

LAMPIRAN A
PERHITUNGAN DAN DATA PERCOBAAN

Perhitungan Volume Cetakan

Diketahui : Panjang (P) = 21,2 cm

Lebar (L) = 21,2 cm

Tinggi (T) = 1,7 cm

Ditanya : V_{cetakan} ?

Jawab : $V_{\text{cetakan}} = P \times L \times T = 21,2 \times 21,2 \times 1,7 = 764 \text{ cm}^3$

Perhitungan Tekanan Kompaksi

Diketahui : Luas Penekan (A_H) = 4,91 cm²

Luas penampang komposit (A_K) = $P \times L = 21,2 \times 21,2 = 449,44 \text{ mm}^2$

Tekanan hidrolik (P_H) = 60 bar = 600 N/cm²

= 80 bar = 800 N/cm²

= 100 bar = 1000 N/cm²

Gaya penekan (F_{H60}) = $A_H \times P_H = 4,91 \times 600 = 2946$

Gaya penekan (F_{H80}) = $A_H \times P_H = 4,91 \times 800 = 3928$

Gaya penekan (F_{H100}) = $A_H \times P_H = 4,91 \times 1000 = 4910$

Jawab : $P_{\text{kompaksi60}} = \frac{F_H}{A_K} = \frac{2946}{449,44} = 6,55 = 65500 \text{ Pascal}$

$P_{\text{kompaksi80}} = \frac{F_H}{A_K} = \frac{3928}{449,44} = 8,74 = 97400 \text{ Pascal}$

$P_{\text{kompaksi100}} = \frac{F_H}{A_K} = \frac{4910}{449,44} = 10,92 = 109200 \text{ Pascal}$

Perhitungan Komposisi Bahan

Serat kulit jagung = $32,5\% \times 764 \times 0,58 = 144 \text{ g}$

Serbuk kayu sengon = $32,5\% \times 764 \times 0,43 = 107 \text{ g}$

Lem PVAc = $25\% \times 764 \times 1,07 = 204 \text{ g}$

Resin Epoksi = $10\% \times 764 \times 1,1 = 84 \text{ g}$

Perhitungan Densitas

Contoh perhitungan densitas pada sampel K60A

Diketahui : Massa (m) = 96,54 g

$$\text{Volume (V)} = 132,47 \text{ cm}^3$$

Ditanya : ρ ?

$$\text{Jawab : } = \rho = \frac{m}{V} = \frac{96,54}{132,47} = 0,73 \text{ g/cm}^3$$

Perhitungan Pengembangan Tebal

Contoh perhitungan pengembangan tebal pada sampel K60A

Diketahui : Tebal awal (T_1) = 18,02 mm

Tebal akhir (T_2) = 16,23 mm

Ditanya : %_{pt}?

$$\text{Jawab : } \%_{pt} = \frac{T_2 - T_1}{T_1} \times 100\% = \frac{18,02 - 16,23}{16,23} \times 100\% = 11,03 \%$$

Perhitungan Persentase penyerapan air

Contoh perhitungan persentase penyerapan air pada sampel K60A

Diketahui : Massa awal (B_1) = 31,48 g

Massa akhir (B_2) = 18,10 g

Ditanya : %_{dsa}?

$$\text{Jawab : } \%_{dsa} = \frac{B_2 - B_1}{B_1} \times 100\% = \frac{31,43 - 18,10}{18,10} \times 100\% = 73,92 \%$$

Perhitungan Kekuatan *Bending*

Contoh perhitungan *bending* pada sampel K60A

Diketahui : Panjang sampel uji (L) = 8,134 cm

Lebar sampel uji (b) = 1,273 cm

Tebal sampel uji (h) = 0,539 cm

Beban Maksimum (P) = 0,0135 kN \approx 1,377 kgf

Ditanya : MOR?

$$\text{Jawab : } \text{MOR} = \frac{3PL}{2bh^2} = \frac{3 \cdot 1,38 \cdot 8,134}{2 \cdot 1,273 \cdot 0,539^2} = 42,47 \text{ kg/cm}^2$$

LAMPIRAN B
DATA HASIL PENELITIAN

Pengujian Densitas

Data hasil pengujian densitas ditunjukkan pada tabel berikut.

