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A transient infiltration analysis on Busan landslide using unsaturated hydraulic properties from transient release and imbibitions method

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In unsaturated soils, the fundamental hydraulic properties are the water retention curve and hydraulic conductivity function. Unsaturated hydraulic conductivity functions can be derived from the soil-water retention curve and the saturated conductivity value, theoretically based on capillary mechanics. In order to obtain hydraulic properties of unsaturated soils through an advanced measuring technique, fine data on transient inflow and outflow for each matric suction are measured by transient release and imbibitions method (TRIM). A back analysis on the transient infiltration can solve the behavior of both the water retention and the hydraulic conductivity in one dimensional layer.

The water retention curves obtained from the TRIM were compared with the data from the volumetric pressure plate extractor (VPPE) tests for multiple samples. As a result, the measurement of water retention by the TRIM was reliable and the unsaturated hydraulic conductivity was also available to acquire by back analysis. In the solution of back analysis, similar curves of soil-water retention show differences in the saturated hydraulic conductivity and pore connectivity.

The unsaturated hydraulic properties from TRIM test could be used to assess the actual impact of rainfall induced landslide in Busan. It was successful to perform the analysis on infiltration and stability of unsaturated soils and subsequently to simulate actual landslide in Busan.

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