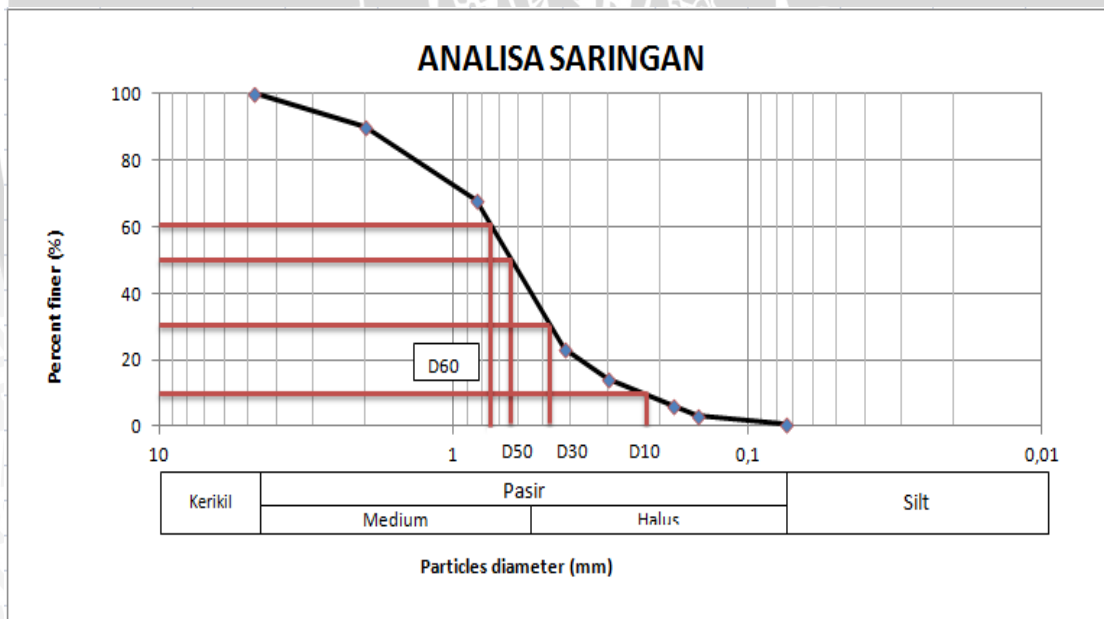


Lampiran 1

Analisis Gradasi Butiran Tanah

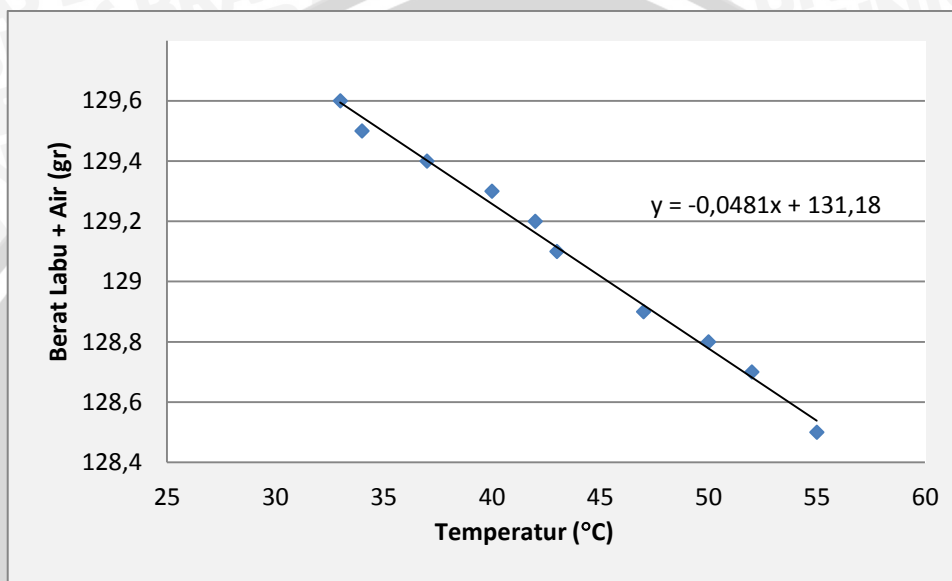
Diameter ayakan	Berat tertahan (gr)	Berat kumulatif (gr)	Persen tertahan (%)	Persen lolos (%)
4,75 mm (no. 4)	0.00	0	0.000	100.000
2,00 mm (no. 10)	48.8	48.8	9.760	90.240
0,84 mm (no. 20)	111	159.8	31.960	68.040
0,42 mm (no. 40)	222.4	382.2	76.440	23.560
0,30 mm (no.50)	47.5	429.7	85.940	14.060
0,18 mm (no. 80)	39.3	469	93.800	6.200
0,15 mm (no. 100)	13.7	482.7	96.540	3.460
0,07 mm (no. 200)	14.5	497.2	99.440	0.560
PAN	2.8	500	100.000	0.000



Lampiran 2

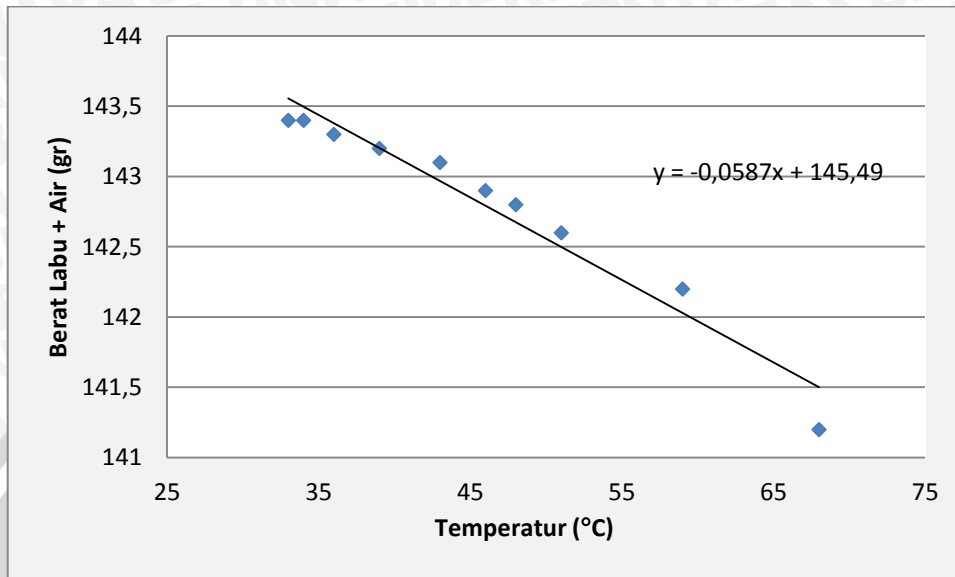
Hasil Analisis *Specific Gravity* Tanah

Labu ukur	A									
No.	1	2	3	4	5	6	7	8	9	10
Berat Labu + Air	128.5	128.7	128.8	128.9	129.1	129.2	129.3	129.4	129.5	129.6
Temperatur	55	52	50	47	43	42	40	37	34	33



Labu Ukur	A					
Berat labu ukur	gr	28.2				
Berat tanah kering (Ws)	gr	20				
Berat piknometer + air + tanah (W1)	gr	140.5	141.5	141.8	142	142
Temperatur	°C	68	49	43	39	34
Berat piknometer + air (W2)	gr	127.836	128.748	129.036	129.228	129.468
Spsific Gravity air (Gt)	-	0.9789	0.9885	0.9911	0.9926	0.9944
$G_s = (W_s * G_t) / (W_s - (W_1 - W_2))$	-	2.669	2.728	2.739	2.747	2.663
Gs rata-rata	-	2.709				

Labu ukur	B									
No.	1	2	3	4	5	6	7	8	9	10
Berat Labu + Air	141.2	142.2	142.6	142.8	142.9	143.1	143.2	143.3	143.4	143.4
Temperatur	68	59	51	48	46	43	39	36	34	33



Labu Ukur	B					
Berat labu ukur	gr	28.2				
Berat tanah kering (Ws)	gr	20				
Berat piknometer + air + tanah (W1)	gr	154.5	155.1	155.4	155.8	156.2
Temperatur	°C	66	47	41	38	34
Berat piknometer + air (W2)	gr	141.572	142.674	143.022	143.196	143.428
Spsific Gravity air (Gt)	-	0.98	0.989	0.9902	0.993	0.9944
$G_s = (W_s * G_t) / (W_s - (W_1 - W_2))$	-	2.771	2.612	2.598	2.685	2.752
Gs rata-rata	-	2.684				

Lampiran 3

Hasil Analisis Uji Geser Langsung (*Direct Shear*)

Lapisan 3

Kalibrasi Alat = 0,358

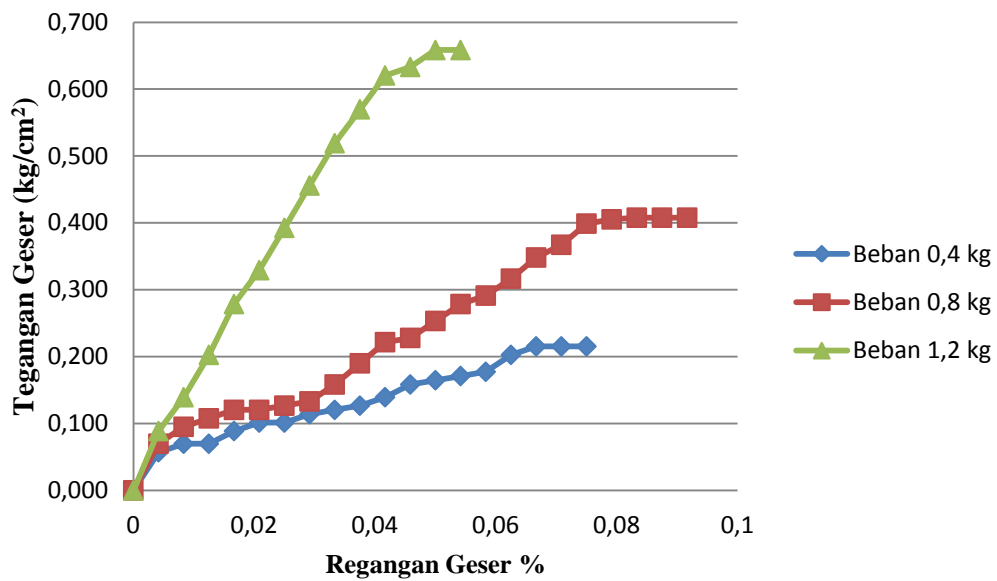
Tinggi Sampel = 2 cm

Diameter Sampel = 6 cm

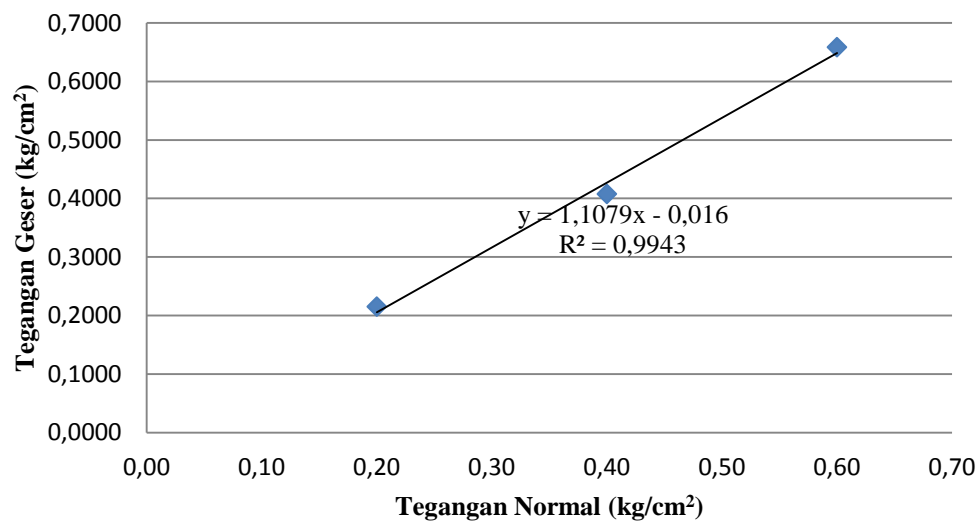
Luas Sampel = 28,274cm²

NORMAL FORCE	P ₁ = 0.4 kg			P ₂ = 0.8 kg			P ₃ = 1.2 kg		
NORMAL STRESS	$\sigma_1 = 0.20 \text{ kg/cm}^2$			$\sigma_2 = 0.40 \text{ kg/cm}^2$			$\sigma_3 = 0.60 \text{ kg/cm}^2$		
HORIZONTAL DIAL READING	VERTIKAL DIAL READING	SHEAR FORCE	SHEAR STRESS	DIAL READING	SHEAR FORCE	SHEAR STRESS	DIAL READING	SHEAR FORCE	SHEAR STRESS
0	0	0	0	0	0	0	0	0	0
25	4.5	1.6110	0.0570	5.5	1.9690	0.0696	7.0	2.5060	0.0886
50	5.5	1.9690	0.0696	7.5	2.6850	0.0950	11.0	3.9380	0.1393
75	5.5	1.9690	0.0696	8.0	2.8640	0.1013	16.0	5.7280	0.2026
100	7.0	2.5060	0.0886	8.5	3.0430	0.1076	22.0	7.8760	0.2786
125	8.0	2.8640	0.1013	9.5	3.4010	0.1203	26.0	9.3080	0.3292
150	8.0	2.8640	0.1013	9.5	3.4010	0.1203	31.0	11.0980	0.3925
175	9.0	3.2220	0.1140	10.0	3.5800	0.1266	36.0	12.8880	0.4558
200	9.5	3.4010	0.1203	10.5	3.7590	0.1329	41.0	14.6780	0.5191
225	10.0	3.5800	0.1266	12.5	4.4750	0.1583	45.0	16.1100	0.5698
250	11.0	3.9380	0.1393	15.0	5.3700	0.1899	49.0	17.5420	0.6204
275	12.5	4.4750	0.1583	17.5	6.2650	0.2216	50.0	17.9000	0.6331
300	13.0	4.6540	0.1646	18.0	6.4440	0.2279	52.0	18.6160	0.6584
325	13.5	4.8330	0.1709	20.0	7.1600	0.2532	52.0	18.6160	0.6584
350	14.0	5.0120	0.1773	22.0	7.8760	0.2786			
375	16.0	5.7280	0.2026	23.0	8.2340	0.2912			
400	17.0	6.0860	0.21525	25.0	8.9500	0.3165			
425	17.0	6.0860	0.21525	27.5	9.8450	0.3482			
450	17.0	6.0860	0.21525	29	10.382	0.36719			
475	19.0	6.8020	0.24057	31.5	11.277	0.39885			
500	19.5	6.9810	0.24691	32	11.456	0.40518			
525	20	7.1600	0.25324	32.2	11.5276	0.40771			
550	22	7.8760	0.27856	32.2	11.5276	0.40771			
575	22	7.8760	0.27856	32.2	11.5276	0.40771			
600	22	7.8760	0.27856						
625									
650									
675									
700									

Grafik Hubungan antara Tegangan Geser dan Regangan Geser



Grafik Hubungan Tegangan Geser dan Tegangan Normal



$C = 0.0177 \text{ kg/cm}^2$
 $\phi = 34.101^\circ$



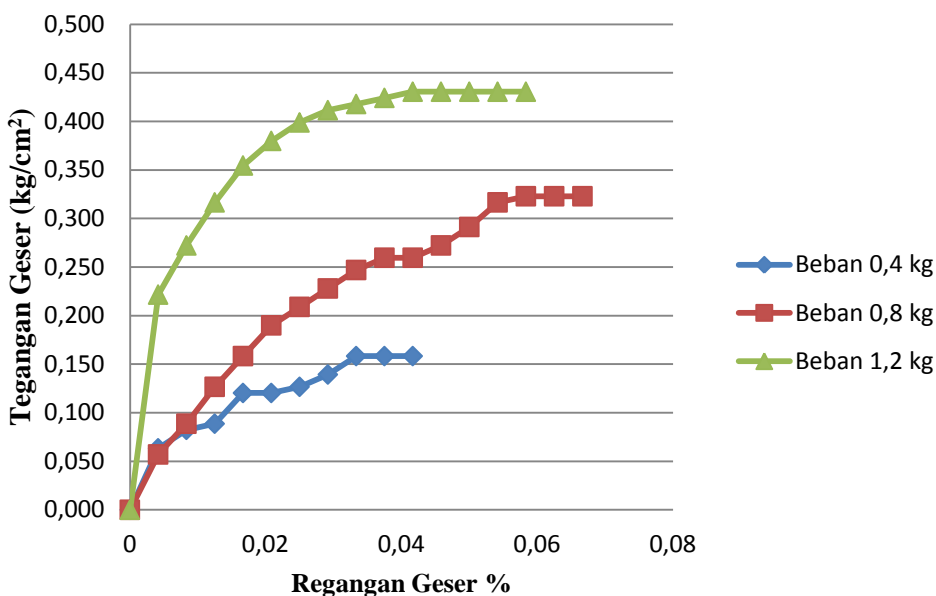
Lapisan 5

Kalibrasi Alat = 0,358
 Tinggi Sampel = 2 cm

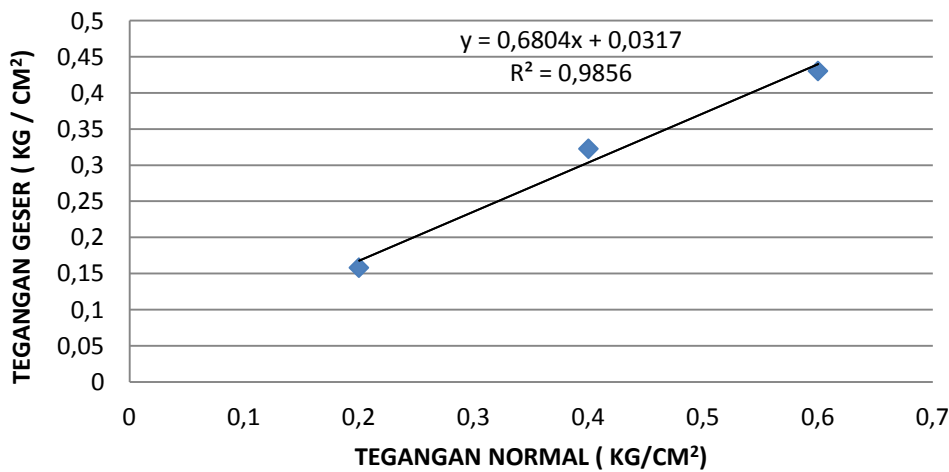
Diameter Sampel = 6 cm
 Luas Sampel = 28,274cm²

