

WATER CONTENT (w)**KADAR AIR**

Project : TUGAS AKHIR Date of Testing : _____
 Location : P. KALIMANTAN Job No. : _____
 Boring No. : _____
 Depth : _____
 Description of Soil : SAND

SAMPEL +100 cc AQUADEST

BORING No.				
Container No.				
Weight Con. + Wet Soil	51,1	47,1	37,8	38,6
Weight Con. + Dry Soil	50,0	45,9	36,8	37,9
Weight of Container	9,8	9,7	9,7	9,7
Weight of Dry Soil	40,2	36,2	27,1	28,2
Weight of Water	1,1	1,2	1,0	0,7
Water Content	2,7363%	3,3149%	3,6900%	2,4823%

SAMPEL + 200 cc AQUADEST

BORING No.				
Container No.				
Weight Con. + Wet Soil	33,0	33,5	27,7	20,8
Weight Con. + Dry Soil	31,2	31,9	26,2	19,55
Weight of Container	4,7	5,1	5,8	1,7
Weight of Dry Soil	26,5	26,8	21,2	17,85
Weight of Water	1,8	1,6	1,5	1,25
Water Content	6,7924%	5,9701%	7,0755%	7,0028%



**LABORATORIUM MEKANIKA TANAH
 FAKULTAS TEKNIK JURUSAN SIPIL
 UNIKA SOEGJAPRAHATA SEMARANG**

WATER CONTENT (w)

KADAR AIR

Project : TUGAS AKHIR Date of Testing : _____
 Location : P. KALIMANTAN Job No. : _____
 Boring No. : _____
 Depth : _____
 Description of Soil : SAND

SAMPEL + 300 cc AQUADEST

BORING No.				
Container No.				
Weight Con. + Wet Soil	28,60	30,00	36,20	24,30
Weight Con. + Dry Soil	26,55	27,85	32,70	21,60
Weight of Container	4,50	4,50	4,50	4,60
Weight of Dry Soil	22,05	23,35	28,20	17,00
Weight of Water	2,05	2,15	3,50	2,70
Water Content	9,2971 %	9,2077 %	12,4113 %	15,8824 %

SAMPEL + 400 cc AQUADEST

BORING No.				
Container No.				
Weight Con. + Wet Soil	27,60	32,10	29,40	27,70
Weight Con. + Dry Soil	24,95	28,60	25,60	24,60
Weight of Container	6,20	4,30	4,60	4,70
Weight of Dry Soil	18,75	24,30	21,00	19,90
Weight of Water	2,65	3,50	3,80	3,10
Water Content	14,1333 %	14,4033 %	18,0952 %	15,5779 %



**LABORATORIUM MEKANIKA TANAH
 FAKULTAS TEKNIK JURUSAN SIPIL
 UNIKA SOEGJAPRANATA SEMARANG**

WATER CONTENT (w)**KADAR AIR**

Project : _____ Date of Testing : _____
 Location : P. KALIMANTAN Job No. : _____
 Boring No. : _____
 Depth : _____
 Description of Soil : SAND

SAMPEL + 500 cc AQUADEST

BORING No.				
Container No.				
Weight Con. + Wet Soil	27,8	29,7	35,2	34,9
Weight Con. + Dry Soil	24,36	26,5	30,5	30,6
Weight of Container	2,0	5,6	2,1	4,2
Weight of Dry Soil	22,36	20,9	28,4	26,4
Weight of Water	3,44	3,2	4,7	4,3
Water Content	15,38461%	15,31100%	15,54932%	16,16541%

SAMPEL + 600 cc AQUADEST

BORING No.				
Container No.				
Weight Con. + Wet Soil	59,45	65,1	46,9	62,4
Weight Con. + Dry Soil	53,25	57,7	41,6	55,8
Weight of Container	9,5	5,5	4,3	10,3
Weight of Dry Soil	43,75	52,2	37,3	45,5
Weight of Water	6,2	7,4	5,3	6,6
Water Content	14,17142%	14,17624%	14,20911%	14,50549%



LABORATORIUM MEKANIKA TANAH
 FAKULTAS TEKNIK JURUSAN SIPIL
 UNIKA SOEGIJAPRAHATA SEMARANG

Y. A. YUDI UNTORO 92.12.0965
 A. BAMBANG GUNARSO 93.12.1063

WATER CONTENT (w)**KADAR AIR**

Project : TUGAS AKHIR Date of Testing : _____
 Location : P. PARANGTRITIS Job No. : _____
 Boring No. : _____
 Depth : _____
 Description of Soil : SAND

SAMPEL + 100 cc AQUADEST

BORING No.				
Container No.				
Weight Con. + Wet Soil	48,80	56,75	41,75	35,80
Weight Con. + Dry Soil	47,95	55,50	41,10	35,30
Weight of Container	9,60	12,30	10,40	10,40
Weight of Dry Soil	38,35	43,20	30,70	25,10
Weight of Water	0,85	1,25	0,65	0,50
Water Content	2,2164 %	2,8935 %	2,1173 %	2,0080 %

SAMPEL + 200 cc AQUADEST

BORING No.				
Container No.				
Weight Con. + Wet Soil	20,70	38,00	38,00	35,90
Weight Con. + Dry Soil	20,10	36,30	36,60	34,60
Weight of Container	10,30	10,50	10,50	10,50
Weight of Dry Soil	9,80	25,80	26,10	24,10
Weight of Water	0,60	1,70	1,40	1,30
Water Content	6,1224 %	6,5891 %	5,3639 %	5,3942 %



LABORATORIUM MEKANIKA TANAH
 FAKULTAS TEKNIK JURUSAN SIPIL
 UKI SOEGJAPRAHATA SEMARANG

WATER CONTENT (w)**KADAR AIR**

Project : TUGAS AKHIR Date of Testing : _____
 Location : P. PARANGTRITIS Job No. : _____
 Boring No. : _____
 Depth : _____
 Description of Soil : SAND

SAMPEL + 300 cc AQUADEST

BORING No.				
Container No.				
Weight Con. + Wet Soil	26,50	30,50	27,50	27,50
Weight Con. + Dry Soil	24,35	28,15	25,35	24,90
Weight of Container	4,70	4,60	4,80	4,40
Weight of Dry Soil	19,65	23,55	20,75	20,50
Weight of Water	2,15	2,35	2,15	2,60
Water Content	10,9415 %	9,9788 %	10,4623 %	12,6829 %

SAMPEL + 400 cc AQUADEST

BORING No.				
Container No.				
Weight Con. + Wet Soil	24,60	21,75	34,30	31,05
Weight Con. + Dry Soil	21,70	19,20	29,90	26,45
Weight of Container	5,85	4,90	5,10	1,70
Weight of Dry Soil	15,85	14,30	24,80	24,75
Weight of Water	2,90	2,55	4,40	4,60
Water Content	18,2965 %	17,8321 %	17,7494 %	18,5858 %



LABORATORIUM MEKANIKA TANAH
 FAKULTAS TEKNIK JURUSAN SIPIL
 UNIKA SOEGLIAPRANATA SEMARANG

WATER CONTENT (w)**KADAR AIR**

Project : TUGAS AKHIR Date of Testing : _____
 Location : P. PARANGTRITIS Job No. : _____
 Boring No. : _____
 Depth : _____
 Description of Soil : SAND

SAMPEL + 500 cc AQUADEST

BORING No.				
Container No.				
Weight Con. + Wet Soil	25,30	20,20	36,90	28,30
Weight Con. + Dry Soil	21,55	17,80	31,65	24,40
Weight of Container	1,90	4,80	5,30	4,90
Weight of Dry Soil	19,65	13,00	26,35	19,50
Weight of Water	3,75	2,40	5,25	3,90
Water Content	19,0839%	18,4615%	19,9241%	20,0000%

SAMPEL + 600 cc AQUADEST

BORING No.				
Container No.				
Weight Con. + Wet Soil	32,00	24,00	16,35	34,90
Weight Con. + Dry Soil	28,50	20,40	14,15	30,20
Weight of Container	5,40	1,70	1,70	4,70
Weight of Dry Soil	23,10	18,70	12,45	25,50
Weight of Water	3,50	3,60	2,20	4,70
Water Content	15,1515%	19,2513%	17,6707%	18,4314%



LABORATORIUM MEKANIKA TANAH
 FAKULTAS TEKNIK JURUSAN SIPIL
 UNIKA SOEGJAPRAHATA SEMARANG

WATER CONTENT (w)**KADAR AIR**

Project : TUGAS AKHIR Date of Testing : _____
 Location : P. SUMATERA Job No. : _____
 Boring No. : _____
 Depth : _____
 Description of Soil : SAND

SAMPEL + 100 cc AQUADEST

BORING No.				
Container No.				
Weight Con. + Wet Soil	19,65	26,25	24,80	27,50
Weight Con. + Dry Soil	19,30	25,70	23,80	27,00
Weight of Container	4,80	4,70	4,70	4,70
Weight of Dry Soil	14,50	21,00	19,10	22,30
Weight of Water	0,35	0,55	1,00	0,50
Water Content	2,4137%	2,6190%	5,2356%	2,2421%

SAMPEL + 200 cc AQUADEST

BORING No.				
Container No.				
Weight Con. + Wet Soil	29,70	32,10	32,25	32,80
Weight Con. + Dry Soil	28,00	30,60	30,30	30,40
Weight of Container	4,55	4,60	4,80	4,70
Weight of Dry Soil	23,45	26,00	25,50	25,70
Weight of Water	1,70	1,50	1,95	2,40
Water Content	7,2495%	5,7692%	7,6471%	9,3385%



LABORATORIUM MEKANIKA TANAH
 FAKULTAS TEKNIK JURUSAN SIPIL
 UNIKA SOEGLJAPRAMATA SEMARANG

WATER CONTENT (w)

KADAR AIR

Project : TUGAS AKHIR Date of Testing : _____
 Location : P. SUMATERA Job No. : _____
 Boring No. : _____
 Depth : _____
 Description of Soil : SAND

SAMPEL + 300 cc AQUADEST

BORING No.				
Container No.				
Weight Con. + Wet Soil	30,10	31,60	27,70	34,65
Weight Con. + Dry Soil	28,15	29,45	25,35	31,80
Weight of Container	4,75	4,70	4,60	4,50
Weight of Dry Soil	23,40	24,75	20,75	27,30
Weight of Water	1,95	2,15	2,35	2,85
Water Content	8,3333 %	8,6868 %	11,3253 %	10,4395 %

SAMPEL + 400 cc AQUADEST

BORING No.				
Container No.				
Weight Con. + Wet Soil	30,75	36,00	36,30	41,00
Weight Con. + Dry Soil	27,65	32,55	32,00	36,20
Weight of Container	4,65	4,70	4,70	5,10
Weight of Dry Soil	23,00	27,85	27,30	31,1
Weight of Water	3,10	3,45	4,30	4,8
Water Content	13,4782 %	12,3878 %	15,7509 %	15,4341 %



**LABORATORIUM MEKANIKA TANAH
 FAKULTAS TEKNIK JURUSAN SIPIL
 UNIKA SOEGJAPRANATA SEMARANG**

WATER CONTENT (w)**KADAR AIR**

Project : TUGAS-AKHIR Date of Testing : _____
 Location : P. SUMATERA Job No. : _____
 Boring No. : _____
 Depth : _____
 Description of Soil : SAND

SAMPEL + 500 cc AGUADEST

BORING No.				
Container No.				
Weight Con. + Wet Soil	30,20	45,75	42,60	52,00
Weight Con. + Dry Soil	26,70	39,95	37,15	45,50
Weight of Container	4,65	4,65	4,80	4,55
Weight of Dry Soil	22,05	35,30	32,35	40,95
Weight of Water	3,50	5,80	5,45	6,50
Water Content	15,8730 %	16,4306 %	16,8469 %	15,8730 %

SAMPEL + 600 cc AGUADEST

BORING No.				
Container No.				
Weight Con. + Wet Soil	32,15	34,00	36,70	36,10
Weight Con. + Dry Soil	27,80	29,70	31,70	31,75
Weight of Container	4,65	4,85	4,50	4,65
Weight of Dry Soil	23,15	24,85	27,20	27,10
Weight of Water	4,35	4,30	5,00	4,35
Water Content	18,7905 %	17,3038 %	18,3823 %	16,0517 %



**LABORATORIUM MEKANIKA TANAH
 FAKULTAS TEKNIK JURUSAN SIPIL
 UNIKA SOEGLJAPRANATA SEMARANG**

WATER CONTENT (w)

KADAR AIR

Project : TUGAS AKHIR Date of Testing : _____
 Location : P. SUMATERA Job No. : _____
 Boring No. : _____
 Depth : _____
 Description of Soil : SAND

SAMPEL + 700 cc AQUADEST

BORING No.				
Container No.				
Weight Con. + Wet Soil	33,30	33,70	40,15	47,30
Weight Con. + Dry Soil	29,20	29,60	35,50	41,50
Weight of Container	4,40	4,55	4,75	4,65
Weight of Dry Soil	24,80	25,05	30,75	36,85
Weight of Water	4,10	4,10	4,65	5,80
Water Content	16,5323 %	16,3623 %	15,1212 %	15,7395 %

BORING No.				
Container No.				
Weight Con. + Wet Soil				
Weight Con. + Dry Soil				
Weight of Container				
Weight of Dry Soil				
Weight of Water				
Water Content				



**LABORATORIUM MEKANIKA TANAH
 FAKULTAS TEKNIK JURUSAN SIPIL
 UNIKA SOEGLJAPRAKATA SEMARANG**

SPECIFIC GRAVITY (GS)**BERAT JENIS**

PROYEK : TUGAS AKHIR PERCOBAAN NO. : _____
 LOKASI : P. KALIMANTAN TANGGAL : _____
 BORING NO. : _____
 KEDALAMAN : _____
 MACAM TANAH : PASIR
 WARNA TANAH : PUTIH

Penentuan Nomer	1	2	3	4
Picnometer Nomer				
Berat Pic. + air + contoh tanah : W ₁ dalam gram	177,30	176,60		
Temperatur T dalam °C				
Berat Picnometer + air W ₂ dalam gram	161,70	161,00		
Container Nomor (B/K)				
Berat Pic. + contoh tanah kering dalam gram	87,60	86,85		
Berat Con. kosong	62,60	61,85		
Berat tanah kering dalam gram	25	25		
Specific gravity dari air pada T ° G ₁				
Specific gravity dari tanah G _S	2,559	2,559		

Catatan :

$$G_S = \frac{c \cdot a}{W \cdot (d \cdot c) \cdot l_2}$$



LABORATORIUM MEKANIKA TANAH
 FAKULTAS TEKNIK JURUSAN SIPIL
 UNIKA SOEGLJAPRAWATA SEMARANG

SPECIFIC GRAVITY (G_S)**BERAT JENIS**

PROYEK : TUGAS AKHIR
 LOKASI : P. PARANGTRITIS
 BORING NO. : _____
 KEDALAMAN : _____
 MACAM TANAH : PASIR
 WARNA TANAH : HITAM

PERCOBAAN NO. : _____
 TANGGAL : _____

Penentuan Nomer	1	2	3	4
Picnometer Nomer				
Berat Pic. + air + contoh tanah : W ₁ dalam gram	178,00	177,55		
Temperatur T dalam °C				
Berat Picnometer + air W ₂ dalam gram	161,60	161,30		
Container Nomor (B/K)				
Berat Pic. + contoh tanah kering dalam gram	87,6	87,5		
Berat Con. kosong	62,6	62,5		
Berat tanah kering dalam gram	25	25		
Specific gravity dari air pada T ° G ₁				
Specific gravity dari tanah G _S	2,793	2,747		

Catatan :

$$G_S = \frac{c \cdot a}{W - (d \cdot c) \cdot l_2}$$



LABORATORIUM MEKANIKA TANAH
 FAKULTAS TEKNIK JURUSAN SIPIL
 UNIKA SOEGIJAPRANATA SEMARANG

SPECIFIC GRAVITY (GS)**BERAT JENIS**

PROYEK : TUGAS AKHIR PERCOBAAN NO. : _____
 LOKASI : P. SUMATERA TANGGAL : _____
 BORING NO. : _____
 KEDALAMAN : _____
 MACAM TANAH : PASIR
 WARNA TANAH : _____

