POLITEKNIK MALAYSIA

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SMART GS2

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DEPARTMENT OF MECHANICAL ENGINEERING

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CONFIRMATION OF PROJECT

The project report entitled 'Smart GS2' has been submitted, reviewed and certified as eligible and the requirements of project writing as set.

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Signature of Supervisor : _____

Name of Supervisor : ANI BINTI YAAKUB

Date :

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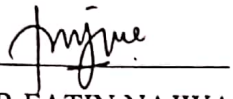
STUDENTS VERIFICATION LETTER

"We acknowledge this work is our work unless the only on is explained that source"

1. Signature : 
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DEDICATION

To First of all, we would like to thank a lot to our parents for the support and encouragement of yours for the good of your children. Don't forget to also thank the thousands of guests and thank you to the visiting lecturer who have given us a lot of guidance and support in reviewing our project. In addition, we would like to thank the individuals, whether directly or indirectly involved in the project's success. Without all of you, this project report couldn't have been possible in the best possible way.

To the partners involved in this project, unexpected time challenges and the sweet experience of the final project was very meaningful and very valuable. This will also enable us to move forward, which will serve as a bridge to life as a student this semester. Thankfully, we are grateful to be blessed with the gift of the one and only God, the Creator of the universe.

APPRECIATION

I would like to express my gratitude and appreciation to all those who gave me the possibility to complete this report.

This study is wholeheartedly dedicated to our beloved parents, who have been our source of inspiration and gave us strength when we thought of giving up, who continually provide their moral, spiritual, emotional and financial support.

A special thanks to our supervisor, Mrs. Ani Binti Yaakub whose help, stimulating suggestions and encouragement, helped us to prepare our project especially in writing this report. As an experienced person, she also acts as a supervisor who has given a lot of guidance and criticism in every job he does as working in this field requires high efficiency and skill to facilitate the work process.

To our family, relatives, mentor, friends, and classmates who shared their words of advice and encouragement to finish this study. Special thanks to my teammates who have helped to finished this project and report.

And lastly, we dedicated this report to the Almighty God, thank you for the guidance, strength, power of mind, protection and skills and for giving us a healthy life.

All of these, we offer to you.

ABSTRACT

This project is to design and develop holder and angle adjustable for a paint roller. A paint roller produces texture paint surfaces having a cylindrical core with a paint applying and texturing cover bonded to the outer surface of the cylindrical core. The paint applying and texturing cover is an open web of inter engaged continuous crinkled coarse filaments of resilient material. The open loops of the open web carry the texture paint material, apply it to the surface being painted, and the texture in it is essentially a single motion. During application, the loop elements are actually immersed in the texture paint material and lift it into peaks, therefore it produces deeper textures compared in the past. In this project, we develop an easy paint roller which is the paint filled in the roller and it is closed to disable from any leakage. It also has an angle to make necessary adjustments while painting.

A handle is made available to be used with a standard paint tray, to make it convenient to carry it by using one hand. In addition, it does not require any modification to the paint tray and it provides a stable with strong support. The handle itself, once mounted on the tray, can be placed in two positions. First, collapsed and adjacent the paint tray edge itself. Therefore, it is not loading the tray and further it supports the handle of the roller when the painter needs both hands free for a short period of time.

ABSTRAK

Projek ini adalah untuk merekabentuk dan membolehlaras pemegang dan sudut boleh laras untuk roller cat. Roller cat menghasilkan permukaan cat tekstur yang mempunyai teras silinder dengan cat yang memohon dan menutup tekstur yang terikat pada permukaan luar silinder teras. Cat yang digunakan dan penutupan tekstur adalah web terbuka antara yang terlibat filamen kasar berkerut berterusan penggunaan bahan berdaya tahan. Gelung terbuka web terbuka membawa bahan cat tekstur, menerapkannya ke permukaan yang dicat, dan tekstur di dalamnya pada dasarnya satu gerakan tunggal. Semasa aplikasi, elemen gelung sebenarnya direndam dalam bahan cat tekstur dan mengangkatnya ke puncak, oleh itu ia menghasilkan tekstur yang lebih mendalam berbanding pada masa lalu. Dalam projek ini, kami mencipta roller cat yang mudah diisi dalam roller dan ia ditutup untuk mengelakkan dari apa-apa kebocoran. Ia juga mempunyai sudut untuk membuat pelarasan yang perlu semasa mengecat.

Pemegang yang sedia ada adalah untuk digunakan pada bekas cat yang biasa, untuk menjadikannya mudah untuk membawanya dengan menggunakan satu tangan. Di samping itu, ia tidak memerlukan apa-apa pengubahsuaian pada bekas cat dan ia menyediakan stabil dengan sokongan yang kuat. Pemegangnya sendiri, sekali dipasang pada bekas dan boleh diletakkan dalam dua kedudukan. Pertama sekali, turunkan dan laraskan pembolehlaras sudut itu. Oleh itu, ia tidak memuatkan dulang dan terus menyokong pemegang roller apabila pengecat memerlukan kedua-dua tangan untuk tempoh masa yang singkat.

CHAPTER 1

INTRODUCTION

The project to be implemented by us for the Final Year Project 2019 is an innovation of an existed paint roller. The normal or exist paint roller initially uses a small hand brush, then a coil of paint is created to make it easier to paint. It is usually having container or tray to fill the paint before start painting. There is a few equipment to be prepared before start painting. So then we created or make an innovation for that roller by using paint roller that is already have its space to fill the paint. Other than that, we also make an innovation of angle adjustable and also holder adjustable. So that it is easier to people to start painting.

1.1 PROBLEM STATEMENT

The cause of our idea to innovate this paint roller project is because we often see and do it ourselves when we want to paint walls or other materials, the paint will easily overflow and cause the floor or other place to be affected by the paint. Additionally, it also poses a risk when painting highlights that may result in accidents. This will inconvenience the user to finish painting work more smoothly. Other than that, it also difficult to paint on the corner and need additional equipment to paint such as canvas and tray.

1.2 OBJECTIVE

1. Facilitate users to paint with adjustable holder and angle to reduce risk of accidents.
2. It is save time as it creates a special place to fill the paint in this paint roller.
3. Avoid paint from spoilage because of use the smart GS2 fabric that can be able to absorb paint according to the given pressure on it.

1.3 SCOPES AND LIMITATIONS

1. Can fill a liter of paint in the roller at once.
2. Water based paint and house concrete wall are used.
3. Adjustable have to adjust manually.
4. Can hold up to 1 quart of paint
5. Cover more than 275 square feet per fill up.

CHAPTER 2

LITERATURE REVIEW

(NUR FATIN NAJWA BINTI MOHD KARIM)

DESIGN

1. CHAPTER INTRODUCTION

In this chapter, an explanation about design of "Smart *GS2*". First of all, the design is created an idea from the old or use paint roller that already exist in nowadays marketing. In Malaysia and globally today there is only a paint roller manually, where we need to roll roller first to the tray so the paint is attached to the roller and then paint to the wall. The existing paint roller can be found either in foreign or in Malaysia.

However, there are still weaknesses in the roller market. Among the inherent weaknesses are the paint easily overflowing to the floor, the work for painting also takes quite a while.

2. BACKGROUND OF "SMART *GS2* "

Evolution of Creation of GS2

Paint roller is important to help humans simplify the process of wall painting quickly and neatly. The figure 4.1 shows the development of paint roller.

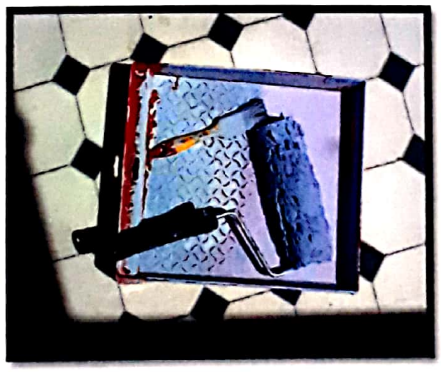

Figure 4.1 : Evolution of paint roller creation

3. Types Of Paint Roller Available In The Market

There are different types of roller in the market, each type has different shapes and sizes. The diagram below shows the types of paint roller with its advantages and disadvantages.

