

Chapter 27

Open section beams

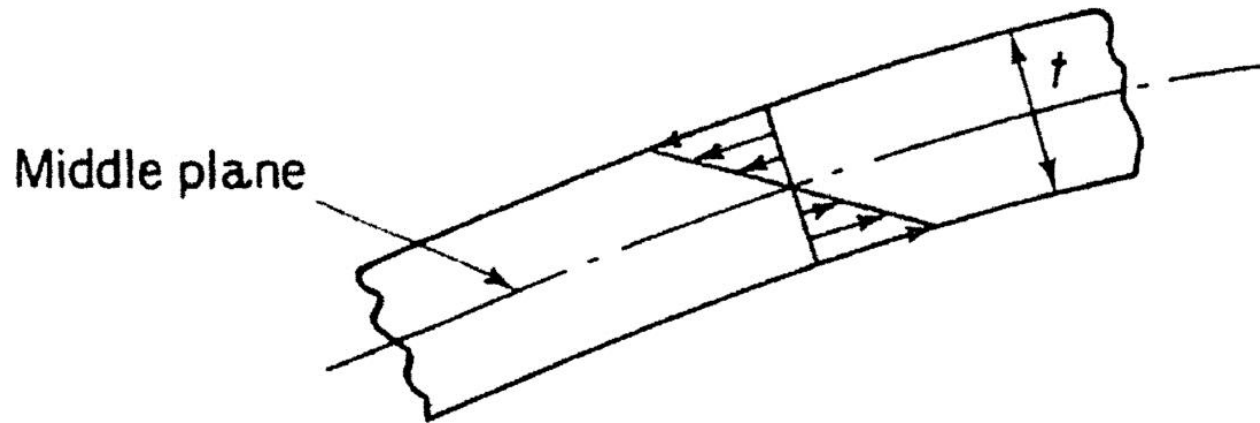


FIGURE 27.1 Shear Stress Distribution across the Wall of an Open Section Beam Subjected to Torsion

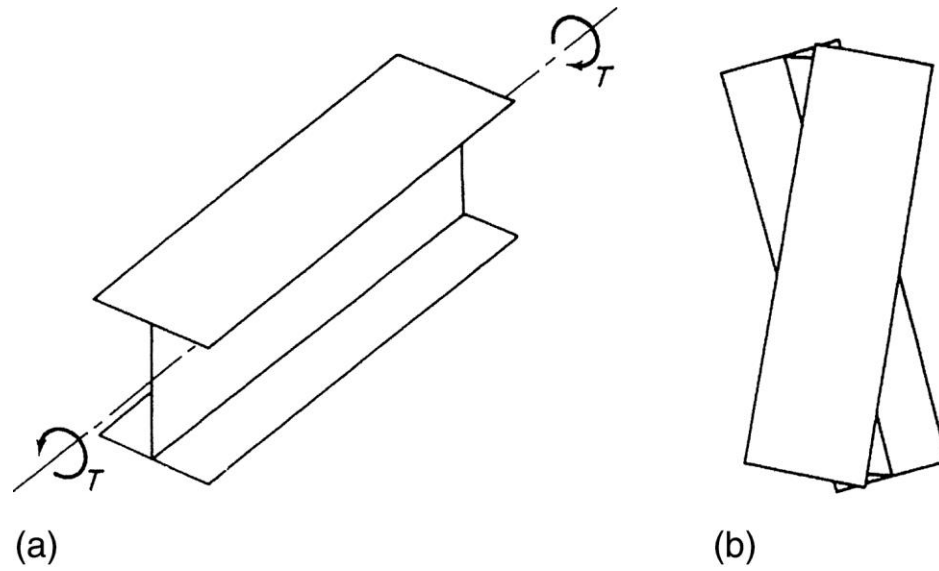


FIGURE 27.2 (a) Torsion of I-Section Beam; (b) Plan View of Beam Showing Undistorted Shape of Flanges

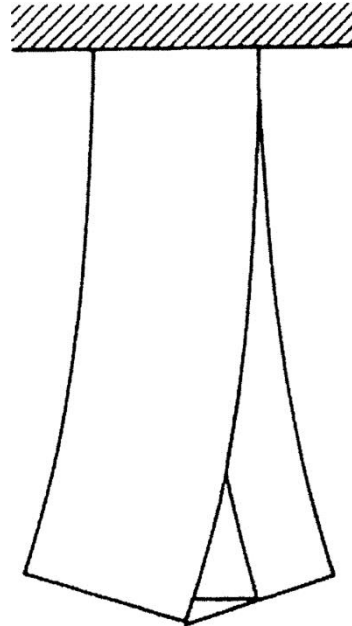


FIGURE 27.3 Bending Effect of Axial Constraint on Flanges of I-Section Beam Subjected to Torsion

