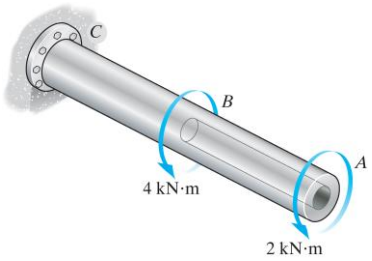
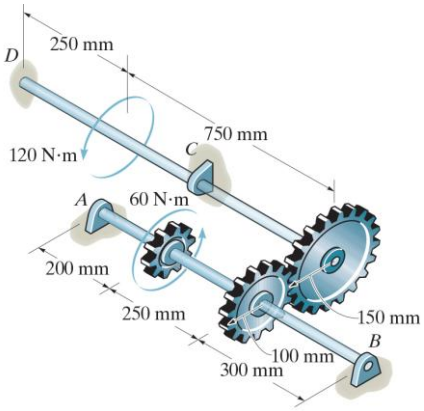
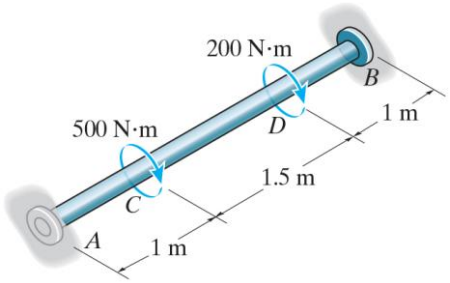
1. The shaft is hollow (中空) from *A* to *B* and solid (實心) from *B* to *C*. Determine the maximum shear stresses in segment *AB* and segment *BC*. The shaft has an outer diameter of 80 mm, and the thickness of the wall of the hollow segment (段) is 10 mm. [15%] Ans:29.1, 59.7 MPa



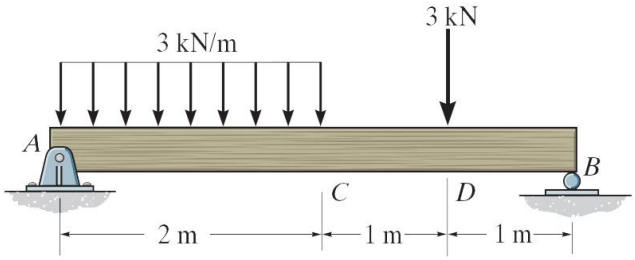
2. The two shafts are made of A-36 steel. Each has a diameter of 25 mm, and they are supported by bearings at *A*, *B*, and *C*, which allow free rotation. If the support at *D* is fixed, determine the angle of twist of end *A* when the torques are applied to the assembly (組合) as shown. *G*=75 GPa. [20%] Ans:0.036506 rad



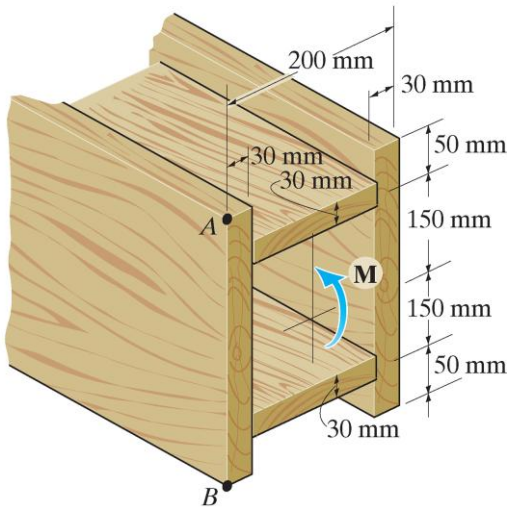
3. The A992 steel shaft has a diameter of 60 mm and is fixed at its ends A and B. If it is subjected to the torques shown, determine the absolute maximum shear stress in the shaft. [15%] Ans:9.77 MPa



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=10 kN・m, determine the bending stress in the beam at points A and B. [15%] Ans:-3.92, 3.92 MPa



6. Determine the maximum tensile and compressive bending stress in the beam if it is subjected to a moment of M=6 N・m . [15%] Ans: 31.0, -14.8 MPa