LAMPIRAN

Lampiran 1. Data hasil uji sifat-sifat geoteknik tanah

1. Uji berat jenis tanah

KALIBRASI PIKNOMETER

No	Uraian	Satuan	1	2	3	4	5
1	Berat piknometer kosong (Wp)	g	26.45	26.45	26.45	26.45	26.45
2	Berat piknometer + air (Wpw,c)	g	76.11	76.11	76.11	76.11	76.11
3	Temperatur dalam piknometer (T)	C	29	29	29	29	29
4	Berat volume kering (ɣw,c)		0.99595	0.99595	0.99595	0.99595	0.99595
5	Volume piknometer (Vp)	mL	49.8619	49.8619	49.8619	49.8619	49.8619

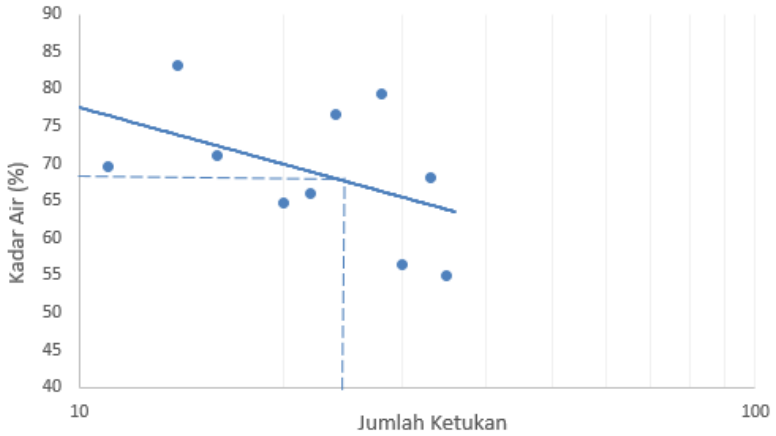
PERHITUNGAN BERAT JENIS

No	Uraian	Satuan	1	2
1	Berat piknometer kosong (Wp)	g	26.45	24.22
2	Berat piknometer + tanah keirng (Wps)	g	36.75	34.36
3	Berat piknometer + tanah + air (Wpws,t)	g	82.55	80.38
4	Berat pikomter + air(Wpw,t)	g	76.11	73.88
5	Temperatur (t)	C	26.6	26.7
6	Berat jenis (Gs,t)		2.67	2.79
7	Koefisien temperatur (K)		0.99842	0.99839
8	Berat jenis pada T=20°		2.66	2.78
9	Berat jenis rata-rata, Gs		2.72	

1. Uji batas-batas *atterberg*

a. Uji batas cair

No	Uraian	Satuan	1		2		3		4		5	
1	Jumlah pukulan		14	11	16	20	22	24	28	30	35	33
2	Nomor cawan		CA2	FF	PRO10	Q6	AO3	M3	Q5	D42	P2	C9
3	Berat cawan kosong (W_1)	g	10.23	9.17	8.71	9.36	6.4	9.1	9.67	6.26	6.12	9.27
4	Berat cawan + tanah basah (W_2)	g	29.23	28.17	27.71	28.36	25.4	28.1	28.67	25.26	25.12	28.27
5	Berat cawan + tanah kering (W_3)	g	20.61	20.38	19.82	20.9	17.85	19.86	20.27	18.4	18.38	20.58
6	Berat air, $W_W = W_2 - W_3$	g	8.62	7.79	7.89	7.46	7.55	8.24	8.4	6.86	6.74	7.69
7	Berat tanah kering, $W_5 = W_3 - W_1$	g	10.38	11.21	11.11	11.54	11.45	10.76	10.6	12.14	12.26	11.31
8	Kadar air, $W = (W_W / W_5)$	%	83.04	69.49	71.02	64.64	65.94	76.58	79.25	56.51	54.98	67.99
9	Rata-rata kadar air	%	76.27		67.83		71.26		67.88		61.48	
10	Batas cair	%					68.94					
11	Flow Indeks						0.29					



Gambar 1 Hubungan jumlah pukulan dan kadar air

b. Uji batas plastis

No	Uraian	Satuan	H3	R6
1	Berat cawan kosong	g	9.3	9.21
2	Berat cawan + tanah basah	g	30.22	30.44
3	Berat cawan + tanah kering	g	23.5	23.76
4	Berat air, $W_w = W_2 - W_3$	g	6.72	6.68
5	Berat tanah, $W_s = W_3 - W_1$	g	14.2	14.55
6	Kadar air, $W = (W_w/W_s) \times 100\%$	%	47.3	45.9
7	Kadar air rata - rata	%	46.6	

Batas Plastis (PL) = 46.62 %

Indeks Plastisitas (PI = LL - PL) = 21.22 %

LL atau Batas Cair = 67.83 %

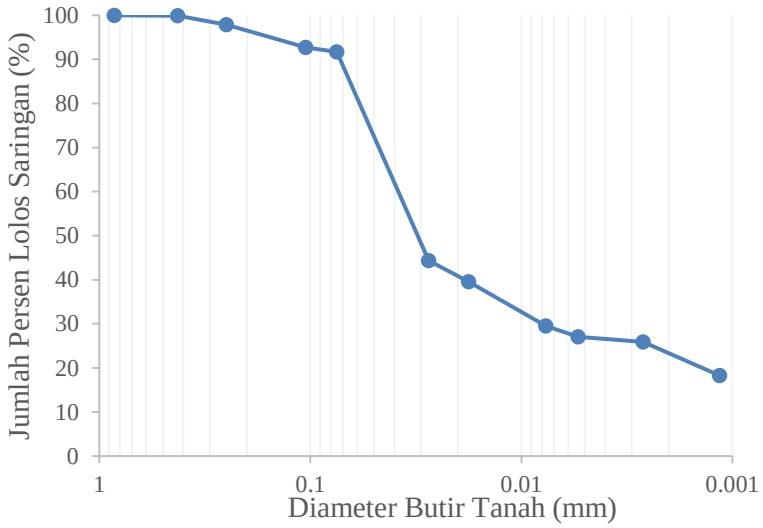
2. Uji distribusi partikel tanah

Analisis Hidrometer

t (menit)	Pembacaan skala hidrometer		Temperatur t°C	$R^I = R_1 + m$	Kedalaman L	Konstanta K	D (mm)	$R = R^I - R_2 + C_T$	Persen berat, P	Adjust Percent, PA (%)
	Larutan tanah (R1)	Larutan Reagent (R2)								
2	25.0	0	29.50	26.00	10.53	0.011987	0.02750	29.43	48.4%	44.3%
5	22.0	0	29.30	23.00	10.95	0.012013	0.01777	26.28	43.2%	39.6%
30	16.0	0	28.40	17.00	11.78	0.012238	0.00767	19.60	32.2%	29.5%
60	14.0	0	28.90	15.00	12.06	0.012026	0.00539	17.98	29.5%	27.1%
250	13.0	0	29.20	14.00	12.20	0.011984	0.00265	17.20	28.3%	25.9%
1440	8.0	0	29.10	9.00	12.89	0.012155	0.00115	12.13	19.9%	18.3%

Analisis Saringan

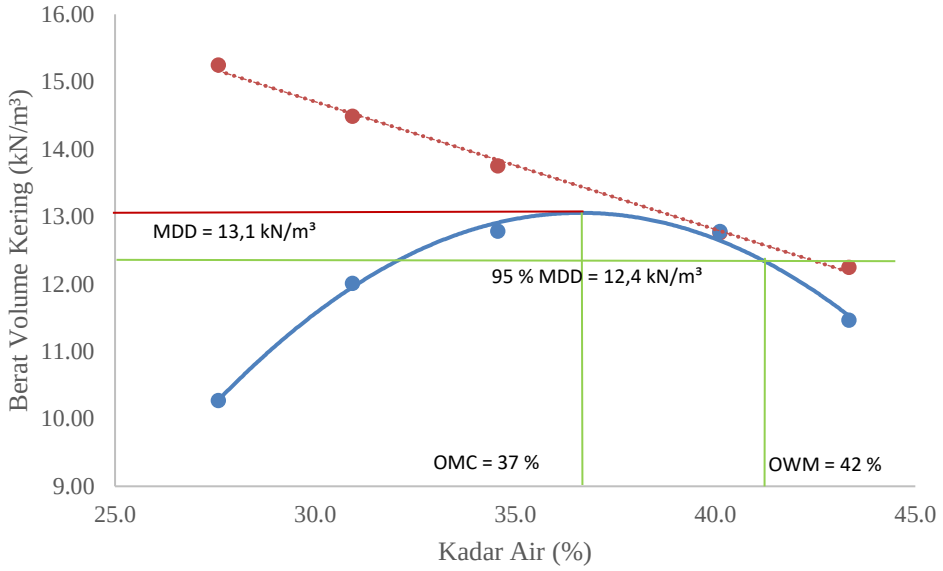
Nomor Saringan	Ukuran butir (mm)	Berat tertahan (g)	Persen berat tertahan (g)	Persen lolos saringan (%)
#4	4.740	0.00	0.00	100.0
#10	2.000	0.00	0.00	100.0
#20	0.850	0.00	0.00	100.0
#40	0.425	0.04	0.07	99.9
#60	0.250	1.22	2.03	97.9
#140	0.105	3.10	5.17	92.7
#200	0.075	0.64	1.07	91.7
Pan	< 0,075	55.00	91.67	0.0
Berat butiran <0,075 mm, B_2		55.00		
Jumlah berat tanah tertahan, W		60.00		



