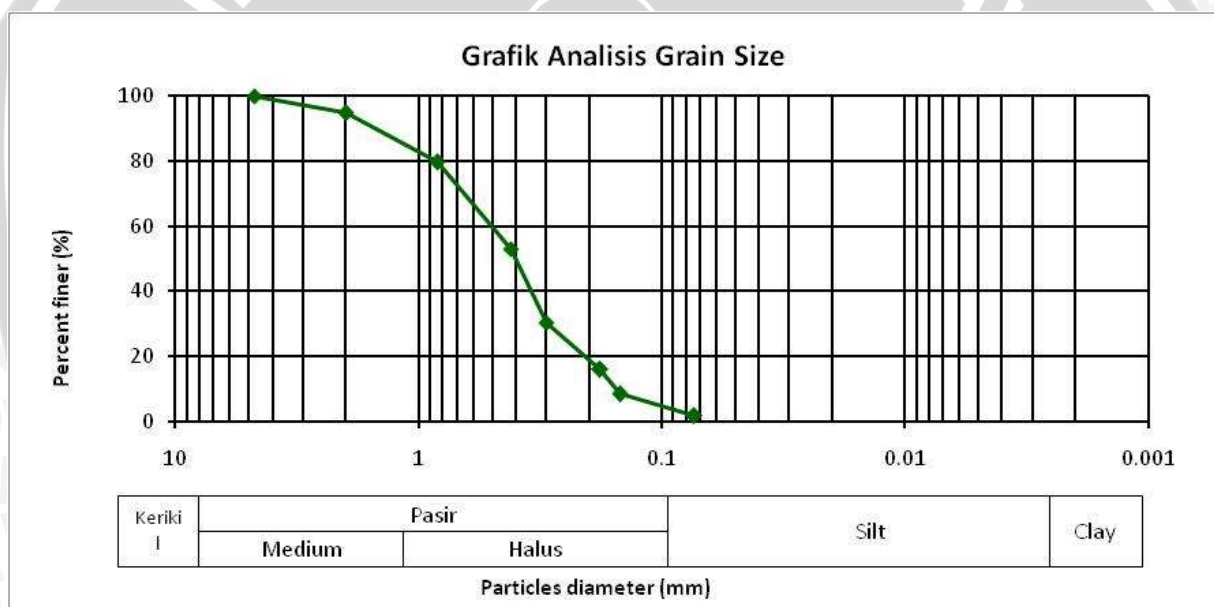


### Lampiran 1

#### Hasil Analisis Gradasi Butiran Tanah

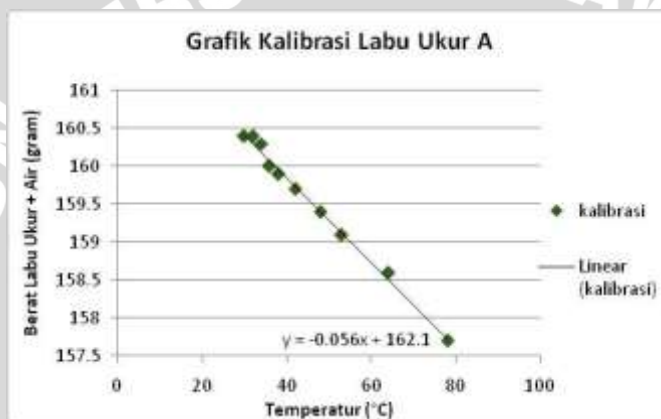
Nomor Ayakan	Diameter Ayakan (mm)	Berat Tertahan (gr)	Berat Kumulatif (gr)	Persen Tertahan (%)	Persen Lolos (%)
No. 4	4.75	0.0	0	0.00	100.00
No. 10	2	26.0	26	5.22	94.78
No. 20	0.84	75.9	101.9	20.44	79.56
No. 40	0.42	132.0	233.9	46.92	53.08
No. 50	0.3	112.2	346.1	69.43	30.57
No. 80	0.18	72.5	418.6	83.97	16.03
No. 100	0.149	37.5	456.1	91.49	8.51
No. 200	0.074	33.3	489.4	98.17	1.83
PAN		9.1	498.5	100.00	0.00



## Lampiran 2

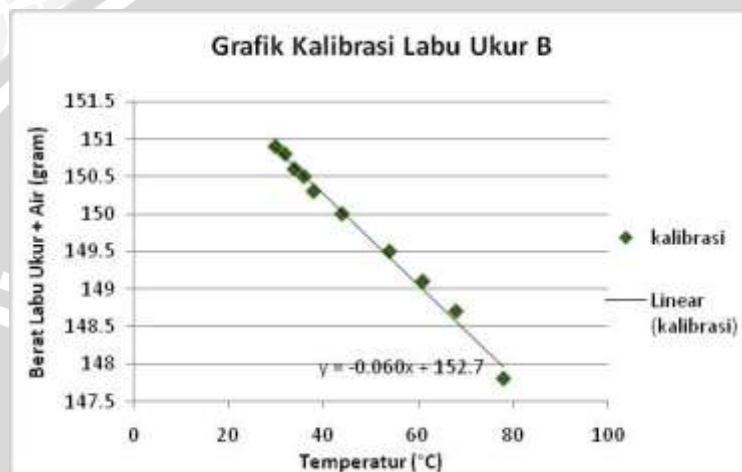
### Hasil Analisis Spesifik Gravity Tanah

Labu Ukur	A									
No. Pemeriksaan	1	2	3	4	5	6	7	8	9	10
Temperatur (°C)	78	64	53	48	42	38	36	34	32	30
Berat Labu Ukur + Air (gram)	157.7	158.6	159.1	159.4	159.7	160	160	160.3	160.4	160.4



Labu Ukur		A									
Berat Labu Ukur	gram	52.2									
Berat Tanah Kering (Ws)	gram	20									
Berat Labu Ukur + Air + Tanah (W1)	gram	170.5	170.9	171.2	171.9	172.3	172.6	172.7	173.1	173.4	173.4
Subu	gram	82	76	70	62	53	45	42	37	34	30
Berat Labu Ukur + Air (W2)	(°C)	157.502	157.839	158.176	158.626	159.131	159.581	159.750	160.031	160.199	160.424
Berat Jenis Air (Gt)	gram/cm <sup>3</sup>	0.971	0.974	0.978	0.982	0.986	0.99	0.992	0.993	0.994	0.995
Berat Jenis Tanah (Gs)	gram/cm <sup>3</sup>	2.774	2.807	2.804	2.920	2.887	2.836	2.814	2.866	2.924	2.833
Rata-rata Berat Jenis	gram/cm <sup>3</sup>	2.846									

Labu Ukur	B									
No. Pemeriksaan	1	2	3	4	5	6	7	8	9	10
Temperatur (°C)	78	68	61	54	44	38	36	34	32	30
Berat Labu Ukur + Air (gram)	147.8	148.7	149.1	149.5	150	150	150.5	150.6	150.8	150.9



Labu Ukur		B									
Berat Labu Ukur	gram	50.1									
Berat Tanah Kering (Ws)	gram	20									
Berat Labu Ukur + Air + Tanah (W1)	gram	160.8	161.3	161.5	162	162.2	162.6	163.1	163.3	163.5	163.7
Suhu	gram	82	75	71	64	61	50	45	40	33	30
Berat Labu Ukur + Air (W2)	(°C)	147.723	148.148	148.390	148.815	148.997	149.665	149.969	150.272	150.697	150.879
Berat Jenis Air (Gt)	gram/cm <sup>3</sup>	0.971	0.975	0.977	0.981	0.983	0.988	0.99	0.992	0.995	0.995
Berat Jenis Tanah (Gs)	gram/cm <sup>3</sup>	2.805	2.848	2.836	2.879	2.892	2.797	2.883	2.846	2.765	2.772
Rata-rata Berat Jenis	gram/cm <sup>3</sup>	2.832									

### Lampiran 3

#### Hasil Analisis Uji Geser Langsung (Direct Shear)

Data :

Kalibrasi alat : 0,358

Tinggi Sampel : 2 cm

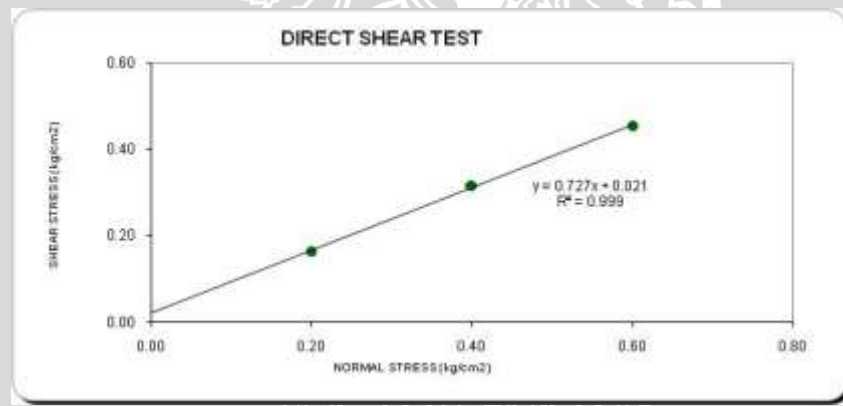
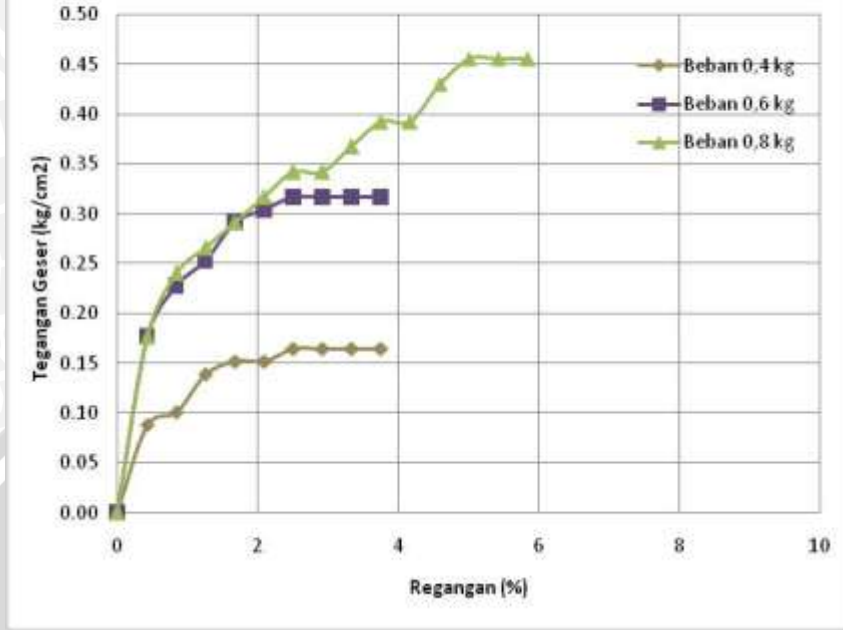
Diameter Sampel : 6 cm

Luas Sampel : 28,274 cm<sup>2</sup>

NORMAL FORCE	P1 = 0.4 kg			P2 = 0.8 kg			P3 = 1.2 kg			
NORMAL STRESS	s1 = 0.20 kg/cm <sup>2</sup>			s2 = 0.40 kg/cm <sup>2</sup>			s3 = 0.60 kg/cm <sup>2</sup>			
STRAIN	DIAL READING	SHEAR FORCE	SHEAR STRESS	DIAL READING	SHEAR FORCE	SHEAR STRESS	DIAL READING	SHEAR FORCE	SHEAR STRESS	$\Delta L$ L0
0	0	0	0	0	0	0	0	0	0	0.00
25	7.0	2.506	0.089	14.0	5.012	0.177	14.0	5.012	0.177	0.42
50	8.0	2.864	0.101	18.0	6.444	0.228	19.0	6.802	0.241	0.83
75	11.0	3.938	0.139	20.0	7.160	0.253	21.0	7.518	0.266	1.25
100	12.0	4.296	0.152	23.0	8.234	0.291	23.0	8.234	0.291	1.67
125	12.0	4.296	0.152	24.0	8.592	0.304	25.0	8.950	0.317	2.08
150	13.0	4.654	0.165	25.0	8.950	0.317	27.0	9.666	0.342	2.50
175	13.0	4.654	0.165	25.0	8.950	0.317	27.0	9.666	0.342	2.92
200	13.0	4.654	0.165	25.0	8.950	0.317	29.0	10.382	0.367	3.33
225	13.0	4.654	0.165	25.0	8.950	0.317	31.0	11.098	0.393	3.75
250		0.000	0.000		0.000	0.000	31.0	11.098	0.393	4.17
275		0.000	0.000		0.000	0.000	34.0	12.172	0.431	4.58
300		0.000	0.000		0.000	0.000	36.0	12.888	0.456	5.00
325		0.000	0.000		0.000	0.000	36.0	12.888	0.456	5.42
350		0.000	0.000		0.000	0.000	36.0	12.888	0.456	5.83
375		0.000	0.000		0.000	0.000	36.0	12.888	0.456	6.25
400		0	0		0.000	0.000		0.0000	0.0000	
425		0	0		0.000	0.000				
450		0	0							



### Grafik Hubungan Tegangan dan Regangan Geser



$C = 0.0000 \text{ kg/cm}^2$   
 $\phi = 33.007^\circ$



### Lampiran 4

#### Hasil Analisis Uji Pemadatan Standar

Berat Mould : 4260 kg

Diameter Mould : 10,16 cm

Tinggi Sampel : 11,63 cm

#### Kadar Air

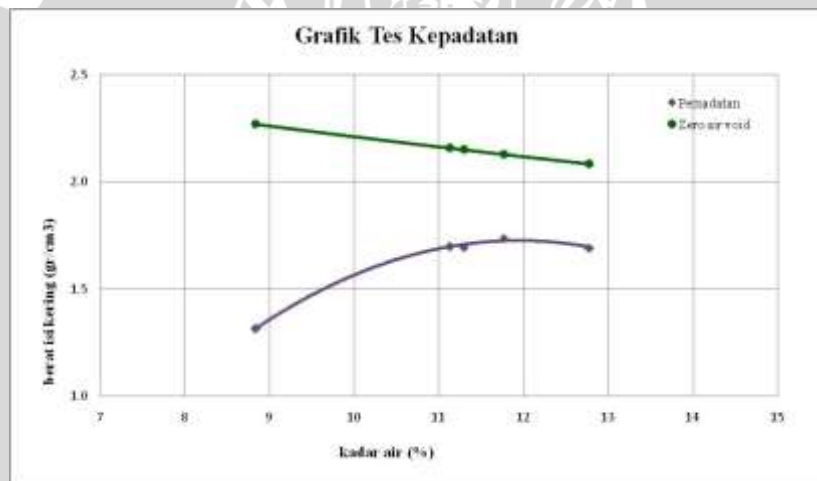
Penambahan air (ml)	264			330			360			390			420		
Lapisan	Atas	Tengah	Bawah	Atas	Tengah	Bawah	Atas	Tengah	Bawah	Atas	Tengah	Bawah	Atas	Tengah	Bawah
Cawan No.	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Berat cawan + berat tanah basah	25.50	29.90	25.80	23.90	30.70	29.20	22.20	36.70	27.20	25.20	29.10	30.00	37.80	37.40	44.50
Berat cawan + berat tanah kering	24.10	27.90	24.00	22.30	28.30	26.50	20.70	32.80	25.10	23.50	26.30	27.20	34.60	33.70	39.80
Berat air	1.40	2.00	1.8	1.6	2.4	2.7	1.5	3.9	2.1	1.7	2.8	2.8	3.20	3.70	4.7
Berat cawan	5.70	5.70	5.80	5.70	5.60	6.00	4.00	4.30	6.40	5.70	4.20	5.80	5.90	6.10	5.70
Berat tanah kering	18.40	22.20	18.2	16.6	22.7	20.5	16.7	28.5	18.7	17.8	22.1	21.4	28.70	27.60	34.1
Kadar air w%	7.61	9.01	9.89	9.64	10.57	13.17	8.98	13.68	11.23	9.55	12.67	13.08	11.15	13.41	13.78
Rata-rata Kadar Air %	8.8			11.1			11.3			11.8			12.8		

## Kepadatan

Penambahan Air		264	330	360	390	420
Berat tanah basah +cetakan	gram	5610	6040	6040	6090	6060
Berat cetakan	gram	4260	4260	4260	4260	4260
Berat tanah basah	gram	1350	1780	1780	1830	1800
Volume cetakan	cm <sup>3</sup>	943.50	943.50	943.50	943.50	943.50
Berat isi basah ( $\gamma_w$ )	gr/cm <sup>3</sup>	1.431	1.887	1.887	1.940	1.908
Berat isi kering ( $\gamma_d$ )	gr/cm <sup>3</sup>	1.315	1.698	1.695	1.735	1.692

## Zero Air Void

Penambahan Air	ml	264	330	360	390	420
Kadar air (wc)	%	8.84	11.13	11.30	11.77	12.78
Gs	gr/cm <sup>3</sup>	2.839	2.839	2.839	2.839	2.839
Berat jenis air (gw)	gr/cm <sup>3</sup>	1	1	1	1	1
ZAV	gr/cm <sup>3</sup>	2.270	2.158	2.150	2.128	2.083



**Lampiran 5**

**Hasil Analisis Pemadatan Model Lereng**

$\gamma_a$  rencana :  $1.315 \text{ gr/cm}^3 = 1315 \text{ kg/m}^3$

Luas box : (Panjang box  $\times$  Lebar box) =  $0,98 \text{ m} \times 1,15 \text{ m} = 1,13 \text{ m}^2$

Berat tanah untuk tinggi rencana 10 cm :  $1315 \times 0,113 = 148,595 \text{ kg}$

Berat tanah untuk tinggi rencana 3,6 cm :  $1315 \times 0,041 = 53,915 \text{ kg}$

Berat tanah untuk tinggi rencana 3,2 cm :  $1315 \times 0,036 = 47,34 \text{ kg}$

Berat galian (gram)	800
Berat pasir+kerucut (gram)	5900
Berat sisa pasir di kerucut (gram)	5120
Tanah di pelat (gram)	172
Berat isi kering lapangan	1.316
Berat isi kering maksimal di laboratorium	1.735
Rc (%)	75.84





## Lampiran 6

### Hasil Pengujian Kadar Air dan Kepadatan Pasir

Tanpa Perkuatan Sudut 46, B=4cm, d=2B

Kepadatan

Lapisan		1			2			3			4			5			6			7			
Ring No.		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Tinggi Ring	cm	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60
Diameter Ring	cm	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30
Volume Ring	cm <sup>3</sup>	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81
Berat Ring	gr	18,50	18,70	18,60	18,50	18,70	18,60	18,50	18,70	18,60	18,50	18,70	18,60	18,50	18,70	18,60	18,50	18,70	18,60	18,50	18,70	18,60	18,50
Berat Tanah Basah + Ring	gr	33,30	32,80	33,70	33,40	32,60	33,50	34,20	32,60	34,30	32,90	33,70	33,70	35,20	34,50	36,00	33,50	35,40	34,40	35,10	35,10	35,30	35,30
Berat Tanah Basah	gr	14,80	14,10	15,10	14,90	13,90	14,90	15,70	13,90	15,70	14,40	15,00	15,10	16,70	15,80	17,40	15,00	16,70	15,80	16,60	16,40	16,70	16,70
Soil Unit Weight	gr/cm <sup>3</sup>	1,37	1,30	1,40	1,38	1,29	1,38	1,45	1,29	1,45	1,33	1,39	1,40	1,55	1,46	1,61	1,39	1,55	1,46	1,54	1,52	1,55	1,55
Berat Tanah Kering + Ring	gr	32,10	31,80	32,50	32,20	31,40	32,30	32,80	31,30	33,00	31,80	32,40	32,40	33,90	33,10	34,60	32,30	34,20	33,20	33,80	33,70	34,00	34,00
Berat Tanah Kering	gr	13,60	13,10	13,90	13,70	12,70	13,70	14,30	12,60	14,40	13,30	13,70	13,80	15,40	14,40	16,00	13,80	15,50	14,60	15,30	15,00	15,40	15,40
Berat Air	gr	1,20	1,00	1,20	1,20	1,20	1,20	1,40	1,30	1,30	1,10	1,30	1,30	1,30	1,40	1,40	1,20	1,20	1,20	1,30	1,40	1,30	1,30
Kadar Air	%	8,82	7,63	8,63	8,76	9,45	8,76	9,79	10,32	9,03	8,27	9,49	9,42	8,44	9,72	8,75	8,70	7,74	8,22	8,50	9,33	8,44	8,44
Dry Density of Soil (γ <sub>d</sub> )	gr/cm <sup>3</sup>	1,258	1,212	1,286	1,268	1,175	1,268	1,323	1,166	1,333	1,231	1,268	1,277	1,425	1,333	1,481	1,277	1,434	1,351	1,416	1,388	1,425	1,425
γ <sub>d</sub> Rata-Rata	gr/cm <sup>3</sup>	1,314																					

Kadar Air

Lapisan		1			2			3			4			5			6			7			
Nomor Cawan		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Berat Cawan + Tanah Basah	gram	20,50	19,80	20,70	20,60	19,30	20,80	21,70	18,10	19,90	20,10	19,20	20,70	22,70	21,50	23,00	20,80	22,30	21,50	20,70	20,30	20,70	20,70
Berat Cawan + Tanah Kering	gram	19,30	18,80	19,50	19,40	18,10	19,60	20,30	16,80	18,60	19,00	17,90	19,40	21,40	20,10	21,60	19,60	21,10	20,30	19,40	18,90	19,40	19,40
Berat Cawan	gram	5,7	5,7	5,6	5,7	5,4	5,9	6	4,2	4,2	5,7	4,2	5,6	6	5,7	5,6	5,8	5,6	5,7	4,1	3,9	4	4
Berat Tanah Kering	gram	13,6	13,1	13,9	13,7	12,7	13,7	14,3	12,6	14,4	13,3	13,7	13,8	15,4	14,4	16	13,8	15,5	14,6	15,3	15	15,4	15,4
Berat Air	gram	1,2	1	1,2	1,2	1,2	1,2	1,4	1,3	1,3	1,1	1,3	1,3	1,3	1,4	1,4	1,2	1,2	1,2	1,3	1,4	1,3	1,3
Kadar Air	%	8,82	7,63	8,63	8,76	9,45	8,76	9,79	10,32	9,03	8,27	9,49	9,42	8,44	9,72	8,75	8,70	7,74	8,22	8,50	9,33	8,44	8,44
Kadar Air Rata-Rata	%	8,87																					

**Tanpa Perkuatan Sudut 46, B=6cm, d=2B**

**Kepadatan**

Lapisan	Ring No.	1			2			3			4			5			6			7			
		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Tinggi Ring	cm	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60
Diameter Ring	cm	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30
Volume Ring	cm <sup>3</sup>	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81
Berat Ring	gr	18,50	18,70	18,60	18,50	18,70	18,60	18,50	18,70	18,60	18,50	18,60	18,60	18,50	18,70	18,60	18,50	18,70	18,60	18,50	18,70	18,60	18,60
Berat Tanah Basah + Ring	gr	33,80	33,90	33,90	34,60	33,40	33,80	34,50	33,90	33,70	33,70	33,80	34,30	33,90	34,30	33,50	33,80	33,10	33,60	33,80	34,70	34,20	34,20
Berat Tanah Basah	gr	15,30	15,20	15,30	16,10	14,70	15,20	16,00	15,20	15,10	15,20	15,20	15,70	15,40	15,60	14,90	15,30	14,40	15,00	15,30	16,00	15,60	15,60
Soil Unit Weight	gr/cm <sup>3</sup>	1,42	1,41	1,42	1,49	1,36	1,41	1,48	1,41	1,40	1,41	1,41	1,45	1,43	1,44	1,38	1,42	1,33	1,39	1,42	1,48	1,44	1,44
Berat Tanah Kering + Ring	gr	32,50	32,70	32,70	33,30	32,20	32,60	33,20	32,70	32,50	32,50	32,60	33,10	32,60	33,00	32,30	32,60	32,00	32,30	32,50	33,30	33,00	33,00
Berat Tanah Kering	gr	14,00	14,00	14,10	14,80	13,50	14,00	14,70	14,00	13,90	14,00	14,00	14,50	14,10	14,30	13,70	14,10	13,30	13,70	14,00	14,60	14,40	14,40
Berat Air	gr	1,30	1,20	1,20	1,30	1,20	1,20	1,30	1,20	1,20	1,20	1,20	1,20	1,30	1,30	1,20	1,20	1,10	1,30	1,30	1,40	1,20	1,20
Kadar Air	%	9,29	8,57	8,51	8,78	8,89	8,57	8,84	8,57	8,63	8,57	8,57	8,28	9,22	9,09	8,76	8,51	8,27	9,49	9,29	9,59	8,33	8,33
Dry Density of Soil (γ <sub>d</sub> )	gr/cm <sup>3</sup>	1,295	1,295	1,305	1,370	1,249	1,295	1,360	1,295	1,286	1,295	1,295	1,342	1,305	1,323	1,268	1,305	1,231	1,268	1,295	1,351	1,333	1,333
γ <sub>d</sub> Rata-Rata	gr/cm <sup>3</sup>	1,303																					

**Kadar Air**

Lapisan	Nomor Cawan	1			2			3			4			5			6			7			
		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Berat Cawan + Tanah Basah	gram	20,30	20,80	20,50	21,20	20,30	20,70	21,10	20,50	20,90	20,50	20,90	20,80	20,70	20,80	20,50	20,50	20,30	20,60	20,40	21,20	21,00	21,00
Berat Cawan + Tanah Kering	gram	19,00	19,60	19,30	19,90	19,10	19,50	19,80	19,30	19,70	19,30	19,70	19,60	19,40	19,50	19,30	19,30	19,20	19,30	19,10	19,80	19,80	19,80
Berat Cawan	gram	5	5,6	5,2	5,1	5,6	5,5	5,1	5,3	5,8	5,3	5,7	5,1	5,3	5,2	5,6	5,2	5,9	5,6	5,1	5,2	5,4	5,4
Berat Tanah Kering	gram	14	14	14,1	14,8	13,5	14	14,7	14	13,9	14	14	14,5	14,1	14,3	13,7	14,1	13,3	13,7	14	14,6	14,4	14,4
Berat Air	gram	1,3	1,2	1,2	1,3	1,2	1,2	1,3	1,2	1,2	1,2	1,2	1,2	1,3	1,3	1,2	1,2	1,1	1,3	1,3	1,4	1,2	1,2
Kadar Air	%	9,29	8,57	8,51	8,78	8,89	8,57	8,84	8,57	8,63	8,57	8,57	8,28	9,22	9,09	8,76	8,51	8,27	9,49	9,29	9,59	8,33	8,33
Kadar Air Rata-Rata	%	8,79																					

**Tanpa Perkuatan Sudut 46, B=8cm, d=2B**

**Kepadatan**

Lapisan		1			2			3			4			5			6			7			
Ring No.		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Tinggi Ring	cm	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60
Diameter Ring	cm	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30
Volume Ring	cm <sup>3</sup>	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81
Berat Ring	gr	18,50	18,70	18,60	18,50	18,70	18,60	18,50	18,70	18,60	18,50	18,70	18,60	18,50	18,70	18,60	18,50	18,70	18,60	18,50	18,70	18,60	18,50
Berat Tanah Basah + Ring	gr	34,20	34,20	34,30	34,20	34,10	34,10	34,00	34,10	34,20	34,30	34,20	34,20	34,30	34,10	34,10	34,30	34,00	34,10	34,20	34,10	34,20	34,10
Berat Tanah Basah	gr	15,70	15,50	15,70	15,70	15,40	15,50	15,50	15,40	15,60	15,80	15,50	15,60	15,80	15,40	15,50	15,80	15,30	15,50	15,70	15,40	15,40	15,40
Soil Unit Weight	gr/cm <sup>3</sup>	1,45	1,43	1,45	1,45	1,43	1,43	1,43	1,43	1,44	1,46	1,43	1,44	1,46	1,43	1,43	1,46	1,42	1,43	1,45	1,43	1,43	1,43
Berat Tanah Kering + Ring	gr	32,90	32,90	33,00	32,90	32,90	32,90	32,80	32,90	32,90	33,00	33,00	33,00	33,00	32,90	32,80	32,90	32,70	32,90	32,90	32,90	32,90	32,70
Berat Tanah Kering	gr	14,40	14,20	14,40	14,40	14,20	14,30	14,30	14,20	14,30	14,50	14,30	14,40	14,50	14,20	14,20	14,40	14,00	14,30	14,40	14,20	14,10	14,10
Berat Air	gr	1,30	1,30	1,30	1,30	1,20	1,20	1,20	1,20	1,30	1,30	1,20	1,20	1,30	1,20	1,30	1,40	1,30	1,20	1,30	1,20	1,30	1,20
Kadar Air	%	9,03	9,15	9,03	9,03	8,45	8,39	8,39	8,45	9,09	8,97	8,39	8,33	8,97	8,45	9,15	9,72	9,29	8,39	9,03	8,45	9,22	9,22
Dry Density of Soil (γ <sub>d</sub> )	gr/cm <sup>3</sup>	1,333	1,314	1,333	1,333	1,314	1,323	1,323	1,314	1,323	1,342	1,323	1,333	1,342	1,314	1,314	1,333	1,295	1,323	1,333	1,314	1,305	1,305
γ <sub>d</sub> Rata-Rata	gr/cm <sup>3</sup>	1,323																					

**Kadar Air**

Lapisan		1			2			3			4			5			6			7			
Nomor Cawan		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Berat Cawan + Tanah Basah	gram	21,40	21,20	21,30	21,50	20,90	21,00	21,10	20,80	21,10	21,30	21,30	21,30	21,40	21,20	21,20	21,70	21,20	21,30	21,10	21,20	21,10	21,10
Berat Cawan + Tanah Kering	gram	20,10	19,90	20,00	20,20	19,70	19,80	19,90	19,60	19,80	20,00	20,10	20,10	20,10	20,00	19,90	20,30	19,90	20,10	19,80	20,00	19,80	19,80
Berat Cawan	gram	5,7	5,7	5,6	5,8	5,5	5,5	5,6	5,4	5,5	5,5	5,8	5,7	5,6	5,8	5,7	5,9	5,9	5,8	5,4	5,8	5,7	5,7
Berat Tanah Kering	gram	14,4	14,2	14,4	14,4	14,2	14,3	14,3	14,2	14,3	14,5	14,3	14,4	14,5	14,2	14,2	14,4	14	14,3	14,4	14,2	14,1	14,1
Berat Air	gram	1,3	1,3	1,3	1,3	1,2	1,2	1,2	1,2	1,3	1,3	1,2	1,2	1,3	1,2	1,3	1,4	1,3	1,2	1,3	1,2	1,3	1,2
Kadar Air	%	9,03	9,15	9,03	9,03	8,45	8,39	8,39	8,45	9,09	8,97	8,39	8,33	8,97	8,45	9,15	9,72	9,29	8,39	9,03	8,45	9,22	9,22
Kadar Air Rata-Rata	%	8,83																					

