Mi Universidad

Ejercicios

Alejandra Monserrath Aguilar Gómez

Centroides y momentos de inercia

Tercer Parcial

Resistencia de materiales de construcción

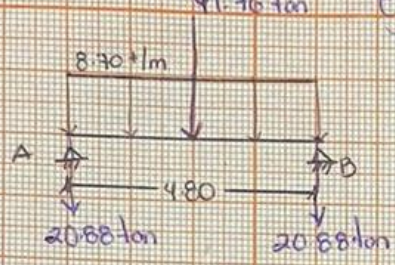
Pedro Alberto García López

Arquitectura

Cuarto Cuatrimestre

Comitán de Domínguez, 10/Noviembre/2023

Ejercicio 1



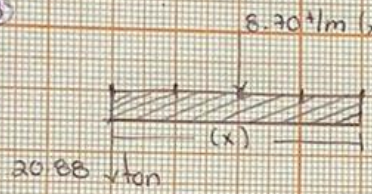
① $q(c)$

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

② $RA = RB = \frac{qL}{2}$

$\frac{8.70\ t/m\ (4.80m)}{2} = 20.88\ ton$

③



④ Ecuación de cortante

$\sum FY = 0$

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

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

⑤ Ecuación de momentos

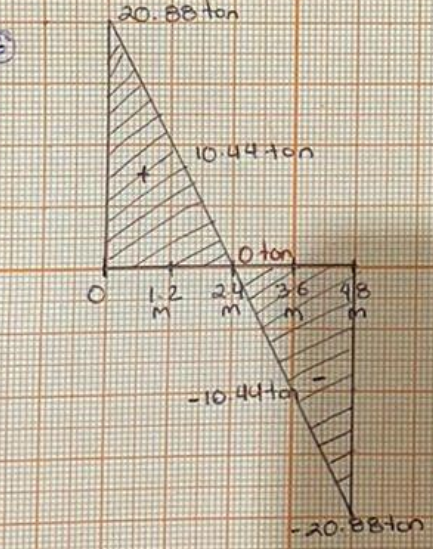
$-20.88\ ton\ [8.70\ t/m\ (x)(x/2)] + M = 0$

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

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

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

⑥



⑥.1

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

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

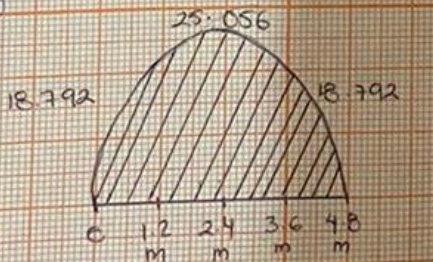
$V = 20.88\ ton - [8.70\ t/m\ (1.2m)] = 10.44$

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

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

$V = 20.88\ ton - [8.70\ t/m\ (4.8m)] = -20.88$

⑦



⑦.1

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

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

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

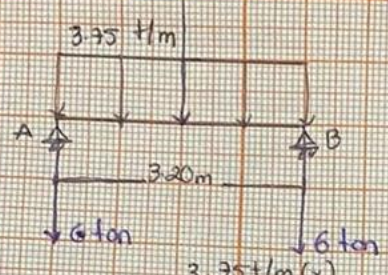
$M = 20.88\ ton\ (2.4m) - 4.35\ t/m\ (2.4m)^2 = 25.056$

$M = 20.88\ ton\ (3.6m) - 4.35\ t/m\ (3.6m)^2 = 18.792$

$M = 20.88\ ton\ (4.8m) - 4.35\ t/m\ (4.8m)^2 = 0$

1.2 ton

Ejercicio 2



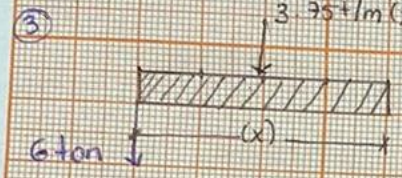
① q(c)

$3.75\ t/m\ (3.20m) = 12\ ton$

② $R_A = R_B = \frac{qL}{2}$

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

③



④ Ecuación de cortante

$\sum F_y = 0$

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

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

⑤ Ecuación de momentos

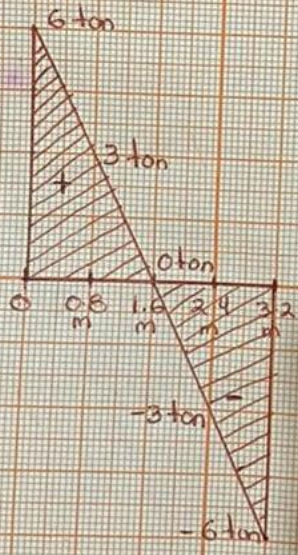
$-6\ ton\ (x) [3.75\ t/m\ (x)\ (x/2)] + M = 0$

