THESIS

EFFECT OF VEGETATION ON FLOW RESISTANCE IN SMALL CHANNELS

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ABSTRACT

Submerged and standing vegetations create resistance (drag and shear) forces that slow the movement of water in the channels, directly influencing the channel capacity. A representation of vegetative effects on flow resistance, in terms of parameters describing flow depth and vegetal covering is needed to improve numerical accuracy of channel design and modeling techniques for surface-water flow.

The present study aims at determining the inter-relationship of flow-depth and vegetal cover in terms of percentage vegetation density, their combined effects on the Manning's roughness co-efficient, and a quantitative relationship for the same.

An experimental Channel was designed to conduct the study. Natural vegetation weed and grass (*lathyrus odoratus and avena sativa*), commonly available in drains and small channels of Pakistan, was experimented upon in the channel under different scenarios. Variations were made in the vegetation spacing to increase the vegetation density.

Significant retardness was observed in the vegetated channel. The flow depth had a direct relation with the vegetation density, also indicated from the decrease in channel capacity with the increasing vegetal cover. It was thereby inferred that submergence of the vegetation height caused an increase in the roughness coefficient. Typical numerical expressions were derived for these relations signifying the comparative trend of each scenario adopted.