**Tanpa Perkuatan Sudut 51, B=4cm, d=2B**

**Kepadatan**

Lapisan		1			2			3			4			5			6			7			
Ring No.		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Tinggi Ring	cm	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60
Diameter Ring	cm	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30
Volume Ring	cm <sup>3</sup>	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81
Berat Ring	gr	18,50	18,70	18,60	18,50	18,70	18,60	18,50	18,70	18,60	18,50	18,70	18,60	18,50	18,70	18,60	18,50	18,70	18,60	18,50	18,70	18,60	18,50
Berat Tanah Basah + Ring	gr	34,10	34,20	34,30	34,30	34,20	34,30	34,00	34,30	34,20	34,10	34,30	34,20	34,10	34,10	34,20	34,10	34,30	34,10	34,20	34,10	34,30	34,30
Berat Tanah Basah	gr	15,60	15,50	15,70	15,80	15,50	15,70	15,50	15,60	15,60	15,60	15,60	15,60	15,60	15,40	15,60	15,60	15,60	15,50	15,70	15,40	15,70	15,70
Soil Unit Weight	gr/cm <sup>3</sup>	1,44	1,43	1,45	1,46	1,43	1,45	1,43	1,44	1,44	1,44	1,44	1,44	1,44	1,43	1,44	1,44	1,44	1,43	1,45	1,43	1,45	1,45
Berat Tanah Kering + Ring	gr	32,90	32,90	33,00	33,00	33,00	33,00	32,80	33,10	32,90	32,80	33,00	33,00	32,90	32,90	32,90	32,90	33,00	33,00	32,90	32,90	33,00	33,00
Berat Tanah Kering	gr	14,40	14,20	14,40	14,50	14,30	14,40	14,30	14,40	14,30	14,30	14,30	14,40	14,40	14,20	14,30	14,40	14,30	14,40	14,40	14,20	14,40	14,40
Berat Air	gr	1,20	1,30	1,30	1,30	1,20	1,30	1,20	1,20	1,30	1,30	1,30	1,20	1,20	1,20	1,30	1,20	1,30	1,10	1,30	1,20	1,30	1,30
Kadar Air	%	8,33	9,15	9,03	8,97	8,39	9,03	8,39	8,33	9,09	9,09	9,09	8,33	8,33	8,45	9,09	8,33	9,09	7,64	9,03	8,45	9,03	9,03
Dry Density of Soil (γ <sub>d</sub> )	gr/cm <sup>3</sup>	1,333	1,314	1,333	1,342	1,323	1,333	1,323	1,333	1,323	1,323	1,323	1,333	1,333	1,314	1,323	1,333	1,323	1,333	1,333	1,314	1,333	1,333
γ <sub>d</sub> Rata-Rata	gr/cm <sup>3</sup>	1,327																					

**Kadar Air**

Lapisan		1			2			3			4			5			6			7			
Nomor Cawan		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Berat Cawan + Tanah Basah	gram	21,20	21,20	21,30	21,50	21,30	21,50	21,20	21,40	21,20	21,20	21,30	21,40	21,20	21,10	21,20	21,50	21,50	21,10	21,50	21,10	21,40	21,40
Berat Cawan + Tanah Kering	gram	20,00	19,90	20,00	20,20	20,10	20,20	20,00	20,20	19,90	19,90	20,00	20,20	20,00	19,90	19,90	20,30	20,20	20,00	20,20	19,90	20,10	20,10
Berat Cawan	gram	5,6	5,7	5,6	5,7	5,8	5,8	5,7	5,8	5,6	5,6	5,7	5,8	5,6	5,7	5,6	5,9	5,9	5,6	5,8	5,7	5,7	5,7
Berat Tanah Kering	gram	14,4	14,2	14,4	14,5	14,3	14,4	14,3	14,4	14,3	14,3	14,3	14,4	14,4	14,2	14,3	14,4	14,3	14,4	14,4	14,2	14,4	14,4
Berat Air	gram	1,2	1,3	1,3	1,3	1,2	1,3	1,2	1,2	1,3	1,3	1,3	1,2	1,2	1,2	1,3	1,2	1,3	1,1	1,3	1,2	1,3	1,3
Kadar Air	%	8,33	9,15	9,03	8,97	8,39	9,03	8,39	8,33	9,09	9,09	9,09	8,33	8,33	8,45	9,09	8,33	9,09	7,64	9,03	8,45	9,03	9,03
Kadar Air Rata-Rata	%	8,70																					

**Tanpa Perkuatan Sudut 51, B=6cm, d=2B**

**Kepadatan**

Lapisan		1			2			3			4			5			6			7			
Ring No.		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Tinggi Ring	cm	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60
Diameter Ring	cm	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30
Volume Ring	cm <sup>3</sup>	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81
Berat Ring	gr	18,50	18,70	18,60	18,50	18,70	18,60	18,50	18,70	18,60	18,50	18,70	18,60	18,50	18,70	18,60	18,50	18,70	18,60	18,50	18,70	18,60	18,60
Berat Tanah Basah + Ring	gr	33,70	34,20	33,60	33,80	33,90	34,00	33,80	33,70	33,90	34,10	34,00	34,30	34,30	34,20	33,90	33,80	34,20	33,70	33,80	34,00	34,20	34,20
Berat Tanah Basah	gr	15,20	15,50	15,00	15,30	15,20	15,40	15,30	15,00	15,30	15,60	15,30	15,70	15,80	15,50	15,30	15,30	15,50	15,10	15,30	15,30	15,60	15,60
Soil Unit Weight	gr/cm <sup>3</sup>	1,41	1,43	1,39	1,42	1,41	1,43	1,42	1,39	1,42	1,44	1,42	1,45	1,46	1,43	1,42	1,42	1,43	1,40	1,42	1,42	1,44	1,44
Berat Tanah Kering + Ring	gr	32,40	32,90	32,40	32,50	32,70	32,70	32,60	32,50	32,60	32,70	32,80	33,00	33,10	33,00	32,80	32,50	33,00	32,40	32,60	32,70	33,00	33,00
Berat Tanah Kering	gr	13,90	14,20	13,80	14,00	14,00	14,10	14,10	13,80	14,00	14,20	14,10	14,40	14,60	14,30	14,20	14,00	14,30	13,80	14,10	14,00	14,40	14,40
Berat Air	gr	1,30	1,30	1,20	1,30	1,20	1,30	1,20	1,20	1,30	1,40	1,20	1,30	1,20	1,20	1,10	1,30	1,20	1,30	1,20	1,30	1,20	1,20
Kadar Air	%	9,35	9,15	8,70	9,29	8,57	9,22	8,51	8,70	9,29	9,86	8,51	9,03	8,22	8,39	7,75	9,29	8,39	9,42	8,51	9,29	8,33	8,33
Dry Density of Soil (γ <sub>d</sub> )	gr/cm <sup>3</sup>	1,286	1,314	1,277	1,295	1,295	1,305	1,305	1,277	1,295	1,314	1,305	1,333	1,351	1,323	1,314	1,295	1,323	1,277	1,305	1,295	1,333	1,333
γ <sub>d</sub> Rata-Rata	gr/cm <sup>3</sup>	1,306																					

**Kadar Air**

Lapisan		1			2			3			4			5			6			7			
Nomor Cawan		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Berat Cawan + Tanah Basah	gram	20,90	21,20	20,60	21,10	20,70	21,40	21,40	19,20	19,50	19,90	21,10	21,40	21,80	21,30	21,00	21,20	21,40	20,90	19,40	19,30	19,70	19,70
Berat Cawan + Tanah Kering	gram	19,60	19,90	19,40	19,80	19,50	20,10	20,20	18,00	18,20	18,50	19,90	20,10	20,60	20,10	19,90	19,90	20,20	19,60	18,20	18,00	18,50	18,50
Berat Cawan	gram	5,7	5,7	5,6	5,8	5,5	6	6,1	4,2	4,2	4,3	5,8	5,7	6	5,8	5,7	5,9	5,9	5,8	4,1	4	4,1	4,1
Berat Tanah Kering	gram	13,9	14,2	13,8	14	14	14,1	14,1	13,8	14	14,2	14,1	14,4	14,6	14,3	14,2	14	14,3	13,8	14,1	14	14,4	14,4
Berat Air	gram	1,3	1,3	1,2	1,3	1,2	1,3	1,2	1,2	1,3	1,4	1,2	1,3	1,2	1,2	1,1	1,3	1,2	1,3	1,2	1,3	1,2	1,2
Kadar Air	%	9,35	9,15	8,70	9,29	8,57	9,22	8,51	8,70	9,29	9,86	8,51	9,03	8,22	8,39	7,75	9,29	8,39	9,42	8,51	9,29	8,33	8,33
Kadar Air Rata-Rata	%	8,85																					

**Tanpa Perkuatan Sudut 51, B=8cm, d=2B**

**Kepadatan**

Lapisan		1			2			3			4			5			6			7			
Ring No.		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Tinggi Ring	cm	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60
Diameter Ring	cm	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30
Volume Ring	cm <sup>3</sup>	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81
Berat Ring	gr	18,50	18,70	18,60	18,50	18,70	18,60	18,50	18,70	18,60	18,50	18,70	18,60	18,50	18,70	18,60	18,50	18,70	18,60	18,50	18,70	18,60	18,60
Berat Tanah Basah + Ring	gr	34,30	34,20	33,90	33,80	33,70	34,30	33,80	33,70	33,90	34,00	34,20	34,30	34,30	34,20	33,90	34,30	34,20	34,00	33,80	34,20	34,10	34,10
Berat Tanah Basah	gr	15,80	15,50	15,30	15,30	15,00	15,70	15,30	15,00	15,30	15,50	15,50	15,70	15,80	15,50	15,30	15,80	15,50	15,40	15,30	15,50	15,50	15,50
Soil Unit Weight	gr/cm <sup>3</sup>	1,46	1,43	1,42	1,42	1,39	1,45	1,42	1,39	1,42	1,43	1,43	1,45	1,46	1,43	1,42	1,46	1,43	1,43	1,42	1,43	1,43	1,43
Berat Tanah Kering + Ring	gr	33,00	32,90	32,70	32,50	32,50	33,10	32,60	32,50	32,60	32,70	33,10	33,10	33,00	33,10	32,70	33,10	33,00	32,70	32,50	33,90	32,80	32,80
Berat Tanah Kering	gr	14,50	14,20	14,10	14,00	13,80	14,50	14,10	13,80	14,00	14,20	14,40	14,50	14,50	14,40	14,10	14,60	14,30	14,10	14,00	15,20	14,20	14,20
Berat Air	gr	1,30	1,30	1,20	1,30	1,20	1,20	1,20	1,20	1,30	1,30	1,10	1,20	1,30	1,10	1,20	1,20	1,20	1,30	1,30	0,30	1,30	1,30
Kadar Air	%	8,97	9,15	8,51	9,29	8,70	8,28	8,51	8,70	9,29	9,15	7,64	8,28	8,97	7,64	8,51	8,22	8,39	9,22	9,29	1,97	9,15	9,15
Dry Density of Soil (γd)	gr/cm <sup>3</sup>	1,342	1,314	1,305	1,295	1,277	1,342	1,305	1,277	1,295	1,314	1,333	1,342	1,342	1,333	1,305	1,351	1,323	1,305	1,295	1,407	1,314	1,314
γd Rata-Rata	gr/cm <sup>3</sup>	1,320																					

**Kadar Air**

Lapisan		1			2			3			4			5			6			7			
Nomor Cawan		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Berat Cawan + Tanah Basah	gram	21,50	21,20	20,90	21,10	20,50	21,70	21,40	19,20	19,50	19,80	21,30	21,40	21,80	21,30	21,00	21,70	21,40	21,20	19,40	19,50	19,60	19,60
Berat Cawan + Tanah Kering	gram	20,20	19,90	19,70	19,80	19,30	20,50	20,20	18,00	18,20	18,50	20,20	20,20	20,50	20,20	19,80	20,50	20,20	19,90	18,10	19,20	18,30	18,30
Berat Cawan	gram	5,7	5,7	5,6	5,8	5,5	6	6,1	4,2	4,2	4,3	5,8	5,7	6	5,8	5,7	5,9	5,9	5,8	4,1	4	4,1	4,1
Berat Tanah Kering	gram	14,5	14,2	14,1	14	13,8	14,5	14,1	13,8	14	14,2	14,4	14,5	14,5	14,4	14,1	14,6	14,3	14,1	14	15,2	14,2	14,2
Berat Air	gram	1,3	1,3	1,2	1,3	1,2	1,2	1,2	1,2	1,3	1,3	1,1	1,2	1,3	1,1	1,2	1,2	1,2	1,3	1,3	0,3	1,3	1,3
Kadar Air	%	8,97	9,15	8,51	9,29	8,70	8,28	8,51	8,70	9,29	9,15	7,64	8,28	8,97	7,64	8,51	8,22	8,39	9,22	9,29	1,97	9,15	9,15
Kadar Air Rata-Rata	%	8,37																					

**Tanpa Perkuatan Sudut 56, B=4cm, d=2B**

**Kepadatan**

Lapisan		1			2			3			4			5			6			7			
Ring No.		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Tinggi Ring	cm	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60
Diameter Ring	cm	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30
Volume Ring	cm <sup>3</sup>	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81
Berat Ring	gr	18,50	18,70	18,60	18,50	18,70	18,60	18,50	18,70	18,60	18,50	18,70	18,60	18,50	18,70	18,60	18,50	18,70	18,60	18,50	18,70	18,60	18,50
Berat Tanah Basah + Ring	gr	33,90	34,00	34,20	34,00	34,10	33,80	34,00	34,40	33,80	34,20	33,90	33,80	33,80	34,20	34,00	34,10	33,80	33,90	34,20	33,80	33,90	33,90
Berat Tanah Basah	gr	15,40	15,30	15,60	15,50	15,40	15,20	15,50	15,70	15,20	15,70	15,20	15,20	15,30	15,50	15,40	15,60	15,10	15,30	15,70	15,10	15,30	15,30
Soil Unit Weight	gr/cm <sup>3</sup>	1,43	1,42	1,44	1,43	1,43	1,41	1,43	1,45	1,41	1,45	1,41	1,41	1,42	1,43	1,43	1,44	1,40	1,42	1,45	1,40	1,42	1,42
Berat Tanah Kering + Ring	gr	32,60	32,80	32,90	32,70	33,00	32,60	32,70	33,20	32,60	32,90	32,70	32,60	32,50	33,00	32,80	32,80	32,60	32,60	32,90	32,50	32,80	32,80
Berat Tanah Kering	gr	14,10	14,10	14,30	14,20	14,30	14,00	14,20	14,50	14,00	14,40	14,00	14,00	14,00	14,30	14,20	14,30	13,90	14,00	14,40	13,80	14,20	14,20
Berat Air	gr	1,30	1,20	1,30	1,30	1,10	1,20	1,30	1,20	1,20	1,30	1,20	1,20	1,30	1,20	1,20	1,30	1,20	1,30	1,30	1,30	1,30	1,10
Kadar Air	%	9,22	8,51	9,09	9,15	7,69	8,57	9,15	8,28	8,57	9,03	8,57	8,57	9,29	8,39	8,45	9,09	8,63	9,29	9,03	9,42	7,75	7,75
Dry Density of Soil (γd)	gr/cm <sup>3</sup>	1,305	1,305	1,323	1,314	1,323	1,295	1,314	1,342	1,295	1,333	1,295	1,295	1,295	1,323	1,314	1,323	1,286	1,295	1,333	1,277	1,314	1,314
γd Rata-Rata	gr/cm <sup>3</sup>	1,310																					

**Kadar Air**

Lapisan		1			2			3			4			5			6			7			
Nomor Cawan		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Berat Cawan + Tanah Basah	gram	21,10	21,00	21,20	21,30	20,90	21,20	21,60	19,90	19,40	20,00	21,00	20,90	21,30	21,30	21,10	21,50	21,00	21,10	21,80	20,70	20,80	20,80
Berat Cawan + Tanah Kering	gram	19,80	19,80	19,90	20,00	19,80	20,00	20,30	18,70	18,20	18,70	19,80	19,70	20,00	20,10	19,90	20,20	19,80	19,80	20,50	19,40	19,70	19,70
Berat Cawan	gram	5,7	5,7	5,6	5,8	5,5	6	6,1	4,2	4,2	4,3	5,8	5,7	6	5,8	5,7	5,9	5,9	5,8	6,1	5,6	5,5	5,5
Berat Tanah Kering	gram	14,1	14,1	14,3	14,2	14,3	14	14,2	14,5	14	14,4	14	14	14	14,3	14,2	14,3	13,9	14	14,4	13,8	14,2	14,2
Berat Air	gram	1,3	1,2	1,3	1,3	1,1	1,2	1,3	1,2	1,2	1,3	1,2	1,2	1,3	1,2	1,2	1,3	1,2	1,3	1,3	1,3	1,1	1,1
Kadar Air	%	9,22	8,51	9,09	9,15	7,69	8,57	9,15	8,28	8,57	9,03	8,57	8,57	9,29	8,39	8,45	9,09	8,63	9,29	9,03	9,42	7,75	7,75
Kadar Air Rata-Rata	%	8,75																					

### Tanpa Perkuatan Sudut 56, B=6cm, d=2B

#### Kepadatan

Lapisan		1			2			3			4			5			6			7			
Ring No.		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Tinggi Ring	cm	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60
Diameter Ring	cm	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30
Volume Ring	cm <sup>3</sup>	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81
Berat Ring	gr	18,50	18,70	18,60	18,50	18,70	18,60	18,50	18,70	18,60	18,50	18,70	18,60	18,50	18,70	18,60	18,50	18,70	18,60	18,50	18,70	18,60	18,60
Berat Tanah Basah + Ring	gr	34,40	34,20	34,30	34,00	34,10	33,70	34,00	34,40	33,80	34,30	34,20	33,80	33,80	34,20	34,00	34,40	33,80	34,10	34,20	34,30	33,90	33,90
Berat Tanah Basah	gr	15,90	15,50	15,70	15,50	15,40	15,10	15,50	15,70	15,20	15,80	15,50	15,20	15,30	15,50	15,40	15,90	15,10	15,50	15,70	15,60	15,30	15,30
Soil Unit Weight	gr/cm <sup>3</sup>	1,47	1,43	1,45	1,43	1,43	1,40	1,43	1,45	1,41	1,46	1,43	1,41	1,42	1,43	1,43	1,47	1,40	1,43	1,45	1,44	1,42	1,42
Berat Tanah Kering + Ring	gr	33,10	33,00	32,90	32,80	32,80	32,50	32,70	33,10	32,70	33,20	32,90	32,70	32,70	33,00	32,90	33,10	32,60	32,90	32,90	33,20	32,80	32,80
Berat Tanah Kering	gr	14,60	14,30	14,30	14,30	14,10	13,90	14,20	14,40	14,10	14,70	14,20	14,10	14,20	14,30	14,30	14,60	13,90	14,30	14,40	14,50	14,20	14,20
Berat Air	gr	1,30	1,20	1,40	1,20	1,30	1,20	1,30	1,30	1,10	1,10	1,30	1,10	1,10	1,20	1,10	1,30	1,20	1,20	1,30	1,10	1,10	1,10
Kadar Air	%	8,90	8,39	9,79	8,39	9,22	8,63	9,15	9,03	7,80	7,48	9,15	7,80	7,75	8,39	7,69	8,90	8,63	8,39	9,03	7,59	7,75	7,75
Dry Density of Soil (γd)	gr/cm <sup>3</sup>	1,351	1,323	1,323	1,323	1,305	1,286	1,314	1,333	1,305	1,360	1,314	1,305	1,314	1,323	1,323	1,351	1,286	1,323	1,333	1,342	1,314	1,314
γd Rata-Rata	gr/cm <sup>3</sup>	1,321																					

#### Kadar Air

Lapisan		1			2			3			4			5			6			7			
Nomor Cawan		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Berat Cawan + Tanah Basah	gram	21,60	21,20	21,30	21,30	20,90	21,10	21,60	19,90	19,40	20,10	21,30	20,90	21,30	21,30	21,10	21,80	21,00	21,30	21,80	21,20	20,80	20,80
Berat Cawan + Tanah Kering	gram	20,30	20,00	19,90	20,10	19,60	19,90	20,30	18,60	18,30	19,00	20,00	19,80	20,20	20,10	20,00	20,50	19,80	20,10	20,50	20,10	19,70	19,70
Berat Cawan	gram	5,7	5,7	5,6	5,8	5,5	6	6,1	4,2	4,2	4,3	5,8	5,7	6	5,8	5,7	5,9	5,9	5,8	6,1	5,6	5,5	5,5
Berat Tanah Kering	gram	14,6	14,3	14,3	14,3	14,1	13,9	14,2	14,4	14,1	14,7	14,2	14,1	14,2	14,3	14,3	14,6	13,9	14,3	14,4	14,5	14,2	14,2
Berat Air	gram	1,3	1,2	1,4	1,2	1,3	1,2	1,3	1,3	1,1	1,1	1,3	1,1	1,1	1,2	1,1	1,3	1,2	1,2	1,3	1,1	1,1	1,1
Kadar Air	%	8,90	8,39	9,79	8,39	9,22	8,63	9,15	9,03	7,80	7,48	9,15	7,80	7,75	8,39	7,69	8,90	8,63	8,39	9,03	7,59	7,75	7,75
Kadar Air Rata-Rata	%	8,47																					



**Tanpa Perkuatan Sudut 56, B=8cm, d=2B**

**Kepadatan**

Lapisan		1			2			3			4			5			6			7			
Ring No.		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Tinggi Ring	cm	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60
Diameter Ring	cm	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30
Volume Ring	cm <sup>3</sup>	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81
Berat Ring	gr	18,50	18,70	18,60	18,50	18,70	18,60	18,50	18,70	18,60	18,50	18,70	18,60	18,50	18,70	18,60	18,50	18,70	18,60	18,50	18,70	18,60	18,60
Berat Tanah Basah + Ring	gr	34,30	34,40	34,20	34,00	34,10	33,70	34,00	33,90	33,80	34,30	34,20	33,80	33,80	34,20	34,00	33,90	33,80	34,10	34,20	34,40	33,80	33,80
Berat Tanah Basah	gr	15,80	15,70	15,60	15,50	15,40	15,10	15,50	15,20	15,20	15,80	15,50	15,20	15,30	15,50	15,40	15,40	15,10	15,50	15,70	15,70	15,20	15,20
Soil Unit Weight	gr/cm <sup>3</sup>	1,46	1,45	1,44	1,43	1,43	1,40	1,43	1,41	1,41	1,46	1,43	1,41	1,42	1,43	1,43	1,43	1,40	1,43	1,45	1,45	1,41	1,41
Berat Tanah Kering + Ring	gr	33,00	33,10	32,90	32,70	32,80	32,50	32,70	32,80	32,60	33,00	32,90	32,50	32,60	33,00	32,70	32,60	32,60	32,80	32,90	33,10	32,60	32,60
Berat Tanah Kering	gr	14,50	14,40	14,30	14,20	14,10	13,90	14,20	14,10	14,00	14,50	14,20	13,90	14,10	14,30	14,10	14,10	13,90	14,20	14,40	14,40	14,00	14,00
Berat Air	gr	1,30	1,30	1,30	1,30	1,30	1,20	1,30	1,10	1,20	1,30	1,30	1,30	1,20	1,20	1,30	1,30	1,20	1,30	1,30	1,30	1,20	1,20
Kadar Air	%	8,97	9,03	9,09	9,15	9,22	8,63	9,15	7,80	8,57	8,97	9,15	9,35	8,51	8,39	9,22	9,22	8,63	9,15	9,03	9,03	8,57	8,57
Dry Density of Soil (γ <sub>d</sub> )	gr/cm <sup>3</sup>	1,342	1,333	1,323	1,314	1,305	1,286	1,314	1,305	1,295	1,342	1,314	1,286	1,305	1,323	1,305	1,305	1,286	1,314	1,333	1,333	1,295	1,295
γ <sub>d</sub> Rata-Rata	gr/cm <sup>3</sup>	1,312																					

**Kadar Air**

Lapisan		1			2			3			4			5			6			7			
Nomor Cawan		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Berat Cawan + Tanah Basah	gram	21,50	21,40	21,20	21,30	20,90	21,10	21,60	19,40	19,40	20,10	21,30	20,90	21,30	21,30	21,10	21,30	21,00	21,30	21,80	21,30	20,70	20,70
Berat Cawan + Tanah Kering	gram	20,20	20,10	19,90	20,00	19,60	19,90	20,30	18,30	18,20	18,80	20,00	19,60	20,10	20,10	19,80	20,00	19,80	20,00	20,50	20,00	19,50	19,50
Berat Cawan	gram	5,7	5,7	5,6	5,8	5,5	6	6,1	4,2	4,2	4,3	5,8	5,7	6	5,8	5,7	5,9	5,9	5,8	6,1	5,6	5,5	5,5
Berat Tanah Kering	gram	14,5	14,4	14,3	14,2	14,1	13,9	14,2	14,1	14	14,5	14,2	13,9	14,1	14,3	14,1	14,1	13,9	14,2	14,4	14,4	14	14
Berat Air	gram	1,3	1,3	1,3	1,3	1,3	1,2	1,3	1,1	1,2	1,3	1,3	1,3	1,2	1,2	1,3	1,3	1,2	1,3	1,3	1,3	1,2	1,2
Kadar Air	%	8,97	9,03	9,09	9,15	9,22	8,63	9,15	7,80	8,57	8,97	9,15	9,35	8,51	8,39	9,22	9,22	8,63	9,15	9,03	9,03	8,57	8,57
Kadar Air Rata-Rata	%	8,90																					

**Dengan Perkuatan Sudut 46, B=4cm, d=2B, n=2**

**Kepadatan**

Lapisan		1			2			3			4			5			6			7			
Ring No.		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Tinggi Ring	cm	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60
Diameter Ring	cm	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30
Volume Ring	cm <sup>3</sup>	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81
Berat Ring	gr	18,40	18,50	18,40	18,40	18,50	18,40	18,40	18,50	18,40	18,40	18,50	18,40	18,40	18,50	18,40	18,40	18,50	18,40	18,40	18,50	18,40	18,40
Berat Tanah Basah + Ring	gr	33,70	34,20	33,60	33,90	33,70	33,80	34,00	33,70	33,80	33,60	33,90	33,80	33,80	34,00	33,80	33,90	33,60	34,00	33,90	33,80	34,10	34,10
Berat Tanah Basah	gr	15,30	15,70	15,20	15,50	15,20	15,40	15,60	15,20	15,40	15,20	15,40	15,40	15,40	15,50	15,40	15,50	15,10	15,60	15,50	15,30	15,70	15,70
Soil Unit Weight	gr/cm <sup>3</sup>	1,42	1,45	1,41	1,43	1,41	1,43	1,44	1,41	1,43	1,41	1,43	1,43	1,43	1,43	1,43	1,43	1,43	1,43	1,40	1,44	1,43	1,42
Berat Tanah Kering + Ring	gr	32,40	32,90	32,40	32,60	32,50	32,50	32,60	32,50	32,60	32,40	32,60	32,50	32,50	32,70	32,50	32,60	32,30	32,70	32,80	32,50	32,80	32,80
Berat Tanah Kering	gr	14,00	14,40	14,00	14,20	14,00	14,10	14,20	14,00	14,20	14,00	14,10	14,10	14,10	14,20	14,10	14,20	13,80	14,30	14,40	14,00	14,40	14,40
Berat Air	gr	1,30	1,30	1,20	1,30	1,20	1,30	1,40	1,20	1,20	1,20	1,30	1,30	1,30	1,30	1,30	1,30	1,30	1,30	1,10	1,30	1,30	1,30
Kadar Air	%	9,29	9,03	8,57	9,15	8,57	9,22	9,86	8,57	8,45	8,57	9,22	9,22	9,22	9,15	9,22	9,15	9,42	9,09	7,64	9,29	9,03	9,03
Dry Density of Soil (γd)	gr/cm <sup>3</sup>	1,295	1,333	1,295	1,314	1,295	1,305	1,314	1,295	1,314	1,295	1,305	1,305	1,305	1,314	1,305	1,314	1,277	1,323	1,333	1,295	1,333	1,333
γd Rata-Rata	gr/cm <sup>3</sup>	1,308																					

**Kadar Air**

Lapisan		1			2			3			4			5			6			7			
Nomor Cawan		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Berat Cawan + Tanah Basah	gram	21,10	21,70	21,00	19,80	21,30	19,70	21,70	21,00	21,40	19,80	19,70	21,10	21,40	21,30	21,10	21,20	19,40	21,40	21,20	19,60	21,30	21,30
Berat Cawan + Tanah Kering	gram	19,80	20,40	19,80	18,50	20,10	18,40	20,30	19,80	20,20	18,60	18,40	19,80	20,10	20,00	19,80	19,90	18,10	20,10	20,10	18,30	20,00	20,00
Berat Cawan	gram	5,8	6	5,8	4,3	6,1	4,3	6,1	5,8	6	4,6	4,3	5,7	6	5,8	5,7	5,7	4,3	5,8	5,7	4,3	5,6	5,6
Berat Tanah Kering	gram	14	14,4	14	14,2	14	14,1	14,2	14	14,2	14	14,1	14,1	14,1	14,2	14,1	14,2	13,8	14,3	14,4	14	14,4	14,4
Berat Air	gram	1,3	1,3	1,2	1,3	1,2	1,3	1,4	1,2	1,2	1,2	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,1	1,3	1,3	1,3
Kadar Air	%	9,29	9,03	8,57	9,15	8,57	9,22	9,86	8,57	8,45	8,57	9,22	9,22	9,22	9,15	9,22	9,15	9,42	9,09	7,64	9,29	9,03	9,03
Kadar Air Rata-Rata	%	9,00																					

**Dengan Perkuatan Sudut 46, B=6cm, d=2B, n=2**

**Kepadatan**

Lapisan		1			2			3			4			5			6			7			
Ring No.		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Tinggi Ring	cm	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60
Diameter Ring	cm	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30
Volume Ring	cm <sup>3</sup>	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81
Berat Ring	gr	18,40	18,50	18,40	18,40	18,50	18,40	18,40	18,50	18,40	18,40	18,50	18,40	18,40	18,50	18,40	18,40	18,50	18,40	18,40	18,50	18,40	18,40
Berat Tanah Basah + Ring	gr	34,20	34,30	34,40	33,90	33,80	34,00	34,30	33,90	33,90	34,10	34,00	33,70	33,80	33,90	33,60	33,70	34,30	34,20	33,80	33,60	34,10	34,10
Berat Tanah Basah	gr	15,80	15,80	16,00	15,50	15,30	15,60	15,90	15,40	15,50	15,70	15,50	15,30	15,40	15,40	15,20	15,30	15,80	15,80	15,40	15,10	15,70	15,70
Soil Unit Weight	gr/cm <sup>3</sup>	1,46	1,46	1,48	1,43	1,42	1,44	1,47	1,43	1,43	1,45	1,43	1,42	1,43	1,43	1,41	1,42	1,46	1,46	1,43	1,40	1,45	1,45
Berat Tanah Kering + Ring	gr	32,90	33,00	33,20	32,60	32,50	32,70	33,10	32,70	32,70	32,90	32,70	32,50	32,60	32,80	32,40	32,50	32,90	32,90	32,50	32,40	32,90	32,90
Berat Tanah Kering	gr	14,50	14,50	14,80	14,20	14,00	14,30	14,70	14,20	14,30	14,50	14,20	14,10	14,20	14,30	14,00	14,10	14,40	14,50	14,10	13,90	14,50	14,50
Berat Air	gr	1,30	1,30	1,20	1,30	1,30	1,30	1,20	1,20	1,20	1,20	1,30	1,20	1,20	1,10	1,20	1,20	1,40	1,30	1,30	1,20	1,20	1,20
Kadar Air	%	8,97	8,97	8,11	9,15	9,29	9,09	8,16	8,45	8,39	8,28	9,15	8,51	8,45	7,69	8,57	8,51	9,72	8,97	9,22	8,63	8,28	8,28
Dry Density of Soil (γd)	gr/cm <sup>3</sup>	1,342	1,342	1,370	1,314	1,295	1,323	1,360	1,314	1,323	1,342	1,314	1,305	1,314	1,323	1,295	1,305	1,333	1,342	1,305	1,286	1,342	1,342
γd Rata-Rata	gr/cm <sup>3</sup>	1,323																					

**Kadar Air**

Lapisan		1			2			3			4			5			6			7			
Nomor Cawan		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Berat Cawan + Tanah Basah	gram	20,10	20,00	20,30	21,20	20,80	21,60	21,60	21,20	21,10	20,10	21,20	21,20	21,30	19,70	21,10	19,70	20,00	21,60	21,20	19,40	21,40	21,40
Berat Cawan + Tanah Kering	gram	18,80	18,70	19,10	19,90	19,50	20,30	20,40	20,00	19,90	18,90	19,90	20,00	20,10	18,60	19,90	18,50	18,60	20,30	19,90	18,20	20,20	20,20
Berat Cawan	gram	4,3	4,2	4,3	5,7	5,5	6	5,7	5,8	5,6	4,4	5,7	5,9	5,9	4,3	5,9	4,4	4,2	5,8	5,8	4,3	5,7	5,7
Berat Tanah Kering	gram	14,5	14,5	14,8	14,2	14	14,3	14,7	14,2	14,3	14,5	14,2	14,1	14,2	14,3	14	14,1	14,4	14,5	14,1	13,9	14,5	14,5
Berat Air	gram	1,3	1,3	1,2	1,3	1,3	1,3	1,2	1,2	1,2	1,2	1,3	1,2	1,2	1,1	1,2	1,2	1,4	1,3	1,3	1,2	1,2	1,2
Kadar Air	%	8,97	8,97	8,11	9,15	9,29	9,09	8,16	8,45	8,39	8,28	9,15	8,51	8,45	7,69	8,57	8,51	9,72	8,97	9,22	8,63	8,28	8,28
Kadar Air Rata-Rata	%	8,69																					

