Slope Stability

Geotechnical Engineering and Geomorphology

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(Graton and Fraser, 1935). As the cross-sectional area of pore necks is the main control over water movement (ignoring wetted surface area, capillarity, tortuosity, etc.) and provided that a soil is relatively free of fine-grained particles, then void ratio can be used as a soil-specific indicator of soil hydraulic conductivity when considering changes in particle size distribution with weathering (Fraser, 1935; Beard and Weyl, 1973; Statham, 1974).

If it is not assumed that soil particle characteristics are independent of size then particle shape, roundness, and mineralogy (especially with finer soils) also have to be considered as these parameters are size dependent, varying considerably with the state of weathering (Francis, 1984) and affecting the void ratio and hence hydraulic conductivity (Fraser, 1935; Gaither, 1953; Rogers and Head, 1961; Beard and Weyl, 1973). A further important control over soil hydraulic conductivity is the soil organic material, which promotes soil structure with the development of a secondary soil hydraulic conductivity, and differentiation into soil horizons of different hydrological properties.

19.4 SUMMARY

This chapter has not attempted to provide answers to the problem of assessing the influence of mass movement upon slope evolution. Instead it has highlighted a series of unresolved problems which are relevant to stability modelling. It is evident that the state of the art is insufficiently precise to allow sweeping evolutionary statements to be made (Anderson *et al.*, 1980). In the short term, site-specific studies indicate that mass movement can control the form of steep slopes, but inevitably evolutionary interpretations become more speculative over longer time-scales. This is a particular problem as most studies of slope development have been made in temperate regions where palaeoclimates have been variable: perhaps this variability can be minimized by looking in more detail at slopes which have evolved under more constant environmental conditions.

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