INVESTIGATION ON THE EFFECT OF DRIVE TRAIN SYSTEM FOR ARCHIMEDES SCREW TURBINE

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Abstract

Nowadays, the Archimedes screw turbine has become one of alternative in generating electricity. It is low in terms of cost and sourceful as the Earth is covered more than 70% of water. The objective of this study is to investigate the effect of the drive train system that may influence, power generated from the Archimedes screw turbine. This paper focused on studying the relationship between drive train system and rotational speed. An experiment was conducted with two different types of drive train system to compare the rotational speed of the turbine at the same flow rate range from 0.012 m³/s to 0.016 m³/s (diameter of driver Pulley A is 102mm and diameter of driver Pulley B is 150mm). By increasing the diameter of the driver pulley up to 150mm, the maximum power generated of 0.444 Watts at low rotational per minutes (RPM) of 70. In conclusion, increase the diameter of driver pulley requires low RPM to produce maximum power output.

Keywords: Archimedes screw turbine; rotational speed; experimental study

1.0 INTRODUCTION

Recently, renewable energy has become a major concerned due to the growing of fossil fuels demand which is estimated to decline by 2020 [1, 2]. Several types of renewable energy that are commonly are wind, wave, solar and hydro energy. Hydro energy is currently demanding in developing countries as it is environmentally safe. The energy is not depleted throughout time. In general, hydropower plants can be classified into a numerous category, such as large, small, mini, micro and Pico which can contribute more than 100kW, 500 to 1000kW, 100 to 500kW, 5-100kW and 100W to 5kW respectively [3-5]. The Archimedes screw turbine is one of the potential selections due to its maintenance costs, environmentally friendly and good efficiency for high flow rates and low head [6, 7]. This Archimedes turbine is classified as reaction turbine as the ratio of static pressure drop across the rotor to the static pressure drop across the turbine state [8, 9]. The primary features of the Archimedes screw...