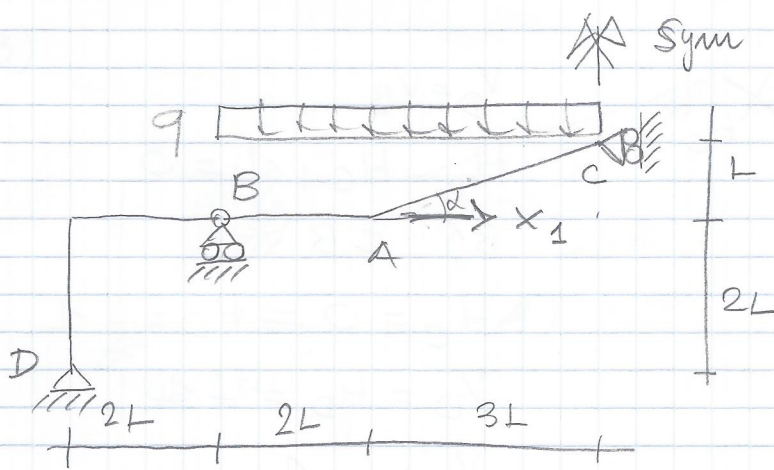


17/11/17

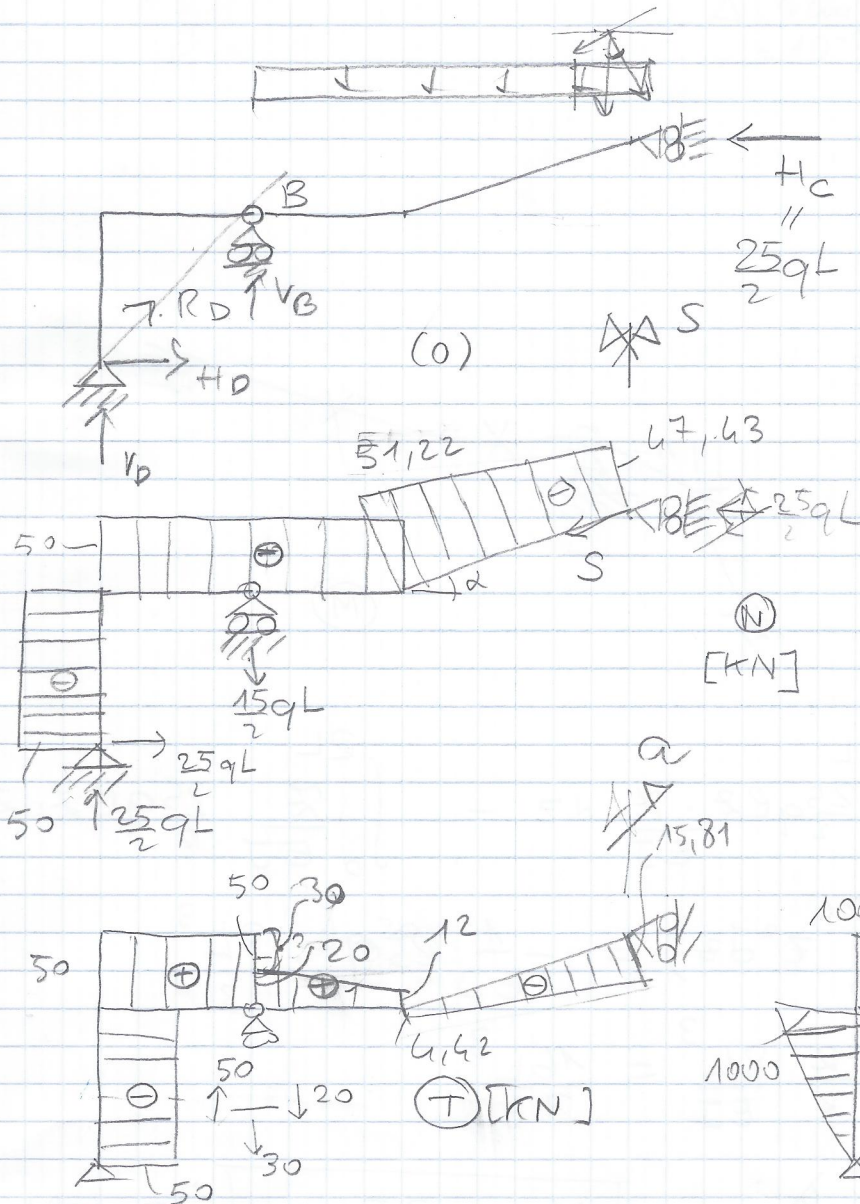


$$q = 4000 \text{ N/m}$$

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

$$\tan \alpha = \frac{1}{3} \Rightarrow \alpha = \arctan\left(\frac{1}{3}\right) = \frac{1}{\sqrt{10}}$$

