

POLITEKNIK SULTAN SALAHUDDIN ABDUL AZIZ SHAH

CLOTHES DRYER RACKS

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JABATAN KEJURUTERAAN MEKANIKAL

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**Laporan ini dikemukakan kepada Jabatan Kejuruteraan Mekanikal
sebagai memenuhi sebahagian syarat penganugerahan Diploma
Kejuruteraan Mekanikal (Pembungkusan)**

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AKUAN KEASLIAN DAN HAK MILIK

TAJUK : CLOTHES DRYER RACKS

SESI : JUNE 2020

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2. Kami mengakui bahawa "Projek tersebut di atas" dan harta intelek yang ada di dalamnya adalah hasil karya/reka cipta asli kami tanpa mengambil atau meniru mana-mana harga intelek daripada pihak-pihak lain.

3. Kami bersetuju melepaskan pemilikan harta intelek 'projek tersebut' kepada 'Politeknik tersebut' bagi memenuhi keperluan untuk peanugerahan **Diploma Kejuruteraan Mekanikal (Pembungkusan)** kepada kami.

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ABSTRACT

This wardrobe is implemented to solve the problem in the drying of imperfect clothes in daily life. This machine is equipped with a fan and heating element suitable for use in the process of drying clothes in a short time. This idea was obtained after seeing the problems that often occur to society. One of the common problems is the clothes cannot dry properly due to unpredictable weather factors. Next is the limited space to dry clothes in homes such as apartments as most clothes hangers are prone to many problems. The main purpose of this project is to facilitate the process of drying clothes during rainy and unpredictable weather. High humidity slows down the process of drying clothes while taking a long time to dry. The project uses several components such as heating elements as a source of heat and nylon fabric as a heat trap so that it does not spread out. A survey was conducted to obtain reviews about this project and the feedback received was positive. There are some improvements that can be made to this project for the future. One of them is to improve the stronger structure so that more clothes can fit into the clothes dryer racks.

ABSTRAK

Almari pengering pakaian ini merupakan satu projek yang dilaksanakan untuk menyelesaikan masalah dalam pengeringan pakaian yang tidak sempurna dalam kehidupan seharian. Mesin ini dilengkapi dengan kipas dan elemen pemanas yang sesuai digunakan untuk proses pengeringan baju dengan masa yang singkat. Idea ini diperolehi setelah melihat masalah yang sering berlaku kepada masyarakat. Antara masalah yang sering berlaku ialah pakaian tidak dapat kering dengan sempurna kerana faktor cuaca yang tidak menentu. Seterusnya ruang yang terhad untuk mengeringkan baju di kediaman seperti pangsapuri kerana kebanyakan tempat penyidai pakaian terdedah kepada banyak masalah. Tujuan utama projek ini di laksanakan adalah untuk memudahkan proses pengeringan baju pada waktu hujan dan cuaca yang tidak menentu. Kelembapan udara yang tinggi melambatkan proses pengeringan pakaian sekaligus mengambil masa yang lama untuk pengeringan . Projek ini menggunakan beberapa komponen seperti elemen pemanas sebagai sumber haba dan kain nylon sebagai pemerangkap haba supaya tidak tersebar keluar . Kajian telah dijalankan untuk mendapatkan pandangan tentang projek ini dan maklum balas yang diterima adalah positif . Terdapat beberapa penambahbaikan yang boleh dilakukan ke atas projek ini untuk masa akan datang. Antaranya ialah menambah baik struktur yang lebih kukuh agar lebih banyak pakaian yang boleh dimuatkan ke dalam pengering baju tersebut .

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CHAPTER 1

INTRODUCTION

1.1 RESEARCH BACKGROUND

Noticeable changes in the weather over the last 2 years and in general the number of rainfall incidents has increased since the 80s. This factor is the main driving force in the study of how to make clothing more effective than any other factor. In addition to facilitating the working class, the system is known to dry oak in accordance with the prescribed process.

Every problem can be solved practically (the design of an automatic wardrobe drying system) without having to go through a complicated drying process. This project is designed as a system that solves the problem of non-drying and so on. The Clothes Dryer system is designed to be a dryer that can operate automatically without the use of labour. Use of timer, electric heater box, relay and electronic circuit acting.

1.2 PROBLEM STATEMENT

This wardrobe is implemented to solve the problem in the drying of imperfect clothes in daily life. This machine is equipped with heating element suitable for use in the process of drying clothes in a short time. This idea was obtained after seeing the problems that often occurred. One of the common problems, which the clothes cannot dry properly due to unpredictable weather factors. Many people choose to wear clothes which are not completely dry which is very unhealthy because this might cause skin disease. Next is the limited space to dry clothes in homes such as apartments as most clothes hangers are prone to many problems. The main purpose of this project is to develop a drying clothes space during rainy and unpredictable weather. High humidity slows down the process of drying clothes while taking a long time to dry.

Other circumstances that had been taken into account was the haze problem that continuing to spread every year. The air pollutions that may contains particles hazardous to our skin may tend to adhere to the laundry when it was being left to dry outdoor. This occurrence is particularly happening in the urban area where the pollutions activity is at large. The ones who suffered from the circumstances was the tenants who lives in the area.

1.3 RESEARCH OBJECTIVES

The objectives to this research are:

- i. Provides an easy-to-use automated dryer system that is easy to use and ideal for those who are unable to manage their clothes (working and living in a large city)
- ii. To design and analyse cloth drying machine by utilizing heat waste.
- iii. Build a clothes dryer as desired
- iv. The project works well and works as desired

1.4 RESEARCH QUESTIONS

This study will answer the following research questions:

- i. How can wet clothes dry faster indoor?
- ii. How do we save more time during laundry?
- iii. How to increase the level of mobility of a dryer?

1.5 SCOPE OF RESEARCH

The scopes and limits to this research are:

- I. Design and develop prototype of mobile clothes dryer for home use.
- II. Specialized for everyday clothes such as clothes, pants, scarves, shoes and more.
- III. Can be loaded with totally wet clothes.
- IV. The space inside the wardrobe is not big.
- V. The wardrobe can only withstand a limited amount weight of load.

1.6 SIGNIFICANCE OF RESEARCH

Although, the clothes dryer racks is already invented, produced, and distributed worldwide with some variations in models and price. However, majority of people in Malaysia are still not aware of its existence. Moreover, most people find that they better take a long time to let their clothes dry or wear damp clothes than spending some money for a dryer. Thus, the finding of this study is hoped to bring the changes of perspective upon the clothes dryer racks

which is innovated to another level. Plus, it will absolutely benefit Malaysian since they do not have to worry much about laundry anymore.

1.7 CHAPTER'S SUMMARY

In this chapter, the studies was explained about its origin of ideas and inspirations. All the objectives were made out of all the problem statements. The objective for this project along with the importance will be clothes dryer racks that will be very portable and affordable causing it to be more convenient for citizens, and even the scope of this project only focusing at the fast drying clothes dryer racks. Thus, this new dryer could be used for daily routine with a really good care for a longer lifetime.

