



**UNIVERSITI TEKNIKAL MALAYSIA MELAKA**

**PORTABLE ABLUTION MACHINE WITH SOLAR SYSTEM**

This report submitted in accordance with requirement of the Universiti Teknikal Malaysia Melaka (UTeM) for the Bachelor Degree in Engineering Technology Electronic (Industrial Electronic) with Hons.

by

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**BORANG PENGESAHAN STATUS LAPORAN PROJEK SARJANA MUDA**

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## **APPROVAL**

This report is submitted to the Faculty of Engineering Technology of UTeM as a partial fulfillment of the requirements for the degree of Bachelor of Engineering Technology Electronics (Industrial Electronic) with Hons. The member of the supervisory is as follow:

.....

(Khairul Azha Bin A Aziz)

## ABSTRAK

Setiap hari umat Islam menunaikan solat lima waktu dan biasanya mereka akan menggunakan enam hingga sembilan liter air semasa mengambil wuduk. Mesin wuduk mudah alih dengan sistem solar membolehkan penjimatan air setiap kali mereka berwuduk. Mesin ini mengawal aliran air semasa berwuduk. Objektif projek ini adalah untuk mereka bentuk mesin wuduk mudah alih yang menggunakan panel solar sebagai sumber kuasa dan untuk mereka bentuk satu sistem yang boleh mengurangkan pembaziran air semasa berwuduk atau lain-lain . Mikropengawal PIC16F877A akan digunakan sebagai pengawal untuk mengawal injap 12V solenoid. Injap 12V solenoid akan mengawal aliran air apabila penderia mengesan tangan pengguna . Penderia yang akan digunakan untuk mengesan tangan pengguna adalah penderia inframerah. Tambahan pula , panel solar akan digunakan untuk bekalan kuasa dan sokongan dengan 12V asid plumbum bateri pada waktu malam. Kedua-dua bekalan kuasa ini adalah kawalan oleh pengawal pengecas bateri. Kod untuk projek ini akan ditulis menggunakan bahasa C dalam perisian MPLAB untuk penyusun PIC . Keputusan dan analisis projek ini akan menerangkan dalam laporan ini.

## **ABSTRACT**

Everyday Muslims need to prepare for their five daily prayers and usually they will use six to nine liters of water during ablution. Portable ablution machine with solar system would save water every time they perform their ablution. This system will control the flow of water during the ablution ritual. The objective of this project is to design a portable ablution machine that use solar panel as power source and to design a system that can minimize the waste of the water when performing ablution or other. PIC16F877A microcontroller will be used as controller to control the 12V Solenoid Valve. The 12V Solenoid Valve will control the flow of the water when sensor detect the user hand. The sensor that will be used to detect user hand is infrared sensor. Furthermore, solar panel will be used for power supply and support by 12V lead acid battery during night. Both of this power supply are control by battery charger controller. The program is written using C language in MPLAB software for PIC compiler and the result and analysis of this project will be described in this report.

## **DEDICATION**

To my beloved family members, lecturers, friends and my supervisor  
Mr. Khairul Azha bin A.Aziz



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# TABLE OF CONTENT

|  |          |
|--|----------|
| Abstrak  | i        |
| Abstract   | ii       |
| Dedication   | iii      |
| Acknowledgement  | iv       |
| Table of Content   | v        |
| List of Tables   | viii     |
| List of Figures  | x        |
| List of Abbreviations, symbols and nomenclature                        | xiii     |
| <b>CHAPTER 1: INTRODUCTION</b>   | <b>1</b> |
| 1.1 Project Background   | 1        |
| 1.2 Problem Statement  | 3        |
| 1.3 Research Objectives  | 3        |
| 1.4 Project Scope  | 3        |
| 1.5 Project Significant  | 4        |
| 1.6 Conclusion / Summary   | 4        |
| <b>CHAPTER 2: LITERATURE REVIEW</b>                                    | <b>5</b> |
| 2.1 A Behaviour on Ablution Ritual among Muslim in Malaysia            | 5        |
| 2.2 Sustainability of Water Conservation Gadgets for Modern Styled Era | 6        |
| 2.2.1 Tap Flow Regulators  | 7        |
| 2.2.2 Aerators   | 7        |
| 2.2.3 Auto Taps  | 8        |
| 2.3 Automatic Ablution Machine   | 8        |
| 2.3.1 Auto Wudu' Washers (AWWs)  | 9        |
| 2.3.2 Automatic Ablution Machine Using Vision Sensor                   | 10       |
| 2.4 Solar Renewable and Clean Energy                                   | 11       |
| 2.4.1 Solar Technology in Malaysia                                     | 12       |
| 2.4.2 Photovoltaic (PV) system   | 12       |