Gambar 2 Distribusi ukuran partikel tanah

3. Uji pemadatan tanah

No	Uraian	1			3			5			6		9	
1	W_1 (berat tabung)	3820.00			3837.00			4216.00			1689.00		1703.00	
2	W_2 (berat tabung+b.u)	5352.00			5513.00			5794.00			3700.00		3175.00	
3	W_m	1532.00			1676.00			1578.00			2011.00		1472.00	
4	D	10.05			10.05			10.09			10.95		10.95	
5	h	12.05			12.05			11.78			11.70		11.70	
6	V	955.86			955.86			941.90			1101.77		1101.77	
7	$Y = K (W_m/V)$	15.72			17.20			16.44			17.91		13.11	
8	Pemeriksaan W	I	II	III	I	II	III	I	II	III	I	II	I	II
a	No Cawan	I3	N4	X2	Y1	I7	P2	I7	G9	IB	T4A	T4B	M2	SE
b	W_o (berat cawan)	9.50	9.53	9.48	9.85	9.17	9.85	9.28	9.94	9.53	9.42	9.17	9.78	9.45
c	W_b (cawan +b.u)	29.74	29.88	29.67	29.85	29.17	29.85	29.28	29.94	29.53	35.94	34.90	36.97	36.48
d	W_d (kadar air)	24.97	25.08	24.88	24.68	24.05	24.73	23.16	24.01	23.44	28.08	27.80	31.13	30.60
e	$W_w = W_b - W_d$	4.77	4.80	4.79	5.17	5.12	5.12	6.12	5.93	6.09	7.86	7.10	5.84	5.88
f	$W_s = W_d - W_o$	15.47	15.55	15.40	14.83	14.88	14.88	13.88	14.07	13.91	18.66	18.63	21.35	21.15
g	W	30.8	30.9	31.1	34.9	34.4	34.4	44.1	42.1	43.8	42.1	38.1	27.4	27.8
h	W rata-rata	30.9			34.6			43.3			40.1		27.6	
9	Berat V kering	12.01			12.78			11.47			12.78		10.27	
10	Berat jenis	2.72			2.72			2.72			2.72		2.72	
11	Y_{zav}	14.49			13.75			12.25			12.76		15.25	



Gambar 3 Kurva pemadatan

Lampiran 2. Perhitungan campuran tanah

Perhitungan kadar campuran

1. Volum silinder

$$V = \frac{1}{4} \times \pi \times d \times h$$

$$V = \frac{1}{4} \times \pi \times 0{,}05^2 \times 0{,}1$$

$$V = 1.96 \times 10^{-4} m^3$$

2. Berat campuran (W)

$$W = \gamma_d \times V$$

$$W = 12{,}4 \times (1{,}96 \times 10^{-4})$$

$$W = \frac{2{,}43 \times 10^{-3}}{9{,}81}$$

$$W = 0{,}248 Kg$$

$$W = 248 gram$$

3. Berat masing-masing campuran

a. Kapur

$$= 18\% \times 248 gram$$

$$= 44{,}64 gram$$

b. Abu sekam padi

Perbandingan kapur dan abu sekam padi = 1:1

Abu sekam padi = kapur = 44,64 gram

c. Serat

$$= 0{,}4\% \times 248 gram$$

$$= 0{,}99 gram$$

d. Berat tanah

$$= W - (kapur + abu + serat$$

$$= 248 - (44{,}64 + 44{,}64 + 0{,}99)$$

$$= 157{,}73 gram$$

4. Air yang digunakan

   Kadar air kering (ODM) = 32,5%

   Air yang digunakan

   $= 42\% \times 248$

   $= 80{,}6 mL$

Lampiran 3. Data hasil uji tekan bebas

1. Non siklus

a. Benda uji 1

Data benda uji sebelum pengujian:

Diameter :	5.05	cm		Luas	:	20.03	cm^2
Tinggi :	10.3	cm		Volume	:	206.31	cm^3
Berat :	322.03	g		Berat vol.	:	1.56	g/cm^3

Kalibrasi proving ring : 1.581 kg/ div

Hasil kuat tekan bebas (q_u) : 5746.41 kPa

Modulus sekan (E_{50}) : 52.32 Mpa

Waktu (detik)	Deformasi		Regangan $\varepsilon = \Delta H/Ho$ (%)	Luas terkoreksi A (cm^2)	Beban Aksial		Tegangan P/A (kPa)
	Arloji ukur (a)	$\Delta H = a \times 10^{-3}$ (cm)			Arloji Ukur	Beban P (kg)	
0	0	0	0.0000	20.029617	0	0.0000	0
30	30	0.03	0.2913	20.088126	24	37.9440	185.2988
60	60	0.06	0.5825	20.146978	41	64.8210	315.6275
90	90	0.09	0.8738	20.206175	62	98.0220	475.8920
120	120	0.12	1.1650	20.265722	83	131.2230	635.2094
150	150	0.15	1.4563	20.325621	122	192.8820	930.9297
180	180	0.18	1.7476	20.385875	136	215.0160	1034.6904
210	210	0.21	2.0388	20.446487	158	249.7980	1198.5034
240	240	0.24	2.3301	20.50746	177	279.8370	1338.6353
270	270	0.27	2.6214	20.568799	199	314.6190	1500.5312
300	300	0.3	2.9126	20.630505	216	341.4960	1623.8457
330	330	0.33	3.2039	20.692583	235	371.5350	1761.3840
360	360	0.36	3.4951	20.755035	251	396.8310	1875.6471
390	390	0.39	3.7864	20.817866	277	437.9370	2063.6899
420	420	0.42	4.0777	20.881078	299	472.7190	2220.8496
450	450	0.45	4.3689	20.944675	317	501.1770	2347.3968
480	480	0.48	4.6602	21.008661	339	535.9590	2502.6620
510	510	0.51	4.9515	21.073039	354	559.6740	2605.4154
540	540	0.54	5.2427	21.137813	377	596.0370	2766.1911
570	570	0.57	5.5340	21.202986	396	626.0760	2896.6701
600	600	0.6	5.8252	21.268562	416	657.6960	3033.5844
630	630	0.63	6.1165	21.334545	437	690.8970	3176.8662
660	660	0.66	6.4078	21.400939	454	717.7740	3290.2121
690	690	0.69	6.6990	21.467747	473	747.8130	3417.2405
720	720	0.72	6.9903	21.534974	496	784.1760	3572.2200
750	750	0.75	7.2816	21.602623	514	812.6340	3690.2646

780	780	0.78	7.5728	21.670699	534	844.2540	3821.8111
810	810	0.81	7.8641	21.739205	554	875.8740	3952.4555
840	840	0.84	8.1553	21.808145	575	909.0750	4089.3096
870	870	0.87	8.4466	21.877524	595	940.6950	4218.1272
900	900	0.9	8.7379	21.947346	616	973.8960	4353.1094
930	930	0.93	9.0291	22.017615	628	992.8680	4423.7467
960	960	0.96	9.3204	22.088335	633	1000.7730	4444.6913
990	990	0.99	9.6117	22.159511	633	1000.7730	4430.4150
1020	1020	1.02	9.9029	22.231148	626	989.7060	4367.3030
1050	1050	1.05	10.1942	22.303249	509	804.7290	3539.5702
1080	1080	1.08	10.4854	22.375819	498	787.3380	3451.8449
1110	1110	1.11	10.7767	22.448863	0	0.0000	0.0000

b. Benda uji 2

Data Benda uji sebelum pengujian:

