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DAFTAR LAMPIRAN

Lampiran I.1. Berat Spesifik Mineral

Mineral	Specific gravity, G_s
Quartz	2.65
Kaolinite	2.6
Illite	2.8
Montmorillonite	2.65–2.80
Halloysite	2.0–2.55
Potassium feldspar	2.57
Sodium and calcium feldspar	2.62–2.76
Chlorite	2.6–2.9
Biotite	2.8–3.2
Muscovite	2.76–3.1
Hornblende	3.0–3.47
Limonite	3.6–4.0
Olivine	3.27–3.7

Lampiran I.2. Variasi harga K pada pengujian hydrometer

Temperature (°C)	G_s							
	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80
16	0.01510	0.01505	0.01481	0.01457	0.01435	0.01414	0.01394	0.01374
17	0.01511	0.01486	0.01462	0.01439	0.01417	0.01396	0.01376	0.01356
18	0.01492	0.01467	0.01443	0.01421	0.01399	0.01378	0.01359	0.01339
19	0.01474	0.01449	0.01425	0.01403	0.01382	0.01361	0.01342	0.01323
20	0.01456	0.01431	0.01408	0.01386	0.01365	0.01344	0.01325	0.01307
21	0.01438	0.01414	0.01391	0.01369	0.01348	0.01328	0.01309	0.01291
22	0.01421	0.01397	0.01374	0.01353	0.01332	0.01312	0.01294	0.01276
23	0.01404	0.01381	0.01358	0.01337	0.01317	0.01297	0.01279	0.01261
24	0.01388	0.01365	0.01342	0.01321	0.01301	0.01282	0.01264	0.01246
25	0.01372	0.01349	0.01327	0.01306	0.01286	0.01267	0.01249	0.01232
26	0.01357	0.01334	0.01312	0.01291	0.01272	0.01253	0.01235	0.01218
27	0.01342	0.01319	0.01297	0.01277	0.01258	0.01239	0.01221	0.01204
28	0.01327	0.01304	0.01283	0.01264	0.01244	0.01225	0.01208	0.01191
	0.01312	0.01290	0.01269	0.01249	0.01230	0.01212	0.01195	0.01178
	0.01298	0.01276	0.01256	0.01236	0.01217	0.01199	0.01182	0.01169

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Lampiran I.3. Sistem Klasifikasi AASHTO

General classification	Granular materials (35% or less of total sample passing No. 200)						
	A-1		A-3	A-2			
Group classification	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7
Sieve analysis (percentage passing)							
No. 10	50 max.						
No. 40	30 max.	50 max.	51 min.				
No. 200	15 max.	25 max.	10 max.	35 max.	35 max.	35 max.	35 max.
Characteristics of fraction passing No. 40							
Liquid limit				40 max.	41 min.	40 max.	41 min.
Plasticity index	6 max.		NP	10 max.	10 max.	11 min.	11 min.
Usual types of significant constituent materials	Stone, fragments, gravel and sand		Fine sand	Silty or clayey gravel, and sand			
General subgrade rating	Excellent to good						

General classification	Silt-clay materials (more than 35% of total sample passing No. 200)			
	A-4	A-5	A-6	A-7 A-7-5 ^a A-7-6 ^b
Sieve analysis (percentage passing)				
No. 10				
No. 40				
No. 200	36 min.	36 min.	36 min.	36 min.
Characteristics of fraction passing No. 40				
Liquid limit	40 max.	41 min.	40 max.	41 min.
Plasticity index	10 max.	10 max.	11 min.	11 min.
Usual types of significant constituent materials	Silty soils		Clayey soils	
General subgrade rating	Fair to poor			

