BAB VI

KESIMPULAN DAN SARAN

6.1   Kesimpulan

Pada penelitian ini, stabilisasi tanah dasar lempung dilakukan dengan menggunakan 2 jenis polimer. Secara visual tanah yang digunakan merupakan tanah organik dengan klasifikasi OH (lempung organik dengan plastisitas sedang sampai tinggi). Secara umum, pengaruh polimer dan waktu *curing* terlihat pada saat tanah dasar lempung distabilisasi oleh polimer di tunjukkan dengan adanya penurunan kadar air, nilai batas plastis, batas cair dan indeks plastisitas. Kenaikkan nilai kuat tekan bebas dari 85,6 kPa untuk tanah asli menjadi 121,1 kPa untuk tanah dasar yang telah distabilisasi oleh polimer dengan waktu *curing* 7 hari. Nilai modulus elastisitas juga mengalami kenaikkan dimana tanah asli memiliki nilai modulus sebesar 823,7 kN/m^2 dan tanah dicampur polimer dengan waktu *curing* 72 jam memiliki nilai sebesar 3139,1 kN/m^2. Hasil uji kuat tekan bebas tidak signifikan karena hanya mengalami kenaikan sebesar 10%.

6.2   Saran

Saran yang penulis berikan pada tugas akhir yaitu, penelitian lanjutan untuk stabilisasi tanah dasar dengan polimer masih perlu dilakukan untuk mengetahui lebih lanjut cara penggunaan polimer yang efektif. Penggunaan polimer dengan kadar semen rendah perlu di pertimbangkan untuk melihat efek polimer terhadap stabilisasi tanah dasar. Cara persiapan benda uji perlu diperhatikan lebih lanjut untuk mendapatkan

benda uji yang lebih baik karena mempengaruhi untuk hasil pengujian uji kuat tekan

bebas dan nilai modulus elastisitas.

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KADAR AIR TANAH ASLI

Pengujian Sampel   : Kadar Air Tanah Asli   Tanggal Pengujian   : 5 Februari 2019

OMC   : 27 %   MDD   : 1,5 %

Kode Cawan		A	B
Berat Cawan Kosong	w_1	24.16	23.95
Berat Cawan + Tanah Basah	w_2	123.41	122.37
Berat Cawan + Tanah Kering	w_3	90.26	90.11
Berat Air	$w_w = w_2 - w_3$	33.15	32.26
Berat Tanah Kering	$w_s = w_3 - w_1$	66.10	66.16
Kadar Air	$W = \frac{w_w}{w_s} \times 100\%$	50.15	48.76
Kadar Air Rata-Rata		49.46	

Lampiran 1.a

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KADAR AIR TANAH + POLIMER (24 JAM)

Pengujian Sampel   : Kadar Air Tanah Asli   Tanggal Pengujian   : 26 Maret 2019
OMC   : 27 %   MDD   : 1,5   %

Kode Cawan		A	B
Berat Cawan Kosong	w_1	23.41	22.82
Berat Cawan + Tanah Basah	w_2	42.72	42.85
Berat Cawan + Tanah Kering	w_3	38.80	38.87
Berat Air	$w_w = w_2 - w_3$	3.92	3.98
Berat Tanah Kering	$w_s = w_3 - w_1$	15.39	16.05
Kadar Air	$W = \dfrac{w_w}{w_s} \times 100\%$	25.47	24.80
Kadar Air Rata-Rata		25,13	

Lampiran 1.b

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KADAR AIR TANAH + POLIMER (48 JAM)

Pengujian Sampel   : Kadar Air Tanah Asli   Tanggal Pengujian   : 28 Maret 2019

OMC   : 27 %   MDD   : 1,5 %

Kode Cawan		A	B
Berat Cawan Kosong	w_1	23.67	24.62
Berat Cawan + Tanah Basah	w_2	55.60	37.33
Berat Cawan + Tanah Kering	w_3	49.42	34.90
Berat Air	$w_w = w_2 - w_3$	6.18	2.43
Berat Tanah Kering	$w_s = w_3 - w_1$	25.75	10.28
Kadar Air	$W = \dfrac{w_w}{w_s} \times 100\%$	24.00	23.64
Kadar Air Rata-Rata		23.82	

Lampiran 1.c

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KADAR AIR TANAH + POLIMER (72 JAM)

Pengujian Sampel : Kadar Air Tanah Asli   Tanggal Pengujian   : 25 Maret 2019
OMC   : 27 %   MDD   : 1,5   %

Kode Cawan		A	B
Berat Cawan Kosong	w_1	24.58	23.65
Berat Cawan + Tanah Basah	w_2	47.52	41.86
Berat Cawan + Tanah Kering	w_3	43.62	38.64
Berat Air	$w_w = w_2 - w_3$	3.90	3.22
Berat Tanah Kering	$w_s = w_3 - w_1$	19.04	14.99
Kadar Air	$W = \dfrac{w_w}{w_s} \times 100\%$	20.48	21.48
Kadar Air Rata-Rata		20.98	

Lampiran 1.d

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KADAR AIR TANAH + POLIMER (7 HARI)

Pengujian Sampel   : Kadar Air Tanah Asli   Tanggal Pengujian   : 29 Maret 2019

OMC   : 27 %   MDD   : 1,5 %

Kode Cawan		A	B
Berat Cawan Kosong	w_1	24.13	24.57
Berat Cawan + Tanah Basah	w_2	42.77	38.58
Berat Cawan + Tanah Kering	w_3	39.48	36.07
Berat Air	$w_w = w_2 - w_3$	3.29	2.51
Berat Tanah Kering	$w_s = w_3 - w_1$	15.35	11.50
Kadar Air	$W = \dfrac{w_w}{w_s} \times 100\%$	21.43	21.83
Kadar Air Rata-Rata		21.63	

Lampiran 1.e

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PENGUJIAN BERAT JENIS

Pengujian Sampel   : Berat Jenis Tanah Asli   Tanggal Pengujian   : 5 Februari 2019

OMC   : 27 %   MDD   : 1,5   %

No Picnometer	1	2
Berat Picnometer kosong/ w1	30,55	32,25
Berat Picnometer+Tanah Kering/ w2	47,53	50,36
Berat Picnometer+Tanah+Air/ w2	90,66	91,90
Berat Picnometer+Air /w3	80,44	81,93
Temperatur	29°	29°
A = w2-w1	16,98	18,11
B = w3-w4	10,22	9,97
C = A-B	6,76	8,14
Berat Jenis = A / C	2,512	2,225
Berat Jenis Rata-rata	2,368	
Berat Jenis Tanah pada 27.5° C $$G_{27.5} = G \times \frac{\gamma_{w\,(t°C)}}{\gamma_{w\,(27.5°C)}}$$	2,367	