CHAPTER 2

LITERATURE REVIEW

2.1 LITERATURE REVIEW

This literature review explains about relevant past research and project development which is used the almost similar system for this project. A literature review was conducted to obtain information related to the project being developed. In this study, the focus is more on projects that have been done either directly or based on observations. In the context of this design, detailed study in all aspects is important to ensure that each process can be carried out well.

Technological and scientific advances today have no limits and no boundaries. Humans have tried to create a variety of goods or equipment to make their daily lives easier. Wherever we are, we can see a wide variety of electrical goods used to meet human needs.

2.2 INTRODUCTION

People are always having a problem to go home to pick their clothes if it's raining. Malaysia has an unpredictable weather. Sometime it rains in the morning and sunny in the evening. A clothes dryer or tumble dryer is a household appliance that is used to remove the moisture from a load of clothing and other textiles, generally shortly after they are cleaned in a washing machine. Most dryers consist of a rotating drum called a tumbler through which heated air is circulated to evaporate the moisture from the load. The tumbler is rotated relatively slowly to maintain space between the articles in the load. In most cases, the tumbler is belt- driven by an induction motor.

There are two general classes of rotating dryers: electric and gas . Both of these refer to the method used to raise the temperature of the air flowing through the tumbler, since the tumbling action is usually electrically powered. The electric dryer generally uses a coiled wire that is heated with electric current. The amount of electric current is varied to adjust the air temperature. The gas dryer employs a gas burner that burns natural gas, propane, or butane to form a jet of hot gases that are directed into a venturi chamber, which uses

Bernoulli principle to pull in ambient air and raise its temperature. The air temperature can be altered by adjusting the size of the gas flame or, more commonly, by merely extinguishing it and relighting it. Gas dryers require electricity to spin the clothes, but the amount of electricity is much smaller than in an electric dryer removing the need for a special connection.

2.3 Product Review

Prepared By Nur Anis Dalilah Binti Anuwar

2.3.1 Spin Dryer

This machine simply spins their drums faster than a typical washer could in order to extract additional water from the load. They may remove more water in two minutes than a heated tumbler dryer can in twenty, thus saving significant amounts of time and energy. Although spinning alone will not completely dry clothing, this additional step saves a worthwhile amount of time and energy for large laundry operations such as those of hospitals.



Figure 2.3.1 Spin Dryer

2.3.1.1 Advantages of spin dryer

- A spin dryer does not use heat to get clothes dry. Instead it rotates the washing at great speed causing water to be spun out due centrifugal force.
- A spin dryer using less electricity.
- Fast dryer clothes and save time.
-

2.3.2 Condensation Dryer.

Just as in a normal dryer, condensation dryers pass heated air through the load. However, instead of exhausting this air, the dryer uses a heat exchanger to cool the air and

condense the water vapor into either a drain pipe or a collection tank. Afterwards, this air is run through the loop again. The heat exchanger typically uses ambient air as its coolant, therefore the heat produced by the dryer will go into the immediate surroundings instead of the outside, increasing the room temperature slightly. In some designs, cold water is used in the heat exchanger, eliminating this heating, but requiring increased water usage.



Figure 2.3.2 Condensation Dryer

2.3.2.1 Advantages of condensation dryer .

- They are less energy efficient as vented , as air being converted to water , using a lot of energy .
- Condenser dryers do not need an external vent , so you can put your condenser dryer wherever you need to fit .

2.3.3 Dehumidifier Dryer

Dehumidification drying is a method of drying in which heat pump is used to recycle the heat that is normally vented to the atmosphere during normal drying .By keeping a low humidity, dehumidifiers encourage fast evaporation without high heat. This type of dryer is suitable for clothes that can withstand tumbling but not high heat.The essential stages of dehumidification are as follows:

- Hot moist air from the dryer is forced over cold evaporator coils.
- Moisture condensed and water is drained from the system .
- Heat from the air and the latent heat of condensation causes the refrigerant fluid in the evaporator coils to vaporise .
- The heated refrigerant is then passed through a compressor where it absorbs further heat .
- The heated refrigerant is passed back to the condenser where its heat is transferred back to the cold dry air coming back from the refrigerator

In this manner heat is recycled during dryer . energy inputs to this method of drying include that to the compressor and the fans . an electrical heater is also required to bring the temperature of the system up to at least 25 degrees centigrade .



Figure 2.3.3 Dehumidifier Dryer .

2.3.3.1 Advantages dehumidifier dryer .

- Efficient utilisation of heat .
- Operate at low temperatures and therefore small dryers can be built using sample insulated wood frames with plastic , or metal sheets
- Maintenance costs and peak energy requirements are low and up a kiln capacity of 45-70 cubic metres the initial equipment is low .

2.3.4 Heat Pump Dryer

The heat pump system is arranged in the drum external, the heat generated by the heat pump device is exchanged to the outer surface of the drum through a liquid medium so as to heat the wet clothes in the drum, simultaneously damp-hot air mixed with the water vapor pumped from heating clothes in drum by a vacuum device and the hot steam pumped into the drum and contacted with clothes are cooled and condensed into water, the water produced by damp-hot air is connected with water provided by the steam generating device. This existing invention increases the efficiency of heat-exchange but it can reduces the energy consumption, improve the safety of dryer and eliminate the fire threads.

In the process of the drying clothes, the hot steam is passed into the drum to increase heat between the inner surface of drum with the clothes in order to rapid dry clothes in the process of drying clothes, the damp hot air mixed with the water vapor produced by heating clothes and the hot steam pumped into the drum and contacted with clothes are pumped out through the vacuum extraction and condensed into water by the heat pump system.

The drum surface is heated through liquid medium using the quantity of heat, which is produced through that the refrigerant is compressed by the heat pump system, then, the refrigerant with low temperature and low pressure exchange heat with the damp-hot air, the damp-hot air is cooled and condensed into condensation water, collecting condensation water, and a part of which is heated into hot steam and sent into the drum.

The lower part of the drum is immersed in the liquid medium heated by the heat pump system, the temperature of the liquid medium can keep at a 35 to 60°C, the temperature of the drum surface is of 95 °C, and the temperature within the drum is of 40-70 °C.



Figure 2.2.4 Heat Pump Dryer

2.3.4.1 Advantages of heat pump dryer

- A heat pump will dry clothes a lot faster than hanging them up to dry .
- Convenient if you don't have a garden .
- Can help save on energy costs.
- Save time .
- The efficiency of the machine can reach up to approximately 50-70%, thus the energy that produce by the machine is very high .

2.4 CHARACTERISTICS OF CLOTHS DRYER RACK

2.4.1 Advantages clothes dryer rack

- **Speed:** This clothes dryer can dry clothes faster than in the yard. if drying clothes outside the house it takes 4 hours to dry compared to this machine can dry clothes for an hour
- **Consistency:** The best thing about a dryer is that you can use it anytime . it doesn't matter what weather conditions are . on the contrary , if you hang your clothes

outdoors , you will have to wait for the sun to shine bright . bright coloured clothes might even fade in the sun .

- **Flexible:** These cabinets can be stored indoors for everyday use. With this, it is able to provide ease of use and save time.
- **Easy use:** The handling is also very simple and meets the needs of the users.
- **Costs:** The price of this machine is cheaper than the clothes dryer out there. This machine also does not require weekly maintenance.

