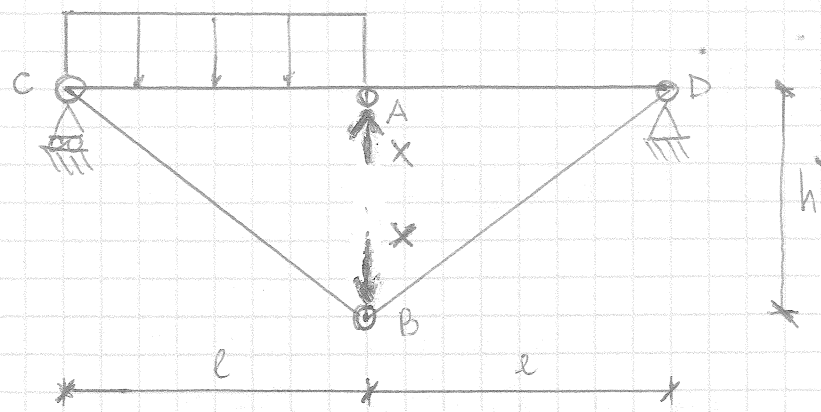


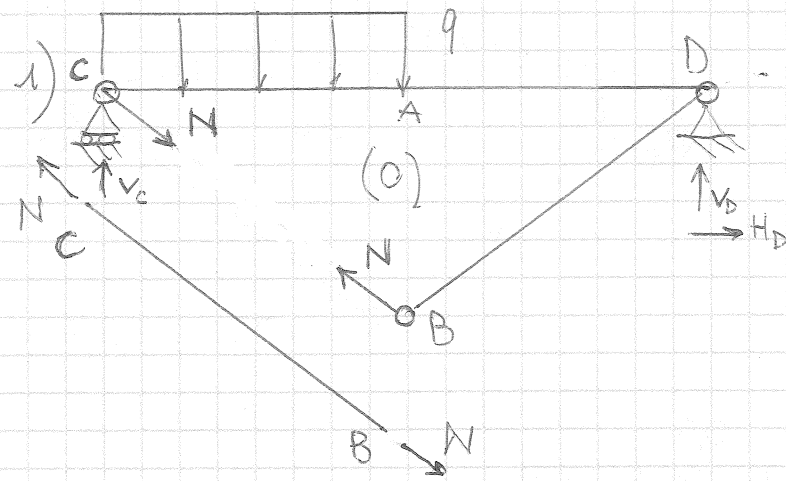
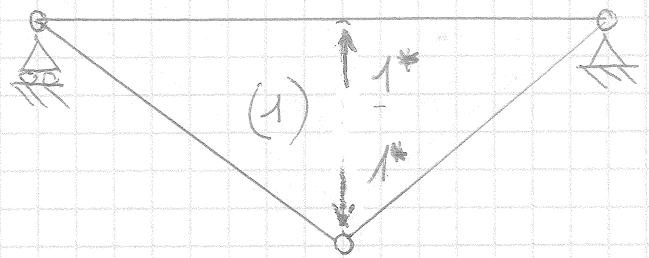
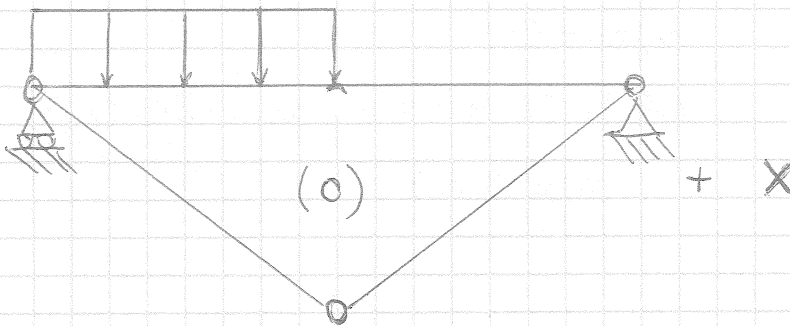


