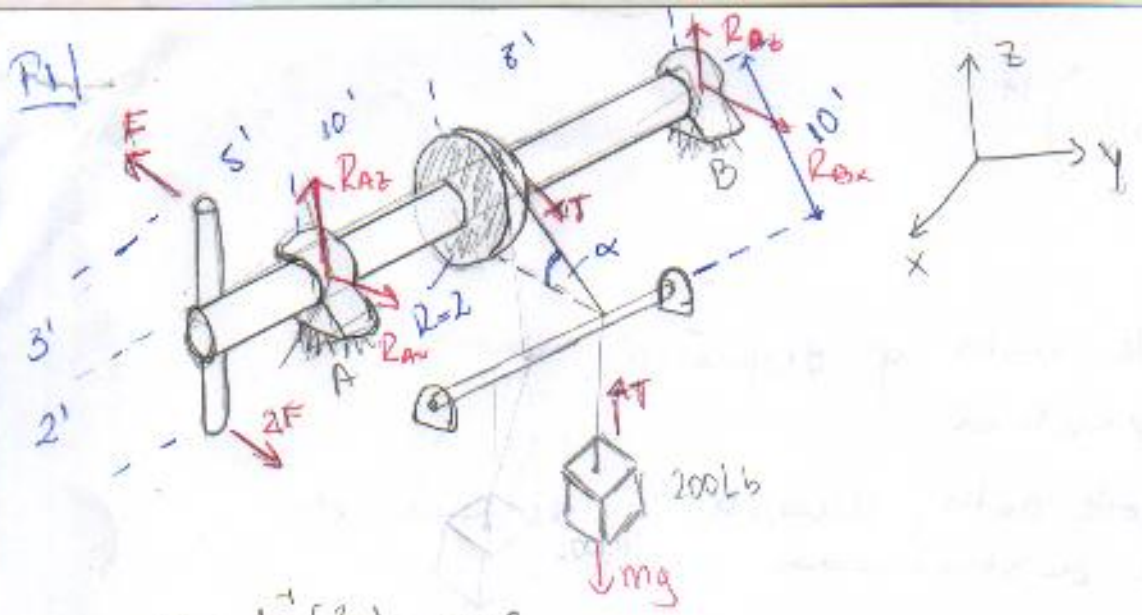
R1/



$$\alpha = tg^{-1}\left(\frac{2}{10}\right) = 11,3°$$

$$T = mg = 200\,lb \cdot 32,2\,ft/s^2 = 6440\,lbf$$

Conocida la Tension, en el eje principal quedan 5 incógnitas

$F, R_{Az}, R_{Ax}, R_{Bz}, R_{Bx}$

Donde R_{ij} es la reacción en el soporte i en la dirección j

y se tienen 5 ecuaciones (3 torques + 2 de fuerza)

$$\sum T_{zB} = 8T\cos\alpha + 18R_{Ax} + 23 \cdot 2F - 23F = 0 \quad (1)$$

$$\sum T_{xB} = 8T\sin\alpha - 18R_{Az} = 0 \quad (2)$$

$$\sum T_{yB} = 2T - 3F - 2 \cdot 2F = 0$$

$$2T - 7F = 0 \quad (3)$$

$$\sum F_z = 0 \Rightarrow R_{Az} + R_{Bz} - T\sin\alpha = 0 \quad (4)$$

$$\sum F_x = 0 \Rightarrow 2F + R_{Ax} + R_{Bx} - F = 0 \quad (5)$$

De (3) $F = \frac{2}{7}T = 1840\,[lbf]$ (6)

