POLITEKNIK SULTAN SALAHUDDIN ABDUL AZIZ SHAH

TROLLEY CABLE REVOLVING WITH MAGNETIC

NAME	MATRIC NUMBER
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CIVIL ENGINEERING DEPARTMENT

JUNE 2019

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This report is submitted to the Department of Civil Engineering in fulfillment of the terms of the award of Diploma in Civil Engineering

CIVIL ENGINEERING DEPARTMENT

SESION JUNE 2019

AKUAN KEASLIAN DAN HAK MILIK

TAJUK : TROLLEY CABLE REVOLVING WITH MAGNETIC

SESI : JUN 2019

1. Kami, **1. NUR HIDAYAH BINTI SULAIMAN**
2. NUR SHAMIMI BINTI AMIR RUDIN
3. MUHAMMAD AIRIEL SYARIMAN BIN SULAIMAN
4. MUHAMMAD AKMAL BIN DFAIZAL ILLAHI

adalah pelajar tahun akhir **Diploma Kejuruteraan Perkhidmatan Bangunan, Jabatan Kejuruteraan Awam, Politeknik Sultan Salahuddin Abdul Aziz Shah,** yang beralamat di **Persiaran Usahawan, Seksyen U1, 40150, Shah Alam, Selangor.**

2. Kami mengakui bahawa TROLLEY CABLE REVOLVING WITH MAGNETIC dan harta intelek yang ada didalamnya adalah hasil karya/ reka cipta asli kami tanpa mengambil atau meniru mana-mana harta intelek daripada pihak lain.

3. Kami bersetuju melepaskan pemilikan harta intelek TROLLEY CABLE REVOLVING WITH MAGNETIC kepada Politeknik Sultan Salahuddin Abdul Aziz Shah bagi memenuhi keperluan untuk penganugerahan **Diploma Perkhidmatan Bangunan** kepada kami.

Diperbuat dan dengan sebenar-benarnya diakui

oleh yang tersebut;

a) NUR HIDAYAH BINTI SULAIMAN
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DFAIZAL ILLAHI)

di Politeknik Sultan Salahuddin Abdul Aziz Shah, pada

Di hadapan saya JAMILAH BINTI HJ ABBAS ……..

(730724-04-5250) (JAMILAH BINTI HJ ABBAS)

sebagai penyelia projek pada tarikh

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ABSTRACT

Today's worker of wiring installation is very difficult to do work on the site due to poor wiring installation. When they do wiring, there are several problems that always occur, such as the issue of fibrous wiring and small component such as scattered nails on the surface of the floor, as well as the use of cables that do not recognized and does not guarantee the safety of users. So, we made Trolley cable revolving with magnetic is designed for workers in wiring installation that have problem when doing wiring. The main purpose our project is to make it easier for wiring workers to work with a wire roller that allows them to pull and roll the wire back. Besides, it designed to make it easy for users to have trolleys to ease the burden of workers and easy to carry everywhere also can collect small components such as nails, screw and so on. This product can be used in polytechnic workshops and in buildings being built. This product describes about the system to installed wiring in the building and how employees installed wiring at the site quicker without no accident or injury. We find that cable installation work is difficult to do for such factors as time, cleanliness, and safety. The selection of this project as it has multi-purpose to facilitate employees in the electrical wiring installation sector can save you time during installation. Additionally, it can also guarantee the atmosphere and clean the site when working.

Keywords : Motor,neodymium manget,steel,aluminium,ferit magnet

ABSTRAK

Pekerja pemasangan pendawaian hari ini sangat sukar untuk melakukan kerja di tapak kerja kerana pemasangan pendawaian yang kurang cekap. Apabila mereka melakukan pendawaian, terdapat beberapa masalah yang selalu berlaku, seperti masalah wayar berserabut dan komponen-komponen kecil seperti paku berselerak di permukaan lantai, serta penggunaan kabel yang tidak diiktiraf dan tidak menjamin keselamatan pengguna. Oleh itu, kami membuat troli penggulung wayar beserta dengan magnet direka untuk pekerja dalam pemasangan pendawaian yang mempunyai masalah semasa melakukan pendawaian. Tujuan utama projek kami adalah untuk memudahkan pekerja pendawaian bekerja dengan penggulung wayar yang membolehkan mereka untuk menarik dan menggulung kembali wayar. Di samping itu, ia direka untuk memudahkan para pengguna mempunyai troli untuk meringankan beban pekerja dan mudah dibawa ke mana-mana dan juga boleh mengutip komponen kecil seperti paku, skru dan sebagainya. Produk ini boleh digunakan dalam bengkel politeknik dan bangunan yang telah dibina. Produk ini menerangkan tentang sistem baharu untuk memasang pendawaian di bangunan dan bagaimana pekerja memasang pendawaian di tapak kerja dengan lebih cepat tanpa sebarang kemalangan atau kecederaan. Kami mendapati kerja pemasangan kabel adalah sukar untuk dilakukan. Faktornya adalah seperti masa, kebersihan, dan keselamatan. Di samping itu, ia juga dapat menjamin suasana dan keadaan yang bersih semasa bekerja. Selain itu, ia juga dapat membantu proses pembersihan bahan-bahan yang dibuat daripada besi, keluli dan sebagainya.

Kata kunci : Motor,magnet neodymium,magnet ferit,keluli,magnet ferit

APPRECIATION

Thanks to divine wishes with His approval we have successfully completed the final project for the Diploma in Building Services Engineering as required for all engineering students. First and foremost, we would like to thank Madam Jamilah Binti Hj Abbas as our supervisor for two semesters for the support and guidance, encouragement, advice and ideas that have been poured out on us. All the knowledge that has been given to us will be used as much as possible in the future when it comes to work. Furthermore, do not forget our team members who have worked hard to produce and produce products from our own work.

In addition, we would like to thank the Faculty of Engineering Services faculty and project coordinators who have provided valuable guidance, helped improve the project and held several briefing sessions with external speakers to share their experiences in project development. The results of the briefing sessions and the sharing of knowledge from the speakers were understandable and to a great extent helped us prepare the report and produce the product successfully.

Finally, we would like to thank our two parents and the entire family for their encouragement, encouragement, and advice to not give up until we make this project a success.

PRODUCT DESCRITION

KEMENTERIAN PENDIDIKAN TINGGI

POLITEKNIK MALAYSIA
SULTAN SALAHUDDIN ABDUL AZIZ SHAH

CIVIL ENGINEERING DEPARTMENT

PRODUCT TITLE : TROLLEY CABLE REVOLCING WITH MAGNETIC

Product View

Description

Trolley cable revolving with magnetic is a product that can roll cable wire using an automatic method. Design of this product is suitable to use in any place both outdoor and indoor because the wheel is suitable for floor or site area. The dimension of the trolley is length (0.46 m/46 cm), width (0.6m/60 cm), height (0.95 m/95cm) and for the drawer under the trolley height is (0.06m/6 cm). The diameter of the cable roller is (0.23 m/23 cm). Trolley cable revolving with magnetic is a product made from, for the trolley body and the drawer material that are used is steel and aluminium plate for the cover. The battery used to turn on the motor is 12V battery. The motor is used to operate and control the cable roller. Moreover the safety features that of this product is, it safe and easy to use even the user does not have any experience in using automatic roller. This product also used to reduce the time for rolling the cable than using a manual method and also to get a neat roll of cable. Lastly, the product also can be used as *mini toolbox* that can put and keep a small components such as screw in the drawer under the trolley.

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CHAPTER 1
INTRODUCTION

1.1 INTRODUCTION

Nowadays, electrical wiring is the most important work for all building. Electrical wiring is an electrical conductor network system for transporting electrical current to the electrical equipment involved. This module is related to the electrical wiring system for building Malaysia. In Malaysia, the electrical wiring system is subject to the regulations set by the Malaysian Energy Commission. When doing electrical wiring works, they need a good focus in order to do the job well and avoid unwanted events such as electrical connection installation incidents that can cause life-threatening such as fires. Since 2002, 914 fires are reported from the circuit electrically poorly installed.

We find that cable installation work is difficult to do for such factor as time, cleanliness, and safety. Therefore, we take the initiative to produce a project that helps wiring contractors to ease their burden in order to make electrical installations well and uninterrupted by the work environment when conducting electrical wiring and can avoid minor accidents such as falling or running fast working.

1.2 BACKGROUND PROJECT

This project is designed for wiring workers when doing electrical wiring work. The most common problem when doing electrical wiring is the problem of fibrous wiring and small component such as scattered nails on the floor surface. Our project is design to make it easier for users to have trolley to ease the burden of workers and easy to carry everywhere. It also can use in polytechnic electrical workshop and in building being built.

1.3 PROBLEM STATEMENT

Usually there are many problems that occur when wiring is installed or when a house, a building or something just completed is certainly electrical wiring works will be done but there is undoubtedly an unpleasant problem like small component such as nails and screws are scattered on the floor during electrical wiring. Besides, it takes a long time to roll up the excess cable after the electrical is completed because some worker in electrical wiring sector they use their hand to roll up the wire.

Additionally, workers' safety less secure due to the work environment being cluttered with faulty cables and it can cause the worker to get injured or fall when doing work. Furthermore, the wiring cables maybe are clogged and do not roll well because rolling using by hand. This source we find from workers working in electrical wiring.

1.4 OBJECTIVES OF THE PROJECT

The objective of this study is to:

i. Assist cleaning process for materials made of iron, steel and so on for labour safety.
ii. It can shorten the time to complete an electrical wiring job.
iii. Ensuring the cleanliness of work environment areas such as cable, nails, screws, and other small components are not fibrous and scattered on the floor.
iv. To prevent the cable from getting stuck, damaged and clumped and get a smooth and orderly cable roll.

1.5 SCOPE OF PROJECT

i. This product is targeted at wiring company and contractors working on electrical wiring at the high building.

ii. Can be targeted at housing or building contractors who handle electrical wiring. iii. This product are also can be used in workshop for student in polytechnic or university.

iv. It makes it easier for wiring workers to do work in high-rise buildings and also high-altitude installations.

v. This project was created for various use areas and various uses in the field of electrical wiring.

1.6 IMPORTANT OF PROJECT

This project is very important and useful for electrical wiring operator contractors. This project is designed for workers working in electrical wiring. It is very important to facilitate and speed up the work process and installation of electrical wiring because it has variety of uses in one tool. Add, to improve sanitary standards at work with the presence of a strong magnet that traps small scattered components. At the same time, it is possible to emphasize the work ethic when working. Lastly, it can produce complex project designs capable of producing multiple functions in one product with tool box, trolley, extension and others.

1.7 MEANING / OPERATION OF THE PROJECT

Trolley: In this project, the trolley shows an object that can withstand the weight of an item or object. It acts as a cable loop on it. Additionally, these trolleys can also move and are easy to carry around.

Cable: A wired cable that has various colours indicates the basic colour of the wiring. Among them are red, blue, and green. It works as a cable used when wiring installation. It aims to facilitate workers in the field of electrical wiring installation sector to make wiring work.

Revolving: revolving shows it is a rolled cylinder. It works to wind up wiring wires either pull or roll the cable. It is intended to be easy to pull the cable and the cable is also not fibrous and easy to recirculate the cable on the cylinder.

Magnetic: magnetic indicates the strong magnet used. This strong magnetic works to attract small components on the floor such as screws, nails, and so on made of iron. It is aimed at safety and hygiene. Among them is, to avoid small injury such as nails. In addition, it maintains the cleanliness of the working environment.

1.8 CHAPTER SUMMARIES

In general, this project can enhance knowledge and experience on ongoing projects. In the process of this project, we are exposed to being more creative, innovative and independent to produce multi-purpose and quality products and can bring progress to our daily life.

In conclusion, what we can summarize in this chapter is that we acquire a wide range of knowledge from various aspects of electrical wiring. We are aware of the various problem faced by the wiring employees through our survey to those employees and also can help employees or wiring worker to ease their work while doing a job. The project we create has a variety of advantages for wiring workers.

CHAPTER 2
LITERATURE REVIEW

2.1 INTRODUCTION

This chapter mainly provides detail description of literature review done regarding the differences, advantages and disadvantages and comparison between the existing trolley cable revolving and magnetic.

In this chapter contains some statements taken from several articles as literature review. This article is a reference and helps in supporting the implementation of this project. There are several subtopic in this chapter is on the designs used for trolley, the materials used to revolving the wire and the efficiency of a motor to spinning or revolving the wire. Most articles are obtained from internet sources.

A trolley cable revolving and magnetic for workers in the electrical wiring installation sector or known as wiremen which designed to ease the work of wiremen to carry and arrange their tools in order. There are various types of trolley cable revolving and magnetic which differ from each other by size, function, portability, cost and durability.

2.1.1 TROLLEY

Trolley is a pulley or truck traveling on an overhead track and serving to support and move a suspended object. It is a grooved metallic wheel or pulley carried on the end of a pole (trolley pole) by an electric car or locomotive, and held in contact with an overhead conductor, usually a suspended wire (trolley wire), from which it collects

the current for the propulsion of the car or locomotive. It is any of various devices for collecting current for such a purpose, as a pantograph, or a bow like structure (bow trolley) sliding along an overhead wire, or a device (underground trolley) for taking current from the underground wire or conductor used by some electric railways.

2.1.2 CABLE REVOLVING

Cable revolving is a wire that revolving or spinning using the motor to move it and it uses a direct current motor. It is a function to restore the condition of the wires without scattering at workplace. In addition, it facilitates and speeds up the work being done.

