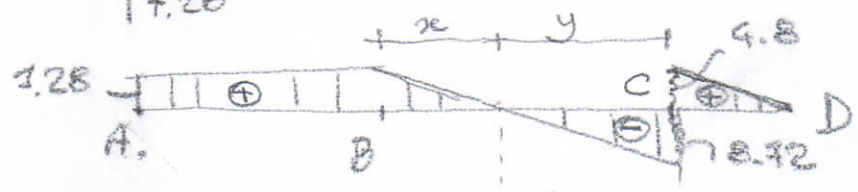
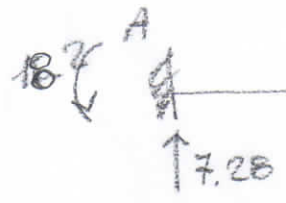


ES.1



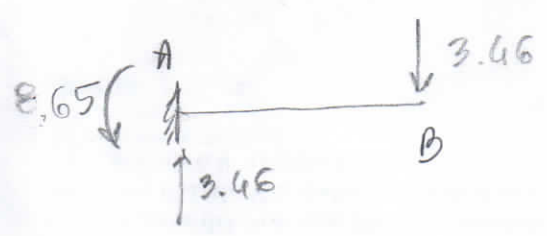
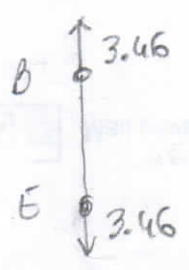
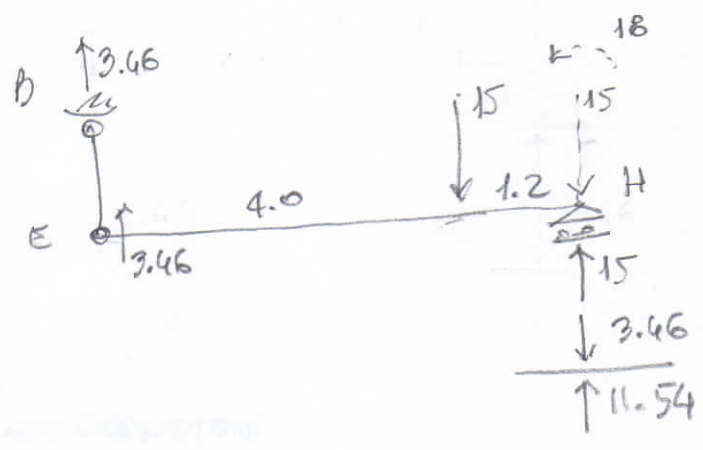
Tension part

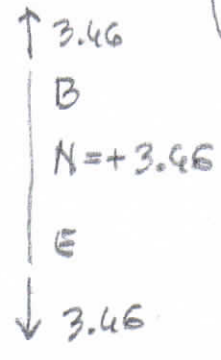
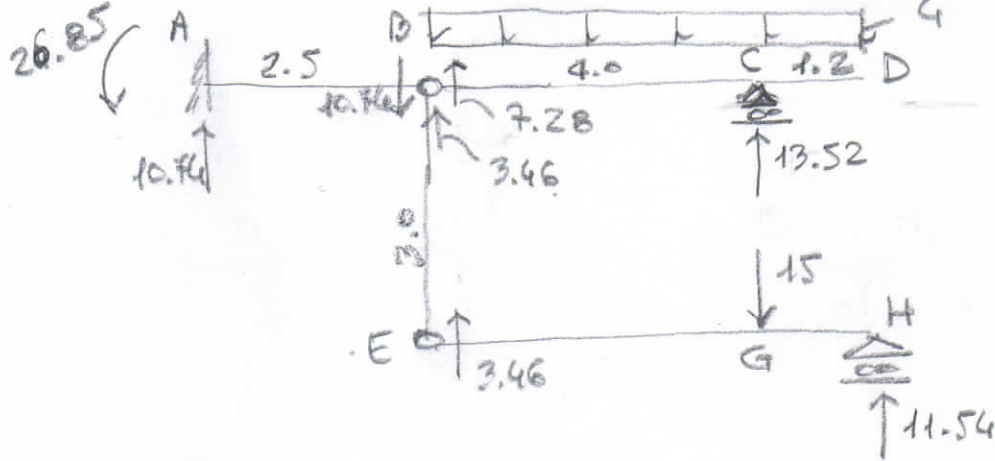