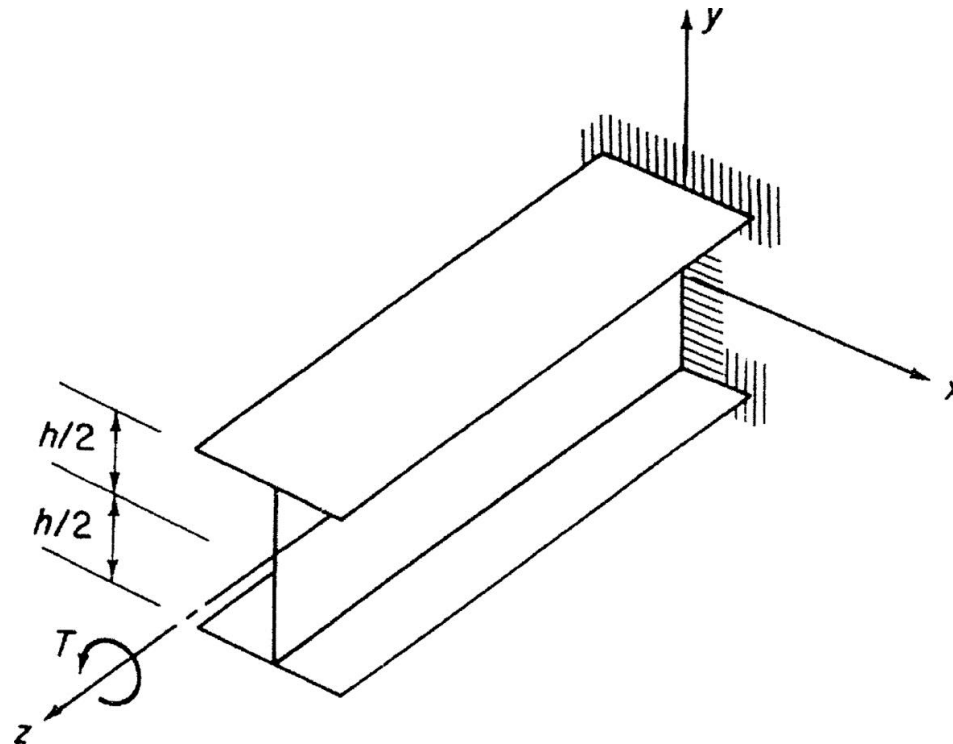


FIGURE 27.4 Torsion of I-Section Beam Fully Built in at One End

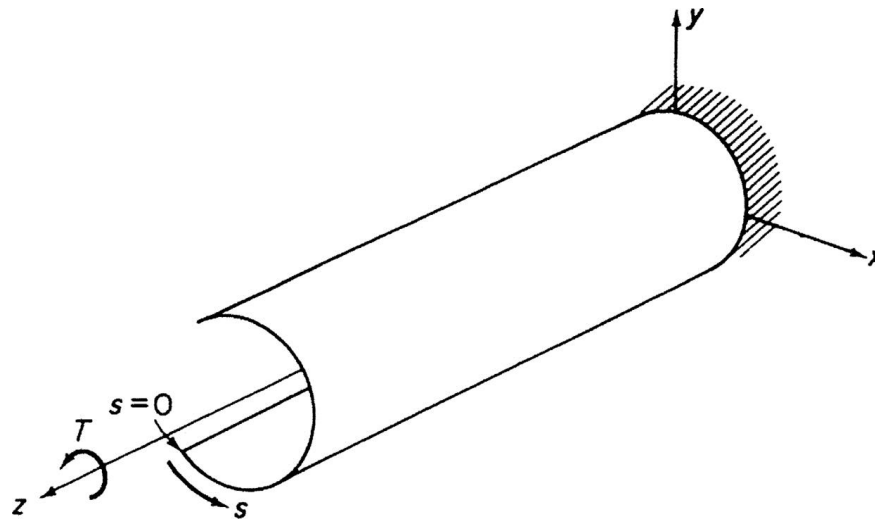


FIGURE 27.5 Torsion of an Open Section Beam Fully Built-in at One End

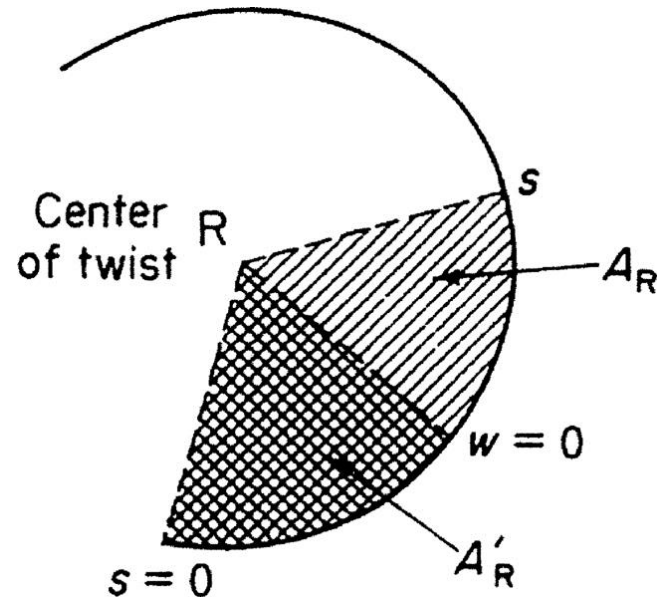


FIGURE 27.6 Computation of Swept Area A_R

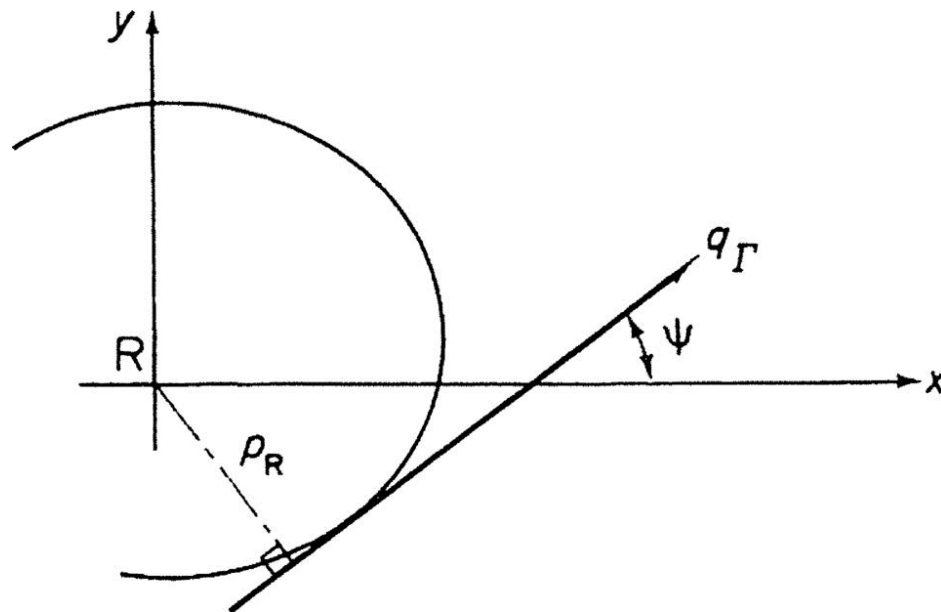


FIGURE 27.7 Determination of the Position of the Center of the Twist

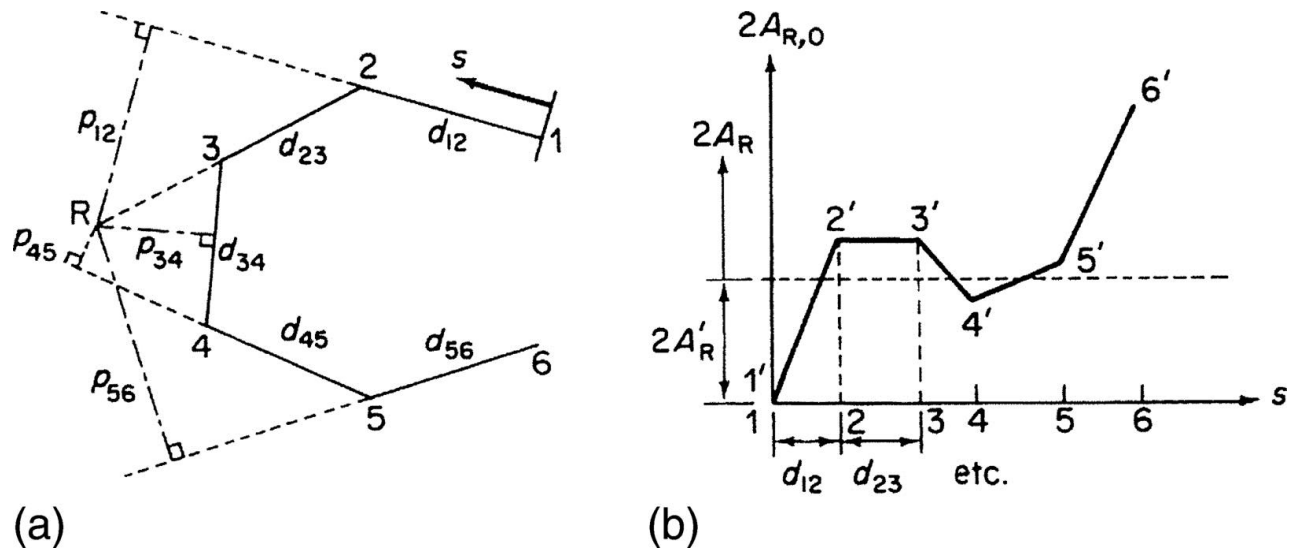


FIGURE 27.8 Computation of Torsion Bending Constant J_R : (a) Dimensions of the Flat-Sided Open Section Beam; (b) Variation of $2A_{R,0}$ around the Beam Section

