



Mi Universidad

Nombre del Alumno: Blanca Yoseline Cano Vázquez

Nombre del tema: métodos energeticos

Unida: 3

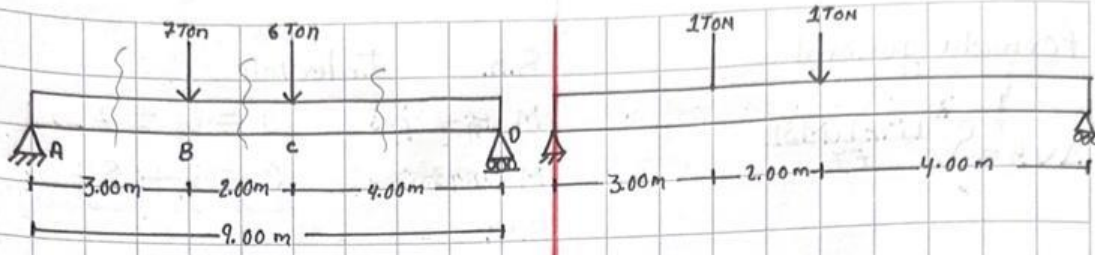
Nombre de la Materia: análisis de estructuras

Nombre del profesor: ARQ. PERLA MARISOL BARAJAS PEREZ

Nombre de la Licenciatura: Arquitectura

Cuatrimestre: 5

Fecha: 09/03/2025



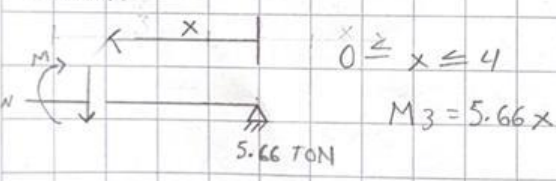
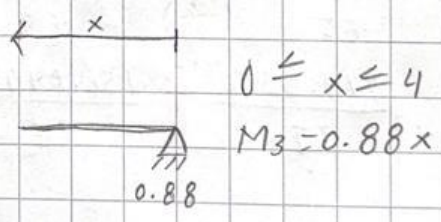
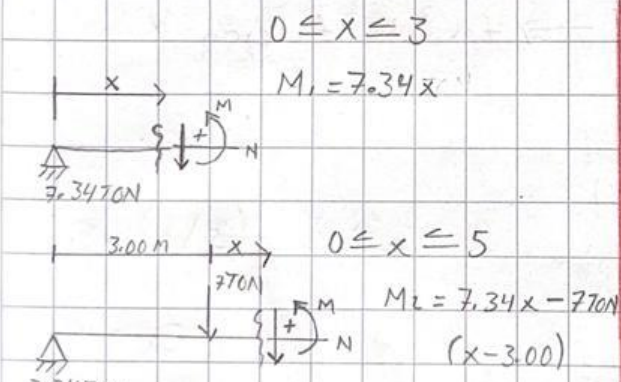
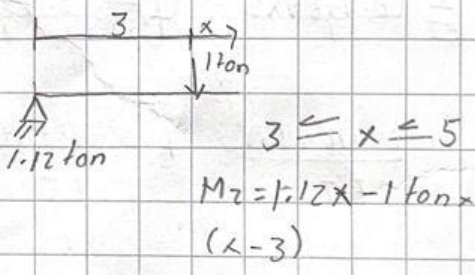
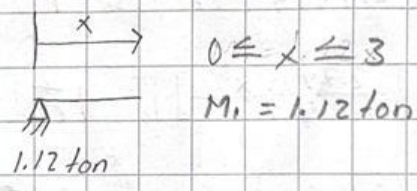
$\sum M = 0$
 $\sum F_x = 0$
 $\sum F_y = 0$

$-1 \text{ ton} (3\text{m}) - 1 \text{ ton} (5\text{m}) - D_y (9\text{m}) = 0$
 $-3 \text{ ton}\cdot\text{m} - 5 \text{ ton}\cdot\text{m} - D_y (9\text{m}) = 0$
 $D_y (9\text{m}) = \frac{8 \text{ ton}\cdot\text{m}}{9\text{m}}$

$D_y (9\text{m}) - 6 \text{ TON} (5\text{m}) - 7 \text{ TON} (3\text{m}) = 0$
 $D_y (9\text{m}) - 30 \text{ TON}\cdot\text{m} - 21 \text{ TON}\cdot\text{m} = 0$
 $D_y (9\text{m}) = \frac{51 \text{ TON}\cdot\text{m}}{9\text{m}}$
 $D_y = 5.66 \text{ TON}$