At the beginning of the paint roller creation, it is simpler and has limited functions such as Figure 6.2 and Figure 6.3. where it only uses brushes to paint. The brush is also difficult to paint because it has a small size and is slow. This can cause the painter to take a long time to paint.

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Figure 4.2: Paintbrushes

Figure 4.3: Types of paint roller

4. History of paint roller

For a history of paint rollers, see Wahl: "Neuentwicklungen bei Farbrollern" Die Mappe. It says that the first paint rollers had lambskin covers but that today almost equal quality can be attained at lower cost with woven and knitted polyamide or polyester fibers and that the best of these is a woven plush of polyamide spun fibers. For painting large areas with latex paints, the pile heights may be from 12 to 25 mm. The roll body or core of the paint roller is usually a cardboard impregnated by a plastic material, and strips of the pile fabric are diagonally wound onto and firmly adhered to the core. U.S. (Garcia) shows equipment for helically winding a cover fabric onto a thermoplastic tubular core and fusing the fabric to the core.

The Wahl publication points out that fiber-deep cleaning of paint roller covers is a prerequisite for achieving a sufficiently long useful life and a good coating quality. Wahl says that this can be done manually but that better cleaning is provided by a device which rotates the roll rapidly while a stream of water is directed against the roll, thus centrifuging the paint out of the cover material.

The invention of the paint roller occurred in 1940. Norman Breakey, a Canadian citizen, developed and built the first paint roller to assist in the hard work of painting. This design consisted of a cylindrical core with a fabric cover that could soak up and distribute paint when rolled over a blank surface.

Unfortunately, however, Norman was unable to manufacture sizeable numbers of paint rollers and therefore never made a large profit off of his invention. Other paint roller designers took the design, made small changes, and marketed their own paint roller inventions. These designs performed much better financially than Norman's attempts. The most well-known of the paint roller design offshoots was created by Richard Croxton Adams, who patented his paint roller version in 1940.

The next paint rollers are a necessity for any professional or amateur looking to paint a wall or a house. Developments in the original design have allowed for the creation of numerous options that can be considered when choosing a paint roller. These include the choice of fabric or foam rollers that can be sold with or without a handle. Further, paint rollers now come in numerous sizes in order to facilitate the painting of multiple surfaces.
Unfortunately, it also has a litte bit problem about that paint roller.

5. Smart GS2 Components

A good design can be produced by studying each material used. In order to produce the best design, a review of key components of Smart GS2 is performed. The purpose of the study was to obtain information and to know more in-depth key components of Smart GS2. The Smart GS2 components are as follows:

i. Roller

ii. Adjustable holder

iii. Closure

iv. Adjustable angle

i. Roller

In a paint roller having an inner core with an outer annular surface and a radially resilient, outer, annular paint roll medium extending around the inner core and affixed to the inner core for rotation therewith; the improvement wherein the outer medium comprises a layer of resilient porous material extending around and affixed to the inner core and non-porous areas on the outer surface of the layer of resilient porous material.

Figure 4.5: Paint Roller

ii. Adjustable holder

A paint brush holder comprising a wide base element provided with a dependent lip-shaped portion complemental to a chime of a paint can arranged for association therewith, said chime having a circumference, a wide upstanding cradle means including an upper terminal portion and a planar portion offset from a juncture with said base element at an acute angle with respect thereto, the juncture of said cradle means with said base element being provided with a flat edge portion against which a paint brush may be moved in an upward direction for removing excess pain therefrom, and retention means for releasably holding said paint brush spaced from said edge portion secured to said upper terminal portion of said cradle means, said dependent lip-shaped portion of said base element circumscribing an arc at the least of substantially one-third of the circumference of the chime of said paint can.

Figure 4.6: Paint roller holder

iii. Closure

A paint roller cover for disposition about a tubular roller element of a paint roller tool having a handle with a transversely bent rod and a rotatable roller support journaled on the rod and removably mounting the roller element for protecting the roller element against drying when wetted with paint.

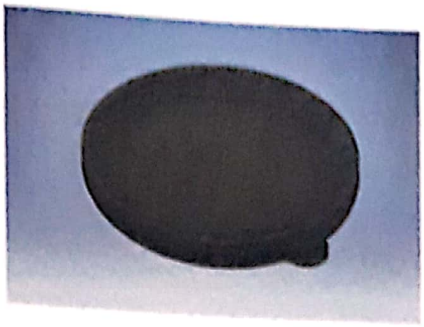


Figure 4.7: Paint Roller Closure

iv. Adjustable angle

Adjustable angle is created from an idea of adjustment for angle while painting. It is to make peoplea easily to use paint roller

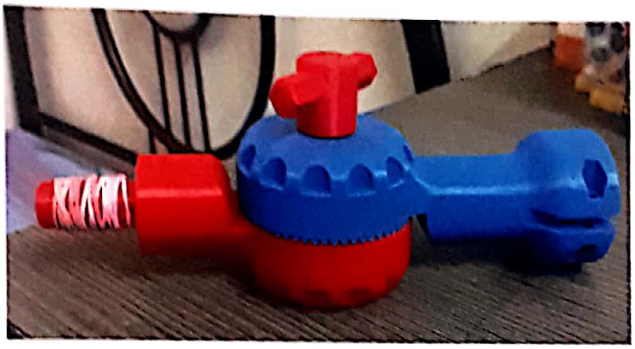
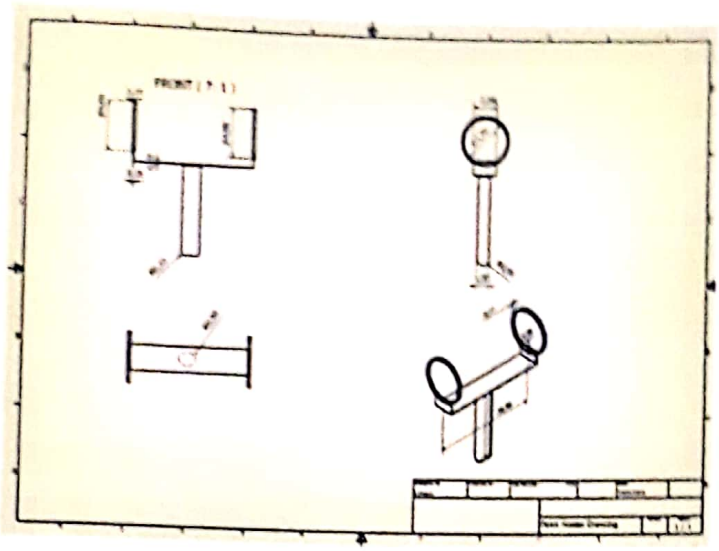


Figure 4.8 : Adjustable angle

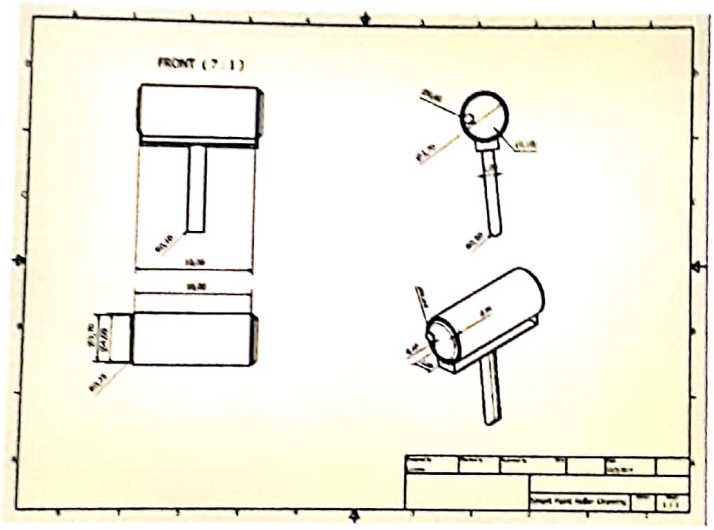
6. Scientific Research Formula

After carrying out literature studies, much information can be collected about paint rollers. This information provides references to the design, specifications and technology used in the production of paint rollers already in the market. These information are also useful as a guide to help ease the design and development of the paint roller prototype.

