

1. List the ways in which torsional members can be indeterminate.
2. Write out the general steps for solving the different types of indeterminate torsional problems.
3. A solid steel shaft has a diameter of 5 inches and is 3 feet long. The shaft is fixed at both ends. A counter-clockwise torque of 15 k-in is applied one foot from the left support. Determine the maximum shear stress in the member.
4. A solid steel shaft member is 3 feet long. The left two feet of the member has a diameter of 2 inches and the remaining foot has a diameter of 5 inches. The shaft is fixed at both ends. A counter-clockwise torque of 15 k-in is applied one foot from the left support. Determine the maximum shear stress in the member.
5. A steel tube with a diameter of 5 inches surrounds a solid copper core with a 3 inch diameter. The member is 3 feet long. The shaft is fixed at one end and free at the other end. A counter-clockwise torque of 15 k-in is applied one foot from the left support. Determine the maximum shear stress in each material.
6. Given the information in problem 5, determine the angle of twist of the free end relative to the fixed end.