Estática

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Nombre del tema: Estática

Parcial: I

Nombre de la Materia: Estática para la Arquitectura

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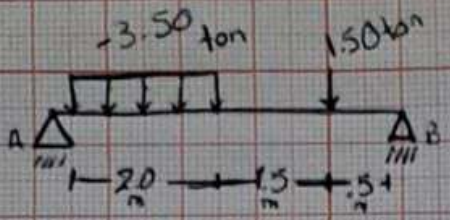
Nombre de la Licenciatura: Arquitectura

Cuatrimestre: Tercer Cuatrimestre

Comitán de Domínguez a 21 de mayo del 2023.



① $P = W \cdot L$

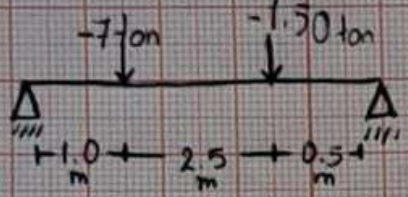
$UP = Y_2$

$P = 3.50 \text{ ton/m} \ (2.0 \text{ m})$

$UP = 7.0 \text{ ton}$

$UP = 2 \text{ m} / 2 = 1 \text{ m}$

② D.C.L



③ $\Sigma M = -7 \text{ ton}(1 \text{ m}) + [(1.50)(3.50)] + [RB(4.0)] = 0$

$-7 \text{ ton} \cdot \text{m} - 5.25 \text{ ton} \cdot \text{m} + RB \cdot 4 \text{ m} = 0$

$-12.25 \text{ ton} \cdot \text{m} + RB \cdot 4 \text{ m} = 0$

$RB = \frac{12.25 \text{ ton} \cdot \cancel{\text{m}}}{4 \cancel{\text{m}}} = 3.0625 \text{ ton}$

④ $RA - 7 \text{ ton} + 1.50 \text{ ton} + 3.625 \text{ ton} = 0$

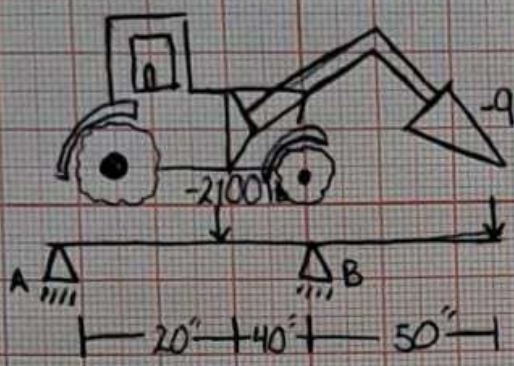
$RA - 8.50 \text{ ton} + 3.0625 \text{ ton} = 0$

$RA - 5.4375 \text{ ton}$

⑤ $\Sigma FY = 0$

$5.4375 \text{ ton} - 7 \text{ ton} - 1.50 \text{ ton} + 3.0625 = 0$

Un tractor de 2100Lb se utiliza para cargar 900lb grava. Determina la reacción de cada eje de llantan.