Penentuan Nomer	1	2	3	4
Picnometer Nomer				
Berat Pic. + air + contoh tanah : W ₁ dalam gram	177,30	176,55		
Temperatur T dalam °C				
Berat Picnometer + air W ₂ dalam gram	161,70	160,80		
Container Nomor (B/K)				
Berat Pic. + contoh tanah kering dalam gram	87,60	86,85		
Berat Con. kosong	62,60	61,85		
Berat tanah kering dalam gram	25	25		
Specific gravity dari air pada T ° G ₁				
Specific gravity dari tanah G _S	2,559	2,599		

Catatan :

$$G_s = \frac{c \cdot a}{W \cdot (d \cdot c) \cdot l_2}$$



LABORATORIUM MEKANIKA TANAH
 FAKULTAS TEKNIK JURUSAN SIPIL
 UNIKA SOEGIJAPRANATA SEMARANG

LAMPIRAN

TABEL. : KOREKSI TEMPERATUR

Satuan Derajat	1 / 10 Derajat				
	0	1	2	3	4
25	1,00301	1,00303	1,00305	1,00307	1,00310
26	1,00324	1,00326	1,00329	1,00331	1,00334
27	1,00349	1,00351	1,00353	1,00356	1,00359
28	1,00374	1,00378	1,00379	1,00382	1,00384
29	1,00400	1,00403	1,00406	1,00408	1,00411
30	1,00428	1,00430	1,00433	1,00436	1,00439
31	1,00456	1,00459	1,00462	1,00464	1,00467
32	1,00485	1,00488	1,00491	1,00494	1,00497
33	1,00515	1,00518	1,00521	1,00524	1,00527
34	1,00546	1,00549	1,00552	1,00554	1,00558

Satuan Derajat	1 / 10 Derajat				
	5	6	7	8	9
25	1,00312	1,00314	1,00317	1,00319	1,00322
26	1,00336	1,00338	1,00341	1,00343	1,00346
27	1,00361	1,00364	1,00366	1,00368	1,00371
28	1,00387	1,00390	1,00392	1,00395	1,00398
29	1,00414	1,00416	1,00419	1,00422	1,00425
30	1,00442	1,00445	1,00448	1,00450	1,00453
31	1,00470	1,00473	1,00476	1,00479	1,00482
32	1,00500	1,00403	1,00506	1,00509	1,00512
33	1,00530	1,00533	1,00536	1,00539	1,00542
34	1,00562	1,00565	1,00568	1,00571	1,00574

GRAIN SIZE ANALYSIS - MECHANICAL

Project : TUGAS AKHIR Job No. : _____
 Location of Project : P. KALIMANTAN Boring No. : _____ Sample No. : _____
 Description of Soil : SAND Depth of sample : _____
 Tasted By : _____ Date of testing : _____

Soil Sample Size (ASTM D1140-54)

Nominal diameter of largest particle	Approximate minimum Wt. of sample g
No. 10 sieve	200
No. 4 sieve	500
3/4 in	1500

Wt. of dry sample + container	
Wt. of container	
Wt. of dry sample , W _s	500 gr.

Sieve analysis and grain shape

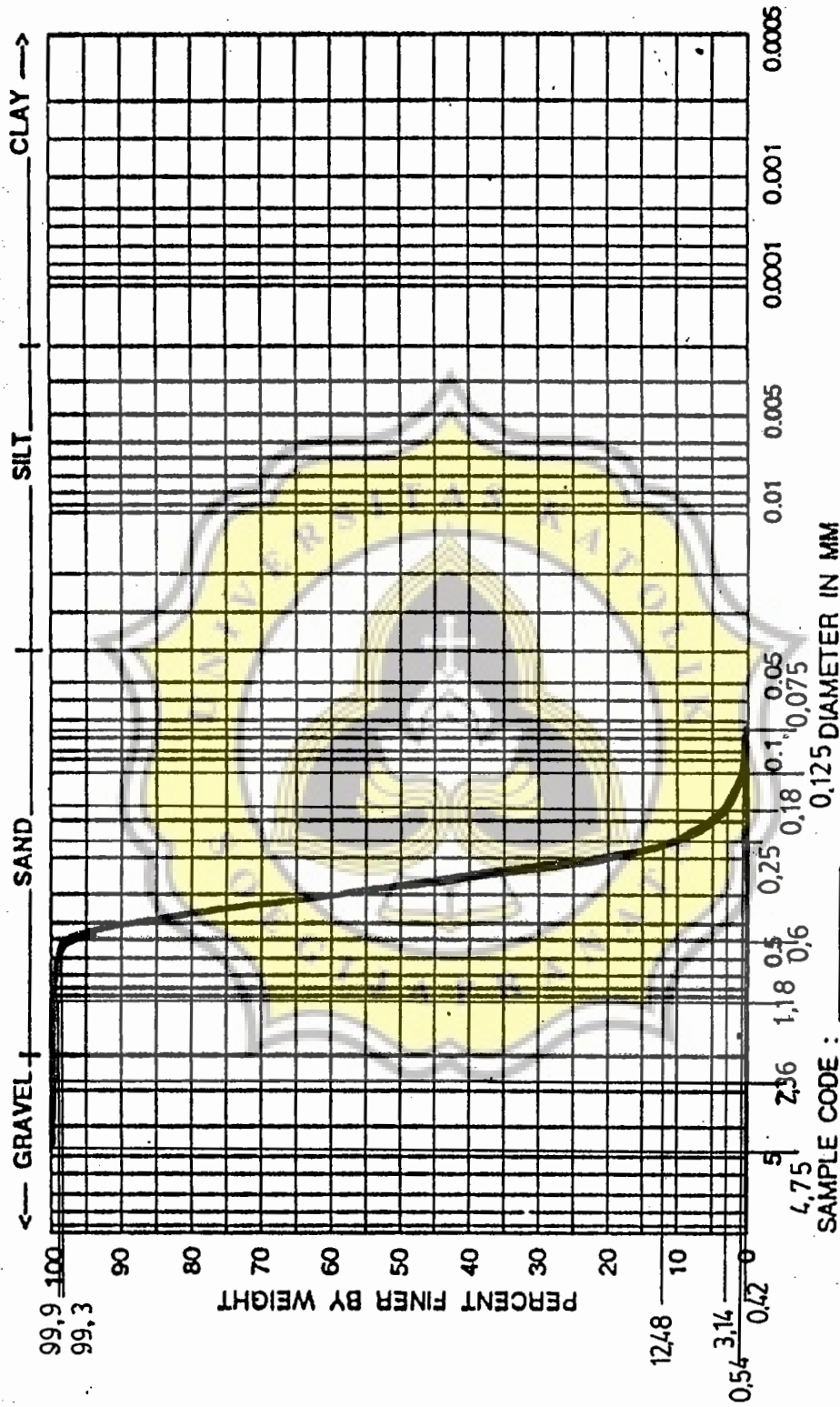
Sieve no.	DIAM (mm)	Wt. of retained	% retained	% passing
4	4,75	0	0	100
8	2,36	0	0	100
16	1,18	0,5	0,1	99,9
30	0,6	3	0,6	99,3
60	0,25	432,6	86,52	12,78
80	0,18	48,2	9,64	3,14
120	0,125	13	2,6	0,54
200	0,075	0,6	0,12	0,42
pan	—	0,2	0,04	0,38

$$\% \text{ retained} = 100 - \Sigma \% \text{ retained}$$



**LABORATORIUM MEKANIKA TANAH
 FAKULTAS TEKNIK JURUSAN SIPIL
 UNIKA SOEGLJAPRANATA SEMARANG**

GRAIN SIZE ACCUMULATION CURVE



LABORATORIUM MEKANIKA TANAH
 FAKULTAS TEKNIK JURUSAN SIPIL
 UNIVERSITAS SOEGIJAPRANATA SEMARANG

KALIMANTAN

0.125 DIAMETER IN MM
 SAMPLE CODE :

GRAIN SIZE ANALYSIS - MECHANICAL

Project : TUGAS AKHIR
 Location of Project : P. PARANGTRITIS
 Description of Soil : SAND
 Tested By : _____

Job No. : _____
 Boring No. : _____ Sample No. : _____
 Depth of sample : _____
 Date of testing : _____

Soil Sample Size (ASTM D1140-54)

Nominal diameter of largest particle	Approximate minimum Wt. of sample g
No. 10 sieve	200
No. 4 sieve	500
3/4 in	1500

Wt. of dry sample + container	
Wt. of container	
Wt. of dry sample , W _s	500 gr

Sieve analysis and grain shape

Sieve no.	DIAM (mm)	Wt. of retained	% retained	% passing
4	4.75	0	0	100
8	2.36	0,05	0,01	99,99
16	1,18	0,25	0,05	99,94
30	0,6	63,4	12,68	87,26
60	0,25	221,50	44,30	42,96
80	0,18	149,60	29,92	13,04
120	0,125	59,50	11,90	1,14
200	0,075	3,90	0,78	0,36
pan	—	1,20	0,24	0,12

% retained = 100 - Σ % retained



**LABORATORIUM MEKANIKA TANAH
 FAKULTAS TEKNIK JURUSAN SIPIL
 UNIKA SOEGJAPRANATA SEMARANG**

GRAIN SIZE ANALYSIS - MECHANICAL

Project : TUGAS AKHIR Job No. : _____
 Location of Project : P/SUMATERA Boring No. : _____ Sample No. : _____
 Description of Soil : SAND Depth of sample : _____
 Tested By : _____ Datu of testing : _____

Soli, Sample Size (ASTM D1140-54)

Nomlnal diameter of largest particle	Approximate minimum Wt. of sample g
No. 10 sieve	200
No. 4 sieve	500
3/4 in	1500

Wt. of dry sample + container	
Wt. of container	
Wt. of dry sample , W _s	490 gr.

Sieve analysis and grain shape

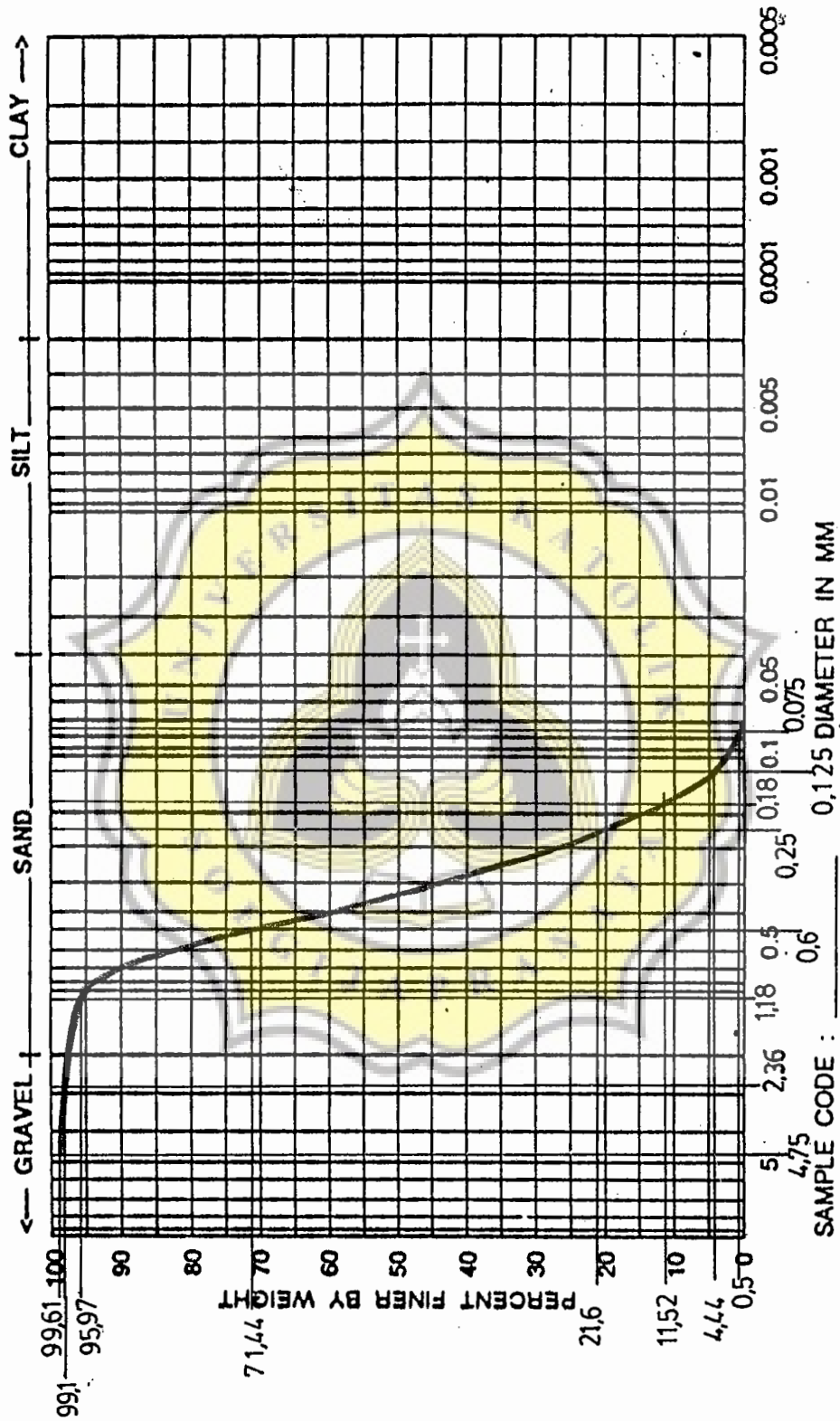
Sieve no.	DIAM (mm)	Wt. of retained	% retained	% passing
4	4.75	1.9	0.39	99.61
8	2.36	2.5	0.51	99.1
16	1.18	15.35	3.13	95.97
30	0.6	120.2	24.53	71.44
60	0.25	244.2	49.84	21.6
80	0.18	49.4	10.08	11.52
120	0.125	34.7	7.08	4.44
200	0.075	19.3	3.94	0.5
pan	—	1.9	0.39	0.11

% retained = 100 - Σ % retained



**LABORATORIUM MEKANIKA TANAH
 FAKULTAS TEKNIK JURUSAN SIPIL
 UNIKA SOEGJAPRANATA SEMARANG**

GRAIN SIZE ACCUMULATION CURVE



SAMPLE CODE : _____ 0.125 DIAMETER IN MM

SUMATERA

LABORATORIUM MEKANIKA TANAH
 FAKULTAS TEKNIK JURUSAN SIPIL
 UNIKA SOEGLJAPRANATA SEMARANG

Perhitungan kadar air pasir Kalimantan dengan campuran 200,300,400,500,dan 600 cc menggunakan rumus seperti di atas.

