

Development of In Situ Permeability Test Using Constant Discharge Method for Sandy Soils

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Abstract : The post-rain puddles problem that occurs in the first yard of Prambanan Temple are often disturbing visitor activity. A puddle layer and a drainage system has ever built to avoid such a problem, but puddles still didn't stop appearing after rain. Permeability parameter needs to be determined by using more simple procedure to find exact method of solution. The instrument modelling were proposed according to the development of field permeability testing instrument. This experiment used proposed Constant Discharge method. Constant Discharge method used a tube poured with constant water flow. The procedure were carried out from unsaturated until saturated soil condition. Volumetric water content (θ) were being monitored by soil moisture measurement device. The results were relationship between k and θ which drawn by numerical approach Van Genuchten model. Parameters θ_r optimum value obtained from the test was at very dry soil. Coefficient of permeability with a density of 19.8 kN/m³ for unsaturated conditions was in range of 3×10^{-6} cm/sec ($S_r = 68\%$) until 9.98×10^{-4} cm/sec ($S_r = 82\%$). The equipment and testing procedure developed in this research was quite effective, simple and easy to be implemented on determining field soil permeability coefficient value of sandy soil. Using constant discharge method in proposed permeability test, value of permeability coefficient under unsaturated condition can be obtained without establish soil water characteristic curve.

Keywords : constant discharge method, in situ permeability test, sandy soil, unsaturated conditions

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