
DJJ5141:
PROJECT 1
(GAS TANK TROLLEY)

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GAS TANK TROLLEY

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**Laporan ini dikemukakan kepada Jabatan Kejuruteraan Mekanikal
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CHAPTER 1

1.1 INTRODUCTION

The product that is to be implemented, designed and built is a gas tank trolley called a climbing trolley. The main objective of this project is to provide comfort in reducing the workforce that will be used by the main targets for this project, namely the housewives and the gas sellers or the suppliers. The function of this trolley is to make sure housewives and gas sellers do not have to use as much energy as needed when lifting the tanks. The designs of the trolleys available on the market today are less user-friendly. This is because the trolleys available in the market today are not very well designed and also require a lot of energy and power when using them. There are trolley designs where the wheel cannot climb up the stairs. The advantage of this project is that it is designed to have a clutch where the gas tank is not required to be lifted but simply push the trolley towards the gas tank, tighten it and lift the gas tank. It also has the function of a triangular wheel which allows the trolley to climb the stairs easily.

1.2 BACKGROUND

In modern times, manpower is becoming less used for human work. However, with the advancement of these modern technologies, it is possible that mechanical tools can reduce human labor in daily work. For example, if you want to lift something that is heavy or beyond human capacity, it can be a burden on humans because it needs to use a lot of energy like lifting the gas tank.

A gas tank is a heavy object regardless of whether it has gas inside it or not, which cannot be lifted by someone who does not have enough energy or power such as a housewife and the sellers. Because of this problem and also based on the discussions that have been made to solve this problem, one project or product could be produced, namely a gas tank trolley.

With this gas tank trolley, the burden of the housewives and the sellers can be lightened as there is not much energy and power to use when lifting and carrying the gas tank. Furthermore, this mechanical device can also be used in the apartments and condominium. With this gas tank trolley, the sellers can use the trolley using the stairs easily to send the gas tank in case an emergency like damaged elevators happened. This is because of its unique design and easy to use.

ABSTRAK

Kajian ini dijalankan di bawah tajuk trolley multi-function. Trolley multi-function direka khas bagi memudahkan suri rumah dan penjual tong gas untuk mengangkat tong gas. Objektifnya adalah mewujudkan trolley multifunction untuk kegunaan suri rumah dan penjual tong gas. Tambahan pula, trolley multi-function juga dapat digunakan pada waktu kecemasan, seperti lif rosak. Berdasarkan kajian semasa yang telah dijalankan kebanyakan suri rumah memerlukan perkhidmatan penjual tong gas untuk hantar pesanan ke hadapan rumah mereka. Di samping itu, tenaga yang banyak perlu ada pada setiap penjual tong gas. Dengan adanya rekaan ini, pengendalian kerja lebih cekap dan lebih selamat berbanding dengan kaedah sebelumnya.

ABSTRACT

This research is run under the title of trolley multi-function. This trolley multi-function is specially designed for house wife and gas barrel seller to lifting the gas barrel easier. The objective of creating this trolley multi-function is for the uses of housewife and gas barrel seller. In addition, this trolley multi-function can be use in an emergency. For example, when lift cannot be use. Based on the research that has been done, most of all house wife need the service that the gas barrel seller can send their order to infront of their house. In addition, gas barrel seller must have a lot of work force. With this design, the control of the work become more efficient and safe compared to the old method.

1.3 PROBLEM STATEMENT

- The difficulty of carrying the gas barrel up and down the stairs.
- Problems faced by users to lift heavy barrels of gas.
- The existing product did not follow the safety rules.

1.4 RESEARCH OBJECTIVE

- Produces trolley tires that can work up and down stairs.
- Produces a multi-function trolley without having to lift the gas barrel to the trolley.
- Creates a clamp to prevent the gas barrel from falling.

1.5 RESEARCH QUESTIONS

1. How much capital was spent on the project?
2. How much weight can the project cover?
3. What is the average weight of a gas barrel sent home?
4. Who is the primary user for this project?
6. What is the purpose of this project?
7. Can this project be used by gas barriers throughout Malaysia?
8. What is the main material used to make the project?
9. What are the applications available in the project?
10. Does this project have security features?
11. What are the benefits of this project?

1.6 PROJECT SCOPE

-This project was created for the use of condominium apartments and houses

-This project is focused on the community

1.7 IMPORTANCE OF PROJECT

-The purpose of this project is to facilitate and reduce the burden on the main targets of the project such as housewives or gas seller

-Ensures that seller can provides tools that make him deliver more faster and can saves time that make the seller can send the barrel gas at the right time

CHAPTER 2

LITERATURE REVIEW

2.0 INTRODUCTION

In carrying out a project, it is very important to conduct a study of the materials that will be used to complete the project. This chapter describes the main components used in producing this project. Previous studies have been conducted to identify how the trolley works, the type of frame, the type of wheel to be used and the best way to create this chair lifter based on the selected components. Previously, the work of lifting and moving gas tank required a lot of manpower and time to complete the task.

2.1 Gas Tank Trolley

Prepared By Nurshairah

2.2.1 INTRODUCTION

Gas tank trolley is used for ease of transportation of gas tank to any location. Mostly the person who used the gas tank trolley are the delivery men who incharge of delivering the gas tank to the customers and for the domestic use. There are two types of gas tank trolley use which are gas tank trolley for domestic use and for commercial use.

The trolley is a mechanism that allowed man to transfer their heavy items such as computers, files and etc to other places. It's help man to do their work without having a problem due to the heavy loading. Its also helps to reduce pain in waist, back, hand and feet. No mater how light the loading is, people usually will suffocate a large pain in their body if lifting the items in many times. So, this is when the people rely upon a trolley that can do items transferring many times with just a little effort. From the statement above conclude that the trolley playing a major role as an items transferring mechanism for people without having a problem of doing that. A trolley also functioned as a helper to people to hold items orderly while transferring between rough lands.

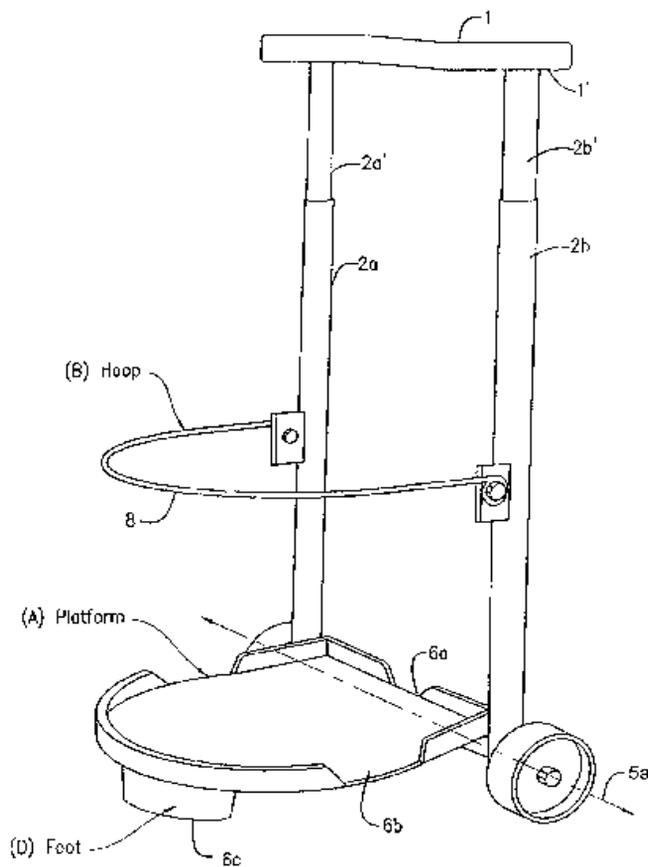
They introduced about in developing a mechanism for easy transportation of heavy loads over uneven terrain. The need for such a system arises from day-to-day requirements in our society. Devices such as hand trolleys are used to relieve the stress of lifting while on flat ground; however, these devices usually fail when it comes to carrying the load over short height. Several designs were conceived that would allow a non-industrial hand trolley to travel over stairs, curbs, or uneven terrain while reducing the strain on the user.

