

Chapter 18

Torsion of beams

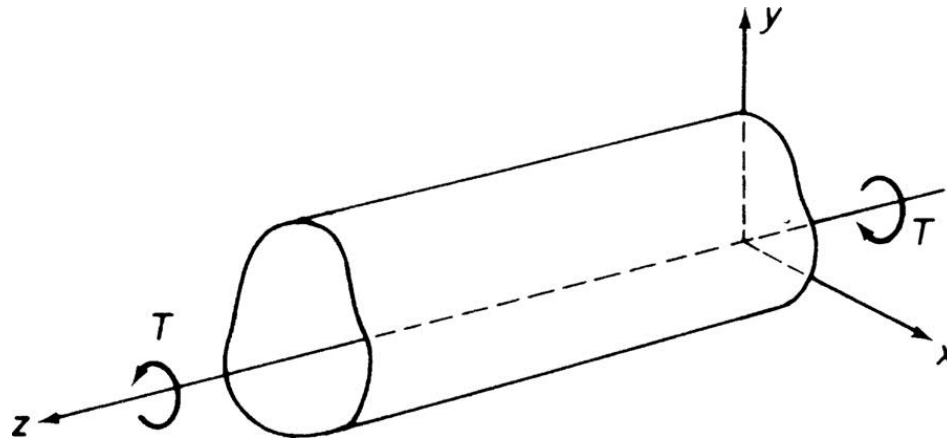


FIGURE 18.1 Torsion of a Closed Section Beam

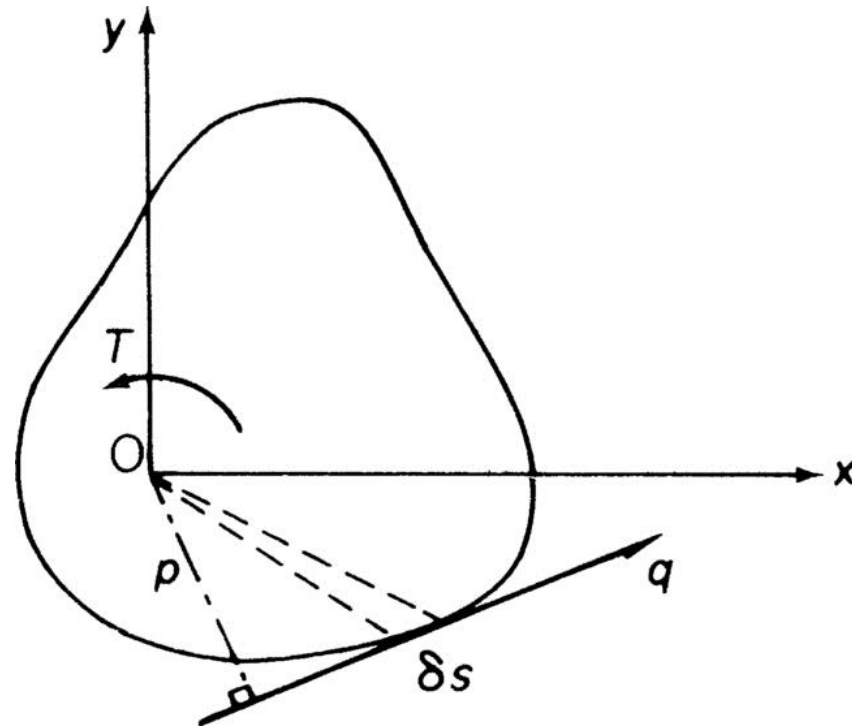


FIGURE 18.2 Determination of the Shear Flow Distribution in a Closed Section Beam Subjected to Torsion