Lampiran 2

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PENGUJIAN BATAS SUSUT

Pengujian Sampel : Berat Jenis Tanah Asli   Tanggal Pengujian : 9 Februari 2019

A. **Berat Jenis Sudah Diketahui**

Berdasarkan pengujian berat jenis tanah asli, G = 2,3674

No Cawan		1	2
Berat cawan susut + tanah kering	W_2	30,02	30,91
Berat cawan susut	W_3	15,74	16,52
Berat tanah kering	$W_4 = W_2 - W_3$	14,28	14,39
Berat air raksa yang didesak tanah kering + cawan kaca	W_5	156,56	163,19
Berat cawan kaca	W_6	48,29	48,29
Berat air raksa	$W_7 = W_5 - W_6$	108,27	114,9
Volume tanah kering	$V_o = \dfrac{W_5}{13,6}$	7,96	8,45
Batas Susut Tanah	$SL = \left[\dfrac{V_0}{W_o} - \dfrac{1}{G}\right] x100$	13,51	16,47
Batas Susut Tanah Rata-Rata		14,99	

Lampiran 3

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PENGUJIAN BATAS CAIR TANAH ASLI

Target Pukulan		15-20		21-24		26-30		31-40	
Jumlah Pukulan		18		23		30		31	
Kode Cawan		A	B	C	D	E	F	G	H
Berat Cawan Kosong	w_c	22,87	24,29	24,29	24,34	23,65	24,06	22,59	23,51
Berat Cawan + Tanah Basah	w_1	29,14	32,75	36,03	33,82	31,16	32,17	31,24	31,46
Berat Cawan + Tanah Kering	w_2	26,29	28,92	31,10	29,74	27,99	28,72	27,58	28,02
Berat Air	$w_w = w_1 - w_2$	2,85	3,83	4,93	4,08	3,17	3,45	3,66	3,44
Berat Tanah Kering	$W_k = W_2 - W_c$	3,42	4,63	6,81	5,40	4,34	4,66	4,99	4,51
Kadar Air	$W = \frac{w_w}{w_k}$ x 100%	83,33	82,72	72,39	75,56	73,04	74,03	73,35	76,27
Kadar Air Rata-Rata		83,03		73,97		73,54		74,81	

Batas Cair
(Liquid Limit,
LL) =   76,29

w_{10} =   89,67

w_{100} =   56,03

Flow Index, I_f
= w_{10} - w_{100} =   33,64

Lampiran 4.a

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PENGUJIAN BATAS CAIR TANAH + POLIMER (24 JAM)

	Target Pukulan		15-20		21-24		26-30		31-40	
	Jumlah Pukulan		16		23		27		40	
	Kode Cawan		A	B	C	D	E	F	G	H
1	Berat Cawan Kosong	w_c	24,06	23,66	23,60	23,72	24,34	24,59	23,85	23,62
2	Berat Cawan + Tanah Basah	w_1	30,24	31,57	27,71	27,69	29,04	31,17	30,30	31,48
3	Berat Cawan + Tanah Kering	w_2	27,37	27,96	25,66	25,75	26,77	27,99	27,68	28,37
4	Berat Air	$w_w = w_1 - w_2$	2,87	3,61	2,05	1,94	2,27	3,18	2,62	3,11
5	Berat Tanah Kering	$W_k = W_2 - W_c$	3,31	4,30	2,06	2,03	2,43	3,40	3,83	4,75
6	Kadar Air	$W = \frac{w_w}{w_k} \times 100\%$	86,71	83,95	99,51	95,57	93,42	93,53	68,41	65,47
	Kadar Air Rata-Rata		85,33		97,54		93,47		66,94	

Batas Cair (Liquid Limit, LL)

=	85,91
w_{10} =	105,05
w_{100} =	56,95
Flow Index, I_f = w_{10} - w_{100} =	48,101

Lampiran 4.b

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PENGUJIAN BATAS CAIR TANAH + POLIMER (48 JAM)

	Target Pukulan		15-20		21-24		26-30		31-40	
			16		23		27		33	
			A	B	C	D	E	F	G	H
1	Berat Cawan Kosong	w_c	23,73	24,58	24,38	23,89	23,25	23,66	24,09	23,38
2	Berat Cawan + Tanah Basah	w_1	27,04	28,08	27,19	26,57	26,43	25,65	26,06	25,56
3	Berat Cawan + Tanah Kering	w_2	25,62	26,44	25,95	25,41	25,02	24,72	25,33	24,73
4	Berat Air	$w_w = w_1 - w_2$	1,42	1,64	1,24	1,16	1,41	0,93	0,73	0,83
5	Berat Tanah Kering	$W_k = W_2 - W_c$	1,89	1,86	1,57	1,52	1,77	1,06	1,24	1,35
6	Kadar Air	$W = \frac{w_w}{w_k} \times 100\%$	75,13	88,17	78,98	76,32	79,66	87,74	58,87	61,48
	Kadar Air Rata-Rata		81,65		77,65		83,70		60,18	

Batas Cair (Liquid Limit, LL) = 74,78
w_{10} = 95,93
w_{100} = 42,79
Flow Index, I_f = $w_{10} - w_{100}$ = 53,14

Lampiran 4.c

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PENGUJIAN BATAS CAIR TANAH + POLIMER (72 JAM)

	Target Pukulan		15-20		21-24		26-30		31-40	
	Jumlah Pukulan		18		21		27		32	
	Kode Cawan		A	B	C	D	E	F	G	H
1	Berat Cawan Kosong	w_c	23,39	24,00	24,33	14,00	22,83	22,56	23,84	24,33
2	Berat Cawan + Tanah Basah	w_1	28,45	28,17	31,76	23,98	28,90	28,04	44,82	52,40
3	Berat Cawan + Tanah Kering	w_2	26,29	26,04	28,73	20,98	26,53	26,62	37,18	41,87
4	Berat Air	$w_w = w_1 - w_2$	2,16	2,13	3,03	3,00	2,37	1,78	7,64	10,53
5	Berat Tanah Kering	$W_k = W_2 - W_c$	2,90	2,04	4,40	6,98	3,70	4,06	13,34	17,54
6	Kadar Air	$W = \frac{w_w}{w_k} \times 100\%$	74,48	104,41	68,86	42,98	64,05	43,84	57,27	60,03
	Kadar Air Rata-Rata		89,45		69,09		53,95		58,65	