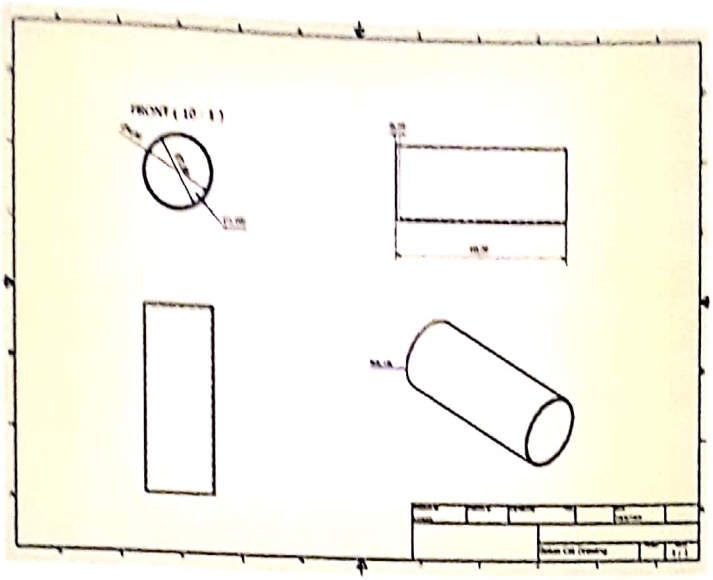
i. **DESIGN DRAWING**



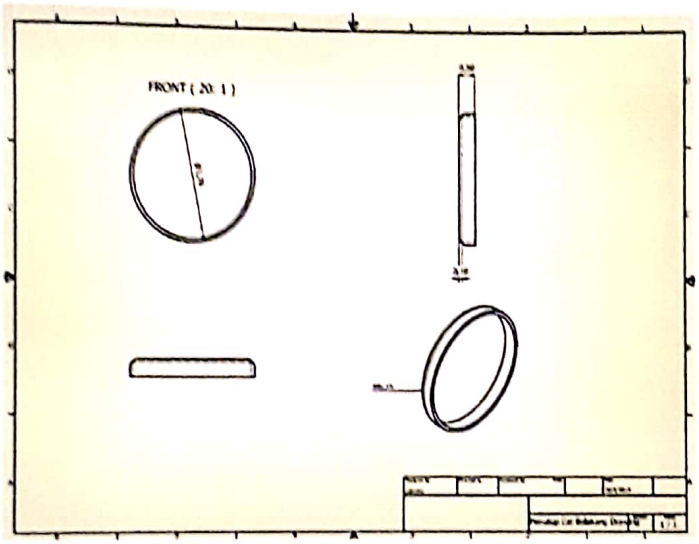
HOLDER



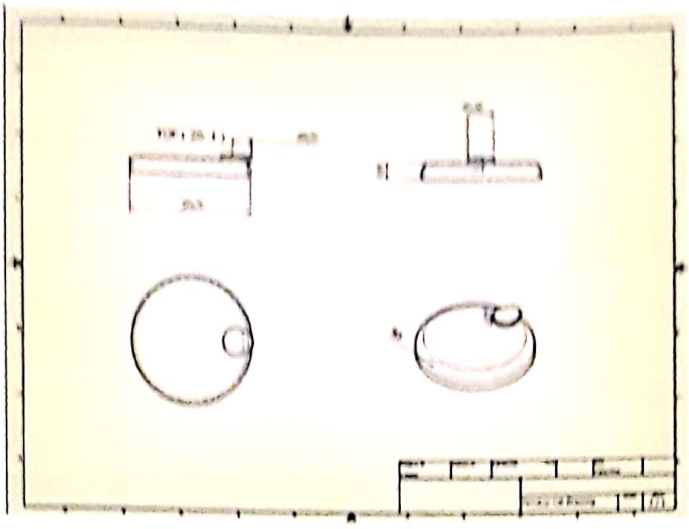
ROLLER WITH HOLDER



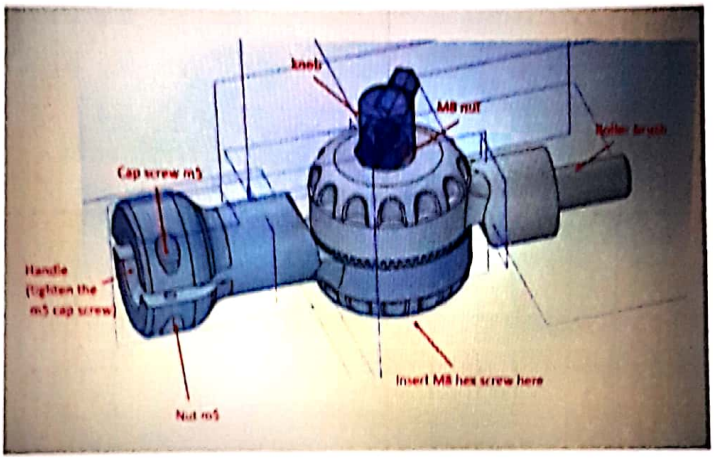
ROLLER



CLOSURE



CAP CLOSURE



DESIGN OF ADJUSTABLE ANGLE

CHAPTER 2
LITERATURE REVIEW
(MIZA SAMHANA BINTI MUSTAFA KAMAL)
MATERIAL

2.1 INTRODUCTION

The present invention relates generally to a method and apparatus for manufacturing reusable paint rollers. Paint rollers are frequently used by professional painters and non-professional painters to apply a layer of paint to walls, ceilings, and other surfaces. Paint rollers increase the painter's efficiency by permitting the paint to be applied much more rapidly than is possible by using a conventional paint brush. Paint rollers typically include a core and a paint absorbing outer fabric layer or cover. The core may be solid preformed stock material, or may be wound from one or more strips of base material. A moveable platform applies a continuous strip of fabric to the rotating core. The core is partially melted just prior to application of the fabric material such that the fabric becomes permanently bonded to the core. However, this technique is expensive, as preformed stock material is required.

2.2 SCIENTIFY STUDY

In Malaysia and globally today there is only a paint roller manually, where we need to roll roller first to the tray so the paint is attached to the roller and then paint to the wall. The existing paint roller can be found either in foreign or in Malaysia.

However, there are still weaknesses in the roller market. Among the inherent weaknesses are the paint easily overflowing to the floor, the work for painting also takes quite a while.

2.3 Evolution of Creation of GS2

Paint roller is important to help humans simplify the process of wall painting quickly and neatly. The figure 2.3.1 shows the development of paint roller.

Figure 2.3.1: Evolution of paint roller creation

2.4 Types of Paint Roller Available in The Market

There are different types of roller in the market, each type has different shapes and sizes. The diagram below shows the types of paint roller with its advantages and disadvantages.

At the beginning of the paint roller creation, it is simpler and has limited functions such as Figure 2.4.1 and Figure 2.4.2 where it only uses brushes to paint. The brush is also difficult to paint because it has a small size and is slow. This can cause the painter to take a long time to paint.

Figure 2.4.1: Paintbrushes

Figure 2.4.2: Types of paint roller

2.5 History of paint roller

For a history of paint rollers, see Wahl: "Neuentwicklungen bei Farbrollern" Die Mappe. It says that the first paint rollers had lambskin covers but that today almost equal quality can be attained at lower cost with woven and knitted polyamide or polyester fibers and that the best of these is a woven plush of polyamide spun fibers. For painting large areas with latex paints, the pile heights may be from 12 to 25 mm. The roll body or core of the paint roller is usually a cardboard impregnated by a plastic material, and strips of the pile fabric are diagonally wound onto and firmly adhered to the core. U.S. (Garcia) shows equipment for helically winding a cover fabric onto a thermoplastic tubular core and fusing the fabric to the core.

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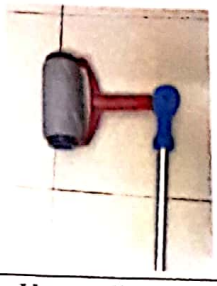
The next paint rollers are a necessity for any professional or amateur looking to paint a wall or a house. Developments in the original design have allowed for the creation of numerous options that can be considered when choosing a paint roller. These include the choice of fabric or foam rollers that can be sold with or without a handle. Further, paint rollers now come in numerous sizes in order to facilitate the painting of multiple surfaces. Unfortunately, it also has a little bit problem about that paint roller.

2.6 Criteria Comparison

Table 2.6 below shows the comparison of criteria for used paint roller in the market.

