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STUDI SIFAT MEKANIKA KOMPOSIT HIBRID UNSATURATED POLYESTER/CLAY/SERAT GELAS
Husaini, Prof. Dr. Ir. Kusmono., S.T., M.T., IPM., ASEAN Eng
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LAMPIRAN



LAMPIRAN A

Data Hasil Pengujian Tarik

No. Sampel	Kode Sampel	Tebal (mm)	Lebar (mm)	Luas (mm ²)	Beban (%)	Beban Maksimum		Kekuatan Tarik	
						(kg)	(N)	(kg/mm ²)	(MPa)
1	T/UP/FG/H/C0	3,47	13,00	45,11	19,50	390,00	3822,00	8,65	84,73
2	T/UP/FG/H/C0	3,56	13,00	46,28	16,40	328,00	3214,40	7,09	69,46
3	T/UP/FG/H/C0	3,84	13,00	49,92	18,00	360,00	3528,00	7,21	70,67
4	T/UP/FG/H/C0	3,83	13,00	49,79	20,70	414,00	4057,20	8,31	81,49
5	T/UP/FG/H/C0	3,96	13,00	51,48	17,90	358,00	3508,40	6,95	68,15
Rata-rata		3,73	13,00	48,52	18,50	370,00	3626,00	7,64	74,90
Standar deviasi		0,21	0,00	2,69	1,65	32,95	322,95	0,78	7,63
6	T/UP/FG/H/C2	3,85	13,00	50,05	20,30	406,00	3978,80	8,11	79,50
7	T/UP/FG/H/C2	3,49	13,00	45,37	20,70	414,00	4057,20	9,12	89,42
8	T/UP/FG/H/C2	3,44	13,00	44,72	19,70	394,00	3861,20	8,81	86,34
9	T/UP/FG/H/C2	3,62	13,00	47,06	21,20	424,00	4155,20	9,01	88,30
10	T/UP/FG/H/C2	3,57	13,00	46,41	18,70	374,00	3665,20	8,06	78,97
Rata-rata		3,59	13,00	46,72	20,12	402,40	3943,52	8,62	84,51
Standar deviasi		0,16	0,00	2,07	0,97	19,31	189,22	0,50	4,94
11	T/UP/FG/H/C4	3,39	13,00	44,07	14,80	296,00	2900,80	6,72	65,82
12	T/UP/FG/H/C4	3,30	13,00	42,90	14,40	288,00	2822,40	6,71	65,79
13	T/UP/FG/H/C4	3,30	13,00	42,90	17,30	346,00	3390,80	8,07	79,04
14	T/UP/FG/H/C4	3,27	13,00	42,51	15,80	316,00	3096,80	7,43	72,85
15	T/UP/FG/H/C4	3,44	13,00	44,72	17,70	354,00	3469,20	7,92	77,58
Rata-rata		3,34	13,00	43,42	16,00	320,00	3136,00	7,37	72,22
Standar deviasi		0,07	0,00	0,93	1,47	29,36	287,73	0,64	6,28
16	T/UP/FG/H/C6	3,75	13,00	48,75	17,70	354,00	3469,20	7,26	71,16
17	T/UP/FG/H/C6	3,51	13,00	45,63	16,70	334,00	3273,20	7,32	71,73
18	T/UP/FG/H/C6	3,64	13,00	47,32	17,70	354,00	3469,20	7,48	73,31
19	T/UP/FG/H/C6	3,59	13,00	46,67	17,50	350,00	3430,00	7,50	73,49
20	T/UP/FG/H/C6	3,82	13,00	49,66	17,30	346,00	3390,80	6,97	68,28
Rata-rata		3,66	13,00	47,61	17,38	347,60	3406,48	7,31	71,60
Standar deviasi		0,12	0,00	1,61	0,41	8,29	81,29	0,21	2,11



LAMPIRAN B Data Hasil Pengujian Bending

Data hasil pengujian sampel uji bending (Bag.1)

No.	Defleksi (mm)	Nomor sampel/kode sampel/beban (kg)				
		1	2	3	4	5
		B/UP/FG/H/C0	B/UP/FG/H/C0	B/UP/FG/H/C0	B/UP/FG/H/C0	B/UP/FG/H/C0
		Beban	Beban	Beban	Beban	Beban
1.	0,25	5,10	5,00	4,80	4,90	2,70
2.	0,50	10,90	9,30	9,50	10,10	6,50
3.	0,75	16,00	14,70	14,40	14,30	10,80
4.	1,00	21,30	19,60	19,50	12,00	15,00
5.	1,25	25,50	24,40	24,10	24,10	19,10
6.	1,50	29,90	28,90	28,70	27,80	24,10
7.	1,75	34,50	32,00	31,80	32,00	28,10
8.	2,00	38,90	36,70	36,10	37,00	31,00
9.	2,25	41,10	41,50	40,50	39,20	35,00
10.	2,50	43,12	42,11	41,20	42,10	39,00
11.	2,75					
12.	3,00					
13.	3,25					

