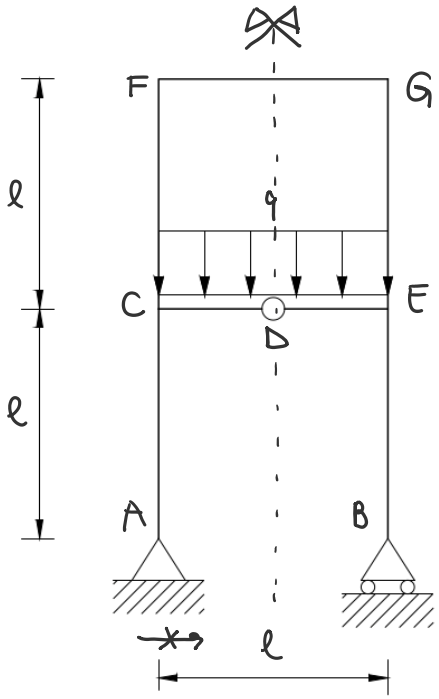
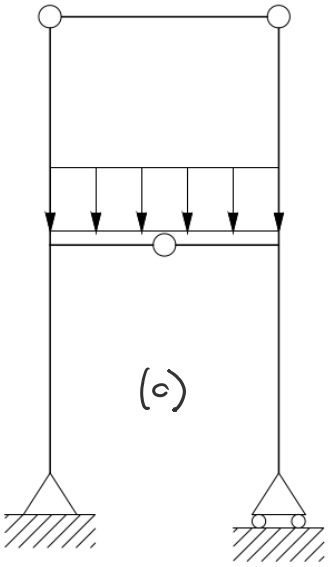
TOTALE SDC 23-06-2020



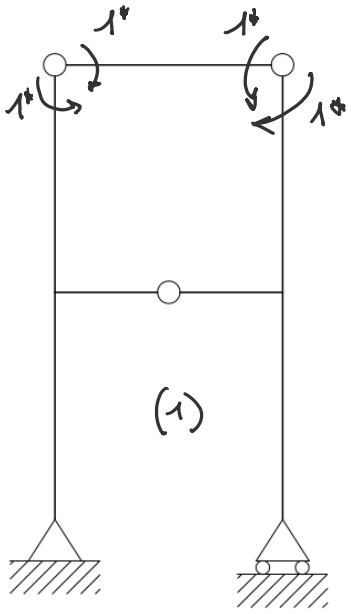
$l = 3m$

$q = 2000\ N/m$

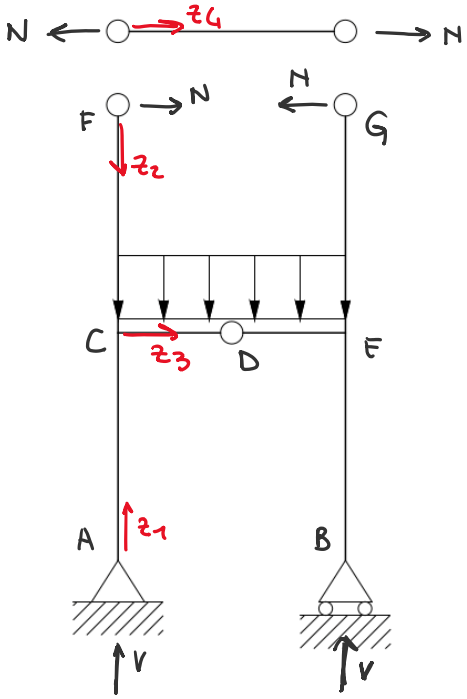
$\rightarrow) \ H_A = 0$



+ X



SISTEMA (0)



$\uparrow) \ V = \frac{ql}{2}$

$D\circlearrowleft) \ -V \cdot \frac{l}{2} - N\,l + \frac{ql}{2} \cdot \frac{l}{4} = 0$

