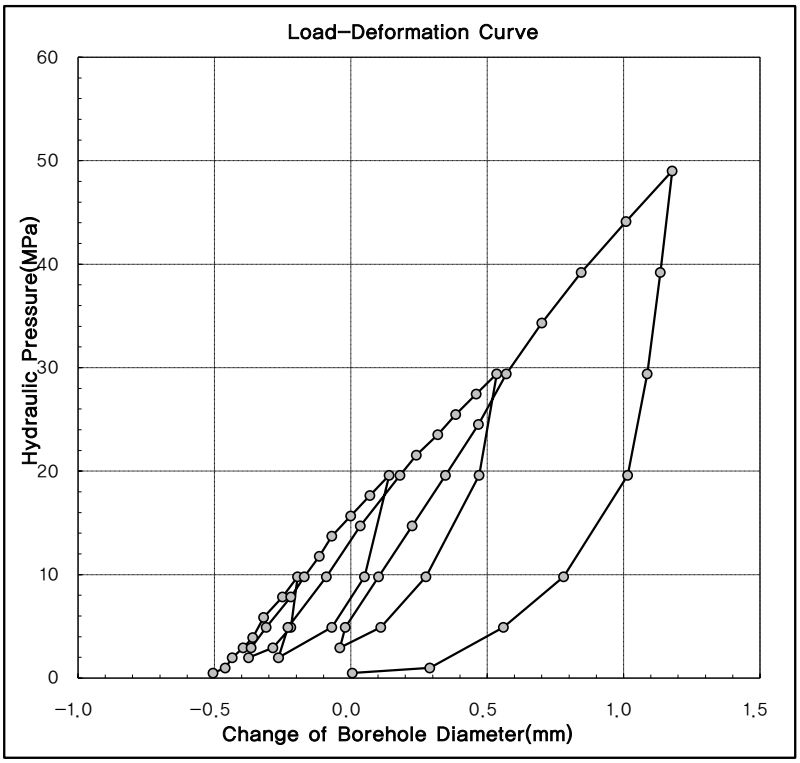
Et = 8.20E+05 (psi) **= 5.65E+03** (MPa)

공 내 재 하 시 험

(Goodmanjack Test Sheet)

공 사 명		중앙선(도담~영천)복선전철 제5공구 지반조사						시험일자	2014. 06.
공 번	NTB-27	심도(m)	11.0	TCR/RQD	100/32	시험자	이종현	D =	**1.94E+03** (MPa)
지 층	연암	암 종	셰일			작성자		E =	**3.97E+03** (MPa)

Presure (MPa)	LVDT Displacement Reading (mm)		
	Near (mm)	Far (mm)	⊿AVG (mm)
0.49	-0.30	-0.71	-0.505
0.98	-0.27	-0.65	-0.460
1.96	-0.26	-0.61	-0.435
2.94	-0.26	-0.53	-0.395
3.92	-0.25	-0.47	-0.360
5.88	-0.25	-0.39	-0.320
7.85	-0.24	-0.26	-0.250
9.81	-0.24	-0.15	-0.195
4.90	-0.24	-0.20	-0.220
2.94	-0.24	-0.33	-0.285
1.96	-0.24	-0.51	-0.375
2.94	-0.24	-0.49	-0.365
4.90	-0.24	-0.38	-0.310
7.85	-0.24	-0.20	-0.220
9.81	-0.24	-0.10	-0.170
11.77	-0.23	0.00	-0.115
13.73	-0.23	0.09	-0.070
15.69	-0.23	0.23	0.000
17.65	-0.23	0.37	0.070
19.61	-0.23	0.51	0.140
9.81	-0.23	0.33	0.050
4.90	-0.23	0.09	-0.070
1.96	-0.23	-0.30	-0.265
4.90	-0.23	-0.23	-0.230
9.81	-0.23	0.05	-0.090
14.71	-0.23	0.30	0.035
19.61	-0.23	0.59	0.180
21.57	-0.23	0.71	0.240
23.54	-0.23	0.87	0.319
25.50	-0.23	1.00	0.385
27.46	-0.23	1.15	0.460
29.42	-0.23	1.30	0.535
19.61	-0.23	1.17	0.470
9.81	-0.23	0.78	0.275
4.90	-0.23	0.45	0.110
2.94	-0.23	0.15	-0.040
4.90	-0.23	0.19	-0.020
9.81	-0.24	0.44	0.102
14.71	-0.23	0.68	0.225
19.61	-0.24	0.93	0.348
24.52	-0.23	1.17	0.468
29.42	-0.23	1.37	0.570
34.32	-0.23	1.63	0.700
39.23	-0.23	1.92	0.845
44.13	-0.23	2.25	1.009
49.03	-0.23	2.59	1.178
39.23	-0.23	2.50	1.135
29.42	-0.23	2.40	1.087
19.61	-0.22	2.25	1.015
9.81	-0.22	1.78	0.780
4.90	-0.22	1.34	0.560
0.98	-0.22	0.80	0.290
0.49	-0.21	0.22	0.005



Dc (Calculation Deformation Modulus) = 0.86×e×T*×[⊿P/(⊿D/D)]

e : efficiency of jack's hydraulic system = 0.93

[Coeffcient Dependent on Poission's Ratio] = 1.438

Poission's Ratio	0.10	0.20	0.25	0.30	0.33	0.40	0.50
T*	1.519	1.474	1.438	1.397	1.366	1.289	1.151

D : jack operating point = 76.200 (mm)

⊿P = $P_2 - P_1$ 19.61 − 3.92 = 15.69064 (MPa)

⊿D = $D_2 - D_1$ 0.348 − −0.360 = 0.708 (mm)

= 4.5091 (mm/100MPa)

Dc = 1.94E+03 (MPa) = 2.82E+05 (psi)

[* If Dc>1E+06(psi), Use Fallowing Correction Data for Determining E_{true}]

E_{calc}	0	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.9	1.0
1	1.2	1.3	1.5	1.7	1.9	2.1	2.4	2.6	2.9	3.1
2	3.4	3.7	4.0	4.3	4.7	5.1	5.6	6.0	6.5	7.0
3	7.6	8.2	9.0	9.7	10.6	11.5	12.5	13.4	14.3	15.3

Dt (True Deformation Modulus)

= 2.82E+05 (psi) **= 1.94E+03** (MPa)

Ec(Calculation Elastic Modulus)

⊿P = $P_2 - P_1$ = 9.81 − 29.42 = −19.6133 (MPa)

⊿D = $D_2 - D_1$ = 0.102 − 0.535 = −0.4335 D_2 (mm)

Ec = 3.97E+03 (MPa) = 5.75E+05 (psi)

* Because Ec>1E+06(psi), Correction data use

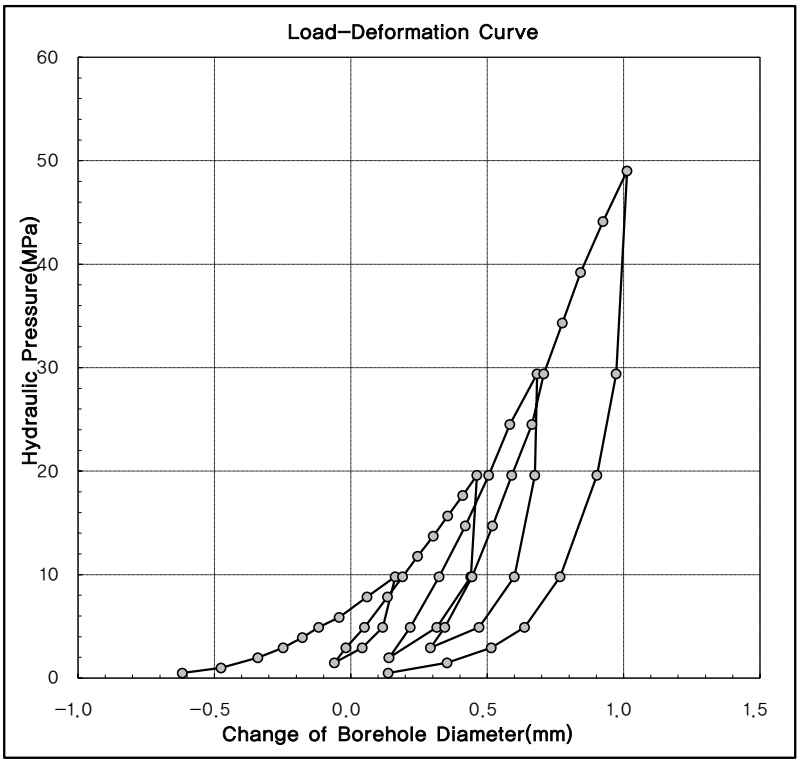
Et = 5.75E+05 (psi) **= 3.97E+03** (MPa)

공 내 재 하 시 험

(Goodmanjack Test Sheet)

공 사 명		중앙선(도담~영천)복선전철 제5공구 지반조사						시험일자	2014. 06.
공 번	NTB-29	심도(m)	31.0	TCR/RQD	100/41	시험자	이종현	D =	**2.52E+03** (MPa)
지 층	연암	암 종	셰일			작성자		E =	**8.38E+03** (MPa)

Presure (MPa)	LVDT Displacement Reading (mm)		
	Near (mm)	Far (mm)	⊿AVG (mm)
0.49	-0.52	-0.72	-0.618
0.98	-0.44	-0.51	-0.475
1.96	-0.40	-0.28	-0.340
2.94	-0.37	-0.13	-0.248
3.92	-0.34	-0.02	-0.178
4.90	-0.31	0.07	-0.118
5.88	-0.26	0.17	-0.043
7.85	-0.20	0.32	0.060
9.81	-0.13	0.45	0.163
4.90	-0.14	0.37	0.118
2.94	-0.17	0.25	0.043
1.47	-0.22	0.10	-0.060
2.94	-0.21	0.17	-0.018
4.90	-0.18	0.28	0.050
7.85	-0.14	0.41	0.135
9.81	-0.10	0.48	0.190
11.77	-0.05	0.54	0.245
13.73	-0.02	0.62	0.303
15.69	0.03	0.68	0.355
17.65	0.08	0.74	0.410
19.61	0.13	0.80	0.463
9.81	0.11	0.77	0.440
4.90	0.02	0.61	0.315
1.96	-0.06	0.34	0.140
4.90	-0.05	0.48	0.218
9.81	-0.01	0.66	0.324
14.71	0.09	0.76	0.420
19.61	0.15	0.86	0.505
24.52	0.22	0.95	0.583
29.42	0.30	1.07	0.683
19.61	0.29	1.06	0.675
9.81	0.21	0.99	0.600
4.90	0.11	0.83	0.470
2.94	0.00	0.58	0.293
4.90	0.01	0.68	0.345
9.81	0.06	0.83	0.445
14.71	0.09	0.95	0.520
19.61	0.19	0.99	0.590
24.52	0.31	1.02	0.664
29.42	0.31	1.11	0.708
34.32	0.37	1.18	0.775
39.23	0.44	1.25	0.843
44.13	0.48	1.37	0.925
49.03	0.55	1.48	1.013
29.42	0.49	1.46	0.973
19.61	0.42	1.39	0.903
9.81	0.30	1.24	0.768
4.90	0.18	1.10	0.638
2.94	0.11	0.92	0.515
1.47	0.04	0.67	0.353
0.49	-0.06	0.33	0.138



Dc (Calculation Deformation Modulus) = 0.86×e×T*×[⊿P/(⊿D/D)]

e : efficiency of jack's hydraulic system = 0.93

[Coeffcient Dependent on Poission's Ratio] = 1.438

Poission's Ratio	0.10	0.20	0.25	0.30	0.33	0.40	0.50
T*	1.519	1.474	1.438	1.397	1.366	1.289	1.151

D : jack operating point = 76.200 (mm)

⊿P = $P_2 - P_1$ 29.42 − 3.92 = 25.49729 (MPa)

⊿D = $D_2 - D_1$ 0.708 − (−0.178) = 0.885 (mm)

= 3.4710 (mm/100MPa)

Dc = 2.52E+03 (MPa) = 3.66E+05 (psi)

[* If Dc>1E+06(psi), Use Fallowing Correction Data for Determining E_{true}]

E_{calc}	0	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.9	1.0
1	1.2	1.3	1.5	1.7	1.9	2.1	2.4	2.6	2.9	3.1
2	3.4	3.7	4.0	4.3	4.7	5.1	5.6	6.0	6.5	7.0
3	7.6	8.2	9.0	9.7	10.6	11.5	12.5	13.4	14.3	15.3

Dt (True Deformation Modulus)

= 3.66E+05 (psi) **= 2.52E+03** (MPa)

Ec(Calculation Elastic Modulus)

⊿P = $P_2 - P_1$ = 19.61 − 9.81 = 9.80665 (MPa)

⊿D = $D_2 - D_1$ = 0.590 − 0.470 = 0.12 D_2 (mm)

Ec = 7.16E+03 (MPa) = 1.04E+06 (psi)

* Because Ec>1E+06(psi), Correction data use

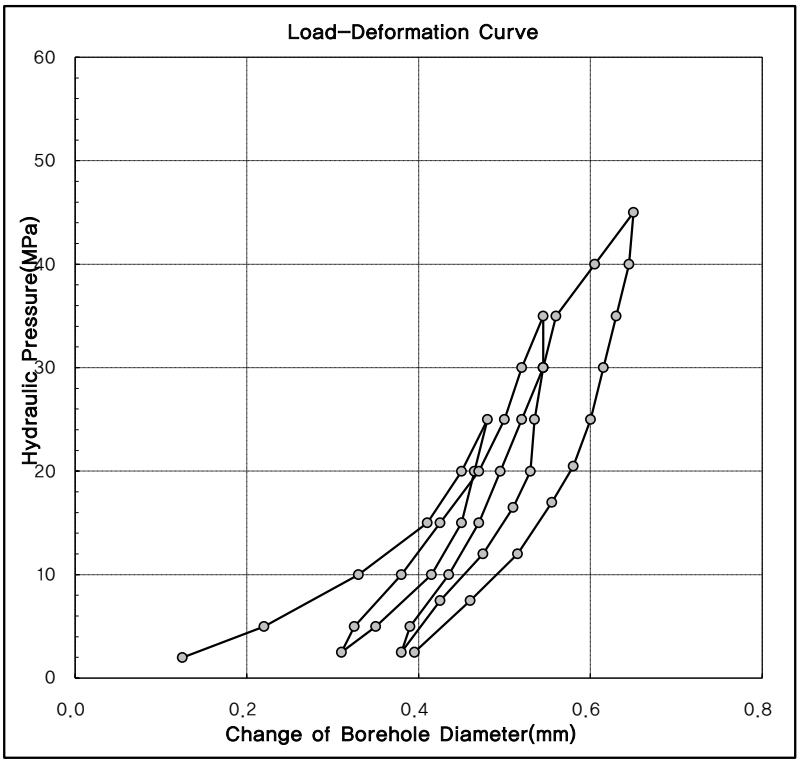
Et = 1.21E+06 (psi) **= 8.38E+03** (MPa)

공 내 재 하 시 험

(Goodmanjack Test Sheet)

공 사 명		중앙선(도담~영천)복선전철 제5공구 지반조사						시험일자	2014. 06. 07
공 번	NTB-31	심도(m)	15.5	TCR/RQD	100/100	시험자	이종현	D =	**1.31E+04** (MPa)
지 층	경암	암 종	셰일			작성자	박상우	E =	**2.59E+04** (MPa)

Presure (MPa)	LVDT Displacement Reading (mm)		
	Near (mm)	Far (mm)	⊿AVG (mm)
2.00	0.11	0.14	0.125
5.00	0.21	0.23	0.220
10.00	0.32	0.34	0.330
15.00	0.40	0.42	0.410
20.00	0.45	0.45	0.450
25.00	0.47	0.49	0.480
20.00	0.46	0.47	0.465
15.00	0.44	0.46	0.450
10.00	0.40	0.43	0.415
5.00	0.35	0.35	0.350
2.50	0.30	0.32	0.310
5.00	0.32	0.33	0.325
10.00	0.37	0.39	0.380
15.00	0.42	0.43	0.425
20.00	0.46	0.48	0.470
25.00	0.49	0.51	0.500
30.00	0.52	0.52	0.520
35.00	0.54	0.55	0.545
30.00	0.54	0.55	0.545
25.00	0.53	0.54	0.535
20.00	0.53	0.53	0.530
16.50	0.51	0.51	0.510
12.00	0.47	0.48	0.475
7.50	0.42	0.43	0.425
2.50	0.38	0.38	0.380
5.00	0.39	0.39	0.390
10.00	0.43	0.44	0.435
15.00	0.46	0.48	0.470
20.00	0.49	0.50	0.495
25.00	0.51	0.53	0.520
30.00	0.54	0.55	0.545
35.00	0.55	0.57	0.560
40.00	0.60	0.61	0.605
45.00	0.64	0.66	0.650
40.00	0.34	0.95	0.645
35.00	0.62	0.64	0.630
30.00	0.61	0.62	0.615
25.00	0.59	0.61	0.600
20.50	0.57	0.59	0.580
17.00	0.55	0.56	0.555
12.00	0.51	0.52	0.515
7.50	0.45	0.47	0.460
2.50	0.39	0.40	0.395



Dc (Calculation Deformation Modulus) = 0.86×e×T*×[⊿P/(⊿D/D)]

e : efficiency of jack's hydraulic system = 0.93

[Coeffcient Dependent on Poission's Ratio] = 1.438

Poission's Ratio	0.10	0.20	0.25	0.30	0.33	0.40	0.50
T*	1.519	1.474	1.438	1.397	1.366	1.289	1.151

D : jack operating point = 76.200 (mm)

⊿P = $P_2 - P_1$ 45.00 − 10.00 = 35 (MPa)

⊿D = $D_2 - D_1$ 0.650 − 0.330 = 0.320 (mm)

= 0.9143 (mm/100MPa)

Dc = 9.59E+03 (MPa) = 1.39E+06 (psi)

[* If Dc>1E+06(psi), Use Fallowing Correction Data for Determining E_{true}]

E_{calc}	0	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.9	1.0
1	1.2	1.3	1.5	1.7	1.9	2.1	2.4	2.6	2.9	3.1
2	3.4	3.7	4.0	4.3	4.7	5.1	5.6	6.0	6.5	7.0
3	7.6	8.2	9.0	9.7	10.6	11.5	12.5	13.4	14.3	15.3

Dt (True Deformation Modulus)

= 1.90E+06 (psi) **= 1.31E+04** (MPa)

Ec(Calculation Elastic Modulus)

⊿P = $P_2 - P_1$ = 45.00 − 7.50 = 37.5 (MPa)

⊿D = $D_2 - D_1$ = 0.650 − 0.425 = 0.225 D_2 (mm)

Ec = 1.46E+04 (MPa) = 2.12E+06 (psi)

* Because Ec>1E+06(psi), Correction data use

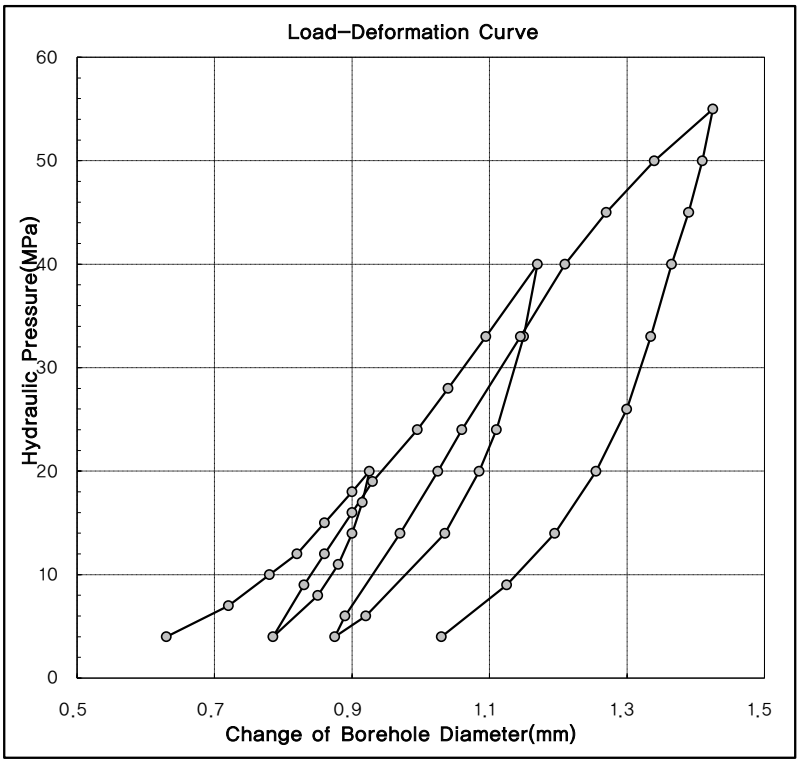
Et = 3.76E+06 (psi) **= 2.59E+04** (MPa)

공 내 재 하 시 험

(Goodmanjack Test Sheet)

공 사 명		중앙선(도담~영천)복선전철 제5공구 지반조사						시험일자	2014. 06. 20
공 번	NTB-44	심도(m)	12.5	TCR/RQD	100/46	시험자	이종현	D =	**6.23E+03** (MPa)
지 층	연 암	암 종	셰일			작성자	박상우	E =	**8.38E+03** (MPa)

Presure (MPa)	LVDT Displacement Reading (mm)		
	Near (mm)	Far (mm)	⊿AVG (mm)
4.00	0.62	0.64	0.630
7.00	0.76	0.68	0.720
10.00	0.81	0.75	0.780
12.00	0.82	0.82	0.820
15.00	0.85	0.87	0.860
18.00	0.91	0.89	0.900
20.00	0.95	0.90	0.925
17.00	0.94	0.89	0.915
14.00	0.93	0.87	0.900
11.00	0.91	0.85	0.880
8.00	0.89	0.81	0.850
4.00	0.85	0.72	0.785
9.00	0.87	0.79	0.830
12.00	0.89	0.83	0.860
16.00	0.92	0.88	0.900
19.00	0.94	0.92	0.930
24.00	1.01	0.98	0.995
28.00	1.06	1.02	1.040
33.00	1.10	1.09	1.095
40.00	1.15	1.19	1.170
33.00	1.13	1.17	1.150
24.00	1.12	1.10	1.110
20.00	1.09	1.08	1.085
14.00	1.03	1.04	1.035
6.00	0.97	0.87	0.920
4.00	0.93	0.82	0.875
6.00	0.94	0.84	0.890
14.00	0.98	0.96	0.970
20.00	1.00	1.05	1.025
24.00	1.04	1.08	1.060
33.00	1.10	1.19	1.145
40.00	1.14	1.28	1.210
45.00	1.18	1.36	1.270
50.00	1.29	1.39	1.340
55.00	1.33	1.52	1.425
50.00	1.32	1.50	1.410
45.00	1.30	1.48	1.390
40.00	1.27	1.46	1.365
33.00	1.25	1.42	1.335
26.00	1.23	1.37	1.300
20.00	1.19	1.32	1.255
14.00	1.15	1.24	1.195
9.00	1.13	1.12	1.125
4.00	1.06	1.00	1.030



Dc (Calculation Deformation Modulus) = 0.86×e×T*×[⊿P/(⊿D/D)]

e : efficiency of jack's hydraulic system = 0.93

[Coeffcient Dependent on Poission's Ratio] = 1.438

Poission's Ratio	0.10	0.20	0.25	0.30	0.33	0.40	0.50
T*	1.519	1.474	1.438	1.397	1.366	1.289	1.151

D : jack operating point = 76.200 (mm)

⊿P = $P_2 - P_1$ 55.00 − 12.00 = 43 (MPa)

⊿D = $D_2 - D_1$ 1.425 − 0.820 = 0.605 (mm)

= 1.4070 (mm/100MPa)

Dc = 6.23E+03 (MPa) = 9.03E+05 (psi)

[* If Dc>1E+06(psi), Use Fallowing Correction Data for Determining E_{true}]

E_{calc}	0	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.9	1.0
1	1.2	1.3	1.5	1.7	1.9	2.1	2.4	2.6	2.9	3.1
2	3.4	3.7	4.0	4.3	4.7	5.1	5.6	6.0	6.5	7.0
3	7.6	8.2	9.0	9.7	10.6	11.5	12.5	13.4	14.3	15.3

Dt (True Deformation Modulus)

= 9.03E+05 (psi) = **6.23E+03** (MPa)

Ec(Calculation Elastic Modulus)

⊿P = $P_2 - P_1$ = 55.00 − 8.00 = 47 (MPa)

⊿D = $D_2 - D_1$ = 1.425 − 0.850 = 0.575 D_2 (mm)

Ec = 7.16E+03 (MPa) = 1.04E+06 (psi)

* Because Ec>1E+06(psi), Correction data use

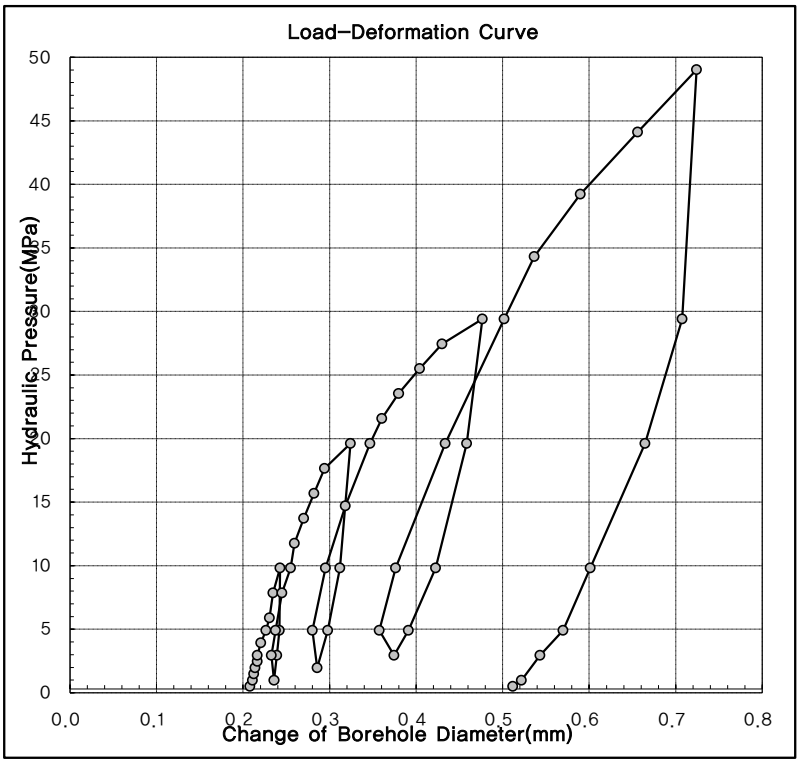
Et = 1.22E+06 (psi) = **8.38E+03** (MPa)

공 내 재 하 시 험

(Goodmanjack Test Sheet)

공 사 명		중앙선(도담~영천)복선전철 제5공구 지반조사						시험일자	2014. 06.
공 번	NTB-45	심도(m)	10.0	TCR/RQD	100/58	시험자	이종현	D =	**1.52E+03** (MPa)
지 층	경 암	암 종	셰일			작성자		E =	**4.04E+03** (MPa)

Presure (MPa)	LVDT Displacement Reading (mm)		
	Near (mm)	Far (mm)	⊿AVG (mm)
0.49	0.22	0.19	0.208
0.98	0.22	0.20	0.211
1.47	0.23	0.20	0.212
1.96	0.23	0.20	0.214
2.45	0.23	0.21	0.216
2.94	0.23	0.21	0.216
3.92	0.23	0.21	0.221
4.90	0.23	0.22	0.226
5.88	0.24	0.23	0.231
7.85	0.24	0.23	0.235
9.81	0.25	0.24	0.243
4.90	0.24	0.24	0.242
2.94	0.24	0.24	0.239
0.98	0.24	0.24	0.236
2.94	0.23	0.23	0.233
4.90	0.24	0.24	0.237
7.85	0.25	0.24	0.245
9.81	0.26	0.25	0.255
11.77	0.26	0.26	0.259
13.73	0.27	0.27	0.270
15.69	0.29	0.28	0.282
17.65	0.30	0.29	0.294
19.61	0.34	0.31	0.324
9.81	0.32	0.30	0.312
4.90	0.30	0.30	0.298
1.96	0.28	0.29	0.286
4.90	0.28	0.28	0.280
9.81	0.30	0.29	0.295
14.71	0.33	0.31	0.318
19.61	0.36	0.33	0.347
21.57	0.38	0.34	0.360
23.54	0.40	0.36	0.380
25.50	0.43	0.38	0.404
27.46	0.47	0.39	0.430
29.42	0.52	0.43	0.477
19.61	0.50	0.42	0.458
9.81	0.45	0.40	0.423
4.90	0.41	0.37	0.391
2.94	0.39	0.36	0.374
4.90	0.37	0.35	0.357
9.81	0.39	0.36	0.376
19.61	0.48	0.39	0.434
29.42	0.58	0.42	0.502
34.32	0.63	0.45	0.536
39.23	0.72	0.46	0.590
44.13	0.83	0.48	0.656
49.03	0.94	0.50	0.724
29.42	0.92	0.50	0.708
19.61	0.85	0.48	0.664
9.81	0.75	0.45	0.601
4.90	0.71	0.43	0.570
2.94	0.67	0.42	0.543
0.98	0.64	0.40	0.522
0.49	0.64	0.39	0.512



Dc (Calculation Deformation Modulus) = 0.86×e×T*×[⊿P/(⊿D/D)]

e : efficiency of jack's hydraulic system = 0.93

[Coeffcient Dependent on Poission's Ratio] = 1.438

Poission's Ratio	0.10	0.20	0.25	0.30	0.33	0.40	0.50
T*	1.519	1.474	1.438	1.397	1.366	1.289	1.151

D : jack operating point = 76.200 (mm)

⊿P = $P_2 - P_1$ 4.90 − 2.45 = 2.4516625 (MPa)

⊿D = $D_2 - D_1$ 0.357 − 0.216 = 0.141 (mm)

= 5.7595 (mm/100MPa)

Dc = 1.52E+03 (MPa) = 2.21E+05 (psi)

[* If Dc>1E+06(psi), Use Fallowing Correction Data for Determining E_{true}]

E_{calc}	0	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.9	1.0
1	1.2	1.3	1.5	1.7	1.9	2.1	2.4	2.6	2.9	3.1
2	3.4	3.7	4.0	4.3	4.7	5.1	5.6	6.0	6.5	7.0
3	7.6	8.2	9.0	9.7	10.6	11.5	12.5	13.4	14.3	15.3

Dt (True Deformation Modulus)

= 2.21E+05 (psi) **= 1.52E+03** (MPa)

Ec(Calculation Elastic Modulus)

⊿P = $P_2 - P_1$ = 4.90 − 23.54 = −18.63264 (MPa)

⊿D = $D_2 - D_1$ = FALSE − 0.404 = −0.403983 D_2 (mm)

Ec = 4.04E+03 (MPa) = 5.86E+05 (psi)

* Because Ec>1E+06(psi), Correction data use

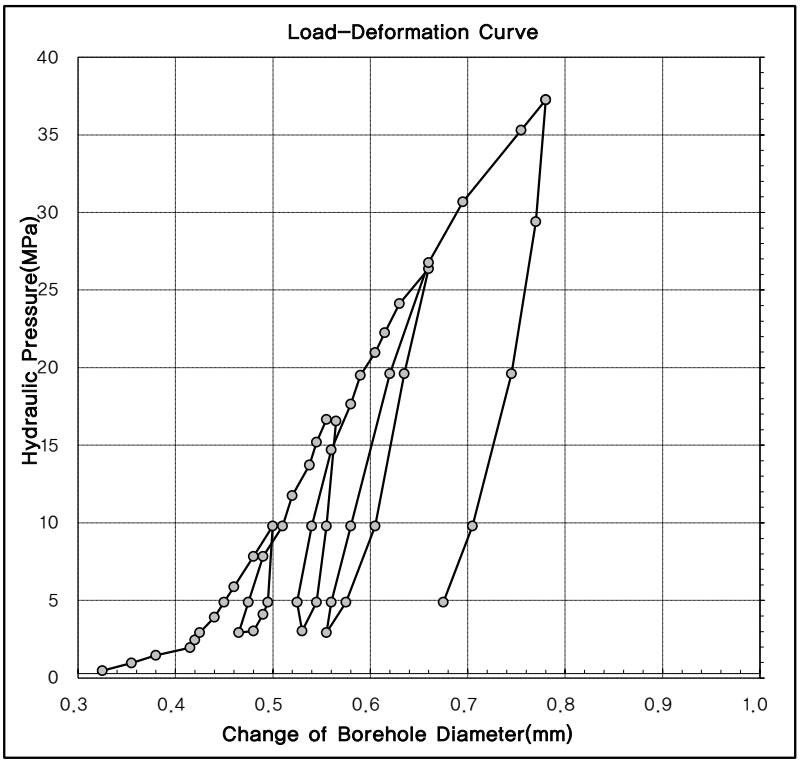
Et = 5.86E+05 (psi) **= 4.04E+03** (MPa)

공 내 재 하 시 험

(Goodmanjack Test Sheet)

공 사 명		중앙선(도담~영천)복선전철 제5공구 지반조사						시험일자	2014. 06.
공 번	NTB-46	심도(m)	4.0	TCR/RQD	94/56	시험자	이종현	D =	**9.79E+03** (MPa)
지 층	경 암	암 종	셰일			작성자		E =	**3.06E+04** (MPa)

Presure (MPa)	LVDT Displacement Reading (mm)		
	Near (mm)	Far (mm)	⊿AVG (mm)
0.49	0.10	0.55	0.325
0.98	0.15	0.56	0.355
1.47	0.20	0.56	0.380
1.96	0.26	0.57	0.415
2.45	0.26	0.58	0.420
2.94	0.27	0.58	0.425
3.92	0.27	0.61	0.440
4.90	0.28	0.62	0.450
5.88	0.28	0.64	0.460
7.85	0.28	0.68	0.480
9.81	0.30	0.70	0.500
4.90	0.29	0.70	0.495
4.12	0.29	0.69	0.490
3.04	0.28	0.68	0.480
2.94	0.28	0.65	0.465
4.90	0.29	0.66	0.475
7.85	0.30	0.68	0.490
9.81	0.31	0.71	0.510
11.77	0.32	0.72	0.520
13.73	0.33	0.75	0.538
15.20	0.34	0.75	0.545
16.67	0.35	0.76	0.555
16.57	0.36	0.77	0.565
9.81	0.34	0.77	0.555
4.90	0.33	0.76	0.545
3.04	0.32	0.74	0.530
4.90	0.32	0.73	0.525
9.81	0.33	0.75	0.540
14.71	0.34	0.78	0.560
17.65	0.37	0.79	0.580
19.52	0.37	0.81	0.590
20.99	0.38	0.83	0.605
22.26	0.39	0.84	0.615
24.12	0.41	0.85	0.630
26.38	0.43	0.89	0.660
19.61	0.42	0.85	0.635
9.81	0.37	0.84	0.605
4.90	0.35	0.80	0.575
2.94	0.34	0.77	0.555
4.90	0.36	0.76	0.560
9.81	0.40	0.76	0.580
19.61	0.45	0.79	0.620
26.77	0.49	0.83	0.660
30.69	0.51	0.88	0.695
35.30	0.53	0.98	0.755
37.27	0.57	0.99	0.780
37.27	0.68	0.88	0.780
29.42	0.57	0.97	0.770
19.61	0.55	0.94	0.745
9.81	0.50	0.91	0.705
4.90	0.46	0.89	0.675



Dc (Calculation Deformation Modulus) = 0.86×e×T*×[⊿P/(⊿D/D)]

e : efficiency of jack's hydraulic system = 0.93

[Coeffcient Dependent on Poission's Ratio] = 1.438

Poission's Ratio	0.10	0.20	0.25	0.30	0.33	0.40	0.50
T*	1.519	1.474	1.438	1.397	1.366	1.289	1.151

D : jack operating point = 76.200 (mm)

⊿P = $P_2 - P_1$ 24.12 − 1.47 = 22.653362 (MPa)

⊿D = $D_2 - D_1$ 0.630 − 0.380 = 0.250 (mm)

= 1.1036 (mm/100MPa)

Dc = 7.9E+03 (MPa) = 1.15E+06 (psi)

[* If Dc>1E+06(psi), Use Fallowing Correction Data for Determining E_{true}]

E_{calc}	0	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.9	1.0
1	1.2	1.3	1.5	1.7	1.9	2.1	2.4	2.6	2.9	3.1
2	3.4	3.7	4.0	4.3	4.7	5.1	5.6	6.0	6.5	7.0
3	7.6	8.2	9.0	9.7	10.6	11.5	12.5	13.4	14.3	15.3

Dt (True Deformation Modulus)

= 1.42E+06 (psi) **= 9.79E+03** (MPa)

Ec(Calculation Elastic Modulus)

⊿P = $P_2 - P_1$ = 24.12 − 4.90 = 19.221034 (MPa)

⊿D = $D_2 - D_1$ = 0.630 − 0.525 = 0.105 D_2 (mm)

Ec = 1.60E+04 (MPa) = 2.33E+06 (psi)

* Because Ec>1E+06(psi), Correction data use

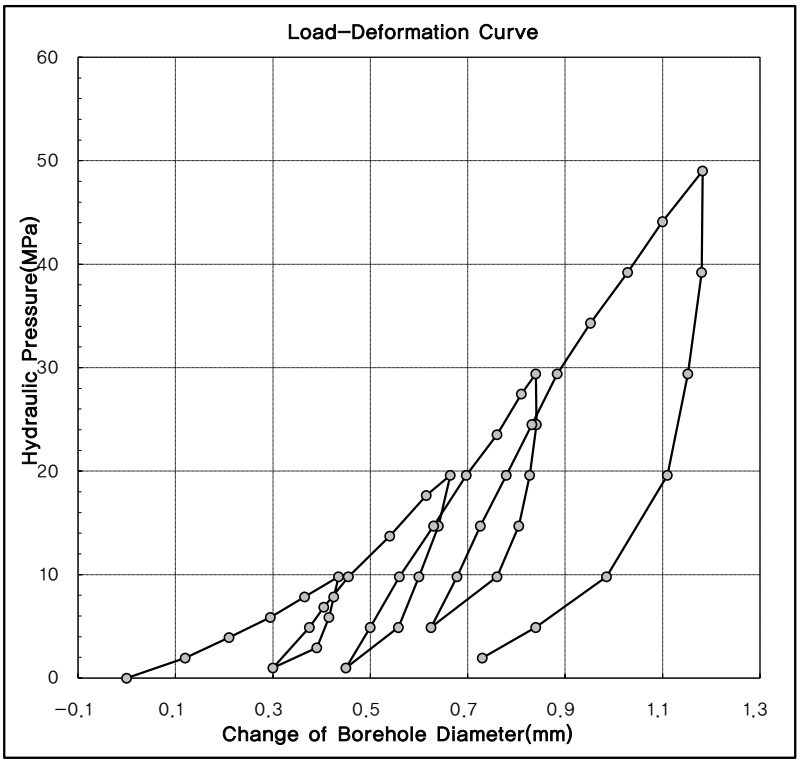
Et = 4.43E+06 (psi) **= 3.1E+04** (MPa)

공 내 재 하 시 험

(Goodmanjack Test Sheet)

공 사 명		중앙선(도담~영천)복선전철 제5공구 지반조사						시험일자	2014. 06.
공 번	NTB-49	심도(m)	92.0	TCR/RQD	100/52	시험자	이종현	D =	**4.33E+03** (MPa)
지 층	경 암	암 종	셰일			작성자		E =	**9.68E+03** (MPa)

Presure (MPa)	LVDT Displacement Reading (mm)		
	Near (mm)	Far (mm)	⊿AVG (mm)
0.00	0.00	0.00	0.000
1.96	0.10	0.14	0.120
3.92	0.21	0.21	0.210
5.88	0.31	0.28	0.295
7.85	0.42	0.31	0.365
9.81	0.52	0.35	0.435
7.85	0.52	0.33	0.425
5.88	0.50	0.33	0.415
2.94	0.48	0.30	0.390
0.98	0.40	0.20	0.300
4.90	0.50	0.25	0.375
6.86	0.53	0.28	0.405
9.81	0.55	0.36	0.455
13.73	0.65	0.43	0.540
17.65	0.75	0.48	0.615
19.61	0.83	0.50	0.664
14.71	0.79	0.49	0.640
9.81	0.77	0.43	0.600
4.90	0.74	0.38	0.558
0.98	0.60	0.30	0.450
4.90	0.65	0.35	0.500
9.81	0.71	0.41	0.560
14.71	0.81	0.45	0.630
19.61	0.91	0.48	0.697
23.54	1.00	0.52	0.760
27.46	1.04	0.58	0.810
29.42	1.08	0.60	0.840
24.52	1.02	0.66	0.841
19.61	1.04	0.61	0.827
14.71	1.04	0.57	0.805
9.81	1.03	0.49	0.760
4.90	0.84	0.41	0.625
9.81	0.92	0.44	0.678
14.71	0.95	0.50	0.726
19.61	1.01	0.55	0.779
24.52	1.06	0.60	0.832
29.42	1.12	0.65	0.884
34.32	1.20	0.70	0.952
39.23	1.31	0.75	1.028
44.13	1.40	0.80	1.100
49.03	1.49	0.87	1.182
39.23	1.49	0.87	1.180
29.42	1.46	0.84	1.152
19.61	1.43	0.79	1.110
9.81	1.35	0.62	0.985
4.90	1.16	0.52	0.840
1.96	1.09	0.37	0.730



Dc (Calculation Deformation Modulus) = 0.86×e×T*×[⊿P/(⊿D/D)]

e : efficiency of jack's hydraulic system = 0.93

[Coeffcient Dependent on Poission's Ratio] = 1.438

Poission's Ratio	0.10	0.20	0.25	0.30	0.33	0.40	0.50
T*	1.519	1.474	1.438	1.397	1.366	1.289	1.151

D : jack operating point = 76.200 (mm)

⊿P = $P_2 - P_1$ 44.13 − 7.85 = 36.284605 (MPa)

⊿D = $D_2 - D_1$ 1.100 − 0.365 = 0.735 (mm)

= 2.0257 (mm/100MPa)

Dc = 4.33E+03 (MPa) = 6.27E+05 (psi)

[* If Dc>1E+06(psi), Use Fallowing Correction Data for Determining E_{true}]

E_{calc}	0	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.9	1.0
1	1.2	1.3	1.5	1.7	1.9	2.1	2.4	2.6	2.9	3.1
2	3.4	3.7	4.0	4.3	4.7	5.1	5.6	6.0	6.5	7.0
3	7.6	8.2	9.0	9.7	10.6	11.5	12.5	13.4	14.3	15.3

Dt (True Deformation Modulus)

= 6.27E+05 (psi) **= 4.33E+03** (MPa)

Ec(Calculation Elastic Modulus)

⊿P = $P_2 - P_1$ = 34.32 − 4.90 = 29.41995 (MPa)

⊿D = $D_2 - D_1$ = 0.952 − 0.625 = 0.327 D_2 (mm)

Ec = 7.88E+03 (MPa) = 1.14E+06 (psi)

* Because Ec>1E+06(psi), Correction data use

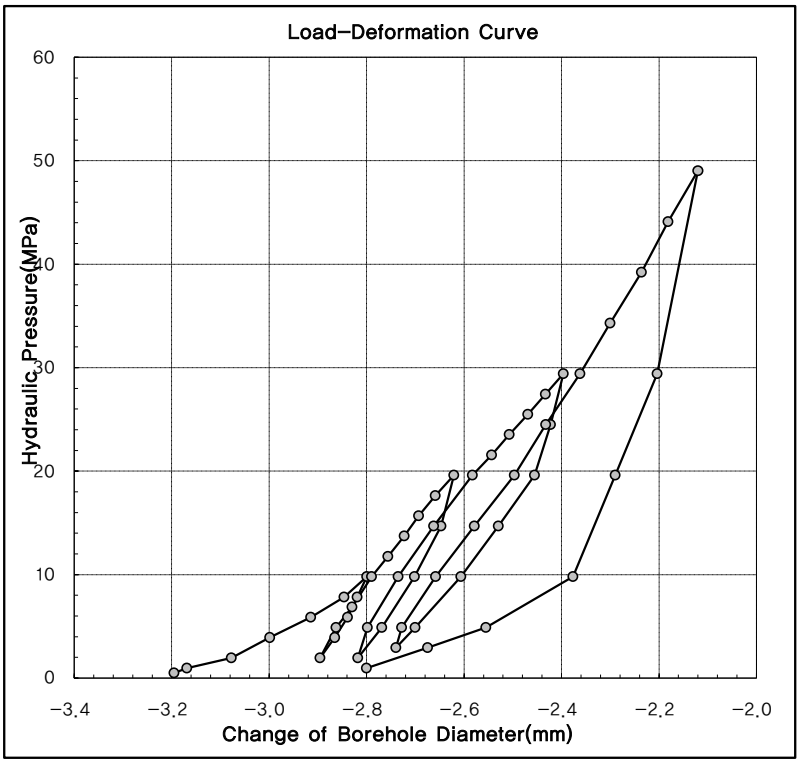
Et = 1.40E+06 (psi) **= 9.68E+03** (MPa)

공 내 재 하 시 험

(Goodmanjack Test Sheet)

공 사 명		중앙선(도담~영천)복선전철 제5공구 지반조사						시험일자	2014. 06.
공 번	NTB-50	심도(m)	74.0	TCR/RQD	100/44	시험자	이종현	D =	**1.34E+03** (MPa)
지 층	연암	암 종	셰일			작성자		E =	**6.75E+03** (MPa)

Presure (MPa)	LVDT Displacement Reading (mm)		
	Near (mm)	Far (mm)	⊿AVG (mm)
0.49	-3.94	-2.45	-3.195
0.98	-3.90	-2.43	-3.169
1.96	-3.77	-2.39	-3.078
3.92	-3.63	-2.37	-2.999
5.88	-3.49	-2.34	-2.915
7.85	-3.38	-2.31	-2.846
9.81	-3.31	-2.29	-2.799
7.85	-3.35	-2.29	-2.819
5.88	-3.38	-2.30	-2.839
3.92	-3.43	-2.30	-2.865
1.96	-3.49	-2.30	-2.896
4.90	-3.45	-2.28	-2.863
6.86	-3.40	-2.26	-2.830
9.81	-3.33	-2.25	-2.790
11.77	-3.27	-2.24	-2.756
13.73	-3.22	-2.22	-2.723
15.69	-3.18	-2.21	-2.693
17.65	-3.12	-2.20	-2.659
19.61	-3.06	-2.19	-2.621
14.71	-3.10	-2.19	-2.647
9.81	-3.21	-2.20	-2.702
4.90	-3.33	-2.20	-2.769
1.96	-3.42	-2.22	-2.818
4.90	-3.38	-2.22	-2.798
9.81	-3.27	-2.20	-2.735
14.71	-3.14	-2.19	-2.662
19.61	-3.00	-2.16	-2.583
21.57	-2.93	-2.16	-2.543
23.54	-2.87	-2.14	-2.507
25.50	-2.81	-2.13	-2.469
27.46	-2.75	-2.12	-2.433
29.42	-2.69	-2.10	-2.396
24.52	-2.73	-2.11	-2.422
19.61	-2.79	-2.12	-2.455
14.71	-2.93	-2.13	-2.530
9.81	-3.07	-2.14	-2.606
4.90	-3.24	-2.16	-2.700
2.94	-3.31	-2.17	-2.740
4.90	-3.27	-2.19	-2.728
9.81	-3.15	-2.17	-2.658
14.71	-3.00	-2.16	-2.579
19.61	-2.85	-2.14	-2.496
24.52	-2.75	-2.11	-2.432
29.42	-2.64	-2.09	-2.362
34.32	-2.53	-2.07	-2.300
39.23	-2.41	-2.06	-2.236
44.13	-2.33	-2.03	-2.181
49.03	-2.23	-2.00	-2.120
29.42	-2.37	-2.03	-2.204
19.61	-2.51	-2.07	-2.290
9.81	-2.65	-2.10	-2.376
4.90	-3.00	-2.11	-2.555
2.94	-3.20	-2.15	-2.675
0.98	-3.40	-2.20	-2.800



Dc (Calculation Deformation Modulus) = 0.86×e×T*×[⊿P/(⊿D/D)]

e : efficiency of jack's hydraulic system = 0.93

[Coeffcient Dependent on Poission's Ratio] = 1.438

Poission's Ratio	0.10	0.20	0.25	0.30	0.33	0.40	0.50
T*	1.519	1.474	1.438	1.397	1.366	1.289	1.151

D : jack operating point = 76.200 (mm)

⊿P = $P_2 - P_1$ 9.81 − 5.88 = 3.92266 (MPa)

⊿D = $D_2 - D_1$ −2.658 − −2.915 = 0.257 (mm)

= 6.5408 (mm/100MPa)

Dc = 1.34E+03 (MPa) = 1.94E+05 (psi)

[* If Dc>1E+06(psi), Use Fallowing Correction Data for Determining E_{true}]

E_{calc}	0	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.9	1.0
1	1.2	1.3	1.5	1.7	1.9	2.1	2.4	2.6	2.9	3.1
2	3.4	3.7	4.0	4.3	4.7	5.1	5.6	6.0	6.5	7.0
3	7.6	8.2	9.0	9.7	10.6	11.5	12.5	13.4	14.3	15.3

Dt (True Deformation Modulus)

= 1.94E+05 (psi) **= 1.34E+03** (MPa)

Ec(Calculation Elastic Modulus)

⊿P = $P_2 - P_1$ = 2.94 − 29.42 = −26.47796 (MPa)

⊿D = $D_2 - D_1$ = −2.740 − −2.396 = −0.343996 D_2 (mm)

Ec = 6.75E+03 (MPa) = 9.78E+05 (psi)

* Because Ec>1E+06(psi), Correction data use

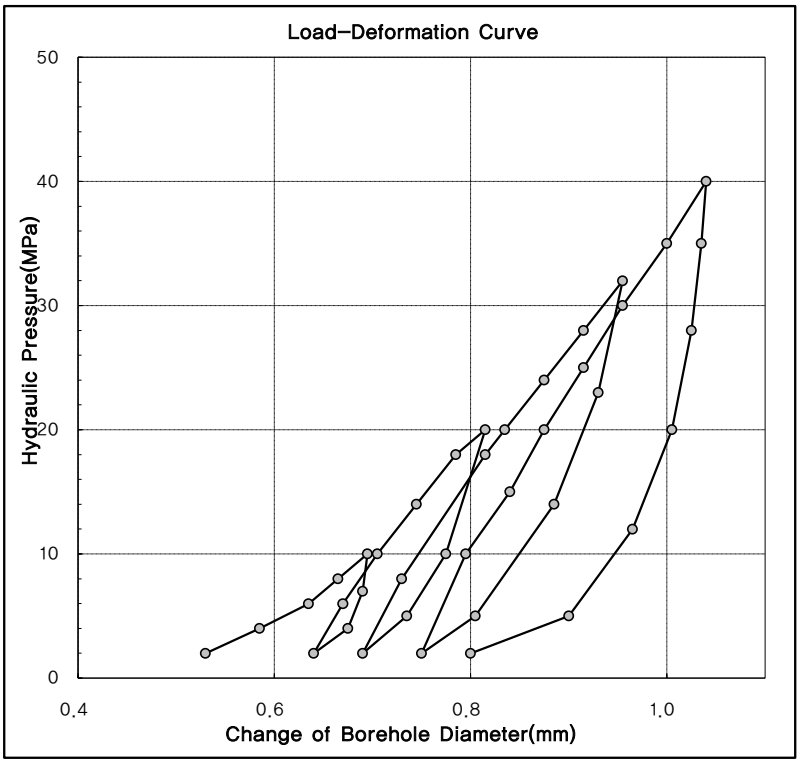
Et = 9.78E+05 (psi) **= 6.75E+03** (MPa)

공 내 재 하 시 험

(Goodmanjack Test Sheet)

공 사 명		중앙선(도담~영천)복선전철 제5공구 지반조사						시험일자	2014. 06. 24
공 번	NTB-61	심도(m)	18.2	TCR/RQD	100/91	시험자	이종현	D =	**9.19E+03** (MPa)
지 층	경암	암 종	셰일			작성자	박상우	E =	**1.42E+04** (MPa)

Presure (MPa)	LVDT Displacement Reading (mm)		
	Near (mm)	Far (mm)	⊿AVG (mm)
2.00	0.55	0.51	0.530
4.00	0.68	0.49	0.585
6.00	0.75	0.52	0.635
8.00	0.79	0.54	0.665
10.00	0.82	0.57	0.695
7.00	0.81	0.57	0.690
4.00	0.80	0.55	0.675
2.00	0.75	0.53	0.640
6.00	0.77	0.57	0.670
10.00	0.81	0.60	0.705
14.00	0.85	0.64	0.745
18.00	0.88	0.69	0.785
20.00	0.91	0.72	0.815
10.00	0.85	0.70	0.775
5.00	0.79	0.68	0.735
2.00	0.75	0.63	0.690
8.00	0.81	0.65	0.730
18.00	0.92	0.71	0.815
20.00	0.93	0.74	0.835
24.00	0.96	0.79	0.875
28.00	1.02	0.81	0.915
32.00	1.07	0.84	0.955
23.00	1.04	0.82	0.930
14.00	0.99	0.78	0.885
5.00	0.91	0.70	0.805
2.00	0.82	0.68	0.750
10.00	0.87	0.72	0.795
15.00	0.91	0.77	0.840
20.00	0.97	0.78	0.875
25.00	1.03	0.80	0.915
30.00	1.09	0.82	0.955
35.00	1.15	0.85	1.000
40.00	1.20	0.88	1.040
35.00	1.19	0.88	1.035
28.00	1.18	0.87	1.025
20.00	1.15	0.86	1.005
12.00	1.10	0.83	0.965
5.00	1.02	0.78	0.900
2.00	0.87	0.73	0.800



Dc (Calculation Deformation Modulus) = 0.86×e×T*×[⊿P/(⊿D/D)]

e : efficiency of jack's hydraulic system = 0.93

[Coeffcient Dependent on Poission's Ratio] = 1.438

Poission's Ratio	0.10	0.20	0.25	0.30	0.33	0.40	0.50
T*	1.519	1.474	1.438	1.397	1.366	1.289	1.151

D : jack operating point = 76.200 (mm)

⊿P = $P_2 - P_1$ 40.00 − 10.00 = 30 (MPa)

⊿D = $D_2 - D_1$ 1.040 − 0.695 = 0.345 (mm)

= 1.1500 (mm/100MPa)

Dc = 7.62E+03 (MPa) = 1.11E+06 (psi)

[* If Dc>1E+06(psi), Use Fallowing Correction Data for Determining E_{true}]

E_{calc}	0	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.9	1.0
1	1.2	1.3	1.5	1.7	1.9	2.1	2.4	2.6	2.9	3.1
2	3.4	3.7	4.0	4.3	4.7	5.1	5.6	6.0	6.5	7.0
3	7.6	8.2	9.0	9.7	10.6	11.5	12.5	13.4	14.3	15.3

Dt (True Deformation Modulus)

= 1.33E+06 (psi) **= 9.19E+03** (MPa)

Ec(Calculation Elastic Modulus)

⊿P = $P_2 - P_1$ = 40.00 − 5.00 = 35 (MPa)

⊿D = $D_2 - D_1$ = 1.040 − 0.735 = 0.305 D_2 (mm)

Ec = 1.01E+04 (MPa) = 1.46E+06 (psi)

* Because Ec>1E+06(psi), Correction data use

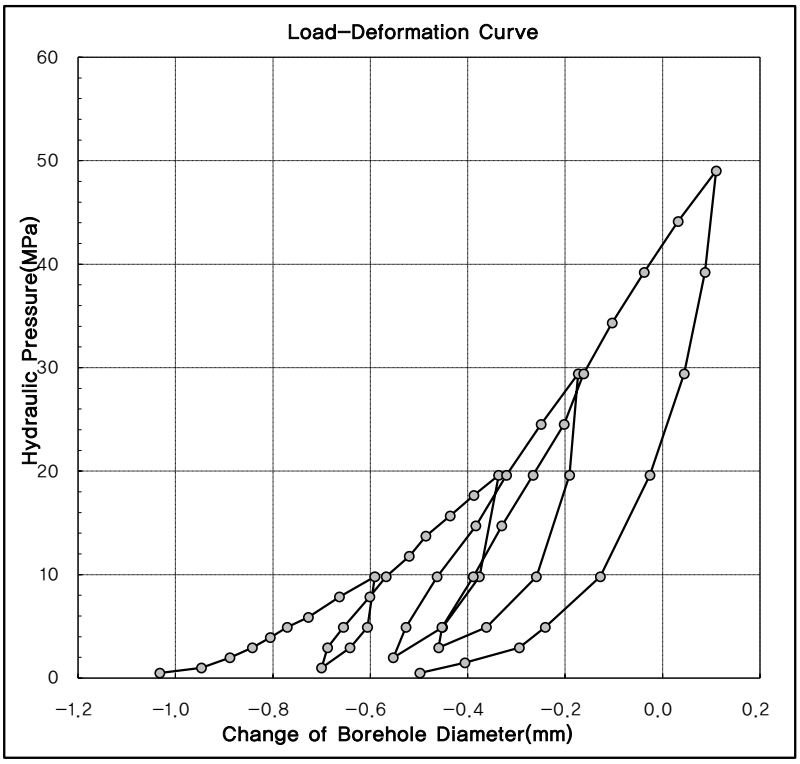
Et = 2.05E+06 (psi) **= 1.42E+04** (MPa)

공 내 재 하 시 험

(Goodmanjack Test Sheet)

공 사 명		중앙선(도담~영천)복선전철 제5공구 지반조사						시험일자	2014. 06.
공 번	NTB-62	심도(m)	8.0	TCR/RQD	100/53	시험자	이종현	D =	**3.47E+03** (MPa)
지 층	경 암	암 종	셰일			작성자		E =	**1.16E+04** (MPa)

Presure (MPa)	LVDT Displacement Reading (mm)		
	Near (mm)	Far (mm)	⊿AVG (mm)
0.49	-1.12	-0.94	-1.032
0.98	-1.00	-0.90	-0.947
1.96	-0.93	-0.84	-0.888
2.94	-0.88	-0.81	-0.842
3.92	-0.83	-0.78	-0.805
4.90	-0.78	-0.76	-0.770
5.88	-0.70	-0.76	-0.727
7.85	-0.61	-0.72	-0.663
9.81	-0.48	-0.70	-0.591
4.90	-0.50	-0.71	-0.606
2.94	-0.55	-0.73	-0.641
0.98	-0.64	-0.76	-0.700
2.94	-0.61	-0.76	-0.688
4.90	-0.57	-0.74	-0.655
7.85	-0.51	-0.69	-0.601
9.81	-0.44	-0.69	-0.567
11.77	-0.36	-0.68	-0.520
13.73	-0.30	-0.67	-0.486
15.69	-0.23	-0.64	-0.436
17.65	-0.15	-0.63	-0.387
19.61	-0.08	-0.60	-0.337
9.81	-0.10	-0.65	-0.376
4.90	-0.25	-0.66	-0.452
1.96	-0.38	-0.73	-0.553
4.90	-0.35	-0.70	-0.527
9.81	-0.26	-0.67	-0.463
14.71	-0.14	-0.63	-0.383
19.61	-0.04	-0.61	-0.320
24.52	0.09	-0.59	-0.250
29.42	0.20	-0.55	-0.173
19.61	0.19	-0.58	-0.191
9.81	0.06	-0.58	-0.259
4.90	-0.10	-0.62	-0.361
2.94	-0.27	-0.65	-0.460
4.90	-0.26	-0.64	-0.453
9.81	-0.18	-0.59	-0.388
14.71	-0.10	-0.56	-0.330
19.61	0.03	-0.56	-0.266
24.52	0.14	-0.54	-0.202
29.42	0.22	-0.54	-0.162
34.32	0.32	-0.53	-0.104
39.23	0.43	-0.51	-0.038
44.13	0.55	-0.49	0.032
49.03	0.68	-0.46	0.110
39.23	0.63	-0.46	0.087
29.42	0.55	-0.46	0.044
19.61	0.44	-0.49	-0.026
9.81	0.26	-0.51	-0.128
4.90	0.06	-0.54	-0.241
2.94	-0.04	-0.55	-0.294
1.47	-0.22	-0.59	-0.406
0.49	-0.37	-0.63	-0.498



Dc (Calculation Deformation Modulus) = 0.86×e×T*×[⊿P/(⊿D/D)]

e : efficiency of jack's hydraulic system = 0.93

[Coeffcient Dependent on Poission's Ratio] = 1.438

Poission's Ratio	0.10	0.20	0.25	0.30	0.33	0.40	0.50
T*	1.519	1.474	1.438	1.397	1.366	1.289	1.151

D : jack operating point = 76.200 (mm)

⊿P = $P_2 - P_1$ 29.42 − 3.92 = 25.49729 (MPa)

⊿D = $D_2 - D_1$ −0.162 − −0.805 = 0.643 (mm)

= 2.5222 (mm/100MPa)

Dc = 3.47E+03 (MPa) = 5.04E+05 (psi)

[* If Dc>1E+06(psi), Use Fallowing Correction Data for Determining E_{true}]

E_{calc}	0	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.9	1.0
1	1.2	1.3	1.5	1.7	1.9	2.1	2.4	2.6	2.9	3.1
2	3.4	3.7	4.0	4.3	4.7	5.1	5.6	6.0	6.5	7.0
3	7.6	8.2	9.0	9.7	10.6	11.5	12.5	13.4	14.3	15.3

Dt (True Deformation Modulus)

= 5.04E+05 (psi) **= 3.47E+03** (MPa)

Ec(Calculation Elastic Modulus)

⊿P = $P_2 - P_1$ = 19.61 − 9.81 = 9.80665 (MPa)

⊿D = $D_2 - D_1$ = −0.162 − −0.259 = 0.0969288 D_2 (mm)

Ec = 8.87E+03 (MPa) = 1.29E+06 (psi)

* Because Ec>1E+06(psi), Correction data use

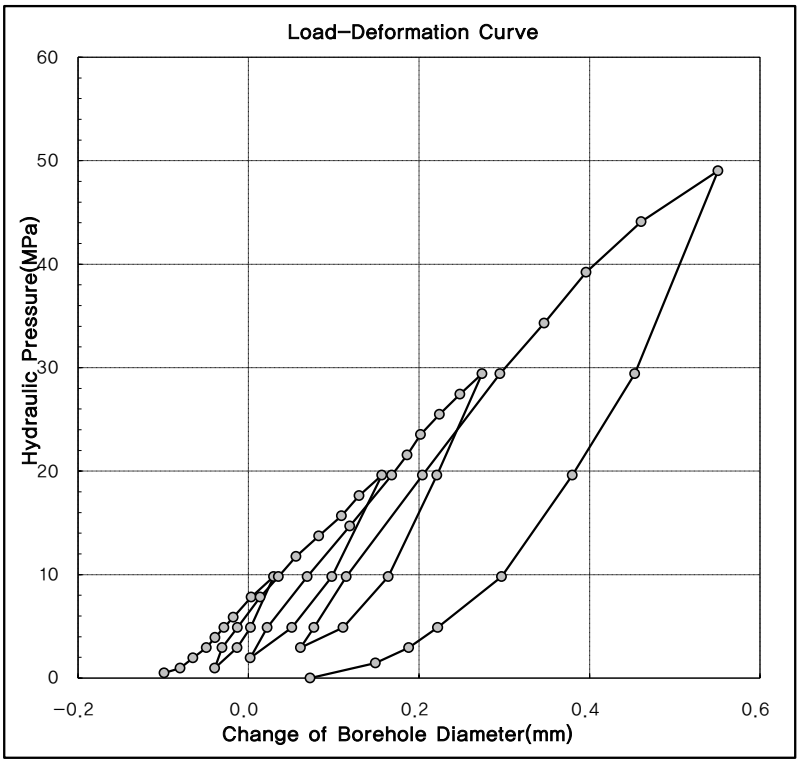
Et = 1.68E+06 (psi) **= 1.16E+04** (MPa)

공 내 재 하 시 험

(Goodmanjack Test Sheet)

공 사 명		중앙선(도담~영천)복선전철 제5공구 지반조사						시험일자	2014. 06.
공 번	NTB-63	심도(m)	13.0	TCR/RQD	100/64	시험자	이종현	D =	**5.66E+03** (MPa)
지 층	경 암	암 종	셰일			작성자		E =	**1.77E+04** (MPa)

Presure (MPa)	LVDT Displacement Reading (mm)		
	Near (mm)	Far (mm)	⊿AVG (mm)
0.49	-0.21	0.01	-0.099
0.98	-0.20	0.04	-0.080
1.96	-0.18	0.05	-0.065
2.94	-0.15	0.05	-0.049
3.92	-0.14	0.06	-0.039
4.90	-0.13	0.07	-0.029
5.88	-0.11	0.07	-0.018
7.85	-0.07	0.08	0.003
9.81	-0.04	0.10	0.030
4.90	-0.09	0.10	0.003
2.94	-0.12	0.09	-0.013
0.98	-0.15	0.07	-0.039
2.94	-0.13	0.07	-0.031
4.90	-0.11	0.08	-0.013
7.85	-0.06	0.09	0.014
9.81	-0.03	0.10	0.035
11.77	-0.01	0.12	0.056
13.73	0.03	0.13	0.082
15.69	0.08	0.14	0.109
17.65	0.10	0.16	0.130
19.61	0.14	0.17	0.156
9.81	0.05	0.15	0.098
4.90	0.00	0.10	0.051
1.96	-0.08	0.08	0.002
4.90	-0.03	0.07	0.022
9.81	0.06	0.08	0.069
14.71	0.14	0.10	0.119
19.61	0.22	0.12	0.168
21.57	0.24	0.13	0.186
23.54	0.25	0.15	0.202
25.50	0.29	0.16	0.224
27.46	0.32	0.18	0.248
29.42	0.35	0.20	0.274
19.61	0.27	0.17	0.221
9.81	0.18	0.15	0.164
4.90	0.10	0.12	0.111
2.94	0.01	0.11	0.061
4.90	0.04	0.11	0.077
9.81	0.10	0.13	0.115
19.61	0.25	0.16	0.204
29.42	0.41	0.18	0.295
34.32	0.49	0.20	0.347
39.23	0.54	0.25	0.396
44.13	0.66	0.26	0.461
49.03	0.80	0.30	0.551
29.42	0.75	0.16	0.453
19.61	0.64	0.12	0.380
9.81	0.50	0.09	0.297
4.90	0.37	0.08	0.222
2.94	0.30	0.07	0.188
1.47	0.13	0.17	0.149
0.00	0.08	0.07	0.073



Dc (Calculation Deformation Modulus) = 0.86×e×T*×[⊿P/(⊿D/D)]

e : efficiency of jack's hydraulic system = 0.93

[Coeffcient Dependent on Poission's Ratio] = 1.438

Poission's Ratio	0.10	0.20	0.25	0.30	0.33	0.40	0.50
T*	1.519	1.474	1.438	1.397	1.366	1.289	1.151

D : jack operating point = 76.200 (mm)

⊿P = $P_2 - P_1$ 19.61 − 3.92 = 15.69064 (MPa)

⊿D = $D_2 - D_1$ 0.204 − −0.039 = 0.243 (mm)

= 1.5487 (mm/100MPa)

Dc = 5.66E+03 (MPa) = 8.21E+05 (psi)

[* If Dc>1E+06(psi), Use Fallowing Correction Data for Determining E_{true}]

E_{calc}	0	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.9	1.0
1	1.2	1.3	1.5	1.7	1.9	2.1	2.4	2.6	2.9	3.1
2	3.4	3.7	4.0	4.3	4.7	5.1	5.6	6.0	6.5	7.0
3	7.6	8.2	9.0	9.7	10.6	11.5	12.5	13.4	14.3	15.3

Dt (True Deformation Modulus)

= 8.21E+05 (psi) **= 5.66E+03** (MPa)

Ec(Calculation Elastic Modulus)

⊿P = $P_2 - P_1$ = 4.90 − 27.46 = −22.5553 (MPa)

⊿D = $D_2 - D_1$ = 0.077 − 0.248 = −0.171 D_2 (mm)

Ec = 1.16E+04 (MPa) = 1.68E+06 (psi)

* Because Ec>1E+06(psi), Correction data use

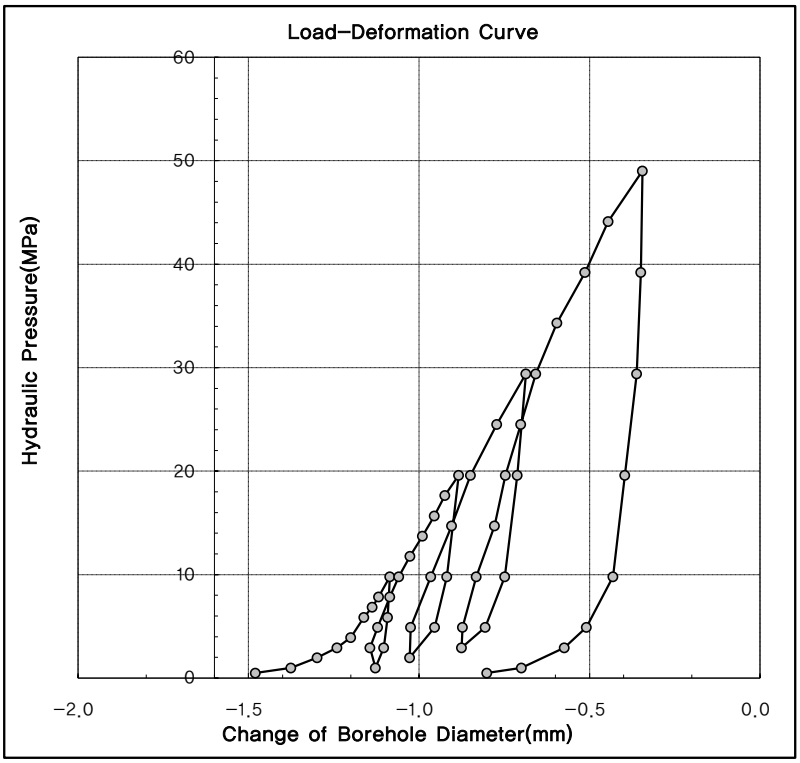
Et = 2.56E+06 (psi) **= 1.77E+04** (MPa)

공 내 재 하 시 험

(Goodmanjack Test Sheet)

공 사 명		중앙선(도담~영천)복선전철 제5공구 지반조사						시험일자	2014. 06.
공 번	NTB-64	심도(m)	8.0	TCR/RQD	92/50	시험자	이종현	D =	**4.12E+03** (MPa)
지 층	연암	암 종	셰일			작성자		E =	**1.48E+03** (MPa)

Presure (MPa)	LVDT Displacement Reading (mm)		
	Near (mm)	Far (mm)	⊿AVG (mm)
0.49	-1.37	-1.59	-1.480
0.98	-1.31	-1.45	-1.376
1.96	-1.25	-1.35	-1.299
2.94	-1.21	-1.27	-1.241
3.92	-1.19	-1.22	-1.201
5.88	-1.17	-1.16	-1.162
6.86	-1.16	-1.11	-1.137
7.85	-1.15	-1.09	-1.119
9.81	-1.14	-1.04	-1.086
5.88	-1.14	-1.05	-1.093
2.94	-1.14	-1.07	-1.104
0.98	-1.16	-1.10	-1.128
2.94	-1.15	-1.14	-1.144
4.90	-1.14	-1.10	-1.122
7.85	-1.14	-1.04	-1.086
9.81	-1.13	-0.99	-1.060
11.77	-1.11	-0.94	-1.027
13.73	-1.10	-0.88	-0.990
15.69	-1.08	-0.83	-0.956
17.65	-1.07	-0.78	-0.925
19.61	-1.06	-0.71	-0.884
9.81	-1.05	-0.79	-0.919
4.90	-1.07	-0.84	-0.955
1.96	-1.11	-0.95	-1.028
4.90	-1.11	-0.94	-1.025
9.81	-1.09	-0.84	-0.966
14.71	-1.07	-0.74	-0.905
19.61	-1.04	-0.66	-0.850
24.52	-1.01	-0.54	-0.773
29.42	-0.94	-0.44	-0.687
19.61	-0.95	-0.48	-0.713
9.81	-0.96	-0.54	-0.749
4.90	-0.99	-0.62	-0.806
2.94	-1.01	-0.74	-0.875
4.90	-1.02	-0.73	-0.873
9.81	-1.01	-0.65	-0.832
14.71	-0.97	-0.58	-0.779
19.61	-0.97	-0.52	-0.747
24.52	-0.95	-0.45	-0.702
29.42	-0.95	-0.37	-0.658
34.32	-0.94	-0.26	-0.596
39.23	-0.92	-0.11	-0.514
44.13	-0.89	0.00	-0.445
49.03	-0.84	0.15	-0.345
39.23	-0.82	0.12	-0.350
29.42	-0.84	0.12	-0.362
19.61	-0.85	0.06	-0.397
9.81	-0.88	0.02	-0.431
4.90	-0.91	-0.11	-0.510
2.94	-0.96	-0.19	-0.575
0.98	-1.05	-0.35	-0.700
0.49	-1.08	-0.52	-0.802



Dc (Calculation Deformation Modulus) = 0.86×e×T*×[⊿P/(⊿D/D)]

e : efficiency of jack's hydraulic system = 0.93

[Coeffcient Dependent on Poission's Ratio] = 1.438

Poission's Ratio	0.10	0.20	0.25	0.30	0.33	0.40	0.50
T*	1.519	1.474	1.438	1.397	1.366	1.289	1.151

D : jack operating point = 76.200 (mm)

⊿P = $P_2 - P_1$ 29.42 − 3.92 = 25.49729 (MPa)

⊿D = $D_2 - D_1$ −0.658 − −1.201 = 0.543 (mm)

= 2.1296 (mm/100MPa)

Dc = 4.12E+03 (MPa) = 5.97E+05 (psi)

[* If Dc>1E+06(psi), Use Fallowing Correction Data for Determining E_{true}]

E_{calc}	0	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.9	1.0
1	1.2	1.3	1.5	1.7	1.9	2.1	2.4	2.6	2.9	3.1
2	3.4	3.7	4.0	4.3	4.7	5.1	5.6	6.0	6.5	7.0
3	7.6	8.2	9.0	9.7	10.6	11.5	12.5	13.4	14.3	15.3

Dt (True Deformation Modulus)

= 5.97E+05 (psi) **= 4.12E+03** (MPa)

Ec(Calculation Elastic Modulus)

⊿P = $P_2 - P_1$ = 19.61 − 9.81 = 9.80665 (MPa)

⊿D = $D_2 - D_1$ = −0.106 − −0.687 = 0.5805 D_2 (mm)

Ec = 1.48E+03 (MPa) = 2.15E+05 (psi)

* Because Ec>1E+06(psi), Correction data use

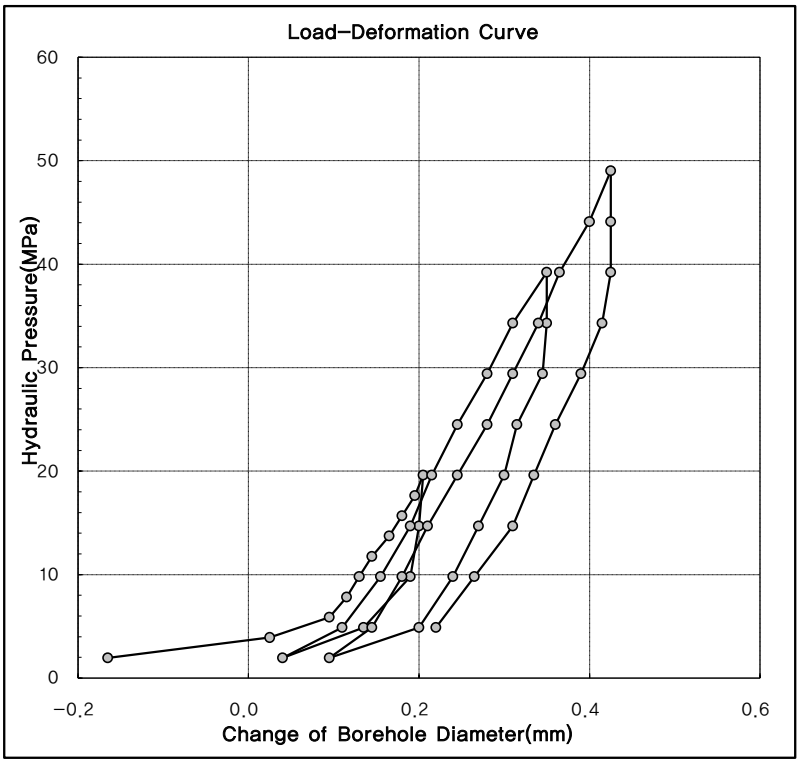
Et = 2.15E+05 (psi) **= 1.48E+03** (MPa)

공 내 재 하 시 험

(Goodmanjack Test Sheet)

공 사 명		중앙선(도담~영천)복선전철 제5공구 지반조사						시험일자	2014. 06.
공 번	NTB-65	심도(m)	10.0	TCR/RQD	100/100	시험자	이종현	D =	**1.79E+04** (MPa)
지 층	경 암	암 종	셰일			작성자		E =	**2.39E+04** (MPa)

Presure (MPa)	LVDT Displacement Reading (mm)		
	Near (mm)	Far (mm)	⊿AVG (mm)
1.96	-0.25	-0.08	-0.165
3.92	-0.06	0.11	0.025
5.88	0.02	0.17	0.095
7.85	0.04	0.19	0.115
9.81	0.05	0.21	0.130
11.77	0.06	0.23	0.145
13.73	0.09	0.24	0.165
15.69	0.11	0.25	0.180
17.65	0.12	0.27	0.195
19.61	0.14	0.27	0.205
14.71	0.13	0.27	0.200
9.81	0.11	0.27	0.190
4.90	0.06	0.21	0.135
1.96	-0.03	0.11	0.040
4.90	0.03	0.19	0.110
9.81	0.10	0.21	0.155
14.71	0.14	0.24	0.190
19.61	0.16	0.27	0.215
24.52	0.17	0.32	0.245
29.42	0.21	0.35	0.280
34.32	0.24	0.38	0.310
39.23	0.29	0.41	0.350
34.32	0.29	0.41	0.350
29.42	0.29	0.40	0.345
24.52	0.25	0.38	0.315
19.61	0.22	0.38	0.300
14.71	0.19	0.35	0.270
9.81	0.16	0.32	0.240
4.90	0.11	0.29	0.200
1.96	0.03	0.16	0.095
4.90	0.08	0.21	0.145
9.81	0.11	0.25	0.180
14.71	0.13	0.29	0.210
19.61	0.17	0.32	0.245
24.52	0.21	0.35	0.280
29.42	0.24	0.38	0.310
34.32	0.27	0.41	0.340
39.23	0.29	0.44	0.365
44.13	0.32	0.48	0.400
49.03	0.35	0.50	0.425
44.13	0.35	0.50	0.425
39.23	0.35	0.50	0.425
34.32	0.35	0.48	0.415
29.42	0.32	0.46	0.390
24.52	0.28	0.44	0.360
19.61	0.25	0.42	0.335
14.71	0.22	0.40	0.310
9.81	0.18	0.35	0.265
4.90	0.15	0.29	0.220



Dc (Calculation Deformation Modulus) = 0.86×e×T*×[⊿P/(⊿D/D)]

e : efficiency of jack's hydraulic system = 0.93

[Coeffcient Dependent on Poission's Ratio] = 1.438

Poission's Ratio	0.10	0.20	0.25	0.30	0.33	0.40	0.50
T*	1.519	1.474	1.438	1.397	1.366	1.289	1.151

D : jack operating point = 76.200 (mm)

⊿P = $P_2 - P_1$ 49.03 − 9.81 = 39.2266 (MPa)

⊿D = $D_2 - D_1$ 0.425 − 0.130 = 0.295 (mm)

= 0.7520 (mm/100MPa)

Dc = 1.17E+04 (MPa) = 1.69E+06 (psi)

[* If Dc>1E+06(psi), Use Fallowing Correction Data for Determining E_{true}]

E_{calc}	0	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.9	1.0
1	1.2	1.3	1.5	1.7	1.9	2.1	2.4	2.6	2.9	3.1
2	3.4	3.7	4.0	4.3	4.7	5.1	5.6	6.0	6.5	7.0
3	7.6	8.2	9.0	9.7	10.6	11.5	12.5	13.4	14.3	15.3

Dt (True Deformation Modulus)

= 2.59E+06 (psi) **= 1.79E+04** (MPa)

Ec(Calculation Elastic Modulus)

⊿P = $P_2 - P_1$ = 39.23 − 9.81 = 29.41995 (MPa)

⊿D = $D_2 - D_1$ = 0.365 − 0.180 = 0.185 D_2 (mm)

Ec = 1.39E+04 (MPa) = 2.02E+06 (psi)

* Because Ec>1E+06(psi), Correction data use

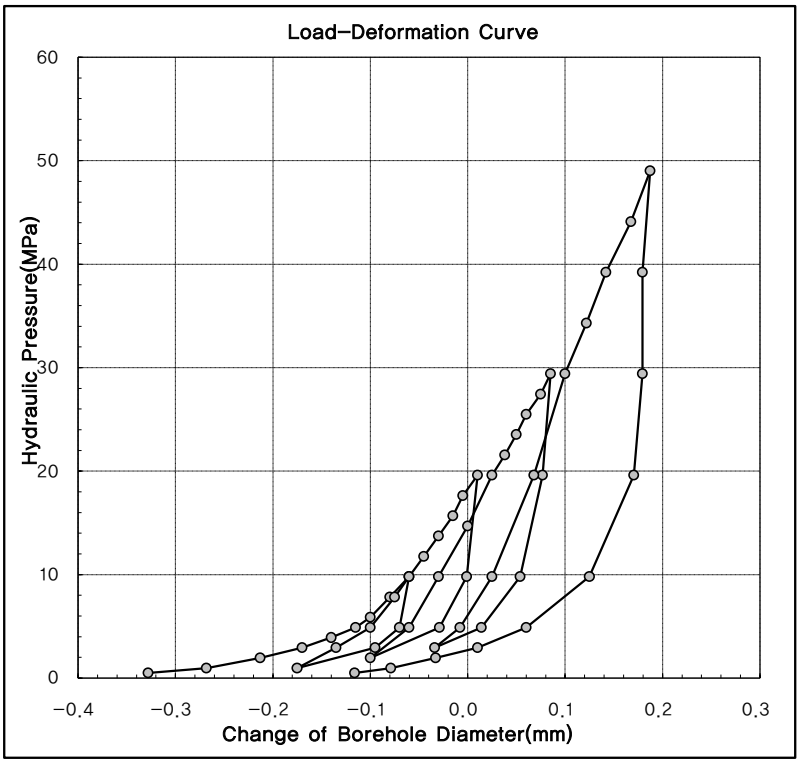
Et = 3.47E+06 (psi) **= 2.39E+04** (MPa)

공 내 재 하 시 험

(Goodmanjack Test Sheet)

공 사 명		중앙선(도담~영천)복선전철 제5공구 지반조사						시험일자	2014. 07.
공 번	NTB-66	심도(m)	30.0	TCR/RQD	100/100	시험자	이종현	D =	**1.59E+04** (MPa)
지 층	경 암	암 종	셰일			작성자		E =	**4.69E+04** (MPa)

Presure (MPa)	LVDT Displacement Reading (mm)		
	Near (mm)	Far (mm)	⊿AVG (mm)
0.49	0.05	-0.71	-0.328
0.98	0.07	-0.61	-0.268
1.96	0.09	-0.52	-0.213
2.94	0.10	-0.44	-0.170
3.92	0.11	-0.39	-0.140
4.90	0.12	-0.35	-0.115
5.88	0.12	-0.32	-0.100
7.85	0.13	-0.29	-0.080
9.81	0.14	-0.26	-0.060
4.90	0.13	-0.27	-0.070
2.94	0.12	-0.31	-0.095
0.98	0.07	-0.42	-0.175
2.94	0.09	-0.36	-0.135
4.90	0.11	-0.31	-0.100
7.85	0.12	-0.27	-0.075
9.81	0.13	-0.25	-0.060
11.77	0.14	-0.23	-0.045
13.73	0.15	-0.21	-0.030
15.69	0.16	-0.19	-0.015
17.65	0.17	-0.18	-0.005
19.61	0.18	-0.16	0.010
9.81	0.17	-0.17	-0.001
4.90	0.15	-0.21	-0.029
1.96	0.12	-0.32	-0.100
4.90	0.14	-0.26	-0.060
9.81	0.15	-0.21	-0.030
14.71	0.17	-0.17	0.000
19.61	0.18	-0.13	0.025
21.57	0.19	-0.11	0.038
23.54	0.21	-0.11	0.050
25.50	0.22	-0.10	0.060
27.46	0.23	-0.08	0.075
29.42	0.24	-0.07	0.085
19.61	0.24	-0.09	0.077
9.81	0.21	-0.10	0.054
4.90	0.18	-0.15	0.014
2.94	0.16	-0.23	-0.034
4.90	0.17	-0.19	-0.008
9.81	0.18	-0.13	0.025
19.61	0.21	-0.07	0.068
29.42	0.24	-0.04	0.100
34.32	0.27	-0.03	0.122
39.23	0.29	-0.01	0.142
44.13	0.32	0.02	0.168
49.03	0.34	0.03	0.187
39.23	0.33	0.03	0.179
29.42	0.33	0.03	0.179
19.61	0.31	0.03	0.171
9.81	0.24	0.01	0.125
4.90	0.19	-0.07	0.060
2.94	0.15	-0.13	0.010
1.96	0.14	-0.21	-0.033
0.98	0.09	-0.25	-0.079
0.49	0.08	-0.31	-0.116



Dc (Calculation Deformation Modulus) = 0.86×e×T*×[⊿P/(⊿D/D)]

e : efficiency of jack's hydraulic system = 0.93

[Coeffcient Dependent on Poission's Ratio] = 1.438

Poission's Ratio	0.10	0.20	0.25	0.30	0.33	0.40	0.50
T*	1.519	1.474	1.438	1.397	1.366	1.289	1.151

D : jack operating point = 76.200 (mm)

⊿P = $P_2 - P_1$ 27.46 − 5.88 = 21.57463 (MPa)

⊿D = $D_2 - D_1$ 0.075 − −0.100 = 0.175 (mm)

= 0.8111 (mm/100MPa)

Dc = 1.08E+04 (MPa) = 1.57E+06 (psi)

[* If Dc>1E+06(psi), Use Fallowing Correction Data for Determining E_{true}]

E_{calc}	0	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.9	1.0
1	1.2	1.3	1.5	1.7	1.9	2.1	2.4	2.6	2.9	3.1
2	3.4	3.7	4.0	4.3	4.7	5.1	5.6	6.0	6.5	7.0
3	7.6	8.2	9.0	9.7	10.6	11.5	12.5	13.4	14.3	15.3

Dt (True Deformation Modulus)

= 2.30E+06 (psi) **= 1.59E+04** (MPa)

Ec(Calculation Elastic Modulus)

⊿P = $P_2 - P_1$ = 2.94 − 27.46 = −24.51663 (MPa)

⊿D = $D_2 - D_1$ = −0.034 − 0.075 = −0.109 D_2 (mm)

Ec = 1.97E+04 (MPa) = 2.86E+06 (psi)

* Because Ec>1E+06(psi), Correction data use

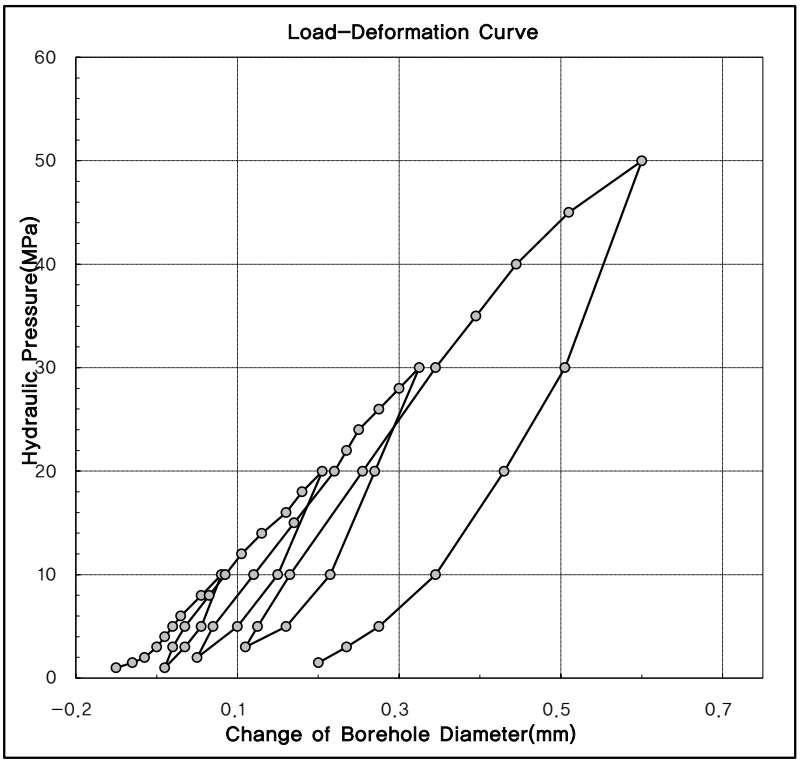
Et = 6.81E+06 (psi) **= 4.69E+04** (MPa)

공 내 재 하 시 험

(Goodmanjack Test Sheet)

공 사 명		중앙선(도담~영천)복선전철 제5공구 지반조사						시험일자	2014. 08. 13
공 번	NTB-70	심도(m)	21.2	TCR/RQD	100/82	시험자	이종현	D =	**6.75E+03** (MPa)
지 층	경암	암 종	셰일			작성자	박상우	E =	**9.68E+03** (MPa)

Presure (MPa)	LVDT Displacement Reading (mm)		
	Near (mm)	Far (mm)	⊿AVG (mm)
1.00	-0.21	0.01	-0.100
1.50	-0.20	0.04	-0.080
2.00	-0.18	0.05	-0.065
3.00	-0.15	0.05	-0.050
4.00	-0.14	0.06	-0.040
5.00	-0.13	0.07	-0.030
6.00	-0.11	0.07	-0.020
8.00	-0.07	0.08	0.005
10.00	-0.04	0.10	0.030
5.00	-0.09	0.10	0.005
3.00	-0.12	0.09	-0.015
1.00	-0.15	0.07	-0.040
3.00	-0.13	0.07	-0.030
5.00	-0.11	0.08	-0.015
8.00	-0.06	0.09	0.015
10.00	-0.03	0.10	0.035
12.00	-0.01	0.12	0.055
14.00	0.03	0.13	0.080
16.00	0.08	0.14	0.110
18.00	0.10	0.16	0.130
20.00	0.14	0.17	0.155
10.00	0.05	0.15	0.100
5.00	0.00	0.10	0.050
2.00	-0.08	0.08	0.000
5.00	-0.03	0.07	0.020
10.00	0.06	0.08	0.070
15.00	0.14	0.10	0.120
20.00	0.22	0.12	0.170
22.00	0.24	0.13	0.185
24.00	0.25	0.15	0.200
26.00	0.29	0.16	0.225
28.00	0.32	0.18	0.250
30.00	0.35	0.20	0.275
20.00	0.27	0.17	0.220
10.00	0.18	0.15	0.165
5.00	0.10	0.12	0.110
3.00	0.01	0.11	0.060
5.00	0.04	0.11	0.075
10.00	0.10	0.13	0.115
20.00	0.25	0.16	0.205
30.00	0.41	0.18	0.295
35.00	0.49	0.20	0.345
40.00	0.54	0.25	0.395
45.00	0.66	0.26	0.460
50.00	0.80	0.30	0.550
30.00	0.75	0.16	0.455
20.00	0.64	0.12	0.380
10.00	0.50	0.09	0.295
5.00	0.37	0.08	0.225
3.00	0.30	0.07	0.185
1.50	0.13	0.17	0.150



Dc (Calculation Deformation Modulus) = 0.86×e×T*×[⊿P/(⊿D/D)]

e : efficiency of jack's hydraulic system = 0.93

[Coeffcient Dependent on Poission's Ratio] = 1.438

Poission's Ratio	0.10	0.20	0.25	0.30	0.33	0.40	0.50
T*	1.519	1.474	1.438	1.397	1.366	1.289	1.151

D : jack operating point = 76.200 (mm)

⊿P = $P_2 - P_1$ 50.00 − 8.00 = 42 (MPa)

⊿D = $D_2 - D_1$ 0.550 − 0.005 = 0.545 (mm)

= 1.2976 (mm/100MPa)

Dc = 6.75E+03 (MPa) = 9.80E+05 (psi)

[* If Dc>1E+06(psi), Use Fallowing Correction Data for Determining E_{true}]

E_{calc}	0	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.9	1.0
1	1.2	1.3	1.5	1.7	1.9	2.1	2.4	2.6	2.9	3.1
2	3.4	3.7	4.0	4.3	4.7	5.1	5.6	6.0	6.5	7.0
3	7.6	8.2	9.0	9.7	10.6	11.5	12.5	13.4	14.3	15.3

Dt (True Deformation Modulus)

= 9.80E+05 (psi) **= 6.75E+03** (MPa)

Ec(Calculation Elastic Modulus)

⊿P = $P_2 - P_1$ = 50.00 − 5.00 = 45 (MPa)

⊿D = $D_2 - D_1$ = 0.550 − 0.050 = 0.5 D_2 (mm)

Ec = 7.89E+03 (MPa) = 1.14E+06 (psi)

* Because Ec>1E+06(psi), Correction data use

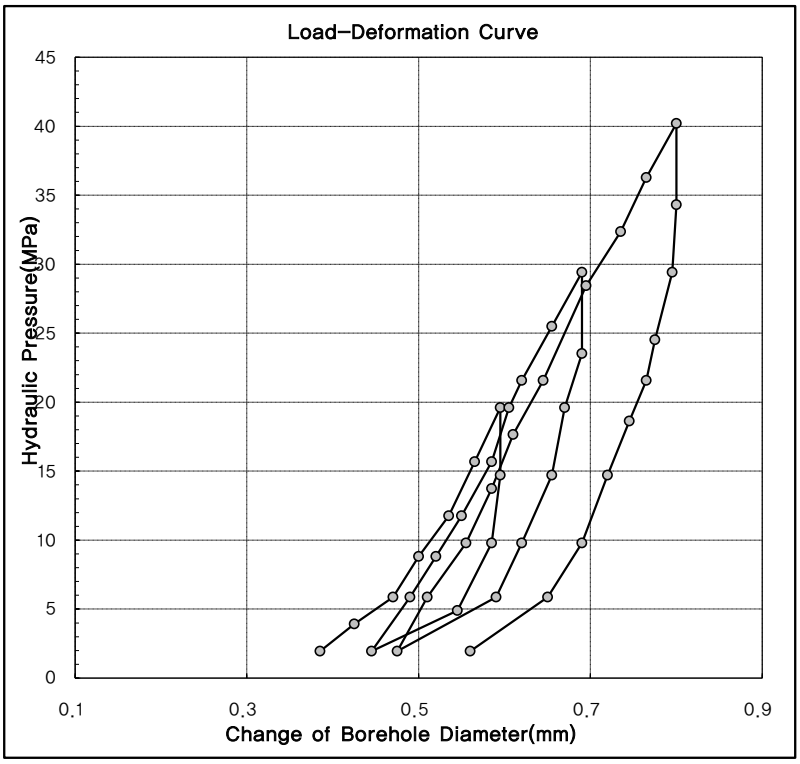
Et = 1.40E+06 (psi) **= 9.68E+03** (MPa)

공 내 재 하 시 험

(Goodmanjack Test Sheet)

공 사 명		중앙선(도담~영천)복선전철 제5공구 지반조사						시험일자	2014. 07.
공 번	NTB-72	심도(m)	10.0	TCR/RQD	100/96	시험자	이종현	D =	**1.22E+04** (MPa)
지 층	경 암	암 종	셰일			작성자		E =	**1.79E+04** (MPa)

Presure (MPa)	LVDT Displacement Reading (mm)		
	Near (mm)	Far (mm)	⊿AVG (mm)
1.96	0.37	0.40	0.385
3.92	0.42	0.43	0.425
5.88	0.47	0.47	0.470
8.83	0.51	0.49	0.500
11.77	0.56	0.51	0.535
15.69	0.59	0.54	0.565
19.61	0.63	0.56	0.595
14.71	0.63	0.56	0.595
9.81	0.61	0.56	0.585
4.90	0.56	0.53	0.545
1.96	0.44	0.45	0.445
5.88	0.49	0.49	0.490
8.83	0.53	0.51	0.520
11.77	0.57	0.53	0.550
15.69	0.61	0.56	0.585
19.61	0.64	0.57	0.605
21.57	0.65	0.59	0.620
25.50	0.69	0.62	0.655
29.42	0.74	0.64	0.690
23.54	0.74	0.64	0.690
19.61	0.71	0.63	0.670
14.71	0.69	0.62	0.655
9.81	0.65	0.59	0.620
5.88	0.62	0.56	0.590
1.96	0.47	0.48	0.475
5.88	0.51	0.51	0.510
9.81	0.57	0.54	0.555
13.73	0.61	0.56	0.585
17.65	0.63	0.59	0.610
21.57	0.68	0.61	0.645
28.44	0.75	0.64	0.695
32.36	0.80	0.67	0.735
36.28	0.83	0.70	0.765
40.21	0.88	0.72	0.800
34.32	0.88	0.72	0.800
29.42	0.87	0.72	0.795
24.52	0.84	0.71	0.775
21.57	0.83	0.70	0.765
18.63	0.81	0.68	0.745
14.71	0.78	0.66	0.720
9.81	0.74	0.64	0.690
5.88	0.69	0.61	0.650
1.96	0.59	0.53	0.560



Dc (Calculation Deformation Modulus) = 0.86×e×T*×[⊿P/(⊿D/D)]

e : efficiency of jack's hydraulic system = 0.93

[Coeffcient Dependent on Poission's Ratio] = 1.438

Poission's Ratio	0.10	0.20	0.25	0.30	0.33	0.40	0.50
T*	1.519	1.474	1.438	1.397	1.366	1.289	1.151

D : jack operating point = 76.200 (mm)

⊿P = $P_2 - P_1$ 40.21 − 8.83 = 31.38128 (MPa)

⊿D = $D_2 - D_1$ 0.800 − 0.500 = 0.300 (mm)

= 0.9560 (mm/100MPa)

Dc = 9.17E+03 (MPa) = 1.33E+06 (psi)

[* If Dc>1E+06(psi), Use Fallowing Correction Data for Determining E_{true}]

E_{calc}	0	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.9	1.0
1	1.2	1.3	1.5	1.7	1.9	2.1	2.4	2.6	2.9	3.1
2	3.4	3.7	4.0	4.3	4.7	5.1	5.6	6.0	6.5	7.0
3	7.6	8.2	9.0	9.7	10.6	11.5	12.5	13.4	14.3	15.3

Dt (True Deformation Modulus)

= 1.77E+06 (psi) **= 1.22E+04** (MPa)

Ec(Calculation Elastic Modulus)

⊿P = $P_2 - P_1$ = 28.44 − 9.81 = 18.632635 (MPa)

⊿D = $D_2 - D_1$ = 0.695 − 0.555 = 0.14 D_2 (mm)

Ec = 1.17E+04 (MPa) = 1.69E+06 (psi)

* Because Ec>1E+06(psi), Correction data use

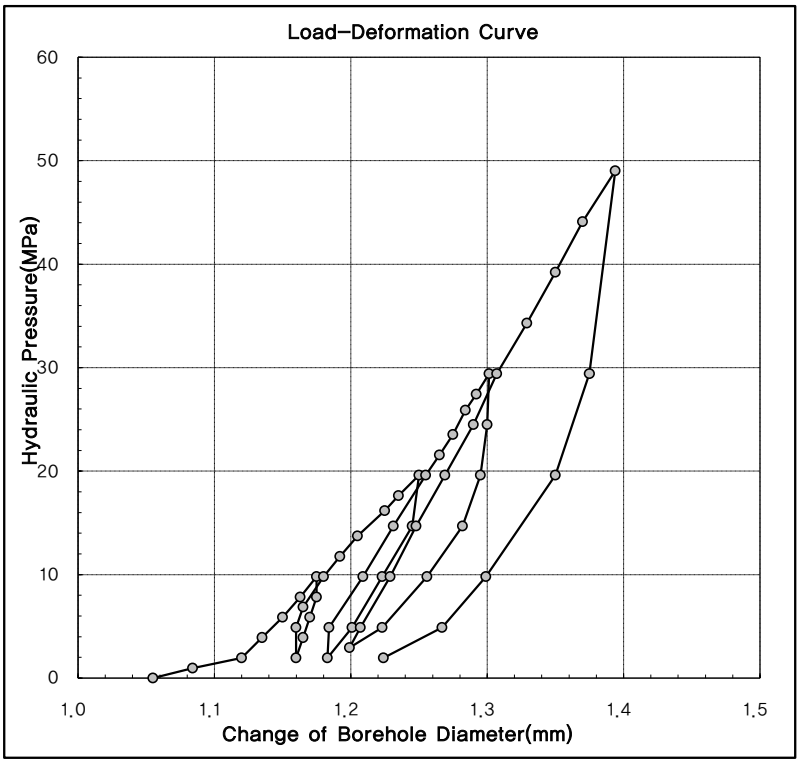
Et = 2.60E+06 (psi) **= 1.79E+04** (MPa)

공 내 재 하 시 험

(Goodmanjack Test Sheet)

공 사 명		중앙선(도담~영천)복선전철 제5공구 지반조사						시험일자	2014. 07.
공 번	NTB-73	심도(m)	15.0	TCR/RQD	100/100	시험자	이종현	D =	**1.37E+04** (MPa)
지 층	경 암	암 종	셰일			작성자		E =	**5.74E+04** (MPa)

Presure (MPa)	LVDT Displacement Reading (mm)		
	Near (mm)	Far (mm)	⊿AVG (mm)
0.00	1.00	1.11	1.055
0.98	1.04	1.13	1.084
1.96	1.10	1.14	1.120
3.92	1.12	1.15	1.135
5.88	1.14	1.16	1.150
7.85	1.17	1.16	1.163
9.81	1.17	1.18	1.175
7.85	1.17	1.18	1.175
5.88	1.17	1.17	1.170
3.92	1.16	1.17	1.165
1.96	1.16	1.16	1.160
4.90	1.16	1.16	1.160
6.86	1.16	1.17	1.165
9.81	1.18	1.18	1.180
11.77	1.18	1.20	1.192
13.73	1.20	1.21	1.205
16.18	1.22	1.23	1.225
17.65	1.23	1.24	1.235
19.61	1.25	1.25	1.250
14.71	1.25	1.24	1.245
9.81	1.23	1.22	1.223
4.90	1.21	1.19	1.201
1.96	1.20	1.17	1.183
4.90	1.20	1.17	1.184
9.81	1.23	1.19	1.209
14.71	1.24	1.22	1.231
19.61	1.26	1.25	1.255
21.57	1.27	1.26	1.265
23.54	1.28	1.27	1.275
25.89	1.29	1.28	1.284
27.46	1.29	1.29	1.292
29.42	1.31	1.29	1.302
24.52	1.31	1.29	1.300
19.61	1.31	1.28	1.295
14.71	1.31	1.25	1.282
9.81	1.28	1.23	1.256
4.90	1.26	1.19	1.223
2.94	1.22	1.18	1.199
4.90	1.23	1.18	1.207
9.81	1.26	1.20	1.229
14.71	1.27	1.23	1.248
19.61	1.28	1.26	1.269
24.52	1.30	1.28	1.290
29.42	1.31	1.30	1.307
34.32	1.31	1.35	1.329
39.23	1.36	1.34	1.350
44.13	1.38	1.36	1.370
49.03	1.41	1.38	1.394
29.42	1.39	1.36	1.375
19.61	1.36	1.34	1.350
9.81	1.35	1.25	1.299
4.90	1.32	1.21	1.267
1.96	1.27	1.18	1.224



Dc (Calculation Deformation Modulus) = 0.86×e×T*×[⊿P/(⊿D/D)]

e : efficiency of jack's hydraulic system = 0.93

[Coeffcient Dependent on Poission's Ratio] = 1.438

Poission's Ratio	0.10	0.20	0.25	0.30	0.33	0.40	0.50
T*	1.519	1.474	1.438	1.397	1.366	1.289	1.151

D : jack operating point = 76.200 (mm)

⊿P = $P_2 - P_1$ 19.61 − 0.98 = 18.632635 (MPa)

⊿D = $D_2 - D_1$ 1.250 − 1.084 = 0.166 (mm)

= 0.8909 (mm/100MPa)

Dc = 9.84E+03 (MPa) = 1.43E+06 (psi)

[* If Dc>1E+06(psi), Use Fallowing Correction Data for Determining E_{true}]

E_{calc}	0	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.9	1.0
1	1.2	1.3	1.5	1.7	1.9	2.1	2.4	2.6	2.9	3.1
2	3.4	3.7	4.0	4.3	4.7	5.1	5.6	6.0	6.5	7.0
3	7.6	8.2	9.0	9.7	10.6	11.5	12.5	13.4	14.3	15.3

Dt (True Deformation Modulus)

= 1.98E+06 (psi) **= 1.37E+04** (MPa)

Ec(Calculation Elastic Modulus)

⊿P = $P_2 - P_1$ = 29.42 − 4.90 = 24.516625 (MPa)

⊿D = $D_2 - D_1$ = 1.302 − 1.201 = 0.1005 D_2 (mm)

Ec = 2.14E+04 (MPa) = 3.10E+06 (psi)

* Because Ec>1E+06(psi), Correction data use

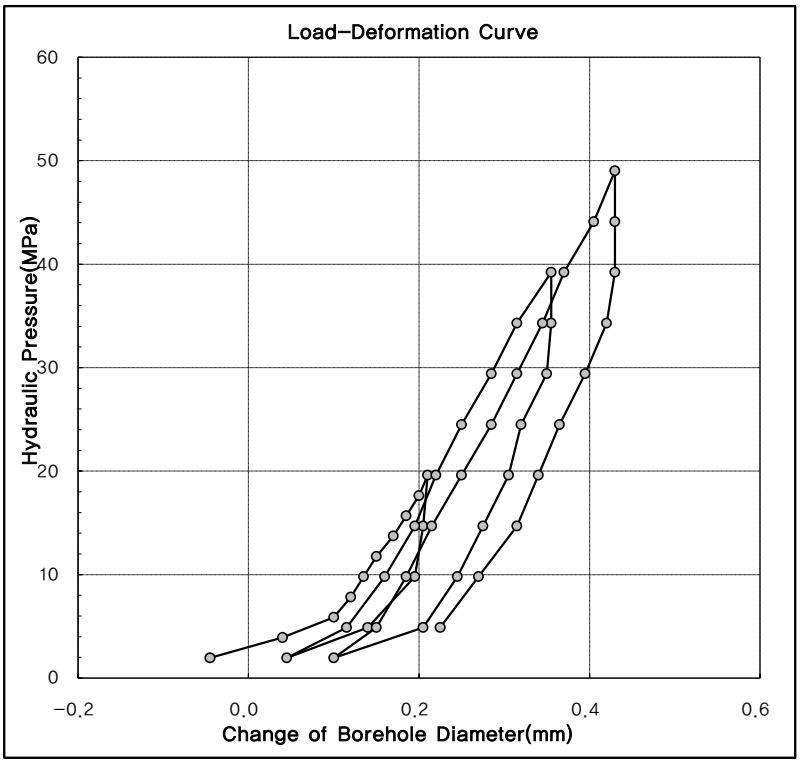
Et = 8.32E+06 (psi) **= 5.7E+04** (MPa)

공 내 재 하 시 험

(Goodmanjack Test Sheet)

공 사 명		중앙선(도담~영천)복선전철 제5공구 지반조사						시험일자	2014. 07.
공 번	NTB-74	심도(m)	43.0	TCR/RQD	100/100	시험자	이종현	D =	**1.43E+04** (MPa)
지 층	경 암	암 종	셰일			작성자		E =	**2.39E+04** (MPa)

Presure (MPa)	LVDT Displacement Reading (mm)		
	Near (mm)	Far (mm)	⊿AVG (mm)
1.96	-0.01	-0.08	-0.045
3.92	-0.03	0.11	0.040
5.88	0.01	0.19	0.100
7.85	0.03	0.21	0.120
9.81	0.04	0.23	0.135
11.77	0.05	0.25	0.150
13.73	0.08	0.26	0.170
15.69	0.10	0.27	0.185
17.65	0.11	0.29	0.200
19.61	0.13	0.29	0.210
14.71	0.12	0.29	0.205
9.81	0.10	0.29	0.195
4.90	0.05	0.23	0.140
1.96	-0.04	0.13	0.045
4.90	0.02	0.21	0.115
9.81	0.09	0.23	0.160
14.71	0.13	0.26	0.195
19.61	0.15	0.29	0.220
24.52	0.16	0.34	0.250
29.42	0.20	0.37	0.285
34.32	0.23	0.40	0.315
39.23	0.28	0.43	0.355
34.32	0.28	0.43	0.355
29.42	0.28	0.42	0.350
24.52	0.24	0.40	0.320
19.61	0.21	0.40	0.305
14.71	0.18	0.37	0.275
9.81	0.15	0.34	0.245
4.90	0.10	0.31	0.205
1.96	0.02	0.18	0.100
4.90	0.07	0.23	0.150
9.81	0.10	0.27	0.185
14.71	0.12	0.31	0.215
19.61	0.16	0.34	0.250
24.52	0.20	0.37	0.285
29.42	0.23	0.40	0.315
34.32	0.26	0.43	0.345
39.23	0.28	0.46	0.370
44.13	0.31	0.50	0.405
49.03	0.34	0.52	0.430
44.13	0.34	0.52	0.430
39.23	0.34	0.52	0.430
34.32	0.34	0.50	0.420
29.42	0.31	0.48	0.395
24.52	0.27	0.46	0.365
19.61	0.24	0.44	0.340
14.71	0.21	0.42	0.315
9.81	0.17	0.37	0.270
4.90	0.14	0.31	0.225



Dc (Calculation Deformation Modulus) = 0.86×e×T*×[⊿P/(⊿D/D)]

e : efficiency of jack's hydraulic system = 0.93

[Coeffcient Dependent on Poission's Ratio] = 1.438

Poission's Ratio	0.10	0.20	0.25	0.30	0.33	0.40	0.50
T*	1.519	1.474	1.438	1.397	1.366	1.289	1.151

D : jack operating point = 76.200 (mm)

⊿P = $P_2 - P_1$ 49.03 − 3.92 = 45.11059 (MPa)

⊿D = $D_2 - D_1$ 0.430 − 0.040 = 0.390 (mm)

= 0.8645 (mm/100MPa)

Dc = 1.01E+04 (MPa) = 1.47E+06 (psi)

[* If Dc>1E+06(psi), Use Fallowing Correction Data for Determining E_{true}]

E_{calc}	0	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.9	1.0
1	1.2	1.3	1.5	1.7	1.9	2.1	2.4	2.6	2.9	3.1
2	3.4	3.7	4.0	4.3	4.7	5.1	5.6	6.0	6.5	7.0
3	7.6	8.2	9.0	9.7	10.6	11.5	12.5	13.4	14.3	15.3

Dt (True Deformation Modulus)

= 2.08E+06 (psi) **= 1.43E+04** (MPa)

Ec(Calculation Elastic Modulus)

⊿P = $P_2 - P_1$ = 39.23 − 9.81 = 29.41995 (MPa)

⊿D = $D_2 - D_1$ = 0.370 − 0.185 = 0.185 D_2 (mm)

Ec = 1.39E+04 (MPa) = 2.02E+06 (psi)

* Because Ec>1E+06(psi), Correction data use

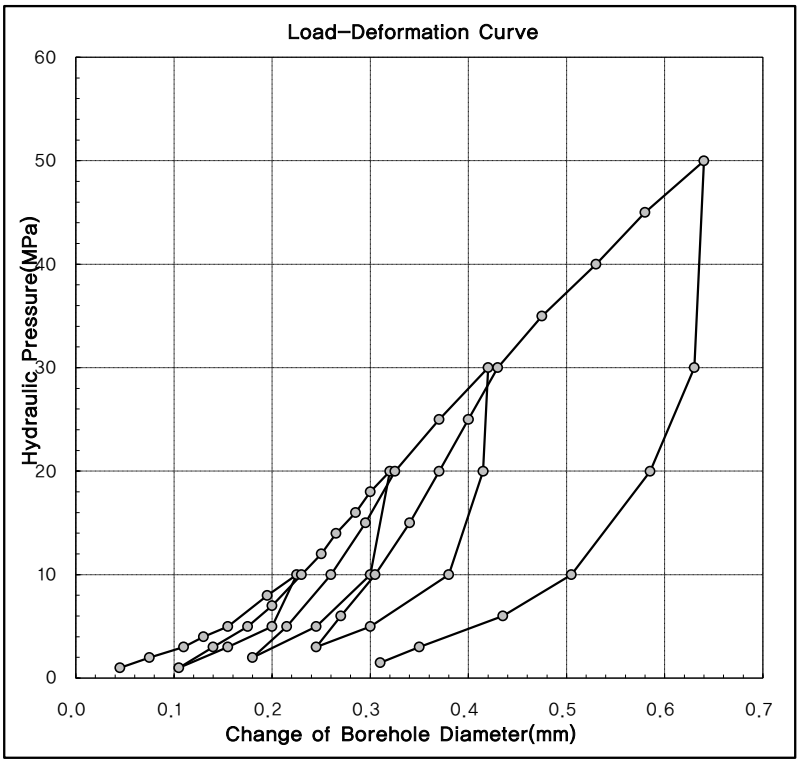
Et = 3.47E+06 (psi) **= 2.39E+04** (MPa)

공 내 재 하 시 험

(Goodmanjack Test Sheet)

공 사 명		중앙선(도담~영천)복선전철 제5공구 지반조사						시험일자	2014. 07. 05
공 번	NTB-75	심도(m)	21.0	TCR/RQD	100/100	시험자	이종현	D =	**1.04E+04** (MPa)
지 층	경암	암 종	셰일			작성자	박상우	E =	**1.40E+04** (MPa)

Presure (MPa)	LVDT Displacement Reading (mm)		
	Near (mm)	Far (mm)	⊿AVG (mm)
1.00	0.01	0.08	0.045
2.00	0.06	0.09	0.075
3.00	0.11	0.11	0.110
4.00	0.14	0.12	0.130
5.00	0.17	0.14	0.155
8.00	0.22	0.17	0.195
10.00	0.26	0.19	0.225
5.00	0.23	0.17	0.200
3.00	0.16	0.15	0.155
1.00	0.07	0.14	0.105
3.00	0.13	0.15	0.140
5.00	0.19	0.16	0.175
7.00	0.22	0.18	0.200
10.00	0.27	0.19	0.230
12.00	0.29	0.21	0.250
14.00	0.31	0.22	0.265
16.00	0.34	0.23	0.285
18.00	0.36	0.24	0.300
20.00	0.38	0.26	0.320
10.00	0.35	0.25	0.300
5.00	0.27	0.22	0.245
2.00	0.17	0.19	0.180
5.00	0.22	0.21	0.215
10.00	0.29	0.23	0.260
15.00	0.34	0.25	0.295
20.00	0.38	0.27	0.325
25.00	0.43	0.31	0.370
30.00	0.49	0.35	0.420
20.00	0.48	0.35	0.415
10.00	0.44	0.32	0.380
5.00	0.32	0.28	0.300
3.00	0.25	0.24	0.245
6.00	0.29	0.25	0.270
10.00	0.34	0.27	0.305
15.00	0.38	0.30	0.340
20.00	0.42	0.32	0.370
25.00	0.46	0.34	0.400
30.00	0.50	0.36	0.430
35.00	0.54	0.41	0.475
40.00	0.59	0.47	0.530
45.00	0.64	0.52	0.580
50.00	0.69	0.59	0.640
30.00	0.67	0.59	0.630
20.00	0.61	0.56	0.585
10.00	0.51	0.50	0.505
6.00	0.45	0.42	0.435
3.00	0.37	0.33	0.350
1.50	0.35	0.27	0.310
	0.30	0.30	



Dc (Calculation Deformation Modulus) = 0.86×e×T*×[⊿P/(⊿D/D)]

e : efficiency of jack's hydraulic system = 0.93

[Coeffcient Dependent on Poission's Ratio] = 1.438

Poission's Ratio	0.10	0.20	0.25	0.30	0.33	0.40	0.50
T*	1.519	1.474	1.438	1.397	1.366	1.289	1.151

D : jack operating point = 76.200 (mm)

⊿P = $P_2 - P_1$ 50.00 − 8.00 = 42 (MPa)

⊿D = $D_2 - D_1$ 0.640 − 0.195 = 0.445 (mm)

= 1.0595 (mm/100MPa)

Dc = 8.27E+03 (MPa) = 1.20E+06 (psi)

[* If Dc>1E+06(psi), Use Fallowing Correction Data for Determining E_{true}]

E_{calc}	0	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.9	1.0
1	1.2	1.3	1.5	1.7	1.9	2.1	2.4	2.6	2.9	3.1
2	3.4	3.7	4.0	4.3	4.7	5.1	5.6	6.0	6.5	7.0
3	7.6	8.2	9.0	9.7	10.6	11.5	12.5	13.4	14.3	15.3

Dt (True Deformation Modulus)

= 1.51E+06 (psi) **= 1.04E+04** (MPa)

Ec(Calculation Elastic Modulus)

⊿P = $P_2 - P_1$ = 50.00 − 5.00 = 45 (MPa)

⊿D = $D_2 - D_1$ = 0.640 − 0.245 = 0.395 D_2 (mm)

Ec = 9.98E+03 (MPa) = 1.45E+06 (psi)

* Because Ec>1E+06(psi), Correction data use

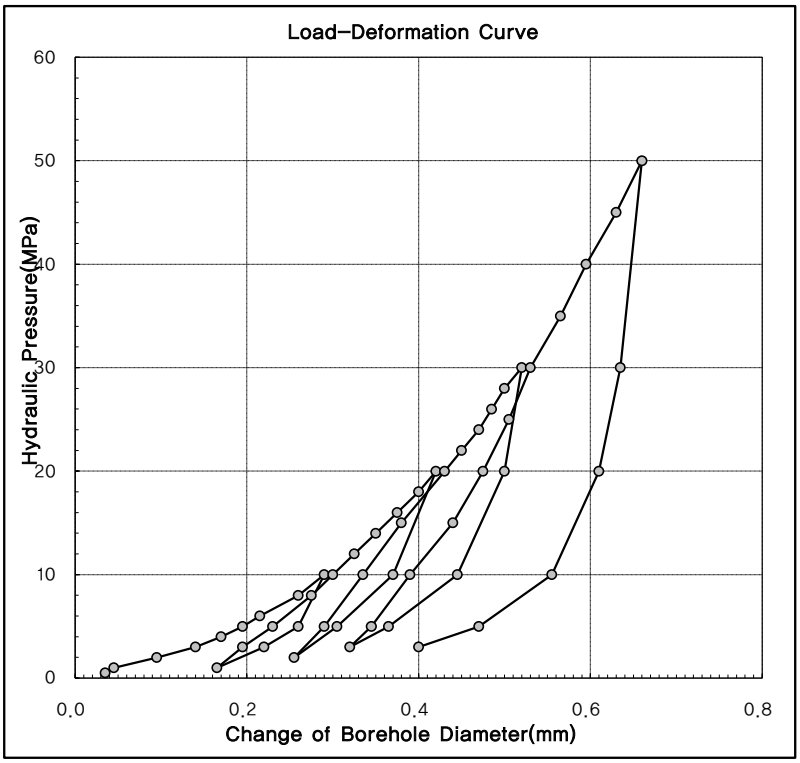
Et = 2.03E+06 (psi) **= 1.40E+04** (MPa)

공 내 재 하 시 험

(Goodmanjack Test Sheet)

공 사 명		중앙선(도담~영천)복선전철 제5공구 지반조사						시험일자	2014. 07. 05
공 번	NTB-76	심도(m)	13.0	TCR/RQD	100/97	시험자	이종현	D =	**1.23E+04** (MPa)
지 층	경암	암 종	셰일			작성자	박상우	E =	**1.66E+04** (MPa)

Presure (MPa)	LVDT Displacement Reading (mm)		
	Near (mm)	Far (mm)	⊿AVG (mm)
0.50	0.04	0.03	0.035
1.00	0.08	0.01	0.045
2.00	0.11	0.08	0.095
3.00	0.14	0.14	0.140
4.00	0.16	0.18	0.170
5.00	0.18	0.21	0.195
6.00	0.20	0.23	0.215
8.00	0.24	0.28	0.260
10.00	0.25	0.33	0.290
5.00	0.21	0.31	0.260
3.00	0.18	0.26	0.220
1.00	0.13	0.20	0.165
3.00	0.18	0.21	0.195
5.00	0.21	0.25	0.230
8.00	0.24	0.31	0.275
10.00	0.26	0.34	0.300
12.00	0.28	0.37	0.325
14.00	0.30	0.40	0.350
16.00	0.31	0.44	0.375
18.00	0.33	0.47	0.400
20.00	0.34	0.50	0.420
10.00	0.26	0.48	0.370
5.00	0.23	0.38	0.305
2.00	0.23	0.28	0.255
5.00	0.27	0.31	0.290
10.00	0.30	0.37	0.335
15.00	0.31	0.45	0.380
20.00	0.35	0.51	0.430
22.00	0.37	0.53	0.450
24.00	0.38	0.56	0.470
26.00	0.38	0.59	0.485
28.00	0.40	0.60	0.500
30.00	0.41	0.63	0.520
20.00	0.39	0.61	0.500
10.00	0.41	0.48	0.445
5.00	0.36	0.37	0.365
3.00	0.34	0.30	0.320
5.00	0.37	0.32	0.345
10.00	0.37	0.41	0.390
15.00	0.40	0.48	0.440
20.00	0.40	0.55	0.475
25.00	0.41	0.60	0.505
30.00	0.42	0.64	0.530
35.00	0.43	0.70	0.565
40.00	0.45	0.74	0.595
45.00	0.47	0.79	0.630
50.00	0.50	0.82	0.660
30.00	0.48	0.79	0.635
20.00	0.50	0.72	0.610
10.00	0.51	0.60	0.555
5.00	0.48	0.46	0.470
3.00	0.41	0.39	0.400



Dc (Calculation Deformation Modulus) = 0.86×e×T*×[⊿P/(⊿D/D)]

e : efficiency of jack's hydraulic system = 0.93

[Coeffcient Dependent on Poission's Ratio] = 1.438

Poission's Ratio	0.10	0.20	0.25	0.30	0.33	0.40	0.50
T*	1.519	1.474	1.438	1.397	1.366	1.289	1.151

D : jack operating point = 76.200 (mm)

⊿P = $P_2 - P_1$ 50.00 − 8.00 = 42 (MPa)

⊿D = $D_2 - D_1$ 0.660 − 0.260 = 0.400 (mm)

= 0.9524 (mm/100MPa)

Dc = 9.20E+03 (MPa) = 1.33E+06 (psi)

[* If Dc>1E+06(psi), Use Fallowing Correction Data for Determining E_{true}]

E_{calc}	0	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.9	1.0
1	1.2	1.3	1.5	1.7	1.9	2.1	2.4	2.6	2.9	3.1
2	3.4	3.7	4.0	4.3	4.7	5.1	5.6	6.0	6.5	7.0
3	7.6	8.2	9.0	9.7	10.6	11.5	12.5	13.4	14.3	15.3

Dt (True Deformation Modulus)

= 1.78E+06 (psi) **= 1.23E+04** (MPa)

Ec(Calculation Elastic Modulus)

⊿P = $P_2 - P_1$ = 50.00 − 5.00 = 45 (MPa)

⊿D = $D_2 - D_1$ = 0.660 − 0.305 = 0.355 D_2 (mm)

Ec = 1.11E+04 (MPa) = 1.61E+06 (psi)

* Because Ec>1E+06(psi), Correction data use

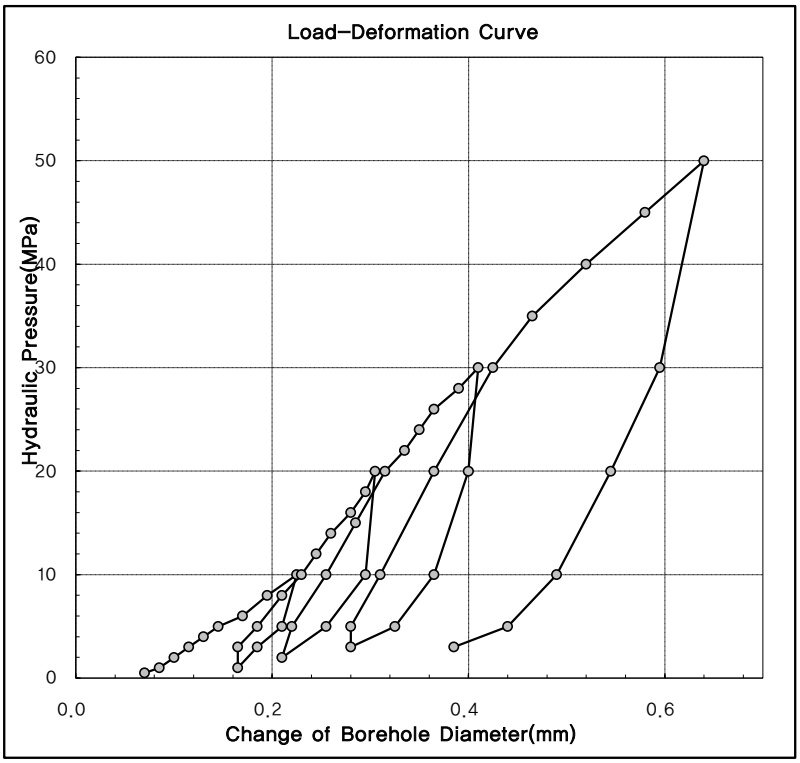
Et = 2.40E+06 (psi) **= 1.66E+04** (MPa)

공 내 재 하 시 험

(Goodmanjack Test Sheet)

공 사 명		중앙선(도담~영천)복선전철 제5공구 지반조사						시험일자	2014. 05. 24
공 번	NTB-85	심도(m)	30.7	TCR/RQD	100/100	시험자	이종현	D =	**1.04E+04** (MPa)
지 층	경암	암 종	셰일			작성자	박상우	E =	**1.46E+04** (MPa)

