84.02 Estabilidad I
64.11 Estabilidad I B

Diagrama de Características Estructura Espacial

Universidad de Buenos Aires - Facultad de Ingeniería
Departamento de Estabilidad

Estructura Plana con cargas fuera del plano:

- GL: 6
- Diagramas: Normal, Corte Z, Corte Y. Torsión, Momento Y, Momento Z.

Estructura Espacial:

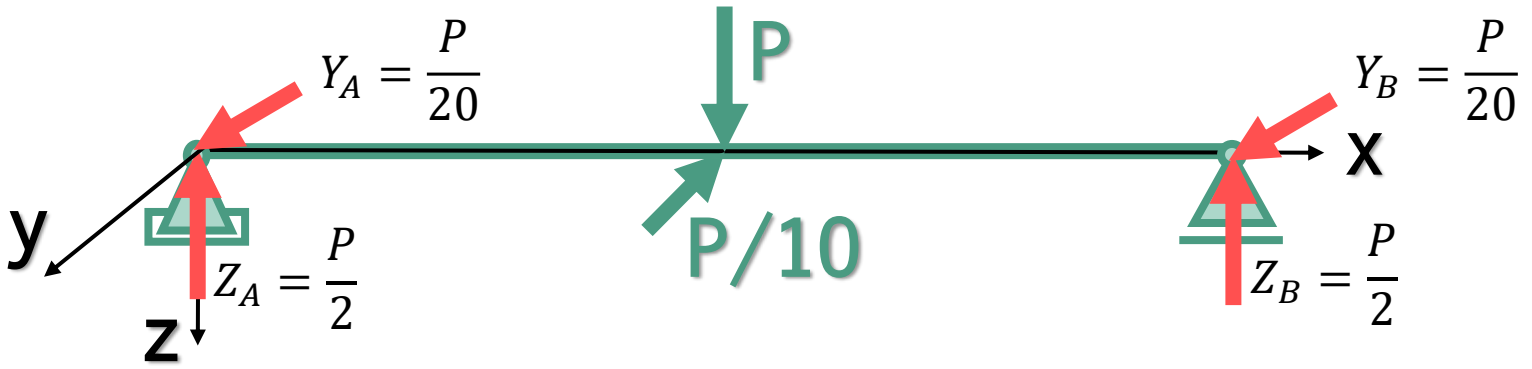
- GL: 6
- Diagramas: Normal, Corte Z, Corte Y. Torsión, Momento Y, Momento Z.

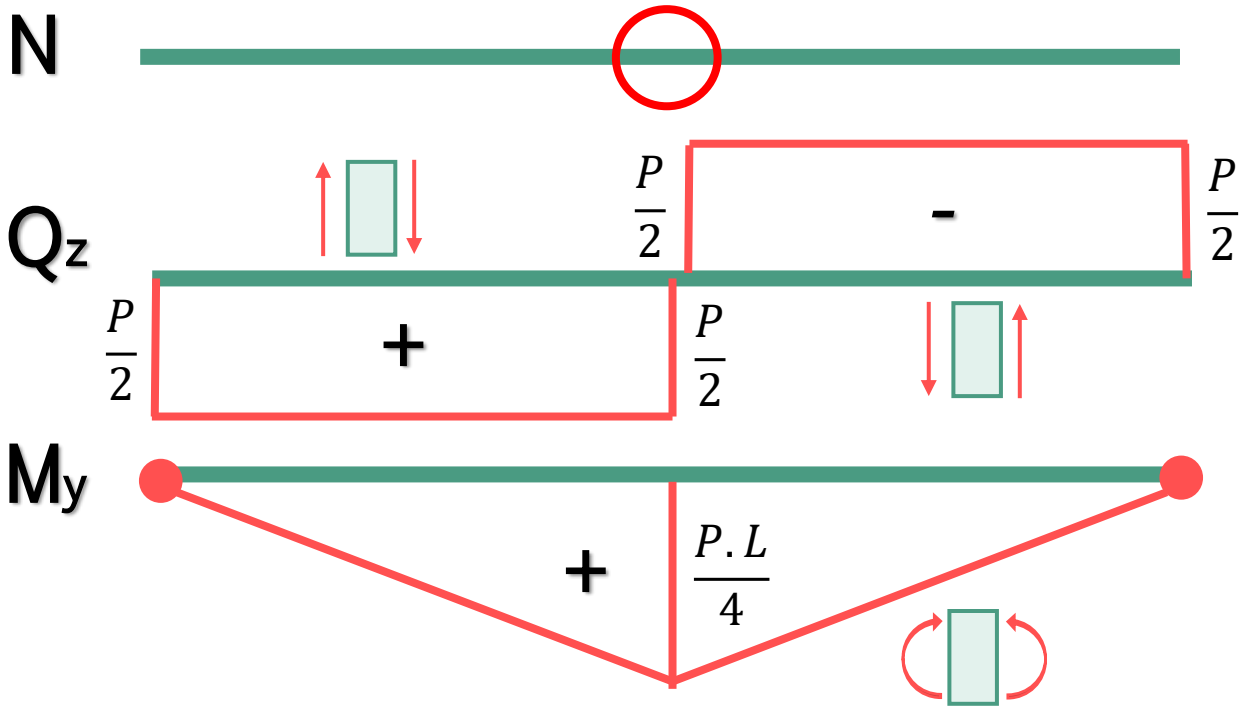
Relaciones diferenciales:

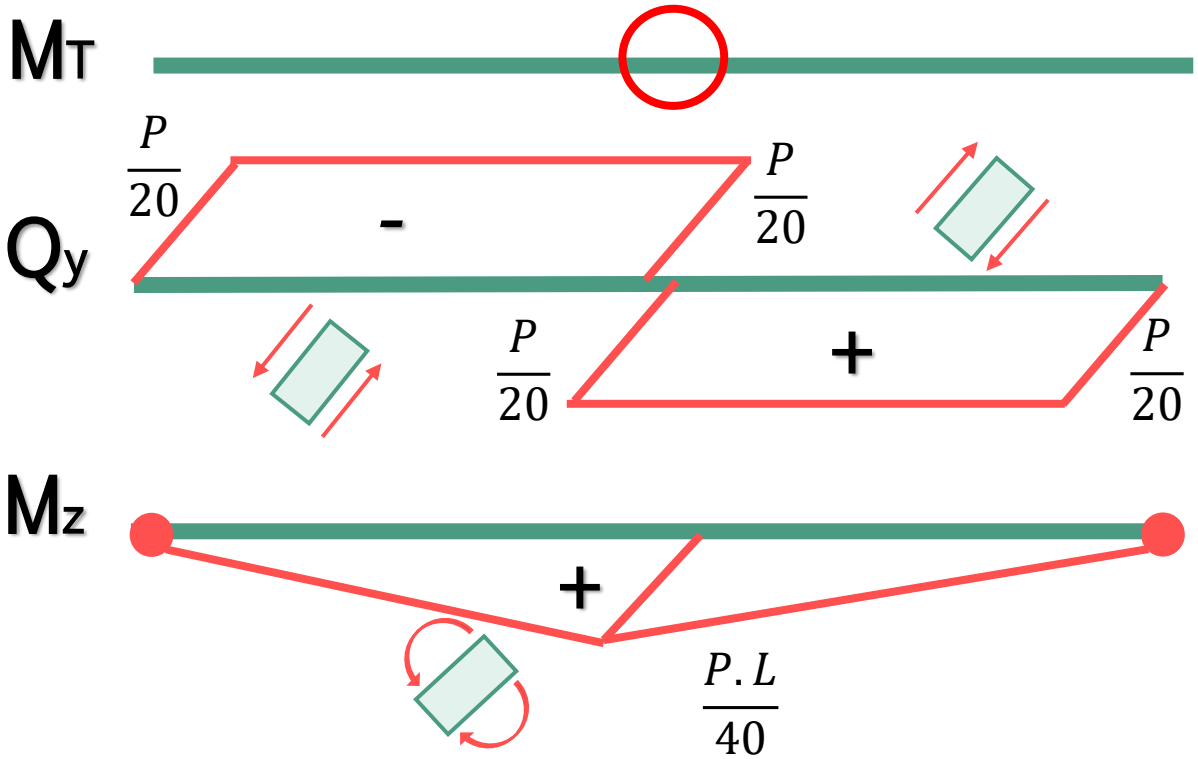
$$\frac{dN(x)}{dx} = -q_x(x) \qquad \frac{dM_T(x)}{dx} = -m_x(x)$$