Diameter : 5.1 cm Luas : 20.43 cm^2

Tinggi : 10.33 cm Volume : 211.02 cm^3

Berat : 316.99 g Berat vol. : 1.50 g/cm^3

Kalibrasi proving ring : 1.581 kg/ div

Hasil kuat tekan bebas (q_u) : 4950.15 kPa

Modulus sekan (E_{50}) : 46.07 Mpa

Waktu (detik)	deformasi			luas terkoreksi A (cm2)	Beban Aksial		tegangan P/A (kPa)
	arloji ukur (a)	ΔH = a x 10^(-3)	regangan ε = ΔH/Ho (%)		arloji Ukur	Beban (P) (kg)	
0	0	0	0.0000	20.428206	0	0.0000	0
30	30	0.03	0.2904	20.428206	18	28.4580	136.6605
60	60	0.06	0.5808	20.428206	33	52.1730	250.5443
90	90	0.09	0.8712	20.428206	49	77.4690	372.0204
120	120	0.12	1.1617	20.428206	63	99.6030	478.3119
150	150	0.15	1.4521	20.428206	77	121.7370	584.6034
180	180	0.18	1.7425	20.428206	93	147.0330	706.0795
210	210	0.21	2.0329	20.428206	107	169.1670	812.3710
240	240	0.24	2.3233	20.428206	128	202.3680	971.8083
270	270	0.27	2.6137	20.428206	147	232.4070	1116.0611
300	300	0.3	2.9042	20.428206	162	256.1220	1229.9449
330	330	0.33	3.1946	20.428206	182	287.7420	1381.7900
360	360	0.36	3.4850	20.428206	202	319.3620	1533.6350
390	390	0.39	3.7754	20.428206	219	346.2390	1662.7033

420	420	0.42	4.0658	20.428206	238	376.2780	1806.9561
450	450	0.45	4.3562	20.428206	258	407.8980	1958.8011
480	480	0.48	4.6467	20.428206	277	437.9370	2103.0539
510	510	0.51	4.9371	20.428206	299	472.7190	2270.0835
540	540	0.54	5.2275	20.428206	316	499.5960	2399.1518
570	570	0.57	5.5179	20.428206	336	531.2160	2550.9968
600	600	0.6	5.8083	20.428206	357	564.4170	2710.4341
630	630	0.63	6.0987	20.428206	378	597.6180	2869.8714
660	660	0.66	6.3892	20.428206	301	475.8810	2285.2680
690	690	0.69	6.6796	20.428206	322	509.0820	2444.7053
720	720	0.72	6.9700	20.428206	341	539.1210	2588.9581
750	750	0.75	7.2604	20.428206	362	572.3220	2748.3954
780	780	0.78	7.5508	20.428206	386	610.2660	2930.6095
810	810	0.81	7.8412	20.428206	402	635.5620	3052.0855
840	840	0.84	8.1317	20.428206	424	670.3440	3219.1151
870	870	0.87	8.4221	20.428206	443	700.3830	3363.3679
900	900	0.9	8.7125	20.428206	466	736.7460	3537.9897
930	930	0.93	9.0029	20.428206	488	771.5280	3705.0192
960	960	0.96	9.2933	20.428206	509	804.7290	3864.4565
990	990	0.99	9.5837	20.428206	527	833.1870	4001.1171
1020	1020	1.02	9.8742	20.428206	549	867.9690	4168.1466
1050	1050	1.05	10.1646	20.428206	571	902.7510	4335.1762
1080	1080	1.08	10.4550	20.428206	588	929.6280	4464.2445
1110	1110	1.11	10.7454	20.428206	605	956.5050	4593.3128
1140	1140	1.14	11.0358	20.428206	623	984.9630	4729.9733
1170	1170	1.17	11.3262	20.428206	638	1008.6780	4843.8571
1200	1200	1.2	11.6167	20.428206	648	1024.4880	4919.7796
1230	1230	1.23	11.9071	20.428206	652	1030.8120	4950.1486
1260	1260	1.26	12.1975	20.428206	637	1007.0970	4836.2648
1290	1290	1.29	12.4879	20.428206	609	962.8290	4623.6818
1320	1320	1.32	12.7783	20.428206	0	0.0000	0.0000

c. Benda uji 3

Data Benda uji sebelum pengujian:

Diameter	:	5.07	cm	Luas	:	20.19	cm^2
Tinggi	:	10.38	cm	Volume	:	209.56	cm^3
Berat	:	317.68	g	Berat vol.	:	1.52	g/cm^3

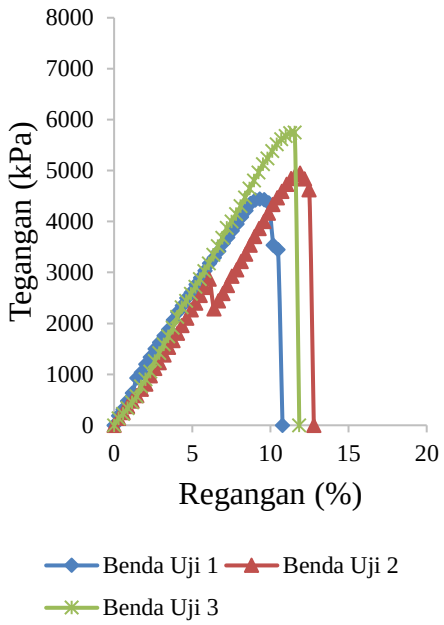
Kalibrasi proving ring : 1.581 kg/ div

Hasil nilai kuat tekan bebas (q_u) : 5746.41 kPa

Modulus sekan (E_{50}) : 52.32 Mpa

Waktu (detik)	deformasi			luas terkoreksi A (cm2)	Beban Aksial		tegangan P/A (kPa)
	arloji ukur (a)	ΔH = a x 10^(-3)	regangan ε = ΔH/Ho (%)		arloji Ukur	Beban (P) (kg)	
0	0	0	0.0000	20.188581	0	0.0000	0.0000
30	30	0.03	0.2890	20.19	18	28.4580	138.2826
60	60	0.06	0.5780	20.19	29	45.8490	222.7887
90	90	0.09	0.8671	20.19	44	69.5640	338.0242
120	120	0.12	1.1561	20.19	59	93.2790	453.2597
150	150	0.15	1.4451	20.19	74	116.9940	568.4952
180	180	0.18	1.7341	20.19	100	158.1000	768.2367
210	210	0.21	2.0231	20.19	118	186.5580	906.5194
240	240	0.24	2.3121	20.19	137	216.5970	1052.4843
270	270	0.27	2.6012	20.19	164	259.2840	1259.9083
300	300	0.3	2.8902	20.19	185	292.4850	1421.2380
330	330	0.33	3.1792	20.19	207	327.2670	1590.2501
360	360	0.36	3.4682	20.19	227	358.8870	1743.8974
390	390	0.39	3.7572	20.19	249	393.6690	1912.9095
420	420	0.42	4.0462	20.19	277	437.9370	2128.0158
450	450	0.45	4.3353	20.19	302	477.4620	2320.0750
480	480	0.48	4.6243	20.19	318	502.7580	2442.9929
510	510	0.51	4.9133	20.19	336	531.2160	2581.2755
540	540	0.54	5.2023	20.19	354	559.6740	2719.5581
570	570	0.57	5.4913	20.19	374	591.2940	2873.2054
600	600	0.6	5.7803	20.19	394	622.9140	3026.8528
630	630	0.63	6.0694	20.19	414	654.5340	3180.5001
660	660	0.66	6.3584	20.19	436	689.3160	3349.5122
690	690	0.69	6.6474	20.19	458	724.0980	3518.5243
720	720	0.72	6.9364	20.19	479	757.2990	3679.8540
750	750	0.75	7.2254	20.19	505	798.4050	3879.5956
780	780	0.78	7.5145	20.19	521	823.7010	4002.5135
810	810	0.81	7.8035	20.19	540	853.7400	4148.4784
840	840	0.84	8.0925	20.19	560	885.3600	4302.1258
870	870	0.87	8.3815	20.19	582	920.1420	4471.1379
900	900	0.9	8.6705	20.19	605	956.5050	4647.8323
930	930	0.93	8.9595	20.19	626	989.7060	4809.1620
960	960	0.96	9.2486	20.19	646	1021.3260	4962.8094
990	990	0.99	9.5376	20.19	667	1054.5270	5124.1391
1020	1020	1.02	9.8266	20.19	682	1078.2420	5239.3746
1050	1050	1.05	10.1156	20.19	701	1108.2810	5385.3396
1080	1080	1.08	10.4046	20.19	718	1135.1580	5515.9398

