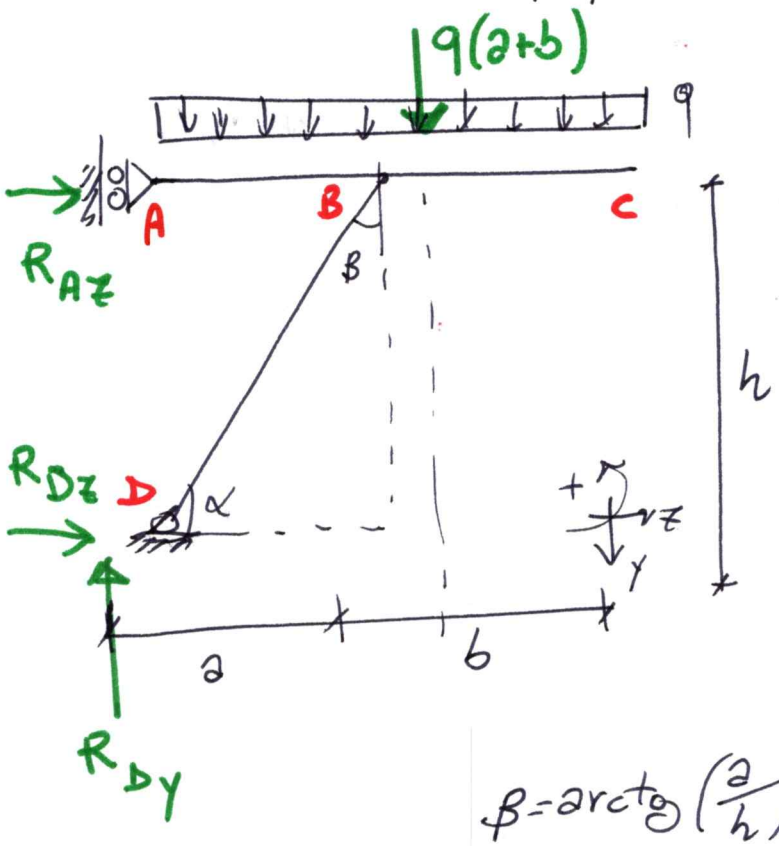
Esercizio n. 1 del 28/05/2020



Dati

$q = 0{,}8\ KN/m$

$a = 1{,}2\ m$

$b = 1{,}8\ m$

$h = 1{,}5\ m$

$\beta = \arctg\left(\frac{a}{h}\right) = 0{,}6747\ rad = 38{,}66°$

$\alpha = \text{//}\ \left(\frac{b}{a}\right) = 0{,}8960\ rad = 51{,}34°$

Reazioni vincolari

$$\begin{cases} \downarrow) -R_{Dy} + q(a+b) = 0 \\ \rightarrow) R_{Dz} + R_{Az} = 0 \\ \circlearrowleft) -R_{Az}\,h - q\frac{(a+b)^2}{2} = 0 \end{cases}$$

$$\begin{cases} R_{Dy} = q(a+b) = 2{,}4\ KN \\ R_{Dz} = -R_{Az} = 2{,}4\ KN \\ R_{Az} = -\frac{q(a+b)^2}{2}\cdot\frac{1}{h} = -2{,}4\ KN \end{cases}$$

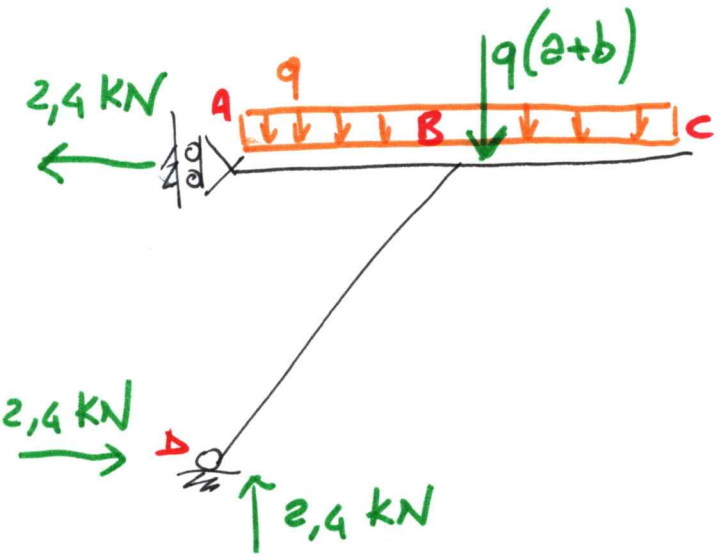
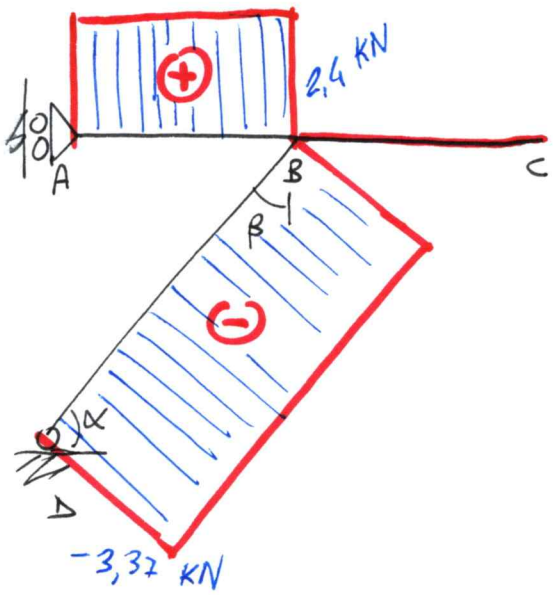