^aFor A-7-5, $PI \leq LL - 30$

^bFor A-7-6, $PI > LL - 30$



Lampiran I.4. Sistem klasifikasi USCS

Criteria for assigning group symbols				Group symbol	
Coarse-grained soils More than 50% retained on No. 200 sieve	Gravels More than 50% of coarse fraction retained on No. 4 sieve	Clean Gravels Less than 5% fines ^a	$C_u \geq 4$ and $1 \leq C_c \leq 3^b$ $C_u < 4$ and/or $C_c < 1$ or $C_c > 3^b$	GW GP	
		Gravels with Fines More than 12% fines ^{a,d}	$PI < 4$ or plots below "A" line (Figure 5.3) $PI > 7$ and plots on or above "A" line (Figure 5.3)	GM GC	
		Sands 50% or more of coarse fraction passes No. 4 sieve	Clean Sands Less than 5% fines ^a	$C_u \geq 6$ and $1 \leq C_c \leq 3^b$ $C_u < 6$ and/or $C_c < 1$ or $C_c > 3^b$	SW SP
		Sands with Fines More than 12% fines ^{a,b}	$PI < 4$ or plots below "A" line (Figure 5.3) $PI > 7$ and plots on or above "A" line (Figure 5.3)	SM SC	
	Fine-grained soils 50% or more passes No. 200 sieve	Sils and clays Liquid limit less than 50	Inorganic	$PI > 7$ and plots on or above "A" line (Figure 5.3) ^e $PI < 4$ or plots below "A" line (Figure 5.3) ^e	CL ML
			Organic	Liquid limit—oven dried Liquid limit—not dried	< 0.75; see Figure 5.3; OL zone OL
Inorganic			PI plots on or above "A" line (Figure 5.3) PI plots below "A" line (Figure 5.3)	CH MH	
		Organic	Liquid limit—oven dried Liquid limit—not dried	< 0.75; see Figure 5.3; OH zone OH	
Highly organic soils		Primarily organic matter, dark in color, and organic odor			Pt

^aGravels with 5 to 12% fine require dual symbols: GW-GM, GW-GC, GP-GM, GP-GC.

^bSands with 5 to 12% fines require dual symbols: SW-SM, SW-SC, SP-SM, SP-SC.

Lampiran I.5. Perbandingan kelompok tanah sistem AASHTO dan USCS


Soil group in Unified system	Comparable soil groups in AASHTO system		
	Most probable	Possible	Possible but improbable
GW	A-1-a	—	A-2-4, A-2-5, A-2-6, A-2-7
GP	A-1-a	A-1-b	A-3, A-2-4, A-2-5, A-2-6, A-2-7
GM	A-1-b, A-2-4, A-2-5, A-2-7	A-2-6	A-4, A-5, A-6, A-7-5, A-7-6, A-1-a
GC	A-2-6, A-2-7	A-2-4	A-4, A-6, A-7-6, A-7-5
SW	A-1-b	A-1-a	A-3, A-2-4, A-2-5, A-2-6, A-2-7
SP	A-3, A-1-b	A-1-a	A-2-4, A-2-5, A-2-6, A-2-7
SM	A-1-b, A-2-4, A-2-5, A-2-7	A-2-6, A-4	A-5, A-6, A-7-5, A-7-6, A-1-a
SC	A-2-6, A-2-7	A-2-4, A-6, A-4, A-7-6	A-7-5
ML	A-4, A-5	A-6, A-7-5, A-7-6	—
CL	A-6, A-7-6	A-4	—
OL	A-4, A-5	A-6, A-7-5, A-7-6	—
MH	A-7-5, A-5	—	A-7-6
CH	A-7-6	A-7-5	—
OH	A-7-5, A-5	—	A-7-6
Pt	—	—	—

Lampiran I.6. Batasan-batasan ukuran golongan tanah


Soil Group	Ukuran butiran (mm)	Soil Group	Ukuran butiran (mm)	Soil Group	Ukuran butiran (mm)	Soil Group	Ukuran butiran (mm)	Soil Group	Ukuran butiran (mm)	Soil Group	Ukuran butiran (mm)
Kerikil	10	Pasir	0.075	Lanau	0.075	lempung	0.002	Massachusetts Institute of Technology			
Kerikil	10	Pasir	0.075	Lanau	0.075	lempung	0.002	U.S. Department of Agriculture			
Kerikil	10	Pasir	0.075	Lanau	0.075	lempung	0.002	American Association of State Highway and Transportation Officials			
Kerikil	10	Pasir	0.075	Lanau dan lempung	0.075			Unified Soil Classification System			



Lampiran II.1. Hasil pengujian Kadar air

WATER CONTENT							
PROJECT	: PENELITIAN THESIS						
LOCATION	: FAKULTAS TEKNIK UNHAS GOWA						
TESTING METHOD	: ASTM D 2216-(98), D 2937-(71), AASHTO T100-71				TESTED BY	: Silvether T	
LABORATORY	: HASANUDDIN UNIVERSITY				DATE	:	
Bore Hole No.	-						
Sample	-	1		2		Rata-Rata	KETERANGAN
	m	A	B	A	B		
Weight of Container, (1)	Gram	7.69	6.65	7.68	6.67	39.75	
Weight of Container + Wet Soil (2)	Gram	25.42	28.46	27.68	28.52		
Weight of Container + Dry Soil (3)	Gram	18.21	20.40	19.71	20.45		
Water Content, $w=(2-3)/3*100\%$	Gram	39.59	39.51	40.44	39.46		

