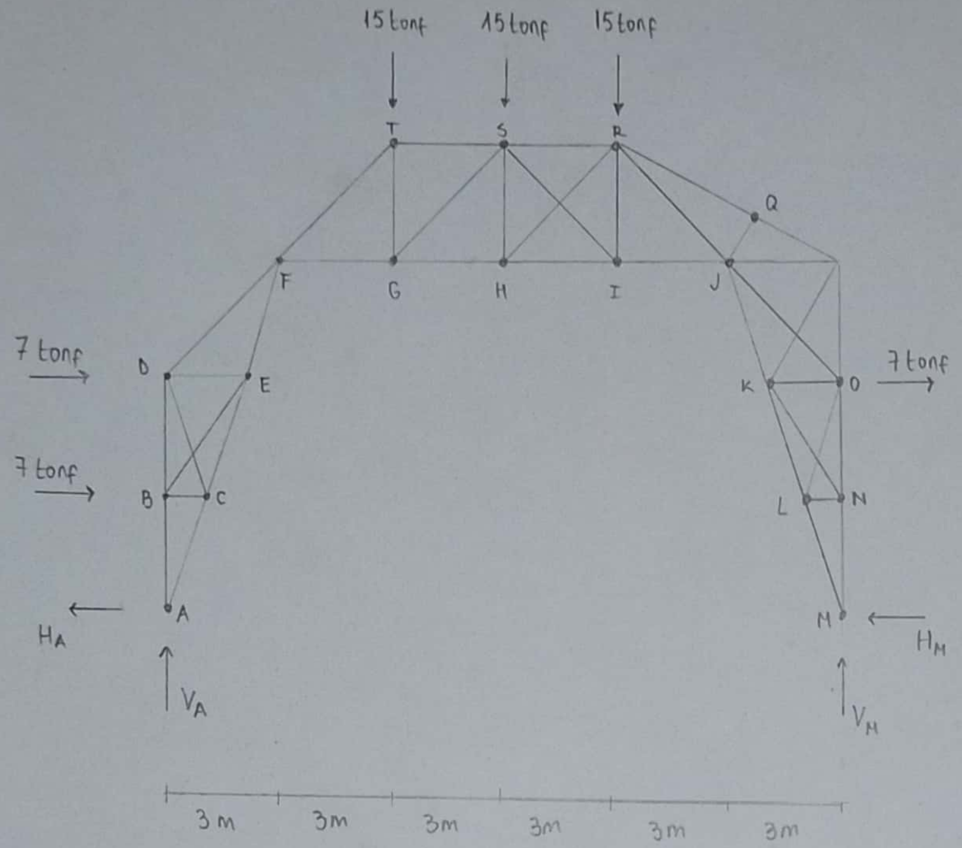
1. Cálculo de reacciones

Pauta P2 Ejercicio 4.



$$\Sigma M_A = 0 : -7\cdot 3 - 7\cdot 6 - 15\cdot 6 - 15\cdot 9 - 15\cdot 12 - 7\cdot 6 + 18 V_M = 0$$

$$\Rightarrow \boxed{V_M = \frac{85}{3} \text{ [tonf]} \sim 28{,}33 \text{ [tonf]}}$$

$$\Sigma F_y = 0 : -15 - 15 - 15 + V_A + V_M = 0 \Rightarrow V_A = 45 - V_M \Rightarrow \boxed{V_A = \frac{50}{3} \text{ [tonf]} \sim 16{,}67 \text{ [tonf]}}$$

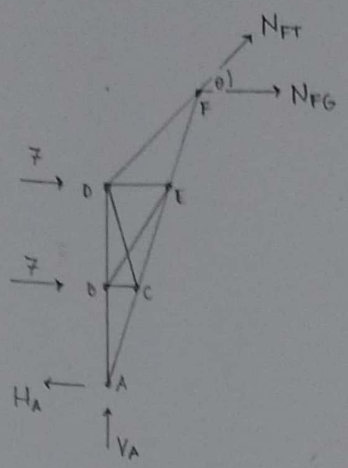
Considerando la rótula global en F, se tiene:

$$\Sigma M_F^{izq} = 0 : 7\cdot 3 + 7\cdot 6 - 3V_A - 9H_A = 0 \Rightarrow \boxed{H_A = 13/9 \text{ [tonf]}} \sim 1{,}44 \text{ [tonf]}$$