Compression part

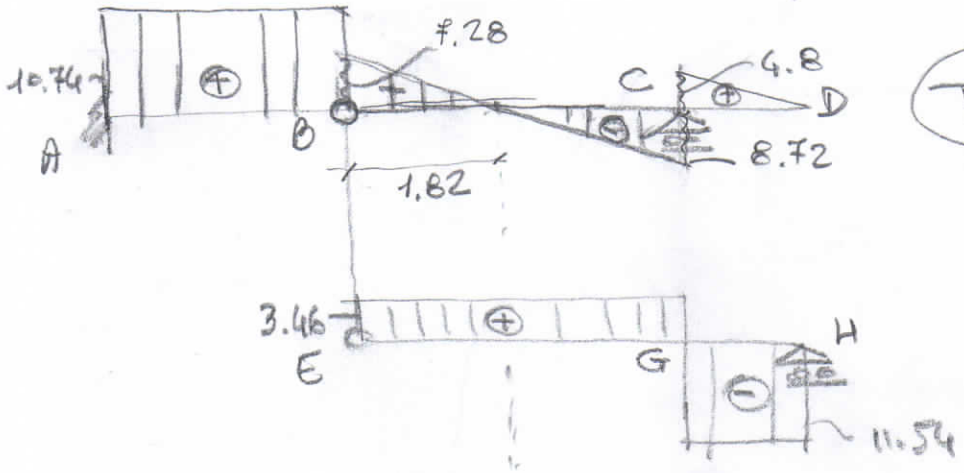
$$7.28 - 4x = 0 \Rightarrow x = 1.82 \text{ m} \quad y = 4 - 1.82 = 2.18 \text{ m}$$

