

Title

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Una caja tiene 250kg de masa, determine la fuerza en cada uno de los cables.

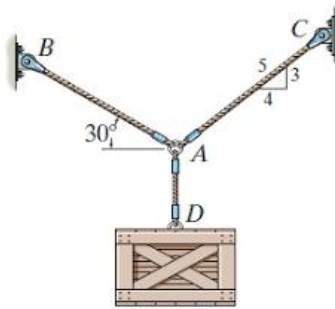


Figure 1: $TAC: \vec{W} = TAB = 250 \times 9.81 = 2452.5$

$$TAB = ?$$

Para TAB

De 1

$$TAB_x = TAB \cos 30^\circ$$

$$tac \left(\frac{4}{5} \right) = tab \cos 30$$

$$TAB_y = TAB \sin 30^\circ$$

$$tac = \left(\frac{5}{4} \right) tab \cos 30$$

Para TAC

Sustituir (3) en (2)

$$\cos \theta \frac{4}{5} \quad \sin \theta \frac{3}{5}$$

$$tab \sin 30 + \left(\frac{3}{5} \right) \left(\frac{5}{4} \right) tab \cos 30 = w$$

$$tac_x = tac \cos \left(\frac{4}{5} \right) = tac \left(\frac{4}{5} \right)$$

$$tab \left(\sin 30 + \frac{3}{4} \cos 30 \right) = w$$

$$tacy = tac \sin \left(\frac{3}{5} \right) = tac \left(\frac{3}{5} \right)$$

$$tab = \frac{2452.5}{(\sin 30 + 0.75 \cos 30)} = 2133N$$

$$\sum F_x = 0$$

Sustituir Tab en (3)

$$tac_x - tab_x = 0$$

$$tac = \left(\frac{5}{4} \right) (2133) \cos 30 = 2309N$$

$$tac \left(\frac{4}{5} \right) - tab \cos 30 = 0 \quad (1)$$

$$E_f y = 0$$

$$tac \left(\frac{3}{5} \right) - tab \sin 30 - 2452.5 = 0$$

$$tac \left(\frac{3}{5} \right) - tab \sin 30 = 2452.5 \quad (2)$$

Una viga tiene una masa de 350 kg. Determine la longitud del cable mas corto ABC que puede ser utilizado para levantarla si la fuerza máxima que puede soportar el cable es de 6670 N.

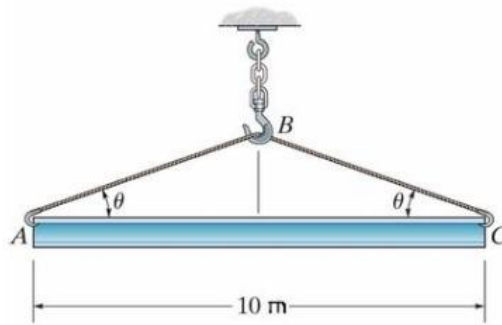


Figure 2: $w = mg = (350kg)(9.81ms) = 3433.5N$

$$\sum F_x = 0$$

$$\sum F_y = 0$$

Para X

$$tabx - tbcx = 0$$

$$tab \cos \theta - tbc \cos \theta = 0$$

$$tab \cos \theta = tbc \cos \theta$$

$$tab = tbc = 6670N$$

Para y

$$tbcy + taby = w$$

$$tbc \sin \theta + tab \sin \theta = w$$

$$tbc \sin \theta + tbc \sin \theta = w$$

$$2tbc \sin \theta = w$$

$$\sin \theta = \frac{w}{2tbc} = \frac{3433.5N}{13340N}$$

$$\theta = \sin^{-1} \left(\frac{3433.5N}{13300N} \right) = 15$$

$$\cos 15 = \frac{c.a}{h} = \frac{5ft}{h}$$

$$h \cos 15 = 5ft$$

$$h = \frac{5ft}{\cos 15}$$

$$L_{abc} - 2h = \frac{10ft}{\cos 15} = 10.35ft$$

Si un bloque de 5kg esta suspendido de la placa B y la elocación esta d=0.15m, determine la fuerza en la cuerda ABC

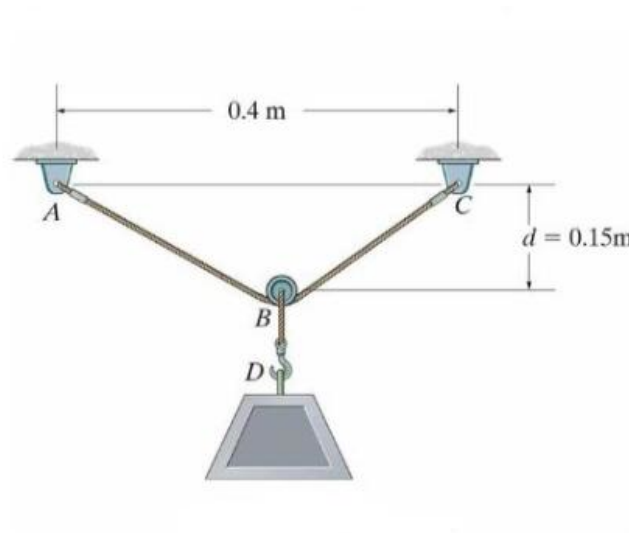


Figure 3: $w = (5kg) (9.81ms) = 49.05N$

$$\sum F_x = 0$$

$$t_{bcx} - t_{ab} = 0$$

$$t_{bc} \cos \theta = t_{ab} \cos \theta = 0$$

$$t_{bc} \cos \theta = t_{ab} \cos \theta$$

$$t_{bc} = t_{ab}$$

$$\sum F_y = 0$$

$$t_{bcy} + t_{aby} - w = 0$$

$$t_{bc} \sin \theta + t_{ab} \sin \theta = w$$

$$\text{pero } t_{bc} = t_{ab}$$

$$t_{bc} \sin \theta + t_{bc} \sin \theta = w$$

$$2t_{ac} \sin \theta = w$$

$$t_{bc} = \frac{w}{2 \sin} = \frac{49.05N}{2 \sin 36.56}$$

Por lo tanto

$$t_{bc} = 40.88N$$

Para calcular el ángulo

$$\tan \theta = \frac{c.o}{c.a} = \frac{0.15m}{0.12m}$$

$$\theta = \tan^{-1} \left(\frac{0.15}{0.12} \right) = 36.36$$

Si la masa del cilindro es 40kg, determine la masa del cilindro A para lograr mantener la posicion mostrada

$$\sum F_x = 0$$

$$teb \cos 30 - tde = 0$$

$$tde = (40kg) (9.81ms) \cos 30$$

Para y

$$\sum F_y = 0$$

$$teb \sin 30 - WA = 0$$

$$teb \sin 30 = WA$$

$$WA = teb \sin 30$$

$$mag = (40kg) (9.81ms) \sin 30$$

$$MA = (40kg) \sin 30 = 20 \text{ kg}$$