

ESO 202A/204: Mechanics of Solids (2016-17 II Semester)

Assignment No. – 7

- 7.1 The motor delivers a twisting moment of 50 Nm to the shaft AB. This moment is transmitted to shaft CD using the gears at E and F. Determine the equilibrium twisting moment T' on shaft CD and the maximum shear stress in each shaft. The bearings B, C, and D allow free rotation to the shafts (Fig. 7.1).
- 7.2 The 80 mm diameter shaft is made of 6061-T6 ($G = 26$ GPa) aluminium alloy and subjected to the torsional loading shown in Fig. 7.2. Determine the angle of twist at end A.
- 7.3 The two shafts are made of Fe250 steel. Each has a diameter of 25 mm and they are connected using the gears fixed to their ends. Their other ends are attached to fixed supports at A and B. They are also supported by journal bearings at C and D, which allow free rotation of the shafts along their axes. If a twisting moment of 500 Nm is applied to the gear at E as shown in Fig. 7.3, determine the reactions at A and B. Also determine the rotation of the gear at E.

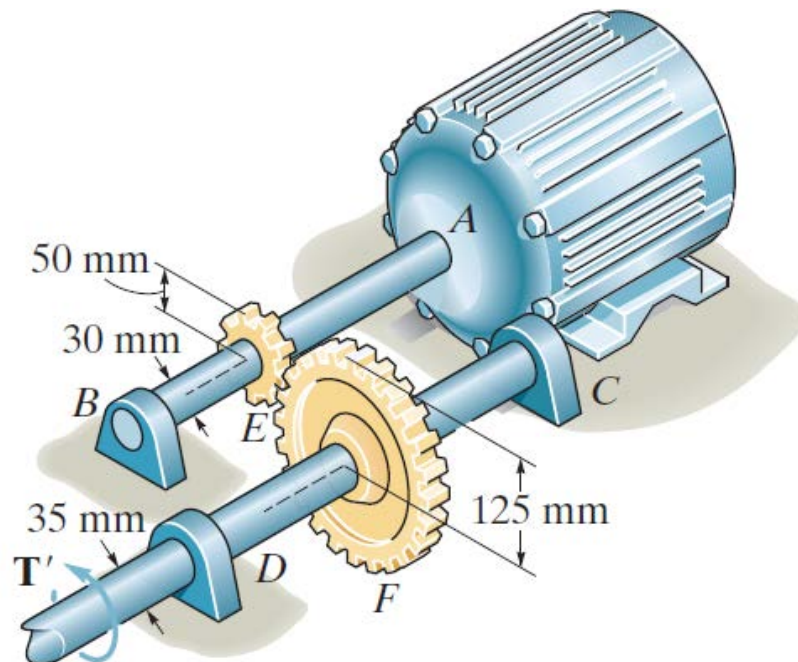


Fig. 7.1

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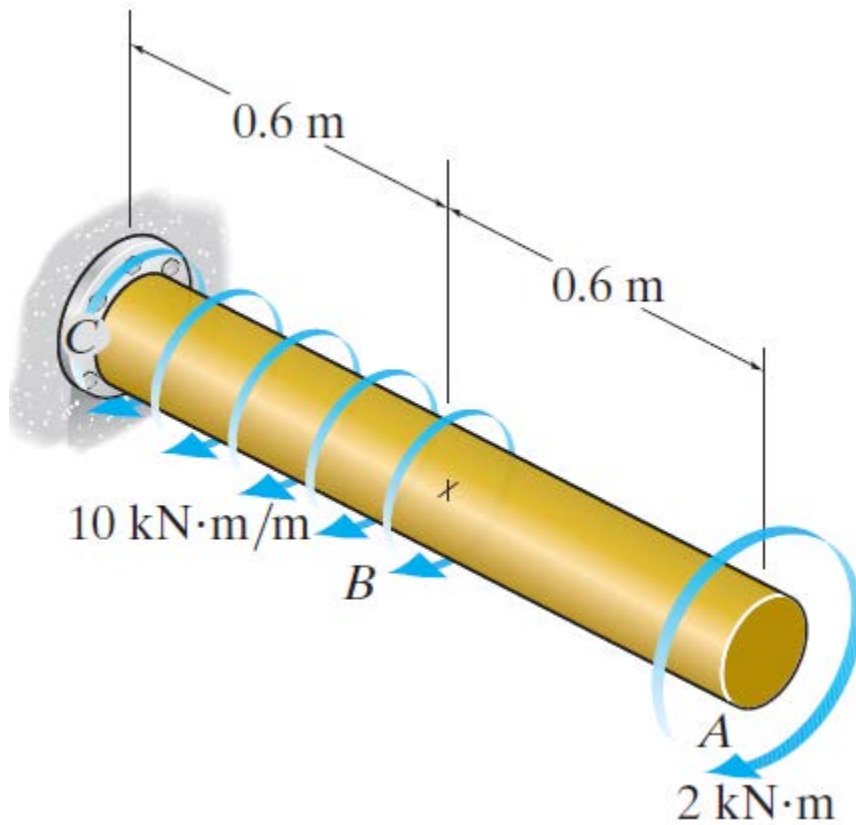


Fig. 7.2

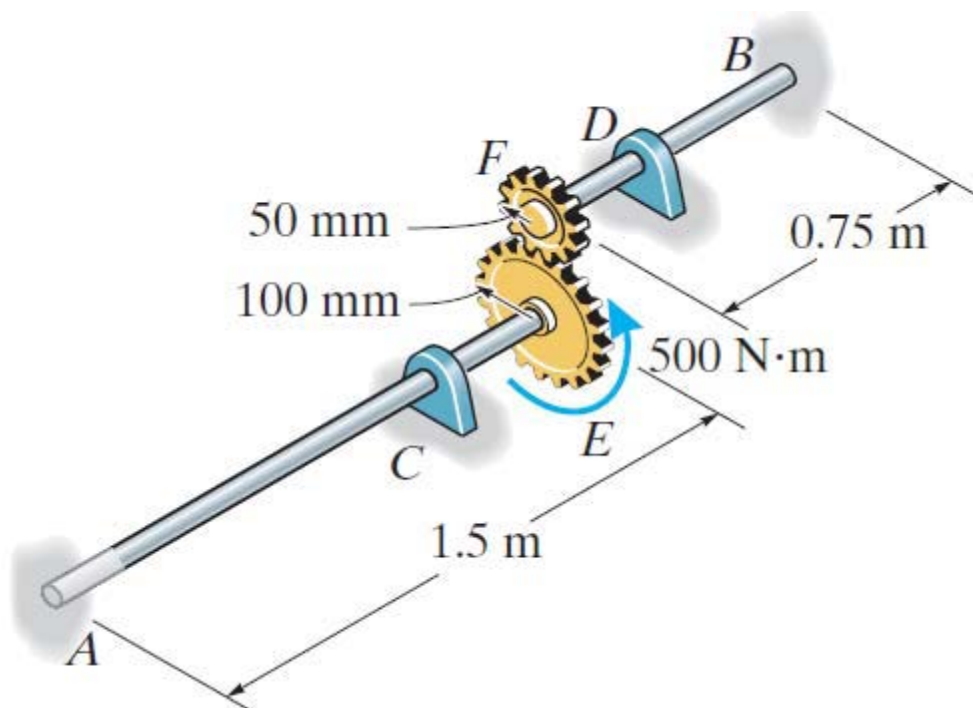


Fig. 7.3