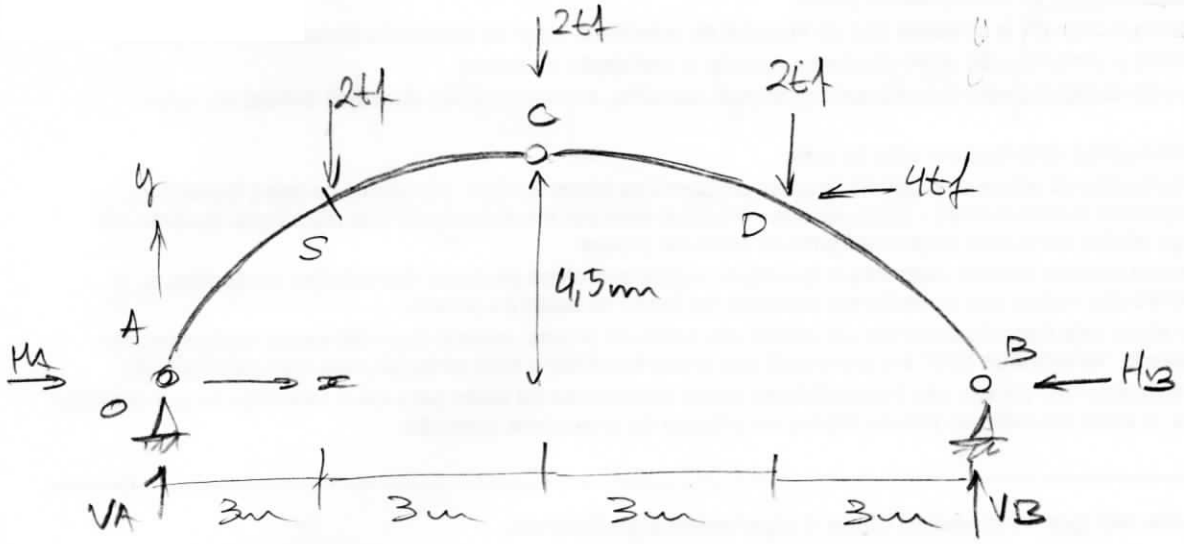
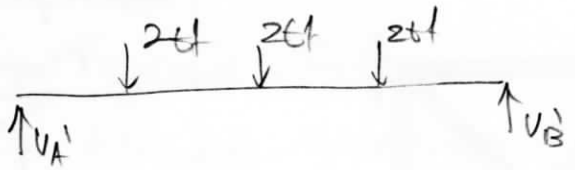
TE1-7.1



DETERMINAR M_S, N_S e Q_S:

- Viga do Subst.:



{ VÁLIDA SOMENTE P/ CARREG VERTICAL

- Equação da Parábola:

$y(x) = a + bx + cx^2$

$0 = a + b.0 + c.0^2 \Rightarrow a = 0$

$4,5 = a + b.6 + c.6^2$

$0 = a + b.12 + c.12^2$

$$\begin{bmatrix} 6 & 36 \\ 12 & 144 \end{bmatrix} \begin{bmatrix} b \\ c \end{bmatrix} = \begin{bmatrix} 4,5 \\ 0 \end{bmatrix}$$

$y = 1,5x - 0,125x^2$

$y_D = y_S = 1,5.3 - 0,125.3^2 = 3,375$

$\overset{(+)}{\curvearrowleft} \Sigma M_B = 0 \quad V_A.12 - 2.3 - 2.6 - 2.9 - 4.3,375 = 0$

$V_A = \frac{1}{12}(6 + 12 + 18 + 13,5) = 4,125\ tf$

$\overset{(+)}{\uparrow} \Sigma F_V = 0 \quad 4,125 - 6 + V_B = 0 \quad V_B = 1,875\ tf$

$\overset{(+)}{\curvearrowleft} \Sigma M_C = 0 \quad V_A.6 - 2.3 - H_A.4,5 = 0$

CA

$H_A = 4,125.6 - 2.3 / 4,5 = 4,1667\ tf$

$\overset{(+)}{\rightarrow} \Sigma F_H = 0 \quad H_A - 4 - H_B = 0 \quad H_B = 4,1667 - 4 = 0,1667\ tf$

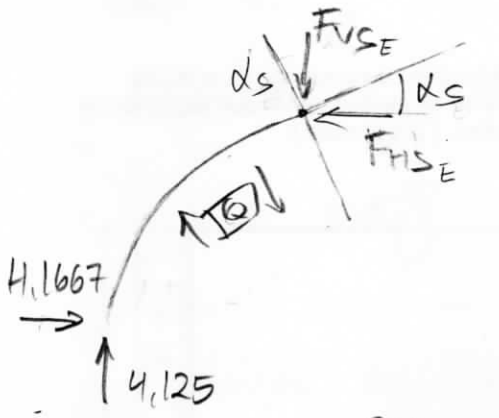
$$M_S = V_A \cdot 3 - H_A \cdot 3{,}375$$
$$= 4{,}125\,tf \cdot 3\,m - 4{,}1667\,tf \cdot 3{,}375\,m = -1{,}688\,tf\,m$$

$$\alpha(x) = \operatorname{arctg}\left(dy/dx\right) = \operatorname{arctg}(1{,}5 - 0{,}25x)$$

$$\alpha_S = \alpha(3) = \operatorname{arctg}(1{,}5 - 0{,}25 \cdot 3) = 0{,}6435\,rad$$

$\operatorname{sen}\alpha_S = 0{,}6$

$\cos\alpha_S = 0{,}8$



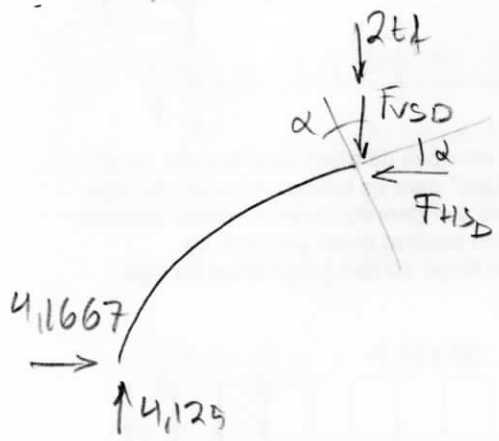
$F_{VS_E} = 4{,}125 \qquad F_{HS_E} = 4{,}1667$

$Q_{S_E} = F_{VS_E} \cdot \cos\alpha - F_{HS} \operatorname{sen}\alpha$

$Q_{S_E} = 4{,}125 \cdot 0{,}8 - 4{,}1667 \cdot 0{,}6 = +0{,}8\,tf$

$N_{S_E} = -F_{VS} \operatorname{sen}\alpha - F_{HS} \cos\alpha$

$N_{S_E} = -4{,}125 \cdot 0{,}6 - 4{,}1667 \cdot 0{,}8 = -5{,}808\,tf$



$F_{VSD} = 4{,}125 - 2 = 2{,}125\,tf$

$F_{HS_D} = 4{,}1667$

$Q_{S_D} = F_{VSD} \cos\alpha - F_{HS_D} \operatorname{sen}\alpha$

$Q_{SD} = 2{,}125 \cdot 0{,}8 - 4{,}1667 \cdot 0{,}6 = -98\,tf$

$N_{SE} = -F_{VSD} \cdot \operatorname{sen}\alpha - F_{HS} \cos\alpha$

$N_{SE} = -2{,}125 \cdot 0{,}6 - 4{,}1667 \cdot 0{,}8 = -4{,}608\,tf$