



FAN CLEANER

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JABATAN KEJURUTERAAN MEKANIKAL

JUN 2020

POLITEKNIK SULTAN SALAHUDDIN ABDUL AZIZ SHAH

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

JABATAN KEJURUTERAAN MEKANIKAL

JUN 2020

AKUAN KEASLIAN DAN HAK MILIK

TAJUK : FAN CLEANER

SESI : JUN 2020

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Adalah pelajar tahun akhir **Diploma Kejuruteraan Mekanikal, Jabatan Kejuruteraan Mekanikal, Politeknik Sultan Salahuddin Abdul Aziz Shah**, yang beralamat di **Persiaran Usahawan, 40150, Shah Alam, Selangor**. (selepas ini dirujuk sebagai 'Politeknik tersebut').

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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sebagai penyelia projek pada tarikh: 28/11/2020) WAN MAJDAH

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Alhamdulillah , In the name of Allah the most gracious and the most precious, first and foremost , I would like extend our deepest praise to Allah SWT who given us the patient , strength ,determination, obstacle that helping us to think wisely in making a decision and courage to completed this project .Plus , many thanks and highest gratitude to Pn Wan Majdah Binti Ton Mamat, our supervisor , which helps , lead and guides us with our project “Fan Cleaner”.

ABSTRACT

Nowadays, there are a lot of people out there like housewives, cleaning contractors and others have trouble cleaning the ceiling fan. This is because they still use old methods such as climbing stairs or opening the fan blades first to clean the ceiling fan. They also use ceiling fan cleaners such as cloths, brooms and chicken feathers. These cleaning tools are not suitable for use due to various deficiencies identified such as unsecured safety, the time required to clean the ceiling fan for too long and the cleanliness quality of the ceiling fan is not guaranteed. Many previous studies have focused on the difficulties they face in cleaning the ceiling fan but the results are not yet fully available. Therefore, this study aims to discuss the resolution to overcome the difficulty of cleaning the ceiling fan. A questionnaire study was conducted on the local community who have difficulty washing fans, especially housewives and cleaning contractors. Several suggestions have been made to improve the fan cleaner such as providing an adjustable rod up to 4 meters, having a rotating roller and having a water drain for cleaning. Previously the time taken to clean was 8 minutes, with the renewal of this product it could take only 4 minutes to clean the same fan blade with only one operator. Suggestions for improvement for this tool are to reduce the load by using a lighter type of rod and for cleaning can use a type of fabric on a roller that traps more dust.

ABSTRAK

Pada masa kini, ramai orang di luar sana seperti suri rumah, kontraktor pembersihan dan lain-lain menghadapi masalah untuk membersihkan kipas siling. Ini kerana mereka masih menggunakan kaedah lama seperti menaiki tangga atau membuka bilah kipas terlebih dahulu untuk membersihkan kipas siling. Mereka juga menggunakan alat pembersih kipas siling seperti kain, penyapu dan bulu ayam. Alat pembersih ini tidak sesuai digunakan kerana pelbagai kekurangan yang dikenal pasti seperti keselamatan yang kurang, masa yang diperlukan untuk membersihkan kipas siling terlalu lama dan kualiti kebersihan kipas siling tidak terjamin. Banyak kajian terdahulu yang memfokuskan pada kesukaran yang mereka hadapi dalam membersihkan kipas siling tetapi hasilnya masih belum tersedia sepenuhnya. Oleh itu, kajian ini bertujuan untuk membincangkan solusi untuk mengatasi kesukaran membersihkan kipas siling. Kajian soal selidik telah dijalankan keatas masyarakat setempat yang mempunyai kesukaran untuk mencuci kipas terutamanya suri rumah dan kontraktor pembersihan . Beberapa cadangan telah dibuat untuk menambah baik alat pembersih kipas seperti menyediakan batang boleh laras sehingga 4 meter, mempunyai pengelek yang berputar dan mempunyai saluran air untuk pembersihan. Sebelum ini masa yang diambil untuk membersihkan adalah 8 minit, dengan pembaharuan produk ini ia dapt mengambil hanya 4 minit untuk membersihkan bilah kipas yang sama dengan hanya seorang pengendali . Cadangan untuk penambahbaik untuk alat ini ialah kurangkan beban dengan cara menggunakan jenis batang yang lebih ringan dan untuk pembersihan boleh gunakan jenis fabrik pada pengelek yang lebih memerangkap habuk.

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CHAPTER 1

INTRODUCTION

1.1 RESEARCH BACKGROUND

Currently, many people out there like housewives, cleaning contractors and others are having difficulty cleaning ceiling fans. This is because they still use old methods such as climbing stairs or removing the fan blades first to clean the ceiling fan. They also use ceiling fan cleaning tools such as cloth, broom and chicken feathers. This device is currently not suitable for use due to various identified deficiencies such as unsecured safety, time taken to clean ceiling fan too long and the quality of the ceiling fan is poor

Many previous studies have focused on the difficulties they face in cleaning ceiling fans but the results are still not fully available. Therefore, this study aims to discuss the resolution to address the difficulty of cleaning ceiling fans

1.2 PROBLEM STATEMENT

Events like sliding down the stairs while cleaning the ceiling fan are often heard. This is because, they have to climb the stairs to clean the ceiling fan which is an average height of 3 meters. This will make them slip from the stairs as their safety is not guaranteed. They also remove the fan blade first before cleaning. It will take some time for the ceiling fan to be cleaned. In addition, they also use a broom or chicken feather to clean the ceiling fan. This will make the quality cleanliness of ceiling fan unsatisfactory. Therefore, the initiative focuses on consumer safety, the time taken when cleaning ceiling fans and quality cleanliness of ceiling fan is greatly needed for example cleaning tool electronic ceiling fan.

1.3 RESEARCH OBJECTIVES

The objective of this study is to:

- Guarantees user safety.
- Clean the fan for a shorter time.
- Can effectively clean the ceiling fan.

1.4 RESEARCH QUESTIONS

The research questions are as follows:

How well does the use and function of this electronic ceiling fan effective as the previous ceiling fan replacement mechanism ?

The hypothesis to be tested in this study is:

- H1: Does the function of the electronic ceiling fan can improve the problem such as user safety, the time to clean the ceiling fan take too long and the quality cleanliness of the ceiling fan unsatisfactory ?
- H2: Does the function of the electronic ceiling fan can't improve the problem such as user safety, the time to clean the ceiling fan take too long and the quality cleanliness of the ceiling fan unsatisfactory ?

1.5 SCOPE OF THE RESEARCH

The participants in this study were full-time housewives, working women and cleaning contractors around Shah Alam, Malaysia.

