Figure 2.1
Tensile loading machine with automatic data-processing system. (Courtesy of MTS Systems Corp.)

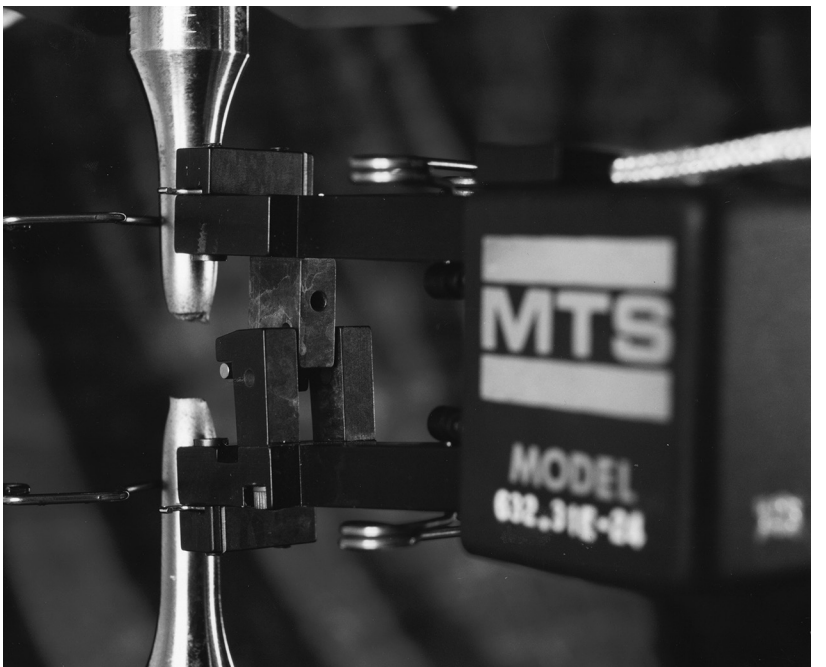

Figure 2.2
A tensile test specimen with extensometer attached; the specimen has fractured. (Courtesy of MTS Systems Corp.)

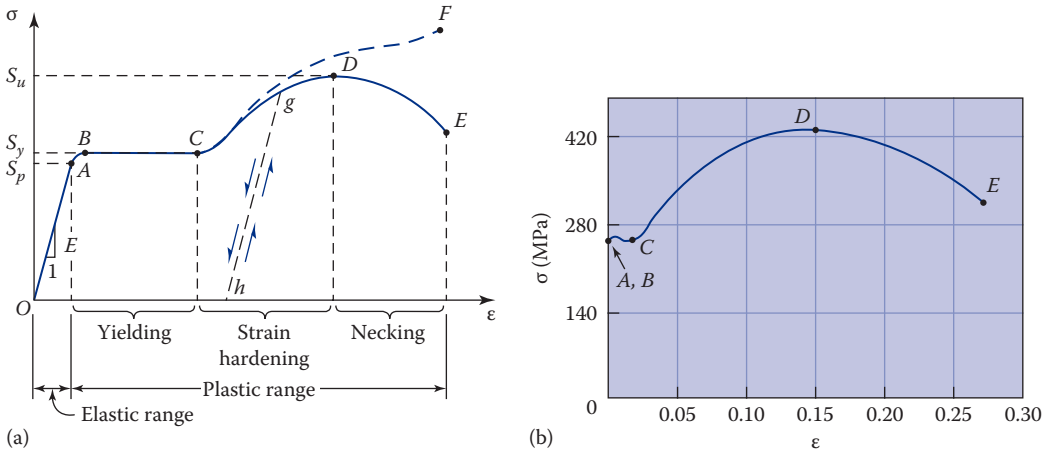

Figure 2.3
Stress–strain diagram for a typical structural steel in tension: (a) drawn not to scale and (b) drawn to scale.