$N = -\frac{ql}{4} + \frac{ql}{8} \qquad N = -\frac{ql}{18}$

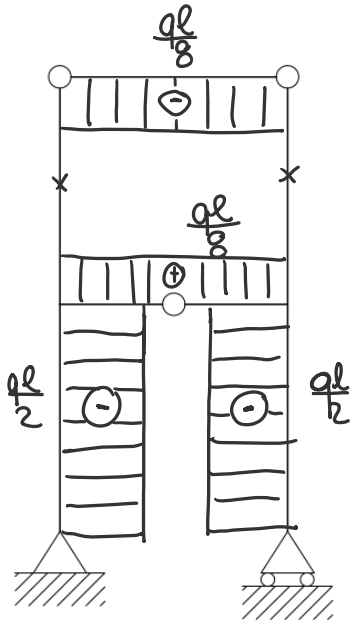
$N_0(z_1) = -\frac{ql}{2}$

$N_0(z_3) = \frac{ql}{8}$

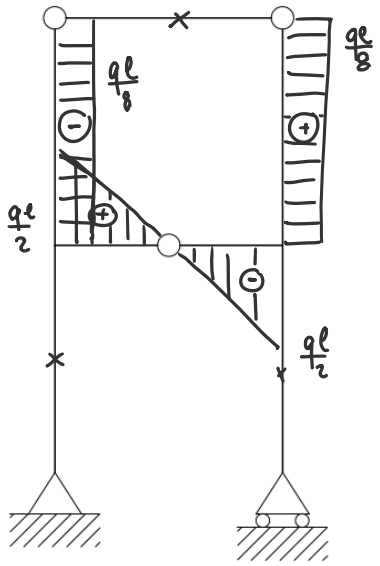
$N_0(z_4) = -\frac{ql}{8}$

$T_0(z_2) = -\frac{ql}{8}$

$T_0(z_3) = \frac{ql}{12} - qz$



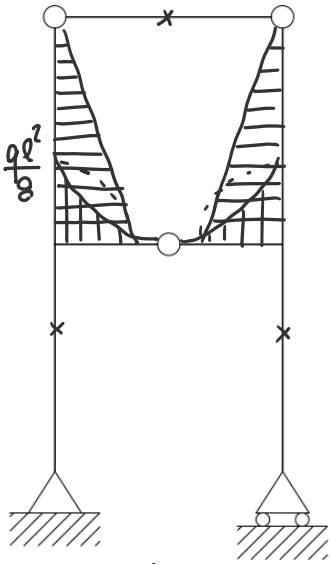
N_0



T_0

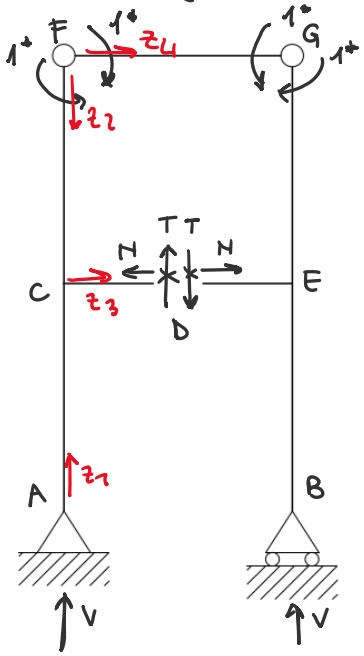
$M_0(z_1) = \frac{ql}{8} z$

$M_0(z_3) = -\frac{ql^2}{8} + \frac{qlz}{2} - \frac{qz^2}{2}$



M_0

SISTEMA (1)



