ISAAC GABRIEL AGUILAR CANO

RESISTENCIA DE LOS MATERIALES

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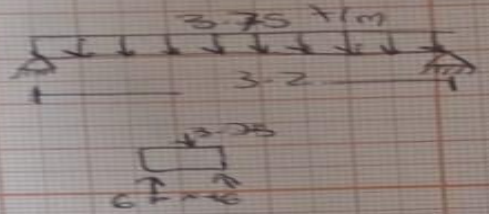
EJERCICIOS

4TO CUATRIMESTRE

Resistencia de los materiales



$q.l = 3.75 \cdot 3.2 = 12$ ton

$RA = RB = q.l/2 \; (3.75 \; t/m \cdot 3.2) \; c = 6$ ton

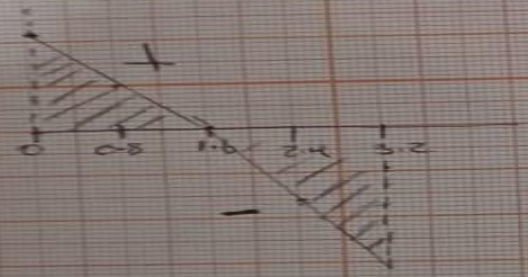
$\Sigma F_x = 0 \quad 6 \text{ ton} - [3.75 \cdot (x)] - v = 0$

$v = 6 \text{ ton} - [3.75 \cdot x]$

$\Sigma m = 0 \quad -6 \text{ ton} \cdot x + [3.75 \cdot (x) \cdot (x/2)] = t$

$M = (6 \text{ ton} \cdot x) - (1.875 \; t/m \cdot (x)^2]$

Grafica de Cortante



x	0	0.8	1.6	2.4	3.2
v	6	3	0	−3	−6
	0	3.6	4.8	3.6	0

$v = 6 \text{ ton} \; [3.75 \cdot 0] = 6$

$v = 6 \text{ ton} \; [3.75 \cdot 0.8] = 3$

$v = 6 \text{ ton} \; [3.75 \cdot 1.6] = 0$

$v = 6 \text{ ton} \; [3.7 \cdot 2.4] = -3$

$v = 6 \text{ ton} \; [3.7 \cdot 3.2] = -6$

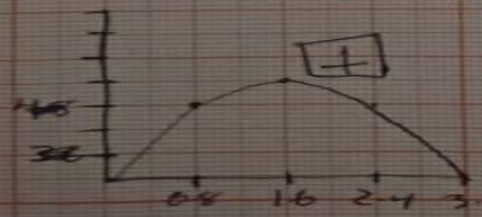
Grafica de Momento

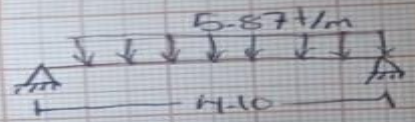
$M = (6 \text{ ton} \cdot 0.8 m) - [3.75 \cdot (0.8)^2] = 3.6$

$M = (6 \text{ ton} \cdot 1.6 m) - [3.75 \cdot (1.6)^2] = 4.8$

$M = (6 \text{ ton} \cdot 2.4) - [3.75 \cdot (2.4)^2] = 3.6$

$M = (6 \text{ ton} \cdot 3.2) - [3.75 \cdot (3.2)^2] = 0$





$q \cdot L = 5.87 \text{ t/m} \cdot 4.10\text{m} = 24.067 \text{ ton}$

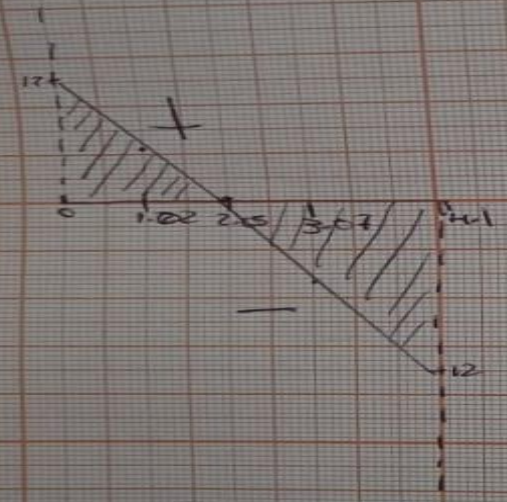
$RA = RB\,(5.87 \cdot 4.10)/2 = 12.0335 \text{ ton}$

