



LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Malang 65145

WATER CONTENT

PEMERIKSAAN KADAR AIR

Nomor cawan		b10	b5	b2
Berat cawan + tanah basah	(gr)	62.53	64.48	65.29
Berat cawan + tanah kering	(gr)	51.11	52.97	54.20
Berat cawan	(gr)	13.74	14.30	16.83
Berat air	(gr)	11.42	11.51	11.09
Berat tanah kering	(gr)	37.37	38.67	37.37
Kadar air (w)	(%)	30.56	29.76	29.68
Kadar air rata-rata	(%)	30.00		



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Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

TRIAXIAL COMPRESSION TEST

Lokasi :
Jenis Tanah :

Dikerjakan :
Permintaan :

Sample Data

Diameter = 3.98 cm Area (Ao) = 12.435 cm² Water content (w) = 30.72 %
Volume = 90.152 cm³ Height (Lo) = 7.25 cm Dry density (gd) = 1.41 gr/cm³

ΔH (mm)	Load dial reading	ΔL col 2 . 10 ⁻²	ϵ %	1 - ϵ	Corrected Area A'	Deviator Stress
1	2	3	4	5	6	7
50	29	0.290	0.040	0.960	12.953	0.3296
100	32	0.320	0.044	0.956	13.009	0.3621
150	34	0.340	0.047	0.953	13.047	0.3836
200	36	0.360	0.050	0.950	13.084	0.4050
250	38	0.380	0.052	0.948	13.123	0.4263
300	42	0.420	0.058	0.942	13.199	0.4684
350	44	0.440	0.061	0.939	13.238	0.4893
400	47	0.470	0.065	0.935	13.297	0.5203
450	49	0.490	0.068	0.932	13.336	0.5408
500	53	0.530	0.073	0.927	13.415	0.5815
600	57	0.570	0.079	0.921	13.496	0.6217
700	60	0.600	0.083	0.917	13.557	0.6515
800	62	0.620	0.086	0.914	13.598	0.6712
900	61	0.610	0.084	0.916	13.577	0.6614
1000	61.5	0.615	0.085	0.915	13.587	0.6663
1100	60	0.600	0.083	0.917	13.557	0.6515
1200	59	0.590	0.081	0.919	13.536	0.6416
1300	55	0.550	0.076	0.924	13.455	0.6017
1400	51	0.510	0.070	0.930	13.376	0.5613
1500	48	0.480	0.066	0.934	13.316	0.5306
1600						
1700						
1800						
1900						
2000						

Lateral pressure = 1.000 kg/cm²
Max. Deviator stress = 0.671 kg/cm² 0.336
Max. Value of Vertical Stress = 1.671 kg/cm²



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TRIAXIAL COMPRESSION TEST

Lokasi :
Jenis Tanah :

Dikerjakan :
Permintaan :

Sample Data

Diameter = 3.61 cm Area (Ao) = 10.230 cm² Water content (w) = 30.06 %
Volume = 72.53 cm³ Height (Lo) = 7.09 cm Dry density (gd) = 1.42 gr/cm³

ΔH (mm)	Load dial reading	ΔL col 2 . 10 ⁻²	ϵ %	1 - ϵ	Corrected Area A'	Deviator Stress
1	2	3	4	5	6	7
50	27	0.270	0.038	0.962	10.635	0.3737
100	31	0.310	0.044	0.956	10.698	0.4265
150	36	0.360	0.051	0.949	10.777	0.4917
200	38	0.380	0.054	0.946	10.810	0.5175
250	41.5	0.415	0.059	0.941	10.866	0.5622
300	42	0.420	0.059	0.941	10.874	0.5685
350	43	0.430	0.061	0.939	10.891	0.5812
400	43	0.430	0.061	0.939	10.891	0.5812
450	45	0.450	0.063	0.937	10.924	0.6064
500	46.5	0.465	0.066	0.934	10.948	0.6252
600	47	0.470	0.066	0.934	10.957	0.6314
700	47	0.470	0.066	0.934	10.957	0.6314
800	49	0.490	0.069	0.931	10.990	0.6563
900	50.5	0.505	0.071	0.929	11.015	0.6749
1000	51	0.510	0.072	0.928	11.023	0.6810
1100	48	0.480	0.068	0.932	10.973	0.6439
1200	45	0.450	0.063	0.937	10.924	0.6064
1300	40	0.400	0.056	0.944	10.842	0.5431
1400	37	0.370	0.052	0.948	10.793	0.5046
1500	34.5	0.345	0.049	0.951	10.753	0.4723
1600						
1700						
1800						
1900						
2000						

Lateral pressure = 1.500 kg/cm²
Max. Deviator stress = 0.681 kg/cm² 0.341
Max. Value of Vertical Stress = 2.181 kg/cm²



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TRIAXIAL COMPRESSION TEST

Lokasi :

Dikerjakan :

Jenis Tanah :

Permintaan :

Sample Data

Diameter = 3.60 cm Area (Ao) = 10.174 cm² Water content (w) = 31.34 %
Volume = 71.215 cm³ Height (Lo) = 7.00 cm Dry density (gd) = 1.49 gr/cm³

ΔH (mm)	Load dial reading	ΔL col 2 . 10 ⁻²	ϵ %	1 - ϵ	Corrected Area A'	Deviator Stress
1	2	3	4	5	6	7
50	16	0.160	0.023	0.977	10.412	0.2262
100	18	0.180	0.026	0.974	10.442	0.2537
150	26	0.260	0.037	0.963	10.566	0.3622
200	32	0.320	0.046	0.954	10.661	0.4418
250	36	0.360	0.051	0.949	10.725	0.4941
300	42	0.420	0.060	0.940	10.823	0.5712
350	45	0.450	0.064	0.936	10.873	0.6092
400	43	0.430	0.061	0.939	10.839	0.5839
450	46	0.460	0.066	0.934	10.889	0.6218
500	48	0.480	0.069	0.931	10.923	0.6469
600	49	0.490	0.070	0.930	10.939	0.6593
700	51	0.510	0.073	0.927	10.973	0.6841
800	53	0.530	0.076	0.924	11.007	0.7088
900	50	0.500	0.071	0.929	10.956	0.6718
1000	47	0.470	0.067	0.933	10.906	0.6344
1100	44	0.440	0.063	0.937	10.856	0.5966
1200	43	0.430	0.061	0.939	10.839	0.5839
1300	41	0.410	0.059	0.941	10.807	0.5585
1400	41	0.410	0.059	0.941	10.807	0.5585
1500	40	0.400	0.057	0.943	10.790	0.5457
1600						
1700						
1800						
1900						
2000						

Lateral pressure = 2.000 kg/cm²

Max. Deviator stress = 0.709 kg/cm²

Max. Value of Vertical Stress = 2.709 kg/cm²

0.354



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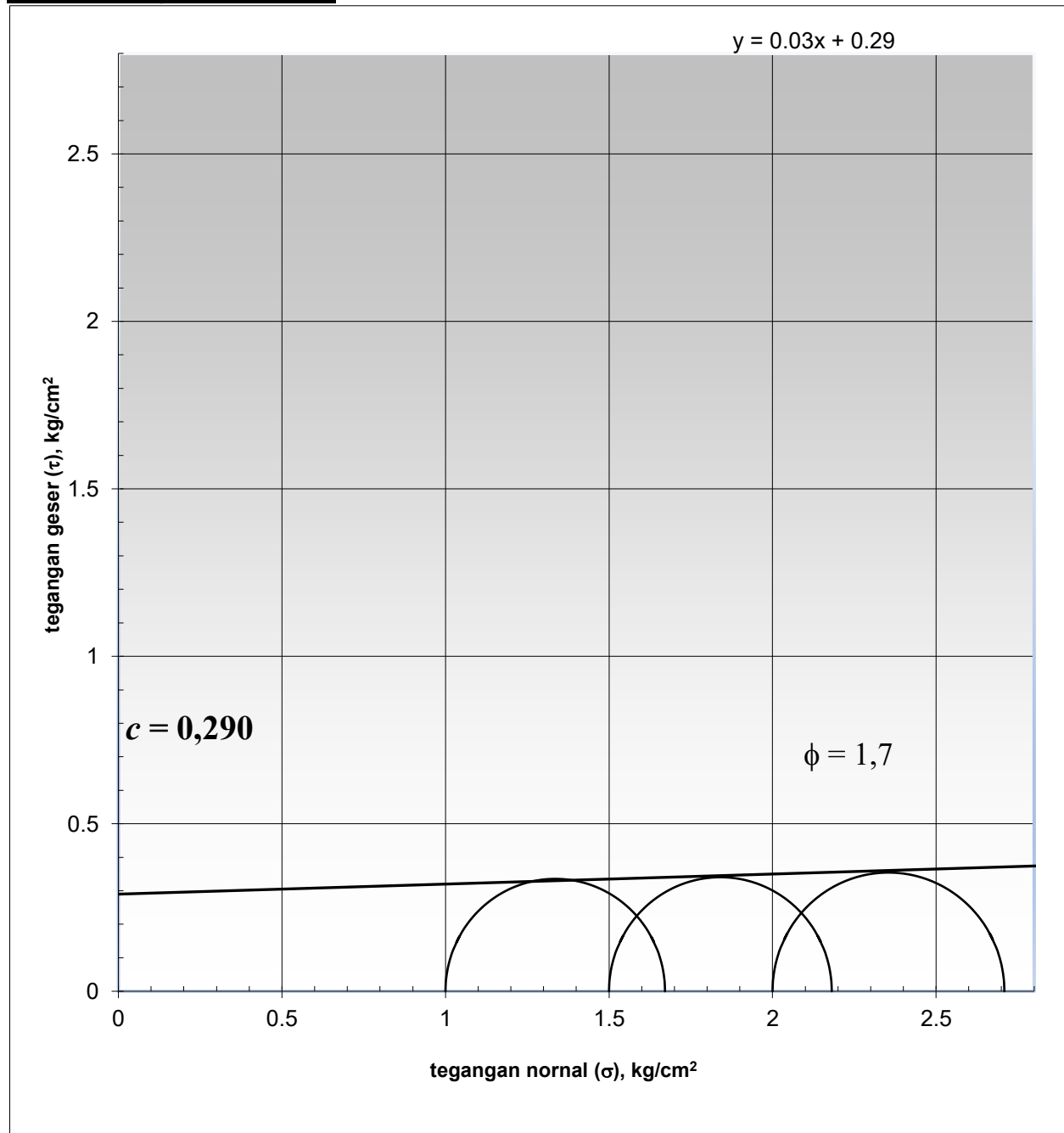
Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

TRIAXIAL COMPRESSION TEST

Location :
Jenis Tanah :

Dikerjakan :
Tested by :

Grafik Lingkaran Mohr





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UNCONFINED COMPRESSIVE STRENGTH

Lokasi :

Jenis Tanah :

Dikerjakan :

Permintaan :

Sample Data

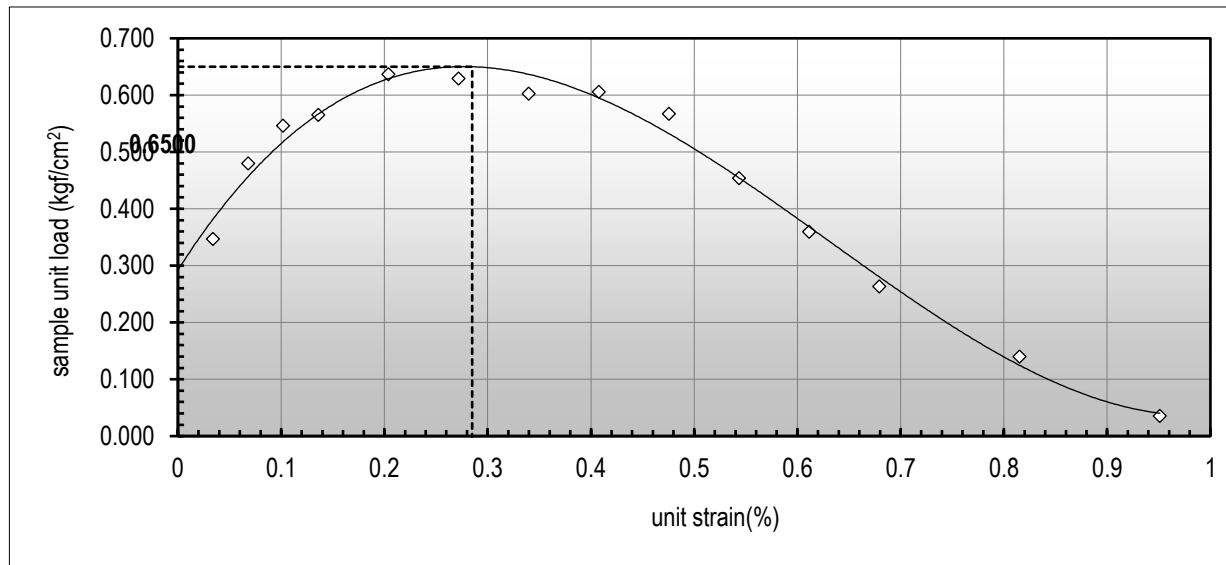
Area (A_0) = 10.81 cm² Height (L_0) = 7.36 cm

w = 42.09 % γ_d = 1.28 gr/cm³

Machine Data

LRC = 0.35 kgf Diameter = 3.71 cm

deformation dial reading	load dial (units)	ΔL col 1 . 10 ⁻⁴	unit strain $\Delta L / L_0$	area CF 1 - col 4	corrected area A'	total load on sample	sample unit load
25.00	11.1	0.25	0.034	0.966	11.195	3.886	0.347
50.00	15.9	0.50	0.068	0.932	11.603	5.567	0.480
75.00	18.8	0.75	0.102	0.898	12.042	6.582	0.547
100.00	20.2	1.00	0.136	0.864	12.515	7.072	0.565
150.00	24.7	1.50	0.204	0.796	13.583	8.647	0.637
200.00	26.7	2.00	0.272	0.728	14.850	9.348	0.629
250.00	28.2	2.50	0.340	0.660	16.378	9.873	0.603
300.00	31.6	3.00	0.408	0.592	18.256	11.063	0.606
350.00	33.4	3.50	0.476	0.524	20.621	11.693	0.567
400.00	30.7	4.00	0.543	0.457	23.689	10.748	0.454
450.00	28.6	4.50	0.611	0.389	27.831	10.013	0.360
500.00	25.4	5.00	0.679	0.321	33.727	8.893	0.264
600.00	23.4	6.00	0.815	0.185	58.526	8.192	0.140
700.00	22.5	7.00	0.951	0.049	221.100	7.877	0.036
800.00							
900.00							
1000.00							
1100.00							
1200.00							
1300.00							
1400.00							
1500.00							
1600.00							
1700.00							



Dari test didapat q_u = 0.650 kgf/cm²



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DIRECT SHEAR TEST

Lokasi : Kedalaman :

Permintaan :

Sample Data :

Area (A_0)	=	31.38	cm^2	Height (L_0)	=	2.89	cm
w	=	35.76	%	Weight	=	165.22	gr
Volume	=	90.62	cm^3	Diameter	=	6.32	cm
Normal load	=	4375	gr	LRC	=	0.17	kgf
γ_m	=	1.82	gr/cm^3	γ_d	=	1.34	gr/cm^3
				Normal stress	=	0.14	kg/cm^2

Horizontal dial reading (x 10^{-2} mm)	Horizontal displace (mm)	Corrected Area (A') cm^2	Load ring dial reading (x 10^{-3} mm)	Horizontal shear force (kgf)	Shear stress (kg/cm^2)
1	2	3	4	5	6
25	0.25	31.26	38	6.430	0.206
50	0.50	31.14	44	7.445	0.239
75	0.75	31.01	47	7.952	0.256
100	1.00	30.89	51	8.629	0.279
150	1.50	30.64	54	9.137	0.298
200	2.00	30.39	55	9.306	0.306
250	2.50	30.14	56	9.475	0.314
300	3.00	29.89	58	9.814	0.328
350	3.50	29.65	59	9.983	0.337
400	4.00	29.40	59.5	10.067	0.342
450	4.50	29.15	60	10.152	0.348
500	5.00	28.90	62	10.490	0.363
600	6.00	28.40	60	10.152	0.357
700	7.00	27.91	58	9.814	0.352

Sample Data :

Area (A_0)	=	37.30	cm^2	Height (L_0)	=	2.99	cm
w	=	34.57	%	Weight	=	149.38	gr
Volume	=	111.42	cm^3	Diameter	=	6.89	cm
Normal load	=	8375	gr	LRC	=	0.17	kgf
γ_m	=	1.34	gr/cm^3	γ_d	=	1.00	gr/cm^3
				Normal stress	=	0.22	kg/cm^2

Horizontal dial reading (x 10^{-2} mm)	Horizontal displace (mm)	Corrected Area (A') cm^2	Load ring dial reading (x 10^{-3} mm)	Horizontal shear force (kgf)	Shear stress (gr/cm^2)
1	2	3	4	5	6
25	0.25	37.16	34	5.753	0.155
50	0.50	37.03	38	6.430	0.174
75	0.75	36.89	44	7.445	0.202
100	1.00	36.76	56	9.475	0.258
150	1.50	36.49	63	10.660	0.292
200	2.00	36.22	71	12.013	0.332
250	2.50	35.95	76	12.859	0.358
300	3.00	35.68	79	13.367	0.375
350	3.50	35.40	80	13.536	0.382
400	4.00	35.13	81	13.705	0.390
450	4.50	34.86	81	13.705	0.393
500	5.00	34.59	83	14.044	0.406
600	6.00	34.05	81	13.705	0.402
700	7.00	33.51	79	13.367	0.399



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DIRECT SHEAR TEST

<u>Sample Data :</u>	Area (A_0)	=	32.18	cm^2	Height (L_0)	=	2.80	cm
	w	=	36.31	%	Weight	=	168.32	gr
	Volume	=	90.03	cm^3	Diameter	=	6.40	cm
	Normal load	=	12375	gr	LRC	=	0.17	kgf
	γ_m	=	1.87	gr/cm^3	γ_d	=	1.37	gr/cm^3
					Normal stress	=	0.38	kg/cm^2

Horizontal dial reading ($\times 10^{-2}$ mm)	Horizontal displace (mm)	Corrected Area (A') cm^2	Load ring dial reading ($\times 10^{-3}$ mm)	Horizontal shear force (kgf)	Shear stress (kg/cm^2)
1	2	3	4	5	6
25	0.25	32.06	32	5.414	0.169
50	0.50	31.93	40	6.768	0.212
75	0.75	31.81	47	7.952	0.250
100	1.00	31.68	54	9.137	0.288
150	1.50	31.43	65	10.998	0.350
200	2.00	31.18	76	12.859	0.412
250	2.50	30.93	80	13.536	0.438
300	3.00	30.67	82	13.874	0.452
350	3.50	30.42	80	13.536	0.445
400	4.00	30.17	79	13.367	0.443
450	4.50	29.92	77	13.028	0.435
500	5.00	29.67	76	12.859	0.433
600	6.00	29.17	75	12.690	0.435
700	7.00	28.66	75	12.690	0.443



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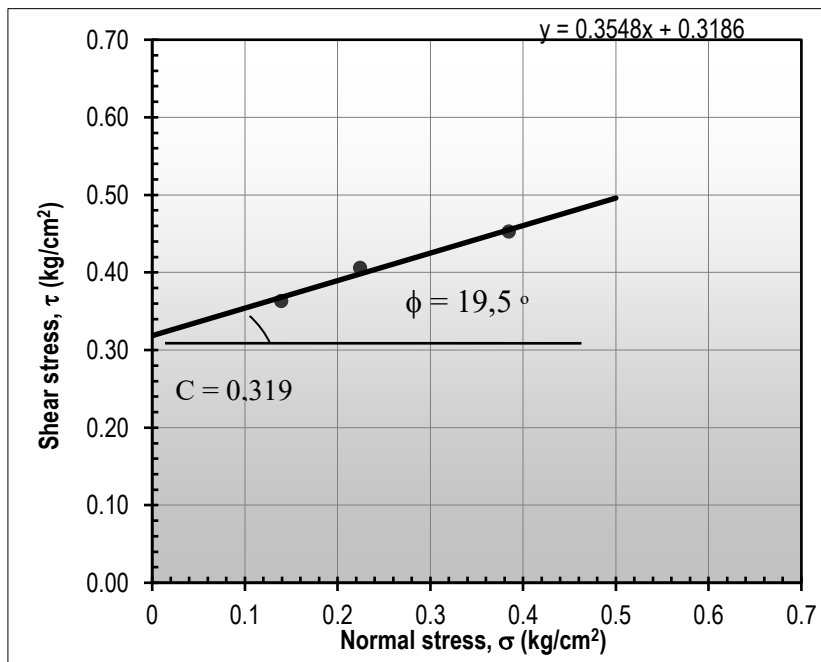
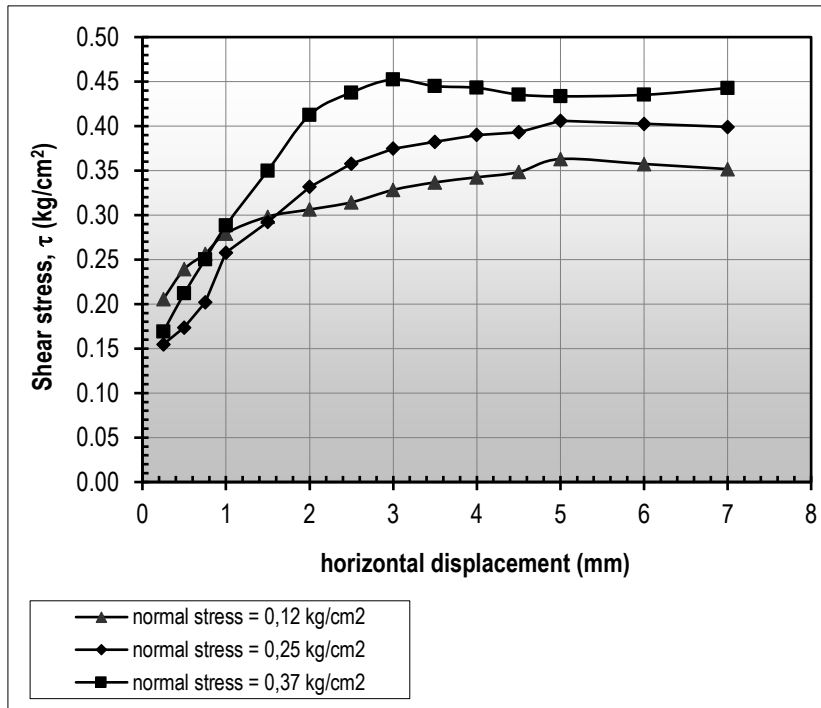
Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

DIRECT SHEAR TEST

Lokasi :

Kedalaman :

Permintaan :





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GRAIN SIZE ANALYSIS (Hydrometer)

LOCATION : Lab. Mekanika Tanah
SAMPLE NO. : B-1

Dikerjakan

Wt. (air dry* soil + container) =
Wt. Container =
Wt. Air dry soil W' = 130 g
*Test is made of soil sample passing 2,0 mm sieve

Specific gravity G = 2.580 a = 1
Plasticity index P.I. = 15.65 %

WATER CONTENT OF AIR DRY SOIL SAMPLE

Kode b10			Kode b5			Kode b2			Mean value (w)
WW = 62.53	DW = 51.11		WW = 64.48	DW = 52.97		WW = 65.29	DW = 54.20		
DW = 51.11	TW = 13.74		DW = 52.97	TW = 14.30		DW = 54.20	TW = 16.83		
Ww = 11.42	Ws = 37.37		Ww = 11.51	Ws = 38.67		Ww = 11.09	Ws = 37.37		
w = 30.56 %			w = 29.76 %			w = 29.68 %			= 30.00 %

Wt. Of oven - dry soil $W = \frac{100W'}{100+w}$ = 100 g

HYDROMETER ANALYSIS

1	2	3	4	5	6	7	8	9	10	11
Elapsed time (t) (min)	Hydrometer reading		Temperature °C	L	$\sqrt{L/t}$	$\sqrt{\frac{30m}{980(G-G')}} = K$	$d_{6 \times 7}$	F	$R_c = r'/1000 + F$	% finer = P $k_{10} \times M \times 1000$
	Under decimal only	r' col. 2 + Cm								
1	25	26.00	27	15.48	3.934	0.01316	0.0518	0.0023	0.0283	74.443
2	22	23.00	27	15.82	2.812	0.01316	0.0370	0.0023	0.0253	66.551
3	19	20.00	27	16.16	2.321	0.01316	0.0306	0.0023	0.0223	58.660
15	16	17.00	27	16.51	1.049	0.01316	0.0138	0.0023	0.0193	50.768
30	14	15.00	27	16.73	0.747	0.01316	0.0098	0.0023	0.0173	45.507
60	13	14.00	27	16.85	0.530	0.01316	0.0070	0.0023	0.0163	42.877
240	11	12.00	27	17.19	0.268	0.01316	0.0018	0.0023	0.0143	37.616
1440	9	10.00	27	17.30	0.110	0.01316	0.0015	0.0023	0.0123	32.355
2880	7	8.00	27	17.65	0.078	0.01316	0.0010	0.0023	0.0103	27.094

$\frac{100}{W} = 1.000$; $\frac{G}{G - G'} = 1.63048$ $M = \frac{100}{W} + \frac{G}{G - G'} = 2.630$

Meniscus correction Cm = 1.00 G' = 0.9971 m = 0.00896

SEIVE ANALYSIS

Sieve opening in mm	Weight of soil retained in gr.	*Percent retained	*Cummulative Percent retained	*Cummulative Percent finer P
0.85	1.93	1.48%	1.48%	98.52%
0.4	1.43	1.10%	2.58%	97.42%
0.25	3.80	2.92%	5.51%	94.49%
0.11	3.41	2.62%	8.13%	91.87%
0.075	1.54	1.18%	9.32%	90.68%

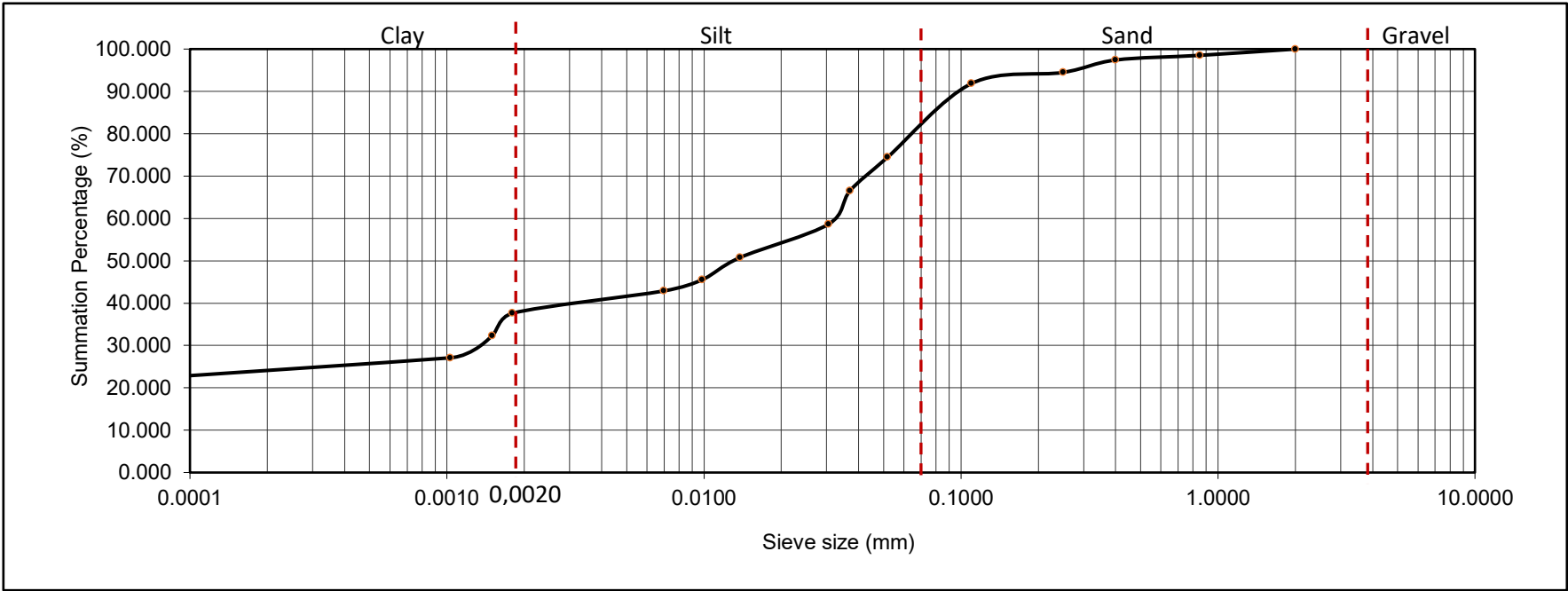
L = Effective depth in cm
m = Viscosity of water in poise
G' = Specific gravity of water
d = Maximum diameter of soil grain in mm
F = Correction factor against temperature



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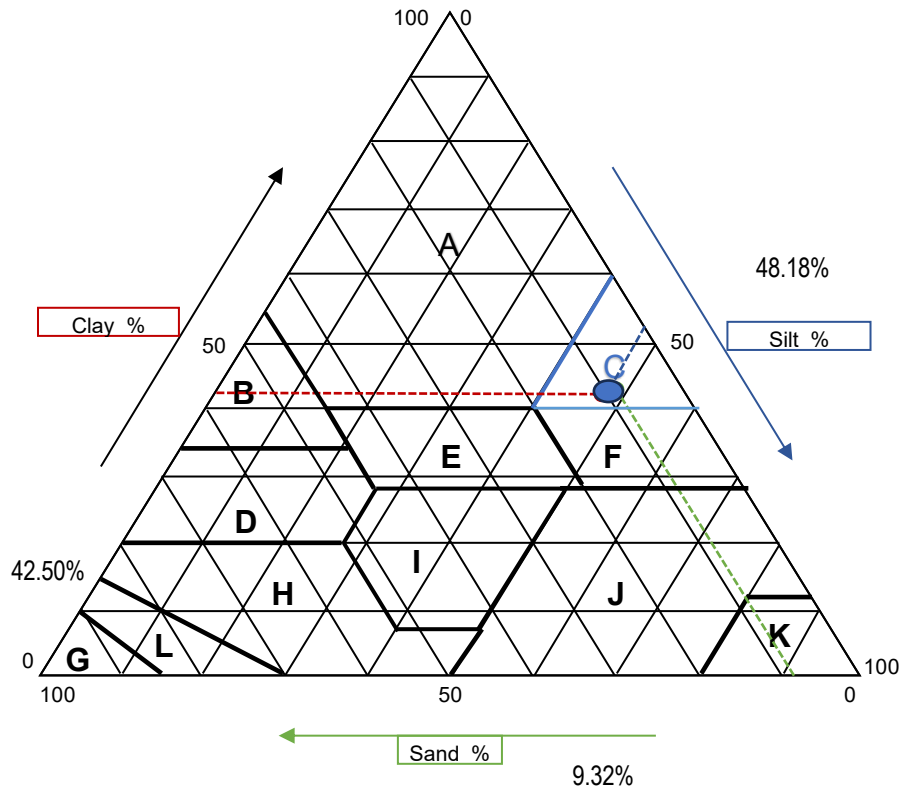
GRAIN SIZE ANALYSIS (Hydrometer)



Gravel	Sand	Silt	Clay	Max size	D 60	D 10	Classification	Remarks
0%	9.32%	48.18%	42.50%	0.0518	0.010	-	I.	=

CLASSIFICATION

- A. CLAY
- B. SANDY CLAY
- C. SILTY CLAY
- D. SANDY CLAY LOAM
- E. CLAYLEY LOAM
- F. SILTY CLAY LOAM
- G. SAND
- H. SANDY LOAM
- I. LOAM
- J. SILTY LOAM
- K. SILT
- L. LOAMY SAND



SILTY CLAY

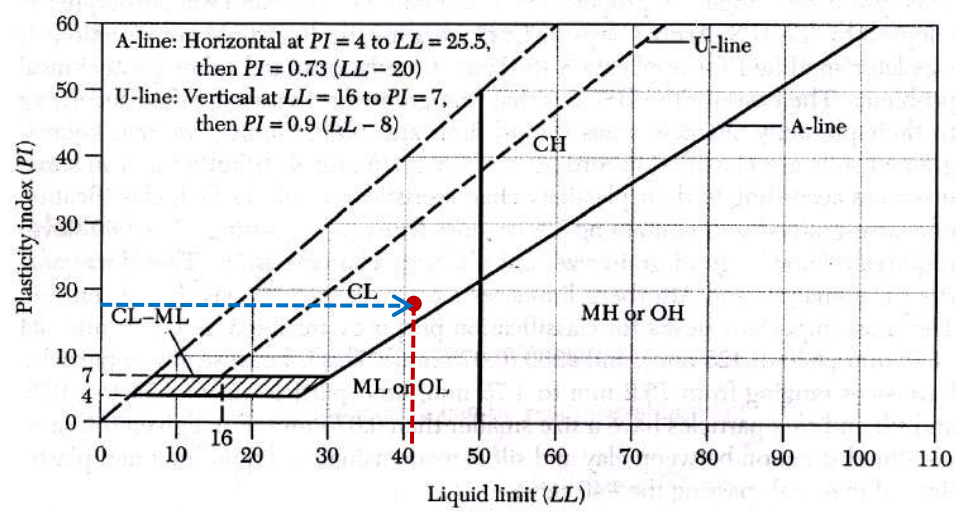


FIGURE 3.14 Plasticity chart used in the classification of fine-grained soils. (Adapted from Casagrande, 1948; Howard, 1977.)

Kesimpulan :-



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LOCATION :
SAMPLE NO. :

TESTED BY :
:

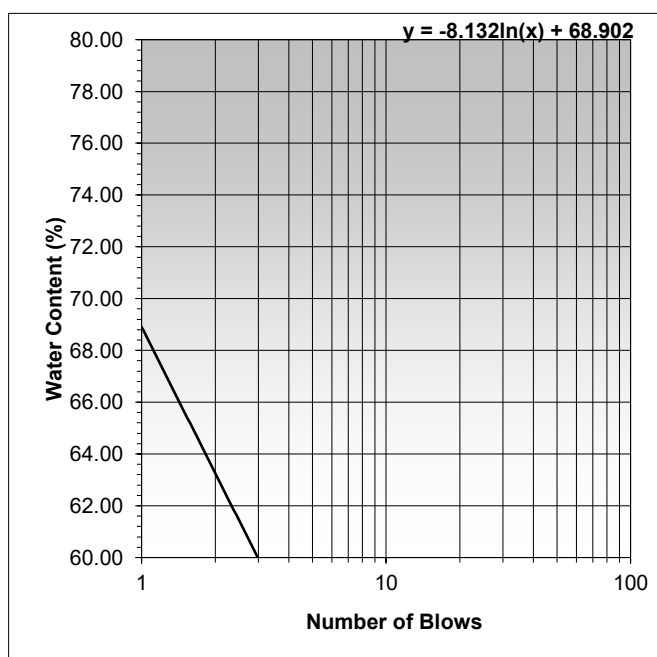
LIQUID LIMIT TEST

1	2	3
NO. OF BLOWS 9	NO. OF BLOWS 15	NO. OF BLOWS 20
No. b8	No. d9	No. d4
WW = 25.55 DW = 21.88	WW = 26.26 DW = 22.50	WW = 26.30 DW = 22.11
DW = 21.88 TW = 14.56	DW = 22.50 TW = 14.56	DW = 22.11 TW = 12.93
Ww = 3.67 Ws = 7.32	Ww = 3.76 Ws = 7.94	Ww = 4.19 Ws = 9.18
w = 50.14 %	w = 47.36 %	w = 45.64 %

4	5	6
NO. OF BLOWS 24	NO. OF BLOWS 30	NO. OF BLOWS 34
No. f9	No. a6	No. b3
WW = 27.77 DW = 23.77	WW = 29.41 DW = 25.39	WW = 27.08 DW = 23.39
DW = 23.77 TW = 14.66	DW = 25.39 TW = 15.50	DW = 23.39 TW = 14.00
Ww = 4.00 Ws = 9.11	Ww = 4.02 Ws = 9.89	Ww = 3.69 Ws = 9.39
w = 43.91 %	w = 40.65 %	w = 39.30 %

PLASTIC LIMIT TEST

1	2	3
No. c8	No. B2	No. b10
WW = 14.60 DW = 14.44	WW = 17.57 DW = 17.42	WW = 14.58 DW = 14.41
DW = 14.44 TW = 13.81	DW = 17.42 TW = 16.83	DW = 14.41 TW = 13.72
Ww = 0.16 Ws = 0.63	Ww = 0.15 Ws = 0.59	Ww = 0.17 Ws = 0.69
w = 25.40 %	w = 25.42 %	w = 24.64 %



REMARKS :

WW = Wt of container + wet soil in gr.
DW = Wt of container + dry soil in gr.
TW = Wt of container in gr.

The limits is determined on the portion of the soil passing 0,4 mm sieve

Dari percobaan didapatkan :

LIQUID LIMIT = 42.73 %
PLASTIC LIMIT = 25.15 %
PLAST. INDEX = 17.57 %



LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

PEMERIKSAAN BERAT JENIS

LOKASI :
DIKERJAKAN :
JENIS TANAH :
KEDALAMAN :
NOMOR CONTOH :

BERAT JENIS TANAH

Nomor Picno		C3	C	O
Berat Picno + Tanah (W_2)	gr	98.76	84.16	84.76
Berat Picno (W_1)	gr	46.60	30.11	38.46
Berat Tanah ($W_2 - W_1$)	gr	52.16	54.05	46.30
Suhu (T)	°C	27	27	27
Berat Picno + Air pada T (W_4)	gr	145.76	131.14	138.80
$W_2 - W_1 + W_4$	gr	197.92	185.19	185.10
Berat Picno + Air + Tanah (W_3)	gr	177.81	163.98	167.35
Faktor Koreksi Suhu		0.9986	0.9986	0.9986
Isi Tanah ($W_2 - W_1$) + ($W_4 - W_3$)	cm ³	20.11	21.21	17.75
Berat Jenis Tanah		2.590	2.545	2.605
Rata-rata		2.580		



**LABORATORIUM MEKANIKA TANAH
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Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Malang 65145

WATER CONTENT

PEMERIKSAAN KADAR AIR

Nomor cawan		j10	d2	d10
Berat cawan + tanah basah	(gr)	60.75	54.59	54.31
Berat cawan + tanah kering	(gr)	50.03	45.99	45.94
Berat cawan	(gr)	13.83	14.80	15.32
Berat air	(gr)	10.72	8.60	8.37
Berat tanah kering	(gr)	36.20	31.19	30.62
Kadar air (w)	(%)	29.61	27.57	27.34
Kadar air rata-rata	(%)	28.17		



LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

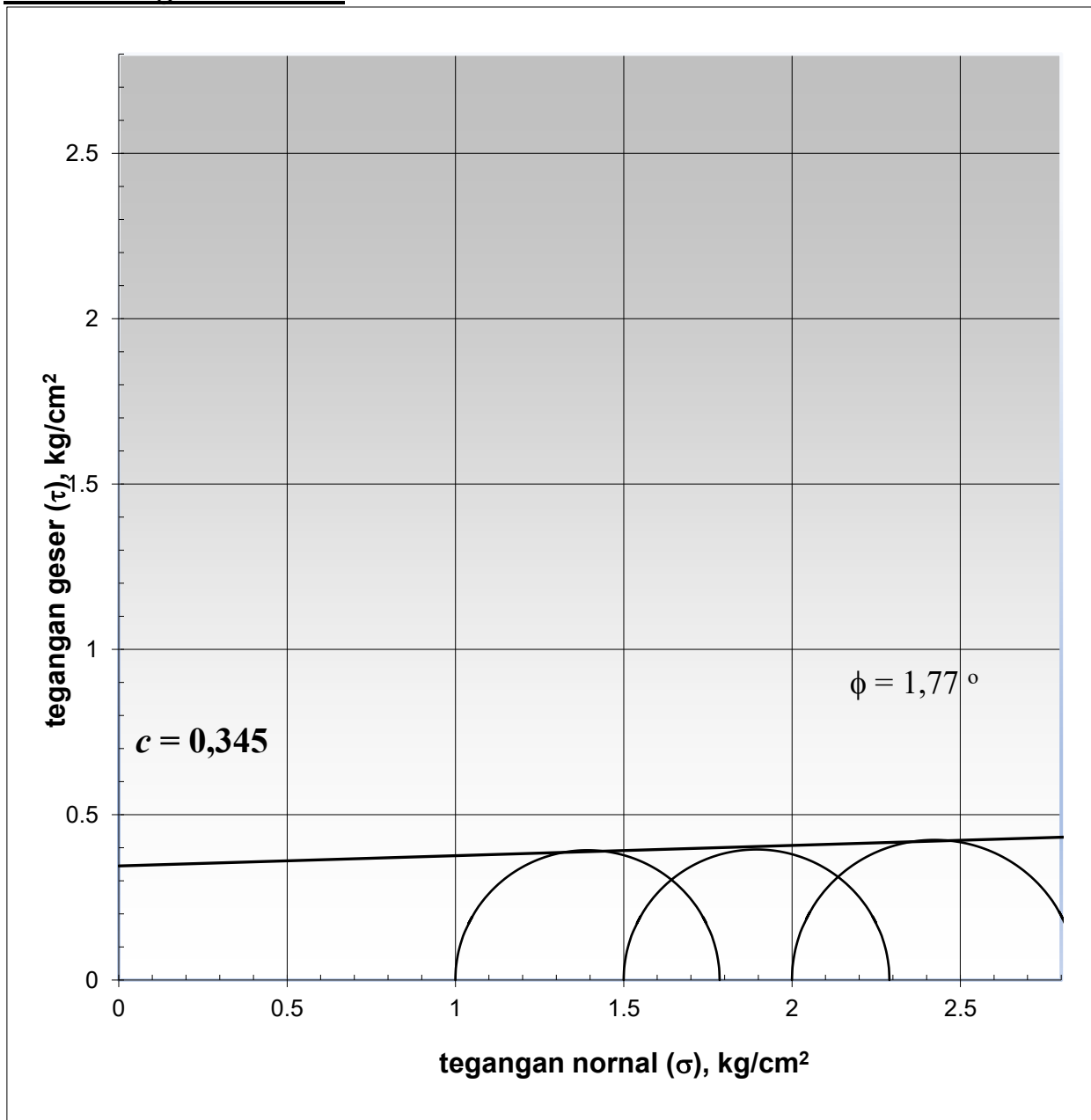
Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

TRIAXIAL COMPRESSION TEST

Location :
Jenis Tanah :

Dikerjakan :
Tested by :

Grafik Lingkaran Mohr





LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

UNCONFINED COMPRESSIVE STRENGTH

Lokasi :

Dikerjakan :

Jenis Tanah :

Permintaan :

Sample Data

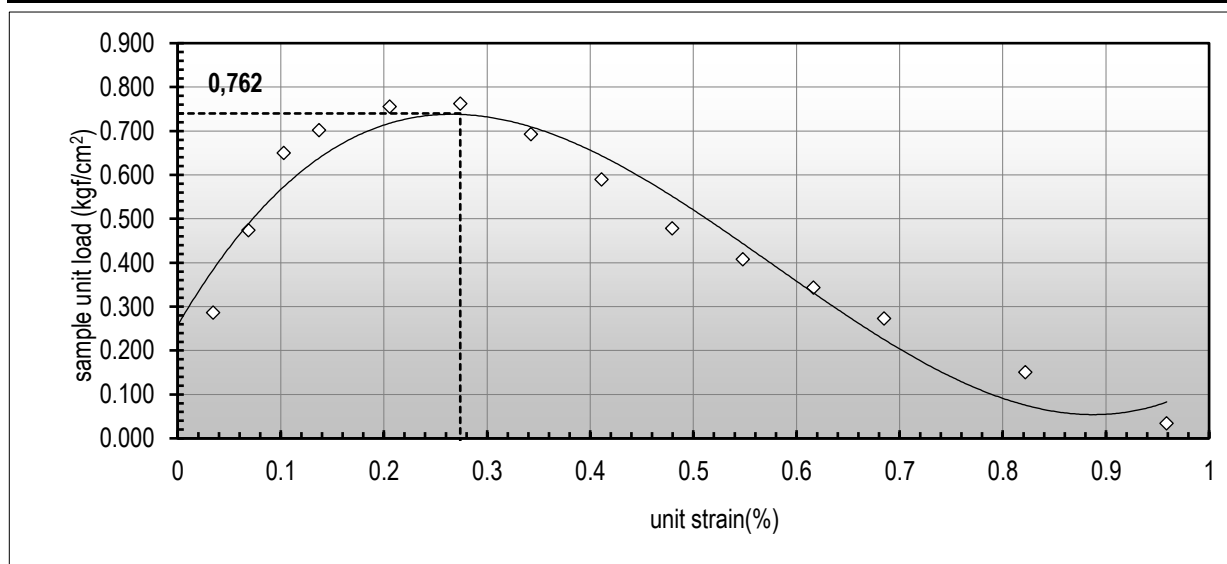
Area (A_0) = 9.90 cm² Height (L_0) = 7.30 cm

w = 26.00 % γ_d = 1.51 gr/cm³

Machine Data

LRC = 0.35 kgf Diameter = 3.55 cm

deformation dial reading	load dial (units)	ΔL col 1 . 10 ⁻²	unit strain $\Delta L / L_0$	area CF 1 - col 4	corrected area A'	total load on sample	sample unit load
25.00	8.4	0.25	0.034	0.966	10.253	2.941	0.287
50.00	14.4	0.50	0.068	0.932	10.630	5.041	0.474
75.00	20.5	0.75	0.103	0.897	11.036	7.177	0.650
100.00	23.0	1.00	0.137	0.863	11.474	8.052	0.702
150.00	26.9	1.50	0.205	0.795	12.463	9.418	0.756
200.00	29.7	2.00	0.274	0.726	13.639	10.398	0.762
250.00	29.8	2.50	0.342	0.658	15.059	10.433	0.693
300.00	28.3	3.00	0.411	0.589	16.810	9.908	0.589
350.00	26.0	3.50	0.479	0.521	19.022	9.103	0.479
400.00	25.5	4.00	0.548	0.452	21.904	8.928	0.408
450.00	25.3	4.50	0.616	0.384	25.816	8.858	0.343
500.00	24.5	5.00	0.685	0.315	31.428	8.577	0.273
600.00	24.0	6.00	0.822	0.178	55.603	8.402	0.151
700.00	23.5	7.00	0.959	0.041	240.948	8.227	0.034
800.00							
900.00							
1000.00							
1100.00							
1200.00							
1300.00							
1400.00							
1500.00							
1600.00							
1700.00							



Dari test didapat q_u = 0.762 kgf/cm²

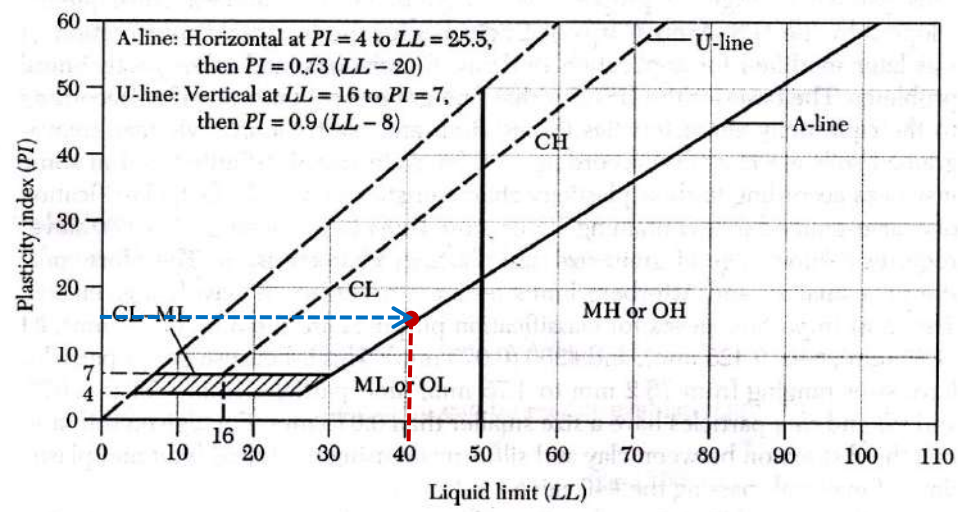


FIGURE 3.14 Plasticity chart used in the classification of fine-grained soils. (Adapted from Casagrande, 1948; Howard, 1977.)

Kesimpulan :-



LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

LOCATION :
SAMPLE NO. :

TESTED BY :
:

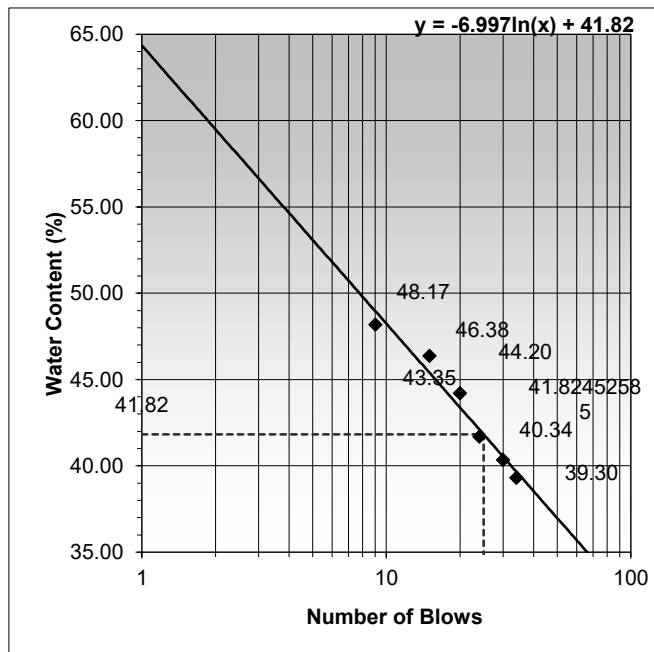
LIQUID LIMIT TEST

1	2	3
NO. OF BLOWS 9	NO. OF BLOWS 15	NO. OF BLOWS 20
No. f10	No. g7	No. j7
WW = 25.54 DW = 21.98	WW = 26.24 DW = 22.53	WW = 26.20 DW = 22.12
DW = 21.98 TW = 14.59	DW = 22.53 TW = 14.53	DW = 22.12 TW = 12.89
Ww = 3.56 Ws = 7.39	Ww = 3.71 Ws = 8.00	Ww = 4.08 Ws = 9.23
w = 48.17 %	w = 46.38 %	w = 44.20 %

4	5	6
NO. OF BLOWS 24	NO. OF BLOWS 30	NO. OF BLOWS 34
No. f4	No. a9	No. b32
WW = 27.50 DW = 23.76	WW = 29.42 DW = 25.39	WW = 27.07 DW = 23.36
DW = 23.76 TW = 14.79	DW = 25.39 TW = 15.40	DW = 23.36 TW = 13.92
Ww = 3.74 Ws = 8.97	Ww = 4.03 Ws = 9.99	Ww = 3.71 Ws = 9.44
w = 41.69 %	w = 40.34 %	w = 39.30 %

PLASTIC LIMIT TEST

1	2	3
No. c7	No. B10	No. j2
WW = 14.71 DW = 14.47	WW = 17.59 DW = 17.43	WW = 14.59 DW = 14.41
DW = 14.47 TW = 13.56	DW = 17.43 TW = 16.80	DW = 14.41 TW = 13.74
Ww = 0.24 Ws = 0.91	Ww = 0.16 Ws = 0.63	Ww = 0.18 Ws = 0.67
w = 26.37 %	w = 25.40 %	w = 26.87 %



REMARKS :

WW = Wt of container + wet soil in gr.
DW = Wt of container + dry soil in gr.
TW = Wt of container in gr.

