



MECHANICAL ENGINEERING DEPARTMENT

CLIMB GAS TANK TROLLEY
WITH BRAKE

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ABSTRACT

A good tools is very important in doing work. It is the same as doing work when delivery gas tank. However, there are some problem in this situation when you want to lift the gas trolley upstairs to the customer's house. So we have solution to lift up the trolley easily. We have customize trolley to easy going upstairs. Additionally, it can reduce human energy. We have add brake for safety when handle this trolley.

This trolley is focused on worker delivery gas tank to the customer's house.

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CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

The process of completing this project takes 2 semesters, finally Climb Gas Tank Trolley With Brake becomes the preferred project as the final year project, after several times changing and changing idea. Looking at the improvements to the use of simple technology items, the idea of innovation that can be the Final Year Project for us to complete the Certificate of Diploma in Mechanical Engineering (Packaging).

Every student pursuing studies at the Polytechnic of the Ministry of Higher Education Malaysia is required to design a final project that is provided within 1 year (2 semesters) for the student to be awarded a Diploma Certificate.

It is divided into 2 semesters where the 4th semester is a medium to present project ideas to supervisors and panels. Then, the 5th semester is to realize the project. This final project is very important as it can learn the ability of students to design a project with various innovations and practice the knowledge acquired throughout the theoretical learning. It is also compatible with training sessions for student to become more proficient in their field in line with the concept of polytechnics to produce educated student as well as skill-based.

1.2 BACKGROUND RESEARCH

In this era of modernization, most people use tools to facilitate their life affairs in all aspects. People are always looking for something to help do hard work in their daily affairs. Because of that, trolleys are built to help reduce the use of manpower when lifting and moving heavy object from one place to another.

The history of the first trolley creation took place in United States when people there were having difficulties in bringing their item. Sylvan Nathan Goldman is the creator of the first trolley. There are various trolleys available in the market. These trolleys are familiar with the market and in our lives, but it is difficult to get a trolley gas tank that can go up and down the stairs.



Figure 1.2.1 Old version of trolley

1.3 PROBLEM STATEMENT

The study is ambitious to study the innovations and improvements we have made to the old trolley.

Problem statement :

- People have trouble lifting and moving their gas tank especially for those who living at flat house
- Using a lot of energy to go up and down the stairs
- The existing gas tank trolley has no safety features

1.4 RESEARCH OBJECTIVE

The objective of the study is as a guideline for producing product. It refers to the problem statement that occurs to find a solution to the problem.

- Innovating trolleys of gas tank to go up and down the stairs
- Add safety features at trolley
- Save manpower to go up and down stairs

1.5 SCOPE OF RESEARCH

To achieve this objective, some of specialization have be implemented. This is a list of specialization that have been made.

- This product is limited to lifting one barrels of gas
- The maximum weight that can be accommodated is 100 kg

1.6 RESEARCH QUESTIONS

In the question of this study, we are asking for some of the questions we have attached to the questionnaire. We make research on general knowledge of the public regarding their existing knowledge of the new version trolley. This is to identify whether they have heard of a new version of trolley or have used it before.

Next, find out the day-to-day work of trolley that is often used by workers and general public. This method is often done by the workers in lifting any item or product. Additionally, we are researching the benefits of this Climb Gas Tank Trolley with Brake or new version trolley of time saving and easy to use today.

Additionally, we are researching the problems faced by users by using the old trolley. For example, it difficult to lifting gas tank climb the stairs. Next, know their opinions and willingness to buy and use this Climb Trolley Gas Tank with Brake if we can realize the creation of the innovation trolley.

We also investigate the frequency of our present society with sophisticated trolley. This will help us to know the real needs of our society to set the rate of use of sophisticated trolley among consumers.

We also place reasonable price and take opinions from the public on the rational value of the ringgit. The value is in RM 100 - RM 150. Not to mention, we are very concerned about the safety aspect in the creation of this project. Therefore, we are asking current users about safety aspect on the use of trolley new version or trolley old version.

Finally, we are researching the difficulty of fixing the product quickly, moreover when we have time to repair and repair it. We also request their opinion on the suitability of this product to be used for workers or public.

1.7 IMPORTANCE OF RESEARCH

A study should be carried out as it is important to collect data as well as to ensure that resulting material reaches its objectives. Besides, to see the effectiveness of a given material. It also ensures that a material can be produced successfully. Therefore, this research also has some interests that can be utilized by certain parties in raising the level of technology development in the country.

- Find out the overall cost of the material for installation and purchase of materials
- Find out its dimensions
- Knowing the type of material used
- Identify the strategic design for trolley
- To improve working skills
- To improve communication skills and train yourself to work in groups
- To learn how to deal with and solve problems and correct past mistakes

1.8 CHAPTER SUMMARY

In conclusion, this introductory chapter will help us and others to know as much of a pre-concept and description of this project. For example, the background of this study we explain from where the idea of this project is to come up with innovation on this trolley. In additions, we can also identify and understand the past problems that are the cause of this trolley's creation and innovation. Hence, it can be improved and expanded so that the problems of previous projects can be reduced.

In addition, we are also investigating the objectives or goals of this project more clearly and for the benefits to be applied appropriately by the users if the trolley. We also discuss the question of questionnaire by making questionnaires to be distributed to the public with the majority being workers and also the general public.

