

IN-SITU DRY DENSITY TEST using SAND-CONE

Project : 제2영동(서울~원주) 고속도로 민간투자사업 실시설계(7공구) 지반조사 Test Date : 2007. 12.

Location : KTP-4

(1) Determination density of the sand to be used(in lab.)

Iteration Test No.		1	2	3
Wt. Of sand	Jug's Weight(W_1) (g)	200	200	200
	Jug+fulled sand(W_2) (g)	4575	4583	4578
	Sand in jug(W_{sand}) (g)	4375	4383	4378
Vol. Of jug	Jug + water(W_3) (g)	3325	3326	3325
	Water's temperature(T)(°C)	15	15	15
	Water's density(G_w)	0.999129	0.999129	0.999129
	Water in jug(W_w) (g)	3125	3126	3125
	Volume of jug(V) (cm^3)	3127.7	3128.7	3127.7
Dry density of sand(γ_{sand})		each		
		ave	1.399	1.401
			1.400	

(2) Determination dry density of digged-out soil in test hole

Test Hole No.				1.5 (M)	Disturbed	
Wt. (g)	soil	Pan's weight(W_1)		426	426	
		Pan+wet soil(W_2)		2367	2264	
		Wt. Of wet soil(W)		1941	1838	
	sand	Cone+Sand	Initial	4641	4366	
			Final	1752	1335	
		Sand in hole(W_{sand})		1589	1731	
Wet density		Volume(V^*) (cm)	1135	1237		
		Wet density(γ_t)(t/m ³)	1.710	1.486		
Water content (%)		Can No.		1	–	
		Can + wet soil(WW) (g)		216.33	–	
		Can + dry soil(DW) (g)		199.36	–	
		Wt. Of can (CW) (g)		64.66	–	
		Water content		12.6	–	
Dry density (t/m ³)		Tested in–place(γ_d)		1.519	1.320	
REMARKS						

Tested By : _____ Checked By : _____

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Project : 제2영동(서울~원주) 고속도로 민간투자사업 실시설계(7공구) 지반조사 Test Date : 2007. 12.

Location : KTP-5

(1) Determination density of the sand to be used(in lab.)

Iteration Test No.		1	2	3
Wt. Of sand	Jug's Weight(W_1) (g)	200	200	200
	Jug+fulled sand(W_2) (g)	4575	4583	4578
	Sand in jug(W_{sand}) (g)	4375	4383	4378
Vol. Of jug	Jug + water(W_3) (g)	3325	3326	3325
	Water's temperature(T)(°C)	15	15	15
	Water's density(G_w)	0.999129	0.999129	0.999129
	Water in jug(W_w) (g)	3125	3126	3125
	Volume of jug(V) (cm^3)	3127.7	3128.7	3127.7
Dry density of sand(γ_{sand})		each		
		ave	1.399	1.401
			1.400	

(2) Determination dry density of digged-out soil in test hole

Test Hole No.				1.5 (M)	Disturbed	
Wt. (g)	soil	Pan's weight(W_1)		634	634	
		Pan+wet soil(W_2)		1784	1436	
		Wt. Of wet soil(W)		1150	802	
	sand	Cone+Sand	Initial	4236	4121	
			Final	2007	2078	
		Sand in hole(W_{sand})		929	743	
Wet density		Volume(V^*) (cm)	664	531		
		Wet density(γ_t)(t/m ³)	1.733	1.510		
Water content (%)		Can No.		2	–	
		Can + wet soil(WW) (g)		213.66	–	
		Can + dry soil(DW) (g)		193.83	–	
		Wt. Of can (CW) (g)		41.33	–	
		Water content		13.0	–	
Dry density (t/m ³)		Tested in–place(γ_d)		1.534	1.336	
REMARKS						

Tested By : _____ Checked By : _____

IN-SITU DRY DENSITY TEST using SAND-CONE

Project : 제2영동(서울~원주) 고속도로 민간투자사업 실시설계(7공구) 지반조사 Test Date : 2007. 12.

Location : KTP-6

(1) Determination density of the sand to be used(in lab.)

