



Analysis of slope stability in unsaturated weathered soil dependent on rainfall infiltration velocity

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In this study the unsaturated soil column tests were carried out for weathered granite and weathered mudstone soils to find out the relationship between rainfall intensity and rainfall infiltration velocity on the basis of different unit weight conditions for the soils. For this purpose, the volumetric water content and pore water pressure were measured using TDR sensors and tensiometers at constant time interval. For the column tests, three different unit weights such as in-situ, loose and dense condition were applied, and two different rainfall intensities (20mm/h and 50mm/h) were selected for the analysis. The test results showed that the higher rainfall intensity and the lower unit weight of soil, the faster average infiltration velocity. In addition, the weathered granite soils had faster rainfall infiltration velocities than those of the weathered mudstone soils. It is because weathered mudstone soils contain more clay minerals than weathered granite soils. The infinite slope stability was analyzed to find out the relationship between the slope stability and rainfall infiltration velocity considering saturation depth ratio of rainfall based on column test results. The analysis showed that the faster average infiltration velocity and the higher unit weight of soil, the faster reducing the factor of safety. Finally, landslide susceptibility of a study area was analyzed using the calculation results of the factor of safety and GIS techniques. For the analysis, slope angle and soil depth were obtained from digital topographic data, and cohesion, unit weight and internal friction angle for slope materials were obtained from the laboratory tests and field investigation. In addition, landslide locations were identified using the aerial photos and landslide inventory map.