Furthermore, we also provided the scope of the study, in terms of users, how it is used and how this mechanism works more specially and thoroughly to illuminate the scope of the study. We also explain the importance of this study as a medium to clarify every detail of this study having a specific reason and relate to a chapter with other chapters.

Finally, about the operation / term that is about how the trolley created by us with little innovation and innovation work or operate. It will explain the functionality of this trolley.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

Literature review is one of the most important parts before starting a project or an idea that you want to present. The production of a project requires careful research and accurate information about the material. Through this study, this project can be carried out more smoothly and proactively and facilitated the process. In addition, this study will help to achieve the desired objectives through a deeper study of previous projects than current projects.

The literature review of the projects we run helps in terms of safety, quality and the appropriate items. In doing a project, conducting a study on the materials used to complete the project is very important. This chapter explains the main components used in producing this project. This information can be obtained through internet, references book and other related sources.

2.2 CONCEPT AND THEORY

This trolley can certainly help workers to solve problems such as lifting the gas tank climb the stairs. Workers need to use this trolley the right way. Besides, workers can also save time to complete the job, especially lifting the gas tank. Even for the public users, they do not have to use many power to lifting the gas tank climb the stairs like trolley that had previously been in market because this product make it easy for users.

If you're moving and handling high-pressure gas tank, you need a purpose-built trolley. We've designed our gas tank trolley easy to use. The original gas tank trolley is perfect for transporting gas tank around the customer's house, while our climb trolley gas tank with brake has added benefit of lifting hoist and safety features.

In addition, this product also can save cost for consumers who want to buy. If we see, the previous trolley are cheap but it had no features that can climb the stairs and no safety features. So that's where we can see wastage has already happen. So the trolley we are working on this can help solve the issue as mention above.

2.3 DESIGN STUDY

The design of the project is very important in the manufacturing process. The resulting design should include some aspects that need to be taken into account physically, size tire and the strength of the material used. The production of new products should conform to all aspects of safety, attractiveness and others.

The study has done some additional materials in this project. These additional material are selected according to the specifications appropriate to the construction of this project. This project is absorbed with important values such as safety, attractive design, durability and reasonable price.

To produce this trolley we use steel plate so it is strong and durable. We also use high quality tires to support the load when lifted.

2.3.1 Steel Plate

Steel plate can be manufactured by large steel factories or smaller, more specialized plants. Steel plates are one of the many types of steel that can be produced, other types include steel bars, sheets, slabs, rolls and more. Steel plates are often used for structural and construction. The grade, elements and parameters of steel plate are also important in how it is used.

A steel plate is a broad and generic term for steel in the form of a plate. However, steel can be combined with other metals from alloys, which can make them corrosion resistant, stronger or lighter. In addition to what alloy of steel plate is made, the thickness can range from 3/16 inch to several inches.

2.3.2 TIG Welding

Gas Tungsten Arc Welding (GTAW) also known as Tungsten Inert Gas (TIG) welding is an arc welding process that uses a non-consumable tungsten electrode to produce the weld. The weld area and electrode is protected from oxidation or other atmospheric contamination by an inert shielding gas (argon or helium) and a filler metal is normally used, though some welds, known as crogenous welds, do not require it. A constant-current welding power supply produces electrical energy, which is conducted across the arc through a column of highly ionized gas and metal vapor known as a plasma.

GTAW is most commonly used to weld thin sections of stainless steel and non-ferrous metals such as aluminium, magnesium and copper alloys. The process grants the operator greater control over the weld than competing processes such as shielded metal arc welding and gas metal arc welding, allowing for stronger, higher quality welds. However, GTAW is comparatively more complex and difficult to master and furthermore, it is significantly slower than most other welding techniques. A related process plasma arc welding uses a slightly different welding torch to create a more focused welding arc and as a result is often automated.

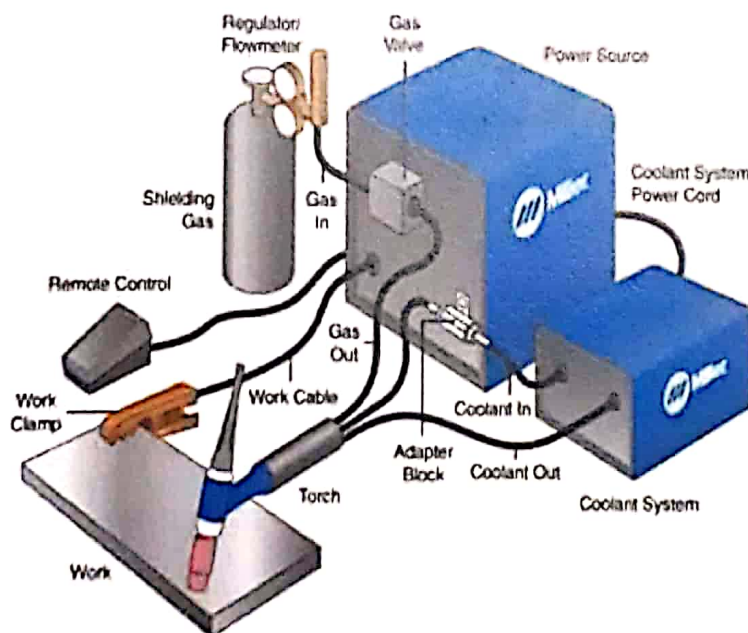


Figure 2.3.2 TIG welding machine schematic

Advantages

- The weld joints are stronger as they are able to block corrosion more effectively and more smoothly
- Gas shielding makes it easier to get the arc control more stable
- Less trapped air no pollution of material does not occur slag trapped on the inside of the connection
- Protective gas is non-misty and less smoke while facilitating the welder to see the welding area well

Disadvantages

- The process is slow compared to the process that uses the electrode to run out
- Protective gases are supplied separately
- Cannot be used for metal with low melting temperatures
- The process is difficult to do automatically because the filler metal needs to be provided separately to the weld field

2.4 PREVIOUS RESEARCH

Previous studies were conducted to identify the functionality of the trolley, the appropriate frame type, the type of wheel and the best method to create this gas tank trolley based on the selected component. The work of lifting and transferring gas cylinder requires manpower and time consuming.

