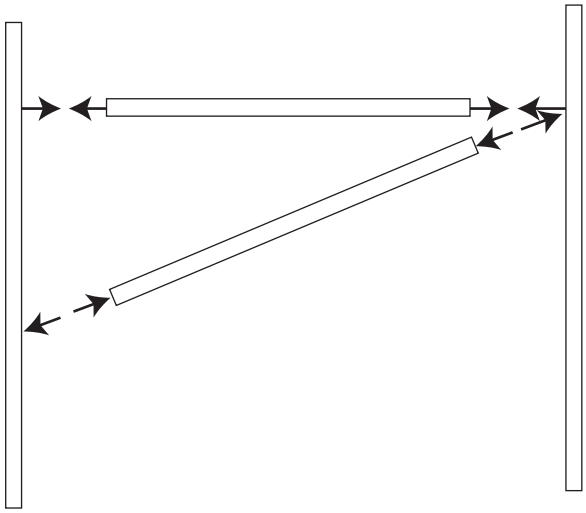

Figure 2.1
Isolated bars of underwater structure.

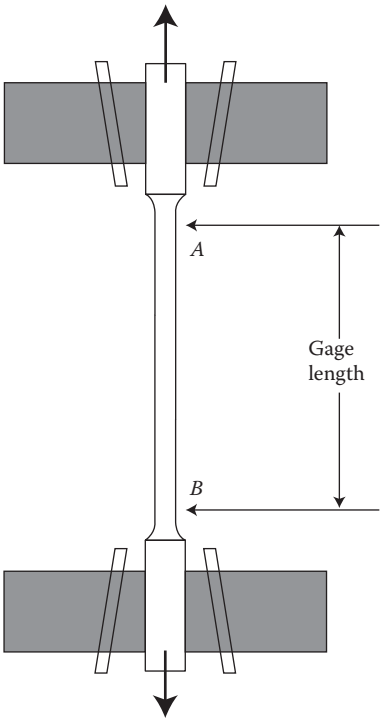

Figure 2.2
Tension specimen.

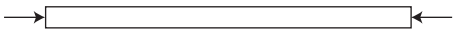

Figure 2.3
Bar in compression.

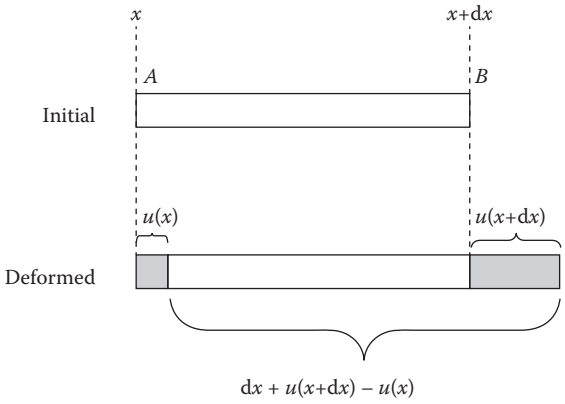

Figure 2.4
One-dimensional stretching of a bar.

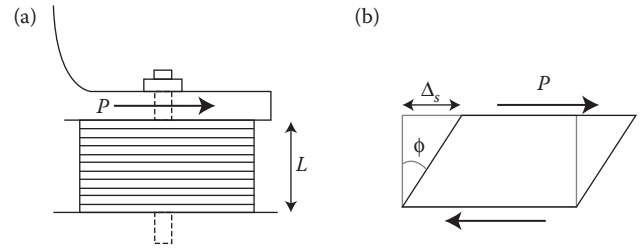

Figure 2.5
Shear strain. (a) Motor mount. (b) Motor mount distorted in shear.

