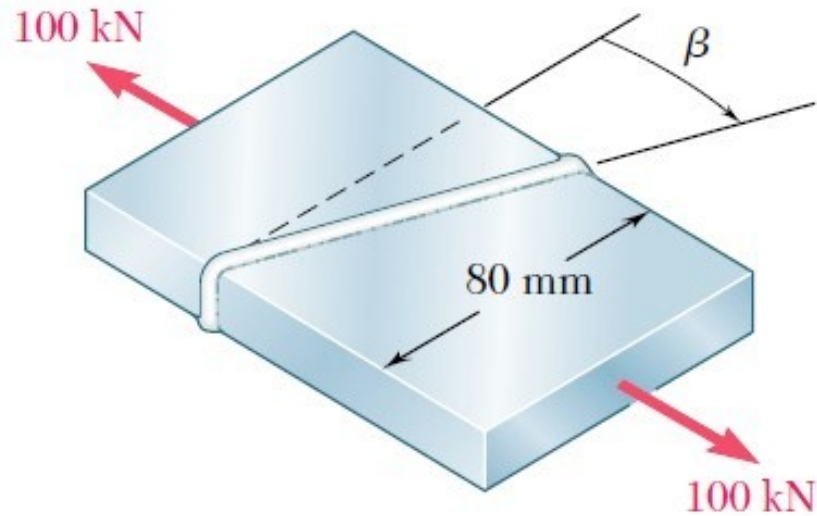


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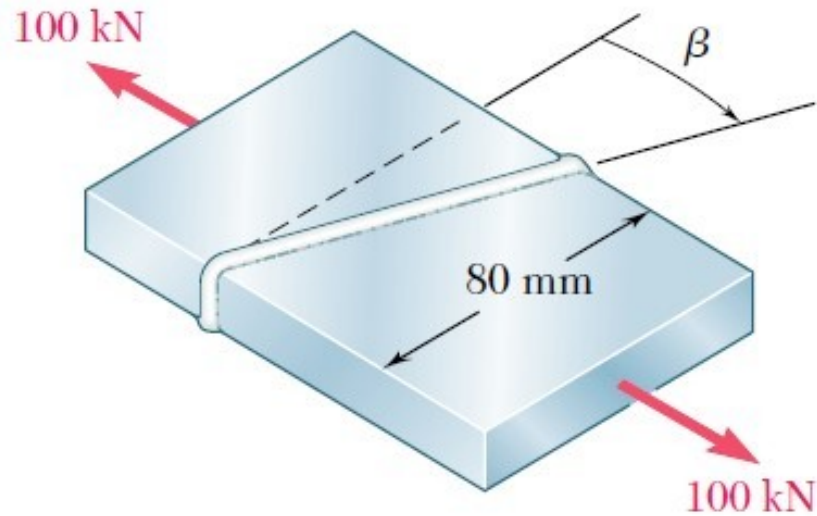


PROBLEM HOUR VII

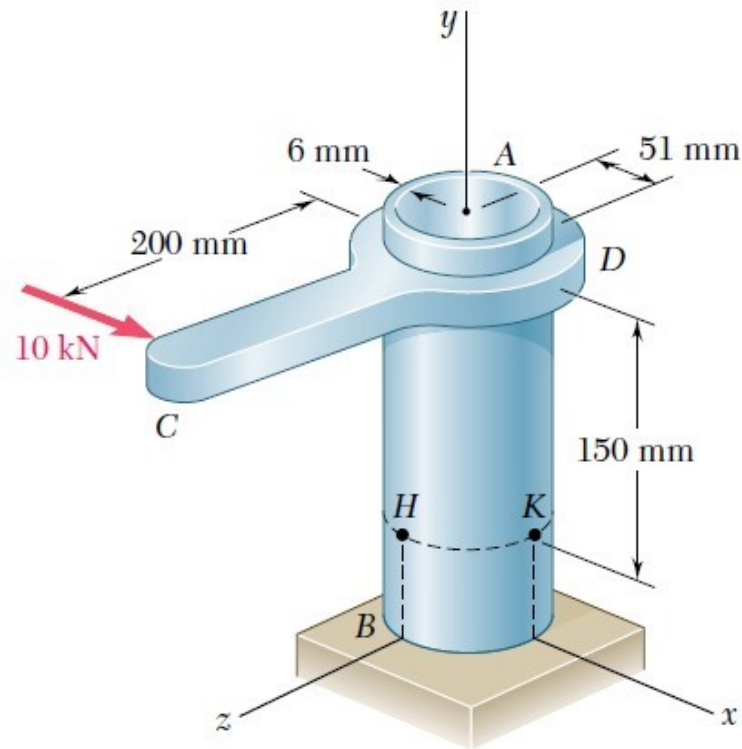
Q1) Two steel plates of uniform cross section $10 \times 80\text{mm}$ are welded together as shown. Knowing that centric 100-kN forces are applied to the welded plates and that $\beta = 25^\circ$, determine (a) the in-plane shearing stress parallel to the weld, (b) the normal stress perpendicular to the weld.



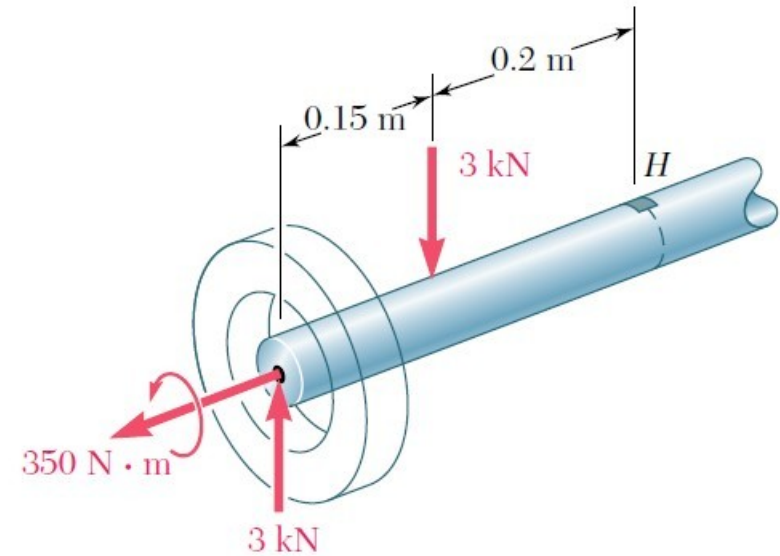
Q2) Two steel plates of uniform cross section 10×80 mm are welded together as shown. Knowing that centric 100-kN forces are applied to the welded plates and that the in-plane shearing stress parallel to the weld is 30 MPa, determine (a) the angle β , (b) the corresponding normal stress perpendicular to the weld.



Q3) The steel pipe AB has a 102-mm outer diameter and a 6-mm wall thickness. Knowing that arm CD is rigidly attached to the pipe, determine the principal stresses and the maximum shearing stress at point K.



Q4) The axle of an automobile is acted upon by the forces and couple shown. Knowing that the diameter of the solid axle is 32 mm, determine (a) the principal planes and principal stresses at point H located on top of the axle, (b) the maximum shearing stress at the same point.



Q5) A steel pipe with an outer diameter of 150 mm and a wall thickness of 6 mm is subjected to an axial compression load $P=160$ kN and a torque $T=3$ kNm. The pipe is joined by a helical weld making an angle of 22.5° with the horizontal. Determine the normal stress perpendicular to the weld and the shearing stress parallel to the weld.

