

MATRIC SUCTION CHARACTERISTICS OF UNSATURATED RESIDUAL SOILS OF SRI LANKA

This thesis was submitted to the Department of Civil Engineering of the University of Moratuwa in partial fulfillment of the requirements for the Degree of M. Eng. in Geotechnical Engineering



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DECLARATION

The work included in the thesis in part or whole, has not been submitted for any other academic qualification at any institution.


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ABSTRACT

Residual soils from selected prominent landslide sites of the upcountry of Sri Lanka are tested under unsaturated conditions to evaluate pertinent unsaturated properties of the soils. The selected landslide sites are Naketiya, Kahagalla, Walhaputenna and Beragala.

The tri-axial test apparatus was modified by using high air-entry disks so that pore-air pressures and pore-water pressures of a soil sample could be maintained at separate, required magnitude. Soil samples obtained from Dambulla International Stadium site were used to verify the repeatability of the test results by the modified apparatus, and the reliability of the apparatus.

Soil samples obtained from each of the selected landslides sites were prepared at the maximum dry density and optimum moisture content as determined by the proctor compaction test. These were tested in triaxial conditions under five different matric suction (which is the difference between pore-air and pore-water pressure) magnitudes. Time was allowed for each sample to reach an equilibrium state under the particular matric suction applied, before triaxial testing commenced. The test results are used to develop the shear strength function for each soil tested, and the soil-water characteristic curve (SWCC) for each soil over the range of matric suction (30 kPa – 200 kPa) considered in the investigation.

These results are of importance in interpreting the variation of shear strength with the moisture content for these residual soils, which will have a direct bearing on stability of slopes there.

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