2.1.3 MAGNET

A magnet is a material or object that produces a magnetic field. This magnetic field is invisible but is responsible for the most notable property of a magnet: a force that pulls on other ferromagnetic materials, such as iron, and attracts or repels other magnets.

2.2 CONCEPTS / THEORIES

CONCEPTS

An idea or interpretation that is extruded from concrete events. Concept also means as a result of project, process or anything outside the language, used by reason to understand other things. Abstract is a universal thing that refers to a category or class of things or events, or relationships. Understanding the concept itself is universal where it is usually applied extensively to every addition.

THEORIES

Opinions based on research and discovery, supported by data and discussions. The theory is also an analysis of the relationship between one fact and the other facts that will be collected and made into data. Theoretical statements are generally only accepted temporarily and are not conclusive definitions.

2.2.1 CONCEPT AND THEORY FOR TROLLEY CABLE REVOLVING WITH MAGNETIC

Trolley Cable Revolving with Magnetic used concept by embracing some products that have been created before this but we have improving the product by producing new products that have more advantage to wiring contractor. Among the product that we want to improve is hand trolley, cable reel, and others. By produce trolley cable revolving with magnetic all the problems that wiring worker faced can be solved.

Hand trolley is a concept that allows users to manoeuvring and relocating goods within working environments is at the core of any vibrant warehouse, store room or workshop. In order to carry out daily routine exercise, our heavy duty Hand Trolley helps to prevent potential injuries to wiring worker and also to ensure damage to goods is minimised. Then it can give users carrying out tasks safely and efficiently.

The concept of regular cable reel similar point in that we used in our product, cable reel makes users work easy because it can save time to rolling and pulling cable. We have been improve this product to make it as automatic cable reel. We just have to the on/off button when we want use it. Cable can look more neat in the cable tray and easy to use it.

Cable reels are used for storage, unwinding, and winding of conductive cable or lifting cable. Electric cable reels have contacts for maintaining live power during winding. Reels are devices around which lengthy, continuous items such as cable, wires, paper, etc., wrapped for transportation or storage. Reels are available as simple storage devices although more advanced styles are self-winding. They are also

available with live connections that allow an item like a hose or electrical cable to be used while still on the reel.

A magnet is a material or object that produces a magnetic field. This magnetic field is invisible but is responsible for the most notable property of a magnet: a force that pulls on other ferromagnetic materials, such as iron, and attracts or repels other magnets.

A DC motor is any of a class rotary electrical machines that converts direct current electrical energy into mechanical energy. The most common types rely on the forces produced by magnetic fields.

By embracing all the components, then Trolley Cable Revolving with Magnetic can be produce. This product can give a lot of advantage to users such as it can make wiring worker easy to complete work. Trolley Cable Revolving with Magnetic can also save time because it runs with automatic by using the motor.

2.3 PREVIOUS RESEARCH

2.3.1 TROLLEY

Trolley is a pulley or truck traveling on an overhead track and serving to support and move a suspended object. It is a grooved metallic wheel or pulley carried on the end of a pole (trolley pole) by an electric car or locomotive, and held in contact with an overhead conductor, usually a suspended wire (trolley wire), from which it collects the current for the propulsion of the car or locomotive

It is any of various devices for collecting current for such a purpose, as a pantograph, or a bow like structure (bow trolley) sliding along an overhead wire, or a device (underground trolley) for taking current from the underground wire or conductor used by some electric railways.

Trolleys are an incredibly practical material handling solution for transporting both light and heavy items. They increase warehouse efficiency by allowing

employees to quickly and efficiently load, transport and locate items. This in turn reduces the operational costs of the warehouse, and contributes towards worker safety. There are various different types of trolleys, all made for carrying out specific tasks.

Some of the most popular types include the platform trolley, cage trolley, tool trolley and the shelf trolley.

2.3.1.1 TYPES OF TROLLEY

i. Platform Trolley

Platform trolleys are arguably the most commonly utilised trolleys of all. They feature a flat platform that's mounted on a 4-wheel chassis and has handles on one or both ends. The weight capacity of platform trolleys varies greatly, and they can either be caged or open. Most heavy-duty platform trolleys are made of quality steel, while the more light-duty models are made of aluminium.

ii. Cage trolley

Cage trolleys are basically platform trolleys that feature meshed walls to prevent items from falling off during transit. Cage trolleys significantly increase worker safety, and they feature departmentalised shelving for better organization. Similarly to platform trolleys, their durability and weight capacity depends on the materials the cage and the platform itself are made from. Steel is the recommended material for both platform and cage, as it's very durable.

iii. Tool Trolley

Tool trolleys are ideal for technicians and maintenance crews that need to store commonly used tools in a convenient, portable place. They're typically small and feature shelving that allows you to store everything in an organised manner. The molded tops provide space for diagnostic equipment, laptop or smart devices, while the smaller molder spaces provide space for small items like fasteners.

iv. Shelf Trolley

Shelf trolleys, as their name implies, are warehouse trolleys with shelving that allows you to carry multiple-sized boxes or items. The shelves are usually slightly sloped to the back, so that you don't have to worry about items falling off during transit. Additionally, three sides of the shelf trolley are surrounded with bars, meaning. There's only one side open for loading.

2.3.1.2 ADVANTAGE OF TROLLEY

1. Unbreakable
2. Sturdy
3. Long lasting
4. Low maintenance
5. Value for money
6. Easy to store
7. Variety of storage
8. Speed of service
9. Easy to locate
10. Strong and reliable

2.3.1.3 BACKGROUND OF THE INVENTION

The present invention relates to a trolley, preferably a collapsible trolley which may be used as a trolley for children and/or shopping.

2.3.1.4 STATE OF THE ART

Many types of trolleys for children, with the possibility of storing luggage Such as shopping goods, are known from prior art. The goods or luggage holder is usually placed behind the back of the seat or under the seat, and consists of a basket or net in a hard or soft material. A problem with such storage baskets is that the goods or luggage must often be removed from the trolley before it can be collapsed. This is impractical when taking the trolley on public transport such as on a bus, tram or train, but also if the trolley is to be placed in the boot of a car. Furthermore, these trolleys are seldom very practical as shopping trolleys or luggage trolleys alone, as the whole trolley must be completely opened including the seat, and may therefore not be manoeuvred and handled with the same degree of ease, as is possible with a simple, conventional two-wheeled hand-trolley.

This is attempted solved by a collapsible trolley in which the luggage holder is simultaneously kept intact. The problem with this solution is that all of the many trolley parts, such as the seat and several rods, with their dimension and weight, are always fastened to the trolley. This reduces the possibilities to collapse the trolley into an effectively reduced size, and it is impracticable to carry all of the parts when the trolley will only be used as a shopping trolley.

Furthermore, the luggage holder is permanently mounted onto the rest of the trolley. It will thus be difficult to take necessary care of the goods which, for example need to stand upright during transport, or which must not be squeezed by other goods, as the trolley cannot necessarily be stored upright with the aforementioned modes of transport.

There is consequently a need for a trolley which may be used both as a children's trolley and/or as a shopping trolley, and which has a simple and lightweight construction, where the necessary units may be simply adapted to the usage by being assembled or disassembled.

2.3.1.5 SHORT DESCRIPTION OF THE INVENTION

The object of the invention is attained by a trolley as defined in the patent claims, which comprises a frame with wheels and at least one handle, characterised in that the frame comprises: one main Supporting rod, equipped with a handle at the upper end and a least one wheel at the lower end; one Sub-Supporting rod, fastened at its upper end to the main Supporting rod between the extreme ends of the main Supporting rod, and equipped with at least one wheel in the lower end; and where the wheels are fastened to the main Supporting rod by one first crosspiece and/or where the wheels are fastened to the Sub-Supporting rod by a second cross piece. The trolley may advantageously comprise one or several detachable and height-controllable modules such as a lug gage holder, a fastening bracket and/or a seat.

2.3.2 MAGNET

2.3.2.1 TYPE OF MAGNET EXIST THE WORLD

Magnets are objects that generate a magnetic field, a force-field that either pulls or repels certain materials, such as nickel and iron. Magnets are solid objects that attract iron or steel. Magnets do this by a phenomenon called magnetism, in which they generate a force that extends into a (magnetic) field (i.e., the area around the magnet). A magnet may have the ability to do this naturally, such as lodestone, or it may *acquire* the ability when combined with other elements (e.g., samarium cobalt).

2.3.2.2 DIFFERENT TYPES OF MAGNET

Not all magnets are composed of the same elements, and thus can be broken down into categories based on their composition and source of magnetism. Permanent magnets are magnets that retain their magnetism once magnetized. Temporary magnets are materials magnets that perform like permanent magnets when in the presence of a magnetic field, but lose magnetism when not in a magnetic field. Electromagnets are wound coils of wire that function as magnets when an electrical

current is passed through. By adjusting the strength and direction of the current, the strength of the magnet is also altered. Below we breakdown the various types of magnet available.

i. Permanent Magnets

There are typically four categories of permanent magnets: neodymium iron boron (NdFeB), samarium cobalt (SmCo), alnico, and ceramic or ferrite magnets.

ii. Neodymium Iron Boron (NdFeB)

This type of magnet is composed of rare earth magnetic material, and has a high coercive force. They have an extremely high energy product range, up to 50 MGOe. Because of this high product energy level, they can usually be manufactured to be small and compact in size. However, NdFeB magnets have low mechanical strength, tend to be brittle, and low corrosion-resistance if left uncoated. If treated with gold, iron, or nickel plating, they can be used in many applications. They are very strong magnets and are difficult to demagnetize.

iii. Samarium Cobalt (SmCo)

Like NdFeB magnets, SmCo magnets are also very strong and difficult to demagnetize. They are also highly oxidation-resistant and temperature resistant, withstanding temperatures up to 300 degrees Celsius. Two different groups of SmCo magnets exist, divided based on their product energy range. The first series (Sm1Co5) has an energy product range of 15-22 MGOe. The second series (Sm2Co17) has a range that falls between 22 and 30 MGOe. However, they can be expensive and have low-mechanical strength.

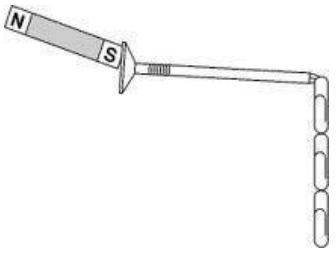
iv. Alnico

Alnico magnets get their name from the first two letters of each of three main ingredients: aluminum, nickel, and cobalt. Although they feature good temperature resistance, they can easily be demagnetized and are sometimes replaced by ceramic and rare earth magnets in certain applications. They can be produced by either sintering or casting, with each process yielding different magnet characteristics. Sintering produces enhanced mechanical traits. Casting results in higher energy products and enables the magnets to achieve more complicated design features.

v. Ceramic or Ferrite

Comprised of sintered iron oxide and barium or strontium carbonate, ceramic or ferrite permanent magnets are typically inexpensive and easily produced, either through sintering or pressing. However, because these magnets tend to be brittle, they require grinding using a diamond wheel. They are one of the most commonly used types of magnet, and are strong and is not easy to demagnetize.

vi. Temporary Magnets



Temporary magnets can vary in composition, as they are essentially any material that behaves like a permanent magnet when in the presence of a magnetic field. Soft iron devices, such as paper clips, are often temporary magnets.

vii. Electromagnets

Electromagnets are made by winding a wire into multiple loops around a core material this formation is known as a solenoid. To magnetize electromagnets, an electrical current is passed through the solenoid to create a magnetic field. The field is strongest on the inside of the coil, and the strength of the field is proportionate to the number of loops and the strength of the current. The electromagnet core material at the centre of the coil (the core of the solenoid) can also affect the strength of an electromagnet. If a wire is wrapped around a nonmagnetic material, such as a piece of

wood, the overall magnetic field will not be very strong. However, if the core is composed of ferromagnetic material, such as iron, the strength of the magnet will dramatically increase. So why is an electromagnet classified as a temporary magnet? Because when the power from the battery ceases, so does the current, and the magnetic field disappears.

2.3.2.3 APPLICATIONS

Within the industrial sector, magnets are often used as magnetic sweepers, sorters, and to separate impure metals during metal manufacturing or recycling. In electronic applications, magnets are used in speakers, televisions, telephones, radios, and videotapes. Typically, electromagnets are used within televisions, computers, and telephones because of their extreme strength. For this same reason, they are also used in on-off applications, such as cranes used for heavy lifting. Permanent magnets are perhaps the most common type they are used to manufacture refrigerator magnets, as well as in jewellery making. Temporary magnets can be useful in applications that generate a temporary magnetic field and require a magnetic response for the duration of the field.

2.3.2.4 MAGNETS IN EXPERIMENS

Permanent magnets are commonly made from ceramic, alnico, and neodymium. Ceramic magnets are strong, and work well for most experiments. Alnico magnets are stronger and more expensive, and work very well for science experiments. Neodymium magnets are the strongest and most expensive of the three.

2.3.3 STEEL

Steel is an alloy of iron and carbon, and sometimes other elements. Because of its high tensile strength and low cost, it is a major component used in buildings, infrastructure, tools, ships, automobiles, machines, appliances, and weapon.

Iron is the base metal of steel. Iron is able to take on two crystalline forms (allotropic forms), body cantered cubic and face cantered cubic, depending on its temperature. In the body-cantered cubic arrangement, there is an iron atom in the centre and eight atoms at the vertices of each cubic unit cell; in the face-cantered cubic, there is one atom at the centre of each of the six faces of the cubic unit cell and eight atoms at its vertices. It is the interaction of the allotropes of iron with the alloying elements, primarily carbon that gives steel and cast iron their range of unique properties.

