

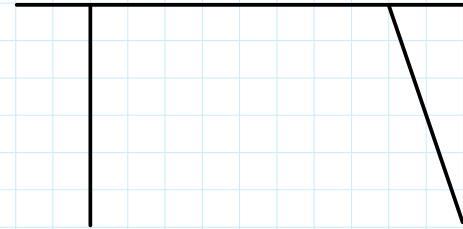
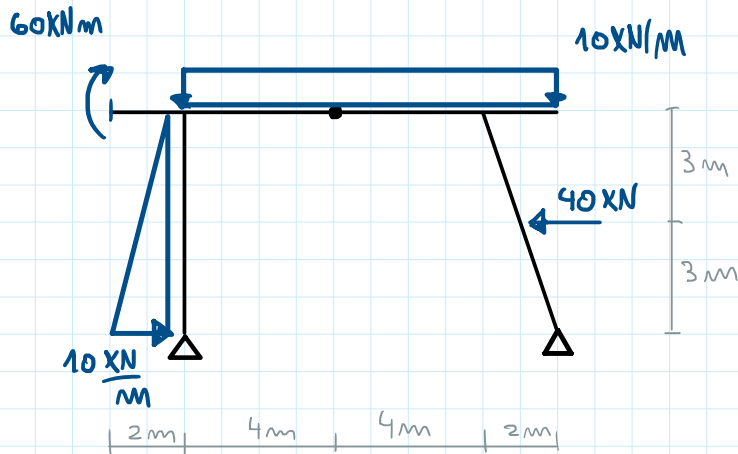
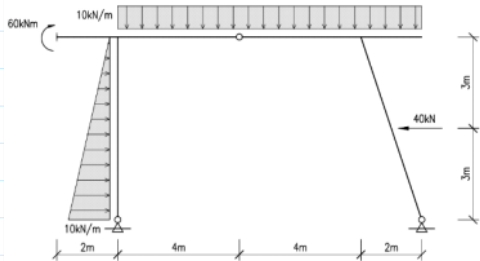
Ejercicio 2.2

lunes, 28 de abril de 2025 16:35

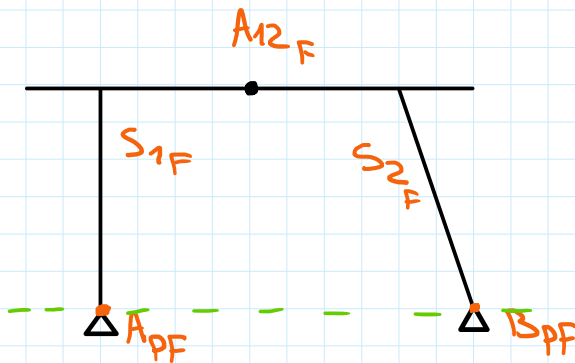
Para las siguientes estructuras planas, se pide:

1. Análisis cinemático;
2. Cálculo de reacciones de vínculo externo;
3. Diagramas de esfuerzos característicos (dibujar los diagramas en la estructura completa);
4. Equilibrio de todos los nudos;
5. Hacer el despiece de la estructura mostrando que cada chapa está en equilibrio
6. Determinar el valor y la posición del momento flector de dimensionamiento.