1.6 SIGNIFICANCE OF THE RESEARCH

Although there are many initiatives to clean ceiling fans such as chicken feathers and brooms, these tools do not guarantee safety and users will have difficulty. However, this electronic ceiling fan will solve the problem. These findings will have a positive impact on the community to effectively clean ceiling fans and reduce the risk of accidents when cleaning ceiling fans.

1.7 DEFINITION OF OPERATIONAL TERMS

The concept that use in this product is motor concept, so it will be easier for the user to clean the ceiling fan. Users just need to turn on the on button and the roller will work around the fan blade. The users just need to make sure that the blade is between the two roller and users just need to move the holder of the fan cleaner. Users do not need to climb the stairs to clean the fan and safety of the users will be guaranteed. Its will make users feel comfortable because users does not need stand above the stairs. The roller will clean the blade neatly. The ceiling fan is too high so the users can not reach to clean the ceiling fan. The old method make users feel very tired and it is to difficult to the users.

1.8 SUMMARY

The summary for this introduction show that how we manage to get the idea to make this project. The problem when clean the ceiling fan that faced by many people out there make us feel that we have to settle this problem. The problem when clean the ceiling fan is dangerous for users because they need to climb the stairs and the stairs is not sure either it safe or not to the users. Some of people are afraid of the heights, so they had no choice then it will make they feel more trauma. Then some people clean the blade just with broom and chicken feathers, this two product just clean the dry dust only but it will not clean the dust that attached at the fan blade. The dry dust will fall down to the floor. Then the last when they clean the ceiling fan , some people had backache so it make them feel not comfort to clean the fan.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

Nowadays, too many fan cleaning tools have been created to facilitate ceiling fan cleaning work. This has inspired us to improve our common ceiling fan to electronic ceiling fan. Our goal is to improve ceiling fan cleaning to ensure the safety of our users. Cleaner fan and user comfort are also our priority. Through surveys that have been distributed to consumers, most consumers are not happy about the ceiling fan cleaning tools. Most of the earlier tools were just to use chicken feathers and sweepers or climb stairs to clean the fan. This makes users uncomfortable and at risk of slipping down the stairs. Therefore, the purpose of the project we are aiming for is to ensure the quality of cleanliness, safety and user comfort.

2.2 CONCEPT/ THEORY (REFERS TO THE RESEARCHED VARIABLES)

Prepared by Raffe Ikhwan bin Mohd Zukhi

According to our research, existing ceiling fan cleaning tools has many disadvantages as it is fan not completely clean. The complaint we receive from users is that most users complain of flying dust while cleaning. They also worry about safety risks when cleaning the fan. The concept we will highlight is that we make sure that our products guarantee the safety of the user when cleaning the fan and that the quality when cleaning the fan is maximum. In addition, we also feature user comfort such as a handlebar that can be adjusted according to the height of a ceiling fan. This ensures the safety and security of the user from climbing the stairs to clean the ceiling fan. Our products will also be faster than previous ceiling fan cleaning tools. Therefore, we manufacture products using motor-like

electronics. With this, the user does not have to clean the fan with time and save time. The rollers used will also guarantee the quality of the fan compared to previous fan cleaning tools.

2.3 LITERATURE REVIEW (BASED ON THE RESEARCHED VARIABLES)

A ceiling fan is a mechanical fan mounted on the ceiling of a room or space, usually electrically powered, suspended from the ceiling of a room, that uses hub-mounted rotating blades to circulate air. They cool people effectively by introducing slow movement into the otherwise still, hot air of a room. Fans do not reduce air temperature, unlike air-conditioning equipment but create a wind chill effect by evaporating sweat in the summer. In fact they heat up the air slightly due to the waste heat from the motor and friction between the moving air. Fans use significantly less power than air conditioning as cooling air is thermodynamically expensive. Conversely, a ceiling fan can also be used to reduce the stratification of warm air in a room by forcing it down to affect both occupants' sensations and thermostat readings, thereby improving climate control energy efficiency.

There are many types of fans that have been created. For example, *Deca Kronos*. This ceiling fan has 5 blades in 142 cm diameter. This ceiling fan has 5 speeds. The fan has a longer durability and is quiet. It also has a remote control to control fan speed. Also, *Eco Breeze EB6016*. This ceiling fan has 3 brass blades in diameter 142 cm. It has 5 speeds and has longer durability and stealthily. It is designed with high quality electronics with the concept of energy saving. Internal motors with 100% pure copper wire produce high conductivity and low resistance.



Figure 2.3.1 *Deca Kronos*



Figure 2.3.2 *Eco Breeze EB6016*

There is also have previous ceiling fan tools. Among them is a *flexible static duster*. *Flexible plastic duster* can remove dust quickly and easily. Electrostatic fiber and flexible head are ideal for dusty ceiling fans, curved blades and hard-to-reach parts. No need to move objects, just move and sweep around the fan blades to remove dust on the fan blade. The handle can extend up to 5 feet so nothing is out of reach. It can also be removed from the head for washing elsewhere. Next, a *vacuum cleaner*. Ceiling fan blades collect a lot of dust. This vacuum attachment makes it easy to clean your fan blades. Advantages of finger open and close around the fan blade can remove dust well. You do not need to stand on a chair to clean and dust easily to the main vacuum. Compatible with all major brand vacuums, including adapter and adjustable corner brushes. Has a 5 foot long stem connected to a vacuum. Also, the *squeegee cleaner*. The *squeegee cleanser* makes cleaning quick and easy. The span pulls dust and spider webs. It is ideal for cleaning the ceiling fan blades as well as

on the part of the fan blades that are difficult to clean. With one quick move, this fan blade cleaner can clean the surface of the fan blade well.



Figure 2.3.3 *Flexible plastic duster*



Figure 2.3.4 *vacuum cleaner*



Figure 2.3.5 *squeegee cleanser*

According to the previous ceiling fan cleaning tool, there are some disadvantages to each item. Therefore, the product we will be releasing is addressing the shortcomings of the tool. These features are our products using electronic motors. This electronic motor works to rotate the roller when the fan blade enters the roller. This can increase the time it takes to

clean the fan. Next, this product also has adjustable handlebar. This handlebar works to adjust the height to clean the ceiling fan. This way the user's safety will be safe as there is no need to climb the stairs when cleaning the fan. In fact, this product has a water wire that connects to the roller. With this, the quality of cleanliness will be guaranteed. In addition, there are also dust containers in our products. This container will cover dust falling from the fan. Therefore, the user will feel comfortable tapping the fan and not be bothered by dust and people who are allergic to the dust will also be comfortable.