1110	1110	1.11	10.6936	20.19	731	1155.7110	5615.8106
1140	1140	1.14	10.9827	20.19	739	1168.3590	5677.2696
1170	1170	1.17	11.2717	20.19	747	1181.0070	5738.7285
1200	1200	1.2	11.5607	20.19	748	1182.5880	5746.4109
1230	1230	1.23	11.8497	20.19	0	0.0000	0.0000



Gambar 4 Hubungan tegangan dan regangan benda uji tanpa siklus

2. Satu siklus

a. Benda uji 1

Data Benda Uji Sebelum Pengujian:

Diameter	:	5.05	cm	Luas	:	20.03	cm^2
Tinggi	:	10.25	cm	Volume	:	205.30	cm^3
Berat	:	310.98	g	Berat vol.	:	1.51	g/cm^3

Kalibrasi proving ring : 1.581 kg/ div

Hasl nilai kuat tekan bebas : 6303.08 kPa

Modulus sekan (E_{50}) : 65.97 Mpa

Waktu (detik)	Deformasi		Regangan ε = ΔH/Ho (%)	Luas terkoreksi A (cm^2)	Beban Aksial		Tegangan P/A (kPa)
	Arloji ukur (a)	ΔH = a x 10^{-3} (cm)			Arloji Ukur	Beban P (kg)	
0	0	0	0	20.03	0	0.0000	0
30	30	0.03	0.2927	20.03	28	44.2680	216.8135
60	60	0.06	0.5854	20.03	42	66.4020	325.2202
90	90	0.09	0.8780	20.03	65	102.7650	503.3170
120	120	0.12	1.1707	20.03	72	113.8320	557.5204
150	150	0.15	1.4634	20.03	84	132.8040	650.4404
180	180	0.18	1.7561	20.03	110	173.9100	851.7672
210	210	0.21	2.0488	20.03	142	224.5020	1099.5541
240	240	0.24	2.3415	20.03	168	265.6080	1300.8809
270	270	0.27	2.6341	20.03	189	298.8090	1463.4910
300	300	0.3	2.9268	20.03	215	339.9150	1664.8178
330	330	0.33	3.2195	20.03	255	403.1550	1974.5513
360	360	0.36	3.5122	20.03	280	442.6800	2168.1348
390	390	0.39	3.8049	20.03	310	490.1100	2400.4349
420	420	0.42	4.0976	20.03	350	553.3500	2710.1684
450	450	0.45	4.3902	20.03	370	584.9700	2865.0352
480	480	0.48	4.6829	20.03	398	629.2380	3081.8487
510	510	0.51	4.9756	20.03	426	673.5060	3298.6622
540	540	0.54	5.2683	20.03	452	714.6120	3499.9890
570	570	0.57	5.5610	20.03	474	749.3940	3670.3424
600	600	0.6	5.8537	20.03	501	792.0810	3879.4125
630	630	0.63	6.1463	20.03	528	834.7680	4088.4827
660	660	0.66	6.4390	20.03	551	871.1310	4266.5795
690	690	0.69	6.7317	20.03	579	915.3990	4483.3929
720	720	0.72	7.0244	20.03	605	956.5050	4684.7197
750	750	0.75	7.3171	20.03	625	988.1250	4839.5865
780	780	0.78	7.6098	20.03	653	1032.3930	5056.4000
810	810	0.81	7.9024	20.03	682	1078.2420	5280.9568
840	840	0.84	8.1951	20.03	710	1122.5100	5497.7703
870	870	0.87	8.4878	20.03	740	1169.9400	5730.0704
900	900	0.9	8.7805	20.03	770	1217.3700	5962.3706
930	930	0.93	9.0732	20.03	795	1256.8950	6155.9540
960	960	0.96	9.3659	20.03	799	1263.2190	6186.9274
990	990	0.99	9.6585	20.03	814	1286.9340	6303.0775
1020	1020	1.02	9.9512	20.03	0	0.0000	0.0000

Data siklus pembasahan-pengeringan

Siklus ke: 1				
	Awal	Sebelum Rendam	Sesudah Rendam	Setelah Kering
Diameter	5.12	5.12	5.08	5.05
Tinggi	10.35	10.33	10.28	10.25
Berat	316.59	315	318.28	310.98

b. Benda uji 2

Data benda uji sebelum pengujian:

Diameter : 5.12 cm Luas : 20.59 cm^2

Tinggi : 10.33 cm Volume : 212.68 cm^3

Berat : 319.11 g Berat vol. : 1.50 g/cm^3

Kalibrasi proving ring : 1.581 kg/ div

Hasil nilai kuat tekan bebas (q_u) : 4663.46 kPa

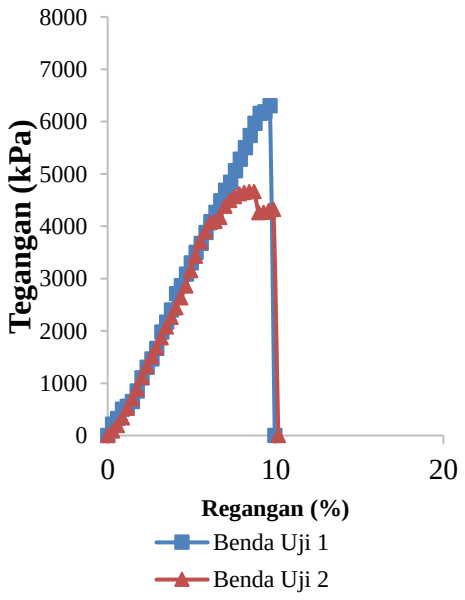
Modulus sekan (E_5) : 59.87 Mpa

Waktu (detik)	Deformasi		Regangan $\varepsilon = \Delta H/Ho$ (%)	Luas terkoreksi A (cm^2)	Beban Aksial		Tegangan P/A (kPa)
	Arloji ukur (a)	$\Delta H = a \times 10^{-3}$ (cm)			Arloji Ukur	Beban P (kg)	
0	0	0	0.0000	20.588742	0	0.0000	0.0000
30	30	0.03	0.2904	20.648709	11	17.3910	82.6229
60	60	0.06	0.5808	20.709026	25	39.5250	187.2325
90	90	0.09	0.8712	20.769697	45	71.1450	336.0340
120	120	0.12	1.1617	20.830725	70	110.6700	521.1882
150	150	0.15	1.4521	20.892112	94	148.6140	697.8248
180	180	0.18	1.7425	20.953862	119	188.1390	880.8131
210	210	0.21	2.0329	21.015978	150	237.1500	1106.9870
240	240	0.24	2.3233	21.078464	179	282.9990	1317.0885
270	270	0.27	2.6137	21.141322	205	324.1050	1503.9126
300	300	0.3	2.9042	21.204556	229	362.0490	1674.9705
330	330	0.33	3.1946	21.26817	256	404.7360	1866.8556
360	360	0.36	3.4850	21.332167	285	450.5850	2072.1003
390	390	0.39	3.7754	21.396549	311	491.6910	2254.3302
420	420	0.42	4.0658	21.461322	338	534.3780	2442.6492
450	450	0.45	4.3562	21.526488	365	577.0650	2629.7869
480	480	0.48	4.6467	21.592051	398	629.2380	2858.8413
510	510	0.51	4.9371	21.658014	440	695.6400	3150.9022
540	540	0.54	5.2275	21.724382	480	758.8800	3426.8467

570	570	0.57	5.5179	21.791158	520	822.1200	3701.0411
600	600	0.6	5.8083	21.858345	548	866.3880	3888.3393
630	630	0.63	6.0987	21.925949	575	909.0750	4067.3386
660	660	0.66	6.3892	21.993971	580	916.9800	4090.0180
690	690	0.69	6.6796	22.062417	593	937.5330	4168.7176
720	720	0.72	6.9700	22.13129	625	988.1250	4380.0005
750	750	0.75	7.2604	22.200595	643	1016.5830	4492.0774
780	780	0.78	7.5508	22.270335	655	1035.5550	4561.5813
810	810	0.81	7.8412	22.340515	665	1051.3650	4616.6755
840	840	0.84	8.1317	22.411138	671	1060.8510	4643.6501
870	870	0.87	8.4221	22.482209	676	1068.7560	4663.4635
900	900	0.9	8.7125	22.553733	678	1071.9180	4662.4280
930	930	0.93	9.0029	22.625713	621	981.8010	4256.8682
960	960	0.96	9.2933	22.698154	624	986.5440	4263.7814
990	990	0.99	9.5837	22.77106	631	997.6110	4297.8078
1020	1020	1.02	9.8742	22.844436	636	1005.5160	4317.9494
1050	1050	1.05	10.1646	22.918287	0	0.0000	0.0000

