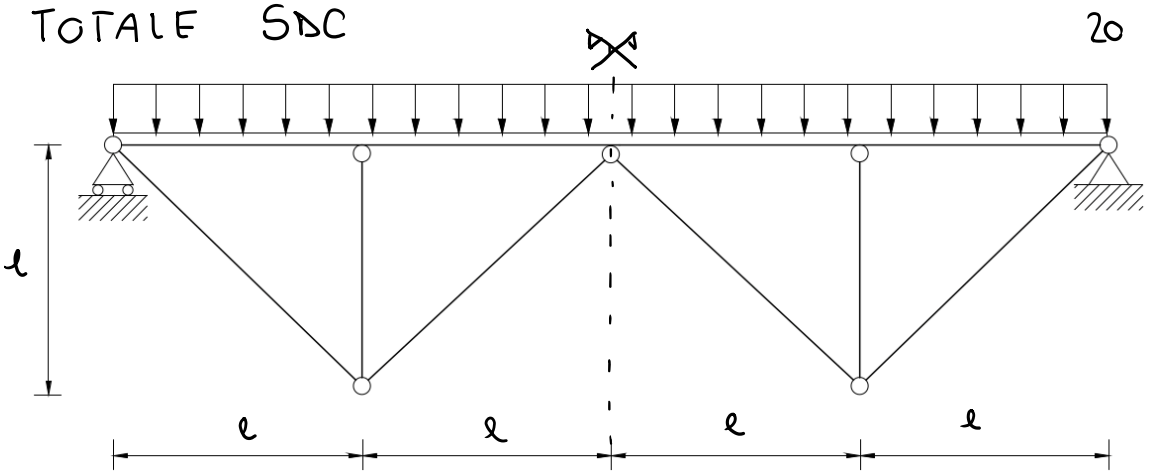
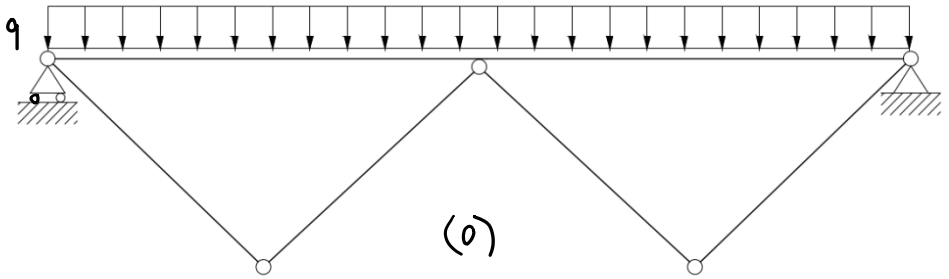
TOTALE SDC