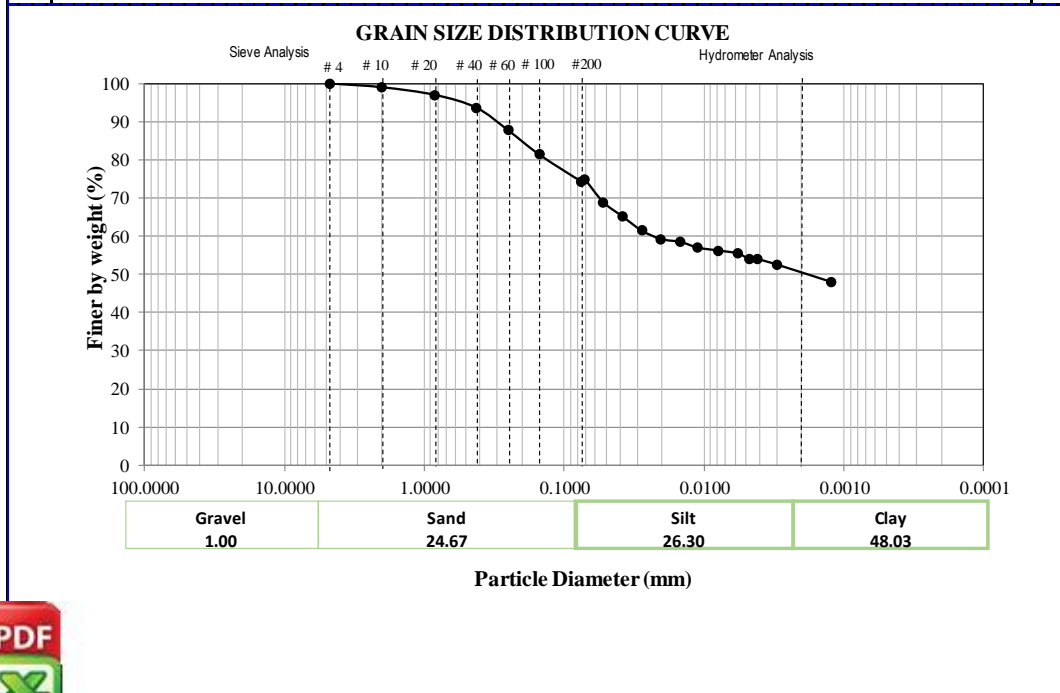
Lampiran II.2. Hasil pengujian Berat Jenis

SPECIFIC GRAVITY TEST RESULTS								
PROJECT	: PENELITIAN THESIS							
LOCATION	: FAKULTAS TEKNIK UNHAS GOWA							
QUARRY	:-							
BORING DEPTH	:-							
TESTING METHOD	: ASTM D 854-58(72)				TESTED BY	: Silvether T		
LABORATORY	: HASANUDDIN UNIVERSITY				DATE	:		
Sample	-	1						
Sample Depth & Inclination	m	2.00						
Number of Volumetric Flask	-	A	B					
Weight of Vol. Flask + Soil (W2)	Gram	35.72	41.06					
Weight of Vol. Flask (W1)	Gram	25.72	31.06					
Weight of Soil	Gram	10.00	10.00					
Temperature, T (oC)	Degree	28.0	28.0					
Weight of Vol. Flask+Water at T (W4)	Gram	73.38	79.21					
Weight of Vol. Flask+Water+Soil (W3)	Gram	79.55	85.42					
Unit Weight of Water at T, γ_T	Gram/Cm ³	0.99624	0.99624					
Temp. Corr. Coefficient, $\alpha=\gamma_T/\gamma_{20}^{oC}$	-	0.99803	0.99803					
Weight of Dry Soil, Ws	Gram	9.80	9.85					
Specific Gravity of Soil ($G_s=\alpha*W_s/W_u$)	-	2.694	2.701					
Average of Gs	-	2.698						
		Unit Weight of Water, $\gamma_{w,20}^{oC}= 0.99821$						

