



A force F is applied to both ends of the turnbuckle shown above. If the turnbuckle has a square thread with a mean radius of r mm, a lead of t mm, and a static coefficient of friction between the screw and the turnbuckle of μ_s , determine the moment M needed to draw the end screws closer together.

Find the lead angle θ and the angle of static friction ϕ .

$$\theta = \tan^{-1} \left(\frac{t}{2\pi r} \right)$$

$$\phi = \tan^{-1}(\mu_s)$$

Determine the moment M needed to draw **both** end screws closer together.

$$+ \rightarrow \Sigma F_x = 0 \rightarrow \frac{M}{r} - 2R \sin(\theta + \phi) = 0$$

$$+ \uparrow \Sigma F_y = 0 \rightarrow R \cos(\theta + \phi) - F = 0$$

$$\Rightarrow M = 2r \cdot F \tan(\theta + \phi)$$