Dengan Perkuatan Sudut 46, B=8cm, d=2B, n=2

Kepadatan

Lapisan		1			2			3			4			5			6			7			
Ring No.		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Tinggi Ring	cm	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60
Diameter Ring	cm	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30
Volume Ring	cm <sup>3</sup>	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81
Berat Ring	gr	18,40	18,50	18,40	18,40	18,50	18,40	18,40	18,50	18,40	18,40	18,50	18,40	18,40	18,50	18,40	18,40	18,50	18,40	18,40	18,50	18,40	18,40
Berat Tanah Basah + Ring	gr	34,30	34,00	34,10	33,90	34,00	33,60	33,50	33,80	33,90	34,30	34,20	34,00	33,90	33,90	34,00	34,00	34,10	33,60	33,80	33,80	34,00	34,00
Berat Tanah Basah	gr	15,90	15,50	15,70	15,50	15,50	15,20	15,10	15,30	15,50	15,90	15,70	15,60	15,50	15,40	15,60	15,60	15,60	15,20	15,40	15,30	15,60	15,60
Soil Unit Weight	gr/cm <sup>3</sup>	1,47	1,43	1,45	1,43	1,43	1,41	1,40	1,42	1,43	1,47	1,45	1,44	1,43	1,43	1,44	1,44	1,44	1,41	1,43	1,42	1,44	1,44
Berat Tanah Kering + Ring	gr	33,00	32,80	32,80	32,70	32,80	32,50	32,40	32,50	32,60	32,90	32,90	32,60	32,60	32,80	32,60	32,80	32,70	32,30	32,70	32,60	32,80	32,80
Berat Tanah Kering	gr	14,60	14,30	14,40	14,30	14,30	14,10	14,00	14,00	14,20	14,50	14,40	14,20	14,20	14,30	14,20	14,40	14,20	13,90	14,30	14,10	14,40	14,40
Berat Air	gr	1,30	1,20	1,30	1,20	1,20	1,10	1,10	1,30	1,30	1,40	1,30	1,40	1,30	1,10	1,40	1,20	1,40	1,30	1,10	1,20	1,20	1,20
Kadar Air	%	8,90	8,39	9,03	8,39	8,39	7,80	7,86	9,29	9,15	9,66	9,03	9,86	9,15	7,69	9,86	8,33	9,86	9,35	7,69	8,51	8,33	8,33
Dry Density of Soil (γ <sub>d</sub> )	gr/cm <sup>3</sup>	1,351	1,323	1,333	1,323	1,323	1,305	1,295	1,295	1,314	1,342	1,333	1,314	1,314	1,323	1,314	1,333	1,314	1,286	1,323	1,305	1,333	1,333
γ <sub>d</sub> Rata-Rata	gr/cm <sup>3</sup>	1,319																					

Kadar Air

Lapisan		1			2			3			4			5			6			7			
Nomor Cawan		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Berat Cawan + Tanah Basah	gram	20,20	19,70	20,00	21,20	21,00	21,20	20,80	21,10	21,10	20,30	21,40	21,50	21,40	19,70	21,50	20,00	19,80	21,00	21,20	19,60	21,30	21,30
Berat Cawan + Tanah Kering	gram	18,90	18,50	18,70	20,00	19,80	20,10	19,70	19,80	19,80	18,90	20,10	20,10	20,10	18,60	20,10	18,80	18,40	19,70	20,10	18,40	20,10	20,10
Berat Cawan	gram	4,3	4,2	4,3	5,7	5,5	6	5,7	5,8	5,6	4,4	5,7	5,9	5,9	4,3	5,9	4,4	4,2	5,8	5,8	4,3	5,7	5,7
Berat Tanah Kering	gram	14,6	14,3	14,4	14,3	14,3	14,1	14	14	14,2	14,5	14,4	14,2	14,2	14,3	14,2	14,4	14,2	13,9	14,3	14,1	14,4	14,4
Berat Air	gram	1,3	1,2	1,3	1,2	1,2	1,1	1,1	1,3	1,3	1,4	1,3	1,4	1,3	1,1	1,4	1,2	1,4	1,3	1,1	1,2	1,2	1,2
Kadar Air	%	8,90	8,39	9,03	8,39	8,39	7,80	7,86	9,29	9,15	9,66	9,03	9,86	9,15	7,69	9,86	8,33	9,86	9,35	7,69	8,51	8,33	8,33
Kadar Air Rata-Rata	%	8,79																					

Dengan Perkuatan Sudut 51, B=4cm, d=2B, n=2

Kepadatan

Lapisan		1			2			3			4			5			6			7				
Ring No.		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3		
Tinggi Ring	cm	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	
Diameter Ring	cm	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	
Volume Ring	cm <sup>3</sup>	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	
Berat Ring	gr	18,40	18,50	18,40	18,40	18,50	18,40	18,40	18,50	18,40	18,40	18,50	18,40	18,40	18,50	18,40	18,40	18,50	18,40	18,40	18,50	18,40	18,40	
Berat Tanah Basah + Ring	gr	34,30	33,80	33,60	34,20	34,10	34,00	33,70	33,70	34,20	34,20	33,80	33,90	33,60	34,10	33,60	33,60	33,90	33,60	33,80	33,80	34,00	34,00	
Berat Tanah Basah	gr	15,90	15,30	15,20	15,80	15,60	15,60	15,30	15,20	15,80	15,80	15,30	15,50	15,20	15,60	15,20	15,20	15,40	15,20	15,40	15,30	15,60	15,60	
Soil Unit Weight	gr/cm <sup>3</sup>	1,47	1,42	1,41	1,46	1,44	1,44	1,42	1,41	1,46	1,46	1,42	1,43	1,41	1,44	1,41	1,41	1,43	1,41	1,43	1,42	1,44	1,44	
Berat Tanah Kering + Ring	gr	32,90	32,60	32,30	32,90	32,80	32,70	32,40	32,60	32,90	33,00	32,40	32,70	32,40	32,80	32,50	32,40	32,80	32,40	32,80	32,40	32,50	32,90	32,90
Berat Tanah Kering	gr	14,50	14,10	13,90	14,50	14,30	14,30	14,00	14,10	14,50	14,60	13,90	14,30	14,00	14,30	14,10	14,00	14,30	14,00	14,40	14,00	14,50	14,50	
Berat Air	gr	1,40	1,20	1,30	1,30	1,30	1,30	1,30	1,10	1,30	1,20	1,40	1,20	1,20	1,30	1,10	1,20	1,10	1,20	1,00	1,30	1,10	1,10	
Kadar Air	%	9,66	8,51	9,35	8,97	9,09	9,09	9,29	7,80	8,97	8,22	10,07	8,39	8,57	9,09	7,80	8,57	7,69	8,57	6,94	9,29	7,59	7,59	
Dry Density of Soil (γd)	gr/cm <sup>3</sup>	1,342	1,305	1,286	1,342	1,323	1,323	1,295	1,305	1,342	1,351	1,286	1,323	1,295	1,323	1,305	1,295	1,323	1,295	1,333	1,295	1,342	1,342	
γd Rata-Rata	gr/cm <sup>3</sup>	1,316																						

Kadar Air

Lapisan		1			2			3			4			5			6			7			
Nomor Cawan		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Berat Cawan + Tanah Basah	gram	20,20	19,50	19,50	21,50	21,10	21,60	21,00	21,00	21,40	20,20	21,00	21,40	21,10	19,90	21,10	19,60	19,60	21,00	21,20	19,60	21,30	21,30
Berat Cawan + Tanah Kering	gram	18,80	18,30	18,20	20,20	19,80	20,30	19,70	19,90	20,10	19,00	19,60	20,20	19,90	18,60	20,00	18,40	18,50	19,80	20,20	18,30	20,20	20,20
Berat Cawan	gram	4,3	4,2	4,3	5,7	5,5	6	5,7	5,8	5,6	4,4	5,7	5,9	5,9	4,3	5,9	4,4	4,2	5,8	5,8	4,3	5,7	5,7
Berat Tanah Kering	gram	14,5	14,1	13,9	14,5	14,3	14,3	14	14,1	14,5	14,6	13,9	14,3	14	14,3	14,1	14	14,3	14	14,4	14	14,5	14,5
Berat Air	gram	1,4	1,2	1,3	1,3	1,3	1,3	1,3	1,1	1,3	1,2	1,4	1,2	1,2	1,3	1,1	1,2	1,1	1,2	1	1,3	1,1	1,1
Kadar Air	%	9,66	8,51	9,35	8,97	9,09	9,09	9,29	7,80	8,97	8,22	10,07	8,39	8,57	9,09	7,80	8,57	7,69	8,57	6,94	9,29	7,59	7,59
Kadar Air Rata-Rata	%	8,64																					

**Dengan Perkuatan Sudut 51, B=6cm, d=2B, n=2**

**Kepadatan**

Lapisan		1			2			3			4			5			6			7			
Ring No.		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Tinggi Ring	cm	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60
Diameter Ring	cm	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30
Volume Ring	cm <sup>3</sup>	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81
Berat Ring	gr	18,40	18,50	18,40	18,40	18,50	18,40	18,40	18,50	18,40	18,40	18,50	18,40	18,40	18,50	18,40	18,40	18,50	18,40	18,40	18,50	18,40	18,40
Berat Tanah Basah + Ring	gr	33,90	34,00	33,80	34,20	33,90	33,70	34,10	33,80	34,00	33,80	33,90	33,70	33,80	34,00	33,90	33,80	33,70	33,90	34,20	34,00	34,30	34,30
Berat Tanah Basah	gr	15,50	15,50	15,40	15,80	15,40	15,30	15,70	15,30	15,60	15,40	15,40	15,30	15,40	15,50	15,50	15,40	15,20	15,50	15,80	15,50	15,90	15,90
Soil Unit Weight	gr/cm <sup>3</sup>	1,43	1,43	1,43	1,46	1,43	1,42	1,45	1,42	1,44	1,43	1,43	1,42	1,43	1,43	1,43	1,43	1,41	1,43	1,46	1,43	1,47	1,47
Berat Tanah Kering + Ring	gr	32,70	32,70	32,50	31,90	32,60	32,50	33,00	32,50	32,80	32,60	32,60	32,50	32,70	32,80	32,70	32,60	32,40	32,50	33,00	32,70	33,10	33,10
Berat Tanah Kering	gr	14,30	14,20	14,10	13,50	14,10	14,10	14,60	14,00	14,40	14,20	14,10	14,10	14,30	14,30	14,30	14,20	13,90	14,10	14,60	14,20	14,70	14,70
Berat Air	gr	1,20	1,30	1,30	2,30	1,30	1,20	1,10	1,30	1,20	1,20	1,30	1,20	1,10	1,20	1,20	1,20	1,30	1,40	1,20	1,30	1,20	1,20
Kadar Air	%	8,39	9,15	9,22	17,04	9,22	8,51	7,53	9,29	8,33	8,45	9,22	8,51	7,69	8,39	8,39	8,45	9,35	9,93	8,22	9,15	8,16	8,16
Dry Density of Soil (γ <sub>d</sub> )	gr/cm <sup>3</sup>	1,323	1,314	1,305	1,249	1,305	1,305	1,351	1,295	1,333	1,314	1,305	1,305	1,323	1,323	1,323	1,314	1,286	1,305	1,351	1,314	1,360	1,360
γ <sub>d</sub> Rata-Rata	gr/cm <sup>3</sup>	1,314																					

**Kadar Air**

Lapisan		1			2			3			4			5			6			7			
Nomor Cawan		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Berat Cawan + Tanah Basah	gram	21,50	21,50	21,60	22,00	21,50	21,50	21,30	21,20	21,50	21,40	21,40	21,30	21,40	21,50	21,50	20,80	20,70	20,90	21,30	21,00	21,40	21,40
Berat Cawan + Tanah Kering	gram	20,30	20,20	20,30	19,70	20,20	20,30	20,20	19,90	20,30	20,20	20,10	20,10	20,30	20,30	20,30	19,60	19,40	19,50	20,10	19,70	20,20	20,20
Berat Cawan	gram	6	6	6,2	6,2	6,1	6,2	5,6	5,9	5,9	6	6	6	6	6	6	5,4	5,5	5,4	5,5	5,5	5,5	5,5
Berat Tanah Kering	gram	14,3	14,2	14,1	13,5	14,1	14,1	14,6	14	14,4	14,2	14,1	14,1	14,3	14,3	14,3	14,2	13,9	14,1	14,6	14,2	14,7	14,7
Berat Air	gram	1,2	1,3	1,3	2,3	1,3	1,2	1,1	1,3	1,2	1,2	1,3	1,2	1,1	1,2	1,2	1,2	1,3	1,4	1,2	1,3	1,2	1,2
Kadar Air	%	8,39	9,15	9,22	17,04	9,22	8,51	7,53	9,29	8,33	8,45	9,22	8,51	7,69	8,39	8,39	8,45	9,35	9,93	8,22	9,15	8,16	8,16
Kadar Air Rata-Rata	%	9,08																					

**Dengan Perkuatan Sudut 51, B=8cm, d=2B, n=2**

**Kepadatan**

Lapisan		1			2			3			4			5			6			7			
Ring No.		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Tinggi Ring	cm	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60
Diameter Ring	cm	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30
Volume Ring	cm <sup>3</sup>	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81
Berat Ring	gr	18,40	18,50	18,40	18,40	18,50	18,40	18,40	18,50	18,40	18,40	18,50	18,40	18,40	18,50	18,40	18,40	18,50	18,40	18,40	18,50	18,40	18,40
Berat Tanah Basah + Ring	gr	34,00	33,70	34,00	33,50	33,60	33,80	33,70	33,70	34,00	33,70	33,80	34,10	33,60	33,60	33,50	33,60	33,50	33,70	33,80	33,80	34,00	34,00
Berat Tanah Basah	gr	15,60	15,20	15,60	15,10	15,10	15,40	15,30	15,20	15,60	15,30	15,30	15,70	15,20	15,10	15,10	15,20	15,00	15,30	15,40	15,30	15,60	15,60
Soil Unit Weight	gr/cm <sup>3</sup>	1,44	1,41	1,44	1,40	1,40	1,43	1,42	1,41	1,44	1,42	1,42	1,45	1,41	1,40	1,40	1,41	1,39	1,42	1,43	1,42	1,44	1,44
Berat Tanah Kering + Ring	gr	32,80	32,40	32,70	32,40	32,50	32,50	32,50	32,40	32,70	32,40	32,50	32,80	32,40	32,60	32,30	32,40	32,30	32,30	32,40	32,60	32,70	32,70
Berat Tanah Kering	gr	14,40	13,90	14,30	14,00	14,00	14,10	14,10	13,90	14,30	14,00	14,00	14,40	14,00	14,10	13,90	14,00	13,80	13,90	14,00	14,10	14,30	14,30
Berat Air	gr	1,20	1,30	1,30	1,10	1,10	1,30	1,20	1,30	1,30	1,30	1,30	1,30	1,20	1,00	1,20	1,20	1,20	1,40	1,40	1,20	1,30	1,30
Kadar Air	%	8,33	9,35	9,09	7,86	7,86	9,22	8,51	9,35	9,09	9,29	9,29	9,03	8,57	7,09	8,63	8,57	8,70	10,07	10,00	8,51	9,09	9,09
Dry Density of Soil (γd)	gr/cm <sup>3</sup>	1,333	1,286	1,323	1,295	1,295	1,305	1,305	1,286	1,323	1,295	1,295	1,333	1,295	1,305	1,286	1,295	1,277	1,286	1,295	1,305	1,323	1,323
γd Rata-Rata	gr/cm <sup>3</sup>	1,302																					

**Kadar Air**

Lapisan		1			2			3			4			5			6			7			
Nomor Cawan		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Berat Cawan + Tanah Basah	gram	19,90	19,40	19,90	20,80	20,60	21,40	21,00	21,00	21,20	19,70	21,00	21,60	21,10	19,40	21,00	19,60	19,20	21,10	21,20	19,60	21,30	21,30
Berat Cawan + Tanah Kering	gram	18,70	18,10	18,60	19,70	19,50	20,10	19,80	19,70	19,90	18,40	19,70	20,30	19,90	18,40	19,80	18,40	18,00	19,70	19,80	18,40	20,00	20,00
Berat Cawan	gram	4,3	4,2	4,3	5,7	5,5	6	5,7	5,8	5,6	4,4	5,7	5,9	5,9	4,3	5,9	4,4	4,2	5,8	5,8	4,3	5,7	5,7
Berat Tanah Kering	gram	14,4	13,9	14,3	14	14	14,1	14,1	13,9	14,3	14	14	14,4	14	14,1	13,9	14	13,8	13,9	14	14,1	14,3	14,3
Berat Air	gram	1,2	1,3	1,3	1,1	1,1	1,3	1,2	1,3	1,3	1,3	1,3	1,3	1,2	1	1,2	1,2	1,2	1,4	1,4	1,2	1,3	1,3
Kadar Air	%	8,33	9,35	9,09	7,86	7,86	9,22	8,51	9,35	9,09	9,29	9,29	9,03	8,57	7,09	8,63	8,57	8,70	10,07	10,00	8,51	9,09	9,09
Kadar Air Rata-Rata	%	8,83																					

**Dengan Perkuatan Sudut 56, B=4cm, d=2B, n=2**

**Kepadatan**

Lapisan		1			2			3			4			5			6			7			
Ring No.		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Tinggi Ring	cm	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60
Diameter Ring	cm	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30
Volume Ring	cm <sup>3</sup>	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81
Berat Ring	gr	18,40	18,50	18,40	18,40	18,50	18,40	18,40	18,50	18,40	18,40	18,50	18,40	18,40	18,50	18,40	18,40	18,50	18,40	18,40	18,50	18,40	18,40
Berat Tanah Basah + Ring	gr	34,10	34,30	33,90	33,90	33,70	34,10	33,60	33,80	34,20	33,90	34,30	34,00	33,80	33,80	33,90	33,80	34,10	34,20	33,90	33,70	33,80	33,80
Berat Tanah Basah	gr	15,70	15,80	15,50	15,50	15,20	15,70	15,20	15,30	15,80	15,50	15,80	15,60	15,40	15,30	15,50	15,40	15,60	15,80	15,50	15,20	15,40	15,40
Soil Unit Weight	gr/cm <sup>3</sup>	1,45	1,46	1,43	1,43	1,41	1,45	1,41	1,42	1,46	1,43	1,46	1,44	1,43	1,42	1,43	1,43	1,44	1,46	1,43	1,41	1,43	1,43
Berat Tanah Kering + Ring	gr	32,80	33,00	32,60	32,60	32,50	32,90	32,40	32,50	32,90	32,70	33,10	32,70	32,60	32,60	32,50	32,50	32,80	32,90	32,60	32,50	32,50	32,50
Berat Tanah Kering	gr	14,40	14,50	14,20	14,20	14,00	14,50	14,00	14,00	14,50	14,30	14,60	14,30	14,20	14,10	14,10	14,10	14,30	14,50	14,20	14,00	14,10	14,10
Berat Air	gr	1,30	1,30	1,30	1,30	1,20	1,20	1,20	1,30	1,30	1,20	1,20	1,30	1,20	1,20	1,40	1,30	1,30	1,30	1,30	1,20	1,30	1,30
Kadar Air	%	9,03	8,97	9,15	9,15	8,57	8,28	8,57	9,29	8,97	8,39	8,22	9,09	8,45	8,51	9,93	9,22	9,09	8,97	9,15	8,57	9,22	9,22
Dry Density of Soil (γd)	gr/cm <sup>3</sup>	1,333	1,342	1,314	1,314	1,295	1,342	1,295	1,295	1,342	1,323	1,351	1,323	1,314	1,305	1,305	1,305	1,323	1,342	1,314	1,295	1,305	1,305
γd Rata-Rata	gr/cm <sup>3</sup>	1,318																					

**Kadar Air**

Lapisan		1			2			3			4			5			6			7			
Nomor Cawan		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Berat Cawan + Tanah Basah	gram	21,50	21,80	21,30	19,80	21,30	20,00	21,30	21,10	21,80	20,10	20,10	21,30	21,40	21,10	21,20	21,10	19,90	21,60	21,20	19,50	21,00	21,00
Berat Cawan + Tanah Kering	gram	20,20	20,50	20,00	18,50	20,10	18,80	20,10	19,80	20,50	18,90	18,90	20,00	20,20	19,90	19,80	19,80	18,60	20,30	19,90	18,30	19,70	19,70
Berat Cawan	gram	5,8	6	5,8	4,3	6,1	4,3	6,1	5,8	6	4,6	4,3	5,7	6	5,8	5,7	5,7	4,3	5,8	5,7	4,3	5,6	5,6
Berat Tanah Kering	gram	14,4	14,5	14,2	14,2	14	14,5	14	14	14,5	14,3	14,6	14,3	14,2	14,1	14,1	14,1	14,3	14,5	14,2	14	14,1	14,1
Berat Air	gram	1,3	1,3	1,3	1,3	1,2	1,2	1,2	1,3	1,3	1,2	1,2	1,3	1,2	1,2	1,4	1,3	1,3	1,3	1,3	1,2	1,3	1,3
Kadar Air	%	9,03	8,97	9,15	9,15	8,57	8,28	8,57	9,29	8,97	8,39	8,22	9,09	8,45	8,51	9,93	9,22	9,09	8,97	9,15	8,57	9,22	9,22
Kadar Air Rata-Rata	%	8,89																					



**Dengan Perkuatan Sudut 56, B=6cm, d=2B, n=2**

**Kepadatan**

Lapisan		1			2			3			4			5			6			7			
Ring No.		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Tinggi Ring	cm	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60
Diameter Ring	cm	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30
Volume Ring	cm <sup>3</sup>	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81
Berat Ring	gr	18,40	18,50	18,40	18,40	18,50	18,40	18,40	18,50	18,40	18,40	18,50	18,40	18,40	18,50	18,40	18,40	18,50	18,40	18,40	18,50	18,40	18,40
Berat Tanah Basah + Ring	gr	33,80	33,70	33,60	34,00	33,70	33,70	33,70	33,60	33,80	34,10	33,80	33,90	33,70	33,60	33,80	33,70	34,10	33,60	33,60	34,00	33,70	33,70
Berat Tanah Basah	gr	15,40	15,20	15,20	15,60	15,20	15,30	15,30	15,10	15,40	15,70	15,30	15,50	15,30	15,10	15,40	15,30	15,60	15,20	15,20	15,50	15,30	15,30
Soil Unit Weight	gr/cm <sup>3</sup>	1,43	1,41	1,41	1,44	1,41	1,42	1,42	1,40	1,43	1,45	1,42	1,43	1,42	1,40	1,43	1,42	1,44	1,41	1,41	1,43	1,42	1,42
Berat Tanah Kering + Ring	gr	32,50	32,50	32,40	32,90	32,40	32,50	32,40	32,40	32,70	32,90	32,50	32,60	32,40	32,40	32,50	32,70	33,20	32,60	32,40	32,60	32,50	32,50
Berat Tanah Kering	gr	14,10	14,00	14,00	14,50	13,90	14,10	14,00	13,90	14,30	14,50	14,00	14,20	14,00	13,90	14,10	14,30	14,70	14,20	14,00	14,10	14,10	14,10
Berat Air	gr	1,30	1,20	1,20	1,10	1,30	1,20	1,30	1,20	1,10	1,20	1,30	1,30	1,30	1,20	1,30	1,00	0,90	1,00	1,20	1,40	1,20	1,20
Kadar Air	%	9,22	8,57	8,57	7,59	9,35	8,51	9,29	8,63	7,69	8,28	9,29	9,15	9,29	8,63	9,22	6,99	6,12	7,04	8,57	9,93	8,51	8,51
Dry Density of Soil (γd)	gr/cm <sup>3</sup>	1,305	1,295	1,295	1,342	1,286	1,305	1,295	1,286	1,323	1,342	1,295	1,314	1,295	1,286	1,305	1,323	1,360	1,314	1,295	1,305	1,305	1,305
γd Rata-Rata	gr/cm <sup>3</sup>	1,308																					

**Kadar Air**

Lapisan		1			2			3			4			5			6			7			
Nomor Cawan		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Berat Cawan + Tanah Basah	gram	21,20	21,20	21,00	19,90	21,30	19,60	21,40	20,90	21,40	20,30	19,60	21,20	21,30	20,90	21,10	21,00	19,90	21,00	20,90	19,80	20,90	20,90
Berat Cawan + Tanah Kering	gram	19,90	20,00	19,80	18,80	20,00	18,40	20,10	19,70	20,30	19,10	18,30	19,90	20,00	19,70	19,80	20,00	19,00	20,00	19,70	18,40	19,70	19,70
Berat Cawan	gram	5,8	6	5,8	4,3	6,1	4,3	6,1	5,8	6	4,6	4,3	5,7	6	5,8	5,7	5,7	4,3	5,8	5,7	4,3	5,6	5,6
Berat Tanah Kering	gram	14,1	14	14	14,5	13,9	14,1	14	13,9	14,3	14,5	14	14,2	14	13,9	14,1	14,3	14,7	14,2	14	14,1	14,1	14,1
Berat Air	gram	1,3	1,2	1,2	1,1	1,3	1,2	1,3	1,2	1,1	1,2	1,3	1,3	1,3	1,2	1,3	1	0,9	1	1,2	1,4	1,2	1,2
Kadar Air	%	9,22	8,57	8,57	7,59	9,35	8,51	9,29	8,63	7,69	8,28	9,29	9,15	9,29	8,63	9,22	6,99	6,12	7,04	8,57	9,93	8,51	8,51
Kadar Air Rata-Rata	%	8,50																					

Dengan Perkuatan Sudut 56, B=8cm, d=2B, n=2

Kepadatan

Lapisan		1			2			3			4			5			6			7			
Ring No.		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Tinggi Ring	cm	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60	2,60
Diameter Ring	cm	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30	2,30
Volume Ring	cm <sup>3</sup>	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81	10,81
Berat Ring	gr	18,40	18,50	18,40	18,40	18,50	18,40	18,40	18,50	18,40	18,40	18,50	18,40	18,40	18,50	18,40	18,40	18,50	18,40	18,40	18,50	18,40	18,40
Berat Tanah Basah + Ring	gr	34,00	33,80	33,60	33,90	34,10	33,50	33,70	33,90	33,80	33,60	34,20	33,70	33,70	33,90	33,50	33,60	33,40	33,60	33,80	33,80	34,00	34,00
Berat Tanah Basah	gr	15,60	15,30	15,20	15,50	15,60	15,10	15,30	15,40	15,40	15,20	15,70	15,30	15,30	15,40	15,10	15,20	14,90	15,20	15,40	15,30	15,60	15,60
Soil Unit Weight	gr/cm <sup>3</sup>	1,44	1,42	1,41	1,43	1,44	1,40	1,42	1,43	1,43	1,41	1,45	1,42	1,42	1,43	1,40	1,41	1,38	1,41	1,43	1,42	1,44	1,44
Berat Tanah Kering + Ring	gr	32,60	32,70	32,40	32,60	32,80	32,30	32,40	32,60	32,50	32,40	32,90	32,40	32,40	32,70	32,20	32,50	32,40	32,30	32,50	32,60	32,70	32,70
Berat Tanah Kering	gr	14,20	14,20	14,00	14,20	14,30	13,90	14,00	14,10	14,10	14,00	14,40	14,00	14,00	14,20	13,80	14,10	13,90	13,90	14,10	14,10	14,30	14,30
Berat Air	gr	1,40	1,10	1,20	1,30	1,30	1,20	1,30	1,30	1,30	1,20	1,30	1,30	1,30	1,20	1,30	1,10	1,00	1,30	1,30	1,20	1,30	1,30
Kadar Air	%	9,86	7,75	8,57	9,15	9,09	8,63	9,29	9,22	9,22	8,57	9,03	9,29	9,29	8,45	9,42	7,80	7,19	9,35	9,22	8,51	9,09	9,09
Dry Density of Soil (γd)	gr/cm <sup>3</sup>	1,314	1,314	1,295	1,314	1,323	1,286	1,295	1,305	1,305	1,295	1,333	1,295	1,295	1,314	1,277	1,305	1,286	1,286	1,305	1,305	1,323	1,323
γd Rata-Rata	gr/cm <sup>3</sup>	1,303																					

Kadar Air

Lapisan		1			2			3			4			5			6			7			
Nomor Cawan		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Berat Cawan + Tanah Basah	gram	19,90	19,50	19,50	21,20	21,10	21,10	21,00	21,20	21,00	19,60	21,40	21,20	21,20	19,70	21,00	19,60	19,10	21,00	21,20	19,60	21,30	21,30
Berat Cawan + Tanah Kering	gram	18,50	18,40	18,30	19,90	19,80	19,90	19,70	19,90	19,70	18,40	20,10	19,90	19,90	18,50	19,70	18,50	18,10	19,70	19,90	18,40	20,00	20,00
Berat Cawan	gram	4,3	4,2	4,3	5,7	5,5	6	5,7	5,8	5,6	4,4	5,7	5,9	5,9	4,3	5,9	4,4	4,2	5,8	5,8	4,3	5,7	5,7
Berat Tanah Kering	gram	14,2	14,2	14	14,2	14,3	13,9	14	14,1	14,1	14	14,4	14	14	14,2	13,8	14,1	13,9	13,9	14,1	14,1	14,3	14,3
Berat Air	gram	1,4	1,1	1,2	1,3	1,3	1,2	1,3	1,3	1,3	1,2	1,3	1,3	1,3	1,2	1,3	1,1	1	1,3	1,3	1,2	1,3	1,3
Kadar Air	%	9,86	7,75	8,57	9,15	9,09	8,63	9,29	9,22	9,22	8,57	9,03	9,29	9,29	8,45	9,42	7,80	7,19	9,35	9,22	8,51	9,09	9,09
Kadar Air Rata-Rata	%	8,86																					