Batas Cair (Liquid Limit, LL) =   68,33

w_{10} =   111,81

w_{100} =   2,55

Flow Index, I_f = $w_{10} - w_{100}$ =   109,25

Lampiran 4.d

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PENGUJIAN BATAS CAIR TANAH + POLIMER (7 HARI)

	Target Pukulan		15-20		21-24		26-30		31-40	
	Jumlah Pukulan		16		21		28		33	
	Kode Cawan		A	B	C	D	E	F	G	H
1	Berat Cawan Kosong	w_c	23,70	23,58	23,64	23,39	24,42	24,64	23,87	23,66
2	Berat Cawan + Tanah Basah	w_1	26,96	27,25	26,20	26,77	28,19	28,56	28,07	28,69
3	Berat Cawan + Tanah Kering	w_2	25,43	25,54	25,09	25,32	26,63	26,80	26,39	26,76
4	Berat Air	$w_w = w_1 - w_2$	1,53	1,71	1,11	1,45	1,56	1,76	1,68	1,93
5	Berat Tanah Kering	$W_k = W_2 - W_c$	1,73	1,96	1,45	1,93	2,21	2,16	2,52	3,10
6	Kadar Air	$W = \frac{w_w}{w_k} \times 100\%$	88,44	87,24	76,55	75,13	70,59	81,48	66,67	62,26
	Kadar Air Rata-Rata		87,84		75,84		76,03		64,46	

Batas Cair (Liquid Limit, LL) =   74,47

w_{10} =   99,73

w_{100} =   36,25

Flow Index, I_f = w_{10} - w_{100} =   63,48

Lampiran 4.e

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PENGUJIAN BATAS PLASTIS TANAH ASLI

Kode Cawan		A	B
Berat Cawan Kosong	w_c	22,59	23,51
Berat Cawan + Tanah Basah	w_1	31,65	32,98
Berat Cawan + Tanah Kering	w_2	28,43	29,80
Berat Air	$w_w = w_1 - w_2$	3,22	3,18
Berat Tanah Kering	$w_s = w_2 - w_c$	5,84	6,29
Kadar Air	$w = \dfrac{w_w}{w_s} \times 100\%$	55,14	50,56
Batas Plastis		52,85	

Lampiran 5.a

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PENGUJIAN BATAS PLASTIS TANAH + POLIMER (24 JAM)

Kode Cawan		A	B
Berat Cawan Kosong	w_c	24,26	23,52
Berat Cawan + Tanah Basah	w_1	65,65	66,02
Berat Cawan + Tanah Kering	w_2	52,93	53,03
Berat Air	$w_w = w_1 - w_2$	12,72	12,99
Berat Tanah Kering	$w_s = w_2 - w_c$	28,67	29,51
Kadar Air	$w = \dfrac{w_w}{w_s} \times 100\%$	44,37	44,02
Batas Plastis		44,19	

Lampiran 5.b

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PENGUJIAN BATAS PLASTIS TANAH + POLIMER (48 JAM)

Kode Cawan		A	B
Berat Cawan Kosong	w_c	23,53	23,58
Berat Cawan + Tanah Basah	w_1	53,89	50,18
Berat Cawan + Tanah Kering	w_2	45,07	41,79
Berat Air	$w_w = w_1 - w_2$	8,82	8,39
Berat Tanah Kering	$w_s = w_2 - w_c$	21,54	18,21
Kadar Air	$w = \dfrac{w_w}{w_s} \times 100\%$	40,95	46,07
Batas Plastis		43,51	

Lampiran 5.c

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PENGUJIAN BATAS PLASTIS TANAH + POLIMER (72 JAM)

Kode Cawan		A	B
Berat Cawan Kosong	w_c	24,11	23,67
Berat Cawan + Tanah Basah	w_1	36,16	39,82
Berat Cawan + Tanah Kering	w_2	32,90	35,39
Berat Air	$w_w = w_1 - w_2$	3,26	4,43
Berat Tanah Kering	$w_s = w_2 - w_c$	8,79	11,72
Kadar Air	$w = \dfrac{w_w}{w_s} \times 100\%$	37,09	37,80
Batas Plastis		37,44	

Lampiran 5.d

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PENGUJIAN BATAS PLASTIS TANAH + POLIMER (7 HARI)

Kode Cawan		A	B
Berat Cawan Kosong	w_c	23,25	23,73
Berat Cawan + Tanah Basah	w_1	51,10	54,16
Berat Cawan + Tanah Kering	w_2	42,99	45,07
Berat Air	$w_w = w_1 - w_2$	8,11	9,09
Berat Tanah Kering	$w_s = w_2 - w_c$	19,74	21,34
Kadar Air	$w = \dfrac{w_w}{w_s} \times 100\%$	41,08	42,60
Batas Plastis		41,84	

Lampiran 5.f

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PENGUJIAN ANALISIS SARINGAN

No. Sieve	Ukuran Butiran (mm)	Berat Saringan	Berat Saringan dan tanah	Berat Tertahan	Berat Lolos	Prosentase Lolos
a	b	c	d	e	f	g
				(d - c)	J - e	(f / J) x 100
4	4,750	581,07	587,35	6,28	93,72	93,72
10	2,000	527,00	527,69	0,69	93,03	93,03
20	0,850	484,12	484,95	0,83	92,20	92,20
40	0,425	433,52	434,59	1,07	91,13	91,13
60	0,250	432,50	434,32	1,82	89,31	89,31
140	0,106	424,33	427,85	3,52	85,79	85,79
200	0,075	412,68	413,60	0,92	84,87	84,87
Pan				84,87		
			Jumlah, J=	100,000		

Lampiran 6

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PENGUJIAN HIDROMETER

Tipe Hidrometer		152
Koreksi Meniskus	m=	1
Berat Jenis Tanah	G=	2,367
Koreksi Hidrometer 152	a=	1,078

Berat Sampel Kering Oven	W	100	gr
K****		1,078	
Reagen		Na2SiO3/	NaPO3
Banyak reagen	2	sendok makan	ml/gr

Jam	Waktu (menit)	Pembacaan Suspensi	Pembacaan Cairan	Temperatur °C	Pembacaan Terkoreksi meniskus	Kedalaman Efektif	Konstan	Diameter Butir (mm)	Pembacaan Terkoreksi	% Lebih Kecil
	T	R1	R2	t °C	R' = R1+m	L* (cm)	Kh**	D	R = R1 - R2	p*** (%)
11:12	2	55	1	28	56	7,1	0,01327	0,0250	54	71,66
11:15	5	40	1	28	41	9,6	0,01327	0,0184	39	51,75
11:40	30	21	0	28	22	12,7	0,01327	0,0086	21	27,87
12:10	60	19	0	28	20	13	0,01327	0,0062	19	25,21
15:20	250	11	0	28	12	14,3	0,01327	0,0032	11	14,60
11:10	1440	5	0	28	6	15,3	0,01327	0,0014	5	6,64