2.2 RESEARCH

Prepared by Nurshairah

2.2.1 WHEELED CONTAINER CARRIER

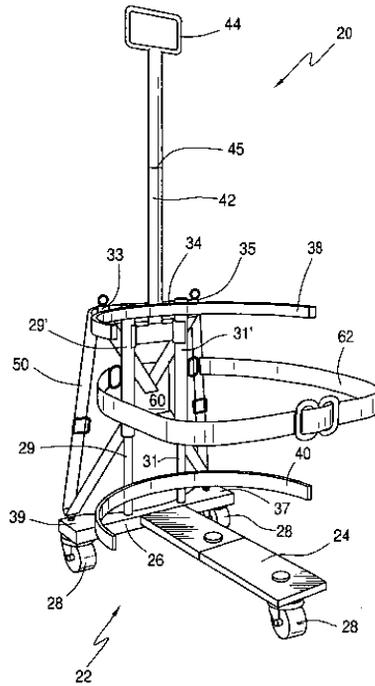
A portable transporting carrier for standard size buckets and for standard size propane gas tanks with wheels connected by an axle element and configured to position and support the bucket or the tank on the axle element and with an offset handle positioned over a center of gravity of the bucket or tank to facilitate lifting and carrying of the carrier with supported bucket or tank. The carrier is optionally convertible to a transportable working skid. (Gerald Umbro, Rosemary Kavanaugh, Joseph Umbro and David Tessel, 2009)



Prepared by Nurshairah

2.2.2 STABLE STAND OR CART FOR A GAS CYLINDER

This invention relates to a stable stand or cart for a gas cylinder or the like and more particularly to a stand or cart for a gas cylinder having a metal frame and flexible belt for accommodating gas cylinders of different sizes. A stable stand or cart for one or more gas cylinders includes a T-shaped base assembly having a forwardly extending base member and a lower rear cross member with three casters fixed to a lower surface thereof. An upwardly extending frame includes two upwardly extending telescoping tubes and an upper cross member fixed to the tubes. An upper and a lower C-shaped support member are fixed to the upwardly extending frame and a clamp is provided to fix the distance between the C-shaped support members. The stand or cart also includes a first flexible belt, four guide members, and a central positioning member for positioning the central positioning member for different size gas cylinders. A second flexible belt extends from the central positioning member around the gas cylinder or cylinders to hold the cylinder or cylinders to the stand or cart. (Khaled Jafar Al-Hasan, 2010)



Prepared by Nurshairah

2.2.3 keg handling equipment.

A keg conveying trolley has a pair of wheels, a central post and a slide which carries a hook for grasping the keg rim. The slide is lockable at different keg heights. A foot plate assists in tipping the trolley to an inclined position for wheeling the keg from one place to another. The keg stacking version has a winch worked by hand or a cordless drill. The keg is supported by a rise and fall carriage. The carriage can be modified to be multitask. Variants can lift gas bottles on their side, truck tyres for placing on wheel studs and odd shaped loads. (Terry George Morgan, 2011)

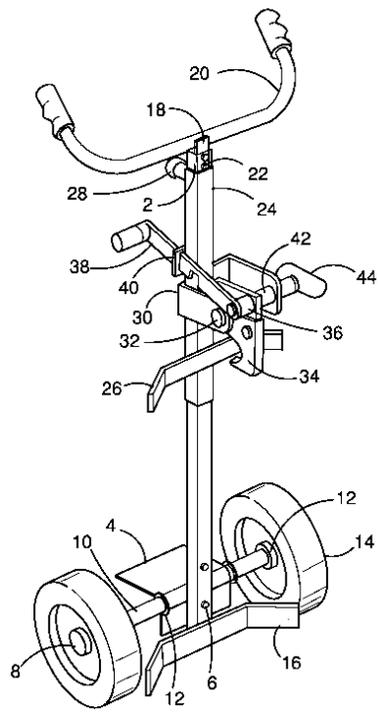


FIG. 1

2.3 THEORY

Prepared by Nurshairah

2.3.1 Tri- Star Wheel

A Tri-Star wheel functions as a standard wheel on flat ground, however has the ability to climb automatically once an impediment to rolling is encountered. This wheel design consists of three tyres, each mounted to a separate shaft. These shafts are placed at the vertices of a trilateral. They will conjointly allow a vehicle to climb over little obstructions like rocks, holes, and stairs. The third wheel idles at the top till the lower front wheel hits an obstruction. The obstruction prevents the lower front wheel from moving forward however doesn't have an effect on the motion of the live axle. This causes the top wheel to roll forward into position because the new front wheel.



2.3.2 Wheels

A wheel is a circular part that's meant to rotate on a shaft bearing. The wheel is one amongst the key parts of the wheel and shaft that is one of the easy machines. Wheels, in conjunction with axles, permit heavy objects to be moved simply facilitating movement or transportation whereas supporting a load, or performing labour in machines. Wheels are also used for different purposes, like a ship's wheel, hand wheel, wheel and flywheel.

Material: Polyurethane (PUR and PU)

It may be a compound composed of organic units joined by carbamate (urethane) links. Whereas most polyurethanes are unit thermoset polymers that don't soften once heated, thermoplastic polyurethanes also are on the market.

Polyurethanes possess high tear resistance together with high tensile properties. Polyurethane's material properties can stay stable (with token swelling) in water / oil / grease. Polyether compounds can last a few years in subsea applications.