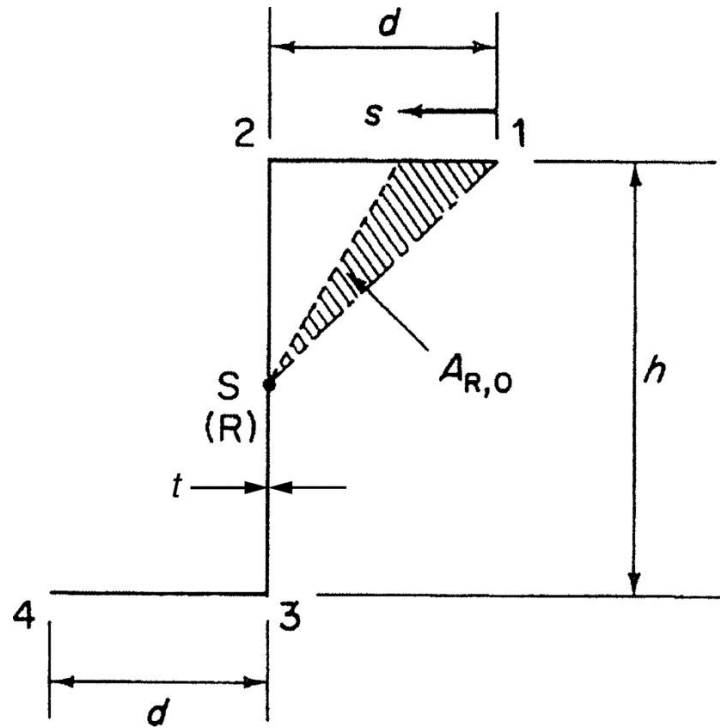


FIGURE 27.9 Section of Axially Constrained Open Section Beam under Torsion

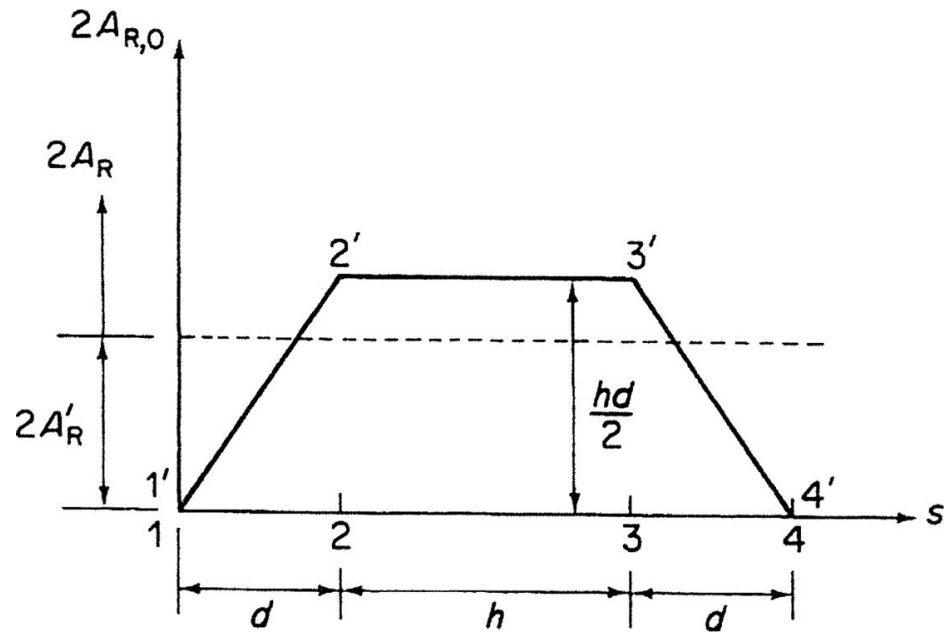


FIGURE 27.10 Calculation of I_R for the Section of Example 27.1.

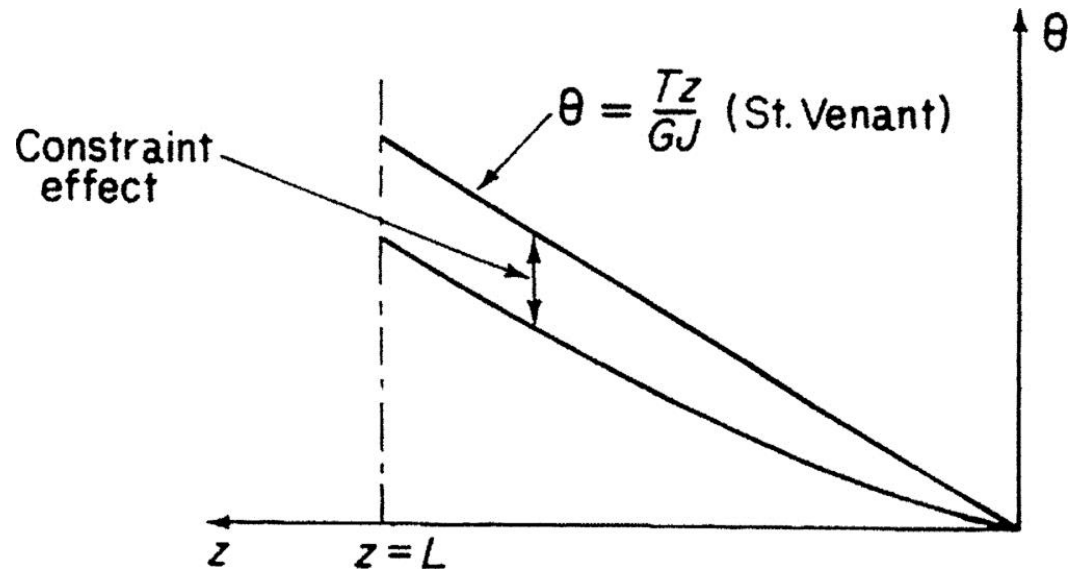


FIGURE 27.11 Stiffening Effect of the Axial Constraint

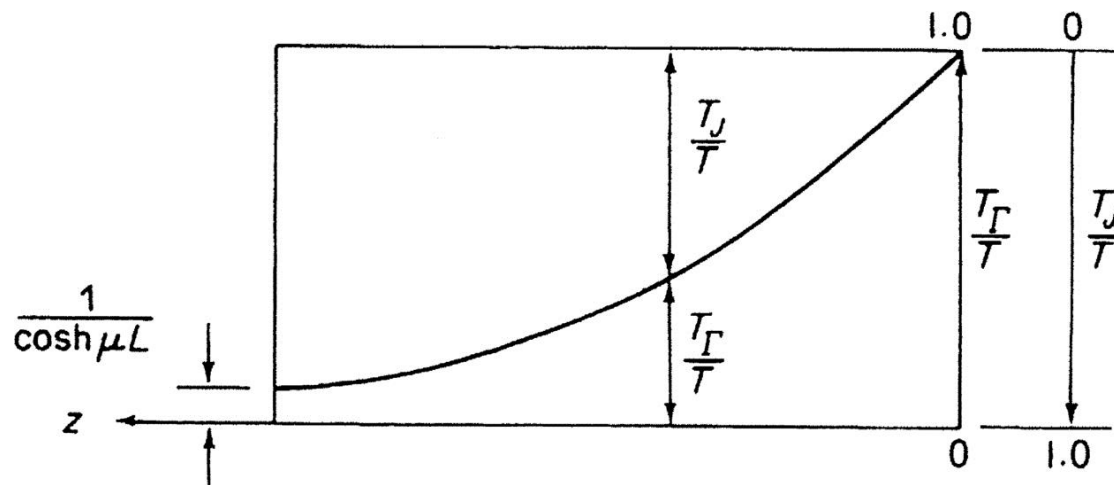


FIGURE 27.12 Distribution of St. Venant and Torsion-Bending Torques along the Length of the Open Section Beam Shown in Fig. 27.9