NORMAL FORCE	P ₁ = 0.4 kg			P ₂ = 0.8 kg			P ₃ = 1.2 kg		
NORMAL STRESS	$\sigma_1 = 0.20 \text{ kg/cm}^2$			$\sigma_2 = 0.40 \text{ kg/cm}^2$			$\sigma_3 = 0.60 \text{ kg/cm}^2$		
HORIZONTAL DIAL READING	VERTIKAL DIAL READING	SHEAR FORCE	SHEAR STRESS	DIAL READING	SHEAR FORCE	SHEAR STRESS	DIAL READING	SHEAR FORCE	SHEAR STRESS
0	0	0	0	0	0	0	0	0	0
25	5.0	1.7900	0.0633	4.5	1.6110	0.0570	17.5	6.2650	0.2216
50	6.5	2.3270	0.0823	7.0	2.5060	0.0886	21.5	7.6970	0.2722
75	7.0	2.5060	0.0886	10.0	3.5800	0.1266	25.0	8.9500	0.3165
100	9.5	3.4010	0.1203	12.5	4.4750	0.1583	28.0	10.0240	0.3545
125	9.5	3.4010	0.1203	15.0	5.3700	0.1899	30.0	10.7400	0.3799
150	10.0	3.5800	0.1266	16.5	5.9070	0.2089	31.5	11.2770	0.3988
175	11.0	3.9380	0.1393	18.0	6.4440	0.2279	32.5	11.6350	0.4115
200	12.5	4.4750	0.1583	19.5	6.9810	0.2469	33.0	11.8140	0.4178
225	12.5	4.4750	0.1583	20.5	7.3390	0.2596	33.5	11.9930	0.4242
250	12.5	4.4750	0.1583	20.5	7.3390	0.2596	34.0	12.1720	0.4305
275				21.5	7.6970	0.2722	34.0	12.1720	0.4305
300				23.0	8.2340	0.2912	34.0	12.1720	0.4305
325				25.0	8.9500	0.3165	34.0	12.1720	0.4305
350				25.5	9.1290	0.3229	34.0	12.1720	0.4305
375				25.5	9.1290	0.3229			
400				25.5	9.1290	0.3229			
425									
450									

Grafik Hubungan antara Tegangan Geser dan Regangan Geser



TEGANGAN GESER DAN NORMAL



$C = 0,0317 \text{ kg/cm}^2$
 $\phi = 34,548^\circ$



Lapisan 7

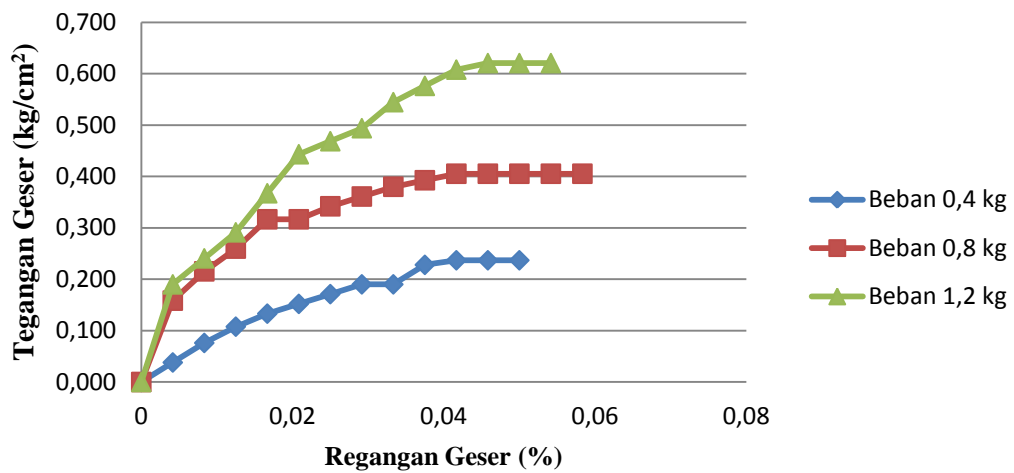
Kalibrasi Alat = 0,358
 Tinggi Sampel = 2 cm

Diameter Sampel = 6 cm
 Luas Sampel = 28,274cm²

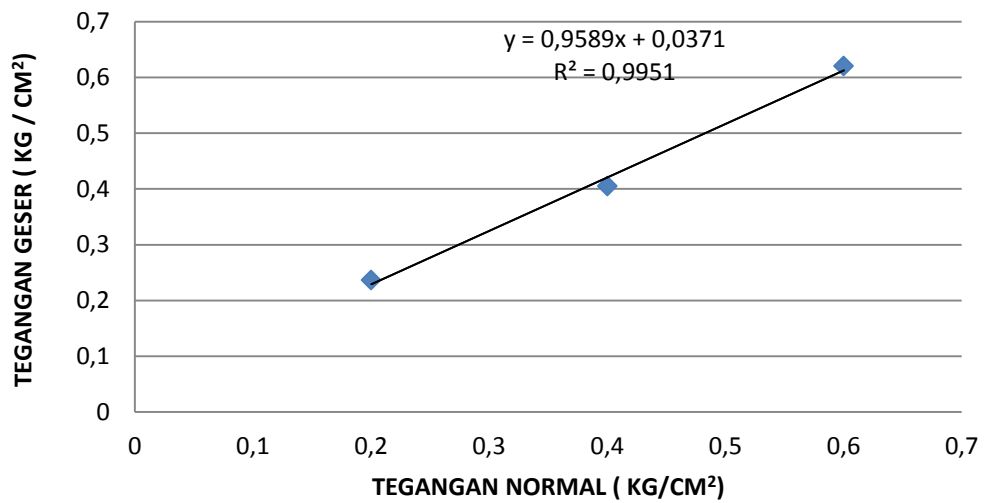
NORMAL FORCE	P ₁ = 0.4 kg			P ₂ = 0.8 kg			P ₃ = 1.2 kg		
NORMAL STRESS	$\sigma_1 = 0.20$ kg/cm ²			$\sigma_2 = 0.40$ kg/cm ²			$\sigma_3 = 0.60$ kg/cm ²		
HORIZONTAL DIAL READING	VERTIKAL DIAL READING	SHEAR FORCE	SHEAR STRESS	DIAL READING	SHEAR FORCE	SHEAR STRESS	DIAL READING	SHEAR FORCE	SHEAR STRESS
0	0	0	0	0	0	0	0	0	0
25	3.0	1.0740	0.0380	12.5	4.4750	0.1583	15.0	5.3700	0.1899
50	6.0	2.1480	0.0760	17.0	6.0860	0.2153	19.0	6.8020	0.2406
75	8.5	3.0430	0.1076	20.5	7.3390	0.2596	23.0	8.2340	0.2912
100	10.5	3.7590	0.1329	25.0	8.9500	0.3165	29.0	10.3820	0.3672
125	12.0	4.2960	0.1519	25.0	8.9500	0.3165	35.0	12.5300	0.4432
150	13.5	4.8330	0.1709	27.0	9.6660	0.3419	37.0	13.2460	0.4685
175	15.0	5.3700	0.1899	28.5	10.2030	0.3609	39.0	13.9620	0.4938
200	15.0	5.3700	0.1899	30.0	10.7400	0.3799	43.0	15.3940	0.5445
225	18.0	6.4440	0.2279	31.0	11.0980	0.3925	45.5	16.2890	0.5761
250	18.7	6.6946	0.2368	32.0	11.4560	0.4052	48.0	17.1840	0.6078
275	18.7	6.6946	0.2368	32.0	11.4560	0.4052	49.0	17.5420	0.6204
300	18.7	6.6946	0.2368	32.0	11.4560	0.4052	49.0	17.5420	0.6204
325				32.0	11.4560	0.4052	49.0	17.5420	0.6204
350				32.0	11.4560	0.4052			
375									
400									
425									
450									



Grafik Hubungan antara Tegangan Geser dan Regangan Geser



TEGANGAN GESER DAN NORMAL



$C = 0,0371 \text{ kg/cm}^2$

$\phi = 34,982^\circ$



Lampiran 4

Hasil Uji Pemadatan Standar

Data :

Berat mould	=	2560 gram
Diameter sampel	=	15.5 cm
Tinggi sampel	=	11.5 cm

Kadar Air

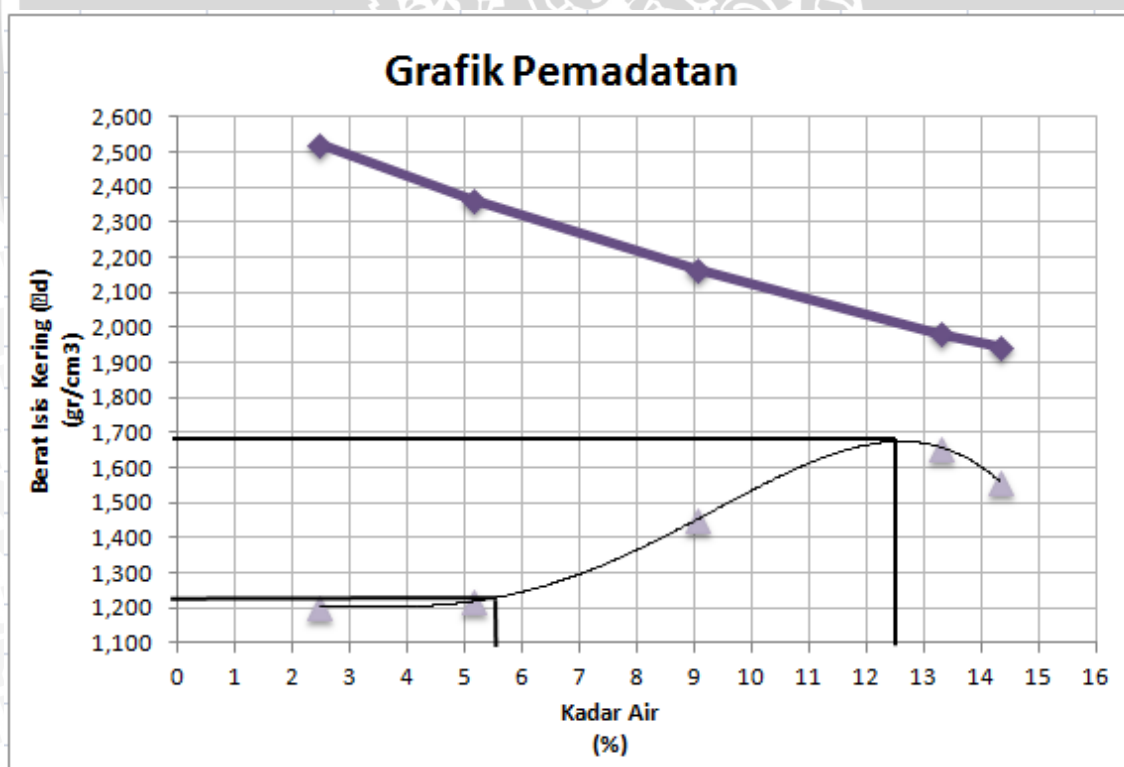
Penambahan Air	ml	100			200			300			400			500		
		atas	tengah	bawah	atas	tengah	bawah	atas	tengah	bawah	atas	tengah	bawah	atas	tengah	bawah
Berat cawan	gr	5.40	5.60	5.80	6.00	5.80	5.30	5.60	5.80	5.40	5.70	5.60	5.80	5.80	6.00	5.60
Berat tanah basah + cawan	gr	17.30	27.30	31.30	17.40	24.60	30.50	32.00	21.20	22.70	20.80	24.20	27.60	22.40	20.30	27.50
Berat tanah kering + cawan	gr	17.00	26.70	30.80	16.80	23.80	29.20	29.80	19.90	21.30	19.00	22.00	25.10	20.30	18.50	24.80
Berat air	gr	0.30	0.60	0.50	0.60	0.80	1.30	2.20	1.30	1.40	1.80	2.20	2.50	2.10	1.80	2.70
Berat tanah kering	gr	11.60	21.10	25.00	10.80	18.00	23.90	24.20	14.10	15.90	13.30	16.40	19.30	14.50	12.50	19.20
Kadar Air	%	2.59	2.84	2.00	5.56	4.44	5.44	9.09	9.22	8.81	13.53	13.41	12.95	14.48	14.40	14.06
Kadar air rata-rata	%	2.48			5.15			9.04			13.30			14.32		

Kepadatan

Penambahan air	ml	100	200	300	400	500
Berat cetakan	gr	2560	2560	2560	2560	2560
Berat tanah basah + cetakan	gr	5240	5340	5995	6635	6430
Berat tanah basah	gr	2680	2780	3435	4075	3870
Isi cetakan	cm ³	2170.8				
Berat isi basah	gr/cm ³	1.235	1.281	1.582	1.877	1.783
Berat isi kering	gr/cm ³	1.205	1.218	1.451	1.657	1.559

Zero Air Void

Penambahan air	ml	100	200	300	400	500
Kadar air	%	2.48	5.15	9.04	13.30	14.32
Gs	gr/cm ³	2.696				
Berat jenis air	gr/cm ³	1				
Berat jenis air (ZAV)	gr/cm ³	2.52726	2.367512	2.16776	1.98442	1.94526



Lampiran 5 (Tergantung Z = Tebal lipatan geotekstil)

Pemadatan Model Lereng

$$\gamma_d \text{ rencana} : 1,23 \text{ gr/cm}^3 = 1230 \text{ kg/m}^3$$

$$\text{Luas boks} : 0,98 \text{ m}^2$$

$$1. \text{ Berat tanah untuk tinggi rencana } 10 \text{ cm} : 1230 \times 0,098 = 120,54 \text{ kg}$$

$$2. \text{ Berat tanah untuk tinggi rencana } 9,1 \text{ cm} : 1230 \times 0,089 = 109,69 \text{ kg}$$

$$\text{Berat tanah untuk tinggi rencana } 0,9 \text{ cm} : 1230 \times 0,00882 = 10,848 \text{ kg}$$

$$3. \text{ Berat tanah untuk tinggi rencana } 10,5 \text{ cm} : 1230 \times 0,1029 = 126,567 \text{ kg}$$

$$\text{Berat tanah untuk tinggi rencana } 9,5 \text{ cm} : 1230 \times 0,0931 = 114,513 \text{ kg}$$

$$4. \text{ Berat tanah untuk tinggi rencana } 7,7 \text{ cm} : 1230 \times 0,0755 = 92,816 \text{ kg}$$

$$\text{Berat tanah untuk tinggi rencana } 2,3 \text{ cm} : 1230 \times 0,022 = 27,7242 \text{ kg}$$

Hasil Pengujian Sand Cone

Berat kerucut+tabung+pasir sebelum	gr	7020
Berat kerucut+tabung+pasir sesudah	gr	6613
Berat tanah yang digali	gr	500
Berat isi kering maksimum di laboratorium	gr/cm ³	1.66
Berat isi kering model	gr/cm ³	1.23
Kerapatan relatif (Dr)	%	74.01

Lampiran 6

Hasil Pengujian Kadar Air dan Kepadatan Pasir pada Model Lereng dengan Jarak Pondasi ke Tepi Lereng = B

Lereng Tanpa Perkuatan

Lapisan		1	2	3	4	5	6	7							
Berat cawan + tanah basah	gram	21.6	21.5	20.3	21.9	21.4	21.7	19.8	21.6	21.4	20.9	21.5	22.3	21.2	20.2
Berat cawan + tanah kering	gram	20.8	20.6	19.5	21.1	20.5	21	19	20.6	20.5	20.1	20.7	21.5	20.3	19.4
Berat cawan	gram	5.4	5.6	4.1	5	5.8	5.5	4	3.7	5.6	5.7	5.2	6	5.6	5.4
Berat tanah kering	gram	15.4	15	15.4	16.1	14.7	15.5	15	16.9	14.9	14.4	15.5	15.5	14.7	14
Berat air	gram	0.8	0.9	0.8	0.8	0.9	0.7	0.8	1	0.9	0.8	0.8	0.8	0.9	0.8
Kadar air	%	5.19	6.00	5.19	4.97	6.12	4.52	5.33	5.92	6.04	5.56	5.16	5.16	6.12	5.71
Kadar air rata-rata (%)									5.50						

Lapisan		1	2	3	4	5	6	7								
Berat ring + tanah	gram	32.6	32.5	32.2	32.1	32.3	32.4	32.2	32.4	32.5	32.5	32	32.3	32	31.9	
Berat ring	gram	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	
Diameter ring	cm	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	
Tinggi ring	cm	2.6	2.5	2.6	2.5	2.6	2.5	2.6	2.5	2.6	2.5	2.6	2.5	2.6	2.5	
Volume ring	cm ³	10.807	10.391	10.807	10.391	10.807	10.391	10.807	10.391	10.807	10.391	10.807	10.391	10.807	10.391	
Berat tanah	gram	14.1	14	13.7	13.6	13.8	13.8	14	13.7	14.2	14	13.6	13.5	13.9	14	
γ_t	gr/cm ³	1.305	1.347	1.268	1.309	1.277	1.328	1.295	1.318	1.314	1.347	1.258	1.299	1.286	1.347	
Kadar air	%	5.19	6.00	5.19	4.97	6.12	4.52	5.33	5.92	6.04	5.56	5.16	5.16	6.12	5.71	
γ_d	gr/cm ³	1.240	1.271	1.205	1.247	1.203	1.271	1.230	1.245	1.239	1.276	1.197	1.235	1.212	1.274	
γ_t rata-rata	gr/cm ³									1.307						
γ_d rata-rata	gr/cm ³									1.239						

