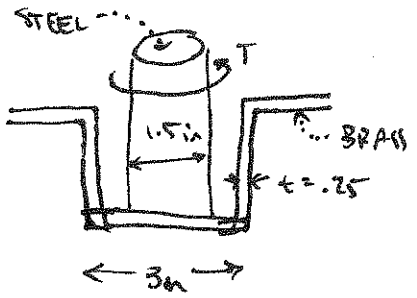
10.51. SOLUTION



Max allowable $\tau_{steel} = 12$ ksi

Max allowable $\tau_{Brass} = 7$ ksi

Find max allowable T

STEEL: $\tau_{s\,max} = \frac{T c_s}{J_s} = \frac{T(.75in)}{\frac{\pi c_s^4}{4}} = \frac{T(.75in)}{\frac{\pi(.75in)^4}{4}} = \frac{3.01}{in^3} T$

Since $\tau_{s\,max}$ must be less than 12 ksi:

$$12\ ksi > \frac{3.01}{in^3} T \Rightarrow \underline{T < 3.9\ kips.in}$$

BRASS:

$$\tau_{b\,max} = \frac{T c_b}{J_B} = \frac{T(1.5in)}{\frac{\pi c_b^4}{2}} = \frac{T(1.5in)}{\frac{\pi(1.5in)^4}{4}} = \frac{0.731}{in^3} T$$

Since $\tau_{b\,max}$ must be less than 7 ksi:

$$7\ ksi > T\left(\frac{.731}{in^3}\right) \Rightarrow \underline{T < 9.57\ kips.in}$$

Since the steel requirement is more restrictive, we need:

$$\boxed{T < 3.9\ kips.in}$$