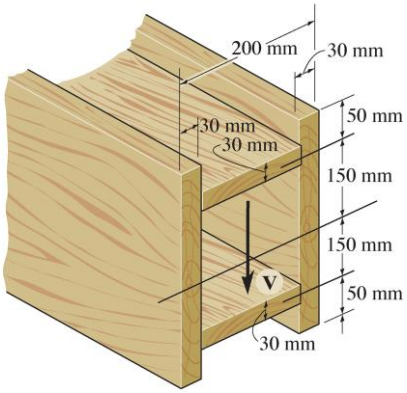
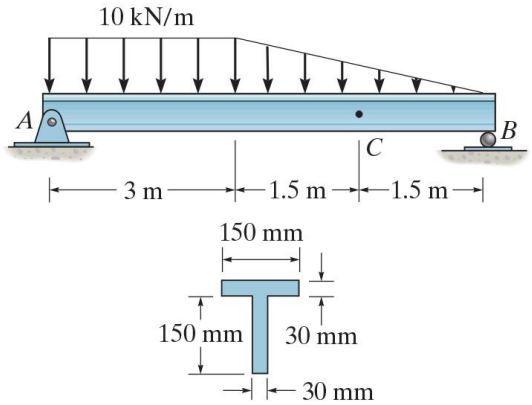
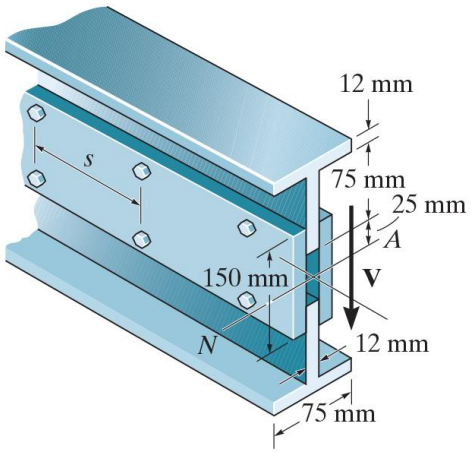
1. If the beam is subjected to a shear force of V=20 kN, determine the maximum shear stress in the beam. [15%] Ans: 1.20 MPa



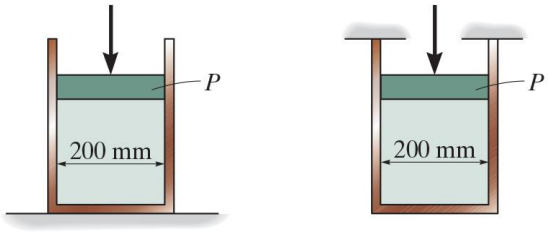
2. Determine the maximum shear stress in the T-beam at the critical section where the internal shear force is maximum. [20%] Ans:7.33 MPa



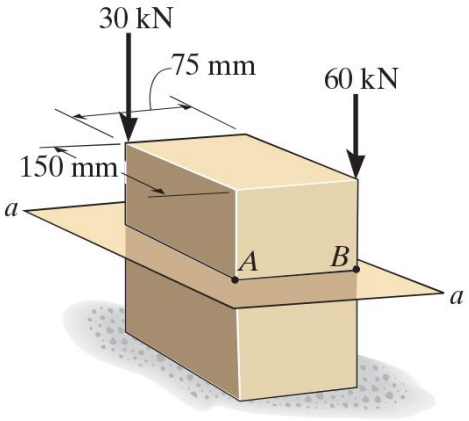
3. The beam is fabricated from two equivalent structural tees (T) and two plates. Each plate has a height of 150 mm and a thickness of 12 mm. If a shear of V=250 kN is applied to the cross section, determine the maximum spacing s of the bolts. Each bolt can resist a shear force of 75 kN. [15%] Ans:138 mm



4. The thin-walled cylinder can be supported in one of two ways as shown. Determine the state of stress in the wall of the cylinder for both cases if the piston *P* causes the internal pressure to be 0.5 MPa. The wall has a thickness of 6 mm and the inner diameter of the cylinder is 200 mm. [15%] Ans: (a) 8.33,0,(b) 8.33, 4.17 MPa



5. Determine the normal stress developed at points *A* and *B*. Neglect the weight of the block. [15%] Ans:-8, -24 MPa



6. The solid rod is subjected to the loading shown. Determine the state of stress at points *A* and *C*. [20%] Ans:A:224, -30.7 MPa, C:295, 25.9 MPa