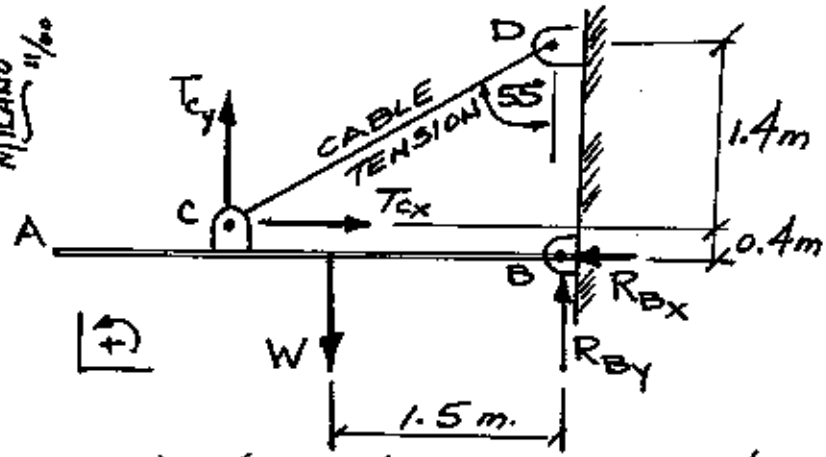
N. LANDO 11/00



RIGID BODY: Beam AB

EXTERNAL FORCES:
- Cable Tension, T_c
- Crate Weight, W
- Reactions at pin B

$W = mg = (50kg)(9.81 \frac{m}{s^2}) = 490.5^N.$

$\Sigma F_x = 0 = T_{cx} - R_{Bx} \quad \therefore \quad R_{Bx} = T_c \sin 55°$

$\Sigma F_y = 0 = T_{cy} - W + R_{By} \quad \therefore \quad R_{By} = 490.5^N - T_c \cos 55°$

$\Sigma M_B = 0$ DON'T FORGET TO INCLUDE T_{cx} @ .4m from B

$$0 = -T_{cy}(1.4 \tan 55°) + W(1.5m) - T_{cx}(0.4m)$$

$$490.5(1.5m) = T_c \cos 55°(1.4 \tan 55°) + T_c \sin 55°(0.4m)$$

$$735.75 = 1.1468\, T_c + 0.3277\, T_c$$

$$\boxed{T_c = 498.99^N} \qquad \underline{T_c \approx 500^N.}$$

BACK SUB TO DETERMINE REACTIONS

$$R_{Bx} = (498.99)\sin 55° = \boxed{408.75^N = R_{Bx}}$$

$$R_{By} = 490.5 - (498.99)\cos 55° = \boxed{204.29^N \uparrow R_{By}}$$

$$R_B = \sqrt{R_{Bx}^2 + R_{By}^2} = 456.96^N, \quad \theta = \tan^{-1}\frac{204.29}{-408.75} = -26.56° + 180°$$

$$\boxed{\vec{R}_B = 457^N \angle 153.4°}$$

$$\boxed{T_{CD} = 499^N. \text{ cable tension}}$$