Presure (MPa)	LVDT Displacement Reading (mm)		
	Near (mm)	Far (mm)	⊿AVG (mm)
0.50	0.13	0.01	0.070
1.00	0.16	0.01	0.085
2.00	0.18	0.02	0.100
3.00	0.20	0.03	0.115
4.00	0.22	0.04	0.130
5.00	0.24	0.05	0.145
6.00	0.27	0.07	0.170
8.00	0.30	0.09	0.195
10.00	0.34	0.11	0.225
5.00	0.31	0.11	0.210
3.00	0.27	0.10	0.185
1.00	0.23	0.10	0.165
3.00	0.24	0.09	0.165
5.00	0.27	0.10	0.185
8.00	0.31	0.11	0.210
10.00	0.34	0.12	0.230
12.00	0.36	0.13	0.245
14.00	0.38	0.14	0.260
16.00	0.41	0.15	0.280
18.00	0.43	0.16	0.295
20.00	0.44	0.17	0.305
10.00	0.42	0.17	0.295
5.00	0.35	0.16	0.255
2.00	0.27	0.15	0.210
5.00	0.30	0.14	0.220
10.00	0.35	0.16	0.255
15.00	0.40	0.17	0.285
20.00	0.45	0.18	0.315
22.00	0.48	0.19	0.335
24.00	0.50	0.20	0.350
26.00	0.51	0.22	0.365
28.00	0.53	0.25	0.390
30.00	0.55	0.27	0.410
20.00	0.54	0.26	0.400
10.00	0.48	0.25	0.365
5.00	0.41	0.24	0.325
3.00	0.33	0.23	0.280
5.00	0.35	0.21	0.280
10.00	0.40	0.22	0.310
20.00	0.49	0.24	0.365
30.00	0.56	0.29	0.425
35.00	0.59	0.34	0.465
40.00	0.66	0.38	0.520
45.00	0.72	0.44	0.580
50.00	0.77	0.51	0.640
30.00	0.68	0.51	0.595
20.00	0.59	0.50	0.545
10.00	0.51	0.47	0.490
5.00	0.45	0.43	0.440
3.00	0.38	0.39	0.385



Dc (Calculation Deformation Modulus) = 0.86×e×T*×[⊿P/(⊿D/D)]

e : efficiency of jack's hydraulic system = 0.93

[Coeffcient Dependent on Poission's Ratio] = 1.438

Poission's Ratio	0.10	0.20	0.25	0.30	0.33	0.40	0.50
T*	1.519	1.474	1.438	1.397	1.366	1.289	1.151

D : jack operating point = 76.200 (mm)

⊿P = $P_2 - P_1$ 50.00 − 8.00 = 42 (MPa)

⊿D = $D_2 - D_1$ 0.640 − 0.195 = 0.445 (mm)

= 1.0595 (mm/100MPa)

Dc = 8.27E+03 (MPa) = 1.20E+06 (psi)

[* If Dc>1E+06(psi), Use Fallowing Correction Data for Determining E_{true}]

E_{calc}	0	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.9	1.0
1	1.2	1.3	1.5	1.7	1.9	2.1	2.4	2.6	2.9	3.1
2	3.4	3.7	4.0	4.3	4.7	5.1	5.6	6.0	6.5	7.0
3	7.6	8.2	9.0	9.7	10.6	11.5	12.5	13.4	14.3	15.3

Dt (True Deformation Modulus)

= 1.51E+06 (psi) **= 1.04E+04** (MPa)

Ec(Calculation Elastic Modulus)

⊿P = $P_2 - P_1$ = 50.00 − 5.00 = 45 (MPa)

⊿D = $D_2 - D_1$ = 0.640 − 0.255 = 0.385 D_2 (mm)

Ec = 1.02E+04 (MPa) = 1.49E+06 (psi)

* Because Ec>1E+06(psi), Correction data use

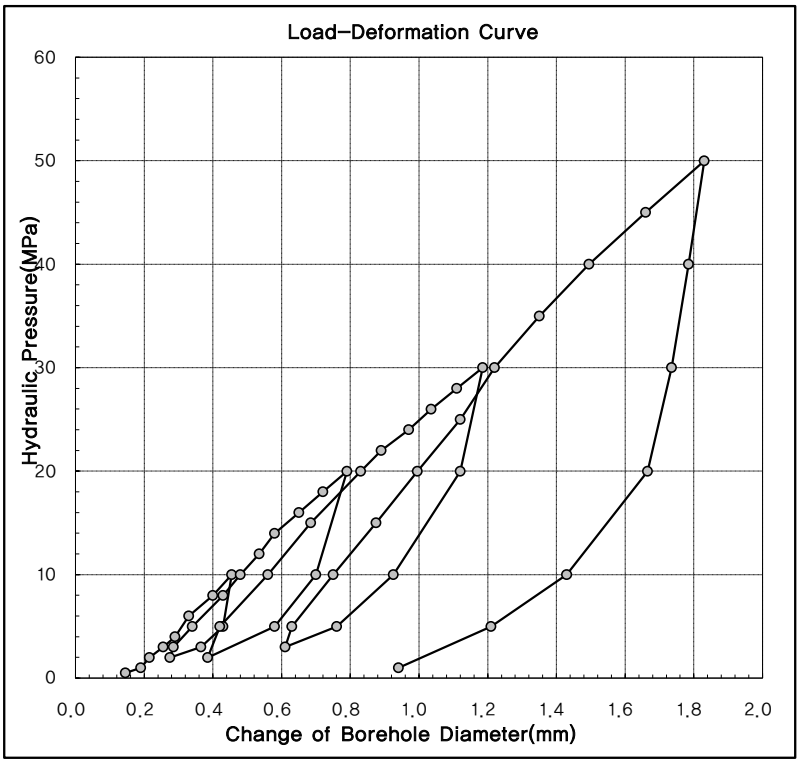
Et = 2.11E+06 (psi) **= 1.46E+04** (MPa)

공 내 재 하 시 험

(Goodmanjack Test Sheet)

공 사 명		중앙선(도담~영천)복선전철 제5공구 지반조사						시험일자	2014. 07. 28
공 번	NTB-88	심도(m)	6.0	TCR/RQD	44/21	시험자	이종현	D =	2.57E+03 (MPa)
지 층	연암	암 종	셰일			작성자	박상우	E =	3.15E+03 (MPa)

Presure (MPa)	LVDT Displacement Reading (mm)		
	Near (mm)	Far (mm)	⊿AVG (mm)
0.50	0.40	-0.11	0.145
1.00	0.43	-0.05	0.190
2.00	0.44	-0.01	0.215
3.00	0.44	0.07	0.255
4.00	0.45	0.13	0.290
6.00	0.45	0.21	0.330
8.00	0.46	0.34	0.400
10.00	0.46	0.45	0.455
5.00	0.46	0.40	0.430
3.00	0.46	0.27	0.365
2.00	0.46	0.09	0.275
3.00	0.46	0.11	0.285
5.00	0.46	0.22	0.340
8.00	0.46	0.40	0.430
10.00	0.46	0.50	0.480
12.00	0.47	0.60	0.535
14.00	0.47	0.69	0.580
16.00	0.47	0.83	0.650
18.00	0.47	0.97	0.720
20.00	0.47	1.11	0.790
10.00	0.47	0.93	0.700
5.00	0.47	0.69	0.580
2.00	0.47	0.30	0.385
5.00	0.47	0.37	0.420
10.00	0.47	0.65	0.560
15.00	0.47	0.90	0.685
20.00	0.47	1.19	0.830
22.00	0.47	1.31	0.890
24.00	0.47	1.47	0.970
26.00	0.47	1.60	1.035
28.00	0.47	1.75	1.110
30.00	0.47	1.90	1.185
20.00	0.47	1.77	1.120
10.00	0.47	1.38	0.925
5.00	0.47	1.05	0.760
3.00	0.47	0.75	0.610
5.00	0.47	0.79	0.630
10.00	0.46	1.04	0.750
15.00	0.47	1.28	0.875
20.00	0.46	1.53	0.995
25.00	0.47	1.77	1.120
30.00	0.47	1.97	1.220
35.00	0.47	2.23	1.350
40.00	0.47	2.52	1.495
45.00	0.47	2.85	1.660
50.00	0.47	3.19	1.830
40.00	0.47	3.10	1.785
30.00	0.47	3.00	1.735
20.00	0.48	2.85	1.665
10.00	0.48	2.38	1.430
5.00	0.48	1.94	1.210
1.00	0.48	1.40	0.940
0.50	0.49	0.82	



Dc (Calculation Deformation Modulus) = 0.86×e×T*×[⊿P/(⊿D/D)]

e : efficiency of jack's hydraulic system = 0.93

[Coeffcient Dependent on Poission's Ratio] = 1.438

Poission's Ratio	0.10	0.20	0.25	0.30	0.33	0.40	0.50
T*	1.519	1.474	1.438	1.397	1.366	1.289	1.151

D : jack operating point = 76.200 (mm)

⊿P = $P_2 - P_1$ 50.00 − 8.00 = 42 (MPa)

⊿D = $D_2 - D_1$ 1.830 − 0.400 = 1.430 (mm)

= 3.4048 (mm/100MPa)

Dc = 2.57E+03 (MPa) = 3.73E+05 (psi)

[* If Dc>1E+06(psi), Use Fallowing Correction Data for Determining E_{true}]

E_{calc}	0	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.9	1.0
1	1.2	1.3	1.5	1.7	1.9	2.1	2.4	2.6	2.9	3.1
2	3.4	3.7	4.0	4.3	4.7	5.1	5.6	6.0	6.5	7.0
3	7.6	8.2	9.0	9.7	10.6	11.5	12.5	13.4	14.3	15.3

Dt (True Deformation Modulus)

= 3.73E+05 (psi) **= 2.57E+03** (MPa)

Ec(Calculation Elastic Modulus)

⊿P = $P_2 - P_1$ = 50.00 − 5.00 = 45 (MPa)

⊿D = $D_2 - D_1$ = 1.830 − 0.580 = 1.25 D_2 (mm)

Ec = 3.15E+03 (MPa) = 4.58E+05 (psi)

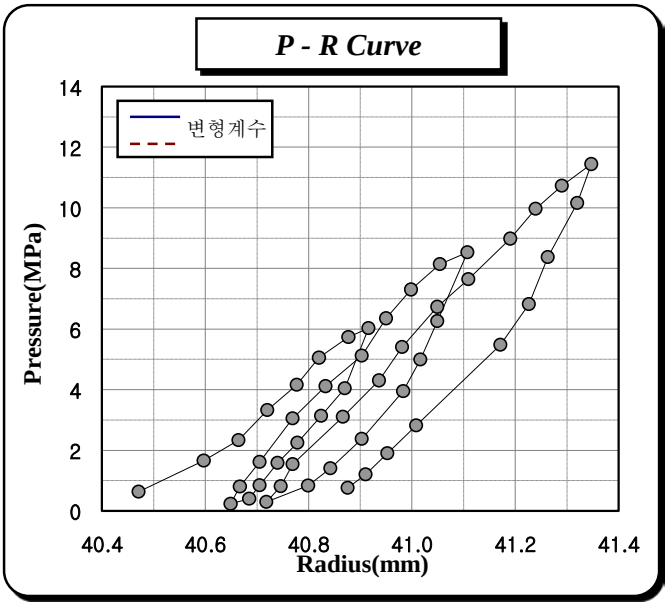
* Because Ec>1E+06(psi), Correction data use

Et = 4.58E+05 (psi) **= 3.15E+03** (MPa)

PRESSUREMETER TEST RESULT

Project Name	중앙선(도담~영천)복선전철 제5공구 지반조사				Model	Elastmeter - 2	
Hole No.	NTB-28	Geology	연암	Rock Name	퇴적암	RQD(%)	30
Depth (m)	14.0m	Tested by	S.C.LEE	Checked by	J.H.LEE	Date	2014.6

No.	Pressure (MPa)	Radius (mm)	No.	Pressure (MPa)	Radius (mm)	No.	Pressure (MPa)	Radius (mm)
1	0.63	40.47	35	4.30	40.94			
2	1.65	40.60	36	5.40	40.98			
3	2.33	40.66	37	6.73	41.05			
4	3.32	40.72	38	7.64	41.11			
5	4.16	40.78	39	8.98	41.19			
6	5.05	40.82	40	9.97	41.24			
7	5.73	40.88	41	10.73	41.29			
8	6.03	40.92	42	11.44	41.35			
9	4.04	40.87	43	10.16	41.32			
10	3.13	40.82	44	8.37	41.26			
11	2.25	40.78	45	6.82	41.23			
12	1.58	40.74	46	5.48	41.17			
13	0.84	40.71	47	2.82	41.01			
14	0.40	40.69	48	1.90	40.95			
15	0.23	40.65	49	1.20	40.91			
16	0.80	40.67	50	0.76	40.88			
17	1.61	40.71						
18	3.05	40.77						
19	4.11	40.83						
20	5.12	40.90						
21	6.35	40.95						
22	7.30	41.00						
23	8.14	41.05						
24	8.53	41.11						
25	6.26	41.05						
26	4.99	41.02						
27	3.95	40.98						
28	2.37	40.90						
29	1.40	40.84						
30	0.83	40.80						
31	0.29	40.72						
32	0.81	40.75						
33	1.54	40.77						
34	3.10	40.87						



	변형계수	탄성계수
P_o	2.33 MPa	0.81 MPa
P_y	8.37 MPa	10.73 MPa
R_o	40.66 mm	40.75 mm
R_y	41.26 mm	41.29 mm
v	0.25	
K_o	10.1 MPa/mm	18.2 MPa/mm
R_m	40.96 mm	41.02 mm
E_d	516.5 MPa	935.0 MPa

Remarks

$K_o = (P_y - P_o) / (R_y - R_o)$

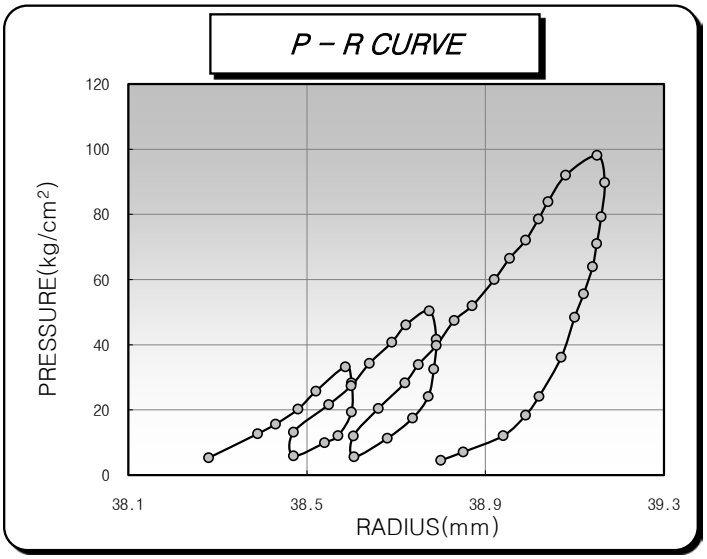
$R_m = (R_o + R_y) / 2$

$E_d = (1 + \upsilon) \times K_o \times R_m$

공 내 재 하 시 험
(PRESSUREMETER TEST RESULT)

PROJECT	중앙선(도담~영천)복선전철 제5공구 지반조사					Elastmeter - 200	
HOLE NO.	NTB-32	CLASS	연암	ROCK NAME	셰일	RQD	14
DEPTH (m)	9.5	TESTED BY	이종현	CHECKED BY	박상우	DATE	2014. 07. 04

NO	PRESSURE (kg/cm^2)	RADIUS (mm)	NO	PRESSURE (kg/cm^2)	RADIUS (mm)	NO	PRESSURE (kg/cm^2)	RADIUS (mm)
1	5.3	38.28	23	11.3	38.68	45	36.1	39.07
2	12.7	38.39	24	5.6	38.61	46	24.2	39.02
3	15.6	38.43	25	12.0	38.60	47	18.4	38.99
4	20.2	38.48	26	20.4	38.66	48	12.1	38.94
5	25.7	38.52	27	28.3	38.72	49	7.1	38.85
6	33.2	38.59	28	33.9	38.75	50	4.5	38.80
7	28.3	38.60	29	39.8	38.79	51		
8	19.3	38.60	30	47.4	38.83	52		
9	12.1	38.57	31	52.0	38.87	53		
10	9.9	38.54	32	60.0	38.92	54		
11	5.9	38.47	33	66.5	38.95	55		
12	13.1	38.47	34	72.1	38.99	56		
13	21.6	38.55	35	78.6	39.02	57		
14	27.4	38.60	36	83.9	39.04	58		
15	34.3	38.64	37	92.0	39.08	59		
16	40.8	38.69	38	98.1	39.15	60		
17	46.1	38.72	39	89.8	39.17	61		
18	50.4	38.77	40	79.3	39.16	62		
19	41.6	38.79	41	71.0	39.15	63		
20	32.5	38.78	42	63.9	39.14	64		
21	24.2	38.77	43	55.6	39.12	65		
22	17.5	38.74	44	48.4	39.10	66		



	변형계수(D)	탄성계수(E)
Po	25.7 kg/㎠	12 kg/㎠
Py	78.6 kg/㎠	78.6 kg/㎠
Ro	38.52 mm	38.604 mm
Ry	39.019 mm	39.019 mm
ν	0.30	
Kb	1060 kg/㎤	1605 kg/㎤
Rm	38.7695 mm	38.8115 mm
D, E	534 Mpa	623 Mpa

REMARKS

Kb = (Py - Po) / (Ry - Ro)

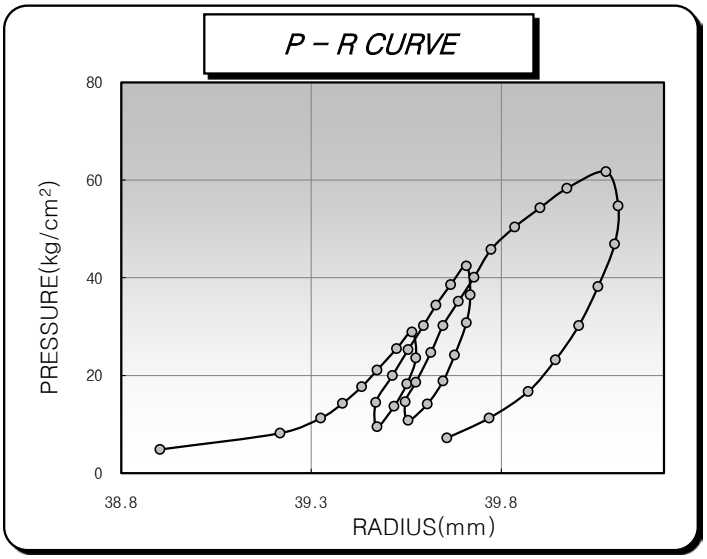
Rm = (Ro + Ry) / 2

D ,E = (1 + υ) x Kb x Rm

공 내 재 하 시 험
(PRESSUREMETER TEST RESULT)

PROJECT	중앙선(도담~영천)복선전철 제5공구 지반조사					Elastmeter - 200	
HOLE NO.	NTB-47	CLASS	풍 화 암	ROCK NAME	셰일	RQD	32
DEPTH (m)	4.5	TESTED BY	이종현	CHECKED BY	박상우	DATE	2014. 08. 09

NO	PRESSURE (kg/cm^2)	RADIUS (mm)	NO	PRESSURE (kg/cm^2)	RADIUS (mm)	NO	PRESSURE (kg/cm^2)	RADIUS (mm)
1	4.9	38.90	23	18.9	39.63	45		
2	8.2	39.21	24	14.2	39.59	46		
3	11.3	39.32	25	10.8	39.54	47		
4	14.3	39.37	26	14.6	39.53	48		
5	17.7	39.42	27	18.6	39.56	49		
6	21.1	39.46	28	24.7	39.60	50		
7	25.5	39.51	29	30.2	39.63	51		
8	28.9	39.55	30	35.2	39.67	52		
9	23.6	39.56	31	40.1	39.71	53		
10	18.3	39.54	32	45.8	39.75	54		
11	13.7	39.50	33	50.4	39.82	55		
12	9.5	39.46	34	54.3	39.88	56		
13	14.5	39.46	35	58.3	39.95	57		
14	20.0	39.50	36	61.7	40.05	58		
15	25.3	39.54	37	54.7	40.08	59		
16	30.2	39.58	38	46.9	40.07	60		
17	34.4	39.61	39	38.2	40.03	61		
18	38.6	39.65	40	30.2	39.98	62		
19	42.5	39.69	41	23.2	39.92	63		
20	36.5	39.70	42	16.7	39.85	64		
21	30.8	39.69	43	11.3	39.75	65		
22	24.2	39.66	44	7.2	39.64	66		



	변형계수(D)	탄성계수(E)
Po	14.3 kg/㎠	14.6 kg/㎠
Py	50.4 kg/㎠	50.4 kg/㎠
Ro	39.371 mm	39.533 mm
Ry	39.815 mm	39.815 mm
ν	0.30	
Kb	813 kg/㎠	1270 kg/㎠
Rm	39.593 mm	39.674 mm
D, E	418 Mpa	504 Mpa

REMARKS

Kb = (Py - Po) / (Ry - Ro)

Rm = (Ro + Ry) / 2

D ,E = (1 + υ) x Kb x Rm

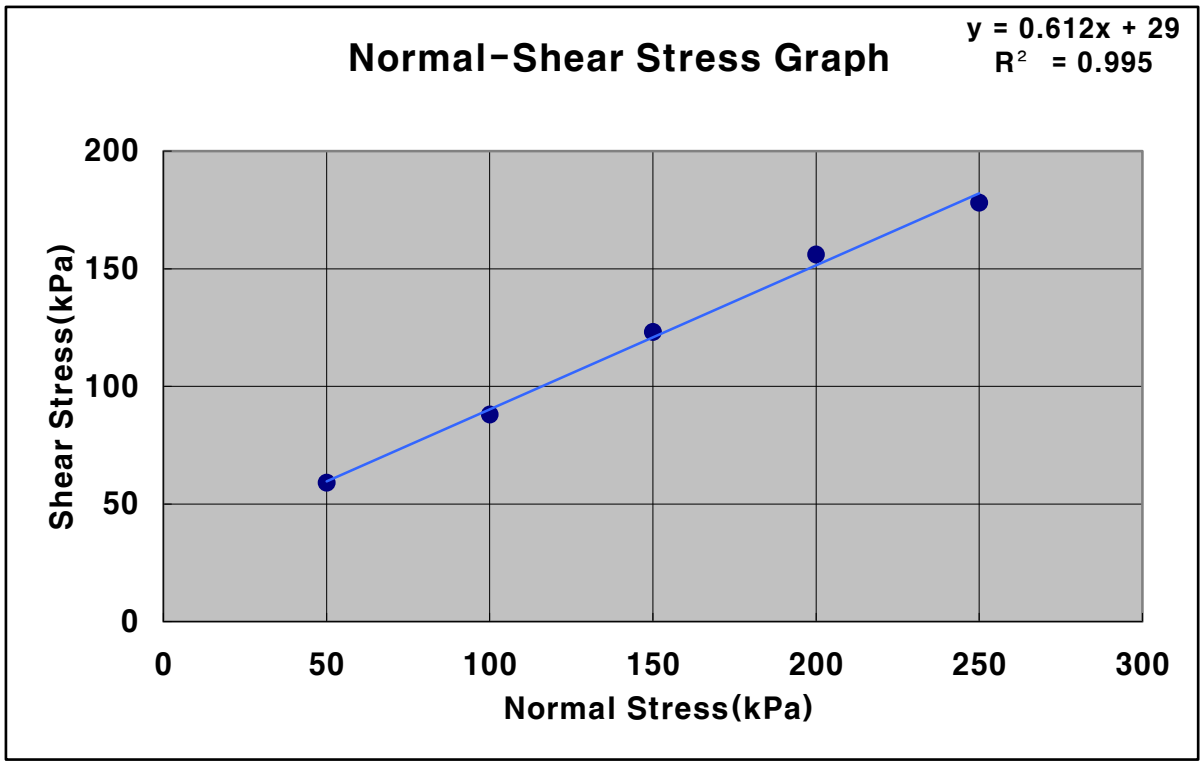
5.3 공내전단시험

Borehole Shear Test

Project Name	중앙선(도담~영천)복선전철 제5공구 지반조사		
Location	하화터널	STA.	
Borehole No.	NTB-5	Depth(m)	2.0
Test Date	2014년 5월 31일	Water level	5.0
Hole Size	NX	Soil Class	풍화암(50/7)

Test Data		
No.	Normal Stress (kPa)	Shear Stress (kPa)
1	50	59
2	100	88
3	150	123
4	200	156
5	250	178

Test Result		
Classfication	Unit	Value
Cohesion	kPa	29.00
Friction Angl	Degree	31.47
R Square	%	99.50

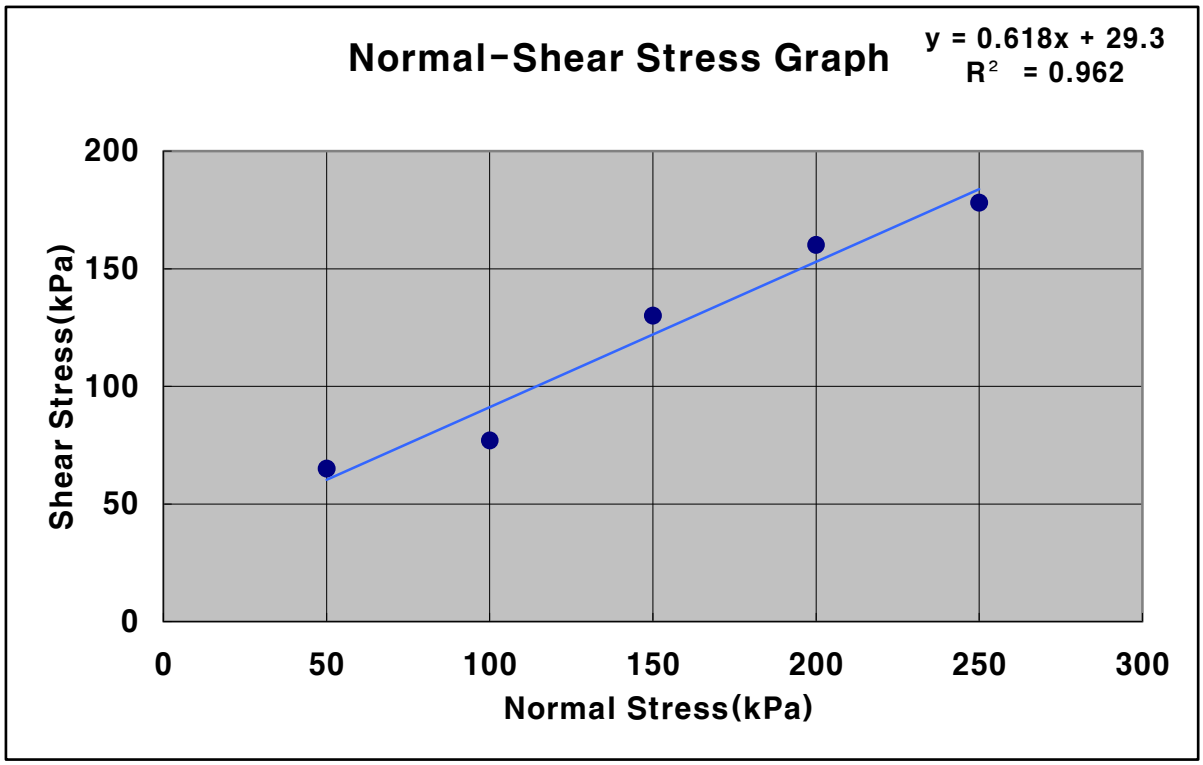


Borehole Shear Test

Project Name	중앙선(도담~영천)복선전철 제5공구 지반조사		
Location	팔성2터널	STA.	
Borehole No.	NTB-26	Depth(m)	2.0
Test Date	2014년 6월 10일	Water level	5.3
Hole Size	NX	Soil Class	풍화암(50/2)

Test Data		
No.	Normal Stress (kPa)	Shear Stress (kPa)
1	50	65
2	100	77
3	150	130
4	200	160
5	250	178

Test Result		
Classfication	Unit	Value
Cohesion	kPa	29.30
Friction Angl	Degree	31.72
R Square	%	96.27

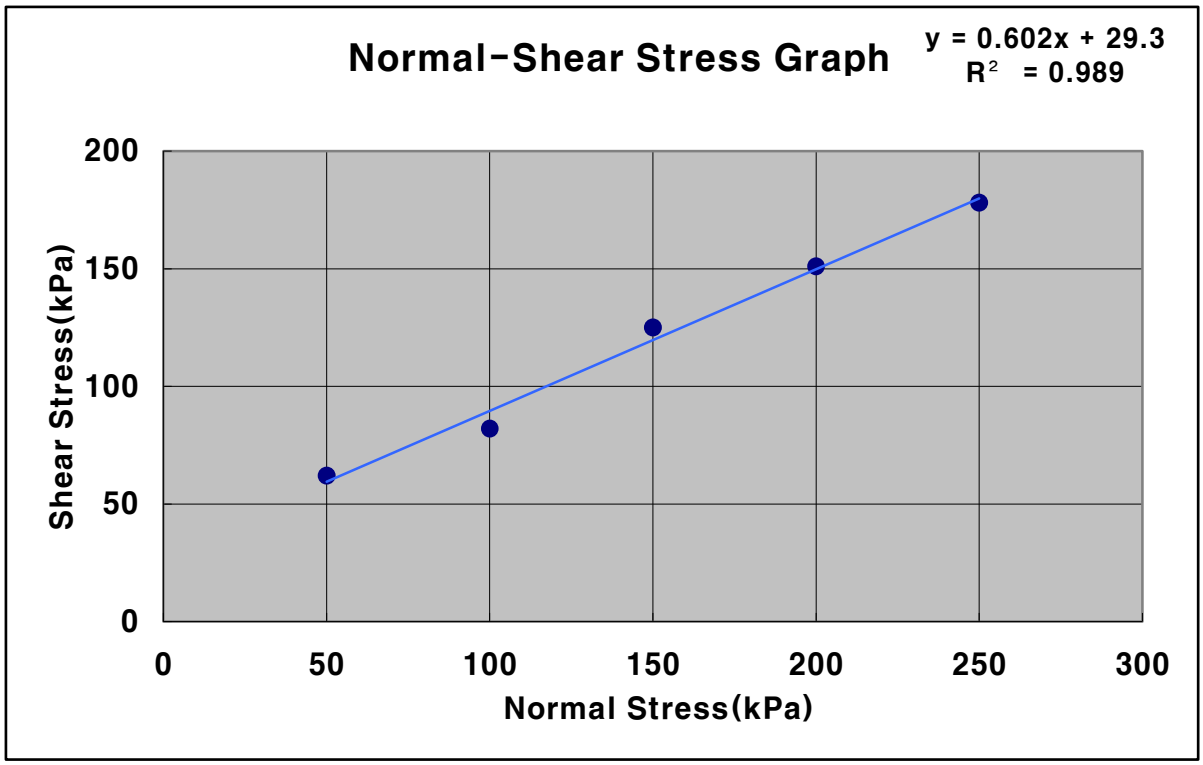


Borehole Shear Test

Project Name	중앙선(도담~영천)복선전철 제5공구 지반조사		
Location	비봉터널	STA.	
Borehole No.	NTB-27	Depth(m)	2.0
Test Date	2014년 6월 9일	Water level	6.0
Hole Size	NX	Soil Class	풍화암(50/3)

Test Data		
No.	Normal Stress (kPa)	Shear Stress (kPa)
1	50	62
2	100	82
3	150	125
4	200	151
5	250	178

Test Result		
Classfication	Unit	Value
Cohesion	kPa	29.30
Friction Angl	Degree	31.05
R Square	%	98.94

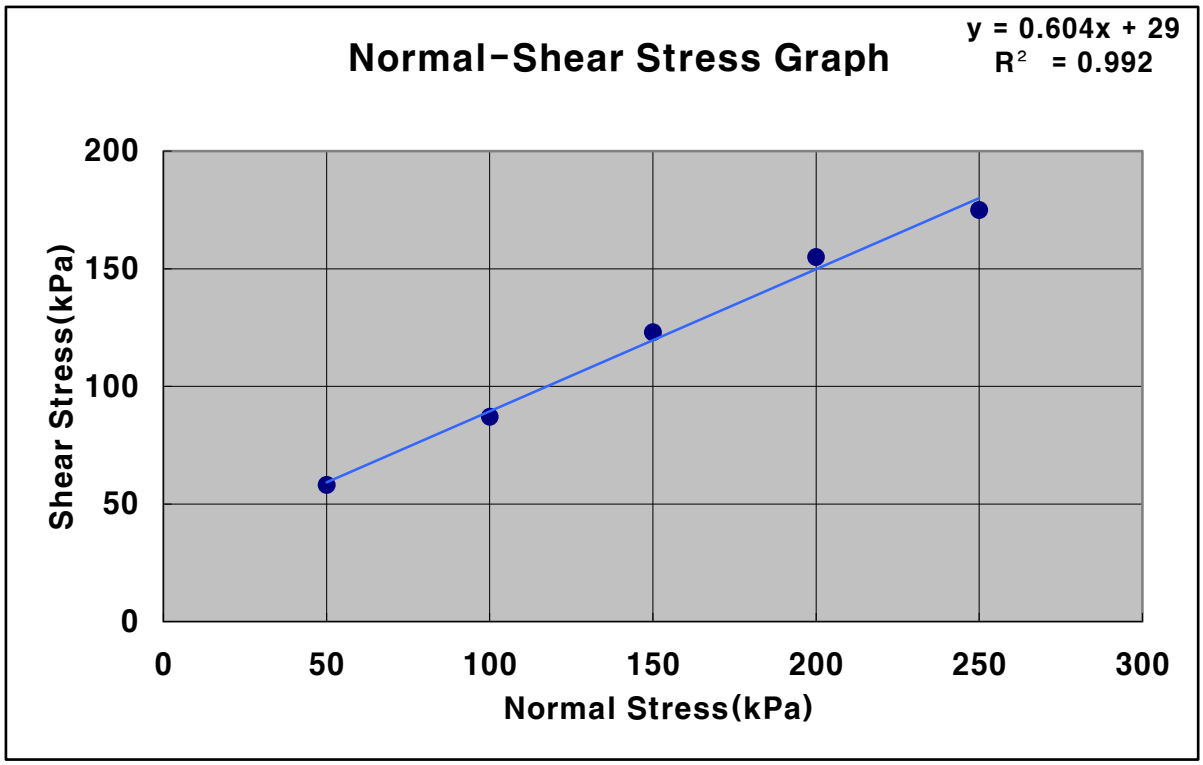


Borehole Shear Test

Project Name	중앙선(도담~영천)복선전철 제5공구 지반조사		
Location	하리터널	STA.	
Borehole No.	NTB-47	Depth(m)	1.0
Test Date	2014년 8월 9일	Water level	3.0
Hole Size	NX	Soil Class	풍화암(50/8)

Test Data		
No.	Normal Stress (kPa)	Shear Stress (kPa)
1	50	58
2	100	87
3	150	123
4	200	155
5	250	175

Test Result		
Classfication	Unit	Value
Cohesion	kPa	29.00
Friction Angl	Degree	31.13
R Square	%	99.23

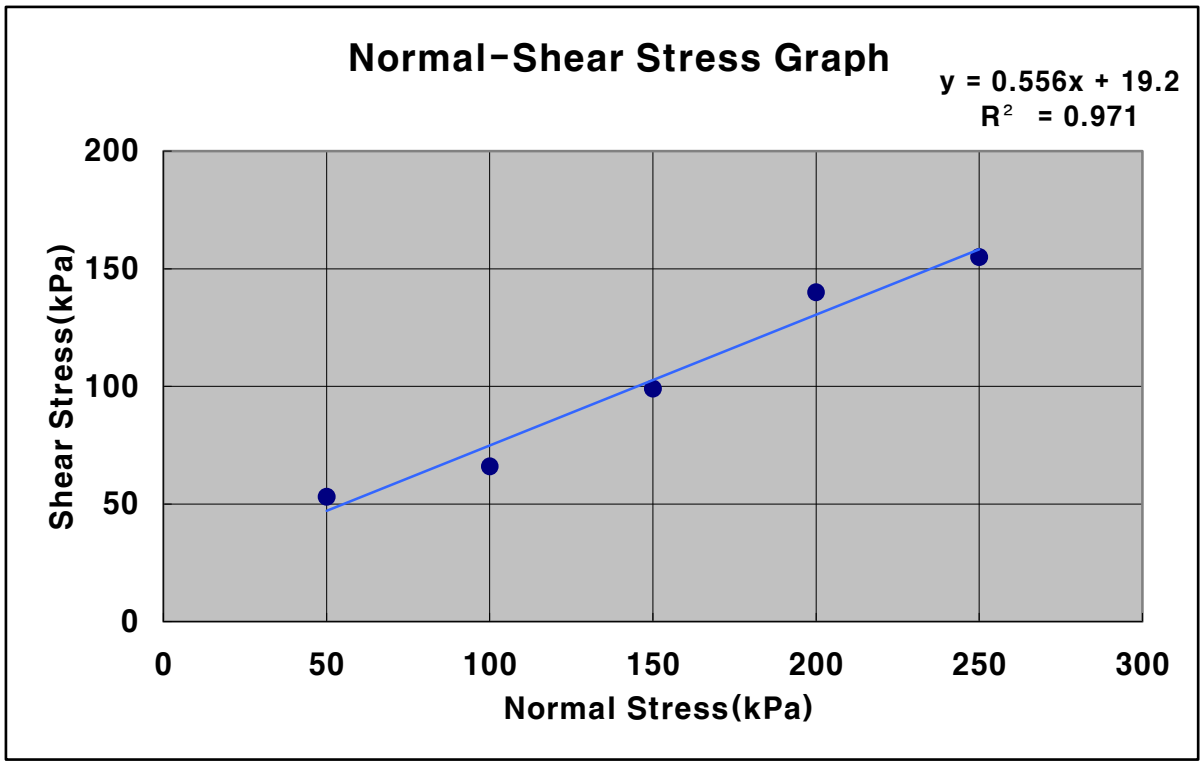


Borehole Shear Test

Project Name	중앙선(도담~영천)복선전철 제5공구 지반조사		
Location	청로터널	STA.	
Borehole No.	NTB-63	Depth(m)	4.0
Test Date	2014년 6월 22일	Water level	7.0
Hole Size	NX	Soil Class	풍화토(9/30)

Test Data		
No.	Normal Stress (kPa)	Shear Stress (kPa)
1	50	53
2	100	66
3	150	99
4	200	140
5	250	155

Test Result		
Classfication	Unit	Value
Cohesion	kPa	19.20
Friction Angl	Degree	29.07
R Square	%	97.12

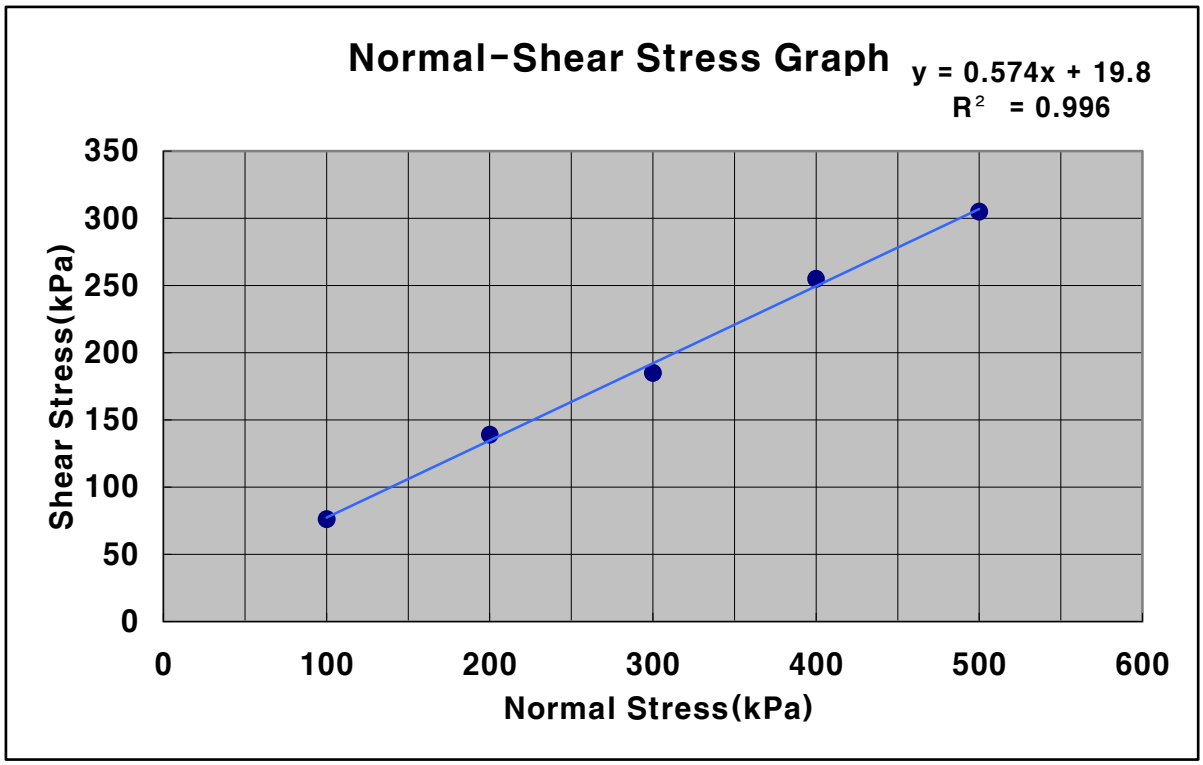


Borehole Shear Test

Project Name	중앙선(도담~영천)복선전철 제5공구 지반조사		
Location	순호터널	STA.	
Borehole No.	NTB-64	Depth(m)	2.0
Test Date	2014년 6월 24일	Water level	6.0
Hole Size	NX	Soil Class	풍화토(40/30)

Test Data		
No.	Normal Stress (kPa)	Shear Stress (kPa)
1	100	76
2	200	139
3	300	185
4	400	255
5	500	305

Test Result		
Classfication	Unit	Value
Cohesion	kPa	19.80
Friction Angl	Degree	29.86
R Square	%	99.68

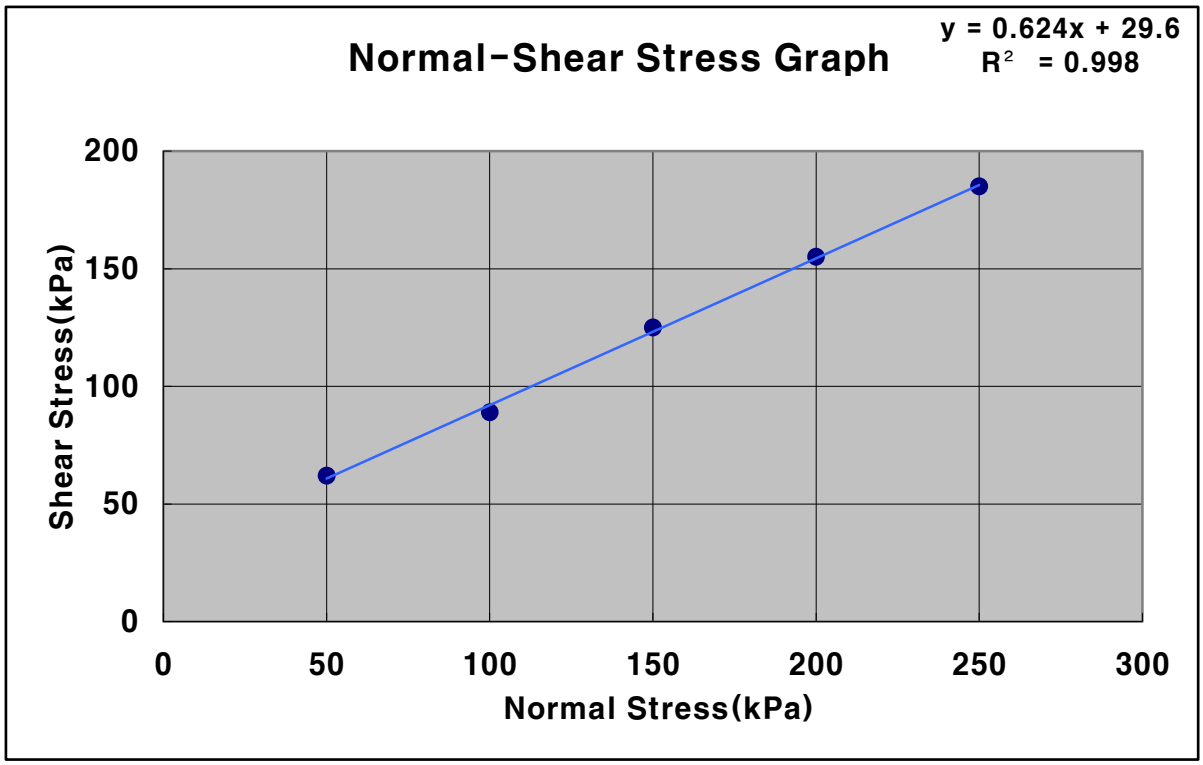


Borehole Shear Test

Project Name	중앙선(도담~영천)복선전철 제5공구 지반조사		
Location	수북터널	STA.	
Borehole No.	NTB-88	Depth(m)	1.0
Test Date	2014년 7월 28일	Water level	3.0
Hole Size	NX	Soil Class	풍화암(50/2)

Test Data		
No.	Normal Stress (kPa)	Shear Stress (kPa)
1	50	62
2	100	89
3	150	125
4	200	155
5	250	185

Test Result		
Classfication	Unit	Value
Cohesion	kPa	29.60
Friction Angl	Degree	31.96
R Square	%	99.85

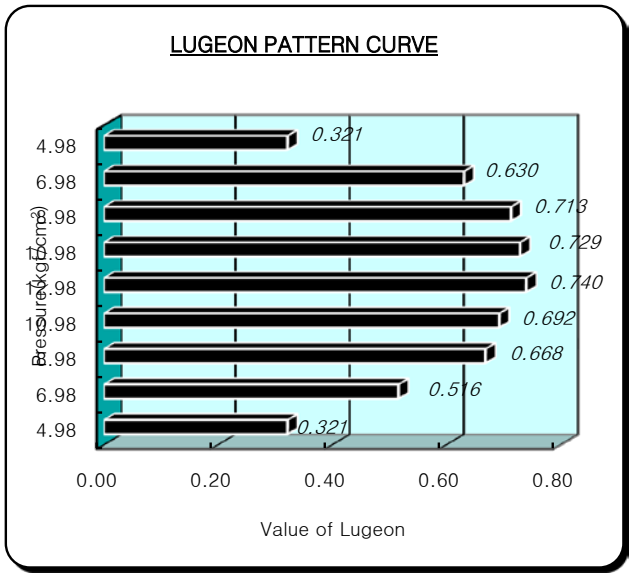


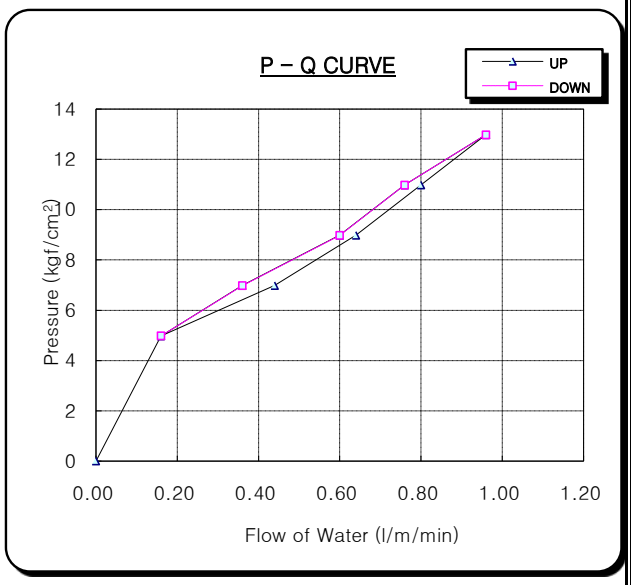
5.4 수압시험

WORKING SHEETS OF WATER PRESSURE TEST

Project	중앙선(도담~영천)복선전철 제5공구 지반조사					
Hole Number	NTB-1	Geology	경 암	Date	2014. 05. 25.	
Test Section (m)	37.3 ~ 42.3	Hole Diameter (cm)	7.6	G.W.L (m)	42.0	
Gauge Height from Ground (m)	0.0	Kind of Packer	Single	Tested by	이종현	
Length of Injection (m)	5.0	Depth to Half an Injector (m)	39.80	Checked by	이석철	

Injection Time	Pressure	Total Head	Readings of Flow Meter (ℓ)			Water Consumed	Flow of Water	K
(min)	(kgf/cm^2)	(m)	from	to	differences	(cm^3/min)	(ℓ/m/min)	(cm/sec)
5	1.0	49.8	550.0	554.0	4.0	800	0.160	4.154E-06
5	3.0	69.8	554.0	565.0	11.0	2,200	0.440	8.150E-06
5	5.0	89.8	565.0	581.0	16.0	3,200	0.640	9.214E-06
5	7.0	109.8	581.0	601.0	20.0	4,000	0.800	9.420E-06
5	9.0	129.8	601.0	625.0	24.0	4,800	0.960	9.562E-06
5	7.0	109.8	625.0	644.0	19.0	3,800	0.760	8.949E-06
5	5.0	89.8	644.0	659.0	15.0	3,000	0.600	8.639E-06
5	3.0	69.8	659.0	668.0	9.0	1,800	0.360	6.668E-06
5	1.0	49.8	668.0	672.0	4.0	800	0.160	4.154E-06





Pattern of Lugeon : **Dilation**

Value of Lugeon : **0.51**

Value of K : **6.5E-06** **cm/sec**

REMARKS

K = (2.30 x Q/60) / (2 x pi x L x H) x log(L/r)

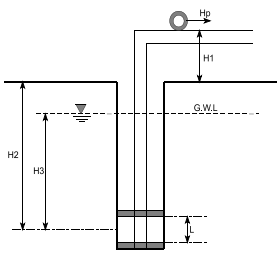
H = Hp + H1 + H2 + H3

Hp = variable head of water pressure

H1 = pressure gauge height from GL.

H2 = depth to half an injector

H3 = length of G.W.L to half an injector

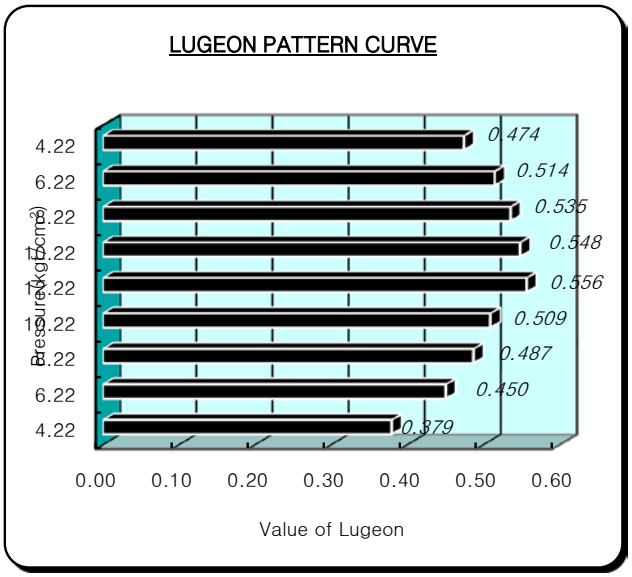


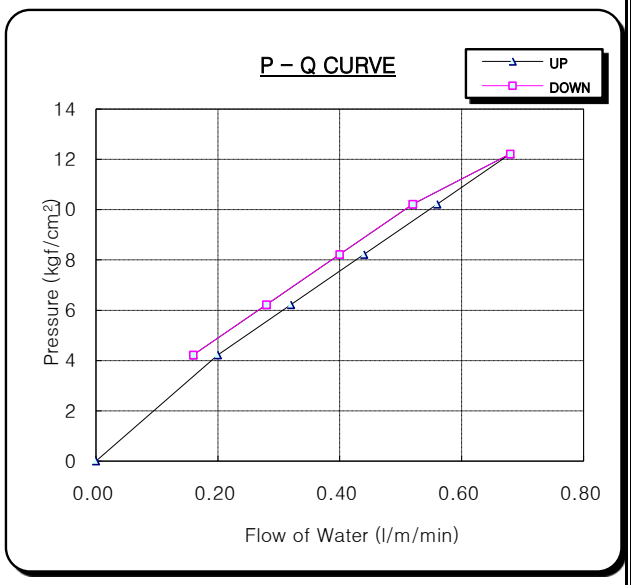
1. When the ground water level reveals above the upper packer the sign of H3 is minus (-)
2. When the ground water level reveals below the lower packer the sign of H3 is zero (0)

WORKING SHEETS OF WATER PRESSURE TEST

Project	중앙선(도담~영천)복선전철 제5공구 지반조사					
Hole Number	NTB-2	Geology	경 암	Date	2014. 06. 28.	
Test Section (m)	29.7 ~ 34.7	Hole Diameter (cm)	7.6	G.W.L (m)	34.0	
Gauge Height from Ground (m)	0.0	Kind of Packer	Single	Tested by	이종현	
Length of Injection (m)	5.0	Depth to Half an Injector (m)	32.20	Checked by	이석철	

Injection Time	Pressure	Total Head	Readings of Flow Meter (ℓ)			Water Consumed	Flow of Water	K
(min)	(kgf/cm^2)	(m)	from	to	differences	(cm^3/min)	(ℓ/m/min)	(cm/sec)
5	1.0	42.2	220.0	225.0	5.0	1,000	0.200	6.128E-06
5	3.0	62.2	225.0	233.0	8.0	1,600	0.320	6.652E-06
5	5.0	82.2	233.0	244.0	11.0	2,200	0.440	6.921E-06
5	7.0	102.2	244.0	258.0	14.0	2,800	0.560	7.084E-06
5	9.0	122.2	258.0	275.0	17.0	3,400	0.680	7.195E-06
5	7.0	102.2	275.0	288.0	13.0	2,600	0.520	6.578E-06
5	5.0	82.2	288.0	298.0	10.0	2,000	0.400	6.291E-06
5	3.0	62.2	298.0	305.0	7.0	1,400	0.280	5.820E-06
5	1.0	42.2	305.0	309.0	4.0	800	0.160	4.902E-06





Pattern of Lugeon : **Dilation**

Value of Lugeon : **0.47**

Value of K : **6.1E-06** **cm/sec**

REMARKS

K = (2.30 x Q/60) / (2 x pi x L x H) x log(L/r)

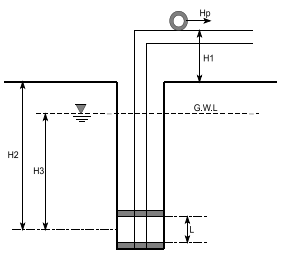
H = Hp + H1 + H2 + H3

Hp = variable head of water pressure

H1 = pressure gauge height from GL.

H2 = depth to half an injector

H3 = length of G.W.L to half an injector

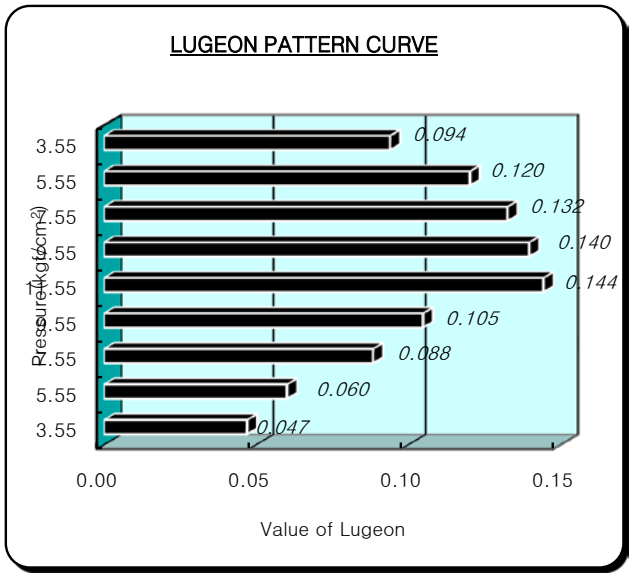


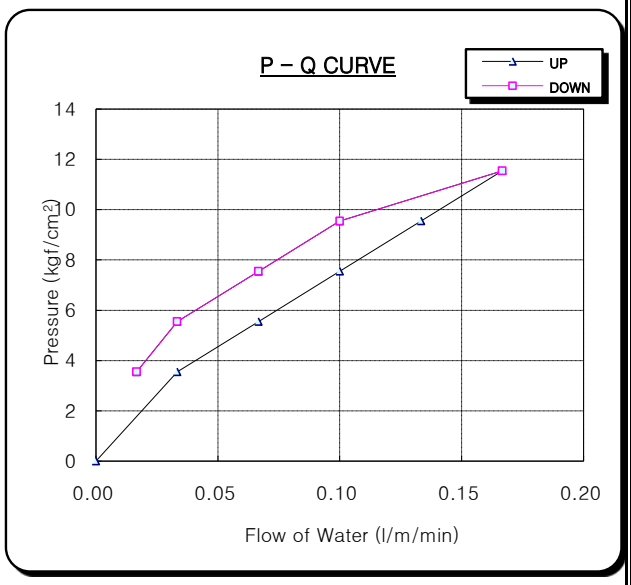
1. When the ground water level reveals above the upper packer the sign of H3 is minus (–)
2. When the ground water level reveals below the lower packer the sign of H3 is zero (0)

WORKING SHEETS OF WATER PRESSURE TEST

Project	중앙선(도담~영천)복선전철 제5공구 지반조사					
Hole Number	NTB-3	Geology	경 암	Date	2014. 05. 31.	
Test Section (m)	22.5 ~ 28.5	Hole Diameter (cm)	7.6	G.W.L (m)	38.0	
Gauge Height from Ground (m)	0.0	Kind of Packer	Single	Tested by	이종현	
Length of Injection (m)	6.0	Depth to Half an Injector (m)	25.50	Checked by	이석철	

Injection Time	Pressure	Total Head	Readings of Flow Meter (ℓ)			Water Consumed	Flow of Water	K
(min)	(kgf/cm^2)	(m)	from	to	differences	(cm^3/min)	(ℓ/m/min)	(cm/sec)
5	1.0	35.5	150.0	151.0	1.0	200	0.033	1.259E-06
5	3.0	55.5	151.0	153.0	2.0	400	0.067	1.611E-06
5	5.0	75.5	153.0	156.0	3.0	600	0.100	1.776E-06
5	7.0	95.5	156.0	160.0	4.0	800	0.133	1.873E-06
5	9.0	115.5	160.0	165.0	5.0	1,000	0.167	1.935E-06
5	7.0	95.5	165.0	168.0	3.0	600	0.100	1.404E-06
5	5.0	75.5	168.0	170.0	2.0	400	0.067	1.184E-06
5	3.0	55.5	170.0	171.0	1.0	200	0.033	8.055E-07
5	1.0	35.5	171.0	171.5	0.5	100	0.017	6.297E-07





Pattern of Lugeon : **Dilation**

Value of Lugeon : **0.09**

Value of K : **1.2E-06** **cm/sec**

REMARKS

K = (2.30 x Q/60) / (2 x pi x L x H) x log(L/r)

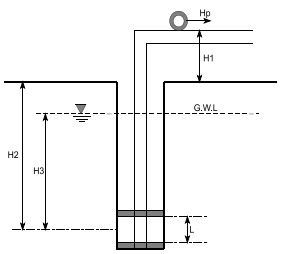
H = Hp + H1 + H2 + H3

Hp = variable head of water pressure

H1 = pressure gauge height from GL.

H2 = depth to half an injector

H3 = length of G.W.L to half an injector

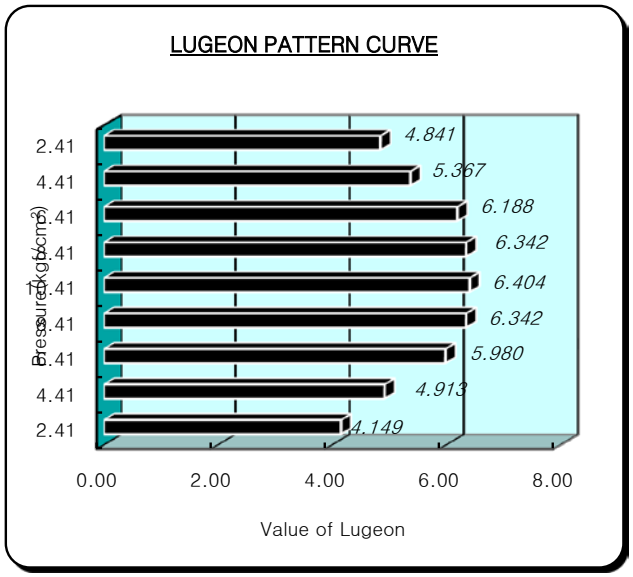


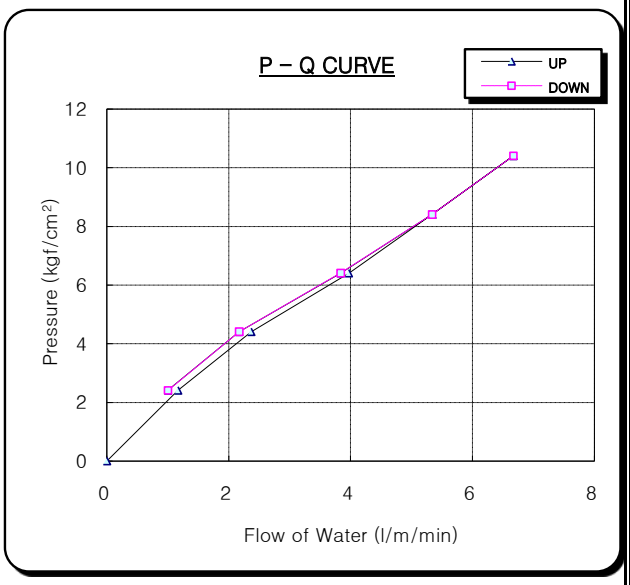
1. When the ground water level reveals above the upper packer the sign of H3 is minus (–)
2. When the ground water level reveals below the lower packer the sign of H3 is zero (0)

WORKING SHEETS OF WATER PRESSURE TEST

Project	중앙선(도담~영천)복선전철 제5공구 지반조사					
Hole Number	NTB-4	Geology	경 암	Date	2014. 05. 31.	
Test Section (m)	11.0 ~ 17.0	Hole Diameter (cm)	7.6	G.W.L (m)	17.0	
Gauge Height from Ground (m)	0.1	Kind of Packer	Single	Tested by	이종현	
Length of Injection (m)	6.0	Depth to Half an Injector (m)	14.00	Checked by	이석철	

Injection Time	Pressure	Total Head	Readings of Flow Meter (ℓ)			Water Consumed	Flow of Water	K
(min)	(kgf/cm^2)	(m)	from	to	differences	(cm^3/min)	(ℓ/m/min)	(cm/sec)
5	1.0	24.1	105.0	140.0	35.0	7,000	1.167	6.493E-05
5	3.0	44.1	140.0	211.0	71.0	14,200	2.367	7.198E-05
5	5.0	64.1	211.0	330.0	119.0	23,800	3.967	8.300E-05
5	7.0	84.1	330.0	490.0	160.0	32,000	5.333	8.505E-05
5	9.0	104.1	490.0	690.0	200.0	40,000	6.667	8.589E-05
5	7.0	84.1	690.0	850.0	160.0	32,000	5.333	8.505E-05
5	5.0	64.1	850.0	965.0	115.0	23,000	3.833	8.021E-05
5	3.0	44.1	965.0	1030.0	65.0	13,000	2.167	6.589E-05
5	1.0	24.1	1060.0	1090.0	30.0	6,000	1.000	5.565E-05





Pattern of Lugeon : **Dilation**

Value of Lugeon : **5.29**

Value of K : **7.1E-05** **cm/sec**

REMARKS

K = (2.30 x Q/60) / (2 x pi x L x H) x log(L/r)

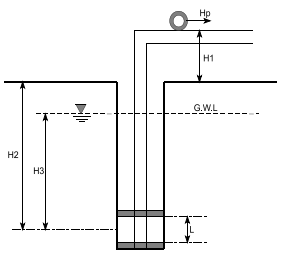
H = Hp + H1 + H2 + H3

Hp = variable head of water pressure

H1 = pressure gauge height from GL.

H2 = depth to half an injector

H3 = length of G.W.L to half an injector

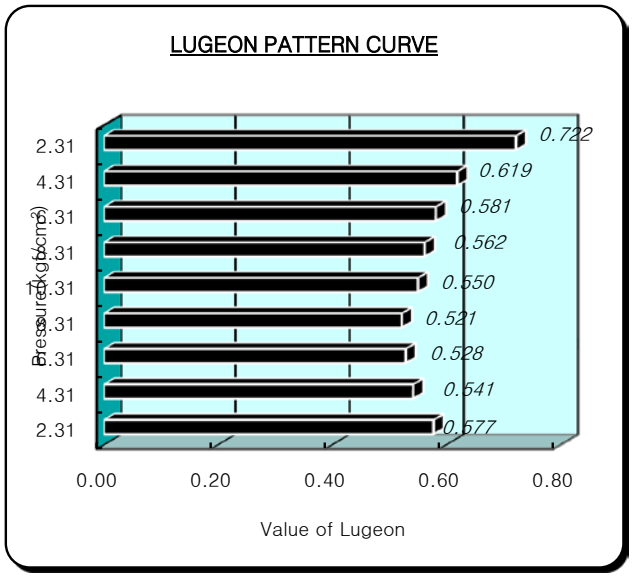


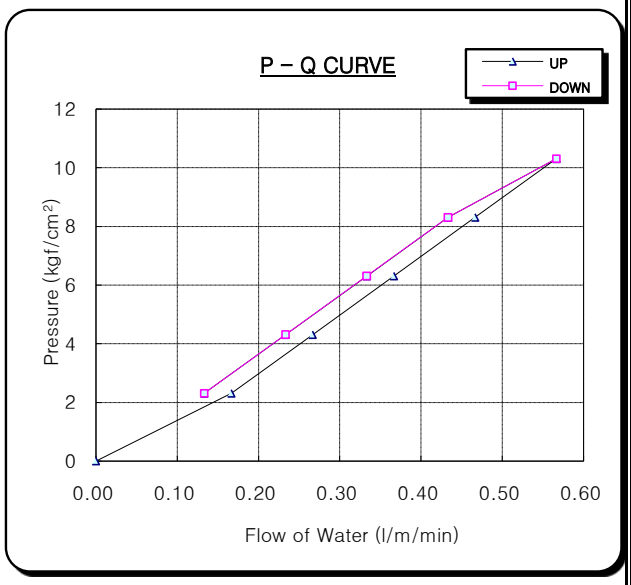
1. When the ground water level reveals above the upper packer the sign of H3 is minus (–)
2. When the ground water level reveals below the lower packer the sign of H3 is zero (0)

WORKING SHEETS OF WATER PRESSURE TEST

Project	중앙선(도담~영천)복선전철 제5공구 지반조사					
Hole Number	NTB-5	Geology	경 암	Date	2014. 06. 01.	
Test Section (m)	10.0 ~ 16.0	Hole Diameter (cm)	7.6	G.W.L (m)	16.0	
Gauge Height from Ground (m)	0.1	Kind of Packer	Single	Tested by	이종현	
Length of Injection (m)	6.0	Depth to Half an Injector (m)	13.00	Checked by	이석철	

Injection Time	Pressure	Total Head	Readings of Flow Meter (ℓ)			Water Consumed	Flow of Water	K
(min)	(kgf/cm^2)	(m)	from	to	differences	(cm^3/min)	(ℓ/m/min)	(cm/sec)
5	1.0	23.1	215.0	220.0	5.0	1,000	0.167	9.677E-06
5	3.0	43.1	220.0	228.0	8.0	1,600	0.267	8.298E-06
5	5.0	63.1	228.0	239.0	11.0	2,200	0.367	7.794E-06
5	7.0	83.1	239.0	253.0	14.0	2,800	0.467	7.532E-06
5	9.0	103.1	253.0	270.0	17.0	3,400	0.567	7.372E-06
5	7.0	83.1	270.0	283.0	13.0	2,600	0.433	6.994E-06
5	5.0	63.1	283.0	293.0	10.0	2,000	0.333	7.085E-06
5	3.0	43.1	293.0	300.0	7.0	1,400	0.233	7.261E-06
5	1.0	23.1	300.0	304.0	4.0	800	0.133	7.741E-06





Pattern of Lugeon : **Turbulent Flow**

Value of Lugeon : **0.55**

Value of K : **7.4E-06** **cm/sec**

REMARKS

K = (2.30 x Q/60) / (2 x pi x L x H) x log(L/r)

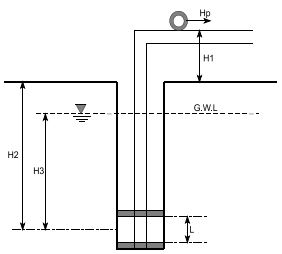
H = Hp + H1 + H2 + H3

Hp = variable head of water pressure

H1 = pressure gauge height from GL.

H2 = depth to half an injector

H3 = length of G.W.L to half an injector

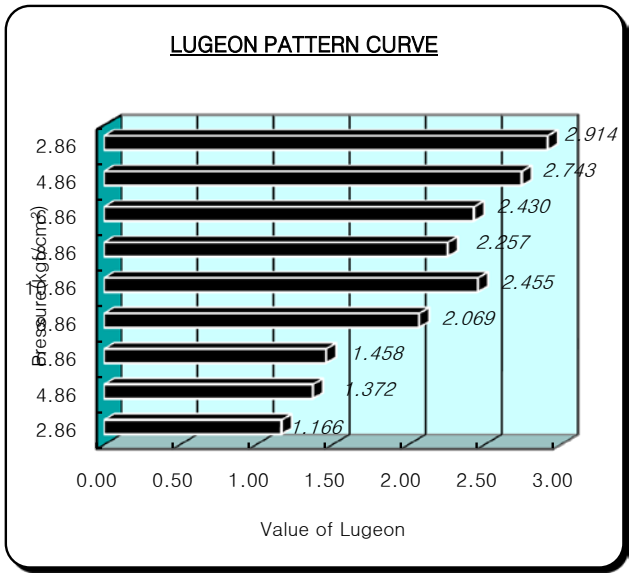


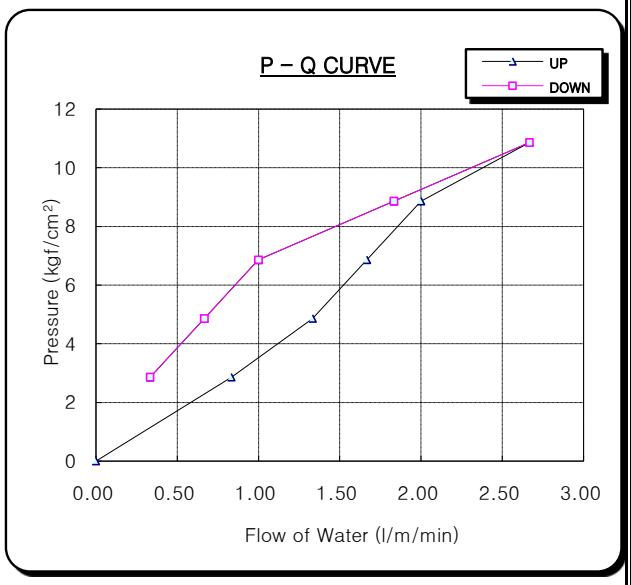
1. When the ground water level reveals above the upper packer the sign of H3 is minus (–)
2. When the ground water level reveals below the lower packer the sign of H3 is zero (0)

WORKING SHEETS OF WATER PRESSURE TEST

Project	중앙선(도담~영천)복선전철 제5공구 지반조사					
Hole Number	NTB-16	Geology	연암	Date	2014. 06. 02.	
Test Section (m)	27.5 ~ 33.5	Hole Diameter (cm)	7.6	G.W.L (m)	18.6	
Gauge Height from Ground (m)	0.0	Kind of Packer	Single	Tested by	이종현	
Length of Injection (m)	6.0	Depth to Half an Injector (m)	30.50	Checked by	이석철	

Injection Time	Pressure	Total Head	Readings of Flow Meter (ℓ)			Water Consumed	Flow of Water	K
(min)	(kgf/cm^2)	(m)	from	to	differences	(cm^3/min)	(ℓ/m/min)	(cm/sec)
5	1.0	28.6	240.0	265.0	25.0	5,000	0.833	3.908E-05
5	3.0	48.6	265.0	305.0	40.0	8,000	1.333	3.680E-05
5	5.0	68.6	305.0	355.0	50.0	10,000	1.667	3.259E-05
5	7.0	88.6	355.0	415.0	60.0	12,000	2.000	3.028E-05
5	9.0	108.6	415.0	495.0	80.0	16,000	2.667	3.293E-05
5	7.0	88.6	495.0	550.0	55.0	11,000	1.833	2.775E-05
5	5.0	68.6	550.0	580.0	30.0	6,000	1.000	1.955E-05
5	3.0	48.6	580.0	600.0	20.0	4,000	0.667	1.840E-05
5	1.0	28.6	600.0	610.0	10.0	2,000	0.333	1.563E-05





Pattern of Lugeon : **Void Filling**

Value of Lugeon : **1.17**

Value of K : **1.6E-05** **cm/sec**

REMARKS

K = (2.30 x Q/60) / (2 x pi x L x H) x log(L/r)

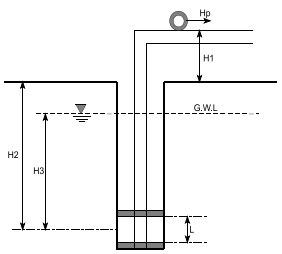
H = Hp + H1 + H2 + H3

Hp = variable head of water pressure

H1 = pressure gauge height from GL.

H2 = depth to half an injector

H3 = length of G.W.L to half an injector

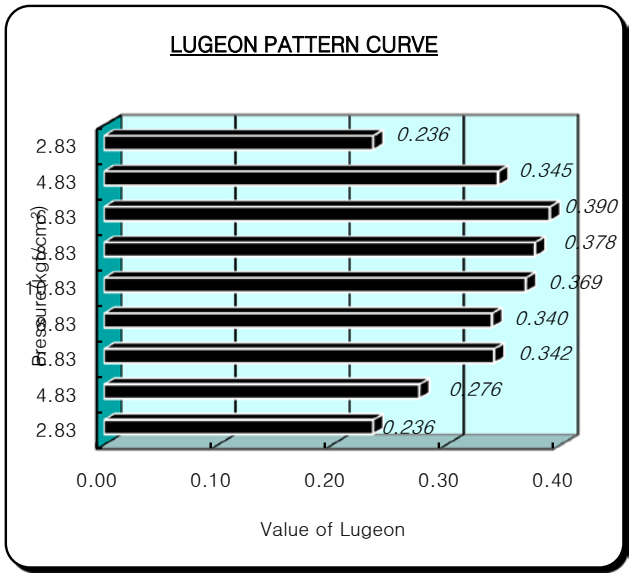


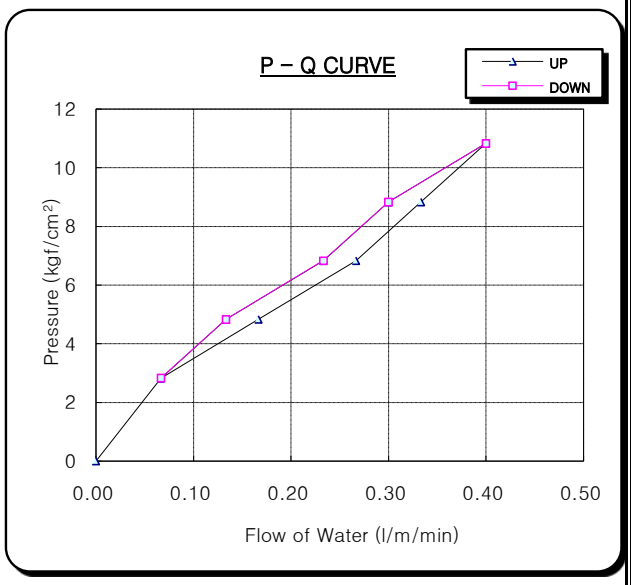
1. When the ground water level reveals above the upper packer the sign of H3 is minus (-)
2. When the ground water level reveals below the lower packer the sign of H3 is zero (0)

WORKING SHEETS OF WATER PRESSURE TEST

Project	중앙선(도담~영천)복선전철 제5공구 지반조사					
Hole Number	NTB-24	Geology	경 암	Date	2014. 06. 13.	
Test Section (m)	15.3 ~ 21.3	Hole Diameter (cm)	7.6	G.W.L (m)	21.9	
Gauge Height from Ground (m)	0.0	Kind of Packer	Single	Tested by	이종현	
Length of Injection (m)	6.0	Depth to Half an Injector (m)	18.30	Checked by	이석철	

Injection Time	Pressure	Total Head	Readings of Flow Meter (ℓ)			Water Consumed	Flow of Water	K
(min)	(kgf/cm^2)	(m)	from	to	differences	(cm^3/min)	(ℓ/m/min)	(cm/sec)
5	1.0	28.3	88.0	90.0	2.0	400	0.067	3.160E-06
5	3.0	48.3	90.0	95.0	5.0	1,000	0.167	4.628E-06
5	5.0	68.3	95.0	103.0	8.0	1,600	0.267	5.237E-06
5	7.0	88.3	103.0	113.0	10.0	2,000	0.333	5.063E-06
5	9.0	108.3	113.0	125.0	12.0	2,400	0.400	4.954E-06
5	7.0	88.3	125.0	134.0	9.0	1,800	0.300	4.557E-06
5	5.0	68.3	134.0	141.0	7.0	1,400	0.233	4.582E-06
5	3.0	48.3	141.0	145.0	4.0	800	0.133	3.702E-06
5	1.0	28.3	145.0	147.0	2.0	400	0.067	3.160E-06





Pattern of Lugeon : **Dilation**

Value of Lugeon : **0.30**

Value of K : **4.0E-06** **cm/sec**

REMARKS

K = (2.30 x Q/60) / (2 x pi x L x H) x log(L/r)

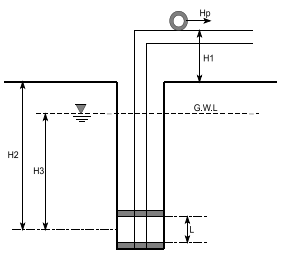
H = Hp + H1 + H2 + H3

Hp = variable head of water pressure

H1 = pressure gauge height from GL.

H2 = depth to half an injector

H3 = length of G.W.L to half an injector

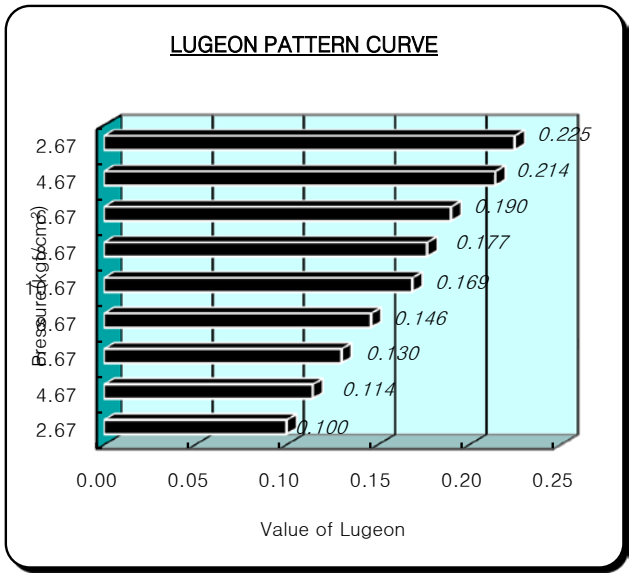


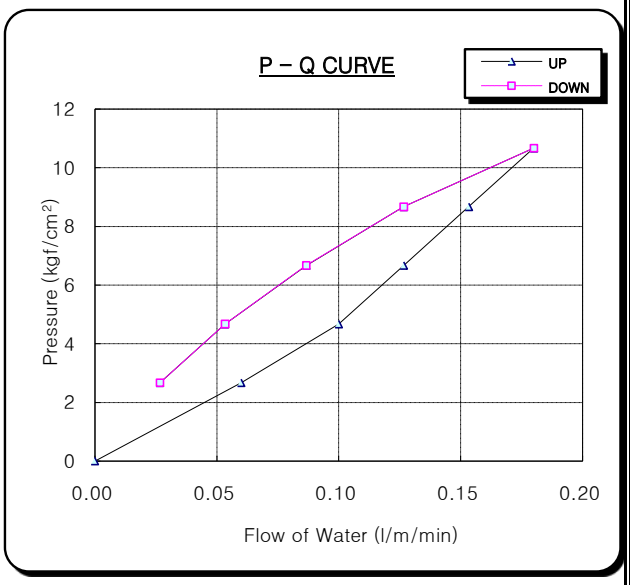
1. When the ground water level reveals above the upper packer the sign of H3 is minus (–)
2. When the ground water level reveals below the lower packer the sign of H3 is zero (0)

WORKING SHEETS OF WATER PRESSURE TEST

Project	중앙선(도담~영천)복선전철 제5공구 지반조사						
Hole Number	NTB-25		Geology		경 암	Date	2014. 06. 10.
Test Section (m)	15.0	~ 18.0	Hole Diameter (cm)		7.6	G.W.L (m)	18.0
Gauge Height from Ground (m)		0.2	Kind of Packer		Single	Tested by	이종현
Length of Injection (m)		3.0	Depth to Half an Injector (m)		16.50	Checked by	이석철

Injection Time	Pressure	Total Head	Readings of Flow Meter (ℓ)			Water Consumed	Flow of Water	K
(min)	(kgf/cm^2)	(m)	from	to	differences	(cm^3/min)	(ℓ/m/min)	(cm/sec)
5	1.0	26.7	186.2	187.1	0.9	180	0.060	2.601E-06
5	3.0	46.7	187.1	188.6	1.5	300	0.100	2.479E-06
5	5.0	66.7	188.6	190.5	1.9	380	0.127	2.198E-06
5	7.0	86.7	190.5	192.8	2.3	460	0.153	2.047E-06
5	9.0	106.7	192.8	195.5	2.7	540	0.180	1.953E-06
5	7.0	86.7	195.5	197.4	1.9	380	0.127	1.691E-06
5	5.0	66.7	197.4	198.7	1.3	260	0.087	1.504E-06
5	3.0	46.7	198.7	199.5	0.8	160	0.053	1.322E-06
5	1.0	26.7	194.2	194.6	0.4	80	0.027	1.156E-06





Pattern of Lugeon : **Void Filling**

Value of Lugeon : **0.10**

Value of K : **1.2E-06** **cm/sec**

REMARKS

K = (2.30 x Q/60) / (2 x pi x L x H) x log(L/r)

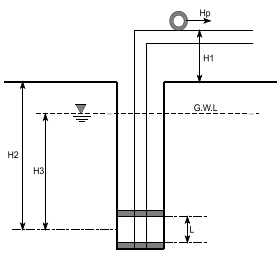
H = Hp + H1 + H2 + H3

Hp = variable head of water pressure

H1 = pressure gauge height from GL.

H2 = depth to half an injector

H3 = length of G.W.L to half an injector

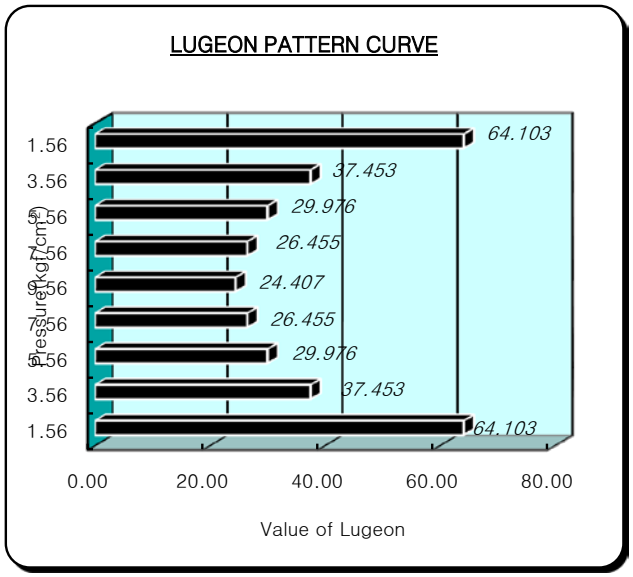


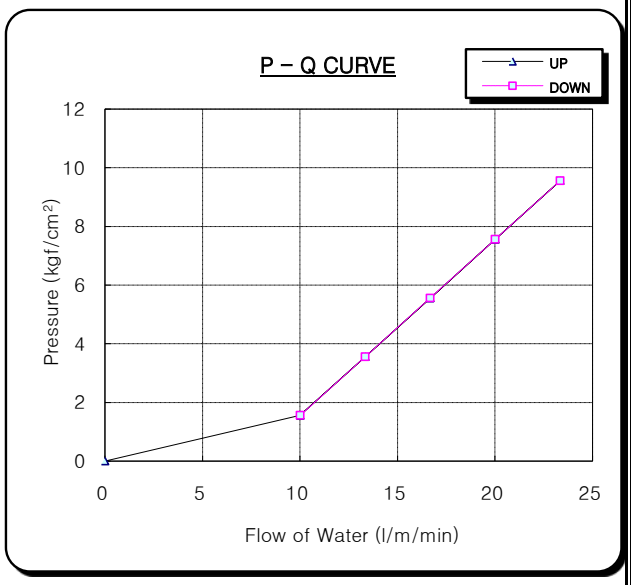
1. When the ground water level reveals above the upper packer the sign of H3 is minus (-)
2. When the ground water level reveals below the lower packer the sign of H3 is zero (0)

WORKING SHEETS OF WATER PRESSURE TEST

Project	중앙선(도담~영천)복선전철 제5공구 지반조사					
Hole Number	NTB-26	Geology	연 암	Date	2014. 06. 10.	
Test Section (m)	4.0 ~ 7.0	Hole Diameter (cm)	7.6	G.W.L (m)	12.0	
Gauge Height from Ground (m)	0.1	Kind of Packer	Single	Tested by	이종현	
Length of Injection (m)	3.0	Depth to Half an Injector (m)	5.50	Checked by	이석철	

Injection Time	Pressure	Total Head	Readings of Flow Meter (ℓ)			Water Consumed	Flow of Water	K
(min)	(kgf/cm^2)	(m)	from	to	differences	(cm^3/min)	(ℓ/m/min)	(cm/sec)
5	1.0	15.6	250.0	400.0	150.0	30,000	10.000	7.420E-04
5	3.0	35.6	400.0	600.0	200.0	40,000	13.333	4.335E-04
5	5.0	55.6	600.0	850.0	250.0	50,000	16.667	3.470E-04
5	7.0	75.6	850.0	1150.0	300.0	60,000	20.000	3.062E-04
5	9.0	95.6	1150.0	1500.0	350.0	70,000	23.333	2.825E-04
5	7.0	75.6	1500.0	1800.0	300.0	60,000	20.000	3.062E-04
5	5.0	55.6	1800.0	2050.0	250.0	50,000	16.667	3.470E-04
5	3.0	35.6	2050.0	2250.0	200.0	40,000	13.333	4.335E-04
5	1.0	15.6	2250.0	2400.0	150.0	30,000	10.000	7.420E-04





Pattern of Lugeon : Turbulent Flow

Value of Lugeon : **24.41**

Value of K : **2.8E-04** **cm/sec**

REMARKS

K = (2.30 x Q/60) / (2 x pi x L x H) x log(L/r)

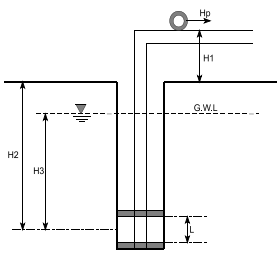
H = Hp + H1 + H2 + H3

Hp = variable head of water pressure

H1 = pressure gauge height from GL.

H2 = depth to half an injector

H3 = length of G.W.L to half an injector

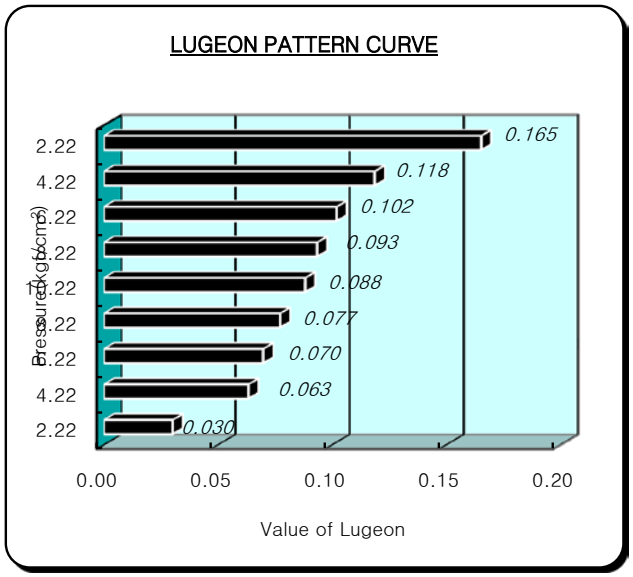


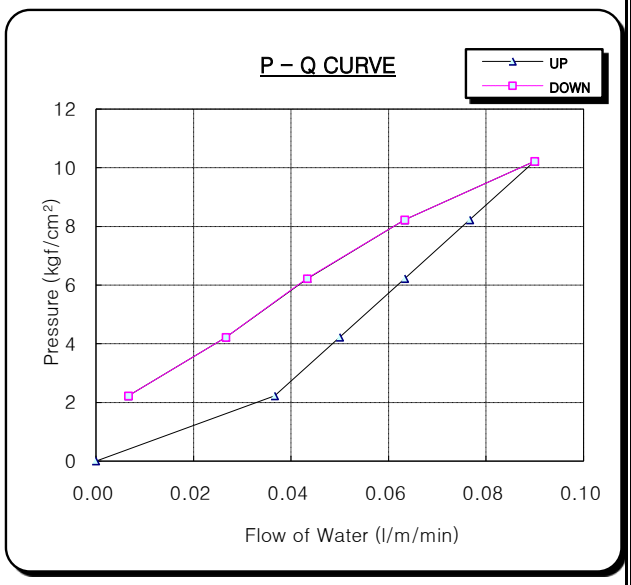
1. When the ground water level reveals above the upper packer the sign of H3 is minus (–)
2. When the ground water level reveals below the lower packer the sign of H3 is zero (0)

WORKING SHEETS OF WATER PRESSURE TEST

Project	중앙선(도담~영천)복선전철 제5공구 지반조사					
Hole Number	NTB-27	Geology	경암	Date	2014. 06. 09.	
Test Section (m)	10.0 ~ 16.0	Hole Diameter (cm)	7.6	G.W.L (m)	12.0	
Gauge Height from Ground (m)	0.2	Kind of Packer	Single	Tested by	이종현	
Length of Injection (m)	6.0	Depth to Half an Injector (m)	13.00	Checked by	이석철	

Injection Time	Pressure	Total Head	Readings of Flow Meter (ℓ)			Water Consumed	Flow of Water	K
(min)	(kgf/cm^2)	(m)	from	to	differences	(cm^3/min)	(ℓ/m/min)	(cm/sec)
5	1.0	22.2	190.1	191.2	1.1	220	0.037	2.215E-06
5	3.0	42.2	191.2	192.7	1.5	300	0.050	1.589E-06
5	5.0	62.2	192.7	194.6	1.9	380	0.063	1.366E-06
5	7.0	82.2	194.6	196.9	2.3	460	0.077	1.251E-06
5	9.0	102.2	196.9	199.6	2.7	540	0.090	1.181E-06
5	7.0	82.2	199.6	201.5	1.9	380	0.063	1.033E-06
5	5.0	62.2	201.5	202.8	1.3	260	0.043	9.344E-07
5	3.0	42.2	202.8	203.6	0.8	160	0.027	8.475E-07
5	1.0	22.2	198.3	198.5	0.2	40	0.007	4.028E-07





Pattern of Lugeon : **Void Filling**

Value of Lugeon : **0.03**

Value of K : **4.0E-07** **cm/sec**

REMARKS

K = (2.30 x Q/60) / (2 x pi x L x H) x log(L/r)

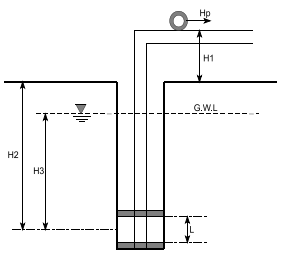
H = Hp + H1 + H2 + H3

Hp = variable head of water pressure

H1 = pressure gauge height from GL.

H2 = depth to half an injector

H3 = length of G.W.L to half an injector

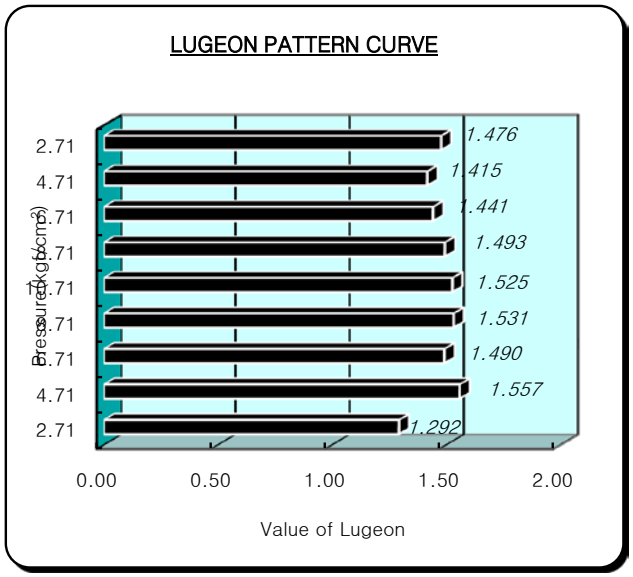


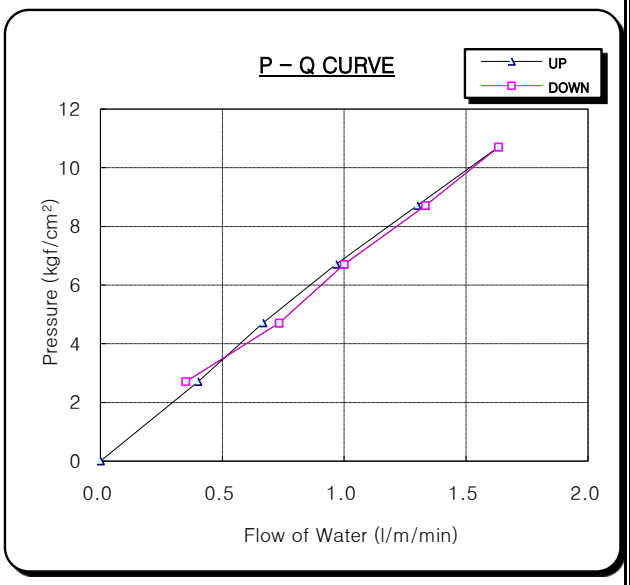
1. When the ground water level reveals above the upper packer the sign of H3 is minus (-)
2. When the ground water level reveals below the lower packer the sign of H3 is zero (0)

WORKING SHEETS OF WATER PRESSURE TEST

Project	중앙선(도담~영천)복선전철 제5공구 지반조사					
Hole Number	NTB-28	Geology	연 암	Date	2014. 06. 10.	
Test Section (m)	14.0 ~ 20.0	Hole Diameter (cm)	7.6	G.W.L (m)	19.0	
Gauge Height from Ground (m)	0.1	Kind of Packer	Single	Tested by	이종현	
Length of Injection (m)	6.0	Depth to Half an Injector (m)	17.00	Checked by	이석철	

Injection Time	Pressure	Total Head	Readings of Flow Meter (ℓ)			Water Consumed	Flow of Water	K
(min)	(kgf/cm^2)	(m)	from	to	differences	(cm^3/min)	(ℓ/m/min)	(cm/sec)
5	1.0	27.1	199.0	211.0	12.0	2,400	0.400	1.980E-05
5	3.0	47.1	211.0	231.0	20.0	4,000	0.667	1.898E-05
5	5.0	67.1	231.0	260.0	29.0	5,800	0.967	1.932E-05
5	7.0	87.1	260.0	299.0	39.0	7,800	1.300	2.002E-05
5	9.0	107.1	299.0	348.0	49.0	9,800	1.633	2.045E-05
5	7.0	87.1	348.0	388.0	40.0	8,000	1.333	2.053E-05
5	5.0	67.1	388.0	418.0	30.0	6,000	1.000	1.999E-05
5	3.0	47.1	418.0	440.0	22.0	4,400	0.733	2.088E-05
5	1.0	27.1	440.0	450.5	10.5	2,100	0.350	1.732E-05





Pattern of Lugeon : **Laminar Flow**

Value of Lugeon : **1.47**

Value of K : **2.0E-05** **cm/sec**

REMARKS

K = (2.30 x Q/60) / (2 x pi x L x H) x log(L/r)

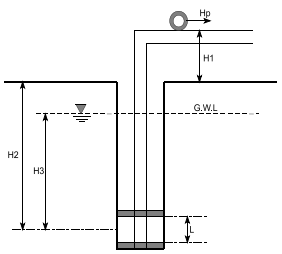
H = Hp + H1 + H2 + H3

Hp = variable head of water pressure

H1 = pressure gauge height from GL.

H2 = depth to half an injector

H3 = length of G.W.L to half an injector

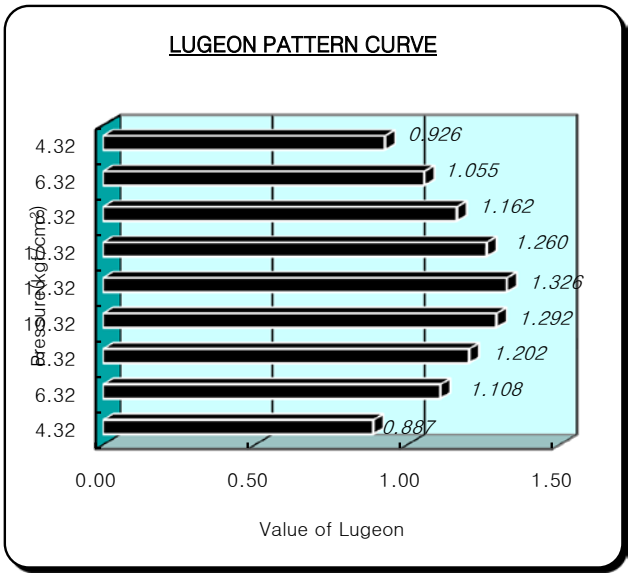


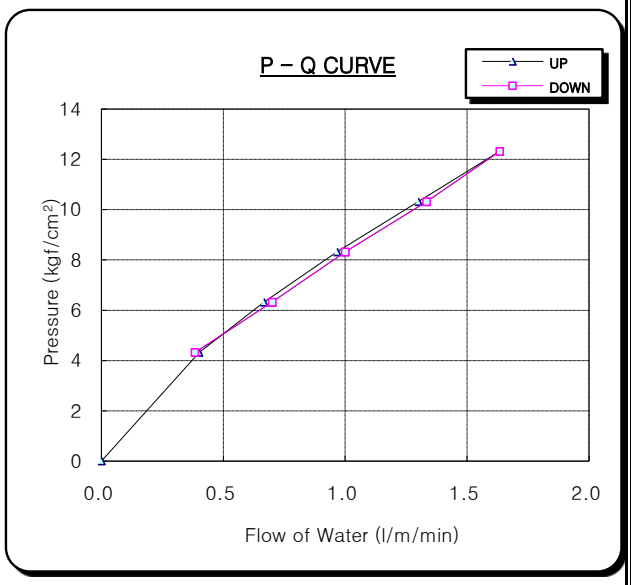
1. When the ground water level reveals above the upper packer the sign of H3 is minus (–)
2. When the ground water level reveals below the lower packer the sign of H3 is zero (0)

WORKING SHEETS OF WATER PRESSURE TEST

Project	중앙선(도담~영천)복선전철 제5공구 지반조사					
Hole Number	NTB-29	Geology	연 암	Date	2014. 06. 11.	
Test Section (m)	30.0 ~ 36.0	Hole Diameter (cm)	7.6	G.W.L (m)	36.0	
Gauge Height from Ground (m)	0.2	Kind of Packer	Single	Tested by	이종현	
Length of Injection (m)	6.0	Depth to Half an Injector (m)	33.00	Checked by	이석철	

Injection Time	Pressure	Total Head	Readings of Flow Meter (ℓ)			Water Consumed	Flow of Water	K
(min)	(kgf/cm^2)	(m)	from	to	differences	(cm^3/min)	(ℓ/m/min)	(cm/sec)
5	1.0	43.2	197.0	209.0	12.0	2,400	0.400	1.242E-05
5	3.0	63.2	209.0	229.0	20.0	4,000	0.667	1.415E-05
5	5.0	83.2	229.0	258.0	29.0	5,800	0.967	1.558E-05
5	7.0	103.2	258.0	297.0	39.0	7,800	1.300	1.690E-05
5	9.0	123.2	297.0	346.0	49.0	9,800	1.633	1.778E-05
5	7.0	103.2	346.0	386.0	40.0	8,000	1.333	1.733E-05
5	5.0	83.2	386.0	416.0	30.0	6,000	1.000	1.612E-05
5	3.0	63.2	416.0	437.0	21.0	4,200	0.700	1.486E-05
5	1.0	43.2	437.0	448.5	11.5	2,300	0.383	1.190E-05





Pattern of Lugeon : **Dilation**

Value of Lugeon : **1.04**

Value of K : **1.4E-05** **cm/sec**

REMARKS

K = (2.30 x Q/60) / (2 x pi x L x H) x log(L/r)

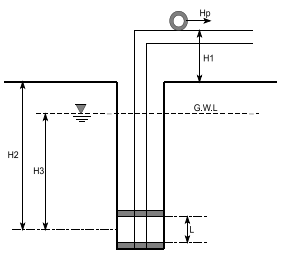
H = Hp + H1 + H2 + H3

Hp = variable head of water pressure

H1 = pressure gauge height from GL.

H2 = depth to half an injector

H3 = length of G.W.L to half an injector

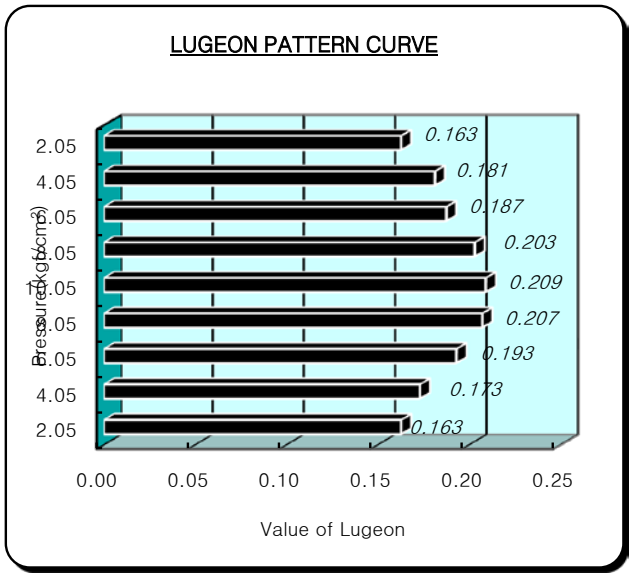


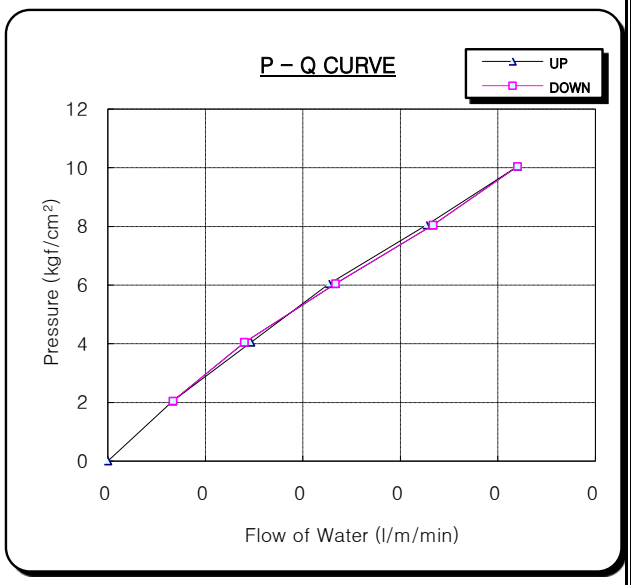
1. When the ground water level reveals above the upper packer the sign of H3 is minus (–)
2. When the ground water level reveals below the lower packer the sign of H3 is zero (0)

WORKING SHEETS OF WATER PRESSURE TEST

Project	중앙선(도담~영천)복선전철 제5공구 지반조사					
Hole Number	NTB-31	Geology	경 암	Date	2014. 06. 07.	
Test Section (m)	15.5 ~ 21.5	Hole Diameter (cm)	7.6	G.W.L (m)	10.4	
Gauge Height from Ground (m)	0.1	Kind of Packer	Single	Tested by	이종현	
Length of Injection (m)	6.0	Depth to Half an Injector (m)	18.50	Checked by	이석철	

Injection Time	Pressure	Total Head	Readings of Flow Meter (ℓ)			Water Consumed	Flow of Water	K
(min)	(kgf/cm^2)	(m)	from	to	differences	(cm^3/min)	(ℓ/m/min)	(cm/sec)
5	1.0	20.5	15.0	16.0	1.0	200	0.033	2.181E-06
5	3.0	40.5	16.0	18.2	2.2	440	0.073	2.429E-06
5	5.0	60.5	18.2	21.6	3.4	680	0.113	2.512E-06
5	7.0	80.5	21.6	26.5	4.9	980	0.163	2.721E-06
5	9.0	100.5	26.5	32.8	6.3	1,260	0.210	2.803E-06
5	7.0	80.5	32.8	37.8	5.0	1,000	0.167	2.777E-06
5	5.0	60.5	37.8	41.3	3.5	700	0.117	2.586E-06
5	3.0	40.5	41.3	43.4	2.1	420	0.070	2.318E-06
5	1.0	20.5	43.4	44.4	1.0	200	0.033	2.181E-06





Pattern of Lugeon : **Dilation**

Value of Lugeon : **0.18**

Value of K : **2.4E-06** **cm/sec**

REMARKS

K = (2.30 x Q/60) / (2 x pi x L x H) x log(L/r)

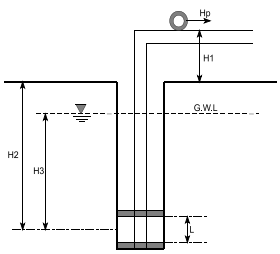
H = Hp + H1 + H2 + H3

Hp = variable head of water pressure

H1 = pressure gauge height from GL.

H2 = depth to half an injector

H3 = length of G.W.L to half an injector

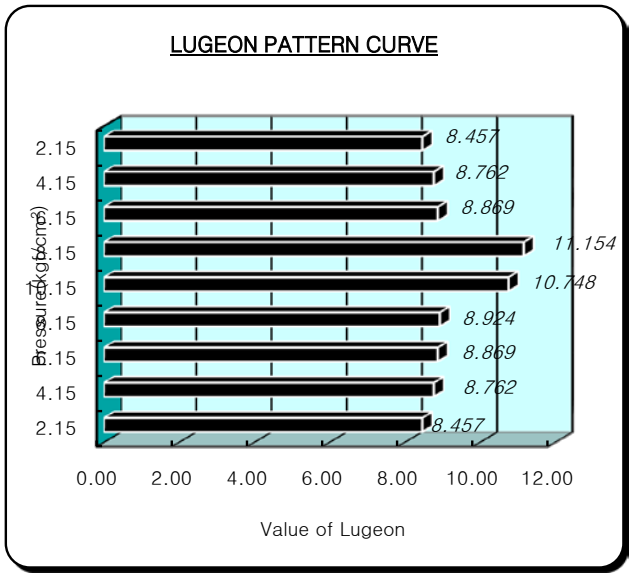


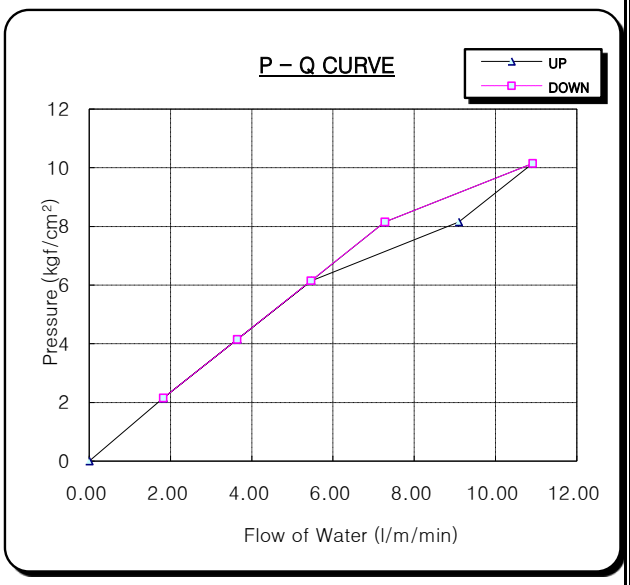
1. When the ground water level reveals above the upper packer the sign of H3 is minus (–)
2. When the ground water level reveals below the lower packer the sign of H3 is zero (0)

WORKING SHEETS OF WATER PRESSURE TEST

Project	중앙선(도담~영천)복선전철 제5공구 지반조사					
Hole Number	NTB-32	Geology	연암	Date	2014. 07. 04.	
Test Section (m)	9.5 ~ 15.0	Hole Diameter (cm)	7.6	G.W.L (m)	11.5	
Gauge Height from Ground (m)	0.0	Kind of Packer	Single	Tested by	이종현	
Length of Injection (m)	5.5	Depth to Half an Injector (m)	12.25	Checked by	이석철	

Injection Time	Pressure	Total Head	Readings of Flow Meter (ℓ)			Water Consumed	Flow of Water	K
(min)	(kgf/cm^2)	(m)	from	to	differences	(cm^3/min)	(ℓ/m/min)	(cm/sec)
5	1.0	21.5	250.0	300.0	50.0	10,000	1.818	1.115E-04
5	3.0	41.5	300.0	400.0	100.0	20,000	3.636	1.155E-04
5	5.0	61.5	400.0	550.0	150.0	30,000	5.455	1.169E-04
5	7.0	81.5	550.0	800.0	250.0	50,000	9.091	1.470E-04
5	9.0	101.5	800.0	1100.0	300.0	60,000	10.909	1.417E-04
5	7.0	81.5	1100.0	1300.0	200.0	40,000	7.273	1.176E-04
5	5.0	61.5	1400.0	1550.0	150.0	30,000	5.455	1.169E-04
5	3.0	41.5	1550.0	1650.0	100.0	20,000	3.636	1.155E-04
5	1.0	21.5	1650.0	1700.0	50.0	10,000	1.818	1.115E-04





Pattern of Lugeon : **Dilation**

Value of Lugeon : **8.66**

Value of K : **1.1E-04** **cm/sec**

REMARKS

K = (2.30 x Q/60) / (2 x pi x L x H) x log(L/r)

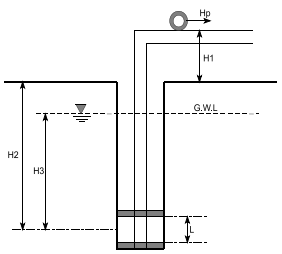
H = Hp + H1 + H2 + H3

Hp = variable head of water pressure

H1 = pressure gauge height from GL.

H2 = depth to half an injector

H3 = length of G.W.L to half an injector

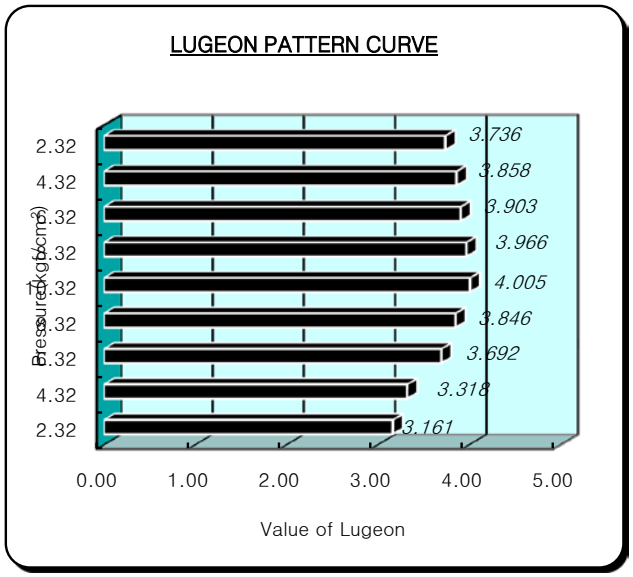


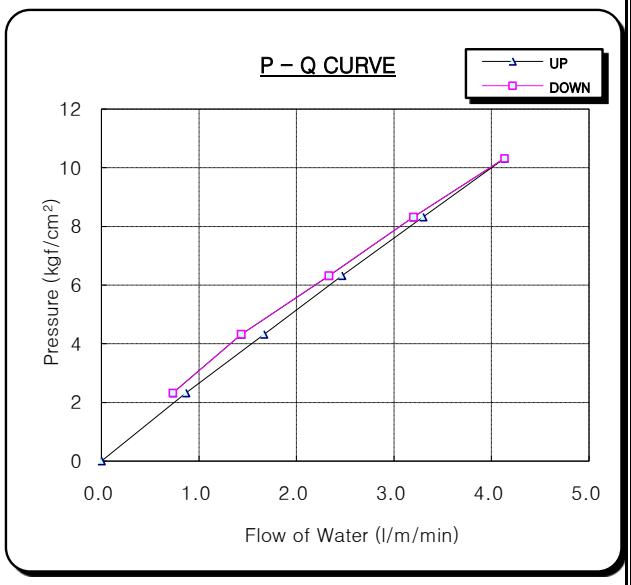
1. When the ground water level reveals above the upper packer the sign of H3 is minus (–)
2. When the ground water level reveals below the lower packer the sign of H3 is zero (0)

WORKING SHEETS OF WATER PRESSURE TEST

Project	중앙선(도담~영천)복선전철 제5공구 지반조사					
Hole Number	NTB-33	Geology	연 암	Date	2014. 07. 02.	
Test Section (m)	11.0 ~ 17.0	Hole Diameter (cm)	7.6	G.W.L (m)	13.0	
Gauge Height from Ground (m)	0.2	Kind of Packer	Single	Tested by	이종현	
Length of Injection (m)	6.0	Depth to Half an Injector (m)	14.00	Checked by	이석철	

Injection Time	Pressure	Total Head	Readings of Flow Meter (ℓ)			Water Consumed	Flow of Water	K
(min)	(kgf/cm^2)	(m)	from	to	differences	(cm^3/min)	(ℓ/m/min)	(cm/sec)
5	1.0	23.2	109.0	135.0	26.0	5,200	0.867	5.010E-05
5	3.0	43.2	135.0	185.0	50.0	10,000	1.667	5.174E-05
5	5.0	63.2	185.0	259.0	74.0	14,800	2.467	5.235E-05
5	7.0	83.2	259.0	358.0	99.0	19,800	3.300	5.320E-05
5	9.0	103.2	358.0	482.0	124.0	24,800	4.133	5.372E-05
5	7.0	83.2	482.0	578.0	96.0	19,200	3.200	5.159E-05
5	5.0	63.2	578.0	648.0	70.0	14,000	2.333	4.952E-05
5	3.0	43.2	648.0	691.0	43.0	8,600	1.433	4.450E-05
5	1.0	23.2	691.0	713.0	22.0	4,400	0.733	4.239E-05





Pattern of Lugeon : **Dilation**

Value of Lugeon : **3.62**

Value of K : **4.9E-05** **cm/sec**

REMARKS

K = (2.30 x Q/60) / (2 x pi x L x H) x log(L/r)

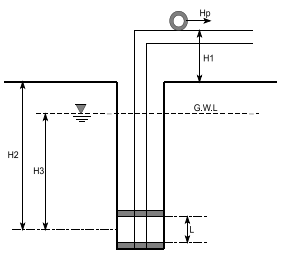
H = Hp + H1 + H2 + H3

Hp = variable head of water pressure

H1 = pressure gauge height from GL.

H2 = depth to half an injector

H3 = length of G.W.L to half an injector

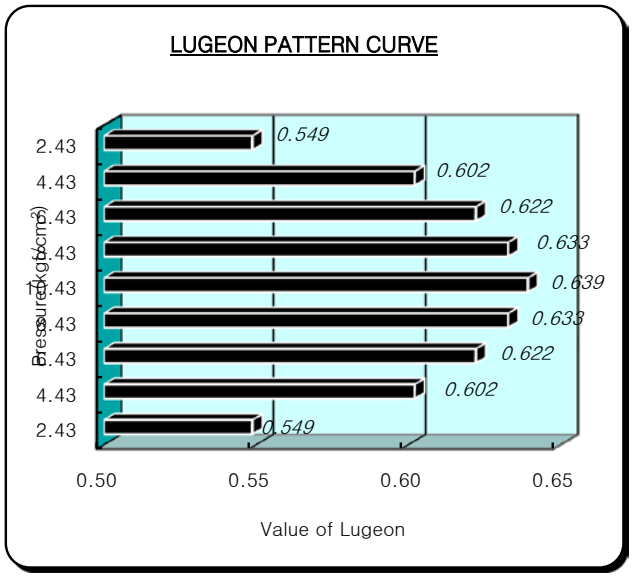


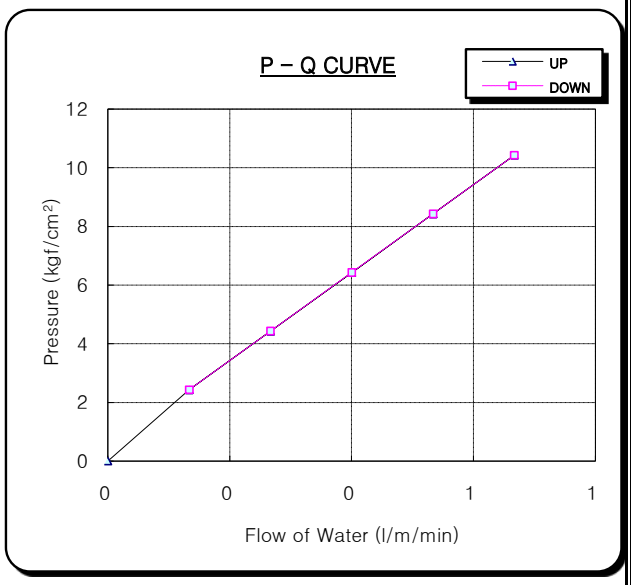
1. When the ground water level reveals above the upper packer the sign of H3 is minus (–)
2. When the ground water level reveals below the lower packer the sign of H3 is zero (0)

WORKING SHEETS OF WATER PRESSURE TEST

Project	중앙선(도담~영천)복선전철 제5공구 지반조사					
Hole Number	NTB-44	Geology	연 암	Date	2014. 06. 20.	
Test Section (m)	12.5 ~ 18.5	Hole Diameter (cm)	7.6	G.W.L (m)	14.2	
Gauge Height from Ground (m)	0.1	Kind of Packer	Single	Tested by	이종현	
Length of Injection (m)	6.0	Depth to Half an Injector (m)	15.50	Checked by	이석철	

Injection Time	Pressure	Total Head	Readings of Flow Meter (ℓ)			Water Consumed	Flow of Water	K
(min)	(kgf/cm^2)	(m)	from	to	differences	(cm^3/min)	(ℓ/m/min)	(cm/sec)
5	1.0	24.3	25.0	29.0	4.0	800	0.133	7.359E-06
5	3.0	44.3	29.0	37.0	8.0	1,600	0.267	8.074E-06
5	5.0	64.3	37.0	49.0	12.0	2,400	0.400	8.343E-06
5	7.0	84.3	49.0	65.0	16.0	3,200	0.533	8.485E-06
5	9.0	104.3	65.0	85.0	20.0	4,000	0.667	8.573E-06
5	7.0	84.3	85.0	101.0	16.0	3,200	0.533	8.485E-06
5	5.0	64.3	101.0	113.0	12.0	2,400	0.400	8.343E-06
5	3.0	44.3	113.0	121.0	8.0	1,600	0.267	8.074E-06
5	1.0	24.3	121.0	125.0	4.0	800	0.133	7.359E-06





Pattern of Lugeon : Dilation

Value of Lugeon : **0.59**

Value of K : **7.9E-06** **cm/sec**

REMARKS

K = (2.30 x Q/60) / (2 x pi x L x H) x log(L/r)

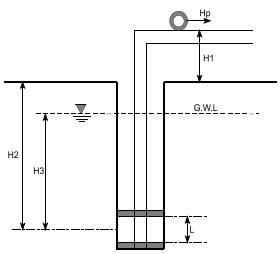
H = Hp + H1 + H2 + H3

Hp = variable head of water pressure

H1 = pressure gauge height from GL.

H2 = depth to half an injector

H3 = length of G.W.L to half an injector

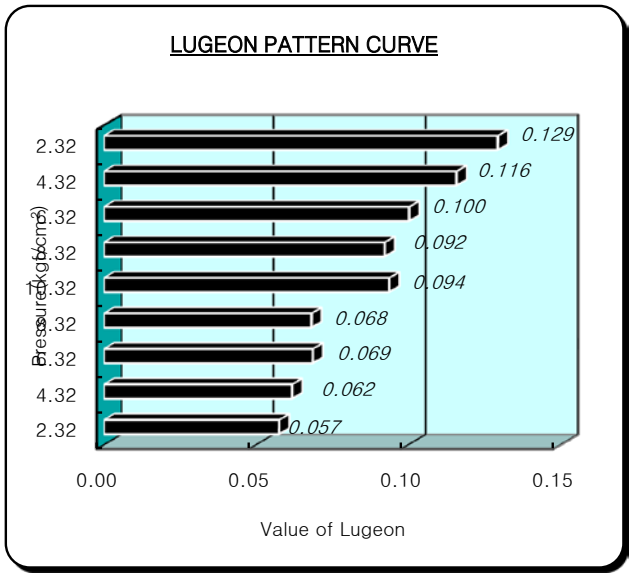


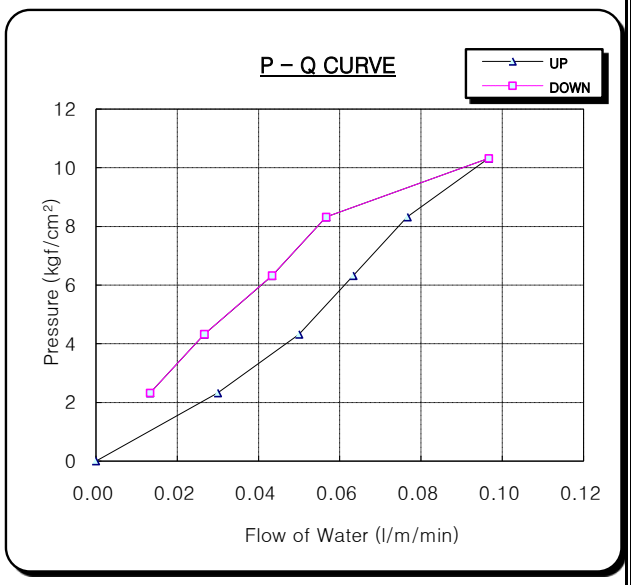
1. When the ground water level reveals above the upper packer the sign of H3 is minus (–)
2. When the ground water level reveals below the lower packer the sign of H3 is zero (0)

WORKING SHEETS OF WATER PRESSURE TEST

Project	중앙선(도담~영천)복선전철 제5공구 지반조사					
Hole Number	NTB-45	Geology	경 암	Date	2014. 06. 23.	
Test Section (m)	10.0 ~ 16.0	Hole Diameter (cm)	7.6	G.W.L (m)	16.0	
Gauge Height from Ground (m)	0.2	Kind of Packer	Single	Tested by	이종현	
Length of Injection (m)	6.0	Depth to Half an Injector (m)	13.00	Checked by	이석철	

Injection Time	Pressure	Total Head	Readings of Flow Meter (ℓ)			Water Consumed	Flow of Water	K
(min)	(kgf/cm^2)	(m)	from	to	differences	(cm^3/min)	(ℓ/m/min)	(cm/sec)
5	1.0	23.2	191.8	192.7	0.9	180	0.030	1.734E-06
5	3.0	43.2	192.7	194.2	1.5	300	0.050	1.552E-06
5	5.0	63.2	194.2	196.1	1.9	380	0.063	1.344E-06
5	7.0	83.2	196.1	198.4	2.3	460	0.077	1.236E-06
5	9.0	103.2	198.4	201.3	2.9	580	0.097	1.256E-06
5	7.0	83.2	201.3	203.0	1.7	340	0.057	9.135E-07
5	5.0	63.2	203.0	204.3	1.3	260	0.043	9.196E-07
5	3.0	43.2	204.3	205.1	0.8	160	0.027	8.279E-07
5	1.0	23.2	199.8	200.2	0.4	80	0.013	7.708E-07





Pattern of Lugeon : **Void Filling**

Value of Lugeon : **0.06**

Value of K : **7.7E-07** **cm/sec**

REMARKS

K = (2.30 x Q/60) / (2 x pi x L x H) x log(L/r)

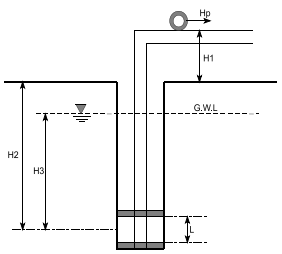
H = Hp + H1 + H2 + H3

Hp = variable head of water pressure

H1 = pressure gauge height from GL.

H2 = depth to half an injector

H3 = length of G.W.L to half an injector

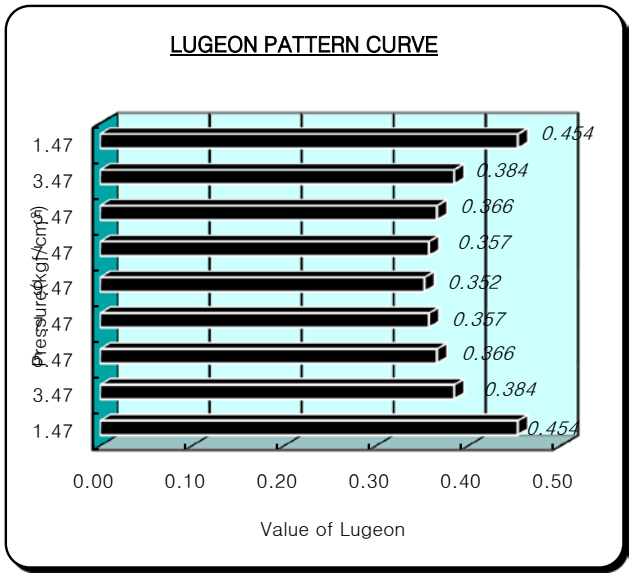


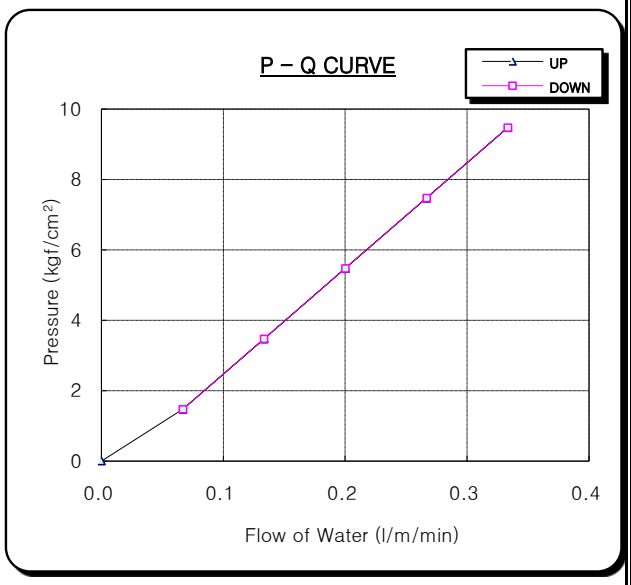
1. When the ground water level reveals above the upper packer the sign of H3 is minus (-)
2. When the ground water level reveals below the lower packer the sign of H3 is zero (0)

WORKING SHEETS OF WATER PRESSURE TEST

Project	중앙선(도담~영천)복선전철 제5공구 지반조사						
Hole Number	NTB-46		Geology		경 암	Date	2014. 06. 23.
Test Section (m)	3.0	~ 6.0	Hole Diameter (cm)		7.6	G.W.L (m)	9.0
Gauge Height from Ground (m)	0.2		Kind of Packer		Single	Tested by	이종현
Length of Injection (m)	3.0		Depth to Half an Injector (m)		4.50	Checked by	이석철

Injection Time	Pressure	Total Head	Readings of Flow Meter (ℓ)			Water Consumed	Flow of Water	K
(min)	(kgf/cm^2)	(m)	from	to	differences	(cm^3/min)	(ℓ/m/min)	(cm/sec)
5	1.0	14.7	539.0	540.0	1.0	200	0.067	5.250E-06
5	3.0	34.7	540.0	542.0	2.0	400	0.133	4.448E-06
5	5.0	54.7	542.0	545.0	3.0	600	0.200	4.232E-06
5	7.0	74.7	545.0	549.0	4.0	800	0.267	4.132E-06
5	9.0	94.7	549.0	554.0	5.0	1,000	0.333	4.074E-06
5	7.0	74.7	554.0	558.0	4.0	800	0.267	4.132E-06
5	5.0	54.7	558.0	561.0	3.0	600	0.200	4.232E-06
5	3.0	34.7	561.0	563.0	2.0	400	0.133	4.448E-06
5	1.0	14.7	563.0	564.0	1.0	200	0.067	5.250E-06





Pattern of Lugeon : **Turbulent Flow**

Value of Lugeon : **0.35**

Value of K : **4.1E-06** **cm/sec**

REMARKS

K = (2.30 x Q/60) / (2 x pi x L x H) x log(L/r)

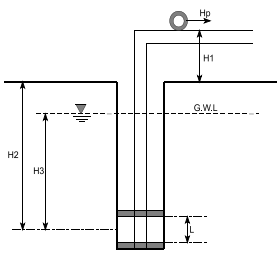
H = Hp + H1 + H2 + H3

Hp = variable head of water pressure

H1 = pressure gauge height from GL.

