TRIAXIAL COMPRESSION TEST (Consolidation stage data sheet)

TEST N°: TP 10U-2 TEST TYPE: CU - PWP DATE STARTED: 12-8-99

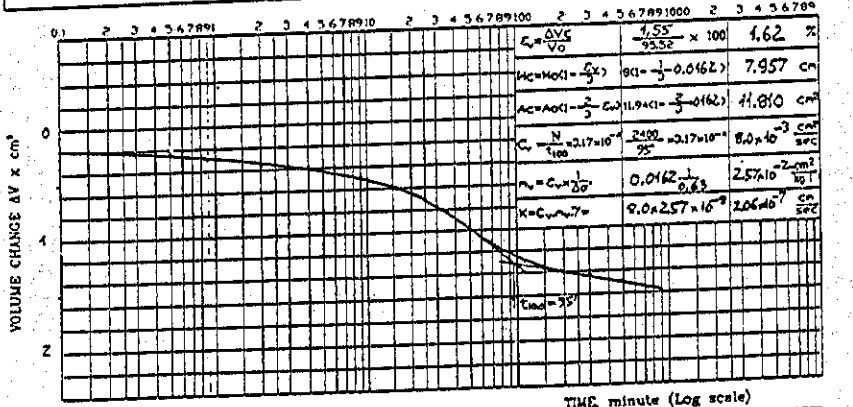
PROJECT: DONG NAI 3 & 4 HYDRO POWER LOAD RING N°:

TEST TYPE CU	WITH / WITHOU SIDE DRAINS	DATE	CLOCK TIME	TIME 1 minutes	$\sqrt{t}$	VOLUME CHANGE gauge cm³	VOLUME CHANGE Diff. cm³	PORE PRESSURE reading kg f/cm²	PORE PRESSURE Diff. kg f/cm²	PORE PRESSURE Diss. %
CELL PRESSURE 1.00	kg f/cm²	12-8	7.00	0		32.00	0.00	0.73	0	0
VERTICAL STRESS 1.00				30"		31.75	0.25	0.73	–	–
BACK STRESS 0				1'		31.70	0.30	0.73	–	–
Pwp AFTER BUILD UP				2		31.65	0.35	0.73	0	0
DIFFERENCE				4		31.60	0.40	0.72	0.01	1.4
EFFECTIVE PRESSURE				9		31.50	0.50	0.71	0.02	2.7
$\sqrt{t_{100}}$ =	t_{100} = 95 min.			16		31.40	0.60	0.69	0.04	5.5
$t_i = a \cdot t_{100} = 0.51 \times 95 = 48.5$				25		31.30	0.70	0.67	0.06	8.2
				36		31.15	0.85	0.66	0.07	9.6
				64'		30.90	1.10	0.65	0.08	11.0
				2h		30.70	1.30	0.62	0.11	15.1
				3		30.60	1.40	0.51	0.22	30.1
				5		30.55	1.45	0.37	0.36	49.3
				8		30.50	1.50	0.16	0.57	78.1
				12		30.45	1.55	0.10	0.63	86.1
				24h						

RATE OF DISPLACEMENT

$$\frac{E_{if} \cdot H_{pe}}{100 \cdot t_{f,s}} = 0.10 \times \frac{79.57}{48.5} = 0.164$$

select v = 0.180 mm/min



$\varepsilon_v = \frac{\Delta V_S}{V_0}$ $\frac{1.55}{95.52} \times 100$ 1.62 %

$H_c = H_0(1 - \frac{\varepsilon_v}{3})$ $H(1 - \frac{1}{3} \cdot 0.0162)$ 7.957 cm

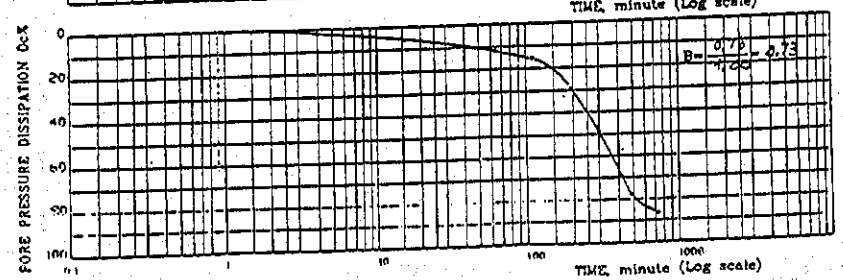
$A_c = A_0(1 - \frac{2}{3}\varepsilon_v)$ $11.94(1 - \frac{2}{3} \cdot 0.162)$ 11.810 cm²

$C_v = \frac{N}{t_{100}} = 0.17 \times 10^{-4}$ $\frac{2400}{95} = 0.17 \times 10^{-4}$ 8.0×10^{-3} cm²/sec

$m_v = C_v = \frac{1}{2\sigma'}$ $0.0162 \frac{1}{0.63}$ 2.57×10^{-2} cm²/kg

$K = C_v \cdot m_v \cdot \gamma_w$ $8.0 \times 2.57 \times 10^{-8}$ 2.06×10^{-7} cm/sec

$t_{100} = 95'$



$B = \frac{0.73}{1.00} = 0.73$

TRIAXIAL COMPRESSION TEST (CU method shearing stage data sheet)

Test N°: TP10U-2 Test type: CU - PwP Depth: 2.5-5.0m

Project: DONG NAI 3&4 COMBINED HYDROPOWER Load ring N°: Date: 12 August 1999

Test type: CU | Load ring constant | Without side drains | Cell pressure σ_3 = 1.00 kg f/cm²

Rate: 0.100 mm/min | CR = 0.833 Kg/Div | Vertical stress σ_1 = 1.00 kg f/cm²

Back pressure Pb = 0 kg f/cm²

Specimen prior to shearing | Eff. cell pressure σ_T = 1.00 kg f/cm²

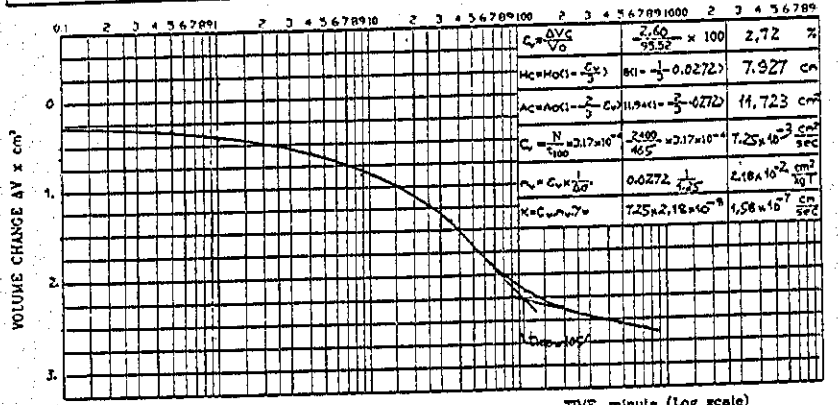
Height H_{pe} = 7.957 cm | Area A_{pe} = 11.810 cm² | Volume V_{pe} = 93.972 cm³

Strain Div. 0.01	Strain ε %	Load Div. 0.01	Load Kg	U kg f/cm²	A cm²	Deviator stress kg f/cm² Stress	Memb. corr.	$\sigma_1-\sigma_3$	Stresses kg f/cm² σ_1	σ_3	$(\sigma_1-\sigma_3)/2$	$(\sigma_1+\sigma_3)/2$	$(\sigma_1+\sigma_T)/2$	σ_1/σ_T
0	0.00	0.00	0.00	0.10	11.810	0.000		0.000	0.900	0.900	0.000	1.000	0.900	1.000
50	0.63	13.50	11.25	0.17	11.885	0.946		0.946	1.776	0.830	0.473	1.473	1.303	2.140
100	1.26	20.00	16.66	0.21	11.960	1.393		1.393	2.183	0.790	0.696	1.696	1.486	2.763
150	1.89	25.00	20.83	0.24	12.037	1.730		1.730	2.490	0.760	0.865	1.865	1.625	3.276
200	2.51	28.00	23.32	0.26	12.114	1.925		1.925	2.665	0.740	0.963	1.963	1.703	3.602
250	3.14	31.00	25.82	0.28	12.193	2.118		2.118	2.838	0.720	1.059	2.059	1.779	3.941
300	3.77	33.40	27.82	0.29	12.273	2.267		2.267	2.977	0.710	1.133	2.133	1.843	4.193
350	4.40	35.40	29.49	0.30	12.353	2.387		2.387	3.087	0.700	1.194	2.194	1.894	4.410
400	5.03	37.20	30.99	0.30	12.435	2.492		2.492	3.192	0.700	1.246	2.246	1.946	4.560
450	5.66	38.80	32.32	0.30	12.518	2.582		2.582	3.282	0.700	1.291	2.291	1.991	4.688
500	6.28	40.00	33.32	0.30	12.602	2.644		2.644	3.344	0.700	1.322	2.322	2.022	4.777
550	6.91	40.80	33.99	0.29	12.687	2.679		2.679	3.389	0.710	1.339	2.339	2.049	4.773
600	7.54	41.60	34.65	0.28	12.773	2.713		2.713	3.433	0.720	1.356	2.356	2.076	4.768
650	8.17	42.40	35.32	0.27	12.861	2.746		2.746	3.476	0.730	1.373	2.373	2.103	4.762
700	8.80	43.00	35.82	0.26	12.949	2.766		2.766	3.506	0.740	1.383	2.383	2.123	4.738
750	9.43	43.60	36.32	0.25	13.039	2.785		2.785	3.535	0.750	1.393	2.393	2.143	4.714
800	10.05	44.10	36.74	0.24	13.130	2.798		2.798	3.558	0.760	1.399	2.399	2.159	4.681
850	10.68	44.60	37.15	0.24	13.222	2.810		2.810	3.570	0.760	1.405	2.405	2.165	4.697
900	11.31	45.00	37.49	0.24	13.316	2.815		2.815	3.575	0.760	1.407	2.407	2.167	4.704
950	11.94	45.30	37.73	0.24	13.411	2.814		2.814	3.574	0.760	1.407	2.407	2.167	4.702
1000	12.57	45.50	37.90	0.23	13.508	2.806		2.806	3.576	0.770	1.403	2.403	2.173	4.644
1050	13.20	45.60	37.98	0.22	13.605	2.792		2.792	3.572	0.780	1.396	2.396	2.176	4.579
1100	13.82	45.70	38.07	0.21	13.705	2.778		2.778	3.568	0.790	1.389	2.389	2.179	4.516
1150	14.45	45.60	37.98	0.20	13.805	2.751		2.751	3.551	0.800	1.376	2.376	2.176	4.439
1200	15.08	45.40	37.82	0.20	13.907	2.719		2.719	3.519	0.800	1.360	2.360	2.160	4.399

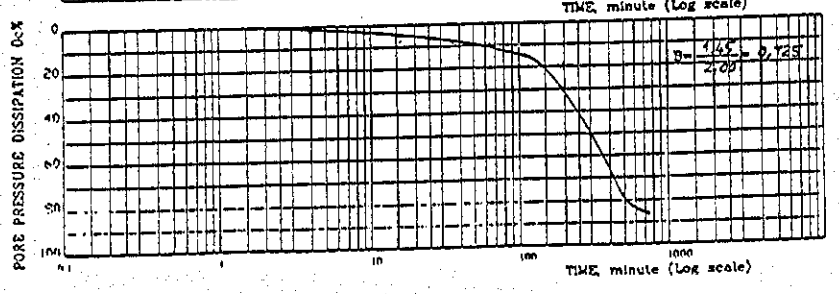
TRIAXIAL COMPRESSION TEST (Consolidation stage data sheet)

TEST N°: TP10U-2 TEST TYPE: CU - PWP DATE STARTED: 11-8-99
PROJECT: DONG NAI 3 & 4 HYDRO POWER LOAD RING N°:

TEST TYPE CU	WITH / WITHOU SIDE DRAINS	DATE	CLOCK TIME	TIME t minutes	$\sqrt{t}$	VOLUME CHANGE gauge cm³	VOLUME CHANGE Diff. cm³	PORE PRESSURE reading kg f/cm²	PORE PRESSURE Diff. kg f/cm²	PORE PRESSURE Diss. %
CELL PRESSURE 2,00	kg f/cm²	11-8	7h00	0		30,00	0,00	1,45	0	0
VERTICAL STRESS 2,00				30"		29,65	0,35	1,45	–	–
BACK STRESS 0				1'		29,60	0,40	1,45	–	–
Pwp AFTER BUILD UP				2		29,50	0,50	1,45	0	0
DIFFERENCE				4		29,40	0,60	1,43	0,02	1,4
EFFECTIVE PRESSURE				9		29,20	0,80	1,41	0,04	2,8
$\sqrt{t_{100}}$ =	t_{100} = 105 min.			16		29,00	1,00	1,38	0,07	4,8
$t_1 = a \cdot t_{100} = 0.51 \times 105 = 53.6$				25		28,80	1,20	1,35	0,10	6,9
				36		28,60	1,40	1,33	0,12	8,2
RATE OF DISPLACEMENT				64'		28,10	1,90	1,31	0,14	9,7
$\frac{E_{1f} \cdot H_{pe}}{100 \cdot t_{f2}} = 0.10 \times \frac{79.27}{53.6} = 0.148$				2h		27,80	2,20	1,24	0,21	14,5
				3		27,65	2,35	1,01	0,44	30,3
				5		27,55	2,45	0,72	0,73	50,3
				8		27,45	2,55	0,37	1,13	77,9
select v = 0,180 mm/min			19h00	12		27,40	2,60	0,20	1,25	86,2
				24h						



$\varepsilon_v = \frac{\Delta V_c}{V_o}$	$\frac{2.60}{95.52} \times 100$	2,72 %
$H_c = H_o(1 - \frac{\varepsilon_v}{3})$	$8(1 - \frac{1}{3} \cdot 0.0272)$	7.927 cm
$A_c = A_o(1 - \frac{2}{3}\varepsilon_v)$	$11.94(1 - \frac{2}{3} \cdot 0.272)$	11,723 cm²
$C_v = \frac{N}{t_{100}} = 2.17 \times 10^{-4}$	$\frac{2400}{105} = 2.17 \times 10^{-4}$	$7.25 \times 10^{-3} \frac{cm^2}{sec}$
$m_v = \varepsilon_v \times \frac{1}{\Delta\sigma}$	$0.0272 \frac{1}{1.25}$	$2.18 \times 10^{-2} \frac{cm^2}{kgf}$
$K = C_v \cdot m_v \cdot \gamma_w$	$7.25 \times 2.18 \times 10^{-8}$	$1.58 \times 10^{-7} \frac{cm}{sec}$



$B = \frac{1.45}{2.00} = 0.725$

TRIAXIAL COMPRESSION TEST (CU method shearing stage data sheet)

Test N°: TP10U-2 Test type: CU - PwP Depth: 2.5-5.0m
Project: DONG NAI 3&4 COMBINED HYDROPOWER Load ring N°: Date: 11 August 1999

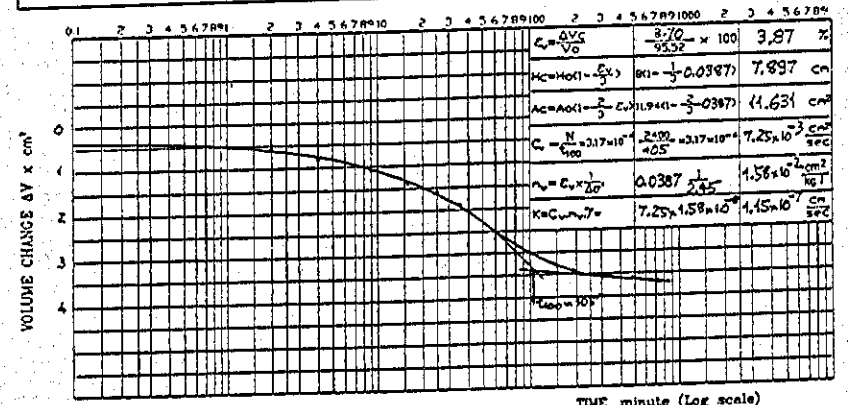
Test type: CU | Load ring constant | Without side drains | Cell pressure σ_3 = 2.00 kg f/cm²
Rate: 0.180 mm/min | CR = 0.833 Kg/Div | Vertical stress σ_1 = 2.00 kg f/cm²
Back pressure Pb = 0 kg f/cm²
Specimen prior to shearing
Height H_{pe} = 7.927 cm | Area A_{pe} = 11.723 cm² | Volume V_{pe} = 92.930 cm³ | Eff. cell pressure σ_3' = 2.00 kg f/cm²

Strain Div. 0.01	Strain ε %	Load Div. 0.01	Load Kg	U kg f/cm²	A cm²	Deviator stress kg/cm² Stress	Memb. corr.	$\sigma_1-\sigma_3$	Stresses kg/cm² σ_1'	σ_3'	$(\sigma_1-\sigma_3)/2$	$(\sigma_1+\sigma_3)/2$	$(\sigma_1+\sigma_3')/2$	σ_1/σ_3'
0	0.00	0.00	0.00	0.20	11.723	0.000		0.000	1.800	1.800	0.000	2.000	1.800	1.000
50	0.63	23.00	19.16	0.27	11.797	1.624		1.624	3.354	1.730	0.812	2.812	2.542	1.939
100	1.26	30.00	24.99	0.32	11.873	2.105		2.105	3.785	1.680	1.052	3.052	2.732	2.253
150	1.89	35.00	29.16	0.35	11.949	2.440		2.440	4.090	1.650	1.220	3.220	2.870	2.479
200	2.52	39.00	32.49	0.38	12.026	2.701		2.701	4.321	1.620	1.351	3.351	2.971	2.667
250	3.15	42.50	35.40	0.40	12.105	2.925		2.925	4.525	1.600	1.462	3.462	3.062	2.828
300	3.78	45.00	37.49	0.42	12.184	3.077		3.077	4.657	1.580	1.538	3.538	3.118	2.947
350	4.42	47.60	39.65	0.43	12.265	3.233		3.233	4.803	1.570	1.616	3.616	3.186	3.059
400	5.05	50.00	41.65	0.44	12.346	3.374		3.374	4.934	1.560	1.687	3.687	3.247	3.163
450	5.68	51.50	42.90	0.45	12.429	3.452		3.452	5.002	1.550	1.726	3.726	3.276	3.227
500	6.31	53.00	44.15	0.46	12.512	3.528		3.528	5.068	1.540	1.764	3.764	3.304	3.291
550	6.94	54.50	45.40	0.46	12.597	3.604		3.604	5.144	1.540	1.802	3.802	3.342	3.340
600	7.57	55.60	46.31	0.46	12.683	3.652		3.652	5.192	1.540	1.826	3.826	3.366	3.371
650	8.20	56.90	47.40	0.46	12.770	3.712		3.712	5.252	1.540	1.856	3.856	3.396	3.410
700	8.83	57.00	47.48	0.46	12.858	3.693		3.693	5.233	1.540	1.846	3.846	3.386	3.398
750	9.46	58.00	48.31	0.46	12.948	3.731		3.731	5.271	1.540	1.866	3.866	3.406	3.423
800	10.09	60.00	49.98	0.45	13.039	3.833		3.833	5.383	1.550	1.917	3.917	3.467	3.473
850	10.72	60.80	50.65	0.44	13.131	3.857		3.857	5.417	1.560	1.929	3.929	3.489	3.472
900	11.35	61.40	51.15	0.44	13.224	3.868		3.868	5.428	1.560	1.934	3.934	3.494	3.479
950	11.98	62.00	51.65	0.44	13.319	3.878		3.878	5.438	1.560	1.939	3.939	3.499	3.486
1000	12.62	62.50	52.06	0.44	13.415	3.881		3.881	5.441	1.560	1.940	3.940	3.500	3.488
1050	13.25	62.80	52.31	0.44	13.513	3.871		3.871	5.431	1.560	1.936	3.936	3.496	3.482
1100	13.88	63.00	52.48	0.44	13.612	3.855		3.855	5.415	1.560	1.928	3.928	3.488	3.471
1150	14.51	63.00	52.48	0.44	13.712	3.827		3.827	5.387	1.560	1.914	3.914	3.474	3.453
1200	15.14	62.80	52.31	0.43	13.814	3.787		3.787	5.357	1.570	1.893	3.893	3.463	3.412
1250	15.77	62.50	52.06	0.43	13.918	3.741		3.741	5.311	1.570	1.870	3.870	3.440	3.383

TRIAXIAL COMPRESSION TEST (Consolidation stage data sheet)

TEST N°: TP10U-2 TEST TYPE: CU - PWP DATE STARTED: 10-8-99
PROJECT: DONG NAI 3&4 HYDROPOWER LOAD RING N°:

TEST TYPE CU	WM/WTHCU SIDE DRAINS	DATE	CLOCK TIME	TIME 1 minutes	$\sqrt{t}$	VOLUME CHANGE gauge, cm³	VOLUME CHANGE Diff. cm³	PORE PRESSURE reading kg f/cm²	PORE PRESSURE Diff. kg f/cm²	Diss. %
CELL PRESSURE 4.00	kg f/cm²	10-8	7.00	0		32.00	0.00	2.84	0	0
VERTICAL STRESS 4.00				30"		31.55	0.45	2.84	–	–
BACK STRESS 0				1'		31.50	0.50	2.84	–	–
Pwp AFTER BUILD UP				2		31.40	0.60	2.84	0	0
DIFFERENCE				4		31.20	0.80	2.80	0.04	1.4
EFFECTIVE PRESSURE				9		30.90	1.10	2.75	0.09	3.2
$\sqrt{t_{100}}$ =	t_{100} = 105 min.			16		30.60	1.40	2.71	0.13	4.6
$t_r = a \cdot t_{100} = 0.51 \times 105 = 53.6$				25		30.40	1.60	2.66	0.18	6.3
				36		30.10	1.90	2.60	0.24	8.5
RATE OF DISPLACEMENT				64'		29.40	2.60	2.57	0.27	9.5
$\frac{E_{15} \cdot H_{ps}}{100 \cdot t_{r,3}} = 0.10 \times \frac{78.97}{53.6} = 0.147$				2h		28.90	3.10	2.43	0.41	14.4
				3		26.60	3.40	2.00	0.84	29.6
				5		28.40	3.60	1.42	1.42	50.0
				8		28.35	3.65	0.57	2.27	79.9
select v = 0.180 mm/min			19.00	12		28.30	3.70	0.39	2.45	86.3
				24h						



$\varepsilon_v = \frac{\Delta V_c}{V_0}$ $\frac{8.70}{95.52} \times 100$ 3.87 %

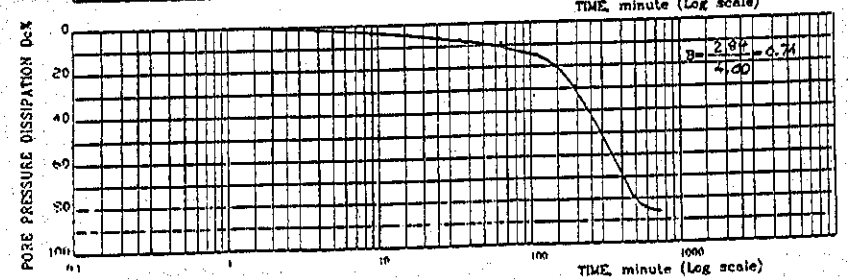
$H_c = H_0(1 - \frac{\varepsilon_v}{3})$ $8(1 - \frac{1}{3} \cdot 0.0387)$ 7.897 cm

$A_c = A_0(1 - \frac{2}{3}\varepsilon_v)$ $11.944(1 - \frac{2}{3} \cdot 0.0387)$ 11.631 cm²

$C_v = \frac{N}{t_{100}} \cdot 0.197 \times 10^{-4}$ $\frac{2 \times 100}{105} \cdot 0.197 \times 10^{-4}$ 7.25×10^{-3} $\frac{cm^2}{sec}$

$m_v = \varepsilon_v \times \frac{1}{\Delta\sigma'}$ $0.0387 \cdot \frac{1}{2.45}$ 1.58×10^{-2} $\frac{cm^2}{kg\,f}$

$K = C_v \cdot m_v \cdot \gamma_w =$ $7.25 \times 1.58 \times 10^{-6}$ 1.15×10^{-7} $\frac{cm}{sec}$



$B = \frac{2.84}{4.00} = 0.71$

TRIAXIAL COMPRESSION TEST (CU method shearing stage data sheet)

Test N°: TP10U-2 Test type: CU - PwP Depth: 2.5-5.0m
Project: DONG NAI 3&4 COMBINED HYDROPOWER Load ring N°: Date: 10 August 1999

Test type: CU | Load ring constant | Without side drains | Cell pressure σ_3 = 4.00 kg f/cm²
Rate: 0.180 mm/min | CR = 0.833 Kg/Div | Vertical stress σ_1 = 4.00 kg f/cm²
Back pressure Pb = 0 kg f/cm²
Specimen prior to shearing
Height H_{ps} = 7.897 cm | Area A_{ps} = 11.631 cm² | Volume V_{ps} = 91.846 cm³ | Eff. cell pressure $\sigma_{3'}$ = 4.00 kg f/cm²

Strain Div. 0.01	Strain ε %	Load Div. 0.01	Load Kg	U kg f/cm²	A cm²	Deviator stress kg f/cm² Stress	Memb. corr.	$\sigma_1-\sigma_3$	Stresses kg f/cm² $\sigma_{1'}$	$\sigma_{3'}$	$(\sigma_1-\sigma_3)/2$	$(\sigma_1+\sigma_3)/2$	$(\sigma_{1'}+\sigma_{3'})/2$	$\sigma_{1'}/\sigma_{3'}$
0	0.00	0.00	0.00	0.39	11.631	0.000		0.000	3.610	3.610	0.000	4.000	3.610	1.000
50	0.63	30.00	24.99	0.52	11.705	2.135		2.135	5.615	3.480	1.067	5.067	4.547	1.613
100	1.27	44.00	36.65	0.60	11.780	3.111		3.111	6.511	3.400	1.556	5.556	4.956	1.915
150	1.90	54.00	44.98	0.65	11.856	3.794		3.794	7.144	3.350	1.897	5.897	5.247	2.133
200	2.53	63.00	52.48	0.68	11.933	4.398		4.398	7.718	3.320	2.199	6.199	5.519	2.325
250	3.17	68.00	56.64	0.71	12.011	4.716		4.716	8.006	3.290	2.358	6.358	5.648	2.433
300	3.80	72.00	59.98	0.73	12.090	4.961		4.961	8.231	3.270	2.480	6.480	5.750	2.517
350	4.43	76.00	63.31	0.75	12.170	5.202		5.202	8.452	3.250	2.601	6.601	5.851	2.601
400	5.07	79.00	65.81	0.77	12.252	5.371		5.371	8.601	3.230	2.686	6.686	5.916	2.663
450	5.70	81.40	67.81	0.79	12.334	5.498		5.498	8.708	3.210	2.749	6.749	5.959	2.713
500	6.33	83.50	69.56	0.80	12.417	5.602		5.602	8.802	3.200	2.801	6.801	6.001	2.750
550	6.96	85.50	71.22	0.81	12.502	5.697		5.697	8.887	3.190	2.848	6.848	6.038	2.786
600	7.60	87.20	72.64	0.82	12.587	5.771		5.771	8.951	3.180	2.885	6.885	6.065	2.815
650	8.23	88.60	73.80	0.83	12.674	5.823		5.823	8.993	3.170	2.912	6.912	6.082	2.837
700	8.86	90.00	74.97	0.84	12.762	5.874		5.874	9.034	3.160	2.937	6.937	6.097	2.859
750	9.50	91.20	75.97	0.85	12.852	5.911		5.911	9.061	3.150	2.956	6.956	6.106	2.877
800	10.13	92.40	76.97	0.86	12.942	5.947		5.947	9.087	3.140	2.974	6.974	6.114	2.894
850	10.76	93.40	77.80	0.86	13.034	5.969		5.969	9.109	3.140	2.985	6.985	6.125	2.901
900	11.40	94.40	78.64	0.86	13.127	5.990		5.990	9.130	3.140	2.995	6.995	6.135	2.908
950	12.03	95.00	79.14	0.86	13.222	5.985		5.985	9.125	3.140	2.993	6.993	6.133	2.906
1000	12.66	95.80	79.80	0.86	13.317	5.992		5.992	9.132	3.140	2.996	6.996	6.136	2.908
1050	13.30	96.00	79.97	0.86	13.415	5.961		5.961	9.101	3.140	2.981	6.981	6.121	2.898
1100	13.93	96.20	80.13	0.86	13.513	5.930		5.930	9.070	3.140	2.965	6.965	6.105	2.889
1150	14.56	96.40	80.30	0.86	13.613	5.899		5.899	9.039	3.140	2.949	6.949	6.089	2.879
1200	15.20	96.50	80.38	0.86	13.715	5.861		5.861	9.001	3.140	2.931	6.931	6.071	2.867
1250	15.83	96.50	80.38	0.86	13.818	5.817		5.817	8.957	3.140	2.909	6.909	6.049	2.853

TRIAXIAL COMPRESSION TEST

(SUMMARY AND REPORT DATA SHEET)

THÍ NGHIỆM NÉN BA TRỤC

(BÁO CÁO TỔNG HỢP)

