UNIVERSITI TEKNIKAL MALAYSIA MELAKA

DEVELOPMENT OF SCIENCE PROJECT FOR SEKOLAH PADANG TEMU

This report is submitted in accordance with the requirement of the Universiti Teknikal Malaysia Melaka (UTeM) for the Bachelor of Electronics Engineering Technology (Industrial Electronics) with Honours.

by

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I hereby, declared this report entitled DEVELOPMENT OF SCIENCE PROJECT FOR SEKOLAH PADANG TEMU is the results of my own research except as cited in references.

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Author : ZULFANIZAM BIN ABDUL WAHAB

Date: 13 DECEMBER 2019

APPROVAL

This report is submitted to the Faculty of Mechanical and Manufacturing Engineering Technology of Universiti Teknikal Malaysia Melaka (UTeM) as a partial fulfilment of the requirements for the degree of Bachelor of Electronic Engineering Technology (Industrial Electronics) with Honours. The member of the supervisory is as follow:

Signature: …….

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ABSTRAK

Hydroelectric is one of the renewable sources of clean energy with no environmental pollution. In addition, the report aims to show students how hydroelectricity works so that they can better understand the concept of electricity generation. In addition, this study shows how to prevent water wastage and optimize electricity consumption. The approaches or analytical methods used in this study are data analysis, simulation and experiment. This project uses 'Proteus software' to simulate and create circuits.

ABSTRACT

Hidroelektrik adalah salah satu sumber tenaga bersih yang boleh diperbaharui yang tidak mempunyai masalah pencemaran alam sekitar. Selain itu, laporan ini bertujuan untuk meunjukkan kepada pelajar cara hidroelektrik berfungsi supaya mereka lebih memahami akan konsep terhasilnya tenaga elektrik. Di samping itu, dalam kajian ini menunjukkan cara untuk mengelakkan pembaziran air dan mengoptimumkan penggunaan elektrik. Pendekatan atau kaedah analisi yang digunakan dalam kajian ini adalah data analisis, simulasi dan experiment. Projek ini menggunakan 'Proteus software' untuk simulasi dan membuat litar.

DEDICATION

To my beloved parents for their faith, time and effort in me, Abdul Wahab bin Senik and Hafsah Binti Awang. To my brother and sister in particular, for their support and motivations, to all my friends.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

CHAPTER 1

INTRODUCTION

1.0 Introduction

This idea project is about producing electricity with nonstop reusing of water with minimum least water loss. Next, hydroelectric power is an eco-friendly and one of the clean renewable energy sources that is not harmful to the environment. This project will be useful because it can generate electricity with by using minimum water, because nowadays the hydroelectric generate water by using water flow without sparing the water. Other than that, on the off chance this idea wound up conceivable, the electric generation can be useful and can reduce cost of water waste. Hydropower has been utilized in numerous ways over the ages and installing small hydro power can build generation of electric power(Adegboyega, 2015)

Hydroelectric will be produce by the water from high place heading for turbine and will generate electricity(Agrawal, Sharma, & Yadav, 2015). Then at this point the motor will pump water again the similar water to the reservoir. This will shape a turn cycle of water in which there will be no space for water to stream out. This is why the water won't be wasted.

This project will help student to have a better understanding of eco-school and know how the operation water turbine. Other than that, water turbine is a machine that will rotate to converts kinetics and potential energy of water to

electrical energy. Then, the water will flow for the turbine blade to create a force on the blade to make the turbine start spinning.

1.1 Problem Statement

Nowadays with the advancement of technology in electrical generation, school student is still having difficulty understanding the concept of electrical generation. This is due to there is no small scale electricity generation model available in the market. Furthermore, there is no science corner in Sekolah Padang Temu. Then, the mini hydroelectric is made to solve this problems.