No	Kode Sampel	Massa Sampel (g)	Volume Sampel (cm ³)	Densitas (g/cm ³)
1	K60	96,54	132,47	0,72
		91,65	127,38	
		98,25	136,89	
2	K80	98,89	129,53	0,76
		87,82	115,60	
		85,08	111,04	
3	K100	88,36	99,66	0,85
		85,84	105,15	
		89,75	106,84	

Pengujian Pengembangan Tebal

Data hasil pengujian pengembangan tebal ditunjukkan pada tabel berikut.

No	Kode Sampel	Tebal Awal (mm)	Tebal Akhir (mm)	Pengembangan Tebal (%)
1	K60	16,23	18,02	9,46
		16,64	17,82	
		16,08	17,74	
2	K80	16,30	17,6	7,04
		16,46	17,51	
		16,41	17,52	
3	K100	15,00	15,86	4,93
		15,24	15,93	
		15,00	15,68	

Pengujian Persentase penyerapan air

Data hasil pengujian persentase penyerapan air ditunjukkan pada tabel berikut.

No	Kode Sampel	Massa Awal (g)	Massa Akhir (g)	Persentase penyerapan air (%)
1	K60	18,10	31,48	73,59
		20,45	35,94	
		17,98	30,71	
2	K80	17,66	29,59	59,77
		21,84	33,89	
		17,40	27,43	
3	K100	21,01	31,47	46,21
		19,83	29,06	
		19,34	27,46	

Pengujian Kekerasan Shore D

Data hasil pengujian kekerasan *shore D* ditunjukkan pada tabel berikut.

No	Kode Sampel	Sampel	Nilai Kekerasan (<i>Shore D</i>)	Rata-rata Nilai Kekerasan (<i>Shore D</i>)
1	K60	1	28,0	28,83
		2	30,0	
		3	28,5	
2	K80	1	34,0	33,33
		2	31,0	
		3	35,0	
3	K100	1	39,0	40,17
		2	37,5	
		3	44,0	














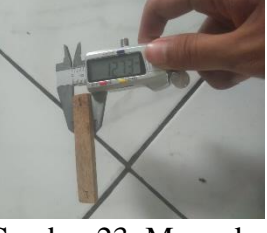

Pengujian *Bending*

Data hasil pengujian *bending* ditunjukkan pada tabel berikut.

No	Kode Sampel	Lebar Sampel (cm)	Tebal Sampel (cm)	<i>Modulus Of Rupture</i> (kg/cm ²)
1	K60	1,273	0,539	57,62
		1,270	0,537	
		1,272	0,547	
2	K80	1,273	0,567	67,95
		1,274	0,594	
		1,269	0,590	
3	K100	1,272	0,488	91,79
		1,273	0,452	
		1,265	0,471	

LAMPIRAN C
DOKUMENTASI PENELITIAN

 <p>Gambar 1. Pegumpulan KJ</p>	 <p>Gambar 2. Perendaman KJ</p>	 <p>Gambar 3. Pengerinan KJ</p>
 <p>Gambar 4. Penyikatan KJ</p>	 <p>Gambar 5. Pengerinan Serat KJ</p>	 <p>Gambar 6. Pemotongan Serat KJ</p>
 <p>Gambar 7. Perendaman Serat KJ dengan NaOH</p>	 <p>Gambar 8. Pembilasan Serat KJ</p>	 <p>Gambar 9. Pengerinan Serat KJ rendam NaOH</p>
 <p>Gambar 10. Mengukur Massa PVAc</p>	 <p>Gambar 11. Mengukur Massa Serat KJ</p>	 <p>Gambar 12. Mengukur Massa Serbuk Sengon</p>
 <p>Gambar 13. Mengukur Massa Resin</p>	 <p>Gambar 14. Mengukur Massa <i>Hardener</i></p>	 <p>Gambar 10. Proses Mixing</p>