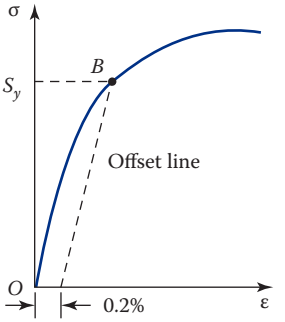

Figure 2.4
Determination of yield strength by the offset method.

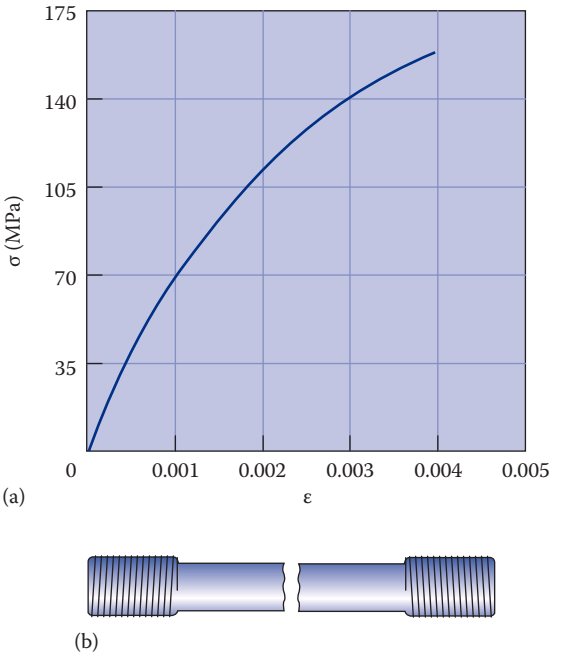

Figure 2.5
Gray cast iron in tension: (a) stress–strain diagram and (b) fractured specimen.

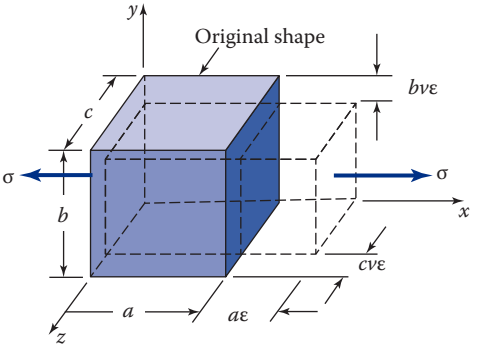

Figure 2.6
Axial elongation and lateral contraction of an element in tension (Poisson's effect).

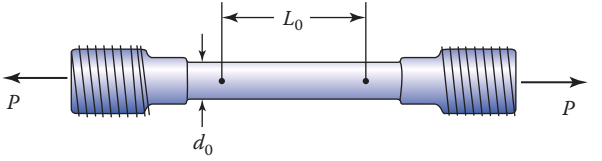

Figure 2.7
Example 2.1. A tensile specimen.

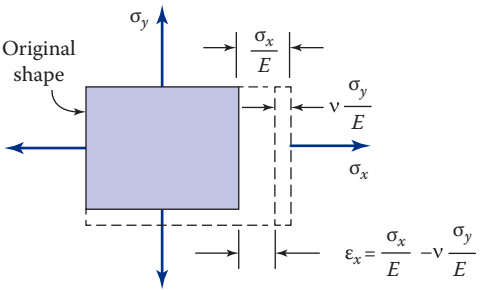

Figure 2.8
Element deformations caused by biaxial stress.

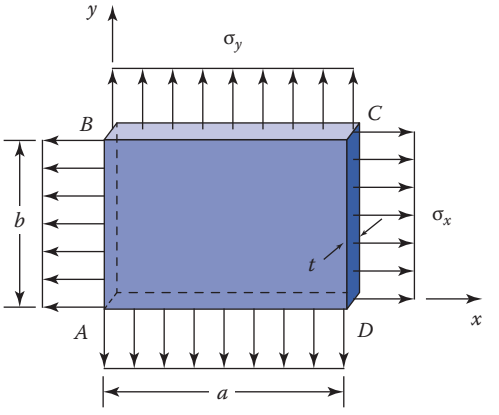

Figure 2.9
Example 2.2. Plate in biaxial stress.

