

# STRUKTUR KAYU

## **DIMENSI BATANG TEKAN**

( pertemuan ke 4)

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$$P_u = 21985,52 \text{ N (kombinasi 1)}$$

$$L = 3055,05 \text{ mm}$$

$$K_c = 1,0 \text{ (sendi - sendi)}$$

$$\lambda = 0,6$$

$$\phi_c = 0,9$$

Kelangsingan

$$\lambda = \frac{K_c L}{r} \leq 175 ; \text{ dimana } r = 0,289 b$$

$$b \geq \frac{1,0 \times 3055,05}{0,289 \times 76,2} = 60,406 \text{ mm}$$

Ambil  $b = 76,2 \text{ mm (3")}$

$$\lambda = \frac{1,0 \times 3055,05}{0,289 \times 76,2} = 138,728 < 175 \dots\dots\dots (\text{ok})$$

$$P_u \leq \lambda \Phi_c P'$$

$$P' = C_p A F_c \quad A F_c = P_o'$$

Faktor kestabilan kolom ( $C_p$ )

$$C_p = \frac{1+\alpha_c}{2c} - \sqrt{\left(\frac{1+\alpha_c}{2c}\right)^2 - \frac{\alpha_c}{c}}$$

$$\alpha_c = \frac{\Phi_s P_e}{\lambda \Phi_c P_o'}$$

$$P_e = \frac{\pi^2 E'_{05} A}{\left(Kc \frac{L}{r}\right)^2} = \frac{3,14^2 \cdot 21481,291 \times A}{\left(\frac{2055,05}{r21,675}\right)^2} = 10,661 A$$

$$\alpha_c = \frac{0,85 \times 10,661 A}{0,6 \times 0,9 \times A \times 46 \times 0,8 \times 0,8} = 0,57$$

$$C_p = \frac{1+0,57}{2 \times 0,8} - \sqrt{\left(\frac{1+0,57}{2 \times 0,8}\right)^2 - \frac{0,57}{0,8}} = 0,981 - 0,5 = 0,481$$

$$\begin{aligned} P' &= C_p A F_c \\ &= 0,481 \times A \times 29,44 \\ &= 14,161 A \\ &= 1079,068 \text{ h} \end{aligned}$$

$$P_u \leq \lambda \phi_c P'$$

$$21985,52 \leq 0,6 \times 0,9 \times 1079,068 h$$

$$21985,52 \leq 582,697 h$$

$$h \geq \frac{21985,52}{582,697}, \text{ maka}$$

$$h \geq 37,731$$

maka ambil dimensi batang tekan 3" x 3" (76,2 mm x 76,2 mm)  
catatan : bila diambil h = 2" maka kelangsingan tidak aman

$$\lambda = \frac{Kc L}{r} = \frac{3055,05}{0,289 \times 2 \times 25,4} = 208,12 > 175 \text{ (terbukti)}$$