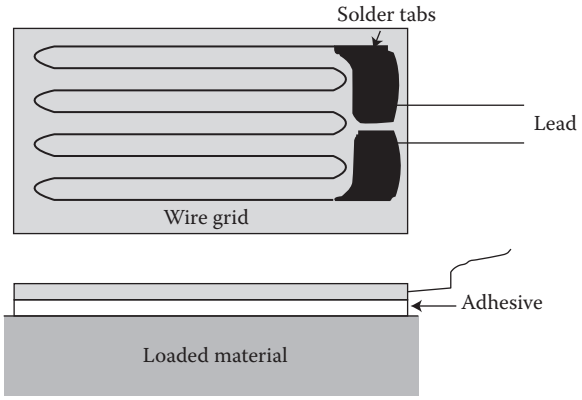

Figure 2.6
Construction of a bonded-wire strain gage.

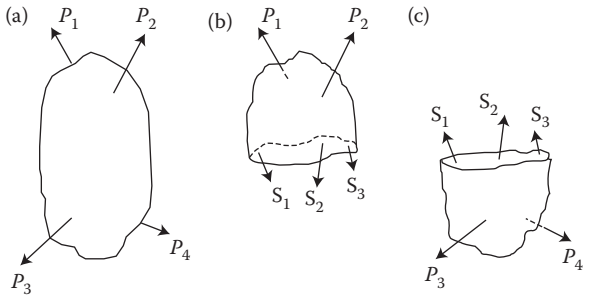

Figure 2.7
The method of sections. (a) Equilibrium of entire body. (b, c) Equilibrium of sections created by arbitrary cut through body.

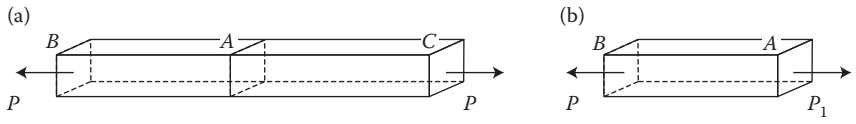

Figure 2.8
Bar in tension. (a) Bar BC. (b) Free body BA.

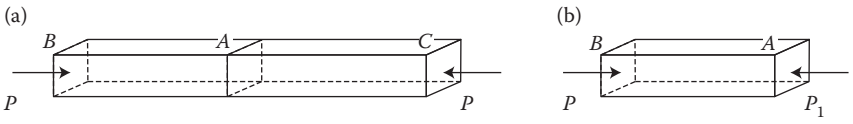

Figure 2.9
Bar in compression. (a) Bar BC. (b) Free body BA.

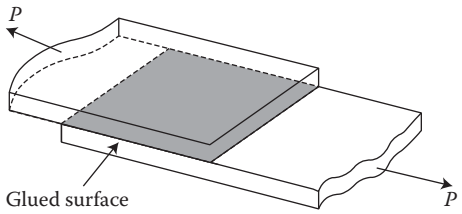

Figure 2.10
Shear between two bodies.

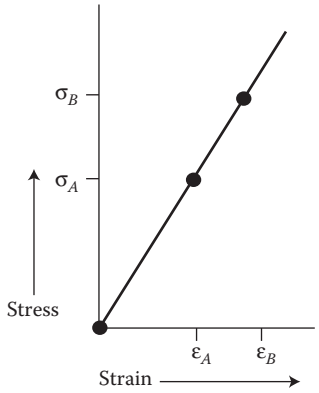

Figure 2.11
Linear relationship between stress and strain.

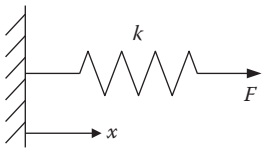

Figure 2.12
Linear (Hookean) spring.

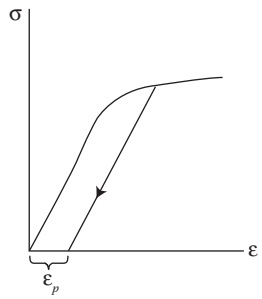

Figure 2.13
Plastic deformation incurred when proportional limit is exceeded.

