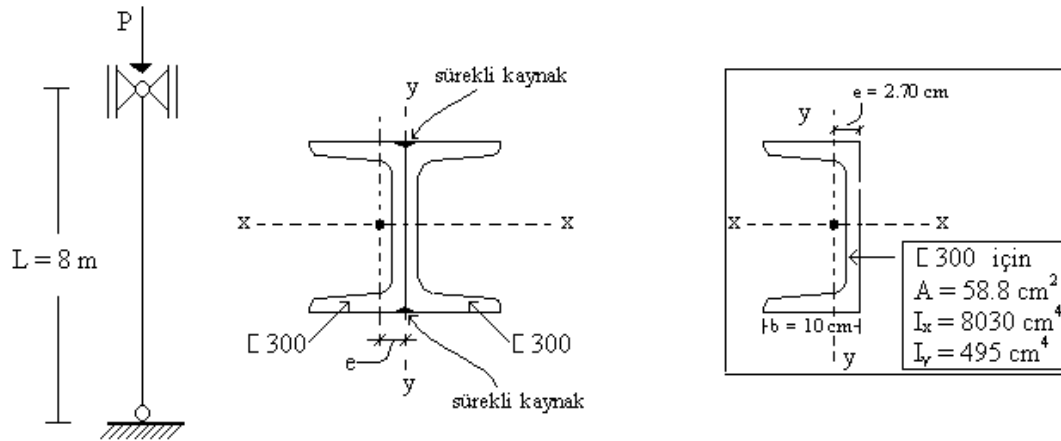


1.)



Şekilde kesiti ve yükleme durumu verilen kolonun emniyetle taşıyabileceği yükü hesaplayınız.

YH1, Ç37, $\sigma_{emn} = 1.44 \text{ t/cm}^2$

Çözüm 1

$$I_{xx} = 2 \times 8030 = 16060 \text{ cm}^4$$

$$I_{yy} = 2 \times (495 + 58.8 \times 2.70^2) = 1847.304 \text{ cm}^4$$

$$i_x = \sqrt{\frac{I_{xx}}{\sum A}} = 11.69 \text{ cm}$$

$$i_y = \sqrt{\frac{I_{yy}}{\sum A}} = 3.96 \text{ cm}$$

$$S_{kx} = S_{ky} = 800 \text{ cm}$$

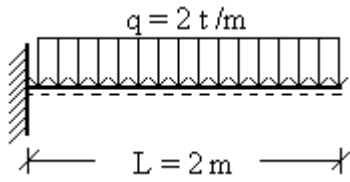
$$\lambda_x = S_{kx} / i_x = 800 / 11.69 = 800 / 11.69 = 68.43$$

$$\lambda_y = S_{ky} / i_y = 800 / 3.96 = 800 / 3.96 = 202.02$$

$$\lambda_{\max} = 202.02 \rightarrow \omega = 6.89$$

$$P_{em} \leq \frac{\sigma_{emn} \times \sum A}{\omega} = 24.58 \text{ t}$$

2.)



Şekilde verilen konsol kirişin kesiti NPI 300 olduğuna göre gerekli kontrolleri yapınız.
YH1, Ç37

$$\sigma_{emn} = 1.44 \text{ t/cm}^2, \tau_{emn} = 0.831 \text{ t/cm}^2, E = 2100 \text{ t/cm}^2$$

$$f_{\max} = qL^4 / (8EI_x), f_{lim} = L / 250$$

$$\text{NPI 300: } I_x = 9800 \text{ cm}^4, W_x = 653 \text{ cm}^3, S_x = 381 \text{ cm}^3, t_g = 10.8 \text{ mm}, h_g = 241 \text{ mm}$$

Çözüm 2

$$M_{\max} = 4 \text{ tm}$$

$$T_{\max} = 4 \text{ t}$$

$$\sigma = M/W_x = 400/653 = 0.612 \text{ t/cm}^2 < 1.44 \text{ t/cm}^2 \quad \checkmark$$

$$\tau = T \times S_x / (I_x \times t_g) = 4 \times 381 / (9800 \times 1.08) = 0.144 \text{ t/cm}^2 < 0.831 \text{ t/cm}^2 \quad \checkmark$$

$$f_{\max} = 0.02 \times 200^4 / (8 \times 2100 \times 9800) = 0.19 \text{ cm} < L / 250 = 200 / 250 = 0.8 \text{ cm} \quad \checkmark$$