In the market		Smart GS2
	Picture	
Does not have adjustable	Feature	Have adjustable
Lamb's wool	Type of roller cover	High density blanket cloth
Must have	Tray	Doesn't have
Non-durable	Endurance	Durable
Take a long time to paint	Times	Can paint in a short time

2.7 COMPONENT

A good design can be produced by studying each material used. In order to produce the best design, a review of key components of Smart GS2 is performed. The purpose of the study was to obtain information and to know more in-depth key components of Smart GS2. The Smart GS2 components are as follows:

i. Roller

ii. Closure

iii. Adjustment angle

iv. M8 screw

v. Adjustment holder

2.7. i Roller

In a paint roller having an inner core with an outer annular surface and a radially resilient, outer, annular paint roll medium extending around the inner core and affixed to the inner core for rotation there with the improvement where in the outer medium comprises a layer of resilient porous material extending around and affixed to the inner core and nonporous areas on the outer surface of the layer of resilient porous material. In our project, The roller cover absorbs the paint and transfers it to the surface the roller frame attaches to the roller cover and can be held with either hand in use. The roller is synthetic and manufactured the instructional use is very easy and anyone that has pertinent skills in the Background of the Invention will be able to use this with ease.

Figure 4.5: Paint Roller

Filling Roller Brush

- High-density blankets cloth.
- Washable (for water-based paint roller only).
- Can paint any wall regardless of the degree texture.
- No dipping, no dripping, and no mess.
- Holds paint (1quart) than regular roller.
- No more bending over to roll in the paint tray.

Size

2.7.ii Closure

A paint roller cover for disposition about a tubular roller element of a paint roller tool having a handle with a transversely bent rod and a rotatable roller support journaled on the rod and removable mounting the roller element for protecting the roller element against drying when wetted with paint.

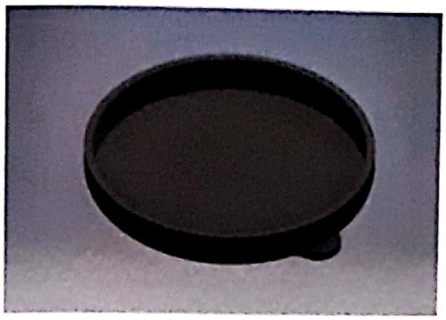


Figure 2.7.ii: Paint Roller Closure

Type of closure

- Polypropylene plastic (PP)

Polypropylene (PP), also known as polypropylene, is a thermoplastic polymer used in a wide variety of applications. It is produced via chain-growth polymerization from the monomer propylene. Polypropylene belongs to the group of polyolefin and is partially crystalline and non-polar. Its properties are similar to polyethylene, but it is slightly harder and more heat resistant. It is a white, mechanically rugged material and has a high chemical resistance. Polypropylene is the second-most widely produced commodity plastic (after polyethylene) and it is often used in packaging and labeling.

2.7. iii Adjustment Angle

Adjustable paint roller in which the roller may be adjusted about three orthogonally disposed axes. The paint roller includes a roller head; a support arm having first and second ends with the roller head being rotatable supported on the first end; a handle for allowing a user to hold the paint roller; and a universal rotating mechanism for rotatable securing the support arm to the handle such that the roller head can be rotated with respect to the handle about three independent axes disposed orthogonally with respect to one another to enable the roller head to be universally adjustable, wherein the roller head is rotatable 360 ° about at least two of the axes. The paint roller further includes lock mechanisms for locking the rotating mechanism in a desired position.

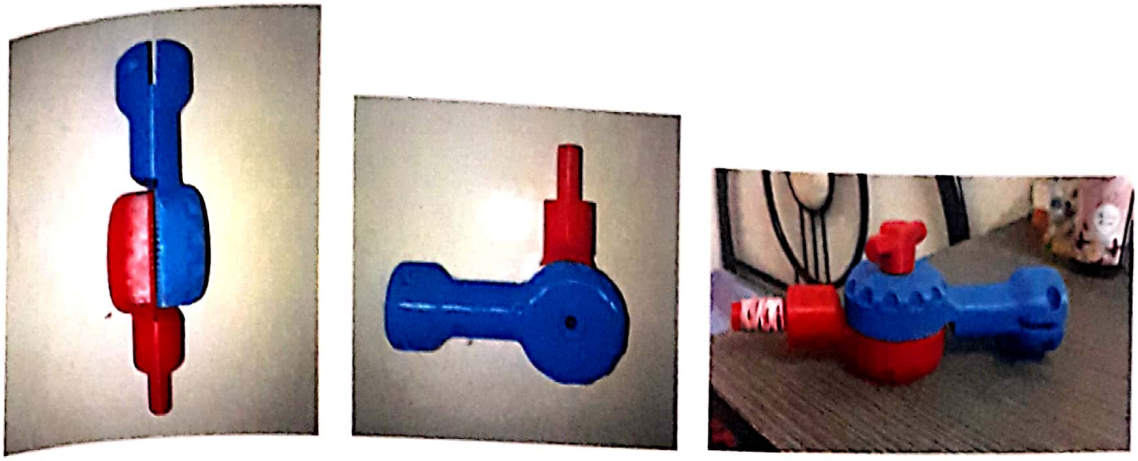


Figure 2.7.1.iii: Angle adjustment

3D Printing

3D printing or additive manufacturing is a process of making three dimensional solid objects from a digital file.

The creation of a 3D printed object is achieved using additive processes. In an additive process an object is created by laying down successive layers of material until the object is created. Each of these layers can be seen as a thinly sliced horizontal cross-section of the eventual object.

3D printing is the opposite of subtractive manufacturing which is cutting out / hollowing out a piece of metal or plastic with for instance a milling machine.

3D printing enables to produce complex shapes using less material than traditional manufacturing methods.

Figure 2.7.2.iii: 3D printing machine

Figure 2.7.3. iii: 3D printing filament

A method of preparing an antimicrobial 3D-printing filament, comprising:

providing a first mixture comprising a plastic resin and at least one antimicrobial agent selected from the group consisting of an inorganic antimicrobial agent, an organic antimicrobial agent, a metal antimicrobial agent, an ammonium salt antimicrobial agent, a guanidine antimicrobial agent, a copper compound antimicrobial agent, a sustained-release polymer antimicrobial agent, and a natural antimicrobial agent providing a master batch by extruding the first mixture and preparing an antimicrobial filament by excluding a second mixture containing the master batch and the plastic resin. The disclosure relates to a method of preparing an antimicrobial 3D-printing filament, and more particularly, to an antimicrobial 3D-printing filament including an inorganic antimicrobial agent, an organic antimicrobial agent, or a natural antimicrobial agent to kill or inhibit viruses, bacteria, or fungi.

2.7. iv M8 Screw

A feeding roller is a mechanical device for assisting raw material feeding when a cutting machine works. After a roller spindle is assembled with the roller through two 6202 bearings, two ends of the roller spindle are sleeved by slide blocks and inlayed into central chutes of side plates, and four fastening shafts are fastened together to form a main machine body through two side plates. M8 screws are respectively screwed into centers of two side plates through threads, and the roller enables the slide blocks to be in tight contact with the M8 screws due to the gravity effect. After assembly, longitudinal height adjustment of the roller can be achieved by adjusting the M8 screws, the M8 screws on the other side are adjusted if the M8 screws on one side are fixed, and adjustment of a +/- 10degree dip angle of the roller can be achieved to enable the roller to adapt to an uneven field. When long raw materials are required to be cut, multiple rollers can be used, feeding can facilitate, and the perpendicularity and flatness of the cutting end face can be well ensured.

Figure 2.7. iv : M8 screw

2.7. v Adjustment Holder

A paint brush holder comprising a wide base element provided with a dependent lip-shaped portion complemental to a chime of a paint can arranged for association therewith, said chime having a circumference, a wide upstanding cradle means including an upper terminal portion and a planar portion offset from a juncture with said base element at an acute angle with respect thereto, the juncture of said cradle means with said base element being provided with a flat edge portion against which a paint brush may be moved in an upward direction for removing excess pain there from, and retention means for releasable holding said paint brush spaced from said edge portion secured to said upper terminal portion of said cradle means, said dependent lip-shaped portion of said base element circumscribing an arc at the least of substantially one-third of the circumference of the chime of said paint can.

