



**PROJECT 1**

**DJJ5141**

**ELECTRIC SPRAY PAINT V2**

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**MECHANICAL ENGINEERING**

**SESSION JUNE 2020**

## AKUAN KEASLIAN DAN HAK MILIK

**TAJUK : ELECTRIC SPRAY PAINT V2**

**SESI : JUNE 2020**

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

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## **ABSTRAK**

Penggunaan alatan untuk mengecat rumah sering digunakan terutamanya menjelang musim perayaan atau juga sebagai penghiasan rumah. Penggunaan alatan cat secara manual yang selalu diguna pakai juga terdapat beberapa masalah dari segi masa, tenaga dan teknikal. Selain itu, masalah ini juga berlaku pada produk yang menggunakan konsep automatik. Pada era ini, kemudahan alatan automatik amat penting dan semakin mudah dari masa ke masa. Berdasarkan kajian semasa yang dijalankan, kebanyakan komuniti kecil yang menggunakan alatan cat secara manual untuk memulakan perniagaan kecil atau menjalankan aktiviti-aktiviti gotong-royong seperti mengecat di masjid mahupun di balai raya. Hakikatnya, penggunaan secara manual dapat membantu mereka untuk mengecat bahagian yang kecil sahaja. Dengan itu, kos penyediaan alatan yang mahal dapat membantu pengguna menggunakannya dalam jangka masa pendek berbanding penggunaan secara automatik. Oleh itu, penggunaan secara manual iaitu dengan menggunakan berus ini juga memerlukan masa yang lama untuk menjalankan aktiviti mengecat kerana penggunaan secara manual ini perlu menggunakan berus yang sesuai untuk mengecat terutamanya di bahagian sudut bangunan. Walhal, kaedah yang digunakan boleh diaplikasikan dengan merekabentuk dan mengubahsuai produk asal “Electric Paint Spray” yang diubah dengan lebih baik kepada “Electric Paint Spray V2”. Pengubahsuaian pada produk asal juga dapat memudahkan pengguna dan pengendalian kerja yang lebih efisien berbanding kaedah manual.

## **ABSTRACT**

The use of home painting tools is often used during festival seasons or as home decorating. The method is manual and there are affected in terms of time, energy and technical. Also the same goes for this product which is using automatic method. In this era, the facilities of automated paint tools on every latest product is very important and this will be becoming easier over time. Based on our latest research, there are a few small community who is use manual paint tools to start small businesses or perform mutual aid activities such as painting in mosques or even in public buildings. In fact, manual uses can help them to paint only a small part. Thus, the cost of setting up expensive tools helps the user in the short term rather than using them automatically. Therefore, the manual use of this brush also takes a long time to carry out the paint job as this manual use should use the appropriate brush to paint especially in the corner of the building. However, the method used can be applied to design and customize the original product of 'Electric Paint Spray' which is further modified to 'Electric Paint Spray V2'. Finally, customization of the original product can facilitate user and work efficiency more efficiently than manual methods.

## CONTENT

CHAPTER	CONTENT	PAGES
	FRONT PAGE	1
	DECLARATION OF OWNERSHIP AND COPYRIGHT	2
	ACKNOWLEDGMENT	3
	ABSTRAK	4
	ABSTRACT	5
	CONTENTS	6
	LIST OF FIGURES	7
1	INTRODUCTION 1.1 Research Background 1.2 Problem Statement 1.3 Research Objectives 1.4 Research Questions 1.5 Scope of Research 1.6 Importance of project 1.7 Chapter's Summary	8 8 9 9 9 10 10
2	LITERATURE REVIEW 2.1 Introduction 2.2 History of Paint Spray 2.3 Research and Advantage 2.4 Theory and Concept 2.5 Material Selection 2.6 Chapter's Summary	11 12 12-19 19-22 22-24 25
3	METHODOLOGY 3.1 Introduction 3.2 Flow Chart 3.3 Flow Chart Description 3.4 Bill of Material 3.5 Project Activity 3.6 Chapter's Summary	26 27 28-32 33 34-37 38
4	FINDINGS AND ANALYSIS 4.1 Introduction 4.2 Project Endurance Testing 4.3 Analysis Data 4.4 Result of Data 4.5 Advantage and Disadvantage 4.6 Chapter' Summary	39 39 40 41-49 50 51
5	DISCUSSION, CONCLUSION AND UPGRADE PLAN 5.1 Introduction 5.2 Discussion 5.3 Conclusion	52 52 53
6	REFERENCES	54
8	APPENDIXES	

## LIST OF FIGURES

CONTENT	PAGES
Figure 2.1.1 – Introduction	11
Figure 2.3.1 – Research of nozzle	12
Figure 2.3.2 – Single phase of paint nozzle	13
Figure 2.3.3 – Two phase of paint nozzle	14
Figure 2.3.4 – Cup sprayer	14
Figure 2.3.5 – Airless sprayer	16
Figure 2.3.6 – NVLP sprayer	17
Figure 2.3.2.1 – Research of compressors	18
Figure 2.4.1 – 6 Gallon Oil Tree Pancake Compressor	19
Figure 2.4.2– Single Cylinder Piston Compressor with air tank	20
Figure 2.4.3- Spray Gun	20
Figure 2.4.4 – Pressure Spray Gun	21
Figure 2.4.5 – Host	22
Figure 2.5.1 – DEKO DKSG55KI Electric Paint Spray	22
Figure 2.5.2 – Types of part	23
Figure 2.5.3 – Types of the sprayer	24
Figure 3.2 – Flow Chart	27
Figure 3.3.1 – Design specification	29
Figure 3.3.2 – Inventor 3D	29
Figure 3.3.3 – Budget Calculation	30
Figure 3.4.1 – Gantt Chart	33
Figure 3.5.1- Pie Chart of Gender	34-35
Figure 4.4.1 – Pie Chart of Work Status	39
Figure 4.4.2 – Pie Chart of Age	40
Figure 4.4.3- Pie Chart of Races	41
Figure 4.4.4 – Pie Chart of Survey Question	42
Figure 4.4.5- Pie Chart of Survey Question	43
Figure 4.4.6 – Pie Chart of Survey Question	44
Figure 4.4.7 – Pie Chart of Survey Question	45
Figure 4.4.8 – Pie Chart of Survey Question	46
Figure 4.4.9 – Pie Chart of Survey Question	47

# **CHAPTER 1**

## **INTRODUCTION**

### **1.1 INTRODUCTION OF PROJECT**

The introduction of the project is a tool that works to spray paint on every surface of the wall where the main objective of this product is to make it easier for consumer to be seen after the constructions sector to work more smoothly. With this paint sprayer it possible for construction workers and small communities to apply every surface especially to the interior.

Although there are companies that manufacture a wide range of products with different types of paint sprayer, they are easier to use than existing paint sprayer. In fact, there are some product that are much better suited to the situation but more specific to the manufacturing industry.

This product can reduce labour and ease of use and can increase the quantity of paint sprayer at a lowest cost. The advantage of this product is modified on a small paint tank and the main paint drainage tube, its more efficient to send the paint drainage tube, it is more efficient to send the paint directly to the sprayer. However, it must maintain its existing use to transfer paint to the sprayer.

### **1.2 STATEMENT OF PROBLEM**

Statement problem for project are:

- i. Small spray tanker.
- ii. Difficult move paint from place to another place.
- iii. Limited used of paint sprayer.



### **1.3 OBJECTIVE PROJECT**

The objective for a project are:

- i. Customizing the existing small tank to make it easier for users to use more paint quantities.
- ii. Easy to move from one place to another place by providing a paint brush base.
- iii. To extend the range of use of the sprayer from the main switch throughout the use area.

### **1.4 QUESTION OF PROJECT**

The question of project are:

- i. Who is the displaced by the tool being produced.
- ii. The extent to which the project was created can help the displaced.
- iii. What is the difference between an existing project and a project being created.

### **1.5 SCOPE OF PROJECT**

This study was conducted around newly completed residential areas in Malaysia and residential gardens. The scope of this study is more about the business of the medium especially to construction workers and small community.

