SHOES DRYER FINAL PROJECT

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SHOE DRYER 2.0

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

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ABSTRACTS

Drying shoes under the sun may take quite a long time for the shoes to dry and may depend on the weather. As a solution to this problem, a shoe dryer is designed. This shoe dryer is easy to carry anywhere, lightweight and a short drying time. The design concept is to use PVC pipes as a body / air duct that will be channeled into the shoes. The air source uses the concept of a hair dryer mechanism where air is generated from the rotation of the fan driven by an electric source and heats the air heater at a low level of this design is to make it easy for people to dry their shoes. For example, when we go on a vacation to a cold place or hiking we must be prepared for unexpected circumstances. With the design of this mobile shoe dryer that is light and easy to carry can to some extent provide the convenience to dry shoes anywhere. Our study through on online question found that an individual who often facing this problem is a housewives and students. This shoe dryer were produced cheap and using durable materials so that it is affordable tool for students and housewives. The shoe dryer is mobile and easy to carry because the size were designed medium sized tool. Then, Shoe Dryer 2.0 is designed to overcame this problems.

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CHAPTER 1
INTRODUCTION

1.1 RESEARCH BACKGROUND

Our project title is about development of Shoe Dryer Apparatus. This apparatus is very simple for us to use. It is because, we just have to plug it to the electric socket and switch it on before we can easily use it. Our project is safe to use as it is doesn't use much manpower, did not required any lot of electricity and very efficient to dry a shoes overnight. The apparatus with the use of thermal convection drying from light bulb that which means that warm air naturally rises, the shoe dryer can dry any shoes in a short time compared to the shoe dryer out there. As we know, in Malaysia, we have an uncertain weather condition that can lead to the problem for us to dry our shoes, especially in the monsoon season. With this apparatus, at least, one shoes can be dried for us to use in the next day. This simple shoe dryer is also can make our shoes more comfortable each day while protecting the shoes investment. Other than that, it also suitable to remove any perspiration, wetness and odour from the shoes. It is because, the shoe dryer is complete with an air space on both of the apparatus. The light bulb is select from high power watts to give a high heater to the shoes. Finally, this apparatus is not too large that it can only dry a pair shoes in one time.

1.2 PROBLEM STATEMENT

The tools needed in the manufacture of this project are electrical goods which we know have averaged different price averages, both cheap and expensive. However, to ensure that something happens, we certainly want high quality goods that we know will not be cheap.

In addition, electrical items such as PVC pipes, heating appliances, etc. are not easy to reuse because the goods need to be repaired because sometimes the equipment has already gone through some damage. However, our project highlights the budget as we only consist of two group members and of course these budget constraints will disrupt the course of this project. Therefore, we have made many calculations and price comparisons in some places and also highlight the quality of the goods.

1.3 RESEARCH OBJECTIVES

The objectives of this research are:

i. To expose users to how to dry their shoes in an easy way
ii. To help users living in places with limited space to dry their shoes more easily
iii. To help users with limited time to dry their shoes in a short time
iv. To help people who like to travel dry their shoes more easily as they of course carry little shoes
v. Helping Malaysians dry their shoes more easily especially those who have many children when the monsoon season arrives
vi. To produce a more user-friendly product or project

1.4 RESEARCH QUESTION

This study will answer the following research questions:

i. Can we produce more user-friendly shoe dryer products?
ii. What type of shoe dryer is suitable to use in this project?
iii. What is the drying duration of the shoes used by the tool?