## Lampiran 7

## Perhitungan Daya Dukung Lereng Tanpa Perkuatan dengan Metode Analitik

## A. Metode Gempeline

$$\gamma = 1.315 \text{ gr/cm}^3$$

$$\phi = \text{sudut geser dalam tanah} = 33,007^\circ$$

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

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

1. Data ( $\beta=46^\circ$ ,  $B=4\text{cm}$ ,  $d=2B$ )

$$\beta = \text{sudut kemiringan lereng} = 46^\circ$$

$$B = \text{lebar Pondasi} = 4 \text{ cm} = 1,5748 \text{ inchi}$$

$$b = \text{Jarak pondasi ke puncak lereng} = 8 \text{ cm} = 3,1496 \text{ inchi}$$

$$f_\phi = 10^{(0,1159\phi - 2,386)} = 10^{(0,1159 \cdot 33,007 - 2,386)} = 27,5113$$

$$f_B = 10^{(0,34 - 0,2 \log B)} = 10^{(0,34 - 0,2 \log 1,5748)} = 1,9978$$

$$f_{D/B} = 1 + 0,65 (D/B) = 1 + 0,65 (0/1,5748) = 1$$

$$f_{B/L} = 1 - 0,27 (B/L) = 1 - 0,27 (1,5748/\sim) = 1$$

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

$$\begin{aligned} f_{\beta, b/B} &= 1 - 0,8 [1 - (1 - \tan \beta)^2] \{2/[2 + (b/B)^2 \tan \beta]\} \\ &= 1 - 0,8 [1 - (1 - \tan 46^\circ)^2] \{2/[2 + (3,1496/1,5748)^2 \tan 46^\circ]\} \\ &= 0,7398 \end{aligned}$$

$$\begin{aligned} f_{\beta, b/D, D/B} &= 1 + 0,6 (B/L) [1 - (1 - \tan \beta)^2] \{2/[2 + (b/B)^2 \tan \beta]\} \\ &= 1 + 0,6 (1,5748/\sim) [1 - (1 - \tan 46^\circ)^2] \{2/[2 + (3,1496/1,5748)^2 \tan 46^\circ]\} \\ &= 1 \end{aligned}$$

$$\begin{aligned} f_{\beta, b/B, B/L} &= 1 + 0,33 (D/B) \tan \beta \{2/[2 + (b/B)^2 \tan \beta]\} \\ &= 1 + 0,33 (0/1,5748) \tan 46^\circ \{2/[2 + (3,1496/1,5748)^2 \tan 46^\circ]\} \\ &= 1 \end{aligned}$$

$$N_{\gamma q} = 27,5113 \times 1,9978 \times 1 \times 1 \times 1 \times 0,7398 \times 1 \times 1 = 40,535$$

$$q_u = 0,5 \times \gamma \times B \times N_{\gamma q} = 0,5 \times 1,315 \times 4 \times 40,535 = 106,607 \text{ gr/cm}^2$$

$$q_u = 10,6607 \text{ kN/m}^2$$

## 2. Data ( $\beta=46^\circ$ , $B=6\text{cm}$ , $d=2B$ )

$$\gamma = 1.3828 \text{ gr/cm}^3$$

$$\phi = \text{sudut geser dalam tanah} = 33,007^\circ$$

$$\beta = \text{sudut kemiringan lereng} = 46^\circ$$

$$B = \text{lebar Pondasi} = 6 \text{ cm} = 2,3622 \text{ inchi}$$

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

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

$$b = \text{Jarak pondasi ke puncak lereng} = 12 \text{ cm} = 4,7244 \text{ inchi}$$

$$f_\phi = 10^{(0,1159\phi-2,386)} = 10^{(0,1159,33,007-2,386)} = 27,5113$$

$$f_B = 10^{(0,34-0,2 \log B)} = 10^{(0,34-0,2 \log 2,3622)} = 1,8422$$

$$f_{D/B} = 1 + 0,65 (D/B) = 1 + 0,65 (0/2,3622) = 1$$

$$f_{B/L} = 1 - 0,27 (B/L) = 1 - 0,27 (2,3622/\sim) = 1$$

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

$$\begin{aligned} f_{\beta, b/B} &= 1 - 0,8 [1 - (1 - \tan \beta)^2] \{2/[2 + (b/B)^2 \tan \beta]\} \\ &= 1 - 0,8 [1 - (1 - \tan 46^\circ)^2] \{2/[2 + (4,7244/2,3622)^2 \tan 46^\circ]\} \\ &= 0,7398 \end{aligned}$$

$$\begin{aligned} f_{\beta, b/D, D/B} &= 1 + 0,6 (B/L) [1 - (1 - \tan 51^\circ)^2] \{2/[2 + (b/B)^2 \tan 51^\circ]\} \\ &= 1 + 0,6 (2,3622/\sim) [1 - (1 - \tan 46^\circ)^2] \{2/[2 + (4,7244/2,3622)^2 \tan 46^\circ]\} \\ &= 1 \end{aligned}$$

$$\begin{aligned} f_{\beta, b/B, B/L} &= 1 + 0,33 (D/B) \tan \beta \{2/[2 + (b/B)^2 \tan \beta]\} \\ &= 1 + 0,33 (0/2,3622) \tan 46^\circ \{2/[2 + (4,7244/2,3622)^2 \tan 46^\circ]\} \\ &= 1 \end{aligned}$$

$$N_{\gamma q} = 27,5113 \times 1,8422 \times 1 \times 1 \times 1 \times 0,7398 \times 1 \times 1 = 37,3164$$

$$q_u = 0,5 \times \gamma \times B \times N_{\gamma q} = 0,5 \times 1,315 \times 4 \times 37,3164 = 147,21 \text{ gr/cm}^2$$

$$q_u = 14,721 \text{ kN/m}^2$$

## 3. Data ( $\beta=46^\circ$ , $B=8\text{cm}$ , $d=2B$ )

$$\beta = \text{sudut kemiringan lereng} = 46^\circ$$

$$B = \text{lebar Pondasi} = 8 \text{ cm} = 3,1496 \text{ inchi}$$

$$b = \text{Jarak pondasi ke puncak lereng} = 16 \text{ cm} = 6,2992 \text{ inchi}$$

$$f_\phi = 10^{(0,1159\phi-2,386)} = 10^{(0,1159,33,007-2,386)} = 27,5113$$

$$f_B = 10^{(0,34-0,2 \log B)} = 10^{(0,34-0,2 \log 3,1496)} = 1,7392$$

$$\begin{aligned}
 f_{D/B} &= 1 + 0,65 (D/B) = 1 + 0,65 (0/3,1496) = 1 \\
 f_{B/L} &= 1 - 0,27 (B/L) = 1 - 0,27 (3,1496/\sim) = 1 \\
 f_{D/B, B/L} &= 1 + 0,39 (D/L) = 1 + 0,39 (0/\sim) = 1 \\
 f_{\beta, b/B} &= 1 - 0,8 [1 - (1 - \tan \beta)^2] \{2/[2 + (b/B)^2 \tan \beta]\} \\
 &= 1 - 0,8 [1 - (1 - \tan 46^\circ)^2] \{2/[2 + (6,2992/3,1496)^2 \tan 46^\circ]\} \\
 &= 0,7398 \\
 f_{\beta, b/D, D/B} &= 1 + 0,6 (B/L) [1 - (1 - \tan \beta)^2] \{2/[2 + (b/B)^2 \tan \beta]\} \\
 &= 1 + 0,6 (3,1496/\sim) [1 - (1 - \tan 46^\circ)^2] \{2/[2 + (6,2992/3,1496)^2 \tan 46^\circ]\} \\
 &= 1 \\
 f_{\beta, b/B, B/L} &= 1 + 0,33 (D/B) \tan \beta \{2/[2 + (b/B)^2 \tan \beta]\} \\
 &= 1 + 0,33 (0/3,1496) \tan 46^\circ \{2/[2 + (6,2992/3,1496)^2 \tan 46^\circ]\} \\
 &= 1 \\
 N_{\gamma q} &= 27,5113 \times 1,7392 \times 1 \times 1 \times 1 \times 0,7398 \times 1 \times 1 = 35,1704 \\
 q_u &= 0,5 \times \gamma \times B \times N_{\gamma q} = 0,5 \times 1,315 \times 4 \times 35,1704 = 184,99 \text{ gr/cm}^2 \\
 q_u &= 18,499 \text{ kN/m}^2
 \end{aligned}$$

#### 4. Data ( $\beta=51^\circ$ , $B=4\text{cm}$ , $d=2B$ )

$$\begin{aligned}
 \beta &= \text{sudut kemiringan lereng} = 51^\circ \\
 B &= \text{lebar Pondasi} = 4 \text{ cm} = 1,5748 \text{ inchi} \\
 b &= \text{Jarak pondasi ke puncak lereng} = 8 \text{ cm} = 3,1496 \text{ inchi} \\
 f_\phi &= 10^{(0,1159\phi - 2,386)} = 10^{(0,1159 \cdot 33,007 - 2,386)} = 27,5113 \\
 f_B &= 10^{(0,34 - 0,2 \log B)} = 10^{(0,34 - 0,2 \log 1,5748)} = 1,9978 \\
 f_{D/B} &= 1 + 0,65 (D/B) = 1 + 0,65 (0/1,5748) = 1 \\
 f_{B/L} &= 1 - 0,27 (B/L) = 1 - 0,27 (1,5748/\sim) = 1 \\
 f_{D/B, B/L} &= 1 + 0,39 (D/L) = 1 + 0,39 (0/\sim) = 1 \\
 f_{\beta, b/B} &= 1 - 0,8 [1 - (1 - \tan \beta)^2] \{2/[2 + (b/B)^2 \tan \beta]\} \\
 &= 1 - 0,8 [1 - (1 - \tan 51^\circ)^2] \{2/[2 + (3,1496/1,5748)^2 \tan 51^\circ]\} \\
 &= 0,7822 \\
 f_{\beta, b/D, D/B} &= 1 + 0,6 (B/L) [1 - (1 - \tan \beta)^2] \{2/[2 + (b/B)^2 \tan \beta]\} \\
 &= 1 + 0,6 (1,5748/\sim) [1 - (1 - \tan 51^\circ)^2] \{2/[2 + (3,1496/1,5748)^2 \tan 51^\circ]\} \\
 &= 1
 \end{aligned}$$

$$\begin{aligned}
 &= 1 \\
 f_{\beta, b/B, B/L} &= 1 + 0,33 (D/B) \tan \beta \{2/[2 + (b/B)^2 \tan \beta]\} \\
 &= 1 + 0,33 (0/1,5748) \tan 51^\circ \{2/[2 + (3,1496/1,5748)^2 \tan 51^\circ]\} \\
 &= 1 \\
 N_{\gamma q} &= 27,5113 \times 1,9978 \times 1 \times 1 \times 1 \times 0,7822 \times 1 \times 1 = 42,7992 \\
 q_u &= 0,5 \times \gamma \times B \times N_{\gamma q} = 0,5 \times 1,315 \times 6 \times 42,7992 = 112,56 \text{ gr/cm}^2 \\
 q_u &= 11,256 \text{ kN/m}^2
 \end{aligned}$$

### 5. Data ( $\beta=51^\circ$ , $B=6\text{cm}$ , $d=2B$ )

$$\begin{aligned}
 \beta &= \text{sudut kemiringan lereng} = 51^\circ \\
 B &= \text{lebar Pondasi} = 6 \text{ cm} = 2,3622 \text{ inchi} \\
 b &= \text{Jarak pondasi ke puncak lereng} = 12 \text{ cm} = 4,7244 \text{ inchi} \\
 f_\phi &= 10^{(0,1159\phi - 2,386)} = 10^{(0,1159 \cdot 33,007 - 2,386)} = 27,5113 \\
 f_B &= 10^{(0,34 - 0,2 \log B)} = 10^{(0,34 - 0,2 \log 2,3622)} = 1,8422 \\
 f_{D/B} &= 1 + 0,65 (D/B) = 1 + 0,65 (0/2,3622) = 1 \\
 f_{B/L} &= 1 - 0,27 (B/L) = 1 - 0,27 (2,3622/\sim) = 1 \\
 f_{D/B, B/L} &= 1 + 0,39 (D/L) = 1 + 0,39 (0/\sim) = 1 \\
 f_{\beta, b/B} &= 1 - 0,8 [1 - (1 - \tan \beta)^2] \{2/[2 + (b/B)^2 \tan \beta]\} \\
 &= 1 - 0,8 [1 - (1 - \tan 51^\circ)^2] \{2/[2 + (4,7244/2,3622)^2 \tan 51^\circ]\} \\
 &= 0,7822 \\
 f_{\beta, b/D, D/B} &= 1 + 0,6 (B/L) [1 - (1 - \tan \beta)^2] \{2/[2 + (b/B)^2 \tan \beta]\} \\
 &= 1 + 0,6 (2,3622/\sim) [1 - (1 - \tan 51^\circ)^2] \{2/[2 + (4,7244/2,3622)^2 \tan 51^\circ]\} \\
 &= 1 \\
 f_{\beta, b/B, B/L} &= 1 + 0,33 (D/B) \tan \beta \{2/[2 + (b/B)^2 \tan \beta]\} \\
 &= 1 + 0,33 (0/2,3622) \tan 51^\circ \{2/[2 + (4,7244/2,3622)^2 \tan 51^\circ]\} \\
 &= 1 \\
 N_{\gamma q} &= 27,5113 \times 1,8422 \times 1 \times 1 \times 1 \times 0,7822 \times 1 \times 1 = 39,3756 \\
 q_u &= 0,5 \times \gamma \times B \times N_{\gamma q} = 0,5 \times 1,315 \times 6 \times 39,3756 = 163,345 \text{ gr/cm}^2 \\
 q_u &= 16,3345 \text{ kN/m}^2
 \end{aligned}$$

## 6. Data ( $\beta=51^\circ$ , $B=8\text{cm}$ , $d=2B$ )

$$\begin{aligned}\beta &= \text{sudut kemiringan lereng} = 51^\circ \\ B &= \text{lebar Pondasi} = 8 \text{ cm} = 3,1496 \text{ inchi} \\ b &= \text{Jarak pondasi ke puncak lereng} = 16 \text{ cm} = 6,2992 \text{ inchi} \\ f_\phi &= 10^{(0,1159\phi-2,386)} = 10^{(0,1159 \cdot 33,007 - 2,386)} = 27,5113 \\ f_B &= 10^{(0,34-0,2 \log B)} = 10^{(0,34-0,2 \log 3,1496)} = 1,7392 \\ f_{D/B} &= 1 + 0,65 (D/B) = 1 + 0,65 (0/3,1496) = 1 \\ f_{B/L} &= 1 - 0,27 (B/L) = 1 - 0,27 (3,1496/\sim) = 1 \\ f_{D/B, B/L} &= 1 + 0,39 (D/L) = 1 + 0,39 (0/\sim) = 1 \\ f_{\beta, b/B} &= 1 - 0,8 [1 - (1 - \tan \beta)^2] \{2/[2 + (b/B)^2 \tan \beta]\} \\ &= 1 - 0,8 [1 - (1 - \tan 51^\circ)^2] \{2/[2 + (6,2992/3,1496)^2 \tan 51^\circ]\} \\ &= 0,7822 \\ f_{\beta, b/D, D/B} &= 1 + 0,6 (B/L) [1 - (1 - \tan \beta)^2] \{2/[2 + (b/B)^2 \tan \beta]\} \\ &= 1 + 0,6 (3,1496/\sim) [1 - (1 - \tan 51^\circ)^2] \{2/[2 + (6,2992/3,1496)^2 \tan 51^\circ]\} \\ &= 1 \\ f_{\beta, b/B, B/L} &= 1 + 0,33 (D/B) \tan \beta \{2/[2 + (b/B)^2 \tan \beta]\} \\ &= 1 + 0,33 (0/3,1496) \tan 51^\circ \{2/[2 + (6,2992/3,1496)^2 \tan 51^\circ]\} \\ &= 1 \\ N_{\gamma q} &= 27,5113 \times 1,7392 \times 1 \times 1 \times 1 \times 0,7822 \times 1 \times 1 = 37,0877 \\ q_u &= 0,5 \times \gamma \times B \times N_{\gamma q} = 0,5 \times 1,315 \times 6 \times 37,0877 = 195,08 \text{ gr/cm}^2 \\ q_u &= 19,508 \text{ kN/m}^2\end{aligned}$$

## 7. Data ( $\beta=56^\circ$ , $B=4\text{cm}$ , $d=2B$ )

$$\begin{aligned}\beta &= \text{sudut kemiringan lereng} = 56^\circ \\ B &= \text{lebar Pondasi} = 4 \text{ cm} = 1,5748 \text{ inchi} \\ b &= \text{Jarak pondasi ke puncak lereng} = 8 \text{ cm} = 3,1496 \text{ inchi} \\ f_\phi &= 10^{(0,1159\phi-2,386)} = 10^{(0,1159 \cdot 33,007 - 2,386)} = 27,5113 \\ f_B &= 10^{(0,34-0,2 \log B)} = 10^{(0,34-0,2 \log 1,5748)} = 1,9978 \\ f_{D/B} &= 1 + 0,65 (D/B) = 1 + 0,65 (0/1,5748) = 1 \\ f_{B/L} &= 1 - 0,27 (B/L) = 1 - 0,27 (1,5748/\sim) = 1 \\ f_{D/B, B/L} &= 1 + 0,39 (D/L) = 1 + 0,39 (0/\sim) = 1 \\ f_{\beta, b/B} &= 1 - 0,8 [1 - (1 - \tan \beta)^2] \{2/[2 + (b/B)^2 \tan \beta]\}\end{aligned}$$

$$= 1 - 0,8 [1 - (1 - \tan 56^\circ)^2] \{2/[2 + (3,1496/1,5748)^2 \tan 56^\circ]\}$$

$$= 0,8452$$

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

$$= 1 + 0,6 (1,5478/\sim) [1 - (1 - \tan 56^\circ)^2] \{2/[2 + (3,1496/1,5748)^2 \tan 56^\circ]\}$$

$$= 1$$

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

$$= 1 + 0,33 (0/1,5748) \tan 56^\circ \{2/[2 + (3,1496/1,5748)^2 \tan 56^\circ]\}$$

$$= 1$$

$$N_{\gamma q} = 27,5113 \times 1,9978 \times 1 \times 1 \times 1 \times 0,8452 \times 1 \times 1 = 46,1613$$

$$q_u = 0,5 \times \gamma \times B \times N_{\gamma q} = 0,5 \times 1,315 \times 8 \times 46,1613 = 121,40 \text{ gr/cm}$$

$$q_u = 12,140 \text{ kN/m}^2$$

### 8. Data ( $\beta=56^\circ$ , $B=6\text{cm}$ , $d=2B$ )

$$\beta = \text{sudut kemiringan lereng} = 56^\circ$$

$$B = \text{lebar Pondasi} = 6 \text{ cm} = 2,3622 \text{ inchi}$$

$$b = \text{Jarak pondasi ke puncak lereng} = 12 \text{ cm} = 4,7244 \text{ inchi}$$

$$f_\phi = 10^{(0,1159\phi - 2,386)} = 10^{(0,1159 \cdot 33,007 - 2,386)} = 27,5113$$

$$f_B = 10^{(0,34 - 0,2 \log B)} = 10^{(0,34 - 0,2 \log 2,3622)} = 1,8422$$

$$f_{D/B} = 1 + 0,65 (D/B) = 1 + 0,65 (0/2,3622) = 1$$

$$f_{B/L} = 1 - 0,27 (B/L) = 1 - 0,27 (2,3622/\sim) = 1$$

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

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

$$= 1 - 0,8 [1 - (1 - \tan 56^\circ)^2] \{2/[2 + (2,3622/4,7244)^2 \tan 56^\circ]\}$$

$$= 0,8452$$

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

$$= 1 + 0,6 (2,3622/\sim) [1 - (1 - \tan 56^\circ)^2] \{2/[2 + (4,7244/2,3622)^2 \tan 56^\circ]\}$$

$$= 1$$

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

$$= 1 + 0,33 (0/2,3622) \tan 56^\circ \{2/[2 + (4,7244/2,3622)^2 \tan 56^\circ]\}$$

$$= 1$$



$$N_{\gamma q} = 27,5113 \times 1,8422 \times 1 \times 1 \times 1 \times 0,8452 \times 1 \times 1 = 42,4283$$

$$q_u = 0,5 \times \gamma \times B \times N_{\gamma q} = 0,5 \times 1,315 \times 8 \times 42,4283 = 167,38 \text{ gr/cm}^2$$

$$q_u = 16,738 \text{ kN/m}^2$$

### 9. Data ( $\beta=56^\circ$ , $B=8\text{cm}$ , $d=2B$ )

$$\beta = \text{sudut kemiringan lereng} = 56^\circ$$

$$B = \text{lebar Pondasi} = 8 \text{ cm} = 3,1496 \text{ inchi}$$

$$b = \text{Jarak pondasi ke puncak lereng} = 16 \text{ cm} = 6,2992 \text{ inchi}$$

$$f_\phi = 10^{(0,1159\phi - 2,386)} = 10^{(0,1159 \cdot 33,007 - 2,386)} = 27,5113$$

$$f_B = 10^{(0,34 - 0,2 \log B)} = 10^{(0,34 - 0,2 \log 3,1496)} = 1,7392$$

$$f_{D/B} = 1 + 0,65 (D/B) = 1 + 0,65 (0/3,1496) = 1$$

$$f_{B/L} = 1 - 0,27 (B/L) = 1 - 0,27 (3,1496/\sim) = 1$$

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

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

$$= 1 - 0,8 [1 - (1 - \tan 56^\circ)^2] \{2/[2 + (6,2992/3,1496)^2 \tan 56^\circ]\}$$

$$= 0,8452$$

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

$$= 1 + 0,6 (3,1496/\sim) [1 - (1 - \tan 56^\circ)^2] \{2/[2 + (6,2992/3,1496)^2 \tan 56^\circ]\}$$

$$= 1$$

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

$$= 1 + 0,33 (0/3,1496) \tan 56^\circ \{2/[2 + (6,2992/3,1496)^2 \tan 56^\circ]\}$$

$$= 1$$

$$N_{\gamma q} = 27,5113 \times 1,7392 \times 1 \times 1 \times 1 \times 0,8452 \times 1 \times 1 = 39,9253$$

$$q_u = 0,5 \times \gamma \times B \times N_{\gamma q} = 0,5 \times 1,315 \times 8 \times 39,9253 = 210,01 \text{ gr/}$$

$$q_u = 21,001 \text{ kN/m}^2$$

## B. Metode Hansen

$$\gamma = 1.315 \text{ gr/cm}^3$$

$$\phi = \text{sudut geser dalam tanah} = 33,007^\circ$$

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

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

### 1. Data ( $\beta=46^\circ$ , $B=4\text{cm}$ , $d=2B$ )

$$\beta = \text{sudut kemiringan lereng} = 46^\circ$$

$$B = \text{lebar Pondasi} = 4 \text{ cm}$$

$$b = \text{Jarak pondasi ke puncak lereng} = 8 \text{ cm}$$

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

$$N_q = e^{\pi \tan \phi} \cdot \tan^2 \left( 45 + \frac{\phi}{2} \right) = e^{\pi \tan 33,007} \cdot \tan^2 \left( 45 + \frac{33,007}{2} \right) = 26,114$$

$$N_c = (N_q - 1) \cot \phi = (26,114 - 1) \cot 33,007 = 38,662$$

$$N_\gamma = 1,5 (N_q - 1) \tan \phi = 1,5 (26,114 - 1) \tan 33,007 = 24,470$$

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

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

$$q_u = (0 \times 38,662) + (0 \times 1,315 \times 26,114) + \left( 1,315 \times \frac{4}{2} \times 24,470 \right)$$

$$q_u = 64,36 \text{ gr/cm}^2 = 6,436 \text{ kN/m}^2$$

Untuk Tanah Lereng :

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

$$N_q = e^{\pi \tan \phi} \cdot \tan^2 \left( 45 + \frac{\phi}{2} \right) = e^{\pi \tan 33,007} \cdot \tan^2 \left( 45 + \frac{33,007}{2} \right) = 26,114$$

$$N_c = (N_q - 1) \cot \phi = (26,114 - 1) \cot 33,007 = 38,662$$

$$N_\gamma = 1,5 (N_q - 1) \tan \phi = 1,5 (26,114 - 1) \tan 33,007 = 24,470$$

dimana;

$$d_c = d_q = d_\gamma = 1 \quad (\text{faktor kedalaman})$$

$$i_c = i_q = i_\gamma = 1 \quad (\text{faktor kemiringan beban})$$

$$s_c = s_q = s_\gamma = 1 \quad (\text{faktor bentuk pondasi})$$

$$b_c = b_q = b_\gamma = 1 \quad (\text{faktor kemiringan dasar pondasi})$$

untuk  $d=0$  cm, maka;

$$g_q = g_\gamma = (1 - \tan \beta)^2 = (1 - \tan 46^\circ)^2 = 0,991$$

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

$$q_u = 1,315 \times \frac{4}{2} \times 24,470 \times 0,991 = 63,778 \text{ gr/cm}^2 = 6,3778 \text{ kN/m}^2$$

Dengan menggunakan interpolasi, dihitung daya dukung pada kondisi  $d = 2B$  (8cm) :

$$d = 0 \rightarrow q_u = 6,3778 \text{ kN/m}^2$$

$$d = 4B \text{ (16 cm)} \rightarrow q_u = 6,436 \text{ kN/m}^2$$

$$\frac{6,436 - 6,3778}{16 - 0} = \frac{q_u - 6,3778}{8 - 0}$$

$$0,4656 = 16 q_u - 102,0448$$

$$q_u = 6,4069 \text{ kN/m}^2$$

## 2. Data ( $\beta=46^\circ$ , $B=6\text{cm}$ , $d=2B$ )

$\beta$  = sudut kemiringan lereng =  $46^\circ$

$B$  = lebar Pondasi = 6 cm

$b$  = Jarak pondasi ke puncak lereng = 12 cm

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

$$N_q = e^{\pi \tan \phi} \cdot \tan^2 \left( 45 + \frac{\phi}{2} \right) = e^{\pi \tan 33,007} \cdot \tan^2 \left( 45 + \frac{33,007}{2} \right) = 26,114$$

$$N_c = (N_q - 1) \cot \phi = (26,114 - 1) \cot 33,007 = 38,662$$

$$N_\gamma = 1,5 (N_q - 1) \tan \phi = 1,5 (26,114 - 1) \tan 33,007 = 24,470$$

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

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

$$q_u = (0 \times 38,662) + (0 \times 1,315 \times 26,114) + \left( 1,315 \times \frac{6}{2} \times 24,470 \right)$$

$$q_u = 96,534 \text{ gr/cm}^2 = 9,6534 \text{ kN/m}^2$$

Untuk Tanah Lereng :

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

$$Nq = e^{\pi \tan \phi} \cdot \tan^2 \left(45 + \frac{\phi}{2}\right) = e^{\pi \tan 33,007} \cdot \tan^2 \left(45 + \frac{33,007}{2}\right) = 26,114$$

$$Nc = (Nq - 1) \cot \phi = (26,114 - 1) \cot 33,007 = 38,662$$

$$N\gamma = 1,5 (Nq - 1) \tan \phi = 1,5 (26,114 - 1) \tan 33,007 = 24,470$$

dimana;

$$d_c = d_q = d_\gamma = 1 \quad (\text{faktor kedalaman})$$

$$i_c = i_q = i_\gamma = 1 \quad (\text{faktor kemiringan beban})$$

$$s_c = s_q = s_\gamma = 1 \quad (\text{faktor bentuk pondasi})$$

$$b_c = b_q = b_\gamma = 1 \quad (\text{faktor kemiringan dasar pondasi})$$

untuk  $d=0$  cm, maka;

$$g_q = g_\gamma = (1 - \tan \beta)^2 = (1 - \tan 46^\circ)^2 = 0,991$$

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

$$q_u = 1,315 \times \frac{6}{2} \times 24,470 \times 0,991 = 95,665 \text{ gr/cm}^2 = 9,5665 \text{ kN/m}^2$$

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

$$d = 0 \rightarrow q_u = 9,5665 \text{ kN/m}^2$$

$$d = 4B \text{ (24 cm)} \rightarrow q_u = 9,6534 \text{ kN/m}^2$$

$$\frac{9,6534 - 9,5665}{24 - 0} = \frac{q_u - 9,5665}{12 - 0}$$

$$1,0428 = 24 q_u - 229,596$$

$$q_u = 9,60995 \text{ kN/m}^2$$

### 3. Data ( $\beta=46^\circ$ , $B=8\text{cm}$ , $d=2B$ )

$\beta$  = sudut kemiringan lereng =  $46^\circ$

$B$  = lebar Pondasi = 8 cm

$b$  = Jarak pondasi ke puncak lereng = 16 cm

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

$$Nq = e^{\pi \tan \phi} \cdot \tan^2 \left(45 + \frac{\phi}{2}\right) = e^{\pi \tan 33,007} \cdot \tan^2 \left(45 + \frac{33,007}{2}\right) = 26,114$$

$$Nc = (Nq - 1) \cot \phi = (26,114 - 1) \cot 33,007 = 38,662$$

$$N\gamma = 1,5 (Nq - 1) \tan \phi = 1,5 (26,114 - 1) \tan 33,007 = 24,470$$

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

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

$$q_u = (0 \times 38,662) + (0 \times 1,315 \times 26,114) + (1,315 \times \frac{8}{2} \times 24,470)$$

$$q_u = 128,712 \text{ gr/cm}^2 = 12,8712 \text{ kN/m}^2$$

Untuk Tanah Lereng :

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

$$N_q = e^{\pi \tan \phi} \cdot \tan^2 \left(45 + \frac{\phi}{2}\right) = e^{\pi \tan 33,007} \cdot \tan^2 \left(45 + \frac{33,007}{2}\right) = 26,114$$

$$N_c = (N_q - 1) \cot \phi = (26,114 - 1) \cot 33,007 = 38,662$$

$$N_\gamma = 1,5 (N_q - 1) \tan \phi = 1,5 (26,114 - 1) \tan 33,007 = 24,470$$

dimana;

$$d_c = d_q = d_\gamma = 1 \text{ (faktor kedalaman)}$$

$$i_c = i_q = i_\gamma = 1 \text{ (faktor kemiringan beban)}$$

$$s_c = s_q = s_\gamma = 1 \text{ (faktor bentuk pondasi)}$$

$$b_c = b_q = b_\gamma = 1 \text{ (faktor kemiringan dasar pondasi)}$$

untuk  $d=0$  cm, maka;

$$g_q = g_\gamma = (1 - \tan \beta)^2 = (1 - \tan 46^\circ)^2 = 0,991$$

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

$$q_u = 1,315 \times \frac{8}{2} \times 24,470 \times 0,991 = 127,554 \text{ gr/cm}^2 = 12,7554 \text{ kN/m}^2$$

Dengan menggunakan interpolasi, dihitung daya dukung pada kondisi  $d = 2B$  (16 cm) :

$$d = 0 \rightarrow q_u = 12,7554 \text{ kN/m}^2$$

$$d = 4B (32 \text{ cm}) \rightarrow q_u = 12,8712 \text{ kN/m}^2$$

$$\frac{12,8712 - 12,7554}{32 - 0} = \frac{q_u - 12,7554}{16 - 0}$$

$$1,8528 = 32 q_u - 408,1728$$

$$q_u = 12,8133 \text{ kN/m}^2$$

#### 4. Data ( $\beta=51^\circ$ , $B=4\text{cm}$ , $d=2B$ )

- $\beta$  = sudut kemiringan lereng =  $51^\circ$   
 $B$  = lebar Pondasi = 4 cm  
 $b$  = Jarak pondasi ke puncak lereng = 8 cm

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

$$N_q = e^{\pi \tan \phi} \cdot \tan^2 \left( 45 + \frac{\phi}{2} \right) = e^{\pi \tan 33,007} \cdot \tan^2 \left( 45 + \frac{33,007}{2} \right) = 26,114$$

$$N_c = (N_q - 1) \cot \phi = (26,114 - 1) \cot 33,007 = 38,662$$

$$N_\gamma = 1,5 (N_q - 1) \tan \phi = 1,5 (26,114 - 1) \tan 33,007 = 24,470$$

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

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

$$q_u = (0 \times 38,662) + (0 \times 1,315 \times 26,114) + \left( 1,315 \times \frac{4}{2} \times 24,470 \right)$$

$$q_u = 64,35 \text{ gr/cm}^2 = 6,435 \text{ kN/m}^2$$

Untuk Tanah Lereng :

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

$$N_q = e^{\pi \tan \phi} \cdot \tan^2 \left( 45 + \frac{\phi}{2} \right) = e^{\pi \tan 33,007} \cdot \tan^2 \left( 45 + \frac{33,007}{2} \right) = 26,114$$

$$N_c = (N_q - 1) \cot \phi = (26,114 - 1) \cot 33,007 = 38,662$$

$$N_\gamma = 1,5 (N_q - 1) \tan \phi = 1,5 (26,114 - 1) \tan 33,007 = 24,470$$

dimana;

$$d_c = d_q = d_\gamma = 1 \text{ (faktor kedalaman)}$$

$$i_c = i_q = i_\gamma = 1 \text{ (faktor kemiringan beban)}$$

$$s_c = s_q = s_\gamma = 1 \text{ (faktor bentuk pondasi)}$$

$$b_c = b_q = b_\gamma = 1 \text{ (faktor kemiringan dasar pondasi)}$$

untuk  $d=0$  cm, maka;

$$g_q = g_\gamma = (1 - \tan \beta)^2 = (1 - \tan 51^\circ)^2 = 0,99$$

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

$$q_u = 1,315 \times \frac{4}{2} \times 24,470 \times 0,99 = 63,712 \text{ gr/cm}^2 = 6,3712 \text{ kN/m}^2$$