In pure iron, the crystal structure has relatively little resistance to the iron atoms slipping past one another, and so pure iron is quite ductile, or soft and easily formed. In steel, small amounts of carbon, other elements, and inclusions within the iron act as hardening agents that prevent the movement of dislocations.

The carbon in typical steel alloys may contribute up to 2.14% of its weight. Varying the amount of carbon and many other alloying elements, as well as controlling their chemical and physical makeup in the final steel (either as solute elements, or as precipitated phases), slows the movement of those dislocations that make pure iron ductile, and thus controls and enhances its qualities. These qualities include the hardness, quenching behaviour, need for annealing, tempering behaviour, yield strength, and tensile strength of the resulting steel. The increase in steel's strength compared to pure iron is possible only by reducing iron's ductility.

Steel was produced in bloomer furnaces for thousands of years, but its largescale, industrial use began only after more efficient production methods were devised in the 17th century, with the introduction of the blast furnace and production of crucible steel. This was followed by the open-hearth furnace and then the Bessemer process in England in the mid-19th century. With the invention of the Bessemer process, a new era of mass-produced steel began. Mild steel replaced wrought iron.

Further refinements in the process, such as basic oxygen steelmaking (BOS), largely replaced earlier methods by further lowering the cost of production and increasing the quality of the final product. Today, steel is one of the most common manmade materials in the world, with more than 1.6 billion tons produced annually.

Modern steel is generally identified by various grades defined by assorted standards organizations.

2.3.3.1 TYPES OF STEEL

i. Carbon Steel

Carbon steel is dull and matte in appearance and is vulnerable to corrosion. Carbon steel can contain other alloys, such as manganese, silicon, and copper. There are three main types of carbon steel: low carbon steel, medium carbon steel, and high carbon steel. Low carbon steel is the most common and typically contains less than .30% of carbon. Medium carbon steel contains up to .60% of carbon as well as manganese and is much stronger than low carbon steel. High carbon steel contains up to 1.5% carbon steel and is the strongest of the categories and can often be hard to work with.

Type of Carbon Steel:

- Mild or low-carbon steel
- High-tensile steel
- Higher-carbon steels

ii. Alloy Steel

Alloy steels are a mixture of several metals, including nickel, copper, and aluminium. Alloy steels tend to be cheaper and are used in mechanical work, car parts, pipelines, and motors. The strength and property of alloy steels depends on the concentration of elements they contain.

Type of Alloy Steel:

- High-Alloy Steel
- Low-Alloy Steel

iii. Stainless Steel

Stainless steels are shiny, corrosion resistant, and used in many products, including home appliances, backsplashes and cooking utensils. It has a low carbon content Stainless steel contains the alloy chromium and can also include nickel or molybdenum. Stainless steel is strong and can withstand high temperatures. There are more than 100 grades of stainless steel, making it an extremely versatile material that is customizable depending on your purpose.

iv. Tool Steel

Tool steels are hard and heat and scrape-resistant. They are named tool steels because they are often used to make metal tools, such as stamping, cutting, and mold making tools. They are also commonly used to make hammers. There are several different grades of steel that can be used for distinct applications.

2.3.3.2 CLASSIFICATIONS

Types of Steel can also be classified by a variety of different factors:

1. Composition: Carbon range, Alloy, Stainless.
2. The production method: Continuous cast, Electric furnace, Etc.
3. Finishing method used: Cold Rolled, Hot Rolled, Cold Drawn (Cold Finished), Etc.
4. Form or shape: Bar, Rod, Tube, Pipe, Plate, Sheet, Structural, Etc.
5. De-oxidation process (oxygen removed from steelmaking process): Killed & Semi-Killed Steel, Etc.
6. Microstructure: Ferritic, Pearlitic, Martensitic, Etc.
7. Physical Strength (Per ASTM Standards).
8. Heat Treatment: Annealed, Quenched & Tempered, Etc.
9. Quality Nomenclature: Commercial Quality, Drawing Quality, Pressure Vessel Quality, Etc.

2.3.3.3 STEEL NUMBERING SYSTEMS

There are two major numbering systems used by the steel industry, the first developed by the American Iron & Steel Institute (AISI), and the second by the Society of Automotive Engineers (SAE). Both of these systems are based on four digit code numbers when identifying the base carbon and alloy steels. There are selections of alloys that have five digit codes instead.

If the first digit is a one (1) in this designation it indicates a carbon steel. All carbon steels are in this group (1xxx) in both the SAE & AISI system. They are also subdivided into four categories due to particular underlying properties among them. See below:

- Plain Carbon Steel is encompassed within the 10xx series (containing 1.00% Mn maximum)
- Re-Sulfurized Carbon steel is encompassed within the 11xx series
- Re -Sulfurized and Re-Phosphorized Carbon Steel is encompassed within the 12xx series
- Non-Re-Sulfurized High-Manganese (up-to 1.65%) carbon steel is encompassed within the 15xx series.

The first digit on all other alloy steels (under the SAE-AISI system), are then classified as follows:

2 = Nickel steels.

3 = Nickel-chromium steels.

4 = Molybdenum steels.

5 = Chromium steels.

6 = Chromium-vanadium steels.

7 = Tungsten-chromium steels.

8 = Nickel-chromium-molybdenum steels

9 = Silicon-manganese steels and various other SAE grades

The second digit of the series (sometimes but not always) indicates the concentration of the major element in percentiles (1 equals 1%).

The last two digits of the series indicate the carbon concentration to 0.01%.

For example: SAE 5130 is a chromium alloy steel containing about 1% of chromium and approximately 0.30% of carbon.

2.3.4 ALUMINUM

Aluminium is corrosion resistant and virtually maintenance free. It has unbeatable strength to weight ratio when compared to other metals, and weighs in at roughly 1/3 as much as iron, steel, copper, or brass. Aluminium plate has heat conductivity better than any other common metal and conducts electricity comparable to copper products.

Aluminium is non-toxic and can be used in food preparation equipment. It is non-combustible (does not burn) and has a reflective nature, making it suitable for light fixtures. Some end uses for all grades of aluminium include transportation, food packaging, furniture, electrical applications, building, construction, machinery and equipment. It is interesting to note that aluminium is the most abundant metal element in Earth's crust and makes up about 8% by weight.

2.3.4.1 TYPES OF ALUMINUM

i. 2024 aluminium plate

2024 aluminium plate is the most widely used aerospace alloy. It has a high yield strength and good fatigue resistance, as well as good machinability and grain

structure. 2024 aluminium plate is great for precision fittings and parts, including aircraft fittings, computer parts, and bolts.

ii. 3003 aluminium plate

3003 aluminium is the most widely used aluminium alloy. It has excellent workability and corrosion resistance, and reacts well to finishing such as laminating or anodizing. It is non-heat treatable. It is typically used for pressure vessels, garage doors, builder's hardware, and more.

iii. 5052 aluminium plate

5052 aluminium is an alloy similar to 3003 aluminium, but with better corrosion resistance and strength. It is typically used for cooking utensils, mail boxes, railings, and more.

iv. 6061 aluminium plate

6061 aluminium plate is the most versatile and widely used of heat treat grades. It has excellent machinability, weld ability and medium strength. (It is less strong when compared to aluminium 2024 and 7075). 6061 aluminium has great welding and brazing abilities due to its high corrosion resistance at all temperatures. Typical applications include pipe fittings and bridge components.

v. 7075 aluminium plate

7075 aluminium is the highest strength aluminium plate that Arlo stocks; it has a strength comparable to many steels. This aluminium grade has a relatively high cost, so it is typically used when cheaper alloys aren't suitable. Typical applications include aircraft fittings, missile parts, bike frames, and more.

vi. Alumold

Alumold aluminium plate is a unique aluminium mold plate that has been

Successfully substituted for P-20 steel in a multitude of mold applications. It has better thermal conductivity, as well as dimensional stability and consistent through thickness hardness qualities. Alumold is most commonly used for thermoplastic injection molds for medium to large series.

vii. Cast Mold Plate

Cast Mold Plate is a cast aluminium mold product characterized by an excellent dimensional stability. It can be used to meet a wide range of mold making applications. Alro stocks both 2000 series cast mold plate and 5000 series cast mold plate.

viii. Cast Aluminium for Tool and Jig Plate

Alro stocks several different brands of Cast Aluminium Tool & Jig Plate. This material is produced from a fine-grain aluminium alloy which is free from internal stresses. It is typically used for assembly jigs and fixtures, rubber and plastic molds, prototypes, and more.

2.3.5 CASTER WHEEL

A caster (or a Castor) is introduced as a device including wheel which usually comes mounted with a larger object. A castor is mostly used for easy rolling movement. You can find one ranging your load capacity. There are casters with heavier and lighter load capacity ranging from 100 lbs. or less to 100 000 lbs. You just need to choose the required one for you. They are also different in size. You will discover them smaller for furniture as well as massive in bigger factories or industrial areas

Casters are a wheeled device installed in a larger object. Casters are important to enable the relatively easy rolling movement.

Though a caster is a smaller device, the mechanism is not as easy as a wheel. A caster contains Mount, swivel head, yoke, spring, wheel, bearings, axle bolt, and nut. They all are required to complete the different mechanism for a caster. Caster

wheel is built with cast iron, plastic, rubber, polyurethane, nylon, rubber, thermoplastic, stainless steel, aluminium and many more.

2.3.5.1 TYPES OF CASTERS

I. Swivel Caster

Swivel caster allows swivelling towards all the directions. It may have a couple of raceways which enable the caster to move around an axis to 360 degrees with loads. It comes with positive caster angle that helps the caster to follow the floor trails at the back of the steering axis.

There are different types of Swivel Casters available in the market. We will introduce you to all other Swivel Casters present in the market.

- Plate Casters
- Hollow Kingpin Casters
- Kingpin-less Casters
- Locking Casters
- Stem Casters

II. Plate Casters: Comfortable with Heavier Industrial Workloads

Plate caster is the most common one available in the industry oriented casters. They are able to carry both the lighter and heavier loads in industry based workloads. Plate casters are mounting to a unit which is commonly looking like a plate. It is also known as the top plate. That is why this type of casters is familiar as plate casters.

They are mostly used in the industrial areas which have load capacities starting from at least 300 pounds. The mounting plates in the plate caster are bolted to the unit with four holes. It also offers different patterns of holes to adjust the numerous categories of mounting necessities. The top plate has added the advantage of carrying heavier weight loads.

III. Hollow Kingpin Casters: Extra Heavy Duty Caster

Kingpin Casters are the traditional swivel casters built with the composition of several pieces. It features a kingpin, a top plate, a lower thrust race, a lower thrust bearing, an upper load race, and an upper load bearing. The kingpin is usually a bolt or rivet which has fastened all the other sections that allow the caster to swivel. The swivel mechanism happens around the kingpin which works like the axis. The

kingpin caster has an adaptable design with a load bearing and a thrust bearing that transmits the load.

But the kingpin design does not come without problems. The kingpin is the main part that holds all other sections together and connects all the elements that have to absorb the whole transmitted load causing strained and stressed over time.

IV. Kingpin-Less Casters: A Caster Without the Kingpin

The kingpin-less casters are much simpler than traditional Kingpin Swivel Casters. Naturally, the design itself eliminates the kingpin requirement. A Kingpinless caster is built with a top plate including a forged inner race and an outer race in which the legs are attached with the ball bearings between two pieces. So the design is much straightforward.

The Kingpin-less casters are also able to carry the heavier loads and removing the kingpin eliminates the problem mentioned above in traditional Kingpin Casters. But it has some other problems. Comparing both the kingpin and the Kingpin-less casters the difference is in their design and the load distribution system. But the kingpin-less casters is the better one with cost competitive market and offers greater impact area.

V. Locking Casters: Experience of Both Swivel and Rigid Casters

Locking caster is the one that enables a caster to lock down reaching a final destination and unlock it again to move around all the directions. It can convert the swivel caster and make this one completely immobile. It comes with an added braking mechanism that prevents the swivel assembly from turning. You can choose the brake types as your requirement or order one which will be suitable for you. There are several brake types available – wheel-brakes, central locking, double locking, add-on buffer brake, or total locking.

VI. Stem Casters: The Light Duty Casters

A Stem Caster is assembled with wheels mounted onto a fork including a stem attached to it. The different stem styles feature various types of stem casters. There are three types of common styles available in the market – The threaded stem, the grip ring stem, and the grip neck system.

- Threaded stems are same as threaded like a bold with a bolt into a receptacle.
- The grip ring stem is a caster that comes with a steel ring which is inserted into a predrilled hole within the wheel.

- The grip neck stem is also like grip ring one including a predrilled hole with wood sockets.

VII. Rigid Casters: The Fixed Casters

A rigid caster is the one which is also familiar as the fixed caster. The rigid caster wheel is mounted in a fork set that has no turning capacity. It only can move forward and backward following a straight line which is unable to steer. But these are effective of the cargo. The rigid casters are stronger than the swivel casters which allow greater weight capacities.

But we have to be careful using rigid casters to line it up correctly in order to ensure a smooth track. The rigid casters feature four in one set that follows the diamond pattern with a larger centre wheel. This mechanism allows it to rotate on the centre wheels.

2.3.5.2 WHEEL MATERIALS

Wheel being the most important and prime component of this rolling mechanism, the construction and materials of it merit special attention. The general rule is that to go for the softer wheels for tougher floor and vice versa. For this reason, you need to have full knowledge of the softer and harder wheel materials. Here you go with two sets of wheels materials and their functions.