Hasil Pengujian Kadar Air dan Kepadatan Pasir pada Model Lereng dengan Jarak Pondasi ke Tepi Lereng 1,5 B

Lereng Tanpa Perkuatan

Lapisan		1	2	3	4	5	6	7							
Berat cawan + tanah basah	gram	21.8	21.5	20.3	21.9	21.3	21.7	19.8	21.6	21.3	20.9	21.5	22.3	21.2	20.1
Berat cawan + tanah kering	gram	20.8	20.6	19.5	21.1	20.5	21	19	20.6	20.5	20.1	20.7	21.5	20.3	19.4
Berat cawan	gram	5.7	5.7	4.1	5.5	5.8	5.9	4.3	3.7	5.6	5.7	5	6	5.6	5.4
Berat tanah kering	gram	15.1	14.9	15.4	15.6	14.7	15.1	14.7	16.9	14.9	14.4	15.7	15.5	14.7	14
Berat air	gram	1	0.9	0.8	0.8	0.8	0.7	0.8	1	0.8	0.8	0.8	0.8	0.9	0.7
Kadar air	%	6.62	6.04	5.19	5.13	5.44	4.64	5.44	5.92	5.37	5.56	5.10	5.16	6.12	5.00
Kadar air rata-rata (%)		5.48													

Lapisan		1	2	3	4	5	6	7							
Berat ring + tanah	gram	32.7	32.6	32.1	32.1	32.4	32.2	32.6	32.4	32.6	32.5	32	32.1	32.3	32.2
Berat ring	gram	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5
Diameter ring	cm	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Tinggi ring	cm	2.6	2.5	2.6	2.5	2.6	2.5	2.6	2.5	2.6	2.5	2.6	2.5	2.6	2.5
Volume ring	cm ³	10.807	10.391	10.807	10.391	10.807	10.391	10.807	10.391	10.807	10.391	10.807	10.391	10.807	10.391
Berat tanah	gram	14.2	14.1	13.6	13.6	13.9	13.6	14	14	14.2	14.1	13.5	13.6	13.9	13.7
γ_t	gr/cm ³	1.314	1.357	1.258	1.309	1.286	1.309	1.295	1.347	1.314	1.357	1.249	1.309	1.286	1.318
Kadar air	%	6.62	6.04	5.19	5.13	5.44	4.64	5.44	5.92	5.37	5.56	5.10	5.16	6.12	5.00
γ_d	gr/cm ³	1.232	1.280	1.196	1.245	1.220	1.251	1.229	1.272	1.247	1.286	1.189	1.245	1.212	1.256
γ_t rata-rata	gr/cm ³	1.308													
γ_d rata-rata	gr/cm ³	1.240													

Hasil Pengujian Kadar Air dan Kepadatan Pasir pada Model Lereng dengan Jarak Pondasi ke Tepi Lereng 2 B

Lereng Tanpa Perkuatan

Lapisan		1	2	3	4	5	6	7							
Berat cawan + tanah basah	gram	21.8	21.5	20.3	21.9	21.3	21.7	19.8	21.6	21.3	20.9	21.5	22.3	21.2	20.1
Berat cawan + tanah kering	gram	21	20.7	19.5	21.1	20.4	20.9	18.9	20.7	20.5	20.1	20.7	21.4	20.4	19.3
Berat cawan	gram	5.7	5.7	4.1	5.5	5.8	5.9	4.3	3.7	5.7	5.7	6	6	5.6	5.4
Berat tanah kering	gram	15.3	15	15.4	15.6	14.6	15	14.6	17	14.8	14.4	14.7	15.4	14.8	13.9
Berat air	gram	0.8	0.8	0.8	0.8	0.9	0.8	0.9	0.9	0.8	0.8	0.8	0.9	0.8	0.8
Kadar air	%	5.23	5.33	5.19	5.13	6.16	5.33	6.16	5.29	5.41	5.56	5.44	5.84	5.41	5.76
Kadar air rata-rata (%)									5.52						

Lapisan		1	2	3	4	5	6	7								
Berat ring + tanah	gram	32.7	32.5	32	32.3	32.5	32.2	32.6	32.5	32.6	32.5	31.9	32.1	32.3	32.2	
Berat ring	gram	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	
Diameter ring	cm	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	
Tinggi ring	cm	2.6	2.5	2.6	2.5	2.6	2.5	2.6	2.5	2.6	2.5	2.6	2.5	2.6	2.5	
Volume ring	cm ³	10.807	10.391	10.807	10.391	10.807	10.391	10.807	10.391	10.807	10.391	10.807	10.391	10.807	10.391	
Berat tanah	gram	14.2	14	13.5	13.8	14	13.7	14.1	14	14.1	14	13.4	13.6	13.8	13.7	
γ_t	gr/cm ³	1.31	1.35	1.25	1.33	1.30	1.32	1.30	1.35	1.30	1.35	1.24	1.31	1.28	1.32	
Kadar air	%	5.23	5.33	5.19	5.13	6.16	5.33	6.16	5.29	5.41	5.56	5.44	5.84	5.41	5.76	
γ_d	gr/cm ³	1.25	1.28	1.19	1.26	1.22	1.25	1.23	1.28	1.24	1.28	1.18	1.24	1.21	1.25	
γ_t rata-rata	gr/cm ³									1.31						
γ_d rata-rata	gr/cm ³									1.24						

Lereng dengan perkuatan geotekstil L=22,4 cm; d= 6 cm; n = 1; Z : 0,15 H

Lapisan		1	2	3	4	5	6	7							
Berat cawan + tanah basah	gram	21,9	20,9	20,3	21,9	21,3	21,6	19,4	21,6	21,6	21	21,6	22	21,5	20,3
Berat cawan + tanah kering	gram	21,1	20,1	19,3	20,9	20,4	20,7	18,8	20,8	20,7	20	20,8	21,2	20,6	19,4
Berat cawan	gram	5,7	5,7	4,1	5,5	5,8	5,9	4,3	3,7	5,7	5,7	6	6	5,6	5,4
Berat tanah kering	gram	15,4	14,4	15,2	15,4	14,6	14,8	14,5	17,1	15	14,3	14,8	15,2	15	14
Berat air	gram	0,8	0,8	1	1	0,9	0,9	0,6	0,8	0,9	1	0,8	0,8	0,9	0,9
Kadar air	%	5,19	5,56	6,58	6,49	6,16	6,08	4,14	4,68	6,00	6,99	5,41	5,26	6,00	6,43
Kadar air rata-rata (%)									5,78						

Lapisan		1	2	3	4	5	6	7								
Berat ring + tanah	gram	32,8	32,5	32,1	32,4	32,7	32,4	32,6	32,4	32,9	32,8	32,5	32,1	32,5	32,2	
Berat ring	gram	18,5	18,5	18,5	18,5	18,5	18,5	18,5	18,5	18,5	18,5	18,5	18,5	18,5	18,5	
Diameter ring	cm	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	
Tinggi ring	cm	2,6	2,5	2,6	2,5	2,6	2,5	2,6	2,5	2,6	2,5	2,6	2,5	2,6	2,5	
Volume ring	cm ³	10,807	10,391	10,807	10,391	10,807	10,391	10,807	10,391	10,807	10,391	10,807	10,391	10,807	10,391	
Berat tanah	gram	14,3	14	13,6	13,9	14,2	13,9	14,1	13,9	14,4	14,3	14	13,6	14	13,7	
γ_t	gr/cm ³	1,323	1,347	1,258	1,338	1,314	1,338	1,305	1,338	1,333	1,376	1,295	1,309	1,295	1,318	
Kadar air	%	5,19	5,56	6,58	6,49	6,16	6,08	4,14	4,68	6,00	6,99	5,41	5,26	6,00	6,43	
γ_d	gr/cm ³	1,258	1,276	1,181	1,256	1,238	1,261	1,253	1,278	1,257	1,286	1,229	1,243	1,222	1,239	
γ_t rata-rata	gr/cm ³									1,321						
γ_d rata-rata	gr/cm ³									1,248						

Lereng dengan perkuatan geotekstil L=22,4 cm; d= 6 cm; n = 1; Z : 0,18 H

Lapisan		1	2	3	4	5	6	7							
Berat cawan + tanah basah	gram	22,1	19,9	20,3	21,1	21,2	22,6	19,8	20,6	21,6	21,2	21,9	22,3	22	19,3
Berat cawan + tanah kering	gram	21,1	19,2	19,3	20,9	20,4	20,7	19,1	19,2	21,7	21,2	20,8	21,2	20,6	19,4
Berat cawan	gram	5,7	5,7	4,1	5,5	5,8	5,9	4,3	3,7	5,7	5,7	6	6	5,6	5,4
Berat tanah kering	gram	15,4	13,5	15,2	15,4	14,6	14,8	14,8	15,5	16	15,5	14,8	15,2	15	14
Berat air	gram	1	0,7	1	0,2	0,8	1,9	0,7	1,4	-0,1	0	1,1	1,1	1,4	-0,1
Kadar air	%	6,49	5,19	6,58	1,30	5,48	12,84	4,73	9,03	-0,62	0,00	7,43	7,24	9,33	-0,71
Kadar air rata-rata (%)		5,31													

Lapisan		1	2	3	4	5	6	7							
Berat ring + tanah	gram	31,5	33,2	32,1	33,1	31,2	30,3	32,9	31,8	32,2	32,3	32,3	31,1	32,4	33,2
Berat ring	gram	18,5	18,5	18,5	18,5	18,5	18,5	18,5	18,5	18,5	18,5	18,5	18,5	18,5	18,5
Diameter ring	cm	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3
Tinggi ring	cm	2,6	2,5	2,6	2,5	2,6	2,5	2,6	2,5	2,6	2,5	2,6	2,5	2,6	2,5
Volume ring	cm ³	10,807	10,391	10,807	10,391	10,807	10,391	10,807	10,391	10,807	10,391	10,807	10,391	10,807	10,391
Berat tanah	gram	13	14,7	13,6	14,6	12,7	11,8	14,4	13,3	13,7	13,8	13,8	12,6	13,9	14,7
γ_t	gr/cm ³	1,203	1,415	1,258	1,405	1,175	1,136	1,333	1,280	1,268	1,328	1,277	1,213	1,286	1,415
Kadar air	%	6,49	5,19	6,58	1,30	5,48	12,84	4,73	9,03	-0,62	0,00	7,43	7,24	9,33	-0,71
γ_d	gr/cm ³	1,130	1,345	1,181	1,387	1,114	1,006	1,272	1,174	1,276	1,328	1,189	1,131	1,176	1,425
γ_t rata-rata	gr/cm ³	1,285													
γ_d rata-rata	gr/cm ³	1,224													

Lereng dengan perkuatan geotekstil L=22,4 cm; d= 6 cm; n = 1; Z : 0,21 H

Lapisan		1	2	3	4	5	6	7							
Berat cawan + tanah basah	gram	21,1	20,33	21,2	21,1	22,2	20,9	20,3	21,9	22,2	20	23,3	21,1	19,3	22,1
Berat cawan + tanah kering	gram	20,4	20,6	20,9	20,5	21,3	20,7	19,8	20,8	21,9	18,6	22,1	20,8	18,1	19
Berat cawan	gram	4,7	5,8	5,7	5,8	5,7	6	5,8	5,7	5,8	4,3	5,7	6	4,3	4,2
Berat tanah kering	gram	15,7	14,8	15,2	14,7	15,6	14,7	14	15,1	16,1	14,3	16,4	14,8	13,8	14,8
Berat air	gram	0,7	-0,27	0,3	0,6	0,9	0,2	0,5	1,1	0,3	1,4	1,2	0,3	1,2	3,1
Kadar air	%	4,46	-1,82	1,97	4,08	5,77	1,36	3,57	7,28	1,86	9,79	7,32	2,03	8,70	20,95
Kadar air rata-rata (%)		5,52													

Lapisan		1	2	3	4	5	6	7							
Berat ring + tanah	gram	34,1	32,1	32,4	32,5	32,6	33,5	34,65	33,52	31,5	32,8	32,7	32,5	32,5	32,4
Berat ring	gram	18,5	18,5	18,5	18,5	18,5	18,5	18,5	18,5	18,5	18,5	18,5	18,5	18,5	18,5
Diameter ring	cm	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3
Tinggi ring	cm	2,6	2,5	2,6	2,5	2,6	2,5	2,6	2,5	2,6	2,5	2,6	2,5	2,6	2,5
Volume ring	cm ³	10,807	10,391	10,807	10,391	10,807	10,391	10,807	10,391	10,807	10,391	10,807	10,391	10,807	10,391
Berat tanah	gram	15,6	13,6	13,9	14	14,1	15	16,15	15,02	13	14,3	14,2	14	14	13,9
γ_t	gr/cm ³	1,444	1,309	1,286	1,347	1,305	1,444	1,494	1,445	1,203	1,376	1,314	1,347	1,295	1,338
Kadar air	%	4,46	-1,82	1,97	4,08	5,77	1,36	3,57	7,28	1,86	9,79	7,32	2,03	8,70	20,95
γ_d	gr/cm ³	1,382	1,333	1,261	1,294	1,234	1,424	1,443	1,347	1,181	1,253	1,224	1,321	1,192	1,106
γ_t rata-rata	gr/cm ³	1,353													
γ_d rata-rata	gr/cm ³	1,285													

Lereng dengan perkuatan geotekstil L=22,4 cm; d= 9 cm; n = 1; Z : 0,15 H

Lapisan		1	2	3	4	5	6	7							
Berat cawan + tanah basah	gram	21,7	21,2	20,2	22,1	21,6	20,8	18,9	21,6	19,3	22,33	23,2	21	21,5	20,3
Berat cawan + tanah kering	gram	21,1	20,1	19,3	20,9	20,4	20,7	18,6	20,8	20,7	20	20,8	21,2	20,6	19,4
Berat cawan	gram	5,7	5,7	4,1	5,5	5,8	5,9	4,3	3,7	5,7	5,7	6	6	5,6	5,4
Berat tanah kering	gram	15,4	14,4	15,2	15,4	14,6	14,8	14,3	17,1	15	14,3	14,8	15,2	15	14
Berat air	gram	0,6	1,1	0,9	1,2	1,2	0,1	0,3	0,8	-1,4	2,33	2,4	-0,2	0,9	0,9
Kadar air	%	3,90	7,64	5,92	7,79	8,22	0,68	2,10	4,68	-9,33	16,29	16,22	-1,32	6,00	6,43
Kadar air rata-rata (%)		5,37													

Lapisan		1	2	3	4	5	6	7								
Berat ring + tanah	gram	32,5	32,5	32,1	31,4	30,9	32,4	30,6	32,4	33,9	32,22	33,5	31,1	31,6	32,2	
Berat ring	gram	18,5	18,5	18,5	18,5	18,5	18,5	18,5	18,5	18,5	18,5	18,5	18,5	18,5	18,5	
Diameter ring	cm	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	
Tinggi ring	cm	2,6	2,5	2,6	2,5	2,6	2,5	2,6	2,5	2,6	2,5	2,6	2,5	2,6	2,5	
Volume ring	cm ³	10,807	10,391	10,807	10,391	10,807	10,391	10,807	10,391	10,807	10,391	10,807	10,391	10,807	10,391	
Berat tanah	gram	14	14	13,6	12,9	12,4	13,9	12,1	13,9	15,4	13,72	15	12,6	13,1	13,7	
γ_t	gr/cm ³	1,295	1,347	1,258	1,241	1,147	1,338	1,120	1,338	1,425	1,320	1,388	1,213	1,212	1,318	
Kadar air	%	3,90	7,64	5,92	7,79	8,22	0,68	2,10	4,68	-9,33	16,29	16,22	-1,32	6,00	6,43	
γ_d	gr/cm ³	1,247	1,252	1,188	1,152	1,060	1,329	1,097	1,278	1,572	1,135	1,194	1,229	1,144	1,239	
γ_t rata-rata	gr/cm ³									1,283						
γ_d rata-rata	gr/cm ³									1,222						

Lereng dengan perkuatan geotekstil L=22,4 cm; d= 9 cm; n = 1; Z : 0,18 H

Lapisan		1	2	3	4	5	6	7							
Berat cawan + tanah basah	gram	22,2	22,32	21,44	21,9	20,12	20,98	19	21,6	21,6	20,3	20,4	21,5	21,5	20,3
Berat cawan + tanah kering	gram	22,1	21,1	18,3	19,1	20,4	22,3	19,7	20,8	19,8	20,64	19,9	20,21	20,6	19,4
Berat cawan	gram	5,7	5,7	4,1	5,5	5,8	5,9	4,3	3,7	5,7	5,7	6	6	5,6	5,4
Berat tanah kering	gram	16,4	15,4	14,2	13,6	14,6	16,4	15,4	17,1	14,1	14,94	13,9	14,21	15	14
Berat air	gram	0,1	1,22	3,14	2,8	-0,28	-1,32	-0,7	0,8	1,8	-0,34	0,5	1,29	0,9	0,9
Kadar air	%	0,61	7,92	22,11	20,59	-1,92	-8,05	-4,55	4,68	12,77	-2,28	3,60	9,08	6,00	6,43
Kadar air rata-rata (%)		5,50													