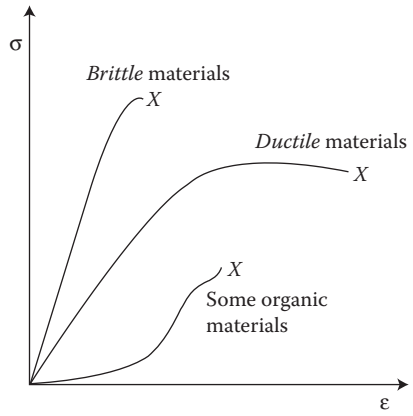

Figure 2.14
Schematic of typical stress–strain diagrams.

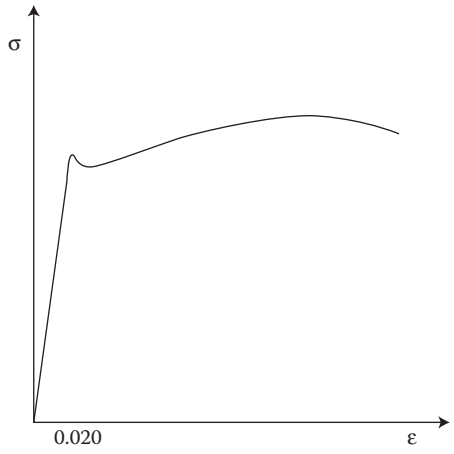

Figure 2.15
Idealized stress–strain diagram for mild steel (ductile).

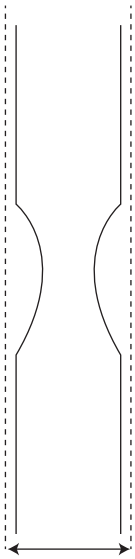

Figure 2.16
Necking of a ductile material during tensile testing.

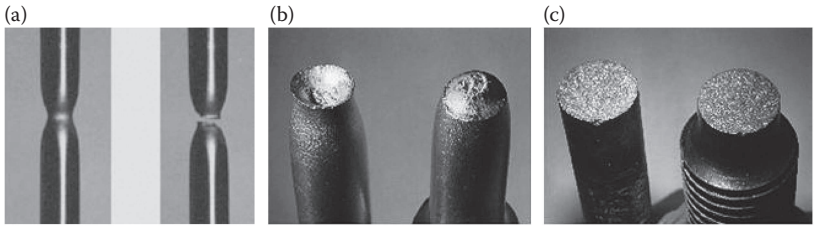

Figure 2.17
Ductile material (a) experiencing necking and (b) after failure, and (c) brittle material after failure, in uniaxial tension test. (http://www.hsc.csu.edu.au/engineering_studies/application/lift/3210/index.html. With permission.)

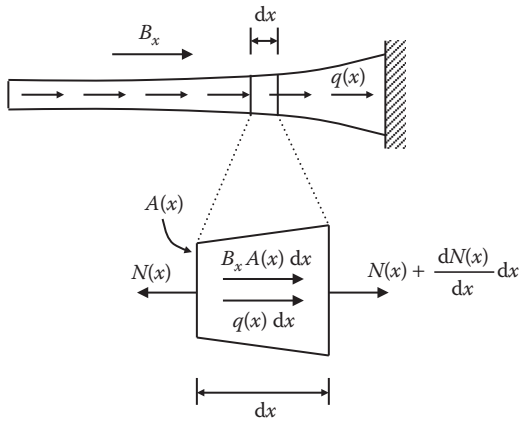

Figure 2.18
Equilibrium of an infinitesimal element in one dimension: internal axial force $N(x)$ balances applied axial load $q(x)$ and body force B_x.

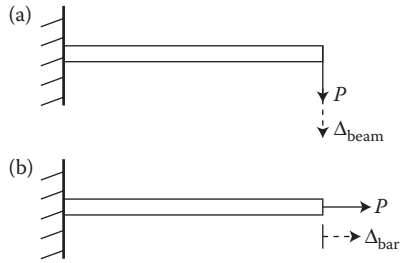

Figure 2.19
Steel ruler in (a) beam and (b) bar modes.

