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JACK & GO

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TITLE : JACK & GO

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APPRECIATION

ASSALAMUALAIKUM

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ABSTRACT

Nowadays, people are very busy with their work until they do not have time to inspect their car before using it or even doing the maintenance according to the schedule that have been set for them. This will lead to having a breakdown at any time. For example, when the car keeps moving, the tires will eventually start to get damage and at a certain time, it will break. When that happen, the car must be stopped on the side of the road to change the tire. In other case, there is also where flat tire happens when it got hit by sharp objects such as nails and steel. To continue the journey, the flat tire must be replaced with the spare tire. This where the problem begins, most people especially women and elderly do not know or even have the strength to operate the manual car jack. So for the main purpose of this project is to help those people by making the car jack more convenient to use for everybody. All the user need to do is just connect the electric to Jack & Go and it will automatically operate by itself which the electricity comes from the car battery using mini jumper to the jack. We also use 12V motor wiper, 0.4m square hollow steel and bearings to make the fluctuation movement. Therefore, it will pump the jack by itself. For now, Jack & Go only focus on light car such as sedan car.

ABSTRAK

Pada masa kini, orang ramai sibuk dengan kerja mereka sehingga mereka tidak mempunyai masa untuk memeriksa kereta mereka sebelum menggunakannya atau bahkan melakukan penyelenggaraan mengikut jadual yang telah ditetapkan untuk mereka. Ini akan membawa kepada kerosakan pada bila-bila masa. Sebagai contoh, apabila kereta terus bergerak, tayar akhirnya akan mendapat kerosakan dan pada masa tertentu, ia akan pecah. Apabila itu berlaku, kereta mesti dihentikan di tepi jalan untuk menukar tayar. Dalam kes lain, terdapat juga tempat tayar bocor berlaku apabila ia dilanda objek tajam seperti paku dan keluli. Untuk meneruskan perjalanan, tayar yang bocor itu mesti digantikan dengan tayar baru. Di mana masalahnya bermula, kebanyakan orang terutama wanita dan orang tua tidak tahu atau bahkan mempunyai kekuatan untuk mengendalikan jack kereta manual. Oleh itu, tujuan utama projek ini adalah untuk membantu orang-orang dengan membuat jack kereta lebih mudah digunakan untuk semua orang. Apa yang pengguna perlu lakukan hanya menyambungkan elektrik ke Jack & Go dan ia secara automatik akan mengendalikan dengan sendirinya dimana elektrik datang dari bateri kereta menggunakan jumper mini ke jack. Kami juga menggunakan wiper motor 12V, keluli berongga persegi 0.4m dan galas untuk membuat pergerakan turun naik. Oleh itu, ia akan mengepam bicu dengan sendirinya. Buat masa ini, Jack & Go hanya menumpukan pada kereta ringan seperti kereta sedan.

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CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

This chapter is discussed about the project background, problem statement, objective and project scope.

1.2 PROJECT MOTIVATION

An automobile trigger is a device used to lift all or part of the vehicle into the air to facilitate repair. Most people are familiar with the basic (manually operated) car jack that is still included as standard equipment with most new cars. Today, car bumps are an important tool in our vehicles due to unknown events such as tires on our way. Changing tires is not a very pleasant experience. In addition, the 'USMA' report on West Point's Women's Integration and Achievement in Proceedings (July 1998) revealed the sex-offender scheme in which women. A Navy study shows that only 12% of women can reach two stretchers, a critical requirement for boat safety. Women can drive a five-ton truck, but need men's help if they have to change tires. Women have a lighter frame which means that, among other things, they are not able to attract more energy as well as men and are at higher risk of skeletal injury. Usually the car accidentally tries to get a tire at the wrong times. Like an emergency, a business meeting or in the middle of the woods, for example. You won't be able to drive, so you'll need to remove and install your car spare tire in its place. This is a waste of time and will even harm you if you are dismantling and changing the tire in a hurry. Working near a vehicle supported by a car crash can be fatal. In Australia, over the past four years, at least 19 people have been crushed and killed by vehicles while working. All deaths are male and involve vehicles being pulled or backed up in the wrong way. Home mechanics are most at risk for this type of death or injury. In some cases, workers are killed when the vehicle is not affected by the shock and the vehicle is launched, or the structure used to support the vehicle fails. On average, 160 injuries are associated with car crashes each year. The injury has been around from cuts to broken bones and crushing injuries. Proper use of a jack can prevent death or injury. With spare parts installed, you should be able to reach your home or nearest service station. In addition, an organization called the American Lift Institute (ALI) was established to promote the improvement of automotive lift technology, especially in the field of safety. In the late 1990s, car manufacturers or jack manufacturers were allowed to declare that their products were safe even if they did not meet any standards. Thanks to ALI's partnership with the American National Institute of Standards, all jack and lifts must meet the set of standards to be ALI / ANSI certified. Improvements in automobile car brakes are essential to make this tool more efficient, user-friendly, practical to use, industry-leading changes and safety features. Further research of car jack is important.