$$M_{\text{max}} = \frac{7.28 \times 1.82}{2} = 6.52 \text{ kNm}$$

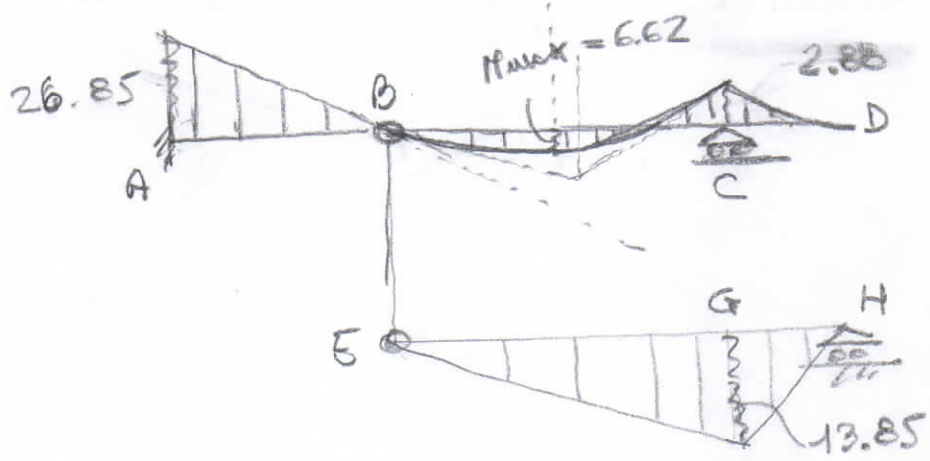




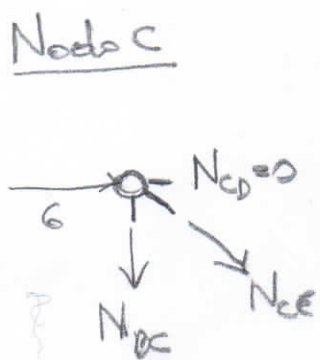
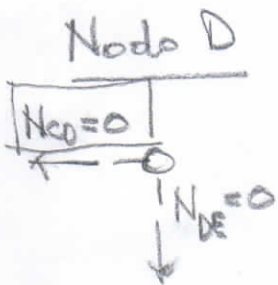
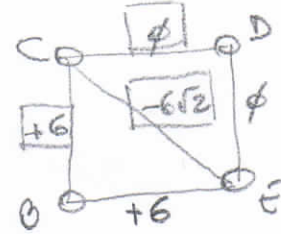
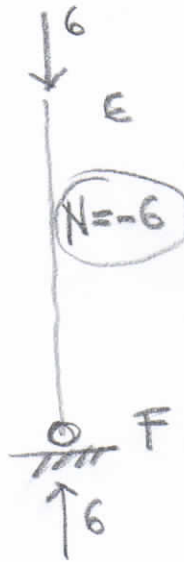
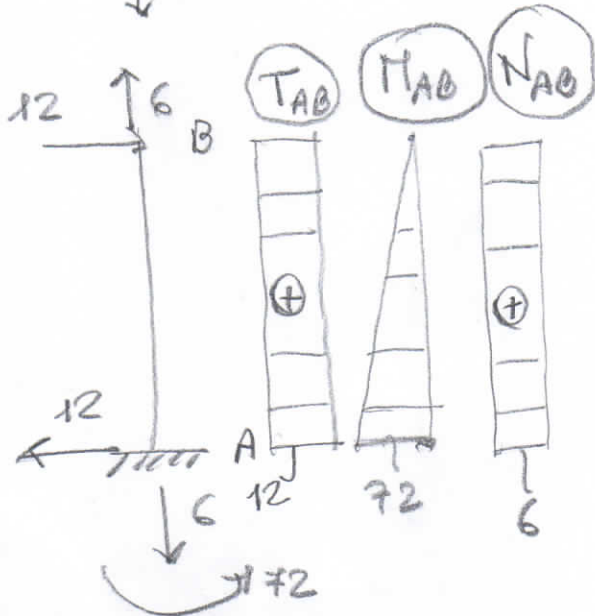
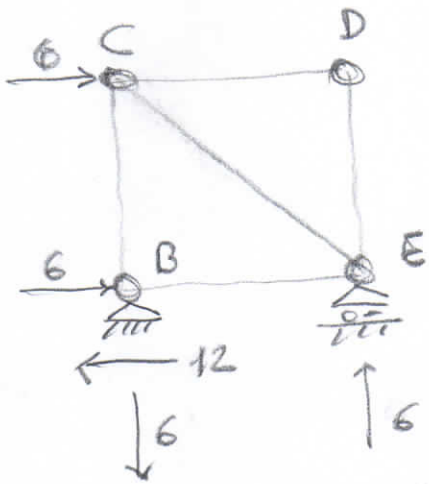
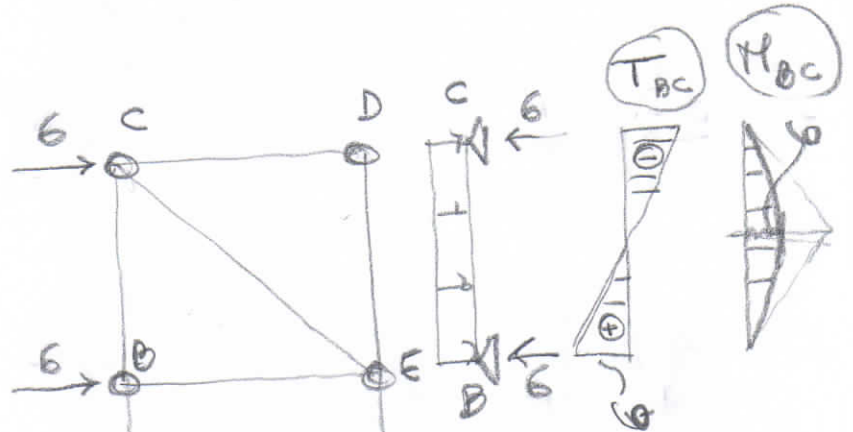
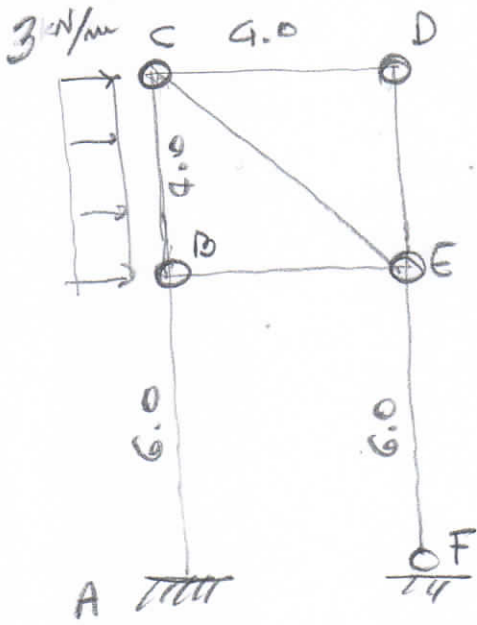
T completo