Dengan menggunakan interpolasi, dihitung daya dukung pada kondisi  $d = 2B$

(16 cm) :

$$d = 0 \rightarrow q_u = 6,3712 \text{ kN/m}^2$$

$$d = 4B \text{ (16 cm)} \rightarrow q_u = 6,435 \text{ kN/m}^2$$

$$\frac{6,435 - 6,3712}{16 - 0} = \frac{q_u - 6,3712}{8 - 0}$$

$$0,5104 = 16 q_u - 101,9392$$

$$q_u = 6,4031 \text{ kN/m}^2$$

### 5. Data ( $\beta=51^\circ$ , $B=6\text{cm}$ , $d=2B$ )

$\beta$  = sudut kemiringan lereng =  $51^\circ$

$B$  = lebar Pondasi = 6 cm

$b$  = Jarak pondasi ke puncak lereng = 12 cm

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

$$N_q = e^{\pi \tan \phi} \cdot \tan^2 \left( 45 + \frac{\phi}{2} \right) = e^{\pi \tan 33,007} \cdot \tan^2 \left( 45 + \frac{33,007}{2} \right) = 26,114$$

$$N_c = (N_q - 1) \cot \phi = (26,114 - 1) \cot 33,007 = 38,662$$

$$N_\gamma = 1,5 (N_q - 1) \tan \phi = 1,5 (26,114 - 1) \tan 33,007 = 24,470$$

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

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

$$q_u = (0 \times 38,662) + (0 \times 1,315 \times 26,114) + \left( 1,315 \times \frac{6}{2} \times 24,470 \right)$$

$$q_u = 96,53 \text{ gr/cm}^2 = 9,653 \text{ kN/m}^2$$

Untuk Tanah Lereng :

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

$$N_q = e^{\pi \tan \phi} \cdot \tan^2 \left( 45 + \frac{\phi}{2} \right) = e^{\pi \tan 33,007} \cdot \tan^2 \left( 45 + \frac{33,007}{2} \right) = 26,114$$

$$N_c = (N_q - 1) \cot \phi = (26,114 - 1) \cot 33,007 = 38,662$$

$$N_\gamma = 1,5 (N_q - 1) \tan \phi = 1,5 (26,114 - 1) \tan 33,007 = 24,470$$

dimana;

$$d_c = d_q = d_\gamma = 1 \text{ (faktor kedalaman)}$$

$$i_c = i_q = i_\gamma = 1 \text{ (faktor kemiringan beban)}$$

$$s_c = s_q = s_\gamma = 1 \text{ (faktor bentuk pondasi)}$$

$$b_c = b_q = b_\gamma = 1 \text{ (faktor kemiringan dasar pondasi)}$$

untuk  $d=0$  cm, maka;

$$g_q = g_\gamma = (1 - \tan \beta)^2 = (1 - \tan 51^\circ)^2 = 0,99$$

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

$$q_u = 1,315 \times \frac{6}{2} \times 24,470 \times 0,99 = 95,569 \text{ gr/cm}^2 = 9,5569 \text{ kN/m}^2$$

Dengan menggunakan interpolasi, dihitung daya dukung pada kondisi  $d = 2B$

(12 cm) :

$$d = 0 \rightarrow q_u = 9,5569 \text{ kN/m}^2$$

$$d = 4B (24 \text{ cm}) \rightarrow q_u = 9,653 \text{ kN/m}^2$$

$$\frac{9,653 - 9,5569}{24 - 0} = \frac{q_u - 9,5569}{12 - 0}$$

$$1,1532 = 24 q_u - 229,3656$$

$$q_u = 9,605 \text{ kN/m}^2$$

#### 6. Data ( $\beta=51^\circ$ , $B=8\text{cm}$ , $d=2B$ )

$\beta$  = sudut kemiringan lereng =  $51^\circ$

$B$  = lebar Pondasi = 8 cm

$b$  = Jarak pondasi ke puncak lereng = 16 cm

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

$$N_q = e^{\pi \tan \phi} \cdot \tan^2 \left( 45 + \frac{\phi}{2} \right) = e^{\pi \tan 33,007} \cdot \tan^2 \left( 45 + \frac{33,007}{2} \right) = 26,114$$

$$N_c = (N_q - 1) \cot \phi = (26,114 - 1) \cot 33,007 = 38,662$$

$$N_\gamma = 1,5 (N_q - 1) \tan \phi = 1,5 (26,114 - 1) \tan 33,007 = 24,470$$

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

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

$$q_u = (0 \times 38,662) + (0 \times 1,315 \times 26,114) + (1,315 \times \frac{8}{2} \times 24,470)$$

$$q_u = 128,712 \text{ gr/cm}^2 = 12,8712 \text{ kN/m}^2$$



Untuk Tanah Lereng :

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

$$N_q = e^{\pi \tan \phi} \cdot \tan^2 \left( 45 + \frac{\phi}{2} \right) = e^{\pi \tan 33,007} \cdot \tan^2 \left( 45 + \frac{33,007}{2} \right) = 26,114$$

$$N_c = (N_q - 1) \cot \phi = (26,114 - 1) \cot 33,007 = 38,662$$

$$N_\gamma = 1,5 (N_q - 1) \tan \phi = 1,5 (26,114 - 1) \tan 33,007 = 24,470$$

dimana;

$$d_c = d_q = d_\gamma = 1 \text{ (faktor kedalaman)}$$

$$i_c = i_q = i_\gamma = 1 \text{ (faktor kemiringan beban)}$$

$$s_c = s_q = s_\gamma = 1 \text{ (faktor bentuk pondasi)}$$

$$b_c = b_q = b_\gamma = 1 \text{ (faktor kemiringan dasar pondasi)}$$

untuk  $d=0$  cm, maka;

$$g_q = g_\gamma = (1 - \tan \beta)^2 = (1 - \tan 56^\circ)^2 = 0,99$$

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

$$q_u = 1,315 \times \frac{8}{2} \times 24,470 \times 0,99 = 127,425 \text{ gr/cm}^2 = 12,7425 \text{ kN/m}^2$$

Dengan menggunakan interpolasi, dihitung daya dukung pada kondisi  $d = 2B$  (16 cm) :

$$d = 0 \rightarrow q_u = 12,7425 \text{ kN/m}^2$$

$$d = 4B (32 \text{ cm}) \rightarrow q_u = 12,8712 \text{ kN/m}^2$$

$$\frac{12,8712 - 12,7425}{32 - 0} = \frac{q_u - 12,7425}{16 - 0}$$

$$2,0592 = 32 q_u - 407,76$$

$$q_u = 12,807 \text{ kN/m}^2$$

**7. Data ( $\beta=56^\circ$ ,  $B=4\text{cm}$ ,  $d=2B$ )**

$$\beta = \text{sudut kemiringan lereng} = 56^\circ$$

$$B = \text{lebar Pondasi} = 4 \text{ cm}$$

$$b = \text{Jarak pondasi ke puncak lereng} = 8 \text{ cm}$$

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

$$N_q = e^{\pi \tan \phi} \cdot \tan^2 \left( 45 + \frac{\phi}{2} \right) = e^{\pi \tan 33,007} \cdot \tan^2 \left( 45 + \frac{33,007}{2} \right) = 26,114$$

$$N_c = (N_q - 1) \cot \phi = (26,114 - 1) \cot 33,007 = 38,662$$

$$N_\gamma = 1,5 (N_q - 1) \tan \phi = 1,5 (26,114 - 1) \tan 33,007 = 24,470$$

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

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

$$q_u = (0 \times 38,662) + (0 \times 1,315 \times 26,114) + (1,315 \times \frac{4}{2} \times 24,470)$$

$$q_u = 64,356 \text{ gr/cm}^2 = 6,4356 \text{ kN/m}^2$$

Untuk Tanah Lereng :

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

$$N_q = e^{\pi \tan \phi} \cdot \tan^2 (45 + \frac{\phi}{2}) = e^{\pi \tan 33,007} \cdot \tan^2 (45 + \frac{33,007}{2}) = 26,114$$

$$N_c = (N_q - 1) \cot \phi = (26,114 - 1) \cot 33,007 = 38,662$$

$$N_\gamma = 1,5 (N_q - 1) \tan \phi = 1,5 (26,114 - 1) \tan 33,007 = 24,470$$

dimana;

$$d_c = d_q = d_\gamma = 1 \text{ (faktor kedalaman)}$$

$$i_c = i_q = i_\gamma = 1 \text{ (faktor kemiringan beban)}$$

$$s_c = s_q = s_\gamma = 1 \text{ (faktor bentuk pondasi)}$$

$$b_c = b_q = b_\gamma = 1 \text{ (faktor kemiringan dasar pondasi)}$$

untuk  $d=0$  cm, maka;

$$g_q = g_\gamma = (1 - \tan \beta)^2 = (1 - \tan 56^\circ)^2 = 0,989$$

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

$$q_u = 1,315 \times \frac{4}{2} \times 24,470 \times 0,989 = 63,648 \text{ gr/cm}^2 = 6,3648 \text{ kN/m}^2$$

Dengan menggunakan interpolasi, dihitung daya dukung pada kondisi  $d = B$  (8 cm) :

$$d = 0 \rightarrow q_u = 6,3648 \text{ kN/m}^2$$

$$d = 4B (16 \text{ cm}) \rightarrow q_u = 6,4356 \text{ kN/m}^2$$

$$\frac{6,4356 - 6,3648}{16 - 0} = \frac{q_u - 6,3648}{8 - 0}$$

$$0,5664 = 16 q_u - 101,8368$$

$$q_u = 6,4002 \text{ kN/m}^2$$

### 8. Data ( $\beta=56^\circ$ , $B=6\text{cm}$ , $d=2B$ )

- $\beta$  = sudut kemiringan lereng =  $56^\circ$   
 $B$  = lebar Pondasi = 6 cm  
 $b$  = Jarak pondasi ke puncak lereng = 12 cm

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

$$N_q = e^{\pi \tan \phi} \cdot \tan^2 \left( 45 + \frac{\phi}{2} \right) = e^{\pi \tan 33,007} \cdot \tan^2 \left( 45 + \frac{33,007}{2} \right) = 26,114$$

$$N_c = (N_q - 1) \cot \phi = (26,114 - 1) \cot 33,007 = 38,662$$

$$N_\gamma = 1,5 (N_q - 1) \tan \phi = 1,5 (26,114 - 1) \tan 33,007 = 24,470$$

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

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

$$q_u = (0 \times 38,662) + (0 \times 1,315 \times 26,114) + \left( 1,315 \times \frac{6}{2} \times 24,470 \right)$$

$$q_u = 96,534 \text{ gr/cm}^2 = 9,6534 \text{ kN/m}^2$$

Untuk Tanah Lereng :

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

$$N_q = e^{\pi \tan \phi} \cdot \tan^2 \left( 45 + \frac{\phi}{2} \right) = e^{\pi \tan 33,007} \cdot \tan^2 \left( 45 + \frac{33,007}{2} \right) = 26,114$$

$$N_c = (N_q - 1) \cot \phi = (26,114 - 1) \cot 33,007 = 38,662$$

$$N_\gamma = 1,5 (N_q - 1) \tan \phi = 1,5 (26,114 - 1) \tan 33,007 = 24,470$$

dimana;

$$d_c = d_q = d_\gamma = 1 \text{ (faktor kedalaman)}$$

$$i_c = i_q = i_\gamma = 1 \text{ (faktor kemiringan beban)}$$

$$s_c = s_q = s_\gamma = 1 \text{ (faktor bentuk pondasi)}$$

$$b_c = b_q = b_\gamma = 1 \text{ (faktor kemiringan dasar pondasi)}$$

untuk  $d=0$  cm, maka;

$$g_q = g_\gamma = (1 - \tan \beta)^2 = (1 - \tan 51^\circ)^2 = 0,989$$

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

$$q_u = 1,315 \times \frac{6}{2} \times 24,470 \times 0,989 = 95,472 \text{ gr/cm}^2 = 9,5472 \text{ kN/m}^2$$

Dengan menggunakan interpolasi, dihitung daya dukung pada kondisi  $d = B$  (8 cm) :

$$d = 0 \rightarrow q_u = 9,5472 \text{ kN/m}^2$$

$$d = 4B (24 \text{ cm}) \rightarrow q_u = 9,6534 \text{ kN/m}^2$$

$$\frac{9,6534 - 9,5472}{24 - 0} = \frac{q_u - 9,5472}{12 - 0}$$

$$1,2744 = 24 q_u - 229,1328$$

$$q_u = 9,6003 \text{ kN/m}^2$$

### 9. Data ( $\beta=56^\circ$ , $B=8\text{cm}$ , $d=2B$ )

$\beta$  = sudut kemiringan lereng =  $56^\circ$

$B$  = lebar Pondasi = 8 cm

$b$  = Jarak pondasi ke puncak lereng = 16 cm

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

$$N_q = e^{\pi \tan \phi} \cdot \tan^2 \left( 45 + \frac{\phi}{2} \right) = e^{\pi \tan 33,007} \cdot \tan^2 \left( 45 + \frac{33,007}{2} \right) = 26,114$$

$$N_c = (N_q - 1) \cot \phi = (26,114 - 1) \cot 33,007 = 38,662$$

$$N_\gamma = 1,5 (N_q - 1) \tan \phi = 1,5 (26,114 - 1) \tan 33,007 = 24,470$$

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

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

$$q_u = (0 \times 38,662) + (0 \times 1,315 \times 26,114) + \left( 1,315 \times \frac{8}{2} \times 24,470 \right)$$

$$q_u = 128.712 \text{ gr/cm}^2 = 12.8712 \text{ kN/m}^2$$

Untuk Tanah Lereng :

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

$$N_q = e^{\pi \tan \phi} \cdot \tan^2 \left( 45 + \frac{\phi}{2} \right) = e^{\pi \tan 33,007} \cdot \tan^2 \left( 45 + \frac{33,007}{2} \right) = 26,114$$

$$N_c = (N_q - 1) \cot \phi = (26,114 - 1) \cot 33,007 = 38,662$$

$$N_\gamma = 1,5 (N_q - 1) \tan \phi = 1,5 (26,114 - 1) \tan 33,007 = 24,470$$

dimana;

$$d_c = d_q = d_\gamma = 1 \quad (\text{faktor kedalaman})$$

$$i_c = i_q = i_\gamma = 1 \quad (\text{faktor kemiringan beban})$$

$$s_c = s_q = s_\gamma = 1 \quad (\text{faktor bentuk pondasi})$$

$$b_c = b_q = b_\gamma = 1 \quad (\text{faktor kemiringan dasar pondasi})$$

untuk  $d=0$  cm, maka;

$$g_q = g_\gamma = (1 - \tan\beta)^2 = (1 - \tan 56^\circ)^2 = 0,989$$

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

$$q_u = 1,315 \times \frac{8}{2} \times 24,470 \times 0,989 = 127,296 \text{ gr/cm}^2 = 12,7296 \text{ kN/m}^2$$

Dengan menggunakan interpolasi, dihitung daya dukung pada kondisi  $d = B$  (8 cm) :

$$d = 0 \rightarrow q_u = 12,7296 \text{ kN/m}^2$$

$$d = 4B \text{ (32 cm)} \rightarrow q_u = 12,8712 \text{ kN/m}^2$$

$$\frac{12,8712 - 12,7296}{32 - 0} = \frac{q_u - 12,7296}{16 - 0}$$

$$2,2656 = 32 q_u - 407,3472$$

$$q_u = 12,8004 \text{ kN/m}^2$$



## Lampiran 8

### Hasil Analisis Daya Dukung Lereng dengan Metode Eksperimen

#### Lereng Tanpa Perkuatan

1.  $\alpha=46^\circ$ ,  $B=4$  cm,  $d/B=2$

Beban (kg)	LVDT	Penurunan (mm)	s/B (%)	q (kg/cm <sup>2</sup> )	q (kN/m <sup>2</sup> )
0	3626	0,000	0,000	0,000	0,000
25	3562	0,320	0,800	0,064	6,378
50	3422	1,020	2,550	0,128	12,755
75	3144	2,410	6,025	0,191	19,133
78	3028	2,990	7,475	0,199	19,898



2.  $\alpha=46^\circ$ ,  $B=6$  cm,  $d/B=2$

Beban (kg)	LVDT	Penurunan (mm)	s/B (%)	q (kg/cm <sup>2</sup> )	q (kN/m <sup>2</sup> )
0	2933	0,000	0,000	0,000	0,000
25	2902	0,155	0,258	0,043	4,252
50	2844	0,445	0,742	0,085	8,503
75	2760	0,865	1,442	0,128	12,755
100	2628	1,525	2,542	0,170	17,007
126	2325	3,040	5,067	0,214	21,429



3.  $\alpha=46^\circ$ ,  $B=8$  cm,  $d/B=2$

Beban (kg)	LVDT	Penurunan (mm)	s/B (%)	q (kg/cm <sup>2</sup> )	q (kN/m <sup>2</sup> )
0	2735	0,000	0,000	0,000	0,000
25	2726	0,045	0,056	0,032	3,189
50	2688	0,235	0,294	0,064	6,378
75	2645	0,450	0,563	0,096	9,566
100	2597	0,690	0,863	0,128	12,755
125	2516	1,095	1,369	0,159	15,944
150	2440	1,475	1,844	0,191	19,133
175	2335	2,000	2,500	0,223	22,321
200	2160	2,875	3,594	0,255	25,510
225	1762	4,865	6,081	0,287	28,699



4.  $\alpha=51^\circ$ ,  $B=4$  cm,  $d/B=2$

Beban (kg)	LVDT	Penurunan (mm)	s/B (%)	q (kg/cm <sup>2</sup> )	q (kN/m <sup>2</sup> )
0	4263	0,000	0,000	0,000	0,000
25	4173	0,450	1,125	0,064	6,378
50	4037	1,130	2,825	0,128	12,755
74,5	3751	2,560	6,400	0,190	19,005



5.  $\alpha=51^\circ$ ,  $B=6$  cm,  $d/B=2$

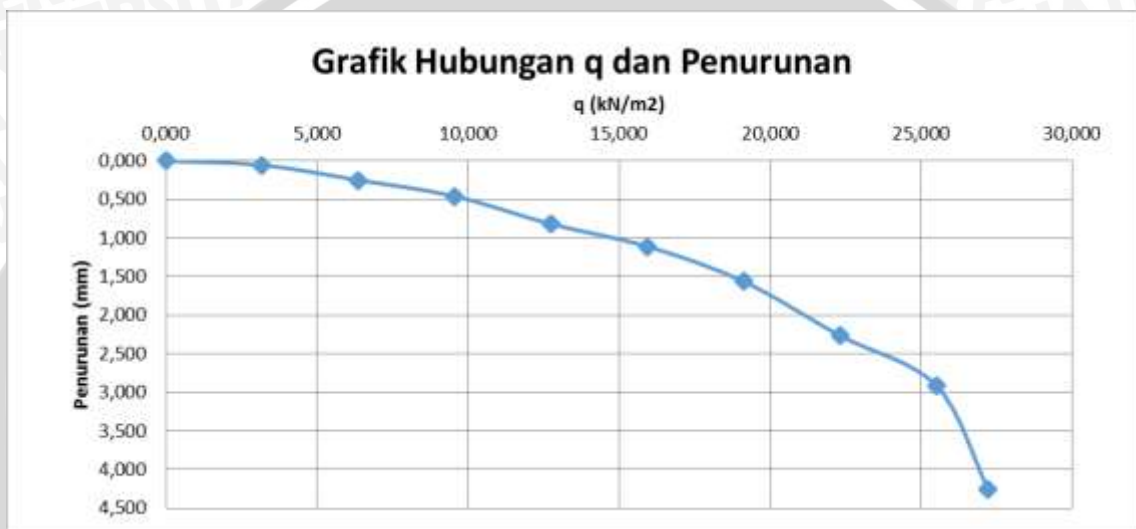
Beban (kg)	LVDT	Penurunan (mm)	s/B (%)	q (kg/cm <sup>2</sup> )	q (kN/m <sup>2</sup> )
0	2659	0,000	0,000	0,000	0,000
25	2620	0,195	0,325	0,043	4,252
50	2561	0,490	0,817	0,085	8,503
75	2456	1,015	1,692	0,128	12,755
100	2308	1,755	2,925	0,170	17,007
118	2073	2,930	4,883	0,201	20,068





6.  $\alpha=51^\circ$ ,  $B=8$  cm,  $d/B=2$

Beban (kg)	LVDT	Penurunan (mm)	s/B (%)	q (kg/cm <sup>2</sup> )	q (kN/m <sup>2</sup> )
0	3055	0,000	0,000	0,000	0,000
25	3044	0,055	0,069	0,032	3,189
50	3005	0,250	0,313	0,064	6,378
75	2963	0,460	0,575	0,096	9,566
100	2891	0,820	1,025	0,128	12,755
125	2833	1,110	1,388	0,159	15,944
150	2742	1,565	1,956	0,191	19,133
175	2602	2,265	2,831	0,223	22,321
200	2472	2,915	3,644	0,255	25,510
213,5	2203	4,260	5,325	0,272	27,232



7.  $\alpha=56^\circ$ ,  $B=4$  cm,  $d/B=2$

Beban (kg)	LVDT	Penurunan (mm)	s/B (%)	q (kg/cm <sup>2</sup> )	q (kN/m <sup>2</sup> )
0	2580	0,000	0,000	0,000	0,000
25	2453	0,635	1,588	0,064	6,378
50	2335	1,225	3,063	0,128	12,755
67	2139	2,205	5,513	0,171	17,092



8.  $\alpha=56^\circ$ ,  $B=6$  cm,  $d/B=2$

Beban (kg)	LVDT	Penurunan (mm)	s/B (%)	q (kg/cm <sup>2</sup> )	q (kN/m <sup>2</sup> )
0	3157	0,000	0,000	0,000	0,000
25	3118	0,195	0,325	0,043	4,252
50	3059	0,490	0,817	0,085	8,503
75	2954	1,015	1,692	0,128	12,755
110,5	2672	2,425	4,042	0,188	18,793



9.  $\alpha=56^\circ$ ,  $B=8$  cm,  $d/B=2$

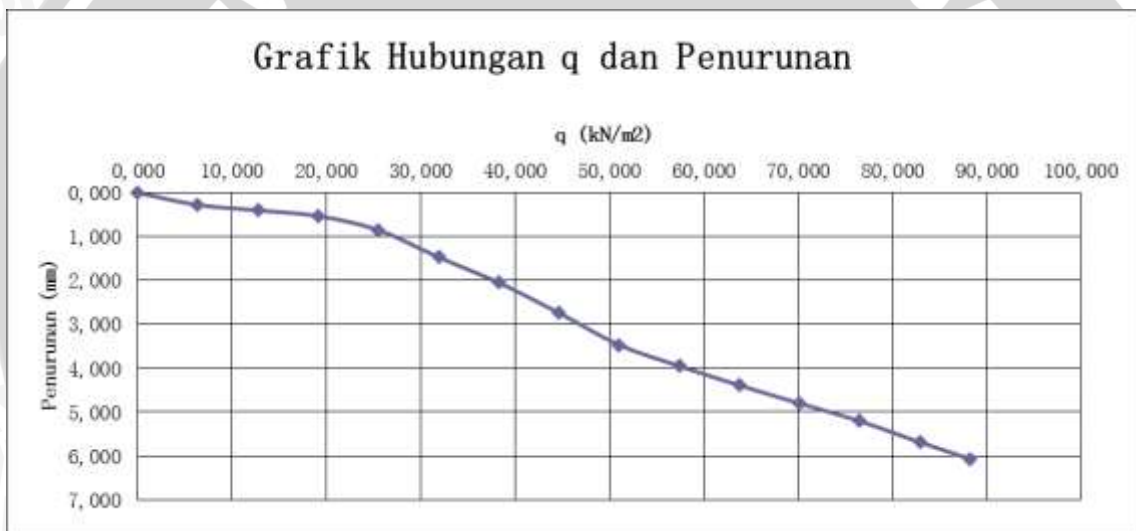
Beban (kg)	LVDT	Penurunan (mm)	s/B (%)	q (kg/cm <sup>2</sup> )	q (kN/m <sup>2</sup> )
0	2763	0,000	0,000	0,000	0,000
25	2750	0,065	0,081	0,032	3,189
50	2705	0,290	0,363	0,064	6,378
75	2656	0,535	0,669	0,096	9,566
100	2587	0,880	1,100	0,128	12,755
125	2533	1,150	1,438	0,159	15,944
150	2425	1,690	2,113	0,191	19,133
175	2245	2,590	3,238	0,223	22,321
193	2138	3,125	3,906	0,246	24,617



## Lereng Dengan Perkuatan

1.  $\alpha=46^\circ$ ,  $B=4\text{cm}$ ,  $d/B=2$ ,  $n=2$

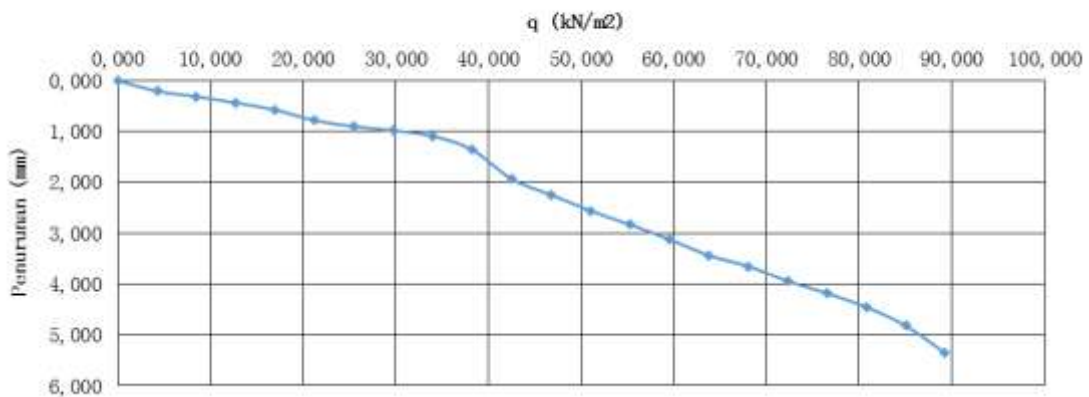
Beban (kg)	LVDT	Penurunan (mm)	s/B (%)	q (kg/cm <sup>2</sup> )	q (kN/m <sup>2</sup> )
0	1852	0,000	0,000	0,000	0,000
25	1797	0,277	0,691	0,064	6,378
50	1772	0,400	1,000	0,128	12,755
75	1746	0,530	1,325	0,191	19,133
100	1682	0,850	2,125	0,255	25,510
125	1558	1,470	3,675	0,319	31,888
150	1442	2,050	5,125	0,383	38,265
175	1304	2,740	6,850	0,446	44,643
200	1158	3,469	8,671	0,510	51,020
225	1062	3,952	9,879	0,574	57,398
250	974	4,393	10,981	0,638	63,776
275	891	4,806	12,014	0,702	70,153
300	810	5,208	13,020	0,765	76,531
325	714	5,691	14,228	0,829	82,908
346	638	6,073	15,181	0,883	88,265



2.  $\alpha=46^\circ$ ,  $B=6\text{cm}$ ,  $d/B=2$ ,  $n=2$

Beban (kg)	LVDT	Penurunan (mm)	s/B (%)	q (kg/cm <sup>2</sup> )	q (kN/m <sup>2</sup> )
0	3549	0,000	0,000	0,000	0,000
25	3507	0,210	0,350	0,043	4,252
50	3486	0,315	0,525	0,085	8,503
75	3461	0,440	0,733	0,128	12,755
100	3433	0,580	0,967	0,170	17,007
125	3392	0,785	1,308	0,213	21,259
150	3368	0,905	1,508	0,255	25,510
175	3352	0,985	1,642	0,298	29,762
200	3330	1,095	1,825	0,340	34,014
225	3276	1,365	2,275	0,383	38,265
250	3161	1,940	3,233	0,425	42,517
275	3099	2,250	3,750	0,468	46,769
300	3036	2,564	4,273	0,510	51,020
325	2982	2,836	4,727	0,553	55,272
350	2924	3,124	5,207	0,595	59,524
375	2861	3,440	5,733	0,638	63,776
400	2818	3,655	6,092	0,680	68,027
425	2760	3,945	6,575	0,723	72,279
450	2712	4,185	6,975	0,765	76,531
475	2657	4,460	7,433	0,808	80,782
500	2584	4,825	8,042	0,850	85,034
525	2477	5,360	8,933	0,893	89,286

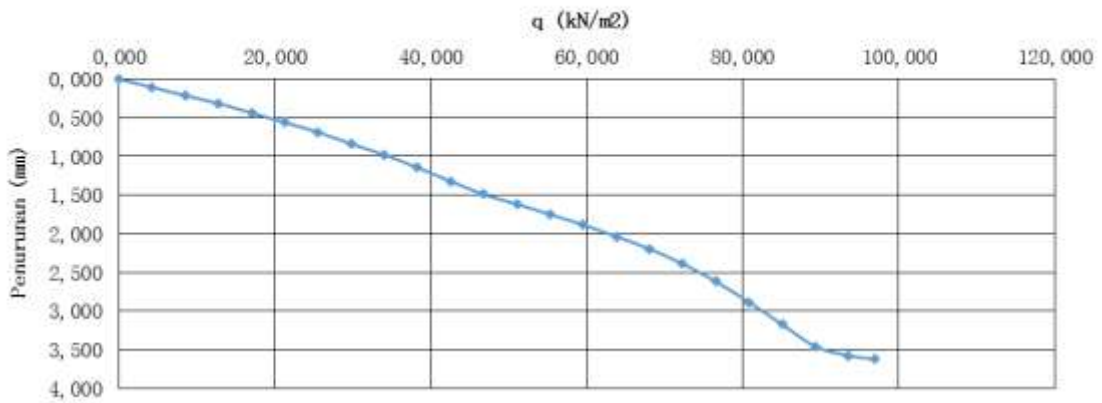
Grafik Hubungan q dan Penurunan



3.  $\alpha=46^\circ$ ,  $B=8\text{cm}$ ,  $d/B=2$ ,  $n=2$

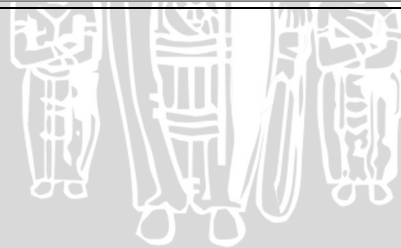
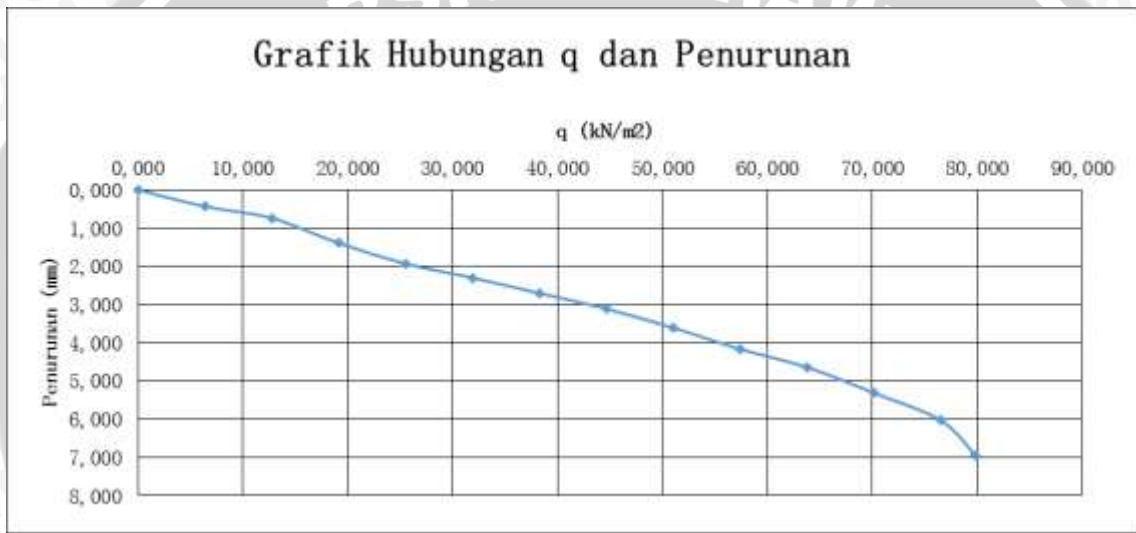
Beban (kg)	LVDT	Penurunan (mm)	s/B (%)	q (kg/cm <sup>2</sup> )	q (kN/m <sup>2</sup> )
0	4834	0,000	0,000	0,000	0,000
25	4813	0,105	0,131	0,043	4,252
50	4792	0,212	0,265	0,085	8,503
75	4771	0,315	0,394	0,128	12,755
100	4747	0,437	0,547	0,170	17,007
125	4722	0,562	0,702	0,213	21,259
150	4697	0,686	0,858	0,255	25,510
175	4666	0,838	1,048	0,298	29,762
200	4638	0,978	1,222	0,340	34,014
225	4605	1,145	1,431	0,383	38,265
250	4570	1,321	1,651	0,425	42,517
275	4536	1,491	1,863	0,468	46,769
300	4511	1,616	2,021	0,510	51,020
325	4484	1,749	2,187	0,553	55,272
350	4457	1,884	2,355	0,595	59,524
375	4427	2,036	2,545	0,638	63,776
400	4395	2,196	2,746	0,680	68,027
425	4356	2,390	2,987	0,723	72,279
450	4310	2,618	3,273	0,765	76,531
475	4257	2,886	3,607	0,808	80,782
500	4200	3,172	3,966	0,850	85,034
525	4142	3,459	4,324	0,893	89,286
550	4118	3,578	4,472	0,935	93,537
570	4110	3,622	4,527	0,969	96,939