Diagramma N ← [+] →



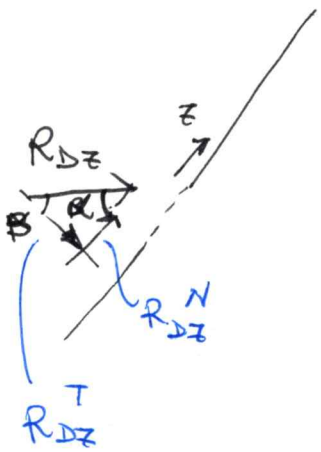
$N_{A_D} = 2,4\ kN$

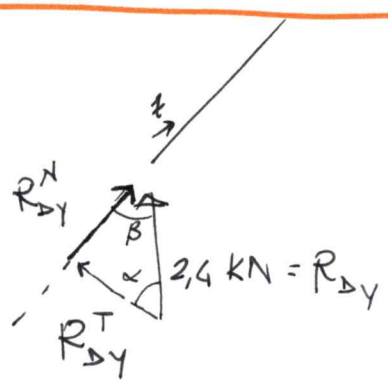
$N_B^S = 2,4\ kN$

$N_B^D = 0$

$N_C = 0$

$N_D = -R_{Dz}^N - R_{Dy}^N = -3,37\ kN$





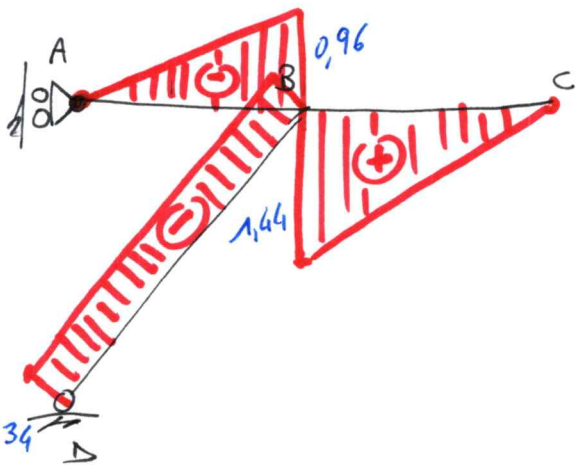
$R_{Dy}^N = R_{Dy} \cdot \cos\beta$

$R_{Dy}^T = R_{Dy} \cdot \operatorname{sen}\beta$

$R_{Dz}^N = R_{Dz} \cdot \cos\alpha = R_{Dz} \cdot \operatorname{sen}\beta$

$R_{Dz}^T = R_{Dz} \operatorname{sen}\alpha = R_{Dz} \cos\beta$

Diagramma T ↑ [+] ↓



$\frac{dT}{dz} + q = 0 \Rightarrow T = cost.$

$T_A^D = 0$

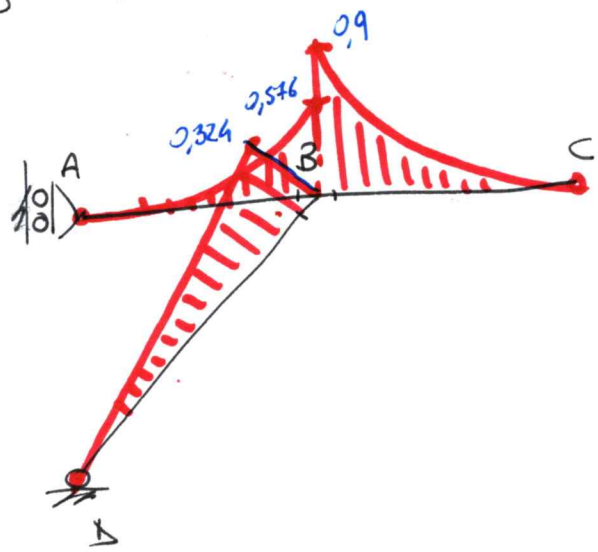
$T_B^S = -q \cdot a = -0,96\ kN$

$T_B^D = -q \cdot a + 2,4\ kN = 1,44\ kN$

$+q \cdot b = 1,44\ kN$

$T_D = R_{Dy}^T - R_{Dz}^T = -0,37\ kN$

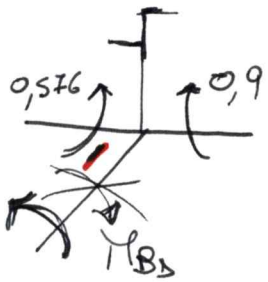
Diagramma M



$M_A = M_C = M_D = 0$

$$M_B^S = -\frac{q a^2}{2} = -0,576 \text{ kNm}$$

$$M_B^D = -\frac{q b^2}{2} = -0,9 \text{ kNm}$$



$$M_{BD} + 0,9 - 0,576 = 0$$

$$M_{BD} = -0,9 + 0,576 = -0,324 \text{ kNm}$$