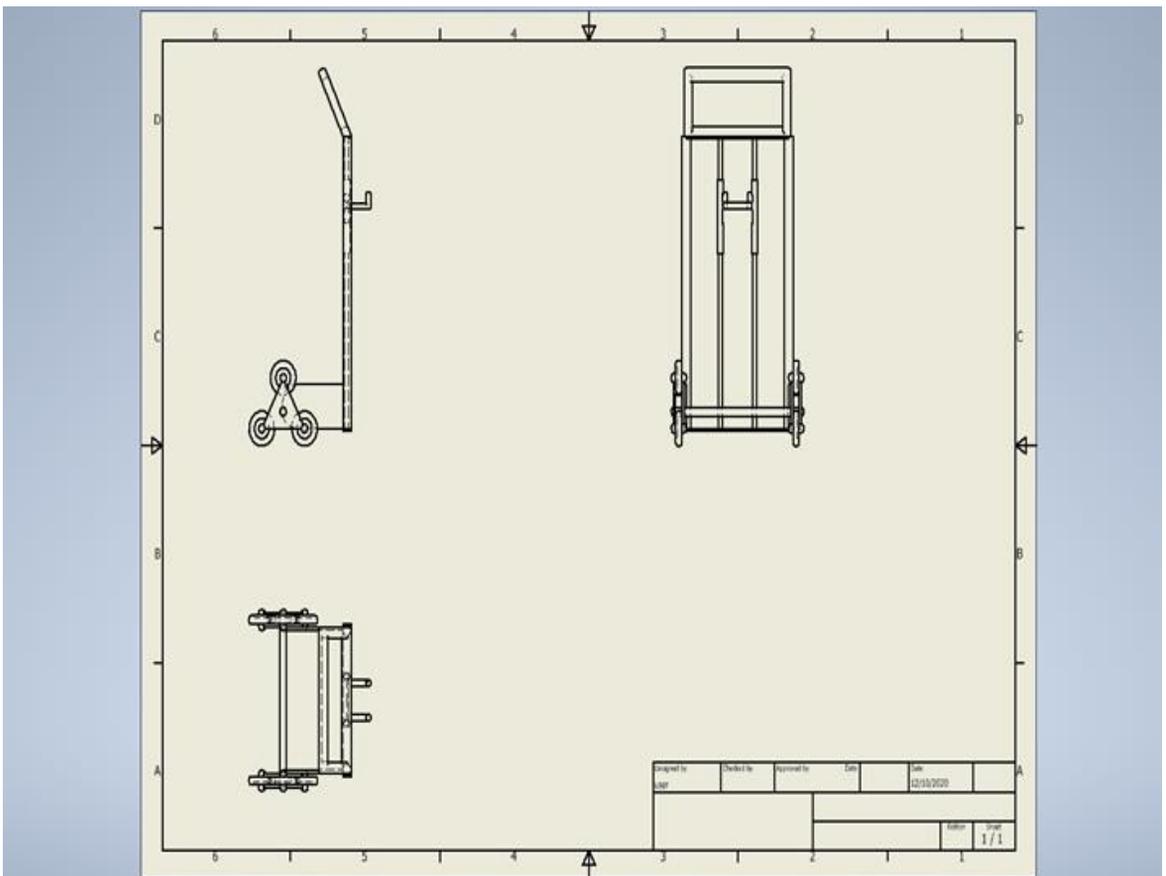
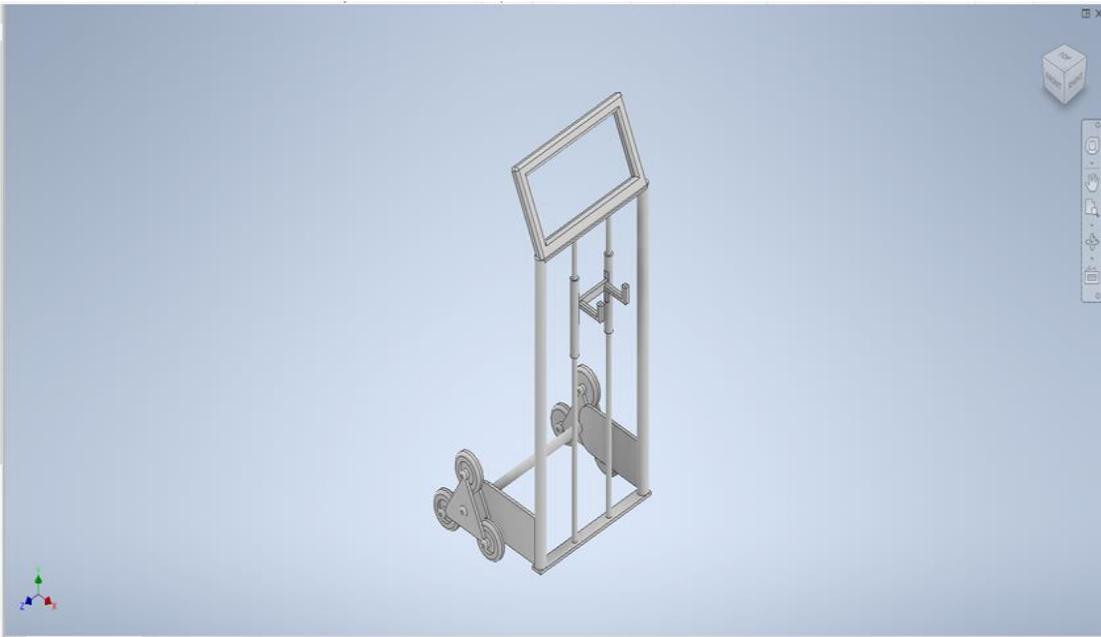


2.3.3 Trolley Frame & Handle

Frame is main assembly of trolley mounted on axle .Aim to kept material that must be moved. A frame is usually a structural system that supports different parts of a physical construction and/or steel frame that limits the construction's extent. Framing, in construction, is the fitting together of items to give a structure support and shape. Framing materials are usually wood, built wood, or steel. Handle is to hold by mover and easy movement of trolley from one place to different to hold heavy load.



PROJECT DRAWING



CHAPTER 3

METHODOLOGY

INTRODUCTION

Methodology is a general research strategy that outlines the way in which research works and, among other things, identify the methods to be used in it. These methods, described in the methodology, determine the way or means of data collection or, sometimes, how certain decisions are calculated. The methodology does not specify a particular method, although much attention is given to the nature and nature of the process to be followed in a particular procedure or to achieve the goal.

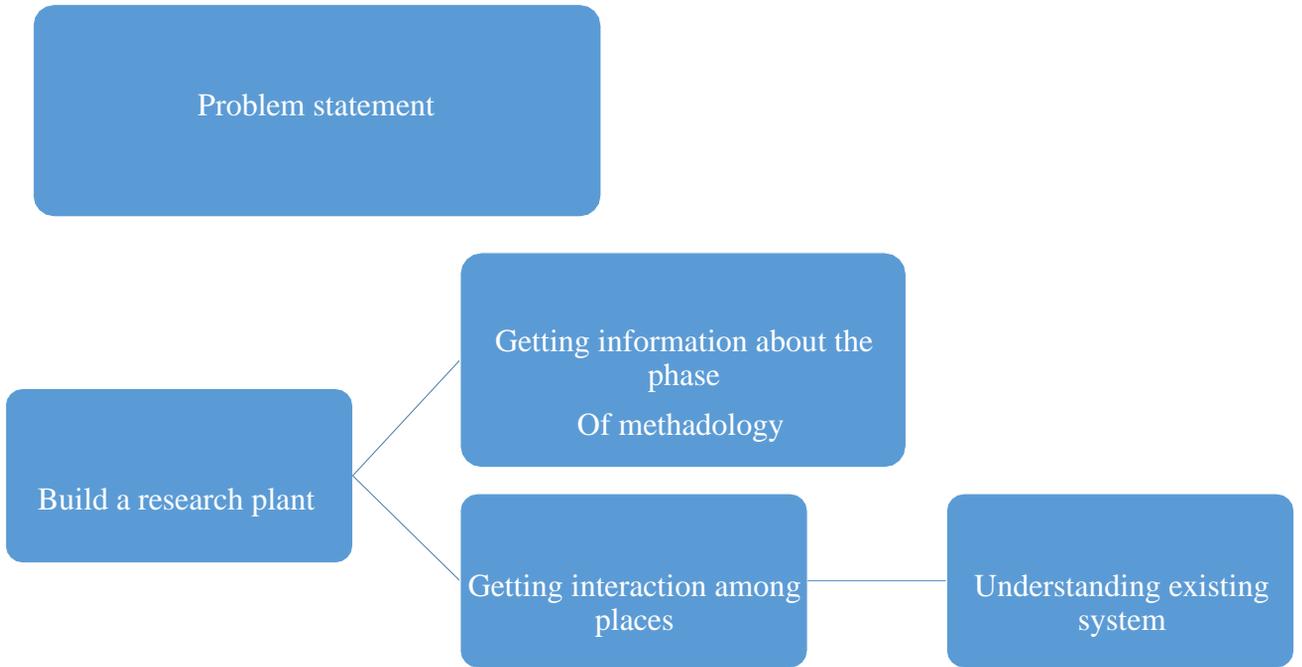
Any description of how the calculation of certain results is always an explanation of a method and has never been a description of the methodology. It is therefore important to avoid the use of the methodology as a synonym for method or body of methods. Doing it diverts it from the true epistemological meaning and reduces it to the procedure itself, or set of tools, or instruments that are supposed to be the result. Methodology is a design process for conducting research or development of procedures and not by itself an instrument, or method, or procedure for doing something.

Method are irreversible. However, in recent years there has been a tendency to use the methodology as "a pure substitute for the word method", Using a methodology as a synonym for method or set of methods leads to confusion and misinterpretation and weighing the proper analysis that should be done in planning.