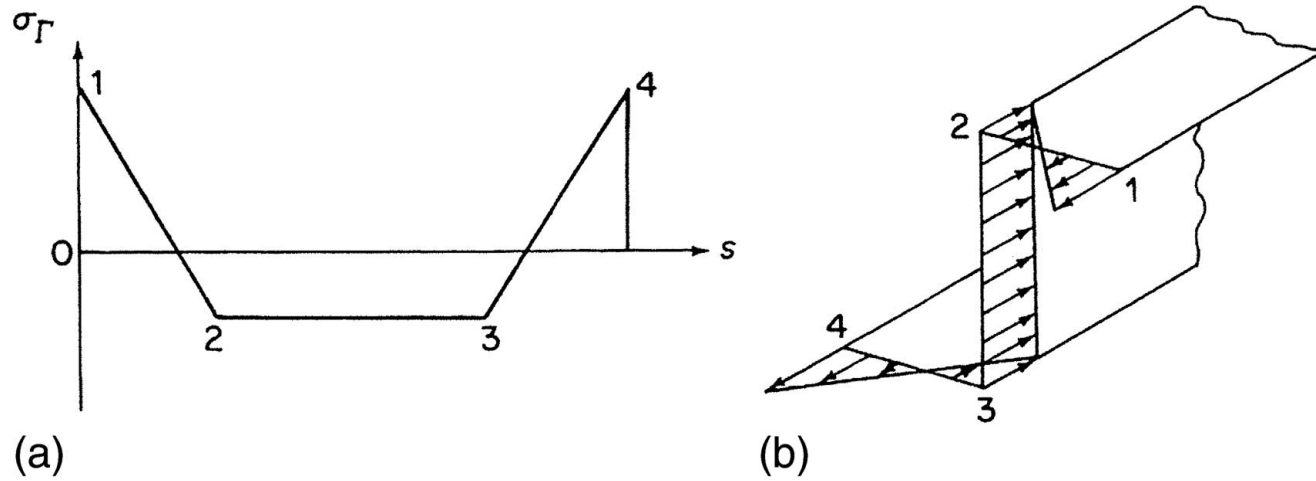


FIGURE 27.13 Distribution of Axial Constraint Direct Stress around the Section

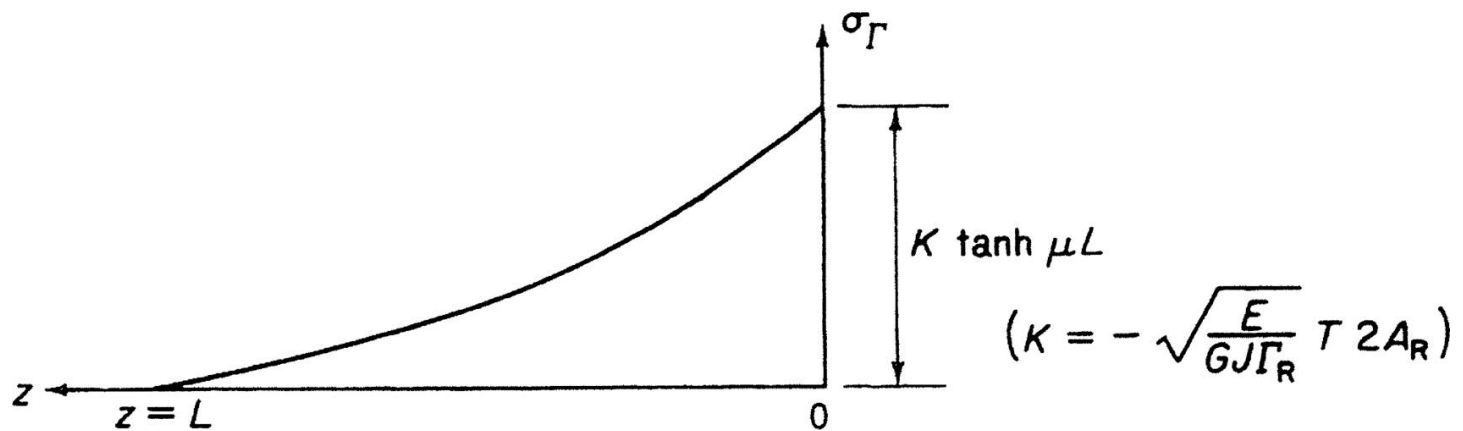


FIGURE 27. 14 Spanwise Distribution of Axial Constraint Direct Stress

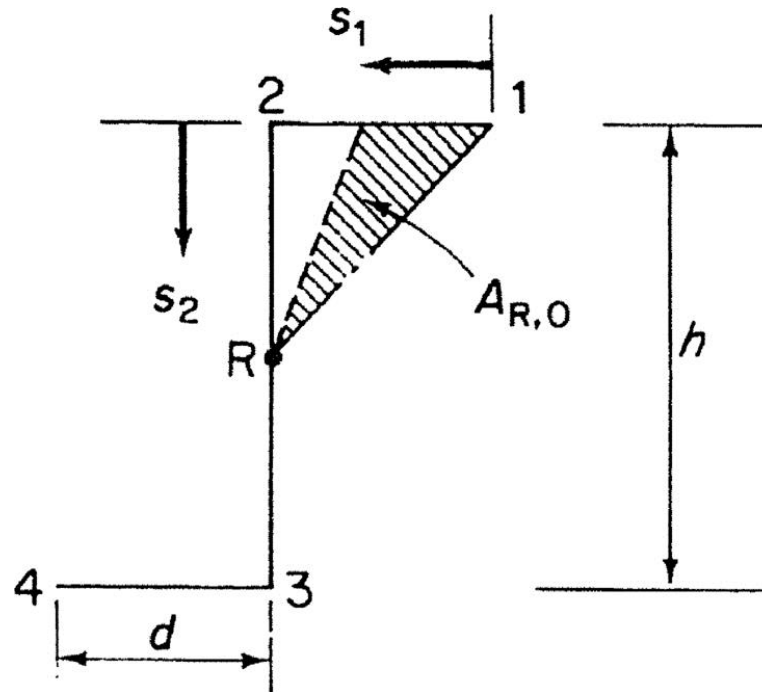


FIGURE 27.15 Calculation of Axial Constraint Shear Flows

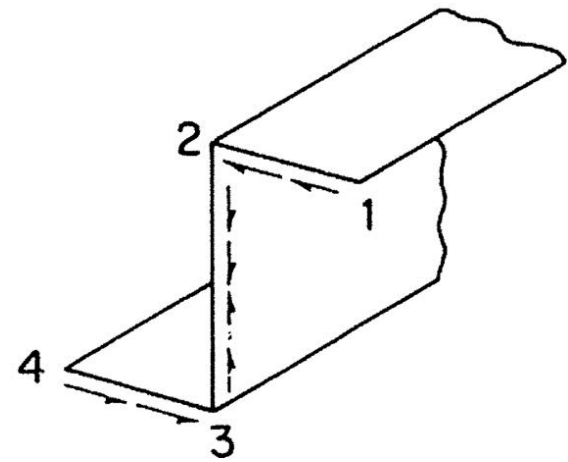
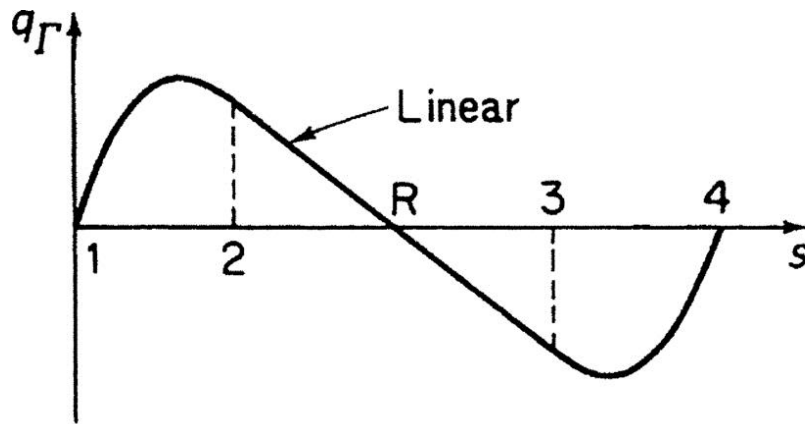