## **1.6 IMPORTANCE OF PROJECT**

The importance of this project is to help consumers such as construction workers and the general public perform their work quickly. A manual paint that makes it difficult to spray the target surface should not be anyone's choice. On top of that, when we choose to use a high-pressure paint sprayer and with the paint brush base, the pressure may cause an overspray that eventually causes so much paint to spray in the air. Secondly, even if we have no large area to paint, we have to spend all day doing the same thing while there is a way of doing it fast and professionally. Ideally, Electric Paint Sprayer V2 in contrast to brushes and rollers works four times faster. Eventually, we get time to do more painting work or any other task that may be pending. Furthermore, moving painting tools sometimes may cost all the energy, or sometimes we need to call someone to help move it. And when sometimes we want to do it all alone, it may be difficult to move around when using heavy tools. Besides, these sprayers come with a cart to make things easy for us. Therefore, move the tool around without calling anyone for support. Also, storage becomes less tiresome since we can quickly push it from one working site to another. It will help users in terms of speed of work and reduce user load.

## **1.7 SUMMARY**

Nowadays we are aware of the problem faced by construction workers and the general public in the process of painting a house. Overall in this chapter, such as study objectives, project background, problem statement, project question and project definitions. We have created an innovative tool from a basic home-based tool. This tool reduces the burden on project displacement and improves cleanliness. The preparation of this tool makes it easier for users to provide a much cheaper and multi-functional tool. Finally, this tool can help consumers in terms of money, energy and time.

## CHAPTER 2

### LITERATURE REVIEW

#### 2.1 INTRODUCTION

The first airbrush, depending on the definition, was patented in 1876 by [Francis Edgar Stanley](#) of [Newton, Massachusetts](#). This worked akin to a diffuser / atomiser and did not have a continuous air supply. Stanley and his twin brother later invented a process for continuously coating photographic plates (Stanley Dry Plate Company) but are perhaps best known for their [Stanley Steamer](#). No artistic images that used this 'paint distributor / atomiser exist or are as yet known. (Francis Edgar Stanley,1876)

The first instrument to be named the "paint distributor" was developed "for the painting of [watercolors](#) and other artistic purposes" and used a hand-operated [compressor](#) to supply continuous air. It was rather crude, being based on a number of spare parts in a jeweller's workshop such as old screwdrivers and welding torches. It took 4 years of further development before a working prototype was developed by [Liberty Walkup](#) of Mt. Morris, Illinois. Walkup repatented the work under the name of "air-brush", a name his wife Phoebe Walkup came up with. Thus the formal birth of the name 'Air Brush' can be traced to a stakeholders meeting of the new Air Brush Manufacturing Co. at 7pm on 6 October 1883, and the name was formally born. ([Abner Peeler,1883](#))

The first certain 'atomising' type airbrush was invented in 1893 and presented by [Thayer and Chandler](#) art materials company at the [World Columbian Exposition](#) in [Chicago](#). Burdick founded the Fountain Brush Company in the US, and launched the first series of airbrushes onto the market. However, Burdick initially 're-cased the Walkup design into finger operated instrument, and as many of his designs echoed those being developed by Walkup, a legal row resulted over the name Air Brush. This device was essentially the same as a modern airbrush, resembling a pen and working in a different manner than Peeler's device. Aerograph, Burdick's original company, still makes and sells airbrushes in England. Thayer and Chandler were acquired by [Badger Air-Brush Co.](#) in 2000. Badger Air-Brush continues the Thayer and Chandler tradition of manufacturing quality airbrush guns, tools and compressors out of Franklin Park, Illinois. ([Charles Burdick,1893](#))



Figure 2.1

## 2.2 HISTORY OF SPRAY PAINT

Spray paint with compressed air can be traced back to its use on the [Southern Pacific Railway](#) in the early 1880s. In 1887 Joseph Binks, the maintenance supervisor at [Chicago's Marshall Field's Wholesale Store](#) developed a hand pumped cold-water paint spraying machine to apply whitewash to the subbasement walls of the store. ( Joseph Binks,1887).

[The](#) decorations director for the [World's Columbian Exposition](#) in [Chicago](#) in 1893, used Binks and his spray painting system to apply [whitewash](#) consisting of a mix of oil and white lead to the buildings at the Exposition, taking considerably less time than traditional brush painting and turning it into what has been called the [White City](#). ( [Francis Davis Millet](#), 1893)

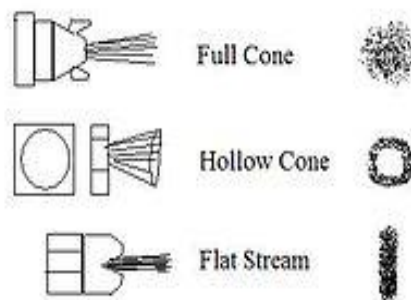
A type of spray painting are developed, [aerosol paint](#), that could be delivered via a compressed [aerosol](#) in a can. (Edward Seymour,1949)

## 2.3 RESEARCH

### 2.3.1 RESEARCH OF NOZZLE

INVENTOR: MOHAMMAD LUKMAN BIN ZAINI

This process occurs when paint is applied to an object through the use of an air-pressurized spray gun. The air gun has a nozzle, paint basin, and air compressor. When the trigger is pressed the paint mixes with the compressed air stream and is released in a fine spray. Due to a wide range of nozzle shapes and sizes, the consistency of the paint can be varied. The shape of the work piece and the desired paint consistency and pattern are important factors when choosing a nozzle. The three most common nozzles are the full cone, hollow cone, and flat stream. There are two types of air-gun spraying processes. In a manual operation method the air-gun sprayer is held by a skilled operator, about 6 to 10 inches (15–25 cm) from the object, and moved back and forth over the surface, each stroke overlapping the previous to ensure a continuous coat. In an automatic process the gun head is attached to a mounting block and delivers the stream of paint from that position. The object being painted is usually placed on rollers or a turntable to ensure overall equal coverage of all sides.



#### a) SINGLE PHASE OF PAINT NOZZLE

The single phase of paint that comes in a sealed pressurized container and released in a fine spray mist when depressing a valve button called aerosol paint. It can produce a smooth and coated surface, unlike many rolled or brushed paints. These types of paint nozzle are portable, cheap and easy to store. The history of this type on paint nozzle by Edward Seymour in 1949 was designed to demonstrate aluminium paint. The uses of this type paint sprayer from small to medium-sized repairs to automobile bodywork can be completed, but it would be difficult and expensive if use this way to paint the entire vehicle. The main disadvantages, compared to professional spray guns, are the limited quality offered by the built-in nozzle and the lack of infra-red baking after applying the paint, which means the paint can take several months to achieve its final hardness. Figure 2.1 illustrate aerosol paint can. Propellant in the top of the can pressures down on the paint propellant mixture in the 8 bottom. The paint mixture is pushed up through the dip tube when the valve is opened.



Figure 2.3.2: Aerosol paint can

#### b) TWO PHASE OF PAINT NOZZLE

There are several types of two phase of paint nozzle in this industry. There are combinations of air and paints, also airless and paint. The stated sprayers are cup sprayer, air sprayer, and airless sprayer. Each type of sprayer is designed for different painting tasks that allow an efficient work to produce amazing arts. The study of paint spray for automotive car body is important to make beautiful appearance on cars. This is why choosing the right paint spray and its system are important in spray painting works. It can be determined by the surfaces of the body where it will be painted, what types of paint or stain that needs to apply as well as the coverage whether it will be large or small. Gravity feed spray guns for spraying paints are the most commonly used guns in these industries.

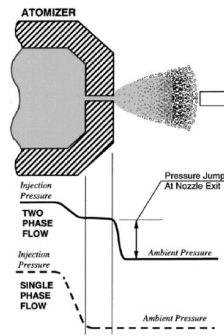


Figure 2.3.3

### c) CUP SPRAYER

Cup sprayers are operating at a basic with high pressure that is best for solo paintings or hobby activities. They connect to an air compressor and the finish is blasted onto the project using this high pressure. It is also suitable for small jobs, touch-up work or when using multiple colours. They are low in price in terms of models, parts and do not require more advanced models for large-scale work. So, a person can do a painting work very quickly with it with unnecessary expenditure. The sample of cup sprayer is shown in Figure 2.3.



Figure 2.3.4

#### d) AIR SPRAYER

The air gun has a nozzle, paint basin and air compressor. Due to wide range of nozzle shapes and sizes, the consistency of the paint can be varied. The shape of the project, the paints and pattern are important factors in choosing a nozzle. The three common nozzles are the full cone, hollow cone, and flat stream. These conventional air sprayers are usually used for automotive works that gives high quality finishes for both interiors and exteriors surface of a project. An air sprayer is made of compressed air system that creates a smooth spray pattern and projects paints that covers a large surface. A stream of paint meets air will form the paint droplets and then are exerted out by a pressure which will flow them out through the spray nozzle. An extensive masking is required when handling this sprayer for safety. Besides that, a spraying distance of at least 15 cm to 30 cm is suggested to prevent user from inhaling the paint droplets. This sprayer can use a lot of paint types and may be adjusted for paint thickness by diluting with liquid to suit it with its uses.

