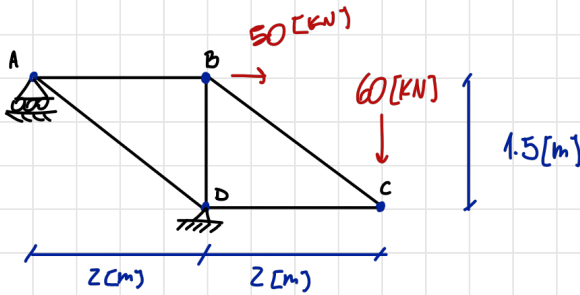
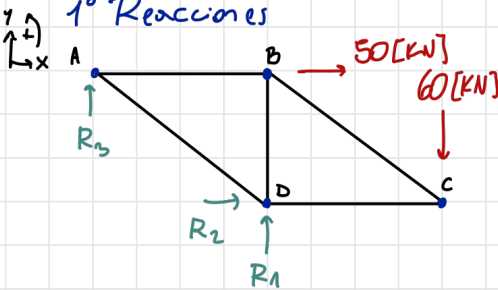


Control #1



1° Reacciones



$$\sum F_x = 0$$

$$R_2 = -50$$

$$\sum F_y = 0$$

$$R_3 + R_1 - 60 = 0$$

$$\sum M_D = 0$$

$$-60(2) - R_3(2) - 50(1.5) = 0 \quad (+2.0)$$

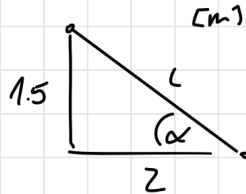
$$R_1 = 157.5 \text{ [kN]}$$

$$R_2 = -50 \text{ [kN]}$$

$$R_3 = -97.5 \text{ [kN]}$$

2° Esfuerzos internos → determinemos la fuerza de cada biela usando el método de los nodos

* Geometría

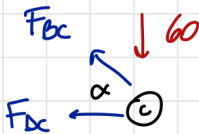


$$L = \sqrt{1.5^2 + 2^2} = 2.5 \text{ m}$$

$$\sin \alpha = \frac{1.5}{2.5}$$

$$\cos \alpha = \frac{2}{2.5}$$

Nodo C



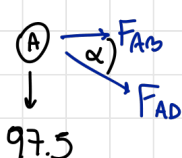
$$\hat{x}) -F_{DC} - F_{DC} \cos \alpha = 0$$

$$\hat{y}) -60 + F_{DC} \sin \alpha = 0$$

$$F_{DC} = 100 \text{ [kN]}$$

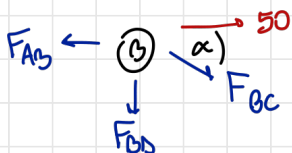
$$F_{DC} = -80 \text{ [kN]}$$

Nodo A



$$\begin{aligned} \sum \hat{x}) \quad F_{AB} + F_{AD} \cos \alpha &= 0 \\ \sum \hat{y}) \quad -97.5 - F_{AD} \sin \alpha &= 0 \end{aligned} \quad \left\{ \begin{aligned} F_{AB} &= 130 \text{ [kN]} \\ F_{AD} &= -162.5 \text{ [kN]} \end{aligned} \right.$$

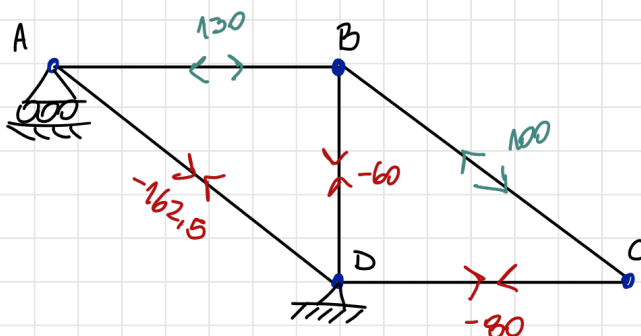
Nodo B



$$\begin{aligned} \sum \hat{x}) \quad -F_{AB} + F_{BC} \cos \alpha + 50 &= 0 \\ \sum \hat{y}) \quad -F_{BD} - F_{BC} \sin \alpha &= 0 \end{aligned}$$

$$F_{BD} = -60 \text{ [kN]}$$

Diagrama Axial [kN]



(+2.5)

Fibra más traccionada

$$\sigma = \frac{N}{A} = \frac{130 \text{ kN}}{466 \text{ mm}^2} = 0.279 \frac{\text{kN}}{\text{mm}^2}$$

$$0.6 (F_y) = 0.6 (250 \frac{\text{N}}{\text{mm}^2})$$

$$= 150 \frac{\text{N}}{\text{mm}^2} = 0.16 \frac{\text{kN}}{\text{mm}^2} < 0.279 \frac{\text{kN}}{\text{mm}^2}$$

$0.6 F_y > \sigma_t$ no se cumple

(+0.5)

Fibra más comprimida

$$\sigma_c = \frac{162.5 \text{ kN}}{466 \text{ mm}^2} = 0.349 \left(\frac{\text{kN}}{\text{mm}^2} \right)$$

$$< 0.216 \frac{\text{kN}}{\text{mm}^2} \text{ No cumple}$$

(+0.5)

Para que cumplan se debe buscar un perfil de mayor area (+0.5)