

## **Experimental study the effects of water pressure and turbine blade lengths & numbers on the model free vortex power generation system**

### **Abstract**

Gravitational water vortex power plant is a green technology that extracts energy from the water vortex. The main advantage of this type power plant is its low hydraulic pressure requirement that makes this technology ideal for installation at areas with river or stream. In order to determine the optimum efficiency of the power plant, a model free vortex power generation system was designed and tested under different water pressure and turbine parameters at Material and Mineral Research Unit laboratories, Faculty of Engineering, University Malaysia Sabah. The experimental result showed that the tangential velocity at the vortex free surface was highest for 0.12m water head and the maximum efficiency about 43% achieved with three blades and 0.027m turbine outer diameter. It was also found that in the model vortex power generation system the maximum hydraulic efficiency was recorded when the turbine rotating speed was half of the vortex tangential velocity. The turbine speed had a very weak relation with hydraulic efficiency