#### e) AIRLESS SPRAYERS

Airless sprays guns are widely used in heavy industries mainly focussing on corrosion protection, such as metal construction work, bridges or ships. Usually it produce thick films due to high impact momentum of droplets, the coating material is penetrating into pits. Its working principle is the paint was pressured to go out through small nozzle to the surface. Its applications are for spraying large interior and exterior projects. But this type of spray gun have to maintain its nozzle because of the dirt come from paint always block the nozzle hole. However, most of the sprayers' fabricator companies come out with reversible spray tips that include in the pamphlet or catalogue of their products to overcome that problem according to (Qiaoyan ye), et al: 2013. This type of spray considered the fastest spray gun and also minimizes overspray as shown in Figure 2.4. This spray was characterized by relatively large droplets and a high axial momentum according to (Qiaoyan ye), et al: 2013.



Figure 2.3.5

#### f) MULTIPHASE OF PAINT NOZZLE

The multiphase of paint nozzle is an outlet for combination three types of substances which are paint, air and activator. Usually, the paints already mixed with the activator. The most common activator is hardener. The common type of multiphase of paint nozzle is High Volume Low Pressure (HVLP) spray guns which can give a better result than the conventional spray gun because of less air entrapment. Based on Craig Kelly 2009 it also saves material.

#### g) HVLP SPRAYERS

The meaning of HVLP is high volume low pressure refers to conventional spray gun using a compressor to supply the air, but the spray gun requires a lower pressure (LP). A higher volume (HV) is used to aerosolise and propel the paint at lower air pressure. Higher proportion of paint reaching the surface with reducing overspray and air pollution can be achieved with HVLP sprayer. Thus, it's suitable for small project to heavy projects according to William C. Smith, 1996. For small industries, automotive painters can use HVLP sprayer with portable air compressor but a regulator is required to lower the pressure. Some masking may be required for this type of sprayer depending on the time use and proficiency of the user. 15cm to 20cm is the best spraying distance for this type of sprayer. HVLP sprayers are not good with thick paint such as latex, but works great with thinner substances. Additional to that, this sprayer provide the highest level of transfer efficiency. Thus, more paint reaches the spraying surface resulting less masking and drop cloth usage. HVLP sprayers become popular because it can provide a high quality finish with good transfer efficiency. Figure 2.5 illustrate a simple type of HVLP sprayer.





Figure 2.3.6 HVLP SPRAYERS

## 2.3.2 RESEARCH OF COMPRESSOR

INVENTOR: AZRI NAZMI BIN ABDUL BASID

An air compressor is an equipment that converts power into kinetic energy by compressing and pressurizing air, the can be released in quick bursts. Two common types of compressor are positive-displacement and negative-displacement. Compressors that use rotating impeller to generate air pressure, positive displacement compressors in Figure 2.3.2.1 are the most common used by workers. Its working by forcing air into chamber whose volume is decreased to compress the air. Common types of positive-displacement are piston type, rotary screw compressors and vane compressors. The piston-type air compressors working principle is by pumping air chamber through the use of the constant motion of pistons. It uses one way valves to guide air into a cylinder chamber, where the air is compressed. Another type is rotary screw compressors use positive-displacement compression by matching two helical screws that, when turned, guide into a chamber, whose volume is decreased as the screws turn. Refer to Patrick B. Nolan, 2002 the last type is vane compressors use a slotted rotor with varied blade placement to guide air into a chamber and compress the volume and delivers a fixed volume of air at high pressures.

For negative-displacement air compressors or dynamic compressor include centrifugal compressors to generate force by spinning the impeller to accelerate and then decelerate the capture air, which pressurizes it according to Patrick B. Nolan, 2002. Air compressor is needed to supply air pressure to spray gun. This device will be used in paint spray gun experiment to supply consistent air pressure by connecting using proper hoses. A pressure gauge will be connected at the outlet of air compressor to record the air pressure produced.



Figure 2.3.2.1

### 2.2.3.1 ADVANTAGES OF COMPRESSOR

Since the discovery of compressor types, it beneficial for the industries and research. Air compressor is used and important part of this product because there are a few types of compressor. For types of positive displacement. There are two section which is reciprocating and rotary.

Reciprocating have three compressor which is single acting, double acting and rotary. Benefit of single acting compressor is simple design, compact size, reduction in valve and piping costs, and air consumption is halved compared with the equivalent sized double acting cylinder. After that, double acting cylinder also have a benefit which is efficient compression, particularly with multi- stage compressors, three- step (0- 50- 100 percent) or five- step (0- 25- 50- 75- 100 percent) capacity controls, allowing efficient part- load operation .relatively routine maintenance procedures. Lastly, a few advantages of diaphragm compressor which is energy-efficient, easily maintained, miniscule uneven forces seal and diaphragm failure, all compression is loading on the rod, lower load on the crankshaft bearings and No problematic transition assembly.

Nest, rotary section have four types of compressor which is lobe blower, liquid ring, screw and vane. There are a few advantages for lobe blower compressor is Reduced life-cycle costs, Amazing energy efficiency, High levels of reliability, long service life, Processed air is 100% free of oil and absorbing material and Reduced maintenance requirements. After that, liquid ring compressor have a benefit of it which is No pressure fluctuations, Operating speeds are mostly designed to match electric motors synchronous speeds, making it possible to directly connect the compressor to the motor, eliminating the need for a gearbox device .Then, low operating temperatures ,vibration ,noise level and no need for expensive silencers .Then , the benefit of screw compressor which is Screw compressors have 25 to 30 percent higher energy

efficiency than piston compressors, a lot less noise and vibration than piston compressors, occupy less space than piston compressors and excess of 2000 litres per minute have a lower maintenance load than piston compressors. Last advantages of rotary compressor which is vane compressor. Vane compressor have a few advantages which is its oil free air output ,suitable continuous air supplied and high power (up to 500 hp) high pressure (up to 85bar) compression is possible.

Eventually, dynamic have two types of compressor which centrifugal and axial. Firstly, there three advantages of centrifugal compressor which is High-flow rate than the positive displacement compressor, relatively energy efficient and Suitable for continuous compressed air supply, such as cooling unit. Lastly, axial compressor also have one advantage which is offers higher efficiency, speed capability and capacity for a given size than a centrifugal compressor.

## **2.4 THEORY/CONCEPT**

### **TYPES OF COMPONENT**

INVENTOR: ANIS SYAFIQAH BINTI MOHD AZHAR

#### **2.4.1 AIR COMPRESSOR**

##### **a) 6 GALLON OIL FREE PANCAKE COMPRESSOR**



150 psi 6-Gallon Oil-Free Pancake Compressor is constructed with a pancake style tank for stability, with a water drain valve and tough rubber feet. The high-pressure design optimizes air tool performance, delivering 2.6 SCFM at 90 psi for quick recovery time. The oil-free pump provides maintenance-free performance. Transporting is easy with the integrated cord wrap.

## b) SINGLE CYLINDER PISTON COMPRESSOR WITH AIR TANK



The mini air compressor can be widely used to show off your artistic flair, simply connect to an airbrush with the braided hose included and it is ideal for designing murals for your studio walls, or for airbrushing canvases to hang on your walls.

## 2.4.2 SPRAY GUN/ NOZZLE

### a) HVLP AIR SPRAY GUN

HVLP / LVLP spray guns, high pressure / low pressure paint sprayers, mini touch up painting guns hopper cup spray gun, paint tank, airbrush guns. For woodworking construction automotive & wall painting jobs.



- \* Nozzle size: 1.4/1.7/2.0mm
- \* Available size: 1.0 - 2.2mm
- \* Operating pressure: 20-40psi
- \* Air consumption: 1.5cfm @ 30psi
- \* High volume low pressure
- \* Air inlet volume / paint volume / spray pattern could be easily adjusted.
- \* Paint filter included in each package.