Data siklus pembasahan-pengeringan

Siklus ke : 1				
	Awal	Sebelum Rendam	Sesudah Rendam	Setelah Kering
Diameter	5.12	5.11	5.14	5.12
Tinggi	10.38	3.38	10.43	10.4
Berat	316.73	316.02	342.63	338.23



Gambar 5 Hubungan tegangan dan regangan benda uji satu siklus

3. Dua siklus

a. Benda uji 1

Data benda uji sebelum pengujian:

Diameter : 5.69 cm Luas : 25.43 cm^2

Tinggi : 10.3 cm Volume : 261.91 cm^3

Berat : 315.87 g Berat vol. : 1.21 g/cm^3

Kalibrasi proving ring : 1.581 kg/ div

Hasil nilai kuat tekan bebas (q_u) : 3956.21 kPa

Modulus sekan (E_{50}) : 42.86 Mpa

Waktu (detik)	Deformasi		Regangan ε = ΔH/Ho (%)	Luas terkoreksi A (cm^2)	Beban Aksial		Tegangan P/A (kPa)
	Arloji ukur (a)	ΔH = a x 10^{-3} (cm)			Arloji Ukur	Beban P (kg)	
0	0	0	0.0000	25.42812948	0	0.0000	0.0000
30	30	0.03	0.2913	25.50240834	9	14.2290	54.7346
60	60	0.06	0.5825	25.57712242	28	44.2680	169.7881
90	90	0.09	0.8738	25.65227558	54	85.3740	326.4891
120	120	0.12	1.1650	25.72787167	79	124.8990	476.2381
150	150	0.15	1.4563	25.80391464	102	161.2620	613.0776
180	180	0.18	1.7476	25.88040846	130	205.5300	779.0639
210	210	0.21	2.0388	25.95735715	155	245.0550	926.1303
240	240	0.24	2.3301	26.03476477	178	281.4180	1060.3939
270	270	0.27	2.6214	26.11263546	192	303.5520	1140.3847
300	300	0.3	2.9126	26.19097336	218	344.6580	1290.9390
330	330	0.33	3.2039	26.26978271	242	382.6020	1428.7616
360	360	0.36	3.4951	26.34906777	264	417.3840	1553.9590
390	390	0.39	3.7864	26.42883286	284	449.0040	1666.6378
420	420	0.42	4.0777	26.50908235	308	486.9480	1802.0088
450	450	0.45	4.3689	26.58982067	329	520.1490	1919.0282
480	480	0.48	4.6602	26.6710523	342	540.7020	1988.7804
510	510	0.51	4.9515	26.75278178	360	569.1600	2087.0576
540	540	0.54	5.2427	26.83501369	380	600.7800	2196.2544
570	570	0.57	5.5340	26.91775268	412	651.3720	2373.8829
600	600	0.6	5.8252	27.00100347	438	692.4780	2515.9099
630	630	0.63	6.1165	27.0847708	468	739.9080	2679.9184
660	660	0.66	6.4078	27.1690595	492	777.8520	2808.6096
690	690	0.69	6.6990	27.25387447	524	828.4440	2981.9744
720	720	0.72	6.9903	27.33922063	545	861.6450	3091.7990
750	750	0.75	7.2816	27.425103	574	907.4940	3246.1195

780	780	0.78	7.5728	27.51152664	604	954.9240	3405.0471
810	810	0.81	7.8641	27.59849669	632	999.1920	3551.6694
840	840	0.84	8.1553	27.68601835	656	1037.1360	3674.8889
870	870	0.87	8.4466	27.77409688	681	1076.6610	3802.8399
900	900	0.9	8.7379	27.86273762	703	1111.4430	3913.2034
930	930	0.93	9.0291	27.95194596	713	1127.2530	3956.2011
960	960	0.96	9.3204	28.04172737	0	0.0000	0.0000

Data siklus pembasahan-pengeringan

Siklus ke: 1				
	Awal	Sebelum Rendam	Sesudah Rendam	Setelah Kering
Diameter	5.1	5.1	5.08	5.12
Tinggi	10.355	10.35	10.38	10.36
Berat	321.09	319.92	324.85	315.37

Siklus ke: 2				
	Awal	Sebelum Rendnam	Sesudah Rendam	Setelah Kering
Diameter	5.1	5.12	5.08	5.69
Tinggi	10.355	10.36	10.31	10.3
Berat	321.09	315.37	326.47	315.87

b. Benda uji 2

Data benda uji sebelum pengujian

Diameter : 5.12 cm Luas : 20.59 cm^2

Tinggi : 10.35 cm Volume : 213.09 cm^3

Berat : 327.74 g Berat vol. : 1.54 g/cm^3

Kalibrasi proving ring : 1.581 kg/ div

Hasil nilai kuat tekan bebas (q_u) : 3328.87 kPa

Modulus sekan (E_{50}) : 59.63 Mpa

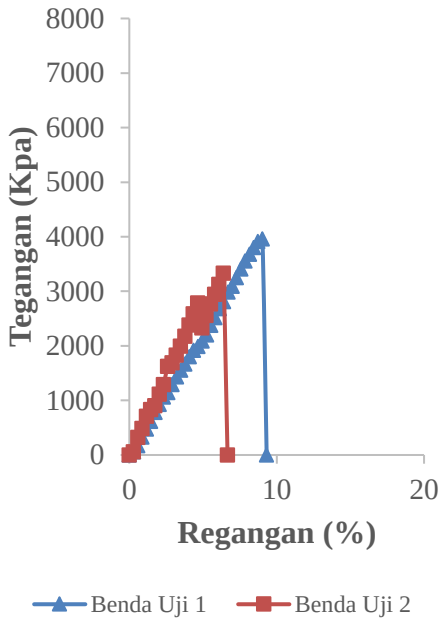
Waktu (detik)	Deformasi		Regangan $\varepsilon = \Delta H/Ho$ (%)	Luas terkoreksi A (cm^2)	Beban Aksial		Tegangan P/A (kPa)
	Arloji ukur (a)	$\Delta H = a \times 10^{-3}$ (cm)			Arloji Ukur	Beban P (kg)	
0	0	0	0	20.58874161	0	0.0000	0
30	30	0.03	0.2899	20.64859261	8	12.6480	60.0898
60	60	0.06	0.5797	20.70879259	43	67.9830	322.0435

90	90	0.09	0.8696	20.76934461	65	102.7650	485.3907
120	120	0.12	1.1594	20.83025178	95	150.1950	707.3428
150	150	0.15	1.4493	20.89151723	112	177.0720	831.4745
180	180	0.18	1.7391	20.95314412	122	192.8820	903.0494
210	210	0.21	2.0290	21.01513567	151	238.7310	1114.4116
240	240	0.24	2.3188	21.07749512	175	276.6750	1287.7155
270	270	0.27	2.6087	21.14022576	221	349.4010	1621.3752
300	300	0.3	2.8986	21.20333092	231	365.2110	1689.6967
330	330	0.33	3.1884	21.26681394	251	396.8310	1830.5103
360	360	0.36	3.4783	21.33067825	274	433.1940	1992.2635
390	390	0.39	3.7681	21.39492728	300	474.3000	2174.7599
420	420	0.42	4.0580	21.45956452	329	520.1490	2377.8030
450	450	0.45	4.3478	21.52459351	359	567.5790	2586.7852
480	480	0.48	4.6377	21.5900178	388	613.4280	2787.2736
510	510	0.51	4.9275	21.65584103	325	513.8250	2327.6045
540	540	0.54	5.2174	21.72206684	358	565.9980	2556.1289
570	570	0.57	5.5072	21.78869895	389	615.0090	2768.9759
600	600	0.6	5.7971	21.8557411	415	656.1150	2944.9874
630	630	0.63	6.0870	21.92319709	442	698.8020	3126.9379
660	660	0.66	6.3768	21.99107076	472	746.2320	3328.8674
690	690	0.69	6.6667	22.05936602	0	0.0000	0.0000

Data siklus pembasahan-pengeringan

Siklus ke: 1				
	Awal	Sebelum Rendam	Sesudah Rendam	Setelah Kering
Diameter	5.11	5.1	5.1	5.15
Tinggi	10.35	10.35	10.33	10.3
Berat	317.13	315.65	337.91	326.54

