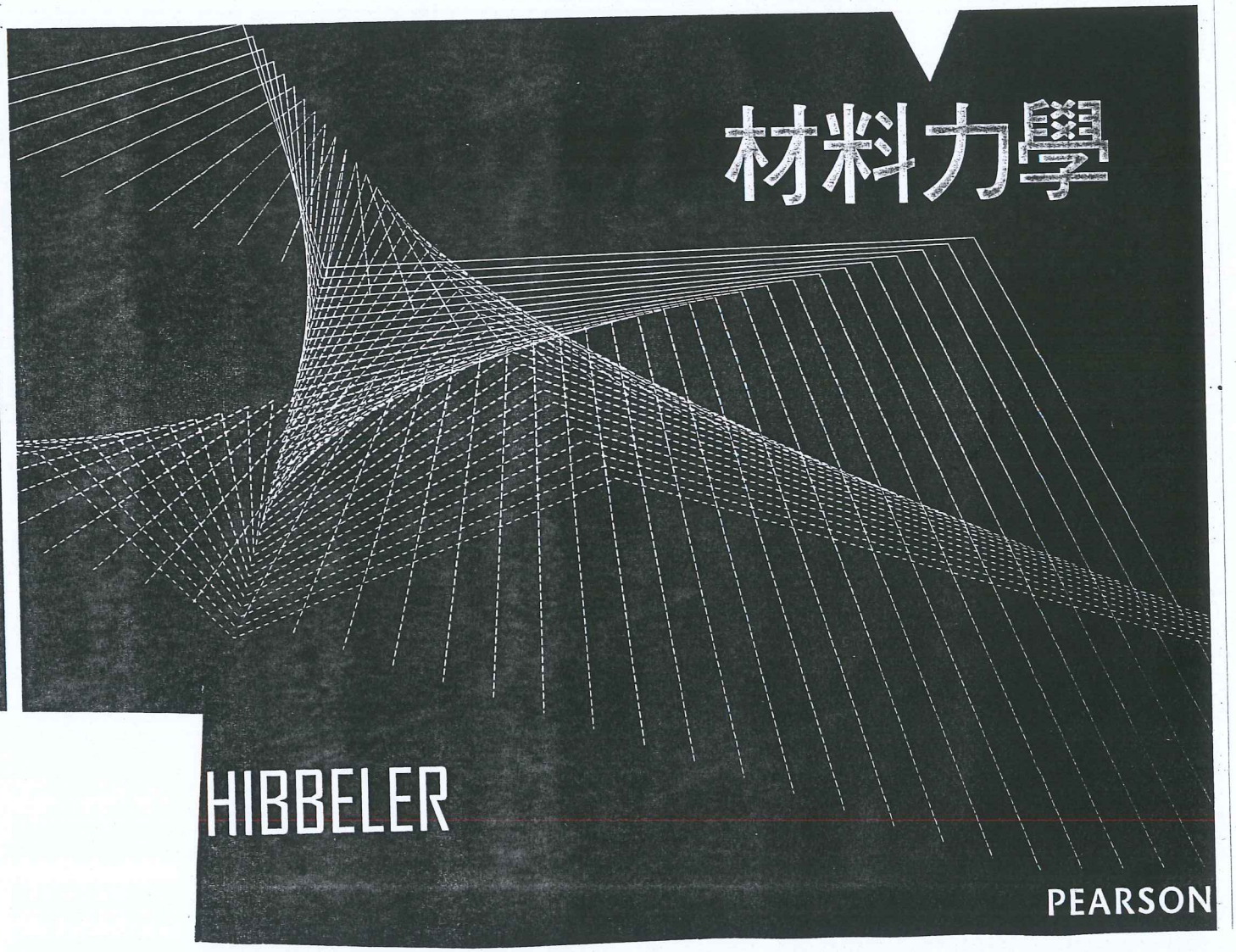
ch 1 ~ ch. 7
ch 9

MECHANICS OF MATERIALS

9th
~~EIGHTH~~ EDITION



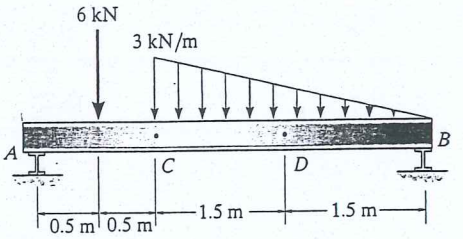
材料力學

HIBBELER

PEARSON

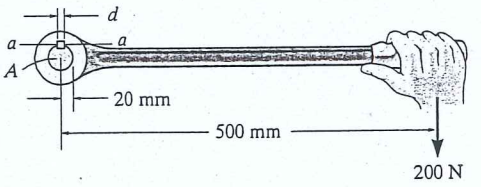
Ch 1 – A

Determine the resultant internal loadings on the cross section through point D. Assume the reactions at the supports A and B are vertical.