Dilanjutkan pada bag. 2

Data hasil pengujian sampel uji bending (lanjutan bag. 2)

No.	Defleksi (mm)	Nomor sampel/kode sampel/beban (kg)				
		6	7	8	9	10
		B/UP/FG/H/C2	B/UP/FG/H/C2	B/UP/FG/H/C2	B/UP/FG/H/C2	B/UP/FG/H/C2
		Beban	Beban	Beban	Beban	Beban
1.	0,25	3,80	3,20	4,10	3,30	3,80
2.	0,50	7,80	6,70	8,10	6,70	7,50
3.	0,75	11,10	10,20	12,10	10,10	11,50
4.	1,00	15,10	13,90	16,10	13,90	15,50
5.	1,25	18,60	17,60	19,90	17,30	19,20
6.	1,50	22,10	20,80	23,60	20,90	23,10
7.	1,75	25,50	24,20	27,10	24,20	26,80
8.	2,00	27,90	27,50	29,10	27,50	28,90
9.	2,25	31,10	29,30	32,70	29,30	32,50
10.	2,50	34,10	32,10	36,00	32,60	36,00
11.	2,75	36,10	35,70	38,70	35,70	39,10
12.	3,00		38,70	39,10	38,60	40,60
13.	3,25		41,10		41,10	

Dilanjutkan pada bag.3



Data hasil pengujian sampel uji bending (Bag.3)

No.	Defleksi (mm)	Nomor sampel/kode sampel/beban (kg)				
		11	12	13	14	15
		B/UP/FG/H/C4	B/UP/FG/H/C4	B/UP/FG/H/C4	B/UP/FG/H/C4	B/UP/FG/H/C4
		Beban	Beban	Beban	Beban	Beban
1.	0,25	3,40	3,70	3,60	3,60	3,90
2.	0,50	7,00	7,40	7,00	7,40	7,40
3.	0,75	10,60	11,00	10,40	11,10	11,20
4.	1,00	14,00	14,20	13,50	14,80	14,50
5.	1,25	17,40	17,70	16,50	18,10	18,20
6.	1,50	20,70	20,10	19,60	21,50	21,50
7.	1,75	23,90	23,90	22,50	24,60	24,70
8.	2,00	26,60	26,80	25,10	27,40	27,90
9.	2,25	27,70	27,90	27,60	29,20	29,10
10.	2,50	30,90	30,70	28,70	31,90	31,40
11.	2,75	34,60	33,70	32,50	34,70	33,90
12.	3,00					
13.	3,25					

Dilanjutkan pada bag. 4

Data hasil pengujian sampel uji bending (Bag.4)

No.	Defleksi (mm)	Nomor sampel/kode sampel/beban (kg)				
		16	17	18	19	20
		B/UP/FG/H/C6	B/UP/FG/H/C6	B/UP/FG/H/C6	B/UP/FG/H/C6	B/UP/FG/H/C6
		Beban	Beban	Beban	Beban	Beban
1.	0,25	3,60	3,40	4,10	3,10	3,90
2.	0,50	7,30	7,80	8,10	6,70	8,10
3.	0,75	10,70	11,90	12,10	9,30	11,80
4.	1,00	14,50	16,00	16,00	13,70	16,10
5.	1,25	18,10	19,80	19,30	17,00	19,10
6.	1,50	21,60	23,70	23,60	20,40	23,30
7.	1,75	25,00	27,50	27,30	23,30	27,00
8.	2,00	28,10	29,30	28,90	26,40	28,80
9.	2,25	29,90	32,10	32,00	27,30	32,10
10.	2,50	30,00	35,00	35,00	29,90	32,10
11.	2,75					
12.	3,00					
13.	3,25					



Hasil pengukuran rata-rata dimensi sampel uji bending

No. Sampel	Tebal (mm)	Lebar (mm)	No. Sampel	Tebal (mm)	Lebar (mm)
1	4,46	13,62	11	3,78	13,41
	4,27	13,57		3,92	13,38
	4,09	13,47		3,86	13,42
Rata-rata	4,27	13,55	Rata-rata	3,85	13,40
2	4,50	13,46	12	3,74	13,46
	4,19	13,40		3,87	13,48
	3,95	13,25		3,80	13,45
Rata-rata	4,21	13,37	Rata-rata	3,80	13,46
3	4,19	13,48	13	3,74	12,95
	4,25	13,43		3,70	12,76
	3,88	13,32		3,70	12,95
Rata-rata	4,11	13,41	Rata-rata	3,71	12,89
4	4,41	13,20	14	3,86	13,46
	4,32	13,44		3,88	13,47
	4,32	13,45		3,97	13,48
Rata-rata	4,35	13,36	Rata-rata	3,90	13,47
5	4,35	13,45	15	3,92	13,38
	4,03	13,56		3,89	13,37
	3,90	13,61		3,90	13,36
Rata-rata	4,09	13,54	Rata-rata	3,91	13,37
6	3,83	13,20	16	3,91	13,14
	3,79	13,25		3,86	13,22
	3,66	13,24		3,90	13,31
Rata-rata	3,76	13,23	Rata-rata	3,89	13,22
7	3,82	13,23	17	3,95	13,17
	3,67	13,32		3,98	13,18
	3,62	13,31		3,96	13,09
Rata-rata	3,70	13,29	Rata-rata	3,96	13,15
8	3,69	13,44	18	3,89	13,34
	3,94	13,32		3,92	13,39
	3,79	13,23		3,94	13,35
Rata-rata	3,81	13,33	Rata-rata	3,92	13,36
9	3,78	13,38	19	3,90	13,09
	3,64	13,34		3,70	13,19
	3,58	13,26		3,87	13,24
Rata-rata	3,67	13,33	Rata-rata	3,82	13,17
10	3,88	13,28	20	3,97	13,46
	3,89	13,28		3,98	13,52
	3,75	13,27		3,99	13,56
Rata-rata	3,84	13,28	Rata-rata	3,98	13,51