20 LUGLIO 2020

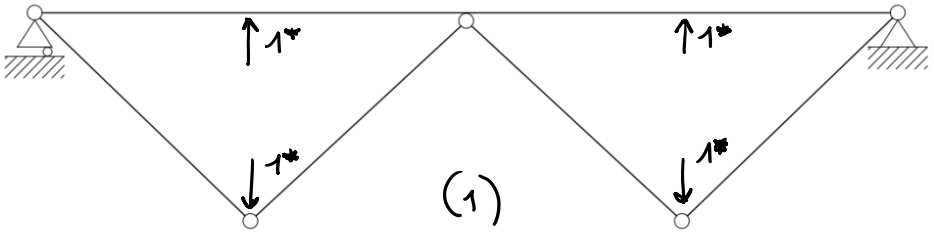


$l = 3\,m$

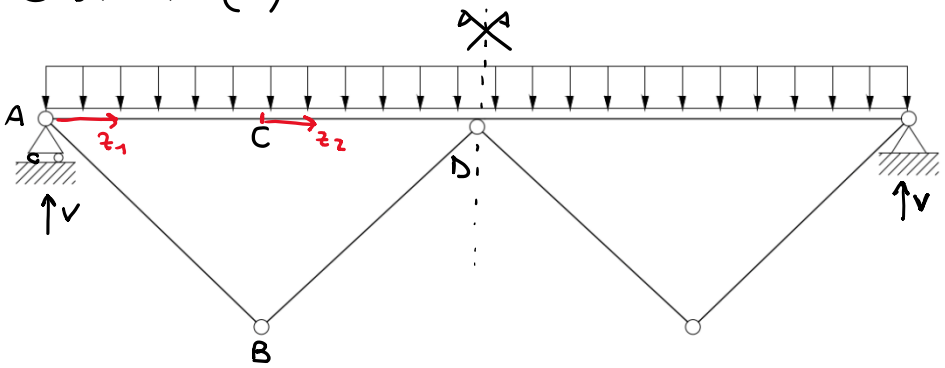
$q = 2000\,N/m$



+ X

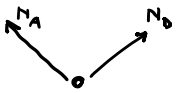


1) SISTEMA (0)



