

LAMPIRAN

Lampiran L.1 Mencari gaya yang digunakan pada uji *Static*

$$m = 0.4 \text{ Kg}$$

$$v = 20 \text{ m/s}$$

$$s = 0.5$$

$$E_k = \frac{1}{2}mv^2$$

$$E_k = \frac{1}{2} \times 0.4 \times 20^2 = 80 \text{ J}$$

$$F = \frac{W}{s}$$

$$F = \frac{80}{0.5} = 160 \text{ N}$$

Lampiran L.2 Mencari nilai inersia pada produk ornamen pagar

- Perhitungan $\frac{1}{4}$ ellips II

$$I = \frac{1}{4} \times \frac{\pi ab^3}{4}$$

$$I = \frac{1}{4} \times \frac{3.14 \times 63.89 \times 29.69^3}{4}$$

$$I = 328150.56 \text{ mm}^4$$

- Perhitungan total

$$I = \frac{bh^3}{12}$$

$$I = \frac{29.69 \times 63.89^3}{12}$$

$$I = 645249.41 \text{ mm}^4$$

- Perhitungan I

$$I_{\text{total}} = 645249.41 \text{ mm}^4 - 328150.56 \text{ mm}^4$$

$$I_{\text{total}} = 317098.85 \text{ mm}^4 \times 2$$

$$I_{\text{total}} = 634197.7 \text{ mm}^4$$

- Perhitungan II segitiga siku-siku

$$I = \frac{bh^3}{36}$$

$$I = \frac{2.96 \times 12^3}{36}$$

$$I = 142.08 \text{ mm}^4$$

- Perhitungan III persegi panjang dengan setengah lingkaran

$$I = \frac{bh^3}{12} - \frac{\pi r^4}{8}$$

$$I = \frac{2.96 \times 9.13^3}{12} - \frac{3.14 \times 5^4}{8}$$

$$I = 187.73 - 245.31$$

$$I = 57.59 \text{ mm}^4$$

- Perhitungan IV persegi panjang

$$I = \frac{bh^3}{12}$$

$$I = \frac{2.96 \times 7.94^3}{12}$$

$$I = 123.47 \text{ mm}^4$$

- Perhitungan total

$$I = \frac{bh^3}{12}$$

$$I = \frac{7.96 \times 29.13^3}{12}$$

$$I = 16396.58 \text{ mm}^4$$

- Perhitungan I

$$I = 16396.58 - 142.08 - 57.59 - 122.64$$

$$I = 16074.27 \text{ mm}^4 \times 2$$

$$I = 32148.54 \text{ mm}^4$$

- Perhitungan inersia total ornamen pagar

$$I_{\text{total}} = 634197.7 \text{ mm}^4 + 32148.54 \text{ mm}^4$$

$$I_{\text{total}} = 666346.24 \text{ mm}^4$$

Lampiran L.3 Mencari luas penampang

- Perhitungan $\frac{1}{4}$ luas ellips

$$LII = \frac{1}{4} \times \pi \times a \times b$$

$$LII = \frac{1}{4} \times 3.14 \times 63.89 \times 29.69$$

$$LII = 1489.06 \text{ mm}^2$$

- Perhitungan luas total

$$L_{\text{tot}} = P \times L$$

$$L_{\text{tot}} = 63.89 \times 29.69$$

$$L_{\text{tot}} = 1896.89 \text{ mm}^2$$

- Perhitungan luas I

$$L_I = L_{\text{tot}} - L_{II}$$

$$L_I = 1896.89 - 1489.06$$

$$L_I = 407.83 \times 2$$

$$L_I = 815.66 \text{ mm}^2$$

Berikut merupakan perhitungan pada bagian bawah dari produk ornamen pagar:

- Perhitungan segitiga siku-siku

$$L_I = \frac{1}{2} \times a \times t$$

$$L_I = \frac{1}{2} \times 2.96 \times 12$$

$$L_I = 17.76 \text{ mm}^2$$

- Perhitungan segiempat dengan setengah lingkaran didalam

$$L_2 = (P \times L) - \left(\frac{1}{2} \times \frac{1}{4} \times \pi \times r^2 \right)$$

$$L_2 = (9.13 \times 2.96) - \left(\frac{1}{2} \times \frac{1}{4} \times 3.14 \times 5^2 \right)$$

$$L_2 = 27.02 - 9.81$$

$$L_2 = 17.21 \text{ mm}^2$$

- Perhitungan persegi panjang

$$L_3 = (P \times L)$$

$$L_3 = 7.94 \times 2.96$$

$$L_3 = 23.5 \text{ mm}^2$$

- Perhitungan luas total

$$L_{\text{tot}} = (P \times L)$$

$$L_{\text{tot}} = (29.13 \times 7.96)$$

$$L_{\text{tot}} = 231.87 \text{ mm}^2$$

- Luas penampang total

$$L_a = L_{total} - L_1 - L_2 - L_3$$

$$L_a = 231.87 - 17.76 - 17.21 - 23.5$$

$$L_a = 173.4 \text{ mm}^2$$

$$L_a = 173.4 \times 2$$

$$L_a = 346.8 \text{ mm}^2$$
- Perhitungan luas total

$$L_{total} = 815.66 + 346.84$$

$$L_{total} = 1162.5 \text{ mm}^2$$

Tabel L.1 Hasil Simulasi Sumbu X

No	Ketebalan (mm)	Material	Posisi Layer	Komposisi Material (mm)	Tegangan maksimal (MPa)	<i>Displacement</i> (mm)
1	5	PP	1	2.5	6.801	0.054
		PET	2	1.5		
		HDPE	3	1		
2	5	PP	1	2.5	7.107	0.055
		PET	3	1.5		
		HDPE	2	1		
3	5	PP	3	2.5	12.35	0.038
		PET	1	1.5		
		HDPE	2	1		
4	5	PP	2	2.5	8.302	0.038
		PET	1	1.5		
		HDPE	3	1		
5	5	PP	2	2.5	11.89	0.072
		PET	3	1.5		
		HDPE	1	1		
6	5	PP	3	2.5	10.30	0.062
		PET	2	1.5		

		HDPE	1	1		
7	10	PP	1	5	12.38	0.071
		PET	2	3		
		HDPE	3	2		
8	10	PP	1	5	6.91	0.073
		PET	3	3		
		HDPE	2	2		
9	10	PP	2	5	9.194	0.038
		PET	1	3		
		HDPE	3	2		
10	10	PP	3	5	11.79	0.040
		PET	1	3		
		HDPE	2	2		
11	10	PP	2	5	10.71	0.074
		PET	3	3		
		HDPE	1	2		
12	10	PP	3	5	8.764	0.069
		PET	2	3		
		HDPE	1	2		
13	15	PP	1	7.5	8.660	0.066
		PET	2	4.5		
		HDPE	3	3		
14	15	PP	1	7.5	7.189	0.067
		PET	3	4.5		
		HDPE	2	3		
15	15	PP	2	7.5	8.340	0.044
		PET	1	4.5		
		HDPE	3	3		
16	15	PP	3	7.5	11.06	0.041
		PET	1	4.5		
		HDPE	2	3		

17	15	PP	2	7.5	9.765	0.090
		PET	3	4.5		
		HDPE	1	3		
18	15	PP	3	7.5	9.783	0.080
		PET	2	4.5		
		HDPE	1	3		