$$q = 500 \text{ N/m}$$

$$h = 3 \text{ m} = \frac{3l}{4}$$

$$l = 4 \text{ m}$$

$$\alpha = \arctan\left(\frac{3}{4}\right)$$

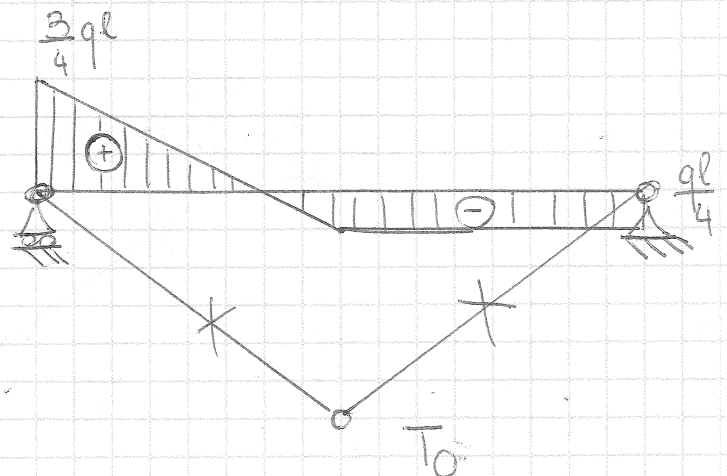
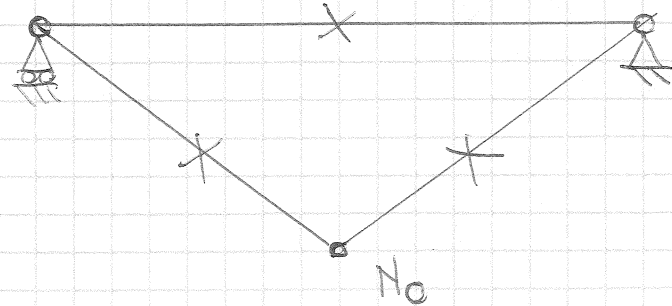