2.5 MATERIAL SELECTION

2.5.1 HEATER

The function of heater is blowing hot air into the wardrobe from below. The air then passes over nichrome wire coils that heat it , making it able to blow the clothes dry with hot air . the process of air blowing on the clothes speeds up water evaporation. The components that we use in heater is timer , main circuit , mini fan , heating elements and power cable .



Figure 2.5.1 - Heater

2.5.2 TIMER

A timer is a specialized type of clock used for measuring specific time intervals. Timers can be categorized into two main types. A timer which counts upwards from zero for measuring elapsed time is often called a stopwatch, while a device which counts down from a specified time interval is more usually called a timer. Function timer in this project is when the timer is set for 60 minutes, the electric current from the power supply will flow directly to the heater and timer, thus heat will be removed from the heater into the wardrobe to dry the shirt and the machine works. with the heat output it will dry the clothes in the wardrobe. When it is over 60

minutes, the machine will stop working and the heater will stop releasing heat. the timer returns to empty after being set for 60 minutes.



Figure 2.5.2 Timer

2.5.3 MAIN CIRCUIT

A circuit is the closed loop through which electricity can flow. A closed circuit allows an uninterrupted flow of electricity from the source of power, through the conductor or wire, to the load, and then back again to the ground or source of power. An open circuit will not conduct electricity because either air, or some other insulator has stopped or broken the flow of current in the loop .

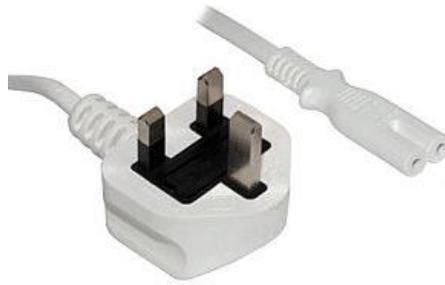


Figure 2.5.3 - Main Circuit

2.5.4 POWER CABLE

A power cable is an electrical cable, an assembly of one or more electrical conductors, usually held together with an overall sheath. The assembly is used for transmission of electrical power. Power cables may be installed as permanent wiring within buildings, buried in the ground, run overhead, or exposed.

Figure 2.5.4 - Power cable



2.5.5 NYLON FABRIC

The nylon fabric is used as the wardrobe exterior . this is able to prevent massive heat loss. Nylon is a polymer, meaning it is a plastic that has a molecular structure of a large number of similar units bonded together. An analogy would be that it is just like a metal chain is made of repeating links. Nylon is a whole family of very similar types of materials called polyamides. Nylon has both excellent strength and abrasion resistance, allowing it to stand up to any sport. It has a fantastic elastic recovery meaning that fabrics can stretch to their limits without losing their shape. Besides, nylon has good resistance to sunlight, making it an excellent choice for activewear. Its ability to accept acid dyes makes it possible to achieve brighter colors than it's other synthetic counterparts.



Figure 2.5.5 – Nylon fabric

2.5.6 STAINLESS STEEL ROD PIPE

The stainless-steel design is completely waterproof and will not corrode over the years of usage. Stainless steel pipes will give at least 100 years of service without cracking or bursting. Failure of stainless steel pipe is extremely rare. Stainless steel is generally divided into four distinct groups:

- **Austenitic.** The austenitic group comprises the most common types of stainless steel. Austenitic stainless steels, in comparison with other types, contain elevated levels of chromium, molybdenum and nickel. They are particularly versatile and are renowned for displaying excellent strength and malle-ability.

-**Ferritic.** Containing anywhere between 10.5% and 30% chromium, ferritic stainless steels usually have low carbon consis-ten-cies of not more than 0.1%. Ferritic stainless steels are magnetic and are primarily chosen for their resistance to temperature oxidation and stress corrosion cracking.

-**Duplex.** Duplex stainless steel combines the austenitic with the ferritic, resulting in a metal that is stronger than both: this higher strength can lead to considerable weight reductions. Its excellent resistance to corrosion, even in demanding envi-ron-ments, make it perfect for use in marine appli-cations.

-**Martensitic.** Structurally similar to ferritic stainless steel but with an elevated carbon content (up to 1.2%), martensitic stainless steel can be hardened to a large degree. They are especially useful for creating medical tools and surgical instruments.-

The advantages of using stainless steel rod pipe in clothes dryer rack is Stainless steel has a number of properties that make it extremely useful. Because of the way in which the different metals within it interact with one another, stainless steel is highly resistant to oxidation, which is a complicated way of saying that it does not rust easily, and is capable of remaining in mint condition for many years.



Figure 2.5.6 - Stainless steel rod pipe

2.5.7 CONNECTOR

the function of the connector is to be a connector between stainless steel rod pipe to make the rack stronger and stronger. when the rack is stronger, it will support the shirt more to dry in one go.



Figure 2.5.7 - Connector

2.6 CHAPTER'S SUMMARY

As to conclude this chapter, literature review is important to showcase all the studies of materials and methods to enhance the knowledge on this project. Every thesis and others projects that are related to this clothes dryer rack is really helpful especially for us to understand it fully.

This is determined based on the cost required in addition to the components that are readily available and the timeframe set for completing the project. The use of the system is also in line with the concept of the system. This well-organized control system is able to control the cost of project development. Theoretically, the criteria that need to be given full attention are the project operation, the components used, the software selected, and the form of hardware developed. Overall, this study has helped a lot to get information and ideas in developing the project in terms of system and design of the project. This will indirectly be the main basis in determining the direction of the project.

After a lot of materials and methods were discussed and researches were done, the materials that are the most compatible for our project is heater. Due to its characters and advantages, meanwhile the methods that we decided to carry on is hands layup method. This is because of its low cost benefits and great for beginner's process.

CHAPTER 3

METHODOLOGY

3.1 INTRODUCTION

A methodology is a plan-of-attack, especially when that plan-of-attack is used repeatedly. This might be obvious, but the word methodology is related to the word method. In fact, a methodology is a system of methods followed consistently. Scientists, for example, use various methodologies as they perform experiments. It might seem like the world is nothing but chaos and disorder. Thus, the purpose of conducting research is to obtain answers through the use of a systematic and scientific scientific method (J.supranto, 1986: 7 (quoted by Azhur, 2006: 139). Therefore, any study requires methodology as a way to obtain findings. Methodology which is used requires systematic techniques to meet scientific requirements, scientific methods and have quality. In order to develop this system, several methods to display materials have been made such as obtaining hardware and information through instructors and other colleagues.

In addition, it is very important to know and understand in depth every process found in the structure of the study methodology. Among what needs to be done is to get as much information as possible. Clothes dryer system is a project created to overcome the problem of erratic weather changes throughout the year causing the clothes not dry and men emitting an unpleasant odour method to this madness. And sometimes there's a methodology.

In this chapter, there will be a lot of information about the process and journey through out the making of our final project. There will be flow chart showing the process of us making the whole project. This flow chart will explain the processes we took. Next, is the Gantt Chart, which will show the actual and planning throughout all the 13 weeks of our final year project journey.