$$\Sigma M = (-2100lb)(20") + (-900lb)(110") + (RB \cdot 60")$$

$$-42,000lb \cdot " - 990000lb \cdot " + RB \cdot 60"$$

$$141,000lb + RB \cdot 60"$$

$$RB = \frac{141,000lb \cdot "}{60"} = 2350\,lb$$

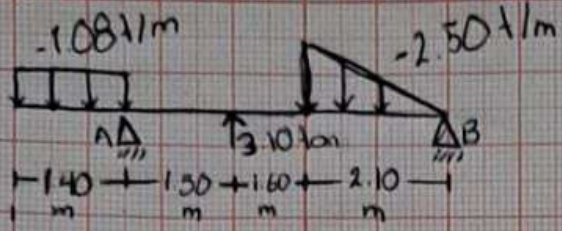
$$RA = 2350lb - 2100lb - 900lb$$

$$2350lb + 3000lb$$

$$RA = 650\,lb$$

$$\Sigma FY = 0$$

$$650lb - 2100lb + 2350lb - 900lb = 0$$



$P = (1.08\ t/m)(1.40\ m)$

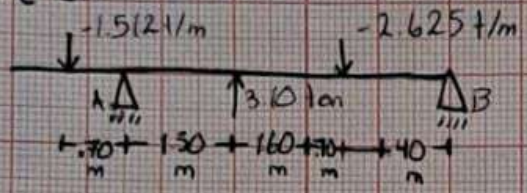
$uP = 1.512\ t/m$

$uP = 0.7$

$P = \frac{(-2.50\ t/m)(2.10\ m)}{2}$

$uP = \frac{-5.25\ t/m}{2} = -2.625$

D.C.L.



$\Sigma M = [(1.512\ t/m)(.70\ m)] + [(3.10\ ton)(1.50\ m)] + [(-2.625)(3.80\ m)] + RB \cdot 5.20$

$(1.0584) + (4.65) + (9.975) + RB \cdot 5.20 = 0$

$-6.3834\ RB \cdot 5.20 = 0$

$RB = \frac{4.267\ t \cdot m}{5.20\ m} = 0.82\ ton$

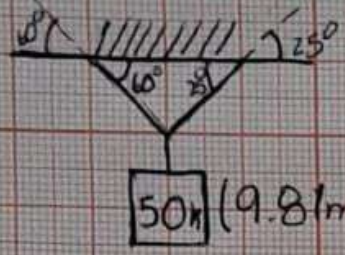
$-1.512 + RA + 3.10 - 2.625 + 0.82 = 0$

$RA = 0.217$

$-1.512 + 0.217 + 3.10 - 2.625 + 0.82 = 0$

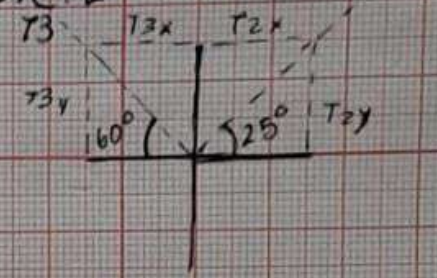
Un saco de semento de 50kg de masa cuelga en equilibrio de 3 cuerdas, 2 de las cuerdas forman ángulos de 60° y 25° con la horizontal. Halla la tensión de las cuerdas.

(1)



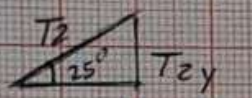
$50kg(9.81m/s^2) = 490.5N$

(2) D.C.L



$T1 = -490.5N$

(3)



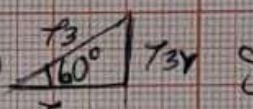
$Sen\ 25° = \frac{T_{2y}}{T_2}$

$T_{2y} = Sen\ 25°(T_2)$

$Cos\ 25° = \frac{T_{2x}}{T_2}$

$T_{2x} = Cos\ 25°(T_2)$

(4)



$Sen\ 60° = \frac{T_{3y}}{T_3}$

$T_{3y} = Sen\ 60°(T_3)$

$Cos\ 60° = \frac{T_{3x}}{T_3}$

$T_{3x} = Cos\ 60°(T_3)$

(5) $\Sigma F_x = 0$

$T_{2x} + T_{3x} = 0$

$Cos\ 25°(T_2) - Cos\ 60°(T_3) = 0$

$Cos\ 25°(T_2) = Cos\ 60°(T_3)$

$T_2 = \frac{Cos\ 60°(T_3)}{Cos\ 25°} = 0.551(T_3)$

(6) $\Sigma F_y = 0 \rightarrow T_{2y} + T_{3y} - T_1 = 0$

$Sen\ 25°(T_2) + Sen\ 60°(T_3) - 490.5N$

$Sen\ 25°(0.551 - T_3) + Sen\ 60°(T_3) = 490.5N$

$0.233 + T_3 + 0.866 \cdot T_3 = 490.5N$

$1.099 \cdot T_3 = 490.5N$

$T_3 = \frac{490.5}{1.099} = 446.315N$

(7)

$= 0.551(446.315N)$

$T_2 = 245.919N$