



UNIVERSITI TEKNIKAL MALAYSIA MELAKA

A DEVELOPMENT OF AUTOMATIC WIRE CUTTER
WITH DESIRED LENGTH USING ARDUINO

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

by

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Tajuk: A DEVELOPMENT OF AUTOMATIC WIRE CUTTER WITH DESIRED LENGTH USING ARDUINO

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APPROVAL

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

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ABSTRAK

Dalam projek ini, tumpuan kepada isu-isu yang selalu berlaku di makmal perindustrian dan elektrik yang masih digunakan tenaga manusia untuk memotong wayar. Tujuan membuat projek ini adalah untuk mengurangkan tenaga kerja dan kesilapan apabila mengukur dan memotong wayar. Mesin ini direka untuk mengukur dan memotong wayar dengan tepat walaupun untuk memotong dan mengukur banyak wayar. Di samping itu, kualiti wayar juga dijamin kerana kebanyakan dawai konduktor akan rosak jika ditarik. Dengan mesin pemotong dawai automatik, prosedur itu bermula apabila wayar ditetapkan dalam mesin pemotong wayar automatik. Pada ketika itu, mesin akan memaparkan pada LCD untuk pengguna mengisi jumlah panjang dan bilangan wayar yang diinginkan. Mesin akan membaca input dari maklumat yang diberikan. Mesin akan mengeluarkan wayar di dalam mesin dan anggaran panjang wayar sehingga mencapai panjang diperlukan, pemotong akan memotong dawai dan mengulangi prosedur sehingga jumlah kabel selesai. Projek ini menggunakan Arduino sebagai mikrokontroler, butang tekan sebagai input. Untuk keluaran adalah LCD standard 16x sebagai paparan, motor stepper untuk mengeluarkan wayar dan motor servo bertindak memotong wayar. Daripada projek ini, matlamatnya ialah membina mesin pemotong dawai automatik untuk makmal industri dan juga elektrik.

ABSTRACT

In this project focus on the issues that always happened in industrial and electrical labs which are still used manpower to cut the wire. The purpose of making this project is to reduce the manpower and mistake when measure and cutting the wire. This machine is designed to measure and cut the wire with precisely even though to cut and measure a lot of wire. In addition, the quality of the wires is also guaranteed since most conductor wire will be damaged if pulled. In an automatic wire cutting machine, the procedure begins when the wire is set in the automatics wires cutter machines. At that point, the machines will request to fill in with the push button the length of wire and the amount of wire the needed. The machines will read the input from the information given. The machine will pull out the wire inside the machine and estimation of the length of wire until it achieves the length is required, the cutter will cut the wire and repeat the procedure till the number of wires is accomplished. The project uses Arduino as the microcontroller, push button as the input. For the output are standard 16x LCD as a display, a stepper motor to pull out the wire and servo motor act a cutting the wire. From this project, the goal is to build an automatic wire cutter machines for industrial and also electrical labs.

DEDICATION

I dedicate this project to my parents who always support me until this project finish. I also want to dedicate this project to my supervisor, Mrs. Nurbahirah Binti Norddin because always guide and teach me to develop this project. Then to my friends who always give me the motivation to complete this project.

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CHAPTER 1

INTRODUCTION

1.0 Introduction

This chapter will be explained about a project background, problem statement, project objective, and scope.

1.1 Project Background

Electrical wire is very important to our life. In electrical industry there is huge requirement of wires and its measurement. The heavy wire weight is needed to be measured accurately. The wire measurement and cutting is traditional and human efforts are required for it. The wire is used to allow current to flow from one place to another. Then, to cut the wire their need tool which is wire cutter. Usually, wire cutters used to cut copper, brass, iron, aluminum, and steel wire. Some wire cutters have insulated handles which ensure that you will not get shocked from the wires you're working with.



Figure 1.1: Wire Cutter

This project about on wire cutter but in automatically. To solve this problem in a very efficient way, the system of automation in the industry have to apply. The automation system can solve many problems that happen in the industry, which are

labor problems that save cost, reduces human errors and increases accuracy. Subsequent to reviewing many electrical and electronics industries, these days the industries have introduced mechanization in their system with some extent however for some fundamental procedures which are time-wasting like wire cutting, bundling, and utilize human resources. When these basic processes have been introduced to the project automation then it will be fruitful regarding the company's development and benefits gain as it improves the system in many ways. One such industry discovered in which is need an answer that is proficient, quick and conservative for cutting different lengths of wires which are required for delivering capacitors. So the wire cutting machine has to be market because of cost-effective(Sammed Narendra Patil et al.2017).

In an automatic wire cutting machine, the procedure begins when the wire is set in the automatics wires cutter machines. At that point, the machines will request to fill in with the push button the length of wire and the amount of wire the needed. The machines will read the input from the information given. The machine will pull out the wire inside the machine and estimation of the length of wire until it achieves the length is required, the cutter will cut the wire and repeat the procedure till the number of wires is accomplished.

The crucial part of this project is a controller that functions to control the input and output of the project. Nowadays there are many controllers that available for this kind project such as microcontroller PIC, Arduino, and Rashpberry Pi. All of this type of microcontroller does have the same function basically. They use the same language's level in their programming in order to control the input and output

1.2 Problem Statement

Nowadays, facility issues in any organization, especially organizations such as laboratories and the electricity industry related to wire cuts require labor. The company is using normal method for wire cutting which is using a wire cutter and requires manpower. From this method, the production rate is very low because they have to measure the length of wire for every piece before cutting which also takes more time. It also sometimes wires unequal length when in large quantities.

Then, the machine of wire cutter is big and floor space is needed. In addition, the machine wire cutter is very expensive. The endurance of the wire not really good when the user pulling the wire aggressively causes the wire may be damaged. Therefore, the quality of wires is not guaranteed when consumers use wire in large production.



Figure 1.2: Wire Cutter Machines

1.3 Project Objective

The objective of this project are as follows:

- 1) To develop an automatic wire cutter for facilitating measuring and cutting wire using Arduino.
- 2) To ensure the accuracy and quantity length of the wire are the same as the user need.
- 3) To reduce the wastage of wire when the user using the manual way to measure and cut the wire.

1.4 Scope

The scope of project development includes:

- 1) Design system using Arduino controller with stepper motor, servo motor, keypad and LCD display.
- 2) To help the workers easier to cut the wire and reduce time in the process of installation.
- 3) Develop a machine that will cut the amount of wire needed without any wasted wires.

CHAPTER 2

LITERATURE REVIEW

2.0 Introduction

In this chapter, all the information that can be related for this project is reviewed. It includes an overview of this project and a study the related article or journal found on the internet. The explanation about this project has been taken from the article. Then, the previous project that has been made has also been described more obviously in this chapter. Lastly, the theories of components that will be used also will be covered in this chapter.

2.1 Overview

According to International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering, written by Sawant OT and Patil MS (2017), In a growing small scale industry, labor is now a noteworthy problem. Numerous circumstances happen that laborers strike for their own advantages that result in reduced performance and loss of productivity. Accordingly, the owners of the company need to hold up under huge misfortunes and consequently cannot accomplish the benefit and the objectives they need.