TEST N°	TP12U-1
TEST TYPE	CU-PwP

SOIL DESCRIPTION : Yellowish mottle reddish brown silty clay with gravels

TYPE OF SAMPLE : Remoulded to 0.95 MDD on wet branch

SHEARING RATE : 0.180 mm/min DATE : 21-24 September 1999

PROJECT : DONG NAI 3&4 COMBINED HYDROPOWER

BOREHOLE N°: TP12U

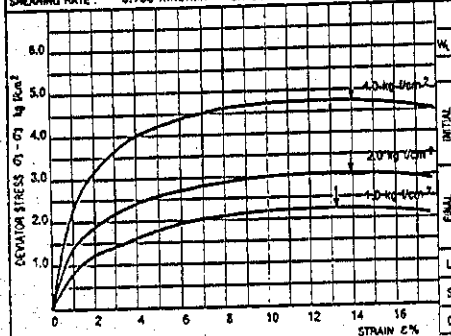
DEPTH OF SAMPLE : 1.0 - 3.0m

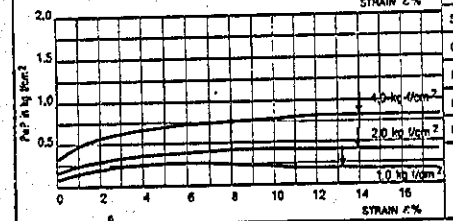
SPECIMEN PROPERTIES & SHEARING STAGE (AT FAILURE)

W_L 59.0 W_P 25.3 B -0.30 Ho 80 mm Do 38 mm

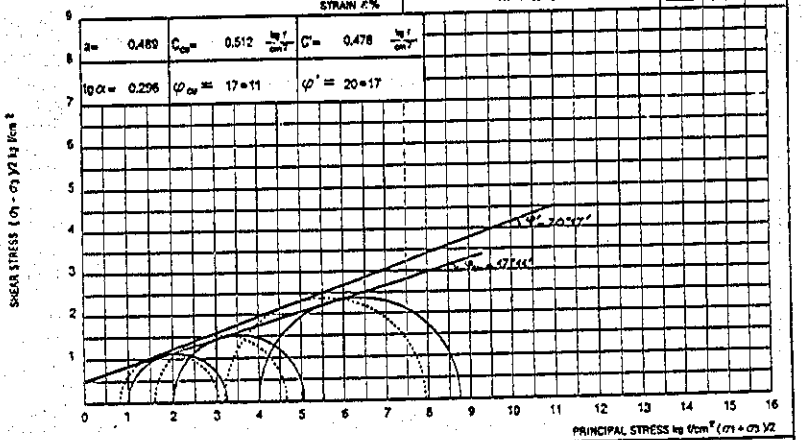
	SPECIMENS		UNIT	A	B	C
INITIAL	WET DENSITY	γ_w	g/cm³	1.975	2.975	1.975
	MOISTURE	W	%	26.00	26.00	26.00
	DRY DENSITY	γ_d	g/cm³	1.567	1.567	1.567
FINAL	WET DENSITY	γ_w	g/cm³	1.997	2.013	2.029
	MOISTURE	W	%	24.60	23.60	22.60
	DRY DENSITY	γ_d	g/cm³	1.602	1.629	1.654
LATERAL STRESS		σ_3	kg f/cm²	1.00	2.00	4.00
STRAIN		ε	%	13.22	13.93	14.00
DEVIATOR STRESS		$\sigma_1 - \sigma_3$	kg f/cm²	2.232	3.060	4.748
SHEAR STRESS		$(\sigma_1 - \sigma_3)/2$		1.116	1.530	2.374
CENTER MOHR CIRCLE		$(\sigma_1 + \sigma_3)/2$		2.116	3.530	6.374
PWP		U		0.19	0.41	0.82
EFFECTIVE MOHR		$(\sigma_1' + \sigma_3')/2$		1.926	3.120	5.554
MAX TOTAL STRESS		σ_1		3.232	5.060	8.748

ILLUSTRATIVE DESCRIPTION OF SPECIMEN AT FAILURE





a = 0.489	C_{cu} = 0.512 kg f/cm²	C' = 0.478 kg f/cm²	
tg α = 0.296	φ_{cu} = 17°11	φ' = 20°17	



TESTED BY CHECKED BY APPROVED BY

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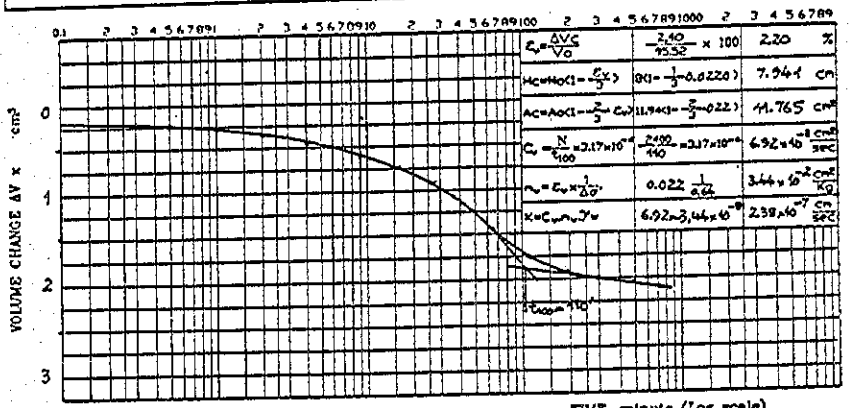
TRIAXIAL COMPRESSION TEST (Consolidation stage data sheet)

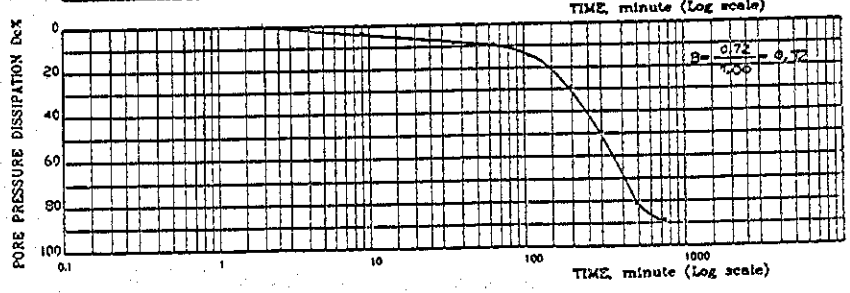
TEST N° : TP 12U-1 TEST TYPE : CU - PWP DATE STARTED : 24-9-99

PROJECT : DONG NAI 3 &4 COMBINED HYDROPOWER LOAD RING N° :

TEST TYPE CU	WITH / WITHOU SIDE DRAINS	DATE	CLOCK TIME	TIME t minutes	$\sqrt{t}$	VOLUME CHANGE gauge cm³	VOLUME CHANGE Diff. cm³	PORE PRESSURE reading kg/cm²	PORE PRESSURE Diff. kg/cm²	PORE PRESSURE Diss. %
CELL PRESSURE 1.00	kg/cm²	24-9	7h00	0		31.00	0.00	0.72	0	0
VERTICAL STRESS 1.00				30"		30.75	0.25	0.72	–	–
BACK STRESS 0				1'		30.70	0.30	0.72	–	
Pwp AFTER BUILD UP				2		30.65	0.35	0.72	0	0
DIFFERENCE				4		30.55	0.45	0.71	0.01	1.4
EFFECTIVE PRESSURE 1.00				9		30.45	0.55	0.70	0.02	2.8
$\sqrt{t_{100}}$ = t_{100} = 440 min.				16		30.25	0.75	0.68	0.04	5.6
$t_c = 4 . t_{100} = 0.51 \times 440 = 56.1$				25		30.10	0.90	0.67	0.05	6.9
				36		29.90	1.10	0.66	0.06	8.3
RATE OF DISPLACEMENT				64'		29.55	1.45	0.65	0.07	9.7
$\frac{E_{ff}.H_{pp}}{100.t_{f.s}} = 0.10\% \frac{7.941}{56.1} = 0.142$				2h		29.25	1.75	0.62	0.10	13.9
				3		29.10	1.90	0.51	0.21	29.2
				5		29.00	2.00	0.37	0.35	48.6
				8		28.95	2.05	0.14	0.58	80.6
select v = 0.180 mm/min			19h00	12		28.90	2.10	0.08	0.64	88.9
				24h						

$\varepsilon_v = \frac{\Delta V_c}{V_o}$	$\frac{2.10}{95.52} \times 100$	2.20 %
$H_c = H_o(1 - \frac{\varepsilon_v}{3})$	$80(1 - \frac{1}{3} \cdot 0.0220)$	7.941 cm
$A_c = A_o(1 - \frac{2}{3}\varepsilon_v)$	$11.94(1 - \frac{2}{3} \cdot 0.022)$	11.765 cm²
$C_v = \frac{N}{t_{100}} = 2.17 \times 10^{-4}$	$\frac{2400}{440} = 2.17 \times 10^{-4}$	6.92×10^{-8} cm²/sec
$m_v = \varepsilon_v \times \frac{1}{\Delta\sigma'}$	$0.022 \frac{1}{0.64}$	3.44×10^{-2} cm²/kg
$K = C_v \cdot m_v \cdot \gamma_w$	$6.92 \times 3.44 \times 10^{-9}$	2.38×10^{-7} cm/sec





170a

TRIAXIAL COMPRESSION TEST (CU method shearing stage data sheet)

Test N°: TP12U-1 | Test type: CU - PwP | Depth: 1.0-1.3m

Project: DONG NAI 3&4 COMBINED HYDROPOWER | Load ring N°: | Date: 24 Sept. 1999

Test type: CU	Load ring constant	Without side drains	Cell pressure σ_3 =	1.00	kg f/cm²
Rate: 0.180 mm/min	CR = 0.766 Kg/Div		Vertical stress σ_1 =	1.00	kg f/cm²
Specimen prior to shearing			Back pressure Pb =	0	kg f/cm²
Height H_{ps} = 7.941 cm	Area A_{ps} = 11.765 cm²	Volume V_{ps} = 93.426 cm³	Eff. cell pressure σ_3 =	1.00	kg f/cm²

Strain		Load		U	A	Deviator stress kg f/cm²			Stresses kg f/cm²					
Div. 0.01	ε %	Div. 0.01	Load Kg	kg f/cm²	cm²	Stress	Memb. corr.	$\sigma_1-\sigma_3$	σ_1	σ_3	$(\sigma_1-\sigma_3)/2$	$(\sigma_1+\sigma_3)/2$	$(\sigma_1+\sigma_3)/2$	σ_1/σ_3
0	0.00	0.00	0.00	0.08	11.765	0.000		0.000	0.920	0.920	0.000	1.000	0.920	1.000
50	0.63	9.50	7.28	0.13	11.840	0.615		0.615	1.485	0.870	0.307	1.307	1.177	1.706
100	1.26	15.00	11.49	0.16	11.915	0.964		0.964	1.804	0.840	0.482	1.482	1.322	2.148
150	1.89	19.00	14.55	0.19	11.992	1.214		1.214	2.024	0.810	0.607	1.607	1.417	2.498
200	2.52	21.00	16.09	0.21	12.069	1.333		1.333	2.123	0.790	0.666	1.666	1.456	2.687
250	3.15	22.50	17.24	0.23	12.147	1.419		1.419	2.189	0.770	0.709	1.709	1.479	2.843
300	3.78	25.00	19.15	0.24	12.227	1.566		1.566	2.326	0.760	0.783	1.783	1.543	3.061
350	4.41	27.00	20.68	0.25	12.307	1.680		1.680	2.430	0.750	0.840	1.840	1.590	3.241
400	5.04	29.00	22.21	0.26	12.389	1.793		1.793	2.533	0.740	0.897	1.897	1.637	3.423
450	5.67	30.80	23.59	0.26	12.472	1.892		1.892	2.632	0.740	0.946	1.946	1.686	3.556
500	6.30	32.20	24.67	0.26	12.556	1.964		1.964	2.704	0.740	0.982	1.982	1.722	3.655
550	6.93	33.50	25.66	0.26	12.640	2.030		2.030	2.770	0.740	1.015	2.015	1.755	3.743
600	7.56	34.40	26.35	0.25	12.727	2.071		2.071	2.821	0.750	1.035	2.035	1.785	3.761
650	8.19	35.20	26.96	0.24	12.814	2.104		2.104	2.864	0.760	1.052	2.052	1.812	3.769
700	8.82	36.00	27.58	0.23	12.902	2.137		2.137	2.907	0.770	1.069	2.069	1.839	3.776
750	9.44	36.80	28.19	0.22	12.992	2.170		2.170	2.950	0.780	1.085	2.085	1.865	3.782
800	10.07	37.50	28.73	0.21	13.083	2.196		2.196	2.986	0.790	1.098	2.098	1.888	3.779
850	10.70	38.00	29.11	0.20	13.175	2.209		2.209	3.009	0.800	1.105	2.105	1.905	3.762
900	11.33	38.40	29.41	0.19	13.269	2.217		2.217	3.027	0.810	1.108	2.108	1.918	3.737
950	11.96	38.80	29.72	0.19	13.364	2.224		2.224	3.034	0.810	1.112	2.112	1.922	3.746
1000	12.59	39.20	30.03	0.19	13.460	2.231		2.231	3.041	0.810	1.115	2.115	1.925	3.754
1050	13.22	39.50	30.26	0.19	13.558	2.232		2.232	3.042	0.810	1.116	2.116	1.926	3.755
1100	13.85	39.70	30.41	0.19	13.657	2.227		2.227	3.037	0.810	1.113	2.113	1.923	3.749
1150	14.48	39.90	30.56	0.18	13.757	2.222		2.222	3.042	0.820	1.111	2.111	1.931	3.709
1200	15.11	40.00	30.64	0.18	13.859	2.211		2.211	3.031	0.820	1.105	2.105	1.925	3.696
1250	15.74	40.00	30.64	0.18	13.963	2.194		2.194	3.014	0.820	1.097	2.097	1.917	3.676
1300	16.37	39.80	30.49	0.17	14.068	2.167		2.167	2.997	0.830	1.084	2.084	1.914	3.611
1350	17.00	39.50	30.26	0.17	14.175	2.135		2.135	2.965	0.830	1.067	2.067	1.897	3.572
1400	17.63	39.00	29.87	0.17	14.283	2.092		2.092	2.922	0.830	1.046	2.046	1.876	3.520

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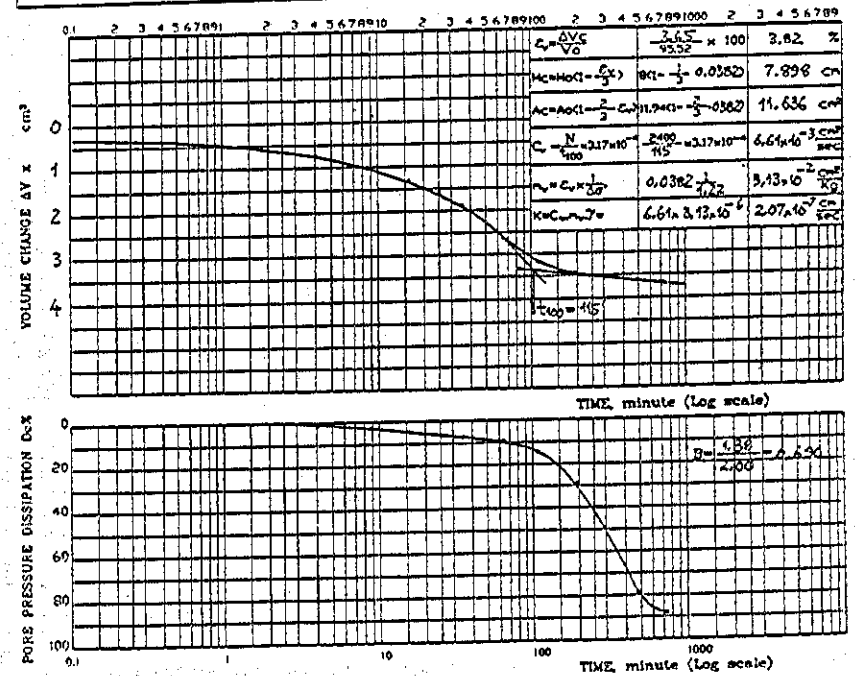
TRIAXIAL COMPRESSION TEST (Consolidation stage data sheet)

TEST N°: TP12U-1 | TEST TYPE: CU - PWP | DATE STARTED: 22-9-99

PROJECT: DONG NAI 3&4 COMBINED HYDRO POWER | LOAD RING N°:

TEST TYPE CU	WITH / WITHOU SIDE DRAINS	DATE	CLOCK TIME	TIME t minutes	$\sqrt{t}$	VOLUME CHANGE gauge cm³	VOLUME CHANGE Diff. cm³	PORE PRESSURE reading kg/cm²	PORE PRESSURE Diff. kg/cm²	Diss. %
CELL PRESSURE 2,00	kg/cm²	22/9	7h00	0		32.00	0.00	1.38	0	0
VERTICAL STRESS 2,00				30"		31.60	0.40	1.38	–	–
BACK STRESS 0				1'		31.50	0.50	1.38	–	–
Pwp AFTER BUILD UP				2		31.40	0.60	1.38	0	0
DIFFERENCE				4		31.25	0.75	1.36	0.02	1.4
EFFECTIVE PRESSURE 2.00				9		31.00	1.00	1.34	0.04	2.9
$\sqrt{t_{100}}$ =	t_{100} = 115 min.			16		30.65	1.35	1.31	0.07	5.1
$t_v = a \cdot t_{100} = 0.51 \times 115 = 58,7$				25		30.40	1.60	1.28	0.10	7.2
RATE OF DISPLACEMENT				36		30.15	1.85	1.27	0.11	8.0
$\frac{E_{ff} \cdot H_{ps}}{100 \cdot t_{f,a}} = 0.10 \times \frac{78.58}{58.7} = 0.135$				64'		29.60	2.60	1.25	0.13	9.4
				2h		28.80	3.20	1.19	0.19	13.8
				3		28.55	3.45	0.99	0.39	28.3
				5		28.45	3.55	0.70	0.68	49.3
				8		28.40	3.60	0.28	1.10	79.7
select v = 0,180 mm/min			19.00	12		28.35	3.65	0.16	1.22	88.4
				24h						



$\varepsilon_v = \frac{\Delta V_c}{V_0}$	$\frac{3.65}{93.52} \times 100$	3.82 %
$H_c = H_0(1-\frac{\varepsilon_v}{3})$	$8(1-\frac{1}{3}\cdot 0.0382)$	7.898 cm
$A_c = A_0(1-\frac{2}{3}\varepsilon_v)$	$11.94(1-\frac{2}{3}\cdot 0.0382)$	11.636 cm²
$C_v = \frac{N}{100} = 3.17\times10^{-4}$	$\frac{2.409}{115} = 3.17\times10^{-4}$	6.61×10^{-3} cm²/sec
$m_v = C_v \times \frac{1}{\sigma_3}$	$0.0382 \cdot \frac{1}{1.22}$	3.13×10^{-2} cm²/kg
$K = C_v \cdot m_v \cdot \gamma =$	$6.61\times3.13\times10^{-6}$	2.07×10^{-7} cm/sec

$D = \frac{1.38}{2.00} = 0.690$

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TRIAXIAL COMPRESSION TEST (CU method shearing stage data sheet)

Test N°: TP12U-1 | Test type: CU - PwP | Depth: 1.0-1.3m

Project: DONG NAI 3&4 COMBINED HYDROPOWER | Load ring N°: | Date: 22 Sept. 1999

Test type: CU	Load ring constant	Without side drains	Cell pressure σ_3 = 2.00 kg f/cm²
Rate: 0.180 mm/min	CR = 0.766 Kg/Div		Vertical stress σ_1 = 2.00 kg f/cm²
Specimen prior to shearing			Back pressure Pb = 0 kg f/cm²
Height H_{ps} = 7.898 cm	Area A_{ps} = 11.636 cm²	Volume V_{ps} = 91.900 cm³	Eff. cell pressure $\sigma_{3'}$ = 2.00 kg f/cm²

Strain Div. 0.01	Strain ε %	Load Div. 0.01	Load Kg	U kg f/cm²	A cm²	Deviator stress kg/cm² Stress	Memb. corr.	$\sigma_1-\sigma_3$	Stresses kg/cm² $\sigma_{1'}$	$\sigma_{3'}$	$(\sigma_1-\sigma_3)/2$	$(\sigma_1+\sigma_3)/2$	$(\sigma_{1'}+\sigma_{3'})/2$	$\sigma_{1'}/\sigma_{3'}$
0	0.00	0.00	0.00	0.16	11.636	0.000		0.000	1.840	1.840	0.000	2.000	1.840	1.000
50	0.63	18.00	13.79	0.21	11.710	1.177		1.177	2.967	1.790	0.589	2.589	2.379	1.658
100	1.27	24.00	18.38	0.26	11.785	1.560		1.560	3.300	1.740	0.780	2.780	2.520	1.897
150	1.90	28.50	21.83	0.28	11.861	1.841		1.841	3.561	1.720	0.920	2.920	2.640	2.070
200	2.53	32.00	24.51	0.31	11.938	2.053		2.053	3.743	1.690	1.027	3.027	2.717	2.215
250	3.17	35.00	26.81	0.33	12.016	2.231		2.231	3.901	1.670	1.116	3.116	2.786	2.336
300	3.80	37.50	28.73	0.35	12.095	2.375		2.375	4.025	1.650	1.187	3.187	2.837	2.439
350	4.43	39.80	30.49	0.36	12.176	2.504		2.504	4.144	1.640	1.252	3.252	2.892	2.527
400	5.06	41.50	31.79	0.37	12.257	2.594		2.594	4.224	1.630	1.297	3.297	2.927	2.591
450	5.70	43.20	33.09	0.38	12.339	2.682		2.682	4.302	1.620	1.341	3.341	2.961	2.655
500	6.33	44.40	34.01	0.39	12.422	2.738		2.738	4.348	1.610	1.369	3.369	2.979	2.701
550	6.96	46.00	35.24	0.40	12.507	2.817		2.817	4.417	1.600	1.409	3.409	3.009	2.761
600	7.60	47.00	36.00	0.41	12.593	2.859		2.859	4.449	1.590	1.429	3.429	3.019	2.798
650	8.23	48.00	36.77	0.42	12.680	2.900		2.900	4.480	1.580	1.450	3.450	3.030	2.835
700	8.86	49.00	37.53	0.42	12.768	2.940		2.940	4.520	1.580	1.470	3.470	3.050	2.861
750	9.50	50.00	38.30	0.42	12.857	2.979		2.979	4.559	1.580	1.489	3.489	3.069	2.885
800	10.13	50.80	38.91	0.42	12.947	3.005		3.005	4.585	1.580	1.503	3.503	3.083	2.902
850	10.76	51.40	39.37	0.42	13.039	3.020		3.020	4.600	1.580	1.510	3.510	3.090	2.911
900	11.40	52.00	39.83	0.41	13.132	3.033		3.033	4.623	1.590	1.517	3.517	3.107	2.908
950	12.03	52.60	40.29	0.41	13.227	3.046		3.046	4.636	1.590	1.523	3.523	3.113	2.916
1000	12.66	53.10	40.67	0.41	13.323	3.053		3.053	4.643	1.590	1.526	3.526	3.116	2.920
1050	13.29	53.60	41.06	0.41	13.420	3.059		3.059	4.649	1.590	1.530	3.530	3.120	2.924
1100	13.93	54.00	41.36	0.41	13.519	3.060		3.060	4.650	1.590	1.530	3.530	3.120	2.924
1150	14.56	54.30	41.59	0.41	13.619	3.054		3.054	4.644	1.590	1.527	3.527	3.117	2.921
1200	15.19	54.50	41.75	0.41	13.721	3.043		3.043	4.633	1.590	1.521	3.521	3.111	2.914
1250	15.83	54.50	41.75	0.41	13.824	3.020		3.020	4.610	1.590	1.510	3.510	3.100	2.899
1300	16.46	54.50	41.75	0.41	13.929	2.997		2.997	4.587	1.590	1.499	3.499	3.089	2.885
1350	17.09	54.00	41.36	0.40	14.035	2.947		2.947	4.547	1.600	1.474	3.474	3.074	2.842
1400	17.73	53.60	41.06	0.40	14.143	2.903		2.903	4.503	1.600	1.452	3.452	3.052	2.814

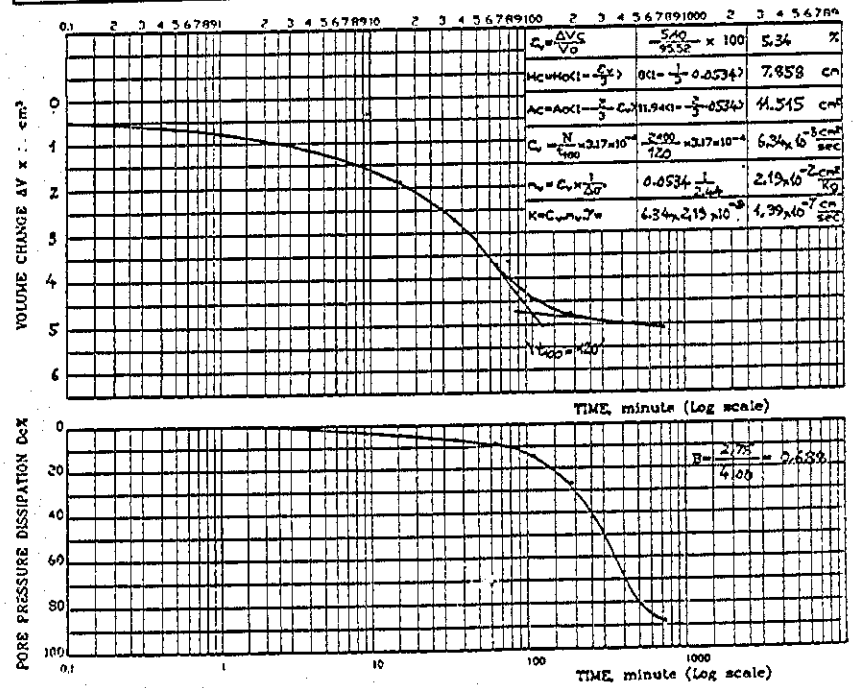
173a

TRIAXIAL COMPRESSION TEST (Consolidation stage data sheet)

TEST N°: TP 12 U-1 | TEST TYPE: CU - PWP | DATE STARTED: 24 - 9 - 99

PROJECT: DONG NAI 3&4 COMBINED HYDROPOWER | LOAD RING N°:

TEST TYPE CU	WITH / WITHOU SIDE DRAINS	DATE	CLOCK TIME	TIME t minutes	$\sqrt{t}$	VOLUME CHANGE gauge cm³	Diff. cm³	PORE PRESSURE reading kg/cm²	Diff. kg/cm²	Diss. %
CELL PRESSURE 4,00	kg/cm²	21.9	7h00	0		30.00	0.00	2.75	0	0
VERTICAL STRESS 4,00				30"		29.35	0.65	2.75	–	–
BACK STRESS 0				1'		29.25	0.75	2.75	–	–
Pwp AFTER BUILD UP				2		29.05	0.95	2.75	0	0
DIFFERENCE				4		28.85	1.15	2.72	0.03	1.1
EFFECTIVE PRESSURE 4,00				9		28.50	1.50	2.69	0.06	2.2
$\sqrt{t_{100}}$ =	t_{100} = 120 min.			16		28.10	1.90	2.64	0.11	4.0
$t_f = a \cdot t_{100} = 0.51 \times 120 = 61.2$				25		27.65	2.35	2.60	0.15	5.5
RATE OF DISPLACEMENT				36		27.30	2.70	2.56	0.19	6.9
				64'		26.30	3.70	2.50	0.25	9.1
$\frac{\varepsilon_{tf} \cdot H_{ps}}{100 \cdot t_{f,s}} = 0.10 \times \frac{78.52}{61.2} = 0.128$				2h		25.50	4.50	2.37	0.38	13.9
				3		25.25	4.75	1.98	0.77	28.0
				5		25.05	4.95	1.38	1.37	49.8
select v = 0,180 mm/min				8		25.00	5.00	0.55	2.20	80.0
			19h00	12		24.90	5.10	0.31	2.44	88.7
				24h						



$\varepsilon_v = \frac{\Delta V S}{V_0}$	$\frac{5.10}{95.52} \times 100$	5.34 %
$H_c = H_0(1 - \frac{\varepsilon_v}{3})$	$80(1 - \frac{1}{3} \cdot 0.0534)$	7.858 cm
$A_c = A_0(1 - \frac{\varepsilon_v}{3})$	$11.940(1 - \frac{2}{3} \cdot 0.534)$	11.515 cm²
$C_v = \frac{N}{t_{100}} \times 3.17 \times 10^{-4}$	$\frac{2400}{120} \times 3.17 \times 10^{-4}$	6.34×10^{-3} cm²/sec
$m_v = C_v \times \frac{1}{2\sigma_1}$	$0.0534 \cdot \frac{1}{2 \cdot 4}$	2.19×10^{-2} cm²/kg
$K = C_v \cdot m_v \cdot \gamma_w$	$6.34 \times 2.19 \times 10^{-8}$	1.39×10^{-7} cm/sec

$B = \frac{2.75}{4.00} = 0.688$

174a

TRIAXIAL COMPRESSION TEST (CU method shearing stage data sheet)