FIGURE 27.16 Distribution of Axial Constraint Shear Flows

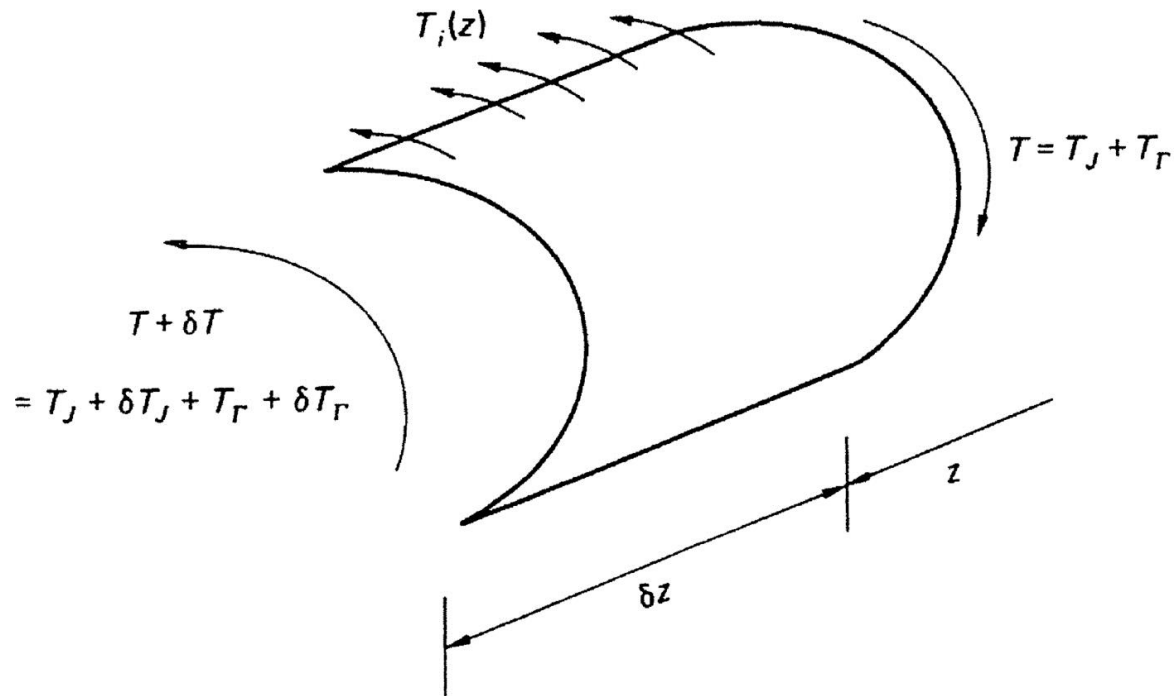


FIGURE 27.17 Beam Carrying a Distributed Torque Loading

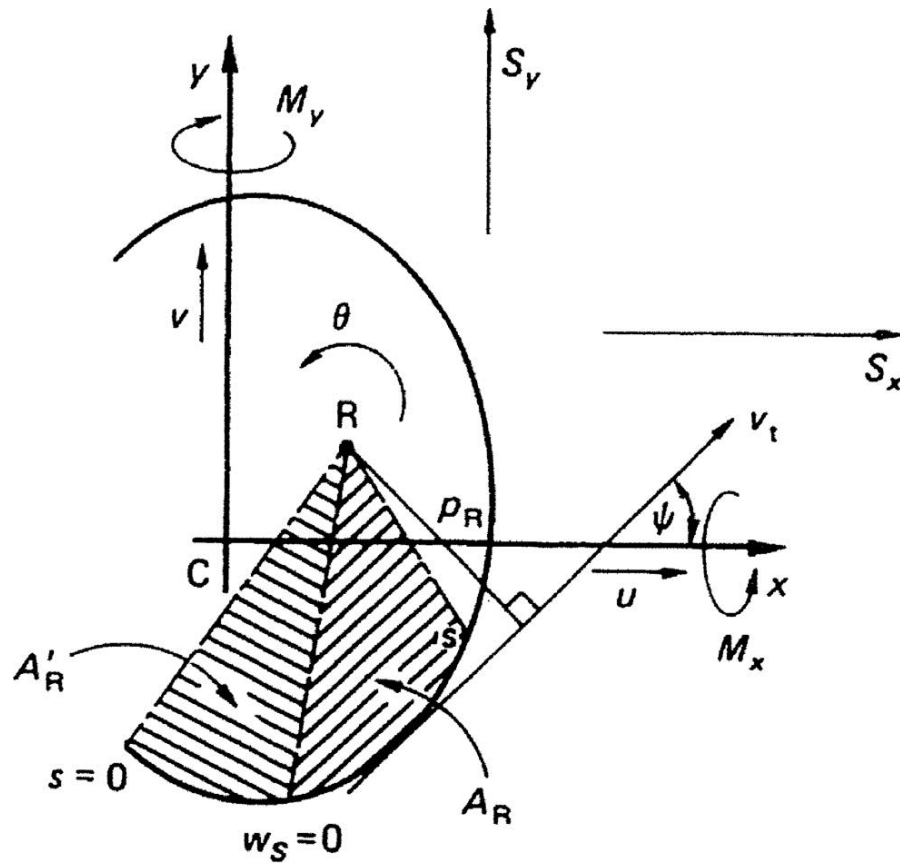


FIGURE 27.18 Cross-section of an Open Section Beam Subjected to a General System of Loads

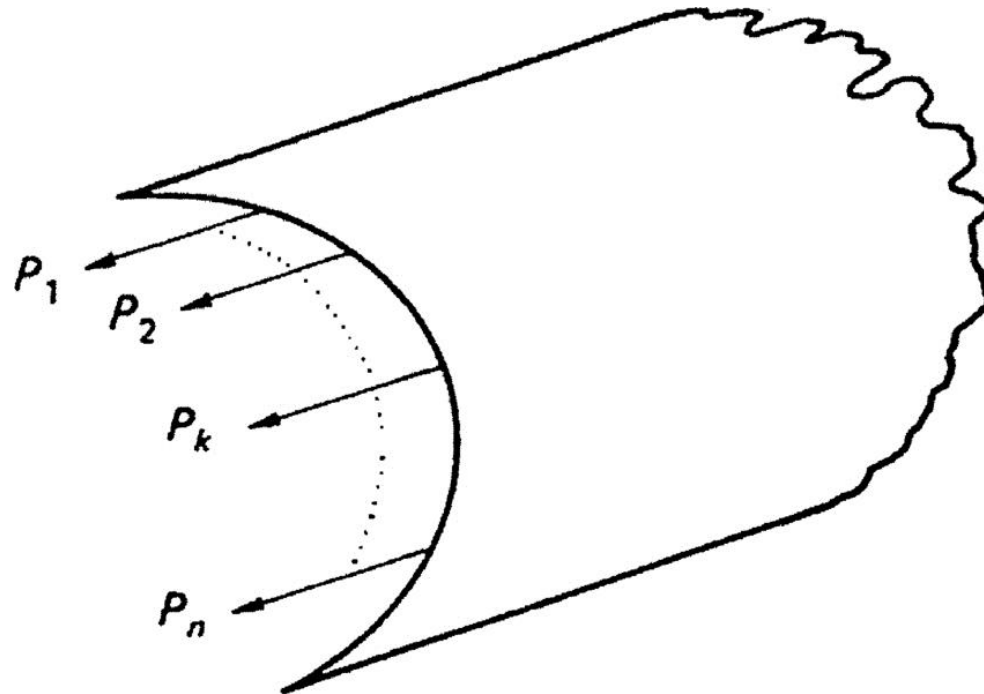


FIGURE 27.19 Open Section Beam Subjected to Concentrated Loads Parallel to Its Longitudinal Axis