2.5 REVIEW OF PRODUCTS MADE IN MARKET

Various types of trolleys have been marketed nationwide. Each trolley is designed with its own characteristic features, possessing abilities and uniqueness. Trolley created based on problems arising from user observations.

2.5.1 Four Wheel Trolley

The four wheel trolley has two different sizes – big and small. Usually used in grocery stores, workshops and other. This trolley can accommodate a maximum load of 300 kg. The advantages of this trolley is easy to carry and easy to maintenance.



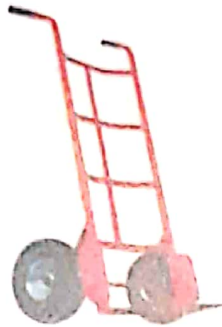
2.5.2 Service Trolley




This trolley is strong and light, it is easy to carry heavy items. Does not require a big place to store a cart, service trolley suitable for use in hotel, restaurant and all. This trolley has three layer, size 102 × 50 × 96cm. it has tire size 2.5-inch.



2.5.3 Gas Tank Trolley

This type of trolley is used by gas vendors to bring gas from truck to buyer's house. Only single cylinder will carry easily and safely and also act a stand to store the cylinder.



TYPES OF TROLLEY	USAGE	MATERIAL	LOAD CAPACITY
 Four Wheel Trolley	Used at warehouse, shop, hotel and restaurant	Stainless steel	500 kg
 Service Trolley	Used in food service industry. It can be also use as a daily tool at home & garden	Plastic	50 kg
 Gas Tank Trolley	Used to lift gas cylinder	Steel	250 kg

2.6 CHAPTER SUMMARY

This literature review is very important in the project construction progress. Through this literature review, we can learn about factors that affect the construction of this trolley. For example in term of improvements to the old structure, the time taken, the attraction of the consumer and so on. This trolley also need to take account of safety and durability.

Additionally, this project is very important for graduates to always be prepared with challenges while pursuing a job environment. Must be skilled graduates not only in terms of academic but also in practical terms in tandem with the present-day image wishing to produce innovative and creative graduates. Through this project, graduates can communicate with each other to solve problems that arise during the construction process of the project.

The literary study can also help compare products already in the market with the products we will build. We are able to identify the shortcomings that need to be added as well as we can build innovative and appropriate projects as well as safe use by users. In addition, we can also study the materials that are suitable for use in the project we build.

