DESIGN AND CONSTRUCTION OF A PORTABLE MICROHYDRO POWER PLANT PROTOTYPE USING ARCHIMEDES SCREW TURBINE

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ABSTRACT

Micro-hydro or what is meant by Micro-hydro Power Plant (PLTMH) is a small-scale power plant that uses hydropower as its driving force such as irrigation channels, rivers, or natural waterfalls by utilizing the head and the amount of water discharge. This research begins by determining the formulation of the problem and research objectives based on the facts and existing problems. Furthermore, a literature study is carried out to study some of the existing references, the next stage is to design hardware which includes the model or design of the tool that will be examined and the mechanical design of the tool that will be made using the SketchUp application. For the manufacture of hardware from tools that have been previously designed, it is done by assembling the tools and materials that have been prepared. After the tool has been assembled, the next stage is to test the entire tool to assess whether the tool can work well or not. The test aims to determine how much water discharge, voltage, current and RPM (revolution per minute) from the generator. The design of the Prototype of a Portable Microhydro Power Plant Using the Archimedes Screw Turbine consists of several main components, namely the Archimedes Screw turbine, the PLTMH frame, gear, chain, generator, and bearing. Based on the test results, the battery charging with the highest water discharge value is 219 L/s, 1.5 ampere current, and 12.4 volt voltage, getting the battery charging time for 2 hours 10 minutes with a battery capacity of 12.7 Volt 3.5 Ah.

Keywords*: MHP, Generator, Turbine, Voltage, Current*