

LAMPIRAN

LAMPIRAN 1

Sifat Fisik dan Mekanik Tanah Asli

- A. Analisis Saringan dan Hidrometer
- B. *Specific Gravity*
- C. Kadar Air
- D. *Density Test*
- E. Batas – Batas Konsistensi
- F. Permeabilitas
- G. Konsolidasi
- H. Pengembangan (*Swelling*)
- I. Pemadatan

A. Analisis Saringan dan Hidrometer

- Analisis Saringan

No Saringan	Diameter (mm)	Tertahan saringan (gram)	Jumlah Tertahan (gram)	% Jumlah Tertahan	% Lolos Saringan
4	4.75	0	0	0	100
10	2	1.87	1.87	0.9350	99.0650
20	0.84	1.81	3.68	1.8400	98.1600
40	0.42	2.63	6.31	3.1550	96.8450
50	0.3	0.5	6.81	3.4050	96.5950
80	0.18	2.53	9.34	4.6700	95.3300
100	0.15	1.56	10.9	5.4500	94.5500
200	0.075	4.8	15.7	7.8500	92.1500
PAN		184.3	200	100	0

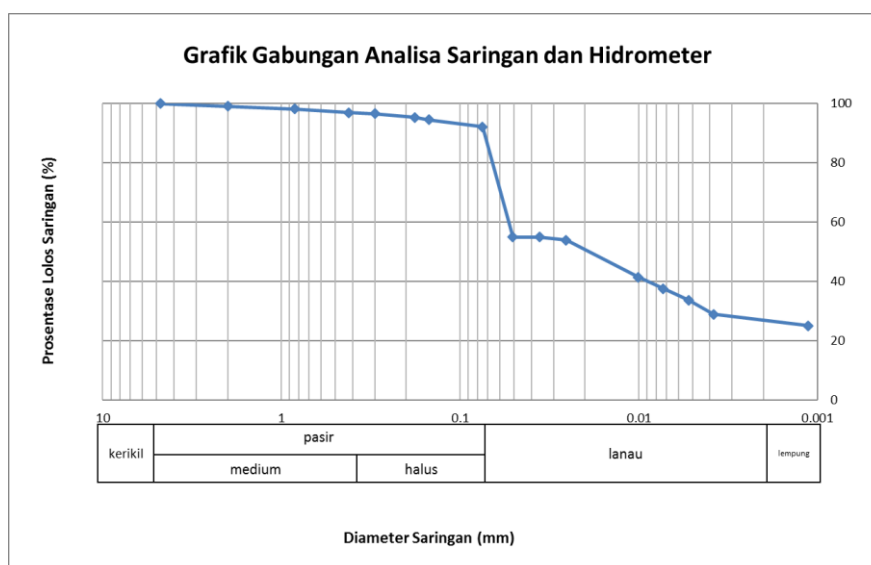
- Hidrometer

Tipe hidrometer : 151H

Berat sampel : 50 gram

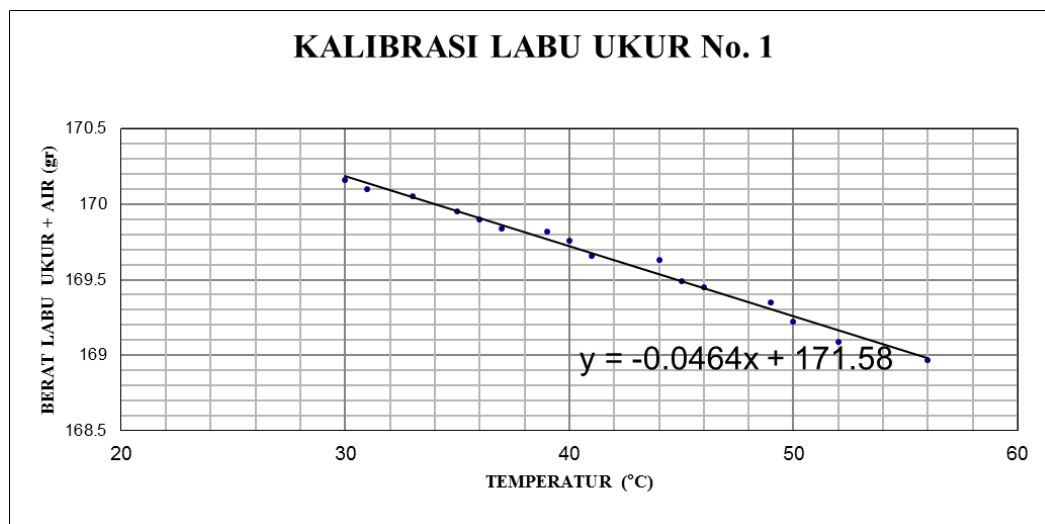
Pendispersi : H₂O₂

T (menit)	C (°C)	Bacaan Hidrometer (Ra)	Bacaan Terkoreksi (Rc)	% lolos	Terkoreksi Meniskus (R)	Kedalaman Efektif (L)	V = L/t	K	Diameter Butiran (D)	Kumulatif lolos
0.0	28	1.0260	1.0295	61.7199	1.0360	9.40	0	0.0132	0	56.8749
0.5	28	1.0250	1.0285	59.6277	1.0350	9.70	19.4000	0.0132	0.0506	54.9469
1	28	1.0250	1.0285	59.6277	1.0350	9.70	9.7000	0.0132	0.0358	54.9469
2	28	1.0245	1.0280	58.5816	1.0345	9.85	4.9250	0.0132	0.0255	53.9829
15	28	1.0180	1.0215	44.9823	1.0280	11.50	0.7667	0.0132	0.0101	41.4512
30	28	1.0160	1.0195	40.7979	1.0260	12.10	0.4033	0.0132	0.0073	37.5953
60	28	1.0140	1.0175	36.6135	1.0240	12.60	0.2100	0.0132	0.0053	33.7393
120	27	1.0120	1.0150	31.3830	1.0220	13.10	0.1092	0.0134	0.0038	28.9194
1440	27	1.0100	1.0130	27.1986	1.0200	13.70	0.0095	0.0134	0.0011	25.0635



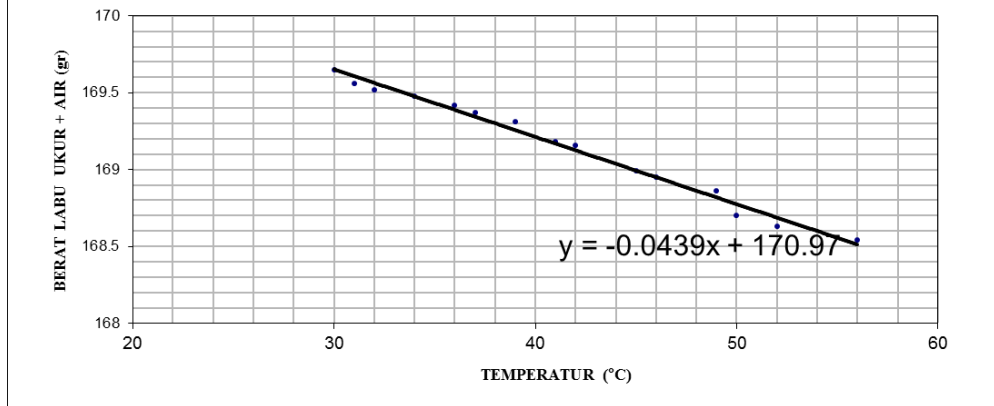
B. Specific Gravity

NO	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Berat Labu Ukur + Air (gr)	168.97	169.09	169.22	169.35	169.45	169.49	169.63	169.66	169.76	169.82	169.84	169.9	169.95	170.05	170.1	170.16
Temperatur °C	56	52	50	49	46	45	44	41	40	39	37	36	35	33	31	30

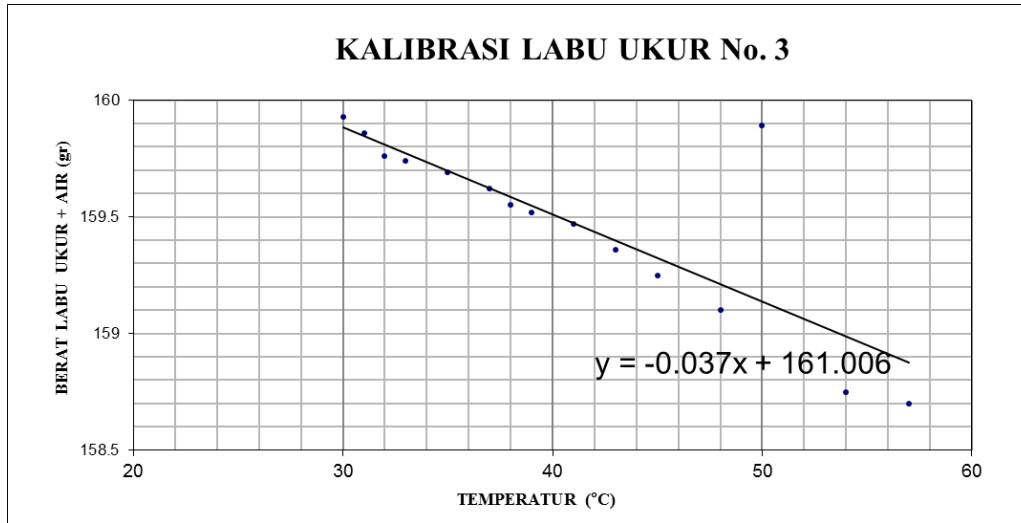


NO	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Berat Labu Ukur + Air (gr)	168.54	168.63	168.7	168.86	168.95	168.99	169.16	169.18	169.31	169.37	169.42	169.48	169.52	169.56	169.65
Temperatur °C	56	52	50	49	46	45	42	41	39	37	36	34	32	31	30

KALIBRASI LABU UKUR No. 2



NO	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Berat Labu Ukur + Air (gr)	158.7	158.75	159.89	159.1	159.25	159.36	159.47	159.52	159.55	159.62	159.69	159.74	159.76	159.86	159.93
Temperatur °C	57	54	50	48	45	43	41	39	38	37	35	33	32	31	30



Labu ukur 1

LABU UKUR	SATUAN	1									
Berat Labu Ukur	gram	69.82									
Berat Tanah Kering (Ws)	gram	20	20	20	20	20	20	20	20	20	20
Berat Labu Ukur + Air + Tanah Kering (W1)	gram	181.49	181.57	181.64	181.79	181.8	181.86	181.89	181.94	182	182.04
Suhu (°C)	°C	52	48	41	38	37	36	35	34	32	30
Berat Labu Ukur + Air (W2)	gram	169.167	169.353	169.678	169.817	169.863	169.91	169.956	170.002	170.095	170.188
Gs	gram/cm ³	2.605	2.570	2.488	2.492	2.480	2.485	2.480	2.481	2.471	2.455
Rata-rata Gs	gram/cm ³	2.501									

Labu ukur 2

LABU UKUR	SATUAN	2									
Berat Labu Ukur	gram	69.91									
Berat Tanah Kering (Ws)	gram	20	20	20	20	20	20	20	20	20	20
Berat Labu Ukur + Air + Tanah Kering (W1)	gram	180.95	181.06	181.14	181.18	181.22	181.28	181.31	181.35	181.41	181.42
Suhu (°C)	°C	45	41	38	37	36	35	34	32	31	30
Berat Labu Ukur + Air (W2)	gram	168.995	169.17	169.302	169.346	169.39	169.434	169.477	169.565	169.609	169.653
Gs	gram/cm ³	2.486	2.466	2.450	2.449	2.448	2.453	2.449	2.435	2.439	2.429
Rata-rata Gs	gram/cm ³	2.450									

Labu ukur 3

LABU UKUR	SATUAN	3									
Berat Labu Ukur	gram	56.25									
Berat Tanah Kering (Ws)	gram	20	20	20	20	20	20	20	20	20	20
Berat Labu Ukur + Air + Tanah Kering (W1)	gram	171.27	171.35	171.37	171.42	171.45	171.49	171.53	171.58	171.65	171.76
Suhu (°C)	°C	42	40	38	37	36	35	34	33	32	30
Berat Labu Ukur + Air (W2)	gram	159.452	159.526	159.6	159.637	159.674	159.711	159.748	159.785	159.822	159.896
Gs	gram/cm ³	2.444	2.446	2.430	2.434	2.432	2.433	2.434	2.438	2.447	2.458
Rata-rata Gs	gram/cm ³	2.228									

RATA - RATA	2.463
--------------------	--------------

C. Kadar Air

Sampel	Satuan	1	2	3
Berat Cawan	gram	5,68	5,91	5,96
Berat Cawan + tanah basah	gram	16,62	16,00	21,19
Berat Cawan + tanah kering	gram	12,30	12,52	16,20
Berat Air	gram	3,32	3,48	4,99
Berat Tanah Kering	gram	6,62	6,61	10,24
Kadar Air	%	50,15	52,65	48,73
Kadar Air Rata - Rata	%		50,51	

D. Density Test

Titik No. / Kedalaman	Satuan	1	2
Tinggi Ring	cm	2.6	2.5
Diameter Ring (tabung)	cm	2.3	2.3
1. Berat Ring	gram	18.94	18.54
2. Berat Ring + Tanah Basah	gram	36.87	36.61
3. Berat Tanah Basah (2)-(1)	gram	17.93	18.07
4. Volume Tanah (Volume Ring)	cm ³	10.797	10.382
5. Berat Isi Tanah (3)/(4)	gram/cm ³	1.661	1.741
6. Berat Ring + Tanah Kering	gram	31.67	31.79
7. Berat Tanah Kering (6)-(1)	gram	12.73	13.25
8. Berat Air (3)-(7)	gram	5.2	4.82
9. Kadar Air (8)/(7) x 100%	%	40.848	36.377
10. γ_d (7)/(4)	gram/cm ³	1.179	1.276
γ rata-rata	gram/cm ³		1,228
11. Berat Jenis (Gs)			2.463
12. Volume Tanah Kering (7)/(Gs)			5.169
13. Isi Pori (4)-(12)		5.628	5.001
14. Derajat Kejenuhan Sr = (8)/(13) x 100%	%	92.397	96.372
15. Porositas (13)/(4) x 100%	%	52.125	48.176
rata - rata porositas	%		50,15

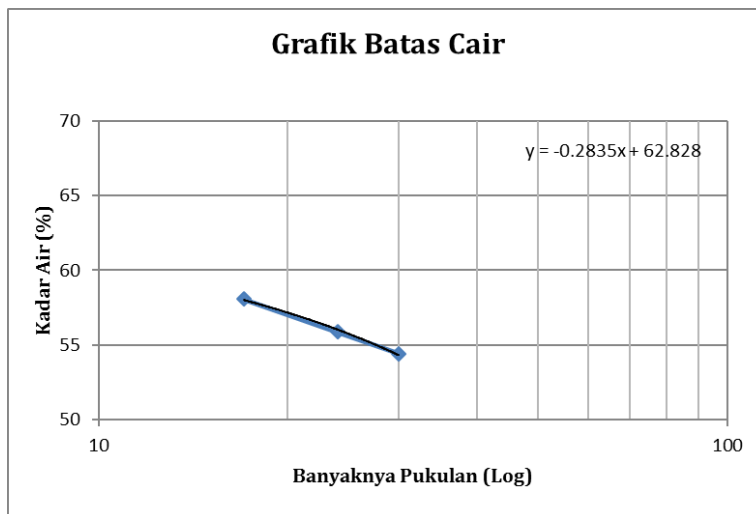
E. Batas Konsistensi

- *Plastic Limit*

Sampel	Satuan	1	2	3
Berat Cawan	gram	5,80	6,22	4,27
Berat Cawan + tanah basah	gram	13,28	13,71	12,13
Berat Cawan + tanah kering	gram	10,96	11,43	9,83
Berat Air	gram	2,32	2,28	2,30
Berat Tanah Kering	gram	5,16	5,21	5,56
Kadar Air	%	44,96	43,76	41,37
Kadar Air Rata - Rata	%		43,36	

- *Liquid Limit*

Banyak Pukulan	Satuan	17	24	30
Nomor Cawan		1	2	3
Berat Cawan	gram	5,64	5,97	5,71
Berat Cawan + tanah basah	gram	20,80	20,06	22,00
Berat Cawan + tanah kering	gram	15,23	15,01	16,26
Berat Air	gram	5,57	5,05	5,74
Berat Tanah Kering	gram	9,59	9,04	10,55
Kadar Air	%	58,08	55,86	54,41
Kadar Air Rata - Rata	%		56,12	



$$\begin{aligned}
 PI &= LL - PL \\
 &= 56,12 - 43,36 \\
 &= 12,76
 \end{aligned}$$

- *Shrinkage Limit*

No. Cetakan	Satuan	1	2
Berat Cetakan	gr	17.88	17,54
Berat Cetakan + Tanah Basah	gr	56.72	55,71
Berat Cetakan + Tanah Kering	gr	47.33	46,92
Berat Tanah Basah	gr	38.84	38,17
Berat Air	gr	9.39	8,79
Berat Tanah Kering	gr	29.45	29,38
Isi Tanah Basah	ml	26.2	25,77
Isi Tanah Kering	ml	20.6	20,17
Kadar Air (ω)	%	31.885	29,918

$$SL = \omega - \frac{V - V_0}{W_0} \times 100\%$$

	12.869	10,858
--	--------	--------

Rata - rata SL	11,863
-----------------------	---------------

F. Permeabilitas (*Falling Head*)

No. Contoh		1	2
ϕ dalam pipa	cm	1.00	1.00
a pot. dalam pipa	cm ²	0.79	0.79
ϕ contoh tanah	cm	6.30	6.30
A pot. contoh tanah	cm ²	31.16	31.16
Panjang contoh tanah	cm	1.50	1.50
Waktu	detik	86400.00	86400.00
Tinggi air pada $t_1 \rightarrow h_1$		89.50	87.75
Tinggi air pada $t_2 \rightarrow h_2$		80.75	81.25
h_1/h_2		1.11	1.08
Log h_1/h_2		0.04	0.03
$a \cdot L$		1.18	1.18
$a \cdot L/A$		0.04	0.04
$2,3/(t_2-t_1)$		0.26	0.35
$K_T = aL/A \cdot 2.3/\Delta t \cdot \text{Log } h_1/h_2$		0.0004439	0.0004470
T ⁰ C		27.00	27.00
X_{27}^0/X_{20}^0		0.85	0.85
$K_{20} = K_T X_{27}^0/X_{20}^0$		0.000377	0.000380
Koefisien rembesan	cm s ⁻¹	0.00037860	