1.3 RESEARCH BACKGROUND

In car repairs and maintenance (cars), it is often necessary to upgrade a car to change tires or access the car's bottom. In this regard, various types of car brakes have been developed to lift a car off the ground. Existing car drives, however, are usually manually operated and therefore require considerable physical effort on the part of the user. The package poses difficulties for older people, women and disabled people who are unlucky under adverse weather conditions and even at night. In addition, the jacks are usually large, heavy and may be difficult to store, transport, carry or move in the correct position under the car. In addition, due to the difficulty in installing and setting up the jack, it is usually not customizable to be disassembled and easily stored after the car repair has been completed. Let's say the car jack should be easy to use for pregnant women or anyone who has problems with tires everywhere. In view of such shortcomings, car repairs and commercial service stations are usually equipped with large and high-tech car lifts, where they are upgraded and lowered via electric power systems. However, due to the sheer size and high cost of purchasing and maintaining electric car elevators, they are not available to the average car owner. Engineering is about making things easier or better and more effective. The electric-powered portable bus not only eliminates the difficult task of lifting the car through a manually operated car, but it also reduces the time it takes to repair the car. Such features can be very useful when needed to repair a car on the side of the road or under other dangerous conditions. There have also been reports of car crashes resulting in a significant number of accidents. This is due to the lack of safety features on conventional car brakes. A jack is intended to hold up to 1000 pounds, but tests by Consumer Affairs have revealed that it fails to function after lifting 250 pounds and may physically break down when it weighs over 1000 pounds. Although no injuries have been reported so far, Ms Rankine has warned of the dangers associated with the use of non-heavy vehicle brakes that have been promoted to bear. Tests have shown that the jack has a tendency to roll well under the weight it promotes, and it does not meet the labeling requirements or performance of the Malaysian Standard for vehicle brakes.

Hydraulic batteries are mechanical devices used for lifting device to lift heavy loads or apply great power. A hydraulic mechanical machinery using a mechanism hydraulic power system in lifting weights equipment. The most common form is a car jack, floor jack or car repair workshop truck so maintenance can be done. Hydraulic screws are usually rated based on them Maximum lifting capacity may include: 1.5 ton, 3 ton, 20 ton or 30 ton. Remote controlled hydraulic batteries are a type of jack designed to control motor control and links mechanism and receiving and recording receiver circuits control signals for up and down jack hydraulic movement. Here works in a way that it can be used to lift weights The task truck is very smooth with no impact and even easy operation so that it is unskilled workers can use it easily. This is the era automation in which it is generally defined as replacement of manual effort with mechanical power at all levels. Mechanical automation remains on to be an integral part of the system as it comes with some

physical changes to the jack; degree mechanization is greatly improved. According to ezinearticles.com, the hydraulic origin Jack was dating a few years ago when Richard Dudgeon, owner and creator of hydraulic jack started a machine shop. In 1851, he granted a patent for its hydraulic jack. This year 1855, he excited the audience in New York when he drove from his place of residence to his place of work steam transport. It produces very strange sounds disturbing the horse and its use is limited to a single path. Richard claims that his creation has the power to bring about 10 people at a single barrel of anthracite coal at a speed of 14 m.p.h. Dudgeon deserves a special credit for being awesome creations including roller boiler tube mounts, filter jack press, jack pull, hydraulic weight plate punch holes and various types of lifting jacks. Hydraulic screws use fluid, which is non-compressible, which is forced into a cylinder by a pump plunger. Hydraulic oil is used because it is a lubricant and stable. When the plunger retracts, it withdraws the oil exit the reservoir through the inlet check valve pump room. As the plunger moves forward, it pushes oil through a one-way discharge valve cylinder. The suction valve ball is inside space and open with each plunger capture. The release valve ball is out of space and opens when the oil is pushed into the cylinder. Here shows the suction ball in the room to be forced valve and oil pressure built in cylinder. In another case, some hydraulic jack has a horizontal piston pushing the short end of the bell crank, with long sleeves that provide vertical movement to the lifting pad, stored horizontally with a horizontal connection. The combining castors and wheels allows it compensation from the arc taken by the lifting pad; Here mechanism provides low profile when collapsed, for Easy maneuvers under the current truck enabling a large extension. DC Motor coupled to hydraulic jack with gear arrangement with motor rotation determines the speed of lifting the hydraulic jack.

