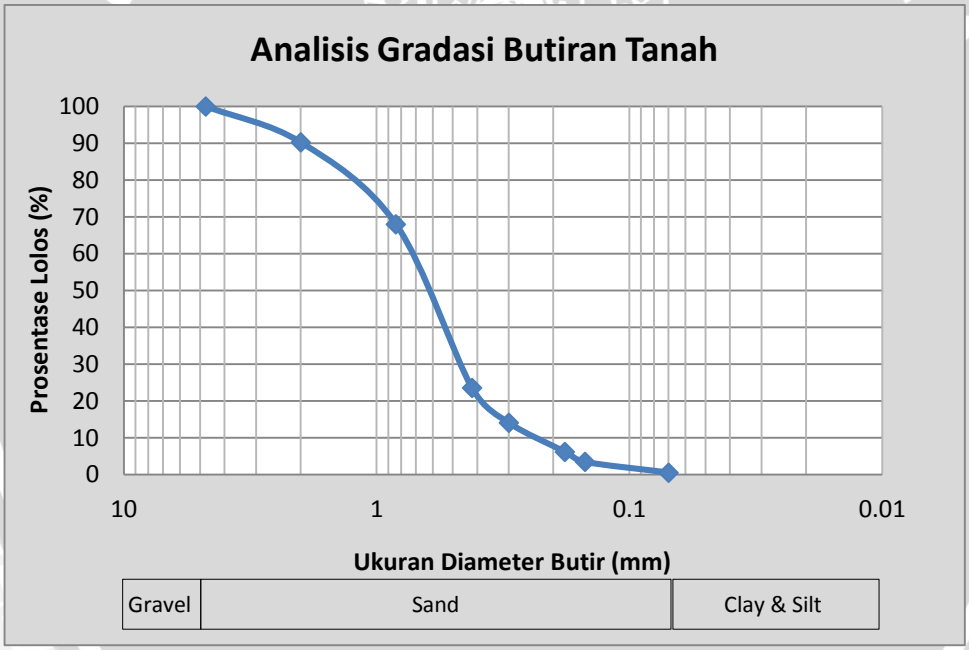
Lampiran 1

Analisis Gradasi Butiran Tanah

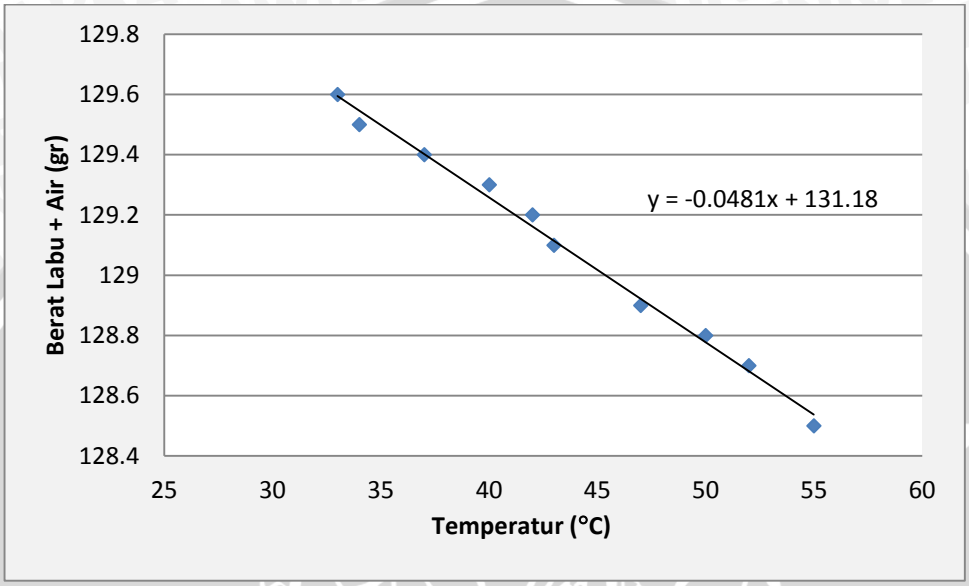
Diameter ayakan	Berat tertahan (gr)	Berat kumulatif (gr)	Persen tertahan (%)	Persen lolos (%)
4,75 mm (no. 4)	0.00	0	0.000	100.000
2,00 mm (no. 10)	48.8	48.8	9.760	90.240
0,84 mm (no. 20)	111	159.8	31.960	68.040
0,42 mm (no. 40)	222.4	382.2	76.440	23.560
0,30 mm (no.50)	47.5	429.7	85.940	14.060
0,18 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

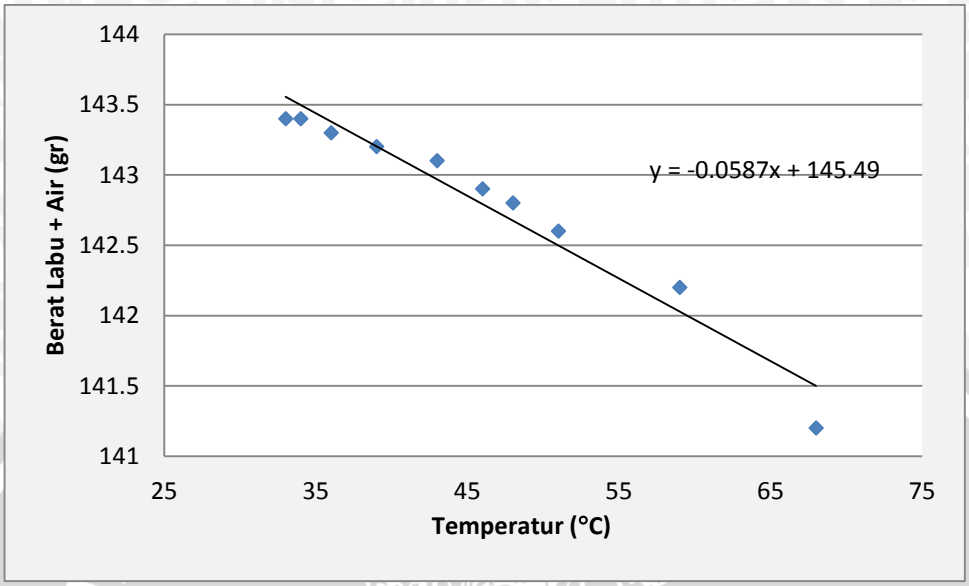
Hasil Analisis *Specific Gravity* Tanah

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
Gs = (Ws*Gt)/(Ws-(W1-W2))	-	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
Gs = (Ws*Gt)/(Ws-(W1-W2))	-	2.771	2.612	2.598	2.685	2.752
Gs rata-rata	-	2.684				

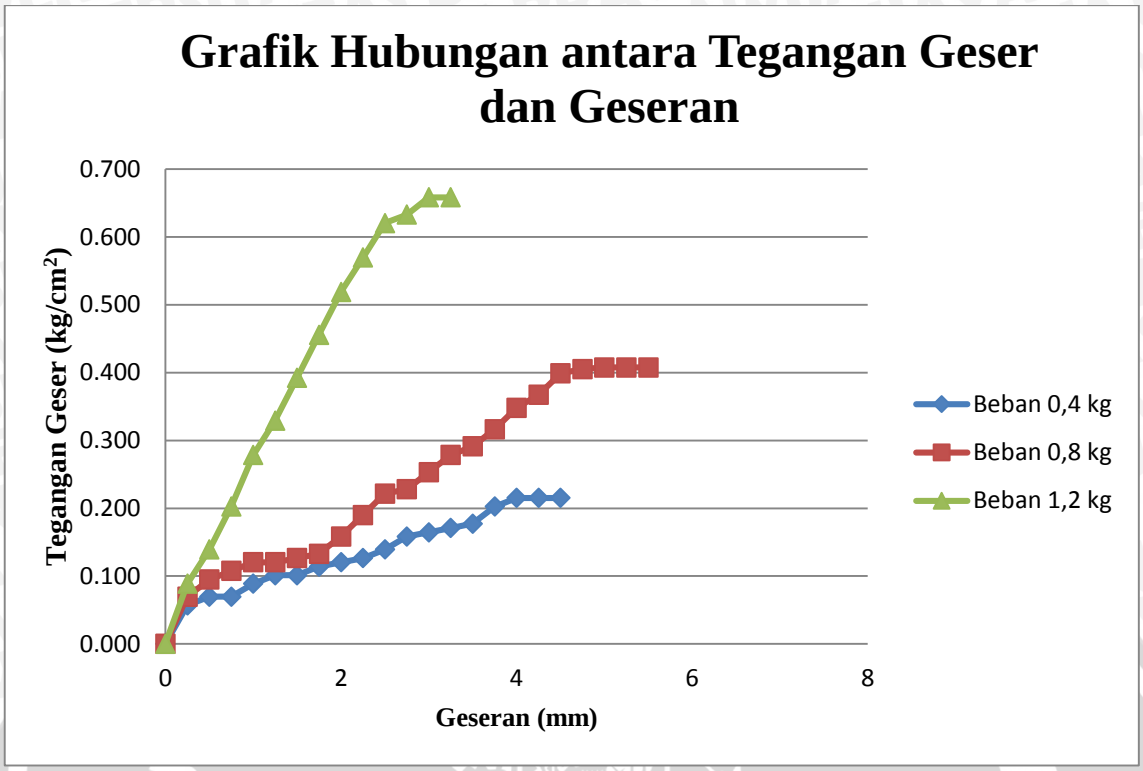
Lampiran 3

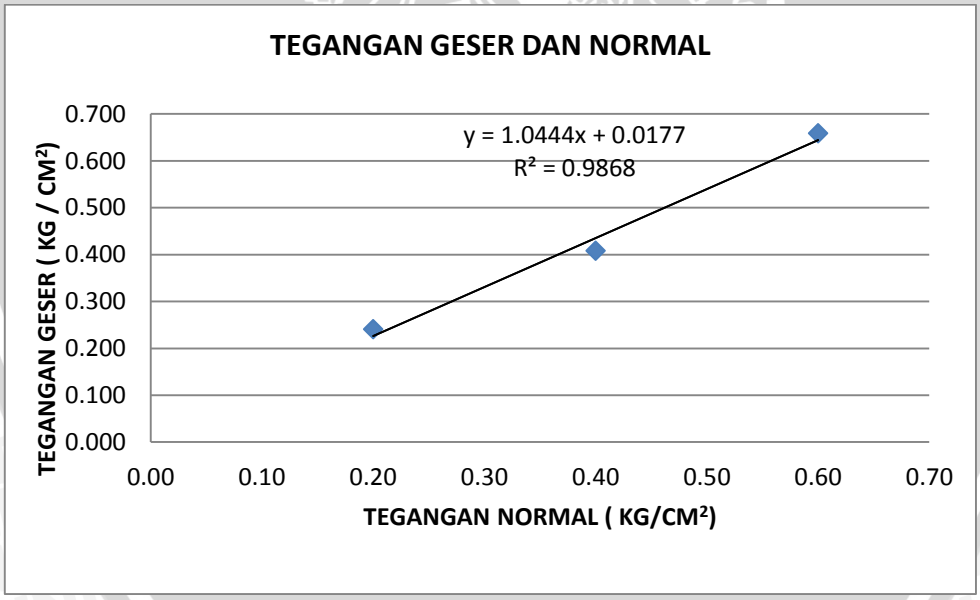
Hasil Analisis Uji Geser Langsung *(Direct Shear)*

Lapisan 3

Kalibrasi Alat = 0,358 Diameter Sampel = 6 cm
Tinggi Sampel = 2 cm Luas Sampel = 28,274cm^2

Gaya Normal		P_1 =	0.4	kg		P_1 =	0.8	kg		P_1 =	1.2	kg
Tegangan Normal		σ_1 =	0.20	kg/cm^2		σ_1 =	0.40	kg/cm^2		σ_1 =	0.60	kg/cm^2
Geseran Horisontal	Pembacaan dial		Gaya Geser	Tegangan Geser	Pembacaan dial		Gaya Geser	Tegangan Geser	Pembacaan dial		Gaya Geser	Tegangan Geser
0	0		0	0.000	0		0	0.000	0		0	0.000
25	4.5		1.611	0.057	5.5		1.969	0.070	7		2.506	0.089
50	5.5		1.969	0.070	7.5		2.685	0.095	11		3.938	0.139
75	5.5		1.969	0.070	8.5		3.043	0.108	16		5.728	0.203
100	7		2.506	0.089	9.5		3.401	0.120	22		7.876	0.279
125	8		2.864	0.101	9.5		3.401	0.120	26		9.308	0.329
150	8		2.864	0.101	10		3.58	0.127	31		11.098	0.393
175	9		3.222	0.114	10.5		3.759	0.133	36		12.888	0.456
200	9.5		3.401	0.120	12.5		4.475	0.158	41		14.678	0.519
225	10		3.58	0.127	15		5.37	0.190	45		16.11	0.570
250	11		3.938	0.139	17.5		6.265	0.222	49		17.542	0.620
275	12.5		4.475	0.158	18		6.444	0.228	50		17.9	0.633
300	13		4.654	0.165	20		7.16	0.253	52		18.616	0.658
325	13.5		4.833	0.171	22		7.876	0.279	52		18.616	0.658
350	14		5.012	0.177	23		8.234	0.291				
375	16		5.728	0.203	25		8.95	0.317				
400	17		6.086	0.215	27.5		9.845	0.348				
425	17		6.086	0.215	29		10.382	0.367				
450	17		6.086	0.215	31.5		11.277	0.399				
475	19				32		11.456	0.405				
500	19.5				32.2		11.5276	0.408				
525	20				32.2		11.5276	0.408				
550	22				32.2		11.5276	0.408				
575	22											
600	22											
625												
650												
675												
700												