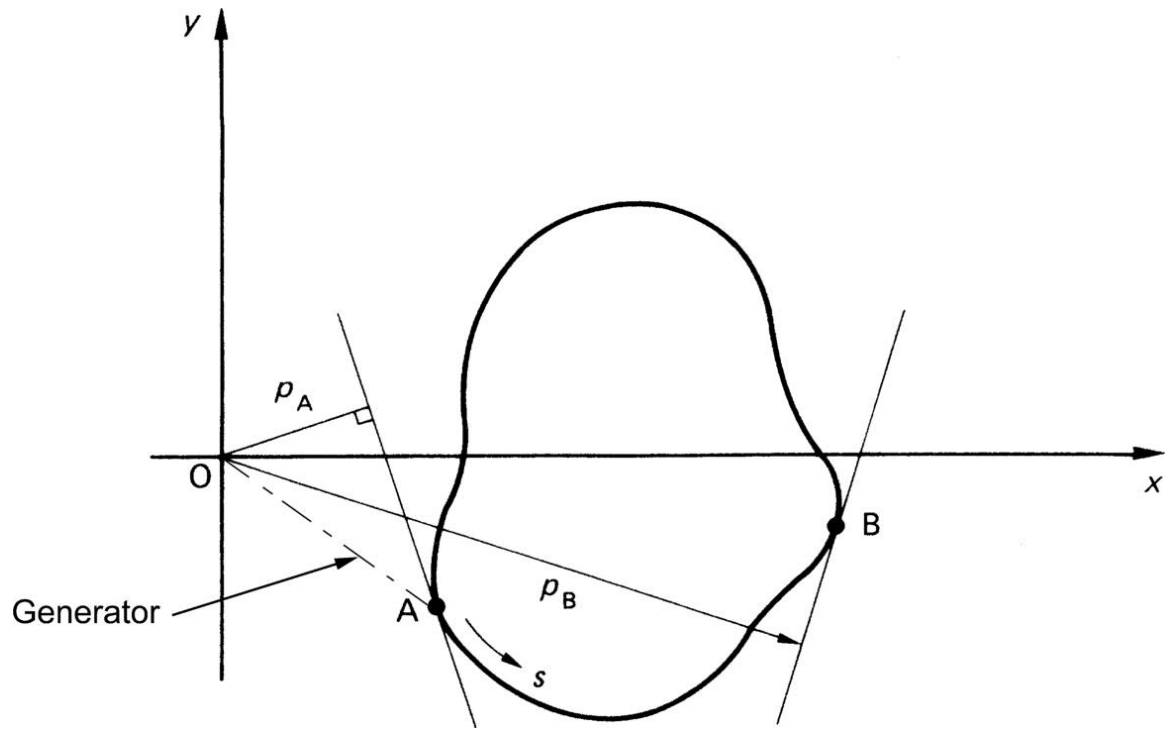


FIGURE 18.3 Sign Convention for Swept Areas

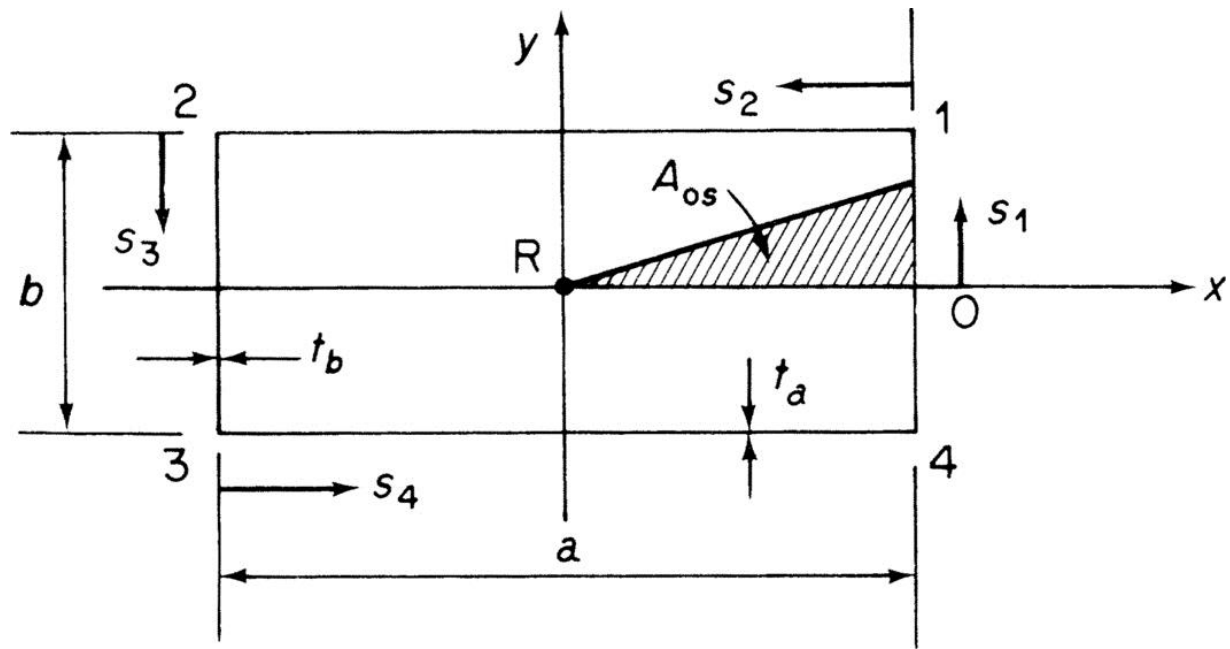


FIGURE 18.4 Torsion of a Rectangular Section Beam

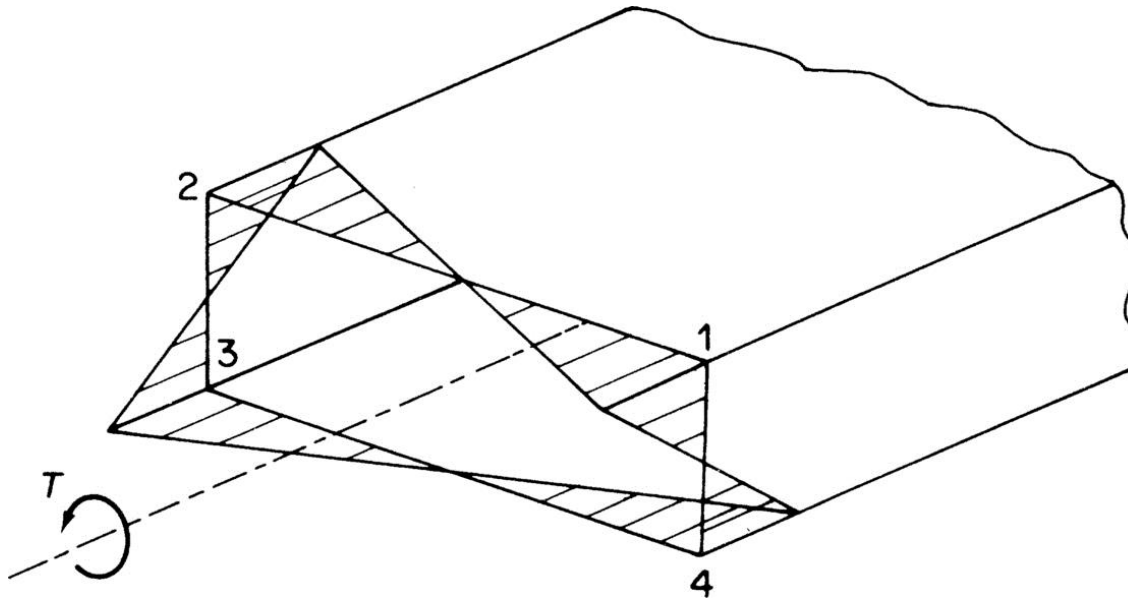


FIGURE 18.5 Warping Distribution in the Rectangular Section Beam of Example 18.2