Estructura 2



AC

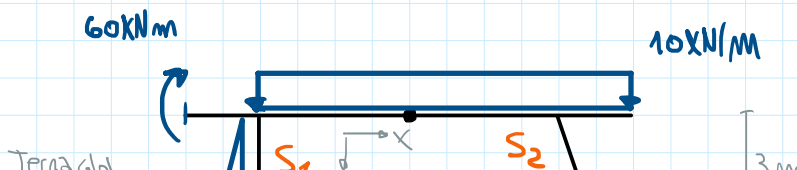


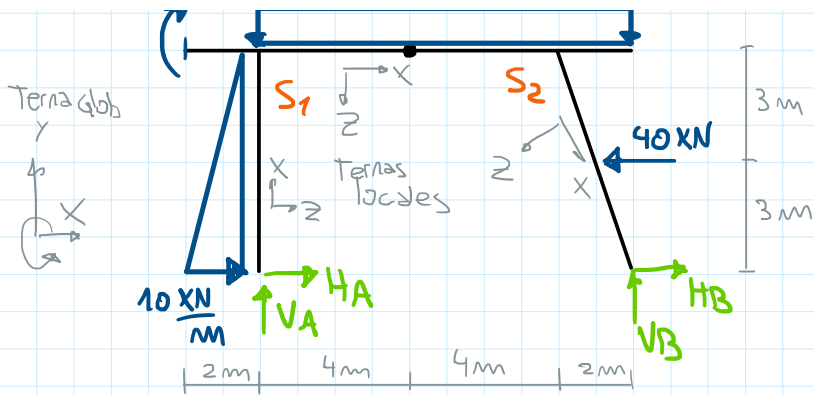
A y B son PF
A12 Articulación no alheada } Arco Triartic. $\Rightarrow A12F$

A $\wedge$ A12 $\in S1 \Rightarrow S1F$
B $\wedge$ A12 $\in S2 \Rightarrow S2F$

GL = CV
 $n+2 = \Delta + \Delta$
 $4 = 4 \Rightarrow ISO$

Reacciones





$$\sum M_A^G = V_A \cdot 0 + H_A \cdot 0 + H_B \cdot 0 + V_B \cdot 10m - \left(10 \frac{\text{kN}}{\text{m}} \cdot 6m / 2\right) \cdot 2m - 60 \text{ kNm} - 10 \frac{\text{kN}}{\text{m}} \cdot 10m \cdot 5m + 40 \text{ kN} \cdot 3m = 0$$

$$V_B = 50 \text{ kN} \quad \downarrow$$

$$\sum F_V = V_A + V_B - 10 \frac{\text{kN}}{\text{m}} \cdot 10m = 0$$

$$V_A + 50 \text{ kN} - 100 \text{ kN} = 0$$

$$V_A = 50 \text{ kN} \quad \downarrow$$

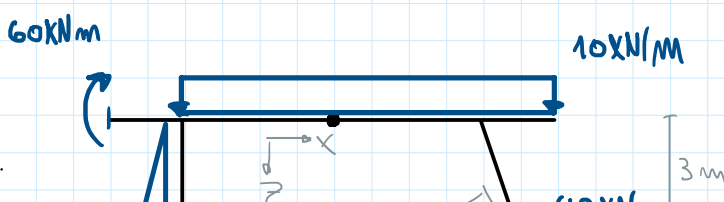
$$\sum M_{M2}^{S2} = \underbrace{V_B}_{50 \text{ kN}} \cdot 6m + H_B \cdot 6m - 40 \text{ kN} \cdot 3m - 10 \frac{\text{kN}}{\text{m}} \cdot 6m \cdot 3$$

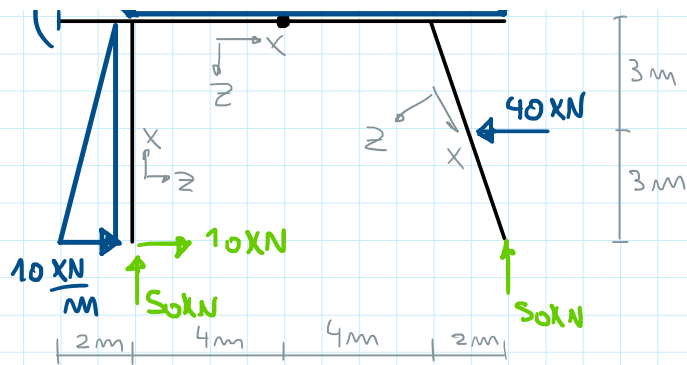
$$H_B = 0 \text{ kN} \quad \downarrow$$

$$\sum F_H = H_A + \underbrace{H_B}_0 - 40 \text{ kN} + 10 \frac{\text{kN}}{\text{m}} \cdot 6m / 2$$