H2 = depth to half an injector

H3 = length of G.W.L to half an injector

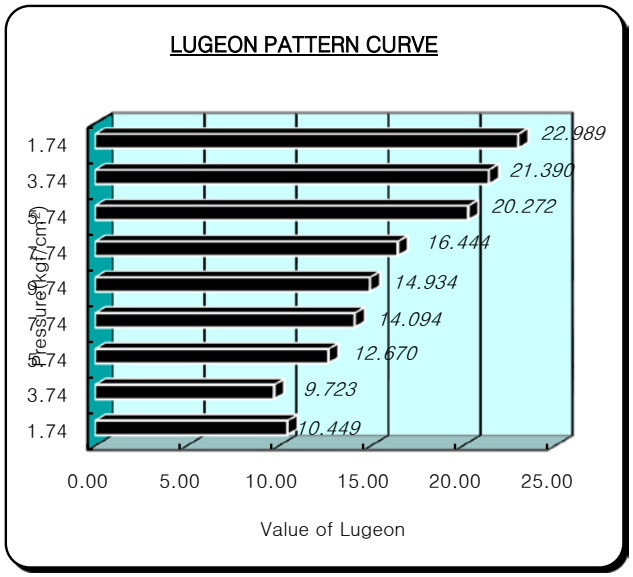


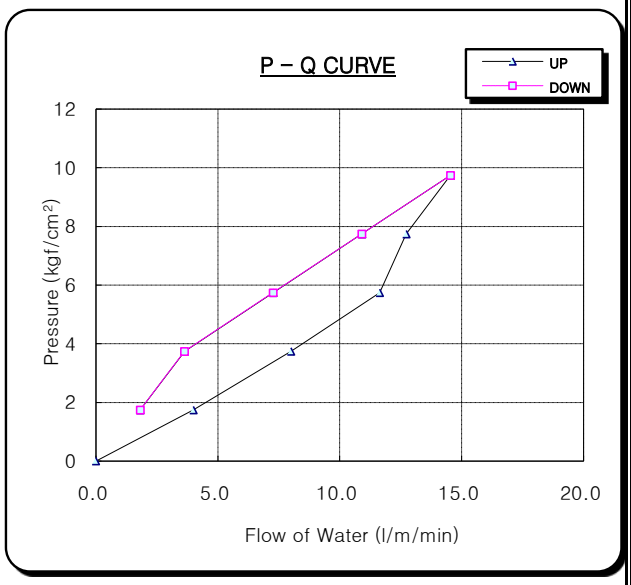
1. When the ground water level reveals above the upper packer the sign of H3 is minus (-)
2. When the ground water level reveals below the lower packer the sign of H3 is zero (0)

WORKING SHEETS OF WATER PRESSURE TEST

Project	중앙선(도담~영천)복선전철 제5공구 지반조사					
Hole Number	NTB-47	Geology	풍화암	Date	2014. 08. 09.	
Test Section (m)	4.5 ~ 10.0	Hole Diameter (cm)	7.6	G.W.L (m)	7.2	
Gauge Height from Ground (m)	0.2	Kind of Packer	Single	Tested by	이종현	
Length of Injection (m)	5.5	Depth to Half an Injector (m)	7.25	Checked by	이석철	

Injection Time	Pressure	Total Head	Readings of Flow Meter (ℓ)			Water Consumed	Flow of Water	K
(min)	(kgf/cm^2)	(m)	from	to	differences	(cm^3/min)	(ℓ/m/min)	(cm/sec)
5	1.0	17.4	450.0	560.0	110.0	22,000	4.000	3.030E-04
5	3.0	37.4	560.0	780.0	220.0	44,000	8.000	2.820E-04
5	5.0	57.4	780.0	1100.0	320.0	64,000	11.636	2.672E-04
5	7.0	77.4	1050.0	1400.0	350.0	70,000	12.727	2.168E-04
5	9.0	97.4	1400.0	1800.0	400.0	80,000	14.545	1.968E-04
5	7.0	77.4	1800.0	2100.0	300.0	60,000	10.909	1.858E-04
5	5.0	57.4	2100.0	2300.0	200.0	40,000	7.273	1.670E-04
5	3.0	37.4	2300.0	2400.0	100.0	20,000	3.636	1.282E-04
5	1.0	17.4	2400.0	2450.0	50.0	10,000	1.818	1.377E-04





Pattern of Lugeon : **Void Filling**

Value of Lugeon : **10.45**

Value of K : **1.4E-04** **cm/sec**

REMARKS

K = (2.30 x Q/60) / (2 x pi x L x H) x log(L/r)

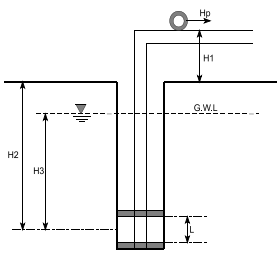
H = Hp + H1 + H2 + H3

Hp = variable head of water pressure

H1 = pressure gauge height from GL.

H2 = depth to half an injector

H3 = length of G.W.L to half an injector

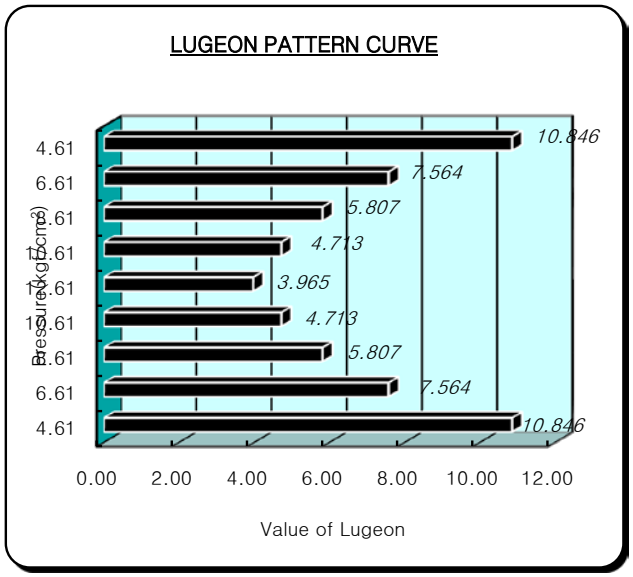


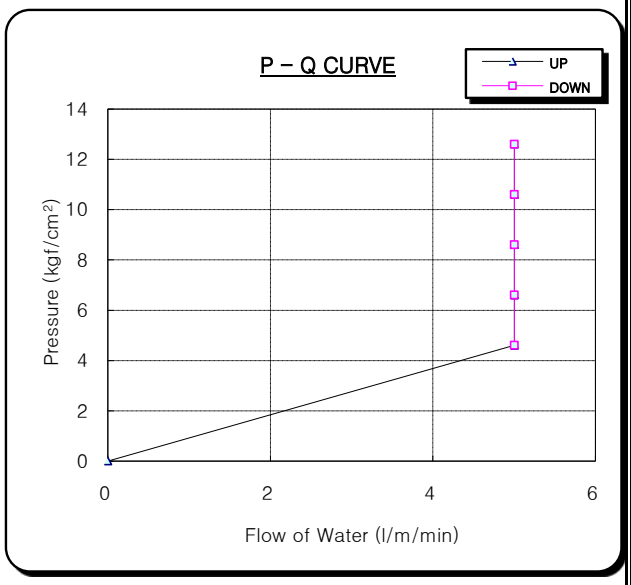
1. When the ground water level reveals above the upper packer the sign of H3 is minus (-)
2. When the ground water level reveals below the lower packer the sign of H3 is zero (0)

WORKING SHEETS OF WATER PRESSURE TEST

Project	중앙선(도담~영천)복선전철 제5공구 지반조사					
Hole Number	NTB-49	Geology	연암	Date	2014. 06. 30.	
Test Section (m)	92.0 ~ 98.0	Hole Diameter (cm)	7.6	G.W.L (m)	36.0	
Gauge Height from Ground (m)	0.1	Kind of Packer	Single	Tested by	이종현	
Length of Injection (m)	6.0	Depth to Half an Injector (m)	95.00	Checked by	이석철	

Injection Time	Pressure	Total Head	Readings of Flow Meter (ℓ)			Water Consumed	Flow of Water	K
(min)	(kgf/cm^2)	(m)	from	to	differences	(cm^3/min)	(ℓ/m/min)	(cm/sec)
5	1.0	46.1	150.0	300.0	150.0	30,000	5.000	1.455E-04
5	3.0	66.1	300.0	450.0	150.0	30,000	5.000	1.015E-04
5	5.0	86.1	450.0	600.0	150.0	30,000	5.000	7.789E-05
5	7.0	106.1	600.0	750.0	150.0	30,000	5.000	6.321E-05
5	9.0	126.1	750.0	900.0	150.0	30,000	5.000	5.318E-05
5	7.0	106.1	900.0	1050.0	150.0	30,000	5.000	6.321E-05
5	5.0	86.1	1050.0	1200.0	150.0	30,000	5.000	7.789E-05
5	3.0	66.1	1200.0	1350.0	150.0	30,000	5.000	1.015E-04
5	1.0	46.1	1350.0	1500.0	150.0	30,000	5.000	1.455E-04





Pattern of Lugeon : **Turbulent Flow**

Value of Lugeon : **3.97**

Value of K : **5.3E-05** **cm/sec**

REMARKS

K = (2.30 x Q/60) / (2 x pi x L x H) x log(L/r)

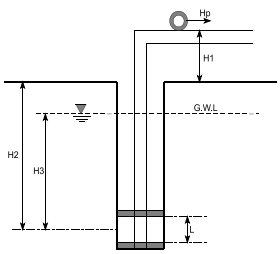
H = Hp + H1 + H2 + H3

Hp = variable head of water pressure

H1 = pressure gauge height from GL.

H2 = depth to half an injector

H3 = length of G.W.L to half an injector

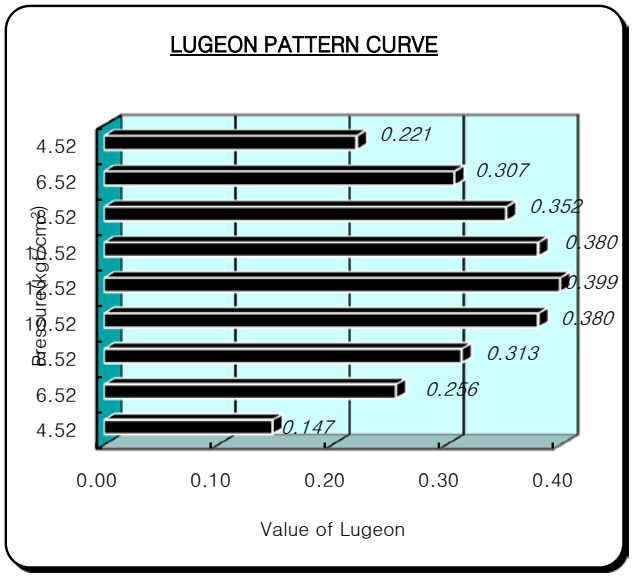


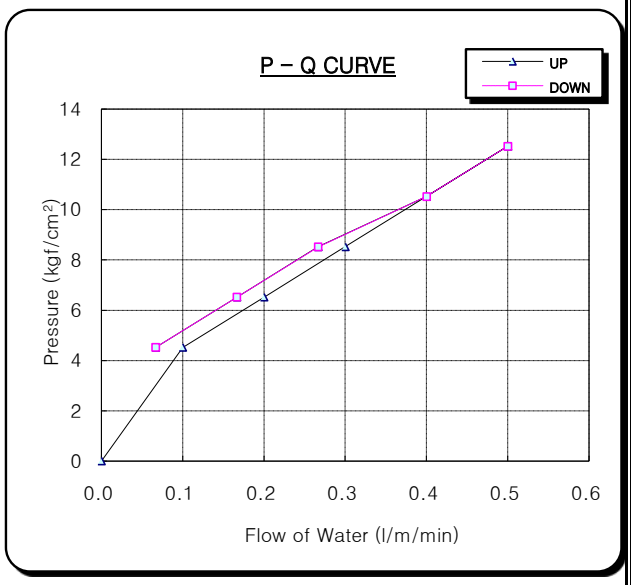
1. When the ground water level reveals above the upper packer the sign of H3 is minus (-)
2. When the ground water level reveals below the lower packer the sign of H3 is zero (0)

WORKING SHEETS OF WATER PRESSURE TEST

Project	중앙선(도담~영천)복선전철 제5공구 지반조사					
Hole Number	NTB-50	Geology	경 암	Date	2014. 06. 30.	
Test Section (m)	74.0 ~ 80.0	Hole Diameter (cm)	7.6	G.W.L (m)	35.0	
Gauge Height from Ground (m)	0.2	Kind of Packer	Single	Tested by	이종현	
Length of Injection (m)	6.0	Depth to Half an Injector (m)	77.00	Checked by	이석철	

Injection Time	Pressure	Total Head	Readings of Flow Meter (ℓ)			Water Consumed	Flow of Water	K
(min)	(kgf/cm^2)	(m)	from	to	differences	(cm^3/min)	(ℓ/m/min)	(cm/sec)
5	1.0	45.2	533.0	536.0	3.0	600	0.100	2.967E-06
5	3.0	65.2	536.0	542.0	6.0	1,200	0.200	4.114E-06
5	5.0	85.2	542.0	551.0	9.0	1,800	0.300	4.723E-06
5	7.0	105.2	551.0	563.0	12.0	2,400	0.400	5.100E-06
5	9.0	125.2	563.0	578.0	15.0	3,000	0.500	5.356E-06
5	7.0	105.2	578.0	590.0	12.0	2,400	0.400	5.100E-06
5	5.0	85.2	590.0	598.0	8.0	1,600	0.267	4.198E-06
5	3.0	65.2	598.0	603.0	5.0	1,000	0.167	3.428E-06
5	1.0	45.2	603.0	605.0	2.0	400	0.067	1.978E-06





Pattern of Lugeon : **Dilation**

Value of Lugeon : **0.26**

Value of K : **3.5E-06** **cm/sec**

REMARKS

K = (2.30 x Q/60) / (2 x pi x L x H) x log(L/r)

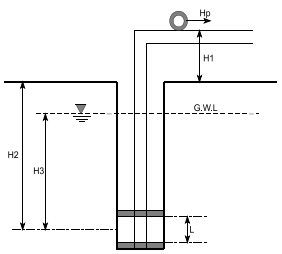
H = Hp + H1 + H2 + H3

Hp = variable head of water pressure

H1 = pressure gauge height from GL.

H2 = depth to half an injector

H3 = length of G.W.L to half an injector

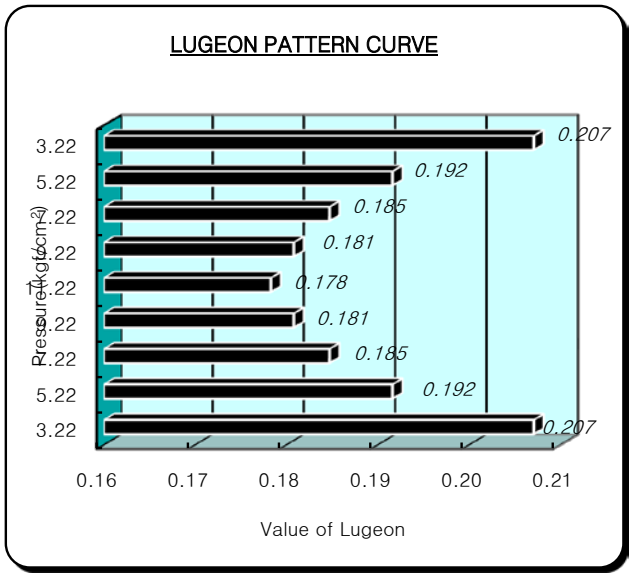


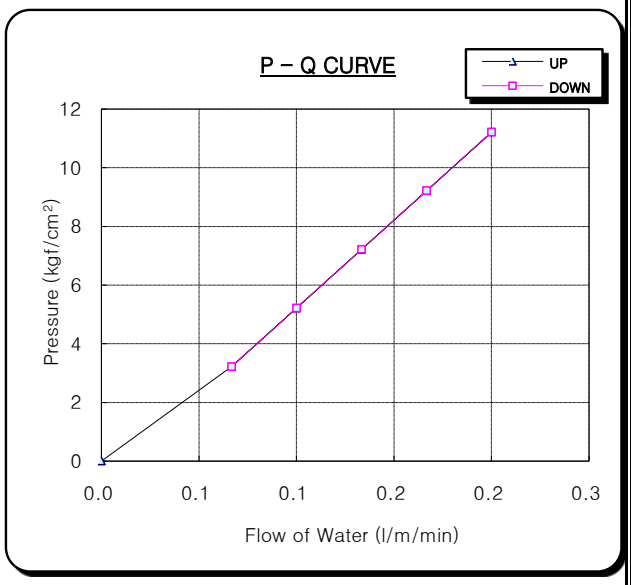
1. When the ground water level reveals above the upper packer the sign of H3 is minus (–)
2. When the ground water level reveals below the lower packer the sign of H3 is zero (0)

WORKING SHEETS OF WATER PRESSURE TEST

Project	중앙선(도담~영천)복선전철 제5공구 지반조사					
Hole Number	NTB-61	Geology	경 암	Date	2014. 06. 24.	
Test Section (m)	18.2 ~ 24.2	Hole Diameter (cm)	7.6	G.W.L (m)	21.9	
Gauge Height from Ground (m)	1.0	Kind of Packer	Single	Tested by	이종현	
Length of Injection (m)	6.0	Depth to Half an Injector (m)	21.20	Checked by	이석철	

Injection Time	Pressure	Total Head	Readings of Flow Meter (ℓ)			Water Consumed	Flow of Water	K
(min)	(kgf/cm^2)	(m)	from	to	differences	(cm^3/min)	(ℓ/m/min)	(cm/sec)
5	1.0	32.2	117.0	119.0	2.0	400	0.067	2.777E-06
5	3.0	52.2	119.0	122.0	3.0	600	0.100	2.569E-06
5	5.0	72.2	122.0	126.0	4.0	800	0.133	2.477E-06
5	7.0	92.2	126.0	131.0	5.0	1,000	0.167	2.424E-06
5	9.0	112.2	131.0	137.0	6.0	1,200	0.200	2.391E-06
5	7.0	92.2	138.0	143.0	5.0	1,000	0.167	2.424E-06
5	5.0	72.2	143.0	147.0	4.0	800	0.133	2.477E-06
5	3.0	52.2	147.0	150.0	3.0	600	0.100	2.569E-06
5	1.0	32.2	150.0	152.0	2.0	400	0.067	2.777E-06





Pattern of Lugeon : **Turbulent Flow**

Value of Lugeon : **0.18**

Value of K : **2.4E-06** **cm/sec**

REMARKS

K = (2.30 x Q/60) / (2 x pi x L x H) x log(L/r)

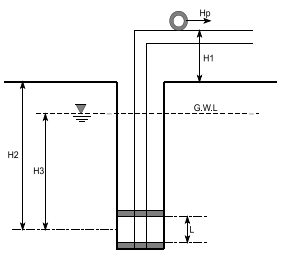
H = Hp + H1 + H2 + H3

Hp = variable head of water pressure

H1 = pressure gauge height from GL.

H2 = depth to half an injector

H3 = length of G.W.L to half an injector

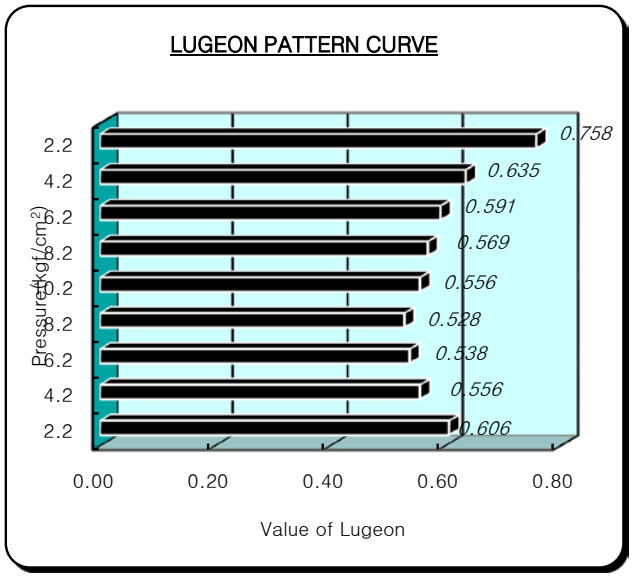


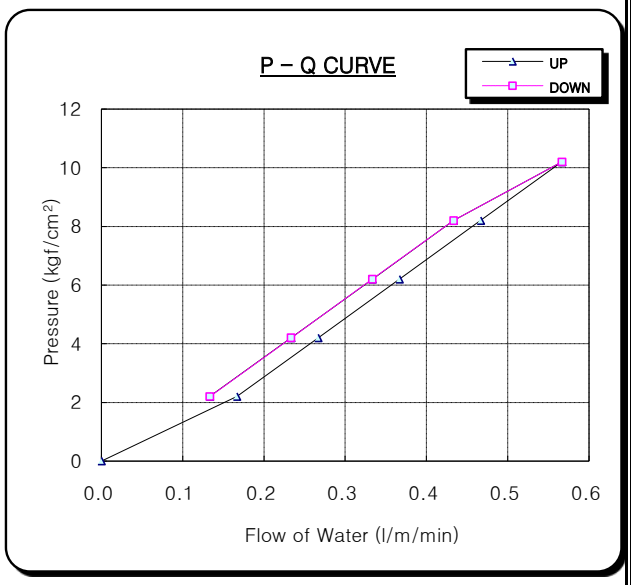
1. When the ground water level reveals above the upper packer the sign of H3 is minus (–)
2. When the ground water level reveals below the lower packer the sign of H3 is zero (0)

WORKING SHEETS OF WATER PRESSURE TEST

Project	중앙선(도담~영천)복선전철 제5공구 지반조사					
Hole Number	NTB-62	Geology	경 암	Date	2014. 07. 25.	
Test Section (m)	8.0 ~ 14.0	Hole Diameter (cm)	7.6	G.W.L (m)	14.0	
Gauge Height from Ground (m)	1.0	Kind of Packer	Single	Tested by	이종현	
Length of Injection (m)	6.0	Depth to Half an Injector (m)	11.00	Checked by	이석철	

Injection Time	Pressure	Total Head	Readings of Flow Meter (ℓ)			Water Consumed	Flow of Water	K
(min)	(kgf/cm^2)	(m)	from	to	differences	(cm^3/min)	(ℓ/m/min)	(cm/sec)
5	1.0	22.0	217.0	222.0	5.0	1,000	0.167	1.016E-05
5	3.0	42.0	222.0	230.0	8.0	1,600	0.267	8.516E-06
5	5.0	62.0	230.0	241.0	11.0	2,200	0.367	7.932E-06
5	7.0	82.0	241.0	255.0	14.0	2,800	0.467	7.633E-06
5	9.0	102.0	255.0	272.0	17.0	3,400	0.567	7.451E-06
5	7.0	82.0	272.0	285.0	13.0	2,600	0.433	7.088E-06
5	5.0	62.0	285.0	295.0	10.0	2,000	0.333	7.211E-06
5	3.0	42.0	295.0	302.0	7.0	1,400	0.233	7.451E-06
5	1.0	22.0	302.0	306.0	4.0	800	0.133	8.129E-06





Pattern of Lugeon : **Turbulent Flow**

Value of Lugeon : **0.56**

Value of K : **7.5E-06** **cm/sec**

REMARKS

K = (2.30 x Q/60) / (2 x pi x L x H) x log(L/r)

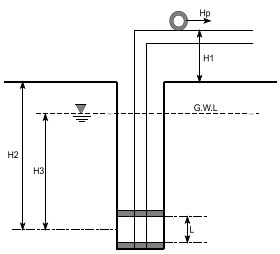
H = Hp + H1 + H2 + H3

Hp = variable head of water pressure

H1 = pressure gauge height from GL.

H2 = depth to half an injector

H3 = length of G.W.L to half an injector

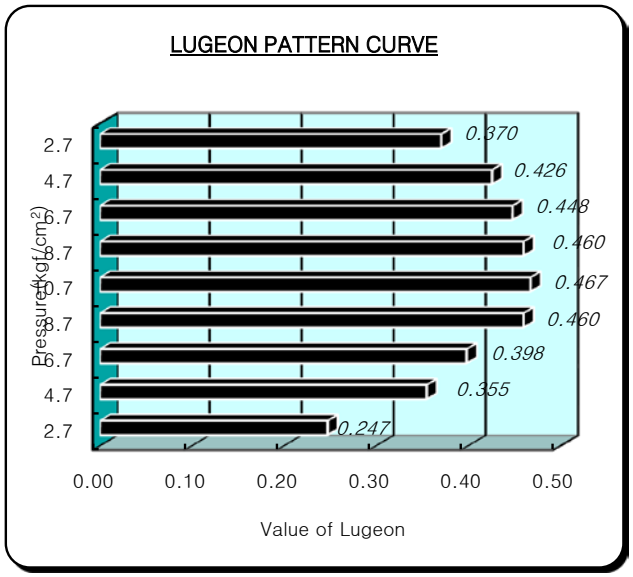


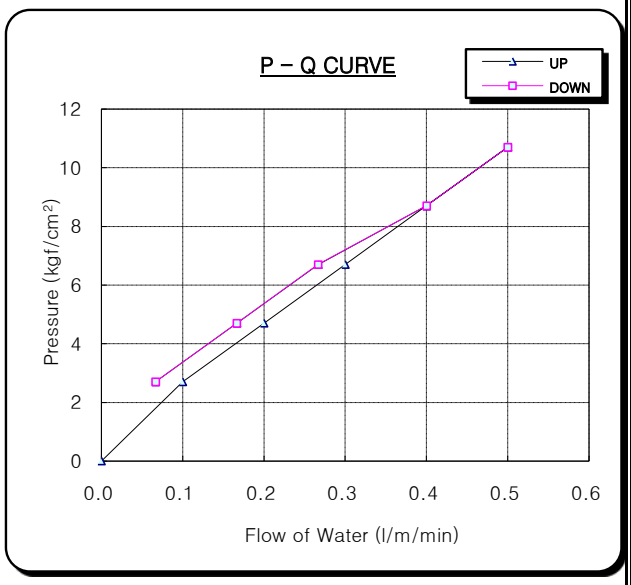
1. When the ground water level reveals above the upper packer the sign of H3 is minus (–)
2. When the ground water level reveals below the lower packer the sign of H3 is zero (0)

WORKING SHEETS OF WATER PRESSURE TEST

Project	중앙선(도담~영천)복선전철 제5공구 지반조사					
Hole Number	NTB-63	Geology	경 암	Date	2014. 06. 22.	
Test Section (m)	13.0 ~ 19.0	Hole Diameter (cm)	7.6	G.W.L (m)	16.0	
Gauge Height from Ground (m)	1.0	Kind of Packer	Single	Tested by	이종현	
Length of Injection (m)	6.0	Depth to Half an Injector (m)	16.00	Checked by	이석철	

Injection Time	Pressure	Total Head	Readings of Flow Meter (ℓ)			Water Consumed	Flow of Water	K
(min)	(kgf/cm^2)	(m)	from	to	differences	(cm^3/min)	(ℓ/m/min)	(cm/sec)
5	1.0	27.0	528.5	531.5	3.0	600	0.100	4.967E-06
5	3.0	47.0	531.5	537.5	6.0	1,200	0.200	5.707E-06
5	5.0	67.0	537.5	546.5	9.0	1,800	0.300	6.005E-06
5	7.0	87.0	546.5	558.5	12.0	2,400	0.400	6.166E-06
5	9.0	107.0	558.5	573.5	15.0	3,000	0.500	6.267E-06
5	7.0	87.0	573.5	585.5	12.0	2,400	0.400	6.166E-06
5	5.0	67.0	585.5	593.5	8.0	1,600	0.267	5.338E-06
5	3.0	47.0	593.5	598.5	5.0	1,000	0.167	4.756E-06
5	1.0	27.0	598.5	600.5	2.0	400	0.067	3.312E-06





Pattern of Lugeon : **Dilation**

Value of Lugeon : **0.37**

Value of K : **4.9E-06** **cm/sec**

REMARKS

K = (2.30 x Q/60) / (2 x pi x L x H) x log(L/r)

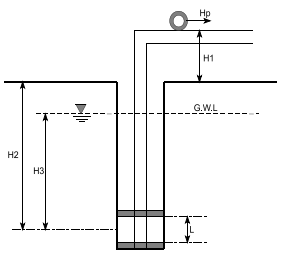
H = Hp + H1 + H2 + H3

Hp = variable head of water pressure

H1 = pressure gauge height from GL.

H2 = depth to half an injector

H3 = length of G.W.L to half an injector

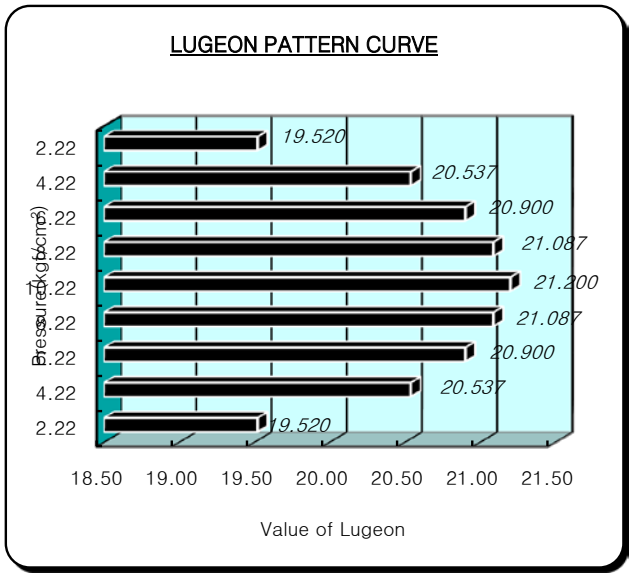


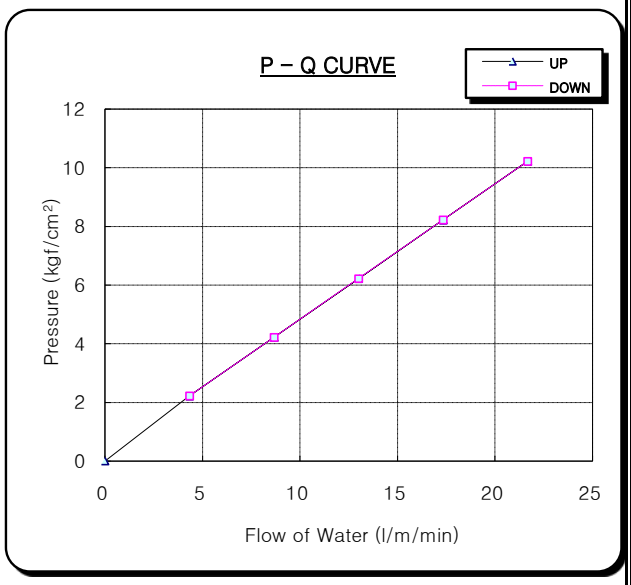
1. When the ground water level reveals above the upper packer the sign of H3 is minus (–)
2. When the ground water level reveals below the lower packer the sign of H3 is zero (0)

WORKING SHEETS OF WATER PRESSURE TEST

Project	중앙선(도담~영천)복선전철 제5공구 지반조사					
Hole Number	NTB-64	Geology	연암	Date	2014. 06. 24.	
Test Section (m)	9.0 ~ 15.0	Hole Diameter (cm)	7.6	G.W.L (m)	12.0	
Gauge Height from Ground (m)	0.2	Kind of Packer	Single	Tested by	이종현	
Length of Injection (m)	6.0	Depth to Half an Injector (m)	12.00	Checked by	이석철	

Injection Time	Pressure	Total Head	Readings of Flow Meter (ℓ)			Water Consumed	Flow of Water	K
(min)	(kgf/cm^2)	(m)	from	to	differences	(cm^3/min)	(ℓ/m/min)	(cm/sec)
5	1.0	22.2	500.0	630.0	130.0	26,000	4.333	2.618E-04
5	3.0	42.2	630.0	890.0	260.0	52,000	8.667	2.754E-04
5	5.0	62.2	890.0	1280.0	390.0	78,000	13.000	2.803E-04
5	7.0	82.2	1280.0	1800.0	520.0	104,000	17.333	2.828E-04
5	9.0	102.2	1800.0	2450.0	650.0	130,000	21.667	2.843E-04
5	7.0	82.2	2450.0	2970.0	520.0	104,000	17.333	2.828E-04
5	5.0	62.2	2970.0	3360.0	390.0	78,000	13.000	2.803E-04
5	3.0	42.2	3360.0	3620.0	260.0	52,000	8.667	2.754E-04
5	1.0	22.2	3620.0	3750.0	130.0	26,000	4.333	2.618E-04





Pattern of Lugeon : **Dilation**

Value of Lugeon : **20.21**

Value of K : **2.7E-04** **cm/sec**

REMARKS

K = (2.30 x Q/60) / (2 x pi x L x H) x log(L/r)

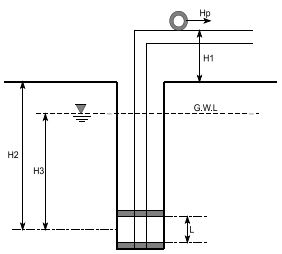
H = Hp + H1 + H2 + H3

Hp = variable head of water pressure

H1 = pressure gauge height from GL.

H2 = depth to half an injector

H3 = length of G.W.L to half an injector

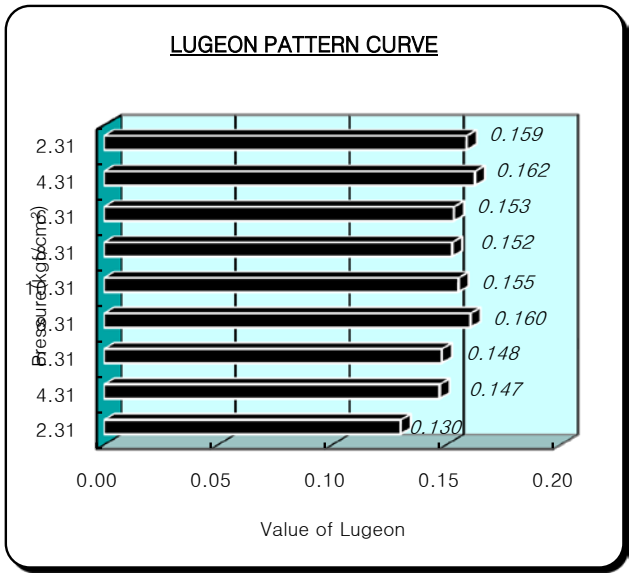


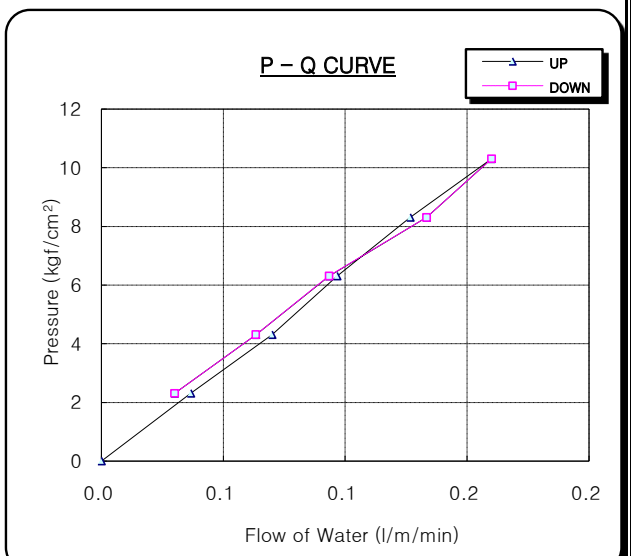
1. When the ground water level reveals above the upper packer the sign of H3 is minus (-)
2. When the ground water level reveals below the lower packer the sign of H3 is zero (0)

WORKING SHEETS OF WATER PRESSURE TEST

Project	중앙선(도담~영천)복선전철 제5공구 지반조사						
Hole Number	NTB-65		Geology		경 암	Date	2014. 06. 25.
Test Section (m)	10.0	~ 16.0	Hole Diameter (cm)		7.6	G.W.L (m)	13.0
Gauge Height from Ground (m)		0.1	Kind of Packer		Single	Tested by	이종현
Length of Injection (m)		6.0	Depth to Half an Injector (m)		13.00	Checked by	이석철

Injection Time	Pressure	Total Head	Readings of Flow Meter (ℓ)			Water Consumed	Flow of Water	K
(min)	(kgf/cm^2)	(m)	from	to	differences	(cm^3/min)	(ℓ/m/min)	(cm/sec)
5	1.0	23.1	149.0	150.1	1.1	220	0.037	2.129E-06
5	3.0	43.1	150.1	152.2	2.1	420	0.070	2.178E-06
5	5.0	63.1	152.2	155.1	2.9	580	0.097	2.055E-06
5	7.0	83.1	155.1	158.9	3.8	760	0.127	2.044E-06
5	9.0	103.1	158.9	163.7	4.8	960	0.160	2.081E-06
5	7.0	83.1	163.7	167.7	4.0	800	0.133	2.152E-06
5	5.0	63.1	167.7	170.5	2.8	560	0.093	1.984E-06
5	3.0	43.1	170.5	172.4	1.9	380	0.063	1.971E-06
5	1.0	23.1	172.4	173.3	0.9	180	0.030	1.742E-06





Pattern of Lugeon : **Laminar Flow**

Value of Lugeon : **0.16**

Value of K : **2.0E-06** **cm/sec**

REMARKS

K = (2.30 x Q/60) / (2 x pi x L x H) x log(L/r)

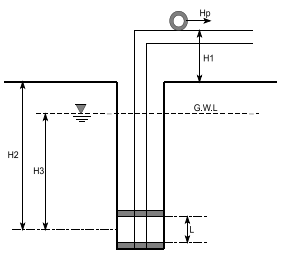
H = Hp + H1 + H2 + H3

Hp = variable head of water pressure

H1 = pressure gauge height from GL.

H2 = depth to half an injector

H3 = length of G.W.L to half an injector

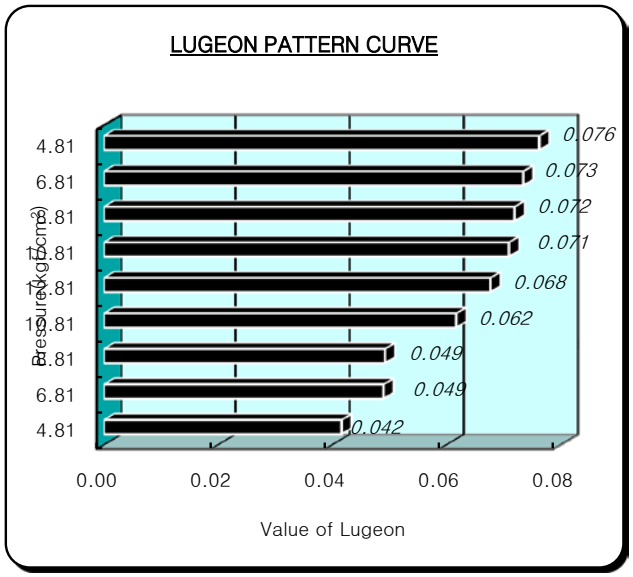


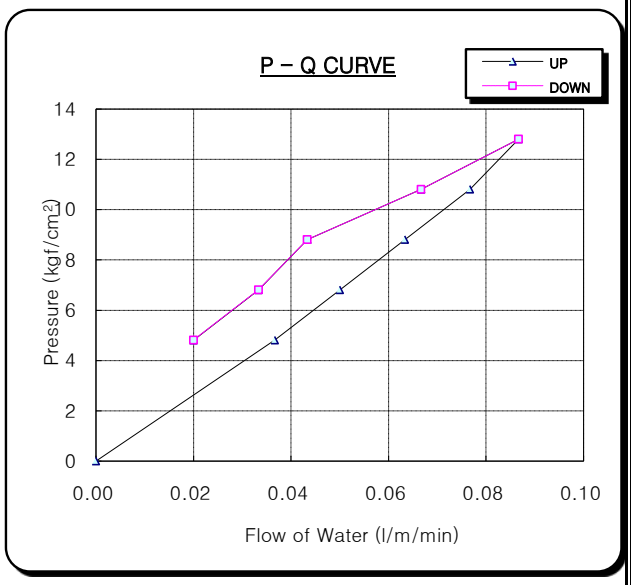
1. When the ground water level reveals above the upper packer the sign of H3 is minus (-)
2. When the ground water level reveals below the lower packer the sign of H3 is zero (0)

WORKING SHEETS OF WATER PRESSURE TEST

Project	중앙선(도담~영천)복선전철 제5공구 지반조사						
Hole Number	NTB-66		Geology		경 암	Date	2014. 07. 07.
Test Section (m)	35.0	~ 41.0	Hole Diameter (cm)		7.6	G.W.L (m)	39.0
Gauge Height from Ground (m)		0.1	Kind of Packer		Single	Tested by	이종현
Length of Injection (m)		6.0	Depth to Half an Injector (m)		38.00	Checked by	이석철

Injection Time	Pressure	Total Head	Readings of Flow Meter (ℓ)			Water Consumed	Flow of Water	K
(min)	(kgf/cm^2)	(m)	from	to	differences	(cm^3/min)	(ℓ/m/min)	(cm/sec)
5	1.0	48.1	199.9	201.0	1.1	220	0.037	1.022E-06
5	3.0	68.1	201.0	202.5	1.5	300	0.050	9.847E-07
5	5.0	88.1	202.5	204.4	1.9	380	0.063	9.642E-07
5	7.0	108.1	204.4	206.7	2.3	460	0.077	9.512E-07
5	9.0	128.1	206.7	209.3	2.6	520	0.087	9.074E-07
5	7.0	108.1	209.3	211.3	2.0	400	0.067	8.271E-07
5	5.0	88.1	211.3	212.6	1.3	260	0.043	6.597E-07
5	3.0	68.1	212.6	213.6	1.0	200	0.033	6.565E-07
5	1.0	48.1	213.6	214.2	0.6	120	0.020	5.577E-07





Pattern of Lugeon : **Void Filling**

Value of Lugeon : **0.04**

Value of K : **5.6E-07** **cm/sec**

REMARKS

K = (2.30 x Q/60) / (2 x pi x L x H) x log(L/r)

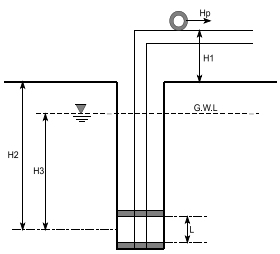
H = Hp + H1 + H2 + H3

Hp = variable head of water pressure

H1 = pressure gauge height from GL.

H2 = depth to half an injector

H3 = length of G.W.L to half an injector

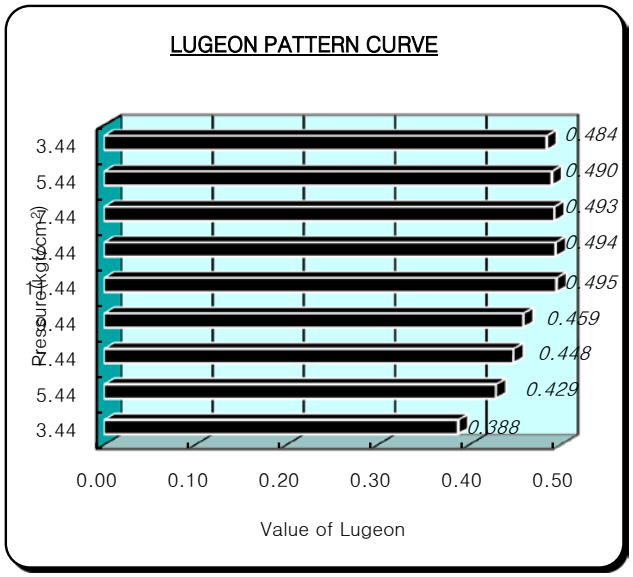


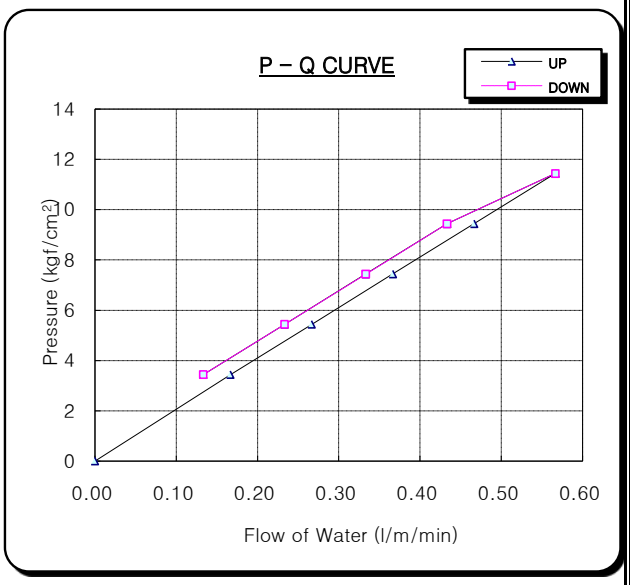
1. When the ground water level reveals above the upper packer the sign of H3 is minus (-)
2. When the ground water level reveals below the lower packer the sign of H3 is zero (0)

WORKING SHEETS OF WATER PRESSURE TEST

Project	중앙선(도담~영천)복선전철 제5공구 지반조사						
Hole Number	NTB-70		Geology		경 암	Date	2014. 08. 13.
Test Section (m)	21.2	~ 27.2	Hole Diameter (cm)		7.6	G.W.L (m)	35.0
Gauge Height from Ground (m)		0.2	Kind of Packer		Single	Tested by	이종현
Length of Injection (m)		6.0	Depth to Half an Injector (m)		24.20	Checked by	이석철

Injection Time	Pressure	Total Head	Readings of Flow Meter (ℓ)			Water Consumed	Flow of Water	K
(min)	(kgf/cm^2)	(m)	from	to	differences	(cm^3/min)	(ℓ/m/min)	(cm/sec)
5	1.0	34.4	307.0	312.0	5.0	1,000	0.167	6.498E-06
5	3.0	54.4	312.0	320.0	8.0	1,600	0.267	6.575E-06
5	5.0	74.4	320.0	331.0	11.0	2,200	0.367	6.610E-06
5	7.0	94.4	331.0	345.0	14.0	2,800	0.467	6.630E-06
5	9.0	114.4	345.0	362.0	17.0	3,400	0.567	6.644E-06
5	7.0	94.4	362.0	375.0	13.0	2,600	0.433	6.157E-06
5	5.0	74.4	375.0	385.0	10.0	2,000	0.333	6.009E-06
5	3.0	54.4	385.0	392.0	7.0	1,400	0.233	5.753E-06
5	1.0	34.4	392.0	396.0	4.0	800	0.133	5.198E-06





Pattern of Lugeon : **Void Filling**

Value of Lugeon : **0.39**

Value of K : **5.2E-06** **cm/sec**

REMARKS

K = (2.30 x Q/60) / (2 x pi x L x H) x log(L/r)

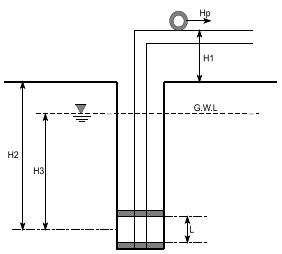
H = Hp + H1 + H2 + H3

Hp = variable head of water pressure

H1 = pressure gauge height from GL.

H2 = depth to half an injector

H3 = length of G.W.L to half an injector

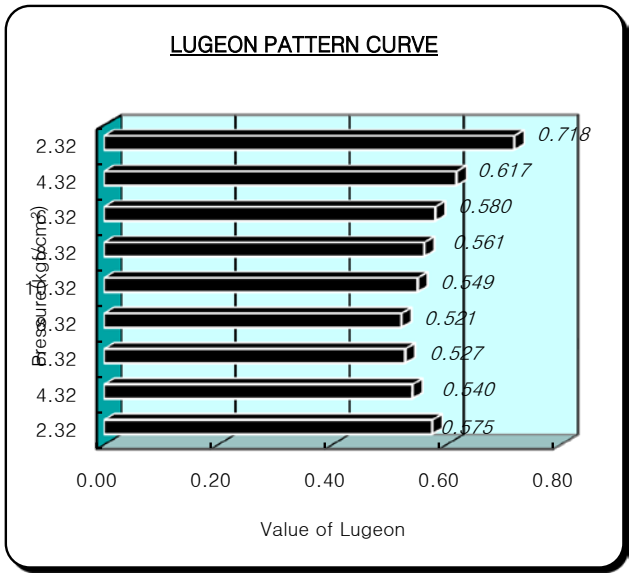


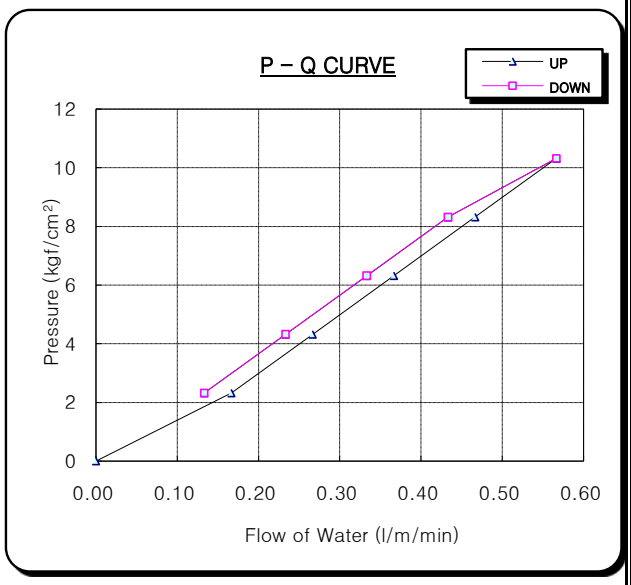
1. When the ground water level reveals above the upper packer the sign of H3 is minus (-)
2. When the ground water level reveals below the lower packer the sign of H3 is zero (0)

WORKING SHEETS OF WATER PRESSURE TEST

Project	중앙선(도담~영천)복선전철 제5공구 지반조사					
Hole Number	NTB-72	Geology	경 암	Date	2014. 07. 05.	
Test Section (m)	10.0 ~ 16.0	Hole Diameter (cm)	7.6	G.W.L (m)	15.0	
Gauge Height from Ground (m)	0.2	Kind of Packer	Single	Tested by	이종현	
Length of Injection (m)	6.0	Depth to Half an Injector (m)	13.00	Checked by	이석철	

Injection Time	Pressure	Total Head	Readings of Flow Meter (ℓ)			Water Consumed	Flow of Water	K
(min)	(kgf/cm^2)	(m)	from	to	differences	(cm^3/min)	(ℓ/m/min)	(cm/sec)
5	1.0	23.2	207.0	212.0	5.0	1,000	0.167	9.635E-06
5	3.0	43.2	212.0	220.0	8.0	1,600	0.267	8.279E-06
5	5.0	63.2	220.0	231.0	11.0	2,200	0.367	7.781E-06
5	7.0	83.2	231.0	245.0	14.0	2,800	0.467	7.523E-06
5	9.0	103.2	245.0	262.0	17.0	3,400	0.567	7.365E-06
5	7.0	83.2	262.0	275.0	13.0	2,600	0.433	6.985E-06
5	5.0	63.2	275.0	285.0	10.0	2,000	0.333	7.074E-06
5	3.0	43.2	285.0	292.0	7.0	1,400	0.233	7.244E-06
5	1.0	23.2	292.0	296.0	4.0	800	0.133	7.708E-06





Pattern of Lugeon : **Turbulent Flow**

Value of Lugeon : **0.55**

Value of K : **7.4E-06** **cm/sec**

REMARKS

K = (2.30 x Q/60) / (2 x pi x L x H) x log(L/r)

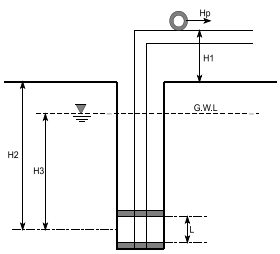
H = Hp + H1 + H2 + H3

Hp = variable head of water pressure

H1 = pressure gauge height from GL.

H2 = depth to half an injector

H3 = length of G.W.L to half an injector

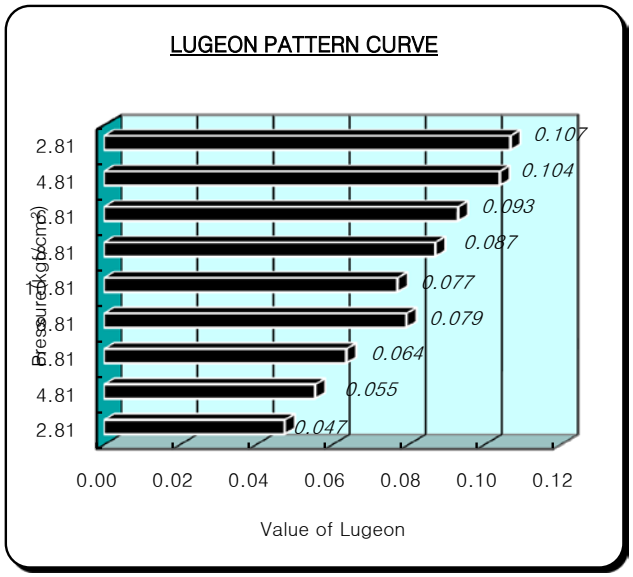


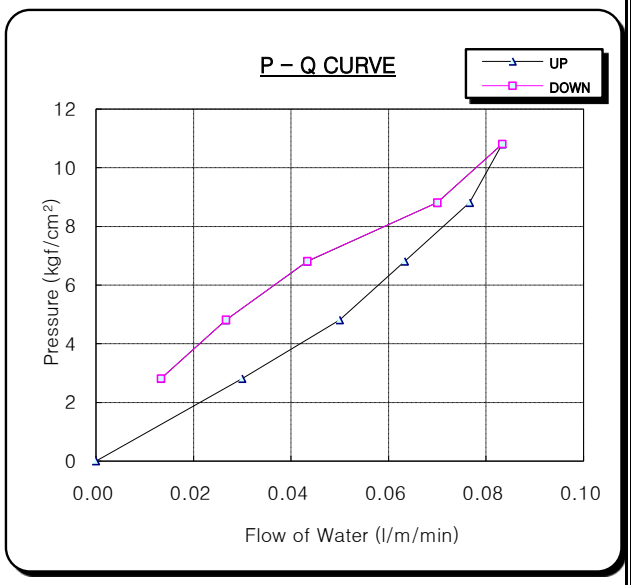
1. When the ground water level reveals above the upper packer the sign of H3 is minus (–)
2. When the ground water level reveals below the lower packer the sign of H3 is zero (0)

WORKING SHEETS OF WATER PRESSURE TEST

Project	중앙선(도담~영천)복선전철 제5공구 지반조사						
Hole Number	NTB-73		Geology		경 암	Date	2014. 07. 05.
Test Section (m)	15.0	~ 21.0	Hole Diameter (cm)		7.6	G.W.L (m)	18.0
Gauge Height from Ground (m)		0.1	Kind of Packer		Single	Tested by	이종현
Length of Injection (m)		6.0	Depth to Half an Injector (m)		18.00	Checked by	이석철

Injection Time	Pressure	Total Head	Readings of Flow Meter (ℓ)			Water Consumed	Flow of Water	K
(min)	(kgf/cm^2)	(m)	from	to	differences	(cm^3/min)	(ℓ/m/min)	(cm/sec)
5	1.0	28.1	195.4	196.3	0.9	180	0.030	1.432E-06
5	3.0	48.1	196.3	197.8	1.5	300	0.050	1.394E-06
5	5.0	68.1	197.8	199.7	1.9	380	0.063	1.247E-06
5	7.0	88.1	199.7	202.0	2.3	460	0.077	1.167E-06
5	9.0	108.1	202.0	204.5	2.5	500	0.083	1.034E-06
5	7.0	88.1	204.5	206.6	2.1	420	0.070	1.066E-06
5	5.0	68.1	206.6	207.9	1.3	260	0.043	8.534E-07
5	3.0	48.1	207.9	208.7	0.8	160	0.027	7.436E-07
5	1.0	28.1	203.4	203.8	0.4	80	0.013	6.364E-07





Pattern of Lugeon : **Void Filling**

Value of Lugeon : **0.05**

Value of K : **6.4E-07** **cm/sec**

REMARKS

K = (2.30 x Q/60) / (2 x pi x L x H) x log(L/r)

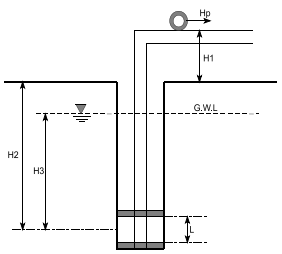
H = Hp + H1 + H2 + H3

Hp = variable head of water pressure

H1 = pressure gauge height from GL.

H2 = depth to half an injector

H3 = length of G.W.L to half an injector

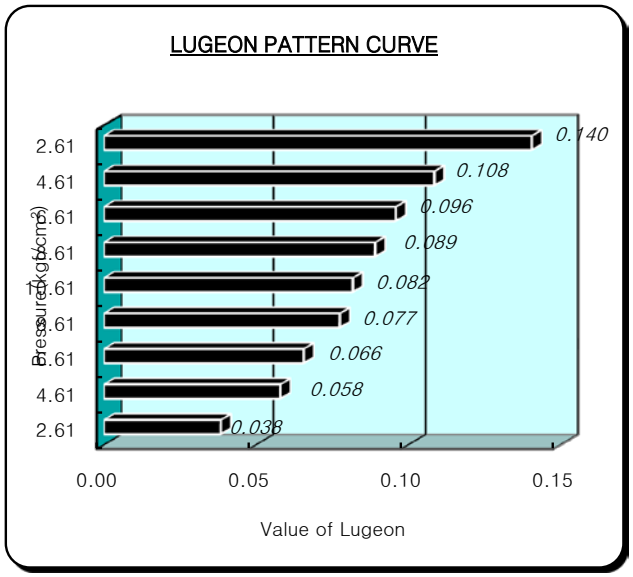


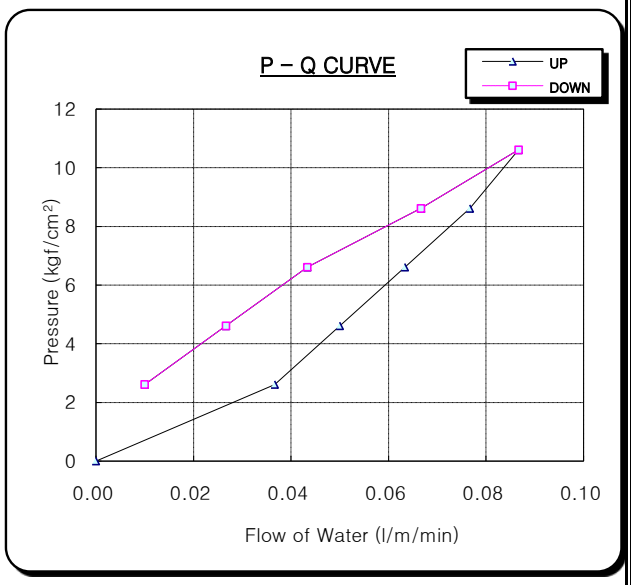
1. When the ground water level reveals above the upper packer the sign of H3 is minus (-)
2. When the ground water level reveals below the lower packer the sign of H3 is zero (0)

WORKING SHEETS OF WATER PRESSURE TEST

Project	중앙선(도담~영천)복선전철 제5공구 지반조사						
Hole Number	NTB-74		Geology		경 암	Date	2014. 07. 07.
Test Section (m)	13.0	~ 19.0	Hole Diameter (cm)		7.6	G.W.L (m)	18.0
Gauge Height from Ground (m)		0.1	Kind of Packer		Single	Tested by	이종현
Length of Injection (m)		6.0	Depth to Half an Injector (m)		16.00	Checked by	이석철

Injection Time	Pressure	Total Head	Readings of Flow Meter (ℓ)			Water Consumed	Flow of Water	K
(min)	(kgf/cm^2)	(m)	from	to	differences	(cm^3/min)	(ℓ/m/min)	(cm/sec)
5	1.0	26.1	189.9	191.0	1.1	220	0.037	1.884E-06
5	3.0	46.1	191.0	192.5	1.5	300	0.050	1.455E-06
5	5.0	66.1	192.5	194.4	1.9	380	0.063	1.285E-06
5	7.0	86.1	194.4	196.7	2.3	460	0.077	1.194E-06
5	9.0	106.1	196.7	199.3	2.6	520	0.087	1.096E-06
5	7.0	86.1	199.3	201.3	2.0	400	0.067	1.038E-06
5	5.0	66.1	201.3	202.6	1.3	260	0.043	8.793E-07
5	3.0	46.1	202.6	203.4	0.8	160	0.027	7.758E-07
5	1.0	26.1	203.4	203.7	0.3	60	0.010	5.139E-07





Pattern of Lugeon : **Void Filling**

Value of Lugeon : **0.04**

Value of K : **5.1E-07** **cm/sec**

REMARKS

K = (2.30 x Q/60) / (2 x pi x L x H) x log(L/r)

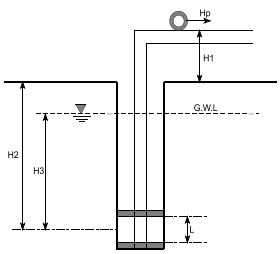
H = Hp + H1 + H2 + H3

Hp = variable head of water pressure

H1 = pressure gauge height from GL.

H2 = depth to half an injector

H3 = length of G.W.L to half an injector

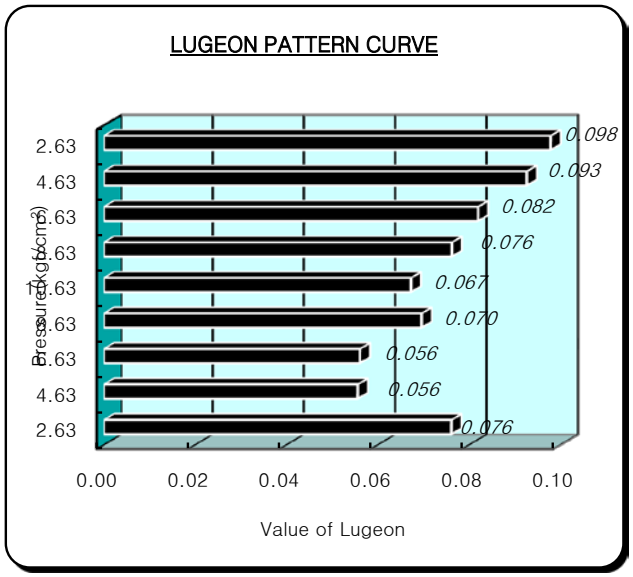


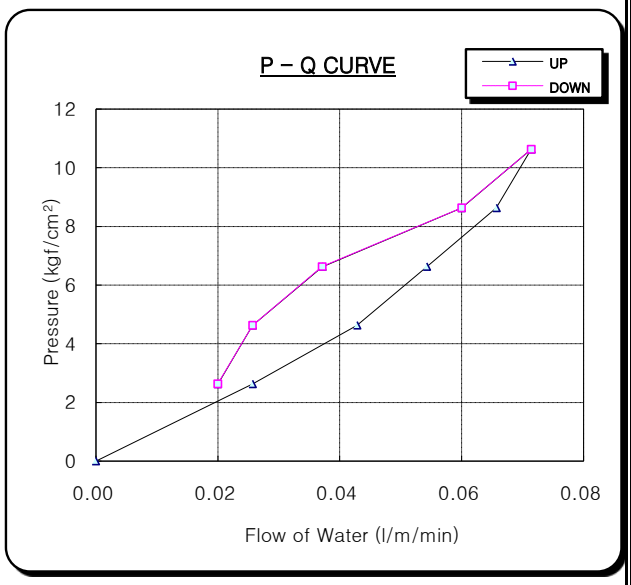
1. When the ground water level reveals above the upper packer the sign of H3 is minus (–)
2. When the ground water level reveals below the lower packer the sign of H3 is zero (0)

WORKING SHEETS OF WATER PRESSURE TEST

Project	중앙선(도담~영천)복선전철 제5공구 지반조사					
Hole Number	NTB-75	Geology	경 암	Date	2014. 07. 05.	
Test Section (m)	21.0 ~ 28.0	Hole Diameter (cm)	7.6	G.W.L (m)	16.2	
Gauge Height from Ground (m)	0.1	Kind of Packer	Single	Tested by	이종현	
Length of Injection (m)	7.0	Depth to Half an Injector (m)	24.50	Checked by	이석철	

Injection Time	Pressure	Total Head	Readings of Flow Meter (ℓ)			Water Consumed	Flow of Water	K
(min)	(kgf/cm^2)	(m)	from	to	differences	(cm^3/min)	(ℓ/m/min)	(cm/sec)
5	1.0	26.3	395.4	396.3	0.9	180	0.026	1.351E-06
5	3.0	46.3	396.3	397.8	1.5	300	0.043	1.279E-06
5	5.0	66.3	397.8	399.7	1.9	380	0.054	1.132E-06
5	7.0	86.3	399.7	402.0	2.3	460	0.066	1.052E-06
5	9.0	106.3	402.0	404.5	2.5	500	0.071	9.287E-07
5	7.0	86.3	404.5	406.6	2.1	420	0.060	9.609E-07
5	5.0	66.3	406.6	407.9	1.3	260	0.037	7.743E-07
5	3.0	46.3	409.2	410.1	0.9	180	0.026	7.676E-07
5	1.0	26.3	411.2	411.9	0.7	140	0.020	1.051E-06





Pattern of Lugeon : **Void Filling**

Value of Lugeon : **0.08**

Value of K : **1.1E-06** **cm/sec**

REMARKS

K = (2.30 x Q/60) / (2 x pi x L x H) x log(L/r)

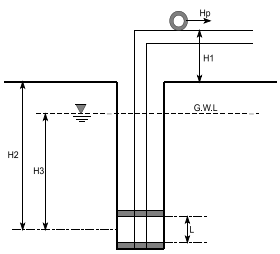
H = Hp + H1 + H2 + H3

Hp = variable head of water pressure

H1 = pressure gauge height from GL.

H2 = depth to half an injector

H3 = length of G.W.L to half an injector

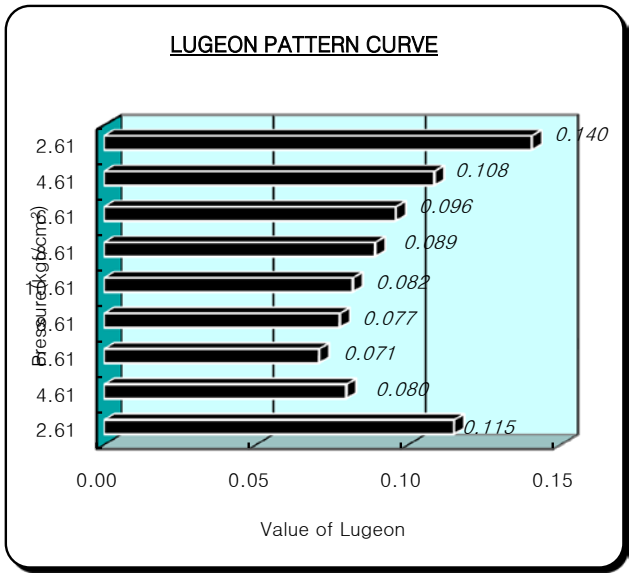


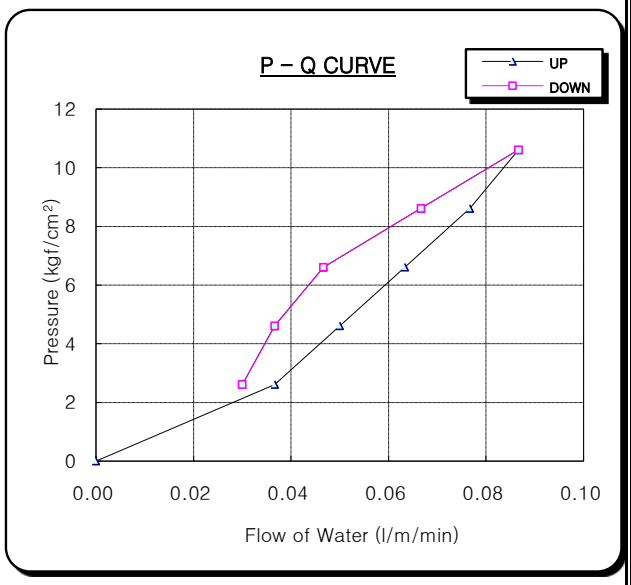
1. When the ground water level reveals above the upper packer the sign of H3 is minus (-)
2. When the ground water level reveals below the lower packer the sign of H3 is zero (0)

WORKING SHEETS OF WATER PRESSURE TEST

Project	중앙선(도담~영천)복선전철 제5공구 지반조사					
Hole Number	NTB-76	Geology	경 암	Date	2014. 07. 05.	
Test Section (m)	13.0 ~ 19.0	Hole Diameter (cm)	7.6	G.W.L (m)	18.0	
Gauge Height from Ground (m)	0.1	Kind of Packer	Single	Tested by	이종현	
Length of Injection (m)	6.0	Depth to Half an Injector (m)	16.00	Checked by	이석철	

Injection Time	Pressure	Total Head	Readings of Flow Meter (ℓ)			Water Consumed	Flow of Water	K
(min)	(kgf/cm^2)	(m)	from	to	differences	(cm^3/min)	(ℓ/m/min)	(cm/sec)
5	1.0	26.1	146.9	148.0	1.1	220	0.037	1.884E-06
5	3.0	46.1	148.0	149.5	1.5	300	0.050	1.455E-06
5	5.0	66.1	149.5	151.4	1.9	380	0.063	1.285E-06
5	7.0	86.1	151.4	153.7	2.3	460	0.077	1.194E-06
5	9.0	106.1	153.7	156.3	2.6	520	0.087	1.096E-06
5	7.0	86.1	156.3	158.3	2.0	400	0.067	1.038E-06
5	5.0	66.1	158.3	159.7	1.4	280	0.047	9.469E-07
5	3.0	46.1	159.7	160.8	1.1	220	0.037	1.067E-06
5	1.0	26.1	160.8	161.7	0.9	180	0.030	1.542E-06





Pattern of Lugeon : **Turbulent Flow**

Value of Lugeon : **0.08**

Value of K : **1.1E-06** **cm/sec**

REMARKS

K = (2.30 x Q/60) / (2 x pi x L x H) x log(L/r)

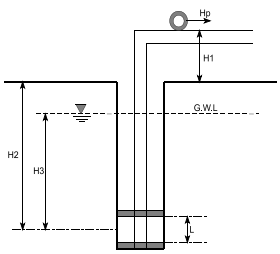
H = Hp + H1 + H2 + H3

Hp = variable head of water pressure

H1 = pressure gauge height from GL.

H2 = depth to half an injector

H3 = length of G.W.L to half an injector

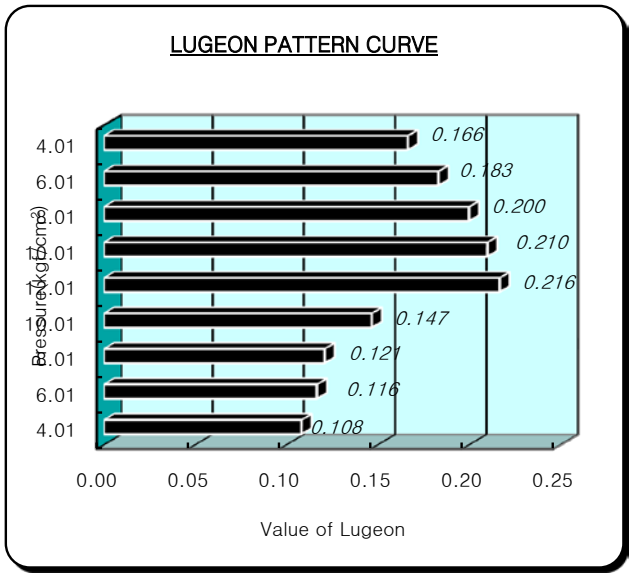


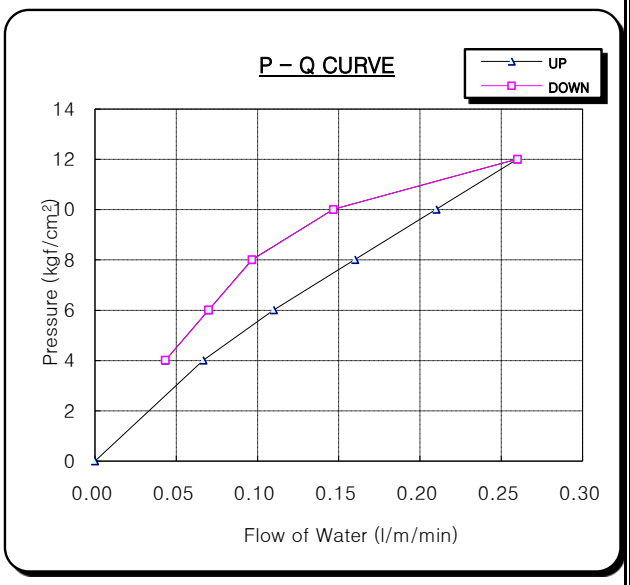
1. When the ground water level reveals above the upper packer the sign of H3 is minus (–)
2. When the ground water level reveals below the lower packer the sign of H3 is zero (0)

WORKING SHEETS OF WATER PRESSURE TEST

Project	중앙선(도담~영천)복선전철 제5공구 지반조사					
Hole Number	NTB-85	Geology	경 암	Date	2014. 05. 24.	
Test Section (m)	30.7 ~ 36.7	Hole Diameter (cm)	7.6	G.W.L (m)	30.1	
Gauge Height from Ground (m)	0.0	Kind of Packer	Single	Tested by	이종현	
Length of Injection (m)	6.0	Depth to Half an Injector (m)	33.70	Checked by	이석철	

Injection Time	Pressure	Total Head	Readings of Flow Meter (ℓ)			Water Consumed	Flow of Water	K
(min)	(kgf/cm^2)	(m)	from	to	differences	(cm^3/min)	(ℓ/m/min)	(cm/sec)
5	1.0	40.1	257.0	259.0	2.0	400	0.067	2.230E-06
5	3.0	60.1	259.0	262.3	3.3	660	0.110	2.455E-06
5	5.0	80.1	262.3	267.1	4.8	960	0.160	2.679E-06
5	7.0	100.1	267.1	273.4	6.3	1,260	0.210	2.814E-06
5	9.0	120.1	273.4	281.2	7.8	1,560	0.260	2.904E-06
5	7.0	100.1	281.2	285.6	4.4	880	0.147	1.965E-06
5	5.0	80.1	285.6	288.5	2.9	580	0.097	1.619E-06
5	3.0	60.1	288.5	290.6	2.1	420	0.070	1.562E-06
5	1.0	40.1	290.6	291.9	1.3	260	0.043	1.449E-06





Pattern of Lugeon : **Dilation**

Value of Lugeon : **0.15**

Value of K : **2.0E-06** **cm/sec**

REMARKS

K = (2.30 x Q/60) / (2 x pi x L x H) x log(L/r)

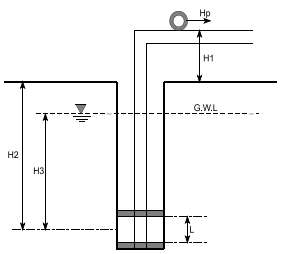
H = Hp + H1 + H2 + H3

Hp = variable head of water pressure

H1 = pressure gauge height from GL.

H2 = depth to half an injector

H3 = length of G.W.L to half an injector

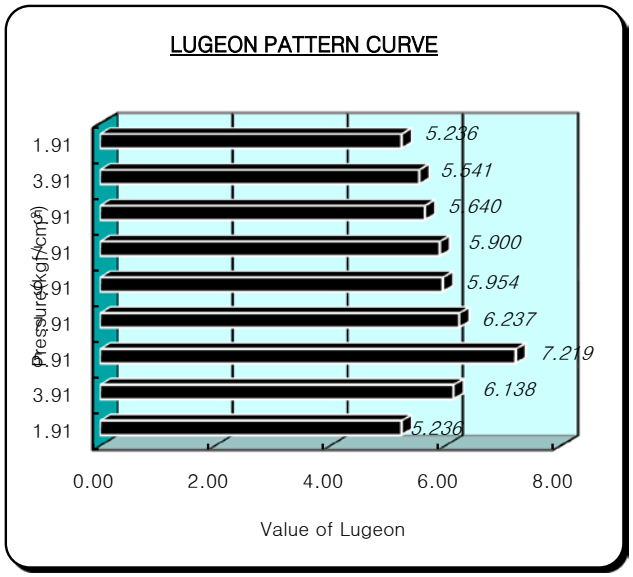


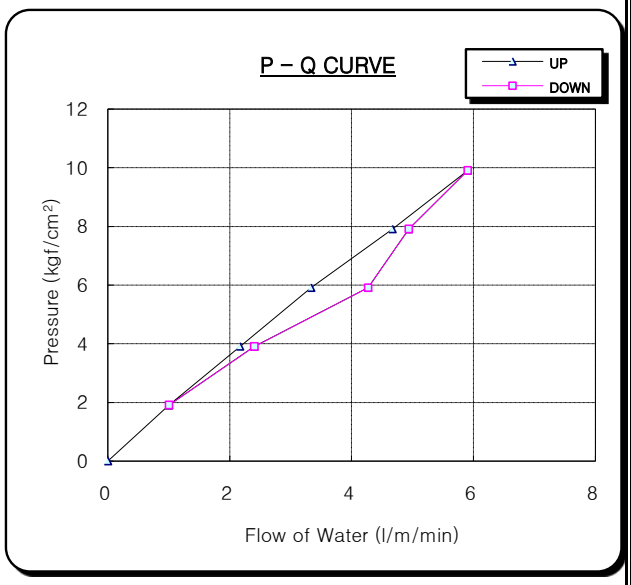
1. When the ground water level reveals above the upper packer the sign of H3 is minus (–)
2. When the ground water level reveals below the lower packer the sign of H3 is zero (0)

WORKING SHEETS OF WATER PRESSURE TEST

Project	중앙선(도담~영천)복선전철 제5공구 지반조사					
Hole Number	NTB-88	Geology	경 암	Date	2014. 07. 28.	
Test Section (m)	6.0 ~ 12.0	Hole Diameter (cm)	7.6	G.W.L (m)	9.5	
Gauge Height from Ground (m)	0.1	Kind of Packer	Single	Tested by	이종현	
Length of Injection (m)	6.0	Depth to Half an Injector (m)	9.00	Checked by	이석철	

Injection Time	Pressure	Total Head	Readings of Flow Meter (ℓ)			Water Consumed	Flow of Water	K
(min)	(kgf/cm^2)	(m)	from	to	differences	(cm^3/min)	(ℓ/m/min)	(cm/sec)
5	1.0	19.1	120.0	150.0	30.0	6,000	1.000	7.022E-05
5	3.0	39.1	150.0	215.0	65.0	13,000	2.167	7.432E-05
5	5.0	59.1	215.0	315.0	100.0	20,000	3.333	7.565E-05
5	7.0	79.1	315.0	455.0	140.0	28,000	4.667	7.913E-05
5	9.0	99.1	455.0	632.0	177.0	35,400	5.900	7.985E-05
5	7.0	79.1	632.0	780.0	148.0	29,600	4.933	8.365E-05
5	5.0	59.1	780.0	908.0	128.0	25,600	4.267	9.683E-05
5	3.0	39.1	908.0	980.0	72.0	14,400	2.400	8.232E-05
5	1.0	19.1	980.0	1010.0	30.0	6,000	1.000	7.022E-05





Pattern of Lugeon : **Dilation**

Value of Lugeon : **5.83**

Value of K : **7.8E-05** **cm/sec**

REMARKS

K = (2.30 x Q/60) / (2 x pi x L x H) x log(L/r)

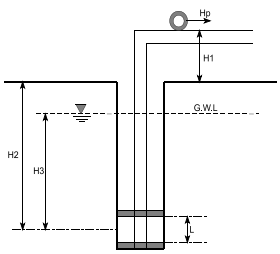
H = Hp + H1 + H2 + H3

Hp = variable head of water pressure

H1 = pressure gauge height from GL.

H2 = depth to half an injector

H3 = length of G.W.L to half an injector



1. When the ground water level reveals above the upper packer the sign of H3 is minus (–)
2. When the ground water level reveals below the lower packer the sign of H3 is zero (0)

5.5 S-PS검층

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1.0 부유식 PS 검층 개요

1.1 조사 목적

본 조사는 '중앙선 도담-영천 복선전철 제5공구 지반조사' 중 계획 구간내 부유식 PS검층을 실시하여 지층 및 지반 상태를 파악, 제반 자료를 제공함으로서 합리적이고 경제적인 설계 및 시공이 되도록 하는데 목적이 있다.

1.2 조사 범위

본 조사에서 수행된 탐사수량은 <표 1-1>과 같다.

<표 1-1> 부유식 PS 검층 범위

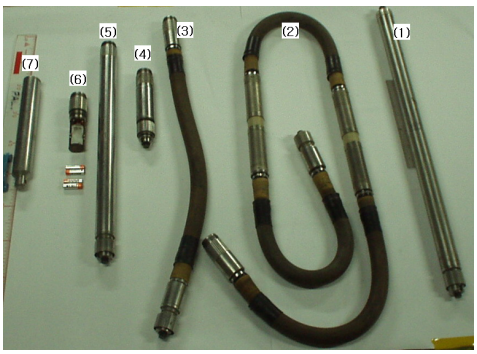
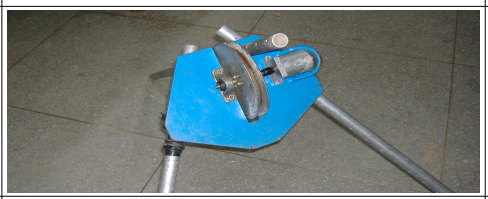
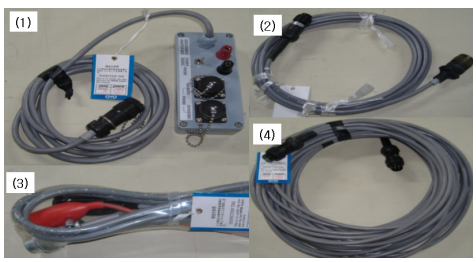
공 번	심 도	측정 심도	비고
NBB-15	7.0m	2.0m ~ 7.0m	-
NBB-20	5.0m	2.0m ~ 5.0m	

1.3 조사 기간

- 현장 조사 및 시험 : 2014. 12.
- 성과분석 및 보고서 작성 : 2014. 12.

1.4 조사 장비

<표 1-2> 조사 장비

No.	Name	External appearance	.Sub-unit	Model No	Serial No.
1	Geologger-3 (OYO Co., Japan)			3970	14037
2	Suspension PS Log Probe (OYO Co., Japan)		(1) Suspension Telemetry unit	3403	12007
			(2) Geophone	3385B	21048
			(3) Filter tube(1m)	3387	20043
			(4) H-S wave source	3304	36110
			(5)Driver	3386A	40121
			(6) Battery case	3302W	35109
			(7) Weight		
3	Sheave/Tripod (Robertson Geologging LTD., UK)				
4	RG 500m Winch with 300m (Robertson Geologging LTD., UK)			RG 500m Winch with 300m	3680
5	Cable (OYO Co., Japan)		(1) Adapter box	P/N:03970-9209	
			(2) Signal Cable(5m)	P/N:03970-9322	
			(3) Sheave Cable(20m)	P/N:03970-9321	
			(4) Power Cable WK-3 pins	P/N:01220-1015	

2.0 조 사 방 법

2.1 조사원리 및 방법

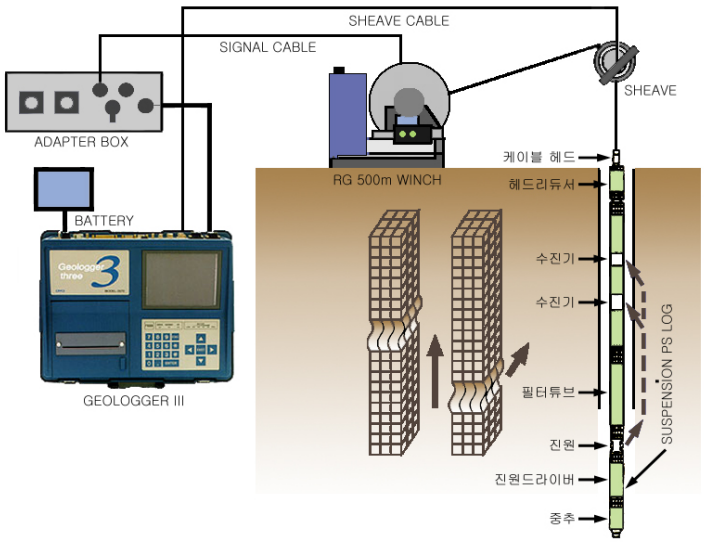
• Suspension PS Logging은 시추공을 대상으로 실시되는 현장 탐사 시험방법으로 발진원과 수진기가 일체화된 sonde를 공내에 삽입하여 상향시켜 가며 공내에서 발진과 수진을 실시, 각 지층별 P파, S파 속도를 측정하는 방법이다.

• S파 기진방법은 강체를 공축에 대해 직교하는 방향으로 급격하게 움직여 공내수에 압력을 가함으로서 공벽을 움직여 발생시킨다.

• 시추공 지름에 비하여 발생하는 파의 파장이 충분하게 길면 이 진원은 무한매질중의 수평인 1방향성의 점진원이 되고 P파와 함께 공축방향으로 탁월한 S파가 발생한다. 또 시추공이 공내수로 채워지고 있는 경우 공벽이 움직이면 공내수도 일체로 움직인다. 그 때문에 수진기를 공내수중에서 겉보기 비중이 1이 되도록 제작하고 공내수의 움직임을 측정하는 것에 의해 공벽의 움직임을 측정한다.

• 진원에는 solenoid형 전자진원이 사용되고 하나의 수진기에는 P파 측정용 상하 동 성분 및 S파 측정용 수평 동 성분 즉, 진원의 운동방향에 감도축을 일치시킨 수평 동 성분의 합계 2성분의 수진기가 내장되어 있다.

• 이 방법에 의해 얻어진 파형기록 중 S파는 180 ° 위상반전을 확인해야 한다.



[그림 1.2] 부유식 PS 검층 모식도

2.2 Suspension PS Logger의 장점

• 발진원과 수진점이 단거리로 일체화되어 탐사 심도별로 같이 이동시켜가며 시험이 실시된다.

• sourec와 수진기간의 거리가 짧기 때문에 분해능이 다른 탐사방법에 비하여 높다.

• 하나의 시추공으로 정성적 해석이 가능하다.

• 간편한 조사가 이루어질 수 있으며 다른 조사법에서 사용되어지는 modeling 혹은 inversion의 단계가 필요 없이 현장에서 직접 해석이 이루어질 수 있다.

• 다층 지반에서의 지층별 탄성파속도 측정에 효과적이다.

• 공내수 변위가 지반의 변위와 같게 되어 수진기를 공벽에 압착하지 않는 hydrophone의 사용으로 간편한 조사가 가능하다.

• Crosshole Test에 비해서 시험비가 비교적 저렴하며, 하나의 시추공에서 탐사가 수행됨에 따라 시험 시간이 단축된다는 이점이 있다.

• Downhole Test, Uphole Test 등이 갖고 있는 탄성파 탐사 심도가 깊어짐에 따른 발진원과 수진점의 멀어짐으로 인한 탄성파 수진 불량 문제가 없다.

2.3 시험 및 자료 해석시 고려사항

• 파형기록 중 S파는 180 ° 위상반전을 반드시 확인해야 한다.

• 기진에 의해 생긴 지반의 움직임은 공내수를 통하여 파악되기 때문에 지하수 이하 부분에서만 측정이 가능하다.

• Cable을 통해 전파해 온 파동과 지반을 전파해 온 파동이 혼재해서 관측되는 경우가 있기 때문에 측정시에 전파속도를 확인하는 등의 주의가 필요하다.

• P파속도가 1,500m/s 이하인 토사 등의 지반에서 측정을 할 때 지반이 지하수 등으로 포화되어있는 경우에는 지반의 P파 속도가 물의 속도보다 늦기 때문에 지반의 정확한 P파 속도가 검출되지 않고 물의 전파속도(약 1,500m/s)를 지반 속도치로 산출할 경우가 있으므로 주의하여야 한다.

2.4 현장조사

• 본 조사는 계획 구간 내 동적물성치 산출을 위하여 Suspension PS Logging을 실시하였다.

• 탐사는 지하수위 하부 지반에 대해서 가능하므로 탐사공의 지하수위 심도를 확인한다.

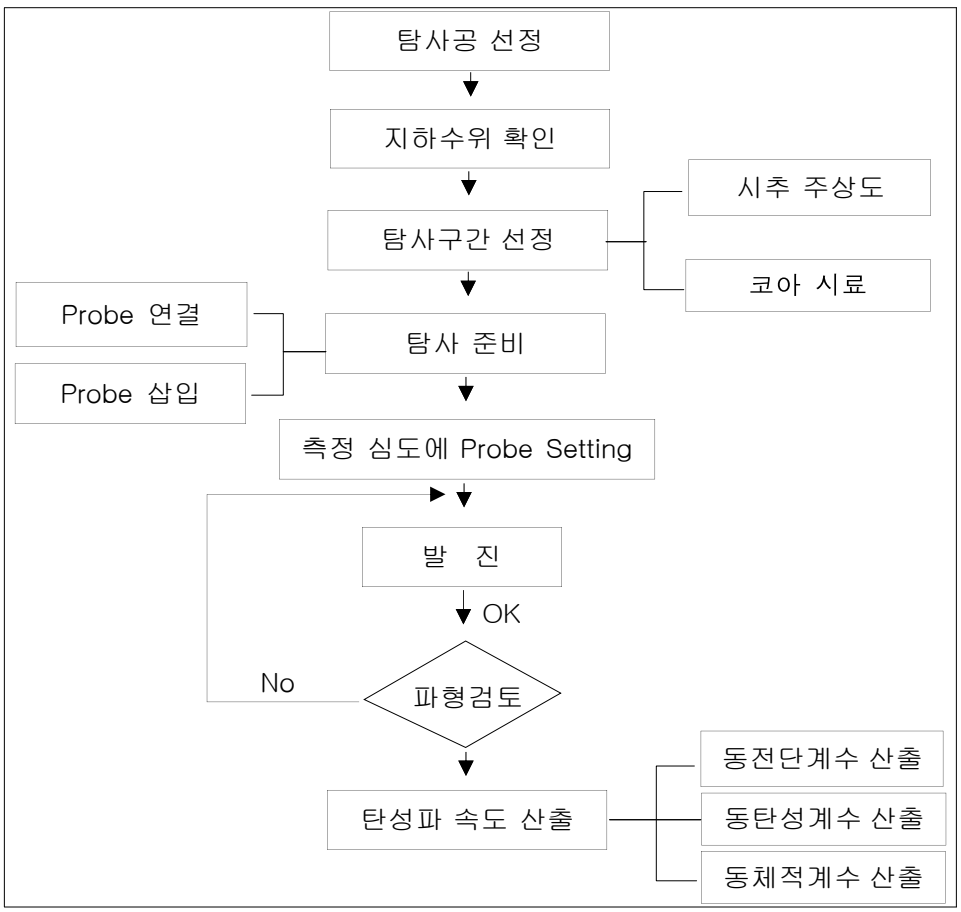
• 탐사지점 및 구간을 설정한다.

• 탐사 지점 및 구간을 설정 후 sonde를 검층공 내에 삽입하여 상향시켜 가며 일정 간격으로 발진과 수진을 실시하며 시험을 수행한다.

• 각 심도별 실시된 시험결과인 수진된 파의 도달속도, 파형 등의 측정자료들은 본체의 Data Logger에 입력 저장되고 필요시 모니터상으로 또는 기록지로도 재 출력하여 사전 검토한다.

• 다음 지점의 시험을 수행토록 하며, 이러한 과정은 탐사 종료까지 반복한다.

• 탐사 수행과정 흐름



[그림 1.3] Suspension PS Logging 수행과정

2.5 해석 방법

• 측정한 기록파형은 본체에 Digital 수치로 저장된다. 이 자료를 실내 컴퓨터에서 S파와 P파로 분리한다. 수진기는 발진기의 상부쪽에 필터 케이블로 연결되어 있고, 2개의 수진기 사이의 간격의 1m로 고정되어 있으므로 두 수진기 사이의 파의 도달 시간차를 구함으로써 두 수진기 사이의 구간 지반의 속도를 계산한다. 두 수진기 사이의 거리가 1m로 고정되어 있으므로 두 수진기 사이의 도달시간 차이를 구하게 된다면 그 구간의 속도(V)는 아래와 같이 도달시간 차이(T)의 역수가 된다.

$$V = \frac{1}{T}$$

• 측정심도는 1m 간격의 상하 2개의 수진기의 중간심도로 하며, 산출된 속도값(V_P, V_S)은 측정심도의 상하 0.5m 구간의 평균치를 의미한다.

• 결정된 P, S파의 구간속도와 밀도검층 등을 이용하여 구한 밀도값과 함께 각 지층의 지반설계 및 내진설계의 필수적인 동탄성계수(포아송비, 강성률, 영율, 체적탄성율 등)을 아래의 식을 이용하여 구할 수 있다.

(1) 포아송비

$$\nu = \frac{(V_p/V_s)^2 - 2}{2[(V_p/V_s)^2 - 1]}$$

V_p : P파 속도 (m/s), V_s : S파 속도(m/s)

(2) 강성률 (횡탄성정수)

$$G_d = \rho \times V_s^2/g \times 10^{-3} \quad \text{(MPa)}$$

ρ : 밀도 (kN/m^3), g : 중력가속도

(3) 영률 (종탄성정수)

$$E_d = 2G_d(1+\nu) \quad \text{(MPa)}$$

G_d:강성률, ν: 포아송비

(4) 체적탄성율 (체적계수)

$$K = \frac{E_d}{3(1-2\nu)} \quad \text{(MPa)}$$

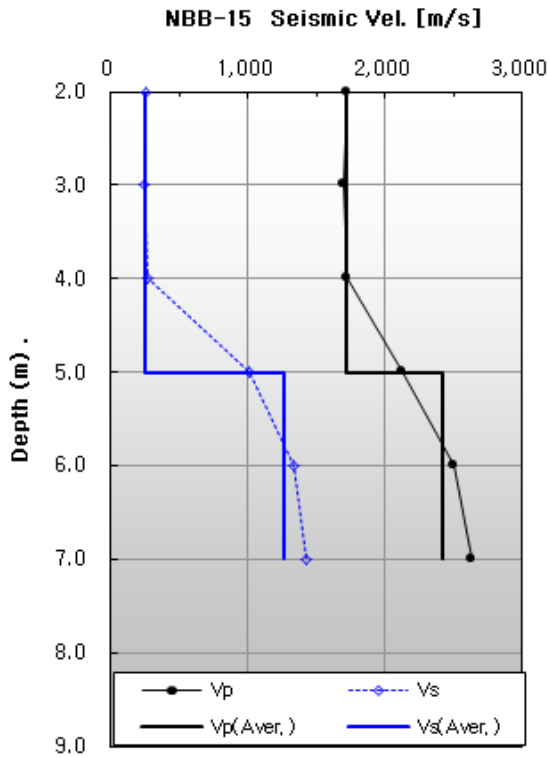
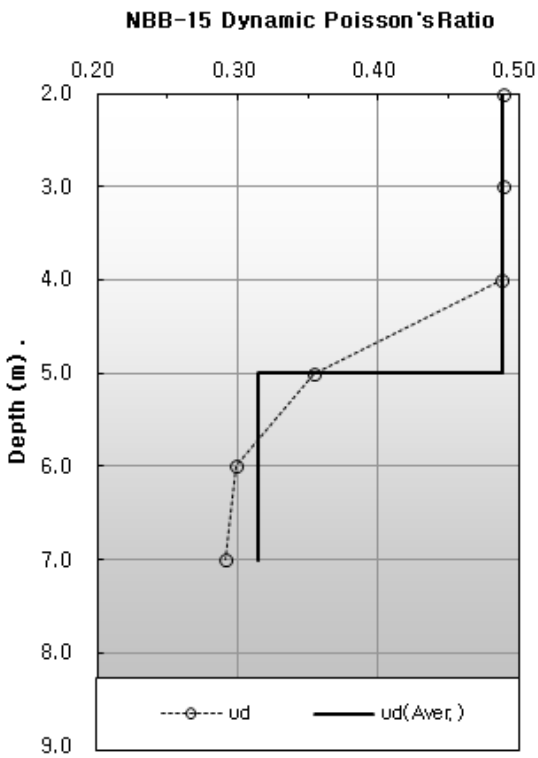
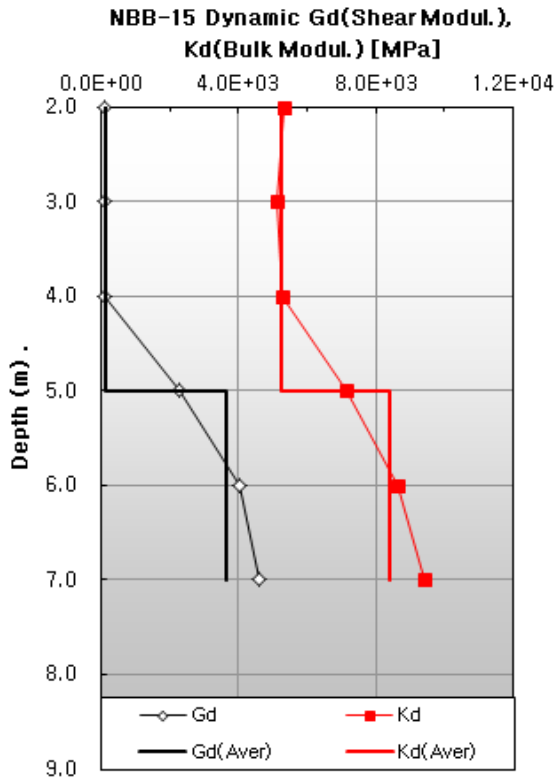
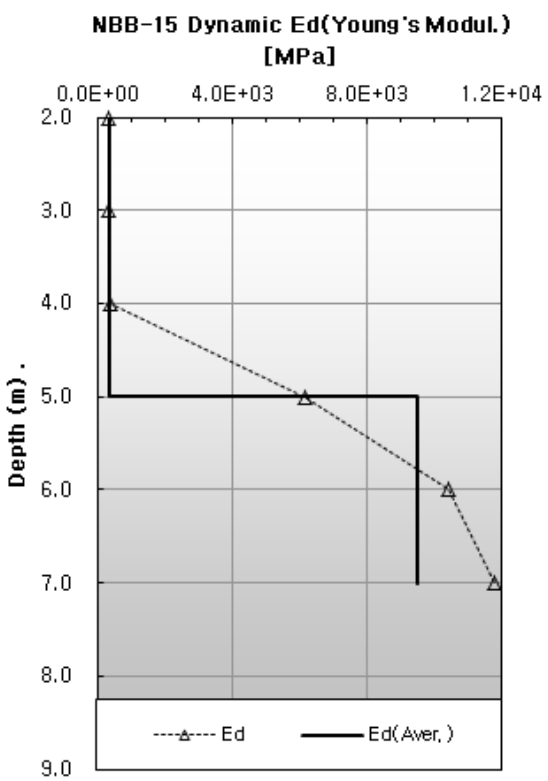
E_d: 영률, ν: 포아송비

3.0 조 사 결 과

3.1 NBB-15 시험공

<표 3-1-1> NBB-15시험공의 구간별 검층 결과

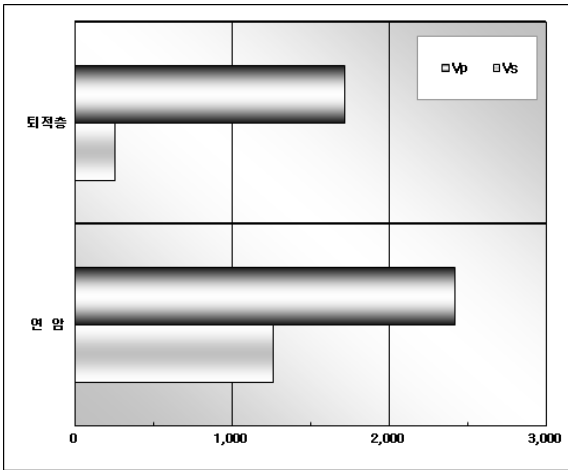
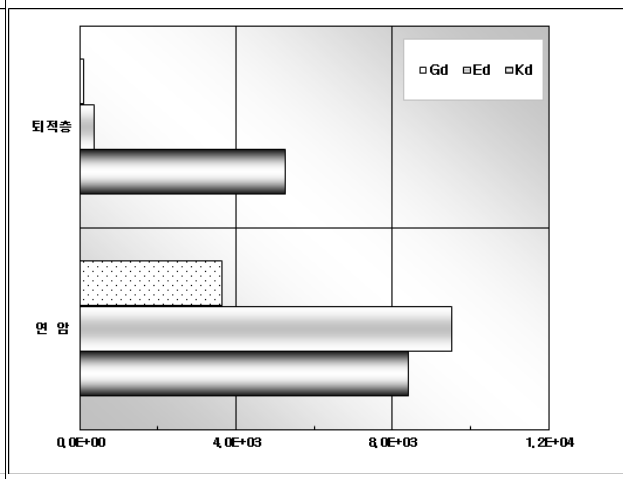
NBB-15								
심도 (m)	지층 내역	속도(m/s)		단위중량 (kN/m^3)	동전단계수 (MPa)	동탄성계수 (MPa)	동체적계수 (MPa)	동적 포아송비
		P파	S파					
2.0	퇴적층	1,724	251	18.0	116	345	5,305	0.489
3.0	퇴적층	1,695	248	18.0	113	335	5,127	0.489
4.0	퇴적층	1,724	265	18.0	128	382	5,288	0.488
5.0	연 암	2,128	1,010	22.0	2,290	6,204	7,112	0.355
6.0	연 암	2,500	1,340	22.0	4,028	10,462	8,660	0.299
7.0	연 암	2,632	1,429	22.0	4,584	11,836	9,439	0.291

Vp, Vs 의 분포	포아송비 의 분포
	
Gd, Kd 의 분포	Ed 의 분포
	

<그림 1.4> NBB-15 계수별 시험결과 그래프

<표 3-1-2> NBB-15 시험공의 지층별 검층 결과

NBB-15							
심도 (m)	지층	Vp (m/sec)	Vs (m/sec)	동전단계수 (MPa)	동탄성계수 (MPa)	동체적계수 (MPa)	동적 포아송비
2.0-5.0	퇴적층	1,714	254	119	354	5,240	0.489
5.0-7.0	연 암	2,420	1,260	3,634	9,501	8,404	0.315

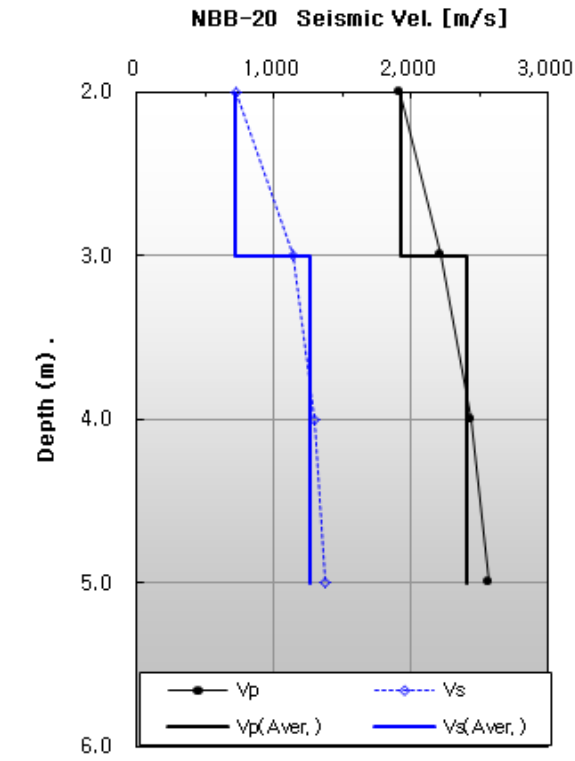
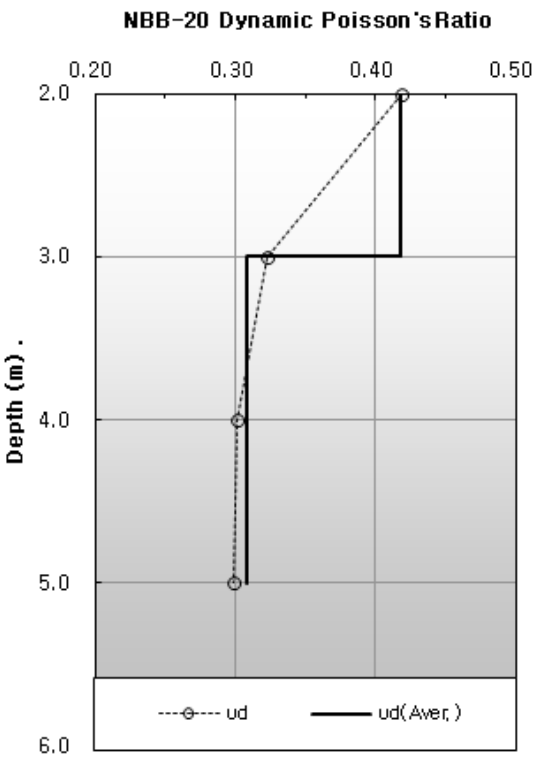
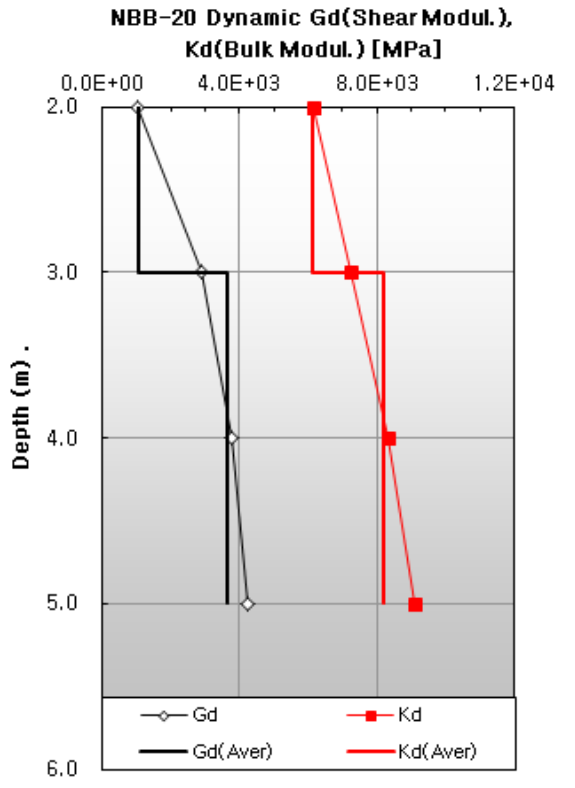
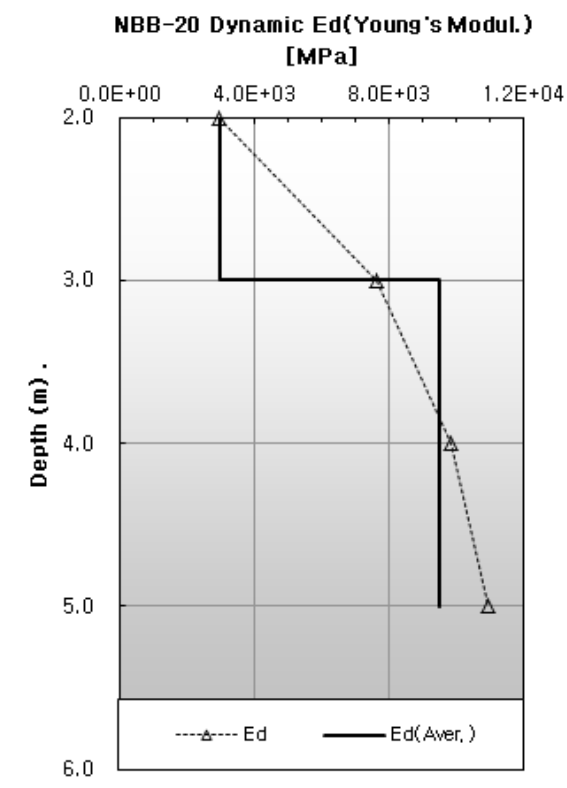
P파와 S파 속도	Gd, Ed, Kd
	

[그림 1.5] NBB-15 지층별 시험결과 그래프

3.2 NBB-20 시험공

<표 3-2-1> NBB-20시험공의 구간별 검층 결과

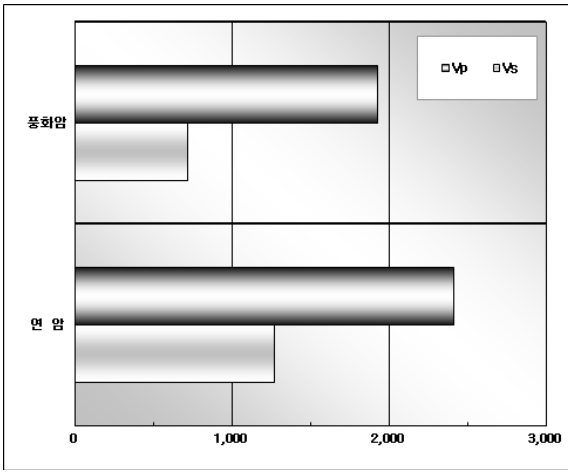
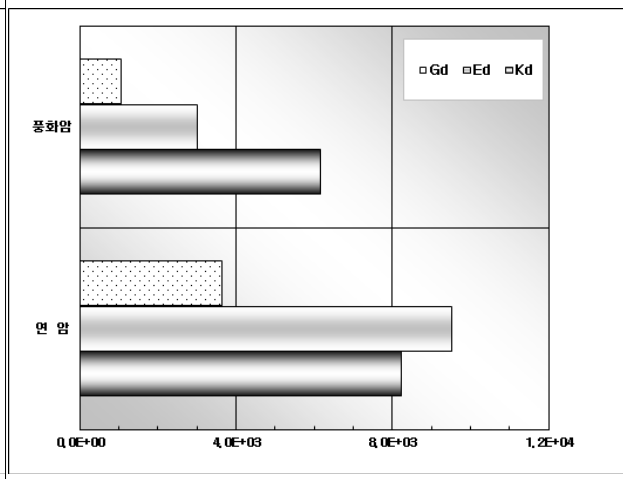
NBB-20								
심도 (m)	지층 내역	속도(m/s)		단위중량 (kN/m^3)	동전단계수 (MPa)	동탄성계수 (MPa)	동체적계수 (MPa)	동적 포아송비
		P파	S파					
2.0	풍화암	1,923	720	20.0	1,056	2,997	6,138	0.419
3.0	연 암	2,222	1,136	22.0	2,897	7,666	7,221	0.323
4.0	연 암	2,439	1,299	22.0	3,788	9,864	8,304	0.302
5.0	연 암	2,564	1,373	22.0	4,229	10,988	9,120	0.299

Vp, Vs 의 분포	포아송비 의 분포
	
Gd, Kd 의 분포	Ed 의 분포
	

<그림 1.4> NBB-20 계수별 시험결과 그래프

<표 3-1-2> NBB-20 시험공의 지층별 검층 결과

NBB-20							
심도 (m)	지층	Vp (m/sec)	Vs (m/sec)	동전단계수 (MPa)	동탄성계수 (MPa)	동체적계수 (MPa)	동적 포아송비
2.0-3.0	풍화암	1,923	720	1,056	2,997	6,138	0.419
3.0-5.0	연 암	2,408	1,269	3,638	9,506	8,215	0.308

P파와 S파 속도	Gd, Ed, Kd
	

[그림 1.5] NBB-20 지층별 시험결과 그래프

4.0 부록 : 사 진 첩

Project name : 중앙선 도담-영천 복선전철 제5공구 지반조사

NBB-15 : SPS 검층



공사명	도담-영천 5공구 복선전철
	실시설계 지반조사
공 종	SPS 검층
공 번	NBB - 15
날 짜	2014.11



공사명	도담-영천 5공구 복선전철
	실시설계 지반조사
공 종	SPS 검층
공 번	NBB - 15
날 짜	2014.11

NBB-20 : SPS 검증



공사명	도담-영천 5공구 복선전철
	실시설계 지반조사
공 종	SPS 검증
공 번	NBB - 20
날 짜	2014.11



공사명	도담-영천 5공구 복선전철
	실시설계 지반조사
공 종	SPS 검증
공 번	NBB - 20
날 짜	2014.11

5. 현장시험

5.1 현장밀도시험

5.2 공내재하시험

5.3 공내전단시험

5.4 수압시험

5.5 S-PS검층

6.1 실내토질시험

Lab. Test Summary Table (**I**)

Date : 2014. 08.

Project : 도담~영천 5공구 지반조사 실내 토질시험

Boring No.	Depth (m)	Wn (%)	Gs	Atterberg Limit		Uncomfined Compression Test			Triaxial Compression Test						Compaction Test				Direct Simple Shrear Test		Modified CBR(%)	Grain Size Distribution (%)					USCS
									UU		CU		$\overline{CU}$		A		$\overline{D}$										
				LL (%)	PI (%)	qu (kPa)	qur (kPa)	St	c (kPa)	Φ (°)	c (kPa)	Φ (°)	c' (kPa)	Φ' (°)	γd max (kN/㎥)	O.M.C (%)	γd max (kN/㎥)	O.M.C (%)	c (kPa)	Φ (°)		No. 4	No. 10	No. 40	No. 200	0.002 mm	
NBB-1	1.0	14.4	2.674	32.8	17.4																	90.5	80.9	58.7	39.6	8.7	SC
NBB-1	2.0	24.5	2.684	38.2	16.8																	97.3	94.6	85.5	66.8	8.2	CL
NBB-1	3.0	19.1	2.659	N	P																	71.3	56.8	37.9	18.7	-	SM
NBB-2	1.0	15.5	2.683	33.5	16.3																	92.6	82.5	56.0	36.3	12.0	SC
NBB-2	2.0	10.5	2.656	29.6	16.1																	72.2	58.3	39.7	25.0	4.7	SC
NBB-2	3.0	9.9	2.632	N	P																	78.7	60.3	31.8	12.0	-	SM
NBB-3	2.0	13.5	2.642	N	P																	72.5	55.1	33.7	17.0	-	SM
NBB-3	5.0	12.8	2.664	29.9	14.3																	92.1	76.3	45.6	22.8	5.2	SC
NBB-3	8.0	25.6	2.678	27.6	12.2																	93.2	87.6	69.8	44.2	7.1	SC
NBB-4	1.0	8.0	2.659	N	P																	86.4	65.0	37.0	14.1	-	SM
NBB-4	2.0	19.4	2.656	N	P																	92.5	76.9	37.9	12.7	-	SM
NBB-4	3.0	9.7	2.632	N	P																	89.8	70.5	36.2	16.0	-	SM
NBB-4	4.0	9.3	2.672	N	P																	69.4	52.7	33.3	15.8	-	SM
NBB-5	1.0	17.9	2.659	29.5	14.8																	95.8	80.9	46.9	24.3	5.4	SC
NBB-5	4.0	17.6	2.678	N	P																	77.6	57.4	31.3	15.5	-	SM
NBB-5	5.0	11.9	2.674	25.6	14.7																	74.1	57.4	38.0	22.8	6.0	SC
NBB-6	1.0	12.6	2.632	N	P																	80.2	65.5	39.2	17.2	-	SM
NBB-6	2.0	11.6	2.642	N	P																	78.7	62.1	33.8	16.3	-	SM
NBB-6	4.0	18.3	2.681	N	P																	73.0	56.8	34.2	17.1	-	SM
NBB-7	2.0	21.5	2.671	31.6	14.5																	94.7	84.1	59.3	34.1	4.0	SC
NBB-7	3.0	14.1	2.669	26.5	13.3																	91.0	80.3	52.9	26.6	5.0	SC
NBB-7	5.0	15.1	2.659	N	P																	77.2	60.6	38.9	23.0	-	SM

Lab. Test Summary Table (Ⅱ)

Date : 2014. 08.

Project : 도담~영천 5공구 지반조사 실내 토질시험

Boring No.	Depth (m)	Wn (%)	Gs	Atterberg Limit		Uncomfined Compression Test			Triaxial Compression Test						Compaction Test				Direct Simple Shrear Test		Modified CBR(%)	Grain Size Distribution (%)					USCS
									UU		CU		$\overline{CU}$		A		$\overline{D}$									
				LL (%)	PI (%)	qu (kPa)	qur (kPa)	St	c (kPa)	Φ (°)	c (kPa)	Φ (°)	c' (kPa)	Φ' (°)	γd max (kN/㎥)	O.M.C (%)	γd max (kN/㎥)	O.M.C (%)	c (kPa)	Φ (°)		No. 4	No. 10	No. 40	No. 200	0.002 mm	
NBB-8	1.0	11.6	2.657	N	P																	83.5	59.4	19.8	0.7	-	SW
NBB-8	2.0	10.8	2.634	N	P																	85.4	59.1	20.6	1.2	-	SW
NBB-8	3.0	15.5	2.668	N	P																	87.3	68.8	39.8	14.9	-	SM
NBB-9	1.0	11.5	2.654	N	P																	88.0	62.4	22.3	0.9	-	SW
NBB-9	3.0	14.2	2.679	N	P																	88.7	70.3	44.2	22.7	-	SM
NBB-9	4.0	15.5	2.664	N	P																	93.4	70.3	38.5	12.7	-	SM
NBB-10	1.0	16.7	2.625	29.3	13.6																	93.9	78.8	47.2	28.6	6.7	SC
NBB-10	3.0	13.8	2.656	N	P																	88.7	68.4	40.6	18.0	-	SM
NBB-10	5.0	14.1	2.632	N	P																	84.0	60.0	20.8	4.1	-	SW
NBB-11	1.0	12.5	2.672	N	P																	91.0	70.2	38.7	14.3	-	SM
NBB-11	3.0	9.8	2.653	N	P																	82.1	54.5	18.8	2.4	-	SW
NBB-11	5.0	16.3	2.663	28.9	14.1																	91.2	70.3	36.1	18.1	2.2	SC
NBB-12	1.0	25.2	2.657	N	P																	82.9	57.3	25.2	4.6	-	SW
NBB-12	3.0	14.9	2.683	29.6	13.9																	95.6	90.5	63.5	39.0	7.5	SC
NBB-12	5.0	15.2	2.661	N	P																	77.1	61.5	34.3	13.2	-	SM
NBB-14	1.0	11.5	2.656	N	P																	83.3	65.7	37.6	18.2	-	SM
NBB-14	2.0	10.1	2.657	N	P																	77.3	55.2	32.6	13.2	-	SM
NBB-14	3.0	10.1	2.673	N	P																	80.2	61.1	43.1	19.0	-	SM
NBB-15	1.0	13.0	2.659	25.7	13.0																	96.1	82.5	54.3	34.3	5.2	SC
NBB-15	2.0	12.1	2.667	N	P																	81.2	68.0	45.3	21.9	-	SM
NBB-15	4.0	8.6	2.667	N	P																	95.2	78.7	44.8	19.3	-	SM
NBB-16	1.0	14.3	2.669	N	P																	88.9	71.6	44.3	18.9	-	SM

Lab. Test Summary Table (Ⅲ)

Date : 2014. 08.

Project : 도담~영천 5공구 지반조사 실내 토질시험

Boring No.	Depth (m)	Wn (%)	Gs	Atterberg Limit		Uncomfined Compression Test			Triaxial Compression Test						Compaction Test				Direct Simple Shrear Test		Modified CBR(%)	Grain Size Distribution (%)					USCS
									UU		CU		$\overline{CU}$		A		$\overline{D}$										
				LL (%)	PI (%)	qu (kPa)	qur (kPa)	St	c (kPa)	Φ (°)	c (kPa)	Φ (°)	c' (kPa)	Φ' (°)	γd max (kN/㎥)	O.M.C (%)	γd max (kN/㎥)	O.M.C (%)	c (kPa)	Φ (°)		No. 4	No. 10	No. 40	No. 200	0.002 mm	
NBB-16	2.0	10.8	2.657	N	P																	84.6	61.3	31.9	13.2	-	SM
NBB-16	4.0	12.7	2.656	N	P																	83.1	63.6	36.8	18.9	-	SM
NBB-17	2.0	11.7	2.661	N	P																	83.1	58.3	35.0	16.5	-	SM
NBB-17	3.0	12.1	2.671	N	P																	86.5	69.3	45.3	16.5	-	SM
NBB-17	5.0	4.3	2.642	N	P																	9.8	5.7	1.8	0.2	-	GP
NBB-19	1.0	1.6	2.634	N	P																	5.4	1.7	0.8	0.5	-	GP
NBB-20	1.0	14.0	2.625	26.4	12.5																	92.5	73.7	47.1	29.5	7.6	SC
NBB-22	1.0	18.2	2.656	27.2	11.5																	81.1	63.9	44.6	29.9	7.8	SC
NBB-22	2.0	2.3	2.632	N	P																	14.7	8.0	4.3	0.9	-	GP
NBB-23	2.0	19.4	2.661	31.8	18.1																	96.0	87.5	63.1	43.5	8.5	SC
NBB-23	4.0	16.4	2.668	28.4	13.7																	81.2	62.8	37.5	21.2	4.2	SC
NBB-23	6.0	25.8	2.678	28.6	13.4																	95.3	83.8	59.7	41.4	13.5	SC
NBB-24	1.0	17.3	2.665	N	P																	79.1	58.7	33.2	16.3	-	SM
NBB-24	2.0	16.5	2.682	24.5	11.0																	81.5	65.9	41.7	27.0	5.9	SC
NBB-25	1.0	24.4	2.681	29.4	15.8																	98.2	93.0	80.2	53.5	7.6	CL
NBB-25	2.0	26.5	2.687	32.5	18.8																	97.7	91.4	77.3	56.5	13.4	CL
NBB-26	1.0	27.4	2.672	30.4	14.5																	97.7	94.9	82.7	42.9	7.0	SC
NBB-26	2.0	17.8	2.659	N	P																	89.5	71.0	44.0	26.9	-	SM
NBB-26	3.0	10.7	2.632	29.7	15.0																	89.2	73.9	49.7	30.7	5.5	SC
NBB-27	1.0	24.8	2.675	33.4	16.5																	98.1	96.2	87.7	66.4	6.8	CL
NBB-27	2.0	29.8	2.674	34.9	18.5																	100.0	100.0	97.8	76.7	10.6	CL
NBB-27	3.0	27.8	2.693	34.9	17.3																	99.4	99.1	98.1	90.1	19.9	CL

Lab. Test Summary Table (Ⅲ)

Date : 2014. 08.

Project : 도담~영천 5공구 지반조사 실내 토질시험

Boring No.	Depth (m)	Wn (%)	Gs	Atterberg Limit		Uncomfined Compression Test			Triaxial Compression Test						Compaction Test				Direct Simple Shrear Test		Modified CBR(%)	Grain Size Distribution (%)					USCS
									UU		CU		~~CU~~		A		~~D~~									
				LL (%)	PI (%)	qu (kPa)	qur (kPa)	St	c (kPa)	Φ (°)	c (kPa)	Φ (°)	c' (kPa)	Φ' (°)	γd max (kN/㎥)	O.M.C (%)	γd max (kN/㎥)	O.M.C (%)	c (kPa)	Φ (°)		No. 4	No. 10	No. 40	No. 200	0.002 mm	
NBB-28	1.0	10.2	2.659	28.4	14.5																	91.1	72.8	43.2	24.9	3.1	SC
NBB-28	2.0	17.0	2.668	28.1	12.7																	91.4	75.3	51.5	34.4	8.1	SC
NBB-28	3.0	21.6	2.649	N	P																	84.3	66.1	40.0	20.5	-	SM
NBB-29	1.0	29.9	2.687	34.2	15.5																	99.7	99.7	96.8	84.7	17.8	CL
NBB-29	2.0	29.1	2.675	37.8	18.4																	100.0	99.7	97.2	80.9	17.2	CL
NBB-29	3.0	15.1	2.659	27.9	13.7																	85.5	71.0	47.4	28.3	2.7	SC
NBB-30	1.0	12.6	2.674	25.9	14.2																	78.2	62.7	41.9	28.4	5.1	SC
NBB-30	2.0	17.6	2.672	29.8	13.1																	75.7	62.2	45.5	34.0	10.3	SC
NBB-30	3.0	7.8	2.659	N	P																	69.5	52.4	30.8	16.4	-	SM
NBB-31	1.0	12.4	2.666	N	P																	83.2	63.6	21.4	3.9	-	SW
NBB-31	2.0	2.1	2.625	N	P																	10.4	4.0	2.0	1.1	-	GW
NBB-32	1.0	10.7	2.656	N	P																	74.1	53.9	30.0	16.1	-	SM
NBB-32	2.0	11.8	2.673	N	P																	79.9	62.5	36.4	17.3	-	SM
NBB-32	3.0	9.7	2.634	N	P																	19.1	10.0	3.0	0.6	-	GW
NBB-33	1.0	13.1	2.671	25.4	12.5																	87.5	69.2	44.0	26.7	5.2	SC
NBB-33	2.0	12.6	2.656	N	P																	78.9	60.8	34.2	14.1	-	SM
NBB-40	1.0	15.5	2.684	27.4	13.5																	91.0	74.4	52.1	32.1	6.6	SC
NBB-40	2.0	8.9	2.653	N	P																	88.0	57.9	20.4	4.2	-	SW
NBB-41	2.0	17.9	2.656	28.9	13.2																	90.0	76.2	56.7	39.7	10.3	SC
NBB-42	1.0	23.5	2.687	37.6	15.9																	98.5	92.2	80.0	60.5	12.5	CL
NBB-42	2.0	3.4	2.642	N	P																	5.9	2.6	1.0	0.3	-	GP
NBB-44	1.0	23.7	2.693	33.6	17.8																	100.0	99.9	97.4	77.3	14.5	CL

Lab. Test Summary Table (Ⅲ)

Date : 2014. 08.