Iteration Test No.		1	2	3
Wt. Of sand	Jug's Weight(W_1) (g)	200	200	200
	Jug+fulled sand(W_2) (g)	4575	4583	4578
	Sand in jug(W_{sand}) (g)	4375	4383	4378
Vol. Of jug	Jug + water(W_3) (g)	3325	3326	3325
	Water's temperature(T)(°C)	15	15	15
	Water's density(G_w)	0.999129	0.999129	0.999129
	Water in jug(W_w) (g)	3125	3126	3125
	Volume of jug(V) (cm^3)	3127.7	3128.7	3127.7
Dry density of sand(γ_{sand})		each		
		ave	1.399	1.401
			1.400	

(2) Determination dry density of digged-out soil in test hole

Test Hole No.				1.2 (M)	Disturbed	
Wt. (g)	soil	Pan's weight(W_1)		264	264	
		Pan+wet soil(W_2)		2000	1892	
		Wt. Of wet soil(W)		1736	1628	
	sand	Cone+Sand	Initial	4461	4322	
			Final	1743	1470	
		Sand in hole(W_{sand})		1418	1552	
Wet density		Volume(V^*) (cm)	1013	1109		
		Wet density(γ_t)(t/m ³)	1.714	1.469		
Water content (%)		Can No.		33	–	
		Can + wet soil(WW) (g)		206.66	–	
		Can + dry soil(DW) (g)		182.75	–	
		Wt. Of can (CW) (g)		45.36	–	
		Water content		17.4	–	
Dry density (t/m ³)		Tested in–place(γ_d)		1.460	1.251	
REMARKS						

Tested By : _____ Checked By : _____

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Project : 제2영동(서울~원주) 고속도로 민간투자사업 실시설계(7공구) 지반조사 Test Date : 2007. 12.

Location : KTP-7

(1) Determination density of the sand to be used(in lab.)

Iteration Test No.		1	2	3
Wt. Of sand	Jug's Weight(W_1) (g)	200	200	200
	Jug+fulled sand(W_2) (g)	4575	4583	4578
	Sand in jug(W_{sand}) (g)	4375	4383	4378
Vol. Of jug	Jug + water(W_3) (g)	3325	3326	3325
	Water's temperature(T)(°C)	15	15	15
	Water's density(G_w)	0.999129	0.999129	0.999129
	Water in jug(W_w) (g)	3125	3126	3125
	Volume of jug(V) (cm^3)	3127.7	3128.7	3127.7
Dry density of sand(γ_{sand})		each		
		ave	1.399	1.401
			1.400	

(2) Determination dry density of digged-out soil in test hole

Test Hole No.				1.5 (M)	Disturbed	
Wt. (g)	soil	Pan's weight(W_1)		446	446	
		Pan+wet soil(W_2)		2223	1908	
		Wt. Of wet soil(W)		1777	1462	
	sand	Cone+Sand	Initial	4512	4331	
			Final	1722	1612	
		Sand in hole(W_{sand})		1490	1419	
Wet density		Volume(V^*) (cm)	1064	1013		
		Wet density(γ_t)(t/m ³)	1.670	1.442		
Water content (%)		Can No.		22	–	
		Can + wet soil(WW) (g)		236.90	–	
		Can + dry soil(DW) (g)		216.62	–	
		Wt. Of can (CW) (g)		55.63	–	
		Water content		12.6	–	
Dry density (t/m ³)		Tested in–place(γ_d)		1.483	1.281	
REMARKS						

Tested By : _____ Checked By : _____

IN-SITU DRY DENSITY TEST using SAND-CONE

Project : 제2영동(서울~원주) 고속도로 민간투자사업 실시설계(7공구) 지반조사 Test Date : 2007. 12.

Location : KTP-8

(1) Determination density of the sand to be used(in lab.)

Iteration Test No.		1	2	3
Wt. Of sand	Jug's Weight(W_1) (g)	200	200	200
	Jug+fulled sand(W_2) (g)	4575	4583	4578
	Sand in jug(W_{sand}) (g)	4375	4383	4378
Vol. Of jug	Jug + water(W_3) (g)	3325	3326	3325
	Water's temperature(T)(°C)	15	15	15
	Water's density(G_w)	0.999129	0.999129	0.999129
	Water in jug(W_w) (g)	3125	3126	3125
	Volume of jug(V) (cm^3)	3127.7	3128.7	3127.7
Dry density of sand(γ_{sand})		each	1.399	1.401
		ave	1.400	

