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## **Numerical Investigation of the Flow Field on the Ogee Spillway under the Influence of the Crest Shape and Slope of the Upstream Face of the Spillway**

*In this study, the ogee spillway flow pattern under the influence of the spillway curve shape and upstream slope changes was evaluated using Flow-3D numerical simulator software. Thus, two ogee spillways with elliptical crest and USBR pattern were simulated in two vertical and oblique upstream modes with a slope of 3H:3V and three different heads, and the results of changes in effective parameters such as flow, velocity and pressure in the length of each spillway was examined. Validation of the results of the numerical model with the results of the Maynard experimental model showed that the Flow-3D numerical model has a high ability to simulate the flow field on the ogee spillway. Comparison of flow rate from numerical model with experimental data showed that the average computational error was less than 3% of the numerical model. Examination of the pressure field showed that at the height of the head equal to the design head, the pressures are close to atmospheric pressure and no negative pressure is created on the spillway crest, but at the head higher than the design head, negative pressure will be created on the spillway. The amount of negative pressure created at the beginning of the USBR spillway crest is higher than the negative pressure value of the elliptical spillway crest due to the lack of continuity in the crest and further separation of the flow lines from it. The results also showed that the ogee spillway with oval crest has a relatively better performance in the flow over the spillway and in these spillways it is possible to pass more discharge with higher safety and sloping the upstream side of the spillway causes a change in the discharge coefficient and finally the flow rate of the spillways.*

**Keywords:** Ogee Spillway, Numerical simulation, Flow-3D, Volume of fluid (VOF), Pressure distribution.

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