Lampiran 7

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PENGUJIAN PEMADATAN

Kadar Air Percobaan (%)	15	20	24	25	26	27	28	29	30
Penambahan Air Campuran	375	500	600	625	650	675	700	725	750
Berat Silinder + Tanah Padat	2768	2824	2986	3045	2873	2937	2884	2816	3020
Berat Silinder	1566	1503	1567	1604	1502	1603	1566	1502	1604
Diameter Silinder	10.14	10.13	10.14	10.14	10.13	10.14	10.14	10.13	10.14
Tinggi Silinder	10.20	10.18	10.20	10.18	9.31	8.68	9.23	9.28	10.18
Berat Tanah Padat	1202	1321	1419	1441	1371	1334	1318	1314	1416
Berat Volume Basah	1.460	1.612	1.724	1.755	1.829	1.905	1.769	1.759	1.724
Berat Volume Tanah Kering	1.270	1.343	1.390	1.404	1.452	1.500	1.382	1.364	1.326

Lampiran 8

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PENGUJIAN KUAT TEKAN BEBAS

Waktu : -   Sampel   : Tanah Asli
Diameter : 5,63   cm   Luas mula – mula (Ao) : 24,895 cm2
Tinggi   : 8,29   cm   Berat   : 375,43 gr

Perubahan Tinggi			Luas Penampang (cross-section area)		Beban		Tekanan (Q)
Angka Dial Vertikal	ΔL (mm)	ε Regangan (strain)	Koreksi	Luas Terkoreksi A (cm^2)	Angka Dial Beban	Beban (kg)	P / A (kPa)
a	a x 10^{-3}	$\Delta L / L_0$	d = 1 - ε	e = A_0 / d	f	g	h
0	0	0	1.000	24.895	0	0.00	0.000
20	0.02	0.002	0.998	24.955	3	0.73	2.885
40	0.04	0.005	0.995	25.015	4	0.98	3.837
60	0.06	0.007	0.993	25.076	5	1.22	4.784
80	0.08	0.010	0.990	25.137	5	1.22	4.773
100	0.1	0.012	0.988	25.199	6	1.47	5.713
120	0.12	0.014	0.986	25.260	7	1.71	6.649
140	0.14	0.017	0.983	25.322	8	1.96	7.581
160	0.16	0.019	0.981	25.385	10	2.45	9.453
180	0.18	0.022	0.978	25.447	12	2.94	11.315
200	0.2	0.024	0.976	25.510	14	3.42	13.169
220	0.22	0.027	0.973	25.573	18	4.40	16.889
240	0.24	0.029	0.971	25.637	20	4.89	18.719
260	0.26	0.031	0.969	25.701	22	5.38	20.540
280	0.28	0.034	0.966	25.765	26	6.36	24.214
300	0.3	0.036	0.964	25.829	29	7.09	26.941
320	0.32	0.039	0.961	25.894	32	7.83	29.653
340	0.34	0.041	0.959	25.959	35	8.56	32.352
360	0.36	0.043	0.957	26.025	38	9.29	35.037
380	0.38	0.046	0.954	26.091	43	10.52	39.547
400	0.4	0.048	0.952	26.157	48	11.74	44.033
420	0.42	0.051	0.949	26.223	52	12.72	47.582
440	0.44	0.053	0.947	26.290	57	13.94	52.025
460	0.46	0.055	0.945	26.357	61	14.92	55.534
480	0.48	0.058	0.942	26.425	62	15.17	56.300
500	0.5	0.060	0.940	26.493	67	16.39	60.684
520	0.52	0.063	0.937	26.561	71	17.37	64.142
540	0.54	0.065	0.935	26.629	75	18.35	67.581
560	0.56	0.068	0.932	26.698	79	19.32	71.002
580	0.58	0.070	0.930	26.767	84	20.55	75.301
600	0.6	0.072	0.928	26.837	87	21.28	77.788
620	0.62	0.075	0.925	26.907	87	21.28	77.585
640	0.64	0.077	0.923	26.977	86	21.04	76.493

Lampiran 9

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PENGUJIAN KUAT TEKAN BEBAS

Waktu	: 2 Jam		Sampel	: 2 Jam - A
Diameter	: 5,40	cm	Luas mula – mula (Ao)	: 22,911 cm2
Tinggi	: 8,22	cm	Berat	: 355,85 gr

Perubahan Tinggi			Luas Penampang (cross-section area)		Beban		Tekanan (Q)
Angka Dial Vertikal	ΔL (mm)	ε Regangan (strain)	Koreksi	Luas Terkoreksi A (cm²)	Angka Dial Beban	Beban (kg)	P / A (kPa)
a	a x 10⁻³	ΔL / L₀	d = 1 - ε	e = A₀ / d	f	g	h
0	0	0	1.000	22.911	0	0	0.000
20	0.02	0.000	0.998	22.967	1	0.24	1.045
40	0.04	0.002	0.995	23.023	1	0.24	1.042
60	0.06	0.005	0.993	23.079	2	0.49	2.079
80	0.08	0.007	0.990	23.136	2	0.49	2.074
100	0.1	0.010	0.988	23.193	2	0.49	2.069
120	0.12	0.012	0.985	23.250	3	0.73	3.096
140	0.14	0.015	0.983	23.307	5	1.22	5.148
160	0.16	0.017	0.981	23.365	12	2.94	12.324
180	0.18	0.019	0.978	23.423	12	2.94	12.293
200	0.2	0.022	0.976	23.482	21	5.14	21.459
220	0.22	0.024	0.973	23.540	27	6.60	27.522
240	0.24	0.027	0.971	23.599	34	8.32	34.570
260	0.26	0.029	0.968	23.659	39	9.54	39.555
280	0.28	0.032	0.966	23.718	45	11.01	45.526
300	0.3	0.034	0.964	23.778	52	12.72	52.475
320	0.32	0.036	0.961	23.838	59	14.43	59.389
340	0.34	0.039	0.959	23.899	65	15.90	65.263
360	0.36	0.041	0.956	23.959	71	17.37	71.106
380	0.38	0.044	0.954	24.020	76	18.59	75.920
400	0.4	0.046	0.951	24.082	84	20.55	83.698
420	0.42	0.049	0.949	24.144	90	22.01	89.447
440	0.44	0.051	0.947	24.206	95	23.24	94.175
460	0.46	0.053	0.944	24.268	101	24.70	99.865
480	0.48	0.056	0.942	24.331	106	25.93	104.539
500	0.5	0.058	0.939	24.394	106	25.93	104.269
520	0.52	0.061	0.937	24.457	106	25.93	103.999