1.4 PROBLEM STATEMENT

Nowadays in this country, most of the cars were equipped with the hydraulic scissor jack. We found that the scissor jack was very difficult to be used because this types of jack needed more strength and energy to operate this jack by hydraulic. Thus, we want to develop a product based from the problem faced by the users who drive a car regarding to this issue. To overcome this problem, a research has been conducted to find the solution on how to design a hydraulic bottle jack for the car using the simplest and cheapest way while it is energy saved.

Hydraulic scissor jack present difficulties for the elderly, women and are especially. Disadvantageous under adverse weather conditions. Furthermore, require the operator to remain in prolonged bent or squatting position to operate the jack. Doing work in a bent or squatting position for a period of time is not ergonomic to human body. It will give back problem in due of time.

This is for the safety precaution in case if the screw broke. Furthermore, available jacks are typically large, heavy and also difficult to store, transport, carry or move into the proper position under an automobile. Suppose car jacks must be easy to use for pregnant women or whoever have problem with the tire in the middle of nowhere. The purpose of this project is to encounter these problems. A Smart Hydraulic Jack which has a frame type of design by using electric from the car lighter will be developed. Operator only needs to press the button from the controller without working in a bent or squatting position for a long period of time to change the tire.

1.5 RESEARCH OBJECTIVES

To meet the needs of the jack right now, some improvements should be made. The main object of this project is based on the problem statement:

- I. To make it convenient to use
- II. To conserve energy and save time
- III. To use a motor to make it the jack operate automatically

1.6 RESEARCH QUESTION

A research question is an answerable inquiry into a specific concern or issue. It is the initial step in a research project. The 'initial step' means after you have an idea of what you want to study, the research question is the first active step in the research project. A metaphor for a research project is a house. Your data collection forms the walls, and your hypothesis that guides your data collection is the foundation. So, what is the research question? It is the ground beneath the foundation. It is what everything in a research project is built on. Without a question, you can't have a hypothesis. Without the hypothesis, you won't know how to study what you are interested in. A research question forms the base of where you are going, so we have to write a good research question. If your foundation is built on something shifty, like a house built on sand, then everything following that will be about correcting that initial issue instead of on making an awesome home/research project.

1.7 PROJECT SCOPE

The scope of the Project is about planning and manufacturing of car jack. The type of car jack we use in this project is a hydraulic car jack because it is more reliable and easier to operate. To develop a new concept of car jack design, we conducted research by questioning the car users. The scope of the research is to design the maximum capacity of the car carrier jack by using the automated concept that connects to the car dashboard. To optimize human power, we have added the hydraulic jack with the motor wiper to lift quickly. In addition, we add control devices to control the fluctuation of the hydraulic jack. With this, the mechanical advantage of lifting can be reduced. In our design, we use the Inventor to draw detailed drawings for each of our product components. From our analysis, we will propose the best concept of car jack in terms of user friendly, cost-saving and time-consuming product development.

1.8 SIGNIFICANCE OF RESEARCH

The term significance when related to research has a very specific role. Significance refers to the level of certainty in the results of a study. We can say that our subjects differed by an average of ten points with 100% certainty because we personally witnessed this difference. To say that the population will differ is another story. To do this, we must determine how valid our results are based on a statistical degree of error. If we find, through the use of inferential statistics, that the grades of those with and without work experience are different we must state the estimated error involved in this inference. While the standard acceptable error is 5%, it can be as high as 20% or as low as 0.1%.

The amount of error to be accepted in any study must be determined prior to beginning the study. In other words, if we want to be 95% confident in our results, we set the significance level at .05 (or 5%). If we want to be 99% confident, our significance level is set at .01. We can then state that there is a difference in the population means at the 95% significance level or at the 99% significance level if our statistics support this statement. If our statistics estimate that there is 10% error and we said we would accept only 5%, the results of our study would be stated as 'not significant.' When determining significance, we are saying that a difference exists within our acceptable level of error and we must therefore reject the null hypothesis. When results are found to be not significant, the only option available is to accept the null hypothesis.