Hasil Perhitungan kekuatan bending

No. Sampel	Tebal (mm)	Lebar (mm)	Length Support (mm)	Beban		Kekuatan bending	
				(kg)	(N)	(kg/mm ²)	(MPa)
1	4,27	13,55	51,20	43,12	423,01	13,40	131,50
2	4,21	13,37	51,20	42,11	413,10	13,65	133,88
3	4,11	13,41	51,20	41,20	404,17	13,97	137,03
4	4,35	13,36	51,20	42,10	413,00	12,79	125,47
5	4,09	13,54	51,20	39,00	382,59	13,22	129,73
Rata-rata	4,21	13,45	51,20	41,51	407,17	13,41	131,52
Standar deviasi	0,11	0,09	0,00	1,56	15,27	0,44	4,35
6	3,76	13,23	51,20	36,10	354,14	14,82	145,41
7	3,70	13,29	51,20	41,10	403,19	17,35	170,19
8	3,81	13,33	51,20	39,10	383,57	15,52	152,24
9	3,67	13,33	51,20	41,10	403,19	17,58	172,47
10	3,84	13,28	51,20	40,60	398,29	15,92	156,21
Rata-rata	3,76	13,29	51,20	39,60	388,48	16,24	159,30
Standar deviasi	0,07	0,04	0,00	2,12	20,81	1,19	11,67
11	3,85	13,40	51,20	34,60	339,43	13,38	131,24
12	3,80	13,46	51,20	33,70	330,60	13,32	130,63
13	3,71	12,89	51,20	32,50	318,83	14,07	138,01
14	3,90	13,47	51,20	34,70	340,41	13,01	127,60
15	3,91	13,37	51,20	33,90	332,56	12,74	124,95
Rata-rata	3,83	13,32	51,20	33,88	332,36	13,30	130,49
Standar deviasi	0,08	0,24	0,00	0,88	8,68	0,50	4,90
16	3,89	13,22	51,20	30,00	294,30	11,52	112,99
17	3,96	13,15	51,20	35,00	343,35	13,04	127,87
18	3,92	13,36	51,20	35,00	343,35	13,09	128,45
19	3,82	13,17	51,20	29,90	293,32	11,95	117,22
20	3,98	13,51	51,20	32,10	314,90	11,52	113,01
Rata-rata	3,91	13,28	51,20	32,40	317,84	12,22	119,91
Standar deviasi	0,06	0,15	0,00	2,53	24,83	0,79	7,73



Hasil Perhitungan modulus elastisitas bending

No. Sampel	Tebal (mm)	Lebar (mm)	Length Support (mm)	Beban		Defleksi (mm)	Modulus Elastisitas Bending		
				(kg)	(N)		(kg/mm ²)	(MPa)	(GPa)
1	4,27	13,55	51,20	43,12	423,01	2,50	548,61	5381,89	5,38
2	4,21	13,37	51,20	42,11	413,10	2,50	566,52	5557,59	5,56
3	4,11	13,41	51,20	41,20	404,17	2,50	593,95	5826,69	5,83
4	4,35	13,36	51,20	42,10	413,00	2,50	513,83	5040,65	5,04
5	4,09	13,54	51,20	39,00	382,59	2,50	565,05	5543,13	5,54
Rata-rata	4,21	13,45	51,20	41,51	407,17	2,50	557,59	5469,99	5,47
Standar deviasi	0,11	0,09	0,00	1,56	15,27	0,00	29,38	288,25	0,29
6	3,76	13,23	51,20	36,10	354,14	2,75	626,33	6144,27	6,14
7	3,70	13,29	51,20	41,10	403,19	3,25	630,34	6183,68	6,18
8	3,81	13,33	51,20	39,10	383,57	3,00	593,20	5819,28	5,82
9	3,67	13,33	51,20	41,10	403,19	3,25	643,99	6317,55	6,32
10	3,84	13,28	51,20	40,60	398,29	3,00	603,90	5924,23	5,92
Rata-rata	3,76	13,29	51,20	39,60	388,48	3,05	619,55	6077,80	6,08
Standar deviasi	0,07	0,04	0,00	2,12	20,81	0,21	20,61	202,19	0,20
11	3,85	13,40	51,20	34,60	339,43	2,75	552,09	5415,96	5,42
12	3,80	13,46	51,20	33,70	330,60	2,75	556,74	5461,60	5,46
13	3,71	12,89	51,20	32,50	318,83	2,75	602,46	5910,10	5,91
14	3,90	13,47	51,20	34,70	340,41	2,75	529,89	5198,22	5,20
15	3,91	13,37	51,20	33,90	332,56	2,75	517,55	5077,20	5,08
Rata-rata	3,83	13,32	51,20	33,88	332,36	2,75	551,74	5412,62	5,41
Standar deviasi	0,08	0,24	0,00	0,88	8,68	0,00	32,57	319,52	0,32
16	3,89	13,22	51,20	30,00	294,30	2,50	517,43	5075,98	5,08
17	3,96	13,15	51,20	35,00	343,35	2,50	575,26	5643,33	5,64
18	3,92	13,36	51,20	35,00	343,35	2,50	583,73	5726,41	5,73
19	3,82	13,17	51,20	29,90	293,32	2,50	546,64	5362,59	5,36
20	3,98	13,51	51,20	32,10	314,90	2,50	505,84	4962,26	4,96
Rata-rata	3,91	13,28	51,20	32,40	317,84	2,50	545,78	5354,11	5,35
Standar deviasi	0,06	0,15	0,00	2,53	24,83	0,00	34,31	336,61	0,34