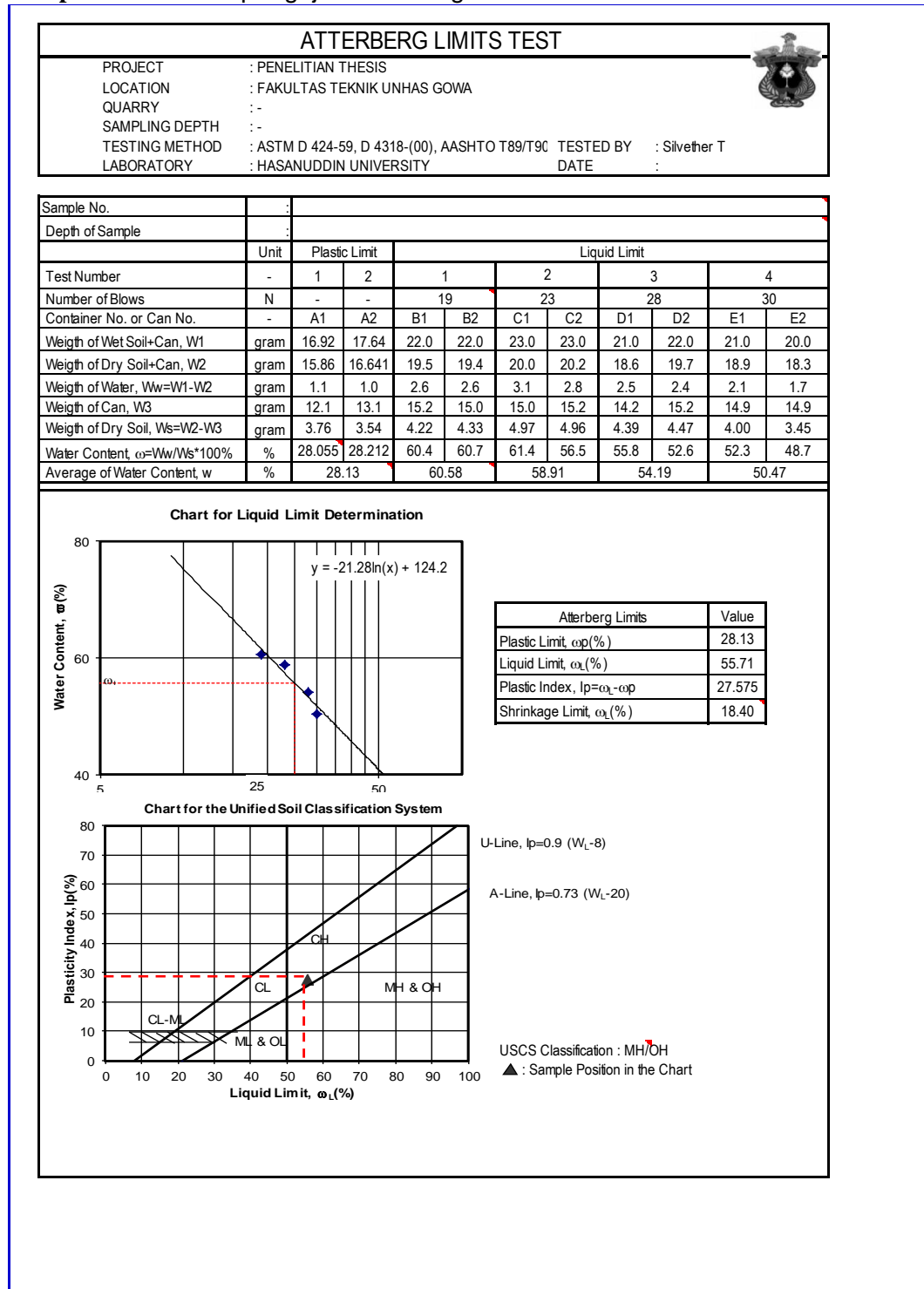


Lampiran II.3. Hasil pengujian Analisa Saringan

TEST RESULTS OF GRAIN-SIZE ANALYSIS													
(Sieve-Mechanical and Hydrometer Methods)													
PROJECT		: PENELITIAN THESIS											
LOCATION		: FAKULTAS TEKNIK UNHAS GOWA											
SAMPLING DEPTH		: -											
TESTING METHOD		: ASTM D 424-59, D 4318-(00), AASHTO T89/T90											
LABORATORY		: HASANUDDIN UNIVERSITY											
TESTED BY		: SILVETHER TANDI											
Berat Tanah Kering :		300		gr		Spec. Gravity, G _s :		2.629		T :		28.0 °C	
Analisa Saringan						Analisa Hidrometer							
Saringan No.	Diameter (mm)	Berat Tertahan (Gram)	Berat Kumulatif (gram)	Persen Kumulatif Tertahan (%)	Persen Lobes (%)	Waktu (menit)	R	Rep = R+F+Fz	% Finer = ((a x Rp)/Ws)x100% + % Finer Sieve Analysis	RdL = R + Fm	L (cm)	A	D=A\sqrt{L} (mm)
4	4.75	0	0	0	100	0.25	55.00	50.15	74.92	56.00	8.30	0.0124	0.07145
10	2	3	3	1	99	0.5	51.00	46.15	68.95	52.00	9.00	0.0124	0.05261
20	0.84	6	9	3	97	1	48.50	43.65	65.21	49.50	9.60	0.0124	0.03842
40	0.425	10	19	6	94	2	46.00	41.15	61.48	47.00	10.10	0.0124	0.02787
60	0.25	18	37	12	88	4	44.50	39.65	59.23	45.50	10.70	0.0124	0.02028
100	0.15	19	56	19	81	8	44.00	39.15	58.49	45.00	11.30	0.0124	0.01474
200	0.075	21	77	26	74	15	43.00	38.15	56.99	44.00	11.95	0.0124	0.01107
Pan	-	233	310	103	8	30	42.50	37.65	56.25	43.50	12.30	0.0124	0.00794
						60	42.00	37.15	55.50	43.00	12.90	0.0124	0.00575
						90	41.00	36.15	54.01	42.00	13.20	0.0124	0.00475
						120	41.00	36.15	54.01	42.00	13.50	0.0124	0.00416
						240	40.00	35.15	52.51	41.00	13.90	0.0124	0.00298
						1440	37.00	32.15	48.03	38.00	14.30	0.0124	0.00124
Berat jenis air terhadap temperatur, g _{wet} /T						= 0.99624							
faktor, K = (1000 x G _s x g _{wet})/(10 x W _s (G _s - 1))						= 3.2157							
Faktor Kt = f(G _s , T)						= 0.0124							
