

Torque example 1 Crane

A crane arm (5.0 m long) of mass 395 kg is connected by a cable for lifting at an angle of 55° to the horiz. If this cable is connected at a point 4.5 m from the pivot point What is the torque on the crane by the cable, and what is the torque of the crane arm's own weight on the crane? ($T = 1250\text{ N}$)
cm = center of mass

$\tau = r \perp F_g$
 $\tau = \frac{1}{2}(5.0)(3874.95) = 9487.4 \text{ Nm}$
ccw
 $\tau_T = r \perp T = (4.5 \sin 55)(1250) = 4607.7 \text{ Nm}$

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