Understanding the Effect of Unsaturated Hydraulic Conductivity of Surface Soils on Landslide Triggering: A Case Study in *Yahalabedda* Landslide Risky Area, Sri Lanka

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Hydraulic conductivity (*K*) is one of the most important soil properties for rainfall-induced landslide triggering. *Yahalabedda* receives higher rainfalls in Northeast and Southwest monsoon seasons and considered a potential landslide risky area in Sri Lanka. The objective of this study was to evaluate the unsaturated *K* (*K*unsat) of surface colluvium soils using a minidisk tension infiltrometer together with relevant basic soil properties. Field investigations were conducted at three soil depths; 0, 30, and 60 cm of a prepared soil profile in September 2019. The infiltration test was conducted at each soil depth using three tension levels of -0.03, -0.02, and -0.01 m. The *K*unsat has been calculated using the *K*unsat = C_1/A, where C_1 is the slope of the curve of the cumulative infiltration versus the square root of time, and *A* is a value relating the van Genuchten parameters for a given soil type to the suction rate and radius of the infiltrometer disk. *K*unsat increased with the soil profile depth for each tension value. *K*unsat values for -0.03 m tension, are 1.35 × 10-6, 2.62 × 10-6 and 7.77 × 10-6 m s^{-1}; for -0.02 m tension, are 2.13 × 10-6, 3.91 × 10-6 and 1.02 × 10-5 m s^{-1} and for -0.01 m tension, are 4.23 × 10-6, 7.86 × 10-6 and 1.42 × 10-5 m s^{-1} for 0, 30 and 60 cm depths, respectively. *K*unsat increases with decreasing the tension values at each depth as expected. 0 and 30 cm depths show nearly the same bulk density (1.0 g cm^{-3}), while the 60 cm depth shows higher bulk density (1.1 g cm^{-3}). The soil texture is clay loam for the entire soil profile while the uniformity coefficient (Cu) is higher (6.8) in upper soil resulting in a lower chance to interlock between soil particles and higher pore spaces. As the *K*unsat increases with the depth, more water will be percolated to deeper soils resulting in the increasing soil weight in deeper soils and the landslide risk. The study reveals that *the Yahalabedda* area has a threat to landslide triggering in rainy seasons.

Keywords: Minidisk tension infiltrometer, Hydraulic conductivity, Infiltration, Landslide risky soils

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