Temperatur Correction (F _t) = -4.85 + 0.25 T						= 2.15							
Zero Correction (F _z)						= 7.0							
Meniscus correction (F _m)						= 1							
G _s Correction						= 1.00							



Lampiran II.4. Hasil pengujian Atterberg



Lampiran II.5. Hasil pengujian Atterberg

ATTERBERG LIMITS TEST												
PROJECT	:	PENELITIAN THESIS										
LOCATION	:	FAKULTAS TEKNIK UNHAS GOWA										
QUARRY	:	:-										
SAMPLING DEPTH	:	:-										
TESTING METHOD	:	ASTM D 424-59, D 4318-(00), AASHTO T89/T90							TESTED BY		: Silvetter T	
LABORATORY	:	HASANUDDIN UNIVERSITY							DATE		:	
Sample No.	:	0										
Depth of Sample	:	0										
Test Number	Unit	Plastic Limit		Liquid Limit								Shrinkage Limit
		1	2	1		2		3		4		1
Number of Blows	N	-	-	19		23		28		30		-
Container No. or Can No.	-	A1	A2	B1	B2	C1	C2	D1	D2	E1	E2	F1
Weigh of Wet Soil+Can, W1	gram	16.92	17.64	22.00	22.00	23.00	23.00	21.00	22.00	21.00	20.00	64
Weigh of Dry Soil+Can, W2	gram	15.86	16.64	19.45	19.37	19.95	20.20	18.55	19.65	18.91	18.32	40.53
Weigh of Water, Ww=W1-W2	gram	1.06	1.00	2.55	2.63	3.05	2.80	2.45	2.35	2.09	1.68	23.47
Weigh of Can, W3	gram	12.10	13.10	15.23	15.04	14.98	15.24	14.16	15.18	14.91	14.87	10.44
Weigh of Dry Soil, Ws=W2-W3	gram	3.76	3.54	4.22	4.33	4.97	4.96	4.39	4.47	4.00	3.45	30.09
Water Content, $\omega = Ww/Ws \cdot 100\%$	%	28.06	28.21	60.43	60.74	61.37	56.45	55.81	52.57	52.25	48.70	78.00
Average of Water Content, w	%	28.13		60.58		58.91		54.19		50.47		78.00
Weigh of Can+Hg, W1	gram											523
Weigh of Shrink dish	gram											35.12
Weight of displaced Hg + Shrink dis	gram											279
Hg content	gr/cm ³											13.6
Volume of Wet Soil	cm ³											37.69
Volume of Dry Soil	cm ³											19.76
Shrinkage Limit	%											18.40
Average of Shrinkage Limit	%											18.40