|   |  |           |
|---|--|-----------|
| 2.5                                     | Basic Operation Principles of Infrared   | 13        |
| 2.7                                     | Conclusion/Summary   | 14        |
| <b>CHAPTER 3: METHODOLOGY</b>           |  | <b>15</b> |
| 3.1                                     | Hardware Development   | 17        |
| 3.1.1                                   | PIC Microcontroller PIC16F877A   | 17        |
| 3.1.2                                   | Digital Infrared Sensor  | 18        |
| 3.1.3                                   | 12 Volt Solenoid Controlled Fluid Valve  | 20        |
| 3.1.4                                   | Photovoltaic Solar Panel   | 20        |
| 3.1.5                                   | Solar Charger Controller   | 20        |
| 3.2                                     | Software   | 21        |
| 3.2.1                                   | Programming Design   | 22        |
| 3.3                                     | Circuit Implementation   | 24        |
| 3.3.1                                   | Circuit Design   | 26        |
| 3.4                                     | Printed Circuit Board (PCB) Development  | 29        |
| 3.5                                     | Prototype Development  | 33        |
| 3.6                                     | Project Planning   | 35        |
| 3.7                                     | Conclusion   | 36        |
| <b>CHAPTER 4: RESULT AND DISCUSSION</b> |  | <b>37</b> |
| 4.1                                     | Overall System Function  | 37        |
| 4.2                                     | Battery Charging Analysis  | 40        |
| 4.2.1                                   | Charging from 8AM until 11AM   | 41        |
| 4.2.2                                   | Charging from 11AM until 1PM   | 43        |
| 4.2.3                                   | Charging from 2.30PM until 4PM   | 45        |
| 4.3                                     | Water Consumption Analysis   | 46        |
| 4.3.1                                   | Water consumption for normal water tap (Manual) and portable<br>ablution machine (Automatic) with three different speeds                                 | 47        |
| 4.3.2                                   | Comparison average and total water consumption between Manual<br>and Automatic method  | 52        |
| 4.4                                     | Water consumption for 5 prayer time in 1day using normal water tap<br>(Manual) and portable ablution machine ( Automatic) with three different<br>speeds | 54        |

|  |   |           |
|--|---|-----------|
| 4.4.1  | Comparison of average and total water consumption for 5 prayer time between Manual and Automatic method | 57        |
| 4.5  | Duration of battery durability analysis   | 59        |
| 4.6  | Discussion  | 60        |
| <b>CHAPTER 5: CONCLUSION AND FUTURE WORK</b> |   | <b>65</b> |
| 5.1  | Conclusion  | 65        |
| 5.2  | Future Work   | 66        |
| <b>REFERENCES</b>                            |   | <b>67</b> |
| <b>APPENDICES</b>                            |   |           |
| A  | Full Program  |           |
| B  | Full View of Prototype  |           |
| C  | Gant Chart  |           |

## LIST OF TABLES

|      |  |    |
|------|--|----|
| 3.1  | Configuration relationships between solar panel and batteries                            | 20 |
| 4.1  | Charging data for 8AM until 11AM   | 42 |
| 4.2  | Charging data for 11AM until 1PM   | 44 |
| 4.3  | Charging data for 2.30AM to 4PM  | 45 |
| 4.4  | Water consumption for each person with 3 different speeds(Manual)                        | 48 |
| 4.5  | Total water consumption for 10 persons with3 different speeds(Manual)                    | 49 |
| 4.6  | Average water consumption for10 persons with 3 different speeds (Manual)                 | 49 |
| 4.7  | Water consumption for each person 3 different speeds (Automatic)                         | 50 |
| 4.8  | Total water consumption for 10 persons with 3 different speeds (Automatic)               | 51 |
| 4.9  | Average water consumption for 10 persons with 3 different speeds (Automatic)             | 52 |
| 4.10 | Comparison of average water consumption between Manual and Automatic for 10 persons      | 53 |
| 4.11 | Comparison of total water consumption between manual and automatic for 10 persons        | 53 |
| 4.12 | Water consumption for each person in 5 prayer time with 3 different speeds (Manual).     | 55 |
| 4.13 | Water consumption for each persons in 5 prayer times with 3 different speeds (Automatic) | 56 |

|      |  |    |
|------|--|----|
| 4.14 | Comparison of average water consumption between manual and automatic in 5 prayer time for 10 persons with 3 speeds results | 57 |
| 4.15 | Comparison of total water consumption between manual and automatic in 5 prayer time for 10 persons with 3 speeds           | 58 |
| 4.16 | Battery durability analysis result   | 60 |