2.4 SUMMARY

The conclusion is our product is made to solve the problem that the old method or old product faced. Before that ceiling fan have different type, shape and size so some old method can be used but some methods are not used. The tool that used to clean the fan can make users feel annoying because it can't reach the ceiling fan. The product that has been produced to clean the ceiling fan is too big and wastes time. If the product is too big, users do not know where to keep the product because it takes a large place to keep it. The products also will waste the user's time, so better users just apply the old method by using the tool to clean the fan. Our product is produced to make the user's time to clean the fan become more short and they will be able to keep it anywhere because it is easy to keep. Our products also can clean any type, size and shape of ceiling fan.

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CHAPTER 3

METHODOLOGY

3.1 INTRODUCTION

Methodology is the most appropriate method to run a research and to determine the effective procedures for answering the problem of research. This chapter include introduction, research design, data collection method, data analysis method, research instrument, sampling techniques and summary of the chapter. However there is a one subtopic that contained in this chapter is the biggest thing that have relation with the type of product will be produce. Some research maybe need more detailed discussion relate to the design and Instrument research than the other research.

Methodology is one of the engineering aspects that should be taken seriously in making a products. Methodology has been define as a ways of selection and analysis method. Moreover with this methodology, a product that made can be make perfectly and excellently.

Methodology also a method and a technique to design, collect and analysis data to have an evidence to support a research. Methodology will explain the problem that be examined and cause of a method and technique use in this research.

3.2 FLOW CHART

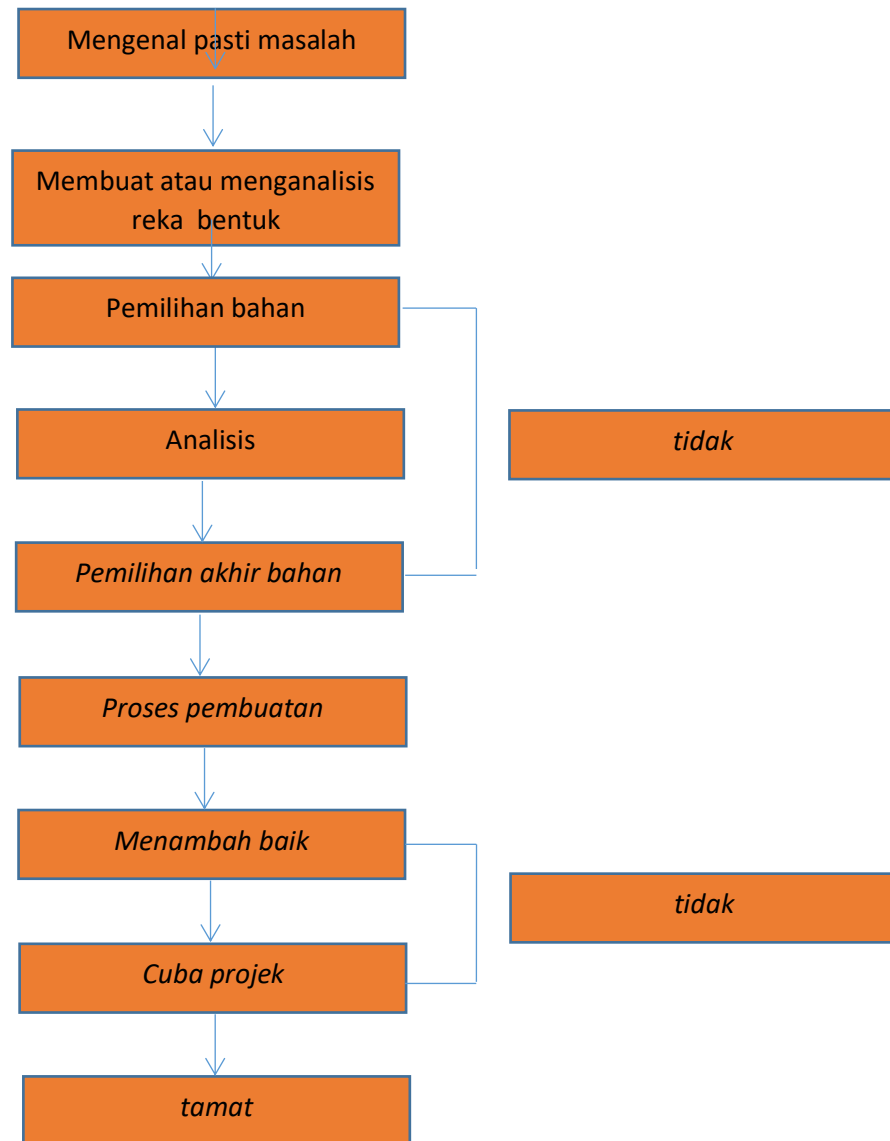


Figure 3.1– Flow Chart

3.2.1 Identifying problems

Prepared by Muhammad Aiman bin Mohd Hisham

At the beginning of this study was done to identify the problem of cleaning the fan with a short time rate. Therefore, careful planning is implemented to overcome the problem by creating a "Fan Cleaner". This is to save time during the cleaning process and make it easier for the user to easily wash the fan to prevent accidents.

3.2.2 Design

This design is intended so that before the implementation is done, it can reflect before the project is implemented even this design will provide more detailed information to build a "Fan Cleaner".

3.2.3 Material Selection

The selection of materials is intended to facilitate the project implementation process. In addition, it can also avoid wastage of cost production because before starting the project we have made the selection of the right material and suitable for the project to be created.

3.2.4 Analysis

The data obtained are collected, processed, and analyzed to enable the next steps to be taken and the determination of the study to be done as required in the objectives.

3.2.5 Final selection of materials

The final selection of materials is the process of selecting the materials to be used before purchasing project materials. This aims to avoid wastage of costs and be able to start a project without any problems.

3.2.6 Manufacturing process

The process of cutting, connecting and attaching to all components is a process to make our 'Fan Cleaner' work well to clean the fan blades.

3.2.7 Improvements

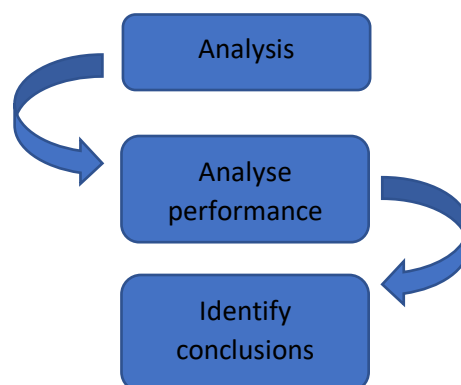
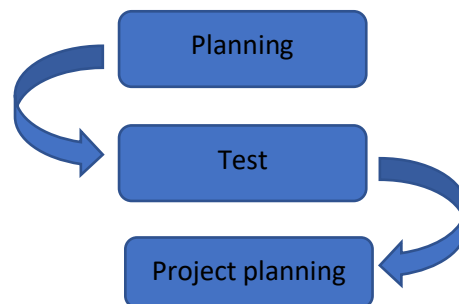
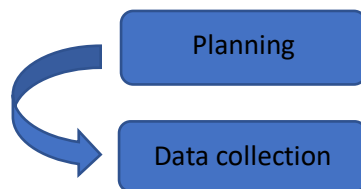
Modification activities are intended to improve the project if it does not work well and has other needs in addition to the project. Modifications are also very important for our project to look better than before.