LAMPIRAN C

Data Hasil Pengujian Impak

Data hasil pengujian sampel uji impak (Bag.1)

No. sampel	Kode sampel	Tebal (mm)	Lebar (mm)	α (°)	β (°)	R (m)	G (m/s ²)	m (kg)
1	B/UP/FG/H/CO	4,30	10,00	156	140	0,83	9,81	1
		4,20	10,00					
		4,20	10,00					
Rata-rata		4,23	10,00					
2	B/UP/FG/H/CO	4,20	10,00	156	140	0,83	9,81	1
		4,20	10,00					
		4,20	10,00					
Rata-rata		4,20	10,00					
3	B/UP/FG/H/CO	4,40	10,00	156	140	0,83	9,81	1
		4,30	10,00					
		4,30	10,00					
Rata-rata		4,33	10,00					
4	B/UP/FG/H/CO	4,25	10,00	156	140	0,83	9,81	1
		4,25	10,00					
		4,25	10,00					
Rata-rata		4,25	10,00					
5	B/UP/FG/H/CO	4,30	10,00	156	141	0,83	9,81	1
		4,30	10,00					
		4,50	10,00					
Rata-rata		4,37	10,00					
6	B/UP/FG/H/C2	4,00	10,00	156	140	0,83	9,81	1
		4,00	10,00					
		4,00	10,00					
Rata-rata		4,00	10,00					
7	B/UP/FG/H/C2	4,00	10,00	156	140	0,83	9,81	1
		4,00	10,00					
		4,00	10,00					
Rata-rata		4,00	10,00					
8	B/UP/FG/H/C2	4,00	10,00	156	141	0,83	9,81	1
		4,10	9,90					
		4,20	10,00					
Rata-rata		4,10	9,97					
9	B/UP/FG/H/C2	4,20	10,00	156	141	0,83	9,81	1
		4,10	10,00					
		4,00	10,00					
Rata-rata		4,10	10,00					
10	B/UP/FG/H/C2	4,10	9,90	156	141	0,83	9,81	1
		4,10	10,00					
		4,10	10,00					
Rata-rata		4,10	9,97					

Dilanjutkan pada bag.2



Data hasil pengujian sampel uji impact (Bag.2)

No. Sampel	Kode sampel	Tebal (mm)	Lebar (mm)	α (°)	β (°)	R (mm)	G (m/s ²)	m (kg)
11	B/UP/FG/H/C4	4,40	10,00	156	138	0,83	9,81	1
		4,30	10,00					
		4,20	10,00					
Rata-rata		4,30	10,00					
12	B/UP/FG/H/C4	4,30	10,00	156	137	0,83	9,81	1
		4,30	10,00					
		4,30	10,00					
Rata-rata		4,30	10,00					
13	B/UP/FG/H/C4	4,10	10,00	156	136	0,83	9,81	1
		4,30	10,00					
		4,30	10,00					
Rata-rata		4,23	10,00					
14	B/UP/FG/H/C4	4,20	9,90	156	137	0,83	9,81	1
		4,20	10,00					
		4,20	10,00					
Rata-rata		4,20	9,97					
15	B/UP/FG/H/C4	4,30	10,00	156	137	0,83	9,81	1
		4,20	10,00					
		4,20	10,00					
Rata-rata		4,23	10,00					
16	B/UP/FG/H/C6	4,10	10,00	156	141	0,83	9,81	1
		4,20	10,00					
		4,30	9,90					
Rata-rata		4,20	9,97					
17	B/UP/FG/H/C6	4,10	10,00	156	142	0,83	9,81	1
		4,10	10,00					
		4,20	10,00					
Rata-rata		4,13	10,00					
18	B/UP/FG/H/C6	4,10	10,00	156	142	0,83	9,81	1
		4,20	10,00					
		4,20	10,00					
Rata-rata		4,17	10,00					
19	B/UP/FG/H/C6	4,10	10,00	156	142	0,83	9,81	1
		4,20	10,00					
		4,30	10,00					
Rata-rata		4,20	10,00					
20	B/UP/FG/H/C6	4,10	10,00	156	141	0,83	9,81	1
		4,10	10,00					
		4,20	10,00					
Rata-rata		4,13	10,00					