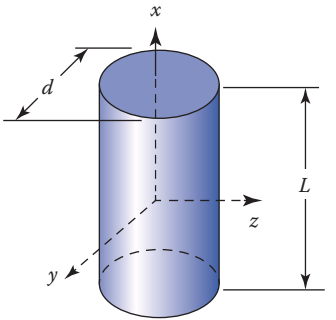

Figure 2.10
Example 2.3. A solid cylinder.

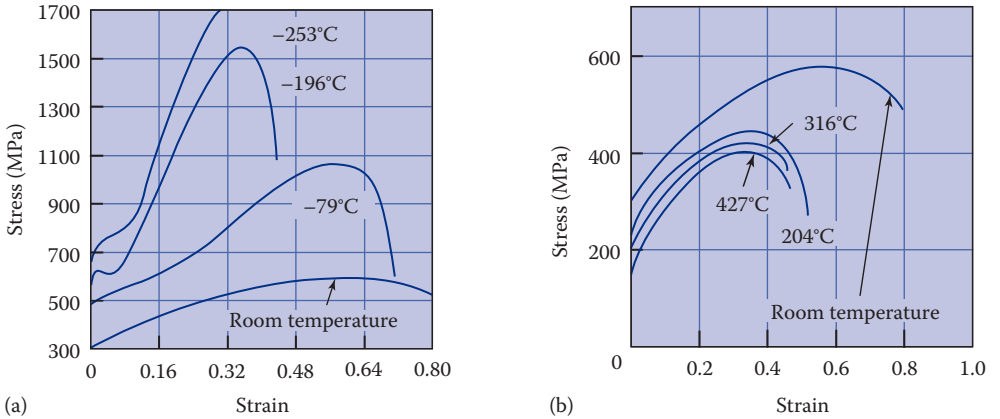

Figure 2.11
Stress–strain diagrams for AISI type 304 stainless steel in tension: (a) at low temperatures and (b) at elevated temperatures.

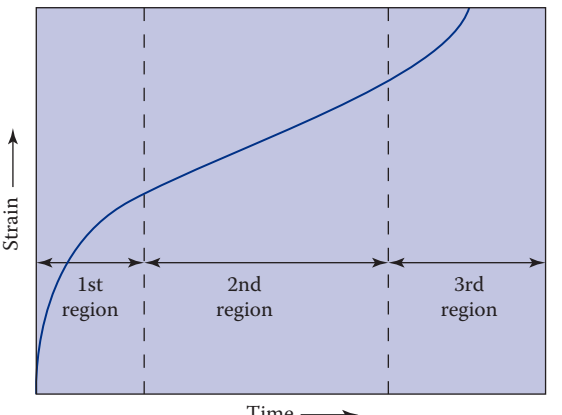

Figure 2.12
Creep curve for structural steel in tension at high temperatures.

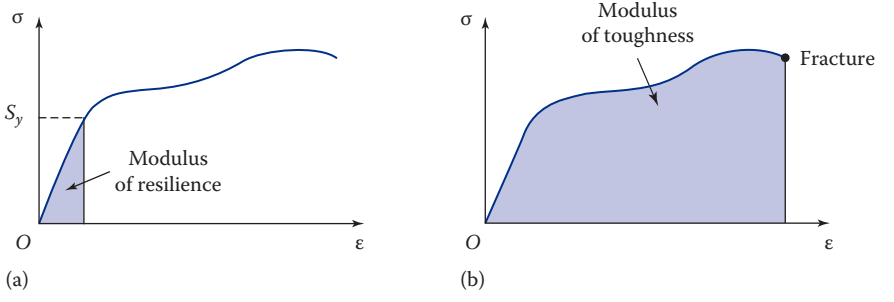

Figure 2.13
Stress–strain diagram: (a) modulus of resilience and (b) modulus of toughness.