Test N° : TP12U-1 Test type : CU - PwP Depth : 1.0-1.3m

Project : DONG NAI 3&4 COMBINED HYDROPOWER Load ring N° : Date : 21 Sept. 1999

Test type : CU	Load ring constant	Without side drains	Cell pressure σ_3 =	4.00	kg f/cm²
Rate : 0.180 mm/min	CR = 0.766 Kg/Div		Vertical stress σ_1 =	4.00	kg f/cm²
Specimen prior to shearing			Back pressure Pb =	0	kg f/cm²
Height H_{eq} = 7.858 cm	Area A_{eq} = 11.515 cm²	Volume V_{eq} = 90.485 cm³	Eff. cell pressure $\sigma_{3'}$ =	4.00	kg f/cm²

Strain		Load		U	A	Deviator stress kg f/cm²			Stresses kg f/cm²					
Div. 0.01	ε %	Div. 0.01	Load Kg	kg f/cm²	cm²	Stress	Memb. corr.	$\sigma_1-\sigma_3$	$\sigma_{1'}$	$\sigma_{3'}$	$(\sigma_1-\sigma_3)/2$	$(\sigma_1+\sigma_3)/2$	$(\sigma_{1'}+\sigma_{3'})/2$	$\sigma_{1'}/\sigma_{3'}$
0	0.00	0.00	0.00	0.31	11.515	0.000		0.000	3.690	3.690	0.000	4.000	3.690	1.000
50	0.64	28.00	21.45	0.43	11.589	1.851		1.851	5.421	3.570	0.925	4.925	4.495	1.518
100	1.27	40.50	31.02	0.51	11.663	2.660		2.660	6.150	3.490	1.330	5.330	4.820	1.762
150	1.91	48.00	36.77	0.56	11.739	3.132		3.132	6.572	3.440	1.566	5.566	5.006	1.910
200	2.55	53.00	40.60	0.60	11.816	3.436		3.436	6.836	3.400	1.718	5.718	5.118	2.011
250	3.18	58.00	44.43	0.63	11.893	3.736		3.736	7.106	3.370	1.868	5.868	5.238	2.108
300	3.82	62.00	47.49	0.66	11.972	3.967		3.967	7.307	3.340	1.983	5.983	5.323	2.188
350	4.45	64.80	49.64	0.68	12.052	4.119		4.119	7.439	3.320	2.059	6.059	5.379	2.241
400	5.09	67.00	51.32	0.70	12.133	4.230		4.230	7.530	3.300	2.115	6.115	5.415	2.282
450	5.73	69.50	53.24	0.72	12.214	4.359		4.359	7.639	3.280	2.179	6.179	5.459	2.329
500	6.36	71.40	54.69	0.73	12.297	4.447		4.447	7.717	3.270	2.224	6.224	5.494	2.360
550	7.00	73.00	55.92	0.74	12.382	4.516		4.516	7.776	3.260	2.258	6.258	5.518	2.385
600	7.64	74.80	57.30	0.75	12.467	4.596		4.596	7.846	3.250	2.298	6.298	5.548	2.414
650	8.27	76.00	58.22	0.76	12.553	4.637		4.637	7.877	3.240	2.319	6.319	5.559	2.431
700	8.91	77.00	58.98	0.77	12.641	4.666		4.666	7.896	3.230	2.333	6.333	5.563	2.445
750	9.54	78.00	59.75	0.78	12.730	4.693		4.693	7.913	3.220	2.347	6.347	5.567	2.458
800	10.18	79.00	60.51	0.79	12.820	4.720		4.720	7.930	3.210	2.360	6.360	5.570	2.470
850	10.82	79.80	61.13	0.80	12.912	4.734		4.734	7.934	3.200	2.367	6.367	5.567	2.479
900	11.45	80.50	61.66	0.81	13.004	4.742		4.742	7.932	3.190	2.371	6.371	5.561	2.486
950	12.09	81.20	62.20	0.82	13.099	4.749		4.749	7.929	3.180	2.374	6.374	5.554	2.493
1000	12.73	81.90	62.74	0.82	13.194	4.755		4.755	7.935	3.180	2.377	6.377	5.557	2.495
1050	13.36	82.50	63.20	0.82	13.291	4.755		4.755	7.935	3.180	2.377	6.377	5.557	2.495
1100	14.00	83.00	63.58	0.82	13.389	4.748		4.748	7.928	3.180	2.374	6.374	5.554	2.493
1150	14.63	83.20	63.73	0.82	13.489	4.725		4.725	7.905	3.180	2.362	6.362	5.542	2.486
1200	15.27	83.50	63.96	0.82	13.590	4.706		4.706	7.886	3.180	2.353	6.353	5.533	2.480
1250	15.91	83.60	64.04	0.82	13.693	4.677		4.677	7.857	3.180	2.338	6.338	5.518	2.471
1300	16.54	83.50	63.96	0.82	13.798	4.636		4.636	7.816	3.180	2.318	6.318	5.498	2.458
1350	17.18	83.20	63.73	0.82	13.904	4.584		4.584	7.764	3.180	2.292	6.292	5.472	2.441
1400	17.82	83.00	63.58	0.82	14.011	4.538		4.538	7.718	3.180	2.269	6.269	5.449	2.427

175a

DATA 4.1.2

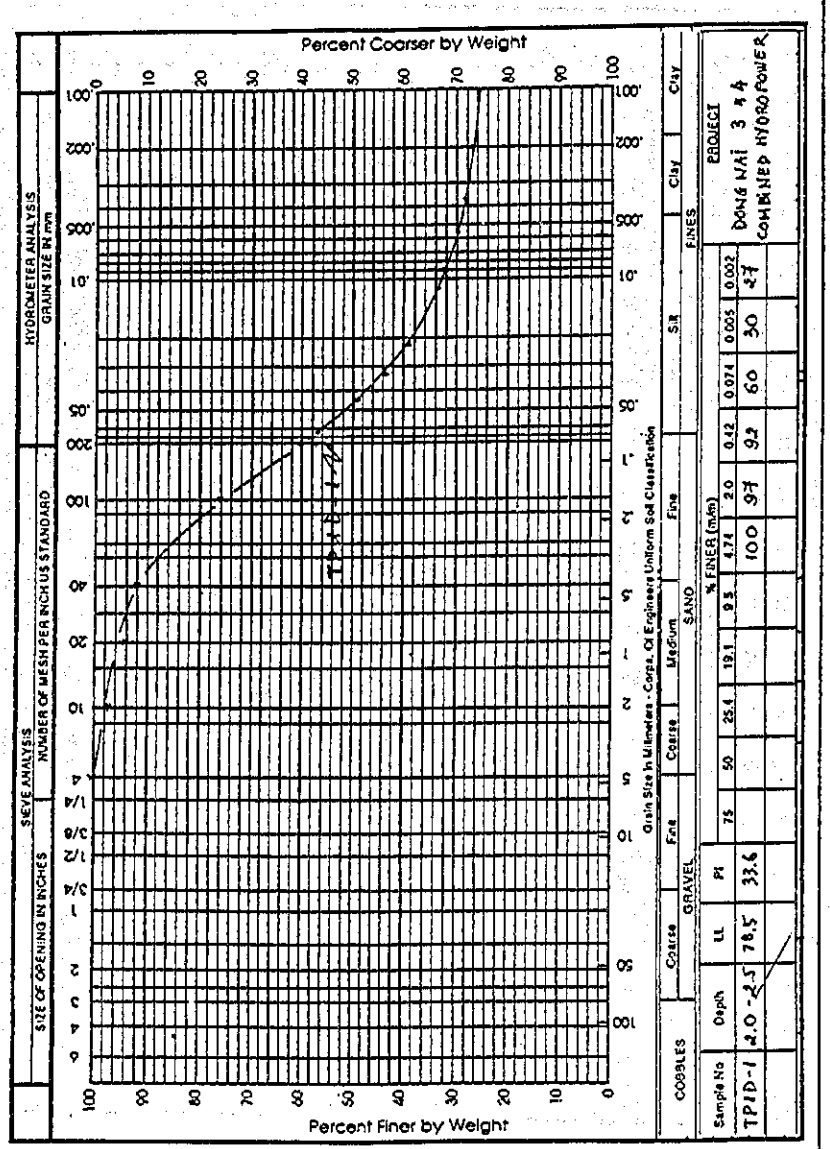
LABORATORY TEST
OF
EARTH CORE MATERIAL
FOR
DONG NAI No.4 DAM

DATA 4.1.2

LABORATORY TEST
OF
EARTH CORE MATERIAL
FOR
DONG NAI No.4 DAM

GRAIN SIZE ANALYSIS

GRADATION CURVES



PHÂN TÍCH THÀNH PHẦN HẠT
GRAIN SIZE ANALYSIS
(METHOD ASTM D422)

Công trình *(Project)* : DONG NAI 3 & 4 COMBINED HYDROPOWER — Mẫu số *(Test N°)* : TP1D-1

Mô tả mẫu *(Description)* : — Tỷ trọng *(Sp. gravity)* : 2.653

TL đất khô-ướt phân tích *(Wt of dry ~~or wet~~ soil)* : 50g — Tỷ trọng kế *(Hydrometer N°)* : ~~151H~~-152 H

Độ ẩm đất ướt phân tích thành phần hạt *(Moisture content of wet soil for grain size)* : — Số hiệu chính mặt cong C_m = 1.0 *(Menicus correction)*

Phân tích sàng *(Sieve analysis)*						Phân tích tỷ trọng kế *(Hydrometer analysis)*								
Tổng TL đất khô TN *(Total Wt of sample)*					50 g	TL đất khô trích phân tích TT kế < N°10 *(Wt of dry soil partical for hydrometer < N° 10)*							- g	
TL hạt thô trên sàng N°4 *(Wt of coarse soil retained N° 4)*					- g	TL đất khô trích phân tích TT kế < N200 *(Wt of dry soil partical for hydrometer < N200)*							- g	
Cỡ sàng *(Sieve size)*		TL trên sàng *(Wt retained)* g	% trên sàng *(% retained)*		% lọt sàng *(% passing)*	TL đất khô toàn phần cho phân tích TT kế *(Wt of dry soil total for hydrometer analysis)*							50 g	
(Sieve No)	*(Sieve open)*		*(Partial)*	*(Total)*		Số HC chất phân tán *(Dispersing correction)* C_d = 8.0					Số HC mặt cong C_m = 1.0 *(Menicus correction)*			
* 3 in	76.2					Thời gian *(Time)* min	Nhiệt độ *(Temp.)* °C	Số HC nhiệt *(Temp. corr.)* m	Số đọc TTK *(Hydro. reading)* R'	HC số đọc *(Corr. reading)* R=R'+Cm	Đường kính hạt *(Particle diameter)* D (m/m)	R-Cd +m R_a	% hạt < D % finer < D *(Partial)* P_p%	*(Total)* P_T%
* 2 in	50.8													
* 1.5	38.1													
1 in	25.4													
* 3/4	19.1													
* 3/8	9.52					0.5	28	1.8	27	28	0.060	26.8	-	53.6
N°3	6.35					1	-	-	24.5	25.5	0.045	24.3	-	48.6
* N°4	4.75					2	-	-	22	23	0.033	21.8	-	43.6
Pan						5	-	-	19.5	20.5	0.023	19.3	-	38.6
* N°10	2.0	1.5	-	3	97	15	-	-	17		0.014	16.8	-	33.6
N°16	1.19					30	-	-	16.5	17.5	0.009	16.3	-	32.6
* N°20	0.84	3.0	-	6	94	60	-	-	15	16	0.0057	14.8	-	29.6
N°30	0.59					120	-	-	14.5	15.5	0.0036	14.3	-	28.6
* N°40	0.42	4.0	-	8	92	240	28	1.8	14	15	0.002	13.8	-	27.6
N°50	0.30					1440								
N°70	0.21													
* N°100	0.15	12.0	-	24	76									
N°140	0.11													
* N200	0.074	20.0	-	40	60									
Pan														
Total Wt in g														

Formula calculation :

Partial per. finer $P_p = \frac{G_s}{G_s - 1} \times \frac{100}{W_c} \times R_a$ *for hydrometer 151H*

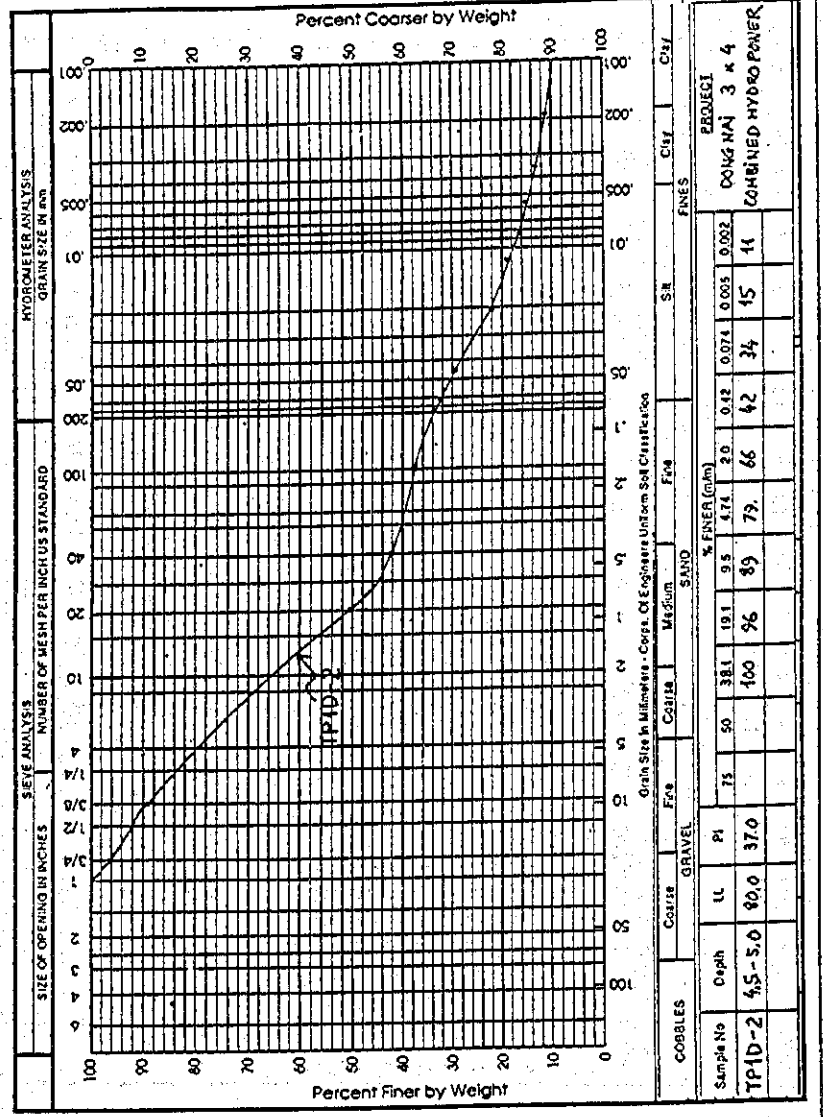
Partial per. finer $P_p = \frac{100}{W_c} \times R_a$ *for hydrometer 152H*

Total per. finer $P_T = P_p \times \frac{W_s - W_1}{W_s}$

Note : W_s = Total ovendry Wt of sample used comfined analysis in grams
W_c = Ovendry Wt of soil used for hydrometer analysis in grams
W_1 = Ovendry Wt of sample retained on N° 10 or N° 200 sieve

Tested by LAN — *Computed by* HIEU — *Checked by* BICH

GRADATION CURVES



PHÂN TÍCH THÀNH PHẦN HẠT
GRAIN SIZE ANALYSIS
(METHOD ASTM D422)

Công trình (Project) : DONG NAI 3 & 4 COMBINED HYDROPOWER
Mẫu số (Test N°) : TP1D-2
Mô tả mẫu (Description) : Sandy clay with laterit gravel
Tỷ trọng (Sp. gravity) : 2,946
TL đất khô-ướt phân tích (Wt of dry ~~or wet~~ soil) : 1000 g
Tỷ trọng kế (Hydrometer N°) : ~~151H~~-152 H
Độ ẩm đất ướt phân tích thành phần hạt (Moisture content of wet soil for grain size) : —
Số hiệu chỉnh mặt cong C_m = 1.0 (Meniscus correction)

Phân tích sàng (Sieve analysis)

Tổng TL đất khô TN (Total Wt of sample): 1000 g
TL hạt thô trên sàng N°4 (Wt of coarse soil retained N°4): 215.0 g

Cỡ sàng (Sieve size) (Sieve No)	(Sieve open)	TL trên sàng (Wt retained) g	% trên sàng (% retained) (Partial)	(Total)	% lọt sàng (% passing)
* 3 in	76.2				—
* 2 in	50.8				
* 1.5	38.1				
1 in	25.4				100,0
* 3/4	19.1	39,8		4,0	96,0
* 3/8	9.52	105,1		10,5	89,5
N°3	6.35				
* N°4	4.75	215,0		21,5	78,5
Pan					
* N°10	2.0	440,4		44,0	66,0
N°16	1.19	—			
* N°20	0.84	500,5		50,0	50,0
N°30	0.59	499,5			
* N°40	0.42	7,8	15,6	57,8	42,2
N°50	0.30	—		—	
N°70	0.21	—			
* N°100	0.15	12,4	24,8	62,4	37,6
N°140	0.11	—			
* N200	0.074	16,0	32,0	66,0	34,0
Pan					
Total Wt in g					

Phân tích tỷ trọng kế (Hydrometer analysis)

TL đất khô trích phân tích TT kế < N°10 (Wt of dry soil partical for hydrometer < N° 10): — g
TL đất khô trích phân tích TT kế < N20 (Wt of dry soil partical for hydrometer < N20) : 50 g
TL đất khô toàn phần cho phân tích TT kế (Wt of dry soil total for hydrometer analysis): — g
Số HC chất phân tán (Dispersing correction) C_d = 3,0
Số HC mặt cong C_m = 1,0 (Meniscus correction)

Thời gian (Time) min	Nhiệt độ (Temp.) °C	Số HC nhiệt (Temp. corr.) m	Số đọc TTK (Hydro. reading) R'	HC số đọc (Corr. reading) R=R'+Cm	Đường kính hạt (Particle diameter) D (m/m)	R-Cd +m R_a	% hạt < D % finer < D (Partial) P_p%	(Total) P_t%
0.5	28	1,8	32,7	33,7	0,062	32,5	64,5	32,4
1			30,0	31,0	0,046	29,8	59,6	29,8
2			26,0	27,0	0,032	25,8	51,5	25,7
5			22,0	23,0	0,021	21,8	43,6	22,0
15			19,0	20,0	0,012	18,7	37,7	19
30	28	1,8	16,0	17,0	0,0083	15,8	31,4	16
60			15,0	16,0	0,006	14,7	29,5	15
120			13,0	14,0	0,0035	12,9	25,6	13
240	28	1,8	11,0	12,0	0,0019	10,8	22,0	11
1440								

Formula calculation :

Partial per. finer $P_p = \frac{G_s}{G_s - 1} \times \frac{100}{W_c} \times R_a$ for hydrometer 151H

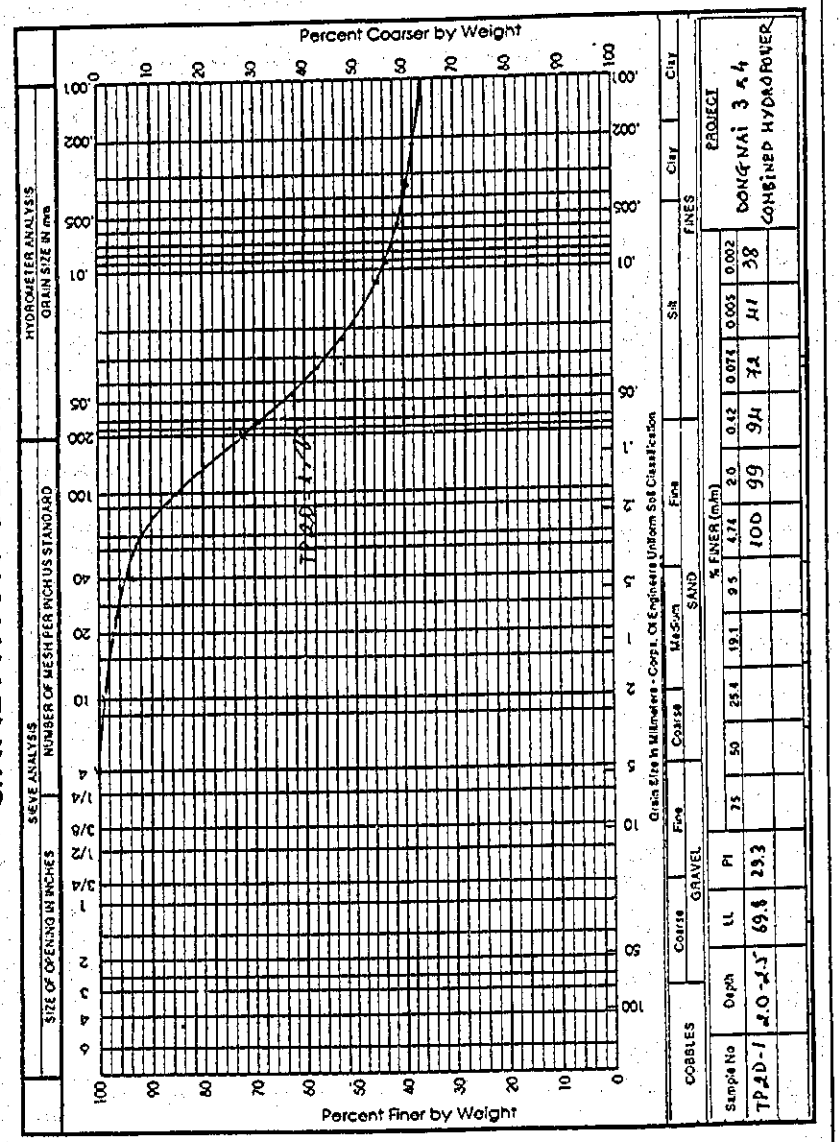
Partial per. finer $P_p = \frac{100}{W_c} \times R_a$ for hydrometer 152H

Total per. finer $P_t = P_p \times \frac{W_s - W_1}{W_s}$

Note: W_s = Total ovendry Wt of sample used ~~combined~~ (sieve) analysis in grams
W_c = Ovendry Wt of soil used for hydrometer analysis in grams
W_1 = Ovendry Wt of sample retained on ~~N°10 or~~ N°20 sieve

Tested by LAN Computed by BICH Checked by HIEN

GRADATION CURVES



PHÂN TÍCH THÀNH PHẦN HẠT
GRAIN SIZE ANALYSIS
(METHOD ASTM D422)

Công trình *(Project)* : DONG NAI 3 & 4 COMBINED HYDROPOWER

Mẫu số *(Test N°)* : TP2D-1

Mô tả mẫu *(Description)* :

Tỷ trọng *(Sp. gravity)* : 2.905

TL đất khô ~~ướt~~ phân tích *(Wt of dry ~~or wet~~ soil)* : 50g

Tỷ trọng kế *(Hydrometer N°)* : ~~151H~~-152 H

Độ ẩm đất ướt phân tích thành phần hạt *(Moisture content of wet soil for grain size)* :

Số hiệu chỉnh mặt cong C_m = 4.0 *(Menicus correction)*

Phân tích sàng *(Sieve analysis)*

Tổng TL đất khô TN *(Total Wt of sample)* : 50 g

TL hạt thô trên sàng N°4 *(Wt of coarse soil retained N° 4)* : - g

Cỡ sàng (Sieve size) (Sieve No)	(Sieve open)	TL trên sàng (Wt retained) g	% trên sàng (% retained) (Partial)	(Total)	% lọt sàng (% passing)
* 3 in	76.2				
* 2 in	50.8				
* 1.5	38.1				
1 in	25.4				
* 3/4	19.1				
* 3/8	9.52				
N°3	6.35				
* N°4	4.75				
Pan					
* N°10	2.0	0.5	-	1	99
N°16	1.19				
* N°20	0.84	1.5	-	3	97
N°30	0.59				
* N°40	0.42	3.0	-	6	94
N°50	0.30				
N°70	0.21				
* N°100	0.15	7.5	-	15	85
N°140	0.11				
* N200	0.074	14.0	-	28	72
Pan					
Total Wt in g					

Phân tích tỷ trọng kế *(Hydrometer analysis)*

TL đất khô trích phân tích TT kế < N°10 *(Wt of dry soil partical for hydrometer < N° 10)* : - g

TL đất khô trích phân tích TT kế < N200 *(Wt of dry soil partical for hydrometer < N200)* : - g

TL đất khô toàn phần cho phân tích TT kế *(Wt of dry soil total for hydrometer analysis)* : 50 g

Số HC chất phân tán *(Dispersing correction)* C_d = 3.0

Số HC mặt cong C_m = 1.0 *(Menicus correction)*

Thời gian (Time) min	Nhiệt độ (Temp.) °C	Số HC nhiệt (Temp. corr.) m	Số đọc TTK (Hydro. reading) R'	HC số đọc (Corr. reading) R=R'+Cm	Đường kính hạt (Particle diameter) D (m/m)	R-Cd +m R_a	% hạt < D % finer < D (Partial) P_p%	(Total) P_T%
0.5	28	1.8	34.5	35.5	0.062	34.3	-	68.6
1	-	-	31	32	0.046	30.8	-	61.6
2	-	-	29	30	0.032	28.8	-	57.6
5	-	-	26	27	0.022	25.8	-	51.6
15	-	-	23	24	0.012	22.8	-	45.6
30	-	-	22	23	0.0092	21.8	-	43.6
60	-	-	20.5	21.5	0.0066	20.3	-	40.6
120	-	-	20	21	0.0035	19.8	-	39.6
240	28	1.8	19	20	0.0022	18.8	-	37.6
1440								

Formula calculation :

Partial per. finer $P_p = \frac{G_s}{G_s - 1} \times \frac{100}{W_c} \times R_a$ for hydrometer 151H

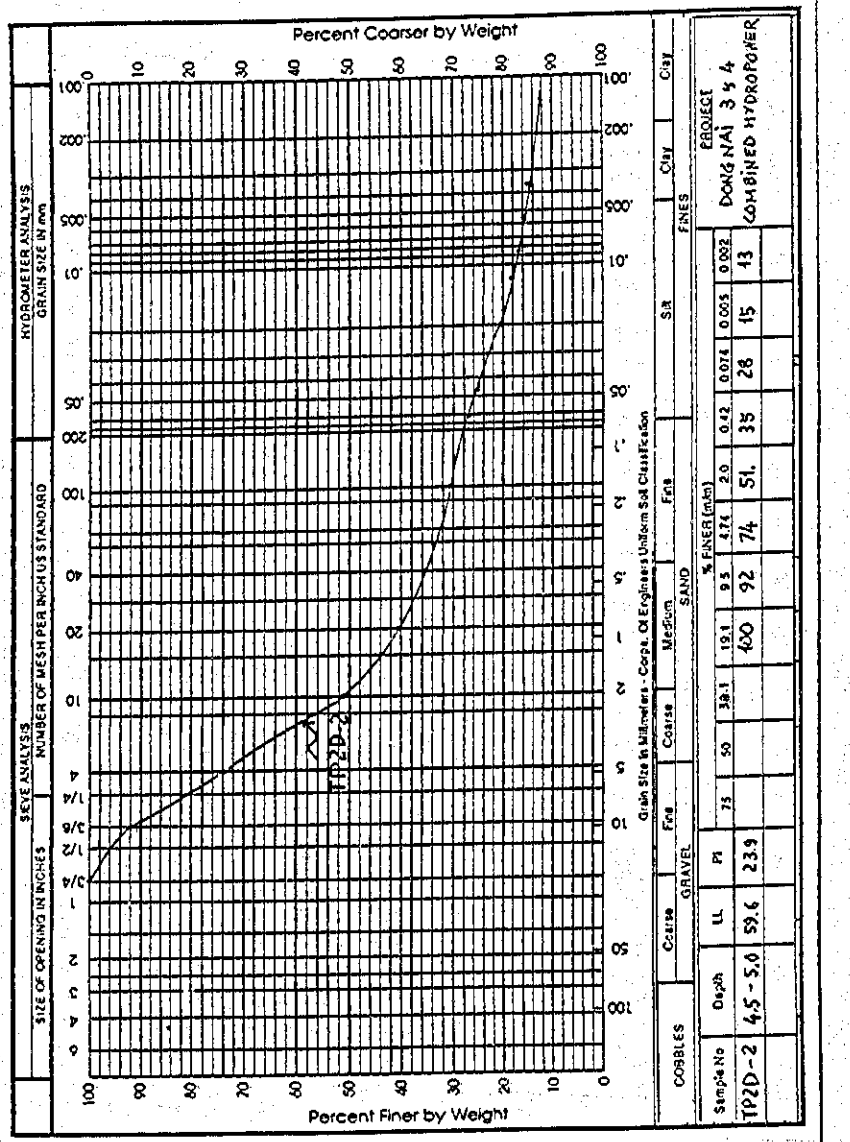
Partial per. finer $P_p = \frac{100}{W_c} \times R_a$ for hydrometer 152H

Total per. finer $P_T = P_p \times \frac{W_s - W_1}{W_s}$

Note : W_s = Total ovendry Wt of sample used confined analysis in grams
W_c = Ovendry Wt of soil used for hydrometer analysis in grams
W_1 = Ovendry Wt of sample retained on N° 10 or N° 200 sieve

Tested by LAN Computed by HIEN Checked by BICH

GRADATION CURVES



PHÂN TÍCH THÀNH PHẦN HẠT
GRAIN SIZE ANALYSIS
(METHOD ASTM D422)