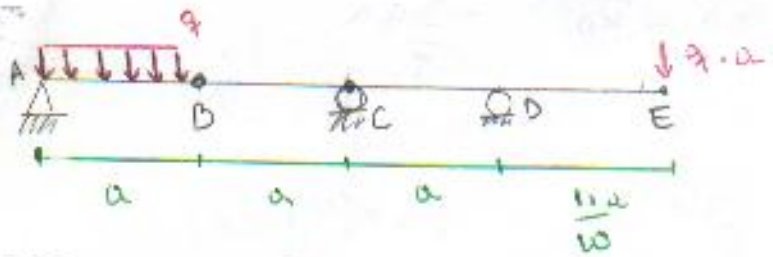
(6) en (1) $\Rightarrow$ $R_{Ax} = \frac{-23F - 8T\cos\alpha}{18} = -5157,85\,[lbf]$ (7)

de (2) $R_{Az} = \frac{4}{9}T\sin\alpha = 560,841\,[lbf]$ (8)

(8) en (4) $R_{Bz} = T\sin\alpha - R_{Az} = 701,057\,[lbf]$ (9)

(7) en (5) $R_{Bx} = -R_{Ax} - F = 3317,85\,[lbf]$ (10)

P2) =



$\sum F_y = 0 \Rightarrow R_A + R_C + R_D = 2q \cdot a$ (1)

$\sum M_C = 0 \Rightarrow R_A \cdot 2a + \frac{21}{10} q a^2 = \frac{3q}{2} a^2 + R_D \, a$ (2)

$\sum M_{\text{interno rótula}} = 0 \Rightarrow R_A \cdot a - q \frac{a^2}{2} = \cancel{M} \, 0$ (3)

(3) $\Rightarrow \boxed{R_A = \frac{qa}{2}}$ (4)

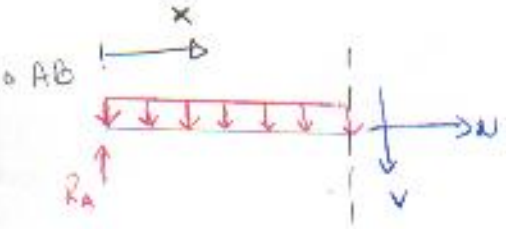
(2) $\Rightarrow q a^2 + \frac{21}{10} q a^2 = \frac{3q}{2} a^2 + R_D a \Rightarrow \boxed{R_D = \frac{8qa}{5}}$ (5)

(3) y (5) en (1) $\Rightarrow \frac{qa}{2} + R_C + \frac{8}{5} qa = 2qa$

$R_C = \left[\frac{20}{10} - \frac{5}{10} - \frac{16}{10}\right] qa \Rightarrow \boxed{R_C = -\frac{qa}{10}}$ (6)

LAS FUERZAS INTERNAS ($N=0$ PARA TODOS LOS TRAMOS)