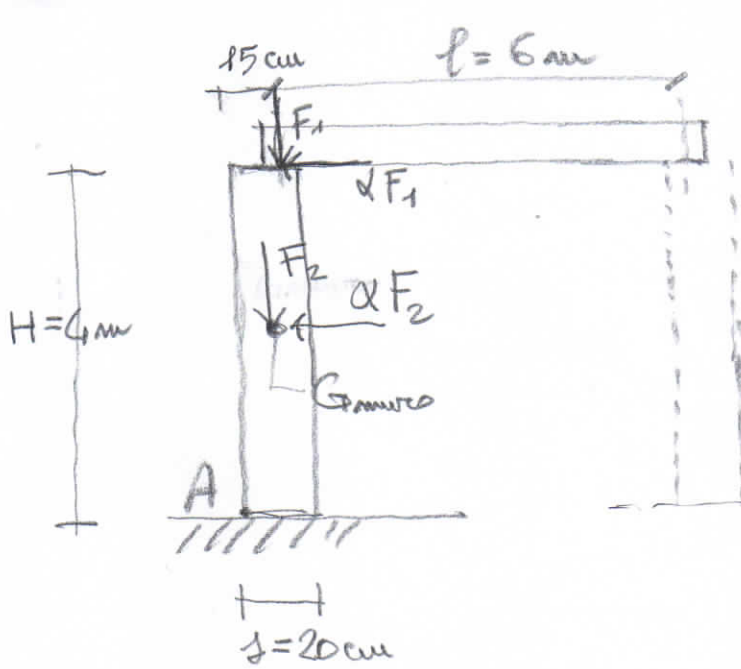
M completo



ES. 2



$$\begin{cases} 6 + N_{CE} \frac{\sqrt{2}}{2} = 0 \Rightarrow N_{CE} = -6\sqrt{2} = -8.49 \\ N_{BC} + N_{CE} \frac{\sqrt{2}}{2} = 0 \Rightarrow N_{BC} = 6 \end{cases}$$



$$\gamma_{\text{muro}} = 12 \frac{\text{kN}}{\text{m}^3}$$

(p.4)

$$p = \text{peso solcio (b=1m)} = 4 \frac{\text{kN}}{\text{m}}$$

$$q = \text{concreto sec (b=1m)} = 2 \frac{\text{kN}}{\text{m}}$$

$F_1 = \text{scarico solcio}$
 su muro dovuto a $p+q$

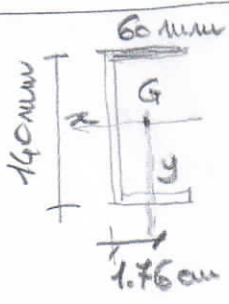
ES.3

$$F_1 = (4+2) \cdot \frac{6}{2} = 18 \text{ kN}; \quad F_2 = 12 \times 0.2 \times 4 = 9.6 \text{ kN}$$

$$M_A = 0 \Rightarrow 18 \times 0.15 + 9.6 \times 0.1 = \alpha (18 \times 4 + 9.6 \times 2)$$

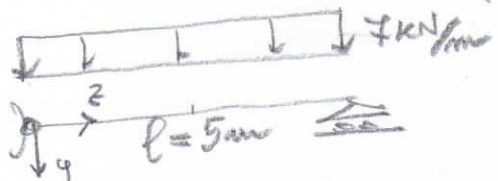
$$\Downarrow$$

$$3.66 = 91.2\alpha \Rightarrow \alpha = 0.04$$



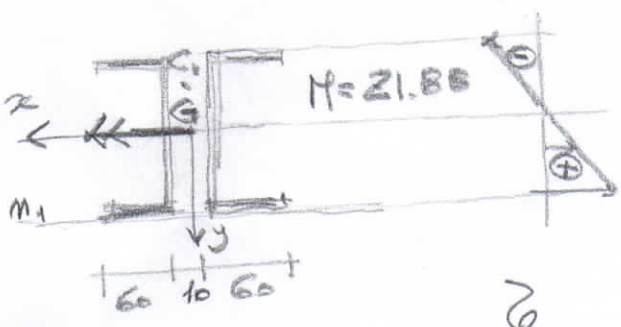
UPN 140
 $A = 20.4 \text{ cm}^2$
 $I_z = 605 \text{ cm}^4$
 $I_y = 62.5 \text{ cm}^4$

ES.4



$$M_{\text{max}} = \frac{7 \times 5^2}{8} = 21.88 \text{ kNm}$$

Sec.



$$\sigma_z = \frac{21.88 \times 10^6}{2 \times 605 \times 10^4} \cdot y = 1.808 y \text{ mm}$$

$$\sigma_z^{\text{max}} = 1.808 \times 70 = 127 \frac{\text{N}}{\text{mm}^2}$$

$$\sigma_z^{\text{min}} = 1.808 (-70) = -127$$

$$d_{G-C_1} = \frac{I_z}{d_{G-M_1}} = \frac{605 \times 2}{20.4 \times 2} = 6.2 \text{ cm}$$