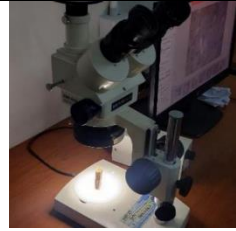
 <p>Gambar 11. Proses Kompaksi</p>	 <p>Gambar 11. Papan dari Cetakan</p>	 <p>Gambar 12. Proses Sintering</p>
 <p>Gambar 13. Proses Pemotongan Sampel</p>	 <p>Gambar 14. Mengukur Lebar Sampel Densitas</p>	 <p>Gambar 15. Mengukur Tebal sampel Densitas</p>
 <p>Gambar 16. Mengukur Massa Sampel Densitas</p>	 <p>Gambar 17. Mengukur Tebal Sampel PT</p>	 <p>Gambar 18. Mengukur Massa Sampel DSA</p>
 <p>Gambar 19. Proses Awal Uji PT dan DSA</p>	 <p>Gambar 20. Proses Akhir Uji PT dan DSA</p>	 <p>Gambar 21. Proses Uji Kekerasan</p>
 <p>Gambar 22. Mengukur Panjang Sampel <i>Bending</i></p>	 <p>Gambar 23. Mengukur Lebar Sampel <i>Bending</i></p>	 <p>Gambar 24. Mengukur Tebal Sampel <i>Bending</i></p>