3.2.8 Test

Perform a final test by selecting a fan blade that has a lot of fittings to see the results or not. We have identified any deficiencies and will make improvements from time to time.

3.3 PROJECT DEVELOPMENT

This project involves three main steps to implement the project starting from planning, implementation and testing. All methods used are to find and analyze data on related projects.



3.4 RESEARCH DESIGN

3.4.1 Project Design Drawing Method

There are 3 categories of design production. The first is an existing design where minor changes are made to the size, shape, safety features and performance. The second is to use or take an existing design and design it to operate in another form. Finally, a new design where the design is a new idea born.

First Design

In the initial phase of idea generation, this design has been produced. This bump design is just a description of the project that we will produce.



Figure 3.4.1 i: First Design

The second design

After the study was made, design changes were made to obtain safety and durability of the machine. It was intended for this project to be easy to operate.

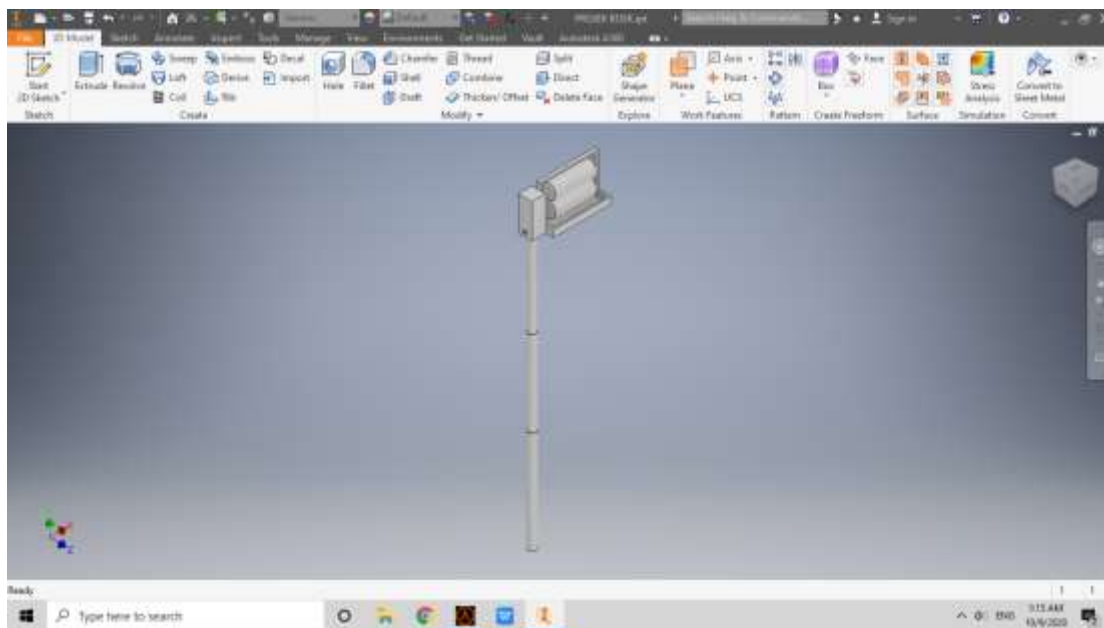


Figure 3.4.1 ii: Second Design

3.4.2 Project Equipment & Materials

3.4.2.1 MATERIALS USED IN THE PROJECT

Material selection is a major factor influencing:

- i. Product cost (manufacturing rate, material cost).
- ii. Product quality and quantity.
- iii. Environment

Among the materials used in the project to produce this "FAN CLEANER" are:

Material Selection

The choice of materials is something that needs to be emphasized to do a project. The selection process of goods must be precisely welcomed to avoid wastage. Selection of goods must be planned accurately so that the material is safe to use and can last a long time.

- 1) Roller cat



This paint roller was chosen because it has the potential to scrub all the dust on the fan blade because it is made of fabric. Next it is lightweight and suitable for our project.

2) Adjustable rods



The selection of adjustable rods is intended so that the user can adjust according to the height of the fan blade and this rod is also made of lightweight aluminum.

3) Aluminium frame



Our choice for the frame is that we choose the type of aluminum material that as we know this material is not easy to rust and also lightweight material.

4) Motor



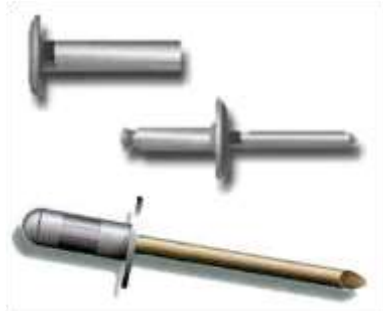
DC motors are used to move or rotate the two brushes in this project. it has a speed of 40rpm and contains 12 v of power.

5) Battery vape



Rechargeable battery is used as the main energy "Fan Blade Cleaner" it has a power of 12 v and can be recharged when the battery runs out.

6) Skru ribet



Is a type of joiner used to join pieces of metal with other or similar pieces of material. This screw is used to attach the Aluminum angle bar.

7) Suis on off



The shut-down switch is used to turn off and turn on the machine.

8) *Wayar*



Wires are used as a tool to connect electrical energy. the wire will be connected to the switch, battery and finally to the DC Motor.

9) *Pemegang bateri*



The battery holder serves as a tool to place the battery so that the battery does not scatter and will not fall off.

COST ITEM

BAHAN	UNIT	JUMLAH
MOTOR DC	2	RM 60.00
ROD BOLEH LARAS	1	RM 40.00
BATERI 12V	2	RM 24.00
ROLLER CAT	2	RM 3.00
BATERI HOLDER	1	RM 3.00
WAYAR	1	RM 2.00
ALUMINIUM ANGLE BAR	1	RM 20.00
SUIS	1	RM 3.00
SKRU RIBER	10	RM 2.00
KOS LUAR JANGKAAN		RM 9.00
JUMLAH		RM 166.00

3.4.4 Safety measures

Before the project work is done, several aspects need to be taken into account and one of them is the safety aspect. This aspect of safety is the most important aspect and should be

prioritized before work is done. If one of the group members suffers an accident or injury then the implementation of the project will be affected and may not be completed within the stipulated period. The security measures that will be discussed here are about: -

OWN SAFETY

General clothing

- Clothing worn while working should be appropriate, ie not too tight.
- Items such as watches, rings and chains should be kept as they may cause accidents due to being stuck or become electrical conductors as short circuits pass.