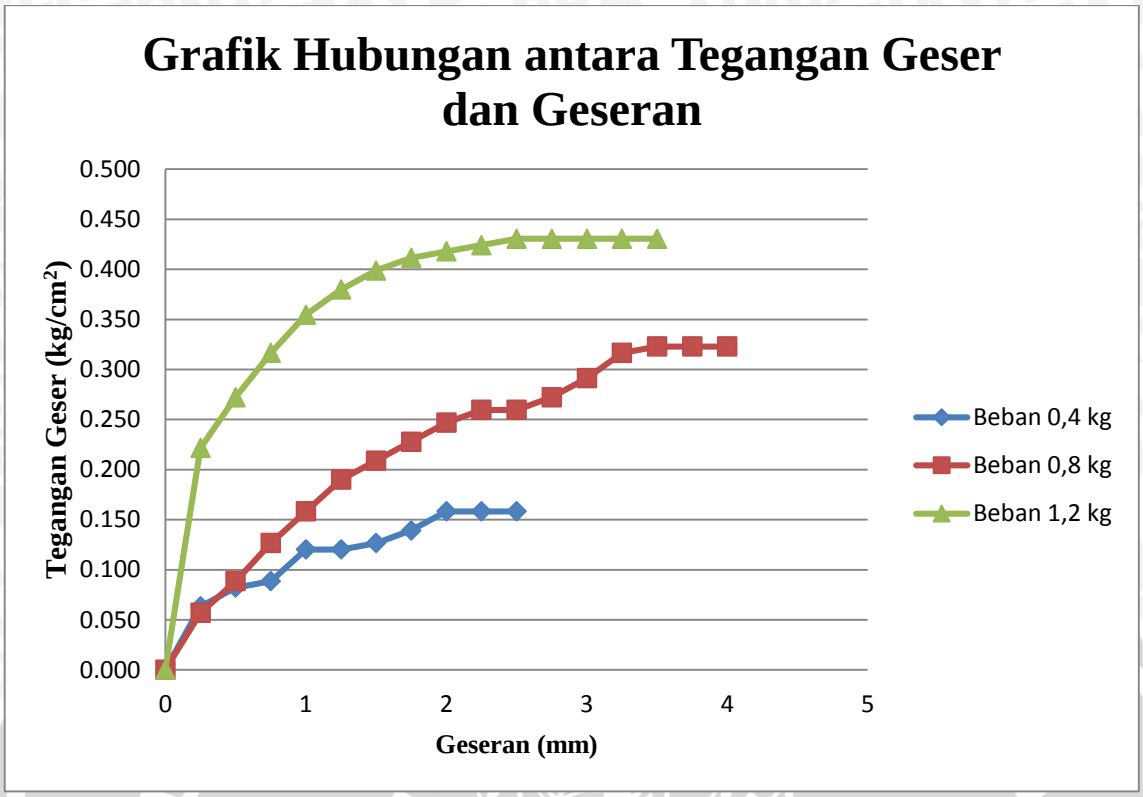


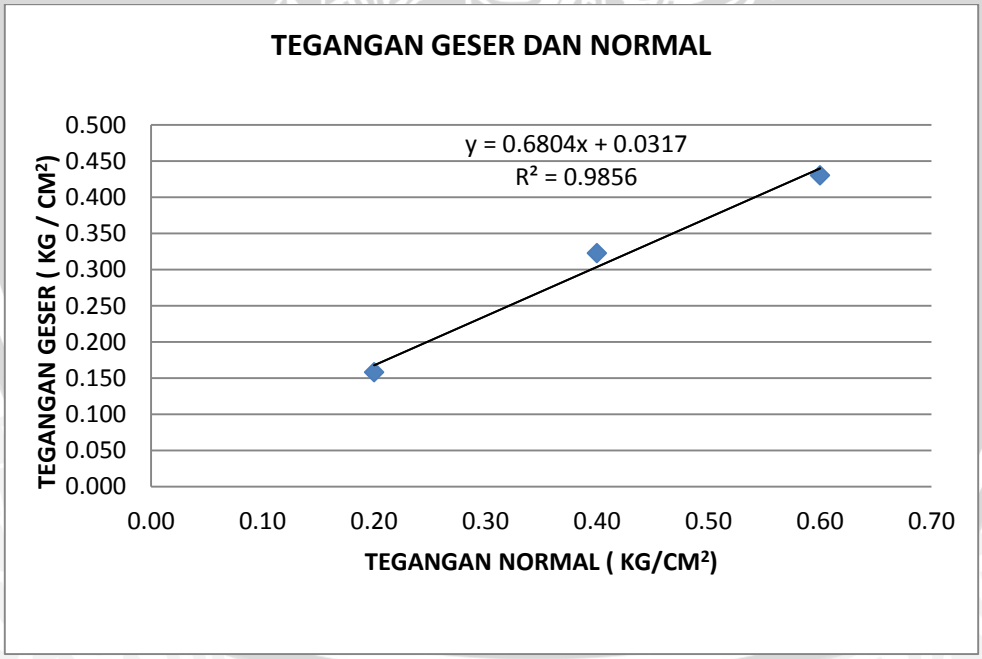
C	=	0.0177	kg/cm²
∅	=	34.101	°

Lapisan 5

Kalibrasi Alat = 0,358 Diameter Sampel = 6 cm
Tinggi Sampel = 2 cm Luas Sampel = 28,274cm^2

Gaya Normal	P_1 =	0.4	kg	P_1 =	0.8	kg	P_1 =	1.2	kg
Tegangan Normal	σ_1 =	0.20	kg/cm^2	σ_1 =	0.40	kg/cm^2	σ_1 =	0.60	kg/cm^2
Geseran Horisontal	Pembacaan dial	Gaya Geser	Tegangan Geser	Pembacaan dial	Gaya Geser	Tegangan Geser	Pembacaan dial	Gaya Geser	Tegangan Geser
0	0	0	0.000	0	0	0.000	0	0	0.000
25	5	1.79	0.063	4.5	1.611	0.057	17.5	6.265	0.222
50	6.5	2.327	0.082	7	2.506	0.089	21.5	7.697	0.272
75	7	2.506	0.089	10	3.58	0.127	25	8.95	0.317
100	9.5	3.401	0.120	12.5	4.475	0.158	28	10.024	0.355
125	9.5	3.401	0.120	15	5.37	0.190	30	10.74	0.380
150	10	3.58	0.127	16.5	5.907	0.209	31.5	11.277	0.399
175	11	3.938	0.139	18	6.444	0.228	32.5	11.635	0.412
200	12.5	4.475	0.158	19.5	6.981	0.247	33	11.814	0.418
225	12.5	4.475	0.158	20.5	7.339	0.260	33.5	11.993	0.424
250	12.5	4.475	0.158	20.5	7.339	0.260	34	12.172	0.431
275				21.5	7.697	0.272	34	12.172	0.431
300				23	8.234	0.291	34	12.172	0.431
325				25	8.95	0.317	34	12.172	0.431
350				25.5	9.129	0.323	34	12.172	0.431
375				25.5	9.129	0.323			
400				25.5	9.129	0.323			



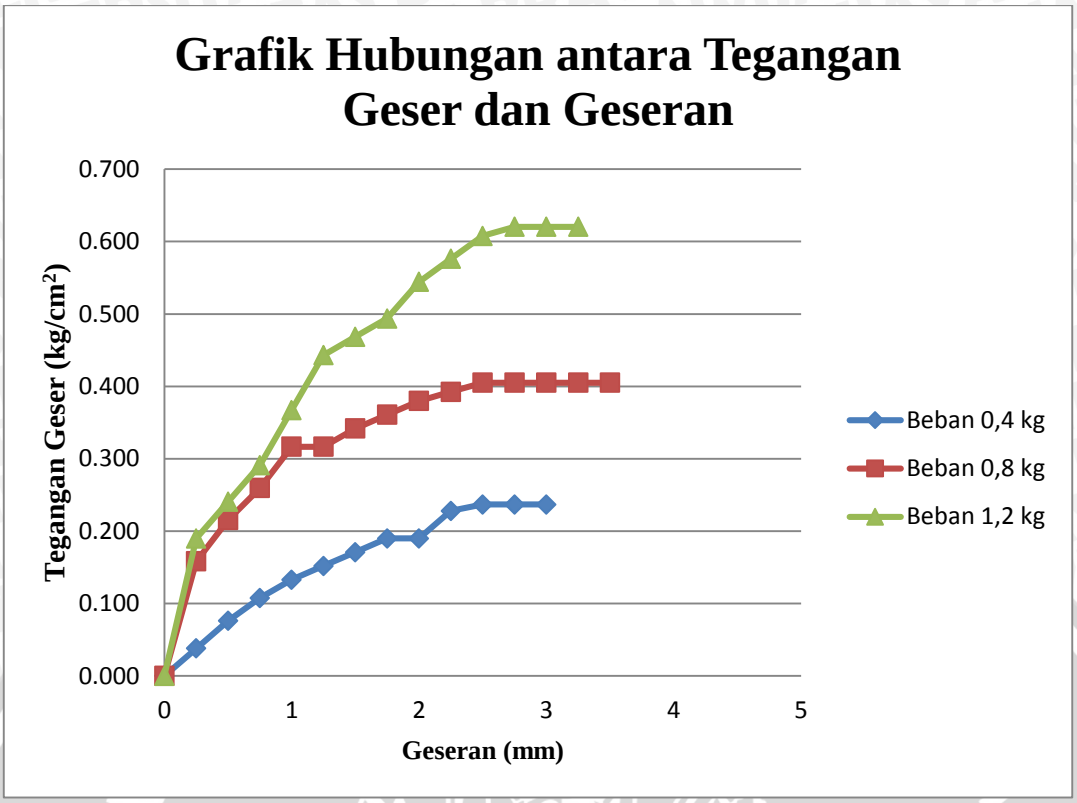


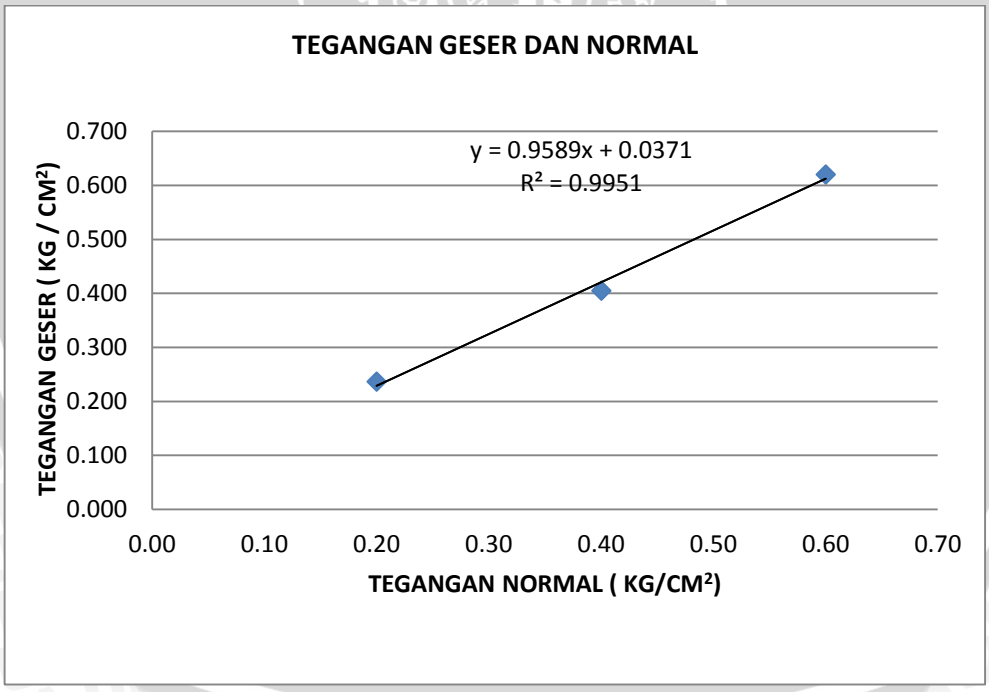
C	=	0,0317	kg/cm²
∅	=	34,548	°

Lapisan 7

Kalibrasi Alat = 0,358 Diameter Sampel = 6 cm
Tinggi Sampel = 2 cm Luas Sampel = 28,274cm^2

Gaya Normal		P_1 =	0.4	kg		P_1 =	0.8	kg		P_1 =	1.2	kg
Tegangan Normal		σ_1 =	0.20	kg/cm^2		σ_1 =	0.40	kg/cm^2		σ_1 =	0.60	kg/cm^2
Geseran Horisontal	Pembacaan dial	Gaya Geser	Tegangan Geser	Pembacaan dial	Gaya Geser	Tegangan Geser	Pembacaan dial	Gaya Geser	Tegangan Geser
0	0	0	0.000	0	0	0.000	0	0	0.000
25	3	1.074	0.038	12.5	4.475	0.158	15	5.37	0.190
50	6	2.148	0.076	17	6.086	0.215	19	6.802	0.241
75	8.5	3.043	0.108	20.5	7.339	0.260	23	8.234	0.291
100	10.5	3.759	0.133	25	8.95	0.317	29	10.382	0.367
125	12	4.296	0.152	25	8.95	0.317	35	12.53	0.443
150	13.5	4.833	0.171	27	9.666	0.342	37	13.246	0.468
175	15	5.37	0.190	28.5	10.203	0.361	39	13.962	0.494
200	15	5.37	0.190	30	10.74	0.380	43	15.394	0.544
225	18	6.444	0.228	31	11.098	0.393	45.5	16.289	0.576
250	18.7	6.6946	0.237	32	11.456	0.405	48	17.184	0.608
275	18.7	6.6946	0.237	32	11.456	0.405	49	17.542	0.620
300	18.7	6.6946	0.237	32	11.456	0.405	49	17.542	0.620
325				32	11.456	0.405	49	17.542	0.620
350				32	11.456	0.405			
375									
400									
425									
450									





C = 0,0371 kg/cm²

∅ = 34,982 °

Lampiran 4

Hasil Uji Pemadatan Standar

Data :

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

Kadar Air

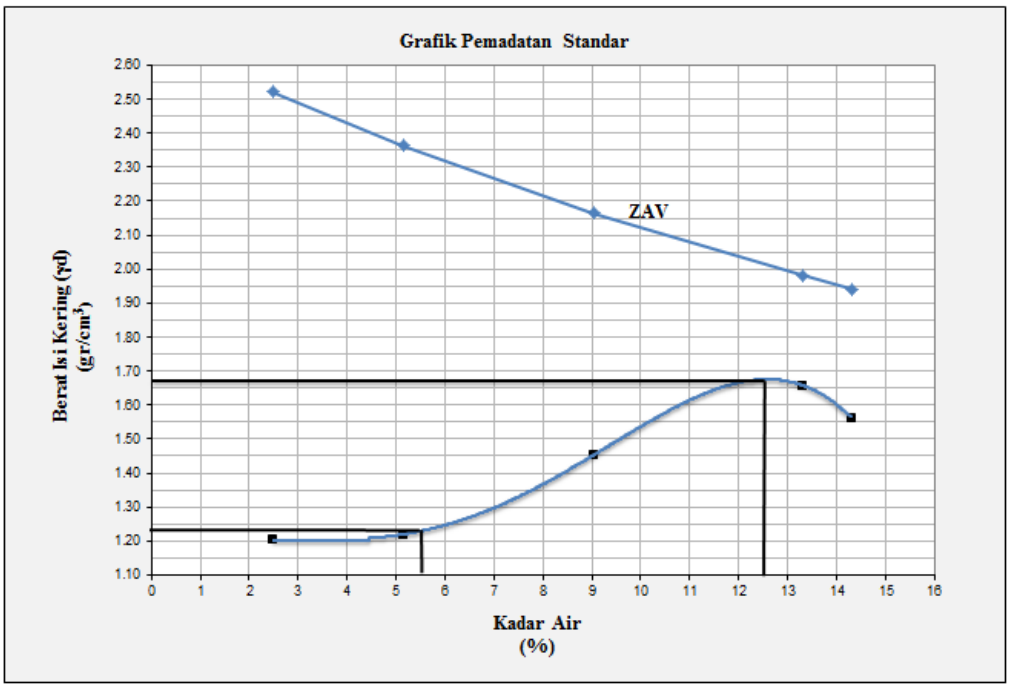
Penambahan Air	ml	100			200			300			400			500		
		atas	tengah	bawah	atas	tengah	bawah	atas	tengah	bawah	atas	tengah	bawah	atas	tengah	bawah
Berat cawan	gr	5.40	5.60	5.80	6.00	5.80	5.30	5.60	5.80	5.40	5.70	5.60	5.80	5.80	6.00	5.60
Berat tanah basah + cawan	gr	17.30	27.30	31.30	17.40	24.60	30.50	32.00	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

