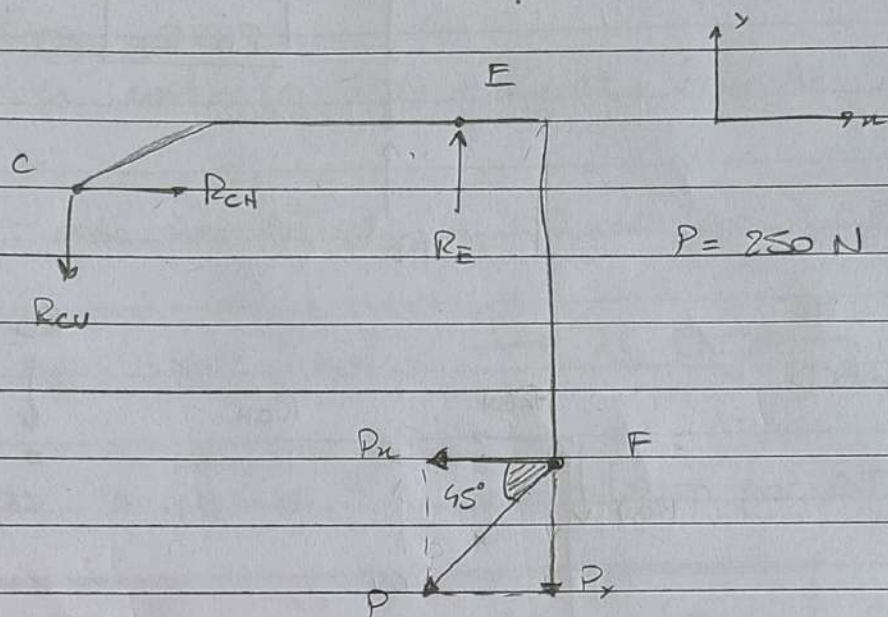


Ejercicio 1:

DCL CEF



Solamente reacción vertical en E porque DE es un elemento a 2 fuerzas.

$$\sum F_x = 0 \Leftrightarrow \boxed{P_x = R_{CH} = P \cdot \cos(45^\circ) = 176,8 \text{ N}} \quad (1)$$

$$\sum F_y = 0 \Leftrightarrow \boxed{R_{CV} + P_y = R_E} \quad (2)$$

$$\sum M_C = 0 \Leftrightarrow R_E \cdot 0,3 \text{ m} = P_x \cdot 0,2 \text{ m} + P_y \cdot 0,4 \text{ m}$$

$$\Rightarrow \boxed{R_E = 353,6 \text{ N}} \quad (3)$$

$$\Rightarrow (1), (3) \Rightarrow \boxed{R_{CV} = 176,8 \text{ N}} \quad (4)$$

Resumen:

$$R_{CH} = 176,8 \text{ N}$$

$$R_E = 353,6 \text{ N}$$

$$R_{CV} = 176,8 \text{ N}$$

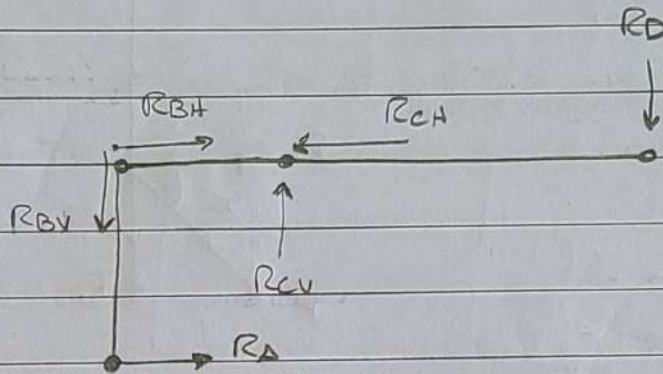
DCL DE

R_E

R_D

$$R_D = R_E \quad (5)$$

DCL ABCD



→ No hay R_{AV} por el tipo de vínculo.