Công trình *(Project)* : DONG NAI 3 & 4 COMBINED HYDROPOWER — Mẫu số *(Test N°)* : TP2D-2

Mô tả mẫu *(Description)* : Residual soil : Sandy clay with latein-gravels — Tỷ trọng *(Sp. gravity)* : 2,981

TL đất khô ~~ẩm~~ phân tích *(Wt of dry ~~or wet~~ soil)* : 1000 g — Tỷ trọng kế *(Hydrometer N°)* : ~~151H~~ 152 H

Độ ẩm đất ướt phân tích thành phần hạt *(Moisture content of wet soil for grain size)* : – — Số hiệu chỉnh mặt cong *(Meniscus correction)* C_m = 1,0

Phân tích sàng *(Sieve analysis)*

Tổng TL đất khô TN *(Total Wt of sample)* : 1000 g

TL hạt thô trên sàng N°4 *(Wt of coarse soil retained N° 4)* : 260¹ 595,0 g

Cỡ sàng (Sieve size) (Sieve No)	(Sieve open)	TL trên sàng (Wt retained) g	% trên sàng (% retained) (Partial)	(Total)	% lọt sàng (% passing)
" 3 in	76.2				
" 2 in	50.8				
" 1.5	38.1				
1 in	25.4				
" 3/4	19.1			0	100.
" 3/8	9.52	85,0		8,5	91,5
N°3	6.35				
" N°4	4.75	260,0		26,0	74,0
Pan					
" N°10	2.0	490,0		49,0	51,0
N°16	1.19				
" N°20	0.84	595,0		59,5	40,5
N°30	0.59	Pan 405,0			
" N°40	0.42	6,47	12,3	64,5	35,5
N°50	0.30				
N°70	0.21				
" N°100	0.15	12,35	24,7	69,5	30,5
N°140	0.11				
" N200	0.074	15,43	30,9	72,0	28,0
Pan					
Total Wt in g					

Phân tích tỷ trọng kế *(Hydrometer analysis)*

TL đất khô trích phân tích TT kế < N°10 *(Wt of dry soil partical for hydrometer < N° 10)* : – g

TL đất khô trích phân tích TT kế < N20⁰ *(Wt of dry soil partical for hydrometer < N20⁰)* : 50 g

TL đất khô toàn phần cho phân tích TT kế *(Wt of dry soil total for hydrometer analysis)* : – g

Số HC chất phân tán *(Dispersing correction)* C_d = 3,0 — Số HC mặt cong C_m = 1,0 *(Meniscus correction)*

Thời gian (Time) min	Nhiệt độ (Temp.) °C	Số HC nhiệt (Temp. corr.) m	Số đọc TTK (Hydro. reading) R'	HC số đọc (Corr. reading) R=R'+Cm	Đường kính hạt (Particle diameter) D (m/m)	R-Cd +m	% hạt < D % finer < D (Partial) P_p%	(Total) P_t%
0.5	28	1,8	33,5	34,5	0,061	32,3	66,6	27
1			31,0	32,0	0,046	30,8	62,0	25
2			28,5	29,5	0,030	28,3	57,0	23
5			25,5	26,5	0,020	25,3	50,6	20,5
15			22,0	23,0	0,012	21,8	44,0	18
30			21,0	22	0,0085	20,8	42,0	17
60			20,0	21	0,0060	19,8	39,6	16
120	28	1,8	19,0	20,	0,0043	18,8	37,6	15
240	28	1,8	16,0	17,	0,0020	15,8	32,0	13
1440								

Formula calculation :

Partial per. finer $P_p = \frac{G_s}{G_s - 1} \times \frac{100}{W_c} \times R_m$ for hydrometer 151H

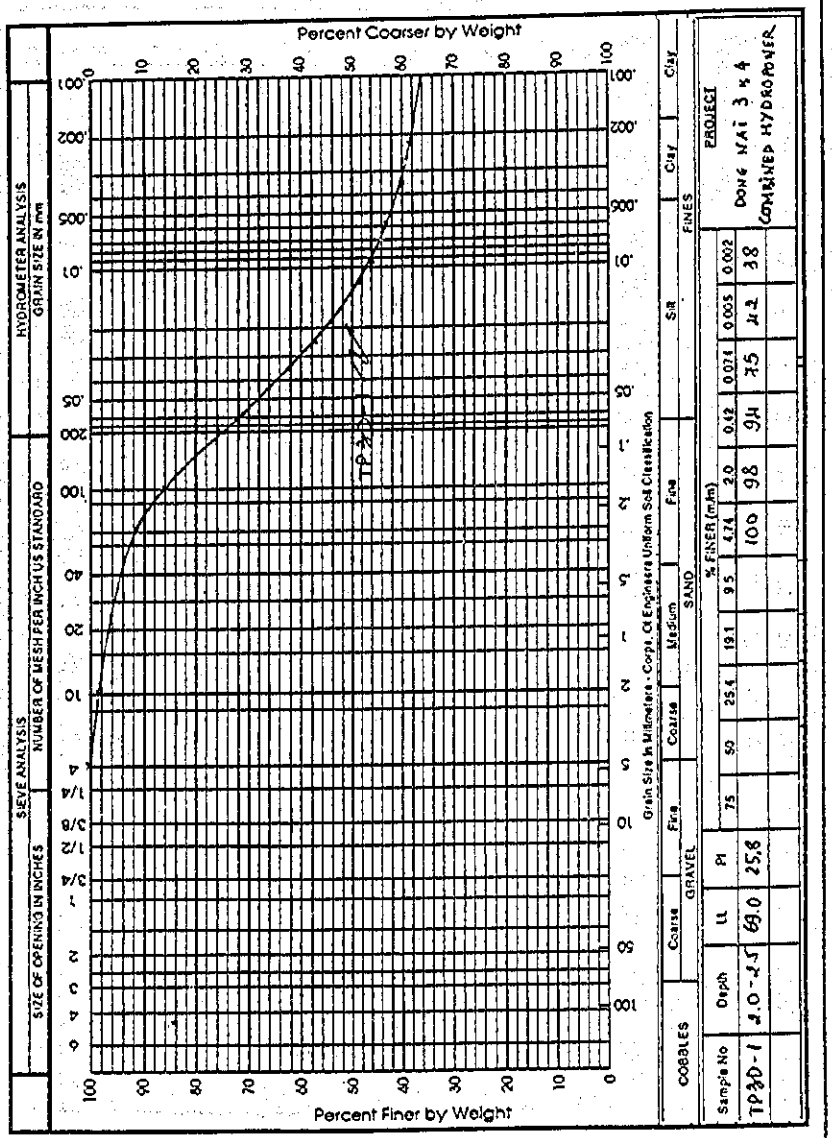
Partial per. finer $P_p = \frac{100}{W_c} \times R_m$ for hydrometer 152H

Total per. finer $P_t = P_p \times \frac{W_s - W_1}{W_s}$

Note : ' W_s = Total ovendry Wt of sample used comfined analysis in grams
W_c = Ovendry Wt of soil used for hydrometer analysis in grams
W_1 = Ovendry Wt of sample retained on ~~N°10 or~~ N° 200 sieve

Tested by LAN — Computed by BICH — Checked by HIEN

GRADATION CURVES



Sample No	Depth	LL	PI	75	50	25.4	19.1	9.5	4.74	2.0	0.42	0.074	0.005	0.002
TP3D-1	1.0-2.5	69.0	25.8						100	98	94	75	42	38

PROJECT: DONG NAI 3 & 4 COMBINED HYDROPOWER

PHÂN TÍCH THÀNH PHẦN HẠT
GRAIN SIZE ANALYSIS
(METHOD ASTM D422)

Công trình (Project) : DONG NAI 3 & 4 COMBINED HYDROPOWER — Mẫu số (Test N°) : TP3D-1

Mô tả mẫu (Description) : — Tỷ trọng (Sp. gravity) : 2.972

TL đất khô ~~ướt~~ phân tích (Wt of dry ~~as wet~~ soil) : 50g — Tỷ trọng kế (Hydrometer N°) : ~~151H~~-152 H

Độ ẩm đất ướt phân tích thành phần hạt (Moisture content of wet soil for grain size) : — Số hiệu chỉnh mặt cong (Meniscus correction) C_m = 1.0

Phân tích sàng (Sieve analysis)

Tổng TL đất khô TN (Total Wt of sample)	50 g
TL hạt thô trên sàng N°4 (Wt of coarse soil retained N° 4)	- g

Cỡ sàng (Sieve size) (Sieve No)	(Sieve open)	TL trên sàng (Wt retained) g	% trên sàng (% retained) (Partial)	(Total)	% lọt sàng (% passing)
* 3 in	76.2				
* 2 in	50.8				
* 1.5	38.1				
1 in	25.4				
* 3/4	19.1				
* 3/8	9.52				
N°3	6.35				
* N°4	4.75				
Pan					
* N°10	2.0	1.0	-	2	98
N°16	1.19				
* N°20	0.84	2.0	-	4	96
N°30	0.59				
* N°40	0.42	3.0	-	6	94
N°50	0.30				
N°70	0.21				
* N°100	0.15	7.0	-	14	86
N°140	0.11				
* N200	0.074	12.5	-	25	75
Pan					
Total Wt in g					

Phân tích tỷ trọng kế (Hydrometer analysis)

TL đất khô trích phân tích TT kế < N°10 (Wt of dry soil partical for hydrometer < N° 10)	- g
TL đất khô trích phân tích TT kế < N200 (Wt of dry soil partical for hydrometer < N200)	- g
TL đất khô toàn phần cho phân tích TT kế (Wt of dry soil total for hydrometer analysis)	50 g

Số HC chất phân tán (Dispersing correction) C_d = 3.0 — Số HC mặt cong C_m = 1.0 (Meniscus correction)

Thời gian (Time) min	Nhiệt độ (Temp.) °C	Số HC nhiệt (Temp. corr.) m	Số đọc TTK (Hydro. reading) R'	HC số đọc (Corr. reading) R=R'+Cm	Đường kính hạt (Particle diameter) D (m/m)	R-Cd =m R_M	% hạt < D % finer < D (Partial) P_P%	(Total) P_T%
0.5	28	1.8	36	37	0.059	35.8	-	71.6
1	-	-	33	34	0.044	32.8	-	65.6
2	-	-	31	32	0.035	30.8	-	61.6
5	-	-	29	30	0.024	28.8	-	57.6
15	-	-	24	25	0.012	23.8	-	47.6
30	-	-	23	24	0.0091	22.8	-	45.6
60	-	-	22	23	0.0058	21.8	-	43.6
120	-	-	20	21	0.0035	19.8	-	39.6
240	28	1.8	19	20	0.0021	18.8	-	37.6
1440								

Formula calculation :

Partial per. finer $P_P = \frac{G_s}{G_s - 1} \times \frac{100}{W_c} \times R_M$ for hydrometer 151H

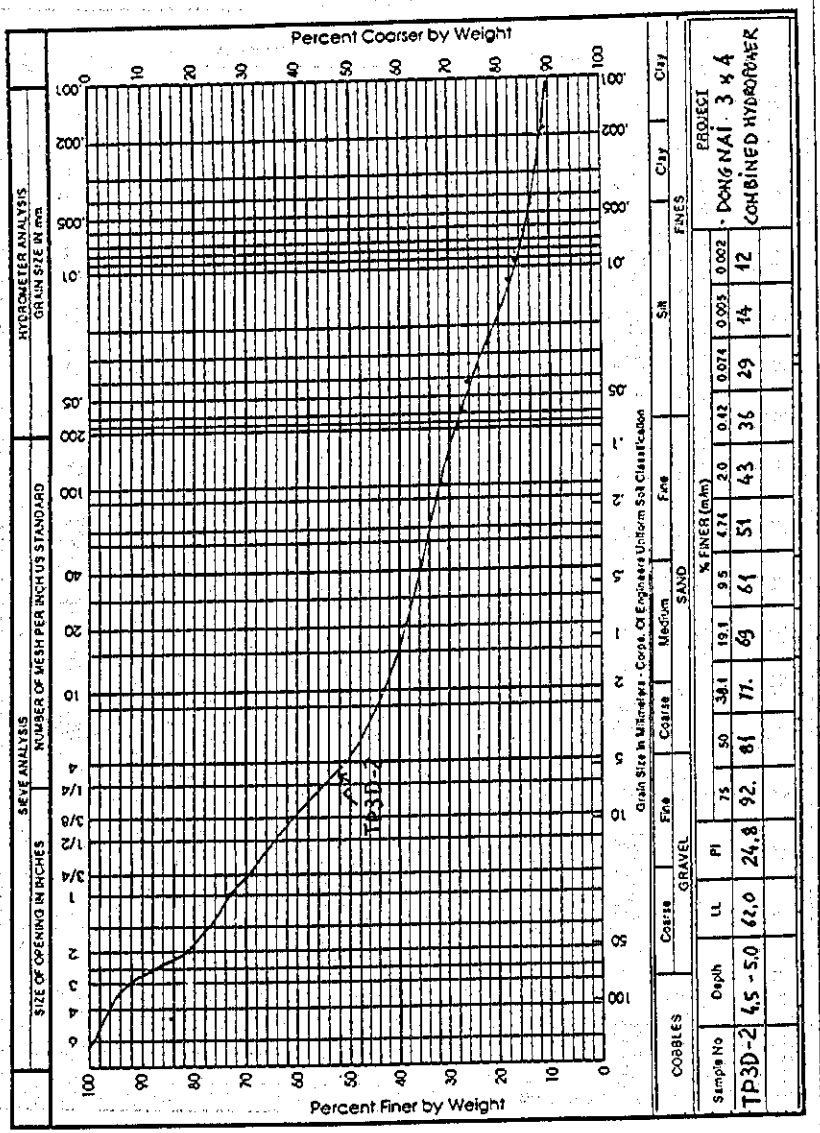
Partial per. finer $P_P = \frac{100}{W_c} \times R_M$ for hydrometer 152H

Total per. finer $P_T = P_P \times \frac{W_c + W_t}{W_s}$

Note : W_s = Total ovendry Wt of sample used confined analysis in grams
W_c = Ovendry Wt of soil used for hydrometer analysis in grams
W_t = Ovendry Wt of sample retained on N° 10 or N° 200 sieve

Tested by LAM — Computed by KIEN — Checked by BACH

GRADATION CURVES



Sample No	Depth	LL	PI	75	50	38.1	19.1	9.5	4.74	2.0	0.42	0.074	0.005	0.002
TP3D-2	4,5 - 5,0	42,0	24,8	92.	81	77.	69	61	51	43	36	29	14	12

PROJECT: DONG NAI 3 & 4 COMBINED HYDROPOWER

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PHÂN TÍCH THÀNH PHẦN HẠT
GRAIN SIZE ANALYSIS
(METHOD ASTM D422)

Công trình *(Project)* : DONG NAI 3 & 4 COMBINED HYDROPOWER

Mẫu số *(Test N°)* : TP3 D-2

Mô tả mẫu *(Description)* : Laterit gravels with sandy clay mix.

Tỷ trọng *(Sp. gravity)* : 3.067

TL đất khô ~~ướt~~ phân tích *(Wt of dry ~~wet~~ soil)* : 4000 g

Tỷ trọng kế *(Hydrometer N°)* : ~~151H~~ 152 H

Độ ẩm đất ướt phân tích thành phần hạt *(Moisture content of wet soil for grain size)* : —

Số hiệu chỉnh mặt cong *(Menicus correction)* C_m = 1,0

Phân tích sàng *(Sieve analysis)*

Tổng TL đất khô TN *(Total Wt of sample)* : 4000,0 g

TL hạt thô trên sàng N°4 *(Wt of coarse soil retained N° 4)* : 1960,4 g

Cỡ sàng (Sieve size) (Sieve No)	(Sieve open)	TL trên sàng (Wt retained) g	% trên sàng (% retained) (Partial)	(Total)	% lọt sàng (% passing)
* 3 in	76.2	320,1		8,0	92
* 2 in	50.8	768,0		19,0	81
* 1.5	38.1	920,3		23,0	77
1 in	25.4	1080,2		27,0	73
* 3/4	19.1	1240,0		31,0	69
* 3/8	9.52	1560,0		39,0	61
N°3	6.35	—		—	—
* N°4	4.75	1960,4		49,0	51
Pan					
* N°10	2.0	2280,1		57,0	43
N°16	1.19				
* N°20	0.84	2440,0		61,0	39,0
N°30	0.59	P_{cm} 1560			
* N°40	0.42	436	8,7	64,4	35,6
N°50	0.30				
N°70	0.21				
* N°100	0.15	962	19,2	68,5	31,5
N°140	0.11				
* N200	0.074	1385	27,0	71,8	28,2
Pan					
Total Wt in g					

Phân tích tỷ trọng kế *(Hydrometer analysis)*

TL đất khô trích phân tích TT kế < N°10 *(Wt of dry soil partical for hydrometer < N° 10)* : — g

TL đất khô trích phân tích TT kế < N200 *(Wt of dry soil partical for hydrometer < N200)* : 50 g

TL đất khô toàn phần cho phân tích TT kế *(Wt of dry soil total for hydrometer analysis)* : — g

Số HC chất phân tán *(Dispersing correction)* C_d = 3.0

Số HC mặt cong *(Menicus correction)* C_m = 1,0

Thời gian (Time) min	Nhiệt độ (Temp.) °C	Số HC nhiệt (Temp. corr.) m	Số đọc TTK (Hydro. reading) R'	HC số đọc (Corr. reading) R=R'+Cm	Đường kính hạt (Paruclé diameter) D (m/m)	R-Cd +m R_H	% hạt < D % finer < D (Partial) P_p%	(Total) P_t%
0.5	28°C	1,8	35,2	36,2	0,054	35,0	70,3	27,4
1			34,5	35,5	0,042	34,3	68,7	26,8
2			28,4	29,4	0,026	28,2	56,4	22,0
5			23,3	24,3	0,012	23,1	46,2	18,0
15			21,5	22,5	0,0072	21,3	42,6	16,6
30			19,5	20,5	— 65	19,3	38,5	15,0
60	28°	1,8	18,2	19,2	— 46	18,0	36,0	14,0
120			16,5	16,5	— 30	16,3	32,6	12,7
240	28°	1,8	15,0	16,0	0,0018	14,8	29,5	11,5
1440	—							

Formula calculation :

Partial per. finer $P_p = \frac{G_s}{G_s - 1} \times \frac{100}{W_c} \times R_H$ *for hydrometer 151H*

Partial per. finer $P_p = \frac{100}{W_c} \times R_H$ *for hydrometer 152H*

Total per. finer $P_T = P_p \times \frac{W_s - W_t}{W_s}$

Note : W_s = Total ovendry Wt of sample used comfined analysis in grams
W_c = Ovendry Wt of soil used for hydrometer analysis in grams
W_t = Ovendry Wt of sample retained on ~~N°10 or~~ N° 200 sieve

Tested by LAN Computed by BICH Checked by

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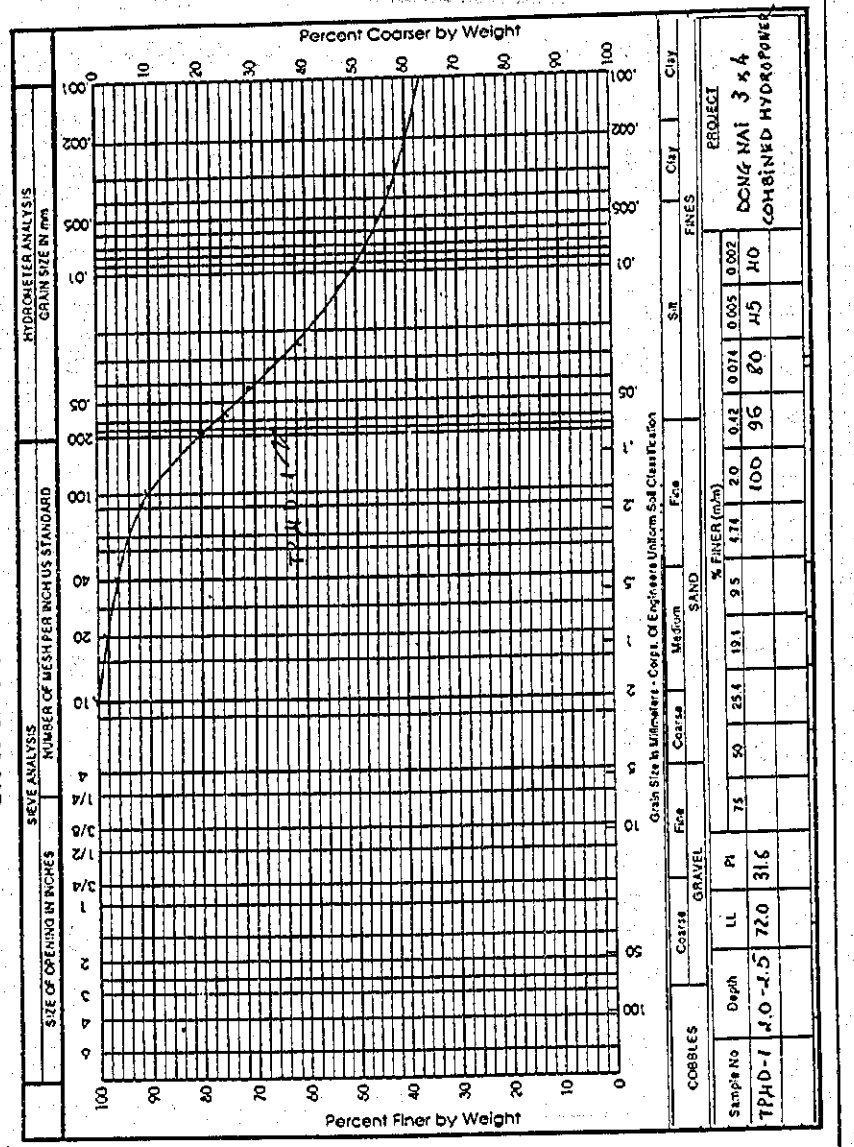
GRADATION CURVES



PHÂN TÍCH THÀNH PHẦN HẠT
GRAIN SIZE ANALYSIS
(METHOD ASTM D422)

Công trình (Project) : DONG NAI 3 & 4 COMBINED HYDROPOWER

Mẫu số (Test N°) : TPHD-1

Mô tả mẫu (Description) :

Tỷ trọng (Sp. gravity) : 2.920

TL đất khô ~~ướt~~ phân tích (Wt of dry ~~or wet~~ soil) : 50g

Tỷ trọng kế (Hydrometer N°) : ~~151H~~-152 H

Độ ẩm đất ướt phân tích thành phần hạt (Moisture content of wet soil for grain size) :

Số hiệu chỉnh mặt cong C_m = 1.0 (Menicus correction)

Phân tích sàng (Sieve analysis)

Tổng TL đất khô TN (Total Wt of sample)	50 g
TL hạt thô trên sàng N°4 (Wt of coarse soil retained N° 4)	- g

Cỡ sàng (Sieve size) (Sieve No)	(Sieve open)	TL trên sàng (Wt retained) g	% trên sàng (% retained) (Partial)	(Total)	% lọt sàng (% passing)
* 3 in	76.2				
* 2 in	50.8				
* 1.5	38.1				
1 in	25.4				
* 3/4	19.1				
* 3/8	9.52				
N°3	6.35				
* N°4	4.75				
Pan					
* N°10	2.0		-		
N°16	1.19				
* N°20	0.84	1.0	-	2	98
N°30	0.59				
* N°40	0.42	2.0	-	4	96
N°50	0.30				
N°70	0.21				
* N°100	0.15	5.0	-	10	90
N°140	0.11				
* N200	0.074	10.0	-	20	80
Pan					
Total Wt in g					

Phân tích tỷ trọng kế (Hydrometer analysis)

TL đất khô trích phân tích TT kế < N°10 (Wt of dry soil partical for hydrometer < N° 10)	- g
TL đất khô trích phân tích TT kế < N200 (Wt of dry soil partical for hydrometer < N200)	- g
TL đất khô toàn phần cho phân tích TT kế (Wt of dry soil total for hydrometer analysis)	50 g

Số HC chất phân tán (Dispersing correction) C_d = 3.0 — Số HC mặt cong C_m = 1.0 (Menicus correction)

Thời gian (Time) min	Nhiệt độ (Temp.) °C	Số HC nhiệt (Temp. corr.) m	Số đọc TTK (Hydro. reading) R'	HC số đọc (Corr. reading) R=R'+Cm	Đường kính hạt (Particle diameter) D (m/m)	R-Cd +m R_a	% hạt < D % finer < D (Partial) P_p%	(Total) P_T%
0.5	28	1.8	37.5	38.5	0.057	37.3	-	74.6
1	-	-	35.5	36.5	0.043	35.3	-	70.6
2	-	-	33.5	34.5	0.034	33.3	-	66.6
5	-	-	30.5	31.5	0.024	30.3	-	60.6
15	-	-	26.5	27.5	0.012	26.3	-	52.6
30	-	-	25	26	0.009	24.8	-	49.6
60	-	-	23	24	0.006	22.8	-	45.6
120	-	-	21.5	22.5	0.0035	21.3	-	42.6
240	28	1.8	20	21	0.0019	19.8	-	39.6
1440								

Formula calculation :

Partial per. finer $P_p = \frac{G_s}{G_s - 1} \times \frac{100}{W_c} \times R_a$ for hydrometer 151H

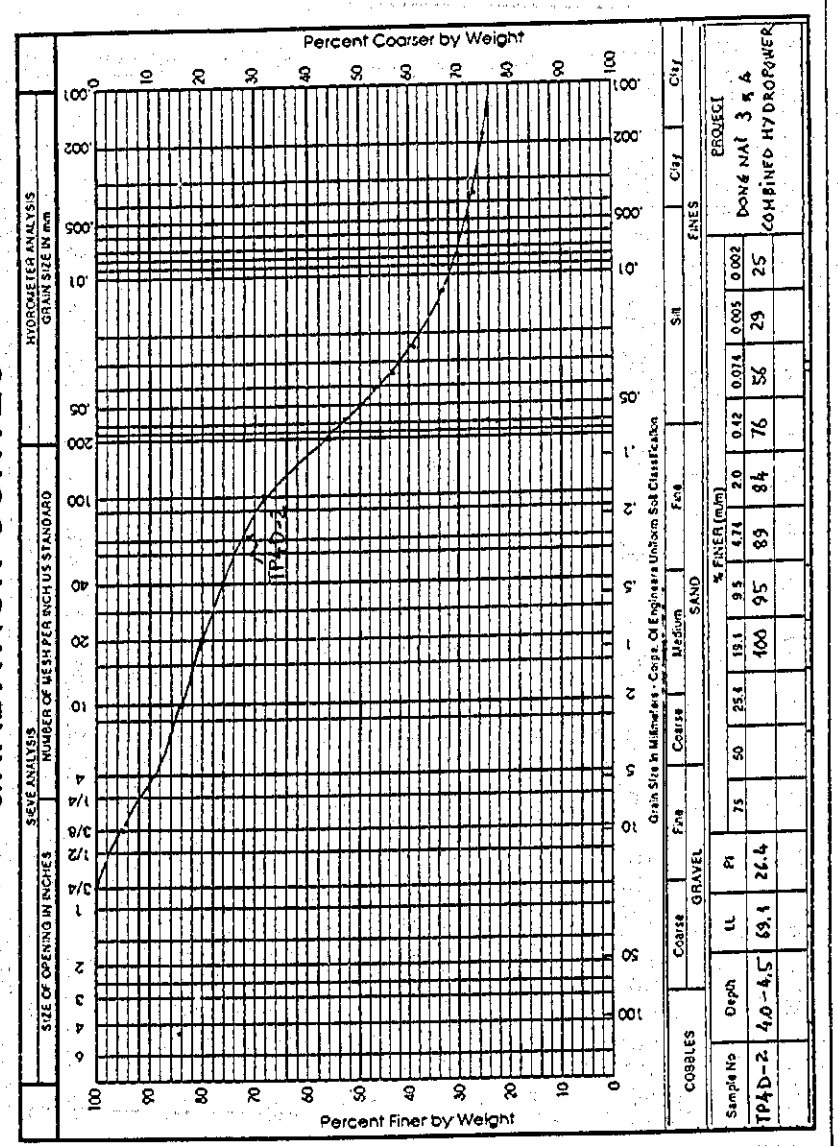
Partial per. finer $P_p = \frac{100}{W_c} \times R_a$ for hydrometer 152H

Total per. finer $P_T = P_p \times \frac{W_s - W_1}{W_s}$

Note : W_s = Total ovendry Wt of sample used comfined analysis in grams
W_c = Ovendry Wt of soil used for hydrometer analysis in grams
W_1 = Ovendry Wt of sample retained on N° 10 or N° 200 sieve

Tested by LAN Computed by HIEN Checked by BICH

GRADATION CURVES



PHÂN TÍCH THÀNH PHẦN HẠT
GRAIN SIZE ANALYSIS
(METHOD ASTM D422)

Công trình *(Project)* : DONG NAI 3 & 4 COMBINED HYDROPOWER — Mẫu số *(Test N°)* : TP4D-2

Mô tả mẫu *(Description)* : Sandy silty clay with fine laterit grav. — Tỷ trọng *(Sp. gravity)* : 3.010

TL đất khô ~~ướt~~ phân tích *(Wt of dry ~~or wet~~ soil)* : 500 g — Tỷ trọng kế *(Hydrometer N°)* : 151H-152 H