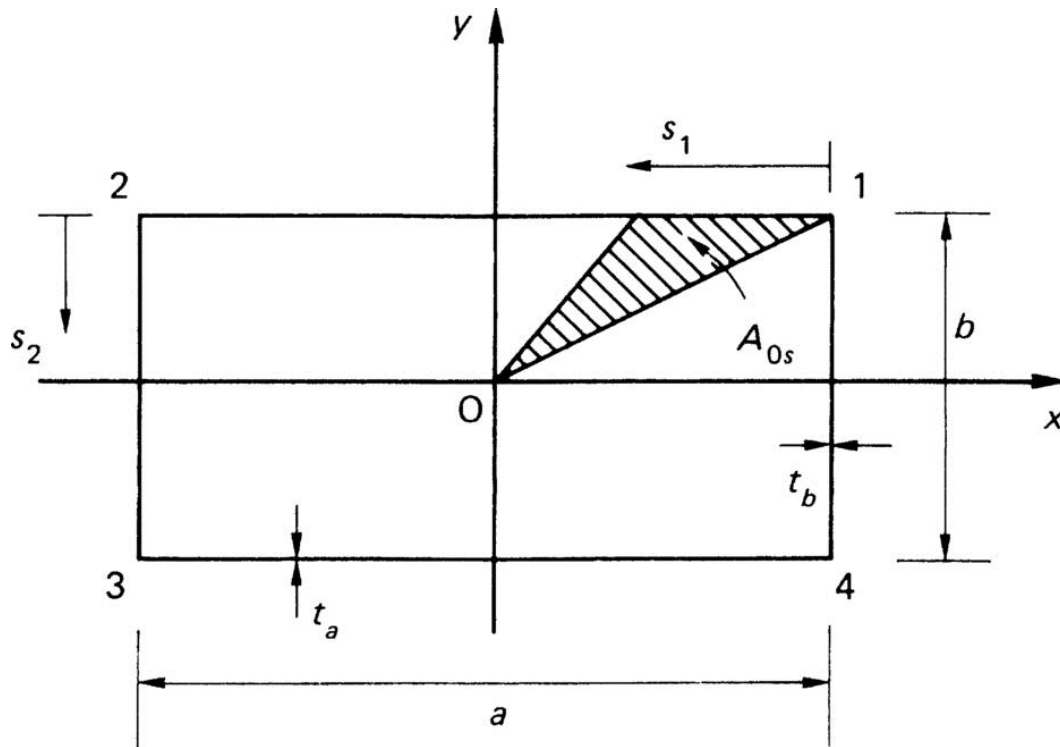


FIGURE 18.6 Arbitrary Origin for s

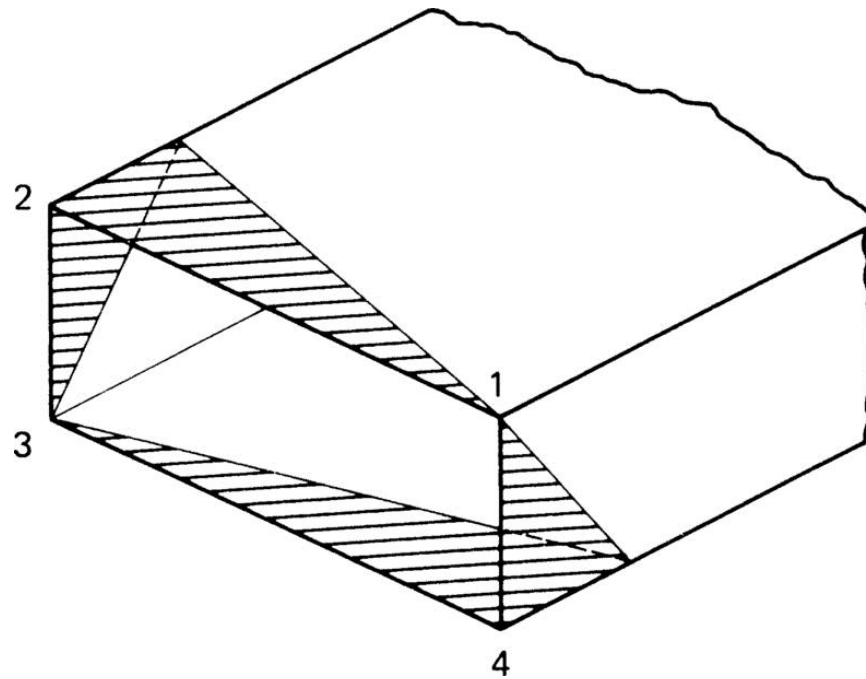


FIGURE 18.7 Warping Distribution Produced by Selecting an Arbitrary Origin for s

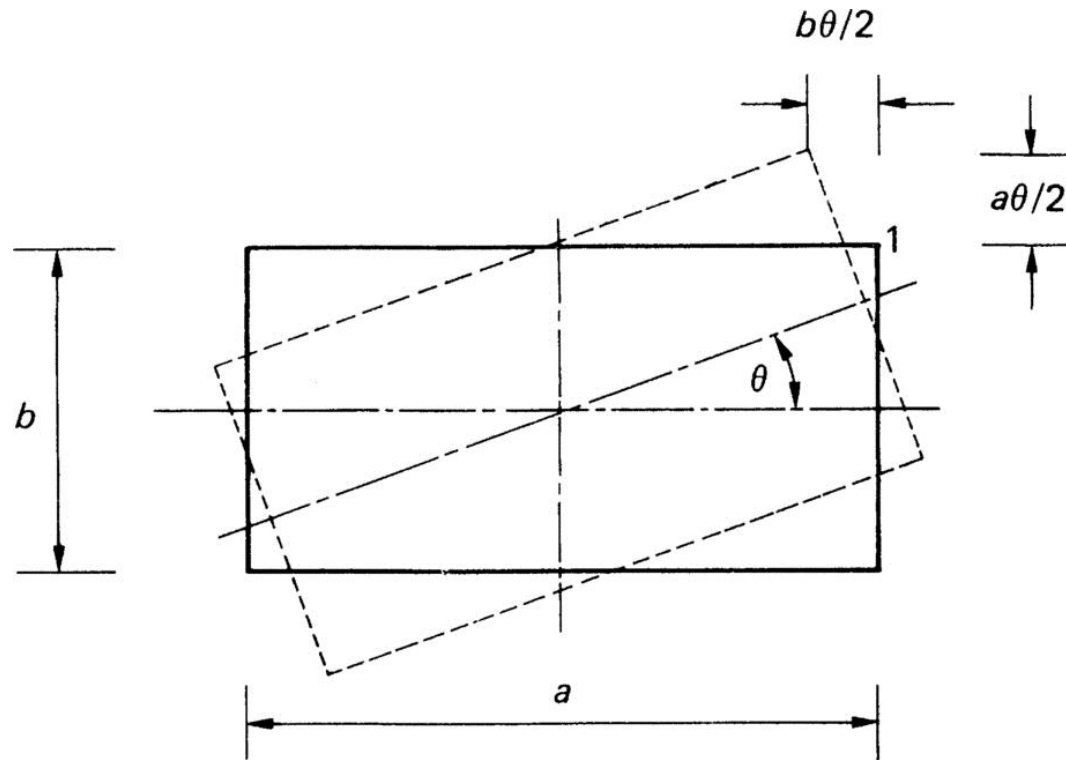


FIGURE 18.8 Twisting of a Rectangular Section Beam