## LIST OF FIGURES

|      |   |    |
|------|---|----|
| 2.1  | Tap Flow Regulators   | 7  |
| 2.2  | Auto Taps   | 8  |
| 2.3  | Auto Wudu' Washers  | 9  |
| 2.4  | Prototype of Automatic Ablution Machine using Vision Sensor | 10 |
| 2.5  | Graphical User Interface (GUI)                              | 11 |
| 2.6  | Depiction of the operation                                  | 13 |
|      |   |    |
| 3.1  | Flowcharts of the project                                   | 16 |
| 3.2  | PIC Microcontroller   | 18 |
| 3.3  | Preset to adjust distance                                   | 18 |
| 3.4  | Internal view of Solenoid Valve                             | 19 |
| 3.5  | Solar Charger Controllers                                   | 21 |
| 3.6  | System Flowchart  | 22 |
| 3.7  | Header File   | 23 |
| 3.8  | TRIS register settings                                      | 23 |
| 3.9  | Main Program  | 24 |
| 3.10 | Circuit implementation flowchart                            | 25 |
| 3.11 | PIC16F877A basic circuit                                    | 26 |
| 3.12 | Relay basic circuit   | 27 |
| 3.13 | Place components window                                     | 27 |
| 3.14 | Proteus ISIS circuit design                                 | 28 |
| 3.15 | Load program window   | 29 |
| 3.16 | PCB circuit design  | 30 |
| 3.17 | Expose process  | 30 |
| 3.18 | Development process   | 31 |
| 3.19 | Circuit after etching process                               | 32 |
| 3.20 | Drilling process  | 32 |
| 3.21 | Circuit placed on box                                       | 33 |

|      |   |    |
|------|---|----|
| 3.22 | AutoCAD design  | 34 |
| 3.23 | Piping installation   | 34 |
| 3.24 | Complete prototype  | 35 |
|      |   |    |
| 4.1  | Overall system block diagram  | 37 |
| 4.2  | Hand place below the sensor   | 38 |
| 4.3  | Program to check the sensor signal  | 38 |
| 4.4  | The water flow when user hand is detected   | 39 |
| 4.5  | User perform ablution   | 40 |
| 4.6  | Performing battery charging analysis  | 41 |
| 4.7  | Charging voltage 8AM to 11AM  | 43 |
| 4.8  | Charging voltage 11AM to 1PM  | 44 |
| 4.9  | Charging voltage 2.30PM to 4PM  | 46 |
| 4.10 | Measurement instrument  | 47 |
| 4.11 | Water consumption for each person with 3 different speeds<br>(manual)   | 48 |
| 4.12 | Total and average water consumption for 10 persons (manual)   | 50 |
| 4.13 | Water consumption for each person with 3 different speeds<br>(automatic)  | 51 |
| 4.14 | Total and average water consumption for 10 persons (automatic)  | 52 |
| 4.15 | Comparison of average water consumption between manual and<br>automatic for 10 persons with 3 speeds                  | 53 |
| 4.16 | Comparison of total water consumption between manual and<br>automatic for 10 persons with 3 speeds                    | 54 |
| 4.17 | Water consumption for each person in 5 prayer time with 3<br>different speeds (manual)                                | 55 |
| 4.18 | Water consumption for each person in 5 prayer time with 3<br>different speeds (automatic)                             | 56 |
| 4.19 | Comparison of average water consumption between manual and<br>automatic in 5 prayer time for 10 persons with 3 speeds | 57 |



|      |   |    |
|------|---|----|
| 4.20 | Comparison of total water consumption between manual and automatic in 5 prayer for 10 persons with 3 speeds | 58 |
| 4.21 | Hand is place below the sensor  | 60 |
| 4.22 | Melaka rate water   | 62 |