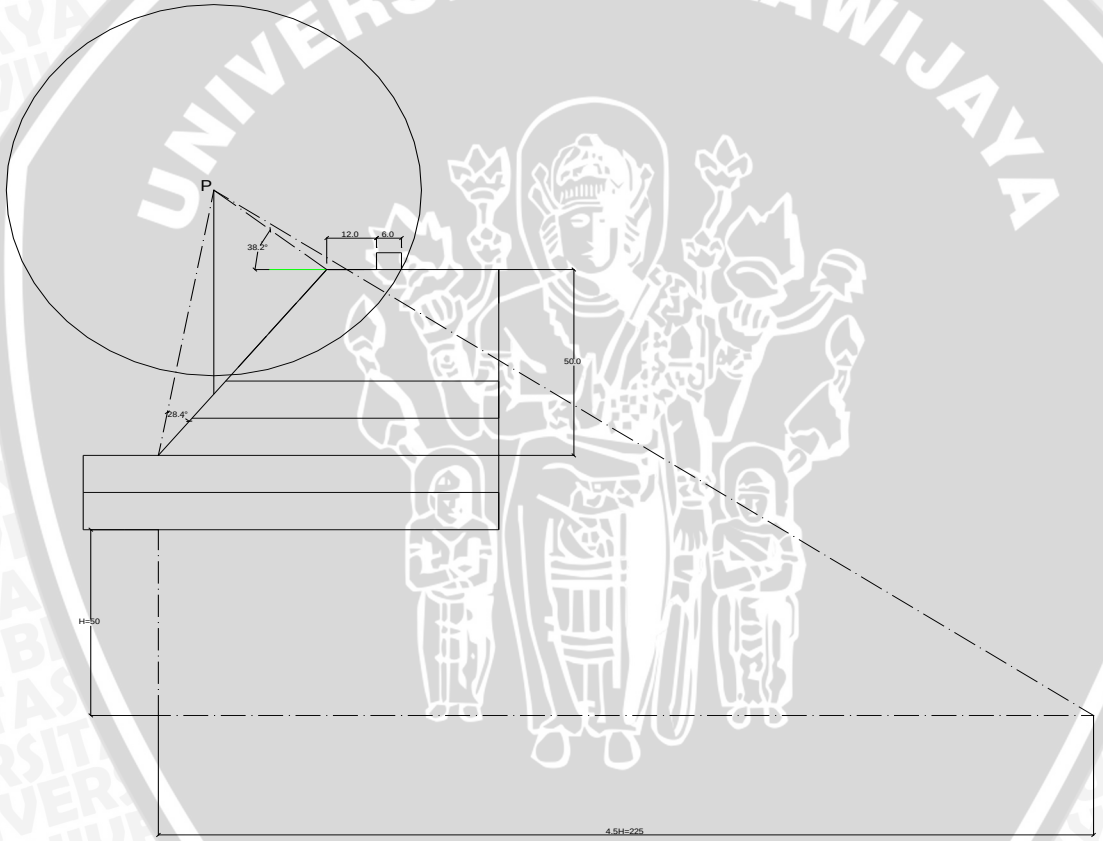
Penambahan air	ml	100	200	300	400	500
Kadar air	%	2.48	5.15	9.04	13.30	14.32
Gs	gr/cm^3	2.696				
Berat jenis air	gr/cm^3	1				
Berat jenis air (ZAV)	gr/cm^3	2.52726	2.367512	2.16776	1.98442	1.94526



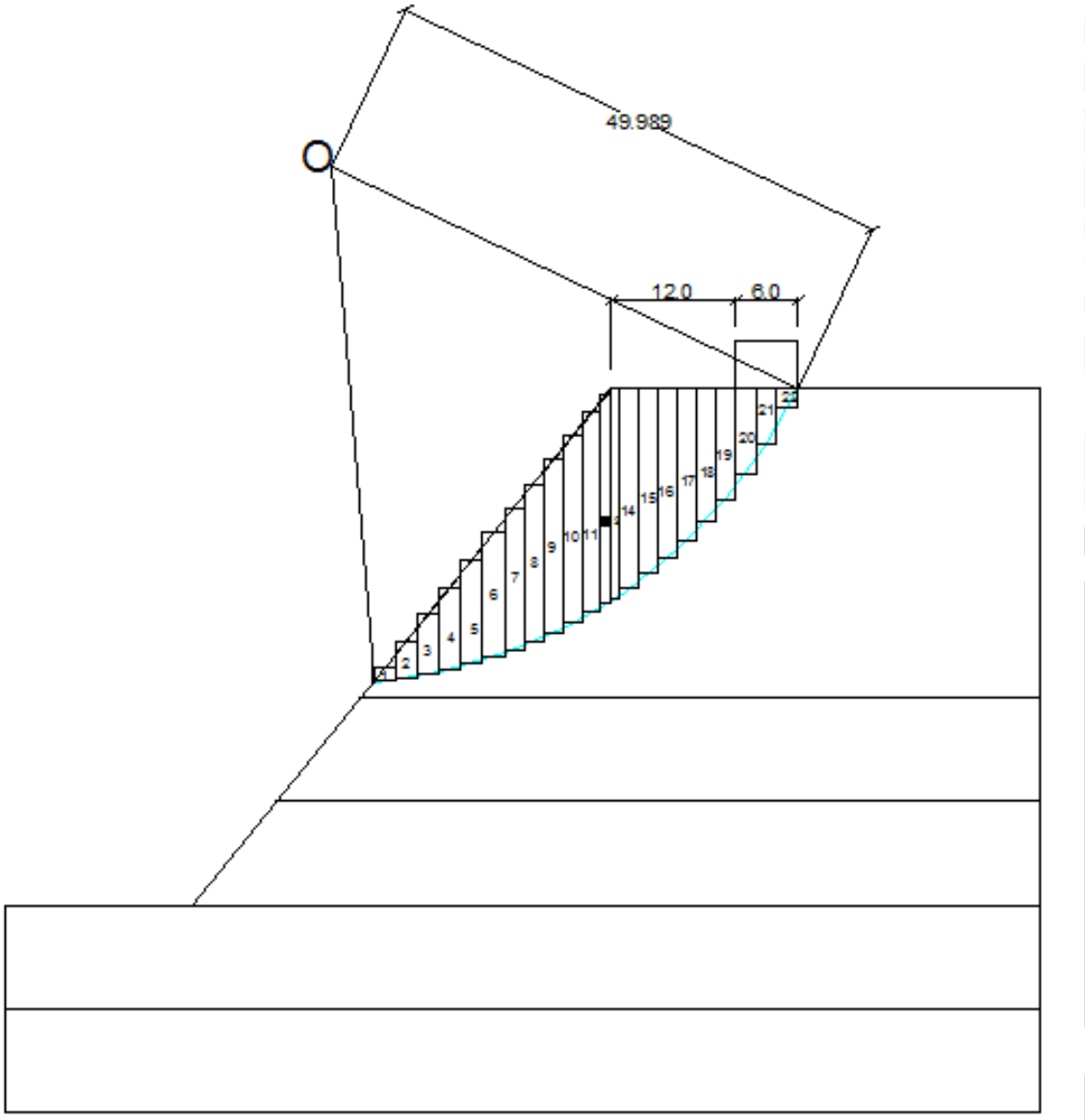
Lampiran 5

Perhitungan Stabilitas Lereng

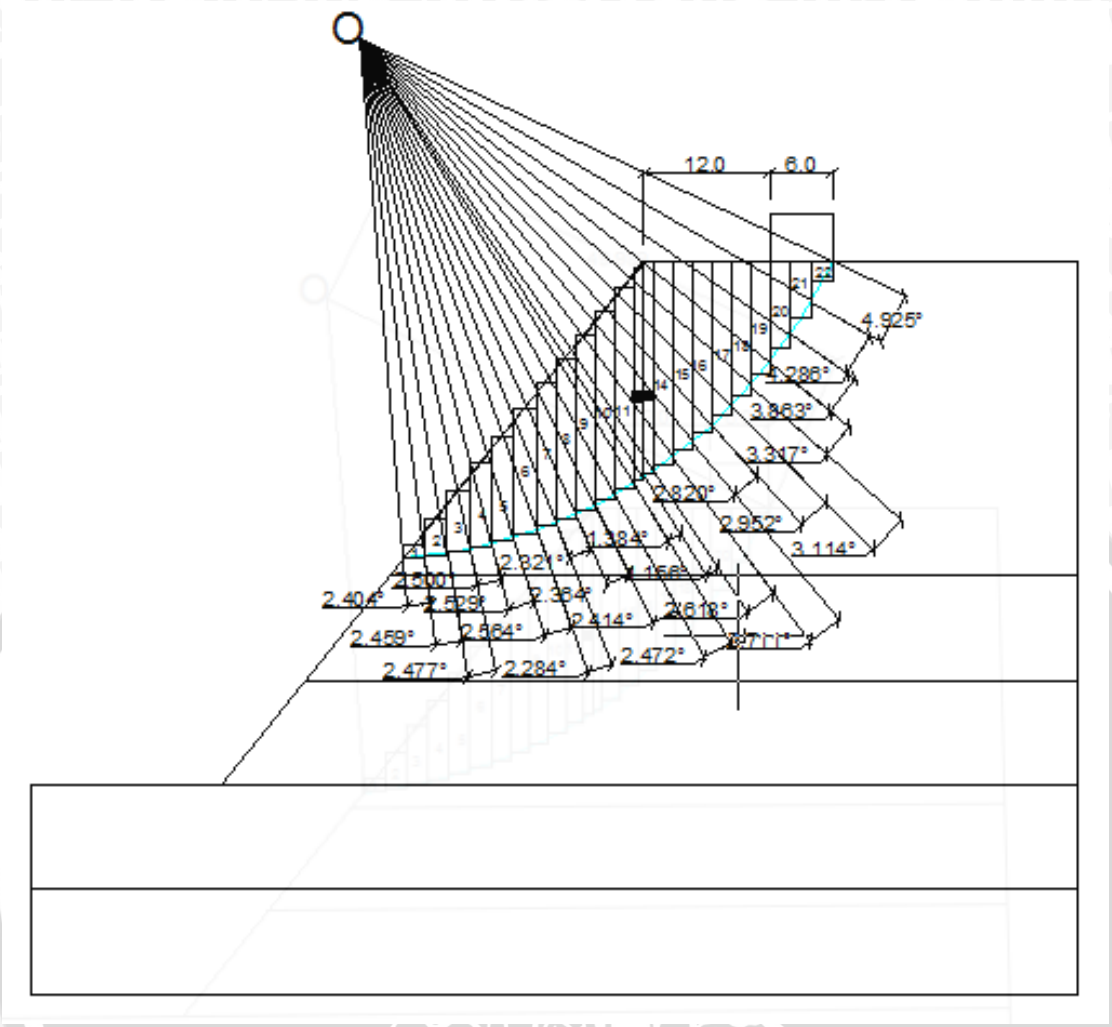
Menentukan pusat lingkaran



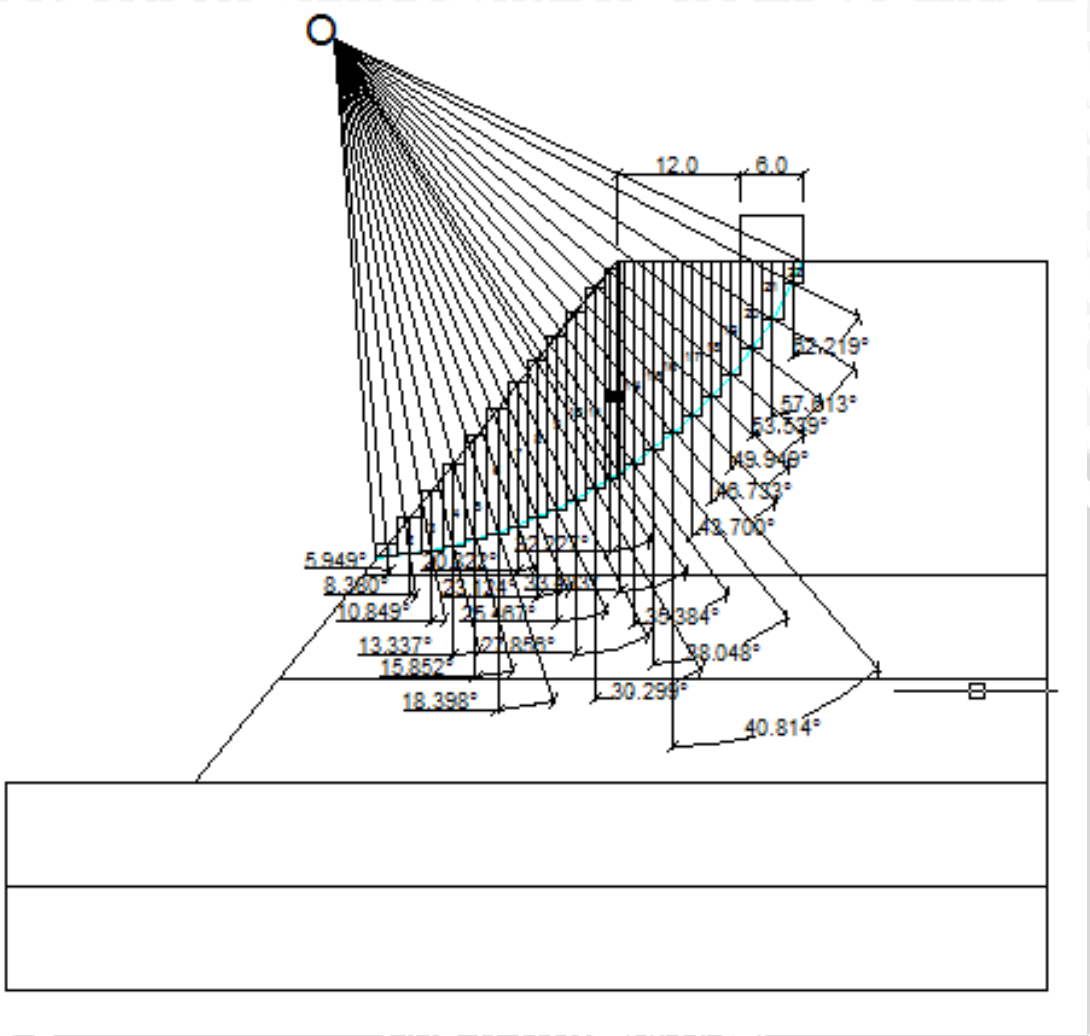
Menentukan pias-pias



Menentukan sudut β



Menentukan sudut α



Perhitungan SF

No	b	h	γ(gr/cm^3)	w(gr/cm)	α	β	r(cm)	W cos α	W sin α	La(cm)
1	2.142	1.178	1.230	3.104	5.949	2.404	49.989	3.087	0.322	2.096
2	2.120	3.509	1.230	9.150	8.380	2.459	49.989	9.052	1.334	2.144
3	2.120	5.767	1.230	15.038	10.849	2.477	49.989	14.769	2.830	2.160
4	2.120	7.931	1.230	20.681	13.337	2.500	49.989	20.123	4.771	2.180
5	2.120	9.997	1.230	26.068	15.852	2.529	49.989	25.077	7.121	2.205
6	2.120	11.961	1.230	31.190	18.398	2.564	49.989	29.595	9.844	2.236
7	1.860	13.712	1.230	31.370	20.822	2.284	49.989	29.321	11.151	1.992
8	1.860	15.258	1.230	34.907	23.124	2.321	49.989	32.103	13.709	2.024
9	1.860	16.715	1.230	38.241	25.467	2.364	49.989	34.525	16.443	2.061
10	1.860	18.078	1.230	41.359	27.856	2.414	49.989	36.566	19.325	2.105
11	1.860	19.340	1.230	44.246	30.299	2.472	49.989	38.202	22.323	2.156
12	1.020	20.253	1.230	25.409	32.227	1.384	49.989	21.495	13.550	1.207
13	0.840	20.305	1.230	20.979	33.483	1.156	49.989	17.498	11.574	1.008
14	1.860	19.345	1.230	44.257	35.384	2.618	49.989	36.083	25.627	2.283
15	1.860	17.956	1.230	41.080	38.048	2.711	49.989	32.350	25.318	2.364
16	1.860	16.425	1.230	37.577	40.814	2.820	49.989	28.440	24.561	2.459
17	1.860	14.734	1.230	33.708	43.700	2.952	49.989	24.370	23.289	2.574
18	1.860	12.857	1.230	29.414	46.733	3.114	49.989	20.160	21.419	2.716
19	1.860	10.762	1.230	24.621	49.949	3.317	49.989	15.843	18.847	2.893
20	2.000	8.303	1.230	41.650	53.539	3.863	49.989	24.751	33.497	3.369
21	2.000	5.373	1.230	13.218	57.613	4.286	49.989	7.080	11.162	3.738
22	2.000	1.898	1.230	4.669	62.219	4.925	49.989	2.176	4.131	4.295
Jumlah								502.668	322.146	52.264

$$F_s = \frac{C\ La + tg\emptyset \sum(W \cos \alpha - UL)}{\sum W \sin \alpha} = 1.07$$