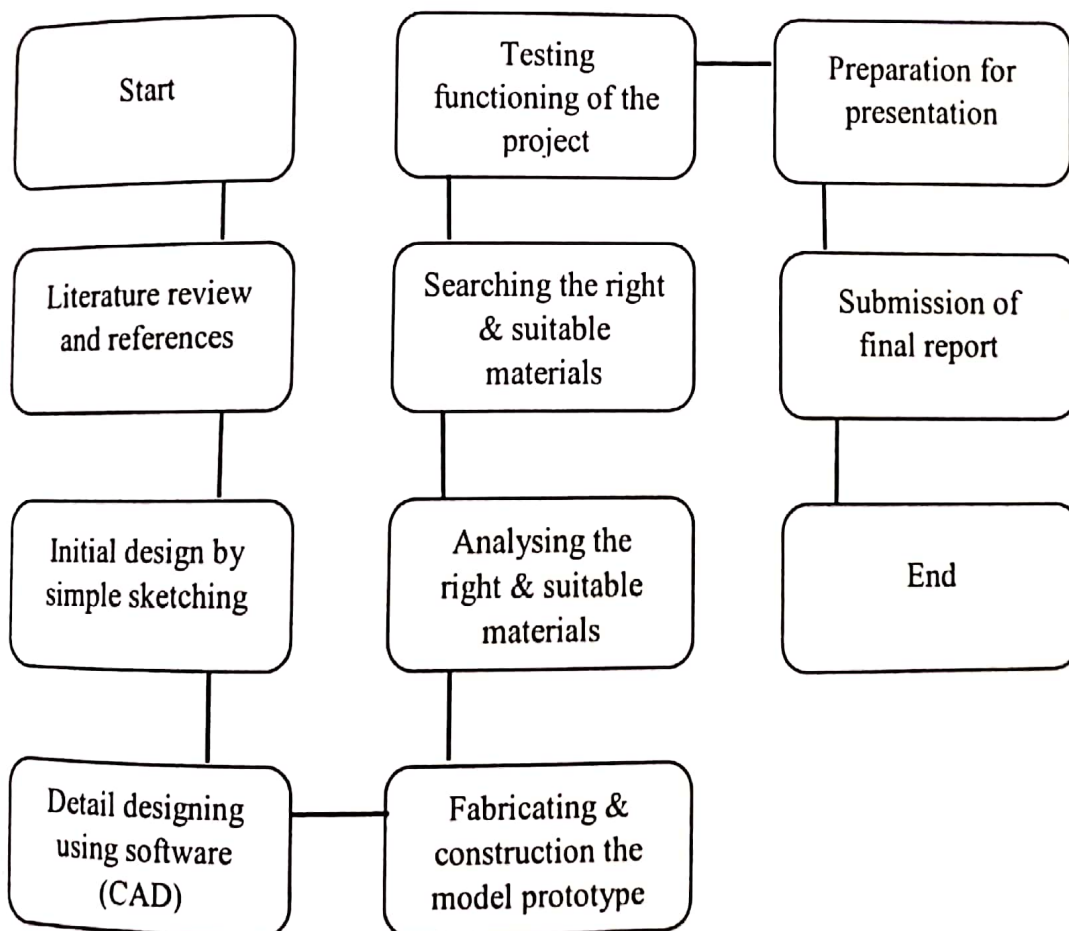
CHAPTER 3

METHODOLOGY

3.1 INTRODUCTION

Methodology is an aspect that needs to be studied in order to produce a project. Process planning needs to be investigated as best as possible to produce a project or quality products. Here is the sequence of all necessary processes or procedures traveled before a product was fully completed. Method of work should be done with organized and suitable for getting better and better work and results. With the existence of an orderly way of working, then all the work and tasks to be done can be followed and implemented in a safe and order manner. In this chapter we will discuss about the steps that will be taken to complete this project. Every step of the work to be done will be explained in the diagram help with understanding the project's income.

3.2 FLOW CHART



3.3 PROCESS DESIGN

Process planning needs to be carefully examined to produce a quality project or product. Work methods need to be done in proper and appropriate way to get better and more secure work and results. With the proper method of work and tasks performed can be followed and implemented in a safe and order manner.

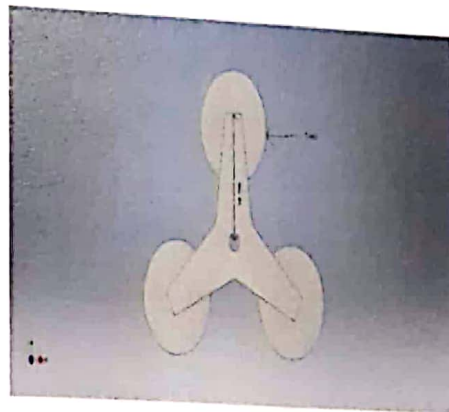
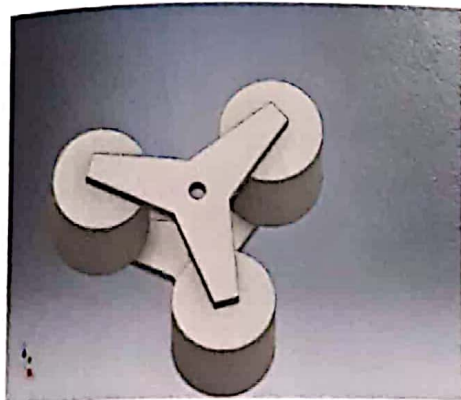
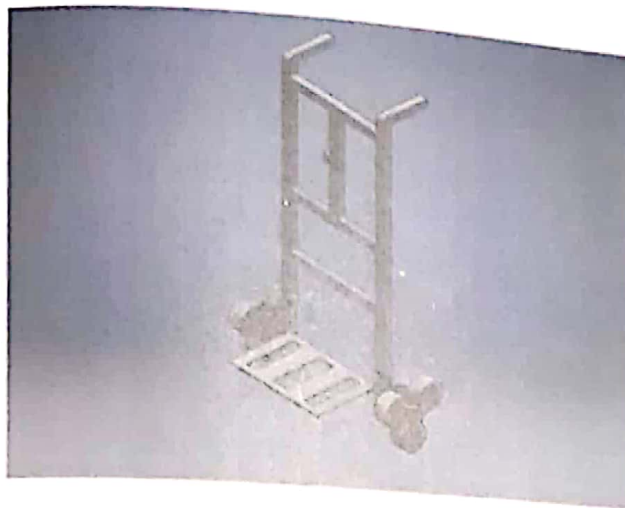
In this chapter, would like to describe the method of producing this project from material to installation. It aims to control excess production costs and equipment. The steps taken in the production of this project are :

- Find the necessary materials and equipment to carry out this project
- Draw the diagram
- Draw the connecting components to be used using CAD
- Arrange all components to be used
- Designing a project framework
- Make testing on ready-made tools

3.4 INITIAL IDEAS

The initial ideas is an important step during project generation. In the process of creating this project there are several steps that need to be done.