The limits is determined on the portion of the soil passing 0,4 mm sieve

Dari percobaan didapatkan :

LIQUID LIMIT = 41.82 %
PLASTIC LIMIT = 26.21 %
PLAST. INDEX = 15.61 %



LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

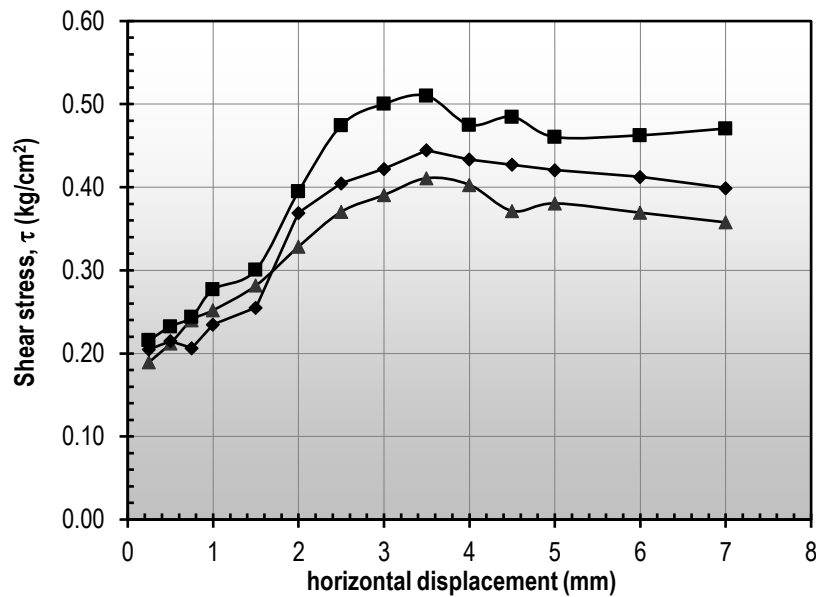
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DIRECT SHEAR TEST

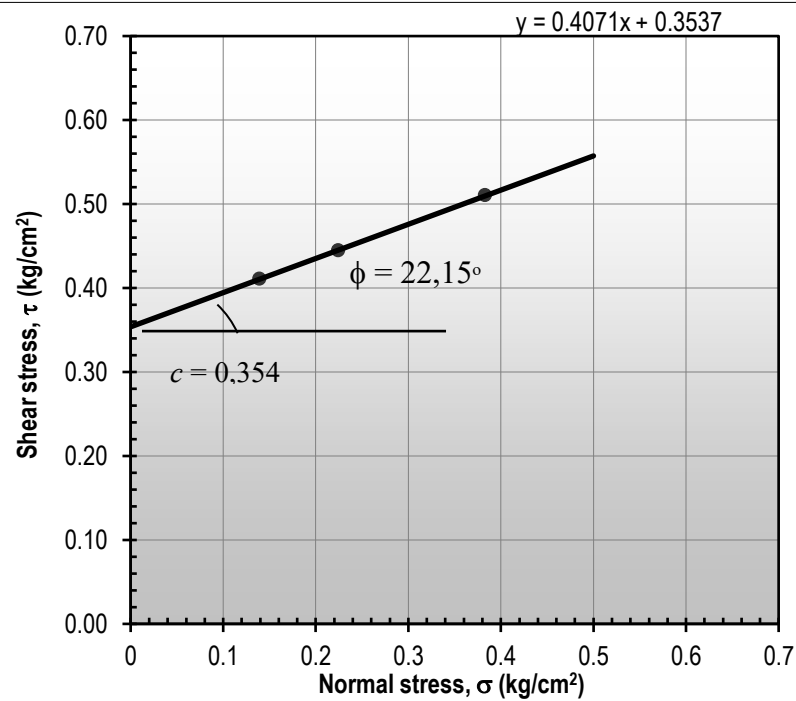
Lokasi :

Kedalaman :

Permintaan :



—▲— normal stress = 0,12 kg/cm²
—◆— normal stress = 0,25 kg/cm²
—■— normal stress = 0,37 kg/cm²

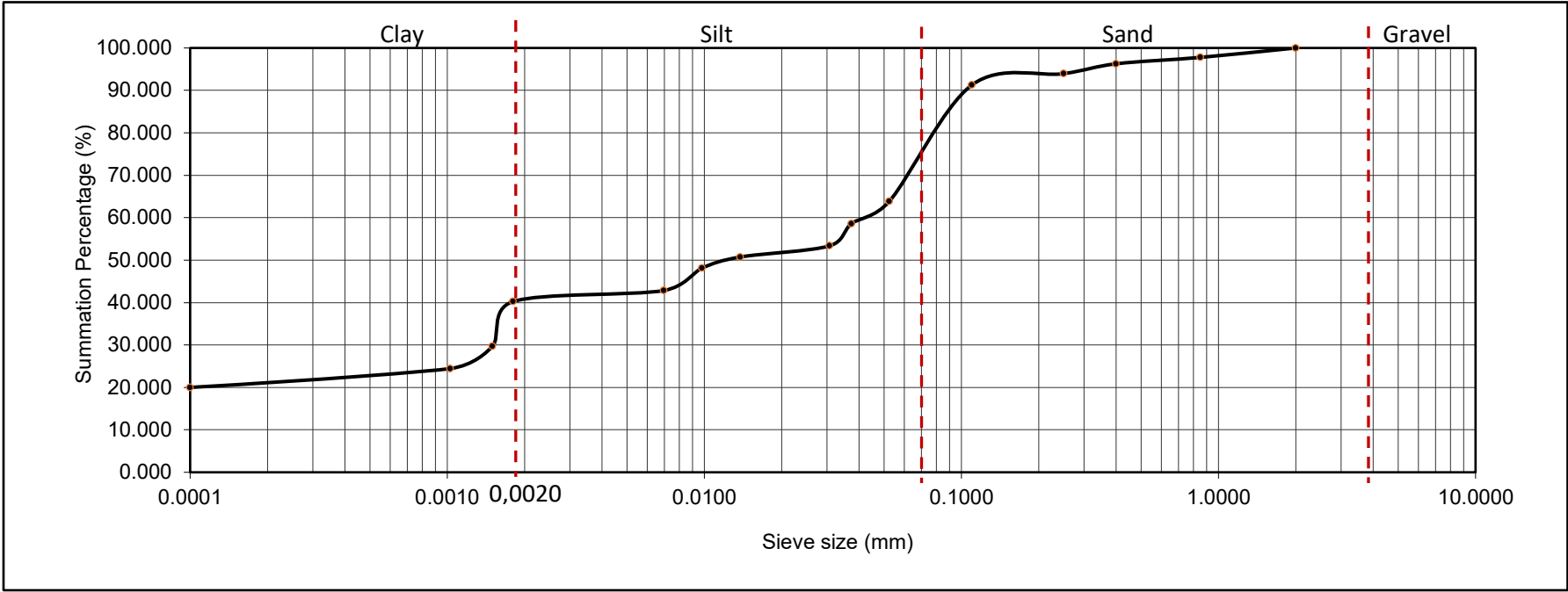




LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

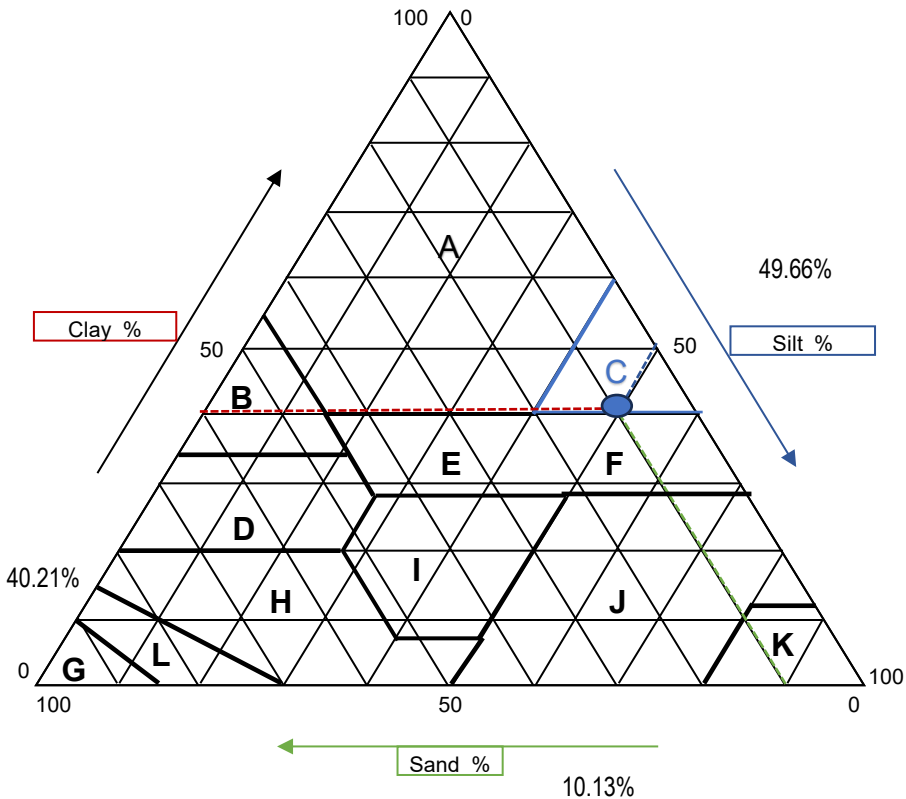
GRAIN SIZE ANALYSIS (Hydrometer)



Gravel	Sand	Silt	Clay	Max size	D 60	D 10	Classification	Remarks
0%	10.13%	49.66%	40.21%	0.0525	0.010	-	I.	=

CLASSIFICATION

- A. CLAY
- B. SANDY CLAY
- C. SILTY CLAY
- D. SANDY CLAY LOAM
- E. CLAYLEY LOAM
- F. SILTY CLAY LOAM
- G. SAND
- H. SANDY LOAM
- I. LOAM
- J. SILTY LOAM
- K. SILT
- L. LOAMY SAND





LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
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Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

PEMERIKSAAN BERAT JENIS

LOKASI :
DIKERJAKAN :
JENIS TANAH :
KEDALAMAN :
NOMOR CONTOH :

BERAT JENIS TANAH

Nomor Picno		C3	C	O
Berat Picno + Tanah (W_2)	gr	96.89	83.20	84.01
Berat Picno (W_1)	gr	46.60	30.11	38.46
Berat Tanah ($W_2 - W_1$)	gr	50.29	53.09	45.55
Suhu (T)	°C	27	27	27
Berat Picno + Air pada T (W_4)	gr	145.76	131.14	138.80
$W_2 - W_1 + W_4$	gr	196.05	184.23	184.35
Berat Picno + Air + Tanah (W_3)	gr	176.60	163.70	166.78
Faktor Koreksi Suhu		0.9986	0.9986	0.9986
Isi Tanah ($W_2 - W_1$) + ($W_4 - W_3$)	cm ³	19.45	20.53	17.57
Berat Jenis Tanah		2.582	2.582	2.589
Rata-rata		2.584		



**LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
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Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Malang 65145

WATER CONTENT

PEMERIKSAAN KADAR AIR

Nomor cawan		h7	i8	j7
Berat cawan + tanah basah	(gr)	52.18	67.96	55.93
Berat cawan + tanah kering	(gr)	43.67	55.28	46.96
Berat cawan	(gr)	14.01	14.85	15.10
Berat air	(gr)	8.51	12.68	8.97
Berat tanah kering	(gr)	29.66	40.43	31.86
Kadar air (w)	(%)	28.69	31.36	28.15
Kadar air rata-rata	(%)	29.40		



LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

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PEMERIKSAAN BERAT JENIS

LOKASI :
DIKERJAKAN :
JENIS TANAH :
KEDALAMAN :
NOMOR CONTOH :

BERAT JENIS TANAH

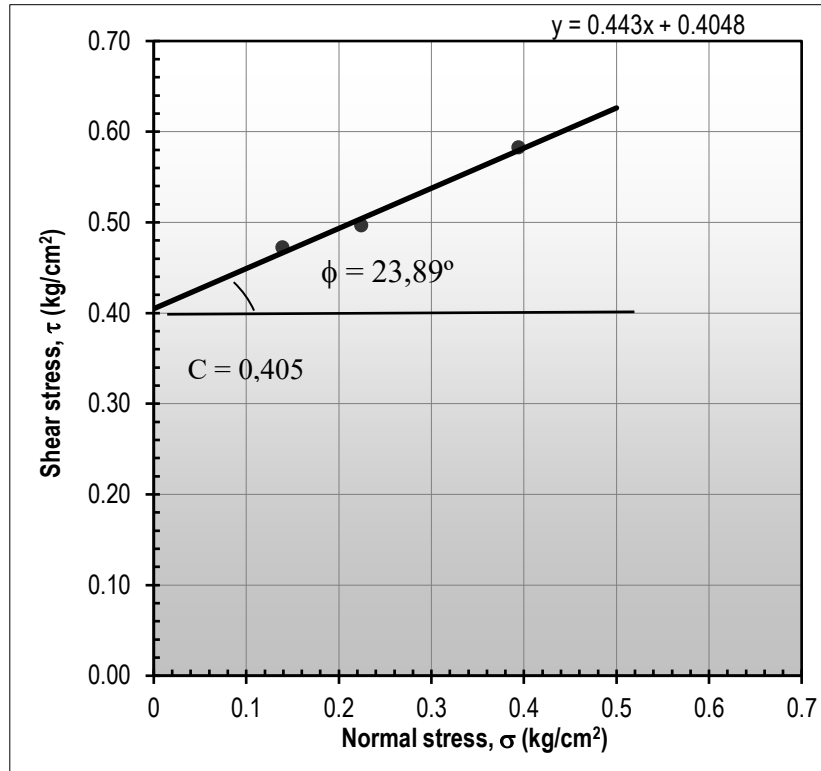
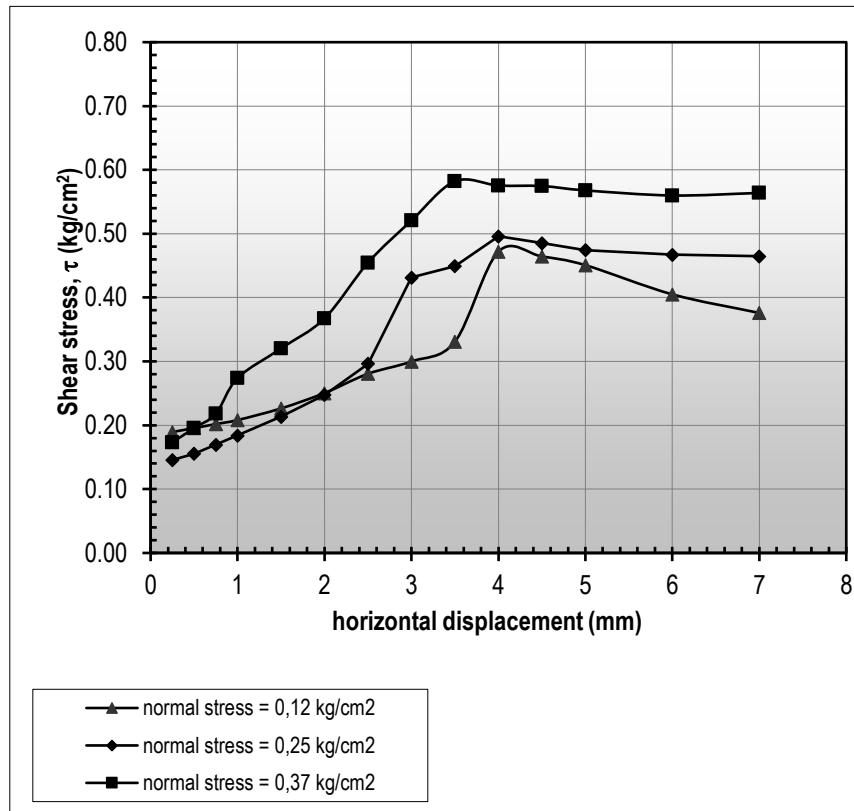
Nomor Picno		C3	C	O
Berat Picno + Tanah (W_2)	gr	97.50	82.09	86.97
Berat Picno (W_1)	gr	46.60	30.11	38.46
Berat Tanah ($W_2 - W_1$)	gr	50.90	51.98	48.51
Suhu (T)	°C	27	27	27
Berat Picno + Air pada T (W_4)	gr	145.76	131.14	138.80
$W_2 - W_1 + W_4$	gr	196.66	183.12	187.31
Berat Picno + Air + Tanah (W_3)	gr	177.40	162.73	168.60
Faktor Koreksi Suhu		0.9986	0.9986	0.9986
Isi Tanah ($(W_2 - W_1) + (W_4 - W_3)$)	cm ³	19.26	20.39	18.71
Berat Jenis Tanah		2.639	2.546	2.589
Rata-rata		2.591		



LABORATORIUM MEKANIKA TANAH
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INSTITUT TEKNOLOGI NASIONAL MALANG

Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

DIRECT SHEAR TEST





LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

GRAIN SIZE ANALYSIS (*Hydrometer*)

LOCATION : Lab. Mekanika Tanah
SAMPLE NO. : **B-1**

Dikerjakan

Wt. (air dry* soil + container) =
Wt. Container =
Wt. Air dry soil W' = 129.4 g
*Test is made of soil sample passing 2,0 mm sieve

Specific gravity G = 2.591
Plasticity index P.I. = 15.65 %
a = 1

WATER CONTENT OF AIR DRY SOIL SAMPLE

Kode				h7		Kode				i8		Kode				j7		Mean value (w) = 29.40 %
WW =	52.18	DW =	43.67	WW =	67.96	DW =	55.28	WW =	55.93	DW =	46.96	WW =	46.96	DW =	15.10			
DW =	43.67	TW =	14.01	DW =	55.28	TW =	14.85	DW =	46.96	TW =	15.10	DW =	46.96	TW =	15.10			
Ww =	8.51	Ws =	29.66	Ww =	12.68	Ws =	40.43	Ww =	8.97	Ws =	31.86	Ww =	8.97	Ws =	31.86			
w = 28.69 %				w = 31.36 %				w = 28.15 %										

Wt. Of oven - dry soil $W = \frac{100W'}{100+w}$ = 100 g

HYDROMETER ANALYSIS

1	2	3	4	5	6	7	8	9	10	11
Elapsed time (t) (min)	Hydrometer reading		Temperature °C	L	$\sqrt{L/t}$	$\sqrt{\frac{30m}{980(G-G')}} = K$	d 6 x 7	F	Rc = r'/1000 + F	% finer = P k10 x M x 1000
	Under decimal only	r' col. 2 + Cm								
1	24	25.00	27	15.48	3.934	0.01312	0.0516	0.0023	0.0273	71.689
2	21	22.00	27	15.82	2.812	0.01312	0.0369	0.0023	0.0243	63.811
3	18	19.00	27	16.16	2.321	0.01312	0.0304	0.0023	0.0213	55.933
15	16	17.00	27	16.51	1.049	0.01312	0.0138	0.0023	0.0193	50.681
30	14	15.00	27	16.73	0.747	0.01312	0.0098	0.0023	0.0173	45.429
60	13	14.00	27	16.85	0.530	0.01312	0.0070	0.0023	0.0163	42.803
240	11	12.00	27	17.19	0.268	0.01312	0.0018	0.0023	0.0143	37.551
1440	8	9.00	27	17.30	0.110	0.01312	0.0015	0.0023	0.0113	29.673
2880	6	7.00	27	17.65	0.078	0.01312	0.0010	0.0023	0.0093	24.421

$$\frac{100}{W} = 1.000 ; \frac{G}{G - G'} = 1.62596 \quad M = \frac{100}{W} + \frac{G}{G - G'} = 2.626$$

Meniscus correction Cm = 1.00 G' = 0.9971 m = 0.00896

SEIVE ANALYSIS

Sieve opening in mm	Weight of soil retained in gr.	*Percent retained	*Cummulative Percent retained	*Cummulative Percent finer P
0.85	2.43	1.88%	1.88%	98.12%
0.4	2.12	1.64%	3.52%	96.48%
0.25	4.13	3.19%	6.71%	93.29%
0.11	3.61	2.79%	9.50%	90.50%
0.075	1.94	1.50%	11.00%	89.00%

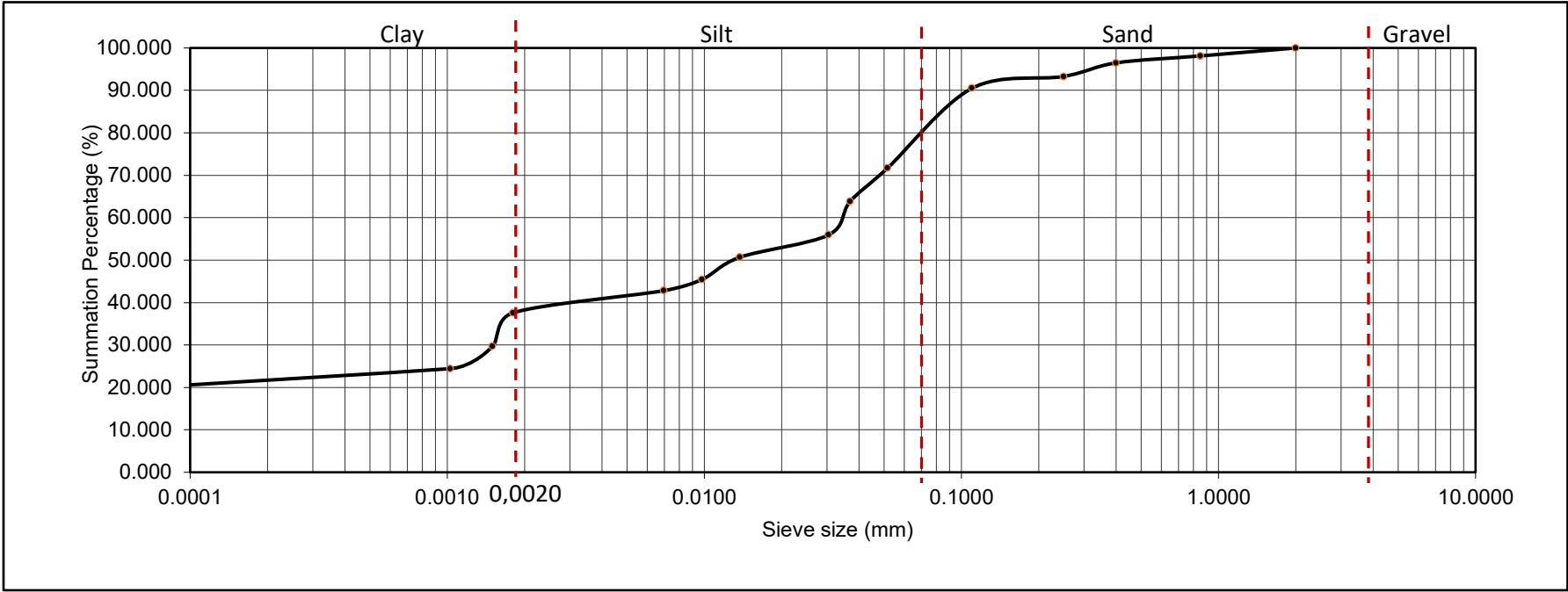
L = Effective depth in cm
m = Viscosity of water in poise
G' = Specific gravity of water
d = Maximum diameter of soil grain in mm
F = Correction factor against temperature



LABORATORIUM MEKANIKA TANAH
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INSTITUT TEKNOLOGI NASIONAL MALANG

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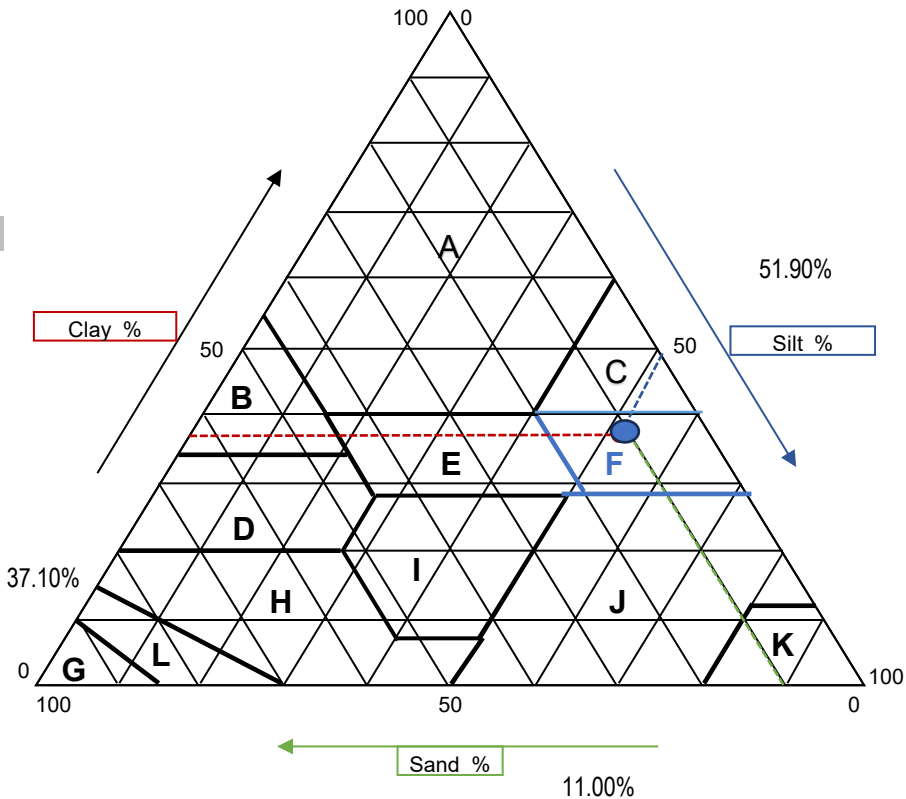
GRAIN SIZE ANALYSIS (Hydrometer)



Gravel	Sand	Silt	Clay	Max size	D 60	D 10	Classification	Remarks
0%	11.00%	51.90%	37.10%	0.0516	0.010	-	I.	=

CLASSIFICATION

- A. CLAY
- B. SANDY CLAY
- C. SILTY CLAY
- D. SANDY CLAY LOAM
- E. CLAYLEY LOAM
- F. SILTY CLAY LOAM
- G. SAND
- H. SANDY LOAM
- I. LOAM
- J. SILTY LOAM
- K. SILT
- L. LOAMY SAND



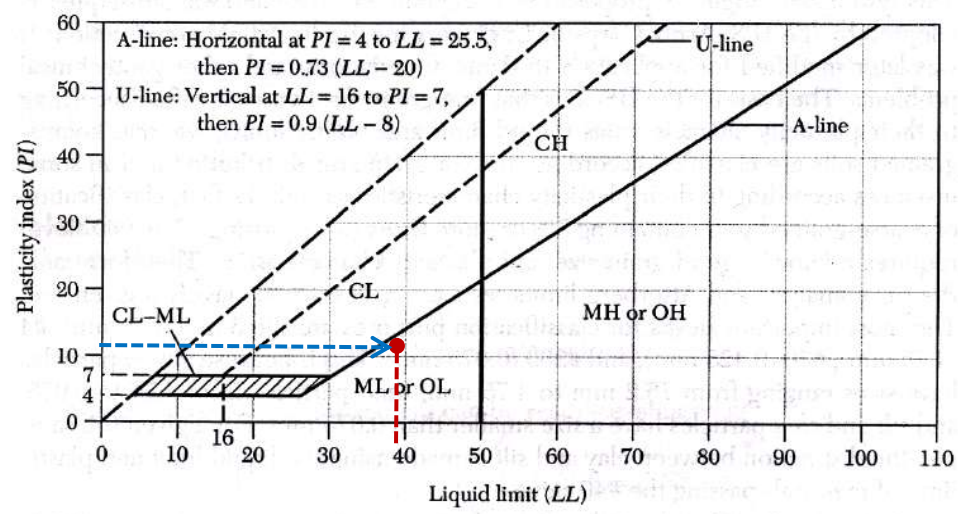


FIGURE 3.14 Plasticity chart used in the classification of fine-grained soils. (Adapted from Casagrande, 1948; Howard, 1977.)

Kesimpulan :-



LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

LOCATION :
SAMPLE NO. :

TESTED BY :
:

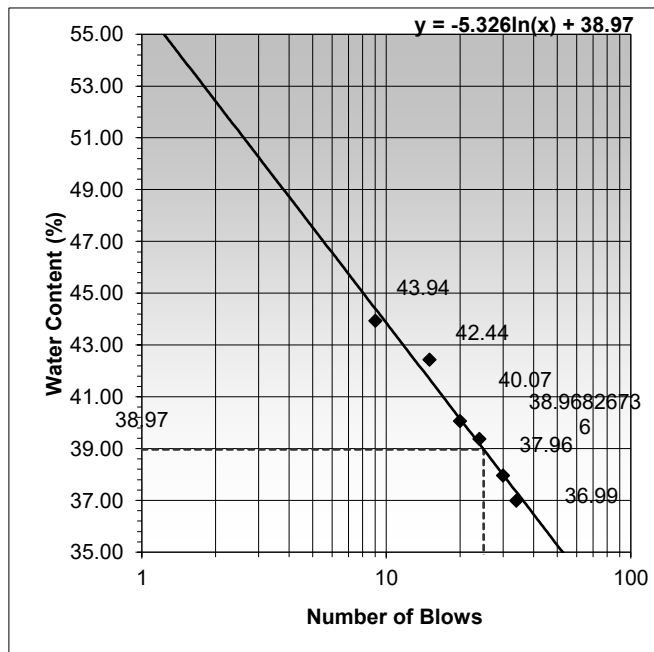
LIQUID LIMIT TEST

1	2	3
NO. OF BLOWS 9	NO. OF BLOWS 15	NO. OF BLOWS 20
No. b8	No. d9	No. d4
WW = 24.98 DW = 21.90	WW = 25.91 DW = 22.57	WW = 25.26 DW = 21.81
DW = 21.90 TW = 14.89	DW = 22.57 TW = 14.70	DW = 21.81 TW = 13.20
Ww = 3.08 Ws = 7.01	Ww = 3.34 Ws = 7.87	Ww = 3.45 Ws = 8.61
w = 43.94 %	w = 42.44 %	w = 40.07 %

4	5	6
NO. OF BLOWS 24	NO. OF BLOWS 30	NO. OF BLOWS 34
No. f9	No. a6	No. b3
WW = 26.99 DW = 23.51	WW = 29.03 DW = 25.31	WW = 27.01 DW = 23.54
DW = 23.51 TW = 14.67	DW = 25.31 TW = 15.51	DW = 23.54 TW = 14.16
Ww = 3.48 Ws = 8.84	Ww = 3.72 Ws = 9.80	Ww = 3.47 Ws = 9.38
w = 39.37 %	w = 37.96 %	w = 36.99 %

PLASTIC LIMIT TEST

1	2	3
No. c8	No. B2	No. b10
WW = 14.62 DW = 14.44	WW = 17.57 DW = 17.41	WW = 14.59 DW = 14.40
DW = 14.44 TW = 13.82	DW = 17.41 TW = 16.82	DW = 14.40 TW = 13.73
Ww = 0.18 Ws = 0.62	Ww = 0.16 Ws = 0.59	Ww = 0.19 Ws = 0.67
w = 28.39 %	w = 27.12 %	w = 28.36 %



REMARKS :

WW = Wt of container + wet soil in gr.
DW = Wt of container + dry soil in gr.
TW = Wt of container in gr.

The limits is determined on the portion of the soil passing 0,4 mm sieve

Dari percobaan didapatkan :

LIQUID LIMIT = 38.97 %
PLASTIC LIMIT = 27.95 %
PLAST. INDEX = 11.01 %

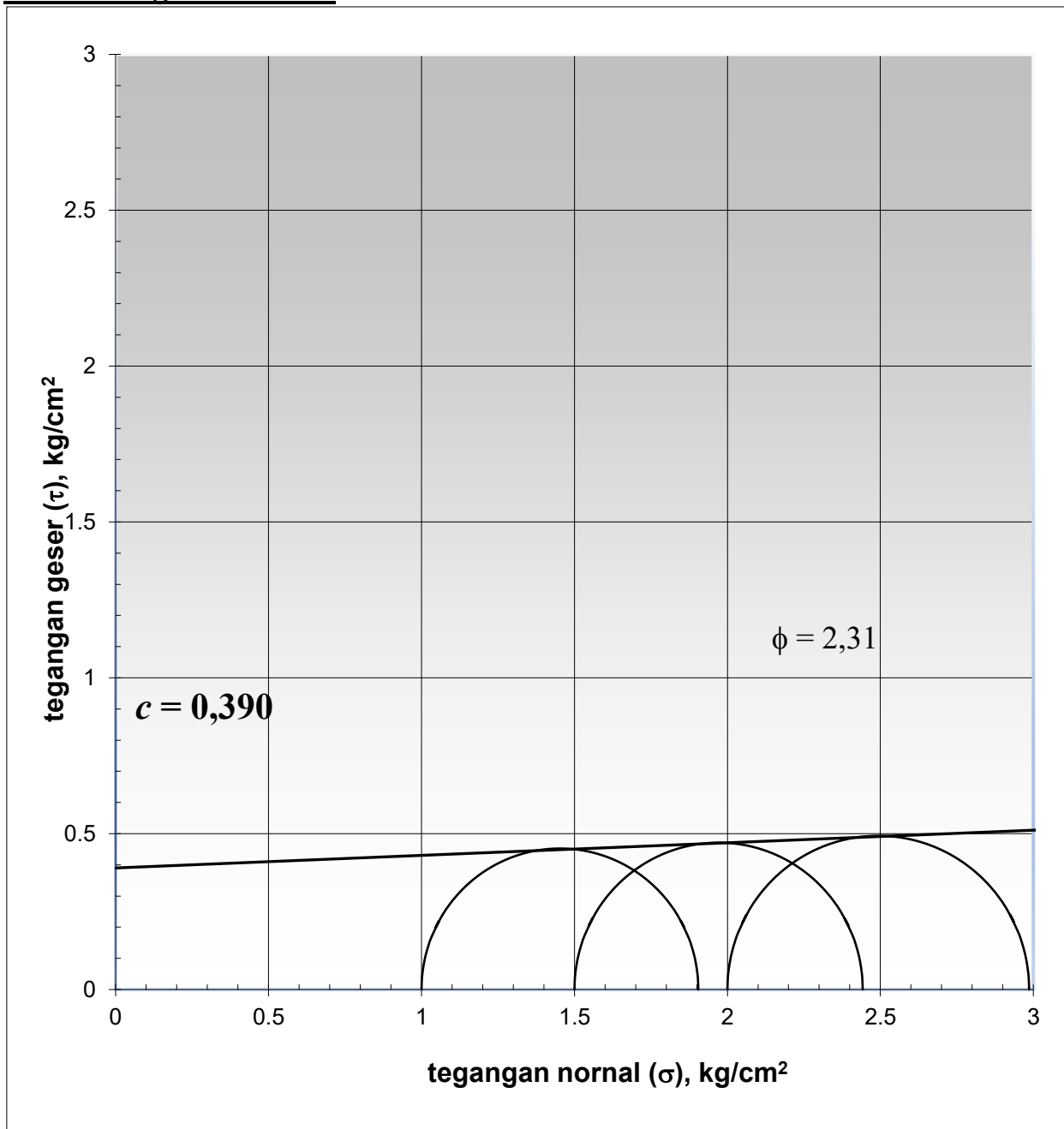


LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

TRIAXIAL COMPRESSION TEST

Grafik Lingkaran Mohr





LABORATORIUM MEKANIK TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
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Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

UNCONFINED COMPRESSIVE STRENGTH

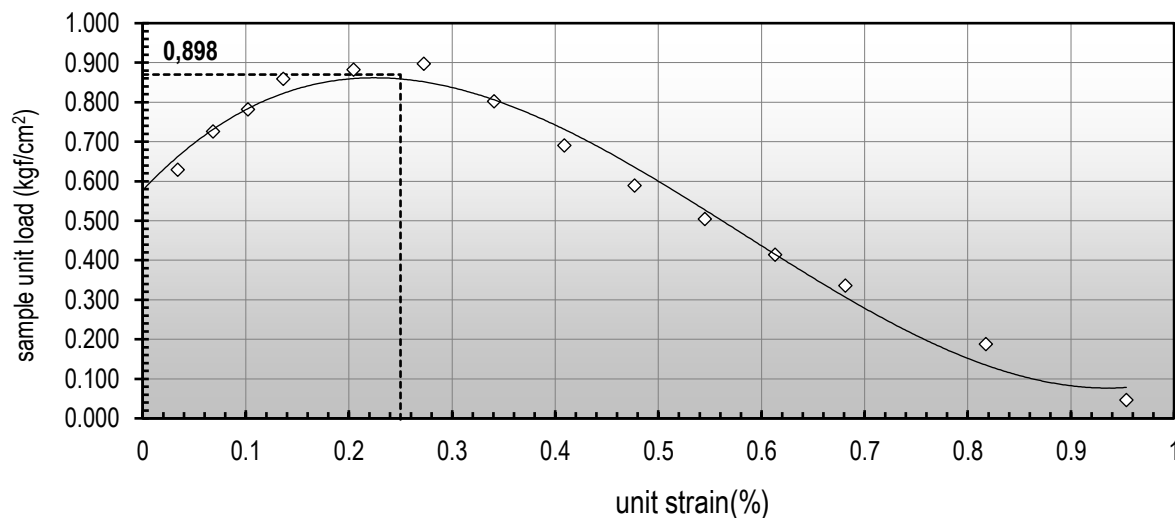
Sample Data

Area (A_0) = 10.70 cm² Height (L_0) = 7.34 cm
w = 25.19 % γ_d = 1.48 gr/cm³

Machine Data

LRC = 0.35 kgf Diameter = 3.69 cm

deformation dial reading	load dial (units)	ΔL col 1 . 10 ⁻²	unit strain $\Delta L / L_0$	area CF 1 - col 4	corrected area A'	total load on sample	sample unit load
25.00	19.9	0.25	0.034	0.966	11.076	6.967	0.629
50.00	23.8	0.50	0.068	0.932	11.480	8.332	0.726
75.00	26.6	0.75	0.102	0.898	11.916	9.313	0.782
100.00	30.4	1.00	0.136	0.864	12.386	10.643	0.859
150.00	33.9	1.50	0.204	0.796	13.446	11.868	0.883
200.00	37.7	2.00	0.272	0.728	14.705	13.199	0.898
250.00	37.2	2.50	0.341	0.659	16.224	13.024	0.803
300.00	35.7	3.00	0.409	0.591	18.094	12.499	0.691
350.00	34.4	3.50	0.477	0.523	20.449	12.043	0.589
400.00	33.9	4.00	0.545	0.455	23.511	11.868	0.505
450.00	32.7	4.50	0.613	0.387	27.650	11.448	0.414
500.00	32.2	5.00	0.681	0.319	33.558	11.273	0.336
600.00	31.4	6.00	0.817	0.183	58.601	10.993	0.188
700.00	30.9	7.00	0.954	0.046	230.959	10.818	0.047
800.00							
900.00							
1000.00							
1100.00							
1200.00							
1300.00							
1400.00							
1500.00							
1600.00							
1700.00							



Dari test didapat q_u = 0.898 kgf/cm²



**LABORATORIUM MEKANIKA TANAH
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WATER CONTENT

PEMERIKSAAN KADAR AIR

Nomor cawan		d6	f8	b3
Berat cawan + tanah basah	(gr)	50.46	45.38	45.73
Berat cawan + tanah kering	(gr)	42.13	38.31	37.84
Berat cawan	(gr)	14.88	13.77	13.97
Berat air	(gr)	8.33	7.07	7.89
Berat tanah kering	(gr)	27.25	24.54	23.87
Kadar air (w)	(%)	30.57	28.81	33.05
Kadar air rata-rata	(%)	30.81		



LABORATORIUM MEKANIKA TANAH
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PEMERIKSAAN BERAT JENIS

BERAT JENIS TANAH

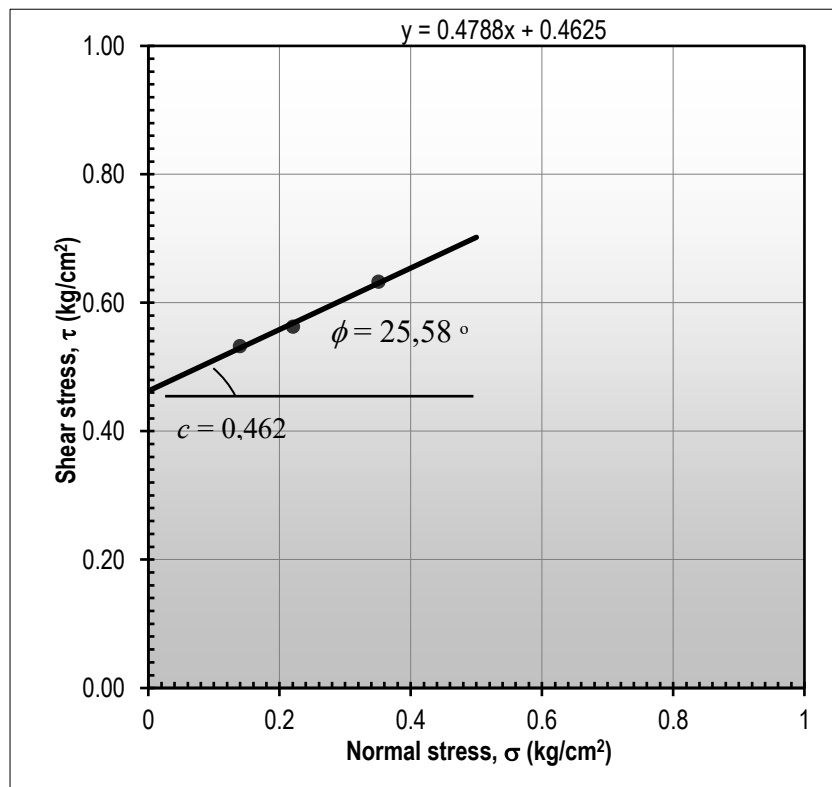
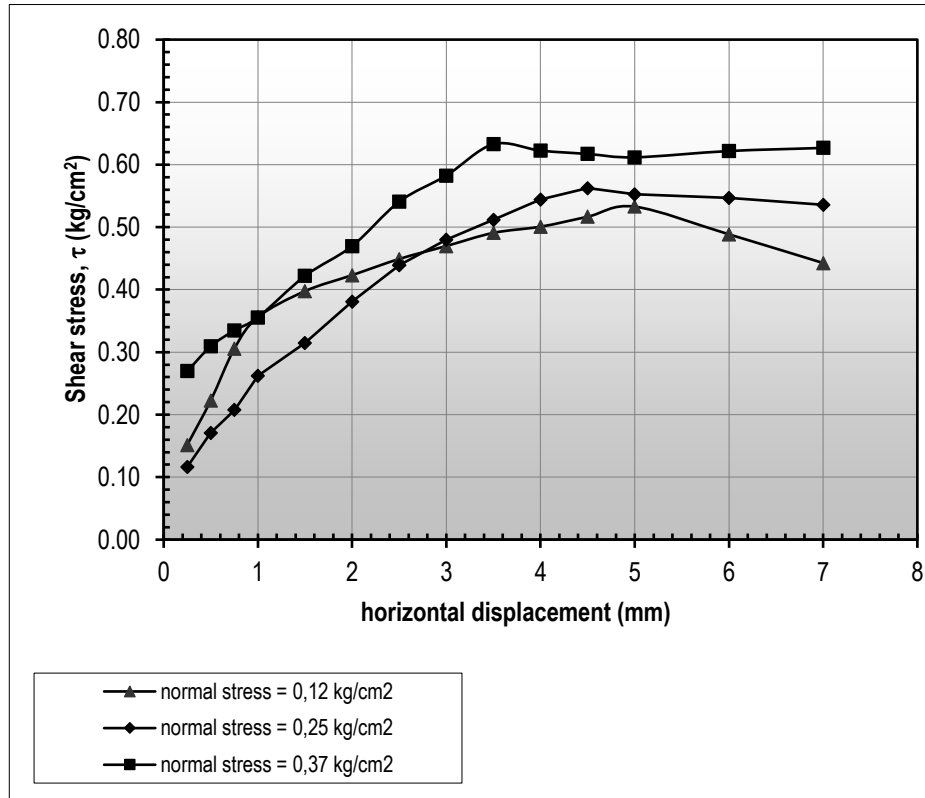
Nomor Picno		C3	O	C
Berat Picno + Tanah (W_2)	gr	96.85	82.06	84.68
Berat Picno (W_1)	gr	46.60	30.11	38.46
Berat Tanah ($W_2 - W_1$)	gr	50.25	51.95	46.22
Suhu (T)	°C	27	27	27
Berat Picno + Air pada T (W_4)	gr	145.76	131.14	138.80
$W_2 - W_1 + W_4$	gr	196.01	183.09	185.02
Berat Picno + Air + Tanah (W_3)	gr	176.81	162.98	167.35
Faktor Koreksi Suhu		0.9986	0.9986	0.9986
Isi Tanah ($W_2 - W_1$) + ($W_4 - W_3$)	cm ³	19.20	20.11	17.67
Berat Jenis Tanah		2.614	2.580	2.612
Rata-rata		2.602		



LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
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Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

DIRECT SHEAR TEST





LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

GRAIN SIZE ANALYSIS (*Hydrometer*)

LOCATION : Lab. Mekanika Tanah
SAMPLE NO. : **B-1**

Dikerjakan

Wt. (air dry* soil + container) =
Wt. Container =
Wt. Air dry soil W' = 130.8 g
*Test is made of soil sample passing 2,0 mm sieve

Specific gravity G = 2.602
Plasticity index P.I. = 15.65 %
a = 1

WATER CONTENT OF AIR DRY SOIL SAMPLE

Kode			d6	Kode			f8	Kode			b3	Mean value (w)
WW =	50.46	DW =	42.13	WW =	45.38	DW =	38.31	WW =	45.73	DW =	37.84	= 30.81 %
DW =	42.13	TW =	14.88	DW =	38.31	TW =	13.77	DW =	37.84	TW =	13.97	
Ww =	8.33	Ws =	27.25	Ww =	7.07	Ws =	24.54	Ww =	7.89	Ws =	23.87	
w = 30.57 %				w = 28.81 %				w = 33.05 %				

Wt. Of oven - dry soil $W = \frac{100W'}{100+w} = 100$ g

HYDROMETER ANALYSIS

1	2	3	4	5	6	7	8	9	10	11
Elapsed time (t) (min)	Hydrometer reading		Temperature °C	L	$\sqrt{L/t}$	$\sqrt{\frac{30m}{980(G-G')}} = K$	d 6 x 7	F	Rc = r'/1000 + F	% finer = P k10 x M x 1000
	Under decimal only	r' col. 2 + Cm								
1	22	23.00	27	15.48	3.934	0.01307	0.0514	0.0023	0.0253	66.334
2	19	20.00	27	15.82	2.812	0.01307	0.0368	0.0023	0.0223	58.468
3	19	20.00	27	16.16	2.321	0.01307	0.0303	0.0023	0.0223	58.468
15	16	17.00	27	16.51	1.049	0.01307	0.0137	0.0023	0.0193	50.602
30	14	15.00	27	16.73	0.747	0.01307	0.0098	0.0023	0.0173	45.359
60	13	14.00	27	16.85	0.530	0.01307	0.0069	0.0023	0.0163	42.737
240	8	9.00	27	17.19	0.268	0.01307	0.0018	0.0023	0.0113	29.627
1440	7	8.00	27	17.30	0.110	0.01307	0.0015	0.0023	0.0103	27.005
2880	6	7.00	27	17.65	0.078	0.01307	0.0010	0.0023	0.0093	24.384

$$\frac{100}{W} = 1.000 ; \frac{G}{G - G'} = 1.62188 \quad M = \frac{100}{W} + \frac{G}{G - G'} = 2.622$$

Meniscus correction Cm = 1.00 G' = 0.9971 m = 0.00896

SEIVE ANALYSIS

Sieve opening in mm	Weight of soil retained in gr.	*Percent retained	*Cummulative Percent retained	*Cummulative Percent finer P
0.85	4.26	3.26%	3.26%	96.74%
0.4	2.93	2.24%	5.50%	94.50%
0.25	3.90	2.98%	8.48%	91.52%
0.11	4.81	3.68%	12.15%	87.85%
0.075	2.94	2.25%	14.40%	85.60%

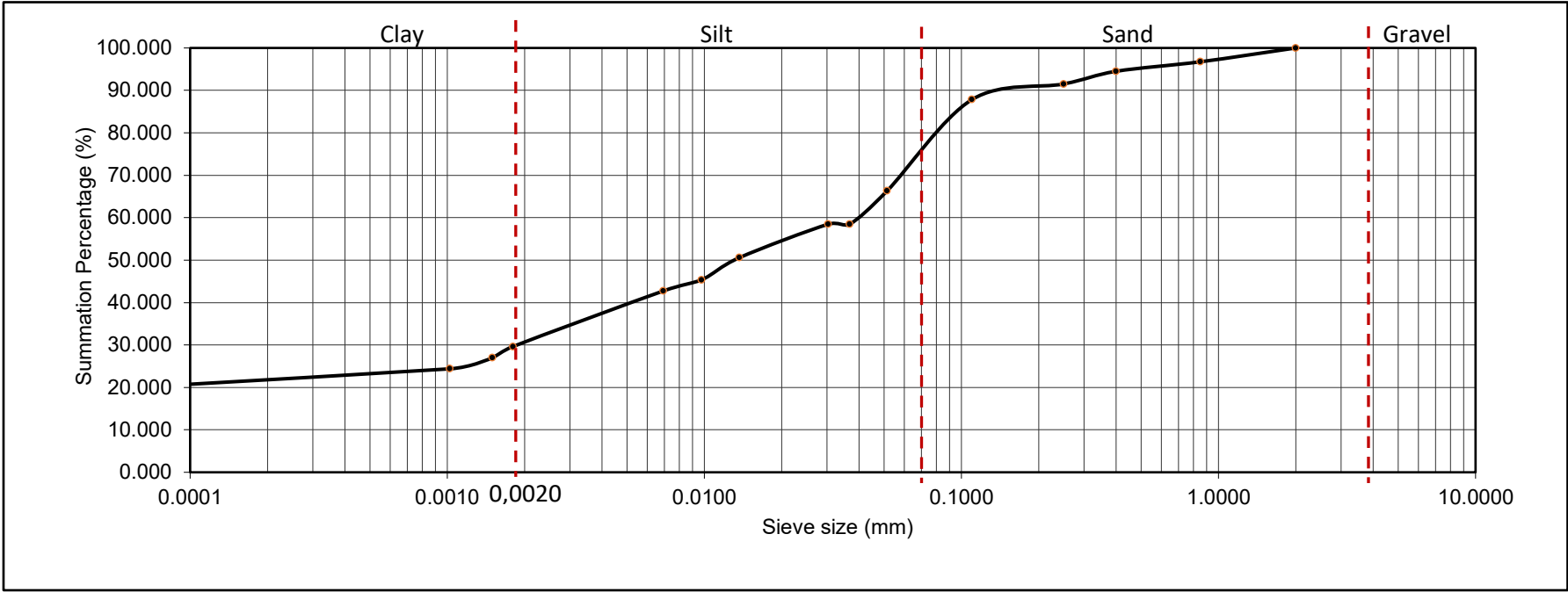
L = Effective depth in cm
m = Viscosity of water in poise
G' = Specific gravity of water
d = Maximum diameter of soil grain in mm
F = Correction factor against temperature



LABORATORIUM MEKANIKA TANAH
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INSTITUT TEKNOLOGI NASIONAL MALANG

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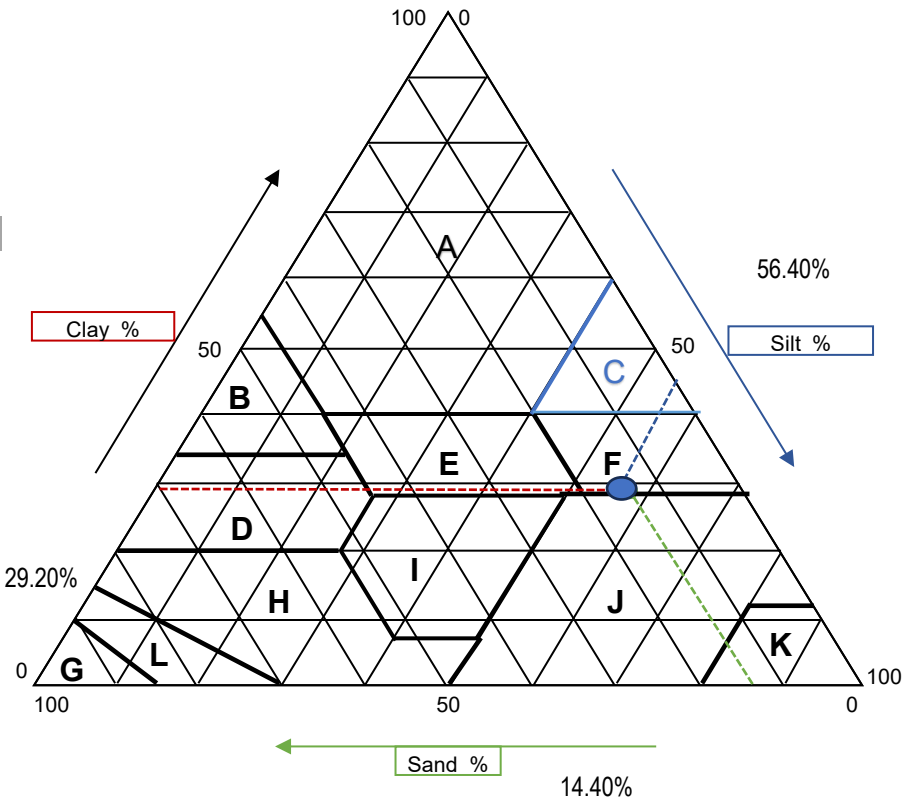
GRAIN SIZE ANALYSIS (Hydrometer)



Gravel	Sand	Silt	Clay	Max size	D 60	D 10	Classification	Remarks
0%	14.40%	56.40%	29.20%	0.0514	0.010	-	I.	=

CLASSIFICATION

- A. CLAY
- B. SANDY CLAY
- C. SILTY CLAY
- D. SANDY CLAY LOAM
- E. CLAYLEY LOAM
- F. SILTY CLAY LOAM
- G. SAND
- H. SANDY LOAM
- I. LOAM
- J. SILTY LOAM
- K. SILT
- L. LOAMY SAND



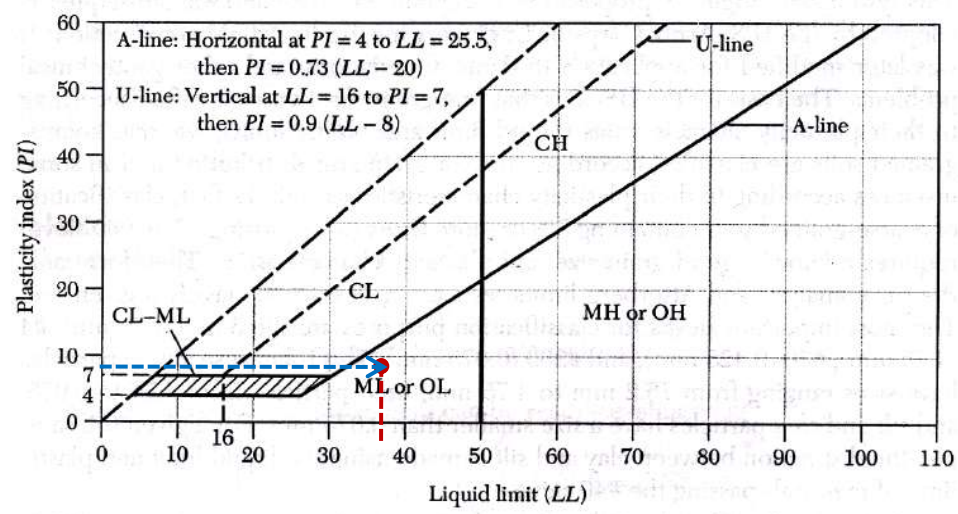


FIGURE 3.14 Plasticity chart used in the classification of fine-grained soils. (Adapted from Casagrande, 1948; Howard, 1977.)

Kesimpulan :-



LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

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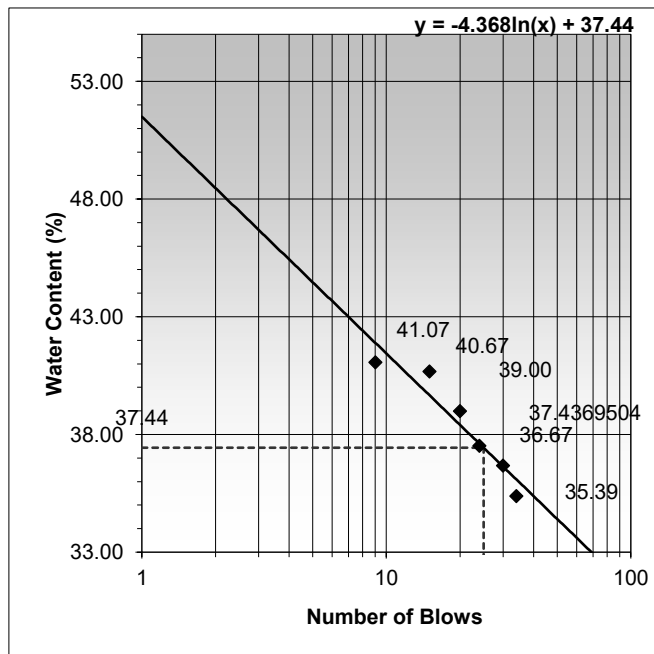
LIQUID LIMIT TEST

1	2	3
NO. OF BLOWS 9	NO. OF BLOWS 15	NO. OF BLOWS 20
No. B6	No. D9	No. D4
WW = 25.19 DW = 22.11	WW = 27.20 DW = 23.67	WW = 26.08 DW = 22.34
DW = 22.11 TW = 14.61	DW = 23.67 TW = 14.99	DW = 22.34 TW = 12.75
Ww = 3.08 Ws = 7.50	Ww = 3.53 Ws = 8.68	Ww = 3.74 Ws = 9.59
w = 41.07 %	w = 40.67 %	w = 39.00 %

4	5	6
NO. OF BLOWS 24	NO. OF BLOWS 30	NO. OF BLOWS 34
No. G7	No. A7	No. B1
WW = 26.99 DW = 23.47	WW = 28.71 DW = 25.23	WW = 26.48 DW = 23.21
DW = 23.47 TW = 14.09	DW = 25.23 TW = 15.74	DW = 23.21 TW = 13.97
Ww = 3.52 Ws = 9.38	Ww = 3.48 Ws = 9.49	Ww = 3.27 Ws = 9.24
w = 37.53 %	w = 36.67 %	w = 35.39 %

PLASTIC LIMIT TEST

1	2	3
No. c8	No. B2	No. b10
WW = 14.78 DW = 14.56	WW = 17.59 DW = 17.42	WW = 14.59 DW = 14.41
DW = 14.56 TW = 13.80	DW = 17.42 TW = 16.83	DW = 14.41 TW = 13.78
Ww = 0.22 Ws = 0.76	Ww = 0.17 Ws = 0.59	Ww = 0.19 Ws = 0.63
w = 28.95 %	w = 28.81 %	w = 29.60 %



REMARKS :

WW = Wt of container + wet soil in gr.

DW = Wt of container + dry soil in gr.

TW = Wt of container in gr.

