

Effect of Guide Vanes on Discharge Coefficient of Rectangular Sharp-Crested Side Weirs

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(Received: May 09-2014 ; Accepted : July 25-2015)

Abstract

Side weir is the structure to evacuate extra water from a canal when level of water rises. This structure is mounted on the wall of canal. It is used predominantly to set flow in irrigation and drainage systems or urban wastewater harvesting systems. Implementing guide vanes is a simple way to increase side weir efficiency. In this study, the effect of using guide vanes on discharge and discharge coefficient of rectangular sharp-crested side weirs was investigated. ADV instrument was applied for recording vertical velocity over the crest of side weir. Local discharge was calculated by vertical velocity data for both conditions of presence and no presence of guide vanes. Results showed that in both cases, increasing the Froude number results in the decrease of passing discharge and discharge coefficient of the rectangular sharp-crested side weir. Data analysis also showed that by increasing the Froude number, guide vanes have more effect on increasing discharge coefficient and local discharge. The local discharge increased along the crest and the most passing local discharge occurred near the end of the side weir. Analysis indicates that using guide vanes leads to the increase of discharge coefficient by about 32%.

Keywords: Sharp-crested side weirs, Guide vanes, Local discharge, Froude number.

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