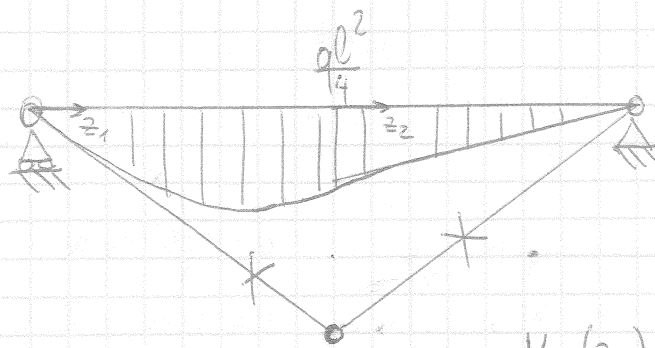
$$C) N = 0$$

$$\rightarrow) H_D = 0$$

$$C) V_D \cdot 2l - \frac{ql^2}{2} = 0 \quad V_D = \frac{ql}{4}$$

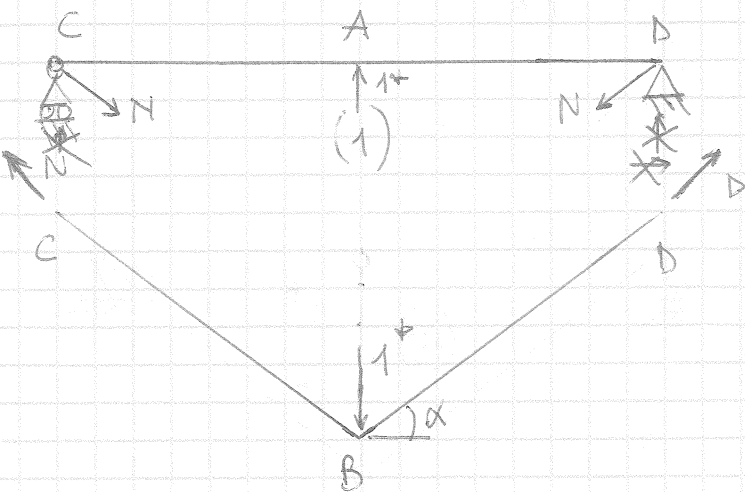
$$\uparrow) V_C = \frac{3}{4}ql$$





$$M_0(z_1) = \frac{3}{4} qlz - \frac{ql^2}{2} z^2$$

$$M_0(z_2) = \frac{ql^2}{4} - \frac{qlz}{4}$$



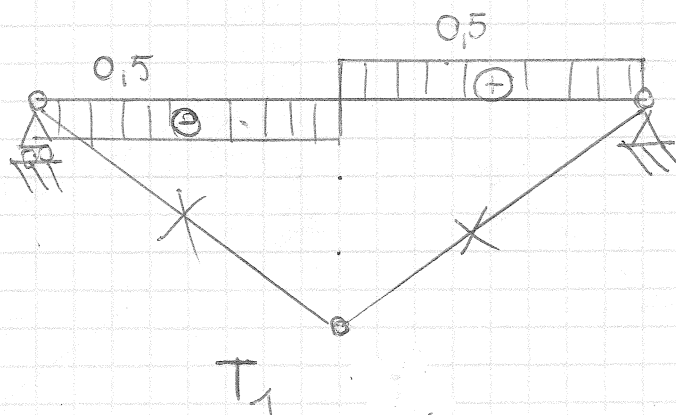
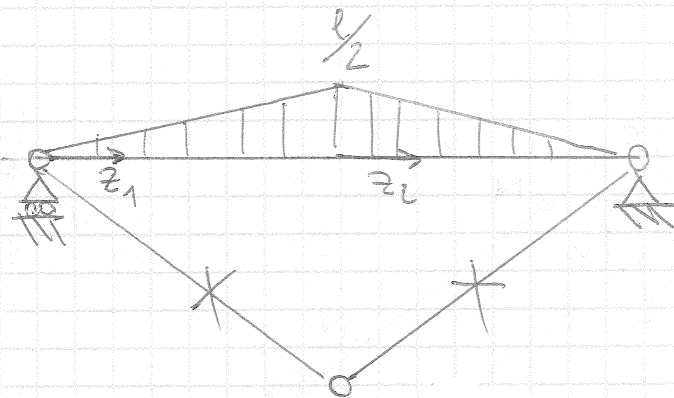
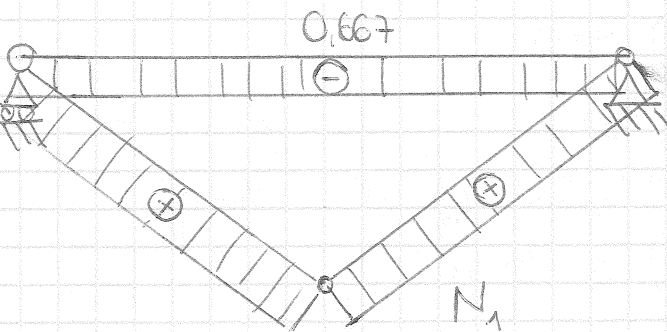
$$\text{Node B } 1) 2T \cdot \sin \alpha - 1 = 0$$

