Preliminary modelling of hydrological performance for green roof Drainage layer using response surface methodology

ABSTRACT

Response Surface Methodology modelling is used in this study to investigate experimental result for waterproofing and drainage layers with slope ranging from 0% to 6% test beds with three types layers of drainage, rubber crumbs, oil palm shells and polyform. The aim of this study is to determine the accuracy and effectiveness of RSM through investigating the hydrological performance of green roofs. Nine sets of experimental data were used to analyse, and the input parameters include type of material drainage layer, slopes, and water absorption of the materials. The output variables were hydrograph and peak runoff, peak attenuation, and water retention for each material. It was proven that the mathematical equations developed by the RSM model can predict the output response, with ANOVA analysis being used to determine the level of significant effect of the input parameters on the green roof hydrological performance. RSM model's 2D contour plot and 3D surface plot expecting to revealed slope and water absorption. This modelling showed significant effect on peak runoff, peak attenuation, and water retention. It is proven that the RSM can be used to investigate various factors affecting green roof hydrological performance.