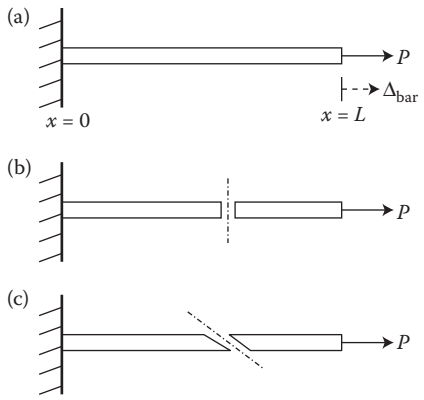

Figure 2.20
Stresses on sections of axially loaded bar. (a) An axially loaded bar. (b) Section cut normal to the bar's longitudinal axis. (c) Section cut at an angle θ.

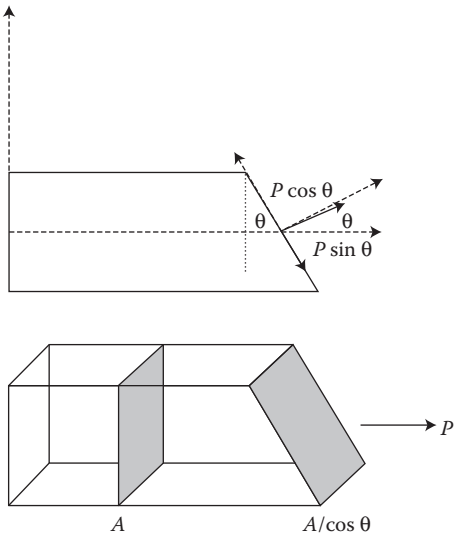

Figure 2.21
Sectioning of a bar at an angle θ.

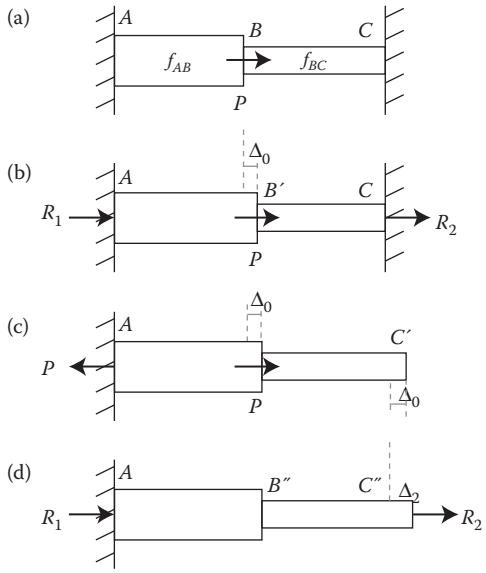

Figure 2.22
Force method for statically indeterminate bar *ABC*: (a) subjected to applied force *P*; (b) experiencing reactions and deformation; (c) with right support "removed"; and (d) subjected only to the support reactions.

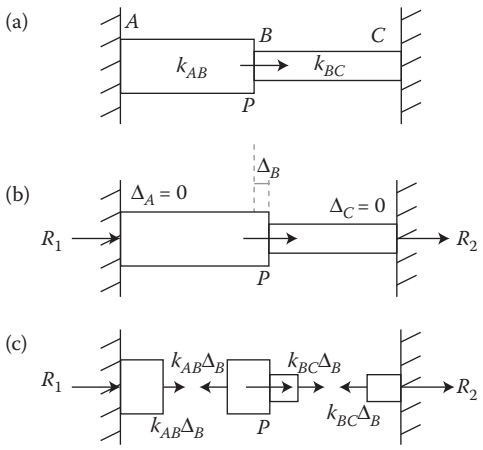

Figure 2.23
Displacement method for a statically indeterminate bar *ABC*: (a) subjected to applied force *P*; (b) experiencing reactions and deformation; (c) with "cuts" in sections *AB* and *BC* to produce node FBDs.