$$\sum F_x = 0 \Leftrightarrow R_A + R_{BH} = R_{CH} \quad (6)$$

$$\sum F_y = 0 \Leftrightarrow R_D + R_{BV} = R_{CV} \quad (7)$$

$$\sum M_B = 0 \Leftrightarrow R_A \cdot 0,2m + R_{CV} \cdot 0,5m = R_D \cdot 0,4m \quad (8)$$

$$\Rightarrow R_A + R_{CH} = 176,8N$$

$$R_{BV} = -176,8N \checkmark$$

$$R_A = 618,8N \checkmark$$

$$\Rightarrow R_{BH} = -992,0N \checkmark$$

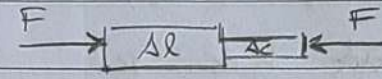
Flex

Papiro

Ejercicio 2.

Verifico si están en contacto $\Rightarrow \delta_{\text{temp Al}} + \delta_{\text{temp Ac}} > 0,5 \text{ mm}$

$$\Rightarrow \alpha_{\text{Al}} L_{\text{Al}} \Delta T + \alpha_{\text{Ac}} L_{\text{Ac}} \Delta T = 1,152 \times 10^{-3} \text{ m} > 0,5 \times 10^{-3} \text{ m} \checkmark$$

\Rightarrow Estado de equilibrio final: 

\Rightarrow Se comprimen por la fuerza F y se dilatan por ΔT

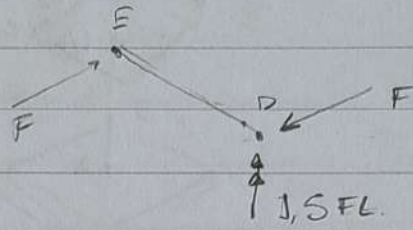
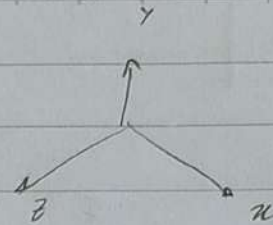
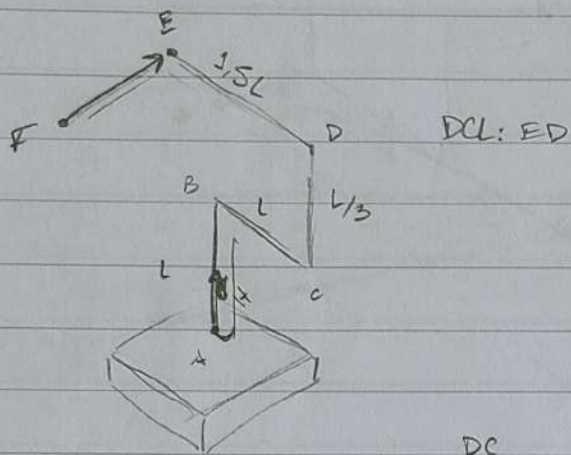
$$\Rightarrow \boxed{\delta = 0,5 \text{ mm} = \delta_{\text{TAAl}} - \delta_{\text{FAAl}} + \delta_{\text{TAc}} - \delta_{\text{FAc}}} \quad \text{CD}$$

$$\Rightarrow 0,5 \times 10^{-3} \text{ m} = \alpha_{\text{Al}} L_{\text{Al}} \Delta T - \frac{F L_{\text{Al}}}{E_{\text{Al}} A_{\text{Al}}} + \alpha_{\text{Ac}} L_{\text{Ac}} \Delta T - \frac{F L_{\text{Ac}}}{E_{\text{Ac}} A_{\text{Ac}}}$$

