

Abstract

In a porous pavement, the incipient rainfall is allowed to enter the pavement through the porous top layer and is temporarily stored in the reservoir base course of high porosity. The stored water is, then, allowed to infiltrate slowly into the underlying subgrade soil. The present thesis aims to develop a model for the determination of the thickness of the reservoir base course of a porous pavement. The model has been developed taking into the account both the unsaturated and saturated flow of water below the surface of the pavement. Richards' equation, which governs the flow of subsurface water, has been discretized using implicit Finite Difference scheme. Van Genuchten equations have been used to get the interrelationships among hydraulic conductivity, soil pressure and moisture content of the soil. A typical rainfall data has been assumed to study the effect of time dependent flow on the thickness of the reservoir course. An algorithm has been developed to solve a set of simultaneous linear equations iteratively. Iterative schemes have been applied to get the modified values of soil pressure over the time. The non-negative soil pressure at a point in the soil mass represents the presence of saturated soil at that point. The thickness of reservoir layer has been accordingly suggested and compared with the result obtained by using a conventional method.

Keywords: Porous pavement, Hydraulic conductivity, Richards' equation, Van Genuchten equations.