Project : 도담~영천 5공구 지반조사 실내 토질시험

Boring No.	Depth (m)	Wn (%)	Gs	Atterberg Limit		Uncomfined Compression Test			Triaxial Compression Test						Compaction Test				Direct Simple Shrear Test		Modified CBR(%)	Grain Size Distribution (%)					USCS
									UU		CU		~~CU~~		A		~~D~~										
				LL (%)	PI (%)	qu (kPa)	qur (kPa)	St	c (kPa)	Φ (°)	c (kPa)	Φ (°)	c' (kPa)	Φ' (°)	γd max (kN/㎥)	O.M.C (%)	γd max (kN/㎥)	O.M.C (%)	c (kPa)	Φ (°)		No. 4	No. 10	No. 40	No. 200	0.002 mm	
NBB-44	2.0	9.2	2.684	N	P																	96.6	80.9	55.3	26.3	-	SM
NBB-44	3.0	8.5	2.656	N	P																	87.2	70.3	44.2	24.3	-	SM
NBB-45	1.0	27.1	2.682	33.7	17.3																	98.3	96.8	90.7	71.9	15.4	CL
NBB-45	2.0	28.3	2.691	37.5	18.2																	99.4	97.7	92.6	67.3	12.6	CL
NBB-45	4.0	8.9	2.656	N	P																	88.0	67.5	43.2	25.0	-	SM
NBB-48	1.0	16.4	2.663	N	P																	88.5	65.2	35.5	17.5	-	SM
NBB-48	2.0	9.9	2.671	N	P																	88.2	69.1	39.3	14.3	-	SM
NBB-48	3.0	2.4	2.632	N	P																	3.3	1.6	0.4	0.1	-	GP
NBB-49	1.0	8.7	2.676	N	P																	68.9	50.0	28.5	12.5	-	SM
NBB-49	2.0	9.3	2.654	N	P																	68.8	52.4	31.4	15.4	-	SM
NBB-49	3.0	13.1	2.659	N	P																	91.6	76.6	45.7	17.1	-	SM
NBB-50	1.0	5.3	2.656	N	P																	90.9	71.4	44.7	22.3	-	SM
NBB-51	1.0	16.6	2.671	N	P																	84.5	68.2	39.1	15.3	-	SM
NBB-52	1.0	9.1	2.659	N	P																	86.1	66.5	39.7	15.6	-	SM
NBB-56	1.0	6.2	2.634	N	P																	1.7	0.5	0.4	0.2	-	GP
NBB-57	1.0	11.5	2.643	N	P																	92.6	71.5	30.4	0.5	-	SP
NBB-58	1.0	21.9	2.673	36.1	17.5																	99.2	98.1	89.7	69.3	12.8	CL
NBB-58	2.0	13.9	2.668	21.9	10.2																	88.6	80.0	66.9	47.8	6.7	SC
NBB-58	3.0	2.0	2.629	N	P																	7.0	4.0	1.6	0.5	-	GP
NBB-59	1.0	15.8	2.669	29.9	14.2																	96.6	82.3	55.3	33.3	6.6	SC
NBB-59	2.0	28.9	2.681	34.9	7.6																	99.2	97.3	91.8	74.3	12.2	ML
NBB-59	3.0	2.3	2.634	N	P																	5.1	3.0	1.0	0.0	-	GP

Lab. Test Summary Table (Ⅲ)

Date : 2014. 08.

Project : 도담~영천 5공구 지반조사 실내 토질시험

Boring No.	Depth (m)	Wn (%)	Gs	Atterberg Limit		Uncomfined Compression Test			Triaxial Compression Test						Compaction Test				Direct Simple Shrear Test		Modified CBR(%)	Grain Size Distribution (%)					USCS
									UU		CU		CU		A		D										
				LL (%)	PI (%)	qu (kPa)	qur (kPa)	St	c (kPa)	Φ (°)	c (kPa)	Φ (°)	c' (kPa)	Φ' (°)	γd max (kN/㎥)	O.M.C (%)	γd max (kN/㎥)	O.M.C (%)	c (kPa)	Φ (°)		No. 4	No. 10	No. 40	No. 200	0.002 mm	
NBB-60	1.0	12.5	2.663	N	P																	85.0	66.0	41.8	21.8	-	SM
NBB-60	2.0	13.2	2.670	N	P																	81.1	62.1	36.2	15.0	-	SM
NBB-60	3.0	9.1	2.634	N	P																	12.4	3.9	1.1	0.1	-	GP
NBB-71	1.0	6.4	2.668	N	P																	74.0	56.1	32.2	14.3	-	SM
NBB-71	2.0	7.9	2.656	N	P																	87.5	68.7	40.1	16.1	-	SM
NBB-71	4.0	10.4	2.681	N	P																	72.5	54.0	30.3	12.6	-	SM
NBB-72	1.0	14.4	2.668	31.1	14.3																	92.0	78.0	56.5	38.8	9.8	SC
NBB-72	2.0	8.4	2.656	N	P																	89.2	70.6	38.1	13.9	-	SM
NBB-72	3.0	9.1	2.676	N	P																	86.3	66.6	38.1	12.4	-	SM
NBB-73	1.0	9.6	2.674	N	P																	90.0	72.6	43.4	16.9	-	SM
NBB-73	3.0	9.4	2.671	N	P																	95.4	77.5	40.6	12.5	-	SM
NBB-73	4.0	4.6	2.642	N	P																	21.3	14.1	9.7	3.2	-	GP
NBB-75	2.0	6.6	2.667	N	P																	85.7	63.7	36.3	13.9	-	SM
NBB-75	3.0	9.6	2.664	N	P																	83.9	66.5	40.3	20.0	-	SM
NBB-75	4.0	8.7	2.627	N	P																	12.4	2.9	0.6	0.1	-	GP

Lab. Test Summary Table (**I**)

Date : 2014. 08.

Project : 도담~영천 5공구 지반조사 실내 토질시험

Boring No.	Depth (m)	Wn (%)	Gs	Atterberg Limit		Uncomfined Compression Test			Triaxial Compression Test						Compaction Test				Direct Simple Shrear Test		Modified CBR(%)	Grain Size Distribution (%)					USCS
									UU		CU		$\overline{CU}$		A		$\overline{D}$									
				LL (%)	PI (%)	qu (kPa)	qur (kPa)	St	c (kPa)	Φ (°)	c (kPa)	Φ (°)	c' (kPa)	Φ' (°)	γd max (kN/㎥)	O.M.C (%)	γd max (kN/㎥)	O.M.C (%)	c (kPa)	Φ (°)		No. 4	No. 10	No. 40	No. 200	0.002 mm	
NSB-1	1.0	8.1	2.632	N	P																	27.9	17.9	6.3	1.1	-	GW
NSB-2	2.0	29.1	2.672	35.9	19.2																	97.5	95.7	90.8	70.3	17.4	CL
NSB-2	4.0	12.4	2.625	N	P																	91.8	72.7	38.7	21.6	-	SM
NSB-2	6.0	7.3	2.657	N	P																	71.8	49.5	26.1	12.3	-	SM
NSB-3	1.0	25.5	2.682	43.2	21.8																	99.9	99.3	95.0	77.3	17.6	CL
NSB-3	2.0	28.4	2.671	38.6	20.8																	99.8	99.0	93.7	69.8	13.6	CL
NSB-3	4.0	21.3	2.679	30.5	13.7																	78.5	64.1	40.7	23.8	4.9	SC
NSB-4	2.0	9.3	2.632	N	P																	41.7	28.1	14.7	3.3	-	GW
NSB-4	3.0	17.5	2.658	N	P																	85.8	68.4	48.1	28.7	-	SM
NSB-4	5.0	11.1	2.663	N	P																	91.6	69.8	39.2	18.4	-	SM
NSB-5	2.0	20.8	2.667	29.2	14.4																	77.5	54.9	37.4	24.8	7.4	SC
NSB-5	3.0	16.0	2.656	N	P																	75.7	56.7	35.8	16.5	-	SM
NSB-5	5.0	7.1	2.632	N	P																	23.8	18.3	11.0	2.6	-	GP
NSB-6	1.0	4.7	2.642	N	P																	14.5	7.0	3.3	0.5	-	GP
NSB-6	3.0	16.4	2.634	N	P																	35.2	25.1	14.7	3.6	-	GP
NSB-6	5.0	6.8	2.626	N	P																	6.4	4.9	2.9	0.9	-	GP
NSB-9	1.0	23.0	2.656	N	P																	95.4	76.0	47.7	21.3	-	SM
NSB-9	2.0	27.1	2.663	32.4	15.2																	93.0	81.3	61.2	36.8	5.0	SC
NSB-9	4.0	13.6	2.664	24.2	11.5																	90.0	69.2	42.7	24.0	4.6	SC
NSB-9	5.0	22.4	2.679	31.6	14.7																	89.0	73.4	54.0	40.0	8.5	SC
NSB-10	2.0	22.9	2.657	N	P																	97.1	90.0	61.0	28.8	-	SM
NSB-10	5.0	4.2	2.631	N	P																	7.3	4.0	2.0	0.9	-	GP

Lab. Test Summary Table (Ⅱ)

Date : 2014. 08.

Project : 도담~영천 5공구 지반조사 실내 토질시험

Boring No.	Depth (m)	Wn (%)	Gs	Atterberg Limit		Uncomfined Compression Test			Triaxial Compression Test						Compaction Test				Direct Simple Shrear Test		Modified CBR(%)	Grain Size Distribution (%)					USCS
									UU		CU		$\overline{CU}$		A		$\overline{D}$										
				LL (%)	PI (%)	qu (kPa)	qur (kPa)	St	c (kPa)	Φ (°)	c (kPa)	Φ (°)	c' (kPa)	Φ' (°)	γd max (kN/㎥)	O.M.C (%)	γd max (kN/㎥)	O.M.C (%)	c (kPa)	Φ (°)		No. 4	No. 10	No. 40	No. 200	0.002 mm	
NSB-11	2.0	24.5	2.683	29.4	14.8																	100.0	99.1	89.6	61.6	11.6	CL
NSB-11	3.0	14.7	2.642	N	P																	22.7	15.9	9.0	1.6	-	GP
NSB-11	4.0	11.9	2.671	N	P																	93.5	73.2	37.4	13.5	-	SM
NSB-13	1.0	16.2	2.673	31.5	16.7																	89.3	80.3	59.4	37.8	5.8	SC
NSB-15	1.0	19.0	2.625	N	P																	33.0	21.1	12.0	3.2	0.0	GP
NSB-17	1.0	27.6	2.667	36.5	21.8																	98.4	95.5	84.4	62.4	12.2	CL
NSB-17	2.0	22.5	2.673	34.9	15.3																	98.2	96.0	87.5	66.5	18.6	CL
NSB-19	1.0	21.0	2.685	32.6	17.2																	100.0	98.5	92.5	79.5	15.0	CL
NSB-19	2.0	17.7	2.658	N	P																	90.5	71.9	39.2	12.3	-	SM
NSB-19	3.0	14.0	2.659	N	P																	93.0	81.2	48.9	18.8	-	SM
NSB-20	1.0	24.7	2.696	30.8	16.3																	96.8	92.4	81.5	54.5	4.7	CL
NSB-20	2.0	18.4	2.653	N	P																	82.6	69.7	40.4	12.4	-	SM
NSB-20	3.0	10.4	2.654	N	P																	89.6	69.6	36.7	15.6	-	SM
NSB-21	1.0	28.4	2.686	30.5	15.7																	93.4	87.6	74.4	52.4	9.7	CL
NSB-21	2.0	20.2	2.691	29.6	13.9																	97.6	93.5	77.9	54.0	8.6	CL
NSB-21	3.0	13.6	2.656	N	P																	72.2	50.8	26.9	12.9	-	SM
NSB-24	1.0	11.4	2.658	N	P																	79.3	56.2	28.6	12.7	-	SM
NSB-24	2.0	12.7	2.651	N	P																	90.6	70.3	32.3	13.5	-	SM
NSB-24	4.0	23.2	2.656	29.1	14.5																	95.0	78.2	46.9	27.3	5.0	SC
NSB-26	1.0	8.8	2.671	N	P																	92.9	75.0	37.6	15.5	-	SM
NSB-26	3.0	23.7	2.676	35.8	17.7																	99.2	97.8	90.9	65.9	15.6	CL
NSB-26	5.0	27.2	2.689	43.1	21.6																	98.8	98.5	94.1	80.5	13.6	CL

Lab. Test Summary Table (Ⅲ)

Date : 2014. 08.

Project : 도담~영천 5공구 지반조사 실내 토질시험

Boring No.	Depth (m)	Wn (%)	Gs	Atterberg Limit		Uncomfined Compression Test			Triaxial Compression Test						Compaction Test				Direct Simple Shrear Test		Modified CBR(%)	Grain Size Distribution (%)					USCS
									UU		CU		C̄Ū		A		Ð										
				LL (%)	PI (%)	qu (kPa)	qur (kPa)	St	c (kPa)	Φ (°)	c (kPa)	Φ (°)	c' (kPa)	Φ' (°)	γd max (kN/㎥)	O.M.C (%)	γd max (kN/㎥)	O.M.C (%)	c (kPa)	Φ (°)		No. 4	No. 10	No. 40	No. 200	0.002 mm	
NSB-27	1.0	21.3	2.684	43.5	22.4																	100.0	99.0	95.2	71.4	12.0	CL
NSB-27	2.0	20.4	2.681	42.8	20.3																	100.0	100.0	99.3	87.4	13.9	CL
NSB-27	4.0	11.2	2.665	N	P																	95.8	80.7	35.0	4.0	-	SW
NSB-29	1.0	5.5	2.656	N	P																	81.0	56.9	28.3	13.0	-	SM
NSB-29	3.0	11.4	2.656	N	P																	75.9	55.5	32.8	17.1	-	SM
NSB-29	4.0	28.6	2.684	35.1	17.6																	99.1	97.7	84.3	53.6	13.6	CL
NSB-30	3.0	14.3	2.659	N	P																	84.6	63.7	30.8	13.0	-	SM
NSB-30	4.0	14.2	2.663	29.7	15.8																	91.3	75.4	48.8	28.6	4.3	SC
NSB-31	1.0	24.0	2.691	29.6	14.8																	99.2	98.3	96.8	69.3	14.8	CL
NSB-31	2.0	12.5	2.661	N	P																	97.1	86.3	47.1	15.9	-	SM
NSB-31	3.0	11.8	2.643	N	P																	92.6	75.7	41.4	17.4	-	SM
NSB-31	4.0	10.2	2.634	N	P																	91.3	66.3	30.8	12.2	-	SM
NSB-32	1.0	22.1	2.674	32.4	13.9																	97.3	93.0	79.6	54.2	14.1	CL
NSB-32	3.0	10.9	2.656	N	P																	89.6	72.5	39.4	17.3	-	SM
NSB-32	5.0	12.6	2.659	N	P																	82.0	62.7	36.4	16.5	-	SM
NSB-33	2.0	11.2	2.652	N	P																	85.8	69.7	34.9	14.1	-	SM
NSB-33	3.0	13.8	2.668	N	P																	81.9	54.6	29.1	14.1	-	SM
NSB-33	5.0	11.1	2.643	N	P																	89.2	68.3	30.9	12.3	-	SM
NSB-34	1.0	15.8	2.672	26.3	12.8																	80.7	63.5	43.5	29.0	6.3	SC
NSB-34	2.0	14.2	2.659	24.1	12.7																	82.9	62.1	38.7	24.6	6.6	SC
NSB-34	3.0	17.0	2.671	29.7	14.8																	96.5	86.1	53.5	27.7	4.6	SC
NSB-35	1.0	15.7	2.673	29.4	15.1																	81.9	62.8	39.2	24.8	5.5	SC

Lab. Test Summary Table (Ⅲ)

Date : 2014. 08.

Project : 도담~영천 5공구 지반조사 실내 토질시험

Boring No.	Depth (m)	Wn (%)	Gs	Atterberg Limit		Uncomfined Compression Test			Triaxial Compression Test						Compaction Test				Direct Simple Shrear Test		Modified CBR(%)	Grain Size Distribution (%)					USCS
									UU		CU		~~CU~~		A		~~D~~										
				LL (%)	PI (%)	qu (kPa)	qur (kPa)	St	c (kPa)	Φ (°)	c (kPa)	Φ (°)	c' (kPa)	Φ' (°)	γd max (kN/㎥)	O.M.C (%)	γd max (kN/㎥)	O.M.C (%)	c (kPa)	Φ (°)		No. 4	No. 10	No. 40	No. 200	0.002 mm	
NSB-35	2.0	24.2	2.686	34.2	18.8																	99.3	97.5	89.1	57.8	15.2	CL
NSB-36	2.0	13.3	2.634	N	P																	69.6	46.9	26.2	13.5	-	SM
NSB-36	4.0	11.6	2.625	N	P																	84.6	59.3	28.7	13.1	-	SM
NSB-36	5.0	14.4	2.643	N	P																	82.9	64.6	38.7	17.3	-	SM

Lab. Test Summary Table (**I**)

Date : 2014. 08.

Project : 도담~영천 5공구 지반조사 실내 토질시험

Boring No.	Depth (m)	Wn (%)	Gs	Atterberg Limit		Uncomfined Compression Test			Triaxial Compression Test						Compaction Test				Direct Simple Shrear Test		Modified CBR(%)	Grain Size Distribution (%)					USCS
									UU		CU		$\overline{CU}$		A		$\overline{D}$									
				LL (%)	PI (%)	qu (kPa)	qur (kPa)	St	c (kPa)	Φ (°)	c (kPa)	Φ (°)	c' (kPa)	Φ' (°)	γd max (kN/㎥)	O.M.C (%)	γd max (kN/㎥)	O.M.C (%)	c (kPa)	Φ (°)		No. 4	No. 10	No. 40	No. 200	0.002 mm	
NTB-5	1.0	16.1	2.656	N	P																	77.4	55.3	21.6	4.4	-	SW
NTB-5	2.0	12.7	2.659	N	P																	86.1	65.2	40.6	17.4	-	SM
NTB-15	1.0	5.5	2.625	N	P																	15.9	6.2	1.5	0.0	-	GW
NTB-15	3.0	7.6	2.641	N	P																	10.2	3.0	0.5	0.0	-	GP
NTB-16	1.0	26.5	2.682	32.4	7.0																	100.0	98.0	93.1	78.7	16.6	ML
NTB-16	2.0	28.6	2.679	34.1	5.9																	97.6	95.0	90.3	70.8	12.0	ML
NTB-17	1.0	3.6	2.634	N	P																	16.8	5.5	1.2	0.1	-	GP
NTB-25	1.0	10.4	2.659	N	P																	80.7	64.1	39.5	22.5	-	SM
NTB-26	1.0	8.1	2.656	N	P																	84.7	63.4	37.7	15.2	-	SM
NTB-29	1.0	11.1	2.662	N	P																	88.4	69.3	38.4	14.6	-	SM
NTB-30	1.0	23.0	2.659	N	P																	89.2	70.3	42.0	18.1	-	SM
NTB-32	2.0	29.3	2.682	36.9	19.4																	100.0	99.7	95.5	80.9	12.7	CL
NTB-32	3.0	8.4	2.656	N	P																	84.2	68.7	42.0	20.0	-	SM
NTB-33	2.0	26.3	2.684	32.8	13.0																	100.0	99.5	96.8	75.5	19.2	CL
NTB-41	1.0	5.8	2.625	N	P																	8.4	4.2	1.3	0.3	-	GP
NTB-52	1.0	19.6	2.673	30.4	11.5																	92.2	74.6	52.3	34.0	7.0	SC
NTB-53	1.0	21.1	2.658	N	P																	82.9	67.9	40.2	21.4	-	SM
NTB-53	2.0	11.7	2.662	N	P																	82.1	62.8	38.3	21.5	-	SM
NTB-54	1.0	27.7	2.682	34.9	19.2																	100.0	99.3	91.3	61.7	7.9	CL
NTB-54	2.0	2.0	2.625	N	P																	5.0	2.5	0.7	0.0	-	GP
NTB-57	1.0	17.5	2.656	31.7	14.8																	89.6	75.4	53.2	34.8	10.0	SC
NTB-57	2.0	17.5	2.656	29.5	15.3																	86.5	70.7	50.5	36.0	9.5	SC

Lab. Test Summary Table (Ⅱ)

Date : 2014. 08.

Project : 도담~영천 5공구 지반조사 실내 토질시험

Boring No.	Depth (m)	Wn (%)	Gs	Atterberg Limit		Uncomfined Compression Test			Triaxial Compression Test						Compaction Test				Direct Simple Shrear Test		Modified CBR(%)	Grain Size Distribution (%)					USCS
									UU		CU		$\overline{CU}$		A		$\overline{D}$										
				LL (%)	PI (%)	qu (kPa)	qur (kPa)	St	c (kPa)	Φ (°)	c (kPa)	Φ (°)	c' (kPa)	Φ' (°)	γd max (kN/㎥)	O.M.C (%)	γd max (kN/㎥)	O.M.C (%)	c (kPa)	Φ (°)		No. 4	No. 10	No. 40	No. 200	0.002 mm	
NTB-57	3.0	21.5	2.674	31.9	15.1																	100.0	97.4	91.6	78.8	20.6	CL
NTB-59	0.0~0.7	4.7	2.634	N	P																	25.8	17.3	10.7	4.1	-	GP
NTB-60	1.0	22.1	2.694	35.1	16.6																	100.0	99.6	97.0	82.4	28.0	CL
NTB-60	3.0	28.9	2.686	33.6	17.8																	100.0	100.0	96.5	85.8	20.5	CL
NTB-63	1.0	25.9	2.681	34.6	14.3																	100.0	98.7	93.4	78.3	22.4	CL
NTB-63	3.0	24.0	2.658	28.4	12.7																	96.1	82.5	54.7	36.2	9.5	SC
NTB-63	4.0	16.7	2.662	N	P																	77.2	59.3	33.3	15.6	-	SM
NTB-64	1.0	25.7	2.672	32.9	15.5																	100.0	97.3	87.7	63.9	14.5	CL
NTB-64	2.0	16.6	2.668	29.4	13.7																	97.8	90.5	66.7	44.9	10.5	SC
NTB-81	1.0	19.0	2.672	30.6	14.4																	84.8	72.4	56.9	38.9	8.6	SC
NTB-82	1.0	10.7	2.632	N	P																	24.4	11.7	4.9	0.5	-	GW

Lab. Test Summary Table (**I**)

Date : 2014.12

Project : 중앙선 도담~영천 복선전철 제 5공구 지반조사

Boring No.	Depth (m)	Wn (%)	Gs	Atterberg Limit		Uncomfined Compression Test			Triaxial Compression Test						Compaction Test				Direct Simple Shrear Test		Modified CBR(%)	Grain Size Distribution (%)					USCS
									UU		CU		$\overline{CU}$		A		$\overline{D}$									
				LL (%)	PI (%)	qu (kPa)	qur (kPa)	St	c (kPa)	Φ (°)	c (kPa)	Φ (°)	c' (kPa)	Φ' (°)	γd max (kN/㎥)	O.M.C (%)	γd max (kN/㎥)	O.M.C (%)	c (kPa)	Φ (°)		No. 4	No. 10	No. 40	No. 200	0.002 mm	
NBB-34	1.00	25.2	2.669	29.4	12.2																	82.4	73.8	59.0	43.1	8.7	SC
NBB-34	3.00	15.1	2.658	N	P																	91.7	77.9	50.6	22.9	-	SM
NBB-35	1.00	24.2	2.663	N	P																	86.1	69.2	45.1	23.8	-	SM
NBB-35	4.00	26.3	2.657	N	P																	92.4	76.7	54.1	26.7	-	SM
NBB-36	1.00	29.7	2.675	30.2	16.7																	100.0	91.9	75.6	57.6	15.1	CL
NBB-36	3.00	15.2	2.662	N	P																	80.0	64.0	44.9	26.2	-	SM
NBB-37	1.00	15.1	2.649	N	P																	46.2	34.3	22.7	14.1	-	GM
NBB-37	2.00	14.6	2.661	N	P																	79.5	63.9	42.2	23.7	-	SM
NBB-38	1.00	29.8	2.689	34.5	19.6																	99.0	96.5	88.6	69.3	14.5	CL
NBB-38	4.00	7.3	2.659	N	P																	80.7	67.7	42.3	19.3	-	SM
NBB-39	1.00	10.3	2.666	N	P																	72.0	58.2	39.7	20.6	-	SM
NBB-39	2.00	13.1	2.662	25.3	10.5																	90.0	75.9	54.3	36.0	7.7	SC
NBB-43	1.00	30.6	2.679	37.6	20.0																	100.0	100.0	98.7	78.1	19.7	CL
NBB-43	2.00	26.3	2.674	29.3	15.7																	100.0	97.0	81.3	57.6	18.0	CL
NBB-46	2.00	22.4	2.680	28.6	15.9																	100.0	97.9	81.7	60.2	17.8	CL
NBB-46	4.00	14.9	2.667	27.5	13.4																	78.7	66.6	48.5	33.8	8.7	SC
NBB-47	1.00	30.7	2.690	31.8	15.7																	100.0	100.0	96.0	76.2	16.4	CL
NBB-47	2.00	23.9	2.672	28.1	10.8																	100.0	98.6	90.7	70.5	12.9	CL
NBB-53	1.00	12.6	2.659	N	P																	75.9	60.5	36.5	12.7	-	SM
NBB-53	2.00	12.3	2.657	N	P																	75.9	59.4	34.4	12.7	-	SM
NBB-54	1.00	11.5	2.644	N	P																	46.4	30.1	13.3	4.7	-	GW
NBB-54	2.00	11.4	2.654	N	P																	72.2	57.8	36.9	18.0	-	SM

Lab. Test Summary Table (Ⅱ)

Date : 2013. 01.

Project : 중앙선 도담~영천 복선전철 제 5공구 지반조사

Boring No.	Depth (m)	Wn (%)	Gs	Atterberg Limit		Uncomfined Compression Test			Triaxial Compression Test						Compaction Test				Direct Simple Shrear Test		Modified CBR(%)	Grain Size Distribution (%)					USCS
									UU		CU		$\overline{CU}$		A		$\overline{D}$									
				LL (%)	PI (%)	qu (kPa)	qur (kPa)	St	c (kPa)	Φ (°)	c (kPa)	Φ (°)	c' (kPa)	Φ' (°)	γd max (kN/㎥)	O.M.C (%)	γd max (kN/㎥)	O.M.C (%)	c (kPa)	Φ (°)		No. 4	No. 10	No. 40	No. 200	0.002 mm	
NBB-55	1.00	10.0	2.667	N	P																	83.9	65.5	37.6	15.4	-	SM
NBB-55	2.00	10.0	2.631	N	P																	33.3	19.4	10.5	3.5	-	GP
NBB-61	1.00	16.6	2.663	N	P																	75.1	60.0	38.5	14.6	-	SM
NBB-61	2.00	14.4	2.671	N	P																	67.5	51.2	30.9	13.3	-	SM
NBB-62-1	1.00	25.6	2.677	36.1	22.4																	100.0	100.0	91.8	66.0	15.6	CL
NBB-62-1	3.00	19.0	2.672	N	P																	84.1	67.3	41.3	17.9	-	SM
NBB-63	3.00	26.9	2.673	31.5	13.2																	96.2	89.9	78.3	62.3	12.5	CL
NBB-63	6.00	11.8	2.668	N	P																	78.6	64.7	44.2	21.1	-	SM
NBB-64	3.00	19.3	2.665	N	P																	85.3	69.9	43.9	19.9	-	SM
NBB-64	6.00	7.5	2.643	N	P																	33.0	27.8	19.4	13.6	-	GM
NBB-66	3.00	15.4	2.662	N	P																	69.9	56.9	33.3	14.3	-	SM
NBB-66	6.00	11.8	2.634	N	P																	47.4	38.3	24.0	12.9	-	GM
NBB-67	2.00	29.1	2.687	35.3	21.1																	99.6	98.7	92.9	66.6	16.7	CL
NBB-67	7.00	21.3	2.652	N	P																	97.5	84.8	49.0	24.0	-	SM
NBB-68	4.00	14.9	2.666	N	P																	77.0	61.1	38.4	14.8	-	SM
NBB-68	7.00	15.7	2.662	N	P																	66.9	47.6	21.5	4.3	-	SW
NBB-74	2.00	5.0	2.667	N	P																	72.1	57.0	32.5	14.0	-	SM
NBB-74	5.00	13.6	2.637	N	P																	49.4	32.4	20.6	13.3	-	GM
NBB-76	1.00	7.1	2.656	N	P																	92.3	76.7	44.2	15.1	-	SM
NBB-76	3.00	10.5	2.664	N	P																	86.3	70.2	40.2	16.2	-	SM
NBB-79	2.00	10.6	2.652	N	P																	72.0	58.6	35.8	13.1	-	SM
NBB-79	3.00	8.9	2.637	N	P																	30.3	23.8	12.4	4.0	-	GP

Lab. Test Summary Table (Ⅲ)

Date : 2014.12

Project : 중앙선 도담~영천 복선전철 제 5공구 지반조사

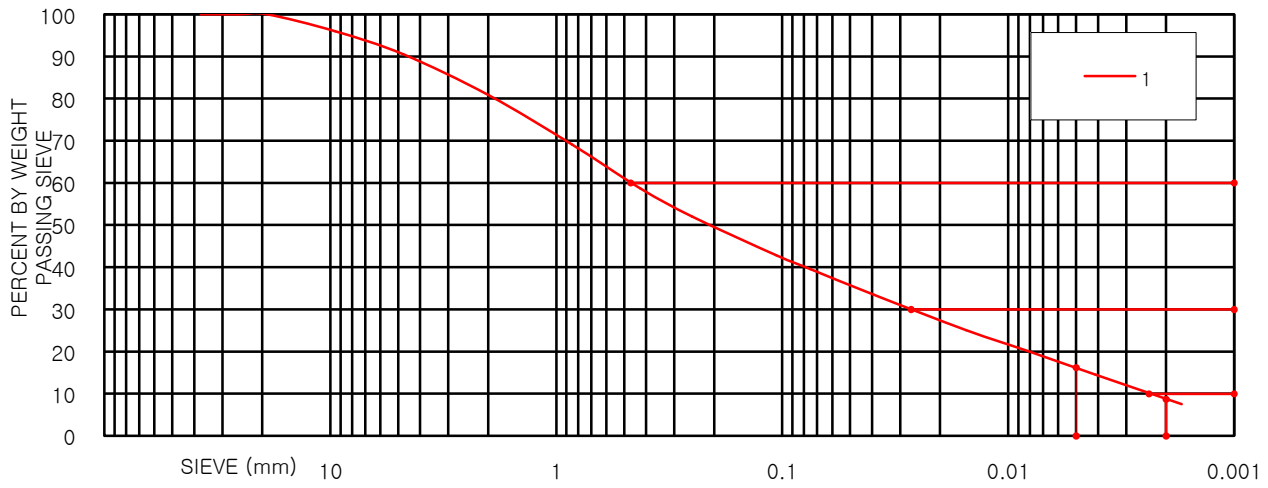
Boring No.	Depth (m)	Wn (%)	Gs	Atterberg Limit		Uncomfined Compression Test			Triaxial Compression Test						Compaction Test				Direct Simple Shrear Test		Modified CBR(%)	Grain Size Distribution (%)					USCS
									UU		CU		C̄Ū		A		D̄										
				LL (%)	PI (%)	qu (kPa)	qur (kPa)	St	c (kPa)	Φ (°)	c (kPa)	Φ (°)	c' (kPa)	Φ' (°)	γd max (kN/㎥)	O.M.C (%)	γd max (kN/㎥)	O.M.C (%)	c (kPa)	Φ (°)		No. 4	No. 10	No. 40	No. 200	0.002 mm	
NSB-07	4.00	34.4	2.676	36.7	21.3																	97.1	92.9	78.9	59.7	11.7	CL
NSB-07	8.00	35.5	2.682	36.6	20.1																	100.0	94.8	85.0	68.9	16.6	CL
NSB-08	2.00	15.4	2.659	N	P																	100.0	100.0	88.3	29.8	-	SM
NSB-08	4.00	13.9	2.655	N	P																	88.3	71.4	43.9	20.1	-	SM
NSB-25	2.00	27.7	2.674	29.9	16.3																	98.6	96.3	87.3	68.8	14.8	CL
NSB-25	4.00	23.0	2.676	29.2	14.0																	100.0	100.0	85.0	59.3	16.4	CL
NTB-47	1.00	18.5	2.659	N	P																	87.0	71.3	50.0	23.8	-	SM

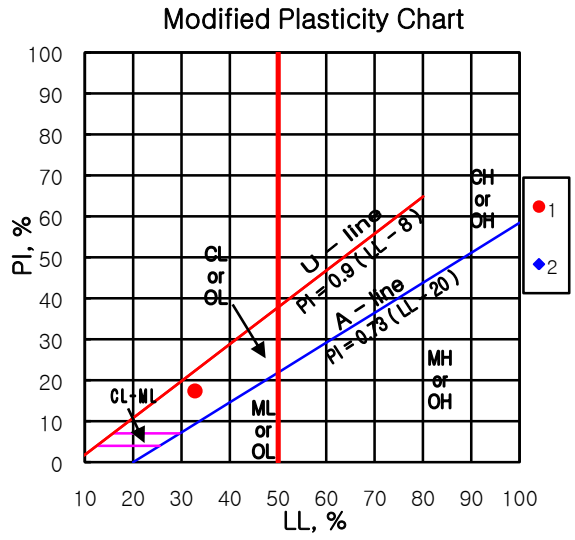
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질실험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-1	1.0	1	14.4	2.674	32.8	15.4	17.4	0.0024	0.0269	0.4688	196.8	0.6

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	90.5	80.9	69.1	58.7	52.0	42.8	39.6	8.7	SC	





	1	2	3	비고
A	2.00			
CI	1.06			
LI	-0.06			

Remarks

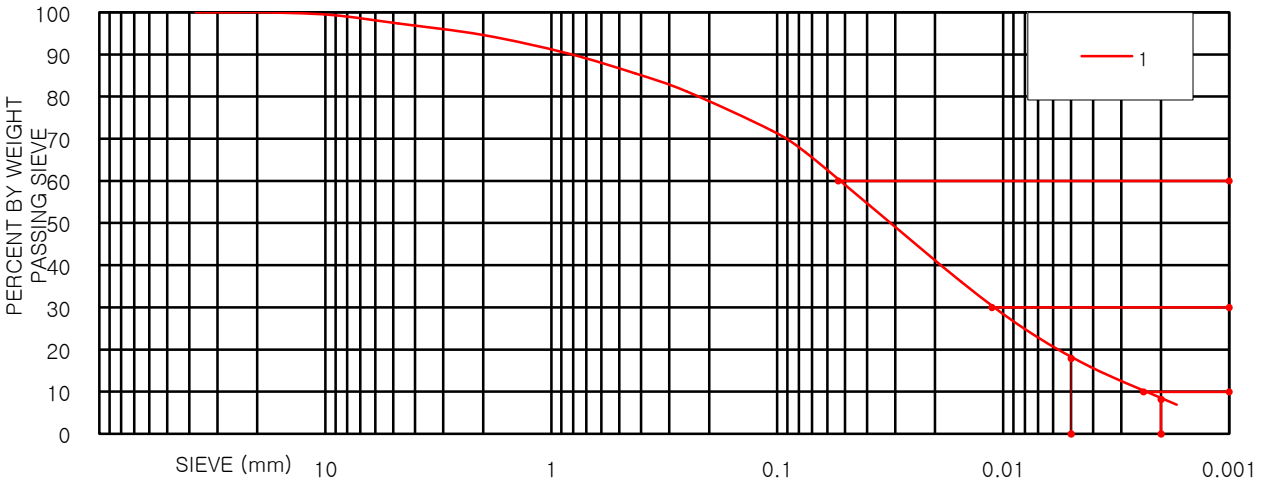
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KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

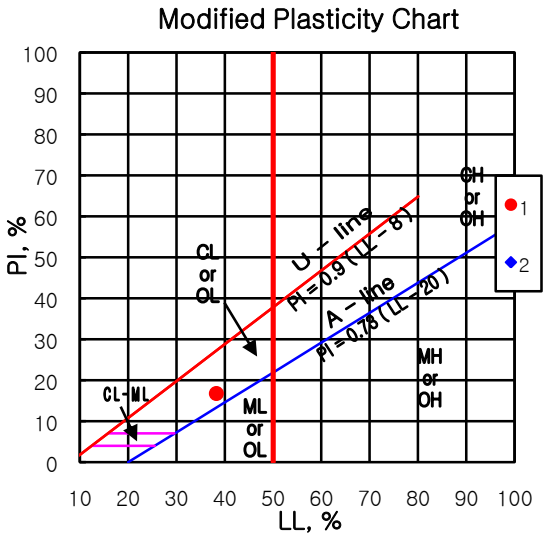
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질실험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-1	2.0	1	24.5	2.684	38.2	21.4	16.8	0.0024	0.0112	0.0537	22.4	1.0

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	97.3	94.6	90.3	85.5	81.2	72.0	66.8	8.2	CL	





	1	2	3	비고
A	2.05			
CI	0.81			
LI	0.19			

Remarks

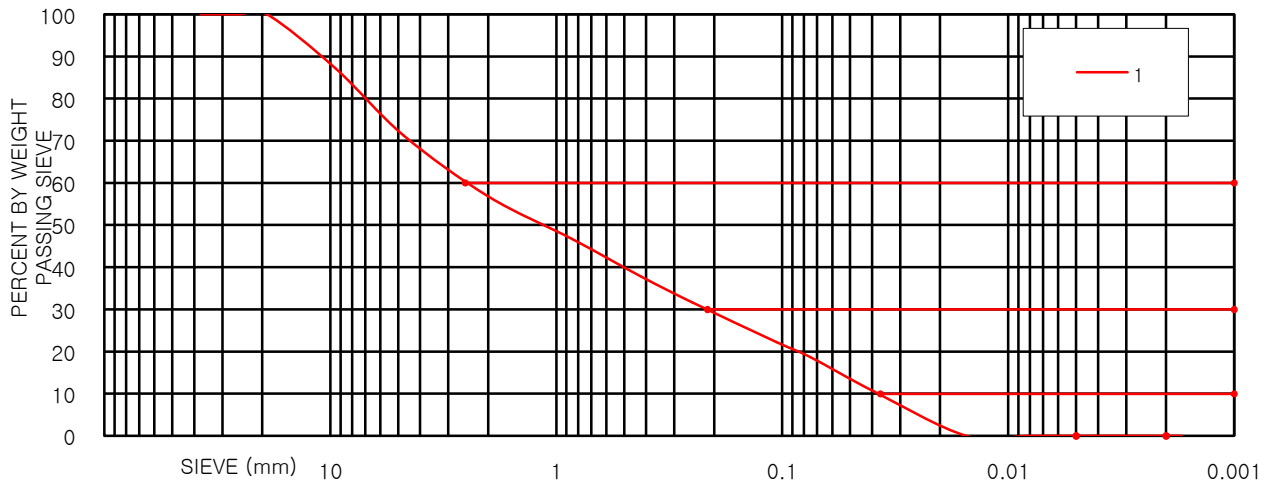
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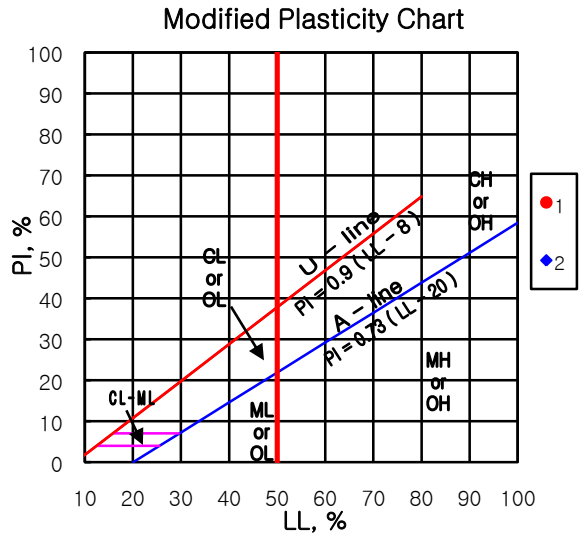
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질실험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-1	3.0	1	19.1	2.659	N	P	P	0.0368	0.2143	2.5293	68.7	0.5

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	71.3	56.8	46.7	37.9	31.7	22.3	18.7	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

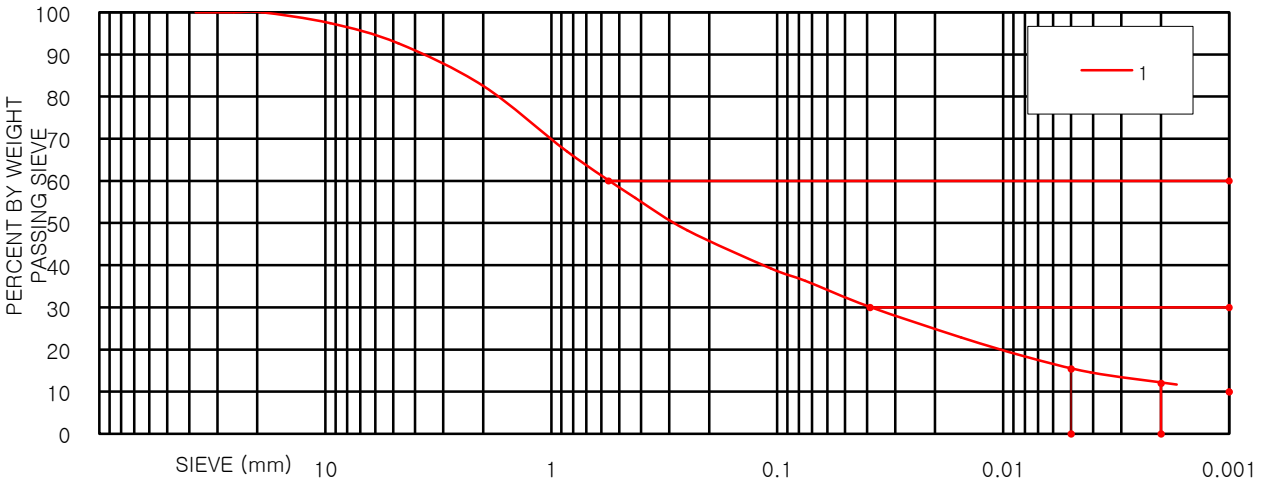
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

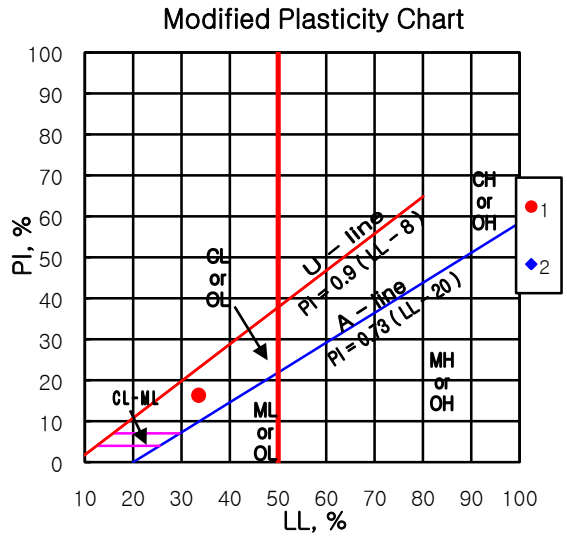
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질실험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-2	1.0	1	15.5	2.683	33.5	17.2	16.3	0.0010	0.0388	0.5585	558.5	2.7

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	92.6	82.5	67.0	56.0	48.3	39.2	36.3	12.0	SC	





	1	2	3	비고
A	1.36			
CI	1.10			
LI	-0.10			

Remarks

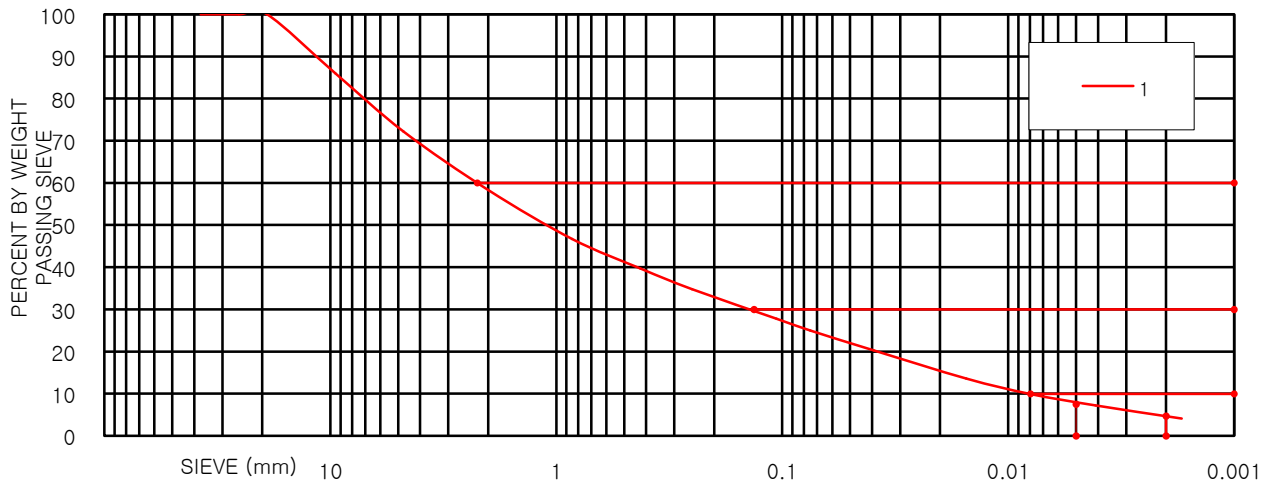
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KS F 2324	06. 10. 19 개정

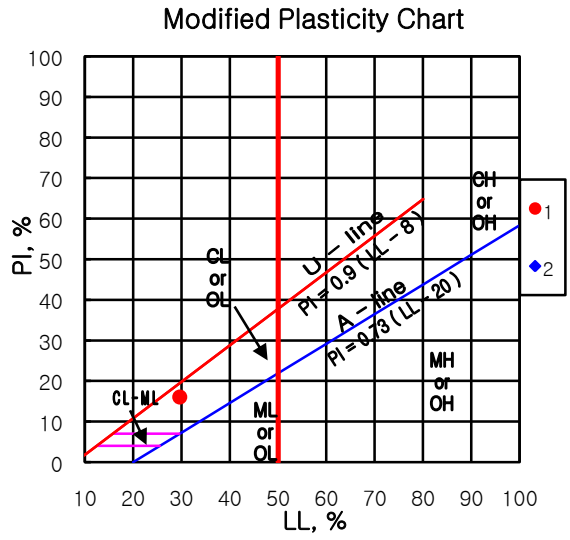
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질실험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-2	2.0	1	10.5	2.656	29.6	13.5	16.1	0.0080	0.1334	2.2387	281.2	1.0

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	72.2	58.3	46.7	39.7	34.8	27.8	25.0	4.7	SC	





	1	2	3	비고
A	3.43			
CI	1.19			
LI	-0.19			

Remarks

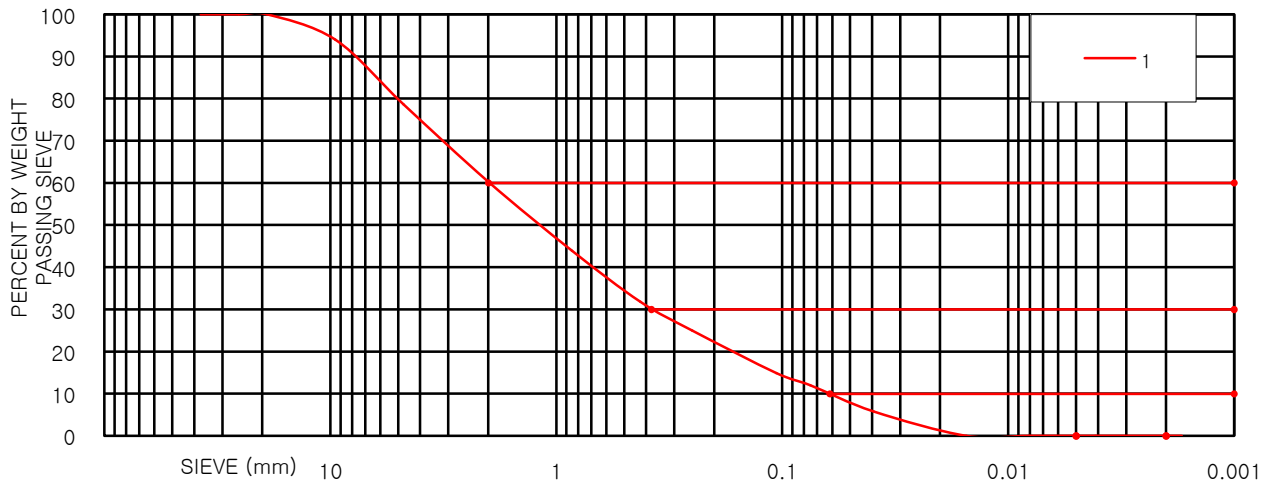
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

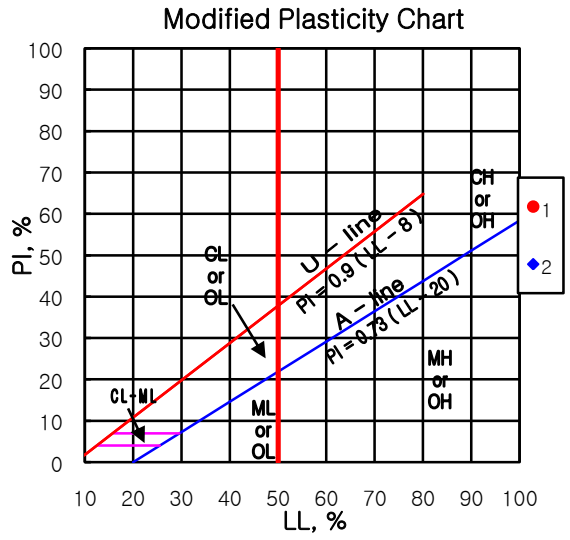
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-2	3.0	1	9.9	2.632	N	P	P	0.0615	0.3793	1.9953	32.4	1.2

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	78.7	60.3	43.9	31.8	25.0	14.9	12.0	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

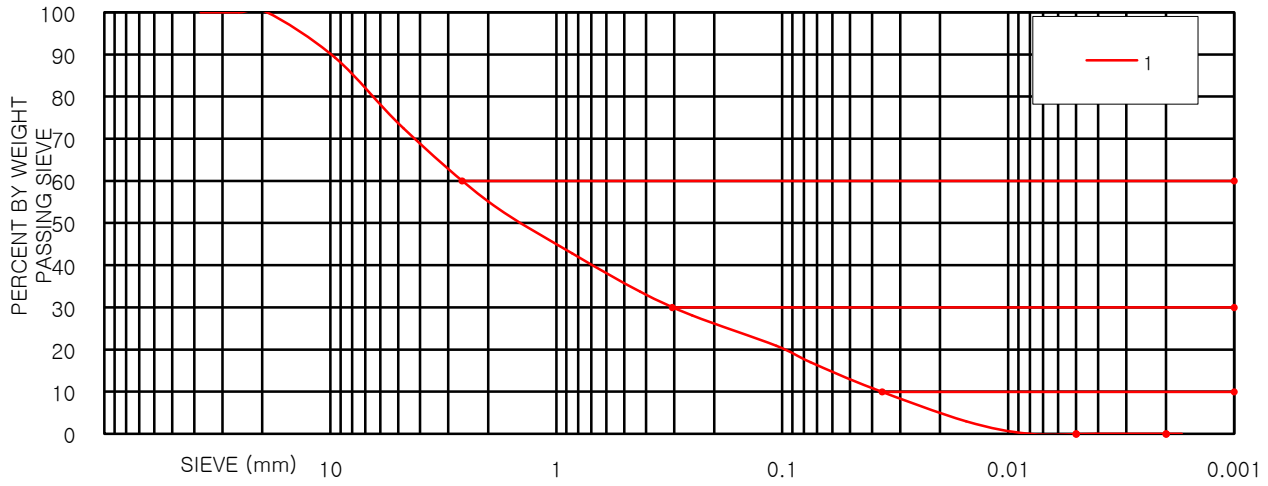
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KS F 2324	06. 10. 19 개정

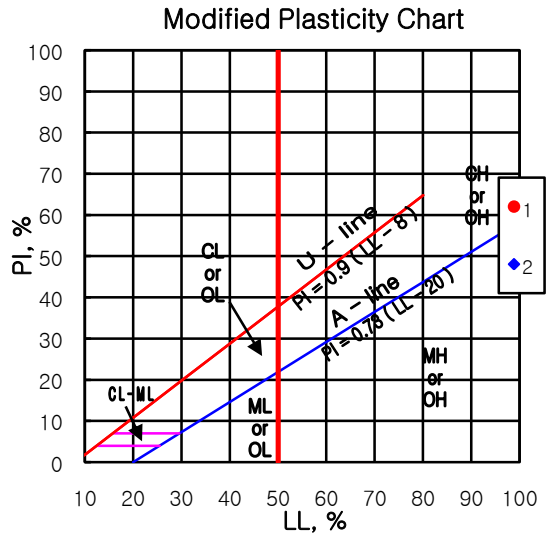
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-3	2.0	1	13.5	2.642	N	P	P	0.0361	0.3069	2.6122	72.3	1.0

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	72.5	55.1	42.8	33.7	28.1	20.9	17.0	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

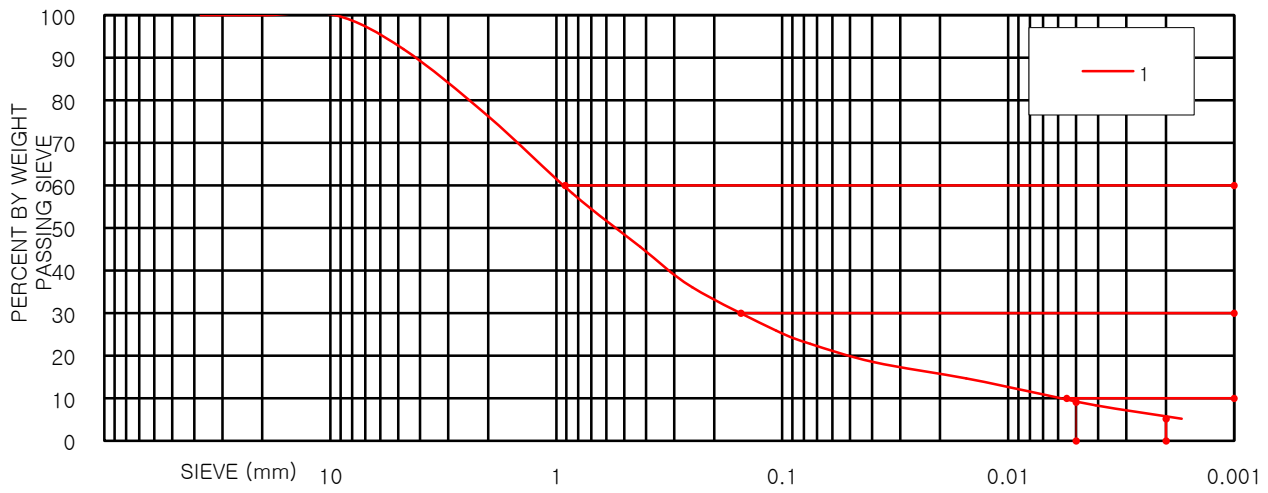
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KS F 2324	06. 10. 19 개정

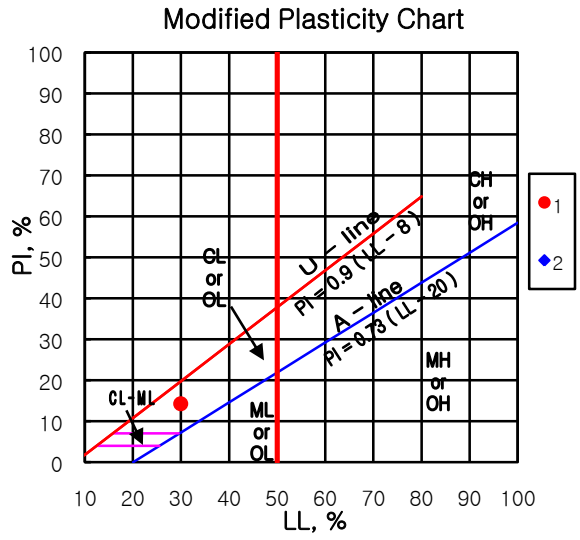
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-3	5.0	1	12.8	2.664	29.9	15.6	14.3	0.0055	0.1524	0.9141	166.0	4.6

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	92.1	76.3	58.2	45.6	36.1	25.9	22.8	5.2	SC	





	1	2	3	비고
A	2.75			
CI	1.19			
LI	-0.19			

Remarks

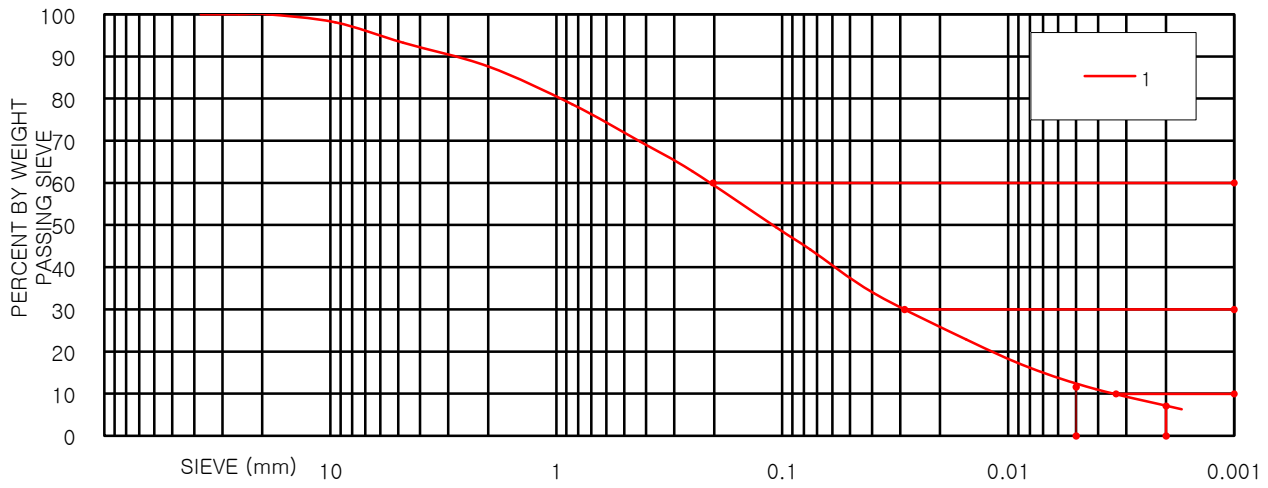
KS F 2301	05. 11. 25 개정
KS F 2302	05. 07. 26 확인
KS F 2303	05. 07. 26 확인
KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

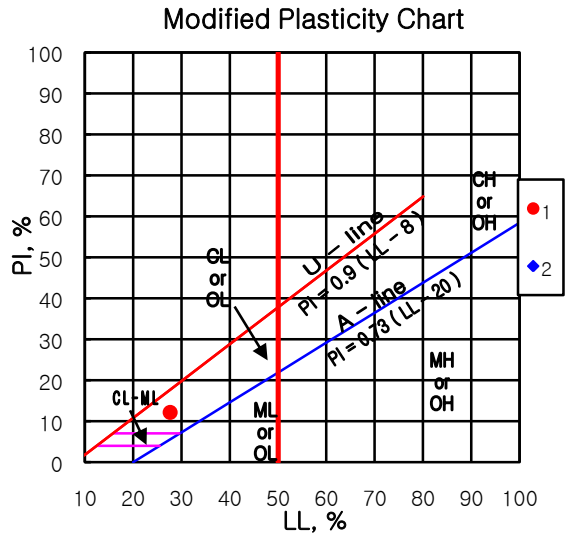
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-3	8.0	1	25.6	2.678	27.6	15.4	12.2	0.0033	0.0288	0.2023	60.7	1.2

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	93.2	87.6	78.7	69.8	62.8	49.4	44.2	7.1	SC	





	1	2	3	비고
A	1.72			
CI	0.17			
LI	0.83			

Remarks

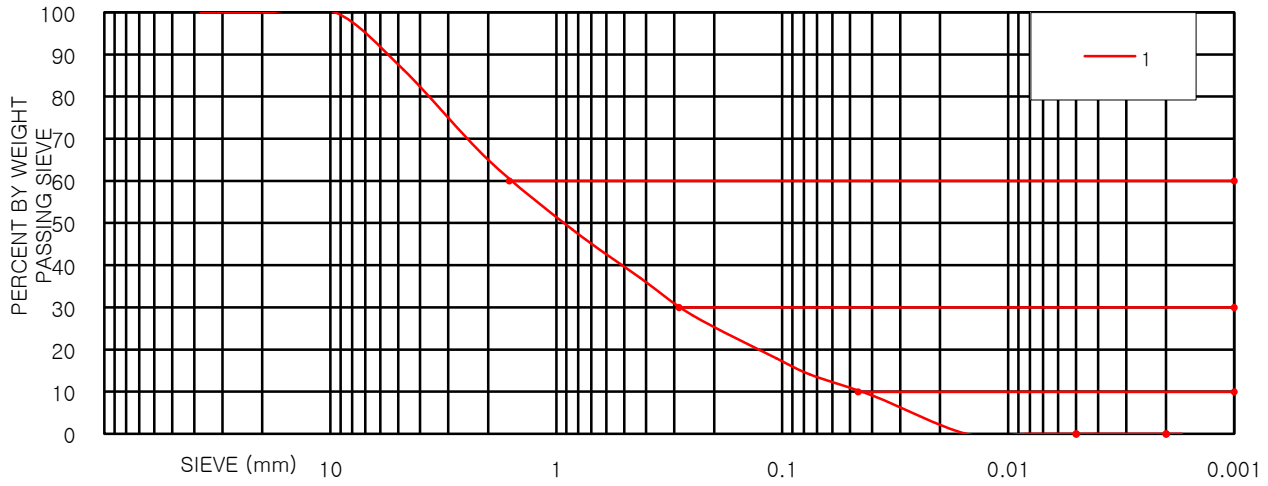
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KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

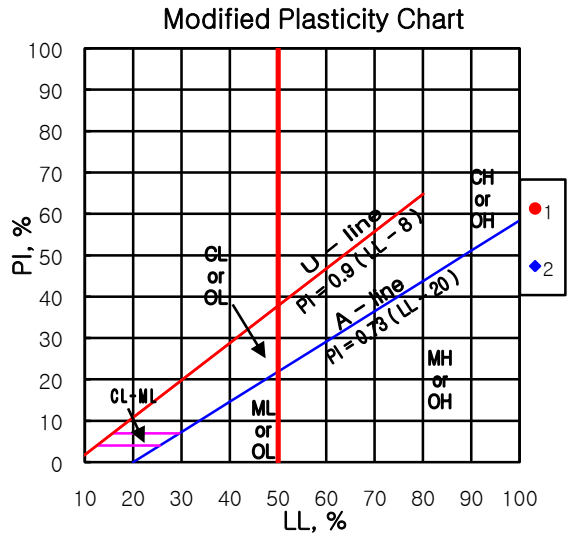
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-4	1.0	1	8.0	2.659	N	P	P	0.0461	0.2864	1.6144	35.0	1.1

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	86.4	65.0	48.5	37.0	28.2	17.9	14.1	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

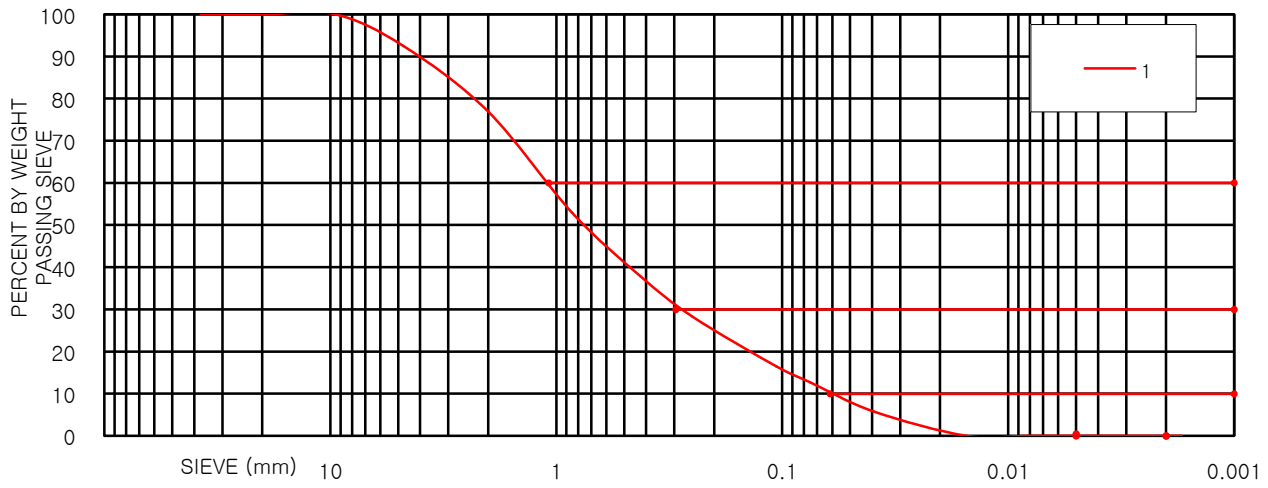
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

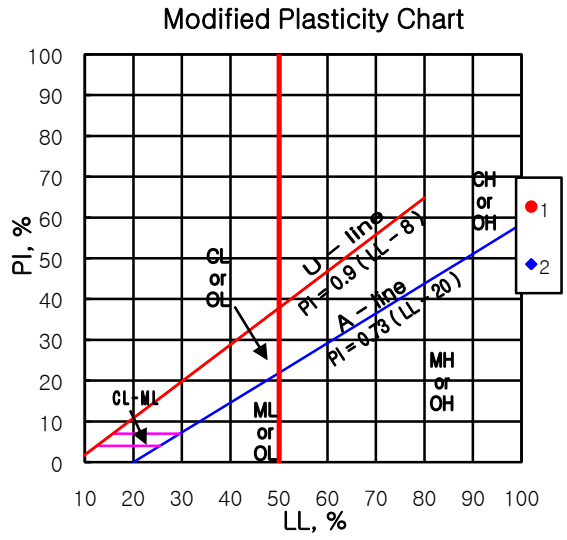
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-4	2.0	1	19.4	2.656	N	P	P	0.0614	0.2958	1.0814	17.6	1.3

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	92.5	76.9	52.9	37.9	28.3	16.5	12.7	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

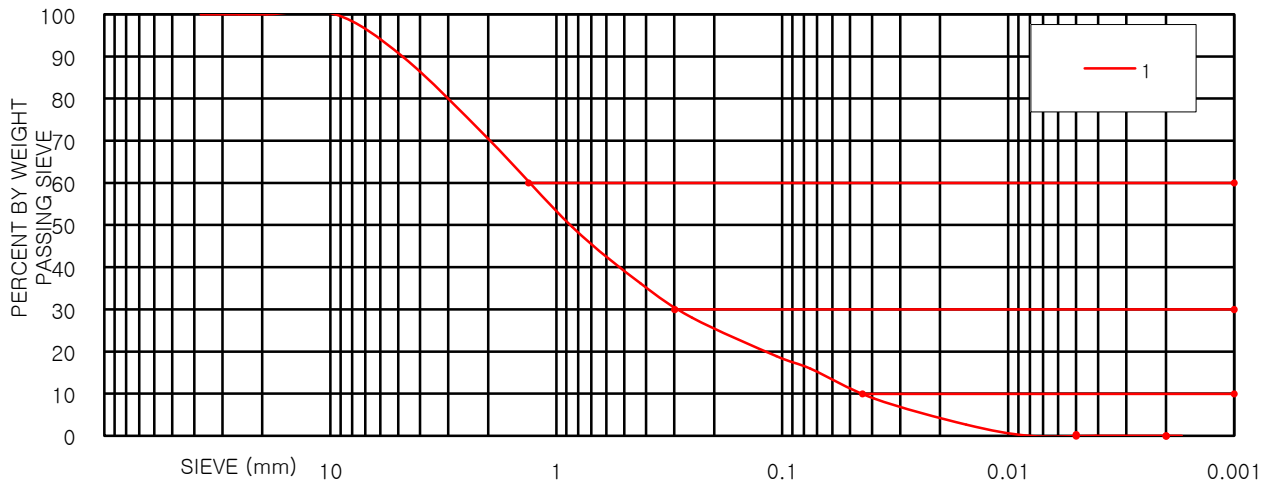
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KS F 2302	05. 07. 26 확인
KS F 2303	05. 07. 26 확인
KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

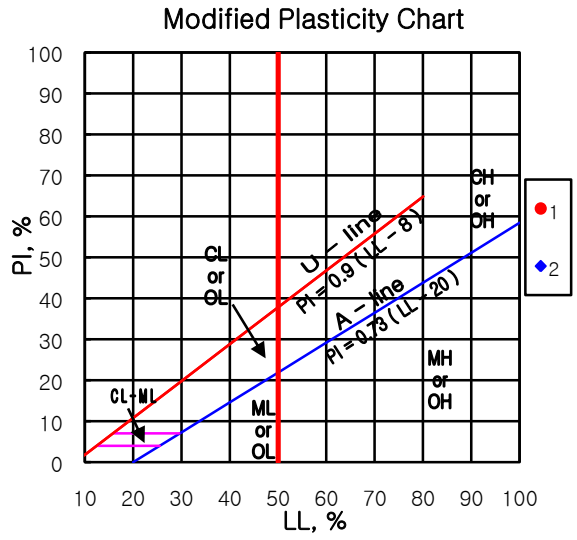
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-4	3.0	1	9.7	2.632	N	P	P	0.0442	0.2992	1.3274	30.1	1.5

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	89.8	70.5	49.6	36.2	28.0	18.9	16.0	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

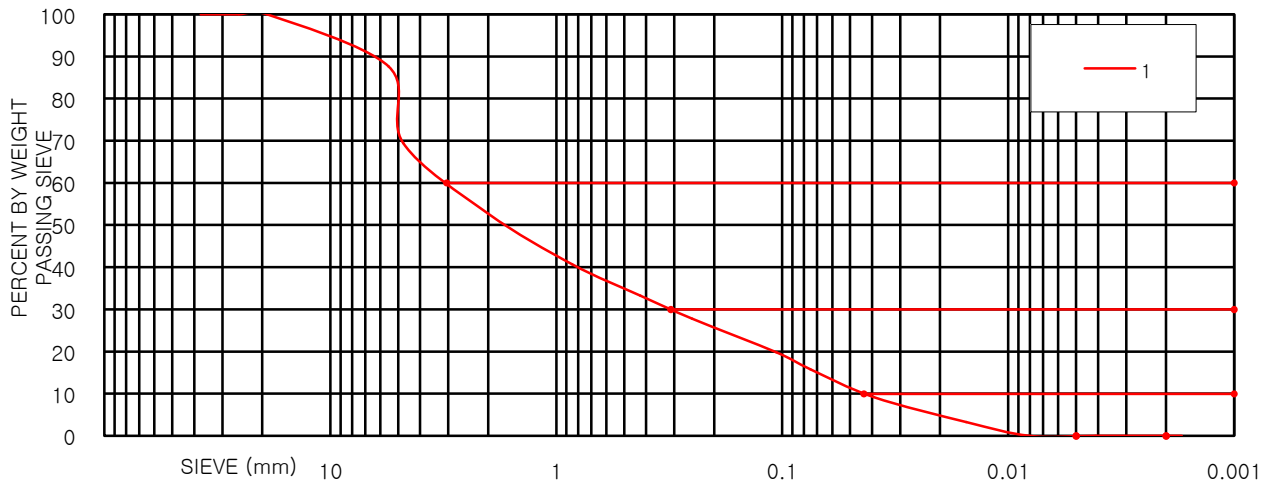
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KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

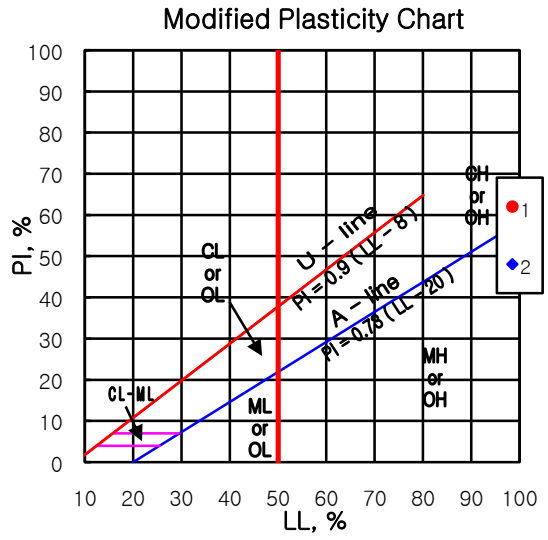
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-4	4.0	1	9.3	2.672	N	P	P	0.0436	0.3112	3.0549	70.1	0.7

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	69.4	52.7	40.7	33.3	27.8	19.8	15.8	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

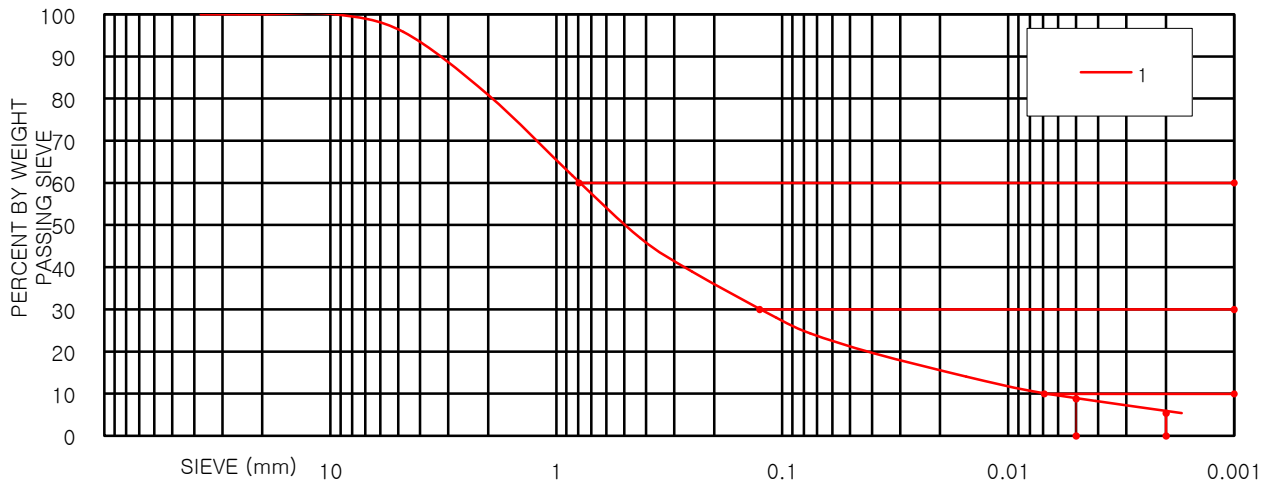
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KS F 2302	05. 07. 26 확인
KS F 2303	05. 07. 26 확인
KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

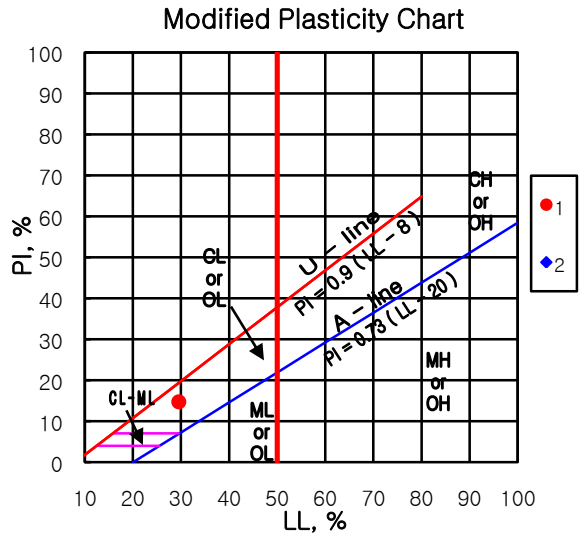
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-5	1.0	1	17.9	2.659	29.5	14.7	14.8	0.0069	0.1259	0.7943	114.8	2.9

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	95.8	80.9	61.8	46.9	39.0	28.0	24.3	5.4	SC	





	1	2	3	비고
A	2.74			
CI	0.79			
LI	0.21			

Remarks

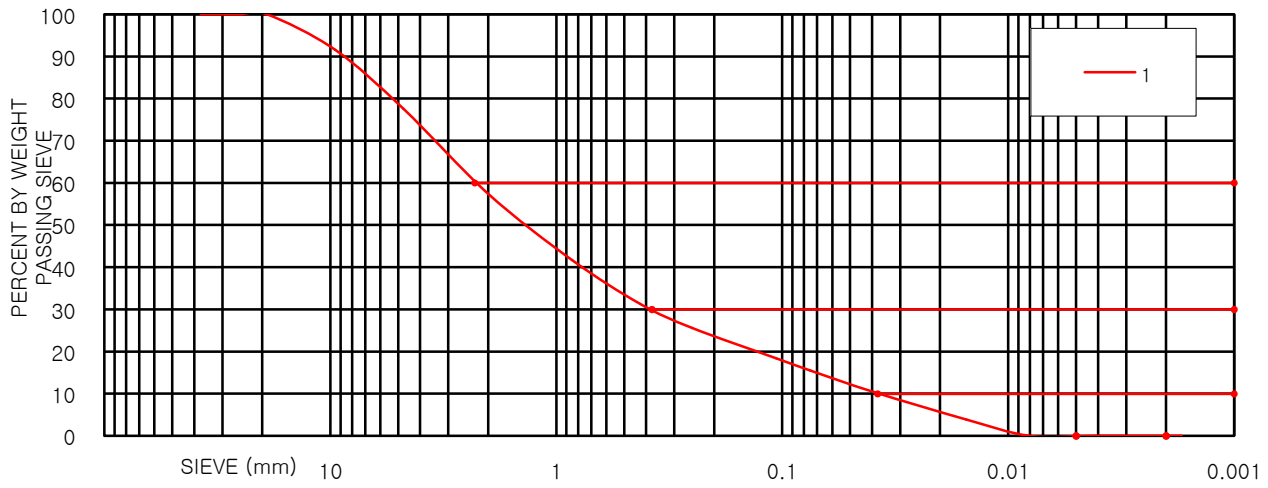
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

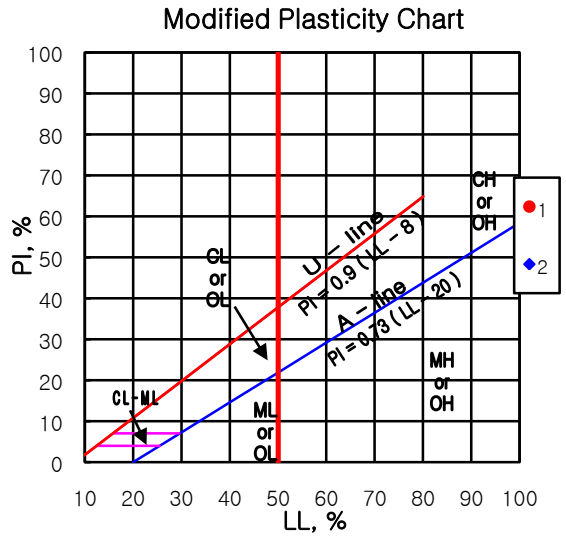
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-5	4.0	1	17.6	2.678	N	P	P	0.0378	0.3776	2.2961	60.7	1.6

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	77.6	57.4	41.7	31.3	25.6	18.4	15.5	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

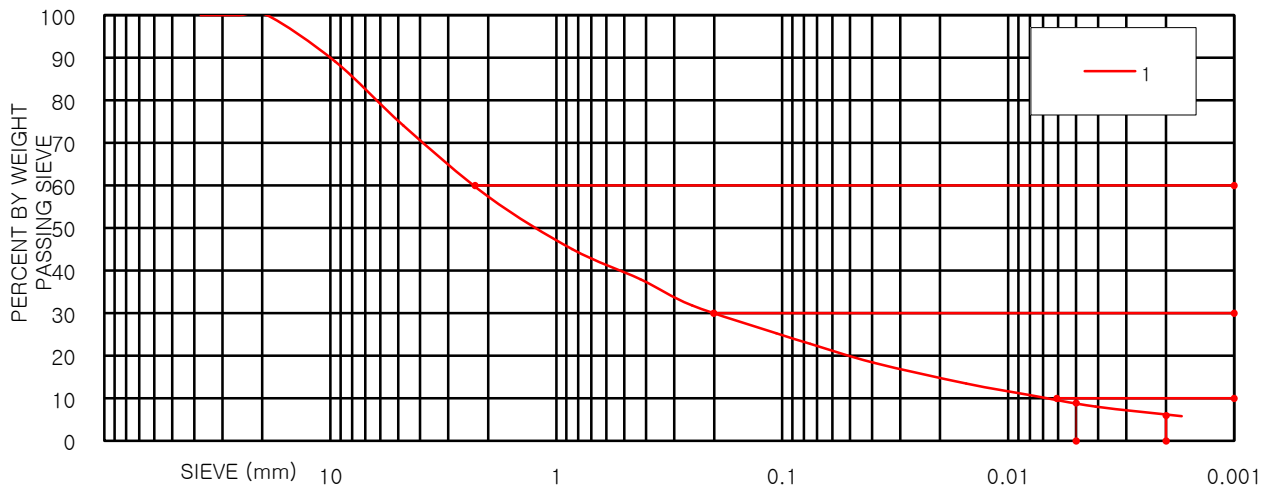
KS F 2301	05. 11. 25 개정
KS F 2302	05. 07. 26 확인
KS F 2303	05. 07. 26 확인
KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

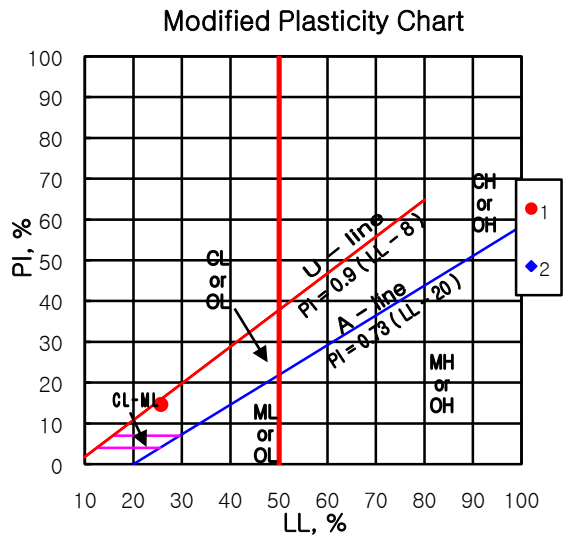
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-5	5.0	1	11.9	2.674	25.6	10.9	14.7	0.0061	0.2009	2.2909	375.8	2.9

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	74.1	57.4	45.1	38.0	31.8	25.3	22.8	6.0	SC	





	1	2	3	비고
A	2.45			
CI	0.93			
LI	0.07			

Remarks

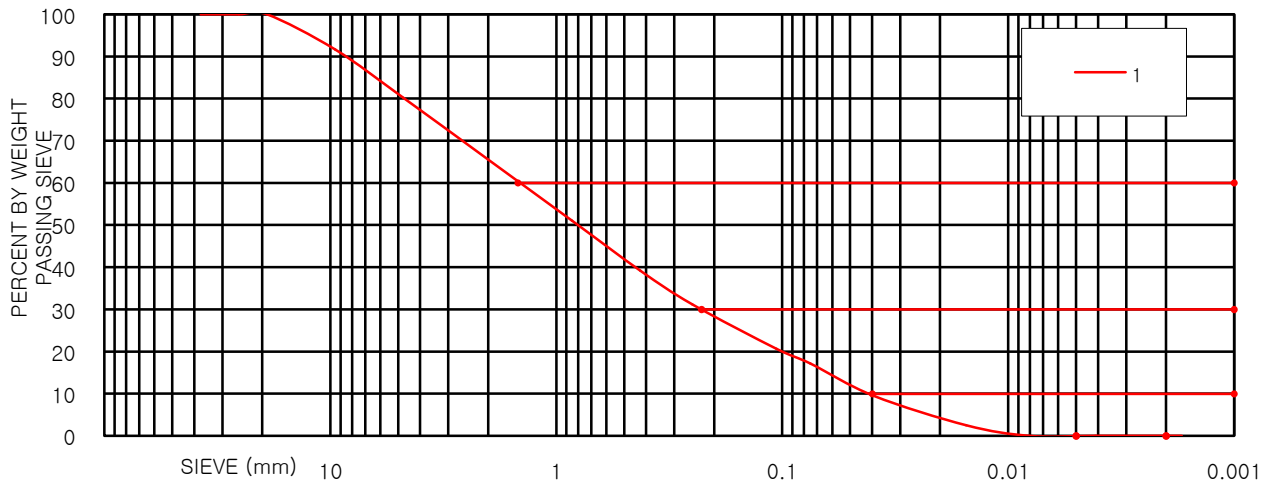
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KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

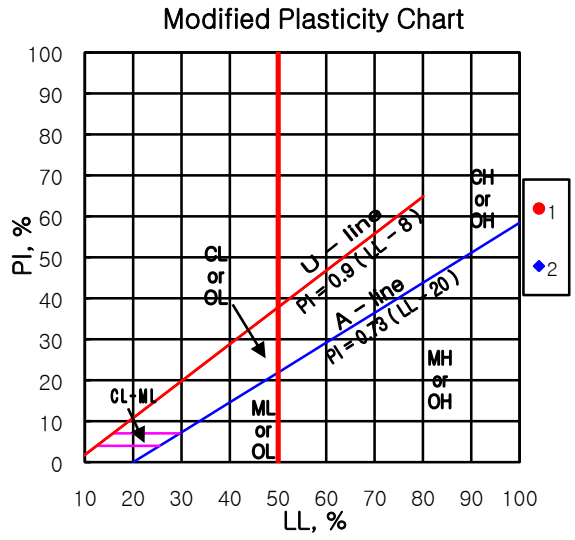
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-6	1.0	1	12.6	2.632	N	P	P	0.0399	0.2275	1.4791	37.1	0.9

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	80.2	65.5	51.0	39.2	31.2	20.7	17.2	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

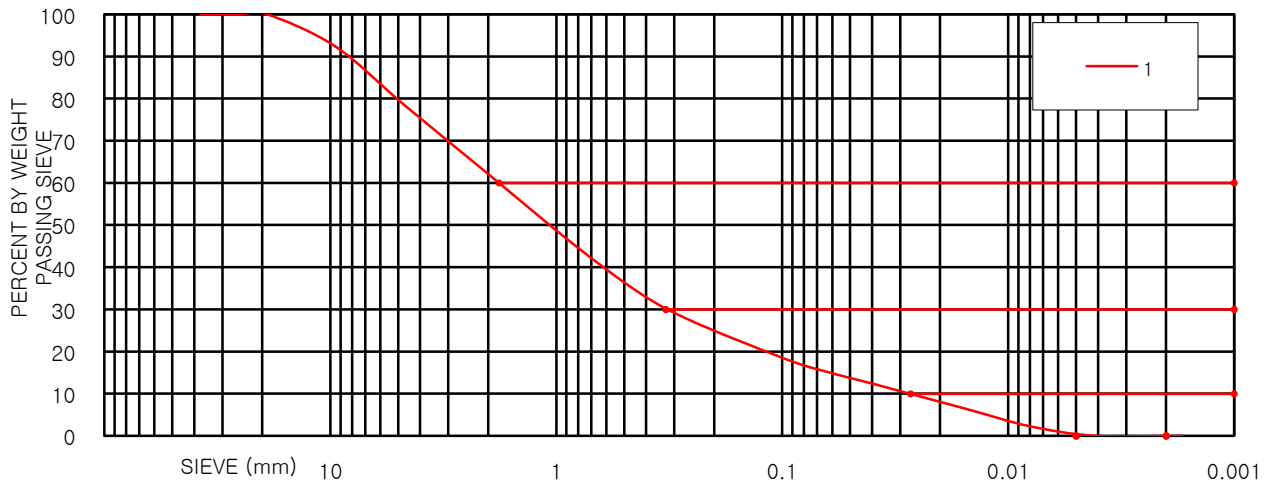
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

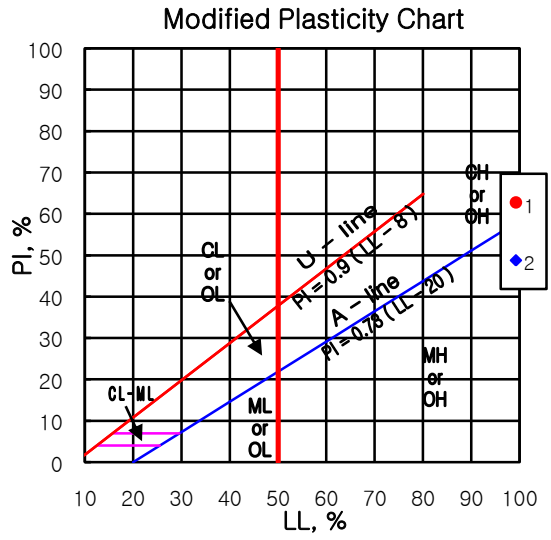
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-6	2.0	1	11.6	2.642	N	P	P	0.0270	0.3273	1.7906	66.2	2.2

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	78.7	62.1	45.7	33.8	27.2	19.1	16.3	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

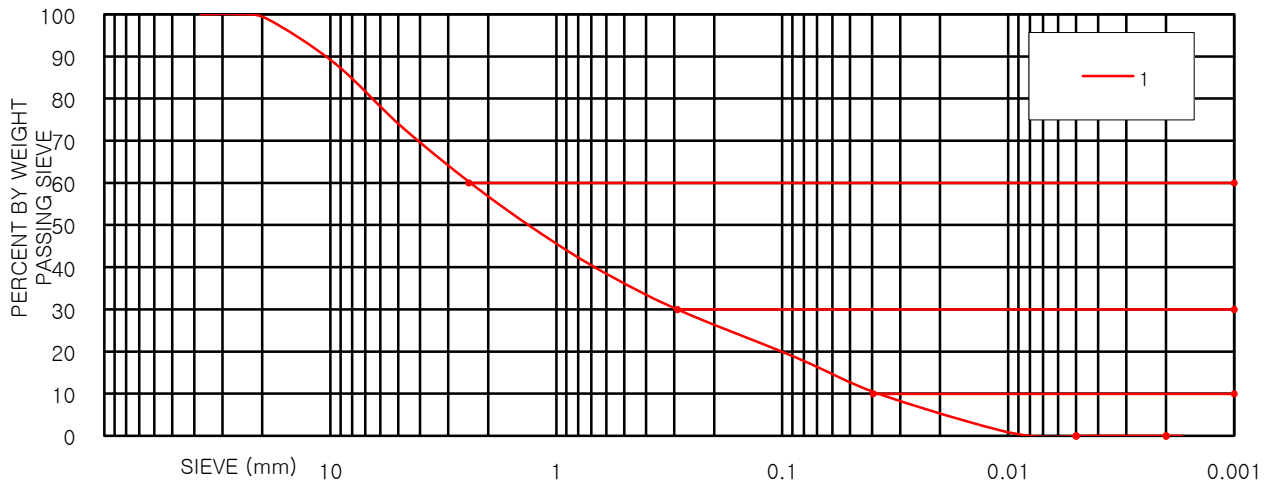
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

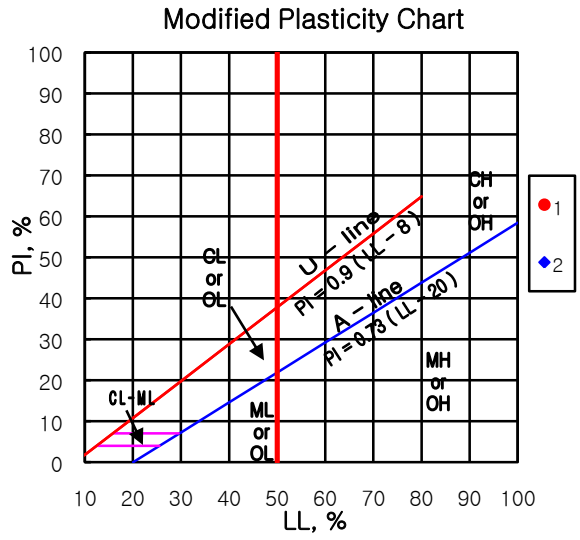
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-6	4.0	1	18.3	2.681	N	P	P	0.0396	0.2911	2.4378	61.5	0.9

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	73.0	56.8	43.2	34.2	28.5	20.5	17.1	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

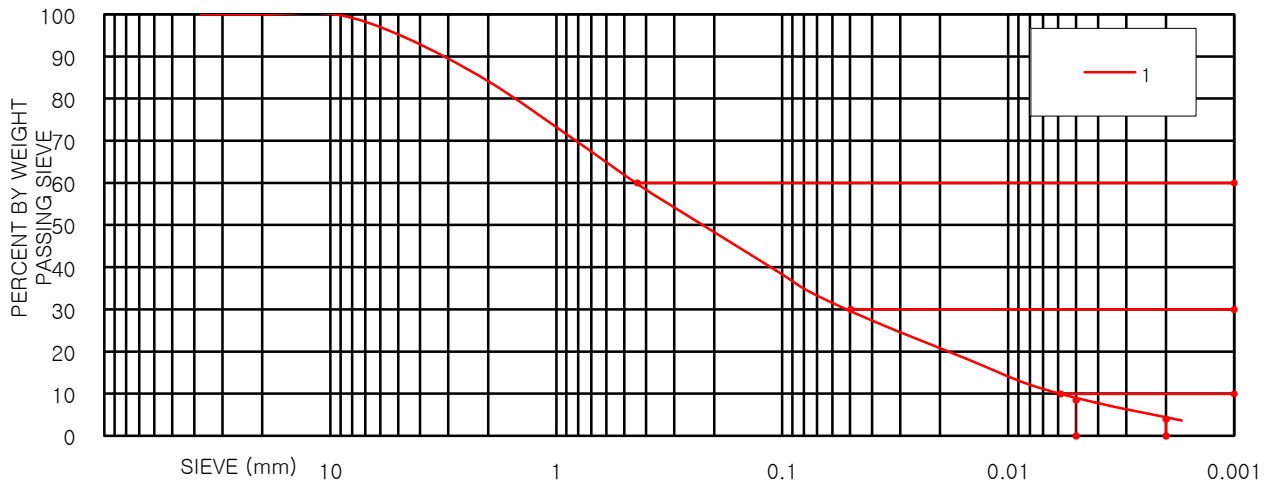
KS F 2301	05. 11. 25 개정
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KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
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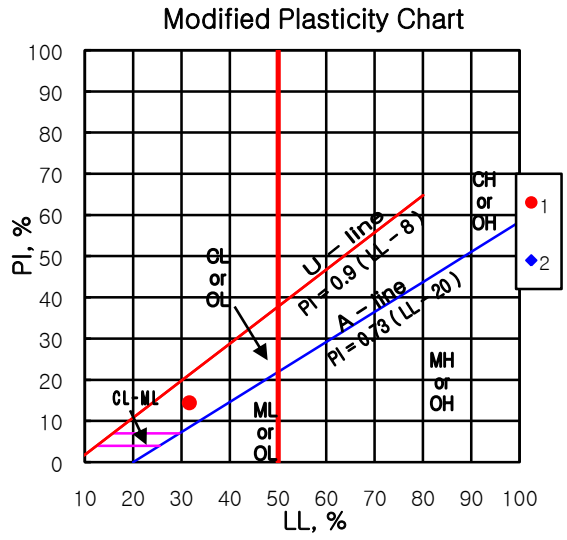
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-7	2.0	1	21.5	2.671	31.6	17.1	14.5	0.0058	0.0498	0.4375	74.8	1.0

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	94.7	84.1	70.6	59.3	51.6	39.2	34.1	4.0	SC	





	1	2	3	비고
A	3.63			
CI	0.69			
LI	0.31			

Remarks

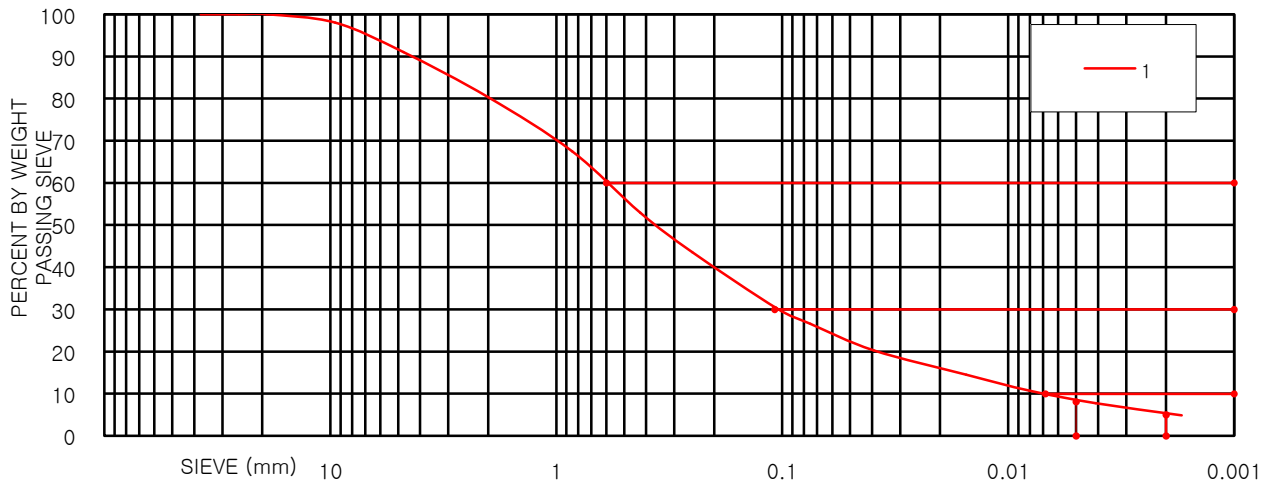
KS F 2301	05. 11. 25 개정
KS F 2302	05. 07. 26 확인
KS F 2303	05. 07. 26 확인
KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

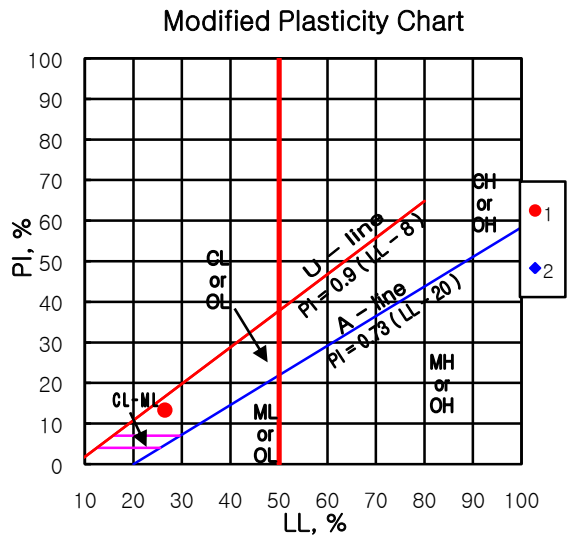
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-7	3.0	1	14.1	2.669	26.5	13.2	13.3	0.0068	0.1079	0.5998	87.7	2.8

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	91.0	80.3	67.5	52.9	43.6	30.3	26.6	5.0	SC	





	1	2	3	비고
A	2.66			
CI	0.93			
LI	0.07			

Remarks

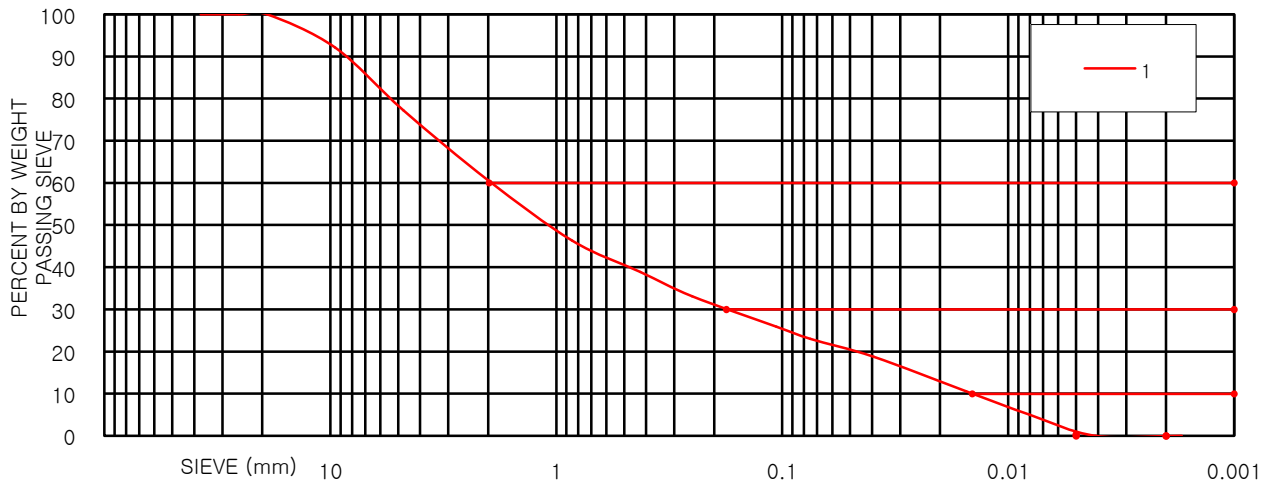
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KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

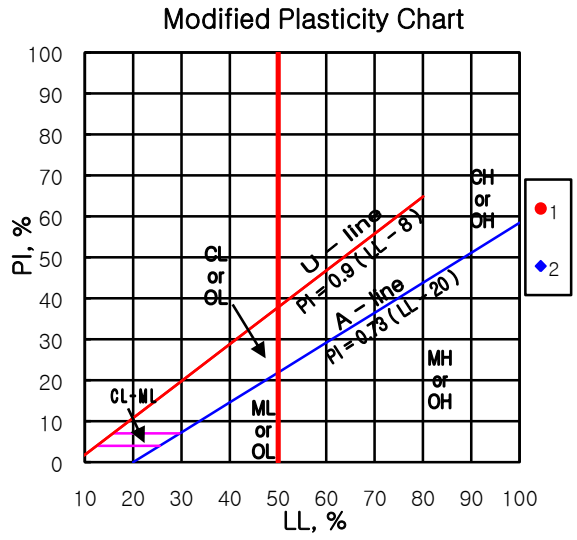
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-7	5.0	1	15.1	2.659	N	P	P	0.0144	0.1766	1.9815	137.4	1.1

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	77.2	60.6	46.3	38.9	33.1	25.9	23.0	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

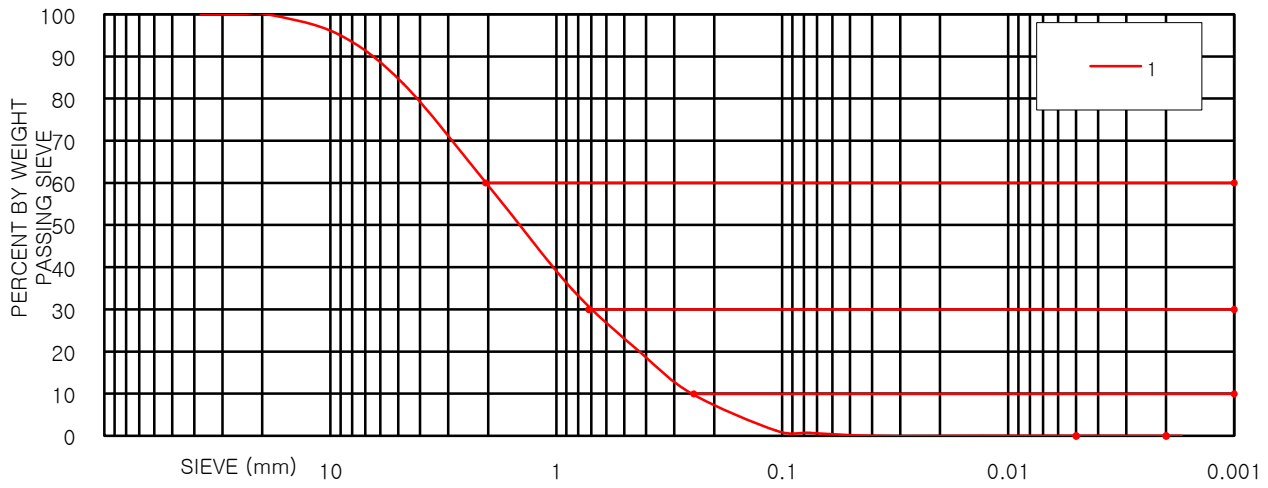
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

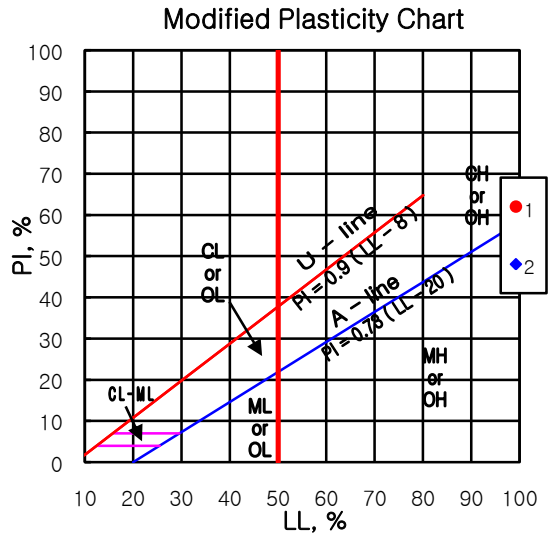
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-8	1.0	1	11.6	2.657	N	P	P	0.2466	0.7178	2.0559	8.3	1.0

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	83.5	59.4	34.8	19.8	10.0	1.2	0.7	-	SW	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

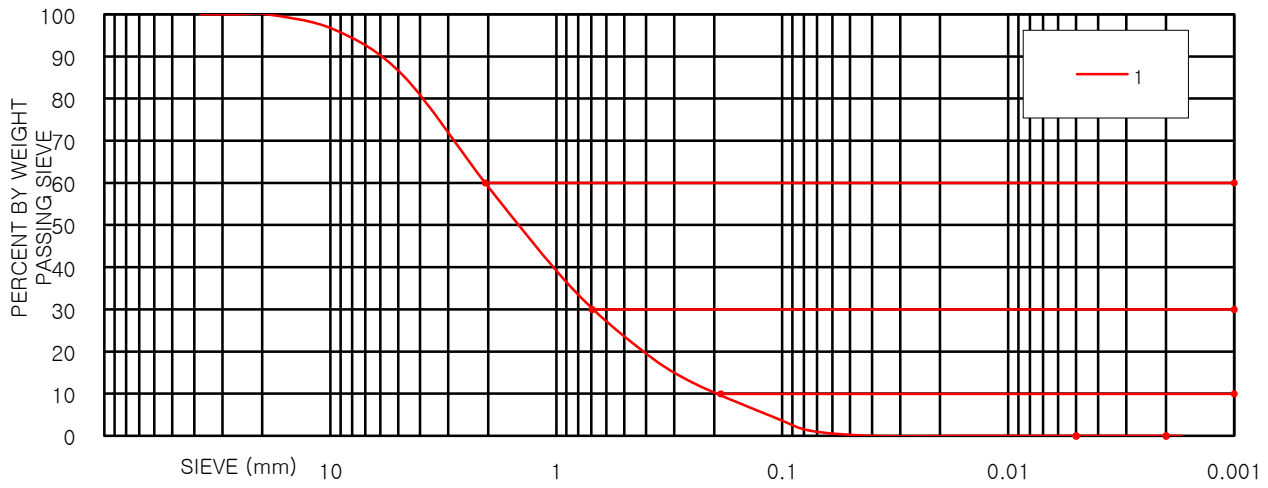
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KS F 2302	05. 07. 26 확인
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KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

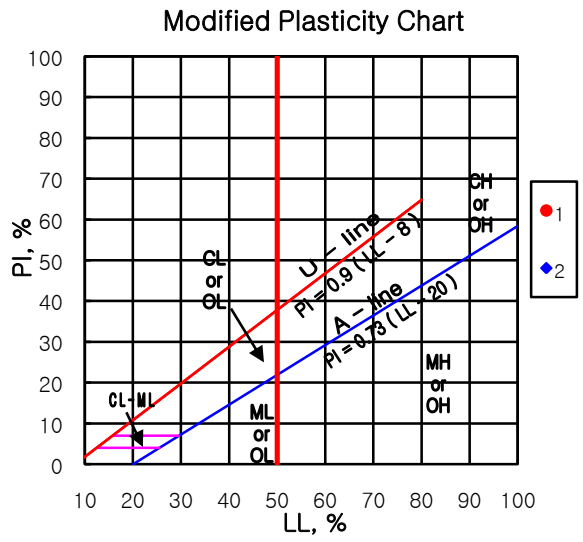
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-8	2.0	1	10.8	2.634	N	P	P	0.1871	0.6950	2.0606	11.0	1.3

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	85.4	59.1	35.0	20.6	12.7	4.2	1.2	-	SW	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

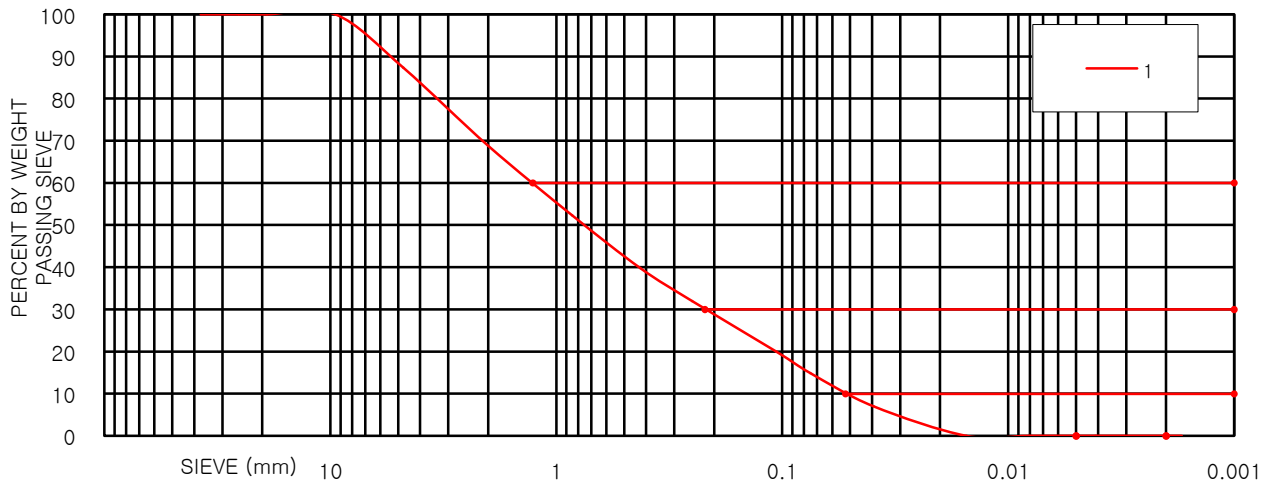
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

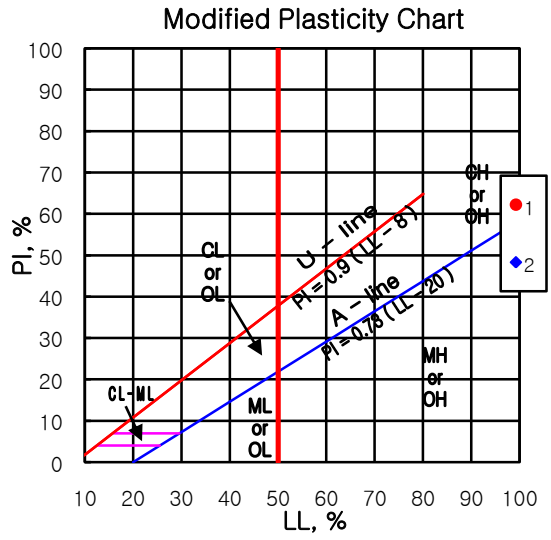
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-8	3.0	1	15.5	2.668	N	P	P	0.0525	0.2198	1.2706	24.2	0.7

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	87.3	68.8	52.3	39.8	32.0	20.0	14.9	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

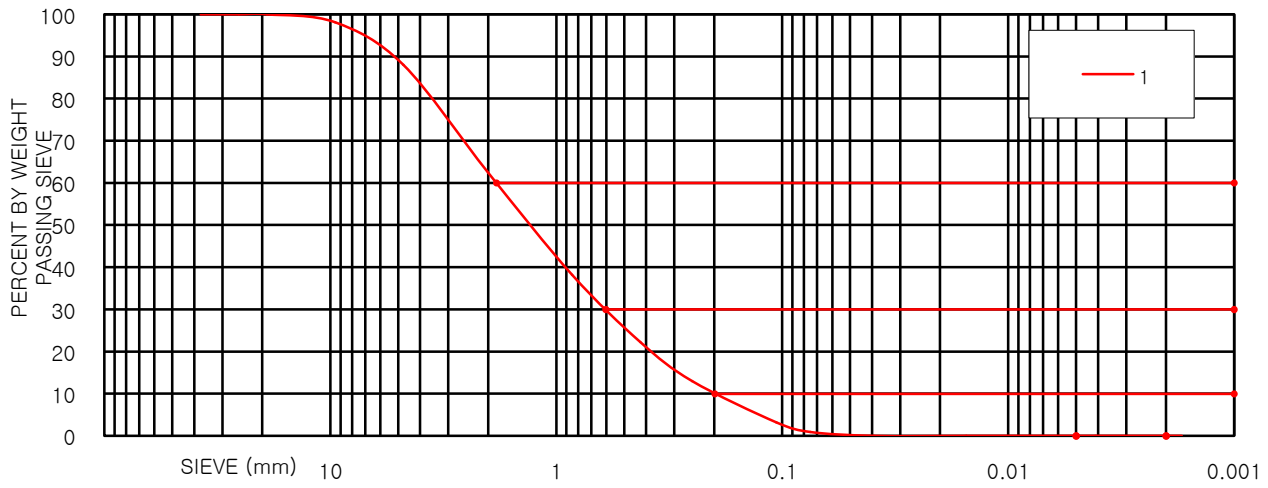
KS F 2301	05. 11. 25 개정
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

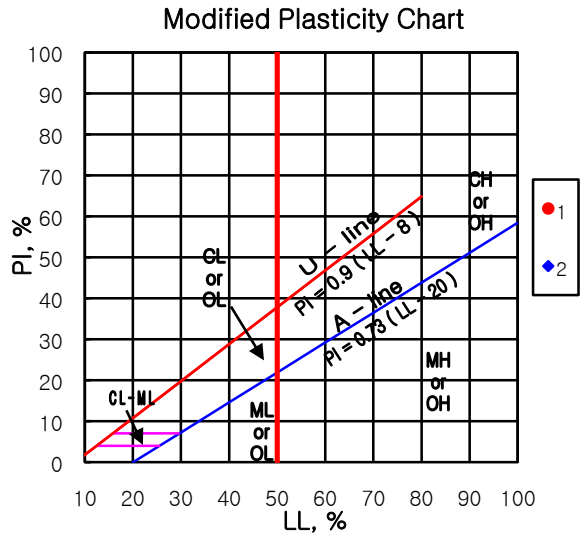
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-9	1.0	1	11.5	2.654	N	P	P	0.1986	0.6039	1.8408	9.3	1.0

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	88.0	62.4	38.2	22.3	13.0	3.2	0.9	-	SW	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

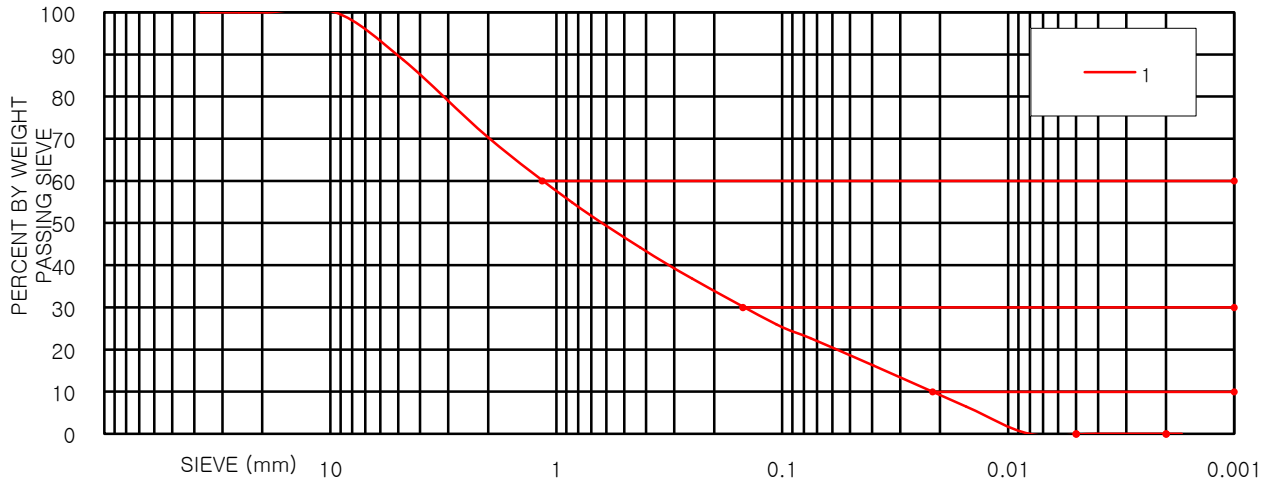
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KS F 2303	05. 07. 26 확인
KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

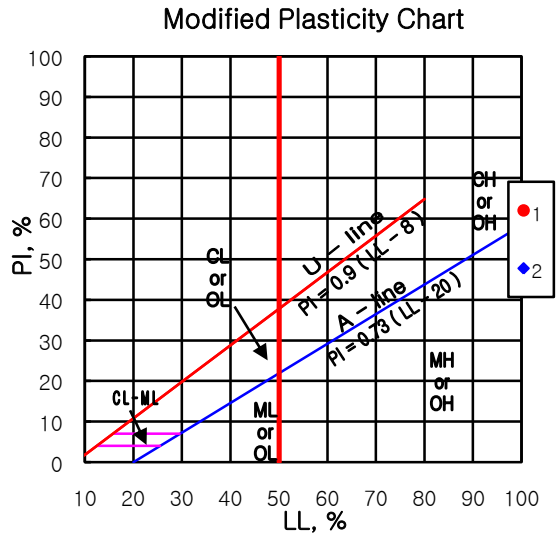
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-9	3.0	1	14.2	2.679	N	P	P	0.0216	0.1493	1.1561	53.5	0.9

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	88.7	70.3	54.9	44.2	36.8	26.0	22.7	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

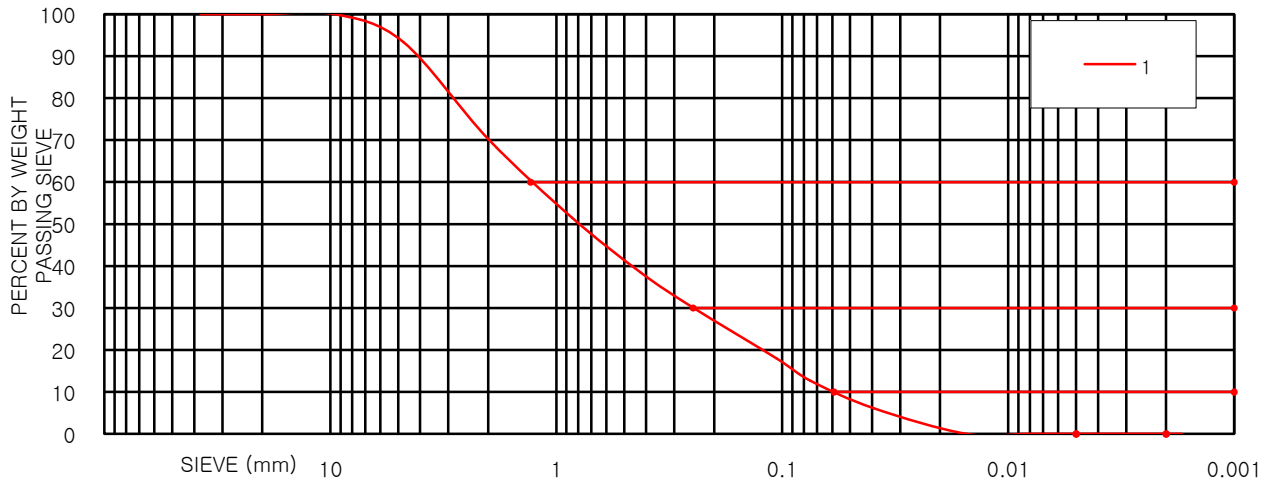
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KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

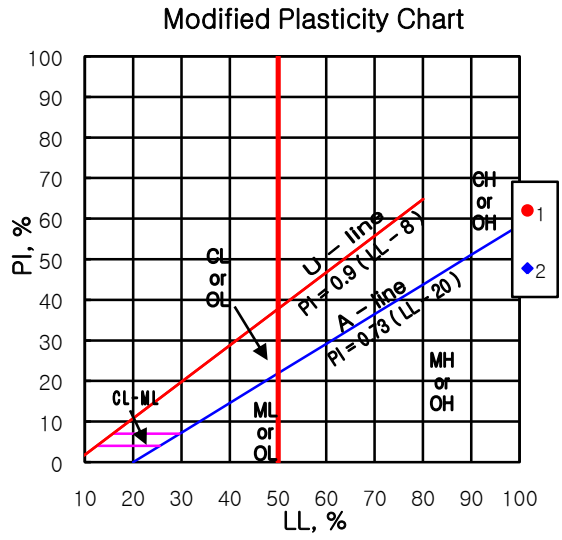
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-9	4.0	1	15.5	2.664	N	P	P	0.0590	0.2483	1.3002	22.0	0.8

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	93.4	70.3	51.5	38.5	30.2	18.0	12.7	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

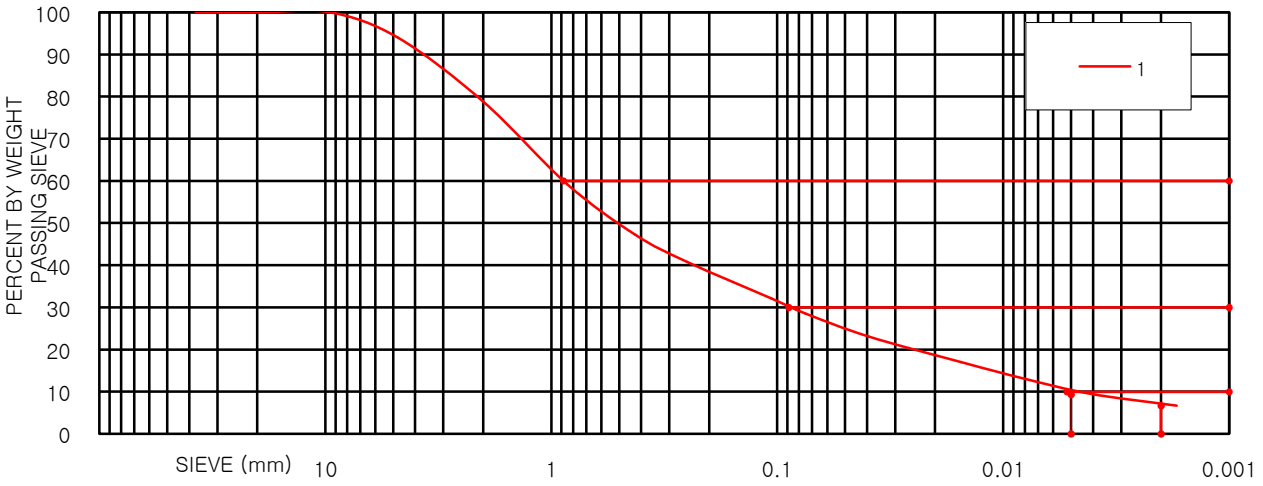
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KS F 2302	05. 07. 26 확인
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

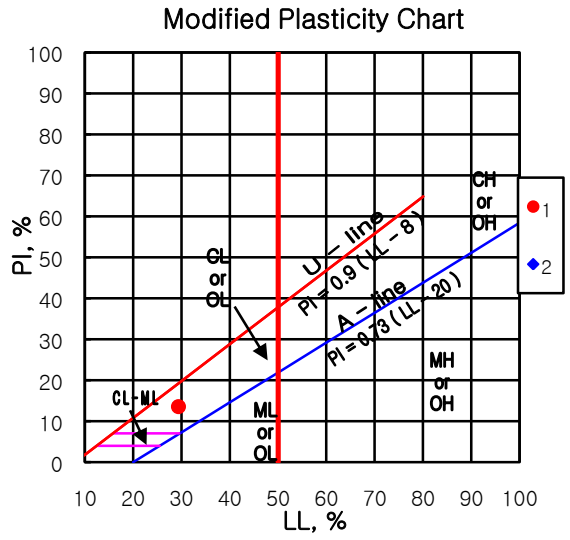
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-10	1.0	1	16.7	2.625	29.3	15.7	13.6	0.0052	0.0889	0.8831	169.0	1.7

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	93.9	78.8	59.2	47.2	40.8	32.1	28.6	6.7	SC	