1.5 SCOPE OF RESEARCH

The scopes and limits to this research are:

i. This product uses only heat drying equipment
ii. Only one pair of shoes can be used at a time
iii. Using PVC pipe as body
iv. Use only electricity to operate
v. Can last a long time if used carefully

1.6 SIGNIFICANT OF RESEARCH

Although Malaysia is a country that is exposed to a lot of sunlight, however, we are also exposed to unpredictable weather such as rain and monsoon season. Most of us do not care about this at first, but after the monsoon season, many of us will have problems with wet shoes because they can not dry them while the next day will need to be reused for other daily affairs such as work or school. people who have limited space such as apartments will definitely find space to dry their shoes because as we already know, a pair of shoes takes a long time to dry even in the sun because the shoes have a complex design for dry. There are many other groups that we take into account in this project initiative such as those who like to travel, parents who have many children and others who are relevant to this tool, so it is very important for us to provide this product because many of them use traditional and less productive way to dry their shoes.

1.7 CHAPTER SUMMARY

In this chapter, the studies was explained about its exposure of ideas and originality. All the objectives were made out of all the problem statements. The objective for this project along with the importance will be effectiveness of the product to the society and affordable to the people. Even though, this project are focused on people's budget. Thus, this our shoe dryer could be used for daily routine with a really good durability.and also easy to bring along on vacation.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

Since this day, people are always having a problem to dry the shoes in a short of time. So, using a D.I.Y shoe dryer, maybe it only uses in a short time to dry shoes. Its mean, use this apparatus when want to dry a shoes within a short time and safely. The function of the apparatus create is want to store and dry the shoes in easy place to persons during in many situations. It is because; the shoe dryer can be store in everywhere that near the electric supply to operate it. From the statement above conclude that the simple shoe dryer apparatus is a major role as an items transferring mechanism for people without having a problem of doing that easier. Others, the apparatus are also powerful, silent, thermal action sends warm air circulating through footwear removing wetness and odor while preventing boot and shoe damage. The Shoe Dryer is ideal for all types of footwear including leather, canvas, vinyl, rubber, plastics and more. Available in electric or propane models for home or outdoor use are remove wetness, perspiration and odor safely from any footwear, overnight. Another that, it also improves foot comfort and health.

2.2 BASIC PRINCIPLES

The heating process of the shoe dryer is subjected split into a few categories:

I. Come from of two exhaust fan on apparatus.
II. Flow of air around the shoe dryer.
III. From two bulb-light (l00 watt).

a) The Dry Element

- Use two units of bulb-light that large than usual Watts (power) to give the high of heat on the shoe during the dry process.
- Another that, the exhaust fan is also supply on the apparatus. The function of the exhaust fan is an extra element of drying to the shoe. It will supply the heat in the apparatus.

b) The time of shoes to dry

After the researches on current market, the shoes are taking a long time to dry. It was around 6 to 7 hour to complete. On market product, the shoe dryer is use the high of air pressure as an element of the dry. The product is looking simple but follows the function. So, on the simple shoe dryer that want to create, it maybe take a short of time compares a usual. For this apparatus, it takes around 3 to 4 hour to dry the shoes in time.

c) How many of shoes that can state on the apparatus in one time?

- It only a pair of shoes because it suitable on the objective that thinking

d) Function of shoe Dryer

- Remove wetness, perspiration and odor safely from any footwear, overnight.
- Improve foot comfort and health.
- Protect your footwear investment.
- Dry and store shoes without ever unplugging dryer.

e) Advantages :-

- Easy to place in everywhere.
- The apparatus is looking simple.
- The cost of develop the apparatus is not expensive and suitable for every rank of community to get it.
- Use more than one dry element to the apparatus.
- Take a short time to dry the shoe compares a usual.

f) Disadvantages:-

- Use a high of power supply compares a usual.
- A space for state a shoes is not enough for many of shoes to dry in one time.