Độ ẩm đất ướt phân tích thành phần hạt *(Moisture content of wet soil for grain size)* : — — Số hiệu chỉnh mặt cong C_m = 1.0 *(Meniscus correction)*

Phân tích sàng *(Sieve analysis)*

Tổng TL đất khô TN *(Total Wt of sample)*	500	g
TL hạt thô trên sàng N°4 *(Wt of coarse soil retained N° 4)*	55 (11%)	g

Cỡ sàng *(Sieve size)* (Sieve No)	(Sieve open)	TL trên sàng *(Wt retained)* g	% trên sàng *(% retained)* (Partial)	(Total)	% lọt sàng *(% passing)*
* 3 in	76.2				
* 2 in	50.8				
* 1.5	38.1				
1 in	25.4				
* 3/4	19.1			0	100
* 3/8	9.52	25		5	95
N°3	6.35	–		–	–
* N°4	4.75	55		11	89
Pan					
* N°10	2.0	80		16	84
N°16	1.19	–		–	–
* N°20	0.84	100		20	80
N°30	0.59	Tổng 400.5		–	–
* N°40	0.42	2.5	5.0	24	76
N°50	0.30	–			–
N°70	0.21	–			–
* N°100	0.15	7.5	15.0	32	68
N°140	0.11	–			–
* N200	0.074	15.0	30.0	44	56
Pan					
Total Wt in g					

Phân tích tỷ trọng kế *(Hydrometer analysis)*

TL đất khô trích phân tích TT kế < N°10 *(Wt of dry soil partical for hydrometer < N° 10)*	–	g
TL đất khô trích phân tích TT kế < N20ϕ *(Wt of dry soil partical for hydrometer < N20ϕ)*	50	g
TL đất khô toàn phần cho phân tích TT kế *(Wt of dry soil total for hydrometer analysis)*	–	g

Số HC chất phân tán *(Dispersing correction)* C_d = 3.0 — Số HC mặt cong C_m = 1.0 *(Meniscus correction)*

Thời gian *(Time)* min	Nhiệt độ *(Temp.)* °C	Số HC nhiệt *(Temp. corr.)* m	Số đọc TTK *(Hydro. reading)* R'	HC số đọc *(Corr. reading)* R=R'+Cm	Đường kính hạt *(Particle diameter)* D (m/m)	R-Cd +m R_w	% hạt < D *% finer < D (Partial)* P_p%	*(Total)* P_t%
0.5	28°	1.8	33.4	34.4	0.058	33.2	66.4	53
1	✓		29.5	30.5	0.041	29.3	58.8	47
2	✓		27.0	28.0	0.035	26.8	53.8	43
5			24.5	25.5	0.025	24.3	48.8	39
15	✓		21.0	22.0	0.012	20.8	41.3	33
30			19.0	20.0	0.008	18.8	37.5	30
60	✓		18.2	19.2	0.005	18.0	36.0	28.5
120	28°	1.8	17.0	18.0	0.0037	16.8	33.8	27
240	28°	1.8	16.0	17.0	0.0018	15.8	31.3	25
1440								

Formula calculation :

Partial per. finer $P_p = \frac{G_s}{G_s-1} \times \frac{100}{W_c} \times R_w$ *for hydrometer 151H*

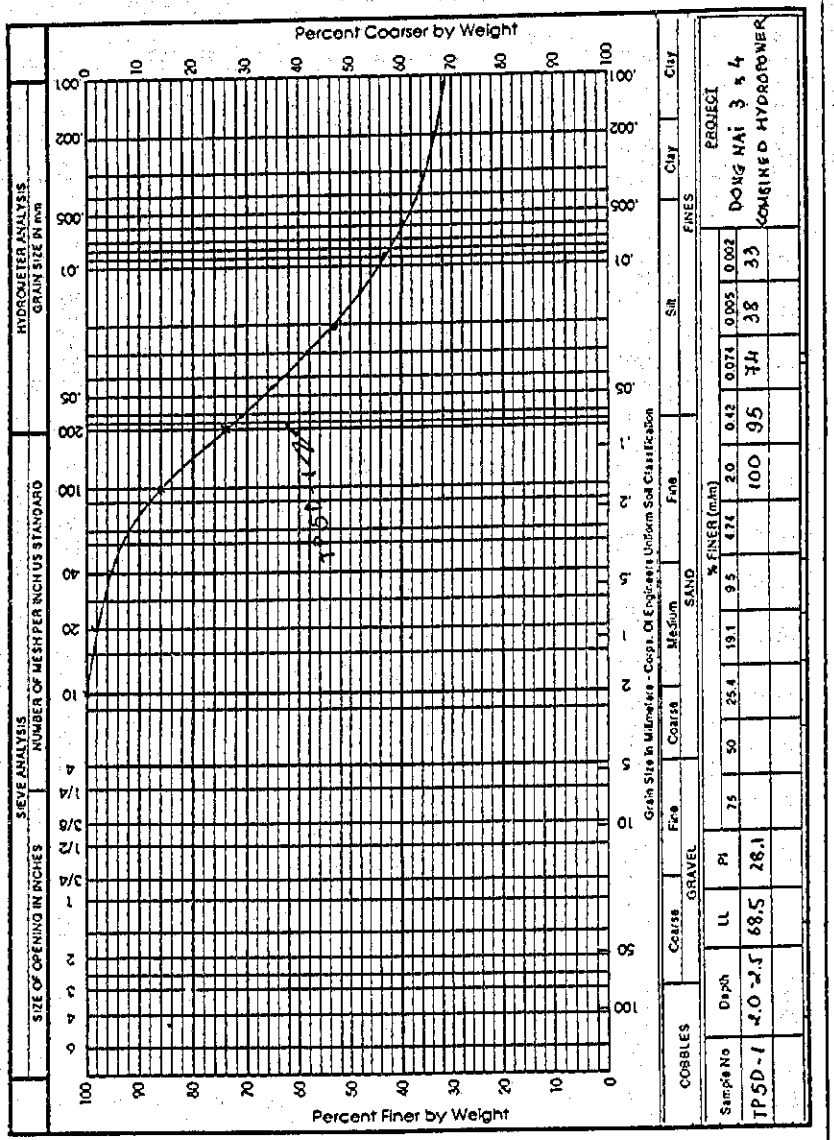
Partial per. finer $P_p = \frac{100}{W_c} \times R_w$ *for hydrometer 152H*

Total per. finer $P_t = P_p \times \frac{W_s - W_1}{W_s}$

Note : W_s = Total ovendry Wt of sample used comfined analysis in grams
W_c = Ovendry Wt of soil used for hydrometer analysis in grams
W_1 = Ovendry Wt of sample retained on ~~N° 10 or~~ N° 20ϕ sieve

Tested by LAN — Computed by BICH — Checked by KIEN

GRADATION CURVES



PHÂN TÍCH THÀNH PHẦN HẠT
GRAIN SIZE ANALYSIS
(METHOD ASTM D422)

Công trình *(Project)* : DONG NAI 3 & 4 COMBINED HYDROPOWER

Mẫu số *(Test N°)* : TP 5D - 1

Mô tả mẫu *(Description)* :

Tỷ trọng *(Sp. gravity)* : 2.899

TL đất khô-ướt phân tích *(Wt of dry ~~or wet~~ soil)* : 50g

Tỷ trọng kế *(Hydrometer N°)* : ~~151H~~-152 H

Độ ẩm đất ướt phân tích thành phần hạt *(Moisture content of wet soil for grain size)* :

Số hiệu chỉnh mặt cong C_m = 1.0 *(Menicus correction)*

Phân tích sàng *(Sieve analysis)*

Tổng TL đất khô TN *(Total Wt of sample)*	50 g
TL hạt thô trên sàng N°4 *(Wt of coarse soil retained N° 4)*	- g

Cỡ sàng *(Sieve size)* (Sieve No)	(Sieve open)	TL trên sàng *(Wt retained)* g	% trên sàng *(% retained)* (Partial)	(Total)	% lọt sàng *(% passing)*
* 3 in	76.2				
* 2 in	50.8				
* 1.5	38.1				
1 in	25.4				
* 3/4	19.1				
* 3/8	9.52				
N°3	6.35				
* N°4	4.75				
Pan					
* N°10	2.0		-		
N°16	1.19				
* N°20	0.84	1.0	-	2	98
N°30	0.59				
* N°40	0.42	2.5	-	5	95
N°50	0.30				
N°70	0.21				
* N°100	0.15	7.0	-	14	86
N°140	0.11				
* N200	0.074	13.0	-	26	74
Pan					
Total Wt in g					

Phân tích tỷ trọng kế *(Hydrometer analysis)*

TL đất khô trích phân tích TT kế < N°10 *(Wt of dry soil partical for hydrometer < N° 10)*	- g
TL đất khô trích phân tích TT kế < N200 *(Wt of dry soil partical for hydrometer < N200)*	- g
TL đất khô toàn phần cho phân tích TT kế *(Wt of dry soil total for hydrometer analysis)*	50 g

Số HC chất phân tán *(Dispersing correction)* C_d = 3.0 — Số HC mặt cong C_m = 1.0 *(Menicus correction)*

Thời gian *(Time)* min	Nhiệt độ *(Temp.)* °C	Số HC nhiệt *(Temp. corr.)* m	Số đọc TTK *(Hydro. reading)* R'	HC số đọc *(Corr. reading)* R=R'+Cm	Đường kính hạt *(Particle diameter)* D (m/m)	R+Cd +m R_w	% hạt < D % finer < D *(Partial)* P_p%	*(Total)* P_t%
0.5	28	1.8	35.5	36.5	0.061	35.3	-	70.6
1	-	-	32.5	33.5	0.047	32.3	-	64.6
2	-	-	29	30	0.030	28.8	-	57.6
5	-	-	27	28	0.021	26.8	-	53.6
15	-	-	24	25	0.014	23.8	-	47.6
30	-	-	22	23	0.0088	21.8	-	43.6
60	-	-	20	21	0.0059	19.8	-	39.6
120	-	-	18	19	0.0036	17.8	-	35.6
240	28	1.8	17	18	0.0026	16.8	-	33.6
1440								

Formula calculation :

Partial per. finer $P_p = \frac{G_s}{G_s - 1} \times \frac{100}{W_c} \times R_w$ for hydrometer 151H

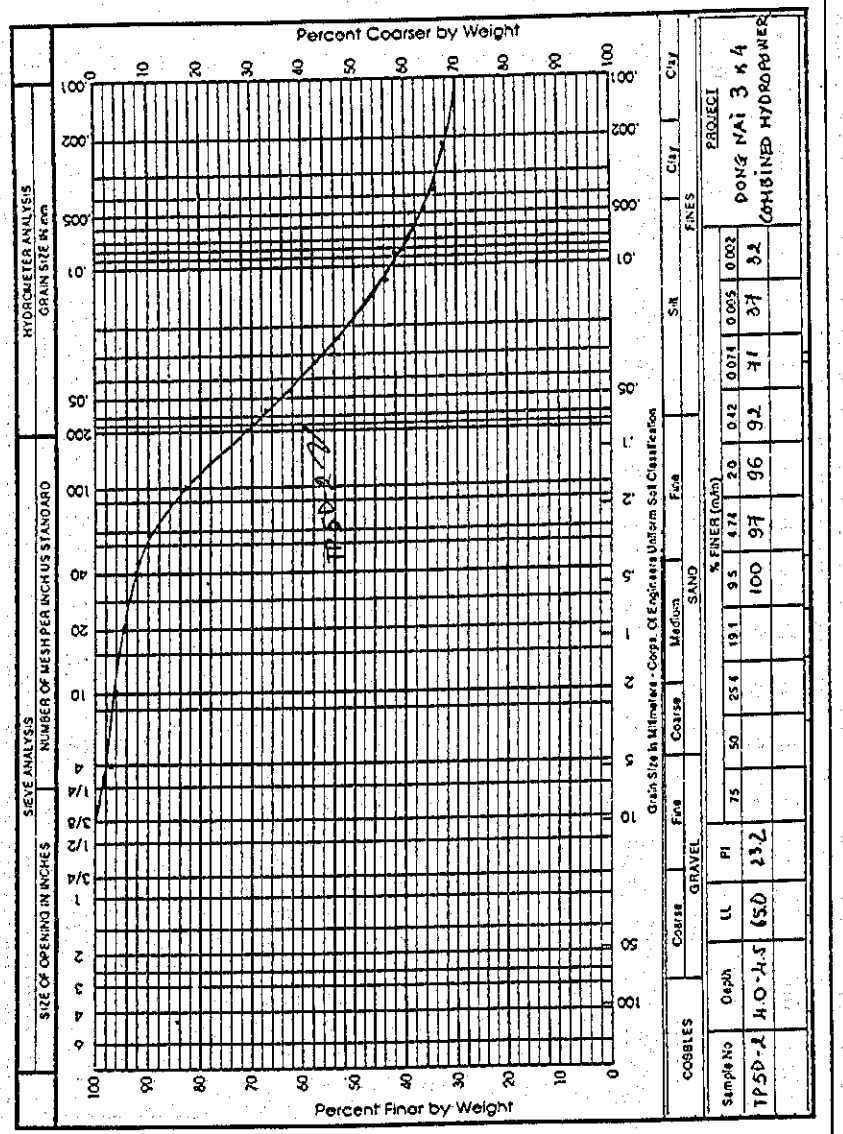
Partial per. finer $P_p = \frac{100}{W_c} \times R_w$ for hydrometer 152H

Total per. finer $P_t = P_p \times \frac{W_s - W_1}{W_s}$

Note : W_s = Total ovendry Wt of sample used comfined analysis in grams
W_c = Ovendry Wt of soil used for hydrometer analysis in grams
W_1 = Ovendry Wt of sample retained on N° 10 or N° 200 sieve

Tested by LAW — Computed by HIEN — Checked by BICH

GRADATION CURVES



PHÂN TÍCH THÀNH PHẦN HẠT
GRAIN SIZE ANALYSIS
(METHOD ASTM D422)

Công trình *(Project)* : DONG NAI 3 & 4 COMBINED HYDROPOWER

Mẫu số *(Test N°)* : TP5D-2

Mô tả mẫu *(Description)* :

Tỷ trọng *(Sp. gravity)* : 2.922

TL đất khô-ướt phân tích *(Wt of dry ~~or wet~~ soil)* : 50g

Tỷ trọng kế *(Hydrometer N°)* : ~~151H~~-152 H

Độ ẩm đất ướt phân tích thành phần hạt *(Moisture content of wet soil for grain size)* :

Số hiệu chỉnh mặt cong C_m = 1.0 *(Menicus correction)*

Phân tích sàng *(Sieve analysis)*

Tổng TL đất khô TN *(Total Wt of sample)*	50 g
TL hạt thô trên sàng N°4 *(Wt of coarse soil retained N° 4)*	- g

Cỡ sàng (Sieve size) (Sieve No)	(Sieve open)	TL trên sàng (Wt retained) g	% trên sàng (% retained) (Partial)	(Total)	% lọt sàng (% passing)
" 3 in	76.2				
" 2 in	50.8				
" 1.5	38.1				
1 in	25.4				
" 3/4	19.1				
" 3/8	9.52				
N°3	6.35				
" N°4	4.75	0.5	-	3	97
Pan					
" N°10	2.0	2.0	-	4	96
N°16	1.19				
" N°20	0.84	3.0	-	6	94
N°30	0.59				
" N°40	0.42	4.0	-	8	92
N°50	0.30				
N°70	0.21				
" N°100	0.15	8.5	-	17	83
N°140	0.11				
" N200	0.074	14.5	-	29	71
Pan					
Total Wt in g					

Phân tích tỷ trọng kế *(Hydrometer analysis)*

TL đất khô trích phân tích TT kế < N°10 *(Wt of dry soil partical for hydrometer < N° 10)*	- g
TL đất khô trích phân tích TT kế < N200 *(Wt of dry soil partical for hydrometer < N200)*	- g
TL đất khô toàn phần cho phân tích TT kế *(Wt of dry soil total for hydrometer analysis)*	50 g

Số HC chất phân tán *(Dispersing correction)* C_d = 3.0 Số HC mặt cong C_m = 1.0 *(Menicus correction)*

Thời gian (Time) min	Nhiệt độ (Temp.) °C	Số HC nhiệt (Temp. corr.) m	Số đọc TTK (Hydro. reading) R'	HC số đọc (Corr. reading) R=R'+Cm	Đường kính hạt (Particle diameter) D (m/m)	R-Cd +m R_w	% hạt < D % finer < D (Partial) P_P%	(Total) P_T%
0.5	28	1.8	33.5	34.5	0.058	33.3	-	66.6
1	-	-	31	32	0.046	30.8	-	61.6
2	-	-	29	30	0.032	28.8	-	57.6
5	-	-	27	28	0.021	26.8	-	53.6
15	-	-	23	24	0.012	22.8	-	45.6
30	-	-	21	22	0.0087	20.8	-	41.6
60	-	-	19	20	0.006	18.8	-	37.6
120	-	-	18	19	0.0037	17.8	-	35.6
240	28	1.8	16	17	0.021	15.8	-	31.6
1440								

Formula calculation :

Partial per. finer $P_P = \frac{G_s}{G_s - 1} \times \frac{100}{W_c} \times P_w$ *for hydrometer 151H*

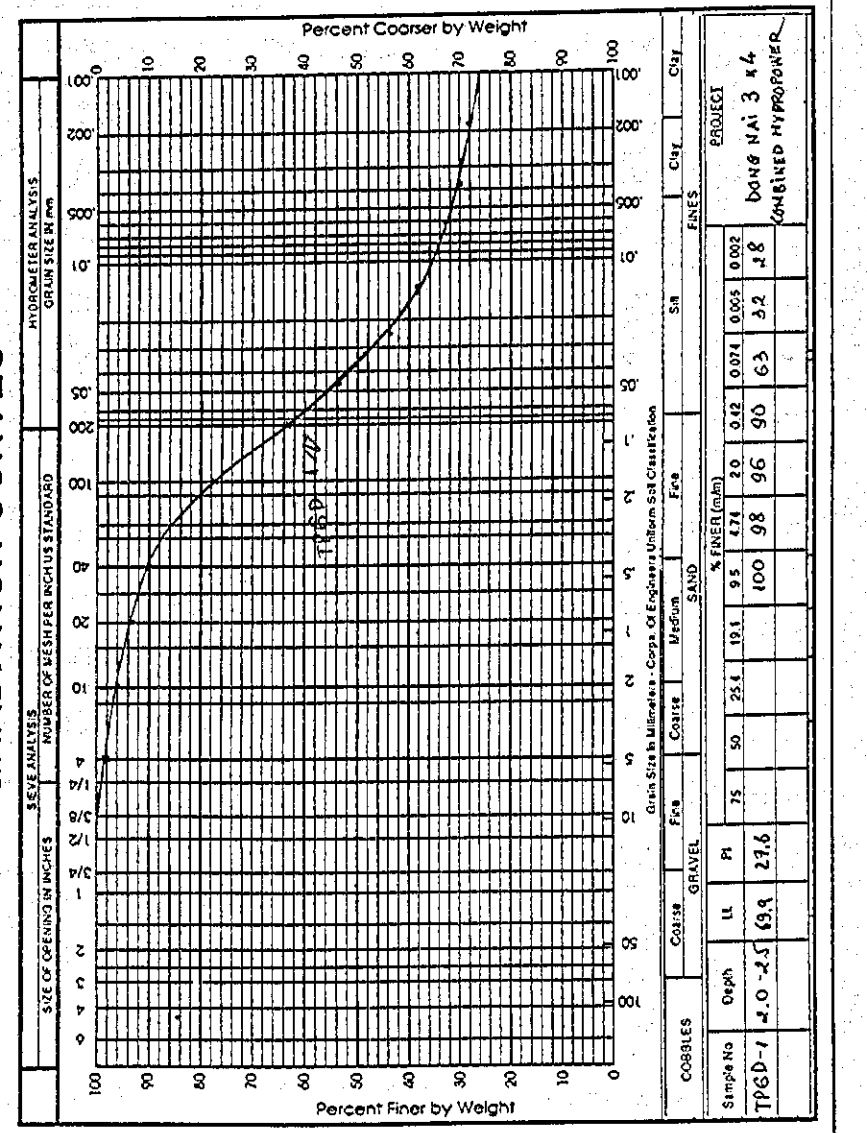
Partial per. finer $P_P = \frac{100}{W_c} \times R_w$ *for hydrometer 152H*

Total per. finer $P_T = P_P \times \frac{W_s - W_r}{W_s}$

Note : W_s = Total ovendry Wt of sample used comfined analysis in grams
W_c = Ovendry Wt of soil used for hydrometer analysis in grams
W_r = Ovendry Wt of sample retained on N° 10 or N° 200 sieve

Tested by LAN Computed by HIEN Checked by BIZH

GRADATION CURVES



PHÂN TÍCH THÀNH PHẦN HẠT
GRAIN SIZE ANALYSIS
(METHOD ASTM D422)

Công trình *(Project)* : DONG NAI 3 & 4 COMBINED HYDROPOWER

Mẫu số *(Test N°)* : TP6D-1

Mô tả mẫu *(Description)* :

Tỷ trọng *(Sp. gravity)* : 2.840

TL đất khô ~~ướt~~ phân tích *(Wt of dry ~~or wet~~ soil)* : 50g

Tỷ trọng kế *(Hydrometer N°)* : ~~151H~~-152 H

Độ ẩm đất ướt phân tích thành phần hạt *(Moisture content of wet soil for grain size)* :

Số hiệu chỉnh mặt cong C_m = 1.0 *(Menicus correction)*

Phân tích sàng *(Sieve analysis)*		Phân tích tỷ trọng kế *(Hydrometer analysis)*	
Tổng TL đất khô TN *(Total Wt of sample)*	50 g	TL đất khô trích phân tích TT kế < N°10 *(Wt of dry soil partical for hydrometer < N° 10)*	- g
TL hạt thô trên sàng N°4 *(Wt of coarse soil retained N° 4)*	- g	TL đất khô trích phân tích TT kế < N200 *(Wt of dry soil partical for hydrometer < N200)*	- g
		TL đất khô toàn phần cho phân tích TT kế *(Wt of dry soil total for hydrometer analysis)*	50 g

Cỡ sàng *(Sieve size)* (Sieve No)	(Sieve open)	TL trên sàng *(Wt retained)* g	% trên sàng *(% retained)* (Partial)	(Total)	% lọt sàng *(% passing)*
* 3 in	76.2				
* 2 in	50.8				
* 1.5	38.1				
1 in	25.4				
* 3/4	19.1				
* 3/8	9.52				
N°3	6.35				
* N°4	4.75	1.0	-	2	98
Pan					
* N°10	2.0	2.0	-	4	96
N°16	1.19				
* N°20	0.84	3.5	-	7	93
N°30	0.59				
* N°40	0.42	5.0	-	10	90
N°50	0.30				
N°70	0.21				
* N°100	0.15	11.5	-	23	77
N°140	0.11				
* N200	0.074	18.5	-	37	63
Pan					
Total Wt in g					

Số HC chất phân tán *(Dispersing correction)* C_d = 3.0 — Số HC mặt cong C_m = 1.0 *(Menicus correction)*

Thời gian *(Time)* min	Nhiệt độ *(Temp.)* °C	Số HC nhiệt *(Temp. corr.)* m	Số đọc TTK *(Hydro. reading)* R'	HC số đọc *(Corr. reading)* R=R'+Cm	Đường kính hạt *(Particle diameter)* D (m/m)	R-Cd +m R_a	% hạt < D % finer < D *(Partial)* P_p%	*(Total)* P_T%
0.5	28	1.8	30	31	0.060	30.8	-	59.6
1	-	-	27	28	0.047	26.8	-	53.6
2	-	-	24	25	0.033	23.8	-	47.6
5	-	-	22	23	0.025	21.8	-	43.6
15	-	-	19	20	0.014	18.8	-	37.6
30	-	-	18	19	0.009	17.8	-	35.6
60	-	-	17	18	0.006	16.8	-	33.6
120	-	-	15	16	0.0038	14.8	-	29.6
240	28	1.8	14	15	0.0019	13.8	-	27.6
1440								

Formula calculation :

Partial per. finer $P_p = \frac{G_s}{G_s - 1} \times \frac{100}{W_c} \times R_a$ *for hydrometer 151H*

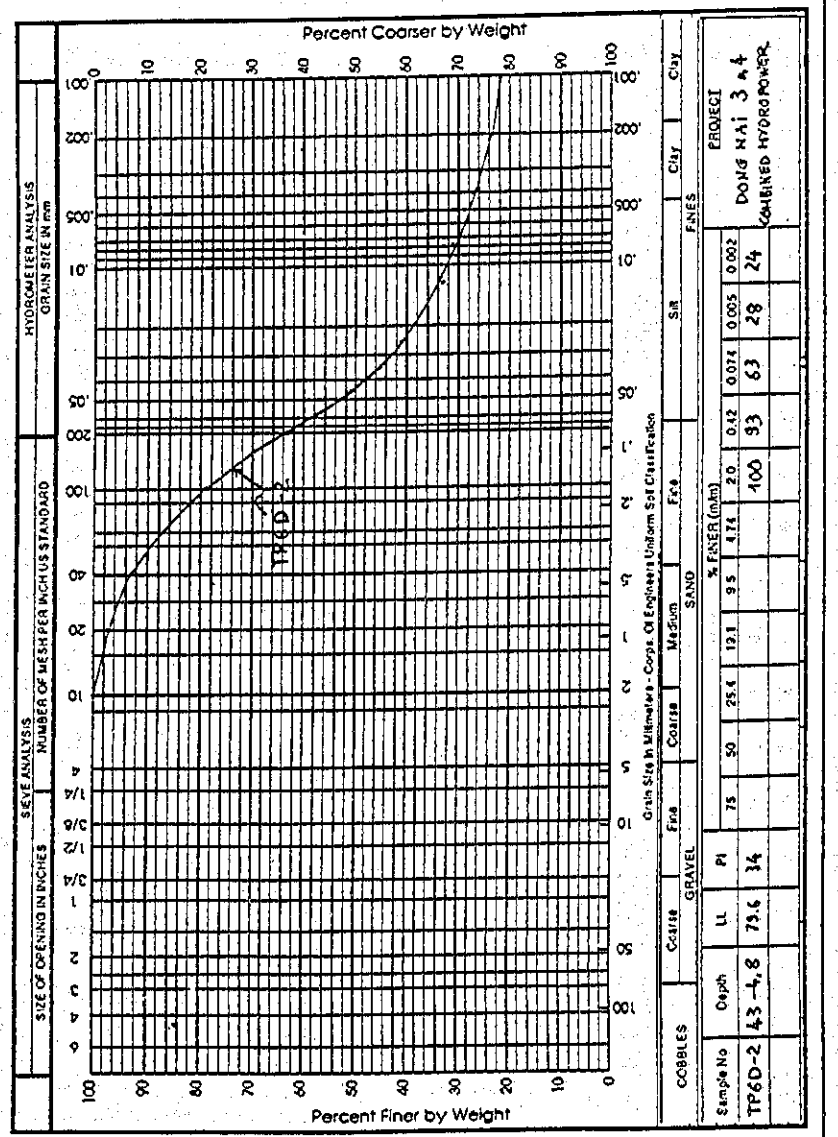
Partial per. finer $P_p = \frac{100}{W_c} \times R_a$ *for hydrometer 152H*

Total per. finer $P_T = P_p \times \frac{W_s - W_1}{W_s}$

Note : W_s = Total ovendry Wt of sample used comfined analysis in grams
W_c = Ovendry Wt of soil used for hydrometer analysis in grams
W_1 = Ovendry Wt of sample retained on N° 10 or N° 200 sieve

Tested by LAN *Computed by* KIEN *Checked by* BICH

GRADATION CURVES



PHÂN TÍCH THÀNH PHẦN HẠT
GRAIN SIZE ANALYSIS
(METHOD ASTM D422)

Công trình *(Project)* : DONG NAI 3 & 4 COMBINED HYDROPOWER

Mẫu số *(Test N°)* : TP6D-2

Mô tả mẫu *(Description)* :

Tỷ trọng *(Sp. gravity)* : 2.845

TL đất khô ~~ướt~~ phân tích *(Wt of dry ~~as-wet~~ soil)* : 50g

Tỷ trọng kế *(Hydrometer N°)* : ~~151H~~-152 H

Độ ẩm đất ướt phân tích thành phần hạt *(Moisture content of wet soil for grain size)* :

Số hiệu chỉnh mặt cong C_m = 1.0 *(Menicus correction)*

Phân tích sàng *(Sieve analysis)*

Tổng TL đất khô TN *(Total Wt of sample)*	50 g
TL hạt thô trên sàng N°4 *(Wt of coarse soil retained N° 4)*	- g

Cỡ sàng (Sieve size) (Sieve No)	(Sieve open)	TL trên sàng (Wt retained) g	% trên sàng (% retained) (Partial)	(Total)	% lọt sàng (% passing)
* 3 in	76.2				
* 2 in	50.8				
* 1.5	38.1				
1 in	25.4				
* 3/4	19.1				
* 3/8	9.52				
N°3	6.35				
* N°4	4.75				
Pan					
* N°10	2.0		-		
N°16	1.19				
* N°20	0.84	1.5	-	3	97
N°30	0.59				
* N°40	0.42	3.5	-	7	93
N°50	0.30				
N°70	0.21				
* N°100	0.15	10.5	-	21	79
N°140	0.11				
* N°200	0.074	18.5	-	37	63
Pan					
Total Wt in g					