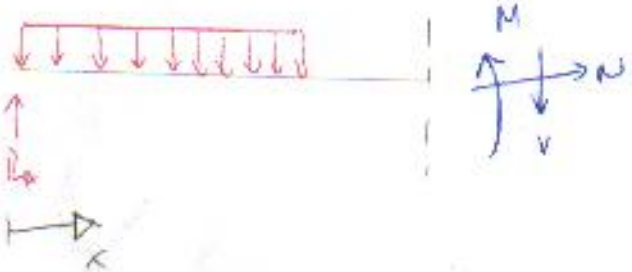
- AB



$V = R_A - q x = q\left(\frac{a}{2} - x\right)$

$M = R_A x - q \frac{x^2}{2} = q\left(\frac{ax}{2} - \frac{x^2}{2}\right)$

- BC



$V = R_A - q \cdot a = -q \frac{a}{2}$

$M = R_A x - qa\left(x - \frac{a}{2}\right)$

$= q\left(\frac{a}{2} x - ax + \frac{a^2}{2}\right)$

$M = -q \frac{a}{2}(x - a)$

• CD

$$V = qa - R_D = -\frac{3}{5}qa$$

$$M = R_D(3a - x) - qa\left(\frac{41}{10}a - x\right)$$

$$M = \frac{8}{5}qa(3a - x) - qa\left(\frac{41}{10}a - x\right)$$

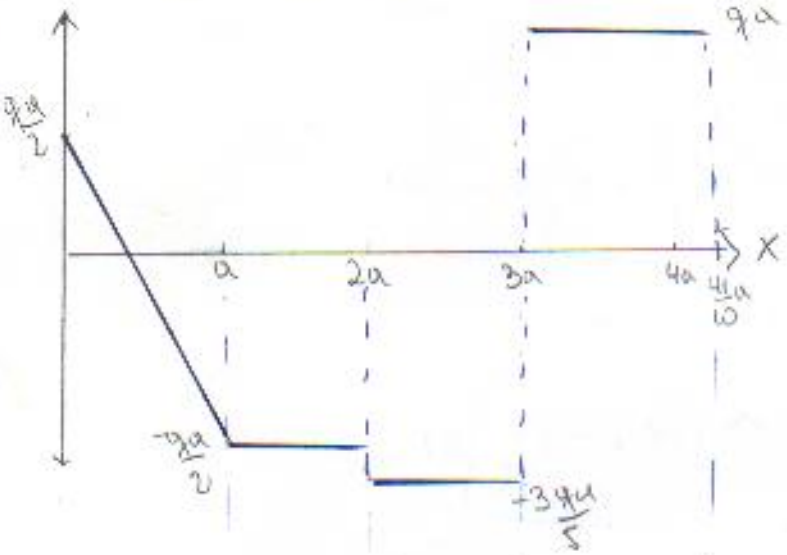
• DE

$$V = qa$$

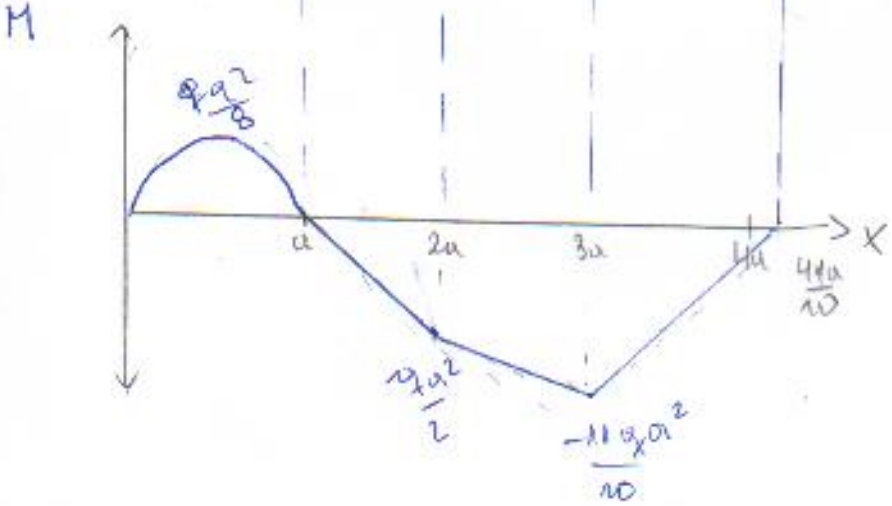
$$M = -qa\left(\frac{41}{10}a - x\right)$$

LOS DIAGRAMAS QUEDAN

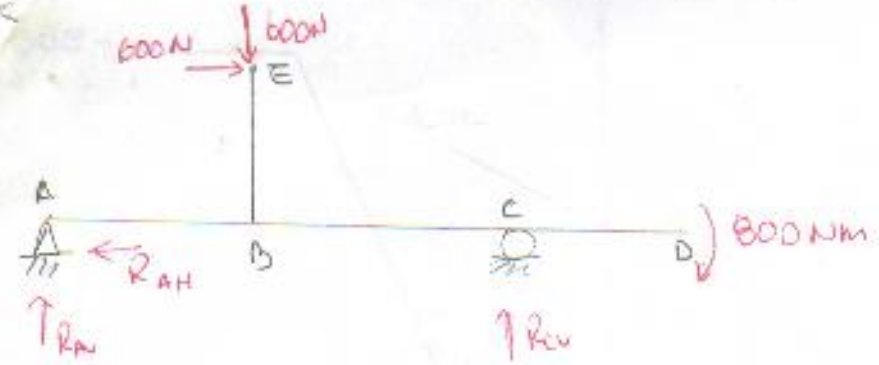
V



M



P3)



$$\sum M_C = 0 \Rightarrow R_{AV} \cdot 6 - 600 \cdot 3 + 600 \cdot 2 + 800 = 0$$

