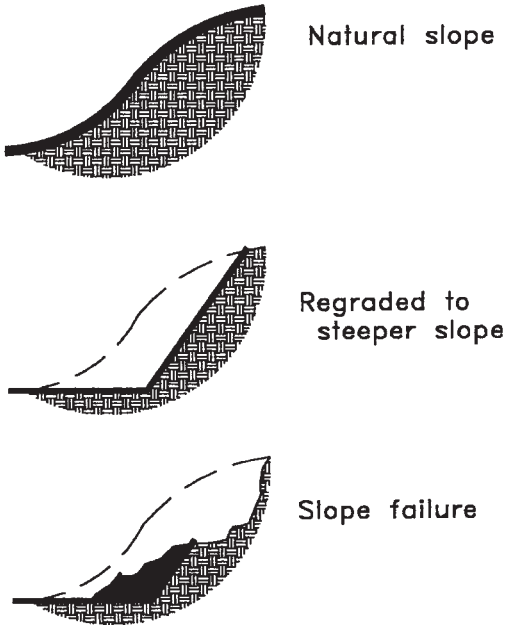

Figure 3.10 Slope failure caused by regarding a slope so that it is steeper.

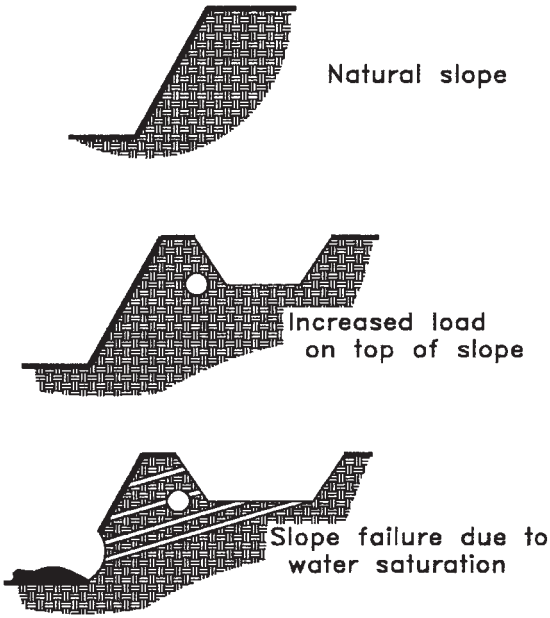

Figure 3.11 Slope failure caused by increased load on top of the slope, which leads to water saturation of the material below the slope.

increasing slope resistance vary from building retaining walls to stabilizing the soil using thermal treatment (heating the soil to the melting point). Although new methods of chemical and thermal treatment have emerged, these methods are generally considered to be experimental and have not been widely used. The most widely used methods are basically variations on the retaining walls or pilings such as the method shown in Fig. 3.13 or the cantilevered reinforced retaining wall shown in Fig. 3.14. New methods include slope stabilization using anchors or interlocking concrete block walls, and using three-dimensional geosynthetic materials as shown in Figs. 3.15 and 3.16. Buttresses are sometimes used as alternatives to the other methods.

To keep changes in grade small, timber and dry laid stone retaining walls have been used successfully (Figs. 3.17 through 3.20). Proper installation is the key to all of these methods, but small retaining walls are often built incorrectly without regard to proper stabilization, footing, soil bearing, batter, and so on. Timber and dry laid stone walls depend on the depth below grade to resist overtopping by the retained earth. Retaining walls may be considered as either flexible or rigid construction. For purposes of this discussion retaining walls are no more than 8 to 10 ft in height, and the maximum surcharge is 2 ft. Taller walls begin to have greater and more complex influences than those discussed here and should be designed by a structural engineer.