

THE NUMERICAL INVESTIGATION OF FREE FALLING JET'S EFFECT ON THE SCOUR OF PLUNGE POOL

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Summary. A free falling jet is associated with an abrupt break in the river bed and in hydraulic structure such as dam outlets, cantilevered culverts, and pipe. The free falling whether in nature or in downstream of hydraulic structure can cause to form local scour. The most of researches on scour by free falling jet have done is laboratorial, and in some case 2D numerical simulation have done. In this comparison, the 3D scour process by free falling jet is simulated and bed deformation and scour pit in specific time domain is considered. Sediment is non-cohesive and water of jet is clear. For flow simulation, momentum equation and continuity equation is used. The k- ϵ turbulence model for simulation of flow turbulent in plunge pool is used. For computational domain a general 3D orthogonal grid in Cartesian coordinate are used and governing equations in scour process solved by finite volume method. Results of to obtain from 3D simulation are compared by results that presented with DOT (U.S. Department of transportation) equation. Also results shows that hole shape and downstream hill is completely similar to laboratory data .About depth, width and length of scour pit exist agreement between simulated sample and results that obtain by DOT equation.