CENTROIDES Y MOMENTOS DE INERCIA

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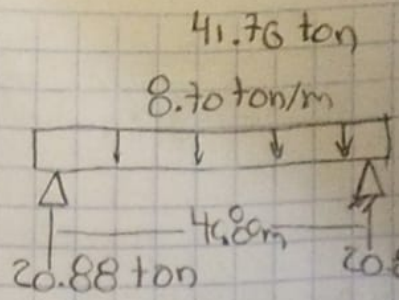
4. CUATRIMESTRE

RESISTENCIA DE MATERIALES DE CONSTRUCCION

10 DE NOVIEMBRE DEL 2023



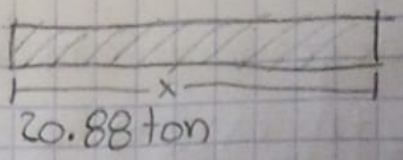
① $q(L)$

$8.70\ t/m\ (4.80) = 41.76$ ton

② $R_A - R_B = qL$

$8.70\ t/m\ (4.80) = 20.88$ ton

③



④ Ecuacion de cortante

$\sum F_Y = 0$

$20.88\ ton - [8.70\ ton/m(x)] - V = 0$

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

⑤ Ecuacion de momentos

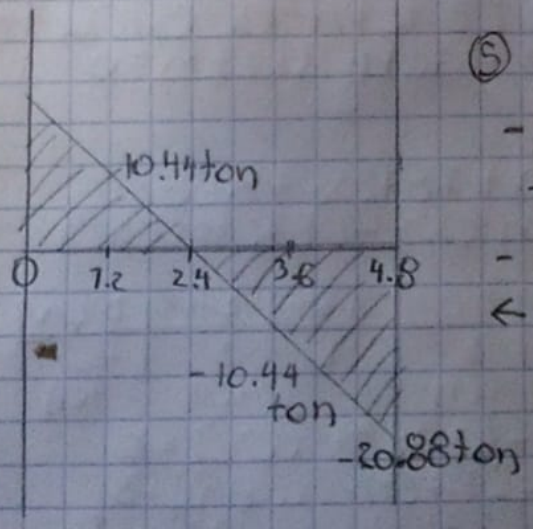
$-20.88\ ton\ [8.70\ t/m(x)(x/2)] + M = 0$

$-20.88(x) + 8.70\ t/m\ (x^2) = 0$

$-20.88\ ton + 4.35x^2 + M = 0$

$\leftarrow M = 20.88\ ton(x) - 4.35\ t/m(x^2)$

⑥ 20.88 ton



6.1

x	0	1.2m	2.4m	3.6m	4.8m
V	20.88 ton	10.44 ton	0 ton	-0.44 ton	-20.58 ton

$V = 20.88\ ton - [8.70\ t/m(0)] = 20.88$

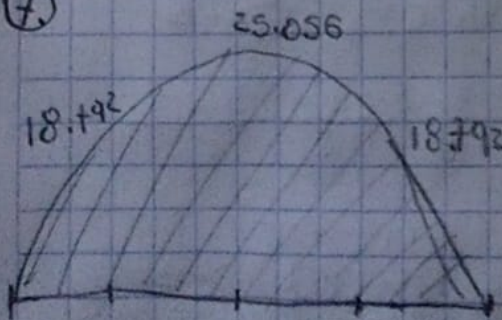
$V = 20.88\ ton - [8.70\ t/m(1.2)] = 10.44$

$V = 20.88\ ton - [8.70\ t/m(2.4)] = 0$

$V = 20.88\ ton - [8.70\ t/m(3.6m)] = 0.44$

$V = 20.88\ ton - [88\ to/m(4.8m)] = -20.88$

⑦



⑦.① $M = 20.88\ ton(0) - 4.35\ t/m(0)^2 = 0$

$M = 20.88\ ton(1.2m) - 4.35\ t/m(1.2)^2 = 18.792$

$M = M = 20.88\ ton(2.4m) - 4.35\ t/m(2.4m)^2 = 25.056$

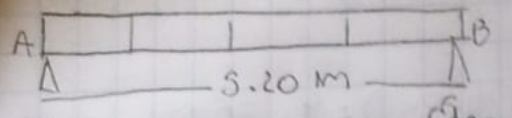
$M = 20.88\ ton(3.6m) - 4.35\ t/m(3.6m)^2 = 18.79$