$$H_A = 10 \text{ kN} \quad \downarrow$$

DCL





Diagramas

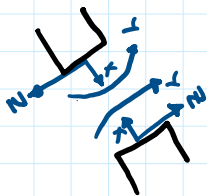
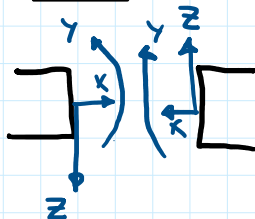
Rel. D.F

$$\frac{dN}{dx} = -q_x$$

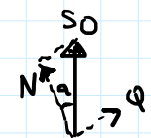
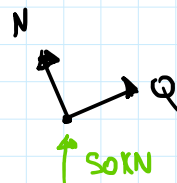
$$\frac{dQ_z}{dx} = -q_z$$

$$\frac{dM_z}{dx} = Q_y$$

Caras



Descomposición de Fuerzas

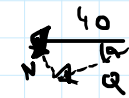
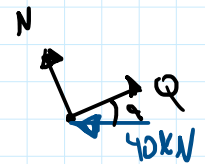


$$N = 50 \text{ kN} \cdot \cos \alpha$$

$$N = 47,4 \text{ kN}$$

$$Q = 50 \text{ kN} \cdot \sin \alpha$$

$$Q = 15,8 \text{ kN}$$

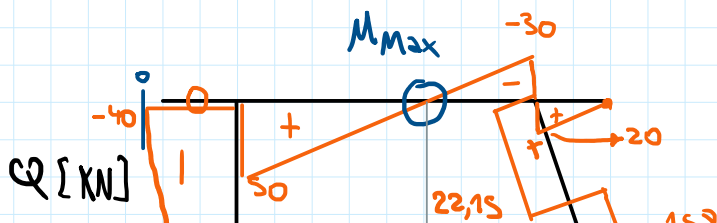
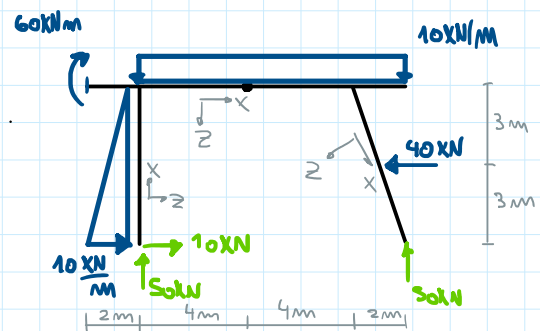
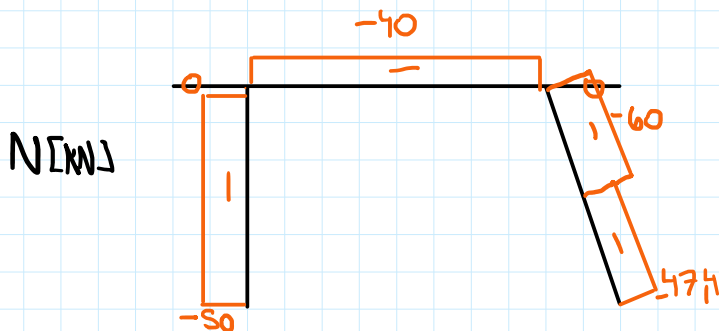