Lapisan		1	2	3	4	5	6	7							
Berat ring + tanah	gram	31,2	31,9	32,2	33,1	33,2	30,7	32,9	32,4	30,9	32,8	31,5	32,1	31,5	32,2
Berat ring	gram	18,5	18,5	18,5	18,5	18,5	18,5	18,5	18,5	18,5	18,5	18,5	18,5	18,5	18,5
Diameter ring	cm	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3
Tinggi ring	cm	2,6	2,5	2,6	2,5	2,6	2,5	2,6	2,5	2,6	2,5	2,6	2,5	2,6	2,5
Volume ring	cm ³	10,807	10,391	10,807	10,391	10,807	10,391	10,807	10,391	10,807	10,391	10,807	10,391	10,807	10,391
Berat tanah	gram	12,7	13,4	13,7	14,6	14,7	12,2	14,4	13,9	12,4	14,3	13	13,6	13	13,7
γ_t	gr/cm ³	1,175	1,290	1,268	1,405	1,360	1,174	1,333	1,338	1,147	1,376	1,203	1,309	1,203	1,318
Kadar air	%	0,61	7,92	22,11	20,59	-1,92	-8,05	-4,55	4,68	12,77	-2,28	3,60	9,08	6,00	6,43
γ_d	gr/cm ³	1,168	1,195	1,038	1,165	1,387	1,277	1,396	1,278	1,018	1,408	1,161	1,200	1,135	1,239
γ_t rata-rata	gr/cm ³	1,278													
γ_d rata-rata	gr/cm ³	1,219													

Lereng dengan perkuatan geotekstil L=22,4 cm; d= 9 cm; n = 1; Z : 0,21 H

Lapisan		1	2	3	4	5	6	7							
Berat cawan + tanah basah	gram	20,2	19,3	19,7	18,4	19,3	21,3	21,8	20,5	17,7	19,3	19,8	20,8	20,7	20,1
Berat cawan + tanah kering	gram	20,2	19,1	18,9	18,2	18,3	19,2	19,6	19,2	18,7	19,4	19,89	19,2	19,1	19,5
Berat cawan	gram	4	4,3	5,4	5,8	6,8	6	3,9	4,2	4,1	4,7	4,5	5,2	5	5,8
Berat tanah kering	gram	16,2	14,8	13,5	12,4	11,5	13,2	15,7	15	14,6	14,7	15,39	14	14,1	13,7
Berat air	gram	0	0,2	0,8	0,2	1	2,1	2,2	1,3	-1	-0,1	-0,09	1,6	1,6	0,6
Kadar air	%	0,00	1,35	5,93	1,61	8,70	15,91	14,01	8,67	-6,85	-0,68	-0,58	11,43	11,35	4,38
Kadar air rata-rata (%)		5,37													

Lapisan		1	2	3	4	5	6	7								
Berat ring + tanah	gram	33,1	30,2	31,8	33,1	33,44	33,8	30,5	31,8	30,9	31,3	32,4	31,2	32,5	33	
Berat ring	gram	18,5	18,5	18,5	18,5	18,5	18,5	18,5	18,5	18,5	18,5	18,5	18,5	18,5	18,5	
Diameter ring	cm	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	
Tinggi ring	cm	2,6	2,5	2,6	2,5	2,6	2,5	2,6	2,5	2,6	2,5	2,6	2,5	2,6	2,5	
Volume ring	cm ³	10,807	10,391	10,807	10,391	10,807	10,391	10,807	10,391	10,807	10,391	10,807	10,391	10,807	10,391	
Berat tanah	gram	14,6	11,7	13,3	14,6	14,94	15,3	12	13,3	12,4	12,8	13,9	12,7	14	14,5	
γ_t	gr/cm ³	1,351	1,126	1,231	1,405	1,382	1,472	1,110	1,280	1,147	1,232	1,286	1,222	1,295	1,395	
Kadar air	%	0,00	1,35	5,93	1,61	8,70	15,91	14,01	8,67	-6,85	-0,68	-0,58	11,43	11,35	4,38	
γ_d	gr/cm ³	1,351	1,111	1,162	1,383	1,272	1,270	0,974	1,178	1,232	1,240	1,294	1,097	1,163	1,337	
γ_t rata-rata	gr/cm ³									1,281						
γ_d rata-rata	gr/cm ³									1,219						

Lereng dengan perkuatan geotekstil L=22,4 cm; d= 12 cm; n = 1; Z : 0,15 H

Lapisan		1	2	3	4	5	6	7							
Berat cawan + tanah basah	gram	20,3	22,1	22,34	23,44	20,17	20,11	20,01	22,3	20,2	21	20,8	22	21,5	20,3
Berat cawan + tanah kering	gram	21,3	21,1	19,7	21,65	20,4	20,1	18,3	19,2	19,3	22	20,8	21,2	20,6	19,4
Berat cawan	gram	5,7	5,7	4,1	5,5	5,8	5,9	4,3	3,7	5,7	5,7	6	6	5,6	5,4
Berat tanah kering	gram	15,6	15,4	15,6	16,15	14,6	14,2	14	15,5	13,6	16,3	14,8	15,2	15	14
Berat air	gram	-1	1	2,64	1,79	-0,23	0,01	1,71	3,1	0,9	-1	0	0,8	0,9	0,9
Kadar air	%	-6,41	6,49	16,92	11,08	-1,58	0,07	12,21	20,00	6,62	-6,13	0,00	5,26	6,00	6,43
Kadar air rata-rata (%)		5,50													

Lapisan		1	2	3	4	5	6	7								
Berat ring + tanah	gram	30,11	31,2	28,77	30,12	40,12	33,4	33,6	32,4	32,9	32,8	32,5	32,1	32,5	32,2	
Berat ring	gram	18,5	18,5	18,5	18,5	18,5	18,5	18,5	18,5	18,5	18,5	18,5	18,5	18,5	18,5	
Diameter ring	cm	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	
Tinggi ring	cm	2,6	2,5	2,6	2,5	2,6	2,5	2,6	2,5	2,6	2,5	2,6	2,5	2,6	2,5	
Volume ring	cm ³	10,807	10,391	10,807	10,391	10,807	10,391	10,807	10,391	10,807	10,391	10,807	10,391	10,807	10,391	
Berat tanah	gram	11,61	12,7	10,27	11,62	21,62	14,9	15,1	13,9	14,4	14,3	14	13,6	14	13,7	
γ_t	gr/cm ³	1,074	1,222	0,950	1,118	2,001	1,434	1,397	1,338	1,333	1,376	1,295	1,309	1,295	1,318	
Kadar air	%	-6,41	6,49	16,92	11,08	-1,58	0,07	12,21	20,00	6,62	-6,13	0,00	5,26	6,00	6,43	
γ_d	gr/cm ³	1,148	1,148	0,813	1,007	2,033	1,433	1,245	1,115	1,250	1,466	1,295	1,243	1,222	1,239	
γ_t rata-rata	gr/cm ³									1,319						
γ_d rata-rata	gr/cm ³									1,261						

Lereng dengan perkuatan geotekstil L=22,4 cm; d= 12 cm; n = 1; Z : 0,18 H

Lapisan		1	2	3	4	5	6	7							
Berat cawan + tanah basah	gram	21,9	20,9	20,3	21,9	21,3	21,6	19,8	21,6	21,6	21	21,6	22	21,5	20,3
Berat cawan + tanah kering	gram	21,1	20,1	19,3	20,9	20,8	20,9	18,9	20,8	20,7	20	20,8	21,2	20,6	19,4
Berat cawan	gram	5,7	5,7	4,1	5,5	5,8	5,9	4,3	3,7	5,7	5,7	6	6	5,6	5,4
Berat tanah kering	gram	15,4	14,4	15,2	15,4	15	15	14,6	17,1	15	14,3	14,8	15,2	15	14
Berat air	gram	0,8	0,8	1	1	0,5	0,7	0,9	0,8	0,9	1	0,8	0,8	0,9	0,9
Kadar air	%	5,19	5,56	6,58	6,49	3,33	4,67	6,16	4,68	6,00	6,99	5,41	5,26	6,00	6,43
Kadar air rata-rata (%)		5,63													

Lapisan		1	2	3	4	5	6	7							
Berat ring + tanah	gram	31,4	29,8	30,4	31,4	30,5	31,1	32,2	33,4	32,1	31,2	33,5	30,9	32,5	31,2
Berat ring	gram	18,5	18,5	18,5	18,5	18,5	18,5	18,5	18,5	18,5	18,5	18,5	18,5	18,5	18,5
Diameter ring	cm	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3
Tinggi ring	cm	2,6	2,5	2,6	2,5	2,6	2,5	2,6	2,5	2,6	2,5	2,6	2,5	2,6	2,5
Volume ring	cm ³	10,807	10,391	10,807	10,391	10,807	10,391	10,807	10,391	10,807	10,391	10,807	10,391	10,807	10,391
Berat tanah	gram	12,9	11,3	11,9	12,9	12	12,6	13,7	14,9	13,6	12,7	15	12,4	14	12,7
γ_t	gr/cm ³	1,194	1,087	1,101	1,241	1,110	1,213	1,268	1,434	1,258	1,222	1,388	1,193	1,295	1,222
Kadar air	%	5,19	5,56	6,58	6,49	3,33	4,67	6,16	4,68	6,00	6,99	5,41	5,26	6,00	6,43
γ_d	gr/cm ³	1,135	1,030	1,033	1,166	1,075	1,159	1,194	1,370	1,187	1,142	1,317	1,134	1,222	1,148
γ_t rata-rata	gr/cm ³	1,231													
γ_d rata-rata	gr/cm ³	1,165													

Lereng dengan perkuatan geotekstil L=22,4 cm , d=12 cm n = 1; Z : 0,21 H

Lapisan		1	2	3	4	5	6	7							
Berat cawan + tanah basah	gram	19,12	20,33	20,9	20,3	20,6	19,3	20,1	20,5	22,1	21,2	21,5	20,3	20,5	18,1
Berat cawan + tanah kering	gram	18,9	18,8	19,4	19,2	19,8	18,4	19,7	19,9	21,1	20,9	20,8	19,4	19,9	17,5
Berat cawan	gram	5,4	5,8	4,7	5,8	4,1	4,7	6,1	6	5,7	6	5,6	5,4	5,7	2,9
Berat tanah kering	gram	13,5	13	14,7	13,4	15,7	13,7	13,6	13,9	15,4	14,9	15,2	14	14,2	14,6
Berat air	gram	0,22	1,53	1,5	1,1	0,8	0,9	0,4	0,6	1	0,3	0,7	0,9	0,6	0,6
Kadar air	%	1,63	11,77	10,20	8,21	5,10	6,57	2,94	4,32	6,49	2,01	4,61	6,43	4,23	4,11
Kadar air rata-rata (%)		5,62													

Lapisan		1	2	3	4	5	6	7								
Berat ring + tanah	gram	31,43	31,22	29,03	32,12	30,13	31,2	30,7	31,9	30,5	31,8	30,6	29,3	30,5	32,2	
Berat ring	gram	18,5	18,5	18,5	18,5	18,5	18,5	18,5	18,5	18,5	18,5	18,5	18,5	18,5	18,5	
Diameter ring	cm	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	
Tinggi ring	cm	2,6	2,5	2,6	2,5	2,6	2,5	2,6	2,5	2,6	2,5	2,6	2,5	2,6	2,5	
Volume ring	cm ³	10,807	10,391	10,807	10,391	10,807	10,391	10,807	10,391	10,807	10,391	10,807	10,391	10,807	10,391	
Berat tanah	gram	12,93	12,72	10,53	13,62	11,63	12,7	12,2	13,4	12	13,3	12,1	10,8	12	13,7	
γ_t	gr/cm ³	1,196	1,224	0,974	1,311	1,076	1,222	1,129	1,290	1,110	1,280	1,120	1,039	1,110	1,318	
Kadar air	%	1,63	11,77	10,20	8,21	5,10	6,57	2,94	4,32	6,49	2,01	4,61	6,43	4,23	4,11	
γ_d	gr/cm ³	1,177	1,095	0,884	1,211	1,024	1,147	1,097	1,236	1,043	1,255	1,070	0,977	1,065	1,266	
γ_t rata-rata	gr/cm ³									1,171						
γ_d rata-rata	gr/cm ³									1,111						

Lampiran 7

Perhitungan Daya Dukung Lereng Tanpa Perkuatan ($d=6$ cm) dengan Metode Analitik

1. Metode Shields

Data:

$$\gamma = 1,23 \text{ gr/cm}^3$$

$$\phi = \text{sudut geser dalam tanah} = 34,544^\circ$$

$$\beta = \text{sudut kemiringan lereng} = 51^\circ$$

$$B = \text{lebar pondasi} = 6 \text{ cm} = 2,362 \text{ inchi}$$

$$D = \text{kedalaman pondasi} = 0$$

$$L = \text{panjang pondasi} = \sim$$

$$b = \text{jarak pondasi ke puncak lereng} = 6 \text{ cm} = 2,362 \text{ inchi}$$

$$f_\phi = 10^{(0,1159\phi - 2,386)} = 10^{(0,1159 \cdot 34,544 - 2,386)} = 41,462$$

$$f_B = 10^{(0,34 - 0,2 \log B)} = 10^{(0,34 - 0,2 \log 2,362)} = 1,842$$

$$f_{D/B} = 1 + 0,65 (D/B) = 1 + 0,65 (0/2,362) = 1$$

$$f_{B/L} = 1 - 0,27 (B/L) = 1 - 0,27 (2,362/\sim) = 1$$

$$f_{D/B, B/L} = 1 + 0,39 (D/L) = 1 + 0,39 (0/\sim) = 1$$

$$\begin{aligned} f_{\beta, b/B} &= 1 - 0,8 [1 - (1 - \tan \beta)^2] \{2/[2 + (b/B)^2 \tan \beta]\} \\ &= 1 - 0,8 [1 - (1 - \tan 51^\circ)^2] \{2/[2 + (2,362/2,362)^2 \tan 51^\circ]\} \\ &= 0,5327 \end{aligned}$$

$$\begin{aligned} f_{\beta, b/D, D/B} &= 1 + 0,6 (B/L) [1 - (1 - \tan \beta)^2] \{2/[2 + (b/B)^2 \tan \beta]\} \\ &= 1 + 0,6 (2,362/\sim) [1 - (1 - \tan 51^\circ)^2] \{2/[2 + (2,362/2,362)^2 \tan 51^\circ]\} \\ &= 1 \end{aligned}$$

$$\begin{aligned} f_{\beta, b/B, B/L} &= 1 + 0,33 (D/B) \tan \beta \{2/[2 + (b/B)^2 \tan \beta]\} \\ &= 1 + 0,33 (0/2,362) \tan 51^\circ \{2/[2 + (2,362/2,362)^2 \tan 51^\circ]\} \\ &= 1 \end{aligned}$$

$$N_{\gamma q} = 41,462 \times 1,842 \times 1 \times 1 \times 1 \times 1 \times 0,5327 \times 1 \times 1 = 40,684$$

$$q_u = 0,5 \times \gamma \times B \times N_{\gamma q} = 0,5 \times 1,23 \times 6 \times 40,684 = 150,124 \text{ gr/cm}^2$$

$$q_u = 15,012 \text{ kN/m}^2$$

2. Metode Hansen

Data:

$$\gamma = 1,23 \text{ gr/cm}^3$$

$$\phi = \text{sudut geser dalam tanah} = 34,544^\circ$$

$$\beta = \text{sudut kemiringan lereng} = 51^\circ$$

$$B = \text{lebar pondasi} = 6 \text{ cm}$$

$$D = \text{kedalaman pondasi} = 0$$

$$L = \text{panjang pondasi} = \sim$$

$$b = \text{jarak pondasi ke puncak lereng} = 6 \text{ cm}$$

Untuk $b = 4B$ (Tanah Datar):

$$N_q = e^{\pi \tan \phi} \cdot \tan^2 \left(45 + \frac{\phi}{2} \right) = e^{\pi \tan 34,544} \cdot \tan^2 \left(45 + \frac{34,544}{2} \right) = 31,469$$

$$N_c = (N_q - 1) \cot \phi = (31,469 - 1) \cot 34,544 = 44,259$$

$$N_\gamma = 1,5(N_q - 1) \tan \phi = 1,5(31,469 - 1) \tan 34,544 = 31,463$$

Dengan mengasumsi bahwa nilai $c = 0$ dan $D_f = 0$, maka diperoleh nilai daya dukung sebagai berikut:

$$q_u = c \times N_c + D_f \times \gamma \times N_q + \gamma \times \frac{B}{2} \times N_\gamma$$

$$q_u = 0 \times 44,259 + 0 \times 1,23 \times 31,469 + 1,23 \times \frac{6}{2} \times 31,463$$

$$q_u = 116,098 \text{ gr/cm}^2 = 11,6098 \text{ kN/m}^2$$

Untuk Tanah Lereng:

$$q_u = c N_c s_c d_c i_c g_c b_c + D_f \gamma N_q s_q d_q i_q g_q b_q + \gamma \frac{B}{2} N_\gamma s_\gamma d_\gamma i_\gamma g_\gamma b_\gamma$$

$$N_q = e^{\pi \tan \phi} \cdot \tan^2 \left(45 + \frac{\phi}{2} \right) = e^{\pi \tan 34,544} \cdot \tan^2 \left(45 + \frac{34,544}{2} \right) = 31,469$$

$$N_c = (N_q - 1) \cot \varphi = (31,469 - 1) \cot 34,544 = 44,259$$

$$N_\gamma = 1,5(N_q - 1) \tan \varphi = 1,5(31,469 - 1) \tan 34,544 = 31,463$$

$$d_c = d_q = d_\gamma = 1$$

$$i_c = i_q = i_\gamma = 1$$

$$b_c = b_q = b_\gamma = 1$$

Untuk $d = 0$ cm, maka:

$$g_q = g_\gamma = (1 - 0,5 \tan \beta)^5 = (1 - 0,5 \tan 51)^5 = 0,0082$$

Untuk $D_f = 0$ cm maka nilai daya dukung:

$$q_u = 1,23 \times \frac{6}{2} \times 31,463 \times 0,0082 = 0,952 \text{ gr/cm}^2 = 0,0952 \text{ kN/m}^2$$

