11-9

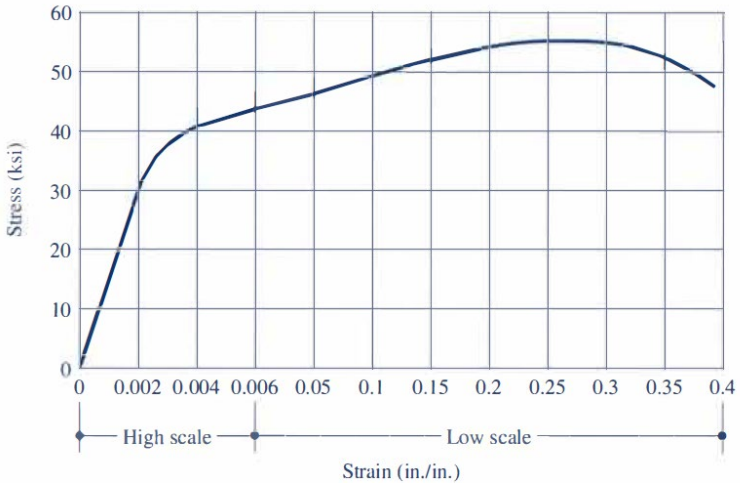
In a tension test of a steel specimen with 0.50-in. diameter and 2.00-in. gage length, the maximum load is 15 200 lb, the final length is 2.59 in., and the final diameter at the necked-down section is 0.423 in. Calculate (a) the ultimate strength, (b) the percent of elongation, and (c) the percent reduction in area.

Solution.

11-11

The stress-strain diagram for a tension test of an alloy specimen is plotted as shown in Fig. P11-11. The following data are recorded:

Initial diameter	= 0.502 in.
Gage length	= 2.00 in.
Diameter at the fractured section	= 0.412 in.
Final length after fracture	= 2.78 in.



Determine (a) the stress at the proportional limit, (b) the modulus of elasticity, (c) the yield stress at 0.2 percent offset, (d) the ultimate strength, (e) the percent elongation, and (f) the percent reduction in area.

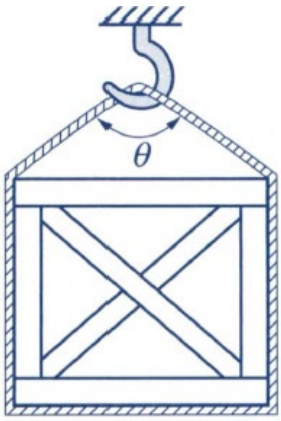
Solution.

11-15
A short, cast iron machine member of square section is subjected to a compressive load of 40 kips. If the compressive ultimate strength of cast iron is 90 ksi, select the cross-sectional dimensions of the member using a factor of safety of 4.

Solution.

11-17

A 50-lb weight is lifted by a cable as shown in Fig. P 11-17. If the rope has a tensile breaking strength of 180 lb, determine the maximum value of angle θ using a factor of safety of 3 to guard against breaking.



Solution.