3.2 FLOW CHART

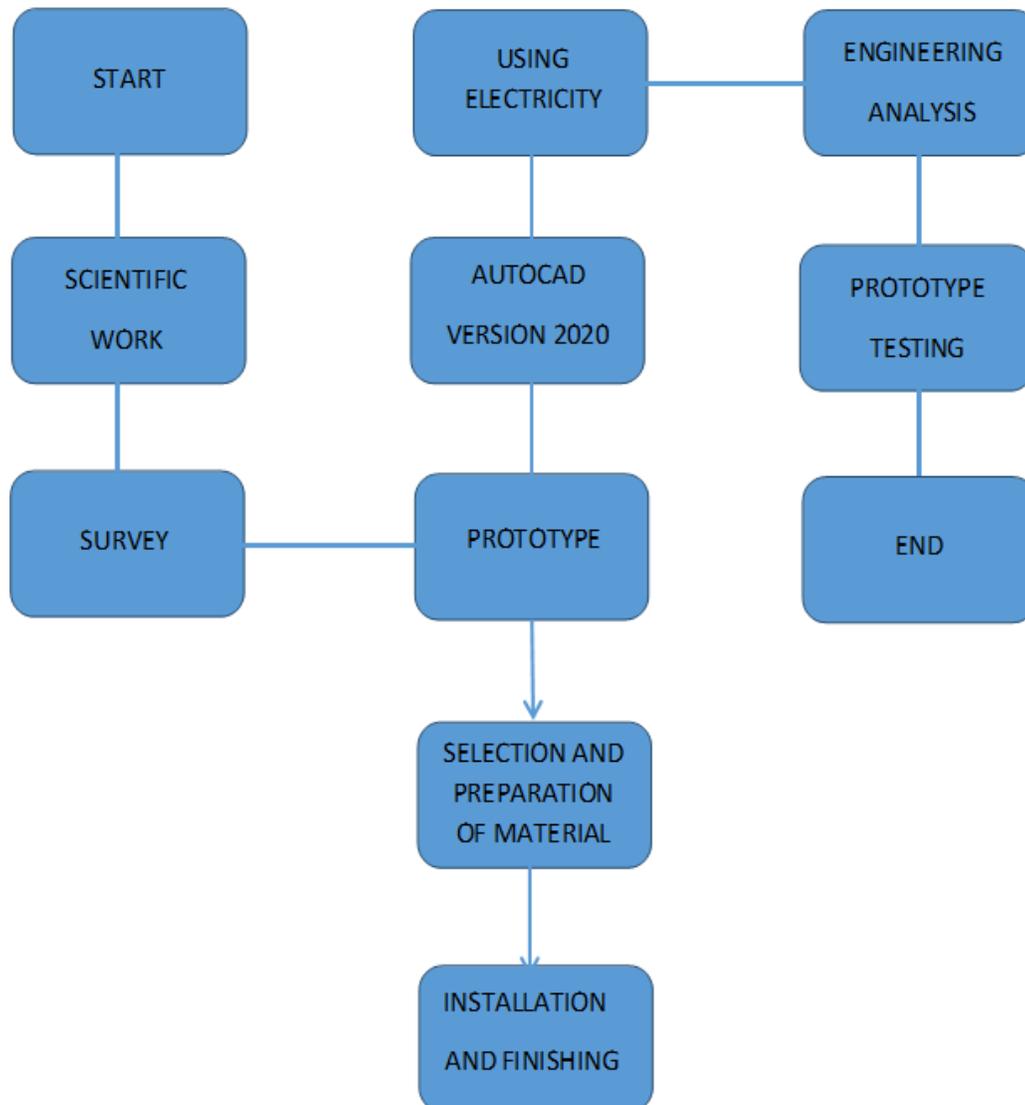


Figure 3.2.1 – Flow Chart

3.3 FLOW CHART EXPLANATION

Prepared by Mohammad Ashraf Bin Zulkiflee

- **Literature review**

A literature review is conducted to obtain information as well as data on the project being developed. In this study, the focus is more on the projects that are being carried out either directly or solely based on observations.

- **Generation and selection concept**

In the process of design and selection of design concepts must be meticulously detailed in all aspects to ensure that each process works well.

- **Detailed design**

The designation of the project began after the researches gathered. New design was made to make an identical change between the past project and the new one. Detailed design is done to assess the level of convenience and speed of drying clothes. The study design serves as a guide in a study to find clear answer to the research questions

- **Tools**

This project involves the use of various tools for manufacturing work such as mini aluminium foil, capacitor, transformer, diode, resistor, relay, waterproof padded cotton cloth, stainless-steel pipe.

- **Prototype development**

In the process of the prototype development tools such as scissors, tape and other were used for the purpose of assembling the components of the product prototype. The prototype was developed as mini project. We did not use the actual materials just yet, instead we used other materials that resembled the actual materials were puts together with the use of the tools

- **Selection and preparation of materials**

Choosing the right and most appropriate material is important to produce a prototype of a wardrobe dryer, if we use quality materials, it will make the project las longer. For example: if using waterproof padded cotton cloth than nylon fabric as case fabric it will keep the temperature of heat in the wardrobe

- **Installation and Finishing**

The assemble prototype will do after all the design process was done and components was found. Proper installations and beautiful packaging are needed to attract customers and make them even better than the clothes dryer in the market

- **Availability and cost**

The main focus is on the design of the clothes dryer to meet the needs of the more user friendly, cost-effective and environmentally friendly and save time. The total cost is only RM00 and the time to complete the project is 2 months and the components to build this project are available at hardware engineering stores and other hardware shop.

- **Ergonomic analysis**

We did ergonomic analysis of this project and found that there was no hazard to the user. For example: we use a very lightweight stainless-steel pipe that will make it easy for users to install it. we also use a systematic wiring system to prevent short circuits when the user handles them.

- **Project testing**

Project testing needs to be done to find out the results and problems encountered by the project. In addition, problems that arise during the testing session can be detected before a product is marketed. project testing is done with the team members as the first user.

3.4 INTERVIEW AND RESEARCH

Prepared By Aina Syukriah Binti Rahim

this interview and research is the result of modifications made from previous theses and journals on the clothes dryer system. Then, discussions were held with the supervisor first before it was done to the working group. The survey is more focused on the effectiveness of the clothes dryer system produced. The main purpose of conducting this survey is to enable us to gather feedback that will be received from those who use regarding the project we are running. The process of conducting the survey is done by group members by distributing survey forms at the housing site. After an hour we have conducted a survey and interview with the parties involved face to face and online. With that, the results we get will be analyzed to give us suggestions and conclusions and encouragement in our final project