The limits is determined on the portion of the soil passing 0,4 mm sieve

Dari percobaan didapatkan :

LIQUID LIMIT = 37.44 %

PLASTIC LIMIT = 29.12 %

PLAST. INDEX = 8.32 %

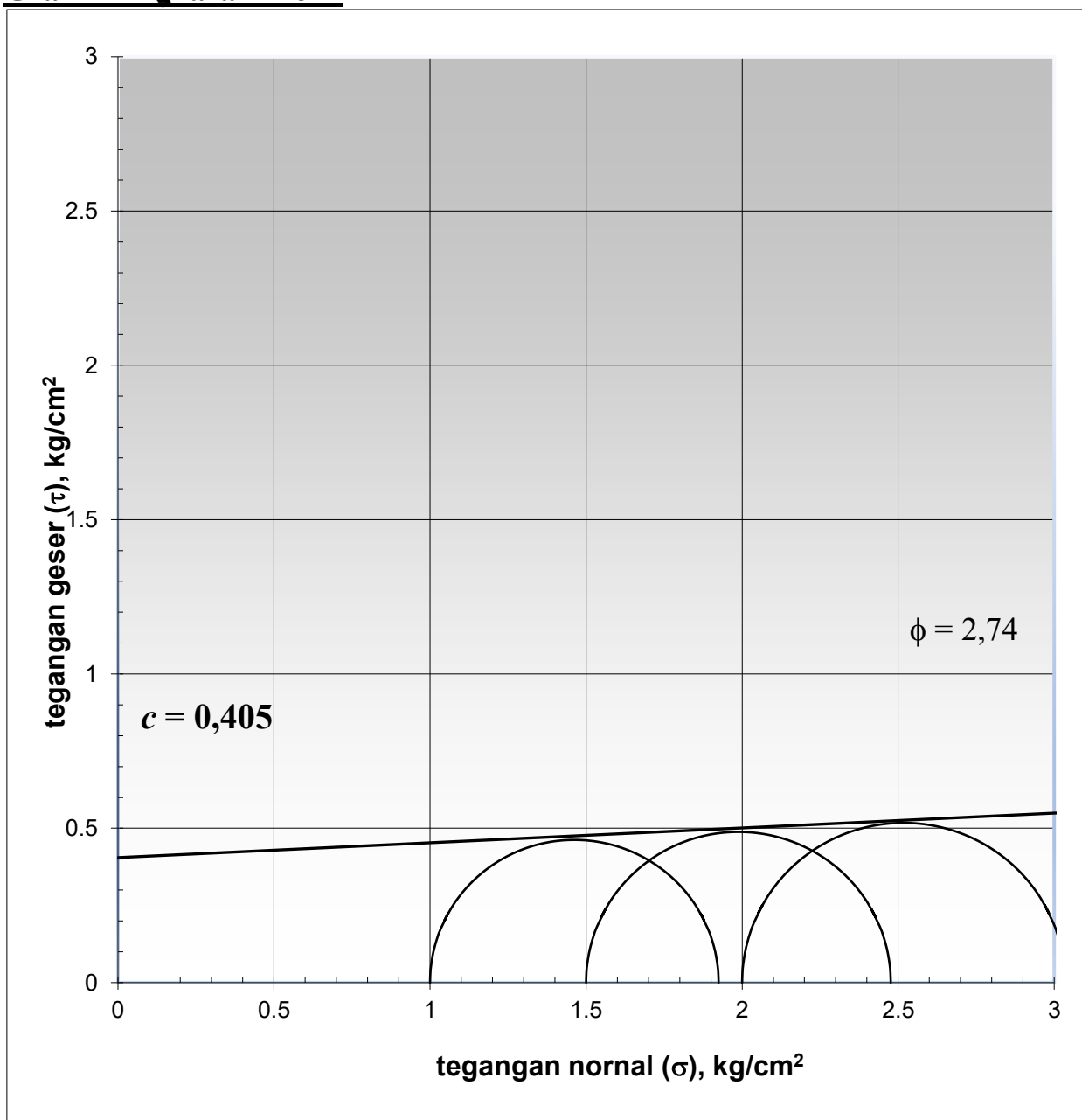


LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

TRIAXIAL COMPRESSION TEST

Grafik Lingkaran Mohr





LABORATORIUM MEKANIK TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

UNCONFINED COMPRESSIVE STRENGTH

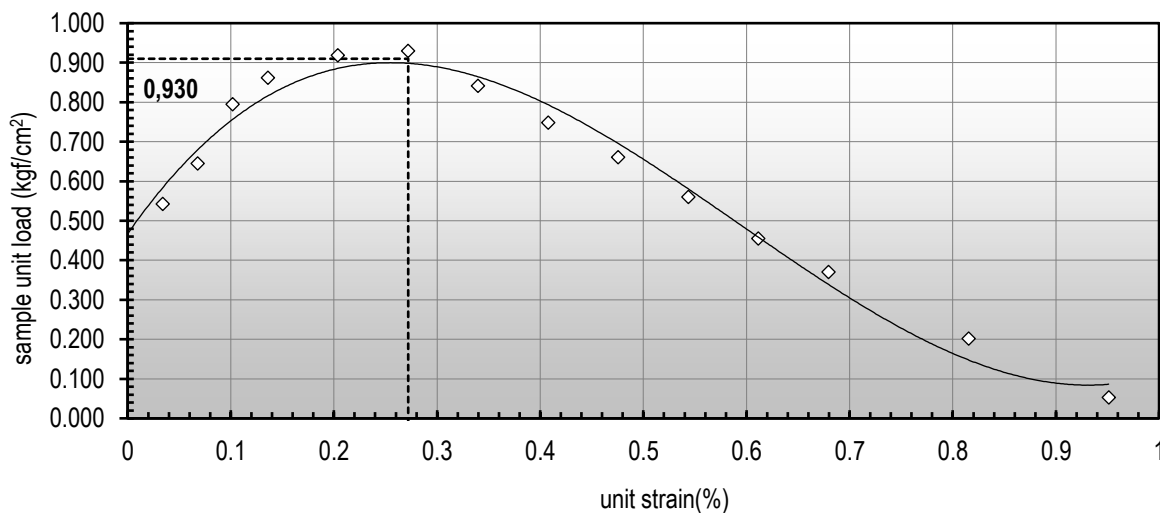
Sample Data

Area (A_0) = 10.53 cm² Height (L_0) = 7.36 cm
w = 24.28 % γ_d = 1.51 gr/cm³

Machine Data

LRC = 0.35 kgf Diameter = 3.66 cm

deformation dial reading	load dial (units)	ΔL col 1 . 10 ⁻²	unit strain $\Delta L / L_0$	area CF 1 - col 4	corrected area A'	total load on sample	sample unit load
25.00	16.9	0.25	0.034	0.966	10.895	5.917	0.543
50.00	20.8	0.50	0.068	0.932	11.292	7.282	0.645
75.00	26.6	0.75	0.102	0.898	11.719	9.313	0.795
100.00	30.0	1.00	0.136	0.864	12.180	10.503	0.862
150.00	34.7	1.50	0.204	0.796	13.219	12.148	0.919
200.00	38.4	2.00	0.272	0.728	14.452	13.444	0.930
250.00	38.3	2.50	0.340	0.660	15.939	13.409	0.841
300.00	38.0	3.00	0.408	0.592	17.767	13.304	0.749
350.00	37.9	3.50	0.476	0.524	20.069	13.269	0.661
400.00	36.9	4.00	0.543	0.457	23.055	12.919	0.560
450.00	35.2	4.50	0.611	0.389	27.086	12.324	0.455
500.00	34.7	5.00	0.679	0.321	32.824	12.148	0.370
600.00	32.9	6.00	0.815	0.185	56.959	11.518	0.202
700.00	32.6	7.00	0.951	0.049	215.180	11.413	0.053
800.00							
900.00							
1000.00							
1100.00							
1200.00							
1300.00							
1400.00							
1500.00							
1600.00							
1700.00							



Dari test didapat q_u = 0.930 kgf/cm²



**LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
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WATER CONTENT

PEMERIKSAAN KADAR AIR

Nomor cawan		a6	b2	f11
Berat cawan + tanah basah	(gr)	52.34	45.48	53.73
Berat cawan + tanah kering	(gr)	43.13	38.25	43.96
Berat cawan	(gr)	15.50	16.85	14.19
Berat air	(gr)	9.21	7.23	9.77
Berat tanah kering	(gr)	27.63	21.40	29.77
Kadar air (w)	(%)	33.33	33.79	32.82
Kadar air rata-rata	(%)	33.31		



LABORATORIUM MEKANIKA TANAH
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INSTITUT TEKNOLOGI NASIONAL MALANG

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PEMERIKSAAN BERAT JENIS

LOKASI :
DIKERJAKAN :
JENIS TANAH :
KEDALAMAN :
NOMOR CONTOH :

BERAT JENIS TANAH

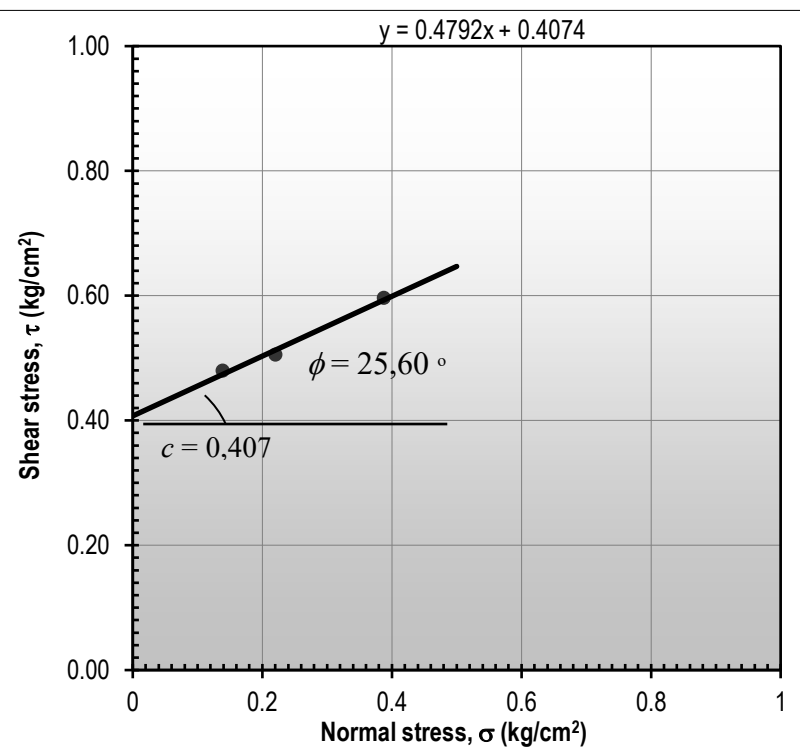
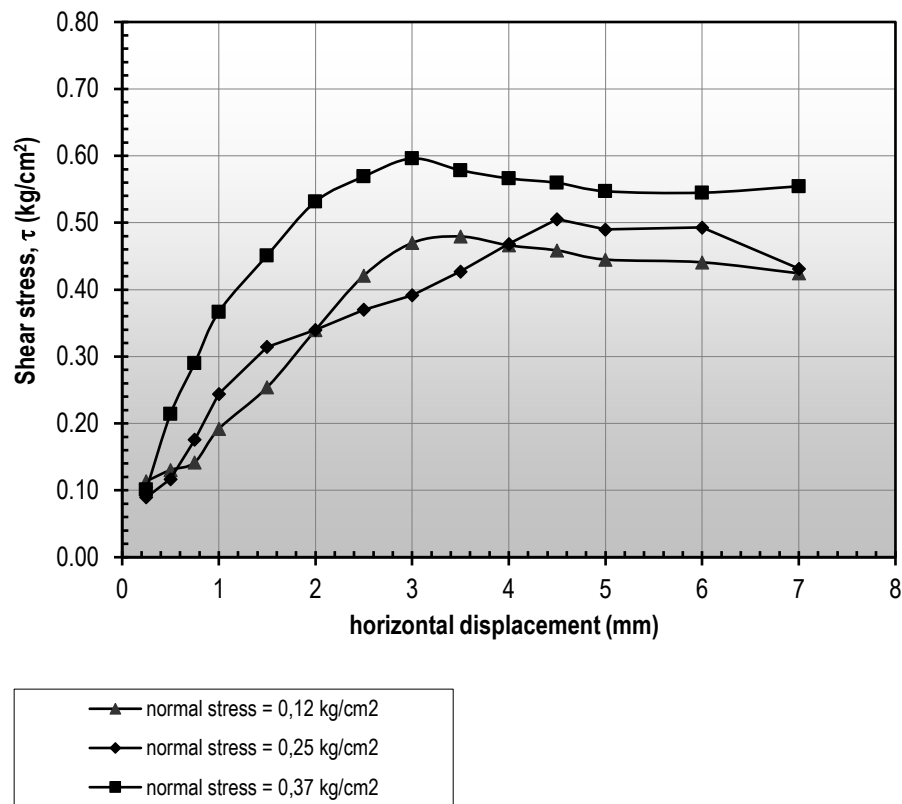
Nomor Picno		C	O	CO
Berat Picno + Tanah (W_2)	gr	96.85	82.26	83.78
Berat Picno (W_1)	gr	46.60	30.11	38.46
Berat Tanah ($W_2 - W_1$)	gr	50.25	52.15	45.32
Suhu (T)	°C	27	27	27
Berat Picno + Air pada T (W_4)	gr	145.76	131.14	138.80
$W_2 - W_1 + W_4$	gr	196.01	183.29	184.12
Berat Picno + Air + Tanah (W_3)	gr	176.71	162.98	167.25
Faktor Koreksi Suhu		0.9986	0.9986	0.9986
Isi Tanah ($W_2 - W_1$) + ($W_4 - W_3$)	cm ³	19.30	20.31	16.87
Berat Jenis Tanah		2.600	2.564	2.683
Rata-rata		2.616		



LABORATORIUM MEKANIKA TANAH
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INSTITUT TEKNOLOGI NASIONAL MALANG

Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

DIRECT SHEAR TEST

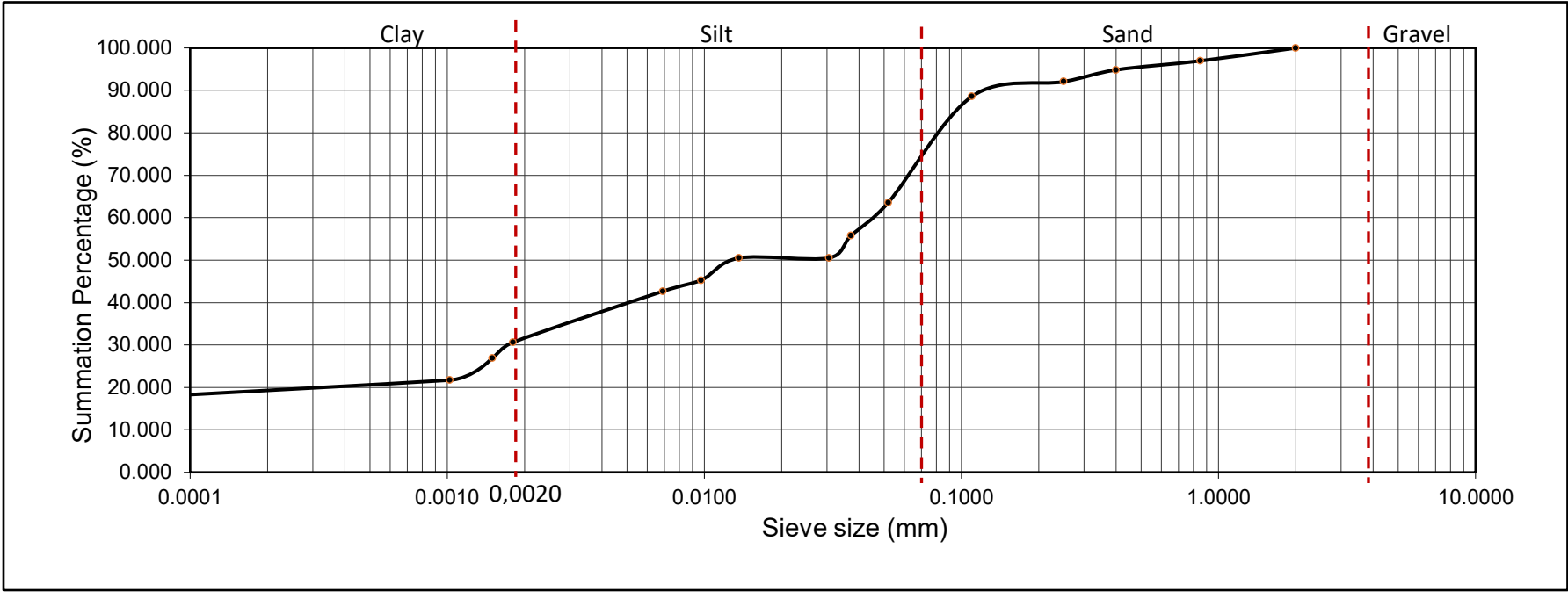




LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

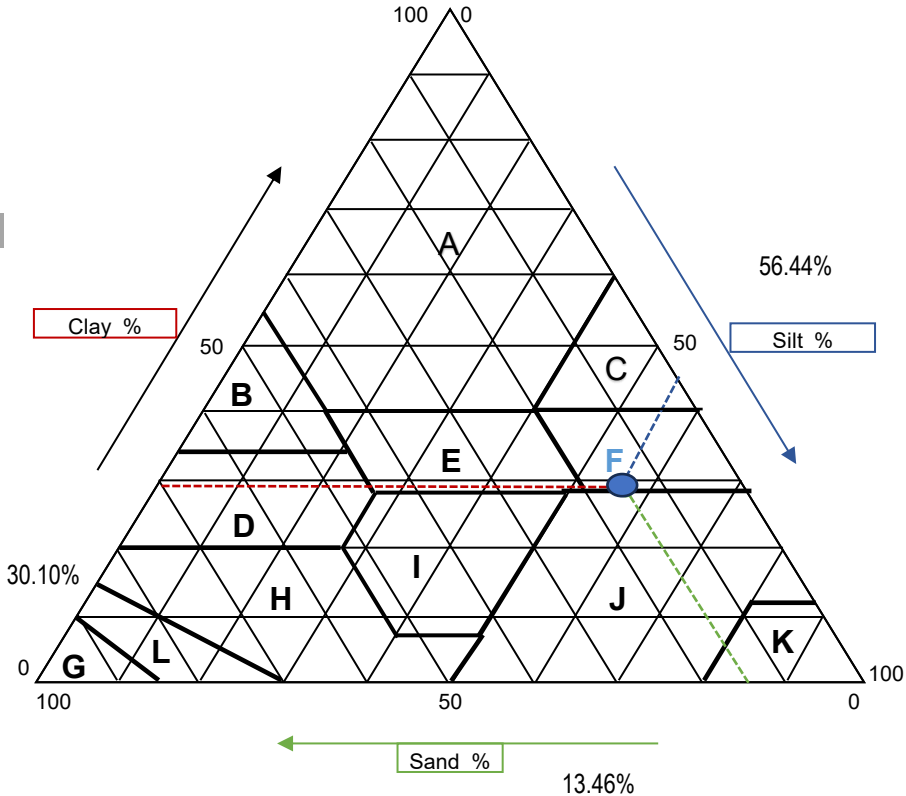
GRAIN SIZE ANALYSIS (Hydrometer)



Gravel	Sand	Silt	Clay	Max size	D 60	D 10	Classification	Remarks
0%	13.46%	56.44%	30.10%	0.0520	0.010	-	I.	=

CLASSIFICATION

- A. CLAY
- B. SANDY CLAY
- C. SILTY CLAY
- D. SANDY CLAY LOAM
- E. CLAYLEY LOAM
- F. SILTY CLAY LOAM
- G. SAND
- H. SANDY LOAM
- I. LOAM
- J. SILTY LOAM
- K. SILT
- L. LOAMY SAND



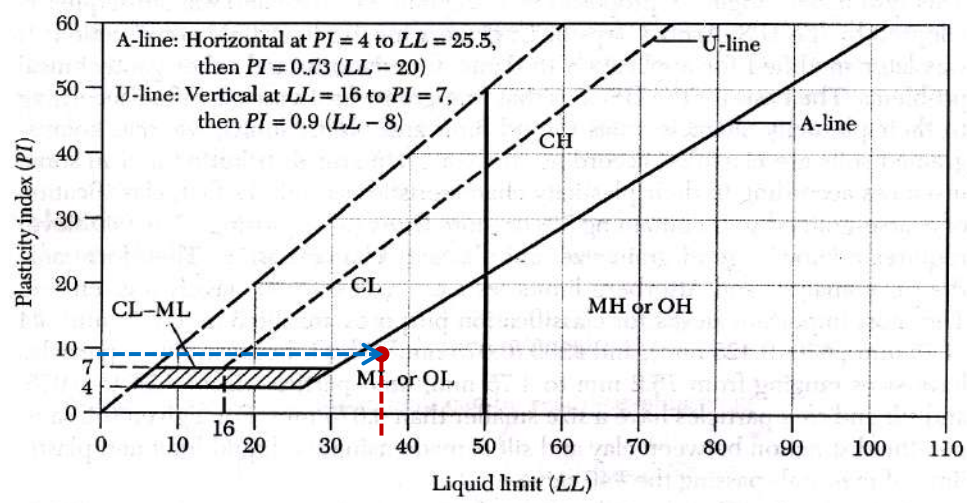


FIGURE 3.14 Plasticity chart used in the classification of fine-grained soils. (Adapted from Casagrande, 1948; Howard, 1977.)

Kesimpulan :-



LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

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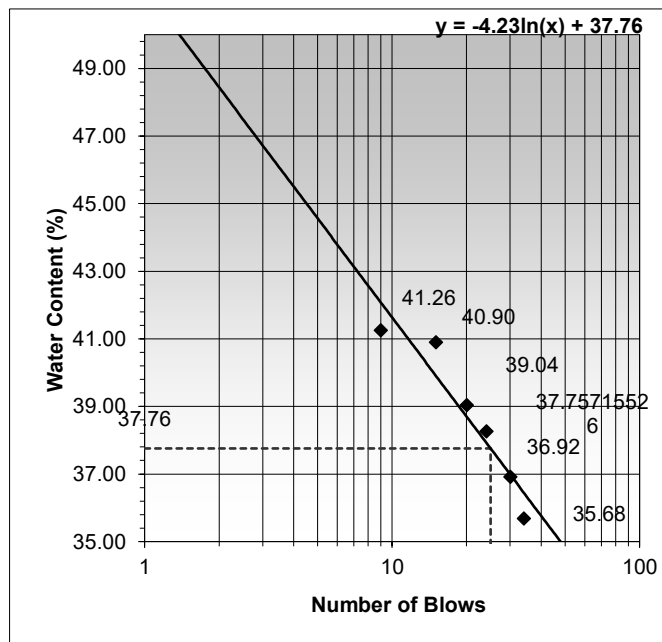
LIQUID LIMIT TEST

1	2	3
NO. OF BLOWS 9	NO. OF BLOWS 15	NO. OF BLOWS 20
No. F1	No. D2	No. D4
WW = 25.19 DW = 22.10	WW = 27.22 DW = 23.67	WW = 26.08 DW = 22.34
DW = 22.10 TW = 14.61	DW = 23.67 TW = 14.99	DW = 22.34 TW = 12.76
Ww = 3.09 Ws = 7.49	Ww = 3.55 Ws = 8.68	Ww = 3.74 Ws = 9.58
w = 41.26 %	w = 40.90 %	w = 39.04 %

4	5	6
NO. OF BLOWS 24	NO. OF BLOWS 30	NO. OF BLOWS 34
No. G4	No. A1	No. J6
WW = 26.99 DW = 23.42	WW = 28.72 DW = 25.22	WW = 26.49 DW = 23.20
DW = 23.42 TW = 14.09	DW = 25.22 TW = 15.74	DW = 23.20 TW = 13.98
Ww = 3.57 Ws = 9.33	Ww = 3.50 Ws = 9.48	Ww = 3.29 Ws = 9.22
w = 38.26 %	w = 36.92 %	w = 35.68 %

PLASTIC LIMIT TEST

1	2	3
No. c8	No. B2	No. b10
WW = 14.79 DW = 14.59	WW = 17.59 DW = 17.42	WW = 14.59 DW = 14.41
DW = 14.59 TW = 13.90	DW = 17.42 TW = 16.83	DW = 14.41 TW = 13.77
Ww = 0.20 Ws = 0.69	Ww = 0.17 Ws = 0.59	Ww = 0.18 Ws = 0.64
w = 28.26 %	w = 28.81 %	w = 28.33 %



REMARKS :

WW = Wt of container + wet soil in gr.
DW = Wt of container + dry soil in gr.
TW = Wt of container in gr.

The limits is determined on the portion of the soil passing 0,4 mm sieve

Dari percobaan didapatkan :

LIQUID LIMIT = 37.76 %
PLASTIC LIMIT = 28.47 %
PLAST. INDEX = 9.29 %

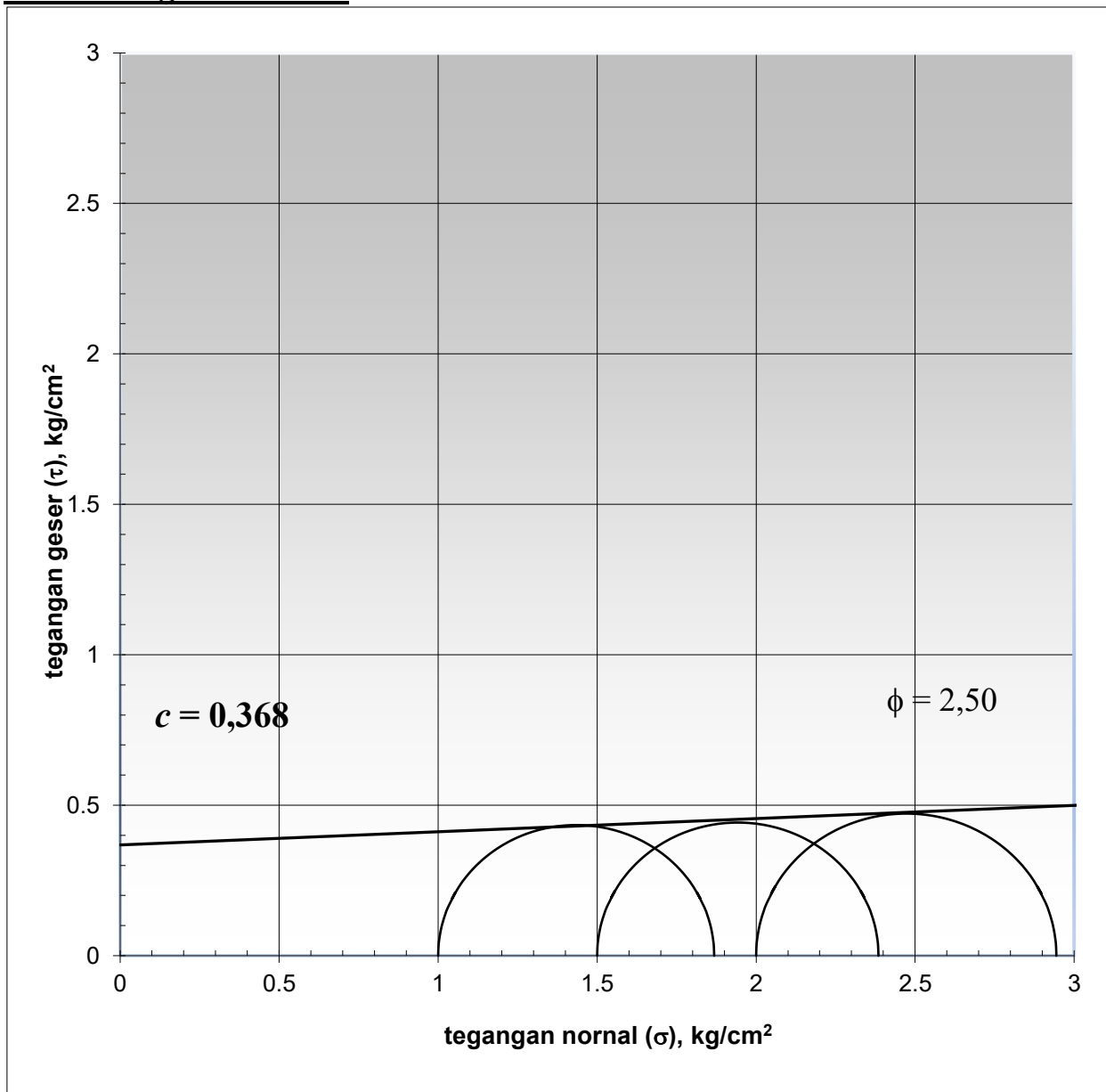


LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

TRIAXIAL COMPRESSION TEST

Grafik Lingkaran Mohr





LABORATORIUM MEKANIK TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

UNCONFINED COMPRESSIVE STRENGTH

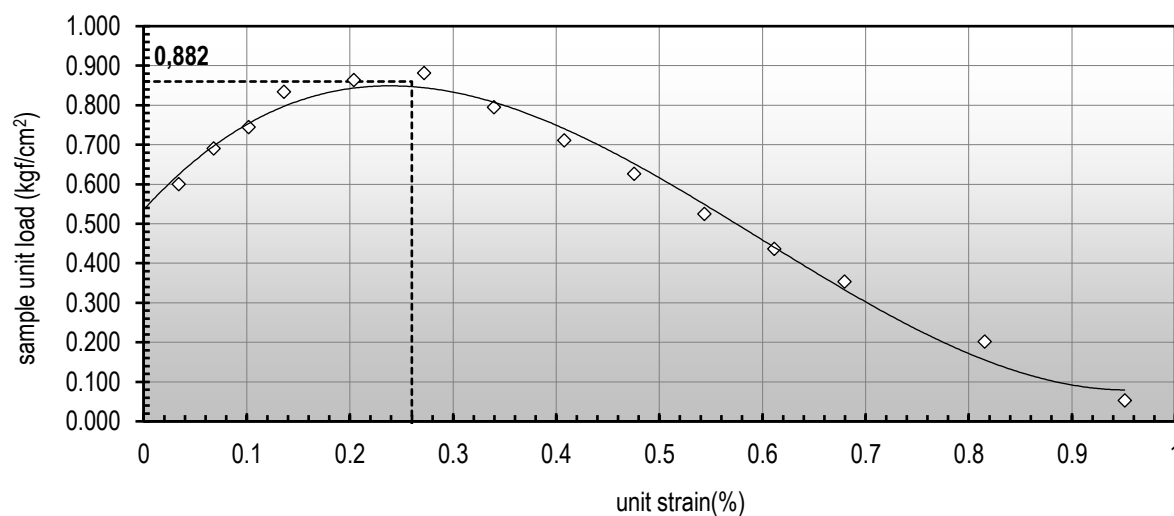
Sample Data

Area (A_0) = 10.81 cm² Height (L_0) = 7.36 cm
w = 42.09 % γ_d = 1.28 gr/cm³

Machine Data

LRC = 0.35 kgf Diameter = 3.71 cm

deformation dial reading	load dial (units)	ΔL col 1 . 10 ⁻²	unit strain $\Delta L / L_0$	area CF 1 - col 4	corrected area A'	total load on sample	sample unit load
25.00	19.2	0.25	0.034	0.966	11.195	6.722	0.600
50.00	22.9	0.50	0.068	0.932	11.603	8.017	0.691
75.00	25.6	0.75	0.102	0.898	12.042	8.963	0.744
100.00	29.8	1.00	0.136	0.864	12.515	10.433	0.834
150.00	33.5	1.50	0.204	0.796	13.583	11.728	0.863
200.00	37.4	2.00	0.272	0.728	14.850	13.094	0.882
250.00	37.2	2.50	0.340	0.660	16.378	13.024	0.795
300.00	37.1	3.00	0.408	0.592	18.256	12.989	0.711
350.00	36.9	3.50	0.476	0.524	20.621	12.919	0.626
400.00	35.5	4.00	0.543	0.457	23.689	12.429	0.525
450.00	34.7	4.50	0.611	0.389	27.831	12.148	0.437
500.00	34.1	5.00	0.679	0.321	33.727	11.938	0.354
600.00	33.8	6.00	0.815	0.185	58.526	11.833	0.202
700.00	33.5	7.00	0.951	0.049	221.100	11.728	0.053
800.00							
900.00							
1000.00							
1100.00							
1200.00							
1300.00							
1400.00							
1500.00							
1600.00							
1700.00							



Dari test didapat q_u = 0.882 kgf/cm²



**LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG**

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WATER CONTENT

PEMERIKSAAN KADAR AIR

Nomor cawan		b8	c9	f9
Berat cawan + tanah basah	(gr)	55.24	43.50	38.82
Berat cawan + tanah kering	(gr)	48.59	39.56	34.33
Berat cawan	(gr)	14.58	14.14	6.12
Berat air	(gr)	6.65	3.94	4.49
Berat tanah kering	(gr)	34.01	25.42	28.21
Kadar air (w)	(%)	19.55	15.50	15.92
Kadar air rata-rata	(%)	16.99		



LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

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PEMERIKSAAN BERAT JENIS

BERAT JENIS TANAH

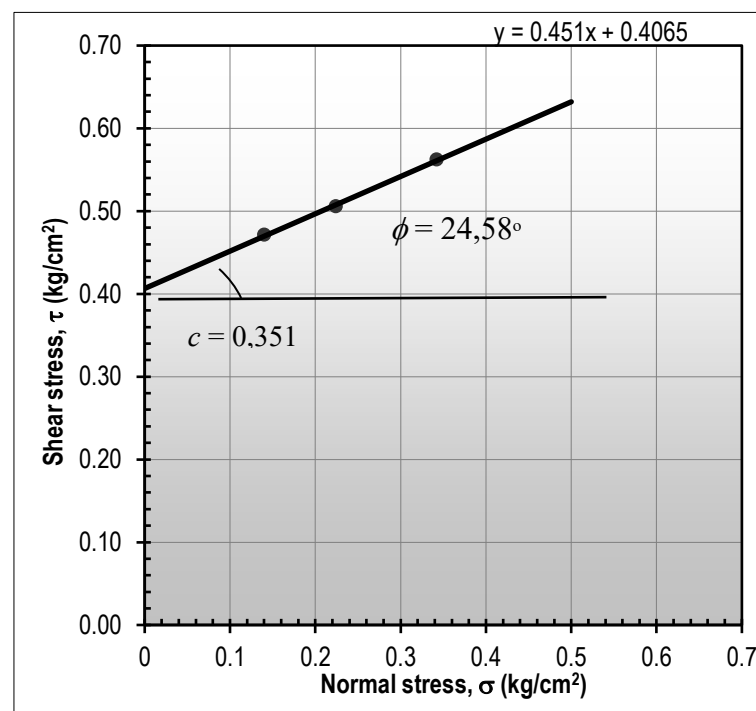
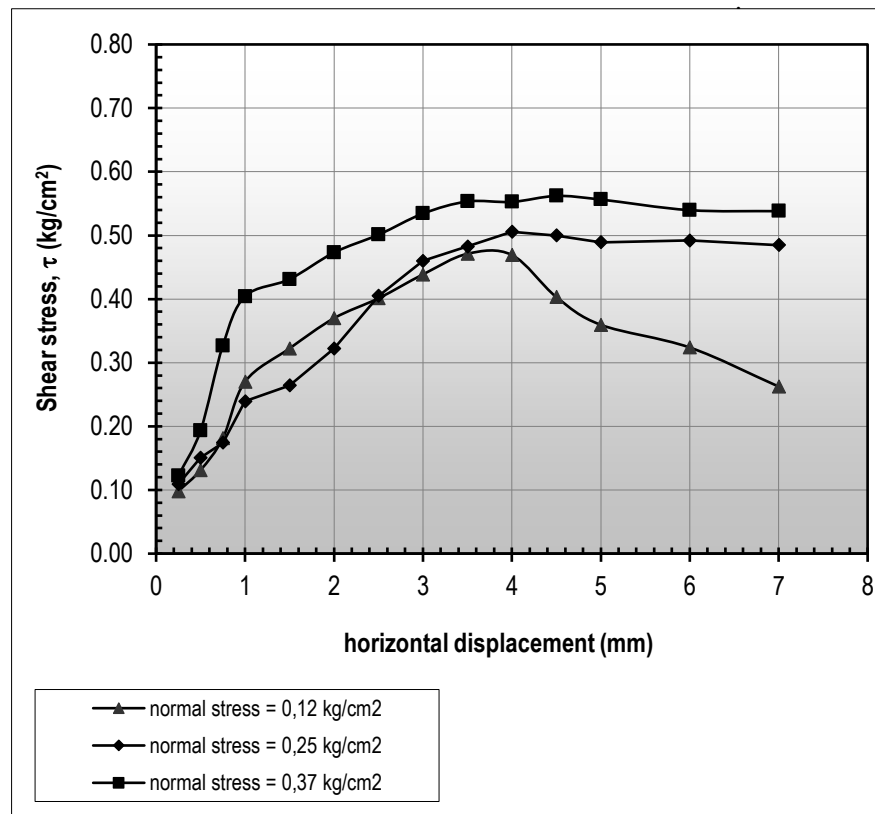
Nomor Picno		C3	C	O
Berat Picno + Tanah (W_2)	gr	97.79	84.90	83.25
Berat Picno (W_1)	gr	46.60	30.11	38.46
Berat Tanah ($W_2 - W_1$)	gr	51.19	54.79	44.79
Suhu (T)	°C	27	27	27
Berat Picno + Air pada T (W_4)	gr	145.76	131.14	138.80
$W_2 - W_1 + W_4$	gr	196.95	185.93	183.59
Berat Picno + Air + Tanah (W_3)	gr	177.22	164.90	166.29
Faktor Koreksi Suhu		0.9986	0.9986	0.9986
Isi Tanah ($W_2 - W_1$) + ($W_4 - W_3$)	cm ³	19.73	21.03	17.30
Berat Jenis Tanah		2.591	2.602	2.585
Rata-rata		2.593		



LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

DIRECT SHEAR TEST





LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

GRAIN SIZE ANALYSIS (*Hydrometer*)

Wt. (air dry* soil + container) =
Wt. Container =
Wt. Air dry soil W' = 117 g
*Test is made of soil sample passing 2,0 mm sieve

Specific gravity G = 2.593 a = 1
Plasticity index P.I. = 15.65 %

WATER CONTENT OF AIR DRY SOIL SAMPLE

Kode			b8	Kode			c9	Kode			f9	Mean value (w) = 16.99 %
WW =	55.24	DW =	48.59	WW =	43.50	DW =	39.56	WW =	38.82	DW =	34.33	
DW =	48.59	TW =	14.58	DW =	39.56	TW =	14.14	DW =	34.33	TW =	6.12	
Ww =	6.65	Ws =	34.01	Ww =	3.94	Ws =	25.42	Ww =	4.49	Ws =	28.21	
w = 19.55 %				w = 15.50 %				w = 15.92 %				

Wt. Of oven - dry soil $W = \frac{100W'}{100+w} = 100$ g

HYDROMETER ANALYSIS

1	2	3	4	5	6	7	8	9	10	11
Elapsed time (t) (min)	Hydrometer reading		Temper ature °C	L	$\sqrt{L/t}$	$\sqrt{\frac{30 m}{980(G-G')}} = K$	d 6 x 7	F	Rc = r'/1000 + F	% finer = P k10 x M x 1000
	Under decimal only	r' col. 2 + Cm								
1	22	23.00	27	15.82	3.977	0.01311	0.0521	0.0023	0.0253	66.423
2	20	21.00	27	16.05	2.833	0.01311	0.0371	0.0023	0.0233	61.173
3	19	20.00	27	16.16	2.321	0.01311	0.0304	0.0023	0.0223	58.547
15	16	17.00	27	16.51	1.049	0.01311	0.0138	0.0023	0.0193	50.671
30	15	16.00	27	16.62	0.744	0.01311	0.0098	0.0023	0.0183	48.045
60	13	14.00	27	16.85	0.530	0.01311	0.0069	0.0023	0.0163	42.795
240	11	12.00	27	17.08	0.267	0.01311	0.0018	0.0023	0.0143	37.544
1440	10	11.00	27	17.19	0.109	0.01311	0.0015	0.0023	0.0133	34.918
2880	7	8.00	27	17.53	0.078	0.01311	0.0010	0.0023	0.0103	27.042

$\frac{100}{W} = 1.000$; $\frac{G}{G - G'} = 1.62543$ $M = \frac{100}{W} + \frac{G}{G - G'} = 2.625$

Meniscus correction Cm = 1.00 G' = 0.9971 m = 0.00896

SEIVE ANALYSIS

Sieve opening in mm	Weight of soil retained in gr.	*Percent retained	*Cumulative Percent retained	*Cumulative Percent finer P
0.85	2.94	2.51%	2.51%	97.49%
0.4	1.65	1.41%	3.92%	96.08%
0.25	2.99	2.56%	6.48%	93.52%
0.11	3.64	3.11%	9.59%	90.41%
0.075	2.85	2.44%	12.03%	87.97%

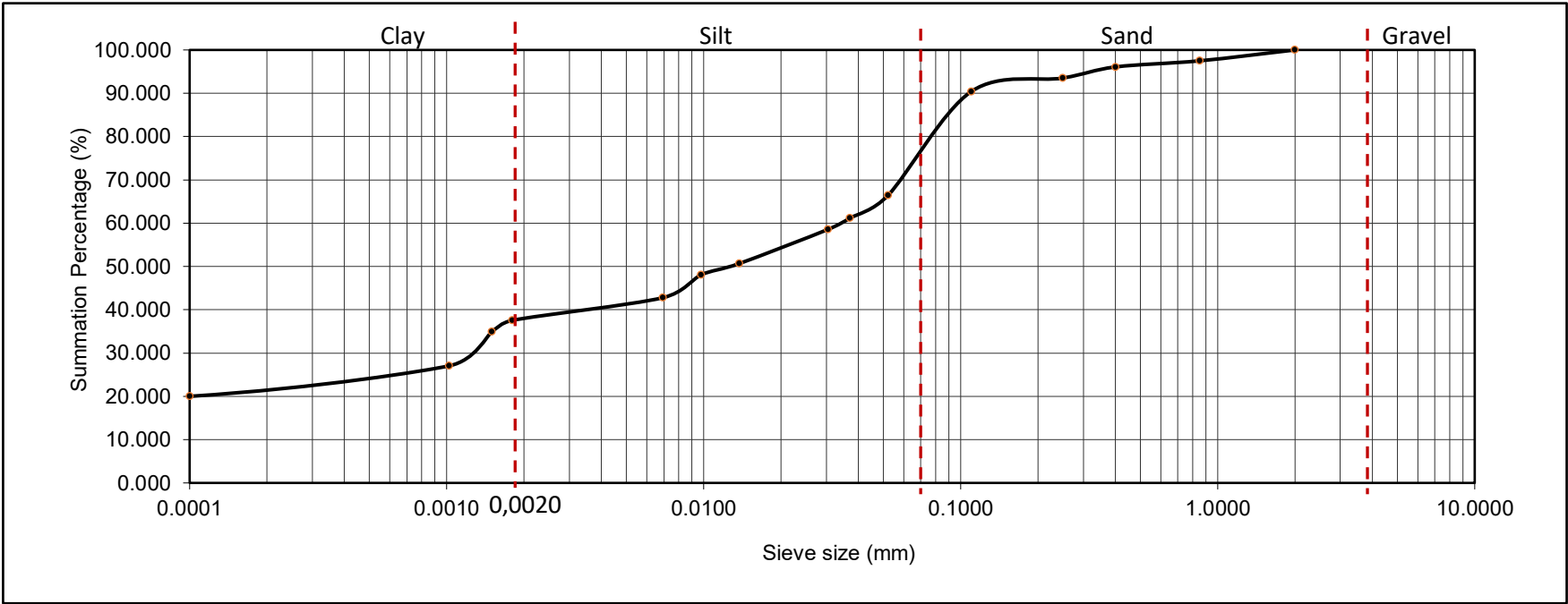
L = Effective depth in cm
m = Viscosity of water in poise
G' = Specific gravity of water
d = Maximum diameter of soil grain in mm
F = Correction factor against temperature



LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

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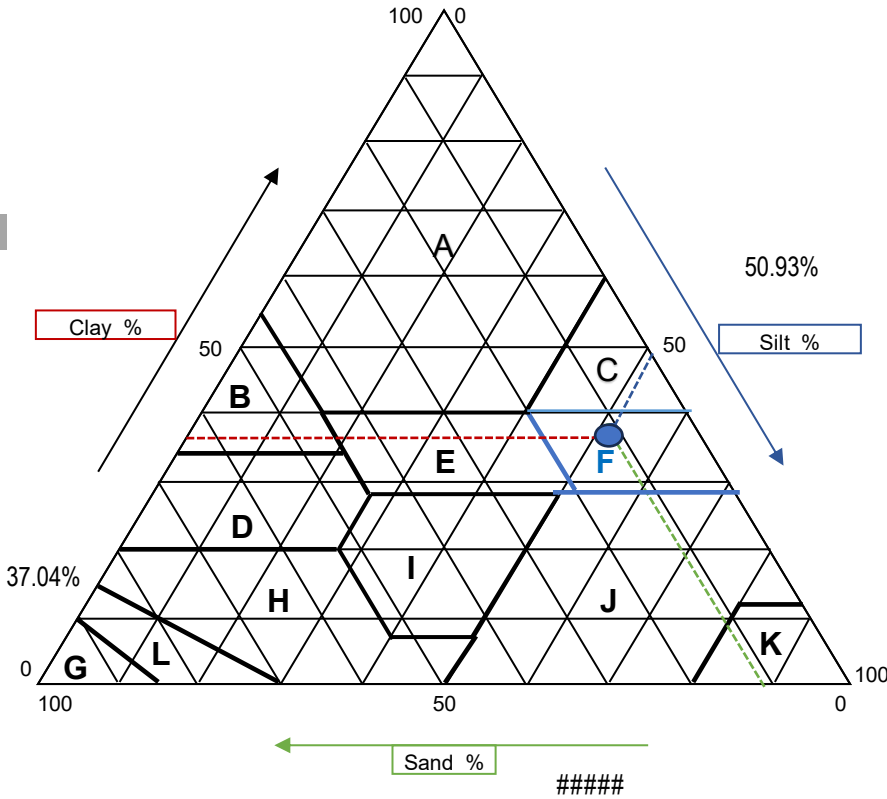
GRAIN SIZE ANALYSIS (Hydrometer)



Gravel	Sand	Silt	Clay	Max size	D 60	D 10	Classification	Remarks
0%	12.03%	50.93%	37.04%	0.0521	0.010	-	I.	=

CLASSIFICATION

- A. CLAY
- B. SANDY CLAY
- C. SILTY CLAY
- D. SANDY CLAY LOAM
- E. CLAYLEY LOAM
- F. SILTY CLAY LOAM
- G. SAND
- H. SANDY LOAM
- I. LOAM
- J. SILTY LOAM
- K. SILT
- L. LOAMY SAND



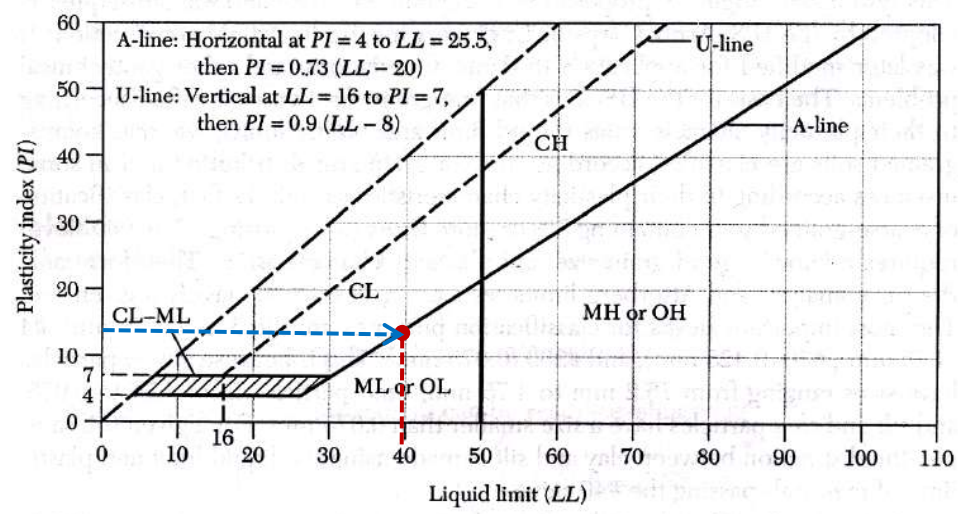


FIGURE 3.14 Plasticity chart used in the classification of fine-grained soils. (Adapted from Casagrande, 1948; Howard, 1977.)

Kesimpulan :-



LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

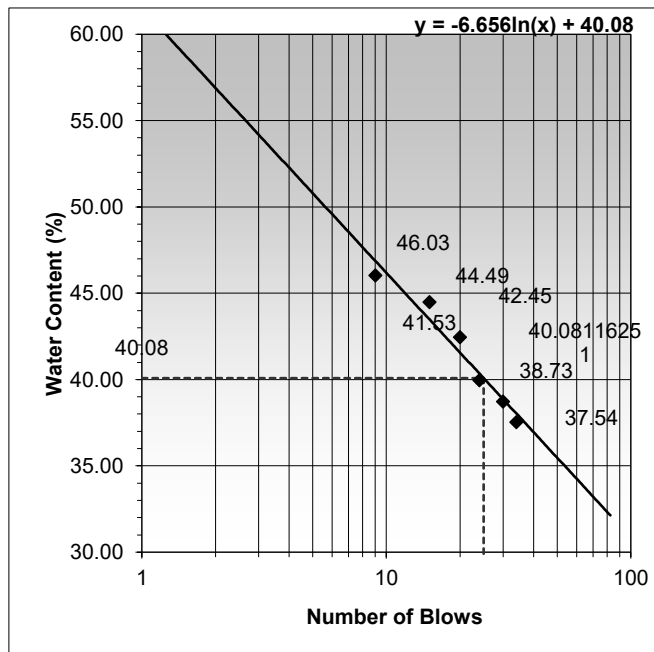
LIQUID LIMIT TEST

1	2	3
NO. OF BLOWS 9	NO. OF BLOWS 15	NO. OF BLOWS 20
No. f10	No. g7	No. j7
WW = 25.24 DW = 21.88	WW = 25.94 DW = 22.43	WW = 25.90 DW = 22.02
DW = 21.88 TW = 14.58	DW = 22.43 TW = 14.54	DW = 22.02 TW = 12.88
Ww = 3.36 Ws = 7.30	Ww = 3.51 Ws = 7.89	Ww = 3.88 Ws = 9.14
w = 46.03 %	w = 44.49 %	w = 42.45 %

4	5	6
NO. OF BLOWS 24	NO. OF BLOWS 30	NO. OF BLOWS 34
No. f4	No. a9	No. b32
WW = 27.20 DW = 23.66	WW = 29.12 DW = 25.29	WW = 26.77 DW = 23.26
DW = 23.66 TW = 14.80	DW = 25.29 TW = 15.40	DW = 23.26 TW = 13.91
Ww = 3.54 Ws = 8.86	Ww = 3.83 Ws = 9.89	Ww = 3.51 Ws = 9.35
w = 39.95 %	w = 38.73 %	w = 37.54 %

PLASTIC LIMIT TEST

1	2	3
No. c7	No. B10	No. j2
WW = 14.69 DW = 14.46	WW = 17.57 DW = 17.41	WW = 14.57 DW = 14.40
DW = 14.46 TW = 13.58	DW = 17.41 TW = 16.79	DW = 14.40 TW = 13.75
Ww = 0.23 Ws = 0.88	Ww = 0.16 Ws = 0.62	Ww = 0.17 Ws = 0.65
w = 26.14 %	w = 25.81 %	w = 26.15 %



REMARKS :

WW = Wt of container + wet soil in gr.

DW = Wt of container + dry soil in gr.

TW = Wt of container in gr.