Gambar 25. Mengukur
Massa Sampel *Bending*

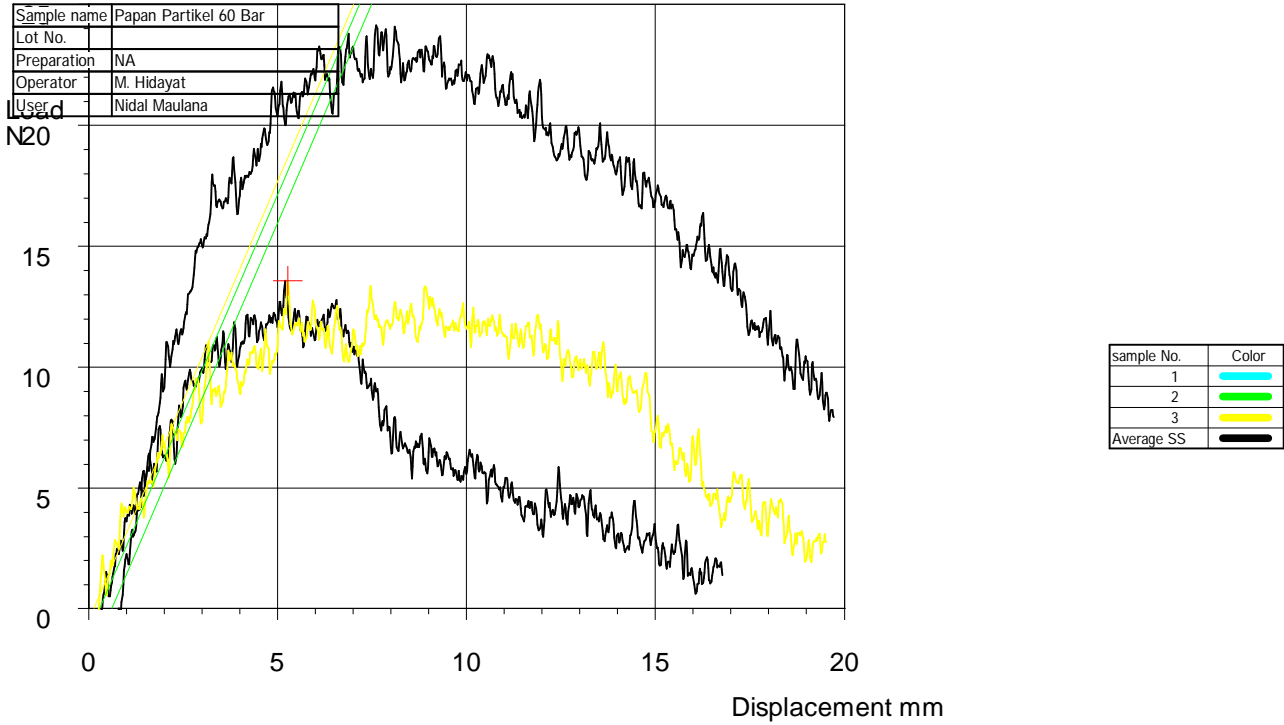


Gambar 26. Proses Uji
Bending



Gambar 27. Proses Uji
Mikroskop

Graph



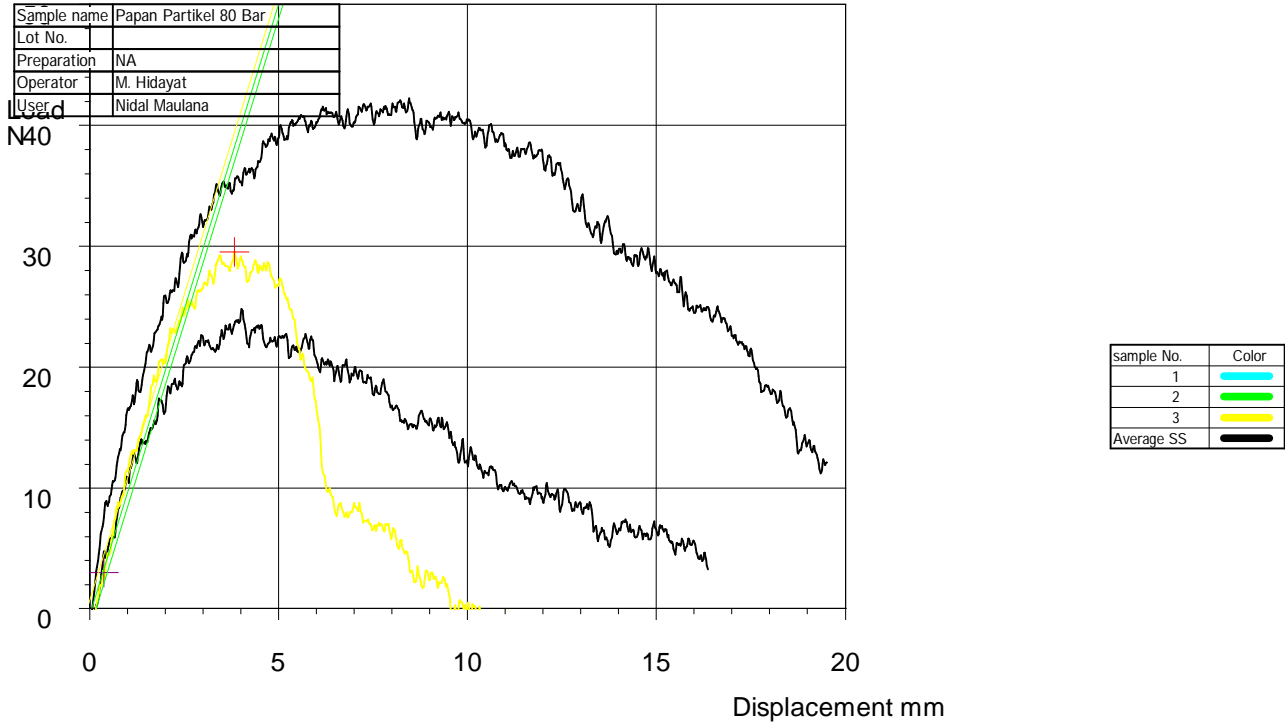
3-point bending testResult

Machine name	RTF			Test type	3-point bending		
Strain input 1	Not used			Test speed	30.0 mm/min		
Chart speed	OFF			Machine rigidity	0 mm/kgf		
Point data(Load)	0	0	0	Point data(Disp)	0	0	0
	N				mm		
Elastic modulus anal.	Interval	1	100	Initial sample length	Edge spa	60 mm	
Load	Pitch	5 N		Origin of elongation	Init. load	0.03 kN	
Elong adjust	No			Break point measurement	0.5 N		
Save SS curve	Yes						

Test date	2023/12/27	Temperature	25 C
Humidity	60 %RH	Sample name	Papan Partikel 60 Bar
Lot No.		Preparation	NA
Operator	M. Hidayat	User	Nidal Maulana
Comment 1	ASTM D790	Comment 2	

TestID=92	Width	Height	SecArea	Maximum poin Load	Maximum poin Stress	BreakPoint Stress
Test No	mm	mm	mm2	kN	kgf/mm2	kgf/mm2
1	12.700	4.8000	60.960	0.0135	0.4247	-0.0783
2	12.700	4.5000	57.150	0.0241	0.8603	0.1889
3	12.700	4.7000	59.690	0.0136	0.4435	-0.0559
Min.	12.700	4.5000	57.150	0.0135	0.4247	-0.0783
Max.	12.700	4.8000	60.960	0.0241	0.8603	0.1889
Average	12.700	4.6667	59.267	0.0171	0.5762	0.0182