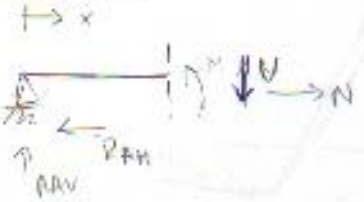
$$\Rightarrow R_{AV} = -\frac{100}{3}\ [N]$$

$$\sum F_y = 0 \Rightarrow R_{AV} - 600 + R_{CV} = 0 \Rightarrow \frac{100}{3} + 600 = R_{CV} = \frac{1900}{3}[N]$$

$$\sum F_H = 0 \Rightarrow R_{AH} = 600[N]$$

FUERZAS INTERNAS

• TRAMO AB

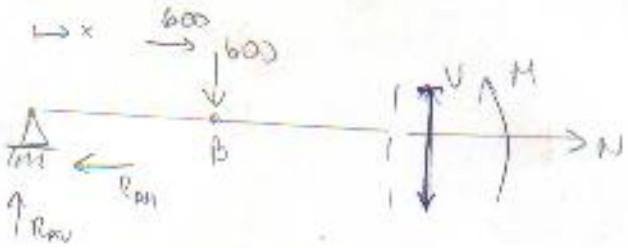


$$V = +R_{AV} = -\frac{100}{3}\ [N]$$

$$N = R_{AH} = 600[N]$$

$$M = R_{A\,v} \cdot x = -\frac{100}{3}\ [N \cdot m]$$

• TRAMO BC.



$$V = +R_{AV} + 600 = -\frac{1900}{3}$$

$$N = 0$$

$$M = R_{AV} \cdot x - 600(x-3) + 600 \cdot 2$$

$$M(x) = -\frac{100}{3}x - 600(x-3) + 600 \cdot 2$$

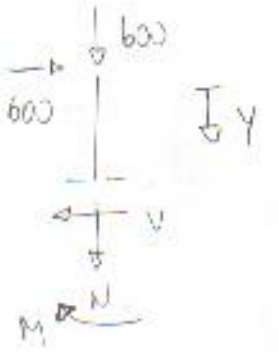
• TRAMO CD

$N = 0$

$V = 0$

$M = 800\ N \cdot m$

• TRAMO BE



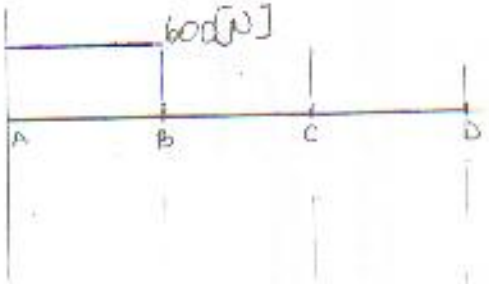
$N = -600\ [N]$

$V = 600\ [N]$

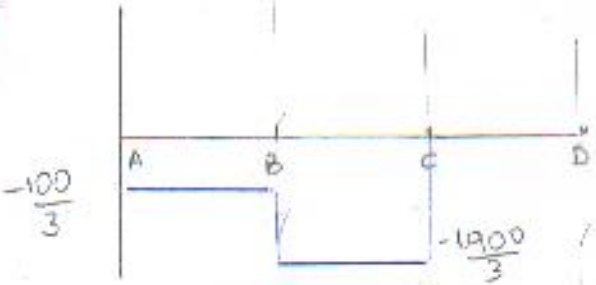
$M = -600x$

LOS DIAGRAMAS QUEDAN

N



T



M