$$\frac{dQ_z(x)}{dx} = -q_z(x) \qquad \frac{dQ_y(x)}{dx} = -q_y(x)$$

$$\frac{dM_y(x)}{dx} = Q_z(x) \qquad \frac{dM_z(x)}{dx} = -Q_y(x)$$


$Y_A = \frac{P}{20}$
P
$Y_B = \frac{P}{20}$
x
y
P/10
$Z_A = \frac{P}{2}$
$Z_B = \frac{P}{2}$
z


N
Qz
$\frac{P}{2}$
$\frac{P}{2}$
-
$\frac{P}{2}$
+
$\frac{P}{2}$
My
+
$\frac{P.L}{4}$


MT
Qy
$\frac{P}{20}$
-
$\frac{P}{20}$
$\frac{P}{20}$
+
$\frac{P}{20}$
Mz
+
$\frac{P.L}{40}$

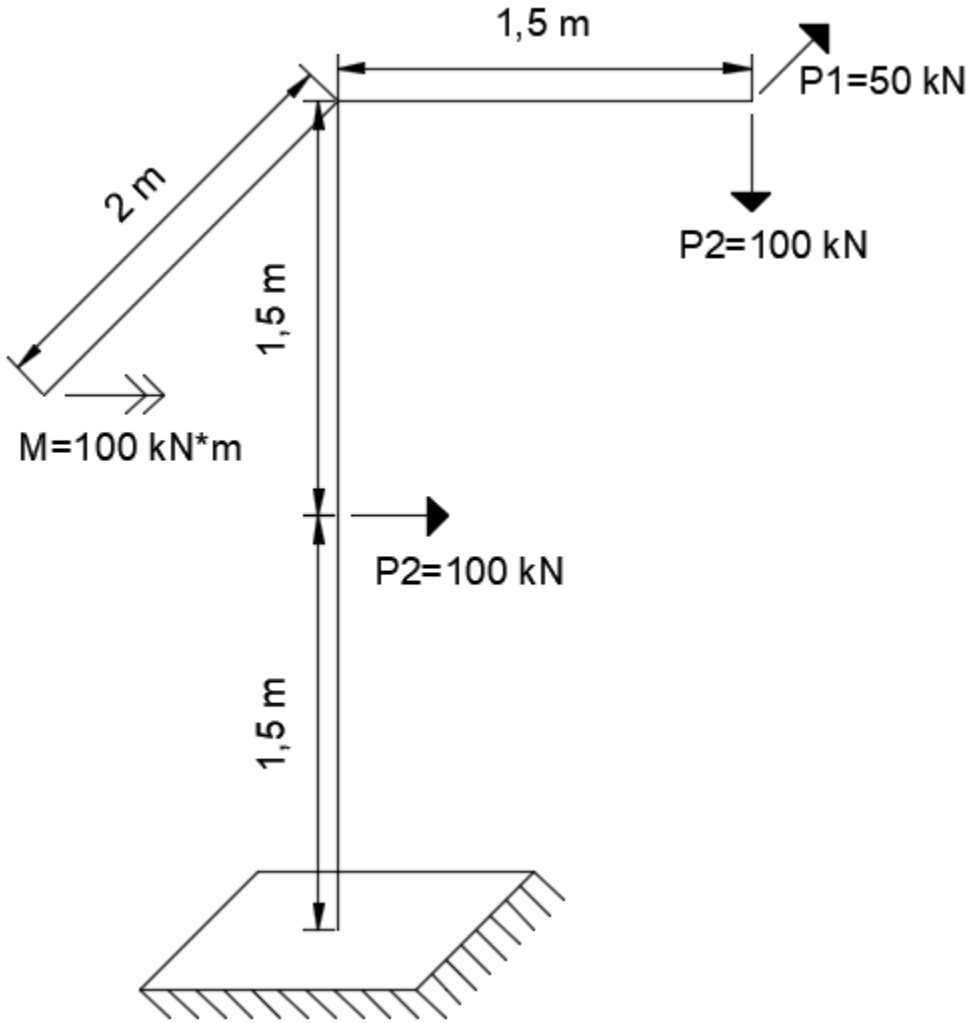
Enunciado:

Para la siguiente figura se pide:

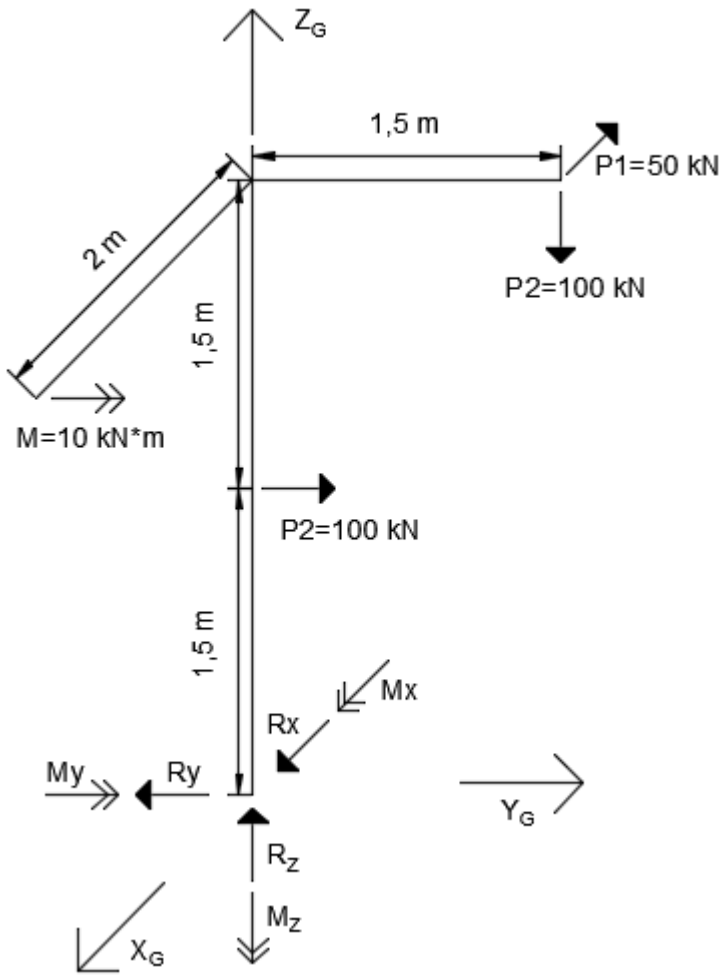
1- Análisis cinemático.

