Esfuerzos y deformaciones

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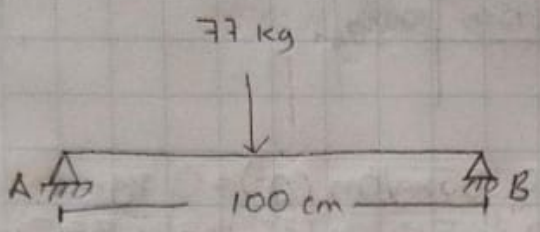
4. CUATRIMESTRE

RESISTENCIA DE MATERIALES DE CONSTRUCCION

3 DE DICIEMBRE DEL 2023

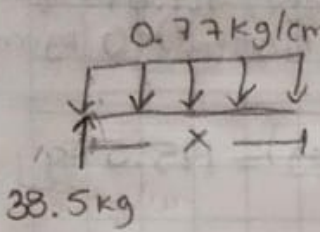
① MÉTODO DE ECUACIONES



① $\frac{77\ kg}{100\ cm} = 0.77\ kg/cm$

② $RA = RB = \frac{qL}{2}$

$\frac{0.77\ kg/cm\ (100\ cm)}{2} = 38.5\ kg$



③ $\Sigma F_Y = 0$

$38.5\ kg - [0.77\ kg/cm\ (x)] - V = 0$

$\ast\leftarrow V = 38.5\ kg - [0.77\ kg/cm\ (x)]$

④ $\Sigma M = 0$

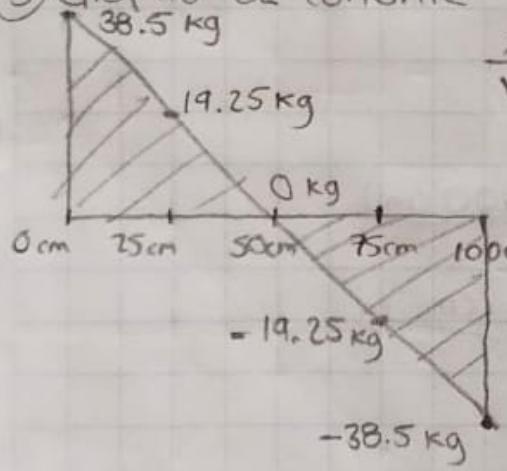
$-38.5\ kg\ (x) + [0.77\ kg/cm\ (x)(x/2)] + M = 0$

$-38.5\ kg\ (x) + \frac{[0.77\ kg/cm\ (x^2)]}{2} + M = 0$

$-38.5\ kg\ (x) + [0.385\ kg/cm\ (x^2)] + M = 0$

$\ast\leftarrow M = 38.5\ kg\ (x) - 0.385\ kg/cm\ (x^2)$

⑤ Gráfica de cortante



x	0 cm	25 cm	50 cm	75 cm	100 cm
V					

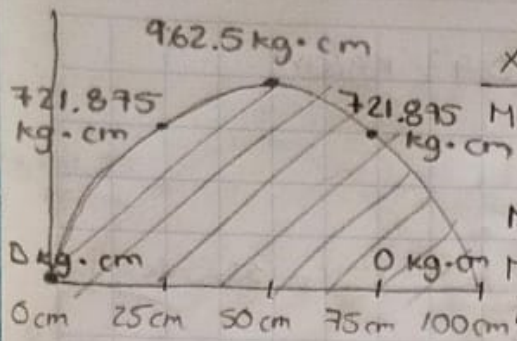
$V = 38.5\ kg - [0.77\ kg/cm\ (0\ cm)] = 38.5\ kg$

$V = 38.5\ kg - [0.77\ kg/cm\ (25\ cm)] = 19.25\ kg$

$V = 38.5\ kg - [0.77\ kg/cm\ (50\ cm)] = 0\ kg$

$V = 38.5\ kg - [0.77\ kg/cm\ (75\ cm)] = -19.25\ kg$

$V = 38.5\ kg - [0.77\ kg/cm\ (100\ cm)] = -38.5\ kg$



X	0cm	25cm	50cm	75cm	100cm
M					

$M = 38.5\ kg\ (0cm) - 0.385\ kg/cm\ (0^2) = 0\ kg \cdot cm$

$M = 38.5\ kg\ (25cm) - 0.385\ kg/cm\ (25^2) = 721.875\ kg \cdot cm$

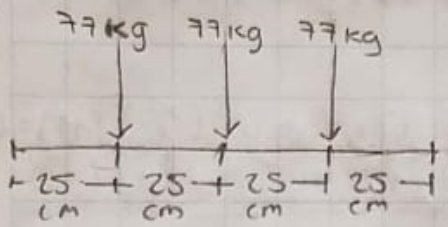
$M = 38.5\ kg\ (50\ cm) - 0.385\ kg/cm\ (50^2) = 962.5\ kg \cdot cm$

$M = 38.5\ kg\ (75cm) - 0.385\ kg/cm\ (75^2) = 721.875\ kg \cdot cm$

$M = 38.5\ kg\ (100cm) - 0.385\ kg/cm\ (100\ cm^2) = 0\ kg \cdot cm$

(2) MÉTODO DE ÁREAS

$RA = RB = \frac{3F}{2} \rightarrow \frac{3(77\ kg)}{2} = 115.5\ kg$

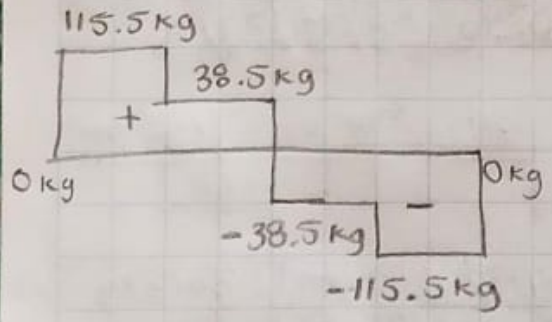


$0\ kg + (25cm \times 115.5\ kg) = 2887.5\ kg \cdot cm$

$2887.5\ kg + (25cm \times 38.5\ kg) = 3850\ kg \cdot cm$

$3850\ kg + (25cm \times -38.5kg) = 2887.5\ kg \cdot cm$

$2887.5\ kg + (25cm \times -115.5\ kg) = 0\ kg \cdot cm$



$M = \frac{F \cdot L}{2}$

$M = \frac{(77\ kg)(100\ cm)}{2}$

$M = 3,850\ kg \cdot cm$