Hasil perhitungan kekuatan impak

No. Sampel	Tebal (mm)	Lebar (mm)	Luas (mm ²)	α (°)	β (°)	R (m)	G (m/s ²)	m (kg)	W (J)	Kekuatan Impak	
										(J/mm ²)	(KJ/m ²)
1	4,23	10,00	42,30	156	140	0,83	9,81	1,00	1,201	0,0284	28,39
2	4,20	10,00	42,00	156	140	0,83	9,81	1,00	1,201	0,0286	28,60
3	4,33	10,00	43,30	156	140	0,83	9,81	1,00	1,201	0,0277	27,74
4	4,25	10,00	42,50	156	140	0,83	9,81	1,00	1,201	0,0283	28,26
5	4,37	10,00	43,70	156	141	0,83	9,81	1,00	1,111	0,0254	25,41
Rata-rata	4,28	10,00	42,76	156	140,2	0,83	9,81	1,00	1,183	0,0277	27,68
Standar deviasi										0,0013	1,31
6	4,00	10,00	40,00	156	140	0,83	9,81	1,00	1,201	0,0300	30,02
7	4,00	10,00	40,00	156	140	0,83	9,81	1,00	1,201	0,0300	30,02
8	4,10	9,97	40,88	156	141	0,83	9,81	1,00	1,111	0,0272	27,17
9	4,10	10,00	41,00	156	141	0,83	9,81	1,00	1,111	0,0271	27,09
10	4,10	9,97	40,88	156	141	0,83	9,81	1,00	1,111	0,0272	27,17
Rata-rata	4,06	9,99	40,55	156	140,6	0,83	9,81	1,00	1,147	0,0283	28,30
Standar deviasi										0,0016	1,58
11	4,30	10,00	43,00	156	138	0,83	9,81	1,00	1,387	0,0323	32,27
12	4,30	10,00	43,00	156	137	0,83	9,81	1,00	1,483	0,0345	34,50
13	4,23	10,00	42,30	156	136	0,83	9,81	1,00	1,581	0,0374	37,38
14	4,20	9,97	41,87	156	137	0,83	9,81	1,00	1,483	0,0354	35,43
15	4,23	10,00	42,30	156	137	0,83	9,81	1,00	1,483	0,0351	35,07
Rata-rata	4,25	9,99	42,49	156	137	0,83	9,81	1,00	1,484	0,0349	34,93
Standar deviasi										0,0018	1,84
16	4,20	9,97	41,87	156	141	0,83	9,81	1,00	1,111	0,0265	26,52
17	4,13	10,00	41,30	156	142	0,83	9,81	1,00	1,022	0,0247	24,75
18	4,17	10,00	41,70	156	142	0,83	9,81	1,00	1,022	0,0245	24,51
19	4,20	10,00	42,00	156	142	0,83	9,81	1,00	1,022	0,0243	24,34
20	4,13	10,00	41,30	156	141	0,83	9,81	1,00	1,111	0,0269	26,89
Rata-rata	4,17	9,99	41,63	156	141,6	0,83	9,81	1,00	1,058	0,0254	25,40
Standar deviasi										0,0012	1,21



LAMPIRAN D
Data Hasil Pengujian Ketangguhan Retak

Data hasil pengujian sampel ketangguhan retak

No. Sampel	Kode Sampel	Lebar (mm)	Tebal (mm)	Length Support (mm)	Panjang Retak (mm)	Beban Patah (kg)
1	K/UP/FG/H/C0	12,40	6,90	50,8	0,004110	44,30
		12,55	6,70			
		12,25	6,50			
Rata-Rata		12,40	6,70			
2	K/UP/FG/H/C0	12,60	7,40	50,8	0,004023	45,30
		12,65	7,30			
		12,55	6,80			
Rata-Rata		12,60	7,17			
3	K/UP/FG/H/C0	12,30	6,95	50,8	0,004233	29,60
		12,55	6,85			
		12,25	6,55			
Rata-Rata		12,37	6,78			
4	K/UP/FG/H/C0	12,60	7,10	50,8	0,004497	35,70
		12,70	6,90			
		12,45	6,50			
Rata-Rata		12,58	6,83			
5	K/UP/FG/H/C0	12,70	6,70	50,8	0,004560	35,30
		12,90	6,80			
		12,75	6,80			
Rata-Rata		12,78	6,77			
6	K/UP/FG/H/C2	12,50	6,35	50,8	0,003963	41,10
		12,55	6,35			
		12,65	6,55			
Rata-Rata		12,57	6,42			
7	K/UP/FG/H/C2	12,55	6,50	50,8	0,003743	45,20
		12,70	6,45			
		12,70	6,35			
Rata-Rata		12,65	6,43			
8	K/UP/FG/H/C2	12,70	6,45	50,8	0,003757	45,20
		12,70	6,55			
		11,60	6,44			
Rata-Rata		12,33	6,48			
9	K/UP/FG/H/C2	12,45	6,50	50,8	0,004617	39,30
		12,65	6,45			
		12,50	6,45			
Rata-Rata		12,53	6,47			
10	K/UP/FG/H/C2	12,65	6,35	50,8	0,003943	36,40
		12,85	6,35			
		12,65	6,35			
Rata-Rata		12,72	6,35			

