



* Luas Penampang

$$A_I = 10 \cdot 2 = 20 \text{ cm}^2 \quad A_{II} = 10 \cdot 2 = 20 \text{ cm}^2 \quad A_{III} = 6 \cdot 2 = 12 \text{ cm}^2$$

* Jarak titik Berat masing-masing penampang

$$\begin{aligned} I \rightarrow x = 0 & \quad II \rightarrow x = 0 & \quad III \rightarrow x = 0 \\ y = 1 \text{ cm} & \quad y = 7 \text{ cm} & \quad y = 13 \text{ cm} \end{aligned}$$

* Titik Berat penampang total $\rightarrow y = \frac{\sum A_i \cdot y_i}{\sum A_i} = \frac{(20 \cdot 1) + (20 \cdot 7) + (12 \cdot 13)}{(20 + 20 + 12)}$

$$= 6,077 \text{ cm (di serat bawah)}$$

* Jarak dr titik Berat penampang ke titik Berat total

$$\begin{aligned} y_{I1} = 6,077 - 1 & \quad y_{II1} = 7 - 6,077 & \quad y_{III1} = 13 - 6,077 \\ = 5,077 \text{ cm} & \quad = 0,923 \text{ cm} & \quad = 6,923 \text{ cm} \end{aligned}$$

* Inersia masing-masing penampang terhadap sumbu x

$$\begin{aligned} I_{I1} &= I_{I0} + A_1 \cdot a^2 = \frac{1}{12} \cdot 10 \cdot 2^3 + 20 (5,077)^2 = 522,185 \text{ cm}^4 \\ I_{II1} &= I_{II0} + A_2 \cdot a^2 = \frac{1}{12} \cdot 2 \cdot 10^3 + 20 (0,923)^2 = 183,705 \text{ cm}^4 \\ I_{III1} &= I_{III0} + A_3 \cdot a^2 = \frac{1}{12} \cdot 6 \cdot 2^3 + 12 (6,923)^2 = 599,135 \text{ cm}^4 \end{aligned}$$

* Momen Inersia Total

$$I_t = I_{I1} + I_{II1} + I_{III1} = 1285,025 \text{ cm}^4$$

20 * Perhitungan Gaya Geser

$$\begin{aligned} \sum M_B = 0 & \rightarrow 6R_A - P \cdot 2 - 2000 \cdot 6 \cdot 3 - MA = 0 \\ 6R_A - 2000 - 36000 - (1000 \cdot 4 + 2000 \cdot 6 \cdot 3) &= 0 \\ 6R_A = 72000 & \rightarrow R_A = 13000 \text{ kg} \end{aligned}$$

$$D_c = R_A - 2000 \cdot 4 - 1000 = 4000 \text{ kg}$$

$$w \quad T_{IIIa} = \frac{Q \cdot A \cdot \bar{y}}{I_b} = \frac{4000 \cdot 12 \cdot 6,923}{1285,025 \cdot 6} = 43,100 \text{ kg/cm}^2$$

$$w \quad T_{IIIb} = \frac{4000 \cdot 12 \cdot 6,923}{1285,025 \cdot 2} = 129,299 \text{ kg/cm}^2$$

$$w \quad T_{II} = \frac{4000 \cdot (12 \cdot 6,923 + 6 \cdot 2 \cdot 2,9615)}{2 \cdot 1285,025} = 183,900 \text{ kg/cm}^2$$

$$w \quad T_{Ia} = \frac{4000 \cdot 20 \cdot 5,077}{1285,025 \cdot 10} = 31,609 \text{ kg/cm}^2$$

$$w \quad T_{Ib} = \frac{4000 \cdot 20 \cdot 5,077}{1285,025 \cdot 2} = 158,036 \text{ kg/cm}^2$$

* Sketsa Diagram Geser