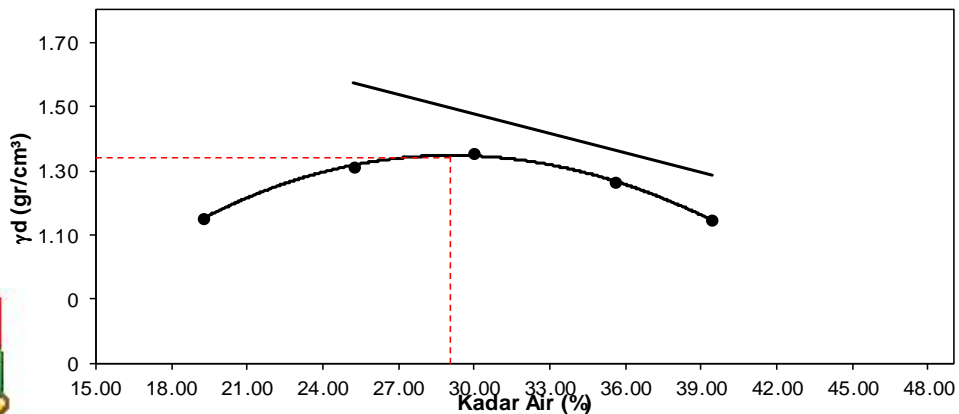
Lampiran II.6. Hasil pengujian Kompaksi

PENGUJIAN KOMPAKSI												
SAMPLE/ SAMPLE NO. : PENELITIAN THESIS												
TESTING METHOD : ASTM D 698/ D 1567					TESTED BY : Silvether T							
LABORATORY : HASANUDDIN UNIVERSITY												
Berat tanah	gram	2000	2000	2000	2000	2000						
Kadar air mula-mula	%	16.53	16.53	16.53	16.53	16.53						
Penambahan air	ml	100	200	300	400	500						
Kadar air akhir	%	22.35	28.18	34.01	39.83	45.66						
Berat Isi Basah (Wet density)												
No. Mould	-	1	2	3	4	5						
Berat Mould	gram	1909	1909	1909	1909	1909						
Berat tanah basah + Mould	gram	3278	3548	3660	3615	3503						
Berat tanah basah, W_{wet}	gram	1369	1639	1751	1706	1594						
Volume Mould	cm ³	996	996	996	996	996						
Berat Volume Basah	gr/cm ³	1.374	1.645	1.757	1.712	1.600						
Kadar Air (Water Content)												
No. Container	-	1A	1B	2A	2B	3A	3B	4A	4B	5A	5B	
Berat tanah basah + Container	gram	48.84	48.76	73.3	67.37	61.88	64.2	54.44	62.79	52.86	58.92	
Berat tanah kering + Container	gram	43.39	43.45	61.69	56.87	51.18	52.9	44.26	50.33	39.33	44.55	
Berat air	gram	5.45	5.31	11.61	10.5	10.7	11.3	10.18	12.46	13.53	14.37	
Berat container	gram	15.3	15.68	15.57	15.34	15.51	15.3	15.58	15.4	5.11	8.00	
Berat tanah kering	gram	28.09	27.77	46.12	41.53	35.67	37.61	28.68	34.93	34.22	36.55	
Kadar air	%	19.40	19.12	25.17	25.28	30.00	29.97	35.50	35.67	39.54	39.32	
Kadar air rata-rata	%	19.26		25.23		29.98		35.58		39.43		
Berat Isi Kering (Dry Density)												
Berat tanah basah, W_{wet}	gram	1369	1639	1751	1706	1594						
Kadar air rata-rata	%	19.26	25.23	29.98	35.58	39.43						
Berat kering	gram	1147.90	1308.81	1347.12	1258.27	1143.25						
Volume Mould	cm ³	996.31	996.31	996.31	996.31	996.31						
Berat isi kering	gr/cm ³	1.15	1.31	1.35	1.26	1.15						
$\gamma_{zav} = \gamma_w / (w + (1/G_s))$	gr/cm ³	1.75	1.58	1.47	1.36	1.29						