A) $V = 0$

$T = 0$ per sym

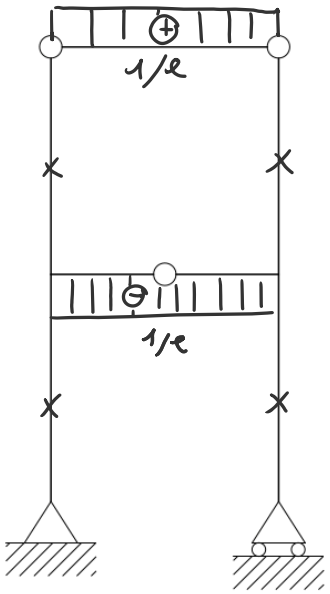
F↑ $1^* - N \cdot \ell = 0$

$N = \frac{1}{\ell}$

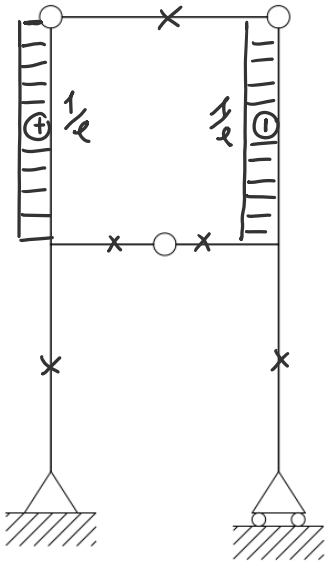
$N_1(z_3) = -1/\ell$

$N_1(z_4) = 1/\ell$

$T_1(z_2) = 1/\ell$



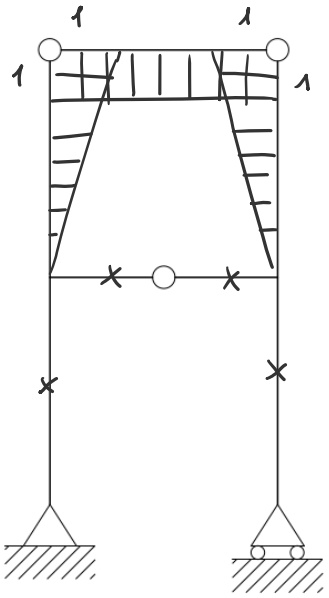
N_1



T_1

$M_1(z_2) = 1 - \frac{x}{\ell}$

$M_1(z_4) = 1$

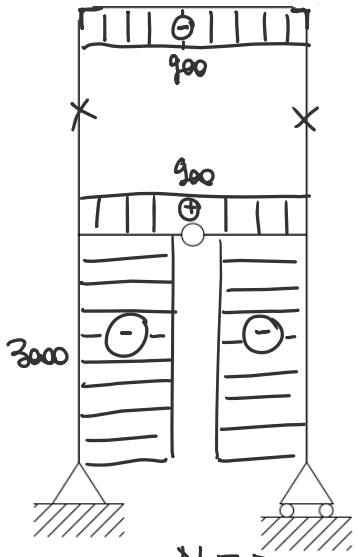


M_1

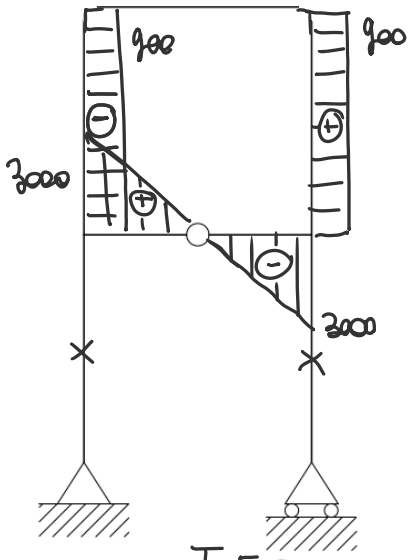
$$\eta_{10} = \frac{1}{EJ}\int_0^{\ell}\left(\frac{q\ell z}{8}\right)\left(1-\frac{x}{\ell}\right)dz = \frac{q\ell^3}{48EJ}$$

$$\eta_{11} = \frac{1}{EJ}\left[\int_0^{\ell}\left(1-\frac{x}{\ell}\right)^2 dz + \int_0^{\frac{\ell}{2}} 1\,dz\right] = \frac{5\ell}{6EJ}$$