Lampiran 10

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PENGUJIAN KUAT TEKAN BEBAS

Waktu : 4 Jam   Sampel : 4 Jam-B
Diameter : 5,60 cm   Luas mula – mula (Ao) : 24,701 cm2
Tinggi : 7,12 cm   Berat : 299,43 gr

Perubahan Tinggi			Luas Penampang (cross-section area)		Beban		Tekanan (Q)
Angka Dial Vertikal	ΔL (mm)	ε Regangan (strain)	Koreksi	Luas Terkoreksi A (cm^2)	Angka Dial Beban	Beban (kg)	P / A (kPa)
a	a x 10^{-3}	$\Delta L / L_0$	d = 1 - ε	e = A$_0$ / d	f	g	h
0	0	0.000	1.000	24.701	0	0.00	0.000
20	0.02	0.003	0.997	24.770	6	1.47	5.812
40	0.04	0.006	0.994	24.840	11	2.69	10.626
60	0.06	0.008	0.992	24.910	17	4.16	16.376
80	0.08	0.011	0.989	24.981	23	5.63	22.093
100	0.1	0.014	0.986	25.052	30	7.34	28.735
120	0.12	0.017	0.983	25.123	38	9.29	36.294
140	0.14	0.020	0.980	25.195	45	11.01	42.857
160	0.16	0.022	0.978	25.268	54	13.21	51.281
180	0.18	0.025	0.975	25.340	61	14.92	57.762
200	0.2	0.028	0.972	25.413	69	16.88	65.149
220	0.22	0.031	0.969	25.487	78	19.08	73.435
240	0.24	0.034	0.966	25.561	86	21.04	80.732
260	0.26	0.036	0.964	25.635	95	23.24	88.922
280	0.28	0.039	0.961	25.710	103	25.19	96.129
300	0.3	0.042	0.958	25.786	108	26.42	100.501
320	0.32	0.045	0.955	25.861	111	27.15	102.991
340	0.34	0.048	0.952	25.938	112	27.40	103.613
360	0.36	0.050	0.950	26.014	112	27.40	103.308
380	0.38	0.053	0.947	26.091	115	28.13	105.762
400	0.4	0.056	0.944	26.169	116	28.37	106.365
420	0.42	0.059	0.941	26.247	117	28.62	106.963
440	0.44	0.062	0.938	26.325	118	28.86	107.556
460	0.46	0.065	0.935	26.404	118	28.86	107.234
480	0.48	0.067	0.933	26.484	118	28.86	106.913

Lampiran 11

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PENGUJIAN KUAT TEKAN BEBAS

Waktu	: 6 Jam		Sampel	: 6 Jam-B
Diameter	: 5,64	cm	Luas mula – mula (Ao)	: 25,036 cm2
Tinggi	: 7,62	cm	Berat	: 296,7 gr

Perubahan Tinggi			Luas Penampang (cross-section area)		Beban		Tekanan (Q)
Angka Dial Vertikal	ΔL (mm)	ε Regangan (strain)	Koreksi	Luas Terkoreksi A (cm²)	Angka Dial Beban	Beban (kg)	P / A (kPa)
a	a x 10⁻³	$\Delta L / L_0$	$d = 1 - \varepsilon$	$e = A_0 / d$	f	g	h
0	0	0.000	1.000	25.036	0	0.00	0.000
20	0.02	0.003	0.997	25.102	2	0.49	1.912
40	0.04	0.005	0.995	25.169	4	0.98	3.814
60	0.06	0.008	0.992	25.235	5	1.22	4.754
80	0.08	0.011	0.989	25.302	6	1.47	5.690
100	0.1	0.013	0.987	25.369	6	1.47	5.675
120	0.12	0.016	0.984	25.437	6	1.47	5.660
140	0.14	0.018	0.982	25.505	11	2.69	10.349
160	0.16	0.021	0.979	25.573	15	3.67	14.074
180	0.18	0.024	0.976	25.642	18	4.40	16.844
200	0.2	0.026	0.974	25.711	22	5.38	20.532
220	0.22	0.029	0.971	25.781	27	6.60	25.130
240	0.24	0.032	0.968	25.851	33	8.07	30.631
260	0.26	0.034	0.966	25.921	36	8.81	33.326
280	0.28	0.037	0.963	25.992	40	9.78	36.928
300	0.3	0.039	0.961	26.063	45	11.01	41.430
320	0.32	0.042	0.958	26.134	51	12.47	46.826
340	0.34	0.045	0.955	26.206	58	14.19	53.107
360	0.36	0.047	0.953	26.278	65	15.90	59.353
380	0.38	0.050	0.950	26.351	71	17.37	64.654
400	0.4	0.053	0.947	26.424	78	19.08	70.832
420	0.42	0.055	0.945	26.497	87	21.28	78.786
440	0.44	0.058	0.942	26.571	93	22.75	83.985
460	0.46	0.060	0.940	26.645	100	24.46	90.055
480	0.48	0.063	0.937	26.720	108	26.42	96.988
500	0.5	0.066	0.934	26.795	111	27.15	99.403
520	0.52	0.068	0.932	26.870	113	27.64	100.909
540	0.54	0.071	0.929	26.946	116	28.37	103.297
560	0.56	0.074	0.926	27.023	117	28.62	103.893
580	0.58	0.076	0.924	27.099	120	29.35	106.255
600	0.6	0.079	0.921	27.177	122	29.84	107.719
620	0.62	0.081	0.919	27.254	125	30.58	110.053
640	0.64	0.084	0.916	27.332	128	31.31	112.372
660	0.66	0.087	0.913	27.411	132	32.29	115.552
680	0.68	0.089	0.911	27.490	132	32.29	115.220
700	0.7	0.092	0.908	27.569	132	32.29	114.888

Lampiran 12

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PENGUJIAN KUAT TEKAN BEBAS

Waktu	: 9 Jam		Sampel	: 9 Jam-B
Diameter	: 5,07 cm		Luas mula – mula (Ao)	: 20,197 cm2
Tinggi	: 7,95 cm		Berat	: 313,56 gr