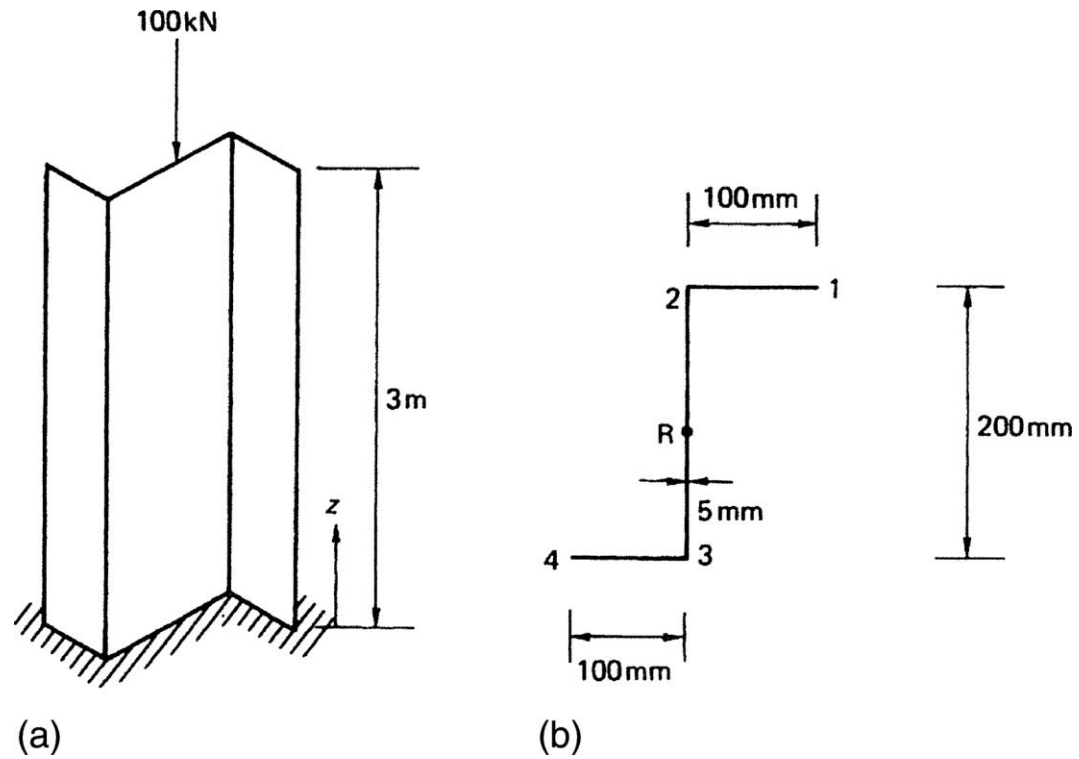


FIGURE 27.20 Column of Example 27.2

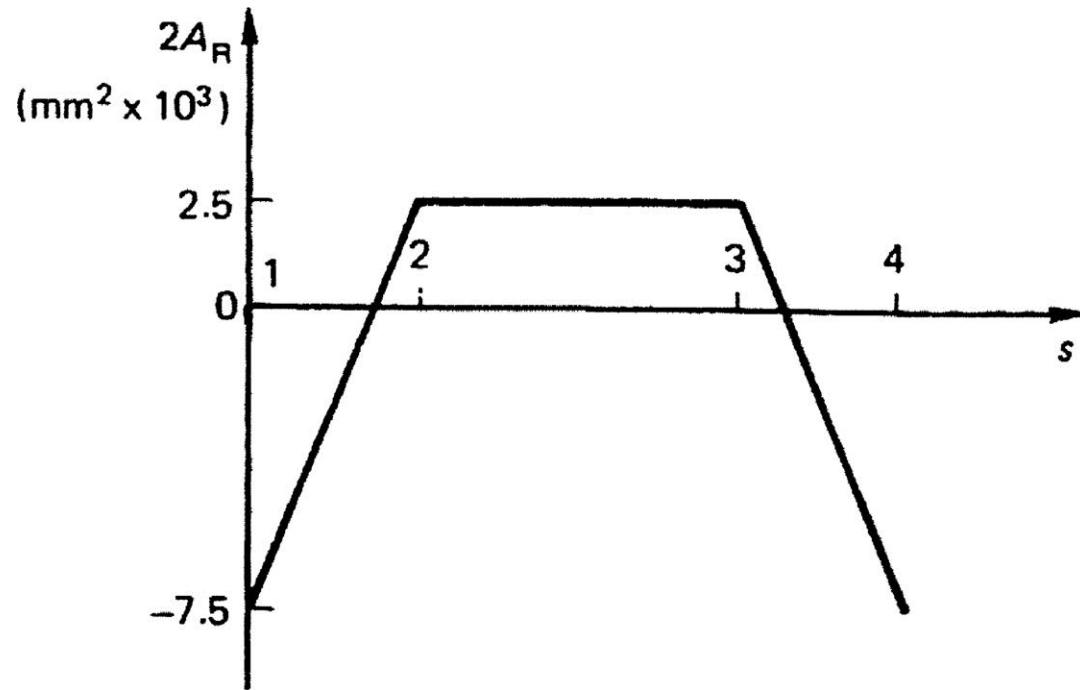


FIGURE 27.21 Distribution of Area $2A_R$ in the Column of Example 27.2

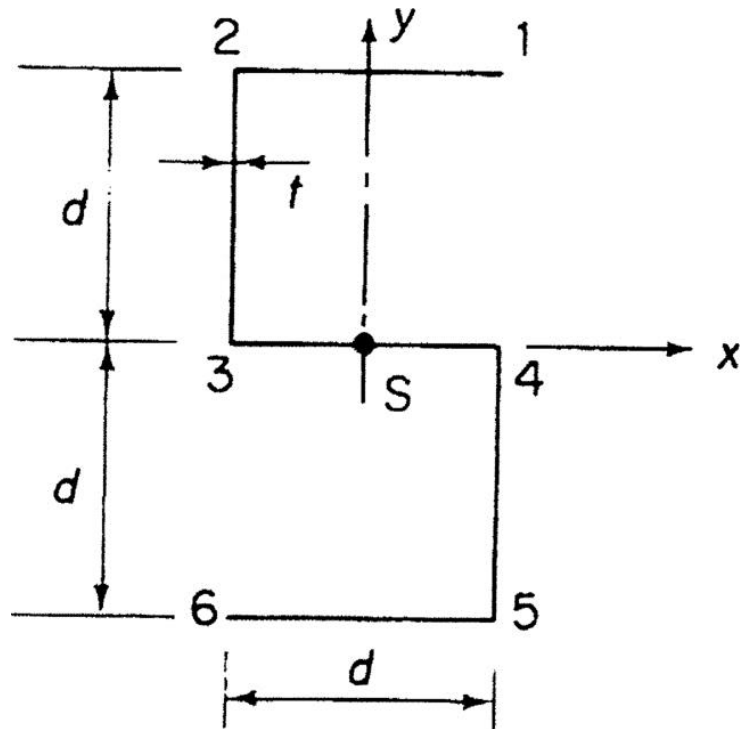