Dilanjutkan pada bag.2



Data hasil pengujian sampel ketangguhan retak (Bag.2)

No. Sampel	Kode Sampel	Lebar (mm)	Tebal (mm)	Length Support (mm)	Panjang Retak (mm)	Beban Patah (kg)
11	K/UP/FG/H/C4	12,55	5,95	50,8	0,003747	41,00
		12,65	6,00			
		12,75	5,95			
Rata-Rata		12,65	5,97			
12	K/UP/FG/H/C4	12,60	6,15	50,8	0,003887	39,80
		12,65	6,20			
		12,55	6,30			
Rata-Rata		12,60	6,22			
13	K/UP/FG/H/C4	12,65	5,90	50,8	0,003690	51,70
		12,85	5,95			
		12,60	5,65			
Rata-Rata		12,70	5,83			
14	K/UP/FG/H/C4	12,65	6,15	50,8	0,003867	41,50
		12,70	6,25			
		12,65	6,35			
Rata-Rata		12,67	6,25			
15	K/UP/FG/H/C4	12,55	5,85	50,8	0,003797	41,00
		12,70	5,95			
		12,65	5,95			
Rata-Rata		12,63	5,92			
16	K/UP/FG/H/C6	12,35	6,95	50,8	0,003483	51,20
		12,45	7,00			
		12,50	6,90			
Rata-Rata		12,43	6,95			
17	K/UP/FG/H/C6	12,50	6,55	50,8	0,003790	40,10
		12,60	6,65			
		12,55	6,55			
Rata-Rata		12,55	6,58			
18	K/UP/FG/H/C6	12,60	6,65	50,8	0,004013	42,70
		12,70	6,55			
		12,50	6,60			
Rata-Rata		12,60	6,60			
19	K/UP/FG/H/C6	12,45	6,68	50,8	0,004300	36,90
		12,50	6,70			
		12,55	6,65			
Rata-Rata		12,50	6,68			
20	K/UP/FG/H/C6	12,75	6,55	50,8	0,003783	40,90
		12,60	6,55			
		12,50	6,55			
Rata-Rata		12,62	6,55			



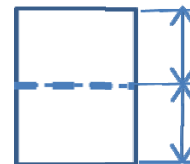
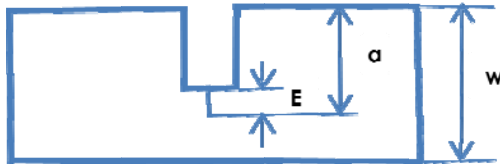
Hasil pengukuran initial retak

No Sampel	Terbaca	Pembagi	Initial Retak (mm)	No Sampel	Terbaca	Pembagi	Initial Retak (mm)
1	10	15	0,667	11	9	15	0,600
	10	15	0,667		8	15	0,533
	8	15	0,533		8	15	0,533
	7	15	0,467		8	15	0,533
	7	15	0,467		8	15	0,533
Rata-rata			0,560	Rata-rata			0,547
2	9	15	0,600	12	9	15	0,600
	9	15	0,600		9	15	0,600
	9	15	0,600		9	15	0,600
	8	15	0,533		9	15	0,600
	8	15	0,533		8	15	0,533
Rata-rata			0,573	Rata-rata			0,587
3	5	15	0,333	13	8,5	15	0,567
	5	15	0,333		8	15	0,533
	5	15	0,333		8	15	0,533
	5	15	0,333		8	15	0,533
	5	15	0,333		8	15	0,533
Rata-rata			0,333	Rata-rata			0,540
4	6	15	0,400	14	10	15	0,667
	5	15	0,333		10	15	0,667
	5	15	0,333		10	15	0,667
	5	15	0,333		10	15	0,667
	5	15	0,333		10	15	0,667
Rata-rata			0,347	Rata-rata			0,667
5	6	15	0,400	15	8	15	0,533
	6	15	0,400		8	15	0,533
	5	15	0,333		8	15	0,533
	5	15	0,333		8	15	0,533
	5	15	0,333		9	15	0,600
Rata-rata			0,360	Rata-rata			0,547
6	10	15	0,667	16	8	15	0,533
	10	15	0,667		8	15	0,533
	10	15	0,667		8	15	0,533
	8	15	0,533		8	15	0,533
	8	15	0,533		8	15	0,533
Rata-rata			0,613	Rata-rata			0,533
7	9,5	15	0,633	17	7,5	15	0,500
	9	15	0,600		8	15	0,533
	9	15	0,600		8	15	0,533
	9	15	0,600		8	15	0,533
	8	15	0,533		9	15	0,600
Rata-rata			0,593	Rata-rata			0,540
8	9,5	15	0,633	18	9	15	0,600
	9	15	0,600		9	15	0,600
	9	15	0,600		9	15	0,600
	9	15	0,600		9	15	0,600
	9	15	0,600		10	15	0,667
Rata-rata			0,607	Rata-rata			0,613
9	6	15	0,400	19	9	15	0,600
	7	15	0,467		9	15	0,600
	9	15	0,600		9	15	0,600
	10	15	0,667		9	15	0,600
	10,5	15	0,700		9	15	0,600
Rata-rata			0,567	Rata-rata			0,600
10	9	15	0,600	20	5	15	0,333
	9	15	0,600		5	15	0,333
	9	15	0,600		5	15	0,333
	9	15	0,600		5	15	0,333
	8,5	15	0,567		5	15	0,333
Rata-rata			0,593	Rata-rata			0,333