Grafik Hubungan q dan Penurunan



4.  $\alpha=51^\circ$ ,  $B=4\text{cm}$ ,  $d/B=2$ ,  $n=2$

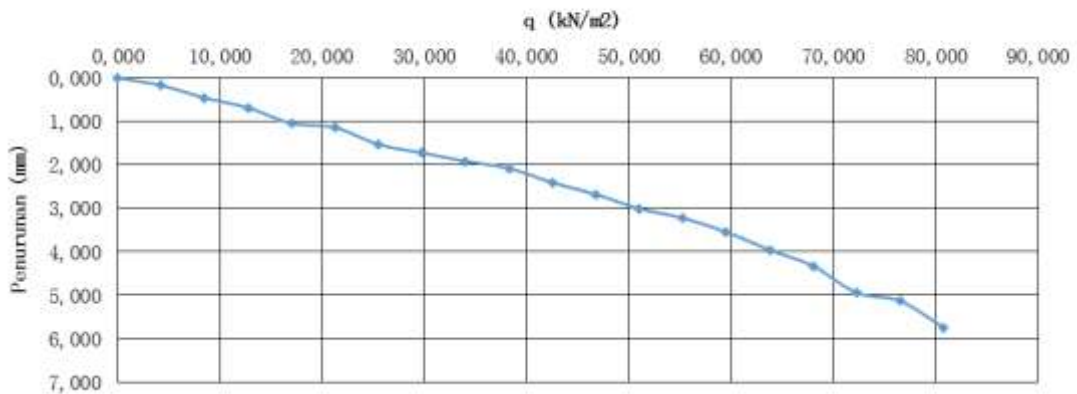
Beban (kg)	LVDT	Penurunan (mm)	s/B (%)	q (kg/cm <sup>2</sup> )	q (kN/m <sup>2</sup> )
0	2493	0,000	0,000	0,000	0,000
25	2406	0,435	1,088	0,064	6,378
50	2345	0,740	1,850	0,128	12,755
75	2214	1,395	3,488	0,191	19,133
100	2107	1,930	4,825	0,255	25,510
125	2032	2,304	5,760	0,319	31,888
150	1952	2,706	6,765	0,383	38,265
175	1870	3,114	7,785	0,446	44,643
200	1771	3,612	9,030	0,510	51,020
225	1659	4,170	10,425	0,574	57,398
250	1564	4,644	11,610	0,638	63,776
275	1430	5,316	13,290	0,702	70,153
300	1286	6,036	15,090	0,765	76,531
313	1100	6,965	17,413	0,798	79,847



5.  $\alpha=51^\circ$ ,  $B=6\text{cm}$ ,  $d/B=2$ ,  $n=2$

Beban (kg)	LVDT	Penurunan (mm)	s/B (%)	q (kg/cm <sup>2</sup> )	q (kN/m <sup>2</sup> )
0	3114	0,000	0,000	0,000	0,000
25	3080	0,170	0,283	0,043	4,252
50	3023	0,455	0,758	0,085	8,503
75	2977	0,685	1,142	0,128	12,755
100	2905	1,045	1,742	0,170	17,007
125	2886	1,140	1,900	0,213	21,259
150	2808	1,530	2,549	0,255	25,510
175	2770	1,722	2,870	0,298	29,762
200	2731	1,915	3,191	0,340	34,014
225	2698	2,080	3,467	0,383	38,265
250	2633	2,405	4,008	0,425	42,517
275	2578	2,680	4,467	0,468	46,769
300	2512	3,010	5,017	0,510	51,020
325	2469	3,225	5,375	0,553	55,272
350	2405	3,545	5,908	0,595	59,524
375	2322	3,960	6,600	0,638	63,776
400	2248	4,330	7,217	0,680	68,027
425	2125	4,946	8,243	0,723	72,279
450	2087	5,135	8,558	0,765	76,531
475	1964	5,750	9,583	0,808	80,782

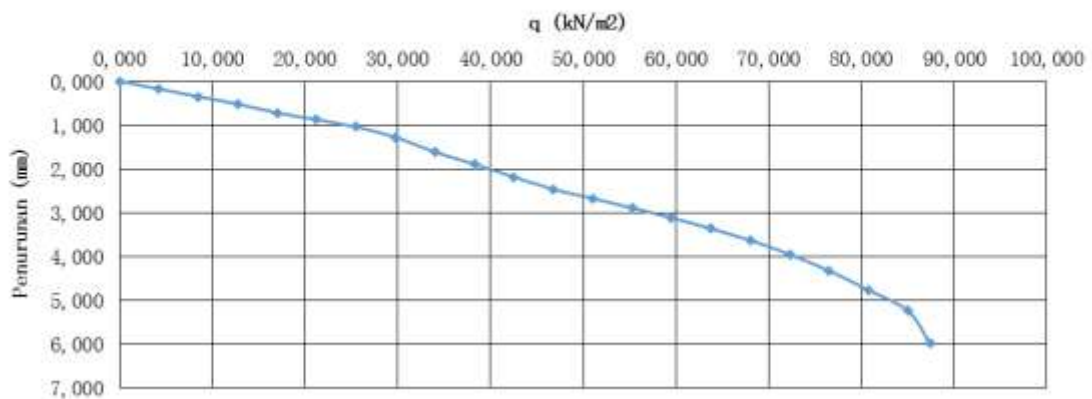
Grafik Hubungan q dan Penurunan



6.  $\alpha=51^\circ$ ,  $B=8\text{cm}$ ,  $d/B=2$ ,  $n=2$

Beban (kg)	LVDT	Penurunan (mm)	s/B (%)	q (kg/cm <sup>2</sup> )	q (kN/m <sup>2</sup> )
0	2853	0,000	0,000	0,000	0,000
25	2818	0,174	0,217	0,043	4,252
50	2783	0,351	0,439	0,085	8,503
75	2749	0,521	0,651	0,128	12,755
100	2708	0,723	0,904	0,170	17,007
125	2678	0,875	1,094	0,213	21,259
150	2644	1,043	1,304	0,255	25,510
175	2598	1,278	1,597	0,298	29,762
200	2530	1,616	2,020	0,340	34,014
225	2475	1,892	2,365	0,383	38,265
250	2416	2,183	2,729	0,425	42,517
275	2360	2,464	3,080	0,468	46,769
300	2319	2,672	3,340	0,510	51,020
325	2275	2,891	3,614	0,553	55,272
350	2230	3,115	3,893	0,595	59,524
375	2180	3,365	4,206	0,638	63,776
400	2127	3,631	4,538	0,680	68,027
425	2063	3,950	4,938	0,723	72,279
450	1988	4,327	5,409	0,765	76,531
475	1899	4,770	5,963	0,808	80,782
500	1804	5,244	6,555	0,850	85,034
514	1656	5,987	7,483	0,874	87,415

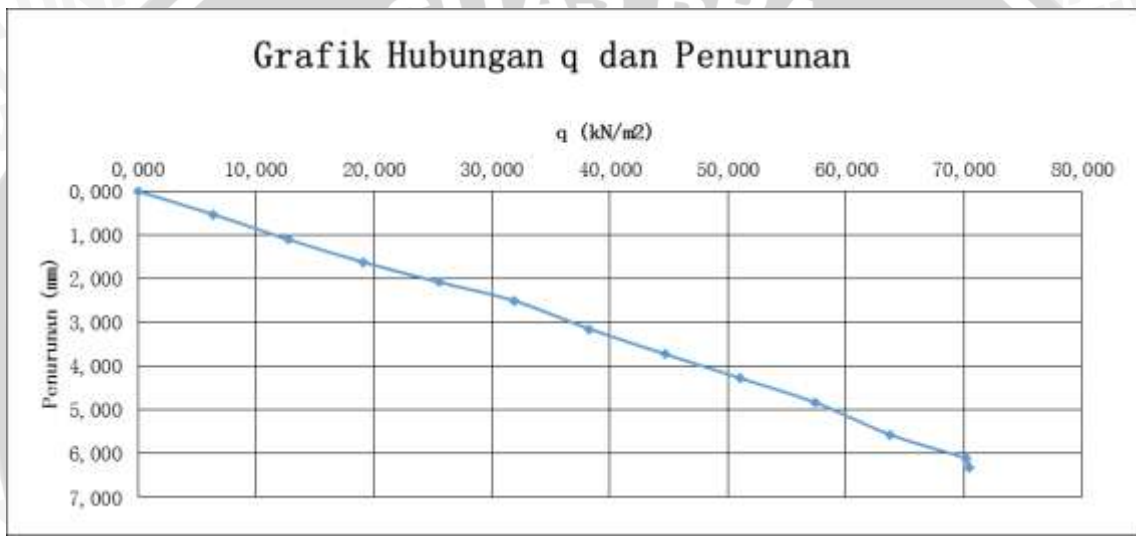
Grafik Hubungan q dan Penurunan





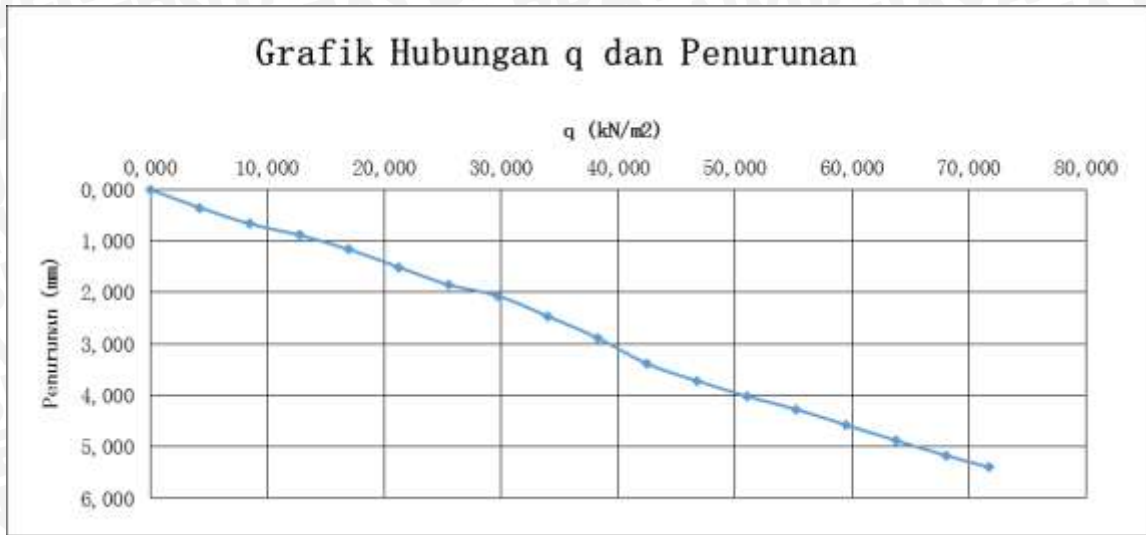
7.  $\alpha=56^\circ$ ,  $B=4\text{cm}$ ,  $d/B=2$ ,  $n=2$

Beban (kg)	LVDT	Penurunan (mm)	s/B (%)	q (kg/cm <sup>2</sup> )	q (kN/m <sup>2</sup> )
0	3328	0,000	0,000	0,000	0,000
25	3222	0,530	1,325	0,064	6,378
50	3107	1,105	2,763	0,128	12,755
75	3003	1,625	4,063	0,191	19,133
100	2912	2,080	5,200	0,255	25,510
125	2827	2,505	6,263	0,319	31,888
150	2698	3,150	7,875	0,383	38,265
175	2584	3,720	9,300	0,446	44,643
200	2473	4,275	10,688	0,510	51,020
225	2362	4,830	12,075	0,574	57,398
250	2214	5,570	13,925	0,638	63,776
275	2105	6,115	15,288	0,702	70,153
276	2063	6,325	15,813	0,704	70,408



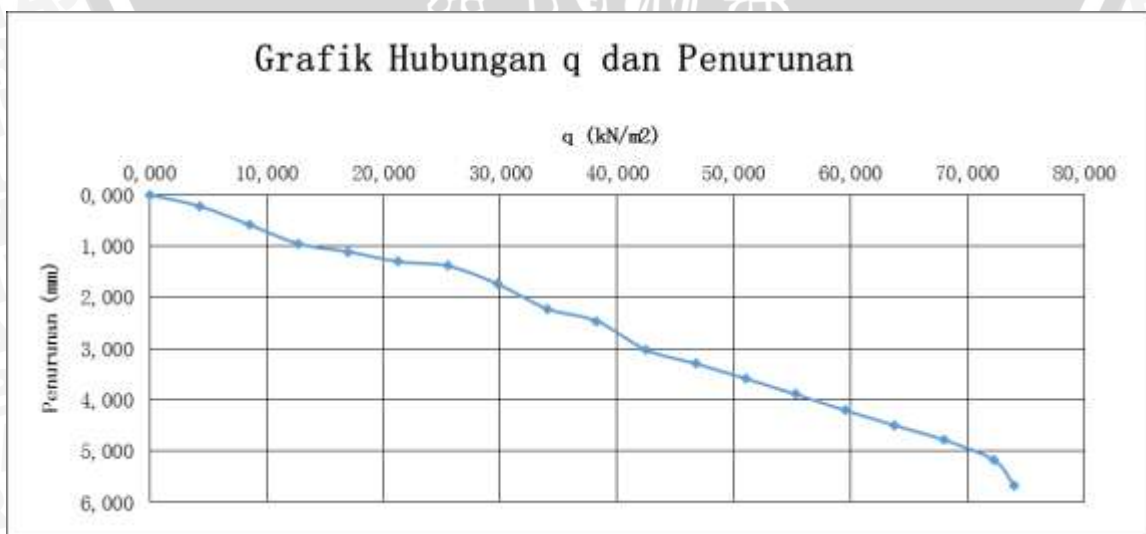
8.  $\alpha=56^\circ$ ,  $B=6\text{cm}$ ,  $d/B=2$ ,  $n=2$

Beban (kg)	LVDT	Penurunan (mm)	s/B (%)	q (kg/cm <sup>2</sup> )	q (kN/m <sup>2</sup> )
0	1976	0,000	0,000	0,000	0,000
25	1906	0,352	0,587	0,043	4,252
50	1843	0,665	1,108	0,085	8,503
75	1799	0,885	1,475	0,128	12,755
100	1743	1,165	1,942	0,170	17,007
125	1674	1,510	2,517	0,213	21,259
150	1606	1,850	3,083	0,255	25,510
175	1562	2,070	3,450	0,298	29,762
200	1483	2,464	4,107	0,340	34,014
225	1399	2,885	4,808	0,383	38,265
250	1298	3,390	5,650	0,425	42,517
275	1232	3,720	6,200	0,468	46,769
300	1172	4,020	6,700	0,510	51,020
325	1121	4,275	7,125	0,553	55,272
350	1060	4,580	7,633	0,595	59,524
375	1000	4,880	8,133	0,638	63,776
400	942	5,170	8,617	0,680	68,027
422	896	5,400	9,000	0,718	71,769



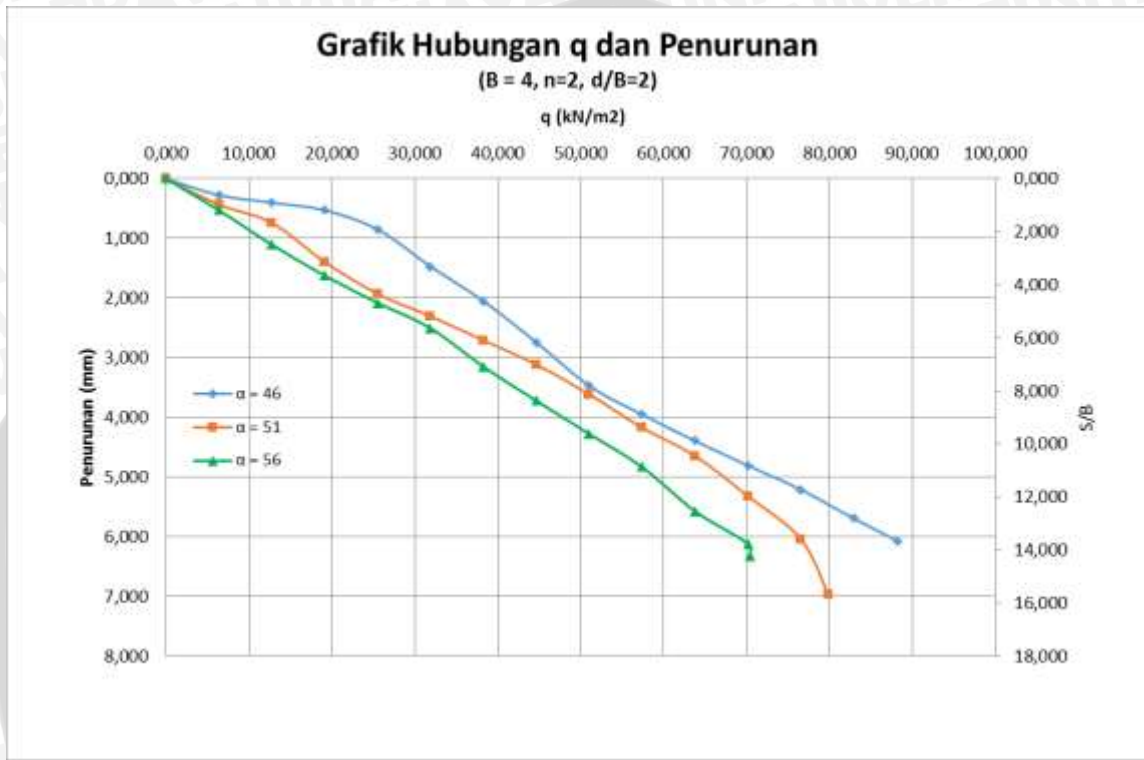
9.  $\alpha=56^\circ$ ,  $B=8\text{cm}$ ,  $d/B=2$ ,  $n=2$

Beban (kg)	LVDT	Penurunan (mm)	s/B (%)	q (kg/cm <sup>2</sup> )	q (kN/m <sup>2</sup> )
0	4428	0,000	0,000	0,000	0,000
25	4384	0,220	0,275	0,043	4,252
50	4312	0,581	0,726	0,085	8,503
75	4237	0,955	1,194	0,128	12,755
100	4206	1,109	1,386	0,170	17,007
125	4168	1,302	1,628	0,213	21,259
150	4151	1,386	1,733	0,255	25,510
175	4080	1,738	2,173	0,298	29,762
200	3984	2,222	2,778	0,340	34,014
225	3935	2,464	3,080	0,383	38,265
250	3823	3,027	3,784	0,425	42,517
275	3769	3,296	4,120	0,468	46,769
300	3711	3,586	4,483	0,510	51,020
325	3650	3,890	4,862	0,553	55,272
350	3587	4,206	5,258	0,595	59,524
375	3528	4,501	5,627	0,638	63,776
400	3471	4,787	5,984	0,680	68,027
425	3392	5,179	6,474	0,723	72,279
435	3294	5,672	7,090	0,740	73,980



## Grafik Perbandingan

B	Kemiringan Lereng	Penurunan (mm)	$q_u$ (kN/m <sup>2</sup> )
4	46	6,073	88,265
	51	6,965	79,847
	56	6,325	70,408



B	Kemiringan Lereng	Penurunan (mm)	qu (kN/m <sup>2</sup> )
6	46	5,360	89,286
	51	5,750	80,782
	56	5,400	71,769



B	Kemiringan Lereng	Penurunan (mm)	qu (kN/m <sup>2</sup> )
8	46	3,622	96,939
	51	5,987	87,415
	56	5,672	73,980



Kemiringan Lereng	B	Penurunan (mm)	$q_u$ (kN/m <sup>2</sup> )
46	4	6,073	88,265
	6	5,360	89,286
	8	3,622	96,939



Kemiringan Lereng	B	Penurunan (mm)	qu (kN/m <sup>2</sup> )
51	4	6,965	79,847
	6	5,750	80,782
	8	5,987	87,415



Kemiringan Lereng	B	Penurunan (mm)	qu (kN/m <sup>2</sup> )
56	4	6,325	70,408
	6	5,400	71,769
	8	5,672	73,980





Lampiran 9

Perhitungan Daya Dukung BCI 2% dan BCIU

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

1.  $\alpha=46^\circ$ , B=4 cm, d/B=2

s/B(%)	s/B (%)		q (kN/m <sup>2</sup> )		B <sub>1</sub>	B <sub>2</sub>	q (kN/m <sup>2</sup> )
(x)	(x <sub>0</sub> ,x <sub>1</sub> ,x <sub>2</sub> )		[f(x <sub>0</sub> ),f(x <sub>1</sub> ),f(x <sub>2</sub> )]				f(x)
2	x <sub>0</sub>	0,000	f(x <sub>0</sub> )	0,000	7,972	-1,697	11,871
	x <sub>1</sub>	0,800	f(x <sub>1</sub> )	6,378			
	x <sub>2</sub>	2,550	f(x <sub>2</sub> )	12,755			
2,550							12,755

2.  $\alpha=46^\circ$ , B=6 cm, d/B=2

s/B(%)	s/B (%)		q (kN/m <sup>2</sup> )		B <sub>1</sub>	B <sub>2</sub>	q (kN/m <sup>2</sup> )
(x)	(x <sub>0</sub> ,x <sub>1</sub> ,x <sub>2</sub> )		[f(x <sub>0</sub> ),f(x <sub>1</sub> ),f(x <sub>2</sub> )]				f(x)
2	x <sub>0</sub>	0,742	f(x <sub>0</sub> )	8,503	6,074	-1,227	15,284
	x <sub>1</sub>	1,442	f(x <sub>1</sub> )	12,755			
	x <sub>2</sub>	2,542	f(x <sub>2</sub> )	17,007			
2,542							17,007

3.  $\alpha=46^\circ$ ,  $B=8$  cm,  $d/B=2$

s/B(%)	s/B (%)		q (kN/m <sup>2</sup> )		B <sub>1</sub>	B <sub>2</sub>	q (kN/m <sup>2</sup> )
(x)	(x <sub>0</sub> ,x <sub>1</sub> ,x <sub>2</sub> )		[f(x <sub>0</sub> ),f(x <sub>1</sub> ),f(x <sub>2</sub> )]				f(x)
2	x <sub>0</sub>	1,369	f(x <sub>0</sub> )	15,944	6,713	-1,639	20,020
	x <sub>1</sub>	1,844	f(x <sub>1</sub> )	19,133			
	x <sub>2</sub>	2,500	f(x <sub>2</sub> )	22,321			
4	x <sub>0</sub>	2,500	f(x <sub>0</sub> )	22,321	2,915	-0,456	26,417
	x <sub>1</sub>	3,594	f(x <sub>1</sub> )	25,510			
	x <sub>2</sub>	6,081	f(x <sub>2</sub> )	28,699			
6,081							28,699

4.  $\alpha=51^\circ$ ,  $B=4$  cm,  $d/B=2$

s/B(%)	s/B (%)		q (kN/m <sup>2</sup> )		B <sub>1</sub>	B <sub>2</sub>	q (kN/m <sup>2</sup> )
(x)	(x <sub>0</sub> ,x <sub>1</sub> ,x <sub>2</sub> )		[f(x <sub>0</sub> ),f(x <sub>1</sub> ),f(x <sub>2</sub> )]				f(x)
2	x <sub>0</sub>	0,000	f(x <sub>0</sub> )	0,000	5,669	-0,679	10,150
	x <sub>1</sub>	1,125	f(x <sub>1</sub> )	6,378			
	x <sub>2</sub>	2,825	f(x <sub>2</sub> )	12,755			
2,825							12,755

5.  $\alpha=51^\circ$ ,  $B=6$  cm,  $d/B=2$

s/B(%)	s/B (%)		q (kN/m <sup>2</sup> )		B <sub>1</sub>	B <sub>2</sub>	q (kN/m <sup>2</sup> )
(x)	(x <sub>0</sub> ,x <sub>1</sub> ,x <sub>2</sub> )		[f(x <sub>0</sub> ),f(x <sub>1</sub> ),f(x <sub>2</sub> )]				f(x)
2	x <sub>0</sub>	0,817	f(x <sub>0</sub> )	8,503	4,859	-0,670	14,009
	x <sub>1</sub>	1,692	f(x <sub>1</sub> )	12,755			
	x <sub>2</sub>	2,925	f(x <sub>2</sub> )	17,007			
2,925							17,007

6.  $\alpha=51^\circ$ ,  $B=8$  cm,  $d/B=2$

s/B(%)	s/B (%)		q (kN/m <sup>2</sup> )		B <sub>1</sub>	B <sub>2</sub>	q (kN/m <sup>2</sup> )
(x)	(x <sub>0</sub> ,x <sub>1</sub> ,x <sub>2</sub> )		[f(x <sub>0</sub> ),f(x <sub>1</sub> ),f(x <sub>2</sub> )]				f(x)
2	x <sub>0</sub>	1,388	f(x <sub>0</sub> )	15,944	5,607	-1,359	19,342
	x <sub>1</sub>	1,956	f(x <sub>1</sub> )	19,133			
	x <sub>2</sub>	2,831	f(x <sub>2</sub> )	22,321			
4	x <sub>0</sub>	2,831	f(x <sub>0</sub> )	22,321	3,925	-1,163	26,424
	x <sub>1</sub>	3,644	f(x <sub>1</sub> )	25,510			
	x <sub>2</sub>	5,325	f(x <sub>2</sub> )	27,232			
5,325							27,232

7.  $\alpha=56^\circ$ ,  $B=4$  cm,  $d/B=2$

s/B(%)	s/B (%)		q (kN/m <sup>2</sup> )		B <sub>1</sub>	B <sub>2</sub>	q (kN/m <sup>2</sup> )
(x)	(x <sub>0</sub> ,x <sub>1</sub> ,x <sub>2</sub> )		[f(x <sub>0</sub> ),f(x <sub>1</sub> ),f(x <sub>2</sub> )]				f(x)
2	x <sub>0</sub>	0,000	f(x <sub>0</sub> )	0,000	4,017	0,100	8,117
	x <sub>1</sub>	1,588	f(x <sub>1</sub> )	6,378			
	x <sub>2</sub>	3,063	f(x <sub>2</sub> )	12,755			
3,063							12,755

8.  $\alpha=56^\circ$ ,  $B=6$  cm,  $d/B=2$

s/B(%)	s/B (%)		q (kN/m <sup>2</sup> )		B <sub>1</sub>	B <sub>2</sub>	q (kN/m <sup>2</sup> )
(x)	(x <sub>0</sub> ,x <sub>1</sub> ,x <sub>2</sub> )		[f(x <sub>0</sub> ),f(x <sub>1</sub> ),f(x <sub>2</sub> )]				f(x)
2	x <sub>0</sub>	0,817	f(x <sub>0</sub> )	8,503	4,859	-0,710	13,994
	x <sub>1</sub>	1,692	f(x <sub>1</sub> )	12,755			
	x <sub>2</sub>	4,042	f(x <sub>2</sub> )	18,793			
4,042							18,793

9.  $\alpha=56^\circ$ ,  $B=8$  cm,  $d/B=2$

s/B(%)	s/B (%)		q (kN/m <sup>2</sup> )		B <sub>1</sub>	B <sub>2</sub>	q (kN/m <sup>2</sup> )
(x)	(x <sub>0</sub> ,x <sub>1</sub> ,x <sub>2</sub> )		[f(x <sub>0</sub> ),f(x <sub>1</sub> ),f(x <sub>2</sub> )]				f(x)
2	x <sub>0</sub>	1,100	f(x <sub>0</sub> )	12,755	9,448	-4,666	18,896
	x <sub>1</sub>	1,438	f(x <sub>1</sub> )	15,944			
	x <sub>2</sub>	2,113	f(x <sub>2</sub> )	19,133			
2,113							19,133

Lereng Dengan Perkuatan Variasi Kemiringan Lereng (n=2)

B	$\alpha$	s/B(%)	s/B (%)		q (kN/m <sup>2</sup> )		B <sub>1</sub>	B <sub>2</sub>	q (kN/m <sup>2</sup> )
		(x)	(x <sub>0</sub> ,x <sub>1</sub> ,x <sub>2</sub> )		[f(x <sub>0</sub> ),f(x <sub>1</sub> ),f(x <sub>2</sub> )]				f(x)
4	46	2	x <sub>0</sub>	1,325	f(x <sub>0</sub> )	19,133	7,972	-1,641	24,652
			x <sub>1</sub>	2,125	f(x <sub>1</sub> )	25,510			
			x <sub>2</sub>	3,675	f(x <sub>2</sub> )	31,888			
	51		x <sub>0</sub>	1,088	f(x <sub>0</sub> )	6,378	8,364	-1,862	13,755
			x <sub>1</sub>	1,850	f(x <sub>1</sub> )	12,755			
			x <sub>2</sub>	3,488	f(x <sub>2</sub> )	19,133			
	56		x <sub>0</sub>	0,000	f(x <sub>0</sub> )	0,000	4,813	-0,136	9,442
			x <sub>1</sub>	1,325	f(x <sub>1</sub> )	6,378			
			x <sub>2</sub>	2,763	f(x <sub>2</sub> )	12,755			
6	46	x <sub>0</sub>	1,642	f(x <sub>0</sub> )	29,762	23,191	-21,699	36,711	
		x <sub>1</sub>	1,825	f(x <sub>1</sub> )	34,014				
		x <sub>2</sub>	2,275	f(x <sub>2</sub> )	38,265				
	51	x <sub>0</sub>	1,742	f(x <sub>0</sub> )	17,007	26,853	-25,143	23,294	
		x <sub>1</sub>	1,900	f(x <sub>1</sub> )	21,259				
		x <sub>2</sub>	2,549	f(x <sub>2</sub> )	25,510				
	56	x <sub>0</sub>	1,475	f(x <sub>0</sub> )	12,755	9,111	-1,648	17,488	
		x <sub>1</sub>	1,942	f(x <sub>1</sub> )	17,007				
		x <sub>2</sub>	2,517	f(x <sub>2</sub> )	21,259				
8	46	x <sub>0</sub>	1,651	f(x <sub>0</sub> )	42,517	20,004	19,035	50,409	
		x <sub>1</sub>	1,863	f(x <sub>1</sub> )	46,769				
		x <sub>2</sub>	2,021	f(x <sub>2</sub> )	51,020				
	51	x <sub>0</sub>	1,597	f(x <sub>0</sub> )	29,762	10,050	2,935	33,790	
		x <sub>1</sub>	2,020	f(x <sub>1</sub> )	34,014				
		x <sub>2</sub>	2,365	f(x <sub>2</sub> )	38,265				
	56	x <sub>0</sub>	1,628	f(x <sub>0</sub> )	21,259	40,686	-56,976	30,724	
		x <sub>1</sub>	1,733	f(x <sub>1</sub> )	25,510				
		x <sub>2</sub>	2,173	f(x <sub>2</sub> )	29,762				