G. Konsolidasi

Data :

$$\text{Diameter tanah (d)} = 6 \text{ cm}$$

$$\text{Tinggi tanah (t)} = 1 \text{ cm}$$

$$A = \frac{1}{4} \cdot \pi \cdot d^2 = 28,274 \text{ cm}^2$$

$$V = A \cdot t = 28,274 \text{ cm}^3$$

$$G_s = 2,463$$

Kadar Air dan Berat Isi	Satuan	Sebelum	Sesudah
Berat Tanah Basah + Cincin	gram	82.33	72.42
Berat Cincin	gram	35.08	35.08
Berat Contoh Basah	gram	47.25	37.34
Berat Contoh Kering	gram	35.42	35.42
Berat Air	gram	11.83	1.92
Kadar Air	%	33.40	5.42
Berat Isi	gram/cm ³	1.67	1.32
Berat Isi Kering	gram/cm ³	1.25	1.25

Angka Pori dan Derajat Kejenuhan	Satuan	Sebelum	Sesudah
Tinggi Sampel	cm	1.00	0.61
Luas	cm ²	28.27	28.27
Volume	cm ³	28.27	17.25
Angka Pori $e = (H - H_t) / H_t$		0.94	0.20
Kadar Air	%	33.40	5.42
Derajat Kejenuhan	%	0.88	0.67
Berat jenis		2.463	2.463
$H_t = (W_s / (A \cdot G_s))$		0.509	0.509

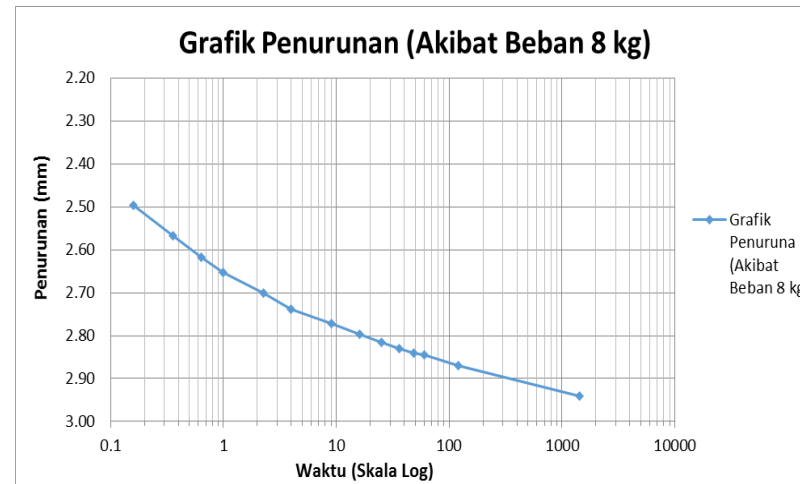
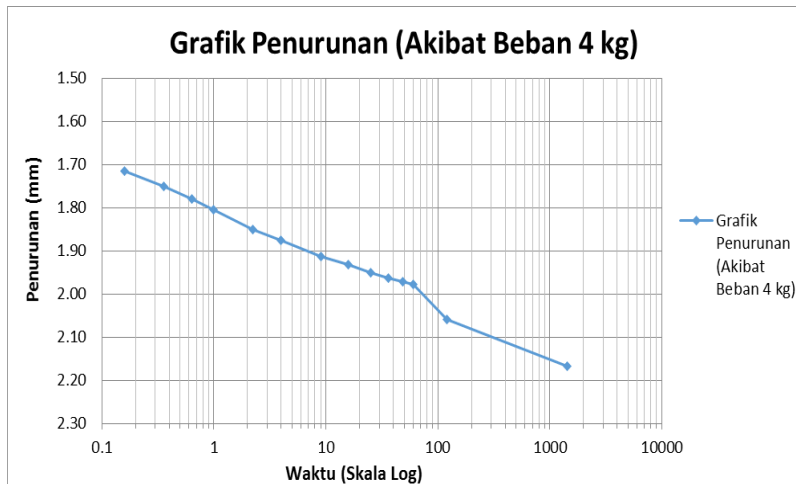
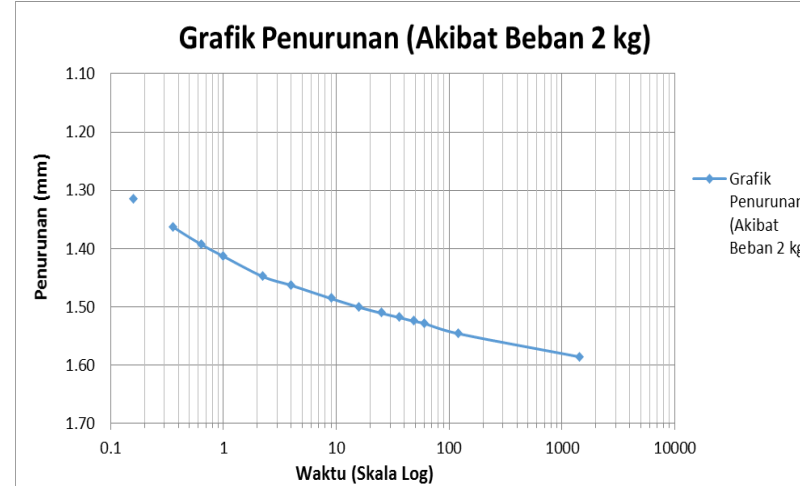
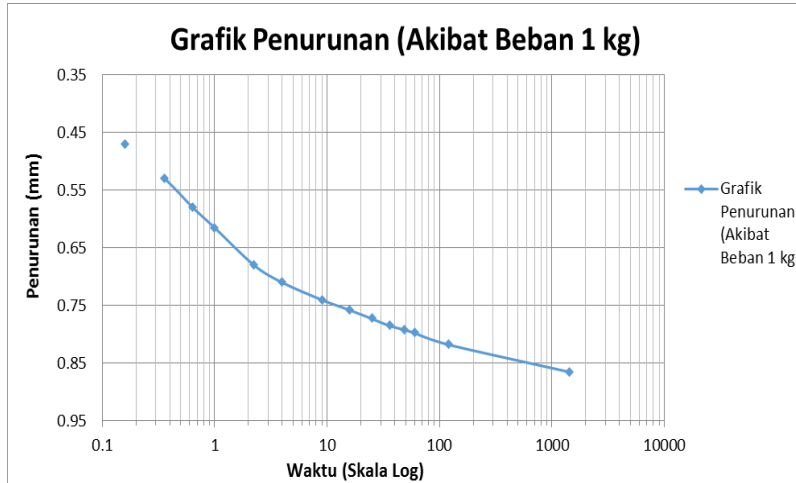
- Data pembacaan konsolidasi

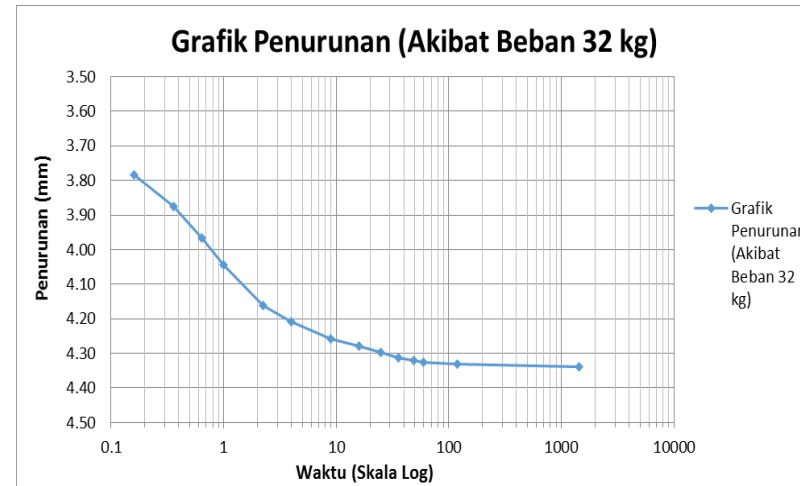
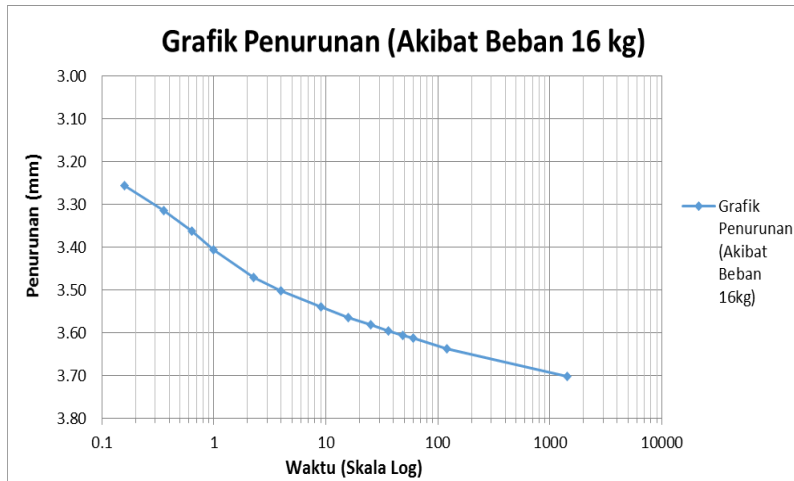
1	2	4	8	16	4	1	32
0	0	0	0	0	0	0	0
47	45	13	33	31.5	60	51.5	148
53	49.75	16.5	40	37.5	63.25	53	157
58	52.75	19.5	45	42.25	66.5	54.75	166
61.5	54.75	22	48.5	46.5	69.25	55.75	174
68	58.25	26.5	53.25	53	72.75	58	185.75
71	59.75	29	57	56.25	74	59.25	190.25
74	62	32.75	60.5	60	74.5	59.75	195.25
75.8	63.5	34.75	63	62.5	75.25	60.25	197.5
77.25	64.5	36.5	64.75	64	75.75	60.25	199.25
78.5	65.25	37.75	66.25	65.5	76	60.75	200.75
79.2	65.9	38.75	67.25	66.5	76.25	60.75	201.5
79.75	66.25	39.25	67.8	67.25	76.3	60.75	202
81.75	68	47.5	70.25	69.75	76.75	61	202.5
86.5	72	58.25	77.25	76.25	78.5	61.25	203.5

- Data perhitungan konsolidasi

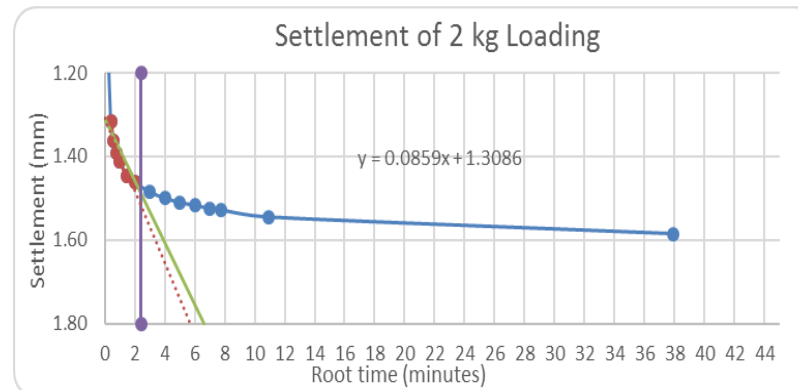
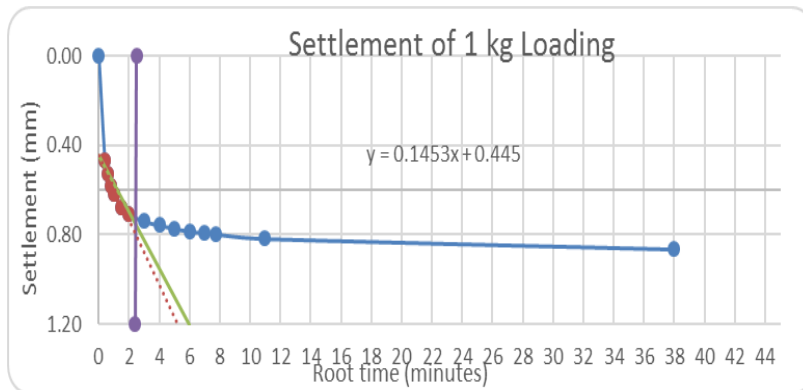
No.								
Beban (kg)	1	2	4	8	16	4	1	32
Tegangan (kg/cm ²)	0.354	0.707	1.415	2.829	5.659	1.415	0.354	11.318
0 detik	0.00	86.50	158.50	216.75	294.00	370.25	291.75	230.50
9,6 detik	47.00	131.50	171.50	249.75	325.50	310.25	240.25	378.50
21,4 detik	53.00	136.25	175.00	256.75	331.50	307.00	238.75	387.50
38,4 detik	58.00	139.25	178.00	261.75	336.25	303.75	237.00	396.50
1 menit	61.50	141.25	180.50	265.25	340.50	301.00	236.00	404.50
2,25 menit	68.00	144.75	185.00	270.00	347.00	297.50	233.75	416.25
4 menit	71.00	146.25	187.50	273.75	350.25	296.25	232.50	420.75
9 menit	74.00	148.50	191.25	277.25	354.00	295.75	232.00	425.75
16 menit	75.80	150.00	193.25	279.75	356.50	295.00	231.50	428.00
25 menit	77.25	151.00	195.00	281.50	358.00	294.50	231.50	429.75
36 menit	78.50	151.75	196.25	283.00	359.50	294.25	231.00	431.25
49 menit	79.20	152.40	197.25	284.00	360.50	294.00	231.00	432.00
60 menit	79.75	152.75	197.75	284.55	361.25	293.95	231.00	432.50
120 menit	81.75	154.50	206.00	287.00	363.75	293.50	230.75	433.00
24 jam	86.50	158.50	216.75	294.00	370.25	291.75	230.50	434.00

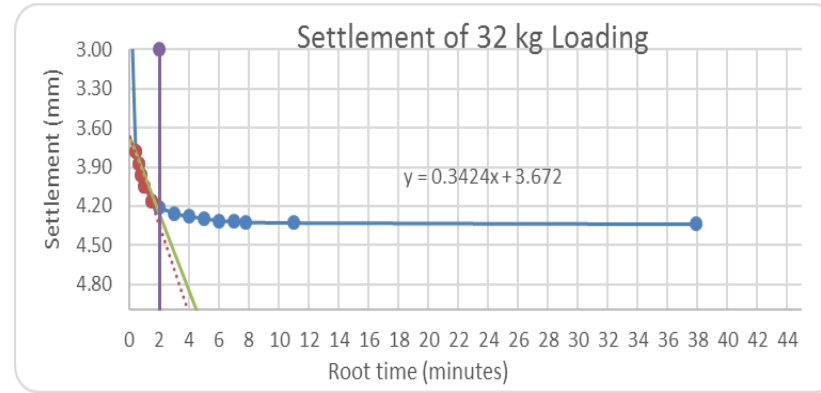
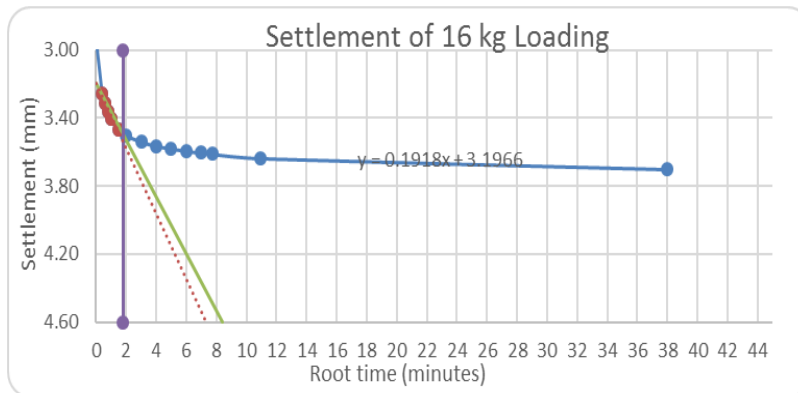
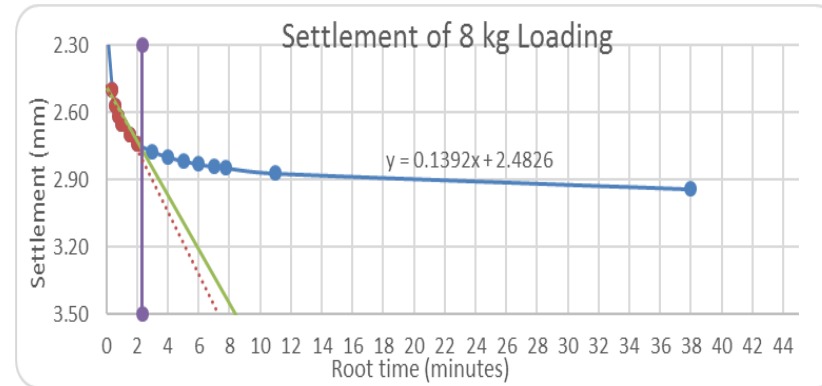
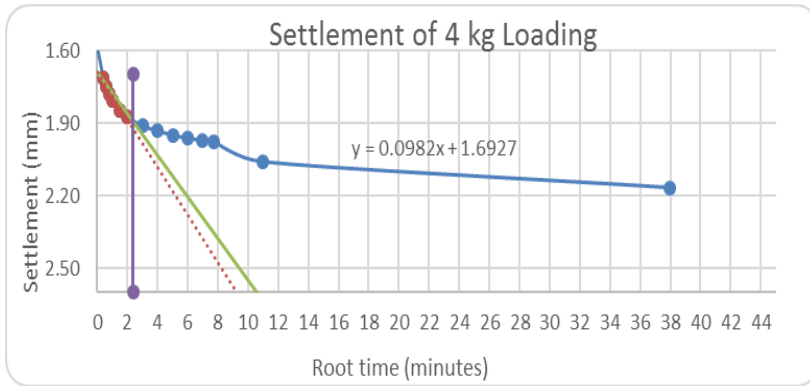
- Grafik Penurunan Log Waktu