PERCOBAAN II (200 cc)

$$w_1 = 6,79245 \%$$

$$w_2 = 5,97014 \%$$

$$\begin{aligned} w \text{ rata-rata atas} &= \frac{6,79245 \% + 5,97014 \%}{2} \\ &= 6,38130 \% \end{aligned}$$

$$w_3 = 7,07547 \%$$

$$w_4 = 7,00280 \%$$

$$\begin{aligned} w \text{ rata-rata bawah} &= \frac{7,07547 \% + 7,0028 \%}{2} \\ &= 7,03913 \% \end{aligned}$$

$$\begin{aligned} w (200 \text{ cc}) &= \frac{6,38130 \% + 7,03913 \%}{2} \\ &= 6,71021 \% \end{aligned}$$

PERCOBAAN III (300 cc)

$$w_1 = 9,29705 \%$$

$$w_2 = 9,20770 \%$$

$$\begin{aligned} w \text{ rata-rata atas} &= \frac{9,29705 \% + 9,20770 \%}{2} \\ &= 9,25238 \% \end{aligned}$$

$$w_3 = 12,41134 \%$$

$$w_4 = 15,88235 \%$$

$$\begin{aligned} w \text{ rata-rata bawah} &= \frac{12,41134 \% + 15,88235 \%}{2} \\ &= 14,14685 \% \end{aligned}$$

$$\begin{aligned} w (300 \text{ cc}) &= \frac{9,25238 \% + 14,146865 \%}{2} \\ &= 11,69961 \% \end{aligned}$$

PERCOBAAN IV (400 cc)

$$w_1 = 14,13333 \%$$

$$w_7 = 14,40329 \%$$

$$\begin{aligned} w \text{ rata-rata atas} &= \frac{14,13333 \% + 14,40329 \%}{2} \\ &= 14,26831 \% \end{aligned}$$

$$w_3 = 18,09529 \%$$

$$w_4 = 15,57788 \%$$

$$\begin{aligned} w \text{ rata-rata bawah} &= \frac{18,09529 \% + 15,57788 \%}{2} \\ &= 16,83656 \% \end{aligned}$$

$$\begin{aligned} w (400 \text{ cc}) &= \frac{14,13333 \% + 16,83656 \%}{2} \\ &= 15,55243 \% \end{aligned}$$

PERCOBAAN V (500 cc)

$$w_1 = 15,38462 \%$$

$$w_2 = 15,31100 \%$$

$$\begin{aligned} w \text{ rata-rata atas} &= \frac{15,38462 \% + 15,31100 \%}{2} \\ &= 15,34781 \% \end{aligned}$$

$$w_3 = 16,54929 \%$$

$$w_4 = 16,28788 \%$$

$$\begin{aligned} w \text{ rata-rata bawah} &= \frac{16,54929 \% + 16,28788 \%}{2} \\ &= 16,41858 \% \end{aligned}$$

$$\begin{aligned} w (500 \text{ cc}) &= \frac{15,34781 \% + 16,41858 \%}{2} \\ &= 15,88319 \% \end{aligned}$$

PERCOBAAN VI (600 cc)

$$w_1 = 14,17142 \%$$

$$w_2 = 14,17624 \%$$

$$\begin{aligned} w \text{ rata-rata atas} &= \frac{14,17142 \% + 14,17624 \%}{2} \\ &= 14,17383 \% \end{aligned}$$

$$\begin{aligned} w_3 &= 14,20911 \% \\ w_4 &= 14,50549 \% \end{aligned}$$

$$\begin{aligned} w \text{ rata-rata bawah} &= \frac{14,20911 \% + 14,50549 \%}{2} \\ &= 14,3573 \% \end{aligned}$$

$$\begin{aligned} w (600 \text{ cc}) &= \frac{14,1738 \% + 14,3573 \%}{2} \\ &= 14,26557 \% \end{aligned}$$

2. PERHITUNGAN WET DENSITY (BERAT VOLUME BASAH)

Diketahui :

Dimensi Mold :

$$R : 5,0675 \text{ cm}$$

$$\pi : 3,14$$

$$t : 11,38 \text{ cm}$$

$$\begin{aligned} V &= \pi \cdot r^2 \cdot t \\ &= 917,61271 \text{ cm}^3 \end{aligned}$$

$$\gamma_b - \frac{W}{V} = \frac{\text{Wt. of Soil in Mold}}{\text{Vol. Soil in Mold}}$$

PERCOBAAN I (100 cc)

$$\text{Wt. of Soil + Mold} = 4830 \text{ gr}$$

$$\text{Wt. of Mold} = 4070 \text{ gr}$$

$$\text{Wt. of Soil in Mold} = 4830 - 4070 = 760 \text{ gr}$$

$$\gamma_b - \frac{760,0000}{917,61271} = 0,82823 \text{ gram/ cm}^3$$

PERCOBAAN II (200 cc)

$$\text{Wt. of Soil + Mold} = 4900 \text{ gr}$$

$$\text{Wt. of Mold} = 4070 \text{ gr}$$

$$\text{Wt. of Soil in Mold} = 4900 - 4070 = 830 \text{ gr}$$

$$\gamma_b - \frac{830,00000}{917,61271} = 0,90452 \text{ gram/ cm}^3$$

PERCOBAAN III (300 cc)

$$\begin{aligned} \text{Wt. of Soil + Mold} &= 4970 \text{ gr} \\ \text{Wt. of Mold} &= 4070 \text{ gr} \\ \text{Wt. of Soil in Mold} &= 4970 - 4070 = 900 \text{ gr} \end{aligned}$$

$$\gamma_b - \frac{900,00000}{917,61271} = 0,98080 \text{ gram/ cm}^3$$

PERCOBAAN IV (400 cc)

$$\begin{aligned} \text{Wt. of Soil + Mold} &= 5050 \text{ gr} \\ \text{Wt. of Mold} &= 4070 \text{ gr} \\ \text{Wt. of Soil in Mold} &= 5050 - 4070 = 980 \text{ gr} \end{aligned}$$

$$\gamma_b - \frac{980,00000}{917,61271} = 1,06798 \text{ gram/ cm}^3$$

PERCOBAAN V (500 cc)

$$\begin{aligned} \text{Wt. of Soil + Mold} &= 5040 \text{ gr} \\ \text{Wt. of Mold} &= 4070 \text{ gr} \\ \text{Wt. of Soil in Mold} &= 5040 - 4070 = 970 \text{ gr} \end{aligned}$$

$$\gamma_b - \frac{970,00000}{917,61271} = 1,05709 \text{ gram/ cm}^3$$

PERCOBAAN VI (600 cc)

$$\begin{aligned} \text{Wt. of Soil + Mold} &= 5025 \text{ gr} \\ \text{Wt. of Mold} &= 4070 \text{ gr} \\ \text{Wt. of Soil in Mold} &= 5025 - 4070 = 955 \text{ gr} \end{aligned}$$

$$\gamma_b - \frac{955,00000}{917,61271} = 1,04074 \text{ gram/ cm}^3$$

3. PERHITUNGAN DRY DENSITY (BERAT VOLUME KERING)

$$\gamma_d = \frac{\gamma_b \times 100 \%}{(100 + w \%)} \quad \text{dimana ;}$$

γ_b = Wet density (gr/ cm³)

γ_d = Dry density (gr/ cm³)

w = Water content (%)

PERCOBAAN I (100 cc)

$$\gamma_d = \frac{0,82823 \times 100}{(100 + 3,05588)} = 0,80367 \text{ gram/cm}^3$$

PERCOBAAN II (200 cc)

$$\gamma_d = \frac{0,90452 \times 100}{(100 + 6,71021)} = 0,84764 \text{ gram/cm}^3$$

PERCOBAAN III (300 cc)

$$\gamma_d = \frac{0,98080 \times 100}{(100 + 11,69961)} = 0,87807 \text{ gram/cm}^3$$

PERCOBAAN IV (400 cc)

$$\gamma_d = \frac{1,06798 \times 100}{(100 + 15,55243)} = 0,92424 \text{ gram/cm}^3$$

PERCOBAAN V (500 cc)

$$\gamma_d = \frac{1,05709 \times 100}{(100 + 17,98267)} = 0,89597 \text{ gram/cm}^3$$

PERCOBAAN VI (600 cc)

$$\gamma_d = \frac{1,05164 \times 100}{(100 + 17,65765)} = 0,89381 \text{ gram/cm}^3$$

4. PERHITUNGAN POROSITY

$$n = \frac{\gamma_d}{(G_s \times W)} \quad \text{dimana ;}$$

γ_d = Dry density (gram/cm³)

G_s = Spesific gravity

W = 1 gram/cm³

PERCOBAAN I (100 cc)

$$n = 1 - \frac{0,80367}{(2,5597 \times 1)}$$
$$= 0,68602$$

PERCOBAAN II (200 cc)

$$n = 1 - \frac{0,84764}{(2,5597 \times 1)}$$
$$= 0,66885$$

PERCOBAAN III (300 cc)

$$n = 1 - \frac{0,87807}{(2,5597 \times 1)}$$
$$= 0,655696$$

PERCOBAAN IV (400 cc)

$$n = 1 - \frac{0,92424}{(2,5597 \times 1)}$$
$$= 0,63892$$

PERCOBAAN V (500 cc)

$$n = 1 - \frac{0,91220}{(2,5597 \times 1)}$$
$$= 0,64363$$

PERCOBAAN VI (600 cc)

$$n = 1 - \frac{0,91081}{(2,5597 \times 1)}$$
$$= 0,64417$$

5. PERHITUNGAN VOID RATIO (ANGKA PORI)

$$e = \frac{n}{1 - n} \quad \text{dimana ;}$$

n = porosity

PERCOBAAN I (100 cc)

$$e = \frac{0,68602}{1 - 0,68602} = 2,18499$$

PERCOBAAN II (200 cc)

$$e = \frac{0,66885}{1 - 0,66885} = 2,01979$$

PERCOBAAN III (300 cc)

$$e = \frac{0,65696}{1 - 0,65696} = 1,91513$$

PERCOBAAN IV (400 cc)

$$e = \frac{0,63892}{1 - 0,63892} = 1,76951$$

PERCOBAAN V (500 cc)

$$e = \frac{0,64363}{1 - 0,64363} = 1,80606$$

PERCOBAAN VI (600 cc)

$$e = \frac{0,64417}{1 - 0,64417} = 1,81036$$

6. PERHITUNGAN ZERO AIR LINE

$$Y_z = \frac{G_s \times Y_w \times 100}{100 + (G_s \times w)} \quad \text{dimana ;}$$

Gs = Spesific Grafity

w = Water content

$$\gamma_w = 1$$

PERCOBAAN I (100 cc)

$$\begin{aligned}\gamma_z &= \frac{2,5597 \times 1 \times 100}{100 + (2,5597 \times 3,05588)} \\ &= 2,37400\end{aligned}$$

PERCOBAAN II (200 cc)

$$\begin{aligned}\gamma_z &= \frac{2,5597 \times 1 \times 100}{100 + (2,5597 \times 6,71021)} \\ &= 2,18448\end{aligned}$$

PERCOBAAN III (300 cc)

$$\begin{aligned}\gamma_z &= \frac{2,5597 \times 1 \times 100}{100 + (2,5597 \times 11,699961)} \\ &= 1,96979\end{aligned}$$

PERCOBAAN IV (400 cc)

$$\begin{aligned}\gamma_z &= \frac{2,5597 \times 1 \times 100}{100 + (2,5597 \times 15,55243)} \\ &= 1,83084\end{aligned}$$

PERCOBAAN V (500 cc)

$$\begin{aligned}\gamma_z &= \frac{2,5597 \times 1 \times 100}{100 + (2,5597 \times 16,41858)} \\ &= 1,81982\end{aligned}$$

PERCOBAAN VI (600 cc)

$$\begin{aligned}\gamma_z &= \frac{2,5597 \times 1 \times 100}{100 + (2,5597 \times 14,26557)} \\ &= 1,87502\end{aligned}$$

Perhitungan kadar air pasir pantai Parangtritis dengan campuran 200,300,400,500,dan 600 cc menggunakan rumus seperti di atas.

PERCOBAAN II (200 cc)

$$w_1 = 6,12244 \%$$

$$w_2 = 6,58914 \%$$

$$\begin{aligned} w \text{ rata-rata atas} &= \frac{6,12244 \% + 6,58914 \%}{2} \\ &= 6,35579 \% \end{aligned}$$

$$w_3 = 5,36398 \%$$

$$w_4 = 5,39419 \%$$

$$\begin{aligned} w \text{ rata-rata bawah} &= \frac{5,36398 \% + 5,39419 \%}{2} \\ &= 5,37908 \% \end{aligned}$$

$$\begin{aligned} w (200 \text{ cc}) &= \frac{6,35579 \% + 5,37908 \%}{2} \\ &= 5,86744 \% \end{aligned}$$

PERCOBAAN III (300 cc)

$$w_1 = 10,94147 \%$$

$$w_2 = 9,97876 \%$$

$$\begin{aligned} w \text{ rata-rata atas} &= \frac{10,94147 \% + 9,97876 \%}{2} \\ &= 10,46012 \% \end{aligned}$$

$$w_3 = 10,46228 \%$$

$$w_4 = 12,68292 \%$$

$$\begin{aligned} w \text{ rata-rata bawah} &= \frac{10,46228 \% + 12,68292 \%}{2} \\ &= 11,57261 \% \end{aligned}$$

$$\begin{aligned} w (300 \text{ cc}) &= \frac{10,46012 \% + 11,57261 \%}{2} \\ &= 11,01633 \% \end{aligned}$$

PERCOBAAN IV (400 cc)

$$w_1 = 18,29653 \%$$

$$w_2 = 17,83216 \%$$

$$\begin{aligned} w \text{ rata-rata atas} &= \frac{18,29653 \% + 17,83216 \%}{2} \\ &= 18,06434 \% \end{aligned}$$

$$w_3 = 17,74193 \%$$

$$w_4 = 18,58585 \%$$

$$\begin{aligned} w \text{ rata-rata bawah} &= \frac{17,74193 \% + 18,58585 \%}{2} \\ &= 18,16389 \% \end{aligned}$$

$$\begin{aligned} w (400 \text{ cc}) &= \frac{18,06434 \% + 18,16389 \%}{2} \\ &= 18,11412 \% \end{aligned}$$

PERCOBAAN V (500 cc)

$$w_1 = 19,08396 \%$$

$$w_2 = 18,46153 \%$$

$$\begin{aligned} w \text{ rata-rata atas} &= \frac{19,08396 \% + 18,46153 \%}{2} \\ &= 18,77275 \% \end{aligned}$$

$$w_3 = 19,92409 \%$$

$$w_4 = 20,00000 \%$$

$$\begin{aligned} w \text{ rata-rata bawah} &= \frac{19,92409 \% + 20,00000 \%}{2} \\ &= 19,96204 \% \end{aligned}$$

$$\begin{aligned} w (500 \text{ cc}) &= \frac{18,77275 \% + 19,96204 \%}{2} \\ &= 19,36740 \% \end{aligned}$$

PERCOBAAN VI (600 cc)

$$w_1 = 15,15151 \%$$

$$w_2 = 19,25133 \%$$

$$w \text{ rata-rata atas} = \frac{15,15151 \% + 19,25133 \%}{2}$$

$$= 17,20142 \%$$

$$w_3 = 17,67068 \%$$

$$w_4 = 18,43137 \%$$

$$w \text{ rata-rata bawah} = \frac{17,67068 \% + 18,43137 \%}{2}$$

$$= 18,051027 \%$$

$$w (600 \text{ cc}) = \frac{17,20142 \% + 18,051027 \%}{2}$$

$$= 17,62622 \%$$

2. PERHITUNGAN WET DENSITY (BERAT VOLUME BASAH)

Diketahui :

Dimensi Mold :

$$R : 5,0675 \text{ cm}$$

$$\pi : 3,14$$

$$t : 11,38 \text{ cm}$$

$$V = \pi \cdot r^2 \cdot t$$

$$= 917,61271 \text{ cm}^3$$

$$\gamma_b = \frac{W}{V} = \frac{\text{Wt. of Soil in Mold}}{\text{Vol. Soil in Mold}}$$