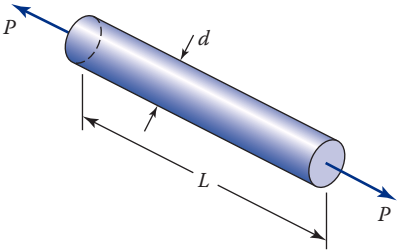

Figure 2.14
Example 2.4. Prismatic bar in tension.

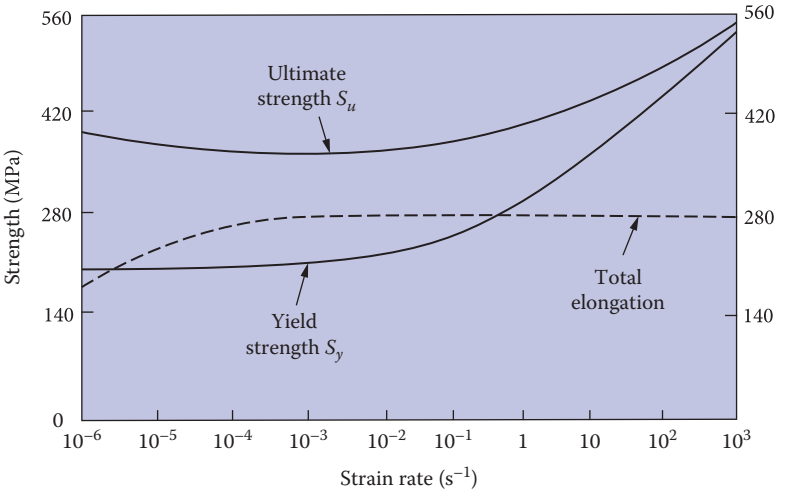

Figure 2.15
Influence of strain rate on tensile properties of a mild steel at room temperature.

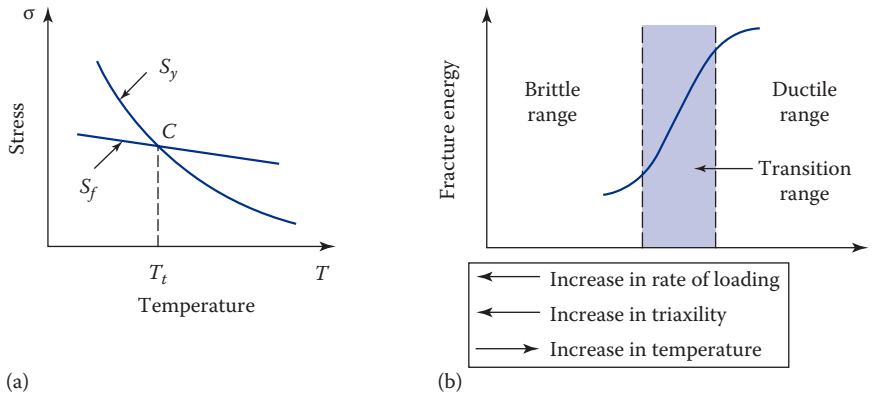

Figure 2.16
Typical transition curves for metals: (a) variation of yield strength S_y and fracture strength S_f with temperature and (b) effects of loading rate, stress around a notch, and temperature on impact toughness.

Figure 2.17
Depiction of Titanic sinking. (Courtesy of google.com.)

