

**DEVELOPMENT OF BATTERY CHARGING SYSTEM USING VORTEX-TYPE
TURBINE FOR LOW HEAD APPLICATION**

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ABSTRACT

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Electricity is one of the most significant energies in human life, especially in the modern world. Although access to power has improve in the Philippines, the country still suffers from energy instability. To meet the rising electricity demand, the country is heavily reliant on coal generation and large scale transmission system. This method has resulted in higher electricity rates, urban and rural disparities in electricity distribution, and a significant environmental impact, while system dependability is jeopardized. To address the demand for an environmentally friendly power source that offers constant power, sustainable energy technology is required. Small hydropower is a viable alternative energy source in various hilly areas across the world. Small hydropower plants consistently generate low-cost and clean energy. This study was carried out using a vortex-type turbine which is designed to harness mechanical energy and convert it to electricity. It is composed of a structural frame, a turbine, a mechanical power transmission system, a generator, and a load board or battery. It works with very small impact on the environment. Here, the flow of water moves the turbine propeller which is coupled with a pulley and generator via shaft. To harness energy from the flowing water, three series of testing were done. To know the power output of the system, torque and rpm are determined. By testing the system using

water flowing on a canal and dragging the blades with the discharged water and determining the height of water rotational speed can be achieved to power up the load. It was found that the development of a battery charging system using vortex type turbine with 5 blades, a transmission system that consists of a pulley with a diameter of 305 mm, 889 mm, 254 mm, and 64 mm produced an efficiency of 91.16 %. As a result, power output that can charge and power the load is achieved and produces 13 volts for no load connected and 14 volts that can be used to charge a battery. This study has the potential of charging a battery for low head irrigation and source of water.

Keywords: Vortex-type Turbine, Micro-hydropower, Turbine Blade

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