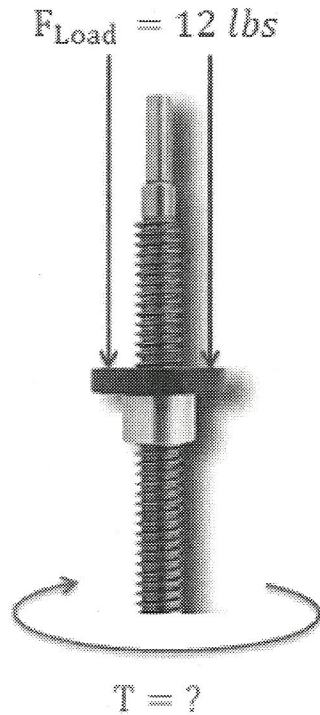The power screw below is being used to lift a platform with a weight of 12 pounds. Based on the information below...
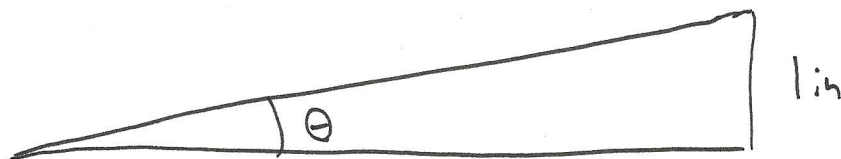
- What is the required torque on the shaft to lift the load?
- Would the load fall if the toque was removed from the shaft?

$F_{Load} = 12\ lbs$

- Diameter of Screw = .375 in
- Threads per inch = 12

$\mu_s = .16$

$\mu_k = .16$

$T = ?$

1 in

$(\pi)(.375\ in)(12) = 14.1\ in$

$\Theta = \tan^{-1}\left(\frac{1}{14.1}\right) = 4.05°$

$$T = \frac{\sin(\theta) + (.16)(\cos(\theta))}{\cos(\theta) - (.16)(\sin(\theta))} (F_{load})(r_{shaft})$$

$$T = (.233)(12 \text{ lbs})\left(\frac{.375}{2} \text{ in}\right)$$

$$\boxed{T = .525 \text{ in lbs}}$$

to lift

$$\theta_{locking} = \tan^{-1}(.16)$$

$$\theta_{locking} = 9.09°$$

Since the self locking angle is more than the actual lead angle the system is self locking. The load will not fall if torque is removed