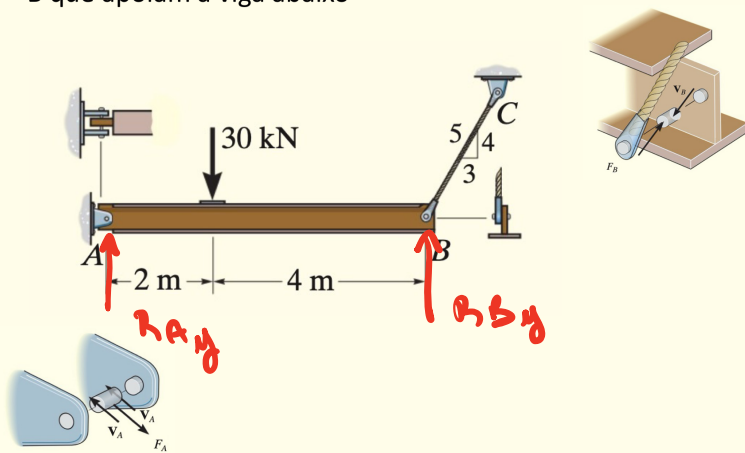


Exemplo

- Determine a tensão média de cisalhamento no pino de 20 mm de diâmetro em A e no pino de 30 mm de diâmetro em B que apoiam a viga abaixo



Reações nos apoios

$$\sum F_u = 0$$

$$R_A - 30 + R_{By} = 0$$

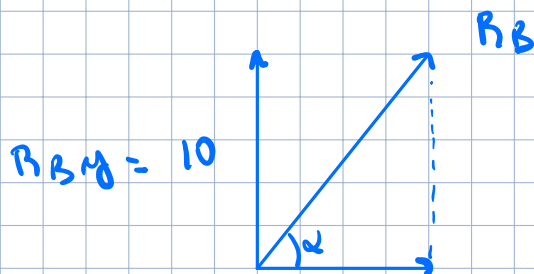
$$R_{Ay} + R_{By} = 30$$

$$\sum M_A = 0$$

$$R_{Ay} \cdot 0 - 30 \cdot 2 + R_{By} \cdot 6 = 0$$

$$R_{By} = \frac{60}{6} \Rightarrow R_{By} = 10 \text{ kN}$$

$$R_{Ay} = 30 - 10 \Rightarrow R_{Ay} = 20 \text{ kN}$$



$$\tan \alpha = \frac{R_{By}}{R_{Bx}}$$

$$\frac{4}{3} = \frac{10}{R_{Bx}} \Rightarrow R_{Bx} = \frac{3 \cdot 10}{4} = \frac{15}{2} \text{ kN}$$

$$R_B = \sqrt{10^2 + \left(\frac{15}{2}\right)^2}$$

$$\Rightarrow R_B = 12,5 \text{ kN} = F_B$$

$$\sum F_H = 0$$

$$R_{Ax} + R_{Bx} = 0$$

$$R_{Ax} = -7,5 \text{ kN}$$

$$R_A = \sqrt{(-7,5)^2 + 20^2} \Rightarrow R_A = 21,4 \text{ kN} = F_A$$

$$\text{Pino A} \Rightarrow V_A = \frac{F_A}{2} \Rightarrow V_A = 10,7 \text{ kN}$$

$$\tau_A = \frac{V_A}{A_A} \Rightarrow \tau_A = \frac{10,7 \times 10^3}{\frac{\pi \cdot 0,02^2}{4}} \Rightarrow \tau_A = 3,41 \times 10^7 \frac{\text{N}}{\text{m}^2}$$

$$\tau = 34,1 \text{ MPa}$$

$$\text{Pino B} \Rightarrow V_B = F_B$$

$$\tau_B = \frac{V_B}{A_B} \Rightarrow \tau_B = \frac{12,5 \cdot 10^3}{\frac{\pi \cdot 0,03^2}{4}} \Rightarrow \tau_B = 1,77 \times 10^7 \frac{\text{N}}{\text{m}^2}$$

$$\tau_B = 17,7 \times 10^6 \frac{\text{N}}{\text{m}^2}$$

$$\tau_B = 17,7 \text{ MPa}$$

$$s_A = \frac{\tau_{adm}}{\tau} \Rightarrow s_A = \frac{105}{34,1} \Rightarrow s_A = 3,1$$

$$s_B = \frac{105}{17,7} \Rightarrow s_B = 5,9$$