2.3.5.3 MATERIALS FOR SOFT WHEEL

i. Ploy II Rubber for wheels of soft thread

ii. Soft Rubber for quite mobility and resistance to chemicals and oil

iii. Thermoplastic Rubber ago between the softer and tougher wheel material.

iv. Glass Coated Nylon highly durable among the soft wheel materials

2.3.5.4 MATERIALS FOR HARD WHEEL

i. Polyolefin most economic and increased impact resistant among the harder wheels

ii. Mold On Polyutherane molded into an aluminium hub to provide with high floor protection and load hauling capacity

iii. Poly II Urethane for added floor safety and high resistance to chemicals and even to acids

iv. Cast Iron most durable and strongest meant mostly for industrial use. Risky if left exposed to water.

2.3.6 MOTOR

Electric motors work by converting electrical energy to mechanical energy in order to create motion. Force is generated within the motor through the interaction between a magnetic field and winding alternating (AC) or direct (DC) current. As the strength of a current increases so does the strength of the magnetic field. Keep Ohm's law (V = I*R) in mind; voltage must increase in order to maintain the same current as resistance increases.

Electric Motors have an array of applications. Conventional industrial uses include blowers, machine and power tools, fans and pumps. Hobbyists generally use

motors in smaller applications requiring movement such as robotics or modules with wheels.

2.3.6.1 TYPES OF MOTOR

- DC motor
- AC motor

I. DC motor

There are many types of DC motors, but the most common are brushed or brushless. There are also vibrating motors, stepper motors, and servo motors.

a. **DC brush motors** are one of the most simple and are found in many appliances, toys, and automobiles. They use contact brushes that connect with a commutator to alter current direction. They are inexpensive to produce and simple to control and have excellent torque at low speeds (measured in revolutions per minute or RPM). A few downsides are that they require constant maintenance to replace worn out brushes, have limited in speed due to brush heating, and can generate electromagnetic noise from brush arcing.

b. **Brushless DC motors** use permanent magnets in their rotor assembly. They are popular in the hobby market for aircraft and ground vehicle applications. They are more efficient, require less maintenance, generate less noise, and have higher power density than brushed DC motors. They can also be mass-produced and resemble an AC motor with a constant RPM, except powered by DC current. There are a few disadvantages however, which include that they are difficult to control without a specialized regulator and they require low starting loads and specialized gearboxes in drive applications causing them to have a higher capital cost, complexity, and environmental limitations.

c. **Vibrating motors** are used for applications requiring vibration such as cell phones or game controllers. They are generated by an electric motor and have an unbalanced mass on the drive shaft which causes the vibration. They can also be used in non-electronic buzzers that vibrate for the purpose of sound or for alarms or door bells.

d. **Stepper motors**. They're found in printers, machine tools, and process control systems and are built for high-holding torque that gives the user the ability to move from one step to the next. They have a controller system that designates the position through signal pulses sent to a driver, which interprets them and sends proportional voltage to the motor. They are relatively simple to make and control, but they draw maximum current constantly. Small step distance limits top speed and steps can be skipped at high loads.

e. **Servo motors** are another popular hobby market motor and are used for position control without precision. Their popular applications include remote control applications like RC toy vehicles and robotics. They consist of a motor, potentiometer, and a control circuit and are mostly controlled through pulse width modulation (PWM), through the sending of electrical pulses to the control wire. Servos can be either AC or DC. AC servos can handle higher current surges and are used for industrial machinery, whereas DC servos are for smaller hobbyist applications.

II. AC motor

There are three basic types of AC motors: induction, synchronous, and industrial. Induction motors are referred to as asynchronous motors, since they do not move at the same constant rate or turn slower than the frequency supplied. Slip, the difference between actual and synchronous speed, is needed to produce torque, the twisting force that causes rotation, in induction motors. The magnetic field that surrounds the rotor of these motors is caused by induced current.

2.3.7 CABLE ROLLER

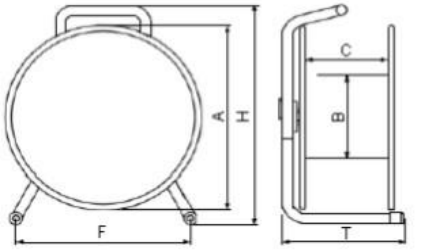
Cable Rollers are designed to ease the procedure of handling and installing cables while on site. Suitable for general cable installation work in trenches, cable rollers are popular when dealing with telecoms, utility and power installations. Created with zinc plating, they are designed for durability and to sustain a reliable performance. Cable rollers ensure an easy installation and there is no better solution to guiding and protecting cables than these cable rollers.

In order to keep the cables in the best condition, cable rollers should always be used when pulling cables but especially in circumstances where the installation area is sharp or abrasive. Cable Rollers also make pulling the cable that much easier as there is less friction between the cable and the surface of the ground.

Cable Rollers are used so that when the cable is being pulled, it runs along the roller and not on the ground. Rollers are available in a range of sizes and can hold a variety of different weights depending on the size of cable. They are also available for applications with inclines and corners. These rollers keep the cable being pulled safe

from any damage the surface may cause and also keep them out of any mud or muck that may be at the bottom of the trench. It is advised to not leave cables lying overnight. Prolonged exposure to the elements during the installation process can cause damage to the cables.

The Cable Rollers that are available from Reid Brothers UK are specifically designed for either Trench or Duct applications. Trench rollers are lightweight, for narrower applications, designed to lay on the ground and protect the cable from the surface. Duct rollers are designed to be placed at the entrance to a duct so the cable is protected from the rim and corner, to ease the cable in and avoid damage.



Dimensions : Millimetres

2.3.8 TYPES OF EXTENSION PLUG

1. **Round Extension Plug**

Extension cords come in various colours, lengths, thicknesses and service duties. In general, the more power needed by the appliance, the thicker the cord needs be (meaning larger wires inside). Cords which will be used outdoors, in wet areas, around oils, or exposed to sunlight for long periods of time should be selected for

such specific conditions. An extension reel is an extension lead that rolls up, usually into the socket end, which in some cases has more than one socket on it (often 2 or 4). Another type of extension reel hangs near the plug end and permits the user to draw the cord out by grasping the socket end.

Some extension cords also incorporate safety features such as a polarized plug and receptacle, grounded terminals, a "power-on" indicator, a fusible link, or even a residual-current device (also known as a ground-fault circuit interrupter or GFCI).

Some cords contain multiple female connectors in close proximity of one another; others have female connectors spaced along the length of the cord. Cords generally contain either grounded or ungrounded connectors. While a grounded male connector can be forced into an ungrounded female socket, this is unsafe.

2. 2/3/4 Gang Extension Plug

A power strip is a block on the end of a power cable with a number of sockets (usually 3 or more), often arranged in a line. This term is also used to refer to the whole unit of a short extension cord terminating in a power strip.

A removable power cord is similar but much shorter, and is designed to connect an appliance to a mains outlet. The female end mates with an appliance inlet.

2.4 CONCLUSION

The purpose of this review was to view the trends in composition studies within the past. Fourty years and see how commentary on student writing has changed and is still changing. It is clear from the research reviewed that evaluative commentary is very immersed and widely practiced throughout composition programs in today's universities. Along with this, it is also clear that the field of

composition studies just in regards to the types of commentary that students receive on their writing is varied and continues to be studied and analyse in order to most benefit composition students and society at large. Corrective vs. evaluative commentary is still being debated, though, and continues to be problematic in the discourse community of college composition and even high school writing as seen in Bardine et al.'s study. This field of inquiry is very important as at its centre is a concern with helping students become better writers. Helping students become better writers and getting students to see the importance in growing as independent writers is also extremely important in our current society with declining school budgets and liberal arts losing popularity and funding.

CHAPTER 3

METHODOLOGY

3.1 INTRODUCTION

In order to implement this “Trolley Cable Revolving with Magnetic product it needs to go through several studies where it is a concept to help and facilitate users. In addition, this product needs to be studied more clearly and in detail by using research methodology and questionnaire conducted in the wiring sector. Will run, need to undergo some kind of test first. The requirement of this test are important in reinforcing the data collected as well as the studies obtained using the right research method.

Next, design a Trolley Cable Revolving, in the flow of design specifications various aspects need to be considered properly the problem statement, identify needs, analysis, evaluation and productions

The methodology can be described and explained in several ways:

1. Analyse the principles and methods adopted.
2. Systemic review of methods that may have been used.
3. A documented process for project managers that contains procedures, definitions, and explanatory techniques used to collect, store, analyse, and present information.

There are several experiments selected for use in identifying the advantages and enhancements to the product.

The selection of this project as it has multi-purpose to facilitate employees in the electrical wiring installation sector can save time during installation. Additionally, it can also guarantee the atmosphere and clean conditions when working.

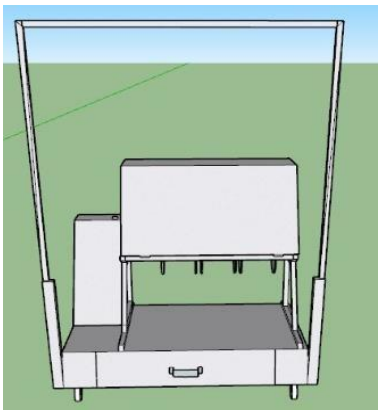
Furthermore, it can also help the cleaning process for materials made of iron, steel and so on. It also can guarantee of workers.

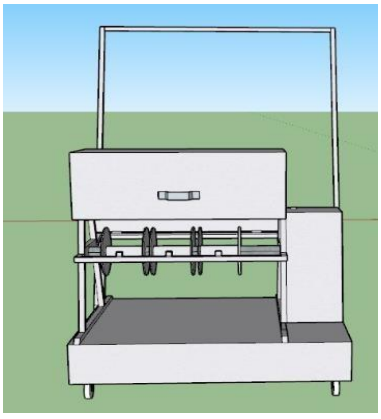
In ensuring the trolley cable revolving with magnetic can work properly, it should be monitored and systematically managed from time to time. With this, the use of trolley cable revolving with magnetic can last longer while saving time can even provide the convenience of wiring contractors and to avoid unwanted light injuries from occurring during their work

This product is also created in accordance with the working environment as well as at the comfort of the employee, more ergonomics. The floor height of the trolley holder is measured at the user's convenience. Hence it is hoped that this innovation product will help the workers in the electrical wiring installation sector.

3.2 RESEARCH DESIGN

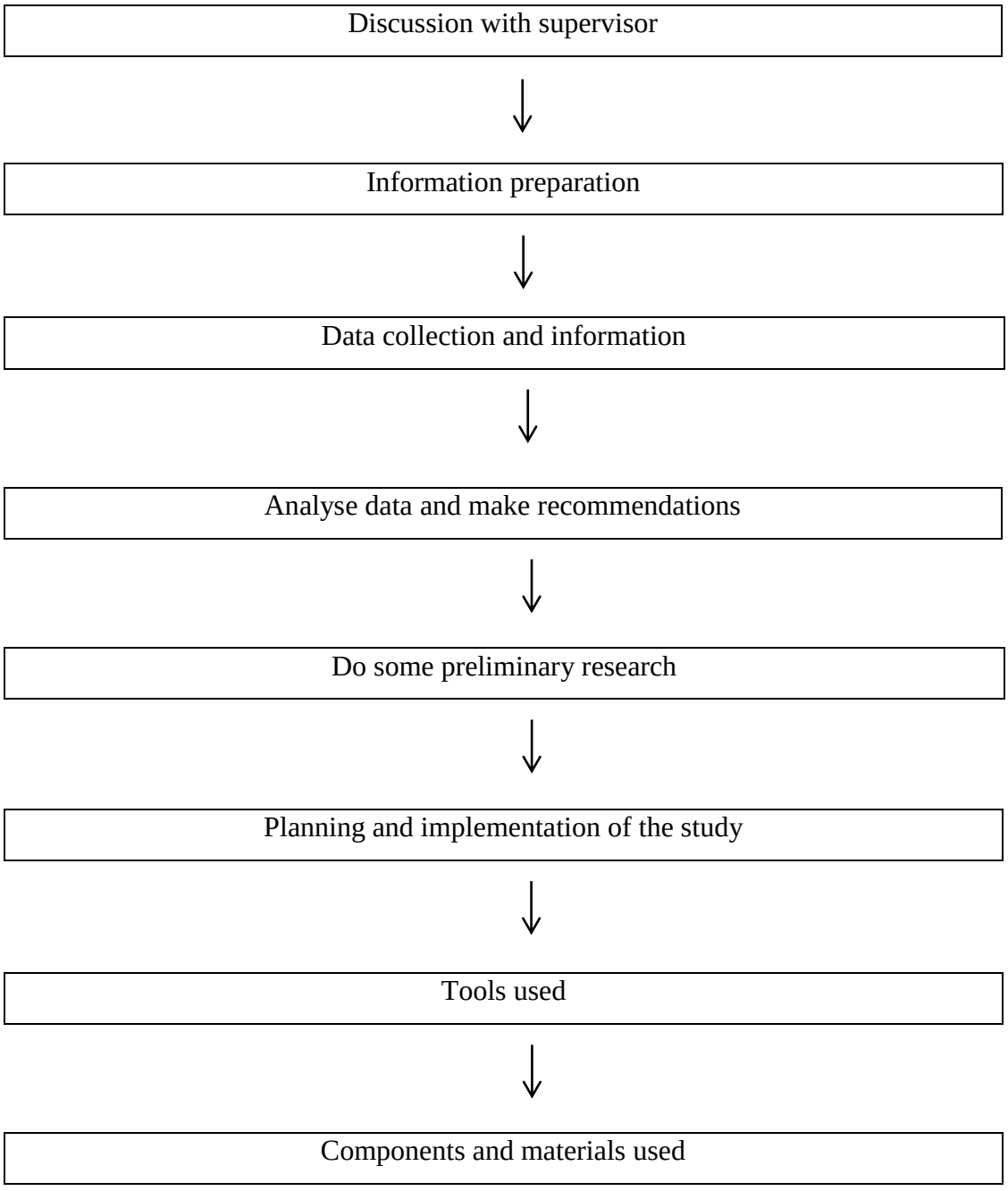
Research consists of several process and component to follow. It is problem identification, data collection prefix, theory framework development, objective development and research question, research design development, data collection and data analysis as well as discussion and conclusions.