Protective clothing

- Protective clothing such as goggles or face protection, gloves, boots, and aprons should be worn for safety and protection while in the workshop.



Glove



Safety shoes



Spectacle

3.4.5 Safety of equipment use

- Make sure the surrounding conditions are in good condition.
- Do not joke while operating the machine.
- Be sure to wear appropriate safety equipment according to the appropriate workshop.
- Need to ask permission from the lecturer before using the workshop.
- Clean up the workshop by sweeping and putting the used tools back in place.
- Operate the machine according to proper instructions to avoid injury while using it.
- Turn off the switch and place it in its original state.

3.4.6 Project pictures are generated



3.5 METHODS OF DATA COLLECTION

Data collection is defined as the procedure of collecting, measuring and analyzing accurate data for research using proper techniques. A researcher can evaluate their hypotheses based on the data collected. In more cases, data collection is a major and most important step for researchers. Different data collection approaches for different fields of study depend on the information required. The main objective of data collection is to ensure that data can be collected for analysis so that data-based decisions can be made for research. There are four methods of data collection, namely through interviews, email surveys, telephone surveys and online / web surveys. Based on this project, online / web surveys were selected for the data collection method. This is because nowadays more people use smartphones and usually they spend more time with their phones. So it is easier to get information and conduct surveys. In addition, it can manage itself and the probability of data errors is very low.

3.6 RESEARCH INSTRUMENTS

Instrument is a general term used by researchers for measuring devices (surveys, tests, questionnaires, etc.). Instruments and instrumentation are different things. The instrument is a device and the instrumentation is the course of action (the process of developing, testing and using the device). In the study section of this study instrument, a questionnaire method was selected. The selection of respondents consisted of housewives of cleaning workers, the public and also students of Sultan Salahuddin Abdul Aziz Shah Polytechnic (PSA).

3.7 SAMPLING TECHNIQUES

After data collection through questionnaires and sampling is done, data analysis is done using SPSS (Statistical Package for Social Science) software package. The software will analyze the questions related to the study. Data analyzer can be divided into two parts, namely the formation of analytical model and quantitative analysis.

3.8 METHODS OF DATA ANALYSIS

Data analysis is the process of examining, cleaning, transforming and modeling data with useful goals, informing conclusions and supporting decision making. Data analysis has various aspects and approaches covering various techniques under various names and is used in different fields of business, science and social sciences. Based on this project, in the process of analyzing the data for this project, the data collected will be analyzed and the results achieved will be presented in the form of pie charts, bar graphs and tables.

3.9 SUMMARY

In the beginning of the stages, research design, data collection method, research instruments, sampling techniques and data analysis method are made systematically for knowing the fact and information to support the research and to imagine it clearly in this research.

After data analysed is made, it important to did a summary and conclusion for the result and hypothesis either the cleaning tool is effective or not. So from that, we can move to the next step to produce the products. This topic is to make the users know the important of our products and how better the improvements that we made to overcome the others product/cleaning tools disadvantages.

CHAPTER 4

FINDINGS AND ANALYSIS

4.1 INTRODUCTION

Prepared by Nurul Fadillah Mazlan

Research is a creative and systematic work undertaken to enhance knowledge, including knowledge of humans, culture and society, and the use of knowledge to design new applications. It is used to establish or validate facts, reaffirm previous work, solve new or existing problems. The results of the research we received from the survey we conducted. A variety of responses that we can and will use in our research. In addition, the results of our investigation are supplemented by our analysis of the respondents' data provided regarding our products.

4.2 RESPONSE RATE

A total of 60 questionnaires were sent to respondents via social media, of which 55 were returned, representing 91.67% of the response. The respondents were in full time housewives, working women and cleaning contractors. However, due to the dissatisfaction of the answer, only 48 completed questionnaires were considered for further analysis. After obtaining the data from the respondents, we continue to analyze the data for further research and carry out the mission to achieve our objective study.

4.3 DEMOGRAPHY PROFILE OF RESPONDENT

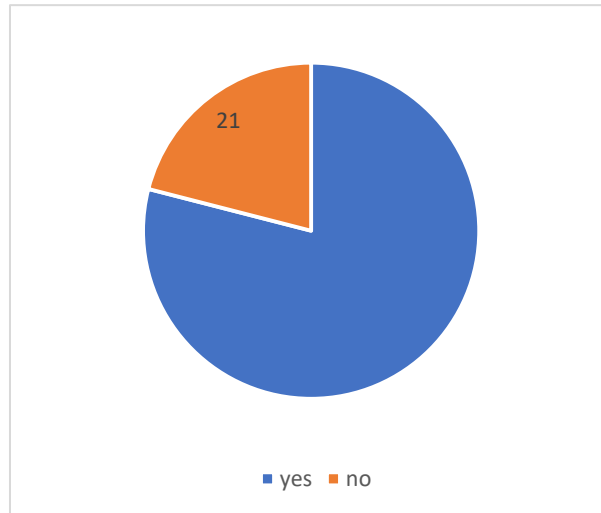
Information from the survey results we conducted was made up of 48 respondents. About 80% of the respondents were women who were employed while 15% were full-time housewives and 5% were working contractors. Then most of the respondents had difficulty cleaning the ceiling fan which recorded up to 83.3%. In terms of cleanliness quality, more than half of the respondents, 62.5% were not satisfied with the cleanliness results when using

other products. Furthermore, most respondents complained that they had allergies with as much as 75%. In addition, 89.6% of respondents prefer electronic fan cleaning tools because when they manually clean ceiling fans, it is very tiring. A total of 95.8% agreed to make electronic ceiling fan appliances. We get a good response when this product is being manufactured at a reasonable price as the percentage of buyers is 97.9%. For good clean, respondents gave us 91.7% confidence in the products we produce because most of the existing products do not guarantee cleanliness. For example, dust flies while the ceiling fan cleaning job is underway. Also, one of the problems that respondents have is the height when they clean the ceiling fan using stairs. They worry about their safety if they slip from the stairs. Among the features that the respondents wanted were easy-to-use products, reasonable price, quality of ceiling fan cleaning and the safety of the respondents when cleaning the ceiling fan.

