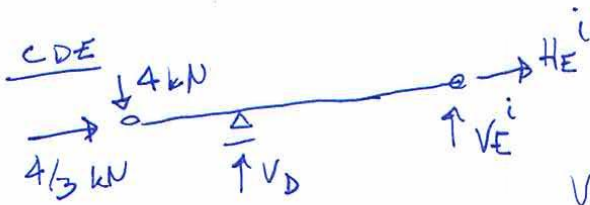


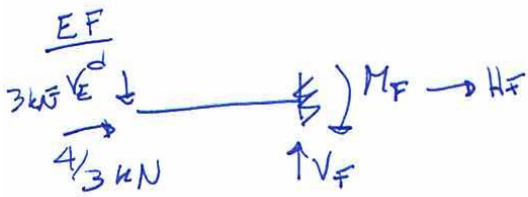
$$V_c = 4 \text{ kN} \quad H_B = \frac{4}{3} \text{ kN}$$

$$H_c = -\frac{4}{3} \text{ kN}$$



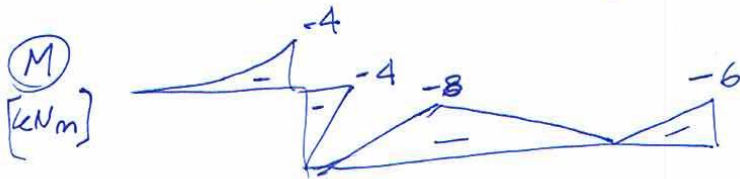
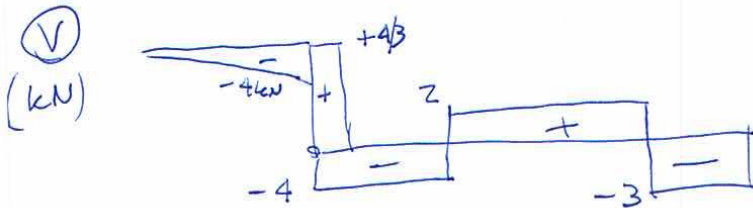
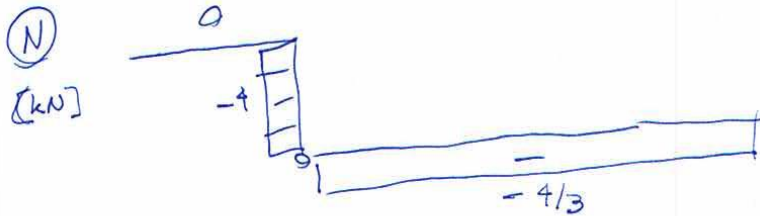
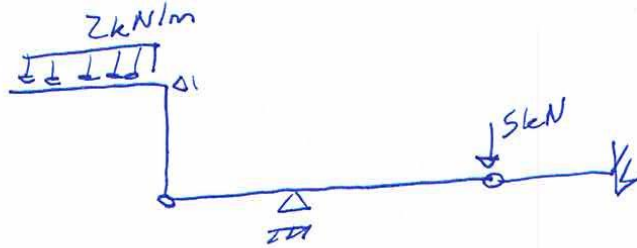
$$H_E^i = -\frac{4}{3} \text{ kN} \quad V_D = 6 \text{ kN}$$

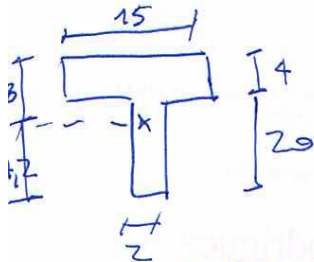
$$V_E^i = 2 \text{ kN}$$



$$V_F = 3 \text{ kN} \quad M_F = 6 \text{ kN}\cdot\text{m}$$

$$H_F = -\frac{4}{3} \text{ kN}$$





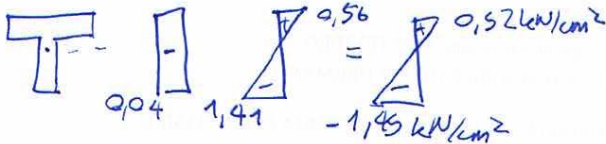
$A = 100 \text{ cm}^2$

$$Y_G = \frac{15 \text{ cm} \times 4 \text{ cm} \times 22 \text{ cm} + 20 \text{ cm} \times 2 \text{ cm} \times 10 \text{ cm}}{15 \text{ cm} \times 4 \text{ cm} + 20 \text{ cm} \times 2 \text{ cm}} = 17,2 \text{ cm}$$

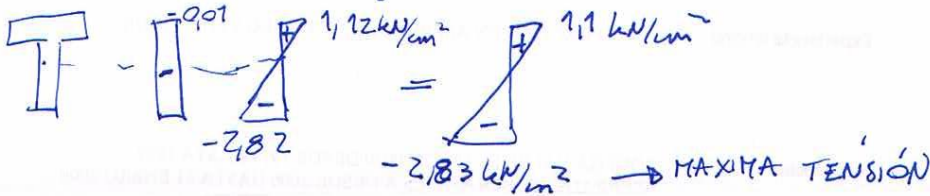
$$I_Z = \frac{2 \times 20^3}{12} + 40 \text{ cm}^2 (17,2 - 10)^2 + \frac{15 \times 4^3}{12} + 60 \text{ cm}^2 (22 - 17,2)^2$$

$$I_Z = 1333 \text{ cm}^4 + 2074 \text{ cm}^4 + 80 + 1382 \text{ cm}^4 = 4869 \text{ cm}^4$$