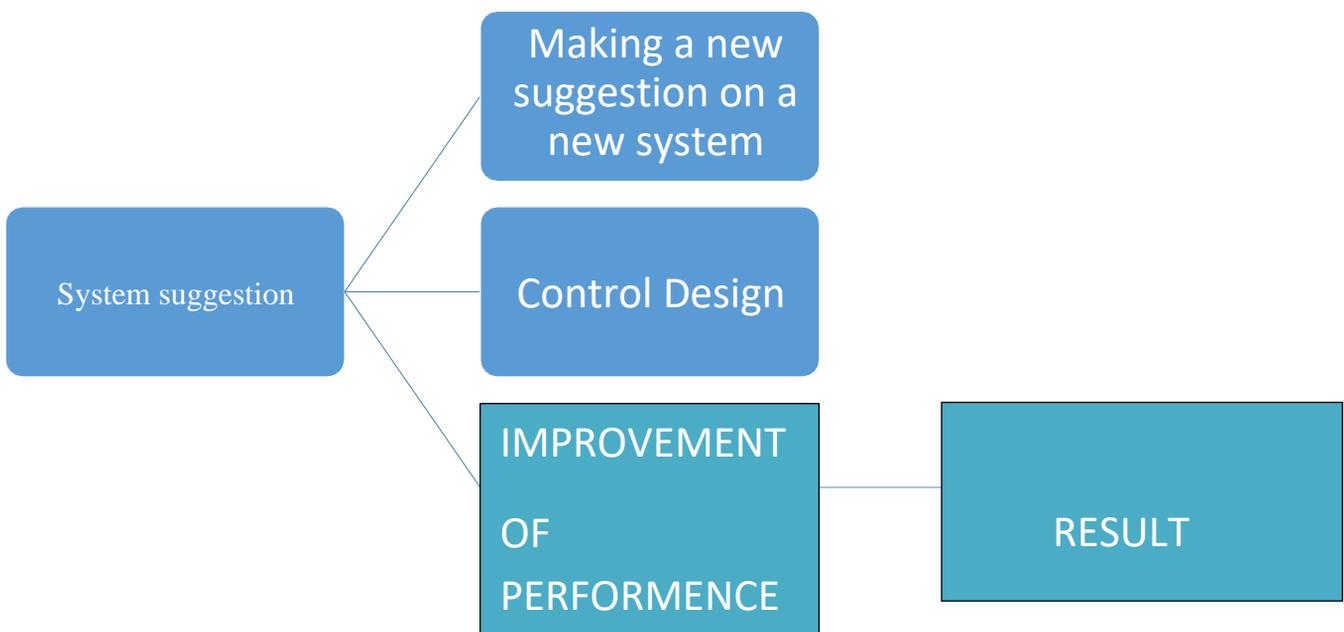
METHODOLOGY CHART

PHASES OF METHODOLOGY

Phase 1: Data Analysis



Phase 2: System Design



Phase 3:Implementation



DESIGN SELECTION

MATERIAL SELECTION

ALUMINIUM

-Aluminium is remarkable for its low density and its ability to resist corrosion through the phenomenon of passivation. Aluminium 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 aluminium.

-We prefer to use aluminium because aluminium is the lightest material. Aluminium is also capable of withstand high loads.

HOLLOW

-We prefer to use hollow because it is greater flexibility in use and higher strength to weight ratio than conventional section.

TROLLEY WHEEL

-We prefer to use roller because wheel can make our trolley easy to move and can decrease friction force between trolley and floor.

TYPE OF JOINT

- Bolt and Nut

-We prefer to use bolt and nut because bolt and nut easier inspection and easier to replacement the part. Bolt and nut also capable of withstand high load base on the size bolt and nat.

- Welding

-We use welding method because a large number of metal/alloys both similar and dissimilar can be joined by welding. Other general welding equipment is not very costly.

COSTING

No.	Material	Price/unit (RM)	Quantity	Total (RM)
1	Trolley wheel	10.00	2	20.00
2	Clamp	5.00	2	10.00
3	Aluminium	-	-	90.00
4	Bolt & nut	1.00	20	20.00
5	Hollow	15.00	4	60.00
Total				200.00

PRODUCT DESIGN



3.5 METHODS OF DATA COLLECTION

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

3.6 RESEARCH INSTRUMENTS

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

3.7 SAMPLING TECHNIQUES

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

3.8 METHODS OF DATA ANALYSIS

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

3.9 SUMMARY

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

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

FINDINGS AND ANALYSIS

4.1 INTRODUCTION

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

4.2 RESPONSE RATE

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

4.3 DEMOGRAPHY PROFILE OF RESPONDENT

Information from the survey results we conducted was made up of 48 respondents. About 80% of the respondents were women who were employed while 15% were full-time housewives and 5% were working contractors. Then most of the respondents had difficulty cleaning the ceiling fan which recorded up to 83.3%. In terms of cleanliness quality, more than half of the respondents, 62.5% were not satisfied with the cleanliness results when using other products. Furthermore, most respondents complained that they had allergies with as much as 75%. In addition, 89.6% of respondents prefer electronic fan cleaning tools because when they

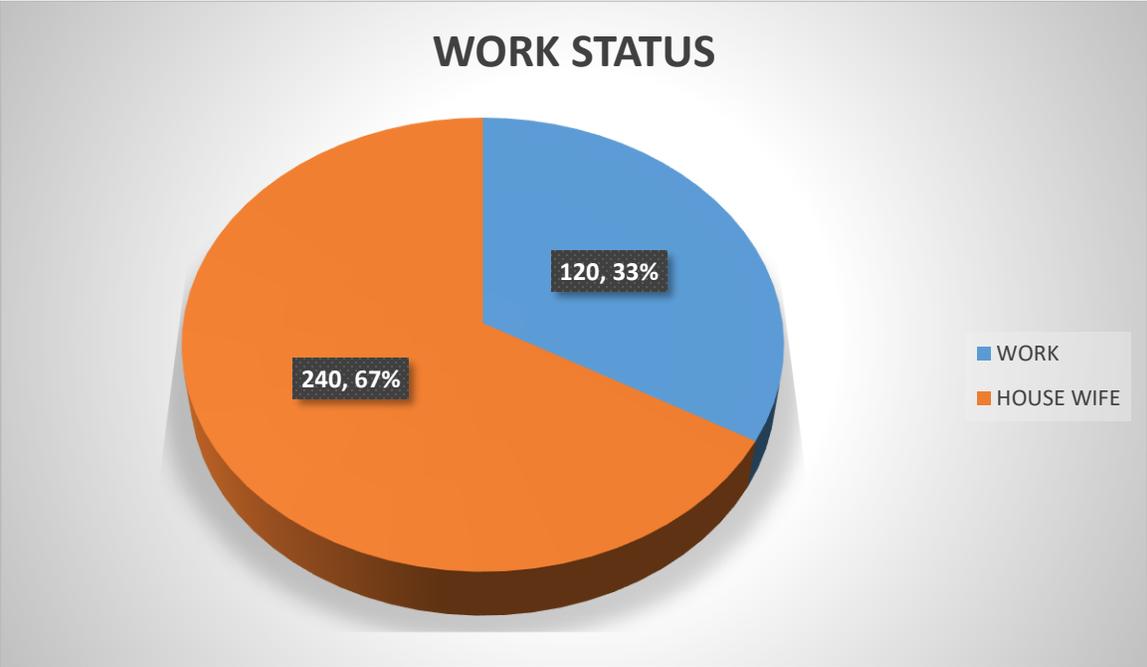
manually clean ceiling fans, it is very tiring. A total of 95.8% agreed to make electronic ceiling fan appliances. We get a good response when this product is being manufactured at a reasonable price as the percentage of buyers is 97.9%. For good clean, respondents gave us 91.7% confidence in the products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

