

BN A:

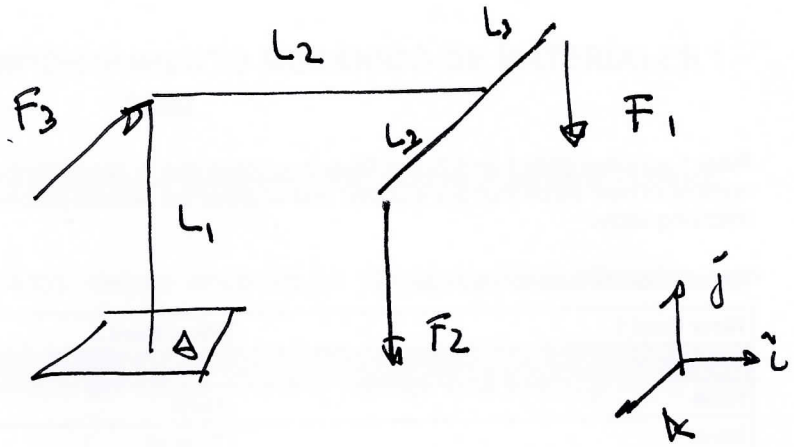
DIRECT

$F_1 + F_2$ (compression)

$= 2,5 \text{ kN}$

TORSION

NULL



CONSTANTE ($-k$)

$F_3 = 1 \text{ kN}$

MOMENT (\hat{i})

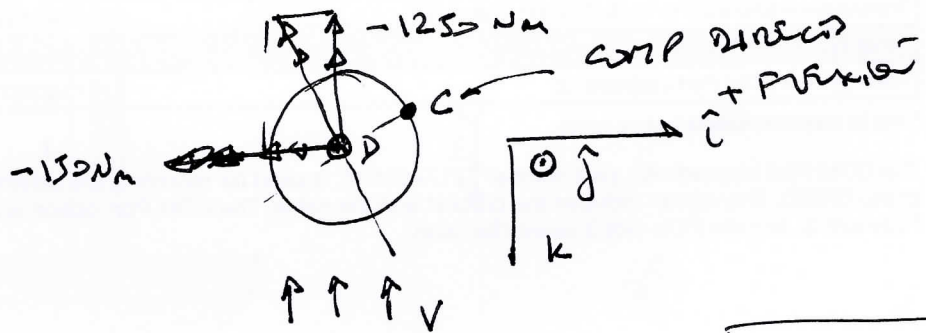
$-F_3 \times L_1 + (F_2 - F_1) L_3 = -150 \text{ Nm}$

CONSTANTE (\hat{i})

MOMENT (\hat{k})

NULL

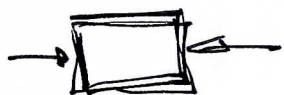
$-(F_1 + F_2) \cdot L_2 = -1250 \text{ Nm}$



BN C

$\sigma_x = -\frac{D}{A} - \frac{M \phi/2}{I}$

$M = \sqrt{150^2 + 1250^2} = 1260$



$= -0,50 \text{ MPa} - 25,1 \text{ MPa} = -25,6 \text{ MPa}$

$\rightarrow \sigma_1 = \sigma_2 = 0 \quad \sigma_3 = -25,6 \text{ MPa} \quad z_{max} = 12,3 \text{ MPa}$

$$L = 1 \text{ m}$$

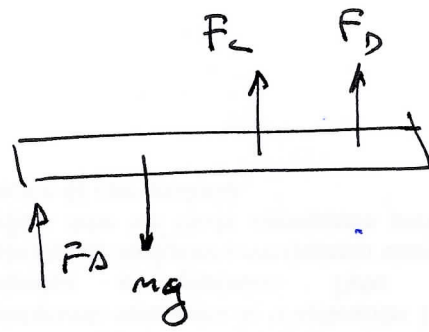
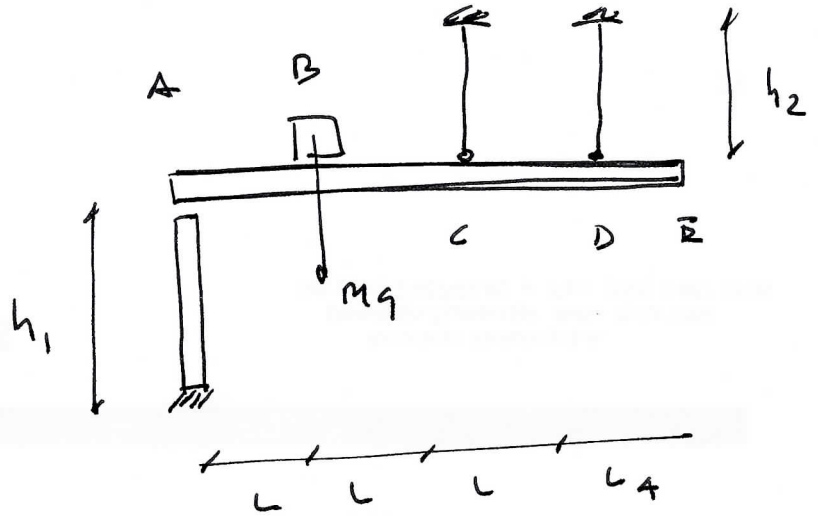
$$L_4 = 0,5 \text{ m}$$

$$h_1 = 2 \text{ m}$$

$$h_2 = 1 \text{ m}$$

$$A_V = 4 \text{ cm}^2 \quad E_V = 200 \text{ GPa}$$

$$A_C = 1 \text{ cm}^2 \quad E_C = 100 \text{ GPa}$$



$$* F_A + F_C + F_D = mg$$

$$* mg = 2F_C + 3F_D$$

$$* \Delta_A = \frac{F_D h_1}{E_V A_V} \quad (\Delta_{\text{vert}})$$

$$* F_C = \frac{F_C h_2}{E_C A_C} \quad (\Delta_{\text{horiz}})$$

$$* \Delta_D = \frac{F_D h_2}{E_C A_C} \quad (\Delta_{\text{horiz}})$$

$$\frac{(\Delta_C - \Delta_A)}{(\Delta_D - \Delta_A)} = \frac{2}{3} \quad \underline{\underline{\text{MOR}}}$$

$$3(\Delta_C - \Delta_A) = 2(\Delta_D - \Delta_A)$$

$$3\Delta_C - 2\Delta_D - \Delta_A = 0$$

$$\underline{\underline{6 \times C}} \left\{ \begin{aligned} F_C &= \frac{mg - 3F_D}{2} \\ F_A &= mg - F_D - F_C = \frac{mg}{2} + \frac{F_D}{2} \\ 3F_C - 2F_D &= F_A \cdot \frac{h_1}{h_2} \cdot \frac{E_C A_C}{E_V A_V} = F_D \cdot \kappa \quad \kappa = 0,25 \end{aligned} \right.$$

$$\rightarrow F_D \cdot \left(-2 - \frac{9}{2} - \frac{\kappa}{2} \right) = mg \cdot \left(\frac{\kappa}{2} - \frac{3}{2} \right) \rightarrow$$

$$F_D = mg \frac{(3-\alpha)}{13+\alpha} = mg \times 0,208.$$

$$F_C = \frac{mg}{2} - \frac{3}{2} F_D = mg \times 0,189.$$

$$F_A = \frac{mg}{2} + \frac{F_D}{2} = mg \times 0,604$$

$$\delta_D = 0,00010m \quad \delta_C = 0,00009m \quad \delta_A = 0,00007m.$$

$$\delta_R = \delta_A + (\delta_C - \delta_A) \times \frac{3,5}{2} = 0,000107m.$$