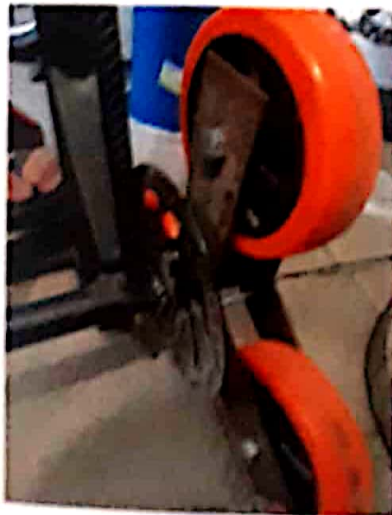
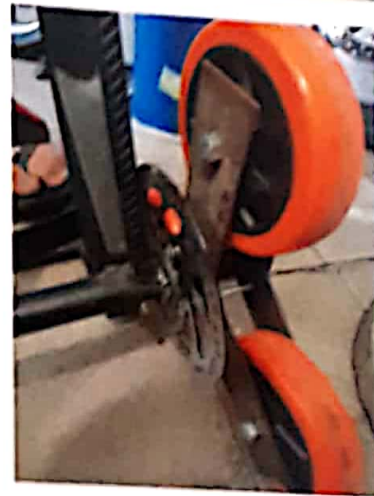
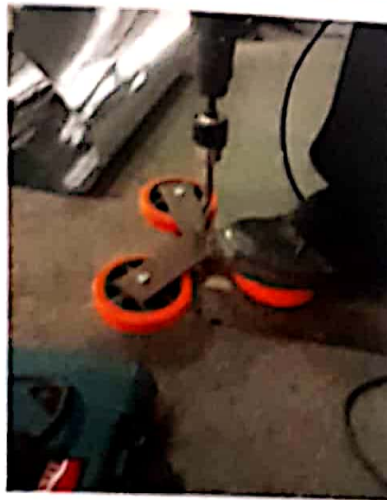
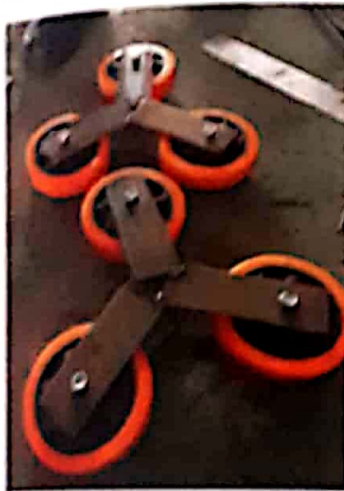
- Identifying user issues
- The idea of creating the product
- Design and selection of ideas
- Project planning







3.6 WORKING PROCEDURE

- Measure and cut steel plate (5cm × 14cm) 3 pieces
- Welding all the steel plate into triangle shape
- Make a hole in the middle and end of the plate
- Install the tire at steel plate using screw
- Install disc at plate
- Place the brake on the brake pedal.




3.7 FABRICATION



3.8 MATERIALS USED

MATERIALS	EXAMPLE IMAGE
Steel plate	
Tire	
Nut and bolt	
Disc brake	

3.9 TOOLS USED

TOOLS	FUNCTIONS
 Hand grinding machine	Cut the steel plate
 Welding machine MIG	Weld the required plate connection on the project
 Drilling machine	Punch holes

CHAPTER 4

RESULTS

4.1 INTRODUCTION

In this chapter, we are discussing the findings of the project that we have done thoroughly. The whole chapter is closely linked to the results we have achieved over the course of one year of the project. In fact, we also get advice from lecturer to understand the concepts we are working on.

In addition, we also look into markets that are relevant to the projects we create to ensure that the project are in line with consumer and market needs. Various challenges and assumptions we have made to ensure this project can be completed over a given period of time. Some important phases also play an important role in our project such as coarse presentation of ideas to supervisor, discussion about the problems we face and timing of a process.

There are also some of the problems we face as design that are not suitable for the market, unsuitable material, cost over budget and relatively limited time. This a bit of an impression on us to complete this project perfectly to meet the needs of consumer. This problems can be solve by group discussion and opinion or advice from our experienced project supervisor.

4.2 FEEDBACK RESULT

The feedback rate we get will help us know the needs of consumers in transforming existing products. Some aspects need to be taken into account in terms of price, attractiveness, appropriateness and the opinions of users we take to complete this project. We also divide the work needed to get the cooperation of each team members to get the correct and accurate information.

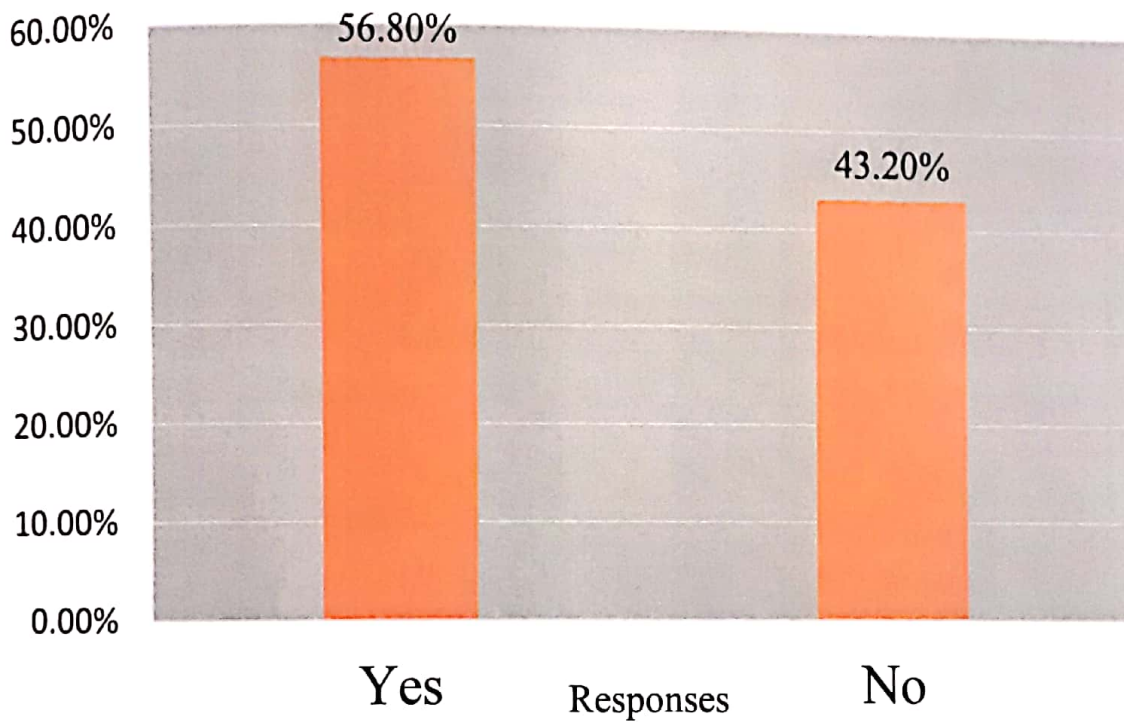
The questionnaire we have targeted is workers especially those who send the gas tank door-to-door service. The projects aims to help reduce the manpower, save time and make it easier to climb the stairs. We also emphasize our test on this project. Through this tests it can help give us the data that will be used in the process of finalizing the final report.