$\uparrow) \; 2V - 4ql = 0 \quad V = 2ql$

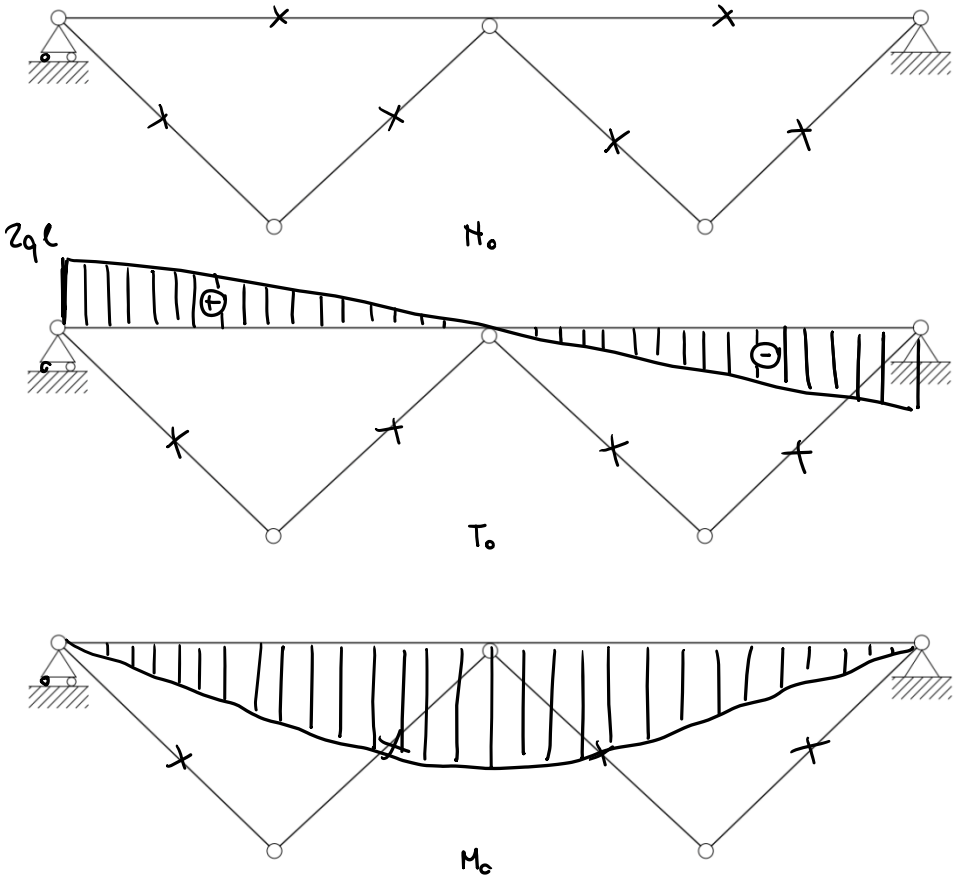
NODO B



$\uparrow) \; N_A \cdot \frac{\sqrt{2}}{2} + N_D \frac{\sqrt{2}}{2} = 0$

$\rightarrow) \; N_A \cdot \frac{\sqrt{2}}{2} - N_D \frac{\sqrt{2}}{2} = 0$

$N_A = 0 \quad N_D = 0$



$T_0(z_1) = 2ql - qz$

$T_0(z_2) = ql - qz$

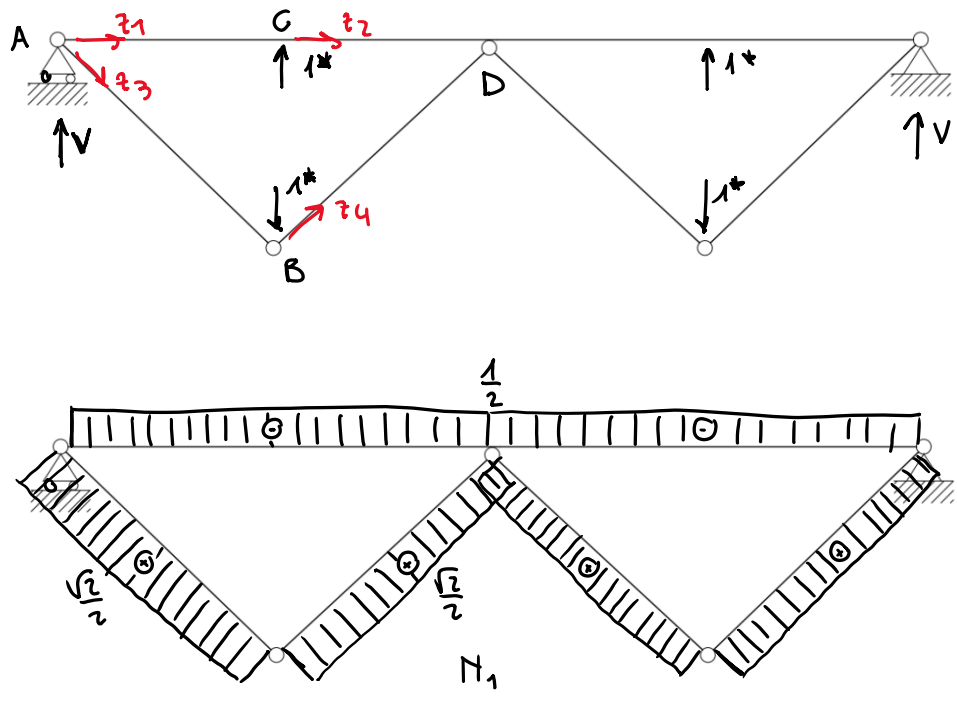
$M_0(z_1) = 2qlz - \frac{qz^2}{2}$

$M_0(z_2) = 2ql(l+z) - \frac{q(l+z)^2}{2} =$

$= 2ql^2 + 2qlz - \frac{ql^2}{2} - \frac{qz^2}{2} - qlz$

$= \frac{3ql^2}{2} + qlz - \frac{qz^2}{2}$

SISTEMA (1)