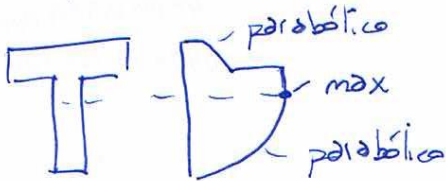
VERIFICO SECCIÓN B CON  $N = -4 \text{ kN}$   $M = -4 \text{ kNm}$



SECCIÓN D  $N = -\frac{4}{2} \text{ kN}$   $M = -8 \text{ kNm}$



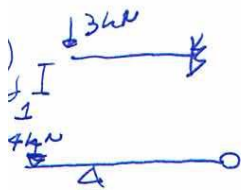
$|V_{max}| = 4 \text{ kN}$



$$\tau_{max} = \frac{VM}{I_z \cdot b} \quad \text{con } \eta = 17,2 \times 2 \times \frac{17,2}{2}$$

$$M = 296 \text{ cm}^3$$

$$\tau_{max} = \frac{4 \text{ kN} \cdot 296 \text{ cm}^3}{4869 \text{ cm}^4 \cdot 2 \text{ cm}} = 0,122 \text{ kN/cm}^2$$



$$d_1 = \frac{3 \times 200^3}{3 \times 2000 \times 4869} = 9,821 \text{ cm}$$

$$d_2 = \frac{4 \times 200^3}{3 \times 2000 \times 4869} = 1,099 \text{ cm}$$

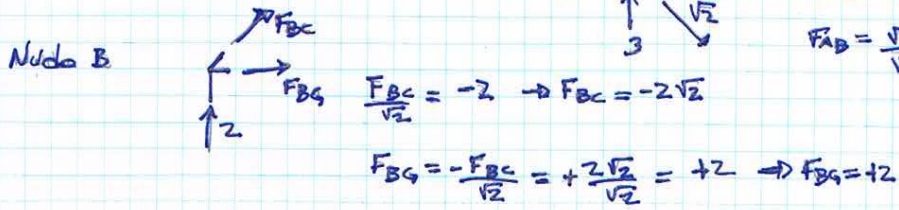
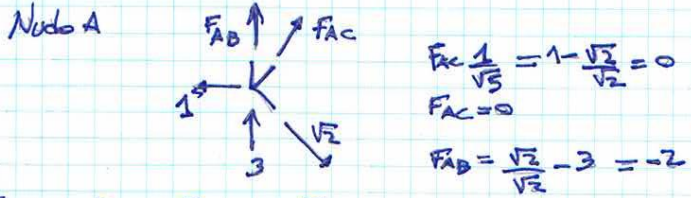
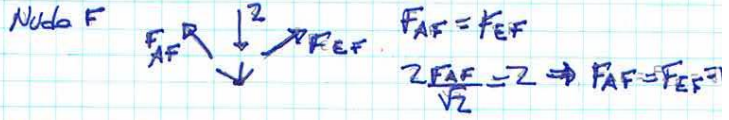
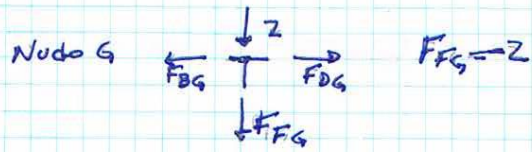
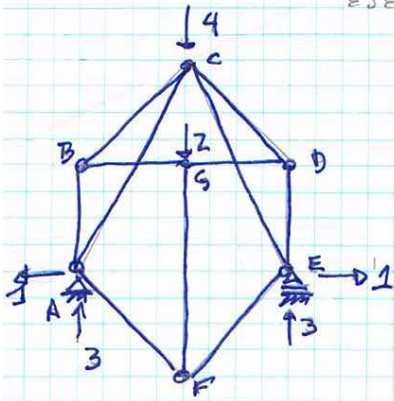
$$\theta_D = \frac{800 \times 400}{3 \times 2000 \times 4869} = 1,095 \times 10^{-2} \text{ rad}$$



$$\Delta_{TOT} = d_2 + \theta_D \cdot L_{CD} \cdot \frac{d_1}{L_{DE}} \cdot L_{CD} = 2,875 \text{ cm}$$

hacia abajo

EJERCICIO 2



BARRA	Fuerza	L	EJ	$\Delta l$ (ML/EJ)
AB=ED	-2	1	1	-2
BC=CD	$-2\sqrt{2}$	$\sqrt{2}$	1	-4
BG=DG	+2	1	1	+2
AF=EF	$\sqrt{2}$	$\sqrt{2}$	1	2
AC=CE	0	$\sqrt{5}$	1	0
FG	-2	2	1	-4