4.4 RESEARCH FINDINGS

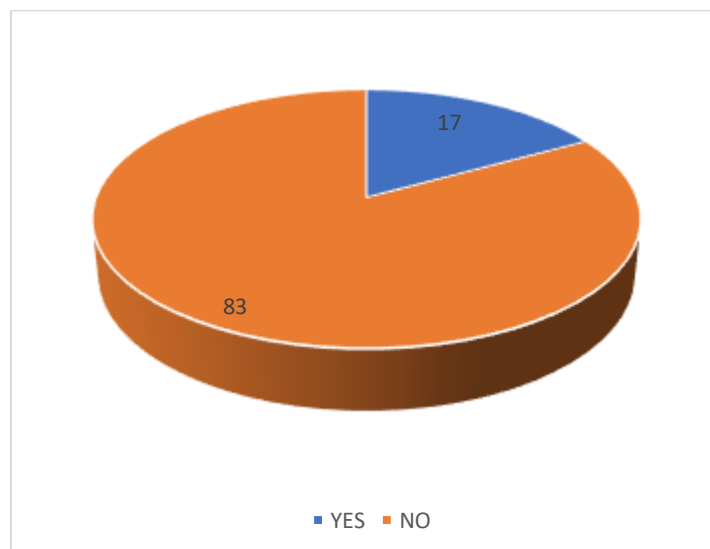
A questionnaire was conducted to identify the problem when cleaning the ceiling fan. The results show that the respondents had difficulty cleaning the ceiling fan and they wanted a better product for cleaning the ceiling fan. Respondents provided positive reactions to the manufacture of electronic ceiling fan cleaning tools. The questionnaire was answered by working women, full-time housewives and cleaning contractors located in Shah Alam, Malaysia. The numbers seen in the diagram are percentages (%). There are the data about 10 question that we ask to the career woman, full-time housewife and cleaning contract worker

4.4.1 DO YOU FEEL DIFFICULT TO CLEAN THE CEILING FAN?



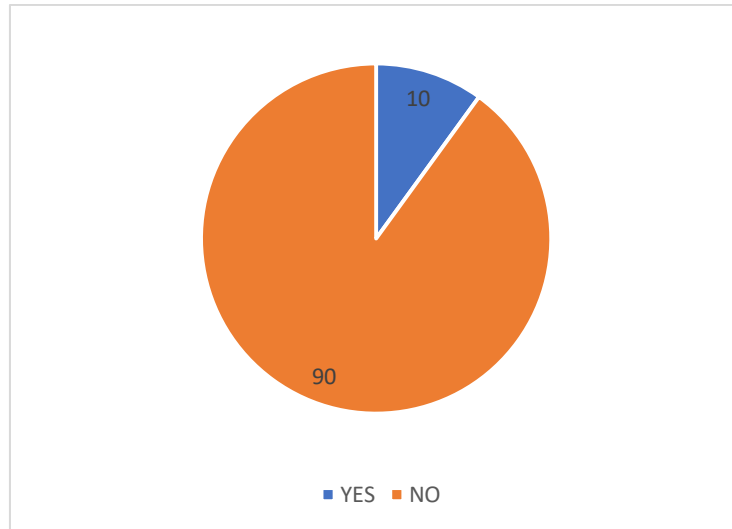
There are 79% respondents answer yes for the question difficult to clean the ceiling fan and 21% respondents had answer no.

4.4.2 ARE YOU SATISFIED WITH THE WAY YOU CLEAN THE CEILING BEFORE?



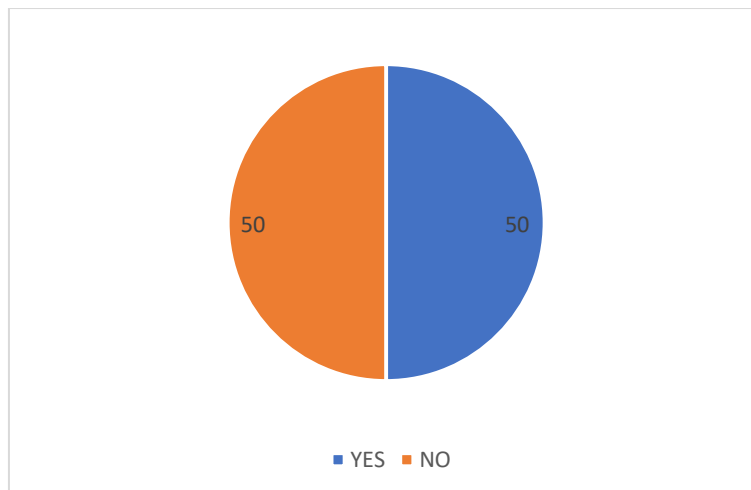
There 17% people say yes to the for the satisfaction on the way they clean the ceiling fan before and 83% say no.

4.4.3 DO YOU HAVE ALLERGIES TO DUST?



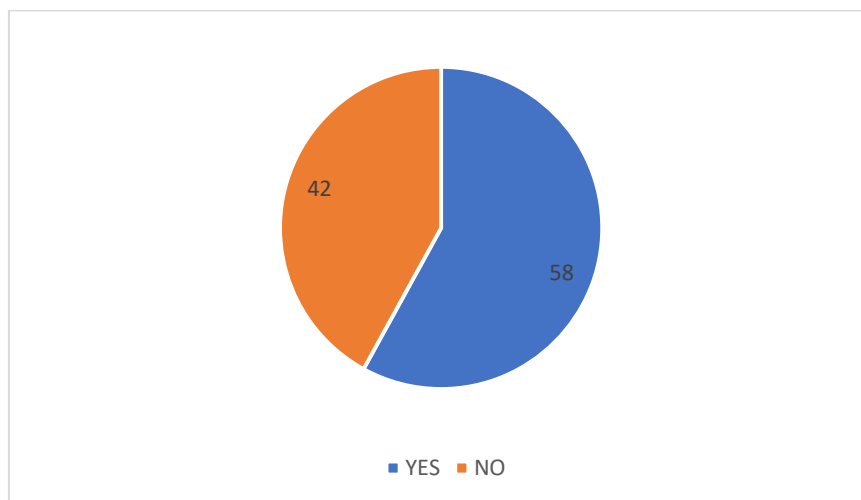
Only 10% had allergies to the dust and 90% doesn't have allergies to the dust.

4.4.4 DO YOU FEEL TIRED WHEN CLEAN THE CEILING FAN MANUALLY?



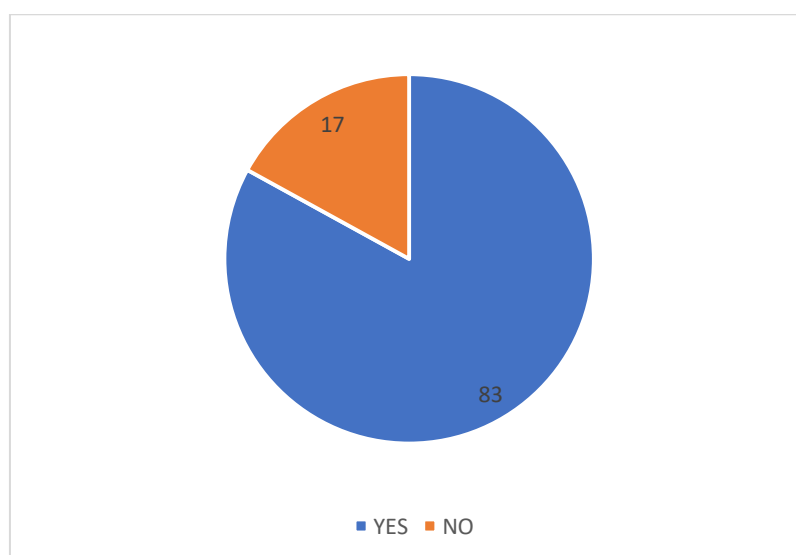
The respondents had answer the same quantity for the yes and no for this question.