Perhitungan Panjang Penyaluran Geotekstil

Tan $_{req}$ $= H \frac{Ka}{L}$

Tan $_{req}$ $= \frac{70\ (\tan^2 (\ 45 - \emptyset/2))}{22,4}$

Tan $_{req}$ $= \frac{70\ (\tan^2 (\ 45 - 34,544/2))}{22,4}$

$= 40,81^0$

T_{act} $= 2(0 + (0,5 \times 70 \times 1,23) \times \tan 40,81^0) \times 22,4$

T_{act} $= 1665,345$ gr/cm

L_{req} $= \frac{1665,345\ gr/cm}{2\ x\ 1,2\ x\ (0+(123\ x\ 0,5\ x\ 70)\ x \tan 34,544)} = 0,234cm$

Lampiran 6

Pemadatan Model Lereng

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

Luas boks : 0,98 m^2

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

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

Berat tanah untuk tinggi rencana 2,7 cm: $1230\ x\ 0{,}0265 = 32{,}546\ kg$

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/cm³**	1.66
Berat isi kering model	**gr/cm³**	1.23
Kerapatan relatif (Dr)	**%**	74.01

Lampiran 7

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
γt	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
γd	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
γt rata-rata	gr/cm^3							1.307							
γd 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
γt	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
γd	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
γt rata-rata	gr/cm^3	1.308													
γd 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
γt	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
γd	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
γt rata-rata	gr/cm^3							1.31							
γd rata-rata	gr/cm^3							1.24							

Lereng dengan perkuatan geotekstil L=22,4 cm , d=6cm

Lapisan		1		2		3		4		5		6		7	
Berat cawan + tanah basah	gram	21.9	20.9	19.6	21.7	21.2	21.5	20.1	21.5	21.6	21	21.7	22.2	21.5	20.3
Berat cawan + tanah kering	gram	21.1	20.1	18.8	20.8	20.4	20.7	19.3	20.9	20.7	20	20.8	21.2	20.6	19.4
Berat cawan	gram	5.7	5.7	4.3	3.7	5.8	5.9	4.1	5.5	5.7	5.7	6	6	5.6	5.4
Berat tanah kering	gram	15.4	14.4	14.5	17.1	14.6	14.8	15.2	15.4	15	14.3	14.8	15.2	15	14
Berat air	gram	0.8	0.8	0.8	0.9	0.8	0.8	0.8	0.6	0.9	1	0.9	1	0.9	0.9
Kadar air	%	5.19	5.56	5.52	5.26	5.48	5.41	5.26	3.90	6.00	6.99	6.08	6.58	6.00	6.43
Kadar air rata-rata (%)								5.69							

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
γt	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	5.52	5.26	5.48	5.41	5.26	3.90	6.00	6.99	6.08	6.58	6.00	6.43
γd	gr/cm^3	1.258	1.276	1.193	1.271	1.246	1.269	1.240	1.288	1.257	1.286	1.221	1.228	1.222	1.239
γt rata-rata	gr/cm^3							1.321							
γd rata-rata	gr/cm^3							1.250							

Lereng dengan perkuatan geotekstil L=25.9 cm , d=6cm

Lapisan		1		2		3		4		5		6		7	
Berat cawan + tanah basah	gram	19.4	21.8	21.6	21.4	21.1	19.7	20.4	21.2	21.5	20	20	21.5	21.5	19.7
Berat cawan + tanah kering	gram	18.5	20.8	20.9	20.7	20.2	18.8	19.8	20.6	20.7	19.2	19	20.6	20.5	18.8
Berat cawan	gram	4.3	5.7	6	6	5.7	4.3	5.7	5.6	5.7	4.3	4.3	5.7	5.7	4.1
Berat tanah kering	gram	14.2	15.1	14.9	14.7	14.5	14.5	14.1	15	15	14.9	14.7	14.9	14.8	14.7
Berat air	gram	0.9	1	0.7	0.7	0.9	0.9	0.6	0.6	0.8	0.8	1	0.9	1	0.9
Kadar air	%	6.34	6.62	4.70	4.76	6.21	6.21	4.26	4.00	5.33	5.37	6.80	6.04	6.76	6.12
Kadar air rata-rata (%)		5.68													

Lapisan		1		2		3		4		5		6		7	
Berat ring + tanah	gram	31.8	31.7	32.5	32.6	32.7	32.9	33	33.1	32.8	32.7	32.9	32.6	32.6	32.8
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	13.3	13.2	14	14.1	14.2	14.4	14.5	14.6	14.3	14.2	14.4	14.1	14.1	14.3
γt	gr/cm^3	1.231	1.270	1.295	1.357	1.314	1.386	1.342	1.405	1.323	1.367	1.333	1.357	1.305	1.376
Kadar air	%	6.34	6.62	4.70	4.76	6.21	6.21	4.26	4.00	5.33	5.37	6.80	6.04	6.76	6.12
γd	gr/cm^3	1.157	1.191	1.237	1.295	1.237	1.305	1.287	1.351	1.256	1.297	1.248	1.280	1.222	1.297
γt rata-rata	gr/cm^3	1.333													
γd rata-rata	gr/cm^3	1.261													

Lereng dengan perkuatan geotekstil L=29.4 cm , d=6cm

Lapisan		1		2		3		4		5		6		7	
Berat cawan + tanah basah	gram	20.2	21	22.3	22	20.5	18.1	19.5	19.6	19.7	19.5	21.5	20.3	20.1	20.5
Berat cawan + tanah kering	gram	19.4	20.2	21.4	21.2	19.9	17.5	18.7	18.8	18.9	18.8	20.6	19.4	19.3	19.6
Berat cawan	gram	4.7	5.8	5.7	6	5.7	2.9	4.1	4.7	5.4	5.8	5.6	5.4	6.1	6
Berat tanah kering	gram	14.7	14.4	15.7	15.2	14.2	14.6	14.6	14.1	13.5	13	15	14	13.2	13.6
Berat air	gram	0.8	0.8	0.9	0.8	0.6	0.6	0.8	0.8	0.8	0.7	0.9	0.9	0.8	0.9
Kadar air	%	5.44	5.56	5.73	5.26	4.23	4.11	5.48	5.67	5.93	5.38	6.00	6.43	6.06	6.62
Kadar air rata-rata (%)		5.56													

Lapisan		1		2		3		4		5		6		7	
Berat ring + tanah	gram	33	32.9	32.8	32.9	32.6	32.6	33.4	33.5	32.7	32.9	33.5	33.2	32.5	32
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	14.5	14.4	14.3	14.4	14.1	14.1	14.9	15	14.2	14.4	15	14.7	14	13.5
γt	gr/cm^3	1.342	1.386	1.323	1.386	1.305	1.357	1.379	1.444	1.314	1.386	1.388	1.415	1.295	1.299
Kadar air	%	5.44	5.56	5.73	5.26	4.23	4.11	5.48	5.67	5.93	5.38	6.00	6.43	6.06	6.62
γd	gr/cm^3	1.273	1.313	1.252	1.317	1.252	1.303	1.307	1.366	1.240	1.315	1.309	1.329	1.221	1.219
γt rata-rata	gr/cm^3	1.358													
γd rata-rata	gr/cm^3	1.287													

Lereng dengan perkuatan geotekstil L=22.4 cm , d=9 cm

Lapisan		1		2		3		4		5		6		7	
Berat cawan + tanah basah	gram	20.2	21	19.8	19.5	21.5	20.3	22.3	21.4	20.5	18.1	20.1	20.5	19.5	20.2
Berat cawan + tanah kering	gram	19.4	20.2	18.9	18.8	20.6	19.4	21.4	21.2	19.9	17.5	19.3	19.6	18.7	18.8
Berat cawan	gram	4.7	5.8	5.4	5.8	5.6	5.4	5.7	6	5.7	2.9	6.1	6	4.1	4.7
Berat tanah kering	gram	14.7	14.4	13.5	13	15	14	14.6	14.1	15.7	15.2	14.2	14.6	13.2	13.6
Berat air	gram	0.8	0.8	0.9	0.7	0.9	0.9	0.8	1.4	0.9	0.2	0.6	0.6	0.8	0.9
Kadar air	%	5.44	5.56	6.67	5.38	6.00	6.43	5.48	9.93	5.73	1.32	4.23	4.11	6.06	6.62
Kadar air rata-rata (%)		5.64													

Lapisan		1		2		3		4		5		6		7	
Berat ring + tanah	gram	33.1	32.3	32.1	32.2	31.8	32	33.2	33.1	32.8	32.9	33.5	33.2	32.8	32.7
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	13.8	13.6	13.7	13.3	13.5	14.7	14.6	14.3	14.4	15	14.7	14.3	14.2
γt	gr/cm^3	1.351	1.328	1.258	1.318	1.231	1.299	1.360	1.405	1.323	1.386	1.388	1.415	1.323	1.367
Kadar air	%	5.44	5.56	6.67	5.38	6.00	6.43	5.48	9.93	5.73	1.32	4.23	4.11	6.06	6.62
γd	gr/cm^3	1.281	1.258	1.180	1.251	1.161	1.221	1.290	1.278	1.252	1.368	1.332	1.359	1.248	1.282
γt rata-rata	gr/cm^3	1.339													
γd rata-rata	gr/cm^3	1.269													

Lereng dengan perkuatan geotekstil L=25,9 cm , d=9cm

Lapisan		1		2		3		4		5		6		7	
Berat cawan + tanah basah	gram	19.4	21.8	21.2	20.2	21.5	20.6	21.6	21.2	21.2	19.7	21.5	19.6	19.7	21.5
Berat cawan + tanah kering	gram	18.5	20.8	20.2	19.2	20.7	19.8	20.9	20.6	20.5	18.8	20.7	18.8	19	20.6
Berat cawan	gram	4.3	5.7	5.7	4.3	6	5.7	5.4	5.6	5.7	4.1	5.7	4.3	4.3	5.7
Berat tanah kering	gram	14.2	15.1	14.5	14.9	14.7	14.1	15.5	15	14.8	14.7	15	14.5	14.7	14.9
Berat air	gram	0.9	1	1	1	0.8	0.8	0.7	0.6	0.7	0.9	0.8	0.8	0.7	0.9
Kadar air	%	6.34	6.62	6.90	6.71	5.44	5.67	4.52	4.00	4.73	6.12	5.33	5.52	4.76	6.04
Kadar air rata-rata (%)								5.62							

Lapisan		1		2		3		4		5		6		7	
Berat ring + tanah	gram	32.7	32.3	32.9	33.1	31.8	32	32.9	32.6	32	32.2	33.4	33.4	33.1	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	14.2	13.8	13.5	13.7	13.3	13.5	14.4	14.1	14.4	14.6	14.9	14.9	14.6	14.7
γt	gr/cm^3	1.314	1.328	1.249	1.318	1.231	1.299	1.333	1.357	1.333	1.405	1.379	1.434	1.351	1.415
Kadar air	%	6.34	6.62	6.90	6.71	5.44	5.67	4.52	4.00	4.73	6.12	5.33	5.52	4.76	6.04
γd	gr/cm^3	1.236	1.246	1.169	1.236	1.167	1.229	1.275	1.305	1.272	1.324	1.309	1.359	1.290	1.334
γt rata-rata	gr/cm^3							1.339							
γd rata-rata	gr/cm^3							1.268							

Lereng dengan perkuatan geotekstil L=29.4 cm , d=9cm

Lapisan		1		2		3		4		5		6		7	
Berat cawan + tanah basah	gram	19.1	21.1	21	20.5	20.8	20.2	19.1	20.2	21.5	22.1	19.8	21	22.2	20
Berat cawan + tanah kering	gram	18.4	20.3	20.2	19.7	20	19.4	18.3	19.4	20.7	21.3	19	20.1	21.2	19.2
Berat cawan	gram	5.7	5.6	4.2	5.3	5.7	4.2	4.2	5.5	5.9	5.6	4.3	4.1	5.8	5.9
Berat tanah kering	gram	12.7	14.7	16	14.4	14.3	15.2	14.1	13.9	14.8	15.7	14.7	16	15.4	13.3
Berat air	gram	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.9	1	0.8
Kadar air	%	5.51	5.44	5.00	5.56	5.59	5.26	5.67	5.76	5.41	5.10	5.44	5.62	6.49	6.02
Kadar air rata-rata (%)		5.56													

Lapisan		1		2		3		4		5		6		7	
Berat ring + tanah	gram	32.4	32.3	32	32.2	31.8	32	32	32.1	32.6	32.1	32.1	32.6	32.5	32.5
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	13.9	13.8	13.5	13.7	13.3	13.5	13.5	13.6	14.1	13.6	13.6	14.1	14	14
γt	gr/cm^3	1.286	1.328	1.249	1.318	1.231	1.299	1.249	1.309	1.305	1.309	1.258	1.357	1.295	1.347
Kadar air	%	5.51	5.44	5.00	5.56	5.59	5.26	5.67	5.76	5.41	5.10	5.44	5.62	6.49	6.02
γd	gr/cm^3	1.219	1.260	1.190	1.249	1.166	1.234	1.182	1.238	1.238	1.245	1.194	1.285	1.216	1.271
γt rata-rata	gr/cm^3	1.296													
γd rata-rata	gr/cm^3	1.228													

Lereng dengan perkuatan geotekstil L=22,4 cm , d=12 cm

Lapisan		1		2		3		4		5		6		7	
Berat cawan + tanah basah	gram	19.8	21.6	21.4	20.7	21.7	20.9	22.6	21.9	23	21	19.9	20.3	21.7	21.1
Berat cawan + tanah kering	gram	18.9	20.6	20.4	19.8	20.9	20.1	21.8	21	22.1	20.2	19.1	19.5	20.8	20.3
Berat cawan	gram	4.1	5.8	5.4	6	5.6	4.2	6.1	5.6	6	6	4.2	4.3	5.7	5.6
Berat tanah kering	gram	14.8	14.8	15	13.8	15.3	15.9	15.7	15.4	16.1	14.2	14.9	15.2	15.1	14.7
Berat air	gram	0.9	1	1	0.9	0.8	0.8	0.8	0.9	0.9	0.8	0.8	0.8	0.9	0.8
Kadar air	%	6.08	6.76	6.67	6.52	5.23	5.03	5.10	5.84	5.59	5.63	5.37	5.26	5.96	5.44
Kadar air rata-rata (%)								**5.75**							

Lapisan		1		2		3		4		5		6		7	
Berat ring + tanah	gram	32.6	32.2	32.3	32.5	32.4	32.4	32	32.3	32.4	32.2	32.1	32.6	32.1	32.6
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	13.7	13.8	14	13.9	13.9	13.5	13.8	13.9	13.7	13.6	14.1	13.6	14.1
γt	gr/cm^3	1.305	1.318	1.277	1.347	1.286	1.338	1.249	1.328	1.286	1.318	1.258	1.357	1.258	1.357
Kadar air	%	6.08	6.76	6.67	6.52	5.23	5.03	5.10	5.84	5.59	5.63	5.37	5.26	5.96	5.44
γd	gr/cm^3	1.230	1.235	1.197	1.265	1.222	1.274	1.189	1.255	1.218	1.248	1.194	1.289	1.188	1.287
γt rata-rata	gr/cm^3							**1.306**							
γd rata-rata	gr/cm^3							**1.235**							

Lereng dengan perkuatan geotekstil L=25,9 cm , d=12 cm

Lapisan		1		2		3		4		5		6		7	
Berat cawan + tanah basah	gram	19.4	21.8	21.3	20.4	21	20	21.6	21.2	21.5	19.7	21.5	19.6	20	21.5
Berat cawan + tanah kering	gram	18.5	20.8	20.7	19.8	20.2	19.2	20.9	20.6	20.5	18.8	20.7	18.8	19	20.6
Berat cawan	gram	4.3	5.7	6	5.7	5.7	4.3	6	5.6	5.7	4.1	5.7	4.3	4.3	5.7
Berat tanah kering	gram	14.2	15.1	14.7	14.1	14.5	14.9	14.9	15	14.8	14.7	15	14.5	14.7	14.9
Berat air	gram	0.9	1	0.6	0.6	0.8	0.8	0.7	0.6	1	0.9	0.8	0.8	1	0.9
Kadar air	%	6.34	6.62	4.08	4.26	5.52	5.37	4.70	4.00	6.76	6.12	5.33	5.52	6.80	6.04
Kadar air rata-rata (%)								5.53							

