Homework H33.A

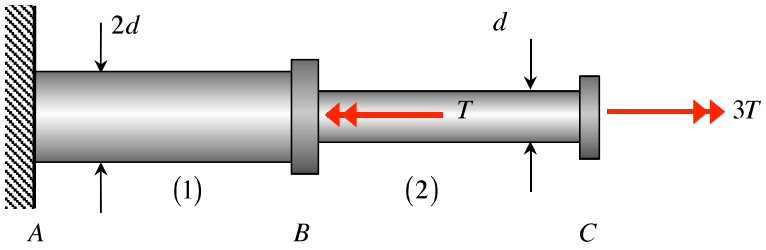
GIVEN: A circular cross-sectioned shaft is made up of solid shaft components (1) and (2), having diameters of $2d$ and d, respectively.. (1) and (2) are joined with the rigid connector B, and (1) is attached to a fixed wall at its left end. A rigid connector is attached to the right end of (2). Torques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

FIND: For this problem:

a) Determine the torque load on each of the components as a result of the applied torques.

b) 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.

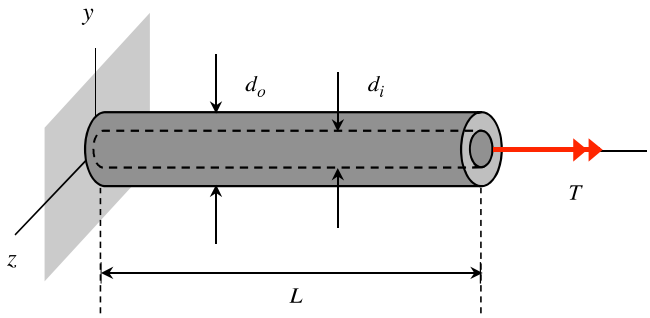
FIND: For this problem:

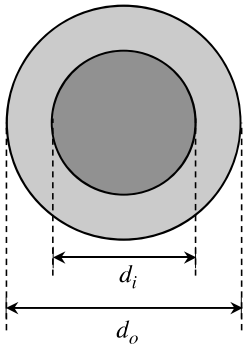
a) Determine the maximum shear stress in the shaft. Where on the shaft's cross section does this maximum shear stress exist?

b) Make a sketch of the shear stress on the cross section of the tube.

c) 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.





cross section of tube