

Vortex profile analysis under different diffuser size for inlet channel of gravitational water vortex power plant

ABSTRACT

Hydropower is a renewable technology to store the amount of electricity which is the least expensive. Gravitational Water Vortex Power Plant is an ultra-low head micro hydropower system working ranging from 0.7 m to 2m without having the needs of a large reservoir and installation area. Several researches have been conducted on its basin configuration, orifice diameter, blade configuration, the geometry of the basin shape but not onto the addition of the diffuser at the inlet channel. The function of the diffuser is to direct the water into the basin allowing the water vortex to travel towards the tangential direction where this phenomenon will increase the rate of speed flow through the turbine. The simulation results showed that the addition of the diffuser has significantly increased the tangential velocity and the kinetic energy of the vortices. The increase in the velocity of the flow increased the height of the vortex which also led to the increase in the strength of the vortex and affects the vortex uniformity.