$$T = 0,833$$

$$\rightarrow H_D = 0$$

$$C) V_D \cdot 2l + 1 \cdot l - T \sin \alpha \cdot 2l = 0$$

$$V_D = V_C = 0$$



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

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

$$E = 2;10 \cdot 10^{11} \text{ Pa}$$

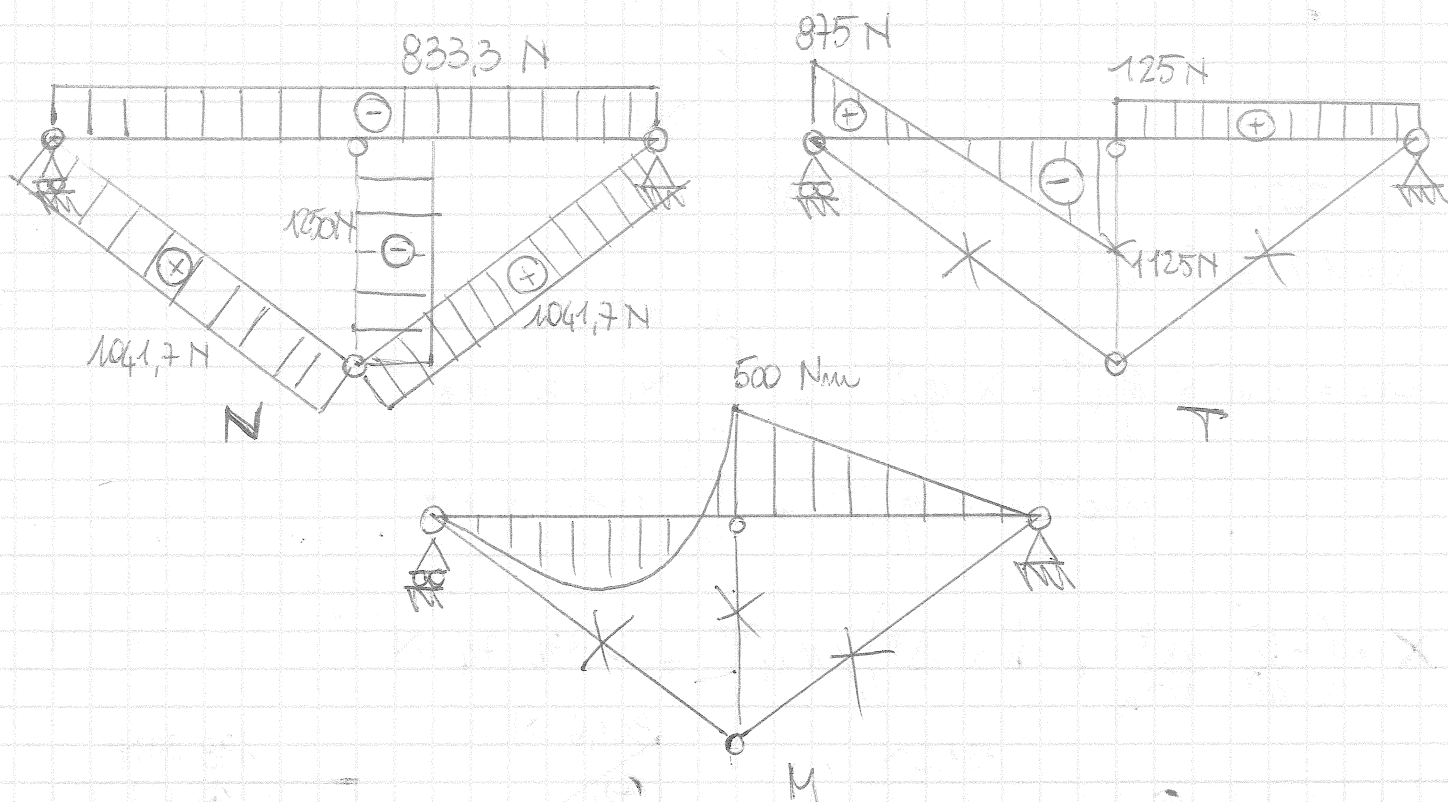
$$J_{IFE} = 8,69 \cdot 10^{-6} \text{ m}^4$$

$$M_{10} = \frac{1}{EJ_{IPE}} \left[\int_0^l \left(\frac{3qlz}{4} - \frac{qz}{2} \right) \left(-\frac{z}{2} \right) dz + \int_0^l \left(\frac{ql^2}{4} - \frac{qlz}{4} \right) \left(-\frac{l}{2} + \frac{z}{2} \right) dz \right] -$$

$$= -\frac{5}{48} \frac{ql^4}{EJ_{IPE}}$$

$$M_{11} = \frac{1}{EJ_{IPE}} \left[\int_0^l \left(\frac{z^2}{4} \right) dz + \int_0^l \left(-\frac{l}{2} + \frac{z}{2} \right)^2 dz \right] = \frac{l^3}{8EJ_{IPE}}$$

