

$$\tau_m = ? \quad \tau_a = ?$$

9th Jan
2004

$$\tau_m = \left(\frac{16 T_m}{\pi d^3} \right) k_f$$

$$\tau_a = \left(\frac{16 T_a}{\pi d^3} \right) k_f$$

need $k_f \rightarrow$ need k_t & q

$$k_t \quad r/d = 0.05 \quad D/d = 1.2$$

$$k_t = 1.57 \text{ from Handout.}$$

q depends on r , which we don't know

\Rightarrow be conservative

just use S_u to get q

$$\Rightarrow q = 0.95$$

$$k_f = 1 + (1.57 - 1)(0.95) \approx 1.54$$

subst into τ_m τ_a

$$\tau_m = \overset{\text{F.S.}}{2} \left[\frac{16 (1000)}{\pi d^3} \right] \overset{k_f}{1.54} = 15685/d^3$$

$$\tau_a = 2 \left[\frac{16 (250)}{\pi d^3} \right] \overset{k_f}{1.54} = \frac{3922}{d^3}$$

$$\left[\begin{array}{l} \tau_a = 0.25 \text{ approx.} \\ \tau_m \end{array} \right] \rightarrow \text{load line}$$