2.3 CURRENT EXISTED SHOE DRYER IN MARKET.

2.3.1 Portable Shoe Dryers at Hammacher Schlemmer.

This is the portable shoe dryer preferred by our customers when they travel because they can be stored in your footwear, and when plugged into an outlet at your destination they gently, safely, silently, and thoroughly dry your footwear overnight. The dryer fits inside a shoe to gradually remove moisture, eliminating bacteria build-up without damaging the material or shape of the footwear. A 20-watt thermal convection heating process silently circulates room air into the dryer, and throughout the shoe. Easy-to-transport, the dryers are ideal for hunting trips, beach vacations, ski or hiking excursions, or out-of-town marathons. Made by PEET, inventor of the original electric shoe dryer in 1968. Can be used with Mens footwear sized 7 and up, or Women's sized 5 and up. Set of two. 2 3/4" H x 2 3/4" W x 7 3/4" L. (3 lbs.).

Figure 2.3.1 : Portable shoe dryers at Hammacher Schlemmer

2.3.2 SHOE AND GLOVE DRYER

A small fan pulls air through the shoes and gloves. In the portable unit shown here, you can turn the heat on or off. This boot dryer will also dry one pair of shoes or boots plus a pair of gloves at the same time, according to the product literature. For this particular model of shoe dryer, some thought needs to be put into supporting the unit. Other, more expensive models have their own stands.

Figure 2.3.2: Shoe and glove dryer

2.3.3 Pro-We United Kingdom - UV Shoe Dryer

The ultra-quiet ventilator provides perfect air circulation. UV light fights bacteria. On your skiing holidays, hiking tours, after working in the garden or that autumn walk: However damp your shoes may be at the end of the day, they will be dry and warm by the next morning. The light from built-in UV-LEDs combats bacteria. Boost your spirits for the coming day, even if it's cold and rainy.

- **Dries with a 40°C warm air stream.**

The flexible heating arms can be extended to a length of 21cm (8 1/4"). The air stream circulates through your shoes at *2.500* 1 per hour and is driven by extremely quiet ventilation technology developed for PCs.

- **Double safety.**

A thermo switch and a thermal safety fuse prevent the ventilator from overheating and ensure gentle drying. Ideal for preformed shoe liners and insoles.

Figure 2.3.3 : **Pro-Jdée United Kingdom - UV Shoe Dryer**

2.4 PART ON SHOE DRYER APPARATUS

2.4.1 BODY

For outdoor use on the apparatus is look simple and not complicated. The body is complete with electric system to supply the heater fill in the apparatus during on it. The apparatus is using the sheet metal on overall their body. On the body, it's complete with air space on both of side to give air to enter and out of the air unused in the apparatus.

2.4.2 MOVEMENT SYSTEM

This apparatus is use the wheel to move the apparatus on destination. It only uses four unit of wheel. The size of wheel is not too large and not too small. The wheel is choosing because it can place the system in safe location and in balance.

2.4.3 JOINING METHOD

The method that apply in the apparatus is not to a short time but it want in a long time uses. It is because; the material that will use is endured from the corrosion. So, for the join all of part on the apparatus, we require to use the rivet tools and also use the welding machine to join the material that have a hard. The rivet is uses because it can join the material that suitable with permanent on the surface. It also uses the arc welding to join the material.

2.5 SUMMARY

The objective of this product is to provide convenience and improvement in today's society. As we can look up on this product, there's a few types of shoe dryer and each of them has their own unique function. Also, each of all types of shoe dryer had their own disadvantages. Some of the shoe dryer resulting in a lot of electricity usage, inefficient use of space, can't be carried anywhere, comes with expensive price, the product are not to be found in local market. These kind of problems might effecting some of user's economical problem, lack of knowledge in the use of modern technology, and etc.. So, our main purpose is to create a product that help people to overcome this issues that always lingering in today's society.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 INTRODUCTION

In fabricate of shoe dryer apparatus, there are several step must be follows. In this part, all students should be understand why chose the material and why must chose the particular methods used to characterize the material. Methodology is important before make the product. In fabricating process, it is include about measuring, transferring, punching, bending, joining and finishing process. Project methodology is a body of practices, procedures and rules used by those who work in a discipline or engage in an inquiry and a set of working methods. All the methods that will be explained in this chapter are very important procedure to ensure it follow the entire project schedule so that it will be move smoothly. Effective methods will give clear view on how to do this project. These methods will be guidance in so that it will be finish at the right time as the planning. Whole process will be explained in this chapter also. So it will give general view of what are the steps should be taken.