Siklus ke: 2				
	Awal	Sebelum Rendam	Sesudah Rendam	Setelah Kering
Diameter	5.11	5.15	5.13	5.12
Tinggi	10.35	10.3	10.35	10.35
Berat	317.13	326.54	339.32	327.74



Gambar 6 Hubungan tegangan dan regangan benda uji dua siklus

4. Tiga siklus

a. Benda uji 1

Data benda uji sebelum pengujian:

Diameter	:	5.2	cm	Luas	:	21.24	cm^2
Tinggi	:	10.42	cm	Volume	:	221.29	cm^3
Berat	:	320.87	g	Berat vol.	:	1.45	g/cm^3

Kalibrasi proving ring : 1.581 kg/ div

Hasil nilai kuat tekan bebas (q_u) : 3932.21 kPa

Modulus sekan (E_{50}) : 55.79 Mpa

Waktu (detik)	Deformasi		Regangan $\varepsilon = \Delta H/Ho$ (%)	Luas terkoreksi A (cm^2)	Beban Aksial		Tegangan P/A (kPa)
	Arloji ukur (a)	$\Delta H = a \times 10^{-3}$ (cm)			Arloji Ukur	Beban P (kg)	
0	0	0	0.0000	21.237166	0	0.0000	0
30	30	0.03	0.2879	21.298486	22	34.7820	160.2045
60	60	0.06	0.5758	21.360162	39	61.6590	283.1789
90	90	0.09	0.8637	21.422195	59	93.2790	427.1584
120	120	0.12	1.1516	21.48459	81	128.0610	584.7347
150	150	0.15	1.4395	21.547349	103	162.8430	741.3858
180	180	0.18	1.7274	21.610476	126	199.2060	904.2887
210	210	0.21	2.0154	21.673974	148	233.9880	1059.0685

240	240	0.24	2.3033	21.737846	168	265.6080	1198.6535
270	270	0.27	2.5912	21.802096	190	300.3900	1351.6251
300	300	0.3	2.8791	21.866727	213	336.7530	1510.7643
330	330	0.33	3.1670	21.931742	239	377.8590	1690.1516
360	360	0.36	3.4549	21.997144	274	433.1940	1931.9022
390	390	0.39	3.7428	22.062939	295	466.3950	2073.7650
420	420	0.42	4.0307	22.129127	312	493.2720	2186.7100
450	450	0.45	4.3186	22.195714	339	535.9590	2368.8166
480	480	0.48	4.6065	22.262704	363	573.9030	2528.8880
510	510	0.51	4.8944	22.330098	392	619.7520	2722.6782
540	540	0.54	5.1823	22.397902	415	656.1150	2873.7013
570	570	0.57	5.4702	22.466119	443	700.3830	3058.2751
600	600	0.6	5.7582	22.534753	467	738.3270	3214.1412
630	630	0.63	6.0461	22.603807	491	776.2710	3368.9982
660	660	0.66	6.3340	22.673286	544	860.0640	3721.2197
690	690	0.69	6.6219	22.743194	514	812.6340	3505.1979
720	720	0.72	6.9098	22.813533	553	874.2930	3759.5291
750	750	0.75	7.1977	22.88431	567	896.4270	3842.7853
780	780	0.78	7.4856	22.955526	582	920.1420	3932.2091
810	810	0.81	7.7735	23.027188	0	0.0000	0.0000

Data siklus pembasahan-pengeringan

Siklus ke: 1				
	Awal	Sebelum Rendam	Sesudah Rendam	Setelah Kering
Diameter	5.1	5.1	5.13	5.08
Tinggi	10.415	10.42	10.39	10.39
Berat	316.84	315.7	319.1	312.4

Siklus ke: 2				
	Awal	Sebelum Rendam	Sesudah Rendam	Setelah Kering
Diameter	5.1	5.08	5.11	5.1
Tinggi	10.415	10.39	10.4	10.43
Berat	316.84	312.4	322.64	311.26

Siklus ke: 3				
	Awal	Sebelum Rendam	Sesudah Rendam	Setelah Kering
Diameter	5.1	5.1	5.215	5.2
Tinggi	10.415	10.43	10.45	10.42
Berat	316.84	311.26	324.96	320.87

b. Benda uji 2

Data benda uji sebelum pengujian

Diameter : 5.09 cm Luas : 20.35 cm^2

Tinggi : 10.5 cm Volume : 213.66 cm^3

Berat : 324.35 g Berat vol. : 1.52 g/cm^3

Kalibrasi proving ring : 1.581 kg/ div

Hasil nilai kuat tekan bebas (q_u) : 4962.00 kPa

Modulus sekan (E_{50}) : 50.30 Mpa

Waktu (detik)	Deformasi		Regangan ε = ΔH/Ho (%)	Luas terkoreksi A (cm^2)	Beban Aksial		Tegangan P/A (kPa)
	Arloji ukur (a)	ΔH = a x 10^{-3} (cm)			Arloji Ukur	Beban P (kg)	
0	0	0	0.0000	20.35	0	0.0000	0.0000
30	30	0.03	0.2857	20.35	18	28.4580	137.1980
60	60	0.06	0.5714	20.35	33	52.1730	251.5298
90	90	0.09	0.8571	20.35	48	75.8880	365.8615
120	120	0.12	1.1429	20.35	65	102.7650	495.4374
150	150	0.15	1.4286	20.35	80	126.4800	609.7691
180	180	0.18	1.7143	20.35	97	153.3570	739.3450
210	210	0.21	2.0000	20.35	111	175.4910	846.0546
240	240	0.24	2.2857	20.35	128	202.3680	975.6306
270	270	0.27	2.5714	20.35	149	235.5690	1135.6950
300	300	0.3	2.8571	20.35	168	265.6080	1280.5151
330	330	0.33	3.1429	20.35	190	300.3900	1448.2016
360	360	0.36	3.4286	20.35	209	330.4290	1593.0218
390	390	0.39	3.7143	20.35	223	352.5630	1699.7314
420	420	0.42	4.0000	20.35	248	392.0880	1890.2842
450	450	0.45	4.2857	20.35	270	426.8700	2057.9707
480	480	0.48	4.5714	20.35	290	458.4900	2210.4130
510	510	0.51	4.8571	20.35	320	505.9200	2439.0764
540	540	0.54	5.1429	20.35	341	539.1210	2599.1408
570	570	0.57	5.4286	20.35	376	594.4560	2865.9148

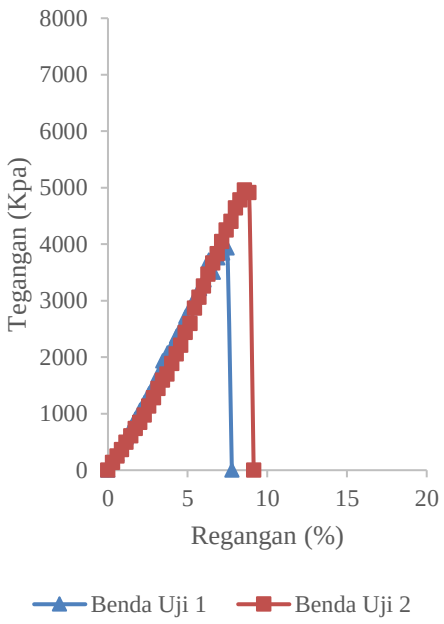
600	600	0.6	5.7143	20.35	402	635.5620	3064.0898
630	630	0.63	6.0000	20.35	428	676.6680	3262.2647
660	660	0.66	6.2857	20.35	455	719.3550	3468.0618
690	690	0.69	6.5714	20.35	481	760.4610	3666.2368
720	720	0.72	6.8571	20.35	503	795.2430	3833.9233
750	750	0.75	7.1429	20.35	531	839.5110	4047.3425
780	780	0.78	7.4286	20.35	558	882.1980	4253.1395
810	810	0.81	7.7143	20.35	578	913.8180	4405.5818
840	840	0.84	8.0000	20.35	609	962.8290	4641.8673
870	870	0.87	8.2857	20.35	628	992.8680	4786.6875
900	900	0.9	8.5714	20.35	651	1029.2310	4961.9961
930	930	0.93	8.8571	20.35	645	1019.7450	4916.2634
960	960	0.96	9.1429	20.35	0	0.0000	0.0000

Data siklus pembasahan-pengeringan

Siklus ke: 1				
	Awal	Sebelum Rendam	Sesudah Rendam	Setelah Kering
Diameter	5.12	5.12	5.11	5.08
Tinggi	10.46	10.45	10.32	10.4
Berat	319.07	317.56	323.57	314.9