1.9 DEFINITION OF OPERATIONAL TERMS

An operational definition is the articulation of operationalization (or statement of procedures) used in defining the terms of a process (or set of validation tests) needed to determine the nature of an item or phenomenon (a variable, term, or object) and its properties such as duration, quantity, extension in space, chemical composition, etc. Since the degree of operationalization can vary itself, it can result in a more or less operational definition. The procedures included in definitions should be repeatable by anyone or at least by peers.

An example of operational definition of the term weight of an object, operationalized to a degree, would be the following: "weight is the numbers that appear when that object is placed on a weighing scale". According to it, the weight can be any of the numbers shown on the scale after and including the very moment the object is put on it. Clearly, the inclusion of the moment when one can start reading the numbers on the scale would make it more fully an operational definition. Nonetheless, it is still in contrast to those purely theoretical definitions.

1.10 SUMMARY

As conclusion, these are the problems that car user face and it is something that we need to overcome with the new technology that can be use easily when changing the flat tire on the side of a road. The objective for this project along with the importance of this project will allow the safest method that reduce energy and life risk even the scope of this project mainly focus on women and elderly. Thus, this new technology will be implemented as the long term use since it can be applied in any situation and condition.

CHAPTER 2
LITERATURE REVIEW
PREPARED BY: MUHAMMAD NAQIB BIN ZAINUL ABIDIN

2.1 INTRODUCTION

Basically, literature review identifies, evaluates, and synthesizes them literature in a particular field of research. It explains how knowledge has evolved in the field, highlighting what has been done, what is generally accepted, what's going on and what's your current state of mind on this topic.

In addition, in research-based texts such as Mechanical thesis, a literature The study identifies research gaps (i.e., unexplored or unexplored areas) and stating how specific research projects address this gap.

In this research paper, we have come up with the idea of Automatic Jacks for 4 wheels where beards are provided and can be easily assisted with the help of the switch on off button placed on the project. we use an easier-to-use moto wiper to solve the problems faced by older men and women who find this problem handy to handle the jack.

A mechanical jack is a device which lifts heavy equipment and vehicles so that maintenance can be carried out. A hydraulic jack is a device that uses a liquid to push against a piston. This is based on Pascal's Principle. The principle states that pressure in a closed container is the same at all points. If there are two cylinders connected, applying force to the smaller cylinder will result in the same amount of pressure in the larger cylinder. However, since the lager cylinder has more area, the resulting force will be greater. In other words, an increase in area leads to an increase in force. The greater the difference in size between the two cylinders, the greater the increase in the force will be. Many trends (screw or hydraulics) have gone down around the lifting applications in the automobile workshops.

2.2 LITERATURE REVIEW

Primitive techniques back in ancient Egyptian cultures used log rollers, greased logs, ropes, and droves of manual labor. Buoyancy in ships made of reeds and grass were loaded with sand to lower a boat in the water. Stones were rolled on, and then sand emptied out to make the boat float. Sand piles, and smaller stone wedges were used in conjunction with the physics of a Fulcrum, in order to use a stone's own weight to stand it upright (for pillars and columns). "Block and Tackle" was the next mechanical evolvement (use of pulleys) to lift objects. The advent of the industrial revolution which saw the major transition in the history of manufacturing and engineering processes nurtured the acquisition of great momentum in technological and economic advancement. For the first time in history, the living standards of the masses of ordinary people have begun to undergo sustained growth. Nothing remotely like the economical behavior has happened before. The first cranes are thought to have been developed by ancient Egyptian, Greek and Roman builders. Some think it was dated as far back as the 6th century (515BC). All of these cultures developed strong skills in construction - as evidenced by the buildings they created that still exist today. These early cranes would have used animal or man power to lift weight. Larger cranes would have a human-powered treadmill. Fast-forward to the medieval era, and technology in lifting equipment had not progressed, although cranes, hoists and other equipment were in limited use in warehouses and mills. As the industrial revolution progressed, technology improved. Whereas equipment had always been made largely of wood, stronger materials such as steel began to be used. There was also a move away from human powered devices, to those which harnessed new found technologies and fuels. Steam powered cranes for example, were introduced, especially for work on railways. Progress was slow though: cranes powered by treadmill and hand winches continued to be used throughout the nineteenth century and beyond. Today, technology has developed to cover an incredibly wide range of uses, and it takes many different forms. There is a piece of lifting equipment for pretty much any job, and a wide range of different kinds of equipment to meet varying needs. Among the most common pieces of lifting equipment available are crane, jack, lever, lift, hydraulic ram, block and tackle, wedge, forklift, and escalator. It's therefore obvious that Lifting technology really didn't emerge until the start of the Industrial Revolution in approximately 1812. Incremental stages that increased productivity were Steam Engines, followed by the Combustion Engine, followed by Hydraulics and Electrical Motors, and now magnetic levitation is a science incorporated into the newest high-speed trains.