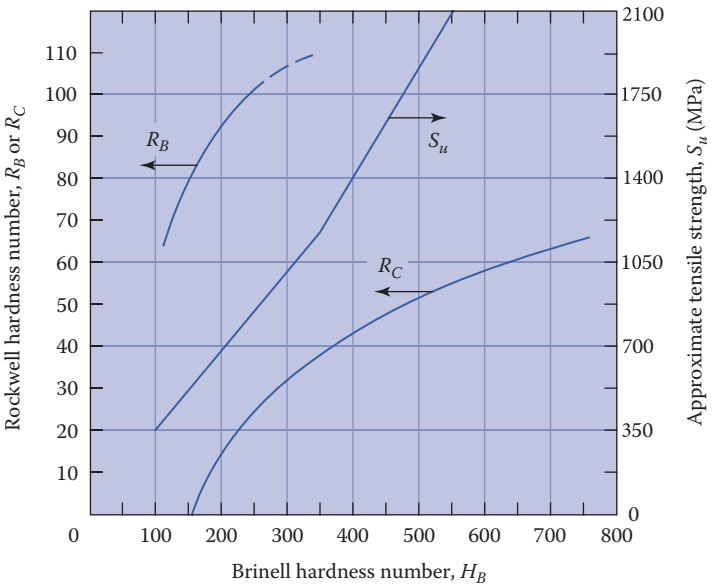

Figure 2.18
Hardness conversion to ultimate strength in tension of steel.

002x018.eps

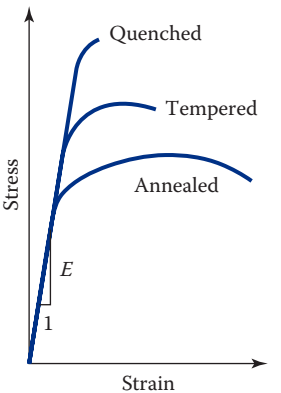

Figure 2.19
Stress–strain diagrams for annealed, quenched, and tempered steel.

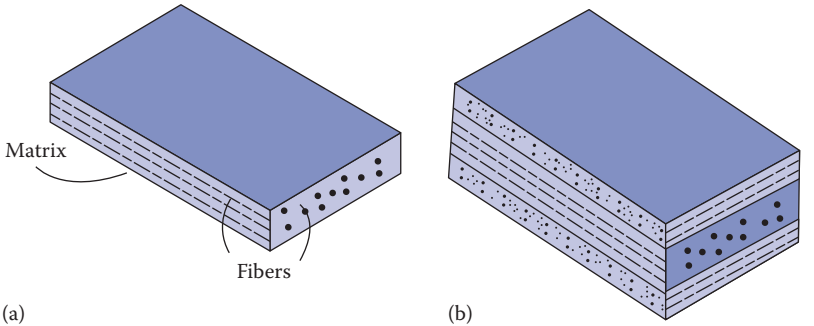

Figure 2.20
Fiber-reinforced materials: (a) single layer and (b) three-cross layer.