2- Cálculo de reacciones de vínculo externo.

3- Diagrama de esfuerzos característicos.



Reacciones de vínculo externo



$$\sum F_x = 0 \rightarrow -50\ kN + Rx = 0 \rightarrow Rx = 50\ kN$$

$$\sum F_y = 0 \rightarrow 100\ kN - Ry = 0 \rightarrow Ry = 100\ kN$$

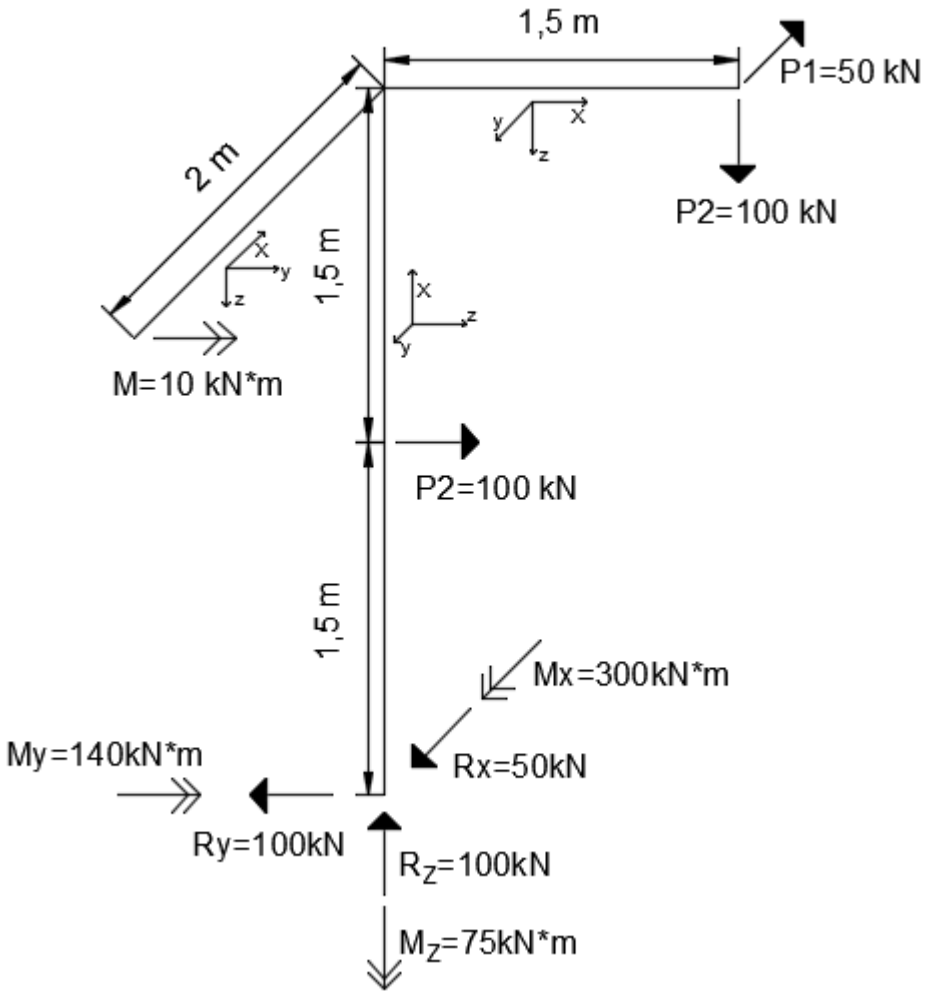
$$\sum F_z = 0 \rightarrow -100\ kN + Rz = 0 \rightarrow Rz = 100\ kN$$

$$\sum Mx = 0 \rightarrow -100\ kN * 1,5\ m - 100\ kN * 1,5\ m + Mx = 0 \rightarrow Mx = 300\ kN * m$$

$$\sum My = 0 \rightarrow -50\ kN * 3\ m + 10\ kN * m + My \rightarrow My = 140\ kN * m$$

$$\sum Mz = 0 \rightarrow 50\ kN * 1,5\ m - Mz = 0 \rightarrow Mz = 75\ kN * m$$

Diagrama de esfuerzo normal:



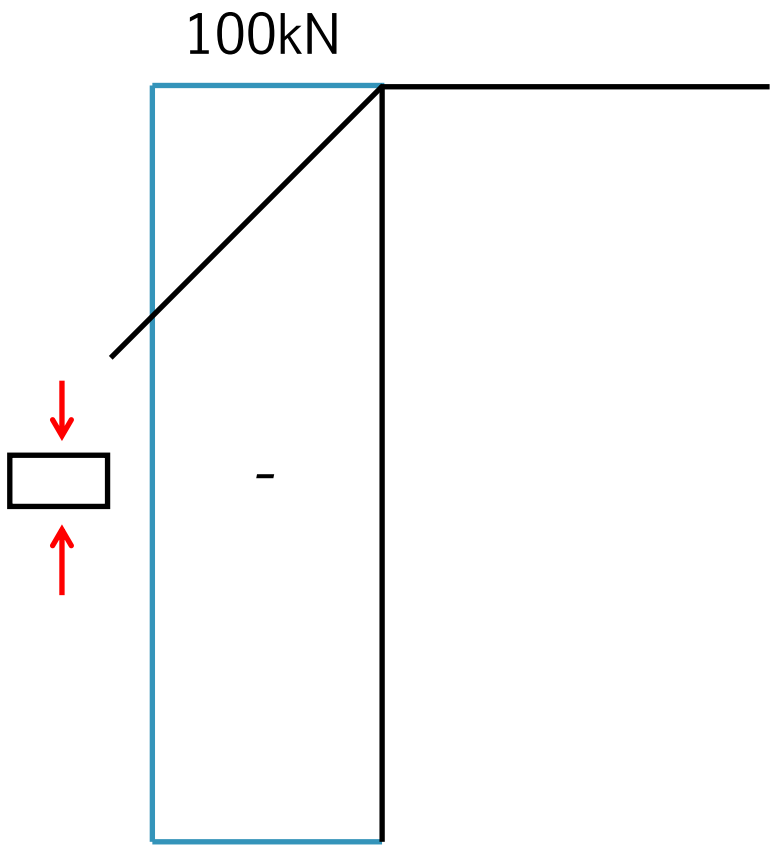
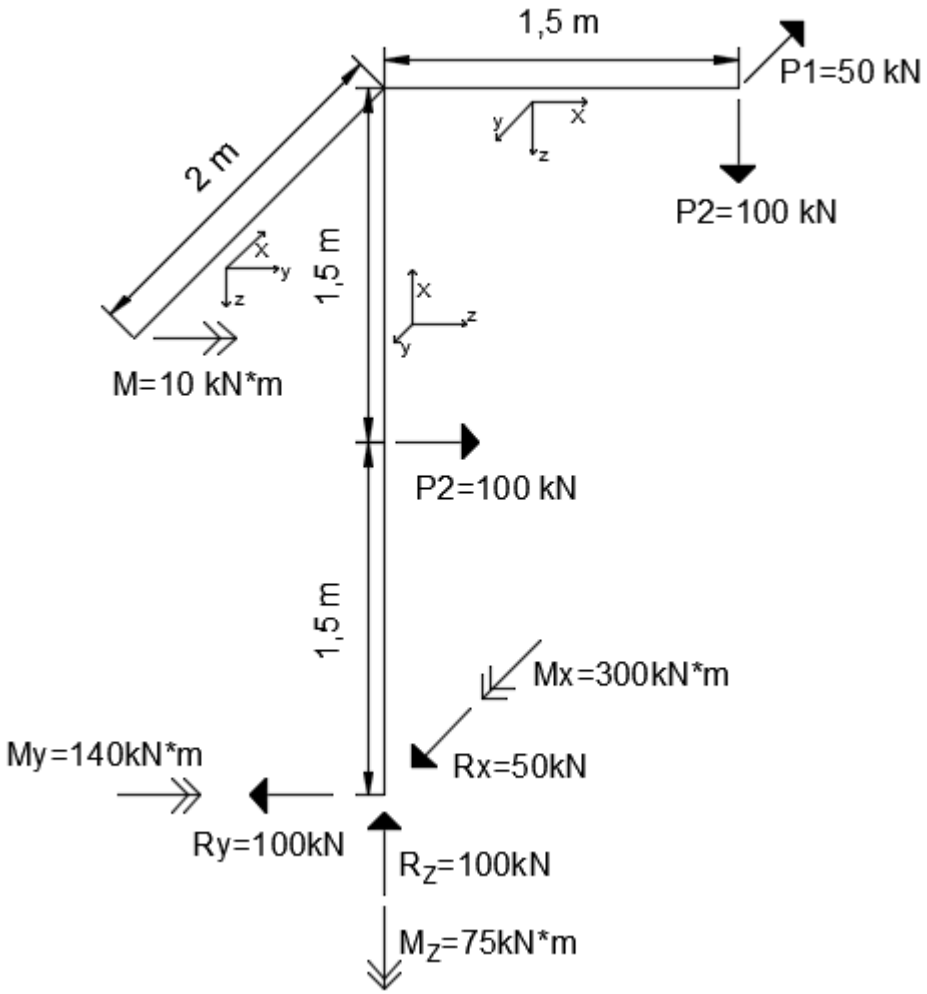


Diagrama de corte en y:



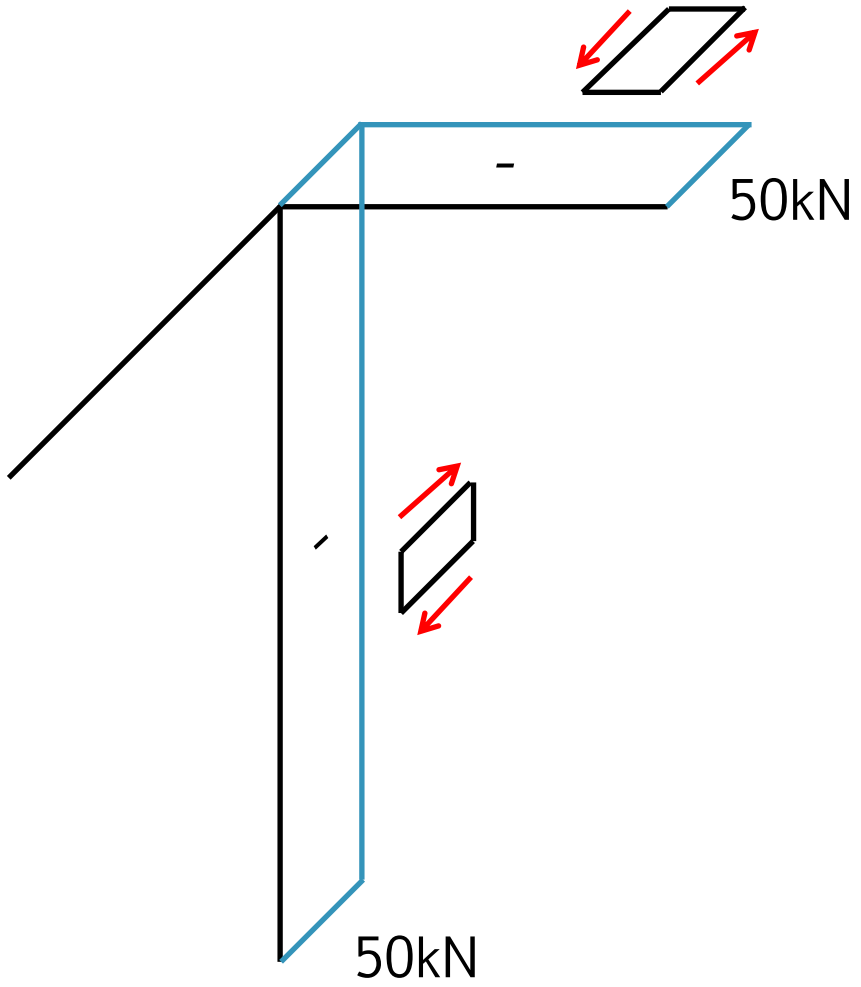
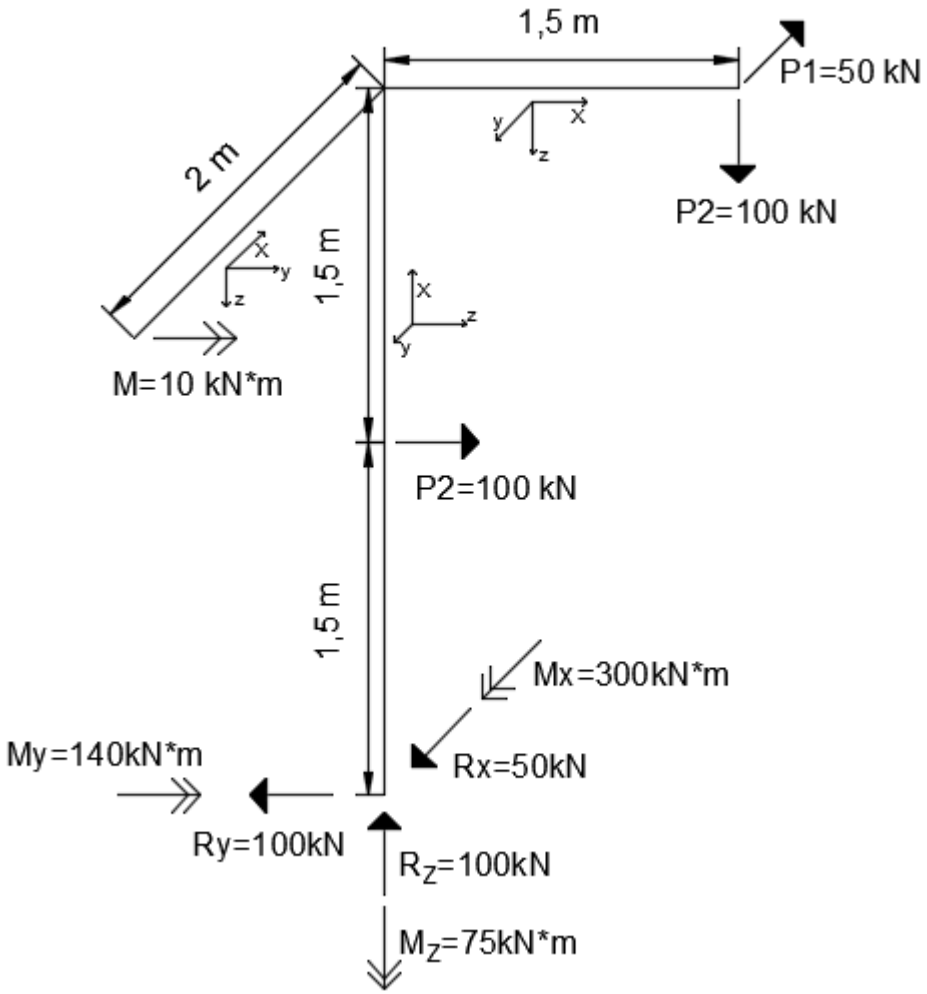