↑) $V = 0$

NODO B

→) $N_A = N_D = N$

↑) $2N\frac{\sqrt{2}}{2} - 1 = 0$

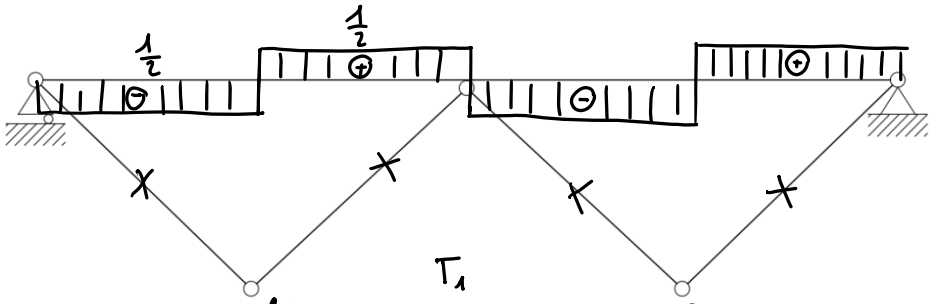
$N = \frac{\sqrt{2}}{2}$

$N_1(z_1) = -\frac{\sqrt{2}}{2} \cdot \frac{\sqrt{2}}{2} = -\frac{1}{2}$

$N_1(z_2) = -\frac{1}{2}$

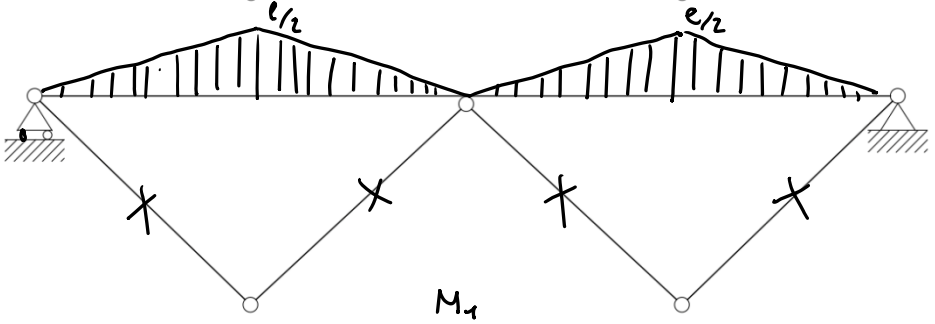
$N_1(z_3) = \frac{\sqrt{2}}{2}$

$N_1(z_4) = \frac{\sqrt{2}}{2}$



$$T_1(z_1) = -\frac{\sqrt{2}}{2}\cdot\frac{\sqrt{2}}{2} = -\frac{1}{2}$$

$$T_1(z_2) = -\frac{1}{2} + 1 = \frac{1}{2}$$



$$M_1(z_1) = -\frac{z}{2}$$

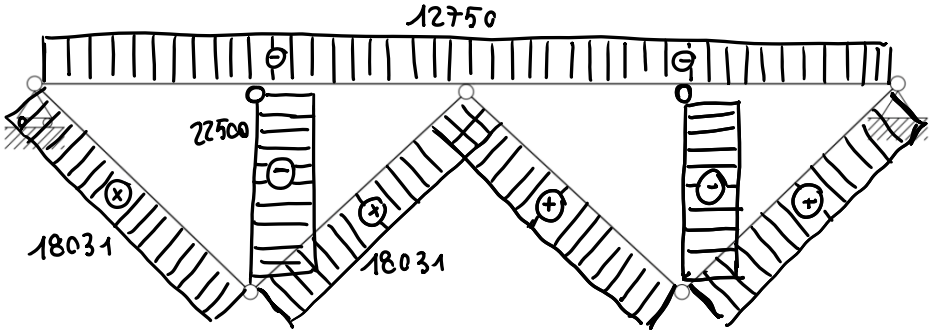
$$M_1(z_2) = -\frac{l}{2} + \frac{z}{2}$$

$$\eta_{10} = \frac{1}{EJ}\int_0^l \left(-\frac{z}{2}\right)\left(2ql z - q\frac{z^2}{2}\right)dz + \frac{1}{EJ}\int_0^l \left(-\frac{l}{2}+\frac{z}{2}\right)\left(3q\frac{l^2}{2} + qlz - q\frac{z^2}{2}\right)dz = -\frac{17\,ql^4}{24\,EJ}$$

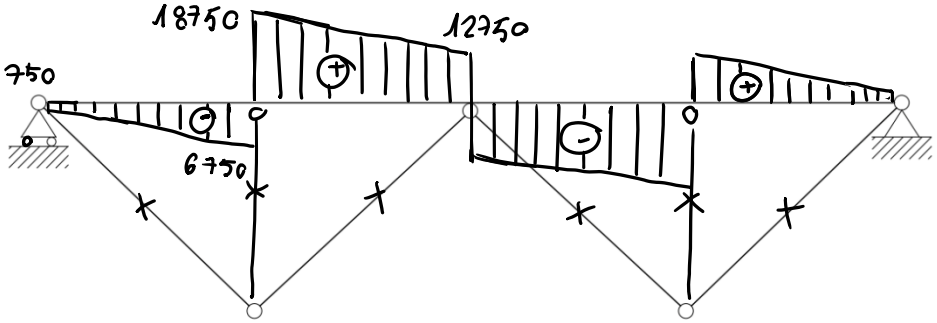
$$\eta_{11} = \frac{1}{EJ}\int_0^l \frac{z^2}{4}\,dz + \frac{1}{EJ}\int_0^l \left(-\frac{l}{2}+\frac{z}{2}\right)^2 dz = \frac{l^3}{6EJ}$$

