

EXTENDED ABSTRACT

Numerical Investigation of Block Form Effect in Amount of Dissipated Energy of Baffled Apron Spillway Drop by Flow3D

Davood Sedaghat Shayegan^{*}, Mohammad Reza Roosta

Faculty of Civil Engineering, Islamic Azad University, Roudehen branch, Teheran, Iran

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1. Introduction

Baffled aprons or Chutes have been in use on irrigation projects for many years. The fact that many of these structures have been built and have performed satisfactorily indicates that they are practical and that in many cases they are an economical answer to the problem of dissipating energy. Baffled chutes are used to dissipate the energy in the flow at a drop and are most often used on channel waste ways or drops. During the past 2 decades, heuristic and metaheuristic optimization techniques have emerged as a promising solution, offering several benefits and possibilities. (Saber et al., 2021; Sedaghat et al., 2019).

2. Methodology

In this research, Petreka's laboratory data has been used to simulate the flow pattern in toothed spillways. After the modeling done using the laboratory data, to numerically check the effect of the shape of the bases on the flow pattern and the amount of energy consumption, the dimensions and distance of the bases have been changed and other modelings have been done (Peterka, 1978).

3. Results and discussion

The object of this research is evaluation Flow3D in numerical modeling of software flow pattern in Baffled apron spillway drops. Flow3D employs a high accurate model in computational fluid dynamics for simulation of complex geometry problems on extensive range of fluid flows in open channel hydraulic. In this paper, some experimental tests were conducted for calibration of the hydraulic parameters of the Jagged Weir and by applying VOF method for simulation water surface profiles were performed and model accuracy are evaluated with the Assistance of Laboratory investigation in a flume (Fig. 1.).

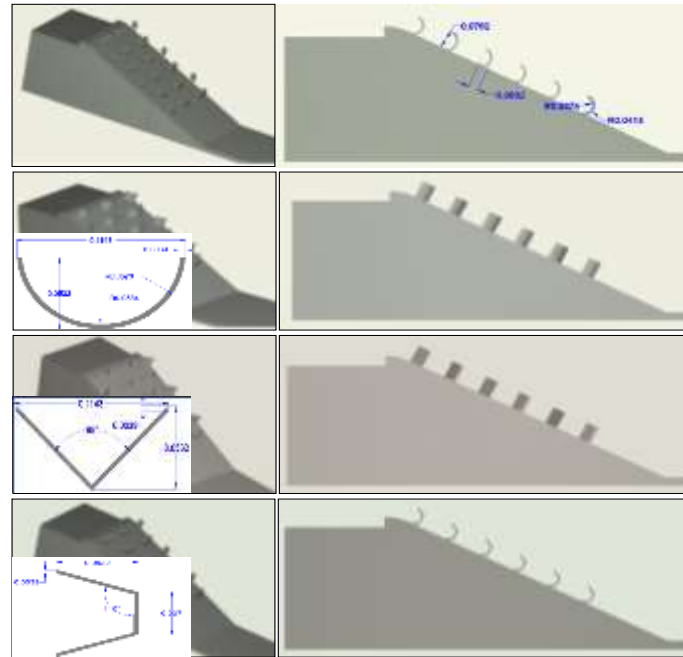


Fig. 1. Baffled Apron Spillway models used in modeling to investigate the effect of the shape of the foundations on the flow pattern and the amount of energy consumption.

4. Conclusions

The results show that Flow3D can be used with high accuracy to simulation of flow over Baffled apron spillway drops. Also, the study was performed for different between five kinds of varied baffles in Baffled apron drop spillway in amount of dissipated energy and we found that horizontal semicircle baffle is the best one.

5. References

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