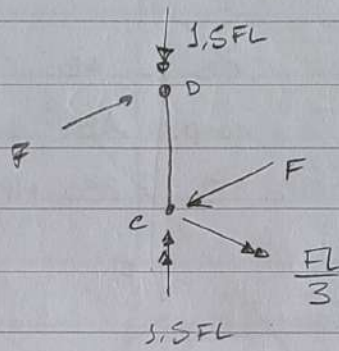
$$\Rightarrow 6,52 \times 10^{-4} = F \left(\frac{L_{\text{Al}}}{E_{\text{Al}} A_{\text{Al}}} + \frac{L_{\text{Ac}}}{E_{\text{Ac}} A_{\text{Ac}}} \right) \Rightarrow \boxed{F = 229 \text{ kN}} \\ \boxed{\sigma_{\text{Al}} = 127 \text{ MPa}}$$

$$1,83 \times 10^{-9} + 1 \times 10^{-9} = 2,83 \times 10^{-9}$$

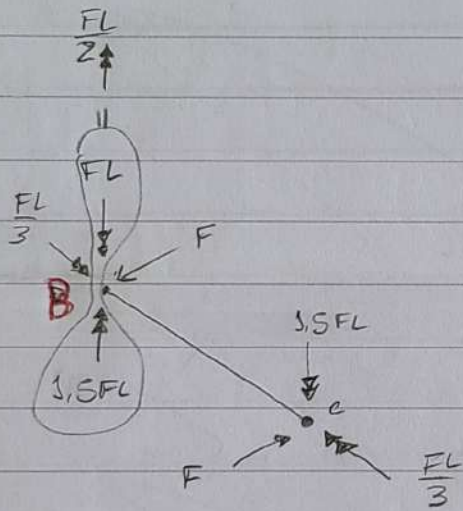
3



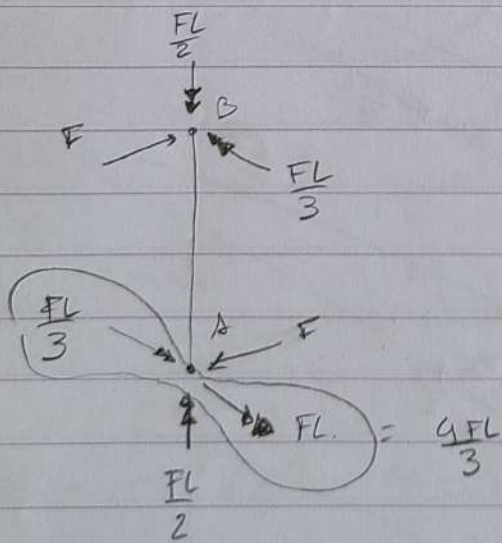
DC



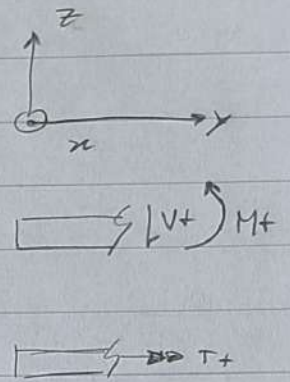
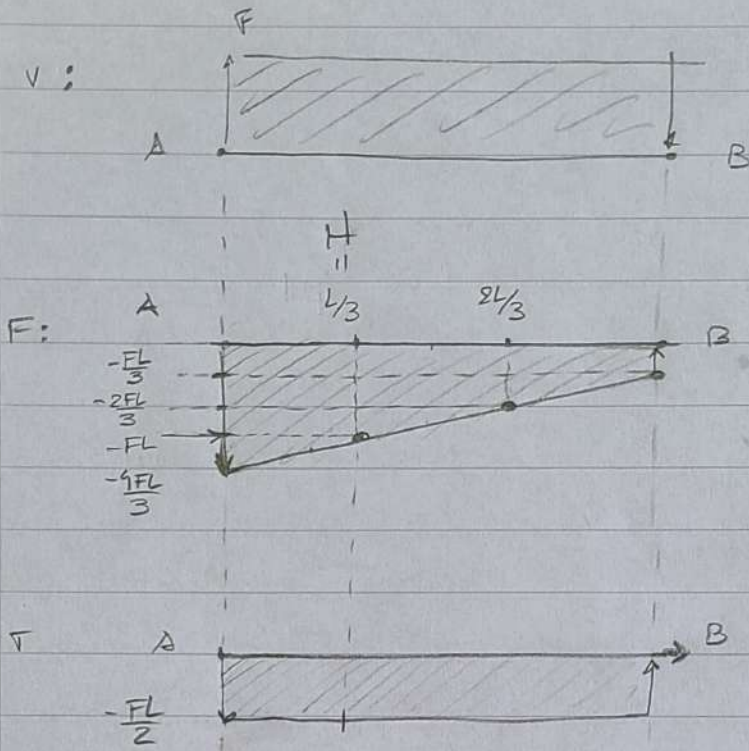
CB