	1	2	3	비고
A	2.03			
CI	0.93			
LI	0.07			

Remarks

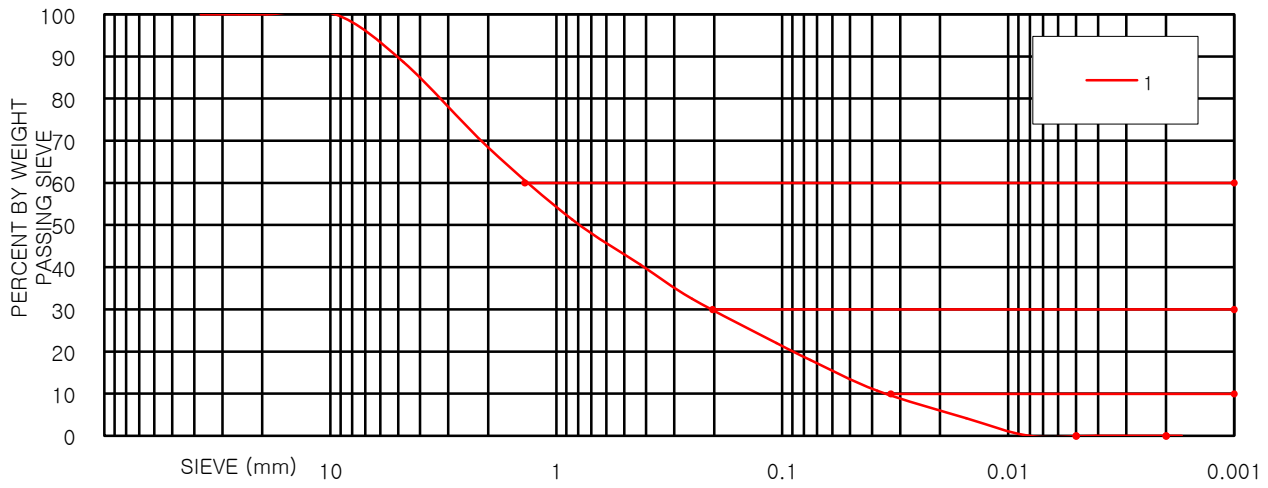
KS F 2301	05. 11. 25 개정
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

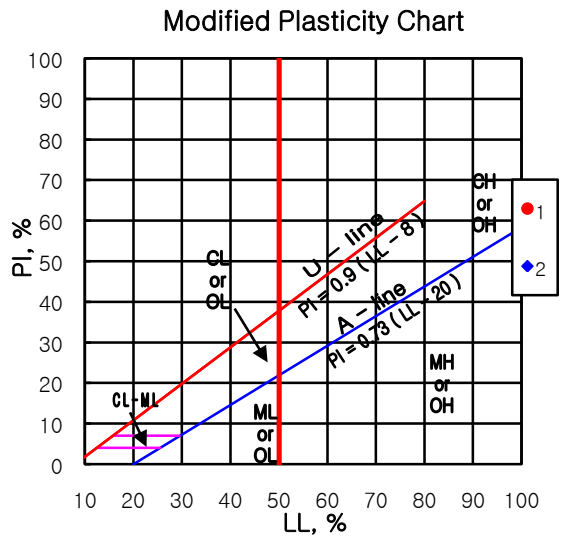
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-10	3.0	1	13.8	2.656	N	P	P	0.0331	0.2032	1.3772	41.6	0.9

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	88.7	68.4	51.3	40.6	32.5	22.0	18.0	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

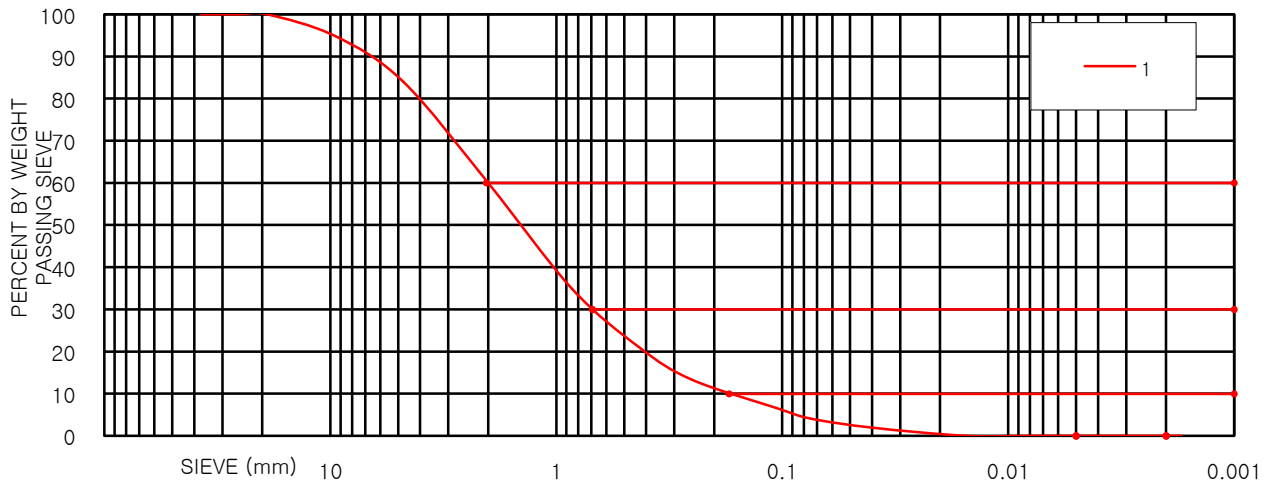
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

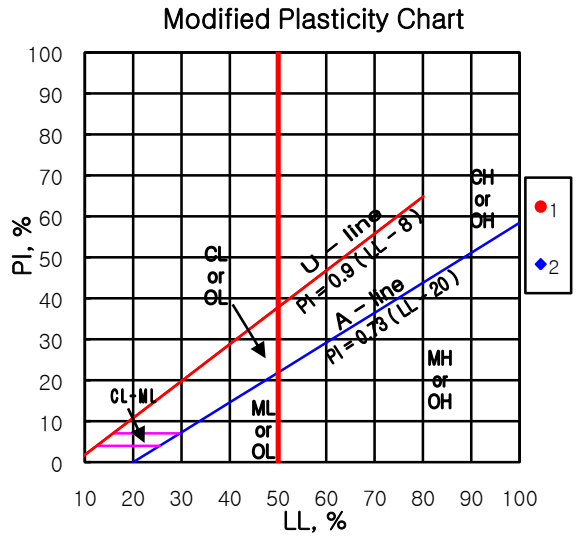
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-10	5.0	1	14.1	2.632	N	P	P	0.1718	0.6918	2.0370	11.9	1.4

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	84.0	60.0	34.9	20.8	13.3	6.6	4.1	-	SW	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

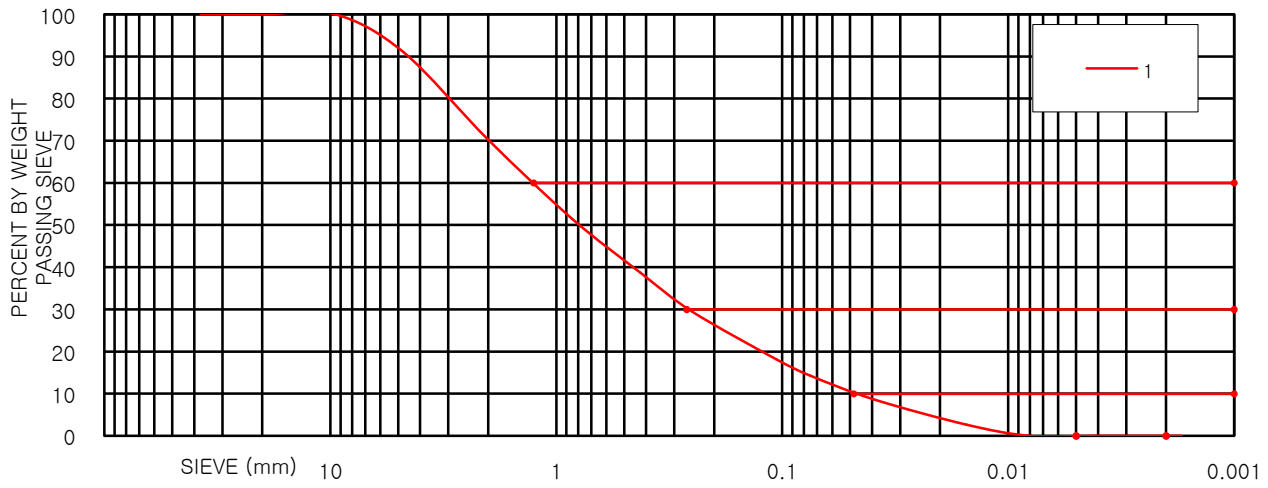
KS F 2301	05. 11. 25 개정
KS F 2302	05. 07. 26 확인
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KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

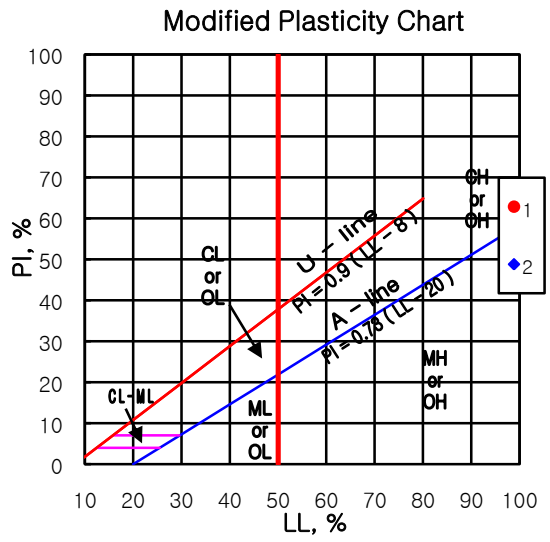
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-11	1.0	1	12.5	2.672	N	P	P	0.0482	0.2649	1.2589	26.1	1.2

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	91.0	70.2	51.5	38.7	29.5	18.2	14.3	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

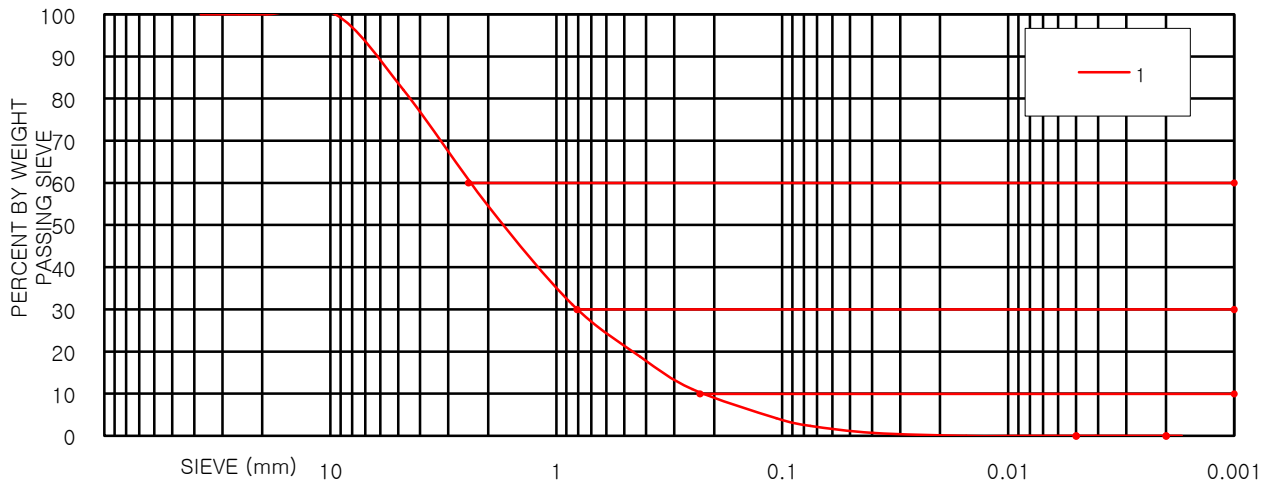
KS F 2301	05. 11. 25 개정
KS F 2302	05. 07. 26 확인
KS F 2303	05. 07. 26 확인
KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

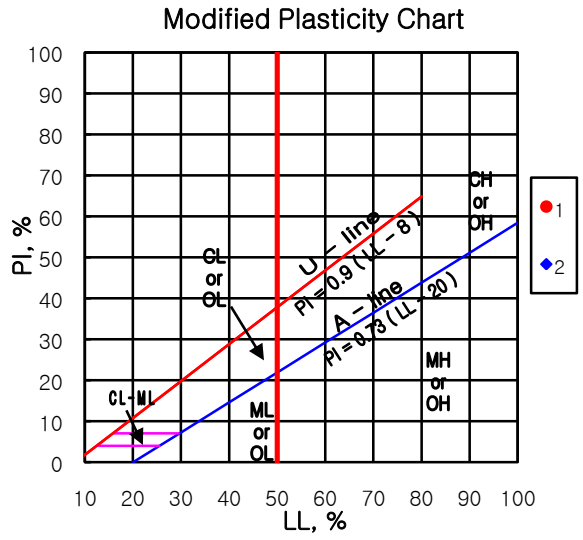
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-11	3.0	1	9.8	2.653	N	P	P	0.2312	0.8091	2.4491	10.6	1.2

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	82.1	54.5	31.2	18.8	11.1	4.2	2.4	-	SW	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

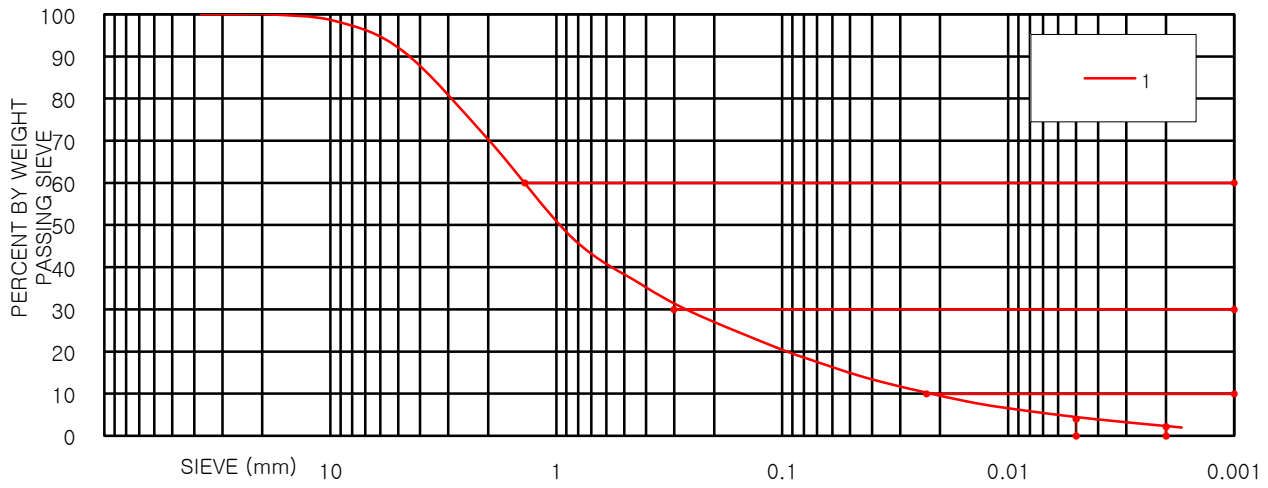
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KS F 2303	05. 07. 26 확인
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

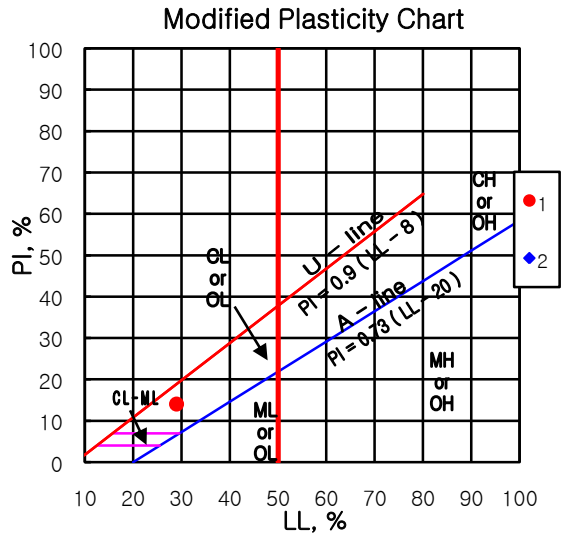
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-11	5.0	1	16.3	2.663	28.9	14.8	14.1	0.0230	0.3020	1.3772	59.8	2.9

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	91.2	70.3	47.0	36.1	29.3	21.0	18.1	2.2	SC	





	1	2	3	비고
A	6.41			
CI	0.89			
LI	0.11			

Remarks

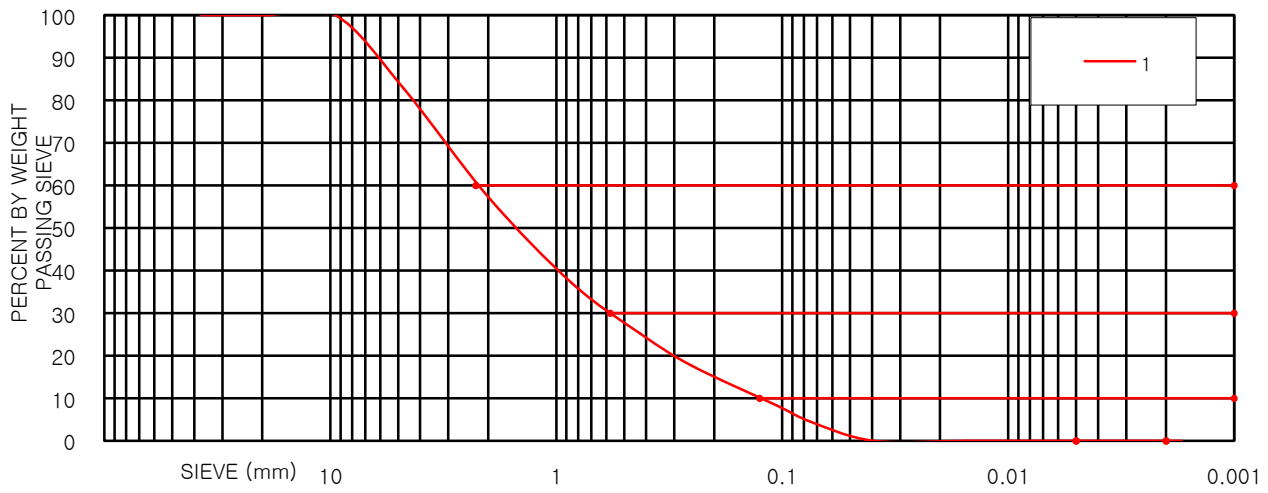
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

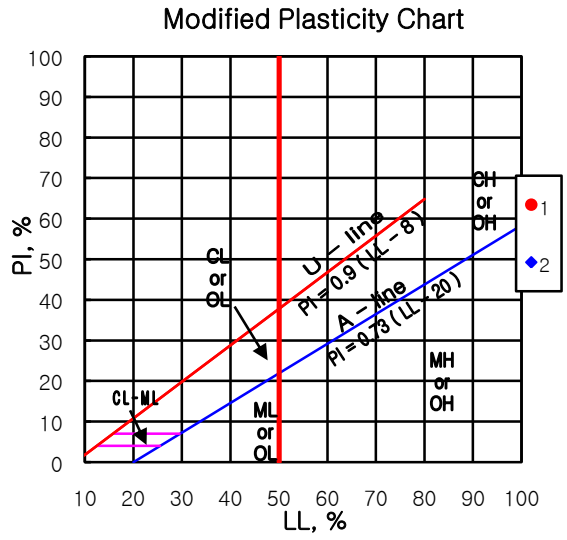
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-12	1.0	1	25.2	2.657	N	P	P	0.1259	0.5781	2.2699	18.0	1.2

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	82.9	57.3	37.0	25.2	17.6	8.4	4.6	-	SW	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

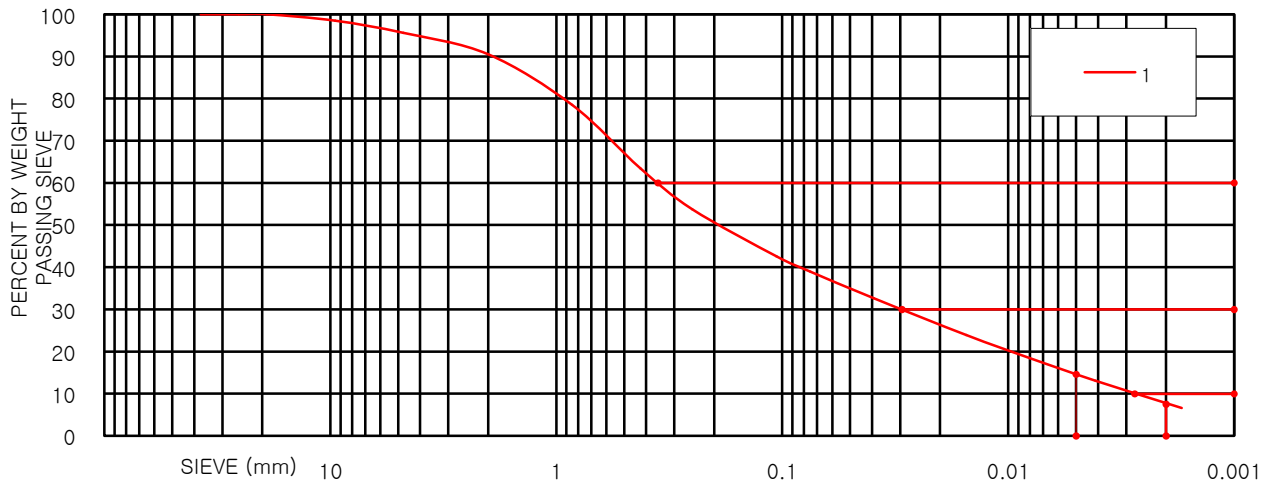
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KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

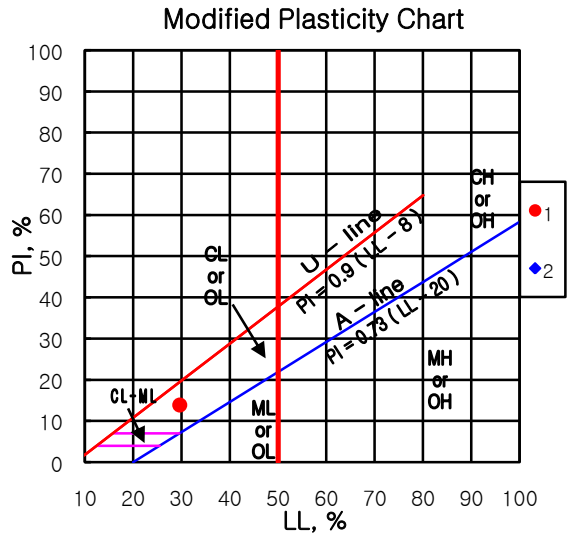
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-12	3.0	1	14.9	2.683	29.6	15.7	13.9	0.0028	0.0295	0.3548	128.8	0.9

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	95.6	90.5	78.5	63.5	53.8	42.6	39.0	7.5	SC	





	1	2	3	비고
A	1.85			
CI	1.06			
LI	-0.06			

Remarks

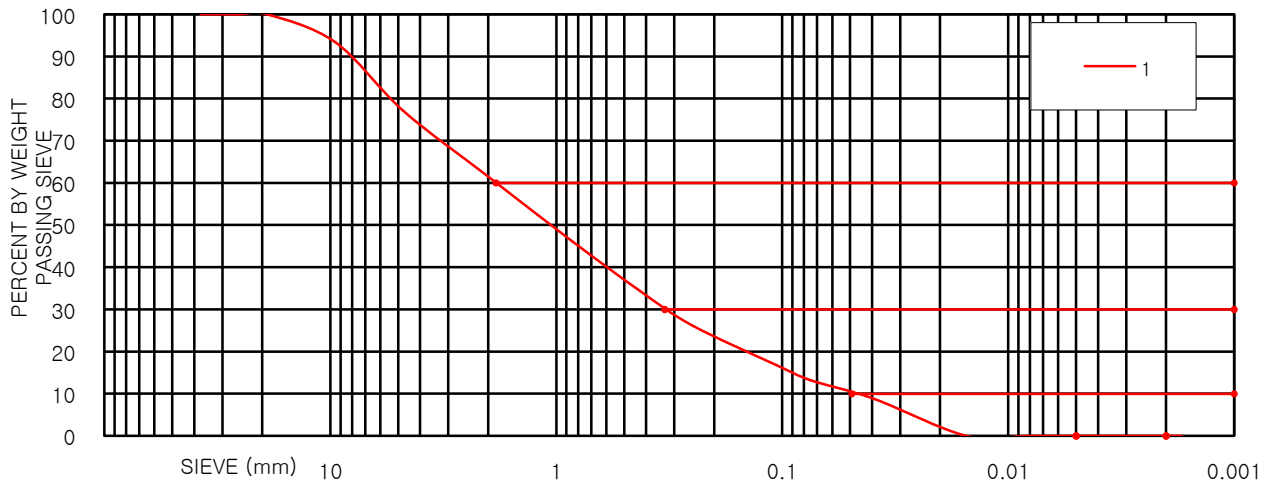
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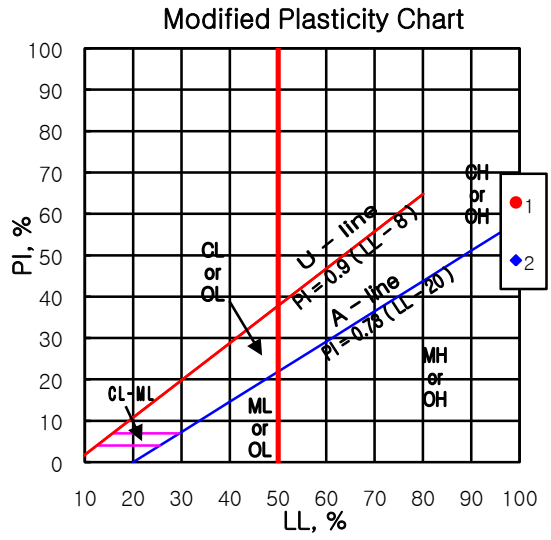
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-12	5.0	1	15.2	2.661	N	P	P	0.0492	0.3311	1.8493	37.6	1.2

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	77.1	61.5	46.2	34.3	26.2	16.8	13.2	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

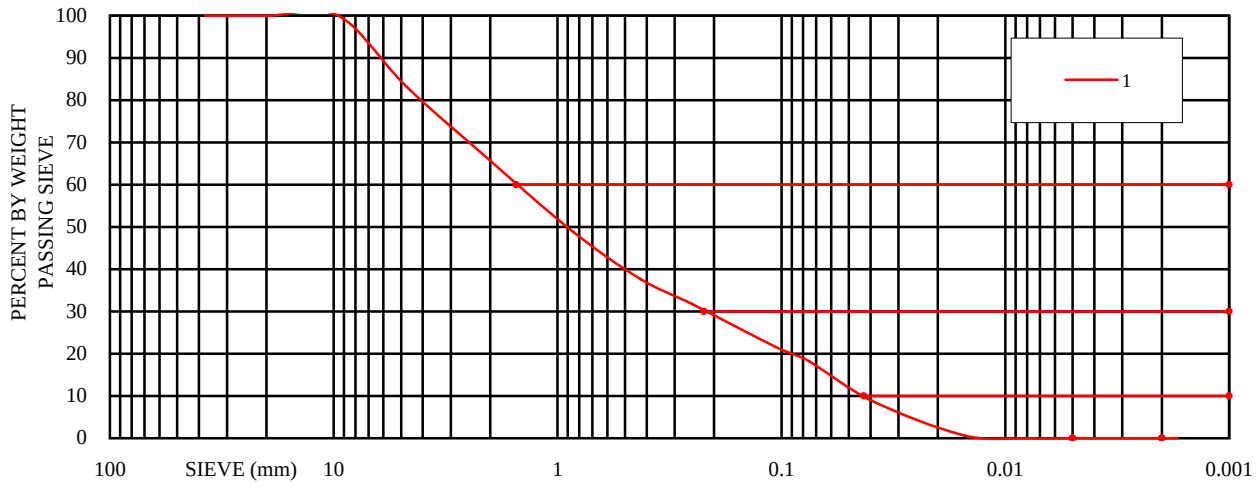
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

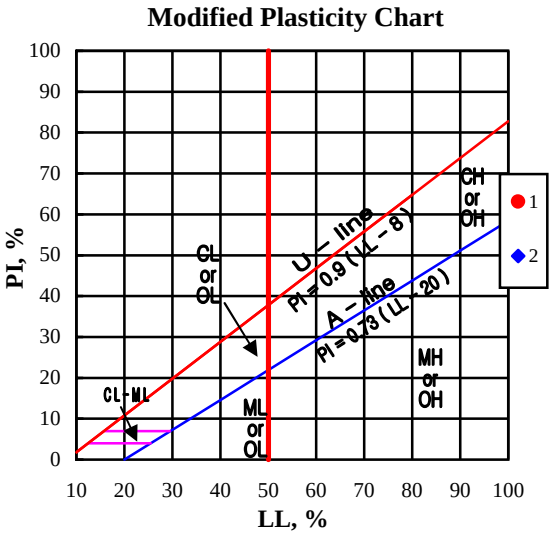
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-14	1.0	1	11.5	2.66	N	P	P	0.0429	0.2213	1.5311	35.7	0.7

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	83.3	65.7	48.8	37.6	31.7	21.6	18.2	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

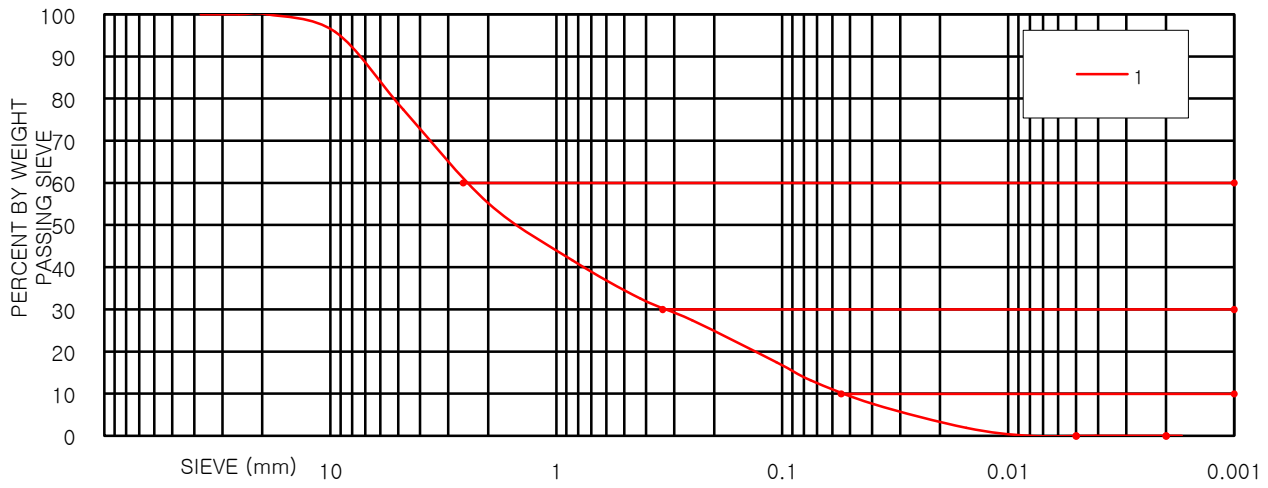
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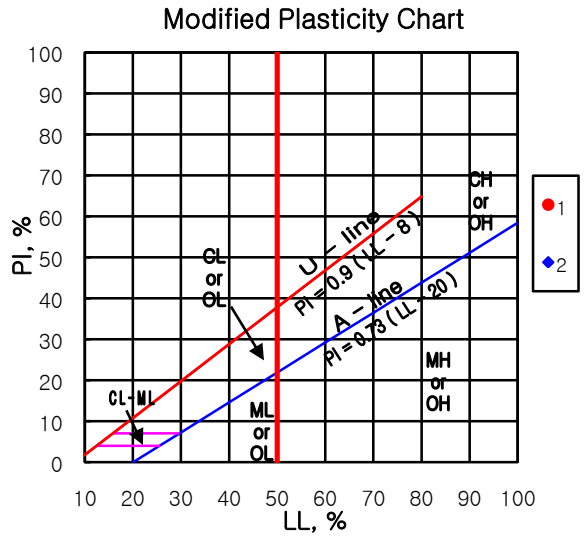
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-14	2.0	1	10.1	2.657	N	P	P	0.0548	0.3381	2.5823	47.1	0.8

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	77.3	55.2	41.7	32.6	27.4	17.5	13.2	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

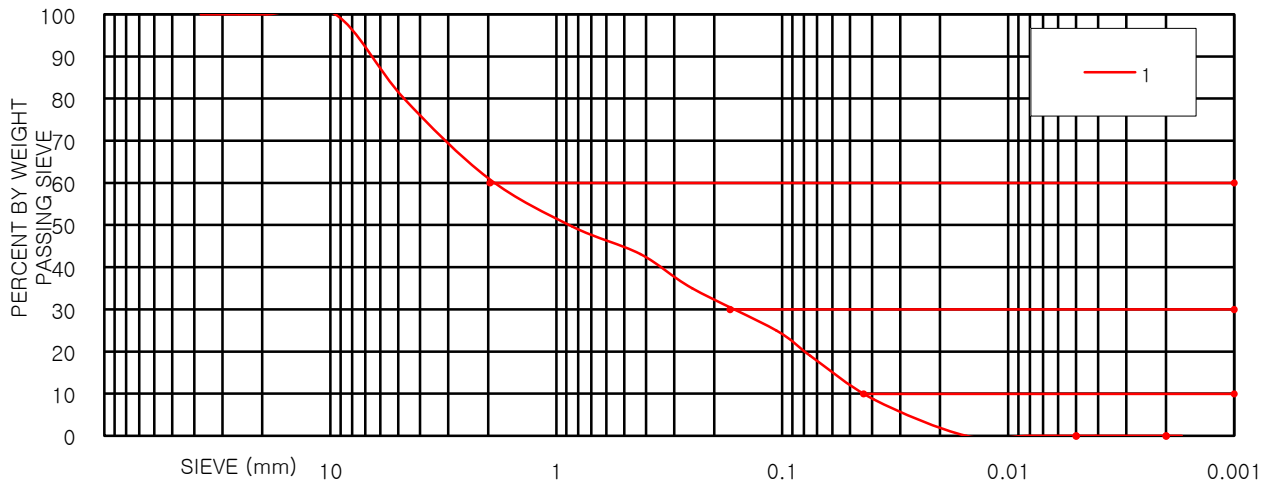
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

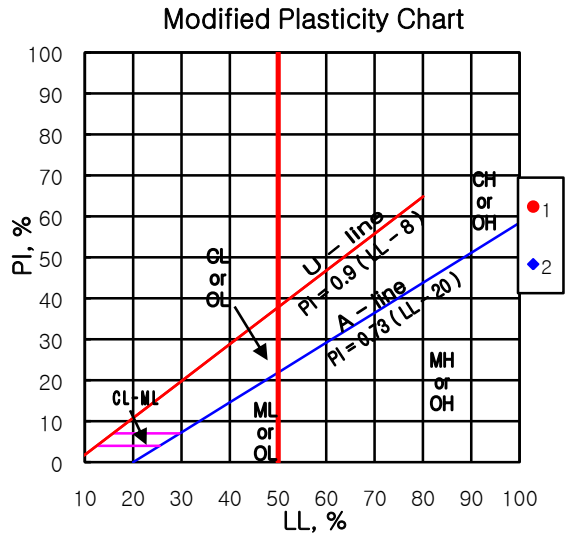
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-14	3.0	1	10.1	2.673	N	P	P	0.0437	0.1702	1.9679	45.1	0.3

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	80.2	61.1	49.7	43.1	35.0	25.0	19.0	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

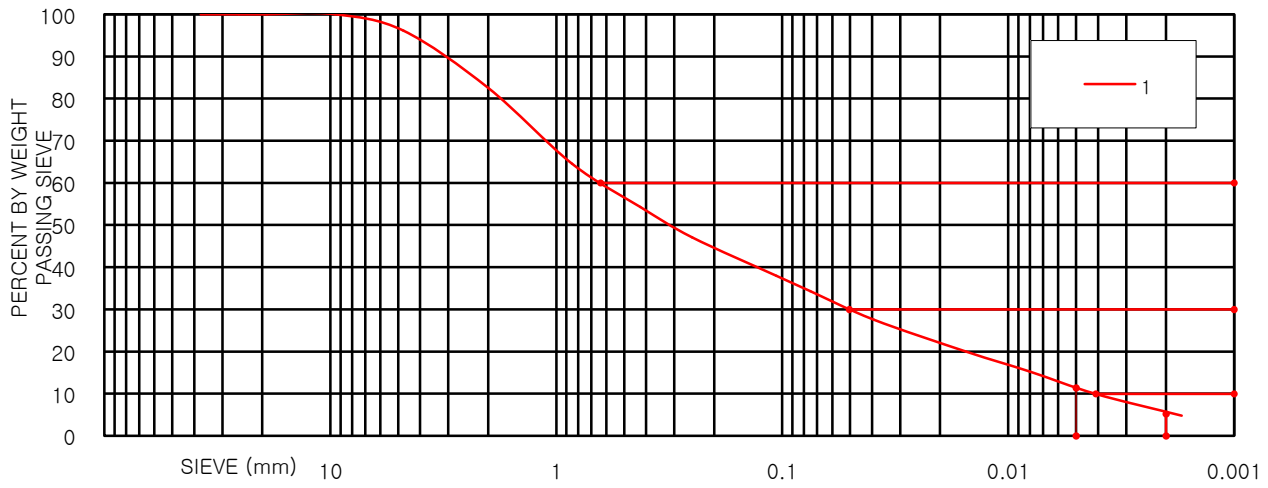
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

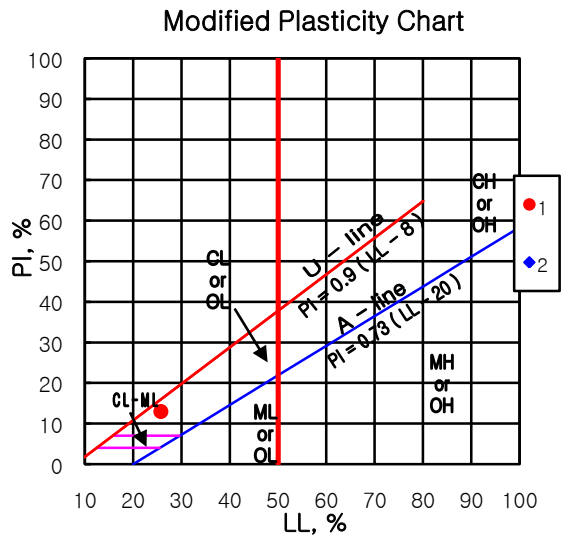
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-15	1.0	1	13.0	2.659	25.7	12.7	13.0	0.0041	0.0505	0.6368	155.6	1.0

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	96.1	82.5	64.5	54.3	47.1	38.0	34.3	5.2	SC	





	1	2	3	비고
A	2.50			
CI	0.98			
LI	0.02			

Remarks

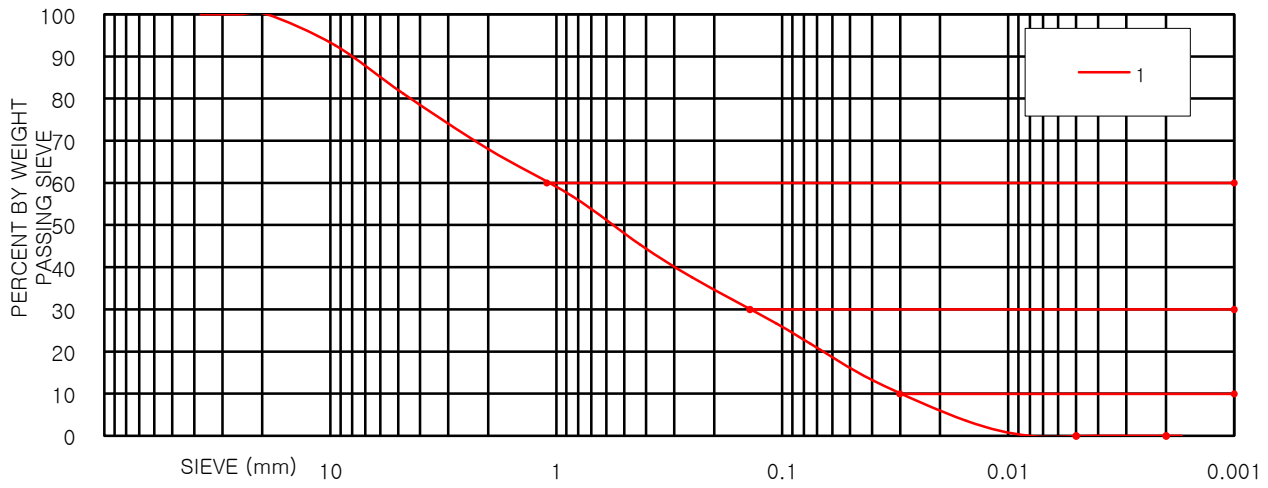
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

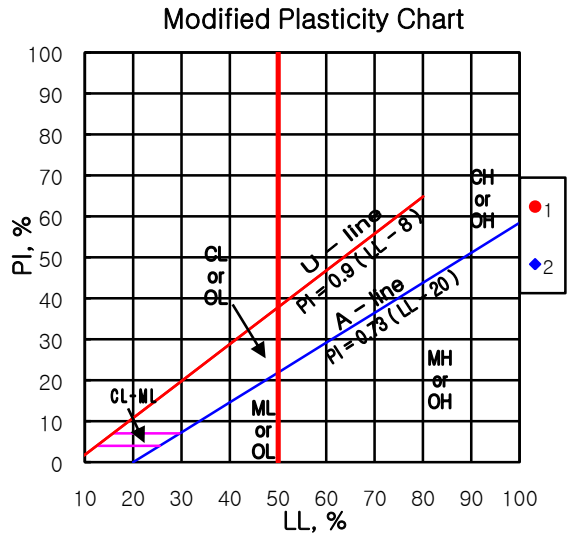
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-15	2.0	1	12.1	2.667	N	P	P	0.0302	0.1390	1.1015	36.5	0.6

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	81.2	68.0	56.9	45.3	37.6	26.7	21.9	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

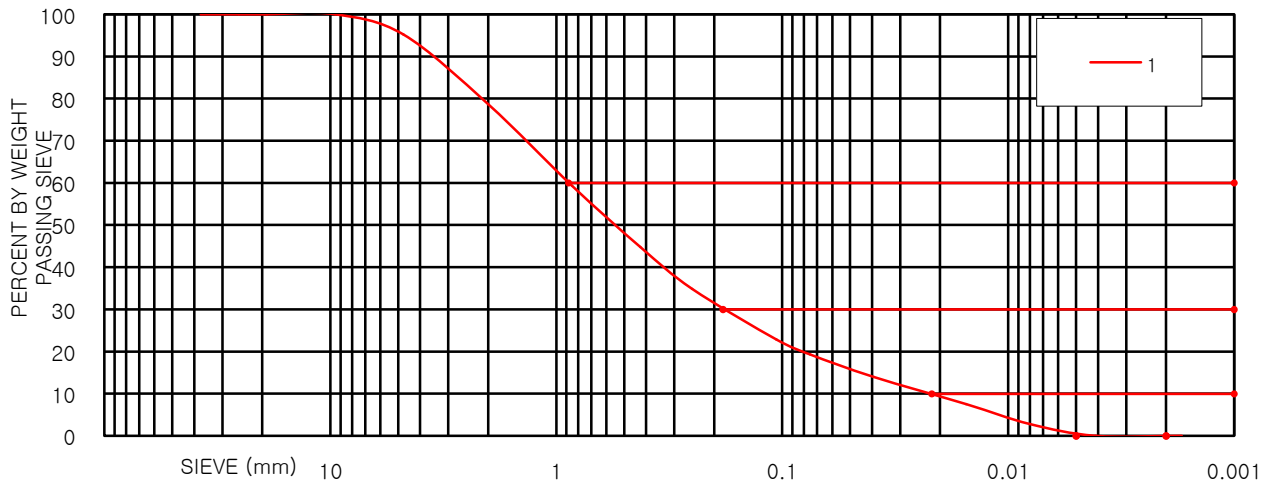
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

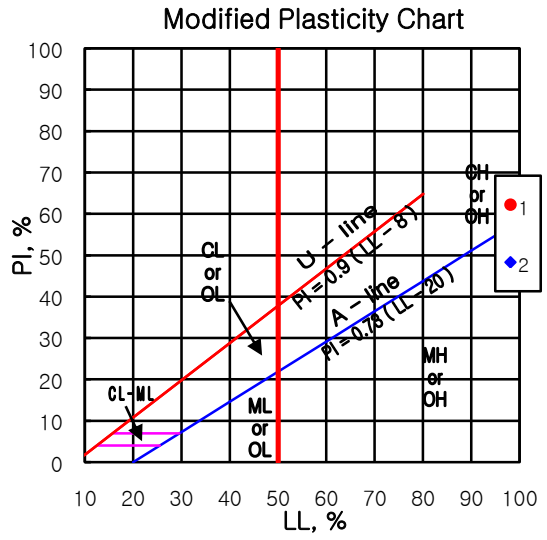
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-15	4.0	1	8.6	2.667	N	P	P	0.0218	0.1828	0.8831	40.6	1.7

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	95.2	78.7	59.3	44.8	34.9	22.9	19.3	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

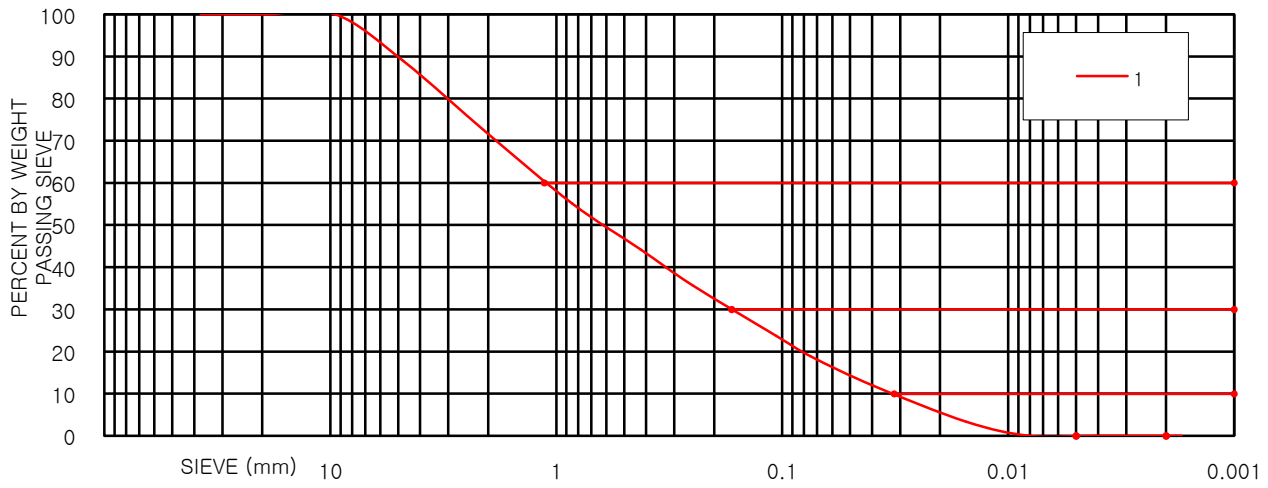
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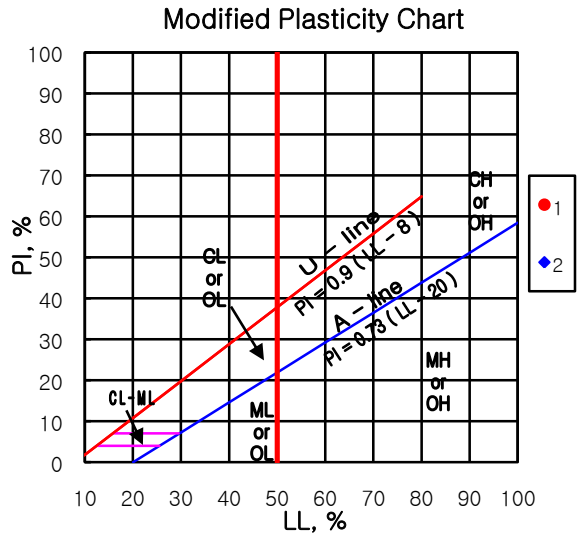
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-16	1.0	1	14.3	2.67	N	P	P	0.0320	0.1675	1.1298	35.3	0.8

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	88.9	71.6	55.1	44.3	35.8	23.7	18.9	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

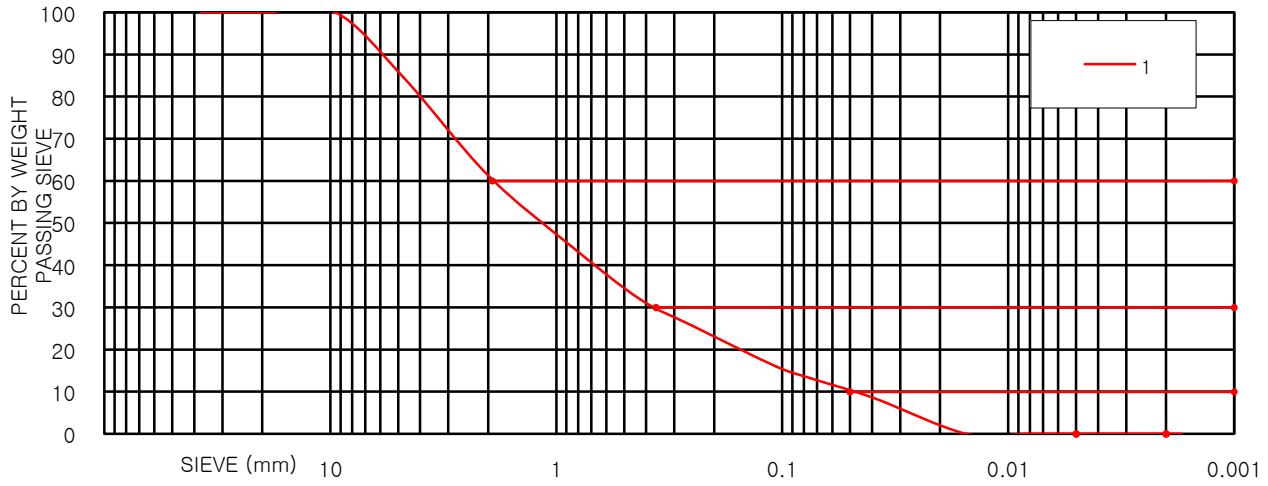
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KS F 2302	05. 07. 26 확인
KS F 2303	05. 07. 26 확인
KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

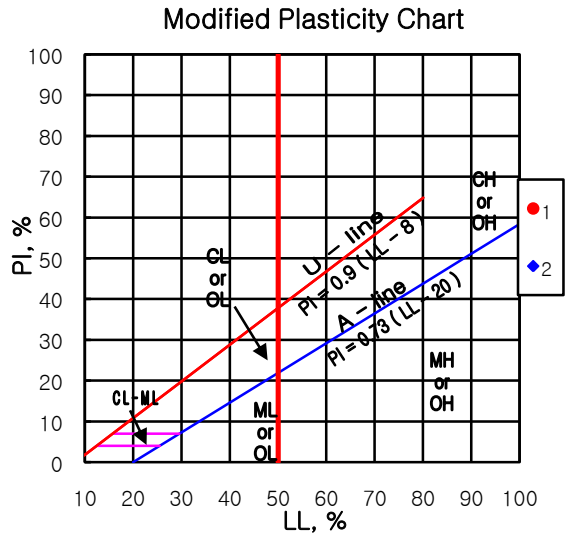
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-16	2.0	1	10.8	2.657	N	P	P	0.0502	0.3622	1.9231	38.3	1.4

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	84.6	61.3	44.3	31.9	25.7	16.0	13.2	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

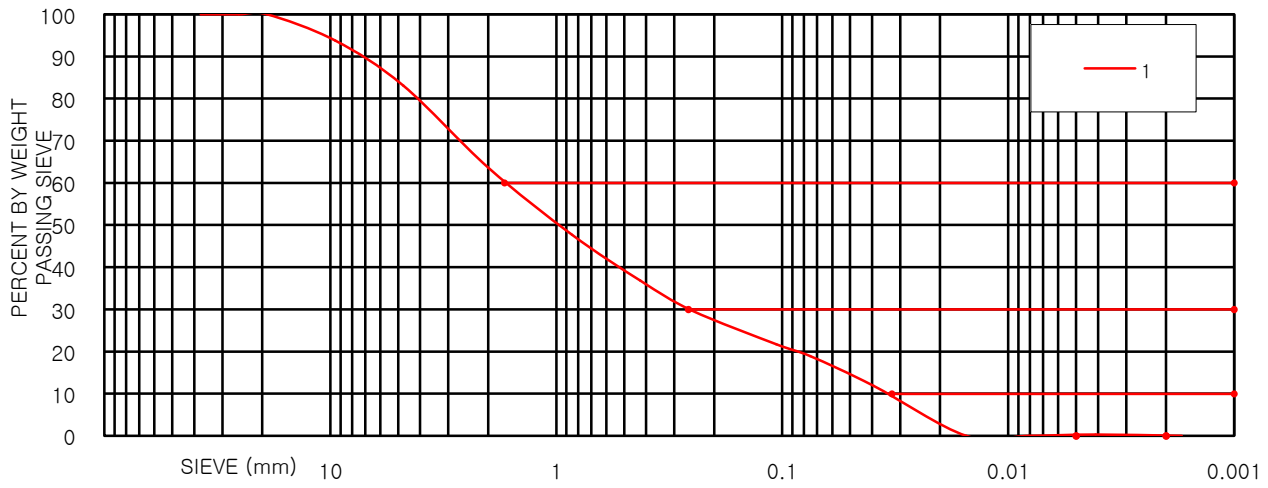
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KS F 2302	05. 07. 26 확인
KS F 2303	05. 07. 26 확인
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

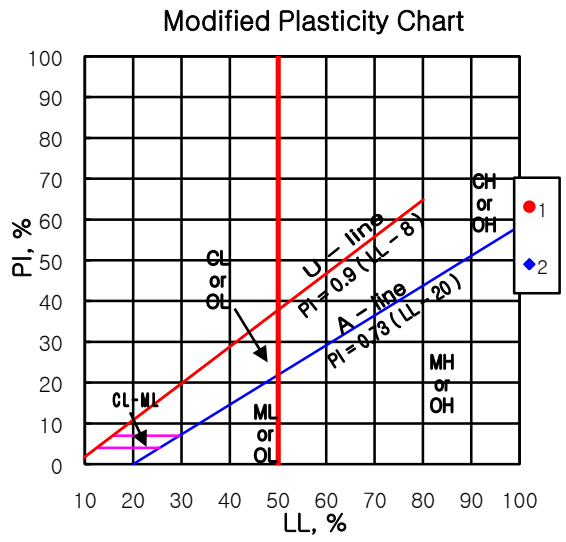
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-16	4.0	1	12.7	2.656	N	P	P	0.0327	0.2600	1.6943	51.8	1.2

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	83.1	63.6	47.7	36.8	29.7	21.7	18.9	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

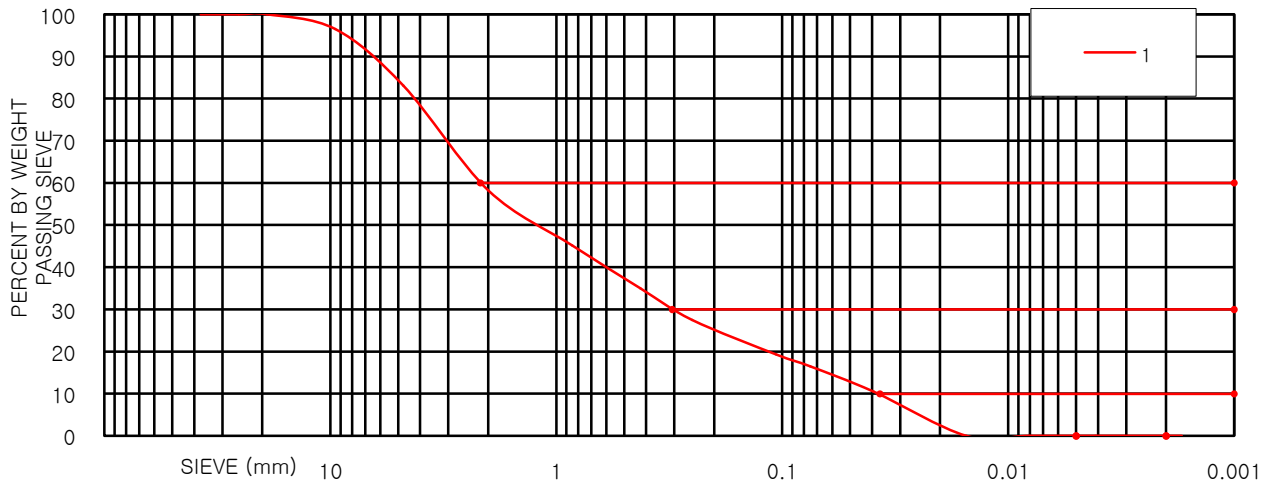
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

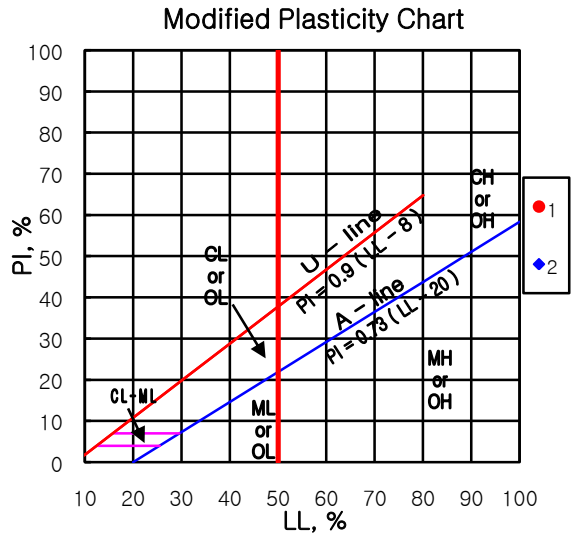
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-17	2.0	1	11.7	2.661	N	P	P	0.0370	0.3069	2.1677	58.6	1.2

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	83.1	58.3	45.2	35.0	27.5	19.3	16.5	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

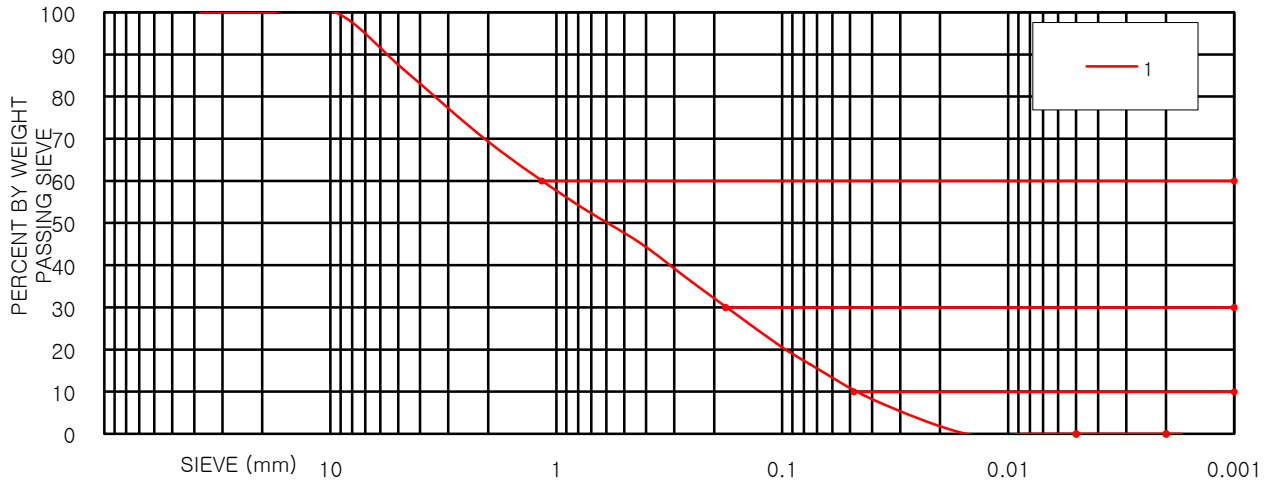
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

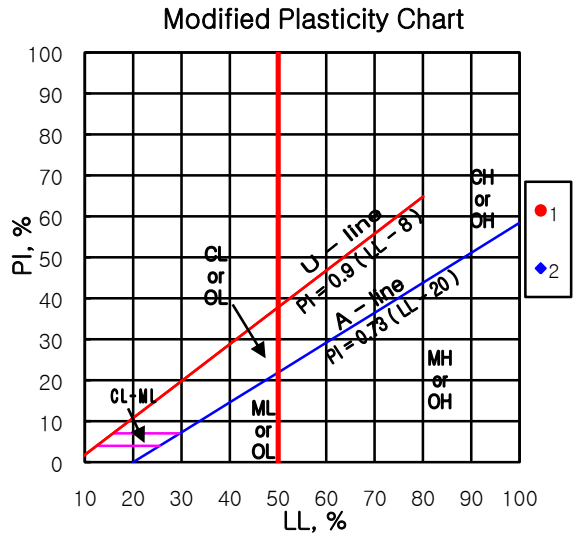
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-17	3.0	1	12.1	2.671	N	P	P	0.0482	0.1782	1.1614	24.1	0.6

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	86.5	69.3	55.2	45.3	36.0	21.5	16.5	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

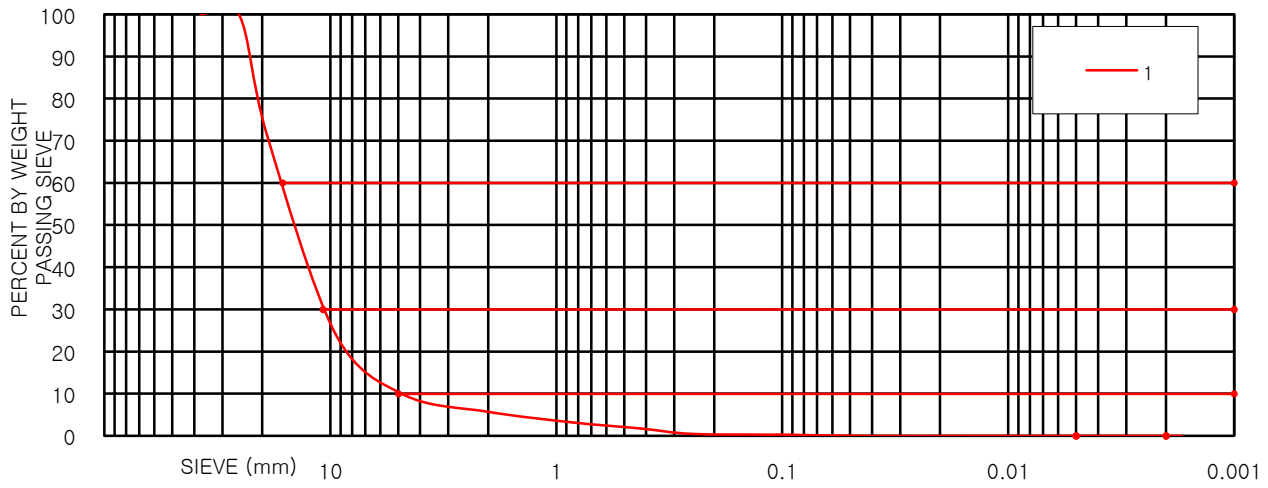
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

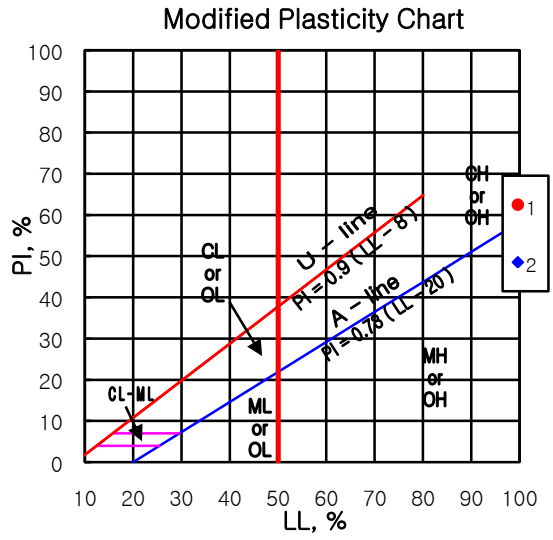
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-17	5.0	1	4.3	2.64	N	P	P	4.9888	10.7895	16.2555	3.3	1.4

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	9.8	5.7	3.2	1.8	0.5	0.3	0.2	-	GP	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

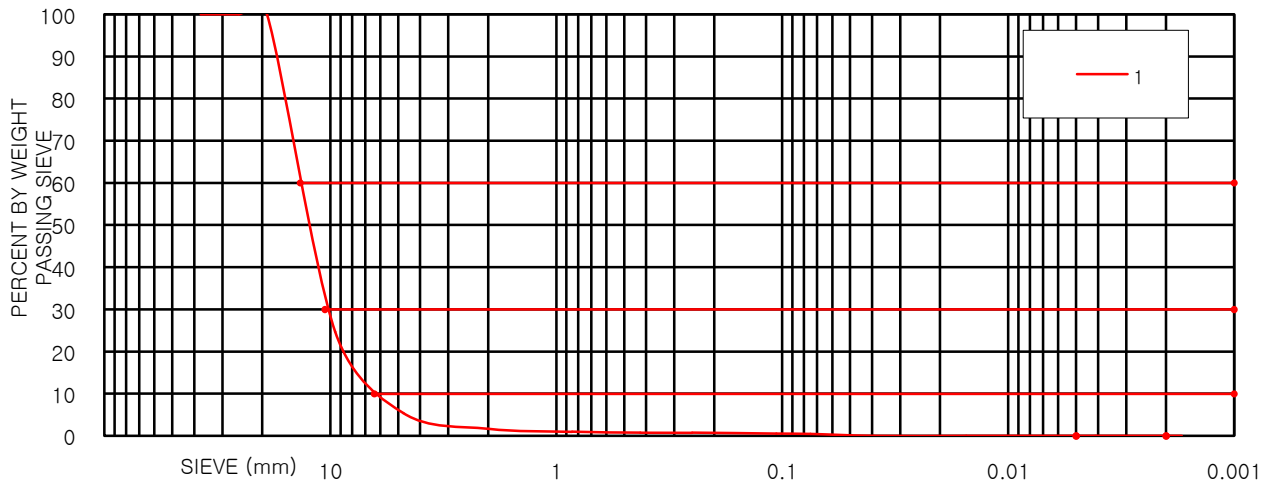
KS F 2301	05. 11. 25 개정
KS F 2302	05. 07. 26 확인
KS F 2303	05. 07. 26 확인
KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

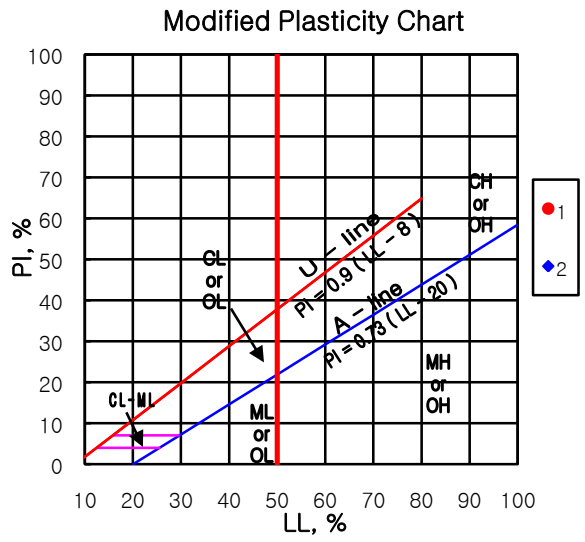
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-19	1.0	1	1.6	2.63	N	P	P	6.3826	10.5682	13.5831	2.1	1.3

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	5.4	1.7	1.0	0.8	0.8	0.6	0.5	-	GP	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

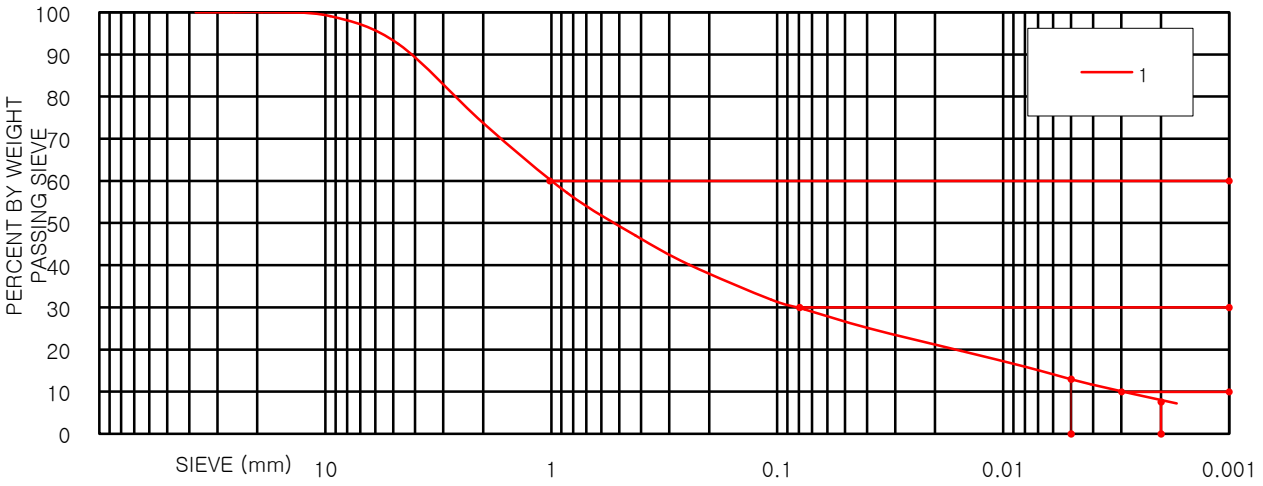
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KS F 2302	05. 07. 26 확인
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KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

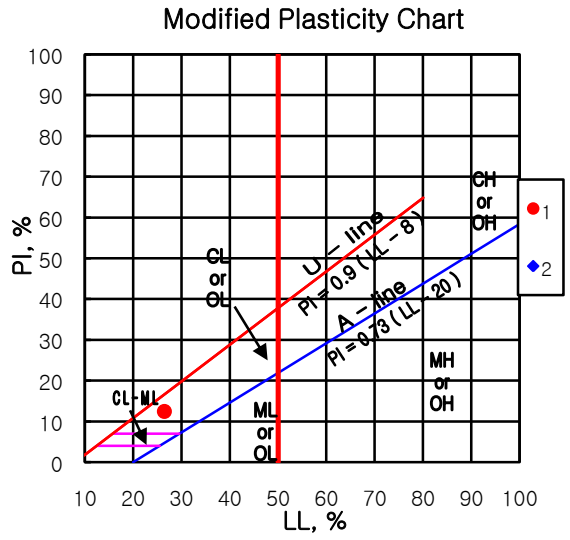
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-20	1.0	1	14.0	2.63	26.4	13.9	12.5	0.0030	0.0796	1.0162	339.6	2.1

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	92.5	73.7	57.2	47.1	40.2	31.8	29.5	7.6	SC	





	1	2	3	비고
A	1.64			
CI	0.99			
LI	0.01			

Remarks

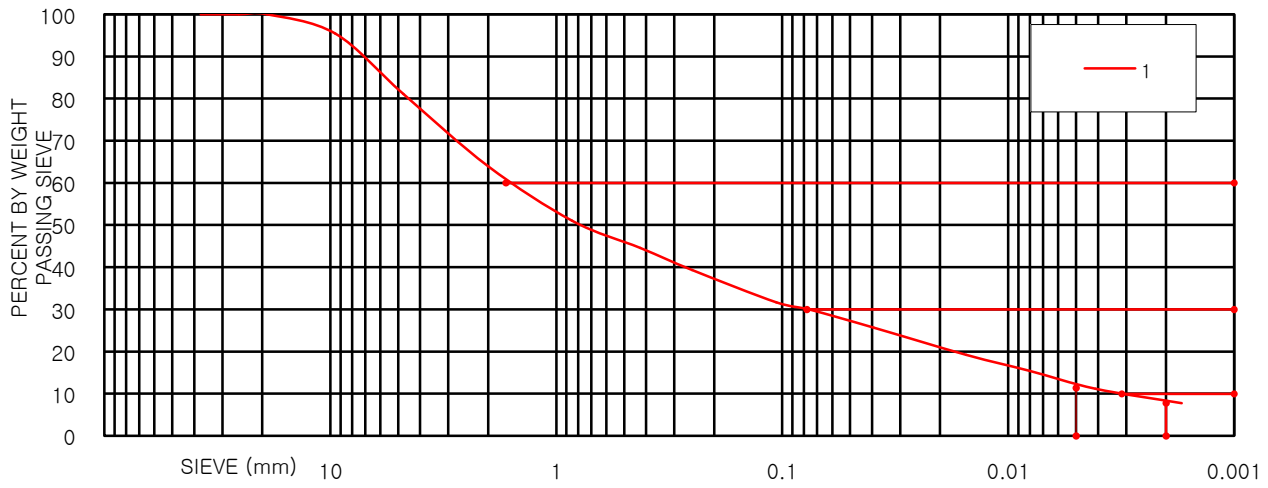
KS F 2301	05. 11. 25 개정
KS F 2302	05. 07. 26 확인
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KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

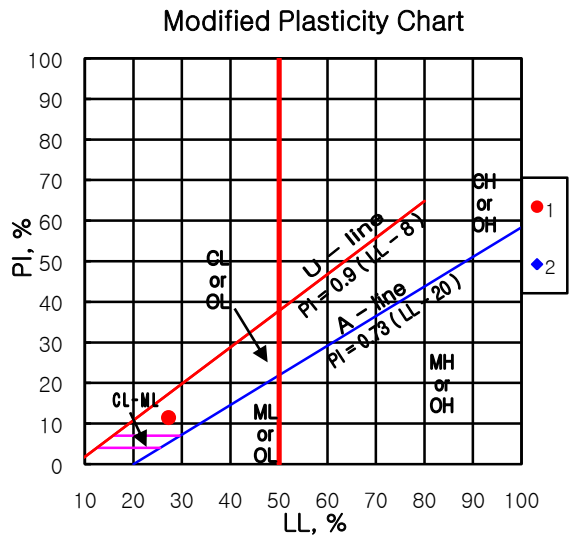
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-22	1.0	1	18.2	2.66	27.2	15.7	11.5	0.0031	0.0778	1.6711	532.1	1.2

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	81.1	63.9	51.0	44.6	39.3	31.7	29.9	7.8	SC	





	1	2	3	비고
A	1.47			
CI	0.78			
LI	0.22			

Remarks

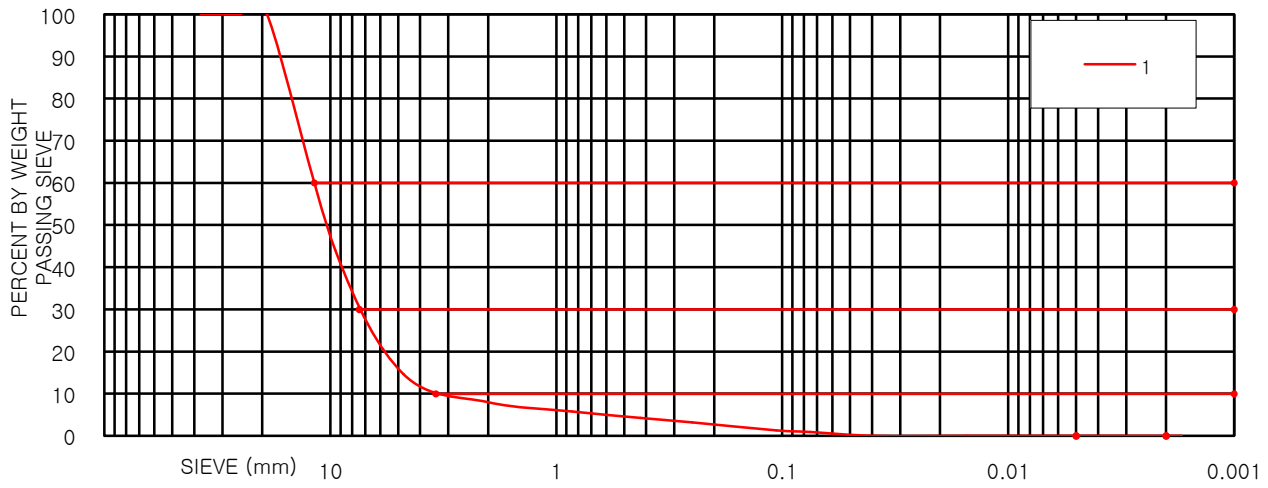
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

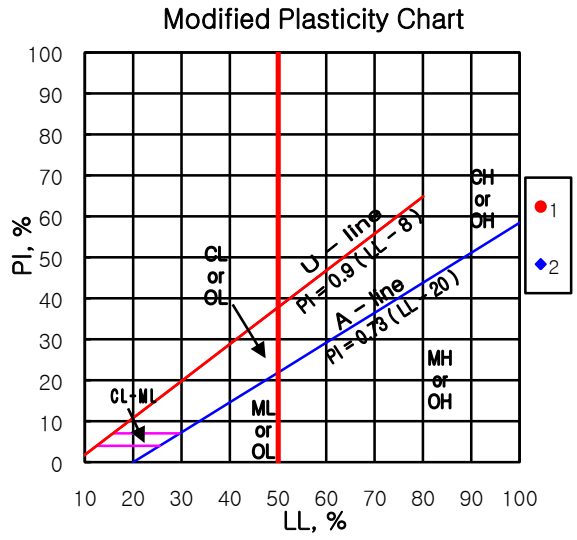
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-22	2.0	1	2.3	2.632	N	P	P	3.4119	7.4473	11.7761	3.5	1.4

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	14.7	8.0	5.8	4.3	3.2	1.3	0.9	-	GP	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

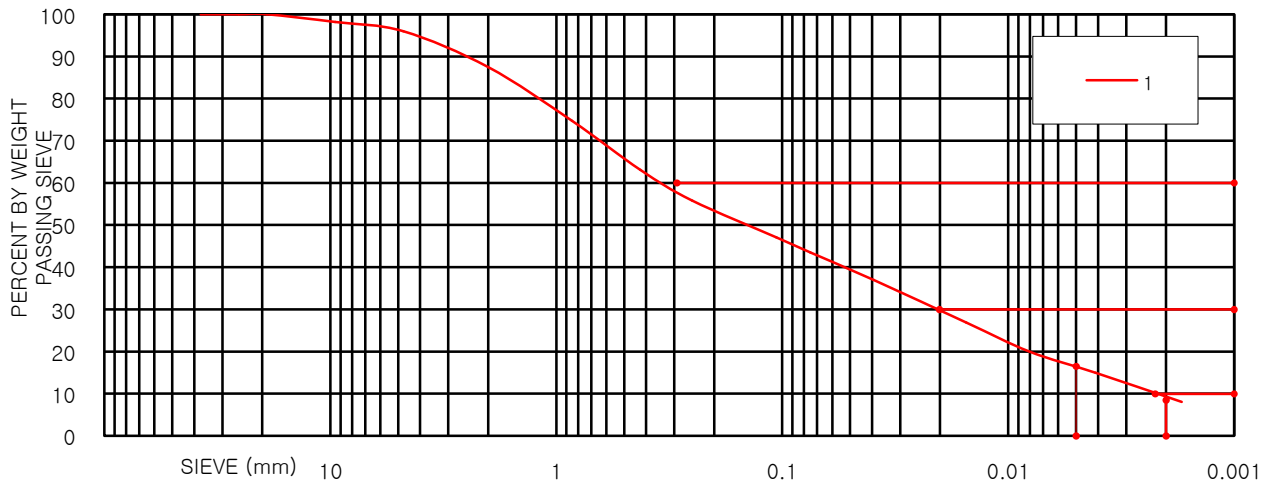
KS F 2301	05. 11. 25 개정
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

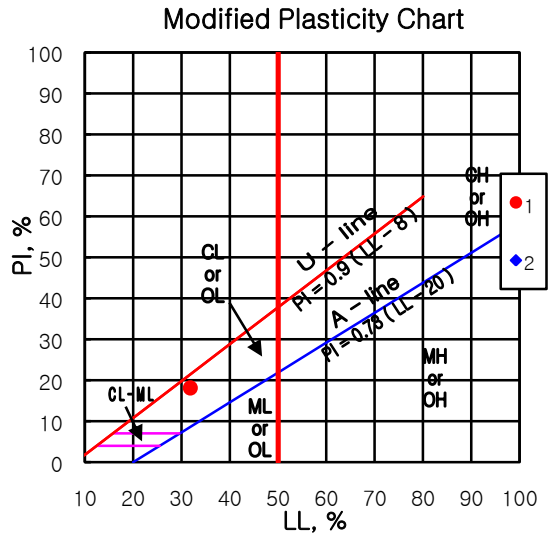
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-23	2.0	1	19.4	2.661	31.8	13.7	18.1	0.0022	0.0201	0.2924	130.9	0.6

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	96.0	87.5	74.7	63.1	55.8	47.1	43.5	8.5	SC	





	1	2	3	비고
A	2.13			
CI	0.68			
LI	0.32			

Remarks

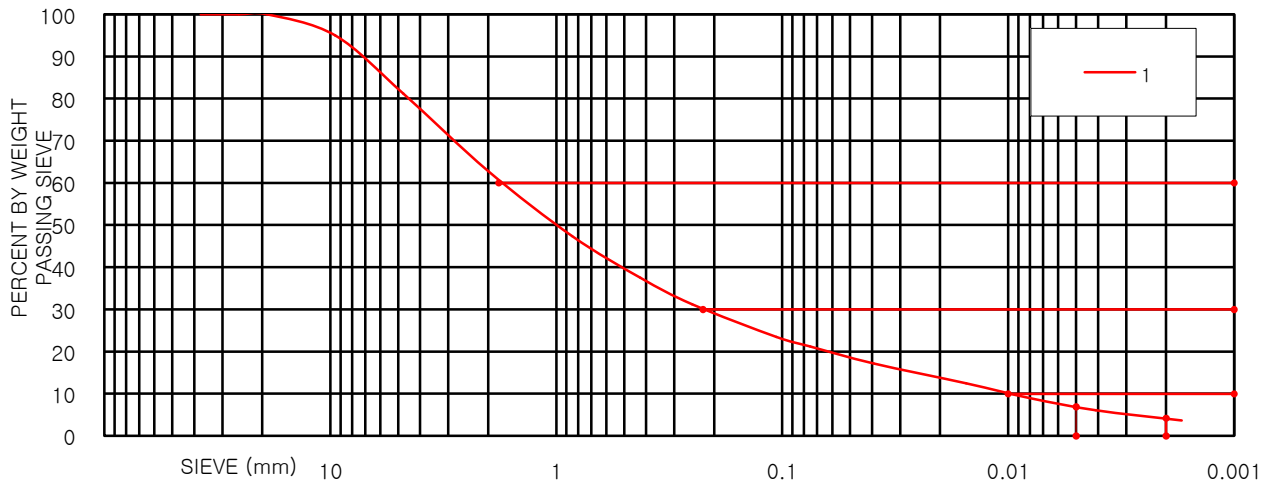
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KS F 2324	06. 10. 19 개정

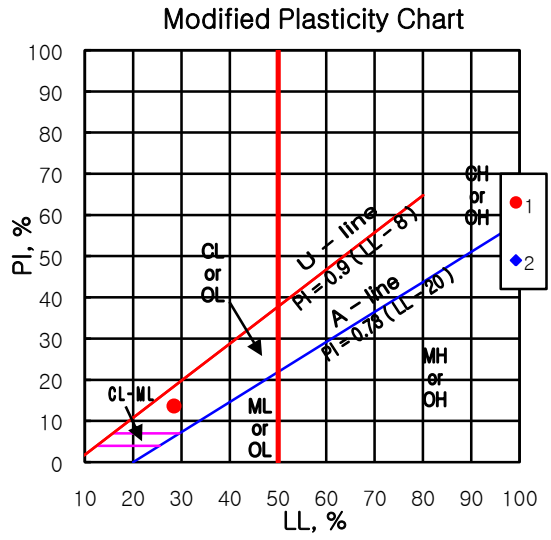
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-23	4.0	1	16.4	2.668	28.4	14.7	13.7	0.0100	0.2244	1.7989	179.9	2.8

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	81.2	62.8	47.4	37.5	31.2	23.5	21.2	4.2	SC	





	1	2	3	비고
A	3.26			
CI	0.88			
LI	0.12			

Remarks

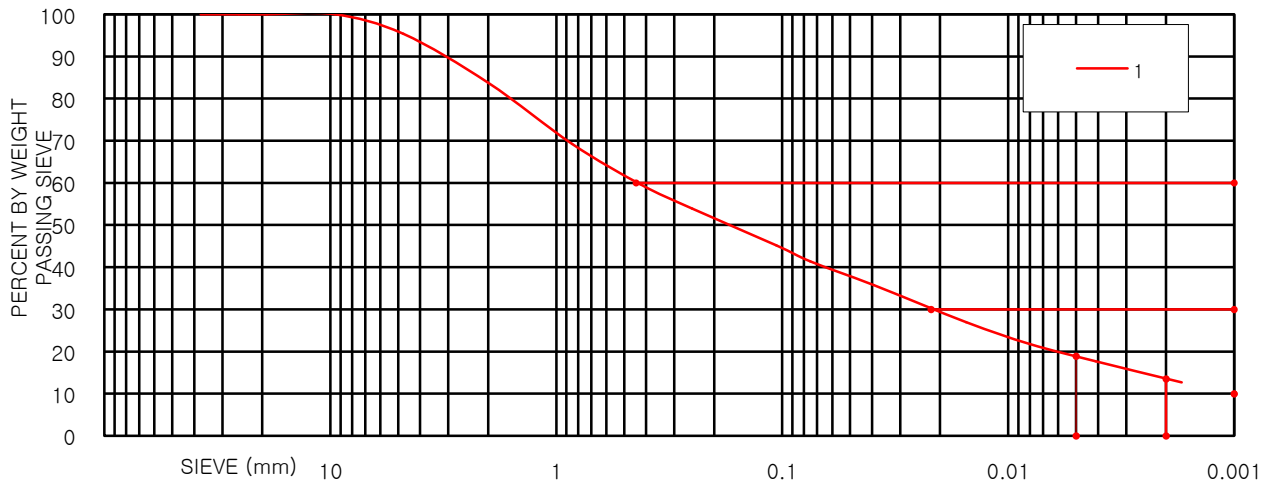
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

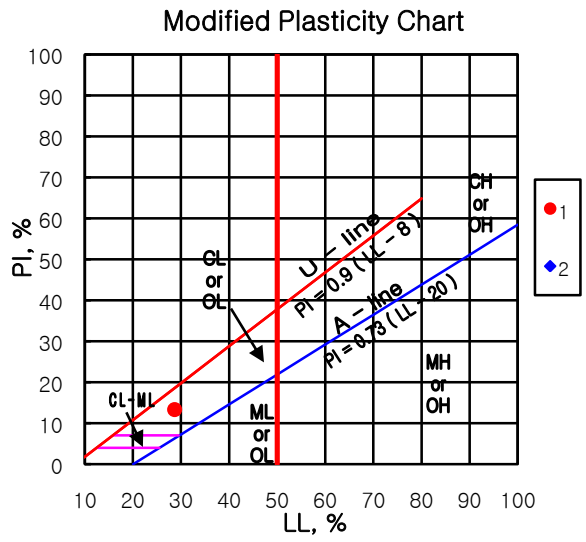
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-23	6.0	1	25.8	2.678	28.6	15.2	13.4	0.0010	0.0219	0.4436	443.6	1.1

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	95.3	83.8	69.2	59.7	53.9	45.2	41.4	13.5	SC	





	1	2	3	비고
A	0.99			
CI	0.21			
LI	0.79			

Remarks

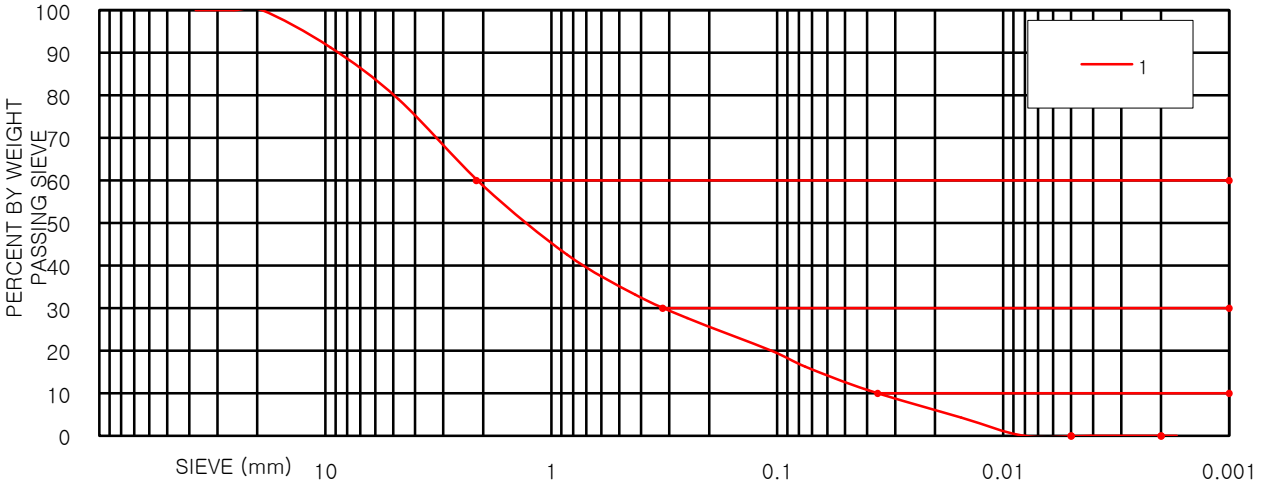
KS F 2301	05. 11. 25 개정
KS F 2302	05. 07. 26 확인
KS F 2303	05. 07. 26 확인
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

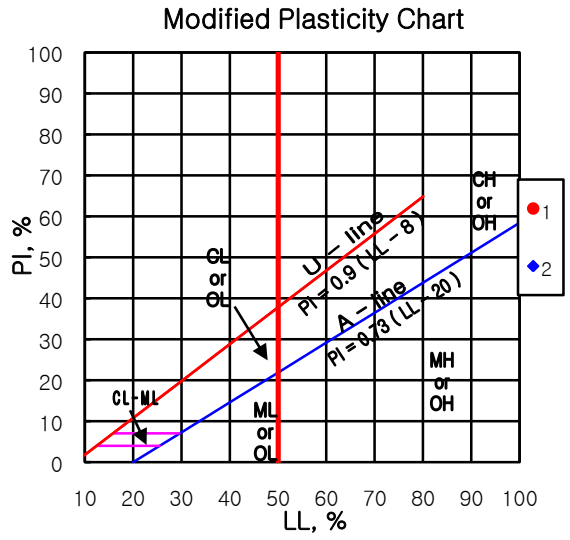
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-24	1.0	1	17.3	2.665	N	P	P	0.0360	0.3214	2.1478	59.7	1.3

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	79.1	58.7	42.6	33.2	27.7	20.0	16.3	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

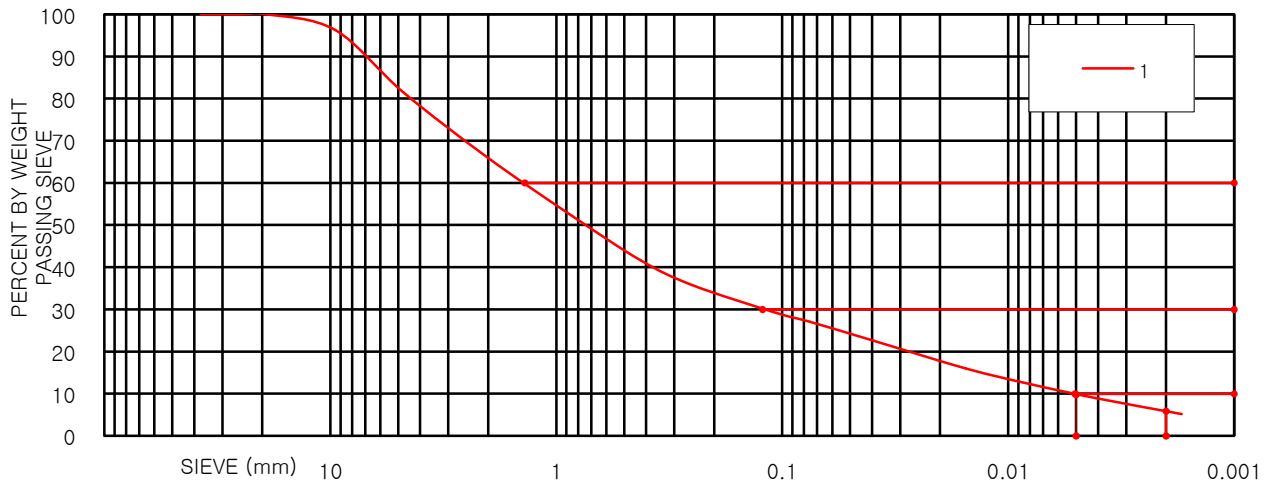
KS F 2301	05. 11. 25 개정
KS F 2302	05. 07. 26 확인
KS F 2303	05. 07. 26 확인
KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

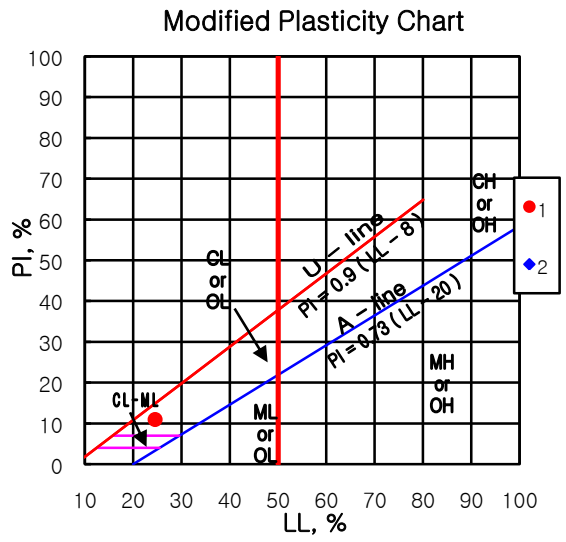
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-24	2.0	1	16.5	2.682	24.5	13.5	11.0	0.0051	0.1222	1.3772	271.6	2.1

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	81.5	65.9	52.2	41.7	35.8	29.2	27.0	5.9	SC	





	1	2	3	비고
A	1.86			
CI	0.72			
LI	0.28			

Remarks

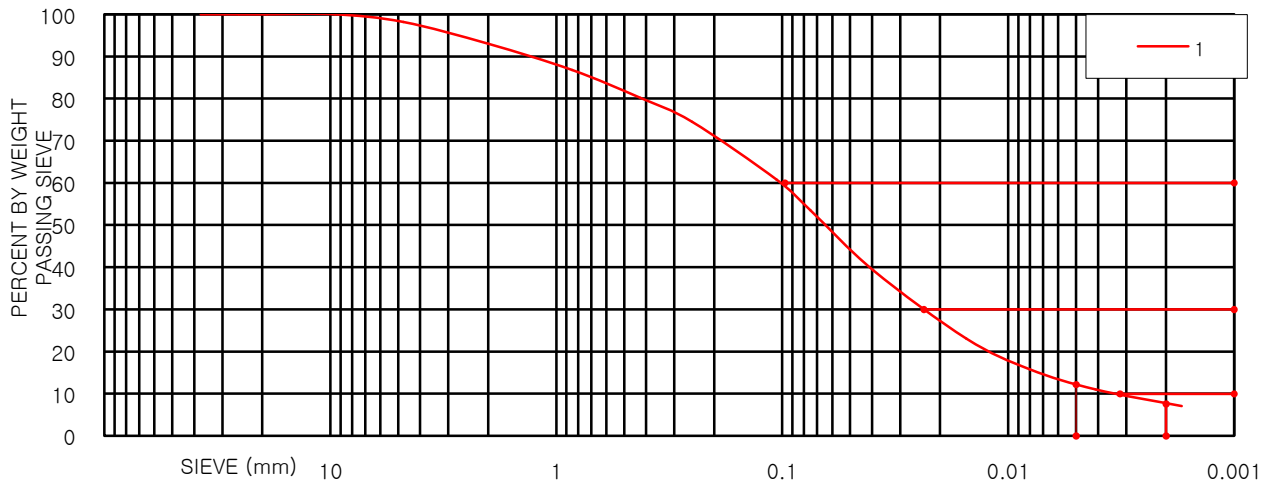
KS F 2301	05. 11. 25 개정
KS F 2302	05. 07. 26 확인
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KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

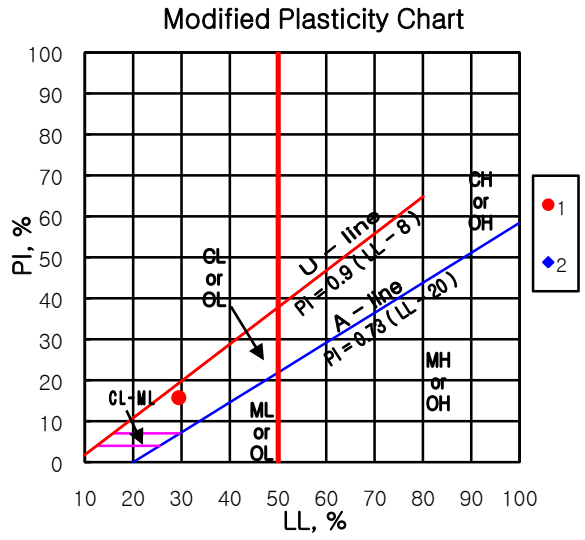
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-25	1.0	1	24.4	2.681	29.4	13.6	15.8	0.0032	0.0236	0.0973	30.4	1.8

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	98.2	93.0	86.8	80.2	74.5	60.8	53.5	7.6	CL	





	1	2	3	비고
A	2.08			
CI	0.32			
LI	0.68			

Remarks

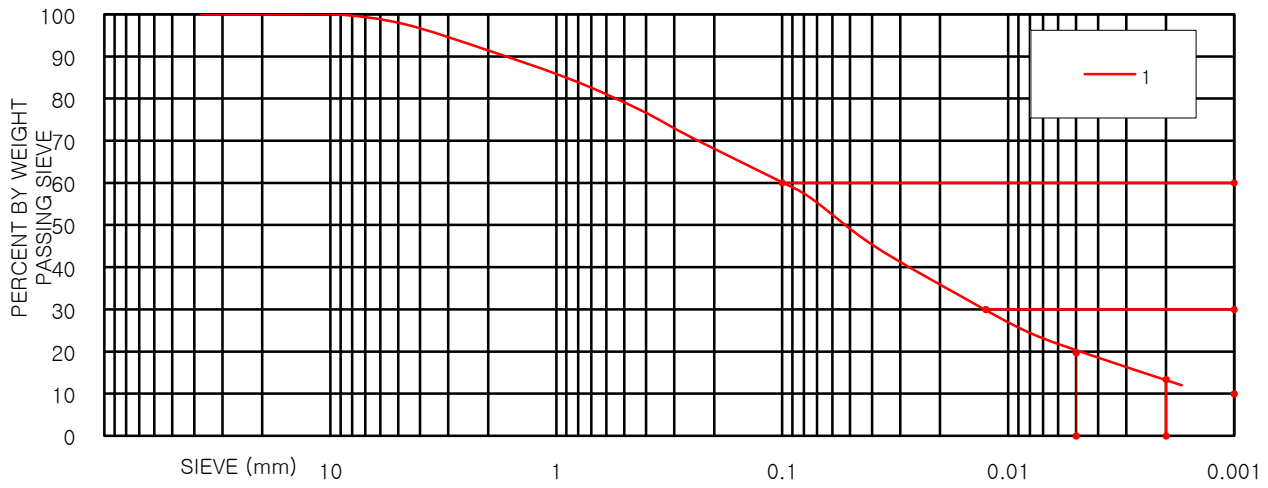
KS F 2301	05. 11. 25 개정
KS F 2302	05. 07. 26 확인
KS F 2303	05. 07. 26 확인
KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

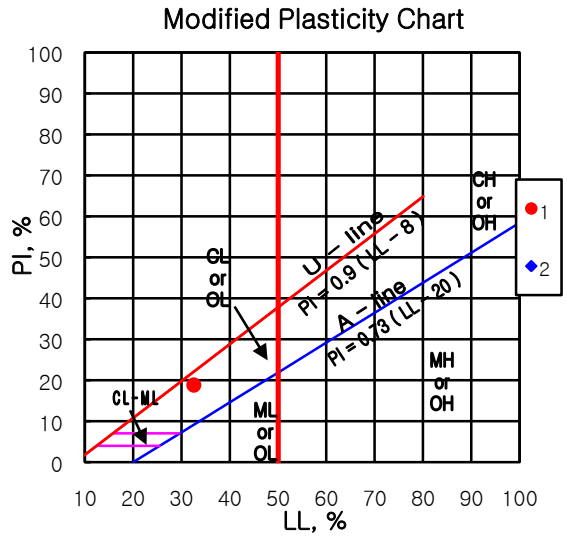
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-25	2.0	1	26.5	2.687	32.5	13.7	18.8	0.0010	0.0126	0.1000	100.0	1.6

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	97.7	91.4	84.4	77.3	70.7	60.8	56.5	13.4	CL	





	1	2	3	비고
A	1.40			
CI	0.32			
LI	0.68			

Remarks

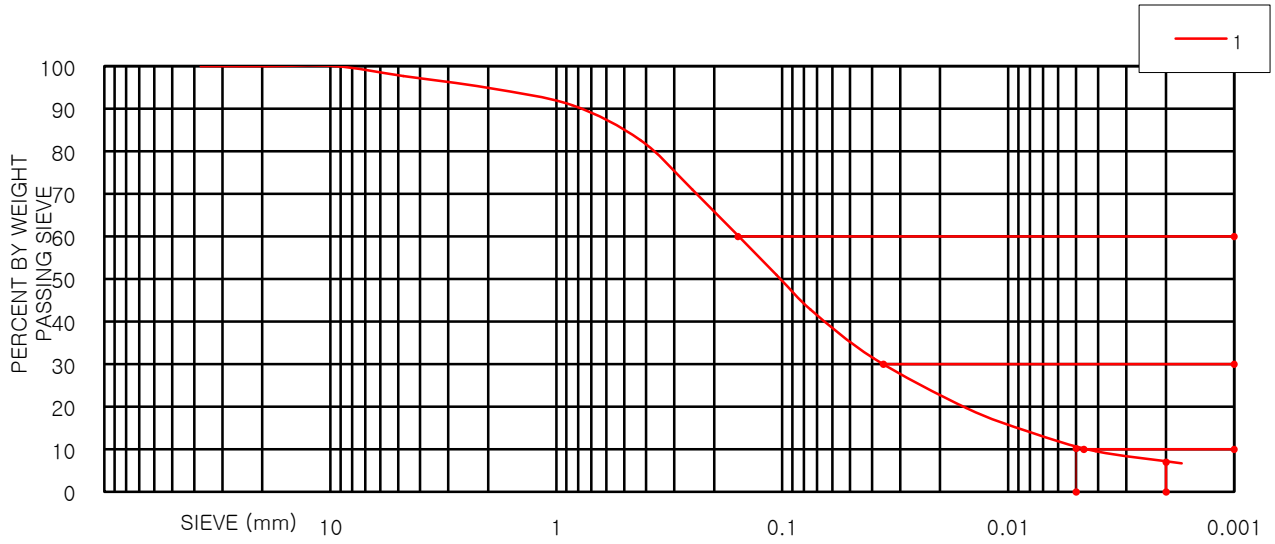
KS F 2301	05. 11. 25 개정
KS F 2302	05. 07. 26 확인
KS F 2303	05. 07. 26 확인
KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

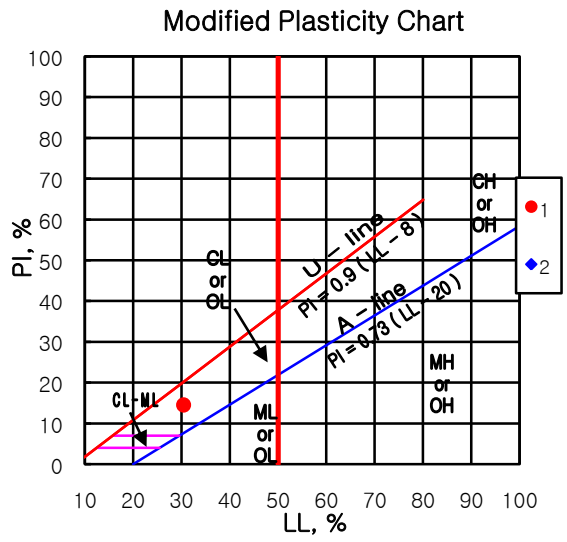
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-26	1.0	1	27.4	2.672	30.4	15.9	14.5	0.0046	0.0356	0.1570	34.0	1.7

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	97.7	94.9	90.8	82.7	71.1	51.0	42.9	7.0	SC	





	1	2	3	비고
A	2.07			
CI	0.21			
LI	0.79			

Remarks

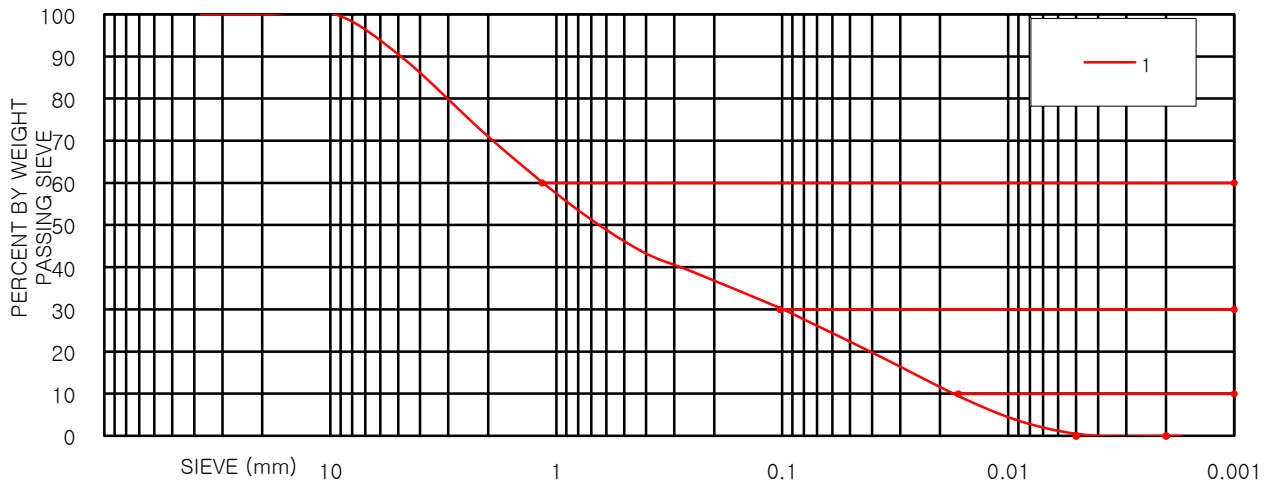
KS F 2301	05. 11. 25 개정
KS F 2302	05. 07. 26 확인
KS F 2303	05. 07. 26 확인
KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

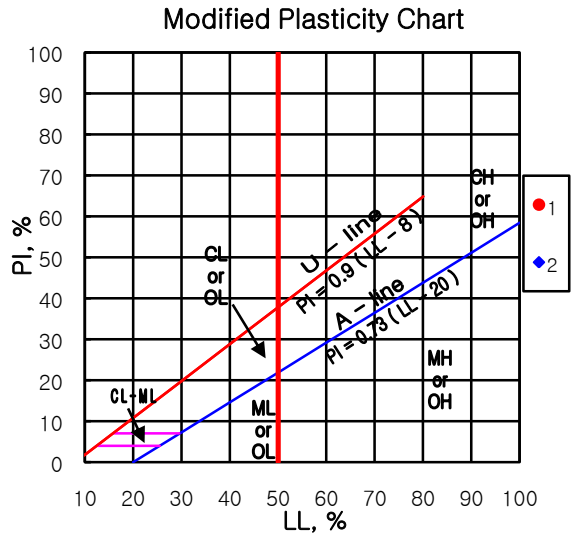
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-26	2.0	1	17.8	2.66	N	P	P	0.0166	0.1021	1.1561	69.5	0.5

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	89.5	71.0	54.6	44.0	39.0	30.7	26.9	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

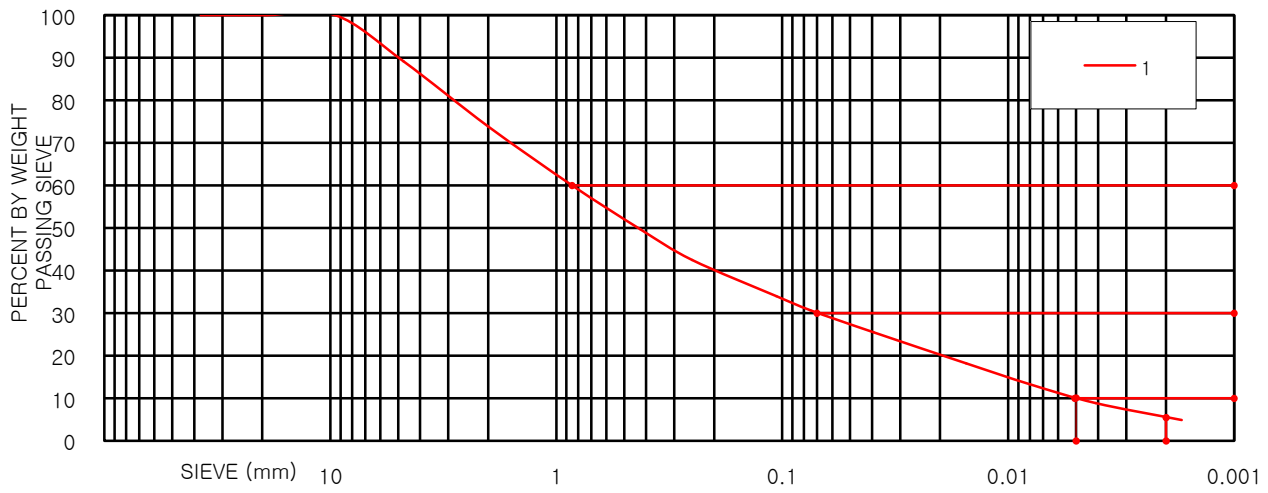
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KS F 2302	05. 07. 26 확인
KS F 2303	05. 07. 26 확인
KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

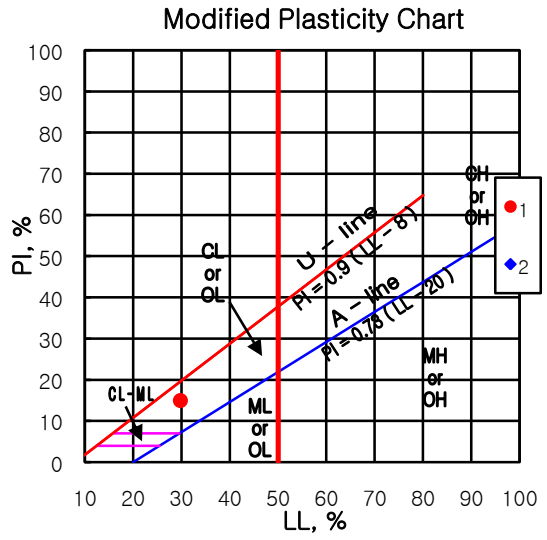
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-26	3.0	1	10.7	2.632	29.7	14.7	15.0	0.0051	0.0701	0.8511	167.9	1.1

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	89.2	73.9	60.0	49.7	42.5	34.0	30.7	5.5	SC	





	1	2	3	비고
A	2.73			
CI	1.26			
LI	-0.26			

Remarks

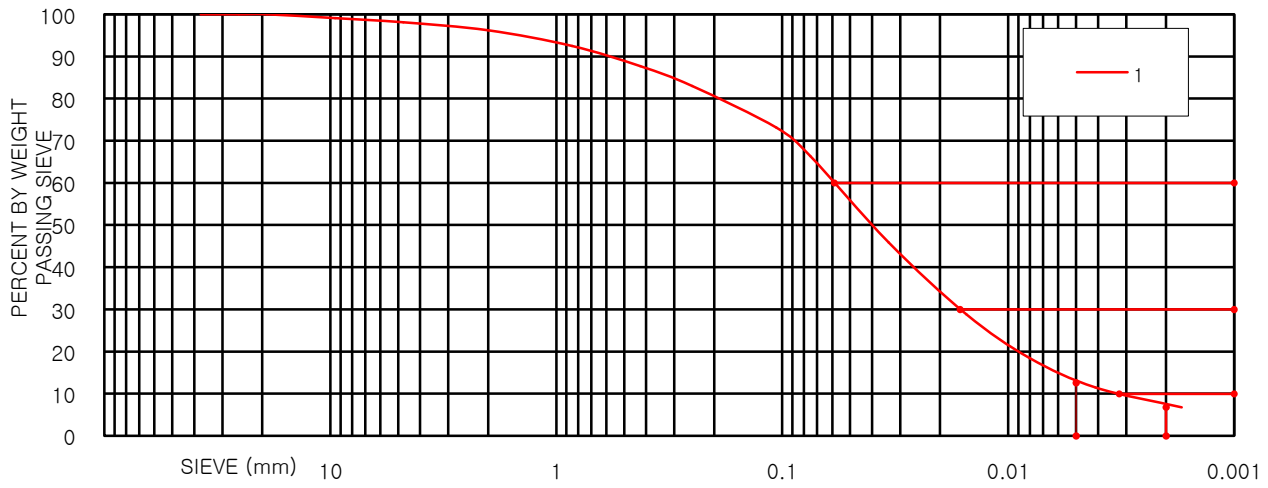
KS F 2301	05. 11. 25 개정
KS F 2302	05. 07. 26 확인
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KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

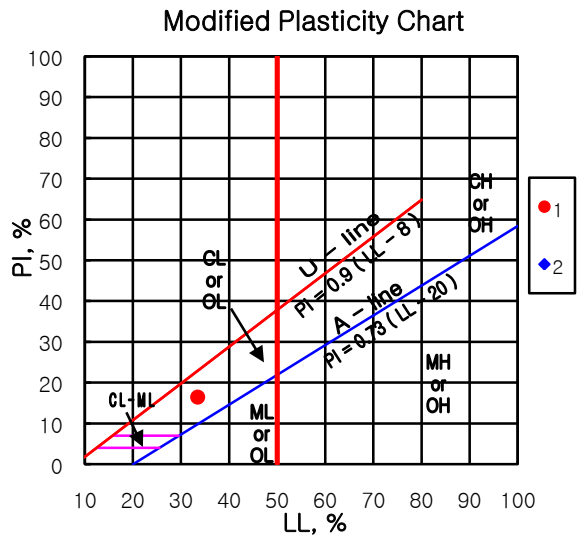
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-27	1.0	1	24.8	2.675	33.4	16.9	16.5	0.0032	0.0163	0.0589	18.2	1.4

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	98.1	96.2	92.5	87.7	83.0	73.1	66.4	6.8	CL	





	1	2	3	비고
A	2.43			
CI	0.52			
LI	0.48			

Remarks

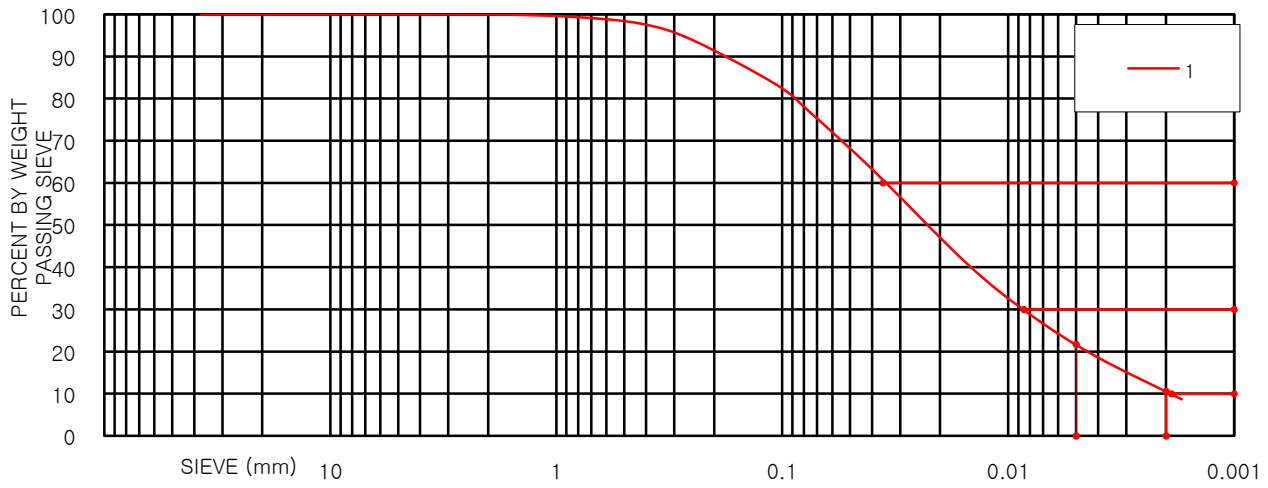
KS F 2301	05. 11. 25 개정
KS F 2302	05. 07. 26 확인
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KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

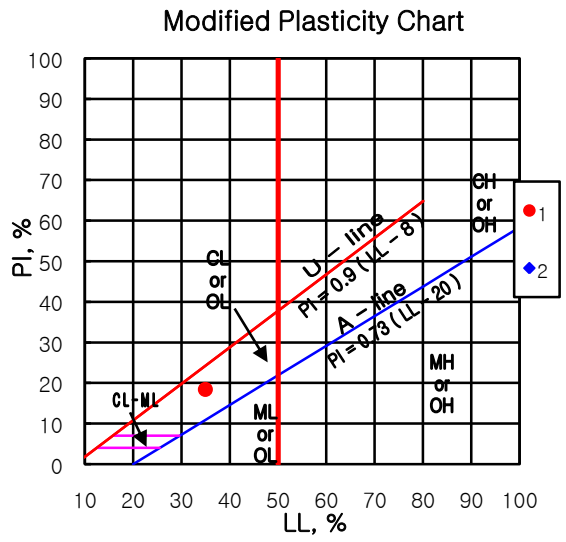
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-27	2.0	1	29.8	2.67	34.9	16.4	18.5	0.0019	0.0085	0.0358	18.9	1.1

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	100.0	100.0	99.4	97.8	93.9	83.3	76.7	10.6	CL	





	1	2	3	비고
A	1.75			
CI	0.28			
LI	0.72			

Remarks

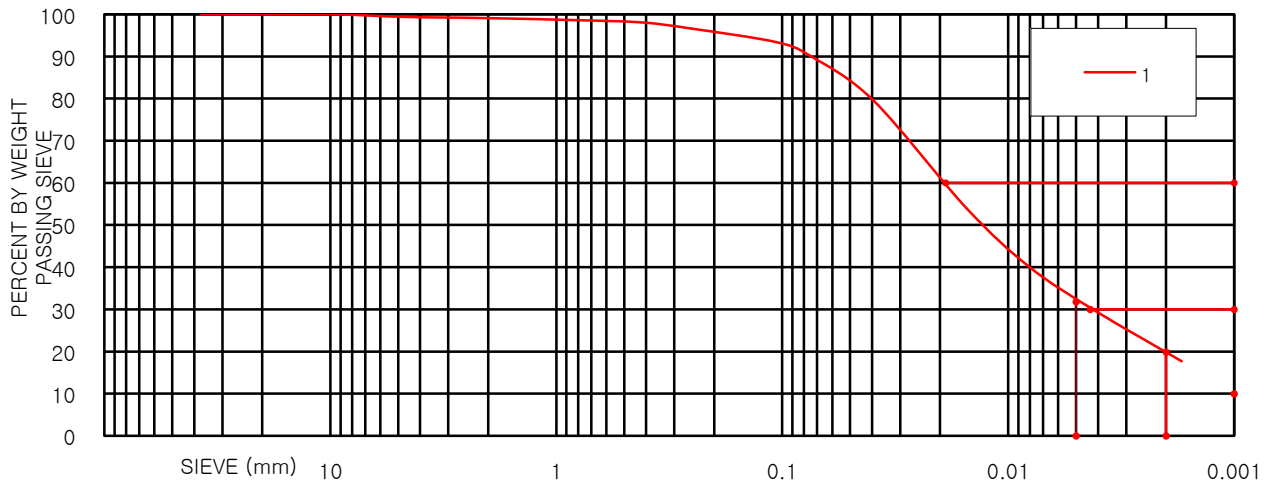
KS F 2301	05. 11. 25 개정
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KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

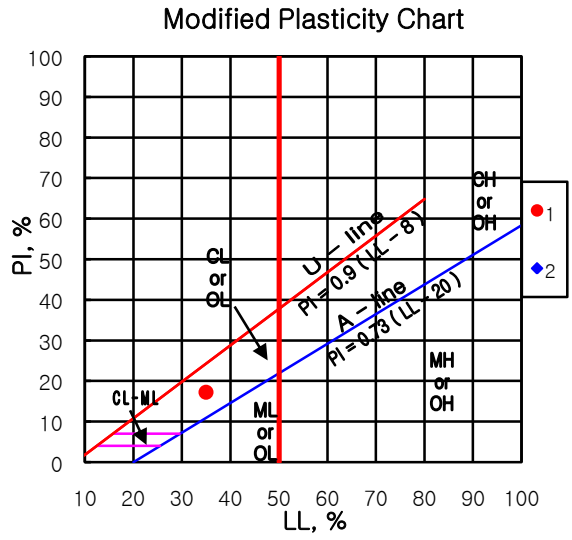
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-27	3.0	1	27.8	2.69	34.9	17.6	17.3	0.0010	0.0043	0.0189	18.9	1.0

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	99.4	99.1	98.6	98.1	96.6	93.4	90.1	19.9	CL	





	1	2	3	비고
A	0.87			
CI	0.41			
LI	0.59			

Remarks

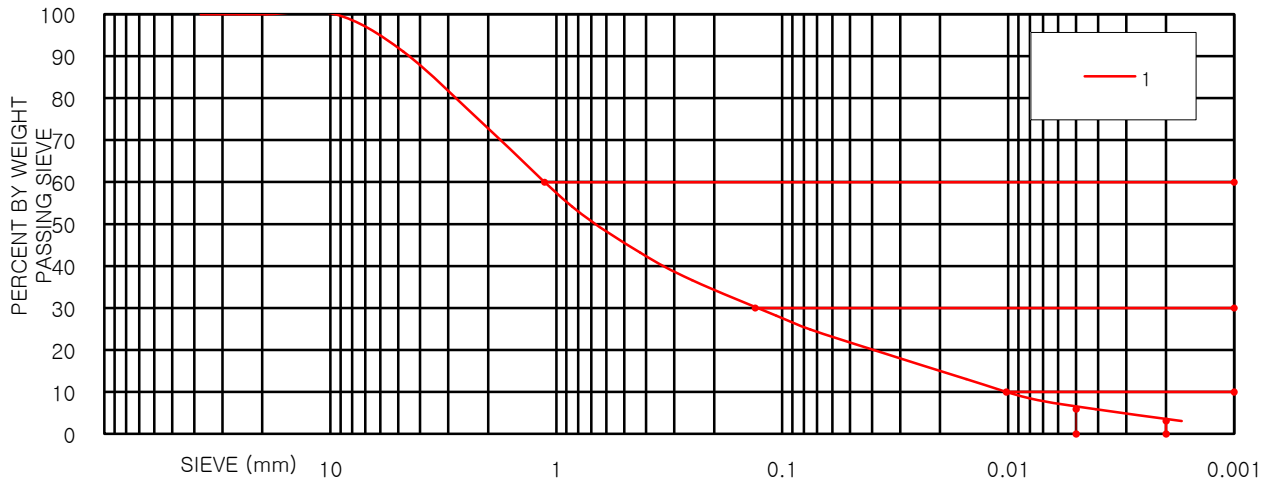
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

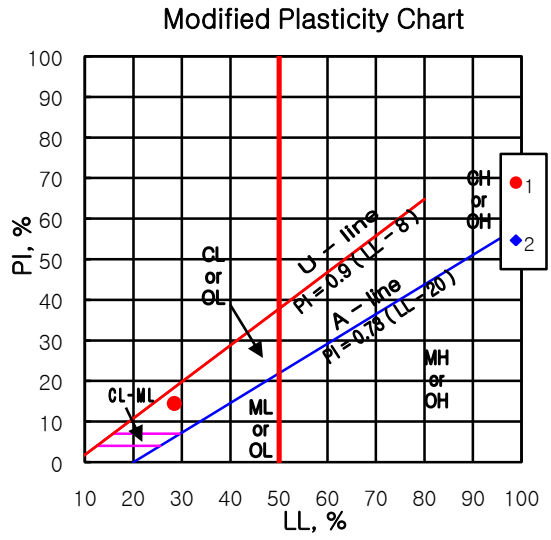
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-28	1.0	1	10.2	2.659	28.4	13.9	14.5	0.0102	0.1318	1.1272	110.7	1.5

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	91.1	72.8	54.2	43.2	36.6	28.2	24.9	3.1	SC	





	1	2	3	비고
A	4.68			
CI	1.25			
LI	-0.25			

Remarks

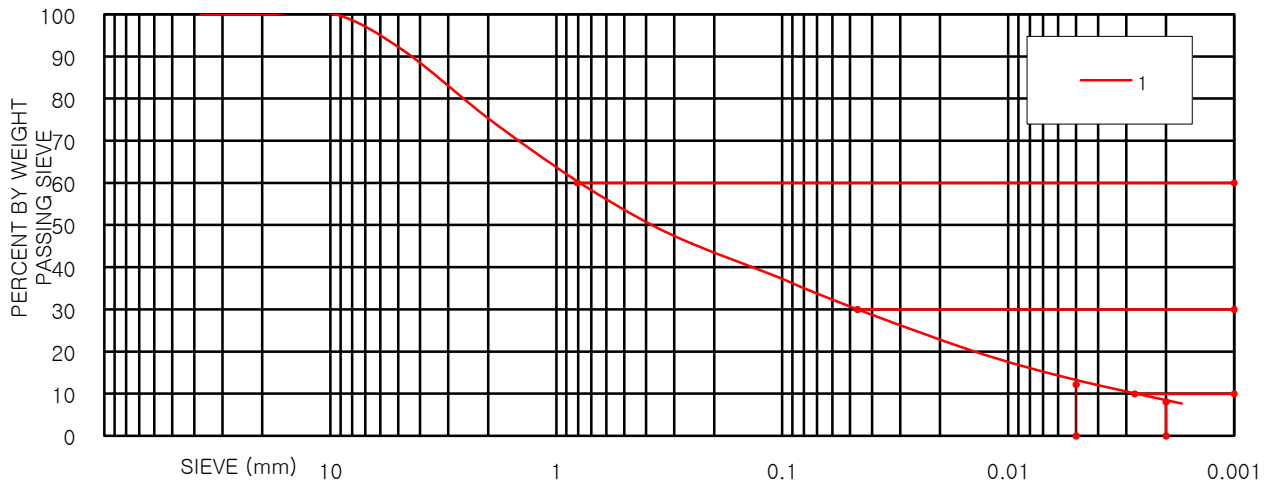
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