Lapisan		1		2		3		4		5		6		7	
Berat ring + tanah	gram	32.7	33.2	33	33.2	32.7	32.8	32.9	32.6	32.9	33.1	33.4	33.4	33.1	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	14.2	14.7	14.5	14.7	14.2	14.3	14.4	14.1	14.4	14.6	14.9	14.9	14.6	14.7
γt	gr/cm^3	1.314	1.415	1.342	1.415	1.314	1.376	1.333	1.357	1.333	1.405	1.379	1.434	1.351	1.415
Kadar air	%	6.34	6.62	4.08	4.26	5.52	5.37	4.70	4.00	6.76	6.12	5.33	5.52	6.80	6.04
γd	gr/cm^3	1.236	1.327	1.289	1.357	1.245	1.306	1.273	1.305	1.248	1.324	1.309	1.359	1.265	1.334
γt rata-rata	gr/cm^3							1.370							
γd rata-rata	gr/cm^3							1.298							

Lereng dengan perkuatan geotekstil L=29,4 cm , d=12 cm

Lapisan		1		2		3		4		5		6		7	
Berat cawan + tanah basah	gram	20.2	21.1	22.8	19.2	20.3	20.9	20.6	20.8	21.5	21.8	21.2	19.7	20.2	21.6
Berat cawan + tanah kering	gram	19.3	20.3	21.8	18.3	19.6	20.1	19.8	20	20.7	21	20.6	19.1	19.4	20.8
Berat cawan	gram	4.2	5.6	5.9	4.7	5.7	5.6	5.7	5.6	5.3	5.9	5.7	4.1	4.2	5.7
Berat tanah kering	gram	15.1	14.7	15.9	13.6	13.9	14.5	14.1	14.4	15.4	15.1	14.9	15	15.2	15.1
Berat air	gram	0.9	0.8	1	0.9	0.7	0.8	0.8	0.8	0.8	0.8	0.6	0.6	0.8	0.8
Kadar air	%	5.96	5.44	6.29	6.62	5.04	5.52	5.67	5.56	5.19	5.30	4.03	4.00	5.26	5.30
Kadar air rata-rata (%)								**5.37**							

Lapisan		1		2		3		4		5		6		7	
Berat ring + tanah	gram	32.1	32.6	33.2	32.3	32.5	32.6	32.8	32.7	32.4	32.6	32.4	32.1	32.4	32.5
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	13.6	14.1	14.7	13.8	14	14.1	14.3	14.2	13.9	14.1	13.9	13.6	13.9	14
γt	gr/cm^3	1.258	1.357	1.360	1.328	1.295	1.357	1.323	1.367	1.286	1.357	1.286	1.309	1.286	1.347
Kadar air	%	5.96	5.44	6.29	6.62	5.04	5.52	5.67	5.56	5.19	5.30	4.03	4.00	5.26	5.30
γd	gr/cm^3	1.188	1.287	1.280	1.246	1.233	1.286	1.252	1.295	1.223	1.289	1.236	1.258	1.222	1.280
γt rata-rata	gr/cm^3							**1.323**							
γd rata-rata	gr/cm^3							**1.255**							

Lampiran 8

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

1. Metode Shields

Data:

γ $= 1{,}23\ gr/cm^3$

ϕ = sudut geser dalam tanah = 34,544°

β = sudut kemiringan lereng = 51°

B = lebar pondasi = 6 cm = 2,362 inchi

D = kedalaman pondasi = 0

L = panjang pondasi = ∼

b = jarak pondasi ke puncak lereng = 6 cm = 2,362 inchi

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

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

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

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

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

$f_{\beta,\ b/B} = 1 - 0{,}8\ [\ 1 - (\ 1 - \tan\beta\ )^2]\ \{2/[2 + (b/B)^2 \tan\beta\ ]\}$

$= 1 - 0{,}8\ [\ 1 - (\ 1 - \tan 51\ )^2]\ \{2/[2 + (2{,}362/2{,}362)^2 \tan 51\ ]\}$

$= 0{,}5327$

$f_{\beta,\ b/D,\ D/B} = 1 + 0{,}6\ (B/L)\ [\ 1 - (\ 1 - \tan\beta\ )^2]\ \{2/[2 + (b/B)^2 \tan\beta\ ]\}$

$= 1 + 0{,}6\ (2{,}362/\sim)\ [\ 1 - (\ 1 - \tan 51\ )^2]\ \{2/[2 + (2{,}362/2{,}362)^2 \tan 51\ ]\}$

$= 1$

$f_{\beta,\ b/B,\ B/L} = 1 + 0{,}33\ (D/B) \tan\beta\ \{2/[2 + (b/B)^2 \tan\beta\ ]\}$

$= 1 + 0{,}33\ (0/2{,}362) \tan 51\ \{2/[2 + (2{,}362/2{,}362)^2 \tan 51]\}$

$= 1$

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

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

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

2. Metode Hansen

Data:

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

ϕ = sudut geser dalam tanah = 34,544°

β = sudut kemiringan lereng = 51°

B = lebar pondasi = 6 cm

D = kedalaman pondasi = 0

L = panjang pondasi = ∼

b = jarak pondasi ke puncak lereng = 6 cm

Untuk b = 4B (Tanah Datar):

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

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

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

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

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

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

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

Untuk Tanah Lereng:

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

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

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

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

$d_c = d_q = d_\gamma = 1$

$i_c = i_q = i_\gamma = 1$

$b_c = b_q = b_\gamma = 1$

Untuk d = 0 cm, maka:

$g_q = g_\gamma = (1 - tan\beta)^2 = (1 - tan51)^2 = 0.055$

Untuk Df = 0 cm maka nilai daya dukung:

$q_u = 1{,}23\ x\ \frac{6}{2} x\ 31{,}463\ x\ 0{,}055 = 6.406\ gr/cm^2 = 0{,}641 kN/m^2$

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

d = 0:

$q_u = 0{,}641 kN/m^2$

d = 4B (24 cm):

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

$$\frac{11{,}6098 - 0{,}0952}{24 - 0} = \frac{q_u - 0{,}641}{6 - 0}$$

$69{,}0876 = 24q_u - 15{,}374$

$q_u = 3{,}519\ kN/m^2$

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

1. Metode Shields

Data:

γ $= 1{,}23\ gr/cm^3$

ϕ = sudut geser dalam tanah = 34,544°

β = sudut kemiringan lereng = 51°

B = lebar pondasi = 6 cm = 2,362 inchi

D = kedalaman pondasi = 0

L = panjang pondasi = ∼

b = jarak pondasi ke puncak lereng = 9 cm = 3,543 inchi

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

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

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

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

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

$f_{\beta,\ b/B} = 1 - 0{,}8\ [\ 1 - (\ 1 - \tan\beta\ )^2]\ \{2/[2 + (b/B)^2 \tan\beta\ ]\}$

$= 1 - 0{,}8\ [\ 1 - (\ 1 - \tan 51\ )^2]\ \{2/[2 + (3{,}543/2{,}362)^2 \tan 51\ ]\}$

$= 0{,}6805$

$f_{\beta,\ b/D,\ D/B} = 1 + 0{,}6\ (B/L)\ [\ 1 - (\ 1 - \tan\beta\ )^2]\ \{2/[2 + (b/B)^2 \tan\beta\ ]\}$

$= 1 + 0{,}6\ (2{,}362/\sim)\ [\ 1 - (\ 1 - \tan 51\ )^2]\ \{2/[2 + (3{,}543/2{,}362)^2 \tan 51\ ]\}$

$= 1$

$f_{\beta,\ b/B,\ B/L} = 1 + 0{,}33\ (D/B) \tan\beta\ \{2/[2 + (b/B)^2 \tan\beta\ ]\}$

$= 1 + 0{,}33\ (0/2{,}362) \tan 51\ \{2/[2 + (3{,}543/2{,}362)^2 \tan 51]\}$

$= 1$

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

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

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

2. Metode Hansen

Data:

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

ϕ = sudut geser dalam tanah = 34,544°

β = sudut kemiringan lereng = 51°

B = lebar pondasi = 6 cm

D = kedalaman pondasi = 0

L = panjang pondasi = ∼

b = jarak pondasi ke puncak lereng = 9 cm

Untuk b = 4B (Tanah Datar):

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

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

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

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

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

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

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

Untuk Tanah Lereng:

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

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

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

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

$d_c = d_q = d_\gamma = 1$

$i_c = i_q = i_\gamma = 1$

$b_c = b_q = b_\gamma = 1$

Untuk d = 0 cm, maka:

$g_q = g_\gamma = (1 - tan\beta)^2 = (1 - tan51)^2 = 0{,}0551$

Untuk Df = 0 cm maka nilai daya dukung:

$q_u = 1{,}23\ x\ \frac{6}{2} x\ 31{,}463\ x\ 0{,}0551 = 6{,}405\ gr/cm^2 = 0{,}641 kN/m^2$

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

d = 0:

$q_u = 0{,}641 kN/m^2$

d = 4B (24 cm):

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

$\frac{11{,}6098 - 0{,}0952}{24 - 0} = \frac{q_u - 0{,}641}{9 - 0}$

$103{,}6314 = 24 q_u - 15{,}384$

$q_u = 4{,}959\ kN/m^2$

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

1. Metode Shields

Data:

γ $= 1{,}23\ gr/cm^3$

ϕ = sudut geser dalam tanah = 34,544°

β = sudut kemiringan lereng = 51°

B = lebar pondasi = 6 cm = 2,362 inchi

D = kedalaman pondasi = 0

L = panjang pondasi = ∼

b = jarak pondasi ke puncak lereng = 12 cm = 4,724 inchi

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

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

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

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

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

$f_{\beta,\ b/B} = 1 - 0{,}8\ [\ 1 - (\ 1 - \tan\beta\ )^2]\ \{2/[2 + (b/B)^2 \tan\beta\ ]\}$

$= 1 - 0{,}8\ [\ 1 - (\ 1 - \tan 51\ )^2]\ \{2/[2 + (4{,}724/2{,}362)^2 \tan 51\ ]\}$

$= 0{,}782$

$f_{\beta,\ b/D,\ D/B} = 1 + 0{,}6\ (B/L)\ [\ 1 - (\ 1 - \tan\beta\ )^2]\ \{2/[2 + (b/B)^2 \tan\beta\ ]\}$

$= 1 + 0{,}6\ (2{,}362/\sim)\ [\ 1 - (\ 1 - \tan 51\ )^2]\ \{2/[2 + (4{,}724/2{,}362)^2 \tan 51\ ]\}$

$= 1$

$f_{\beta,\ b/B,\ B/L} = 1 + 0{,}33\ (D/B) \tan\beta\ \{2/[2 + (b/B)^2 \tan\beta\ ]\}$

$= 1 + 0{,}33\ (0/2{,}362) \tan 51\ \{2/[2 + (4{,}724/2{,}362)^2 \tan 51]\}$

$= 1$

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

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

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

2. Metode Hansen

Data:

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

ϕ = sudut geser dalam tanah = 34,544°

β = sudut kemiringan lereng = 51°

B = lebar pondasi = 6 cm

D = kedalaman pondasi = 0

L = panjang pondasi = ∼

b = jarak pondasi ke puncak lereng = 12 cm

Untuk b = 4B (Tanah Datar):

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

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

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

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

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

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

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

Untuk Tanah Lereng:

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

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

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

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

$d_c = d_q = d_\gamma = 1$

$i_c = i_q = i_\gamma = 1$

$b_c = b_q = b_\gamma = 1$

Untuk d = 0 cm, maka:

$g_q = g_\gamma = (1 - tan\beta)^2 = (1 - tan51)^2 = 0{,}0551$

Untuk Df = 0 cm maka nilai daya dukung:

$q_u = 1{,}23\ x\ \frac{6}{2} x\ 31{,}463\ x\ 0{,}0551 = 6.405 gr/cm^2 = 0{,}641 kN/m^2$

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

d = 0:

$q_u = 0.641 kN/m^2$

d = 4B (24 cm):

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

$$\frac{11{,}6098 - 0{,}0952}{24 - 0} = \frac{q_u - 0{,}641}{12 - 0}$$

$138{,}175 = 24q_u - 15.384$

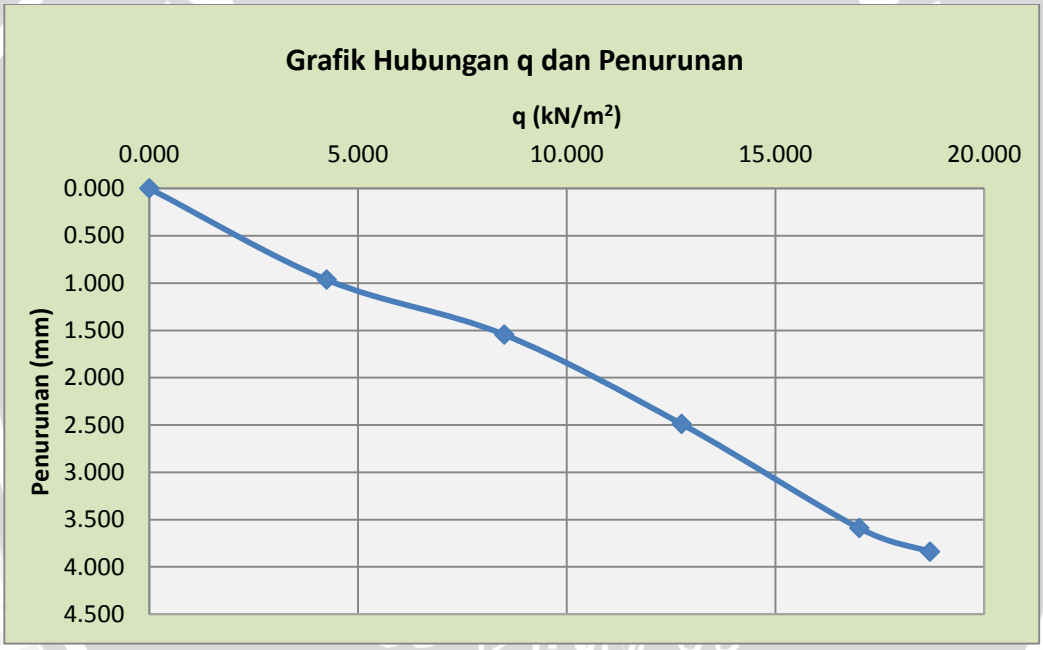
$q_u = 6.398\ kN/m^2$

Lampiran 9

Hasil Analisis Daya Dukung Lereng dengan Metode Eksperimen

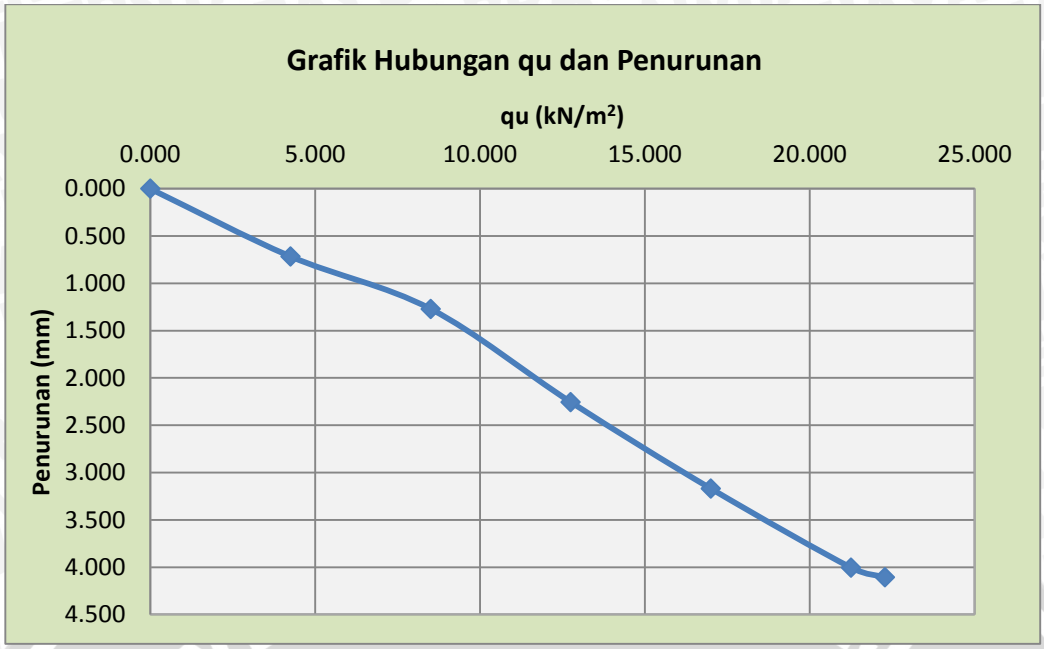
Lereng tanpa perkuatan d=6cm

Beban (kg)	LVDT	Penurunan (mm)	s/B (%)	q (kg/cm²)	q (kN/m²)
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