3.2.1 METHODOLOGY FLOW CHARTS

There are several steps that need to be taken to complete the Trolley Cable Revolving with Magnetic project. Some of the processes implemented are as follows:



3.2.2 IDENTIFYING PROBLEMS

At the beginning of this study, we identified the problem of fibrous wiring occurred in PSA building service workshops when electrical services were performed. In addition, we have obtained information from several wiring contractors who are conducting electrical wiring, they also experience the same problem as having to rewind the cable which is fibrous in use and takes a long time to roll back and trouble to screw screws and nails scattered on the floor. Then, careful planning is implemented to overcome the problem with their trolley cable revolving with magnetic products.

3.2.3 DESIGN

Design is a plan or drawing produced to show the look and function or workings of a building, garment, or other object before it is made. Before we implemented this project at the workshop, we have rendered this project roughly before draw the full picture. We also take into account the stability, stiffness and neatness of this project in order to attract others if it is marketed. In fact, this design is intended to be prior to execution, it can be described before the project is implemented and even this design will provide more detailed information to produce a more effective product. Design planning is very important because from this process also makes the project appear more obvious in terms of materials to be used as well and also the manufacturing costs.

3.2.4 IMPLEMENTION

When our products have been completed, the trolley cable revolving with magnetizing should be tested at the workshop or for a class that performs electrical services to test whether this product is effective in addressing the stated or unspecified problems.

3.2.5 SYSTEM

When the Trolley Cable Revolving with Magnetic has successfully achieved the desired objectives, the product will be placed in PSAS workshops and for the use of electrical wiring contractors. Problems such as fibre cable can be avoided and can save you time and safe use.

3.3 METHOD OF DATA COLLECTION

In order to carry out this study, a data collection method has been developed to obtain data that is important for the analysis stage. Among the methods of data collection is the quantitative or questionnaire method. Without primary data, the objectives of the study would not have been achieved. The data collection process is done through the distribution of questionnaire to respondents.

The quantitative method was selected for data collection conducted by questionnaire. Questionnaires form are distributed to respondents or several Departments in Shah Alam Polytechnic via Google form method by linking them to them. This can save time of respondents because they do not have to use pen and paper and only answer online only. The data collection period lasts for four months, from January to April 2019.

Secondary data comprises literature studies and other sources such as thesis, books related to study field, local newspapers, journals and other publications related to research conducted. These materials are analysed accordingly and become the basis of reference to this study.

Data analysis method that use for this research are descriptive and reliability analysis descriptive statistic are used to describe the basic features of the data in a study they provide summaries about the sample and measured.

Reliability statistic, Statistical Package of The Science Social (SPSS) is being used for statistical analysis.

Generally, the method of data collection is any tool or method or method of obtaining and collecting research data. In this data collection, the questionnaire was selected. Respondents' selection consists of Polytechnic Sultan Salahuddin Abdul Aziz Shah and also contractors working in electrical wiring. Questionnaire used consists of Liker type 2 scale (1 = yes to 2 = no). The questionnaire will be divided into 14 questions relating to respondents' views on the problems they face.

3.4 STUDY INSTRUMENTS

Materials and Methods:

We have carried out research instruments with technical methods, this method explains how we carry out the projects and material we use.

We have used the welding method to connect between the steel to create the product range. The selected steel is a hollow steel and aluminium plate. The selected type of steel material is medium carbon steel as it contains carbon 0.30% to 0.80%. High carbon content makes it rough and has toughness like low carbon steel and yields moderate strength.

Additionally, we have selected 50mm diameter caster wheel for moving the trolley. With this caster wheel size, it can make the trolley easier to move around and also it is the suitable size with the height of the object from the floor level because we use a strong magnet. If we select the large size for caster wheel it maybe cannot to pull the steel component because of the height from the floor. Types of strong magnet that we use have a two type, it is ferrite magnet and neodymium magnet. We have selected this magnet because the ability to pull the small component such as screw, nail and so on.

Furthermore, we have also opted to use a DC motor type synchronous motor as this type because the ability to control the power factor. Besides, in synchronous motor the speed remains constant irrespective of the loads. This characteristic helps

in industrial drives where constant speed is required irrespective of the load it is driving. It also useful when the motor is required to drive another alternator to supply at a different frequency as in frequency changes.

3.4.1 PRODUCT MANUFACTURING

Here are ways to generate TROLLEY CABLE REVOLVING WITH MAGNETIC:



Diagram 3.4.1 i) Show the first step in producing Trolley Cable Revolving with Magnetic. Prepare the round steel to make a roller. We use stainless steel vase to make the roller and combine the round steel with steel rods by welding method.


Figure 3.4.1 ii: Set up the trolley base plate.

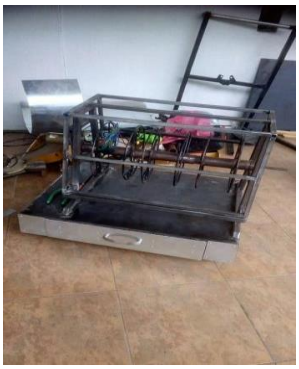


Figure 3.4.1 iii: Create a product framework trolley and rollers body.

Figure 3.4.1 iv: Make a drawer as a tool storage.

Figure 3.4.1 v: Complete the framework and trolley body with aluminium plate.

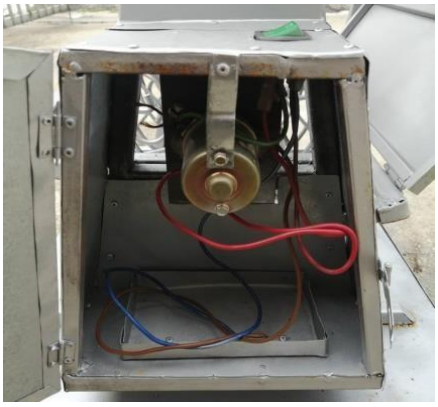


Figure 3.4.1 vi: Install switch and motor to function the roller and finishing the product with painting spray.

3.5 SAMPLING TECHNIQUES

After the data collection process was conducted through questionnaire and sampling, data analysis was made using the SPSS software package (Statistical Package for Social Science). The software will analyse 80 questionnaires containing 14 questions related to the study. Data analysers can be divided into two parts: forming analytical and quantitative analysis models.

We have found that many wiring workers are quite difficult to do the job of installing electrical wiring, especially the wiring conditions on the floor and fibres. In

addition, we also found that there was a danger or risk to the wiring employees for injuries or accidents because the spinal parts such as nails and screws scattered on the floor while working, this is a reason that can invite injuries to the employees as an example of nails. Besides, workmanship is also less satisfactory as wires are scattered over the floor and unmanned wires. Therefore, our product will help to solve the problems available to this wiring employee by creating “Trolley Cable Revolving with Magnetic”.

3.6 DATA ANALYSIS METHOD

This chapter reports on the results of tests and tests the responses provided by the respondents to the questionnaire run. In this chapter, researchers also present the findings. Things that contained in this chapter is the subject and place of study, the instrument of study, the way analysing data and analysing findings. This chapter will describe the findings of the results of the collection of primary data on respondents' samples. The questionnaire on the online survey comprises studies related to the project that we run.

The primary data were collected using the survey method. The instrument is used is a questionnaire distributed through online to students several Departments in Shah Alam Polytechnic. Questionnaire contains two main functions namely the first, to collect information of respondents' demographic information such as gender, age, income and so forth and secondly, to obtain information in the form the measurement of the variable either individual or group.

3.7 CHAPTER SUMMARIES

In the initial stages, the design of the study, data collection methods, research instruments, data sampling techniques and data analysis methods were systematically made in the methodology study to find out the facts and information to support the research instrument and illustrate more clearly in this study.

In summary, in this methodology study, we have received various feedback and benefits that have been provided by the respondents. However, we will make sure

that our product will be accepted by large companies or companies involved in the wiring system. The product we have created is designed to facilitate the work system and also benefit the workers in the wiring system. Although this system has not been widely used, we try to innovate this product and deliver better results and try to expand the use of this product that we have created in the wiring installation system. After analysing the data, it is important to make conclusions or conclusions on the results and hypotheses i.e. whether the trap is effective or not.

CHAPTER 4

ANALYSIS RESULT

4.1 INTRODUCTION

This chapter reports the findings of the survey based on the test results and responses given by the respondents to the questionnaire conducted. This study was analysed using survey form. All the results obtained are presented in the form of pie charts.

The purpose of this study is to look at the level of consumer satisfaction with the 'Trolley Cable Revolving with Magnetic' product. In addition, this study can also identify consumer needs through suggestions and feedback received from survey forms.

Finally, this report can be used to suggest improvements to products that have been produced based on the results obtained.

4.2 BEFORE AND AFTER TEST RESULT DATA

4.2.1 The data below shows the data of the questionnaire conducted prior to testing on Trolley Cable Revolving with Magnetic. There were 70 respondents.

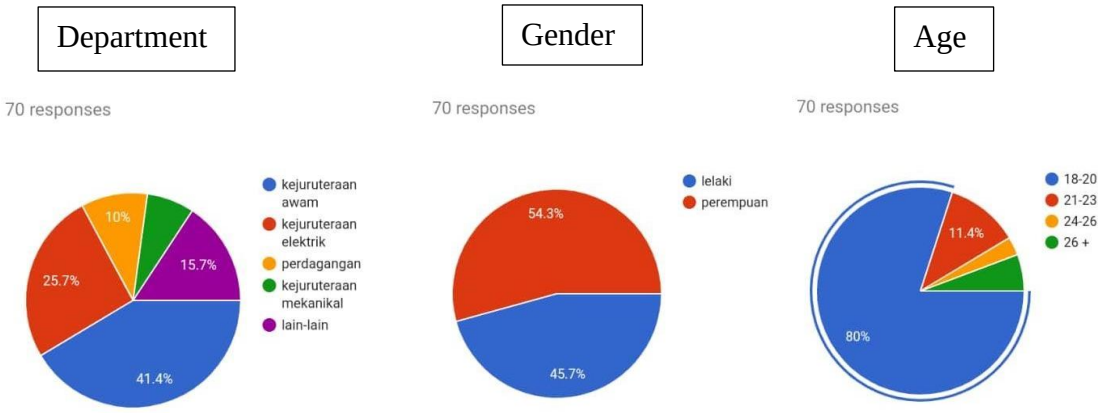


Figure 4.1: Department, gender, age

Most of the respondents were from civil engineering department, among whom were female and between 18-20 years old

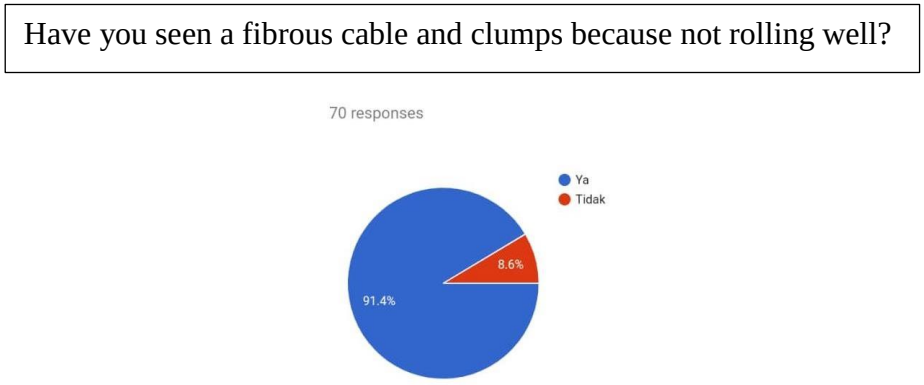


Figure 4.2: Respondents' opinion on the scattered and clumps of the cable as a result of not rolling well

Respondents found that they often saw cables scattered and cluttered on the floor because the cables were not folded properly. 91.4% of them saw it and 8.6% never saw it.

What is your method to use to roll the cables?	Is the time taken to roll the long cable up by using the manual (hand) is long?

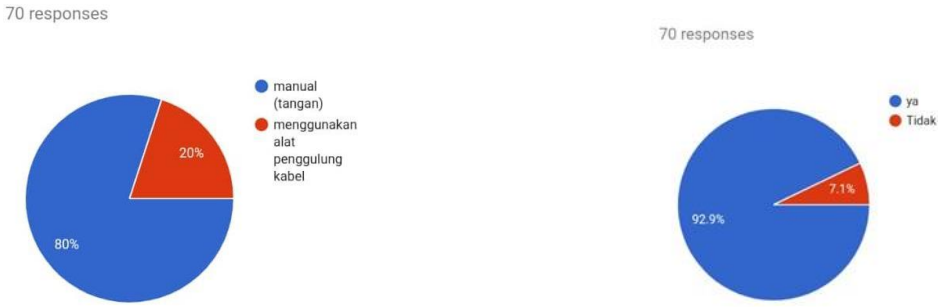


Figure 4.3: shows how to roll the cable either manually or using the cable roller and an opinion on the wiring by hand.