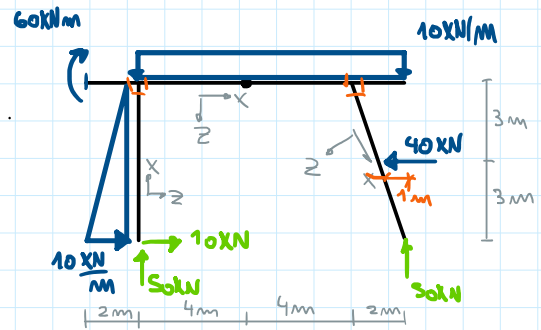
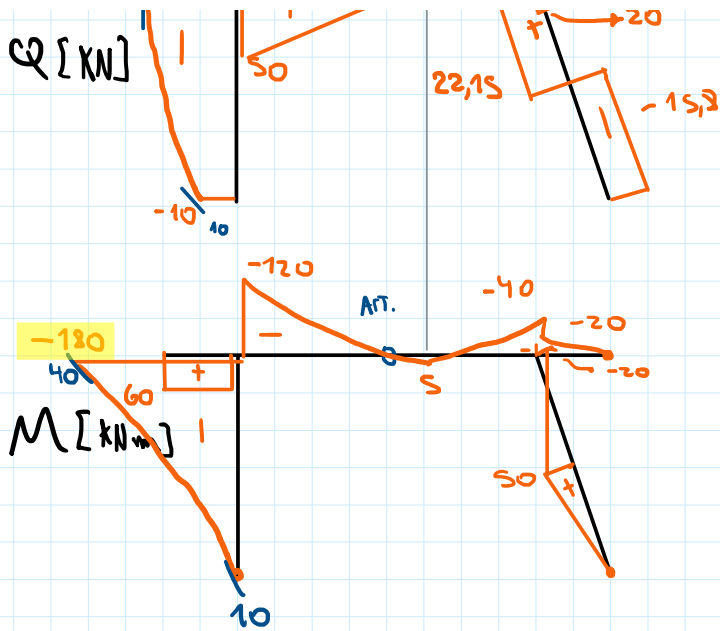
$$N = 40 \text{ kN} \cdot \tan \alpha$$

$$N = 12,6 \text{ kN}$$

$$Q = 40 \text{ kN} \cdot \cos \alpha$$

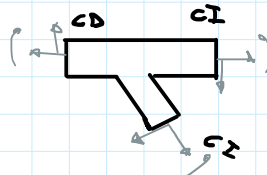
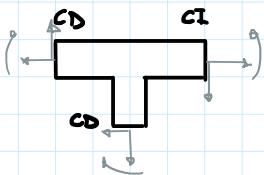
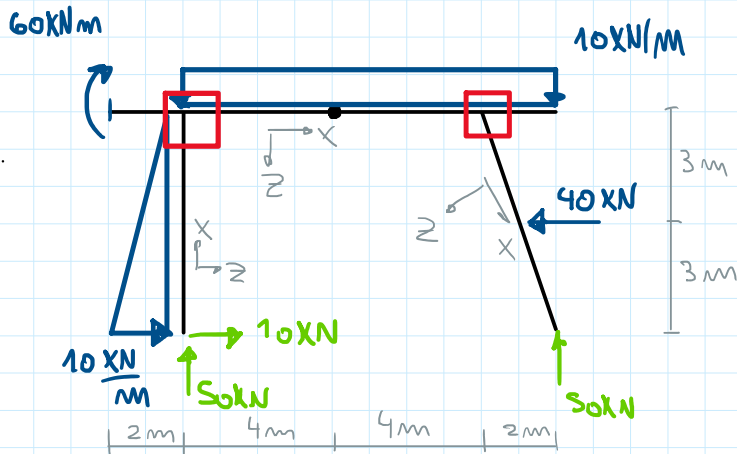
$$Q = 37,95 \text{ kN}$$



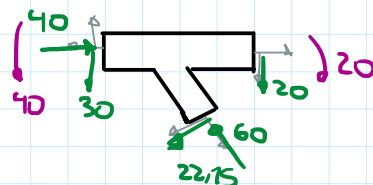
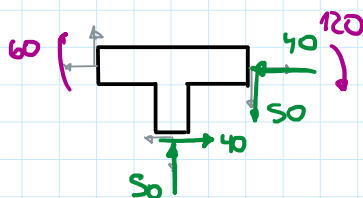


Momento Flector de Dimensionamiento

Equilibrio de Nudos

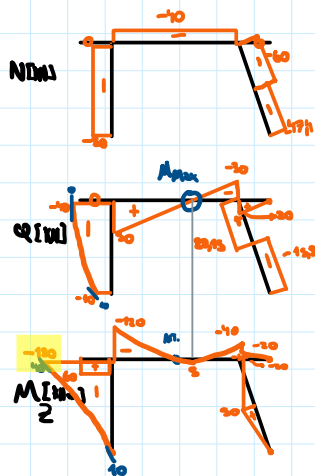


Fuerzas kN
Momentos kNm



Sol

180



22,15'

20

De piece