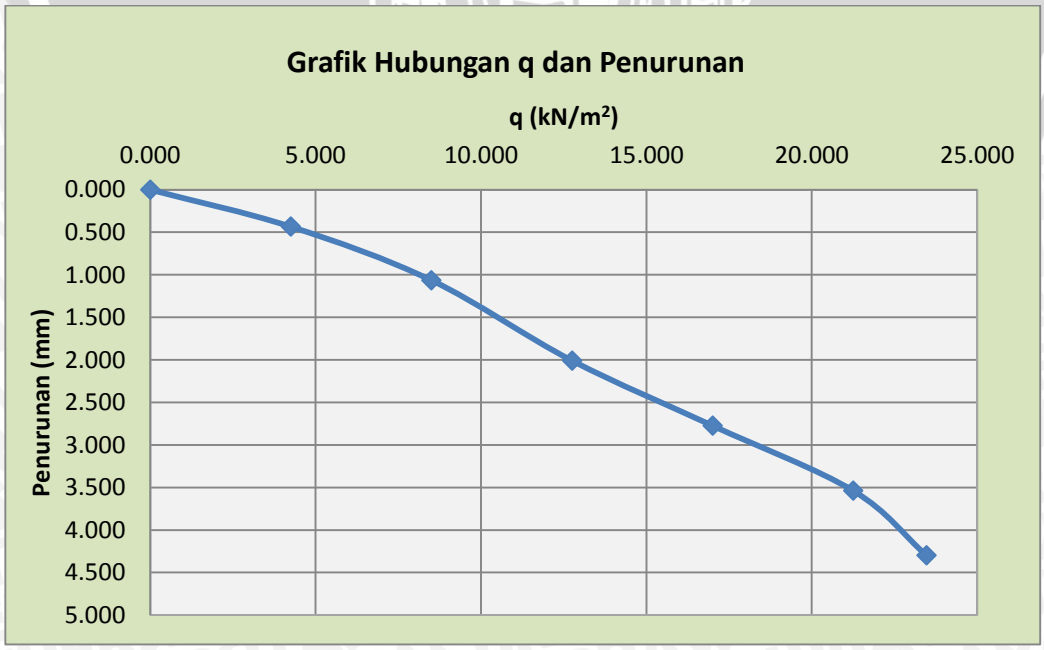
Lereng tanpa perkuatan d=9cm

Beban (kg)	LVDT	Penurunan (mm)	s/B (%)	q (kg/cm²)	q (kN/m²)
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



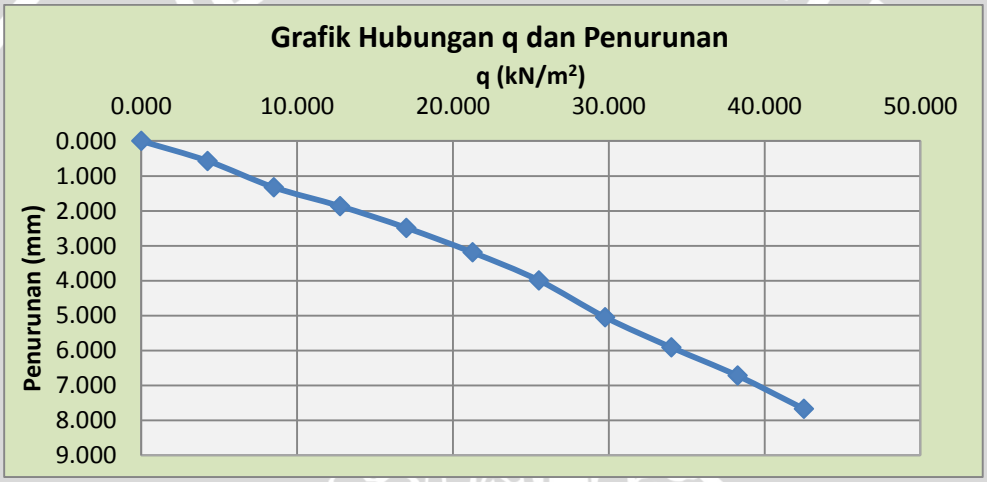
Lereng tanpa perkuatan d=12cm

Beban (kg)	LVDT	Penurunan (mm)	s/B (%)	q (kg/cm²)	q (kN/m²)
0	4344	0.000	0.000	0.000	0.000
25	4257	0.435	0.725	0.043	4.252
50	4131	1.065	1.775	0.085	8.503
75	3942	2.010	3.350	0.128	12.755
100	3789	2.775	4.625	0.170	17.007
125	3636	3.540	5.900	0.213	21.259
138	3484	4.300	7.167	0.235	23.469



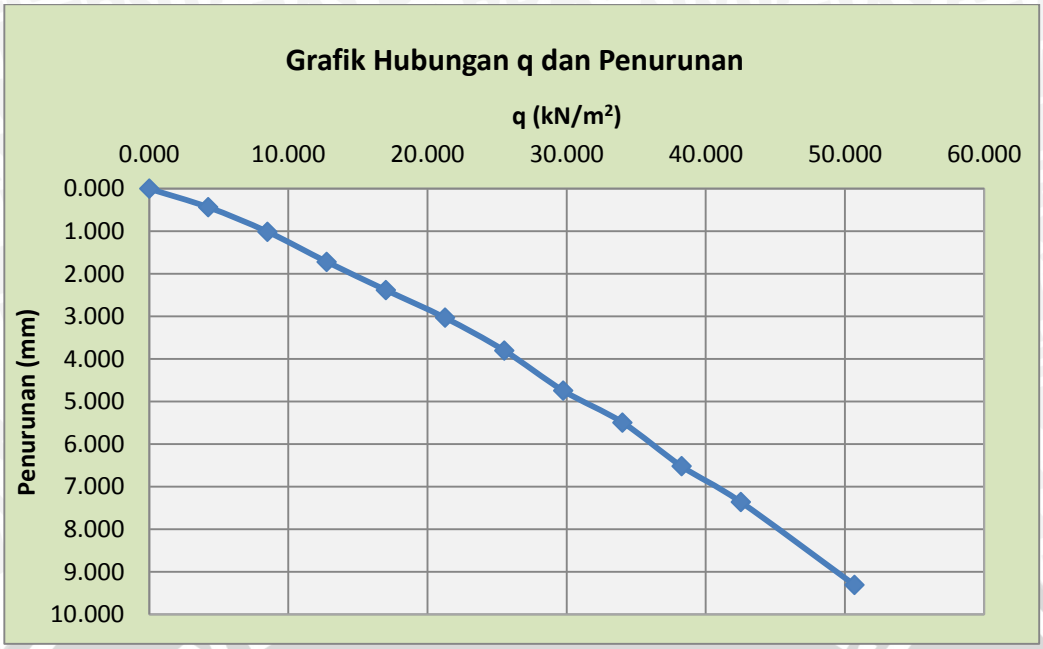
Lereng dengan perkuatan geotekstil L=22,4 cm , d=6 cm

Beban (kg)	LVDT	Penurunan (mm)	s/B (%)	q (kg/cm^2)	q (kN/m^2)
0	4965	0.000	0.000	0.000	0.000
25	4851	0.570	0.950	0.043	4.252
50	4700	1.325	2.208	0.085	8.503
75	4592	1.865	3.108	0.128	12.755
100	4468	2.485	4.142	0.170	17.007
125	4327	3.190	5.317	0.213	21.259
150	4167	3.990	6.650	0.255	25.510
175	3956	5.045	8.408	0.298	29.762
200	3783	5.910	9.850	0.340	34.014
225	3621	6.720	11.200	0.383	38.265
250	3431	7.670	12.783	0.425	42.517



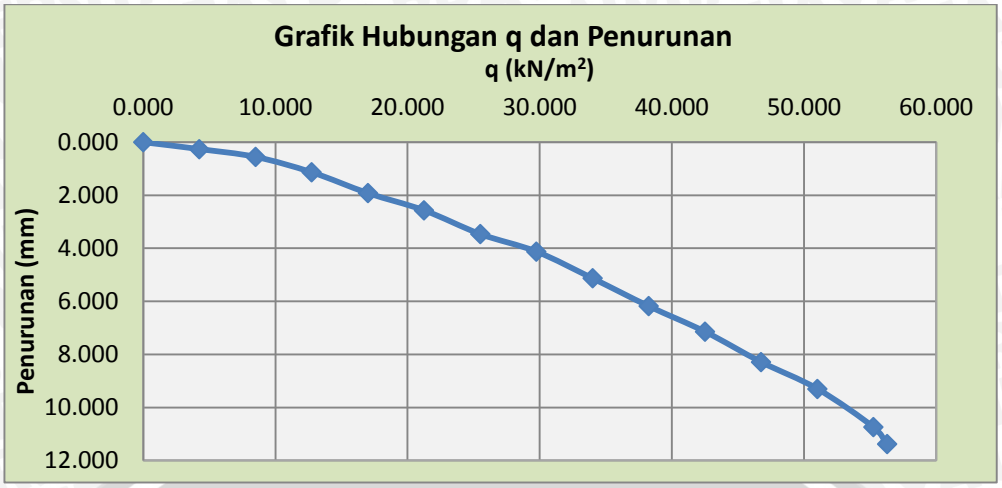
Lereng dengan perkuatan geotekstil L=22,4 cm , d=9cm

Beban (kg)	LVDT	Penurunan (mm)	s/B (%)	q (kg/cm^2)	q (kN/m^2)
0	4865	0.000	0.000	0.000	0.000
25	4778	0.435	0.725	0.043	4.252
50	4663	1.010	1.683	0.085	8.503
75	4522	1.715	2.858	0.128	12.755
100	4389	2.380	3.967	0.170	17.007
125	4259	3.030	5.050	0.213	21.259
150	4105	3.800	6.333	0.255	25.510
175	3916	4.745	7.908	0.298	29.762
200	3767	5.490	9.150	0.340	34.014
225	3561	6.520	10.867	0.383	38.265
250	3393	7.360	12.267	0.425	42.517
298	3004	9.305	15.508	0.507	50.680



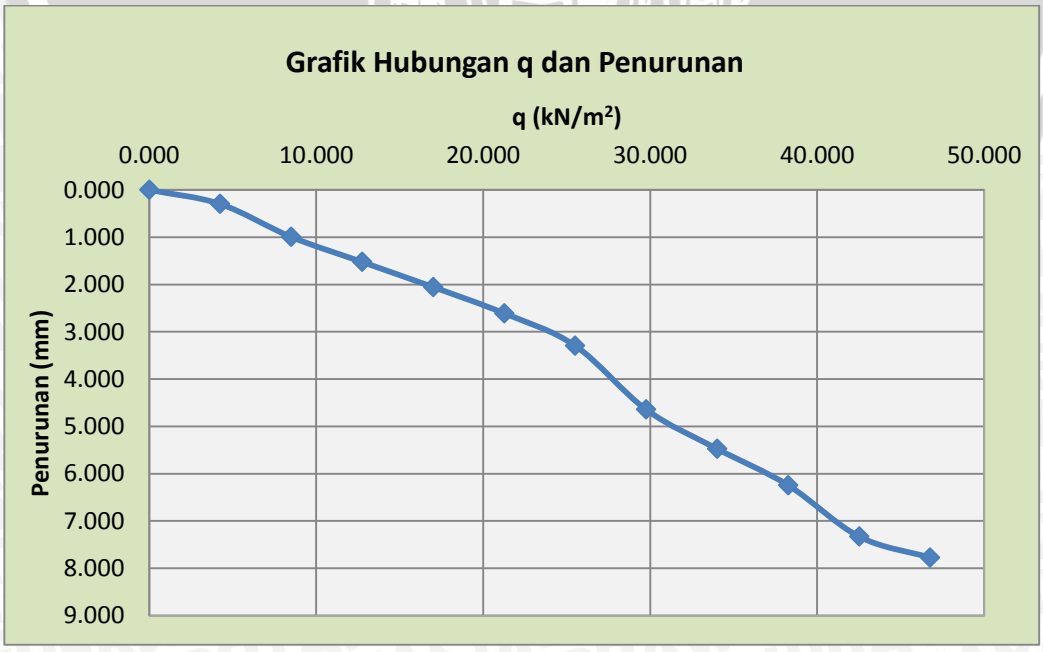
Lereng dengan perkuatan geotekstil L=22,4 cm , d=12 cm

Beban (kg)	LVDT	Penurunan (mm)	s/B (%)	q (kg/cm²)	q (kN/m²)
0	4679	0.000	0.000	0.000	0.000
25	4627	0.260	0.433	0.043	4.252
50	4568	0.555	0.925	0.085	8.503
75	4452	1.135	1.892	0.128	12.755
100	4295	1.920	3.200	0.170	17.007
125	4165	2.570	4.283	0.213	21.259
150	3986	3.465	5.775	0.255	25.510
175	3854	4.125	6.875	0.298	29.762
200	3652	5.135	8.558	0.340	34.014
225	3442	6.185	10.308	0.383	38.265
250	3250	7.145	11.908	0.425	42.517
275	3021	8.290	13.817	0.468	46.769
300	2819	9.300	15.500	0.510	51.020
325	2530	10.745	17.908	0.553	55.272
331	2402	11.385	18.975	0.563	56.293



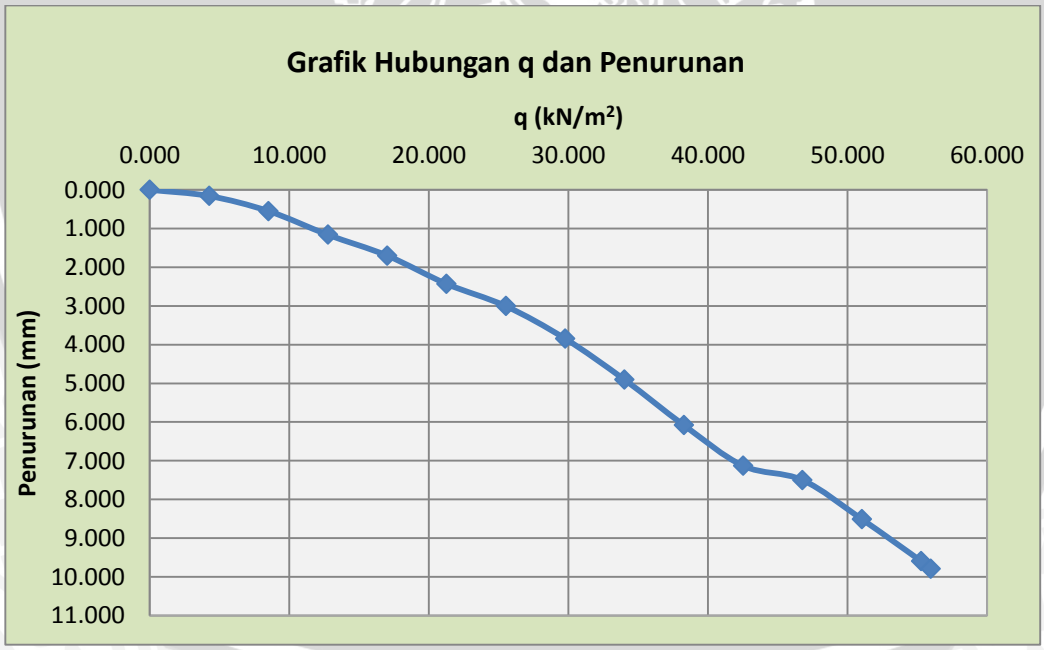
Lereng dengan perkuatan geotekstil L=25,9 cm , d=6cm