3. 2 FLOW CHART

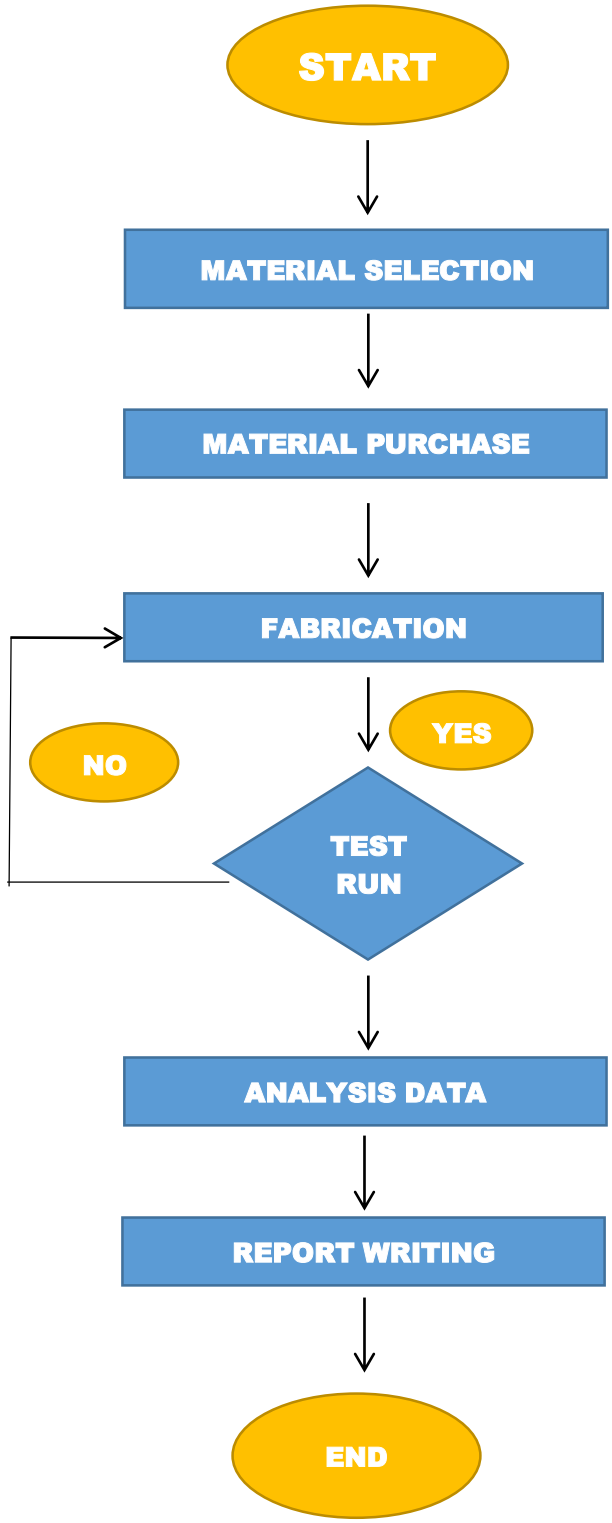

Figure 3.2.1 - Flow Chart

3.3 FLOW CHART EXPLAINATION

- **Material Selection**

The process of material selection is one of the most important process in this final year project. The main factor of material selection is to discuss and finalized which materials that will be use in the project in order to avoid wasting of money and time. The material selection need to be done precisely so that the risks could be avoided.

1) PVC PIPE (BODY)

Figure 3.3.1- PVC PIPE(BODY)

PVC is used because its abrasion resistance, lightweight, good mechanical strength and toughness. PVC can be cut, shaped, welded and joined easily in a variety styles. Its light weight reduces manual handling difficulties not forget to of its low cost and easy to find hardware store.

