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Clear Water Scour around at a Piano Key Side Weir of the Type A at 120° Section of a 180° Curved Channel

A side weir is a hydraulic control structure used in irrigation and drainage systems and combined sewer systems. The Piano Key Weir (PKW) is a new type of long crest weirs that have a relatively simple structure and high economic efficiency structures. Due to the advantages of this weirs, it is necessary to study and investigate the Scour around of these structures as a side-weir. The present study focuses on investigate the scouring around the piano key Side weirs of the Type A at a 30° Section of a 180° Alluvial curved channel for clear water conditions. The results showed that at the end of the Side weir, longitudinal bar in the middle of the main channel and a scour hole close to the outer bank are formed because of the changes in shear stress field. The depth of clear-water scour increases by time and approaches the equilibrium state asymptotically depending on approach flow velocity. The equilibrium depth of scour depends on the dimensionless parameters of flow intensity, flow shallowness, weir crest height, side weir length and the maximum value of scour depth occurs at a depth when the approach flow intensity is equal to 1.0. Also, the scour equilibrium depth in the dimensionless ratio increased $L/r_c = 0.175$ compared to $L/r_c = 0.125$ in different flow velocity of 12 to 35%, 10 to 39% and 18 to 26%, respectively.

Keywords: Scour, Side Weir, Piano Key Side Weir, clear water, Curved Channel.

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