The literature background behind the inbuilt hydraulic jack system is that the most case study has done on the automatic hydraulic jack to making easily operated repaired the damaged and punctured and dissolution conditions of the wheel of the car for to change .if we consider a

problem which is mostly happens in our daily life, while a disabled person ,women and old person is driving a car, immediately car's tire gets punctured and it also gets breakdown conditions then these all are unable to change the tire of the care with the help of mechanically jacks and conventionally jacks, in this condition the inbuilt hydraulic jack system helps them, pressing the button on the control board of the car then respectively the wheel will lift up from the earth ground which one pressed by them. Now we can change the punctured and solve the breakdown conditions. Now a day if we will see that every person wants to very high comforts for their body. It shows that either increasing levels of technology efforts being put to increase the comfort and safety. Dr. Ramachandra C G, Krishna Pavana in his projects aid that main intention is to reduce the manual work and save time during the replacement of the failed tire. To validate our point to overcome the difficulties of the above said problems, inbuilt jacks have been designed and fabricated which is assembled on the vehicle. With the help of the existing brake pad and fluid arrangement of the braking system we incorporate the jack into to chassis of the vehicle with a set of unions, ball valves, master cylinder, five ways directional control valve, separated by a piping arrangements lifts the incorporated jack to action desired without raising any sweat of the driver.

2.3 RESEARCH BACKGROUND

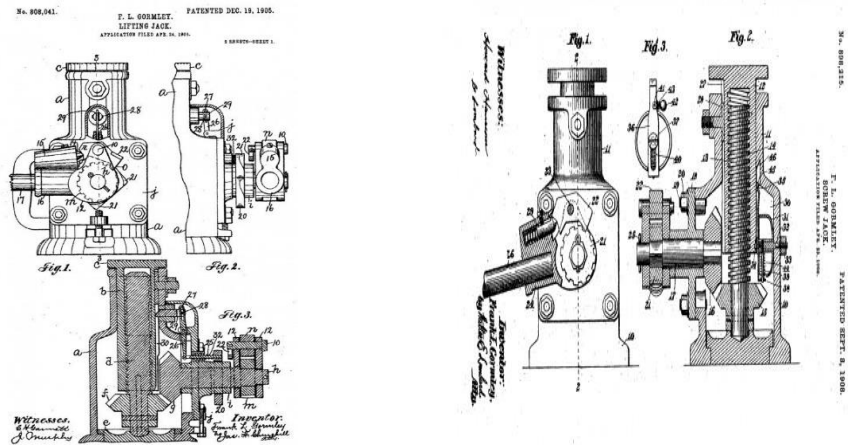


Figure 2.3.1: First Invention

According to Mr. Gormley was the person who invented the jack. He was working at the BUDA Co. located outside Chicago, in Harvey, Illinois, when he does the invention. BUDA Foundry and Manufacturing company supplied the nation's railroads with special track-work and the jacks, drills, scales, levels and signals needed to maintain the right-of-way. The company also had a reputation for building durable velocipedes, hand cars and push cars for line-crews. Mr. Gormley was to discover, or invent, ways in which these materials could be moved, lifted and transported at optimum ability. In 1905, Mr. Gormley was 24 years old when he started the invention and it was The Lifting Jack. This was an incredible invention because it is capable of lifting thousands of pounds (tons) of weight. Mr. Gormley offered a prototype to demonstrate the ability of his invention. The prototype is merely 4" tall, yet it can raise 1,000 lbs by itself. That is 1/2 a ton lifted by an object smaller than your hand.

