ROLE OF ENHANCED SPILLWAY DESIGN TO SUSTAIN EFFICIENT WATER SYSTEM

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ABSTRACT

This work present an engineering system to sustain water required for a community. An efficient water way system was designed. Several numerical run tests performed for highlighting errors involved in design of ogee spillways subjected to overflowing flood from a catchment. Flow-3D software capable of handling turbulent models (Prandtel mixing length, One-equation transport, Two equations transport, Re- Normalized Group (RNG)) were utilized. Two techniques (volume of fluid (VOF) and Fractional Area/Volume Obstacle Representation (FAVOR)) were adopted for geometric simulations. Reynolds - Averaged Navier-Stokes (RANS) equations was solved for possible errors subjected to: design flood head, maximum instantaneous flood head based on probable maximum discharge predictions. Results were compared to graphical models (the U.S. Bureau of reclamation (USBR) and the U.S. Corp of Engineers (USACE)) included with extensive data. A Physical model fabricated, employed, compared to powerful and efficient computational fluid dynamic (CFD) codes, found not errors free and expensive. Results indicated numerical methods as convenient, time saving with least errors.

KEYWORDS: Overflow structures errors, efficient modeling, sustainable water system**,** enhanced CFD techniques