Berat jenis (G_s) = 2.63

Jadi, kadar air optimum dicapai pada saat 30.00 % dan berat isi kering 1.352 gr/cm³

Grafik Hubungan Kadar Air dengan Berat Isi Tanah Kering



Lampiran II.7. Hasil pengujian UCT

UNCONFINED COMPRESSION TEST RESULTS											
PROJECT		: PENELITIAN TESIS									
QUARRY		: FAKULTAS TEKNIK UNHAS GOWA									
TESTING METHOD		: ASTM D 2166-66									
LABORATORY		: HASANUDDIN UNIVERSITY									
REKAPITLASI PENGUJIAN KUAT TEKAN BEBAS											
No	Keterangan	Kultur Bakteri									
		3 Hari					6 Hari				
		Peram 0 Hri	Peram 3 Hri	Peram 7 Hri	Peram 14 Hri	Peram 28 Hri	Peram 0 Hri	Peram 3 Hri	Peram 7 hri	Peram 14 hri	Peram 28 hri
		Nilai qu (Kg/Cm2)					Nilai qu (Kg/Cm2)				
1	Tanah Asli	0.276	-	-	-	-	0.276	-	-	-	-
2	Tanah Asli + Bakteri 4 %	-	1.771	2.108	3.20	3.910	-	1.570	1.979	2.683	3.49
3	Tanah Asli + Bakteri 6 %	-	2.999	3.142	4.307	5.446	-	2.716	3.109	4.137	4.625
4	Tanah Asli + Bakteri 8 %	-	1.461	1.863	2.174	2.270	-	1.276	1.744	2.210	2.560

Lampiran II.8. Hasil pengujian CBR

CBR (UNSOAKED) LABORATORY TEST RESULT																	
PROJECT		: PENELITIAN TESIS															
QUARRY		: FAKULTAS TEKNIK UNHAS GOWA															
TESTING METHOD		: ASTM D 2166-66															
LABORATORY		: HASANUDDIN UNIVERSITY															
REKAPITLASI PENGUJIAN CBR LABORATORIUM																	
No	Keterangan	UNSOAKED															
		Tanpa Bakteri				CULTUR 3Hari											
		Tanpa Peram				Peram 3 Hri			Peram 7 Hri			Peram 14 Hri			Peram 28 Hri		
		10X	25X	56X		10X	25X	56X	10X	25X	56X	10X	25X	56X	10X	25X	56X
Nilai CBR (%)				Nilai CBR (%)			Nilai CBR (%)			Nilai CBR (%)			Nilai CBR (%)				
1	Tanah Asli	3.78	4.32	4.68	4.19												
2	<i>g dry mks</i>	1.29	1.34	1.49													
3	Tanah Asli + Bakteri 4 %					9.18	14.28	16.02	14.53	10.08	16.56	25.38	22.54	10.80	18.36	30.24	26.58
4	<i>g dry mks</i>					1.29	1.32	1.39		1.22	1.29	1.38		1.23	1.28	1.38	
5	Tanah Asli + Bakteri 6 %					10.98	18.36	20.88	18.93	12.78	20.52	34.20	29.91	12.24	18.36	36.90	35.79
6	<i>g dry mks</i>					1.25	1.30	1.41		1.18	1.26	1.39		1.18	1.21	1.36	
7	Tanah Asli + Bakteri 8 %					7.92	11.16	11.52	10.64	7.38	11.40	18.36	16.88	7.56	11.52	20.52	18.88
8	<i>g dry mks</i>					1.23	1.32	1.44		1.20	1.25	1.38		1.22	1.26	1.37	
SOAKED																	
NO	Keterangan	CULTUR 3Hari															
		Tanpa Peram				Peram 3 Hri			Peram 7 Hri			Peram 14 Hri			Peram 28 Hri		
		10X	25X	56X		10X	25X	56X	10X	25X	56X	10X	25X	56X	10X	25X	56X
		Nilai CBR (%)				Nilai CBR (%)			Nilai CBR (%)			Nilai CBR (%)			Nilai CBR (%)		
1	Tanah Asli	2.34	3.42	4.32	3.80												
2	<i>g dry mks</i>	1.19	1.34	1.36													
3	Tanah Asli + Bakteri 6 %					2.70	3.78	4.96	4.40	4.32	4.68	5.58	5.07	4.68	5.22	6.30	5.47
4	<i>g dry mks</i>					1.23	1.32	1.38		1.287	1.328	1.387		1.283	1.322	1.425	