The limits is determined on the portion of the soil passing 0,4 mm sieve

Dari percobaan didapatkan :

LIQUID LIMIT = 40.08 %

PLASTIC LIMIT = 26.03 %

PLAST. INDEX = 14.05 %



LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

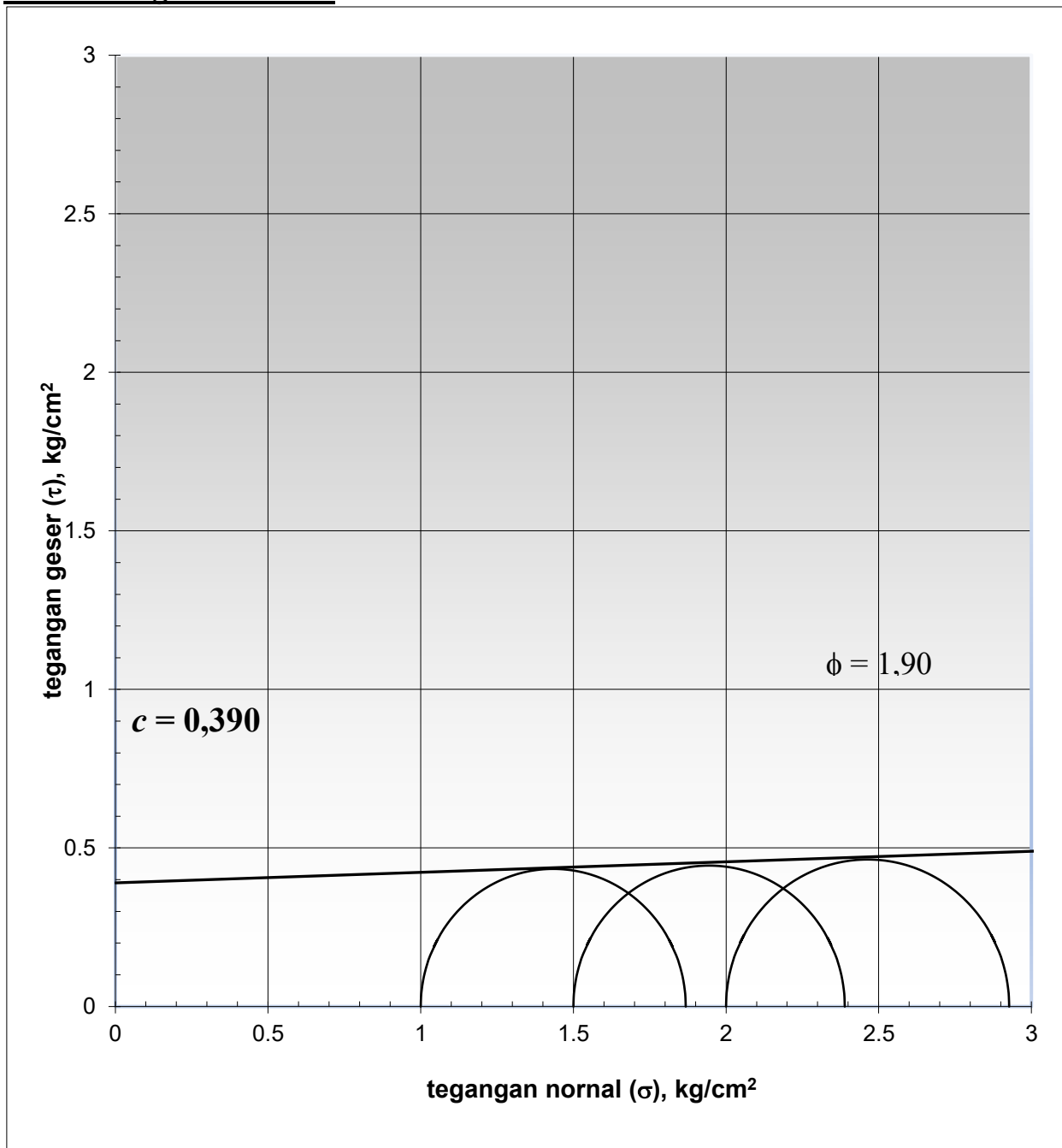
Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

TRIAXIAL COMPRESSION TEST

Location :
Jenis Tanah :

Dikerjakan :
Tested by :

Grafik Lingkaran Mohr





LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

UNCONFINED COMPRESSIVE STRENGTH

Lokasi :

Dikerjakan :

Jenis Tanah :

Permintaan :

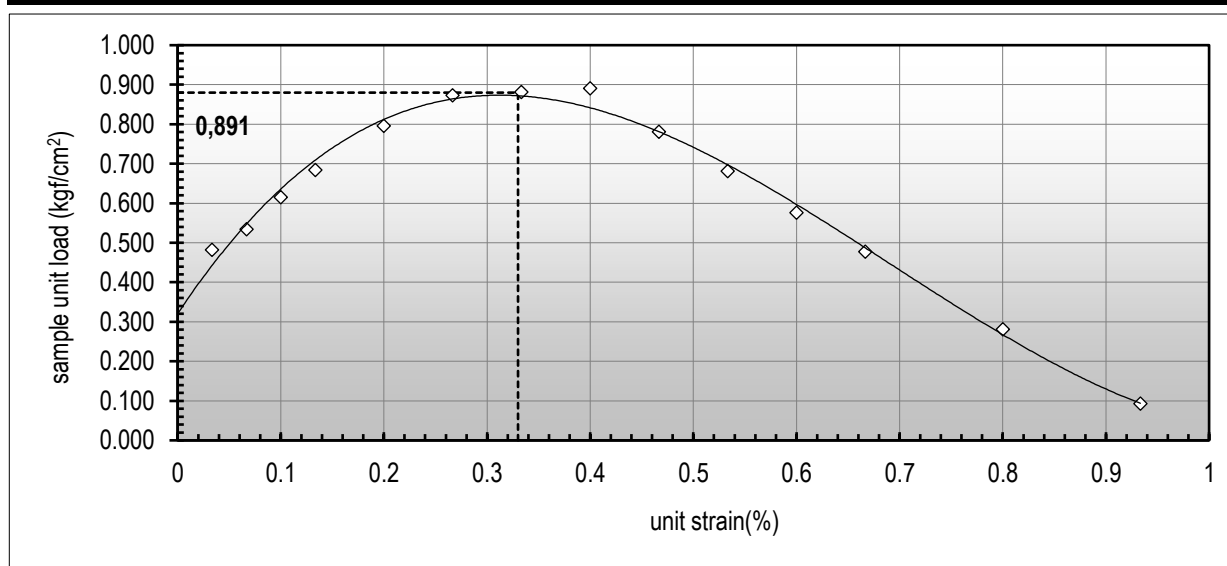
Sample Data

Area (A_0) = 8.56 cm² Height (L_0) = 7.50 cm
w = 23.27 % γ_d = 1.92 gr/cm³

Machine Data

LRC = 0.35 kgf Diameter = 3.30 cm

deformation dial reading	load dial (units)	ΔL col 1 . 10 ⁻²	unit strain $\Delta L / L_0$	area CF 1 - col 4	corrected area A'	total load on sample	sample unit load
25.00	12.2	0.25	0.033	0.967	8.851	4.271	0.483
50.00	14.0	0.50	0.067	0.933	9.168	4.901	0.535
75.00	16.7	0.75	0.100	0.900	9.507	5.847	0.615
100.00	19.3	1.00	0.133	0.867	9.873	6.757	0.684
150.00	24.3	1.50	0.200	0.800	10.696	8.507	0.795
200.00	29.1	2.00	0.267	0.733	11.668	10.188	0.873
250.00	32.3	2.50	0.333	0.667	12.835	11.308	0.881
300.00	36.3	3.00	0.400	0.600	14.261	12.709	0.891
350.00	35.8	3.50	0.467	0.533	16.043	12.534	0.781
400.00	35.7	4.00	0.533	0.467	18.335	12.499	0.682
450.00	35.2	4.50	0.600	0.400	21.391	12.324	0.576
500.00	35.0	5.00	0.667	0.333	25.669	12.254	0.477
600.00	34.3	6.00	0.800	0.200	42.782	12.008	0.281
700.00	34.2	7.00	0.933	0.067	128.346	11.973	0.093
800.00							
900.00							
1000.00							
1100.00							
1200.00							
1300.00							
1400.00							
1500.00							
1600.00							
1700.00							



Dari test didapat q_u = 0.891 kgf/cm²



**LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
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WATER CONTENT

PEMERIKSAAN KADAR AIR

Nomor cawan		h8	e5	h9
Berat cawan + tanah basah	(gr)	38.89	54.31	33.20
Berat cawan + tanah kering	(gr)	34.02	47.90	29.52
Berat cawan	(gr)	6.23	15.31	5.81
Berat air	(gr)	4.87	6.41	3.68
Berat tanah kering	(gr)	27.79	32.59	23.71
Kadar air (w)	(%)	17.52	19.67	15.52
Kadar air rata-rata	(%)	17.57		



LABORATORIUM MEKANIKA TANAH
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INSTITUT TEKNOLOGI NASIONAL MALANG

Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

PEMERIKSAAN BERAT JENIS

LOKASI :
DIKERJAKAN :
JENIS TANAH :
KEDALAMAN :
NOMOR CONTOH :

BERAT JENIS TANAH

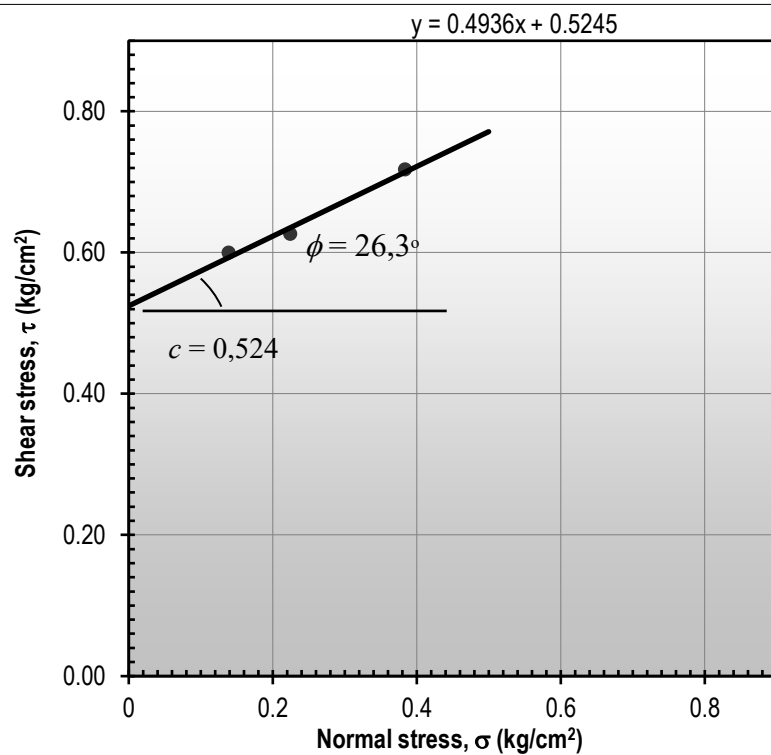
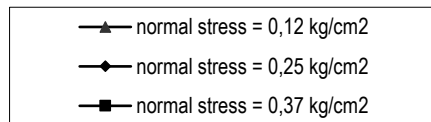
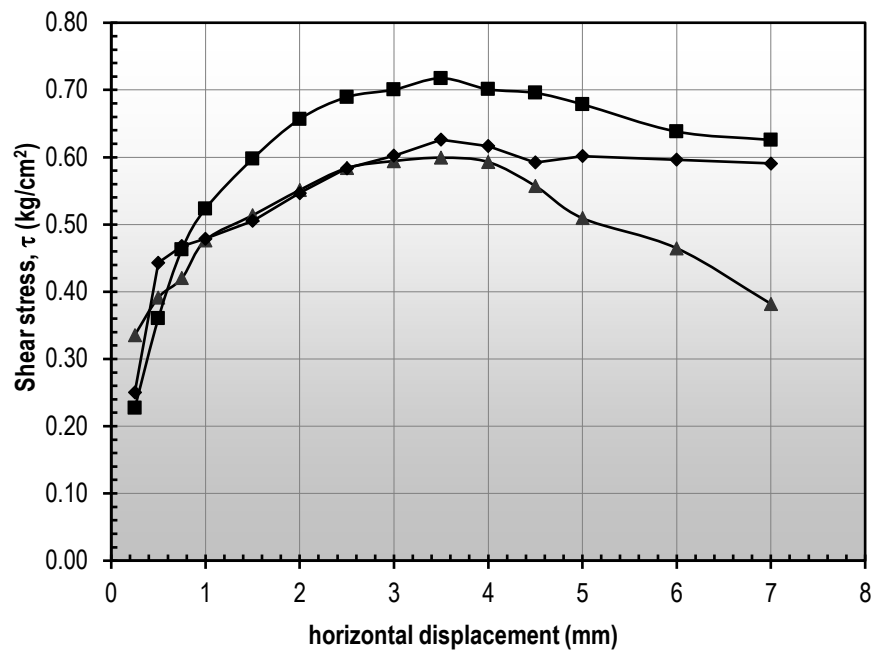
Nomor Picno		C3	C	O
Berat Picno + Tanah (W_2)	gr	98.79	85.90	84.05
Berat Picno (W_1)	gr	46.60	30.11	38.46
Berat Tanah ($W_2 - W_1$)	gr	52.19	55.79	45.59
Suhu (T)	°C	27	27	27
Berat Picno + Air pada T (W_4)	gr	145.99	131.50	139.19
$W_2 - W_1 + W_4$	gr	198.18	187.29	184.78
Berat Picno + Air + Tanah (W_3)	gr	178.22	165.90	167.29
Faktor Koreksi Suhu		0.9986	0.9986	0.9986
Isi Tanah ($W_2 - W_1$) + ($W_4 - W_3$)	cm ³	19.96	21.39	17.49
Berat Jenis Tanah		2.611	2.605	2.603
Rata-rata		2.606		



LABORATORIUM MEKANIKA TANAH
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INSTITUT TEKNOLOGI NASIONAL MALANG

Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

DIRECT SHEAR TEST





LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

GRAIN SIZE ANALYSIS (*Hydrometer*)

LOCATION : Lab. Mekanika Tanah
SAMPLE NO. : **B-1**

Dikerjakan

Wt. (air dry* soil + container) =
Wt. Container =
Wt. Air dry soil W' = 117.6 g
*Test is made of soil sample passing 2,0 mm sieve

Specific gravity G = 2.606
Plasticity index P.I. = 15.65 %
a = 1

WATER CONTENT OF AIR DRY SOIL SAMPLE

Kode				h8		Kode				e5		Kode				h9		Mean value (w) = 17.57 %
WW =	38.89	DW =	34.02	WW =	54.31	DW =	47.90	WW =	33.20	DW =	29.52	WW =	33.20	DW =	29.52			
DW =	34.02	TW =	6.23	DW =	47.90	TW =	15.31	DW =	29.52	TW =	5.81	DW =	29.52	TW =	5.81			
Ww =	4.87	Ws =	27.79	Ww =	6.41	Ws =	32.59	Ww =	3.68	Ws =	23.71	Ww =	3.68	Ws =	23.71			
w = 17.52 %				w = 19.67 %				w = 15.52 %										

Wt. Of oven - dry soil $W = \frac{100W'}{100+w} = 100$ g

HYDROMETER ANALYSIS

1	2	3	4	5	6	7	8	9	10	11
Elapsed time (t) (min)	Hydrometer reading		Temperature °C	L	$\sqrt{L/t}$	$\sqrt{\frac{30m}{980(G-G')}} = K$	d 6 x 7	F	Rc = r'/1000 + F	% finer = P k10 x M x 1000
	Under decimal only	r' col. 2 + Cm								
1	22	23.00	27	15.82	3.977	0.01306	0.0519	0.0023	0.0253	66.290
2	20	21.00	27	16.05	2.833	0.01306	0.0370	0.0023	0.0233	61.050
3	19	20.00	27	16.16	2.321	0.01306	0.0303	0.0023	0.0223	58.430
15	16	17.00	27	16.51	1.049	0.01306	0.0137	0.0023	0.0193	50.569
30	15	16.00	27	16.62	0.744	0.01306	0.0097	0.0023	0.0183	47.949
60	13	14.00	27	16.85	0.530	0.01306	0.0069	0.0023	0.0163	42.709
240	10	11.00	27	17.08	0.267	0.01306	0.0018	0.0023	0.0133	35.112
1440	9	10.00	27	17.19	0.109	0.01306	0.0015	0.0023	0.0123	32.228
2880	7	8.00	27	17.53	0.078	0.01306	0.0010	0.0023	0.0103	26.988

$$\frac{100}{W} = 1.000 ; \frac{G}{G - G'} = 1.62016 \quad M = \frac{100}{W} + \frac{G}{G - G'} = 2.620$$

Meniscus correction Cm = 1.00 G' = 0.9971 m = 0.00896

SEIVE ANALYSIS

Sieve opening in mm	Weight of soil retained in gr.	*Percent retained	*Cummulative Percent retained	*Cummulative Percent finer P
0.85	3.21	2.73%	2.73%	97.27%
0.4	1.94	1.65%	4.38%	95.62%
0.25	3.49	2.97%	7.35%	92.65%
0.11	3.54	3.01%	10.36%	89.64%
0.075	1.95	1.66%	12.02%	87.98%

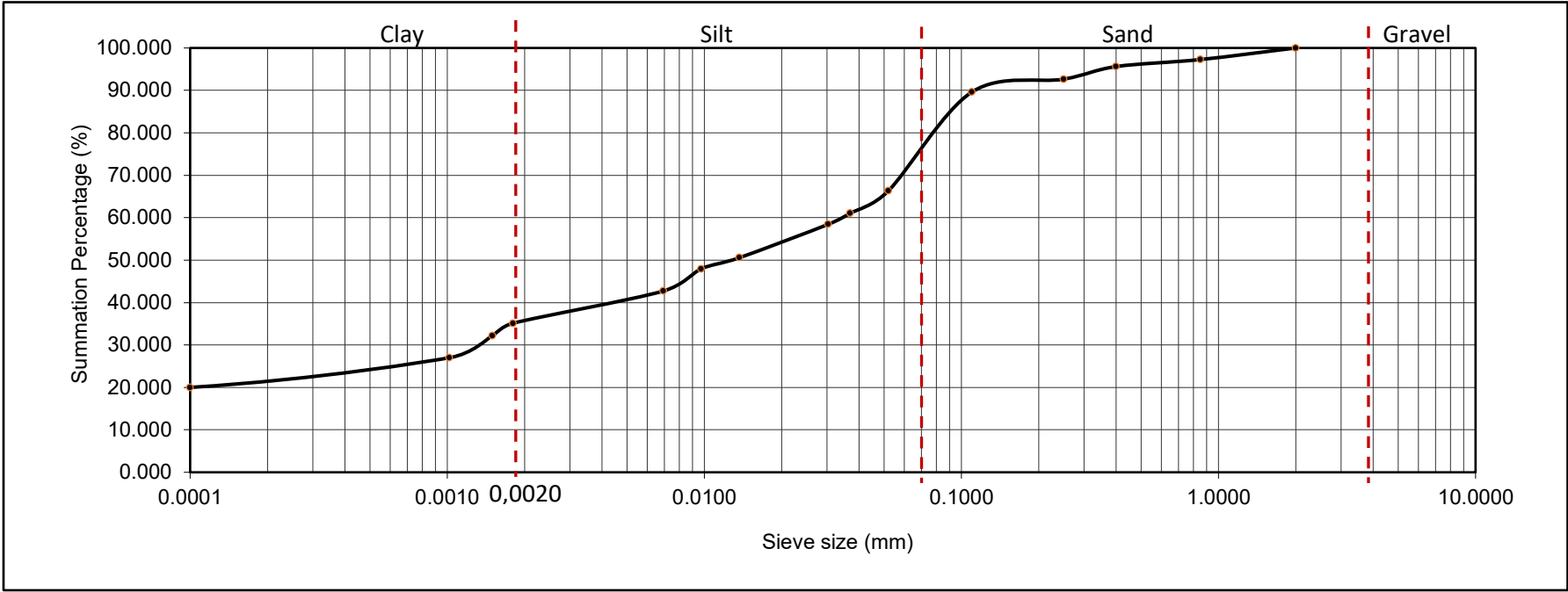
L = Effective depth in cm
m = Viscosity of water in poise
G' = Specific gravity of water
d = Maximum diameter of soil grain in mm
F = Correction factor against temperature



LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

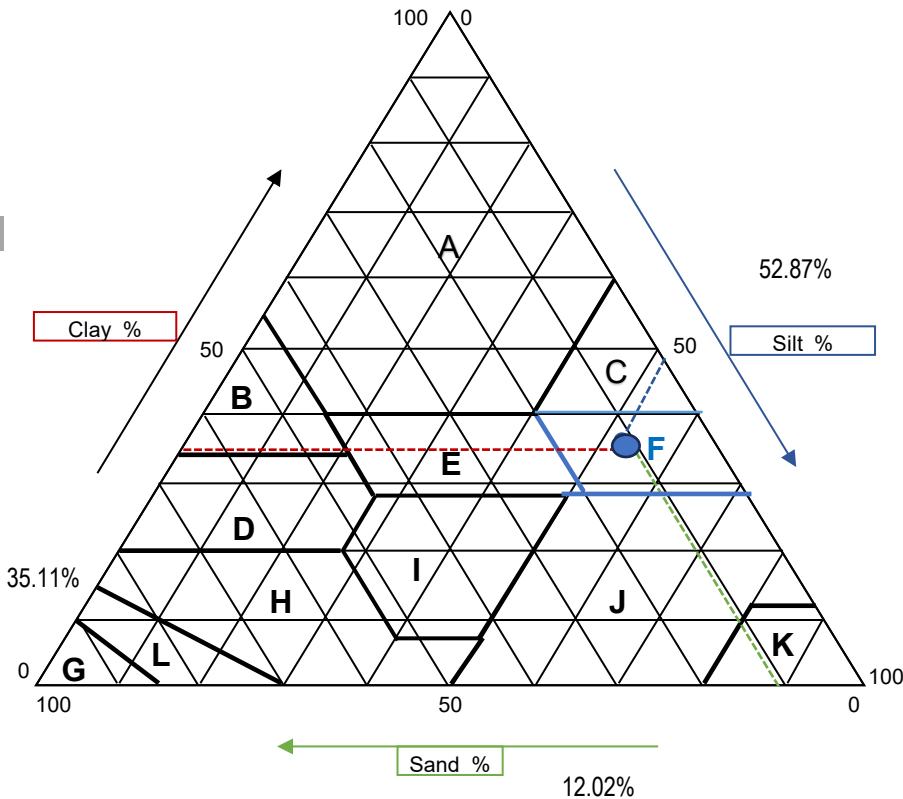
GRAIN SIZE ANALYSIS (Hydrometer)



Gravel	Sand	Silt	Clay	Max size	D 60	D 10	Classification	Remarks
0%	12.02%	52.87%	35.11%	0.0519	0.010	-	I.	=

CLASSIFICATION

- A. CLAY
- B. SANDY CLAY
- C. SILTY CLAY
- D. SANDY CLAY LOAM
- E. CLAYLEY LOAM
- F. SILTY CLAY LOAM
- G. SAND
- H. SANDY LOAM
- I. LOAM
- J. SILTY LOAM
- K. SILT
- L. LOAMY SAND



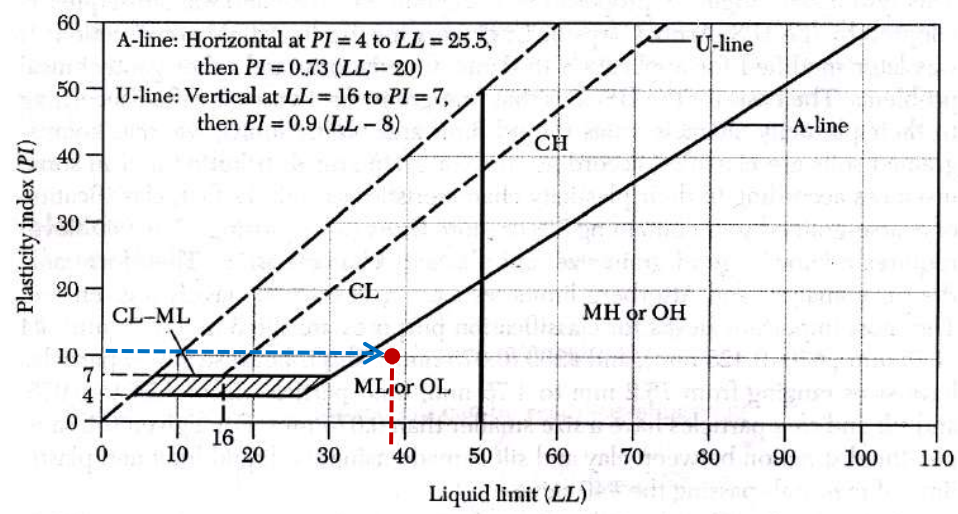


FIGURE 3.14 Plasticity chart used in the classification of fine-grained soils. (Adapted from Casagrande, 1948; Howard, 1977.)

Kesimpulan :-



LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

LOCATION :
SAMPLE NO. :

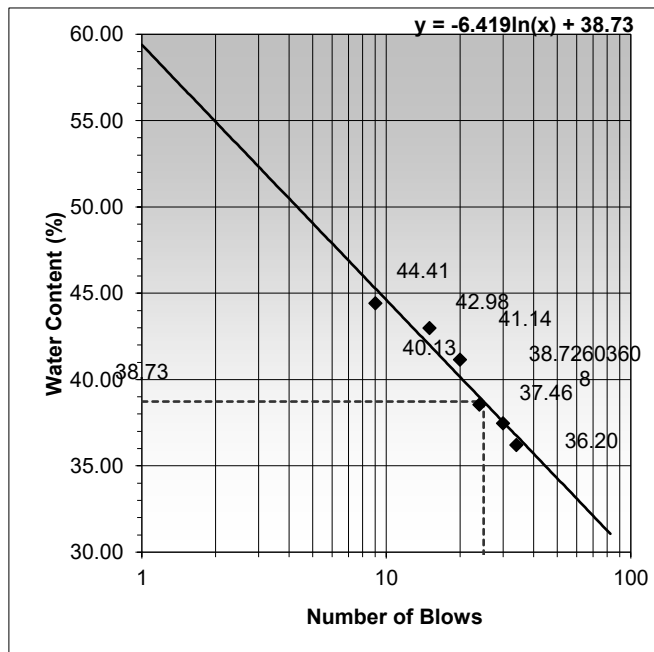
TESTED BY :
:

LIQUID LIMIT TEST

1	2	3
NO. OF BLOWS 9	NO. OF BLOWS 15	NO. OF BLOWS 20
No. f10	No. g7	No. j7
WW = 25.05 DW = 21.83	WW = 25.75 DW = 22.38	WW = 25.71 DW = 21.97
DW = 21.83 TW = 14.58	DW = 22.38 TW = 14.54	DW = 21.97 TW = 12.88
Ww = 3.22 Ws = 7.25	Ww = 3.37 Ws = 7.84	Ww = 3.74 Ws = 9.09
w = 44.41 %	w = 42.98 %	w = 41.14 %
4	5	6
NO. OF BLOWS 24	NO. OF BLOWS 30	NO. OF BLOWS 34
No. f4	No. a9	No. b32
WW = 27.01 DW = 23.61	WW = 28.93 DW = 25.24	WW = 26.58 DW = 23.21
DW = 23.61 TW = 14.79	DW = 25.24 TW = 15.39	DW = 23.21 TW = 13.90
Ww = 3.40 Ws = 8.82	Ww = 3.69 Ws = 9.85	Ww = 3.37 Ws = 9.31
w = 38.55 %	w = 37.46 %	w = 36.20 %

PLASTIC LIMIT TEST

1	2	3
No. c7	No. B10	No. j2
WW = 14.69 DW = 14.45	WW = 17.57 DW = 17.40	WW = 14.57 DW = 14.39
DW = 14.45 TW = 13.59	DW = 17.40 TW = 16.79	DW = 14.39 TW = 13.75
Ww = 0.24 Ws = 0.86	Ww = 0.17 Ws = 0.61	Ww = 0.18 Ws = 0.64
w = 27.91 %	w = 27.87 %	w = 27.95 %



REMARKS :

WW = Wt of container + wet soil in gr.
DW = Wt of container + dry soil in gr.
TW = Wt of container in gr.

The limits is determined on the portion of the soil passing 0,4 mm sieve

Dari percobaan didapatkan :

LIQUID LIMIT = 38.73 %
PLASTIC LIMIT = 27.91 %
PLAST. INDEX = 10.82 %



LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

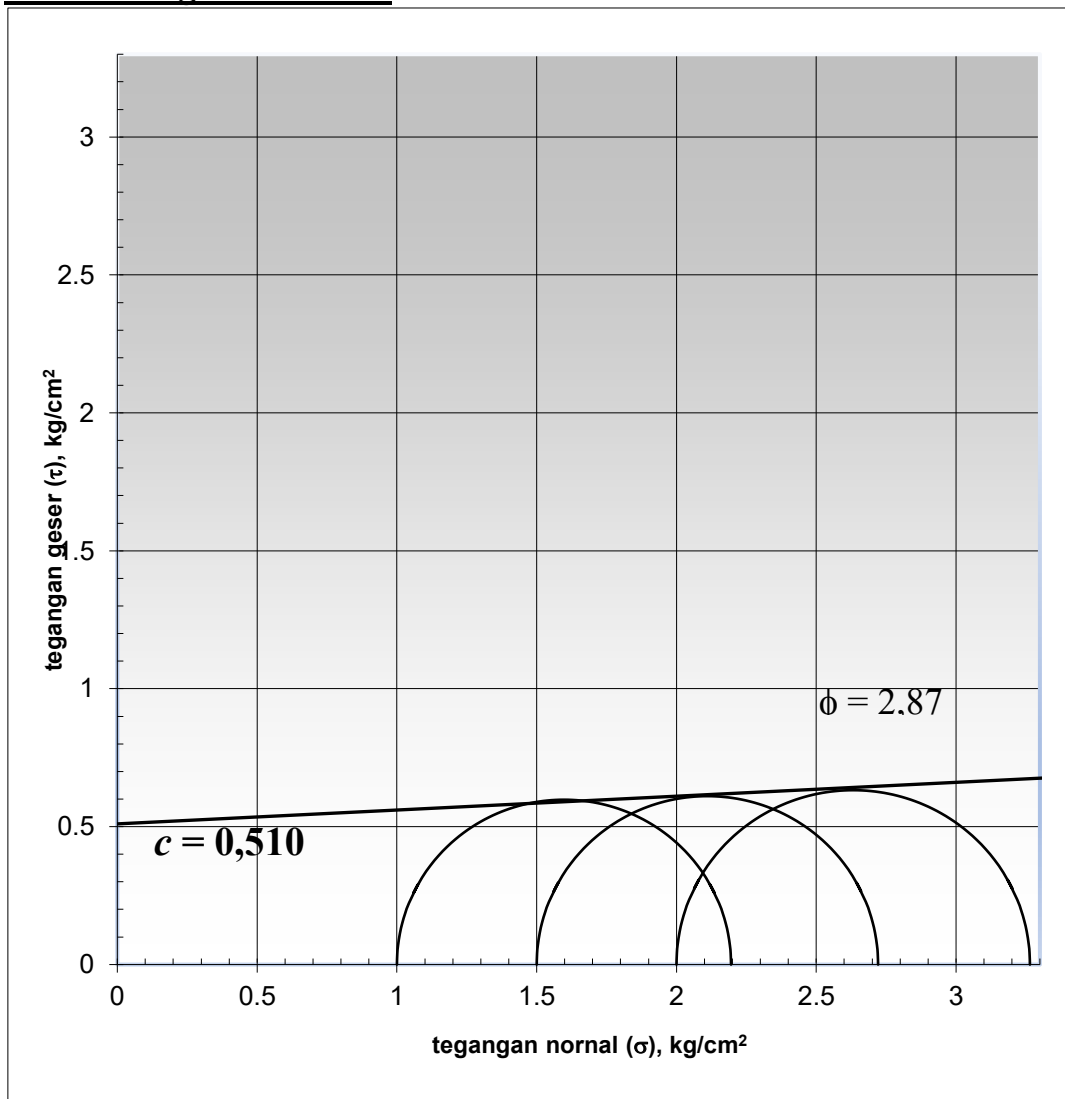
Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

TRIAXIAL COMPRESSION TEST

Location :
Jenis Tanah :

Dikerjakan :
Tested by :

Grafik Lingkaran Mohr





LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

UNCONFINED COMPRESSIVE STRENGTH

Lokasi :
Jenis Tanah :

Dikerjakan :
Permintaan :

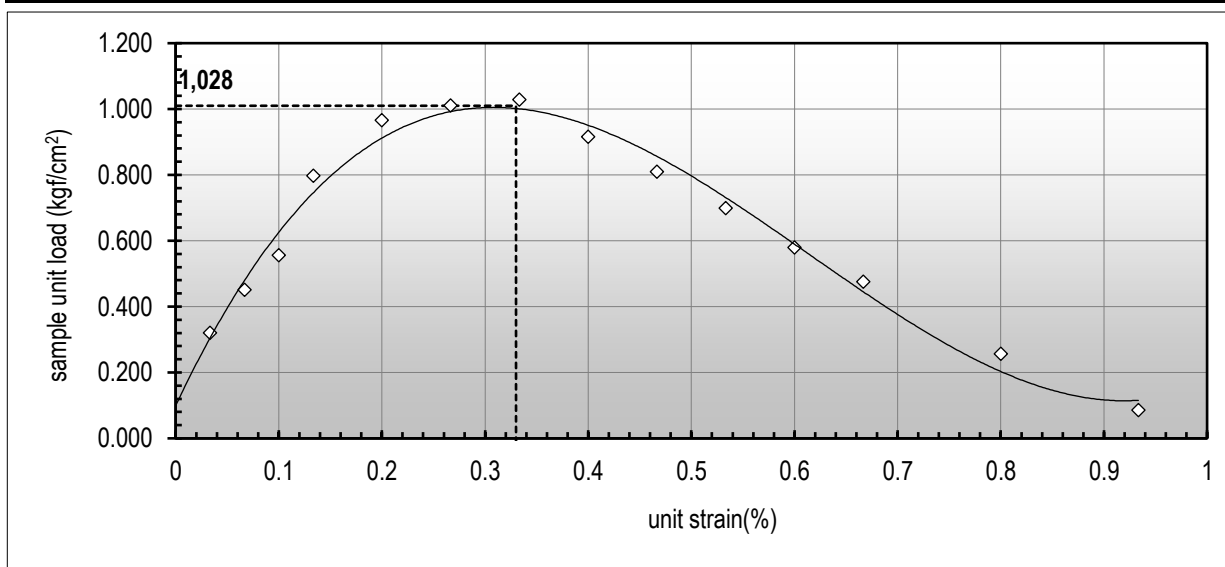
Sample Data

Area (A_0) = 8.56 cm² Height (L_0) = 7.50 cm
w = 23.27 % γ_d = 1.92 gr/cm³

Machine Data

LRC = 0.35 kgf Diameter = 3.30 cm

deformation dial reading	load dial (units)	ΔL col 1 . 10 ⁻²	unit strain $\Delta L / L_0$	area CF 1 - col 4	corrected area A'	total load on sample	sample unit load
25.00	8.1	0.25	0.033	0.967	8.851	2.836	0.320
50.00	11.8	0.50	0.067	0.933	9.168	4.131	0.451
75.00	15.1	0.75	0.100	0.900	9.507	5.287	0.556
100.00	22.5	1.00	0.133	0.867	9.873	7.877	0.798
150.00	29.5	1.50	0.200	0.800	10.696	10.328	0.966
200.00	33.7	2.00	0.267	0.733	11.668	11.798	1.011
250.00	37.7	2.50	0.333	0.667	12.835	13.199	1.028
300.00	37.3	3.00	0.400	0.600	14.261	13.059	0.916
350.00	37.1	3.50	0.467	0.533	16.043	12.989	0.810
400.00	36.6	4.00	0.533	0.467	18.335	12.814	0.699
450.00	35.4	4.50	0.600	0.400	21.391	12.394	0.579
500.00	34.9	5.00	0.667	0.333	25.669	12.218	0.476
600.00	31.4	6.00	0.800	0.200	42.782	10.993	0.257
700.00	31.3	7.00	0.933	0.067	128.346	10.958	0.085
800.00							
900.00							
1000.00							
1100.00							
1200.00							
1300.00							
1400.00							
1500.00							
1600.00							
1700.00							



Dari test didapat q_u = 1.028 kgf/cm²



**LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG**

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WATER CONTENT

PEMERIKSAAN KADAR AIR

Nomor cawan		d1	d8	j7
Berat cawan + tanah basah	(gr)	47.23	53.78	56.83
Berat cawan + tanah kering	(gr)	42.61	46.99	49.46
Berat cawan	(gr)	14.79	13.86	13.92
Berat air	(gr)	4.62	6.79	7.37
Berat tanah kering	(gr)	27.82	33.13	35.54
Kadar air (w)	(%)	16.61	20.50	20.74
Kadar air rata-rata	(%)	19.28		



LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

PEMERIKSAAN BERAT JENIS

LOKASI :
DIKERJAKAN :
JENIS TANAH :
KEDALAMAN :
NOMOR CONTOH :

BERAT JENIS TANAH

Nomor Picno		C3	C	O
Berat Picno + Tanah (W_2)	gr	97.70	84.84	83.05
Berat Picno (W_1)	gr	46.60	30.11	38.46
Berat Tanah ($W_2 - W_1$)	gr	51.10	54.73	44.59
Suhu (T)	°C	27	27	27
Berat Picno + Air pada T (W_4)	gr	145.76	131.16	138.79
$W_2 - W_1 + W_4$	gr	196.86	185.89	183.38
Berat Picno + Air + Tanah (W_3)	gr	177.35	164.99	166.29
Faktor Koreksi Suhu		0.9986	0.9986	0.9986
Isi Tanah ($W_2 - W_1$) + ($W_4 - W_3$)	cm ³	19.51	20.90	17.09
Berat Jenis Tanah		2.616	2.615	2.605
Rata-rata		2.612		



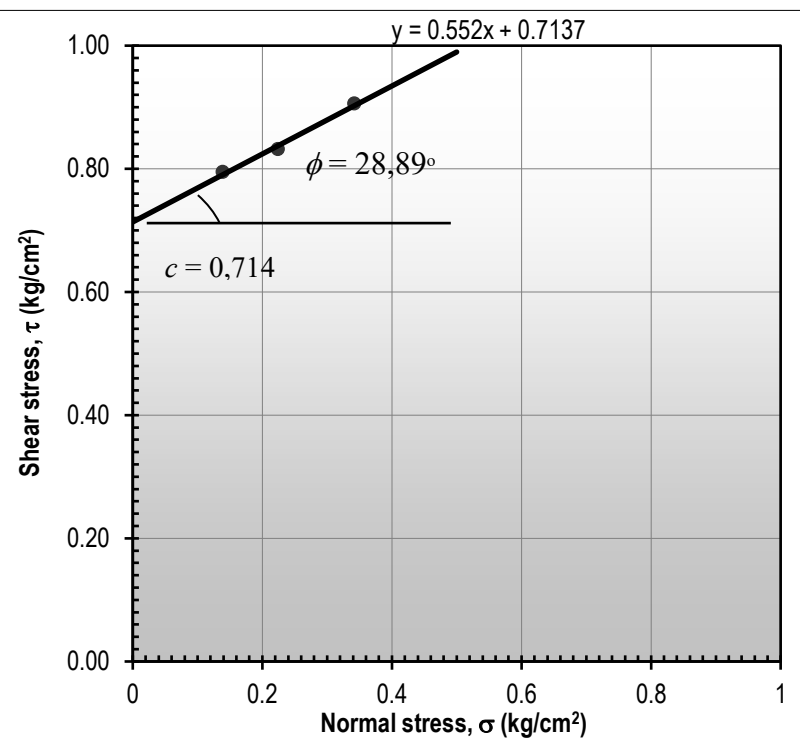
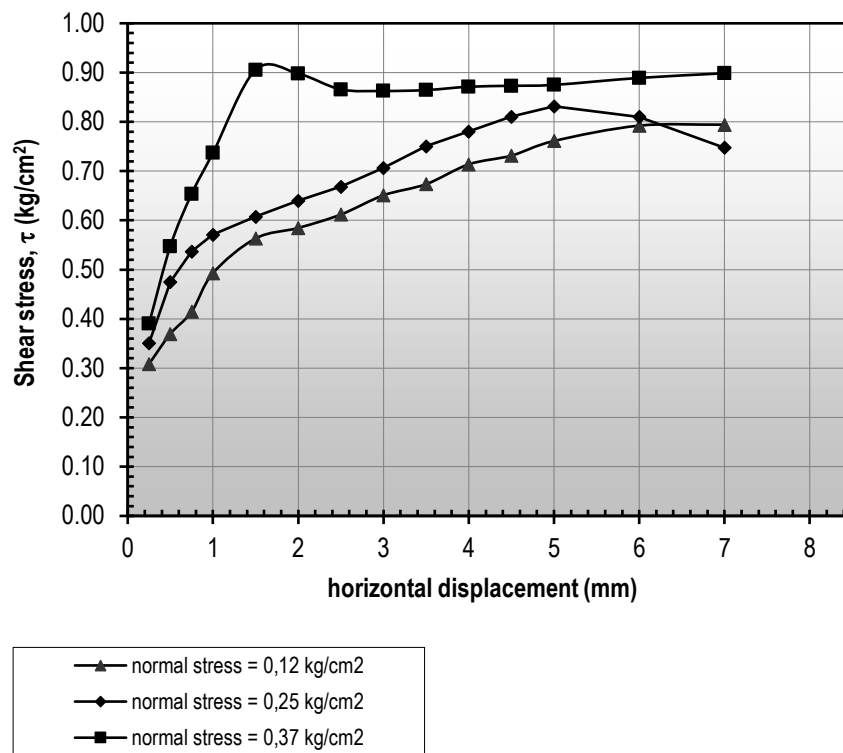
LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

DIRECT SHEAR TEST

Lokasi :

Kedalaman :



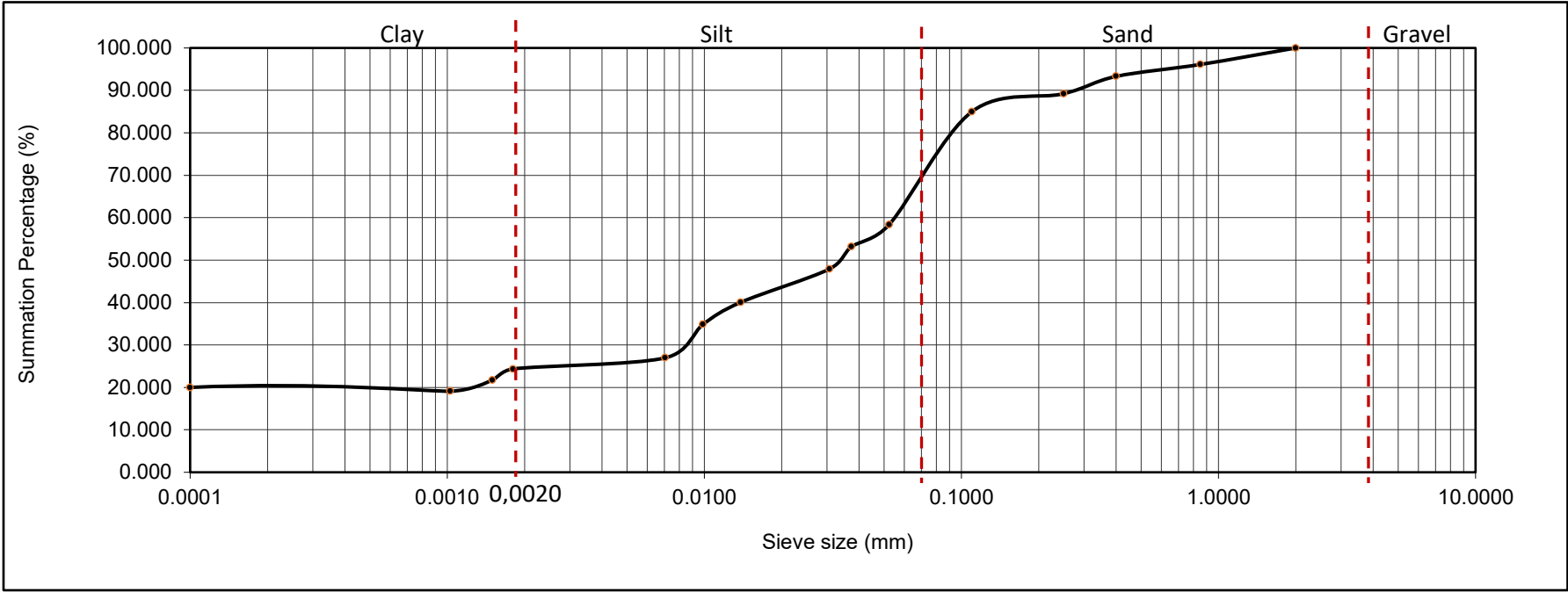
L	=	Effective depth in cm
m	=	Viscosity of water in poise
G'	=	Specific gravity of water
d	=	Maximum diameter of soil grain in mm
F	=	Correction factor against temperature



LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

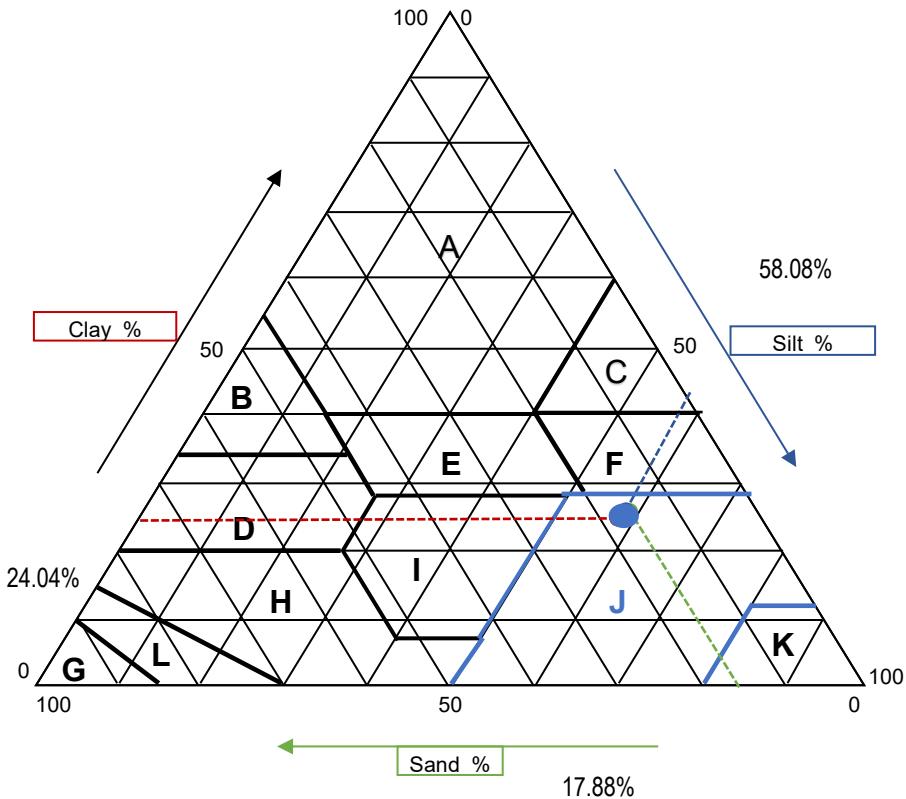
GRAIN SIZE ANALYSIS (Hydrometer)



Gravel	Sand	Silt	Clay	Max size	D 60	D 10	Classification	Remarks
0%	17.88%	58.08%	24.04%	0.0524	0.010	-	I.	=

CLASSIFICATION

- A. CLAY
- B. SANDY CLAY
- C. SILTY CLAY
- D. SANDY CLAY LOAM
- E. CLAYLEY LOAM
- F. SILTY CLAY LOAM
- G. SAND
- H. SANDY LOAM
- I. LOAM
- J. SILTY LOAM
- K. SILT
- L. LOAMY SAND



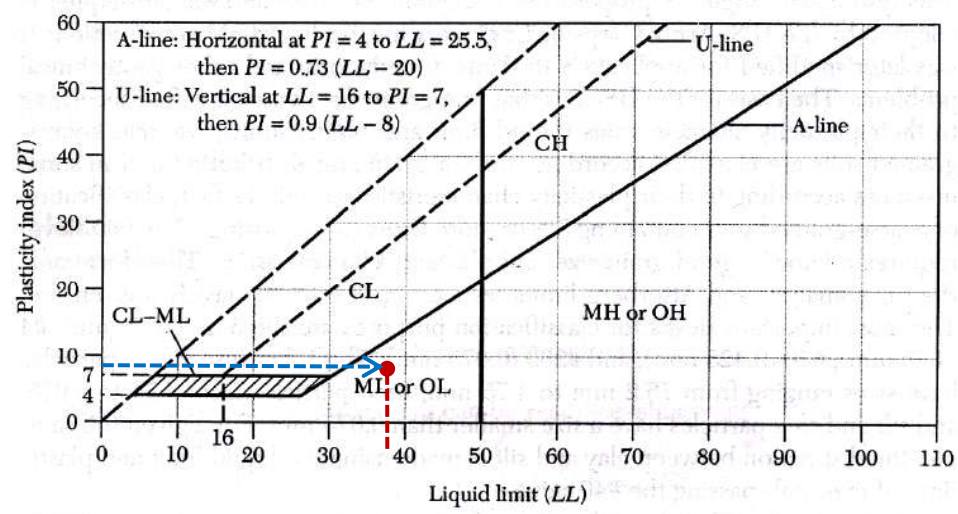


FIGURE 3.14 Plasticity chart used in the classification of fine-grained soils. (Adapted from Casagrande, 1948; Howard, 1977.)

Kesimpulan :-



LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

LOCATION :
SAMPLE NO. :

TESTED BY :
:

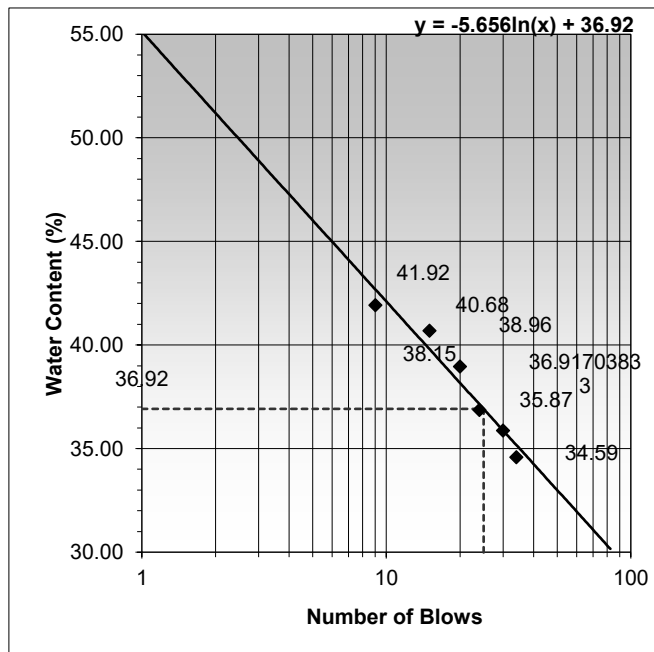
LIQUID LIMIT TEST

1	2	3
NO. OF BLOWS 9	NO. OF BLOWS 15	NO. OF BLOWS 20
No. f10	No. g7	No. j7
WW = 24.94 DW = 21.88	WW = 25.64 DW = 22.43	WW = 25.60 DW = 22.02
DW = 21.88 TW = 14.58	DW = 22.43 TW = 14.54	DW = 22.02 TW = 12.83
Ww = 3.06 Ws = 7.30	Ww = 3.21 Ws = 7.89	Ww = 3.58 Ws = 9.19
w = 41.92 %	w = 40.68 %	w = 38.96 %

4	5	6
NO. OF BLOWS 24	NO. OF BLOWS 30	NO. OF BLOWS 34
No. f4	No. a9	No. b32
WW = 26.90 DW = 23.66	WW = 28.82 DW = 25.29	WW = 26.47 DW = 23.26
DW = 23.66 TW = 14.87	DW = 25.29 TW = 15.45	DW = 23.26 TW = 13.98
Ww = 3.24 Ws = 8.79	Ww = 3.53 Ws = 9.84	Ww = 3.21 Ws = 9.28
w = 36.86 %	w = 35.87 %	w = 34.59 %

PLASTIC LIMIT TEST

1	2	3
No. c7	No. B10	No. j2
WW = 14.70 DW = 14.45	WW = 17.58 DW = 17.40	WW = 14.58 DW = 14.39
DW = 14.45 TW = 13.59	DW = 17.40 TW = 16.78	DW = 14.39 TW = 13.74
Ww = 0.25 Ws = 0.86	Ww = 0.18 Ws = 0.62	Ww = 0.19 Ws = 0.65
w = 29.07 %	w = 29.03 %	w = 29.23 %



REMARKS :

WW = Wt of container + wet soil in gr.
DW = Wt of container + dry soil in gr.
TW = Wt of container in gr.

The limits is determined on the portion of the soil passing 0,4 mm sieve

Dari percobaan didapatkan :

LIQUID LIMIT = 36.92 %
PLASTIC LIMIT = 29.11 %
PLAST. INDEX = 7.81 %



LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

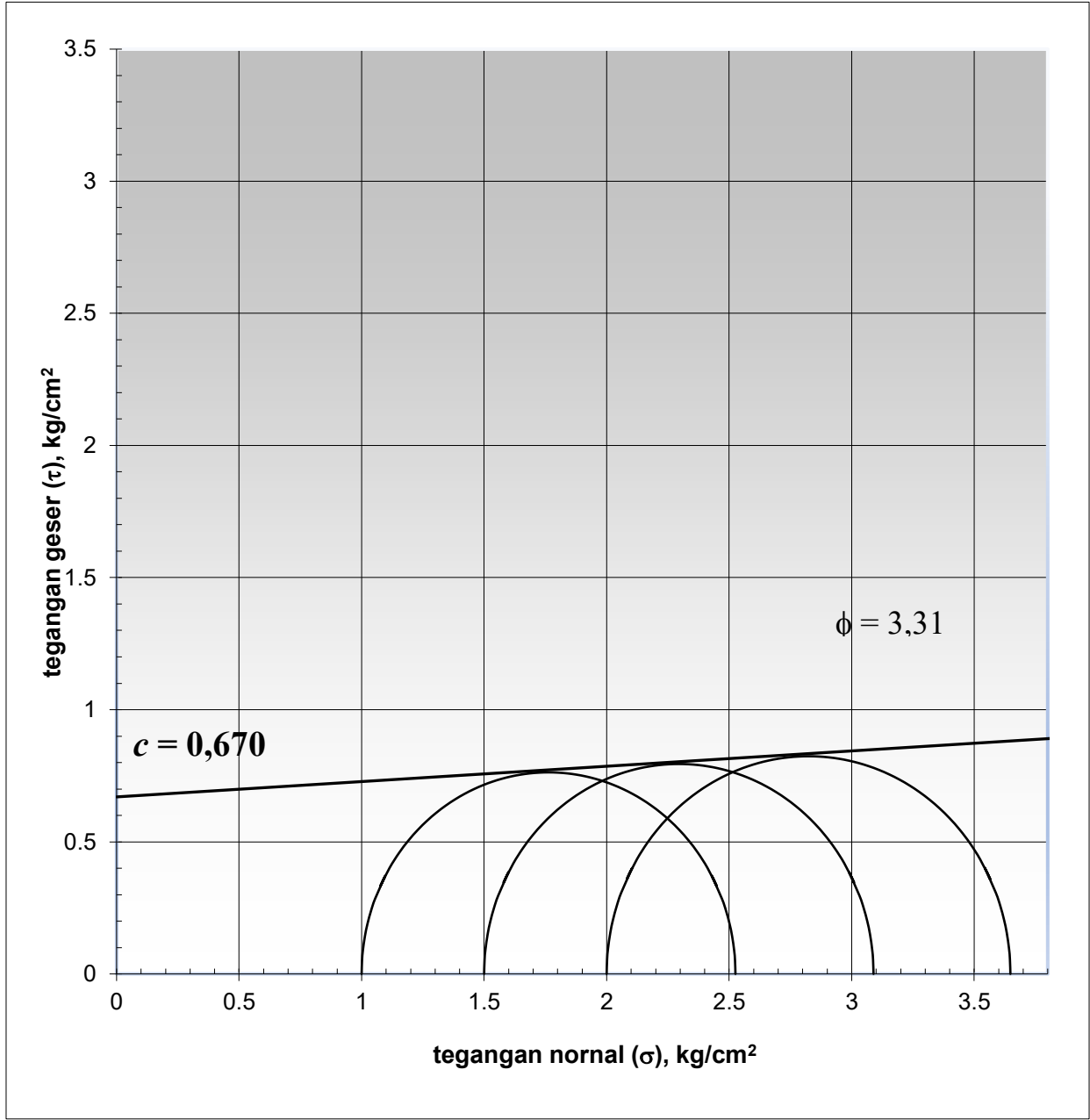
Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

TRIAXIAL COMPRESSION TEST

Location :
Jenis Tanah :

Dikerjakan :
Tested by :

Grafik Lingkaran Mohr





LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

UNCONFINED COMPRESSIVE STRENGTH

Lokasi :
Jenis Tanah :

Dikerjakan :
Permintaan :

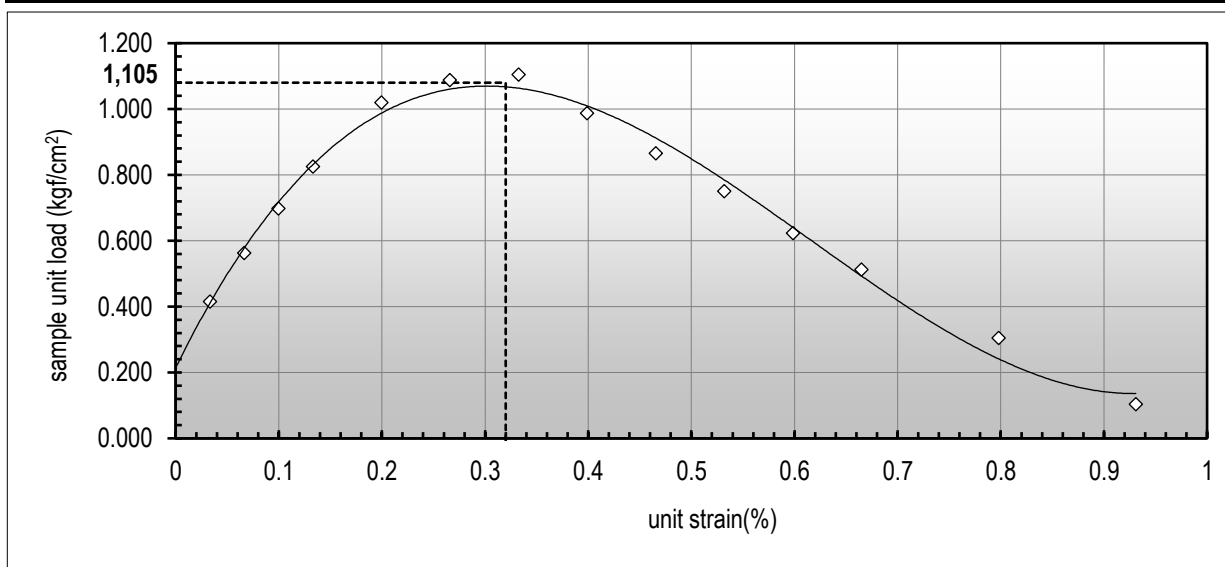
Sample Data

Area (A_0) = 8.71 cm² Height (L_0) = 7.52 cm
w = 23.27 % γ_d = 1.88 gr/cm³

Machine Data

LRC = 0.35 kgf Diameter = 3.33 cm

deformation dial reading	load dial (units)	ΔL col 1 . 10 ⁻²	unit strain $\Delta L / L_0$	area CF 1 - col 4	corrected area A'	total load on sample	sample unit load
25.00	10.7	0.25	0.033	0.967	9.012	3.746	0.416
50.00	15.0	0.50	0.066	0.934	9.333	5.252	0.563
75.00	19.3	0.75	0.100	0.900	9.678	6.757	0.698
100.00	23.7	1.00	0.133	0.867	10.049	8.297	0.826
150.00	31.7	1.50	0.199	0.801	10.884	11.098	1.020
200.00	36.9	2.00	0.266	0.734	11.869	12.919	1.088
250.00	41.2	2.50	0.332	0.668	13.052	14.424	1.105
300.00	40.9	3.00	0.399	0.601	14.495	14.319	0.988
350.00	40.3	3.50	0.465	0.535	16.298	14.109	0.866
400.00	39.9	4.00	0.532	0.468	18.614	13.969	0.750
450.00	38.6	4.50	0.598	0.402	21.695	13.514	0.623
500.00	38.1	5.00	0.665	0.335	26.000	13.339	0.513
600.00	37.6	6.00	0.798	0.202	43.105	13.164	0.305
700.00	37.5	7.00	0.931	0.069	125.999	13.129	0.104
800.00							
900.00							
1000.00							
1100.00							
1200.00							
1300.00							
1400.00							
1500.00							
1600.00							
1700.00							



Dari test didapat q_u = 1.105 kgf/cm²



**LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG**

Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Malang 65145

WATER CONTENT

PEMERIKSAAN KADAR AIR

Nomor cawan		a7	e3	e9
Berat cawan + tanah basah	(gr)	48.18	50.13	49.92
Berat cawan + tanah kering	(gr)	42.32	44.08	43.87
Berat cawan	(gr)	13.82	13.41	14.00
Berat air	(gr)	5.86	6.05	6.05
Berat tanah kering	(gr)	28.50	30.67	29.87
Kadar air (w)	(%)	20.56	19.73	20.25
Kadar air rata-rata	(%)	20.18		



LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

PEMERIKSAAN BERAT JENIS

LOKASI :
DIKERJAKAN :
JENIS TANAH :
KEDALAMAN :
NOMOR CONTOH :

