

STRUKTUR KAYU

DIMENSI LENTUR & TEKAN AKSIAL

(pertemuan ke 8)

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Semester B – 2011/2012

$$\begin{aligned}
 P_u &= 76482,34 \text{ N (kombinasi 1)} \\
 M_u &= 2463226,25 \text{ N mm (kombinasi 3)} \\
 L &= 2309,4 \text{ mm} \\
 K_e &= 1,0 \text{ (sendi - sendi)} \\
 \lambda &= 0.60 \quad \phi_c = 0.90 \quad C = 0.80 \\
 \lambda &= 0.80 \quad \phi_b = 0.85
 \end{aligned}$$

Kelangsingan :

$$\lambda = \frac{K_e L}{r} \leq 175 \quad \text{dimana } r = 0.289 b$$

$$b \geq \frac{1,0 \times 2309}{0.289 \times 175} = 45.655 \text{ mm} \quad \text{ambil } b = 76,2 \text{ mm (3") }$$

$$\lambda = \frac{1,0 \times 2309}{0.289 \times 76,2} = 104,851 < 175 \dots\dots\dots \text{(OK)}$$

$$Pe = \frac{\pi^2 E^1 05 A}{Ke \frac{L^2}{r}} = \frac{3,14^2 \times 21481,291 \times A}{\left(\frac{2309}{22,02}\right) 2} = 19,26 A$$

$$\alpha c = \frac{\emptyset s Pe}{\lambda \emptyset c Po} = \frac{0,85 \times 19,26 A}{0,6 \times 0,9 \times A \times 46 \times 0,8 \times 0,8} = 1,0$$

$$Cp = \frac{1 + \alpha c}{2 c} - \sqrt{\left(\frac{1 + \alpha c}{2 c}\right)^2 - \frac{\alpha c}{c}} = \frac{1 + 1}{2 \cdot 0,8} - \sqrt{\left(\frac{1 + 1}{2 \cdot 0,8}\right)^2 - \frac{1}{0,8}} = 0,691$$

Maka:

$$P' = Cp A Fc = 0,691 A \times 29,44 = 20,34 A = 1549,9 h$$

$$M = S \times Fb = \frac{1}{6} \times 76,2 h^2 \times 44,88 = 569.976 h^2$$

$$\left(\frac{P_u}{\lambda \phi_c P_1}\right)^2 + \frac{M_u}{\lambda \phi_b M'} \leq 1$$

$$\frac{76482,34}{0,6 \times 0,9 \times 1549,9h} + \frac{2463226,25}{0,8 \times 0,85 \times 569,97 bh} \leq 1$$

$$8350,788 + 6357,75 \leq h^2 \rightarrow h = 121,3 \text{ mm (Ambil } h = 5\text{'')}$$

Maka dimensi lentur + Tekan aksial = 3" x 5" (76,2 mm x 127 mm)