Diagrama de corte en z:



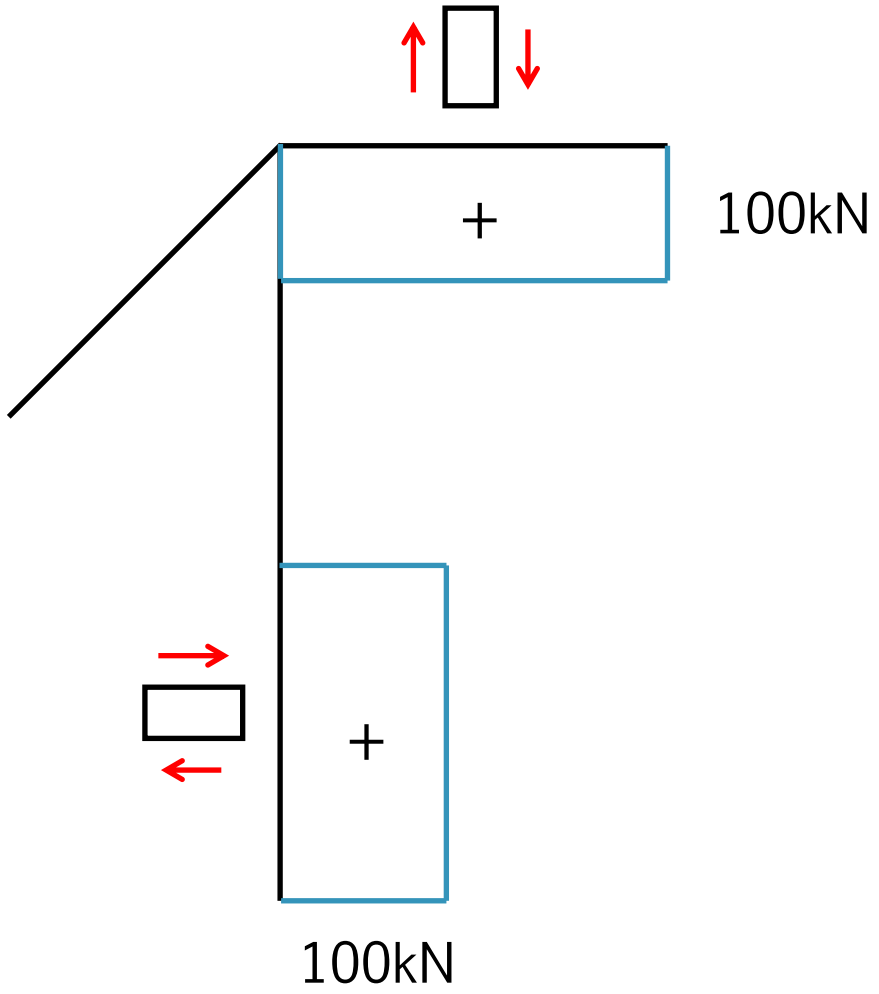
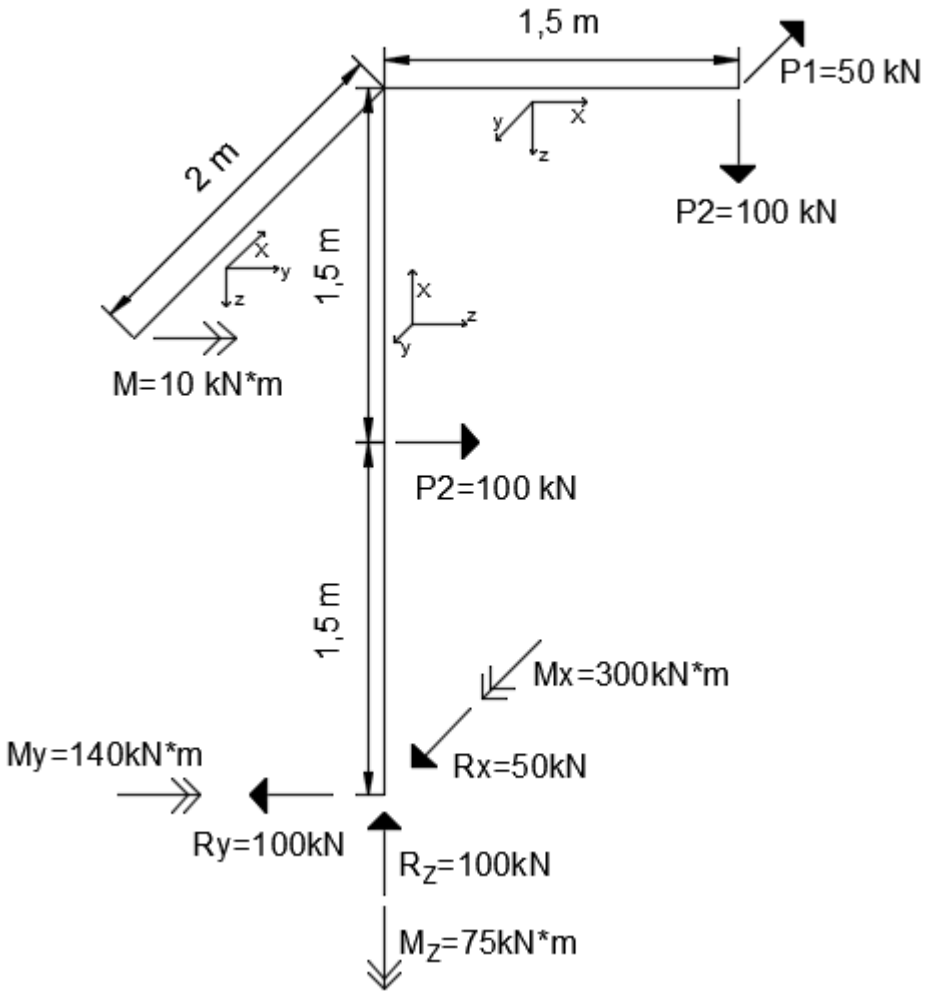
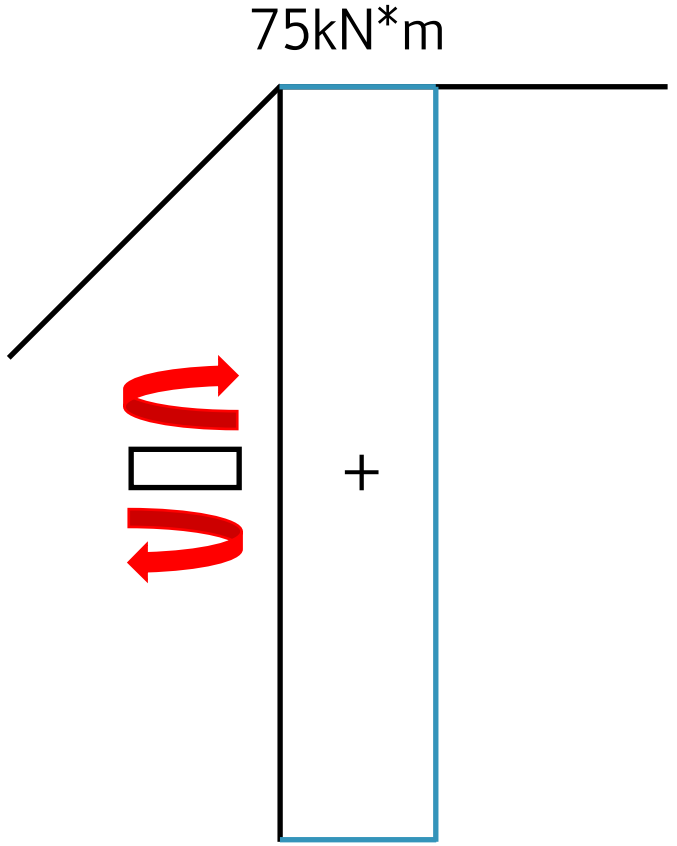