## **LIST OF ABBREVIATIONS, SYMBOLS AND NOMENCLATURE**

|        |  |
|--------|--|
| ADC    | Analog Digital Converter                 |
| AWWs   | Auto Wudu' Wahsers                       |
| CPU    | Computer Processing Unit                 |
| GUI    | Graphical User Interface                 |
| IR     | Infra-Red                                |
| I/O    | Input/Output                             |
| LED    | Light Emitting Diode                     |
| MSSAAS | Masjid Sultan Salahuddin Abdul Aziz Shah |
| PBUH   | Prophet Muhammad Peace Be upon Him       |
| PC     | Personal Computer                        |
| PCB    | Printed Circuit Board                    |
| PV     | Photo Voltaic                            |
| PIC    | Programmable Integrated Circuit          |
| RAM    | Random Access Memory                     |
| RE     | Renewable Energy                         |
| ROM    | Read Only Memory                         |
| SFRs   | Special Function Register                |
| UV     | Ultra Violet                             |
| V      | Volt                                     |

# CHAPTER 1

## INTRODUCTION

Everyday Muslims need to prepare for their 5 daily prayers and usually Muslim will use six to nine liters of water during ablution. During the ablution, the user did not realize that they waste a lot of water at the time they change the step of ablution. This project could be eco-friendly machine that can help people too save the natural resources. The background, objectives, problem statement and scopes of the project will be discussed in this chapter.

### 1.1 Project background

In Islam ablution (called wudhu) is a ritual washing which is a compulsory activities for Muslim to ensure cleanliness before the Muslim perform prayer and it has been recorded in the Holy Books of Quran. As claimed by Al Bukhari, Prophet Muhammad Peace Be upon Him (PBUH) said “cleanliness is half of faith”. Every Muslim must to wear clean clothes and clean before present their self to Allah. The Prophet also said “If there was a river at the door of anyone of you and he took a bath in it five times a day would you notice any dirt on him?” His companions said, “Not a trace of dirt would be left”. The Prophet added, “That is the example of the five prayers with which Allah blots out evil deeds”. In general, ablution is followed by washing on certain body part and has a rules and manner when performing the ablution. The method of the ablution based on Quran, Sunnah and the Scholars

consensus. Based on research the Malaysian Muslim knowledge on ablution is very basic and not detailed.

Water is something that is so cheap and in Malaysia lots of us take it for granted. According to Maciej Zalewski , a Muslim will use six to nine litres of water during ablution .The increasing of human population increase led to a lack of water supply due to a variety of activities including the activities of the logging that affect the watershed. Rapid development in Malaysia also causes rainwater were not absorbed into the ground instead continue to flow into the river. This has led to the decrease of the quantities groundwater, affecting clean water supplies. Because of that, the need of machine that can make Muslim minimize water consumption when they go to perform wudhu without water spillage and eco-friendly which is can make water conservation to human

“Nothing wrong in using a machine as long as the basic pillars and requirements of ablution are strictly observed in a right and precise way” said Sheikh ‘Abdul- Khaliq Hassan Ash –Shareef, Prominent Egyptian scholar. He stressed that Muslims who use this kind of washers should not forget that they are actually performing a worship act and not a routine act of washing bodily parts. "For example, it has been authentically reported that one's sins are forgiven when the drops of water drip from the organs of the person performing ablution. “This spiritual aspect of ablution and other aspects should be present in one's mind and should in no way be absent.”

This portable ablution machine using IR (Infra-Red) as a sensor to detect the present of user hand when they want perform ablution or other object and the 12V solenoid valve is use as an actuator to control the flow of the water that install before the tap. It means, if there is an object under the tap it will opened the solenoid valve then flow the water or vice versa. The 12V solar panel is used for power supply as to meet the objective as the portable ablution machine. Furthermore, this machine is not just for ablution but it can be implement for every outdoor field or indoor.

## **1.2 Problem Statement**

Malaysian Muslim knowledge on ablution is very basic and not detailed. During the ablution ritual user did not realize they already waste a lot of water than they should use at the time change the step of ablution. Even though out, water is cheap but we cannot easily waste the water because we need to conserve this life-sustaining resource and with increasing the human population and pollution has been expressed as a decline in water resources. So that, this machine will minimize the waste of water resources and suitable for outdoor because use solar system for its power source.