Siklus ke:2				
	Awal	Sebelum Rendam	Sesudah Rendam	Setelah Kering
Diameter	5.12	5.08	5.12	5.09
Tinggi	10.46	10.4	10.39	10.31
Berat	319.07	314.9	326.47	315.38

Siklus ke: 3				
	Awal	Sebelum Rendam	Sesudah Rendam	Setelah Kering
Diameter	5.12	5.09	5.13	5.09
Tinggi	10.46	10.31	10.53	10.5
Berat	319.07	315.38	327.92	324.35



Gambar 7 Hubungan tegangan dan regangan benda uji tiga siklus

5. Empat siklus

a. Benda uji 1

Data benda uji sebelum pengujian

Diameter	:	5.24	cm	Luas	:	21.57	cm^2
Tinggi	:	10.34	cm	Volume	:	222.98	cm^3
Berat	:	344.25	g	Berat vol.	:	1.54	g/cm^3

Kalibrasi proving ring : 1.581 kg/ div

Hasil nilai kuat tekan bebas (q_u) : 6494.36 kPa

Modulus sekan (E_{50}) : 49.78 Mpa

Waktu (detik)	Deformasi		Regangan ε = ΔH/Ho (%)	Luas terkoreksi A (cm^2)	Beban Aksial		Tegangan P/A (kPa)
	Arloji ukur (a)	ΔH = a x 10^{-3} (cm)			Arloji Ukur	Beban P (kg)	
0	0	0	0.0000	21.565149	0	0.0000	0.0000
30	30	0.03	0.2901	21.565149	21	33.2010	151.0316
60	60	0.06	0.5803	21.565149	33	52.1730	237.3353
90	90	0.09	0.8704	21.565149	53	83.7930	381.1749
120	120	0.12	1.1605	21.565149	72	113.8320	517.8225
150	150	0.15	1.4507	21.565149	93	147.0330	668.8541
180	180	0.18	1.7408	21.565149	112	177.0720	805.5017
210	210	0.21	2.0309	21.565149	134	211.8540	963.7252

240	240	0.24	2.3211	21.565149	153	241.8930	1100.3728
270	270	0.27	2.6112	21.565149	175	276.6750	1258.5964
300	300	0.3	2.9014	21.565149	200	316.2000	1438.3958
330	330	0.33	3.1915	21.565149	220	347.8200	1582.2354
360	360	0.36	3.4816	21.565149	243	384.1830	1747.6509
390	390	0.39	3.7718	21.565149	268	423.7080	1927.4504
420	420	0.42	4.0619	21.565149	291	460.0710	2092.8659
450	450	0.45	4.3520	21.565149	315	498.0150	2265.4734
480	480	0.48	4.6422	21.565149	340	537.5400	2445.2729
570	570	0.57	5.5126	21.565149	364	575.4840	2617.8804
600	600	0.6	5.8027	21.565149	390	616.5900	2804.8719
630	630	0.63	6.0928	21.565149	411	649.7910	2955.9034
660	660	0.66	6.3830	21.565149	438	692.4780	3150.0869
690	690	0.69	6.6731	21.565149	466	736.7460	3351.4623
720	720	0.72	6.9632	21.565149	490	774.6900	3524.0698
750	750	0.75	7.2534	21.565149	514	812.6340	3696.6773
780	780	0.78	7.5435	21.565149	538	850.5780	3869.2848
810	810	0.81	7.8337	21.565149	562	888.5220	4041.8923
840	840	0.84	8.1238	21.565149	584	923.3040	4200.1158
870	870	0.87	8.4139	21.565149	610	964.4100	4387.1073
900	900	0.9	8.7041	21.565149	634	1002.3540	4559.7148
930	930	0.93	8.9942	21.565149	657	1038.7170	4725.1303
960	960	0.96	9.2843	21.565149	683	1079.8230	4912.1218
990	990	0.99	9.5745	21.565149	705	1114.6050	5070.3453
1020	1020	1.02	9.8646	21.565149	733	1158.8730	5271.7207
1050	1050	1.05	10.1547	21.565149	758	1198.3980	5451.5202
1080	1080	1.08	10.4449	21.565149	786	1242.6660	5652.8956
1110	1110	1.11	10.7350	21.565149	810	1280.6100	5825.5031
1140	1140	1.14	11.0251	21.565149	832	1315.3920	5983.7267
1170	1170	1.17	11.3153	21.565149	854	1350.1740	6141.9502
1200	1200	1.2	11.6054	21.565149	880	1391.2800	6328.9417
1230	1230	1.23	11.8956	21.565149	900	1422.9000	6472.7813
1260	1260	1.26	12.1857	21.565149	903	1427.6430	6494.3572
1290	1290	1.29	12.4758	21.565149	903	1427.6430	6494.3572
1320	1320	1.32	12.7660	21.565149	903	1427.6430	6494.3572
1350	1350	1.35	13.0561	21.565149	903	1427.6430	6494.3572
1380	1380	1.38	13.3462	21.565149	903	1427.6430	6494.3572
1410	1410	1.41	13.6364	21.565149	903	1427.6430	6494.3572
1440	1440	1.44	13.9265	21.565149	0	0	0.0000

Data siklus pembasahan-pengeringan

Siklus ke: 1				
	Awal	Sebelum Rendam	Sesudah Rendam	Setelah Kering
Diameter	5.2	5.2	5.42	5.15
Tinggi	10.3	10.3	10.36	10.36
Berat	314.14	313.06	344.94	311.78

Siklus ke: 2				
	Awal	Sebelum Rendam	Sesudah Rendam	Setelah Kering
Diameter	5.2	5.15	5.17	5.23
Tinggi	10.3	10.36	10.34	10.28
Berat	314.14	311.78	343.74	325.99

Siklus ke: 3				
	Awal	Sebelum Rendam	Sesudah Rendam	Setelah Kering
Diameter	5.2	5.23	5.16	5.19
Tinggi	10.3	10.28	10.35	10.33
Berat	314.14	325.99	343.89	321.05

Siklus ke: 4				
	Awal	Sebelum Rendam	Sesudah Rendam	Setelah Kering
Diameter	5.2	5.19	5.12	5.24
Tinggi	10.3	10.33	10.36	10.34
Berat	314.14	321.05	344.94	344.25

b. Benda uji 2

Data benda uji sebelum pengujian:

Diameter	:	5.23	cm	Luas	:	21.4829	cm^2
Tinggi	:	10.46	cm	Volume	:	224.711	cm^3
Berat	:	343.34	g	Berat vol.	:	1.52792	g/cm^3

Kalibrasi proving ring : 1.581 kg/ div

Hasil nilai kuat tekan bebas (q_u) : 5488.10 kPa

Modulus sekan (E_{50}) : 58.80 Mpa

Waktu (detik)	Deformasi		Regangan $\varepsilon = \Delta H/Ho$ (%)	Luas terkoreksi A (cm^2)	Beban Aksial		Tegangan P/A (kPa)
	Arloji ukur (a)	$\Delta H = a \times 10^{-3}$ (cm)			Arloji Ukur	Beban P (kg)	
0	0	0	0.0000	21.482917	0	0.0000	0.0000
30	30	0.03	0.2868	21.544709	19	30.0390	136.7772
60	60	0.06	0.5736	21.606857	36	56.9160	258.4115
90	90	0.09	0.8604	21.669365	60	94.8600	429.4434
120	120	0.12	1.1472	21.732236	83	131.2230	592.3448
150	150	0.15	1.4340	21.795472	104	164.4240	740.0617
180	180	0.18	1.7208	21.859077	126	199.2060	894.0043
210	210	0.21	2.0076	21.923055	152	240.3120	1075.3340
240	240	0.24	2.2945	21.987409	173	273.5130	1220.3178
270	270	0.27	2.5813	22.052141	209	330.4290	1469.9292
300	300	0.3	2.8681	22.117256	234	369.9540	1640.9128
330	330	0.33	3.1549	22.182756	266	420.5460	1859.8033
360	360	0.36	3.4417	22.248645	291	460.0710	2028.5714
390	390	0.39	3.7285	22.314927	315	498.0150	2189.3538
420	420	0.42	4.0153	22.381605	339	535.9590	2349.1424
450	450	0.45	4.3021	22.448683	364	575.4840	2514.8460
480	480	0.48	4.5889	22.516164	393	621.3330	2707.0671
510	510	0.51	4.8757	22.584052	414	654.5340	2843.1473
540	540	0.54	5.1625	22.65235	442	698.8020	3026.2853
570	570	0.57	5.4493	22.721063	465	735.1650	3174.1334
600	600	0.6	5.7361	22.790194	488	771.5280	3321.0290
630	630	0.63	6.0229	22.859747	512	809.4720	3473.7568
660	660	0.66	6.3098	22.929726	535	845.8350	3618.7268
690	690	0.69	6.5966	23.000135	560	885.3600	3776.2308
720	720	0.72	6.8834	23.070977	589	931.2090	3959.5897
750	750	0.75	7.1702	23.142257	614	970.7340	4114.9403
780	780	0.78	7.4570	23.213979	638	1008.6780	4262.5744
810	810	0.81	7.7438	23.286147	665	1051.3650	4429.1959
840	840	0.84	8.0306	23.358765	686	1084.5660	4554.8609
870	870	0.87	8.3174	23.431837	710	1122.5100	4699.5134
900	900	0.9	8.6042	23.505368	733	1158.8730	4836.5736
930	930	0.93	8.8910	23.579362	761	1203.1410	5005.5694
960	960	0.96	9.1778	23.653823	785	1241.0850	5147.1781
990	990	0.99	9.4646	23.728756	809	1279.0290	5287.7929
1020	1020	1.02	9.7514	23.804165	830	1312.2300	5407.8672
1050	1050	1.05	10.0382	23.880055	845	1335.9450	5488.1032
1080	1080	1.08	10.3250	23.95643	0	0.0000	0.0000