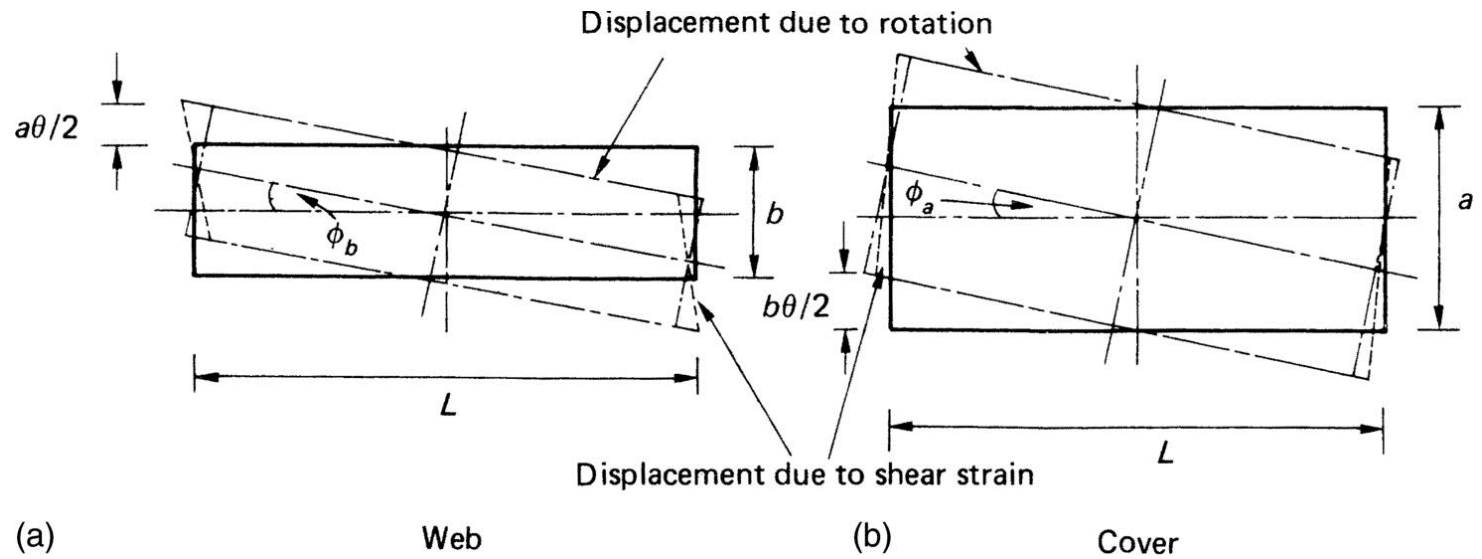


FIGURE 18.9 Displacements Due to Twist and Shear Strain

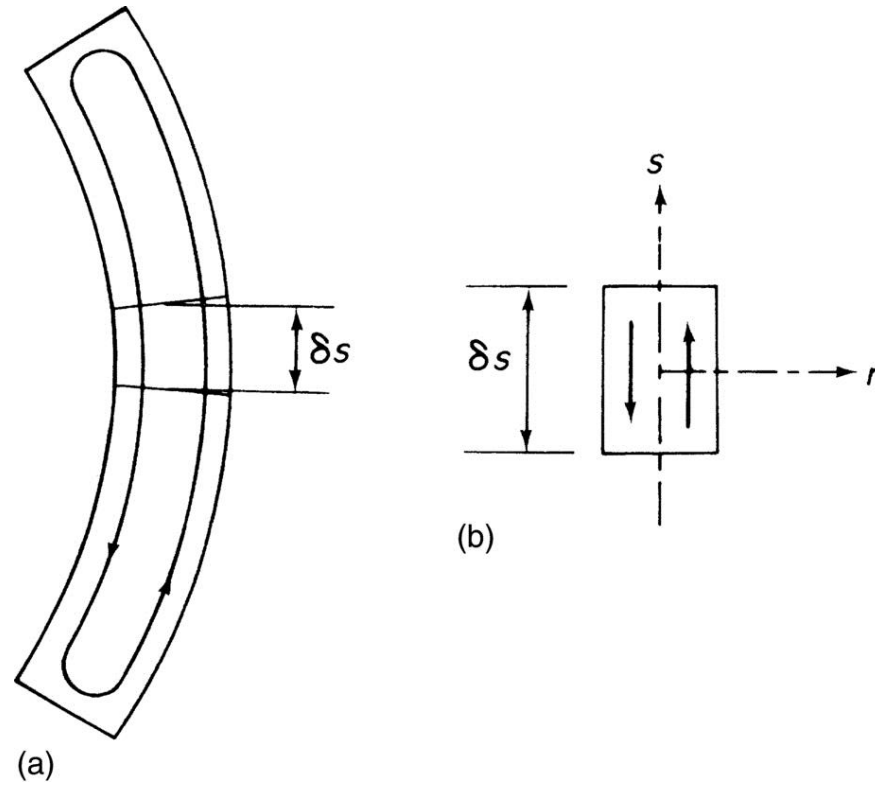


FIGURE 18.10 (a) Shear Lines in a Thin-Walled Open Section Beam Subjected to Torsion; (b) Approximation of Elemental Shear Lines to Those in a Thin Rectangular Strip