FIGURE P.27.1

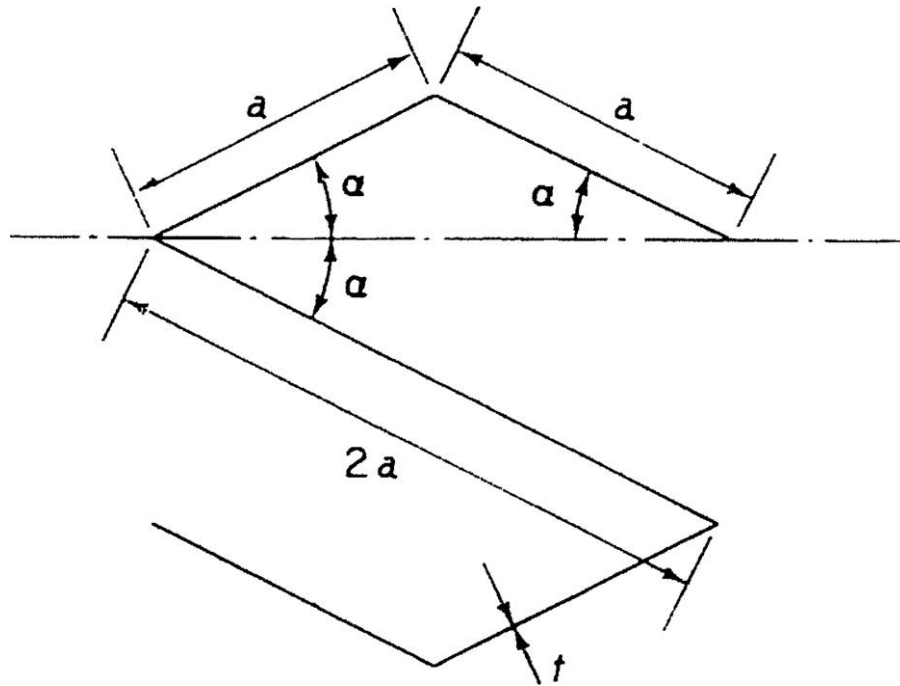


FIGURE P.27.2

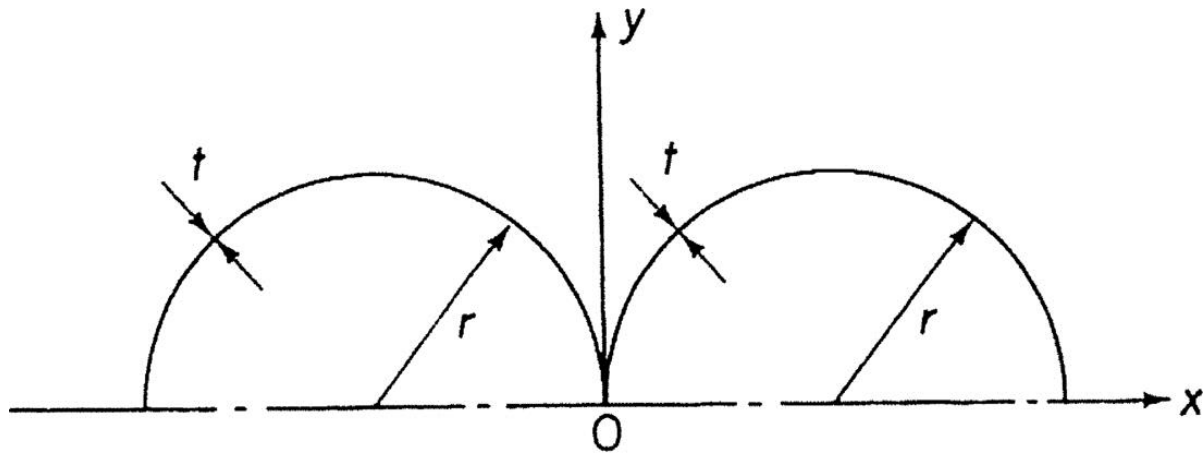


FIGURE P.27.3

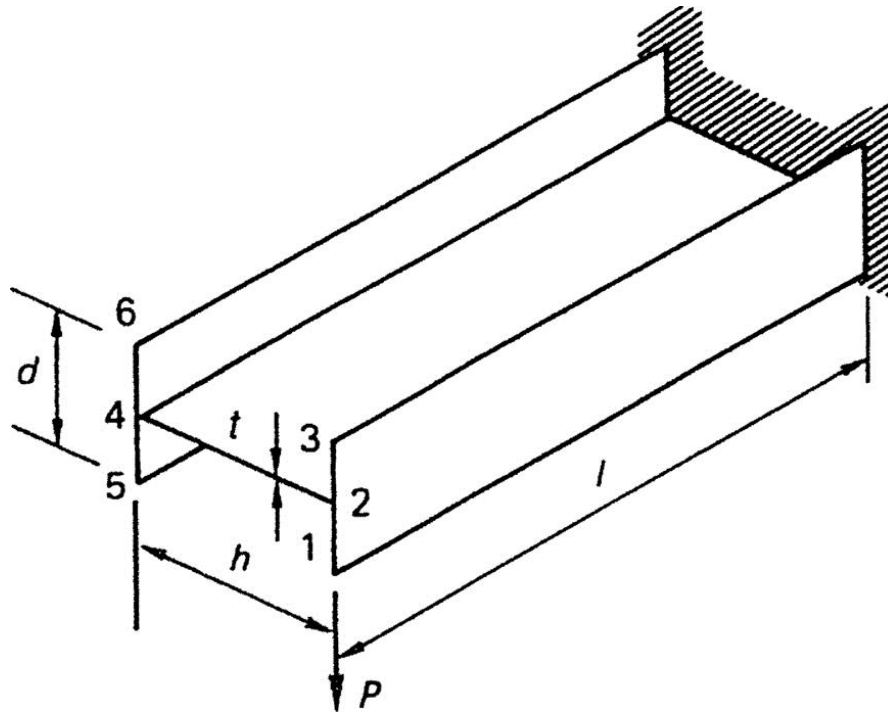


FIGURE P.27.4

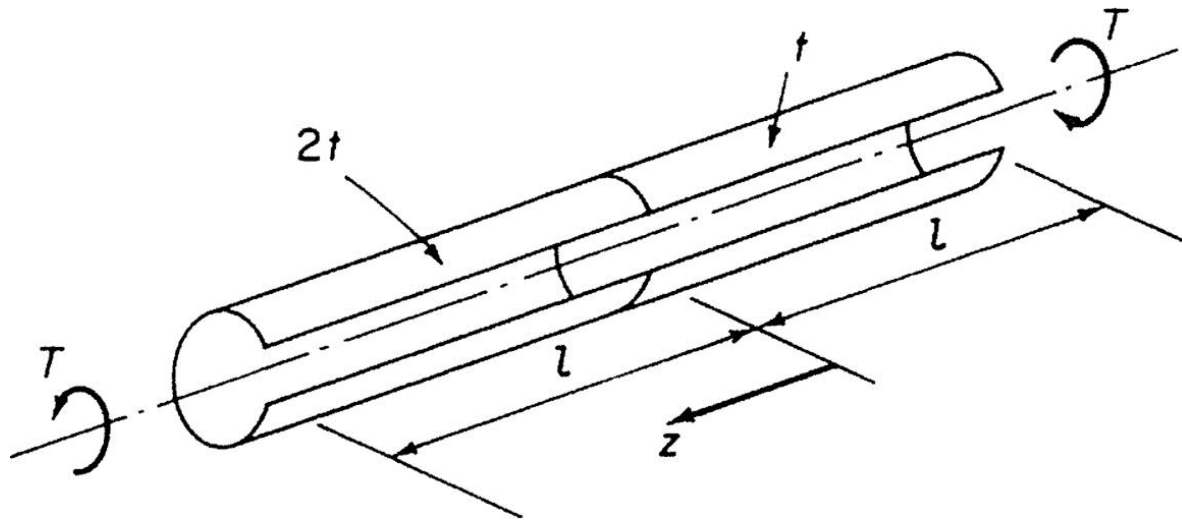


