



EJERCICIO

Nombre del Alumno: José Trinidad López Domínguez

Nombre del tema:

LINEAS DE INFLUENCIA

Parcial: 3°

Nombre de la Materia: ANALISIS DE ESTRUCTURAS

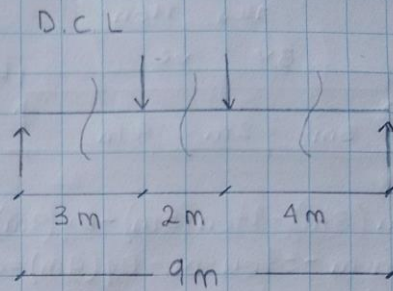
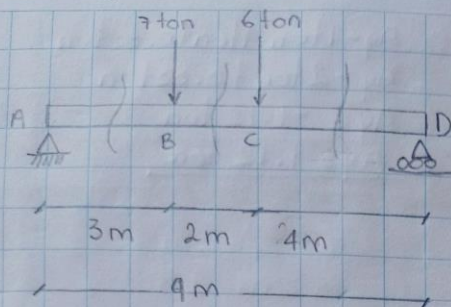
Nombre del profesor: Arq Perla Marisol Barajas

Nombre de la Licenciatura: Arquitectura

Cuatrimestre: 5to

Fecha: Comitán de Domínguez a 09 de marzo de 2025

EJERCICIO 1

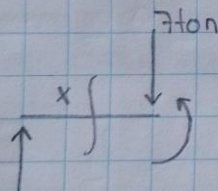


$$\begin{aligned} \sum M_A = 0 \\ -7 \text{ ton}(3\text{m}) - 6 \text{ ton}(5\text{m}) - D_y(9\text{m}) = 0 \\ -21 \text{ ton}\cdot\text{m} - 30 \text{ ton}\cdot\text{m} - D_y(9\text{m}) = 0 \\ D_y(9\text{m}) = \frac{-51 \text{ ton}\cdot\text{m}}{9\text{m}} = -5.66 \text{ ton} \end{aligned}$$

$$\begin{aligned} \sum F_y = 0 \\ 5.66 \text{ ton} - 6 \text{ ton} - 7 \text{ ton} + A_y = 0 \\ A_y = -7.34 \text{ ton} \\ \underline{A_y = 7.34 \text{ ton}} \end{aligned}$$

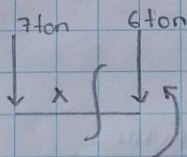
$$\underline{D_y = 5.66 \text{ ton}}$$

CORTE 1



$$7.34 \text{ ton}$$

CORTE 2

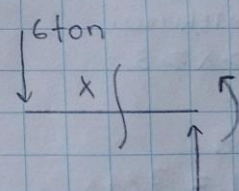


$$m_2 = 7.34(x) - 7 \text{ ton}(x-3)$$

INTERVALO:

$$3 \leq x \leq 5$$

CORTE 3



$$5.66 \text{ ton}$$

$$m_3 = 5.66(x)$$

INTERVALO:

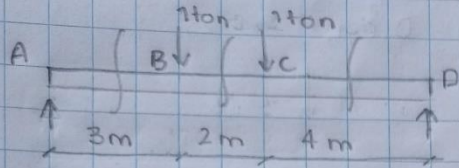
$$0 \leq x \leq 4$$

$$m_1 = 7.34x$$

INTERVALO:

$$0 \leq x \leq 3$$

SISTEMA REAL



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

$$A_y - 2\text{ton} + 0.88\text{ton} = 0$$

$$A_y = -1.12\text{ton}$$

$$A_y = 1.12\text{ton}$$

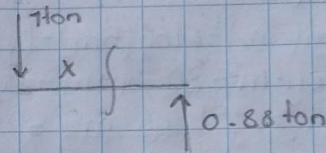
$$-1\text{ton}(3\text{m}) - 1\text{ton}(5\text{m}) - D_y(9\text{m}) = 0$$