This figure shows that many respondents roll the cable manually and the time taken to roll the cable is long. 80% of the respondents said that they roll the cable manually and 20% of them roll the cable using the cable roller. In addition, 92.9% of respondents answered that wiring the wrist using a long time.

Do you have problems with hip pain when you want to collect a large number of components such as screws on the floor in large quantities?	Have you ever had minor injuries such as injuries caused by small components such as screws?

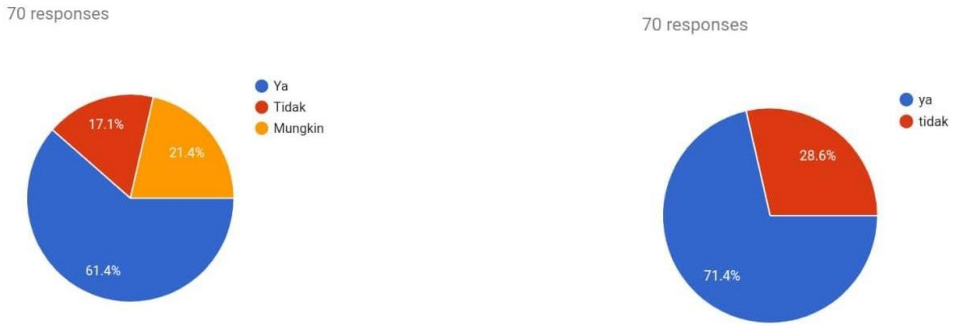


Figure 4.4: shows the problem that respondents have about safety

Most of the respondents had security issues other than wiring problems. They found that they had problems such as hip pain while collecting small components such as screws and that they also often had minor accidents due to sharp components.

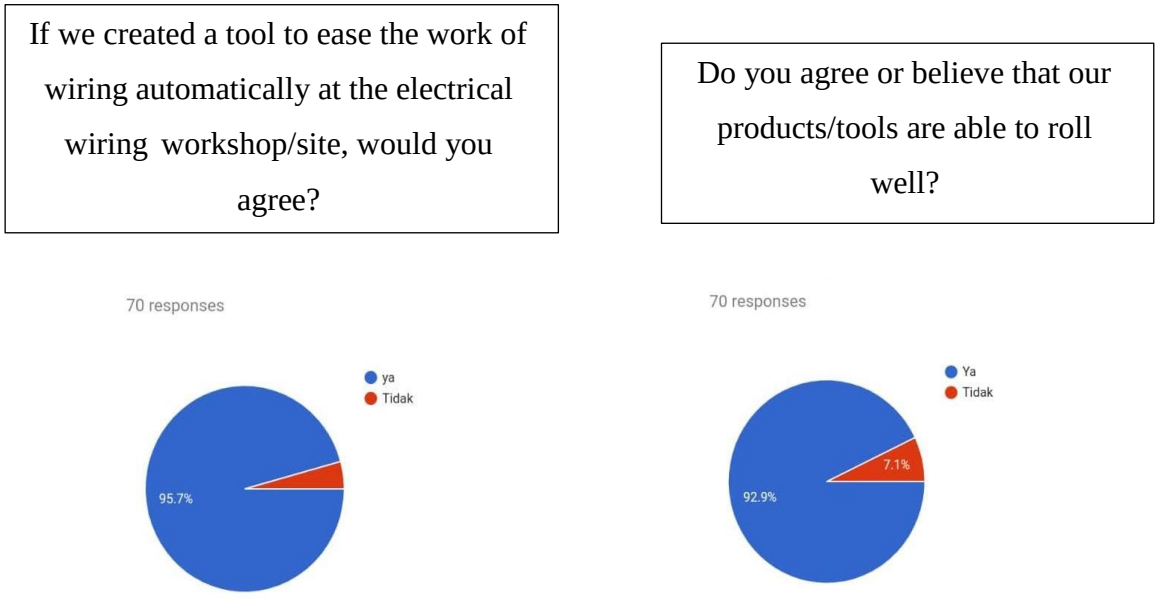


Figure 4.5: respondent's opinion on the creation of a Trolley Cable Revolving with Magnetic

Many of the respondents agreed that we create a Trolley Cable Revolving with Magnetic and they believe that our products can solve their problems. 95.7% of respondents agreed that we created a cable roller automatically and 4.3% disagreed and 92.9% of respondents believe that this product is capable of rolling the cable well.

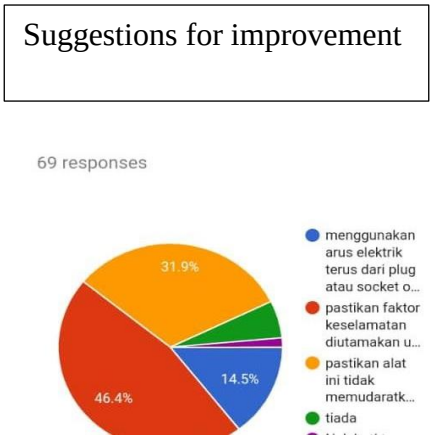


Figure 4.6: suggestions for improvement from respondents

The opinion of the respondents is:

- Using an electrical current from a plug or socket outlet.
- Make sure safety factors are taken into account when doing work.
- Make sure this tool doesn't harm users who use it.

Based on the data collected prior to testing, the majority of respondents agreed to produce the Trolley Cable Revolving with Magnetic product and there were some improvements mentioned in the suggested space. According to the respondents' choice, the percentage of rolling wires by hand was 80%. They also find that they have some problems with wiring, which means that they are often suffering from a waist while picking up a small component and that they are also often injured due to a sharp cut. As a result, many respondents agreed with our idea to create this Trolley Cable Revolving to solve their problem. A total of 95.7% agreed and a further 4.3% disagreed. In addition, they are confident that our product will be able to roll well and fast.

4.2.2 The data below shows a testing result performed after the product was created.

NO.	**LENGTH OF CABLE (m)**	**TIME FOR ROLLING CABLE USING BY HAND (S)**	**TIME FOR ROLLING CABLE USING TROLLEY CABLE REVOLVING WITH MAGNETIC (S)**
1.	10	29.59	04.51
2.	10	30.01	04.52
3.	10	28.32	04.52

Based on data obtained after testing, it is found that the time taken to roll the cable by hand is longer than using Trolley Cable Revolving with Magnetic. This test was performed three times to obtain a more accurate of the time estimate. In addition, this test is performed to test the product so that it works before use.

4.3 CHAPTER SUMMARIES

In this chapter, we present the results obtained before and after carrying out the project aimed at achieving the objectives. In addition, it also aims to obtain data in various ways to produce quality products from the data collected.

Before making the product, we did some preliminary studies such as asking a question in google form and distributing it to respondents to answer it. Most answered this question from students and some outsiders. The results we get are many of us who have a positive opinion or most agree with our product.

In addition, a second collection of data was also receiving feedback from the respondents by testing the product. When the product is created, it is tested to full the needs of respondent and improvements are made in the event of deficiencies. Therefore, this collection of data is crucial to producing quality and safe products.

CHAPTER 5

DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1 CHAPTER INTRODUCTION

Overall, students have been able to make this product work well in a timely manner. In innovating this product, students have successfully achieved the goals that students have wanted. For example, it can produce a neat wire cable roller to prevent damage to the cable. This is because this product uses high pressure water pumps in addition to the home water pressure to facilitate the cleaning process. In addition, this discussion has been conducted from time to time so that the students can solve the problems faced by the group members. Students also often refer to building supervisors and lecturers to do project-related work.

Next, students will be able to make good preparations for the presentation as they have followed the schedule. For example, all team members will be aware of all the components, hand tools used and the manufacturing method used for this project so that the questions that will be answered can be answered correctly. In addition, students also have the knowledge to do a project.

The main function of the "Trolley Cable Revolving with Magnetic" is a mechanical device for cleaning household vehicles. This product has been innovated from existing cable wiring tools that use manual rollers (human assistance). In addition, our products are suitable products for wiring workers, polytechnic students and so on. With this product can help the user to make electrical wiring easier. Advice from supervisors and panels also helped the project succeed. Great ideas also come from supervisors and panels.

5.2 DISCUSSION.

The following is a discussion of the results of the findings and the problems that arose during the survey conducted on the percentage of respondents regarding consent to create this tool. Subsequently, data retrieval identifies the problem and how it is solved. The discussions that we had with Madam Jamilah Binti Abbas supervisor facilitated our research to achieve the objective of Trolley Cable Revolving with Magnetic products.

According to the study conducted, the percentage of respondents who agreed with the creation of this tool was very high. Each member of the group has their own assignment to conduct research and questionnaire. The knowledge we have gained we have shared every information we have gained from various research methods such as websites, reference books, and interviews. Data collection is performed to identify the problem that is being raised and how it is resolved.

5.3 RECOMMENDATIONS.

Within a given time frame, we successfully completed the project. This product can operate as planned, achieve the objectives as desired and the product has been successfully tested. While this product works, the product is very satisfying to every respondent who has used it. In developing this product we hope it will help users to make the process of electrical wiring easier.

After running this project, it was found that this project could benefit the users. The components used are also basic and commonly used and easy to find. However, this Trolley Cable Revolving with Magnetic product also has some improvements that need improvement. Some suggestions have been provided. These include:

1. Change from using alternative current to direct current.

2. Rotate the wheel more smoothly.

3. Modify the design to make it look more attractive.

4. Put a socket outlet on the product.

5. Use stronger materials such as steel.

5.4 CONCLUSION

We are so grateful and grateful that this project has been well completed. These are the methods that have been applied in the process of completing this project. All the time, energy and money have been allocated successfully. We hope the innovation of this product will help users in cleaning their home.

The tolerance and cooperation shown by each team member is a key factor in the success of this project. We hope that this product will have a positive impact on consumers.

The goal of the two semester "Trolley Cable Revolving with Magnetic" project was to achieve the original objective of the project being designed and built whereby this product can assist the user in performing tasks such as installation and maintenance. This product has also achieved the objectives of a trolley that can quickly and efficiently roll the wires. In addition, the trolley is easy to carry anywhere as it is equipped with two wheels mounted to facilitate the movement of the trolley.

Also, the costs involved in producing this product are also not very high and reasonable. As a result of the testing done, the user will be able to better understand the scientific study of the project.

Based on the charts, we can identify and determine the progress of activities carried out in stages to help students monitor project progress throughout the 4 and 5 semesters.

5.5 CHAPTER SUMMARY.

As a result of the questionnaire and testing conducted, we found that our final project was working well and smoothly. This test also proves that it meets the objectives of the designed goals. In addition, this project also has a positive impact on users

After carrying out the process of preparing a project, there are many important elements or elements that must be taken into account when undertaking the project. Among them are the flow chart and flow chart. Flow charts are the processes by which they show from beginning to end producing a project. For example, looking for problems, drawing, and more. The alternate chart is the process by which it completes each process in the flow chart.

In addition, the work steps should be well organized and well organized. In every job we do, we must take precautionary steps in getting things done.

CHAPTER 6

PROJECT COSTS

6.0 PROJECT COSTS

The product "trolley cable revolving with magnetic" has provided the appropriate financial budget for the completion of this product. We have made an initial estimate of the project cost to determine the budget that will need to be allocated to execute this project. Based on the price monitoring done by several stores such as Daiso, Hardware, and Mr DIY, we have found that the cost of innovating this product and the cost of shipping is around RM 300.00. The cost of this project covers the entire cost of the project production until final finishing work such as complete installation.

Overall, some of these components have high prices such as the table below which shows the detailed cost of each component as well as the actual cost and side costs.

COST TO BUILD TROLLEY CABLE REVOLVNG WITH MAGNETIC

ITEM	QUANTITY	PRICE (RM/pcs)	TOTAL (RM)
Hollow steel	1	20.00	20.00
Vase round Steel	4	10.00	40.00
Door Ensel	1	0.80	0.80
Hollow 3/4” x 3/4” x	1	17.00	17.00

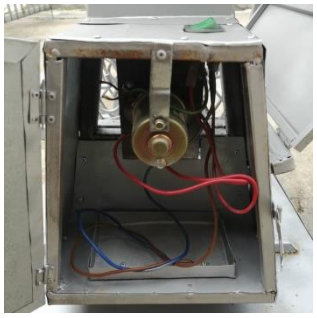
1.6mm			
Hollow 1/2” x 1/2” x 1.2mm	1	10.00	10.00
Cutting Charges	3	1.00	3.00
Screw	5	0.20	1.00
Aluminum Plate	1	50.00	50.00
Steel Pipe	1	18.00	18.00
Stud Bolt M8	1	4.00	4.00
Flat Washer M8	10	0.06	0.60
Nut M8	10	0.04	0.40
Hollow 3/4” x 3/4” x 1.6mm	1	18.00	18.00
Castor Turn wheel (4 pcs)	1	8.47	8.47
DIY Gold Twist Drill 3mm	1	2.36	2.36
Door Handle	1	2.50	2.50
Car Circuit Tester	1	3.68	3.68
Spray Paint Silver	2	5.57	11.14
DIY HSS G Twist Drill 4mm	2	1.98	3.96
Clinch Bolt 14 pcs	1	1.79	1.79
Drill BITS Set	1	5.83	5.83
HT HEX Screw M 10x25	1	0.94	0.94

ALU/ST Dome HD Blind Rivet 1/8 x 1/4	1	1.69	1.69
RTN5Cents	1	0.02	0.02
Roller Drawer 16”	1	10.00	10.00
Extension round plug	1	20.00	20.00
Bearing	4	1.20	4.80
TOTAL			**260.98**