4.4 RESEARCH FINDINGS

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

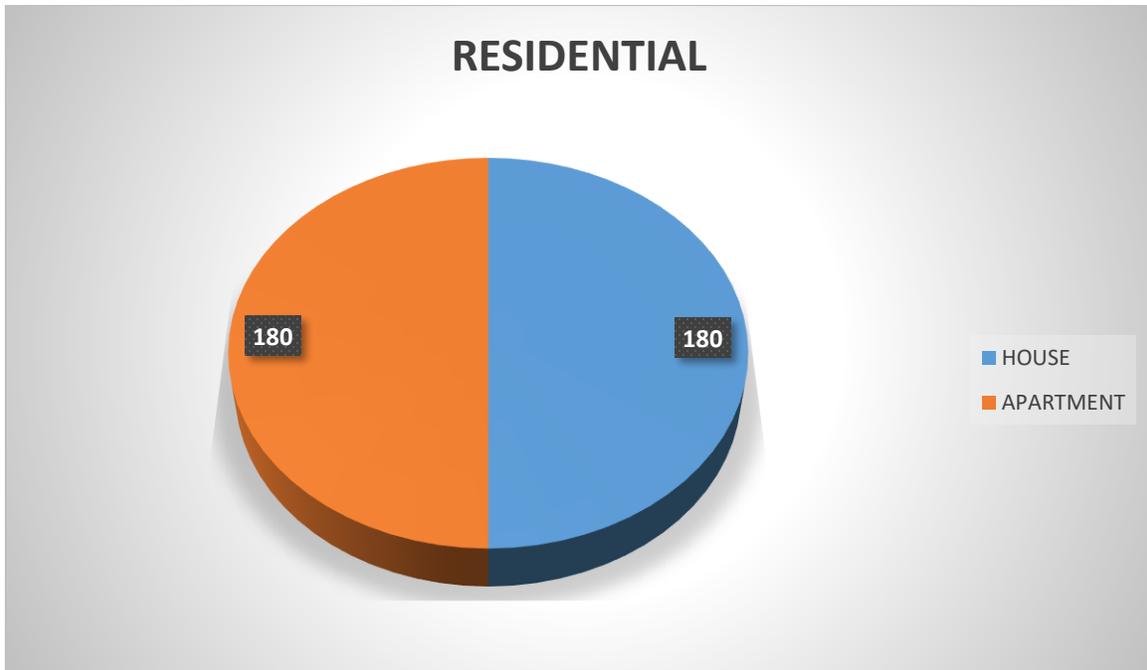
PROFILE DEMOGRPHY RESPONDEN

1) WORK STATUS



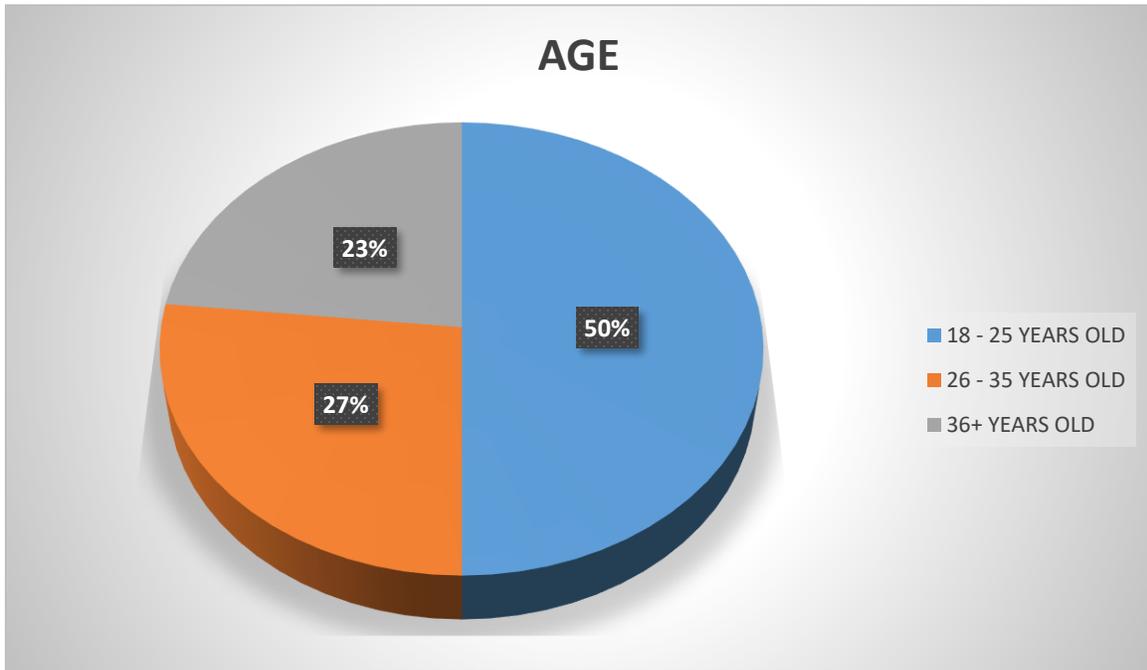
The pie chart above shows that 67% of housewives and 33% of individuals with work status answered the survey questions posed in the survey form. Based on the percentage on the pie chart, it shows that housewives are more interested in this "Gas Tank Trolley" than individuals with working status. This is because, housewives do more homework than individuals who work.

2) RESIDENTIAL



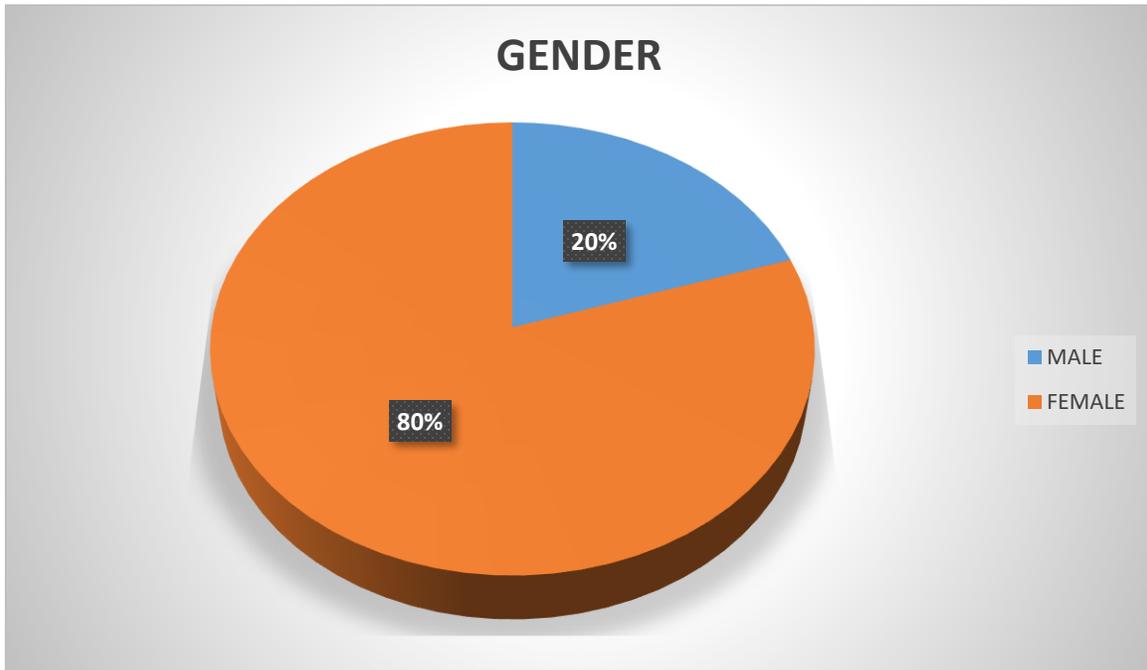
The pie chart above shows that 50% of individuals living in apartments and 50% of people living in ordinary homes such as terraced houses, bungalows and etc, answered the survey questions posed in the survey form. Based on the percentage on the pie chart, it shows that both homes have the same percentage. This means that both homes have similar interests and support the "Gas Tank Trolley" product.

3) AGE



The pie chart shows that 50% of people aged 18-25, 27% of people aged 26-35 and 23% of people 36 and older answered the survey questions posed in the survey form. Based on the percentage on the pie chart, it shows that individuals 18-25 years of age are more than others.

