LINEAS DE INFLUENCIA

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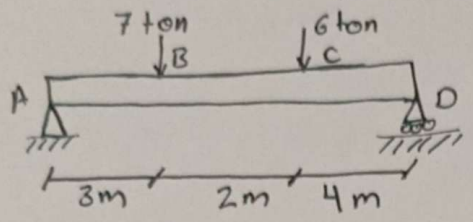
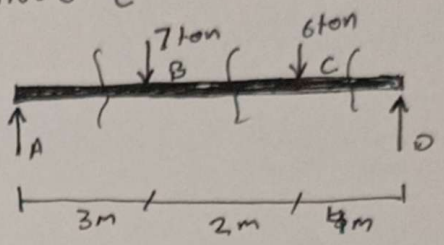
Nombre del tema: LINEAS DE INFLUENCIA
Parcial: 3
Nombre de la Materia: ANALISIS DE ESTRUCTURAS
Nombre del profesor: PERLA MARISOL BARAJAS PEREZ
Nombre de la licenciatura: arquitectura
Cuatrimestre: 5

Ejercicio 1:-

1:- Desplazamiento Vertical en el nudo c





$\Sigma M_A = 0$

$D_y(9m) - 6\,ton(5m) - 7(3m) = 0$

$D_y(9M) - 30\,ton.m - 21\,ton.m = 0$

$D_y(9M) - 51\,ton.m = 0$

$D_y(9m = 51\,ton.m$

$D_y = \frac{51\,ton.m}{9\,m} = 5.66\,ton$

$\Sigma f_y = 0$

$A_y - 7\,ton - 6\,ton + 5.66 = 0$

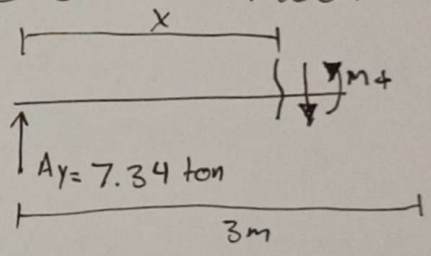
$A_y - 13\,ton + 5.66 = 0$

$A_y - 7.34\,ton = 0$

$A_y = 7.34\,ton$

Sistema Real

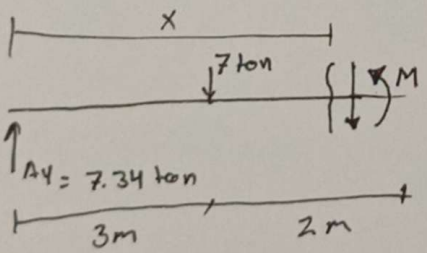
corte ①



$M_1 = 7.34\,(x)$

intervalo $= 0 \leq x \leq 3$

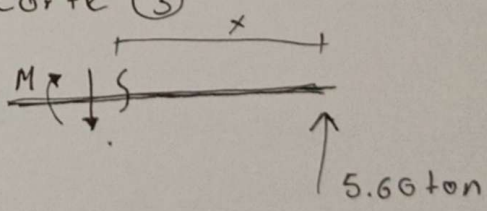
corte ②



$M_2 = 7.34(x) - 7\,ton(x-3)$

Intervalo = $3 \leq x \leq 5$

Corte ③

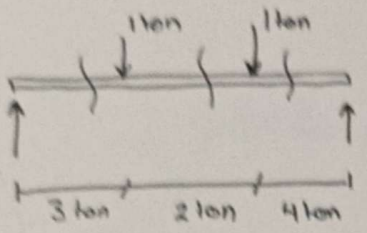


$M_3 = 5.66\,(x)$

$M_3 = 5.66x$

intervalo = $2 \leq x \leq 4$

Sistema virtual



$A_y - 1\,ton - 1\,ton + 0.88\,ton = 0$

$A_y - 2\,ton + 0.88\,ton = 0$

$A_y - 1.12\,ton = 0$

$A_y = 1.12\,ton$

$D_y(9m) - 1ton(5m) - 1ton(3m) = 0$

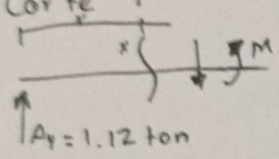
$D_y(9) - 5\,ton\cdot m - 3\,ton\cdot m = 0$