2.4 CAR JACK IN NOWADAYS

1. Scissor jack (Basic car jack)



Figure 2.4.1: Scissor Jack

When Jack LaFrance submitted his design for a diamond-shaped jack on February 24, 1920, it was in Montreal, Quebec. That's right, he was Canadian. His patent is the oldest one in Google Patents under the name "scissor jack". The timeline and his name lend themselves to the credibility of the research. Plus, the picture looks like your basic scissor jack. There is a base, and a platform, connected by two legs which bend at the knees in opposite directions. Through those knees, the spindle travels to raise or lower the platform, presumably under one's car.

LaFrance may have beaten the trail of inventors to the basic concept, but putting one in every car didn't happen right away. Further refinements, like the 1949 version from Wilbur Jackson would make the jack more collapsible so it could stow with ease. By best estimates, screw jacks made it into cars by the 1970s, but they may have made appearances elsewhere before that. If your car had a jack before that, it was bumper jack, a ratcheted dangerous design that can hang its hat on countless injuries and deaths. Had I any idea the complexity of the history behind jacks, I would have never suggested this pitch to my editor. Don't even get me started on the hydraulic jack. That's an even bigger mess, with claims made by different inventors, one we'll save for another blog. No doubt, given the choice, give me a hydraulic lift anyway.

The scissor jack is an adaptation of the screw jack. A screw is a ramp wrapped around a post. Ramps are one sort of simple machine. The screw jack works with the screw shaft situated vertically. Placed under a heavy object, the object lifts when the operator turns a crank connected via sprockets and such to turn the screw shaft one thread at a time.

2. Bottle jack



Figure 2.4.2: Bottle Jack

The origin of hydraulic jacks can be dated several years ago when Richard Dudgeon, the owner and inventor of hydraulic jacks, started a machine shop. In the year 1851, he was granted a patent for his hydraulic jack. In the year 1855, he literally amazed onlookers in New York when he drove from his abode to his place of work in a steam carriage. It produced a very weird noise that disturbed the horses and so its usage was limited to a single street. Richard made a claim that his invention had the power to carry near about 10 people on a single barrel of anthracite coal at a speed of 14 m.p.h. Dudgeon deserves a special credit for his innumerable inventions including the roller boiler tube expanders, filter press jacks, pulling jacks, heavy plate hydraulic hole punches and various kinds of lifting jacks.

A hydraulic jack uses a liquid, which is incompressible, that is forced into a cylinder by a pump plunger. Oil is used since it is self-lubricating and stable. When the plunger pulls back. It draws oil out of the reservoir through a suction check valve into the pump chamber. When the plunger moves forward, it pushes the oil through a discharge check valve into the cylinder. The suction valve ball is within the chamber and opens with each draw of the plunger. The discharge valve ball is outside the chamber and opens when the oil is pushed into the cylinder. At this point, the suction ball within the chamber is forced shut and oil pressure builds in the cylinder.

3. Floor Jack



Figure 2.4.3: Floor Jack

Unlike bottle jack shafts, the shaft in a floor jack is horizontal. The shaft pushes on a crank that connects to a lifting pad, which is then lifted horizontally. Floor jacks typically provide a greater range of vertical lift than bottle jacks, and are available in two sizes. The original jack is about four feet long, a foot wide, and weights around 200 pounds. They can lift 4-10 tons. A more compact model was later made, which is about three feet in length, and can lift 1 1/2 tons.

The invention relates to a hydraulic floor jack. The inventor of the present invention is fully involved with lifting devices, particularly including a two-part system. The two parts

system is inherently safer to use than a conventional floor jack to elevate a vehicle and which then requires the user to crawl under the vehicle to place a conventional jack stand adjacent to the elevated conventional floor jack to support the load. The inventor of the present invention is a pioneer of the two parts jacking system and holds numerous patents related to this technology.

Briefly, the two parts jacking system consists of a mobile hydraulic power unit having a flat front base and extendable lift arms; and a separate mechanical jack stand that can be secured within the front base of the power unit. The jack stand is elevated by extending the lift arms of the power unit, and locked by an integral ratchet locking mechanism.

4. High-Lift Jack



Figure 2.4.4: High-Lift Jack

With over 100 years of quality, the Hi-Lift Jack is a rugged, highly versatile jack that puts you in command of situations requiring lifting, pushing, pulling, winching, and clamping. Although light in weight and easy to maneuver, the Hi-Lift Jack offers a rated capacity of 4,660 lbs (2114 kg) and a tested capacity of 7,000 lbs (3175 kg). Only Hi-Lift Jacks are made with a two-piece handle and socket design that is built for extended life. Cheaper imitations use a one-piece design that bends easily if lateral pressure is applied while lifting a load.