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

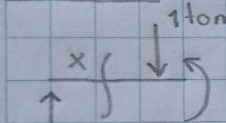
$$D_y(9\text{m}) = -8\text{ton}\cdot\text{m} = -0.88$$

$$D_y = 0.88\text{ton}$$

CORTE 3



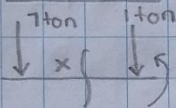
CORTE 1



$$M_1 = 1.12x$$

INTERVALO:
 $0 \leq x \leq 3$

CORTE 2



$$M_2 = 1.12(x) - 1\text{ton}(x+3)$$

INTERVALO:
 $3 \leq x \leq 5$

$$M_2 = 0.88x$$

INTERVALO:
 $0 \leq x \leq 4$

SB

$$M_1 = 7.34x$$

$$M_2 = 7.34x - 7\text{ton}(x-3)$$

$$M_3 = 5.66x$$

$$m_1 = 1.12x$$

$$m_2 = 1.12x - 1\text{ton}(x-3)$$

$$m_3 = 0.88x$$

INTERVALO

$$0 \leq x \leq 3$$

$$3 \leq x \leq 5$$

$$0 \leq x \leq 4$$

$$0 \leq x \leq 3$$

$$3 \leq x \leq 5$$

$$0 \leq x \leq 4$$



FORMULA INTEGRAL

FORMULA DEFINIDA

FORMULA GENERAL

$$\int x^n dx = \frac{x^{n+1}}{n+1} + c$$

$$\int_a^b f(x) dx = F(b) - F(a)$$

$$\Delta VB = \int_0^L \frac{(MR)(MS)}{EI}$$

$$\Delta VB = \int_0^3 \frac{(MR)(MS)}{EI} = \int_0^3 \frac{(7.34x)(1.12x)}{EI} dx + \int_3^7 \frac{(7.34x - 7 \tan(x-3))(1.12x - 7 \tan(x-3))}{EI} dx + \int_7^9 \frac{(5.66x)(0.88x)}{EI}$$

$$\Delta VB = \int_0^3 \frac{(7.34x)(1.12x)}{EI} dx = \frac{1}{EI} \int_0^3 (8.2208x^2) dx = \frac{1}{EI} \left[\frac{8.2208x^{2+1}}{2+1} \right]_0^3$$

$$= \frac{1}{EI} \left[\frac{8.2208x^3}{3} \right]_0^3 = \frac{1}{EI} \left[\frac{2.7402x^3}{1} \right]_0^3 = \frac{2.7402x^3}{EI}$$

$$= \frac{2.7402(3)^3}{EI} - \frac{2.7402(0)^3}{EI} = \frac{2.7402(27)}{EI} = \frac{73.9854}{EI} \text{ ton/m}^3$$

$$\frac{73.9854}{EI} + \int_3^5 \frac{(7.34x - 7 \tan(x-3))(1.12x - 7 \tan(x-3))}{EI} dx = \frac{1}{EI} \int_3^5 (8.2208x^2 - 7 \tan) dx$$

$$= \frac{1}{EI} \left[\frac{8.2208x^{2+1}}{2+1} - 7 \tan \right]_3^5 = \frac{1}{EI} \left[\frac{8.2208x^3}{3} - 7 \tan \right]_3^5 = \frac{1}{EI} \left[\frac{2.7402x^3}{1} - 7 \tan \right]_3^5$$

$$= \frac{2.7402x^3 - 7 \tan}{EI} = \frac{2.7402(5)^3 - 7 \tan}{EI} - \frac{2.7402(3)^3}{EI} = \frac{2.7402(125) - 7 \tan}{EI} = \frac{342.525}{EI}$$

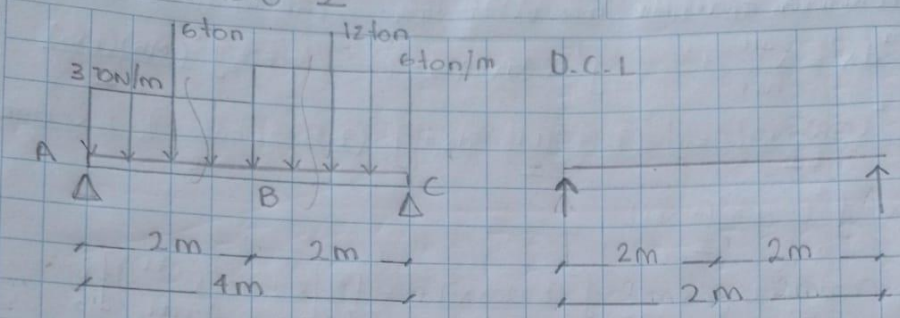
$$\frac{342.525}{EI} + \int_7^9 \frac{(5.66x)(0.88x)}{EI} dx = \frac{1}{EI} \int_7^9 (4.9808x^2) dx = \frac{1}{EI} \left[\frac{4.9808x^{2+1}}{2+1} \right]_7^9$$