FIGURE P.27.5

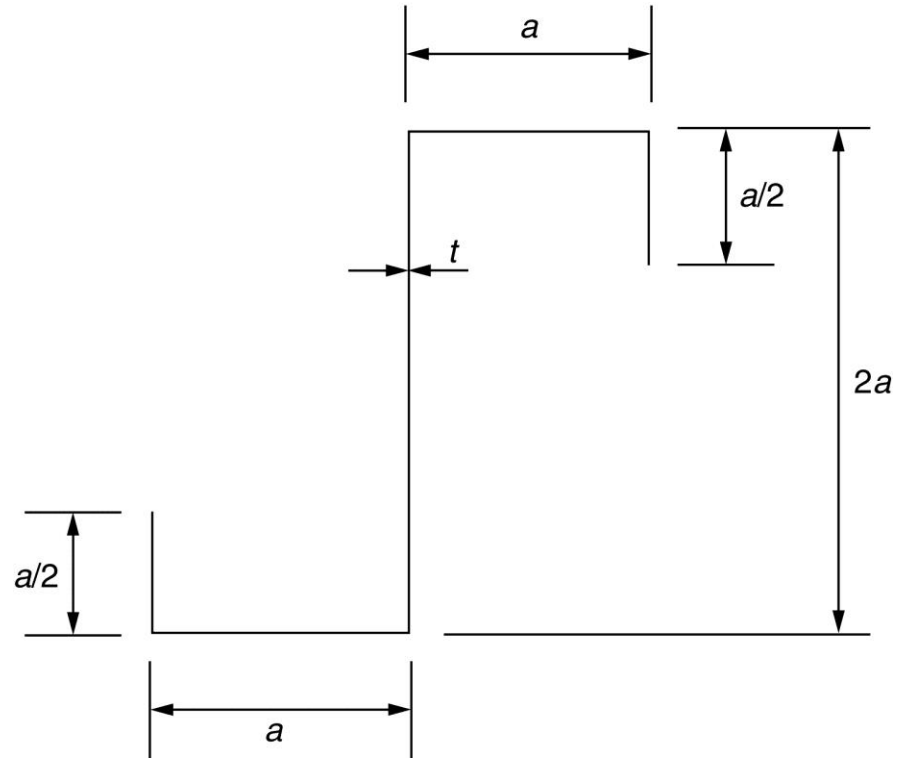


FIGURE P.27.6

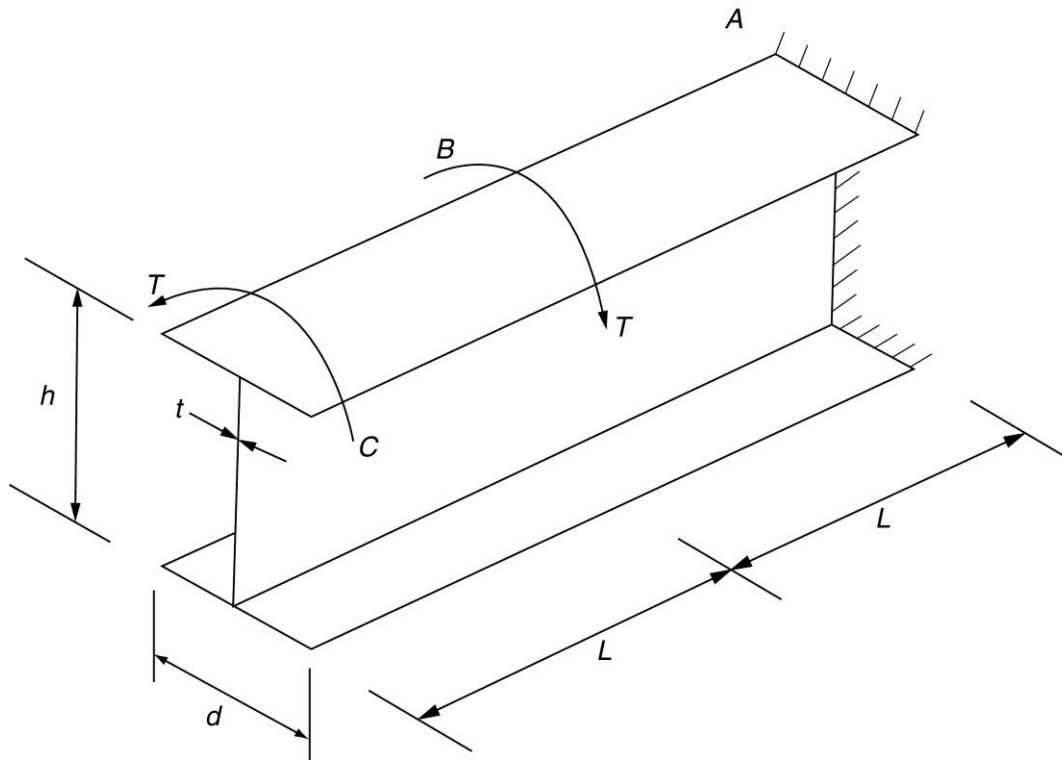


FIGURE P.27.7

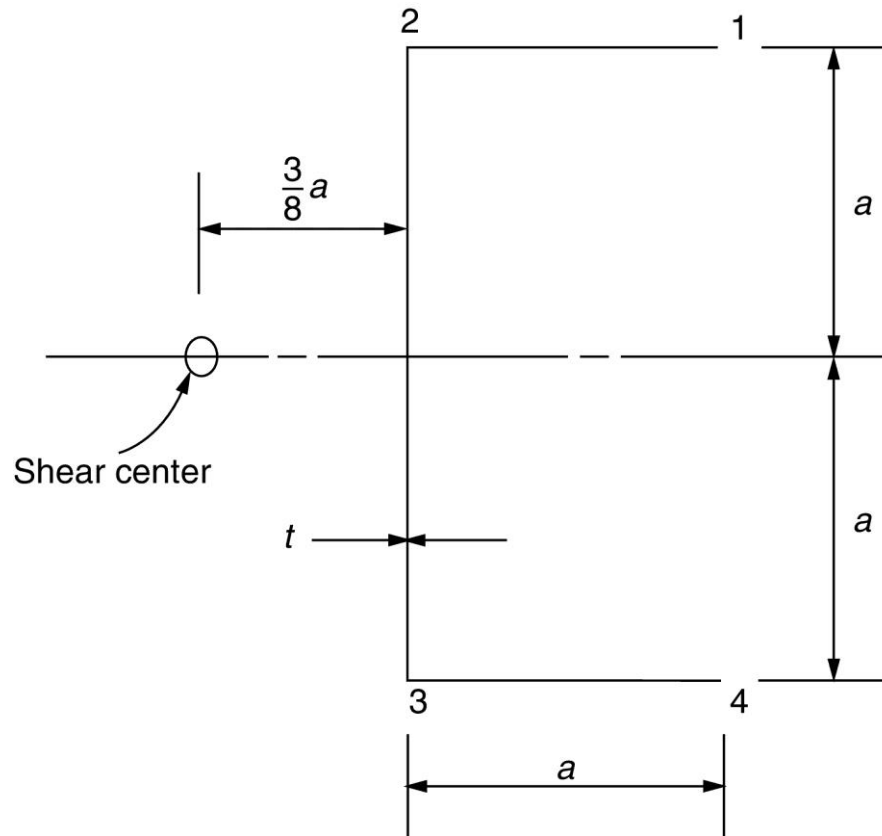


FIGURE P.27.8

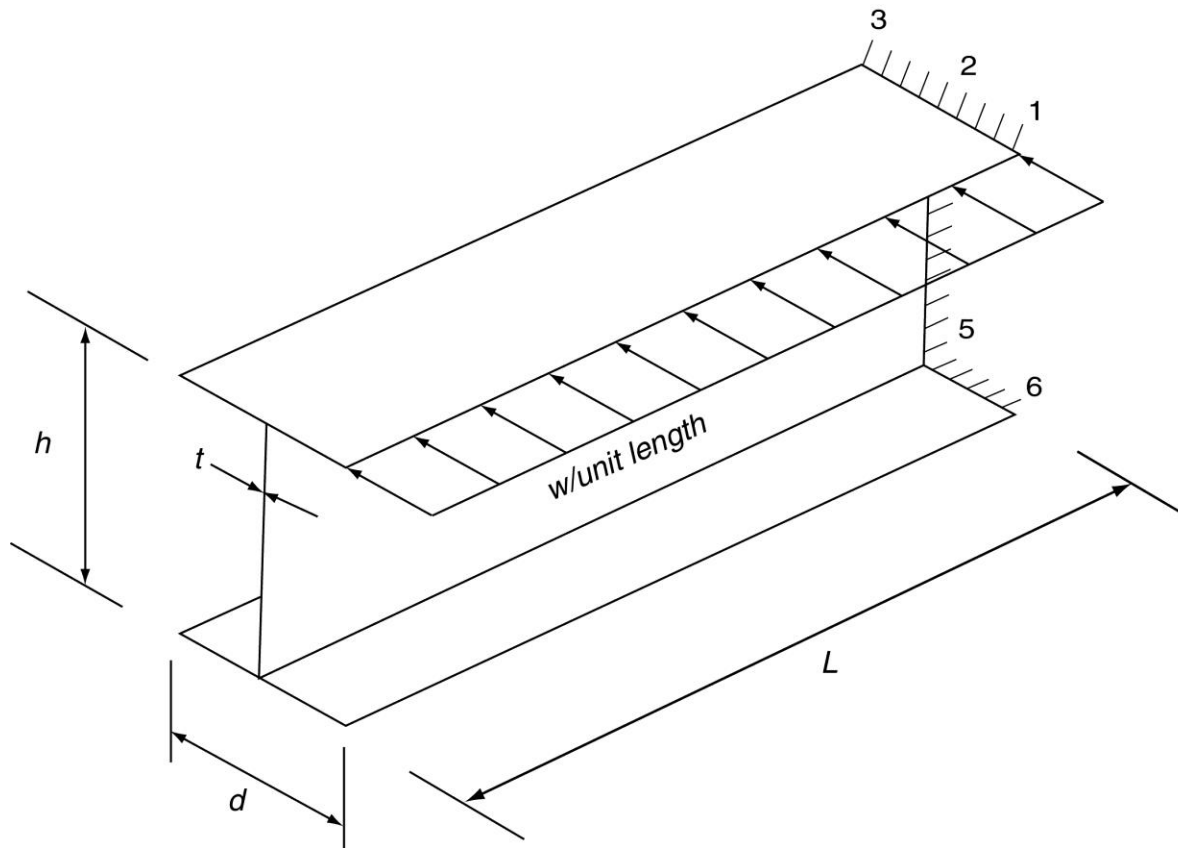


FIGURE P.27.9