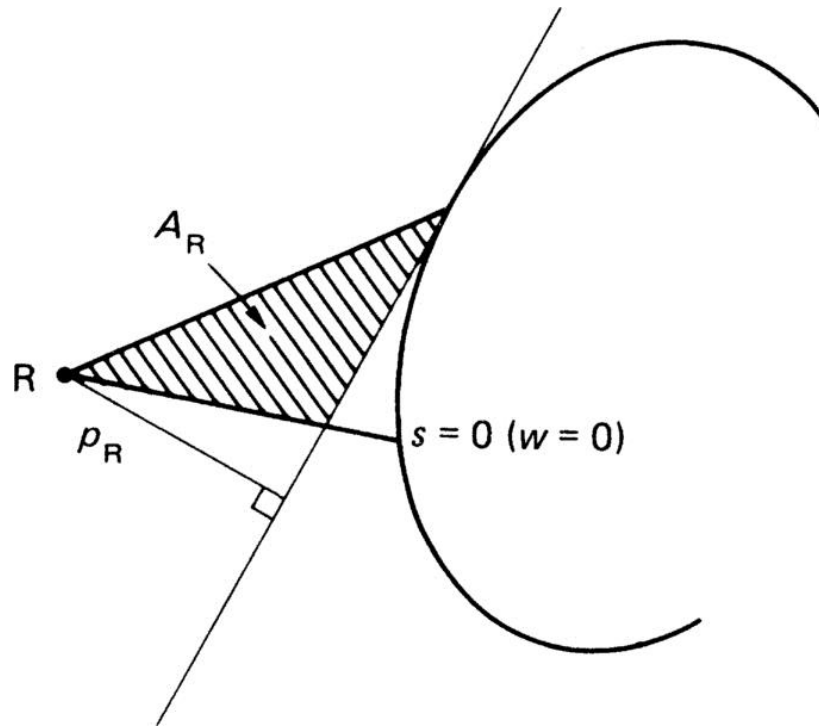


FIGURE 18.11 Warping of an Open Section Beam

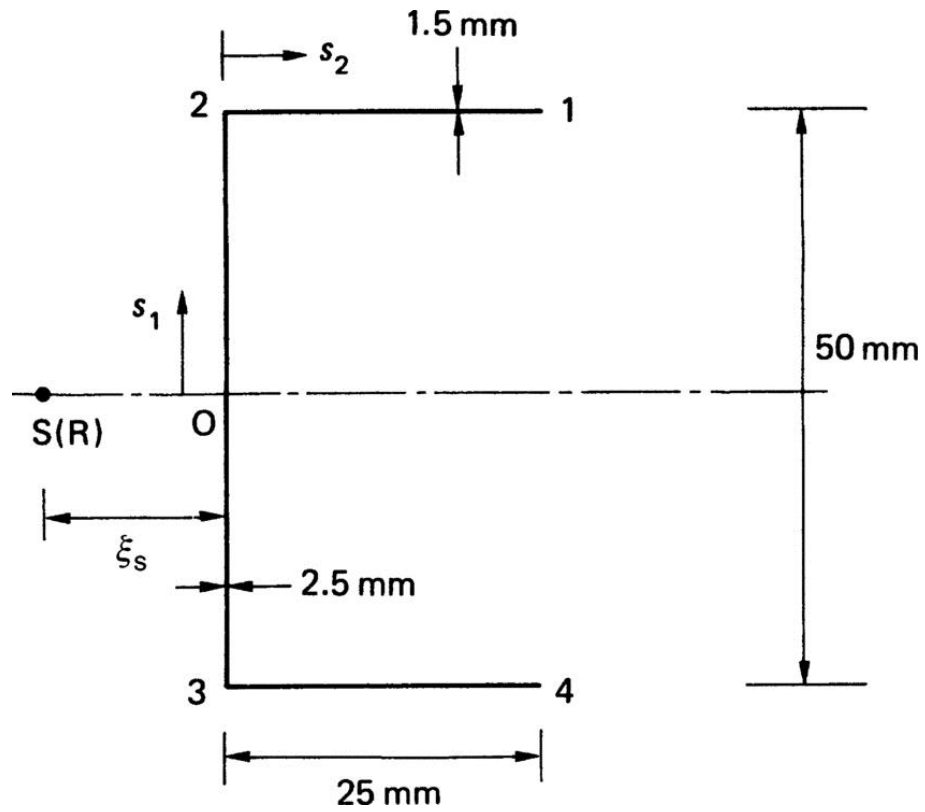


FIGURE 18.12 Channel Section of Example 18.3

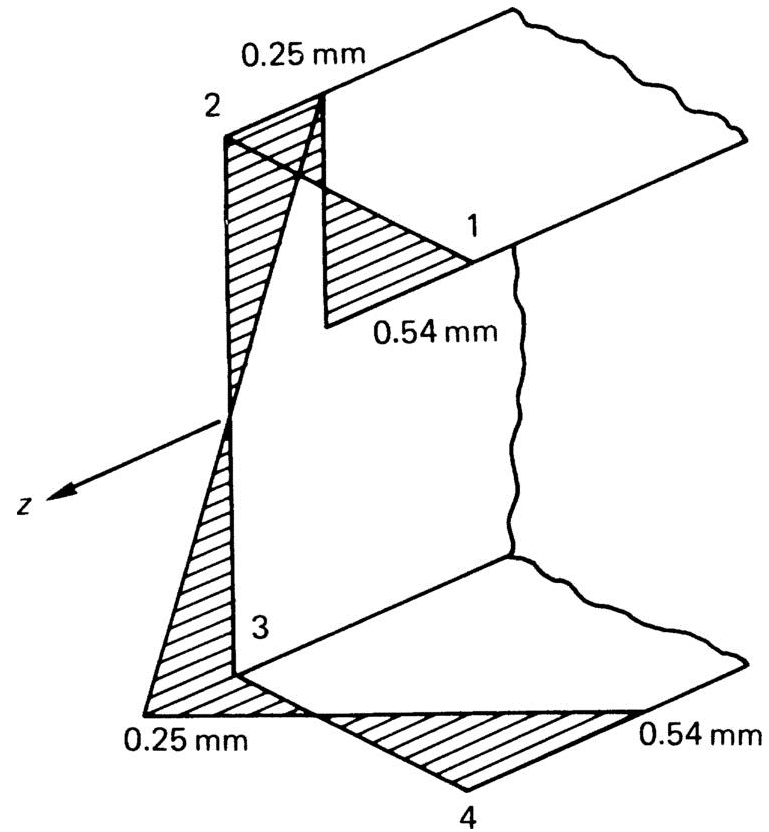


FIGURE 18.13 Warping Distribution in Channel Section of Example 18.3