Beban (kg)	LVDT	Penurunan (mm)	s/B (%)	q (kg/cm²)	q (kN/m²)
0	4950	0.000	0.000	0.000	0.000
25	4890	0.300	0.500	0.043	4.252
50	4751	0.995	1.658	0.085	8.503
75	4645	1.525	2.542	0.128	12.755
100	4539	2.055	3.425	0.170	17.007
125	4428	2.610	4.350	0.213	21.259
150	4291	3.295	5.492	0.255	25.510
175	4021	4.645	7.742	0.298	29.762
200	3855	5.475	9.125	0.340	34.014
225	3701	6.245	10.408	0.383	38.265
250	3484	7.330	12.217	0.425	42.517
275	3395	7.775	12.958	0.468	46.769



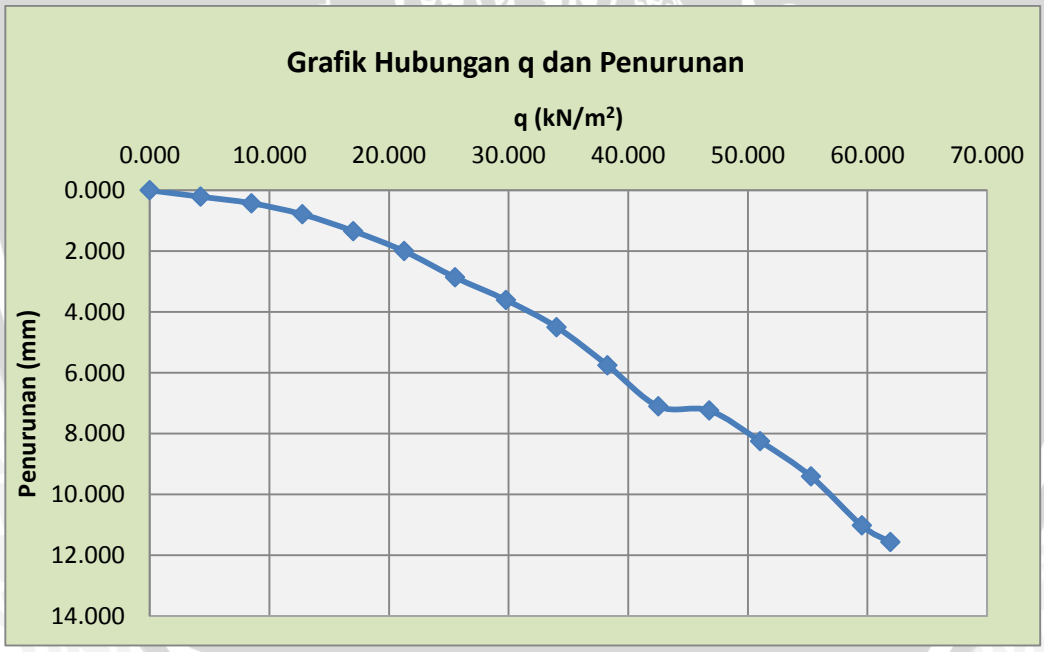
Lereng dengan perkuatan geotekstil L=25,9 cm , d=9 cm

Beban (kg)	LVDT	Penurunan (mm)	s/B (%)	q (kg/cm^2)	q (kN/m^2)
0	4310	0.000	0.000	0.000	0.000
25	4278	0.160	0.267	0.043	4.252
50	4200	0.550	0.917	0.085	8.503
75	4078	1.160	1.933	0.128	12.755
100	3970	1.700	2.833	0.170	17.007
125	3824	2.430	4.050	0.213	21.259
150	3709	3.005	5.008	0.255	25.510
175	3541	3.845	6.408	0.298	29.762
200	3329	4.905	8.175	0.340	34.014
225	3094	6.080	10.133	0.383	38.265
250	2884	7.130	11.883	0.425	42.517
275	2810	7.500	12.500	0.468	46.769
300	2608	8.510	14.183	0.510	51.020
325	2391	9.595	15.992	0.553	55.272
329	2351	9.795	16.325	0.560	55.952



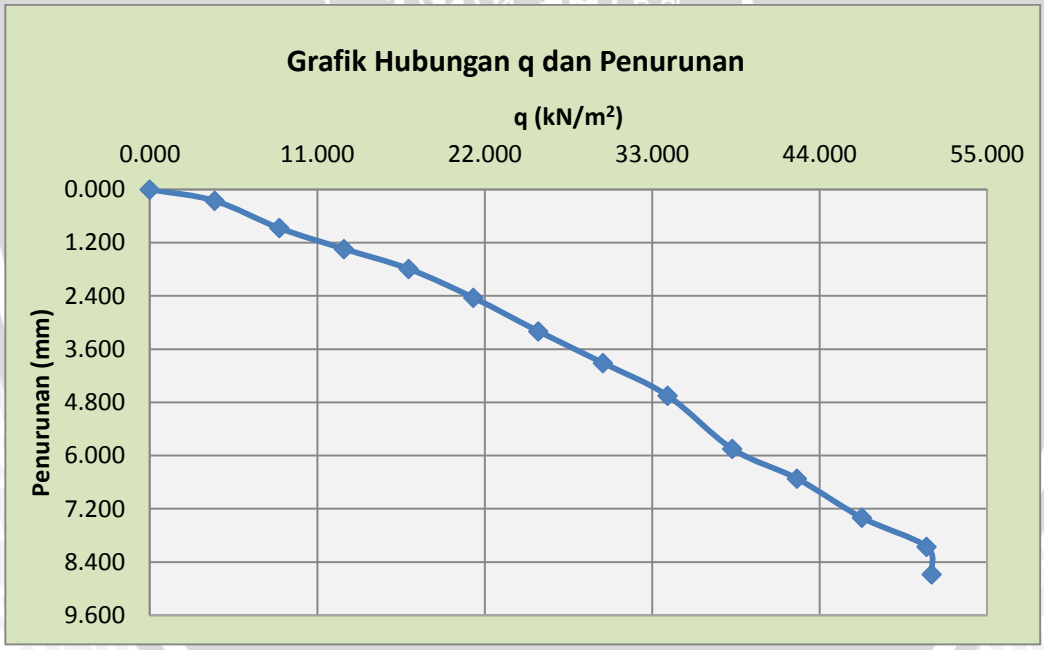
Lereng dengan perkuatan geotekstil L=25,9 cm , d=12cm

Beban (kg)	LVDT	Penurunan (mm)	s/B (%)	q (kg/cm²)	q (kN/m²)
0	4513	0.000	0.000	0.000	0.000
25	4471	0.210	0.350	0.043	4.252
50	4428	0.425	0.708	0.085	8.503
75	4355	0.790	1.317	0.128	12.755
100	4245	1.340	2.233	0.170	17.007
125	4113	2.000	3.333	0.213	21.259
150	3941	2.860	4.767	0.255	25.510
175	3792	3.605	6.008	0.298	29.762
200	3613	4.500	7.500	0.340	34.014
225	3362	5.755	9.592	0.383	38.265
250	3092	7.105	11.842	0.425	42.517
275	3065	7.240	12.067	0.468	46.769
300	2863	8.250	13.750	0.510	51.020
325	2631	9.410	15.683	0.553	55.272
350	2308	11.025	18.375	0.595	59.524
364	2199	11.570	19.283	0.619	61.905



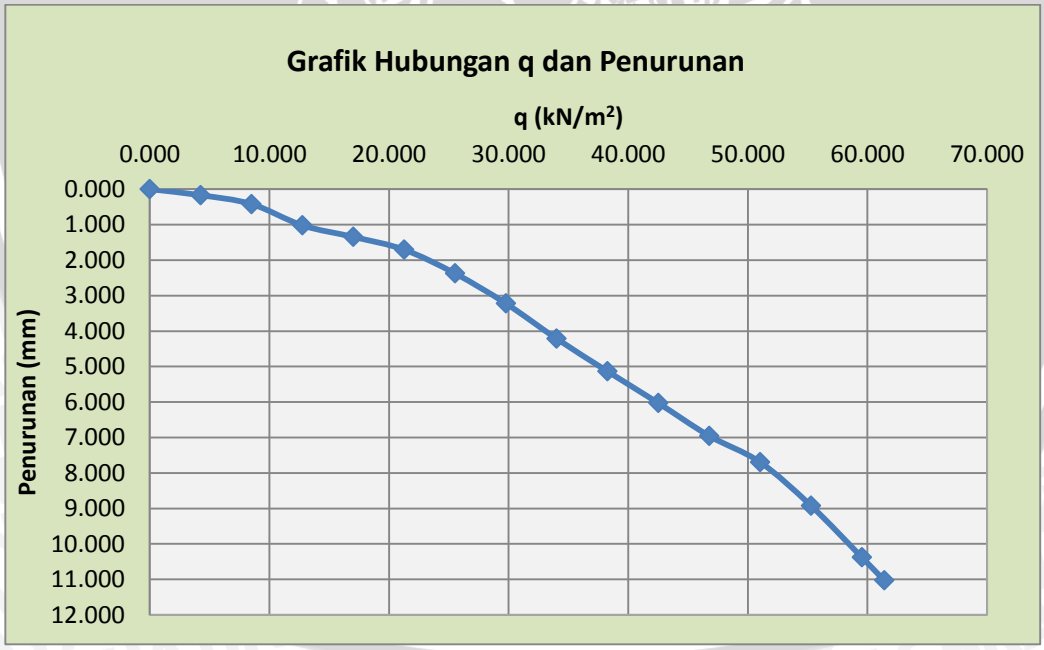
Lereng dengan perkuatan geotekstil L=29,4 cm , d=6 cm

Beban (kg)	LVDT	Penurunan (mm)	s/B (%)	q (kg/cm^2)	q (kN/m^2)
0	4577	0.000	0.000	0.000	0.000
25	4526	0.255	0.425	0.043	4.252
50	4403	0.870	1.450	0.085	8.503
75	4309	1.340	2.233	0.128	12.755
100	4219	1.790	2.983	0.170	17.007
125	4089	2.440	4.067	0.213	21.259
150	3938	3.195	5.325	0.255	25.510
175	3795	3.910	6.517	0.298	29.762
200	3647	4.650	7.750	0.340	34.014
225	3407	5.850	9.750	0.383	38.265
250	3273	6.520	10.867	0.425	42.517
275	3097	7.400	12.333	0.468	46.769
300	2966	8.055	13.425	0.510	51.020
302	2841	8.680	14.467	0.514	51.361



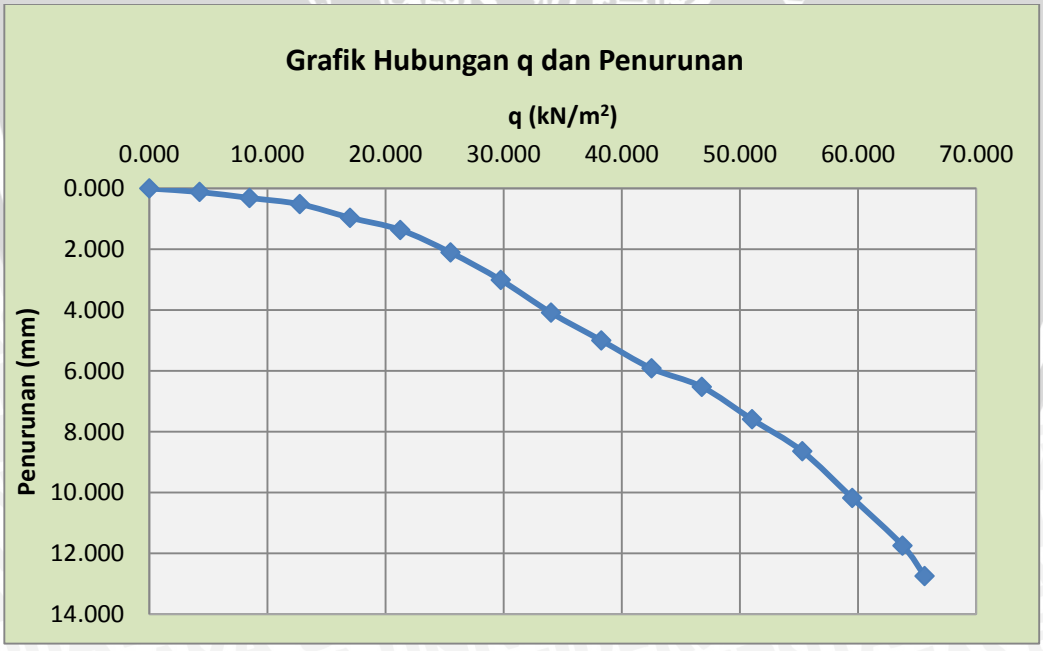
Lereng dengan perkuatan geotekstil L=29,4 cm , d=9 cm

Beban (kg)	LVDT	Penurunan (mm)	s/B (%)	q (kg/cm^2)	q (kN/m^2)
0	5102	0.000	0.000	0.000	0.000
25	5068	0.170	0.283	0.043	4.252
50	5018	0.420	0.700	0.085	8.503
75	4898	1.020	1.700	0.128	12.755
100	4833	1.345	2.242	0.170	17.007
125	4761	1.705	2.842	0.213	21.259
150	4627	2.375	3.958	0.255	25.510
175	4458	3.220	5.367	0.298	29.762
200	4259	4.215	7.025	0.340	34.014
225	4075	5.135	8.558	0.383	38.265
250	3896	6.030	10.050	0.425	42.517
275	3711	6.955	11.592	0.468	46.769
300	3563	7.695	12.825	0.510	51.020
325	3318	8.920	14.867	0.553	55.272
350	3027	10.375	17.292	0.595	59.524
361	2897	11.025	18.375	0.614	61.395



Lereng dengan perkuatan geotekstil L=29,4 cm , d=12 cm

Beban (kg)	LVDT	Penurunan (mm)	s/B (%)	q (kg/cm^2)	q (kN/m^2)
0	5104	0.000	0.000	0.000	0.000
25	5081	0.115	0.192	0.043	4.252
50	5042	0.310	0.517	0.085	8.503
75	5001	0.515	0.858	0.128	12.755
100	4912	0.960	1.600	0.170	17.007
125	4832	1.360	2.267	0.213	21.259
150	4683	2.105	3.508	0.255	25.510
175	4502	3.010	5.017	0.298	29.762
200	4287	4.085	6.808	0.340	34.014
225	4105	4.995	8.325	0.383	38.265
250	3921	5.915	9.858	0.425	42.517
275	3800	6.520	10.867	0.468	46.769
300	3586	7.590	12.650	0.510	51.020
325	3376	8.640	14.400	0.553	55.272
350	3068	10.180	16.967	0.595	59.524
375	2756	11.740	19.567	0.638	63.776
386	2555	12.745	21.242	0.656	65.646



Lampiran 10

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

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

$$f(x_0) = b_o + b_1 (x_o - x_0) + b_2 (x_0 - x_0)(x_0 - x_1)$$

$$b_o = f(x_0)$$

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

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

Lereng tanpa perkuatan 6cm:

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	0.000	f(x_0)	0.000	2.644	0.681	5.821
	x_1	1.608	f(x_1)	4.252			
	x_2	2.575	f(x_2)	8.503			
4	x_0	2.575	f(x_0)	8.503	2.699	-0.112	12.374
	x_1	4.150	f(x_1)	12.755			
	x_2	5.983	f(x_2)	17.007			
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

Lereng tanpa perkuatan 9cm:

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	0.000	f(x_0)	0.000	3.568	0.486	7.921
	x_1	1.192	f(x_1)	4.252			
	x_2	2.117	f(x_2)	8.503			
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			
6.842							22.279