2) **PVC PIPE CONNECTOR AND COUPLING SET.**

Figure 3.3.2 – PVC PIPE CONNECTOR AND COUPLING SET

PVC also came with varieties set and types of connector. They are a small part that connects or “couples” one part to another , usually permanent. They can connect pipe to pipe and pipe to fitting . Some of them even reduce so you can connect a small pipe to a large pipe or vice versa.

3) HEATING ELEMENT + RESISTANCE

Figure 3.3.3 – HEATING ELEMENT + RESISTANCE

We intend to use a heating element from hair dryer components because its size that fit with our ideal size to create shoe dryer. On behalf its function, first and foremost the heating element itself is a bare , coiled nichrome wire that’s wrapped around insulating mica boards. Its poor conductor electricity compared to something like copper wire. This gives the alloy enough resistance to get from all the current flowing into it. Also, does not oxidize when heated.

4) MOTOR

Figure 3.3.4 - MOTOR

Motor also takes big part on generating the electricity for the fan to spin. This mechanism also allows room temperature air to be sucked in through the vent of our shoe dryer and then to be blow over the heating coils.

5) FAN WITH NUT

Figure 3.3.5 - FAN WITH NUT

Fan are used to sucked the room temperature air and transformed to hot air by heating coils. The fan also can be found in small size that goes along with our plan to succeed Shoe Dryer project.

6) CABLE 3m + 2 PIN PLUG

Figure 3.3.6 - CABLE 3mt + PLUG

Function to generate electricity from household power. Also we can get the cable in varieties length and easy for our shoe dryer extended their wire to make itself more convenient to use in any space.

7) ON/OFF SWITH BUTTON

Figure 3.3.7 - ON/OFF SWITH BUTTON

Operating as to complete electric circuit when we press on it. To allows the electricity to flow and activates the shoe dryer.

- **Material Purchase**

The process of materials purchasing is important to collect and obtains all the materials needed. In this process a lot of research on the places and suppliers that the materials are going to be purchase is done. Then, the calculation of the amount of materials needed and also the price of the materials. After that, surveys of price must be carried out to determine the better selling prices. Then finally, the purchases could be made.

- **Fabrication**

Once the materials are available, we begin to fabricate by preparing the engine first as a key element in our project. As described on the previous page, we use a fan with motor as well as an anti-rust heating coil to channel hot air into the shoes.

To host of the engine, we use custom made PVC pipe as the main body of our project. Then, we will do a test run to make sure it works well first. We do not make a total installation in advance, this is because, if there is any problem, we can reopen it easily. Then, we installed a 2-pin electrical cable to channel electricity from the electrical socket as well as on and off switches. After making sure the engine was working properly, we proceeded with our project to the installation of the other parts.

The other part of this device is a pair of air ducts to channel hot air to both sides of the shoe. This part also consists of PVC pipes which are heat resistant. Again, we will first test whether the hot air is actually channeled into the shoe or not. If not, we will reopen the section to find the cause and repeat the same step until it really works.

- **Analysis Data**

Then, we did a data analysis session, various aspects were taken into account both in terms of analytical and logical so that it can function productively.

- **Report Writing**

It is important for us to write our complete project report so that we can identify whether our project is running smoothly or not. This is because the report is very important to ensure that every detail in the process of making our project is fully explained.

- **Project Ends**

Our project is submitted to our Supervisor for a review session.

3.4 INTERVIEW & RESEARCH

We conduct internet searches and also interview sessions via google forms to some students and also housewives. Through these sources, we find that many of them are aware of the existence of these shoe dryers and admit that they find it difficult to dry their shoes when it rains. However, most of them are not relevant to buy because of some factors such as unreasonable price, not user friendly, too big and so on.

