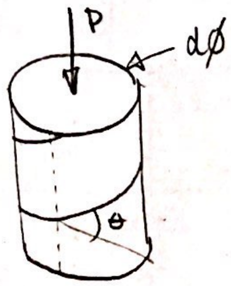
1.36:

Given:



$d = 0.4\,m$
$t = 0.01\,m$
$\theta = 20°$
$\left.\begin{array}{l}\sigma = 60\,MPa \\ \tau = 36\,MPa\end{array}\right\}$ checks out $\sigma = \tau$ for $\theta =$

Find: $|P|$ given allowable σ, τ

Solution:

$$A_0 = \pi \frac{d^2}{4} - \frac{\pi}{4}(d-t)^2$$
$$A_0 = 1.23 \cdot 10^{-2}\ m^2$$

$$\sigma = \frac{P}{A_0} \cos^2\theta \quad , \quad \tau = \frac{P}{A_0} \sin\theta \cos\theta$$

$$\rightarrow P_\sigma = \frac{\sigma A_0}{\cos^2\theta} \quad , \quad P_\tau = \frac{\tau A_0}{\sin\theta \cos\theta}$$

$$P_\sigma = 0.836\ MN \quad , \quad P_\tau = 1.38\ MN$$

$P_\sigma < P_\tau \rightarrow P_\sigma$ is highest allowable force

$$\boxed{\rightarrow P_{allowable} = 836\ kN}$$