- Grafik Penurunan Akar Waktu





- Perhitungan Koefisien Menggunakan Akar Waktu (t_{90}) dan Log Waktu (t_{50})

a) Perhitungan Koefisien Konsolidasi (C_v)

$$e = 0,940$$

$$H \text{ awal} = 1 \text{ cm}$$

$$H_t = 0,509$$

Tegangan	Pembacaan Alroji	ΔH	$\Delta e = \Delta H / H_t$	Angka Pori	Konsolidasi	H	Tinggi contoh tanah rata-rata (Hdr)	t_{90}	t_{50}	Koefisien Konsolidasi (t_{90})	Koefisien Konsolidasi (t_{50})
(kg/cm ²)	(mm)	(cm)		$e = e_0 - \Delta e$	(cm)	(cm)	(cm)	(detik)	(detik)	$C_v = (0,848 \times H^2) / t_{90}$	$C_v = (0,197 \times H^2) / t_{50}$
0.000	0	0.000	0.000	0.940	0.000	1.000	-	-	0	-	-
0.354	0.865	0.087	0.170	0.770	0.087	0.914	0.957	144	36	0.001064	0.001252
0.707	1.585	0.150	0.295	0.645	0.150	0.850	0.925	144	54	0.001229	0.001376
1.415	2.168	0.202	0.397	0.543	0.202	0.798	0.899	144	66	0.000977	0.001315
2.829	2.940	0.274	0.538	0.402	0.274	0.726	0.863	141	24	0.001083	0.001294
5.659	3.703	0.343	0.674	0.266	0.343	0.657	0.829	108	114	0.001302	0.001477
11.318	4.340	0.400	0.786	0.154	0.400	0.600	0.800	120	36	0.000874	0.000876

b) Perhitungan Permeabilitas (k)

$\Delta\sigma$ (kg/cm ²)	H (cm)	ΔH (cm)	$\Delta H/H$	$m_v = (\Delta H/H)/\Delta\sigma$ (kg/cm ²)	$C_v t_{90}$ (cm ² /detik)	$C_v t_{50}$ (cm ² /detik)	$k_{90} = C_v \cdot m_v \cdot \gamma_w$ cm/detik	$k_{50} = C_v \cdot m_v \cdot \gamma_w$ cm/detik
0.000	1.000	0.000	0.000	-				
0.354	0.914	0.087	0.095	0.268	0.001064	0.001252	0.000285	0.000335
0.707	0.850	0.150	0.176	0.249	0.001229	0.001376	0.000306	0.000343
1.415	0.798	0.202	0.253	0.179	0.000977	0.001315	0.000175	0.000235
2.829	0.726	0.274	0.377	0.133	0.001083	0.001294	0.000144	0.000172
5.659	0.657	0.343	0.522	0.092	0.001302	0.001477	0.000120	0.000136
11.318	0.600	0.400	0.666	0.059	0.000874	0.000876	0.000051	0.000052

H. Pengembangan (*Swelling*)

Waktu (menit)	Pengembangan (x0,01 mm)	Pengembangan (%)	Waktu (menit)	Pengembangan (x0,01 mm)	Pengembangan (%)
5	0,070	0,060	210	0,405	0,346
10	0,085	0,073	240	0,440	0,376
15	0,100	0,085	420	0,515	0,440
20	0,115	0,098	600	0,555	0,474
25	0,130	0,111	780	0,600	0,513
30	0,140	0,120	960	0,640	0,547
35	0,155	0,132	1140	0,675	0,577
40	0,170	0,145	1320	0,705	0,603
45	0,180	0,154	1500	0,730	0,624
50	0,190	0,162	1680	0,760	0,650
55	0,200	0,171	2040	0,790	0,675
60	0,215	0,184	2400	0,820	0,701
65	0,225	0,192	2760	0,845	0,722
70	0,235	0,201	3120	0,860	0,735
75	0,250	0,214	3480	0,890	0,761
80	0,260	0,222	3840	0,900	0,769
85	0,270	0,231	4200	0,910	0,778
90	0,280	0,239	4560	0,920	0,786
120	0,325	0,278	4920	0,930	0,795
150	0,360	0,308	5280	0,940	0,803
180	0,390	0,333	5760	0,950	0,812

I. Pematatan

Diketahui:

Berat Mold = 2580 gr

Diamater Mold = 15,5 cm

Tinggi Mold = 11,3 cm

- Kadar Air

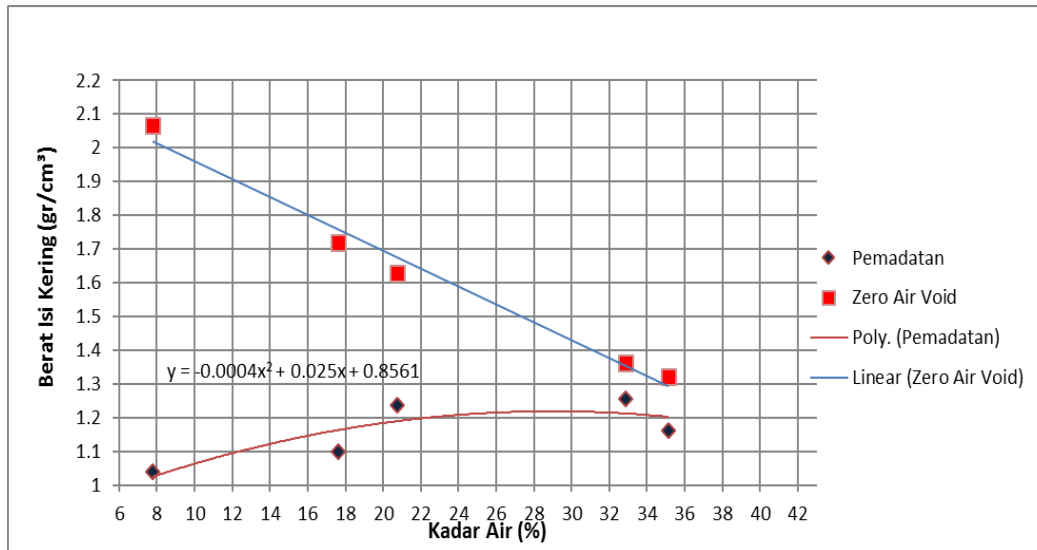
Penambahan Air	ml	200			600			1000			1400			1800		
		atas	tengah	bawah	atas	tengah	bawah	atas	tengah	bawah	atas	tengah	bawah	atas	tengah	bawah
Berat Cawan	gr	4.45	4.41	4.2	4.19	4.09	8.16	5.95	2.97	4.29	2.87	4.22	5.92	2.94	6.01	2.99
Berat Tanah Basah + Berat Cawan	gr	23.02	25.68	22.19	21.03	19.43	24.53	14.26	13.52	17.23	22.78	18.12	20.82	16.9	23.7	23.66
Berat Tanah Kering + Berat Cawan	gr	21.62	24.11	20.98	18.54	17.16	22.02	12.88	11.68	14.96	17.83	14.68	17.15	13.31	19.1	18.22
Berat Air	gr	1.40	1.57	1.21	2.49	2.27	2.51	1.38	1.84	2.27	4.95	3.44	3.67	3.59	4.60	5.44
Berat Tanah Kering	gr	17.17	19.70	16.78	14.35	13.07	13.86	6.93	8.71	10.67	14.96	10.46	11.23	10.37	13.09	15.23
Kadar Air	%	8.154	7.970	7.211	17.352	17.368	18.110	19.913	21.125	21.275	33.088	32.887	32.680	34.619	35.141	35.719
Kadar Air Rata-rata	%	7.78			17.61			20.77			32.89			35.16		

- Density

Penambahan Air	ml	200	600	1000	1400	1800
Berat Cetakan Mold (b1)	gr	6000	6000	6000	6000	6000
Berat Tanah Basah + Berat Cetakan (b2)	gr	8520	8910	9360	9760	9540
Berat Tanah Basah (b2-b1)	gr	2520	2910	3360	3760	3540
Isi Cetakan	cm ³	2252.8	2252.8	2252.8	2252.8	2252.8
Berat Isi Basah (γ)	gr/cm ³	1.119	1.292	1.491	1.669	1.571
Berat Isi Kering (γ _d)	gr/cm ³	1.038	1.098	1.235	1.256	1.163

- Zero Air Void

Penambahan Air	ml	200	600	1000	1400	1800
Kadar Air (ω)	%	7.778	17.610	20.771	32.885	35.160
GS		2.463	2.463	2.463	2.463	2.463
Berat Jenis Air (γ _w)	gr/cm ³	1.000	1.000	1.000	1.000	1.000
Berat Jenis Zero Air Void (γ _{zad})	gr/cm ³	2.067	1.718	1.629	1.361	1.320



$$y = -0.0004x^2 + 0.025x + 0.8561$$

$$dy/dx = -0.0008x + 0.025$$

$$x = 31,25\%$$

$$\text{berat isi kering maksimum} = 1,2467 \text{ gr/cm}^3$$

$$\text{kadar air optimum} = 1346,01 \text{ ml}$$

LAMPIRAN 2

Hasil Uji *California Bearing Ratio* (CBR)

- A. CBR Tanah Kadar Air OMC
- B. CBR Tanah Kadar Air 20%
- C. CBR Tanah Kadar Air 25%
- D. CBR Tanah Kadar Air 32%
- E. CBR Tanah Kadar Air 33%
- F. CBR Tanah Kadar Air 38%
- G. Korelasi Nilai CBR dengan Daya Dukung Tanah

A. CBR Tanah Kadar Air OMC

Kalibrasi alat = 11,65

Luas piston = 3,042 inch

- Tak Terendam (*Unsoaked*)

Dial Reading (mm)	Penurunan (inch)	Pembacaan Arloji	Beban (lbs)	Tegangan (psi)	Keterangan	Satuan	Nilai
0	0	0	0	0	Tanah + cetakan	gram	6020
					Berat cetakan	gram	2480
0.25	0.0125	2	23.3	7.6594	Berat tanah	gram	3540
0.5	0.025	3.5	40.775	13.4040	Isi cetakan	cm ³	2170.830357
1	0.05	4.75	55.3375	18.1912	Berat isi basah	gr/cm ³	1.631
1.5	0.075	6	69.9	22.9783	Berat isi kering	gr/cm ⁴	1.2420
2	0.1	7	81.55	26.8080			
2.5	0.125	8	93.2	30.6377			
3	0.15	8.5	99.025	32.5526			
4	0.2	10	116.5	38.2972			
5	0.25	11	128.15	42.1269			
6	0.3	11.75	136.8875	44.9992			
8	0.4	13	151.45	49.7863			
10	0.5	13.25	154.3625	50.7438			

Keterangan	Satuan	Atas	Tengah	Bawah
Berat cawan	gram	4.72	5.25	4.6
Tanah basah + cawan	gram	14.8	19.5	17.7
Tanah kering + cawan	gram	12.38	15.61	15.1
Berat air	gram	2.42	3.89	2.6
Berat tanah kering	gram	7.66	10.36	10.5
Kadar air	%	31.593	37.548	24.762
Kadar air rata-rata		31.301		

CBR	Penurunan (inch)	
	0.1	0.2
Nilai CBR	2.68	2.55

- Terendam (*Soaked*)

Dial Reading (mm)	Penurunan (inch)	Pembacaan Arloji	Beban (lbs)	Tegangan (psi)
0	0	0	0	0
0.25	0.0125	1.75	20.3875	6.7020
0.5	0.025	2	23.3	7.6594
1	0.05	2.25	26.2125	8.6169
1.5	0.075	2.5	29.125	9.5743
2	0.1	2.75	32.0375	10.5317
2.5	0.125	2.75	32.0375	10.5317
3	0.15	3	34.95	11.4892
4	0.2	3.25	37.8625	12.4466
5	0.25	3.5	40.775	13.4040
6	0.3	3.5	40.775	13.4040
8	0.4	3.75	43.6875	14.3614
10	0.5	3.75	43.6875	14.3614

CBR	Penurunan (inch)	
		0.1
Nilai CBR	1.05	0.83

Keterangan	Satuan	Nilai
Tanah + cetakan	gram	6580
Berat cetakan	gram	2650
Berat tanah	gram	3930
Isi cetakan	cm ³	2170.830357
Berat isi basah	gr/cm ³	1.810
Berat isi kering	gr/cm ⁴	1.1633

Keterangan	Satuan	Atas	Tengah	Bawah
Berat cawan	gram	4.34	6.11	2.92
Tanah basah + cawan	gram	32.13	22.68	24.69
Tanah kering + cawan	gram	22.38	16.75	16.78
Berat air	gram	9.75	5.93	7.91
Berat tanah kering	gram	18.04	10.64	13.86
Kadar air	%	54.047	55.733	57.071
Kadar air rata-rata		55.617		

B. CBR Tanah Kadar Air 20%

Kalibrasi alat = 11,65

Luas piston = 3,042 inch

- Tak Terendam (*Unsoaked*)

Dial Reading (mm)	Penurunan (inch)	Pembacaan Arloji	Beban (lbs)	Tegangan (psi)
0	0	0	0	0
0.25	0.0125	2.25	26.2125	8.6169
0.5	0.025	7.5	87.375	28.7229
1	0.05	14.5	168.925	55.5309
1.5	0.075	20.5	238.825	78.5092
2	0.1	25	291.25	95.7429
2.5	0.125	28.5	332.025	109.1469
3	0.15	31.5	366.975	120.6361
4	0.2	36.5	425.225	139.7847
5	0.25	39.5	460.175	151.2738
6	0.3	41.75	486.3875	159.8907
8	0.4	43.75	509.6875	167.5501
10	0.5	45.5	530.075	174.2521

Keterangan	Satuan	Nilai
Tanah + cetakan	gram	6090
Berat cetakan	gram	2540
Berat tanah	gram	3550
Isi cetakan	cm ³	2170.830357
Berat isi basah	gr/cm ³	1.635
Berat isi kering	gr/cm ⁴	1.3532

Keterangan	Satuan	Atas	Tengah	Bawah
Berat cawan	gram	4.18	5.16	4.25
Tanah basah + cawan	gram	13.03	16.27	14.78
Tanah kering + cawan	gram	11.55	14.31	12.95
Berat air	gram	1.48	1.96	1.83
Berat tanah kering	gram	7.37	9.15	8.7
Kadar air	%	20.081	21.421	21.034
Kadar air rata-rata		20.846		

CBR	Penurunan (inch)	
	0.1	0.2
Nilai CBR	9.57	9.32

- Terendam (*Soaked*)

Dial Reading	Penurunan	Pembacaan	Beban	Tegangan
(mm)	(inch)	Arloji	(lbs)	(psi)
0	0	0	0	0
0.25	0.0125	1	11.65	3.8297
0.5	0.025	1.25	14.5625	4.7871
1	0.05	1.25	14.5625	4.7871
1.5	0.075	1.5	17.475	5.7446
2	0.1	1.75	20.3875	6.7020
2.5	0.125	2	23.3	7.6594
3	0.15	2	23.3	7.6594
4	0.2	2.25	26.2125	8.6169
5	0.25	2.5	29.125	9.5743
6	0.3	2.5	29.125	9.5743
8	0.4	2.75	32.0375	10.5317
10	0.5	2.75	32.0375	10.5317

Keterangan	Satuan	Nilai
Tanah + cetakan	gram	6570
Berat cetakan	gram	2450
Berat tanah	gram	4120
Isi cetakan	cm ³	2170.830357
Berat isi basah	gr/cm ³	1.898
Berat isi kering	gr/cm ⁴	1.1691

Keterangan	Satuan	Atas	Tengah	Bawah
Berat cawan	gram	5.69	5.57	5.65
Tanah basah + cawan	gram	18.58	17.6	18.56
Tanah kering + cawan	gram	13.63	13.06	13.52
Berat air	gram	4.95	4.54	5.04
Berat tanah kering	gram	7.94	7.49	7.87
Kadar air	%	62.343	60.614	64.041
Kadar air rata-rata		62.332		

CBR	Penurunan (inch)	
	0.1	0.2
Nilai CBR	0.67	0.57

C. CBR Tanah Kadar Air 25%

Kalibrasi alat = 11,65

Luas piston = 3,042 inch

- Tak Terendam (*Unsoaked*)

Dial Reading (mm)	Penurunan (inch)	Pembacaan Arloji	Beban (lbs)	Tegangan (psi)
0	0	0	0	0
0.25	0.0125	6	69.9	22.9783
0.5	0.025	9.25	107.7625	35.4249
1	0.05	11.25	131.0625	43.0843
1.5	0.075	12.5	145.625	47.8715
2	0.1	13.5	157.275	51.7012
2.5	0.125	14.25	166.0125	54.5735
3	0.15	15	174.75	57.4458
4	0.2	15.75	183.4875	60.3180
5	0.25	16.5	192.225	63.1903
6	0.3	17	198.05	65.1052
8	0.4	17.5	203.875	67.0201
10	0.5	17.25	200.9625	66.0626

Keterangan	Satuan	Nilai
Tanah + cetakan	gram	6460
Berat cetakan	gram	2940
Berat tanah	gram	3520
Isi cetakan	cm ³	2170.830357
Berat isi basah	gr/cm ³	1.621
Berat isi kering	gr/cm ⁴	1.2969

Keterangan	Satuan	Atas	Tengah	Bawah
Berat cawan	gram	4.41	4.18	4.34
Tanah basah + cawan	gram	20.87	20.99	11.44
Tanah kering + cawan	gram	17.99	17.65	9.84
Berat air	gram	2.88	3.34	1.6
Berat tanah kering	gram	13.58	13.47	5.5
Kadar air	%	21.208	24.796	29.091
Kadar air rata-rata		25.031		

CBR	Penurunan (inch)	
	0.1	0.2
Nilai CBR	5.17	4.02

- Terendam (*Soaked*)

Dial Reading	Penurunan	Pembacaan	Beban	Tegangan
(mm)	(inch)	Arloji	(lbs)	(psi)
0	0	0	0	0
0.25	0.0125	1.25	14.5625	4.7871
0.5	0.025	1.75	20.3875	6.7020
1	0.05	2	23.3	7.6594
1.5	0.075	2.25	26.2125	8.6169
2	0.1	2.5	29.125	9.5743
2.5	0.125	2.5	29.125	9.5743
3	0.15	2.75	32.0375	10.5317
4	0.2	3	34.95	11.4892
5	0.25	3.25	37.8625	12.4466
6	0.3	3.25	37.8625	12.4466
8	0.4	3.5	40.775	13.4040
10	0.5	3.5	40.775	13.4040

CBR	Penurunan (inch)	
	0.1	0.2
Nilai CBR	0.96	0.77

Keterangan	Satuan	Nilai
Tanah + cetakan	gram	6570
Berat cetakan	gram	2560
Berat tanah	gram	4010
Isi cetakan	cm ³	2170.830357
Berat isi basah	gr/cm ³	1.847
Berat isi kering	gr/cm ⁴	1.1615

Keterangan	Satuan	Atas	Tengah	Bawah
Berat cawan	gram	5.56	5.66	3.16
Tanah basah + cawan	gram	26.3	19.17	19.35
Tanah kering + cawan	gram	18.37	14.12	13.57
Berat air	gram	7.93	5.05	5.78
Berat tanah kering	gram	12.81	8.46	10.41
Kadar air	%	61.905	59.693	55.524
Kadar air rata-rata		59.040		

D. CBR Tanah Kadar Air 32%

Kalibrasi alat = 11,65

Luas piston = 3,042 inch

- Tak Terendam (*Unsoaked*)