Figure 2.7.v: Paint roller holder

Type of holder roller

- Aluminum

Aluminum is a chemical element with the symbol Al and atomic number 13. It is a silvery-white, soft, non-magnetic and ductile metal in the boron group. By mass, aluminum makes up about 8% of the Earth's crust; it is the third most abundant element after oxygen and silicon and the most abundant metal in the crust, though it is less common in the mantle below. The chief ore of aluminum is bauxite. Aluminum metal is highly reactive, such that native specimens are rare and limited to extreme reducing environments. Instead, it is found combined in over 270 different minerals. Aluminum is remarkable for its low density and its ability to resist corrosion through the phenomenon of passivation. Aluminum and its alloys are vital to the aerospace industry and important in transportation and building industries,

such as building facades and window frames. The oxides and sulfates are the most useful compounds of aluminum. Despite its prevalence in the environment, no known form of life uses aluminum salts metabolically, but aluminum is well tolerated by plants and animals. Because of these salts' abundance, the potential for a biological role for them is of continuing interest, and studies continue. The aluminum used at this roller is light and easy to handle.

LITERATURE REVIEW
(NURFARHANAH BINTI ABU BAKAR)
ASSEMBLY

2.1 INTRODUCTION

A literature review is a comprehensive summary of previous research on a topic. The literature review surveys scholarly articles, books, and other sources relevant to a particular area of research. The review should enumerate, describe, summarize, objectively evaluate and clarify this previous research. It should give a theoretical base for the research and help you (the author) determine the nature of your research. The literature review acknowledges the work of previous researchers, and in so doing, assures the reader that your work has been well conceived. It is assumed that by mentioning a previous work in the field of study, that the author has read, evaluated, and assimilated that work into the work at hand.

The present invention relates generally to a method and apparatus for manufacturing reusable paint rollers. Paint rollers are frequently used by professional painters and non-professional painters to apply a layer of paint to walls, ceilings, and other surfaces. Paint rollers increase the painter's efficiency by permitting the paint to be applied much more rapidly than is possible by using a conventional paint brush. Paint rollers typically include a core and a paint absorbing outer fabric layer or cover. The core may be solid preformed stock material, or may be wound from one or more strips of base material. A moveable platform applies a continuous strip of fabric to the rotating core. The core is partially melted just prior to application of the fabric material such that the fabric becomes permanently bonded to the core. However, this technique is expensive, as preformed stock material is required.

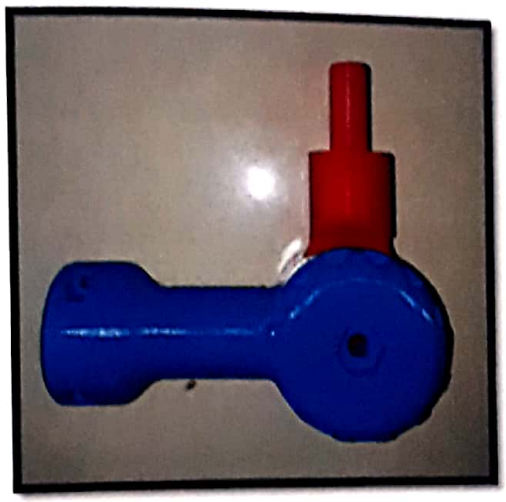
2.2 SCIENTIFY STUDY

In Malaysia and globally today there is only a paint roller manually, where we need to roll roller first to the tray so the paint is attached to the roller and then paint to the wall. The existing paint roller can be found either in foreign or in Malaysia.

However, there are still weaknesses in the roller market. Among the inherent weaknesses are the paint easily overflowing to the floor, the work for painting also takes quite a while.

2.3 FUNCTION OF ANGLE ADJUSTMENT

The challenge for anyone who has ever painted has been to cut in or edge next to ceiling, trim or baseboards. It took over 5 years to refine the tools and bring them to market. Therefore, we come out with the project we created which is the angle adjustment. Angle adjustment are used as to paint the edge.



2.4 ASSEMBLY

The Smart GS2 is an innovation of paint roller. The first use of paint was just a small brush, so the paint coil was created to facilitate the paint. It usually has a tray or container for painting before painting on the wall. This coil of paint, otherwise known as paint roller is already on the market, but we want to make a difference on it. Our projects make painting easier and save time. It can also keep users safe.

In addition, we are innovating on paint roller where we added an angular adjustment.

It makes it easy to paint in different directions like horizontal, vertical and the edges.

CHAPTER 3

METHODOLOGY

(NUR FATIN NAJWA BINTI MOHD KARIM)

DESIGN

1. INTRODUCTION

Methodology is closely related to the methods and use of flow chart to show the processing of the project. Gantt chart can also be used to indicates activities performed during the project period.

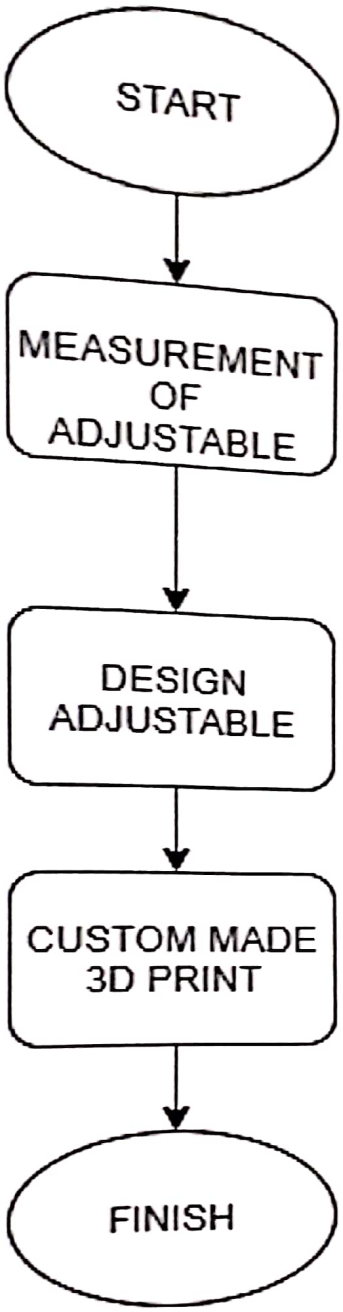
i. Flow Chart

ii. Gantt Chart

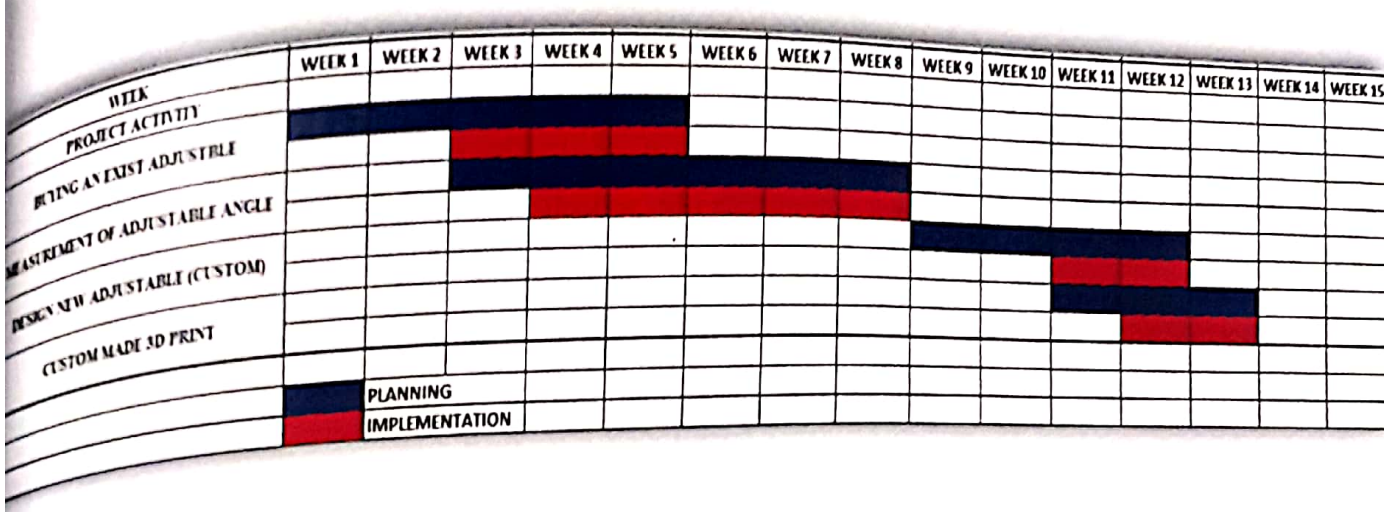
iii. Purpose of product design

iv. Template

ii. FLOWCHART



iii. GANTT CHART



iv. Purpose of Product Design

Each created product must have advantages and disadvantages to consumers. Our products are purpose in the surrounding community they can benefit as well as possible.

