ABSTRACT

This report aims to describe the calculation of actual and theoretical discharge through the mouth piece using software Salome, ICEM CFD, OpenFOAM and Experimental Setup. It also aims to study the flow velocity, discharge through mouthpiece which can be used to calculate coefficient of discharge and comparison of that with real time experiment. Coefficient of discharge is the ratio of the amount of water discharged to the amount theoretically discharge rate.

PROBLEM STATEMENT

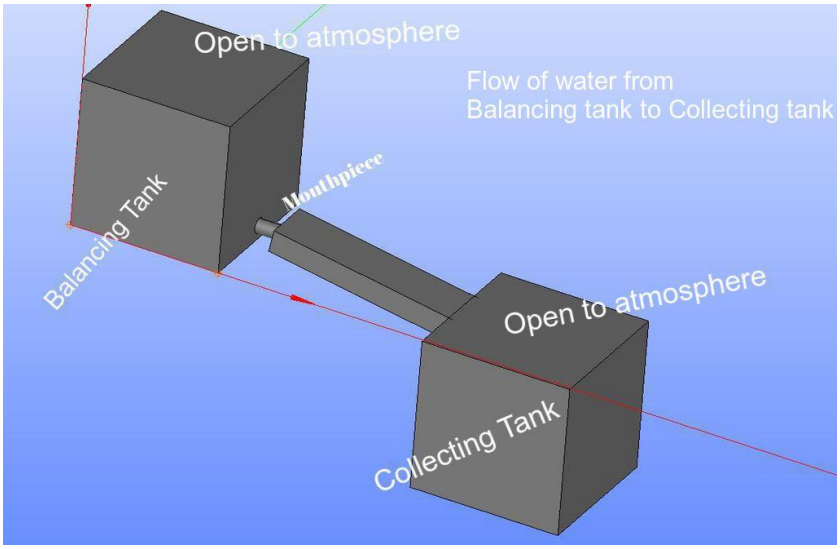
CFD simulation and Experimental validation of flow through a mouthpiece

- Modelling the geometry of balancing tank, collecting tank & mouthpiece using Salome.
- Tetrahedral meshing of geometry in ICEM CFD.
- SnappyHex Meshing of geometry.
- Running the case of flow through a mouthpiece (Variable Head Method) using Multiphase interFoam solver.
- Study of flow velocity through mouthpiece.
- Study of coefficient of discharge through mouthpiece.
- Comparison of CFD results at different mesh size.
- Comparison of CFD results with real time experiment.

Initial Data:

- Collecting Tank – 216000 cm^3, Balancing Tank – 216000 cm^3
- Mouthpiece Diameter – 3 cm
- Water is used as fluid.
- Flow type - Unsteady Turbulent
- Open to atmosphere boundary condition is used for the top surface of balancing and collecting tank.
- Acceleration due to gravity is given in vertical downward direction which allows water to flow.

Experimental Setup



Salome Model