

Effects of cross-section on infiltration and seepage in permeable stormwater channels

ABSTRACT

Factors affecting the infiltration rate have been studied fairly well by many researches; however, the effects of the cross-section of a permeable stormwater channel on the surface water depth reduction due to infiltration and seepage have largely been neglected. In the present study, towards improving the efficiency of permeable channels, the effects of the three components of a trapezoidal section, namely, the water depth, side slope, and base width, on the infiltration and unsteady seepage rates were investigated. Laboratory studies using models of the channel with unsaturated soil were performed under ponding condition using various initial water levels, base widths, and side slopes for two soil textures, namely, sandy loam and loamy sand. The results showed that the rate of surface water depth reduction by infiltration and seepage increases with increasing water level irrespective of the base width and side slope. In addition, an increase of the side slope increases the infiltration rate, with the effect becoming more significant with increasing initial water level, while the effect of varying the base width is insignificant.

Keyword: Stormwater; Channel section; Infiltration; Seepage; Physical modeling