PERCOBAAN I (100 cc)

$$\text{Wt. of Soil + Mold} = 4850 \text{ gr}$$

$$\text{Wt. of Mold} = 4070 \text{ gr}$$

$$\text{Wt. of Soil in Mold} = 4850 - 4070 = 780 \text{ gr}$$

$$\gamma_b = \frac{780,0000}{917,61271} = 0,85003 \text{ gram/ cm}^3$$

PERCOBAAN II (200 cc)

$$\text{Wt. of Soil + Mold} = 4890 \text{ gr}$$

$$\text{Wt. of Mold} = 4070 \text{ gr}$$

$$\text{Wt. of Soil in Mold} = 4890 - 4070 = 820 \text{ gr}$$

$$\gamma_b = \frac{820,00000}{917,61271} = 0,89362 \text{ gram/ cm}^3$$

PERCOBAAN III (300 cc)

$$\begin{aligned} \text{Wt. of Soil + Mold} &= 5020 \text{ gr} \\ \text{Wt. of Mold} &= 4070 \text{ gr} \\ \text{Wt. of Soil in Mold} &= 5020 - 4070 = 950 \text{ gr} \end{aligned}$$

$$\gamma_b = \frac{950,00000}{917,61271} = 1,03529 \text{ gram/ cm}^3$$

PERCOBAAN IV (400 cc)

$$\begin{aligned} \text{Wt. of Soil + Mold} &= 5155 \text{ gr} \\ \text{Wt. of Mold} &= 4070 \text{ gr} \\ \text{Wt. of Soil in Mold} &= 5155 - 4070 = 1085 \text{ gr} \end{aligned}$$

$$\gamma_b = \frac{1085,00000}{917,61271} = 1,18241 \text{ gram/ cm}^3$$

PERCOBAAN V (500 cc)

$$\begin{aligned} \text{Wt. of Soil + Mold} &= 5135 \text{ gr} \\ \text{Wt. of Mold} &= 4070 \text{ gr} \\ \text{Wt. of Soil in Mold} &= 5135 - 4070 = 1065 \text{ gr} \end{aligned}$$

$$\gamma_b = \frac{1065,00000}{917,61271} = 1,16062 \text{ gram/ cm}^3$$

PERCOBAAN VI (600 cc)

$$\begin{aligned} \text{Wt. of Soil + Mold} &= 5125 \text{ gr} \\ \text{Wt. of Mold} &= 4070 \text{ gr} \\ \text{Wt. of Soil in Mold} &= 5125 - 4070 = 1055 \text{ gr} \end{aligned}$$

$$\gamma_b = \frac{1055,00000}{917,61271} = 1,14972 \text{ gram/ cm}^3$$

3. PERHITUNGAN DRY DENSITY (BERAT VOLUME KERING)

$$\gamma_d = \frac{\gamma_b \times 100\%}{(100 \times w\%)} \quad \text{dimana ;}$$

γ_b = Wet density (gr/ cm³)

γ_d = Dry density (gr/ cm³)

w = Water content (%)

PERCOBAAN I (100 cc)

$$\gamma_d = \frac{0,85003 \times 100}{(100 + 2,30881)} = 0,83084 \text{ gram/cm}^3$$

PERCOBAAN II (200 cc)

$$\gamma_d = \frac{0,89362 \times 100}{(100 + 5,86744)} = 0,84409 \text{ gram/cm}^3$$

PERCOBAAN III (300 cc)

$$\gamma_d = \frac{1,03529 \times 100}{(100 + 11,01636)} = 0,93256 \text{ gram/cm}^3$$

PERCOBAAN IV (400 cc)

$$\gamma_d = \frac{1,18241 \times 100}{(100 + 18,11412)} = 1,00107 \text{ gram/cm}^3$$

PERCOBAAN V (500 cc)

$$\gamma_d = \frac{1,16062 \times 100}{(100 + 19,36740)} = 0,97230 \text{ gram/cm}^3$$

PERCOBAAN VI (600 cc)

$$\gamma_d = \frac{1,14972 \times 100}{(100 + 17,62622)} = 0,97743 \text{ gram/cm}^3$$

4. PERHITUNGAN POROSITY

$$n = \frac{\gamma_d}{(G_s \times W)} \quad \text{dimana ;}$$

γ_d = Dry density (gram/cm³)

G_s = Spesific gravity

W = 1 gram/cm³

PERCOBAAN I (100 cc)

$$\begin{aligned}n &= 1 - \frac{0,83084}{(2,77012 \times 1)} \\ &= 0,70007\end{aligned}$$

PERCOBAAN II (200 cc)

$$\begin{aligned}n &= 1 - \frac{0,84409}{(2,77012 \times 1)} \\ &= 0,69528\end{aligned}$$

PERCOBAAN III (300 cc)

$$\begin{aligned}n &= 1 - \frac{0,93256}{(2,77012 \times 1)} \\ &= 0,66335\end{aligned}$$

PERCOBAAN IV (400 cc)

$$\begin{aligned}n &= 1 - \frac{1,00107}{(2,77012 \times 1)} \\ &= 0,63861\end{aligned}$$

PERCOBAAN V (500 cc)

$$\begin{aligned}n &= 1 - \frac{0,97230}{(2,77012 \times 1)} \\ &= 0,64900\end{aligned}$$

PERCOBAAN VI (600 cc)

$$\begin{aligned}n &= 1 - \frac{0,97743}{(2,77012 \times 1)} \\ &= 0,64715\end{aligned}$$

5. PERHITUNGAN VOID RATIO (ANGKA PORI)

$$e = \frac{n}{1 - n} \quad \text{dimana ;}$$

n = porosity

PERCOBAAN I (100 cc)

$$e = \frac{0,70007}{1 - 0,70007} = 2,33419$$

PERCOBAAN II (200 cc)

$$e = \frac{0,69528}{1 - 0,69528} = 2,28170$$

PERCOBAAN III (300 cc)

$$e = \frac{0,66335}{1 - 0,66335} = 1,97044$$

PERCOBAAN IV (100 cc)

$$e = \frac{0,63861}{1 - 0,63861} = 1,76709$$

PERCOBAAN V (500 cc)

$$e = \frac{0,64900}{1 - 0,64900} = 1,84900$$

PERCOBAAN VI (600 cc)

$$e = \frac{0,64715}{1 - 0,64715} = 1,83406$$

6. PERHITUNGAN ZERO AIR LINE

$$Y_z = \frac{G_s \times \gamma_w \times 100}{100 + (G_s \times W)} \quad \text{dimana ;}$$

Gs = Specific Gravity

w = Water content

$$\gamma_w = 1$$

PERCOBAAN I (100 cc)

$$\begin{aligned}\gamma_z &= \frac{2,77012 \times 1 \times 100}{100 + (2,77012 \times 2,30881)} \\ &= 2,60360\end{aligned}$$

PERCOBAAN II (200 cc)

$$\begin{aligned}\gamma_z &= \frac{2,77012 \times 1 \times 100}{100 + (2,77012 \times 5,86744)} \\ &= 2,38282\end{aligned}$$

PERCOBAAN III (300 cc)

$$\begin{aligned}\gamma_z &= \frac{2,77012 \times 1 \times 100}{100 + (2,77012 \times 11,01636)} \\ &= 2,12242\end{aligned}$$

PERCOBAAN IV (400 cc)

$$\begin{aligned}\gamma_z &= \frac{2,77012 \times 1 \times 100}{100 + (2,77012 \times 18,11412)} \\ &= 1,84455\end{aligned}$$

PERCOBAAN V (500 cc)

$$\begin{aligned}\gamma_z &= \frac{2,77012 \times 1 \times 100}{100 + (2,77012 \times 19,36740)} \\ &= 1,80287\end{aligned}$$

PERCOBAAN VI (600 cc)

$$\begin{aligned}\gamma_z &= \frac{2,77012 \times 1 \times 100}{100 + (2,77012 \times 17,62622)} \\ &= 1,861305\end{aligned}$$

3. PERHITUNGAN MODIFIED PROCTOR PASIR SUMATERA

1. WATER CONTENT

Sampel pasir diambil bagian atas dan bawah diambil 2 sampel untuk dihitung kadar airnya.

$$\text{Rumus : } w = \frac{a-b}{b-c} \times 100 \%$$

dimana ; a = Wt.of Can. + Wet Soil
b = Wt. of Can + Dry Soil
c = Wt. of Can

PERCOBAAN I

Atas

a: 29,7 gr
b: 28 gr
c: 4,55 gr

$$w_1 = \frac{29,7 - 28}{28 - 4,55} \times 100 \%$$

$$= 7,24946 \%$$

a: 32,1 gr
b: 30,6 gr
c: 4,6 gr

$$w_2 = \frac{32,1 - 30,6}{30,6 - 4,6} \times 100 \%$$

$$= 5,76923 \%$$

a: 32,25 gr
b: 30,3 gr
c: 4,8 gr

$$w_3 = \frac{32,25 - 30,3}{30,3 - 4,8} \times 100 \%$$

$$= 7,64705 \%$$

a: 32,8 gr
b: 30,4 gr
c: 4,7 gr

$$w_4 = \frac{32,8 - 30,4}{30,4 - 4,7} \times 100 \%$$

$$= 9,33852 \%$$

$$w \text{ rata-rata atas} = \frac{w_1 + w_2}{2}$$

$$= \frac{7,24946 \% + 5,76923 \%}{2}$$

$$= 6,50935 \%$$

$$w \text{ rata-rata bawah} = \frac{w_3 + w_4}{2}$$

$$= \frac{7,64706 \% + 9,33852 \%}{2}$$

$$= 8,49279 \%$$

$$w (200 \text{ cc}) = \frac{w \text{ rata-rata atas} + w \text{ rata-rata bawah}}{2}$$

$$= \frac{6,50935 \% + 8,49279 \%}{2}$$

$$= 7,50107 \%$$

Perhitungan kadar air pasir pantai Sumatera dengan campuran 300,400,500,600 dan 700 cc menggunakan rumus seperti di atas.

PERCOBAAN II (300 cc)

$$w_1 = 8,33333 \%$$

$$w_2 = 8,68687 \%$$

$$\begin{aligned} w \text{ rata-rata atas} &= \frac{8,33333 \% + 8,68687 \%}{2} \\ &= 8,51010 \% \end{aligned}$$

$$w_3 = 11,32530 \%$$

$$w_4 = 10,43956 \%$$

$$\begin{aligned} w \text{ rata-rata bawah} &= \frac{11,32530 \% + 10,43956 \%}{2} \\ &= 10,88243 \% \end{aligned}$$

$$\begin{aligned} w (300 \text{ cc}) &= \frac{8,51010 \% + 10,88243 \%}{2} \\ &= 9,69626 \% \end{aligned}$$

PERCOBAAN III (400 cc)

$$w_1 = 13,47826 \%$$

$$w_2 = 12,38779 \%$$

$$\begin{aligned} w \text{ rata-rata atas} &= \frac{13,47826 \% + 12,38779 \%}{2} \\ &= 12,93302 \% \end{aligned}$$

$$w_3 = 15,75091 \%$$

$$w_4 = 15,43408 \%$$

$$\begin{aligned} w \text{ rata-rata bawah} &= \frac{15,75091 \% + 15,43408 \%}{2} \\ &= 15,59249 \% \end{aligned}$$

$$\begin{aligned} w (400 \text{ cc}) &= \frac{12,93302 \% + 15,59249 \%}{2} \\ &= 14,26276 \% \end{aligned}$$

PERCOBAAN IV (500 cc)

$$w_1 = 15,87301 \%$$

$$w_2 = 16,43059 \%$$

$$\begin{aligned} \text{w rata-rata atas} &= \frac{15,87301 \% + 16,43059 \%}{2} \\ &= 16,15181 \% \end{aligned}$$

$$w_3 = 16,84698 \%$$

$$w_4 = 15,87301 \%$$

$$\begin{aligned} \text{w rata-rata bawah} &= \frac{16,84698 \% + 15,87301 \%}{2} \\ &= 16,36000 \% \end{aligned}$$

$$\begin{aligned} \text{w (500 cc)} &= \frac{16,15181 \% + 16,36000 \%}{2} \\ &= 16,25590 \% \end{aligned}$$

PERCOBAAN V (600 cc)

$$w_1 = 18,79049 \%$$

$$w_2 = 17,30382 \%$$

$$\begin{aligned} \text{w rata-rata atas} &= \frac{18,79049 \% + 17,30382 \%}{2} \\ &= 18,04715 \% \end{aligned}$$

$$w_3 = 18,83235 \%$$

$$w_4 = 16,05166 \%$$

$$\begin{aligned} \text{w rata-rata bawah} &= \frac{18,83235 \% + 16,05166 \%}{2} \\ &= 17,21701 \% \end{aligned}$$

$$\begin{aligned} \text{w (600 cc)} &= \frac{18,04715 \% + 17,21701 \%}{2} \\ &= 17,63208 \% \end{aligned}$$

PERCOBAAN VI (700 cc)

$$w_1 = 16,53222 \%$$

$$w_2 = 16,36727 \%$$

$$\begin{aligned} w \text{ rata-rata atas} &= \frac{16,53222 \% + 16,36727 \%}{2} \\ &= 16,44976 \% \end{aligned}$$

$$w_3 = 15,12195 \%$$

$$w_4 = 15,73948 \%$$

$$\begin{aligned} w \text{ rata-rata bawah} &= \frac{15,12195 \% + 15,73948 \%}{2} \\ &= 15,43071 \% \end{aligned}$$

$$\begin{aligned} w (700 \text{ cc}) &= \frac{16,44976 \% + 15,43071 \%}{2} \\ &= 15,954023 \% \end{aligned}$$

2. PERHITUNGAN WET DENSITY (BERAT VOLUME BASAH)

Diketahui :

Dimensi Mold :

$$R : 5,0675 \text{ cm}$$

$$\pi : 3,14$$

$$t : 11,38 \text{ cm}$$

$$\begin{aligned} V &= \pi \cdot r^2 \cdot t \\ &= 917,61271 \text{ cm}^3 \end{aligned}$$

$$Y_b = \frac{W}{V} = \frac{\text{Wt. of Soil in Mold}}{\text{Vol. Soil in Mold}}$$

PERCOBAAN I (200 cc)

$$\text{Wt. of Soil + Mold} = 4955 \text{ gr}$$

$$\text{Wt. of Mold} = 4070 \text{ gr}$$

$$\text{Wt. of Soil in Mold} = 4955 - 4070 = 885 \text{ gr}$$

$$Y_b = \frac{885,0000}{917,61271} = 0,96445 \text{ gram/ cm}^3$$

PERCOBAAN II (300 cc)

$$\text{Wt. of Soil + Mold} = 5020 \text{ gr}$$

$$\text{Wt. of Mold} = 4070 \text{ gr}$$

$$\text{Wt. of Soil in Mold} = 5020 - 4070 = 950 \text{ gr}$$

$$\gamma_b = \frac{950,00000}{917,61271} = 1,03529 \text{ gram/ cm}^3$$

PERCOBAAN III (400 cc)

Wt. of Soil + Mold = 5105 gr
 Wt. of Mold = 4070 gr
 Wt. of Soil in Mold = 5105 - 4070 = 1035 gr

$$\gamma_b = \frac{1035,00000}{917,61271} = 1,12792 \text{ gram/ cm}^3$$

PERCOBAAN IV (500 cc)

Wt. of Soil + Mold = 5150 gr
 Wt. of Mold = 4070 gr
 Wt. of Soil in Mold = 5150 - 4070 = 1080 gr

$$\gamma_b = \frac{1080,00000}{917,61271} = 1,17696 \text{ gram/ cm}^3$$

PERCOBAAN V (600 cc)

Wt. of Soil + Mold = 5190 gr
 Wt. of Mold = 4070 gr
 Wt. of Soil in Mold = 5190 - 4070 = 1120 gr

$$\gamma_b = \frac{1120,00000}{917,61271} = 1,22055 \text{ gram/ cm}^3$$

PERCOBAAN VI (700 cc)

Wt. of Soil + Mold = 5150 gr
 Wt. of Mold = 4070 gr
 Wt. of Soil in Mold = 5150 - 4070 = 1080 gr

$$\gamma_b = \frac{1080,00000}{917,61271} = 1,17696 \text{ gram/ cm}^3$$

3. PERHITUNGAN DRY DENSITY (BERAT VOLUME KERING)

$$\gamma_d = \frac{\gamma_b \times 100\%}{(100 \times w\%)} \quad \text{dimana ;}$$

γ_b = Wet density (gr/ cm³)

γ_d = Dry density (gr/ cm³)

w = Water content (%)

PERCOBAAN I (200 cc)

$$\gamma_d = \frac{0,96445 \times 100}{(100 + 7,50106)} = 0,89715 \text{ gram/cm}^3$$

PERCOBAAN II (300 cc)

$$\gamma_d = \frac{1,03529 \times 100}{(100 + 9,69629)} = 0,94377 \text{ gram/cm}^3$$

PERCOBAAN III (400 cc)

$$\gamma_d = \frac{1,12792 \times 100}{(100 + 14,26276)} = 0,98712 \text{ gram/cm}^3$$