Lampiran II.9. Hasil pengujian CBR Kultur Bakteri 6 Hari

CBR (UNSOAKED) LABORATORY TEST RESULT															
PROJECT : PENELITIAN TESIS															
QUARRY : FAKULTAS TEKNIK UNHAS GOWA															
TESTING METHOD: ASTM D 2166-66															
LABORATORY : HASANUDDIN UNIVERSITY															
REKAPITLASI PENGUJIAN CBR LABORATORIUM															
CULTUR 6 Hari															
Peram 3 Hri				Peram 7 hri				Peram 14 hri				Peram 28 hri			
10X	25X	56X		10X	25X	56X		10X	25X	56X		10X	25X	56X	
Nilai CBR (%)				Nilai CBR (%)				Nilai CBR (%)				Nilai CBR (%)			
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5.22	7.20	15.66	8.20	9.54	14.94	22.68	12.47	7.74	12.78	23.76	14.77	12.06	14.58	28.62	15.33
1.30	1.33	1.48		1.30	1.40	1.48		1.25	1.31	1.49		1.31	1.35	1.48	
9.48	13.32	18.90	13.24	10.26	17.64	26.28	19.78	10.62	16.56	29.52	20.85	11.28	19.62	32.40	22.48
1.29	1.33	1.47		1.26	1.32	1.42		1.24	1.28	1.46		1.30	1.33	1.40	
5.76	7.38	13.14	7.23	8.28	12.96	15.84	10.80	8.46	10.98	18.90	11.68	8.64	10.62	21.60	11.90
1.31	1.36	1.49		1.30	1.36	1.52		1.30	1.33	1.48		1.31	1.32	1.50	



Lampiran III.1. Persiapan Material Tanah Asli



Lampiran III.2. Material Tanah Asli dan Larutan Bakteri Bacillus Subtilis



Lampiran III.3. Proses Pembuatan sampel dan pengujian Kompaksi



Lampiran III.3. Proses Persiapan dan pencampuran Material sampel UCT



Lampiran III.4. Proses Pembuatan sampel UCT





Lampiran III.5. Proses Pemeraman Sampel UCT



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Lampiran III.6. Pengujian Sampel UCT



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Lampiran III.7. Proses Persiapan Material untuk pembuatan sampel CBR



Lampiran III.8. Proses Pencampuran Tanah dengan Bakteri



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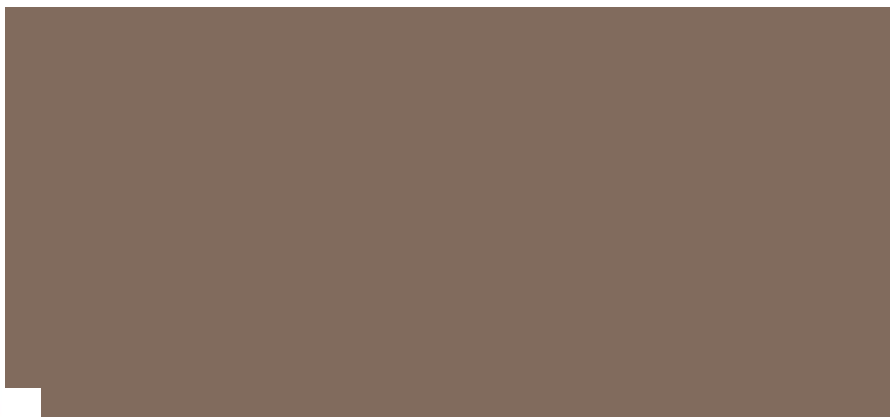
Lampiran III.9 Proses Pembuatan sampel CBR



Lampiran III.10 Sampel CBR yang diperam



Lampiran III.11 Proses Perendaman Sampel CBR





Lampiran III.12 Pengujian Sampel CBR



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