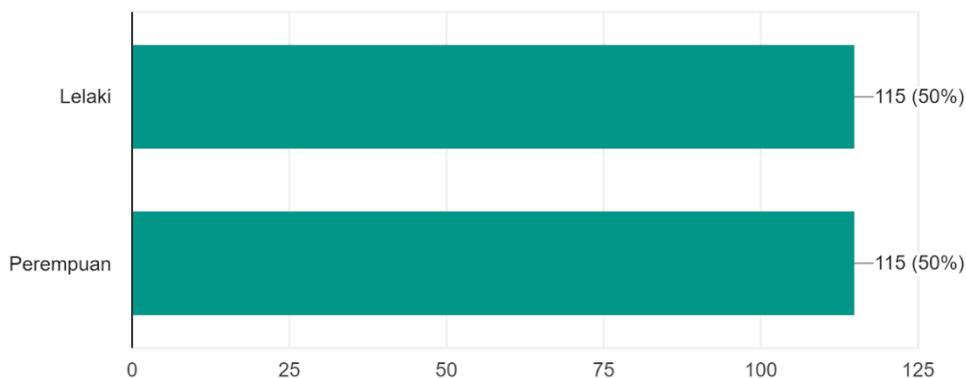
This Questionnaire Form (Refer to Appendix) is divided into:

- i) Part A - The focus of this section is on the background such as age, gender, marital status, level of education and employment.
- ii) Part B - Focus on the effectiveness of the clothes dryer system machine produced

3.4.1 SURVEY RESULTS

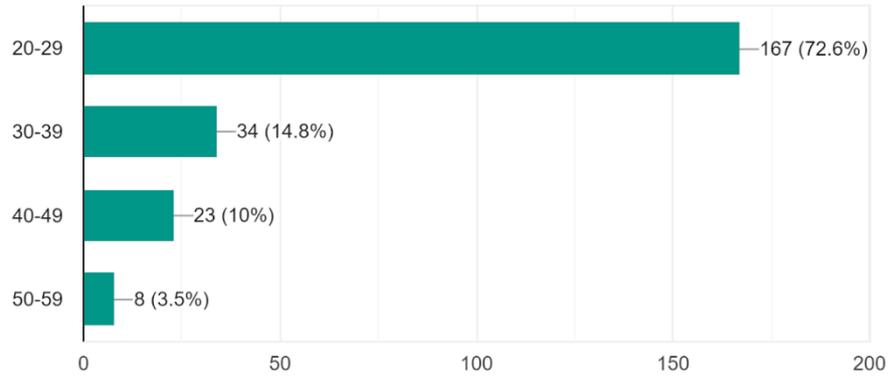
Prepared By Aina Syukriah Binti Rahim

Jantina
230 responses



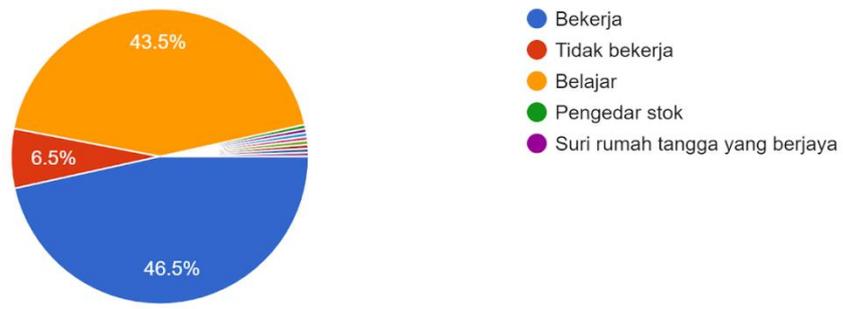
Umur

230 responses



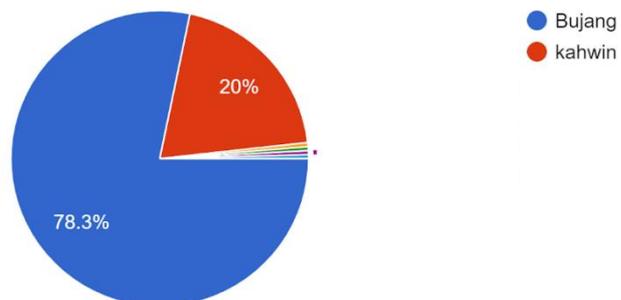
Pekerjaan

230 responses



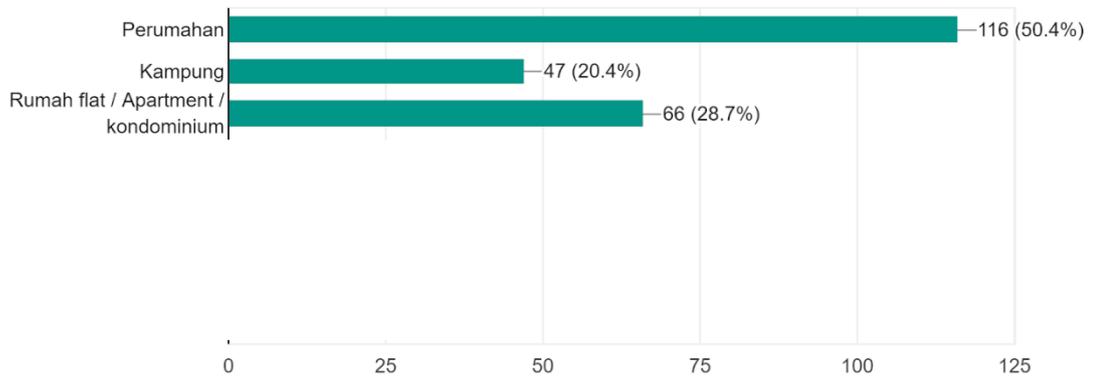
Status

230 responses



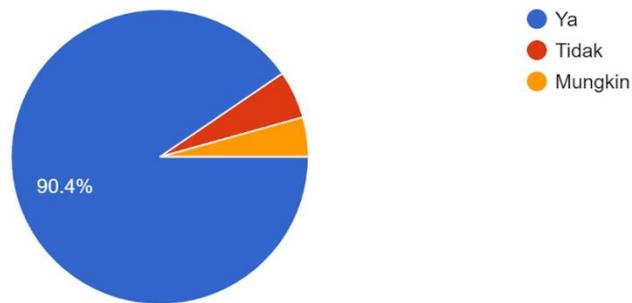
Kawasan tempat tinggal

230 responses



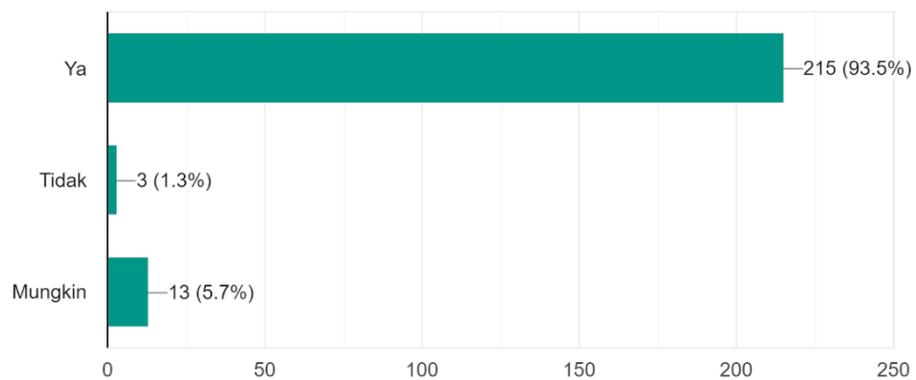
Mengalami kesukaran untuk mengeringkan baju ketika cuaca buruk ?