Dengan menggunakan interpolasi, dihitung daya dukung pada kondisi $d=B$ (9 cm):

$$d = 0:$$

$$q_u = 0,0952 \text{ kN/m}^2$$

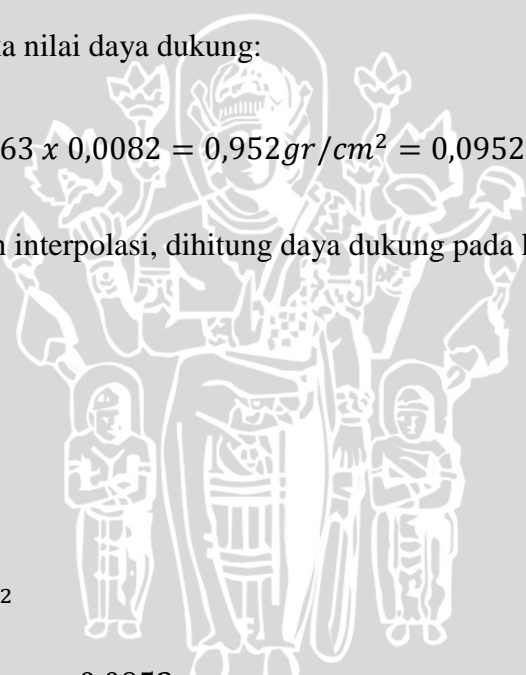
$$d = 4B \text{ (24 cm):}$$

$$q_u = 11,6098 \text{ kN/m}^2$$

$$\frac{11,6098 - 0,0952}{24 - 0} = \frac{q_u - 0,0952}{6 - 0}$$

$$69,0876 = 24q_u - 2,2848$$

$$q_u = 2,974 \text{ kN/m}^2$$



Perhitungan Daya Dukung Lereng Tanpa Perkuatan ($d=9$ cm) dengan Metode

Analitik

1. Metode Shields

Data:

$$\gamma = 1,23 \text{ gr/cm}^3$$

$$\phi = \text{sudut geser dalam tanah} = 34,544^\circ$$

$$\beta = \text{sudut kemiringan lereng} = 51^\circ$$

$$B = \text{lebar pondasi} = 6 \text{ cm} = 2,362 \text{ inchi}$$

$$D = \text{kedalaman pondasi} = 0$$

$$L = \text{panjang pondasi} = \sim$$

$$b = \text{jarak pondasi ke puncak lereng} = 9 \text{ cm} = 3,543 \text{ inchi}$$

$$f_\phi = 10^{(0,1159\phi - 2,386)} = 10^{(0,1159 \cdot 34,544 - 2,386)} = 41,462$$

$$f_B = 10^{(0,34 - 0,2 \log B)} = 10^{(0,34 - 0,2 \log 2,362)} = 1,842$$

$$f_{D/B} = 1 + 0,65 (D/B) = 1 + 0,65 (0/2,362) = 1$$

$$f_{B/L} = 1 - 0,27 (B/L) = 1 - 0,27 (2,362/\sim) = 1$$

$$f_{D/B, B/L} = 1 + 0,39 (D/L) = 1 + 0,39 (0/\sim) = 1$$

$$\begin{aligned} f_{\beta, b/B} &= 1 - 0,8 [1 - (1 - \tan \beta)^2] \{ 2/[2 + (b/B)^2 \tan \beta] \} \\ &= 1 - 0,8 [1 - (1 - \tan 51^\circ)^2] \{ 2/[2 + (3,543/2,362)^2 \tan 51^\circ] \} \\ &= 0,6805 \end{aligned}$$

$$\begin{aligned} f_{\beta, b/D, D/B} &= 1 + 0,6 (B/L) [1 - (1 - \tan \beta)^2] \{ 2/[2 + (b/B)^2 \tan \beta] \} \\ &= 1 + 0,6 (2,362/\sim) [1 - (1 - \tan 51^\circ)^2] \{ 2/[2 + (3,543/2,362)^2 \tan 51^\circ] \} \\ &= 1 \end{aligned}$$

$$\begin{aligned} f_{\beta, b/B, B/L} &= 1 + 0,33 (D/B) \tan \beta \{ 2/[2 + (b/B)^2 \tan \beta] \} \\ &= 1 + 0,33 (0/2,362) \tan 51^\circ \{ 2/[2 + (3,543/2,362)^2 \tan 51^\circ] \} \\ &= 1 \end{aligned}$$

$$N_{\gamma q} = 41,462 \times 1,842 \times 1 \times 1 \times 1 \times 1 \times 0,6805 \times 1 \times 1 = 51,972$$

$$q_u = 0,5 \times \gamma \times B \times N_{\gamma q} = 0,5 \times 1,23 \times 6 \times 51,972 = 191,777 \text{ gr/cm}^2$$

$$q_u = 19,178 \text{ kN/m}^2$$

2. Metode Hansen

Data:

$$\gamma = 1,23 \text{ gr/cm}^3$$

$$\phi = \text{sudut geser dalam tanah} = 34,544^\circ$$

$$\beta = \text{sudut kemiringan lereng} = 51^\circ$$

$$B = \text{lebar pondasi} = 6 \text{ cm}$$

$$D = \text{kedalaman pondasi} = 0$$

$$L = \text{panjang pondasi} = \sim$$

$$b = \text{jarak pondasi ke puncak lereng} = 9 \text{ cm}$$

Untuk $b = 4B$ (Tanah Datar):

$$N_q = e^{\pi \tan \phi} \cdot \tan^2 \left(45 + \frac{\phi}{2} \right) = e^{\pi \tan 34,544} \cdot \tan^2 \left(45 + \frac{34,544}{2} \right) = 31,469$$

$$N_c = (N_q - 1) \cot \phi = (31,469 - 1) \cot 34,544 = 44,259$$

$$N_\gamma = 1,5(N_q - 1) \tan \phi = 1,5(31,469 - 1) \tan 34,544 = 31,463$$

Dengan mengasumsi bahwa nilai $c = 0$ dan $D_f = 0$, maka diperoleh nilai daya dukung sebagai berikut:

$$q_u = c \times N_c + D_f \times \gamma \times N_q + \gamma \times \frac{B}{2} \times N_\gamma$$

$$q_u = 0 \times 44,259 + 0 \times 1,23 \times 31,469 + 1,23 \times \frac{6}{2} \times 31,463$$

$$q_u = 116,098 \text{ gr/cm}^2 = 11,6098 \text{ kN/m}^2$$

Untuk Tanah Lereng:

$$q_u = c N_c s_c d_c i_c g_c b_c + D_f \gamma N_q s_q d_q i_q g_q b_q + \gamma \frac{B}{2} N_\gamma s_\gamma d_\gamma i_\gamma g_\gamma b_\gamma$$

$$N_q = e^{\pi \tan \phi} \cdot \tan^2 \left(45 + \frac{\phi}{2} \right) = e^{\pi \tan 34,544} \cdot \tan^2 \left(45 + \frac{34,544}{2} \right) = 31,469$$

$$N_c = (N_q - 1)cot\phi = (31,469 - 1) cot 34,544 = 44,259$$

$$N_\gamma = 1,5(N_q - 1)tan\phi = 1,5(31,469 - 1) tan 34,544 = 31,463$$

$$d_c = d_q = d_\gamma = 1$$

$$i_c = i_q = i_\gamma = 1$$

$$b_c = b_q = b_\gamma = 1$$

Untuk $d = 0$ cm, maka:

$$g_q = g_\gamma = (1 - 0,5tan\beta)^5 = (1 - 0,5tan51)^5 = 0,0082$$

Untuk $D_f = 0$ cm maka nilai daya dukung:

$$q_u = 1,23 \times \frac{6}{2} \times 31,463 \times 0,0082 = 0,952 gr/cm^2 = 0,0952 kN/m^2$$

Dengan menggunakan interpolasi, dihitung daya dukung pada kondisi $d = 1,5B$ (9 cm):

$d = 0$:

$$q_u = 0,0952 kN/m^2$$

$d = 4B$ (24 cm):

$$q_u = 11,6098 kN/m^2$$

$$\frac{11,6098 - 0,0952}{24 - 0} = \frac{q_u - 0,0952}{9 - 0}$$

$$103,6314 = 24q_u - 2,2848$$

$$q_u = 4,413 kN/m^2$$

Perhitungan Daya Dukung Lereng Tanpa Perkuatan (d=12 cm) dengan Metode Analitik

1. Metode Shields

Data:

$$\gamma = 1,23 \text{ gr/cm}^3$$

$$\phi = \text{sudut geser dalam tanah} = 34,544^\circ$$

$$\beta = \text{sudut kemiringan lereng} = 51^\circ$$

$$B = \text{lebar pondasi} = 6 \text{ cm} = 2,362 \text{ inchi}$$

$$D = \text{kedalaman pondasi} = 0$$

$$L = \text{panjang pondasi} = \sim$$

$$b = \text{jarak pondasi ke puncak lereng} = 12 \text{ cm} = 4,724 \text{ inchi}$$

$$f_\phi = 10^{(0,1159\phi - 2,386)} = 10^{(0,1159 \cdot 34,544 - 2,386)} = 41,462$$

$$f_B = 10^{(0,34 - 0,2 \log B)} = 10^{(0,34 - 0,2 \log 2,362)} = 1,842$$

$$f_{D/B} = 1 + 0,65 (D/B) = 1 + 0,65 (0/2,362) = 1$$

$$f_{B/L} = 1 - 0,27 (B/L) = 1 - 0,27 (2,362/\sim) = 1$$

$$f_{D/B, B/L} = 1 + 0,39 (D/L) = 1 + 0,39 (0/\sim) = 1$$

$$\begin{aligned} f_{\beta, b/B} &= 1 - 0,8 [1 - (1 - \tan \beta)^2] \{ 2/[2 + (b/B)^2 \tan \beta] \} \\ &= 1 - 0,8 [1 - (1 - \tan 51^\circ)^2] \{ 2/[2 + (4,724/2,362)^2 \tan 51^\circ] \} \\ &= 0,782 \end{aligned}$$

$$\begin{aligned} f_{\beta, b/D, D/B} &= 1 + 0,6 (B/L) [1 - (1 - \tan \beta)^2] \{ 2/[2 + (b/B)^2 \tan \beta] \} \\ &= 1 + 0,6 (2,362/\sim) [1 - (1 - \tan 51^\circ)^2] \{ 2/[2 + (4,724/2,362)^2 \tan 51^\circ] \} \\ &= 1 \end{aligned}$$

$$\begin{aligned} f_{\beta, b/B, B/L} &= 1 + 0,33 (D/B) \tan \beta \{ 2/[2 + (b/B)^2 \tan \beta] \} \\ &= 1 + 0,33 (0/2,362) \tan 51^\circ \{ 2/[2 + (4,724/2,362)^2 \tan 51^\circ] \} \\ &= 1 \end{aligned}$$

$$N_{\gamma q} = 41,462 \times 1,842 \times 1 \times 1 \times 1 \times 1 \times 0,782 \times 1 \times 1 = 51,972$$

$$q_u = 0,5 \times \gamma \times B \times N_{\gamma q} = 0,5 \times 1,23 \times 6 \times 51,972 = 220,382 \text{ gr/cm}^2$$

$$q_u = 22,038 \text{ kN/m}^2$$

2. Metode Hansen

Data:

$$\gamma = 1,23 \text{ gr/cm}^3$$

$$\phi = \text{sudut geser dalam tanah} = 34,544^\circ$$

$$\beta = \text{sudut kemiringan lereng} = 51^\circ$$

$$B = \text{lebar pondasi} = 6 \text{ cm}$$

$$D = \text{kedalaman pondasi} = 0$$

$$L = \text{panjang pondasi} = \sim$$

$$b = \text{jarak pondasi ke puncak lereng} = 12 \text{ cm}$$

Untuk $b = 4B$ (Tanah Datar):

$$N_q = e^{\pi \tan \phi} \cdot \tan^2 \left(45 + \frac{\phi}{2} \right) = e^{\pi \tan 34,544} \cdot \tan^2 \left(45 + \frac{34,544}{2} \right) = 31,469$$

$$N_c = (N_q - 1) \cot \phi = (31,469 - 1) \cot 34,544 = 44,259$$

$$N_\gamma = 1,5(N_q - 1) \tan \phi = 1,5(31,469 - 1) \tan 34,544 = 31,463$$

Dengan mengasumsi bahwa nilai $c = 0$ dan $D_f = 0$, maka diperoleh nilai daya dukung sebagai berikut:

$$q_u = c \times N_c + D_f \times \gamma \times N_q + \gamma \times \frac{B}{2} \times N_\gamma$$

$$q_u = 0 \times 44,259 + 0 \times 1,23 \times 31,469 + 1,23 \times \frac{6}{2} \times 31,463$$

$$q_u = 116,098 \text{ gr/cm}^2 = 11,6098 \text{ kN/m}^2$$

Untuk Tanah Lereng:

$$q_u = c N_c s_c d_c i_c g_c b_c + D_f \gamma N_q s_q d_q i_q g_q b_q + \gamma \frac{B}{2} N_\gamma s_\gamma d_\gamma i_\gamma g_\gamma b_\gamma$$

$$N_q = e^{\pi \tan \phi} \cdot \tan^2 \left(45 + \frac{\phi}{2} \right) = e^{\pi \tan 34,544} \cdot \tan^2 \left(45 + \frac{34,544}{2} \right) = 31,469$$

$$N_c = (N_q - 1) \cot \varphi = (31,469 - 1) \cot 34,544 = 44,259$$

$$N_\gamma = 1,5(N_q - 1) \tan \varphi = 1,5(31,469 - 1) \tan 34,544 = 31,463$$

$$d_c = d_q = d_\gamma = 1$$

$$i_c = i_q = i_\gamma = 1$$

$$b_c = b_q = b_\gamma = 1$$

Untuk $d = 0$ cm, maka:

$$g_q = g_\gamma = (1 - 0,5 \tan \beta)^5 = (1 - 0,5 \tan 51)^5 = 0,0082$$

Untuk $D_f = 0$ cm maka nilai daya dukung:

$$q_u = 1,23 \times \frac{6}{2} \times 31,463 \times 0,0082 = 0,952 \text{ gr/cm}^2 = 0,0952 \text{ kN/m}^2$$

Dengan menggunakan interpolasi, dihitung daya dukung pada kondisi $d=2B$ (12 cm):

$d = 0$:

$$q_u = 0,0952 \text{ kN/m}^2$$

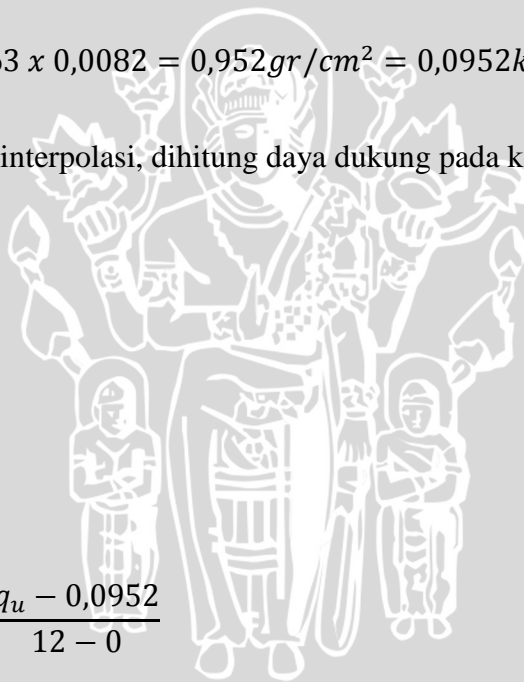
$d = 4B$ (24 cm):

$$q_u = 11,6098 \text{ kN/m}^2$$

$$\frac{11,6098 - 0,0952}{24 - 0} = \frac{q_u - 0,0952}{12 - 0}$$

$$138,175 = 24q_u - 2,2848$$

$$q_u = 5,853 \text{ kN/m}^2$$



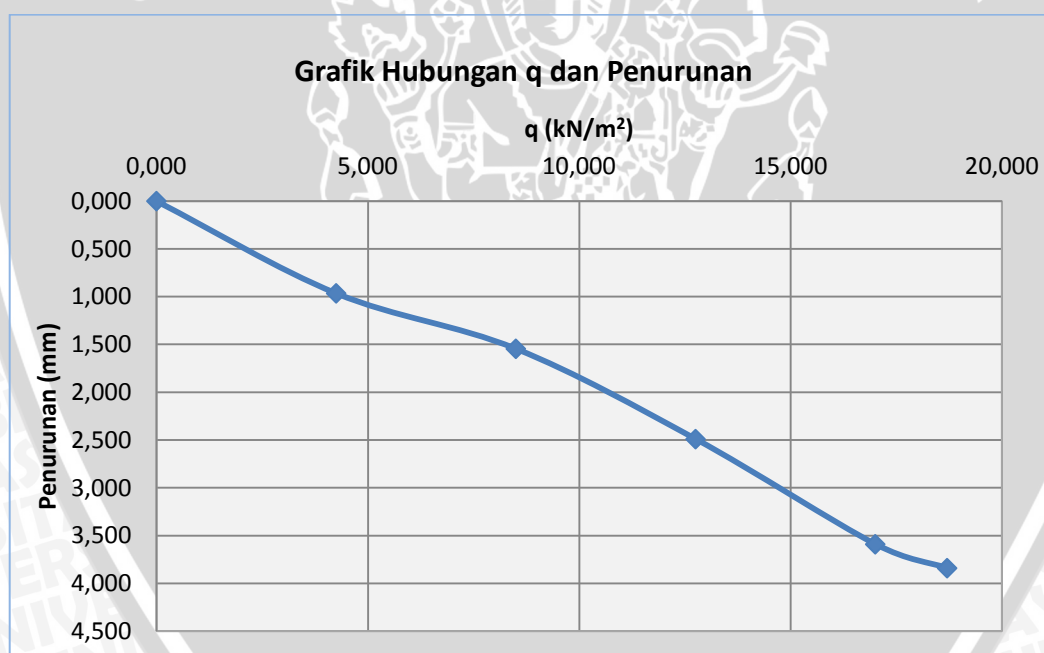
Lampiran 8

Hasil Analisis Daya Dukung Lereng dengan Metode Eksperimen

Lereng tanpa perkuatan

$d = 6 \text{ cm}$

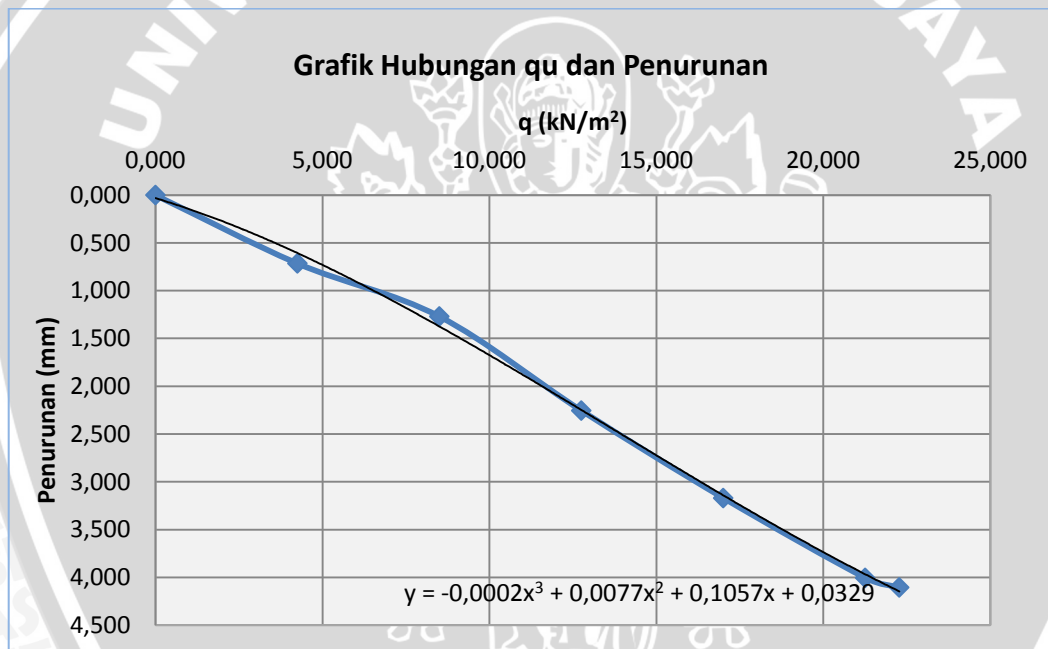
Beban (kg)	LVDT	Penurunan (mm)	s/B (%)	q (kg/cm ²)	q (kN/m ²)
0	2864	0,000	0,000	0,000	0,000
25	2671	0,965	1,608	0,043	4,252
50	2555	1,545	2,575	0,085	8,503
75	2366	2,490	4,150	0,128	12,755
100	2146	3,590	5,983	0,170	17,007
110	2096	3,840	6,400	0,187	18,707