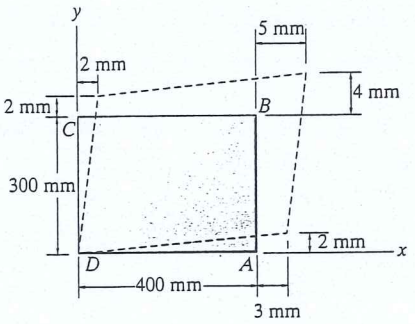
Ch 1 – B

The lever is attached to the shaft A using a key that has a width d and length of 25 mm. If the shaft is fixed and a vertical force of 200 N is applied perpendicular to the handle, determine the dimension d if the allowable shear stress for the key is $\tau_{allow} = 35$ MPa.



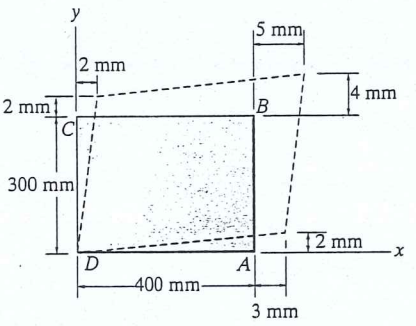
ch 2 – A

The piece of plastic is originally rectangular. Determine the shear strain γ_{xy} at corners A and B if the plastic distorts as shown by the dashed lines.



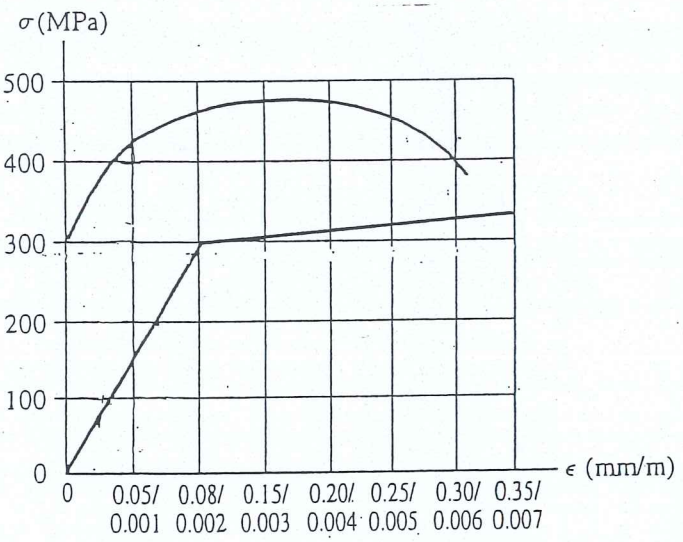
ch 2 – B

.. The piece of plastic is originally rectangular. Determine the average normal strain that occurs along the diagonals AC and DB.



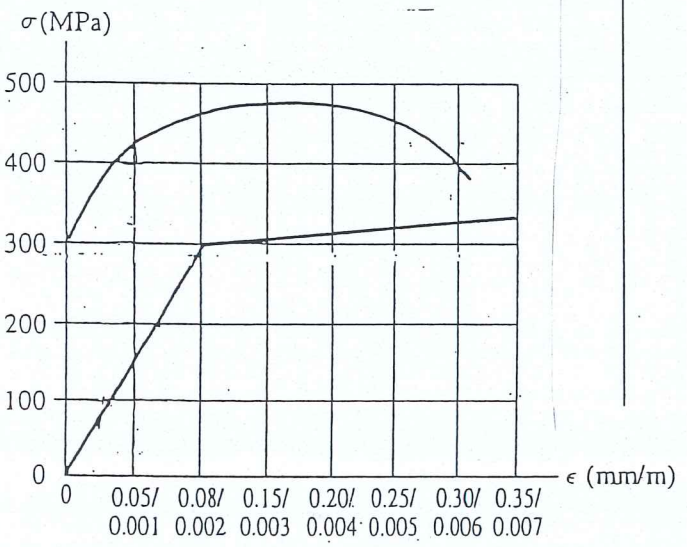
Ch3 – A

The stress-strain diagram for a metal alloy having an original diameter of 12 mm and a gauge length of 50 mm is given in the figure. Determine approximately the modulus of elasticity for the material, the load on the specimen that causes yielding, and the ultimate load the specimen will support.