230 responses

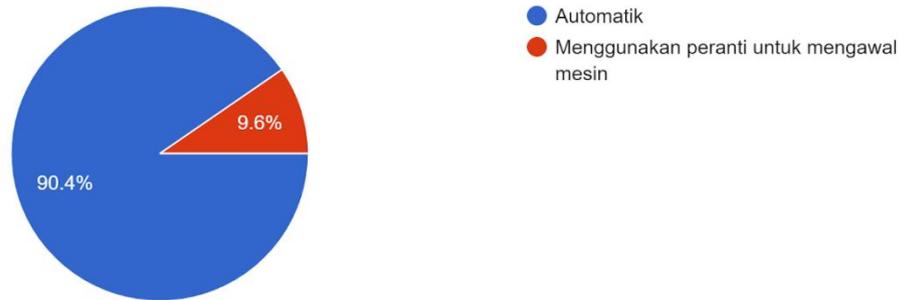


Adakah mesin pengering baju perlu digunakan ?

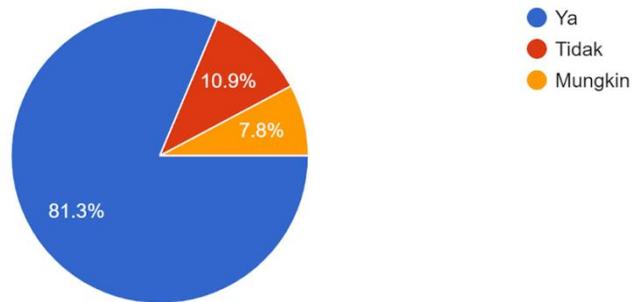
230 responses



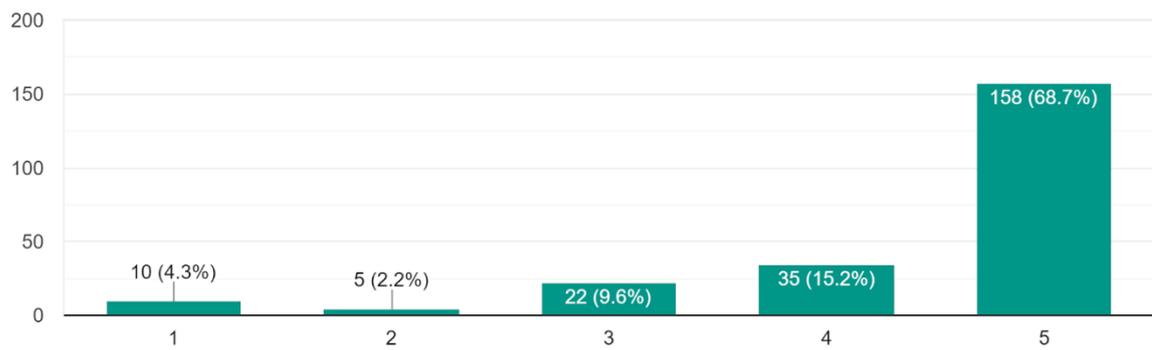
mesin pengering haruslah beroperasi secara
228 responses



Adakah anda perlu mempunyai mesin pengering baju di rumah
230 responses



Mempunyai mesin pengering baju di rumah adalah penting
230 responses



3.5 PRODUCT DESIGN

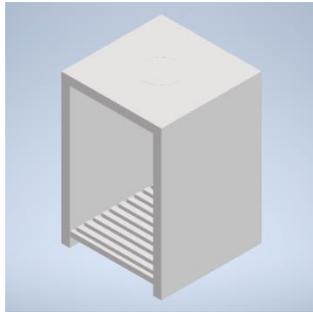


Figure 3.5.1 : Project Sketch

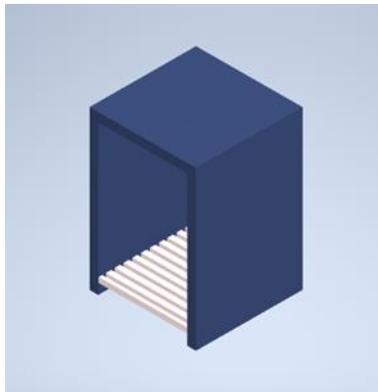


Figure 3.5.2



Figure 3.5.3

3.6 OPERATIONAL METHODOLOGY

Prepared by Aina Syukriah Binti Rahim

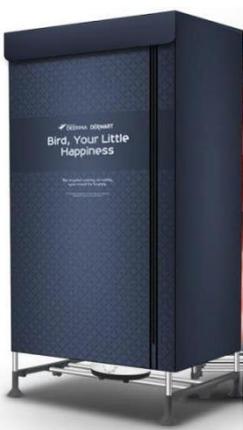
 <p>ARRANGE COMPONENTS</p>	 <p>INSTALLING</p>	 <p>READY TO USE</p>
---	---	--

Table 3.6.1 – Operational Methodology

- **Arrange components**

Arranging components is done by providing all the components needed for the cloth dryer racks installation process perfectly without faults or lack of components. components are arranged in order so that it is easy for the installation process without confusion.

- **Installing**

This installation process is to form the framework and body of the project. This process is done according to the installation steps so that the results obtained are as required. this installation process must be done carefully, so that no damage or fault does not occur to the project material.

- **Ready to use**

The project is ready to be used for the drying process by following the safety precautions and proper use.