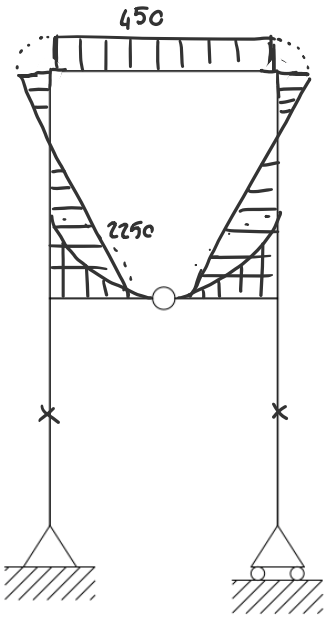
$$X = -\frac{\eta_{10}}{\eta_{11}} = -\frac{q\ell^2}{40}$$



N [N]



T [N]



M [Nm]

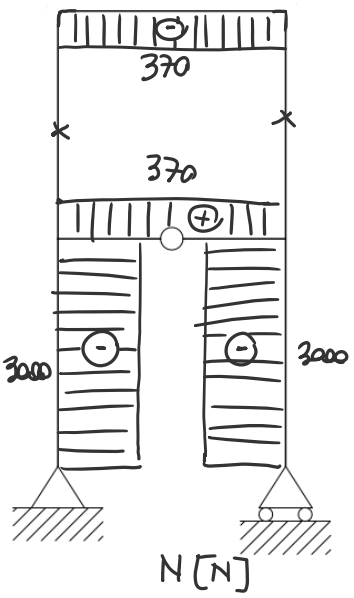
2) $\Delta t = 20°C$ $\quad h = 0{,}12\ m$

$I_x = 317{,}8\ cm^4$ $\quad E = 210000\ MPa$

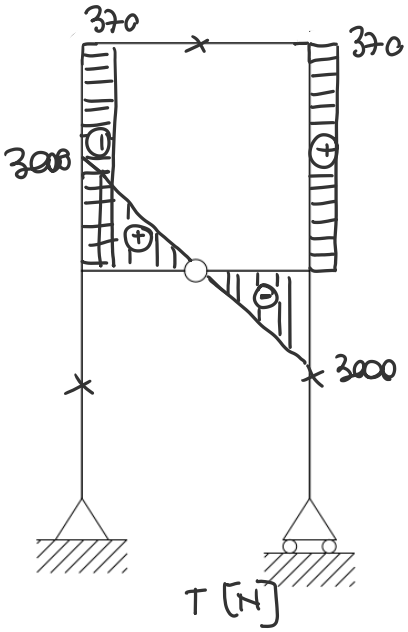
$A = 13{,}21\ cm^2$

$L_{ve} = L_{vi} \qquad 0 = \eta_{10} + X\,\eta_{11} + \int_0^{\ell/2} \left(-\frac{2\alpha\Delta t}{h}\right) \cdot 1\, dz$

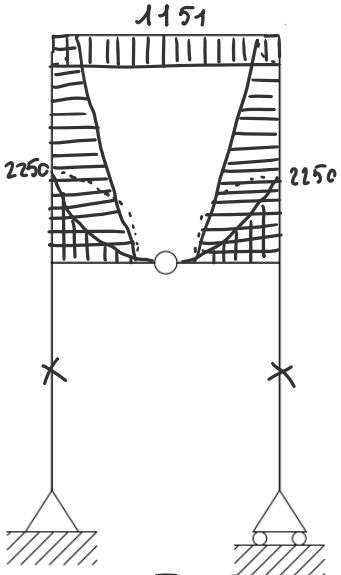
$$x = -\frac{\eta_{10} - \frac{\alpha \Delta t\, \ell}{h}}{\eta_{11}} = 1152\ N$$



N [N]



T [N]



M [Nm]