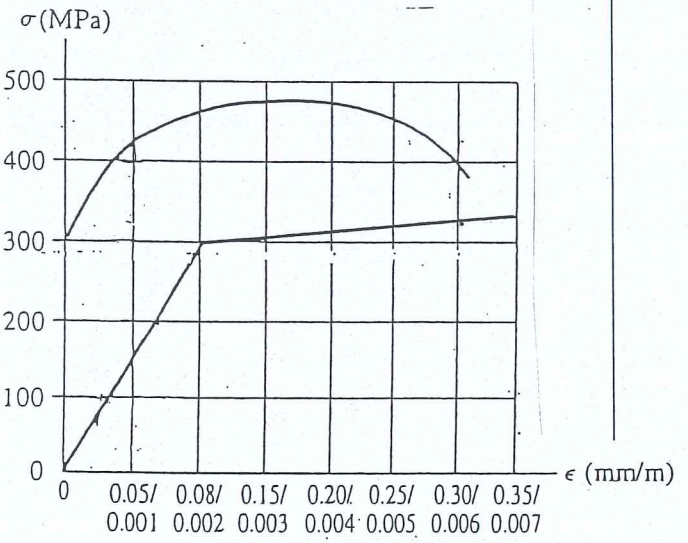
Ch3 – B

The stress–strain diagram for a steel alloy having an original diameter of 12 mm and a gauge length of 50 mm is given in the figure. If the specimen is loaded until it is stressed to 500 MPa, determine the approximate amount of elastic recovery and the increase in the gauge length after it is unloaded.



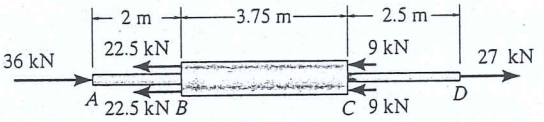
Ch3 - C

The stress–strain diagram for a steel alloy having an original diameter of 12 mm and a gauge length of 50 mm is given in the figure. Determine approximately the modulus of resilience and the modulus of toughness for the material.



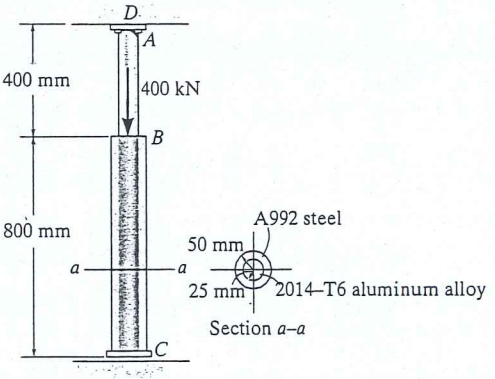
ch4 – A

The copper shaft is subjected to the axial loads shown. Determine the displacement of end A with respect to end D if the diameters of each segment are $d_{AB} = 20$ mm, $d_{BC} = 25$ mm, and $d_{CD} = 12$ mm. Take $E_{cu} = 126$ GPa.



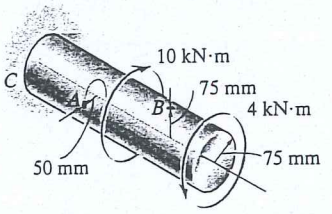
ch4 – B

The 2014-T6 aluminum rod AC is reinforced with the firmly bonded A992 steel tube BC. When no load is applied to the assembly, the gap between end C and the rigid support is 0.5 mm. Determine the support reactions when the axial force of 400 kN is applied.



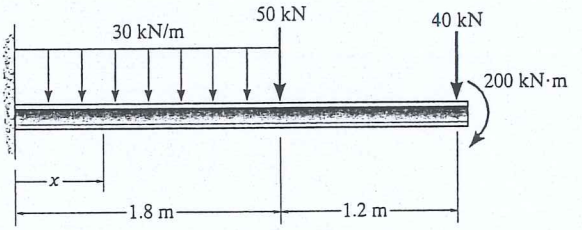
ch5 – A

The solid shaft is fixed to the support at C and subjected to the torsional loadings shown. Determine the shear stress at points A and B and sketch the shear stress on volume elements located at these points.