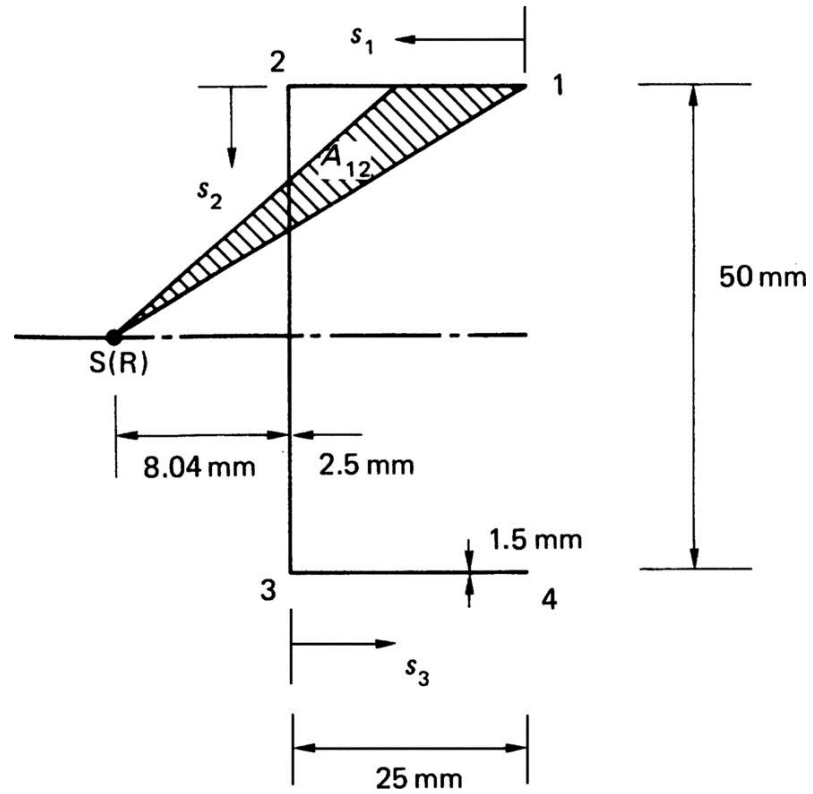


FIGURE 18.14 Determination of Points of Zero Warping

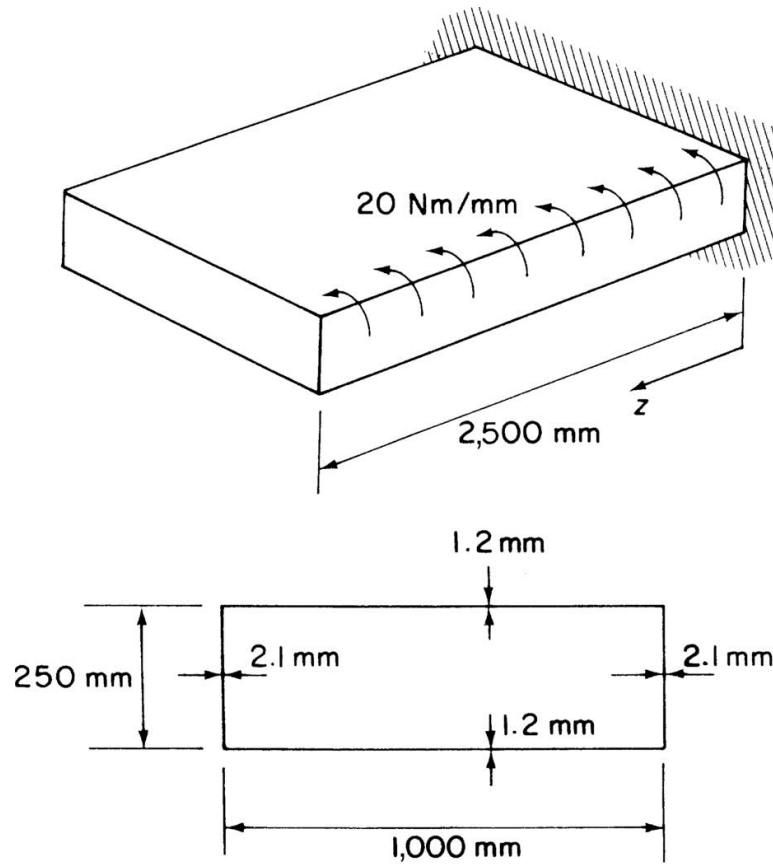


FIGURE P.18.1

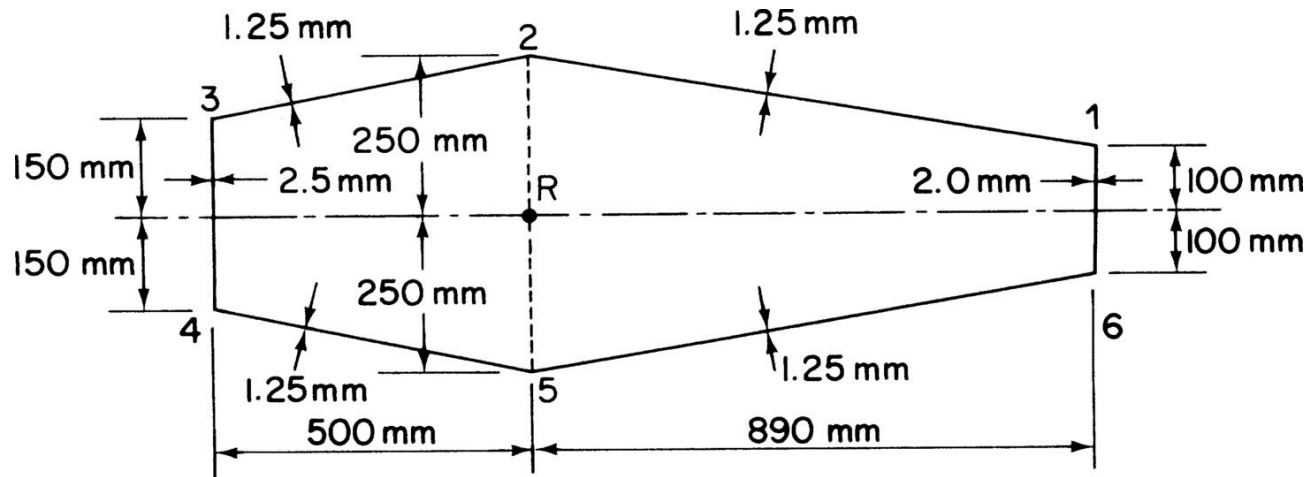


FIGURE P.18.2

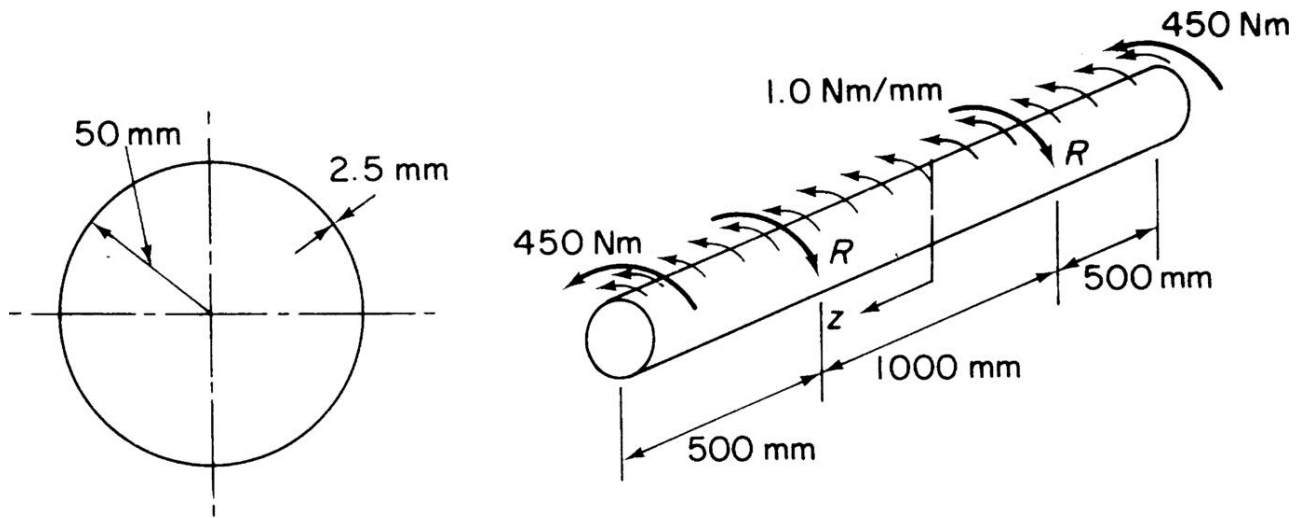