Lereng tanpa perkuatan

d= 9 cm

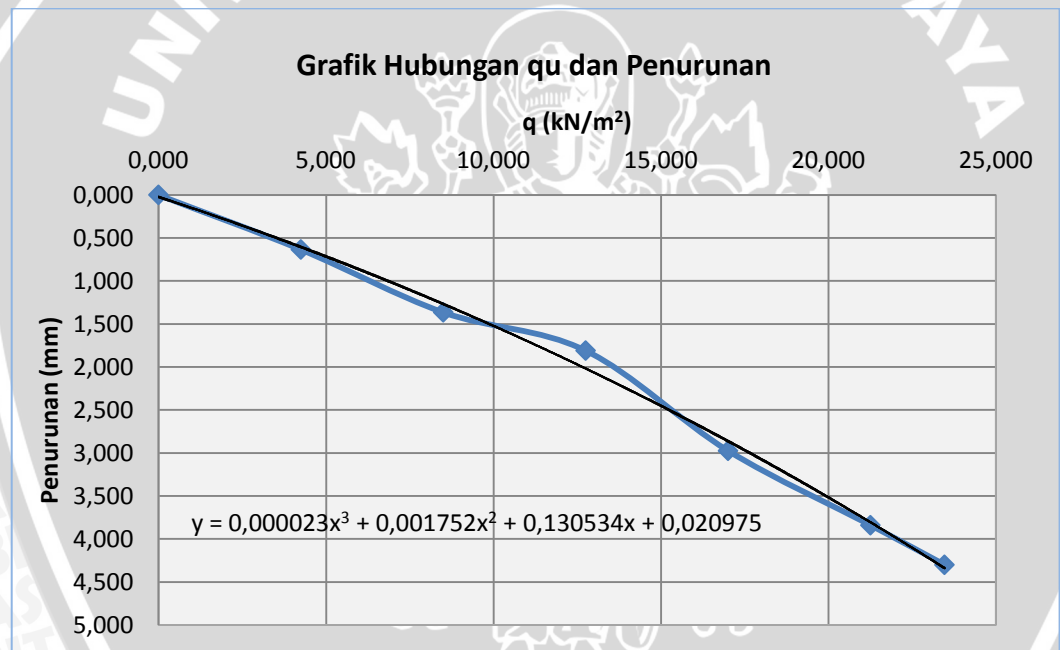
Beban (kg)	LVDT	Penurunan (mm)	s/B (%)	q (kg/cm ²)	q (kN/m ²)
0	5110	0,000	0,000	0,000	0,000
25	4967	0,715	1,192	0,043	4,252
50	4856	1,270	2,117	0,085	8,503
75	4659	2,255	3,758	0,128	12,755
100	4476	3,170	5,283	0,170	17,007
125	4309	4,005	6,675	0,213	21,259
131	4289	4,105	6,842	0,223	22,279



Lereng tanpa perkuatan

d= 12 cm

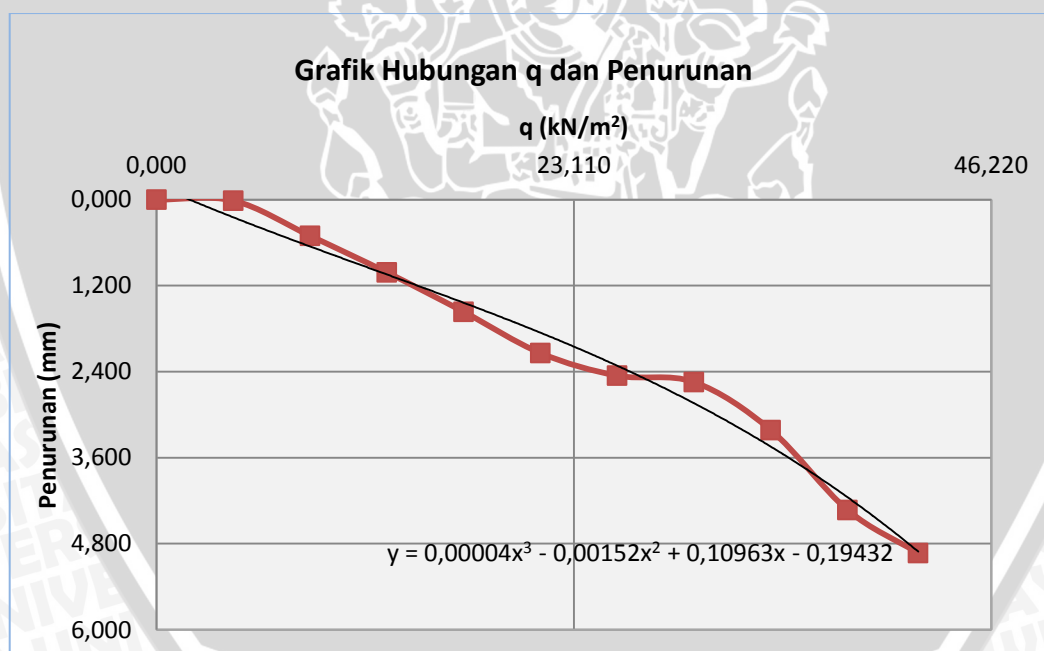
Beban (kg)	LVDT	Penurunan (mm)	s/B (%)	q (kg/cm ²)	q (kN/m ²)
0	4344	0,000	0,000	0,000	0,000
25	4217	0,635	1,058	0,043	4,252
50	4071	1,365	2,275	0,085	8,503
75	3982	1,810	3,017	0,128	12,755
100	3749	2,975	4,958	0,170	17,007
125	3576	3,840	6,400	0,213	21,259
138	3484	4,300	7,167	0,235	23,469



Lereng dengan Perkuatan Geotekstil

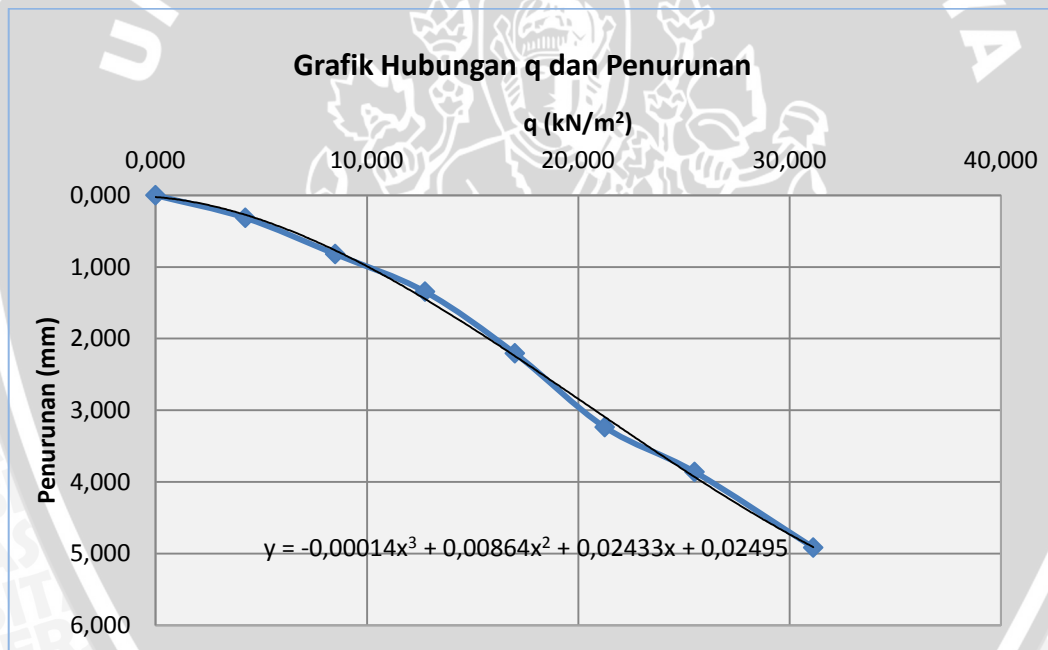
D=6; Sv=0,15; n=1; L= 0,22 H

Beban (kg)	LVDT	Penurunan (mm)	s/B (%)	q (kg/cm ²)	q (kN/m ²)
0	4998	0,000	0,000	0,000	0,000
25	4995	0,015	0,025	0,043	4,252
50	4897	0,505	0,842	0,085	8,503
75	4795	1,015	1,692	0,128	12,755
100	4685	1,565	2,608	0,170	17,007
125	4570	2,140	3,567	0,213	21,259
150	4507	2,455	4,092	0,255	25,510
175	4489	2,545	4,242	0,298	29,762
200	4355	3,215	5,358	0,340	34,014
225	4132	4,33	7,217	0,383	38,265
248	4012	4,93	8,217	0,422	42,177



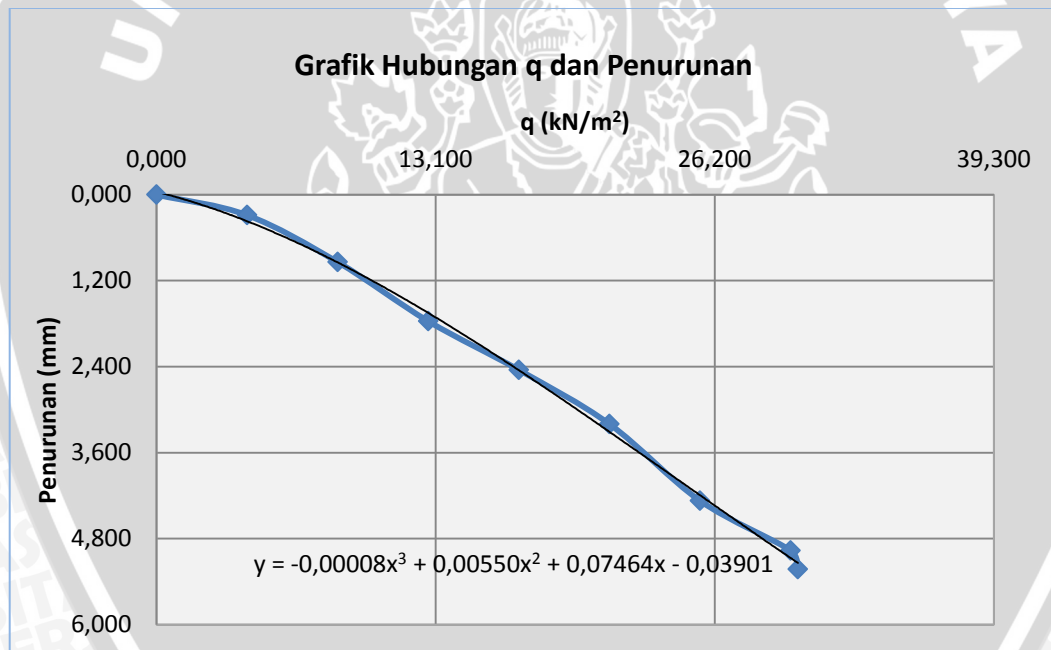
D=6; Sv=0,18; n=1; L= 0,22 H

Beban (kg)	LVDT	Penurunan (mm)	s/B (%)	q (kg/cm ²)	q (kN/m ²)
0	4854	0,000	0,000	0,000	0,000
25	4791	0,315	0,525	0,043	4,252
50	4690	0,820	1,367	0,085	8,503
75	4585	1,345	2,242	0,128	12,755
100	4413	2,205	3,675	0,170	17,007
125	4207	3,235	5,392	0,213	21,259
150	4082	3,860	6,433	0,255	25,510
168	3871	4,915	8,192	0,286	31,125



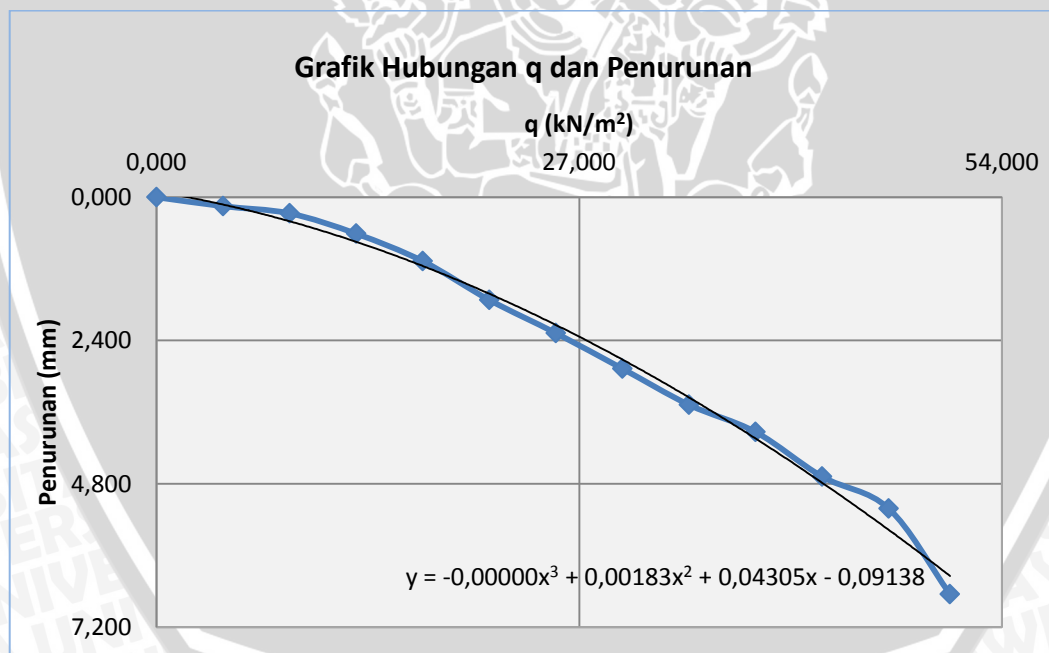
D=6; Sv=0,21; n=1; L= 0,22 H

Beban (kg)	LVDT	Penurunan (mm)	s/B (%)	q (kg/cm ²)	q (kN/m ²)
0	4725	0,000	0,000	0,000	0,000
25	4668	0,285	0,475	0,043	4,252
50	4537	0,940	1,567	0,085	8,503
75	4372	1,765	2,942	0,128	12,755
100	4236	2,445	4,075	0,170	17,007
125	4085	3,200	5,333	0,213	21,259
150	3871	4,270	7,117	0,255	25,510
175	3732	4,965	8,275	0,298	29,762
177	3680	5,225	8,708	0,301	30,102