Dial Reading (mm)	Penurunan (inch)	Pembacaan Arloji	Beban (lbs)	Tegangan (psi)
0	0	0	0	0
0.25	0.0125	3	34.95	11.4892
0.5	0.025	4	46.6	15.3189
1	0.05	4.75	55.3375	18.1912
1.5	0.075	5.25	61.1625	20.1060
2	0.1	6	69.9	22.9783
2.5	0.125	6.25	72.8125	23.9357
3	0.15	6.5	75.725	24.8932
4	0.2	6.75	78.6375	25.8506
5	0.25	7.25	84.4625	27.7655
6	0.3	7.5	87.375	28.7229
8	0.4	7.75	90.2875	29.6803
10	0.5	8.25	96.1125	31.5952

Keterangan	Satuan	Nilai
Tanah + cetakan	gram	6150
Berat cetakan	gram	2600
Berat tanah	gram	3550
Isi cetakan	cm ³	2170.830357
Berat isi basah	gr/cm ³	1.635
Berat isi kering	gr/cm ⁴	1.2382

Keterangan	Satuan	Atas	Tengah	Bawah
Berat cawan	gram	3.91	5.68	2.94
Tanah basah + cawan	gram	15.4	18.76	13.26
Tanah kering + cawan	gram	12.66	15.52	10.76
Berat air	gram	2.74	3.24	2.5
Berat tanah kering	gram	8.75	9.84	7.82
Kadar air	%	31.314	32.927	31.969
Kadar air rata-rata		32.070		

CBR	Penurunan (inch)	
	0.1	0.2
Nilai CBR	2.30	1.72

- Terendam (*Soaked*)

Dial Reading (mm)	Penurunan (inch)	Pembacaan Arloji	Beban (lbs)	Tegangan (psi)
0	0	0	0	0
0.25	0.0125	1.75	20.3875	6.7020
0.5	0.025	2.25	26.2125	8.6169
1	0.05	2.5	29.125	9.5743
1.5	0.075	2.75	32.0375	10.5317
2	0.1	3	34.95	11.4892
2.5	0.125	3.25	37.8625	12.4466
3	0.15	3.5	40.775	13.4040
4	0.2	3.5	40.775	13.4040
5	0.25	3.75	43.6875	14.3614
6	0.3	4	46.6	15.3189
8	0.4	4.25	49.5125	16.2763
10	0.5	4.25	49.5125	16.2763

CBR	Penurunan (inch)	
	0.1	0.2
Nilai CBR	1.15	0.89

Keterangan	Satuan	Nilai
Tanah + cetakan	gram	5900
Berat cetakan	gram	2350
Berat tanah	gram	3550
Isi cetakan	cm ³	2170.830357
Berat isi basah	gr/cm ³	1.635
Berat isi kering	gr/cm ⁴	1.1180

Keterangan	Satuan	Atas	Tengah	Bawah
Berat cawan	gram	5.5	5.65	5.6
Tanah basah + cawan	gram	17.65	15.87	16.084
Tanah kering + cawan	gram	13.91	12.55	12.77
Berat air	gram	3.74	3.32	3.314
Berat tanah kering	gram	8.41	6.9	7.17
Kadar air	%	44.471	48.116	46.220
Kadar air rata-rata		46.269		

E. CBR Tanah Kadar Air 33%

Kalibrasi alat = 11,65

Luas piston = 3,042 inch

- Tak Terendam (*Unsoaked*)

Dial Reading (mm)	Penurunan (inch)	Pembacaan Arloji	Beban (lbs)	Tegangan (psi)
0	0	0	0	0
0.25	0.0125	4	46.6	15.3189
0.5	0.025	4.25	49.5125	16.2763
1	0.05	4.5	52.425	17.2337
1.5	0.075	4.75	55.3375	18.1912
2	0.1	4.75	55.3375	18.1912
2.5	0.125	5	58.25	19.1486
3	0.15	5	58.25	19.1486
4	0.2	5.25	61.1625	20.1060
5	0.25	5.25	61.1625	20.1060
6	0.3	5.5	64.075	21.0634
8	0.4	5.75	66.9875	22.0209
10	0.5	6	69.9	22.9783

Keterangan	Satuan	Nilai
Tanah + cetakan	gram	6050
Berat cetakan	gram	2500
Berat tanah	gram	3550
Isi cetakan	cm ³	2170.830357
Berat isi basah	gr/cm ³	1.635
Berat isi kering	gr/cm ⁴	1.2270

Keterangan	Satuan	Atas	Tengah	Bawah
Berat cawan	gram	2.87	4.07	3.12
Tanah basah + cawan	gram	17.29	19.59	18.47
Tanah kering + cawan	gram	13.72	15.69	14.63
Berat air	gram	3.57	3.9	3.84
Berat tanah kering	gram	10.85	11.62	11.51
Kadar air	%	32.903	33.563	33.362
Kadar air rata-rata		33.276		

CBR	Penurunan (inch)	
	0.1	0.2
Nilai CBR	1.82	1.34

- Terendam (*Soaked*)

Dial Reading	Penurunan	Pembacaan	Beban	Tegangan
(mm)	(inch)	Arloji	(lbs)	(psi)
0	0	0	0	0
0.25	0.0125	2.5	29.125	9.5743
0.5	0.025	3	34.95	11.4892
1	0.05	3.25	37.8625	12.4466
1.5	0.075	3.5	40.775	13.4040
2	0.1	3.5	40.775	13.4040
2.5	0.125	3.75	43.6875	14.3614
3	0.15	4	46.6	15.3189
4	0.2	4.25	49.5125	16.2763
5	0.25	4.25	49.5125	16.2763
6	0.3	4.5	52.425	17.2337
8	0.4	4.75	55.3375	18.1912
10	0.5	5	58.25	19.1486

CBR	Penurunan (inch)	
	0.1	0.2
Nilai CBR	1.34	1.09

Keterangan	Satuan	Nilai
Tanah + cetakan	gram	6390
Berat cetakan	gram	2970
Berat tanah	gram	3420
Isi cetakan	cm ³	2170.830357
Berat isi basah	gr/cm ³	1.575
Berat isi kering	gr/cm ⁴	1.1250

Keterangan	Satuan	Atas	Tengah	Bawah
Berat cawan	gram	4.24	3.05	4.27
Tanah basah + cawan	gram	16.77	18.48	20.58
Tanah kering + cawan	gram	13.2	14.04	15.93
Berat air	gram	3.57	4.44	4.65
Berat tanah kering	gram	8.96	10.99	11.66
Kadar air	%	39.844	40.400	39.880
Kadar air rata-rata		40.041		

F. CBR Tanah Kadar Air 38%

Kalibrasi alat = 11,65

Luas piston = 3,042 inch

- Tak Terendam (*Unsoaked*)

Dial Reading (mm)	Penurunan (inch)	Pembacaan Arloji	Beban (lbs)	Tegangan (psi)
0	0	0	0	0
0.25	0.0125	3.5	40.775	13.4040
0.5	0.025	3.75	43.6875	14.3614
1	0.05	4	46.6	15.3189
1.5	0.075	4.25	49.5125	16.2763
2	0.1	4.5	52.425	17.2337
2.5	0.125	4.5	52.425	17.2337
3	0.15	4.75	55.3375	18.1912
4	0.2	4.75	55.3375	18.1912
5	0.25	5	58.25	19.1486
6	0.3	5	58.25	19.1486
8	0.4	5.25	61.1625	20.1060
10	0.5	5.25	61.1625	20.1060

Keterangan	Satuan	Nilai
Tanah + cetakan	gram	6110
Berat cetakan	gram	2560
Berat tanah	gram	3550
Isi cetakan	cm ³	2170.830357
Berat isi basah	gr/cm ³	1.635
Berat isi kering	gr/cm ⁴	1.1849

Keterangan	Satuan	Atas	Tengah	Bawah
Berat cawan	gram	4.25	5.69	4.17
Tanah basah + cawan	gram	13.92	16.43	14.16
Tanah kering + cawan	gram	11.25	13.51	11.38
Berat air	gram	2.67	2.92	2.78
Berat tanah kering	gram	7	7.82	7.21
Kadar air	%	38.143	37.340	38.558
Kadar air rata-rata		38.014		

CBR	Penurunan (inch)	
	0.1	0.2
Nilai CBR	1.72	1.21

- Terendam (*Soaked*)

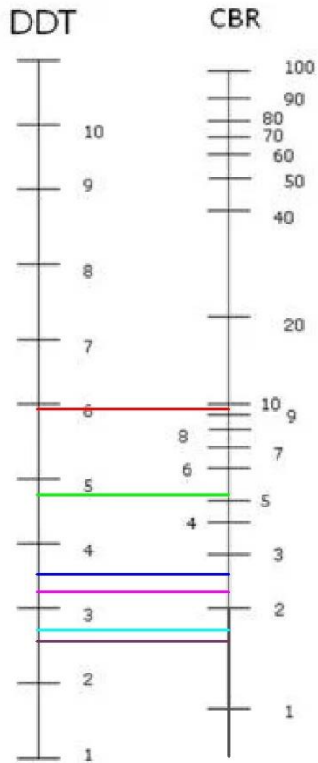
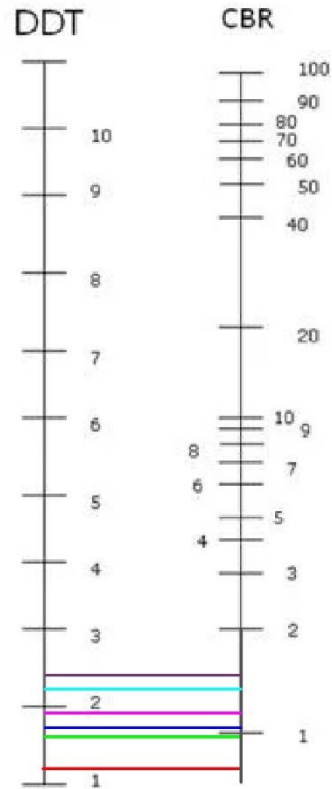
Dial Reading (mm)	Penurunan (inch)	Pembacaan Arloji	Beban (lbs)	Tegangan (psi)
0	0	0	0	0
0.25	0.0125	1.5	17.475	5.7446
0.5	0.025	2.5	29.125	9.5743
1	0.05	3.25	37.8625	12.4466
1.5	0.075	2.75	32.0375	10.5317
2	0.1	4	46.6	15.3189
2.5	0.125	4.5	52.425	17.2337
3	0.15	5	58.25	19.1486
4	0.2	5.75	66.9875	22.0209
5	0.25	6.25	72.8125	23.9357
6	0.3	6.5	75.725	24.8932
8	0.4	6.75	78.6375	25.8506
10	0.5	7	81.55	26.8080

CBR	Penurunan (inch)	
	0.1	0.2
Nilai CBR	1.53	1.47

Keterangan	Satuan	Nilai
Tanah + cetakan	gram	6350
Berat cetakan	gram	2920
Berat tanah	gram	3430
Isi cetakan	cm ³	2170.830357
Berat isi basah	gr/cm ³	1.580
Berat isi kering	gr/cm ⁴	1.1395

Keterangan	Satuan	Atas	Tengah	Bawah
Berat cawan	gram	4.94	4.6	2.87
Tanah basah + cawan	gram	25.65	20.01	16.64
Tanah kering + cawan	gram	19.94	15.59	12.87
Berat air	gram	5.71	4.42	3.77
Berat tanah kering	gram	15	10.99	10
Kadar air	%	38.067	40.218	37.700
Kadar air rata-rata		38.662		

G. Korelasi Nilai CBR dengan Daya Dukung Tanah

Unsoaked*Soaked*

No.	Variasi Kadar Air (%)	Nilai CBR <i>unsoaked</i> (%)	Nilai Daya Dukung Tanah
1	20	9,57	5,93
2	25	5,17	4,76
3	31,25	2,68	3,52
4	32	2,30	3,23
5	33	1,82	2,70
6	38	1,72	2,54

No.	Variasi Kadar Air (%)	Nilai CBR <i>soaked</i> (%)	Nilai Daya Dukung Tanah
1	20	0,67	1,21
2	25	0,96	1,61
3	31,25	1,05	1,73
4	32	1,15	1,92
5	33	1,34	2,22
6	38	1,53	2,40

LAMPIRAN 3

Hasil Uji Kuat Tekan Bebas (*Unconfined Compression Test*)

- A. Kuat Tekan Bebas Tanah Asli
- B. Kuat Tekan Bebas Tanah Kadar Air OMC
- C. Kuat Tekan Bebas Tanah Kadar Air 20%
- D. Kuat Tekan Bebas Tanah Kadar Air 25%
- E. Kuat Tekan Bebas Tanah Kadar Air 32%
- F. Kuat Tekan Bebas Tanah Kadar Air 33%

A. Kuat Tekan Bebas Tanah Asli

Sampel : *Undisturbed*

Data:

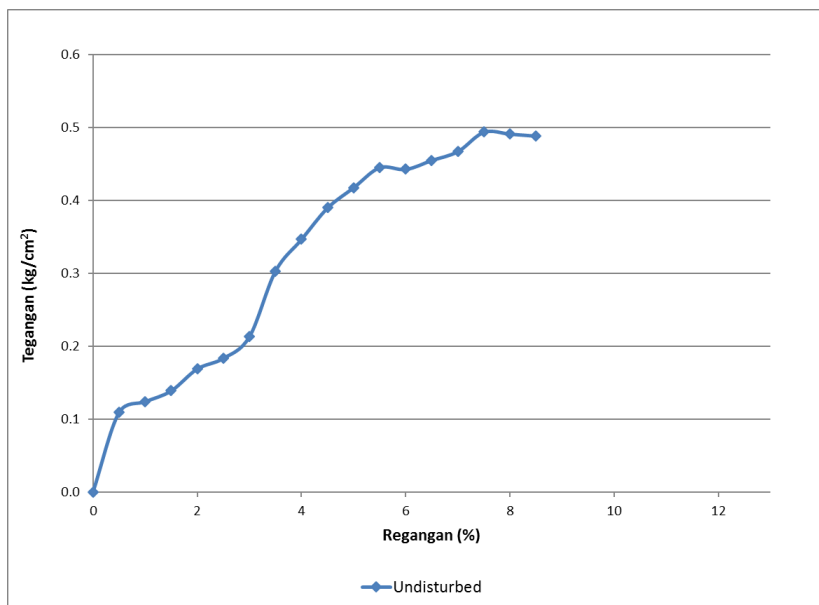
d= 5 cm

L= 10 cm

A= 19,643 cm²

Kalibrasi alat= 0,617

Pembacaan Arloji (penurunan mm)	Pemb. Arloji (tegangan mm)	Regangan ϵ (%)	Beban (kg)	Angka Koreksi	Luas Terkoreksi $A'=A_0 / (1-\epsilon)$ (cm ²)	Tegangan (kg/cm ²)
0	0	0	0	1	19.643	0
0.5	3.5	0.5	2.160	1.005	19.742	0.109
1	4	1	2.468	1.010	19.841	0.124
1.5	4.5	1.5	2.777	1.015	19.942	0.139
2	5.5	2	3.394	1.020	20.044	0.169
2.5	6	2.5	3.702	1.026	20.147	0.184
3	7	3	4.319	1.031	20.250	0.213
3.5	10	3.5	6.170	1.036	20.355	0.303
4	11.5	4	7.096	1.042	20.461	0.347
4.5	13	4.5	8.021	1.047	20.568	0.390
5	14	5	8.638	1.053	20.677	0.418
5.5	15	5.5	9.255	1.058	20.786	0.445
6	15	6	9.255	1.064	20.897	0.443
6.5	15.5	6.5	9.564	1.070	21.008	0.455
7	16	7	9.872	1.075	21.121	0.467
7.5	17	7.5	10.489	1.081	21.236	0.494
8	17	8	10.489	1.087	21.351	0.491
8.5	17	8.5	10.489	1.093	21.468	0.489



Sampel : *Remolded*

Data:

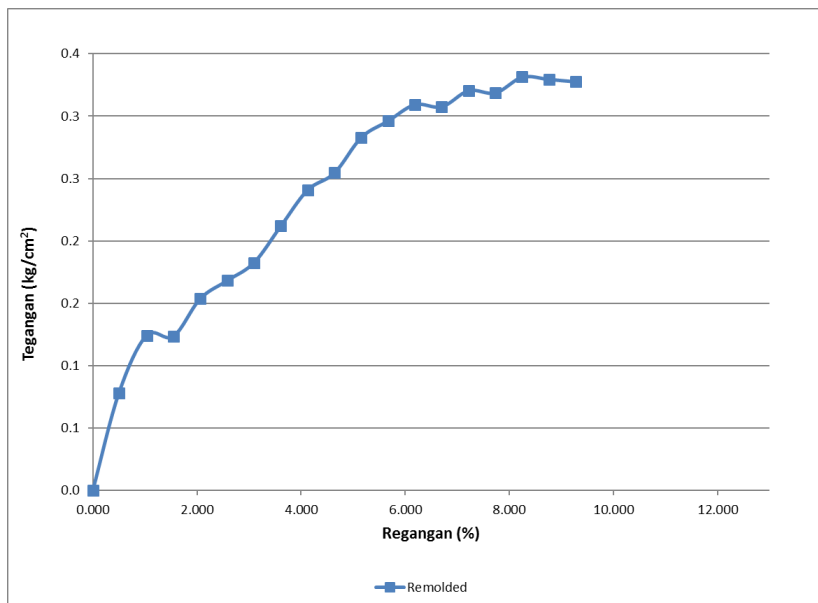
d= 5 cm

L= 10 cm

A= 19,643 cm²

Kalibrasi alat= 0,617

Pembacaan Arloji (penurunan mm)	Pemb. Arloji (tegangan mm)	Regangan ϵ (%)	Beban (kg)	Angka Koreksi	Luas Terkoreksi $A'=A_0 / (1-\epsilon)$ (cm ²)	Tegangan (kg/cm ²)
0	0	0.000	0.000	1.000	19.643	0.000
0.5	2.5	0.500	1.543	1.005	19.742	0.078
1	4	1.031	2.468	1.010	19.847	0.124
1.5	4	1.546	2.468	1.016	19.951	0.124
2	5	2.062	3.085	1.021	20.056	0.154
2.5	5.5	2.577	3.394	1.026	20.163	0.168
3	6	3.093	3.702	1.032	20.270	0.183
3.5	7	3.608	4.319	1.037	20.378	0.212
4	8	4.124	4.936	1.043	20.488	0.241
4.5	8.5	4.639	5.245	1.049	20.598	0.255
5	9.5	5.155	5.862	1.054	20.710	0.283
5.5	10	5.670	6.170	1.060	20.824	0.296
6	10.5	6.186	6.479	1.066	20.938	0.309
6.5	10.5	6.701	6.479	1.072	21.054	0.308
7	11	7.216	6.787	1.078	21.171	0.321
7.5	11	7.732	6.787	1.084	21.289	0.319
8	11.5	8.247	7.096	1.090	21.409	0.331
8.5	11.5	8.763	7.096	1.096	21.529	0.330
9	11.5	9.278	7.096	1.102	21.652	0.328



