RUNOFF VELOCITY BEHAVIOUR ON SMOOTH PAVEMENT AND PAVING BLOCKS SURFACES MEASURED BY A TILTED PLOT

Abstract

Paving blocks have been widely known as an alternative technology for reducing runoff discharge due to their infiltration performance and capability of retarding the flow. Surface configuration of the different paving blocks types and the openings area play important role in decreasing the runoff velocity. In this study, we investigated the surface runoff velocity on two types of paving blocks layers, and a smooth pavement as comparison. The paving blocks type were rectangular blocks, which have 3.2% openings ratio and hexagonal blocks, which have 6.5% openings ratio. We used a tilted plot covering area of 2 × 6 m, equipped by a rainfall simulator to accommodate the variation of surface slope and rainfall intensity. We measured the velocity by using modification of dye tracer and buoyancy method. The data were then tabulated and graphed based on the paving types and the surface slopes. Generally, the velocity-slope relationship has demonstrated that the increase in surface slope leads to the increase in velocity. In this study, the result showed that slope and rainfall intensity simultaneously influenced the velocity ($F = 19.91 > F_{table} = 5.14; P < 0.05$). However, the findings of this study showed a weak relationship between the changes of surface slope and the changes of runoff velocity on the rectangular blocks ($R^2 = 0.38$). The greater slope did not always invariably lead to the greater runoff velocity. It was likely that there was other predictor variable that was not identified before, and need to be further investigated.

Key words: low-impact development, overland flow, permeable pavement, urban drainage