They're very tall, but they're slender, so it's not that hard to find room for a high-lift jack in your vehicle (or even strapped to the outside). They have a small footplate, so they can be unsteady. Also, there is the potential for serious injury from failing to control the handle when the jack is carrying a load.





5. Pneumatic Jack

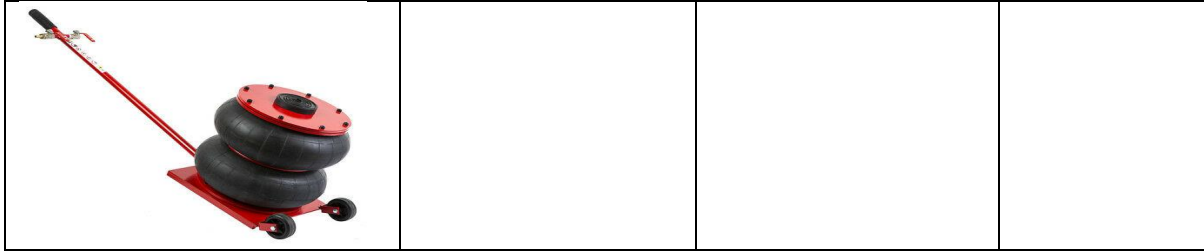


Figure 2.4.5: Pneumatic Jack

A new type of lifting device that uses compressed gas as power, liquid pressurization and telescopic pneumatic cylinder. It has the characteristics of exquisite design, small size, light weight, easy operation, time saving, labor saving, and large tonnage. It is widely used for mobility lifting, especially for the repair industry of transportation industry such as automobiles and tractors.

It uses compressed air as the power to drive the air pump to work, pumping the high-pressure oil into the pneumatic jack, so that the jack can be lifted to achieve the purpose of lifting. The pneumatic jack is lifted and lowered by controlling the oil return valve. The mechanism is divided into five parts: air pressure jack, air pump, wheel frame, pneumatic control and traction. The pneumatic jack part and the air pump part are of split structure. The valve plate is connected by single air pipe bolt type, the upper handle tube of the traction part and the lower part. The stem tube is detachable. It has the characteristics of exquisite design, small size, light weight, easy operation, time saving, labor saving, large lifting tonnage, etc. It is widely used for mobility lifting, especially suitable for the repair industry of transportation industry such as automobile and tractor.

Type	Advantage	Disadvantage	System
<p data-bbox="201 333 350 363">Screw Jack</p> 	<p data-bbox="594 333 829 510">That is large load carrying capacity, compact construction and simple to design.</p>	<p data-bbox="889 333 1154 510">The power screw have very poor efficiency and high friction causes rapid wear of thread.</p>	<p data-bbox="1190 333 1276 363">Screw</p>
<p data-bbox="201 638 350 667">Bottle Jack</p> 	<p data-bbox="594 638 857 814">Hydraulic system include power, accuracy, efficiency and ease maintenance.</p>	<p data-bbox="889 638 1154 848">It can leak, which makes them messy, and the fluids inside them are often caustic to paint and some seals.</p>	<p data-bbox="1190 638 1325 667">Hydraulic</p>
<p data-bbox="201 963 342 993">Floor Jack</p> 	<p data-bbox="594 963 829 1182">Most for effective for high load capacity requirement, that's why this is highly used for freight.</p>	<p data-bbox="889 963 1154 1140">Heavy and hard to carry. The size is big and heavy which will make it hard to move around.</p>	<p data-bbox="1190 963 1325 993">Hydraulic</p>
<p data-bbox="201 1257 391 1287">High-Lift Jack</p> 	<p data-bbox="594 1257 862 1476">They're very tall, but they're slender, so it's not that hard to find room for a high-lift jack in your vehicle.</p>	<p data-bbox="889 1257 1154 1362">They have a small footplate, so they can be unsteady.</p>	<p data-bbox="1190 1257 1341 1287">Mechanical</p>
<p data-bbox="201 1688 407 1717">Pneumatic Jack</p>	<p data-bbox="594 1688 829 1822">Convenient to use and fast for lifting vehicle for maintenance.</p>	<p data-bbox="889 1688 1138 1833">It need compressed air to lift which is hard to bring anywhere.</p>	<p data-bbox="1190 1688 1243 1717">Air</p>



2.5 FINAL RESERCH

PREPARED BY: NURUL FAKHIRA BINTI MUSTAFF KAMARUZZAMAN

2.6 THEORY

The JACK & GO mechanism is to get the beard down and up by using a motor wiper. Motor wiper there will be three gears, and one will use only one high speed.