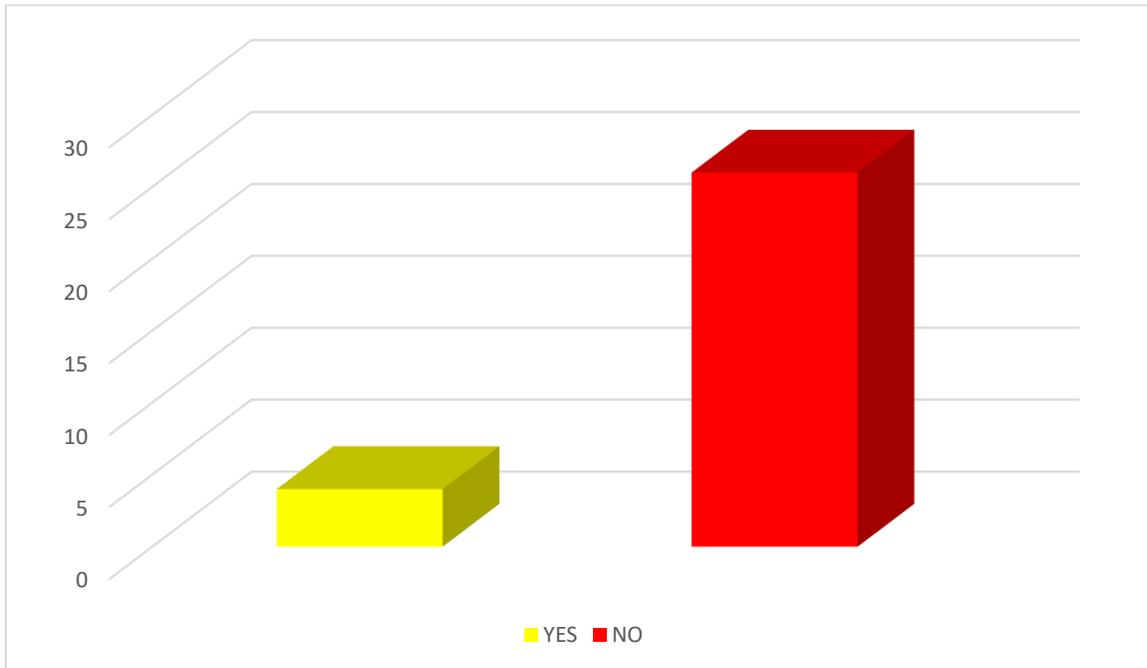
4) GENDER



The pie chart above shows that 80% of women and 20% of men have answered the survey questions posed in the survey form. Based on the percentage on the pie chart, it shows that female are more interested in this "Gas Tank Trolley" than men. This is because, female cannot do heavy work compared to male.

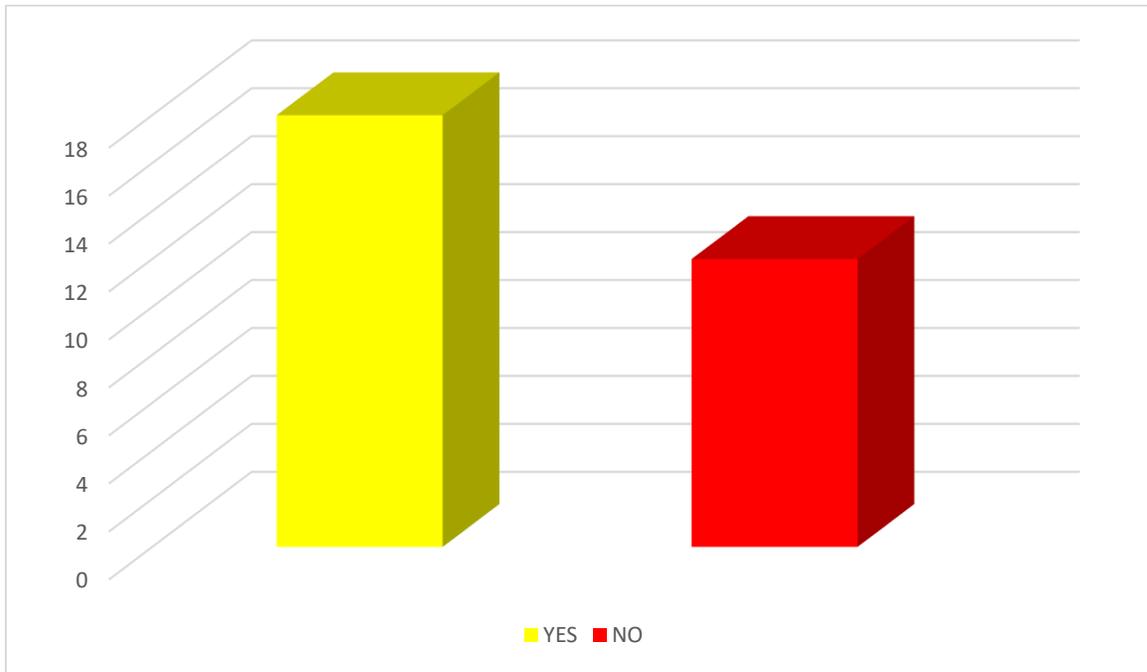
5) ANALYSIS BASED ON RESEARCH QUESTIONS :

LIFT THE GAS TANK USING THE TROLLEY



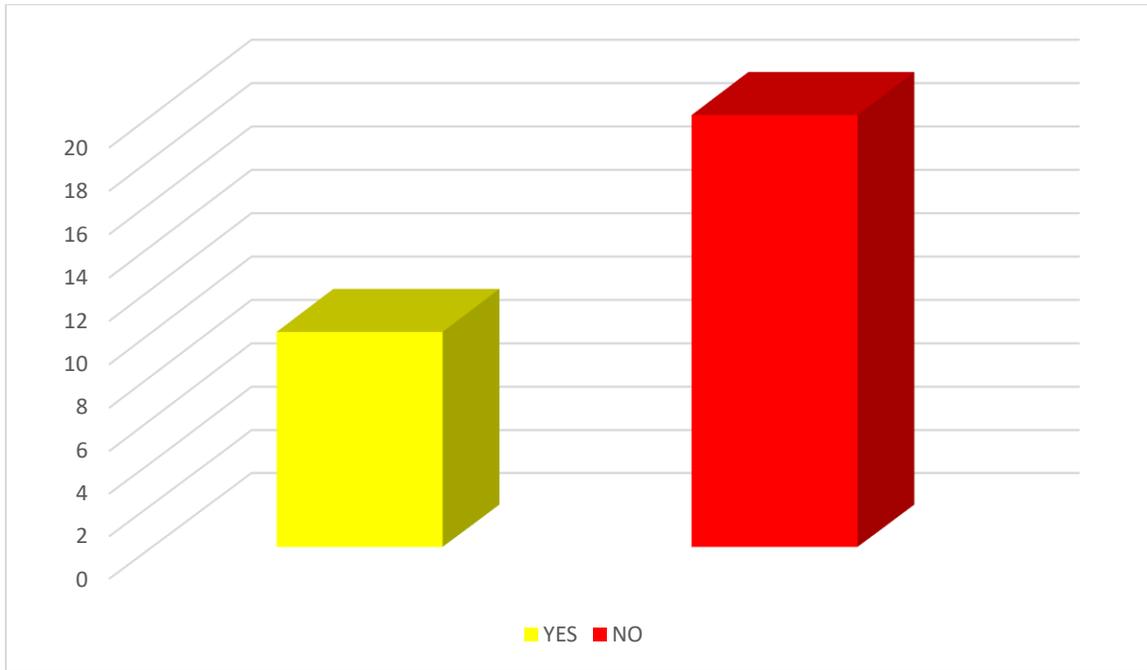
The graph above shows data analysis of the 'lift the gas tank using the trolley' question that was asked to 30 respondents. The graph states that 4 people answered YES who lift the gas tank use the trolley while 26 people answered NO who do not lift the gas tank use the trolley but only use their workforce. With this data available, this trolley project is possible because the main function of this trolley is to bring gas tank up the stairs easily, quickly and safely.