$$X = -\frac{\eta_{10}}{\eta_{11}} = \frac{17}{4}ql^4$$

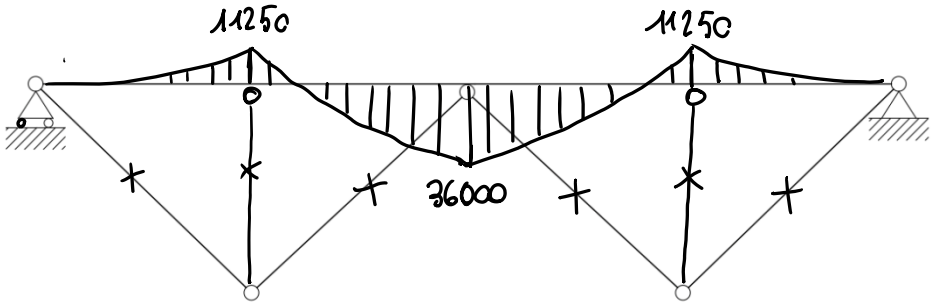
N[N]



T [N]



M[Nm]

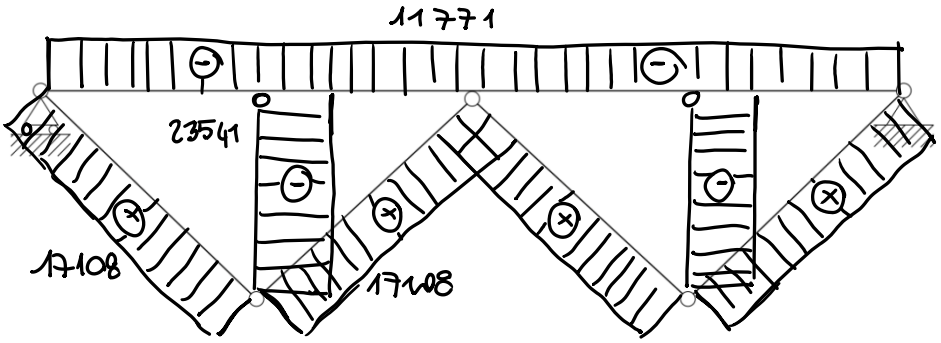


2) $\Delta t = 30°$ $\quad E = 210000\ MPa$ $\quad \alpha = 1{,}2 \cdot 10^{-5}\ °C^{-1}$

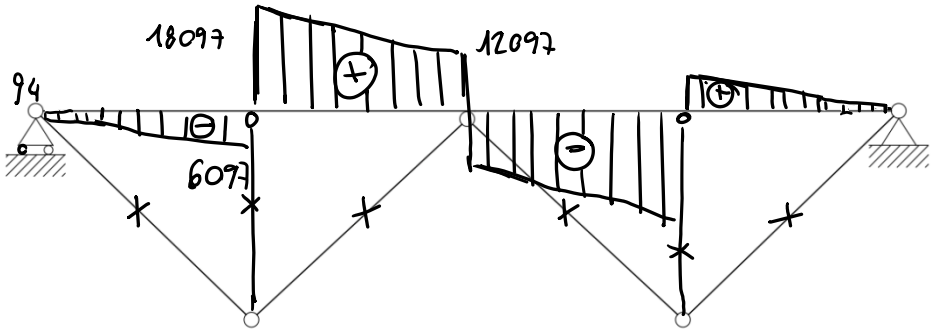
$$l_{VE} = l_{V1} = \eta_{10} + X\,\eta_{11} + 2\int_0^{e\sqrt{i}} \frac{r_i}{2} \cdot \alpha\,\Delta t\, d_7 = 0$$

$X = 23541\ N$

N [N]



T [N]



M [Nmm]