BERAT JENIS TANAH

Nomor Picno		C3	C	O
Berat Picno + Tanah (W_2)	gr	96.79	84.77	83.07
Berat Picno (W_1)	gr	46.60	30.11	38.46
Berat Tanah ($W_2 - W_1$)	gr	50.19	54.66	44.61
Suhu (T)	°C	27	27	27
Berat Picno + Air pada T (W_4)	gr	145.76	131.16	138.79
$W_2 - W_1 + W_4$	gr	195.95	185.82	183.40
Berat Picno + Air + Tanah (W_3)	gr	177.31	164.98	166.21
Faktor Koreksi Suhu		0.9986	0.9986	0.9986
Isi Tanah ($W_2 - W_1$) + ($W_4 - W_3$)	cm ³	18.64	20.84	17.19
Berat Jenis Tanah		2.689	2.619	2.591
Rata-rata		2.633		



LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

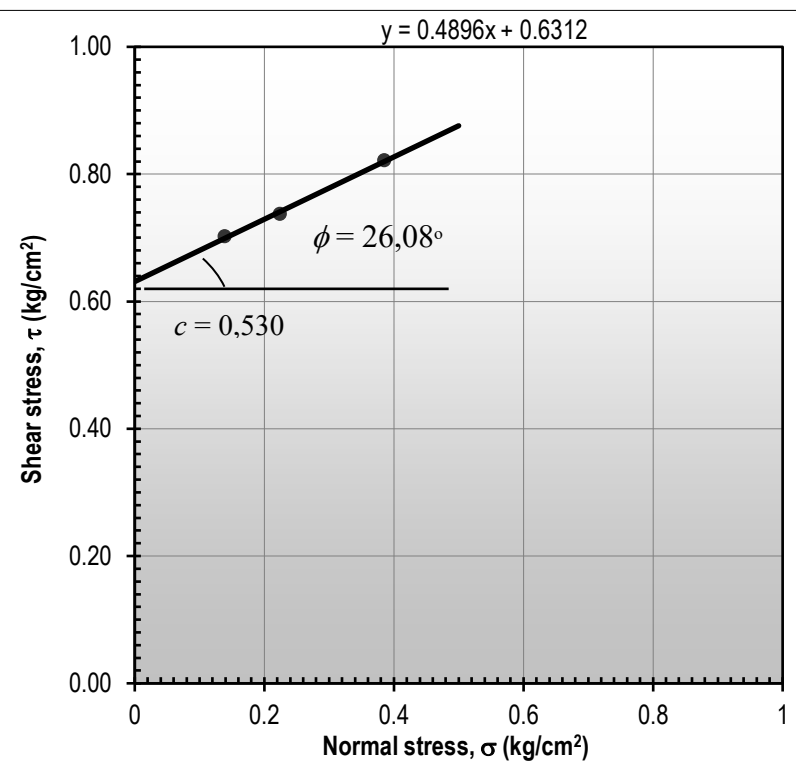
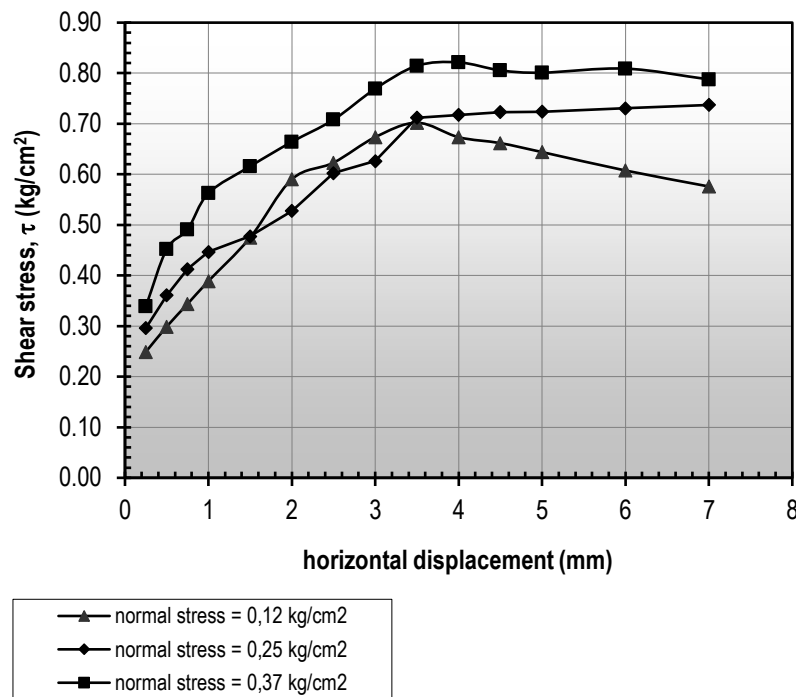
Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

DIRECT SHEAR TEST

Lokasi :

Kedalaman :

Permintaan :



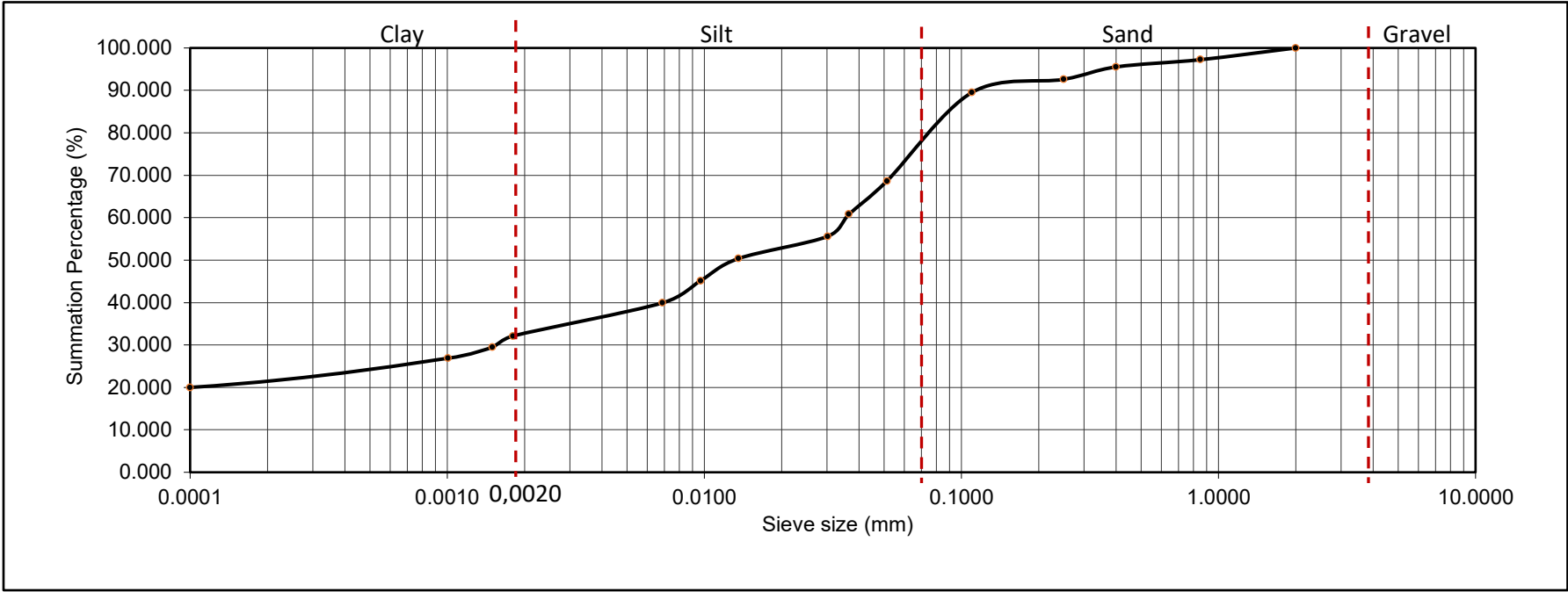
**LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG**



LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

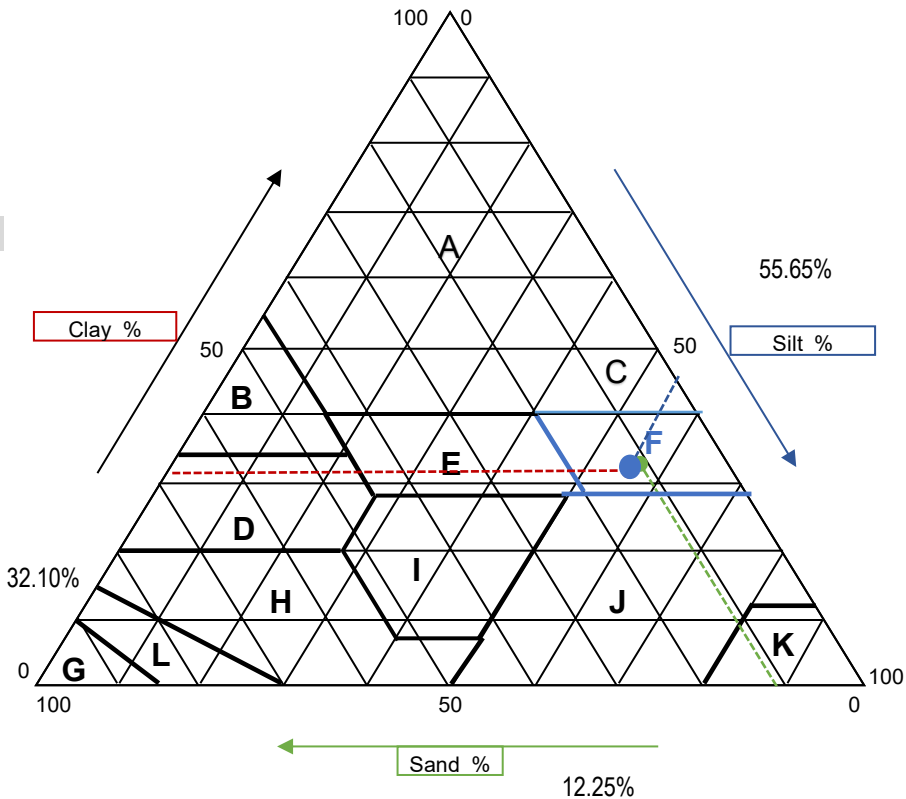
GRAIN SIZE ANALYSIS (Hydrometer)

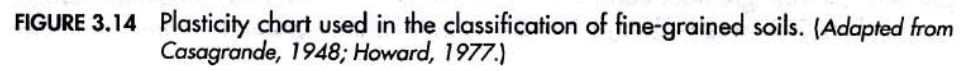


Gravel	Sand	Silt	Clay	Max size	D 60	D 10	Classification	Remarks
0%	12.25%	55.65%	32.10%	0.0513	0.010	-	I.	=

CLASSIFICATION

- A. CLAY
- B. SANDY CLAY
- C. SILTY CLAY
- D. SANDY CLAY LOAM
- E. CLAYLEY LOAM
- F. SILTY CLAY LOAM
- G. SAND
- H. SANDY LOAM
- I. LOAM
- J. SILTY LOAM
- K. SILT
- L. LOAMY SAND





Kesimpulan :-



LABORATORIUM MEKANIK TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

LOCATION :
SAMPLE NO. :

TESTED BY :
:

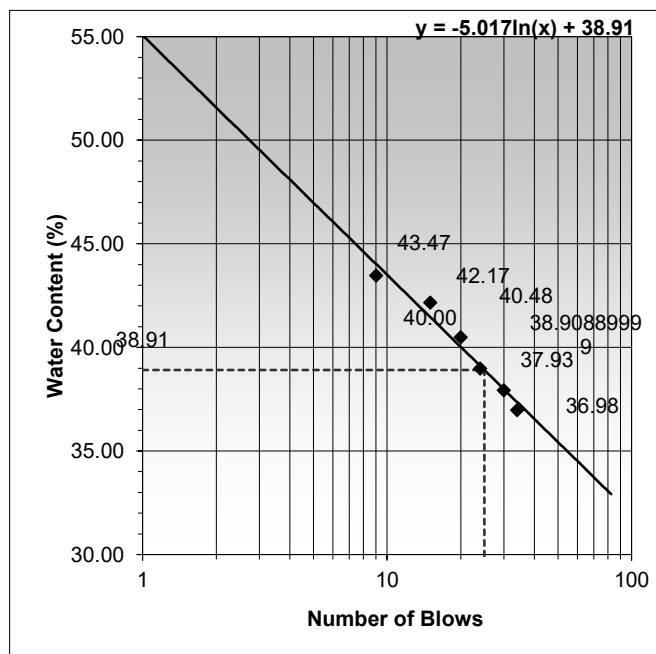
LIQUID LIMIT TEST

1	2	3
NO. OF BLOWS 9	NO. OF BLOWS 15	NO. OF BLOWS 20
No. f10	No. g7	No. j7
WW = 24.94 DW = 21.78	WW = 25.64 DW = 22.33	WW = 25.60 DW = 21.92
DW = 21.78 TW = 14.51	DW = 22.33 TW = 14.48	DW = 21.92 TW = 12.83
Ww = 3.16 Ws = 7.27	Ww = 3.31 Ws = 7.85	Ww = 3.68 Ws = 9.09
w = 43.47 %	w = 42.17 %	w = 40.48 %

4	5	6
NO. OF BLOWS 24	NO. OF BLOWS 30	NO. OF BLOWS 34
No. f4	No. a9	No. b32
WW = 26.90 DW = 23.56	WW = 28.82 DW = 25.19	WW = 26.47 DW = 23.16
DW = 23.56 TW = 14.99	DW = 25.19 TW = 15.62	DW = 23.16 TW = 14.21
Ww = 3.34 Ws = 8.57	Ww = 3.63 Ws = 9.57	Ww = 3.31 Ws = 8.95
w = 38.97 %	w = 37.93 %	w = 36.98 %

PLASTIC LIMIT TEST

1	2	3
No. c7	No. B10	No. j2
WW = 14.68 DW = 14.44	WW = 17.56 DW = 17.39	WW = 14.56 DW = 14.38
DW = 14.44 TW = 13.60	DW = 17.39 TW = 16.80	DW = 14.38 TW = 13.75
Ww = 0.24 Ws = 0.84	Ww = 0.17 Ws = 0.59	Ww = 0.18 Ws = 0.63
w = 28.57 %	w = 28.81 %	w = 28.57 %



REMARKS :

WW = Wt of container + wet soil in gr.
DW = Wt of container + dry soil in gr.
TW = Wt of container in gr.

The limits is determined on the portion of the soil passing 0,4 mm sieve

Dari percobaan didapatkan :

LIQUID LIMIT = 38.91 %
PLASTIC LIMIT = 28.65 %
PLAST. INDEX = 10.26 %



LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

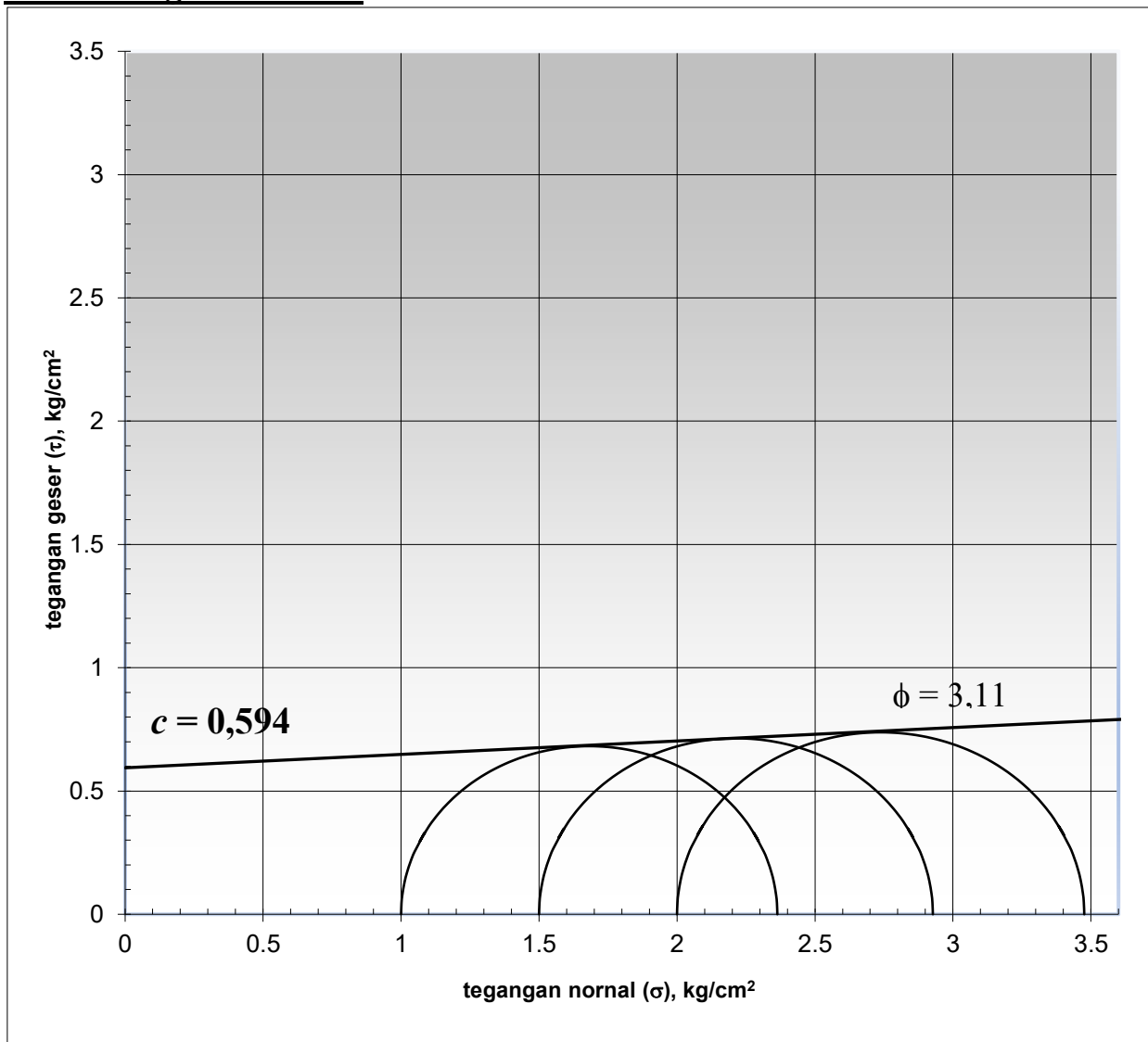
Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

TRIAXIAL COMPRESSION TEST

Location :
Jenis Tanah :

Dikerjakan :
Tested by :

Grafik Lingkaran Mohr





LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

UNCONFINED COMPRESSIVE STRENGTH

Lokasi :
Jenis Tanah :

Dikerjakan :
Permintaan :

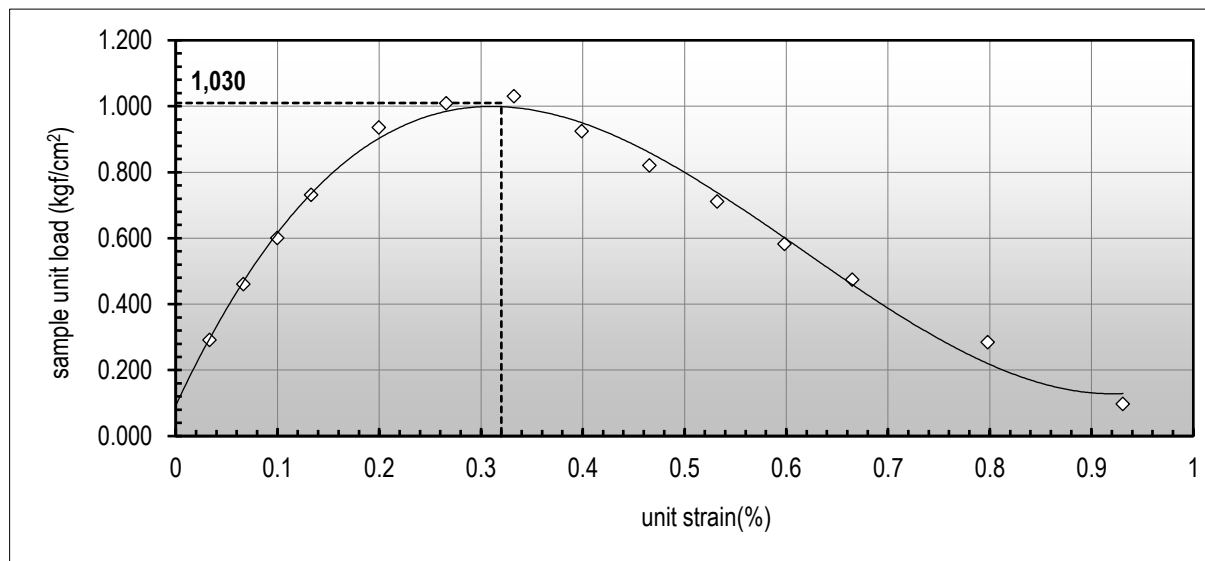
Sample Data

Area (A_0) = 8.71 cm² Height (L_0) = 7.52 cm
w = 23.27 % γ_d = 1.88 gr/cm³

Machine Data

LRC = 0.35 kgf Diameter = 3.33 cm

deformation dial reading	load dial (units)	ΔL col 1 . 10 ⁻²	unit strain $\Delta L / L_0$	area CF 1 - col 4	corrected area A'	total load on sample	sample unit load
25.00	7.5	0.25	0.033	0.967	9.012	2.626	0.291
50.00	12.3	0.50	0.066	0.934	9.333	4.306	0.461
75.00	16.6	0.75	0.100	0.900	9.678	5.812	0.601
100.00	21.0	1.00	0.133	0.867	10.049	7.352	0.732
150.00	29.1	1.50	0.199	0.801	10.884	10.188	0.936
200.00	34.2	2.00	0.266	0.734	11.869	11.973	1.009
250.00	38.4	2.50	0.332	0.668	13.052	13.444	1.030
300.00	38.3	3.00	0.399	0.601	14.495	13.409	0.925
350.00	38.2	3.50	0.465	0.535	16.298	13.374	0.821
400.00	37.8	4.00	0.532	0.468	18.614	13.234	0.711
450.00	36.1	4.50	0.598	0.402	21.695	12.639	0.583
500.00	35.2	5.00	0.665	0.335	26.000	12.324	0.474
600.00	35.1	6.00	0.798	0.202	43.105	12.289	0.285
700.00	35.0	7.00	0.931	0.069	125.999	12.254	0.097
800.00							
900.00							
1000.00							
1100.00							
1200.00							
1300.00							
1400.00							
1500.00							
1600.00							
1700.00							



Dari test didapat q_u = 1.030 kgf/cm²



**LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG**

Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Malang 65145

WATER CONTENT

PEMERIKSAAN KADAR AIR

Nomor cawan		j10	b9	g10
Berat cawan + tanah basah	(gr)	41.64	41.90	39.92
Berat cawan + tanah kering	(gr)	39.59	39.56	37.93
Berat cawan	(gr)	14.68	14.43	14.12
Berat air	(gr)	2.05	2.34	1.99
Berat tanah kering	(gr)	24.91	25.13	23.81
Kadar air (w)	(%)	8.23	9.31	8.36
Kadar air rata-rata	(%)	8.63		



LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

PEMERIKSAAN BERAT JENIS

LOKASI :
DIKERJAKAN :
JENIS TANAH :
KEDALAMAN :
NOMOR CONTOH :

BERAT JENIS TANAH

Nomor Picno		C3	C	O
Berat Picno + Tanah (W_2)	gr	99.99	88.61	88.24
Berat Picno (W_1)	gr	46.60	30.11	38.46
Berat Tanah ($W_2 - W_1$)	gr	53.39	58.50	49.78
Suhu (T)	°C	27	27	27
Berat Picno + Air pada T (W_4)	gr	145.76	131.14	138.80
$W_2 - W_1 + W_4$	gr	199.15	189.64	188.58
Berat Picno + Air + Tanah (W_3)	gr	179.22	167.10	169.01
Faktor Koreksi Suhu		0.9986	0.9986	0.9986
Isi Tanah ($W_2 - W_1$) + ($W_4 - W_3$)	cm ³	19.93	22.54	19.57
Berat Jenis Tanah		2.675	2.592	2.540
Rata-rata		2.602		

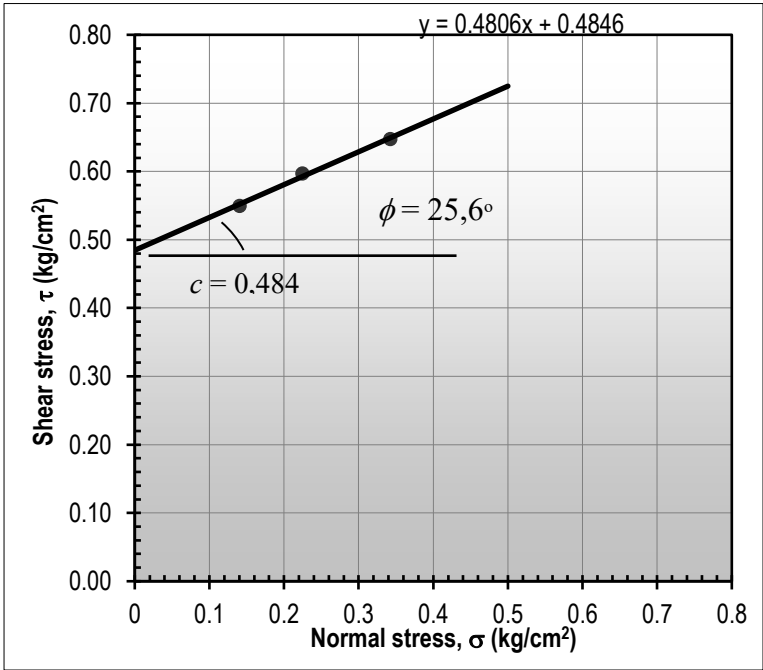
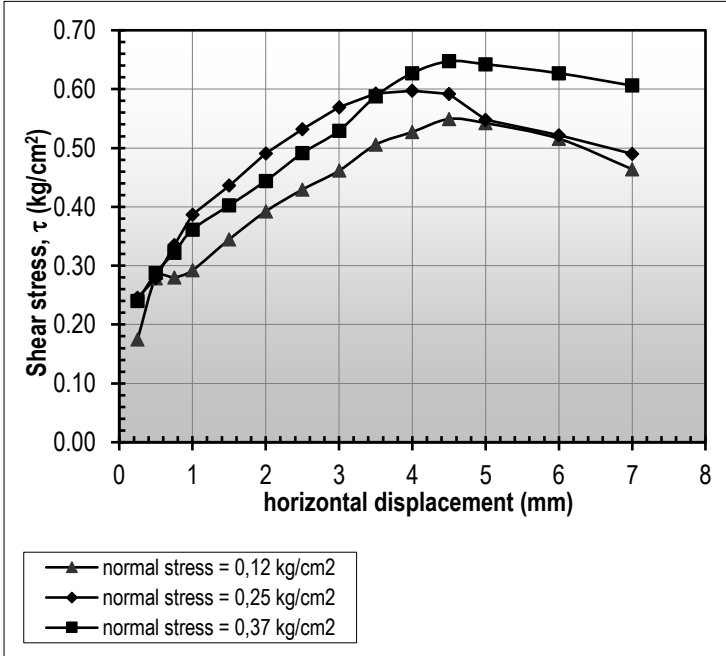


LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

DIRECT SHEAR TEST

Lokasi : Kedalaman :
Permintaan :

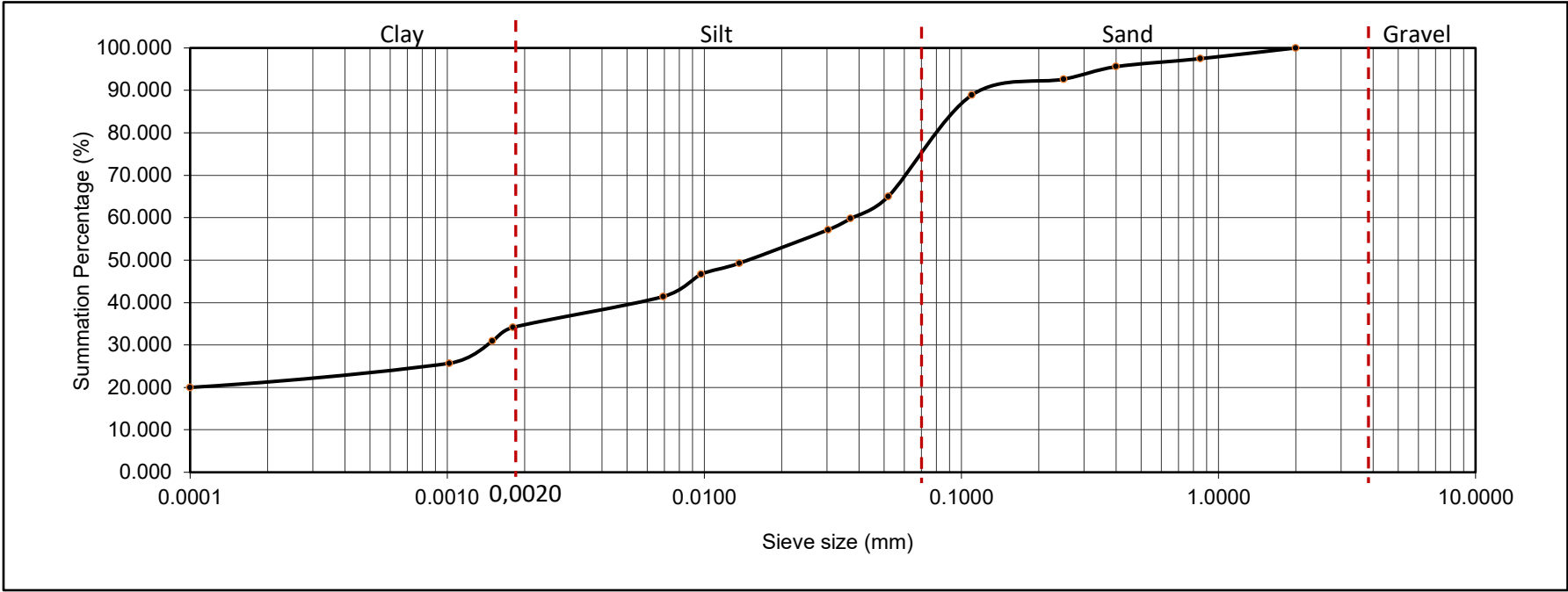




LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

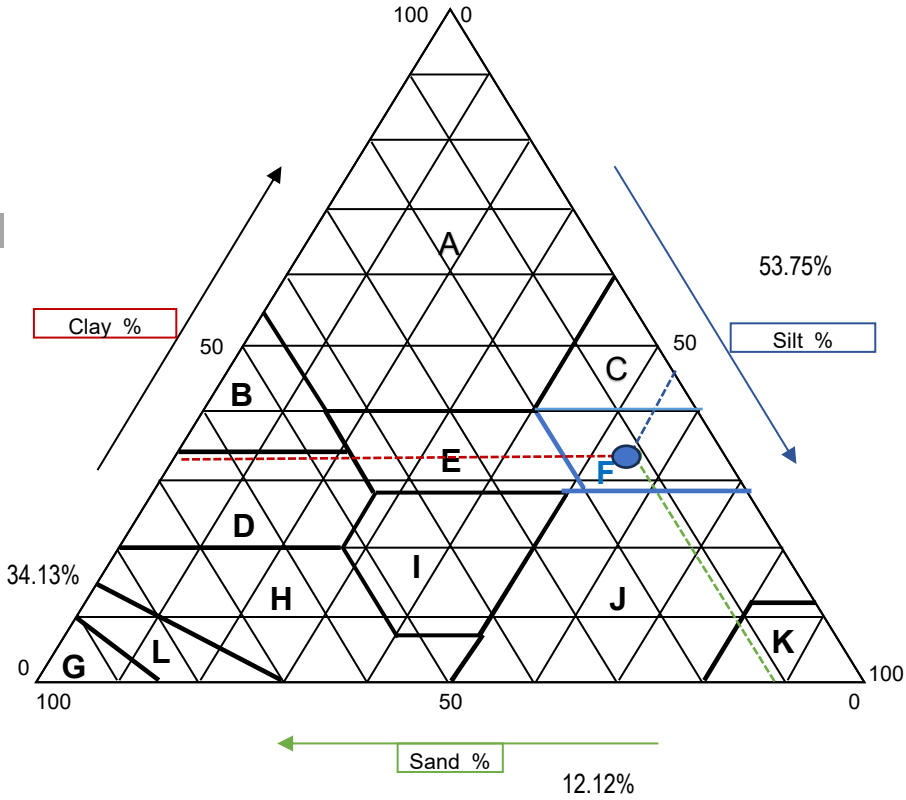
GRAIN SIZE ANALYSIS (Hydrometer)



Gravel	Sand	Silt	Clay	Max size	D 60	D 10	Classification	Remarks
0%	12.12%	53.75%	34.13%	0.0520	0.010	-	I.	=

CLASSIFICATION

- A. CLAY
- B. SANDY CLAY
- C. SILTY CLAY
- D. SANDY CLAY LOAM
- E. CLAYLEY LOAM
- F. SILTY CLAY LOAM
- G. SAND
- H. SANDY LOAM
- I. LOAM
- J. SILTY LOAM
- K. SILT
- L. LOAMY SAND



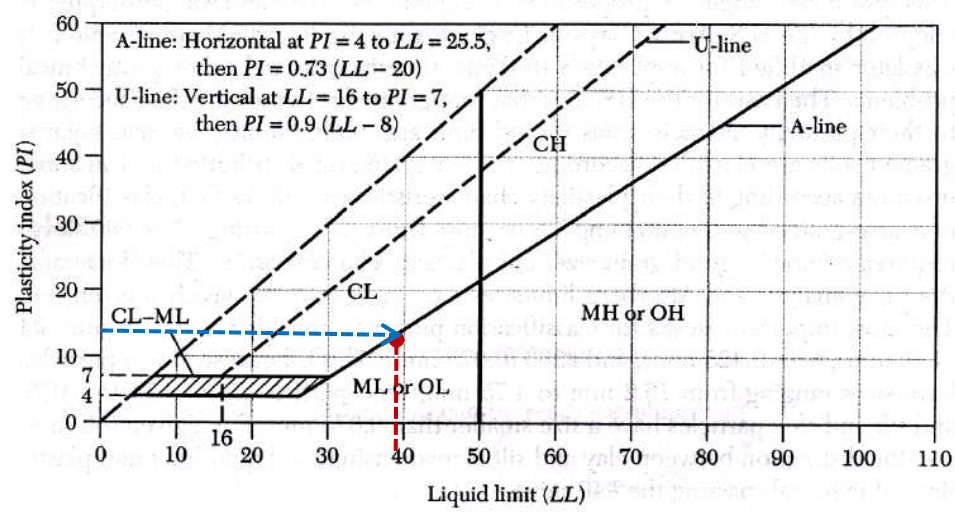


FIGURE 3.14 Plasticity chart used in the classification of fine-grained soils. (Adapted from Casagrande, 1948; Howard, 1977.)

Kesimpulan :-



LABORATORIUM MEKANIK TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

LOCATION :
SAMPLE NO. :

TESTED BY :
:

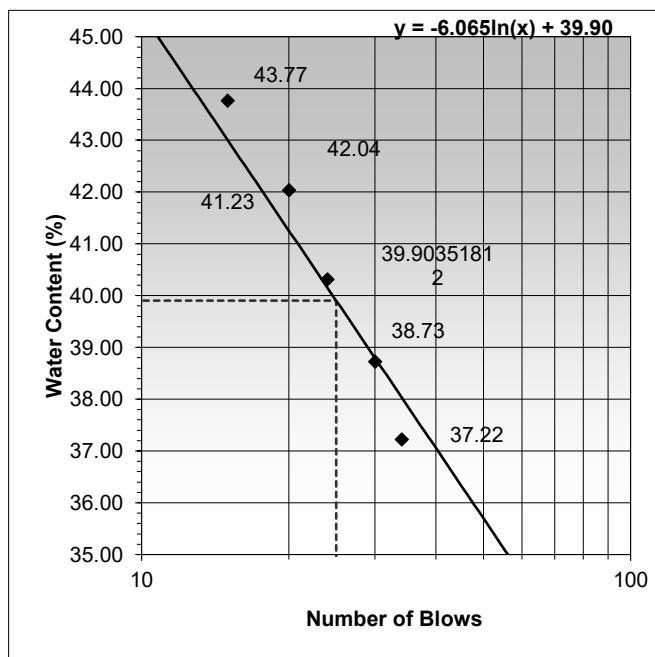
LIQUID LIMIT TEST

1	2	3
NO. OF BLOWS 9	NO. OF BLOWS 15	NO. OF BLOWS 20
No. f10	No. g7	No. j7
WW = 25.34 DW = 21.98	WW = 26.04 DW = 22.53	WW = 26.00 DW = 22.12
DW = 21.98 TW = 14.56	DW = 22.53 TW = 14.51	DW = 22.12 TW = 12.89
Ww = 3.36 Ws = 7.42	Ww = 3.51 Ws = 8.02	Ww = 3.88 Ws = 9.23
w = 45.28 %	w = 43.77 %	w = 42.04 %

4	5	6
NO. OF BLOWS 24	NO. OF BLOWS 30	NO. OF BLOWS 34
No. f4	No. a9	No. b32
WW = 27.30 DW = 23.74	WW = 29.22 DW = 25.39	WW = 26.87 DW = 23.36
DW = 23.74 TW = 14.91	DW = 25.39 TW = 15.50	DW = 23.36 TW = 13.93
Ww = 3.56 Ws = 8.83	Ww = 3.83 Ws = 9.89	Ww = 3.51 Ws = 9.43
w = 40.32 %	w = 38.73 %	w = 37.22 %

PLASTIC LIMIT TEST

1	2	3
No. c7	No. B10	No. j2
WW = 14.68 DW = 14.45	WW = 17.56 DW = 17.40	WW = 14.56 DW = 14.39
DW = 14.45 TW = 13.57	DW = 17.40 TW = 16.79	DW = 14.39 TW = 13.75
Ww = 0.23 Ws = 0.88	Ww = 0.16 Ws = 0.61	Ww = 0.17 Ws = 0.64
w = 26.14 %	w = 26.23 %	w = 26.56 %



REMARKS :

WW = Wt of container + wet soil in gr.
DW = Wt of container + dry soil in gr.
TW = Wt of container in gr.

The limits is determined on the portion of the soil passing 0,4 mm sieve

Dari percobaan didapatkan :

LIQUID LIMIT = 39.90 %
PLASTIC LIMIT = 26.31 %
PLAST. INDEX = 13.59 %



LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

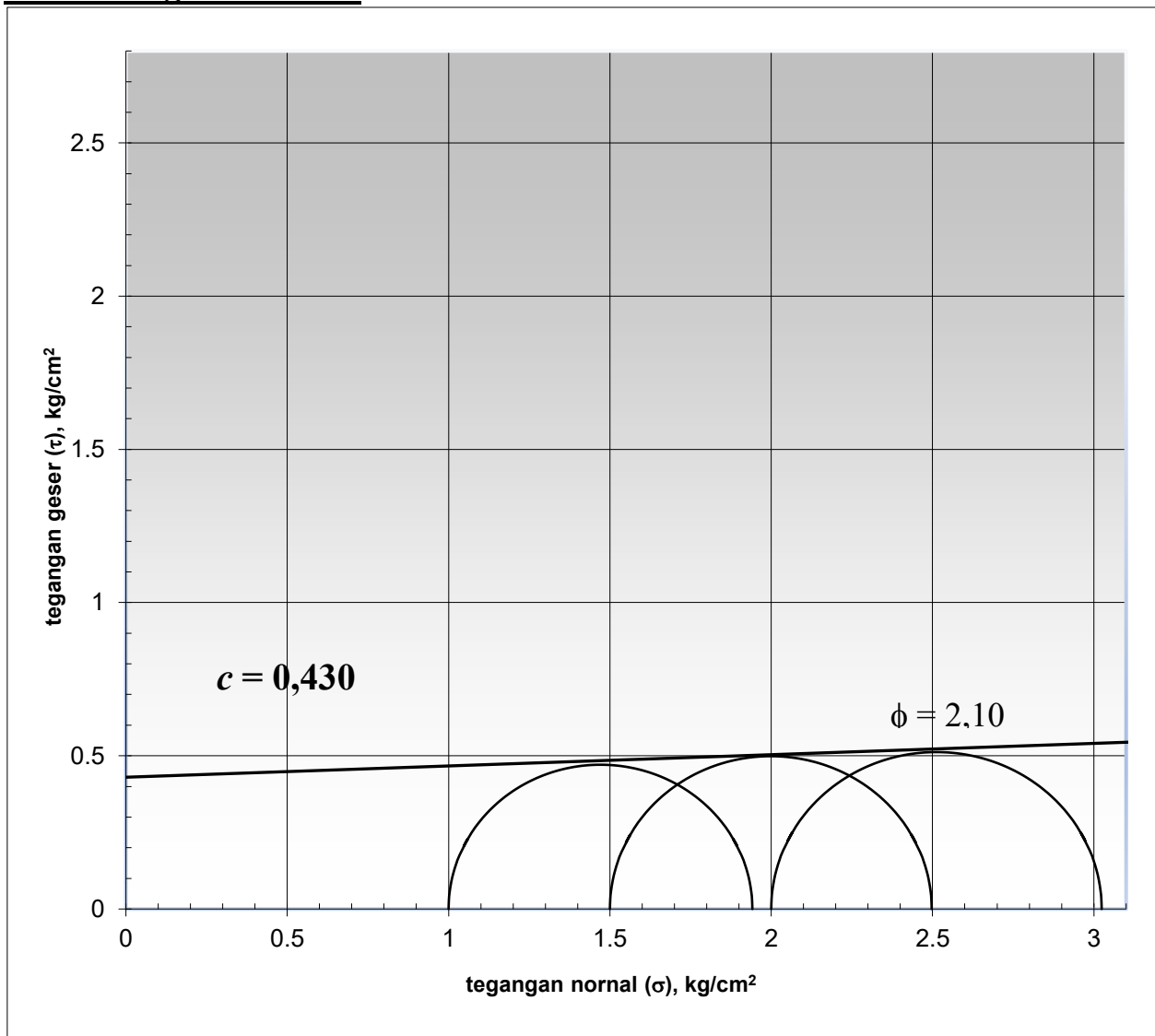
Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

TRIAXIAL COMPRESSION TEST

Location :
Jenis Tanah :

Dikerjakan :
Tested by :

Grafik Lingkaran Mohr





LABORATORIUM MEKANIK TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

UNCONFINED COMPRESSIVE STRENGTH

Lokasi :
Jenis Tanah :

Dikerjakan :
Permintaan :

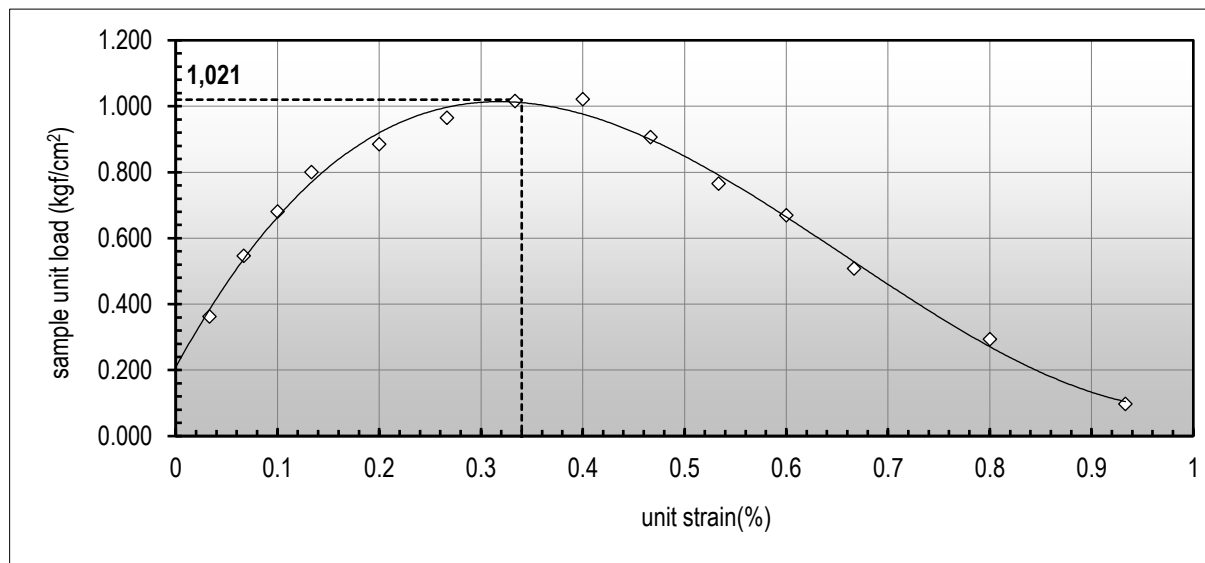
Sample Data

Area (A_0) = 9.63 cm² Height (L_0) = 7.50 cm
w = 23.27 % γ_d = 1.70 gr/cm³

Machine Data

LRC = 0.35 kgf Diameter = 3.50 cm

deformation dial reading	load dial (units)	ΔL col 1 . 10 ⁻²	unit strain $\Delta L / L_0$	area CF 1 - col 4	corrected area A'	total load on sample	sample unit load
25.00	10.3	0.25	0.033	0.967	9.957	3.606	0.362
50.00	16.1	0.50	0.067	0.933	10.313	5.637	0.547
75.00	20.8	0.75	0.100	0.900	10.694	7.282	0.681
100.00	25.4	1.00	0.133	0.867	11.106	8.893	0.801
150.00	30.4	1.50	0.200	0.800	12.031	10.643	0.885
200.00	36.2	2.00	0.267	0.733	13.125	12.674	0.966
250.00	41.9	2.50	0.333	0.667	14.438	14.669	1.016
300.00	46.8	3.00	0.400	0.600	16.042	16.385	1.021
350.00	46.7	3.50	0.467	0.533	18.047	16.350	0.906
400.00	45.1	4.00	0.533	0.467	20.625	15.790	0.766
450.00	46.0	4.50	0.600	0.400	24.063	16.105	0.669
500.00	41.9	5.00	0.667	0.333	28.875	14.669	0.508
600.00	40.4	6.00	0.800	0.200	48.125	14.144	0.294
700.00	40.3	7.00	0.933	0.067	144.375	14.109	0.098
800.00							
900.00							
1000.00							
1100.00							
1200.00							
1300.00							
1400.00							
1500.00							
1600.00							
1700.00							



Dari test didapat q_u = 1.021 kgf/cm²



LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Malang 65145

WATER CONTENT

PEMERIKSAAN KADAR AIR

Nomor cawan		x11	h2	j6
Berat cawan + tanah basah	(gr)	35.69	36.81	32.40
Berat cawan + tanah kering	(gr)	33.03	33.90	29.92
Berat cawan	(gr)	6.23	6.31	5.81
Berat air	(gr)	2.66	2.91	2.48
Berat tanah kering	(gr)	26.80	27.59	24.11
Kadar air (w)	(%)	9.93	10.55	10.29
Kadar air rata-rata	(%)	10.25		



LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

PEMERIKSAAN BERAT JENIS

LOKASI :
DIKERJAKAN :
JENIS TANAH :
KEDALAMAN :
NOMOR CONTOH :

BERAT JENIS TANAH

Nomor Picno		C3	C	O
Berat Picno + Tanah (W_2)	gr	98.95	85.62	84.05
Berat Picno (W_1)	gr	46.60	30.11	38.46
Berat Tanah ($W_2 - W_1$)	gr	52.35	55.51	45.59
Suhu (T)	°C	27	27	27
Berat Picno + Air pada T (W_4)	gr	145.99	131.50	139.19
$W_2 - W_1 + W_4$	gr	198.34	187.01	184.78
Berat Picno + Air + Tanah (W_3)	gr	178.34	165.88	167.29
Faktor Koreksi Suhu		0.9986	0.9986	0.9986
Isi Tanah ($W_2 - W_1$) + ($W_4 - W_3$)	cm ³	20.00	21.13	17.49
Berat Jenis Tanah		2.614	2.623	2.603
Rata-rata		2.613		



LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

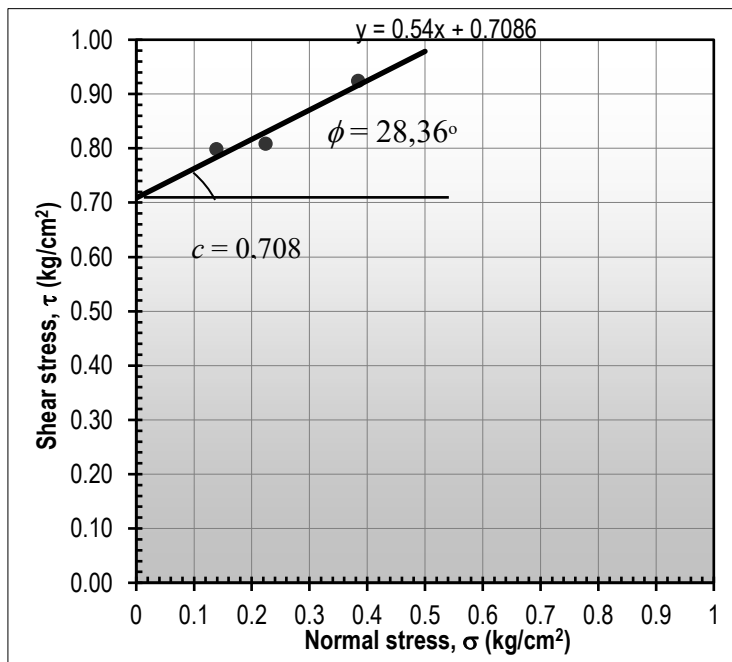
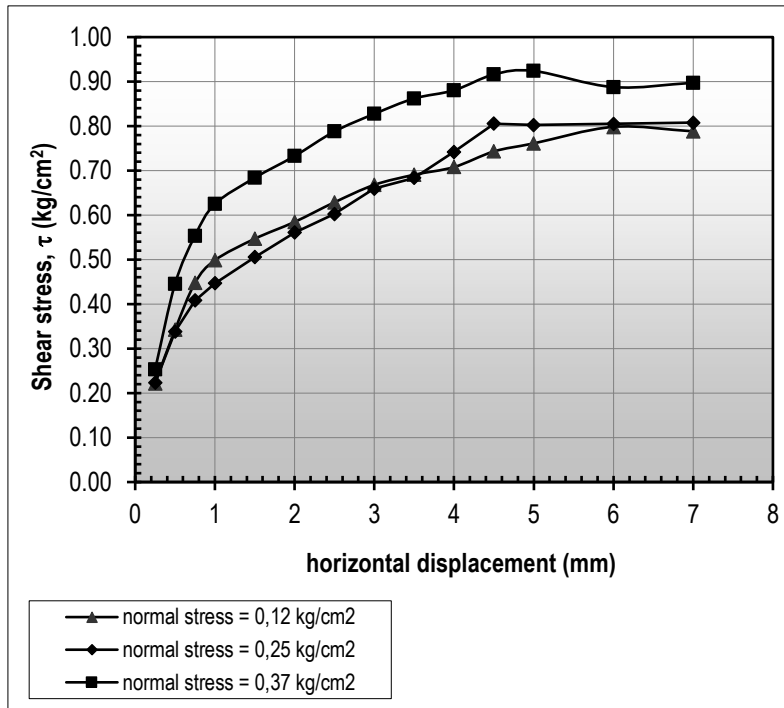
Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

DIRECT SHEAR TEST

Lokasi :

Kedalaman :

Permintaan :



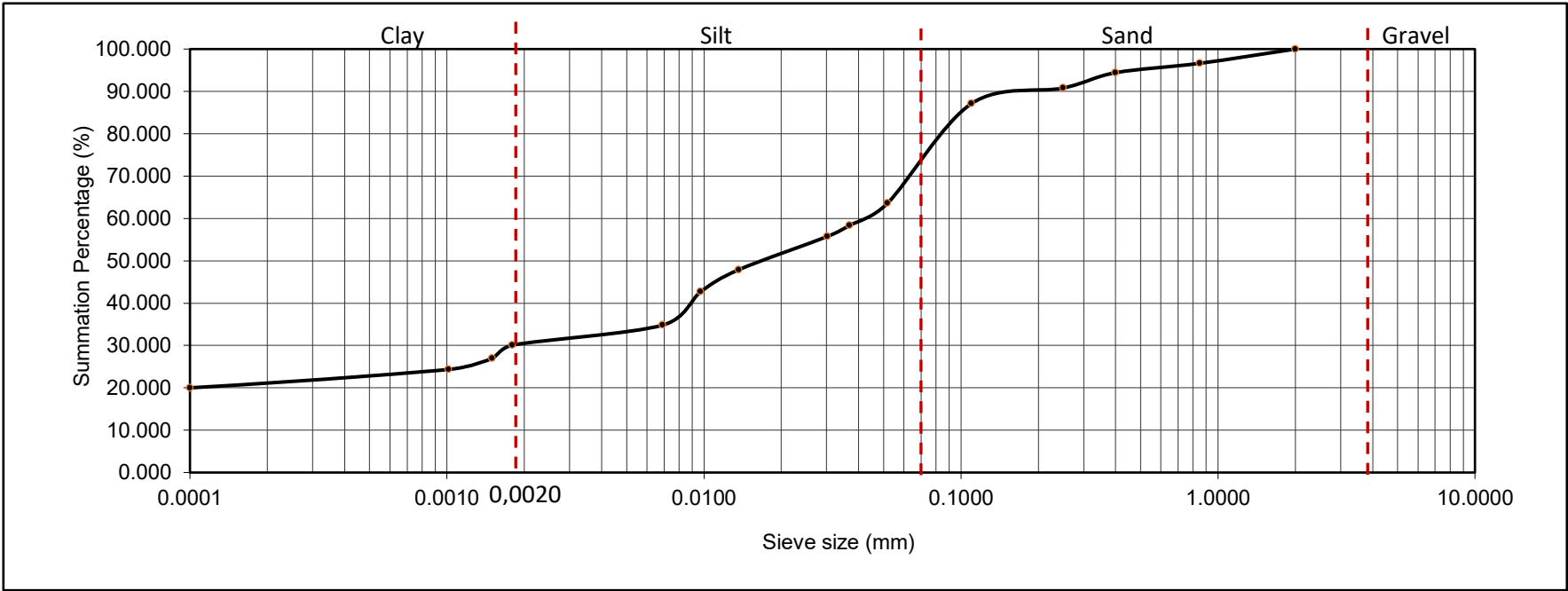
**LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG**



LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

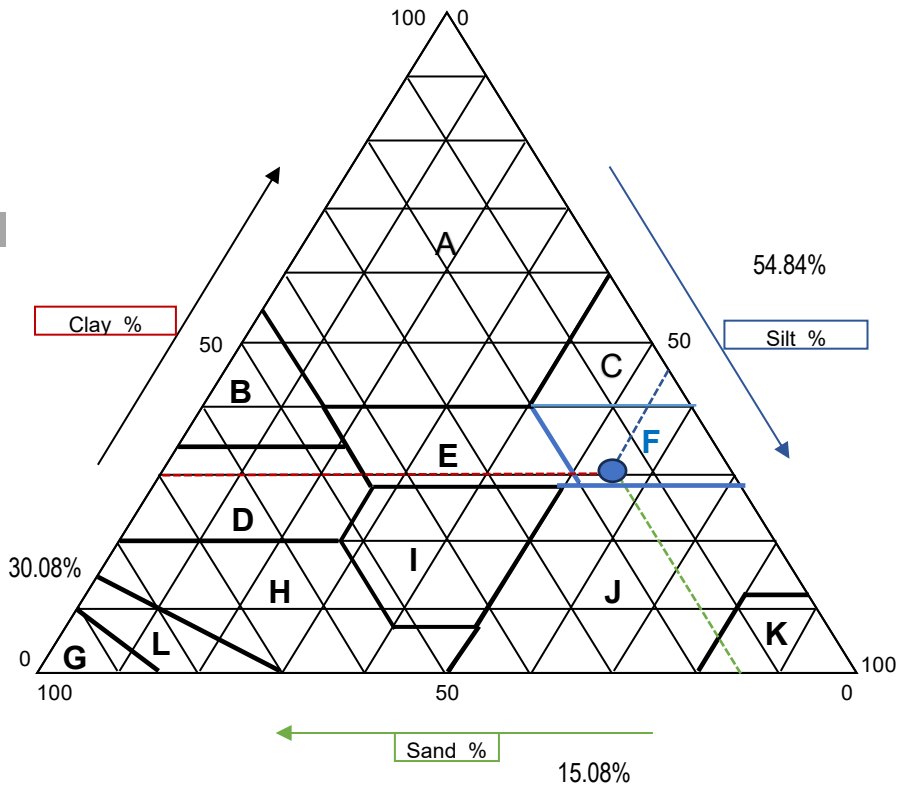
GRAIN SIZE ANALYSIS (Hydrometer)



Gravel	Sand	Silt	Clay	Max size	D 60	D 10	Classification	Remarks
0%	15.08%	54.84%	30.08%	0.0518	0.010	-	I.	=

CLASSIFICATION

- A. CLAY
- B. SANDY CLAY
- C. SILTY CLAY
- D. SANDY CLAY LOAM
- E. CLAYLEY LOAM
- F. SILTY CLAY LOAM
- G. SAND
- H. SANDY LOAM
- I. LOAM
- J. SILTY LOAM
- K. SILT
- L. LOAMY SAND



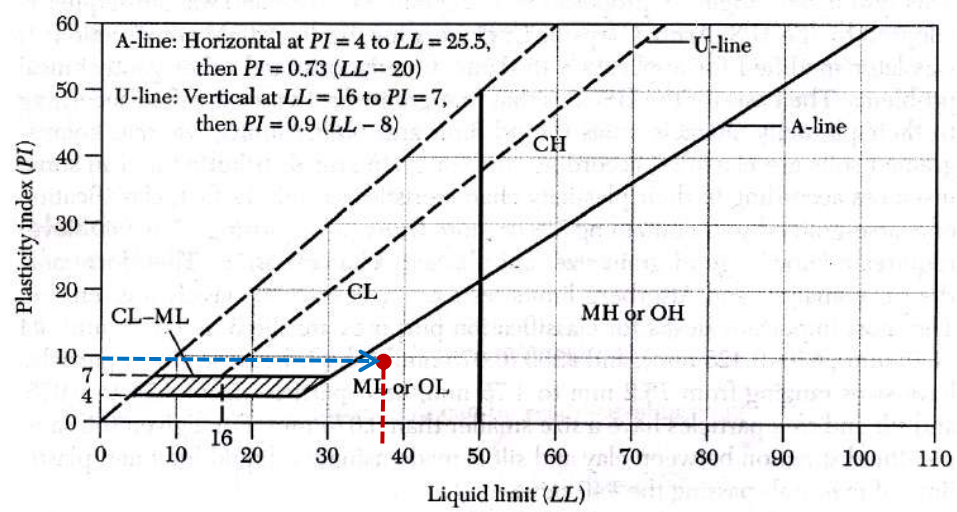


FIGURE 3.14 Plasticity chart used in the classification of fine-grained soils. (Adapted from Casagrande, 1948; Howard, 1977.)