$$= \frac{1}{EI} \left[\frac{4.9808x^3}{3} \right]_7^9 = \frac{1}{EI} \left[\frac{1.6602x^3}{1} \right]_7^9 = \frac{1.6602x^3}{EI} = \frac{1.6602(9)^3}{EI} - \frac{1.6602(7)^3}{EI}$$

$$= \frac{1.6602(64)}{EI} = \frac{106.2528}{EI}$$

$$\Delta VB = \frac{73.9854}{EI} + \frac{342.525}{EI} + \frac{106.2528}{EI} = \frac{522.7632}{EI} \text{ ton/m}^3$$

EJERCICIO 2

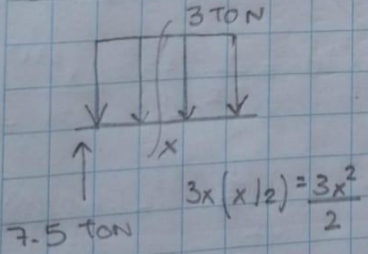


$\bullet 2m(6 \text{ ton/m}) = 12 \text{ TON}$
 $\bullet 2m(3 \text{ ton/m}) = 6 \text{ TON}$

$\sum M_A = 0$
 $C_y(4m) - 12 \text{ ton}(3m) - 6 \text{ TON}(1m)$
 $C_y(4m) - 36 \text{ ton}\cdot\text{m} - 6 \text{ ton}\cdot\text{m} = 0$
 $C_y = +42 \text{ TON}\cdot\text{m} = 0$
 $C_y = \frac{42 \text{ ton}\cdot\text{m}}{4m} = 10.5 \text{ TON}$
 $C_y = 10.5 \text{ TON}$

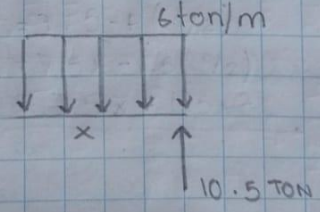
$\sum F_y = 0$
 $A_y - 6 \text{ ton} - 12 \text{ ton} + 10.5 \text{ ton} = 0$
 $A_y - 7.5 \text{ ton} = 0$
 $A_y = 7.5 \text{ ton}$

Corte 1



$3x(x/2) = \frac{3x^2}{2}$
 $M_1 = 7.5x$
 $= 7.5 - P(x/2)$
 $= 7.5x - 1.5(x/2)$
 $= 7.5x - 1.5x^2$

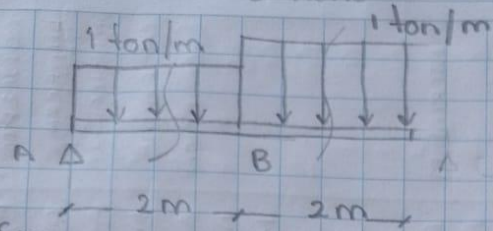
Corte 2



$M_2 = 10.5x$
 $= 10.5x - P(x/2)$
 $= 10.5x - 3(x/2)$
 $= 10.5x - 3x^2$



MOMENTO REAL



$$\begin{aligned} & \cdot 2m(1\text{ ton/m}) = 2\text{ ton} \\ & \cdot 2m(1\text{ ton/m}) = 2\text{ ton} \end{aligned}$$