(2) Determination dry density of digged-out soil in test hole

Test Hole No.				1.5 (M)	Disturbed	
Wt. (g)	soil	Pan's weight(W_1)		430	430	
		Pan+wet soil(W_2)		2236	1905	
		Wt. Of wet soil(W)		1806	1475	
	sand	Cone+Sand	Initial	4763	4862	
			Final	1952	2137	
		Sand in hole(W_{sand})		1511	1425	
Wet density		Volume(V^*) (cm)	1079	1018		
		Wet density(γ_t)(t/m ³)	1.673	1.449		
Water content (%)		Can No.		B39	–	
		Can + wet soil(WW) (g)		229.55	–	
		Can + dry soil(DW) (g)		208.72	–	
		Wt. Of can (CW) (g)		49.69	–	
		Water content		13.1	–	
Dry density (t/m ³)		Tested in–place(γ_d)		1.479	1.281	
REMARKS						

Tested By : _____ Checked By : _____

IN-SITU DRY DENSITY TEST using SAND-CONE

Project : 제2영동(서울~원주) 고속도로 민간투자사업 실시설계(7공구) 지반조사 Test Date : 2007. 12.

Location : KTP-10

(1) Determination density of the sand to be used(in lab.)

Iteration Test No.		1	2	3
Wt. Of sand	Jug's Weight(W_1) (g)	200	200	200
	Jug+fulled sand(W_2) (g)	4575	4583	4578
	Sand in jug(W_{sand}) (g)	4375	4383	4378
Vol. Of jug	Jug + water(W_3) (g)	3325	3326	3325
	Water's temperature(T)(°C)	15	15	15
	Water's density(G_w)	0.999129	0.999129	0.999129
	Water in jug(W_w) (g)	3125	3126	3125
	Volume of jug(V) (cm^3)	3127.7	3128.7	3127.7
Dry density of sand(γ_{sand})		each		
		ave	1.399	1.401
			1.400	

(2) Determination dry density of digged-out soil in test hole

Test Hole No.				1.5 (M)	Disturbed	
Wt. (g)	soil	Pan's weight(W_1)		333	333	
		Pan+wet soil(W_2)		2163	2036	
		Wt. Of wet soil(W)		1830	1703	
	sand	Cone+Sand	Initial	4726	4336	
			Final	1892	1395	
		Sand in hole(W_{sand})		1534	1641	
Wet density		Volume(V^*) (cm)	1096	1172		
		Wet density(γ_t)(t/m ³)	1.669	1.453		
Water content (%)		Can No.		E26	–	
		Can + wet soil(WW) (g)		196.55	–	
		Can + dry soil(DW) (g)		181.67	–	
		Wt. Of can (CW) (g)		56.66	–	
		Water content		11.9	–	
Dry density (t/m ³)		Tested in–place(γ_d)		1.492	1.298	
REMARKS						

Tested By : _____ Checked By : _____

IN-SITU DRY DENSITY TEST using SAND-CONE

Project : 제2영동(서울~원주) 고속도로 민간투자사업 실시설계(7공구) 지반조사 Test Date : 2007. 12.

Location : KTP-11

(1) Determination density of the sand to be used(in lab.)

Iteration Test No.		1	2	3
Wt. Of sand	Jug's Weight(W_1) (g)	200	200	200
	Jug+fulled sand(W_2) (g)	4575	4583	4578
	Sand in jug(W_{sand}) (g)	4375	4383	4378
Vol. Of jug	Jug + water(W_3) (g)	3325	3326	3325
	Water's temperature(T)(°C)	15	15	15
	Water's density(G_w)	0.999129	0.999129	0.999129
	Water in jug(W_w) (g)	3125	3126	3125
	Volume of jug(V) (cm^3)	3127.7	3128.7	3127.7
Dry density of sand(γ_{sand})		each		
		ave	1.399	1.401
			1.400	

(2) Determination dry density of digged-out soil in test hole

Test Hole No.				1.4 (M)	Disturbed	
Wt. (g)	soil	Pan's weight(W_1)		333	333	
		Pan+wet soil(W_2)		2163	2036	
		Wt. Of wet soil(W)		1830	1703	
	sand	Cone+Sand	Initial	4726	4336	
			Final	1909	1317	
		Sand in hole(W_{sand})		1517	1719	
Wet density		Volume(V^*) (cm)	1084	1228		
		Wet density(γ_t)(t/m ³)	1.689	1.387		
Water content (%)		Can No.		C-33	–	
		Can + wet soil(WW) (g)		184.22	–	
		Can + dry soil(DW) (g)		163.31	–	
		Wt. Of can (CW) (g)		49.66	–	
		Water content		18.4	–	
Dry density (t/m ³)		Tested in–place(γ_d)		1.426	1.171	
REMARKS						

Tested By : _____ Checked By : _____

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Project : 제2영동(서울~원주) 고속도로 민간투자사업 실시설계(7공구) 지반조사 Test Date : 2007. 12.