PERCOBAAN IV (500 cc)

$$\gamma_d = \frac{1,17696 \times 100}{(100 + 16,22590)} = 1,012387 \text{ gram/cm}^3$$

PERCOBAAN V (600 cc)

$$\gamma_d = \frac{1,22055 \times 100}{(100 + 17,63208)} = 1,03759 \text{ gram/cm}^3$$

PERCOBAAN VI (700 cc)

$$\gamma_d = \frac{1,17696 \times 100}{(100 + 15,94023)} = 1,01514 \text{ gram/cm}^3$$

4. PERHITUNGAN POROSITY

$$n = \frac{\gamma_d}{(G_s \times W)} \quad \text{dimana ;}$$

γ_d = Dry density (gram/cm³)

G_s = Spesific gravity

W = 1 gram/cm³

PERCOBAAN I (200 cc)

$$n = 1 - \frac{0,89715}{(2,57944 \times 1)}$$
$$= 0,65219$$

PERCOBAAN II (300 cc)

$$n = 1 - \frac{0,94377}{(2,57944 \times 1)}$$
$$= 0,63411$$

PERCOBAAN III (400 cc)

$$n = 1 - \frac{0,98712}{(2,57944 \times 1)}$$
$$= 0,61731$$

PERCOBAAN IV (500 cc)

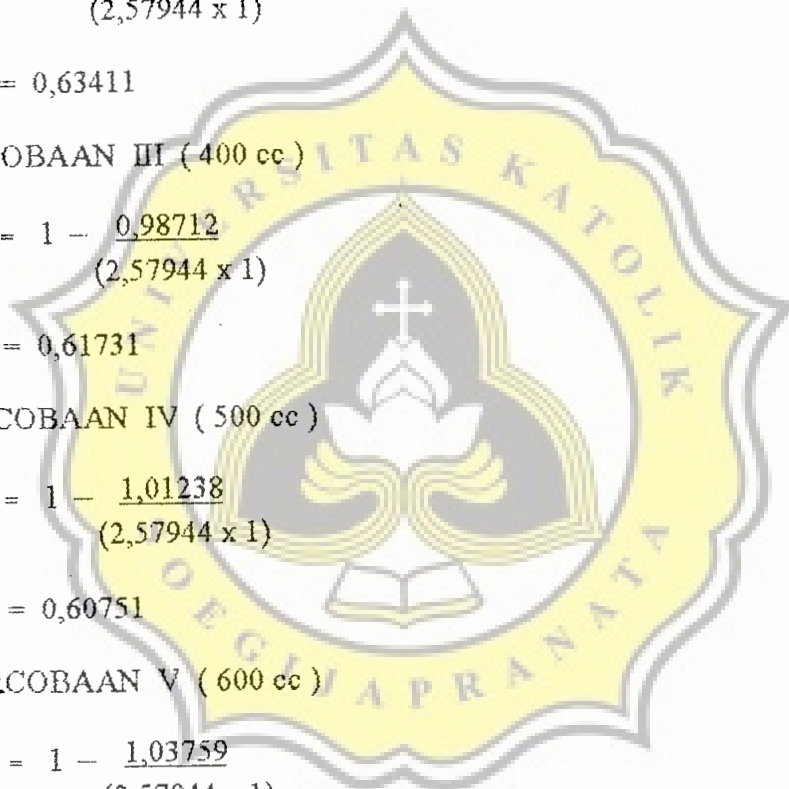
$$n = 1 - \frac{1,01238}{(2,57944 \times 1)}$$
$$= 0,60751$$

PERCOBAAN V (600 cc)

$$n = 1 - \frac{1,03759}{(2,57944 \times 1)}$$
$$= 0,59774$$

PERCOBAAN VI (700 cc)

$$n = 1 - \frac{1,01514}{(2,57944 \times 1)}$$
$$= 0,60644$$



5. PERHITUNGAN VOID RATIO (ANGKA PORI)

$$e = \frac{n}{1 - n} \quad \text{dimana ;}$$

$n = \text{porosity}$

PERCOBAAN I (200 cc)

$$e = \frac{0,65219}{1 - 0,65219} = 1,87513$$

PERCOBAAN II (300 cc)

$$e = \frac{0,63411}{1 - 0,63411} = 1,73306$$

PERCOBAAN III (400 cc)

$$e = \frac{0,61731}{1 - 0,61731} = 1,61308$$

PERCOBAAN IV (500 cc)

$$e = \frac{0,60751}{1 - 0,60751} = 1,54783$$

PERCOBAAN V (600 cc)

$$e = \frac{0,59774}{1 - 0,59774} = 1,48595$$

PERCOBAAN VI (700 cc)

$$e = \frac{0,60644}{1 - 0,60644} = 1,54090$$

6. PERHITUNGAN ZERO AIR LINE

$$\gamma_z = \frac{G_s \times \gamma_w \times 100}{100 + (G_s \times W)} \quad \text{dimana ;}$$

Gs = Specific Gravity

w = Water content

$$\gamma_w = 1$$

PERCOBAAN I (200 cc)

$$\begin{aligned} \gamma_z &= \frac{2,57944 \times 1 \times 100}{100 + (2,57944 \times 7,50106)} \\ &= 2,16126 \end{aligned}$$

PERCOBAAN II (300 cc)

$$\begin{aligned} \gamma_z &= \frac{2,57944 \times 1 \times 100}{100 + (2,57944 \times 9,69626)} \\ &= 2,06337 \end{aligned}$$

PERCOBAAN III (400 cc)

$$\begin{aligned} \gamma_z &= \frac{2,57944 \times 1 \times 100}{100 + (2,57944 \times 14,26276)} \\ &= 1,88569 \end{aligned}$$

PERCOBAAN IV (500 cc)

$$\begin{aligned} \gamma_z &= \frac{2,57944 \times 1 \times 100}{100 + (2,57944 \times 16,25590)} \\ &= 1,81738 \end{aligned}$$

PERCOBAAN V (600 cc)

$$\begin{aligned} \gamma_z &= \frac{2,57944 \times 1 \times 100}{100 + (2,57944 \times 17,63208)} \\ &= 1,77304 \end{aligned}$$

PERCOBAAN VI (700 cc)

$$\begin{aligned} \gamma_z &= \frac{2,57944 \times 1 \times 100}{100 + (2,57944 \times 15,94023)} \\ &= 1,82787 \end{aligned}$$

TABEL 4.1 SIFAT-SIFAT FISIK PASIR PANTAI KALIMANTAN DARI HASIL PERCOBAAN MODIFIED PROCTOR

Banyaknya air (cc)	Kadar air (w %)	Wet Density (γ_b %)	Dry Density (γ_d %)	Porosity (n)	Void Ratio (e)	Zero air V. L
100	3,05588	0,82823	0,80367	0,68602	2,18499	2,37400
200	6,71021	0,90452	0,84764	0,66885	2,01979	2,18448
300	11,69961	0,98080	0,87807	0,65696	1,91513	1,96979
400	15,55243	1,06798	0,92424	0,63892	1,76951	1,83084
500	15,88319	1,05709	0,91220	0,64363	1,80606	1,81982
600	14,26557	1,04074	0,91081	0,64417	1,81036	1,87502

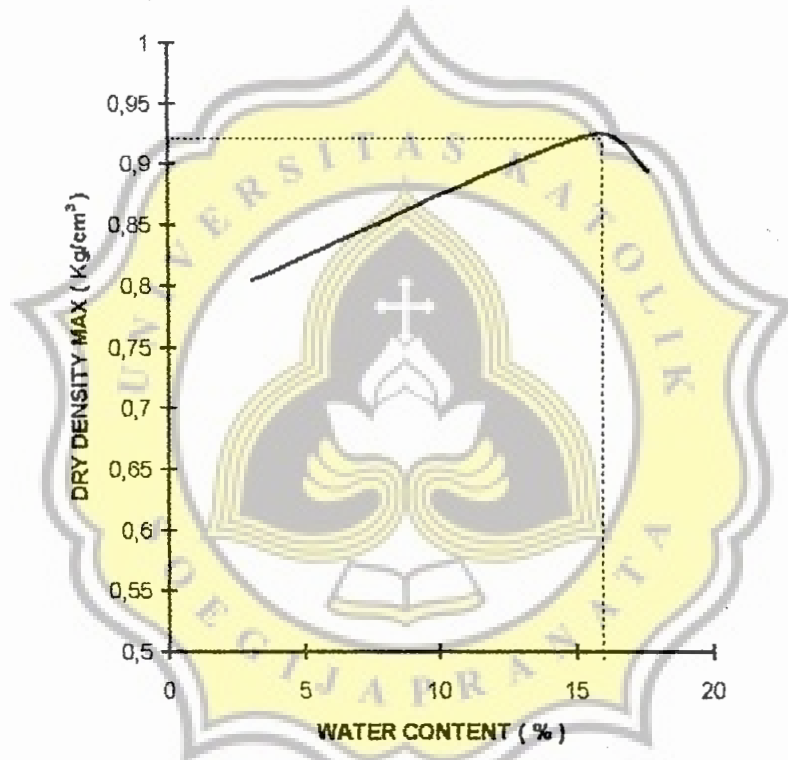
TABEL 4.2 SIFAT-SIFAT FISIK PASIR PANTAI PARANGTRITIS DARI HASIL PERCOBAAN MODIFIED PROCTOR

Banyaknya air (cc)	Kadar air (w %)	Wet Density (γ_b %)	Dry Density (γ_d %)	Porosity (n)	Void Ratio (e)	Zero air V. L
100	2,30881	0,85003	0,83084	0,70006	2,33409	0,82574
200	5,86744	0,89362	0,84409	0,69528	2,28176	0,79705
300	11,01636	1,03529	0,93256	0,66335	1,97045	0,71618
400	18,11412	1,18241	1,00107	0,63861	1,76713	0,64791
500	19,36740	1,16062	0,97969	0,64900	1,84901	0,65719
600	17,62622	1,14972	0,97743	0,64715	1,83407	0,66193

TABEL 4.3 SIFAT-SIFAT FISIK PASIR PANTAI SUMATERA DARI HASIL PERCOBAAN MODIFIED PROCTOR

Banyaknya air (cc)	Kadar air (w %)	Wet Density (γ_b %)	Dry Density (γ_d %)	Porosity (n)	Void ratio (e)	Zero air V. L
200	7,50107	0,96445	0,89715	0,65219	1,87513	2,16126
300	9,69627	1,03529	0,94377	0,63411	1,73306	2,06337
400	14,26276	1,12792	0,98712	0,61731	1,61308	1,88569
500	16,25590	1,17696	1,01238	0,60751	1,54783	1,81738
600	17,63208	1,22055	1,03759	0,59774	1,48595	1,77304
700	15,94024	1,17696	1,01514	0,60644	1,54090	1,82787

**GRAFIK 4.1 : HUBUNGAN ANTARA WATER CONTENT
DAN DRY DENSITY
(PASIR KALIMANTAN)**

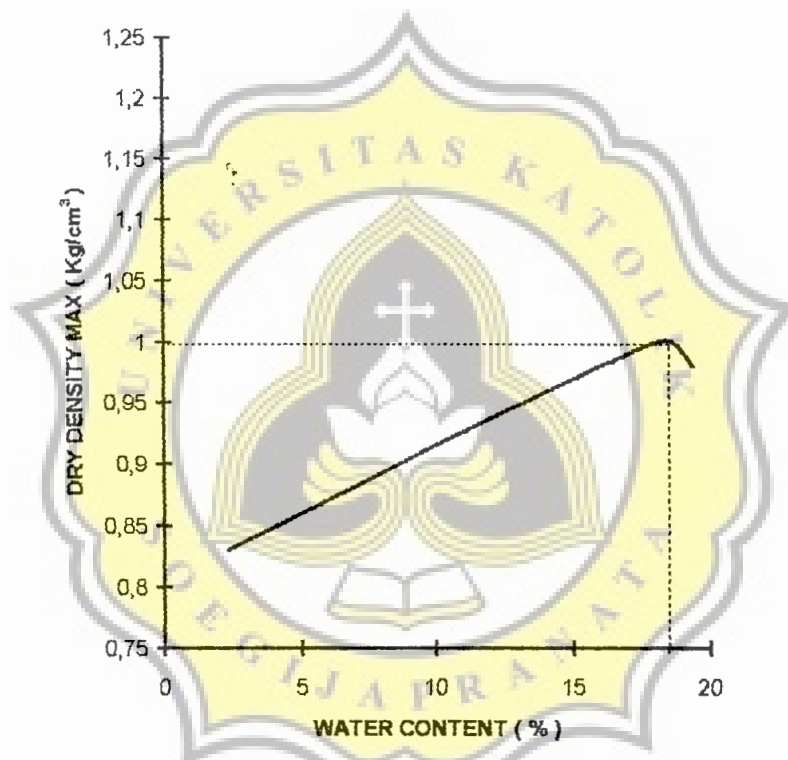


Keterangan grafik 4.1 :

Optimum Moisture content = 15,55 %

Maximum Dry Density = 0,924 gr/cm³

**GRAFIK 4.2 : HUBUNGAN ANTARA WATER CONTENT
DAN DRY DENSITY
(PASIR PARANGTRITIS)**

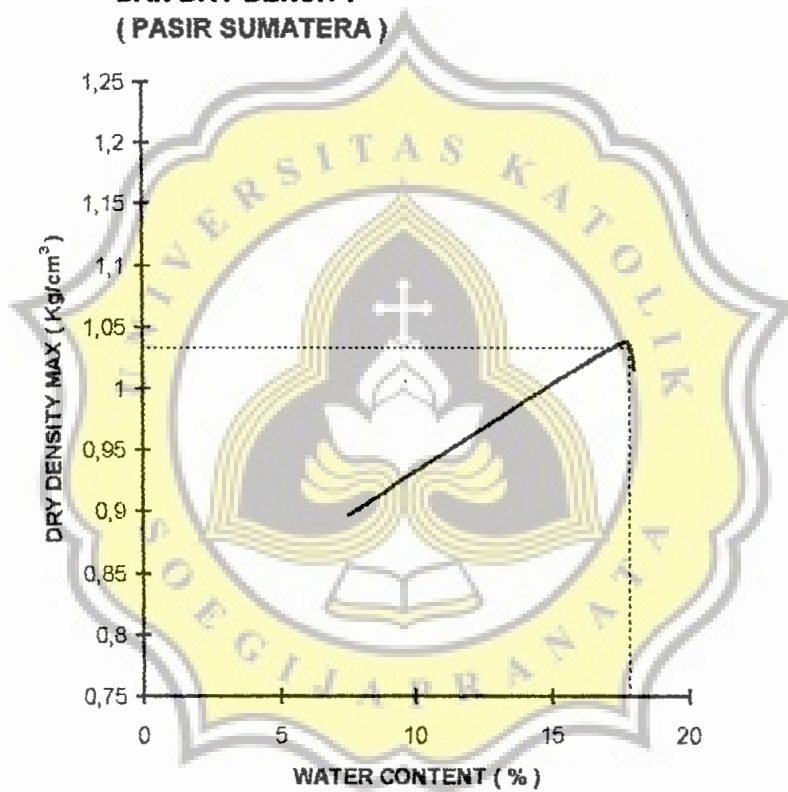


Keterangan grafik 4.2 :

Optimum Moisture content = 18,114 %

Maximum Dry Density = 1,182 gr/cm³

GRAFIK 4.3 : HUBUNGAN ANTARA WATER CONTENT DAN DRY DENSITY (PASIR SUMATERA)



Keterangan grafik 4.3 :