1.2 Objectives

- To show the students who have difficulty understanding the concept of electricity generation
- To create a small-scale electric generating model in the market
- To create a science corner in Sekolah Padang Temu

1.3 SCOPE

The project scope is to develop a science project in Sekolah Padang Temu. Then, by using the existing fish pond will create a small scale electric generation. The small scale electric generation model need a water flow, water pump, water turbine and battery. The Dc supply will be used to energize the water pump. Then, water will flow through pipe to the water pump and goes to

the water turbine and the electric that is produce will charge the battery. Next, the water will flow back into the fish pond to minimize the water loss and the process will be repeated.

Then, the problem statement for the outcome of this project is:

- To ensure the student understand the fundamental of electric by creating this small scale electric generation.
- Design a small scale electric generation that is suitable to be used for a fish pond size Length x Width is (5m x 2m).
- Minimize the water losses, by using the recycle water from the fish pond.

CHAPTER 2

LITERATURE REVIEW

2.0 INTRODUCTION

This section is about the previous paper that related to this project that was created before this by other researcher that is related to hydroelectric generation. Next, in this chapter will compare the methods, results, equipment, and information in the previous study that will be used to develop this project.

The hydroelectric plants work by change the kinetic energy from water falling into electric energy. This is accomplished from water guiding to turbine, and applying the rotation progress to exchange and transfer energy through a shaft to an electric generator.(HASSIN & A, 2015)

Next, little/smaller scale/nano hydropower has pulled in much attentation for current years for the most part in light of reduction of development place for wide scale plants and ecological preservation.(Toshihiko Ikedaa, Shouichiro Iiob, n.d.)

2.1 RELATED WORKS

2.1.1 MODELLING OF MICRO HYDROELECTRIC SYSTEM DESIGN

Nowadays small scale hydropower system is one of the popular sustainable power source in the countries that evolving. Hydropower turbines are separate into two, which are impulse and reaction turbines, each appropriate for

various sorts of water streams and heads.(Elbatran, Yaakob, Ahmed, & Shabara, 2015)

The design of micro hydro generation as energy resources usually serve for a local load and not require for high voltage transmission lines crossing through rural and urban landscapes are chosen due to it low cost of investment for transmission line.(Azliza & Ibrahim, 2012)

2.1.2 Design of Pump as Turbine Experimental Test Facility

This paper suggested the planning of the pump test facility as a turbine hydropower system. Three design possibilities that related to the PAT condition of operation was developed and analyzed by using CFD Software and it is found that the First Variant with a straight flow to the PAT will produce higher velocity, which is needed to generate more rotation of the shaft generator, in order to generate more electric power.(Zariatin, Rhakasywi, Ade, & Setyo, 2017)

2.1.3 Hydroelectricity Generation by the Recycling of Water

As of late the worldwide is eager for more energy persistently which brought additional weight to both sustainable and non-sustainable energy resources.

The primary intention of this idea is to create electricity from water with hydraulic turbine and hydraulic ram pump (hydram) and

primarily gravity, in which turbine will turn with hammering of water on row of blades, and hydraulic ram pump can quicken the water pressure, while not utilizing any electrical or mechanical energy.(Agrawal et al., 2015)

2.1.4 Initial Study of Prototype Pico Hydro Turbine Based on Galvanized Pipe

(Arifin, Wibowo, Pradana, & Lestari, n.d.) Proposed this titled by Design and Construction of Galvanized pipe as Pico Hydro Turbine because one of the abundant natural resources in Indonesia are water. Pico Hydro primarily utilize the height (h) falling water and amount of water flow (q) per second coming from streams, waterfalls, water burst by machinery and irrigation channels. The innovation of this project is to develop a Pico hydro turbine-based galvanized pipe mounted on the blades of the waterwheel.

2.1.5 Waterfall Power Generation System

In a developing country generating of power are necessity for the demand usage in recent situation. Next, this paper idea is to create power for local use equipment's, and is to make hydropower plant to produce energy with the natural resource of waterfall by using the hydraulic energy made by the waterfall it is possible to create power that can fulfill demands.(Dutta, Arun, Karthik, & Ramkumar, n.d.)