#### b) PRESSURE SPRAY GUN



- Air pressure: 2.0 bar
- Air consumption: 360 NI/min
- Fluid output: 255 ml/min
- Pattern width: 280mm
- Weight: 380g
- Cup: 1 Litre

### 2.4.3 HOST

- c) Airless Paint Spray Hose Extension Sprayer Pressure Tube 5000PSI



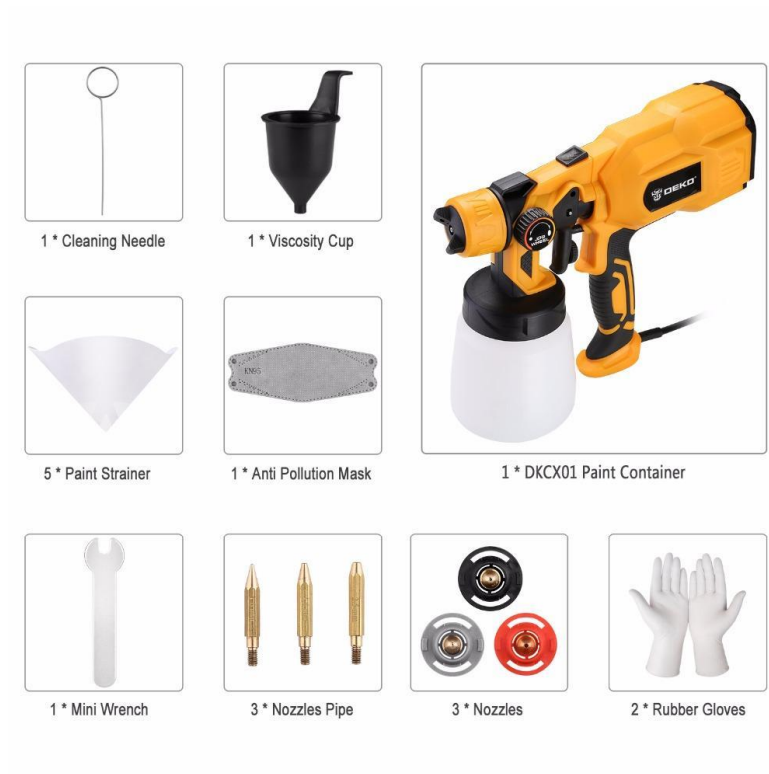
### 2.5 MATERIAL SELECTION

#### 2.5.1 DEKO DKSG55K1 ELECTRIC PAINT SPRAYER (ORIGINAL PRODUCT)



## DETAIL OF THIS PRODUCT:

- Brand Name: DEKO
- Feed Type: Pressure
- Type: HVLP
- Model Number:DKSG55K1
- Usage: Home DIY
- Nozzle Diameter: 1.8mm
- Application: Paint Sprayer
- Power Type: Electric
- Customized: Yes
- Cup Volume: 800ml
- No-Load Speed: 30000rpm





**Horizontal 90°**

**Circular 45°**

**Vertical 180°**



**Flow control knob**





## **2.6 SUMMARY**

As to conclude this chapter, literature review is important to showcase all the studies of materials to enhance the knowledge on this project. Every thesis and others projects that are related to this Electric Spray Paint V2 is really helpful especially for us to understand it fully.

After a lot materials were discussed and researches were done, the materials that are the most compatible for our project is shaft.

# **CHAPTER 3**

## **METHODOLOGY**

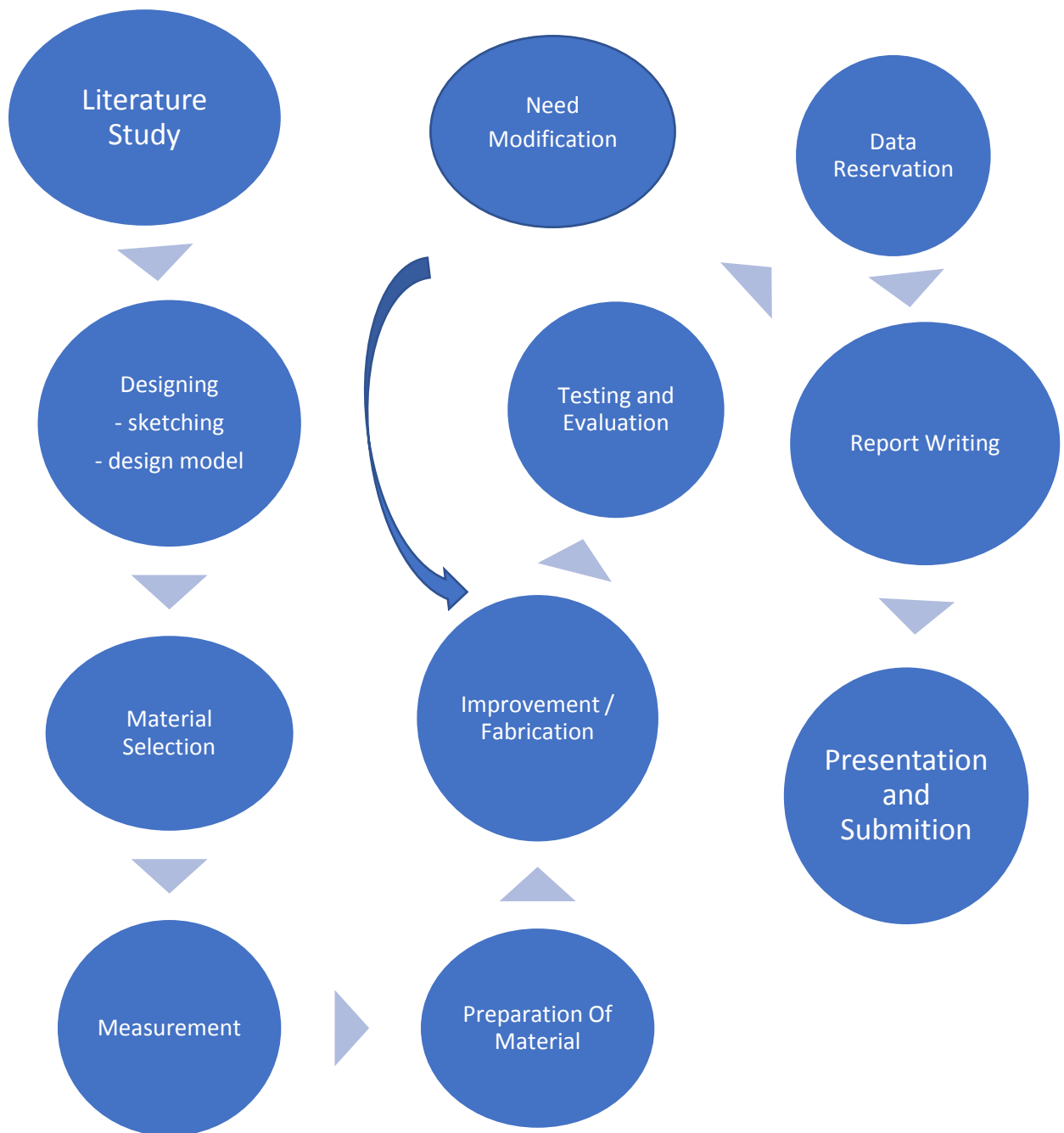
### **3.1 INTRODUCTION**

What is methodology? 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. But actually, sometimes there is a method to this madness. And sometimes there's a methodology.

This chapter gives an outline of research that we followed in the study. It provided information on the participant that is the criteria for inclusion in the study, who the participants were and how they were sampled. The researcher describes the research design that was chosen for the purpose of this study and the reasons for this choice. The instruments that was used for the data collection is also described and the procedures that were followed to carry out this study are included. The researcher also discusses the methods used to analyze the data. All the fabrication process in this project is going to be explained in details.

Lastly, this methodology can help us prepare to continue producing our projects next semester.

### 3.2 FLOW CHART



### 3.3 FLOW CHART DESCRIPTION

#### 1. INTRODUCTION

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. In this chapter, I will explain about the process that involved during the fabrication process. I also will explain about the design and analysis that had been chosen to be as the final idea to be producing or fabricate. All the fabrication process in this project is going to be explained in details.

#### 2. DESIGNING

##### I. DESIGNING MODEL

The design of the Electric Spray Paint V2 must be compliance to several aspects. The design consideration must be done carefully so the design can be fabricated and the parts are all functioning. The aspects that must be considered in designing the product are:

- **Strength:** The trolley have certain strength to ensure that it can load heavy items such as tank of paint and strength of compressor to give pressure for spraying the paint.
- **Ergonomic Factors:** The product must be user friendly as easy and convenience.
- **Suit to environment:** The product must be suitable to be use in factory area.