Kesimpulan :-



LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

LOCATION :
SAMPLE NO. :

TESTED BY :
:

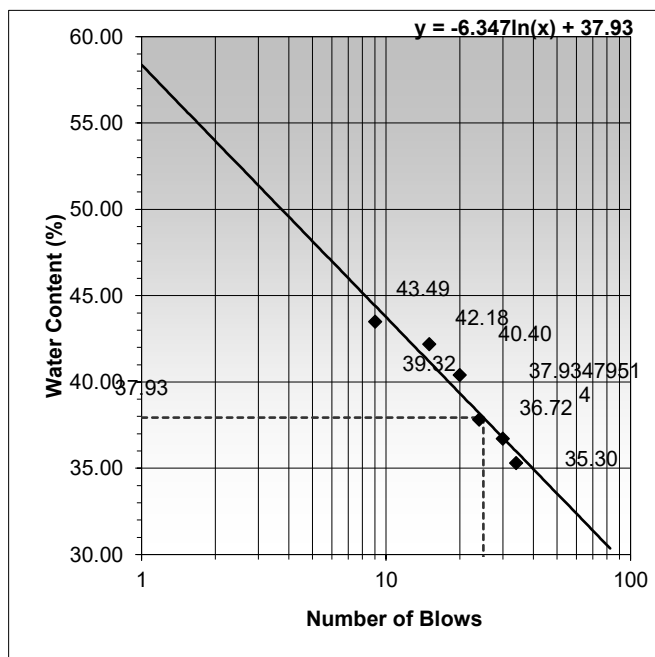
LIQUID LIMIT TEST

1	2	3
NO. OF BLOWS 9	NO. OF BLOWS 15	NO. OF BLOWS 20
No. f10	No. g7	No. j7
WW = 24.93 DW = 21.79	WW = 25.63 DW = 22.34	WW = 25.59 DW = 21.93
DW = 21.79 TW = 14.57	DW = 22.34 TW = 14.54	DW = 21.93 TW = 12.87
Ww = 3.14 Ws = 7.22	Ww = 3.29 Ws = 7.80	Ww = 3.66 Ws = 9.06
w = 43.49 %	w = 42.18 %	w = 40.40 %

4	5	6
NO. OF BLOWS 24	NO. OF BLOWS 30	NO. OF BLOWS 34
No. f4	No. a9	No. b32
WW = 26.89 DW = 23.57	WW = 28.81 DW = 25.20	WW = 26.46 DW = 23.17
DW = 23.57 TW = 14.79	DW = 25.20 TW = 15.37	DW = 23.17 TW = 13.85
Ww = 3.32 Ws = 8.78	Ww = 3.61 Ws = 9.83	Ww = 3.29 Ws = 9.32
w = 37.81 %	w = 36.72 %	w = 35.30 %

PLASTIC LIMIT TEST

1	2	3
No. c7	No. B10	No. j2
WW = 14.68 DW = 14.44	WW = 17.56 DW = 17.39	WW = 14.56 DW = 14.38
DW = 14.44 TW = 13.59	DW = 17.39 TW = 16.80	DW = 14.38 TW = 13.75
Ww = 0.24 Ws = 0.85	Ww = 0.17 Ws = 0.59	Ww = 0.18 Ws = 0.63
w = 28.24 %	w = 28.81 %	w = 28.39 %



REMARKS :

WW = Wt of container + wet soil in gr.
DW = Wt of container + dry soil in gr.
TW = Wt of container in gr.

The limits is determined on the portion of the soil passing 0,4 mm sieve

Dari percobaan didapatkan :

LIQUID LIMIT = 37.93 %
PLASTIC LIMIT = 28.48 %
PLAST. INDEX = 9.45 %



LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

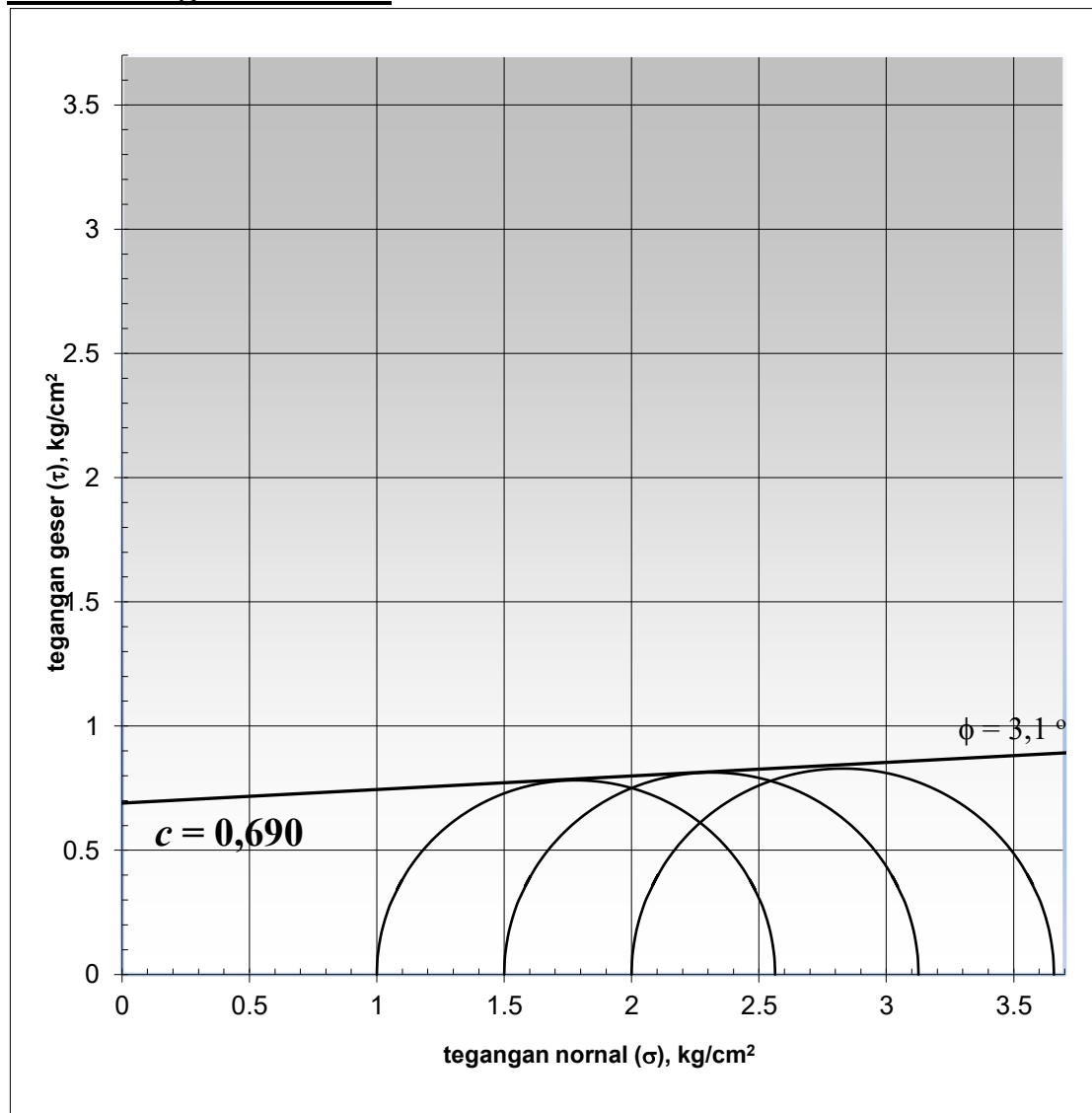
Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

TRIAXIAL COMPRESSION TEST

Location :
Jenis Tanah :

Dikerjakan :
Tested by :

Grafik Lingkaran Mohr





LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

UNCONFINED COMPRESSIVE STRENGTH

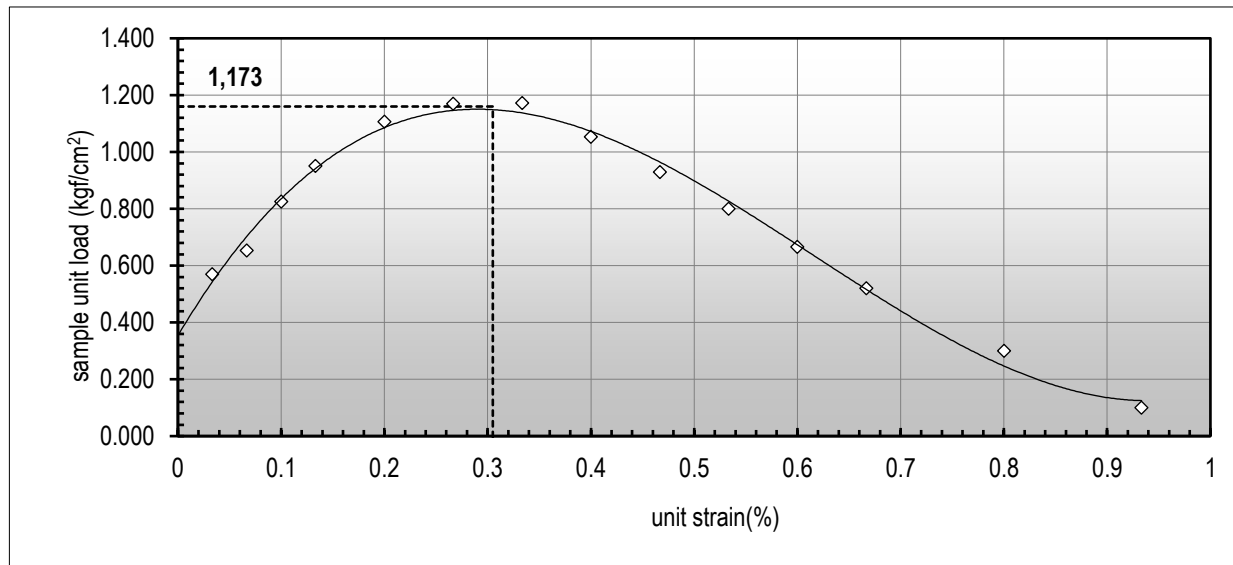
Lokasi :
Jenis Tanah :

Dikerjakan :
Permintaan :

Sample Data

Area (A_0) = 8.56 cm² Height (L_0) = 7.50 cm
w = 23.27 % γ_d = 1.92 gr/cm³
Machine Data LRC = 0.35 kgf Diameter = 3.30 cm

deformation dial reading	load dial (units)	ΔL col 1 . 10 ⁻⁴	unit strain $\Delta L / L_0$	area CF 1 - col 4	corrected area A'	total load on sample	sample unit load
25.00	14.4	0.25	0.033	0.967	8.851	5.041	0.570
50.00	17.1	0.50	0.067	0.933	9.168	5.987	0.653
75.00	22.4	0.75	0.100	0.900	9.507	7.842	0.825
100.00	26.8	1.00	0.133	0.867	9.873	9.383	0.950
150.00	33.8	1.50	0.200	0.800	10.696	11.833	1.106
200.00	39.0	2.00	0.267	0.733	11.668	13.654	1.170
250.00	43.0	2.50	0.333	0.667	12.835	15.054	1.173
300.00	42.9	3.00	0.400	0.600	14.261	15.019	1.053
350.00	42.6	3.50	0.467	0.533	16.043	14.914	0.930
400.00	41.9	4.00	0.533	0.467	18.335	14.669	0.800
450.00	40.7	4.50	0.600	0.400	21.391	14.249	0.666
500.00	38.2	5.00	0.667	0.333	25.669	13.374	0.521
600.00	36.7	6.00	0.800	0.200	42.782	12.849	0.300
700.00	36.6	7.00	0.933	0.067	128.346	12.814	0.100
800.00							
900.00							
1000.00							
1100.00							
1200.00							
1300.00							
1400.00							
1500.00							
1600.00							
1700.00							



Dari test didapat q_u = 1.173 kgf/cm²



**LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG**

. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Malang 65145

WATER CONTENT

PEMERIKSAAN KADAR AIR

Nomor cawan		d1	d8	j7
Berat cawan + tanah basah	(gr)	46.03	50.58	53.83
Berat cawan + tanah kering	(gr)	42.61	46.67	49.46
Berat cawan	(gr)	14.79	13.86	13.92
Berat air	(gr)	3.42	3.91	4.37
Berat tanah kering	(gr)	27.82	32.81	35.54
Kadar air (w)	(%)	12.29	11.92	12.30
Kadar air rata-rata	(%)	12.17		



LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

PEMERIKSAAN BERAT JENIS

LOKASI :
DIKERJAKAN :
JENIS TANAH :
KEDALAMAN :
NOMOR CONTOH :

BERAT JENIS TANAH

Nomor Picno		C3	C	O
Berat Picno + Tanah (W_2)	gr	92.68	86.27	83.09
Berat Picno (W_1)	gr	46.60	30.11	38.46
Berat Tanah ($W_2 - W_1$)	gr	46.08	56.16	44.63
Suhu (T)	°C	27	27	27
Berat Picno + Air pada T (W_4)	gr	145.76	131.16	138.79
$W_2 - W_1 + W_4$	gr	191.84	187.32	183.42
Berat Picno + Air + Tanah (W_3)	gr	174.24	165.99	166.39
Faktor Koreksi Suhu		0.9986	0.9986	0.9986
Isi Tanah ($W_2 - W_1$) + ($W_4 - W_3$)	cm ³	17.60	21.33	17.03
Berat Jenis Tanah		2.615	2.629	2.617
Rata-rata		2.620		



LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

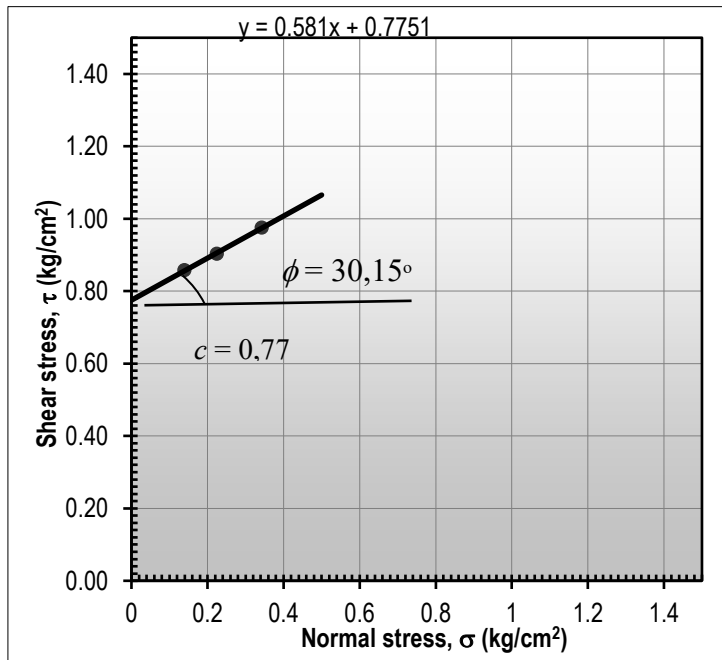
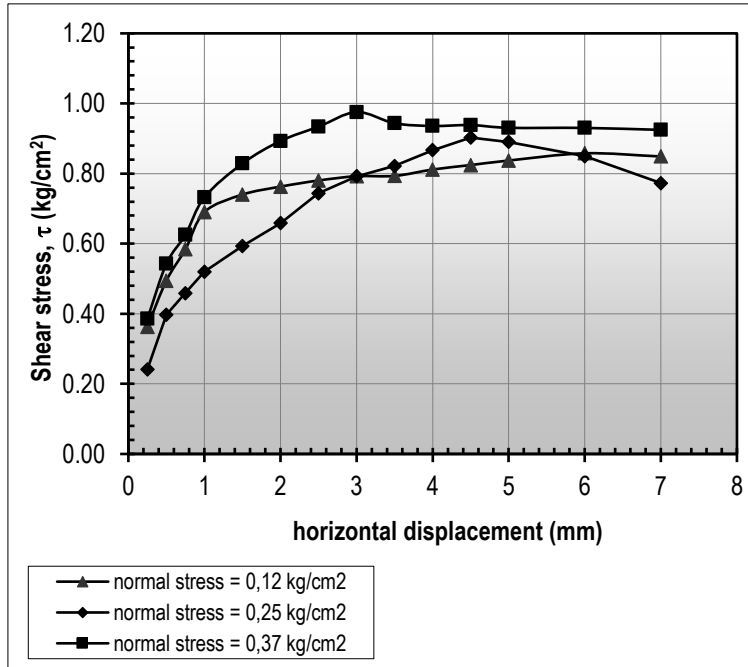
Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

DIRECT SHEAR TEST

Lokasi :

Kedalaman :

Permintaan :



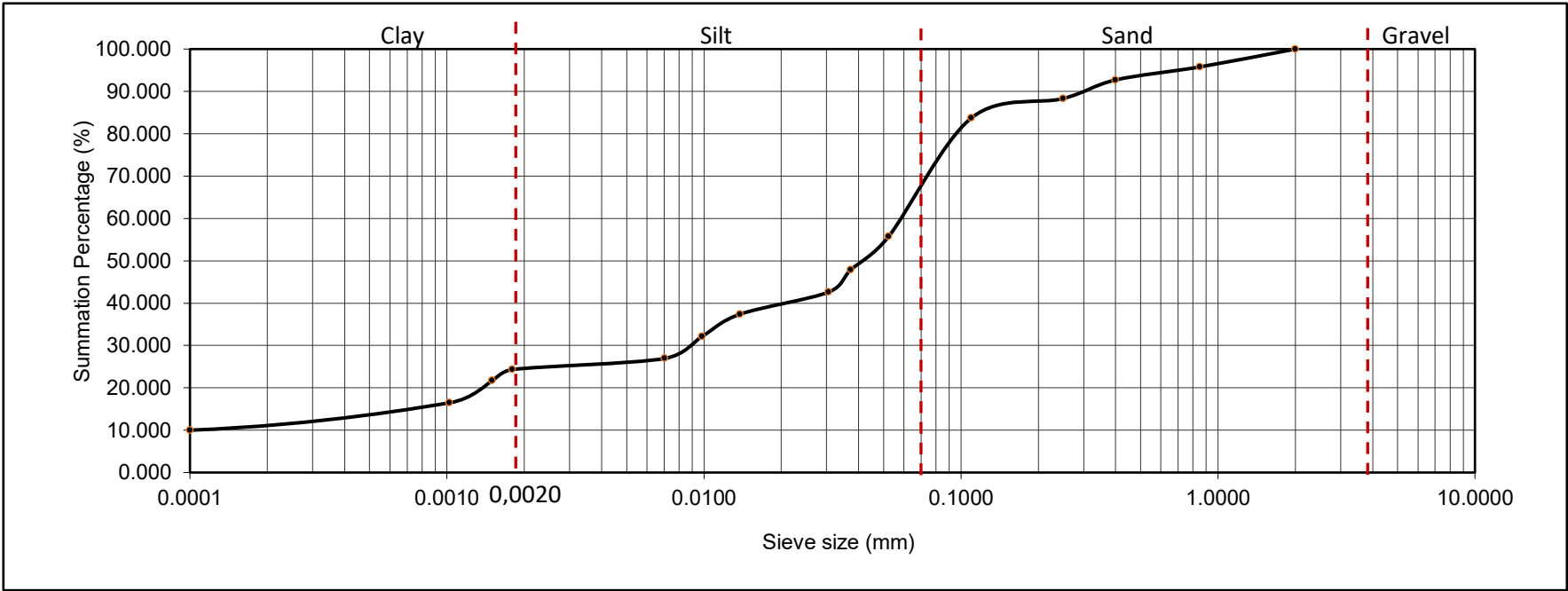
**LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG**



LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

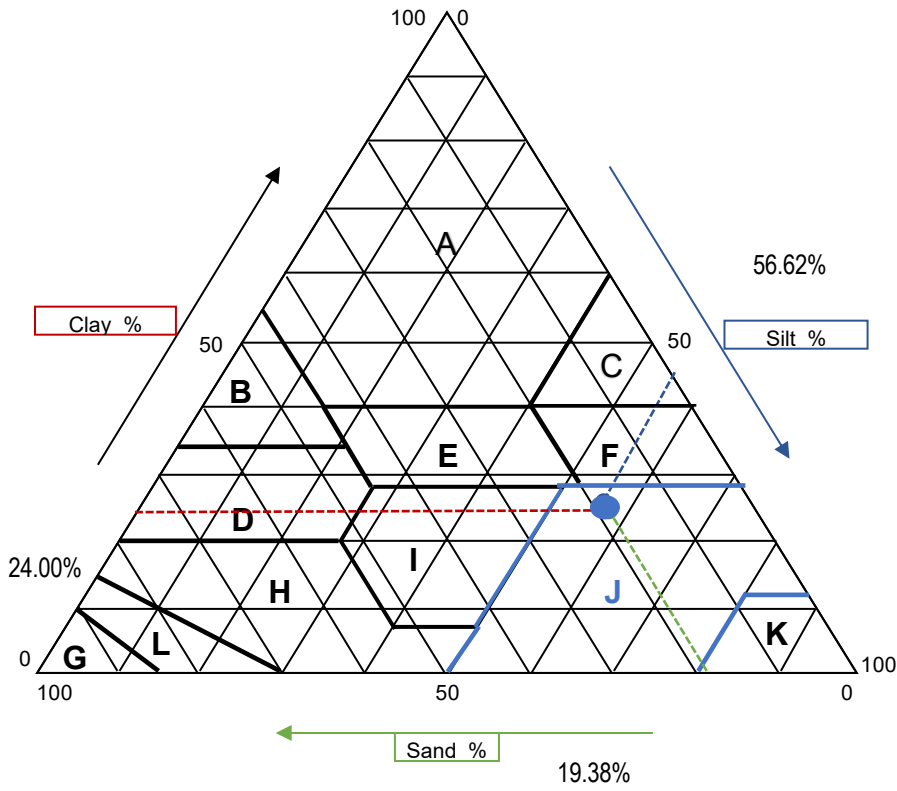
GRAIN SIZE ANALYSIS (Hydrometer)



Gravel	Sand	Silt	Clay	Max size	D 60	D 10	Classification	Remarks
0%	19.38%	56.62%	24.00%	0.0523	0.010	-	I.	=

CLASSIFICATION

- A. CLAY
- B. SANDY CLAY
- C. SILTY CLAY
- D. SANDY CLAY LOAM
- E. CLAYLEY LOAM
- F. SILTY CLAY LOAM
- G. SAND
- H. SANDY LOAM
- I. LOAM
- J. SILTY LOAM
- K. SILT
- L. LOAMY SAND



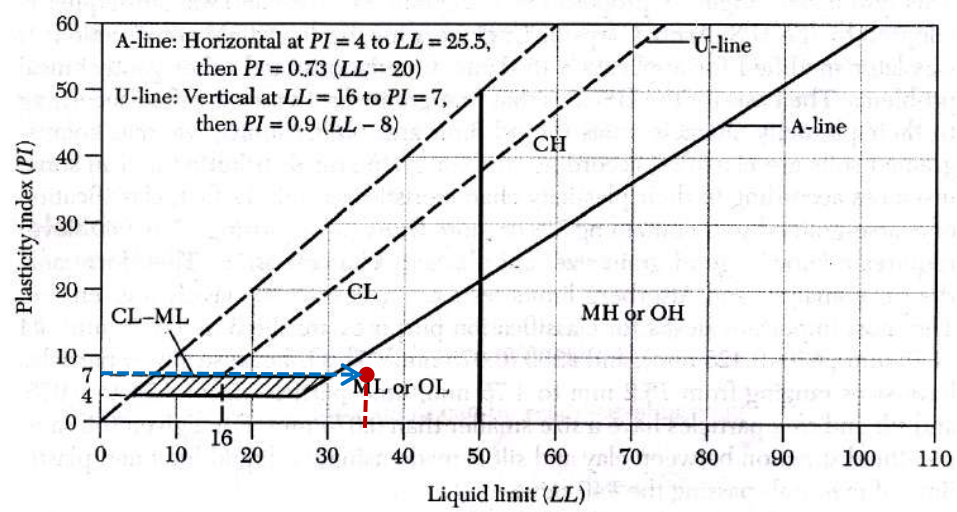


FIGURE 3.14 Plasticity chart used in the classification of fine-grained soils. (Adapted from Casagrande, 1948; Howard, 1977.)

Kesimpulan :-



LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

LOCATION :
SAMPLE NO. :

TESTED BY :
:

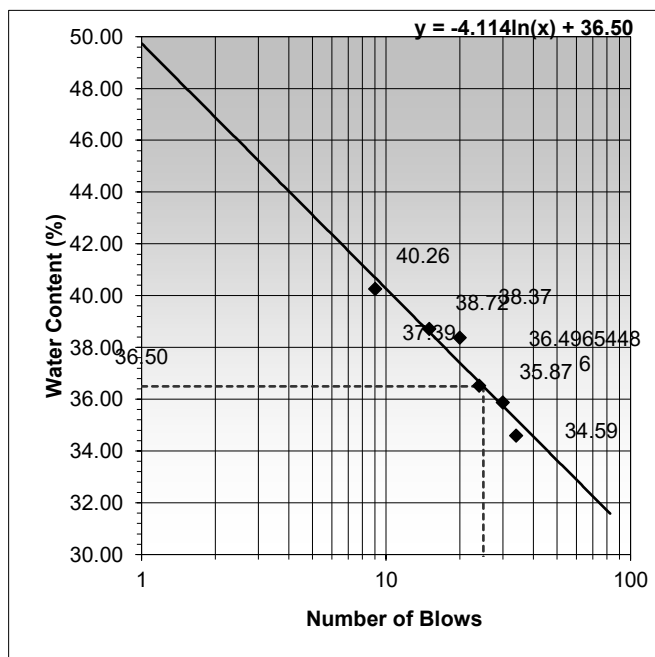
LIQUID LIMIT TEST

1	2	3
NO. OF BLOWS 9	NO. OF BLOWS 15	NO. OF BLOWS 20
No. f10	No. g7	No. j7
WW = 24.84 DW = 21.78	WW = 25.54 DW = 22.33	WW = 25.50 DW = 21.92
DW = 21.78 TW = 14.18	DW = 22.33 TW = 14.04	DW = 21.92 TW = 12.59
Ww = 3.06 Ws = 7.60	Ww = 3.21 Ws = 8.29	Ww = 3.58 Ws = 9.33
w = 40.26 %	w = 38.72 %	w = 38.37 %

4	5	6
NO. OF BLOWS 24	NO. OF BLOWS 30	NO. OF BLOWS 34
No. f4	No. a9	No. b32
WW = 26.80 DW = 23.56	WW = 28.72 DW = 25.19	WW = 26.37 DW = 23.16
DW = 23.56 TW = 14.69	DW = 25.19 TW = 15.35	DW = 23.16 TW = 13.88
Ww = 3.24 Ws = 8.87	Ww = 3.53 Ws = 9.84	Ww = 3.21 Ws = 9.28
w = 36.53 %	w = 35.87 %	w = 34.59 %

PLASTIC LIMIT TEST

1	2	3
No. c7	No. B10	No. j2
WW = 14.69 DW = 14.44	WW = 17.57 DW = 17.39	WW = 14.57 DW = 14.38
DW = 14.44 TW = 13.59	DW = 17.39 TW = 16.77	DW = 14.38 TW = 13.73
Ww = 0.25 Ws = 0.85	Ww = 0.18 Ws = 0.62	Ww = 0.19 Ws = 0.65
w = 29.41 %	w = 29.03 %	w = 29.23 %



REMARKS :

WW = Wt of container + wet soil in gr.
DW = Wt of container + dry soil in gr.
TW = Wt of container in gr.

The limits is determined on the portion of the soil passing 0,4 mm sieve

Dari percobaan didapatkan :

LIQUID LIMIT = 36.50 %
PLASTIC LIMIT = 29.22 %
PLAST. INDEX = 7.27 %



LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

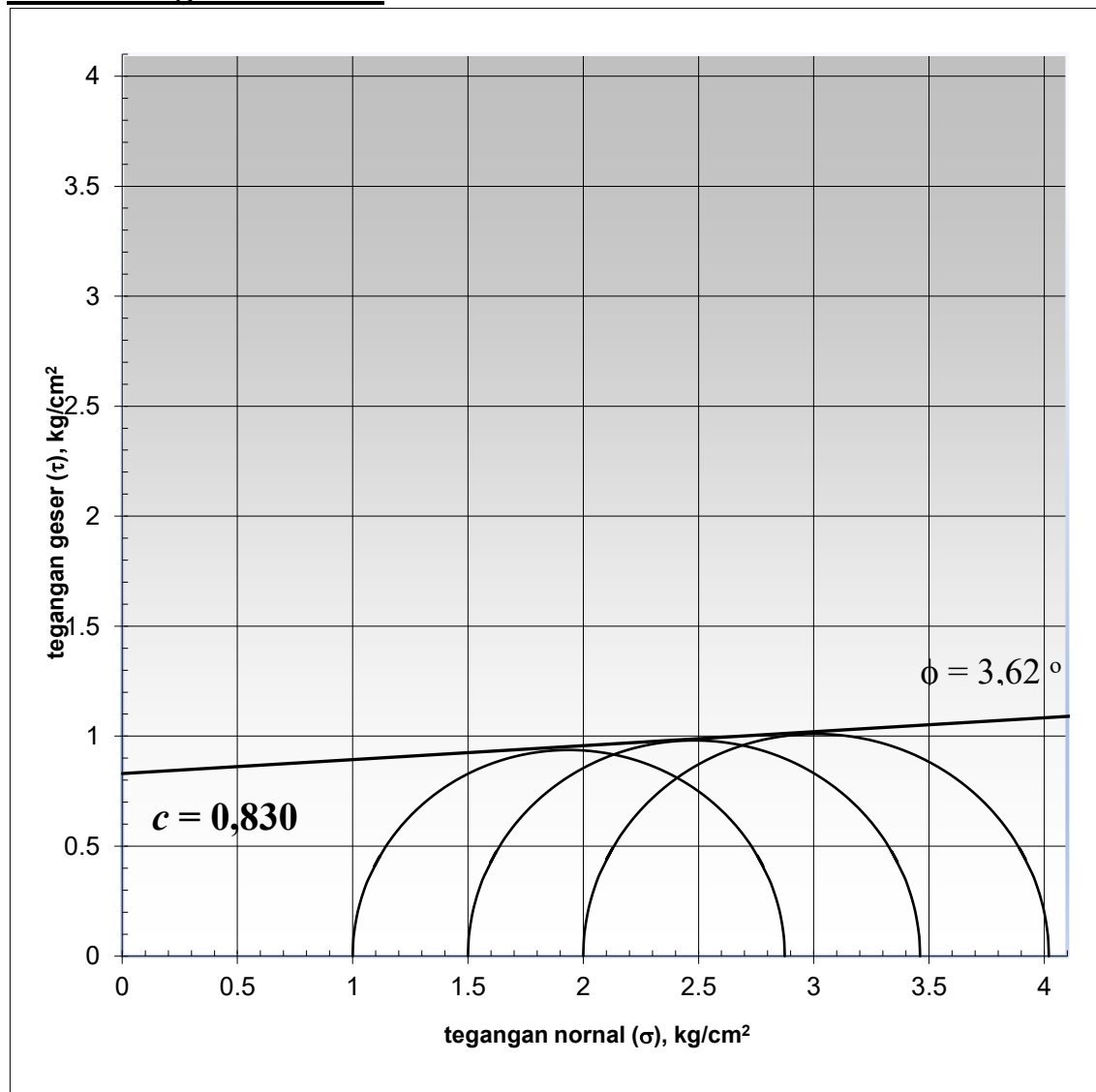
Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

TRIAXIAL COMPRESSION TEST

Location :
Jenis Tanah :

Dikerjakan :
Tested by :

Grafik Lingkaran Mohr





LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

UNCONFINED COMPRESSIVE STRENGTH

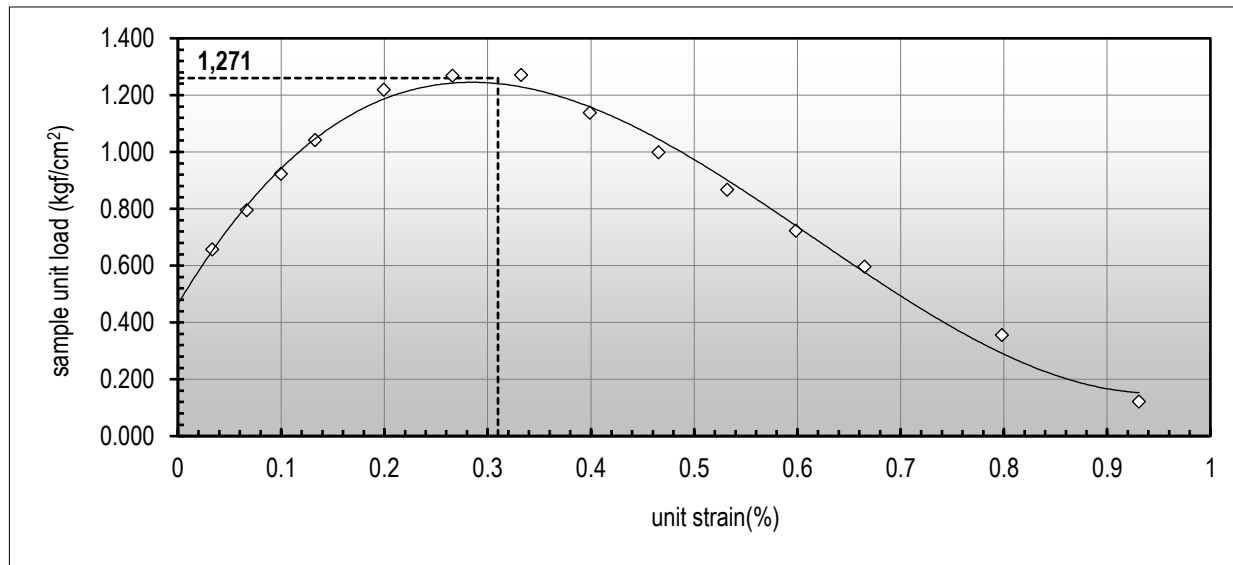
Lokasi :
Jenis Tanah :

Dikerjakan :
Permintaan :

Sample Data

Area (A_0) = 8.71 cm² Height (L_0) = 7.52 cm
w = 23.27 % γ_d = 1.88 gr/cm³
Machine Data LRC = 0.35 kgf Diameter = 3.33 cm

deformation dial reading	load dial (units)	ΔL col 1 . 10 ⁻²	unit strain $\Delta L / L_0$	area CF 1 - col 4	corrected area A'	total load on sample	sample unit load
25.00	16.9	0.25	0.033	0.967	9.012	5.917	0.657
50.00	21.2	0.50	0.066	0.934	9.333	7.422	0.795
75.00	25.5	0.75	0.100	0.900	9.678	8.928	0.922
100.00	29.9	1.00	0.133	0.867	10.049	10.468	1.042
150.00	37.9	1.50	0.199	0.801	10.884	13.269	1.219
200.00	43.0	2.00	0.266	0.734	11.869	15.054	1.268
250.00	47.4	2.50	0.332	0.668	13.052	16.595	1.271
300.00	47.1	3.00	0.399	0.601	14.495	16.490	1.138
350.00	46.5	3.50	0.465	0.535	16.298	16.280	0.999
400.00	46.1	4.00	0.532	0.468	18.614	16.140	0.867
450.00	44.8	4.50	0.598	0.402	21.695	15.684	0.723
500.00	44.3	5.00	0.665	0.335	26.000	15.509	0.597
600.00	43.8	6.00	0.798	0.202	43.105	15.334	0.356
700.00	43.7	7.00	0.931	0.069	125.999	15.299	0.121
800.00							
900.00							
1000.00							
1100.00							
1200.00							
1300.00							
1400.00							
1500.00							
1600.00							
1700.00							



Dari test didapat q_u = 1.271 kgf/cm²



**LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG**

. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Malang 65145

WATER CONTENT

PEMERIKSAAN KADAR AIR

Nomor cawan		d1	d8	j7
Berat cawan + tanah basah	(gr)	46.06	51.18	54.23
Berat cawan + tanah kering	(gr)	42.61	46.67	49.46
Berat cawan	(gr)	14.79	13.86	13.92
Berat air	(gr)	3.45	4.51	4.77
Berat tanah kering	(gr)	27.82	32.81	35.54
Kadar air (w)	(%)	12.40	13.75	13.42
Kadar air rata-rata	(%)	13.19		



LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

PEMERIKSAAN BERAT JENIS

LOKASI :
DIKERJAKAN :
JENIS TANAH :
KEDALAMAN :
NOMOR CONTOH :

BERAT JENIS TANAH

Nomor Picno		C3	C	O
Berat Picno + Tanah (W_2)	gr	92.28	86.27	82.59
Berat Picno (W_1)	gr	46.60	30.11	38.46
Berat Tanah ($W_2 - W_1$)	gr	45.68	56.16	44.13
Suhu (T)	°C	27	27	27
Berat Picno + Air pada T (W_4)	gr	145.76	131.16	138.79
$W_2 - W_1 + W_4$	gr	191.44	187.32	182.92
Berat Picno + Air + Tanah (W_3)	gr	174.24	165.99	166.39
Faktor Koreksi Suhu		0.9986	0.9986	0.9986
Isi Tanah ($W_2 - W_1$) + ($W_4 - W_3$)	cm ³	17.20	21.33	16.53
Berat Jenis Tanah		2.652	2.629	2.666
Rata-rata		2.649		



LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

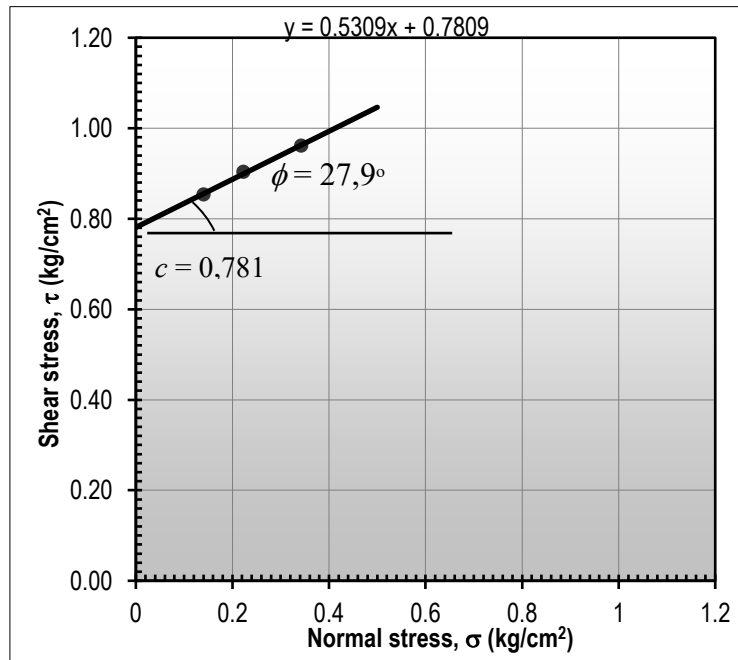
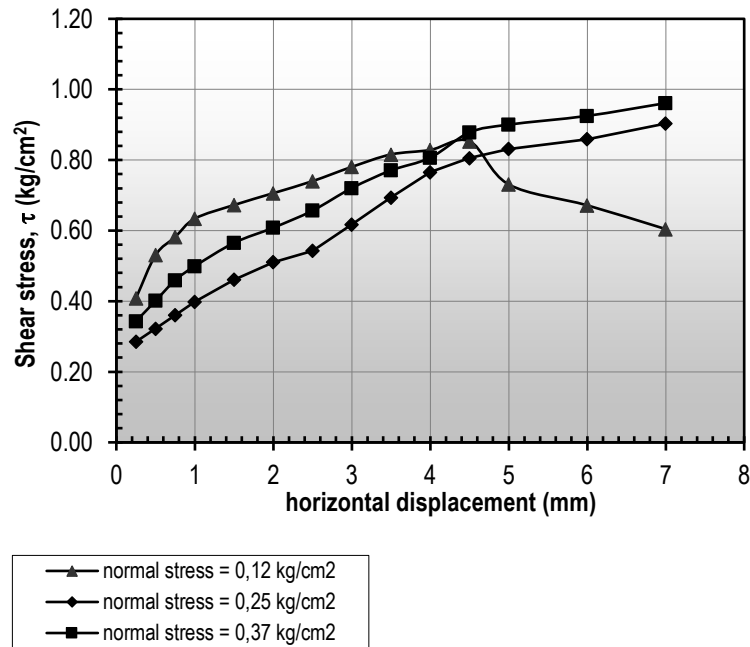
Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

DIRECT SHEAR TEST

Lokasi :

Kedalaman :

Permintaan :



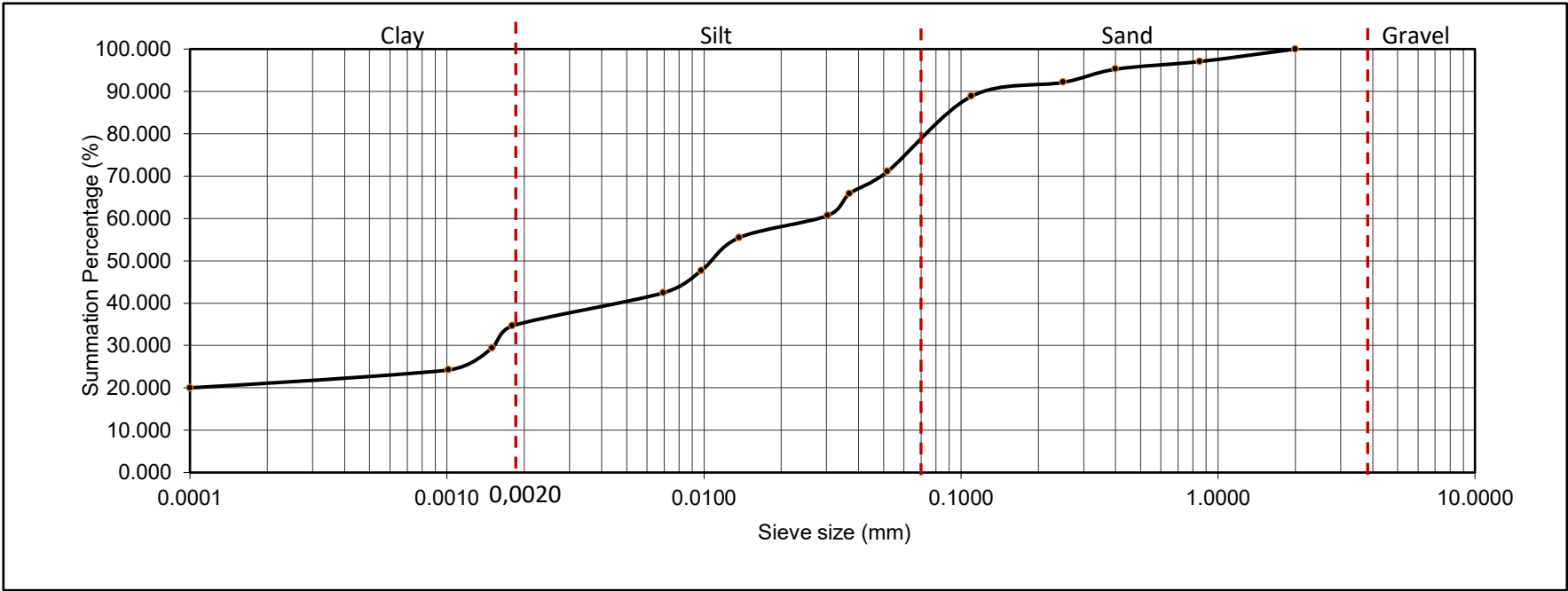
**LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG**



LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

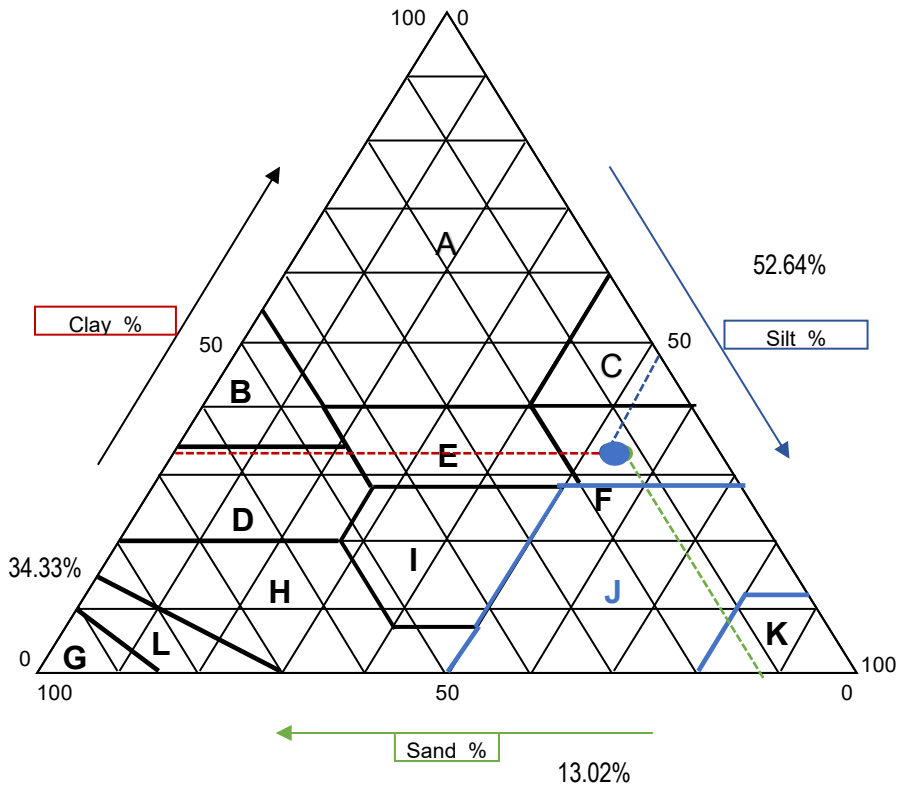
GRAIN SIZE ANALYSIS (Hydrometer)



Gravel	Sand	Silt	Clay	Max size	D 60	D 10	Classification	Remarks
0%	13.02%	52.64%	34.33%	0.0518	0.010	-	I.	=

CLASSIFICATION

- A. CLAY
- B. SANDY CLAY
- C. SILTY CLAY
- D. SANDY CLAY LOAM
- E. CLAYLEY LOAM
- F. SILTY CLAY LOAM
- G. SAND
- H. SANDY LOAM
- I. LOAM
- J. SILTY LOAM
- K. SILT
- L. LOAMY SAND



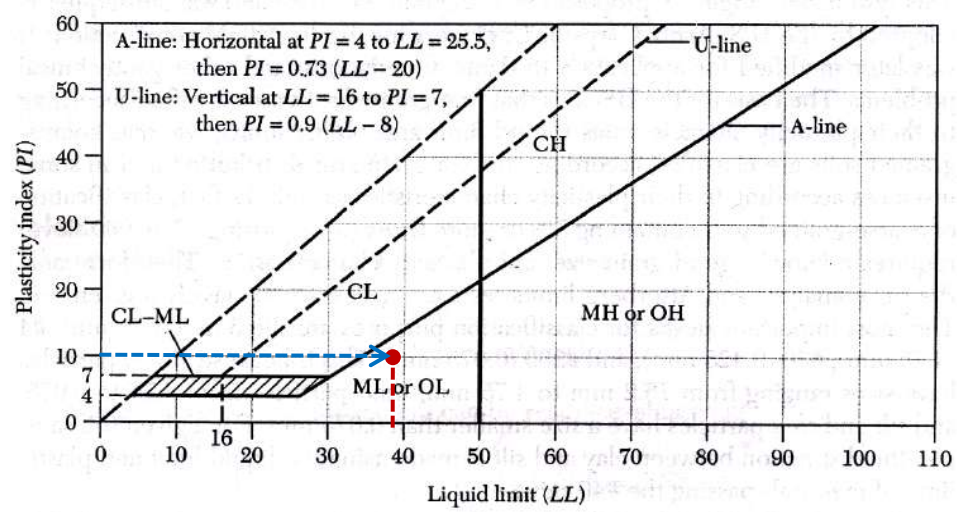


FIGURE 3.14 Plasticity chart used in the classification of fine-grained soils. (Adapted from Casagrande, 1948; Howard, 1977.)

Kesimpulan :-



LABORATORIUM MEKANIK TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

LOCATION :
SAMPLE NO. :

TESTED BY :
:

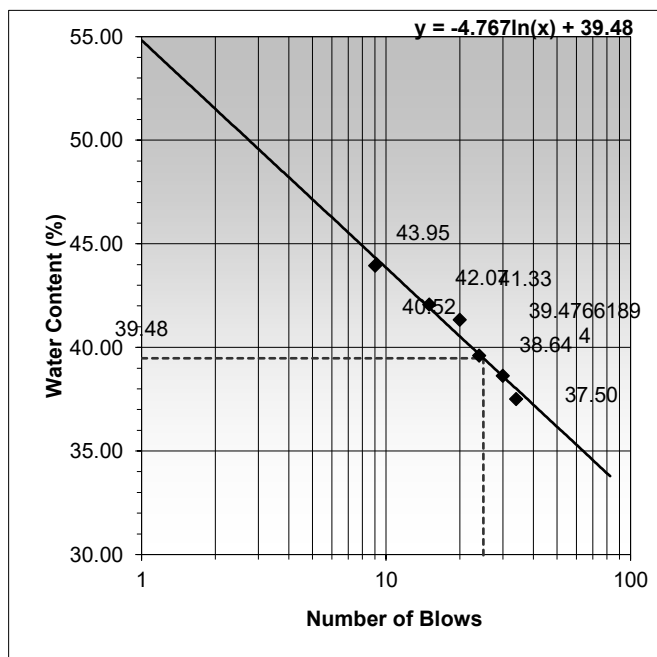
LIQUID LIMIT TEST

1	2	3
NO. OF BLOWS 9	NO. OF BLOWS 15	NO. OF BLOWS 20
No. f10	No. g7	No. j7
WW = 24.89 DW = 21.62	WW = 25.59 DW = 22.17	WW = 25.55 DW = 21.76
DW = 21.62 TW = 14.18	DW = 22.17 TW = 14.04	DW = 21.76 TW = 12.59
Ww = 3.27 Ws = 7.44	Ww = 3.42 Ws = 8.13	Ww = 3.79 Ws = 9.17
w = 43.95 %	w = 42.07 %	w = 41.33 %

4	5	6
NO. OF BLOWS 24	NO. OF BLOWS 30	NO. OF BLOWS 34
No. f4	No. a9	No. b32
WW = 26.85 DW = 23.40	WW = 28.77 DW = 25.03	WW = 26.42 DW = 23.00
DW = 23.40 TW = 14.69	DW = 25.03 TW = 15.35	DW = 23.00 TW = 13.88
Ww = 3.45 Ws = 8.71	Ww = 3.74 Ws = 9.68	Ww = 3.42 Ws = 9.12
w = 39.61 %	w = 38.64 %	w = 37.50 %

PLASTIC LIMIT TEST

1	2	3
No. c7	No. B10	No. j2
WW = 14.69 DW = 14.44	WW = 17.57 DW = 17.39	WW = 14.57 DW = 14.38
DW = 14.44 TW = 13.57	DW = 17.39 TW = 16.77	DW = 14.38 TW = 13.73
Ww = 0.25 Ws = 0.87	Ww = 0.18 Ws = 0.62	Ww = 0.19 Ws = 0.65
w = 28.74 %	w = 29.03 %	w = 29.23 %



REMARKS :

WW = Wt of container + wet soil in gr.
DW = Wt of container + dry soil in gr.
TW = Wt of container in gr.