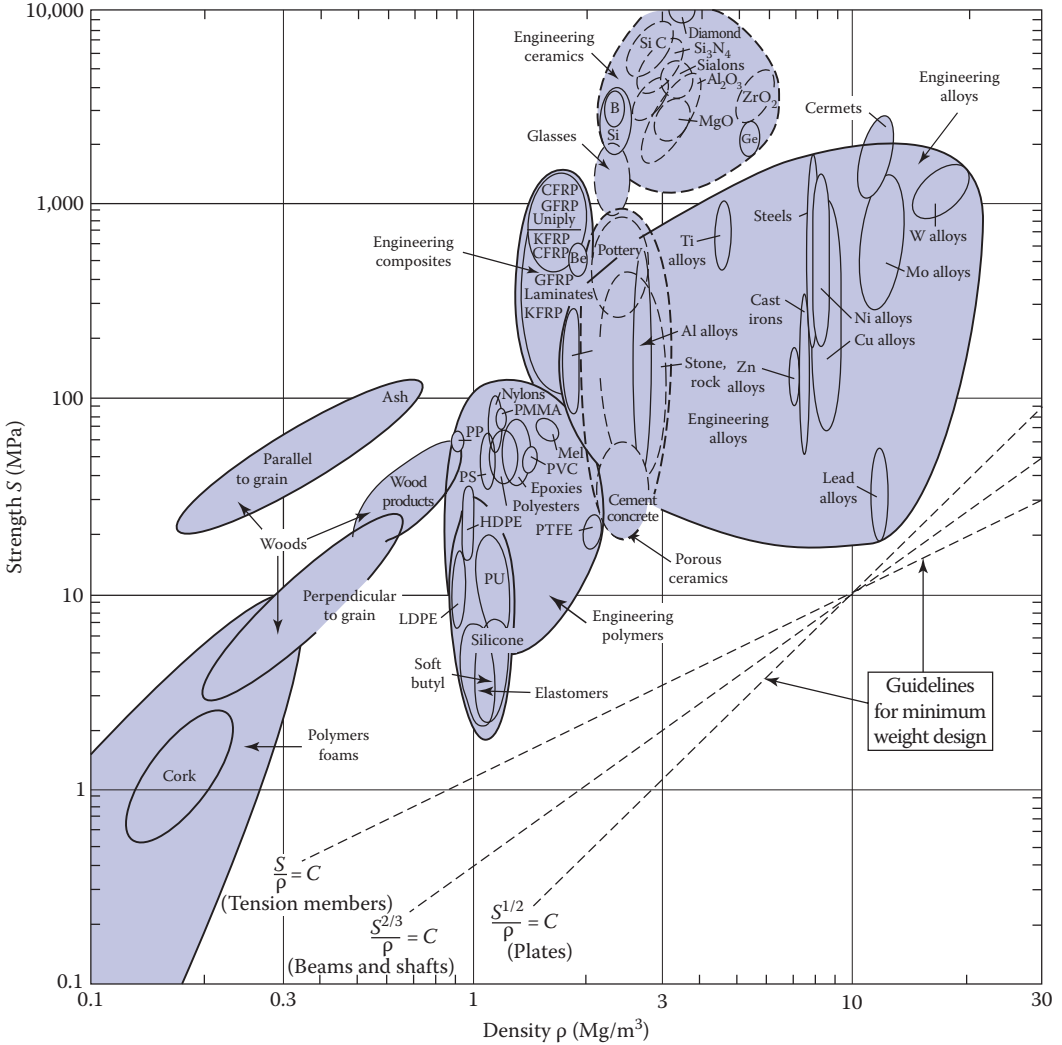

Figure 2.21
Strength versus density for engineering materials. The envelopes enclose data for a prescribed class of material. (From Ashby, M.J., *Material Selection in Mechanical Design*, 4th ed., Butterworth Heinemann, Oxford, U.K., 2011.)