FIGURE P.18.3

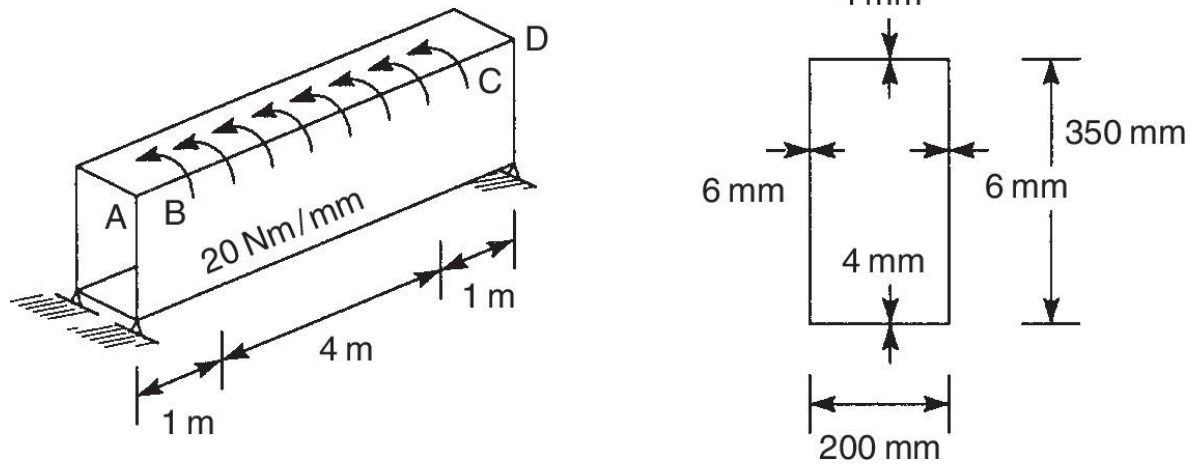


FIGURE P.18.4

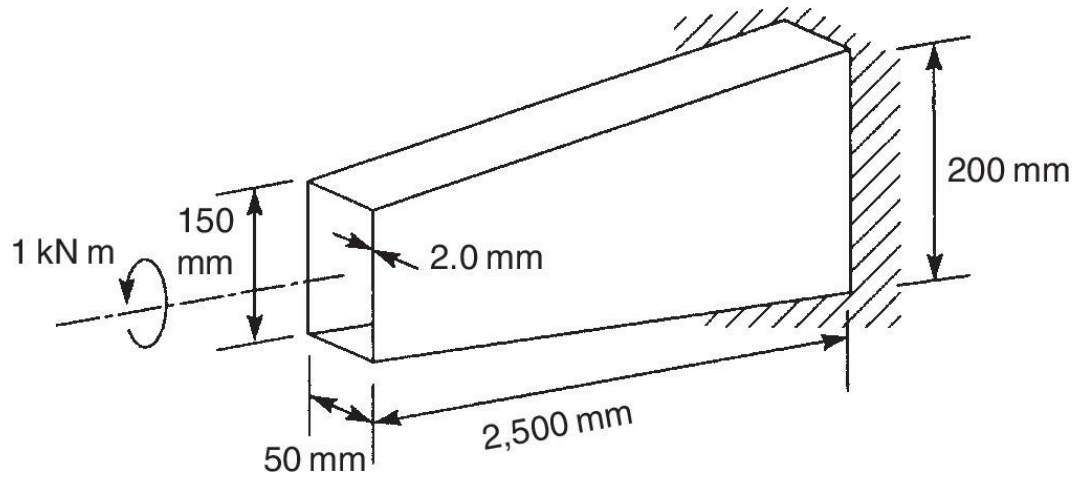


FIGURE P.18.5

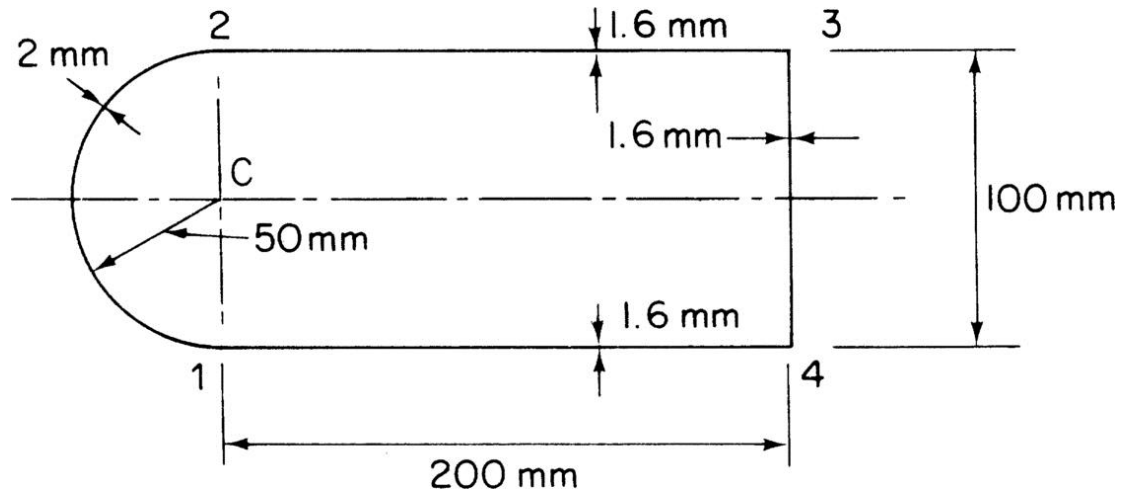


FIGURE P.18.6

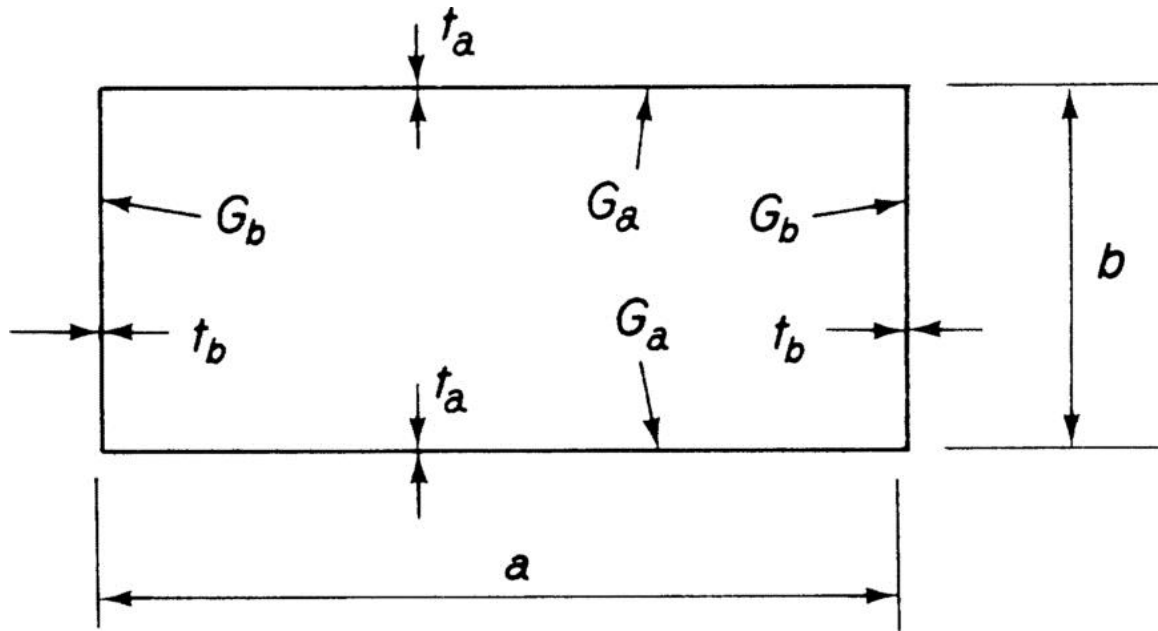


FIGURE P.18.7