The purpose of Smart GS2 design is to reduce the burden and problems for paint roller user. This is because, they have problem to getting up and down after a long time seat on the floor. Not only that, the project also aim to reduce the problem the employees who are tried to put the stuff on shelves in a bow down position. With ergonomic design, it will facilitate the movement.

v.

KEMENTERIAN PENDIDIKAN MALAYSIA

PITEX

INVENTION & INNOVATION TECHNOLOGY EXPOSITION

Tajuk Projek
(Title of the project)

SMART GS2

POLITEKNIK MALAYSIA

Ketua Penyelidik / Pencipta
(Main Researcher / Inventor)

PN ANI BT YAAKUB

Nama Kumpulan Penyelidik / Pencipta Bersama
(Researchers/Inventors Groups)

1) NUR FATIN NAJWA BT MOHD KARIM
2) NURFARHANAH BT ABU BAKAR
3) MIZA SAMHANA BT MUSTAFA KAMAL

E-Mel
(E-mail)

[redacted]

Info Grafik
(Graphical Information)

Deskripsi Produk /Abstrak
(Product Description/ Abstract)

This project is to design and develop holder and angle adjustable for paint roller. A paint roller for producing texture paint surfaces having a cylindrical core with a paint applying and texturing cover bonded to the outer surface of the cylindrical core. In the project , we develop an easy paint roller which is the paint is filled in the roller and closed it to make sure it doesn't leak. It also have angle adjustment to make it easy while painting.

A handle for use in conjunction with a standard paint tray, which while not requiring any alteration to the paint tray, provides a stable, rigid support for the tray allowing it to be carried with one hand.

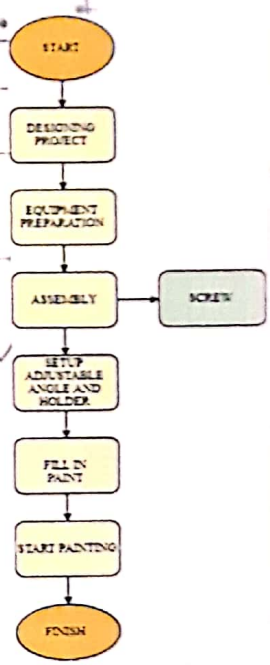
Permyataan Masalah
(Problem Statement)

The cause of our idea is to innovate this paint roller because we often see and ourselves when we want to paint walls or other materials, the paint will easily overflow and cause the floor or other place to be affected by the paint. Additionally, it also poses a risk when painting highlights that may result in accidents. This will inconvenience the user to finish painting work more smoothly.

Objektif
(Objectives)

1) *Facilitate users to paint with adjustable holder and angle to reduce risk of accidents.*
2) *It is save time as it creates a special place to fill the paint in this paint roller.*
3) *Avoid paint from spoilage because of use the smart GS2 fabric that can be able to absorb paint according to the given pressure on it.*

Metodologi
(Methodology)



Potensi Market
(Market Potentials)

1) Industry
2) Domestic

Harta Intelek (IP)
(Intelectual Property)

Industrial Design :

MyIPO

Copyright : LY2019006046

Kolaborasi Industri / Instituti
(Industrial / Institution Collaboration)

1) Fortis Industrial Sdn.Bhd
2) Mr DIY

Hubungi :
(Contact)

PN ANI BT YAAKUB
SUPERVISOR OF MECHANICAL ENGINEERING DEPARTMENT
POLITEKNIK SULTAN SALAHUDDIN ABDUL AZIZ SHAH
TEL : 012-6750956

Nama Pemilik IP / Alamat
(Owner IP Name / Address)

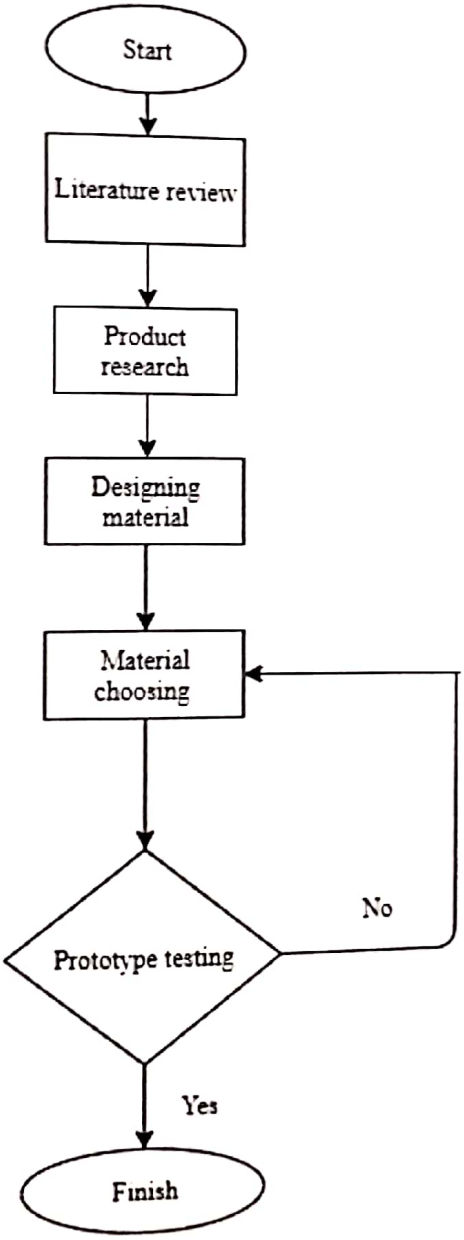
PENGARAH
POLITEKNIK SULTAN SALAHUDDIN ABDULAZIZ SHAH
40150 SHAH ALAM
SELANGOR

METHODOLOGY
(MIZA SAMHANA BINTI MUSTAFA KAMAL)
MATERIAL

3.0 INTRODUCTION

Research methodology is a method and technique for designing, collecting and analyzing data in order to produce evidence that can support a study (summarizing what is being studied). Methodology describes how a problem is studied and why a particular method and techniques used. The purpose of the methodology is to help further understand (in detail) the application of the method by providing a description of the research process.

i. Flow chart



METHODOLOGY

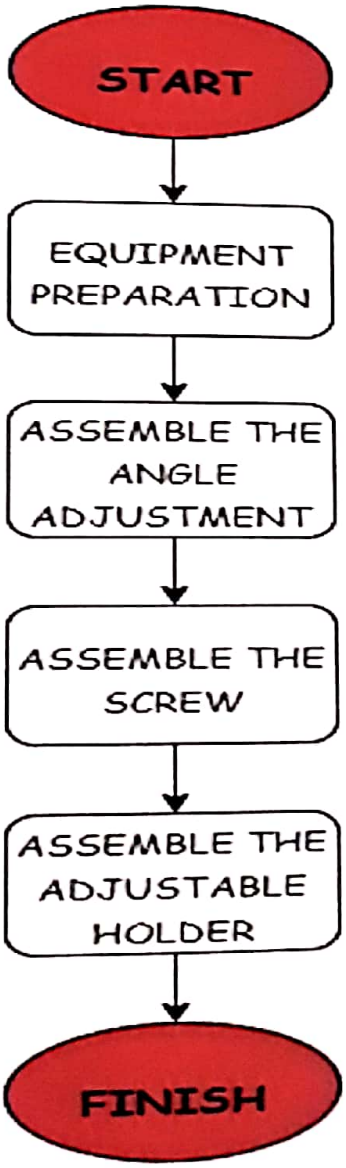
(NURFARHANAH BINTI ABU BAKAR)