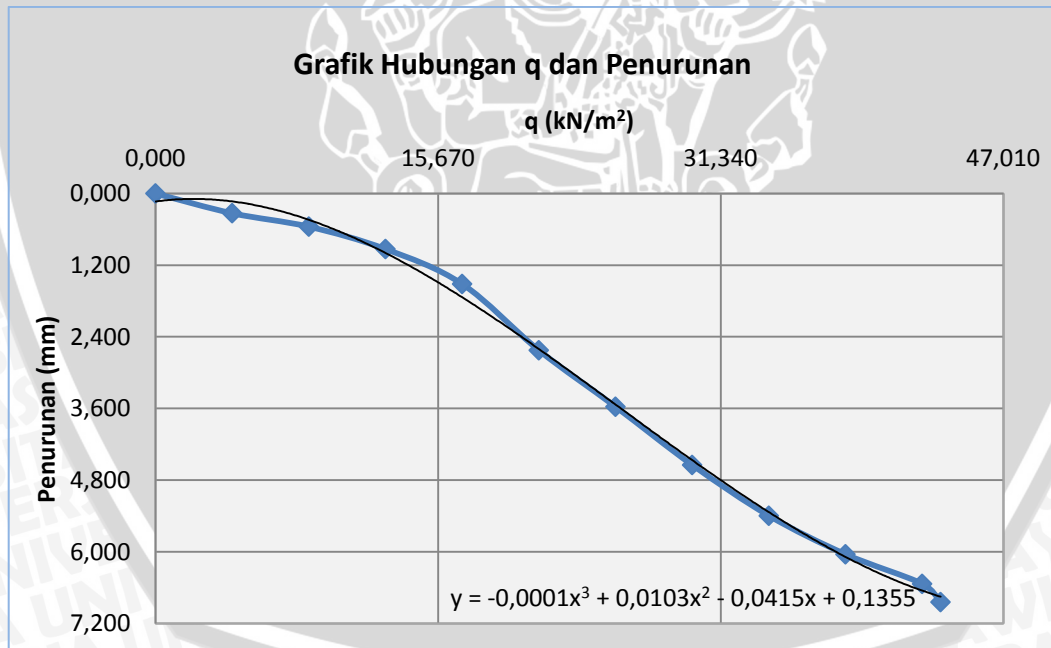
D=9; Sv=0,15; n=1; L= 0,22 H

Beban (kg)	LVDT	Penurunan (mm)	s/B (%)	q (kg/cm ²)	q (kN/m ²)
0	4887	0,000	0,000	0,000	0,000
25	4857	0,150	0,250	0,043	4,252
50	4833	0,270	0,450	0,085	8,503
75	4765	0,610	1,017	0,128	12,755
100	4673	1,070	1,783	0,170	17,007
125	4543	1,720	2,867	0,213	21,259
150	4432	2,275	3,792	0,255	25,510
175	4313	2,870	4,783	0,298	29,762
200	4192	3,475	5,7917	0,340	34,014
225	4101	3,93	6,55	0,383	38,265
250	4022	4,677	7,795	0,425	42,517
275	3912	5,212	8,6867	0,468	46,769
298	3882	6,645	11,075	0,507	50,680



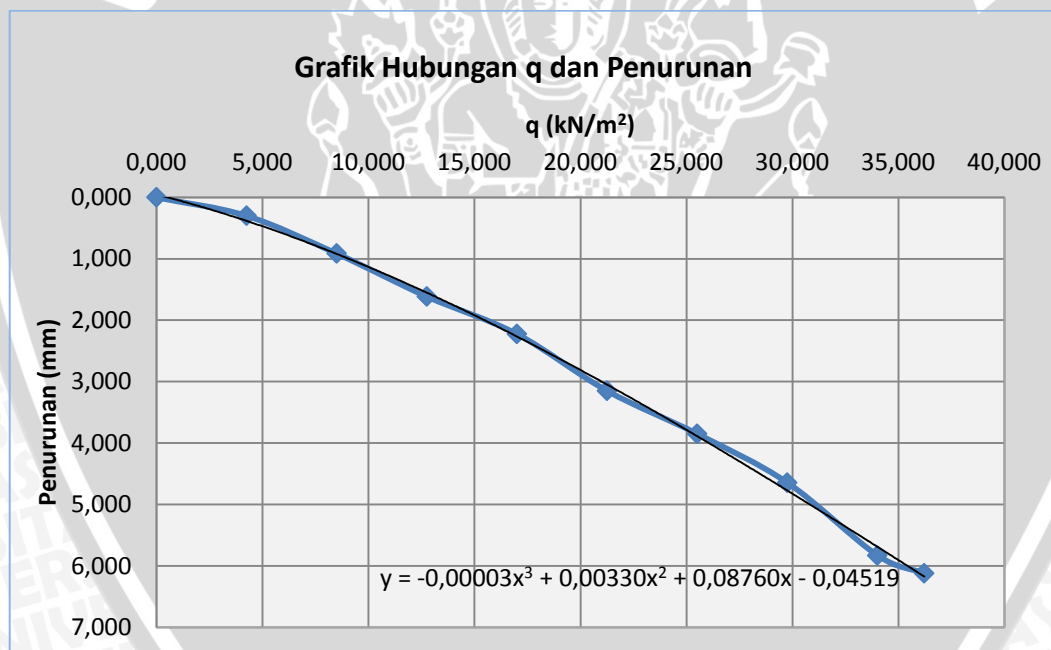
D=9; Sv=0,18; n=1; L= 0,22 H

Beban (kg)	LVDT	Penurunan (mm)	s/B (%)	q (kg/cm ²)	q (kN/m ²)
0	4900	0,000	0,000	0,000	0,000
25	4834	0,330	0,550	0,043	4,252
50	4789	0,555	0,925	0,085	8,503
75	4714	0,930	1,550	0,128	12,755
100	4597	1,515	2,525	0,170	17,007
125	4375	2,625	4,375	0,213	21,259
150	4186	3,570	5,950	0,255	25,510
175	3991	4,545	7,575	0,298	29,762
200	3821	5,395	8,992	0,340	34,014
225	3692	6,040	10,067	0,383	38,265
250	3593	6,535	10,892	0,425	42,517
256	3532	6,840	11,400	0,435	43,537



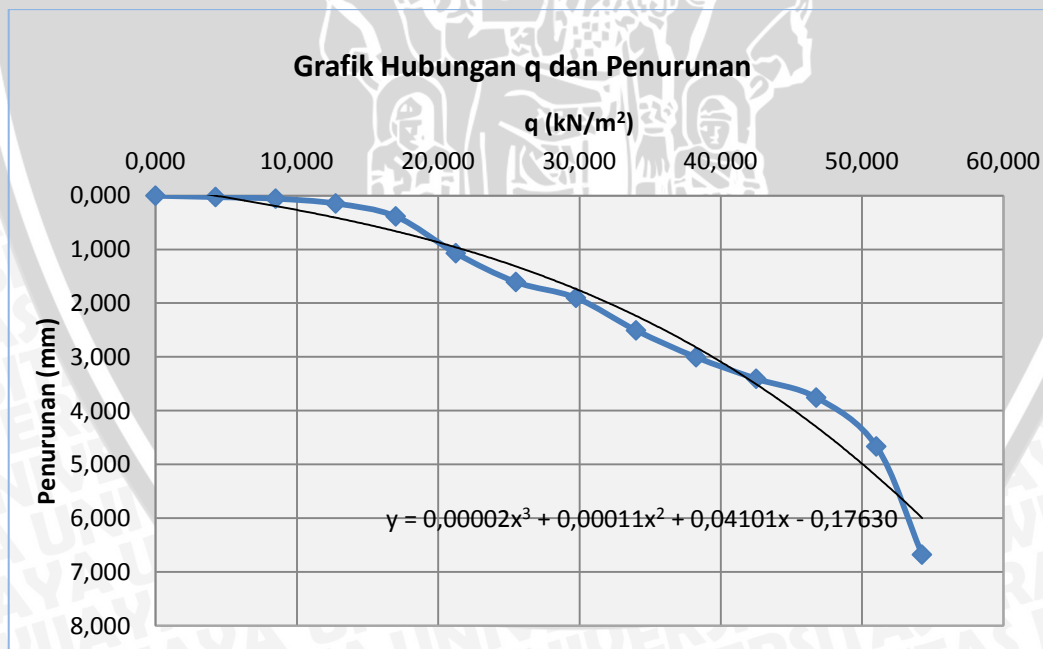
D=9; Sv=0,21; n=1; L= 0,22 H

Beban (kg)	LVDT	Penurunan (mm)	s/B (%)	q (kg/cm ²)	q (kN/m ²)
0	4581	0,000	0,000	0,000	0,000
25	4521	0,300	0,500	0,043	4,252
50	4398	0,915	1,525	0,085	8,503
75	4258	1,615	2,692	0,128	12,755
100	4136	2,225	3,708	0,170	17,007
125	3951	3,150	5,250	0,213	21,259
150	3811	3,850	6,417	0,255	25,510
175	3652	4,645	7,742	0,298	29,762
200	3415	5,830	9,717	0,340	34,014
213	3357	6,12	10,200	0,362	36,224



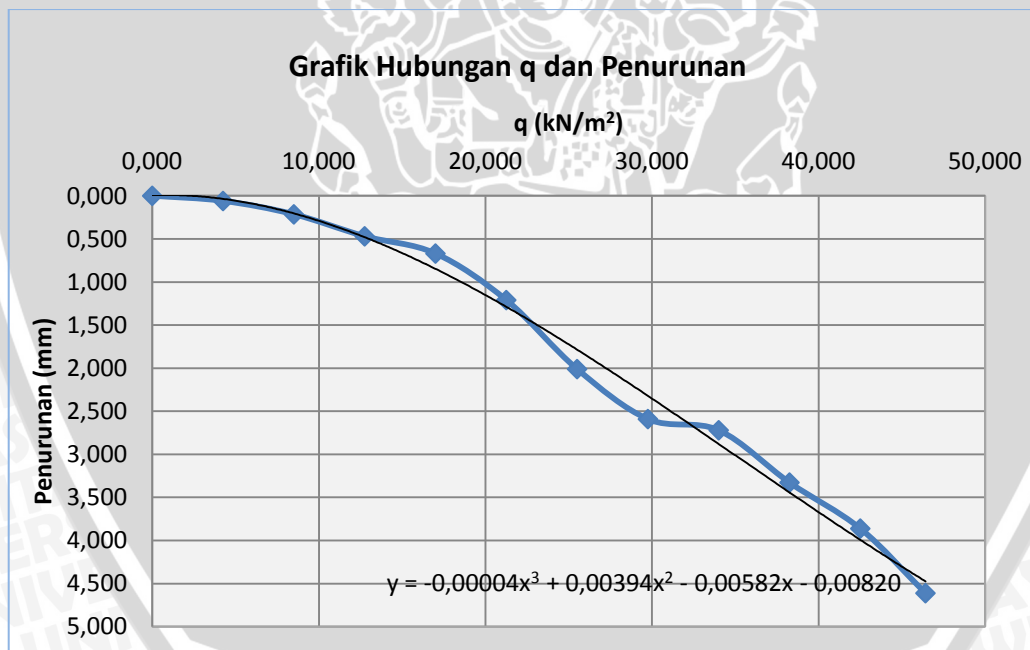
D=12; Sv=0,15; n=1; L= 0,22 H

Beban (kg)	LVDT	Penurunan (mm)	s/B (%)	q (kg/cm ²)	q (kN/m ²)
0	5113	0,000	0,000	0,000	0,000
25	5108	0,025	0,042	0,043	4,252
50	5102	0,055	0,092	0,085	8,503
75	5084	0,145	0,242	0,128	12,755
100	5036	0,385	0,642	0,170	17,007
125	4899	1,070	1,783	0,213	21,259
150	4792	1,605	2,675	0,255	25,510
175	4733	1,900	3,167	0,298	29,762
200	4612	2,505	4,175	0,340	34,014
225	4512	3,005	5,008	0,383	38,265
250	4432	3,405	5,675	0,425	42,517
275	4362	3,755	6,258	0,468	46,769
300	4302	4,664	7,773	0,510	51,020
319	3785	6,676	11,127	0,543	54,252



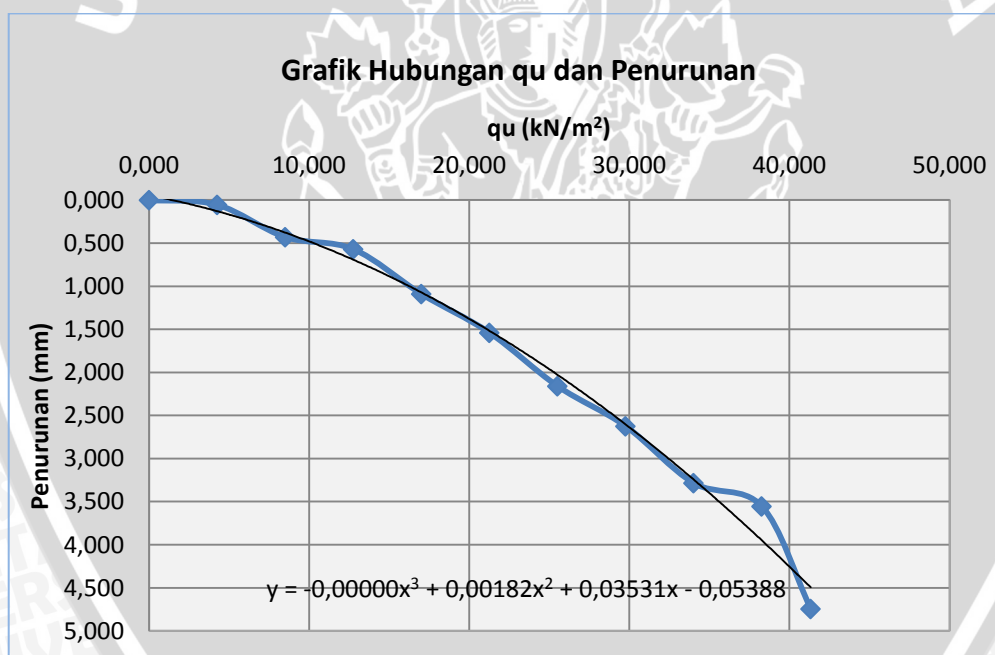
D=12; Sv=0,18; n=1; L= 0,22 H

Beban (kg)	LVDT	Penurunan (mm)	s/B (%)	qu (kg/cm ²)	qu (kN/m ²)
0	4655	0,000	0,000	0,000	0,000
25	4643	0,060	0,100	0,043	4,252
50	4612	0,215	0,358	0,085	8,503
75	4561	0,470	0,783	0,128	12,755
100	4521	0,670	1,117	0,170	17,007
125	4413	1,210	2,017	0,213	21,259
150	4262	2,011	3,352	0,255	25,510
175	4177	2,591	4,3183	0,298	29,762
200	4087	2,721	4,535	0,340	34,014
225	4012	3,328	5,5467	0,383	38,265
250	3924	3,862	6,4367	0,425	42,517
273	3912	4,612	7,6867	0,464	46,429



D=12; Sv=0,21; n=1; L= 0,22 H

Beban (kg)	LVDT	Penurunan (mm)	s/B (%)	qu (kg/cm ²)	qu (kN/m ²)
0	5103	0,000	0,000	0,000	0,000
25	5092	0,055	0,092	0,043	4,252
50	5017	0,430	0,717	0,085	8,503
75	4989	0,570	0,950	0,128	12,755
100	4885	1,090	1,817	0,170	17,007
125	4795	1,540	2,567	0,213	21,259
150	4671	2,160	3,600	0,255	25,510
175	4578	2,625	4,375	0,298	29,762
200	4446	3,285	5,475	0,340	34,014
225	4392	3,555	5,925	0,383	38,265
243	4154	4,745	7,9083	0,413	41,327



Lampiran 9

Perhitungan Daya Dukung pada Penurunan s/B: 2%, 4%, 6% dan 7,167%

Daya dukung (q) diperoleh dengan interpolasi orde dua dengan rumus:

$$f(x_0) = b_0 + b_1(x_0 - x_0) + b_2(x_0 - x_0)(x_0 - x_1)$$

$$b_0 = f(x_0)$$

$$b_1 = \frac{f(x_1) - f(x_0)}{x_1 - x_0}$$

$$b_2 = \frac{\frac{f(x_2) - f(x_1)}{x_2 - x_1} - \frac{f(x_1) - f(x_0)}{x_1 - x_0}}{x_2 - x_0}$$

Lereng tanpa perkuatan

TANPA PERKUATAN D=12 CM

s/B(%)	s/B (%)		q (kN/m ²)		B ₁	B ₂	q (kN/m ²)
(x)	(x ₀ ,x ₁ ,x ₂)		[f(x ₀),f(x ₁),f(x ₂)]				f(x)
2	x ₀	1,058	f(x ₀)	4,252	3,495	1,143	10,213
	x ₁	2,275	f(x ₁)	8,503			
	x ₂	3,017	f(x ₂)	12,755			
4	x ₀	2,275	f(x ₀)	8,503	5,733	-1,320	16,153
	x ₁	3,017	f(x ₁)	12,755			
	x ₂	4,958	f(x ₂)	17,007			
6	x ₀	3,017	f(x ₀)	12,755	2,190	0,224	19,985
	x ₁	4,958	f(x ₁)	17,007			
	x ₂	6,400	f(x ₂)	21,259			
7,167							23,469

TANPA PERKUATAN D=6 CM

s/B(%)	s/B (%)		q (kN/m ²)		B ₁	B ₂	q (kN/m ²)
(x)	(x ₀ ,x ₁ ,x ₂)		[f(x ₀),f(x ₁),f(x ₂)]				f(x)
2	x ₀	1,608	f(x ₀)	4,252	4,398	-0,668	6,125
	x ₁	2,575	f(x ₁)	8,503			
	x ₂	4,150	f(x ₂)	12,755			
4	x ₀	1,608	f(x ₀)	4,252	4,398	-0,668	12,493
	x ₁	2,575	f(x ₁)	8,503			
	x ₂	4,150	f(x ₂)	12,755			
6	x ₀	4,150	f(x ₀)	12,755	2,319	0,783	17,070
	x ₁	5,983	f(x ₁)	17,007			
	x ₂	6,400	f(x ₂)	18,707			
6,4							18,707

TANPA PERKUATAN D=9 CM

s/B(%)	s/B (%)		q (kN/m ²)		B ₁	B ₂	q (kN/m ²)
(x)	(x ₀ ,x ₁ ,x ₂)		[f(x ₀),f(x ₁),f(x ₂)]				f(x)
2	x ₀	1,192	f(x ₀)	4,252	4,596	-0,782	8,041
	x ₁	2,117	f(x ₁)	8,503			
	x ₂	3,758	f(x ₂)	12,755			
4	x ₀	2,117	f(x ₀)	8,503	2,590	0,063	13,409
	x ₁	3,758	f(x ₁)	12,755			
	x ₂	5,283	f(x ₂)	17,007			
6	x ₀	3,758	f(x ₀)	12,755	2,788	0,092	19,152
	x ₁	5,283	f(x ₁)	17,007			
	x ₂	6,675	f(x ₂)	21,259			
6,942							22,279