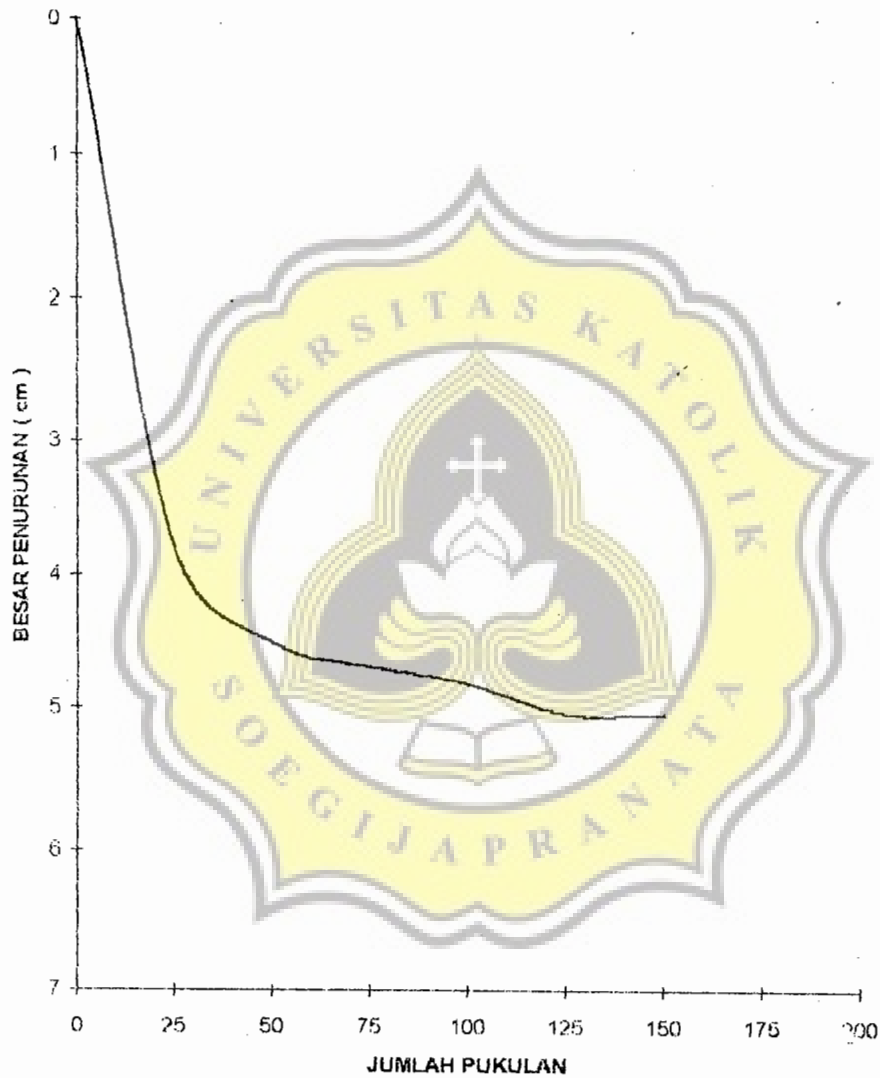
Optimum Moisture content = 17,63 %

Maximum Dry Density = 1,037 gr/cm³

TABEL PERCOBAAN PENURUNAN PASIR AKIBAT BEBAN VERTIKAL DENGAN PASIR BASAH PADA SAMPEL PASIR PANTAI KALIMANTAN (Kadar air optimum = 400 cc)

Tinggi pasir mula- mula	Banyaknya pukulan	Penurunan terhadap tinggi mula-mula	Tinggi pasir akibat pemukulan a- b /4	Penurunan
(a cm)	(n kali)	(b cm)	(cm)	(cm)
16	25	3,5 4,0 3,6 4,1	12,2	3,8
16	25	4,4 4,45 4,6 4,65	11,48	0,72
16	25	4,5 4,9 4,8 4,6	11,3	0,18
16	25	5,3 5 4,6 4,4	11,175	0,125
16	25	5,5 5 4,7 5	10,95	0,225
16	25	4,5 5,3 5,2 5,2	10,95	0

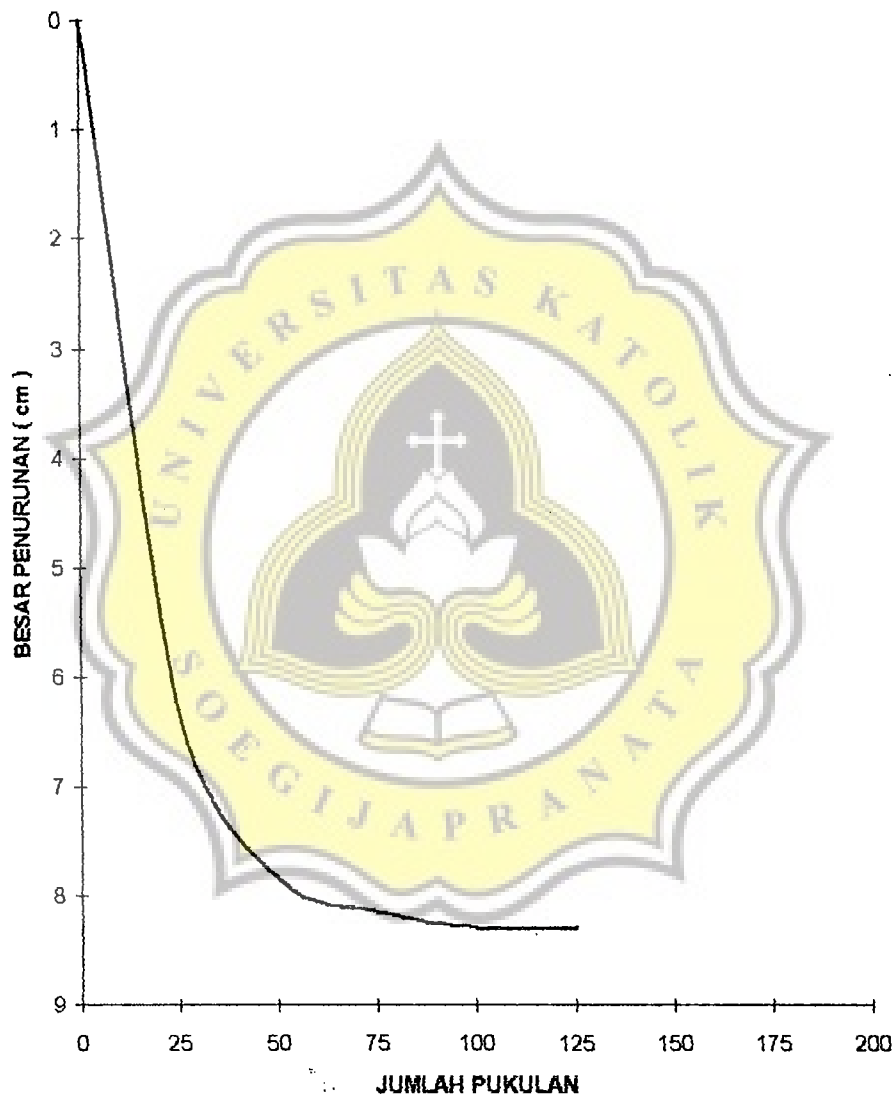
**GRAFIK HUBUNGAN ANTARA JUMLAH PUKULAN
DENGAN BESARNYA PENURUNAN
PADA PASIR PANTAI KALIMANTAN (BASAH)
METODE BEBAN VERTIKAL**



TABEL PERCOBAAN PENURUNAN PASIR AKIBAT BEBAN VERTIKAL DENGAN PASIR BASAH PADA SAMPEL PASIR PANTAI PARANGTRITIS (Kadar air optimum = 300 cc)

Tinggi pasir mula- mula	Banyaknya pukulan	Penurunan terhadap tinggi mula- mula	Tinggi pasir akibat pemukulan a- b /4	Penurunan
(a cm)	(n kali)	(b cm)	(cm)	(cm)
16	25	6,9 6,2 6,1 6,1	9,675	6,325
16	25	7,9 7,9 7,8 7,8	8,15	1,525
16	25	8,2 8,2 8,1 8,2	7,85	0,3
16	25	8,3 8,3 8,3 8,3	7,7	0,15
16	25	8,3 8,3 8,3 8,3	7,7	0

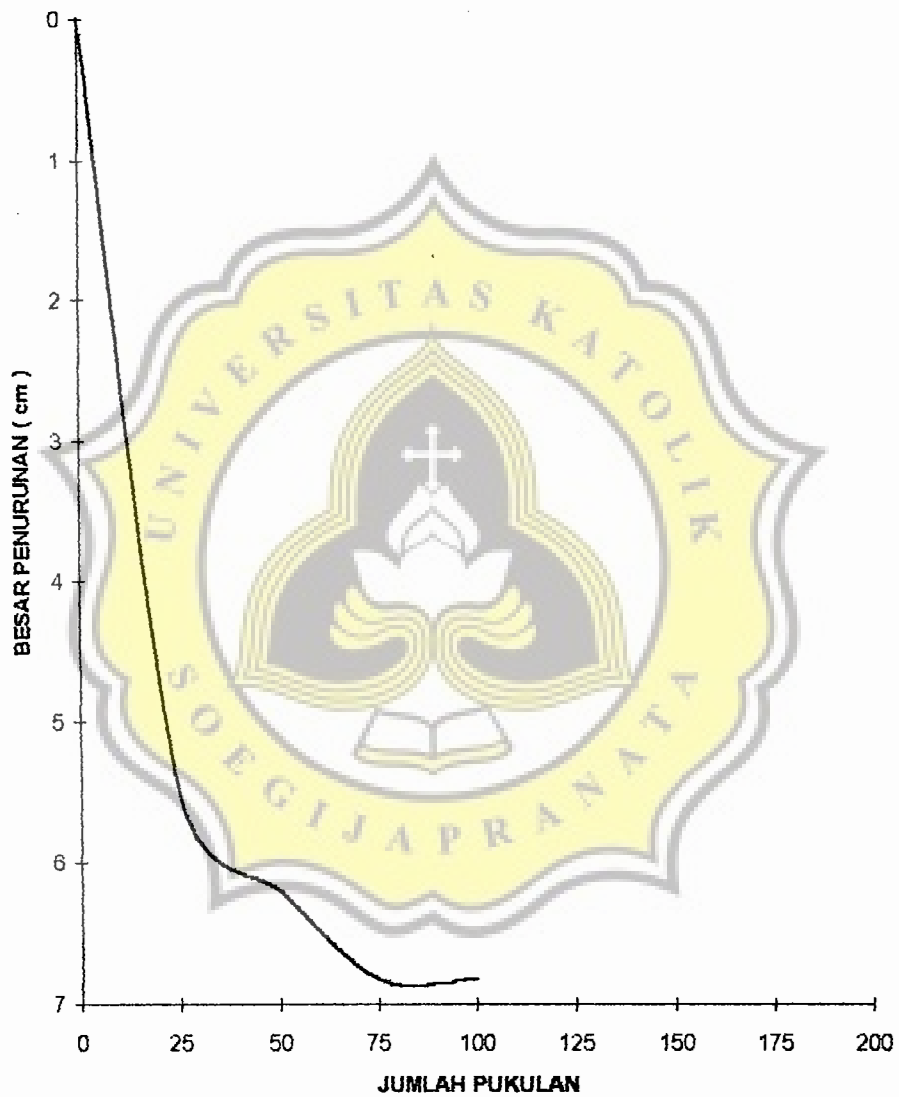
**GRAFIK HUBUNGAN ANTARA JUMLAH PUKULAN
DENGAN BESARNYA PENURUNAN
PADA PASIR PANTAI PARANG TRITIS (BASAH)
METODE BEBAN VERTIKAL**



TABEL PERCOBAAN PENURUNAN PASIR AKIBAT BEBAN VERTIKAL
DENGAN PASIR BASAH PADA SAMPEL PASIR PANTAI
SUMATERA
(Kadar air optimum = 600 cc)

Tinggi pasir mula- mula	Banyaknya pukulan	Penurunan terhadap tinggi mula- mula	Tinggi pasir akibat pemukulan $a - b / 4$	Penurunan
(a cm)	(n kali)	(b cm)	(cm)	(cm)
16	25	5,6 5,4 5,5 5,6	10,475	5,525
16	25	6,2 6,1 6,2 6,3	9,8	0,675
16	25	6,7 6,7 6,5 6,7	9,35	0,625
16	25	6,5 6,7 6,7 6,7	9,35	0

**GRAFIK HUBUNGAN ANTARA JUMLAH PUKULAN
DENGAN BESARNYA PENURUNAN
PADA PASIR PANTAI SUMATERA (BASAH)
METODE BEBAN VERTIKAL**

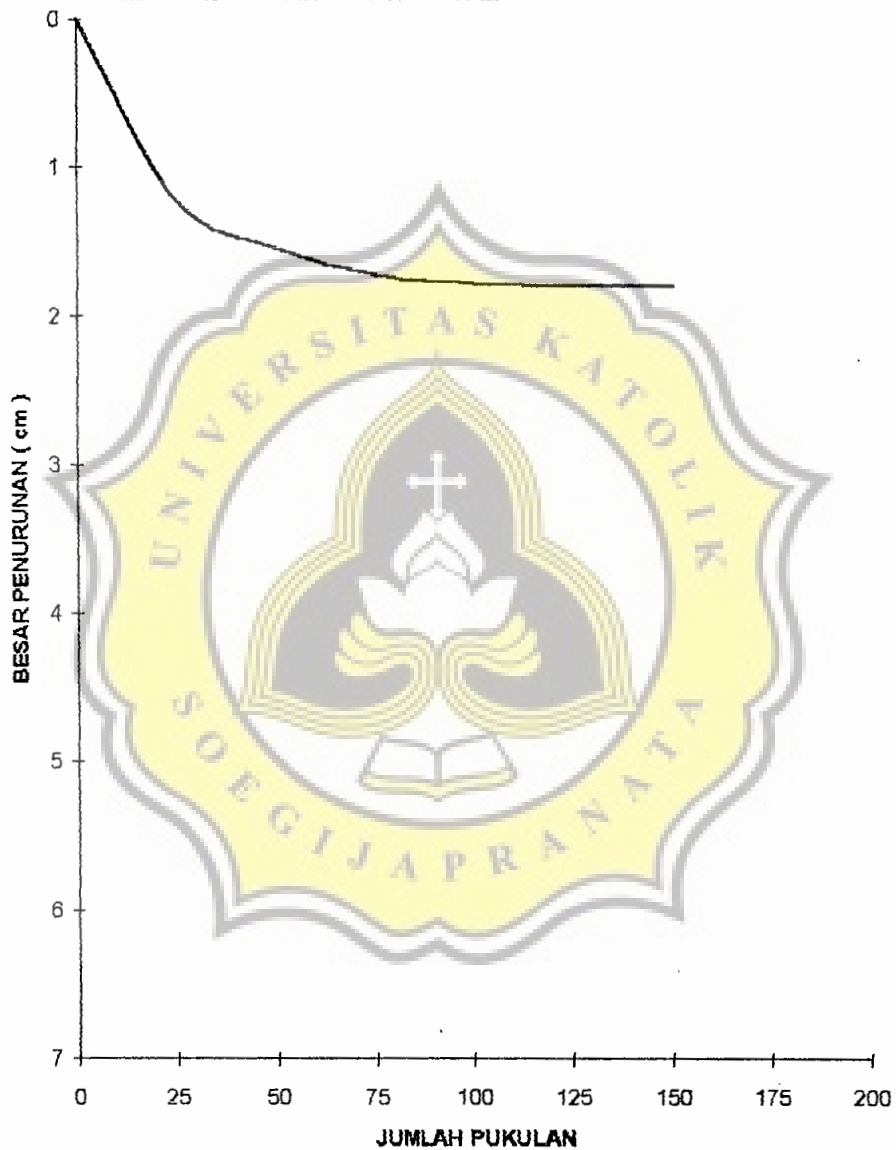


TABEL PERCOBAAN PENURUNAN PASIR AKIBAT BEBAN HORIZONTAL DENGAN SAMPEL PASIR KERING PADA PASIR PANTAI KALIMANTAN

Sudut getar = 45° ; Tinggi alat terhadap permukaan = 42 cm; Panjang tali penggantung beban = 30 cm; Bertat beban = 100 gr.