## **1.3 Research Objectives**

- (i) To design a the portable ablution machine that use solar system as power source
- (ii) To design a system that can minimize the waste of the water when performing ablution or other.

## **1.4 Project Scope**

The focus of this project is about to control the flow of water during performing ablution ritual. The PIC16F877A microcontroller will be used as controller to control the 12V Solenoid Valve. The 12V Solenoid Valve will control the flow of the water when sensor is detecting user hand. The sensor that will be used to detect user hand is infrared sensor. Furthermore, solar panel will be used for power supply and support with 12V lead acid battery at night. Both of this power supply is control by battery charger controller. The program is written using C language in MPLab software for PIC compiler.ii). To design a system that can minimize the waste of the water when performing ablution or other.

## **1.5 Project Significant**

This project will reduce the waste of water during ablution ritual. Hence, this will give advantages to the mosque in minimizing the water consumption. Other than that, nowadays the water supplies problem is occur in Malaysia and water supply company need to ration the water supplies. So, this project will focus on controlling the flow of water instead to save the water supplies.

## **1.6 Conclusion / Summary**

This chapter introduce how this project i.e. portable ablution machine with solar system is chosen. In generally, everyday Muslims need to prepare for their 5 daily prayers and usually Muslim will use six to nine litres of water during ablution. During the ablution, user did not realize that they waste a lot of water at the time change the step of ablution. So that, this project will design a portable ablution machine as power source that can make eco-friendly system and this project also will design system that can minimize the waste of water while performing ablution.

## **CHAPTER 2**

### **LITERATURE REVIEW**

In order to make this project successful, some studies and data collection has been done. The information gathered from different sources such as book, articles, journals and internet. This information is useful as a guide when doing the project. These studies information based on major component and the topic related to the project that will be used in the project such as software and hardware.

#### **2.1 A Behaviour on Ablution Ritual Among Muslim in Malaysia**

Ablution is the compulsory for Muslim before they perform prayer to ensure the cleanness and it has been recorded in the Holy Books of Quran. As claimed by Abu Hurairah, Prophet Muhammad Peace Be upon Him (PBUH) mentions that “He will only accept the prayer of a person that has done ablution ritual” .In general the ablution ritual has a manner and few rules to be followed when performing ablution. Washing at four compulsory which face, both of hand, forehead to crown of head and both of feet is the rule and manner in performing ablution. As claimed by Al Bukhari, the proper way to performed ablution is wash the compulsory body for three times as done by Prophet Muhammad Peace Be upon Him (PBUH). According to Nor Haliza J. and et all “A behavior study on ablution ritual among Muslim in Malaysia” article Malaysia Muslim does not have ablution knowledge in detail and their article is to research about the Muslim understanding towards their knowledge

on ablution and propose a tool or system to control the behaviour of Malaysian Muslim on ablution ritual and minimize of the water usage. The research Method that uses thru the survey method and this survey is done at Masjid Sultan Salahuddin Abdul Aziz Shah (MSSAAS) Shah Alam. This survey is to get information about the ablution ritual when Muslim at MSSAAS performs ablution. The respondent is selected randomly from different background and the survey question is covered about human behaviour while performing ablution ritual. The respondent that they pick is between of 20 to 40 years old because to identify how this age area think about ablution behaviour.

After complete their survey the author is state that most Muslim in Malaysia show their understanding of manner and rule in performing ablution but the knowledge on performing ablution is very basic. Mostly respondent sweep water on the compulsory body 1 more than times because Al-Bukhari M said the proper way of ablution ritual is washing the compulsory body for three times as done by the Prophet Muhammad PBUH. According to A.R.A. Besari and et all amount of water about half to 2 liters it enough to apply on the body .The respondent mostly need a system to control their behaviour which is use water more that required when they performed the ablution because human behaviour is sometimes come naturally. In order to reduce water usage while performing ablution the respondent mostly agreed with the suggestion of introducing new system ablution tub design system.

## **2.2 Sustainability of Water Conservation Gadgets for Modern Styled Era**

The decreasing of the water resources is not a simple matter that we cannot be overstated. Furthermore we cannot simply waste the water because we need to keep sustaining this resource for the next generation because water is the most important in our life. Today, consumers change their focus from conventional gadgets of water usage to modern water saving gadgets like flow limiting taps, air