Phân tích tỷ trọng kế *(Hydrometer analysis)*

TL đất khô trích phân tích TT kế < N°10 *(Wt of dry soil partical for hydrometer < N° 10)*	- g
TL đất khô trích phân tích TT kế < N200 *(Wt of dry soil partical for hydrometer < N200)*	- g
TL đất khô toàn phần cho phân tích TT kế *(Wt of dry soil total for hydrometer analysis)*	50 g

Số HC chất phân tán *(Dispersing correction)* C_d = 3.0

Số HC mặt cong C_m = 1.0 *(Menicus correction)*

Thời gian (Time) min	Nhiệt độ (Temp.) °C	Số HC nhiệt (Temp. corr.) m	Số đọc TTK (Hydro. reading) R'	HC số đọc (Corr. reading) R=R'+Cm	Đường kính hạt (Particle diameter) D (m/m)	R-Cd +m	% hạt < D % finer < D (Partial) P_P%	(Total) P_T%
0.5	28	1.8	30	31	0.061	29.8	-	59.6
1	-	-	26	27	0.046	25.8	-	51.6
2	-	-	23	24	0.034	22.8	-	45.6
5	-	-	21	22	0.026	20.5	-	41.6
15	-	-	17	18	0.013	16.8	-	33.6
30	-	-	16	17	0.0088	15.8	-	31.6
60	-	-	14	15	0.006	13.8	-	27.6
120	-	-	13.5	14.5	0.004	13.3	-	26.6
240	28	1.8	11.5	12.5	0.002	11.3	-	22.6
1440								

Formula calculation :

Partial per. finer $P_P = \frac{G_s}{G_s - 1} \times \frac{100}{W_c} \times R_m$ *for hydrometer 151H*

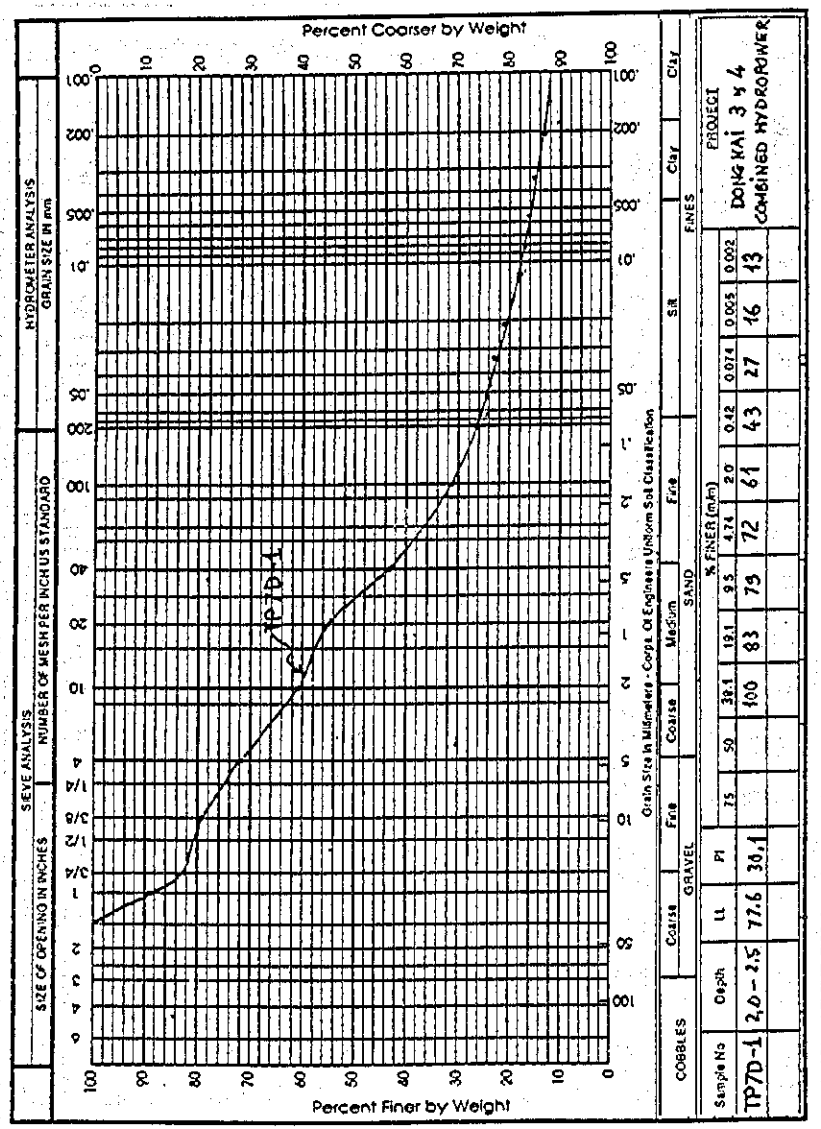
Partial per. finer $P_P = \frac{100}{W_c} \times R_m$ *for hydrometer 152H*

Total per. finer $P_T = P_P \times \frac{W_s - W_1}{W_s}$

Note : W_s = Total ovendry Wt of sample used comfined analysis in grams
W_c = Ovendry Wt of soil used for hydrometer analysis in grams
W_1 = Ovendry Wt of sample retained on N° 10 or N° 200 sieve

Tested by LAN *Computed by* HIEN *Checked by* BÌNH

GRADATION CURVES



PHÂN TÍCH THÀNH PHẦN HẠT
GRAIN SIZE ANALYSIS
(METHOD ASTM D422)

Công trình (Project) : DONG KAI 3 & 4 COMBINED HYDROPOWER

Mẫu số (Test N°) : TP7D-1

Mô tả mẫu (Description) : Laterit gravels with sandy clay

Tỷ trọng (Sp. gravity) : 2,917

TL đất khô ~~ướt~~ phân tích (Wt of dry ~~or wet~~ soil) : 2000 g

Tỷ trọng kế (Hydrometer N°) : ~~151H~~ 152 H

Độ ẩm đất ướt phân tích thành phần hạt (Moisture content of wet soil for grain size) : —

Số hiệu chỉnh mặt cong (Meniscus correction) C_m = 1,0

Phân tích sàng (Sieve analysis)		Phân tích tỷ trọng kế (Hydrometer analysis)	
Tổng TL đất khô TN (Total Wt of sample)	2000 g	TL đất khô trích phân tích TT kế < N°10 (Wt of dry soil partical for hydrometer < N° 10)	— g
TL hạt thô trên sàng N°4 (Wt of coarse soil retained N° 4)	570. g	TL đất khô trích phân tích TT kế < N200 (Wt of dry soil partical for hydrometer < N200)	50 g
		TL đất khô toàn phần cho phân tích TT kế (Wt of dry soil total for hydrometer analysis)	— g

Cỡ sàng (Sieve size) (Sieve No)	(Sieve open)	TL trên sàng (Wt retained) g	% trên sàng (% retained) (Partial)	(Total)	% lọt sàng (% passing)
" 3 in	76.2			—	
" 2 in	50.8			—	
" 1.5	38.1			0	100
1 in	25.4	230.0		11.5	88.5
" 3/4	19.1	356.1		17.8	82.2
" 3/8	9.52	412.0		20.6	79.4
N°3	6.35	—		—	
" N°4	4.75	570.0		28.5	71.5
Pan					
" N°10	2.0	782.0		39.1	60.9
N°16	1.19				
" N°20	0.84	900.2		45.0	55.0
N°30	0.59	Pan 1100			
" N°40	0.42	10.9	21.8	57.0	43.0
N°50	0.30				
N°70	0.21				
" N°100	0.15	21.8	43.6	69.0	31.0
N°140	0.11				
" N200	0.074	25.5	51.0	73.0	27.0
Pan					
Total Wt in g					

Số HC chất phân tán (Dispersing correction) G_s = - 3.0

Số HC mặt cong C_m = 1,0 (Meniscus correction)

Thời gian (Time) min	Nhiệt độ (Temp.) °C	Số HC nhiệt (Temp. corr.) m	Số đọc TTK (Hydro. reading) R'	HC số đọc (Corr. reading) R=R'+Cm	Đường kính hạt (Particle diameter) D (m/m)	R-Cd +m R_m	% hạt < D % finer < D (Partial) P_p%	(Total) P_T%
0.5	28°	1,8	23.5	24.5	0.062	23.3	46.3	25.5
1			22.0	23.0	0.049	21.8	44.0	24.3
2			21.0	22.0	0.034	20.8	42.0	23.0
5			19.2	20.2	0.021	19.0	38.0	21
15			16.5	17.5	0.012	16.3	32.7	18
30			15.8	16.8	0.0083	15.6	31.0	17
60	28°	1.8	14.7	15.7	0.0060	14.5	29.0	16
120	28	1.8	13.8	14.8	0.0035	13.6	27.3	15
240	28	1.8	12.0	13.0	0.0020	11.8	23.6	13
1440	—							

Formula calculation :

Partial per. finer $P_p = \frac{G_s}{G_s - 1} \times \frac{100}{W_c} \times R_m$ for hydrometer 151H

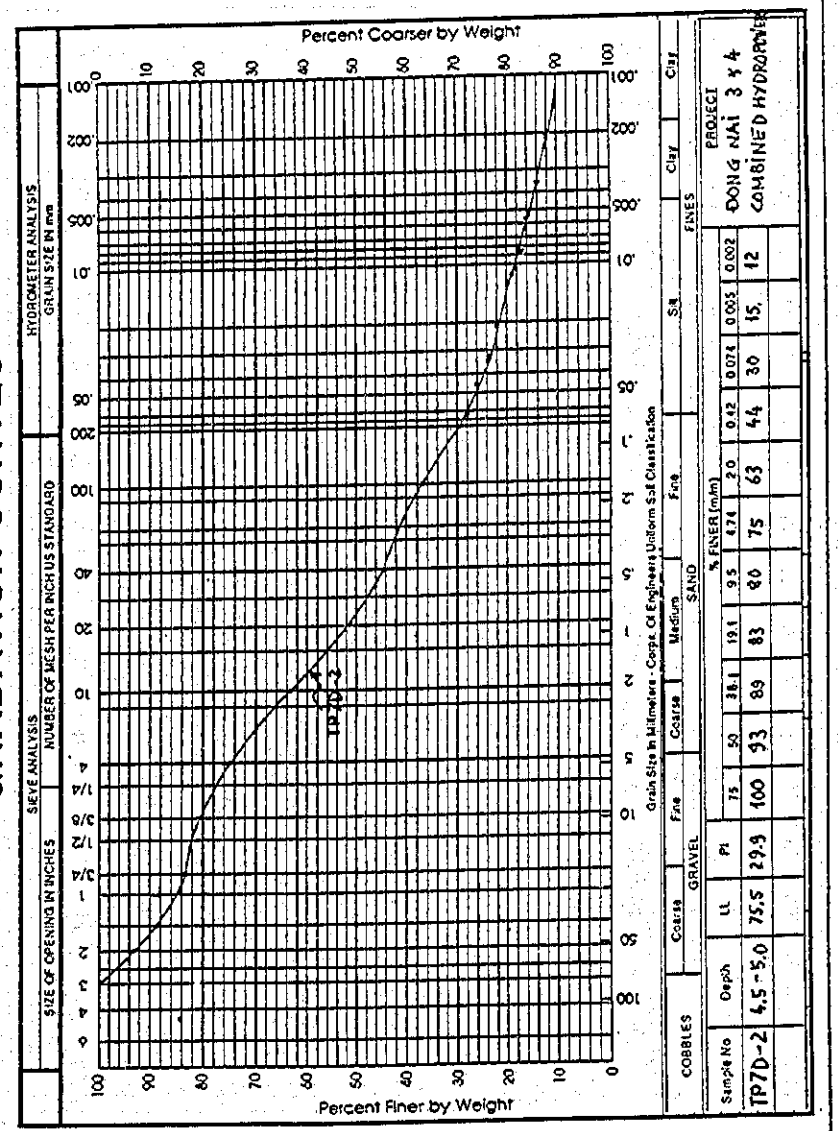
Partial per. finer $P_p = \frac{100}{W_c} \times R_m$ for hydrometer 152H

Total per. finer $P_T = P_p \times \frac{W_s - W_1}{W_s}$

Note : W_s = Total ovendry Wt of sample used comfined analysis in grams
W_c = Ovendry Wt of soil used for hydrometer analysis in grams
W_1 = Ovendry Wt of sample retained on ~~N° 10 or~~ N° 200 sieve

Tested by LAN Computed by BICH Checked by NIEN

GRADATION CURVES



Sample No	Depth	LL	PI	% FINER (m/m) 75	50	38.1	19.1	9.5	4.74	2.0	0.42	0.074	0.005	0.002
TP7D-2	4.5 - 5.0	75.5	29.9	100	93	89	83	80	75	63	44	30	15.	12

PROJECT: DONG NAI 3 & 4 COMBINED HYDROPOWER

PHÂN TÍCH THÀNH PHẦN HẠT
GRAIN SIZE ANALYSIS
(METHOD ASTM D422)

Công trình (Project) : DONG NAI 3 & 4 COMBINED HYDROPOWER — Mẫu số (Test N°) : TP7D-2

Mô tả mẫu (Description) : Sandy clay gravels mixture — Tỷ trọng (Sp. gravity) : 2.945

TL đất khô~~-wet~~ phân tích (Wt of dry ~~or wet~~ soil) : 2000 g — Tỷ trọng kế (Hydrometer N°) : ~~151H~~-152 H

Độ ẩm đất ướt phân tích thành phần hạt (Moisture content of wet soil for grain size) : — Số hiệu chỉnh mặt cong (Menicus correction) C_m = 1.0

Phân tích sàng (Sieve analysis)

Tổng TL đất khô TN (Total Wt of sample): 2000 g

TL hạt thô trên sàng N°4 (Wt of coarse soil retained N° 4): 500.4 g

Cỡ sàng (Sieve size) (Sieve No)	(Sieve open)	TL trên sàng (Wt retained) g	% trên sàng (% retained) (Partial)	(Total)	% lọt sàng (% passing)
* 3 in	76.2			—	100.0
* 2 in	50.8	140,1		7.0	93
* 1.5	38.1	220,2		11.0	89
1 in	25.4	300.5		15.0	85
* 3/4	19.1	330,0		16.5	83.5
* 3/8	9.52	390,2		19.5	80.5
N°3	6.35	—		—	—
* N°4	4.75	500,4		25.0	75
Pan					
* N°10	2.0	740,3	—	37.0	63
N°16	1.19	—		—	—
* N°20	0.84	980,4	—	49.0	51.
N°30	0.59	Bm 1019,6			
* N°40	0.42	6,37	12,7	55.5	44.5
N°50	0.30	—	—	—	—
N°70	0.21	—	—	—	—
* N°100	0.15	13.72	27.4	63.0	37
N°140	0.11	—	—	—	
* N200	0.074	21,1	42,2	70,5	29,5
Pan					
Total Wt in g					

Phân tích tỷ trọng kế (Hydrometer analysis)

TL đất khô trích phân tích TT kế < N°10 (Wt of dry soil partical for hydrometer < N° 10): — g

TL đất khô trích phân tích TT kế < N200 (Wt of dry soil partical for hydrometer < N200): 50 g

TL đất khô toàn phần cho phân tích TT kế (Wt of dry soil total for hydrometer analysis): — g

Số HC chất phân tán (Dispersing correction) C_d = 3.0 — Số HC mặt cong C_m = 1.0 (Menicus correction)

Thời gian (Time) min	Nhiệt độ (Temp.) °C	Số HC nhiệt (Temp. corr.) m	Số đọc TTK (Hydro. reading) R'	HC số đọc (Corr. reading) R=R'+Cm	Đường kính hạt (Particle diameter) D (m/m)	R-Cd +m R_H	% hạt < D % finer < D (Partial) P_p%	(Total) P_t%
0.5	28	1.8	27.7	28.7	0,062	27.5	54.9	28
1			25.7	26.7	0,046	25.5	51.0	26
2			23.3	24.3	0,032	23.1	46.0	23.5
5			21.8	22.8	0,021	21.6	43.0	22
15			19.0	20.0	0,012	18.8	37.5	19
30	28	1.8	17.0	18.0	0,0085	16.8	33.5	17
60			16.0	17.0	0,0055	15.7	31.5	16
120	28	1.8	14.0	15.0	0,0035	13.8	27.5	14
240	28	1.8	12.0	12.0	0,0021	11.8	23.6	12
1440								

Formula calculation:

Partial per. finer $P_p = \frac{G_s}{G_s - 1} \times \frac{100}{W_c} \times R_H$ for hydrometer 151H

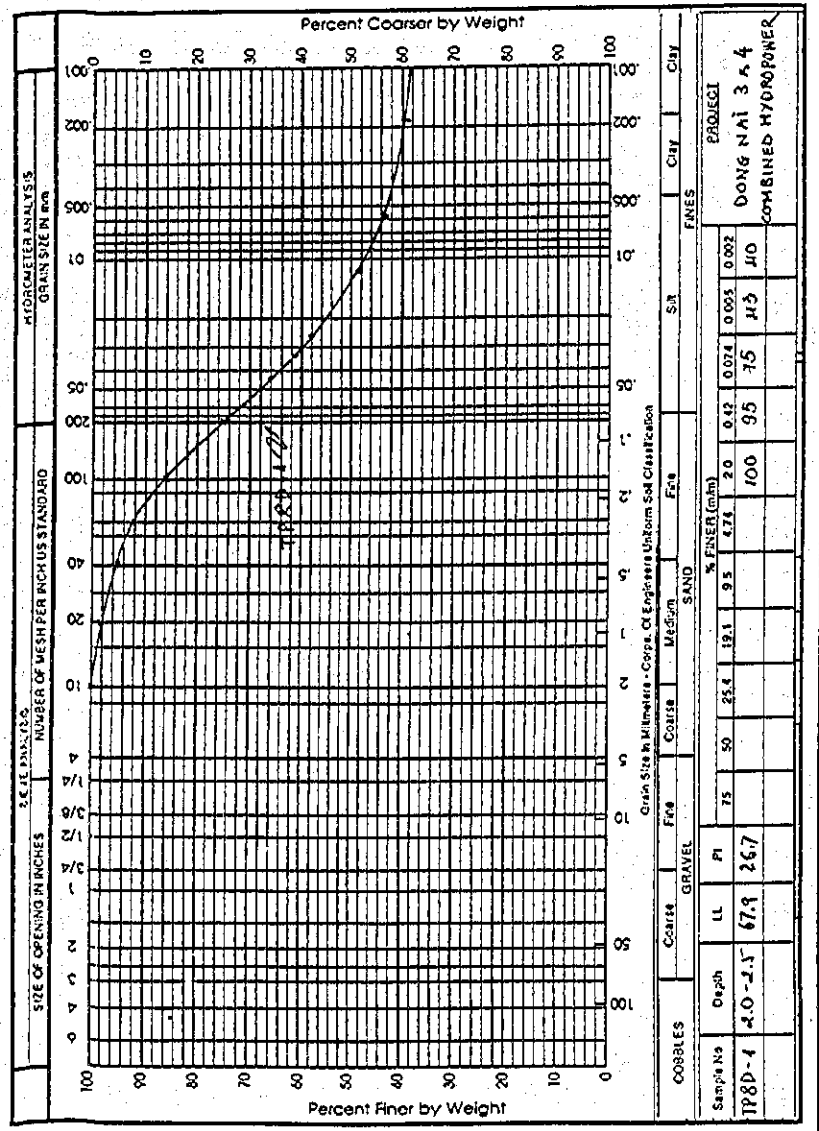
Partial per. finer $P_p = \frac{100}{W_c} \times R_H$ for hydrometer 152H

Total per. finer $P_T = P_p \times \frac{W_s - W_1}{W_s}$

Note: W_s = Total ovendry Wt of sample used confined analysis in grams
W_c = Ovendry Wt of soil used for hydrometer analysis in grams
W_1 = Ovendry Wt of sample retained on ~~N°10 or~~ N° 200 sieve

Tested by LAN — Computed by BICH — Checked by HIEN

GRADATION CURVES



PHÂN TÍCH THÀNH PHẦN HẠT
GRAIN SIZE ANALYSIS
(METHOD ASTM D422)

Công trình *(Project)* : DONG NAI 3 & 4 COMBINED HYDROPOWER

Mẫu số *(Test N°)* : TP 8D-4

Mô tả mẫu *(Description)* :

Tỷ trọng *(Sp. gravity)* : 2.880

TL đất khô-ướt phân tích *(Wt of dry ~~or wet~~ soil)* : 50g

Tỷ trọng kế *(Hydrometer N°)* : ~~151H~~-152 H

Độ ẩm đất ướt phân tích thành phần hạt *(Moisture content of wet soil for grain size)* :

Số hiệu chỉnh mặt cong C_m = 1.0 *(Menicus correction)*

Phân tích sàng *(Sieve analysis)*

Tổng TL đất khô TN *(Total Wt of sample)* : 50 g

TL hạt thô trên sàng N°4 *(Wt of coarse soil retained N° 4)* : - g

Cỡ sàng (Sieve size) (Sieve No)	(Sieve open)	TL trên sàng (Wt retained) g	% trên sàng (% retained) (Partial)	(Total)	% lọt sàng (% passing)
* 3 in	76.2				
* 2 in	50.8				
* 1.5	38.1				
1 in	25.4				
* 3/4	19.1				
* 3/8	9.52				
N°3	6.35				
* N°4	4.75				
Pan					
* N°10	2.0		-		
N°16	1.19				
* N°20	0.84	1.0	-	2	98
N°30	0.59				
* N°40	0.42	2.5	-	5	95
N°50	0.30				
N°70	0.21				
* N°100	0.15	7.0	-	14	86
N°140	0.11				
* N200	0.074	12.5	-	25	75
Pan					
Total Wt in g					

Phân tích tỷ trong kế *(Hydrometer analysis)*

TL đất khô trích phân tích TT kế < N°10 *(Wt of dry soil partical for hydrometer < N° 10)* : - g

TL đất khô trích phân tích TT kế < N200 *(Wt of dry soil partical for hydrometer < N200)* : - g

TL đất khô toàn phần cho phân tích TT kế *(Wt of dry soil total for hydrometer analysis)* : 50 g

Số HC chất phân tán *(Dispersing correction)* C_d = 3.0 Số HC mặt cong C_m = 1.0 *(Menicus correction)*

Thời gian (Time) min	Nhiệt độ (Temp.) °C	Số HC nhiệt (Temp. corr.) m	Số đọc TTK (Hydro. reading) R'	HC số đọc (Corr. reading) R=R'+Cm	Đường kính hạt (Particle diameter) D (m/m)	R-Cd +m R_a	% hạt < D % finer < D (Partial) P_p%	(Total) P_t%
0.5	28	1.8	35.5	36.5	0.059	35.3	-	70.6
1	-	-	33	34	0.045	32.8	-	65.6
2	-	-	30.5	31.5	0.033	30.3	-	60.6
5	-	-	29	30	0.027	28.8	-	57.6
15	-	-	24	25	0.012	23.8	-	47.6
30	-	-	23	24	0.009	22.8	-	45.6
60	-	-	21.5	22.5	0.0059	21.3	-	42.6
120	-	-	21	22	0.0037	20.8	-	41.6
240	28	1.8	19	20	0.0018	18.8	-	37.6
1440								

Formula calculation :

Partial per. finer $P_p = \frac{G_s}{G_s - 1} \times \frac{100}{W_c} \times R_a$ *for hydrometer 151H*

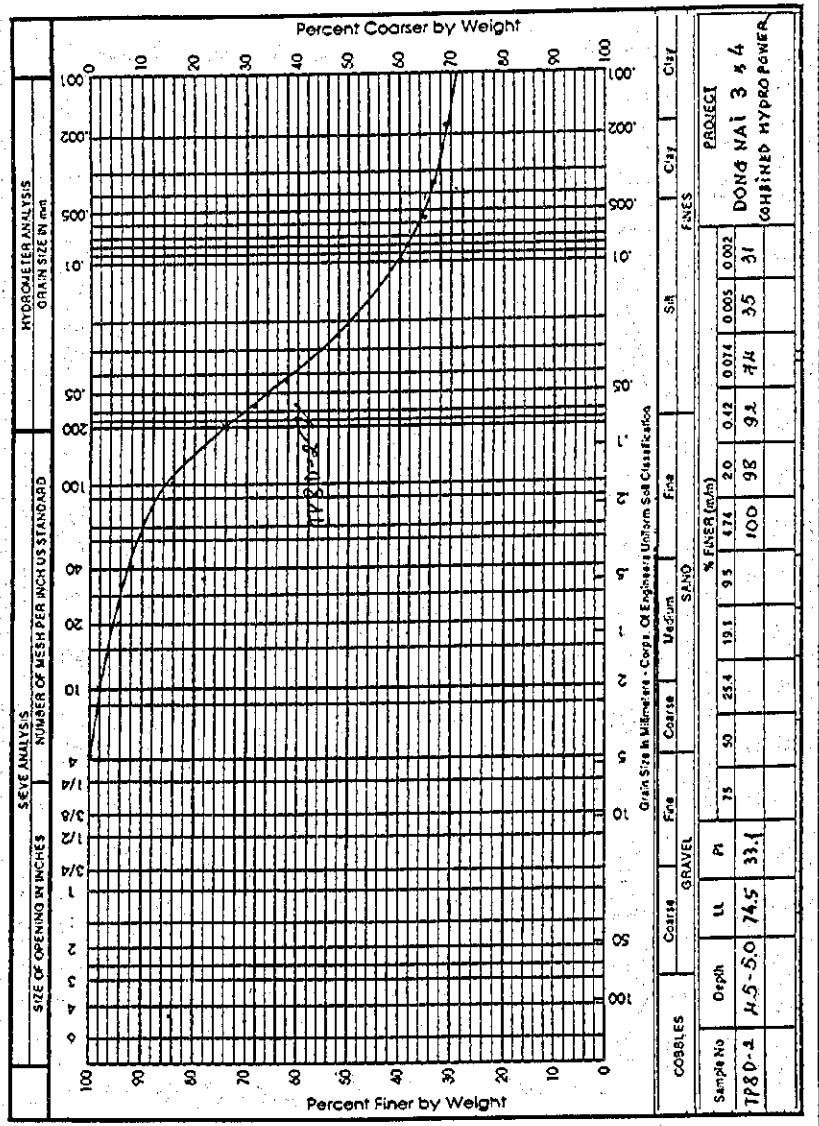
Partial per. finer $P_p = \frac{100}{W_c} \times R_a$ *for hydrometer 152H*

Total per. finer $P_t = P_p \times \frac{W_s - W_1}{W_s}$

Note : W_s = Total ovendry Wt of sample used comfined analysis in grams
W_c = Ovendry Wt of soil used for hydrometer analysis in grams
W_1 = Ovendry Wt of sample retained on N° 10 or N° 200 sieve

Tested by LAN *Computed by* HIEN *Checked by* BICH

GRADATION CURVES



Sample No	Depth	LL	PI	75	50	25.4	19.1	9.5	4.74	2.0	0.42	0.074	0.005	0.002
TP8D-2	4.5-5.0	74.5	33.1						100	98	92	74	35	31

PROJECT: DONG NAI 3 & 4 COMBINED HYDROPOWER

PHÂN TÍCH THÀNH PHẦN HẠT
GRAIN SIZE ANALYSIS
(METHOD ASTM D422)

Công trình (Project) : DONG NAI 3 & 4 COMBINED HYDROPOWER

Mẫu số (Test N°) : TP8D-2

Mô tả mẫu (Description) :

Tỷ trọng (Sp. gravity) : 2.884

TL đất khô ~~ướt~~ phân tích (Wt of dry ~~or wet~~ soil) : 50g

Tỷ trọng kế (Hydrometer N°) : ~~151H~~-152 H

Độ ẩm đất ướt phân tích thành phần hạt (Moisture content of wet soil for grain size) :

Số hiệu chỉnh mặt cong C_m = 1.0 (Menicus correction)

Phân tích sàng (Sieve analysis)

Tổng TL đất khô TN (Total Wt of sample)	50 g
TL hạt thô trên sàng N°4 (Wt of coarse soil retained N° 4)	- g

Cỡ sàng (Sieve size) (Sieve No)	(Sieve open)	TL trên sàng (Wt retained) g	% trên sàng (% retained) (Partial)	(Total)	% lọt sàng (% passing)
" 3 in	76.2				
" 2 in	50.8				
" 1.5	38.1				
1 in	25.4				
" 3/4	19.1				
" 3/8	9.52				
N°3	6.35				
" N°4	4.75				
Pan					
" N°10	2.0	1.0	-	2	98
N°16	1.19				
" N°20	0.84	3.0	-	6	94
N°30	0.59				
" N°40	0.42	4.0	-	8	92
N°50	0.30				
N°70	0.21				
" N°100	0.15	8.0	-	16	84
N°140	0.11				
" N200	0.074	13.0	-	26	74
Pan					
Total Wt in g					

Phân tích tỷ trọng kế (Hydrometer analysis)

TL đất khô trích phân tích TT kế < N°10 (Wt of dry soil partical for hydrometer < N° 10)	- g
TL đất khô trích phân tích TT kế < N200 (Wt of dry soil partical for hydrometer < N200)	- g
TL đất khô toàn phần cho phân tích TT kế (Wt of dry soil total for hydrometer analysis)	50 g

Số HC chất phân tán (Dispersing correction) C_d = 3.0 — Số HC mặt cong C_m = 1.0 (Menicus correction)