Graph



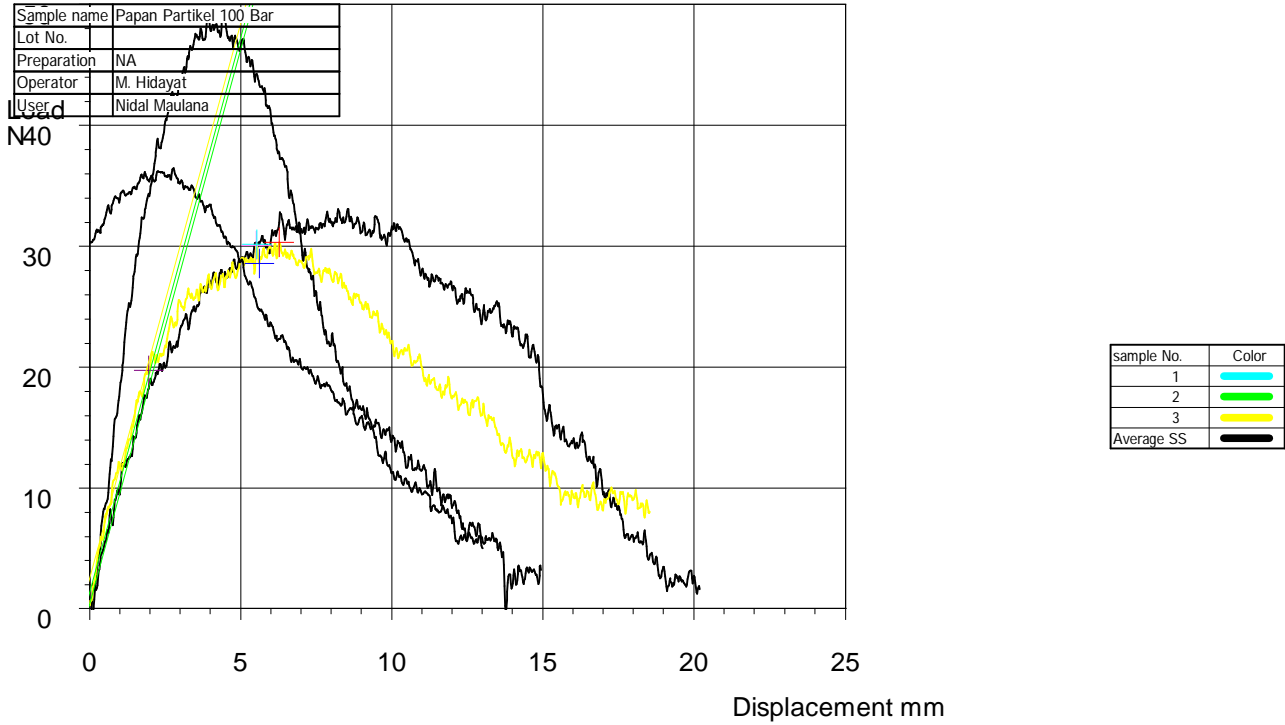
3-point bending testResult

Machine name	RTF		Test type	3-point bending			
Strain input 1	Not used		Test speed	30.0 mm/min			
Chart speed	OFF		Machine rigidity	0 mm/kgf			
Point data(Load)	0	0	0	Point data(Disp)	0	0	0
	N	0	0	mm	0	0	0
Elastic modulus anal.	Interval	1	100	Initial sample length	Edge spa	60 mm	
Load	Pitch	5 N		Origin of elongation	Init. load	0.03 kN	
Elong adjust	No		Break point measurem	0.5 N			
Save SS curve	Yes						

Test date	2023/12/27	Temperature	25 C	
Humidity	60 %RH	Sample name	Papan Partikel 80 Bar	
Lot No.		Preparation	NA	
Operator	M. Hidayat	User	Nidal Maulana	
Comment 1	ASTM D790	Comment 2		

TestID=91	Width	Height	SecArea	Maximum poin	Maximum poin	BreakPoint
				Load	Stress	
Test No	mm	mm	mm2	kN	kgf/mm2	kgf/mm2
1	12.700	5.7000	72.390	0.0248	0.5511	-0.0495
2	12.700	5.9000	74.930	0.0422	0.8755	0.3634
3	12.700	5.9000	74.930	0.0295	0.6119	0.0616
Min.	12.700	5.7000	72.390	0.0248	0.5511	-0.0495
Max.	12.700	5.9000	74.930	0.0422	0.8755	0.3634
Average	12.700	5.8333	74.083	0.0321	0.6795	0.1252

Graph



3-point bending testResult

Machine name	RTF		Test type	3-point bending	
Strain input 1	Not used		Test speed	30.0 mm/min	
Chart speed	OFF		Machine rigidity	0 mm/kgf	
Point data(Load)	0	0	Point data(Disp)	0	0
	N	0		mm	0
Elastic modulus anal.	Interval	1	Initial sample length	Edge spa	60 mm
Load	Pitch	5 N	Origin of elongation	Init. load	0.03 kN
Elong adjust	No		Break point measurem	0.5 N	
Save SS curve	Yes				

Test date	2023/12/27	Temperature	25 C
Humidity	60 %RH	Sample name	Papan Partikel 100 Bar
Lot No.		Preparation	NA
Operator	M. Hidayat	User	Nidal Maulana
Comment 1	ASTM D790	Comment 2	

TestID=90	Width	Height	SecArea	Maximum poin	Maximum poin	BreakPoint
Test No	mm	mm	mm2	Load	Stress	Stress
				kN	kgf/mm2	kgf/mm2
1	12.700	5.4000	68.580	0.0489	1.2118	0.9514
2	12.700	5.4000	68.580	0.0330	0.8189	0.1924
3	12.700	5.5000	69.850	0.0303	0.7231	0.4696
Min.	12.700	5.4000	68.580	0.0303	0.7231	0.1924
Max.	12.700	5.5000	69.850	0.0489	1.2118	0.9514
Average	12.700	5.4333	69.003	0.0374	0.9179	0.5378