Perubahan Tinggi			Luas Penampang (cross-section area)		Beban		Tekanan (Q)
Angka Dial Vertikal	ΔL (mm)	ε Regangan (strain)	Koreksi	Luas Terkoreksi A (cm²)	Angka Dial Beban	Beban (kg)	P / A (kPa)
a	a x 10⁻³	$\Delta L / L_0$	d = 1 - ε	e = A_0 / d	f	g	h
0	0	0.000	1.000	20.197	0	0	0.000
20	0.02	0.003	0.997	20.247	1	0.24	1.185
40	0.04	0.005	0.995	20.299	2	0.49	2.364
60	0.06	0.008	0.992	20.350	6	1.47	7.075
80	0.08	0.010	0.990	20.402	8	1.96	9.409
100	0.1	0.013	0.987	20.454	11	2.69	12.905
120	0.12	0.015	0.985	20.506	13	3.18	15.212
140	0.14	0.018	0.982	20.559	15	3.67	17.508
160	0.16	0.020	0.980	20.611	20	4.89	23.284
180	0.18	0.023	0.977	20.664	22	5.38	25.546
200	0.2	0.025	0.975	20.718	24	5.87	27.797
220	0.22	0.028	0.972	20.771	26	6.36	30.036
240	0.24	0.030	0.970	20.825	28	6.85	32.262
260	0.26	0.033	0.967	20.879	30	7.34	34.477
280	0.28	0.035	0.965	20.934	33	8.07	37.826
300	0.3	0.038	0.962	20.988	36	8.81	41.157
320	0.32	0.040	0.960	21.043	38	9.29	43.330
340	0.34	0.043	0.957	21.099	41	10.03	46.629
360	0.36	0.045	0.955	21.154	44	10.76	49.909
380	0.38	0.048	0.952	21.210	48	11.74	54.303
400	0.4	0.050	0.950	21.266	52	12.72	58.672
420	0.42	0.053	0.947	21.323	57	13.94	64.144
440	0.44	0.055	0.945	21.380	61	14.92	68.463
460	0.46	0.058	0.942	21.437	69	16.88	77.235
480	0.48	0.060	0.940	21.494	78	19.08	87.076
500	0.5	0.063	0.937	21.552	83	20.30	92.410
520	0.52	0.065	0.935	21.610	86	21.04	95.493
540	0.54	0.068	0.932	21.668	90	22.01	99.666
560	0.56	0.070	0.930	21.727	95	23.24	104.919
580	0.58	0.073	0.927	21.786	105	25.68	115.649
600	0.6	0.075	0.925	21.845	105	25.68	115.335
620	0.62	0.078	0.922	21.905	105	25.68	115.022

Lampiran 13

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PENGUJIAN KUAT TEKAN BEBAS

Waktu	: 18 Jam			Sampel		: 18 Jam-D
Diameter	: 5,67	cm		Luas mula – mula (Ao)		: 25,276 cm2
Tinggi	: 8,46	cm		Berat		: 368,57 gr

Perubahan Tinggi			Luas Penampang (cross-section area)		Beban		Tekanan (Q)
Angka Dial Vertikal	ΔL (mm)	ε Regangan (strain)	Koreksi	Luas Terkoreksi A (cm^2)	Angka Dial Beban	Beban (kg)	P / A (kPa)
a	a x 10^{-3}	$\Delta L / L_0$	d = 1 - ε	e = A_0 / d	f	g	h
0	0	0.000	1.000	25.276	0	0.000	0.000
20	0.02	0.002	0.998	25.336	7	1.712	6.629
40	0.04	0.005	0.995	25.396	11	2.691	10.393
60	0.06	0.007	0.993	25.457	14	3.424	13.196
80	0.08	0.009	0.991	25.518	17	4.158	15.986
100	0.1	0.012	0.988	25.579	21	5.137	19.700
120	0.12	0.014	0.986	25.640	24	5.870	22.461
140	0.14	0.017	0.983	25.702	28	6.849	26.141
160	0.16	0.019	0.981	25.763	31	7.583	28.872
180	0.18	0.021	0.979	25.826	38	9.295	35.307
200	0.2	0.024	0.976	25.888	42	10.273	38.929
220	0.22	0.026	0.974	25.951	45	11.007	41.609
240	0.24	0.028	0.972	26.014	48	11.741	44.275
260	0.26	0.031	0.969	26.077	50	12.230	46.008
280	0.28	0.033	0.967	26.141	52	12.719	47.731
300	0.3	0.035	0.965	26.205	59	14.431	54.024
320	0.32	0.038	0.962	26.270	62	15.165	56.632
340	0.34	0.040	0.960	26.334	68	16.633	61.960
360	0.36	0.043	0.957	26.399	72	17.611	65.443
380	0.38	0.045	0.955	26.465	76	18.590	68.909
400	0.4	0.047	0.953	26.530	79	19.323	71.452
420	0.42	0.050	0.950	26.596	84	20.546	75.785
440	0.44	0.052	0.948	26.662	89	21.769	80.097
460	0.46	0.054	0.946	26.729	91	22.259	81.693
480	0.48	0.057	0.943	26.796	96	23.482	85.966
500	0.5	0.059	0.941	26.863	99	24.215	88.430
520	0.52	0.061	0.939	26.931	100	24.460	89.099
540	0.54	0.064	0.936	26.999	102	24.949	90.652
560	0.56	0.066	0.934	27.067	105	25.683	93.083
580	0.58	0.069	0.931	27.136	106	25.928	93.732
600	0.6	0.071	0.929	27.205	111	27.151	97.904
620	0.62	0.073	0.927	27.274	114	27.884	100.294
640	0.64	0.076	0.924	27.344	115	28.129	100.916
660	0.66	0.078	0.922	27.414	120	29.352	105.035
680	0.68	0.080	0.920	27.485	123	30.086	107.385
700	0.7	0.083	0.917	27.555	126	30.820	109.721
720	0.72	0.085	0.915	27.626	130	31.798	112.913
740	0.74	0.087	0.913	27.698	132	32.287	114.354
760	0.76	0.090	0.910	27.770	135	33.021	116.650
780	0.78	0.092	0.908	27.842	135	33.021	116.347
800	0.8	0.095	0.905	27.915	135	33.021	116.044

Lampiran 14

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PENGUJIAN KUAT TEKAN BEBAS

Waktu : 24 Jam　　　Sampel : 24 Jam-D
Diameter : 5,59 cm　　Luas mula – mula (Ao) : 24,56 cm2
Tinggi : 7,98 cm　　　Berat : 357,11 gr