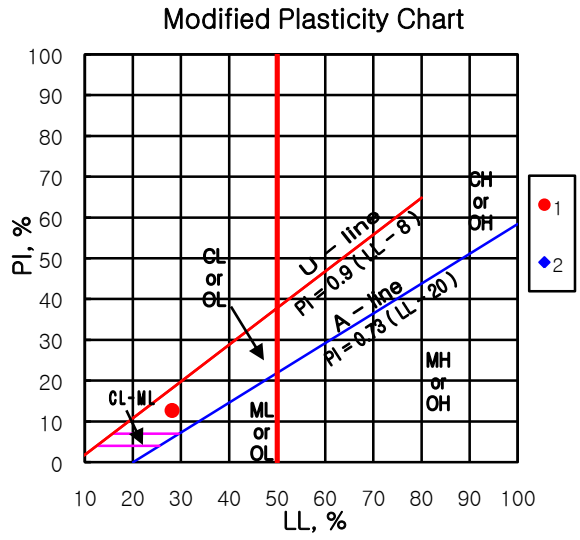
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-28	2.0	1	17.0	2.668	28.1	15.4	12.7	0.0028	0.0465	0.8072	293.1	1.0

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	91.4	75.3	61.2	51.5	45.6	37.8	34.4	8.1	SC	





	1	2	3	비고
A	1.57			
CI	0.87			
LI	0.13			

Remarks

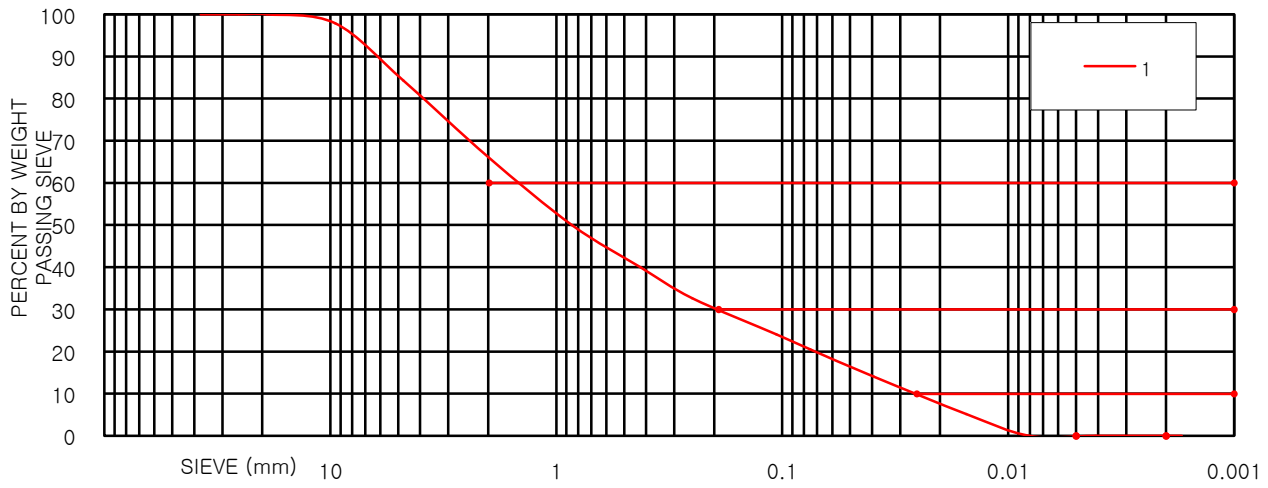
KS F 2301	05. 11. 25 개정
KS F 2302	05. 07. 26 확인
KS F 2303	05. 07. 26 확인
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

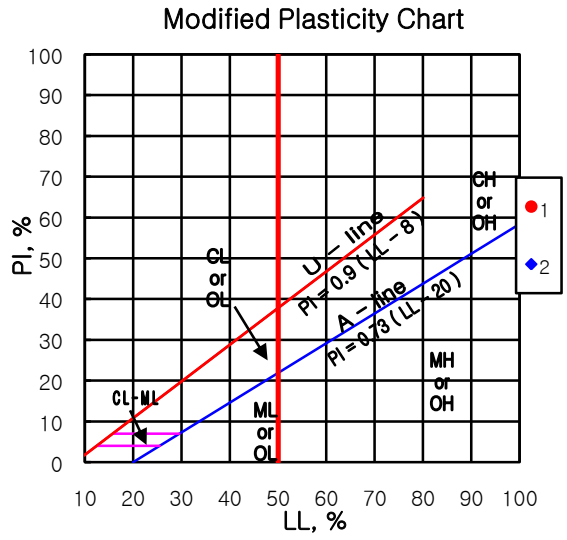
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-28	3.0	1	21.6	2.649	N	P	P	0.0254	0.1910	1.9815	78.2	0.7

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	84.3	66.1	50.0	40.0	32.7	24.1	20.5	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

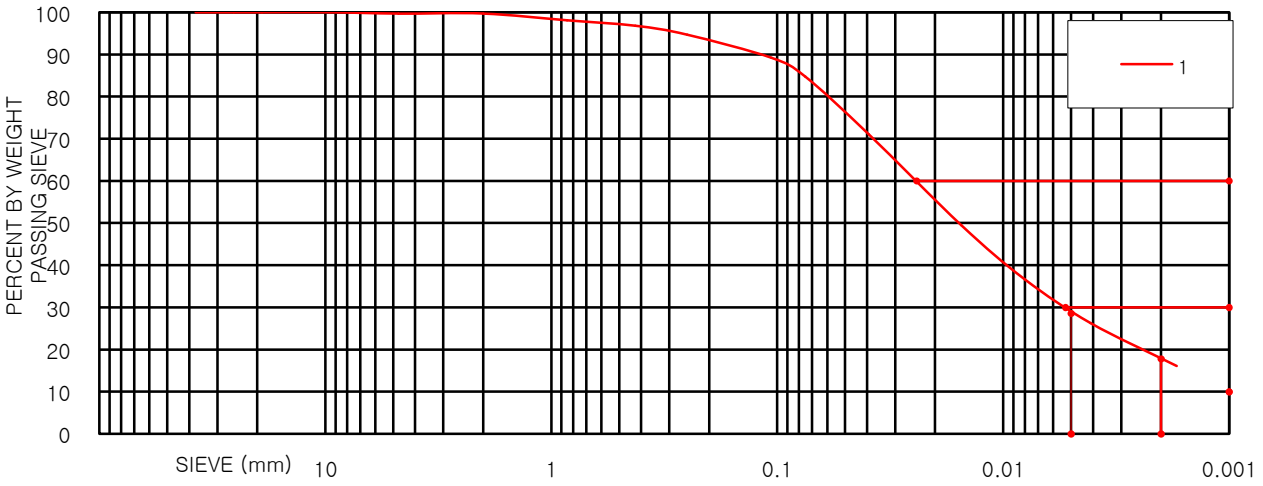
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

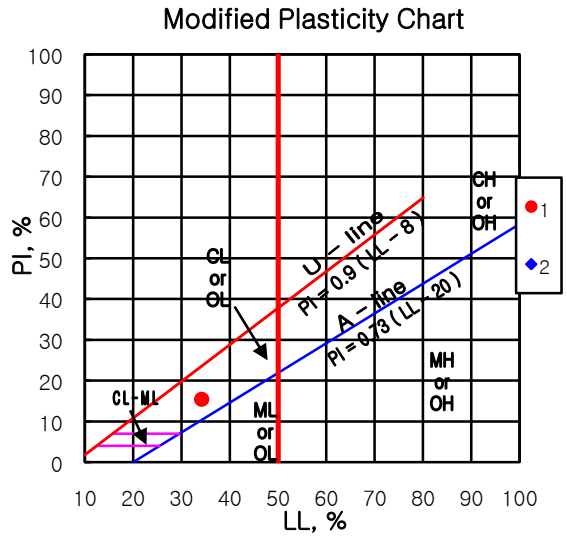
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-29	1.0	1	29.9	2.69	34.2	18.7	15.5	0.0010	0.0053	0.0242	24.2	1.2

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	99.7	99.7	98.1	96.8	94.7	89.2	84.7	17.8	CL	





	1	2	3	비고
A	0.87			
CI	0.28			
LI	0.72			

Remarks

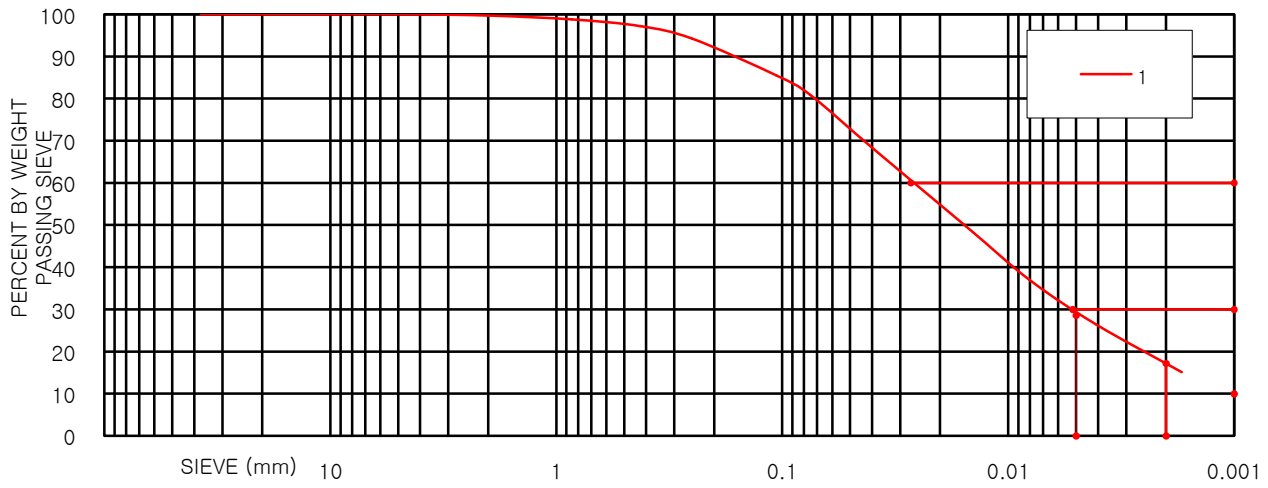
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KS F 2302	05. 07. 26 확인
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

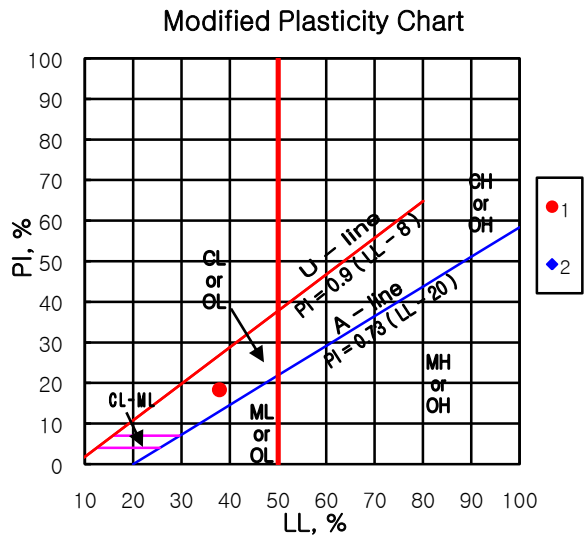
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-29	2.0	1	29.1	2.68	37.8	19.4	18.4	0.0010	0.0052	0.0270	27.0	1.0

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	100.0	99.7	98.8	97.2	94.2	85.5	80.9	17.2	CL	





	1	2	3	비고
A	1.07			
CI	0.47			
LI	0.53			

Remarks

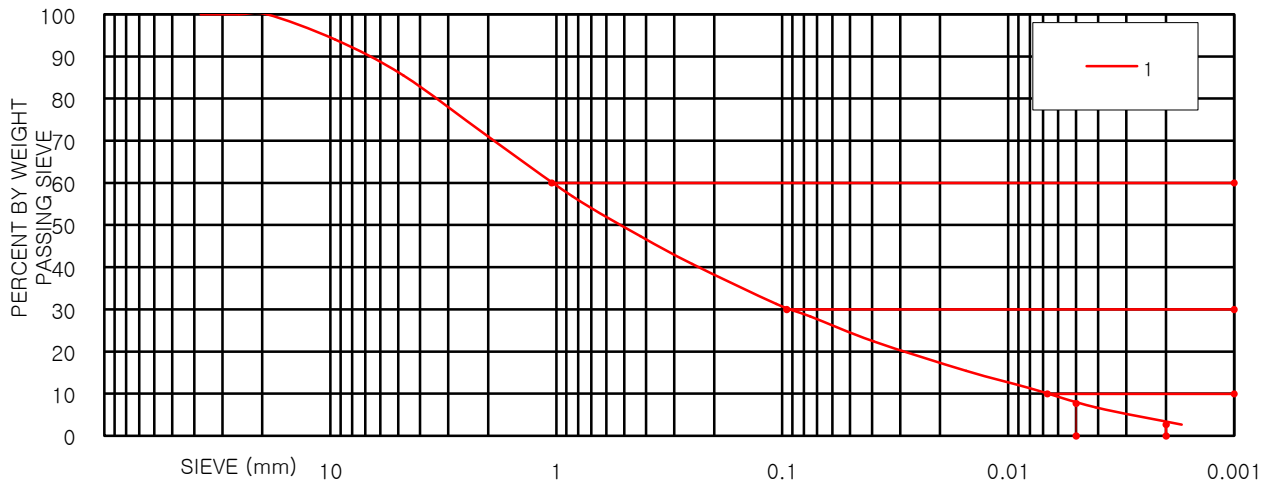
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KS F 2302	05. 07. 26 확인
KS F 2303	05. 07. 26 확인
KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

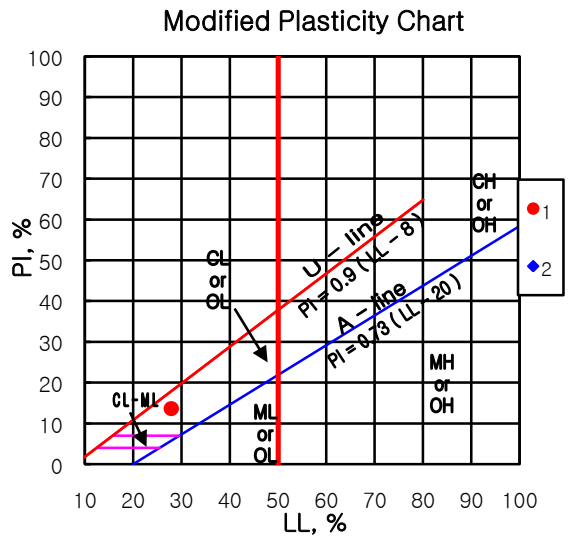
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-29	3.0	1	15.1	2.659	27.9	14.2	13.7	0.0067	0.0955	1.0471	156.0	1.3

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	85.5	71.0	56.9	47.4	40.8	31.3	28.3	2.7	SC	





	1	2	3	비고
A	5.07			
CI	0.94			
LI	0.06			

Remarks

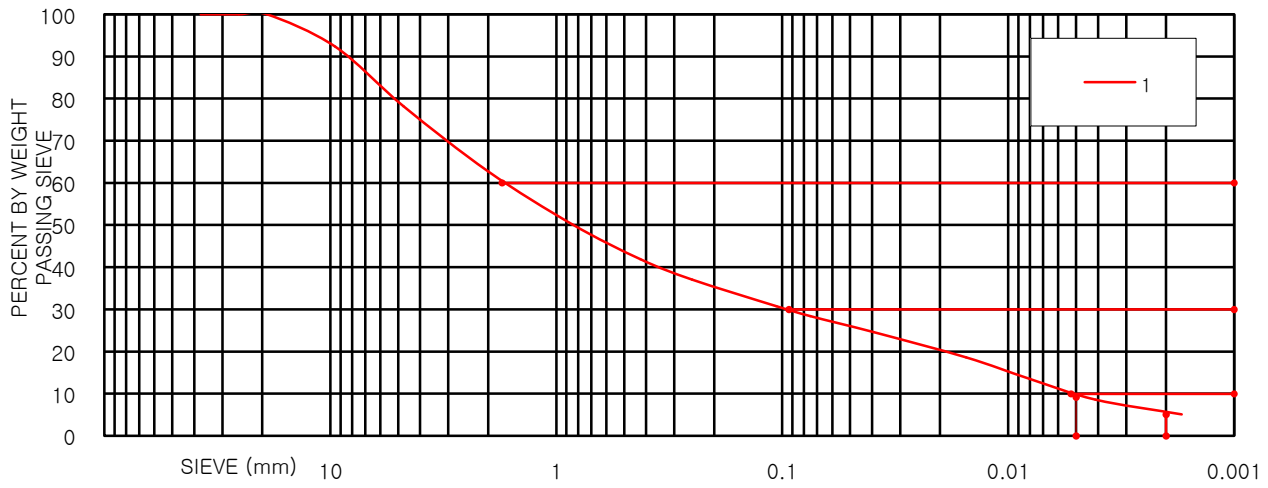
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KS F 2302	05. 07. 26 확인
KS F 2303	05. 07. 26 확인
KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

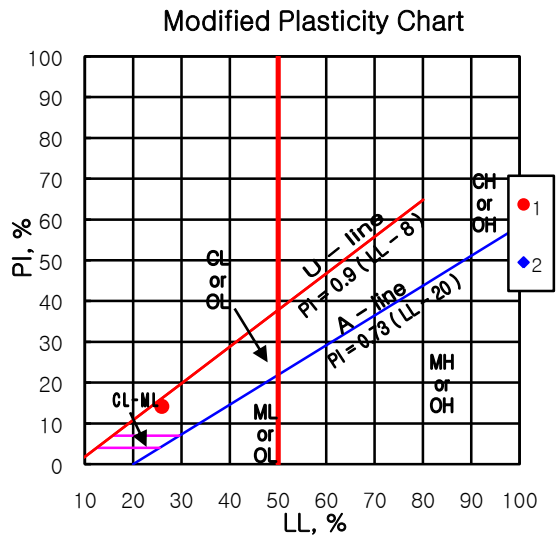
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-30	1.0	1	12.6	2.674	25.9	11.7	14.2	0.0053	0.0933	1.7378	329.6	1.0

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	78.2	62.7	50.2	41.9	37.1	30.8	28.4	5.1	SC	





	1	2	3	비고
A	2.78			
CI	0.93			
LI	0.07			

Remarks

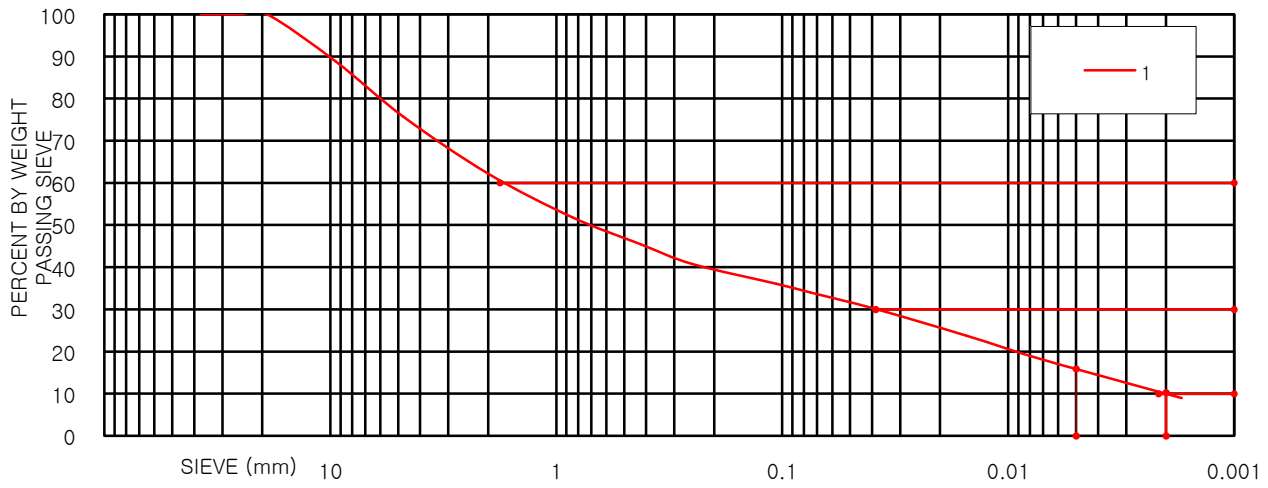
KS F 2301	05. 11. 25 개정
KS F 2302	05. 07. 26 확인
KS F 2303	05. 07. 26 확인
KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

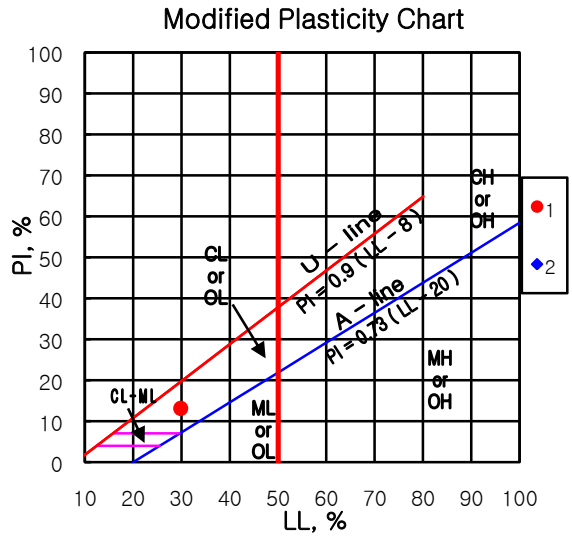
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-30	2.0	1	17.6	2.672	29.8	16.7	13.1	0.0022	0.0385	1.7742	822.2	0.4

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	75.7	62.2	51.9	45.5	40.8	36.1	34.0	10.3	SC	





	1	2	3	비고
A	1.27			
CI	0.93			
LI	0.07			

Remarks

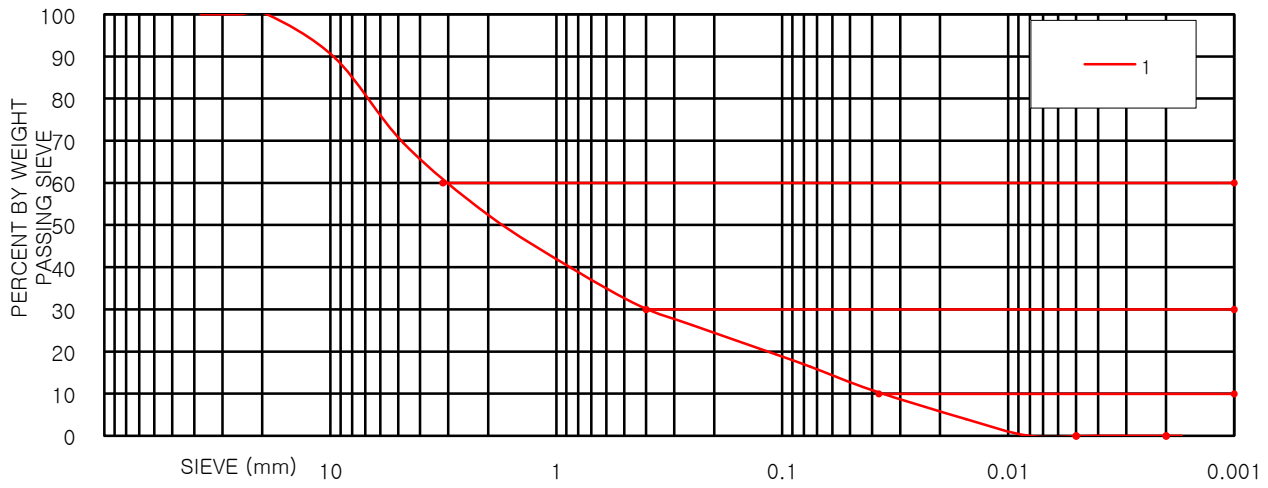
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

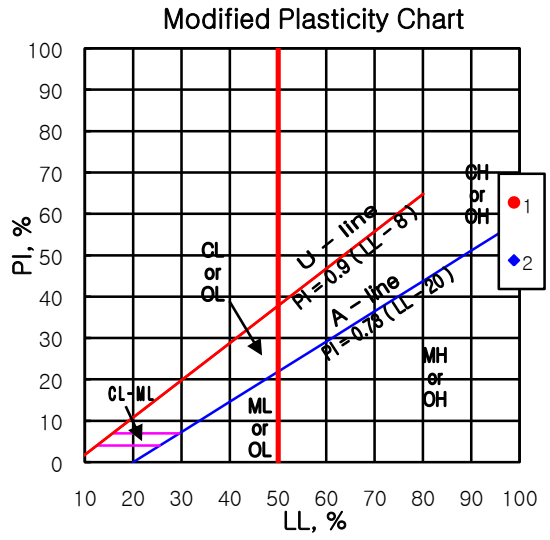
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-30	3.0	1	7.8	2.659	N	P	P	0.0374	0.3999	3.1769	84.9	1.3

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	69.5	52.4	39.7	30.8	26.3	19.3	16.4	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

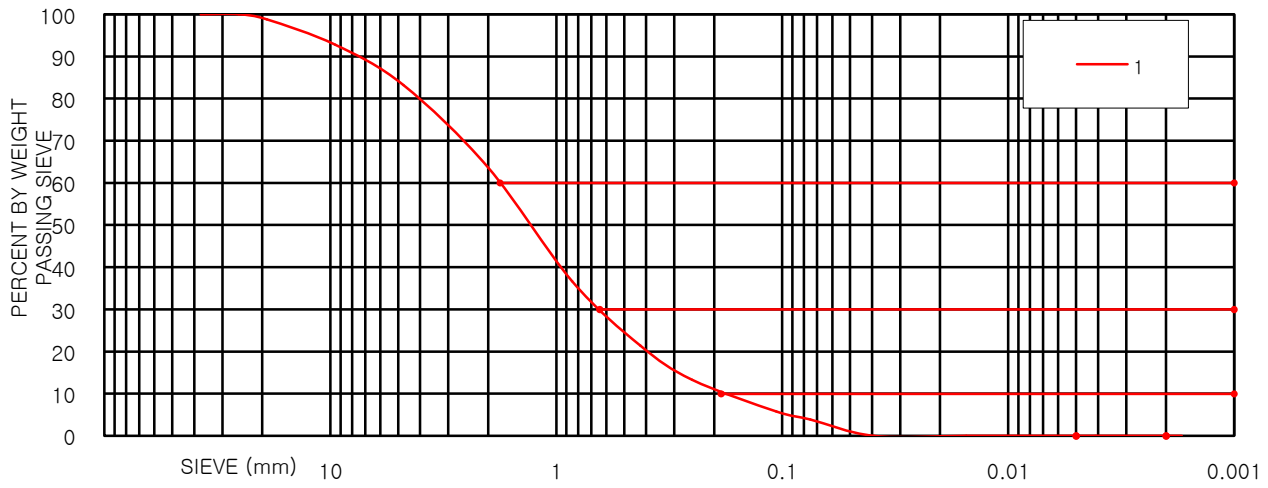
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

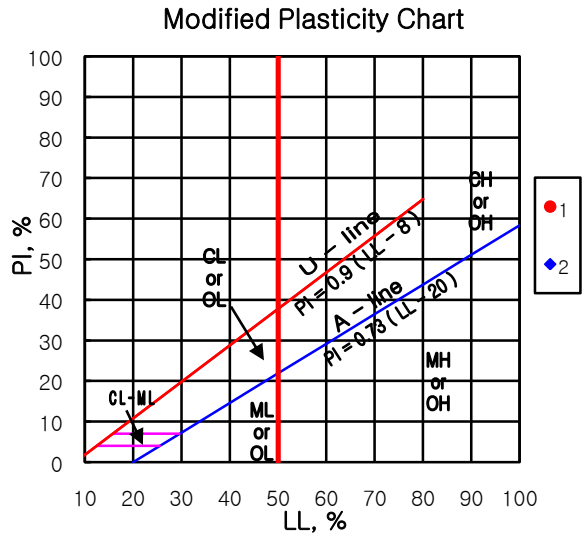
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-31	1.0	1	12.4	2.666	N	P	P	0.1866	0.6427	1.7742	9.5	1.2

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	83.2	63.6	36.7	21.4	13.3	5.8	3.9	-	SW	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

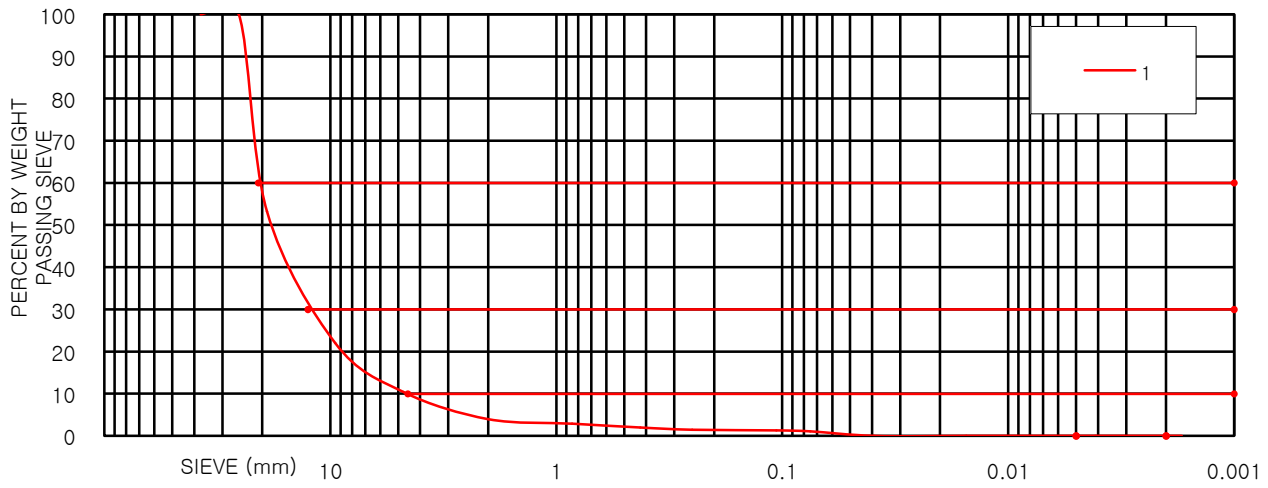
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

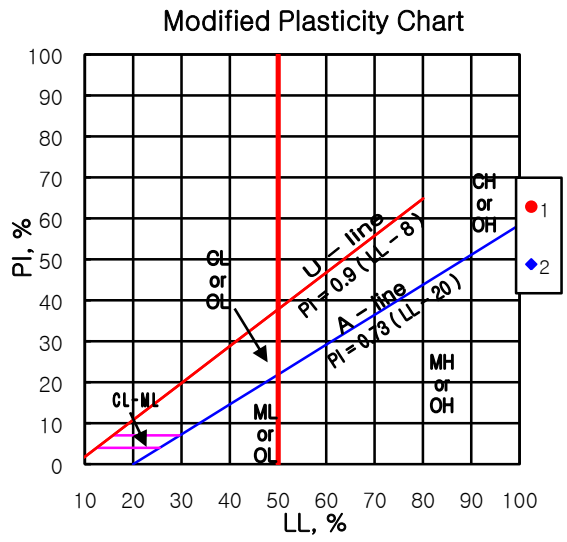
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-31	2.0	1	2.1	2.625	N	P	P	4.5394	12.5603	20.7970	4.6	1.7

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	10.4	4.0	2.9	2.0	1.5	1.3	1.1	-	GW	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

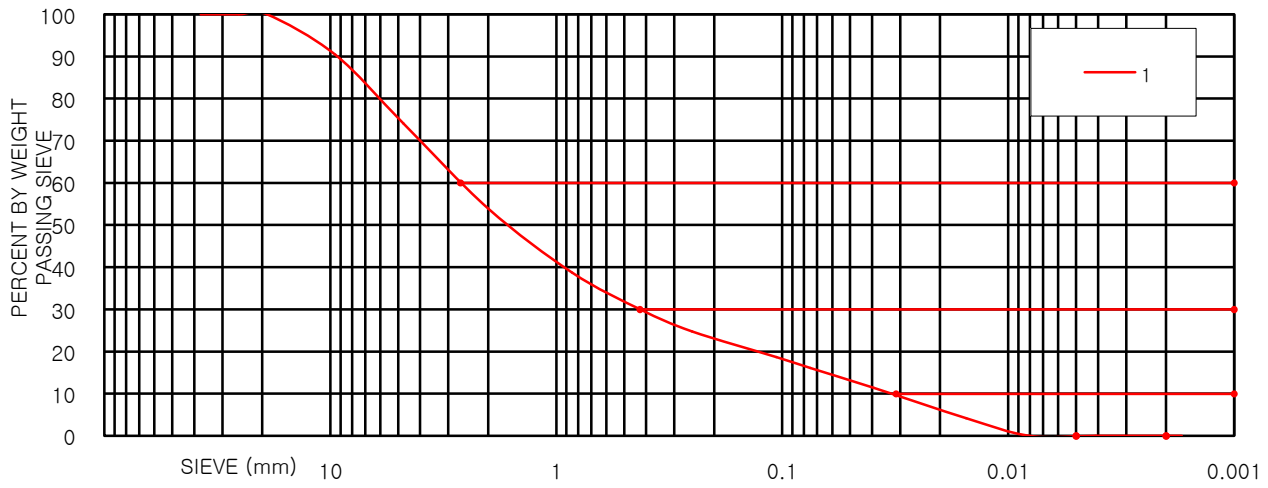
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

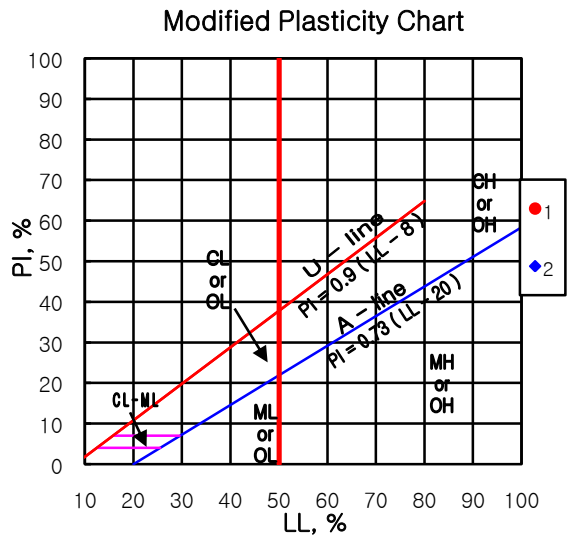
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-32	1.0	1	10.7	2.656	N	P	P	0.0313	0.4266	2.6546	84.7	2.2

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	74.1	53.9	38.7	30.0	24.8	18.7	16.1	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

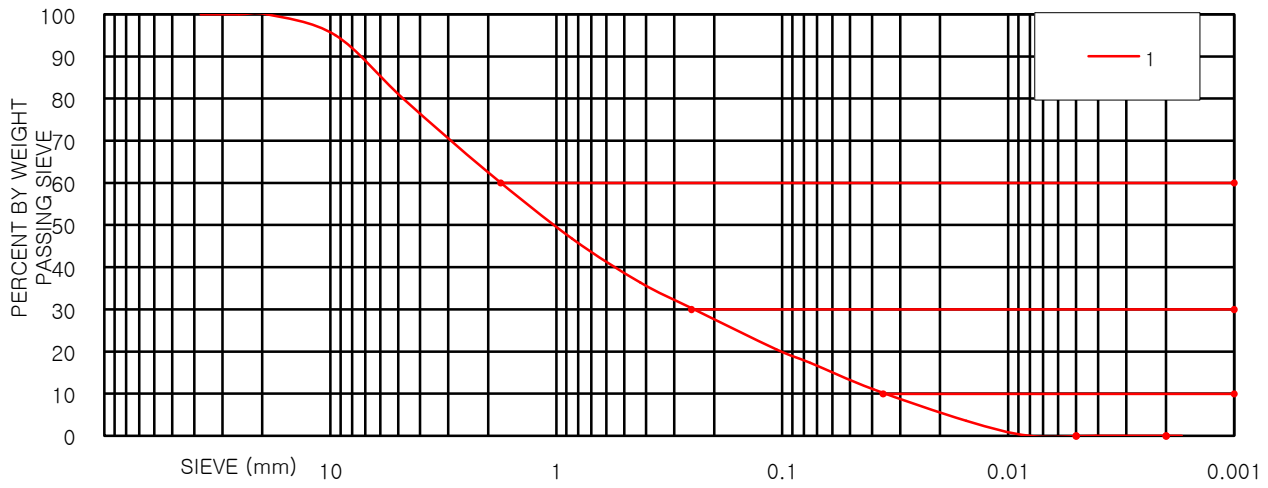
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KS F 2324	06. 10. 19 개정

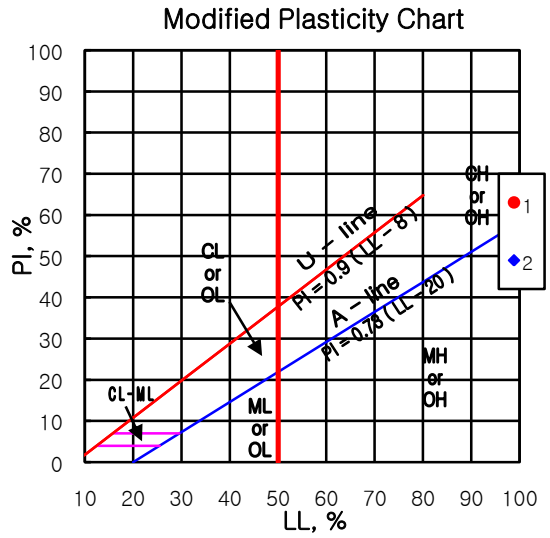
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-32	2.0	1	11.8	2.673	N	P	P	0.0358	0.2523	1.7620	49.2	1.0

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	79.9	62.5	46.8	36.4	30.2	20.5	17.3	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

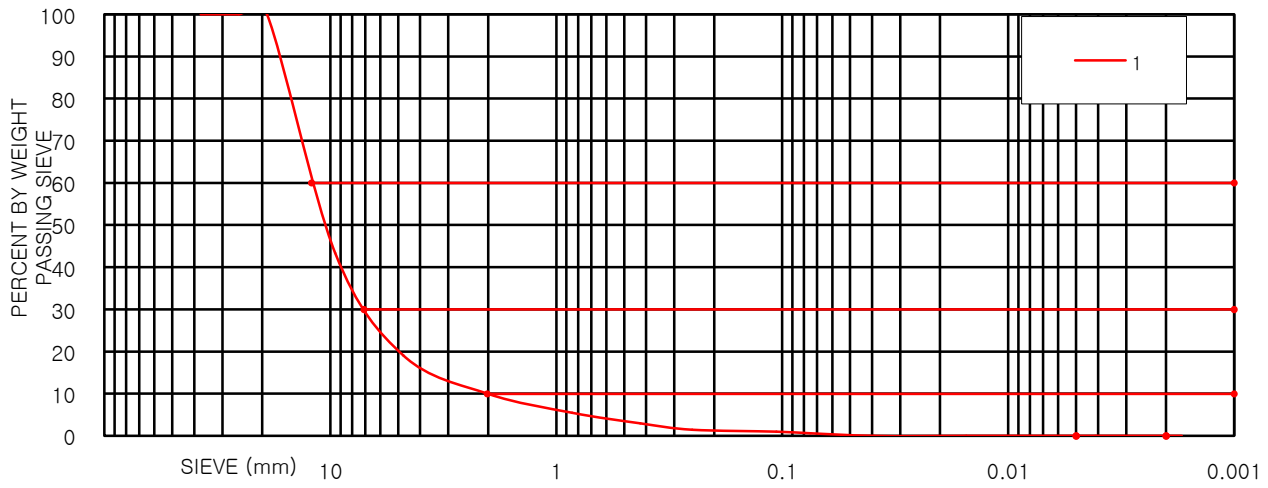
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KS F 2324	06. 10. 19 개정

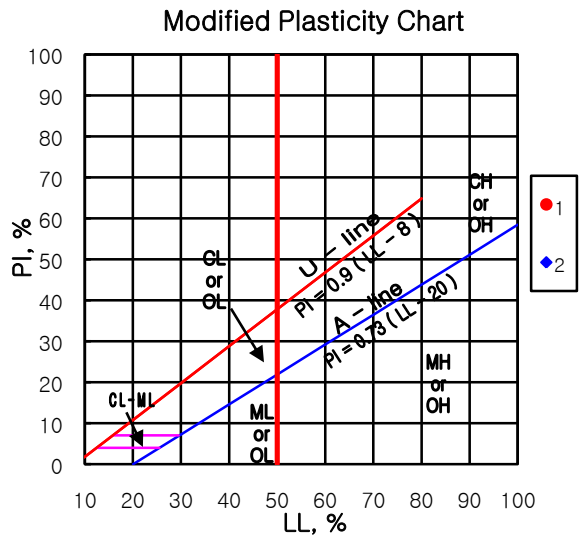
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-32	3.0	1	9.7	2.634	N	P	P	2.0230	7.0958	12.1060	6.0	2.1

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	19.1	10.0	5.5	3.0	1.5	1.0	0.6	-	GW	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

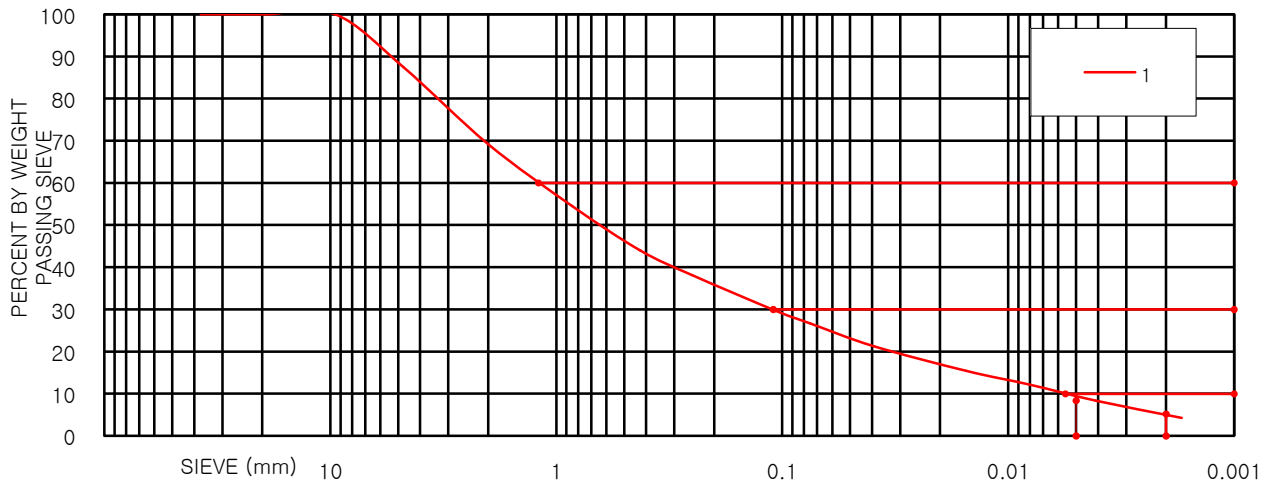
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KS F 2303	05. 07. 26 확인
KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

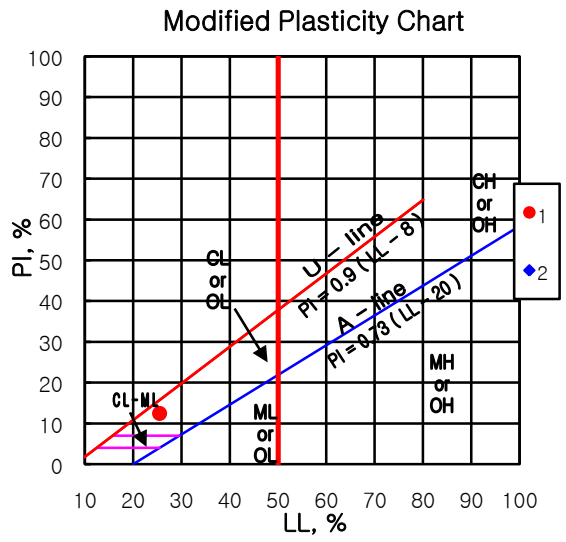
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-33	1.0	1	13.1	2.671	25.4	12.9	12.5	0.0056	0.1096	1.1995	214.8	1.8

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	87.5	69.2	54.5	44.0	38.1	29.6	26.7	5.2	SC	





	1	2	3	비고
A	2.40			
CI	0.98			
LI	0.02			

Remarks

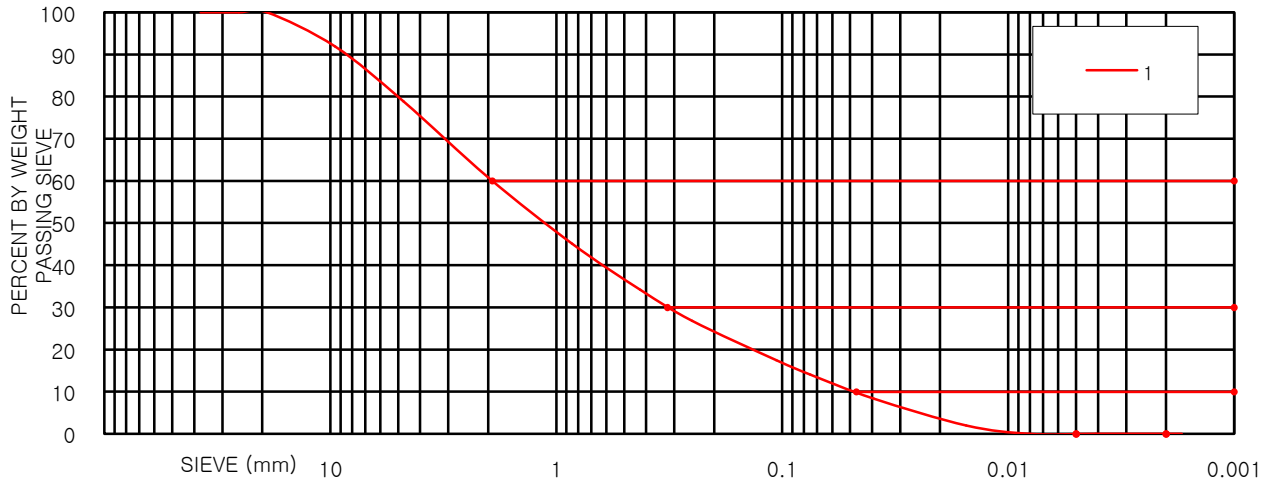
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KS F 2302	05. 07. 26 확인
KS F 2303	05. 07. 26 확인
KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

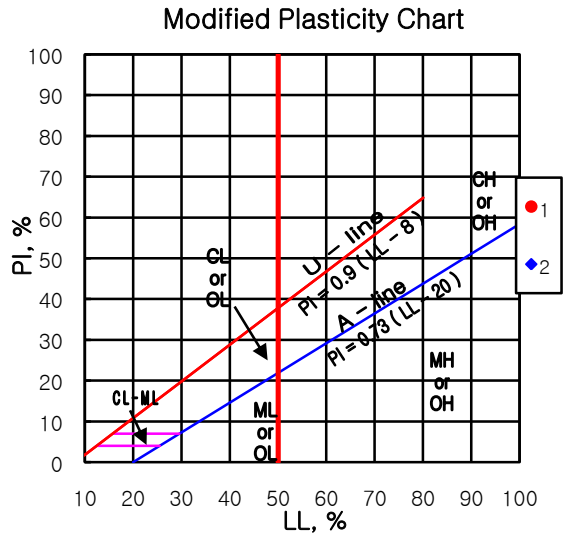
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-33	2.0	1	12.6	2.656	N	P	P	0.0470	0.3221	1.9187	40.8	1.2

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	78.9	60.8	45.1	34.2	26.8	17.5	14.1	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

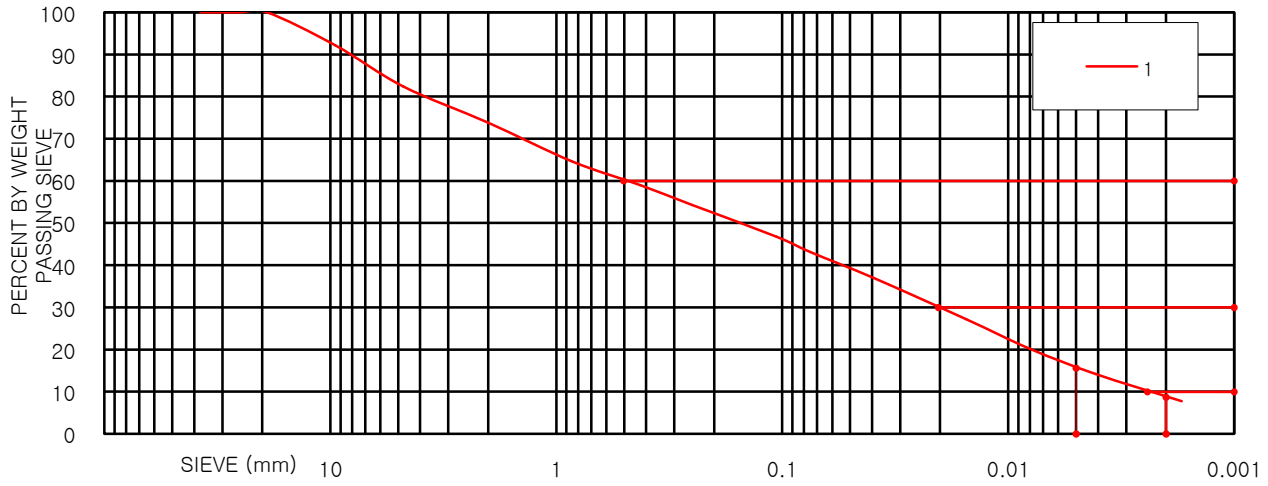
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KS F 2303	05. 07. 26 확인
KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

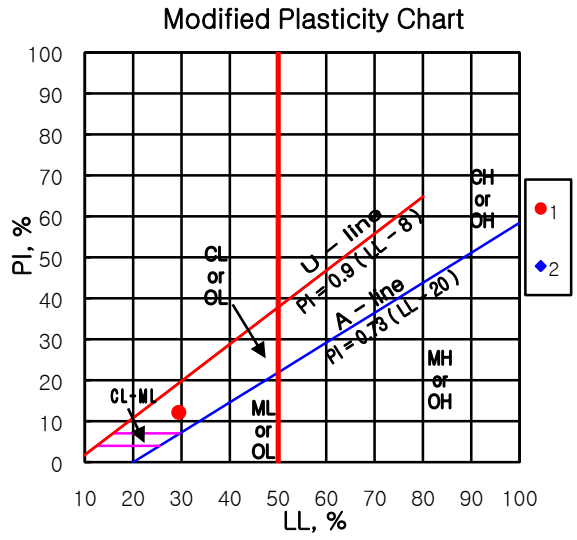
Classification of a Soil (USCS)

Project : 중앙선 도담~영천 복선전철 제 5공구 지반조사

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-34	1.0	1	25.2	2.669	29.4	17.2	12.2	0.0024	0.0204	0.5035	208.0	0.3

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	82.4	73.8	64.6	59.0	54.3	46.8	43.1	8.7	SC	





	1	2	3	비고
A	1.40			
CI	0.34			
LI	0.66			

Remarks

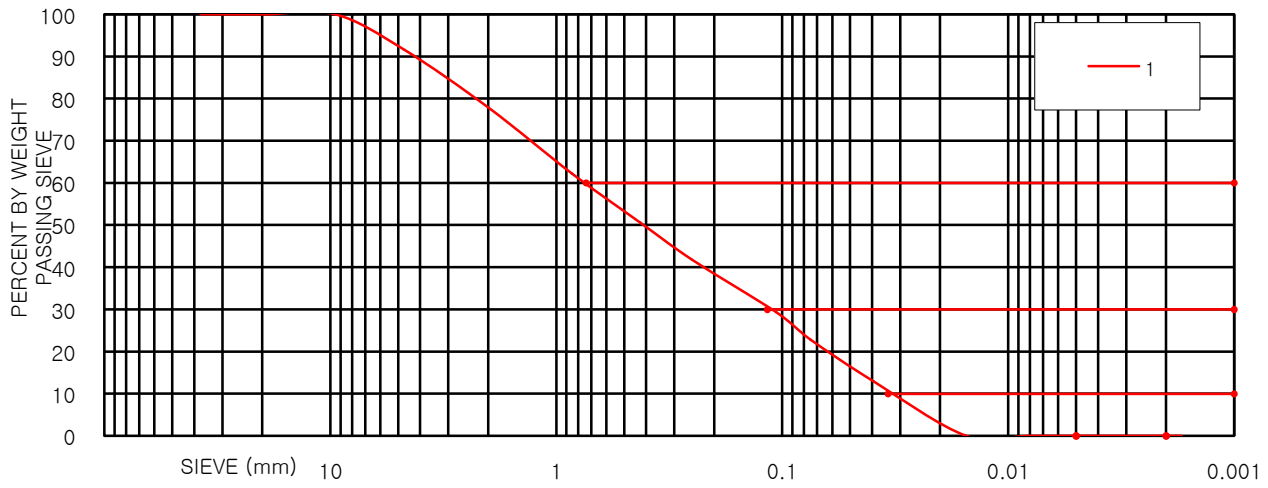
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

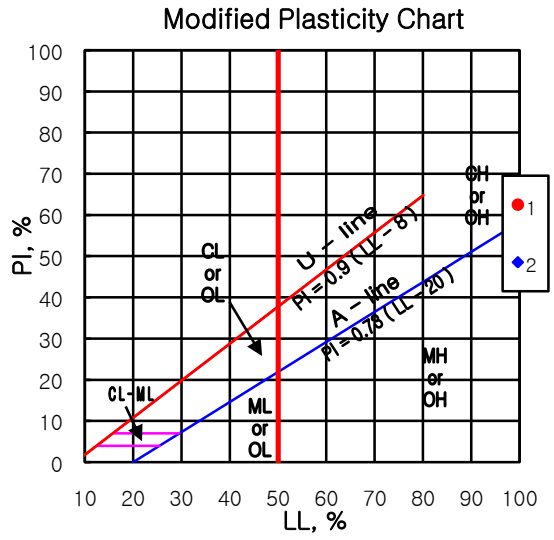
Classification of a Soil (USCS)

Project : 중앙선 도담~영천 복선전철 제 5공구 지반조사

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-34	3.0	1	15.1	2.658	N	P	P	0.0340	0.1164	0.7379	21.7	0.5

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	91.7	77.9	62.2	50.6	41.8	29.3	22.9	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

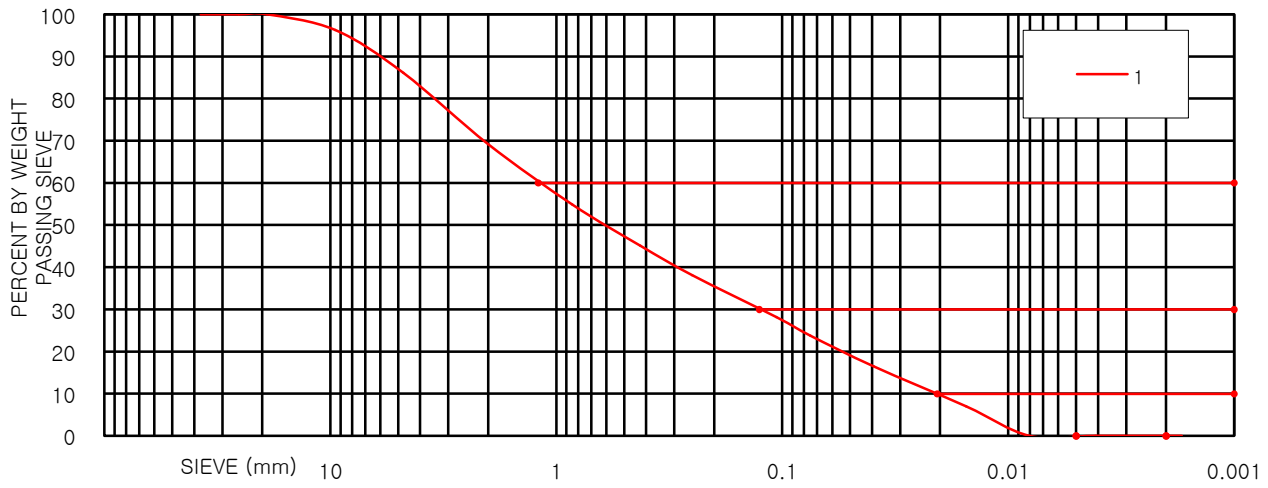
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KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

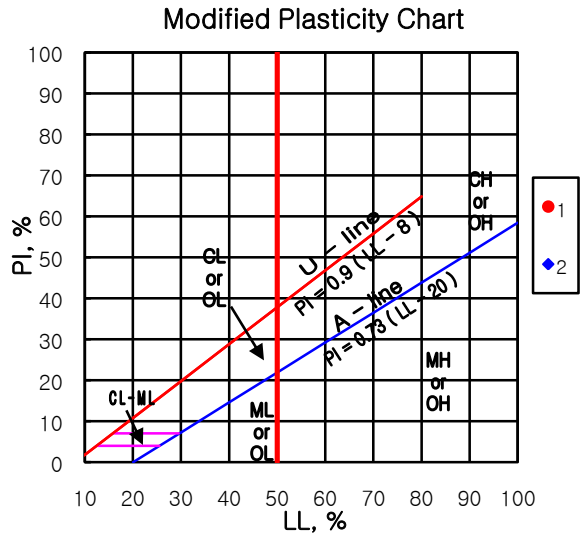
Classification of a Soil (USCS)

Project : 중앙선 도담~영천 복선전철 제 5공구 지반조사

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-35	1.0	1	24.2	2.663	N	P	P	0.0206	0.1262	1.2023	58.3	0.6

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	86.1	69.2	54.9	45.1	38.1	28.2	23.8	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

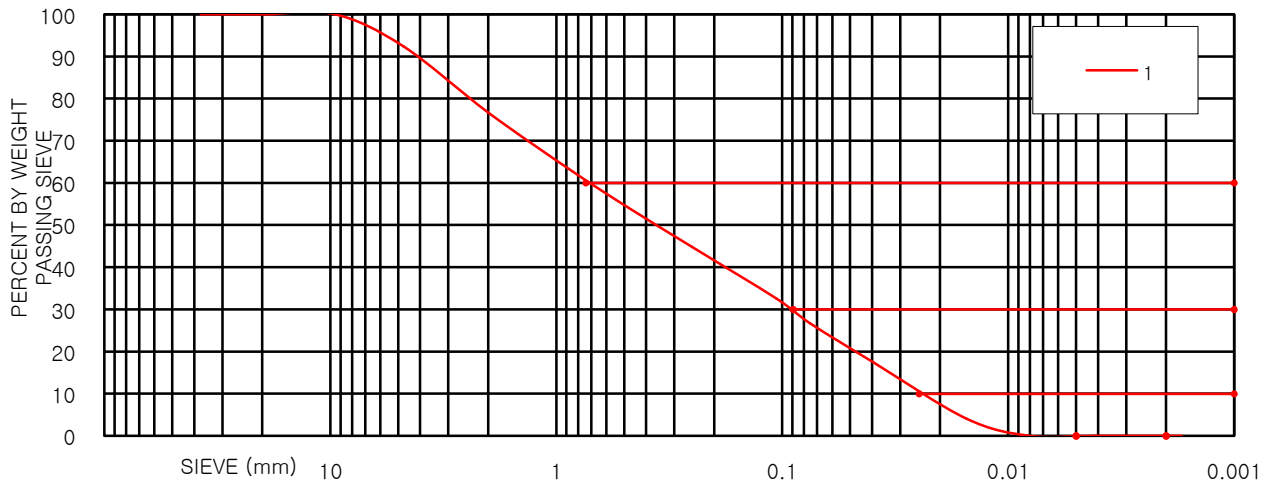
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

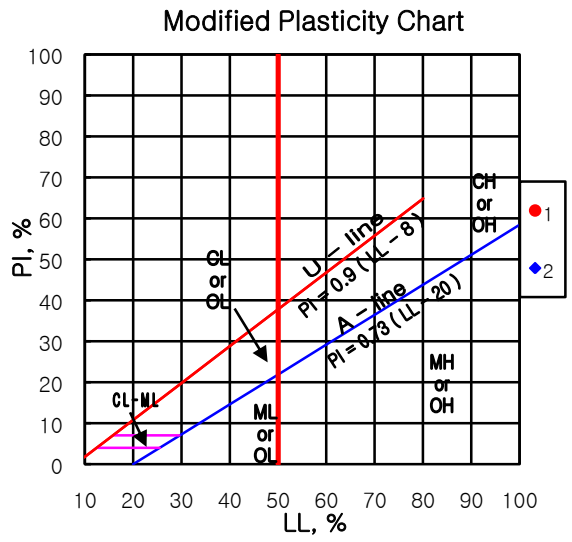
Classification of a Soil (USCS)

Project : 중앙선 도담~영천 복선전철 제 5공구 지반조사

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-35	4.0	1	26.3	2.657	N	P	P	0.0248	0.0895	0.7396	29.9	0.4

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	92.4	76.7	62.8	54.1	44.8	32.6	26.7	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

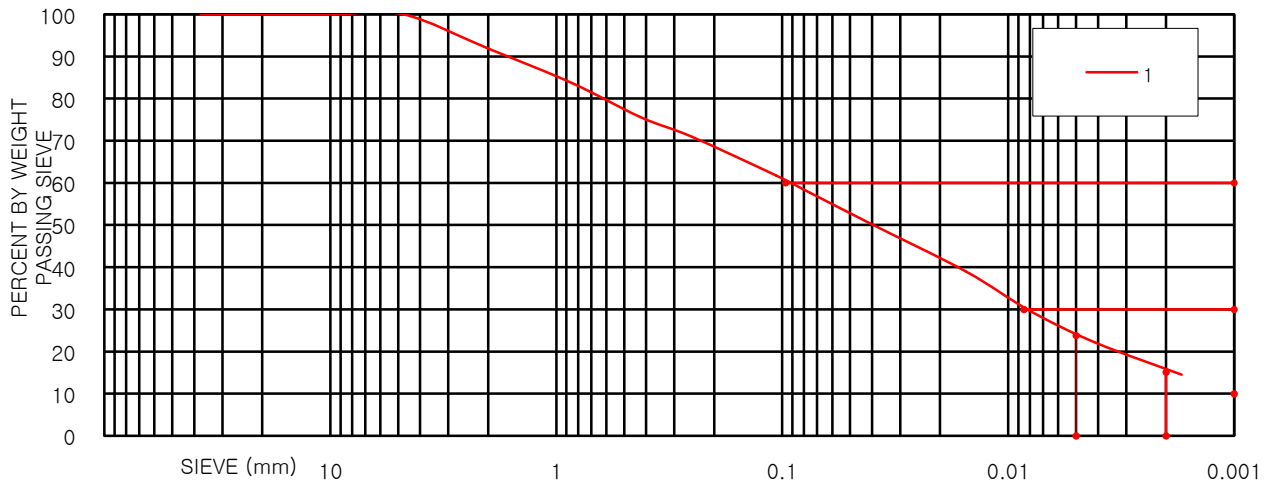
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

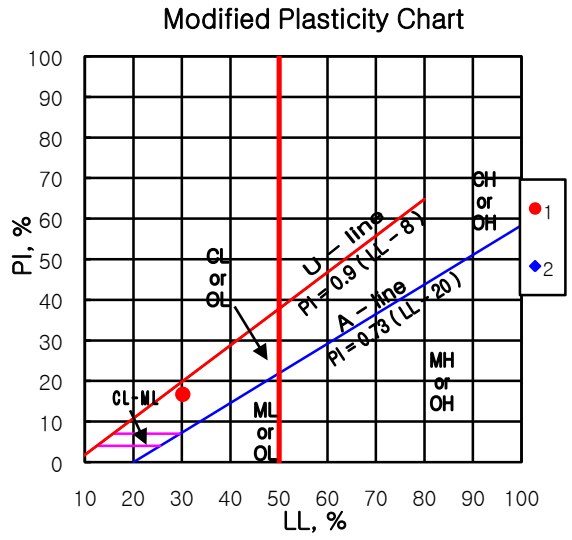
Classification of a Soil (USCS)

Project : 중앙선 도담~영천 복선전철 제 5공구 지반조사

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-36	1.0	1	29.7	2.675	30.2	13.5	16.7	0.0010	0.0085	0.0966	96.6	0.7

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	100.0	91.9	83.7	75.6	70.9	61.7	57.6	15.1	CL	





	1	2	3	비고
A	1.11			
CI	0.03			
LI	0.97			

Remarks

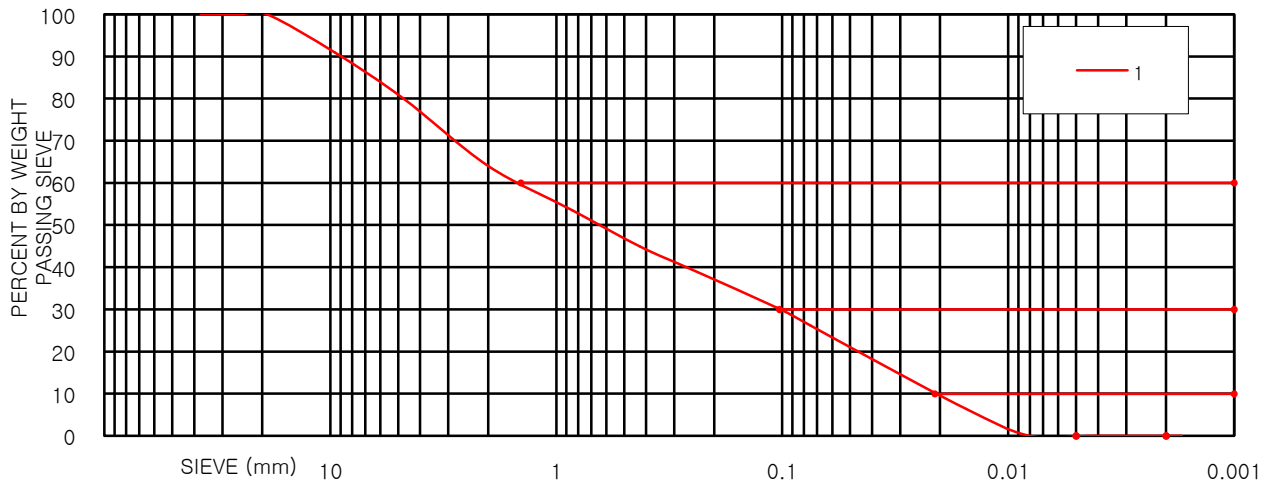
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

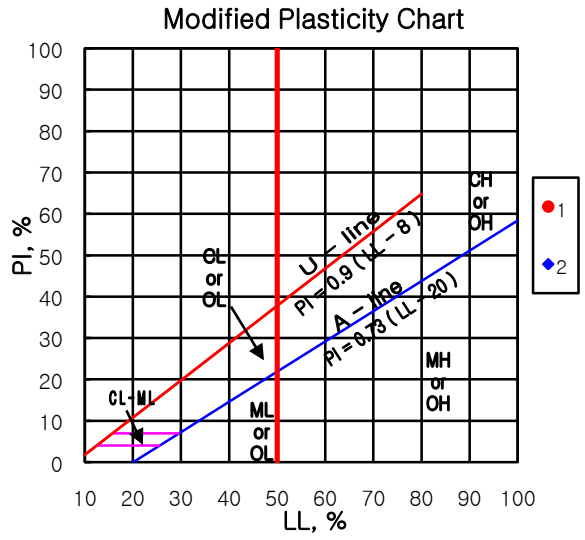
Classification of a Soil (USCS)

Project : 중앙선 도담~영천 복선전철 제 5공구 지반조사

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-36	3.0	1	15.2	2.662	N	P	P	0.0211	0.1028	1.4355	67.9	0.3

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	80.0	64.0	53.5	44.9	39.4	30.4	26.2	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

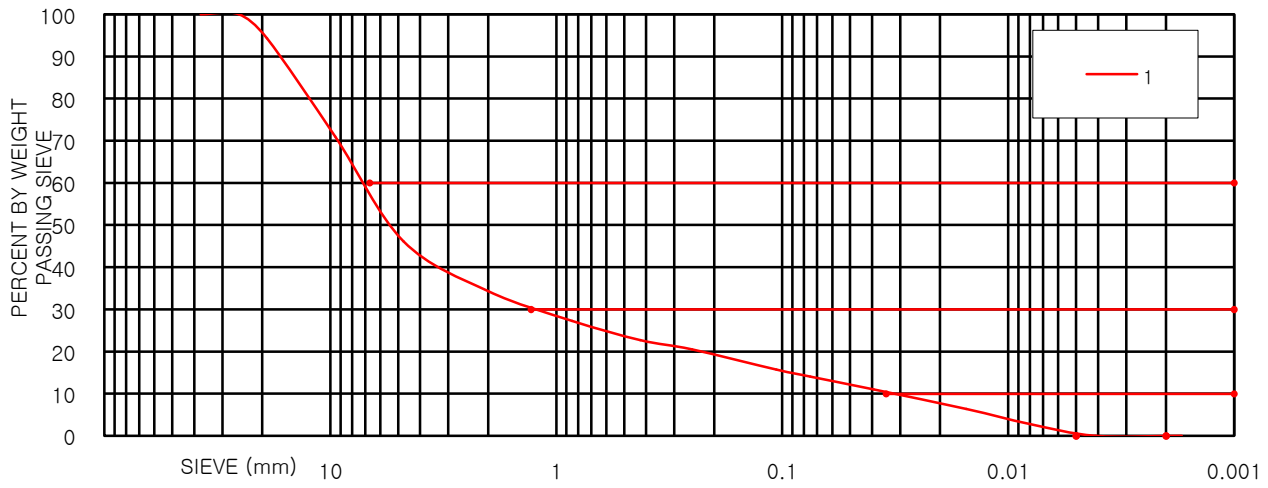
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KS F 2324	06. 10. 19 개정

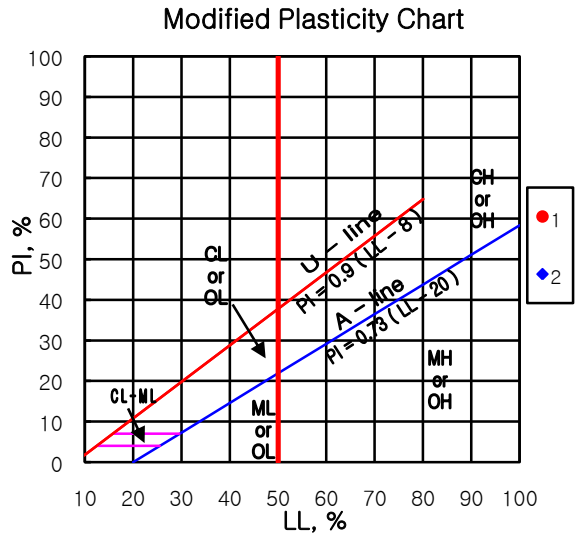
Classification of a Soil (USCS)

Project : 중앙선 도담~영천 복선전철 제 5공구 지반조사

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-37	1.0	1	15.1	2.649	N	P	P	0.0347	1.2942	6.6988	193.2	7.2

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	46.2	34.3	27.3	22.7	20.5	15.7	14.1	-	GM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

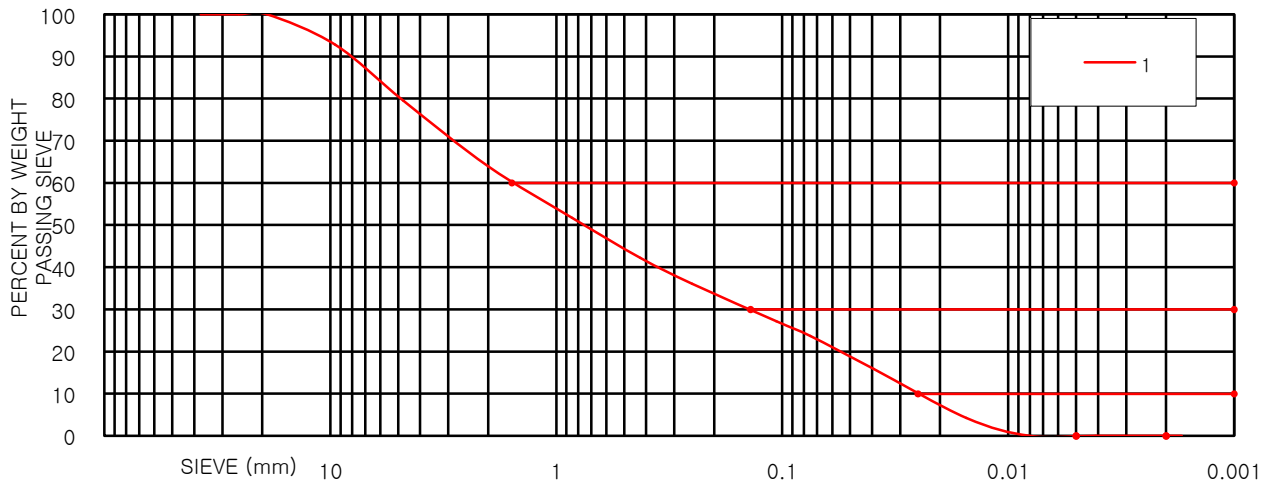
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

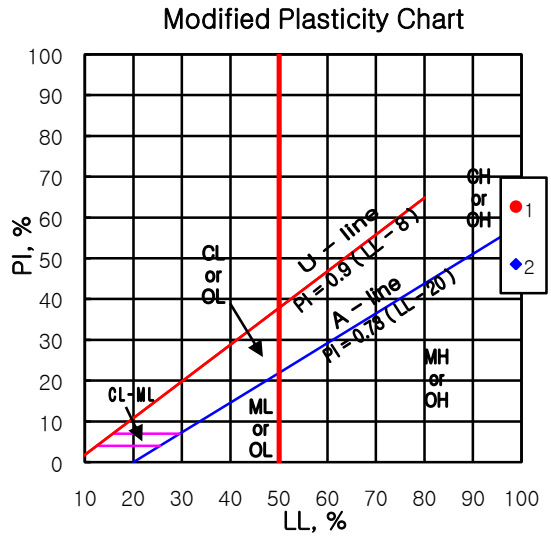
Classification of a Soil (USCS)

Project : 중앙선 도담~영천 복선전철 제 5공구 지반조사

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-37	2.0	1	14.6	2.661	N	P	P	0.0251	0.1380	1.5740	62.8	0.5

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	79.5	63.9	51.7	42.2	36.1	27.2	23.7	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

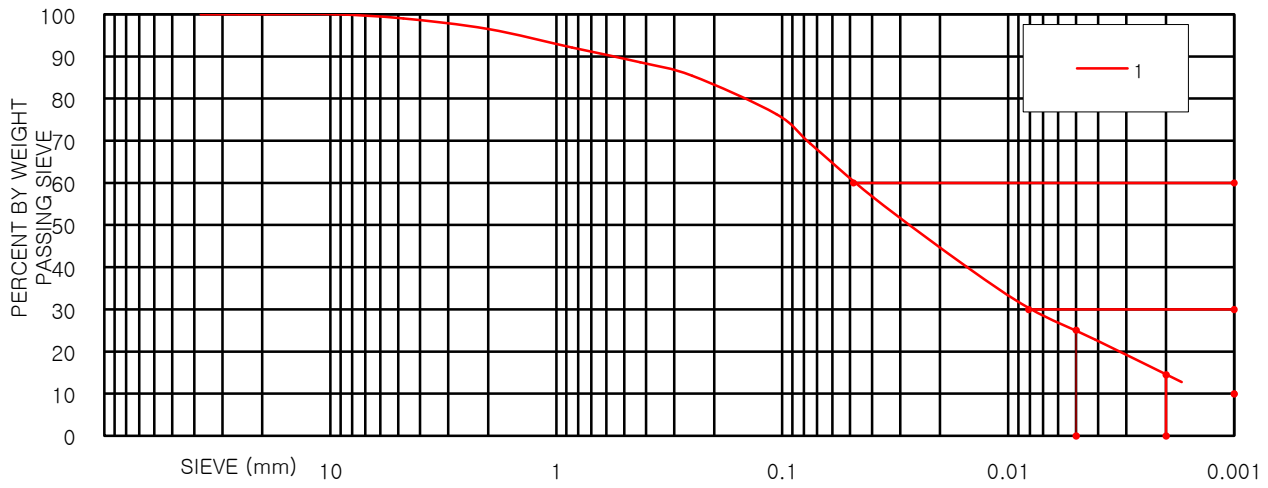
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

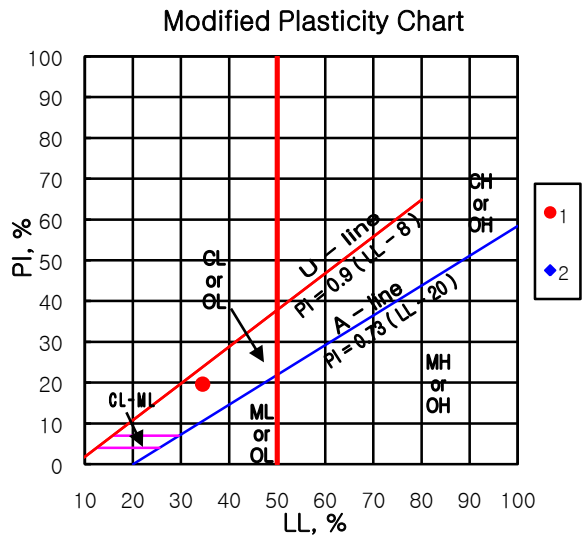
Classification of a Soil (USCS)

Project : 중앙선 도담~영천 복선전철 제 5공구 지반조사

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-38	1.0	1	29.8	2.689	34.5	14.9	19.6	0.0010	0.0081	0.0484	48.4	1.4

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	99.0	96.5	92.1	88.6	85.4	76.3	69.3	14.5	CL	





	1	2	3	비고
A	1.35			
CI	0.24			
LI	0.76			

Remarks

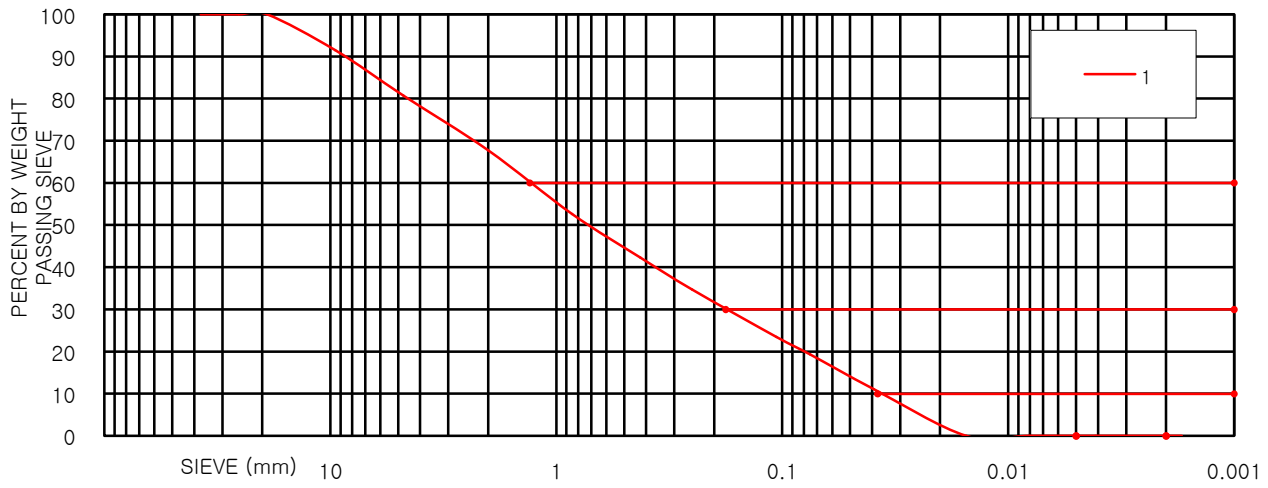
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KS F 2324	06. 10. 19 개정

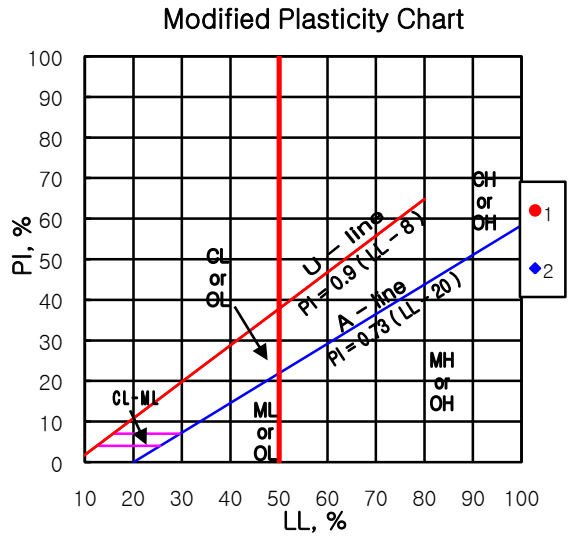
Classification of a Soil (USCS)

Project : 중앙선 도담~영천 복선전철 제 5공구 지반조사

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-38	4.0	1	7.3	2.659	N	P	P	0.0378	0.1778	1.3092	34.6	0.6
					\							

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	80.7	67.7	52.6	42.3	34.7	23.5	19.3	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

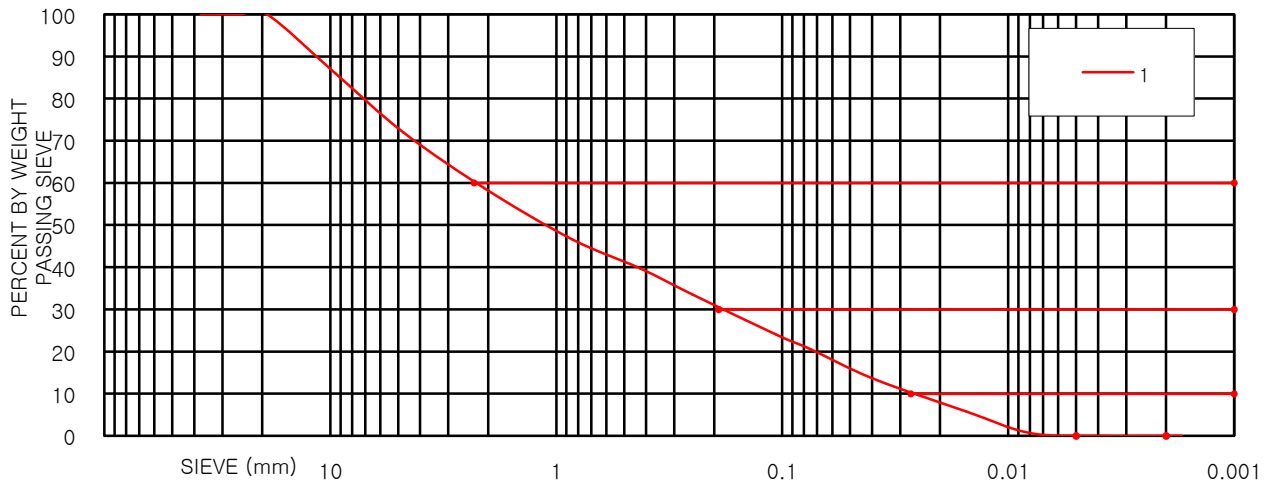
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

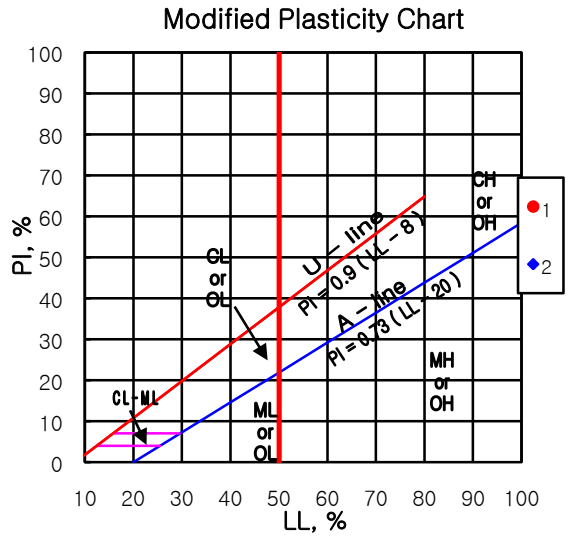
Classification of a Soil (USCS)

Project : 중앙선 도담~영천 복선전철 제 5공구 지반조사

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-39	1.0	1	10.3	2.666	N	P	P	0.0270	0.1910	2.3121	85.7	0.6

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	72.0	58.2	46.6	39.7	33.6	24.0	20.6	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

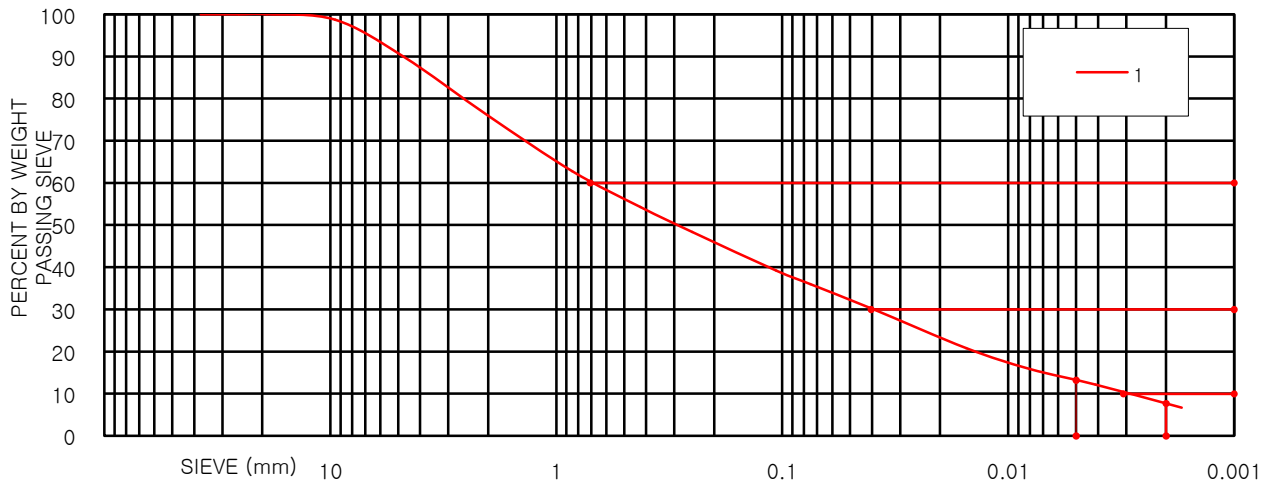
KS F 2301	05. 11. 25 개정
KS F 2302	05. 07. 26 확인
KS F 2303	05. 07. 26 확인
KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

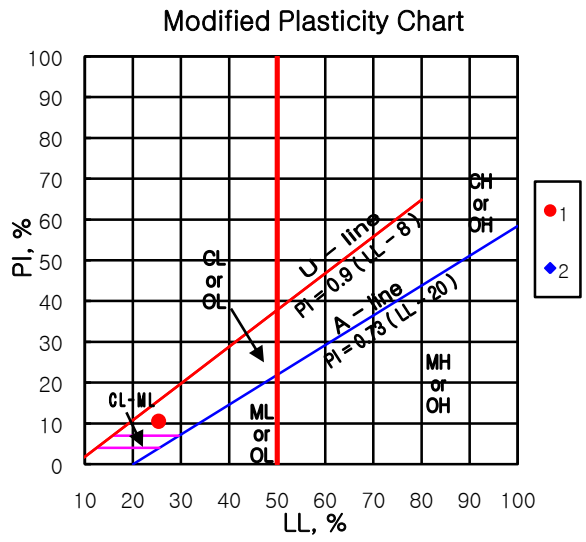
Classification of a Soil (USCS)

Project : 중앙선 도담~영천 복선전철 제 5공구 지반조사

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-39	2.0	1	13.1	2.662	25.3	14.8	10.5	0.0031	0.0405	0.7079	229.1	0.7

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	90.0	75.9	62.8	54.3	48.4	39.2	36.0	7.7	SC	





	1	2	3	비고
A	1.36			
CI	1.16			
LI	-0.16			

Remarks

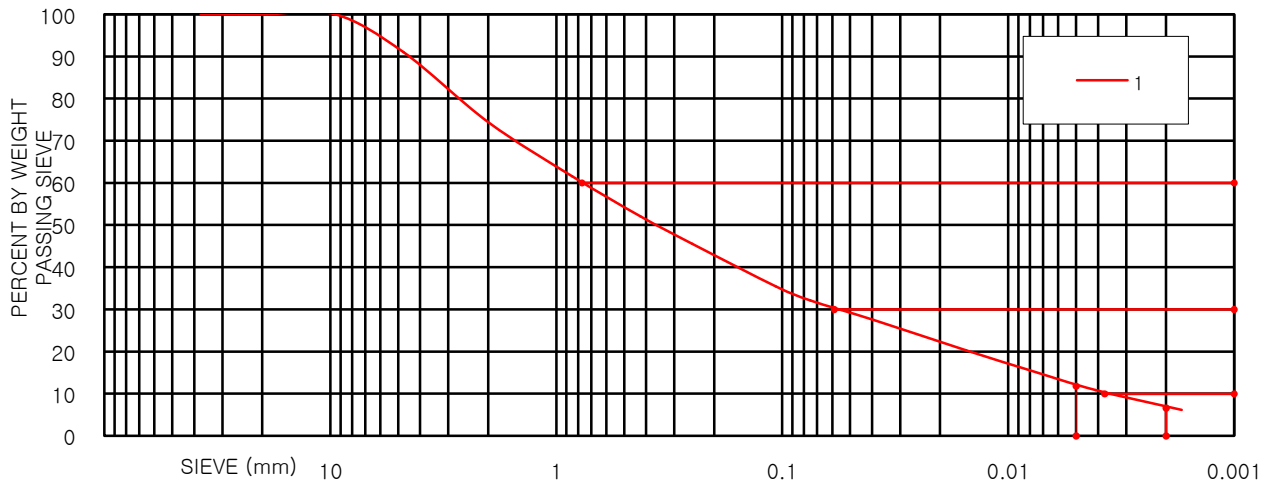
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KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

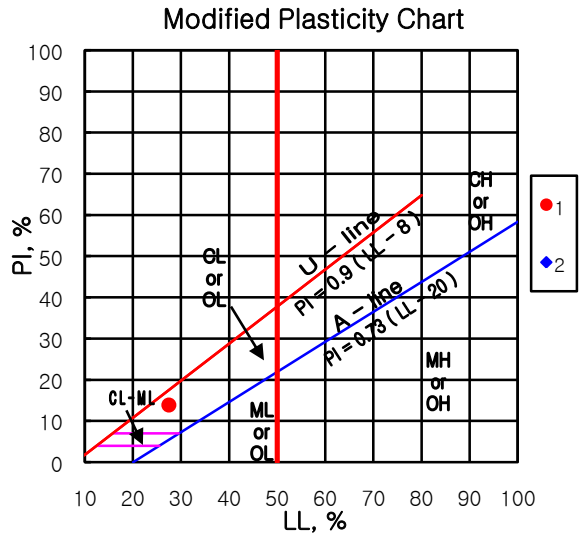
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-40	1.0	1	15.5	2.684	27.4	13.5	13.9	0.0037	0.0589	0.7691	205.6	1.2

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	91.0	74.4	61.6	52.1	45.6	35.4	32.1	6.6	SC	





	1	2	3	비고
A	2.11			
CI	0.85			
LI	0.15			

Remarks

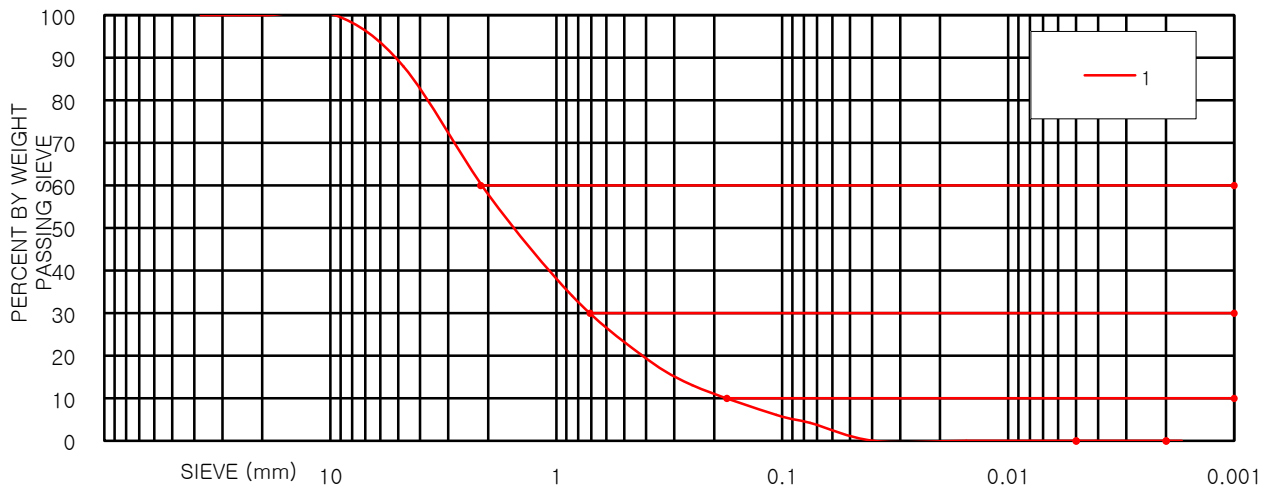
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KS F 2302	05. 07. 26 확인
KS F 2303	05. 07. 26 확인
KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

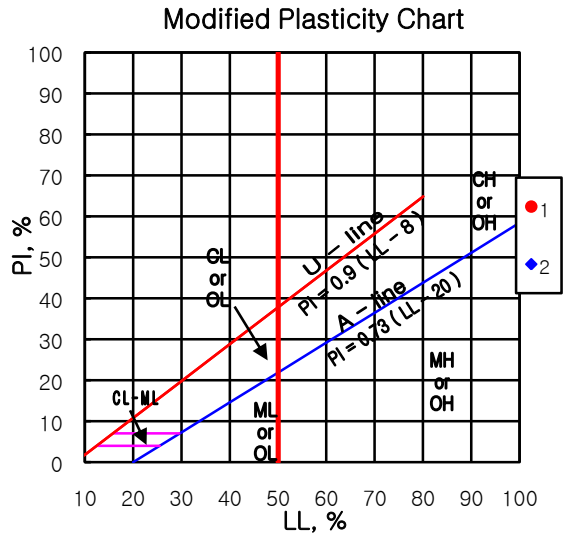
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-40	2.0	1	8.9	2.653	N	P	P	0.1758	0.7096	2.1627	12.3	1.3

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	88.0	57.9	34.1	20.4	13.1	6.1	4.2	-	SW	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

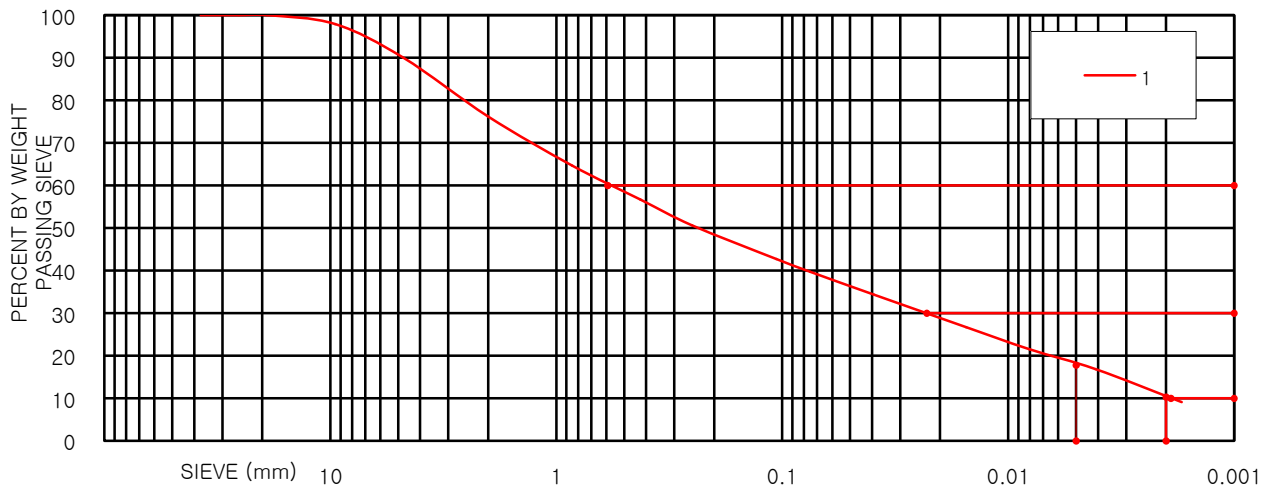
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KS F 2302	05. 07. 26 확인
KS F 2303	05. 07. 26 확인
KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

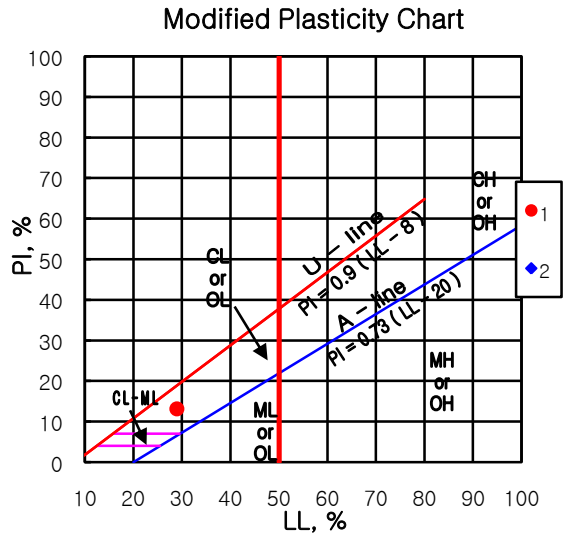
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-41	2.0	1	17.9	2.656	28.9	15.7	13.2	0.0019	0.0229	0.5916	310.5	0.5

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	90.0	76.2	64.7	56.7	50.6	42.7	39.7	10.3	SC	





	1	2	3	비고
A	1.28			
CI	0.84			
LI	0.16			

Remarks

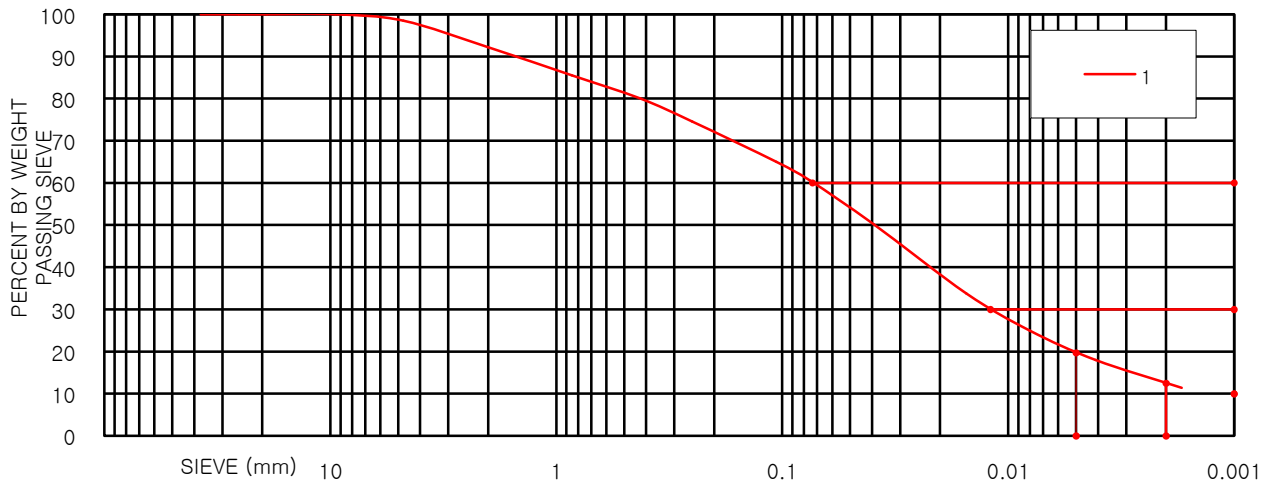
KS F 2301	05. 11. 25 개정
KS F 2302	05. 07. 26 확인
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KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

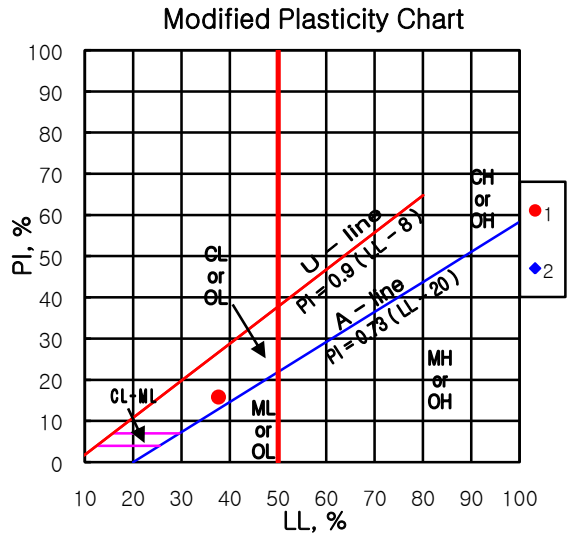
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-42	1.0	1	23.5	2.687	37.6	21.7	15.9	0.0010	0.0120	0.0735	73.5	1.9

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	98.5	92.2	85.5	80.0	74.6	65.0	60.5	12.5	CL	





	1	2	3	비고
A	1.27			
CI	0.89			
LI	0.11			

Remarks

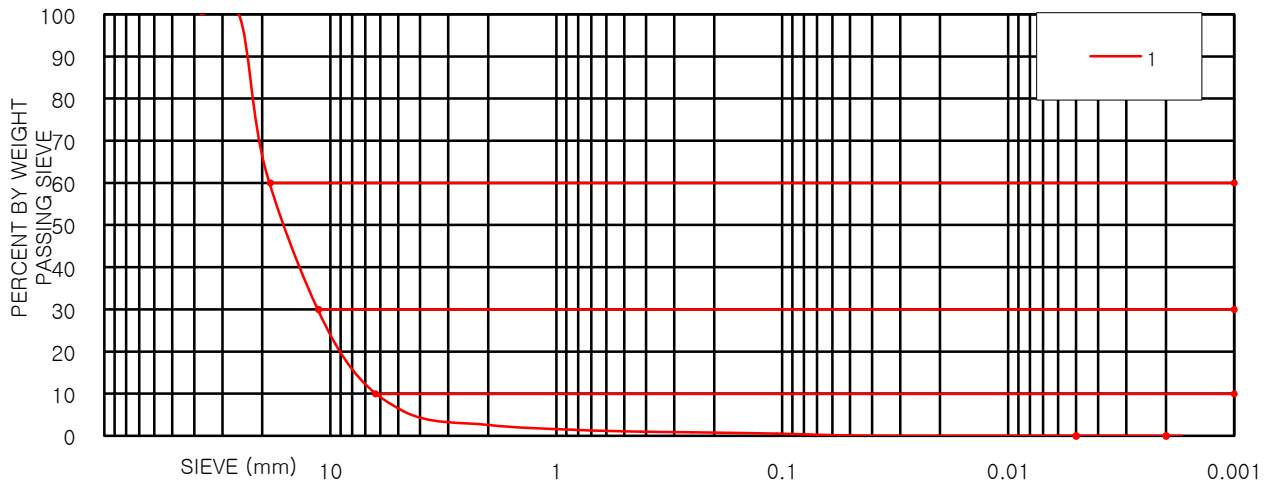
KS F 2301	05. 11. 25 개정
KS F 2302	05. 07. 26 확인
KS F 2303	05. 07. 26 확인
KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

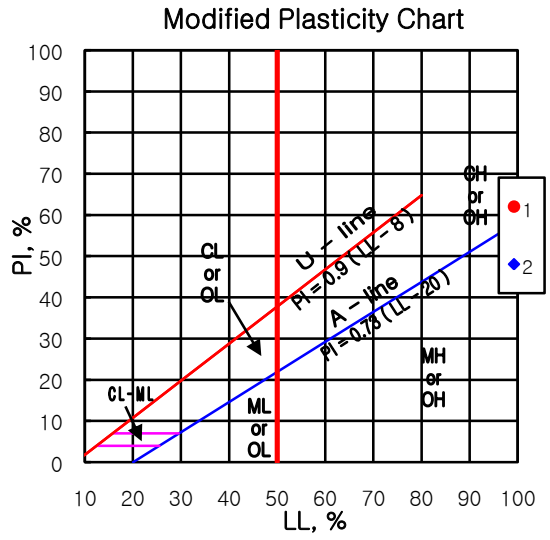
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-42	2.0	1	3.4	2.642	N	P	P	6.3096	11.2720	18.4502	2.9	1.1

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	5.9	2.6	1.5	1.0	0.9	0.6	0.3	-	GP	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

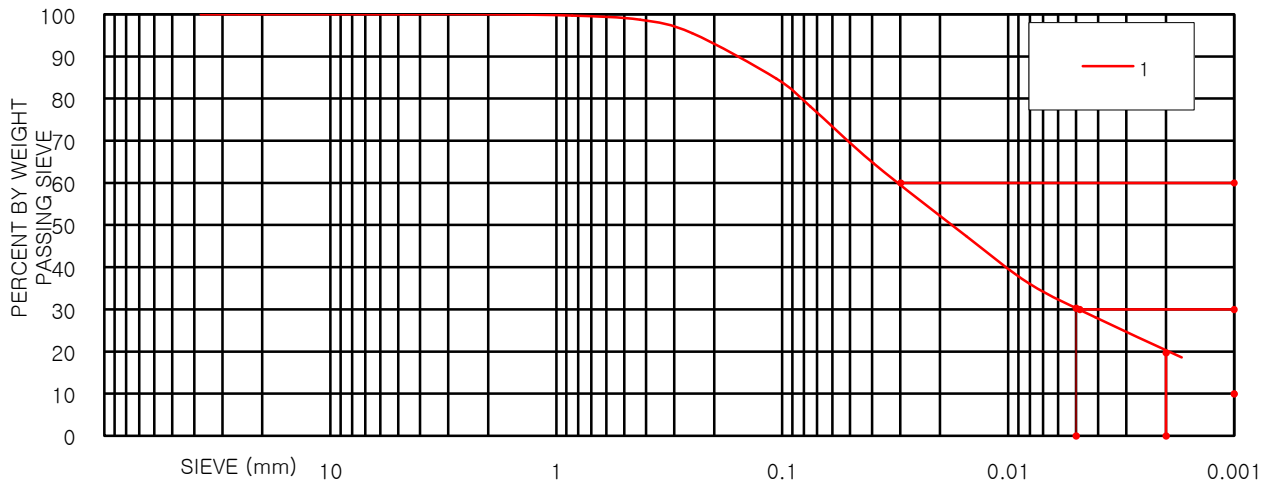
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KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

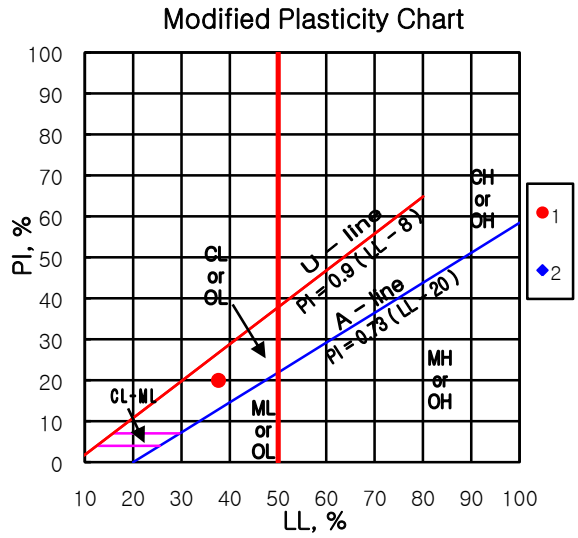
Classification of a Soil (USCS)

Project : 중앙선 도담~영천 복선전철 제 5공구 지반조사

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-43	1.0	1	30.6	2.679	37.6	17.6	20.0	0.0010	0.0048	0.0299	29.9	0.8

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	100.0	100.0	99.7	98.7	95.5	84.7	78.1	19.7	CL	





	1	2	3	비고
A	1.02			
CI	0.35			
LI	0.65			

Remarks

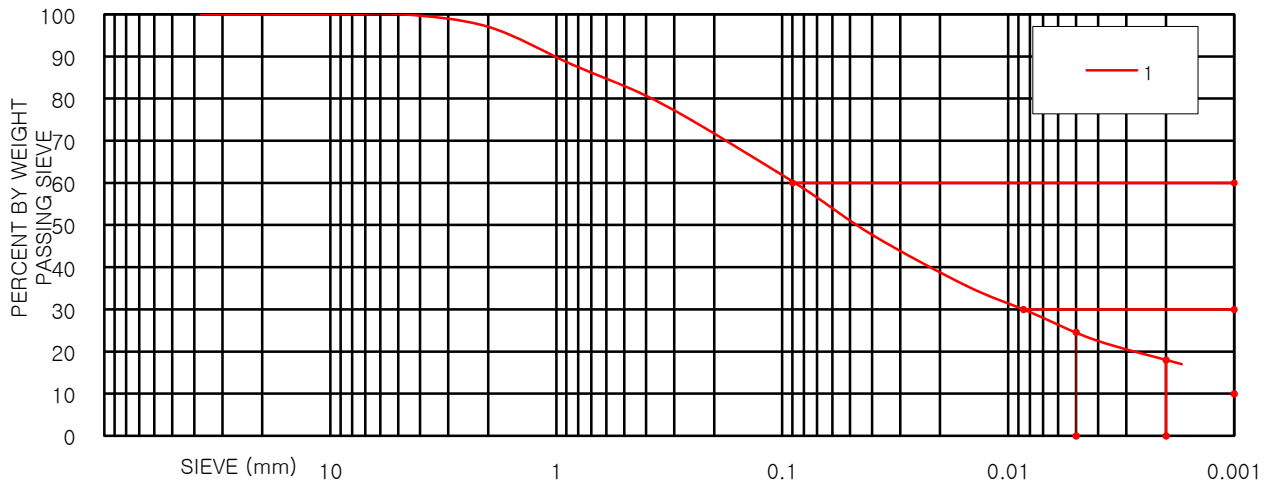
KS F 2301	05. 11. 25 개정
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KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

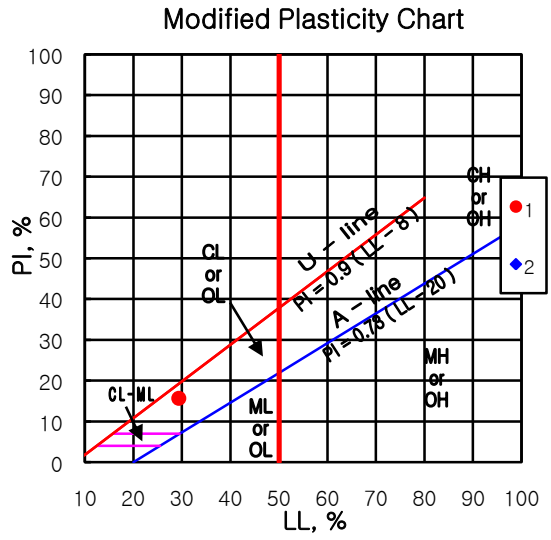
Classification of a Soil (USCS)

Project : 중앙선 도담~영천 복선전철 제 5공구 지반조사

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-43	2.0	1	26.3	2.674	29.3	13.6	15.7	0.0010	0.0086	0.0899	89.9	0.8

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	100.0	97.0	88.1	81.3	74.8	62.7	57.6	18.0	CL	





	1	2	3	비고
A	0.87			
CI	0.19			
LI	0.81			

Remarks

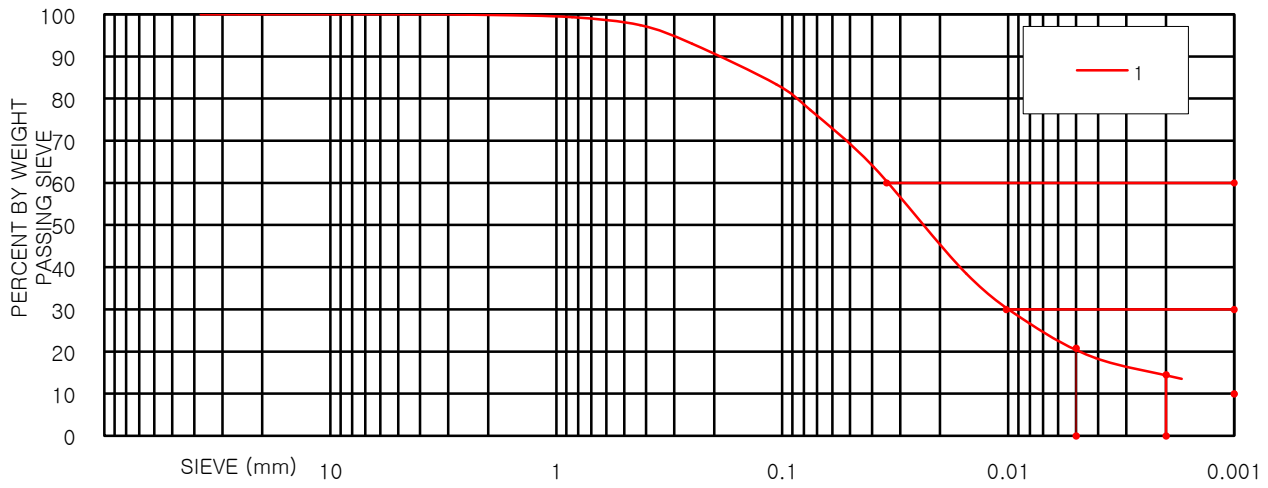
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KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

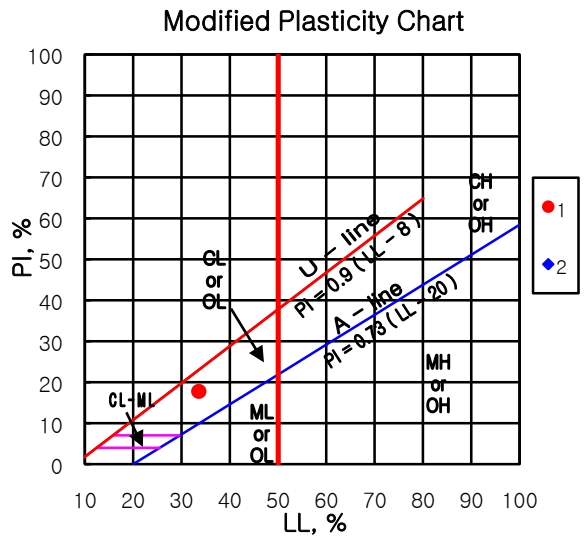
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-44	1.0	1	23.7	2.693	33.6	15.8	17.8	0.0010	0.0102	0.0345	34.5	3.0

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	100.0	99.9	99.3	97.4	93.0	83.4	77.3	14.5	CL	





	1	2	3	비고
A	1.23			
CI	0.55			
LI	0.45			

Remarks

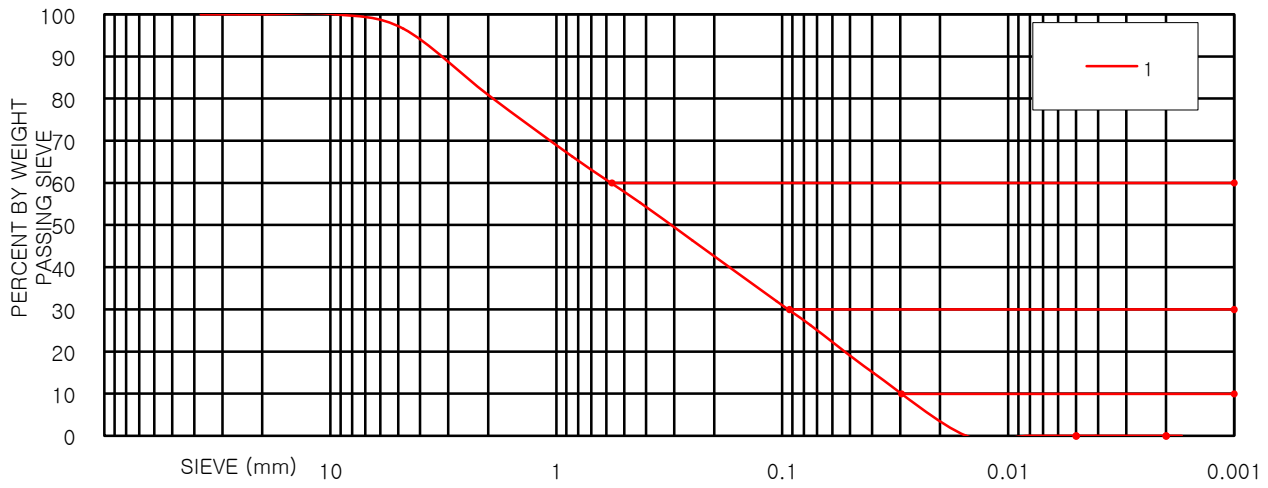
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

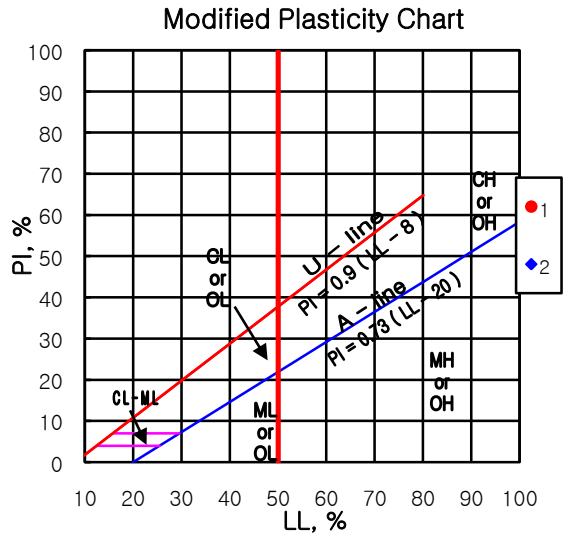
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-44	2.0	1	9.2	2.684	N	P	P	0.0296	0.0929	0.5675	19.1	0.5

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	96.6	80.9	66.3	55.3	46.4	32.0	26.3	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

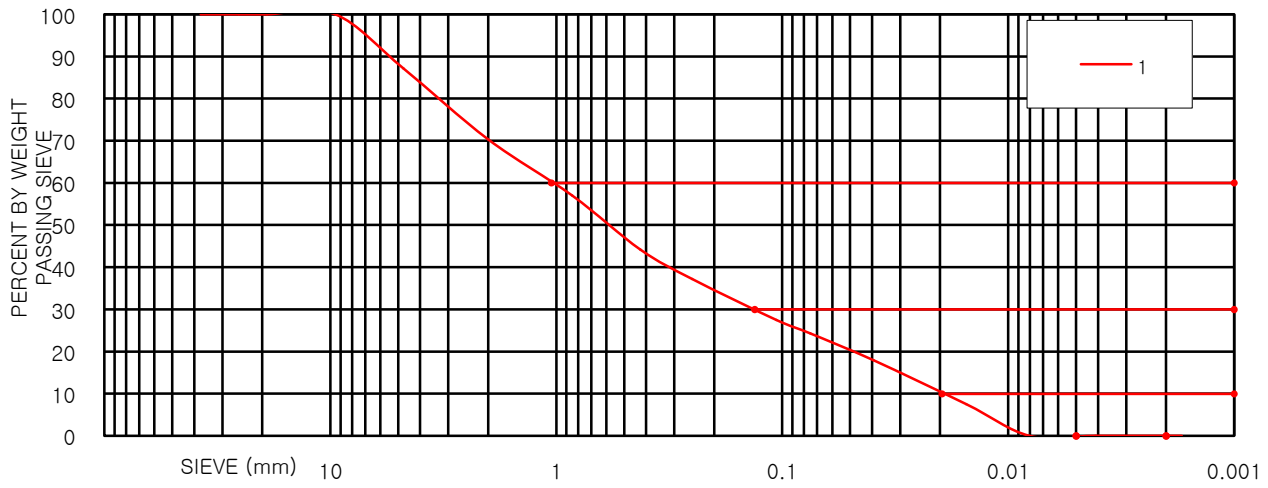
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

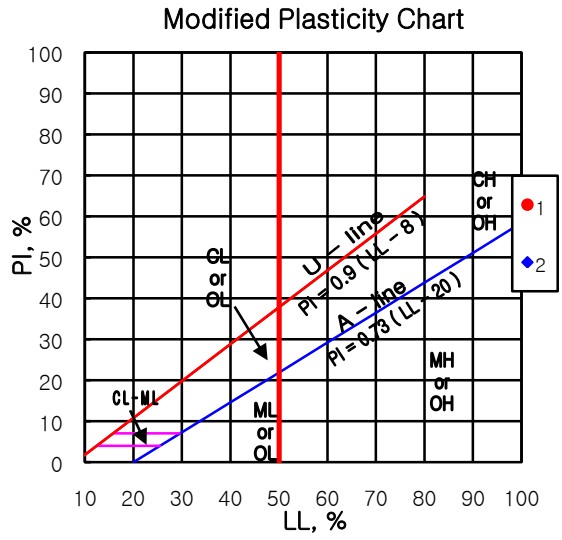
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-44	3.0	1	8.5	2.656	N	P	P	0.0196	0.1324	1.0520	53.6	0.8

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	87.2	70.3	57.0	44.2	37.2	27.5	24.3	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

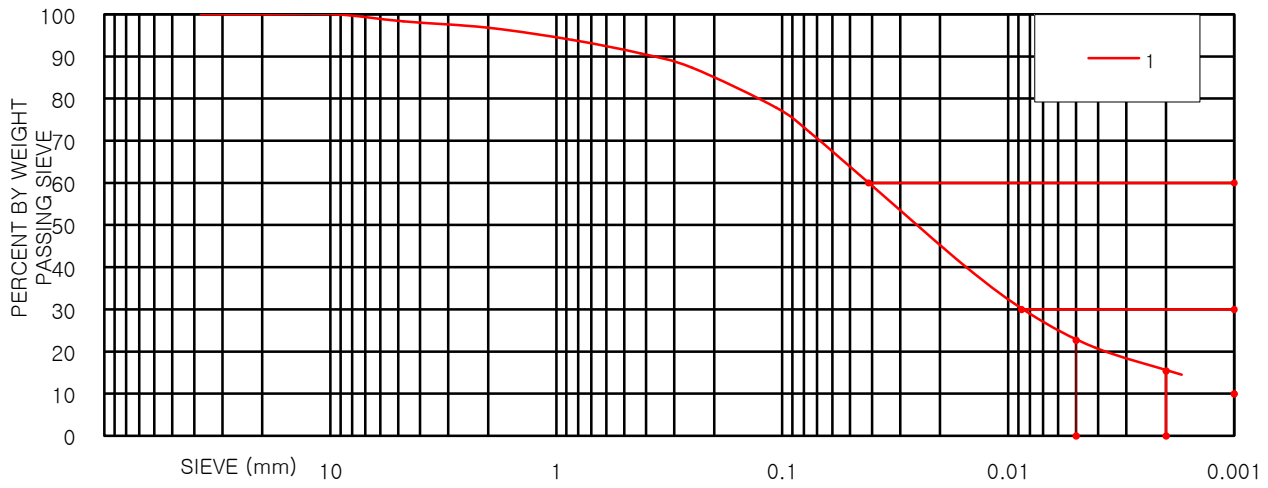
KS F 2301	05. 11. 25 개정
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KS F 2303	05. 07. 26 확인
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

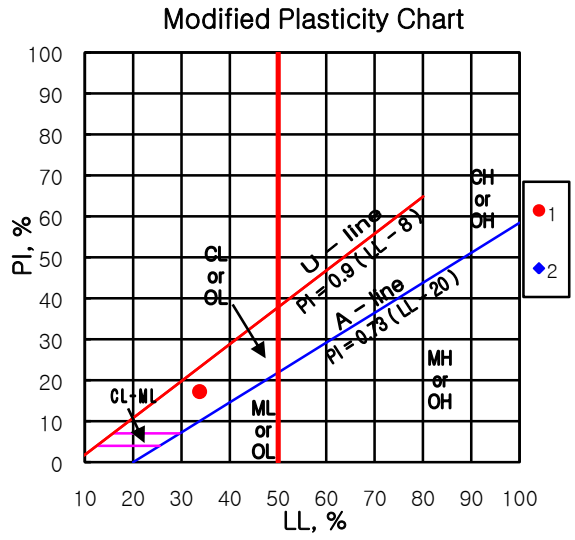
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-45	1.0	1	27.1	2.682	33.7	16.4	17.3	0.0010	0.0087	0.0415	41.5	1.8

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	98.3	96.8	93.9	90.7	87.3	77.8	71.9	15.4	CL	





	1	2	3	비고
A	1.12			
CI	0.38			
LI	0.62			

Remarks

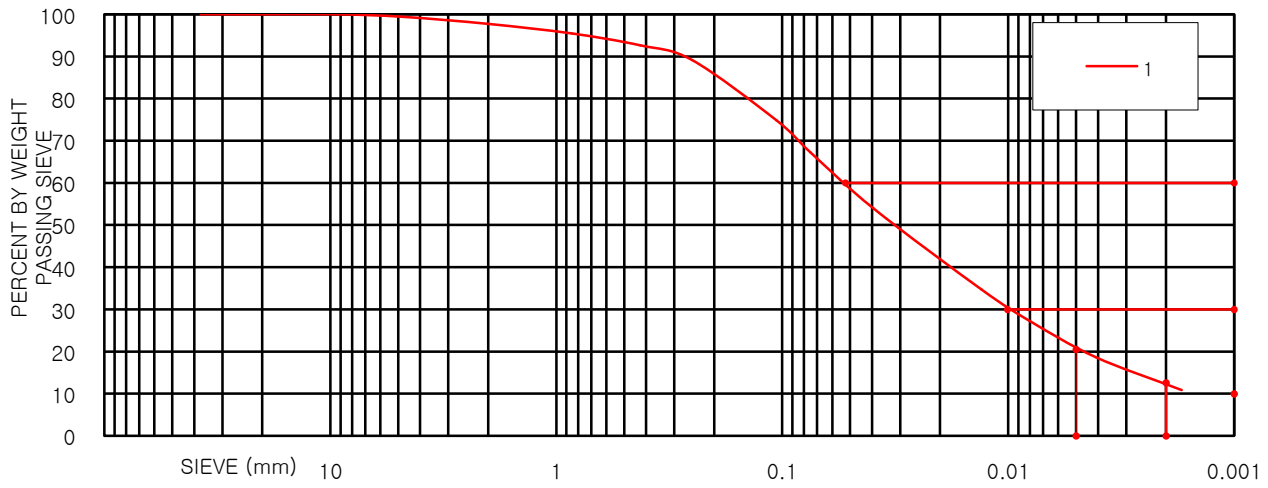
KS F 2301	05. 11. 25 개정
KS F 2302	05. 07. 26 확인
KS F 2303	05. 07. 26 확인
KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

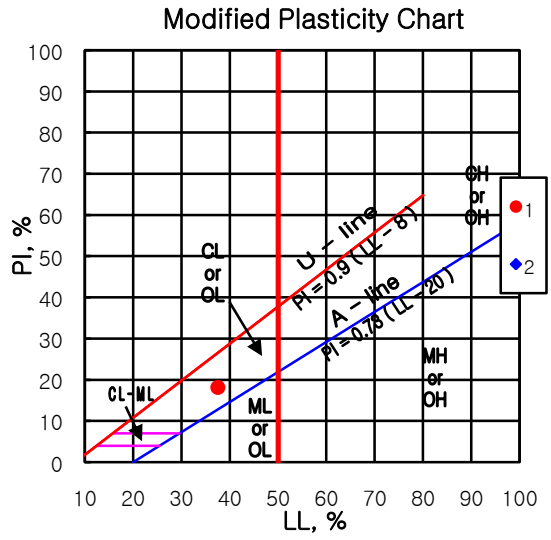
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-45	2.0	1	28.3	2.691	37.5	19.3	18.2	0.0010	0.0101	0.0525	52.5	1.9

