



Experimental Study of Hydraulic Roughness for Kam Tin Main Drainage Channel at Hong Kong

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ABSTRACT

The Kam Tin Main Drainage Channel undertakes the important task from the urban flood drainage systems in Hong Kong. The roughness and its change have an obvious effect on the flood control capacity and the flow capacity. So it is required that the physical model tests is carried on for the Kam Tin Main Drainage Channel. Considering the complex channel structure and the study aim, the tests have been completed by two steps. In Step 1, in order to measure the energy loss along the main channel without inflows, all inflows and outflows are sealed. In Step 2, all the inflows and outflow structures were measured, and the sealed inflow and outflow are open on the base on Step 1. In each step stage, two plans have been carried out. One of the key technologies is that the suitable materials are found to meet the need of the model roughness similar to the prototype one. According to the geometrical similarity and the gravity force similarity, 1:25 scale model are built, and the main channel was manufactured from the acrylic plastic. The facing slopes of grasscrete and stone masonry need to be roughened. A kind of the nylon net is selected to simulate the roughness of the stone masonry and the plastic lawn for the grasscrete facing slope, respectively. For the different structure reach, the roughness coefficients are calibrated and analyzed in detail by the hydraulic theory. The rationality of the test roughness is verified in different sections and different materials in this study. The calibration roughness coefficients can provide the reliable basis for the renovation, expansion, optimization of this channel.

KEYWORDS

Roughness, hydraulic character, channel, facing slope, Grasscrete, Masonry