$$\cos \alpha = \frac{3}{\sqrt{10}}$$



$$\sum H_D = V_D$$

$$\rightarrow H_D = H_C$$

$$\uparrow V_D + V_B = 5qL$$

By taking moments about C

$$H_C L - 5qL \cdot \frac{3}{2}L = 0$$

$$H_C = \frac{25}{2}qL \Rightarrow H_C = \frac{25}{2}qL$$

$$V_D = \frac{25}{2}qL = 50 \text{ kN}$$

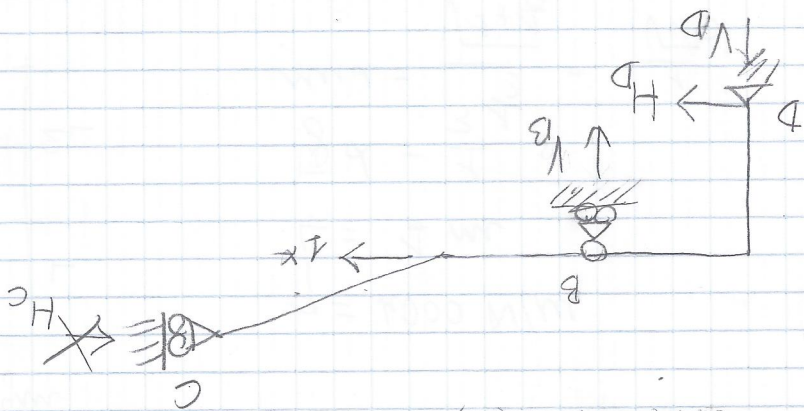
$$V_B = 5qL - \frac{25}{2}qL = -\frac{15}{2}qL = -30 \text{ kN}$$

$$N(s) = -\frac{25}{2}qL \cos \alpha - q s \cos \alpha \rightarrow N\left(\frac{3L}{\cos \alpha}\right) = -\frac{25}{2}qL \cos \alpha - 3qL \sin \alpha$$

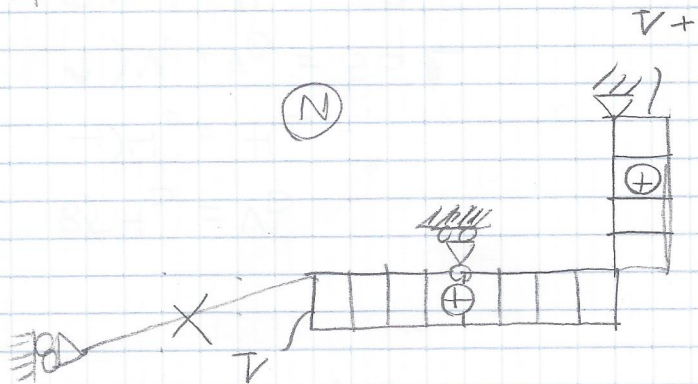
$$T(s) = -\frac{25}{2}qL \sin \alpha + q s \sin \alpha \rightarrow T\left(\frac{3L}{\cos \alpha}\right) = -\frac{25}{2}qL \sin \alpha + 3qL \cos \alpha$$

$$M(s) = \frac{25}{2}qL s \sin \alpha - q \frac{s^2}{2} \cos \alpha \rightarrow M\left(\frac{3L}{\cos \alpha}\right) = \frac{25}{2}qL \cdot \frac{3}{3} - \frac{q}{2} 9L^2 = 8qL^2$$

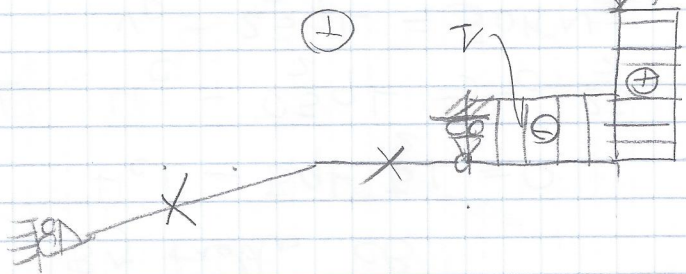
SYSTEMA (A)