Thời gian (Time) min	Nhiệt độ (Temp.) °C	Số HC nhiệt (Temp. corr.) m	Số đọc TTK (Hydro. reading) R'	HC số đọc (Corr. reading) R=R'+Cm	Đường kính hạt (Particle diameter) D (m/m)	R-Cd -m R_a	% hạt < D % finer < D (Partial) P_p%	(Total) P_T%
0.5	28	1.8	34	35	0.0057	33.8	-	67.6
1	-	-	31	32	0.0042	30.8	-	61.6
2	-	-	28	29	0.030	27.8	-	55.6
5	-	-	26	27	0.0025	25.8	-	51.6
15	-	-	20	21	0.0010	19.8	-	39.6
30	-	-	19	20	0.008	18.8	-	37.6
60	-	-	17.5	18.5	0.0055	17.3	-	34.6
120	-	-	16.5	17.5	0.0035	16.3	-	32.6
240	28	1.8	15.5	16.5	0.0018	15.3	-	30.6
1440								

Formula calculation :

Partial per. finer $P_p = \frac{G_s}{G_s - 1} \times \frac{100}{W_c} \times R_a$ for hydrometer 151H

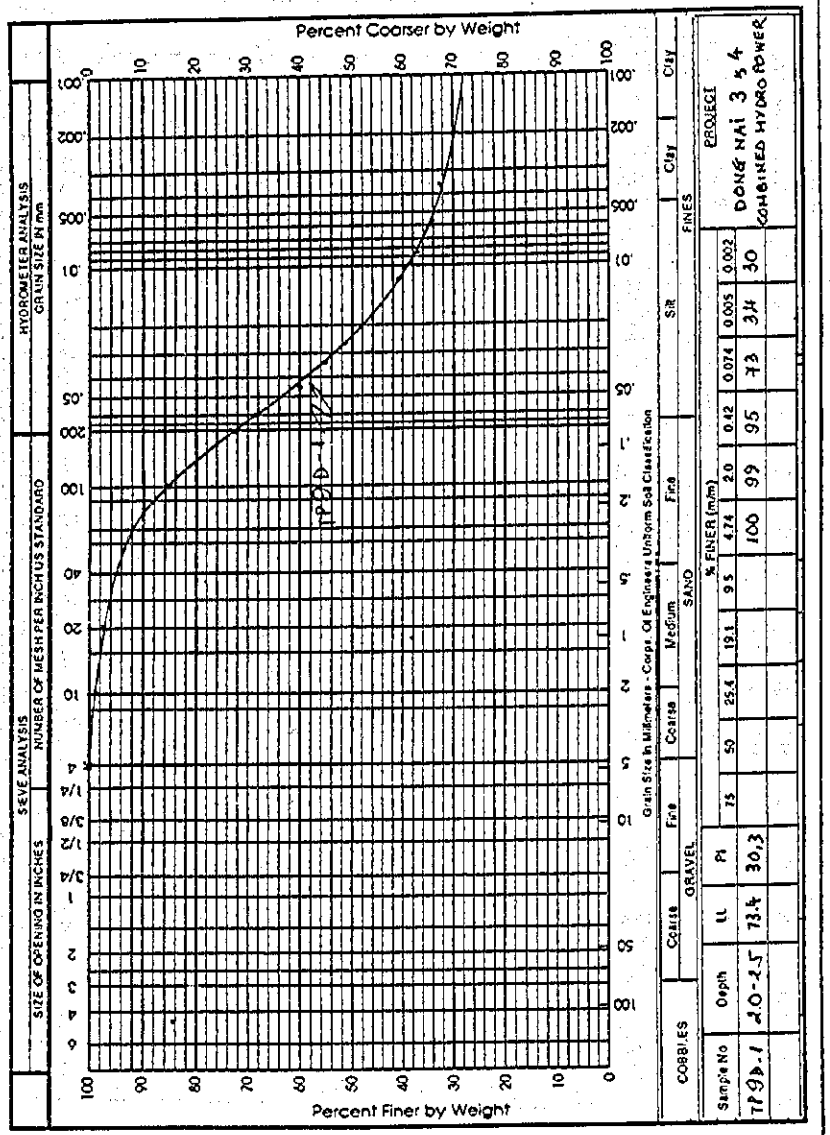
Partial per. finer $P_p = \frac{100}{W_c} \times R_a$ for hydrometer 152H

Total per. finer $P_T = P_p \times \frac{W_s - W_1}{W_s}$

Note : W_s = Total ovendry Wt of sample used comfined analysis in grams
W_c = Ovendry Wt of soil used for hydrometer analysis in grams
W_1 = Ovendry Wt of sample retained on N° 10 or N° 200 sieve

Tested by LAN — Computed by HIEN — Checked by BICH

GRADATION CURVES



Sample No	Depth	LL	PI	% FINER (m/m) 75	50	25.4	19.1	9.5	4.74	2.0	0.42	0.074	0.005	0.002
TP9D-1	2.0-2.5	73.4	30.3						100	99	95	73	34	30

PROJECT: DONG NAI 3 & 4 COMBINED HYDROPOWER

PHÂN TÍCH THÀNH PHẦN HẠT
GRAIN SIZE ANALYSIS
(METHOD ASTM D422)

Công trình *(Project)* : DONG NAI 3 & 4 COMBINED HYDROPOWER

Mẫu số *(Test N°)* : TP9D-1

Mô tả mẫu *(Description)* :

Tỷ trọng *(Sp. gravity)* : 2.842

TL đất khô-ướt phân tích *(Wt of dry ~~or wet~~ soil)* : 50g

Tỷ trọng kế *(Hydrometer N°)* : ~~151H~~-152 H

Độ ẩm đất ướt phân tích thành phần hạt *(Moisture content of wet soil for grain size)* :

Số hiệu chỉnh mặt cong C_m = 1.0 *(Menicus correction)*

Phân tích sàng *(Sieve analysis)*

Tổng TL đất khô TN *(Total Wt of sample)* : 50 g

TL hạt thô trên sàng N°4 *(Wt of coarse soil retained N°4)* : - g

Cỡ sàng *(Sieve size)* (Sieve No)	(Sieve open)	TL trên sàng *(Wt retained)* g	% trên sàng *(% retained)* (Partial)	(Total)	% lọt sàng *(% passing)*
" 3 in	76.2				
" 2 in	50.8				
" 1.5	38.1				
1 in	25.4				
" 3/4	19.1				
" 3/8	9.52				
N°3	6.35				
" N°4	4.75				
Pan					
" N°10	2.0	0.5	-	1	99
N°16	1.19				
" N°20	0.84	1.5	-	3	97
N°30	0.59				
" N°40	0.42	2.5	-	5	95
N°50	0.30				
N°70	0.21				
" N°100	0.15	7.5	-	15	85
N°140	0.11				
" N200	0.074	13.5	-	27	73
Pan					
Total Wt in g					

Phân tích tỷ trọng kế *(Hydrometer analysis)*

TL đất khô trích phân tích TT kế < N°10 *(Wt of dry soil partical for hydrometer < N° 10)* : - g

TL đất khô trích phân tích TT kế < N200 *(Wt of dry soil partical for hydrometer < N200)* : - g

TL đất khô toàn phần cho phân tích TT kế *(Wt of dry soil total for hydrometer analysis)* : 50 g

Số HC chất phân tán *(Dispersing correction)* C_d = 3.0

Số HC mặt cong C_m = 1.0 *(Menicus correction)*

Thời gian *(Time)* min	Nhiệt độ *(Temp.)* °C	Số HC nhiệt *(Temp. corr.)* m	Số đọc TTK *(Hydro. reading)* R'	HC số đọc *(Corr. reading)* R=R'+Cm	Đường kính hạt *(Particle diameter)* D (m/m)	R-Cd +m R_w	% hạt < D % finer < D (Partial) P_p%	(Total) P_T%
0.5	28	1.8	34	35	0.060	33.8	-	67.6
1	-	-	30	31	0.044	29.8	-	59.6
2	-	-	27.5	28.5	0.032	27.3	-	54.6
5	-	-	25.5	26.5	0.027	25.3	-	50.6
15	-	-	20.5	21.5	0.012	20.3	-	40.6
30	-	-	18.5	19.5	0.0085	18.3	-	36.6
60	-	-	17.5	18.5	0.006	17.3	-	34.6
120	-	-	16	17	0.0037	15.8	-	31.6
240	28	1.8	15	16	0.0020	14.8	-	29.6
1440								

Formula calculation :

Partial per. finer $P_p = \frac{G_s}{G_s - 1} \times \frac{100}{W_c} \times R_w$ *for hydrometer 151H*

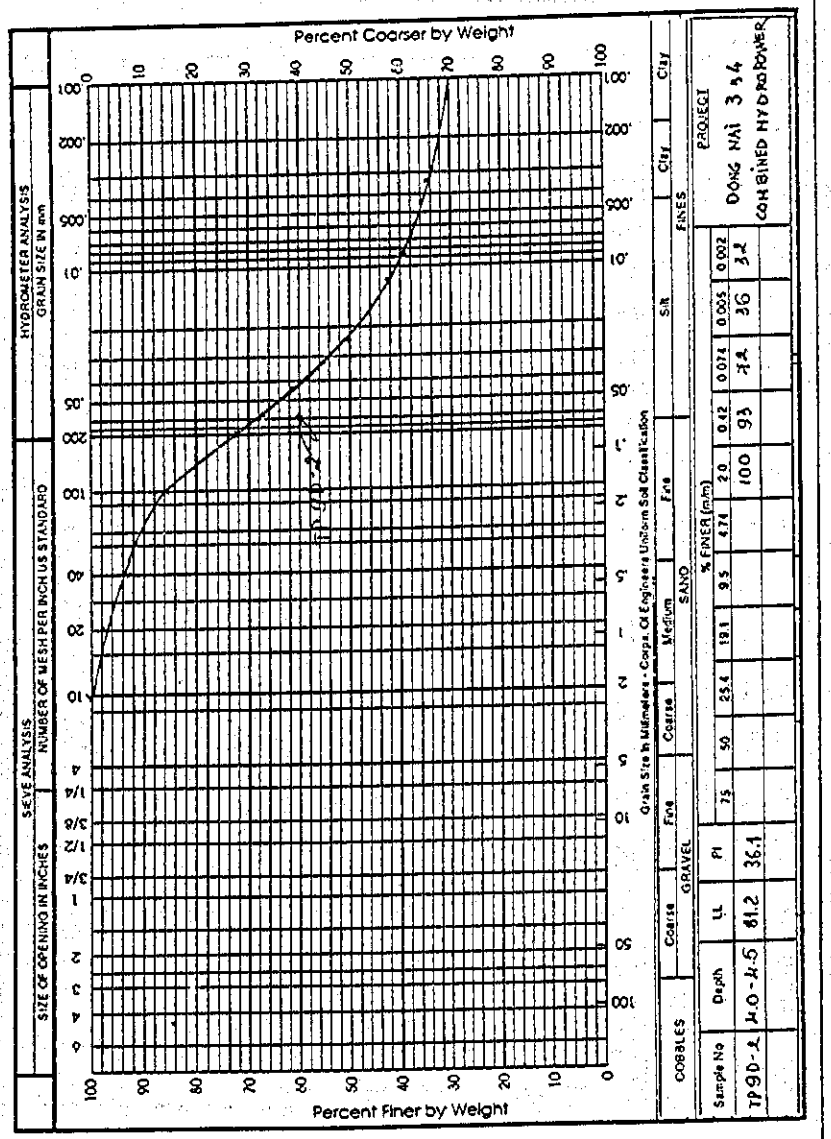
Partial per. finer $P_p = \frac{100}{W_c} \times R_w$ *for hydrometer 152H*

Total per. finer $P_T = P_p \times \frac{W_s - W_1}{W_s}$

Note : W_s = Total ovendry Wt of sample used comfined analysis in grams
W_c = Ovendry Wt of soil used for hydrometer analysis in grams
W_1 = Ovendry Wt of sample retained on N° 10 or N° 200 sieve

Tested by LAN *Computed by* Hiền *Checked by* BÍCH

GRADATION CURVES



PHÂN TÍCH THÀNH PHẦN HẠT
GRAIN SIZE ANALYSIS
(METHOD ASTM D422)

Công trình *(Project)* : DONG NAI 3 & 4 COMBINED HYDROPOWER

Mẫu số *(Test N°)* : TP9D-2

Mô tả mẫu *(Description)* :

Tỷ trọng *(Sp. gravity)* : 2.879

TL đất khô ~~ướt~~ phân tích *(Wt of dry ~~or wet~~ soil)* : 50g

Tỷ trọng kế *(Hydrometer N°)* : ~~151H~~-152 H

Độ ẩm đất ướt phân tích thành phần hạt *(Moisture content of wet soil for grain size)* :

Số hiệu chính mặt cong C_m = 1.0 *(Menicus correction)*

Phân tích sàng *(Sieve analysis)*		Phân tích tỷ trọng kế *(Hydrometer analysis)*	
Tổng TL đất khô TN *(Total Wt of sample)*	50 g	TL đất khô trích phân tích TT kế < N°10 *(Wt of dry soil partical for hydrometer < N° 10)*	- g
TL hạt thô trên sàng N°4 *(Wt of coarse soil retained N° 4)*	- g	TL đất khô trích phân tích TT kế < N200 *(Wt of dry soil partical for hydrometer < N200)*	- g
		TL đất khô toàn phần cho phân tích TT kế *(Wt of dry soil total for hydrometer analysis)*	50 g

Cỡ sàng *(Sieve size)* (Sieve No)	(Sieve open)	TL trên sàng *(Wt retained)* g	% trên sàng *(% retained)* (Partial)	(Total)	% lọt sàng *(% passing)*
* 3 in	76.2				
* 2 in	50.8				
* 1.5	38.1				
1 in	25.4				
* 3/4	19.1				
* 3/8	9.52				
N°3	6.35				
* N°4	4.75				
Pan					
* N°10	2.0		-		
N°16	1.19				
* N°20	0.84	1.5	-	3	97
N°30	0.59				
* N°40	0.42	3.5	-	7	93
N°50	0.30				
N°70	0.21				
* N°100	0.15	7.0	-	14	86
N°140	0.11				
* N200	0.074	14.0	-	28	72
Pan					
Total Wt in g					

Số HC chất phân tán *(Dispersing correction)* C_d = 3.0 — Số HC mặt cong C_m = 1.0 *(Menicus correction)*

Thời gian *(Time)* min	Nhiệt độ *(Temp.)* °C	Số HC nhiệt *(Temp. corr.)* m	Số đọc TTK *(Hydro. reading)* R'	HC số đọc *(Corr. reading)* R=R'+Cm	Đường kính hạt *(Particle diameter)* D (m/m)	R-Cd +m R_a	% hạt < D % finer < D *(Partial)* P_p%	*(Total)* P_t%
0.5	28	1.8	33.5	34.5	0.059	33.3	-	66.6
1	-	-	30.5	31.5	0.044	30.3	-	60.6
2	-	-	27.5	28.5	0.032	27.3	-	54.6
5	-	-	25	26	0.024	24.8	-	49.6
15	-	-	21	22	0.012	20.8	-	41.6
30	-	-	19	20	0.0087	18.8	-	37.6
60	-	-	18.5	19.5	0.006	18.3	-	36.6
120	-	-	16.5	17.5	0.0032	16.3	-	32.6
240	28	1.8	16	17	0.002	15.8	-	31.6
1440								

Formula calculation :

Partial per. finer $P_p = \frac{G_s}{G_s - 1} \times \frac{100}{W_c} \times R_a$ *for hydrometer 151H*

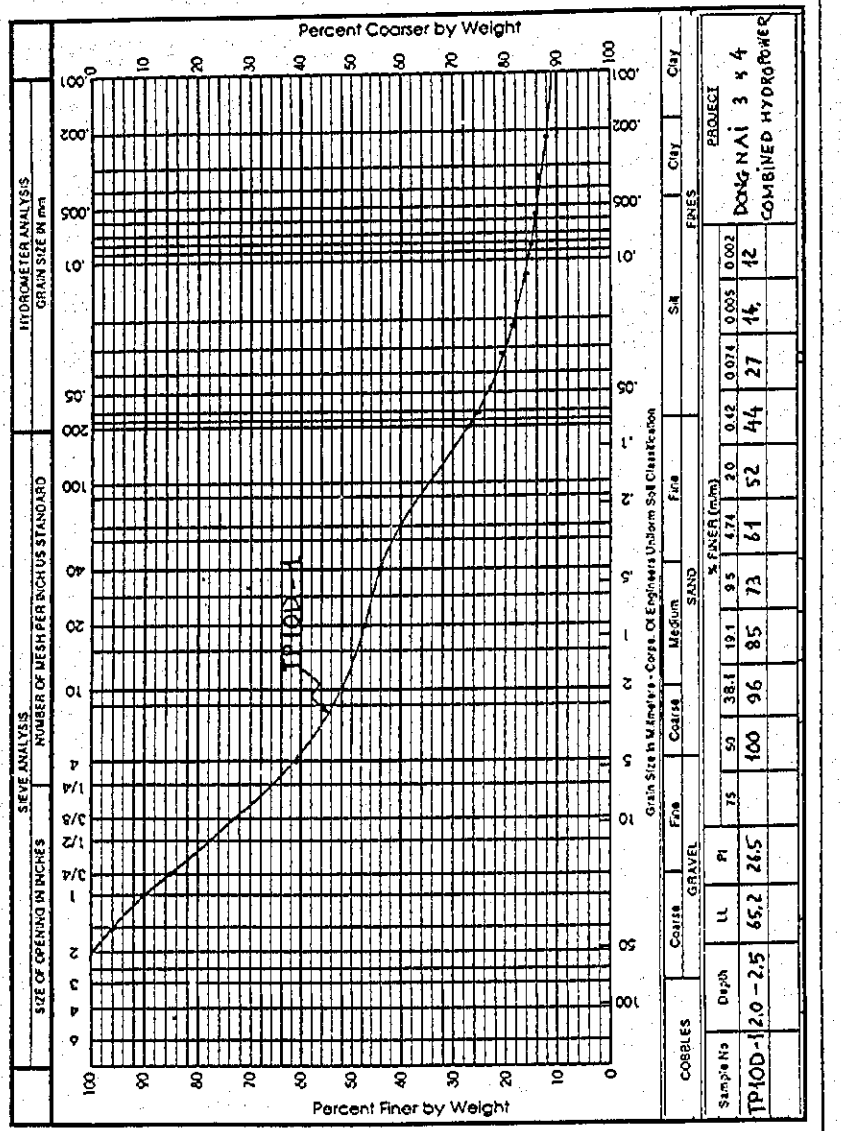
Partial per. finer $P_p = \frac{100}{W_c} \times R_a$ *for hydrometer 152H*

Total per. finer $P_t = P_p \times \frac{W_s - W_t}{W_s}$

Note : W_s = *Total ovendry Wt of sample used comfined analysis in grams*
W_c = *Ovendry Wt of soil used for hydrometer analysis in grams*
W_t = *Ovendry Wt of sample retained on N° 10 or N° 200 sieve*

Tested by LAN *Computed by* HIEN *Checked by* BICH

GRADATION CURVES



PHÂN TÍCH THÀNH PHẦN HẠT
GRAIN SIZE ANALYSIS
(METHOD ASTM D422)

Công trình (Project) : DONG NAI 3 & 4 COMBINED HYDROPOWER — Mẫu số (Test N°) : TP 10D-1

Mô tả mẫu (Description) : Residual soil : Sandy clay gravels mixture — Tỷ trọng (Sp. gravity) : 3.012

TL đất khô phân tích (Wt of dry ~~or wet~~ soil) : 1500 g — Tỷ trọng kế (Hydrometer N°) : ~~151H~~-152 H

Độ ẩm đất ướt phân tích thành phần hạt (Moisture content of wet soil for grain size) : — — Số hiệu chính mặt cong (Meniscus correction) C_m = 1.0

Phân tích sàng (Sieve analysis)

Tổng TL đất khô TN (Total Wt of sample): 1500 g

TL hạt thô trên sàng N°4 (Wt of coarse soil retained N° 4): 592.5 g (39.5%)

Cỡ sàng (Sieve size) (Sieve No)	(Sieve open)	TL trên sàng (Wt retained) g	% trên sàng (% retained) (Partial)	(Total)	% lọt sàng (% passing)
* 3 in	76.2				
* 2 in	50.8				100
* 1.5	38.1	63.0	–	0	
* 1 in	25.4	450.0		4.2	95.8
* 3/4	19.1	228.1		10.0	90.0
* 3/8	9.52	397.5		15.2	84.8
N°3	6.35	–		26.5	73.5
* N°4	4.75	592.5		–	–
Pan				39.5	60.5
* N°10	2.0	720.0		48.0	52.0
N°16	1.19	–		–	–
* N°20	0.84	792.0		52.8	47.2
N°30	0.59	707.4		–	–
* N°40	0.42	3.4	6.8	56.0	44.0
N°50	0.30	–	–	–	–
N°70	0.21	–	–	–	–
* N°100	0.15	43.6	27.2	69.5	34.4
N°140	0.11	–	–	–	–
* N°200	0.074	21.4	42.8	73.0	27.0
Pan					
Total Wt in g					

Phân tích tỷ trọng kế (Hydrometer analysis)

TL đất khô trích phân tích TT kế < N°10 (Wt of dry soil partical for hydrometer < N° 10): — g

TL đất khô trích phân tích TT kế < N200 (Wt of dry soil partical for hydrometer < N200): 50 g

TL đất khô toàn phần cho phân tích TT kế (Wt of dry soil total for hydrometer analysis): — g

Số HC chất phân tán (Dispersing correction) C_d = 3.0 — Số HC mặt cong (Menicus correction) C_m = 1.0

Thời gian (Time) min	Nhiệt độ (Temp.) °C	Số HC nhiệt (Temp. corr.) m	Số đọc TTK (Hydro. reading) R'	HC số đọc (Corr. reading) R=R'+Cm	Đường kính hạt (Particle diameter) D (m/m)	R-Cd +m	% hạt < D % finer < D (Partial) P_P%	(Total) P_T%
0.5	28	1.8	27.5	28.5	0.063	27.3	54	25.4
1			24.5	24.5	0.048	24.3	49	23.0
2			22.0	22.0	0.032	21.8	43.5	20.5
5			19.5	20.5	0.022	19.3	39	18.5
15			17.0	18.0	0.013	16.8	34	16
30			16.0	17.0	0.0085	15.8	32	15
60	28	1.8	15.0	16.0	58	14.9	30	14
120	28	1.8	14.0	15	35	13.8	27.5	13
240	28	1.8	13.0	14	0.0022	12.2	25.4	12
1440								

Formula calculation :

Partial per. finer $P_P = \frac{G_s}{G_s - 1} \times \frac{100}{W_c} \times R_H$ for hydrometer 151H

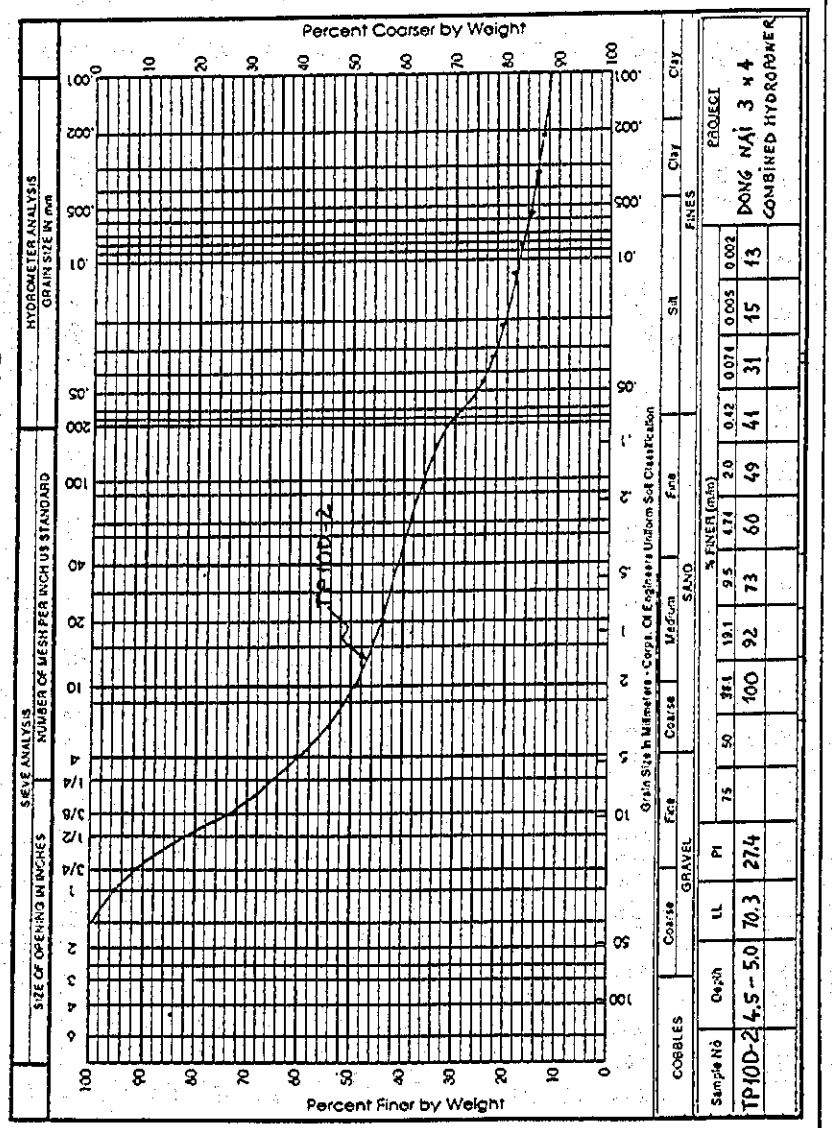
Partial per. finer $P_P = \frac{100}{W_c} \times R_H$ for hydrometer 152H

Total per. finer $P_T = P_P \times \frac{W_s - W_1}{W_s}$

Note : W_s = Total ovendry Wt of sample used comfined analysis in grams
W_c = Ovendry Wt of soil used for hydrometer analysis in grams
W_1 = Ovendry Wt of sample retained on ~~N°40~~ or N° 200 sieve

Tested by LAN — Computed by BICH — Checked by HIEN

GRADATION CURVES



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PHÂN TÍCH THÀNH PHẦN HẠT
GRAIN SIZE ANALYSIS
(METHOD ASTM D422)

Công trình *(Project)* : DONG NAI 3 x 4 COMBINED HYDROPOWER — Mẫu số *(Test N°)* : TP10D-2

Mô tả mẫu *(Description)* : Sandy clay gravels mixture — Tỷ trọng *(Sp. gravity)* : 3.050

TL đất khô ~~ướt~~ phân tích *(Wt of dry ~~wet~~ soil)* : 1500 g — Tỷ trọng kế *(Hydrometer N°)* : ~~151H~~ 152 H

Độ ẩm đất ướt phân tích thành phần hạt *(Moisture content of wet soil for grain size)* : — — Số hiệu chính mặt cong C_m = 1.0 *(Meniscus correction)*

Phân tích sàng *(Sieve analysis)*						Phân tích tỷ trọng kế *(Hydrometer analysis)*		
Tổng TL đất khô TN *(Total Wt of sample)*		1500			g	TL đất khô trích phân tích TT kế < N°10 *(Wt of dry soil partical for hydrometer < N° 10)*	—	g
TL hạt thô trên sàng N°4 *(Wt of coarse soil retained N°4)*		840 (56%)			g	TL đất khô trích phân tích TT kế < N200 *(Wt of dry soil partical for hydrometer < N200)*	50	g
Cỡ sàng *(Sieve size)*	TL trên sàng *(Wt retained)* g	% trên sàng *(% retained)* (Partial)	(Total)	% lọt sàng *(% passing)*		TL đất khô toàn phần cho phân tích TT kế *(Wt of dry soil total for hydrometer analysis)*	—	g
(Sieve No) / (Sieve open)						Số HC chất phân tán *(Dispersing correction)* C_d = 3.0	Số HC mặt cong C_m = 1.0 *(Meniscus correction)*	
* 3 in / 76.2								
* 2 in / 50.8								
* 1.5 / 38.1			0	100				
1 in / 25.4	75,0		5	95				
* 3/4 / 19.1	127.5		8.5	91.5				
* 3/8 / 9.52	405.0		27	73.0				
N°3 / 6.35	—		—	—				
* N°4 / 4.75	594		39.6	60.4				
Pan								
* N°10 / 2.0	757.5		50.5	49.5				
N°16 / 1.19	—		—	—				
* N°20 / 0.84	840		56	44.0				
N°30 / 0.59	659.0	—	—	—				
* N°40 / 0.42	34	6.8	59	41.0				
N°50 / 0.30	—	—	—	—				
N°70 / 0.21	—	—	—	—				
* N°100 / 0.15	91	18.2	64	36.0				
N°140 / 0.11	—	—	—	—				
* N200 / 0.074	148	29.6	69	31.0				
Pan								
Total Wt in g								

Thời gian *(Time)* min	Nhiệt độ *(Temp.)* °C	Số HC nhiệt *(Temp. corr.)* m	Số đọc TTK *(Hydro. reading)* R'	HC số đọc *(Corr. reading)* R=R'+Cm	Đường kính hạt *(Particle diameter)* D (m/m)	R-Cd +m	% hạt < D % finer < D (Partial) R_a	(Total) P_p%	P_t%
0.5	28	1.8	33.5	34.5	0.063	33.3	66	25	
1			28.7	29.7	45	28.5	57	25	
2			25.7	26.7	33	25.5	51	22.5	
5			23.2	25.2	22	24	48	21.	
15			21.2	22.2	0.012	21	42	18.5	
30	28	1.8	19.5	20.5	0.0085	19.3	38.5	17	
60			17.2	18.2	57	17	34	15	
120	28	1.8	16.2	17.2	32	16	32	14	
240	28	1.8	15.0	16.0	22	14.8	29.5	13	
1440									