$$\sum M_A = 0$$

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

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

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

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

$$C_y = \frac{8\text{ ton}\cdot\text{m}}{4m} = \underline{2\text{ ton}}$$

$$\underline{C_y = 2\text{ ton}}$$

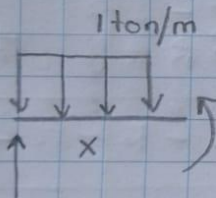
$$\sum F_y = 0$$

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

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

$$\underline{A_y = 2\text{ ton}}$$

CORTE 2



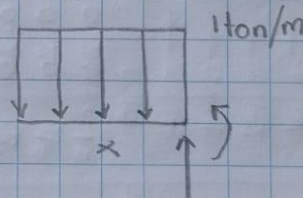
$$2\text{ ton}$$

$$m_1 = 2x - P\left(\frac{x}{2}\right)$$

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

$$\underline{2x - 0.5x^2}$$

CORTE 2



$$2\text{ ton}$$

$$m_2 = 2x - P\left(\frac{x}{2}\right)$$

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

$$\underline{2x - 0.5x^2}$$

Formula General: $\Delta V_B = \int_0^L \frac{(M_B)(M_S)}{EI} dx$

S.R.	Intervalo
$m_1 = 7x - 1.5x^2 = 5.775x$	$0 \leq x \leq 2$
$m_2 = 10.5x - 3x^2 = 8.768x$	$0 \leq x \leq 2$
$m_1 = 2x - 0.5x^2 = 1.293x$	$0 \leq x \leq 2$
$m_2 = 2x - 0.5x^2 = 1.293x$	$0 \leq x \leq 2$

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

$$= \frac{1}{EI} \int_0^2 (7.468x^2) dx = \frac{1}{EI} \left[7.468 \left(\frac{x^{2+1}}{2+1} \right) \right]_0^2 = \frac{1}{EI} \left[7.468 \left(\frac{x^3}{3} \right) \right]_0^2$$

$$\frac{1}{EI} \left[\frac{7.468x^3}{3} \right]_0^2 = \frac{1}{EI} \left(\frac{2.4893x^3}{1} \right) \Big|_0^2 = \frac{2.4893(2)^3}{EI} - \frac{2.4893(0)^3}{EI}$$

$$= \frac{2.4893(8)}{EI} = \frac{19.9144}{EI}$$

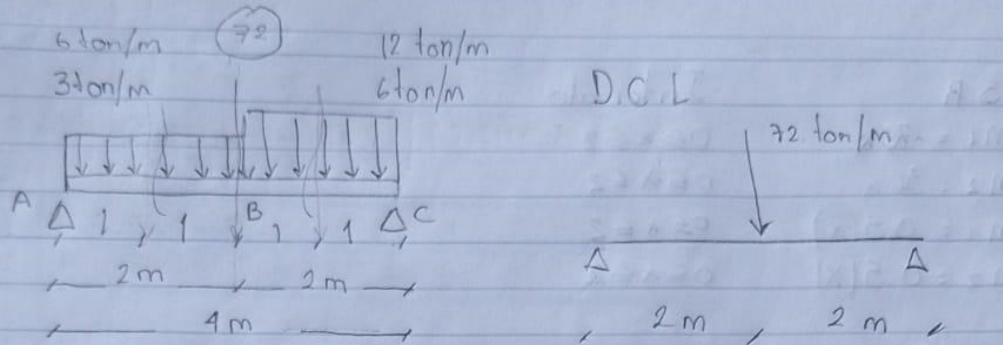
$$\frac{19.9144}{EI} + \frac{1}{EI} \int_0^2 (11.3370x^2) dx = \frac{1}{EI} \left[11.3370 \left(\frac{x^{2+1}}{2+1} \right) \right]_0^2$$

$$= \frac{1}{EI} \left[11.3370 \left(\frac{x^3}{3} \right) \right]_0^2 + \frac{1}{EI} \left[\frac{11.3370x^3}{3} \right]_0^2 + \frac{1}{EI} \left(\frac{3.779x^3}{1} \right) \Big|_0^2$$

$$= \frac{3.779(2)^3}{EI} - \frac{3.779(0)^2}{EI} = \frac{3.779(8)}{EI} = \frac{30.232}{EI}$$

$$\Delta V_B = \frac{19.9144}{EI} + \frac{30.232}{EI} = \frac{50.144}{EI} \text{ ton/m}^3$$