$D_y = 0.88 \text{ ton}$
 $A_y - 1 \text{ ton} - 1 \text{ ton} + 0.88 \text{ ton} = 0$
 $A_y = 1.12 \text{ ton}$

$A_y - 7 \text{ TON} - 6 \text{ TON} + 5.66 \text{ TON} = 0$
 $A_y - 13 \text{ TON} + 5.66 \text{ TON} = 0$
 $A_y = 7.34 \text{ TON}$



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formula general	S.R.	Intervalo
$\Delta v B = \int_0^L \frac{M_B(M_s)}{EI} dx$	$M_1 = 7.34x$	$0 \leq x \leq 3$
	$M_2 = 7.34x - 7 \tan(x-3)$	$3 \leq x \leq 5$
	$M_3 = 5.66x$	$0 \leq x \leq 4$
	$M_1 = 1.12x$	$0 \leq x \leq 3$
	$M_2 = 1.12x - 1 \tan(x-3)$	$3 \leq x \leq 5$
	$M_3 = 0.88x$	$0 \leq x \leq 4$

$$\Delta v B = \int_0^3 \frac{7.34x(1.12x)}{EI} dx + \int_3^5 \frac{7.34x - 7 \tan(x-3)}{EI} dx + \int_0^4 \frac{5.66x(0.88x)}{EI} dx$$

$$\Delta v B = \int_0^3 \frac{8.2208x^2}{EI} dx + \int_3^5 \frac{8.2208x^2 - 7 \tan(x-3)}{EI} dx + \int_0^4 \frac{4.9808x^2}{EI} dx$$

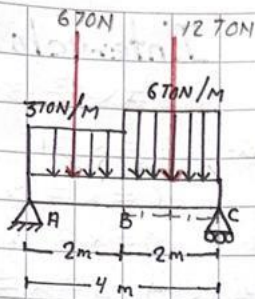
$$= \frac{1}{EI} \left[\frac{8.2208x^3}{3} - 7 \tan(x-3) \right] \Big|_3^5 + \frac{1}{EI} \left[\frac{8.2208x^3}{3} - 7 \tan(x-3) \right] \Big|_3^5 + \frac{1}{EI} \left[\frac{4.9808x^3}{3} \right] \Big|_0^4$$

$$= \frac{2.7402x^3}{EI} - \frac{7 \tan(x-3)}{EI} \Big|_3^5 + \frac{2.7402x^3}{EI} - \frac{7 \tan(x-3)}{EI} \Big|_3^5 + \frac{1.6602x^3}{EI} \Big|_0^4$$

$$= \frac{2.7402(125) - 7 \tan(2)}{EI} - \frac{2.7402(27) - 7 \tan(0)}{EI} + \frac{2.7402(125) - 7 \tan(2)}{EI} - \frac{2.7402(27) - 7 \tan(0)}{EI} + \frac{1.6602(64)}{EI}$$

$$= \frac{268.5396}{EI} + \frac{268.5396}{EI} + \frac{106.2528}{EI} = \frac{448.7778 \text{ ton/m}^3}{EI}$$