3.5 PROJECT DESIGN

Figure 3.5 : An Overview of Portable Shoe Dryer

The sketch of portable shoe dryer is a compact, lightweight portable footwear and garment dryer that operates on three power sources drying footwear and garments anywhere. Legs extend to fit and retract for easy storage. Also, the user can carry the tool to anywhere without having a storage problem. The Shoe Dryer 2.0 utilizes forced ambient (room temperature) air powered by the rotation of the fan driven by an electric source and heats the air heater at a low level of this design is to make it easy for people to dry their shoes in hours. The material of the tool are made from PVC pipes as a body / air duct that will be channeled into the shoes. . The shoe dry time are approximated about 60~80 Minutes.

3.6 RESEARCH INSTRUMENT

The research instrument is a section to approve a research by obtaining data from survey question or anyway. The research instrument we used is by the questionnaire form. The form are split into 3 section. The first section is to identify of people daily basis after washing shoe. The second section is the effectiveness of the shoe dryer on peoples thought. The third section is overall of peoples opinion of our product. The research are conducted to respondents who are full-time housewives, labour worker, and students. These respondents are based around Shah Alam, Selangor, Malaysia. This is overall relating to our research. This research had come up because of our experience and study. Also, these method are effective for the respondents to help us to carry the research.

3.7 DATA ANALYSIS METHOD

The data will be using the closed-ended surveys and online quizzes. This method tells that it is based on question that give respondents predefined answer options opt for. This is the best method for us to analyzing qualitative and quantitative data. Also, we have used statistic analysis method. It was meant to determine our conclusion to solve a problem by using samples and information. The researched data that we have collect and analyzed help us to construct such data so it can understood and easily read. These method are the best method for us to summarize our research to solve the problem.

3.8 PROJECT ACTIVITY

TITLE	S	W 1	W 2	W 3	W 4	W 5	W 6	W 7	W 8	W 9	W 10	W 11	W 12	W 13	W 14
Meeting and Project Planning	P	/	/												
	A	/	/												
Project Design	P		/	/											
	A		/	/	/										
Material Selection	P			/	/										
	A				/	/									
Material Purchase	P					/									
	A					/	/								
Fabrication	P						/	/							
	A							/	/	/					
Test Run	P									/	/				
	A									/	/	/			
Analysis Data	P							/	/						
	A							/	/	/	/	/			
Report Writing	P	/	/	/	/	/	/	/	/	/					
	A	/	/	/	/	/	/	/	/	/	/	/	/		
Video and Slide	P			/	/	/	/	/	/	/					
	A									/	/				
PITEX Preparation	P					/	/								
	A					/	/								
PITEX Presentation	P						/								
	A						/								

P = Planning

A = Actual

3.9 BUDGET CALCULATION

No.	Material	Quantity	Cost per Unit	Total
1.	**PVC Pipe 3 meter**	**1**	**Rm3.00 per meter**	**Rm9.00**
2.	**Motor Fan**	**1**	**Rm0.53**	**Rm0.53**
3.	**PVC Socket Connection Set**	**5**	**Rm2.80 per pieces**	**Rm14.00**
4.	**Heating Element**	**1**	**Rm7.00**	**Rm7.00**
5.	**2 Pin 3m Cable**	**1**	**Rm4.40**	**Rm4.40**
6.	**On/Off switch**	**1**	**Rm2.20**	**Rm2.20**
	TOTAL			**Rm37.13**

3.10 SUMMARY

As a conclusion, the methods implemented in this project are important to complete the project. Thus, we did some research to help the progress of our project to make it succeed by surveys and online quizzes. The materials used in the project will create a light and durable shoe dryer yet very cheap and mobile.

CHAPTER 4

FINDINGS AND ANALYSIS

4.1 INTRODUCTION

This chapter combine data and analysis of the Shoe Dryer and its materials calculations. This data and analysis are very important for this project to achieve the objectives and needs of the project. This data shows the success of the results of the materials used. After getting all of this data, we analyze every single possible to make it success.