Location : KTP-12

(1) Determination density of the sand to be used(in lab.)

Iteration Test No.		1	2	3
Wt. Of sand	Jug's Weight(W_1) (g)	200	200	200
	Jug+fulled sand(W_2) (g)	4575	4583	4578
	Sand in jug(W_{sand}) (g)	4375	4383	4378
Vol. Of jug	Jug + water(W_3) (g)	3325	3326	3325
	Water's temperature(T)(°C)	15	15	15
	Water's density(G_w)	0.999129	0.999129	0.999129
	Water in jug(W_w) (g)	3125	3126	3125
	Volume of jug(V) (cm^3)	3127.7	3128.7	3127.7
Dry density of sand(γ_{sand})		each		
		ave	1.399	1.401
			1.400	

(2) Determination dry density of digged-out soil in test hole

Test Hole No.				1.5 (M)	Disturbed	
Wt. (g)	soil	Pan's weight(W_1)		421	421	
		Pan+wet soil(W_2)		2764	2240	
		Wt. Of wet soil(W)		2343	1819	
	sand	Cone+Sand	Initial	4516	4098	
			Final	1232	1022	
		Sand in hole(W_{sand})		1984	1776	
Wet density		Volume(V^*) (cm)	1418	1269		
		Wet density(γ_t)(t/m ³)	1.653	1.434		
Water content (%)		Can No.		C-33	–	
		Can + wet soil(WW) (g)		172.22	–	
		Can + dry soil(DW) (g)		159.22	–	
		Wt. Of can (CW) (g)		52.66	–	
		Water content		12.2	–	
Dry density (t/m ³)		Tested in–place(γ_d)		1.473	1.278	
REMARKS						

Tested By : _____ Checked By : _____

COMPACTION CHARACTERISTIC OF FILL MATERIAL

PROJECT : 제2영동(서울~원주) 고속도로 민간투자사업 실시설계(7공구) 지반조사

DATE: 2007. 12.

TP No.	Depth (m)	Natural Condition		Disturbed Condition	Compated condition (D Method)										"L" Value	U.S.C.S
		N.M.C (%)	In-Situ density rd(g/cm ³)	In-Situ density rd(g/cm ³)	Max.dry density rd(g/cm ³)	O.M.C (%)	95% of Max. rd (g/cm ³)	C	90% of Max. rd (g/cm ³)	C	85% of Max. rd (g/cm ³)	C	80% of Max. rd (g/cm ³)	C		
KTP-4	1.5	12.6	1.519	1.320	1.830	14.8	1.739	0.873	1.647	0.922	1.556	0.976	1.464	1.037	1.150	SM
KTP-5	1.5	13.0	1.534	1.336	1.839	14.5	1.747	0.878	1.655	0.927	1.563	0.982	1.471	1.043	1.148	SM
KTP-6	1.2	17.4	1.460	1.251	1.800	15.6	1.710	0.854	1.620	0.901	1.530	0.954	1.440	1.014	1.167	SM
KTP-7	1.5	12.6	1.483	1.281	1.811	15.2	1.720	0.862	1.630	0.910	1.539	0.964	1.449	1.024	1.158	SM
KTP-8	1.5	13.1	1.479	1.281	1.820	15.4	1.729	0.855	1.638	0.903	1.547	0.956	1.456	1.016	1.155	SM
KTP-10	1.5	11.9	1.492	1.298	1.822	15.1	1.731	0.862	1.640	0.910	1.549	0.964	1.458	1.024	1.150	SM
KTP-11	1.4	18.4	1.426	1.171	1.766	16.3	1.678	0.850	1.589	0.897	1.501	0.950	1.413	1.009	1.218	SC
KTP-12	1.5	12.2	1.473	1.278	1.807	15.4	1.717	0.858	1.626	0.906	1.536	0.959	1.446	1.019	1.153	SM
Range		11.9	1.426	1.171	1.766	14.5		0.850		0.897		0.950		1.009	1.148	
		18.4	1.534	1.336	1.839	16.3		0.878		0.927		0.982		1.043	1.218	
A.v.g		13.9	1.483	1.277	1.812	15.3		0.862		0.910		0.963		1.023	1.162	