Hasil perhitungan panjang retak

No. Sampel	Lebar (w) (mm)	(C)	Dalam Notch U (D) (mm)	Initial Retak (E) (mm)	Panjang Retak (a)	
					(mm)	(m)
1.	12,55	9,00	3,55	0,560	4,110000	0,004110
2.	12,65	9,20	3,45	0,573	4,023333	0,004023
3.	12,55	8,65	3,90	0,333	4,233333	0,004233
4.	12,70	8,55	4,15	0,347	4,496667	0,004497
5.	12,90	8,70	4,20	0,360	4,560000	0,004560
6.	12,55	9,20	3,35	0,613	3,963333	0,003963
7.	12,70	9,55	3,15	0,593	3,743333	0,003743
8.	12,70	9,55	3,15	0,607	3,756667	0,003757
9.	12,65	8,60	4,05	0,567	4,616667	0,004617
10.	12,85	9,50	3,35	0,593	3,943333	0,003943
11.	12,65	9,45	3,20	0,547	3,746667	0,003747
12.	12,65	9,35	3,30	0,587	3,886667	0,003887
13.	12,85	9,70	3,15	0,540	3,690000	0,003690
14.	12,70	9,50	3,20	0,667	3,866667	0,003867
15.	12,70	9,45	3,25	0,547	3,796667	0,003797
16.	12,45	9,50	2,95	0,533	3,483333	0,003483
17.	12,60	9,35	3,25	0,540	3,790000	0,003790
18.	12,70	9,30	3,40	0,613	4,013333	0,004013
19.	12,50	8,80	3,70	0,600	4,300000	0,004300
20.	12,60	9,15	3,45	0,333	3,783333	0,003783



D

C



Hasil perhitungan ketangguhan retak

No. Sampel	Lebar (mm)	Tebal (mm)	Length Support (mm)	Panjang Retak		Beban Patah		Ketangguhan Retak	
				(mm)	(m)	(kg)	(N)	(kg mm ^{1/2})	(MPa m ^{1/2})
1	12,40	6,70	50,8	4,110000	0,004110	44,30	434,583	12,660	3,927
2	12,60	7,17	50,8	4,023333	0,004023	45,30	444,393	11,452	3,553
3	12,37	6,78	50,8	4,233333	0,004233	29,60	290,376	8,628	2,677
4	12,58	6,83	50,8	4,496667	0,004497	35,70	350,217	10,467	3,247
5	12,78	6,77	50,8	4,560000	0,004560	35,30	346,293	10,190	3,161
Rata-rata								10,680	3,313
Standar deviasi								1,501	0,466
6	12,57	6,42	50,8	3,963333	0,003963	41,10	403,191	11,534	3,578
7	12,65	6,43	50,8	3,743333	0,003743	45,20	443,412	11,917	3,697
8	12,33	6,48	50,8	3,756667	0,003757	45,20	443,412	12,566	3,898
9	12,53	6,47	50,8	4,616667	0,004617	39,30	385,533	12,609	3,912
10	12,72	6,35	50,8	3,943333	0,003943	36,40	357,084	10,003	3,103
Rata-rata								11,726	3,638
Standar deviasi								1,064	0,330
11	12,65	5,97	50,8	3,746667	0,003747	41,00	402,210	11,657	3,616
12	12,60	6,22	50,8	3,886667	0,003887	39,80	390,438	11,275	3,498
13	12,70	5,83	50,8	3,690000	0,003690	51,70	507,177	14,749	4,575
14	12,67	6,25	50,8	3,866667	0,003867	41,50	407,115	11,506	3,569
15	12,63	5,92	50,8	3,796667	0,003797	41,00	402,21	11,917	3,697
Rata-rata								12,221	3,791
Standar deviasi								1,432	0,444
16	12,43	6,95	50,8	3,483333	0,003483	51,20	502,272	12,323	3,823
17	12,55	6,58	50,8	3,790000	0,003790	40,10	393,381	10,625	3,296
18	12,60	6,60	50,8	4,013333	0,004013	42,70	418,887	11,698	3,629
19	12,50	6,68	50,8	4,300000	0,004300	36,90	361,989	10,795	3,349
20	12,62	6,55	50,8	3,783333	0,003783	40,90	401,229	10,735	3,330
Rata-rata								11,235	3,485
Standar deviasi								0,744	0,231