Tinggi pasir mula- mula	Banyaknya pukulan	Penurunan terhadap tinggi mula- mula	Tinggi pasir akibat pemukulan a- b /4	Penurunan
(a cm)	(n kali)	(b cm)	(cm)	(cm)
16	25	1,1	14,775	1,225
		1,2		
		1,5		
		1,1		
16	25	1,4	14,45	0,325
		1,4		
		1,4		
		1,5		
16	25	1,7	14,275	0,175
		1,7		
		1,7		
		1,8		
16	25	1,6	14,225	0,05
		1,9		
		1,7		
		1,9		
16	25	1,8	14,2	0,025
		1,8		
		1,8		
		1,8		
16	25	1,8	14,2	0
		1,8		
		1,8		
		1,8		

**GRAFIK HUBUNGAN ANTARA JUMLAH PUKULAN
DENGAN BESARNYA PENURUNAN
PADA PASIR PANTAI KALIMANTAN (KERING)
METODE BEBAN HORIZONTAL**

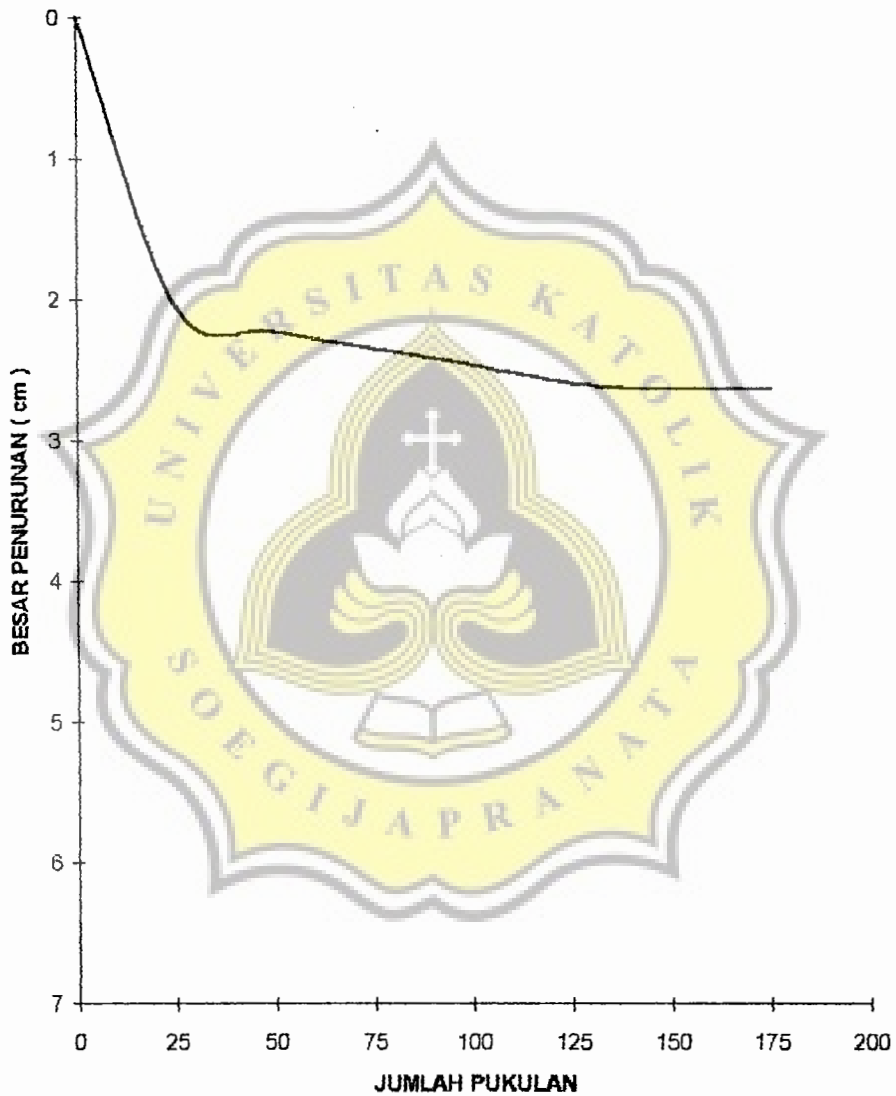


TABEL PERCOBAAN PENURUNAN PASIR AKIBAT BEBAN HORIZONTAL DENGAN SAMPEL PASIR KERING PADA PASIR PANTAI PARANGTRITIS

Sudut getar = 45° ; Tinggi alat terhadap permukaan = 42 cm; Panjang tali penggantung beban = 30 cm; Berat beban = 100 gr.

Tinggi pasir mula- mula	Banyaknya pukulan	Penurunan terhadap tinggi mula- mula	Tinggi pasir akibat pemukulan a- b /4	Penurunan
(a cm)	(n kali)	(b cm)	(cm)	(cm)
16	25	1,6 1,8 1,8 1,6	14,3	1,7
16	25	2,1 2,1 2 2	13,95	0,35
16	25	2,1 2,2 2,2 2,4	13,775	0,175
16	25	2,4 2,4 2,3 2,3	13,65	0,125
16	25	2,4 2,4 2,6 2,46	13,535	0,115
16	25	2,46 2,6 2,6 2,6	13,435	0,135
16	25	2,6 2,6 2,6 2,6	13,4	0,035
16	25	2,6 2,6 2,6 2,6	13,4	0

**GRAFIK HUBUNGAN ANTARA JUMLAH PUKULAN
DENGAN BESARNYA PENURUNAN
PADA PASIR PANTAI PARANG TRITIS (KERING)
METODE BEBAN HORIZONTAL**

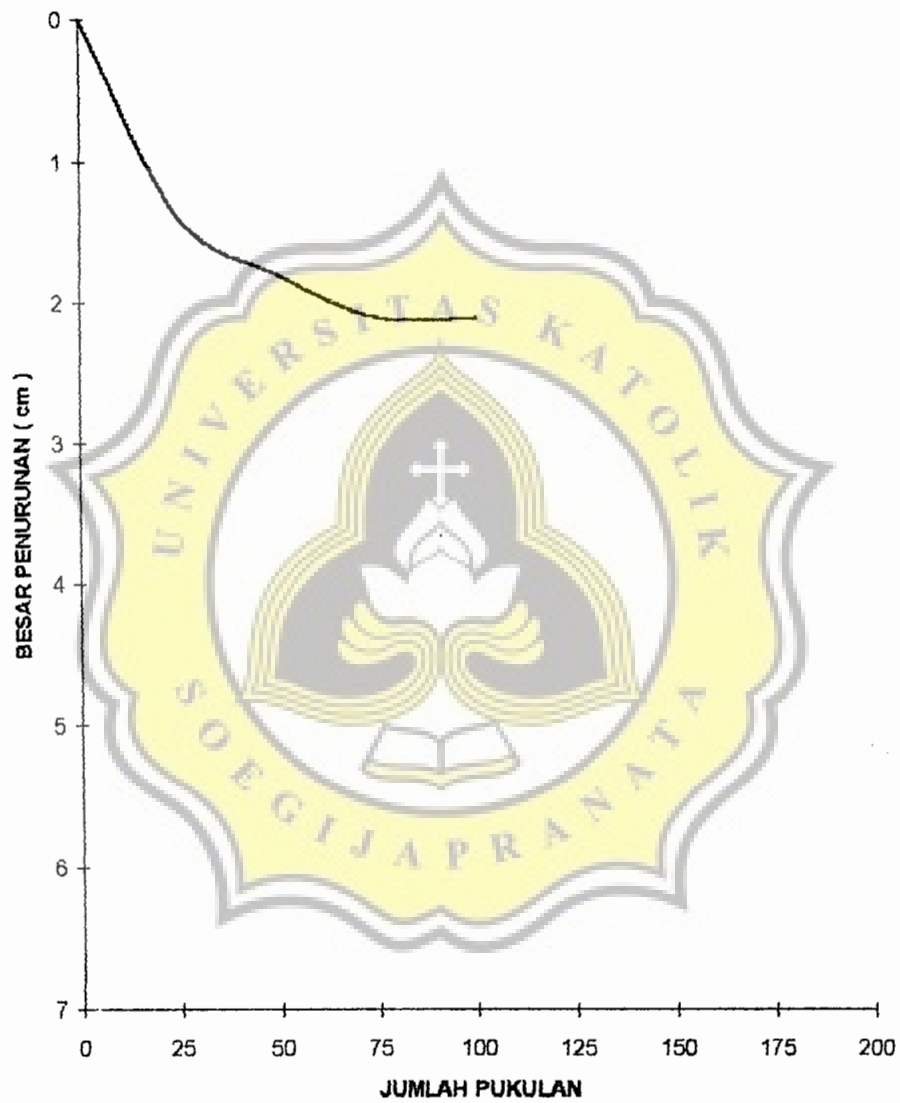


TABEL PERCOBAAN PENURUNAN PASIR AKIBAT BEBAN HORIZONTAL DENGAN SAMPEL PASIR KERING PADA PASIR PANTAI SUMATERA

Sudut getar = 45° ; Tinggi alat terhadap permukaan = 42 cm; Panjang tali penggantung beban = 30 cm; Berat beban = 100 gr.

Tinggi pasir mula- mula	Banyaknya pukulan	Penurunan terhadap tinggi mula- mula	Tinggi pasir akibat pemukulan a- b /4	Penurunan
(a cm)	(n kali)	(b cm)	(cm)	(cm)
16	25	1,4	14,6	1,4
		1,4		
		1,4		
		1,4		
16	25	1,8	14,2	0,4
		1,8		
		1,8		
		1,8		
16	25	2,1	13,9	0,3
		2,1		
		2,1		
		2,1		
16	25	2,1	13,9	0
		2,1		
		2,1		
		2,1		

**GRAFIK HUBUNGAN ANTARA JUMLAH PUKULAN
DENGAN BESARNYA PENURUNAN
PADA PASIR PANTAI SUMATERA (KERING)
METODE BEBAN HORIZONTAL**

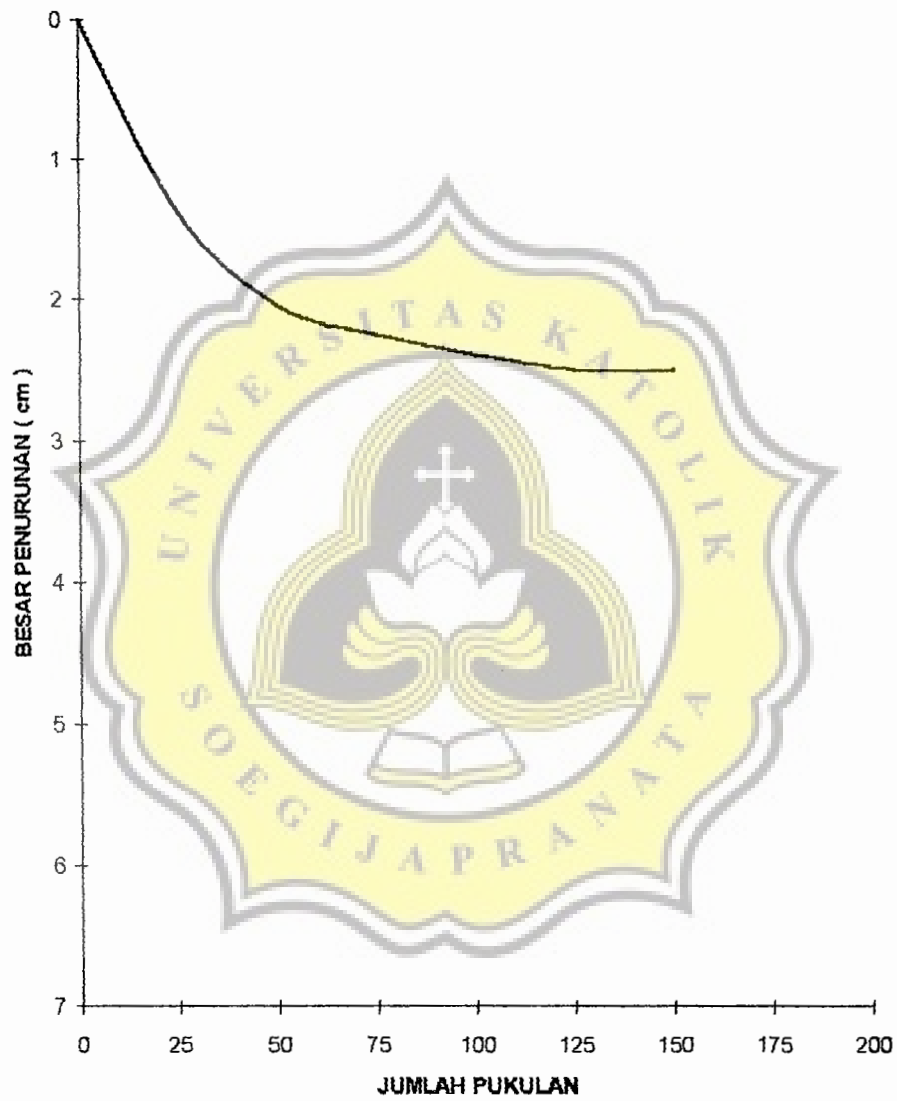


TABEL PERCOBAAN PENURUNAN PASIR AKIBAT BEBAN HORIZONTAL DENGAN SAMPEL PASIR BASAH PADA PASIR PANTAI KALIMANTAN

Kadar air optimum = 400 cc; Sudut getar = 45°; Tinggi alat terhadap permukaan = 42 cm; Panjang tali penggantung beban = 30 cm; Berat beban = 100 gr.

Tinggi pasir mula-mula	Banyaknya pukulan	Penurunan terhadap tinggi mula-mula	Tinggi pasir akibat pemukulan a- b /4	Pemurunan
(a cm)	(n kali)	(b cm)	(cm)	(cm)
16	25	1,6 1,6 1,7 1,8	14,625	1,375
16	25	2 2,1 2,1 2,0	13,95	0,675
16	25	2 2,2 2,5 2,3	13,75	0,2
16	25	2,3 2,3 2,6 2,4	13,6	0,15
16	25	2,4 2,4 2,6 2,6	13,5	0,1
16	25	2,5 2,5 2,5 2,5	13,5	0

**GRAFIK HUBUNGAN ANTARA JUMLAH PUKULAN
DENGAN BESARNYA PENURUNAN
PADA PASIR PANTAI KALIMANTAN (BASAH)
METODE BEBAN HORIZONTAL**

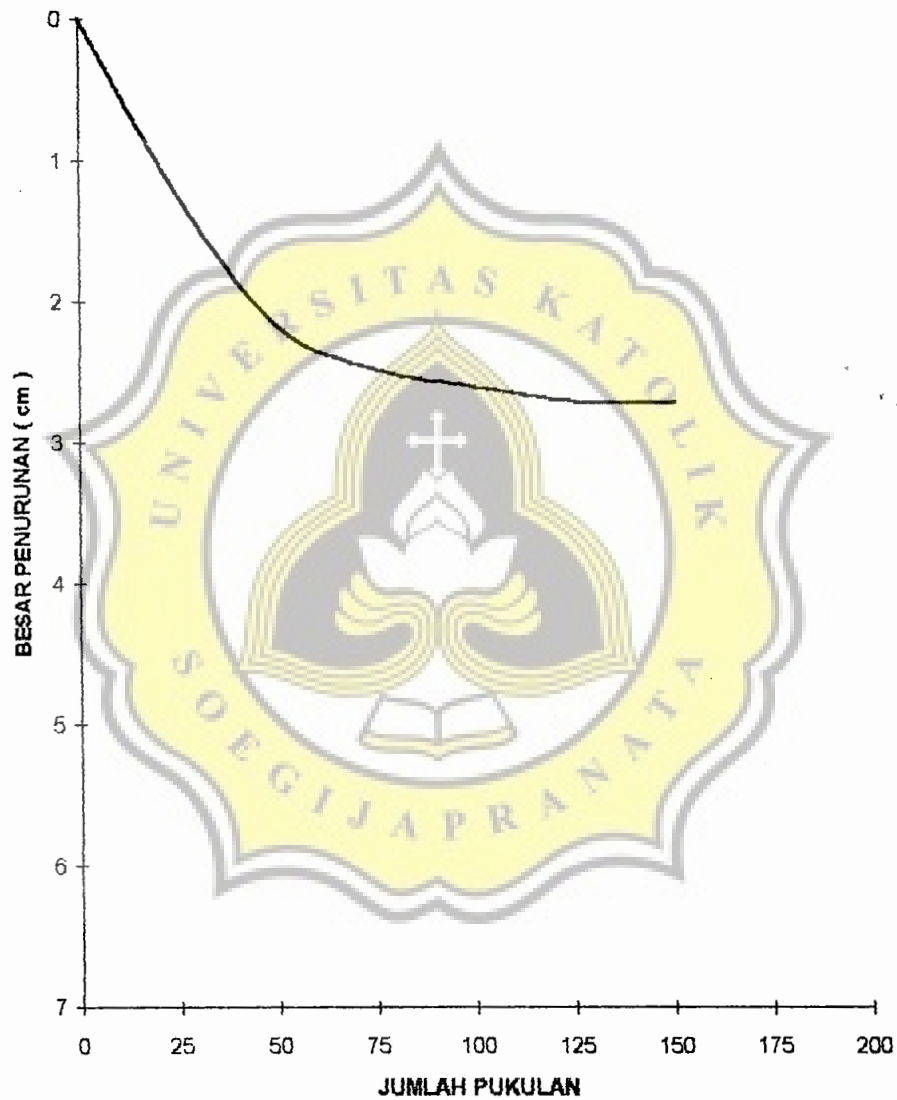


TABEL PERCOBAAN PENURUNAN PASIR AKIBAT BEBAN HORIZONTAL DENGAN SAMPEL PASIR BASAH PADA PASIR PANTAI PARANGTRITIS

Kadar air optimum = 300 cc; Sudut getar = 45°; Tinggi alat terhadap permukaan = 42 cm; Panjang tali penggantung beban = 30 cm; Berat beban = 100 gr.

