Effect of the Free Over Fall Weirs Top Corners Curvatures on the Discharge Coefficient

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Abstract:

In such a hard water situation in Egypt, in which we are facing a serious scarcity problem in our needs of water, we as water engineers have to adapt all the water measuring tools to perform accurate as maximum as possible. Since such tools are exciting everywhere along the very long, and complicated irrigation, and drainage systems on the network, in the forms of weirs, regulators, waterfalls, and others. The accuracy of such measuring structures is of great important in saving the water, and minimizing the overuse water. Owing to the simplicity, low cost, and its wide suitability for all types of waterways, we decided to investigate the clear over-fall weir as one of the most popular tools usually used for measuring the discharge in open channels. As the top edge geometry condition is an important parameter affecting the accuracy performance of such weirs, the present study investigates different top edges geometry conditions. Five shapes of the front weir top edge will be tested to point out the most effective shape in increasing the coefficient of discharge, and hence improving the discharge measuring efficiency. After that, the same tested edge shapes with the front edge, will be tested with the behind the top weir edge to fix the most compatible shapes may be used in both front, and behind top edges in achieving the optimum discharge measuring accuracy. An additional weir model with sharp edges in both fronts, and behind top edges will be tested under the same hydraulic conditions as a reference for comparison purposes. Experiments will be carried out using a horizontal testing laboratory flume 13.0m long, 0.30m wide, and 0.30m height in the Irrigation

Keywords:

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