LAMPIRAN E
Data Parameter Uji XRD

File: sampel : 0% clay fraksi berat UGM-1
3-Nov-2011 13:37

Philips Analytical PC-APD, Diffraction software

Sample identification: sampel 1 0%-clay
Data measured at: 2-Nov-2011 12:55:00

Diffractometer type: PW1710 BASED
Tube anode: Cu
Generator tension [kv]: 40
Generator current [mA]: 25
Wavelength Alpha1 [Å]: 1.54060
Wavelength Alpha2 [Å]: 1.54439
Intensity ratio (alpha2/alpha1): 0.500
Divergence slit: 2ø
Receiving slit: 0.2
Monochromator used: NO

Start angle [ø2θ]: 3.000
End angle [ø2θ]: 9.995
Step size [ø2θ]: 0.005
Maximum intensity: 1568.160
Time per step [s]: 1.000
Type of scan: CONTINUOUS

Minimum peak tip width: 0.00
Maximum peak tip width: 1.00
Peak base width: 2.00
Minimum significance: 0.75
Number of peaks: 2

Angle [ø2θ]	d-value à1 [Å]	d-value à2 [Å]	Peak width [ø2θ]	Peak int [counts]	Back. int [counts]	Rel. int [%]	Signif.
3.360	26.2746	26.3392	0.280	1568	502	100.0	4.86
8.280	10.6699	10.6	0.800	19	671	1.2	1.11



UGM-2
File: Sampel : 2% clay fraksi berat 3-Nov-2011 13:38
Philips Analytical PC-APD, Diffraction software

Sample identification: Sampel 2 2%-clay
Data measured at: 2-Nov-2011 13:29:00
Diffractometer type: PW1710 BASED
Tube anode: Cu
Generator tension [kv]: 40
Generator current [mA]: 25
wavelength Alpha1 [Å]: 1.54060
wavelength Alpha2 [Å]: 1.54439
Intensity ratio (alpha2/alpha1): 0.500
Divergence slit: 2ø
Receiving slit: 0.2
Monochromator used: NO
Start angle [ø2θ]: 3.000
End angle [ø2θ]: 9.995
Step size [ø2θ]: 0.005
Maximum intensity: 1474.560
Time per step [s]: 1.000
Type of scan: CONTINUOUS
Minimum peak tip width: 0.00
Maximum peak tip width: 1.00
Peak base width: 2.00
Minimum significance: 0.75
Number of peaks: 5

Angle [ø2θ]	d-value å1 [Å]	d-value å2 [Å]	Peak width [ø2θ]	Peak int [counts]	Back. int [counts]	Rel. int [%]	signif.
3.390	26.0421	26.1062	0.120	1475	529	100.0	1.08
4.525	19.5122	19.5602	0.640	132	529	9.0	7.62
5.695	15.5059	15.5441	0.070	0	529	0.0	0.79
6.940	12.7268	12.7581	0.480	96	529	6.5	1.09
9.135	9.6731	9.6969	0.320	262	529	17.8	0.85



UGM-3

File: Sampel : 6% clay fraksi berat

3-Nov-2011 13:39

Philips Analytical

PC-APD, Diffraction software

Sample identification: Sampel 3 6%-Clay
Data measured at: 2-Nov-2011 13:56:00

Diffractometer type: PW1710 BASED
Tube anode: Cu
Generator tension [kv]: 40
Generator current [mA]: 25
wavelength Alpha1 []: 1.54060
wavelength Alpha2 []: 1.54439
Intensity ratio (alpha2/alpha1): 0.500
Divergence slit: 2ø
Receiving slit: 0.2
Monochromator used: NO

Start angle [ø2è]: 3.000
End angle [ø2è]: 9.995
Step size [ø2è]: 0.005
Maximum intensity: 1806.250
Time per step [s]: 1.000
Type of scan: CONTINUOUS

Minimum peak tip width: 0.00
Maximum peak tip width: 1.00
Peak base width: 2.00
Minimum significance: 0.75
Number of peaks: 4

Angle [ø2è]	d-value à1 []	d-value à2 []	Peak width [ø2è]	Peak int [counts]	Back. int [counts]	Rel. int [%]	Signif.
3.330	26.5112	26.5764	0.280	1806	581	100.0	4.08
4.520	19.5338	19.5819	0.120	372	581	20.6	0.94
6.890	12.8190	12.8506	0.280	207	581	11.5	2.12
9.180	9.6257	9.6494	0.400	317	581	17.5	1.27



LAMPIRAN F
Grafik Hasil Uji Tarik

Grafik hasil uji tarik, setting beban maksimum 2000 kg

