UDS

Licenciatura en Arquitectura

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Materia:

Estática para la arquitectura

Nombre del profesor:

Arq. Pedro Alberto García López

Cuatrimestre:

Tercero

Nombre de la actividad:

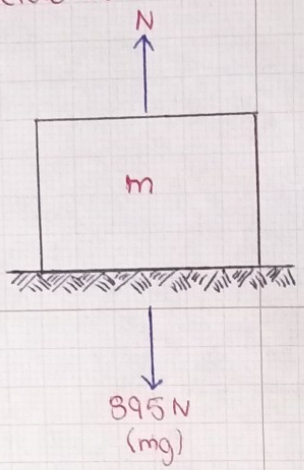
Unidad I: Estática (Ejercicios)

Fecha: 21 de mayo de 2023

"MOMENTOS Y CONDICIONES DE EQUILIBRIO" 21/05/2023

EJERCICIO 1:

①



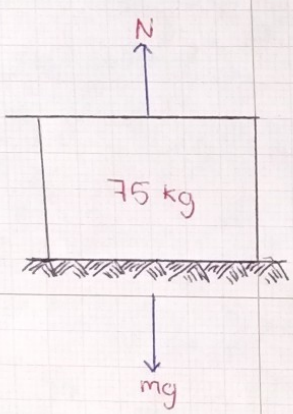
→ Encontrar la masa y comprobar el equilibrio

$N \rightarrow \frac{895\ N}{9.81\ m/s^2} = 91.23\ kg$

$mg \rightarrow \frac{-895\ N}{9.81\ m/s^2} = -91.23\ kg$

$\Sigma Fx = 0 \rightarrow 91.23 - 91.23 = 0$

②



→ Comprobar equilibrio

$N \rightarrow 75\ kg\ (9.81\ m/s^2) = 735.75\ N$

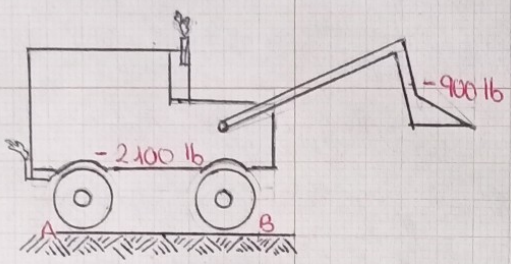
$mg \rightarrow -75\ kg\ (9.81\ m/s^2) = -735.75\ N$

$\Sigma Fy = 0 \rightarrow 735.75 - 735.75 = 0$

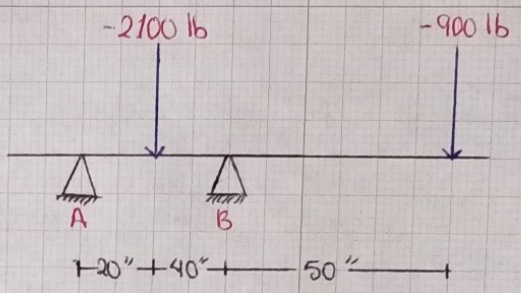
21/05/2023

EJERCICIO 2:

→ Un tractor de 2100 libras se utiliza para levantar 900 libras de grava, determina la reacción de cada uno de sus ejes de sus llantas.



① D.C.L



② ΣM

$M_A \rightarrow [(-2100\ lb)(20")] + [(RB)(60")] + [(-900\ lb)(110")] = 0$

$-42,000 + RB \cdot 60" - 99,000\ lb \cdot " = 0$

$RB = \frac{141000\ lb \cdot "}{60"}$

$RB = 2,350\ lb \downarrow$

③ $\Sigma F_Y = 0$

$RA - 2100\ lb + 2350\ lb - 900\ lb = 0$

$RA - 650\ lb = 0$

$RA = +650\ lb \uparrow$

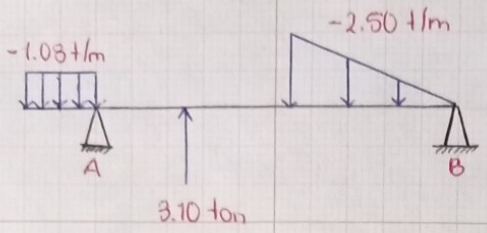
④ Comprobación

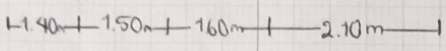
$650\ lb - 2100\ lb + 2350\ lb - 900\ lb = 0$

$0 = 0$ ✓

21/05/2023

EJERCICIO 3:





① Cargas Puntuales

$P_1 = W \cdot L$

$P_1 = (-1.08\ t/m)(1.40\ m)$

$P_1 = -1.512\ ton$

$UP_1 = L/2$

$UP_1 = 1.40\ m/2$

$UP_1 = 0.70\ m$

$P_2 = \frac{W \cdot L}{2}$

$P_2 = \frac{(-2.50\ t/m)(2.10\ m)}{2}$

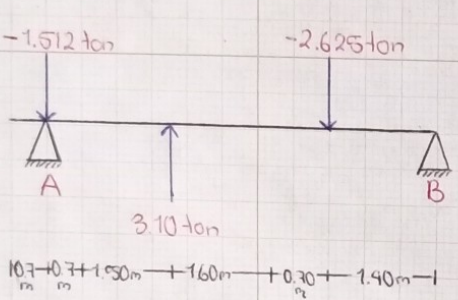
$P_2 = -2.625\ ton$

$UP_2 = 2/3\ L$

$UP_2 = 2/3\ (2.10\ m)$

$UP_2 = 1.40\ m$

② D.C.L



③ RB → $\Sigma M_X = 0$

$(1.512\ ton \cdot 0.70\ m) + (3.10\ ton \cdot 1.50\ m) + (-2.625\ ton \cdot 3.80\ m) + RB \cdot 5.20\ m = 0$

$1.0584\ ton \cdot m + 4.65\ ton \cdot m - 9.975\ ton \cdot m + RB \cdot 5.20\ m = 0$

$-4.2666\ ton \cdot m + RB \cdot 5.20\ m = 0$

$RB = \frac{4.2666\ ton \cdot m}{5.20\ m}$

$RB = 0.82\ ton$

④ RA → $\Sigma F_Y = 0$

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

$-4.137\ ton + RA + 3.92 = 0$

$RA = 0.217\ ton$

⑤ Comprobación

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

$0 = 0$