ASSEMBLY

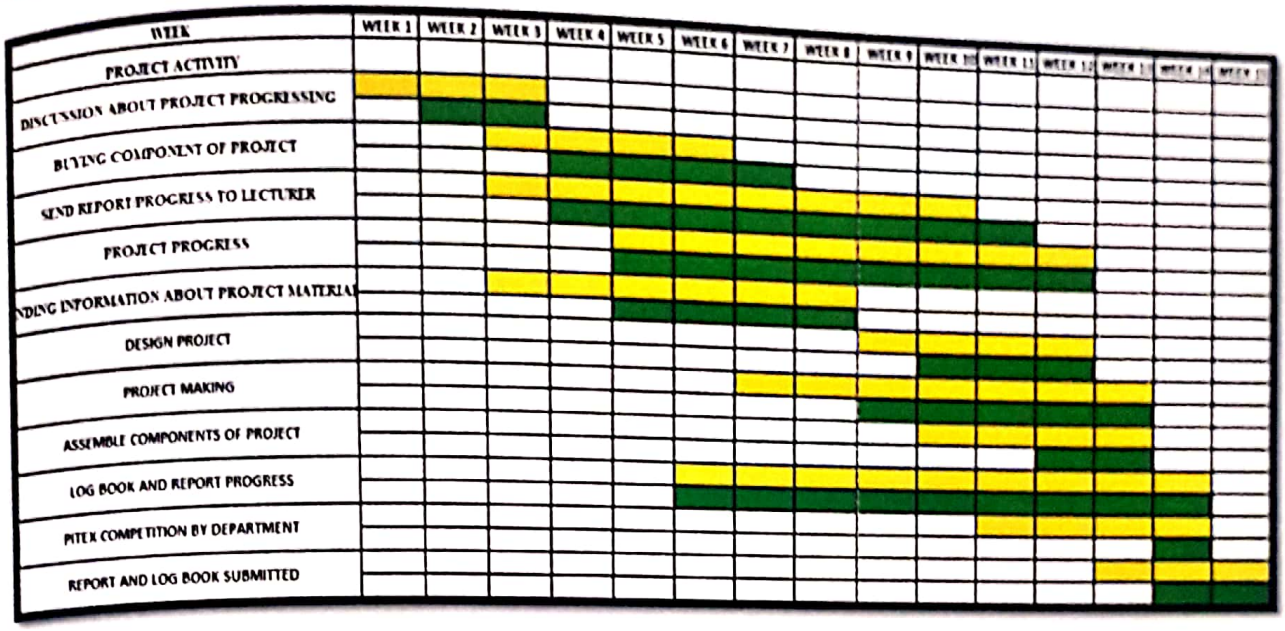
3.0 INTRODUCTION

Research methodology is a method and technique for designing, collecting and analyzing data in order to produce evidence that can support a study (summarizing what is being studied). Methodology describes how a problem is studied and why a particular method and technique is used. The purpose of the methodology is to help further understand (in detail) the application of the method by providing a description of the research process.

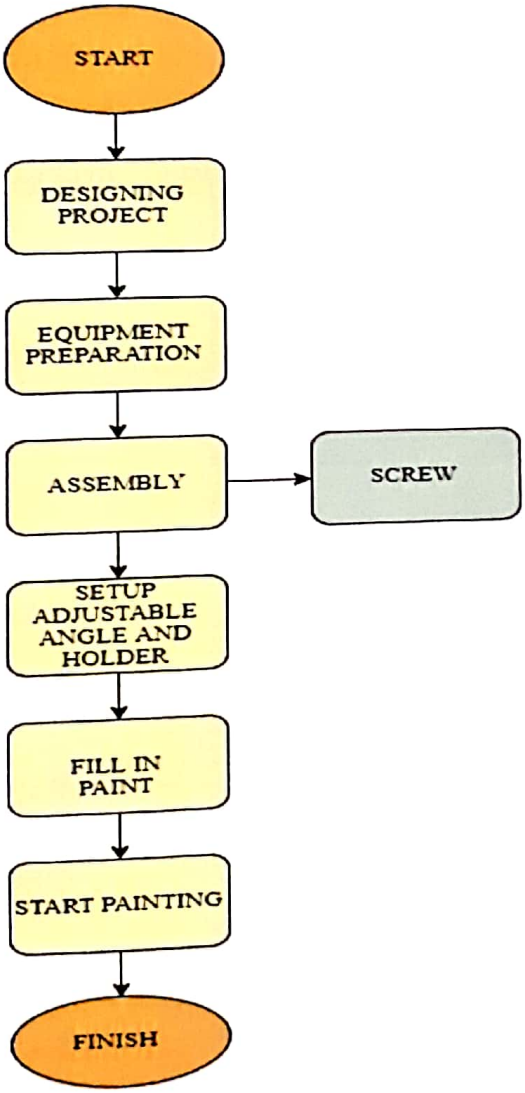
i Flow Chart



GANTT CHART OF PROJECT



FLOWCHART OF PROJECT



CHAPTER 4

ANALYSIS

4.0 INTRODUCTION

Analysis contains several activities such as distinguishing, organizing something that is classified and re-assembled according to certain criteria and then finding its relevance and interpreting its meaning. In other words, analysis is the attitude or attention to something (object, fact, phenomenon) in order to break into a section, and to recognize the relationship between these parts as a whole. Analysis can also be interpreted as the ability to solve or dismantle material or information into smaller components so that it is easier to understand.

Therefore, from the understanding of the analysis above, it can be concluded that analysis is a set of activities and processes. One form of analysis is to compile large amounts of raw data into interpretable information. All forms of analysis try to consistently portray patterns in the data so that the results can be analyzed and interpreted in a concise and meaningful way.

i. Survey Form
ii. Required/Feedback of survey form
iii. Research Project Results
iv. Costing

SURVEY FORM

- *This questionnaire is intended to investigate about Smart GS2 and paint roller users' responses towards this product.*

Instructions: Please tick / in the box provided with the appropriate answer.

Respondents' personal information:

i. Gender

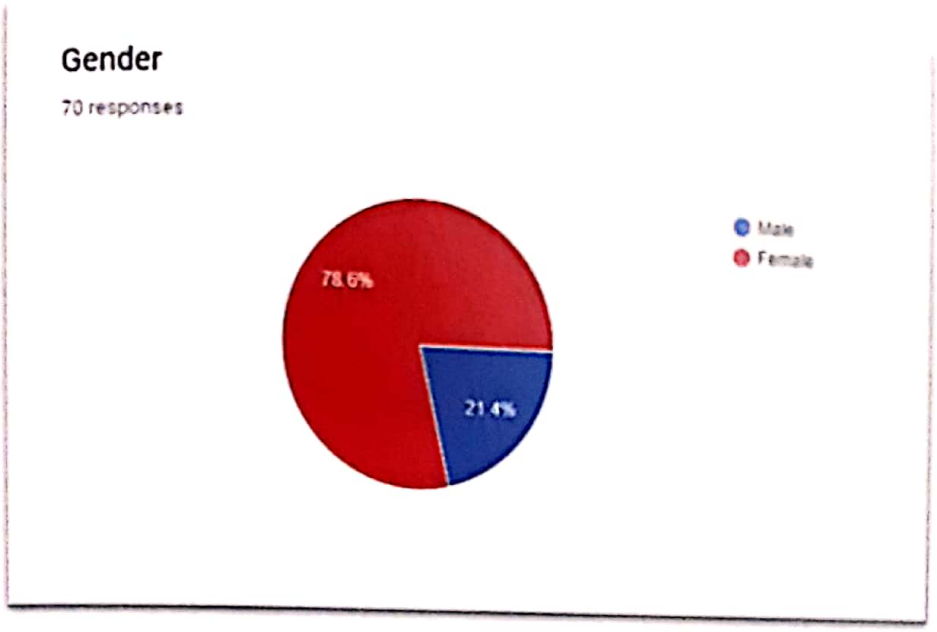
☐ Female ☐ Male

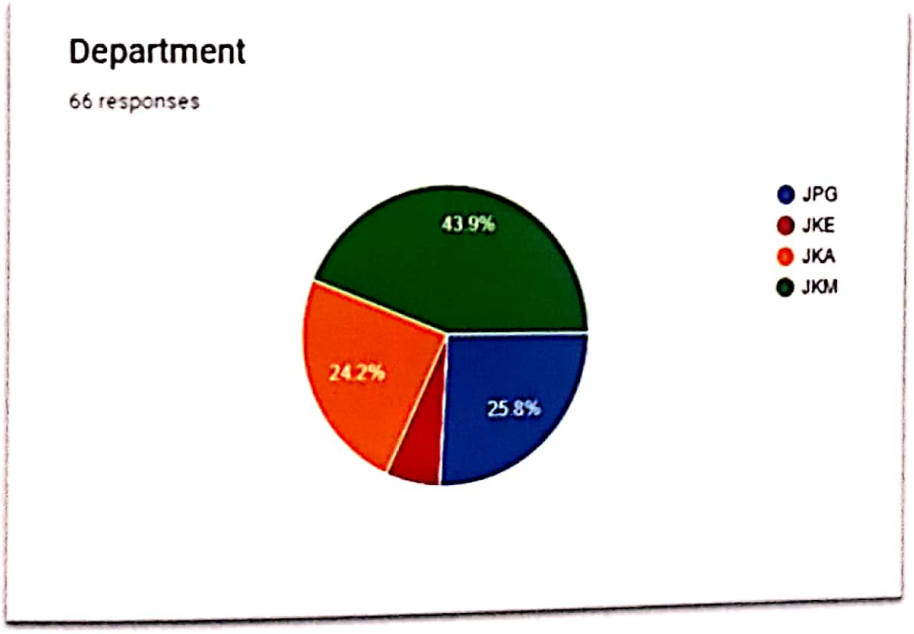
ii. Age

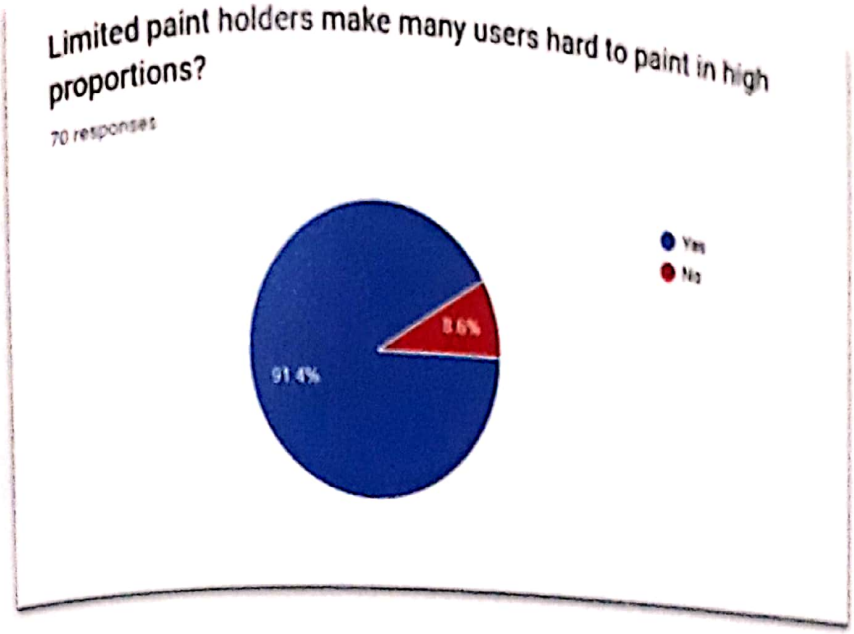
☐ 20 - 30 years ☐ 40 - 50 years ☐ 60 years and above

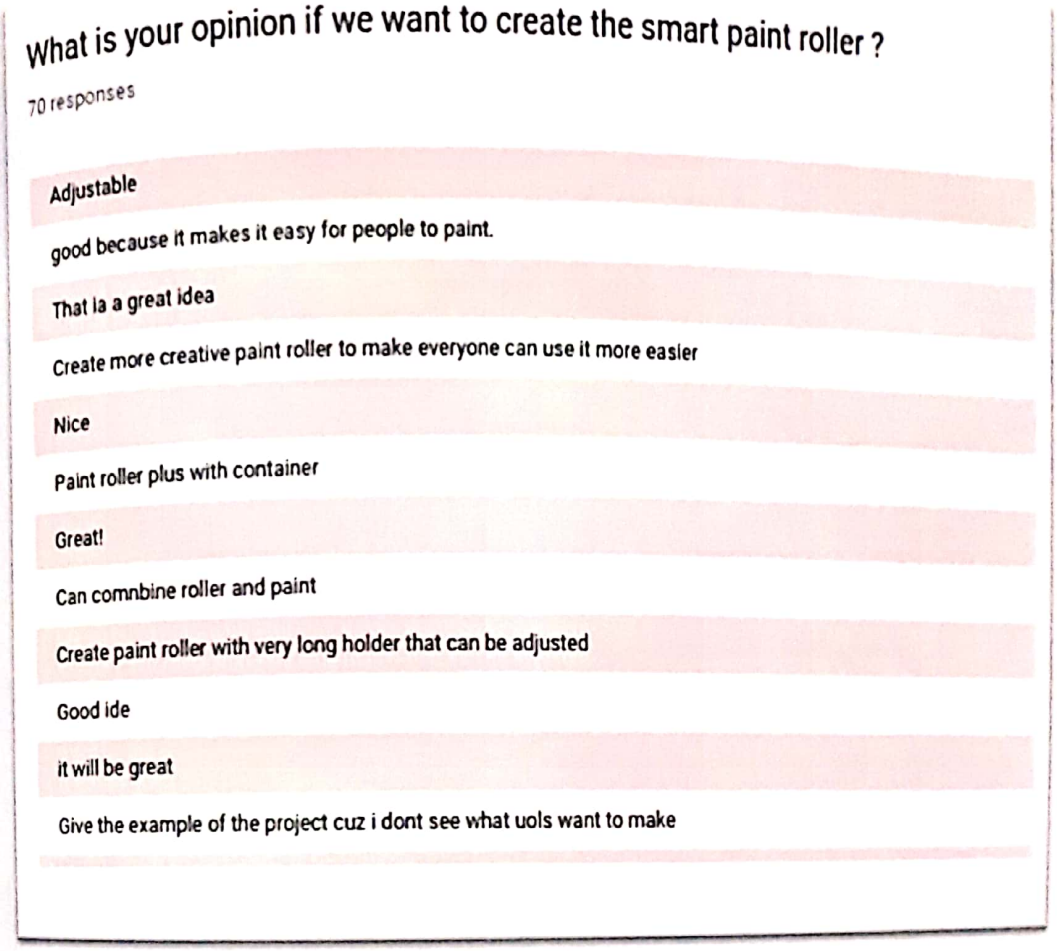
1	2	3	4
VERY DISAGREED	DISAGREED	AGREED	VERY AGREED

BIL	PERKARA	1	2	3	4
1	In your opinion, is this product easier to use than other methods?				
2	Are this product being give benefits to paint roller users?				
3	Does this tool meet the quality of the paint roller user?				
4	Can this tool help reduce the risk of accidents?				
5	Have you ever found a product like this?				
6	If this tool was marketed, would you buy it?				









RESEARCH PROJECT RESULTS

Once the project is completed and tested, we find that every user who views the video recording and decides to fill out the form is satisfied with the project that our group produces. In addition, by using our product many people agreed.

COSTING

No.	Component	Quantity	Price/Unit (RM)	Total price
1.	Roller	1	40.00	40.00
2.	Adjustable angle	1	80.00	80.00
3.	Adjustable holder	3	3.00	9.00
4.	Paint container	1	8.00	8.00
5.	Bunting	1	32.00	32.00
6.	Template/Broshure	10	3	20.00
			TOTAL	**189.00**

CHAPTER 5

DISCUSSION AND CONCLUSION

5.0 INTRODUCTION

In conclusion, the project was well received by roller paint users. Although there were some problems during the project, but eventually after the repair, the project was successfully completed. At first we wanted to use microfiber material on the paint roller sponge but it was hard to find, so we used super fine flocked material.

This project will take several weeks to complete. With the help of team members and supervisors we have been very supportive of this project. After testing, on this project, we prove that this project can help paint roller users.

Overall, the project meets the criteria and objectives as it facilitates roller paint users to use it at home. By the end of the educational experience each student should have achieved the goal. As the conclusion, we hope that all our objective will be achieve. As we know, painting is dangerous if we don't use it properly. Therefore, with this product, we hope that we can do something new that can be used by everyone.

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iii. https://www.fastrimroller.com/
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