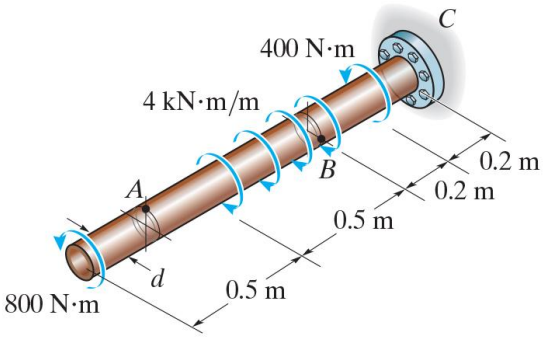
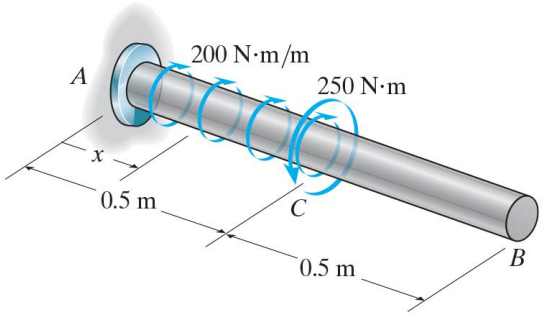
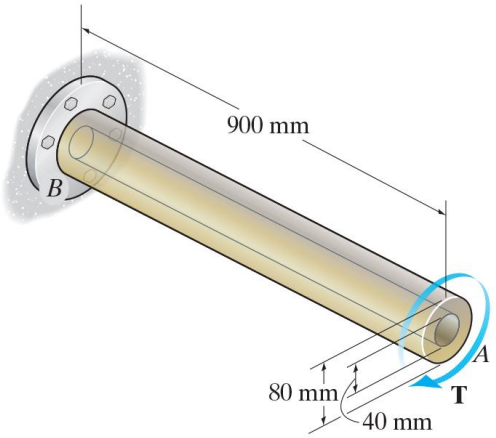
1. The 60-mm-diameter solid shaft is subjected to the distributed and concentrated torsional loadings shown. Determine the absolute maximum and minimum shear stresses on the shaft's surface and specify their locations, measured from the free end. [15%] Ans:28.3 MPa (1<x<1.2 m), 0 MPa x=0.7 m



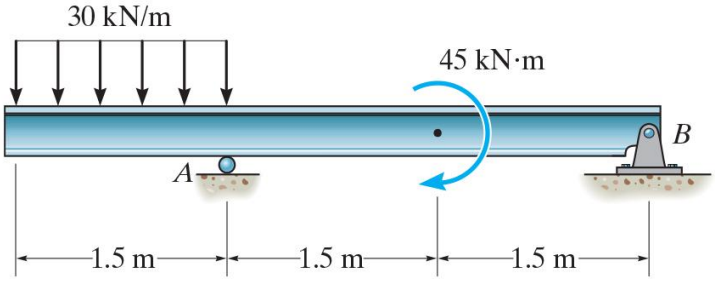
2. The A-36 steel shaft has a diameter of 50 mm and is subjected to the distributed and concentrated loadings shown. Determine the absolute maximum shear stress in the shaft and the angle of twist of end *B* with respect to end *A*. *G*=75 GPa. [17%] Ans:10.2 MPa, 0.00217 rad



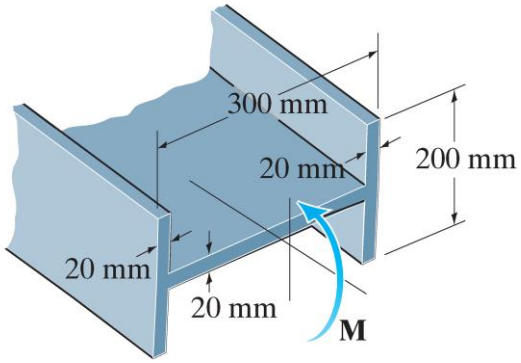
3. The Am1004-T61 magnesium tube (G_{ma}=18 GPa) is bonded to the A-36 steel rod (G_{st}=75 GPa). If a torque of T=5 kN • m is applied to end *A*, determine the maximum shear stress in each material. [18%] Ans:86.5 MPa, 41.5 MPa



4. Draw the shear and moment diagrams for the beam. You must show the values of the shear force and moment at all the transition points (轉折點). [20%]



5. If the beam is subjected to a bending moment of M=20 kN・m, determine the maximum bending stress in the beam. [15%] Ans: 74.5 MPa



6. The beam is made from three boards nailed together as shown. If the moment acting on the cross section is M=600 N・m, determine the maximum tensile and compressive bending stress in the beam. [15%] Ans:2.06 MPa, -0.977 MPa