The limits is determined on the portion of the soil passing 0,4 mm sieve

Dari percobaan didapatkan :

LIQUID LIMIT = 39.48 %
PLASTIC LIMIT = 29.00 %
PLAST. INDEX = 10.48 %



LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

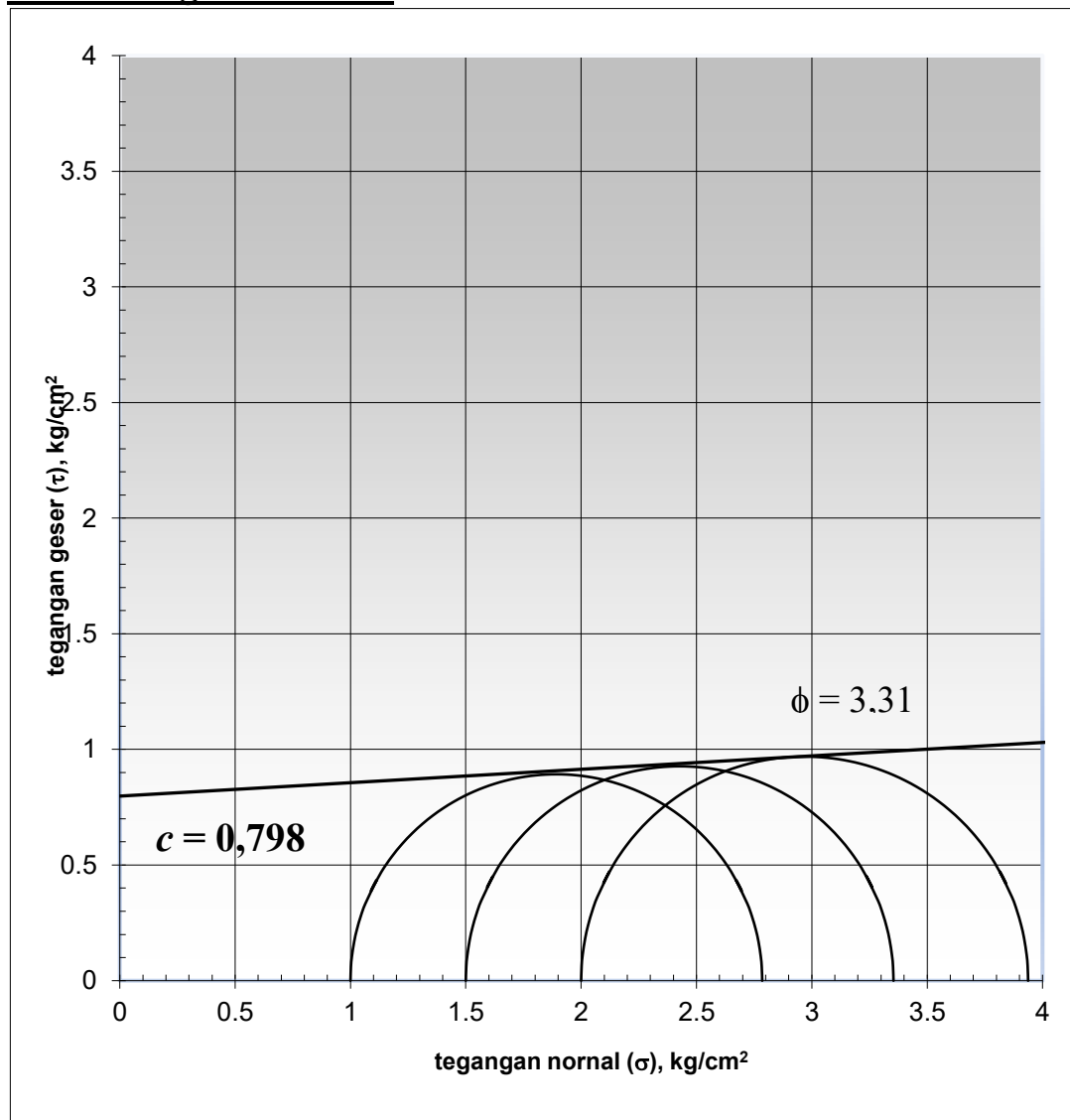
Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

TRIAXIAL COMPRESSION TEST

Location :
Jenis Tanah :

Dikerjakan :
Tested by :

Grafik Lingkaran Mohr





LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

UNCONFINED COMPRESSIVE STRENGTH

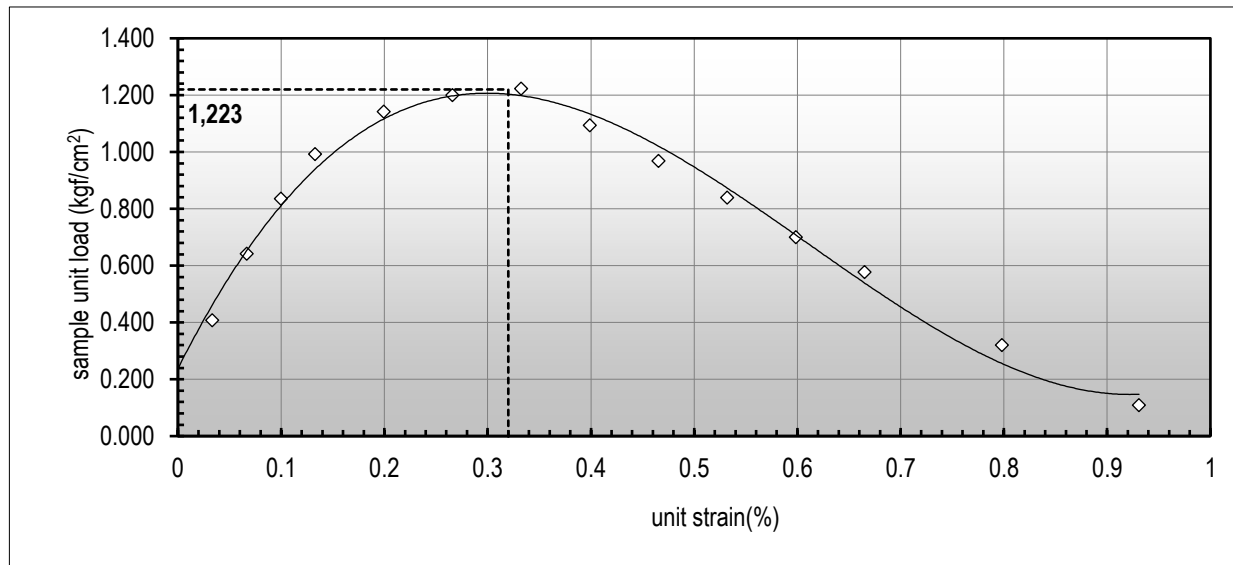
Lokasi :
Jenis Tanah :

Dikerjakan :
Permintaan :

Sample Data

Area (A_0) = 8.71 cm² Height (L_0) = 7.52 cm
w = 23.27 % γ_d = 1.88 gr/cm³
Machine Data LRC = 0.35 kgf Diameter = 3.33 cm

deformation dial reading	load dial (units)	ΔL col 1 . 10 ⁻⁴	unit strain $\Delta L / L_0$	area CF 1 - col 4	corrected area A'	total load on sample	sample unit load
25.00	10.5	0.25	0.033	0.967	9.012	3.676	0.408
50.00	17.1	0.50	0.066	0.934	9.333	5.987	0.641
75.00	23.1	0.75	0.100	0.900	9.678	8.087	0.836
100.00	28.5	1.00	0.133	0.867	10.049	9.978	0.993
150.00	35.5	1.50	0.199	0.801	10.884	12.429	1.142
200.00	40.7	2.00	0.266	0.734	11.869	14.249	1.200
250.00	45.6	2.50	0.332	0.668	13.052	15.965	1.223
300.00	45.3	3.00	0.399	0.601	14.495	15.860	1.094
350.00	45.1	3.50	0.465	0.535	16.298	15.790	0.969
400.00	44.6	4.00	0.532	0.468	18.614	15.614	0.839
450.00	43.4	4.50	0.598	0.402	21.695	15.194	0.700
500.00	42.9	5.00	0.665	0.335	26.000	15.019	0.578
600.00	39.4	6.00	0.798	0.202	43.105	13.794	0.320
700.00	39.3	7.00	0.931	0.069	125.999	13.759	0.109
800.00							
900.00							
1000.00							
1100.00							
1200.00							
1300.00							
1400.00							
1500.00							
1600.00							
1700.00							



Dari test didapat q_u = 1.223 kgf/cm²



LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Malang 65145

WATER CONTENT

PEMERIKSAAN KADAR AIR

Nomor cawan		j10	b9	g10
Berat cawan + tanah basah	(gr)	41.64	41.90	39.92
Berat cawan + tanah kering	(gr)	40.59	40.56	38.93
Berat cawan	(gr)	14.69	14.47	14.13
Berat air	(gr)	1.05	1.34	0.99
Berat tanah kering	(gr)	25.90	26.09	24.80
Kadar air (w)	(%)	4.05	5.14	3.99
Kadar air rata-rata	(%)	4.39		



LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

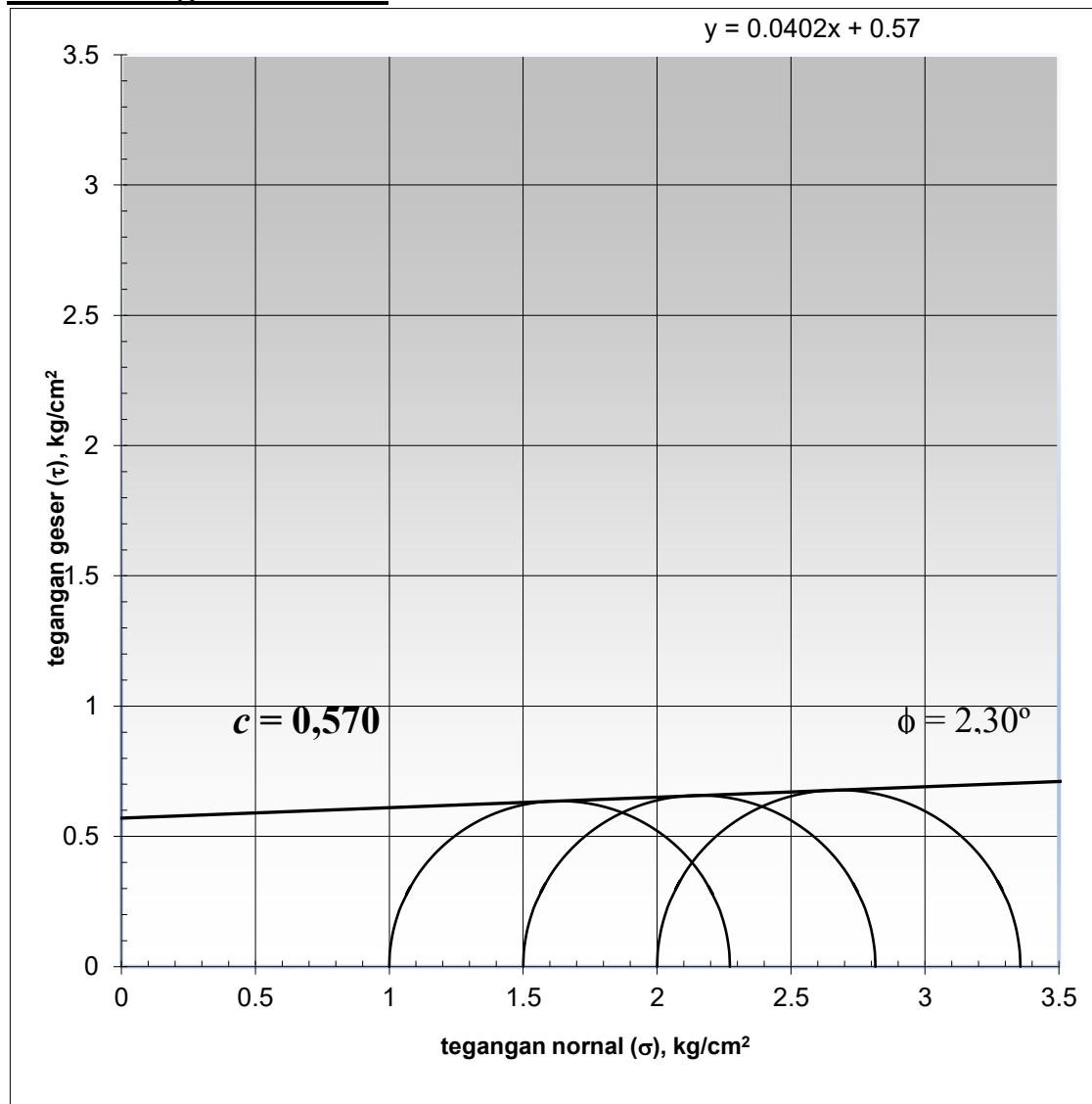
Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

TRIAXIAL COMPRESSION TEST

Location :
Jenis Tanah :

Dikerjakan :
Tested by :

Grafik Lingkaran Mohr





LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

UNCONFINED COMPRESSIVE STRENGTH

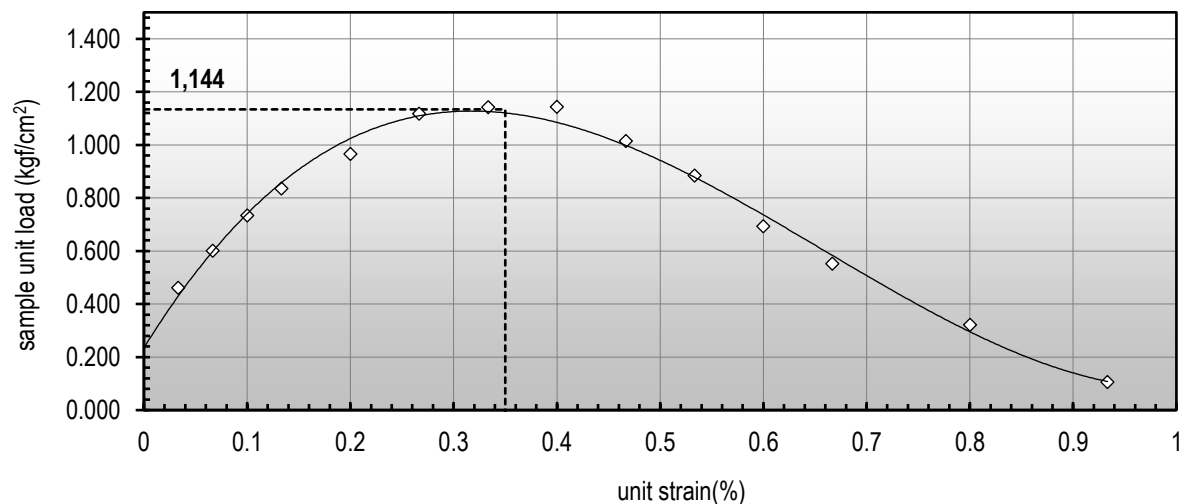
Lokasi :
Jenis Tanah :

Dikerjakan :
Permintaan :

Sample Data

Area (A_0) = 9.63 cm² Height (L_0) = 7.50 cm
w = 23.27 % γ_d = 1.70 gr/cm³
Machine Data LRC = 0.35 kgf Diameter = 3.50 cm

deformation dial reading	load dial (units)	ΔL col 1 . 10 ⁻²	unit strain $\Delta L / L_0$	area CF 1 - col 4	corrected area A'	total load on sample	sample unit load
25.00	13.1	0.25	0.033	0.967	9.957	4.586	0.461
50.00	17.7	0.50	0.067	0.933	10.313	6.197	0.601
75.00	22.4	0.75	0.100	0.900	10.694	7.842	0.733
100.00	26.5	1.00	0.133	0.867	11.106	9.278	0.835
150.00	33.2	1.50	0.200	0.800	12.031	11.623	0.966
200.00	41.9	2.00	0.267	0.733	13.125	14.669	1.118
250.00	47.1	2.50	0.333	0.667	14.438	16.490	1.142
300.00	52.4	3.00	0.400	0.600	16.042	18.345	1.144
350.00	52.3	3.50	0.467	0.533	18.047	18.310	1.015
400.00	52.1	4.00	0.533	0.467	20.625	18.240	0.884
450.00	47.6	4.50	0.600	0.400	24.063	16.665	0.693
500.00	45.5	5.00	0.667	0.333	28.875	15.930	0.552
600.00	44.2	6.00	0.800	0.200	48.125	15.474	0.322
700.00	43.9	7.00	0.933	0.067	144.375	15.369	0.106
800.00							
900.00							
1000.00							
1100.00							
1200.00							
1300.00							
1400.00							
1500.00							
1600.00							
1700.00							



Dari test didapat q_u = 1.144 kgf/cm²



LABORATORIUM MEKANIKA TANAH
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GRAIN SIZE ANALYSIS (*Hydrometer*)

LOCATION : Lab. Mekanika Tanah
SAMPLE NO. : B-1

Dikerjakan

Wt. (air dry* soil + container) =
Wt. Container =
Wt. Air dry soil W' = 104.4 g
*Test is made of soil sample passing 2,0 mm sieve

Specific gravity G = 2.615 a = 1
Plasticity index P.I. = 15.65 %

WATER CONTENT OF AIR DRY SOIL SAMPLE

Kode j10			Kode b9			Kode g10			Mean value (w) = 4.39 %
WW = 41.64	DW = 40.59		WW = 41.90	DW = 40.56		WW = 39.92	DW = 38.93		
DW = 40.59	TW = 14.69		DW = 40.56	TW = 14.47		DW = 38.93	TW = 14.13		
Ww = 1.05	Ws = 25.90		Ww = 1.34	Ws = 26.09		Ww = 0.99	Ws = 24.80		
w = 4.05 %			w = 5.14 %			w = 3.99 %			

Wt. Of oven - dry soil $W = \frac{100W'}{100+w} = 100$ g

HYDROMETER ANALYSIS

1	2	3	4	5	6	7	8	9	10	11
Elapsed time (t) (min)	Hydrometer reading		Temperature °C	L	$\sqrt{L/t}$	$\sqrt{\frac{30m}{980(G-G')}} = K$	d 6 x 7	F	$R_c =$ $r'/1000 + F$	% finer = P $k10 \times M \times 1000$
	Under decimal only	r' col. 2 + Cm								
1	21	22.00	25	15.82	3.977	0.01302	0.0518	0.0018	0.0238	62.276
2	18	19.00	25	16.05	2.833	0.01302	0.0369	0.0018	0.0208	54.426
3	17	18.00	25	16.16	2.321	0.01302	0.0302	0.0018	0.0198	51.809
15	16	17.00	25	16.51	1.049	0.01302	0.0137	0.0018	0.0188	49.193
30	15	16.00	25	16.62	0.744	0.01302	0.0097	0.0018	0.0178	46.576
60	13	14.00	25	16.85	0.530	0.01302	0.0069	0.0018	0.0158	41.343
240	9	10.00	25	17.08	0.267	0.01302	0.0018	0.0018	0.0118	30.876
1440	8	9.00	25	17.19	0.109	0.01302	0.0015	0.0018	0.0108	28.260
2880	7	8.00	25	17.53	0.078	0.01302	0.0010	0.0018	0.0098	25.643

$\frac{100}{W} = 1.000$; $\frac{G}{G - G'} = 1.61664$ $M = \frac{100}{W} + \frac{G}{G - G'} = 2.617$

Meniscus correction Cm = 1.00 G' = 0.9971 m = 0.00896

SEIVE ANALYSIS

Sieve opening in mm	Weight of soil retained in gr.	*Percent retained	*Cummulative Percent retained	*Cummulative Percent finer P
0.85	3.55	3.40%	3.40%	96.60%
0.4	2.26	2.16%	5.57%	94.43%
0.25	3.59	3.44%	9.00%	91.00%
0.11	4.04	3.87%	12.87%	87.13%
0.075	1.37	1.31%	14.19%	85.81%

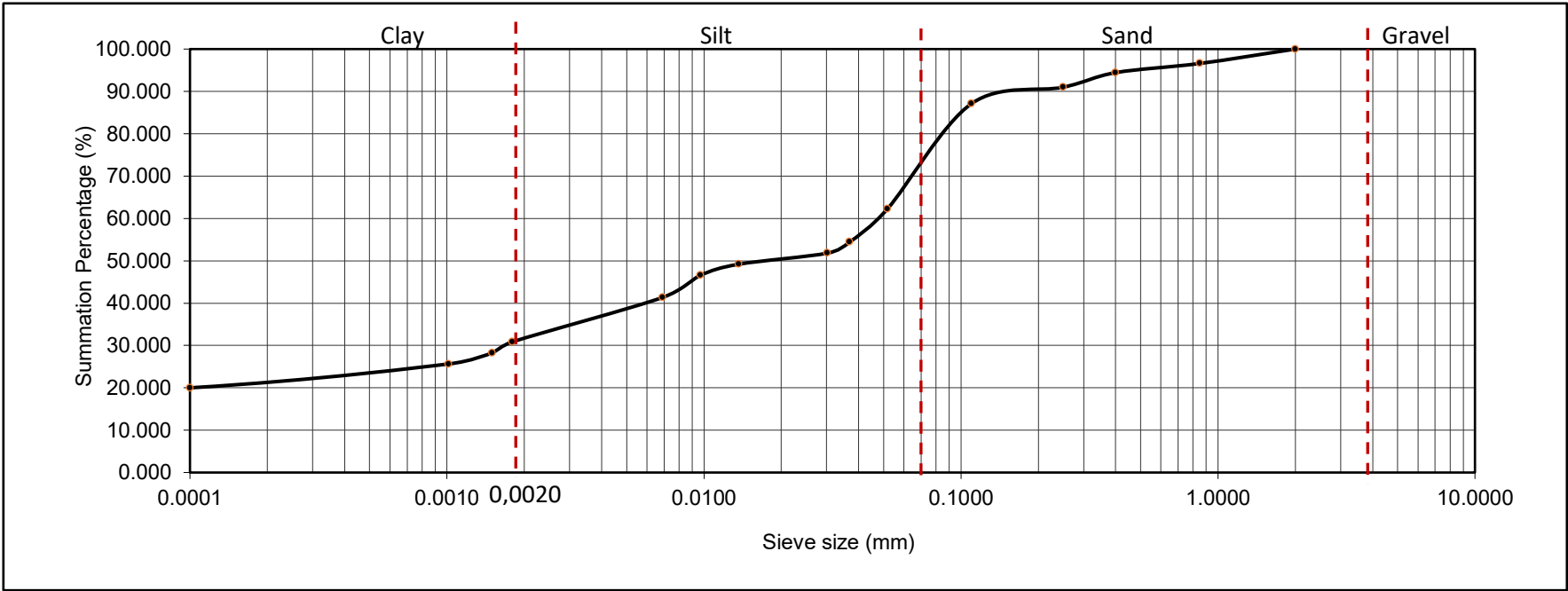
L = Effective depth in cm
m = Viscosity of water in poise
G' = Specific gravity of water
d = Maximum diameter of soil grain in mm
F = Correction factor against temperature



LABORATORIUM MEKANIKA TANAH
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INSTITUT TEKNOLOGI NASIONAL MALANG

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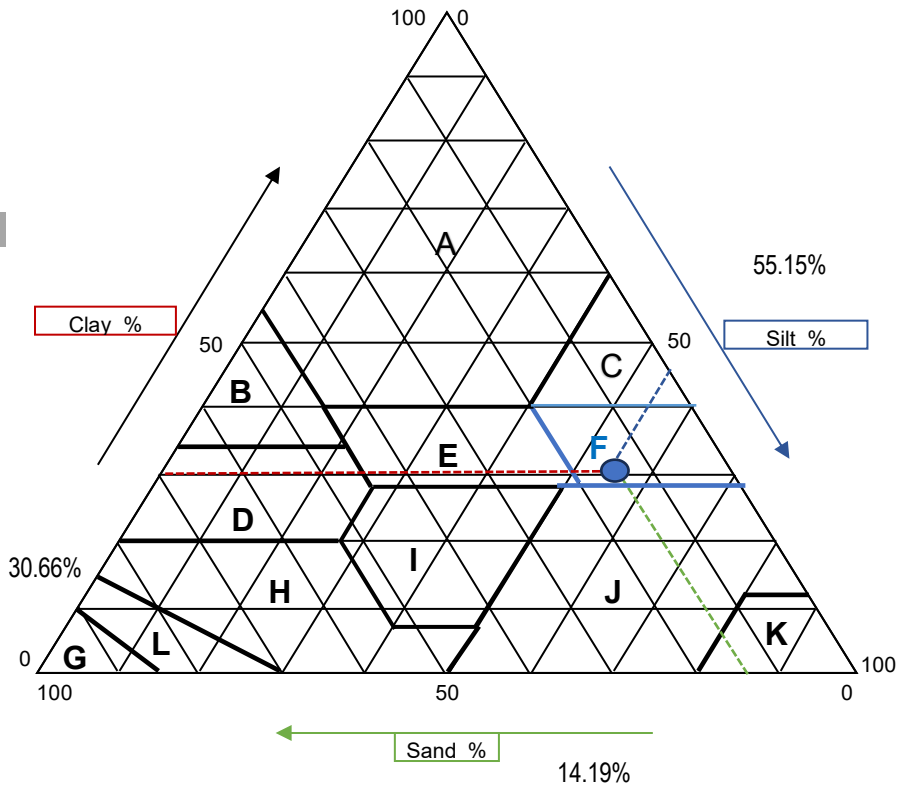
GRAIN SIZE ANALYSIS (Hydrometer)



Gravel	Sand	Silt	Clay	Max size	D 60	D 10	Classification	Remarks
0%	14.19%	55.15%	30.66%	0.0518	0.010	-	I.	=

CLASSIFICATION

- A. CLAY
- B. SANDY CLAY
- C. SILTY CLAY
- D. SANDY CLAY LOAM
- E. CLAYLEY LOAM
- F. SILTY CLAY LOAM
- G. SAND
- H. SANDY LOAM
- I. LOAM
- J. SILTY LOAM
- K. SILT
- L. LOAMY SAND



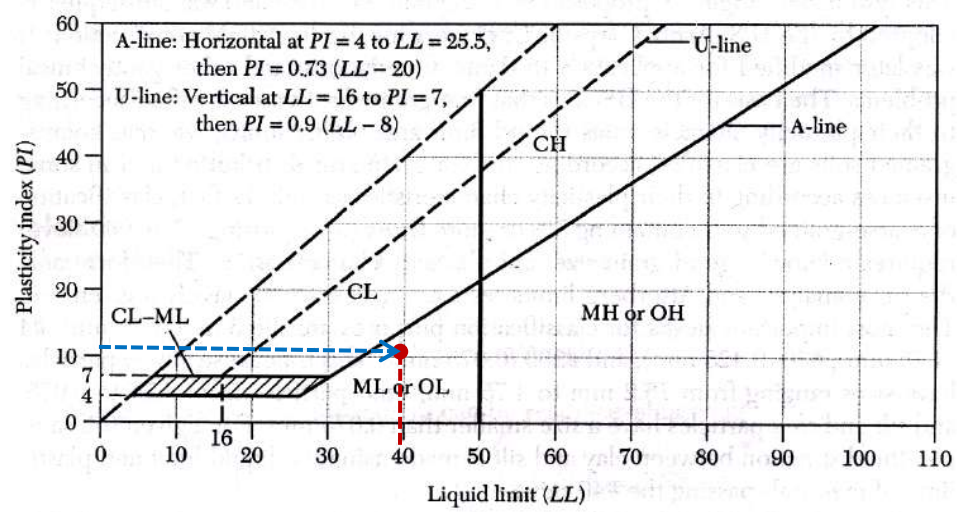


FIGURE 3.14 Plasticity chart used in the classification of fine-grained soils. (Adapted from Casagrande, 1948; Howard, 1977.)

Kesimpulan :-



LABORATORIUM MEKANIK TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

LOCATION :
SAMPLE NO. :

TESTED BY :
:

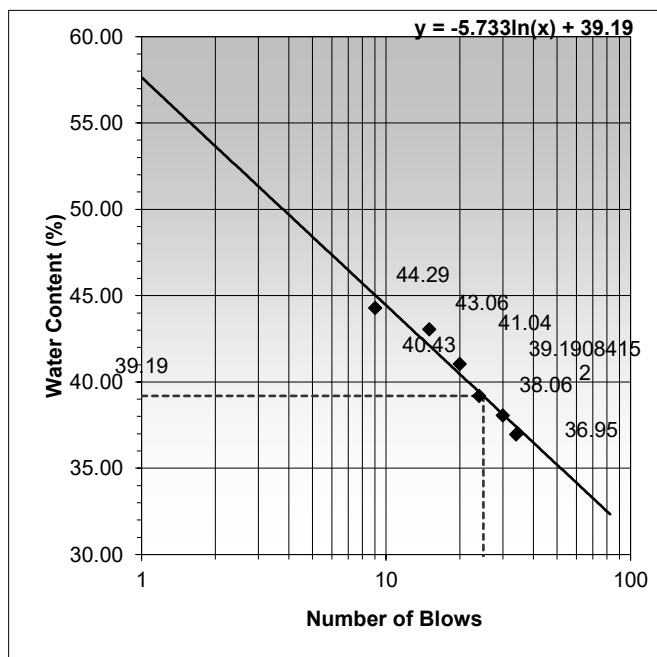
LIQUID LIMIT TEST

1	2	3
NO. OF BLOWS 9	NO. OF BLOWS 15	NO. OF BLOWS 20
No. f10	No. g7	No. j7
WW = 25.14 DW = 21.88	WW = 25.84 DW = 22.43	WW = 25.80 DW = 22.02
DW = 21.88 TW = 14.52	DW = 22.43 TW = 14.51	DW = 22.02 TW = 12.81
Ww = 3.26 Ws = 7.36	Ww = 3.41 Ws = 7.92	Ww = 3.78 Ws = 9.21
w = 44.29 %	w = 43.06 %	w = 41.04 %

4	5	6
NO. OF BLOWS 24	NO. OF BLOWS 30	NO. OF BLOWS 34
No. f4	No. a9	No. b32
WW = 27.10 DW = 23.64	WW = 29.02 DW = 25.29	WW = 26.77 DW = 23.26
DW = 23.64 TW = 14.81	DW = 25.29 TW = 15.49	DW = 23.26 TW = 13.76
Ww = 3.46 Ws = 8.83	Ww = 3.73 Ws = 9.80	Ww = 3.51 Ws = 9.50
w = 39.18 %	w = 38.06 %	w = 36.95 %

PLASTIC LIMIT TEST

1	2	3
No. c7	No. B10	No. j2
WW = 14.66 DW = 14.43	WW = 17.54 DW = 17.38	WW = 14.54 DW = 14.37
DW = 14.43 TW = 13.57	DW = 17.38 TW = 16.79	DW = 14.37 TW = 13.75
Ww = 0.23 Ws = 0.86	Ww = 0.16 Ws = 0.59	Ww = 0.17 Ws = 0.62
w = 26.74 %	w = 27.12 %	w = 27.42 %



REMARKS :

WW = Wt of container + wet soil in gr.
DW = Wt of container + dry soil in gr.
TW = Wt of container in gr.

The limits is determined on the portion of the soil passing 0,4 mm sieve

Dari percobaan didapatkan :

LIQUID LIMIT = 39.19 %
PLASTIC LIMIT = 27.09 %
PLAST. INDEX = 12.10 %



LABORATORIUM MEKANIKA TANAH
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Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

PEMERIKSAAN BERAT JENIS

LOKASI :
DIKERJAKAN :
JENIS TANAH :
KEDALAMAN :
NOMOR CONTOH :

BERAT JENIS TANAH

Nomor Picno		C3	C	O
Berat Picno + Tanah (W_2)	gr	100.19	88.11	85.94
Berat Picno (W_1)	gr	46.60	30.11	38.46
Berat Tanah ($W_2 - W_1$)	gr	53.59	58.00	47.48
Suhu (T)	°C	27	27	27
Berat Picno + Air pada T (W_4)	gr	145.76	131.14	138.80
$W_2 - W_1 + W_4$	gr	199.35	189.14	186.28
Berat Picno + Air + Tanah (W_3)	gr	179.22	166.80	168.01
Faktor Koreksi Suhu		0.9986	0.9986	0.9986
Isi Tanah ($W_2 - W_1$) + ($W_4 - W_3$)	cm ³	20.13	22.34	18.27
Berat Jenis Tanah		2.658	2.593	2.595
Rata-rata		2.615		



LABORATORIUM MEKANIKA TANAH
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. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Malang 65145

WATER CONTENT

PEMERIKSAAN KADAR AIR

Nomor cawan		x11	h2	j6
Berat cawan + tanah basah	(gr)	34.79	35.91	31.50
Berat cawan + tanah kering	(gr)	33.03	33.90	29.92
Berat cawan	(gr)	6.23	6.31	5.81
Berat air	(gr)	1.76	2.01	1.58
Berat tanah kering	(gr)	26.80	27.59	24.11
Kadar air (w)	(%)	6.57	7.29	6.55
Kadar air rata-rata	(%)	6.80		



LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

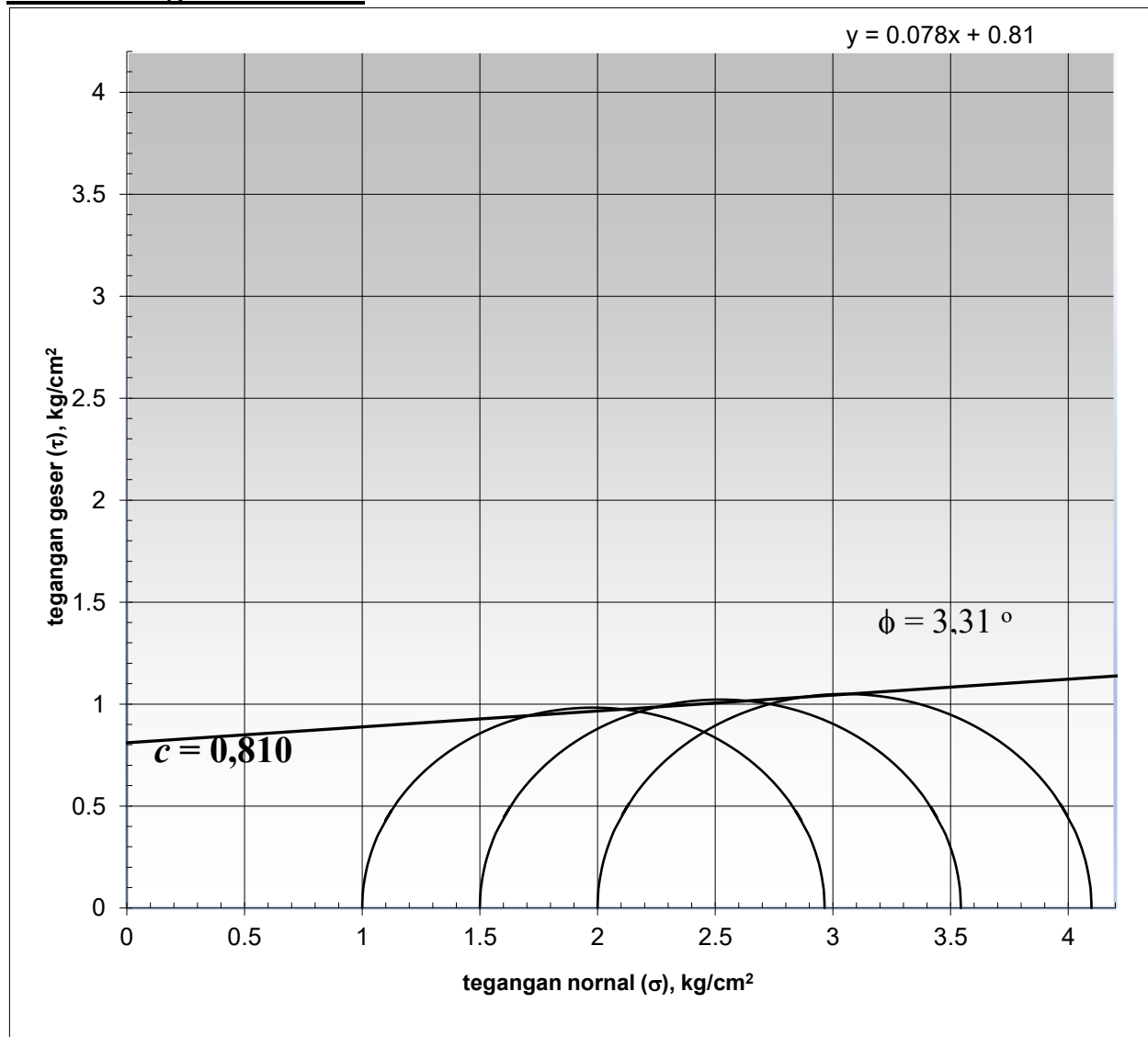
Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

TRIAXIAL COMPRESSION TEST

Location :
Jenis Tanah :

Dikerjakan :
Tested by :

Grafik Lingkaran Mohr





LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

UNCONFINED COMPRESSIVE STRENGTH

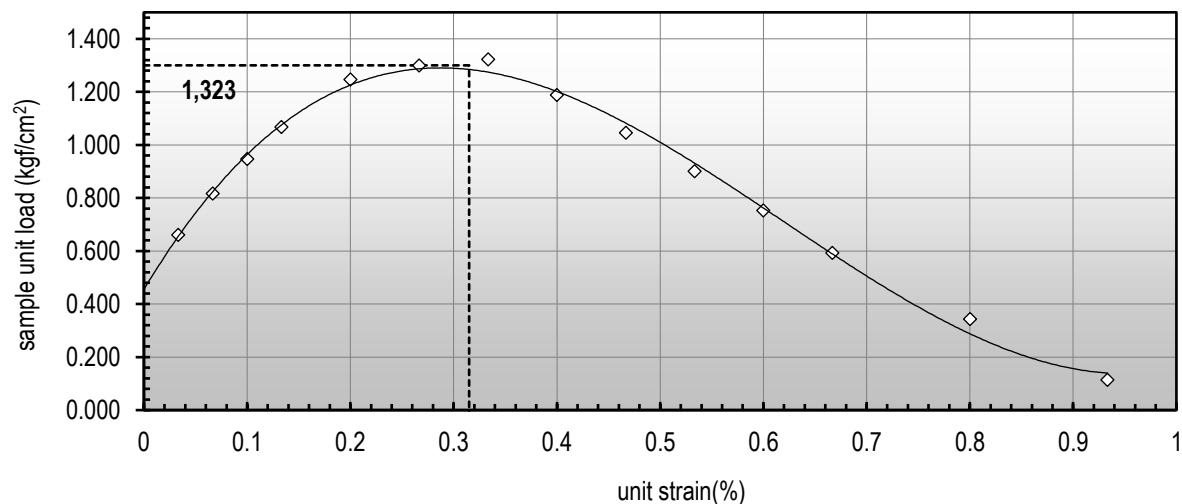
Lokasi :
Jenis Tanah :

Dikerjakan :
Permintaan :

Sample Data

Area (A_0) = 8.56 cm² Height (L_0) = 7.50 cm
w = 23.27 % γ_d = 1.92 gr/cm³
Machine Data LRC = 0.35 kgf Diameter = 3.30 cm

deformation dial reading	load dial (units)	ΔL col 1 . 10 ⁻⁴	unit strain $\Delta L / L_0$	area CF 1 - col 4	corrected area A'	total load on sample	sample unit load
25.00	16.7	0.25	0.033	0.967	8.851	5.847	0.661
50.00	21.4	0.50	0.067	0.933	9.168	7.492	0.817
75.00	25.7	0.75	0.100	0.900	9.507	8.998	0.946
100.00	30.1	1.00	0.133	0.867	9.873	10.538	1.067
150.00	38.1	1.50	0.200	0.800	10.696	13.339	1.247
200.00	43.3	2.00	0.267	0.733	11.668	15.159	1.299
250.00	48.5	2.50	0.333	0.667	12.835	16.980	1.323
300.00	48.4	3.00	0.400	0.600	14.261	16.945	1.188
350.00	47.9	3.50	0.467	0.533	16.043	16.770	1.045
400.00	47.2	4.00	0.533	0.467	18.335	16.525	0.901
450.00	46.0	4.50	0.600	0.400	21.391	16.105	0.753
500.00	43.5	5.00	0.667	0.333	25.669	15.229	0.593
600.00	42.0	6.00	0.800	0.200	42.782	14.704	0.344
700.00	41.9	7.00	0.933	0.067	128.346	14.669	0.114
800.00							
900.00							
1000.00							
1100.00							
1200.00							
1300.00							
1400.00							
1500.00							
1600.00							
1700.00							



Dari test didapat q_u = 1.323 kgf/cm²



LABORATORIUM MEKANIKA TANAH
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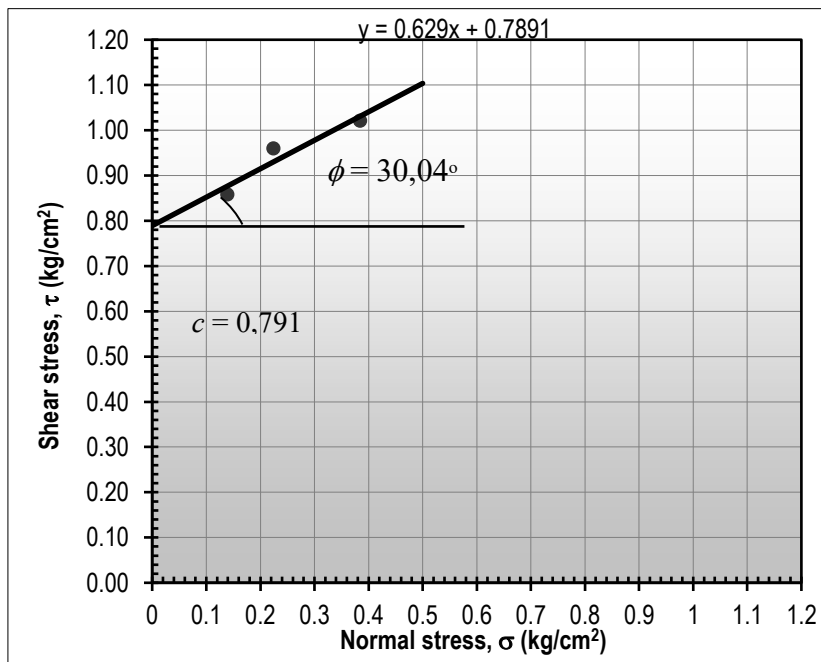
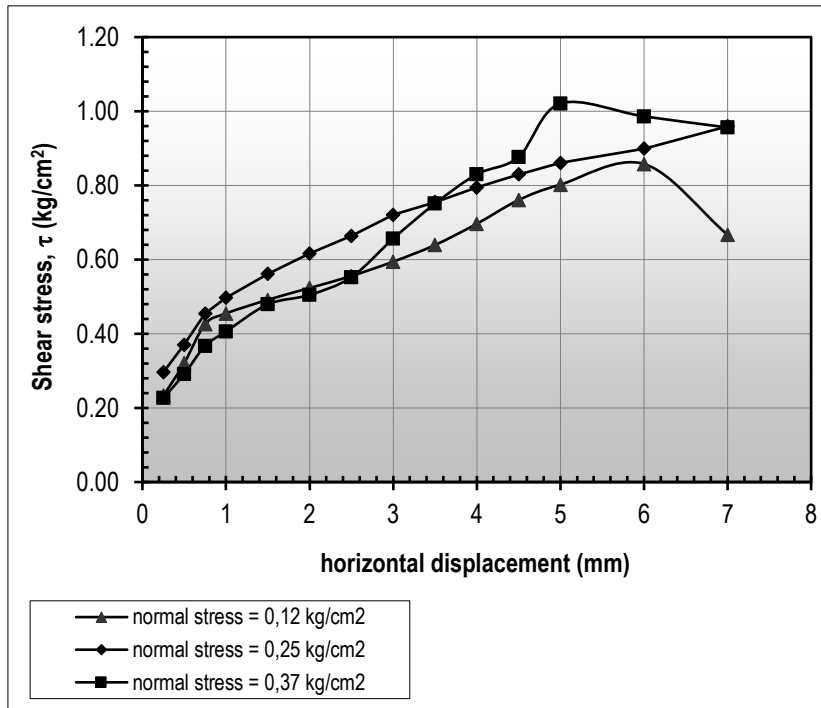
Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

DIRECT SHEAR TEST

Lokasi :

Kedalaman :

Permintaan :





LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

GRAIN SIZE ANALYSIS (*Hydrometer*)

LOCATION : Lab. Mekanika Tanah
SAMPLE NO. : **B-1**

Dikerjakan

Wt. (air dry* soil + container) =
Wt. Container =
Wt. Air dry soil W' = 106.8 g
*Test is made of soil sample passing 2,0 mm sieve

Specific gravity G = 2.632 a = 1
Plasticity index P.I. = 15.65 %

WATER CONTENT OF AIR DRY SOIL SAMPLE

Kode x11			Kode h2			Kode j6			Mean value (w) = 6.80 %
WW = 34.79	DW = 33.03		WW = 35.91	DW = 33.90		WW = 31.50	DW = 29.92		
DW = 33.03	TW = 6.23		DW = 33.90	TW = 6.31		DW = 29.92	TW = 5.81		
Ww = 1.76	Ws = 26.80		Ww = 2.01	Ws = 27.59		Ww = 1.58	Ws = 24.11		
w = 6.57 %			w = 7.29 %			w = 6.55 %			

Wt. Of oven - dry soil $W = \frac{100W'}{100+w}$ = 100 g

HYDROMETER ANALYSIS

1	2	3	4	5	6	7	8	9	10	11
Elapsed time (t) (min)	Hydrometer reading		Tempera ture °C	L	$\sqrt{L/t}$	$\sqrt{\frac{30 m}{980(G-G')}} = K$	d 6 x 7	F	$R_c =$ $r'/1000 + F$	% finer = P $k10 \times M \times 1000$
	Under decimal only	r' col. 2 + Cm								
1	21	22.00	27	15.82	3.977	0.01295	0.0515	0.0023	0.0243	63.436
2	19	20.00	27	16.05	2.833	0.01295	0.0367	0.0023	0.0223	58.215
3	18	19.00	27	16.16	2.321	0.01295	0.0301	0.0023	0.0213	55.605
15	15	16.00	27	16.51	1.049	0.01295	0.0136	0.0023	0.0183	47.773
30	13	14.00	27	16.62	0.744	0.01295	0.0096	0.0023	0.0163	42.552
60	10	11.00	27	16.85	0.530	0.01295	0.0069	0.0023	0.0133	34.720
240	7	8.00	27	17.08	0.267	0.01295	0.0018	0.0023	0.0103	26.889
1440	6	7.00	27	17.19	0.109	0.01295	0.0015	0.0023	0.0093	24.278
2880	5	6.00	27	17.53	0.078	0.01295	0.0010	0.0023	0.0083	21.668

$\frac{100}{W} = 1.000$; $\frac{G}{G - G'} = 1.61055$ $M = \frac{100}{W} + \frac{G}{G - G'} = 2.611$

Meniscus correction Cm = 1.00 G' = 0.9971 m = 0.00896

SEIVE ANALYSIS

Sieve opening in mm	Weight of soil retained in gr.	*Percent retained	*Cummulative Percent retained	*Cummulative Percent finer P
0.85	3.71	3.47%	3.47%	96.53%
0.4	2.44	2.28%	5.76%	94.24%
0.25	3.99	3.74%	9.49%	90.51%
0.11	4.04	3.78%	13.28%	86.72%
0.075	2.45	2.29%	15.57%	84.43%

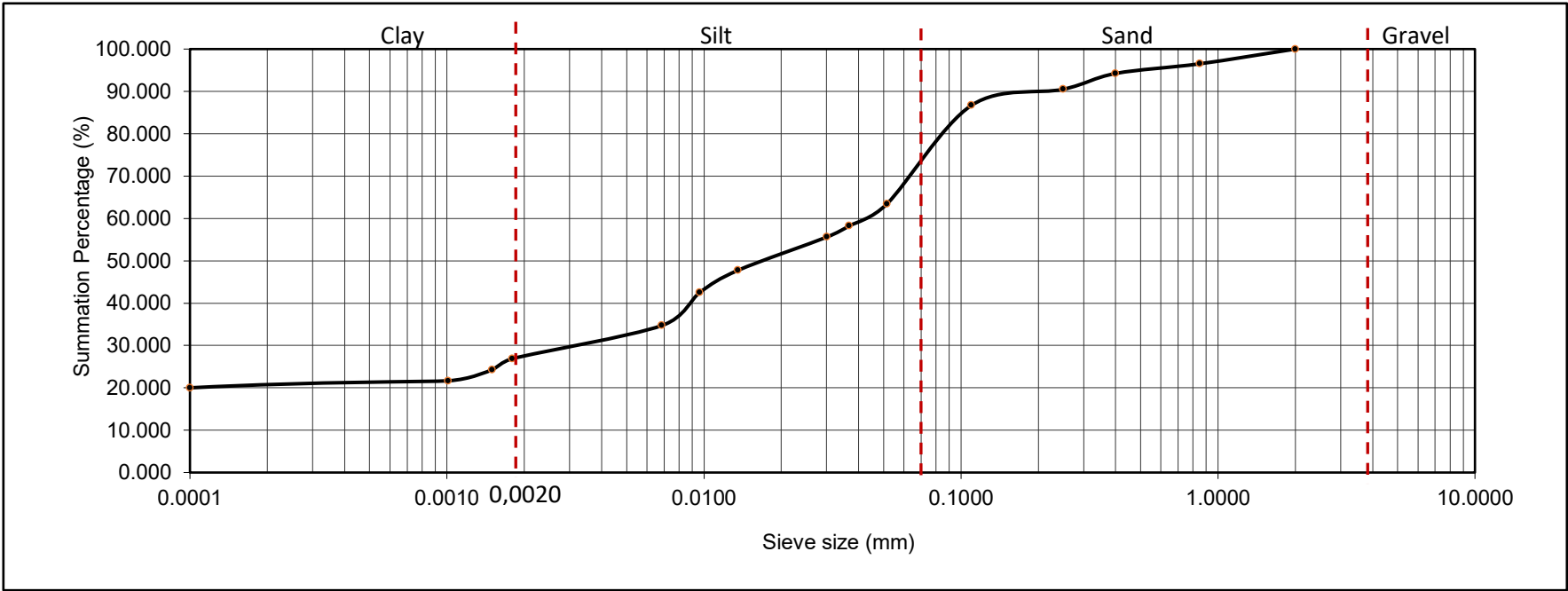
L = Effective depth in cm
m = Viscosity of water in poise
G' = Specific gravity of water
d = Maximum diameter of soil grain in mm
F = Correction factor against temperature



LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

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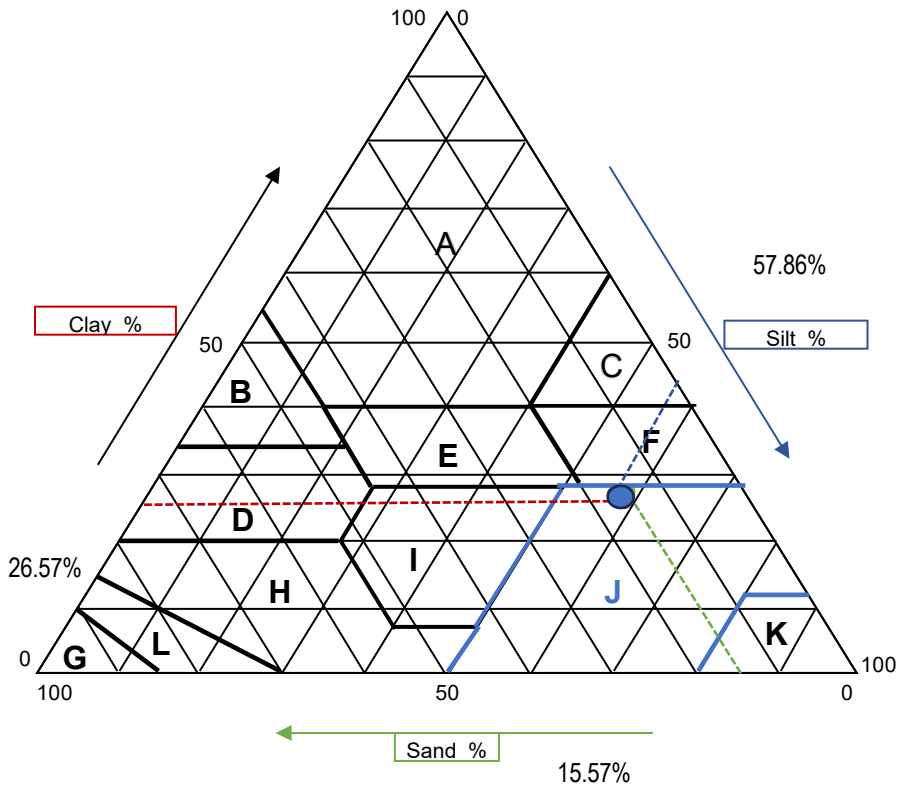
GRAIN SIZE ANALYSIS (Hydrometer)



Gravel	Sand	Silt	Clay	Max size	D 60	D 10	Classification	Remarks
0%	15.57%	57.86%	26.57%	0.0515	0.010	-	I.	=

CLASSIFICATION

- A. CLAY
- B. SANDY CLAY
- C. SILTY CLAY
- D. SANDY CLAY LOAM
- E. CLAYLEY LOAM
- F. SILTY CLAY LOAM
- G. SAND
- H. SANDY LOAM
- I. LOAM
- J. SILTY LOAM
- K. SILT
- L. LOAMY SAND



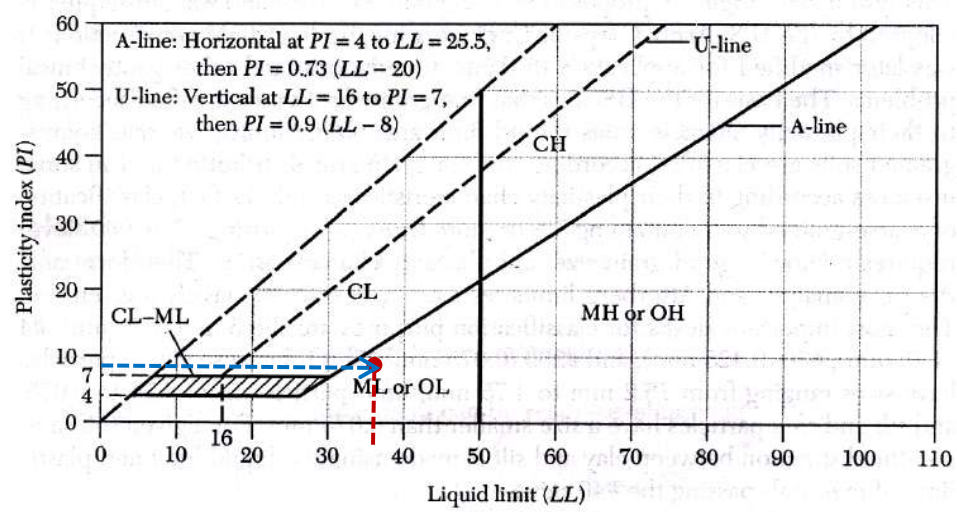


FIGURE 3.14 Plasticity chart used in the classification of fine-grained soils. (Adapted from Casagrande, 1948; Howard, 1977.)

Kesimpulan :-



LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

LOCATION :
SAMPLE NO. :

TESTED BY :
:

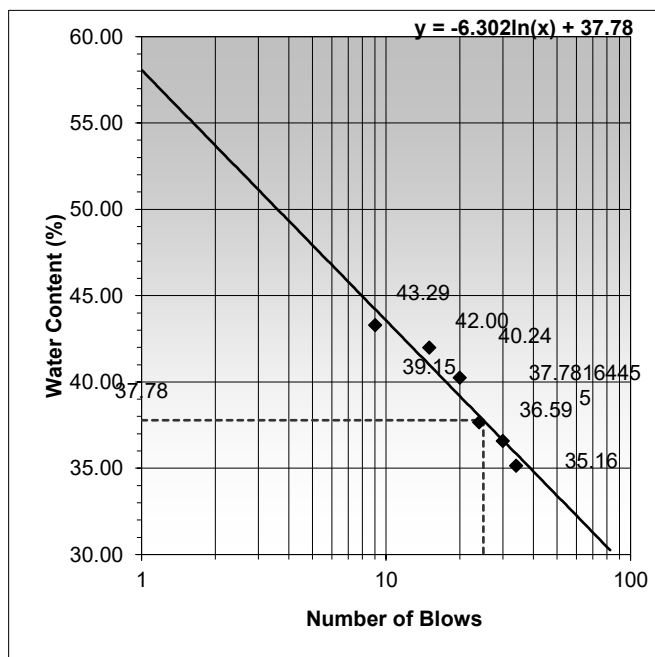
LIQUID LIMIT TEST

1	2	3
NO. OF BLOWS 9	NO. OF BLOWS 15	NO. OF BLOWS 20
No. f10	No. g7	No. j7
WW = 24.93 DW = 21.80	WW = 25.63 DW = 22.35	WW = 25.59 DW = 21.94
DW = 21.80 TW = 14.57	DW = 22.35 TW = 14.54	DW = 21.94 TW = 12.87
Ww = 3.13 Ws = 7.23	Ww = 3.28 Ws = 7.81	Ww = 3.65 Ws = 9.07
w = 43.29 %	w = 42.00 %	w = 40.24 %

4	5	6
NO. OF BLOWS 24	NO. OF BLOWS 30	NO. OF BLOWS 34
No. f4	No. a9	No. b32
WW = 26.89 DW = 23.58	WW = 28.81 DW = 25.21	WW = 26.46 DW = 23.18
DW = 23.58 TW = 14.79	DW = 25.21 TW = 15.37	DW = 23.18 TW = 13.85
Ww = 3.31 Ws = 8.79	Ww = 3.60 Ws = 9.84	Ww = 3.28 Ws = 9.33
w = 37.66 %	w = 36.59 %	w = 35.16 %

PLASTIC LIMIT TEST

1	2	3
No. c7	No. B10	No. j2
WW = 14.67 DW = 14.43	WW = 17.55 DW = 17.38	WW = 14.55 DW = 14.37
DW = 14.43 TW = 13.60	DW = 17.38 TW = 16.79	DW = 14.37 TW = 13.75
Ww = 0.24 Ws = 0.83	Ww = 0.17 Ws = 0.59	Ww = 0.18 Ws = 0.62
w = 28.92 %	w = 28.81 %	w = 28.85 %



REMARKS :

WW = Wt of container + wet soil in gr.
DW = Wt of container + dry soil in gr.
TW = Wt of container in gr.