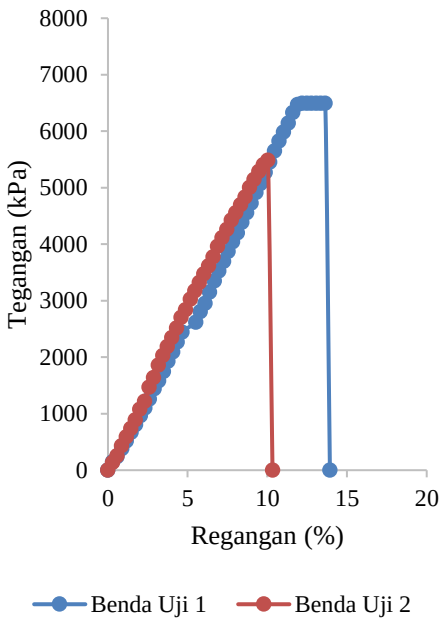
Data pengujian siklus basah-kering

Siklus ke: 1				
	Awal	Sebelum Rendam	Sesudah Rendnam	Setelah Kering
Diameter	5.12	5.12	5.11	5.08
Tinggi	10.35	10.35	10.32	10.4
Berat	318.26	317.72	323.57	314.9

Siklus ke: 2				
	Awal	Sebelum Rendam	Sesudah Rendam	
Diameter	5.13	5.08	5.17	5.17
Tinggi	10.3	10.4	10.43	10.45
Berat	320.04	314.9	341.99	325.81

Siklus ke: 3				
	Awal	Sebelum Rendam	Sesudah Rendam	
Diameter	5.13	5.17	5.13	5.16
Tinggi	10.3	10.45	10.35	10.32
Berat	320.04	325.81	343.22	320.25

Siklus ke: 4				
	Awal	Sebelum Rendam	Sesudah Rendam	Setelah Kering
Diameter	5.13	5.16	5.14	5.23
Tinggi	10.3	10.32	10.44	10.46
Berat	320.04	320.25	343.29	343.34



Gambar 8 Hubungan tegangan dan regangan benda uji tiga siklus

Lampiran 3. Dokumentasi benda uji

1. Non Siklus

a. Benda uji 1

Gambar 9 Benda uji 1 setelah uji tekan bebas

b. Benda uji 2

Gambar 10 Benda uji 2 setelah uji tekan bebas

c. Benda uji 3

Gambar 11 Benda uji 3 setelah uji tekan bebas

2. 1 Siklus

a. Benda uji 1

(a) (b)

Gambar 12 (a) Setelah 1 siklus, dan (b) setelah uji tekan bebas

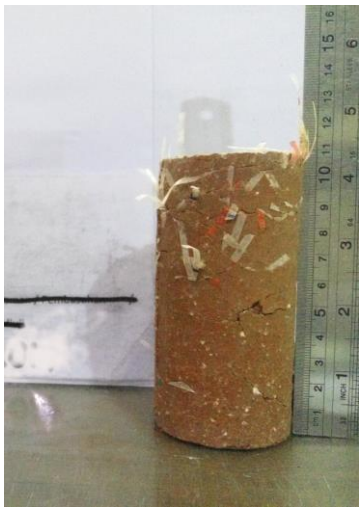
b. Benda uji 2

(a) (b)

Gambar 13 (a) Setelah 1 siklus, dan (b) setelah uji tekan bebas

3. Siklus

a. Benda uji 1



(a)

(b)

(c)

Gambar 14 (a) Setelah 1 siklus, (b) setelah 2 siklus, dan (c) setelah uji tekan bebas,

b. Benda uji 2

(a)

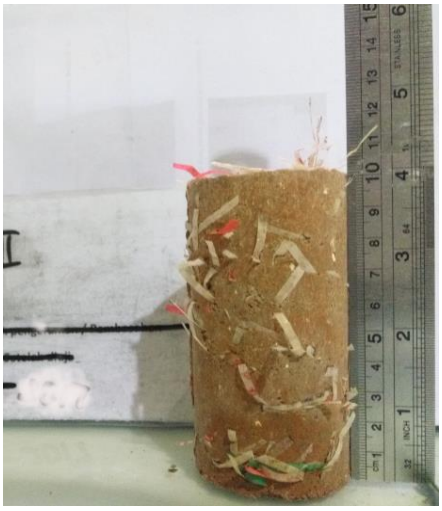
(b)

(c)

Gambar 15 (a) Setelah 1 siklus, (b) setelah 2 siklus, dan (c) setelah uji tekan bebas

4. 3 Siklus

a. Benda uji 1



(a)

(b)

(c)

(d)

Gambar 16 (a) Setelah 1 silus, (b) setelah 2 siklus, (c) setelah 3 siklus, dan (d) setelah uji tekan bebas

b. Benda uji 2

(a)

(b)

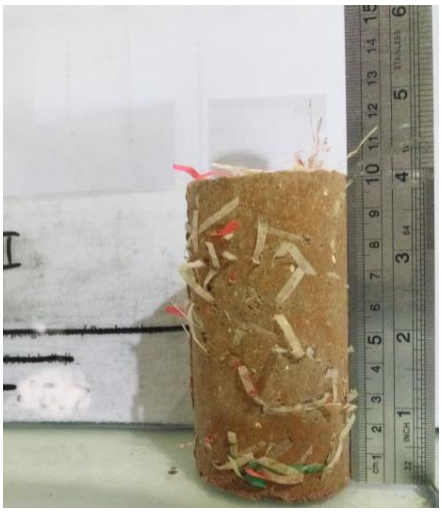
(c)

(d)

Gambar 17 (a) Setelah 1 siklus, (b) setelah 2 siklus, (c) setelah 3 siklus, dan (d) setelah uji tekan bebas

5. 4 Siklus

a. Benda uji 1



(a)

(b)

(c)

(d)

Gambar 18 (a) Setelah 1 siklus, (b) setelah 2 siklus, (c) setelah siklus 3, (d) setelah 4 siklus, (bersambung)

(e)

Gambar 19 (sambungan) dan (e) setelah uji tekan bebas

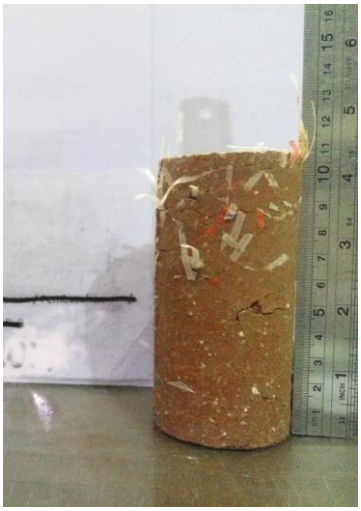
b. Benda uji 2

(a)

(b)

Gambar 20 (a) Setelah 1 siklus, (b) setelah 2 siklus (bersambung)

(c)



(d)

(e)

Gambar 21 (sambungan) (c) setelah siklus 3, (d) setelah 4 siklus, dan (e) setelah uji tekan bebas