

Homework Problem 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.