4.3 FINDING RESULT

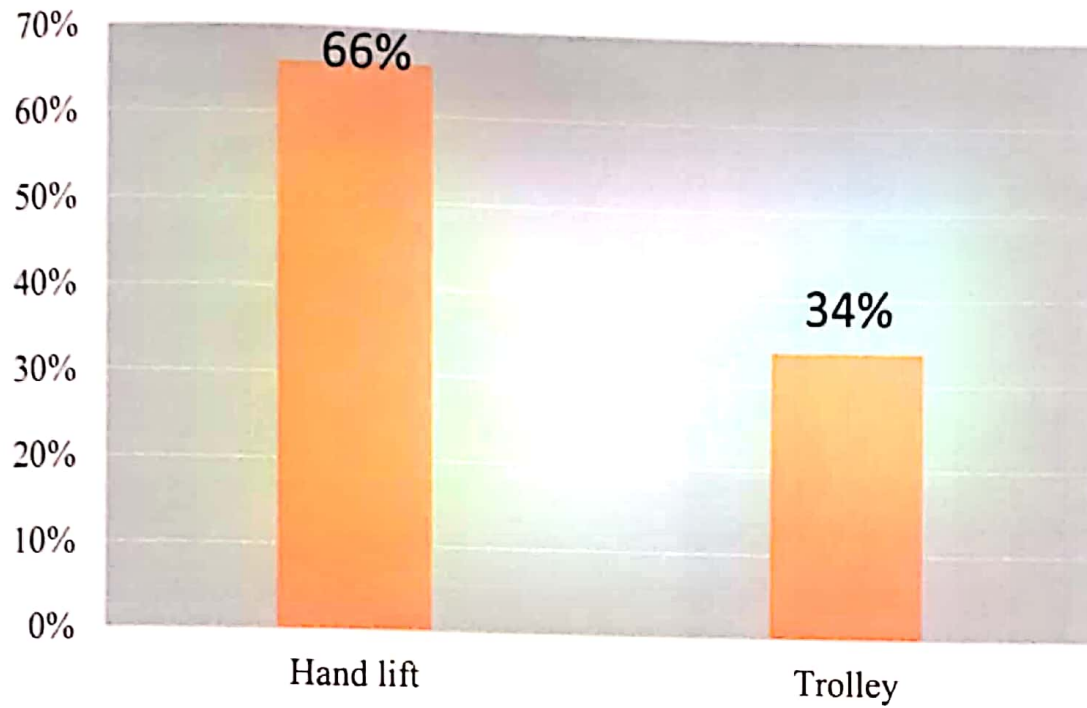
The questionnaire was distributed to 20 people that we randomly selected. Most of them that have been targeting are workers and also public. Through this questionnaire, we are able to identify problems that are arise using existing products.

4.3.1 RESULT ACCORDING TO THE QUESTIONNAIRE

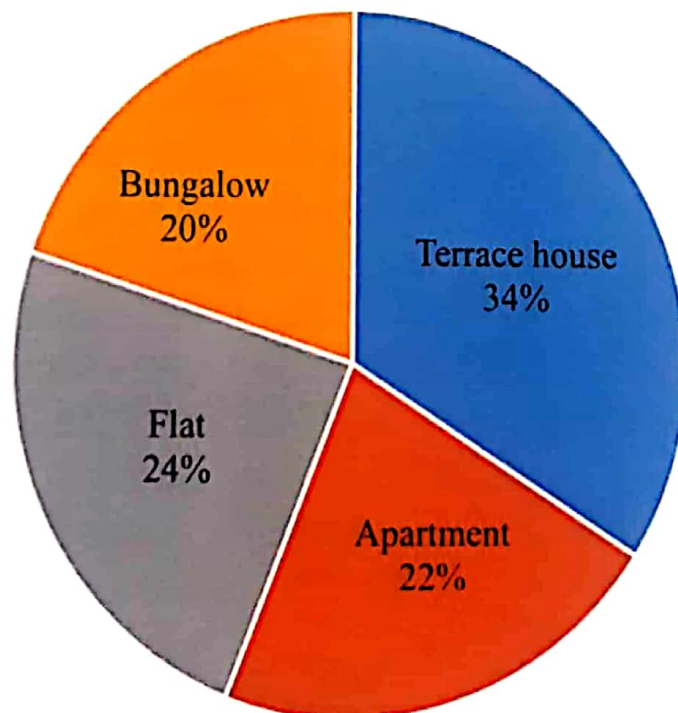
a. Difficulty in bringing gas tank into the house