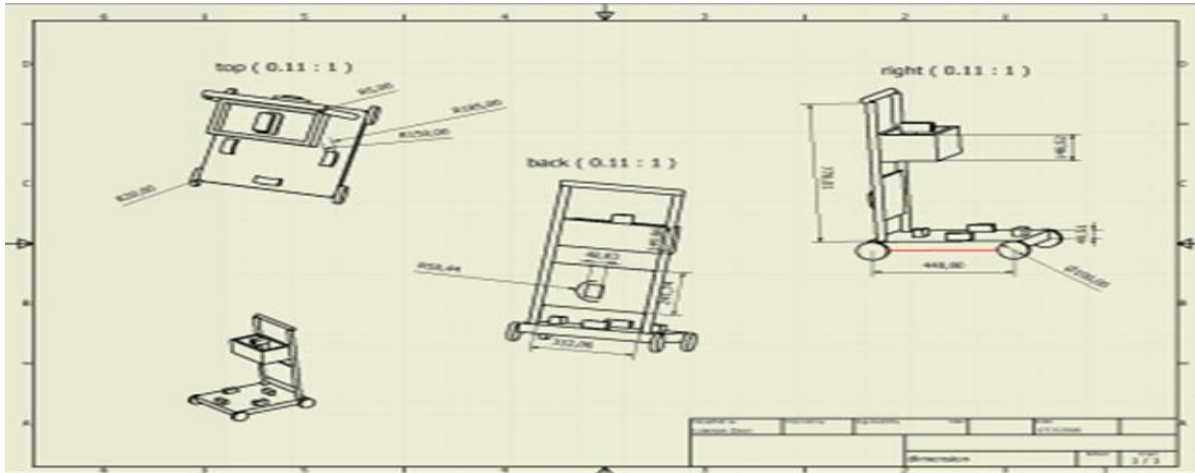
##### II. DRAWING

There are two category which are:

- **Sketching:** All the ideas for the product fabrication are sketched on the paper first to ensure that idea selection and be made after this.
- **CAD Drawing:** The final idea is drawn into the CAD drawing format with details features.

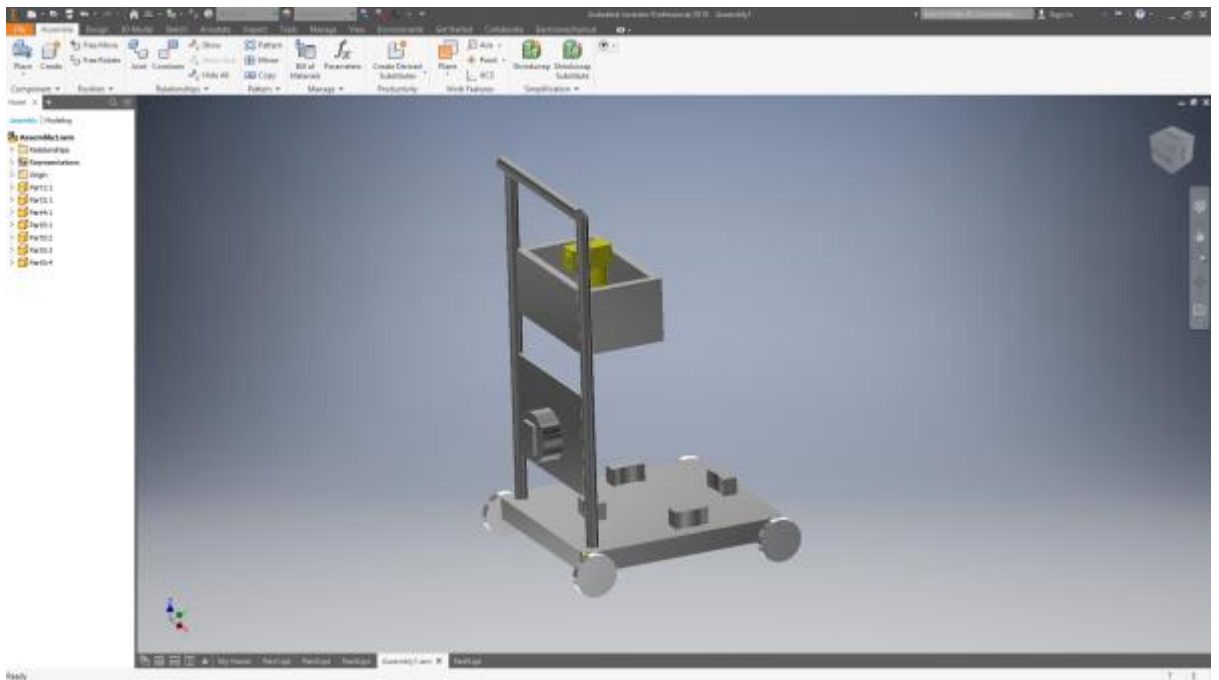
### III. DESIGN SPECIFICATION

#### Dimension and Orthographic



### IV. SKETCHING AND DRAWING

#### Inventor 3D



### 3. MATERIAL SELECTION

The process of material selection is one of the most important process in every 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.

#### DEKO DKSG55K1 ELECTRIC PAINT SPRAYER (ORIGINAL PRODUCT)



#### DETAIL OF THIS PRODUCT:

- Brand Name: DEKO
- Feed Type: Pressure
- Type: HVLP
- Model Number:DKSG55K1
- Usage: Home DIY
- Nozzle Diameter: 1.8mm
- Application: Paint Sprayer
- Power Type: Electric
- Customized: Yes
- Cup Volume: 800ml
- No-Load Speed: 30000rpm

The important part is this original product because we need to make modification for this product to friendly for user.

## I. TROLLEY FOR TANK

Recycled trolley are chosen because we need to reduce cost produce. After that, the recycled trolley will modify in original dimension to make it easy to place the tank of paint on the trolley and make a few modification on the trolley to place the extension wire and sprayer paint.

## II. SPRAY AIRLESS HOSE

This product are chosen because is made of imported fibre and special synthetic rubber, it is resistant to pressure, heat, aging and corrosion. It also have a small fluid resistance, the volume expansion is small but does not affect the pressure. The important is this product is good flexibility, the bending performance and it is not easy to fracture.

The specifications of this product:

Material: Nylon + Fibre Weaving + Polyurethane

Colour: Blue

Length: Approx. 10M/393.7"

Highest Confined: 5000PSI

Working Pressure: 3300 Bar

Bursting Pressure: 4500 Bar

Operating Temperature: -40~100°C

Standard of Use: SAE 100 R7

## III. Industrial Rubber Wheel/ Brake / Swivel / Rigid Castor Wheels Trolley Caster

This product is chosen as wheel for the trolley because there are a few benefit of which is each caster come with mounting bracket and built in with duplex bearing inside. It also silent when operating, suitable for indoor and outdoor usage.

Specification:

- Type: 5" inch Rubber Caster Wheel Series.
- Loading capacity: 100kg per unit
- Mark: Triple S
- Weight: 1kg per pc
- Model: Rigid / Swivel / Swivel + Brake / Wheel Only
- Material: High quality rubber
- Colour: Black

#### IV. EXTENSION WIRE

This product is chosen because to give extra coverage for spraying the wall or else.

#### 4. IMPROVEMENT AND FABRICATION

Fabrication process is difference from manufacturing process in term of production quantity. Fabrication process is a process to make only one product rather than manufacturing process that focus to large scale production. In the project fabrication process needed to make the base plate, framework of display board and display board. Fabrication process was used at the whole system production. This was include part by part fabrication until assembly to others component.



### 3.4 BILL OF MATERIAL

PREPARED BY: ANIS SYAFIQAH BINTI MOHAMAD AZHAR

Diagram below shows the cost to make Electric Spray Paint V2. In this diagram show the material, cost and unit of the material.