Lereng dengan perkuatan variasi tebal lipatan

d	TEBAL LIPATAN	s/B (%) (x)	s/B (%)		q (kN/m ²)		B ₁	B ₂	q (kN/m ²)
			(x ₀ ,x ₁ ,x ₂)	[f(x ₀),f(x ₁),f(x ₂)]	f(x)				
6	Sv/H=0.15	2	x ₀	0,842	f(x ₀)	8,503	5,002	-0,206	12,143
			x ₁	1,692	f(x ₁)	12,755			
			x ₂	2,608	f(x ₂)	17,007			
	Sv/H=0.18		x ₀	0,525	f(x ₀)	4,252	5,052	-0,112	10,113
			x ₁	1,367	f(x ₁)	8,503			
			x ₂	2,242	f(x ₂)	12,755			
	Sv/H=0.21		x ₀	0,475	f(x ₀)	0,043	7,750	-1,888	8,465
			x ₁	1,567	f(x ₁)	8,503			
			x ₂	2,942	f(x ₂)	12,755			
9	Sv/H=0.15	2	x ₀	1,017	f(x ₀)	12,755	5,546	-0,876	16,778
			x ₁	1,783	f(x ₁)	17,007			
			x ₂	2,867	f(x ₂)	21,259			
	Sv/H=0.18		x ₀	0,925	f(x ₀)	8,503	6,803	1,199	14,665
			x ₁	1,550	f(x ₁)	12,755			
			x ₂	2,525	f(x ₂)	21,259			
	Sv/H=0.21		x ₀	0,500	f(x ₀)	4,252	4,148	-0,230	12,288
			x ₁	1,525	f(x ₁)	8,503			
			x ₂	2,692	f(x ₂)	12,755			
12	Sv/H=0.15	2	x ₀	0,642	f(x ₀)	17,007	3,724	0,514	22,114
			x ₁	1,783	f(x ₁)	21,259			
			x ₂	2,675	f(x ₂)	25,510			
	Sv/H=0.18		x ₀	0,783	f(x ₀)	12,755	12,755	-6,512	19,243
			x ₁	1,117	f(x ₁)	17,007			
			x ₂	2,017	f(x ₂)	21,259			
	Sv/H=0.21		x ₀	0,950	f(x ₀)	12,755	4,906	0,472	16,877
			x ₁	1,817	f(x ₁)	17,007			
			x ₂	2,567	f(x ₂)	21,259			

d	Tebal Lipatan	s/B(%)	s/B (%)		q (kN/m ²)		B ₁	B ₂	q (kN/m ²)
		(x)	(x ₀ ,x ₁ ,x ₂)	[f(x ₀),f(x ₁),f(x ₂)]	f(x)				
6	Sv/H=0.15	4	x ₀	2,608	f(x ₀)	17,007	4,437	2,469	12,223
			x ₁	3,567	f(x ₁)	21,259			
			x ₂	4,092	f(x ₂)	25,510			
	Sv/H=0.18		x ₀	2,242	f(x ₀)	12,755	2,966	-0,155	10,314
			x ₁	3,675	f(x ₁)	17,007			
			x ₂	5,392	f(x ₂)	21,259			
	Sv/H=0.21		x ₀	1,567	f(x ₀)	8,503	3,092	0,263	9,176
			x ₁	2,942	f(x ₁)	12,755			
			x ₂	4,075	f(x ₂)	17,007			
9	Sv/H=0.15	x ₀	2,867	f(x ₀)	21,259	4,596	-0,161	17,776	
		x ₁	3,792	f(x ₁)	25,510				
		x ₂	4,783	f(x ₂)	29,762				
	Sv/H=0.18	x ₀	1,550	f(x ₀)	12,755	4,361	-0,730	15,887	
		x ₁	2,525	f(x ₁)	17,007				
		x ₂	4,375	f(x ₂)	21,259				
	Sv/H=0.21	x ₀	2,692	f(x ₀)	12,755	4,182	-0,557	14,156	
		x ₁	3,708	f(x ₁)	17,007				
		x ₂	5,250	f(x ₂)	21,259				
12	Sv/H=0.15	x ₀	2,675	f(x ₀)	25,510	8,648	-2,954	25,132	
		x ₁	3,167	f(x ₁)	29,762				
		x ₂	4,175	f(x ₂)	34,014				
	Sv/H=0.18	x ₀	2,017	f(x ₀)	21,259	3,185	0,527	23,144	
		x ₁	3,352	f(x ₁)	25,510				
		x ₂	4,318	f(x ₂)	29,762				
	Sv/H=0.21	x ₀	2,567	f(x ₀)	21,259	4,115	0,758	21,980	
		x ₁	3,600	f(x ₁)	25,510				
		x ₂	4,375	f(x ₂)	29,762				



d	Tebal Lipatan	s/B(%)	s/B (%)		q (kN/m ²)		B ₁	B ₂	q (kN/m ²)
		(x)	(x ₀ ,x ₁ ,x ₂)	[f(x ₀),f(x ₁),f(x ₂)]	f(x)				
6	Sv/H=0.15	6	x ₀	4,242	f(x ₀)	29,762	3,807	-0,511	9,565
			x ₁	5,358	f(x ₁)	34,014			
			x ₂	7,217	f(x ₂)	38,265			
	Sv/H=0.18		x ₀	3,675	f(x ₀)	17,007	2,477	0,582	8,560
			x ₁	5,392	f(x ₁)	21,259			
			x ₂	6,433	f(x ₂)	25,510			
	Sv/H=0.21		x ₀	4,075	f(x ₀)	17,007	3,379	-0,327	7,111
			x ₁	5,333	f(x ₁)	21,259			
			x ₂	7,117	f(x ₂)	25,510			
9	Sv/H=0.15	6	x ₀	4,783	f(x ₀)	29,762	4,217	0,787	14,422
			x ₁	5,792	f(x ₁)	34,014			
			x ₂	6,550	f(x ₂)	38,265			
	Sv/H=0.18		x ₀	4,375	f(x ₀)	21,259	2,699	-0,026	12,667
			x ₁	5,950	f(x ₁)	25,510			
			x ₂	7,575	f(x ₂)	29,762			
	Sv/H=0.21		x ₀	3,708	f(x ₀)	17,007	2,758	-7,666	11,543
			x ₁	5,250	f(x ₁)	21,259			
			x ₂	6,417	f(x ₂)	0,255			
12	Sv/H=0.15	6	x ₀	5,008	f(x ₀)	38,265	6,378	0,729	23,711
			x ₁	5,675	f(x ₁)	42,517			
			x ₂	6,258	f(x ₂)	46,769			
	Sv/H=0.18		x ₀	4,535	f(x ₀)	34,014	4,203	0,302	18,111
			x ₁	5,547	f(x ₁)	38,265			
			x ₂	6,437	f(x ₂)	42,517			
	Sv/H=0.21		x ₀	5,475	f(x ₀)	34,014	9,448	-3,249	15,879
			x ₁	5,925	f(x ₁)	38,265			
			x ₂	7,908	f(x ₂)	41,327			



d	Panjang	s/B(%)	s/B (%)		q (kN/m ²)		B ₁	B ₂	q (kN/m ²)
		(x)	(x ₀ ,x ₁ ,x ₂)	[f(x ₀),f(x ₁),f(x ₂)]	f(x)				
6	Z/H=0.15	6,4	x ₀	4,242	f(x ₀)	29,762	3,807	-0,511	13,221
			x ₁	5,358	f(x ₁)	34,014			
			x ₂	7,217	f(x ₂)	38,265			
	Z/H=0.18		x ₀	3,675	f(x ₀)	17,007	2,477	0,582	11,545
			x ₁	5,392	f(x ₁)	21,259			
			x ₂	6,433	f(x ₂)	25,510			
	Sv/H=0.21		x ₀	4,075	f(x ₀)	21,259	3,379	-0,327	9,411
			x ₁	5,333	f(x ₁)	25,510			
			x ₂	7,117	f(x ₂)	29,762			
9	Z/H=0.15	6,842	x ₀	5,792	f(x ₀)	34,014	5,607	-1,094	19,543
			x ₁	6,550	f(x ₁)	38,265			
			x ₂	7,795	f(x ₂)	42,517			
	Z/H=0.18		x ₀	4,375	f(x ₀)	21,259	2,699	-0,026	16,767
			x ₁	5,950	f(x ₁)	25,510			
			x ₂	7,575	f(x ₂)	29,762			
	Sv/H=0.21		x ₀	5,250	f(x ₀)	21,259	3,644	-0,175	14,155
			x ₁	6,417	f(x ₁)	25,510			
			x ₂	7,742	f(x ₂)	29,762			
12	Z/H=0.15	7,167	x ₀	5,675	f(x ₀)	42,517	7,289	-2,136	25,657
			x ₁	6,258	f(x ₁)	46,769			
			x ₂	7,773	f(x ₂)	51,020			
	Z/H=0.18		x ₀	5,547	f(x ₀)	38,265	4,777	-0,770	22,887
			x ₁	6,437	f(x ₁)	42,517			
			x ₂	7,687	f(x ₂)	46,429			
	Sv/H=0.21		x ₀	5,475	f(x ₀)	34,014	9,448	-3,249	18,429
			x ₁	5,925	f(x ₁)	38,265			
			x ₂	7,908	f(x ₂)	41,327			

Variasi Jarak pondasi dari Tepi Lereng

Tebal Lipatan	D	s/B(%)	s/B (%)		q (kN/m ²)		B ₁	B ₂	q (kN/m ²)
		(x)	(x ₀ ,x ₁ ,x ₂)		[f(x ₀),f(x ₁),f(x ₂)]				f(x)
0,15 H	6	2	x ₀	0,842	f(x ₀)	8,503	5,002	-0,206	12,132
			x ₁	1,692	f(x ₁)	12,755			
			x ₂	2,608	f(x ₂)	17,007			
	9		x ₀	1,017	f(x ₀)	12,755	5,546	-0,876	17,445
			x ₁	1,783	f(x ₁)	17,007			
			x ₂	2,867	f(x ₂)	21,259			
	12		x ₀	0,642	f(x ₀)	17,007	3,724	0,514	23,177
			x ₁	1,783	f(x ₁)	21,259			
			x ₂	2,675	f(x ₂)	25,510			
0,18H	6	2	x ₀	0,525	f(x ₀)	4,252	5,052	-0,112	10,113
			x ₁	1,367	f(x ₁)	8,503			
			x ₂	2,242	f(x ₂)	12,755			
	9		x ₀	0,925	f(x ₀)	8,503	6,803	-1,526	14,665
			x ₁	1,550	f(x ₁)	12,755			
			x ₂	2,525	f(x ₂)	17,007			
	12		x ₀	0,783	f(x ₀)	12,755	12,755	-6,512	21,445
			x ₁	1,117	f(x ₁)	17,007			
			x ₂	2,017	f(x ₂)	21,259			
0,21 H	6	2	x ₀	0,475	f(x ₀)	4,252	3,895	-0,325	8,465
			x ₁	1,567	f(x ₁)	8,503			
			x ₂	2,942	f(x ₂)	12,755			
	9		x ₀	0,500	f(x ₀)	4,252	4,148	-0,230	12,288
			x ₁	1,525	f(x ₁)	8,503			
			x ₂	2,692	f(x ₂)	12,755			
	12		x ₀	0,950	f(x ₀)	12,755	4,906	0,472	19,413
			x ₁	1,817	f(x ₁)	17,007			
			x ₂	2,567	f(x ₂)	21,259			

Tebal Lipatan	D	s/B(%)	s/B (%)		q (kN/m ²)		B ₁	B ₂	q (kN/m ²)
		(x)	(x ₀ ,x ₁ ,x ₂)	[f(x ₀),f(x ₁),f(x ₂)]		f(x)			
0,15 H	6	4	x ₀	2,608	f(x ₀)	17,007	4,437	2,469	12,223
			x ₁	3,567	f(x ₁)	21,259			
			x ₂	4,092	f(x ₂)	25,510			
	9		x ₀	2,867	f(x ₀)	21,259	4,596	-0,161	17,776
			x ₁	3,792	f(x ₁)	25,510			
			x ₂	4,783	f(x ₂)	29,762			
	12		x ₀	2,675	f(x ₀)	25,510	8,648	-2,954	25,132
			x ₁	3,167	f(x ₁)	29,762			
			x ₂	4,175	f(x ₂)	34,014			
0,18H	6	x ₀	2,242	f(x ₀)	12,755	2,966	-0,155	10,314	
		x ₁	3,675	f(x ₁)	17,007				
		x ₂	5,392	f(x ₂)	21,259				
	9	x ₀	1,550	f(x ₀)	12,755	4,361	-0,730	15,887	
		x ₁	2,525	f(x ₁)	17,007				
		x ₂	4,375	f(x ₂)	21,259				
	12	x ₀	2,017	f(x ₀)	21,259	3,185	0,527	23,144	
		x ₁	3,352	f(x ₁)	25,510				
		x ₂	4,318	f(x ₂)	29,762				
0,21 H	6	x ₀	1,567	f(x ₀)	8,503	3,092	0,263	9,176	
		x ₁	2,942	f(x ₁)	12,755				
		x ₂	4,075	f(x ₂)	17,007				
	9	x ₀	2,692	f(x ₀)	12,755	4,182	-0,557	14,156	
		x ₁	3,708	f(x ₁)	17,007				
		x ₂	5,250	f(x ₂)	21,259				
	12	x ₀	2,567	f(x ₀)	21,259	4,115	0,758	21,980	
		x ₁	3,600	f(x ₁)	25,510				
		x ₂	4,375	f(x ₂)	29,762				

Tebal Lipatan	D	s/B(%)	s/B (%)		q (kN/m ²)		B ₁	B ₂	q (kN/m ²)
		(x)	(x ₀ ,x ₁ ,x ₂)	[f(x ₀),f(x ₁),f(x ₂)]	f(x)				
0,15 H	6	6	x ₀	4,242	f(x ₀)	29,762	3,807	-0,511	9,565
			x ₁	5,358	f(x ₁)	34,014			
			x ₂	7,217	f(x ₂)	38,265			
	9		x ₀	4,783	f(x ₀)	29,762	4,217	0,787	14,422
			x ₁	5,792	f(x ₁)	34,014			
			x ₂	6,550	f(x ₂)	38,265			
	12		x ₀	5,008	f(x ₀)	38,265	6,378	0,729	23,711
			x ₁	5,675	f(x ₁)	42,517			
			x ₂	6,258	f(x ₂)	46,769			
0,18H	6	6	x ₀	3,675	f(x ₀)	17,007	2,477	0,582	8,560
			x ₁	5,392	f(x ₁)	21,259			
			x ₂	6,433	f(x ₂)	25,510			
	9		x ₀	4,375	f(x ₀)	21,259	2,699	-0,026	12,667
			x ₁	5,950	f(x ₁)	25,510			
			x ₂	7,575	f(x ₂)	29,762			
	12		x ₀	4,535	f(x ₀)	34,014	4,203	0,302	18,111
			x ₁	5,547	f(x ₁)	38,265			
			x ₂	6,437	f(x ₂)	42,517			
0,21 H	6	6	x ₀	4,075	f(x ₀)	17,007	3,379	-0,327	7,111
			x ₁	5,333	f(x ₁)	21,259			
			x ₂	7,117	f(x ₂)	25,510			
	9		x ₀	3,708	f(x ₀)	17,007	2,758	-7,666	11,543
			x ₁	5,250	f(x ₁)	21,259			
			x ₂	6,417	f(x ₂)	0,255			
	12		x ₀	5,475	f(x ₀)	34,014	9,448	-3,249	15,879
			x ₁	5,925	f(x ₁)	38,265			
			x ₂	7,908	f(x ₂)	41,327			

Tebal Lipatan	D	s/B(%)	s/B (%)		q (kN/m ²)		B ₁	B ₂	q (kN/m ²)
		(x)	(x ₀ ,x ₁ ,x ₂)	[f(x ₀),f(x ₁),f(x ₂)]	f(x)				
0,15 H	6	6,4	x ₀	4,242	f(x ₀)	29,762	3,807	-0,511	13,221
			x ₁	5,358	f(x ₁)	34,014			
			x ₂	7,217	f(x ₂)	38,265			
	9	6,842	x ₀	5,792	f(x ₀)	34,014	5,607	-1,094	19,543
			x ₁	6,550	f(x ₁)	38,265			
			x ₂	7,795	f(x ₂)	42,517			
	12	7,167	x ₀	5,675	f(x ₀)	42,517	7,289	-2,136	25,657
			x ₁	6,258	f(x ₁)	46,769			
			x ₂	7,773	f(x ₂)	51,020			
0,18H	6	6,4	x ₀	3,675	f(x ₀)	17,007	2,477	0,582	11,545
			x ₁	5,392	f(x ₁)	21,259			
			x ₂	6,433	f(x ₂)	25,510			
	9	6,842	x ₀	4,375	f(x ₀)	21,259	2,699	-0,026	16,767
			x ₁	5,950	f(x ₁)	25,510			
			x ₂	7,575	f(x ₂)	29,762			
	12	7,167	x ₀	5,547	f(x ₀)	38,265	4,777	-0,770	22,887
			x ₁	6,437	f(x ₁)	42,517			
			x ₂	7,687	f(x ₂)	46,429			
0,21 H	6	6,4	x ₀	4,075	f(x ₀)	21,259	3,379	-0,327	9,411
			x ₁	5,333	f(x ₁)	25,510			
			x ₂	7,117	f(x ₂)	29,762			
	9	6,842	x ₀	5,250	f(x ₀)	21,259	3,644	-0,175	14,155
			x ₁	6,417	f(x ₁)	25,510			
			x ₂	7,742	f(x ₂)	29,762			
	12	7,167	x ₀	5,475	f(x ₀)	34,014	9,448	-3,249	18,429
			x ₁	5,925	f(x ₁)	38,265			
			x ₂	7,908	f(x ₂)	41,327			