

A model for removing sediments from open channels

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Abstract

The problems caused by suspended sediment overloading in open channels are of great importance to the hydraulic engineers. One of the important problems caused by the sediment overloading during flood seasons is the change in bed level and corresponding water level of rivers due to its deposition on the river bed. At the upstream reaches, the bed slope is high, velocity is high and hence the rivers carry large amount of sediment during flood seasons. In this paper, eighty-one experiments on a laboratory open-channel of cross-section dimensions (20*50) cm and (10) m long. The experiments include using sharp crested weir in the last third part of the channel. Three heights of weir are used; namely half width of channel (B), equal to the width, and 1.5 times the width of channel). Also, three bed slopes of the channel are used; namely 0.015, 0.0225, and 0.03). In all experiments, the values of discharge are limited between 100 and 300 l/min. The concentration of suspended sediment is measured upstream and downstream the weir through each experiment to calculate the sediment reduction ratio (SRR%). The results of the laboratory experiments showed that the sediment reduction ratio increases with the increase of weir height and reaches about (63%) at a channel bed slope of (0.015) and a weir height 1.5B. When the discharge is more than (100 l/min), the highest values of sediment reduction ratio are obtained for the three slopes used and at weir height of 1.5B.