Lereng Dengan Perkuatan Variasi Lebar Pondasi (B) (n=2)

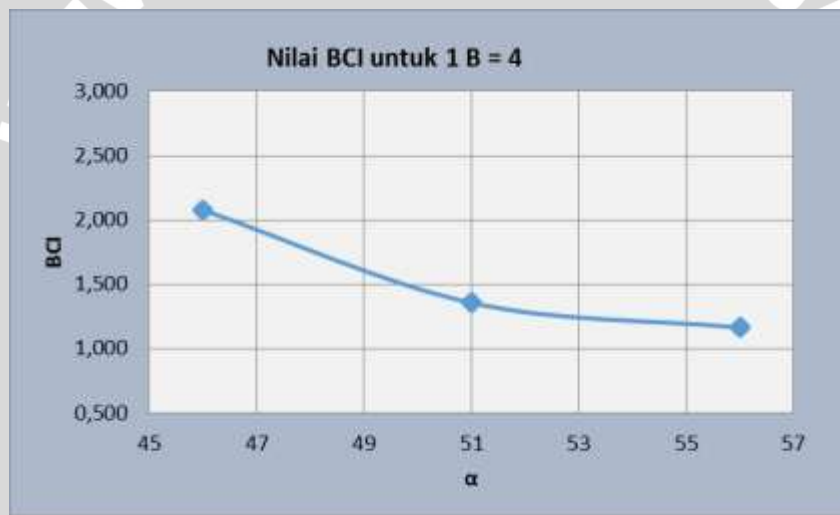
$\alpha$	B	s/B(%)	s/B (%)		q (kN/m <sup>2</sup> )		B <sub>1</sub>	B <sub>2</sub>	q (kN/m <sup>2</sup> )
		(x)	(x <sub>0</sub> ,x <sub>1</sub> ,x <sub>2</sub> )		[f(x <sub>0</sub> ),f(x <sub>1</sub> ),f(x <sub>2</sub> )]				f(x)
46	4	2	x <sub>0</sub>	1,325	f(x <sub>0</sub> )	19,133	7,972	-1,641	24,652
			x <sub>1</sub>	2,125	f(x <sub>1</sub> )	25,510			
			x <sub>2</sub>	3,675	f(x <sub>2</sub> )	31,888			
	6		x <sub>0</sub>	1,642	f(x <sub>0</sub> )	29,762	23,191	-21,699	36,711
			x <sub>1</sub>	1,825	f(x <sub>1</sub> )	34,014			
			x <sub>2</sub>	2,275	f(x <sub>2</sub> )	38,265			
	8		x <sub>0</sub>	1,651	f(x <sub>0</sub> )	42,517	20,004	19,035	50,409
			x <sub>1</sub>	1,863	f(x <sub>1</sub> )	46,769			
			x <sub>2</sub>	2,021	f(x <sub>2</sub> )	51,020			
51	4	2	x <sub>0</sub>	1,088	f(x <sub>0</sub> )	6,378	8,364	-1,862	13,755
			x <sub>1</sub>	1,850	f(x <sub>1</sub> )	12,755			
			x <sub>2</sub>	3,488	f(x <sub>2</sub> )	19,133			
	6		x <sub>0</sub>	1,742	f(x <sub>0</sub> )	17,007	26,853	-25,143	23,294
			x <sub>1</sub>	1,900	f(x <sub>1</sub> )	21,259			
			x <sub>2</sub>	2,549	f(x <sub>2</sub> )	25,510			
	8		x <sub>0</sub>	1,597	f(x <sub>0</sub> )	29,762	10,050	2,935	33,790
			x <sub>1</sub>	2,020	f(x <sub>1</sub> )	34,014			
			x <sub>2</sub>	2,365	f(x <sub>2</sub> )	38,265			
56	4	2	x <sub>0</sub>	0,000	f(x <sub>0</sub> )	0,000	4,813	-0,136	9,442
			x <sub>1</sub>	1,325	f(x <sub>1</sub> )	6,378			
			x <sub>2</sub>	2,763	f(x <sub>2</sub> )	12,755			
	6		x <sub>0</sub>	1,475	f(x <sub>0</sub> )	12,755	9,111	-1,648	17,488
			x <sub>1</sub>	1,942	f(x <sub>1</sub> )	17,007			
			x <sub>2</sub>	2,517	f(x <sub>2</sub> )	21,259			
	8		x <sub>0</sub>	1,628	f(x <sub>0</sub> )	21,259	40,686	-56,976	30,724
			x <sub>1</sub>	1,733	f(x <sub>1</sub> )	25,510			
			x <sub>2</sub>	2,173	f(x <sub>2</sub> )	29,762			

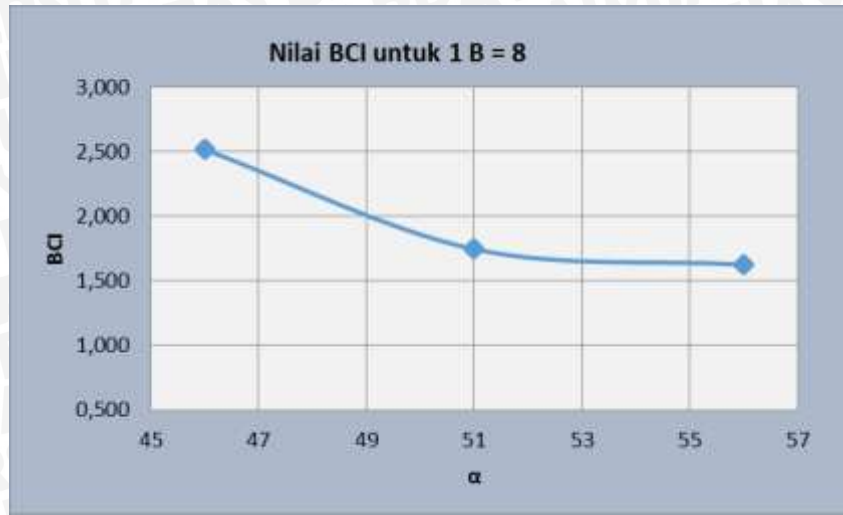
Nilai BCI 2% Variasi Kemiringan Lereng

B	KEMIRINGAN LERENG	qu (kN/m <sup>2</sup> )	qu lereng tanpa perkuatan (kN/m <sup>2</sup> )	BCI (s)
4	46	24,652	11,871	2,077
	51	13,755	10,150	1,355
	56	9,442	8,117	1,163

B	KEMIRINGAN LERENG	qu (kN/m <sup>2</sup> )	qu lereng tanpa perkuatan (kN/m <sup>2</sup> )	BCI (s)
6	46	36,711	15,284	2,402
	51	23,294	14,009	1,663
	56	17,488	13,994	1,250

B	KEMIRINGAN LERENG	qu (kN/m <sup>2</sup> )	qu lereng tanpa perkuatan (kN/m <sup>2</sup> )	BCI (s)
8	46	50,409	20,020	2,518
	51	33,790	19,342	1,747
	56	30,724	18,896	1,626





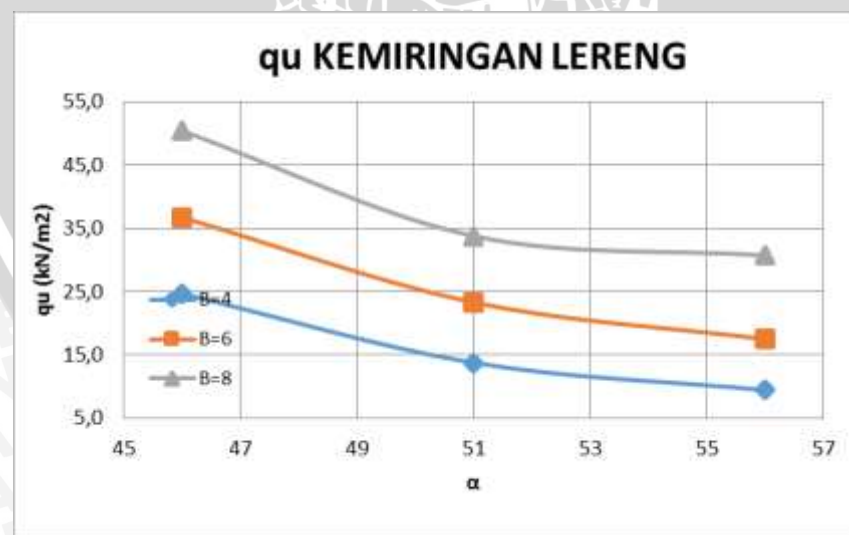
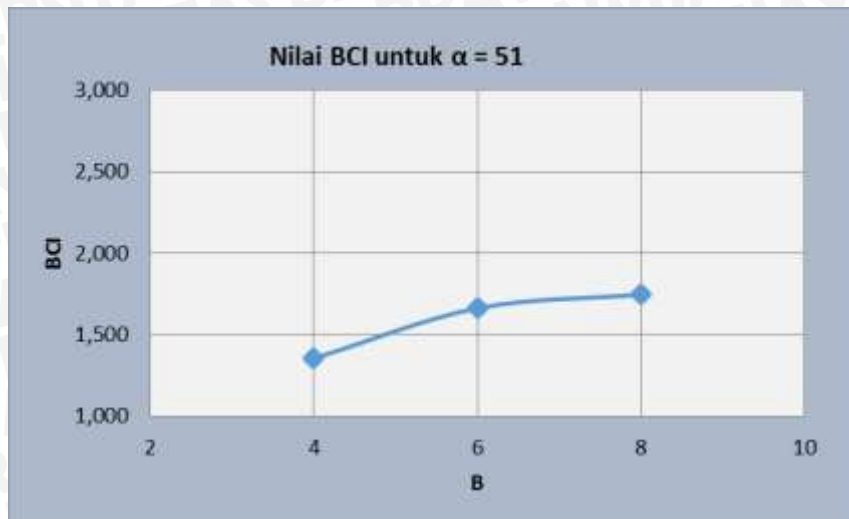
Nilai BCI 2% Variasi Lebar Pondasi

KEMIRINGAN LERENG	B	$q_u$ (kN/m <sup>2</sup> )	$q_u$ lereng tanpa perkuatan (kN/m <sup>2</sup> )	BCI (s)
46	4	24,652	11,871	2,077
	6	36,711	15,284	2,402
	8	50,409	20,020	2,518

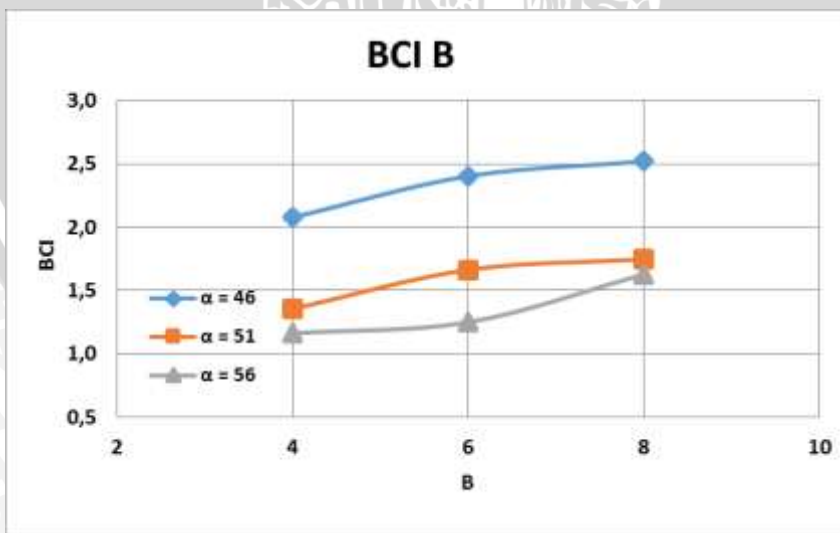
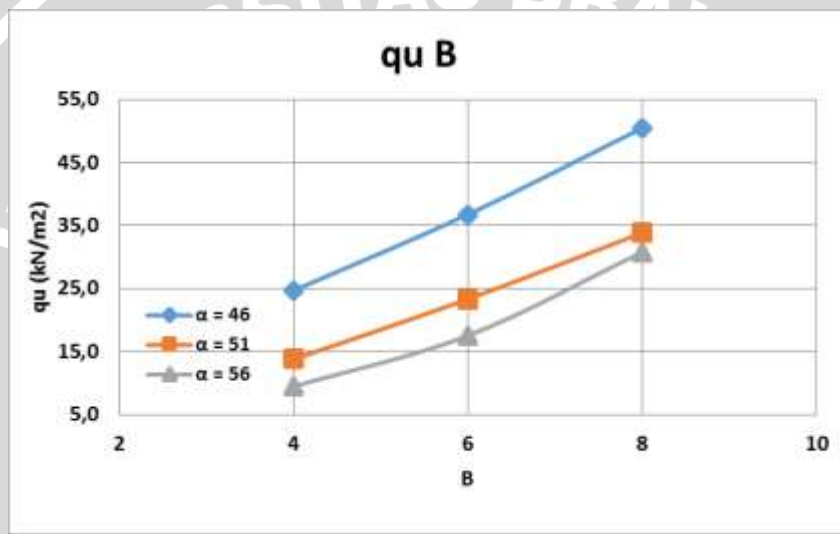
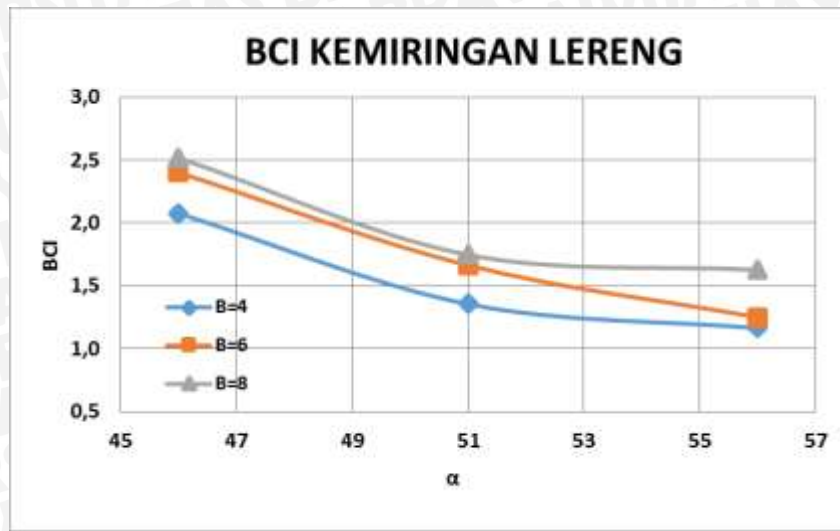
KEMIRINGAN LERENG	B	$q_u$ (kN/m <sup>2</sup> )	$q_u$ lereng tanpa perkuatan (kN/m <sup>2</sup> )	BCI (s)
51	4	13,755	10,150	1,355
	6	23,294	14,009	1,663
	8	33,790	19,342	1,747

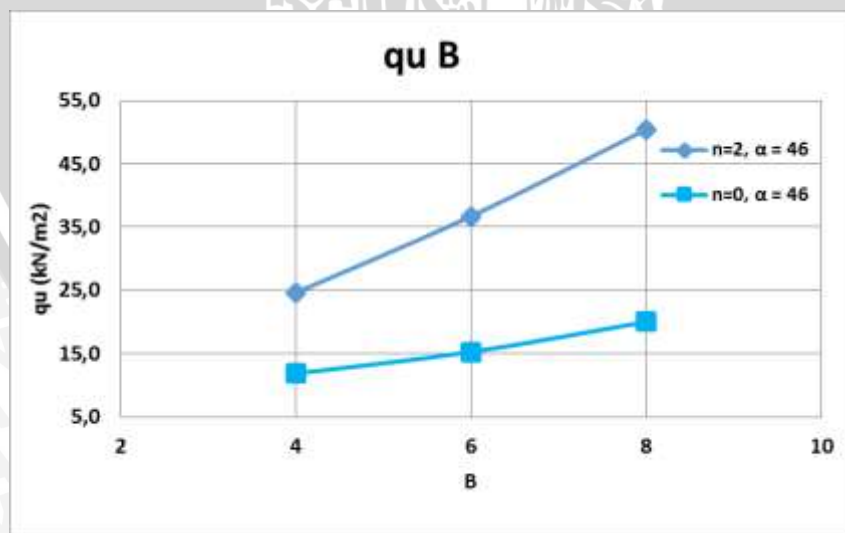
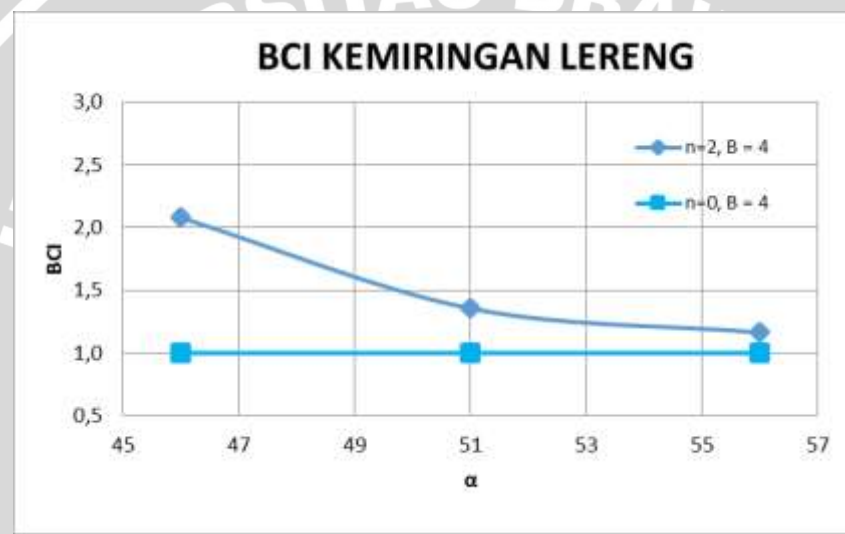
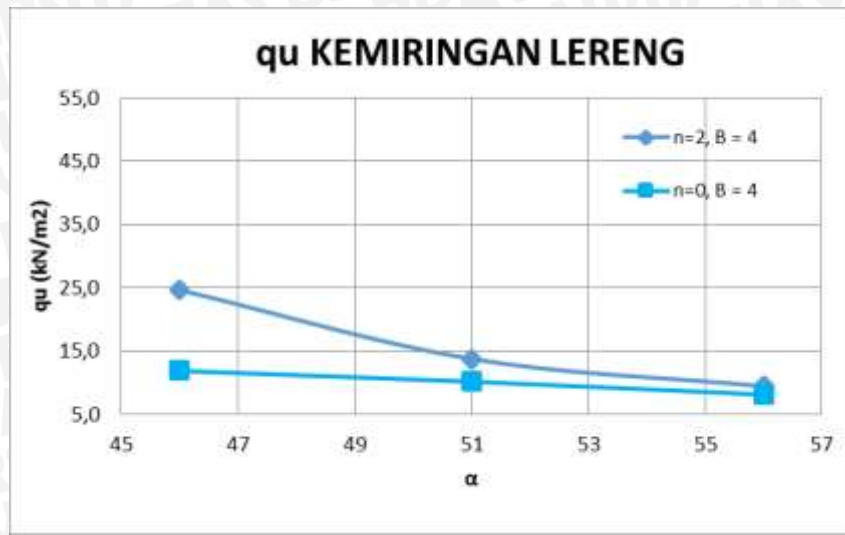
KEMIRINGAN LERENG	B	$q_u$ (kN/m <sup>2</sup> )	$q_u$ lereng tanpa perkuatan (kN/m <sup>2</sup> )	BCI (s)
56	4	9,442	8,117	1,163
	6	17,488	13,994	1,250
	8	30,724	18,896	1,626

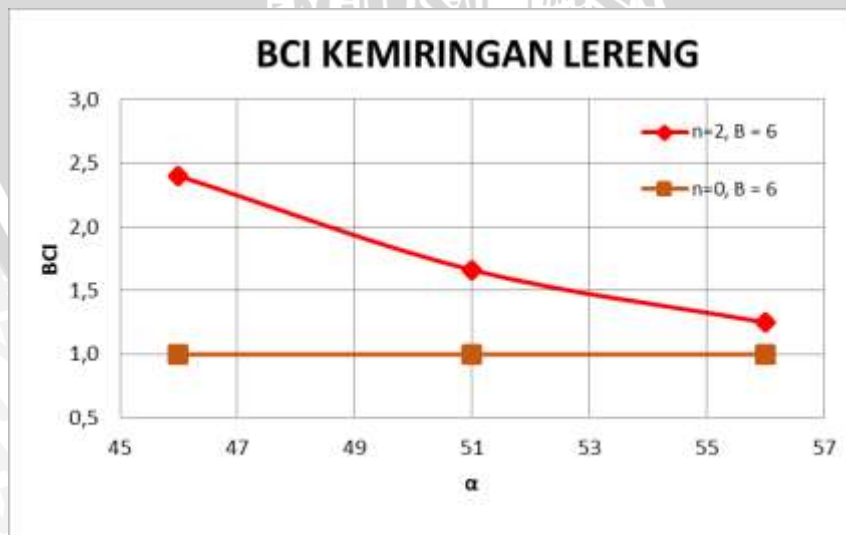
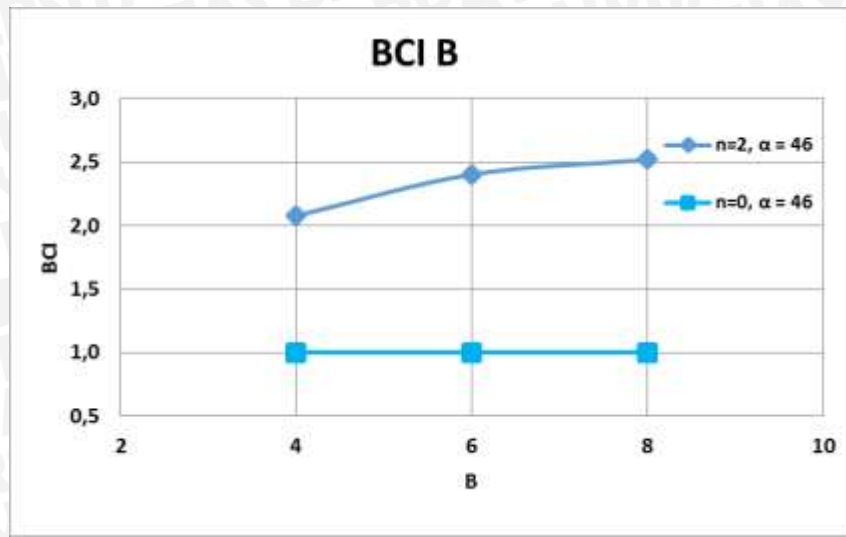


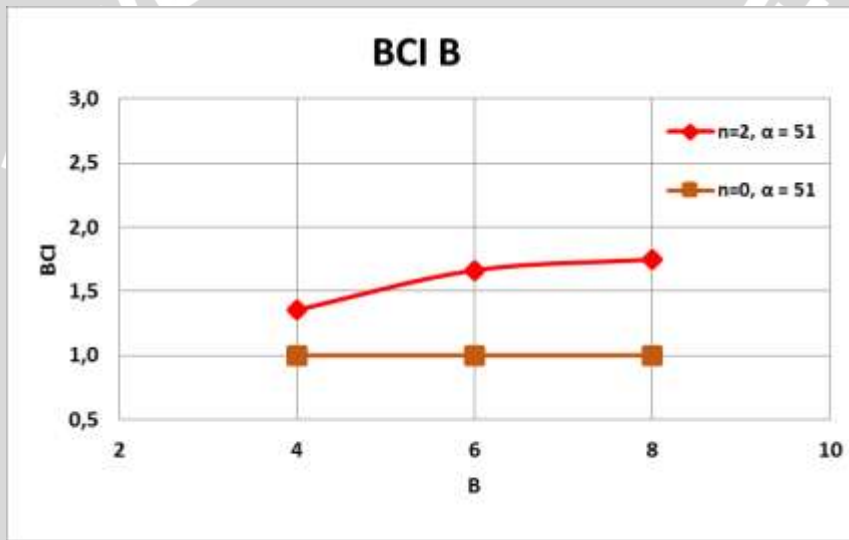
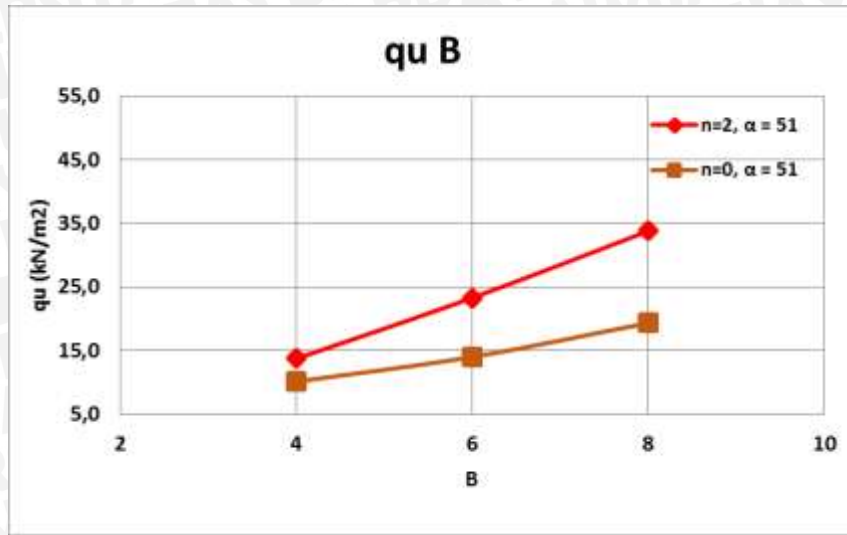


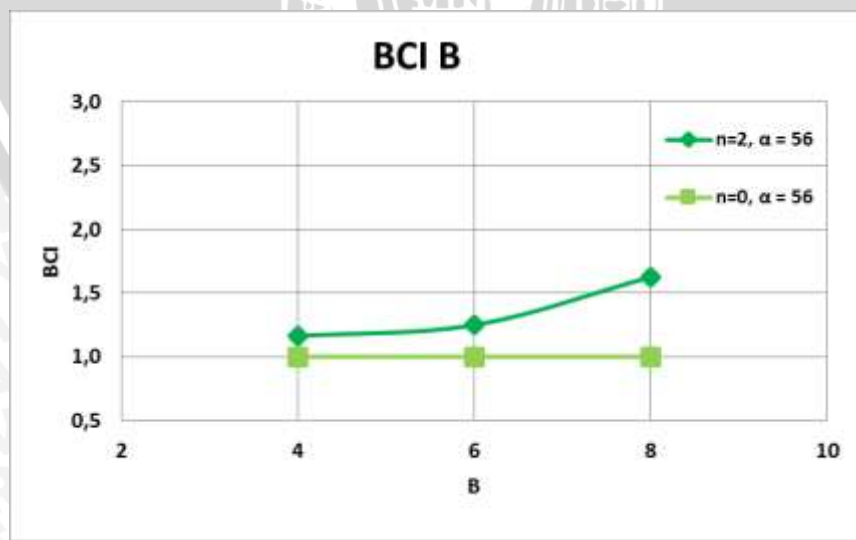
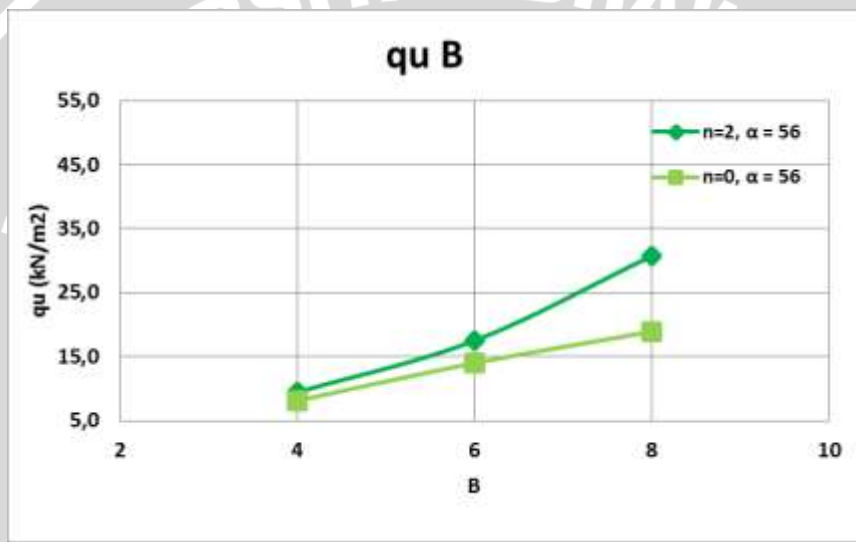
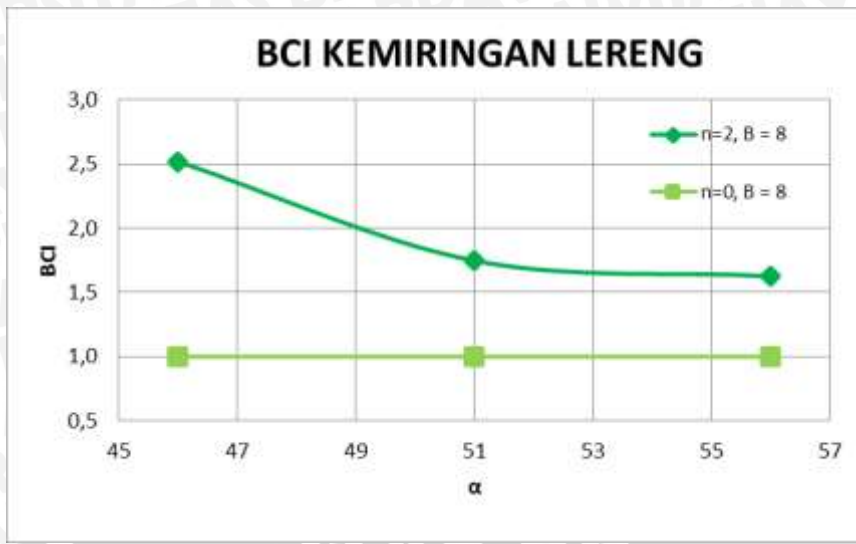