Perubahan Tinggi			Luas Penampang (cross-section area)		Beban		Tekanan (Q)
Angka Dial Vertikal	ΔL (mm)	ε Regangan (strain)	Koreksi	Luas Terkoreksi A (cm^2)	Angka Dial Beban	Beban (kg)	P / A (kPa)
a	a x 10^{-3}	$\Delta L / L_0$	d = 1 - ε	e = A$_0$ / d	f	g	h
0	0	0.000	1.000	24.560	0	0.00	0.000
20	0.02	0.003	0.997	24.621	4	0.98	3.898
40	0.04	0.005	0.995	24.683	6	1.47	5.833
60	0.06	0.008	0.992	24.746	10	2.45	9.697
80	0.08	0.010	0.990	24.808	14	3.42	13.541
100	0.1	0.013	0.987	24.871	18	4.40	17.366
120	0.12	0.015	0.985	24.934	23	5.63	22.134
140	0.14	0.018	0.982	24.998	27	6.60	25.917
160	0.16	0.020	0.980	25.062	32	7.83	30.638
180	0.18	0.023	0.977	25.126	38	9.29	36.290
200	0.2	0.025	0.975	25.191	43	10.52	40.960
220	0.22	0.028	0.972	25.256	48	11.74	45.605
240	0.24	0.030	0.970	25.321	53	12.96	50.226
260	0.26	0.033	0.967	25.386	58	14.19	54.822
280	0.28	0.035	0.965	25.452	62	15.17	58.451
300	0.3	0.038	0.962	25.518	66	16.14	62.061
320	0.32	0.040	0.960	25.585	70	17.12	65.651
340	0.34	0.043	0.957	25.652	77	18.83	72.027
360	0.36	0.045	0.955	25.719	84	20.55	78.370
380	0.38	0.048	0.952	25.787	88	21.52	81.886
400	0.4	0.050	0.950	25.855	90	22.01	83.527
420	0.42	0.053	0.947	25.923	94	22.99	87.009
440	0.44	0.055	0.945	25.992	98	23.97	90.472
460	0.46	0.058	0.942	26.061	101	24.70	92.995
480	0.48	0.060	0.940	26.130	103	25.19	94.584
500	0.5	0.063	0.937	26.200	105	25.68	96.164
520	0.52	0.065	0.935	26.270	105	25.68	95.907
540	0.54	0.068	0.932	26.341	105	25.68	95.650
560	0.56	0.070	0.930	26.412	114	27.88	103.569
580	0.58	0.073	0.927	26.483	117	28.62	106.009
600	0.6	0.075	0.925	26.555	120	29.35	108.433
620	0.62	0.078	0.922	26.627	124	30.33	111.744
640	0.64	0.080	0.920	26.699	126	30.82	113.238
660	0.66	0.083	0.917	26.772	127	31.06	113.826
680	0.68	0.085	0.915	26.846	130	31.80	116.197
700	0.7	0.088	0.912	26.919	131	32.04	116.770
720	0.72	0.090	0.910	26.993	131	32.04	116.450
740	0.74	0.093	0.907	27.068	131	32.04	116.129

Lampiran 15

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PENGUJIAN KUAT TEKAN BEBAS

Waktu : 48 Jam   Sampel : 48 Jam-D
Diameter : 5,67 cm   Luas mula – mula (Ao) : 25,25 cm2
Tinggi : 7,10 cm   Berat : 318,93 gr

Perubahan Tinggi			Luas Penampang (cross-section area)		Beban		Tekanan (Q)
Angka Dial Vertikal	ΔL (mm)	ε Regangan (strain)	Koreksi	Luas Terkoreksi A (cm²)	Angka Dial Beban	Beban (kg)	P / A (kPa)
a	a x 10⁻³	ΔL / L₀	d = 1 - ε	e = A₀ / d	f	g	h
0	0	0.000	1.000	25.259	0	0.00	0.000
20	0.02	0.003	0.997	25.330	3	0.73	2.842
40	0.04	0.006	0.994	25.402	5	1.22	4.723
60	0.06	0.008	0.992	25.474	6	1.47	5.652
80	0.08	0.011	0.989	25.546	10	2.45	9.393
100	0.1	0.014	0.986	25.619	18	4.40	16.859
120	0.12	0.017	0.983	25.692	25	6.12	23.349
140	0.14	0.020	0.980	25.766	33	8.07	30.732
160	0.16	0.023	0.977	25.840	41	10.03	38.073
180	0.18	0.025	0.975	25.915	50	12.23	46.297
200	0.2	0.028	0.972	25.990	55	13.45	50.779
220	0.22	0.031	0.969	26.065	62	15.17	57.076
240	0.24	0.034	0.966	26.141	65	15.90	59.664
260	0.26	0.037	0.963	26.217	72	17.61	65.897
280	0.28	0.039	0.961	26.294	80	19.57	73.005
300	0.3	0.042	0.958	26.371	88	21.52	80.071
320	0.32	0.045	0.955	26.449	95	23.24	86.186
340	0.34	0.048	0.952	26.527	104	25.44	94.073
360	0.36	0.051	0.949	26.606	109	26.66	98.305
380	0.38	0.053	0.947	26.685	114	27.88	102.509
400	0.4	0.056	0.944	26.765	118	28.86	105.791
420	0.42	0.059	0.941	26.845	120	29.35	107.263
440	0.44	0.062	0.938	26.925	122	29.84	108.725
460	0.46	0.065	0.935	27.006	125	30.58	111.064
480	0.48	0.068	0.932	27.088	126	30.82	111.616
500	0.5	0.070	0.930	27.170	128	31.31	113.046
520	0.52	0.073	0.927	27.252	131	32.04	115.345
540	0.54	0.076	0.924	27.335	132	32.29	115.873
560	0.56	0.079	0.921	27.418	135	33.02	118.145
580	0.58	0.082	0.918	27.502	135	33.02	117.785
600	0.6	0.084	0.916	27.587	135	33.02	117.424

Lampiran 16

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PENGUJIAN KUAT TEKAN BEBAS

Waktu	: 72 Jam	Sampel	:72 Jam-D
Diameter	: 5,71 cm	Luas mula – mula (Ao)	: 25,67 cm2
Tinggi	: 7,25 cm	Berat	: 251,52 gr