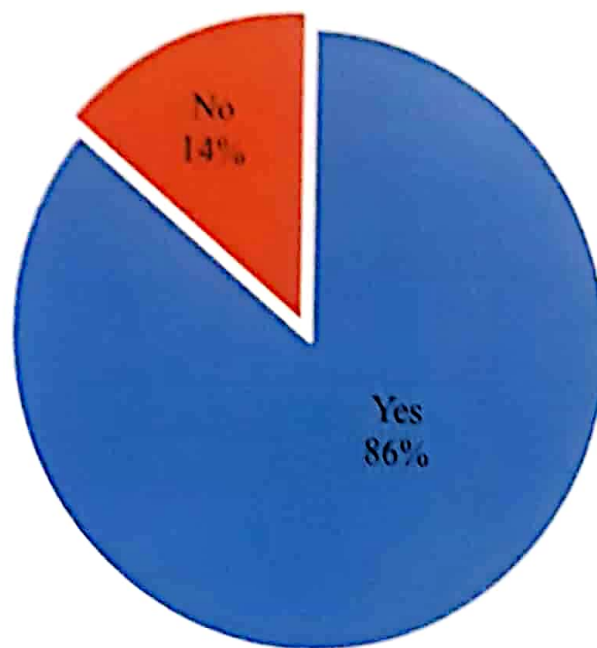
b. How do you bring gas tank into the house ?



c. Type of house



d. Whether the existing trolley is easy to climb the stairs



4.4 CHAPTER SUMMARY

Due to the research question we randomly give to people has help us in continue this project. Results from the research, we can know the witnesses of the consumers in changes in the products which we had investing. We also been trust to be out to finishing our project construction.

We also always committed and work together in producing quality projects and work well. Most of the work is done in groups such as stamping the questionnaire and finding the necessary information. Every problem we face will be discussed together and get advice from lecturer. Through this we can produce quality products in the market.

CHAPTER 5

DISCUSSION & CONCLUSION

5.1 INTRODUCTION

This discussion is the result of the findings as well as some of the problems that arise and the discussion is gathered to make a solid discussion of the solution in relation to all the problems that occur. Through discussions made with an alternative or a new approach that may be created to ensure that all work can be quickly and wisely completed. The following is a discussion of the results of the findings as well as the problems arising during the studies conducted on the weakness of the existing trolley as well. Data retrieval is done to identify the problems that arise and how to solve it.

Without a neat and structured planning, it is possible that the resulting work is not satisfactory. After a few weeks of discussion and research, a climb trolley gas tank with brake was created. The process of designing this project encompasses several stages.

Among the parks and issues to be discussed is in terms of capital, suitable materials to use, the impact on the market and the effective way of implementing it. In addition, we have set up our respective duties as well as daily and weekly work to be done to ensure that the project is well-formed.

5.2 DISCUSSION

Every project completion process, there are some problems that cause the project to be unsatisfactory. The problem that occurred at the start of our project was the people have trouble lifting and moving their gas barrels especially for those who live at flat house. Besides the use of this trolley can save manpower to go up and down stairs. Our product can be one barrel gas tank. Our supervisor wants to add safety features for our product to move up and down stairs. So we decided to add a brake for our product.

We have decided the size of our product. Design of tire we have changed to easily move up & down stairs. The can rotate through the stairs. It can easily deliver the gas tank at flat house. The material to build our product is steel. It is because we want to carry heavy gas tank. Weight of one carry gas tank with full gas is 30.5 Kg. But our product can be lifting to 100 Kg. The steel is very strong & solid. The brake we have used is bicycle brake. It can stop our product to move up & down stairs. The safety added to be avoided from accident while lifting the gas tank at the stairs.

The design of our product is simple and easy to move. The design looks like other designs at market, but our product can be used at stairs and have safety features. The design tire we create can go through the stairs. Trolley at market has two tires only. Our trolley has six tires to move.

5.3 PROPOSAL

Climb gas tank trolley with brake is aiming to help workers to deliver gas tanks to the customer's house at flat house which has no lift. However, according to several research and surveys done, a few improvements can be done to climb gas tank trolley with brake:

- The design plate tire must extend it because it stuck at disc brake to move up and down
- Improve the brake system to stop tire
- It must be easy to store or can be flip
- The stand can be fix more than one gas tank

5.4 CHAPTER SUMMARY

All the skills and experience available to each member of the group are produced and practiced together to ensure the success of this project. Additionally, test the level of patience and determination within each member during the 15 weeks project activity. Carry out every task entrusted to each member of the group with full responsibility and dedication.

Furthermore, the importance of cooperation in each group is due to the fact that without complete cooperation, any work done is not successful and well prepared. The ideas and views gained by each group member should be thoroughly investigated and reviewed before applying in any work undertaken.