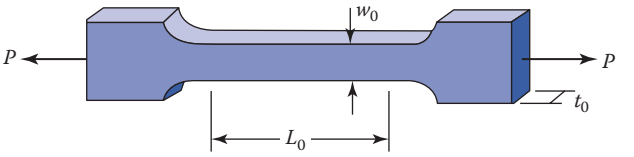

Figure P2.3

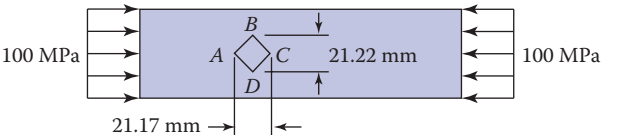

Figure P2.5

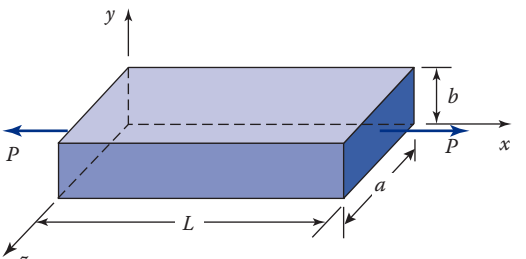

Figure P2.7

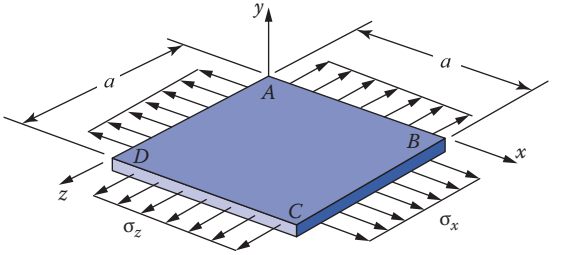

Figure P2.9

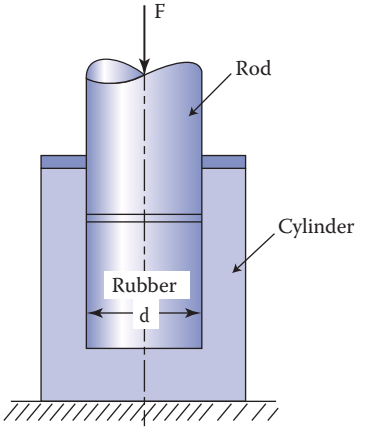

Figure P2.10

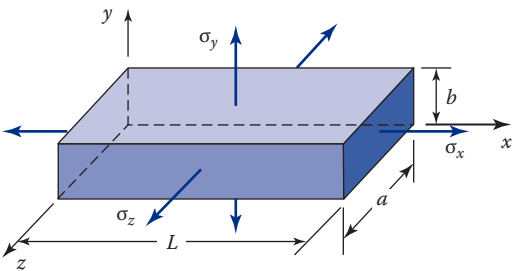

Figure P2.11

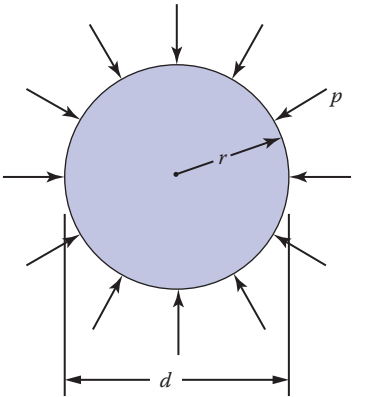

Figure P2.13

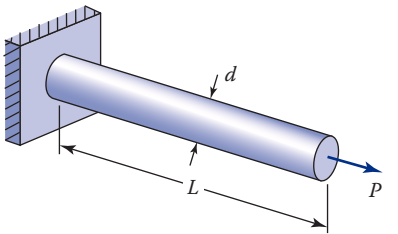

Figure P2.15

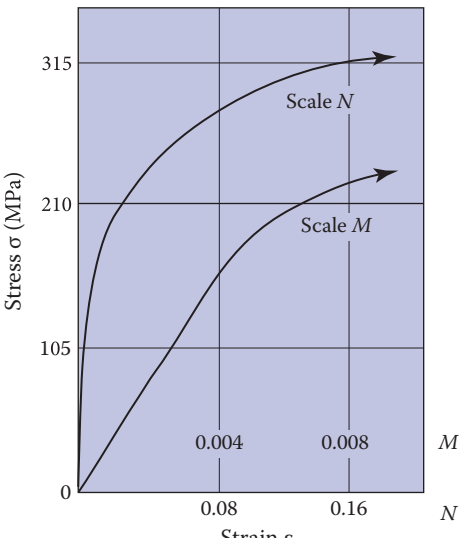

Figure P2.18

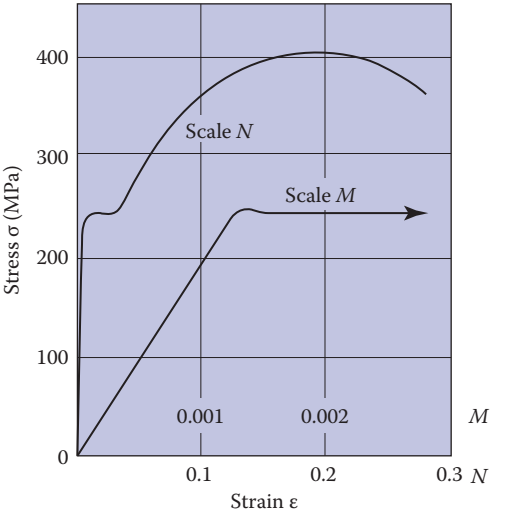

Figure P2.21