Diagrama de momento en x:





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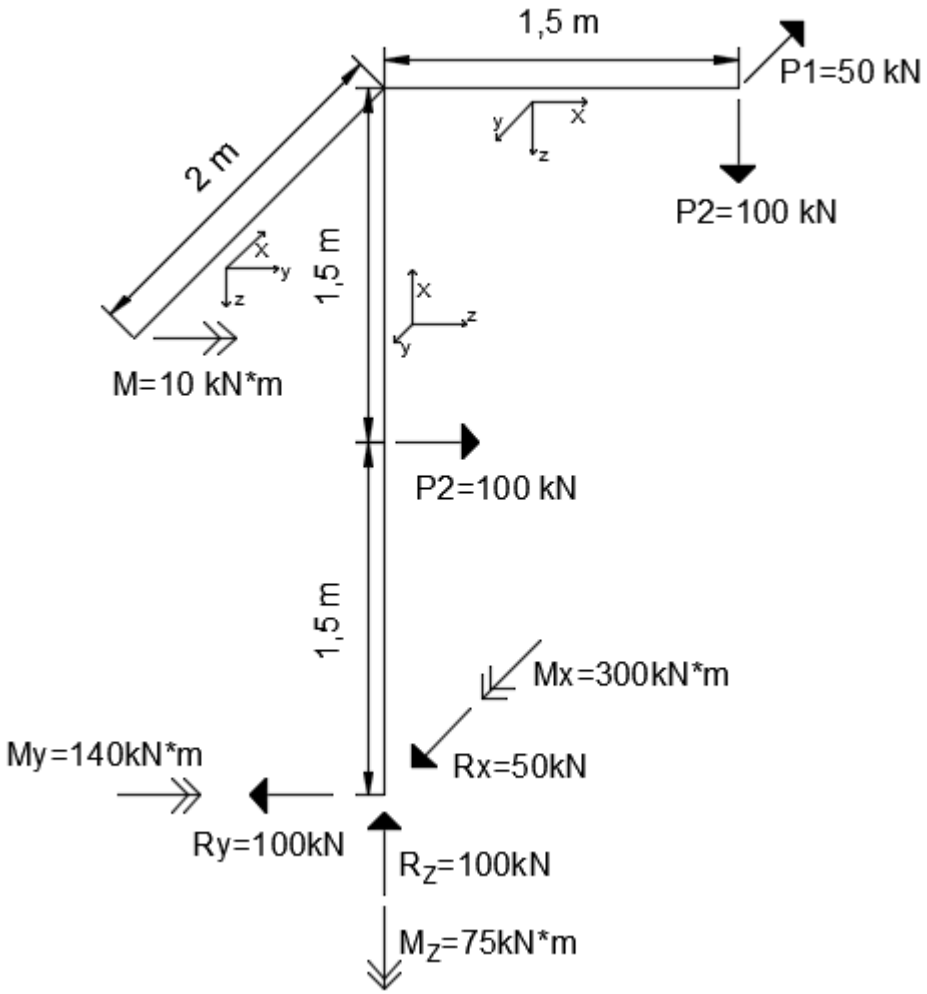
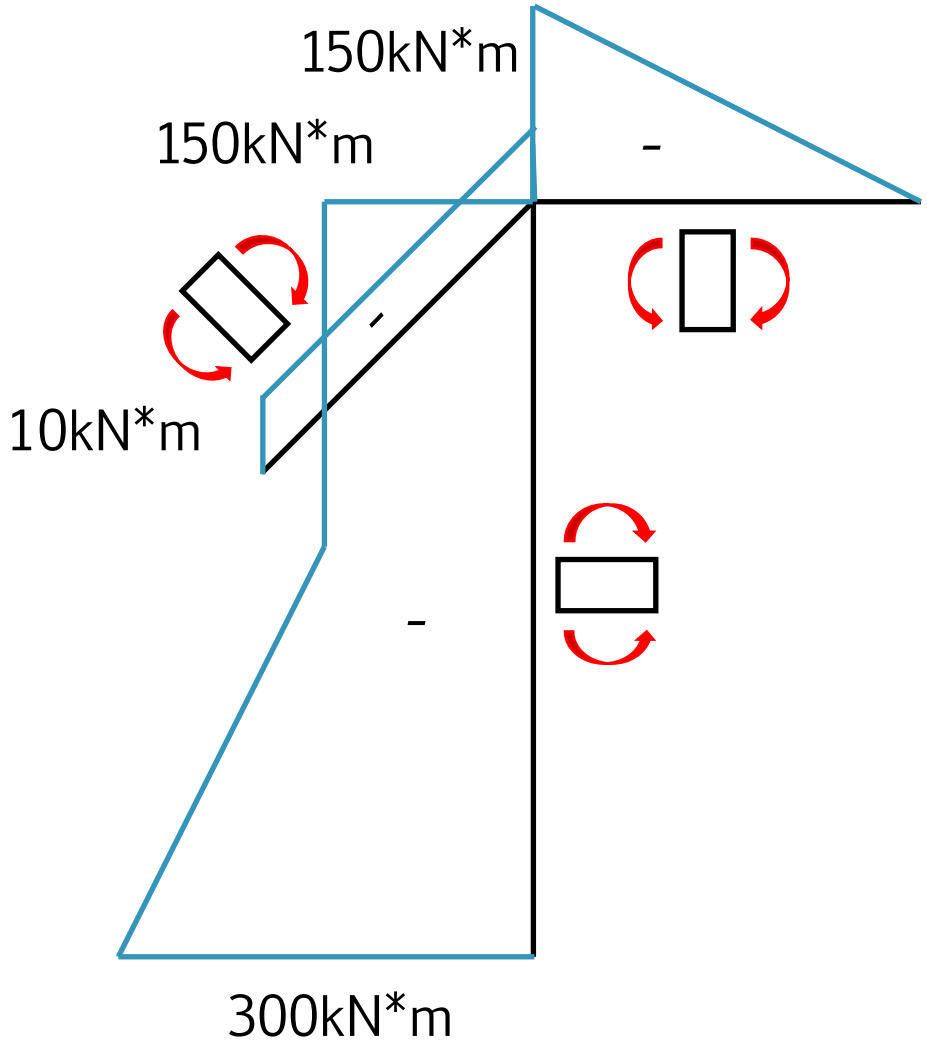