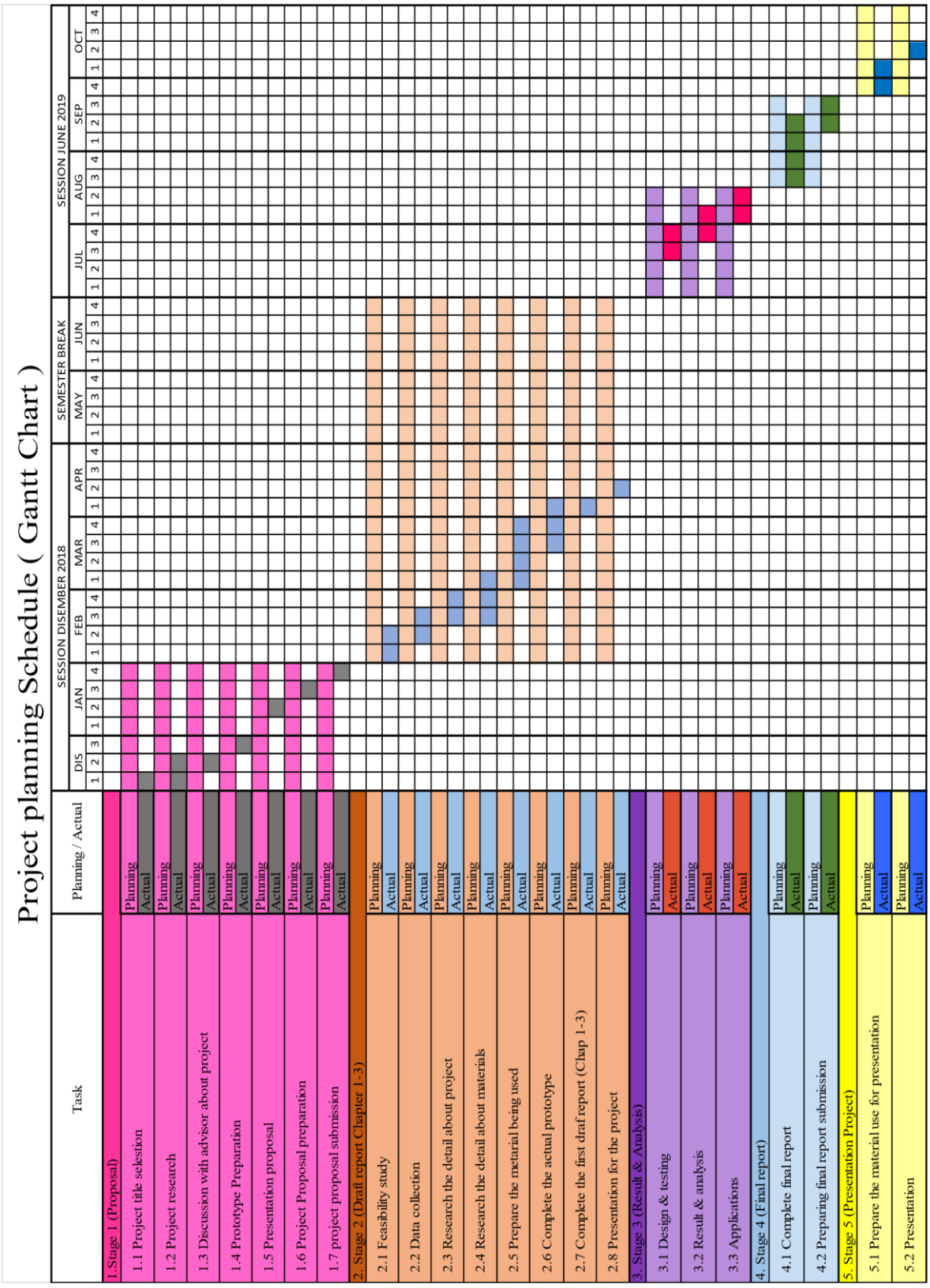
APPENDIX

APPENDIX A	Product process
APPENDIX B	Gant Chart
APPENDIX C	Brochure
APPENDIX D	Document testing with company (KEJURUTERAAN ELEKTRIK DAN PEMBINAAN ZARIS)
APPENDIX E	Document testing with company (UNIT BANGUNAN DAN INFRASTRUKTUR)

APPENDIX A



APPENDIX B


Project planning Schedule (Gantt Chart)
Task
Planning / Actual
SESSION DISEMBER 2018
SEMESTER BREAK
SESSION JUNE 2019
DIS
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
1.Stage 1 (Proposal)
1.1 Project title selestion
1.2 Project research
1.3 Discussion with advisor about project
1.4 Prototype Preparation
1.5 Presentation proposal
1.6 Project Proposal preparation
1.7 project proposal submission
2. Stage 2 (Draft report Chapter 1-3)
2.1 Feasibility study
2.2 Data collection
2.3 Research the detail about project
2.4 Research the detail about materials
2.5 Prepare the metarial being used
2.6 Complete the actual prototype
2.7 Complete the first draf report (Chap 1-3)
2.8 Presentation for the project
3. Stage 3 (Result & Analysis)
3.1 Design & testing
3.2 Result & analysis
3.3 Applications
4. Stage 4 (Final report)
4.1 Complete final report
4.2 Preparing final report submission
5. Stage 5 (Presentation Project)
5.1 Prepare the material use for presentation
5.2 Presentation
Planning
Actual

APPENDIX C

MEANING/OPERATION OF THE PROJECT

Trolley: In this project, the trolley shows an object that can withstand the weight of an item or object. It acts as a cable loop on it. Additionally, these trolleys can also move and are easy to carry around.

Cable: A wired cable that has various colors indicates the basic color of the wiring. among them are red, blue, green. It works as a cable used when wiring installation. It aims to facilitate workers in the field of electrical wiring installation sector to make wiring work.

Revolving: revolving shows it is a rolled cylinder. It works to wind up wiring wires either pull or roll the cable. It is intended to be easy to pull the cable and the cable is also not fibrous and easy to recirculate the cable on the cylinder.

Magnetic: magnetic indicates the strong magnet used. This strong magnetic works to attract small components on the floor such as screws, nails, and so on made of iron. It is aimed at safety and hygiene. Among them is, to avoid small injury such as nails. In addition, it maintains the cleanliness of the working environment.

APPENDIX

KEMENTERIAN PENDIDIKAN MALAYSIA

POLITEKNIK MALAYSIA

TROLLEY CABLE REVOLVING WITH MAGNETIC

SUPERVISOR

PN. HJH JAMILAH BINTI HJ ABBAS

GROUP MEMBER

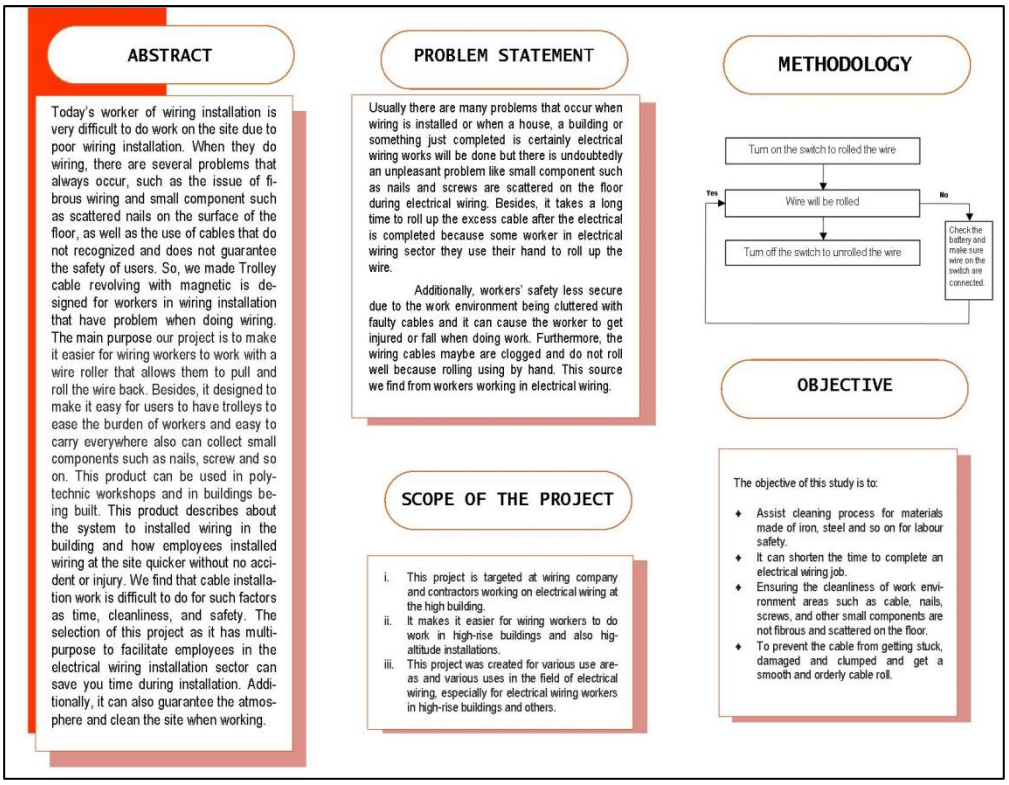
NUR HIDAYAH BINTI SULAIMAN

NUR SHAMIMI BINTI AMIR RUDIN

MUHAMMAD AIREL SYARIMAN BIN SULAIMAN

MUHAMMAD AKMAL BIN DFAIZAL ILLAHI

DPB 5B



ABSTRACT

Today's worker of wiring installation is very difficult to do work on the site due to poor wiring installation. When they do wiring, there are several problems that always occur, such as the issue of fibrous wiring and small component such as scattered nails on the surface of the floor, as well as the use of cables that do not recognized and does not guarantee the safety of users. So, we made Trolley cable revolving with magnetic is designed for workers in wiring installation that have problem when doing wiring. The main purpose our project is to make it easier for wiring workers to work with a wire roller that allows them to pull and roll the wire back. Besides, it designed to make it easy for users to have trolleys to ease the burden of workers and easy to carry everywhere also can collect small components such as nails, screw and so on. This product can be used in polytechnic workshops and in buildings being built. This product describes about the system to installed wiring in the building and how employees installed wiring at the site quicker without no accident or injury. We find that cable installation work is difficult to do for such factors as time, cleanliness, and safety. The selection of this project as it has multipurpose to facilitate employees in the electrical wiring installation sector can save you time during installation. Additionally, it can also guarantee the atmosphere and clean the site when working.

PROBLEM STATEMENT

Usually there are many problems that occur when wiring is installed or when a house, a building or something just completed is certainly electrical wiring works will be done but there is undoubtedly an unpleasant problem like small component such as nails and screws are scattered on the floor during electrical wiring. Besides, it takes a long time to roll up the excess cable after the electrical is completed because some worker in electrical wiring sector they use their hand to roll up the wire.

Additionally, workers' safety less secure due to the work environment being cluttered with faulty cables and it can cause the worker to get injured or fall when doing work. Furthermore, the wiring cables maybe are clogged and do not roll well because rolling using by hand. This source we find from workers working in electrical wiring.

SCOPE OF THE PROJECT

i. This project is targeted at wiring company and contractors working on electrical wiring at the high building.
ii. It makes it easier for wiring workers to do work in high-rise buildings and also high-altitude installations.
iii. This project was created for various use areas and various uses in the field of electrical wiring, especially for electrical wiring workers in high-rise buildings and others.

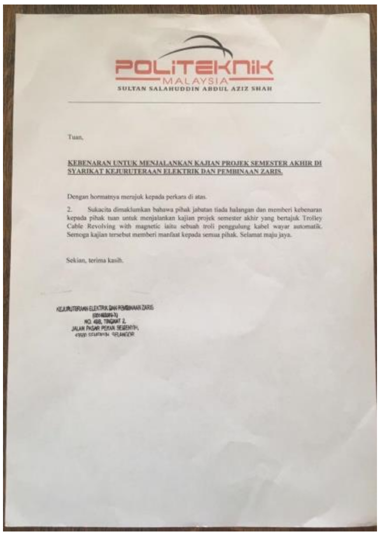
METHODOLOGY

OBJECTIVE

The objective of this study is to:

- Assist cleaning process for materials made of iron, steel and so on for labour safety.
- It can shorten the time to complete an electrical wiring job.
- Ensuring the cleanliness of work environment areas such as cable, nails, screws, and other small components are not fibrous and scattered on the floor.
- To prevent the cable from getting stuck, damaged and clumped and get a smooth and orderly cable roll.

APPENDIX D



POLITEKNIK MALAYSIA
SULTAN SALAHUDDIN ABDUL AZIZ SHAH

Tuan,

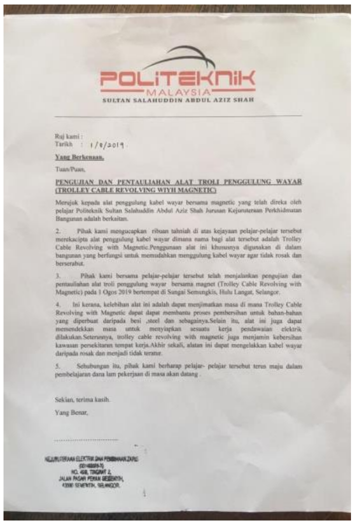
KEBENARAN UNTUK MENJALANKAN KAJIAN PROJEK SEMESTER AKHIR DI SYARIKAT KEJURUTERAAN ELEKTRIK DAN PEMBINAAN ZARIS.

Dengan hormatnya merujuk kepada perkara di atas.

2. Sukacita dimaklumkan bahawa pihak jabatan tiada halangan dan memberi kebenaran kepada pihak tuan untuk menjalankan kajian projek semester akhir yang bertajuk Trolley Cable Revolving with magnetic iaitu sebuah troli penggulung kabel wayar automatik. Semoga kajian tersebut memberi manfaat kepada semua pihak. Selamat maju jaya.

