UDS

Licenciatura en Arquitectura

Nombre del alumno:

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Materia:

Resistencia de materiales de construcción

Nombre del profesor:

Arq. Pedro Alberto García López

Cuatrimestre:

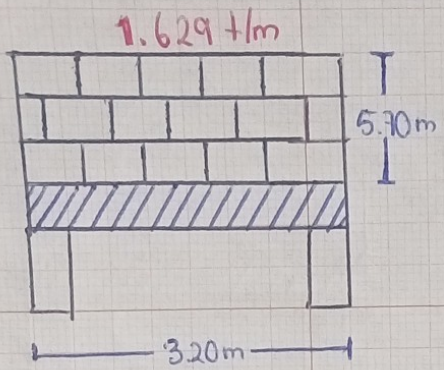
Cuarto

Nombre de la actividad:

Unidad II: Momentos (Ejercicios)

Fecha: 15 de octubre de 2023

EJERCICIO 1:



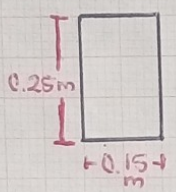
Concreto Reforzado
Muro de Block = 270 kg/m

$h = \frac{L}{12} \rightarrow \frac{3.20m}{12} = 0.2666m$

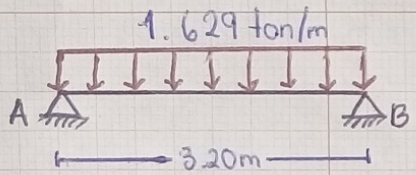
$b = 0.5(h) \rightarrow 0.5(0.25m) = 0.125m$

P.P. trabe = $0.25m \times 0.15m \times 2{,}400\ kg/m^2 = 90\ kg/m$

P.P. Muro = $5.70m\ (270\ kg/m) = 1{,}539\ kg/m$



1,539 kg/m
+ 90 kg/m
1,629 kg/m → 1.629 ton/m



$M = \frac{1}{8} qL^2 \rightarrow \frac{1.629\ ton/m\ (3.20m)^2}{8} = 2.085\ ton \cdot m$

$R_A = R_B = \frac{q \cdot L}{2} \rightarrow \frac{1.629\ ton/m\ (3.20m)}{2} = 2.606\ ton$

$E = 3{,}100{,}000\ ton/m^2$

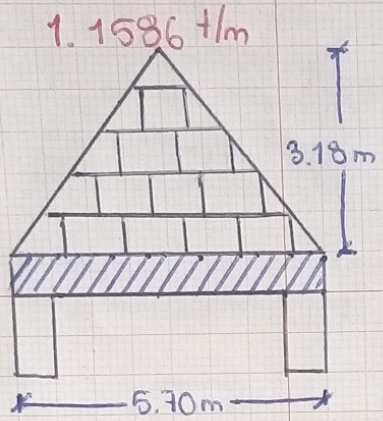
$I_x = \frac{bh^3}{12} \rightarrow \frac{(0.15m)(0.25m)^3}{12} = 0.0001953\ m^4$

$\theta_A = \theta_B = \frac{qL^3}{24EI} \rightarrow \frac{1.629\ (3.20m)^3}{24\ (3{,}100{,}000\ ton/m^2)(0.0001953m^4)} = \frac{53.379072}{14{,}530.32} = 0.003673$

$f = \frac{5}{384} \cdot \frac{qL^4}{EI} \rightarrow \frac{5}{384} \cdot \frac{1.629\ ton/m\ (3.20)^4}{(3{,}100{,}000\ ton/m^2)(0.0001953m^4)} = 0.003673\ m \rightarrow 36.73\ cm$

$\Delta_{per} = \frac{L}{240} \rightarrow \frac{320\ cm}{240} = 1.33\ cm$

EJERCICIO 2:



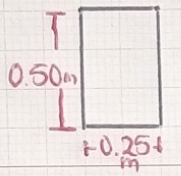
Concreto Reforzado
Muro de Block = 270 kg/m

$h = \frac{L}{12} \rightarrow \frac{5.70\,m}{12} = 0.475\,m$

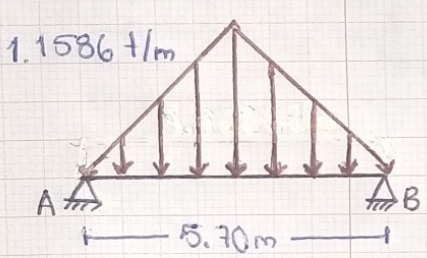
$b = 0.5(h) \rightarrow 0.5(0.50\,m) = 0.25\,m$

P.P. trabe $\Rightarrow 0.50\,m \times 0.25\,m \times 2{,}400\ kg/m^2 = 300\ kg/m$

P.P. muro $= 3.18\,m\,(270\ kg/m) = 858.6\ kg/m$



858.6 kg/m
+ 300. kg/m
1,158.6 kg/m → 1.1586 ton/m



$M = \frac{qL^2}{12} \rightarrow \frac{1.1586\,ton/m\,(5.70)^2}{12} = 3.136\ ton \cdot m$

$RA = RB = \frac{qL}{4} \rightarrow \frac{1.1586\,ton/m\,(5.70\,m)}{4} = 1.651\ ton$

$E = 3{,}100{,}000\ ton/m^2$

$I_x = \frac{bh^3}{12} \rightarrow \frac{0.25\,m\,(0.50)^3}{12} = 0.002604\ m^4$

$\theta A = \theta B = \frac{5qL^3}{196 \cdot EI} \rightarrow \frac{5(1.1586\,ton/m)(5.70)^3}{196\,(3100000\,ton/m^2)(0.002604\,m^4)} = \frac{1072.823049}{1582190.4} = 0.0006780$

$f = \frac{qL^4}{120\,EI} \rightarrow \frac{1.1586\,ton/m\,(5.70\,m)^4}{120\,(3100000\,ton/m^2)(0.002604\,m^4)} = 0.001262\ m \rightarrow 12.62\ cm$

$\Delta per = \frac{L}{240} \rightarrow \frac{5.70\,m}{240} = 2.375\ cm$