Perubahan Tinggi			Luas Penampang (cross-section area)		Beban		Tekanan (Q)
Angka Dial Vertikal	ΔL (mm)	ε Regangan (strain)	Koreksi	Luas Terkoreksi A (cm^2)	Angka Dial Beban	Beban (kg)	P / A (kPa)
a	a x 10^{-3}	$\Delta L / L_0$	d = 1 - ε	e = A_0 / d	f	g	h
0	0	0.000	1.000	25.670	0	0.00	0.000
20	0.02	0.003	0.997	25.741	2	0.49	1.864
40	0.04	0.006	0.994	25.813	4	0.98	3.718
60	0.06	0.008	0.992	25.884	5	1.22	4.635
80	0.08	0.011	0.989	25.957	6	1.47	5.547
100	0.1	0.014	0.986	26.029	8	1.96	7.375
120	0.12	0.017	0.983	26.102	9	2.20	8.273
140	0.14	0.019	0.981	26.176	11	2.69	10.084
160	0.16	0.022	0.978	26.250	12	2.94	10.969
180	0.18	0.025	0.975	26.324	15	3.67	13.673
200	0.2	0.028	0.972	26.399	17	4.16	15.452
220	0.22	0.030	0.970	26.474	21	5.14	19.034
240	0.24	0.033	0.967	26.549	24	5.87	21.691
260	0.26	0.036	0.964	26.625	26	6.36	23.432
280	0.28	0.039	0.961	26.702	30	7.34	26.959
300	0.3	0.041	0.959	26.779	35	8.56	31.362
320	0.32	0.044	0.956	26.856	46	11.25	41.100
340	0.34	0.047	0.953	26.934	53	12.96	47.218
360	0.36	0.050	0.950	27.012	59	14.43	52.411
380	0.38	0.052	0.948	27.091	65	15.90	57.573
400	0.4	0.055	0.945	27.170	70	17.12	61.821
420	0.42	0.058	0.942	27.249	78	19.08	68.685
440	0.44	0.061	0.939	27.330	86	21.04	75.508
460	0.46	0.063	0.937	27.410	92	22.50	80.538
480	0.48	0.066	0.934	27.491	98	23.97	85.538
500	0.5	0.069	0.931	27.573	101	24.70	87.896
520	0.52	0.072	0.928	27.655	101	24.70	87.635
540	0.54	0.075	0.925	27.737	105	25.68	90.835
560	0.56	0.077	0.923	27.820	111	27.15	95.739
580	0.58	0.080	0.920	27.904	115	28.13	98.893
600	0.6	0.083	0.917	27.988	121	29.60	103.740
620	0.62	0.086	0.914	28.072	127	31.06	108.557
640	0.64	0.088	0.912	28.157	130	31.80	110.785
660	0.66	0.091	0.909	28.242	134	32.78	113.849
680	0.68	0.094	0.906	28.329	137	33.51	116.044
700	0.7	0.097	0.903	28.415	141	34.49	119.068
720	0.72	0.099	0.901	28.502	141	34.49	118.704
740	0.74	0.102	0.898	28.590	141	34.49	118.341

Lampiran 17

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PENGUJIAN KUAT TEKAN BEBAS

Waktu	: 7 hari		Sampel	: 7 Hari - D
Diameter	: 5,70	cm	Luas mula – mula (Ao)	: 25,56 cm2
Tinggi	: 8,71	cm	Berat	: 383,88 gr

Perubahan Tinggi			Luas Penampang (cross-section area)		Beban		Tekanan (Q)
Angka Dial Vertikal	ΔL (mm)	ε Regangan (strain)	Koreksi	Luas Terkoreksi A (cm²)	Angka Dial Beban	Beban (kg)	P / A (kPa)
a	a x 10⁻³	$\Delta L / L_0$	d = 1 - ε	e = A₀ / d	f	g	h
0	0	0.000	1.000	25.562	0	0.00	0.000
20	0.02	0.002	0.998	25.621	3	0.73	2.810
40	0.04	0.005	0.995	25.680	7	1.71	6.541
60	0.06	0.007	0.993	25.740	11	2.69	10.255
80	0.08	0.009	0.991	25.799	14	3.42	13.021
100	0.1	0.011	0.989	25.859	17	4.16	15.775
120	0.12	0.014	0.986	25.919	22	5.38	20.367
140	0.14	0.016	0.984	25.980	25	6.12	23.090
160	0.16	0.018	0.982	26.041	28	6.85	25.801
180	0.18	0.021	0.979	26.102	32	7.83	29.418
200	0.2	0.023	0.977	26.163	35	8.56	32.100
220	0.22	0.025	0.975	26.225	36	8.81	32.940
240	0.24	0.028	0.972	26.287	40	9.78	36.513
260	0.26	0.030	0.970	26.349	43	10.52	39.159
280	0.28	0.032	0.968	26.411	45	11.01	40.883
300	0.3	0.034	0.966	26.474	47	11.50	42.599
320	0.32	0.037	0.963	26.537	51	12.47	46.115
340	0.34	0.039	0.961	26.601	54	13.21	48.711
360	0.36	0.041	0.959	26.664	58	14.19	52.194
380	0.38	0.044	0.956	26.728	62	15.17	55.660
400	0.4	0.046	0.954	26.793	66	16.14	59.109
420	0.42	0.048	0.952	26.857	69	16.88	61.647
440	0.44	0.051	0.949	26.922	73	17.86	65.063
460	0.46	0.053	0.947	26.987	75	18.35	66.684
480	0.48	0.055	0.945	27.053	78	19.08	69.184
500	0.5	0.057	0.943	27.119	80	19.57	70.785
520	0.52	0.060	0.940	27.185	81	19.81	71.495
540	0.54	0.062	0.938	27.252	82	20.06	72.201
560	0.56	0.064	0.936	27.319	84	20.55	73.781
580	0.58	0.067	0.933	27.386	86	21.04	75.353
600	0.6	0.069	0.931	27.453	89	21.77	77.789
620	0.62	0.071	0.929	27.521	91	22.26	79.341
640	0.64	0.073	0.927	27.589	92	22.50	80.015
660	0.66	0.076	0.924	27.658	103	25.19	89.360
680	0.68	0.078	0.922	27.727	108	26.42	93.465
700	0.7	0.080	0.920	27.796	112	27.40	96.685
720	0.72	0.083	0.917	27.866	118	28.86	101.611
740	0.74	0.085	0.915	27.935	125	30.58	107.369
760	0.76	0.087	0.913	28.006	130	31.80	111.384
780	0.78	0.090	0.910	28.076	139	34.00	118.795
800	0.8	0.092	0.908	28.147	142	34.73	121.053
820	0.82	0.094	0.906	28.219	142	34.73	120.747
840	0.84	0.096	0.904	28.290	142	34.73	120.441

Lampiran 18

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DOKUMENTASI PENELITIAN

Lampiran 19