EJERCICIO 2



$$A_y(4m) - 72 \text{ ton/m}(2m) = 0$$

$$A_y(4m) - 144 \text{ ton/m} = 0$$

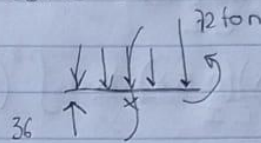
$$A_y = \frac{-144 \text{ ton/m}}{4m} = -36 \text{ ton}$$

$$A_y = 36 \text{ ton}$$

$$C_y = -72 \text{ ton} + 36 \text{ ton} = -36 \text{ ton}$$

$$C_y = 36 \text{ ton}$$

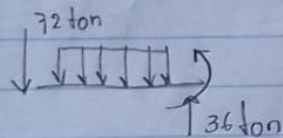
Corte 1



$$M_1 = 36(x)$$

Intervalo: $0 \leq x \leq 2$

Corte 2



$$M_2 = 36(x)$$

Intervalo: $0 \leq x \leq 2$

$$\sum m = 0$$

$$\sum m_A = 0$$

$$A_y(4m) - 1(2m) = 0$$

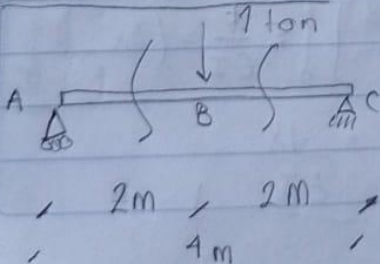
$$A_y(4m) - 2m = 0$$

$$A_y = \frac{2m}{4m} = 0.5m$$

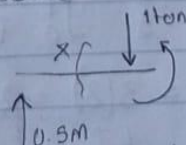
$$C_y = -1 \text{ ton to } 0.5m$$

$$C_y = 0.5m$$

Sistema Real



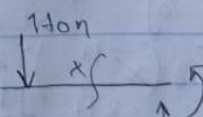
corte 1



$$m_1 = 0.5(x)$$

Int: $0 \leq x \leq 2$

Corte 2



$$m_1 = 0.5(x)$$

Int: $0 \leq x \leq 2$

S.R	Intervalo
$m_1 = 36x$	$0 \leq x \leq 2$
$m_2 = 36x$	$0 \leq x \leq 2$
$m_1 = 0.5(x)$	$0 \leq x \leq 2$
$m_2 = 0.5(x)$	$0 \leq x \leq 2$

Formola General

$$\Delta_{VB} = \int_0^L \frac{(MR)(MS)}{EI} dx$$

$$\Delta_{VB} = \int_0^2 \frac{(36x)(0.5x)}{EI} dx + \int_0^2 \frac{(36x)(0.5x)}{EI} dx$$

$$\Delta_{VB} = \int_0^2 (36x)(0.5) dx = \frac{1}{EI} \int_0^2 (18x^2) dx = \frac{1}{EI} \left[18 \left(\frac{x^{n+1}}{n+1} \right) \right]_0^2$$

$$= \frac{1}{EI} \left[18 \left(\frac{x^{2+1}}{2+1} \right) \right]_0^2 = \frac{1}{EI} \left[\frac{18x^3}{3} \right]_0^2 = \frac{1}{EI} \left[\frac{18x^3}{3} \right]_0^2$$

$$= \frac{1}{EI} = \left(\frac{3x^3}{1} \right) \Big|_0^2 = \frac{3x^3}{EI} = \frac{3(2)^3}{EI} - \frac{3(0)^3}{EI} = \frac{3(8)}{EI}$$

$$= \frac{24}{EI} \text{ ton/m}^3$$

$$\frac{24}{EI} + \int_0^2 \frac{(36x)(0.5x)}{EI} dx = \frac{1}{EI} \int_0^2 (18x^2) dx = \frac{1}{EI} \left[18 \left(\frac{x^{n+1}}{n+1} \right) \right]_0^2 =$$

$$\frac{1}{EI} \left[18 \left(\frac{x^{2+1}}{2+1} \right) \right]_0^2 = \frac{1}{EI} \left[\frac{18x^3}{3} \right]_0^2 = \frac{1}{EI} \left[\frac{18x^3}{3} \right]_0^2 = \frac{1}{EI} = \left(\frac{3x^3}{1} \right) \Big|_0^2$$

$$= \frac{3x^3}{EI} = \frac{3(2)^3}{EI} - \frac{3(0)^3}{EI} = \frac{3(8)}{EI} = \frac{24}{EI} + \frac{24}{EI} = \frac{48}{EI}$$