Recordemos Qz

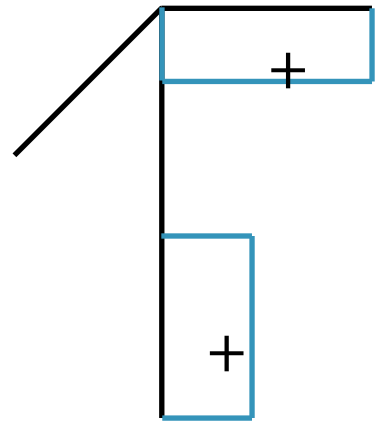
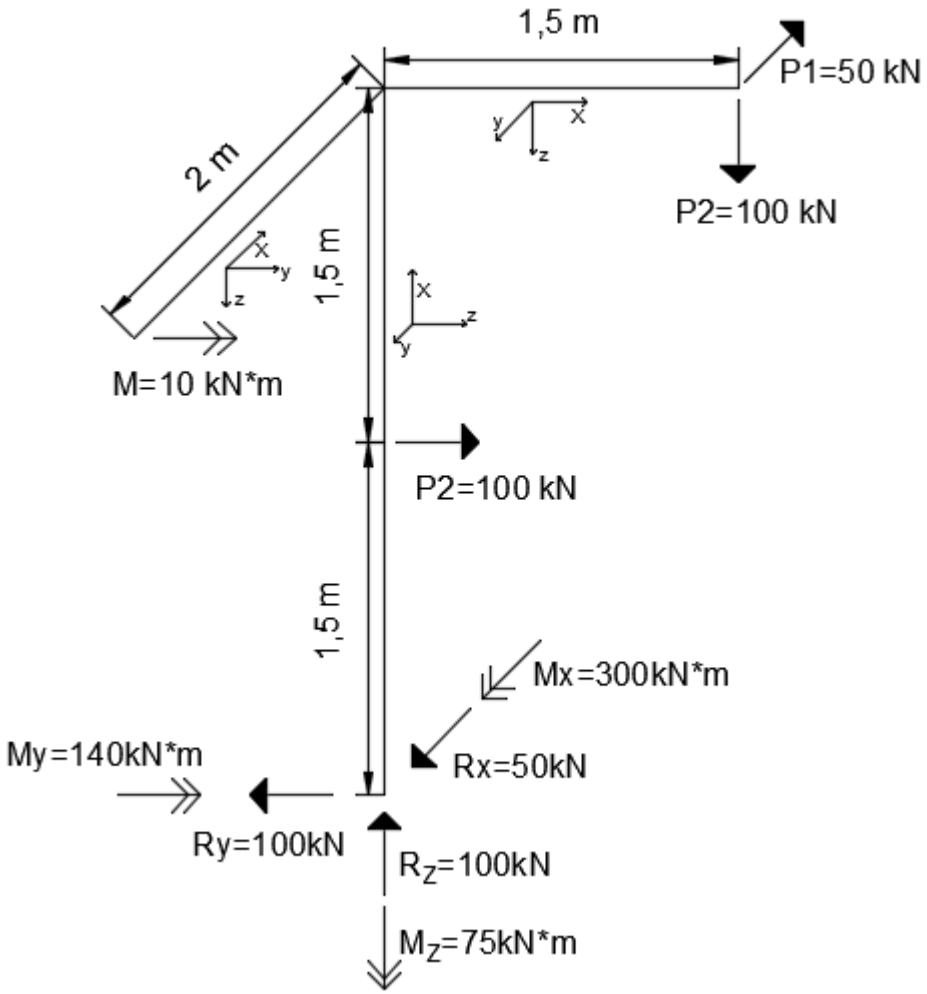
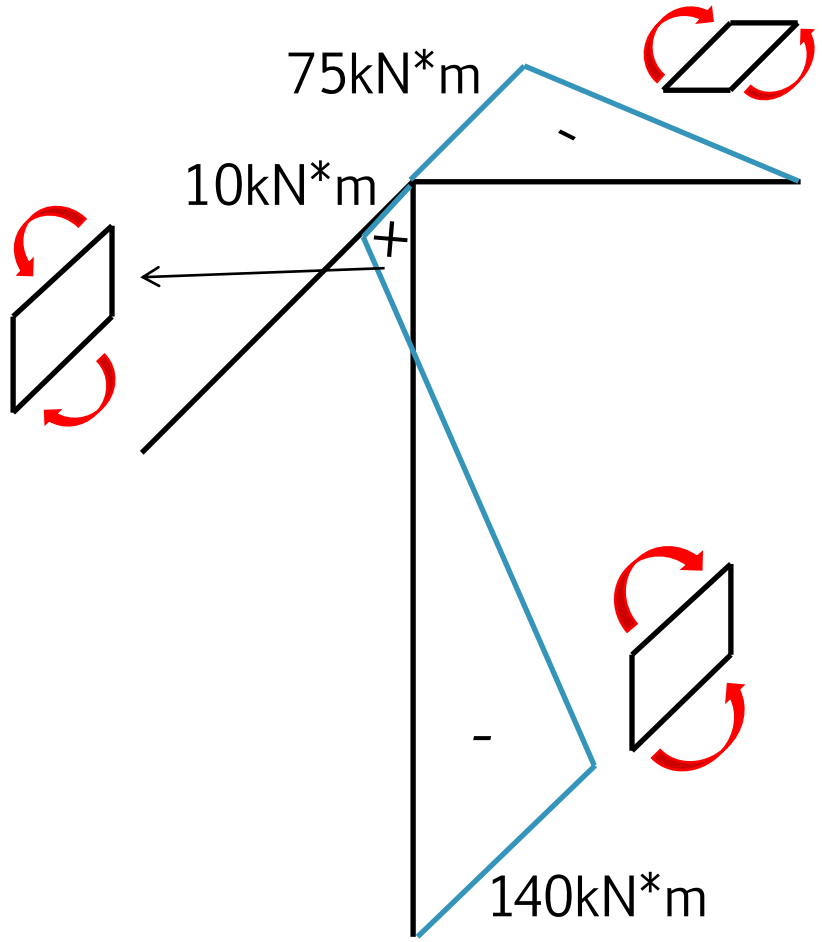
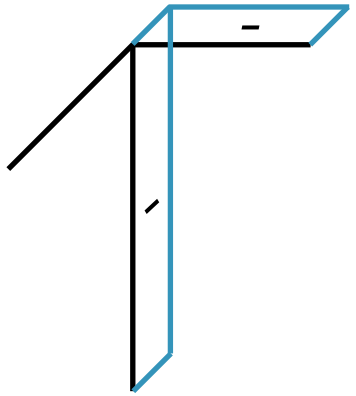