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$$2m(670N/m) = 1270N$$

$$2m(370N/m) = 670N$$

$$C_y(4m) - 1270N(3m) - 670N(1m) = 0$$

$$C_y(4m) - 3670N \cdot m - 670N \cdot m = 0$$

$$C_y(4m) - 4270N \cdot m = 0$$

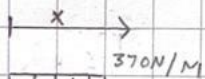
$$C_y = \frac{4270N \cdot m}{4m}$$

$$C_y = 10.570N$$

$$A_y - 670N - 1270N + 10.570N = 0$$

$$A_y - 7.570N = 0$$

$$A_y = 7.570N$$



$$0 \leq x \leq 2$$

$$7.570N$$

$$3x \left(\frac{x}{2} \right) = \frac{3x^2}{2}$$

$$1.5x^2$$



$$670N/m$$

$$10.570N$$

$$6x \left(\frac{x}{2} \right) = \frac{6x^2}{2}$$

$$3x^2$$

$$M_1 = 7.5x$$

$$7.5x - P \left(\frac{x}{2} \right)$$

$$7.5x - 1.5 \left(\frac{x}{2} \right)$$

$$7.5x - 1.5x^2$$

$$\rightarrow 7.5x - \sqrt{1.5}x$$

$$7.5x - 1.225x$$

$$5.775x$$

$$M_2 = 10.5x$$

$$10.5x - P \left(\frac{x}{2} \right)$$

$$10.5x - 3 \left(\frac{x}{2} \right)$$

$$10.5x - 3x^2$$

$$\rightarrow 10.5x - \sqrt{3}x$$

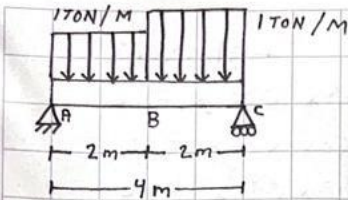
$$10.5x - 1.732x$$

$$8.768x$$

Silky

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SMART
BOOK



$$2m(1\text{TON}/M) = 2\text{TON}$$

$$2m(1\text{TON}/M) = 2\text{TON}$$

$$C_y(4m) - 2\text{TON}(3m) - 2\text{TON}(1m) = 0$$

$$C_y(4m) - 6\text{TON}\cdot m - 2\text{TON}\cdot m = 0$$

$$C_y(4m) - 8\text{TON}\cdot m = 0$$

$$C_y(4m) = 8\text{TON}\cdot m$$

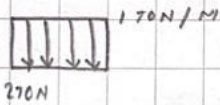
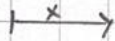
$$C_y = 8\text{TON}\cdot m / 4m$$

$$C_y = 2\text{TON}$$

$$A_y - 2\text{TON} - 2\text{TON} + 2\text{TON}$$

$$A_y - 2\text{TON}$$

$$A_y = 2\text{TON}$$



$$0 \leq x \leq 2$$

$$M_1 = 2x - P\left(\frac{x}{2}\right)$$

$$2x - 0.5\left(\frac{x}{2}\right)$$

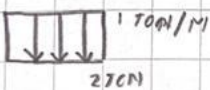
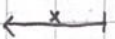
$$2x - 0.5x^2 \rightarrow 2x - \sqrt{0.5}x$$

$$2x - 0.707x$$

$$1.293x$$

$$1x(x/2) = \frac{1x^2}{2}$$

$$0.5x^2$$



$$0 \leq x \leq 2$$

$$M_2 = 2x - P\left(\frac{x}{2}\right)$$

$$2x - 0.5\left(\frac{x}{2}\right)$$

$$2x - 0.5x^2 \rightarrow 2x - \sqrt{0.5}x$$

$$2x - 0.707x$$

$$1.293x$$

$$1x(x/2) = \frac{1x^2}{2}$$

$$0.5x^2$$

Silky

formula general

S.R.

Intervalo

$$\Delta v_B = \int_0^L \frac{(M_B)(m_s)}{EI} dx$$

$$M_1 = 7x - 1.5x^2 = 5.775x \quad 0 \leq x \leq 2$$

$$M_2 = 10.5x - 3x^2 = 8.768x \quad 0 \leq x \leq 2$$

$$M_1 = 2x - 0.5x^2 = 1.293x \quad 0 \leq x \leq 2$$

$$M_2 = 2x - 0.5x^2 = 1.293x \quad 0 \leq x \leq 2$$

$$\Delta v_B = \int_0^2 \frac{(5.775x)(1.293x)}{EI} dx + \int_0^2 \frac{(8.768x)(1.293x)}{EI} dx$$

$$\frac{1}{EI} \int_0^2 (7.468x^2) dx + \frac{1}{EI} \int_0^2 (11.337x^2) dx$$

$$\frac{1}{EI} \left[7.468 \left(\frac{x^{2+1}}{2+1} \right) \right]_0^2 + \frac{1}{EI} \left[11.337 \left(\frac{x^{2+1}}{2+1} \right) \right]_0^2$$

$$\frac{1}{EI} \left[7.468 \left(\frac{x^{2+1}}{2+1} \right) \right]_0^2 + \frac{1}{EI} \left[11.337 \left(\frac{x^{2+1}}{2+1} \right) \right]_0^2$$

$$\frac{1}{EI} \left[\frac{7.468x^3}{3} \right]_0^2 + \frac{1}{EI} \left[\frac{11.337x^3}{3} \right]_0^2$$

$$\frac{1}{EI} \left(\frac{2.489x^3}{1} \right) \Big|_0^2 + \frac{1}{EI} \left(\frac{3.779x^3}{1} \right) \Big|_0^2$$

$$= \frac{2.489(x)^3}{EI} + \frac{3.779(x)^3}{EI} \rightarrow \text{formula función}$$

$$= \frac{2.489(2)^3}{EI} + \frac{3.779(2)^3}{EI}$$

$$= \frac{2.489(8)}{EI} + \frac{3.779(8)}{EI}$$

$$\Delta v_B = \frac{19.912}{EI} + \frac{30.232}{EI}$$

$$\Delta v_B = \frac{50.144}{EI} \text{ ton/m}^3$$