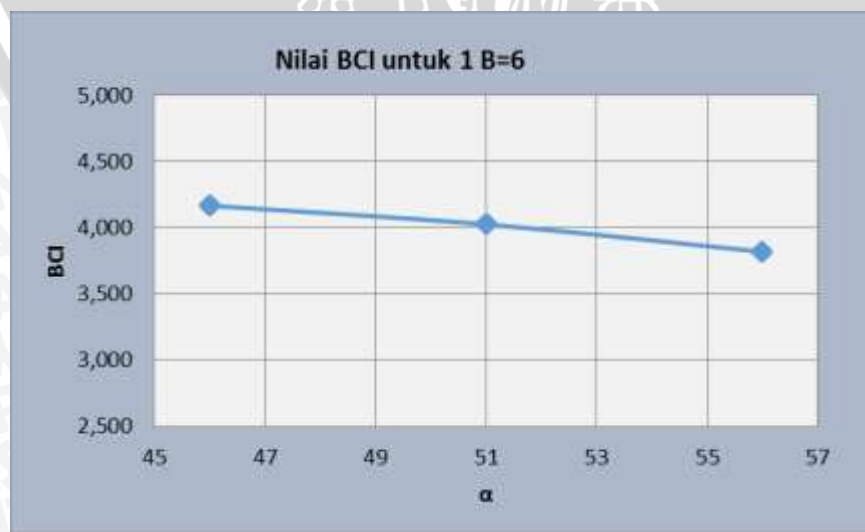
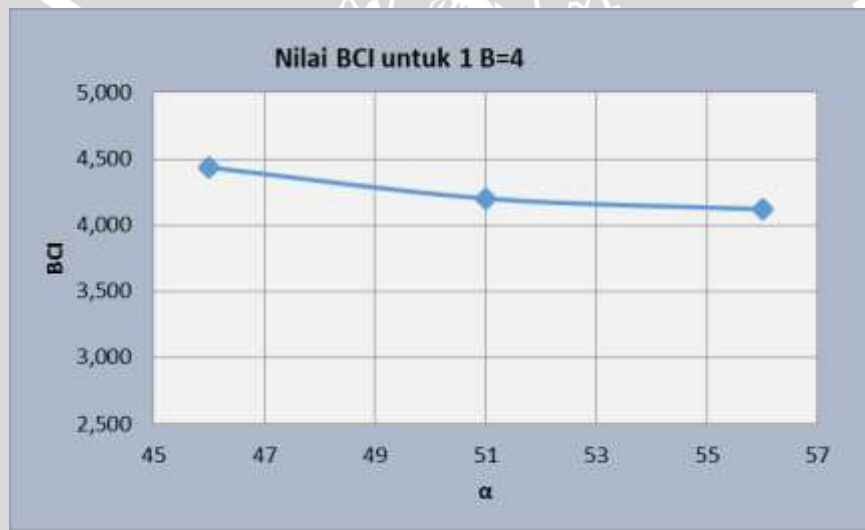


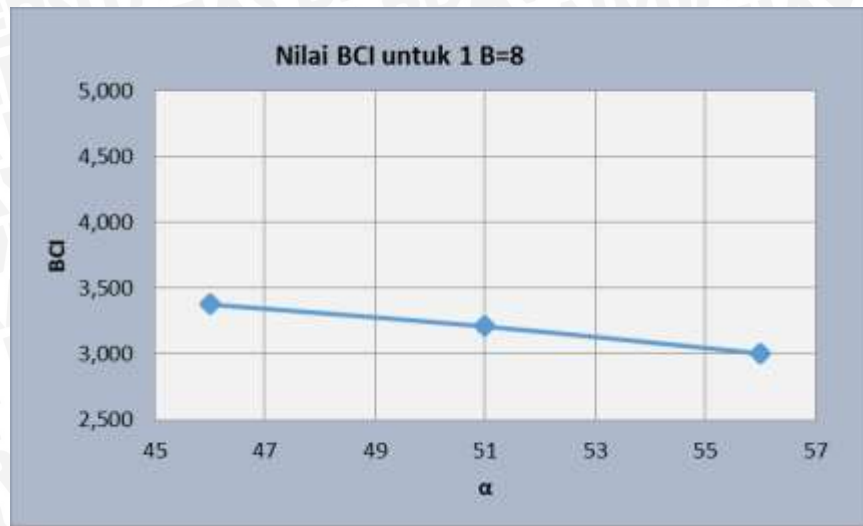
Nilai BCIU Variasi Kemiringan Lereng

B	KEMIRINGAN LERENG	qu (kN/m <sup>2</sup> )	qu lereng tanpa perkuatan (kN/m <sup>2</sup> )	BCI (s)
4	46	88,265	19,898	4,436
	51	79,847	19,005	4,201
	56	70,408	17,092	4,119

B	KEMIRINGAN LERENG	qu (kN/m <sup>2</sup> )	qu lereng tanpa perkuatan (kN/m <sup>2</sup> )	BCI (s)
6	46	89,286	21,429	4,167
	51	80,782	20,068	4,025
	56	71,769	18,793	3,819

B	KEMIRINGAN LERENG	qu (kN/m <sup>2</sup> )	qu lereng tanpa perkuatan (kN/m <sup>2</sup> )	BCI (s)
8	46	96,939	28,699	3,378
	51	87,415	27,232	3,210
	56	73,980	24,617	3,005





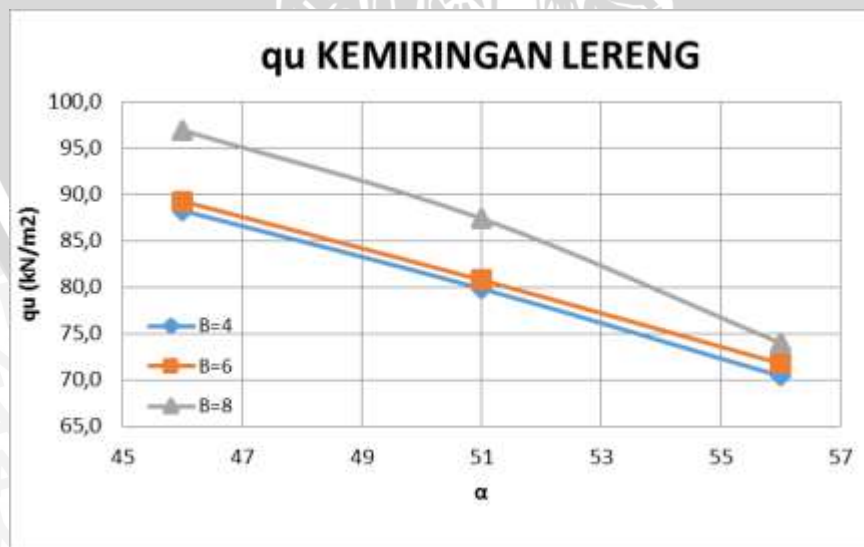
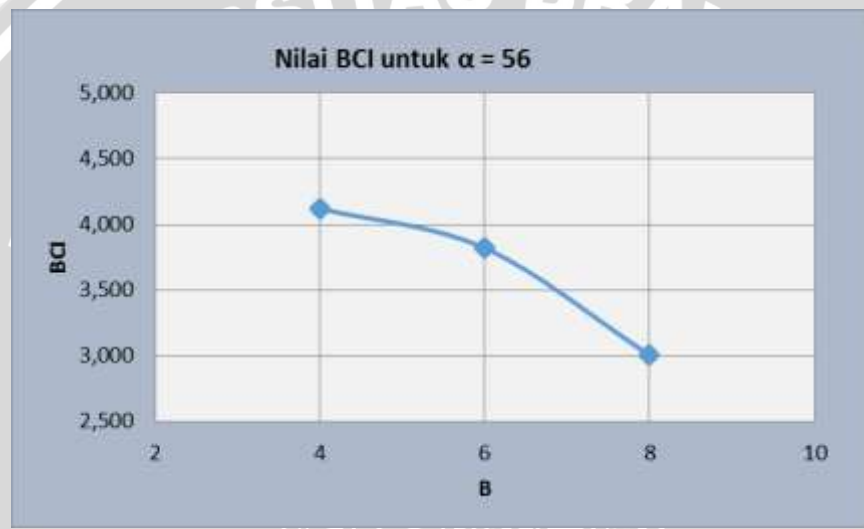
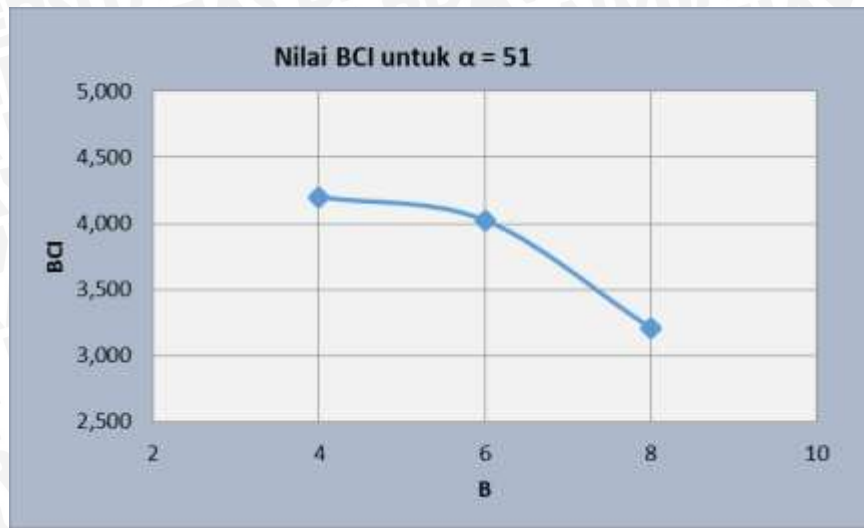
Nilai BCIU Variasi Lebar Pondasi

KEMIRINGAN LERENG	B	qu (kN/m <sup>2</sup> )	qu lereng tanpa perkuatan (kN/m <sup>2</sup> )	BCI (s)
46	4	88,265	19,898	4,436
	6	89,286	21,429	4,167
	8	96,939	28,699	3,378

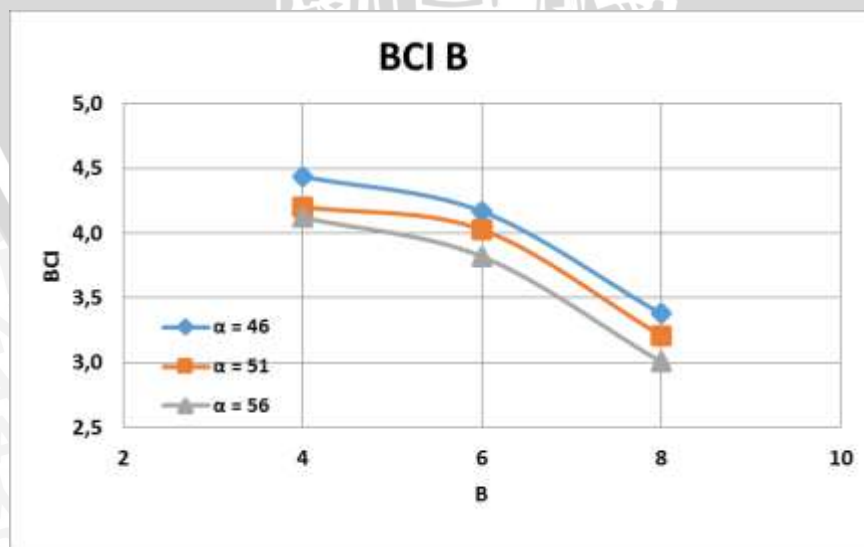
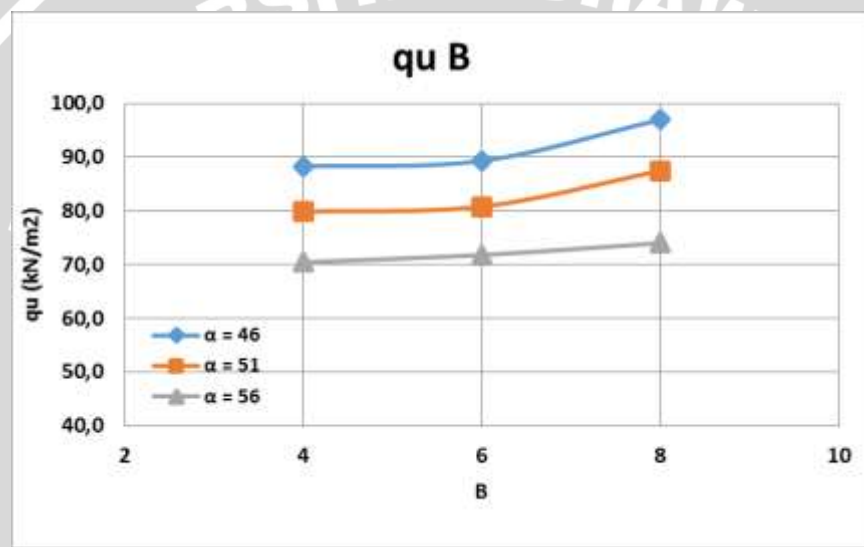
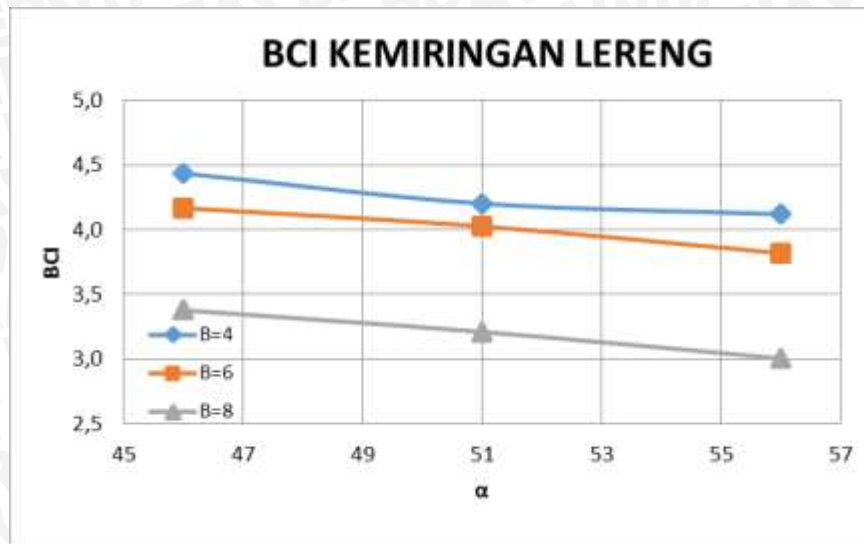
KEMIRINGAN LERENG	B	qu (kN/m <sup>2</sup> )	qu lereng tanpa perkuatan (kN/m <sup>2</sup> )	BCI (s)
51	4	79,847	19,005	4,201
	6	80,782	20,068	4,025
	8	87,415	27,232	3,210

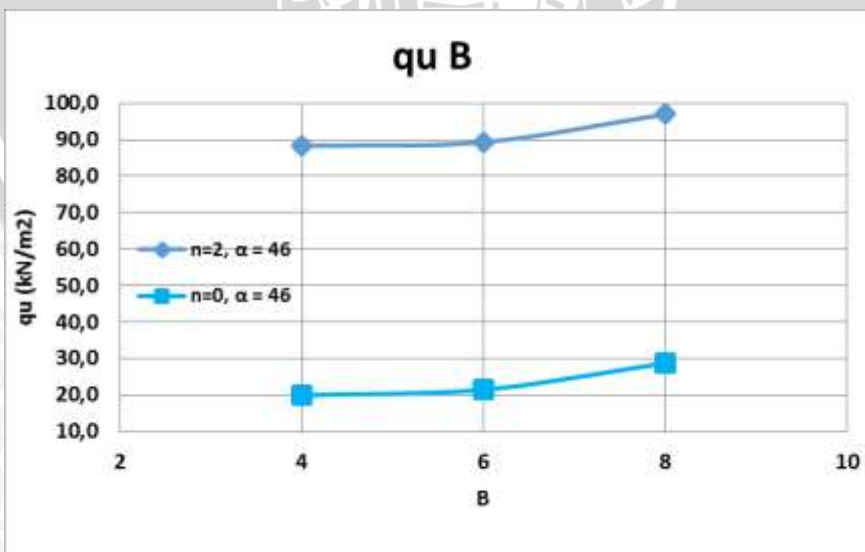
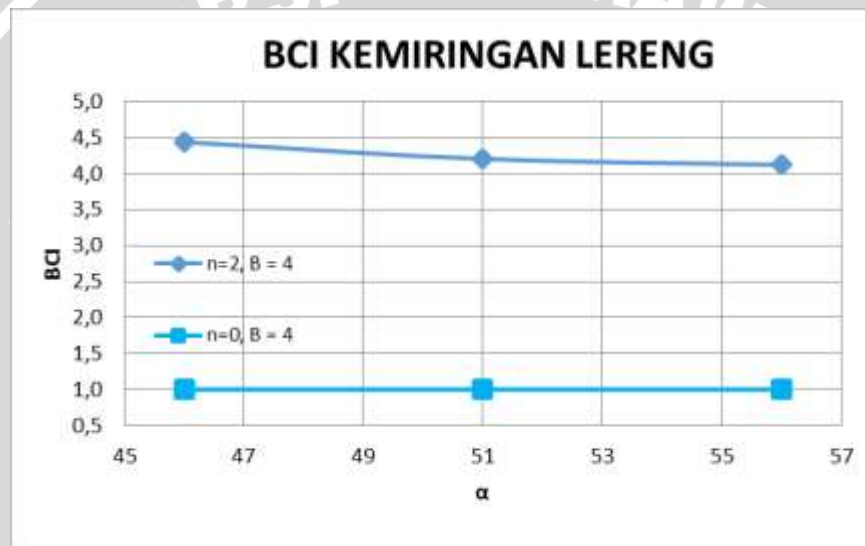
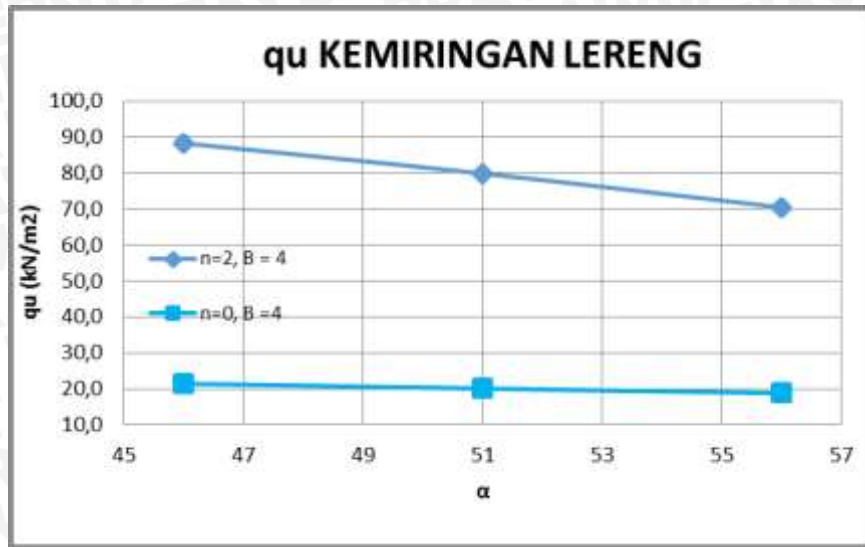
KEMIRINGAN LERENG	B	qu (kN/m <sup>2</sup> )	qu lereng tanpa perkuatan (kN/m <sup>2</sup> )	BCI (s)
56	4	70,408	17,092	4,119
	6	71,769	18,793	3,819
	8	73,980	24,617	3,005

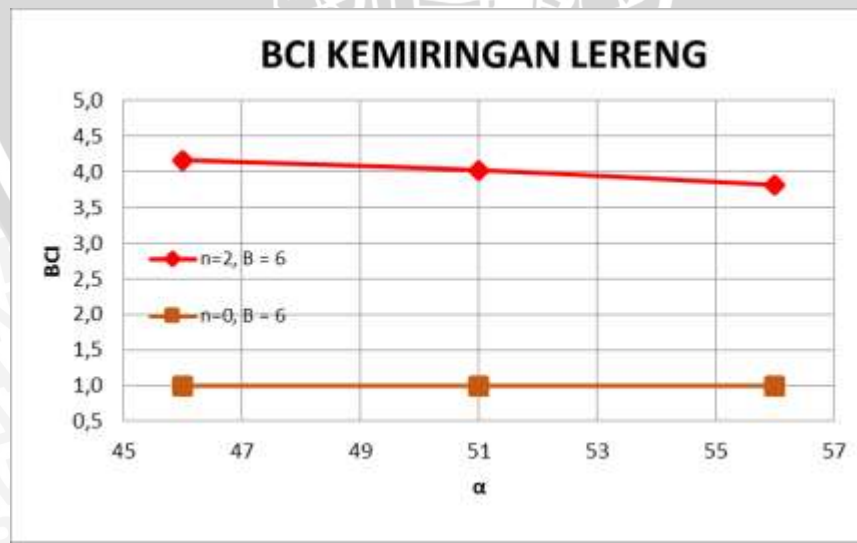
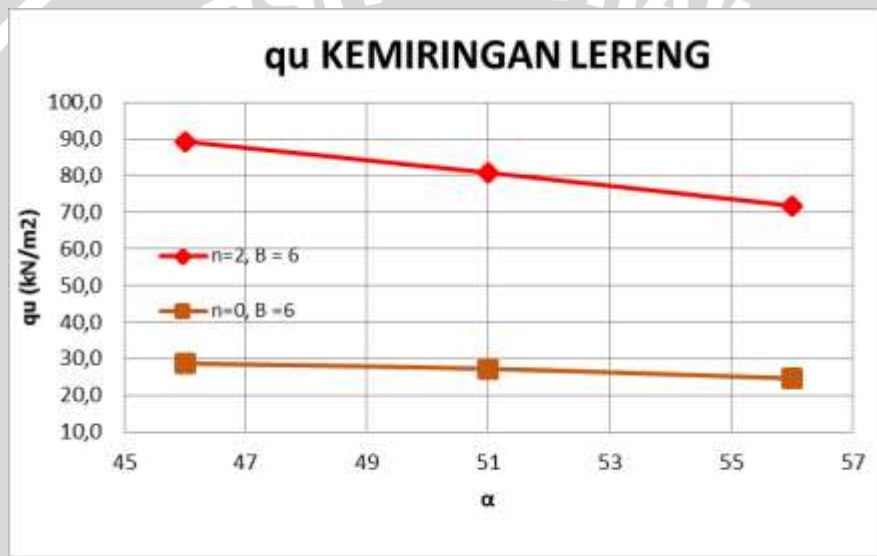
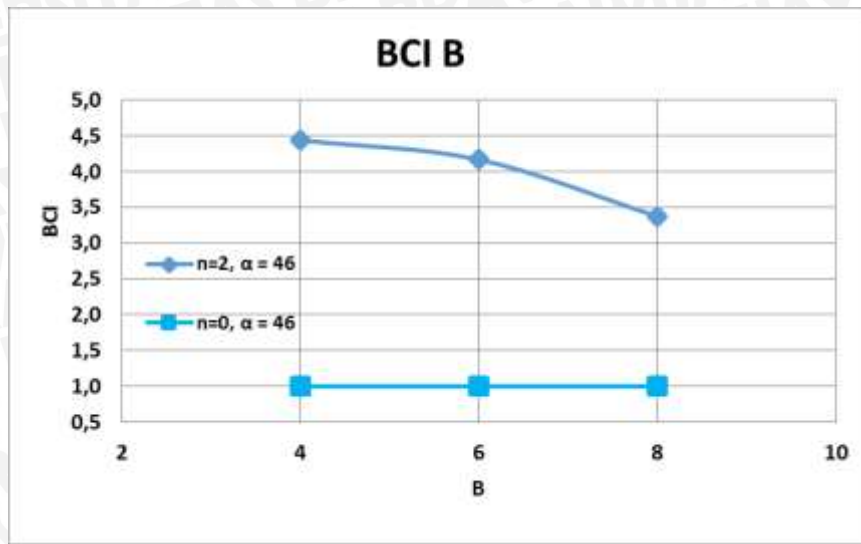


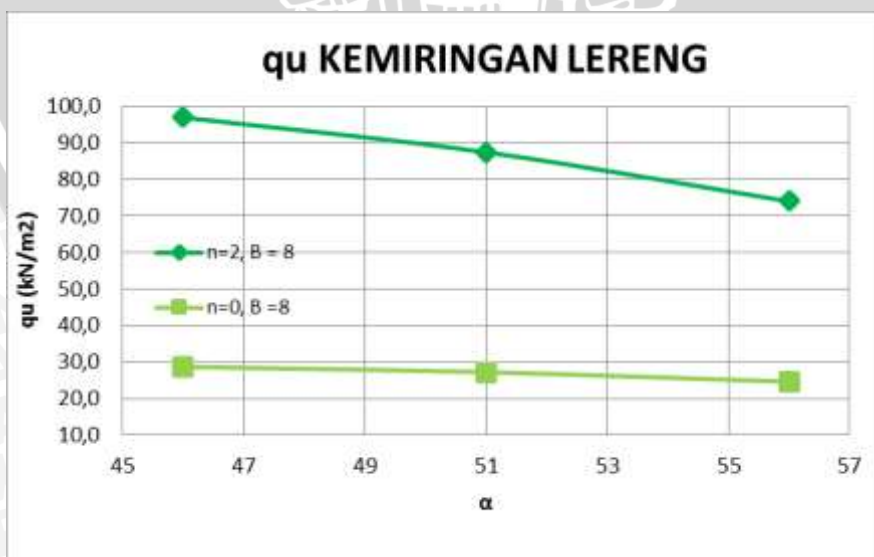
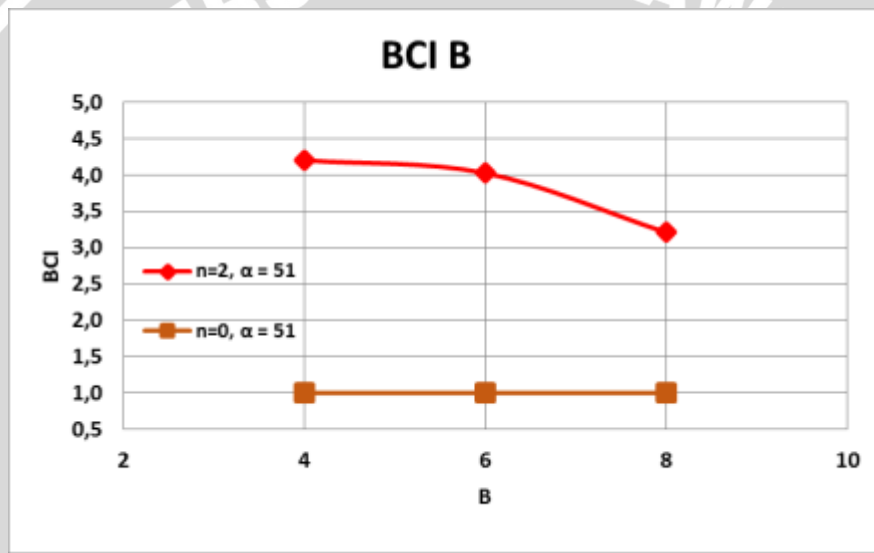
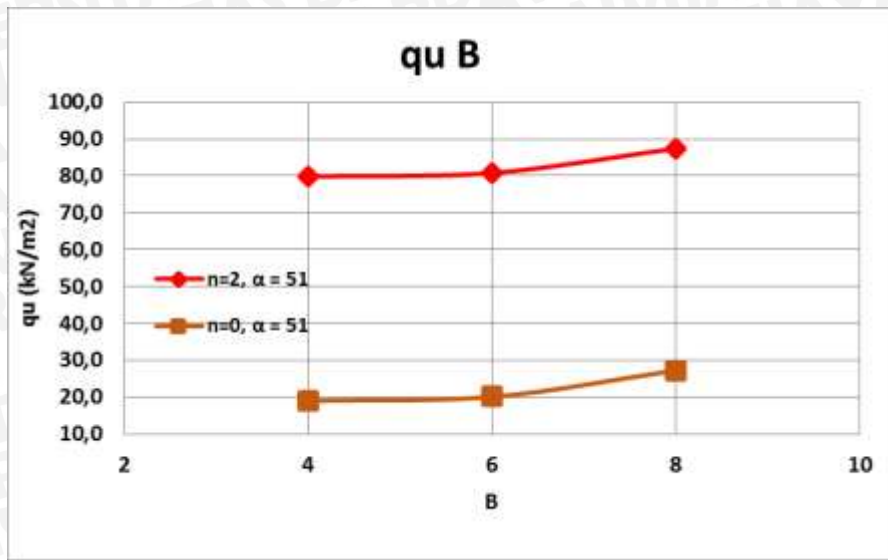


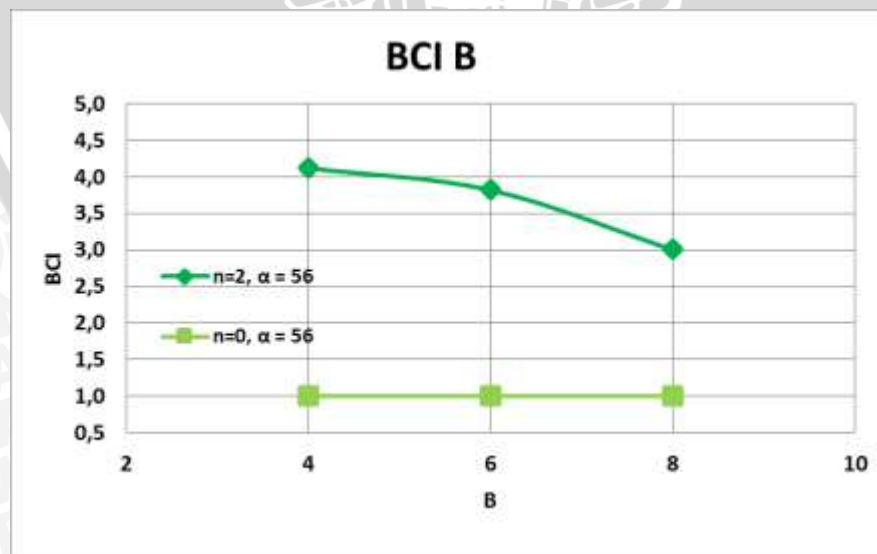
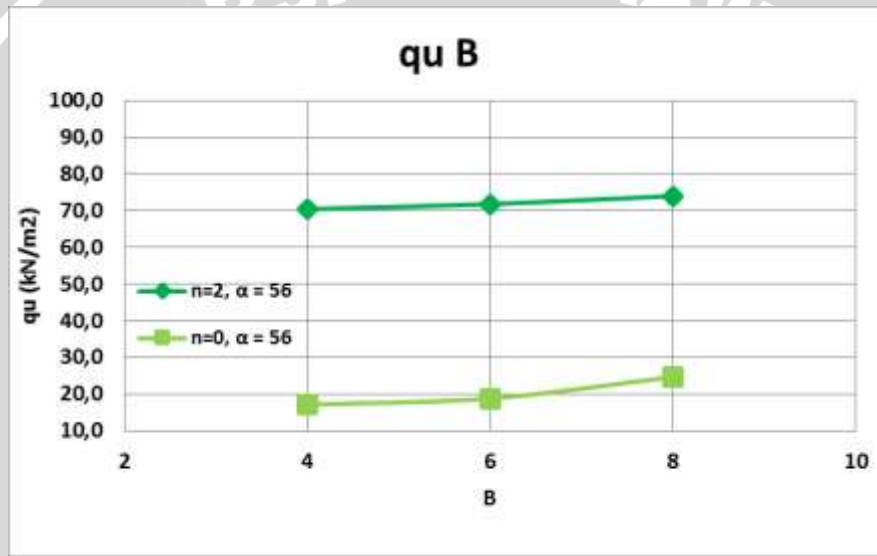
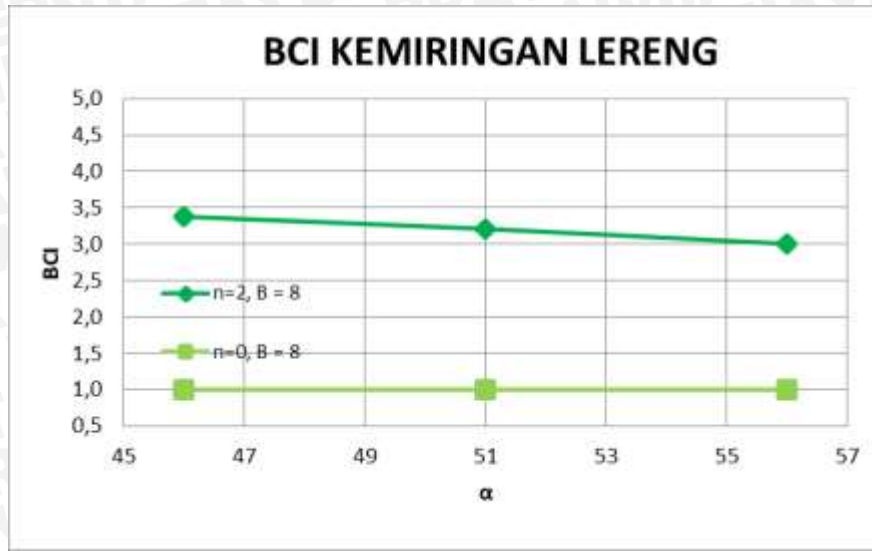












### Lampiran 10 Dokumentasi Penelitian



