

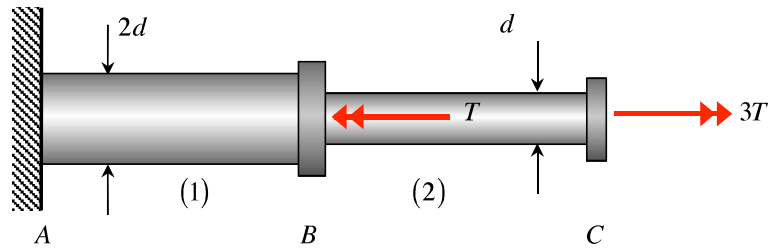
Homework H33.A

GIVEN: A circular cross-sectioned shaft is made up of solid shaft components (1) and (2), having diameters of $2d$ and d , respectively.. (1) and (2) are joined with the rigid connector B, and (1) is attached to a fixed wall at its left end. A rigid connector is attached to the right end of (2). Torques T and $3T$ act on connectors B and C, 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 .



Homework H33.B

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: $d_i = 4$ in, $d_o = 6$ in, $T = 60$ kip-ft and $G = 11 \times 10^3$ ksi.