$\Sigma F_y = 0 \quad 12.0335 - [5.87 \cdot x] - V = 0$

$V = 12.0335 \text{ ton} - [5.87 \cdot x]$

$\Sigma M = 0 \quad 12.0335 \cdot x + [5.87 \cdot (x)(x/2)] + M = 0$

$M = (12.0335 \text{ ton} \cdot x) - (2.935 \cdot x^2)$



Grafica de cortante

X	0	1.02	2.05	3.07	4.1
V	12.0	6.016	0	-6.01	-12.03
M	0	9.2	11.7	-9.2	0

$V = 12.0335 \text{ ton} - [5.87 \cdot 0] = 12.03$

$V = 12.033 \text{ ton} - [5.87 \cdot 1.02] = 6.016$

$V = 12.033 \text{ ton} - [5.87 \cdot 2.05] = 0$

$V = 12.033 \text{ ton} - [5.87 \cdot 3.07] = -6.01$

$V = 12.033 \text{ ton} - [5.87 \cdot 4.1] = 12.03$

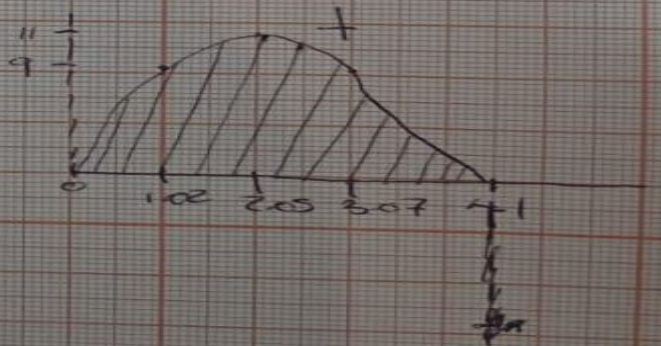
Grafica de Momentos

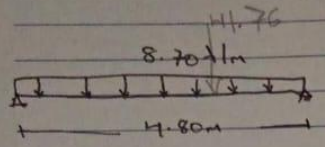
$M = (12.033 \cdot 1.025) - 2.935 \cdot (1.025)^2 = 9.2$

$M = (12.033 \cdot 2.05) - 2.935 \cdot (2.05)^2 = 11.74$

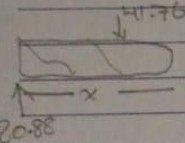
$M = (12.03 \cdot 3.07) - 2.935 \cdot (3.07)^2 = -9.25$

$M = (12.033 \cdot 4.1) - 2.935 \cdot (4.1)^2 = 0$





① $8.70\,t/m\,(4.80\,m) = 41.76$



② $R_A = R_B = \frac{q \cdot l}{2}$

$\frac{8.70\,(4.80)}{2} = 20.88$

③ Ecuación de corte

$\Sigma F_x = 0$

$20.88 - 8.70(x) - V = 0$

$V = 20.88 - [8.70\,t/m\,(x)]$

④ Ecuación de Momentos

$\Sigma M = 0$

$-20.88(x) + [8.70\,t/m\,(x)(x/2)] + M = 0$

$-20.88(x) + \frac{8.70\,t/m\,x^2}{2} + M = 0$

$-20.88(x) + 4.35\,t/m\,(x^2) = 0$

$M = 20.88\tan(x) - 4.35\,t/m\,(x^2)$

X	0	1.2	2.4	3.6	4.80
V	20.88	10.44	0	-10.44	-20.88
M	0	18.792	25.05	18.49	0