

Title

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1.- Una caja de 250 kg de masa. Determine la fuerza en cada uno de los cables.

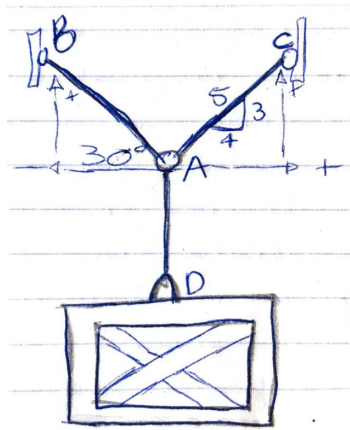


Figure 1: This is a caption

$$TAC = ? \quad \vec{W} = TAD = 250(9.81) = 2452.5$$

$$TAB = ?$$

Para TAB :

$$TABX = TAB \cos 30$$

$$TABY = TAB \sin 30$$

Para TAC :

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

$$TAC_x = TAC \cos \left(\frac{4}{5} \right) = TAC \left(\frac{4}{5} \right)$$

$$TAC_y = TAC \sin \left(\frac{3}{5} \right) = TAC \left(\frac{3}{5} \right)$$

$$\sum FX = 0$$

$$TAC_x - TAB_x = 0$$

$$TAC \left(\frac{4}{5} \right) - TAB \cos 30 = 0$$

$$\sum F_Y = 0$$

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

$$TAC \left(\frac{3}{5}\right) - TAB \sin 30 = 2452.5$$

De 1 :

$$TAC \left(\frac{4}{5}\right) = TAB \cos 30$$

$$TAC = \left(\frac{5}{4}\right) TAB \cos 30$$

Sustituir (3) en (2):

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

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

$$TAB = \frac{2452.5}{(\sin 30 + 0.75 \cos 30)}$$

$$= 2133 \text{ N}$$

Sustituir TAB en (3)

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

2.-Una biga tiene una masa de 350 kg. Determine la longitud del cable A,B,C que puede utilizarse para levantarla si la fuerza maxima que puede soportar el cable es de 6670 NW.

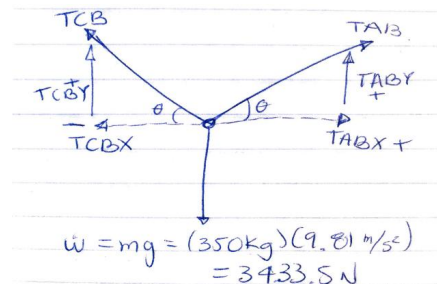


Figure 2: This is a caption

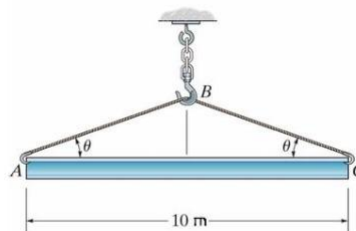


Figure 3: This is a caption

Para X :

$$\sum F_x = 0$$

$$TABX - TBCX = 0$$

$$TAB \cos j - TBC \cos j = 0$$

$$TAB = TBC$$

Para Y :

$$\sum F_y = 0$$

$$TBCY + TABY = W$$

$$TBC \sin \theta + TAB \sin \theta = W$$

$$TBC \sin \theta + TBC \sin \theta = W$$

$$2TBC \sin \theta = W$$

$$\sin \theta = \frac{W}{2 TBC} = \frac{3433.5N}{13340N}$$

$$\theta = \sin^{-1} \left(\frac{3433.5N}{13340N} \right) = 15^\circ$$

Para saber la longitud :

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

$$h \cos \theta = 5ft$$

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

$$L_{ABC} = 2h = \frac{10ft}{\cos 15^\circ} = 10.35ft$$

3.-Un bloque de 5 kg esta suspendido de la polea B y la enlogacion de la cuerda es de =0.15m. Determine la fuerza en la cuerda ABC.

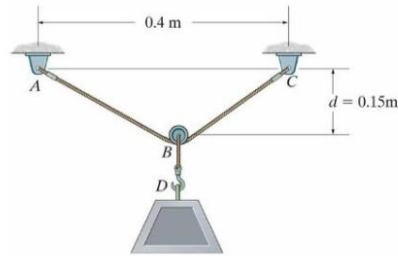


Figure 4: This is a caption

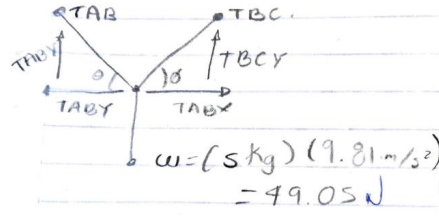


Figure 5: This is a caption

Para calcular el angulo

$$\tan \theta = \frac{0.15m}{0.2m}$$

$$\theta = \tan^{-1} \left(\frac{0.15}{0.2} \right) = 36.56$$

Para X :

$$\sum f_x = 0$$

$$TBCX - TABX = 0$$

$$TBC \cos \theta - TAB \cos \theta = 0$$

$$TBC = TAB$$

Para Y :

$$\sum f_y = 0$$

$$TBCY + TABY - W = 0$$

$$TBC \sin \theta + TAB \sin \theta = W$$

$$\text{Pero } TBC = TAB$$

$$TBC \sin \theta + TBC \sin \theta = W$$

$$2TAC \sin \theta = WTBC = \frac{W}{2 \sin \theta} = \frac{49.05N}{2 \sin 36.56}$$

Por lo tanto

$$TBC = 40.88N$$

4.- Si la masa del cilindro C es de 40 kg determine la masa del cilindro A para lograr mantener el sistema en la posición mostrada.

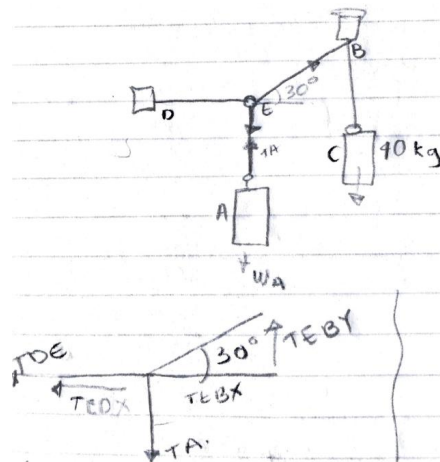


Figure 6: This is a caption

$$\sum f_y = 0$$

$$-TA + 392.4 \sin 30 = 0$$

$$TA = 196.2N$$

$$W = TA = 196.2N$$

$$TA = \frac{196.2N}{m/s^2} = 20 \text{ kg}$$