3.7 METHODOLOGY PHASE

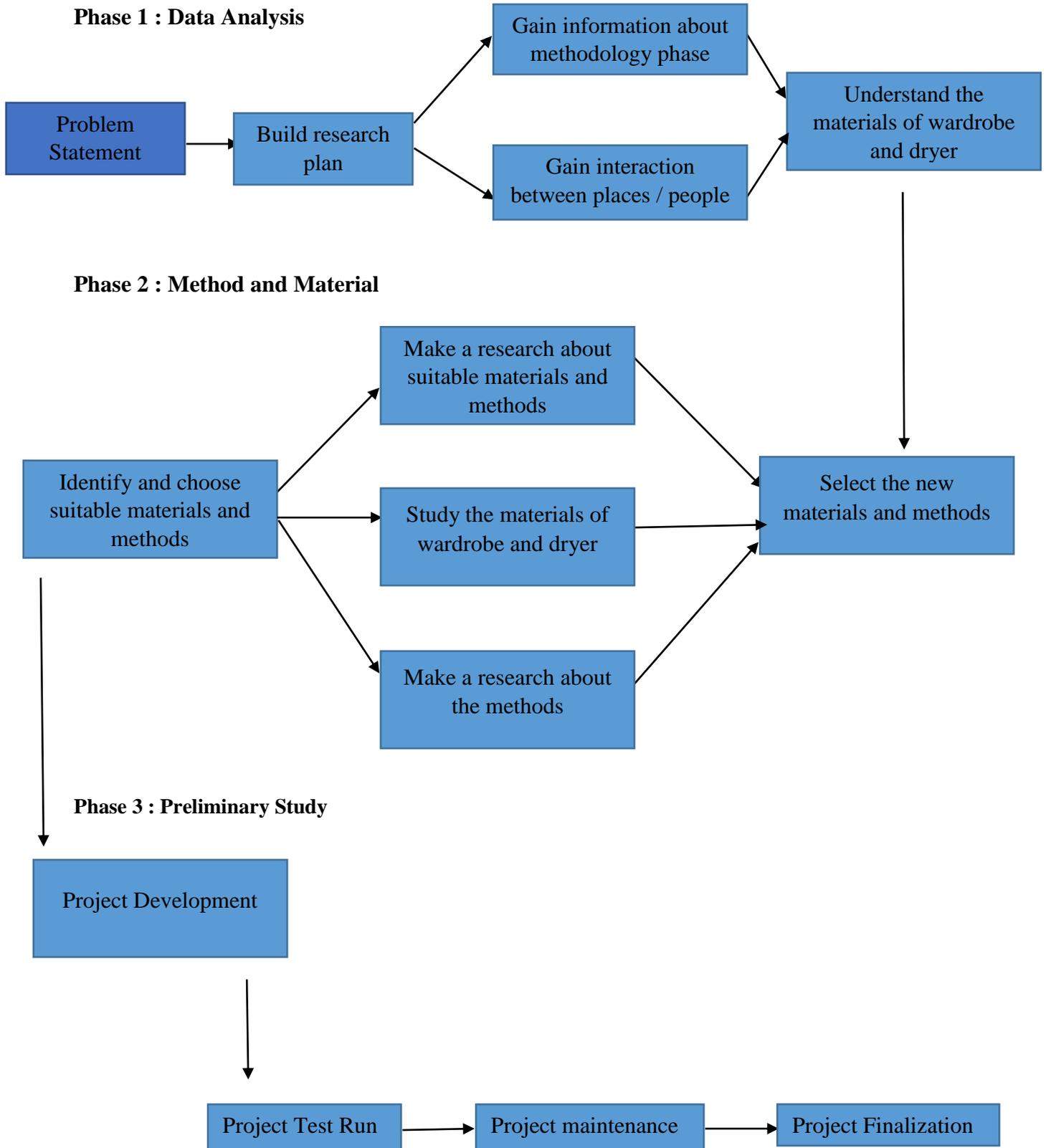


Figure 3.7.1 - Methodology Phase

3.8 BUDGET CALCULATION

Prepared By Aina Syukriah Binti Rahim

No	Materials / Equipment	Amount	Price
1.	Stainless Steel Rod pipe	14 Units	RM 30
2.	Nylon Fabric	12 Meter	RM30
3.	Stand Holder	2 Units	RM 2
4.	Connector	6 Units	RM 10
5.	Timer	1 Units	RM 12
6.	Main Circuit	1 Units	RM 40
7.	Air Heater Heating Element	1 Units	RM 40
8.	Power Cable	1 Units	RM 2
9.	Spray Paint	2 Units	RM 16
10.	Heater casing	1 Units	RM 18
		Total	RM 200

Table 3.8.1

3.9 PROJECT ACTIVITY

PROJECT ACTIVITY PLANNING (GANTT CARRT)

SESSION: JUN 2020
 DEPARTMENT: JKM
 COURSE: MECHANICAL ENGINEERING OF PACKAGING

WEEK	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12	W13	W14	W15
PROJECT ACTIVITY	13/8	18/8	27/8	3/9	10/9	17/9	24/9	1/10	8/10	15/10	22/10	29/10	5/11	12/11	19/11
INITIAL PLANNING	■	■													
RESEARCH	■	■	■	■											
ABSTRACT & POSTER DEVELOPMENT				■	■										
COMPONENTS ASSEMBLY				■	■	■	■	■	■						
REPORT AND VIDEO				■	■	■	■	■							
COMPONENTS MATERIAL TESTING							■	■	■	■	■				
PROJECT IMPROVEMENT							■	■	■	■	■	■			
COMPLETE PROJECT & TESTING													■		
PROJECT PRESENTATION														■	
FINAL REPORT SUBMISSION															■

PLANING DATE ■
 IMPLEMENTATION DATE ■

Figure 3.9.1 - Gantt Chart

3.10 SUMMARY

As a conclusion, the methods implemented in this project are very crucial and important to complete the project. Thus, as stated in the interview, this project is agreed and accepted by most of the people during our survey who comprises of urban area citizen who were affected by the frequent climate changes. The materials used in the project will create a light and strong wardrobe yet easily attachable and detachable, hence this project is very convenient to the housekeepers and also the environment because of its portable character. However, this method will affect the result totally if one of the methods was changed.

CHAPTER 4

FINDINGS AND ANALYSIS

4.1 INTRODUCTION

This chapter combine data and analysis of the clothes dryer racks and its materials calculations. This data and analysis are very important for this project to achieve the objectives and scope of the project. This data indicates the successful results of the materials testing. After getting all of this data, we analyze every single possible to make it perfect.

4.2 SAFETY IN TESTING / PRECUATIONS

Prepared By Nur Anis Dalilah binti Anuwar

In conducting testing work, safety questions are very important at the point of before, during or after testing. This is to prevent damage to components, circuits and test equipment. To prevent such incidents, the following is a list of safety measures that must be practiced.

- Ensure the test equipment is in good condition before testing .
- Before testing the circuit connection , make sure the wiring is in the correct condition based on the selection of the appropriate components .
- Make sure all the testing methods follow the correct steps .
- Ensure the negative wire connection does not come into contact with the positive wire on the components .
- The wiring must be in the correct condition based on the proper selection and installation of components.
-

4.3 COMPONENT TESTING (heater)

Testing on the project needs to be done to find out the results and problems encountered on the project. In addition, problems that will arise from testing can be detected before a product is marketed. Project testing is done together with group members as the first user

NO	NAME OF COMPONENTS	RESULTS	ACTIONS
1	Heat isolator	Not working overhead during installation	Replaced the new heat isolator
2	Mini fans	Wired disconnected wiring made its flow	Repeat circuit wiring
3	Timer	Checking machine termination is not like the set installation time	Installation check again

Table 4.3

4.3.1 SECOND STAGE OF MECHANICAL TESTING

Testing the second test performed is based on a checklist of mechanical components that have been printed to make it easier us to identify problems or results to be obtained .

NO	NAME OF COMPONENTS	RESULTS	ACTIONS
1	Stand holder	Can stand well	-
2	Stainless steel rod	Strong and solid	-
3	Heater	Works fine	-

Table 4.3.1

4.4 CONCLUSION

After undergoing the second test , it was found that all components can function properly . Therefore the clothes dryer rack was successfully produced .

4.5 ADVANTAGES

Every project has its own pros and cons, the pros will help the people and also the environment. However, the cons or the disadvantages must be improved or change for the future so that we could enhance the good and very efficient product that hardly to find disadvantage of the project.

Clothes dryer racks has a lot of advantages to help at housekeeping and also environment. Besides of the advantages, this project also disadvantages that we must overcome it in the future for the better good.

4.6 CHAPTER'S SUMMARY

As a conclusion for this chapter , the analysis and findings have been made. Clothes dryer racks has a lot of advantages however there are every cons to pros. Hence, the challenges are taken as a room for improvements and more developments for future generation and well as to enhance their knowledge on the project we carried out. Test run is carried out to determine the fullest potential of nylon and it is proven that nylon fabric both strong and heat insulator.