B. Kuat Tekan Bebas Tanah Kadar Air OMC

Data:

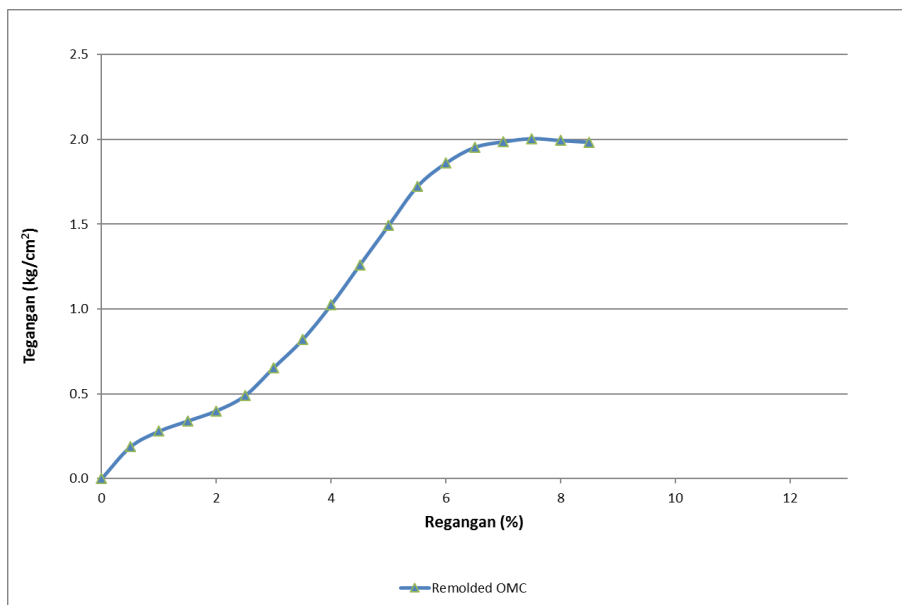
d= 5 cm

L= 10 cm

A= 19,643 cm²

Kalibrasi alat= 0,617

Regangan	Pemb. Arloji (tegangan mm)	Regangan ϵ (%)	Beban (kg)	Angka Koreksi	Luas Terkoreksi $A'=A_0 / (1-\epsilon)$ (cm ²)	Tegangan (kg/cm ²)
0	0	0	0	1	19.643	0
0.5	6	0.5	3.702	1.005	19.742	0.188
1	9	1	5.553	1.010	19.841	0.280
1.5	11	1.5	6.787	1.015	19.942	0.340
2	13	2	8.021	1.020	20.044	0.400
2.5	16	2.5	9.872	1.026	20.147	0.490
3	21.5	3	13.266	1.031	20.250	0.655
3.5	27	3.5	16.659	1.036	20.355	0.818
4	34	4	20.978	1.042	20.461	1.025
4.5	42	4.5	25.914	1.047	20.568	1.260
5	50	5	30.850	1.053	20.677	1.492
5.5	58	5.5	35.786	1.058	20.786	1.722
6	63	6	38.871	1.064	20.897	1.860
6.5	66.5	6.5	41.031	1.070	21.008	1.953
7	68	7	41.956	1.075	21.121	1.986
7.5	69	7.5	42.573	1.081	21.236	2.005
8	69	8	42.573	1.087	21.351	1.994
8.5	69	8.5	42.573	1.093	21.468	1.983



C. Kuat Tekan Bebas Tanah Kadar Air 20%

Data:

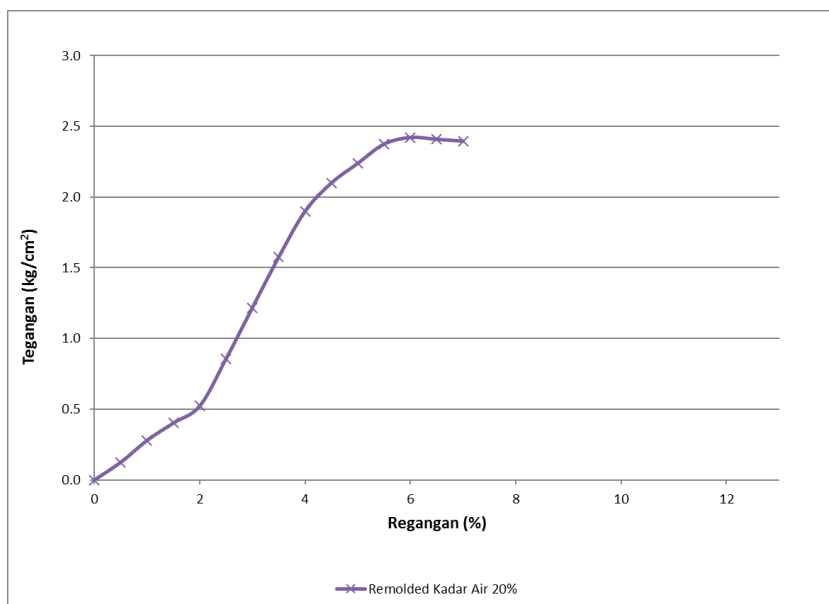
d= 5 cm

L= 10 cm

A= 19,643 cm²

Kalibrasi alat= 0,617

Regangan	Pemb. Arloji (tegangan mm)	Regangan ϵ (%)	Beban (kg)	Angka Koreksi	Luas Terkoreksi $A'=A_0 / (1-\epsilon)$ (cm ²)	Tegangan (kg/cm ²)
0	0	0	0	1	19.643	0
0.5	4	0.5	2.468	1.005	19.742	0.125
1	9	1	5.553	1.010	19.841	0.280
1.5	13	1.5	8.021	1.015	19.942	0.402
2	17	2	10.489	1.020	20.044	0.523
2.5	28	2.5	17.276	1.026	20.147	0.858
3	40	3	24.680	1.031	20.250	1.219
3.5	52	3.5	32.084	1.036	20.355	1.576
4	63	4	38.871	1.042	20.461	1.900
4.5	70	4.5	43.190	1.047	20.568	2.100
5	75	5	46.275	1.053	20.677	2.238
5.5	80	5.5	49.360	1.058	20.786	2.375
6	82	6	50.594	1.064	20.897	2.421
6.5	82	6.5	50.594	1.070	21.008	2.408
7	82	7	50.594	1.075	21.121	2.395



D. Kuat Tekan Bebas Tanah Kadar Air 25%

Data:

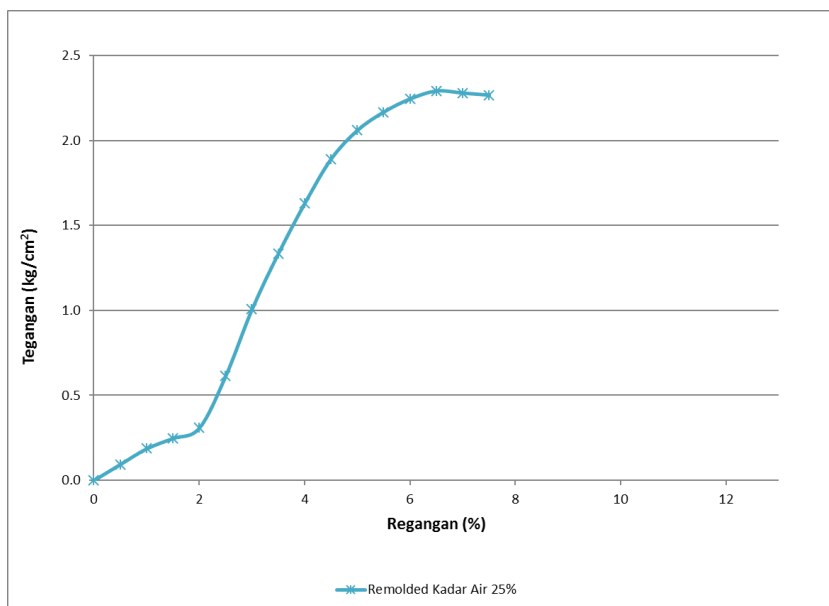
d= 5 cm

L= 10 cm

A= 19,643 cm²

Kalibrasi alat= 0,617

Regangan	Pemb. Arloji (tegangan mm)	Regangan ε (%)	Beban (kg)	Angka Koreksi	Luas Terkoreksi $A'=A_0 / (1-\varepsilon)$ (cm ²)	Tegangan (kg/cm ²)
0	0	0	0	1	19.643	0
0.5	3	0.5	1.851	1.005	19.742	0.094
1	6	1	3.702	1.010	19.841	0.187
1.5	8	1.5	4.936	1.015	19.942	0.248
2	10	2	6.170	1.020	20.044	0.308
2.5	20	2.5	12.340	1.026	20.147	0.613
3	33	3	20.361	1.031	20.250	1.005
3.5	44	3.5	27.148	1.036	20.355	1.334
4	54	4	33.318	1.042	20.461	1.628
4.5	63	4.5	38.871	1.047	20.568	1.890
5	69	5	42.573	1.053	20.677	2.059
5.5	73	5.5	45.041	1.058	20.786	2.167
6	76	6	46.892	1.064	20.897	2.244
6.5	78	6.5	48.126	1.070	21.008	2.291
7	78	7	48.126	1.075	21.121	2.279
7.5	78	7.5	48.126	1.081	21.236	2.266



E. Kuat Tekan Bebas Tanah Kadar Air 32%

Data:

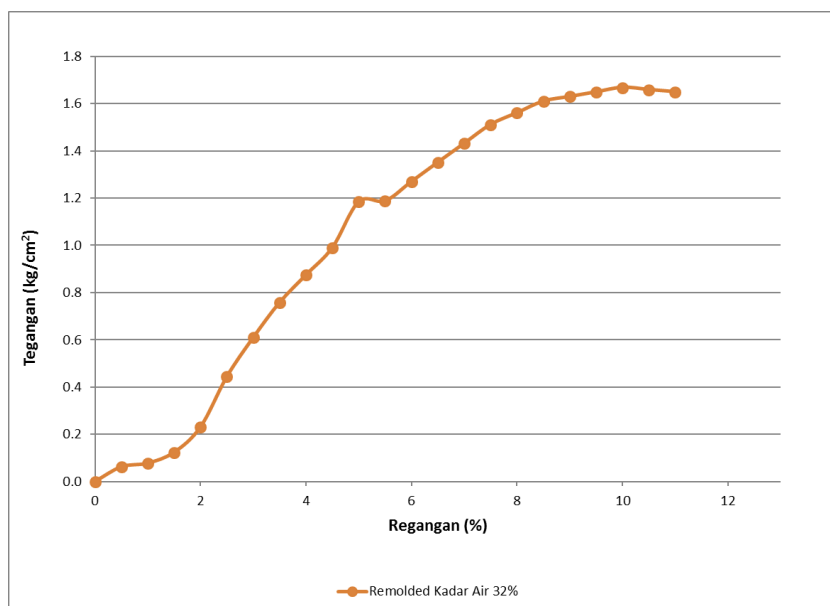
d= 5 cm

L= 10 cm

A= 19,643 cm²

Kalibrasi alat= 0,617

Regangan	Pemb. Arloji (tegangan mm)	Regangan ϵ (%)	Beban (kg)	Angka Koreksi	Luas Terkoreksi $A'=A_0 / (1-\epsilon)$ (cm ²)	Tegangan (kg/cm ²)
0	0	0	0	1	19.643	0
0.5	2	0.5	1.234	1.005	19.742	0.063
1	2.5	1	1.543	1.010	19.841	0.078
1.5	4	1.5	2.468	1.015	19.942	0.124
2	7.5	2	4.628	1.020	20.044	0.231
2.5	14.5	2.5	8.947	1.026	20.147	0.444
3	20	3	12.340	1.031	20.250	0.609
3.5	25	3.5	15.425	1.036	20.355	0.758
4	29	4	17.893	1.042	20.461	0.874
4.5	33	4.5	20.361	1.047	20.568	0.990
5	37	5	22.829	1.053	20.677	1.184
5.5	40	5.5	24.680	1.058	20.786	1.187
6	43	6	26.531	1.064	20.897	1.270
6.5	46	6.5	28.382	1.070	21.008	1.351
7	49	7	30.233	1.075	21.121	1.431
7.5	52	7.5	32.084	1.081	21.236	1.511
8	54	8	33.318	1.087	21.351	1.560
8.5	56	8.5	34.552	1.093	21.468	1.609
9	57	9	35.169	1.099	21.586	1.629
9.5	58	9.5	35.786	1.105	21.705	1.649
10	59	10	36.403	1.111	21.825	1.668
10.5	59	10.5	36.403	1.117	21.947	1.659
11	59	11	36.403	1.124	22.071	1.649



F. Kuat Tekan Bebas Tanah Kadar Air 33%

Data:

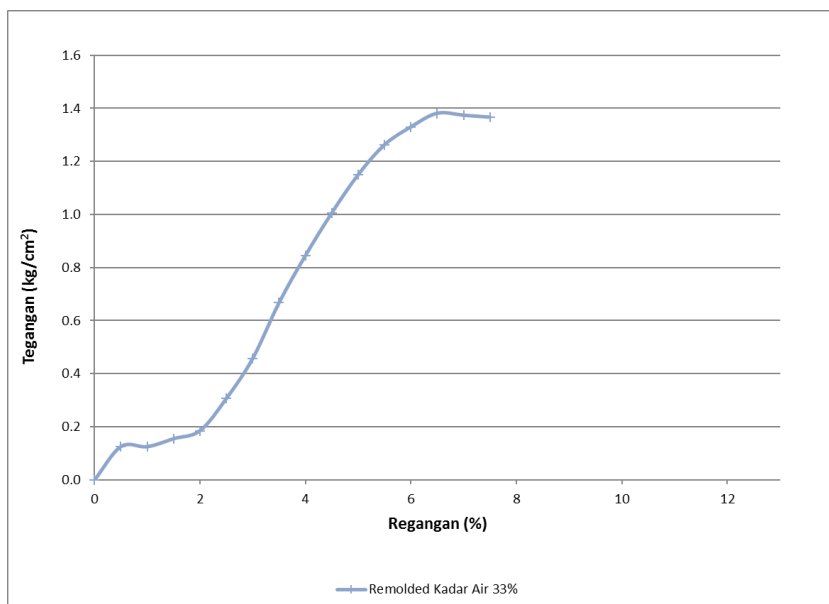
d= 5 cm

L= 10 cm

A= 19,643 cm²

Kalibrasi alat= 0,617

Regangan	Pemb. Arloji (tegangan mm)	Regangan ε (%)	Beban (kg)	Angka Koreksi	Luas Terkoreksi $A'=A_0 / (1-\varepsilon)$ (cm ²)	Tegangan (kg/cm ²)
0	0	0	0	1	19.643	0
0.5	4	0.5	2.468	1.005	19.742	0.125
1	4	1	2.468	1.010	19.841	0.124
1.5	5	1.5	3.085	1.015	19.942	0.155
2	6	2	3.702	1.020	20.044	0.185
2.5	10	2.5	6.170	1.026	20.147	0.306
3	15	3	9.255	1.031	20.250	0.457
3.5	22	3.5	13.574	1.036	20.355	0.667
4	28	4	17.276	1.042	20.461	0.844
4.5	33.5	4.5	20.670	1.047	20.568	1.005
5	38.5	5	23.755	1.053	20.677	1.149
5.5	42.5	5.5	26.223	1.058	20.786	1.262
6	45	6	27.765	1.064	20.897	1.329
6.5	47	6.5	28.999	1.070	21.008	1.380
7	47	7	28.999	1.075	21.121	1.373
7.5	47	7.5	28.999	1.081	21.236	1.366



LAMPIRAN 4

Hasil Uji Triaksial (*Triaxial Test*)

- A. Triaksial Tanah Asli
- B. Triaksial Tanah Kadar Air OMC
- C. Triaksial Tanah Kadar Air 20%
- D. Triaksial Tanah Kadar Air 25%
- E. Triaksial Tanah Kadar Air 32%
- F. Triaksial Tanah Kadar Air 33%
- G. Direct Shear Kadar Air 38%