$D_y(9) - 8\,ton = 0$

$D_y(9) = 8\,ton$

$D_y = \frac{8\,ton}{9\,m} \cdot m = 0.88$

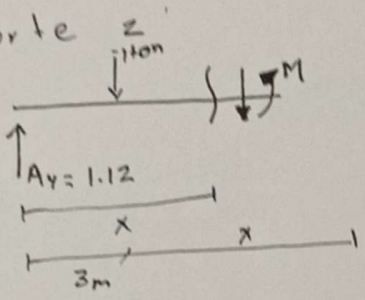
Corte 1



$M_1 = 1.12x$

intervalo $= 0 \leq x \leq 3$

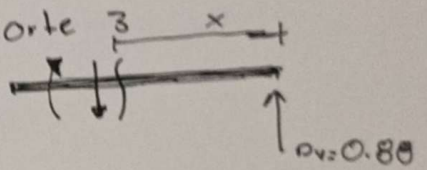
Corte 2



$M_2 = 1.12x - 1(x-3)$

intervalo $= 3 \leq x \leq 5$

Corte 3



$M_3 = 0.88x$

intervalo $= 0 \leq x \leq 4$

Formula general $= \int_0^L \frac{(M_r)(M_s)}{EI}$

$$\Delta vc = \int_0^3 \frac{(7.34x)(1.12x)}{EI}\,dx + \int_0^2 \frac{(7.34x - 7(x-3))(1.12x - 1(x-3))}{EI}\,dx$$

$$+ \int_0^4 \frac{(5.66x)(0.88x)}{EI}$$

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

$$= \frac{1}{EI}\left[8.2208\left(\frac{x^{2+1}}{2+1}\right)\right]\Big|_0^3 = \frac{1}{EI}\left[\frac{8.2208\,x^3}{3}\right]\Big|_0^3 = \frac{1}{EI}\left(\frac{2.7402x^3}{1}\right)\Big|_0^3 =$$

$$\frac{2.7402x^3}{EI} = \frac{2.7402(3)^3}{EI} = \frac{2.7402(27)}{EI} - \frac{2.7402(0)^3}{EI} =$$

$73.9854\ ton/m^3$

$$\frac{73.9854}{EI} + \int_0^2 \frac{7.34x - 7(x-3)(1.12x - 1(x-3)\,dx}{EI}$$

$$= \frac{1}{EI}\int_0^2 \frac{(7.34x - 7(x-3)(1.12x - 1(x-3)dx}{EI}$$

$$= \frac{1}{EI}\int_0^2 \frac{(8.2208x^2 - 7)dx}{EI} = \frac{1}{EI}\left[\frac{8.2208x^{2+1} - 7}{2+1}\right]\Big|_0^2$$

$$\frac{1}{EI}\left[\frac{8.2208x^3 - 7}{3}\right]\Big|_0^2 = \frac{1}{EI}\left(\frac{2.7402x^3 - 7}{1}\right)\Big|_0^2 = \frac{2.7402x^3 - 7}{EI}$$

$$= \frac{2.7402(2)^3\,ton - (2.7402(0)^3\,ton}{EI} = \frac{2.7402(8)}{EI} = 21.9216\ ton/m^3$$

$$\frac{21.9216}{EI} + \int_0^4 \frac{(5.66x)(0.88x)}{EI}dx = \frac{1}{EI}\int_0^4 (4.9808x^2)\,dx$$

$$= \frac{1}{EI}\left[4.9808\left(\frac{x^{2+1}}{2+1}\right)\right]\Big|_0^4 = \frac{1}{EI}\left[\frac{4.9808x^3}{3}\right]\Big|_0^4 = \frac{1}{EI}\left(1.6602x^3\right)\Big|_0^4$$

$$= \frac{1.6602x^3}{EI} = \frac{1.6602(4)^3}{EI} - \frac{(1.6602(0)^3)}{EI} = \frac{1.6602(64)}{EI} = \frac{106.2528}{EI}$$

$$\Delta vc = \frac{73.9854}{EI} + \frac{21.9216}{EI} + \frac{106.2528}{EI} = 202.1487\ ton/m^3$$