Formula calculation :

Partial per. finer $P_p = \frac{G_s}{G_s - 1} \times \frac{100}{W_c} \times R_a$ *for hydrometer 151H*

Partial per. finer $P_p = \frac{100}{W_c} \times R_a$ *for hydrometer 152H*

Total per. finer $P_t = P_p \times \frac{W_s - W_1}{W_s}$

Note : W_s = Total ovendry Wt of sample used comfined analysis in grams
W_c = Ovendry Wt of soil used for hydrometer analysis in grams
W_1 = Ovendry Wt of sample retained on ~~N°40~~ or N° 200 sieve

Tested by LAN — Computed by BICH — Checked by HIEN

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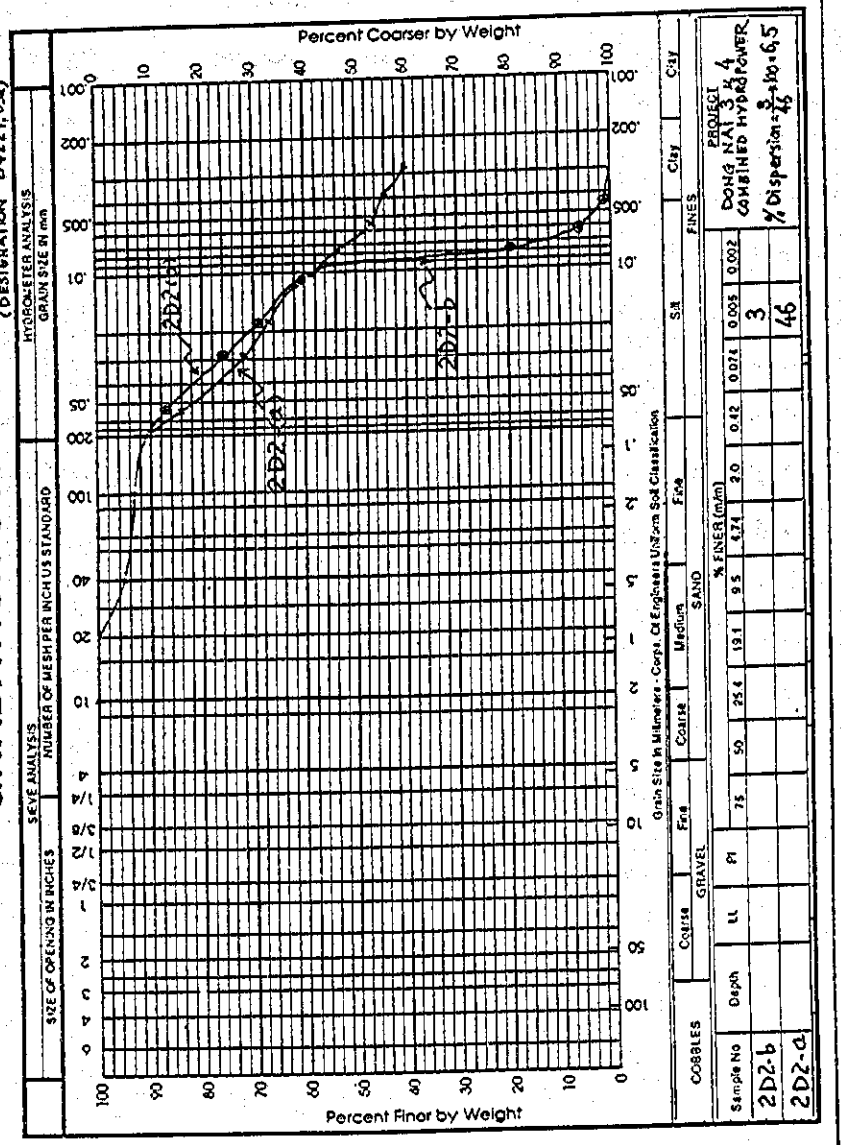
DATA 4.1.2

LABORATORY TEST
OF
EARTH CORE MATERIAL
FOR
DONG NAI No.4 DAM

GRAIN SIZE ANALYSIS FOR DISPERSION TEST

GRADATION CURVES FOR DISPERSIVE TEST (DESIGNATION D422T, 83)



PHÂN TÍCH THÀNH PHẦN HẠT

GRAIN SIZE ANALYSIS

(METHOD ASTM D422)

Công trình (Project) : DONG NAI 3&4 COMBINED HYDROPOWER

Mẫu số (Test N°) : 202 a

Mô tả mẫu (Description) :

Tỷ trọng (Sp. Gravity) : 152H

TL đất khô-ướt phân tích (Wt of dry or wet soil) : 60 g

Tỷ trọng kế (Hydrometer N°) :

Độ ẩm đất ướt phân tích thành phần hạt (Moisture content of soil for grain size) : 36.5 %

Số hiệu chỉnh mặt cong (Menicus correction) Cm = 1.0

Phân tích sàng (Sieve analysis)

Tổng TL đất khô TN (Total Wt sample)	g	
TL hạt thô trên sàng N° 4 (Wt of coarse soil retained N° 4)	g	

Cỡ sàng (Sieve size) (Sieve N°)	(Sieve open)	TL trên sàng (Wt retained) g	% trên sàng (% retained) Partial	Total	% lọt sàng % passing
" 3"	76.2				
" 2"	50.8				
" 1.5"	38.1				
1"	25.4				
" 3/4"	19.1				
" 3/8"	9.52				
N° 3	6.35				
" N° 4	4.75				
Pan					
"N°10	2.0				
N°16	1.19				
"N°20	0.84				
N°30	0.59				
"N°40	0.42	2.0		4.6	95.4
N°50	0.30				
N°70	0.21				
"N°100	0.15	3.0		6.8	93.2
N°140	0.11				
"N°200	0.07	4.0		9.0	91.0
Pan					
Total Wt in g					

Phân tích tỷ trọng kế (Hydrometer analysis)

TL đất khô trích phân tích TT kế < N° 10 (Wt of dry soil partical for hydrometer < N° 10)	43.96 g
TL đất khô trích phân tích TT kế < N° 200 (Wt of dry soil partical for hydrometer < N° 200)	g
TL đất khôtoàn phần cho phân tích TT kế (Wt of dry soil total for hydrometer analysis)	g

Số HC chất phân tán (Dispersing correction) C_d = 3.0

Số HC mặt cong C_m = 1.0 (Menicus correction)

Thời gian Time min	Nhiệt độ Temp. °C	Số HC nhiệt độ Temp. corr. m	Số đọc TTK Hydro. reading R'	HC số đọc Corr. reading R=R'+C_m	Đường kính hạt Particle diameter D (mm)	R-Cd +m R_m	% hạt < D % finer D Partial P_P%	Total P_T%
0.5	27	1.5	37.5	38.5	0.054	37.0		84.2
2	27	1.5	32.0	33.0	0.028	31.5		71.7
5	27	1.5	30.0	31.0	0.018	29.5		67.1
15	27	1.5	26.4	27.4	0.0105	25.9		59
30	27	1.5	24.0	25.0	0.00767	23.5		53.5
60	27	1.5	21.0	22.0	0.0055	20.5		46.6
120	27	1.5	20.0	21.0	0.0039	19.5		44.4
240	27	1.5	18.0	19.0	0.0028	17.5		39.8

Formula calculation :

Partial per. Finer $P_P = \frac{Gs}{Gs-1} \times \frac{100}{W_c} \times R$ for hydrometer 151H

Partial per. Finer $P_P = \frac{100}{W_c} \times R_m$ for hydrometer 152H

Total per. Finer $P_T = P_P \times \frac{W_c - W_1}{W_s}$

Note : Ws = Total overdry Wt of sample used comfined analysis in grams

Wc = Overdry Wt of soil used for hydrometer analysis in grams

W_1 = Overdry Wt of sample on N° 10 or N° 200 sieve

Tested: LAN Computed: HIEN Checked: BICH

PHÂN TÍCH THÀNH PHẦN HẠT

GRAIN SIZE ANALYSIS

(METHOD ASTM D422)

Công trình (Project) : DONG NAI 3&4 COMBINED HYDROPOWER

Mẫu số (Test N°) : 202 b

Mô tả mẫu (Description) :

Tỷ trọng (Sp. Gravity) : 152H

TL đất khô-ướt phân tích (Wt of dry or wet soil) : 60 g

Tỷ trọng kế (Hydrometer N°) :

Độ ẩm đất ướt phân tích thành phần hạt (Moisture content of soil for grain size) : 36.5 %

Số hiệu chỉnh mặt cong (Menicus correction) Cm = 1.0

Phân tích sàng (Sieve analysis)	
Tổng TL đất khô TN (Total Wt sample)	0
TL hạt thô trên sàng N° 4 (Wt of coarse soil retained N° 4)	0

Cỡ sàng (Sieve size) (Sieve N°)	(Sieve open)	TL trên sàng (Wt retained) g	% trên sàng (% retained) Partial	Total	% lọt sàng % passing
" 3"	76.2				
" 2"	50.8				
" 1.5"	38.1				
1"	25.4				
" 3/4"	19.1				
" 3/8"	9.52				
N° 3	6.35				
" N° 4	4.75				
Pan					
"N°10	2.0				
N°16	1.19				
"N°20	0.84				
N°30	0.59				
"N°40	0.42	2.1		4.8	95.2
N°50	0.30				
N°70	0.21				
"N°100	0.15	2.9		6.6	93.4
N°140	0.11				
"N°200	0.07	4.1		9.3	90.7
Pan					
Total Wt in g					

Phân tích tỷ trọng kế (Hydrometer analysis)	
TL đất khô trích phân tích TT kế < N° 10 (Wt of dry soil partical for hydrometer < N° 10)	43.96 g
TL đất khô trích phân tích TT kế < N° 200 (Wt of dry soil partical for hydrometer < N° 200)	0
TL đất khôtoàn phần cho phân tích TT kế (Wt of dry soil total for hydrometer analysis)	0

Số HC chất phân tán (Dispersing correction) C_d = 0.0

Số HC mặt cong C_m = 1.0 (Menicus correction)

Thời gian Time min	Nhiệt độ Temp. °C	Số HC nhiệt độ Temp. corr. m	Số đọc TTK Hydro. reading R'	HC số đọc Corr. reading R=R'+C_m	Đường kính hạt Particle diameter D (mm)	R-Cd +m R_N	% hạt < D % finer D Partial P_P %	Total P_T %
0.5	27	1.5	36.0	37.0	0.054	38.5		87.6
2	27	1.5	31.0	32.0	0.028	33.5		76.2
5	27	1.5	28.0	29.0	0.018	30.5		69.4
15	27	1.5	24.0	25.0	0.0105	26.5		60.2
30	27	1.5	6.0	7.0	0.0088	8.5		19.3
60	27	1.5	0.0	1.0	0.0062	2.5		5.7
120	27	1.5	-2.0	-1.0	0.0044	0.5		1.1
240	27	1.5	-2.5	-1.5	0.0031	0.0		0

Formula calculation :

Partial per. Finer $P_P = \frac{Gs}{Gs-1} \times \frac{100}{W_c} \times R$ for hydrometer 151H

Partial per. Finer $P_P = \frac{100}{W_c} \times R_N$ for hydrometer 152H

Total per. Finer $P_T = P_P \times \frac{W_s - W_1}{W_s}$

Note : Ws = Total overdry Wt of sample used comfined analysis in grams

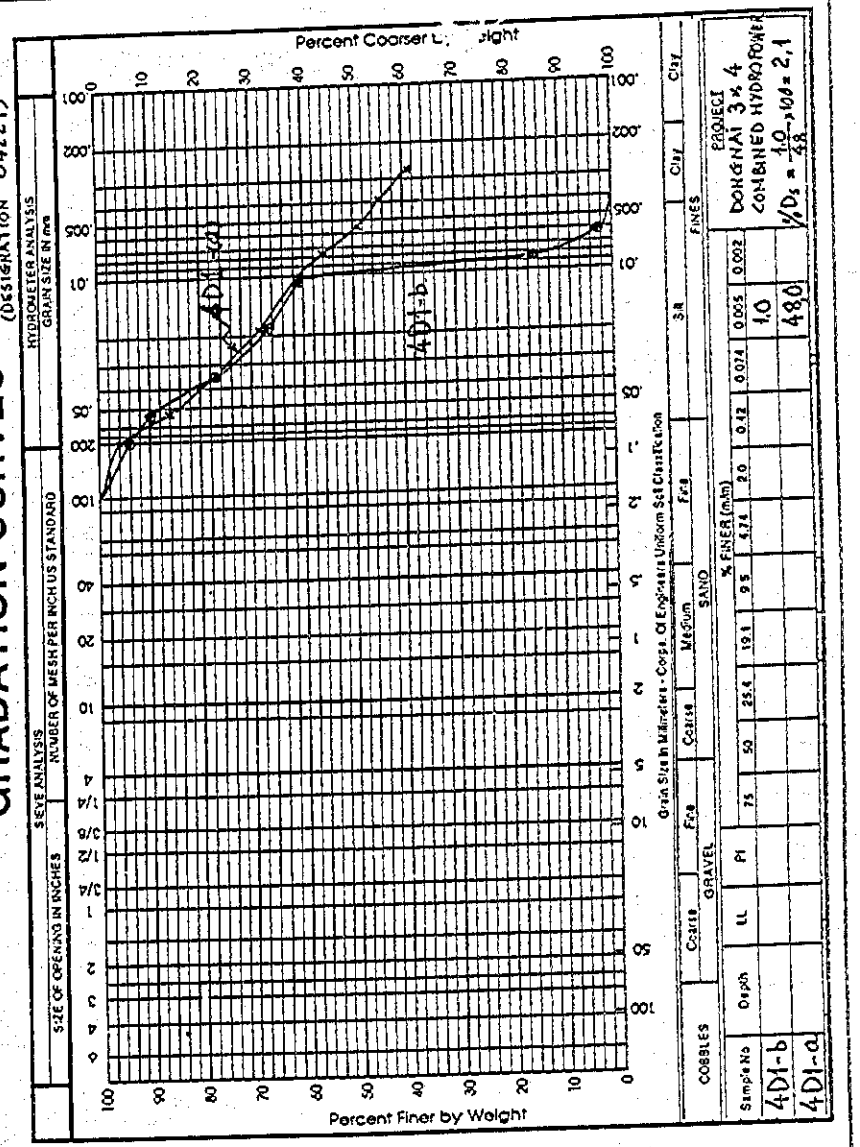
Wc = Overdry Wt of soil used for hydrometer analysis in grams

W_1 = Overdry Wt of sample on N° 10 or N° 200 sieve

Tested LAN Computed HIEN Checked MICH

GRADATION CURVES

FOR DISPERSIVE TEST (DESIGNATION D422)



PHÂN TÍCH THÀNH PHẦN HẠT

GRAIN SIZE ANALYSIS

(METHOD ASTM D422)

Công trình (Project) : DONG NAI 3&4 COMBINED HYDROPOWER

Mẫu số (Test N°) : 4D1-a

Mô tả mẫu (Description) :

Tỷ trọng (Sp. Gravity) : 152H

TL đất khô-ướt phân tích (Wt of dry or wet soil) : 60 g

Tỷ trọng kế (Hydrometer N°) :

Độ ẩm đất ướt phân tích thành phần hạt (Moisture content of soil for grain size) : 38 %

Số hiệu chỉnh mặt cong (Menicus correction) Cm = 1.0

Phân tích sàng (Sieve analysis)

Tổng TL đất khô TN (Total Wt sample)	g
TL hạt thô trên sàng N° 4 (Wt of coarse soil retained N° 4)	g

Cỡ sàng (Sieve size) (Sieve N°)	(Sieve open)	TL trên sàng (Wt retained) g	% trên sàng (% retained) Partial	Total	% lọt sàng % passing
" 3"	76.2				
" 2"	50.8				
" 1.5"	38.1				
1"	25.4				
" 3/4"	19.1				
" 3/8"	9.52				
N° 3	6.35				
" N° 4	4.75				
Pan					
"N°10	2.0				
N°16	1.19				
"N°20	0.84				
N°30	0.59				
"N°40	0.42				
N°50	0.30				
N°70	0.21				
"N°100	0.15				
N°140	0.11				
"N°200	0.07	1.8		4.1	95.9
Pan					
Total Wt in g					

Phân tích tỷ trọng kế (Hydrometer analysis)

TL đất khô trích phân tích TT kế < N° 10 (Wt of dry soil partical for hydrometer < N° 10)	43.48 g
TL đất khô trích phân tích TT kế < N° 200 (Wt of dry soil partical for hydrometer < N° 200)	g
TL đất khôtoàn phần cho phân tích TT kế (Wt of dry soil total for hydrometer analysis)	g

Số HC chất phân tán (Dispersing correction) C_d = 3.0 — Số HC mặt cong C_m = 1.0 (Menicus correction)

Thời gian Time min	Nhiệt độ Temp. °C	Số HC nhiệt độ Temp. corr. m	Số đọc TTK Hydro. reading R'	HC số đọc Corr. reading R=R'+C_m	Đường kính hạt Particle diameter D (mm)	R-Cd +m R_w	% hạt < D % finer D Partia P_P %	Total P_T %
0.5	27	1.5	38.0	39.0	0.053	37.5		86.2
2	27	1.5	34.0	35.0	0.027	33.5		77
5	27	1.5	30.0	31.0	0.018	29.5		67.8
15	27	1.5	27.0	28.0	0.01	26.5		61
30	27	1.5	25.0	26.0	0.00757	24.5		56.3
60	27	1.5	22.0	23.0	0.0055	21.5		49.4
120	27	1.5	20.0	21.0	0.0039	19.5		44.8
240	27	1.5	17.5	18.5	0.0028	17.0		39

Formula calculation :

Partial per. Finer $P_P = \frac{Gs}{Gs-1} \times \frac{100}{W_c} \times R$ for hydrometer 151H

Partial per. Finer $P_P = \frac{100}{W_c} \times R_w$ for hydrometer 152H

Total per. Finer $P_T = P_P \times \frac{W_s - W_1}{W_s}$

Note : Ws = Total overdry Wt of sample used comfined analysis in grams

Wc = Overdry Wt of soil used for hydrometer analysis in grams

W_1 = Overdry Wt of sample on N° 10 or N° 200 sieve

Tested: LAN — Computed: HIEN — Checked: BICH

PHÂN TÍCH THÀNH PHẦN HẠT

GRAIN SIZE ANALYSIS

(METHOD ASTM D422)

Công trình (Project) : DONG NAI 3&4 COMBINED HYDROPOWER

Mẫu số (Test N°) : 4D1-b

Mô tả mẫu (Description) :

Tỷ trọng (Sp. Gravity) : 152H

TL đất khô-ướt phân tích (Wt of dry or wet soil) : 60 g

Tỷ trọng kế (Hydrometer N°) :

Độ ẩm đất ướt phân tích thành phần hạt (Moisture content of soil for grain size) : 38 %

Số hiệu chỉnh mặt cong (Menicus correction) Cm = 1.0

Phân tích sàng (Sieve analysis)

Tổng TL đất khô TN (Total Wt sample)	g
TL hạt thô trên sàng N° 4 (Wt of coarse soil retained N° 4)	g

Cỡ sàng (Sieve size) (Sieve N°)	(Sieve open)	TL trên sàng (Wt retained) g	% trên sàng (% retained) Partial	Total	% lọt sàng % passing
" 3"	76.2				
" 2"	50.8				
" 1.5"	38.1				
1"	25.4				
" 3/4"	19.1				
" 3/8"	9.52				
N° 3	6.35				
" N° 4	4.75				
Pan					
"N°10	2.0				
N°16	1.19				
"N°20	0.84				
N°30	0.59				
"N°40	0.42				
N°50	0.30				
N°70	0.21				
"N°100	0.15				
N°140	0.11				
"N°200	0.07	1.8		4.1	95.9
Pan					
Total Wt in g					

Phân tích tỷ trọng kế (Hydrometer analysis)

TL đất khô trích phân tích TT kế < N° 10 (Wt of dry soil partical for hydrometer < N° 10)	43.48 g
TL đất khô trích phân tích TT kế < N° 200 (Wt of dry soil partical for hydrometer < N° 200)	g
TL đất khôtoàn phần cho phân tích TT kế (Wt of dry soil total for hydrometer analysis)	g

Số HC chất phân tán (Dispersing correction) C_d = 0.0 — Số HC mặt cong C_m = 1.0 (Menicus correction)

Thời gian Time min	Nhiệt độ Temp. °C	Số HC nhiệt độ Temp. corr. m	Số đọc TTK Hydro. reading R'	HC số đọc Corr. reading R=R'+C_m	Đường kính hạt Particle diameter D (mm)	R-Cd +m R_w	% hạt < D % finer D Partia P_P %	Total P_T %
0.5	27	1.5	36.5	37.5	0.053	39.0		89.7
2	27	1.5	31.0	32.0	0.028	33.5		77
5	27	1.5	27.0	28.0	0.018	29.5		67.8
15	27	1.5	24.0	25.0	0.011	26.5		61
30	27	1.5	4.0	5.0	0.0085	6.5		14.9
60	27	1.5	-1.5	-0.5	0.0061	1.0		2.3
120	27	1.5	-2.5	-1.5	0.0041	0.0		0
240	27	1.5	-2.5	-1.5	0.0031	0.0		0

Formula calculation :

Partial per. Finer $P_P = \frac{Gs}{Gs-1} \times \frac{100}{W_c} \times R$ for hydrometer 151H

Partial per. Finer $P_P = \frac{100}{W_c} \times R_w$ for hydrometer 152H

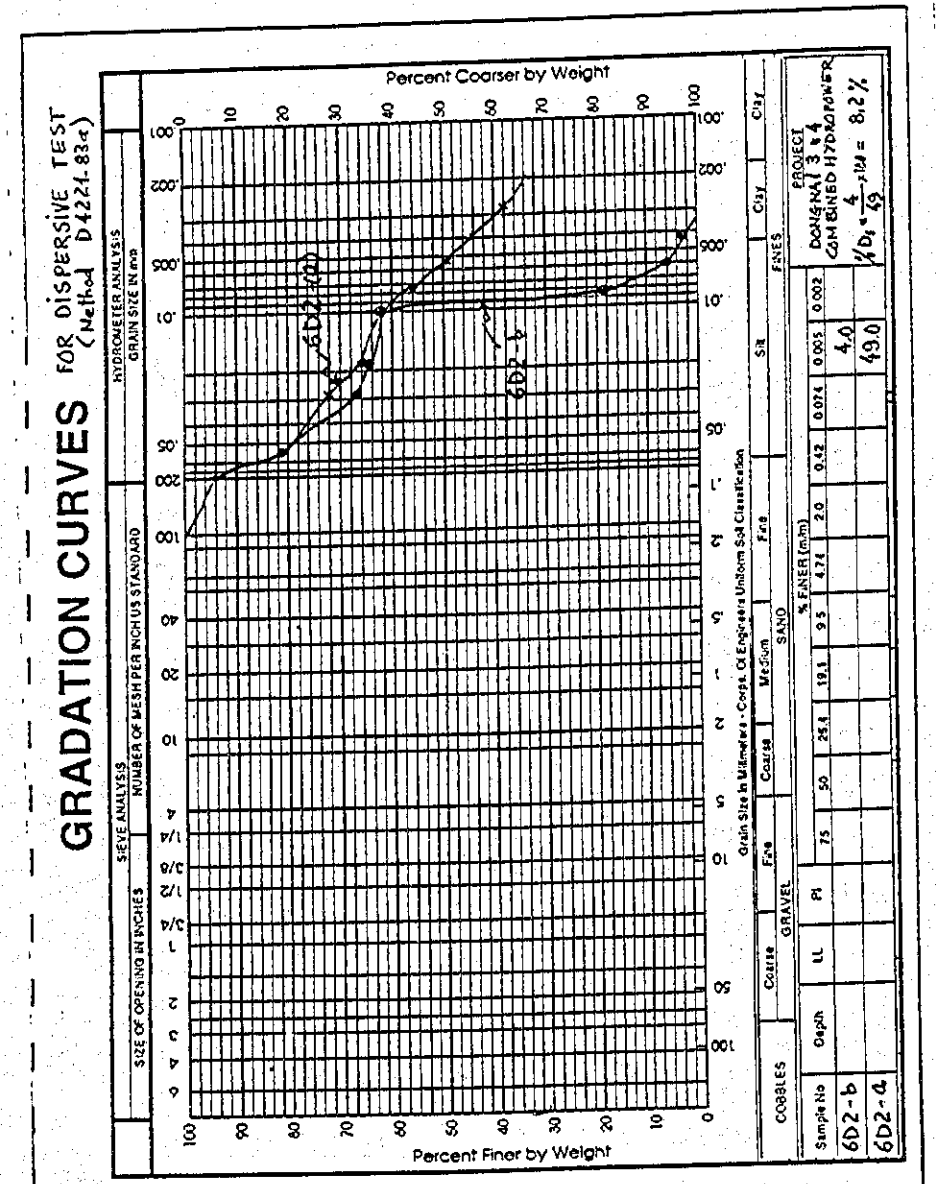
Total per. Finer $P_T = P_P \times \frac{W_s - W_1}{W_s}$

Note : Ws = Total overdry Wt of sample used comfined analysis in grams

Wc = Overdry Wt of soil used for hydrometer analysis in grams

W_1 = Overdry Wt of sample on N° 10 or N° 200 sieve

Tested: LAN — Computed: HIEN — Checked: BICH



PHÂN TÍCH THÀNH PHẦN HẠT

GRAIN SIZE ANALYSIS

(METHOD ASTM D422)

Công trình (Project) : DONG NAI 3&4 COMBINED HYDROPOWER

Mẫu số (Test N°) : 602-cf

Mô tả mẫu (Description) :

Tỷ trọng (Sp. Gravity) : 152H

TL đất khô-ướt phân tích (Wt of dry or wet soil) : 60 g

Tỷ trọng kế (Hydrometer N°) :

Độ ẩm đất ướt phân tích thành phần hạt (Moisture content of soil for grain size) : 36.6 %

Số hiệu chỉnh mặt cong (Menicus correction) Cm = 1.0

Phân tích sàng (Sieve analysis)

Tổng TL đất khô TN (Total Wt sample)	g
TL hạt thô trên sàng N° 4 (Wt of coarse soil retained N° 4)	g

Cỡ sàng (Sieve size) (Sieve N°)	(Sieve open)	TL trên sàng (Wt retained) g	% trên sàng (% retained) Partial	Total	% lọt sàng % passing
* 3"	76.2				
* 2"	50.8				
* 1.5"	38.1				
1"	25.4				
* 3/4"	19.1				
* 3/8"	9.52				
N° 3	6.35				
* N° 4	4.75				
Pan					
*N°10	2.0				
N°16	1.19				
*N°20	0.84				
N°30	0.59				
*N°40	0.42				
N°50	0.30				
N°70	0.21				
*N°100	0.15				
N°140	0.11				
*N°200	0.07	2.5		5.7	94.3
Pan					
Total Wt in g					

Phân tích tỷ trọng kế (Hydrometer analysis)

TL đất khô trích phân tích TT kế < N° 10 (Wt of dry soil partical for hydrometer < N° 10)	43.92 g
TL đất khô trích phân tích TT kế < N° 200 (Wt of dry soil partical for hydrometer < N° 200)	g
TL đất khôtoàn phần cho phân tích TT kế (Wt of dry soil total for hydrometer analysis)	g

Số HC chất phân tán (Dispersing correction) C_d = 3.0 Số HC mặt cong C_m = 1.0 (Menicus correction)

Thời gian Time min	Nhiệt độ Temp. °C	Số HC nhiệt độ Temp. corr. m	Số đọc TTK Hydro. reading R'	HC số đọc Corr. reading $R=R'+C_m$	Đường kính hạt Particle diameter D (mm)	R-Cd +m R_w	% hạt < D % finer D Partia P_P%	Total P_T%
0.5	27	1.5	36.0	37.0	0.054	35.5		80.9
2	27	1.5	32.0	33.0	0.028	31.5		71.8
5	27	1.5	29.0	30.0	0.018	28.5		64.9
15	27	1.5	28.0	29.0	0.010	27.5		62.6
30	27	1.5	25.0	26.0	0.0076	24.5		55.8
60	27	1.5	22.0	23.0	0.0055	21.5		49
120	27	1.5	20.0	21.0	0.0039	19.5		44.4
240	27	1.5	17.0	18.0	0.0028	16.5		37.5

Formula calculation :

Partial per. Finer $P_P = \frac{Gs}{Gs-1} \times \frac{100}{W_c} \times R$ for hydrometer 151H

Partial per. Finer $P_P = \frac{100}{W_c} \times R_w$ for hydrometer 152H

Total per. Finer $P_T = P_P \times \frac{W_s - W_1}{W_s}$

Note : Ws = Total overdry Wt of sample used comfined analysis in grams

Wc = Overdry Wt of soil used for hydrometer analysis in grams

W_1 = Overdry Wt of sample on N° 10 or N° 200 sieve

Tested Computed Checked

LAN HIEN BICH