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	99.4	97.7	95.4	92.6	89.1	74.9	67.3	12.6	CL	





	1	2	3	비고
A	1.44			
CI	0.50			
LI	0.50			

Remarks

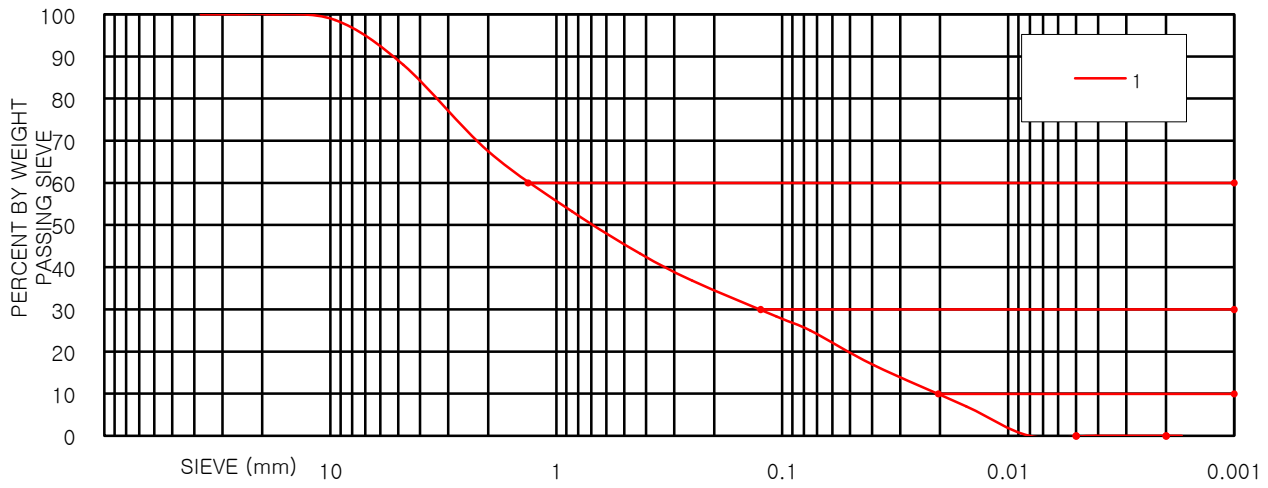
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KS F 2302	05. 07. 26 확인
KS F 2303	05. 07. 26 확인
KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

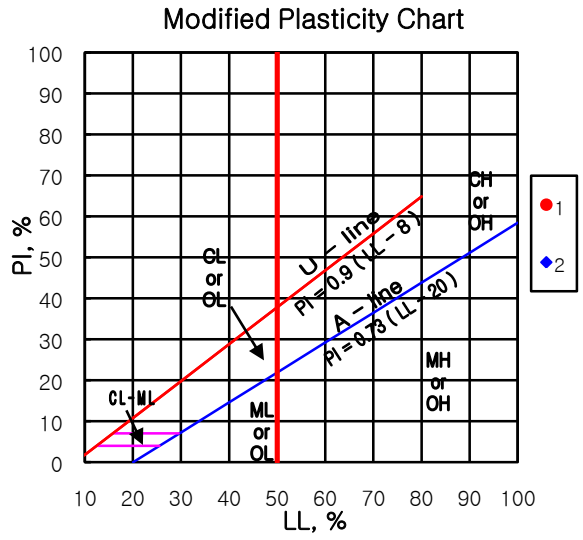
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-45	4.0	1	8.9	2.656	N	P	P	0.0204	0.1247	1.3335	65.5	0.6

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	88.0	67.5	53.2	43.2	36.8	28.3	25.0	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

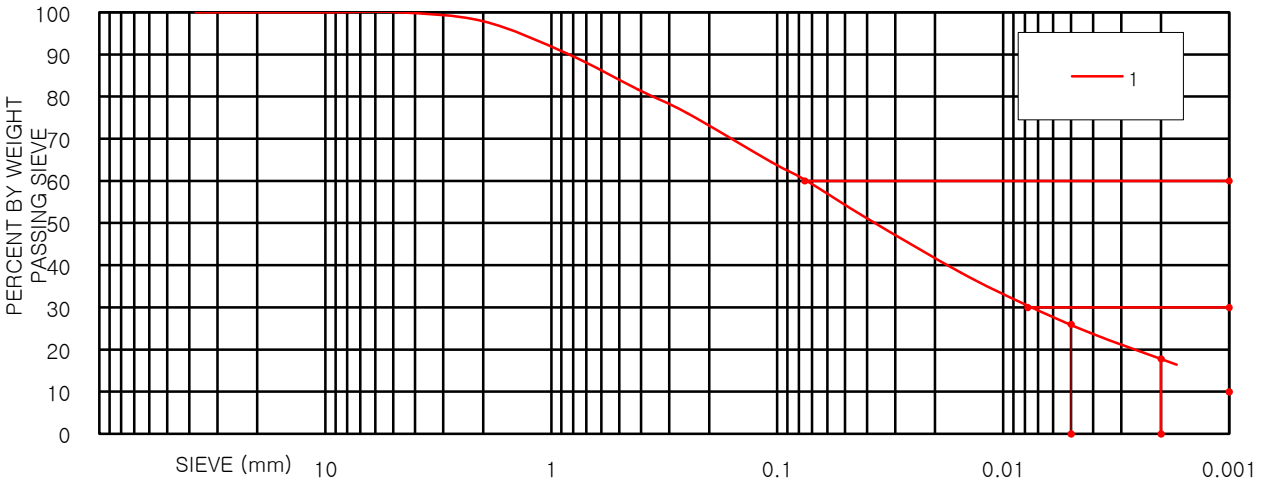
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KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

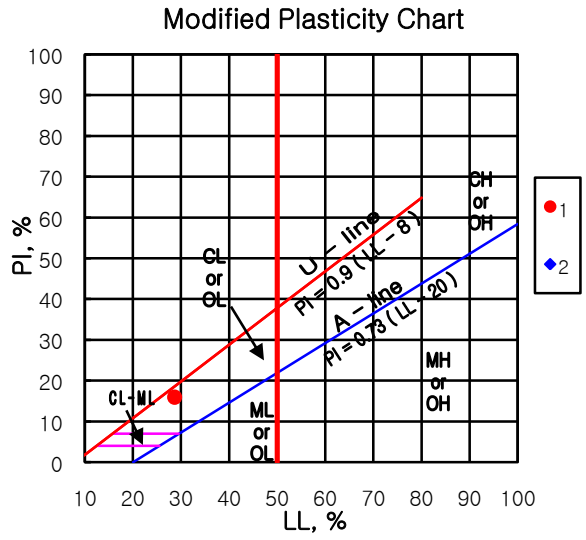
Classification of a Soil (USCS)

Project : 중앙선 도담~영천 복선전철 제 5공구 지반조사

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-46	2.0	1	22.4	2.680	28.6	12.7	15.9	0.0010	0.0078	0.0755	75.5	0.8

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	100.0	97.9	90.2	81.7	76.1	64.5	60.2	17.8	CL	





	1	2	3	비고
A	0.89			
CI	0.39			
LI	0.61			

Remarks

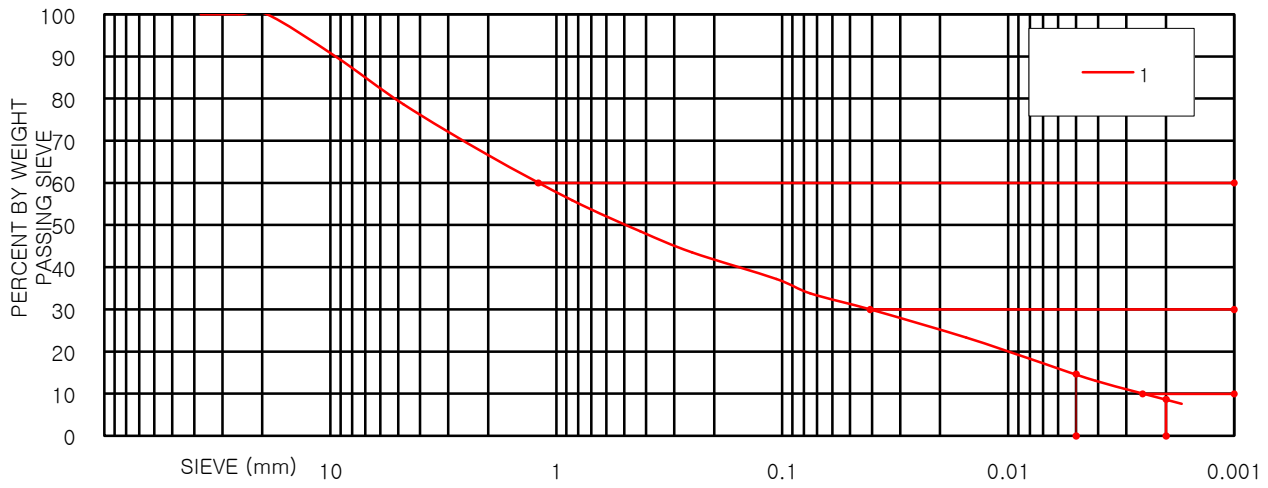
KS F 2301	05. 11. 25 개정
KS F 2302	05. 07. 26 확인
KS F 2303	05. 07. 26 확인
KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

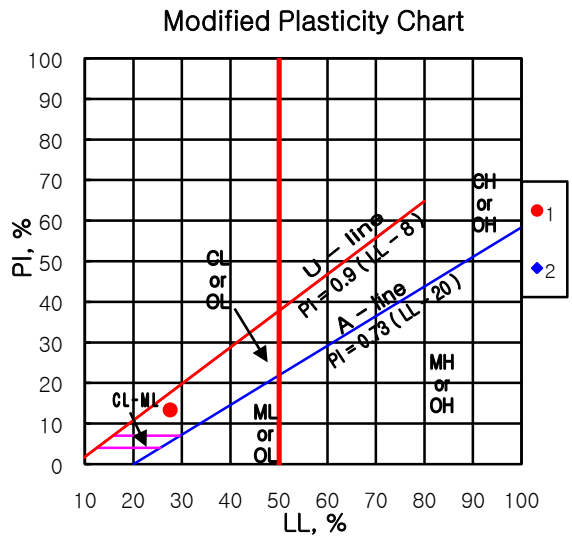
Classification of a Soil (USCS)

Project : 중앙선 도담~영천 복선전철 제 5공구 지반조사

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-46	4.0	1	14.9	2.667	27.5	14.1	13.4	0.0025	0.0408	1.2023	473.2	0.5

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	78.7	66.6	55.9	48.5	43.5	37.2	33.8	8.7	SC	





	1	2	3	비고
A	1.54			
CI	0.94			
LI	0.06			

Remarks

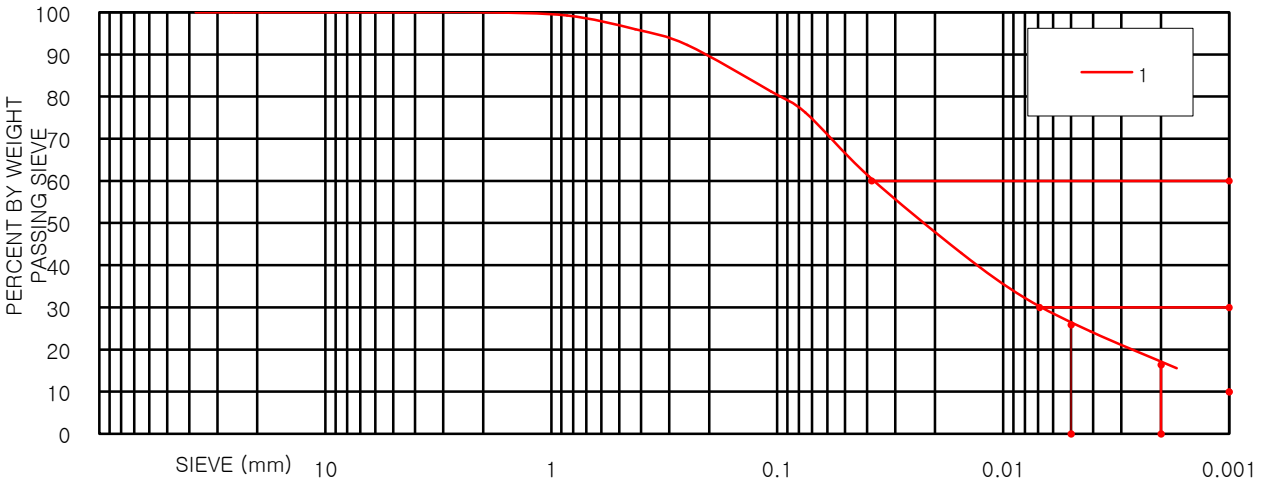
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KS F 2302	05. 07. 26 확인
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

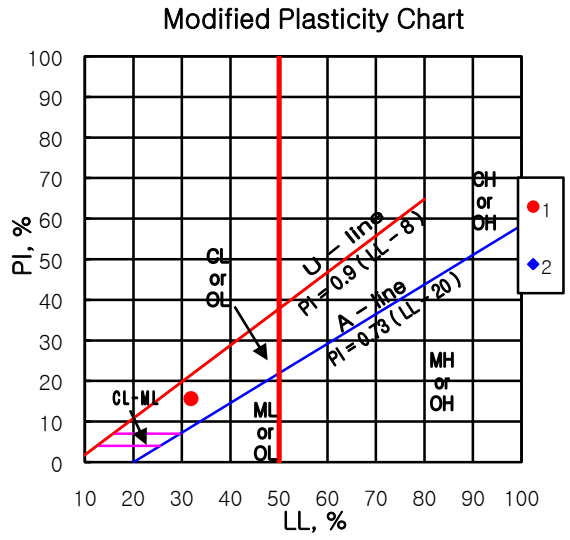
Classification of a Soil (USCS)

Project : 중앙선 도담~영천 복선전철 제 5공구 지반조사

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-47	1.0	1	30.7	2.690	31.8	16.1	15.7	0.0010	0.0069	0.0382	38.2	1.2

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	100.0	100.0	99.2	96.0	92.3	81.2	76.2	16.4	CL	





	1	2	3	비고
A	0.96			
CI	0.07			
LI	0.93			

Remarks

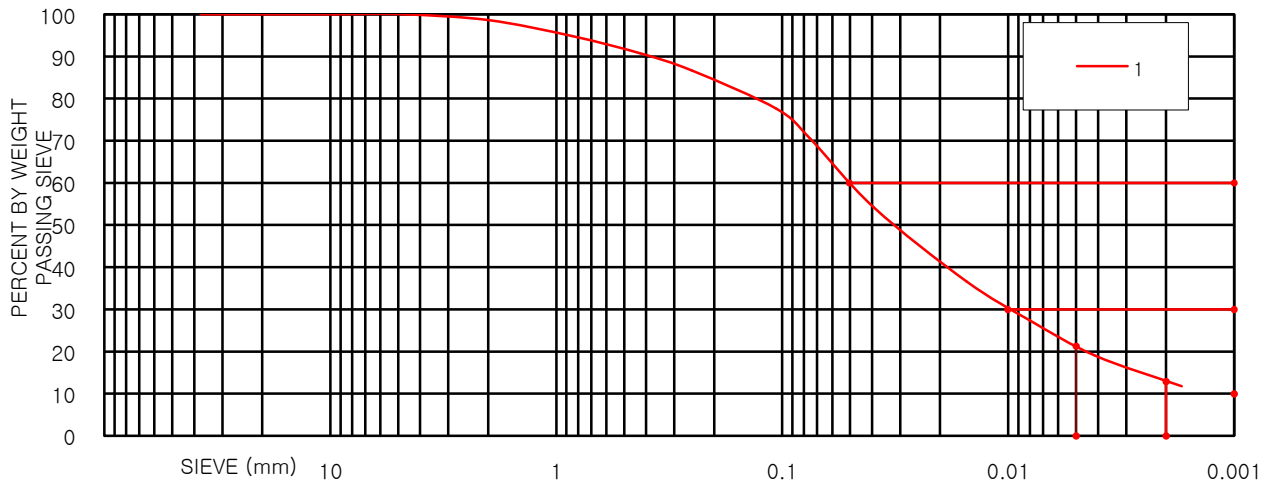
KS F 2301	05. 11. 25 개정
KS F 2302	05. 07. 26 확인
KS F 2303	05. 07. 26 확인
KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

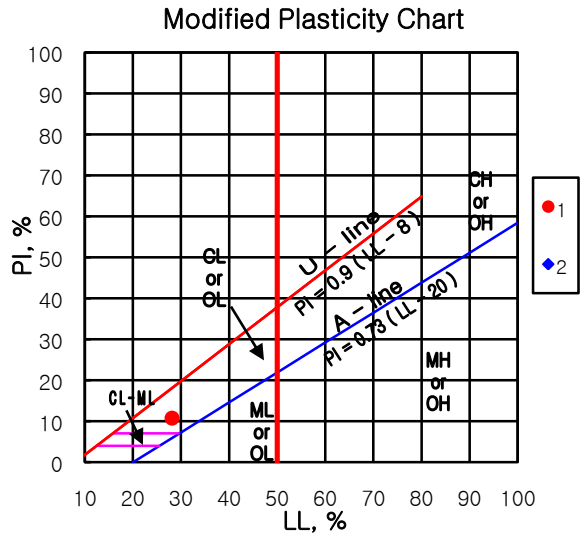
Classification of a Soil (USCS)

Project : 중앙선 도담~영천 복선전철 제 5공구 지반조사

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-47	2.0	1	23.9	2.672	28.1	17.3	10.8	0.0010	0.0100	0.0505	50.5	2.0

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	100.0	98.6	94.8	90.7	86.6	77.6	70.5	12.9	CL	





	1	2	3	비고
A	0.84			
CI	0.39			
LI	0.61			

Remarks

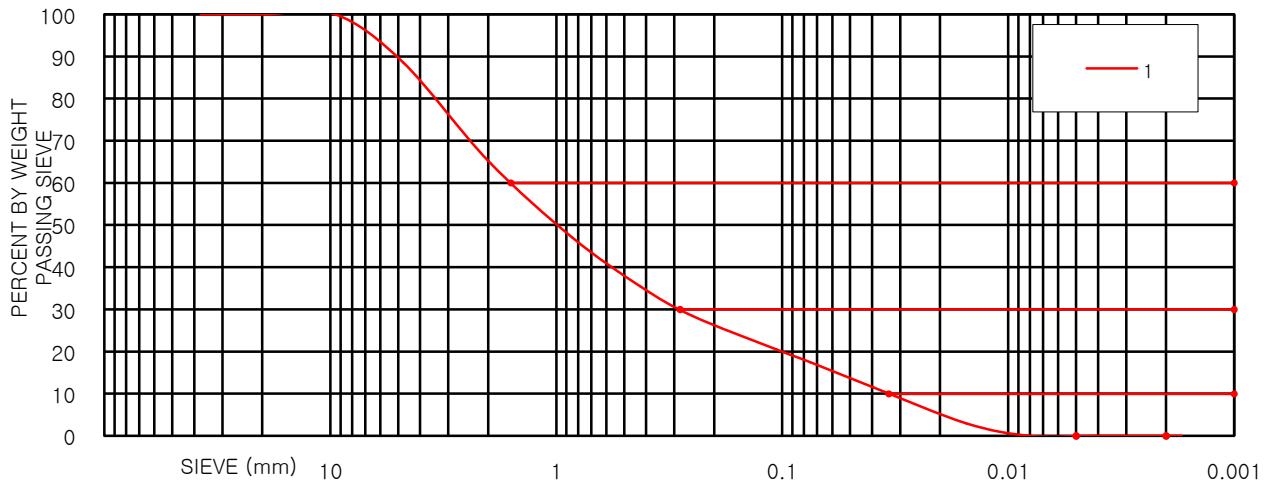
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

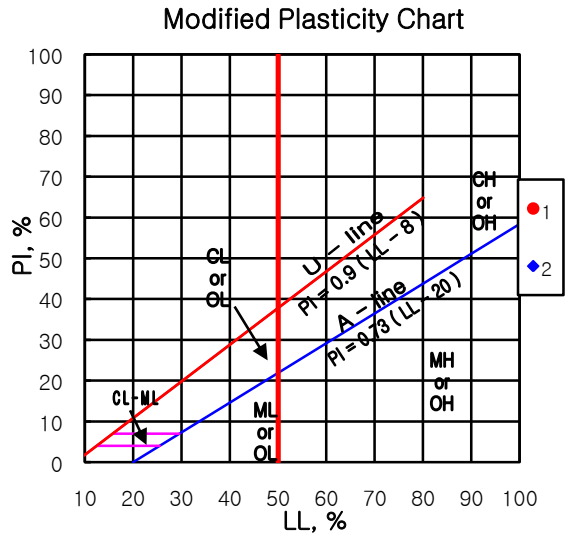
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-48	1.0	1	16.4	2.663	N	P	P	0.0337	0.2831	1.5885	47.1	1.5

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	88.5	65.2	47.1	35.5	28.5	20.5	17.5	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

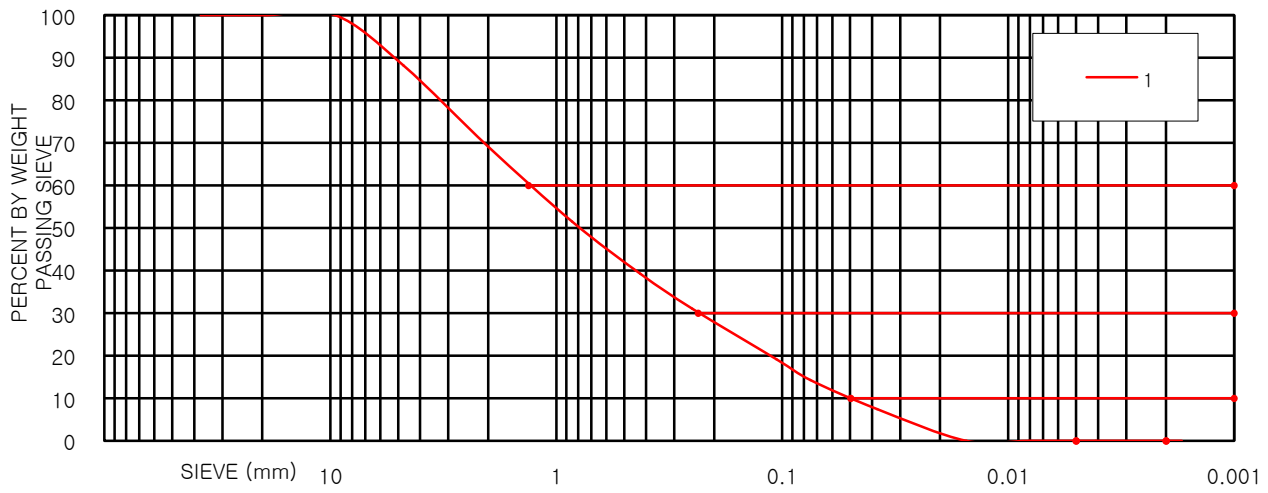
KS F 2301	05. 11. 25 개정
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KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

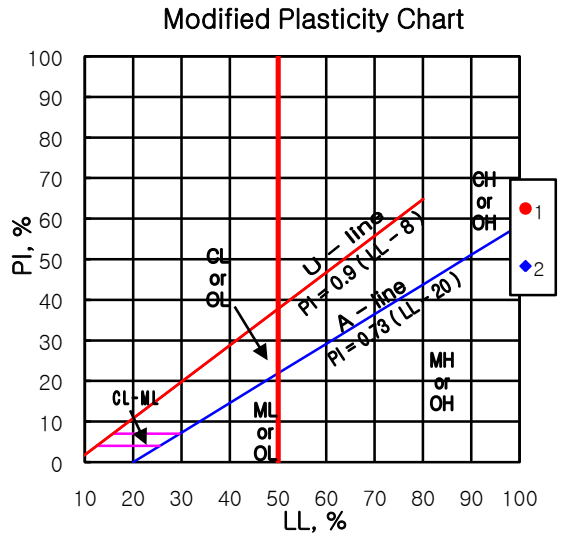
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-48	2.0	1	9.9	2.671	N	P	P	0.0498	0.2355	1.3274	26.7	0.8

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	88.2	69.1	51.5	39.3	31.1	19.2	14.3	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

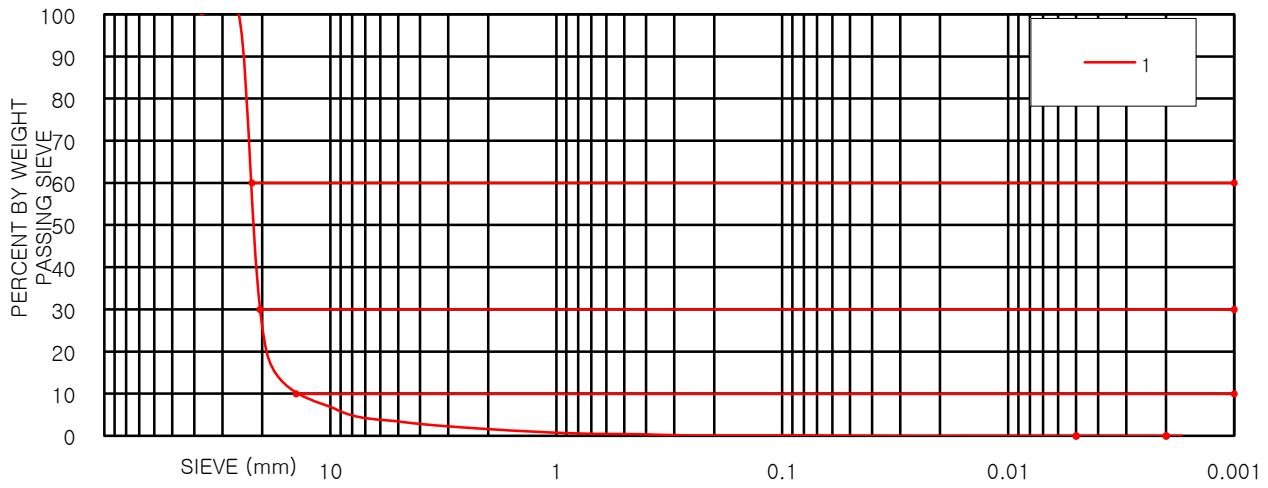
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KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

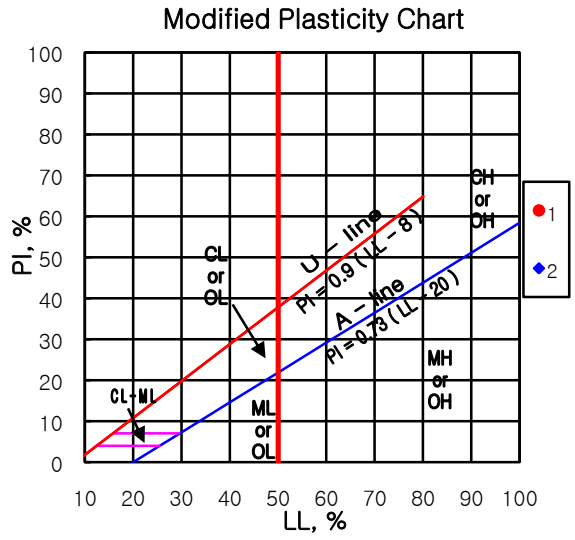
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-48	3.0	1	2.4	2.632	N	P	P	14.1906	20.4644	22.2331	1.6	1.3

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	3.3	1.6	0.6	0.4	0.1	0.1	0.1	-	GP	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

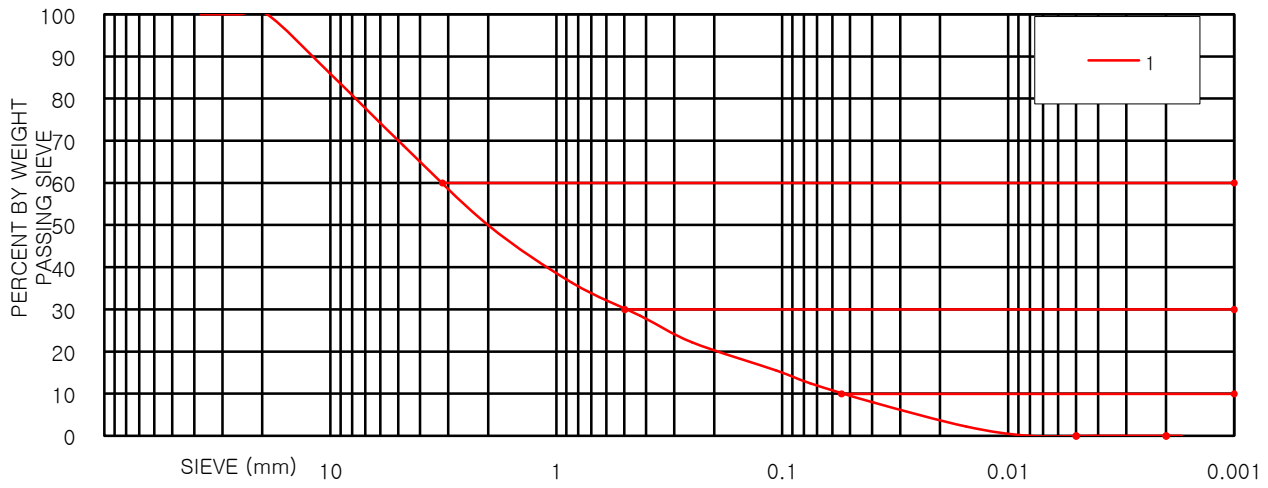
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

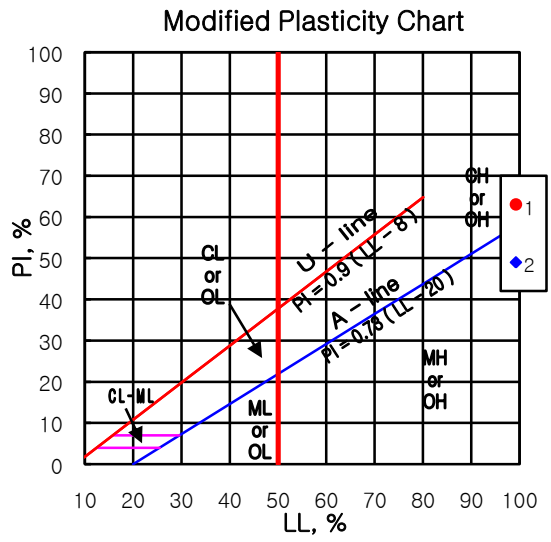
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-49	1.0	1	8.7	2.676	N	P	P	0.0547	0.4977	3.1915	58.3	1.4

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	68.9	50.0	36.3	28.5	22.2	15.5	12.5	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

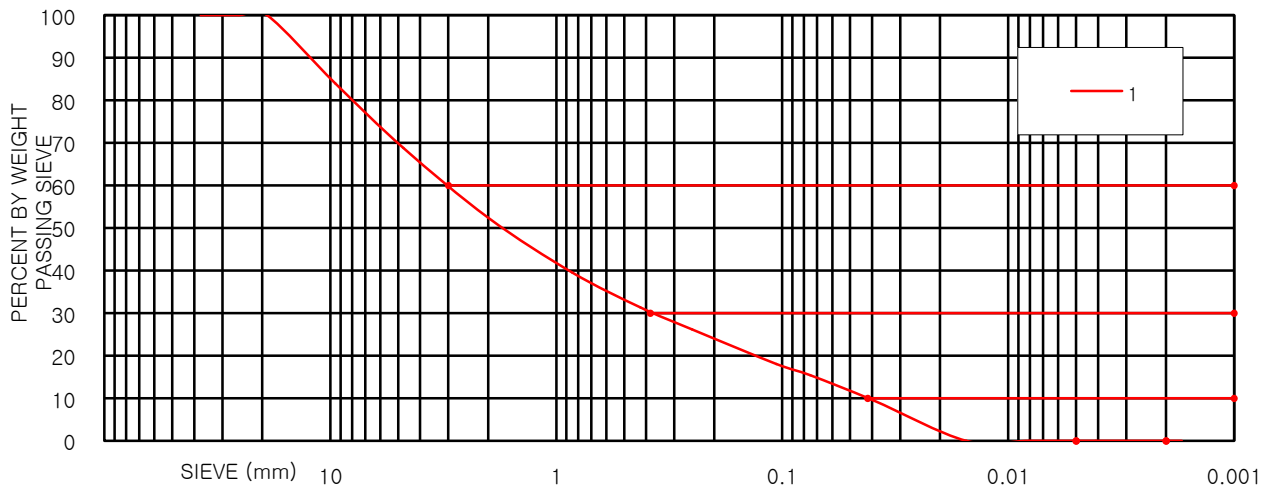
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

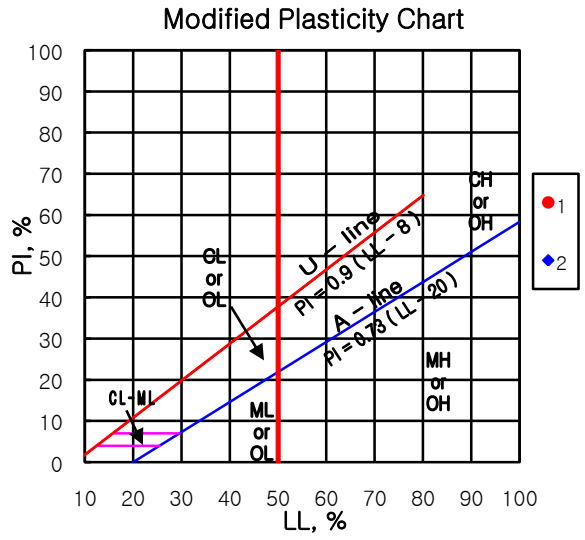
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-49	2.0	1	9.3	2.654	N	P	P	0.0419	0.3837	2.9992	71.6	1.2

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	68.8	52.4	39.6	31.4	26.2	18.1	15.4	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

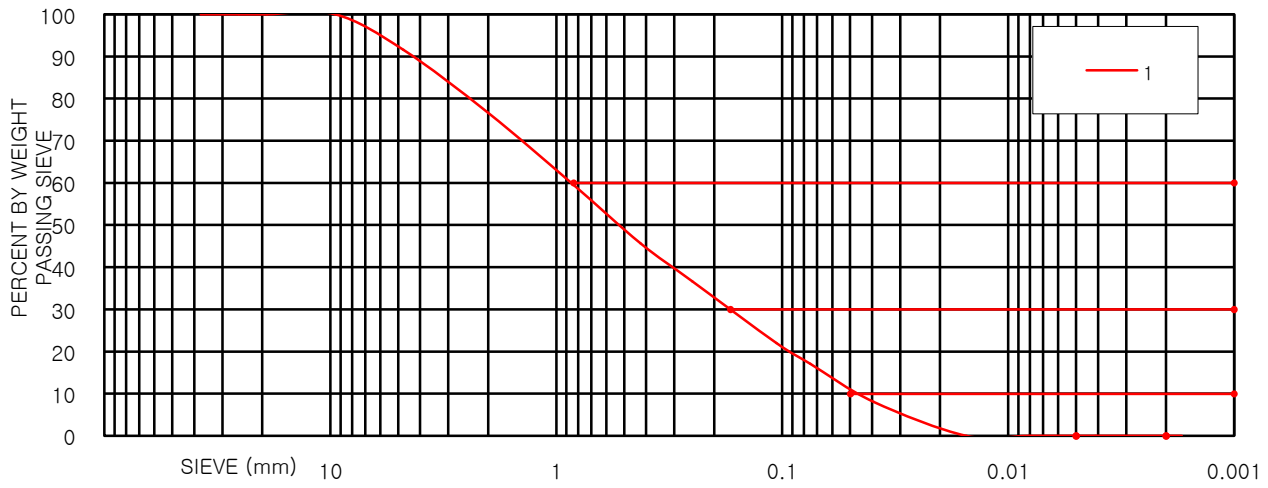
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KS F 2302	05. 07. 26 확인
KS F 2303	05. 07. 26 확인
KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

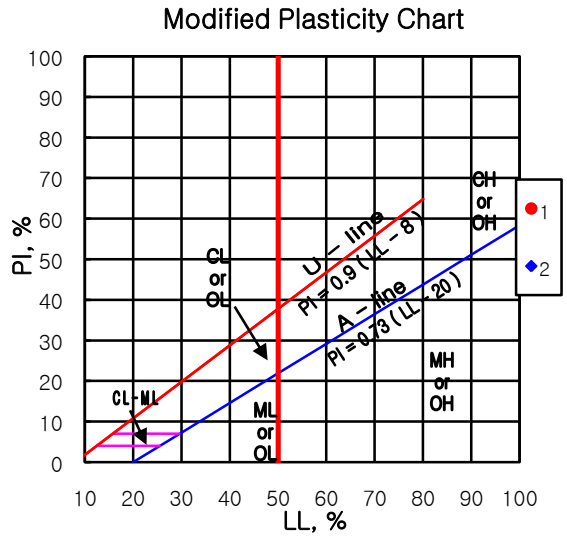
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-49	3.0	1	13.1	2.659	N	P	P	0.0499	0.1694	0.8375	16.8	0.7

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	91.6	76.6	59.8	45.7	36.7	22.0	17.1	-	SM	





	1	2	3	비고
A	#######			
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LI	#######			

Remarks

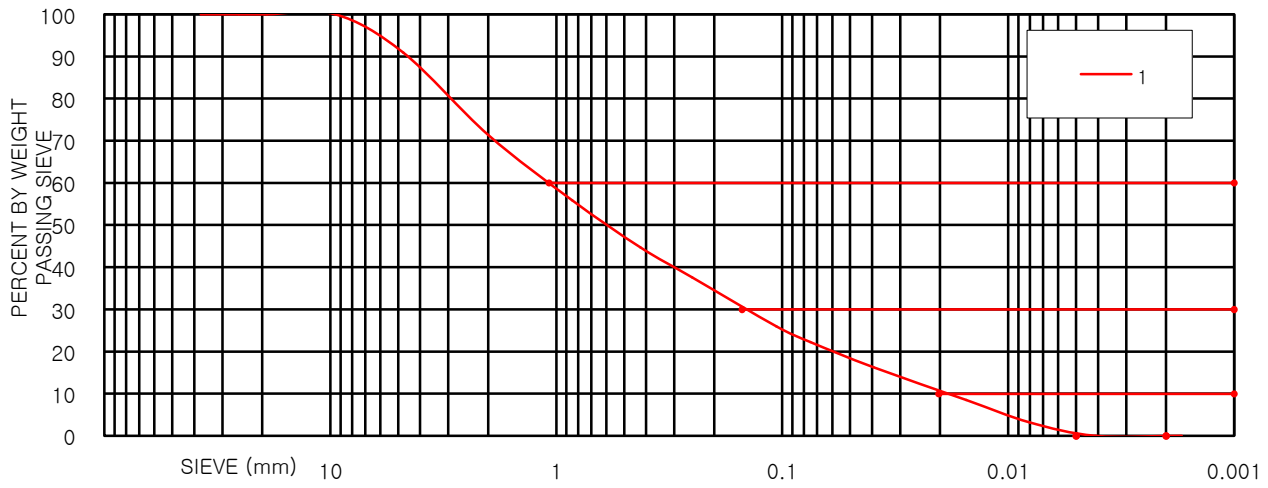
KS F 2301	05. 11. 25 개정
KS F 2302	05. 07. 26 확인
KS F 2303	05. 07. 26 확인
KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

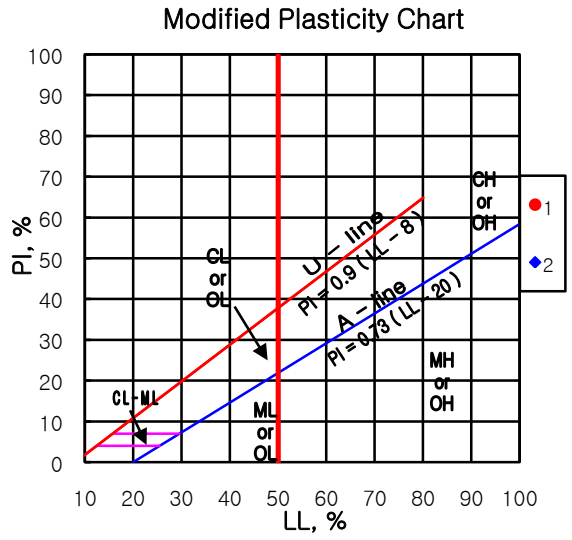
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-50	1.0	1	5.3	2.656	N	P	P	0.0203	0.1507	1.0765	53.1	1.0

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	90.9	71.4	55.9	44.7	37.6	26.0	22.3	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
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Remarks

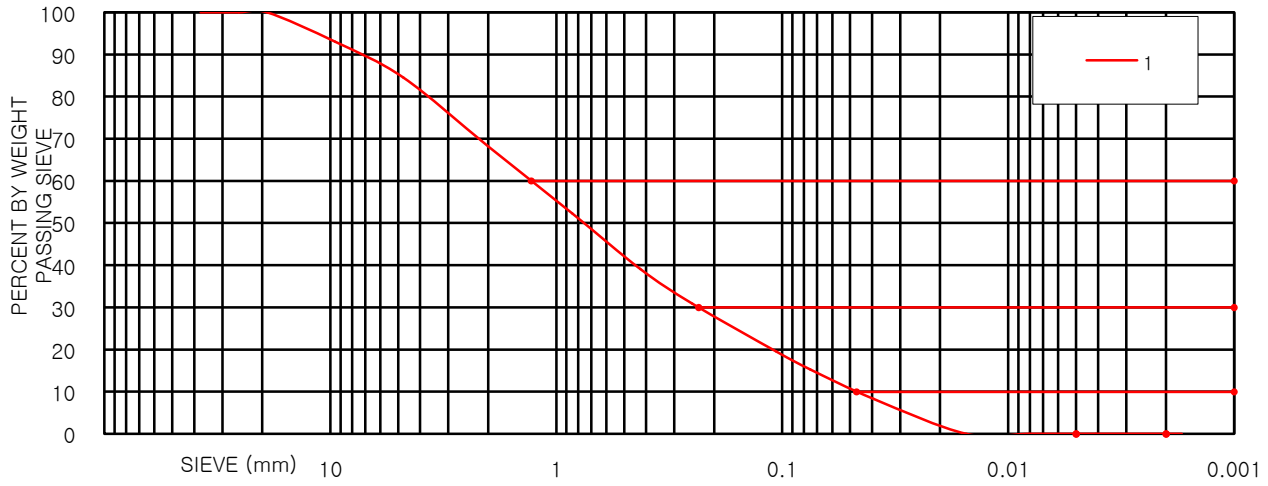
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

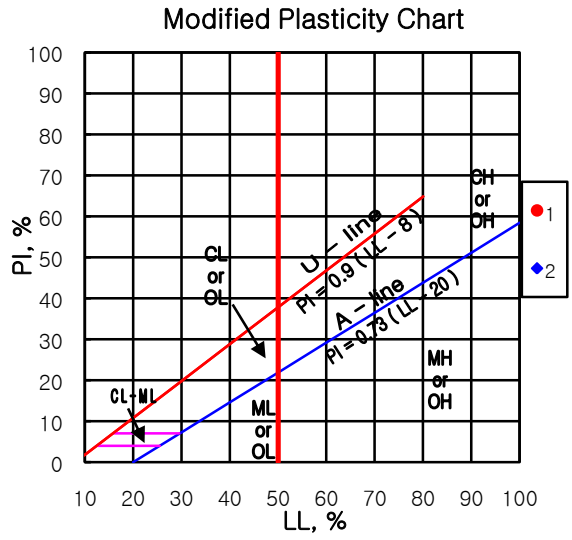
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-51	1.0	1	16.6	2.671	N	P	P	0.0469	0.2344	1.2912	27.5	0.9

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	84.5	68.2	52.3	39.1	30.9	19.5	15.3	-	SM	





	1	2	3	비고
A	#######			
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Remarks

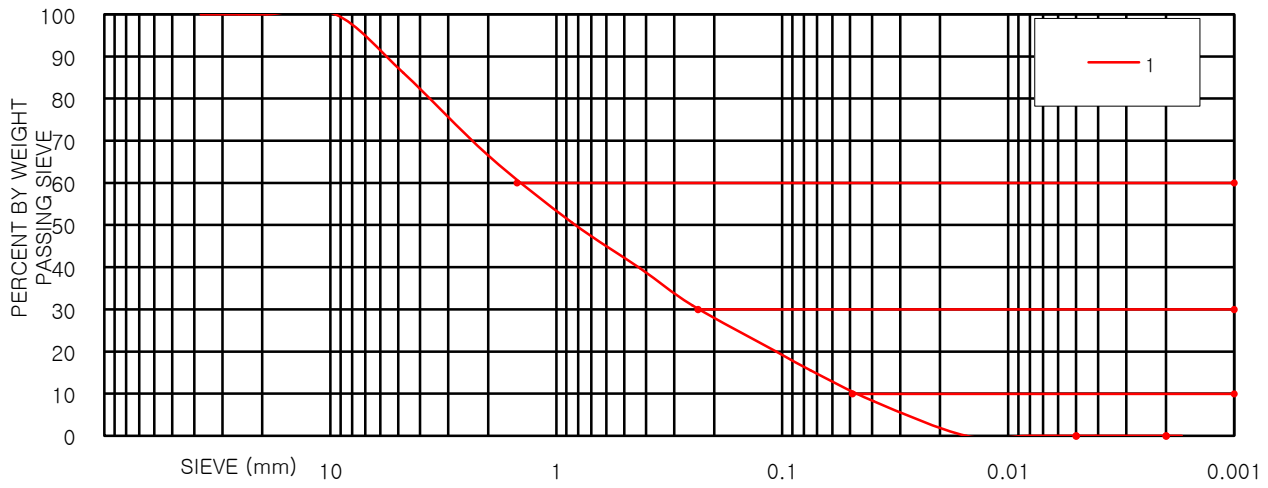
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KS F 2302	05. 07. 26 확인
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

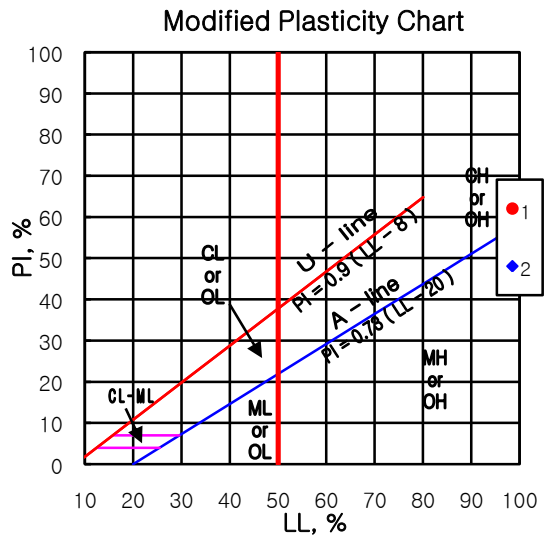
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-52	1.0	1	9.1	2.659	N	P	P	0.0490	0.2360	1.4928	30.5	0.8

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	86.1	66.5	50.6	39.7	31.0	20.0	15.6	-	SM	





	1	2	3	비고
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Remarks

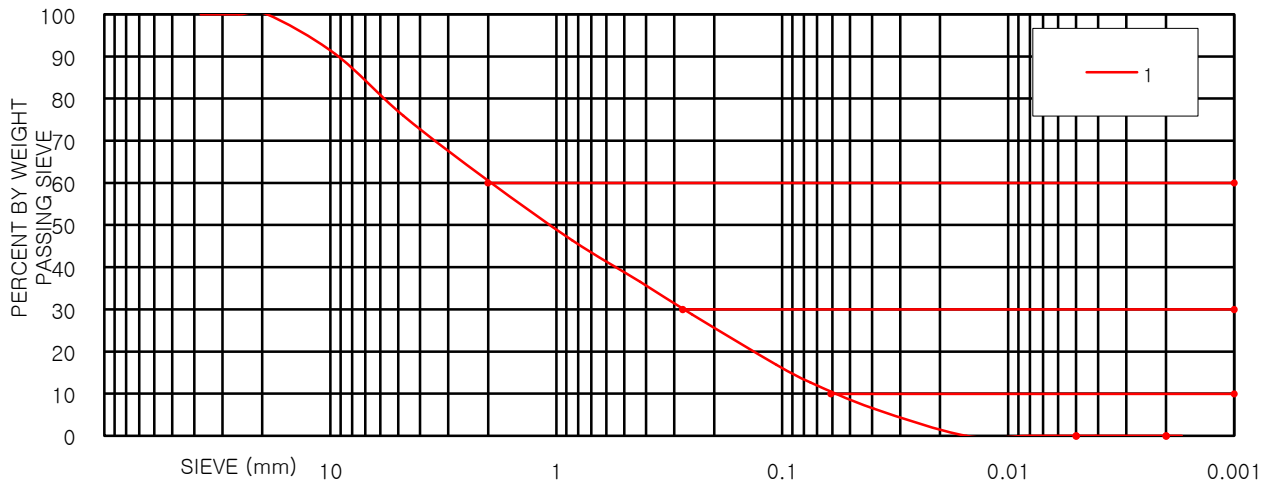
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KS F 2302	05. 07. 26 확인
KS F 2303	05. 07. 26 확인
KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

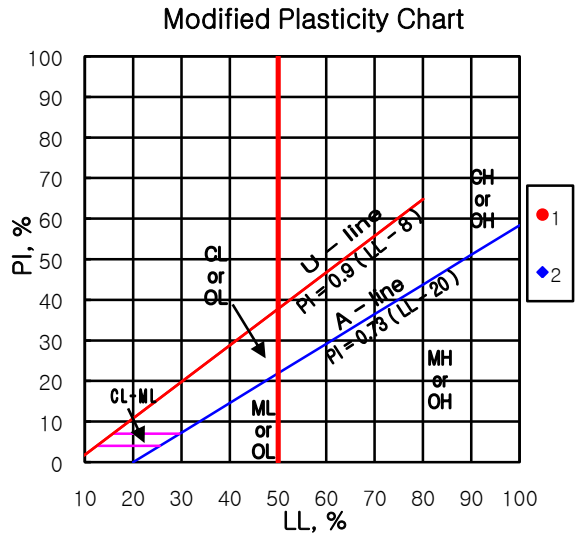
Classification of a Soil (USCS)

Project : 중앙선 도담~영천 복선전철 제 5공구 지반조사

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-53	1.0	1	12.6	2.659	N	P	P	0.0610	0.2761	2.0091	33.0	0.6

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	75.9	60.5	46.4	36.5	28.8	16.9	12.7	-	SM	





	1	2	3	비고
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Remarks

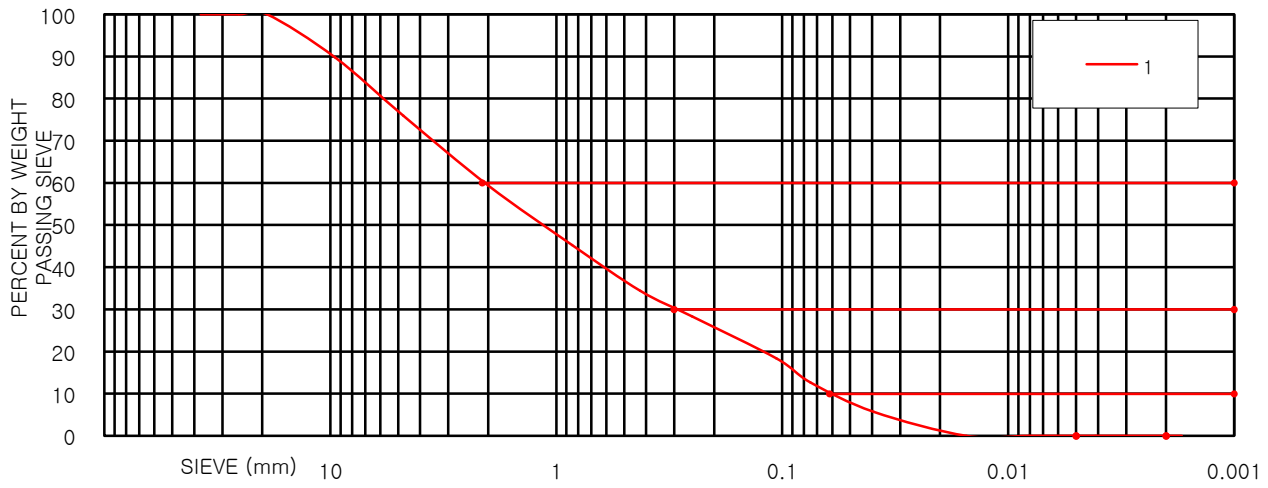
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

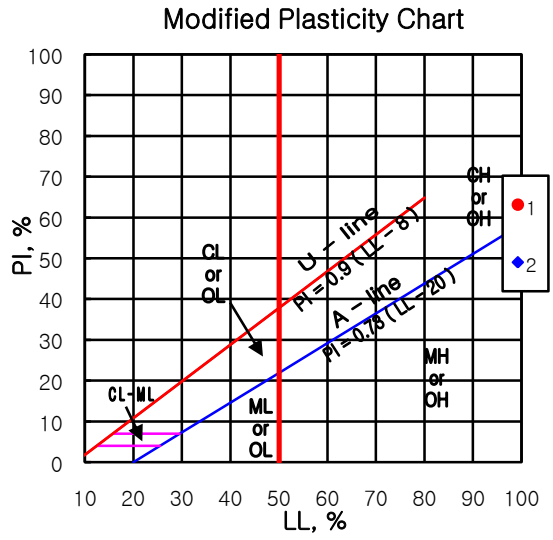
Classification of a Soil (USCS)

Project : 중앙선 도담~영천 복선전철 제 5공구 지반조사

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-53	2.0	1	12.3	2.657	N	P	P	0.0617	0.3013	2.1281	34.5	0.7

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	75.9	59.4	45.3	34.4	28.3	18.4	12.7	-	SM	





	1	2	3	비고
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Remarks

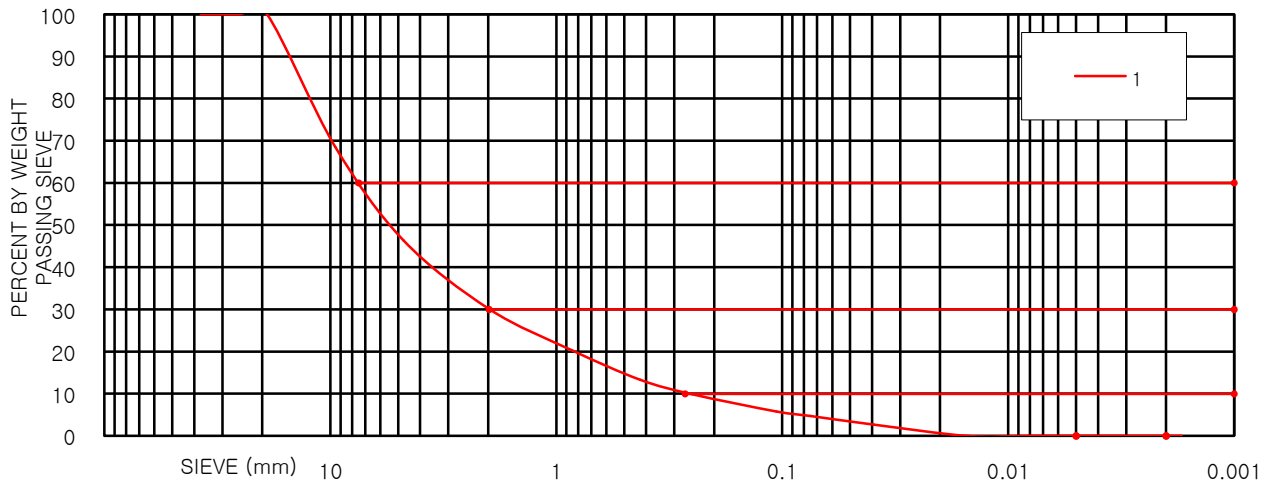
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

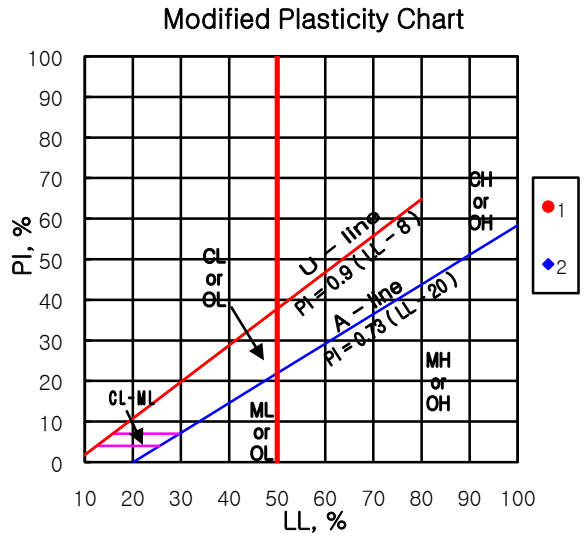
Classification of a Soil (USCS)

Project : 중앙선 도담~영천 복선전철 제 5공구 지반조사

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-54	1.0	1	11.5	2.644	N	P	P	0.2692	1.9815	7.4989	27.9	1.9

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	46.4	30.1	20.3	13.3	9.9	5.8	4.7	-	GW	





	1	2	3	비고
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Remarks

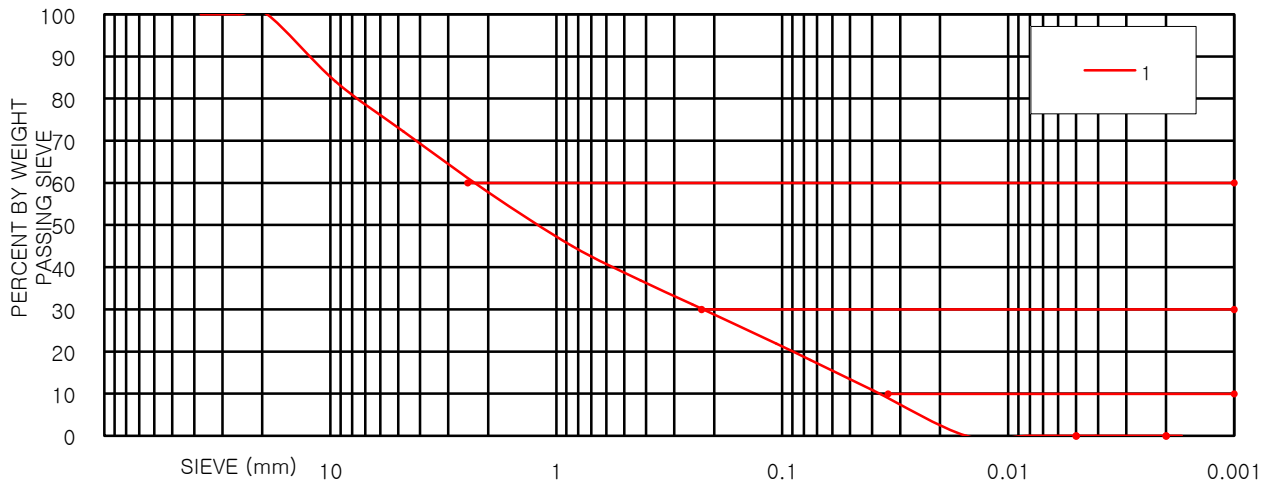
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KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

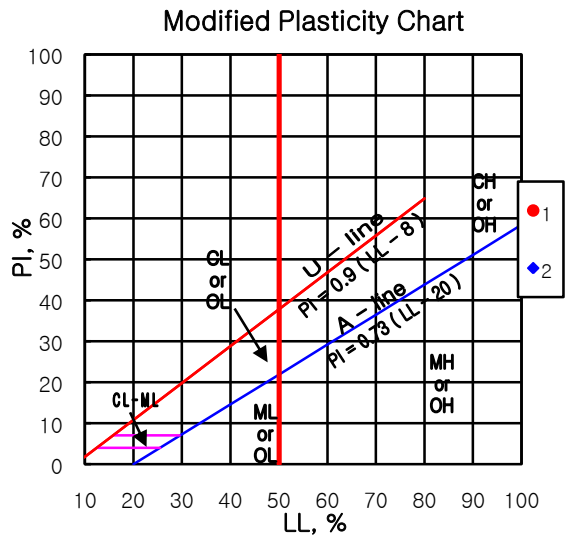
Classification of a Soil (USCS)

Project : 중앙선 도담~영천 복선전철 제 5공구 지반조사

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-54	2.0	1	11.4	2.654	N	P	P	0.0340	0.2275	2.4660	72.4	0.6

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	72.2	57.8	45.0	36.9	31.2	21.9	18.0	-	SM	





	1	2	3	비고
A	#######			
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Remarks

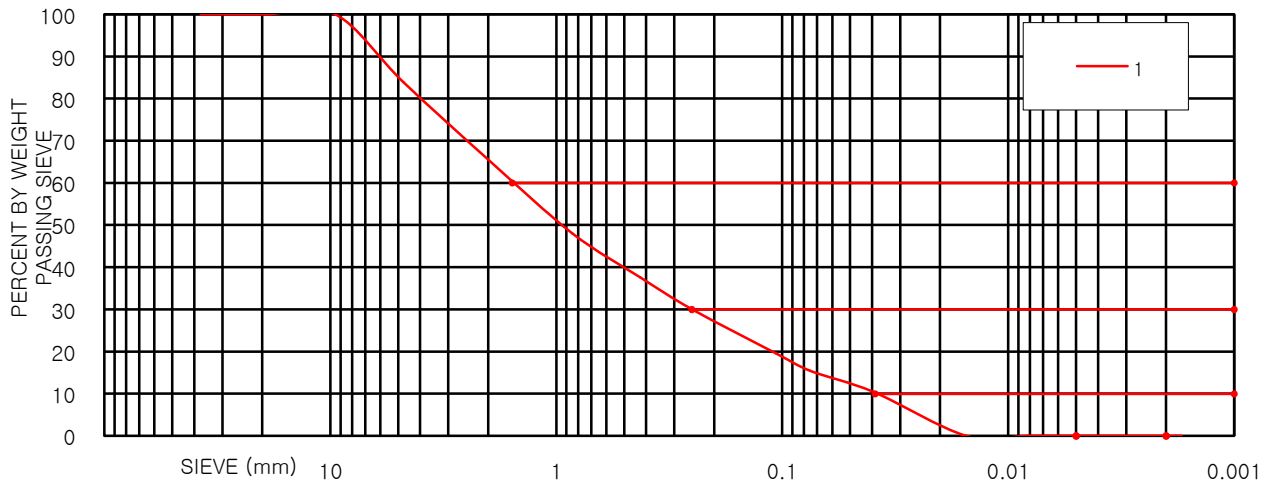
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KS F 2302	05. 07. 26 확인
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

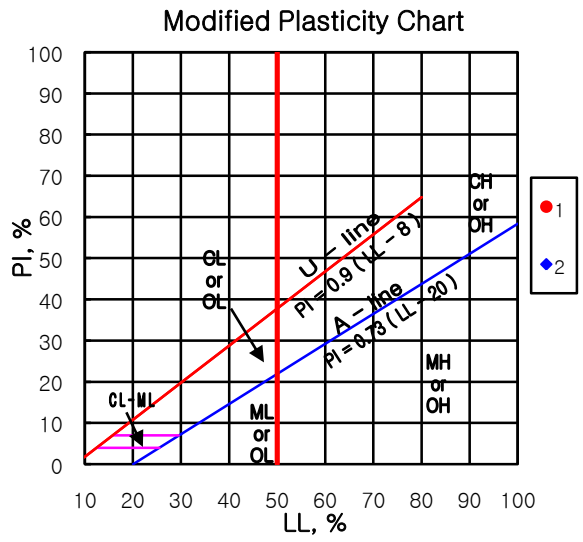
Classification of a Soil (USCS)

Project : 중앙선 도담~영천 복선전철 제 5공구 지반조사

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-55	1.0	1	10.0	2.667	N	P	P	0.0388	0.2512	1.5668	40.4	1.0

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	83.9	65.5	48.1	37.6	30.0	19.5	15.4	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
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Remarks

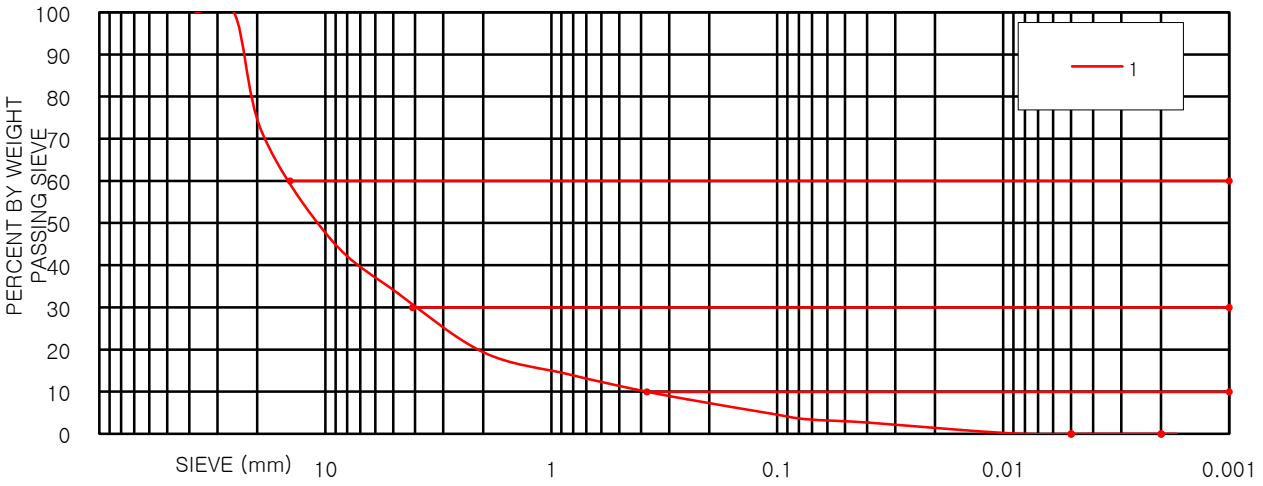
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KS F 2302	05. 07. 26 확인
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KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

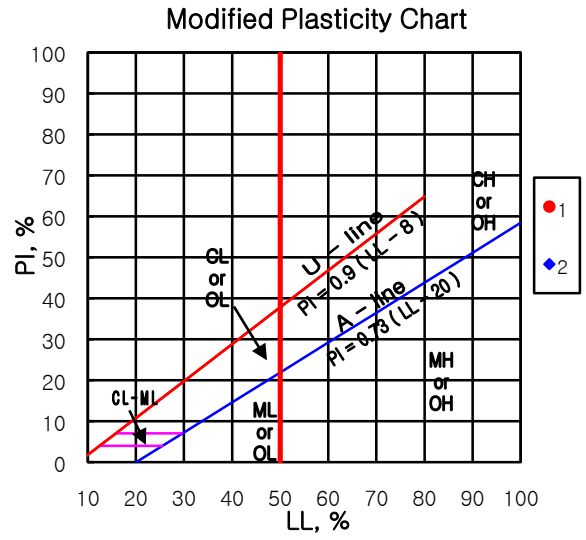
Classification of a Soil (USCS)

Project : 중앙선 도담~영천 복선전철 제 5공구 지반조사

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-55	2.0	1	10.0	2.631	N	P	P	0.3776	4.1210	14.3219	37.9	3.1

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	33.3	19.4	14.2	10.5	8.2	4.8	3.5	-	GP	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

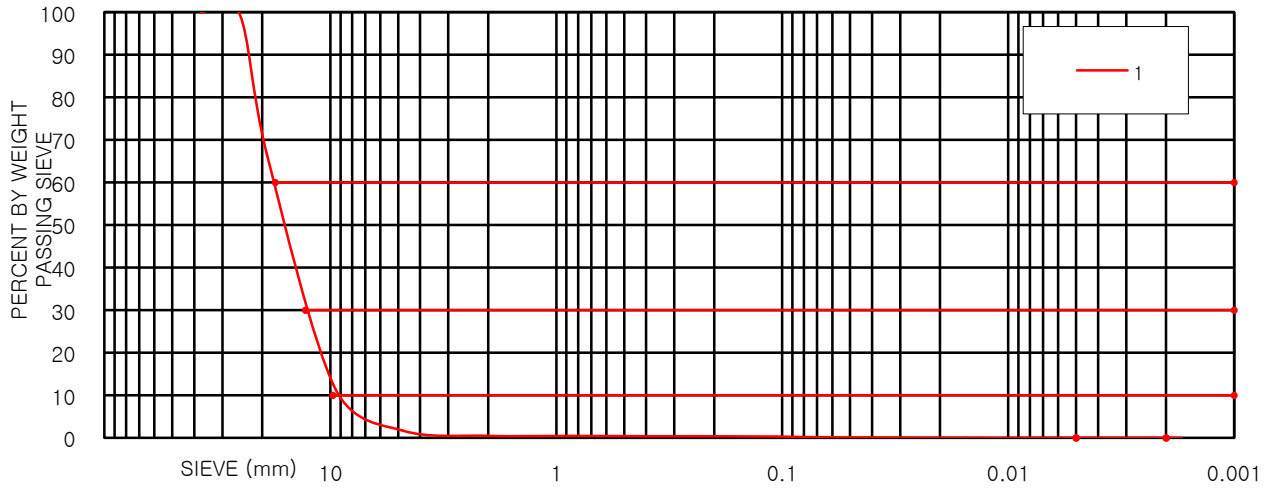
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

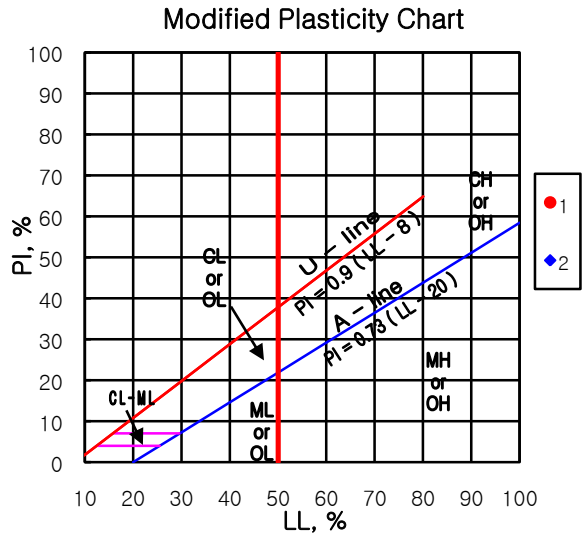
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-56	1.0	1	6.2	2.634	N	P	P	9.7499	12.8825	17.5388	1.8	1.0

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	1.7	0.5	0.5	0.4	0.4	0.3	0.2	-	GP	





	1	2	3	비고
A	#######			
CI	#######			
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Remarks

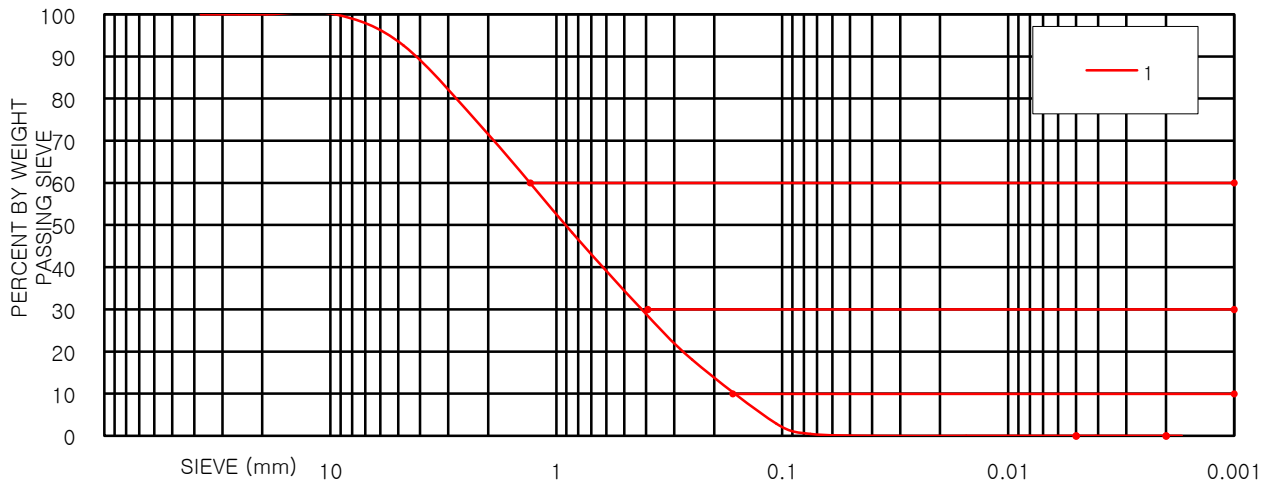
KS F 2301	05. 11. 25 개정
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

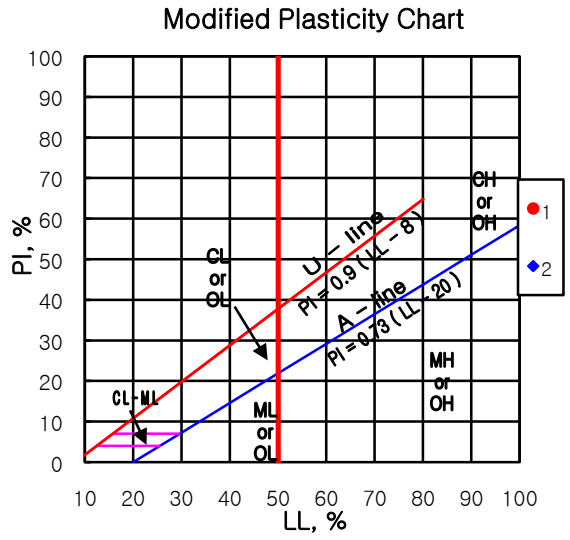
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-57	1.0	1	11.5	2.643	N	P	P	0.1656	0.3936	1.3032	7.9	0.7

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	92.6	71.5	48.2	30.4	18.1	2.9	0.5	-	SP	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

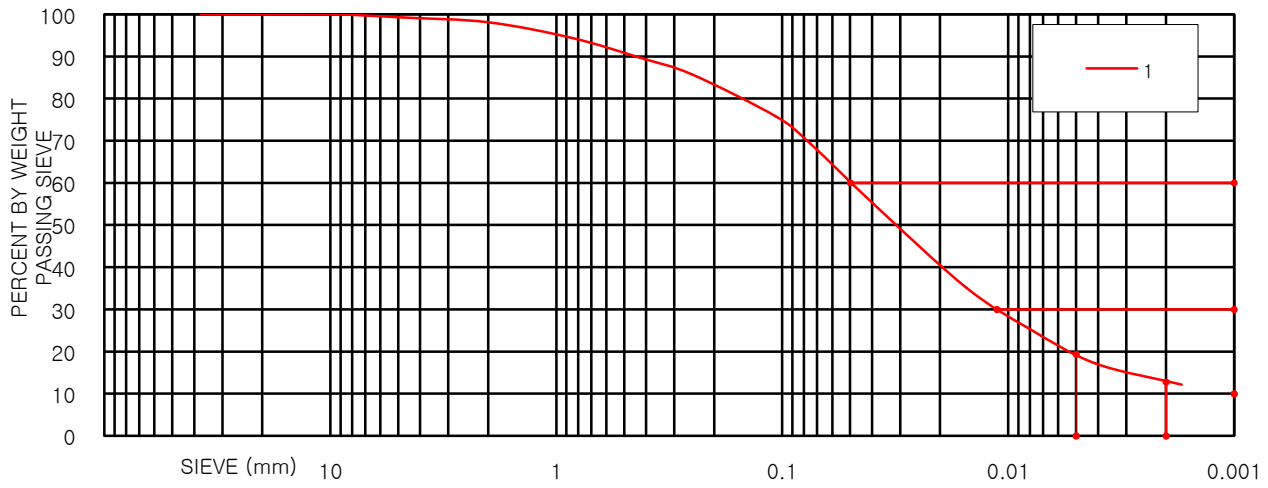
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

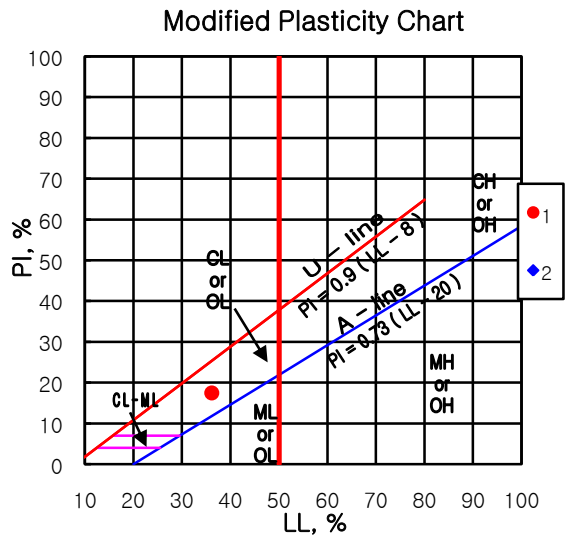
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-58	1.0	1	21.9	2.673	36.1	18.6	17.5	0.0010	0.0112	0.0499	49.9	2.5

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	99.2	98.1	94.4	89.7	85.7	75.7	69.3	12.8	CL	





	1	2	3	비고
A	1.37			
CI	0.81			
LI	0.19			

Remarks

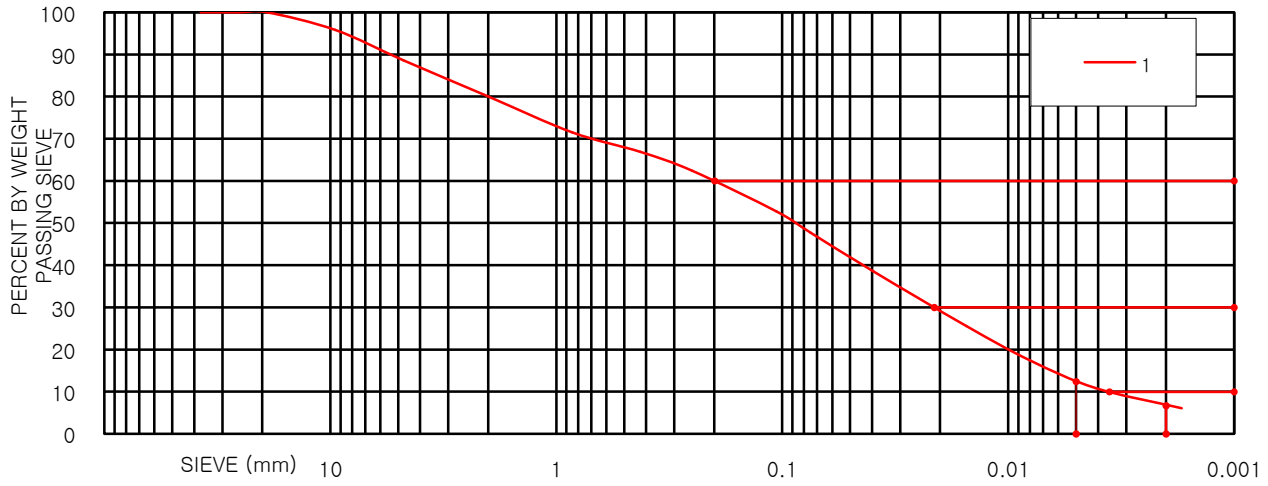
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KS F 2302	05. 07. 26 확인
KS F 2303	05. 07. 26 확인
KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

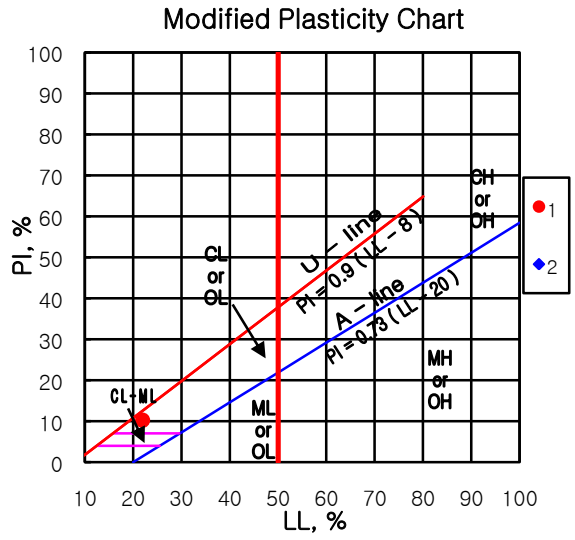
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-58	2.0	1	13.9	2.668	21.9	11.7	10.2	0.0036	0.0212	0.1991	55.8	0.6

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	88.6	80.0	71.5	66.9	62.4	52.8	47.8	6.7	SC	





	1	2	3	비고
A	1.52			
CI	0.78			
LI	0.22			

Remarks

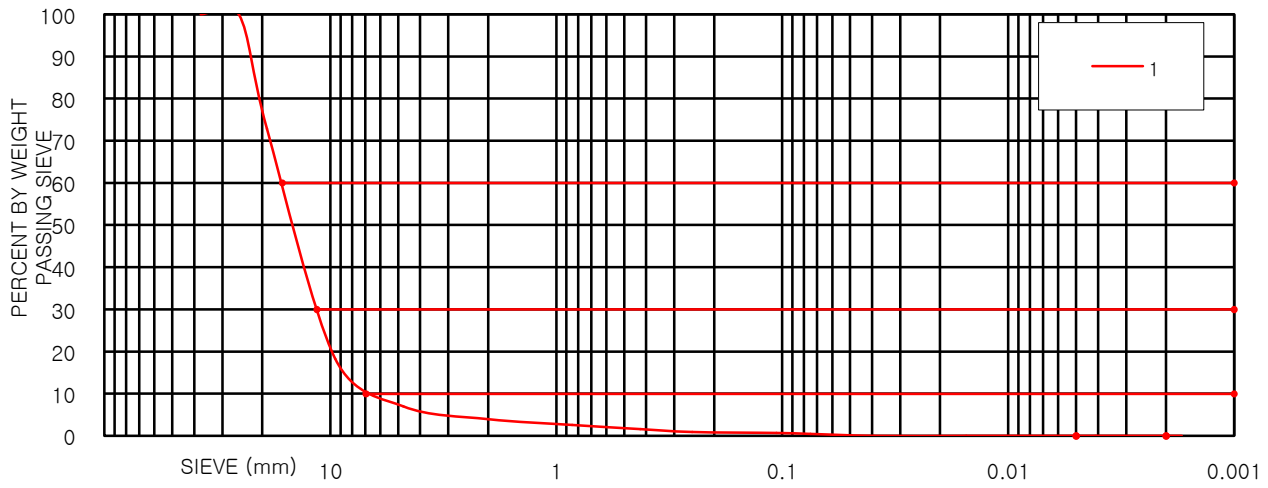
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KS F 2302	05. 07. 26 확인
KS F 2303	05. 07. 26 확인
KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

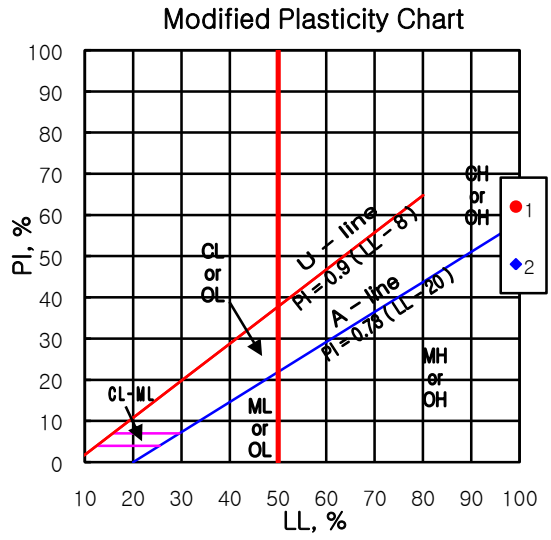
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-58	3.0	1	2.0	2.629	N	P	P	6.9502	11.4815	16.3305	2.3	1.2

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	7.0	4.0	2.6	1.6	0.9	0.7	0.5	-	GP	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

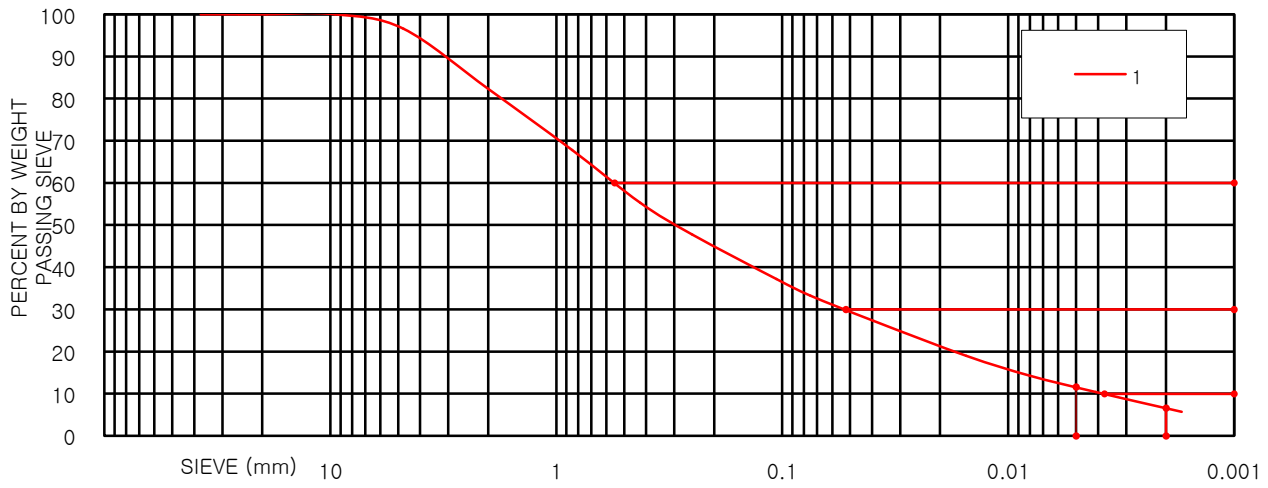
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

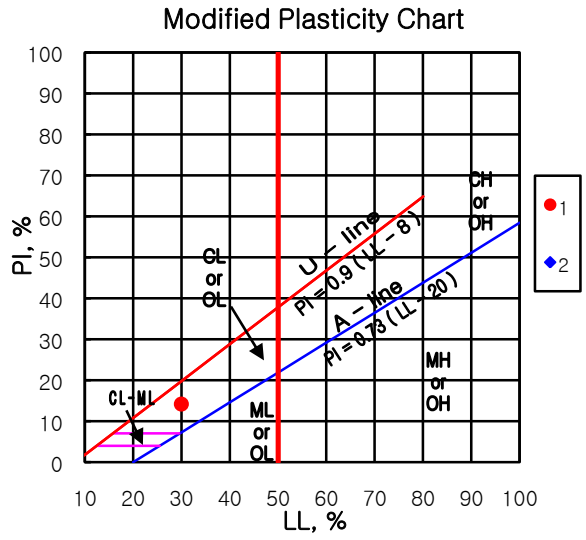
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-59	1.0	1	15.8	2.669	29.9	15.7	14.2	0.0037	0.0522	0.5521	147.2	1.3

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	96.6	82.3	67.8	55.3	47.8	37.2	33.3	6.6	SC	





	1	2	3	비고
A	2.15			
CI	0.99			
LI	0.01			

Remarks

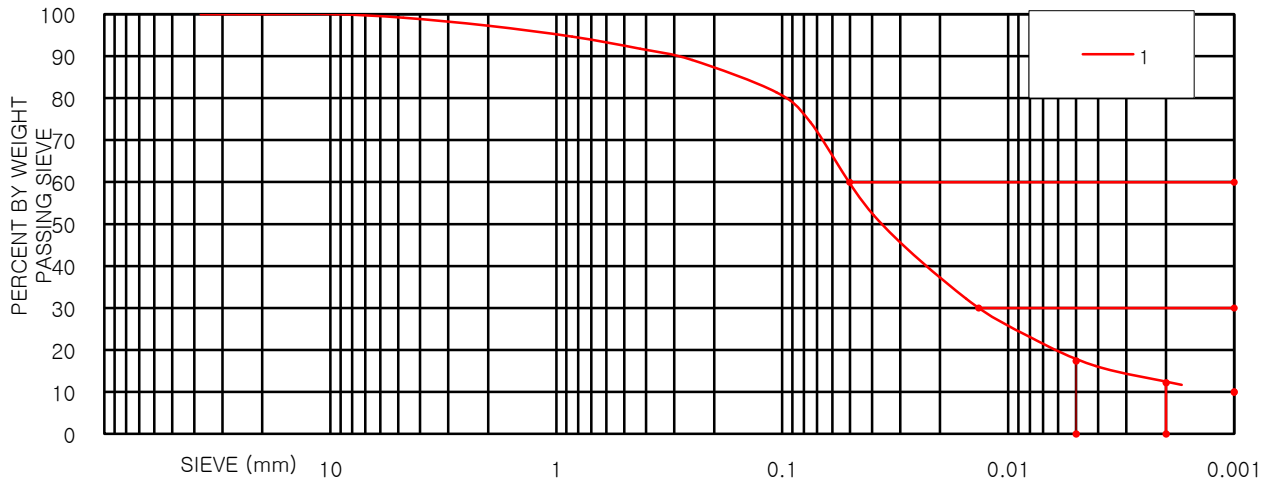
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KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

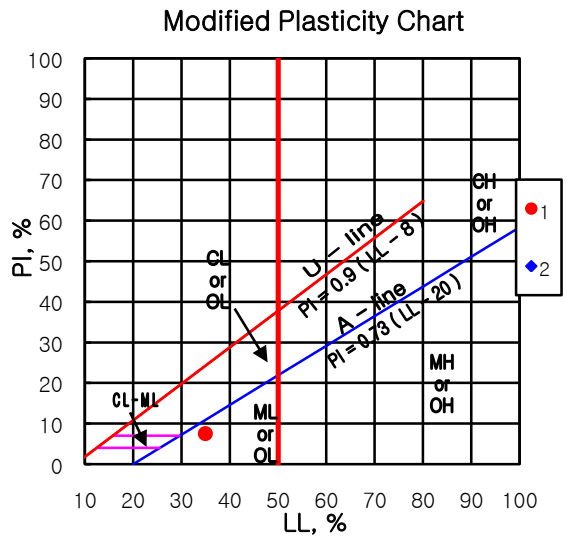
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-59	2.0	1	28.9	2.681	34.9	27.3	7.6	0.0010	0.0135	0.0504	50.4	3.6

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	99.2	97.3	94.7	91.8	89.1	81.4	74.3	12.2	ML	





	1	2	3	비고
A	0.62			
CI	0.79			
LI	0.21			

Remarks

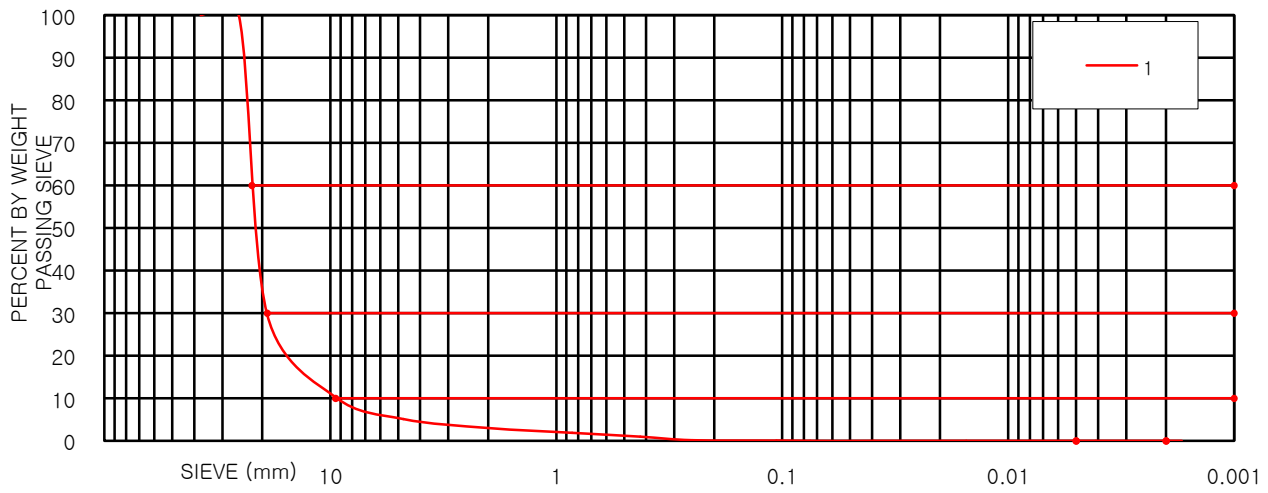
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KS F 2324	06. 10. 19 개정

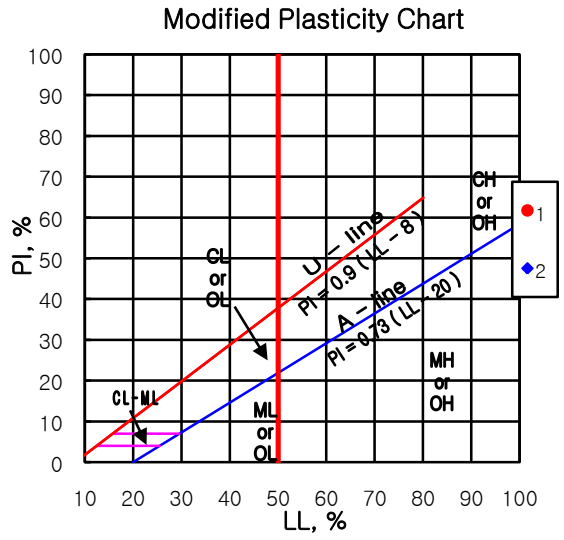
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-59	3.0	1	2.3	2.634	N	P	P	9.4842	19.0108	22.2331	2.3	1.7

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	5.1	3.0	1.9	1.0	0.2	0.1	0.0	-	GP	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

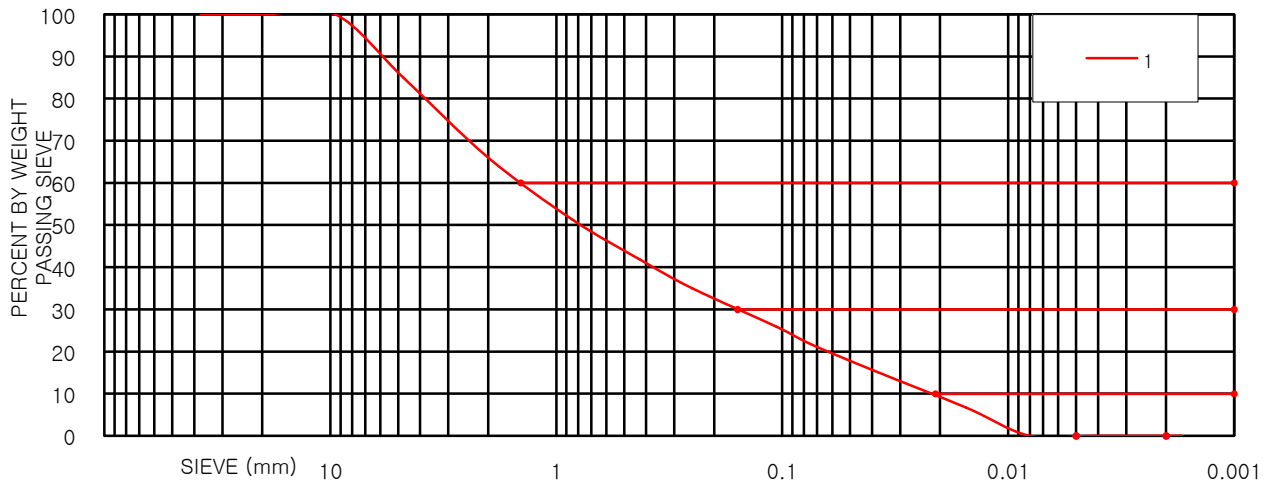
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KS F 2302	05. 07. 26 확인
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

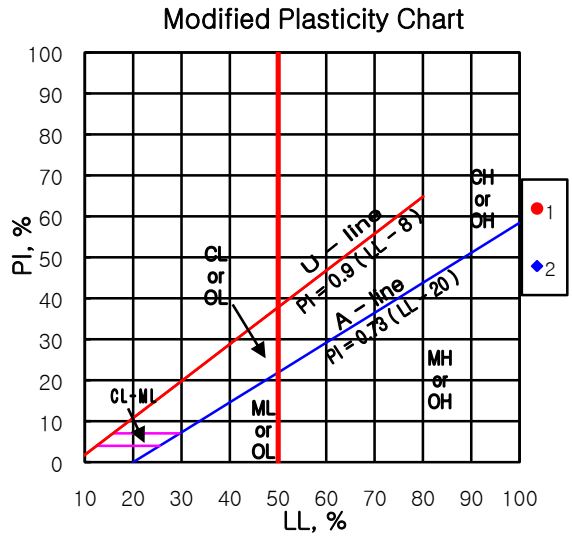
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-60	1.0	1	12.5	2.663	N	P	P	0.0210	0.1578	1.4355	68.4	0.8

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	85.0	66.0	51.3	41.8	35.0	25.9	21.8	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

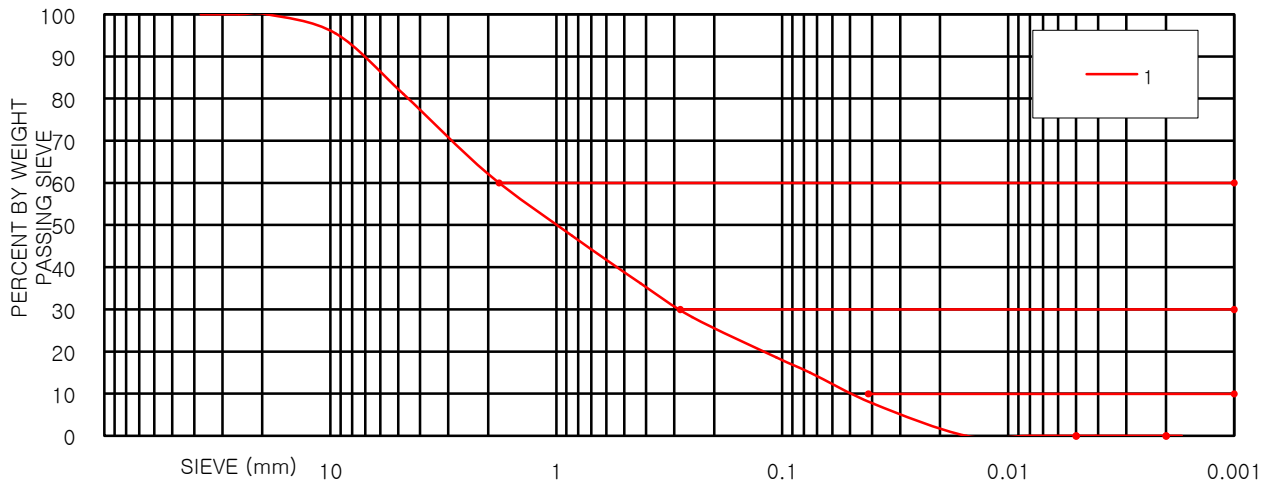
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KS F 2324	06. 10. 19 개정

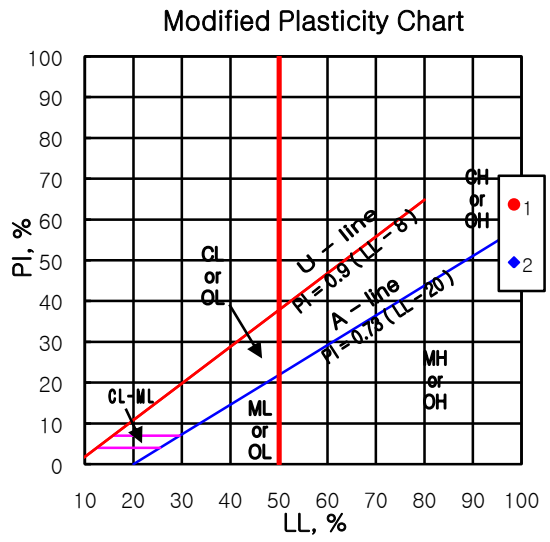
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-60	2.0	1	13.2	2.670	N	P	P	0.0416	0.2825	1.7906	43.1	1.1

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	81.1	62.1	47.5	36.2	28.2	18.6	15.0	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

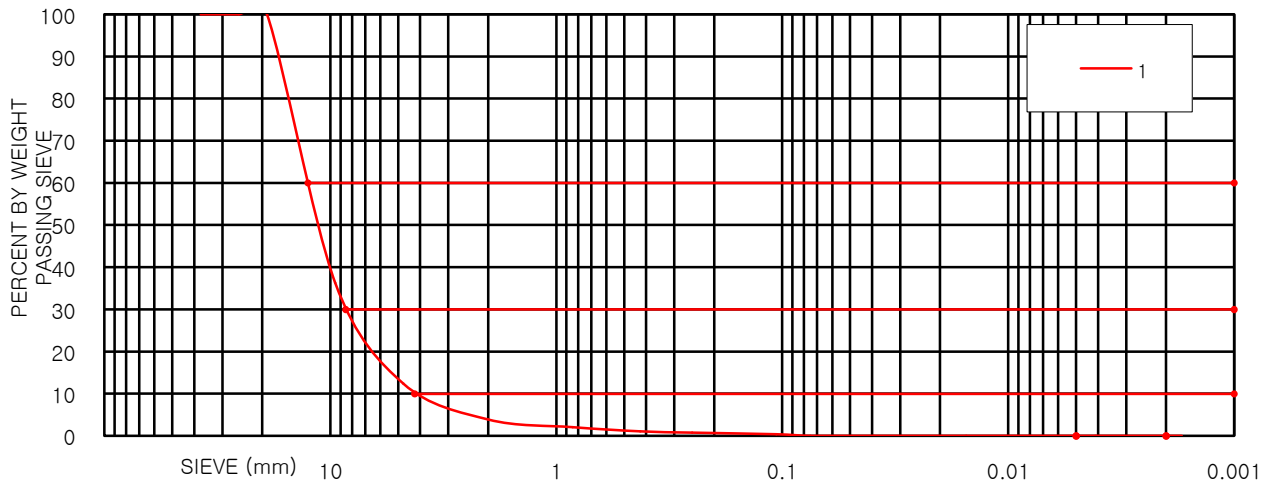
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

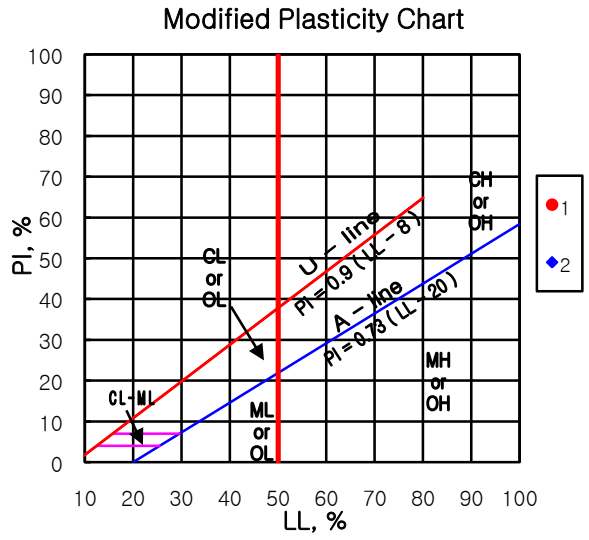
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-60	3.0	1	9.1	2.634	N	P	P	4.2364	8.5507	12.5603	3.0	1.4

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	12.4	3.9	2.1	1.1	0.8	0.4	0.1	-	GP	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

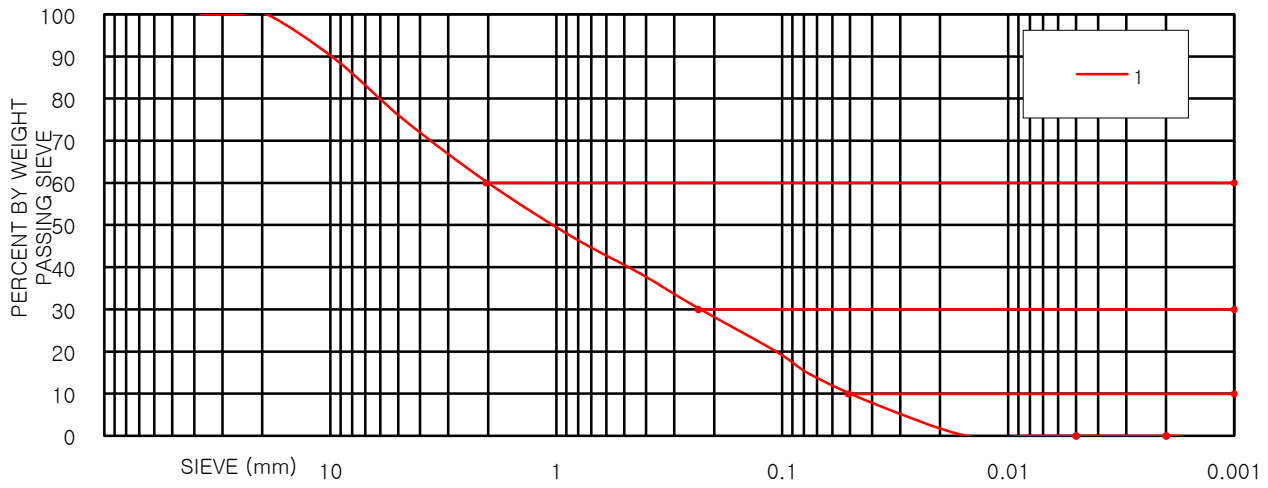
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KS F 2309	04. 12. 29 개정
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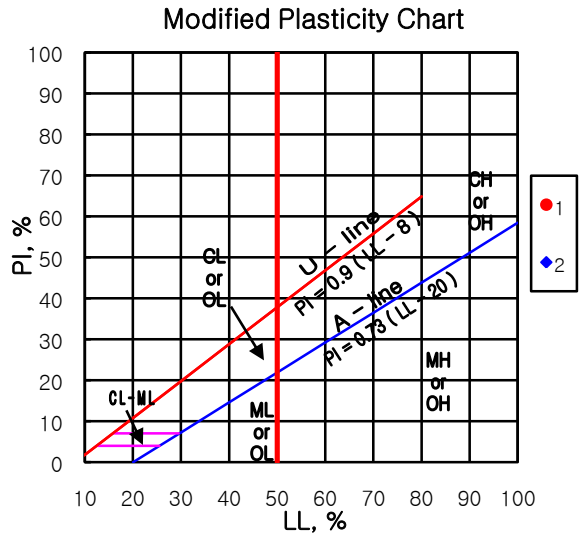
Classification of a Soil (USCS)

Project : 중앙선 도담~영천 복선전철 제 5공구 지반조사

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-61	1.0	1	16.6	2.663	N	P	P	0.0511	0.2350	2.0464	40.1	0.5

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	75.1	60.0	47.2	38.5	31.1	20.0	14.6	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

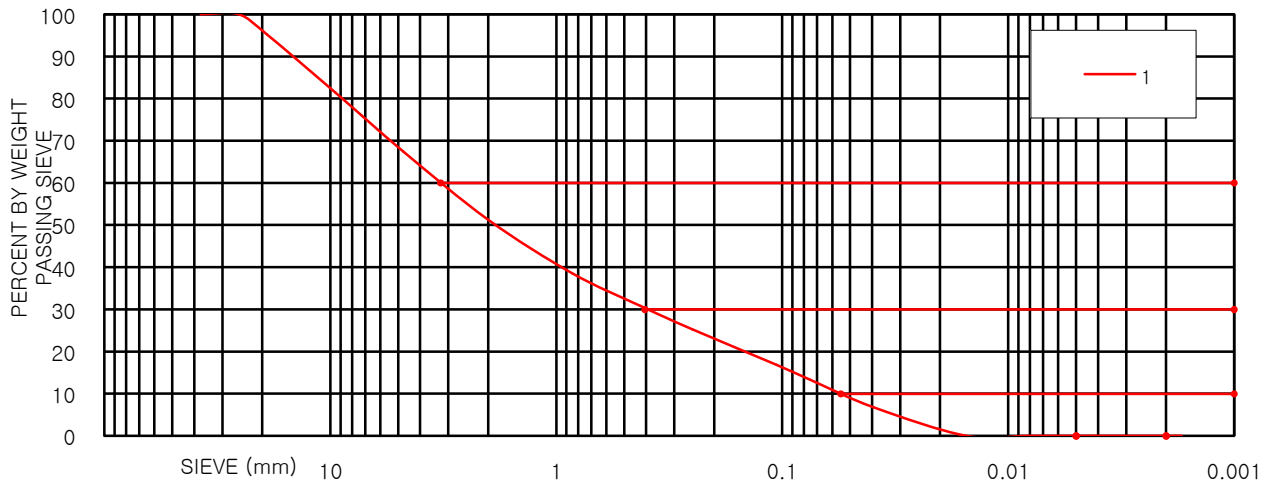
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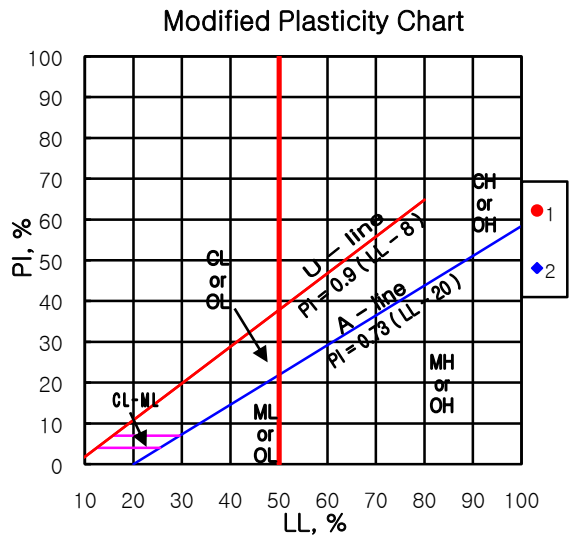
Classification of a Soil (USCS)

Project : 중앙선 도담~영천 복선전철 제 5공구 지반조사

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-61	2.0	1	14.4	2.671	N	P	P	0.0551	0.4055	3.2509	59.0	0.9

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	67.5	51.2	38.6	30.9	25.3	16.9	13.3	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

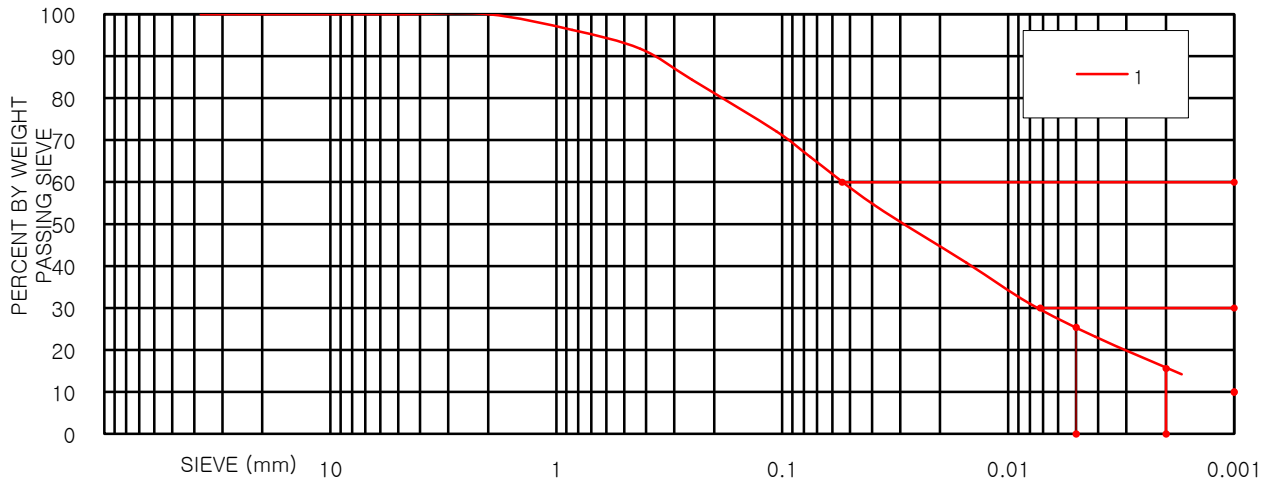
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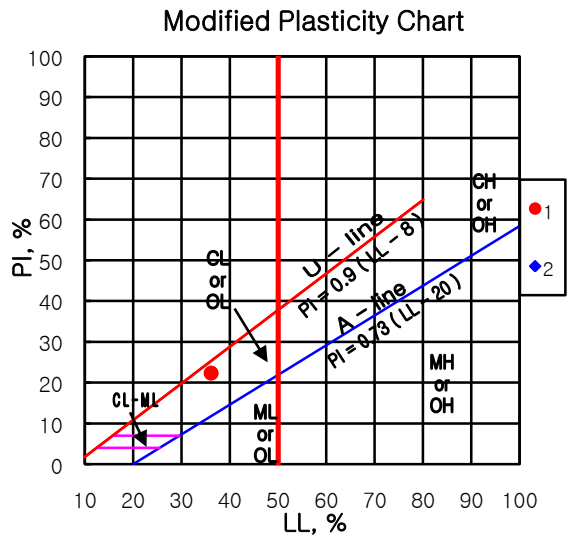
Classification of a Soil (USCS)

Project : 중앙선 도담~영천 복선전철 제 5공구 지반조사

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-62-1	1.0	1	25.6	2.677	36.1	13.7	22.4	0.0010	0.0072	0.0543	54.3	1.0

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	100.0	100.0	96.3	91.8	84.4	72.1	66.0	15.6	CL	





	1	2	3	비고
A	1.44			
CI	0.47			
LI	0.53			

Remarks

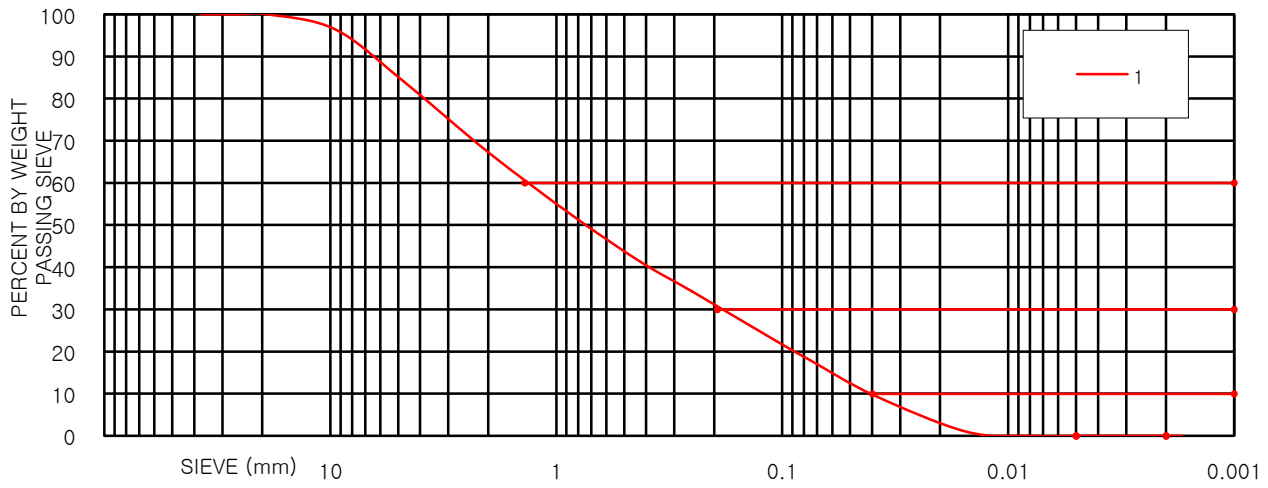
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KS F 2324	06. 10. 19 개정

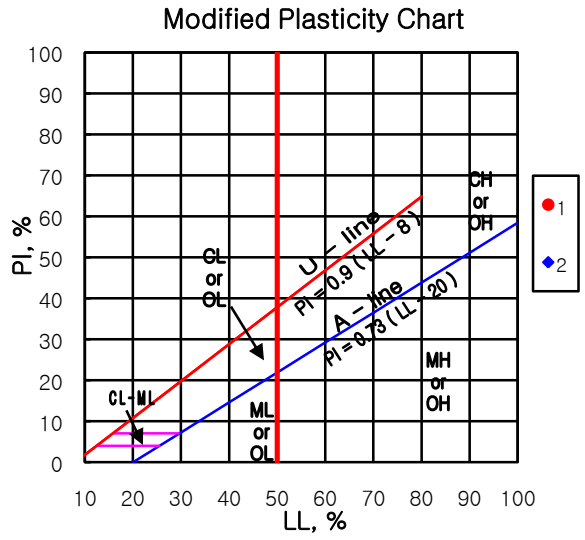
Classification of a Soil (USCS)

Project : 중앙선 도담~영천 복선전철 제 5공구 지반조사

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-62-1	3.0	1	19.0	2.672	N	P	P	0.0399	0.1936	1.3772	34.5	0.7

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	84.1	67.3	52.3	41.3	34.2	22.5	17.9	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

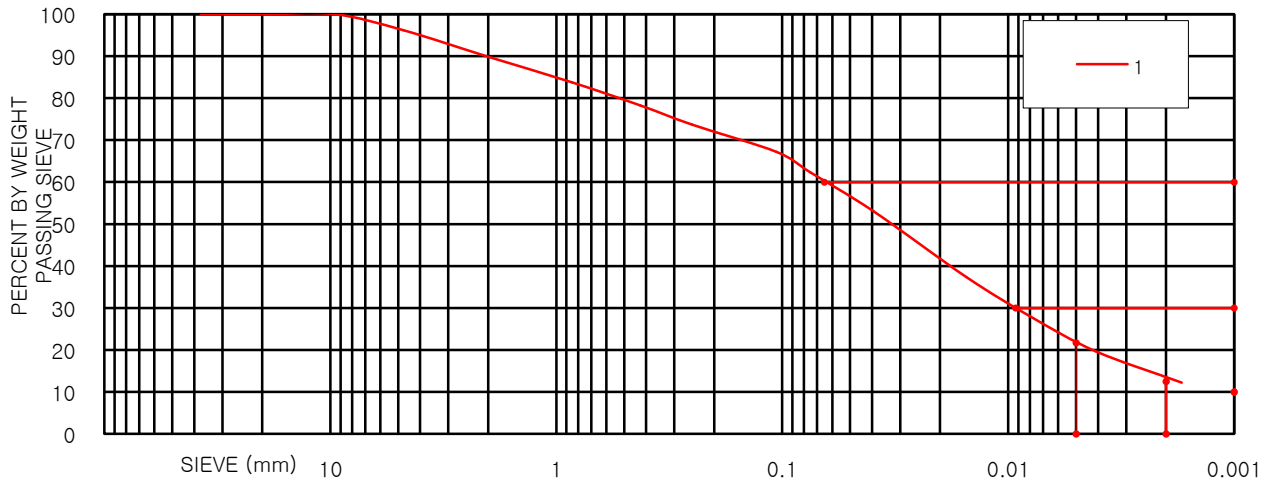
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KS F 2302	05. 07. 26 확인
KS F 2303	05. 07. 26 확인
KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

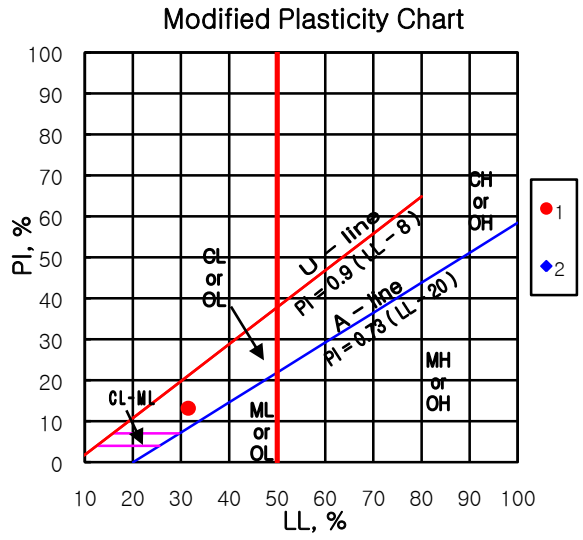
Classification of a Soil (USCS)

Project : 중앙선 도담~영천 복선전철 제 5공구 지반조사

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-63	3.0	1	26.9	2.673	31.5	18.3	13.2	0.0010	0.0093	0.0652	65.2	1.3

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	96.2	89.9	83.8	78.3	73.7	67.2	62.3	12.5	CL	





	1	2	3	비고
A	1.06			
CI	0.35			
LI	0.65			

Remarks

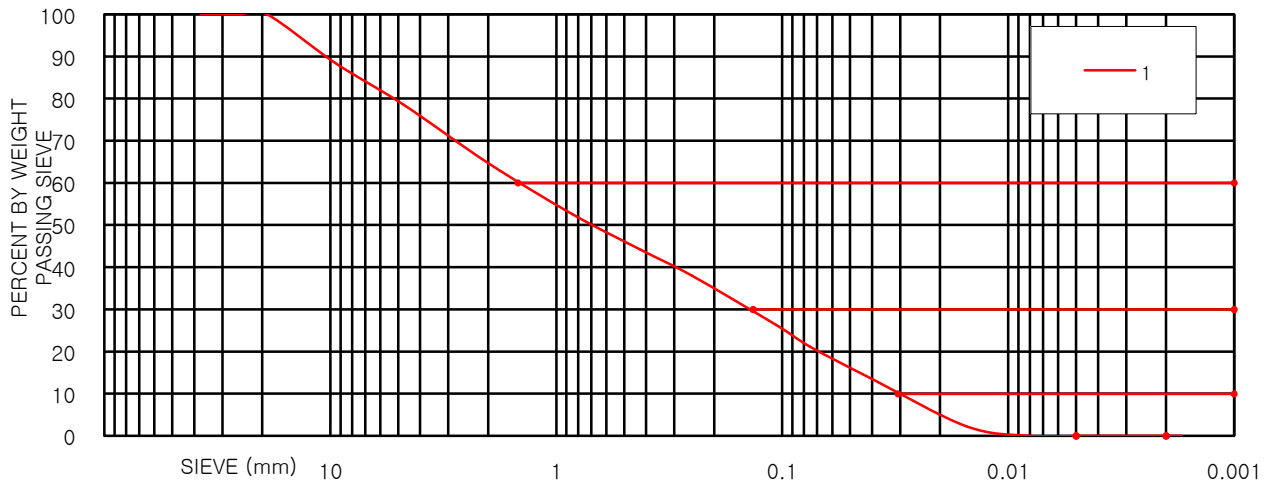
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KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

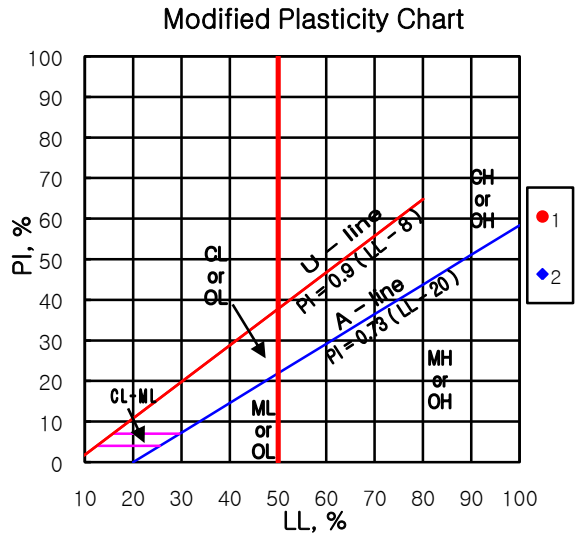
Classification of a Soil (USCS)

Project : 중앙선 도담~영천 복선전철 제 5공구 지반조사

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-63	6.0	1	11.8	2.668	N	P	P	0.0308	0.1346	1.4791	48.1	0.4

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	78.6	64.7	52.6	44.2	38.0	26.3	21.1	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

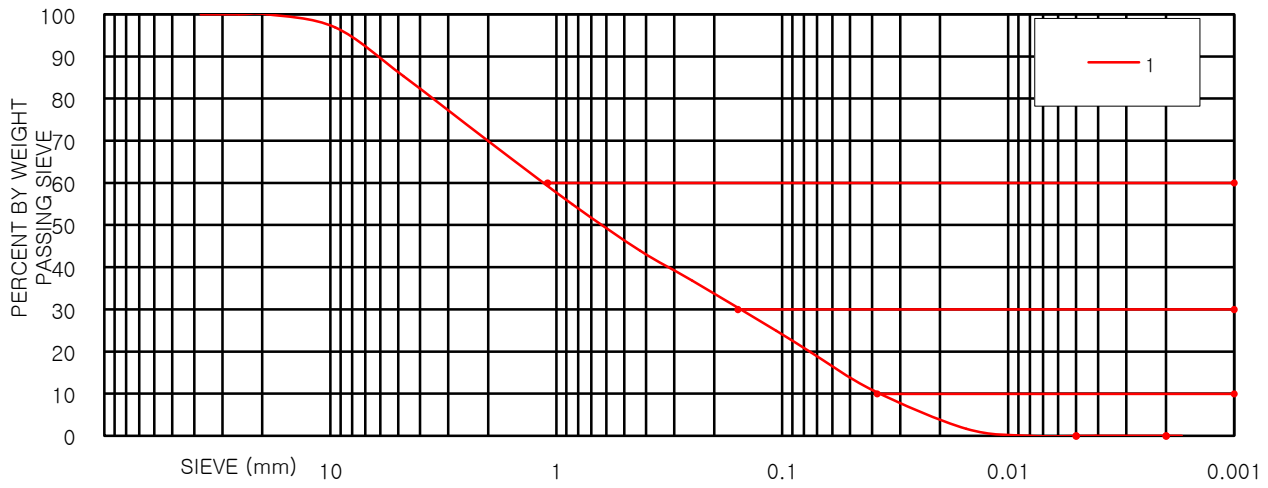
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

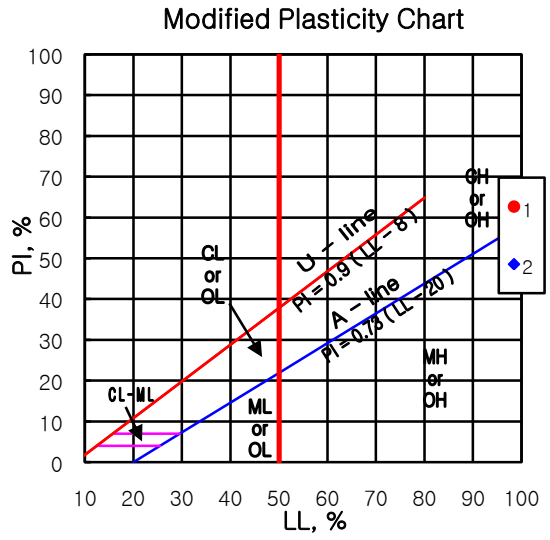
Classification of a Soil (USCS)