$M = 20.88\ ton(4.8m) - 4.35\ t/m(4.8m)^2 =$

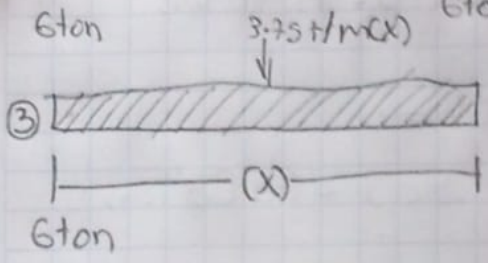
x	0	1.2m	2.4m	3.6m	4.8m
M	0	18.792	25.056	18.792	0

12 ton

3.75 t/m



6 ton 6 ton



q (c)

3.75 t/m (3.20 m) = 12 ton

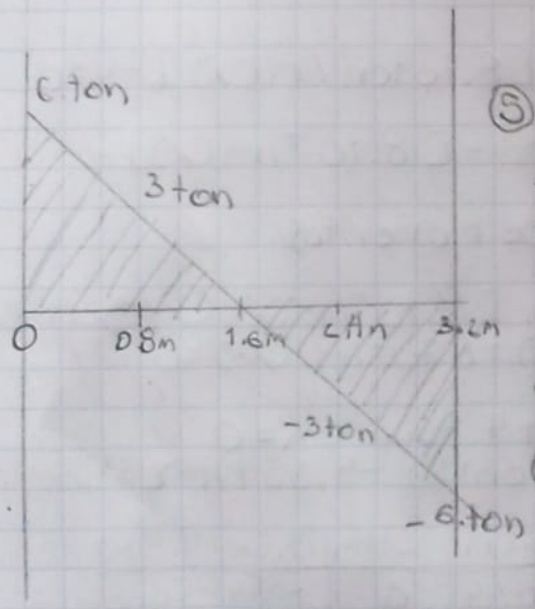
② $RA - RB - \frac{qL}{2}$

$\frac{3.75\ t/m\ (3.20) = 6}{2}$

④ Ecuacion de cortante $\in Fy = 0$

$6\ ton - [3.75\ t/m\ (x)] - y = 0$

$V = -6\ ton - [3.75\ t/m\ (x)]$



⑤ Ecuacion de momentos

$-6\ ton\ (x) [3.75\ t/m\ (x)\ (x/2)] + M = 0$

$-6\ ton\ .(x) + \frac{3.75\ t/m\ (x)^2}{2} + M = 0$

$-6\ ton\ (x) + 1.875 x^2 + M = 0$

$\leftarrow M = 6\ ton\ (x) - 1.875\ t/m\ (x^2)$

(6.1)

x	0	0.8m	1.6m	2.4m	3.2m
V	6 ton	3 ton	0	-3 ton	-6 ton

$V = 6\ ton - [3.75\ t/m\ (0)] = 6$

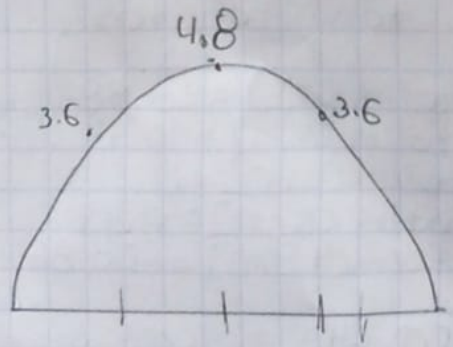
$V = 6\ ton - [3.75\ t/m\ (0.8m)] = 3$

$V = 6\ ton - [3.75\ t/m\ (2.4m)] = -3$

$V = 6\ ton - [3.75\ t/m\ (2.4m)] = -3$

$V = 6\ ton - [3.75\ t/m\ (3.2m)] = -6$

7



(7.1)

x	0	0.8m	1.6m	2.4m	3.2m
M	0	3.6m	4.8	3.6	0

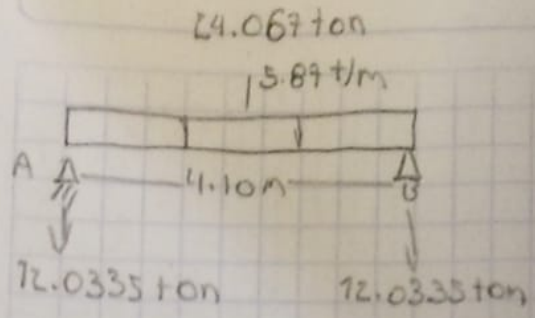
$M = 6\ ton\ (0) - 1.875\ t/m\ (0)^2 = 0$