4.4.5 DOES HAVING AN ELECTRONIC FAN CLEANER HELP YOU CLEAN THE CEILING FAN?



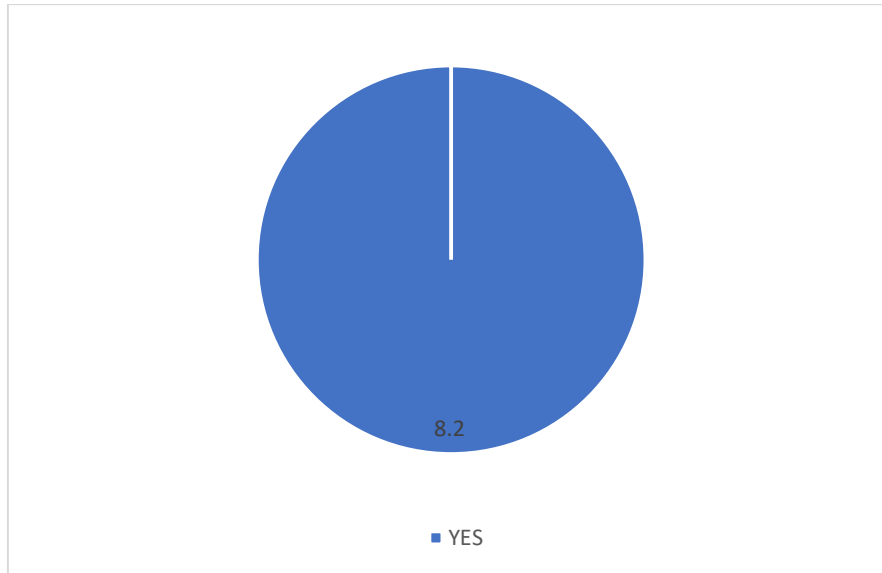
58% say yes that fan cleaner help them to clean the ceiling and 42% say no

4.4.6 IF THE FAN CLEANER PRICE IS REASONABLE , ARE YOU INTERESTED TO BUY?



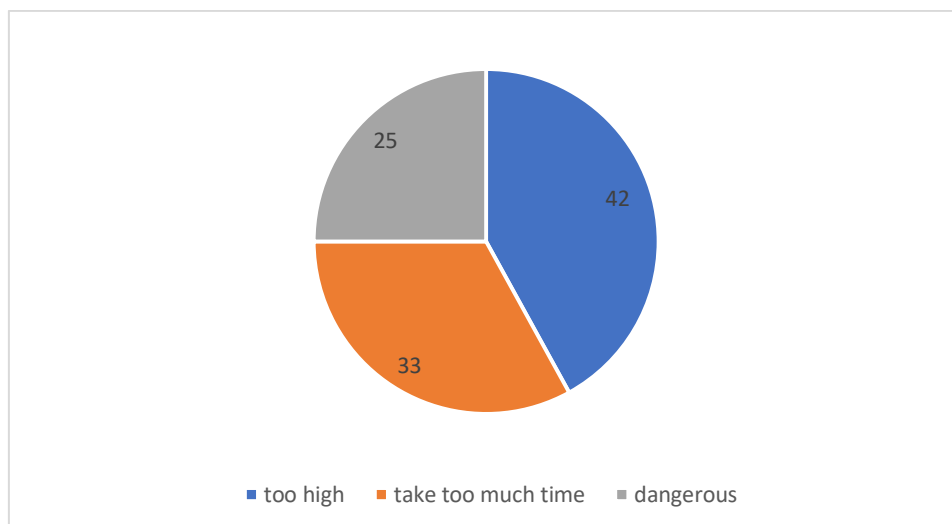
83% people are interested to buy the fan cleaner and 17% are not interested to buy the fan cleaner.

4.4.7 DOES THE DUST ON THE FAN MAKE YOU FEEL UNCOMFORTABLE CLEAN THE CEILING FAN?



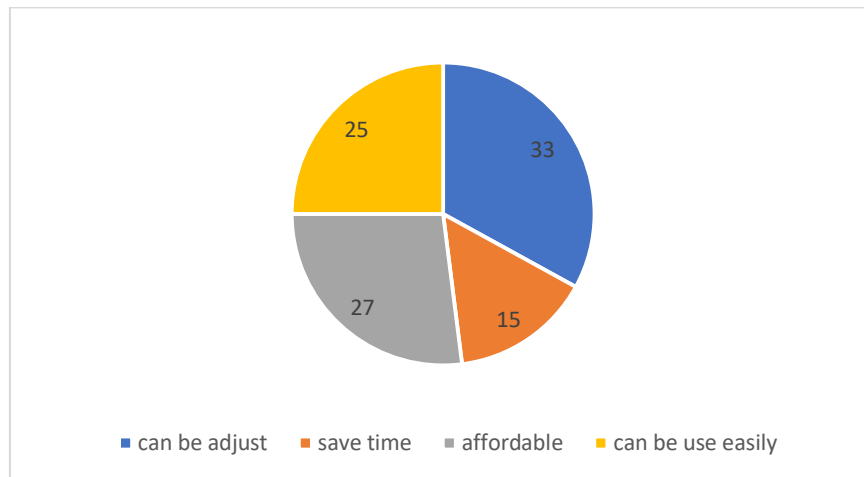
All respondents are agree that the dust make them feel uncomfortable.

4.4.8 PLEASE STATE YOUR PROBLEM WHEN CLEAN THE FAN?



25% person said that it was dangerous to clean the ceiling fan, 42% person said that it was too high and 33% persons said that its take too much time when clean the ceiling time.

4.4.9 STATE THE FEATURES THAT YOU FEEL SHOULD BE ON THE ELECTRONIC FAN CLEANER?



25% person hope that the project can be use easily, 15% wants the product can save their time, 27% hope that the fan cleaner is affordable and 33% wants it can be adjust.

4.5 SUMMARY

The conclusion of this chapter is we must know how many people that needs our products when they clean their ceiling fans. This will make us know our product is valid or not to produce. This is important because we must know either our product can be sold or not. Then we will know our product will be interest for who.