The limits is determined on the portion of the soil passing 0,4 mm sieve

Dari percobaan didapatkan :

LIQUID LIMIT = 37.78 %
PLASTIC LIMIT = 28.86 %
PLAST. INDEX = 8.92 %



LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

PEMERIKSAAN BERAT JENIS

LOKASI :
DIKERJAKAN :
JENIS TANAH :
KEDALAMAN :
NOMOR CONTOH :

BERAT JENIS TANAH

Nomor Picno		C3	C	O
Berat Picno + Tanah (W_2)	gr	98.95	85.72	84.05
Berat Picno (W_1)	gr	46.60	30.11	38.46
Berat Tanah ($W_2 - W_1$)	gr	52.35	55.61	45.59
Suhu (T)	°C	27	27	27
Berat Picno + Air pada T (W_4)	gr	145.99	131.50	139.19
$W_2 - W_1 + W_4$	gr	198.34	187.11	184.78
Berat Picno + Air + Tanah (W_3)	gr	178.44	166.08	167.45
Faktor Koreksi Suhu		0.9986	0.9986	0.9986
Isi Tanah ($W_2 - W_1$) + ($W_4 - W_3$)	cm ³	19.90	21.03	17.33
Berat Jenis Tanah		2.627	2.641	2.627
Rata-rata		2.632		



LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Malang 65145

WATER CONTENT

PEMERIKSAAN KADAR AIR

Nomor cawan		d1	d8	j7
Berat cawan + tanah basah	(gr)	44.73	49.28	52.53
Berat cawan + tanah kering	(gr)	42.61	46.67	49.46
Berat cawan	(gr)	14.79	13.86	13.92
Berat air	(gr)	2.12	2.61	3.07
Berat tanah kering	(gr)	27.82	32.81	35.54
Kadar air (w)	(%)	7.62	7.95	8.64
Kadar air rata-rata	(%)	8.07		



LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

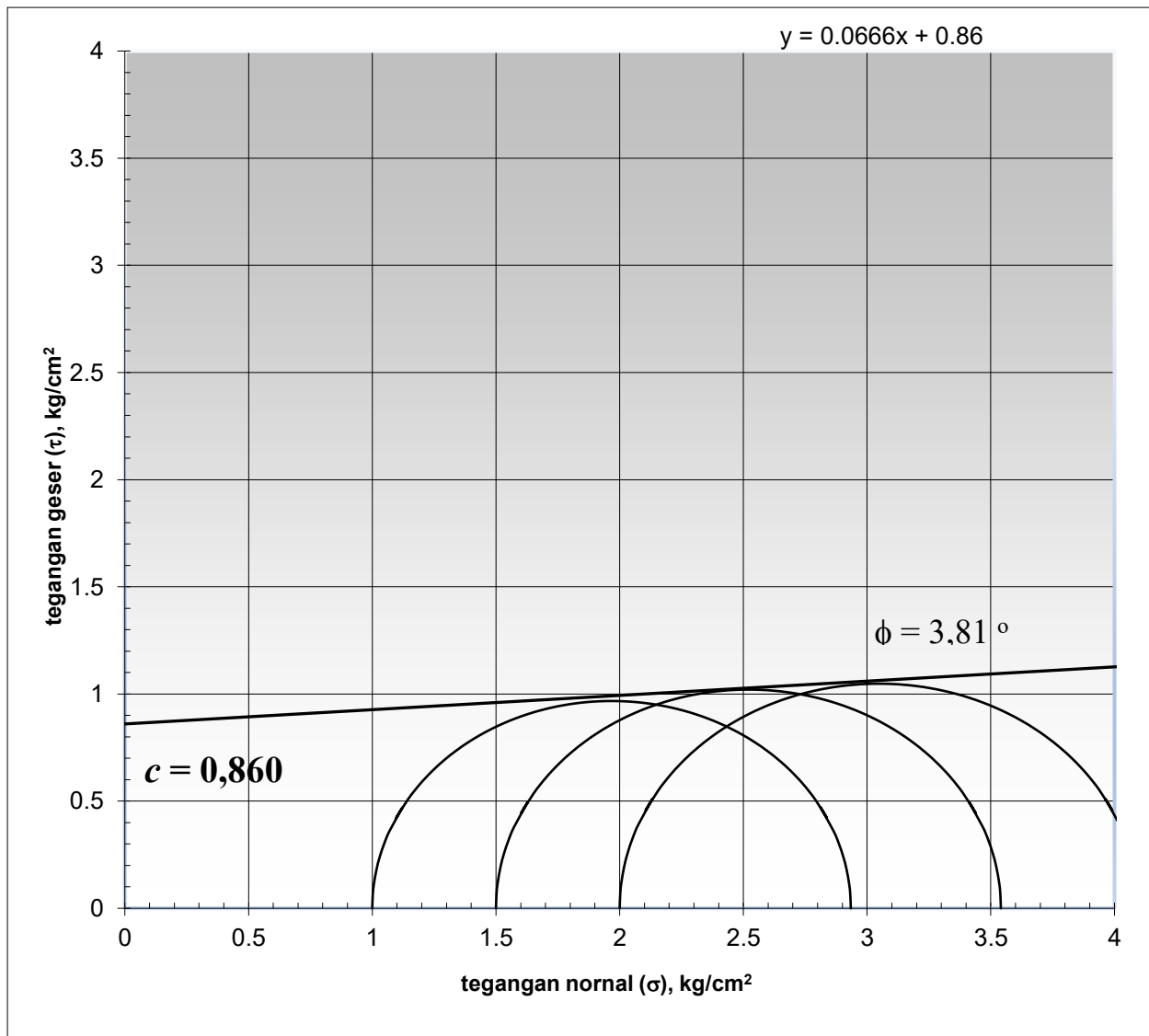
Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

TRIAXIAL COMPRESSION TEST

Location :
Jenis Tanah :

Dikerjakan :
Tested by :

Grafik Lingkaran Mohr





LABORATORIUM MEKANIK TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

UNCONFINED COMPRESSIVE STRENGTH

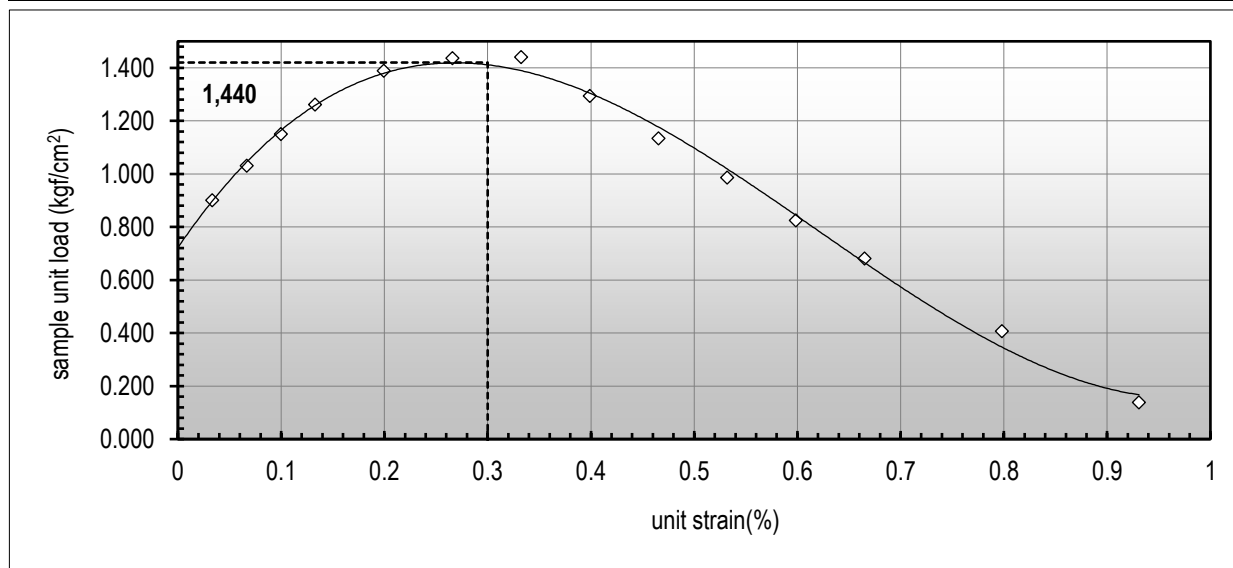
Lokasi :
Jenis Tanah :

Dikerjakan :
Permintaan :

Sample Data

Area (A_0) = 8.71 cm² Height (L_0) = 7.52 cm
w = 23.27 % γ_d = 1.88 gr/cm³
Machine Data LRC = 0.35 kgf Diameter = 3.33 cm

deformation dial reading	load dial (units)	ΔL col 1 . 10 ⁻²	unit strain $\Delta L / L_0$	area CF 1 - col 4	corrected area A'	total load on sample	sample unit load
25.00	23.2	0.25	0.033	0.967	9.012	8.122	0.901
50.00	27.5	0.50	0.066	0.934	9.333	9.628	1.032
75.00	31.8	0.75	0.100	0.900	9.678	11.133	1.150
100.00	36.2	1.00	0.133	0.867	10.049	12.674	1.261
150.00	43.2	1.50	0.199	0.801	10.884	15.124	1.390
200.00	48.7	2.00	0.266	0.734	11.869	17.050	1.436
250.00	53.7	2.50	0.332	0.668	13.052	18.800	1.440
300.00	53.6	3.00	0.399	0.601	14.495	18.765	1.295
350.00	52.8	3.50	0.465	0.535	16.298	18.485	1.134
400.00	52.4	4.00	0.532	0.468	18.614	18.345	0.986
450.00	51.1	4.50	0.598	0.402	21.695	17.890	0.825
500.00	50.6	5.00	0.665	0.335	26.000	17.715	0.681
600.00	50.1	6.00	0.798	0.202	43.105	17.540	0.407
700.00	50.0	7.00	0.931	0.069	125.999	17.505	0.139
800.00							
900.00							
1000.00							
1100.00							
1200.00							
1300.00							
1400.00							
1500.00							
1600.00							
1700.00							



Dari test didapat q_u = 1.440 kgf/cm²



LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

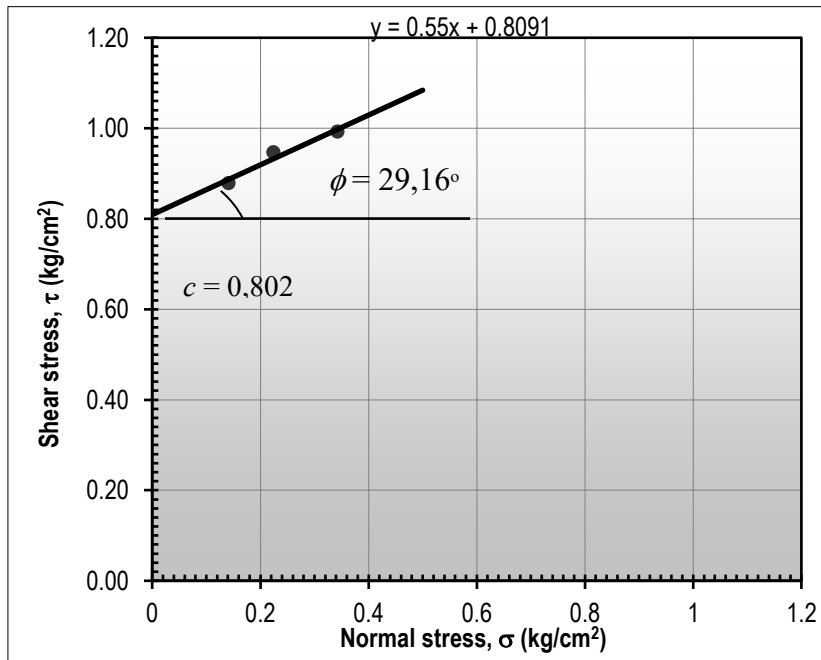
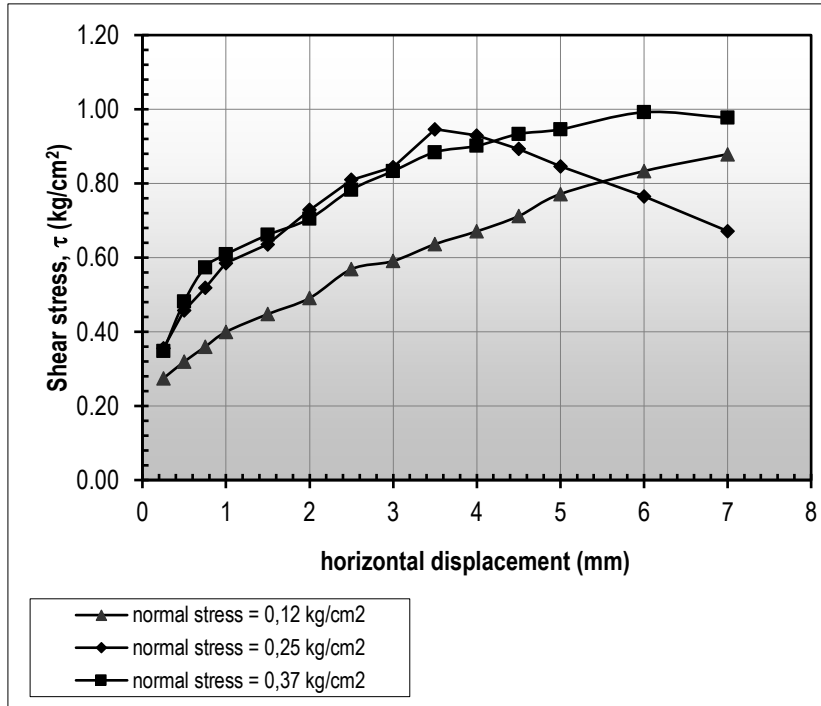
Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

DIRECT SHEAR TEST

Lokasi :

Kedalaman :

Permintaan :





LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

GRAIN SIZE ANALYSIS (*Hydrometer*)

LOCATION : Lab. Mekanika Tanah
SAMPLE NO. : B-1

Dikerjakan

Wt. (air dry* soil + container) =
Wt. Container =
Wt. Air dry soil W' = 108.1 g
*Test is made of soil sample passing 2,0 mm sieve

Specific gravity G = 2.640 a = 1
Plasticity index P.I. = 15.65 %

WATER CONTENT OF AIR DRY SOIL SAMPLE

Kode	d1	Kode	d8	Kode	j7	Mean value (w)
WW = 44.73	DW = 42.61	WW = 49.28	DW = 46.67	WW = 52.53	DW = 49.46	= 8.07 %
DW = 42.61	TW = 14.79	DW = 46.67	TW = 13.86	DW = 49.46	TW = 13.92	
Ww = 2.12	Ws = 27.82	Ww = 2.61	Ws = 32.81	Ww = 3.07	Ws = 35.54	
w = 7.62 %		w = 7.95 %		w = 8.64 %		

Wt. Of oven - dry soil $W = \frac{100W'}{100+w}$ = 100 g

HYDROMETER ANALYSIS

1	2	3	4	5	6	7	8	9	10	11
Elapsed time (t) (min)	Hydrometer reading		Temperature °C	L	$\sqrt{L/t}$	$\sqrt{\frac{30m}{980(G-G')}} = K$	d 6 x 7	F	$R_c = r'/1000 + F$	% finer = P k10 x M x 1000
	Under decimal only	r' col. 2 + Cm								
1	18	19.00	27	16.16	4.020	0.01292	0.0519	0.0023	0.0213	55.542
2	15	16.00	27	16.39	2.863	0.01292	0.0370	0.0023	0.0183	47.719
3	13	14.00	27	16.62	2.354	0.01292	0.0304	0.0023	0.0163	42.504
15	10	11.00	27	16.96	1.063	0.01292	0.0137	0.0023	0.0133	34.681
30	8	9.00	27	17.19	0.757	0.01292	0.0098	0.0023	0.0113	29.466
60	7	8.00	27	17.53	0.541	0.01292	0.0070	0.0023	0.0103	26.858
240	5	6.00	27	17.65	0.271	0.01292	0.0018	0.0023	0.0083	21.643
1440	3	4.00	27	17.76	0.111	0.01292	0.0015	0.0023	0.0063	16.428
2880	2	3.00	27	17.87	0.079	0.01292	0.0010	0.0023	0.0053	13.820

$\frac{100}{W} = 1.000$; $\frac{G}{G - G'} = 1.60759$ $M = \frac{100}{W} + \frac{G}{G - G'} = 2.608$

Meniscus correction Cm = 1.00 G' = 0.9971 m = 0.00896

SEIVE ANALYSIS

Sieve opening in mm	Weight of soil retained in gr.	*Percent retained	*Cummulative Percent retained	*Cummulative Percent finer P
0.85	4.33	4.01%	4.01%	95.99%
0.4	2.95	2.73%	6.74%	93.26%
0.25	4.42	4.09%	10.83%	89.17%
0.11	4.61	4.27%	15.09%	84.91%
0.075	3.03	2.80%	17.90%	82.10%

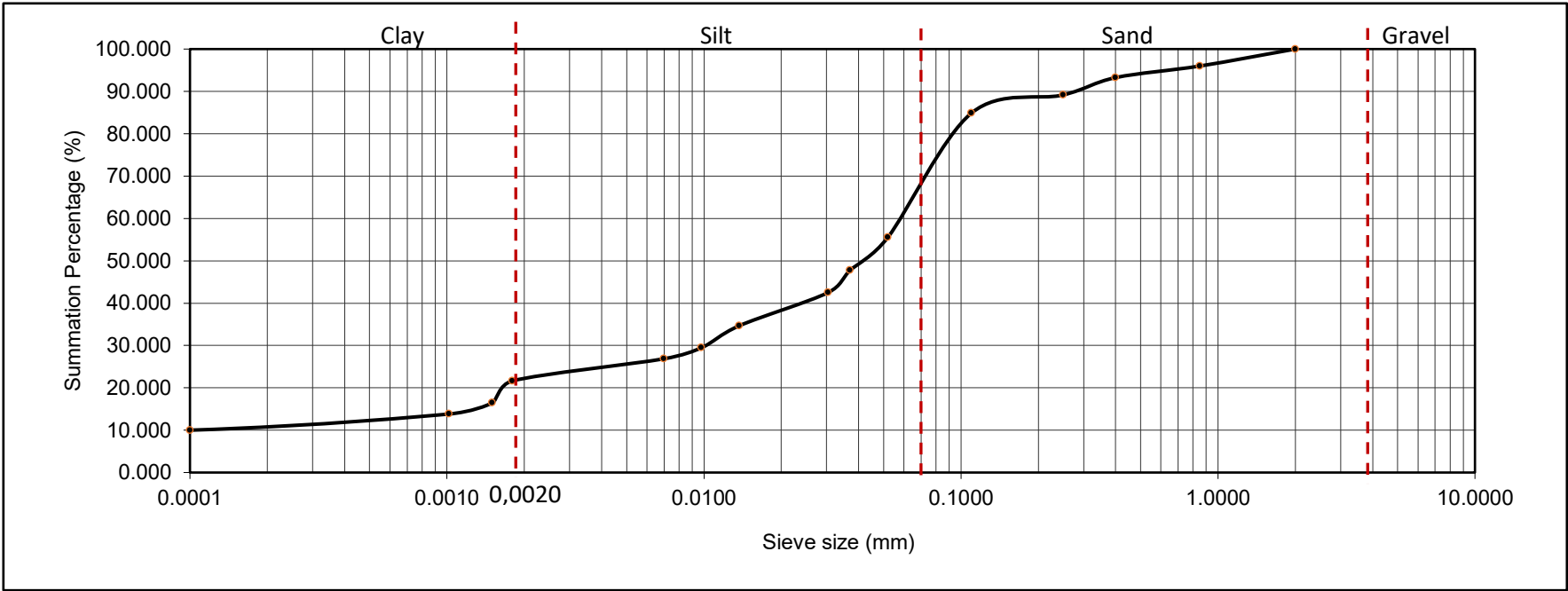
L = Effective depth in cm
m = Viscosity of water in poise
G' = Specific gravity of water
d = Maximum diameter of soil grain in mm
F = Correction factor against temperature



LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

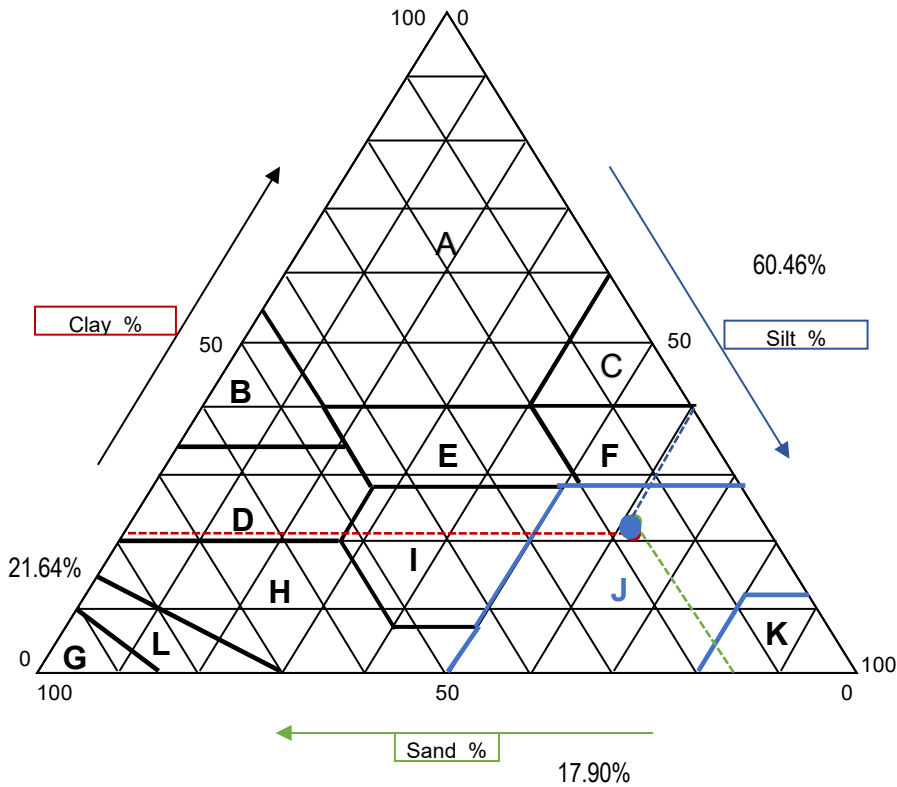
GRAIN SIZE ANALYSIS (Hydrometer)



Gravel	Sand	Silt	Clay	Max size	D 60	D 10	Classification	Remarks
0%	17.90%	60.46%	21.64%	0.0519	0.010	-	I.	=

CLASSIFICATION

- A. CLAY
- B. SANDY CLAY
- C. SILTY CLAY
- D. SANDY CLAY LOAM
- E. CLAYLEY LOAM
- F. SILTY CLAY LOAM
- G. SAND
- H. SANDY LOAM
- I. LOAM
- J. SILTY LOAM
- K. SILT
- L. LOAMY SAND



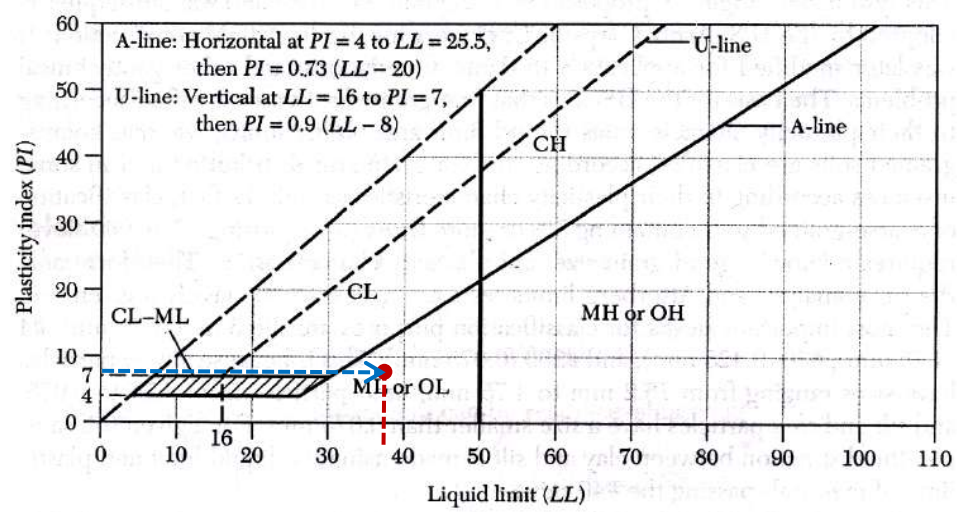


FIGURE 3.14 Plasticity chart used in the classification of fine-grained soils. (Adapted from Casagrande, 1948; Howard, 1977.)

Kesimpulan :-



LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

LOCATION :
SAMPLE NO. :

TESTED BY :
:

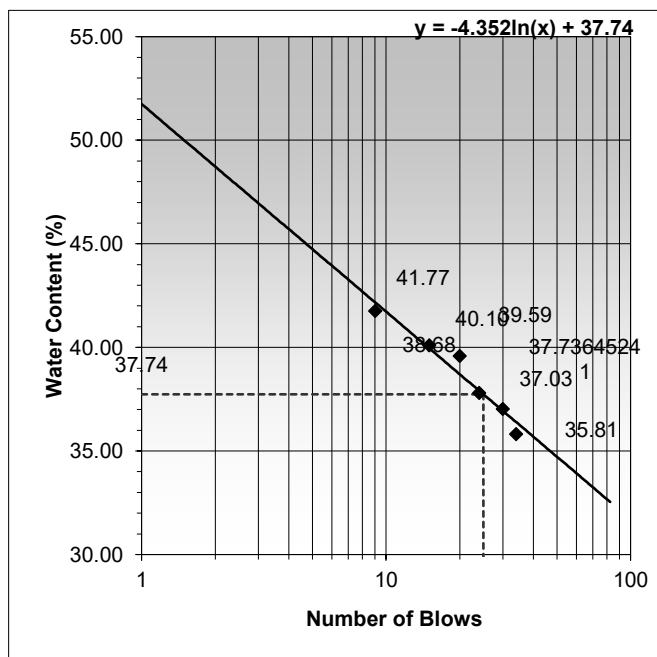
LIQUID LIMIT TEST

1	2	3
NO. OF BLOWS 9	NO. OF BLOWS 15	NO. OF BLOWS 20
No. f10	No. g7	No. j7
WW = 24.94 DW = 21.77	WW = 25.64 DW = 22.32	WW = 25.60 DW = 21.91
DW = 21.77 TW = 14.18	DW = 22.32 TW = 14.04	DW = 21.91 TW = 12.59
Ww = 3.17 Ws = 7.59	Ww = 3.32 Ws = 8.28	Ww = 3.69 Ws = 9.32
w = 41.77 %	w = 40.10 %	w = 39.59 %

4	5	6
NO. OF BLOWS 24	NO. OF BLOWS 30	NO. OF BLOWS 34
No. f4	No. a9	No. b32
WW = 26.90 DW = 23.55	WW = 28.82 DW = 25.18	WW = 26.47 DW = 23.15
DW = 23.55 TW = 14.69	DW = 25.18 TW = 15.35	DW = 23.15 TW = 13.88
Ww = 3.35 Ws = 8.86	Ww = 3.64 Ws = 9.83	Ww = 3.32 Ws = 9.27
w = 37.81 %	w = 37.03 %	w = 35.81 %

PLASTIC LIMIT TEST

1	2	3
No. c7	No. B10	No. j2
WW = 14.68 DW = 14.44	WW = 17.56 DW = 17.38	WW = 14.56 DW = 14.37
DW = 14.44 TW = 13.65	DW = 17.38 TW = 16.79	DW = 14.37 TW = 13.76
Ww = 0.24 Ws = 0.79	Ww = 0.18 Ws = 0.59	Ww = 0.19 Ws = 0.61
w = 30.38 %	w = 30.51 %	w = 31.15 %



REMARKS :

WW = Wt of container + wet soil in gr.
DW = Wt of container + dry soil in gr.
TW = Wt of container in gr.

The limits is determined on the portion of the soil passing 0,4 mm sieve

Dari percobaan didapatkan :

LIQUID LIMIT = 37.74 %
PLASTIC LIMIT = 30.68 %
PLAST. INDEX = 7.06 %



LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

PEMERIKSAAN BERAT JENIS

LOKASI :
DIKERJAKAN :
JENIS TANAH :
KEDALAMAN :
NOMOR CONTOH :

BERAT JENIS TANAH

Nomor Picno		C3	C	O
Berat Picno + Tanah (W_2)	gr	92.48	86.27	82.89
Berat Picno (W_1)	gr	46.60	30.11	38.46
Berat Tanah ($W_2 - W_1$)	gr	45.88	56.16	44.43
Suhu (T)	°C	27	27	27
Berat Picno + Air pada T (W_4)	gr	145.76	131.16	138.79
$W_2 - W_1 + W_4$	gr	191.64	187.32	183.22
Berat Picno + Air + Tanah (W_3)	gr	174.29	166.09	166.39
Faktor Koreksi Suhu		0.9986	0.9986	0.9986
Isi Tanah ($W_2 - W_1$) + ($W_4 - W_3$)	cm ³	17.35	21.23	16.83
Berat Jenis Tanah		2.641	2.642	2.636
Rata-rata		2.640		



**LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG**

. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Malang 65145

WATER CONTENT

PEMERIKSAAN KADAR AIR

Nomor cawan		d1	d8	j7
Berat cawan + tanah basah	(gr)	45.26	50.38	53.43
Berat cawan + tanah kering	(gr)	42.61	46.67	49.46
Berat cawan	(gr)	14.79	13.86	13.92
Berat air	(gr)	2.65	3.71	3.97
Berat tanah kering	(gr)	27.82	32.81	35.54
Kadar air (w)	(%)	9.53	11.31	11.17
Kadar air rata-rata	(%)	10.67		



LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

UNCONFINED COMPRESSIVE STRENGTH

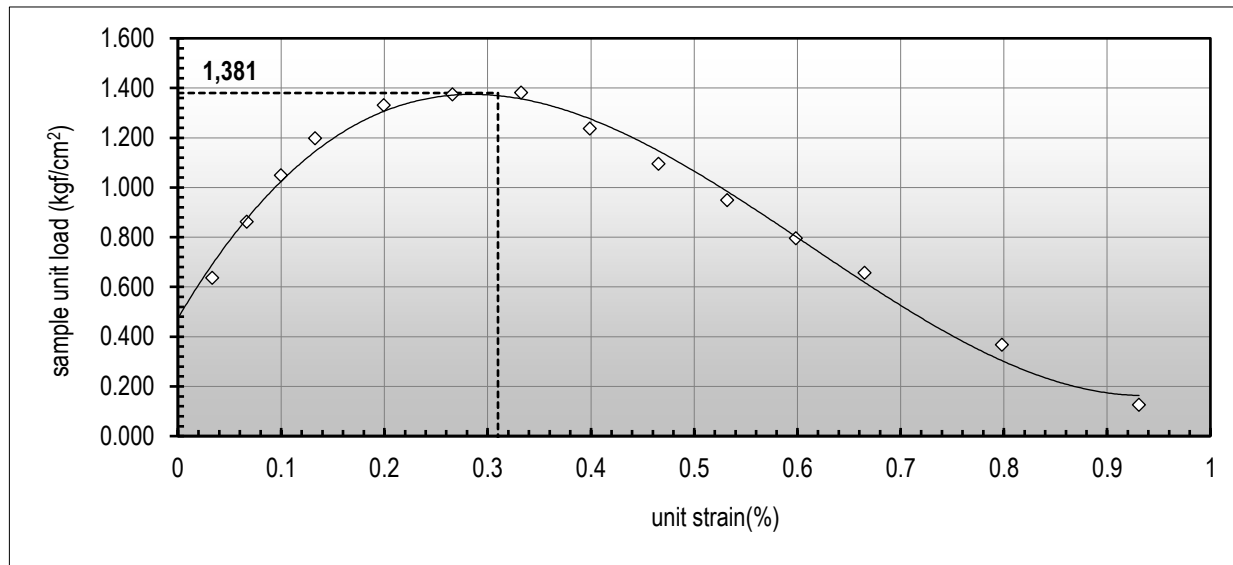
Lokasi :
Jenis Tanah :

Dikerjakan :
Permintaan :

Sample Data

Area (A_0) = 8.71 cm² Height (L_0) = 7.52 cm
w = 23.27 % γ_d = 1.88 gr/cm³
Machine Data LRC = 0.35 kgf Diameter = 3.33 cm

deformation dial reading	load dial (units)	ΔL col 1 . 10 ⁻²	unit strain $\Delta L / L_0$	area CF 1 - col 4	corrected area A'	total load on sample	sample unit load
25.00	16.4	0.25	0.033	0.967	9.012	5.742	0.637
50.00	23.0	0.50	0.066	0.934	9.333	8.052	0.863
75.00	29.0	0.75	0.100	0.900	9.678	10.153	1.049
100.00	34.4	1.00	0.133	0.867	10.049	12.043	1.198
150.00	41.4	1.50	0.199	0.801	10.884	14.494	1.332
200.00	46.6	2.00	0.266	0.734	11.869	16.315	1.375
250.00	51.5	2.50	0.332	0.668	13.052	18.030	1.381
300.00	51.2	3.00	0.399	0.601	14.495	17.925	1.237
350.00	51.0	3.50	0.465	0.535	16.298	17.855	1.096
400.00	50.5	4.00	0.532	0.468	18.614	17.680	0.950
450.00	49.3	4.50	0.598	0.402	21.695	17.260	0.796
500.00	48.8	5.00	0.665	0.335	26.000	17.085	0.657
600.00	45.3	6.00	0.798	0.202	43.105	15.860	0.368
700.00	45.2	7.00	0.931	0.069	125.999	15.825	0.126
800.00							
900.00							
1000.00							
1100.00							
1200.00							
1300.00							
1400.00							
1500.00							
1600.00							
1700.00							



Dari test didapat q_u = 1.381 kgf/cm²



LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

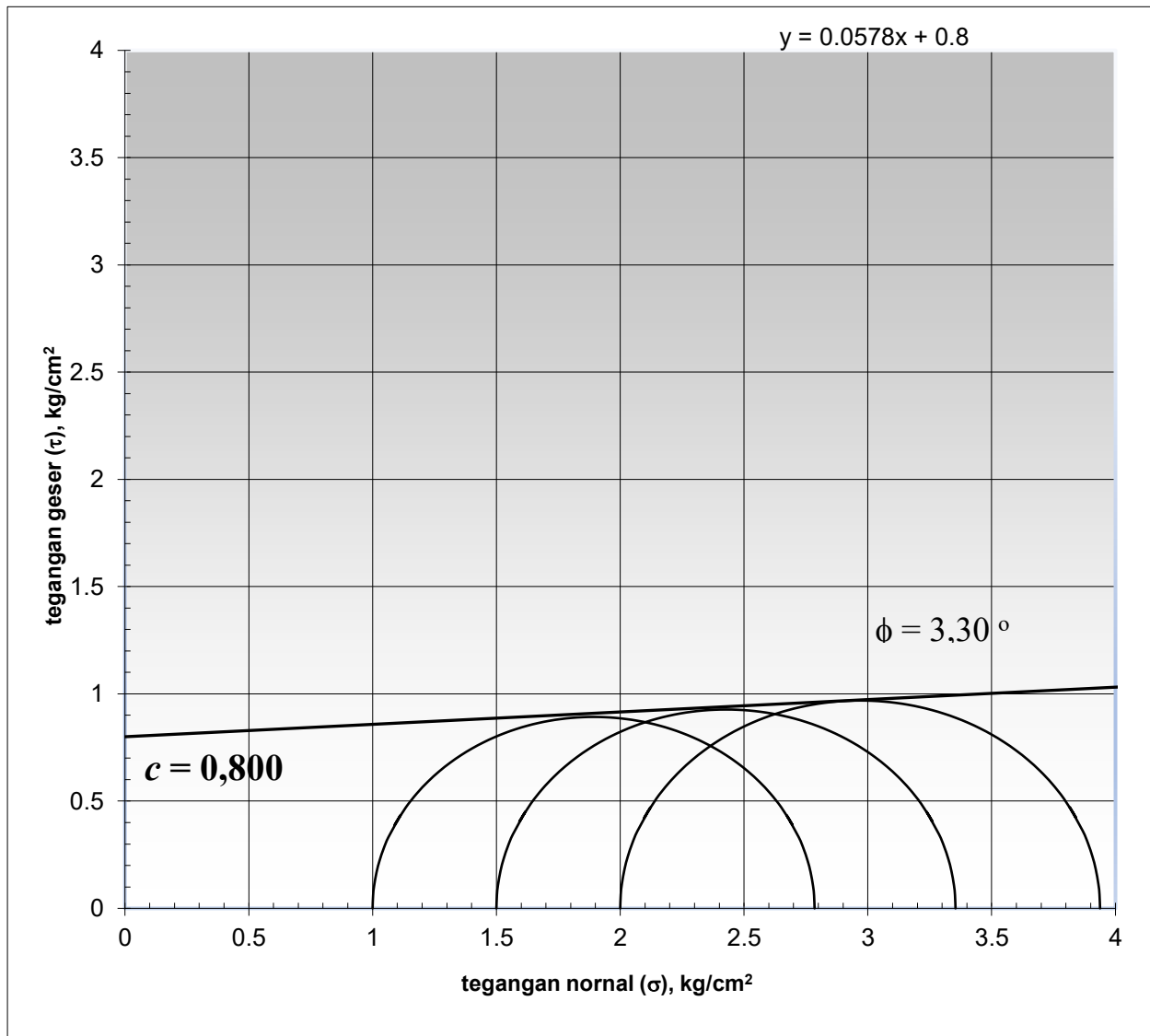
Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

TRIAXIAL COMPRESSION TEST

Location :
Jenis Tanah :

Dikerjakan :
Tested by :

Grafik Lingkaran Mohr





LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

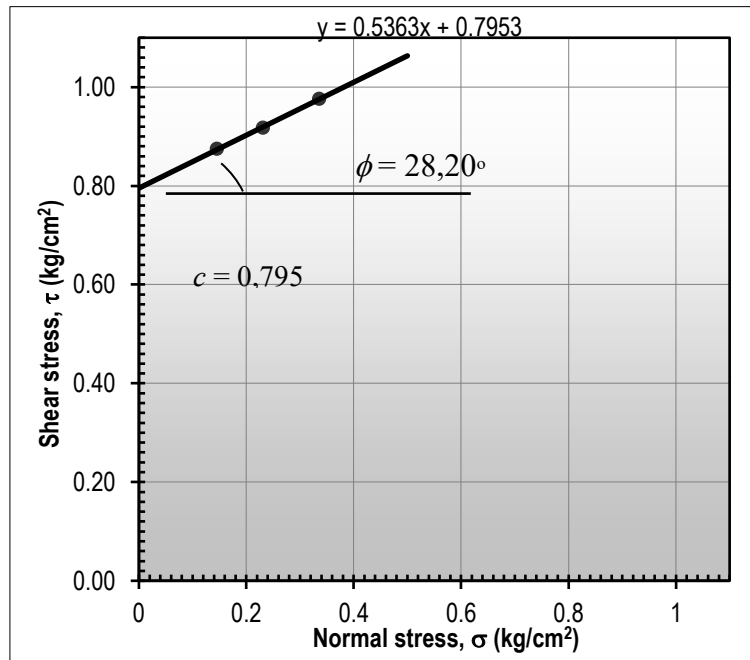
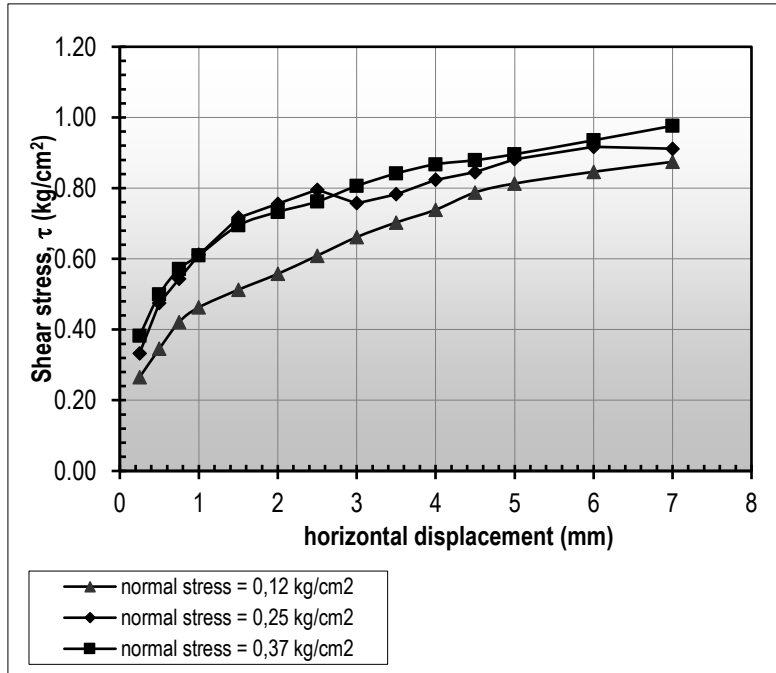
Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

DIRECT SHEAR TEST

Lokasi :

Kedalaman :

Permintaan :





LABORATORIUM MEKANIKA TANAH
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL MALANG

Jl. Bendungan Sigura-gura No. 2 Telp. (0341) 551951 – 551431 Psw. 256 Malang 65145

GRAIN SIZE ANALYSIS (*Hydrometer*)

LOCATION : Lab. Mekanika Tanah
SAMPLE NO. : B-1

Dikerjakan

Wt. (air dry* soil + container) =
Wt. Container =
Wt. Air dry soil W' = 110.7 g
*Test is made of soil sample passing 2,0 mm sieve

Specific gravity G = 2.666 a = 1
Plasticity index P.I. = 15.65 %

WATER CONTENT OF AIR DRY SOIL SAMPLE

Kode			d1	Kode			d8	Kode			j7	Mean value (w) = 10.67 %
WW =	45.26	DW =	42.61	WW =	50.38	DW =	46.67	WW =	53.43	DW =	49.46	
DW =	42.61	TW =	14.79	DW =	46.67	TW =	13.86	DW =	49.46	TW =	13.92	
Ww =	2.65	Ws =	27.82	Ww =	3.71	Ws =	32.81	Ww =	3.97	Ws =	35.54	
w = 9.53 %				w = 11.31 %				w = 11.17 %				

Wt. Of oven - dry soil $W = \frac{100W'}{100+w}$ = 100 g

HYDROMETER ANALYSIS

1	2	3	4	5	6	7	8	9	10	11
Elapsed time (t) (min)	Hydrometer reading		Temperature °C	L	$\sqrt{L/t}$	$\sqrt{\frac{30m}{980(G-G')}} = K$	d 6 x 7	F	$R_c =$ $r'/1000 + F$	% finer = P $k10 \times M \times 1000$
	Under decimal only	r' col. 2 + Cm								
1	22	23.00	27	16.16	4.020	0.01282	0.0515	0.0023	0.0253	65.724
2	20	21.00	27	16.39	2.863	0.01282	0.0367	0.0023	0.0233	60.528
3	19	20.00	27	16.62	2.354	0.01282	0.0302	0.0023	0.0223	57.931
15	16	17.00	27	16.96	1.063	0.01282	0.0136	0.0023	0.0193	50.137
30	15	16.00	27	17.19	0.757	0.01282	0.0097	0.0023	0.0183	47.539
60	14	15.00	27	17.53	0.541	0.01282	0.0069	0.0023	0.0173	44.942
240	12	13.00	27	17.65	0.271	0.01282	0.0018	0.0023	0.0153	39.746
1440	10	11.00	27	17.76	0.111	0.01282	0.0015	0.0023	0.0133	34.551
2880	7	8.00	27	17.87	0.079	0.01282	0.0010	0.0023	0.0103	26.757

$$\frac{100}{W} = 1.000 ; \frac{G}{G - G'} = 1.59778 \quad M = \frac{100}{W} + \frac{G}{G - G'} = 2.598$$

Meniscus correction Cm = 1.00 G' = 0.9971 m = 0.00896

SEIVE ANALYSIS

Sieve opening in mm	Weight of soil retained in gr.	*Percent retained	*Cummulative Percent retained	*Cummulative Percent finer P
0.85	2.73	2.47%	2.47%	97.53%
0.4	1.45	1.31%	3.78%	96.22%
0.25	2.92	2.64%	6.42%	93.58%
0.11	3.11	2.81%	9.23%	90.77%
0.075	1.53	1.38%	10.61%	89.39%

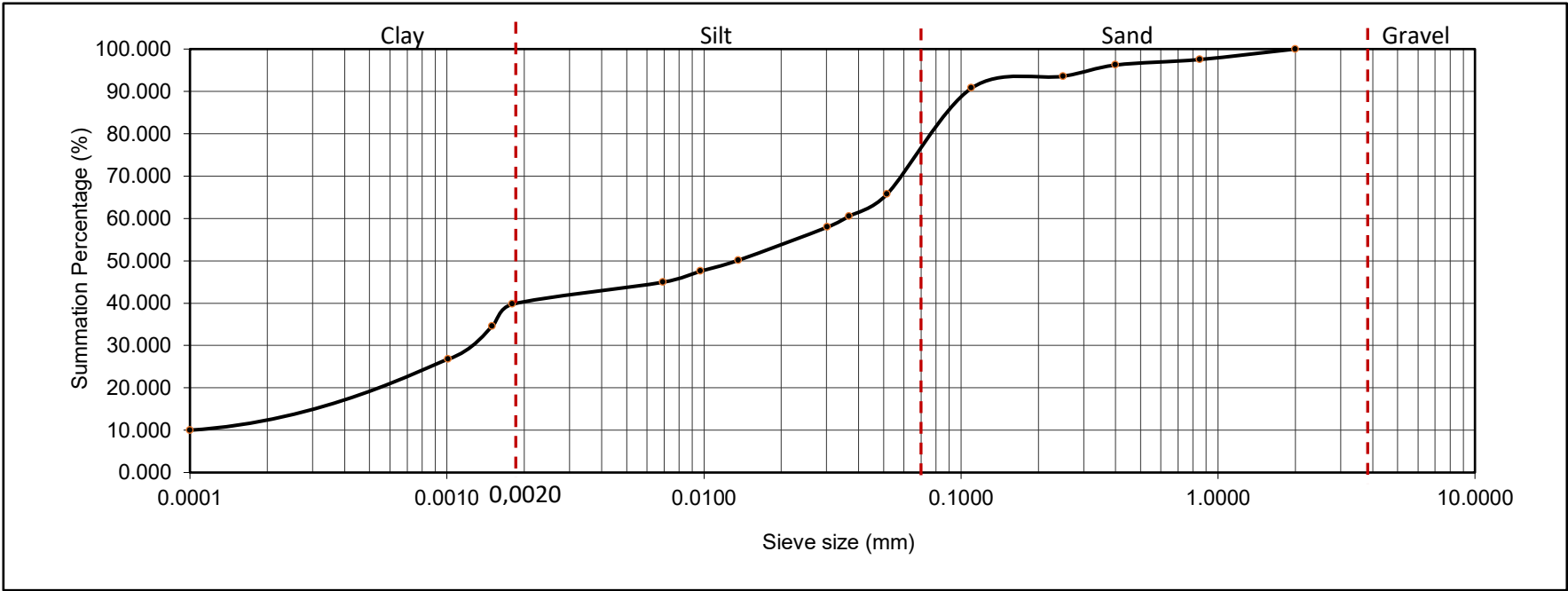
L = Effective depth in cm
m = Viscosity of water in poise
G' = Specific gravity of water
d = Maximum diameter of soil grain in mm
F = Correction factor against temperature



LABORATORIUM MEKANIKA TANAH
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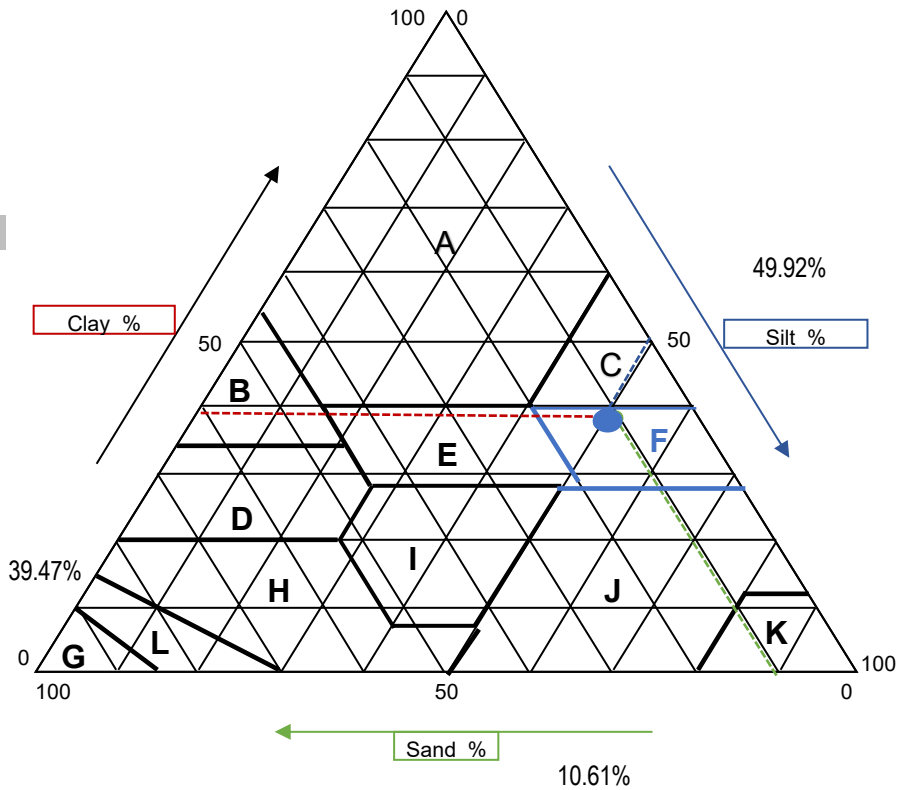
GRAIN SIZE ANALYSIS (Hydrometer)



Gravel	Sand	Silt	Clay	Max size	D 60	D 10	Classification	Remarks
0%	10.61%	49.92%	39.47%	0.0515	0.010	-	I.	=

CLASSIFICATION

- A. CLAY
- B. SANDY CLAY
- C. SILTY CLAY
- D. SANDY CLAY LOAM
- E. CLAYLEY LOAM
- F. SILTY CLAY LOAM
- G. SAND
- H. SANDY LOAM
- I. LOAM
- J. SILTY LOAM
- K. SILT
- L. LOAMY SAND



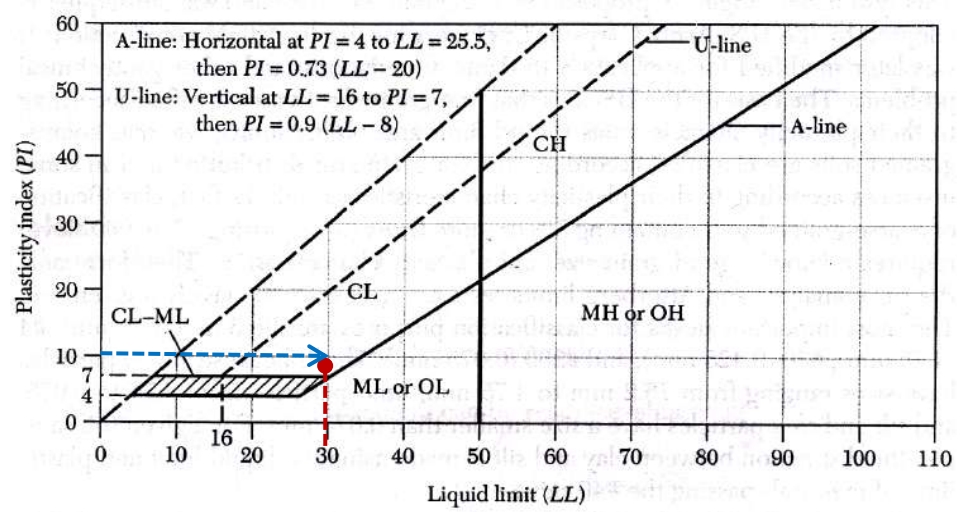


FIGURE 3.14 Plasticity chart used in the classification of fine-grained soils. (Adapted from Casagrande, 1948; Howard, 1977.)

Kesimpulan :-



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LOCATION :
SAMPLE NO. :

TESTED BY :
:

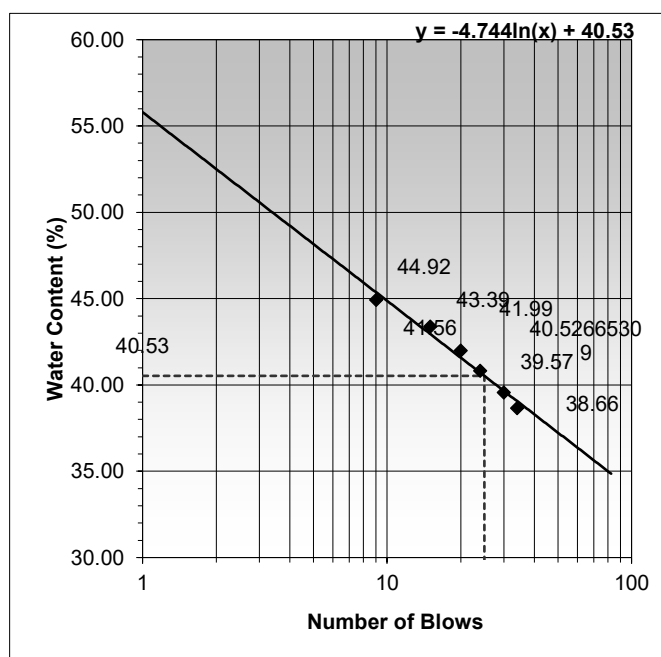
LIQUID LIMIT TEST

1	2	3
NO. OF BLOWS 9	NO. OF BLOWS 15	NO. OF BLOWS 20
No. f10	No. g7	No. j7
WW = 24.94 DW = 21.58	WW = 25.64 DW = 22.13	WW = 25.60 DW = 21.72
DW = 21.58 TW = 14.10	DW = 22.13 TW = 14.04	DW = 21.72 TW = 12.48
Ww = 3.36 Ws = 7.48	Ww = 3.51 Ws = 8.09	Ww = 3.88 Ws = 9.24
w = 44.92 %	w = 43.39 %	w = 41.99 %

4	5	6
NO. OF BLOWS 24	NO. OF BLOWS 30	NO. OF BLOWS 34
No. f4	No. a9	No. b32
WW = 26.90 DW = 23.36	WW = 28.82 DW = 24.99	WW = 26.47 DW = 22.96
DW = 23.36 TW = 14.69	DW = 24.99 TW = 15.31	DW = 22.96 TW = 13.88
Ww = 3.54 Ws = 8.67	Ww = 3.83 Ws = 9.68	Ww = 3.51 Ws = 9.08
w = 40.83 %	w = 39.57 %	w = 38.66 %

PLASTIC LIMIT TEST

1	2	3
No. c7	No. B10	No. j2
WW = 14.69 DW = 14.43	WW = 17.57 DW = 17.38	WW = 14.57 DW = 14.37
DW = 14.43 TW = 13.59	DW = 17.38 TW = 16.80	DW = 14.37 TW = 13.73
Ww = 0.26 Ws = 0.84	Ww = 0.19 Ws = 0.58	Ww = 0.20 Ws = 0.64
w = 30.95 %	w = 32.76 %	w = 31.25 %



REMARKS :

WW = Wt of container + wet soil in gr.
DW = Wt of container + dry soil in gr.
TW = Wt of container in gr.

The limits is determined on the portion of the soil passing 0,4 mm sieve

Dari percobaan didapatkan :

LIQUID LIMIT = 40.53 %
PLASTIC LIMIT = 31.65 %
PLAST. INDEX = 8.87 %



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PEMERIKSAAN BERAT JENIS

LOKASI :
DIKERJAKAN :
JENIS TANAH :
KEDALAMAN :
NOMOR CONTOH :

BERAT JENIS TANAH

Nomor Picno		C3	C	O
Berat Picno + Tanah (W_2)	gr	92.28	86.27	82.09
Berat Picno (W_1)	gr	46.60	30.11	38.46
Berat Tanah ($W_2 - W_1$)	gr	45.68	56.16	43.63
Suhu (T)	°C	27	27	27
Berat Picno + Air pada T (W_4)	gr	145.76	131.16	138.79
$W_2 - W_1 + W_4$	gr	191.44	187.32	182.42
Berat Picno + Air + Tanah (W_3)	gr	174.24	165.99	166.39
Faktor Koreksi Suhu		0.9986	0.9986	0.9986
Isi Tanah ($W_2 - W_1$) + ($W_4 - W_3$)	cm ³	17.20	21.33	16.03
Berat Jenis Tanah		2.652	2.629	2.718
Rata-rata		2.666		