Sekian, terima kasih.

KEJURUTERAAN ELEKTRIK DAN PEMBINAAN ZARIS
NO. 49B, TINGKAT 2,
JALAN PASAR PEKAN SEMENYIH,



POLITEKNIK MALAYSIA
SULTAN SALAHUDDIN ABDUL AZIZ SHAH

Ruj kami :
Tarikh : 1/8/2019

Yang Berkenaan,

Tuan/Puan,

PENGUJIAN DAN PENTAULIAHAN ALAT TROLI PENGGULUNG WAYAR (TROLLEY CABLE REVOLVING WIYH MAGNETIC)

Merujuk kepada alat penggulung kabel wayar bersama magnetic yang telah direka oleh pelajar Politeknik Sultan Salahuddin Abdul Aziz Shah Jurusan Kejuruteraan Perkhidmatan Bangunan adalah berkaitan.

2. Pihak kami mengucapkan ribuan tahniah di atas kejayaan pelajar-pelajar tersebut merekacipta alat penggulung kabel wayar dimana nama bagi alat tersebut adalah Trolley Cable Revolving with Magnetic.Penggunaan alat ini khususnya digunakan di dalam bangunan yang berfungsi untuk memudahkan menggulung kabel wayar agar tidak rosak dan berserabut.

3. Pihak kami bersama pelajar-pelajar tersebut telah menjalankan pengujian dan pentauliahan alat troli penggulung wayar bersama magnet (Trolley Cable Revolving with Magnetic) pada 1 Ogos 2019 bertempat di Sungai Semungkis, Hulu Langat, Selangor.

4. Ini kerana, kelebihan alat ini adalah dapat menjimatkan masa di mana Trolley Cable Revolving with Magnetic dapat dapat membantu proses pembersihan untuk bahan-bahan yang diperbuat daripada besi ,steel dan sebagainya.Selain itu, alat ini juga dapat memendekkan masa untuk menyiapkan sesuatu kerja pendawaian elektrik dilakukan.Seterusnya, trolley cable revolving with magnetic juga menjamin kebersihan kawasan persekitaran tempat kerja.Akhir sekali, alatan ini dapat mengelakkan kabel wayar daripada rosak dan menjadi tidak teratur.

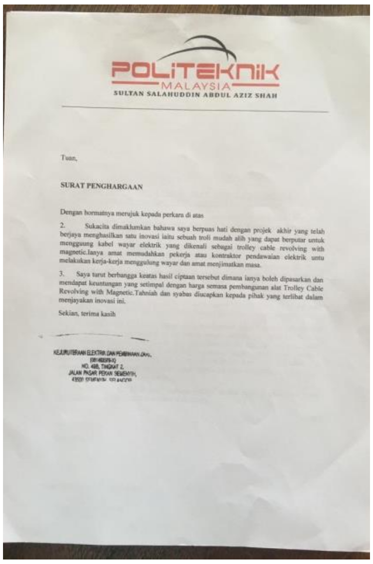
5. Sehubungan itu, pihak kami berharap pelajar- pelajar tersebut terus maju dalam pembelajaran dana lam pekerjaan di masa akan datang .

Sekian, terima kasih.

Yang Benar,

....

KEJURUTERAAN ELEKTRIK DAN PEMBINAAN ZARIS
NO. 49B, TINGKAT 2,
JALAN PASAR PEKAN SEMENYIH,
43500 SEMENYIH, SELANGOR.



POLITEKNIK MALAYSIA
SULTAN SALAHUDDIN ABDUL AZIZ SHAH

Tuan,

SURAT PENGHARGAAN

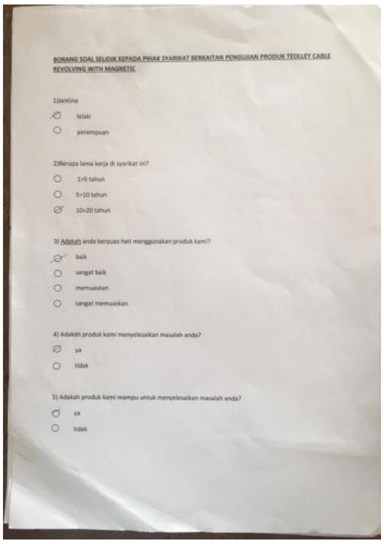
Dengan hormatnya merujuk kepada perkara di atas

2. Sukacita dimaklumkan bahawa saya berpuas hati dengan projek akhir yang telah berjaya menghasilkan satu inovasi iaitu sebuah troli mudah alih yang dapat berputar untuk mengguung kabel wayar elektrik yang dikenali sebagai trolley cable revolving with magnetic.Ianya amat memudahkan pekerja atau kontraktor pendawaian elektrik untu melakukan kerja-kerja menggulung wayar dan amat menjimatkan masa.

3. Saya turut berbangga keatas hasil ciptaan tersebut dimana ianya boleh dipasarkan dan mendapat keuntungan yang setimpal dengan harga semasa pembangunan alat Trolley Cable Revolving with Magnetic.Tahniah dan syabas diucapkan kepada pihak yang terlibat dalam menjayakan inovasi ini.

Sekian, terima kasih

KEJURUTERAAN ELEKTRIK DAN PEMBINAAN ZARIS
NO. 49B, TINGKAT 2,
JALAN PASAR PEKAN SEMENYIH,



BORANG SOAL SELIDIK KEPADA PIHAK SYARIKAT BERKAITAN PENGUJIAN PRODUK TEOLLEY CABLE REVOLVING WITH MAGNETIC

1)Jantina

- lelaki (ticked)
- perempuan

2)Berapa lama kerja di syarikat ini?

- 1>5 tahun
- 5>10 tahun
- 10>20 tahun (ticked)

3) Adakah anda berpuas hati menggunakan produk kami?

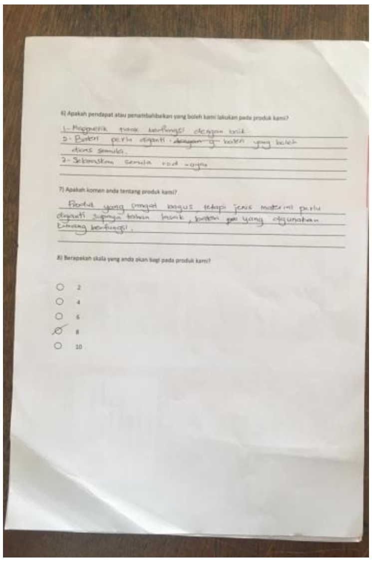
- baik (ticked)
- sangat baik
- memuaskan
- sangat memuaskan

4) Adakah produk kami menyelesaikan masalah anda?

- ya (ticked)
- tidak

5) Adakah produk kami mampu untuk menyelesaikan masalah anda?

- ya (ticked)
- tidak



6) Apakah pendapat atau penambahbaikan yang boleh kami lakukan pada produk kami?

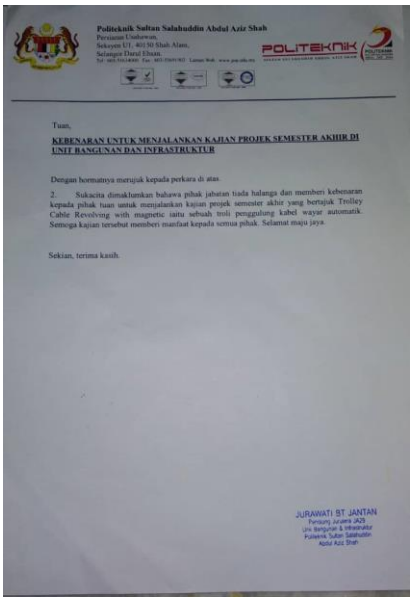
1- Magnetik tidak berfungsi dengan baik

7) Apakah komen anda tentang produk kami?

8) Berapakah skala yang anda akan bagi pada produk kami?

- 2
- 4
- 6
- 8 (ticked)
- 10

APPENDIX E



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Persiaran Usahawan,
Seksyen U1, 40150 Shah Alam,
Selangor Darul Ehsan.

POLITEKNIK

Tuan,

KEBENARAN UNTUK MENJALANKAN KAJIAN PROJEK SEMESTER AKHIR DI UNIT BANGUNAN DAN INFRASTRUKTUR

Dengan hormatnya merujuk kepada perkara di atas.

2. Sukacita dimaklumkan bahawa pihak jabatan tiada halanga dan memberi kebenaran kepada pihak tuan untuk menjalankan kajian projek semester akhir yang bertajuk Trolley Cable Revolving with magnetic iaitu sebuah troli penggulung kabel wayar automatik. Semoga kajian tersebut memberi manfaat kepada semua pihak. Selamat maju jaya.

Sekian, terima kasih.

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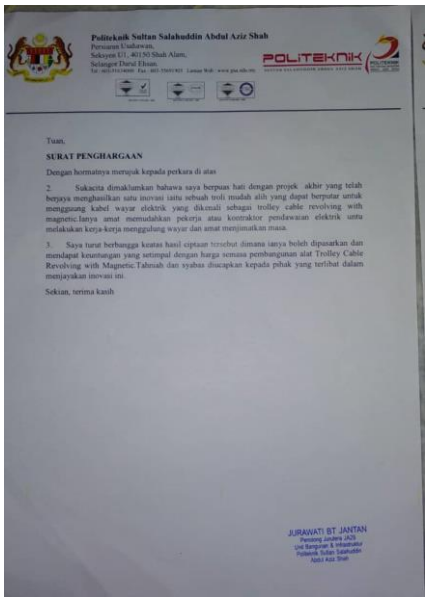
Unit Bangunan & Infrastruktur
Politeknik Sultan Salahuddin
Abdul Aziz Shah



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Persiaran Usahawan,
Seksyen U1, 40150 Shah Alam,
Selangor Darul Ehsan.

POLITEKNIK

Tuan,

SURAT PENGHARGAAN

Dengan hormatnya merujuk kepada perkara di atas

2. Sukacita dimaklumkan bahawa saya berpuas hati dengan projek akhir yang telah berjaya menghasilkan satu inovasi iaitu sebuah troli mudah alih yang dapat berputar untuk menggunng kabel wayar elektrik yang dikenali sebagai trolley cable revolving with magnetic.lanya amat memudahkan pekerja atau kontraktor pendawaian elektrik untu melakukan kerja-kerja menggulung wayar dan amat menjimatkan masa.

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Sekian, terima kasih

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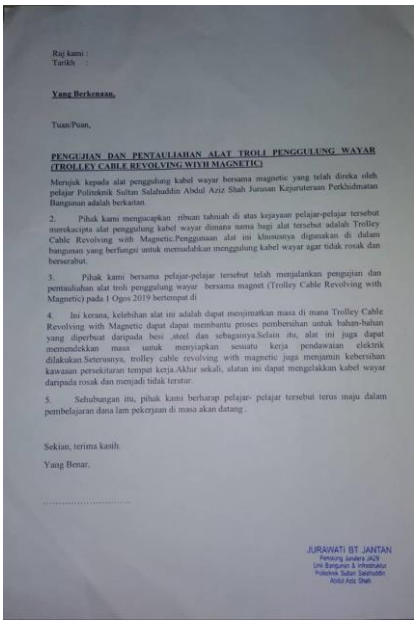
Unit Bangunan & Infrastruktur
Politeknik Sultan Salahuddin
Abdul Aziz Shah



Rujukan :
Tarikh :

Yang Berkenaan,

Tuan/Puan,

PENGUJIAN DAN PENTAULIAHAN ALAT TROLI PENGGULUNG WAYAR (TROLLEY CABLE REVOLVING WIYH MAGNETIC)

Merujuk kepada alat penggulung kabel wayar bersama magnetic yang telah direka oleh pelajar Politeknik Sultan Salahuddin Abdul Aziz Shah Jurusan Kejuruteraan Perkhidmatan Bangunan adalah berkaitan

2. Pihak kami mengucapkan ribuan tahniah di atas kejayaan pelajar-pelajar tersebut merekacipta alat penggulung kabel wayar dimana nama bagi alat tersebut adalah Trolley Cable Revolving with Magnetic.Penggunaan alat ini khususnya digunakan di dalam bangunan yang berfungsi untuk memudahkan menggulung kabel wayar agar tidak rosak dan berserabut.

3. Pihak kami bersama pelajar-pelajar tersebut telah menjalankan pengujian dan pentaulihan alat troli penggulung wayar bersama magnet (Trolley Cable Revolving with Magnetic) pada 1 Ogos 2019 bertempat di

4. Ini kerana, kelebihan alat ini adalah dapat menjimatkan masa di mana Trolley Cable Revolving with Magnetic dapat dapat membantu proses pembersihan untuk bahan-bahan yang diperbuat daripada besi ,steel dan sebagainya.Selain itu, alat ini juga dapat memendekkan masa untuk menyiapkan sesuatu kerja pendawaian elektrik dilakukan.Seterusnya, trolley cable revolving with magnetic juga menjamin kebersihan kawasan persekitaran tempat kerja.Akhir sekali, alatan ini dapat mengelakkan kabel wayar daripada rosak dan menjadi tidak tersusun.

5. Sehubungan itu, pihak kami berharap pelajar- pelajar tersebut terus maju dalam pembelajaran dana lam pekerjaan di masa akan datang .

Sekian, terima kasih.

Yang Benar,

.....

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Unit Bangunan & Infrastruktur
Politeknik Sultan Salahuddin
Abdul Aziz Shah

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