ENGINEERING BEHAVIOUR OF RESIDUAL SOILS

I. Pannila
Faculty of Engineering Technology, Open University, Nawala.

Most of the soils of Sri Lanka are grouped into a category known as residual soil. Residual soils are found in the tropics and are formed by in-situ weathering of igneous, sedimentary and metamorphic rocks.

Soil classification commonly used in soil mechanics work based on mineral composition and particle size has been evolved for soils from temperate climate and is found to be unsatisfactory for residual soils. Test on 12 samples of lateritic soils, which is also a residual soil, showed Atterberg limits and particle size distribution curves depend on how the soil is pretreated before testing i.e. whether tested at natural moisture content or air dried and oven dried states. Liquid limits and plastic limits of the oven dried samples were found to be lower than those of the air dried samples. The reduction was more in liquid limits than in plastic limits.

Consolidation behaviour was investigated by carrying out one-dimensional consolidation tests on undisturbed samples with different consolidation pressures and pressure increment ratios. Pressure increments were maintained for a duration of one week. Test results showed that the settlement-time curves consisted of three phases :

i) an immediate settlement of generally 40% of the total settlement, probably due to the collapse of the structure of residual soil;

ii) primary consolidation settlement due to gradual dissipation of excess pore water pressures; and

iii) secondary consolidation settlement amounting 15 to 20 % of the total settlement due to re-adjustment of soil particles after excess pore water pressures have been dissipated.