CHAPTER 5

DISCUSSION , CONCLUSION AND UPGRADE PLAN

Prepared By Aina Syukriah Binti Rahim

5.1 INTRODUCTION

This chapter explains about discussion , conclusion and upgrade plan all together for the project . From the data from the test run of the project, the analysis have been done. Hence, the discussion from all the results of test run and analysis will be explain in this chapter. Then , the conclusion will be made based on the discussion and upgrade plan that have been made.

5.2 DISCUSSION

Overall in this project,This clothes dryer racks is a project undertaken to solve the problem of imperfect drying in everyday life. This idea comes from looking at the problems that often occur to users. One of the most common problems is that dry clothes cannot dry properly due to inclement weather. In addition, the problem of finding livelihoods in homes is likely to be expensive and branded. With this project, the clothes can be properly dried and any problems that may arise can be effectively addressed. These clothes dryer racks are ideal for use in homes such as condos and flats where they are usually exposed to many problems. These cabinets can be stored indoors for everyday use. With this, it is able to provide ease of use and save time. The handling is also very simple and meets the needs of the users. This project is to help the working class to do their daily work more easily and save manpower. These people do not have to worry about the clothes they left in the wet from the rain and also do not have to rush back home if the day already wants rain. Changing human life and improving the medium along with modern technological advances. Those who work for all communities do not have to worry about special non-dry clothing in Malaysia which is now with uncertain weather. With this clothes drying system can give them time to do other daily chores.

5.3 CONCLUSION

Based on this through out project , this project is an innovation of the existing technology aims to improve the human way of life. As a fellow human, living together in this world, we always seek to help overcoming each other problems. The clothes dryer racks is another initiative to overcome the current struggle for clothes drying during the unpredictable and fast changes of weather. By combining the function of two technologies, the time and energy that should be spent on laundry would be decreased. The consumers can use the extra time to focus on something else.

There is some improvement that can be made to this project for the future. One of them is to improve the structure of a stronger frame so that more clothes can fit into the clothes dryer. In addition, adding new feature like temperature sensor to show the temperature of the air in the dryer

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SURVEY MESIN PENGERING BAJU

Jantina:

Umur:

Pekerjaan:

Status: Bujang / Kahwin / Lain-lain

Kawasan Tempat Tinggal:

Kampung / Rumah Flat, Apartmen atau Kondominium / Lain-lain

Adakah anda mengalami kesukaran untuk mengeringkan baju ketika cuaca buruk?

Ya / Tidak / Mungkin

Adakah mesin pengering baju perlu digunakan?

Ya / Tidak / Mungkin

Adakah anda perlu mempunyai mesin pengering baju di rumah?

Ya / Tidak / Mungkin

Mesin pengering haruslah beroperasi secara...

Automatik / Menggunakan peranti untuk mengawal mesin

Mempunyai mesin pengering baju di rumah adalah penting...

1 / 2 / 3 / 4 / 5

Terima Kasih Atas Kerjasama Anda

CLOTH DRYER RACKS DESIGN CONCEPT IN AUTODESK INVENTOR

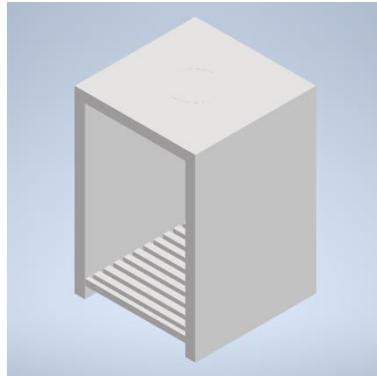


Figure 1 : *Project Sketch*

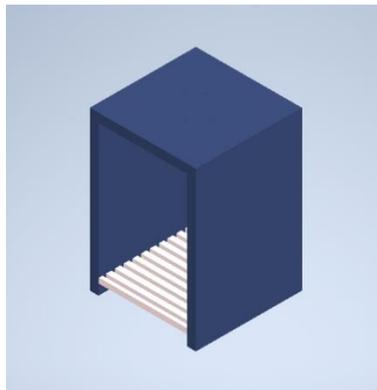


Figure 2 : *The Concept of Cloth Dryer racks*

APPENDIX

Table 1 : Description of Raw Materials

	ITEM	FUNCTION	MATERIALS	DESCRIPTION(cm)	
				length	Width
1	Heater	Blowing hot air into the wardrobe from below.	Plastic	23	23
2	Stainless Steel Rod	Act as the framework for the wardrobe. It also enables clothes to be hanged inside the wardrobe.	Stainless Steel	65	1.5
3	Nylon Fabric	Used as the wardrobe exterior. Able to prevent massive heat loss.	Oxford Nylon	68	50
4	Stand holder	To hold steel rods and to be the base for the racks	Plastic	6	1.8 6
5	Stick installation	To connect the steel rods to each other	Rubber	44.5	2.4

HEATER COMPONENTS		
NO.	COMPONENTS	FUNCTION
1	Timer	The timer functioned as the main switch for the heater which means that if the timer is not set, then the heater will not operate.
2	Main Circuit	The main circuit act as the control center for the heater. Every electrical component inside the heater is connected to the main circuit.
3	Mini Fan	Mini fan blows out the heat produced by the heating element. Mini fan operates in the same time as heating element as soon as the timer is set.
4	Heating Element	Produce heat source for clothes drying. The heating elements convert the electrical energy supplied from the power source through the power cable.
5	Power Cable	Connects the heater to power source, enabling the flows of electrical energy into the heater components.

Table 2 : Description of Components and function

INSTALLATION WORKS

	<ul style="list-style-type: none"> ● The Wardrobe frame is neatly installed
	<ul style="list-style-type: none"> ● Oxford nylon fabric is fitted to cover the frame tightly
	<ul style="list-style-type: none"> ● The heater is placed at the bottom of the wardrobe where there is an air hole to enter

Table 3 : Installation Works

RESULTS

1. Running Test 1

We had conducted a running on the standard clothes dryer at laundry in Figure 1. Figure 2 is mostly people dry their cloths at clothes hanger. So, it take several hours to dry the clothes.



Figure 3 : Clothes dryer



Figure 4 : Clothes hanger

NO	TYPE OF MODEL	ACTION	TOOLS	VOLTAGE	TIME TAKEN	EFFECT OF ACTION
1	T1	Dry clothes by machine	electricity	240v	25 minutes	Clothes become wrinkled
2	T2	Dry clothes using natural weather	weather	-	4-5 hours (depends on weather)	Clothes will be exposed to dust and dirt

Table 4 : Test result 1

REMARKS :



Figure 5 : Condition of Clothes after using standard dryer

2. Running Test 2

Finally, condition of Clothdryer racks are shown in Table 3

NO	TYPE OF MODEL	ACTION	TOOLS	VOLTAGE	TIME TAKEN	EFFECT OF ACTION
1	T1	Dry clothes by clots dryer racks	electricity	220v	1 hours	Clothes completely dry and does not become wrinkled
2	T2	Dry clothes using natural weather	weather	-	4-5 hours (depends on weather)	Clothes will be exposed to dust and dirt

Table 5 : Test result 2

REMARKS :



Table 3 : *Condition of cloth dryer racks after Running Test 2.*