ITEM	UNIT	PRICE (RM)
COMPRESSOR	1	86.00
HOST	1(10m)	22.00
WIRE	1(6m)	6.50
PAINT	1	35.00
SPRAYER	1 set	12.30
GLOVE	1 set	2.09
WHEEL SET	4(1 set)	8.51
GOGGLE	1	2.36
SWICTH SOCKET	1	6.90
PLUG	1	2.90
THICK IRON	1(10m)	15.00
IRON PIECES	1(50cmx120cm)	7.80
NETS	1(20cmx116cm)	5.60



9	DISCUSS THE LITERATURE REVIEW															
10	DISCUSS THE CONCEPTS AND THEORY															
11	MAKE A PHASE OF METHODOLOGY															
12	DISCUSSION THE THEORY AND SKETCHING															
13	MAKE A DATA COLLECTION															
14	MAKE THE CALCULATION AND SIMULATION DISCUSSION															
15	MAKE A DESIGN OF THE PROJECT															

PLAN –  ACTUAL 

GANTT CHART DJJ 6143 (JUNE 2020 SESSION)

NO	PROJECT ACTIVITIES	WEEKS														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	BRIEFING PROJECT TO STUDENT	PLAN														
2	MEET THE SUPERVISOR ( FACE TO FACE AND ONLINE )	PLAN	PLAN	PLAN	PLAN	PLAN	PLAN	PLAN	PLAN	PLAN	PLAN	PLAN	PLAN	PLAN		PLAN
3	BUYING THE PART		PLAN	PLAN	PLAN	PLAN										
4	BODY ASSEMBLING			PLAN	PLAN	PLAN	PLAN									
5	PROJECT TEST RUN							PLAN	PLAN	PLAN						
6	PREPARATION OF REPORT										PLAN	PLAN	PLAN	PLAN	PLAN	
7	SUBMISSION OF THE REPORT															PLAN
8	LOGBOOK REVIEW BY HEAD OF DEPARTMENT															PLAN
9	PITEX SUBMISSION FILTER					PLAN				PLAN						
10	PITEX PRESENTATION (COVID ISSUE)													PLAN		

PLAN – ■ ACTUAL ■

### **3.7 SUMMARY**

The chapter begins with an introduction then describe the research design employed in this study. Population and sample study is also mentioned before discussing the research methodology used to conduct this research. In collecting data, library and field research are used. For field research, qualitative method is chosen in which group of interviewees are involved in the research procedure. The data that were collected are then analysed and discussed and the results are displayed. Lastly, this flow chart helps us to complete the Electric Spray Paint V2 project perfectly as we have provided the necessary cost to produce this project. As such, we hope to better produce our product as a benchmark for our society and nation.

## **CHAPTER 4**

### **FINDINGS AND ANALYSIS**

#### **4.1 INTRODUCTION**

This chapter combine data and analysis of the Electric Spray Paint V2 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 PROJECT ENDURANCE TESTING**

We did some research before creating this project. An important aspect of this project is the durability of the project as it plays an important role so that the paint carried with the cart can be carried with the lancer throughout the painting. In addition, the force of the spray also plays a role when the distance between the spraying nozzle and the surface can be sprayed even if the hose is extended. We have also taken into account the average strength of the spray so that our project can be used indirectly.

### 4.3 ANALYSIS OF DATA

Based on the pie chart above, there were 25 responders given by the construction workers and small community in our residential areas with 56% of male and 44% of female from the responded. As a results, most of them were satisfied with the Electric Spray Paint but we still want to make the improvements to make it. On top of that, we have modified the original to V2 by adding a cart that makes it easy to spray paint from one place to another and extend the range of use the sprayer from main switch throughout the use area.

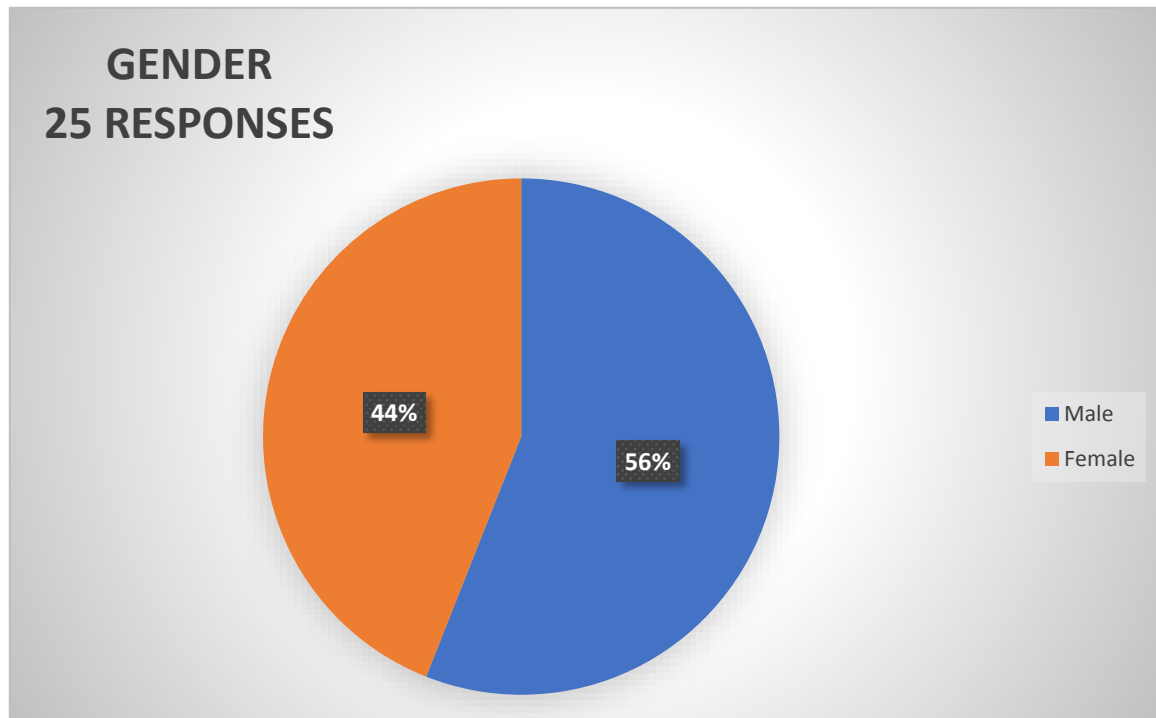
The data generated from this questionnaire were analyzed in more detail to draw conclusions based on the stated objectives of the study. The study was conducted on 25 responders.

There are several aspects that focus on:

- Gender
- Work status
- Age

## 4.4 RESULTS OF DATA

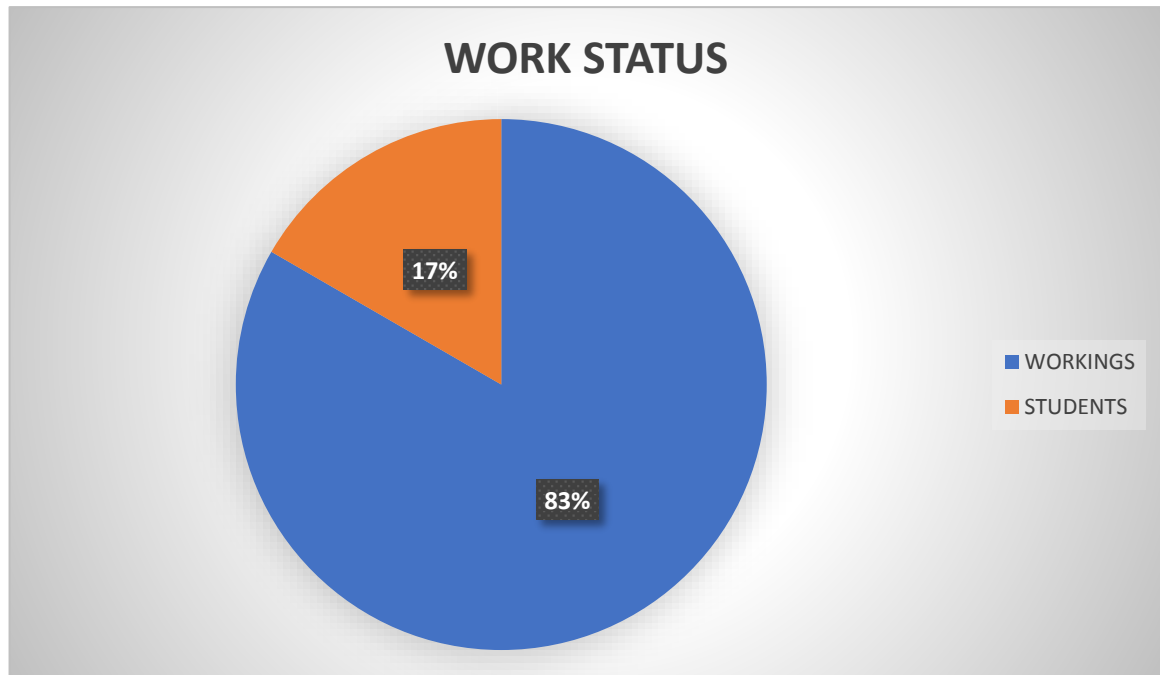
### 1) GENDER



The pie chart above shows that 56% of male and 44% of female have answered some of the questions we raised when we met them. Based on the percentage on the pie chart, it indicates that male responders are more interested in buying 'Electric Spray Paint V2' than female responders. This is because, male responders are more suitable to use our products because they require more energy to paint in large areas.

