

## **Modified Evaluation of the Hydro-Mechanical Dependency of the Water Coefficient of Permeability of a Clayey Sand with a Novel Permeameter for Unsaturated Soils**

**Authors :** G. Adelian, A. Mirzaii, S. S. Yasrobi

**Abstract :** This paper represents data of an extensive experimental laboratory testing program for the measurement of the water coefficient of permeability of clayey sand in different hydraulic and mechanical boundary conditions. A novel permeameter was designed and constructed for the experimental testing program, suitable for the study of flow in unsaturated soils in different hydraulic and mechanical loading conditions. In this work, the effect of hydraulic hysteresis, net isotropic confining stress, water flow condition, and sample dimensions are evaluated on the water coefficient of permeability of understudying soil. The experimental results showed a hysteretic variation for the water coefficient of permeability versus matrix suction and degree of saturation, with higher values in drying portions of the SWCC. The measurement of the water permeability in different applied net isotropic stress also signified that the water coefficient of permeability increased within the increment of net isotropic consolidation stress. The water coefficient of permeability also appeared to be independent of different applied flow heads, water flow condition, and sample dimensions.

**Keywords :** water permeability, unsaturated soils, hydraulic hysteresis, void ratio, matrix suction, degree of saturation

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