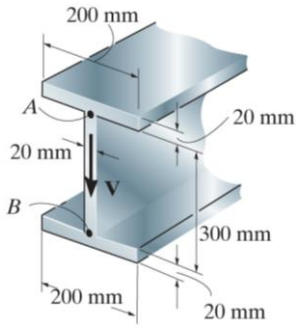
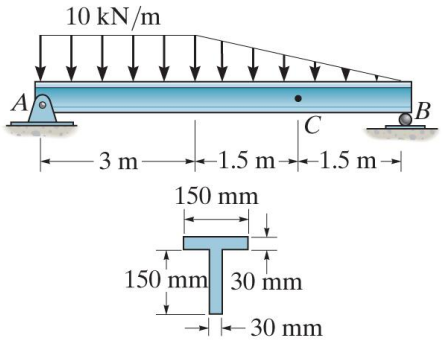
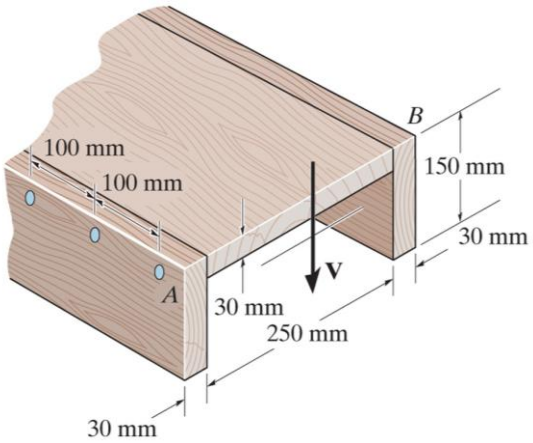
1. If the wide-flange beam is subjected to a shear of V=20 kN, determine the shear stress on the web at A. Determine the maximum shear stress in the beam. [15%] Ans: 2.56, 3.46 MPa



2. Determine the maximum shear stress in the T-beam at the critical section where the internal shear force is maximum. [15%] Ans:7.33 MPa

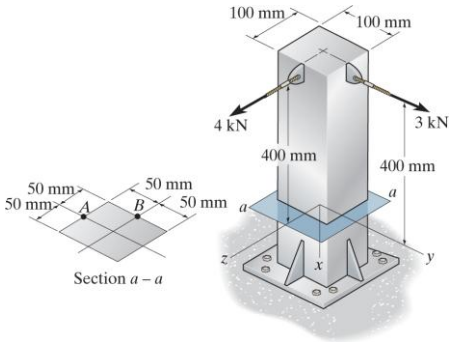


3. The beam is subjected to a shear of V=800 N. Determine the average shear stress developed in the nails along the sides A and B if the nails are spaced s=100 mm apart. Each nail has a diameter of 2 mm. [15%] Ans:97.2 MPa



4. A cylindrical pressure vessel has an inner diameter of 1.2 m and a thickness of 12 mm. Determine the maximum internal pressure it can sustain so that neither its circumferential nor its longitudinal stress component exceeds 140 MPa. Under the same conditions, what is the maximum internal pressure that a similar-sized spherical vessel can sustain? [15%] Ans: 2.8, 5.6 MPa

5. Determine the state of stress at point *A* on the cross section of the pipe assembly at section *a*-*a*. [20%] Ans: $\sigma = 7.20\,\text{MPa}$ $\tau_{xy} = 0$ $\tau_{xz} = 0.6\,\text{MPa}$



6. Determine the state of stress at point *A* on the cross section of the pipe at section *a*-*a*. [20%] Ans: $\sigma = 5.03\,\text{MPa}$ $\tau_{xy} = 0$ $\tau_{xz} = 2.72\,\text{MPa}$