



Comparison of Soil Modulus E_{50} of Residual Soil Slope Failures in Two Different Rainfall Zones

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Abstract

Occurrence of slope failures and landslides in the hilly areas of Sri Lanka poses a threat to lives and frequently makes the roads impassable and thus development process of the country is hindered. The characteristics of slopes, saturation and shear strength of soils are the main parameters associated with rainfall-induced slope failures, and these parameters are directly affected by the different precipitation in prolonged periods of time. In most instances a landslide trigger due to extensive soil saturations and is a function of soil integrity, hydraulic conductivity, density, void content, shear strength and boundary conditions. Two soil samples can have the same dry density but different structures, like loose or dense, and thus have different soil modulus. Water content also impacts soil modulus. At low water contents the water binds the particles, increases the stress and suction between the particles and leads to a high soil modulus. This is especially apparent when considering the stiffness of dried clay. Slope stability analysis enables the identification of risky areas, but the lack of knowledge in terms of variability against the saturations and elastic deformations of subsurface soil is another hindrance in interpretation of instability potential in natural slopes.

Keywords

Soil modules • Rain induced failures • Precipitation

Introduction

In limit equilibrium analysis the relative deformations along the rupture surface are usually ignored but it's a common fact that deformities are highly significant at the failure. Evaluation of stability of natural slopes using the deterministic approach depends on various extrinsic and intrinsic variables for calculation of the factor of safety. Stability of residual soil formations under prolong period of saturation has been the subject of various landslide studies in the recent past, with emphasis placed on evaluation of stability. Since, the subsoil properties and patterns of failures are highly dependent on soil saturation and shear strength, a study on evaluation of inter-related parameters of two different precipitation regions would yield to understand shear strain behavior of soils that can be adopted in each region. The project team has undertaken several sample analysis, shear

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