Diagrama de momento en z:

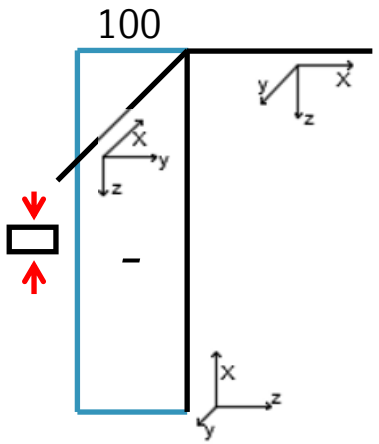




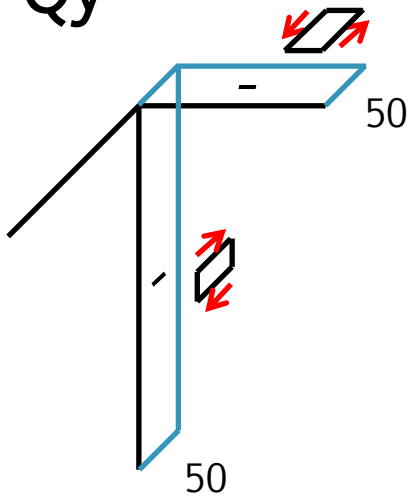
Recordemos Qy



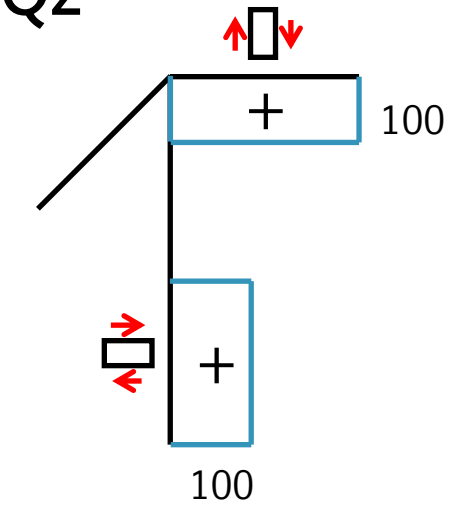
N



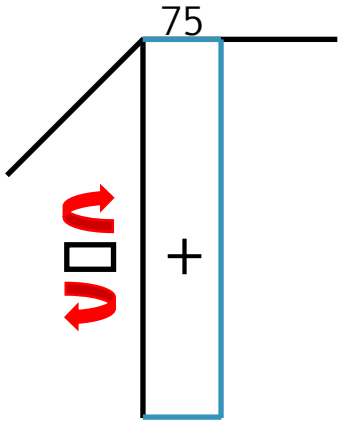
Qy



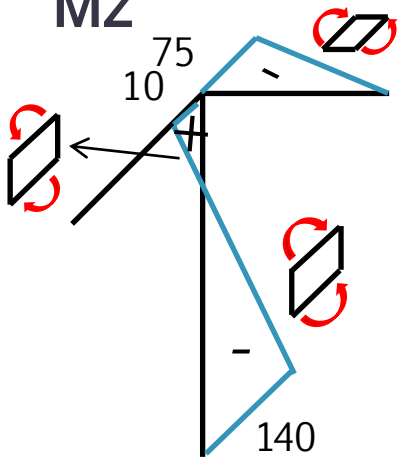
Qz



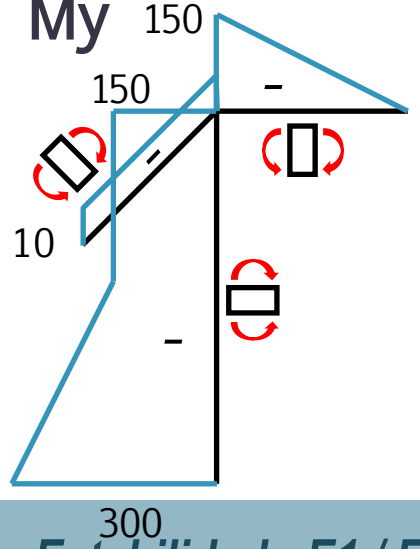
Mt



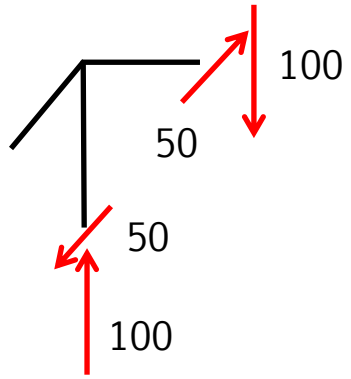
Mz



My



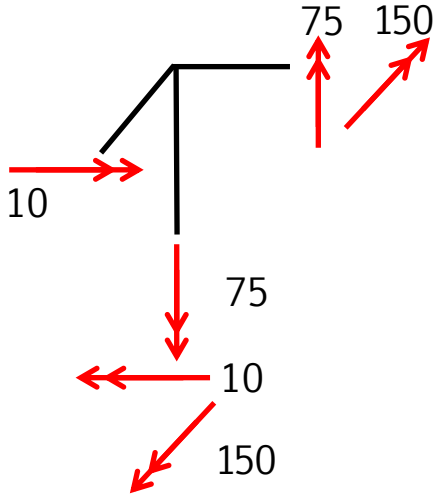
Equilibrio del nudo:



$$\sum F_x = 0$$

$$\sum F_y = 0$$

$$\sum F_z = 0$$



$$\sum Mx = 0$$

$$\sum My = 0$$

$$\sum Mz = 0$$

PREGUNTAS?

GRACIAS POR SU ATENCIÓN!