Lereng tanpa perkuatan 12cm:

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	0.725	f(x_0)	4.252	4.049	-0.514	9.267
	x_1	1.775	f(x_1)	8.503			
	x_2	3.350	f(x_2)	12.755			
4	x_0	3.350	f(x_0)	12.755	3.335	0.000	14.923
	x_1	4.625	f(x_1)	17.007			
	x_2	5.900	f(x_2)	21.259			
6	x_0	4.625	f(x_0)	17.007	3.335	-0.625	21.506
	x_1	5.900	f(x_1)	21.259			
	x_2	7.167	f(x_2)	23.469			
7.167							23.469

Lereng dengan perkuatan dengan variasi panjang geotekstil:

Jarak Pondasi	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)
d/B=1	L/H=0.45	2	x_0	0.000	f(x_0)	0.000	4.475	-0.497	7.908
			x_1	0.950	f(x_1)	4.252			
			x_2	2.208	f(x_2)	8.503			
	L/H=0.52		x_0	0.500	f(x_0)	4.252	3.671	0.560	9.954
			x_1	1.658	f(x_1)	8.503			
			x_2	2.542	f(x_2)	12.755			
	L/H=0.59		x_0	0.425	f(x_0)	4.252	4.148	0.708	11.298
			x_1	1.450	f(x_1)	8.503			
			x_2	2.233	f(x_2)	12.755			
d/B=1,5	L/H=0.45		x_0	0.725	f(x_0)	4.252	4.437	-0.383	10.953
			x_1	1.683	f(x_1)	8.503			
			x_2	2.858	f(x_2)	12.755			
	L/H=0.52		x_0	1.933	f(x_0)	12.755	4.724	-0.581	13.802
			x_1	2.833	f(x_1)	17.007			
			x_2	4.050	f(x_2)	21.259			
	L/H=0.59		x_0	0.700	f(x_0)	8.503	4.252	2.334	15.841
			x_1	1.700	f(x_1)	12.755			
			x_2	2.242	f(x_2)	17.007			
d/B=2	L/H=0.45		x_0	0.925	f(x_0)	8.503	4.398	-0.505	13.173
			x_1	1.892	f(x_1)	12.755			
			x_2	3.200	f(x_2)	17.007			
	L/H=0.52		x_0	0.708	f(x_0)	8.503	6.989	-1.542	16.470
			x_1	1.317	f(x_1)	12.755			
			x_2	2.233	f(x_2)	17.007			
	L/H=0.59		x_0	0.858	f(x_0)	12.755	5.733	0.458	19.509
			x_1	1.600	f(x_1)	17.007			
			x_2	2.267	f(x_2)	21.259			

Jarak Pondasi	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)
d/B=1	L/H=0.45	4	x_0	2.208	f(x_0)	8.503	4.724	-0.315	15.464
			x_1	3.108	f(x_1)	12.755			
			x_2	4.142	f(x_2)	17.007			
	L/H=0.52		x_0	2.542	f(x_0)	12.755	4.813	-0.120	17.874
			x_1	3.425	f(x_1)	17.007			
			x_2	4.350	f(x_2)	21.259			
	L/H=0.59		x_0	2.233	f(x_0)	12.755	5.669	-0.951	21.061
			x_1	2.983	f(x_1)	17.007			
			x_2	4.067	f(x_2)	21.259			
d/B=1,5	L/H=0.45		x_0	2.858	f(x_0)	12.755	3.836	0.040	17.136
			x_1	3.967	f(x_1)	17.007			
			x_2	5.050	f(x_2)	21.259			
	L/H=0.52		x_0	2.833	f(x_0)	17.007	3.495	0.433	20.259
			x_1	4.050	f(x_1)	21.259			
			x_2	5.008	f(x_2)	25.510			
	L/H=0.59		x_0	3.958	f(x_0)	25.510	3.019	-0.148	24.944
			x_1	5.367	f(x_1)	29.762			
			x_2	7.025	f(x_2)	34.014			
d/B=2	L/H=0.45		x_0	3.200	f(x_0)	17.007	3.925	-0.417	20.241
			x_1	4.283	f(x_1)	21.259			
			x_2	5.775	f(x_2)	25.510			
	L/H=0.52		x_0	3.333	f(x_0)	21.259	2.966	0.171	24.049
			x_1	4.767	f(x_1)	25.510			
			x_2	6.008	f(x_2)	29.762			
	L/H=0.59		x_0	3.508	f(x_0)	25.510	2.819	-0.135	29.464
			x_1	5.017	f(x_1)	29.762			
			x_2	6.808	f(x_2)	34.014			

Jarak Pondasi	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)
d/B=1	L/H=0.45	6	x_0	4.142	f(x_0)	17.007	3.618	-0.171	21.714
			x_1	5.317	f(x_1)	21.259			
			x_2	6.650	f(x_2)	25.510			
	L/H=0.52		x_0	4.350	f(x_0)	21.259	3.724	-0.541	24.950
			x_1	5.492	f(x_1)	25.510			
			x_2	7.742	f(x_2)	29.762			
	L/H=0.59		x_0	4.067	f(x_0)	21.259	3.379	0.077	26.392
			x_1	5.325	f(x_1)	25.510			
			x_2	6.517	f(x_2)	29.762			
d/B=1,5	L/H=0.45		x_0	5.050	f(x_0)	21.259	3.313	-0.215	24.974
			x_1	6.333	f(x_1)	25.510			
			x_2	7.908	f(x_2)	29.762			
	L/H=0.52		x_0	4.050	f(x_0)	21.259	4.437	-0.593	28.762
			x_1	5.008	f(x_1)	25.510			
			x_2	6.408	f(x_2)	29.762			
	L/H=0.59		x_0	5.367	f(x_0)	29.762	2.564	0.065	31.343
			x_1	7.025	f(x_1)	34.014			
			x_2	8.558	f(x_2)	38.265			
d/B=2	L/H=0.45		x_0	5.775	f(x_0)	25.510	3.865	-0.481	28.675
			x_1	6.875	f(x_1)	29.762			
			x_2	8.558	f(x_2)	34.014			
	L/H=0.52		x_0	4.767	f(x_0)	25.510	3.424	-0.210	33.736
			x_1	6.008	f(x_1)	29.762			
			x_2	7.500	f(x_2)	34.014			
	L/H=0.59		x_0	5.017	f(x_0)	29.762	2.373	0.130	36.492
			x_1	6.808	f(x_1)	34.014			
			x_2	8.325	f(x_2)	38.265			

Jarak Pondasi	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)
d/B=1	L/H=0.45	6.4	x_0	5.317	f(x_0)	21.259	3.189	-0.249	22.781
			x_1	6.650	f(x_1)	25.510			
			x_2	8.408	f(x_2)	29.762			
	L/H=0.52		x_0	5.492	f(x_0)	25.510	1.890	0.326	24.830
			x_1	7.742	f(x_1)	29.762			
			x_2	9.125	f(x_2)	34.014			
	L/H=0.59		x_0	5.325	f(x_0)	25.510	3.568	-0.050	26.452
			x_1	6.517	f(x_1)	29.762			
			x_2	7.750	f(x_2)	34.014			
d/B=1,5	L/H=0.45		x_0	5.050	f(x_0)	21.259	3.313	-0.215	28.712
			x_1	6.333	f(x_1)	25.510			
			x_2	7.908	f(x_2)	29.762			
	L/H=0.52		x_0	5.008	f(x_0)	25.510	3.037	-0.199	30.339
			x_1	6.408	f(x_1)	29.762			
			x_2	8.175	f(x_2)	34.014			
	L/H=0.59		x_0	5.367	f(x_0)	29.762	2.564	0.065	32.969
			x_1	7.025	f(x_1)	34.014			
			x_2	8.558	f(x_2)	38.265			
d/B=2	L/H=0.45		x_0	6.875	f(x_0)	29.762	2.526	-0.028	31.533
			x_1	8.558	f(x_1)	34.014			
			x_2	10.308	f(x_2)	38.265			
	L/H=0.52		x_0	6.008	f(x_0)	29.762	2.850	-0.228	32.777
			x_1	7.500	f(x_1)	34.014			
			x_2	9.592	f(x_2)	38.265			
	L/H=0.59		x_0	6.808	f(x_0)	34.014	2.803	-0.010	35.761
			x_1	8.325	f(x_1)	38.265			
			x_2	9.858	f(x_2)	42.517			

Lereng dengan perkuatan dengan variasi jarak pondasi:

Panjang	Jarak Pondasi	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)
L/H=0.45	d/B=1	2	x_0	0.000	f(x_0)	0.000	4.475	-0.497	7.908
			x_1	0.950	f(x_1)	4.252			
			x_2	2.208	f(x_2)	8.503			
	d/B=1.5		x_0	0.725	f(x_0)	4.252	4.437	-0.383	10.953
			x_1	1.683	f(x_1)	8.503			
			x_2	2.858	f(x_2)	12.755			
	d/B=2		x_0	0.925	f(x_0)	8.503	4.398	-0.505	13.173
			x_1	1.892	f(x_1)	12.755			
			x_2	3.200	f(x_2)	17.007			
L/H=0.52	d/B=1		x_0	0.500	f(x_0)	4.252	3.671	0.560	9.954
			x_1	1.658	f(x_1)	8.503			
			x_2	2.542	f(x_2)	12.755			
	d/B=1.5		x_0	1.933	f(x_0)	12.755	4.724	-0.581	13.802
			x_1	2.833	f(x_1)	17.007			
			x_2	4.050	f(x_2)	21.259			
	d/B=2		x_0	0.708	f(x_0)	8.503	6.989	-1.542	16.470
			x_1	1.317	f(x_1)	12.755			
			x_2	2.233	f(x_2)	17.007			
L/H=0.59	d/B=1		x_0	0.425	f(x_0)	4.252	4.148	0.708	11.298
			x_1	1.450	f(x_1)	8.503			
			x_2	2.233	f(x_2)	12.755			
	d/B=1.5		x_0	0.700	f(x_0)	8.503	4.252	2.334	15.841
			x_1	1.700	f(x_1)	12.755			
			x_2	2.242	f(x_2)	17.007			
	d/B=2		x_0	0.858	f(x_0)	12.755	5.733	0.458	19.509
			x_1	1.600	f(x_1)	17.007			
			x_2	2.267	f(x_2)	21.259			

Panjang	Jarak Pondasi	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)
L/H=0.45	d/B=1	4	x_0	2.208	f(x_0)	8.503	4.724	-0.315	15.464
			x_1	3.108	f(x_1)	12.755			
			x_2	4.142	f(x_2)	17.007			
	d/B=1.5		x_0	2.858	f(x_0)	12.755	3.836	0.040	17.136
			x_1	3.967	f(x_1)	17.007			
			x_2	5.050	f(x_2)	21.259			
	d/B=2		x_0	3.200	f(x_0)	17.007	3.925	-0.417	20.241
			x_1	4.283	f(x_1)	21.259			
			x_2	5.775	f(x_2)	25.510			
L/H=0.52	d/B=1		x_0	2.542	f(x_0)	12.755	4.813	-0.120	17.874
			x_1	3.425	f(x_1)	17.007			
			x_2	4.350	f(x_2)	21.259			
	d/B=1.5		x_0	2.833	f(x_0)	17.007	3.495	0.433	20.259
			x_1	4.050	f(x_1)	21.259			
			x_2	5.008	f(x_2)	25.510			
	d/B=2		x_0	3.333	f(x_0)	21.259	2.966	0.171	24.049
			x_1	4.767	f(x_1)	25.510			
			x_2	6.008	f(x_2)	29.762			
L/H=0.59	d/B=1		x_0	2.233	f(x_0)	12.755	5.669	-0.951	21.061
			x_1	2.983	f(x_1)	17.007			
			x_2	4.067	f(x_2)	21.259			
	d/B=1.5		x_0	3.958	f(x_0)	25.510	3.019	-0.148	24.944
			x_1	5.367	f(x_1)	29.762			
			x_2	7.025	f(x_2)	34.014			
	d/B=2		x_0	3.508	f(x_0)	25.510	2.819	-0.135	29.464
			x_1	5.017	f(x_1)	29.762			
			x_2	6.808	f(x_2)	34.014			

Panjang	Jarak Pondasi	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)
L/H=0.45	d/B=1	6	x_0	4.142	f(x_0)	17.007	3.618	-0.171	21.714
			x_1	5.317	f(x_1)	21.259			
			x_2	6.650	f(x_2)	25.510			
	d/B=1.5		x_0	5.050	f(x_0)	21.259	3.313	-0.215	24.974
			x_1	6.333	f(x_1)	25.510			
			x_2	7.908	f(x_2)	29.762			
	d/B=2		x_0	5.775	f(x_0)	25.510	3.865	-0.481	28.675
			x_1	6.875	f(x_1)	29.762			
			x_2	8.558	f(x_2)	34.014			
L/H=0.52	d/B=1		x_0	4.350	f(x_0)	21.259	3.724	-0.541	24.950
			x_1	5.492	f(x_1)	25.510			
			x_2	7.742	f(x_2)	29.762			
	d/B=1.5		x_0	4.050	f(x_0)	21.259	4.437	-0.593	28.762
			x_1	5.008	f(x_1)	25.510			
			x_2	6.408	f(x_2)	29.762			
	d/B=2		x_0	4.767	f(x_0)	25.510	3.424	-0.210	33.736
			x_1	6.008	f(x_1)	29.762			
			x_2	7.500	f(x_2)	34.014			
L/H=0.59	d/B=1		x_0	4.067	f(x_0)	21.259	3.379	0.077	26.392
			x_1	5.325	f(x_1)	25.510			
			x_2	6.517	f(x_2)	29.762			
	d/B=1.5		x_0	5.367	f(x_0)	29.762	2.564	0.065	31.343
			x_1	7.025	f(x_1)	34.014			
			x_2	8.558	f(x_2)	38.265			
	d/B=2		x_0	5.017	f(x_0)	29.762	2.373	0.130	36.492
			x_1	6.808	f(x_1)	34.014			
			x_2	8.325	f(x_2)	38.265			

Panjang	Jarak Pondasi	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)
L/H=0.45	d/B=1	6.4	x_0	5.317	f(x_0)	21.259	3.189	-0.249	22.781
			x_1	6.650	f(x_1)	25.510			
			x_2	8.408	f(x_2)	29.762			
	d/B=1.5		x_0	5.050	f(x_0)	21.259	3.313	-0.215	28.712
			x_1	6.333	f(x_1)	25.510			
			x_2	7.908	f(x_2)	29.762			
	d/B=2		x_0	6.875	f(x_0)	29.762	2.526	-0.028	31.533
			x_1	8.558	f(x_1)	34.014			
			x_2	10.308	f(x_2)	38.265			
L/H=0.52	d/B=1		x_0	5.492	f(x_0)	25.510	1.890	0.326	24.830
			x_1	7.742	f(x_1)	29.762			
			x_2	9.125	f(x_2)	34.014			
	d/B=1.5		x_0	5.008	f(x_0)	25.510	3.037	-0.199	30.339
			x_1	6.408	f(x_1)	29.762			
			x_2	8.175	f(x_2)	34.014			
	d/B=2		x_0	6.008	f(x_0)	29.762	2.850	-0.228	32.777
			x_1	7.500	f(x_1)	34.014			
			x_2	9.592	f(x_2)	38.265			
L/H=0.59	d/B=1		x_0	5.325	f(x_0)	25.510	3.568	-0.050	26.452
			x_1	6.517	f(x_1)	29.762			
			x_2	7.750	f(x_2)	34.014			
	d/B=1.5		x_0	5.367	f(x_0)	29.762	2.564	0.065	32.969
			x_1	7.025	f(x_1)	34.014			
			x_2	8.558	f(x_2)	38.265			
	d/B=2		x_0	6.808	f(x_0)	34.014	2.803	-0.010	35.761
			x_1	8.325	f(x_1)	38.265			
			x_2	9.858	f(x_2)	42.517			