A. Triaksial Tanah Asli

Data:

d= 5 cm

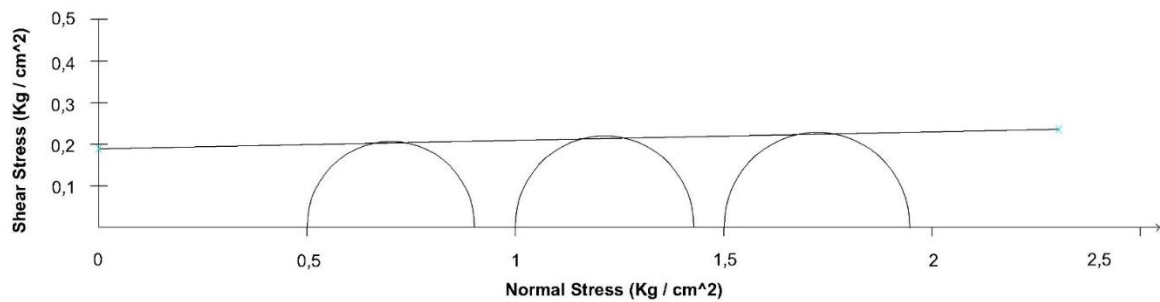
t= 10 cm

Kalibrasi alat = 1,49

t	Δh x 0,001	ϵ	1 - ϵ	Luas Mula-mula Ao	Luas Terkoreksi A'	Proving Ring	Beban P	P/A'= $\sigma_1 - \sigma_3$	σ_3	σ_1
	mm	%		cm ²	cm ²		kg	kg/cm ²	kg/cm ²	kg/cm ²
0	0	0.000	1.000	19.6250	19.6250	0	0	0	0.5	0
50	0.05	0.500	0.500	19.6250	39.2500	0.1	0.145	0.00739	0.5	0.50739
100	0.1	1.000	0.990	19.6250	19.8232	0.25	0.3625	0.009	0.5	0.509
150	0.15	1.500	0.985	19.6250	19.9239	0.25	0.3625	0.018	0.5	0.518
200	0.2	2.000	0.980	19.6250	20.0255	0.5	0.725	0.036	0.5	0.536
250	0.25	2.500	0.975	19.6250	20.1282	0.5	0.725	0.036	0.5	0.536
300	0.3	3.000	0.970	19.6250	20.2320	0.75	1.0875	0.054	0.5	0.554
350	0.35	3.500	0.965	19.6250	20.3368	1.25	1.8125	0.090	0.5	0.590
400	0.4	4.000	0.960	19.6250	20.4427	1.75	2.5375	0.125	0.5	0.625
450	0.45	4.500	0.955	19.6250	20.5497	2.5	3.625	0.177	0.5	0.677
500	0.5	5.000	0.950	19.6250	20.6579	3	4.35	0.212	0.5	0.712
550	0.55	5.500	0.945	19.6250	20.7672	3.5	5.075	0.246	0.5	0.746
600	0.6	6.000	0.940	19.6250	20.8777	4	5.8	0.279	0.5	0.779
650	0.65	6.500	0.935	19.6250	20.9893	4.5	6.525	0.313	0.5	0.813
700	0.7	7.000	0.930	19.6250	21.1022	5	7.25	0.345	0.5	0.845
750	0.75	7.500	0.925	19.6250	21.2162	5.25	7.6125	0.361	0.5	0.861
800	0.8	8.000	0.920	19.6250	21.3315	5.75	8.3375	0.393	0.5	0.893
850	0.85	8.500	0.915	19.6250	21.4481	6	8.7	0.408	0.5	0.908
900	0.9	9.000	0.910	19.6250	21.5659	6	8.7	0.406	0.5	0.906
950	0.95	9.500	0.905	19.6250	21.6851	6	8.7	0.403	0.5	0.903

t	Δh x 0,001	ϵ	1 - ϵ	Luas Mula-mula Ao	Luas Terkoreksi A'	Proving Ring	Beban P	P/A'= $\sigma_1 - \sigma_3$	σ_3	σ_1
	mm	%		cm ²	cm ²		kg	kg/cm ²	kg/cm ²	kg/cm ²
0	0	0	1.0000	19.625	19.6250	0.00	0	0	0	0
50	0.05	0.5000	0.9950	19.625	19.7236	1.00	1.45	0.0735	1	1.0735
100	0.1	1.0000	0.9900	19.625	19.8232	1.00	1.45	0.0731	1	1.0731
150	0.15	1.5000	0.9850	19.625	19.9239	1.25	1.81	0.0910	1	1.0910
200	0.2	2.0000	0.9800	19.625	20.0255	1.25	1.81	0.0905	1	1.0905
250	0.25	2.5000	0.9750	19.625	20.1282	1.50	2.18	0.1081	1	1.1081
300	0.3	3.0000	0.9700	19.625	20.2320	1.50	2.18	0.1075	1	1.1075
350	0.35	3.5000	0.9650	19.625	20.3368	1.50	2.18	0.1069	1	1.1069
400	0.4	4.0000	0.9600	19.625	20.4427	1.75	2.54	0.1241	1	1.1241
450	0.45	4.5000	0.9550	19.625	20.5497	1.75	2.54	0.1235	1	1.1235
500	0.5	5.0000	0.9500	19.625	20.6579	2.00	2.90	0.1404	1	1.1404
550	0.55	5.5000	0.9450	19.625	20.7672	2.00	2.90	0.1396	1	1.1396
600	0.6	6.0000	0.9400	19.625	20.8777	2.50	3.63	0.1736	1	1.1736
650	0.65	6.5000	0.9350	19.625	20.9893	3.00	4.35	0.2072	1	1.2072
700	0.7	7.0000	0.9300	19.625	21.1022	3.25	4.71	0.2233	1	1.2233
750	0.75	7.5000	0.9250	19.625	21.2162	3.75	5.44	0.2563	1	1.2563
800	0.8	8.0000	0.9200	19.625	21.3315	3.75	5.44	0.2549	1	1.2549
850	0.85	8.5000	0.9150	19.625	21.4481	4.50	6.53	0.3042	1	1.3042
900	0.9	9.0000	0.9100	19.625	21.5659	4.75	6.89	0.3194	1	1.3194
950	0.95	9.5000	0.9050	19.625	21.6851	5.25	7.61	0.3510	1	1.3510
1000	1	10.0000	0.9000	19.625	21.8056	5.50	7.98	0.3657	1	1.3657
1050	1.05	10.5000	0.8950	19.625	21.9274	5.75	8.34	0.3802	1	1.3802
1100	1.1	11.0000	0.8900	19.625	22.0506	6.00	8.70	0.3945	1	1.3945
1150	1.15	11.5000	0.8850	19.625	22.1751	6.00	8.70	0.3923	1	1.3923
1200	1.2	12.0000	0.8800	19.625	22.3011	6.25	9.06	0.4064	1	1.4064
1250	1.25	12.5000	0.8750	19.625	22.4286	6.25	9.06	0.4041	1	1.4041
1300	1.3	13.0000	0.8700	19.625	22.5575	6.50	9.43	0.4178	1	1.4178
1350	1.35	13.5000	0.8650	19.625	22.6879	6.50	9.43	0.4154	1	1.4154
1400	1.4	14.0000	0.8600	19.625	22.8198	6.75	9.7875	0.4289	1	1.4289

t	Δh x 0,001	ϵ	1 - ϵ	Luas Mula-mula A ₀	Luas Terkoreksi A'	Proving Ring	Beban P	P/A'= $\sigma_1 - \sigma_3$	σ_3	σ_1
	mm	%		cm ²	cm ²		kg	kg/cm ²	kg/cm ²	kg/cm ²
0	0	0	1.0000	19.625	19.6250	0.00	0	0	0	0
50	0.05	0.5000	0.9950	19.625	19.7236	3.50	5.08	0.2573	1.5	1.7573
100	0.1	1.0000	0.9900	19.625	19.8232	4.00	5.80	0.2926	1.5	1.7926
150	0.15	1.5000	0.9850	19.625	19.9239	4.20	6.09	0.3057	1.5	1.8057
200	0.2	2.0000	0.9800	19.625	20.0255	4.50	6.53	0.3258	1.5	1.8258
250	0.25	2.5000	0.9750	19.625	20.1282	4.50	6.53	0.3242	1.5	1.8242
300	0.3	3.0000	0.9700	19.625	20.2320	4.75	6.89	0.3404	1.5	1.8404
350	0.35	3.5000	0.9650	19.625	20.3368	5.00	7.25	0.3565	1.5	1.8565
400	0.4	4.0000	0.9600	19.625	20.4427	5.00	7.25	0.3546	1.5	1.8546
450	0.45	4.5000	0.9550	19.625	20.5497	5.00	7.25	0.3528	1.5	1.8528
500	0.5	5.0000	0.9500	19.625	20.6579	5.00	7.25	0.3510	1.5	1.8510
550	0.55	5.5000	0.9450	19.625	20.7672	5.00	7.25	0.3491	1.5	1.8491
600	0.6	6.0000	0.9400	19.625	20.8777	5.25	7.61	0.3646	1.5	1.8646
650	0.65	6.5000	0.9350	19.625	20.9893	5.50	7.98	0.3800	1.5	1.8800
700	0.7	7.0000	0.9300	19.625	21.1022	5.75	8.34	0.3951	1.5	1.8951
750	0.75	7.5000	0.9250	19.625	21.2162	5.75	8.34	0.3930	1.5	1.8930
800	0.8	8.0000	0.9200	19.625	21.3315	6.00	8.70	0.4078	1.5	1.9078
850	0.85	8.5000	0.9150	19.625	21.4481	6.25	9.06	0.4225	1.5	1.9225
900	0.9	9.0000	0.9100	19.625	21.5659	6.50	9.43	0.4370	1.5	1.9370
950	0.95	9.5000	0.9050	19.625	21.6851	6.75	9.79	0.4513	1.5	1.9513
1000	1	10.0000	0.9000	19.625	21.8056	6.75	9.79	0.4489	1.5	1.9489
1050	1.05	10.5000	0.8950	19.625	21.9274	6.75	9.79	0.4464	1.5	1.9464



Dari hasil pengujian didapatkan nilai:

$$\Phi = 1.21973$$

$$C = 0.18876 \text{ kg/cm}^2$$

B. Triaksial Tanah Kadar Air OMC

Data:

d= 5 cm

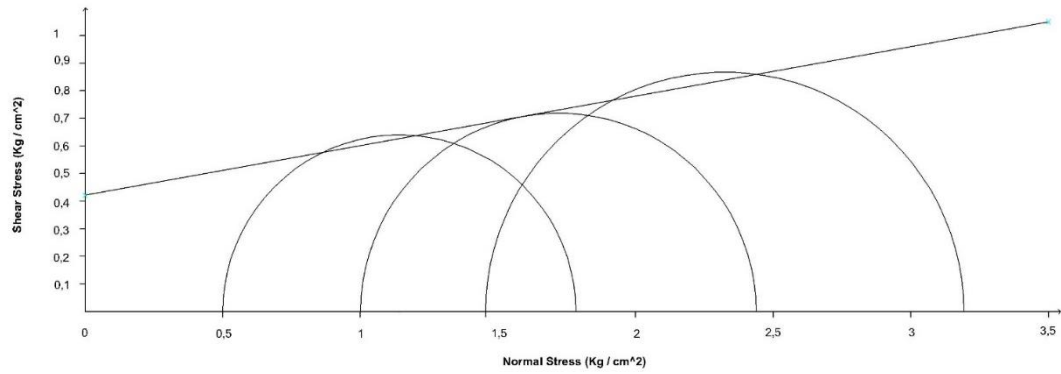
t= 10 cm

Kalibrasi alat = 1,49

t	Δh x 0,001	ϵ	1 - ϵ	Luas Mula-mula A _o	Luas Terkoreksi A'	Proving Ring	Beban P	P/A'= $\sigma_1 - \sigma_3$	σ_3	σ_1
	mm	%		cm ²	cm ²		kg	kg/cm ²	kg/cm ²	kg/cm ²
0	0	0.000	1.000	19.6250	19.6250	0	0	0	0.5	0
50	0.05	0.500	0.995	19.6250	19.7236	4	5.8	0.29554	0.5	0.79554
100	0.1	1.000	0.990	19.6250	19.8232	6	8.7	0.441	0.5	0.941
150	0.15	1.500	0.985	19.6250	19.9239	9	13.05	0.658	0.5	1.158
200	0.2	2.000	0.980	19.6250	20.0255	12	17.4	0.873	0.5	1.373
250	0.25	2.500	0.975	19.6250	20.1282	14	20.3	1.014	0.5	1.514
300	0.3	3.000	0.970	19.6250	20.2320	16	23.2	1.153	0.5	1.653
350	0.35	3.500	0.965	19.6250	20.3368	17	24.65	1.218	0.5	1.718
400	0.4	4.000	0.960	19.6250	20.4427	18	26.1	1.283	0.5	1.783
450	0.45	4.500	0.955	19.6250	20.5497	18	26.1	1.277	0.5	1.777

t	Δh x 0,001	ϵ	1 - ϵ	Luas Mula-mula A _o	Luas Terkoreksi A'	Proving Ring	Beban P	P/A'= $\sigma_1 - \sigma_3$	σ_3	σ_1
	mm	%		cm ²	cm ²		kg	kg/cm ²	kg/cm ²	kg/cm ²
0	0	0	1.0000	19.625	19.6250	0.00	0	0	0	0
50	0.05	0.5000	0.9950	19.625	19.7236	4.50	6.53	0.3308	1	1.3308
100	0.1	1.0000	0.9900	19.625	19.8232	7.00	10.15	0.5120	1	1.5120
150	0.15	1.5000	0.9850	19.625	19.9239	11.00	15.95	0.8005	1	1.8005
200	0.2	2.0000	0.9800	19.625	20.0255	13.50	19.58	0.9775	1	1.9775
250	0.25	2.5000	0.9750	19.625	20.1282	15.50	22.48	1.1166	1	2.1166
300	0.3	3.0000	0.9700	19.625	20.2320	17.25	25.01	1.2363	1	2.2363
350	0.35	3.5000	0.9650	19.625	20.3368	18.00	26.10	1.2834	1	2.2834
400	0.4	4.0000	0.9600	19.625	20.4427	19.00	27.55	1.3477	1	2.3477
450	0.45	4.5000	0.9550	19.625	20.5497	20.00	29.00	1.4112	1	2.4112
500	0.5	5.0000	0.9500	19.625	20.6579	20.50	29.73	1.4389	1	2.4389
550	0.55	5.5000	0.9450	19.625	20.7672	20.50	29.73	1.4313	1	2.4313

t	Δh x 0,001	ϵ	1 - ϵ	Luas Mula-mula A _o	Luas Terkoreksi A'	Proving Ring	Beban P	P/A'= $\sigma_1 - \sigma_3$	σ_3	σ_1
	mm	%		cm ²	cm ²		kg	kg/cm ²	kg/cm ²	kg/cm ²
0	0	0	1.0000	19.625	19.6250	0.00	0	0	0	0
50	0.05	0.5000	0.9950	19.625	19.7236	4.00	5.80	0.2941	1.5	1.7941
100	0.1	1.0000	0.9900	19.625	19.8232	8.00	11.60	0.5852	1.5	2.0852
150	0.15	1.5000	0.9850	19.625	19.9239	12.00	17.40	0.8733	1.5	2.3733
200	0.2	2.0000	0.9800	19.625	20.0255	16.50	23.93	1.1947	1.5	2.6947
250	0.25	2.5000	0.9750	19.625	20.1282	21.00	30.45	1.5128	1.5	3.0128
300	0.3	3.0000	0.9700	19.625	20.2320	24.00	34.80	1.7201	1.5	3.2201
350	0.35	3.5000	0.9650	19.625	20.3368	24.25	35.16	1.7290	1.5	3.2290
400	0.4	4.0000	0.9600	19.625	20.4427	24.50	35.53	1.7378	1.5	3.2378
450	0.45	4.5000	0.9550	19.625	20.5497	24.50	35.53	1.7287	1.5	3.2287



Dari hasil pengujian didapatkan nilai:

$$\begin{aligned}\Phi &= 10.569 \\ C &= 0.42105 \text{ kg/cm}^2\end{aligned}$$

A. Triaksial Tanah Kadar Air 20%

Data:

d= 5 cm

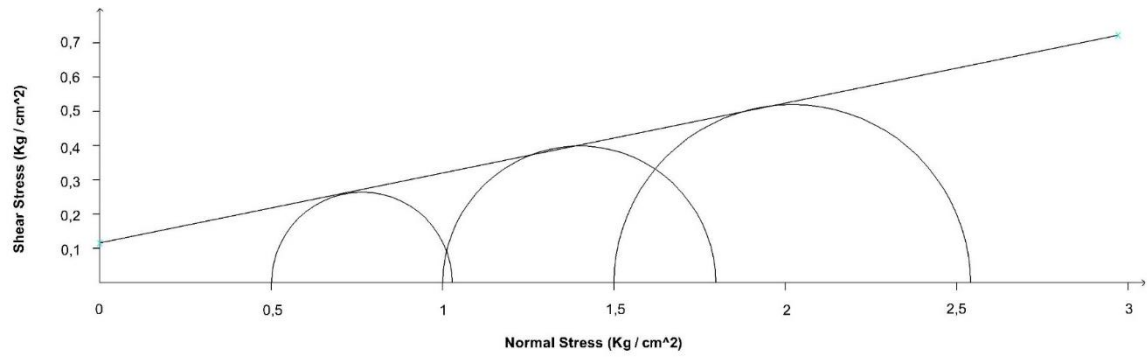
t= 10 cm

Kalibrasi alat = 1,49

t	Δh x 0,001	ε	1 - ε	Luas Mula-mula Ao	Luas Terkoreksi A'	Proving Ring	Beban P	P/A'= $\sigma_1 - \sigma_3$	σ_3	σ_1
	mm	%		cm ²	cm ²		kg	kg/cm ²	kg/cm ²	kg/cm ²
0	0	0.000	1.000	19.6250	19.6250	0	0	0	0.5	0
50	0.05	0.500	0.995	19.6250	19.7236	2.5	3.625	0.18471	0.5	0.68471
100	0.1	1.000	0.990	19.6250	19.8232	3.75	5.4375	0.276	0.5	0.776
150	0.15	1.500	0.985	19.6250	19.9239	4.5	6.525	0.329	0.5	0.829
200	0.2	2.000	0.980	19.6250	20.0255	5.5	7.975	0.400	0.5	0.900
250	0.25	2.500	0.975	19.6250	20.1282	6	8.7	0.434	0.5	0.934
300	0.3	3.000	0.970	19.6250	20.2320	6.5	9.425	0.468	0.5	0.968
350	0.35	3.500	0.965	19.6250	20.3368	6.75	9.7875	0.484	0.5	0.984
400	0.4	4.000	0.960	19.6250	20.4427	7	10.15	0.499	0.5	0.999
450	0.45	4.500	0.955	19.6250	20.5497	7.25	10.5125	0.514	0.5	1.014
500	0.5	5.000	0.950	19.6250	20.6579	7.5	10.875	0.529	0.5	1.029
550	0.55	5.500	0.945	19.6250	20.7672	7.5	10.875	0.526	0.5	1.026

t	Δh x 0,001	ε	1 - ε	Luas Mula-mula Ao	Luas Terkoreksi A'	Proving Ring	Beban P	P/A'= $\sigma_1 - \sigma_3$	σ_3	σ_1
	mm	%		cm ²	cm ²		kg	kg/cm ²	kg/cm ²	kg/cm ²
0	0	0	1.0000	19.625	19.6250	0.00	0	0	0	0
50	0.05	0.5000	0.9950	19.625	19.7236	3.00	4.35	0.2205	1	1.2205
100	0.1	1.0000	0.9900	19.625	19.8232	4.75	6.89	0.3474	1	1.3474
150	0.15	1.5000	0.9850	19.625	19.9239	6.25	9.06	0.4549	1	1.4549
200	0.2	2.0000	0.9800	19.625	20.0255	8.50	12.33	0.6155	1	1.6155
250	0.25	2.5000	0.9750	19.625	20.1282	9.50	13.78	0.6844	1	1.6844
300	0.3	3.0000	0.9700	19.625	20.2320	10.00	14.50	0.7167	1	1.7167
350	0.35	3.5000	0.9650	19.625	20.3368	10.25	14.86	0.7308	1	1.7308
400	0.4	4.0000	0.9600	19.625	20.4427	10.25	14.86	0.7270	1	1.7270
450	0.45	4.5000	0.9550	19.625	20.5497	10.75	15.59	0.7585	1	1.7585
500	0.5	5.0000	0.9500	19.625	20.6579	11.00	15.95	0.7721	1	1.7721
550	0.55	5.5000	0.9450	19.625	20.7672	11.25	16.31	0.7855	1	1.7855
600	0.6	6.0000	0.9400	19.625	20.8777	11.50	16.68	0.7987	1	1.7987
650	0.65	6.5000	0.9350	19.625	20.9893	11.50	16.68	0.7945	1	1.7945

