

Multiphase Flow Model for 3D Numerical Model Using ANSYS for Flow over Stepped Cascade with End Sill

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Abstract : Stepped cascade has been utilized as a hydraulic structure for years. It has proven to be the least costly aeration system in replenishing dissolved oxygen. Numerical modeling of stepped cascade with end sill is very complicated and challenging because of the high roughness and velocity re circulation regions. Volume of fluid multiphase flow model (VOF) is used .The realizable k- ξ model is chosen to simulate turbulence. The computational results are compared with lab-scale stepped cascade data. The lab -scale model was constructed in the hydraulic laboratory, Al-Mustansiriya University, Iraq. The stepped cascade was 0.23 m wide and consisted of 3 steps each 0.2m high and 0.6 m long with variable end sill. The discharge was varied from 1 to 4 l/s. ANSYS has been employed to simulate the experimental data and their related results. This study shows that ANSYS is able to predict results almost the same as experimental findings in some regions of the structure.

Keywords : stepped cascade weir, aeration, multiphase flow model, ansys

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