

Flow in a branching open channel: a review

ABSTRACT

Branching channel flow refers to any side water withdrawals from rivers or main channels. Branching channels have wide application in many practical projects, such as irrigation and drainage network systems, water and waste water treatment plants, and many water resources projects. In the last decades, extensive theoretical and experimental investigations of the branching open channels have been carried out to understand the characteristics of this branching flow, varying from case studies to theoretical and experimental investigations. The objectives of this paper are to review and summarise the relevant literatures regarding branching channel flow. These literatures were reviewed based on flow characteristics, physical characteristics, and modeling of the branching flow. Investigations of the flow into branching channel show that the branching discharge depends on many interlinked parameters. It increases with the decreasing of the main channel flow velocity and Froude number at the upstream of the branch channel junction. Also it increases with the increasing of the branch channel bed slope. In subcritical flow, water depth in the branch channel is always lower than the main channel water depth. The flow diversion to the branch channel leads to an increase of water depth at the downstream of the main channel. From the review, it is important to highlight that most of the study concentrated on flow characteristics in a right angle branch channel with a rigid boundary. Investigations on different branching angles with movable bed have still to be explored.

Keyword: Branching channel; Diversion discharge; Numerical model; Open channel; Separation zone