DELIVER THE ORDERED GAS TANK TO THE FRONT DOOR



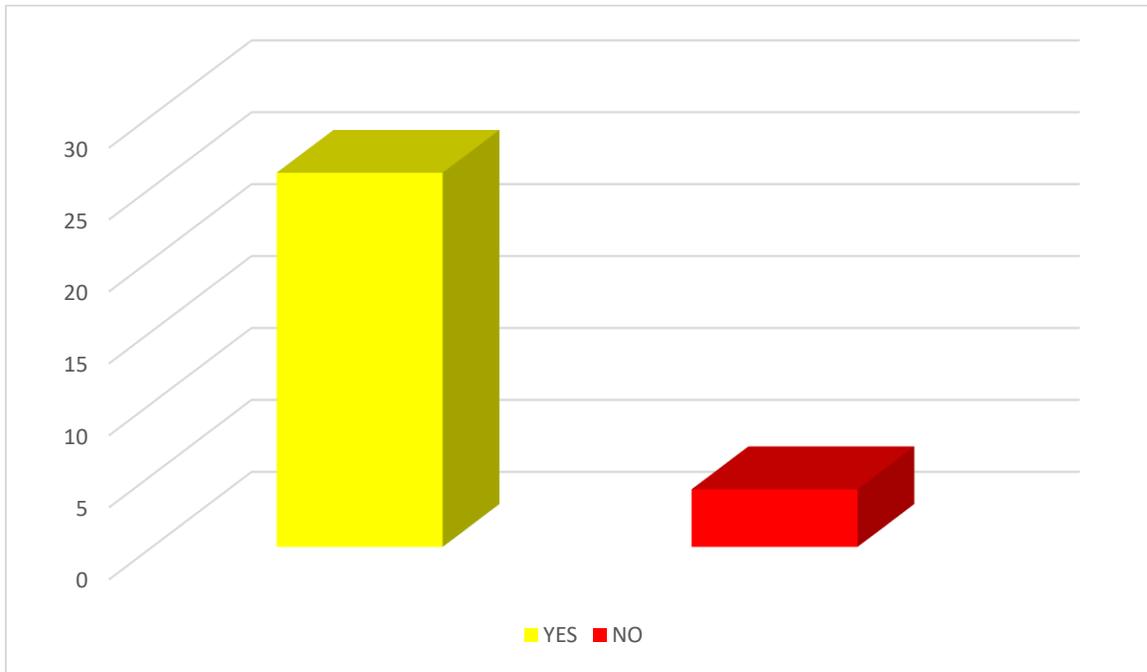
The graph above shows data analysis of the 'deliver the ordered gas tank to the front door' question that was asked to 30 respondents. The graph states that 18 people answered YES who ordered the gas tank to the front door while 12 answered NO who do not ordered the gas tank to the front door. With this data available, it has been proven that a gas tank is heavy for the housewives to lift and ask the gas tank shop worker to lift the gas tank to the front door.

LIFT THE GAS TANK UP THE STAIRS



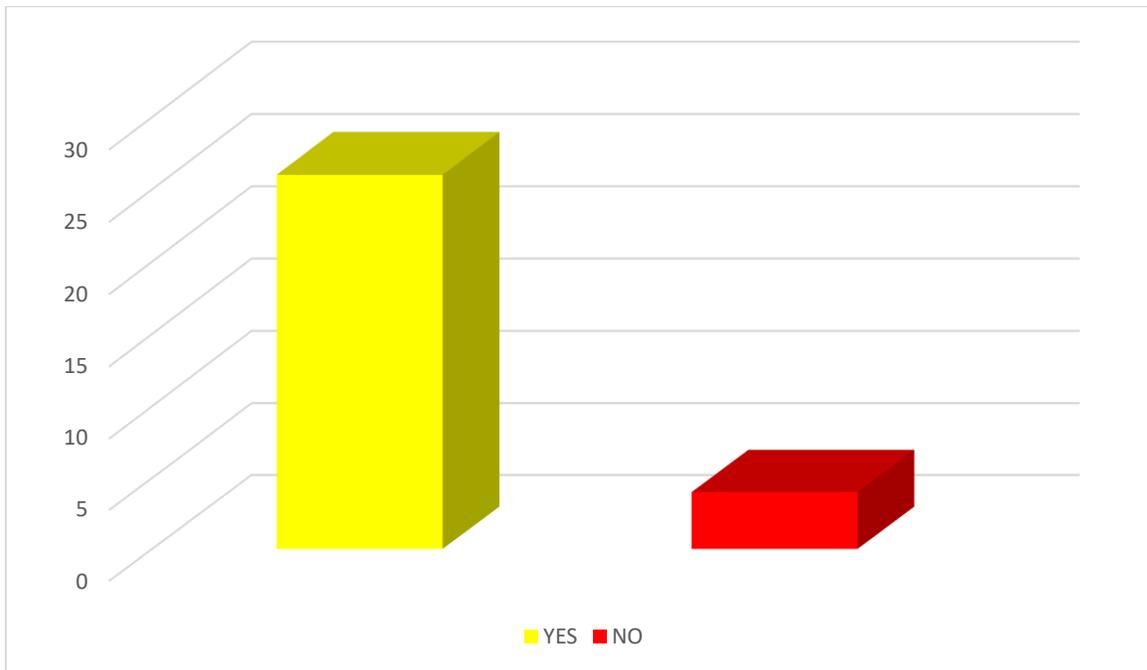
The graph above shows data analysis of the 'lift the gas tank up the stairs' question that was asked to 30 respondents. The graph states that 10 respondents answered YES who lift the gas tank up the stairs while 20 answered NO who did not lift the gas tank up the stairs. With this data available, there are a handful of housewives living in high-rise houses such as apartments that have to lift the gas tanks up the stairs.

GAS TANK IS TOO HEAVY TO BE LIFTED BY HOUSEWIVES



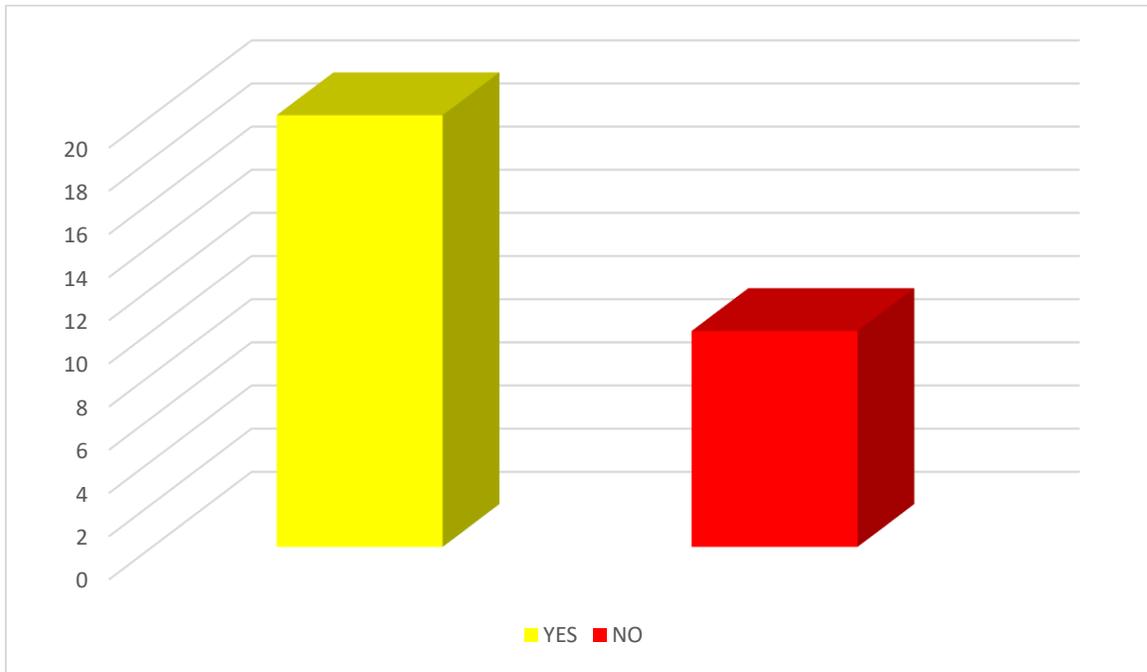
The graph above shows a data analysis of the question 'gas tank is too heavy to be lifted by housewives' asked 30 respondents. The graph states that 26 respondents answered yes that gas tanks are too heavy to be lifted by housewives while 4 respondents did not agree that gas tanks are too heavy to be lifted by housewives. With this data available, gas tank trolleys can be created to help housewives lift gas tanks without using their own workforces.