CHAPTER 5

DISCUSSION

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.

The purpose of the discussion is to enable individuals to ask questions related to the project throughout the semester. This is because to ensure that all work methods can be carried out and reported in the report book as well as projects that have been fully operational. These discussions are also conducted from time to time to ensure that the objectives can be fully achieved.

Specific matters or issues that need to be discussed are in terms of capital, project quality, survey on usage, and effective ways to implement its manufacture.

5.2 DISCUSSION

Prepared by Nurul Fadillah Mazlan

5.2.1 Problems encountered while implementing the project

Problems in terms of equipment

The problem of lack of equipment causes the implementation of the project does not run smoothly according to the planning time that has been set. This is because, to get a neat and perfect project result a lot of equipment needs to be used. The equipment provided at the polytechnic workshop is too limited and shared by some other group members. Therefore, to overcome this problem, borrowing and exchanging equipment with other group members will be done. In this way, waste of cost in purchasing equipment can be avoided.

Problems in terms of time

Among the problems that often arise while carrying out a project is in terms of time. A long time need to find the items and components needed for the project. It was because to find the quality and affordable item for our project.

5.2.2 Problems - other problems.

During the process of designing a project, many aspects - aspects that need to be taken and emphasized so that the product produced is able to achieve the desired goals and satisfy the needs of consumers. For example, in the production of this final project product, 'Fan Cleaner', many aspects need to be taken into account. One of them is :

- i) Reasonable price
- ii) Products that are useful to consumers
- iii) Quality
- iv) Manufacturing cost
- v) The process involved
- vi) The time taken to complete

In addition, there are several factors that need to be taken so it will make any problems in operating the tool. The features that need to be specified are as follows:

- i) Uncomplicated way of handling
- ii) Easy to use.

5.3 SUMMARY

Based on the studies that have been conducted, the results obtained from this experiment can achieve the stated objectives, which is that cleaning workers, housewives and the general public can clean the fan blades more effectively. In addition, it can also save time during the cleaning process compared to the tools or methods that used to be manual. Then, with this machine, it can help prevent accidents during the cleaning process.

Many thanks to the career woman, full-time housewife and cleaning contract worker that involved in the research conducted and responded to the questionnaire for research.

CONCLUSION

During the four months we did research and completed the final project from the first week of our lecture, we have gained a variety of knowledge and experience that is very useful and able to know the knowledge in more depth about various problems and solutions in a job, especially in the mechanical field. We have overcome all these problems in collaboration between group members.

In addition, to ensure that the project is ready to work, the flow chart of project implementation is very important and must be followed so that what is planned can be done smoothly. It can also help us follow the planned time period to complete the project within the stipulated period and be able to perform the next step or process.

One thing that should be emphasized in implementing this project is about the cost planning used. Proper and systematic project planning and implementation will minimize the cost of expenses without compromising the project produced. As well as a survey of the materials to be used in building our project. Finally, we hope that the projects produced will work well and effectively.

After gathering information from various sources and analyzing the information. Respondents' information and needs will be changed to specific criteria in product design specifications. Details or specifications that have been selected by the respondents are collected, interpreted and analyzed, before being changed into product design specifications.

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APPENDIX

A. SURVEY QUESTION

1. Who are you?

Career woman

Full time housewife

Cleaning contract worker²

2. Do you find it difficult to clean ceiling fan?

Yes

No

3. Are you satisfied with the way you cleaned the fan before?

Yes

No

4. Do you have allergies to dust?

Yes

No

5. Do you feel tired when clean the ceiling fan manually?

Yes

No

6. Does having an electronic fan cleaner help you clean the ceiling fan?

Yes

No

7. If the fan cleaner price is reasonable , are you interested to buy?

Yes

No

8. Does the dust on the ceiling fan make you feel uncomfortable?

Yes

No

9. Please state your problem when clean the ceiling fan?

10. State the that you feel should be on the electronic fan?

B. GANTT CHART

i) Project 1

TITLE	S	W	W	W	W	W	W	W	W	W	W	W	W	W	W
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
Project selection	P	/	/												
	I	/	/	/	/										
Literature review	P	/	/	/	/										
	I	/	/	/	/	/	/	/							
Survey	P	/	/	/	/	/									
	I	/	/	/	/	/	/	/							
Kos estimate	P	/	/	/	/	/	/								
	I	/	/	/	/	/	/	/	/	/					
Proposal	P	/	/	/	/	/	/	/	/	/	/				
	I	/	/	/	/	/	/	/	/	/	/	/	/		
3d object	P	/	/	/	/	/	/	/	/	/	/				
	I	/	/	/	/	/	/	/	/	/	/	/			
Methodology	P	/	/	/	/	/	/	/	/						
	I	/	/	/	/	/	/	/	/	/					
Gant chart	P	/	/	/	/	/	/	/	/	/					
	I	/	/	/	/	/	/	/	/	/	/				

Presentation	P	/	/	/	/	/	/	/	/	/	/	/	/	/	/
	I	/	/	/	/	/	/	/	/	/	/	/	/	/	/

ii) Project 2

TITLE	WEEK														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Findings	P	/	/	/											
	I	/	/	/	/										
Discussion and conclusion	P	/	/	/	/	/									
	I	/	/	/	/	/	/								
Project making	P	/	/	/	/	/	/	/	/	/	/	/	/		
	I	/	/	/	/	/	/	/							
Proposal	P	/	/	/	/	/	/	/	/	/	/	/	/	/	
	I	/	/	/	/	/	/	/	/	/	/	/	/	/	/
Poster	P	/	/	/	/	/	/	/							
	I	/	/	/	/	/	/	/	/						
Abstract	P	/	/	/	/	/	/	/	/	/					
	I	/	/	/	/	/	/	/	/	/	/				
Presentation	P	/	/	/	/	/	/	/	/	/	/	/	/	/	
	I	/	/	/	/	/	/	/	/	/	/	/	/	/	/

C. ESTIMATE COST

No.	Material	Quantity	Cost/Unit	Total
1.	Roller	2	RM4.00	RM8.00
2.	Adjustable Aluminium	1	RM19.50	RM19.50
3.	Battery 9V	2	RM9.90	RM19.80
4.	Power Cable 9V	1	RM7.00	RM7.00
5.	Wire (3 meter)	1	RM5.00	RM5.00
6.	DC Motor 12V 22400 RPM	2	RM17.90	RM35.80
7.	Bottle Spray	1	RM2.60	RM2.60
8.	Water Container	1	RM6.00	RM6.00
9.	40A Forward Reverse Speed Adjustable	1	RM38.00	RM38.00
	Total			RM141.70