$$X = \frac{-M_{10}}{M_{11}} = \frac{5}{8} ql = 1250 \text{ N}$$



$$2) A_{IPE} = 2,01 \cdot 10^{-3} \text{ m}^2$$

$$A_{Tond} = 3,1416 \cdot 10^{-4} \text{ m}^2$$

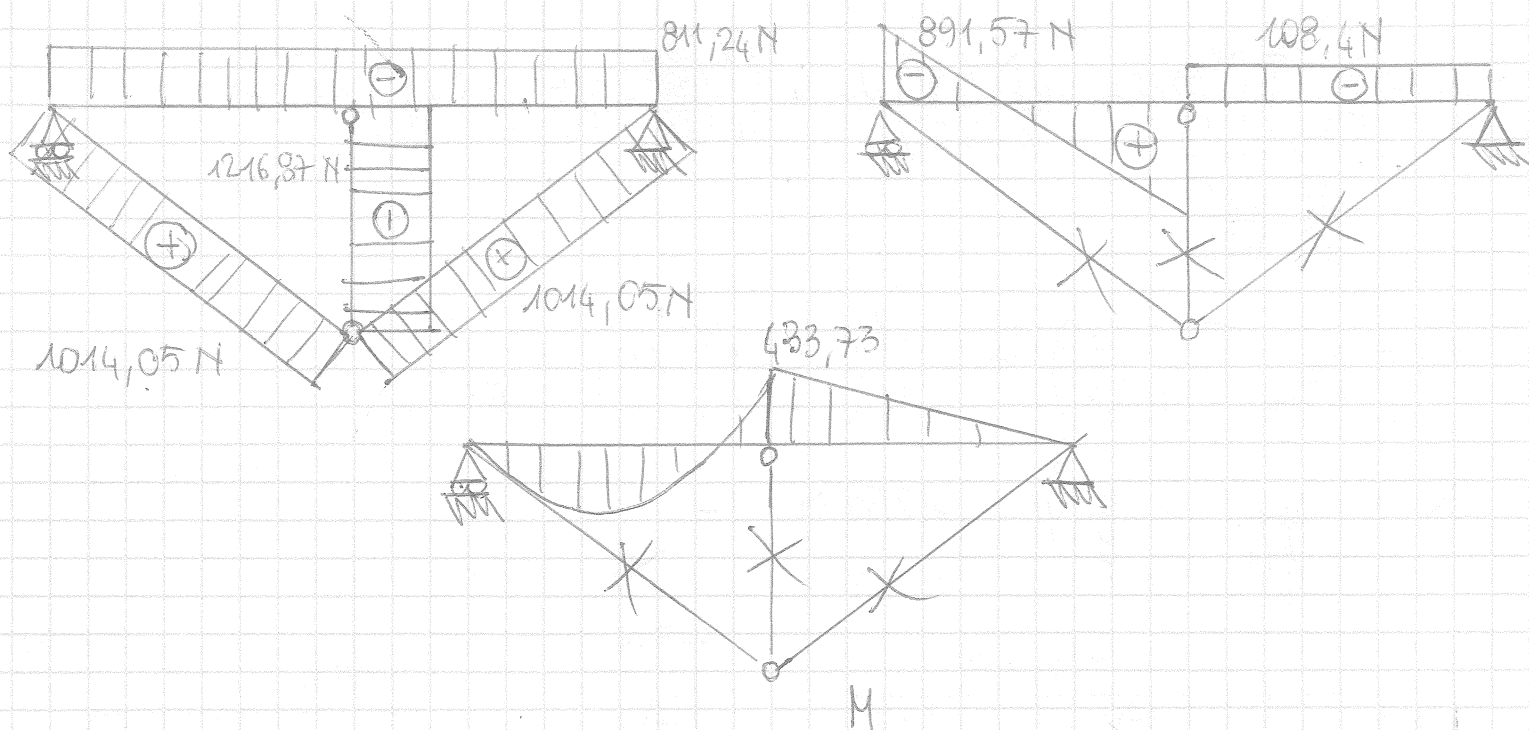
$$M_{10}^{Tot} = M_{10}^{flex} + M_{10}^{def anisale} = -\frac{5}{48} \frac{ql^4}{EJ_{IPE}} + 0$$

$$M_{11}^{Tot} = M_{11}^{flex} + M_{11}^{def anisale}$$

$$= \frac{l^3}{6EJ_{IPE}} + \frac{1}{EA_{IPE}} \int_0^{2l} 0,667 z^2 dz + \frac{2}{EA_{Tond}} \int_0^{l/\cos \alpha} 0,833 z^2 dz + \frac{1}{EA_{Tond}} \int_0^{\frac{3l}{4}} 1 z^2 dz$$

$$= \frac{l^3}{6EJ_{IPE}} + \frac{0,444 \cdot 2l}{EA_{IPE}} + \frac{0,694 \cdot 5l}{EA_{Tond} 2} + \frac{3l}{4EA_{Tond}}$$

$$X^{def an} = \frac{-M_{10}^{Tot}}{M_{11}^{Tot}} = 1216,87 \text{ N}$$



3) $\Delta t = 30^\circ \text{C}$

$\epsilon^T = \alpha \cdot \Delta t$

$\alpha = 1,2 \cdot 10^{-5} \text{ } ^\circ\text{C}^{-1}$

$$L_{ve} = L_{vi} = M_{10}^{\text{TOT}} + X M_{11}^{\text{TOT}} + \int_0^h N_1 \cdot \epsilon^T dz$$

$$= M_{10}^{\text{TOT}} + X M_{11}^{\text{TOT}} + \int_0^h (-1) \alpha \cdot \Delta t dz$$

$$X = \left(\frac{5}{48} \frac{q l^4}{E J_{\text{tr}}} + h \alpha \Delta t \right) / M_{11}^{\text{TOT}} = 1396,74 \text{ N}$$