THE GAS TANK TROLLEY ON THE MARKET DOESN'T HAVE MUCH FUNCTIONALITY



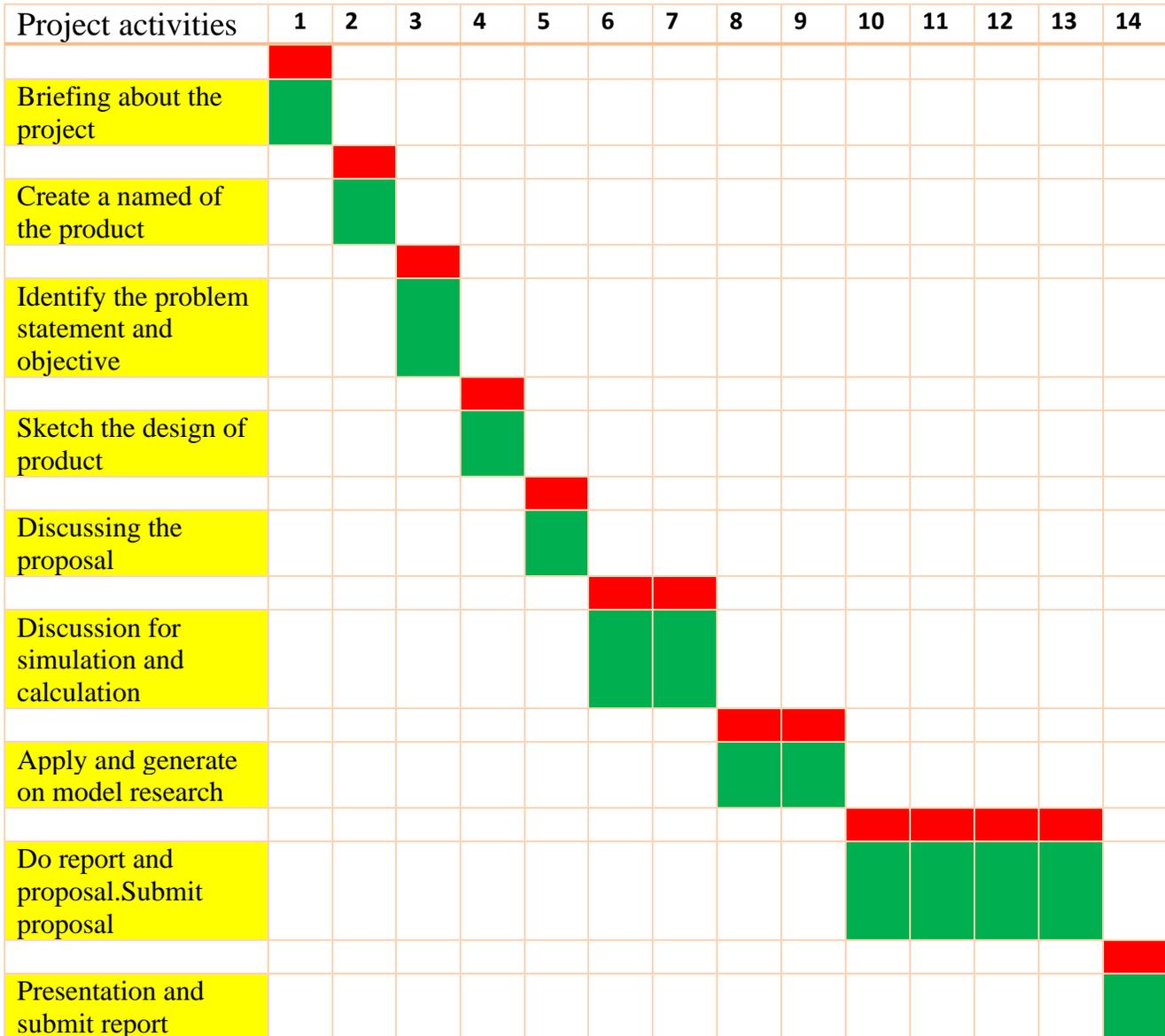
The graph above shows a data analysis of the question 'the gas tank trolley at the market doesn't have much functionality' asked 30 respondents. The graph states that 26 respondents answered yes that the gas tank trolley at the market doesn't have much functionality while 4 respondents did not agree that the gas tank trolley at the market doesn't have functionality. With this data available, gas tank trolleys can be created with many interesting and useful functions.

GAS TANK TROLLEY IS SOLD AT AN AFFORDABLE PRICE OF RM 200



The graph above shows a data analysis of the question 'gas tank trolley is sold at an affordable price of RM 200' asked 30 respondents. The graph states that 20 respondents answered yes that agree this gas tank trolley was sold at an affordable price of RM 200 while 4 respondents did not agree that this gas tank trolley was sold at an affordable price of RM 200. With this data available, gas tank trolleys can be sold at reasonable prices and in accordance with these multi-function products.

GANTT CHART



CHAPTER 5

5.1 INTRODUCTION

This chapter explains about discussion , conclusion and upgrade plan all together for the project . From the data from the test run of the project, the analysis have been done. Hence, the discussion from all the results of test run and analysis will be explain in this chapter. Then , the conclusion will be made based on the discussion and upgrade plan that have been made.

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

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

DISCUSSION

Based on the data we collected, we can agree to the fact that we need to increase the number of wheels from one wheel to three wheels on the trolley. This is because the process of using a trolley to up the stairs is very difficult. The process becomes difficult because the use of one wheel can only move the trolley on a flat surface, otherwise the use of one wheel can not be applied to the stairs. Therefore, it becomes very difficult to move the trolley to up the stairs and even increase the use of time and workforce because users also need to lift the trolley with the gas tank when up the stairs. However, if we add a few wheels to the three wheels that are joined together on the left and right of the trolley, the time required and the workforce used in the use of the trolley to up the stairs may be reduced.

This is because the use of many wheels can make it easier for us to use the trolley to up the stairs because each wheel will spin. For example, when the user uses the trolley to up the stairs, the first wheel will step on the first step followed by the second wheel which will step on the second step and so on with the third wheel. this process will be repeated until the trolley passes the stairs. The method used refers to an individual who up the stairs easily because he has a pair of legs that allow him to step on the stairs easily. The use of three wheels can also reduce the pressure on the wheels when the gas tank is on the trolley compared to using only one wheel.

Other than that, this trolley originally had a large base underneath. This also gives us problems when testing the trolley. The problem was, the original base was too heavy and made it difficult for us to move the trolley while up the stairs. To reduce the mass of the trolley, we decided to cut and remove the original base so that the mass of the trolley can be reduced and can save time and workforce when up the stairs. If the original base is not removed, the trolley will be heavier if there is a gas tank on the trolley while up the stairs and can reduce the attraction to the buyers.

Next, after the original base was cut and removed, the trolley became lighter and we also made new improvements to the trolley. The new improvement is that we added hooks made of hollow iron that have strong resistance to high pressures from loads. The hook is attached to the iron rod located in the middle of the trolley and the hook can be moved up and down and can be locked according to the suitability of the height of the gas tank. The function of the hook is to carry the gas tank by hooking the head of the gas tank. With this hook, the gas tank will be easier to carry up the stairs because the user only needs to adjust the hook and push the trolley towards the gas tank head and continue to hook the gas tank head. This method is not too complicated and not much work needs to do when using this trolley as well as time and workfoce can be reduced. This hook is easy, fast and safe for users to use.

Last but not least, the finish of our product can be highlighted by adding a bright colour that is orange. In this way, this trolley can provide a strong attraction to buyers because of its beautiful and charming colours and has an attractive innovation function. So, based on all these discussions been made , for future improvements , a lot of upgrades could be make to improve

the products quality and also to make the time taken and workforce uses of making the product decreases.

UPGRADE PLAN

In our project, we use aluminium for body part and handle. We found the aluminum it's not particularly strong and too expensive. So, we propose for aluminium replace to steel.

Then, at the trolley wheel, we found the tires not have tread wear indicator. This caused tire not have grip when trolley move. So, we propose tires at the trolley have the tread wear indicator. So that the trolley tires can grip the floor and trolley not easily fall.

In our project, at the handle part not have rubber tool handle. This caused at trolley handle ease to release. So, that we propose the part of handle have the rubber tool handle.

CONCLUSION

Through the completion of the project, it has given us useful thinking experience to be more creative and innovative. In completing this “gas tank trolley” project, it is able to generate students with the results of this project is expected to be a testament to our sincerity and knowledge in producing innovative products in the community. Safety function also very important in our project so it does not harm the user. We also facilitate use by creating ergonomic products. Based on the objectives previously presented, the conclusion of this project are very useful and easy to handle. In conclusion, we can differentiate existing stairs that make it easy and secure for users. This can be concluded the “gas tank trolley” project has achieved its objective. We hope that if this project is approved, we will produce products that will facilitate the daily lives of people in future.

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