t	Δh x 0,001	ε	1 - ε	Luas Mula-mula Ao	Luas Terkoreksi A'	Proving Ring	Beban P	P/A'= $\sigma_1 - \sigma_3$	σ_3	σ_1
	mm	%		cm ²	cm ²		kg	kg/cm ²	kg/cm ²	kg/cm ²
0	0	0	1.0000	19.625	19.6250	0.00	0	0	0	0
50	0.05	0.5000	0.9950	19.625	19.7236	5.00	7.25	0.3676	1.5	1.8676
100	0.1	1.0000	0.9900	19.625	19.8232	6.50	9.43	0.4755	1.5	1.9755
150	0.15	1.5000	0.9850	19.625	19.9239	7.50	10.88	0.5458	1.5	2.0458
200	0.2	2.0000	0.9800	19.625	20.0255	8.50	12.33	0.6155	1.5	2.1155
250	0.25	2.5000	0.9750	19.625	20.1282	9.25	13.41	0.6664	1.5	2.1664
300	0.3	3.0000	0.9700	19.625	20.2320	10.00	14.50	0.7167	1.5	2.2167
350	0.35	3.5000	0.9650	19.625	20.3368	10.50	15.23	0.7486	1.5	2.2486
400	0.4	4.0000	0.9600	19.625	20.4427	11.00	15.95	0.7802	1.5	2.2802
450	0.45	4.5000	0.9550	19.625	20.5497	12.50	18.13	0.8820	1.5	2.3820
500	0.5	5.0000	0.9500	19.625	20.6579	12.75	18.49	0.8949	1.5	2.3949
550	0.55	5.5000	0.9450	19.625	20.7672	13.25	19.21	0.9251	1.5	2.4251
600	0.6	6.0000	0.9400	19.625	20.8777	13.50	19.58	0.9376	1.5	2.4376
650	0.65	6.5000	0.9350	19.625	20.9893	13.75	19.94	0.9499	1.5	2.4499
700	0.7	7.0000	0.9300	19.625	21.1022	14.00	20.30	0.9620	1.5	2.4620
750	0.75	7.5000	0.9250	19.625	21.2162	14.00	20.30	0.9568	1.5	2.4568
800	0.8	8.0000	0.9200	19.625	21.3315	14.25	20.66	0.9686	1.5	2.4686
850	0.85	8.5000	0.9150	19.625	21.4481	14.25	20.66	0.9634	1.5	2.4634
900	0.9	9.0000	0.9100	19.625	21.5659	14.50	21.03	0.9749	1.5	2.4749
950	0.95	9.5000	0.9050	19.625	21.6851	14.75	21.39	0.9863	1.5	2.4863
1000	1	10.0000	0.9000	19.625	21.8056	15.00	21.75	0.9975	1.5	2.4975
1050	1.05	10.5000	0.8950	19.625	21.9274	15.25	22.11	1.0084	1.5	2.5084
1100	1.1	11.0000	0.8900	19.625	22.0506	15.25	22.11	1.0028	1.5	2.5028
1150	1.15	11.5000	0.8850	19.625	22.1751	15.47	22.43	1.0116	1.5	2.5116
1200	1.2	12.0000	0.8800	19.625	22.3011	16.00	23.20	1.0403	1.5	2.5403
1250	1.25	12.5000	0.8750	19.625	22.4286	16.00	23.2	1.0344	1.5	2.5344



Dari hasil pengujian didapatkan nilai:

$$\begin{aligned}\Phi &= 11.7404 \\ C &= 0.11517 \text{ kg/cm}^2\end{aligned}$$

B. Triaksial Tanah Kadar Air 25%

Data:

d= 5 cm

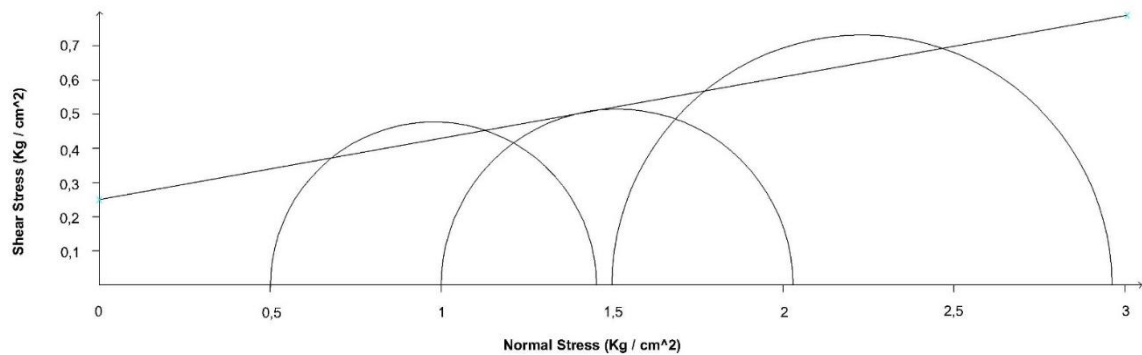
t= 10 cm

Kalibrasi alat = 1,49

t	Δh x 0,001	ϵ	1 - ϵ	Luas Mula-mula Ao	Luas Terkoreksi A'	Proving Ring	Beban P	P/A'= $\sigma_1 - \sigma_3$	σ_3	σ_1
	mm	%		cm ²	cm ²		kg	kg/cm ²	kg/cm ²	kg/cm ²
0	0	0.000	1.000	19.6250	19.6250	0	0	0	0.5	0
50	0.05	0.500	0.995	19.6250	19.7236	2.75	3.9875	0.20318	0.5	0.70318
100	0.1	1.000	0.990	19.6250	19.8232	5.25	7.6125	0.386	0.5	0.886
150	0.15	1.500	0.985	19.6250	19.9239	5.75	8.3375	0.421	0.5	0.921
200	0.2	2.000	0.980	19.6250	20.0255	8	11.6	0.582	0.5	1.082
250	0.25	2.500	0.975	19.6250	20.1282	9.5	13.775	0.688	0.5	1.188
300	0.3	3.000	0.970	19.6250	20.2320	10.5	15.225	0.756	0.5	1.256
350	0.35	3.500	0.965	19.6250	20.3368	11.25	16.3125	0.806	0.5	1.306
400	0.4	4.000	0.960	19.6250	20.4427	11.75	17.0375	0.838	0.5	1.338
450	0.45	4.500	0.955	19.6250	20.5497	12.25	17.7625	0.869	0.5	1.369
500	0.5	5.000	0.950	19.6250	20.6579	12.75	18.4875	0.900	0.5	1.400
550	0.55	5.500	0.945	19.6250	20.7672	13.25	19.2125	0.930	0.5	1.430
600	0.6	6.000	0.940	19.6250	20.8777	13.5	19.575	0.943	0.5	1.443
650	0.65	6.500	0.935	19.6250	20.9893	13.75	19.9375	0.955	0.5	1.455
700	0.7	7.000	0.930	19.6250	21.1022	13.75	19.9375	0.950	0.5	1.450
750	0.75	7.500	0.925	19.6250	21.2162	13.75	19.9375	0.945	0.5	1.445

t	Δh x 0,001	ϵ	1 - ϵ	Luas Mula-mula Ao	Luas Terkoreksi A'	Proving Ring	Beban P	P/A'= $\sigma_1 - \sigma_3$	σ_3	σ_1
	mm	%		cm ²	cm ²		kg	kg/cm ²	kg/cm ²	kg/cm ²
0	0	0	1.0000	19.625	19.6250	0.00	0	0	0	0
50	0.05	0.5000	0.9950	19.625	19.7236	4.00	5.80	0.2941	1	1.2941
100	0.1	1.0000	0.9900	19.625	19.8232	6.50	9.43	0.4755	1	1.4755
150	0.15	1.5000	0.9850	19.625	19.9239	8.50	12.33	0.6186	1	1.6186
200	0.2	2.0000	0.9800	19.625	20.0255	9.75	14.14	0.7060	1	1.7060
250	0.25	2.5000	0.9750	19.625	20.1282	10.75	15.59	0.7744	1	1.7744
300	0.3	3.0000	0.9700	19.625	20.2320	12.25	17.76	0.8779	1	1.8779
350	0.35	3.5000	0.9650	19.625	20.3368	13.25	19.21	0.9447	1	1.9447
400	0.4	4.0000	0.9600	19.625	20.4427	13.75	19.94	0.9753	1	1.9753
450	0.45	4.5000	0.9550	19.625	20.5497	14.25	20.66	1.0055	1	2.0055
500	0.5	5.0000	0.9500	19.625	20.6579	14.50	21.03	1.0178	1	2.0178
550	0.55	5.5000	0.9450	19.625	20.7672	14.75	21.39	1.0299	1	2.0299
600	0.6	6.0000	0.9400	19.625	20.8777	14.75	21.39	1.0244	1	2.0244
650	0.65	6.5000	0.9350	19.625	20.9893	14.75	21.39	1.0190	1	2.0190

t	Δh x 0,001	ε	1 - ε	Luas Mula-mula A _o	Luas Terkoreksi A'	Proving Ring	Beban P	P/A'= $\sigma_1 - \sigma_3$	σ_3	σ_1
	mm	%		cm ²	cm ²		kg	kg/cm ²	kg/cm ²	kg/cm ²
0	0	0	1.0000	19.625	19.6250	0.00	0	0	0	0
50	0.05	0.5000	0.9950	19.625	19.7236	8.00	11.60	0.5881	1.5	2.0881
100	0.1	1.0000	0.9900	19.625	19.8232	10.50	15.23	0.7680	1.5	2.2680
150	0.15	1.5000	0.9850	19.625	19.9239	13.00	18.85	0.9461	1.5	2.4461
200	0.2	2.0000	0.9800	19.625	20.0255	14.50	21.03	1.0499	1.5	2.5499
250	0.25	2.5000	0.9750	19.625	20.1282	15.25	22.11	1.0986	1.5	2.5986
300	0.3	3.0000	0.9700	19.625	20.2320	16.25	23.56	1.1646	1.5	2.6646
350	0.35	3.5000	0.9650	19.625	20.3368	17.00	24.65	1.2121	1.5	2.7121
400	0.4	4.0000	0.9600	19.625	20.4427	17.50	25.38	1.2413	1.5	2.7413
450	0.45	4.5000	0.9550	19.625	20.5497	18.00	26.10	1.2701	1.5	2.7701
500	0.5	5.0000	0.9500	19.625	20.6579	18.50	26.83	1.2985	1.5	2.7985
550	0.55	5.5000	0.9450	19.625	20.7672	19.00	27.55	1.3266	1.5	2.8266
600	0.6	6.0000	0.9400	19.625	20.8777	19.75	28.64	1.3717	1.5	2.8717
650	0.65	6.5000	0.9350	19.625	20.9893	20.00	29.00	1.3817	1.5	2.8817
700	0.7	7.0000	0.9300	19.625	21.1022	20.25	29.36	1.3914	1.5	2.8914
750	0.75	7.5000	0.9250	19.625	21.2162	20.50	29.73	1.4011	1.5	2.9011
800	0.8	8.0000	0.9200	19.625	21.3315	21.00	30.45	1.4275	1.5	2.9275
850	0.85	8.5000	0.9150	19.625	21.4481	21.25	30.81	1.4366	1.5	2.9366
900	0.9	9.0000	0.9100	19.625	21.5659	21.50	31.18	1.4456	1.5	2.9456
950	0.95	9.5000	0.9050	19.625	21.6851	21.75	31.54	1.4543	1.5	2.9543
1000	1	10.0000	0.9000	19.625	21.8056	22.00	31.90	1.4629	1.5	2.9629
1050	1.05	10.5000	0.8950	19.625	21.9274	22.00	31.90	1.4548	1.5	2.9548



Dari hasil pengujian didapatkan nilai:

$$\begin{aligned} \Phi &= 11.0902 \\ C &= 0.25191 \text{ kg/cm}^2 \end{aligned}$$

C. Triaksial Tanah Kadar Air 32%

Data:

d= 5 cm

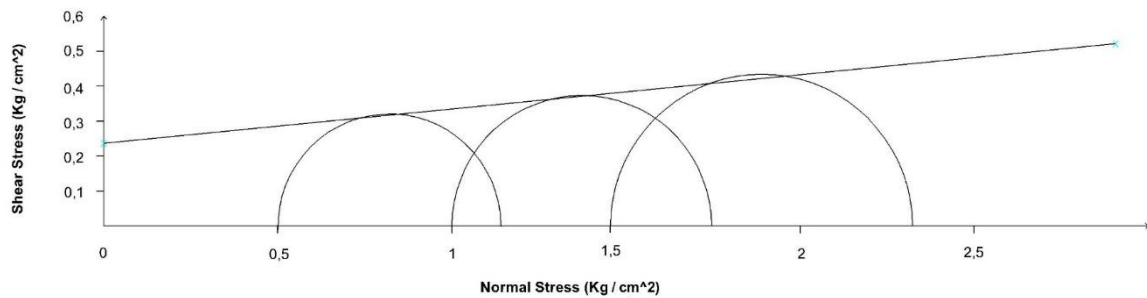
t= 10 cm

Kalibrasi alat = 1,49

t	Δh x 0,001	ϵ	1 - ϵ	Luas Mula-mula A _o	Luas Terkoreksi A'	Proving Ring	Beban P	P/A'= $\sigma_1 - \sigma_3$	σ_3	σ_1
	mm	%		cm ²	cm ²		kg	kg/cm ²	kg/cm ²	kg/cm ²
0	0	0.000	1.000	19.6250	19.6250	0	0	0	0.5	0
50	0.05	0.500	0.995	19.6250	19.7236	2	2.9	0.14777	0.5	0.64777
100	0.1	1.000	0.990	19.6250	19.8232	4	5.8	0.294	0.5	0.794
150	0.15	1.500	0.985	19.6250	19.9239	5.5	7.975	0.402	0.5	0.902
200	0.2	2.000	0.980	19.6250	20.0255	6	8.7	0.437	0.5	0.937
250	0.25	2.500	0.975	19.6250	20.1282	6.75	9.7875	0.489	0.5	0.989
300	0.3	3.000	0.970	19.6250	20.2320	7.25	10.5125	0.522	0.5	1.022
350	0.35	3.500	0.965	19.6250	20.3368	7.5	10.875	0.538	0.5	1.038
400	0.4	4.000	0.960	19.6250	20.4427	8	11.6	0.570	0.5	1.070
450	0.45	4.500	0.955	19.6250	20.5497	8.25	11.9625	0.585	0.5	1.085
500	0.5	5.000	0.950	19.6250	20.6579	8.5	12.325	0.600	0.5	1.100
550	0.55	5.500	0.945	19.6250	20.7672	8.75	12.6875	0.614	0.5	1.114
600	0.6	6.000	0.940	19.6250	20.8777	9	13.05	0.628	0.5	1.128
650	0.65	6.500	0.935	19.6250	20.9893	9.25	13.4125	0.642	0.5	1.142
700	0.7	7.000	0.930	19.6250	21.1022	9.25	13.4125	0.639	0.5	1.139

t	Δh x 0,001	ϵ	1 - ϵ	Luas Mula-mula A _o	Luas Terkoreksi A'	Proving Ring	Beban P	P/A'= $\sigma_1 - \sigma_3$	σ_3	σ_1
	mm	%		cm ²	cm ²		kg	kg/cm ²	kg/cm ²	kg/cm ²
0	0	0	1.0000	19.625	19.6250	0.00	0	0	0	0
50	0.05	0.5000	0.9950	19.625	19.7236	2.75	3.99	0.2022	1	1.2022
100	0.1	1.0000	0.9900	19.625	19.8232	4.75	6.89	0.3474	1	1.3474
150	0.15	1.5000	0.9850	19.625	19.9239	5.25	7.61	0.3821	1	1.3821
200	0.2	2.0000	0.9800	19.625	20.0255	6.50	9.43	0.4706	1	1.4706
250	0.25	2.5000	0.9750	19.625	20.1282	7.00	10.15	0.5043	1	1.5043
300	0.3	3.0000	0.9700	19.625	20.2320	7.75	11.24	0.5554	1	1.5554
350	0.35	3.5000	0.9650	19.625	20.3368	8.25	11.96	0.5882	1	1.5882
400	0.4	4.0000	0.9600	19.625	20.4427	8.75	12.69	0.6206	1	1.6206
450	0.45	4.5000	0.9550	19.625	20.5497	9.00	13.05	0.6350	1	1.6350
500	0.5	5.0000	0.9500	19.625	20.6579	9.25	13.41	0.6493	1	1.6493
550	0.55	5.5000	0.9450	19.625	20.7672	9.50	13.78	0.6633	1	1.6633
600	0.6	6.0000	0.9400	19.625	20.8777	9.75	14.14	0.6772	1	1.6772
650	0.65	6.5000	0.9350	19.625	20.9893	10.00	14.50	0.6908	1	1.6908
700	0.7	7.0000	0.9300	19.625	21.1022	10.50	15.23	0.7215	1	1.7215
750	0.75	7.5000	0.9250	19.625	21.2162	10.75	15.59	0.7347	1	1.7347
800	0.8	8.0000	0.9200	19.625	21.3315	11.00	15.95	0.7477	1	1.7477
850	0.85	8.5000	0.9150	19.625	21.4481	11.00	15.95	0.7437	1	1.7437

t	Δh x 0,001	ε	1 - ε	Luas Mula-mula A _o	Luas Terkoreksi A'	Proving Ring	Beban P	P/A'= $\sigma_1 - \sigma_3$	σ_3	σ_1
	mm	%		cm ²	cm ²		kg	kg/cm ²	kg/cm ²	kg/cm ²
0	0	0	1.0000	19.625	19.6250	0.00	0	0	0	0
50	0.05	0.5000	0.9950	19.625	19.7236	2.75	3.99	0.2022	1.5	1.7022
100	0.1	1.0000	0.9900	19.625	19.8232	3.75	5.44	0.2743	1.5	1.7743
150	0.15	1.5000	0.9850	19.625	19.9239	5.00	7.25	0.3639	1.5	1.8639
200	0.2	2.0000	0.9800	19.625	20.0255	6.50	9.43	0.4706	1.5	1.9706
250	0.25	2.5000	0.9750	19.625	20.1282	8.00	11.60	0.5763	1.5	2.0763
300	0.3	3.0000	0.9700	19.625	20.2320	9.00	13.05	0.6450	1.5	2.1450
350	0.35	3.5000	0.9650	19.625	20.3368	9.25	13.41	0.6595	1.5	2.1595
400	0.4	4.0000	0.9600	19.625	20.4427	9.75	14.14	0.6916	1.5	2.1916
450	0.45	4.5000	0.9550	19.625	20.5497	10.00	14.50	0.7056	1.5	2.2056
500	0.5	5.0000	0.9500	19.625	20.6579	10.50	15.23	0.7370	1.5	2.2370
550	0.55	5.5000	0.9450	19.625	20.7672	11.00	15.95	0.7680	1.5	2.2680
600	0.6	6.0000	0.9400	19.625	20.8777	11.25	16.31	0.7813	1.5	2.2813
650	0.65	6.5000	0.9350	19.625	20.9893	11.75	17.04	0.8117	1.5	2.3117
700	0.7	7.0000	0.9300	19.625	21.1022	12.00	17.40	0.8246	1.5	2.3246
750	0.75	7.5000	0.9250	19.625	21.2162	12.25	17.76	0.8372	1.5	2.3372
800	0.8	8.0000	0.9200	19.625	21.3315	12.50	18.13	0.8497	1.5	2.3497
850	0.85	8.5000	0.9150	19.625	21.4481	12.50	18.13	0.8451	1.5	2.3451
900	0.9	9.0000	0.9100	19.625	21.5659	12.75	18.49	0.8573	1.5	2.3573
950	0.95	9.5000	0.9050	19.625	21.6851	13.00	18.85	0.8693	1.5	2.3693
1000	1	10.0000	0.9000	19.625	21.8056	13.00	18.85	0.8645	1.5	2.3645