AB



Diagramas:



$$F = 10 \text{ kN}, \quad d = 80 \text{ mm}$$

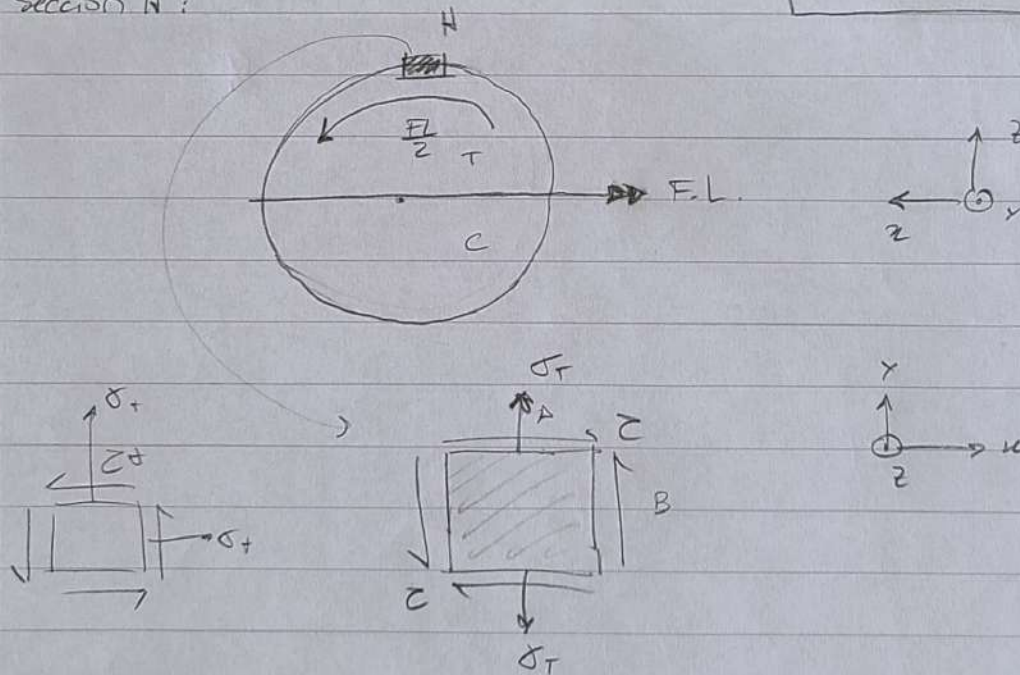
$$I = \frac{\pi R^4}{4} = 2,01 \times 10^{-6}$$

$$J = \frac{\pi R^4}{2} = 4,02 \times 10^{-6}$$

$$\sigma_T = \frac{M \cdot c}{I} = 77,6 \text{ MPa}$$

$$\tau = \frac{T \cdot r}{J} = 19,9 \text{ MPa}$$

Sección H:



$$\tau_H = \sqrt{\left(\frac{\sigma_T}{2}\right)^2 + \tau^2} = 44,5 \text{ MPa}$$

$$FS_{3k} = \frac{\sigma_y}{2\tau_H} = 2,25$$

