Abstract

CFD Validation for Efficient Gravitational Vortex Pool System

Mini hy ower plants are expected to have good potential for providing electricity to remote communities. An important part of this economic and clean energy system is the conversion of the low-head potential energy into kinetic energy to drive power turbines. One way of converting the low-head potential energy is using a gravitation vortex pool. This study describes work to optimize the vortex pool to improve energy conversion and hence generate electricity from low water heads of between 0.7 m to 3 m. The commercial Computational Fluid Dynamics (CFD) code ANSYS Fluent was used in this study to investigate the optimum configuration of the vortex pool system by modeling the free surface flow mathematically. In addition, an experimental test rig was setup to carry out validation of the CFD results. The results of validation prove that ANSYS Fluent is able to model the system correctly.