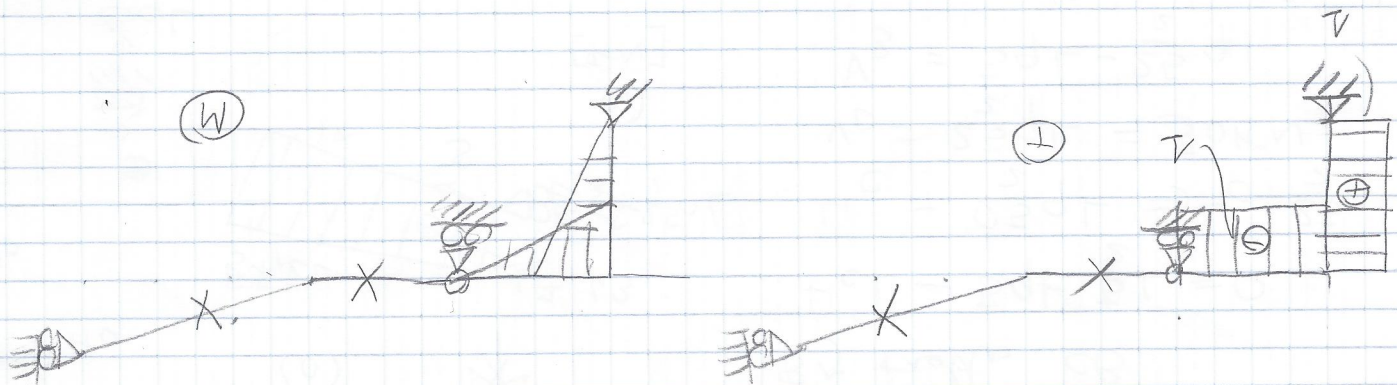
$$\begin{aligned}
 V_D &= V_B \\
 H_D - H_C + 1 &= 0 \\
 B \uparrow \quad C \downarrow \\
 H_C = 0 &\Rightarrow H_D = -1 \\
 V_D = H_D &= -1 \\
 V_B &= -1
 \end{aligned}$$



(N)



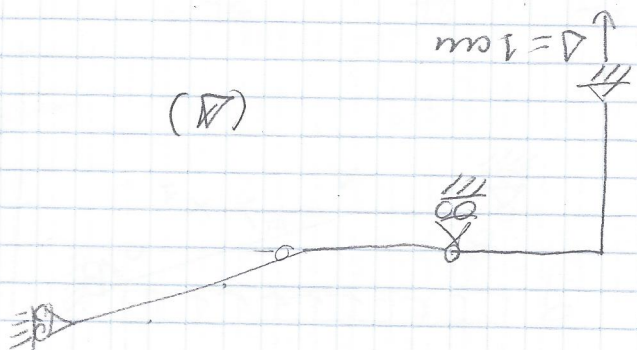
(T)



(M)

$$\begin{aligned}
 \delta_{10} &= \int \frac{H_1 H_0}{EI} dz = - \int_{2L}^0 \frac{25 q L^2}{EI} \cdot \frac{z}{L} dz - \int_0^{2L} \frac{EI}{EI} \cdot \frac{z}{L} dz = - \frac{1}{L} \cdot 25 q L^2 \cdot \frac{z^2}{2} \Big|_{2L}^0 - \frac{EI}{EI} \cdot \frac{z^2}{2} \Big|_0^{2L} \\
 &= - \frac{1}{L} \cdot 25 q L^2 \cdot \frac{4L^2}{2} - \frac{EI}{EI} \cdot \frac{4L^2}{2} = - \frac{50 q L^3}{EI} - \frac{2 EI L^2}{EI} = - \frac{50 q L^3}{EI} - 2 L^2 \\
 \delta_{11} X_1 &= \frac{25 \times 8 q L^3}{EI} \Rightarrow X_1 = \frac{2}{25} q L = 50 \text{ kN}
 \end{aligned}$$

3)



(A)

$$b_{11} X_1 + b_{10} = R_v \Delta = 10^{-2} \cdot 1 X_1 - \frac{2591}{2} \cdot 10^{-2}$$

$\Delta = 1 \text{ cm} = 10^{-2} \text{ m}$