

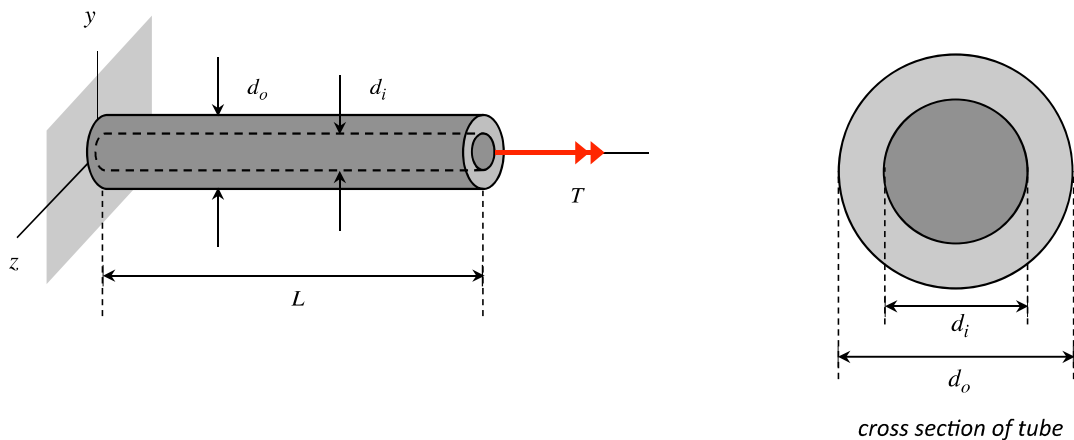
Homework H33.A

Given: A tubular cross-section shaft has inner and outer diameters of d_i and d_o , respectively. The shaft is fixed to a rigid wall at its left end, and an axial torque T is applied to the right end. The material making up the shaft has a shear modulus of G .

Find: For this problem:

- Determine the maximum shear stress in the shaft. Where on the shaft's cross section does this maximum shear stress exist?
- Make a sketch of the shear stress on the cross section of the tube.
- Determine the maximum shear strain in the shaft. Where on the shaft's cross section does this maximum shear strain exist?

For this problem, use the following parameters: $d_i = 2$ in, $d_o = 4$ in, $T = 30$ kip-ft and $G = 11 \times 10^3$ ksi.



Homework H33.B

Given: A circular cross-sectioned shaft is made up of components (1) and (2). Component (1) has a tubular cross section, with inner and outer diameters of d and $2d$, respectively. Component (2) has a solid cross section with a diameter of d . Components (1) and (2) are joined by a rigid connector at B with (1) being attached to a fixed wall at end A. Rigid connector C is attached to end C of component (2). Torques $3T$ and T act on connectors B and C, respectively, as shown.

Find: For this problem:

- Determine the torque load on each of the components as a result of the applied torques.
- What is the maximum shear stress in the shaft? At what location(s) does this maximum stress exist?

Leave your answers in terms of T and d .