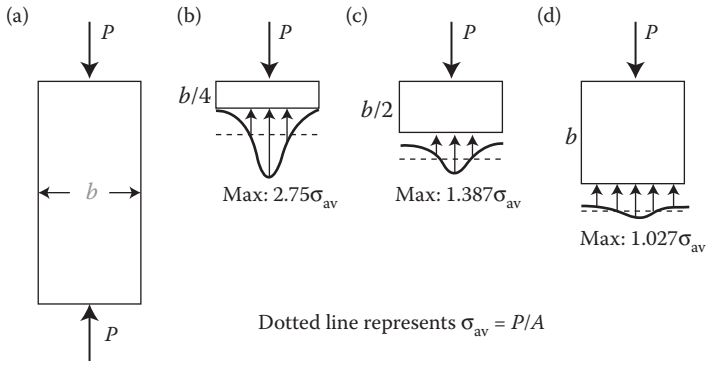

Figure 2.24
Stress distributions near concentrated force in a bar. (a) A bar of width b acted on by concentrated load P; and calculated stress distributions on "cut" sections (b) $b/4$; (c) $b/2$; and (d) b from the load application.

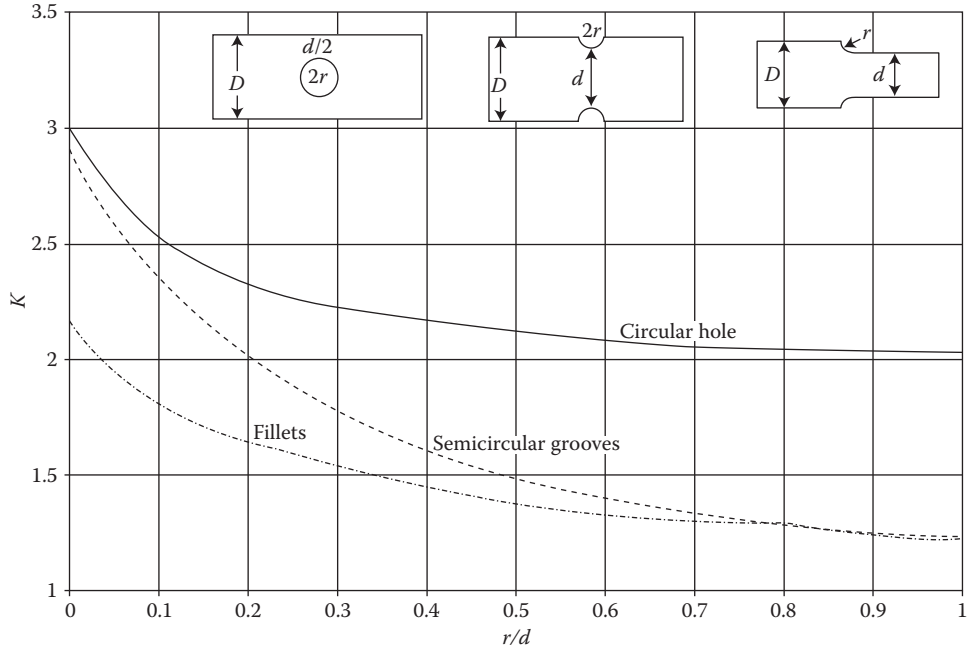

Figure 2.25
Stress concentration factors for flat bars. (After M. M. Frocht, Factors of Stress Concentration Photoelastically Determined, *ASME Journal of Applied Mechanics* 2:A67–A68 (1935).)

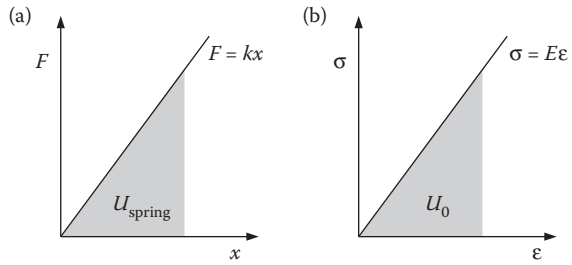

Figure 2.26
Constitutive relationships and (a) strain energy for a spring and (b) strain energy density for an elastic solid.