4.2 ADVANTAGE AND DISADVANTAGE

Our project also has its own pros and cons, the pros will help the people and also people working productivity. However, the cons or the disadvantages will always to be looked forward by us for the enhancement of the project.

Shoe Dryer has a lot benefits to people for reducing their working burden and increasing their working efficiency. Besides of the advantages, they came with disadvantages and that will be the future enhancement that we will looked to overcome it..

4.3 TEST RUN

We conduct some few testing on our project with the compatible materials through our purchase and with our own budget. Surprisingly, we manage to brought our project to success in first try. The project was success because the planning that we have made going smoothly. Despite that, there still some errors with our beginning design project that force us to recreate a new design and we overcome those errors with few research we made.

4.4 SHOE DRYER EFFECTIVENESS

Several test has been done to see the capabilities of our project on drying the shoes and results are much better than our expectations for such productivity on daily basis, drying time, durability and storage efficiency. Our shoe dryer are estimated about 60~80 minutes drying time although its not our ideal drying time but it is good enough for the product working the way it is. PVC as body for our shoe dryer somehow saves us a lot of budget on our investment to the product. Even though its a low cost material, they have great durability for shoe dryer to be used in a long term. Other than that, the speciality of our product is they are easy to store because our product can be detached parts by parts and reattach when going to use it.

4.5 ANALYSIS

Analysis are made during our working on the project and we found out there still a room for improvement for our product to be more successful. We recollect that PVC is a good material to use for a kind of or product. This is because our product produce a high temperature for a long time. Thus, PVC is a good material to use against high temperature because PVC is a low thermal conductivity which means they are really good on resisting heat transfer.

4.6 SUMMARY

As a conclusion for this chapter , the analysis and findings have been made. This Shoe Dryer 2.0 has a lot of advantages however there are still some weaknesses that we can improve for foreseeable future. Even though, there is been a few challenges and obstacles on creating Shoe Dryer 2.0 and we manage to overcome these with our research on available shoe dryer and understand their concept and mechanism. Therefore, we applied it to our Shoe Dryer and improvise it.

CHAPTER 5

DISCUSSION & CONCLUSION

5.1 INTRODUCTION

In this chapter, we will explain about the discussion, conclusion and upgrade plan of our project from beginning to the end.

5.2 DISCUSSION

Based on the data, we need an optimal heating element without much electricity consumption, so we use methods such as hair dryers only. This is because, we do not want to use advanced technology to ensure the use of low budget so that it is more relevant for use by many users. Hot air will be channeled through a pair of left and right tubes into each side of the shoe.

With this, the heat will circulate inside the shoe, therefore, we can say that the shoe is dried from the inside and unlike some other types of shoe dryer like the shoe dryer inside the box where the shoe will be dried from the outside through a lamp.

The way to use it is very easy as follows:

1. Users need to place each side of the shoe into each of the left and right tubes.
2. Connect the socket with the 2-pin cable and turn on the switch.
3. Wait until a few hours and your shoes will be dry.

5.3 CONCLUSION

Based on this project , we can say that the use of our products is better than other shoe dryer products, because it is more user-friendly and does not require much space to use. . Plus , with every single weaknesses on previous she dryer we manage to enhance it. It will help a lot of people especially in the price range of our product. We hopes that our product could penetrate through the shoe dryer market. It is because it will create a productivity lifestyle and decrease people burden. All the upgrades and enhancement are made for our project to give more benefits and useful. Hence, we hope that this project could be recognize by people out there.

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APPENDICES

A. QUESTIONNAIRE

1. What is your occupation/role ?

2. Working hours?

3. How many shoes are wore in a week?

4. How often you wash your shoe?

5. Difficulties when drying shoe?

6. How do you dry the shoe?

7. Estimate your drying time.

8. Do you have shoe dryer product?

9. How much does it cost?

10. What do you require if we produce a shoe dryer

B. PROCESS IN MAKING