Tinggi pasir mula- mula	Banyaknya pukulan	Penurunan terhadap tinggi mula- mula	Tinggi pasir akibat pemukulan a- b /4	Penurunan
(a cm)	(n kali)	(b cm)	(cm)	(cm)
16	25	1,3 1,3 1,3 1,4	14,75	1,25
16	25	2,1 2,2 2,3 2,1	13,825	0,925
16	25	2,4 2,4 2,5 2,6	13,525	0,3
		2,6 2,6 2,6 2,6	13,4	0,125
16	25	2,7 2,7 2,7 2,7	13,3	0,1
16	25	2,7 2,7 2,7 2,7	13,3	0

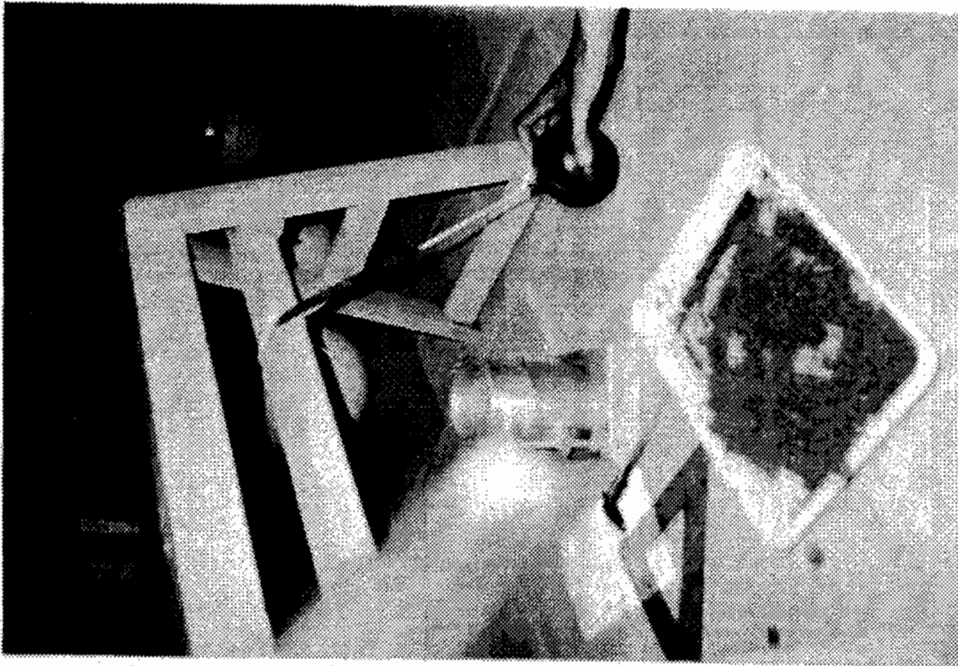
**GRAFIK HUBUNGAN ANTARA JUMLAH PUKULAN
DENGAN BESARNYA PENURUNAN
PADA PASIR PANTAI PARANGTRITIS (BASAH)
METODE BEBAN HORIZONTAL**



TABEL PERCOBAAN PENURUNAN PASIR AKIBAT BEBAN HORIZONTAL DENGAN SAMPEL PASIR BASAH PADA PASIR PANTAI SUMATERA

Kadar air optimum = 600 cc; Sudut getas = 45° ; Tinggi alat terhadap permukaan = 42 cm; Panjang tali penggantung beban = 30 cm; Berat beban = 100 gr.

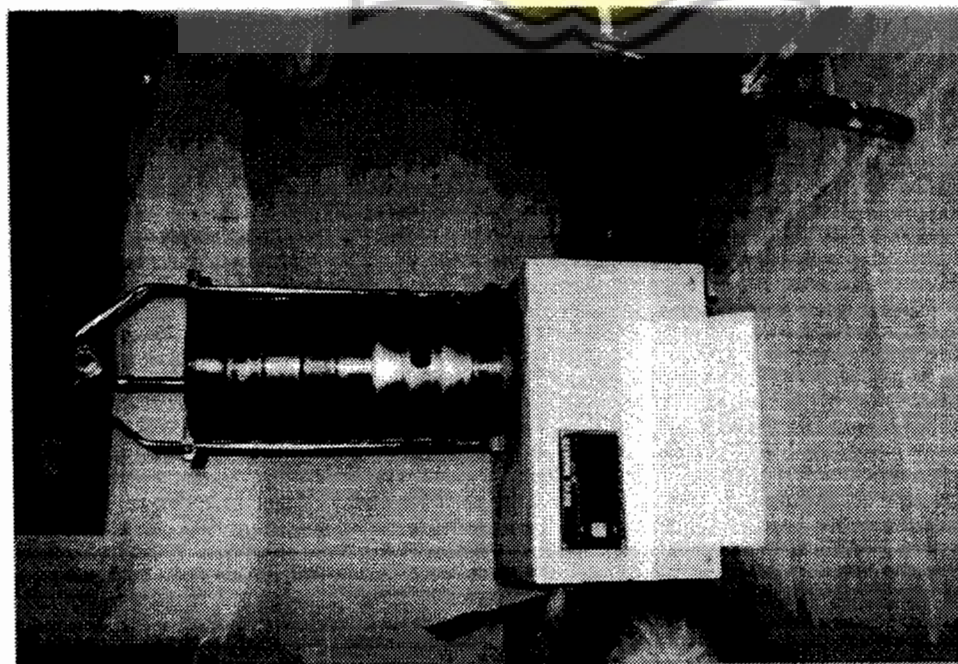
Tinggi pasir mula-mula	Banyaknya pukulan	Penurunan terhadap tinggi mula-mula	Tinggi pasir akibat pemukulan a- b /4	Penurunan
(a cm)	(n kali)	(b cm)	(cm)	(cm)
16	25	2,6 2,6 2,5 2,5	13,45	2,55
16	25	2,9 2,95 2,9 2,95	13,075	0,375
16	25	3,15 3,2 3,25 3,2	12,8	0,275
16	25	3,2 3,2 3,2 3,2	12,8	0



TES PEMADATAN GETAR METODE BEBAN HORIZONTAL



PENGOVENAN SAMPEL UNTUK TEST WATER CONTENT



SIEVE ANALYSIS TEST



PENIMBANGAN SAMPEL SETELAH DILAKUKAN PEMADATAN DENGAN METODE *MODIFIED PROCTOR*

PEMADATAN PASIR METODE PELUNCURAN BEBAN ARAH VERTIKAL (*MODIFIED PROCTOR*)

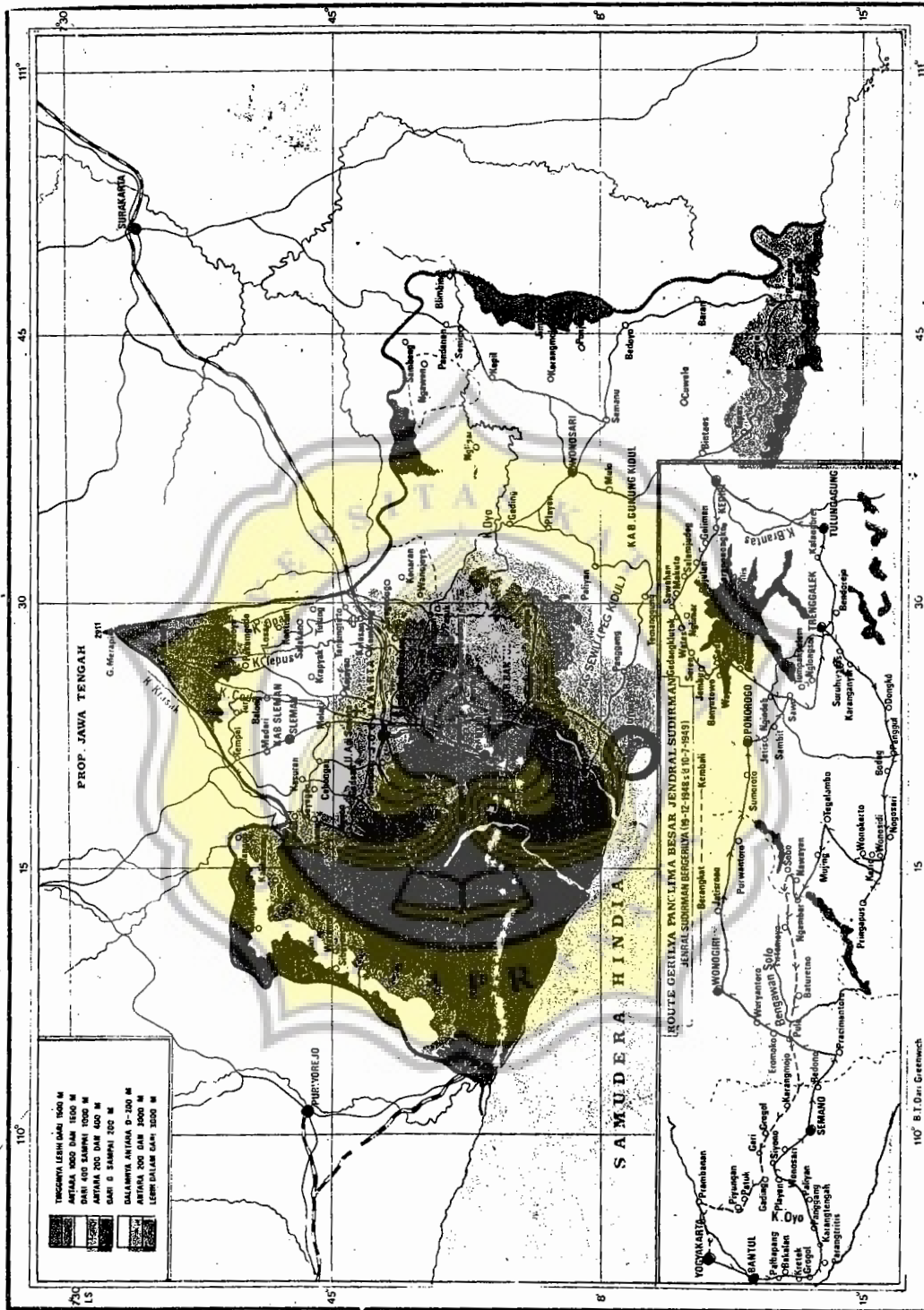


MENYARING SAMPEL PASIR SEBELUM DIOVEN
SELAMA 24 JAM UNTUK TEST SIEVE ANALYSIS



PENIMBANGAN SAMPEL SETELAH DIOVEN SELAMA 24 JAM
UNTUK TEST WATER CONTENT TIAP SAMPEL PASIR

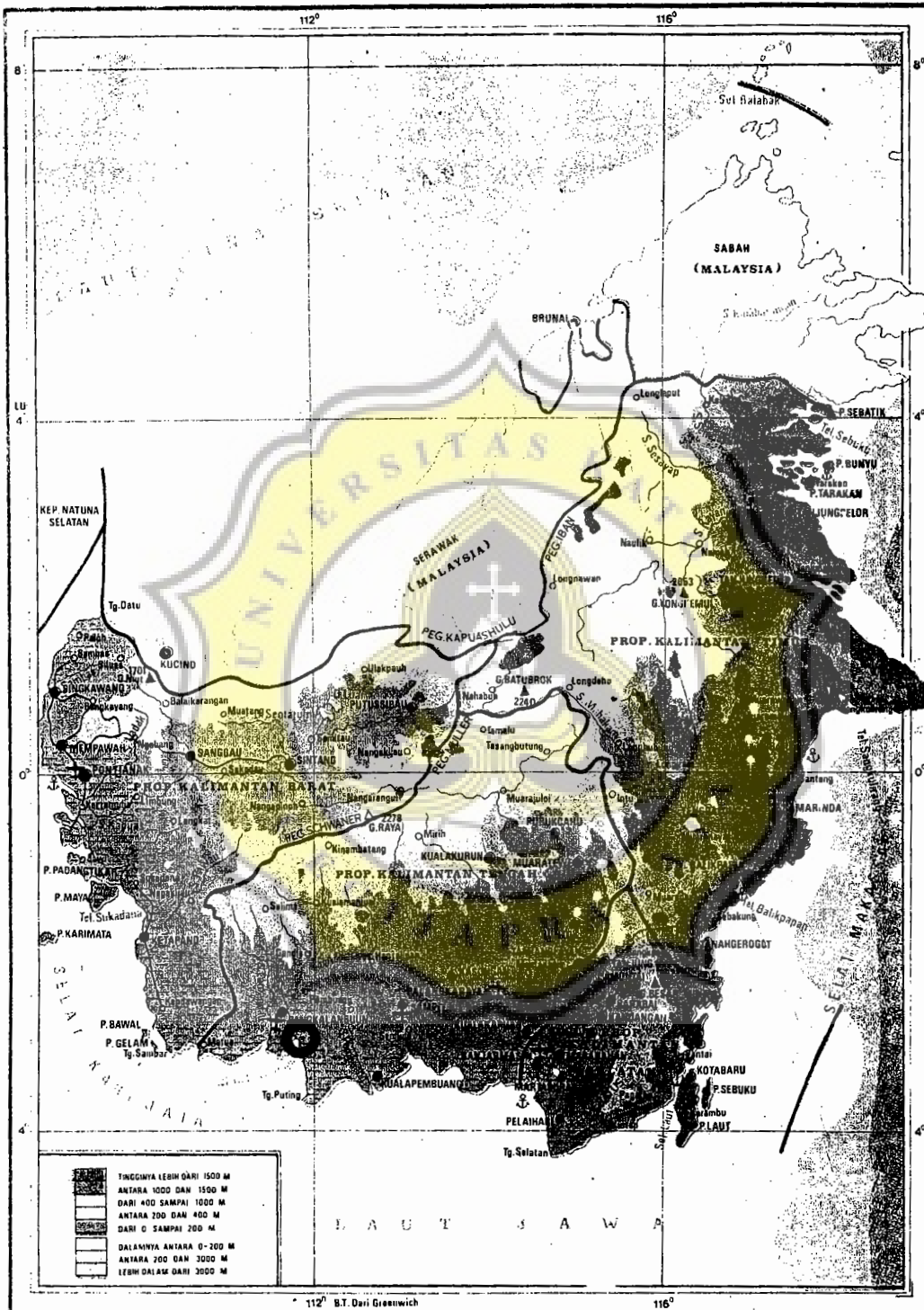
DAERAH ISTIMEWA YOGYAKARTA



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SKALA 1:2.530.000

KALIMANTAN



SKALA 1:8.200.000

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PROPINSI LAMPUNG