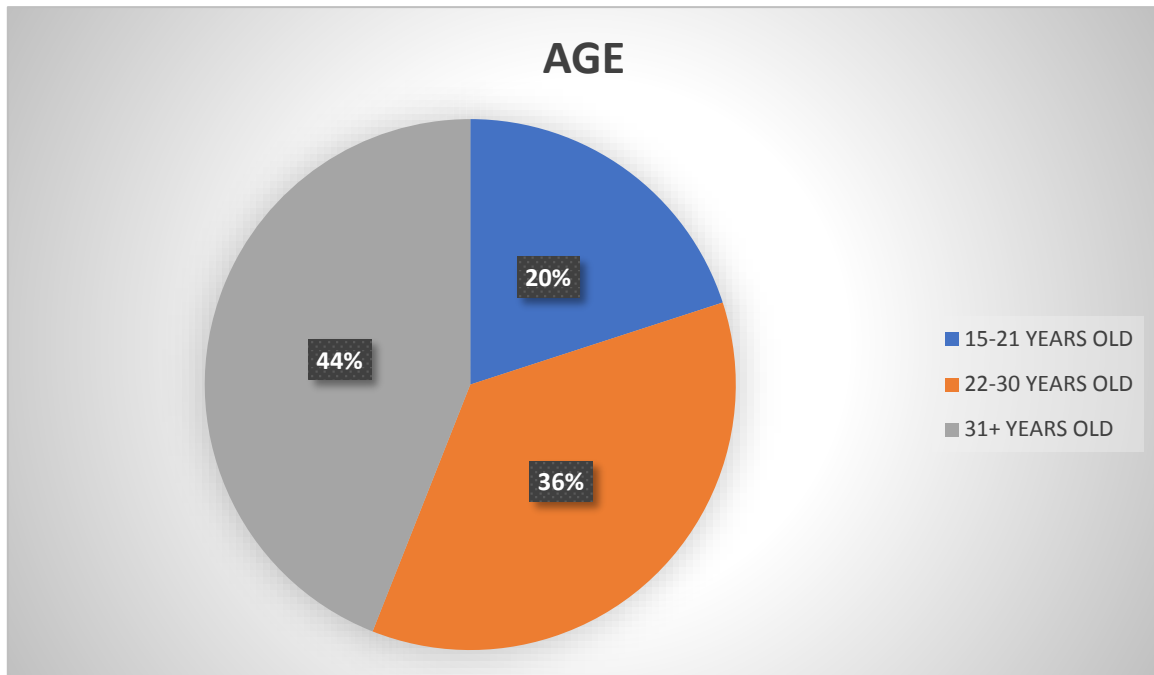


## 2) WORK STATUS



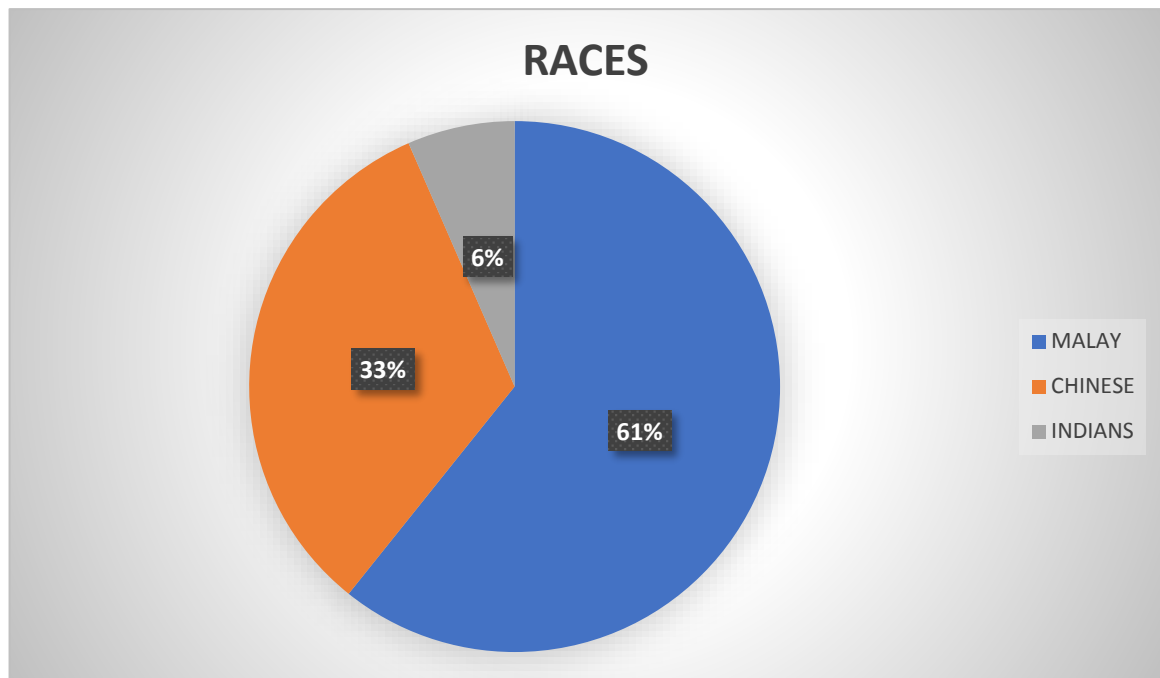
The pie chart above shows that 83% of working and 17% of students with work status answered the survey questions when we met them. Based on the percentage on the pie chart, it shows that workers are more interested than the students. This is because, that workers are in dire need of this product because they prefer to do this painting activity than students.

### 3) AGE



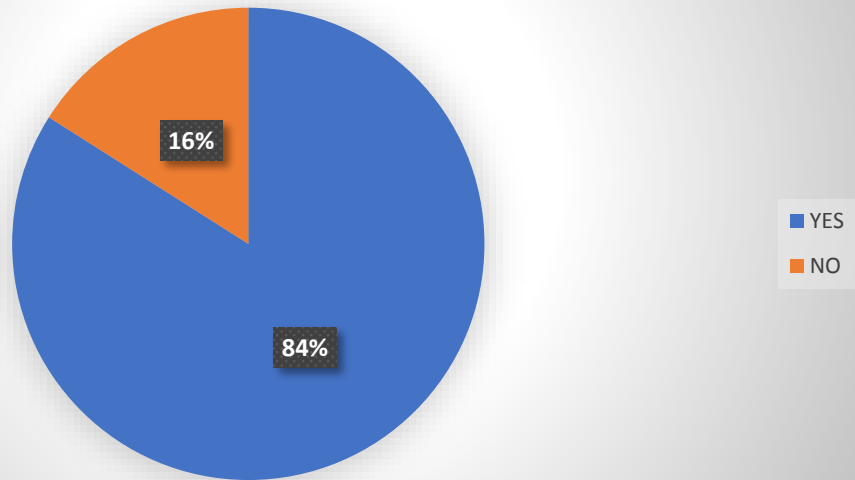
The pie chart shows that 20% of people aged 15-20, 36% of people aged 22-30 and 44% of people 31 and older answered the survey questions when we met them. Based on the percentage on the pie chart, it shows that individuals 31 and older of age are more than others. This is because, at the age of 31 and the older, it is best for them to carry out painting activities to ease their burden.

#### 4) RACES



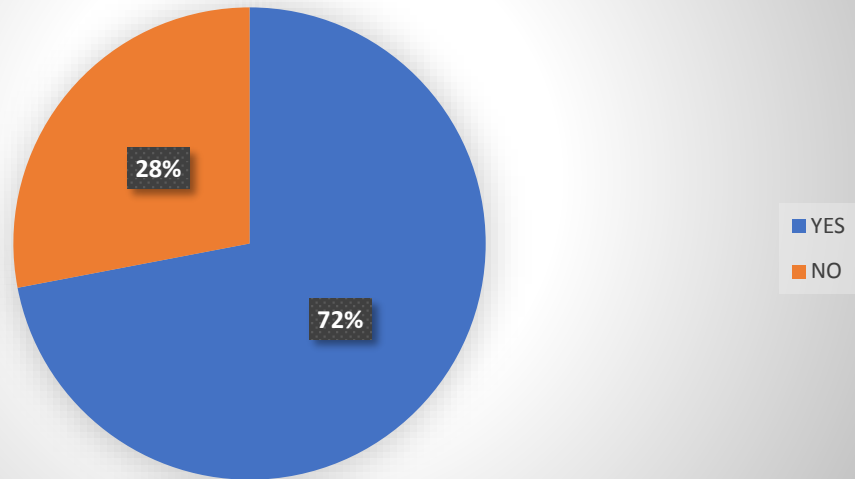
The pie chart above shows that 61% of Malay, 33% of Chinese and 6% of Indian that has come from each of our regions answered the survey questions when we asked them. Based on the percentage on the pie chart, it shows that the percentage of the majority Malays is a lot in comparison to Chinese and Indians. Therefore, our products have gained the full support of the Malays.