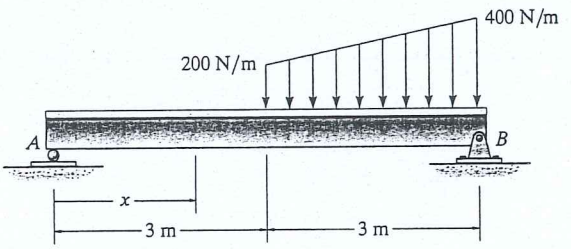
Ch6 – A

Draw the shear and moment diagrams for the beam, and determine the shear and moment throughout the beam as functions of x.



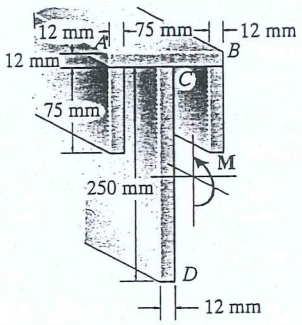
Ch6 – B

. Draw the shear and moment diagrams for the beam and determine the shear and moment as functions of x.



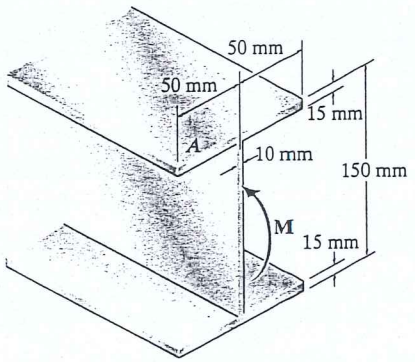
ch6-C

Determine the moment M that will produce a maximum stress of 70 MPa on the cross section.



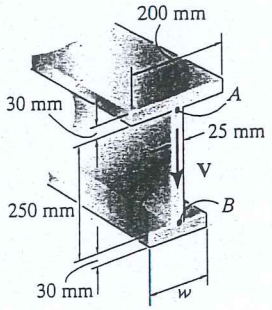
ch6-D

If the beam is subjected to an internal moment of $M = 30\ \text{kN} \cdot \text{m}$, determine the maximum bending stress in the beam. The beam is made from A992 steel. Sketch the bending stress distribution on the cross section.



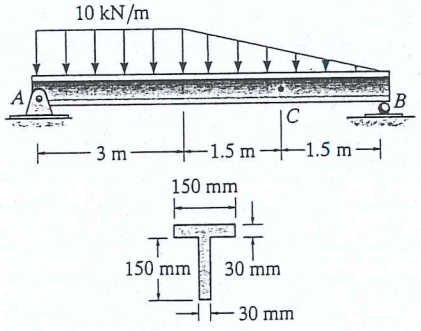
Ch 7 – A

. --. If the wide-flange beam is subjected to a shear of $V = 30$ kN, determine the maximum shear stress in the beam. Set $w = 200$ mm.



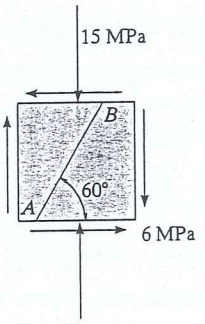
Ch 7 – B

. Determine the maximum shear stress in the T-beam at section C. Show the result on a volume element at this point.



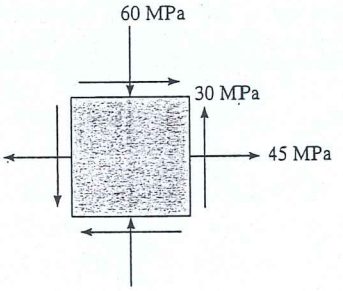
ch 9 - A

Determine the normal stress and shear stress acting on the inclined plane AB. Solve the problem using the stress transformation equations. Show the results on the sectional element.



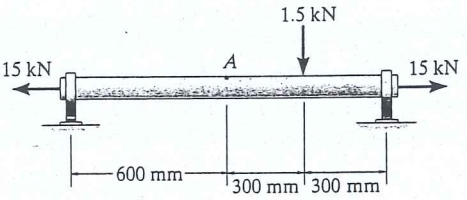
ch 9 - B

The state of stress at a point is shown on the element. Determine (a) the principal stress and (b) the maximum in-plane shear stress and average normal stress at the point. Specify the orientation of the element in each case.



ch9-C

Determine the principal stress and the maximum in-plane shear stress that are developed at point A in the 50-mm-diameter shaft. Show the results on an element located at this point. The bearings only support vertical reactions.



ch9-D

Determine the equivalent state of stress if an element is oriented 20° clockwise from the element shown.