Project : 중앙선 도담~영천 복선전철 제 5공구 지반조사

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-64	3.0	1	19.3	2.665	N	P	P	0.0380	0.1570	1.0940	28.8	0.6

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	85.3	69.9	55.0	43.9	36.8	25.0	19.9	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

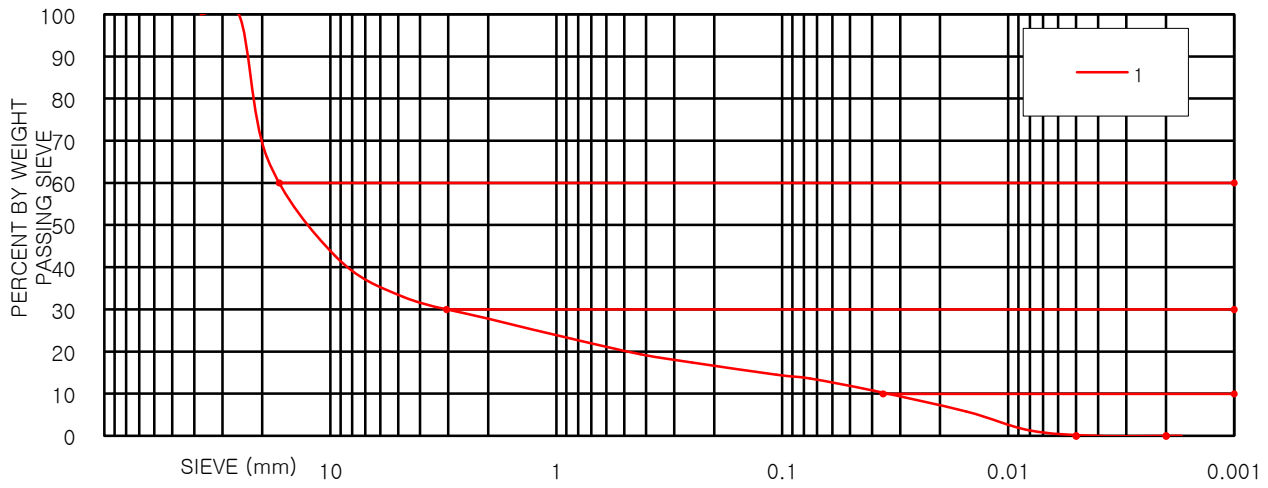
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KS F 2302	05. 07. 26 확인
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

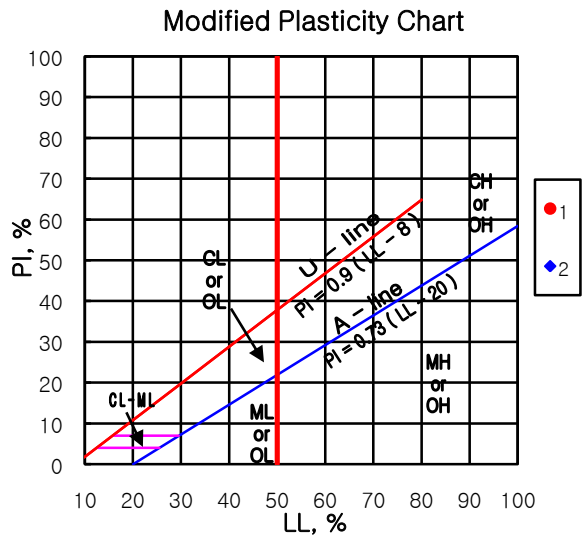
Classification of a Soil (USCS)

Project : 중앙선 도담~영천 복선전철 제 5공구 지반조사

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-64	6.0	1	7.5	2.643	N	P	P	0.0358	3.0620	16.8267	469.9	15.6

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	33.0	27.8	23.0	19.4	17.4	14.5	13.6	-	GM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

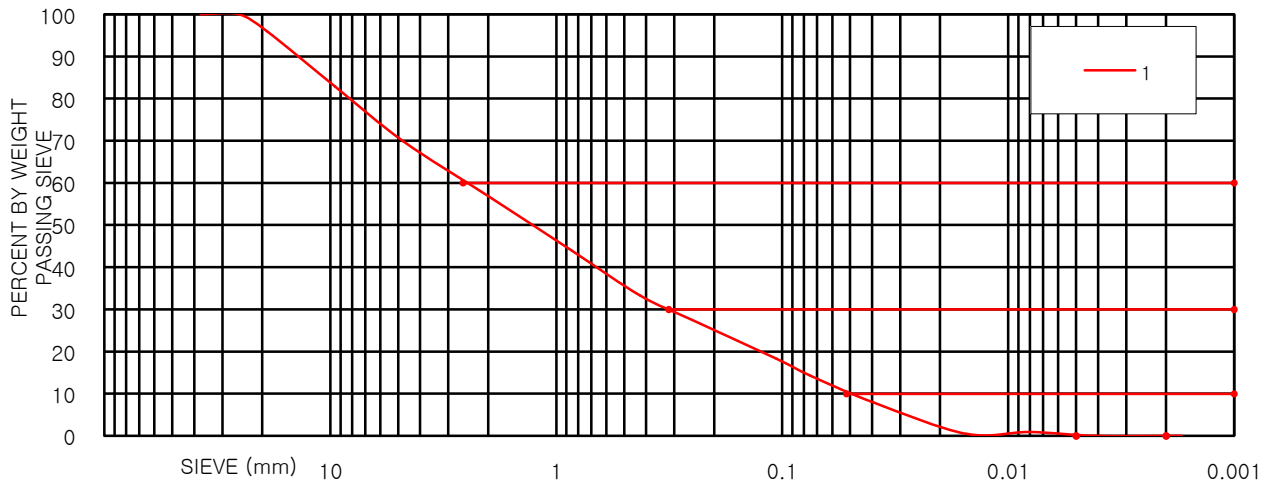
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

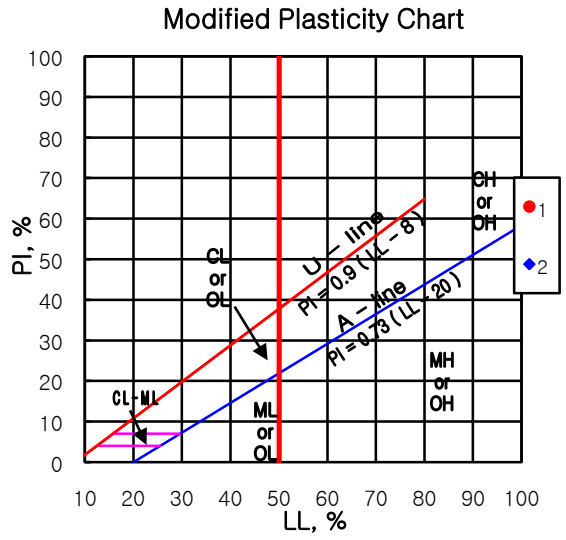
Classification of a Soil (USCS)

Project : 중앙선 도담~영천 복선전철 제 5공구 지반조사

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-66	3.0	1	15.4	2.662	N	P	P	0.0520	0.3177	2.5882	49.8	0.7

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	69.9	56.9	43.9	33.3	27.5	18.3	14.3	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

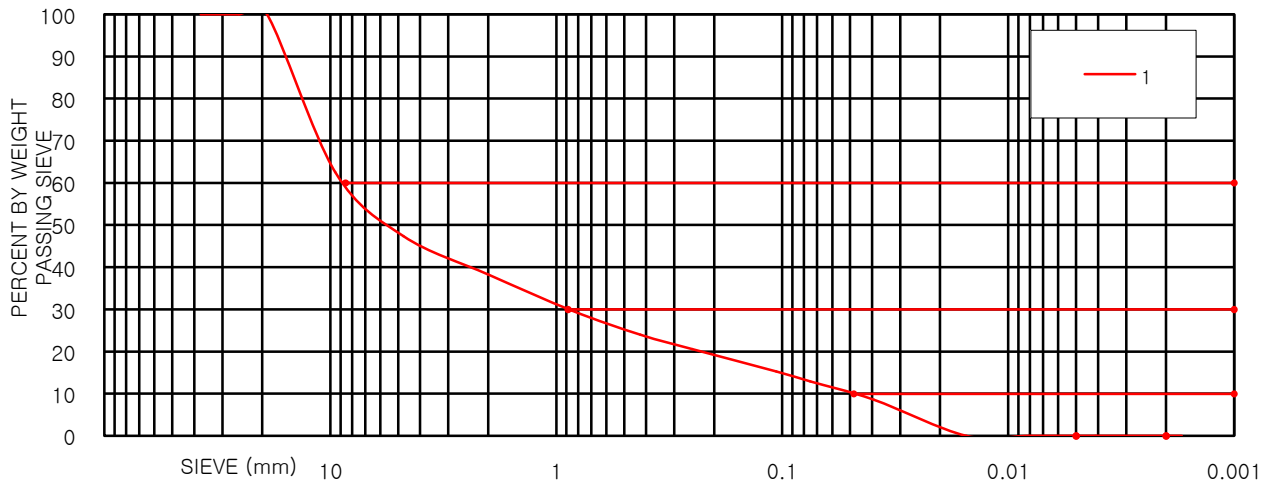
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KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

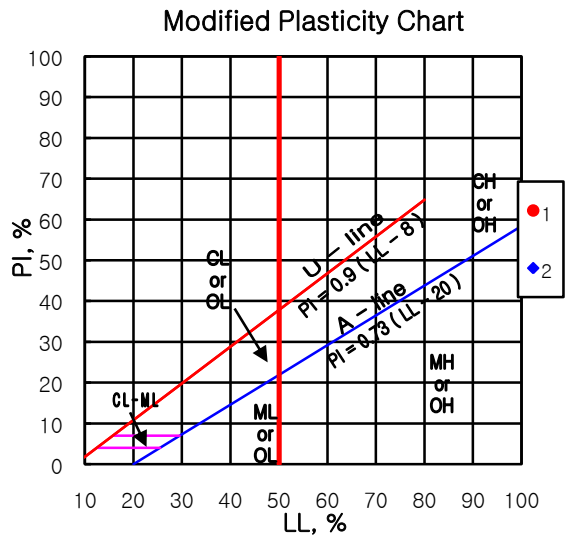
Classification of a Soil (USCS)

Project : 중앙선 도담~영천 복선전철 제 5공구 지반조사

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-66	6.0	1	11.8	2.634	N	P	P	0.0482	0.8872	8.5704	177.8	1.9

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	47.4	38.3	29.7	24.0	20.6	15.3	12.9	-	GM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

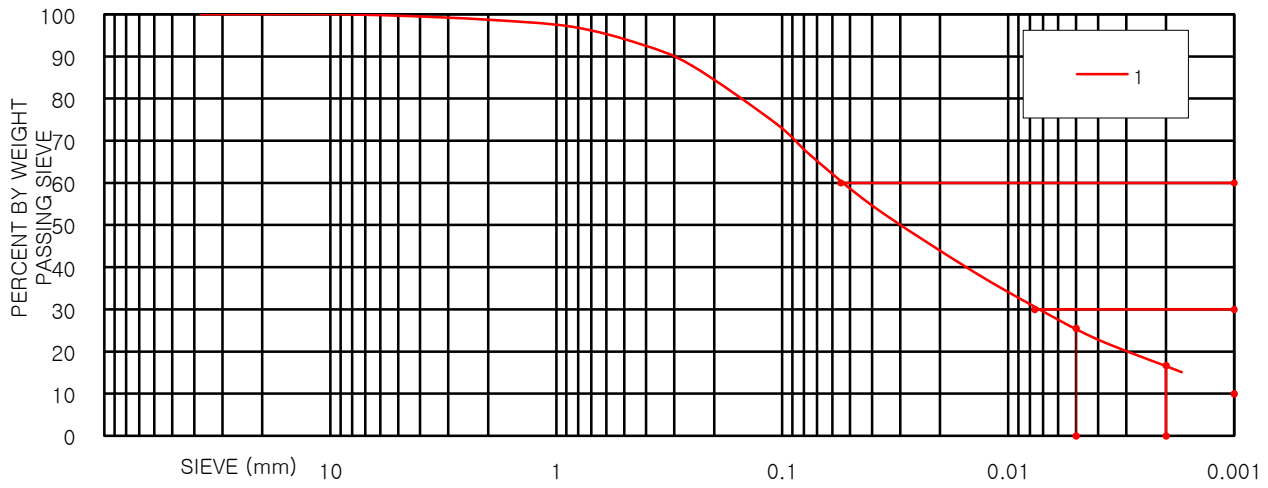
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

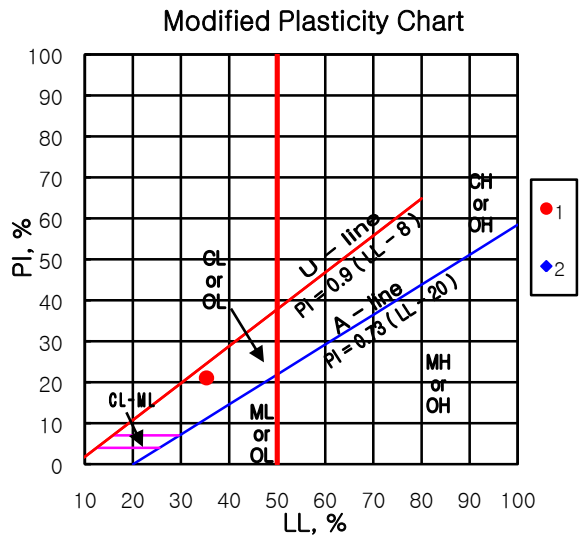
Classification of a Soil (USCS)

Project : 중앙선 도담~영천 복선전철 제 5공구 지반조사

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-67	2.0	1	29.1	2.687	35.3	14.2	21.1	0.0010	0.0076	0.0551	55.1	1.1

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	99.6	98.7	97.0	92.9	87.8	74.0	66.6	16.7	CL	





	1	2	3	비고
A	1.26			
CI	0.29			
LI	0.71			

Remarks

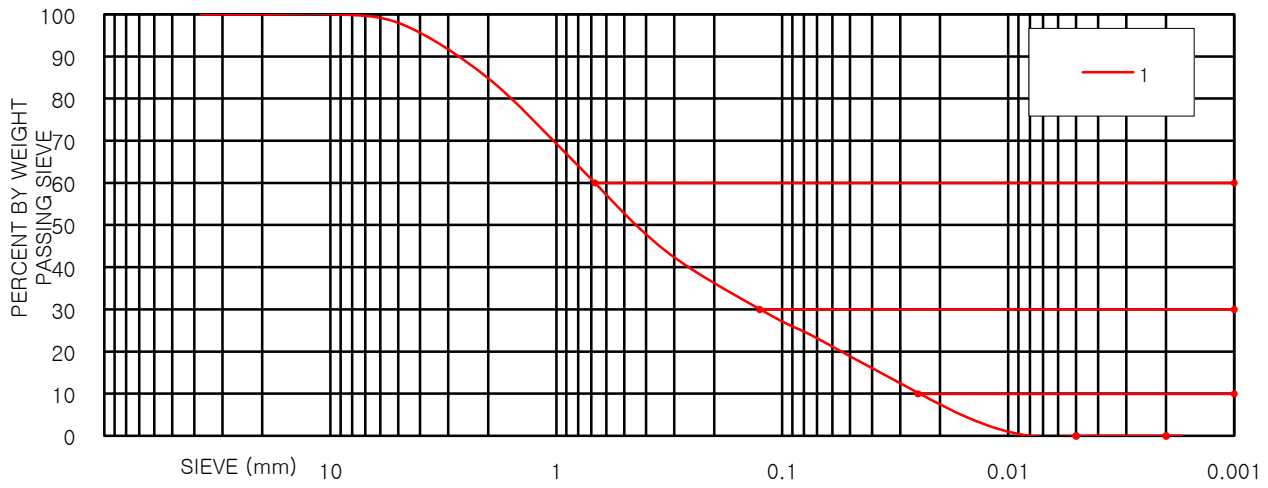
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KS F 2302	05. 07. 26 확인
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

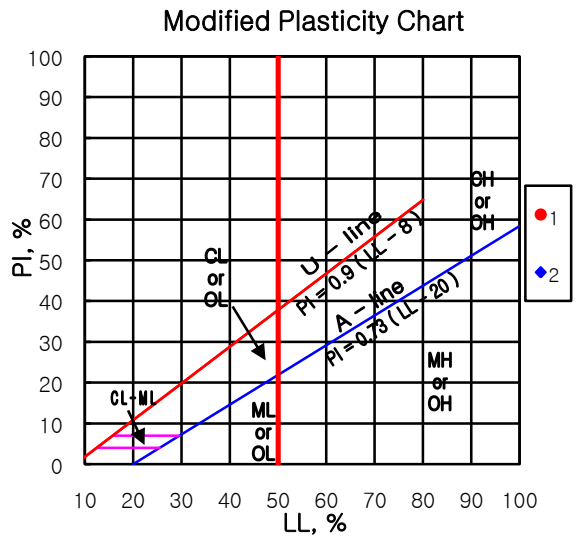
Classification of a Soil (USCS)

Project : 중앙선 도담~영천 복선전철 제 5공구 지반조사

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-67	7.0	1	21.3	2.652	N	P	P	0.0251	0.1259	0.6761	27.0	0.9

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	97.5	84.8	65.5	49.0	39.5	27.9	24.0	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

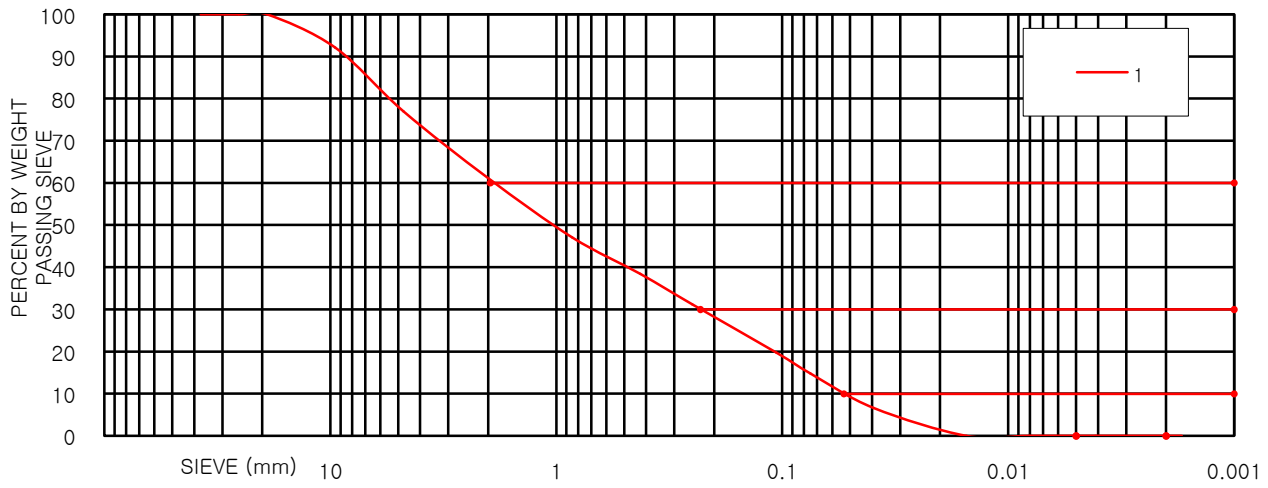
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

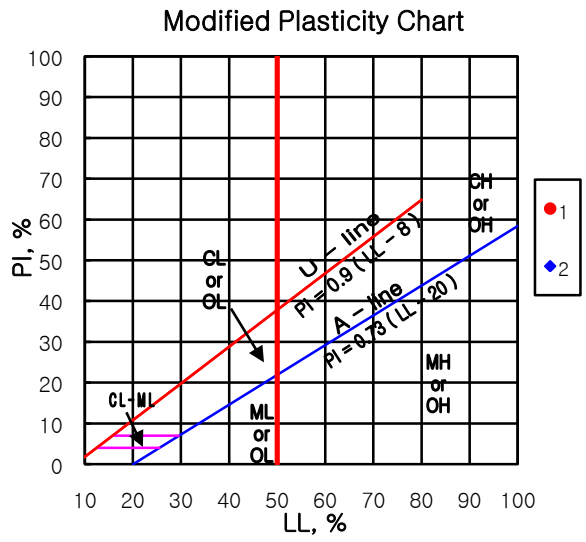
Classification of a Soil (USCS)

Project : 중앙선 도담~영천 복선전철 제 5공구 지반조사

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-68	4.0	1	14.9	2.666	N	P	P	0.0533	0.2301	1.9588	36.7	0.5

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	77.0	61.1	47.1	38.4	31.2	19.7	14.8	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

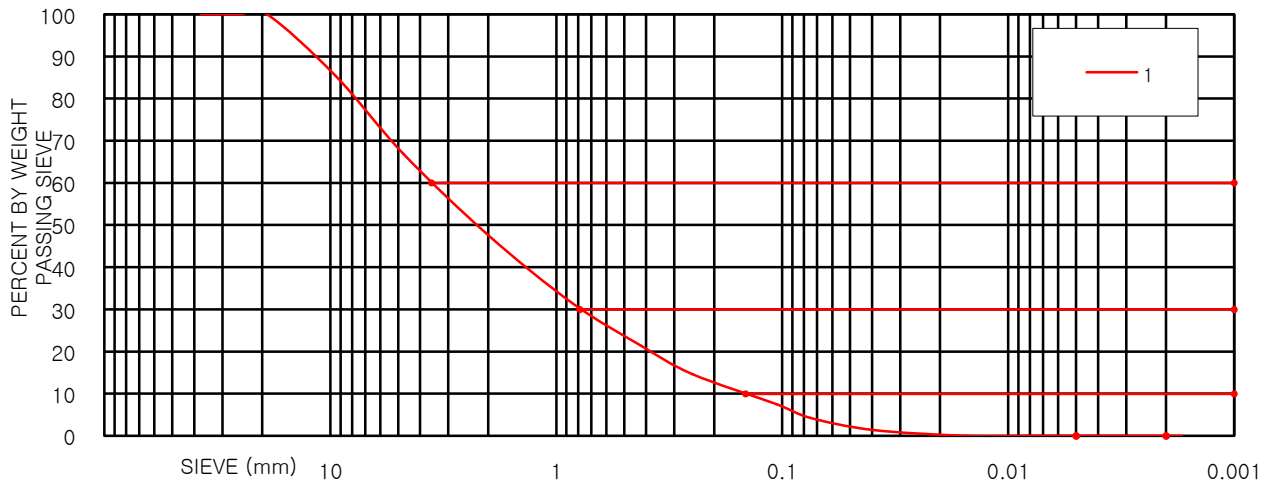
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

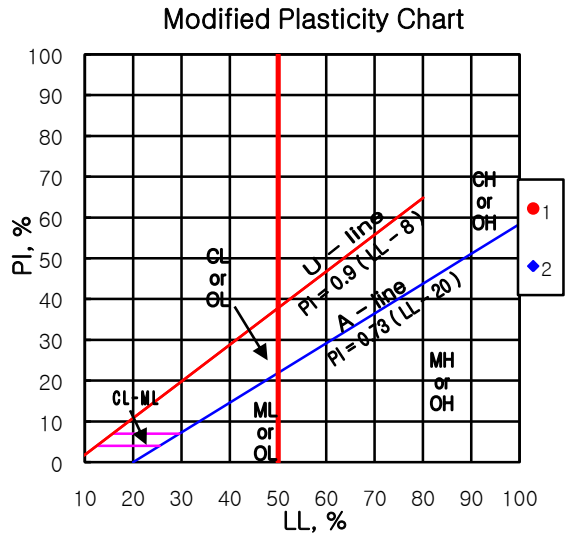
Classification of a Soil (USCS)

Project : 중앙선 도담~영천 복선전철 제 5공구 지반조사

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-68	7.0	1	15.7	2.662	N	P	P	0.1452	0.7870	3.5645	24.5	1.2

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	66.9	47.6	31.5	21.5	14.7	7.5	4.3	-	SW	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

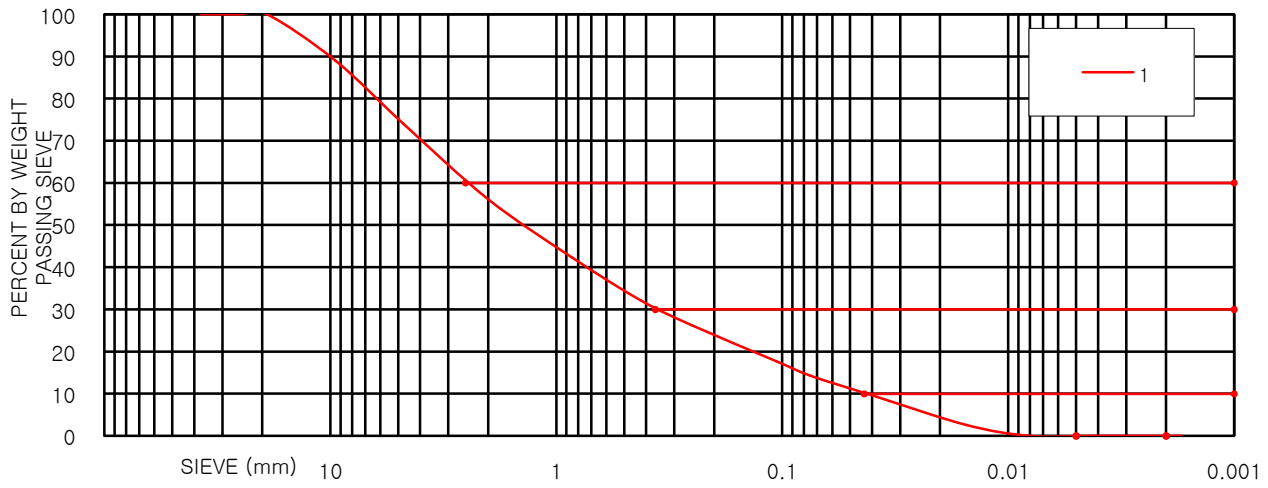
KS F 2301	05. 11. 25 개정
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

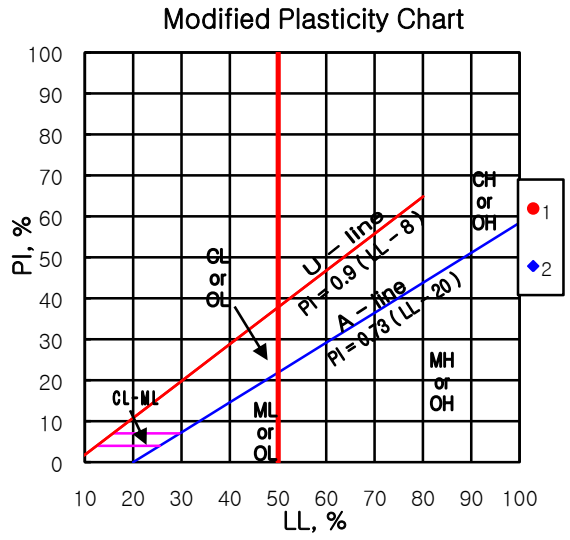
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-71	1.0	1	6.4	2.668	N	P	P	0.0434	0.3648	2.5235	58.2	1.2

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	74.0	56.1	42.3	32.2	26.2	17.7	14.3	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

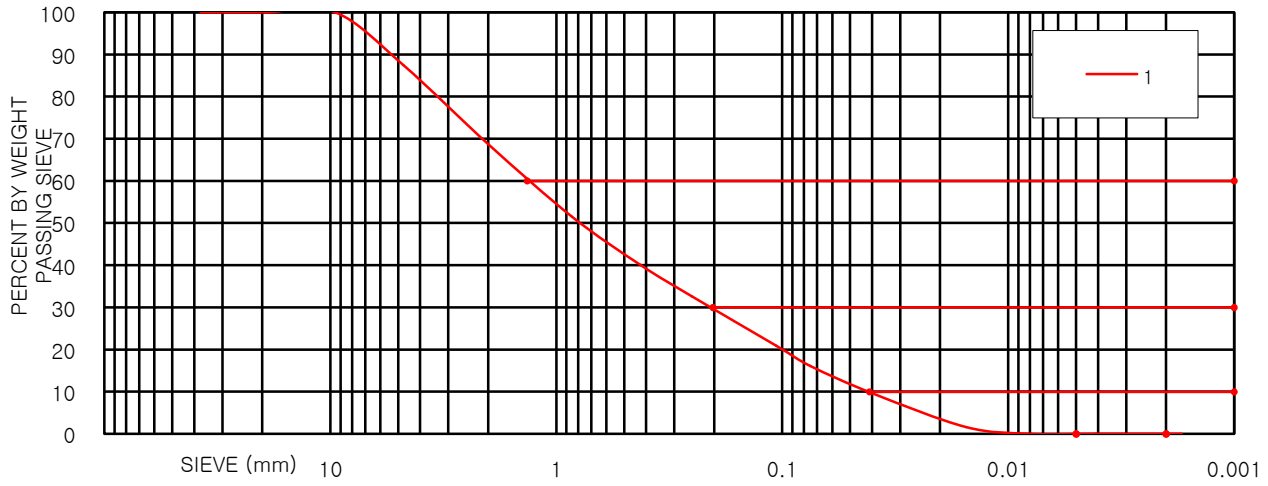
KS F 2301	05. 11. 25 개정
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KS F 2324	06. 10. 19 개정

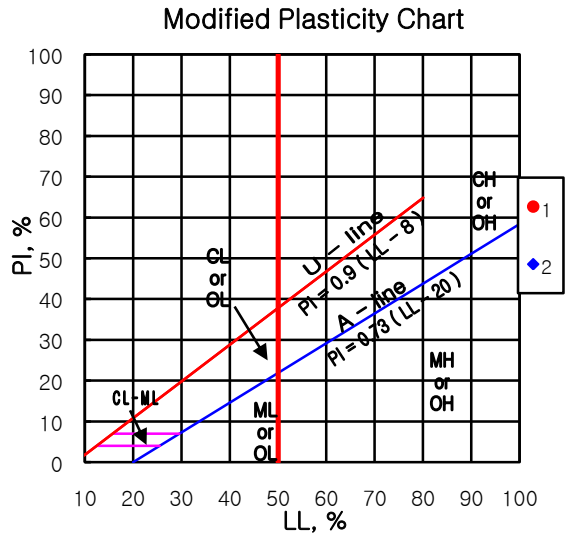
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-71	2.0	1	7.9	2.656	N	P	P	0.0411	0.2028	1.3459	32.7	0.7

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	87.5	68.7	51.5	40.1	32.6	20.9	16.1	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

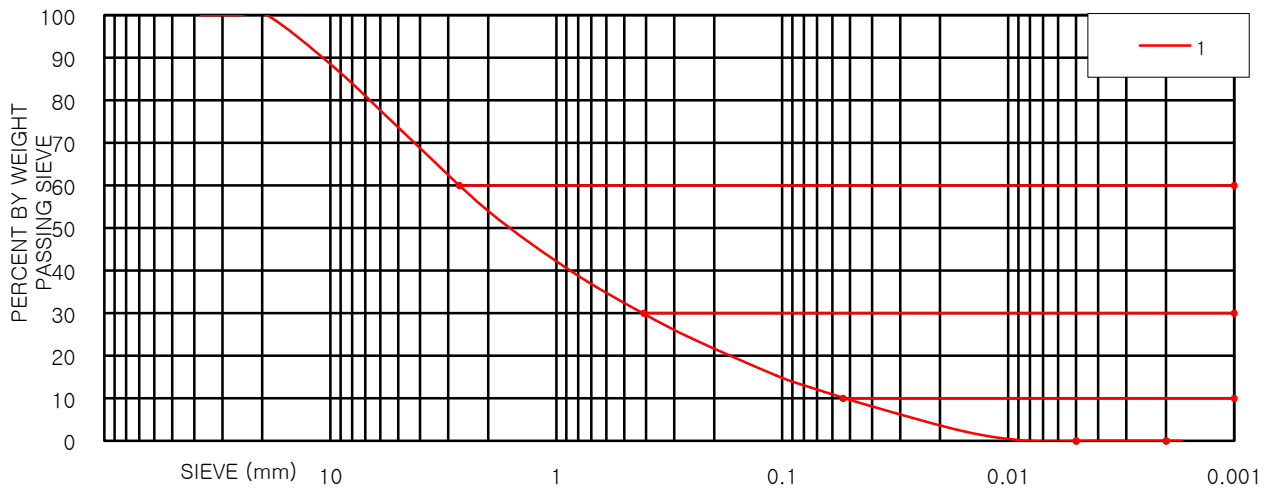
KS F 2301	05. 11. 25 개정
KS F 2302	05. 07. 26 확인
KS F 2303	05. 07. 26 확인
KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

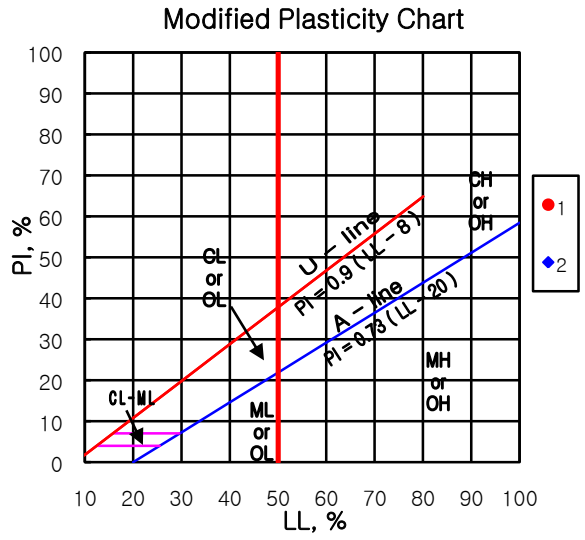
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-71	4.0	1	10.4	2.681	N	P	P	0.0538	0.4102	2.6853	49.9	1.2

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	72.5	54.0	39.7	30.3	23.9	15.3	12.6	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

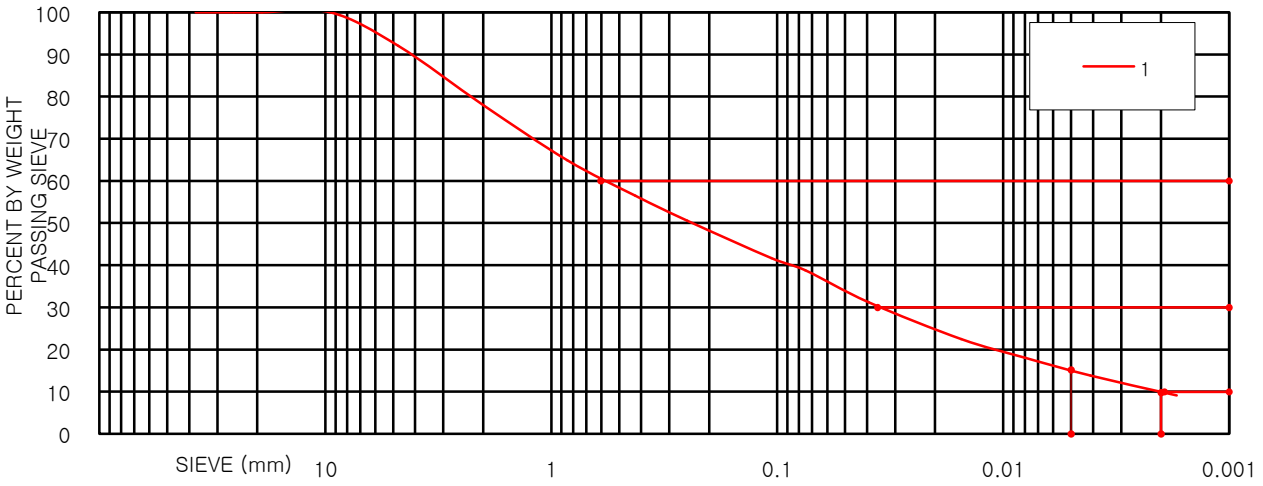
KS F 2301	05. 11. 25 개정
KS F 2302	05. 07. 26 확인
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

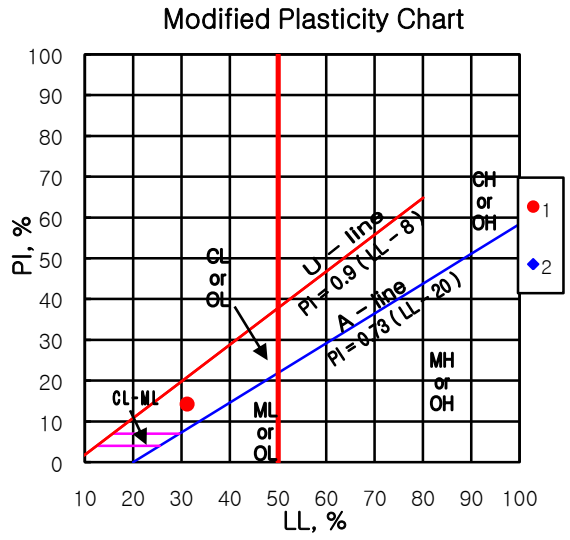
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-72	1.0	1	14.4	2.668	31.1	16.8	14.3	0.0019	0.0360	0.6039	312.6	1.1

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	92.0	78.0	64.9	56.5	50.6	41.7	38.8	9.8	SC	





	1	2	3	비고
A	1.46			
CI	1.17			
LI	-0.17			

Remarks

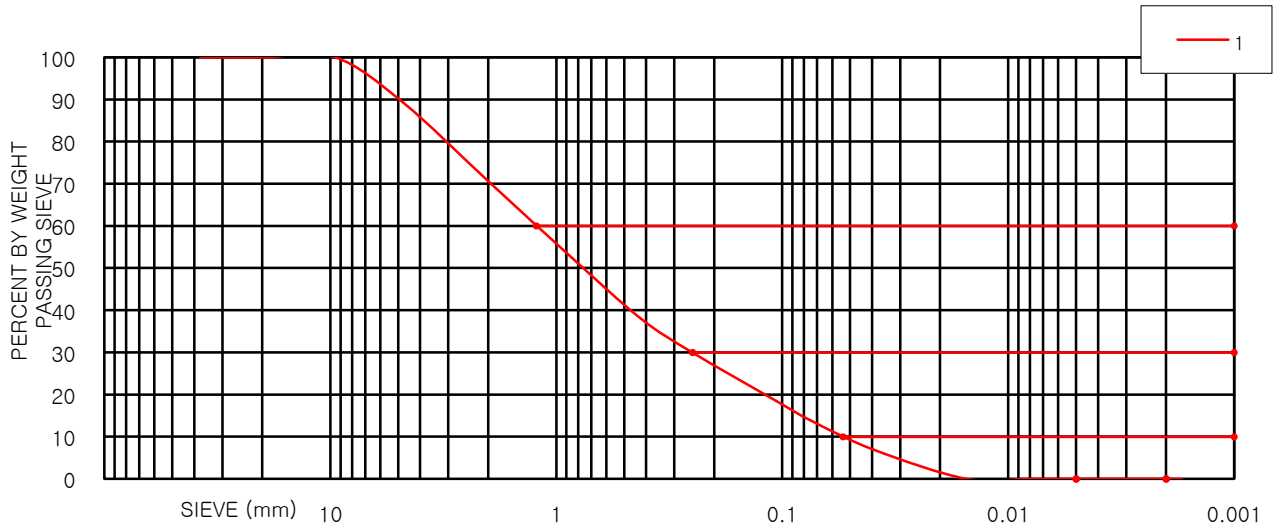
KS F 2301	05. 11. 25 개정
KS F 2302	05. 07. 26 확인
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

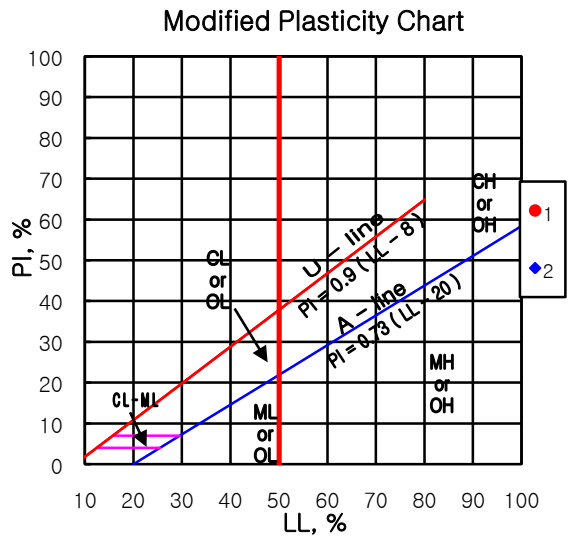
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-72	2.0	1	8.4	2.656	N	P	P	0.0538	0.2495	1.2246	22.8	0.9

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	89.2	70.6	52.4	38.1	30.0	18.5	13.9	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

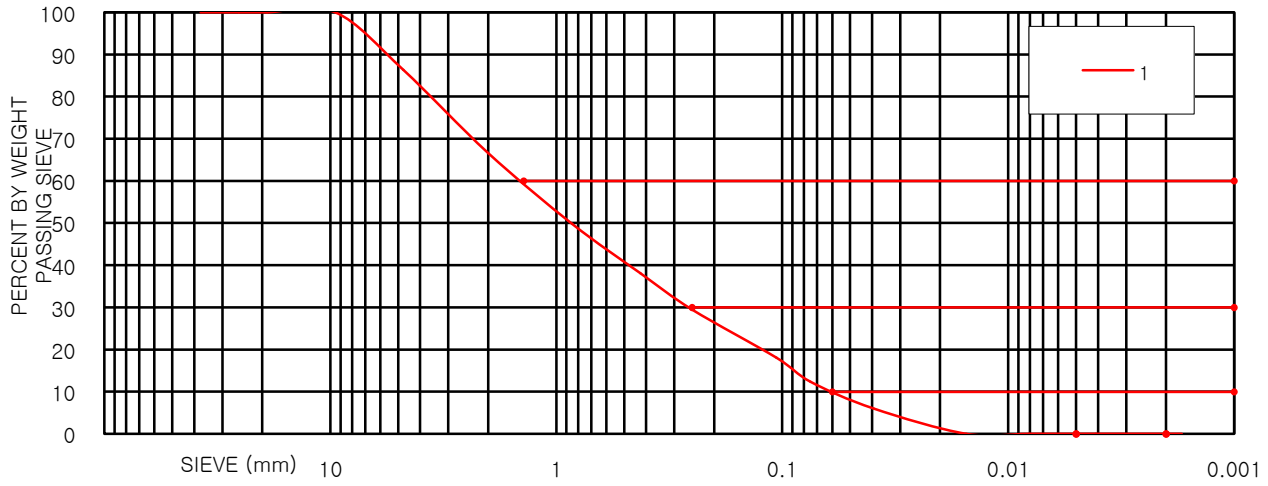
KS F 2301	05. 11. 25 개정
KS F 2302	05. 07. 26 확인
KS F 2303	05. 07. 26 확인
KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

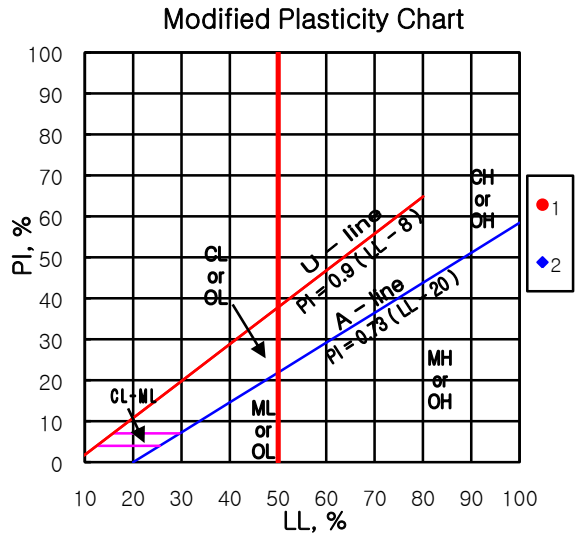
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-72	3.0	1	9.1	2.676	N	P	P	0.0600	0.2506	1.3932	23.2	0.8

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	86.3	66.6	49.8	38.1	29.5	18.1	12.4	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

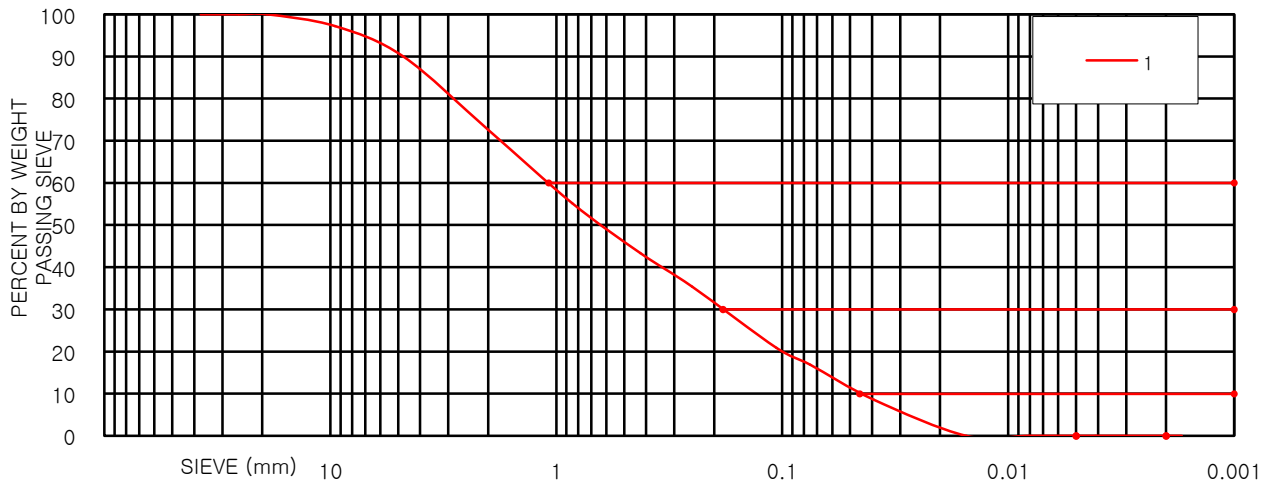
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KS F 2302	05. 07. 26 확인
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KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

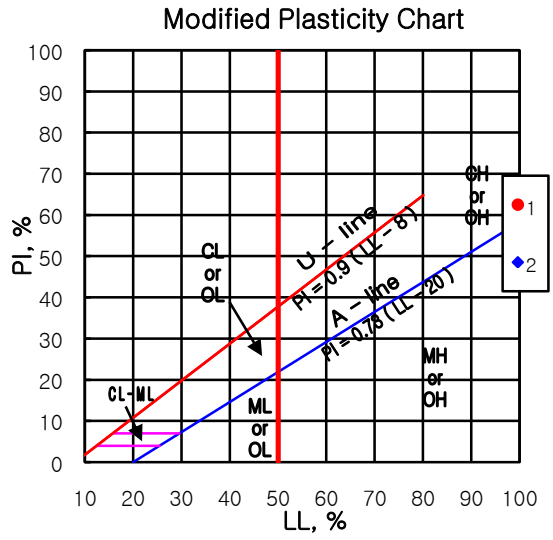
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-73	1.0	1	9.6	2.674	N	P	P	0.0454	0.1828	1.0814	23.8	0.7

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	90.0	72.6	55.2	43.4	35.4	20.9	16.9	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

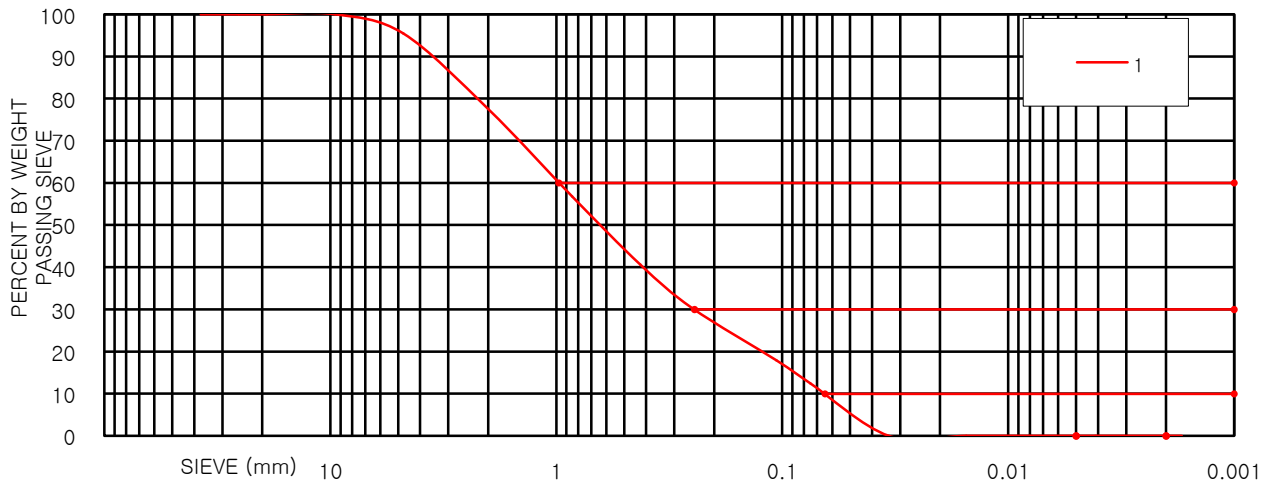
KS F 2301	05. 11. 25 개정
KS F 2302	05. 07. 26 확인
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KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

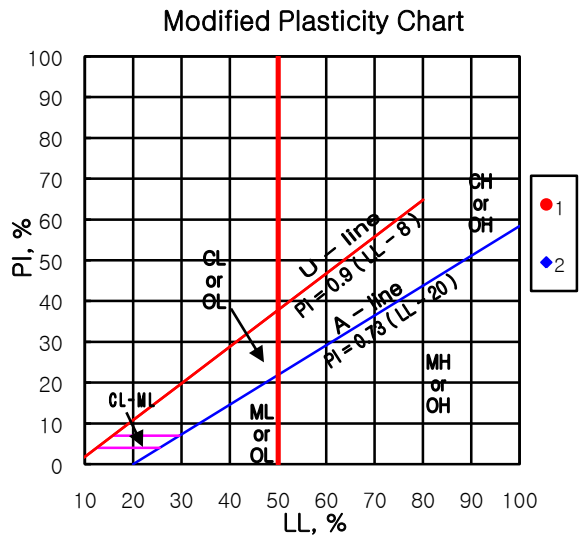
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-73	3.0	1	9.4	2.671	N	P	P	0.0647	0.2443	0.9750	15.1	0.9

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	95.4	77.5	56.8	40.6	30.3	17.9	12.5	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

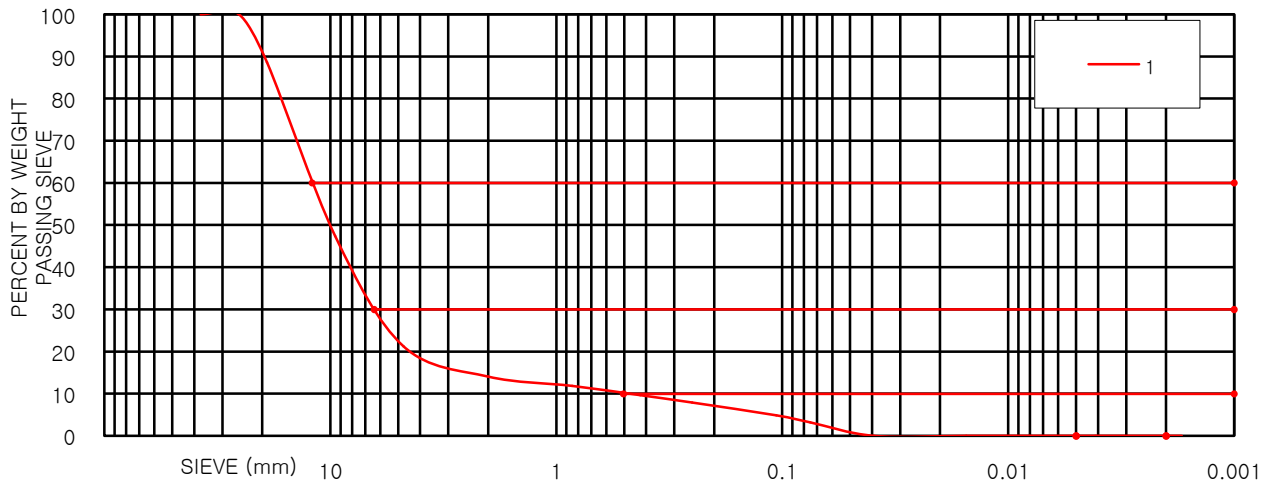
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

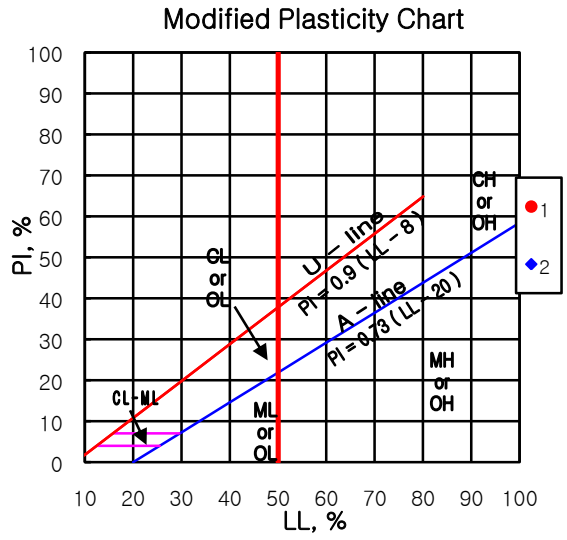
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-73	4.0	1	4.6	2.642	N	P	P	0.5047	6.3973	12.0504	23.9	6.7

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	21.3	14.1	11.9	9.7	7.9	4.9	3.2	-	GP	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

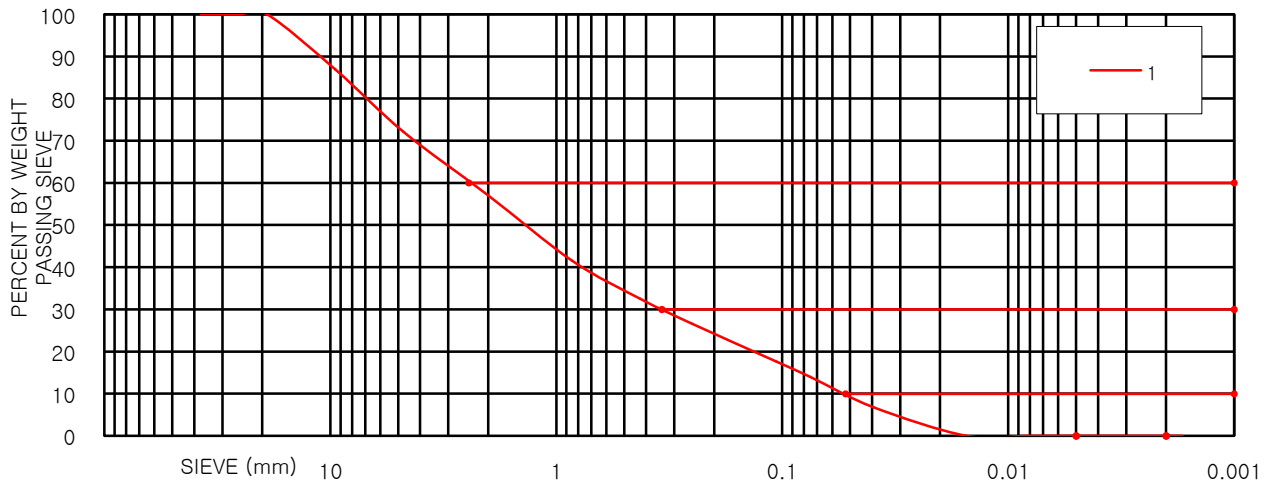
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KS F 2302	05. 07. 26 확인
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KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

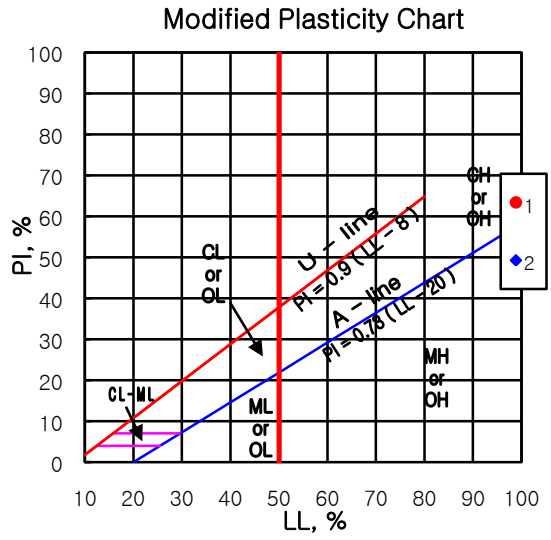
Classification of a Soil (USCS)

Project : 중앙선 도담~영천 복선전철 제 5공구 지반조사

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-74	2.0	1	5.0	2.667	N	P	P	0.0525	0.3412	2.4378	46.5	0.9

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	72.1	57.0	41.5	32.5	26.6	17.6	14.0	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

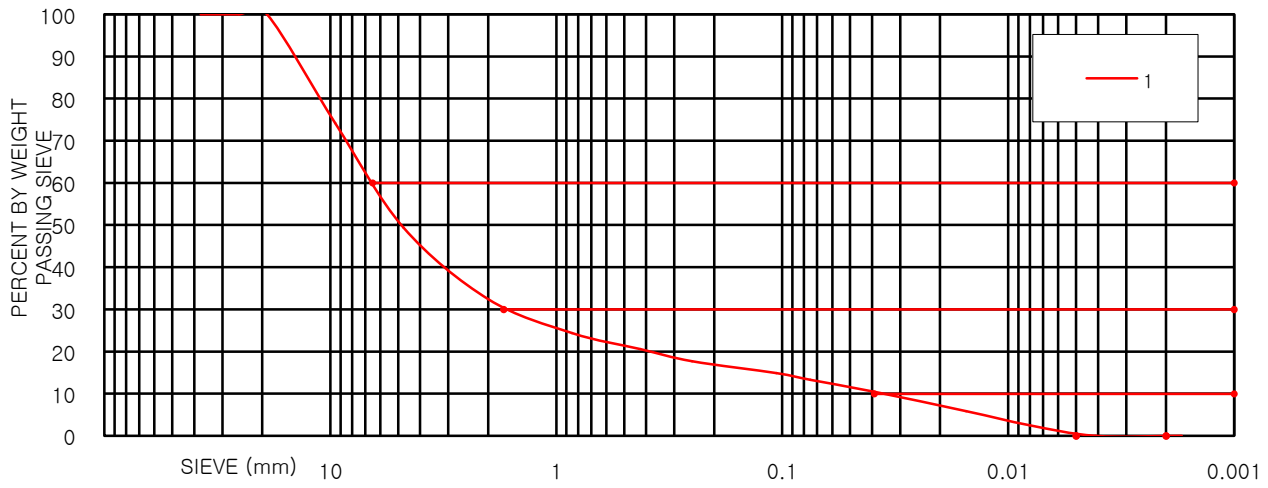
KS F 2301	05. 11. 25 개정
KS F 2302	05. 07. 26 확인
KS F 2303	05. 07. 26 확인
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

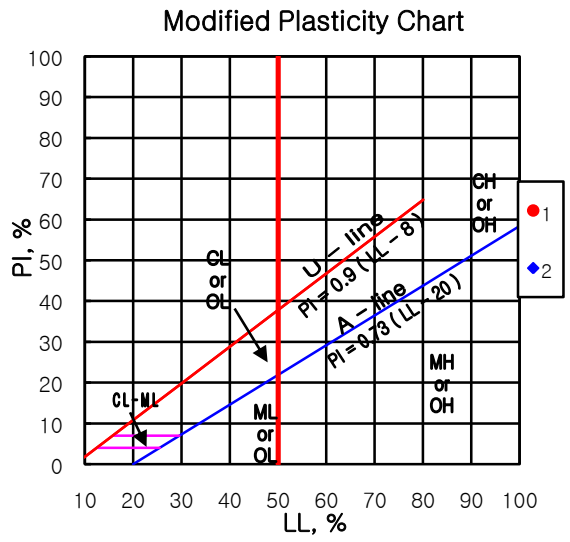
Classification of a Soil (USCS)

Project : 중앙선 도담~영천 복선전철 제 5공구 지반조사

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-74	5.0	1	13.6	2.637	N	P	P	0.0392	1.7100	6.5013	166.0	11.5

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	49.4	32.4	24.4	20.6	17.7	14.9	13.3	-	GM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

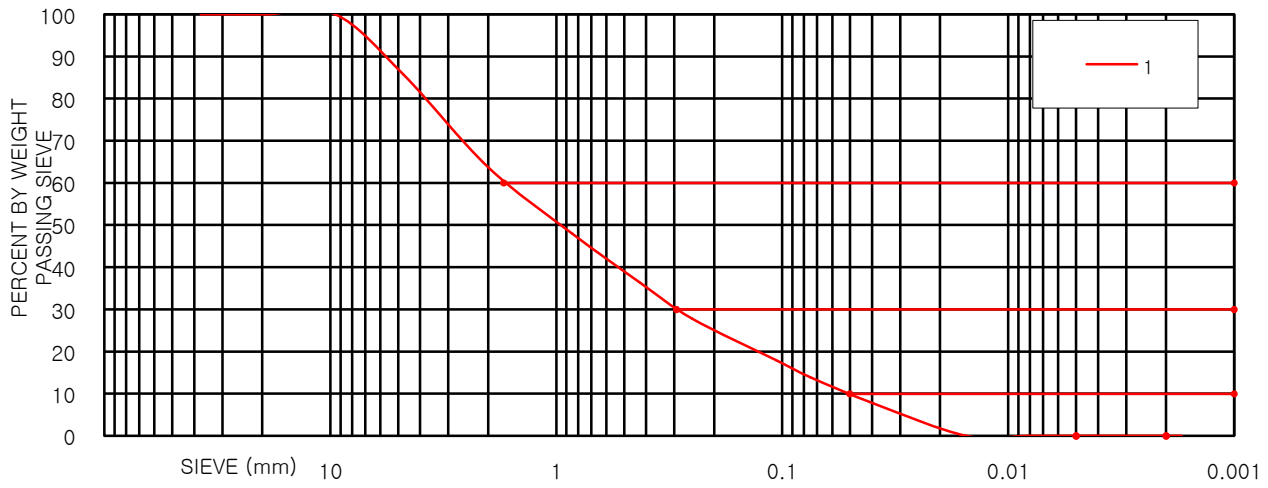
KS F 2301	05. 11. 25 개정
KS F 2302	05. 07. 26 확인
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

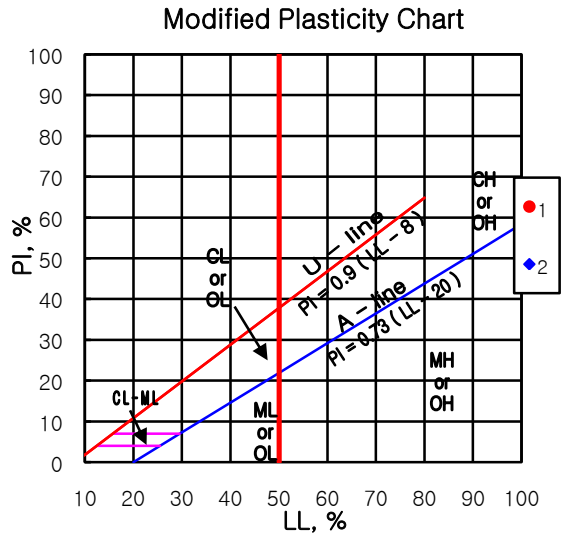
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-75	2.0	1	6.6	2.667	N	P	P	0.0502	0.2938	1.7100	34.0	1.0

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	85.7	63.7	48.0	36.3	27.8	17.9	13.9	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

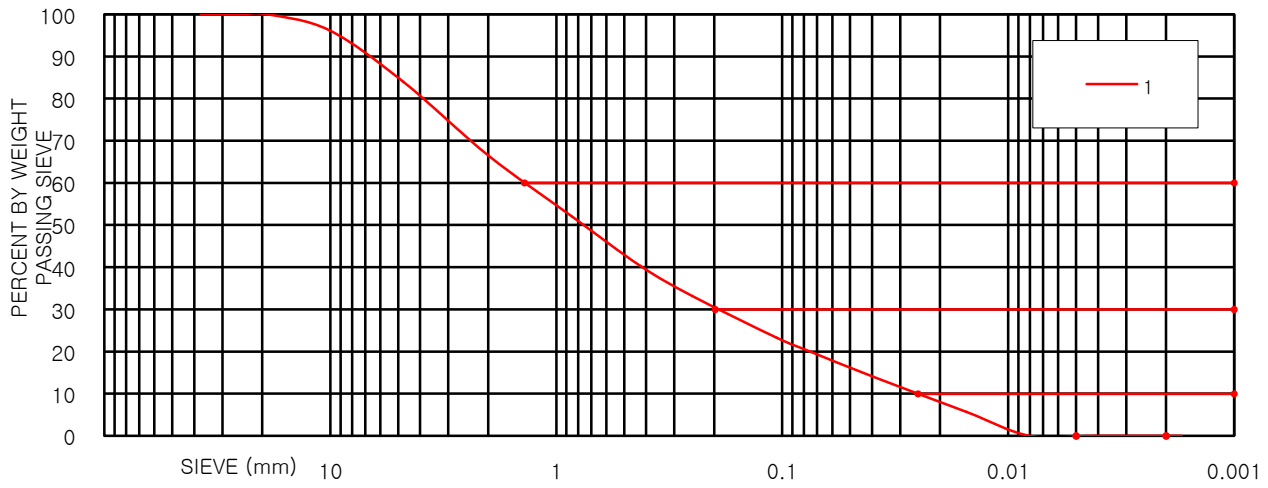
KS F 2301	05. 11. 25 개정
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

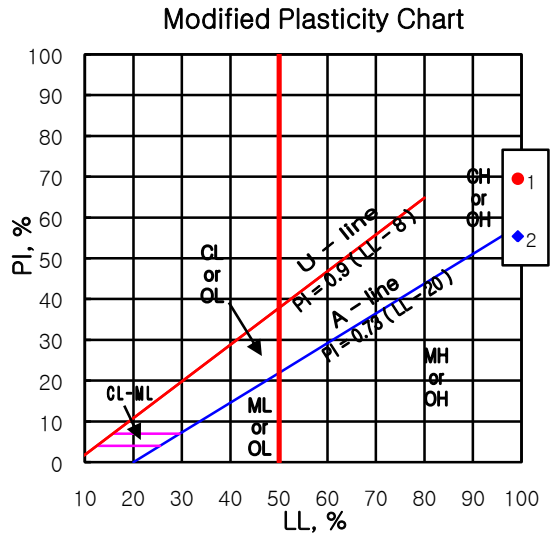
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-75	3.0	1	9.6	2.664	N	P	P	0.0251	0.1982	1.3836	55.2	1.1

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	83.9	66.5	52.0	40.3	33.2	23.3	20.0	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

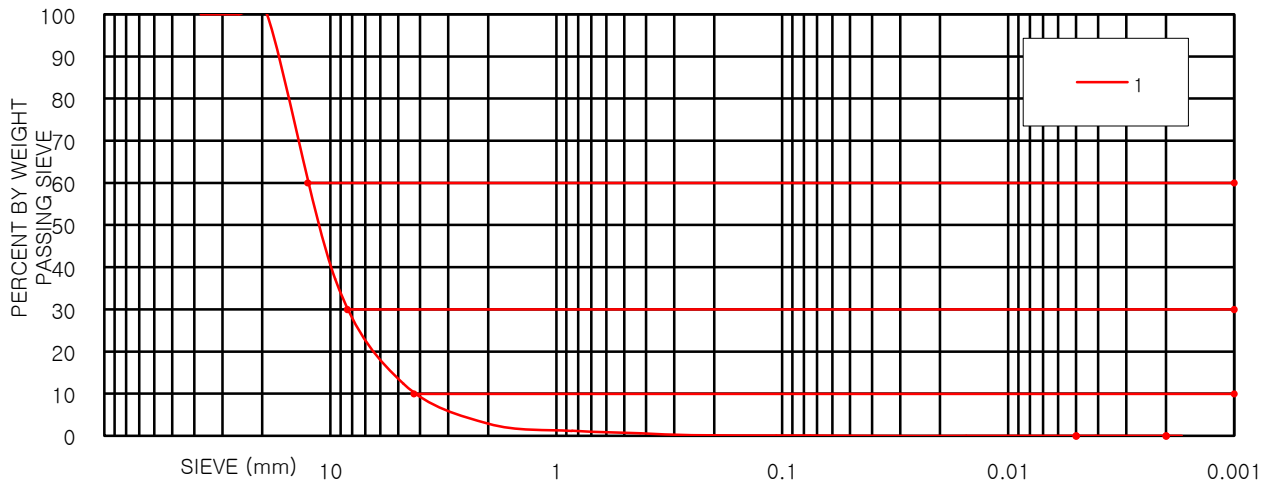
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KS F 2324	06. 10. 19 개정

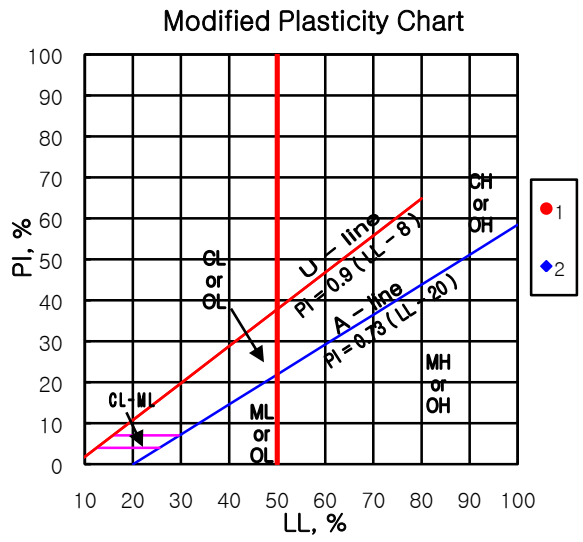
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-75	4.0	1	8.7	2.627	N	P	P	4.2658	8.4140	12.5893	3.0	1.3

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	12.4	2.9	1.2	0.6	0.2	0.1	0.1	-	GP	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

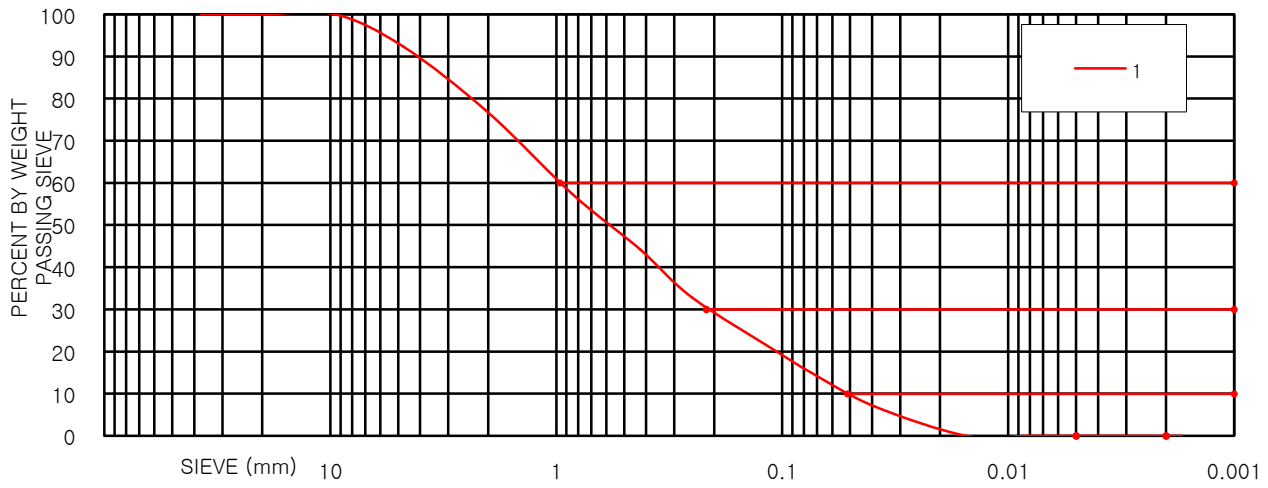
KS F 2301	05. 11. 25 개정
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KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

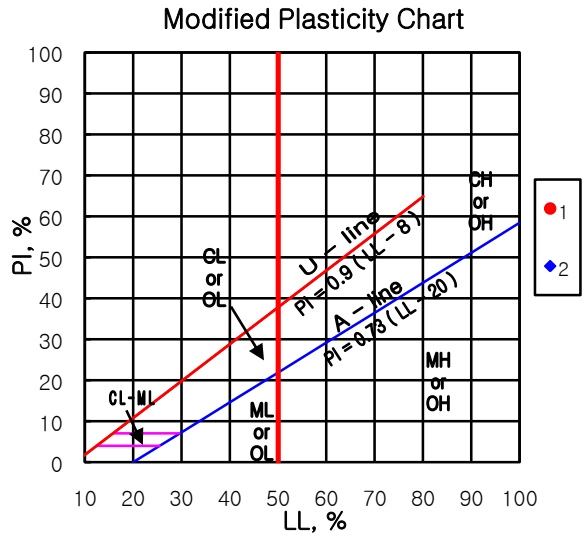
Classification of a Soil (USCS)

Project : 중앙선 도담~영천 복선전철 제 5공구 지반조사

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-76	1.0	1	7.1	2.656	N	P	P	0.0514	0.2168	0.9638	18.7	0.9

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	92.3	76.7	57.4	44.2	32.8	20.1	15.1	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

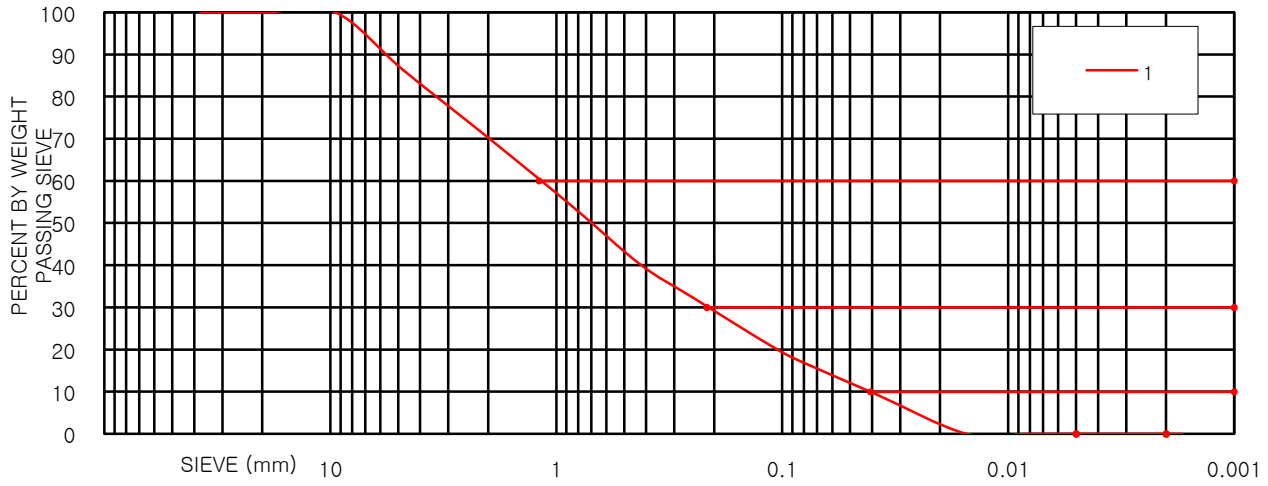
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KS F 2302	05. 07. 26 확인
KS F 2303	05. 07. 26 확인
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

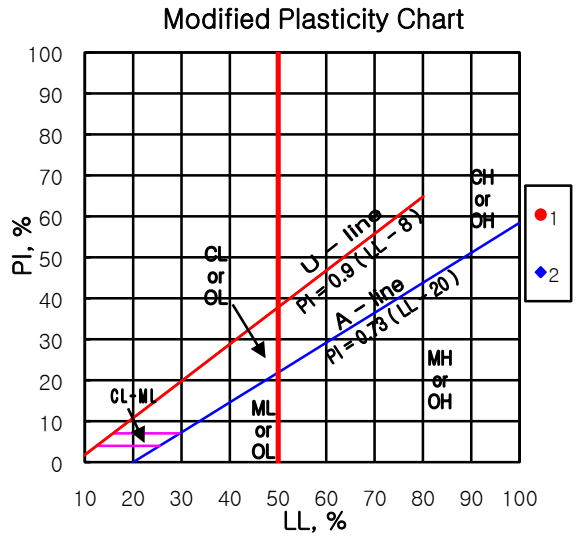
Classification of a Soil (USCS)

Project : 중앙선 도담~영천 복선전철 제 5공구 지반조사

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-76	3.0	1	10.5	2.664	N	P	P	0.0407	0.2158	1.1912	29.2	1.0

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	86.3	70.2	54.0	40.2	32.4	20.1	16.2	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

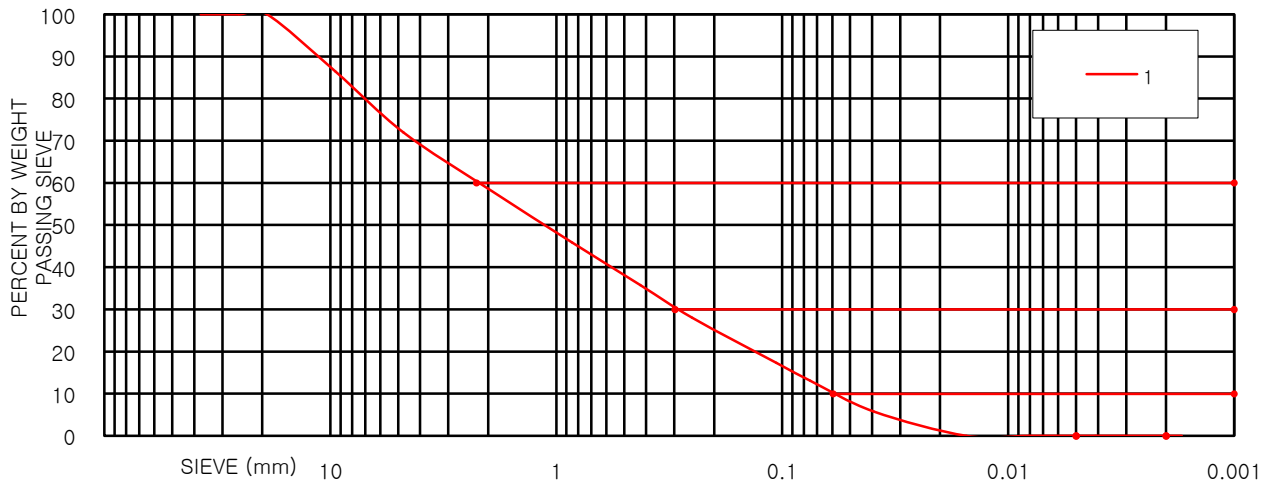
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

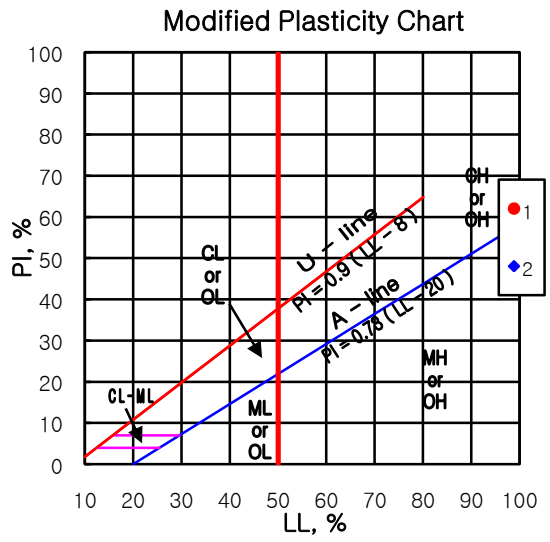
Classification of a Soil (USCS)

Project : 중앙선 도담~영천 복선전철 제 5공구 지반조사

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-79	2.0	1	10.6	2.652	N	P	P	0.0596	0.2985	2.2542	37.8	0.7

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	72.0	58.6	45.9	35.8	28.0	17.3	13.1	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

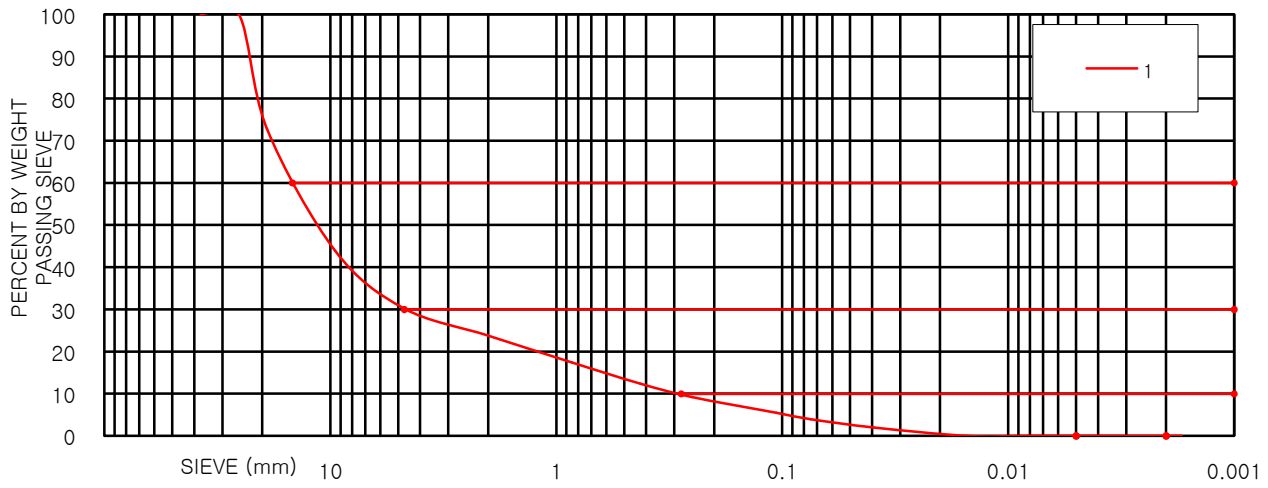
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

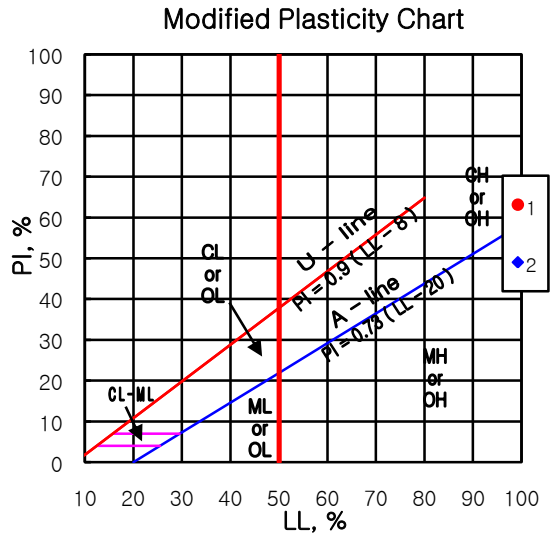
Classification of a Soil (USCS)

Project : 중앙선 도담~영천 복선전철 제 5공구 지반조사

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NBB-79	3.0	1	8.9	2.637	N	P	P	0.2799	4.7098	14.7231	52.6	5.4

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	30.3	23.8	17.4	12.4	9.2	5.5	4.0	-	GP	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

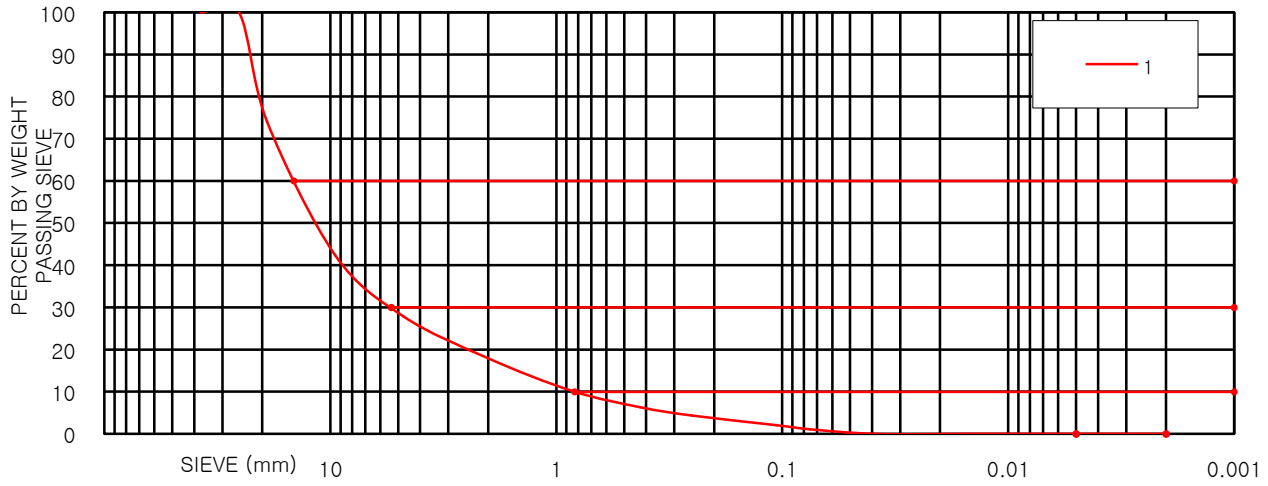
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KS F 2302	05. 07. 26 확인
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KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

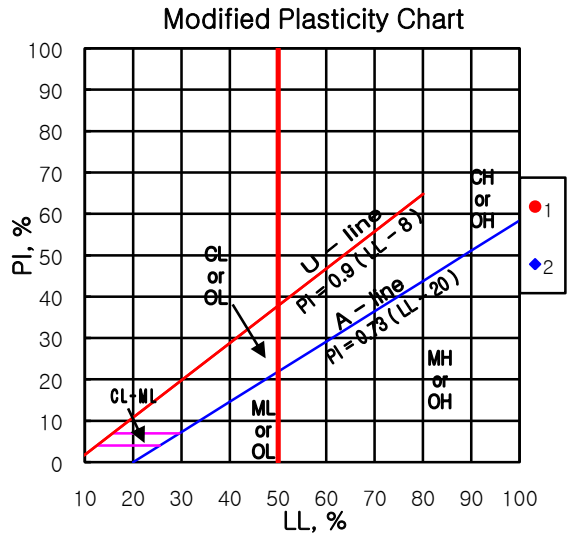
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질실험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NSB-1	1.0	1	8.1	2.63	N	P	P	0.8299	5.3703	14.5211	17.5	2.4

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	27.9	17.9	10.2	6.3	4.4	2.1	1.1	-	GW	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

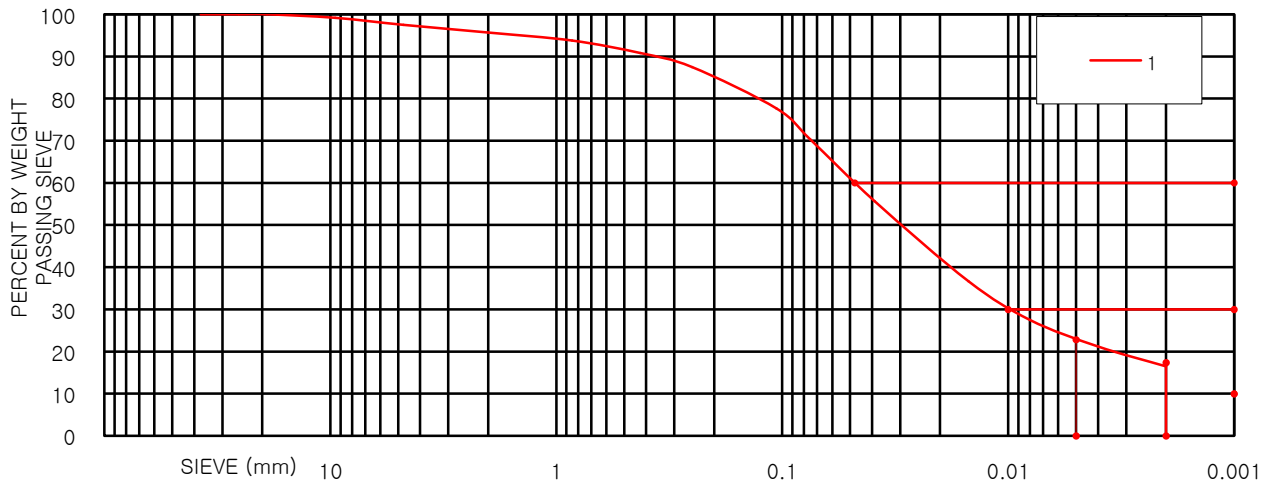
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KS F 2302	05. 07. 26 확인
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KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

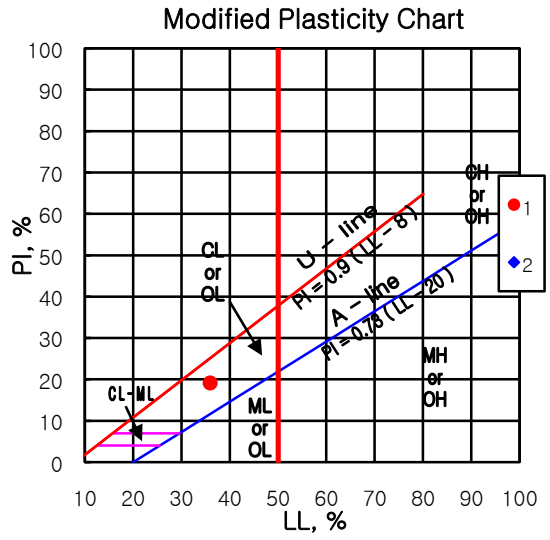
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질실험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NSB-2	2.0	1	29.1	2.67	35.9	16.7	19.2	0.0010	0.0100	0.0478	47.8	2.1

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	97.5	95.7	93.8	90.8	87.5	77.7	70.3	17.4	CL	





	1	2	3	비고
A	1.10			
CI	0.35			
LI	0.65			

Remarks

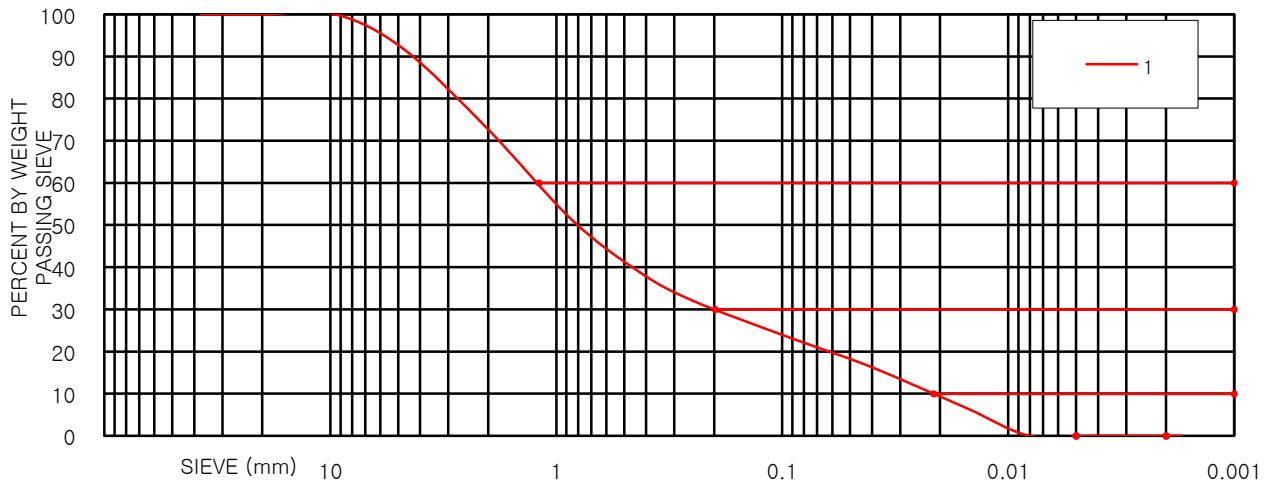
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KS F 2302	05. 07. 26 확인
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

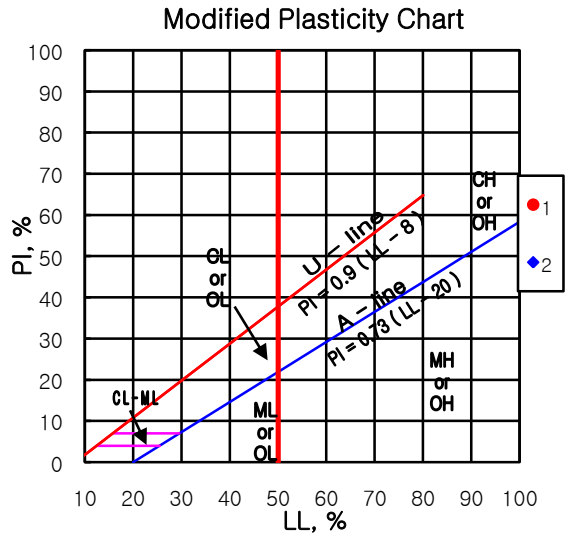
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NSB-2	4.0	1	12.4	2.625	N	P	P	0.0214	0.1982	1.1940	55.8	1.5

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	91.8	72.7	51.2	38.7	32.1	24.5	21.6	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

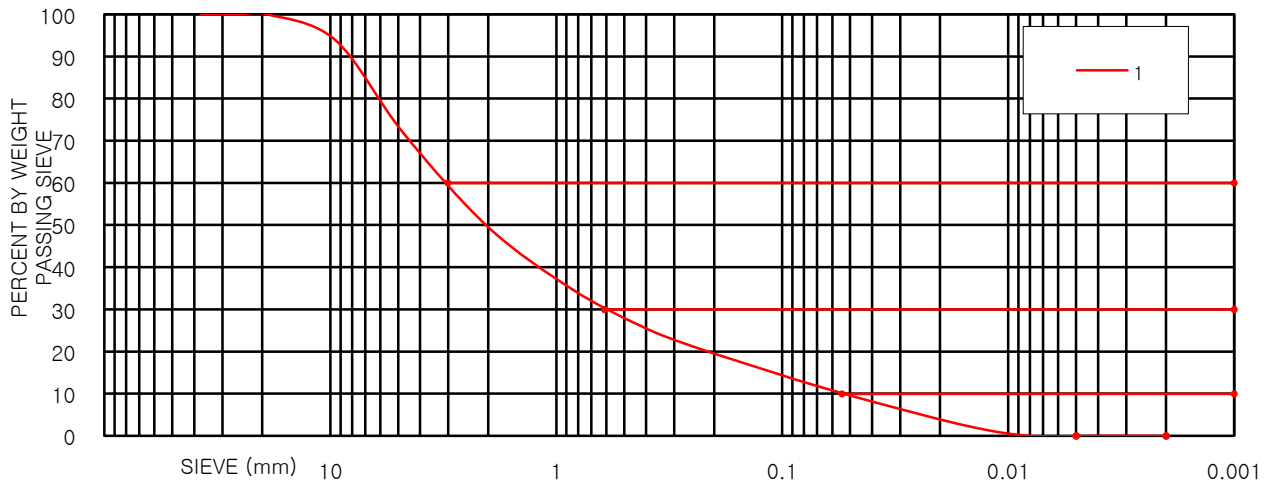
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KS F 2302	05. 07. 26 확인
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

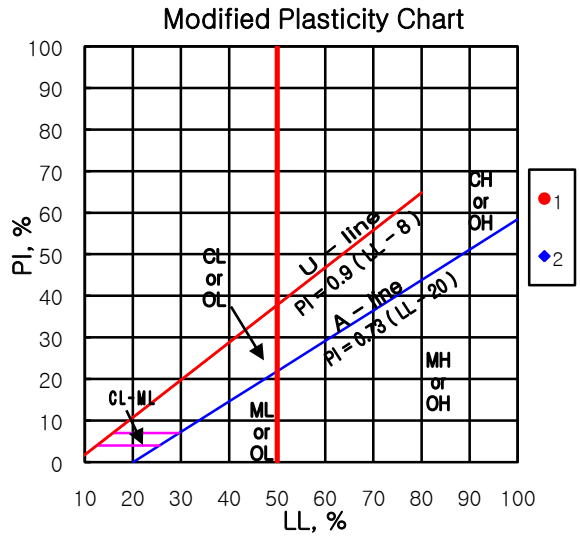
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질실험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NSB-2	6.0	1	7.3	2.66	N	P	P	0.0545	0.6124	3.0200	55.5	2.3

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	71.8	49.5	34.8	26.1	21.3	14.8	12.3	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

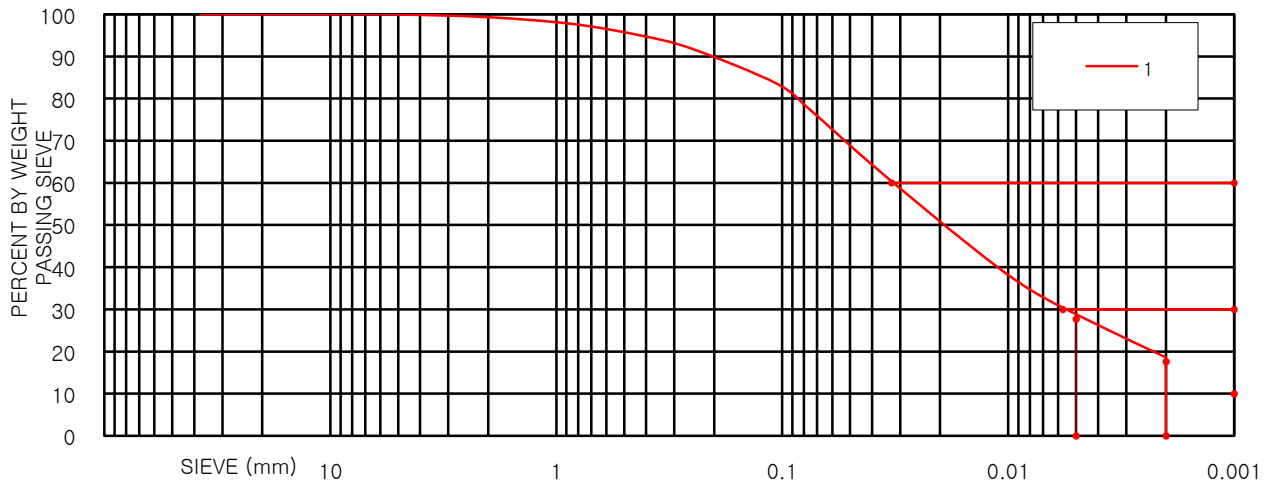
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

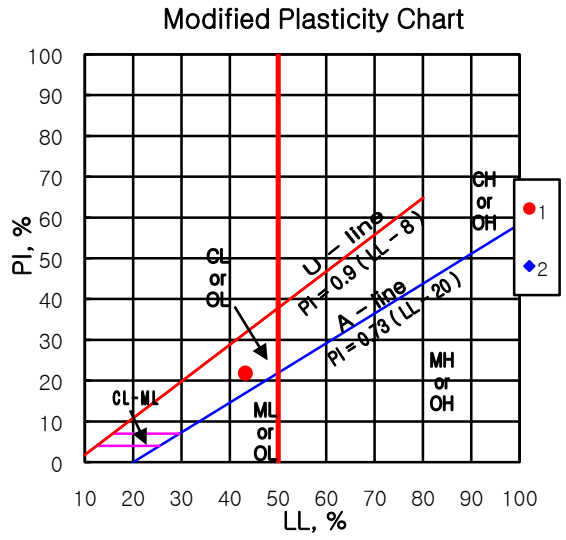
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질실험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NSB-3	1.0	1	25.5	2.68	43.2	21.4	21.8	0.0010	0.0057	0.0328	32.8	1.0

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	99.9	99.3	97.7	95.0	91.8	83.6	77.3	17.6	CL	





	1	2	3	비고
A	1.24			
CI	0.81			
LI	0.19			

Remarks

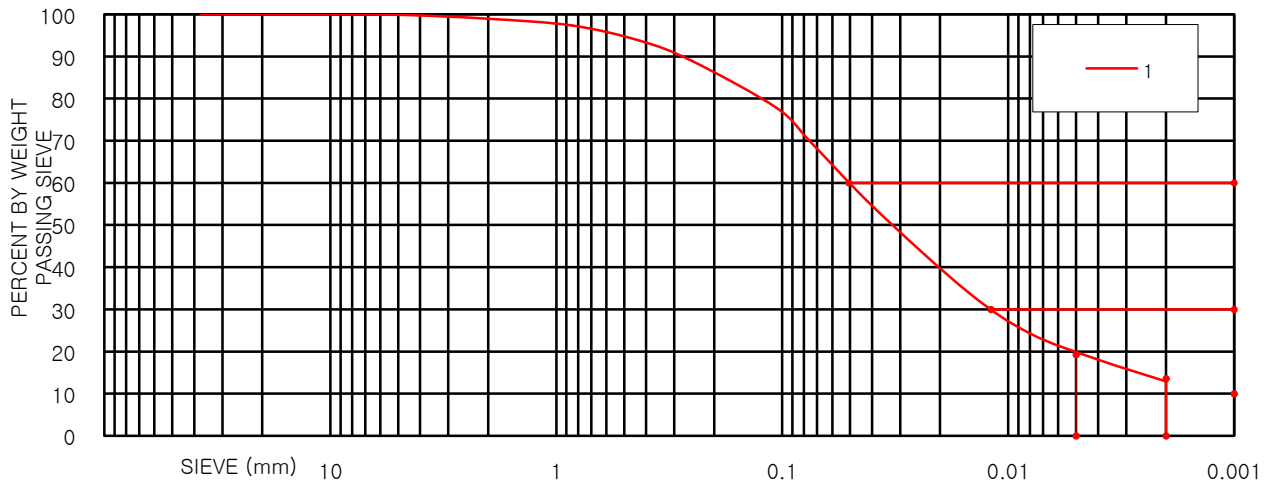
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KS F 2303	05. 07. 26 확인
KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

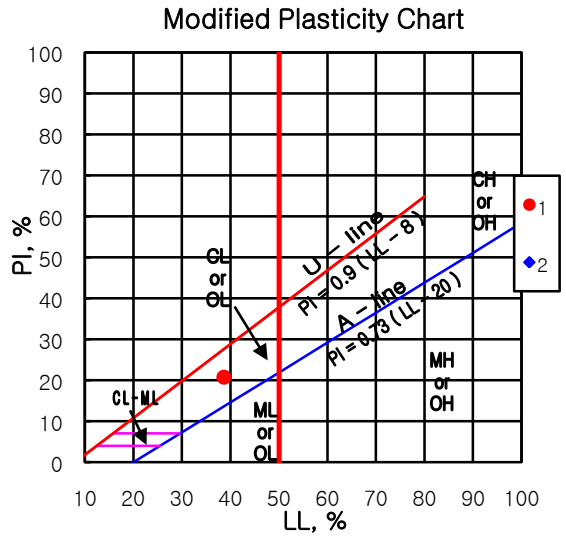
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질실험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NSB-3	2.0	1	28.4	2.67	38.6	17.8	20.8	0.0010	0.0119	0.0508	50.8	2.8

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	99.8	99.0	97.3	93.7	88.9	77.8	69.8	13.6	CL	





	1	2	3	비고
A	1.53			
CI	0.49			
LI	0.51			

Remarks

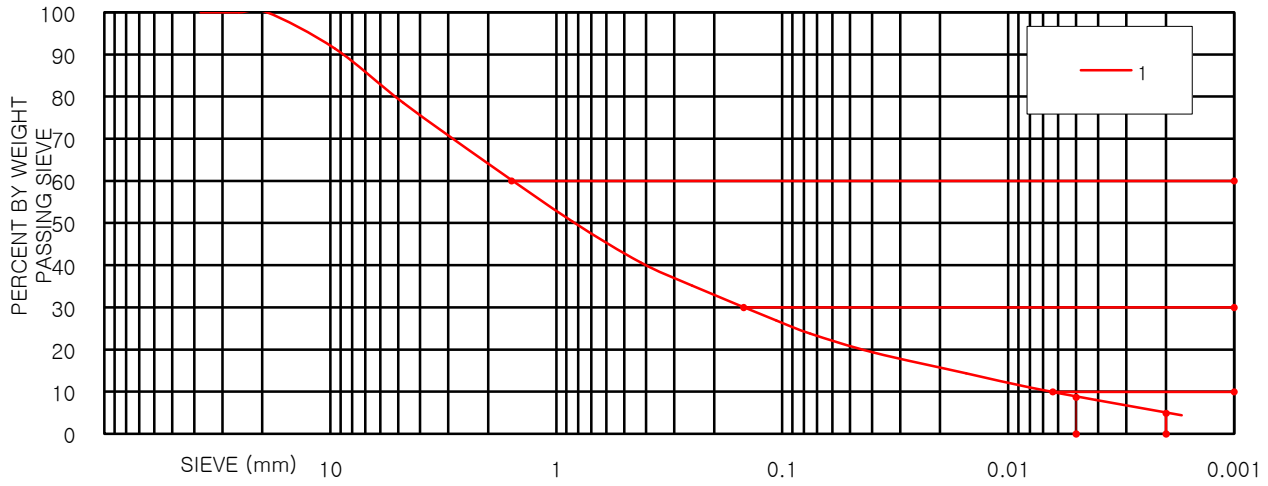
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KS F 2324	06. 10. 19 개정

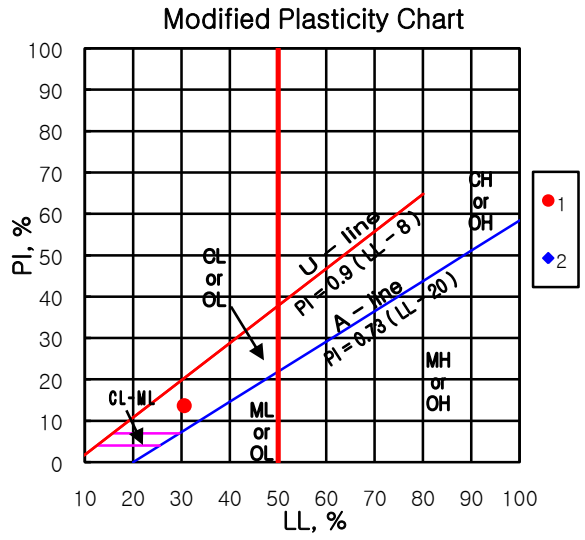
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질시험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NSB-3	4.0	1	21.3	2.679	30.5	16.8	13.7	0.0064	0.1483	1.5776	248.3	2.2

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	78.5	64.1	50.4	40.7	35.2	26.9	23.8	4.9	SC	





	1	2	3	비고
A	2.80			
CI	0.67			
LI	0.33			

Remarks

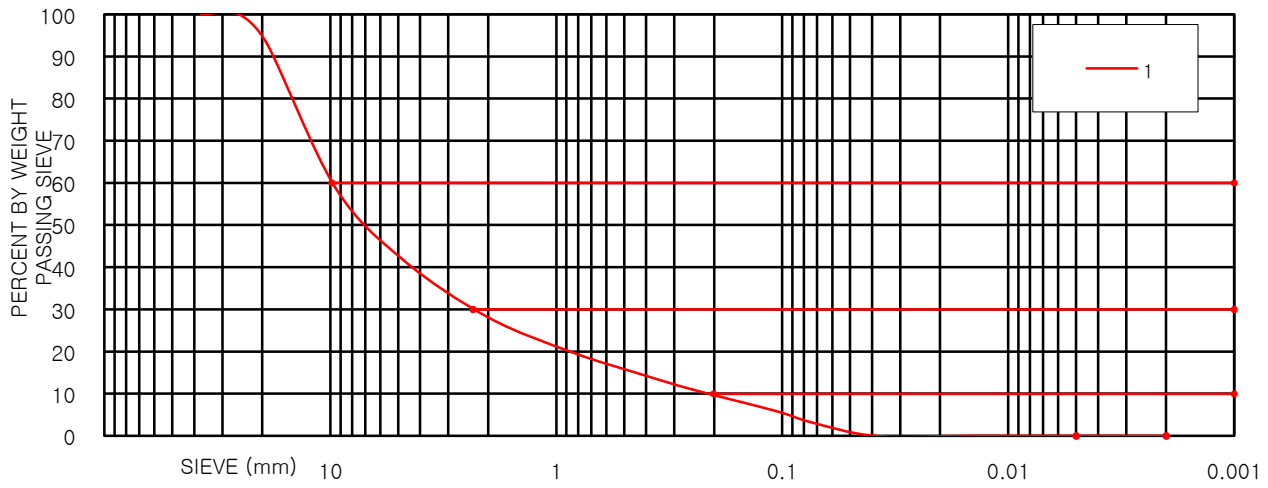
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KS F 2324	06. 10. 19 개정

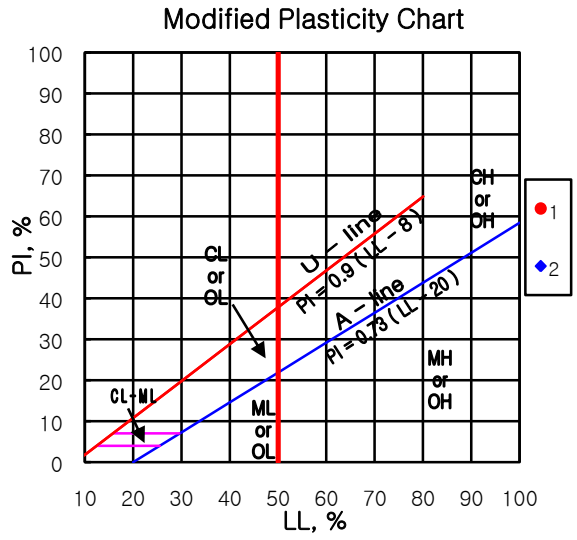
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질실험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NSB-4	2.0	1	9.3	2.63	N	P	P	0.2014	2.3388	9.8628	49.0	2.8

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	41.7	28.1	19.8	14.7	11.0	5.9	3.3	-	GW	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

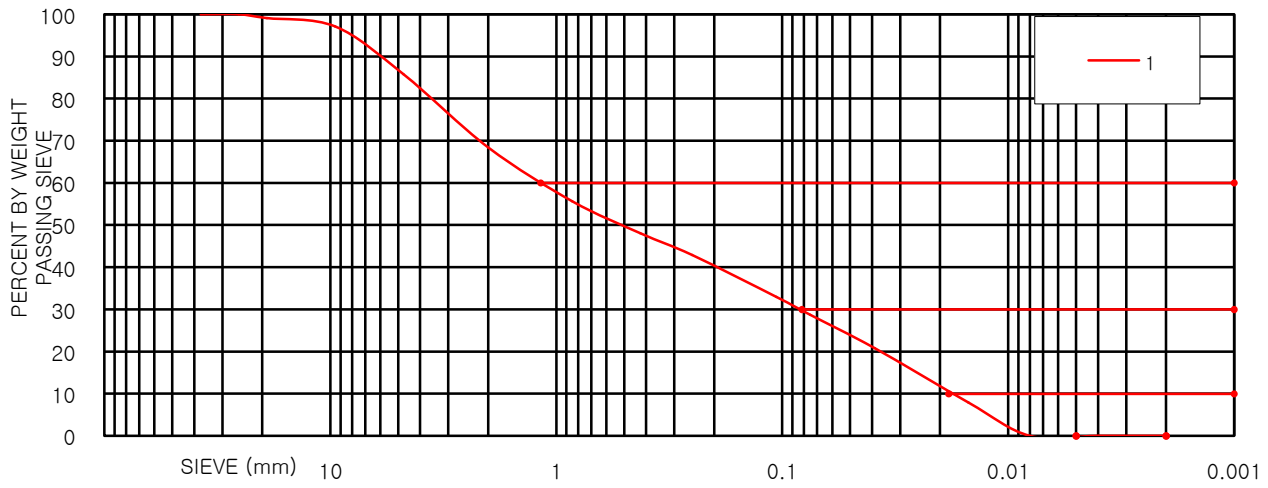
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KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

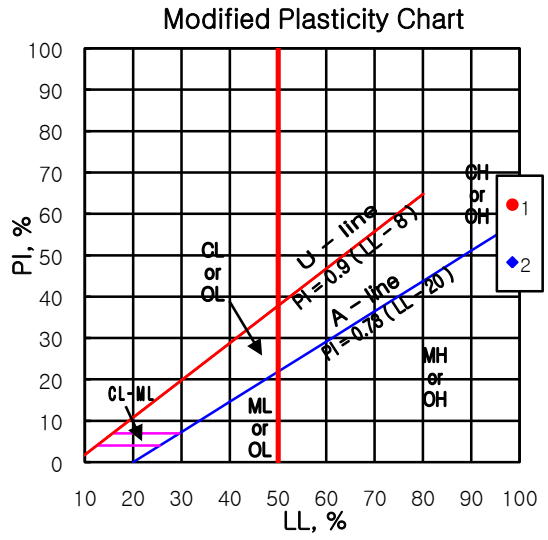
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질실험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NSB-4	3.0	1	17.5	2.66	N	P	P	0.0183	0.0818	1.1722	64.0	0.3

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	85.8	68.4	55.7	48.1	42.9	33.0	28.7	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

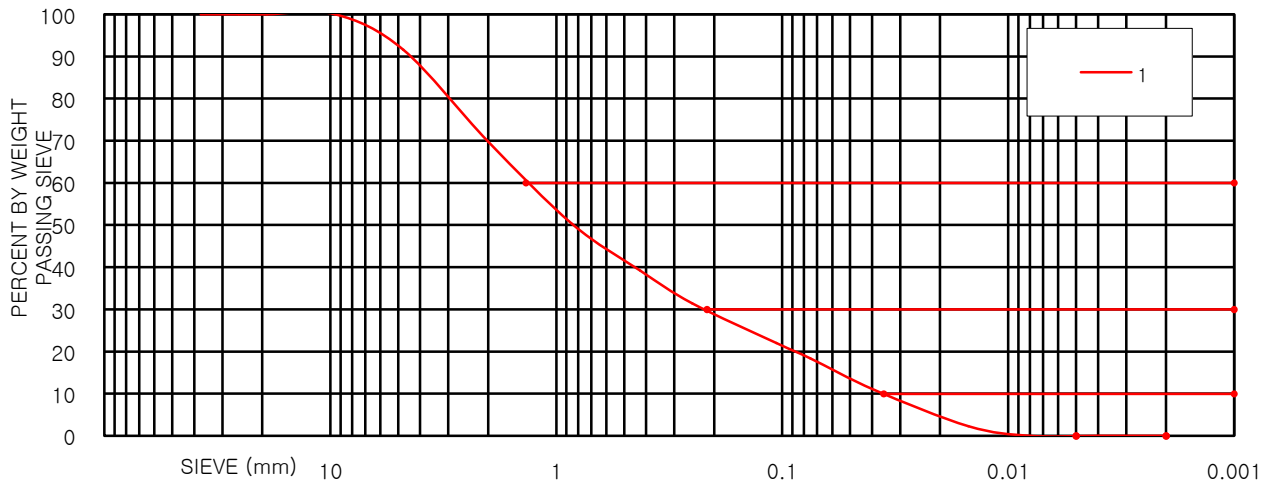
KS F 2301	05. 11. 25 개정
KS F 2302	05. 07. 26 확인
KS F 2303	05. 07. 26 확인
KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

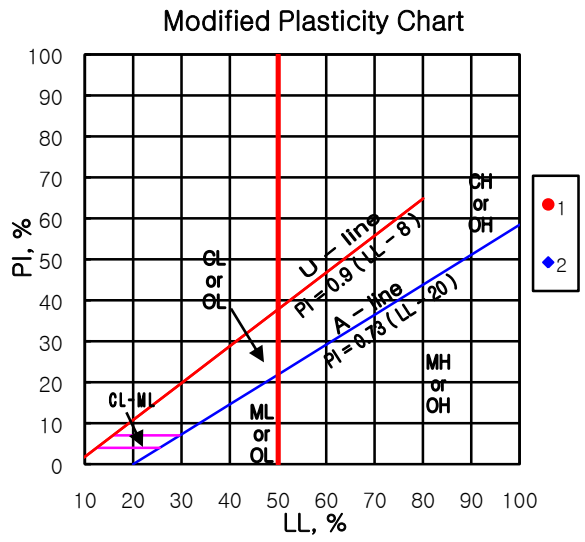
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질실험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NSB-4	5.0	1	11.1	2.663	N	P	P	0.0356	0.2153	1.3614	38.3	1.0

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	91.6	69.8	50.3	39.2	31.5	22.0	18.4	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

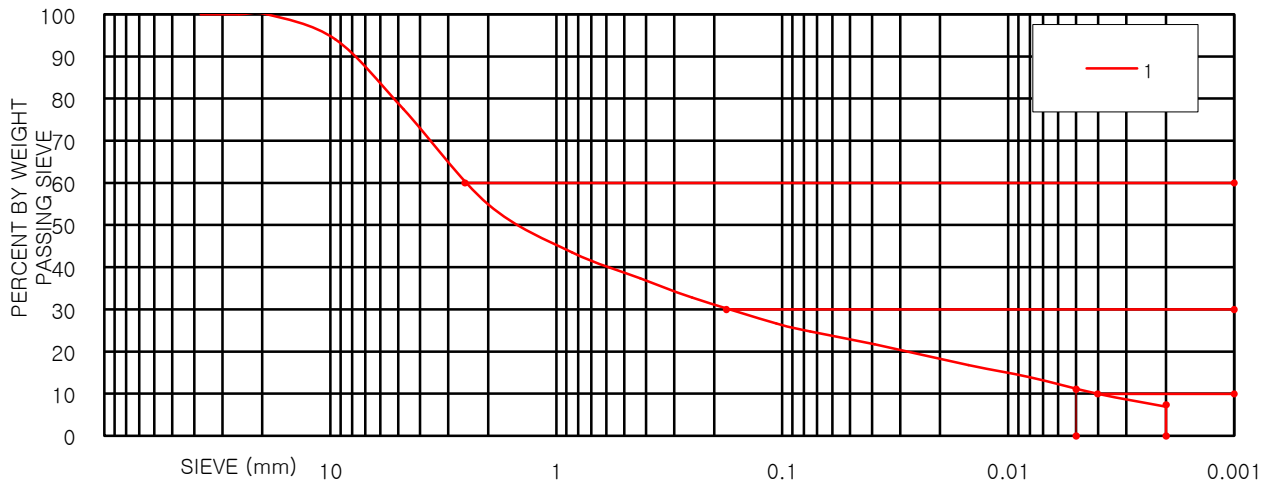
KS F 2301	05. 11. 25 개정
KS F 2302	05. 07. 26 확인
KS F 2303	05. 07. 26 확인
KS F 2306	05. 07. 26 확인
KS F 2309	04. 12. 29 개정
KS F 2324	06. 10. 19 개정

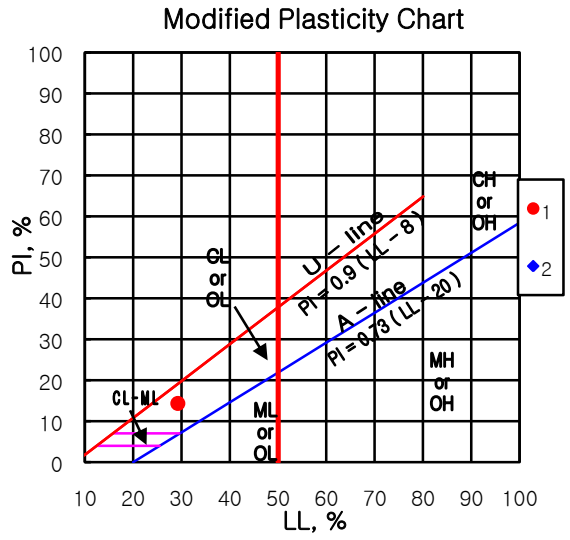
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질실험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NSB-5	2.0	1	20.8	2.667	29.2	14.8	14.4	0.0040	0.1766	2.5351	631.0	3.1

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	77.5	54.9	43.5	37.4	32.8	26.6	24.8	7.4	SC	





	1	2	3	비고
A	1.95			
CI	0.59			
LI	0.41			

Remarks

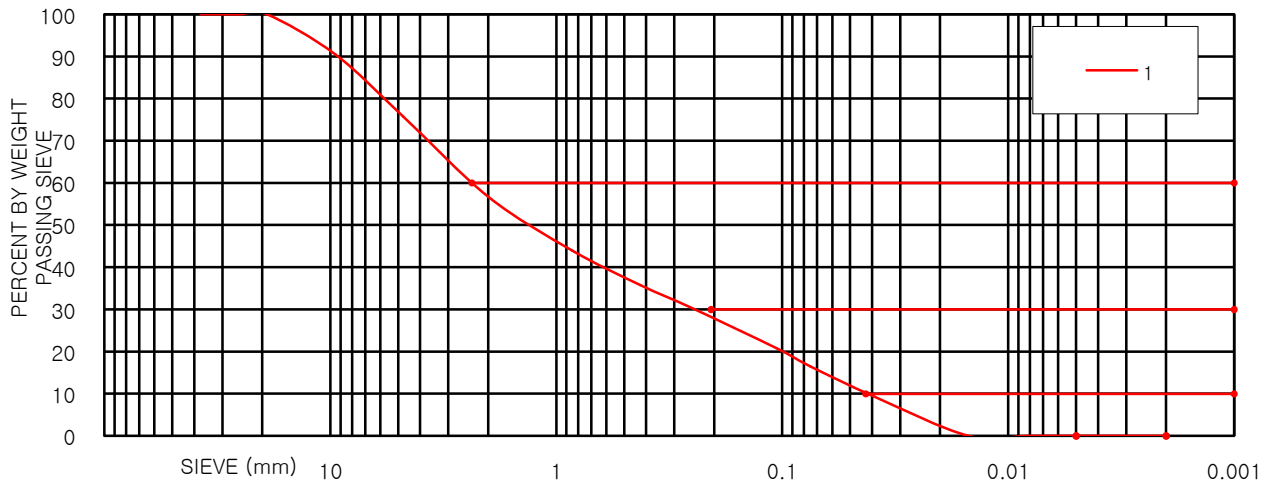
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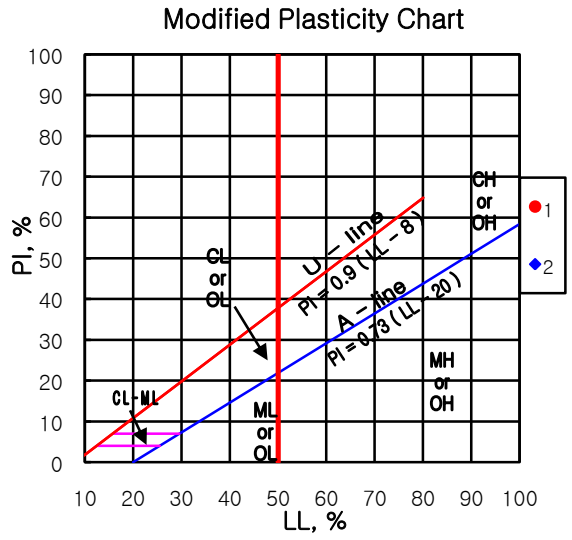
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질실험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NSB-5	3.0	1	16.0	2.656	N	P	P	0.0427	0.2065	2.3659	55.5	0.4

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	75.7	56.7	44.0	35.8	30.3	20.8	16.5	-	SM	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

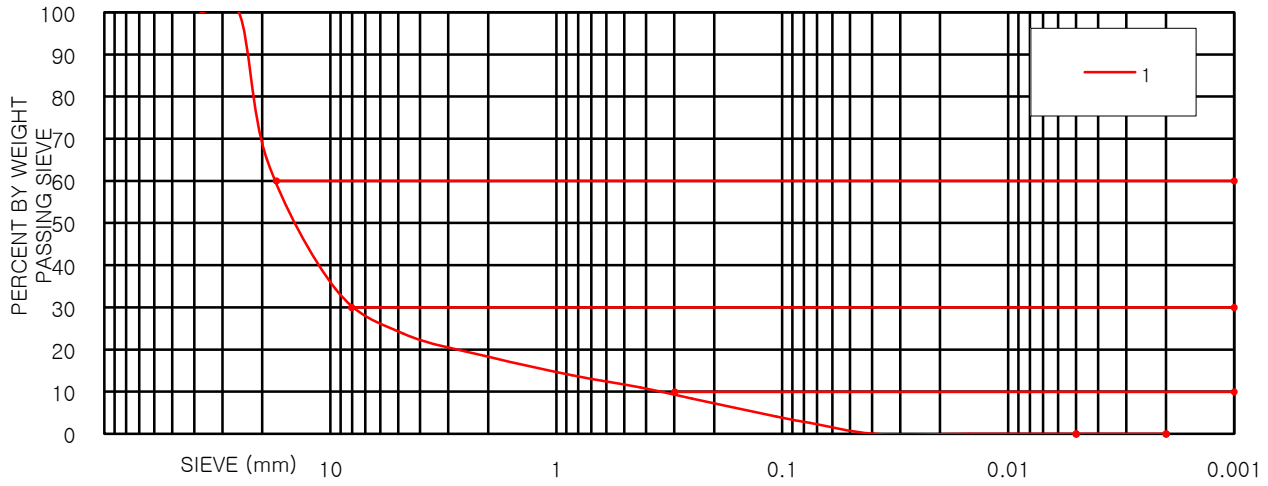
KS F 2301	05. 11. 25 개정
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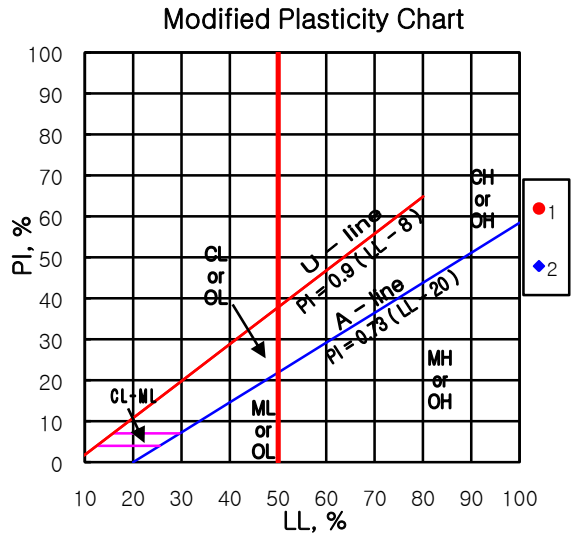
Classification of a Soil (USCS)

Project : 도담~영천 5공구 지반조사 실내 토질실험

Sample No.	Depth(m)	Curve	Wn	Gs	LL	PL	PI	D10	D30	D60	Cu	Cg
NSB-5	5.0	1	7.1	2.632	N	P	P	0.2992	8.0538	17.3380	57.9	12.5

Curve No.	Sieve Analysis Data (% Passing)								USCS	Description
	Sieve Size.									
	4.75	2.00	0.85	0.425	0.250	0.106	0.075	0.002		
1	23.8	18.3	13.9	11.0	8.4	4.1	2.6	-	GP	





	1	2	3	비고
A	#######			
CI	#######			
LI	#######			

Remarks

KS F 2301	05. 11. 25 개정
KS F 2302	05. 07. 26 확인
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