5.3 CONCLUSION

The study attains the objectives of the study & problem statement. The problem statement have solve. We have save manpower went lifting up gas tank at apartment stairs and add safety featured. The trolley can be used at stairs but stuck at the disc brake. We should long the design tire went build it. But the trolley move went up & down stairs.

Our product is limited to lift one gas tank trolley at one time for user's safety. It because stand can fix one barrel only. But we have test our product can accommodate max weight 100 Kg. The brake can be stop the rotation but cannot stop the tire. The design of tire can be through up & down stairs. The material is steel. It strong but it heavy. The material of tire is plastic but it noisy went up and down stairs.

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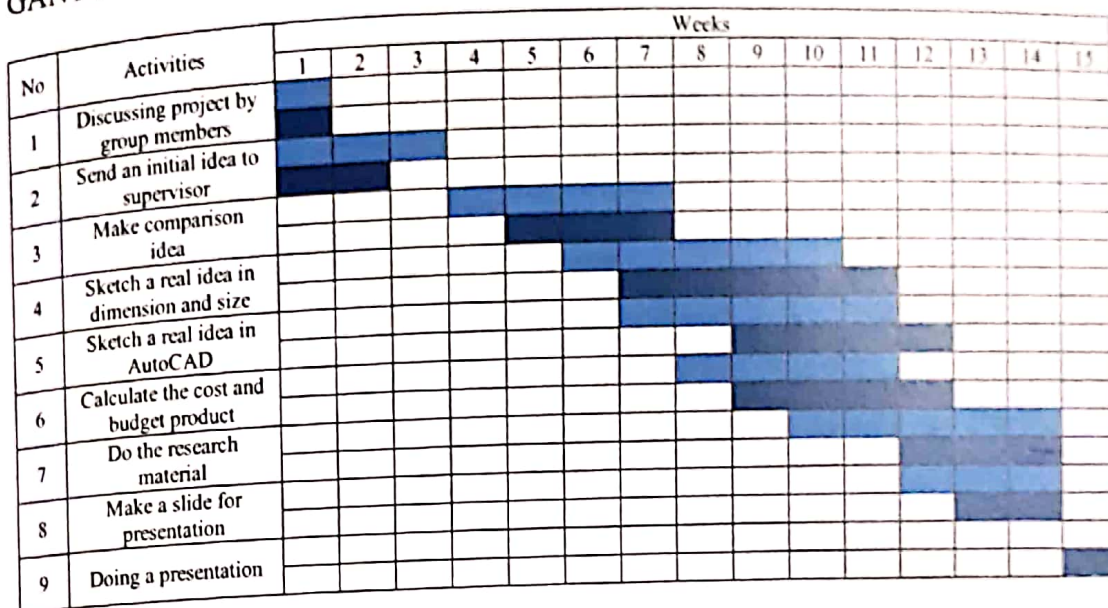
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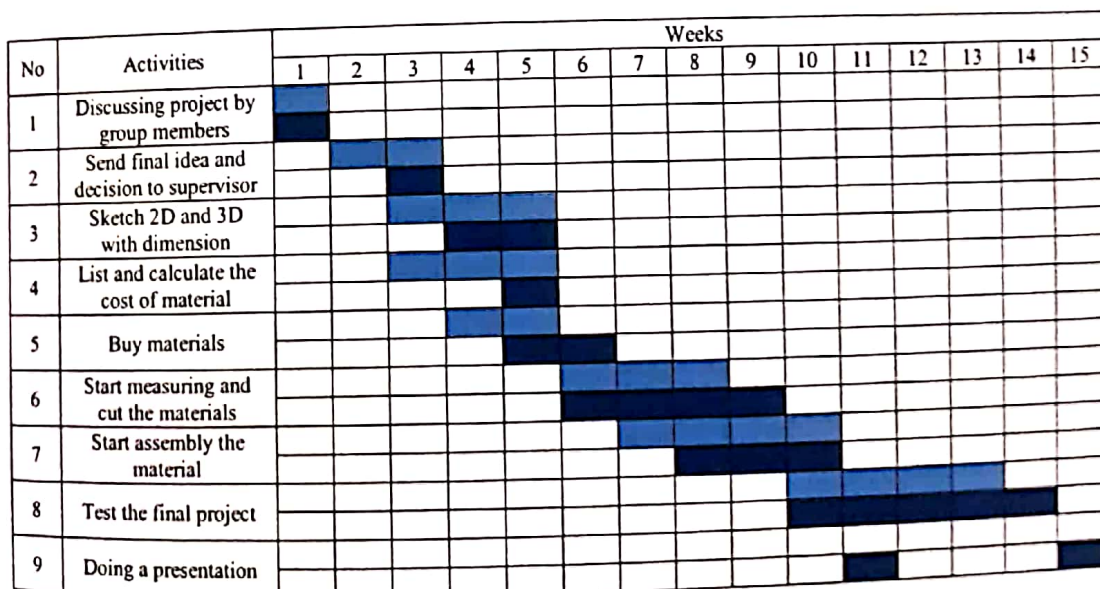
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APPENDIX

GANTT CHART



Project 1



Project 2

ESTIMATION EXPENDITURE

MATERIAL	QUANTITY	PRICE PER UNIT (RM)	TOTAL PRICE (RM)
Wheel	6	14.90	89.40
Steel plate	1	10.00	10.00
Disc brake	1	74.00	74.00
Trolley	1	160.00	160.00
Screw	10	4.00	4.00
TOTAL			337.40