Dari hasil pengujian didapatkan nilai:

$$\Phi = 5.84462$$

$$C = 0.23641 \text{ kg/cm}^2$$

D. Triaksial Tanah Kadar Air 33%

Data:

d= 5 cm

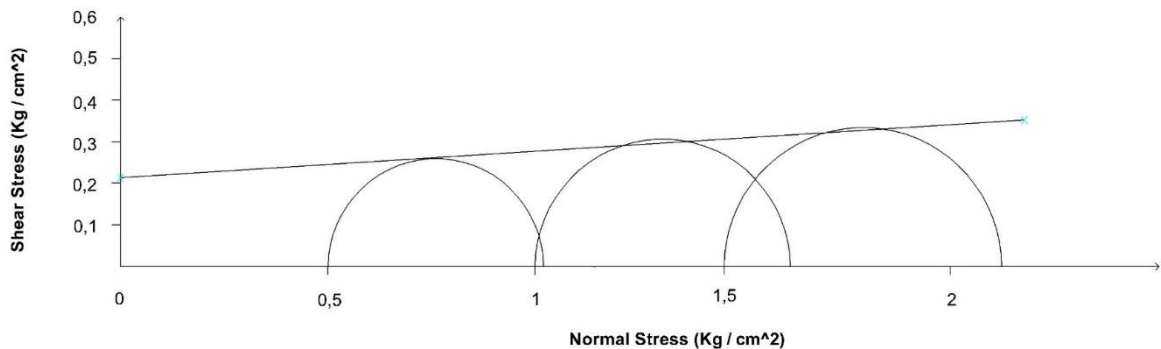
t= 10 cm

Kalibrasi alat = 1,49

t	Δh x 0,001	ϵ	1 - ϵ	Luas Mula-mula Ao	Luas Terkoreksi A'	Proving Ring	Beban P	P/A'= $\sigma_1 - \sigma_3$	σ_3	σ_1
	mm	%		cm ²	cm ²		kg	kg/cm ²	kg/cm ²	kg/cm ²
0	0	0.000	1.000	19.6250	19.6250	0	0	0	0.5	0
50	0.05	0.500	0.995	19.6250	19.7236	2.5	3.625	0.18471	0.5	0.68471
100	0.1	1.000	0.990	19.6250	19.8232	3.5	5.075	0.257	0.5	0.757
150	0.15	1.500	0.985	19.6250	19.9239	4	5.8	0.293	0.5	0.793
200	0.2	2.000	0.980	19.6250	20.0255	4.5	6.525	0.327	0.5	0.827
250	0.25	2.500	0.975	19.6250	20.1282	5	7.25	0.362	0.5	0.862
300	0.3	3.000	0.970	19.6250	20.2320	5.5	7.975	0.396	0.5	0.896
350	0.35	3.500	0.965	19.6250	20.3368	5.75	8.3375	0.412	0.5	0.912
400	0.4	4.000	0.960	19.6250	20.4427	6	8.7	0.428	0.5	0.928
450	0.45	4.500	0.955	19.6250	20.5497	6.5	9.425	0.461	0.5	0.961
500	0.5	5.000	0.950	19.6250	20.6579	6.5	9.425	0.459	0.5	0.959
550	0.55	5.500	0.945	19.6250	20.7672	7	10.15	0.491	0.5	0.991
600	0.6	6.000	0.940	19.6250	20.8777	7	10.15	0.489	0.5	0.989
650	0.65	6.500	0.935	19.6250	20.9893	7.25	10.5125	0.504	0.5	1.004
700	0.7	7.000	0.930	19.6250	21.1022	7.5	10.875	0.518	0.5	1.018
750	0.75	7.500	0.925	19.6250	21.2162	7.5	10.875	0.515	0.5	1.015

t	Δh x 0,001	ϵ	1 - ϵ	Luas Mula-mula Ao	Luas Terkoreksi A'	Proving Ring	Beban P	P/A'= $\sigma_1 - \sigma_3$	σ_3	σ_1
	mm	%		cm ²	cm ²		kg	kg/cm ²	kg/cm ²	kg/cm ²
0	0	0	1.0000	19.625	19.6250	0.00	0	0	0	0
50	0.05	0.5000	0.9950	19.625	19.7236	2.50	3.63	0.1838	1	1.1838
100	0.1	1.0000	0.9900	19.625	19.8232	4.00	5.80	0.2926	1	1.2926
150	0.15	1.5000	0.9850	19.625	19.9239	5.00	7.25	0.3639	1	1.3639
200	0.2	2.0000	0.9800	19.625	20.0255	5.75	8.34	0.4163	1	1.4163
250	0.25	2.5000	0.9750	19.625	20.1282	6.25	9.06	0.4502	1	1.4502
300	0.3	3.0000	0.9700	19.625	20.2320	6.75	9.79	0.4838	1	1.4838
350	0.35	3.5000	0.9650	19.625	20.3368	6.75	9.79	0.4813	1	1.4813
400	0.4	4.0000	0.9600	19.625	20.4427	7.00	10.15	0.4965	1	1.4965
450	0.45	4.5000	0.9550	19.625	20.5497	7.25	10.51	0.5116	1	1.5116
500	0.5	5.0000	0.9500	19.625	20.6579	7.50	10.88	0.5264	1	1.5264
550	0.55	5.5000	0.9450	19.625	20.7672	7.75	11.24	0.5411	1	1.5411
600	0.6	6.0000	0.9400	19.625	20.8777	8.00	11.60	0.5556	1	1.5556
650	0.65	6.5000	0.9350	19.625	20.9893	8.25	11.96	0.5699	1	1.5699
700	0.7	7.0000	0.9300	19.625	21.1022	8.75	12.69	0.6012	1	1.6012
750	0.75	7.5000	0.9250	19.625	21.2162	9.00	13.05	0.6151	1	1.6151
800	0.8	8.0000	0.9200	19.625	21.3315	9.00	13.05	0.6118	1	1.6118

t	Δh x 0,001	ϵ	1 - ϵ	Luas Mula-mula A _o	Luas Terkoreksi A'	Proving Ring	Beban P	P/A'= $\sigma_1 - \sigma_3$	σ_3	σ_1
	mm	%		cm ²	cm ²		kg	kg/cm ²	kg/cm ²	kg/cm ²
0	0	0	1.0000	19.625	19.6250	0.00	0	0	0	0
50	0.05	0.5000	0.9950	19.625	19.7236	2.50	3.63	0.1838	1.5	1.6838
100	0.1	1.0000	0.9900	19.625	19.8232	3.25	4.71	0.2377	1.5	1.7377
150	0.15	1.5000	0.9850	19.625	19.9239	4.25	6.16	0.3093	1.5	1.8093
200	0.2	2.0000	0.9800	19.625	20.0255	5.25	7.61	0.3801	1.5	1.8801
250	0.25	2.5000	0.9750	19.625	20.1282	6.00	8.70	0.4322	1.5	1.9322
300	0.3	3.0000	0.9700	19.625	20.2320	6.25	9.06	0.4479	1.5	1.9479
350	0.35	3.5000	0.9650	19.625	20.3368	6.75	9.79	0.4813	1.5	1.9813
400	0.4	4.0000	0.9600	19.625	20.4427	7.00	10.15	0.4965	1.5	1.9965
450	0.45	4.5000	0.9550	19.625	20.5497	7.25	10.51	0.5116	1.5	2.0116
500	0.5	5.0000	0.9500	19.625	20.6579	7.50	10.88	0.5264	1.5	2.0264
550	0.55	5.5000	0.9450	19.625	20.7672	7.75	11.24	0.5411	1.5	2.0411
600	0.6	6.0000	0.9400	19.625	20.8777	8.00	11.60	0.5556	1.5	2.0556
650	0.65	6.5000	0.9350	19.625	20.9893	8.25	11.96	0.5699	1.5	2.0699
700	0.7	7.0000	0.9300	19.625	21.1022	8.50	12.33	0.5841	1.5	2.0841
750	0.75	7.5000	0.9250	19.625	21.2162	8.75	12.69	0.5980	1.5	2.0980
800	0.8	8.0000	0.9200	19.625	21.3315	9.00	13.05	0.6118	1.5	2.1118
850	0.85	8.5000	0.9150	19.625	21.4481	9.25	13.41	0.6253	1.5	2.1253
900	0.9	9.0000	0.9100	19.625	21.5659	9.75	14.14	0.6555	1.5	2.1555
950	0.95	9.5000	0.9050	19.625	21.6851	10.00	14.50	0.6687	1.5	2.1687
1000	1	10.0000	0.9000	19.625	21.8056	10.00	14.50	0.6650	1.5	2.1650
1050	1.05	10.5000	0.8950	19.625	21.9274	10.00	14.50	0.6613	1.5	2.1613



Dari hasil pengujian didapatkan nilai:

$$\begin{aligned} \Phi &= 4.00004 \\ C &= 0.21351 \text{ kg/cm}^2 \end{aligned}$$

E. *Direct Shear* Tanah Kadar Air 38%

Data:

- D = 6 cm
- A = 28,286 cm²
- Lo = 60 mm
- Panjang lengan = 14,14
- Kalibrasi = 0,358

Load Ring Dial	P1 = 0,4 kg				P2 = 0,8 kg				P3 = 1,2 kg			
	$\sigma_1 = P/A * f = 0,200$				$\sigma_2 = P/A * f = 0,400$				$\sigma_3 = P/A * f = 0,600$			
	Dial Reading x0,01	Gaya Geser x 0,358	Tegangan Geser	Regangan ($\Delta L/Lo$)	Dial Reading x0,01	Gaya Geser x 0,358	Tegangan Geser	Regangan ($\Delta L/Lo$)	Dial Reading x0,01	Gaya Geser x 0,358	Tegangan Geser	Regangan ($\Delta L/Lo$)
0	0	0.000	0	0.0000	0	0	0	0.0000	0	0.000	0.000	0
25	1.5	0.537	0.019	0.4167	4	1.432	0.051	0.4167	4.5	1.611	0.057	0.417
50	3	1.074	0.038	0.8333	6	2.148	0.076	0.8333	6.5	2.327	0.082	0.833
75	4.5	1.611	0.057	1.2500	8	2.864	0.101	1.2500	7	2.506	0.089	1.250
100	6	2.148	0.076	1.6667	9	3.222	0.114	1.6667	8	2.864	0.101	1.667
125	7	2.506	0.089	2.0833	10	3.580	0.127	2.0833	9.5	3.401	0.120	2.083
150	7.5	2.685	0.095	2.5000	10.5	3.759	0.133	2.5000	10	3.580	0.12657	2.500
175	8	2.864	0.101	2.9167	11	3.938	0.139	2.9167	10.5	3.759	0.13289	2.917
200	8.5	3.043	0.108	3.3333	11	3.938	0.139	3.3333	11	3.938	0.13922	3.333
225	9	3.222	0.114	3.7500	11	3.938	0.139	3.7500	11.5	4.117	0.14555	3.750
250	9.5	3.401	0.120	4.1667					11.5	4.117	0.14555	4.167
275	9.5	3.401	0.12024	4.5833					11.5	4.117	0.14555	4.583
300	9.5	3.401	0.12024	5.0000								

$$Y = 0,0589x + 0,1139$$

$$X = 0,2 \rightarrow y = 0,0589 (0,2) + 0,1117 = 0,123 \text{ kg/cm}^2$$

$$X = 0,4 \rightarrow y = 0,0589 (0,4) + 0,1117 = 0,135 \text{ kg/cm}^2$$

$$X = 0,6 \rightarrow y = 0,0589 (0,6) + 0,1117 = 0,147 \text{ kg/cm}^2$$

$$X = 0 \rightarrow c = 0,0589 (0) + 0,1117 = 0,1117 \text{ kg/cm}^2$$

$$\text{Tan } \Phi = \frac{T_2 - T_1}{\sigma_2 - \sigma_1} = \frac{0,135 - 0,123}{0,4 - 0,2} = 0,06$$

$$\Phi = 3,4336$$

(Halaman ini sengaja dikosongkan)

LAMPIRAN 5

- A. Data Pengujian SPT
- B. Perhitungan tanah untuk benda uji
- C. Dokumentasi

B. Perhitungan tanah untuk benda uji

$$\begin{aligned} \gamma_{dmax} &= 1.2467 \text{ gr/cm}^3 \\ \text{OMC} &= 31.25 \% = 0.3125 \\ \gamma_d &= \frac{\gamma_{basah}}{1+w} \\ 1.2467 &= \frac{\gamma_{basah}}{1.3125} \\ \gamma_{basah} &= 1.6363 \text{ gr/cm}^3 \end{aligned}$$

mold CBR

$$\begin{aligned} \text{diameter} &= 15.5 \text{ cm} \\ \text{tinggi} &= 11.5 \text{ cm} \\ \gamma_{basah} &= \frac{W_{total}}{V_{total}} \\ 1.6363 &= \frac{W_{total}}{2168.856875} \\ W_{total} &= 3548.886949 \text{ gr} \end{aligned}$$

KADAR 20 %

$$\begin{aligned} w &= \frac{W_w}{W_s} \\ 0.2 &= \frac{W_w}{W_s} \\ 0.2 \quad W_s &= W_w \\ w &= \frac{ww}{W_s} + \frac{ws}{W_s} \\ 3548.886949 &= 0.2 \quad W_s + ws \\ 3548.886949 &= 1.2 \quad W_s \\ W_s &= 2957.405791 \text{ gr} \\ W_w &= 0.2 \quad W_s \\ &= 0.2 \quad x \quad 2957.406 \\ &= 591.4812 \text{ cm}^3 \\ W_w &= 591.4812 \text{ ml} \end{aligned}$$

KADAR 25 %

$$\begin{aligned} w &= \frac{W_w}{W_s} \\ 0.25 &= \frac{W_w}{W_s} \\ 0.25 \quad W_s &= W_w \\ w &= \frac{ww}{W_s} + \frac{ws}{W_s} \\ 3548.887 &= 0.25 \quad W_s + ws \\ 3548.887 &= 1.25 \quad W_s \\ W_s &= 2839.1096 \text{ gr} \\ W_w &= 0.25 \quad W_s \\ &= 0.25 \quad x \quad 2839.11 \\ &= 709.7774 \text{ cm}^3 \\ W_w &= 709.7774 \text{ ml} \end{aligned}$$

KADAR 31,25 %

$$\begin{aligned} w &= \frac{W_w}{W_s} \\ 0.3125 &= \frac{W_w}{W_s} \\ 0.3125 \quad W_s &= W_w \\ w &= \frac{ww}{W_s} + \frac{ws}{W_s} \\ 3548.8869 &= 0.3125 \quad W_s + ws \\ 3548.8869 &= 1.3125 \quad W_s \\ W_s &= 2703.914 \text{ gr} \\ W_w &= 0.3125 \quad W_s \\ &= 0.3125 \quad x \quad 2703.914 \\ &= 844.9731 \text{ cm}^3 \\ W_w &= 844.9731 \text{ ml} \end{aligned}$$

KADAR 32 %

$$\begin{aligned} w &= \frac{W_w}{W_s} \\ 0.32 &= \frac{W_w}{W_s} \\ 0.32 \quad W_s &= W_w \\ w &= \frac{ww}{W_s} + \frac{ws}{W_s} \\ 3548.887 &= 0.32 \quad W_s + ws \\ 3548.887 &= 1.32 \quad W_s \\ W_s &= 2688.55072 \text{ gr} \\ W_w &= 0.32 \quad W_s \\ &= 0.32 \quad x \quad 2688.551 \\ &= 860.3362 \text{ cm}^3 \\ W_w &= 860.3362 \text{ ml} \end{aligned}$$

KADAR 33 %

$$w = \frac{Ww}{Ws}$$

$$0.33 = \frac{Ww}{Ws}$$

$$0.33 \quad Ws = Ww$$

$$w = ww + ws$$

$$3548.887 = 0.33 \quad Ws + ws$$

$$3548.887 = 1.33 \quad Ws$$

$$Ws = 2668.336052 \quad \text{gr}$$

$$Ww = 0.33 \quad Ws$$

$$= 0.33 \quad x \quad 2668.336$$

$$= 880.5509 \quad \text{cm}^3$$

$$Ww = 880.5509 \quad \text{ml}$$

KADAR 38 %

$$w = \frac{Ww}{Ws}$$

$$0.38 = \frac{Ww}{Ws}$$

$$0.38 \quad Ws = Ww$$

$$w = ww + ws$$

$$3548.887 = 0.38 \quad Ws + ws$$

$$3548.887 = 1.38 \quad Ws$$

$$Ws = 2571.6572 \quad \text{gr}$$

$$Ww = 0.38 \quad Ws$$

$$= 0.38 \quad x \quad 2571.657$$

$$= 977.2297 \quad \text{cm}^3$$

$$Ww = 977.2297 \quad \text{ml}$$

C. Dokumentasi

- Pengambilan sampel tanah



- Pengujian karakteristik tanah





- Pengujian Pemadatan dan CBR



- Pengujian Triaksial



- Pengujian Unconfined