Finalmente

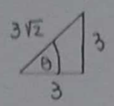
$$\Sigma F_H = 0 : 7 + 7 + 7 - H_M - H_A = 0 \Rightarrow H_M = 21 - H_A \Rightarrow \boxed{H_M = \frac{176}{9} \text{ [tonf]}} \sim 19{,}56 \text{ [tonf]}$$

Utilizando el método de las secciones, se tiene:



De la geometría del problema se tiene que $\theta = 45°$

ΔFGT



$\Rightarrow \cos\theta = \sin\theta = \frac{\sqrt{2}}{2}$

Luego

$$\sum F_y = 0 : N_{FT}\left(\frac{\sqrt{2}}{2}\right) + V_A = 0$$

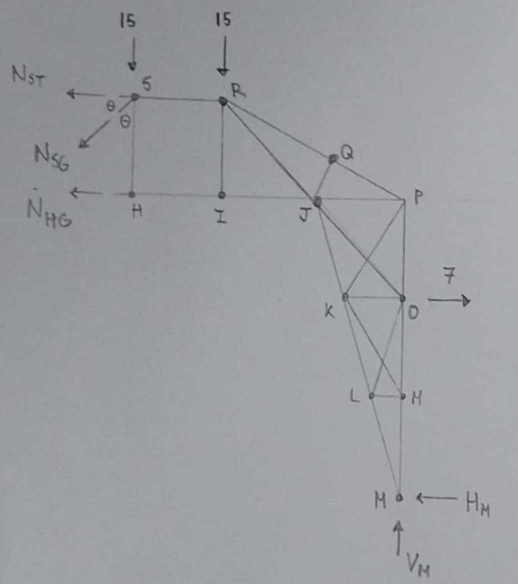
$$\Rightarrow \boxed{N_{FT} = -\frac{50\sqrt{2}}{3}\ [\text{tonf}] \sim -23{,}57\ [\text{tonf}]}$$

$$\sum F_x = 0 : 7 + 7 - H_A + N_{FT}\left(\frac{\sqrt{2}}{2}\right) + N_{FG} = 0$$

$$\Rightarrow \boxed{N_{FG} = \frac{37}{9}\ [\text{tonf}] \sim 4{,}11\ [\text{tonf}]}$$

Acá podian utilizan el método de los nudos en el nudo T y luego en el G, ó usan nuevamente el método de las secciones.

- Método de las secciones:



$$\sum M_S = 0 : -15 \cdot 3 + 7 \cdot 6 - 12 H_M + 9 V_M - 3 N_{HG} = 0$$

$$\Rightarrow \boxed{N_{HG} = \frac{52}{9}\ [\text{tonf}] \sim 5{,}78\ [\text{tonf}]}$$

$$\sum F_y = 0 : -15 - 15 - N_{SG}\left(\frac{\sqrt{2}}{2}\right) + V_M = 0$$

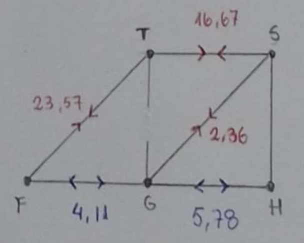
$$\Rightarrow \boxed{N_{SG} = -\frac{5\sqrt{2}}{3}\ [\text{tonf}] \sim -2{,}36\ [\text{tonf}]}$$

$$\sum F_x = 0 : -N_{ST} - N_{SG}\left(\frac{\sqrt{2}}{2}\right) - N_{HG} + 7 - H_M = 0$$

$$\Rightarrow \boxed{N_{ST} = -\frac{50}{3}\ [\text{tonf}] \sim -16{,}67\ [\text{tonf}]}$$

A modo de resumen, se tiene:

$N(x)$ [tonf]:



- tracción
- compresión