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

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

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

⑥



⑥.1

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

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

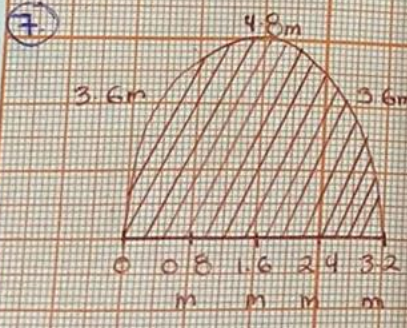
$V = 6\ ton - [3.75\ t/m\ (0.8m) = 3$

$V = 6\ ton - [3.75\ t/m\ (1.6m) = 0$

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

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

⑦



⑦.1

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

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

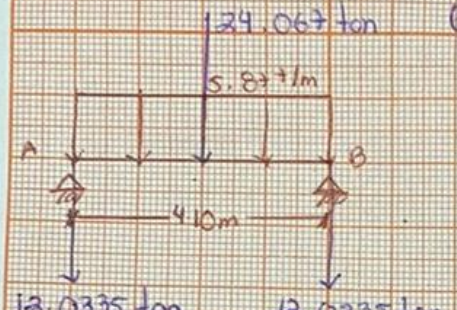
$M = 6\ ton\ (0.8m) - 1.875\ t/m\ (0.8m)^2 = 3.6$

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

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

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

Ejercicio 3

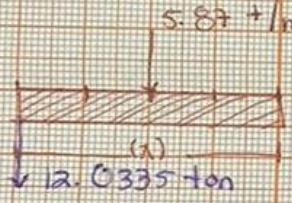


① $q(c)$

$5.87\ t/m\ (4.10m) = \underline{24.067\ ton}$

② $RA = RB = \frac{qL}{2}$

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



④ Ecuaciones de cortante.

$\sum F_y = 0$

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

$\leftarrow V = 12.0835\ ton - [5.87\ t/m\ (x)]$

⑤ Ecuaciones de momento

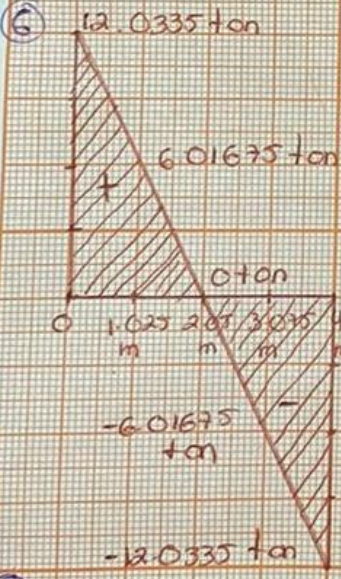
$-12.0335 - [5.87\ t/m\ (x)(x/2)] + m = 0$

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

$-12.0335 + 2.935x^2 + m = 0$

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

⑥



⑥.1

X	0	1.025 m	2.05 m	3.075 m	4.1 m
V	12.033 ton	6.016 ton	0	-6.016 ton	-12.033 ton

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

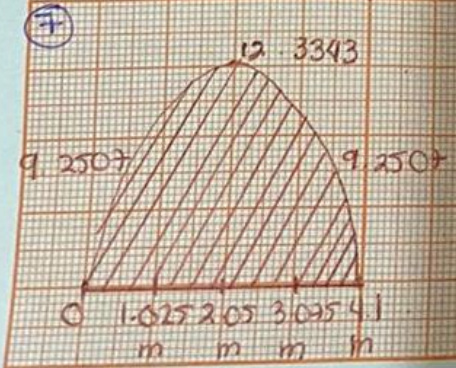
$V = 12.0335\ ton - [5.87\ t/m\ (1.025m)] = 6.0167$

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

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

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

⑦



⑦.1

X	0	1.025 m	2.05 m	3.075 m	4.1 m
M	0	9.250T	12.3343	9.250T	0

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

$M = 12.0335\ ton\ (1.025m) - 2.935\ t/m\ (1.025m)^2 = 9.250T$

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

$M = 12.0335\ ton\ (3.075m) - 2.935\ t/m\ (3.075m)^2 = 9.250T$

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