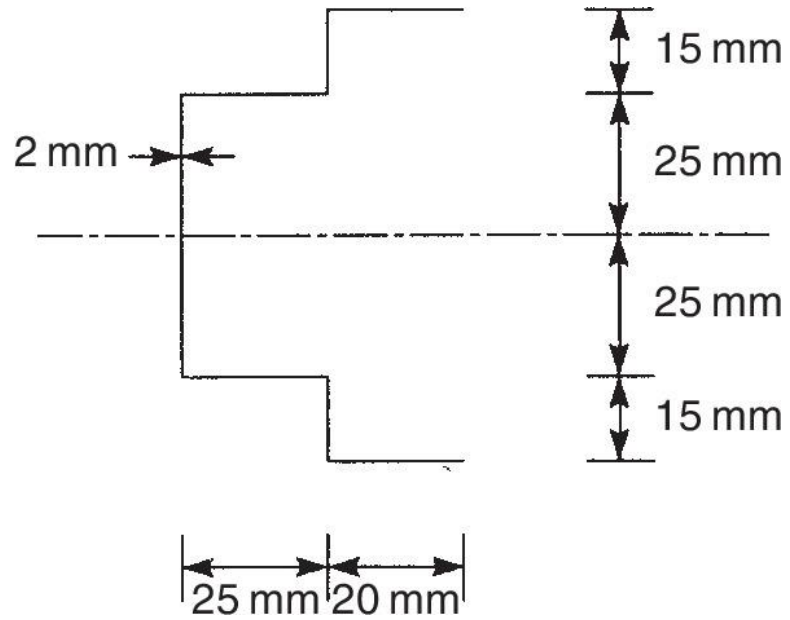


FIGURE P.18.8

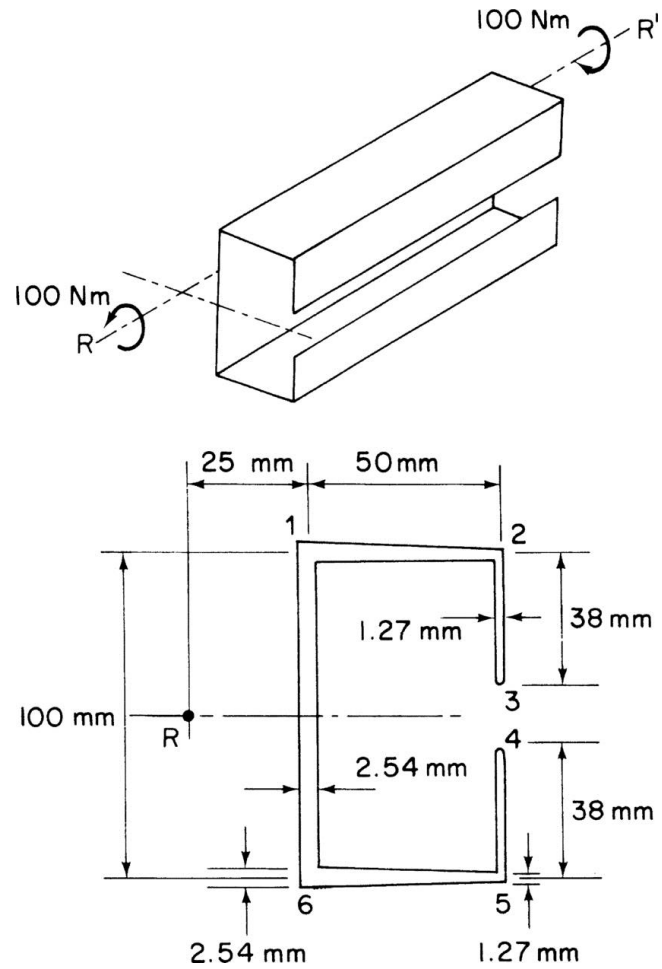


FIGURE P.18.10

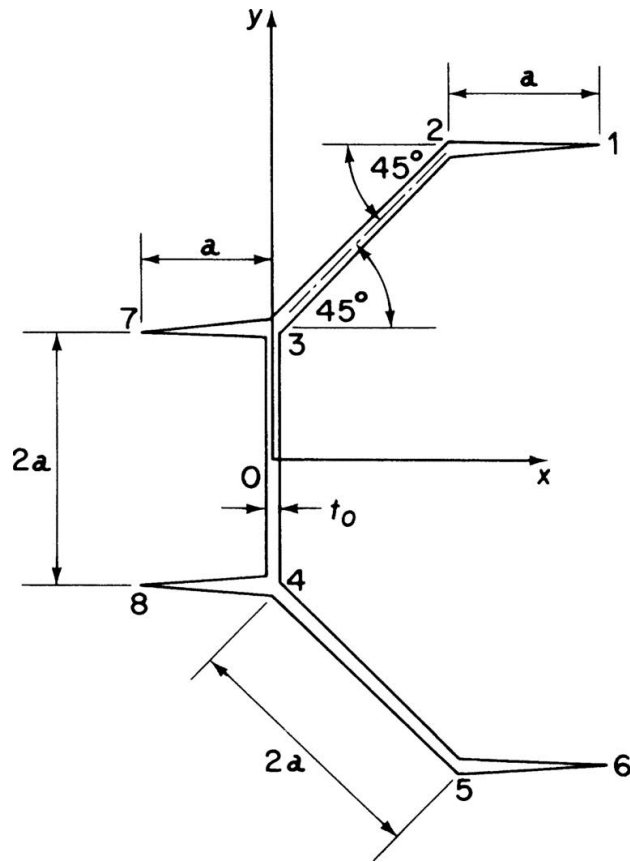


FIGURE P.18.11

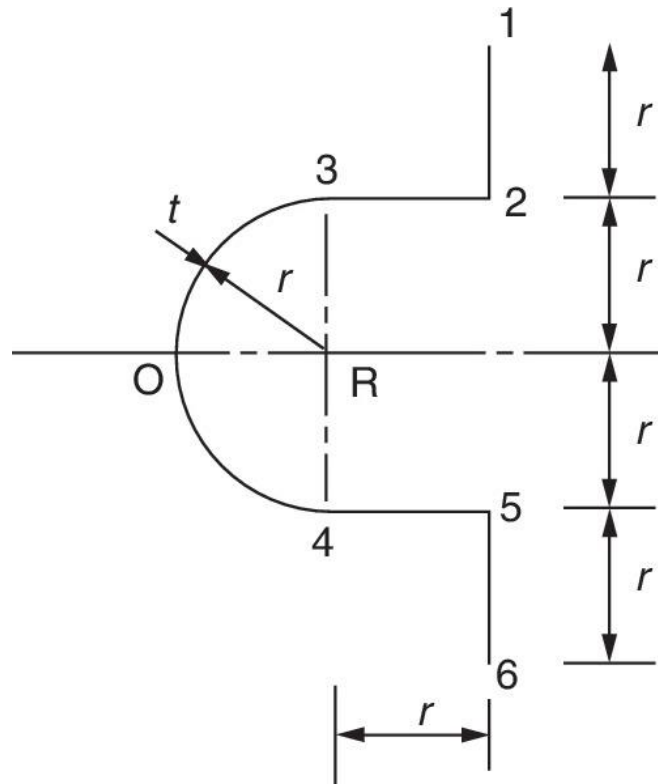


FIGURE P.18.12

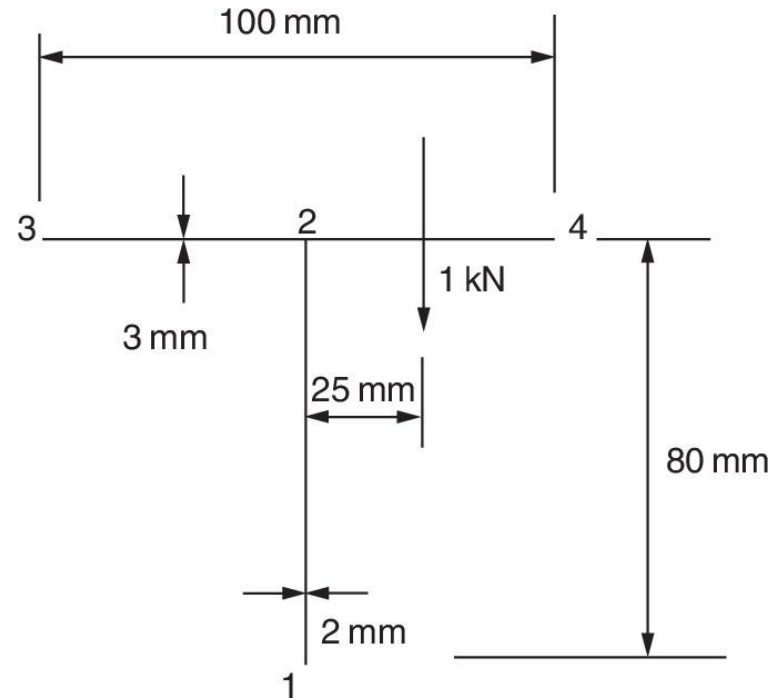


FIGURE P.18.13