## When you use a paintbrush to paint the house, will it save you time?



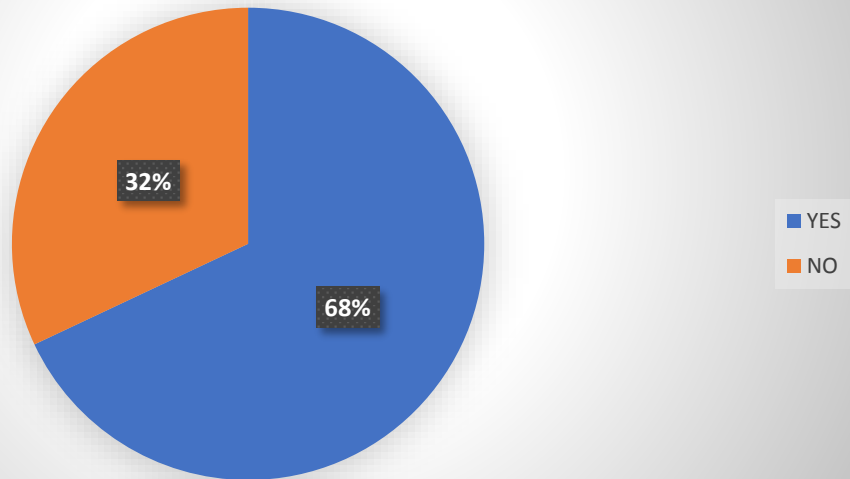
The pie chart above shows that 84% saying yes because of the easy preparation they use compared to the answer 16% because the paint applied to the brush needs to be fully engraved on the wall. This is because, many people say yes instead of no.

## Is the cost of preparing a manual tool for painting a home high?



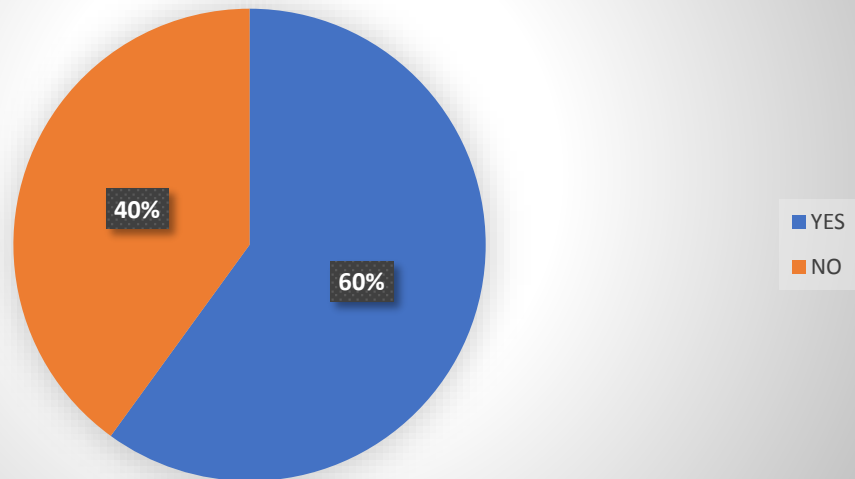
The pie chart above shows that 72% choose yes because they are better suited to buy quality painting equipment than the sum of not only 28% because they consider the price to be like a store selling painter. This is because, many people say yes instead of no.

## Does this mobile paint spray give any good to you?



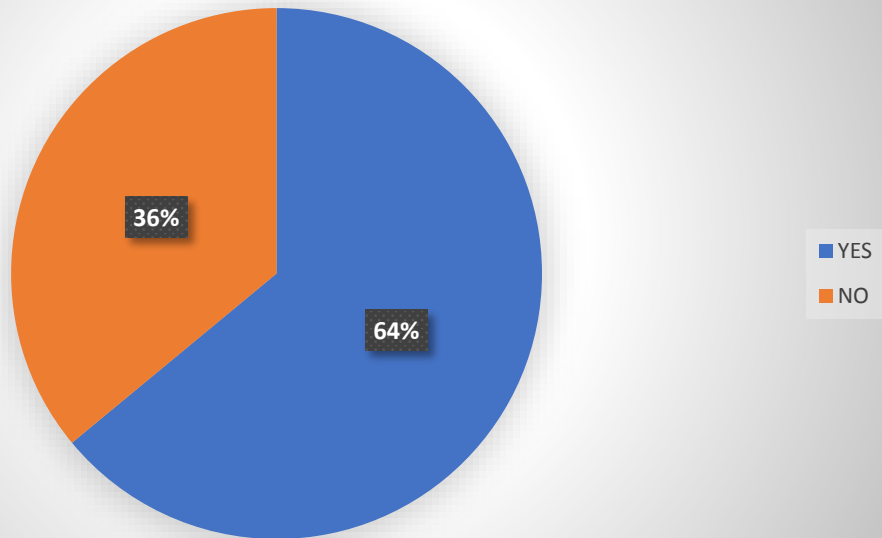
The pie chart above shows that 68% choose yes because this product can make it easier for consumers in many aspects such as facilitating the movement of paint from one place to another with a cart compared to 32% who saying no because it can make the user more comfortable with the original. This is because, many people say yes instead of no.

## Are you interested in “Electric Spray Paint V2”?



The pie chart above shows that 60% choose yes because this product can make it easier for them to do outside painting work better than those who don't answer 32% because they don't have to waste money to buy it. This is because, many people say yes instead of no.

## Do you want to buy if this tool is for sale?



The pie chart above shows that 64% choose yes because the products we produce are appealing and can help carry out painting activities especially in the construction area compared to not answering 36% because they find this product expensive and inefficient to market. This is because, many people say yes instead of no.



#### **4.5 ADVANTAGE AND DISADVANTAGE**

PREPARED BY: MUHAMAD AZRI NAZMI BIN ABDUL BASID

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.

Electric Spray Paint V2 has a lot of advantages to help the construction workers and also small community in Malaysia. For example, some of them need carts and paint bins to facilitate movement from one place to another while making it easier to paint in a short time. Besides of the advantages, this project also disadvantages that we must overcome it in the future for the better good such as for those who are used to using it manually, they do not have to waste money by buying our projects at such a high price.

## **4.6 CHAPTER'S SUMMARY**

As a conclusion for this chapter, the analysis and findings have been made. This Electric Spray Paint V2 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. Tests are conducted to determine the strength of the spray as well as the strength of the trolley to bring the paint barrel together so that it can accumulate high durability when painting activities are carried out. This may indicate that such a power relationship is very influential in shaping the project more efficiently and durably.

## **CHAPTER 5**

### **DISCUSSION, UPGRADE PLAN AND CONCLUSION**

#### **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**

After this project is successful, test has been made to know either the objective is accomplished or not .The test result shows that this project has accomplished the objective which is making this product storage friendly and easy to carry because of the lightweight. Base on the suggestion and conclusion that has been made by our group and our supervisor project, improvement can be made to make the project more perfect and smooth .Our supervisor help us a lot by giving good ideas and guide to make this project .To make sure this project succeed we add a lot of safety precaution such as we have built a basket that can place our electric sprayer so that it is safe from damage placed everywhere. So, it is safer and more perfect when our project is produced.

### **5.3.CONCLUSION**

After spending a couple of month to make this project ELECTRIC SPRAY PAINT V2, we finally finish this project right on time without any problem occurred .Our mission is to accomplish and reach the scope and the objective targeted by us even though there is a lot of weakness in completing this project. Nonetheless, this weakness is overcome by the help of our supervisor and group members to finish this project until the end. The whole work to accomplish this project made us realise how hard it is to make working product. Having said that, all of the work and system that is planned is not easy to reach. A lot of thing happened and we finally finished this project and giving a lot of knowledge and experience that can be applied to our realm of work. We found out that our project will give a lot of benefit to people who have electric spray paint at home. Lastly, our project is storage friendly and easy to carry around because of the lightweight, it also cheaper than the others spray paint which is our project is more mobile where there is a multi-purpose trolley that can make convenient to users.

## 6. REFERENCES

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## APPENDIX