$M = 6\ ton\ (0.8m) - 1.875\ t/m\ (0.8m)^2 = 3.6$

$M = 6\ ton\ (1.6m) = 1.875\ t/m\ (1.6m)^2 = 4.8$

$M = 6\ ton\ (2.4m) - 1.875\ t/m\ (2.4m)^2 = 3.6$

$M = 6\ ton\ (3.2m) - 1.875\ t/m\ (3.2m)^2 = 0$

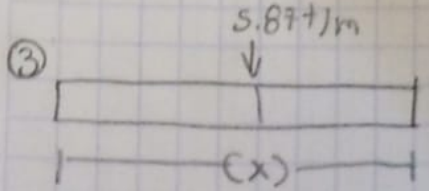


① $q(c)$

$5.87\ t/m\ (4.10m) = 24.06\ ton$

② $RA - RB = \frac{qL}{2}$

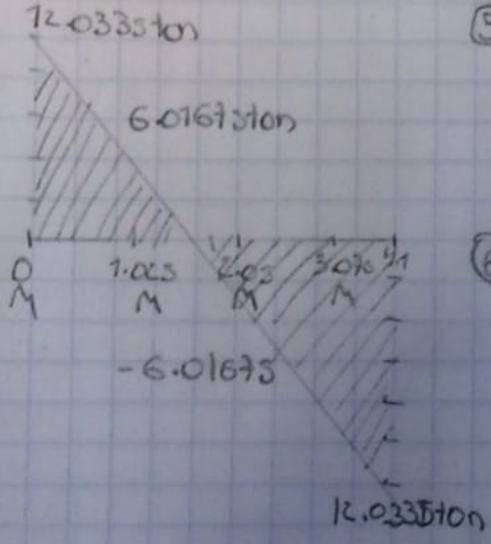
$\frac{5.87\ t/m\ (4.10m)}{2} = 12.0335\ ton$



④ Ecuaciones de momentos

$-12.0335 - [5.87\ t/m\ (x)\ (x/2)] + m = 0$

$V = 12.0335\ ton - [5.87\ t/m\ (x)]$



⑤ $-12.0335 - [5.87\ t/m\ (x)\ (x/2)] + m = 0$

$-12.0335(x) - \frac{5.87}{2}\ t/m(x^2) = 0$

$-12.0335 + 2.935\ x^2 + M = 0$

$M = 12.0335(x) - 2.935\ t/m(x^2)$

⑥.1

X	0 M	1.025 M	2.05 M	3.075 M	4.1 M
V	12.0335 ton	6.0167 ton	0 ton	-6.0167 ton	-12.0335 ton

$V = 12.0335\ ton - [5.87\ t/m\ (0)] = 12.0335$

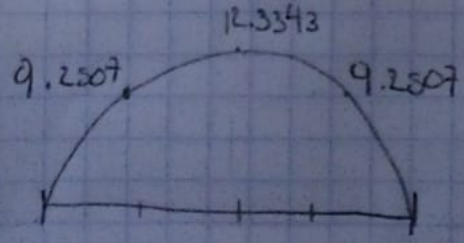
$V = 12.0335\ ton - [5.87\ t/m\ (1.025m)] = 6.0167$

$V = 12.0335\ ton - [5.87\ t/m\ (3.075m)] = -6.0167$

$V = 12.0335\ ton - [5.87\ t/m\ (2.05)] = 0$

$V = 12.0335\ ton - [5.87\ t/m\ (4.1m)] = 12.0335$

⑦



⑦.1

X	0	1.025 M	2.05 M	3.075 M	4.1 m
M	0	24.6679	12.3343	9.2507	0

$M = 12.0335\ ton\ (0) - 2.93\ t/m\ (0)^2 = 0$

$M = 12.0335\ ton\ (0) - 2.93\ t/m\ (1.025m)^2 = 9.2507$

$M = 12.0335\ ton\ (2.05m) - (2.935\ t/m\ (2.05m)^2 = 12.3343$

$M = 12.0335\ ton\ (3.075m) - 2.935\ t/m\ (3.075m)^2 = 9.2507$

$M = 12.0335\ ton\ (4.1m) - 2.935\ t/m\ (4)\ m^2 = 0$