Motor and hydraulic jack movements are conceptual of the movement of old train tires, when the motor rotates with high speed, the gear rotates and transmits the motion at the jack.



Many components should be used, such as:

- Motor
- Bearing.
- Power supply.
- Push Button remote.
- LED light.

MOTOR

An electric motor is an electric machine that converts electrical energy into mechanical energy. In normal motoring mode, most electric motors operate through the interaction between an electric motor's magnetic field and winding currents to generate force within the motor. In certain applications, such as in the transportation industry with traction motors, electric motors can operate in both motoring and generating or braking modes to also produce electrical energy from mechanical energy. Electric motors can be powered by direct current (DC) sources, such as from batteries, motor vehicles or rectifiers, or by alternating current (AC) sources, such as from the power grid, inverters or generators.

BEARING

The purpose of a bearing is to support a load while permitting relative motion between two elements of a machine. The most common type of bearing supports a rotating shaft, resisting purely radial loads or a combination of radial and axial (thrust) loads. Some bearings are designed to carry only thrust loads. Most bearings are used in applications involving rotation, but some are used in linear motion applications.

The ball and roller bearings consist of an inner race which is mounted on the shaft or journal and an outer race which is carried by the housing or casing. In between the inner and outer race, there are balls or rollers.

A number of balls or rollers are used and these are held at proper distances by retainers so that they do not touch each other. The retainers are thin strips and is usually in two parts which are assembled after the balls have been properly spaced. The ball bearings are used for light loads and the roller bearings are used for heavier loads.

POWER SUPPLY

A DC power supply is one that supplies a constant DC voltage to its load. Depending on its design, a DC power supply may be powered from a DC source or from an [AC](#) source such as the power mains

DC power supplies use AC mains electricity as an energy source. Such power supplies will employ a transformer to convert the input voltage to a higher or lower AC voltage. A rectifier is used to convert the transformer output voltage to a varying DC voltage, which in turn is passed through an electronic filter to convert it to an unregulated DC voltage.

PUSH BUTTON

A push-button is a simple switch mechanism for controlling some aspect of a machine or a process. Buttons are typically made out of hard material, usually plastic or metal. The surface is usually flat or shaped to accommodate the human finger or hand, so as to be easily depressed or pushed. Buttons are most often biased switches, though even many un-biased buttons (due to their physical nature) require a spring to return to their un-pushed state. Pushbuttons are often color-coded to associate them with their function so that the operator will not push the wrong button in error. Commonly used colors are red for stopping the machine or process and green for starting the machine or process. Switches with the "push-to-make" mechanism are a type of push button electrical switch that operates by the switch making contact with the electronic system when the button is pressed and breaks the current process when the button is released.

LED LIGHT

A light-emitting diode (LED) is a semiconductor light source that emits light when current flows through it. Electrons in the semiconductor recombine with electron holes, releasing energy in the form of photons. The color of the light is determined by the energy required for electrons to cross the band gap of the semiconductor. White light is obtained by using multiple semiconductors or a layer of light-emitting phosphor on the semiconductor device.

General requirement of inbuilt hydraulic jack system

We know that mechanical and screw jacks are needed more than they are built on built-in hydraulic jacks, and hydraulics do not require human effort and less energy use. The built-in hydraulic jack system can be operated by remote control. This technique is very useful for women and the elderly people. Because all of this cannot operate the mechanical jack manually. Jack has Hydraulic built-in less number of moving parts than mechanical jack. That's why it has low maintenance. Can't lift many tons of load. Built-in hydraulic systems have good features available to suit uneven surface. Built-in hydraulics is an automatic system that provides comfort, the hydraulic also uses LED lamps that are used to operate the tires at night and can also make these emergency lamps a handy, convenient and high quality tool for women and the elderly. This is why mechanical jacking operations are performed automatically without manual effort. In other words, it can be operated from within the vehicle by means of the control panel anywhere. It has a low chance of failure.

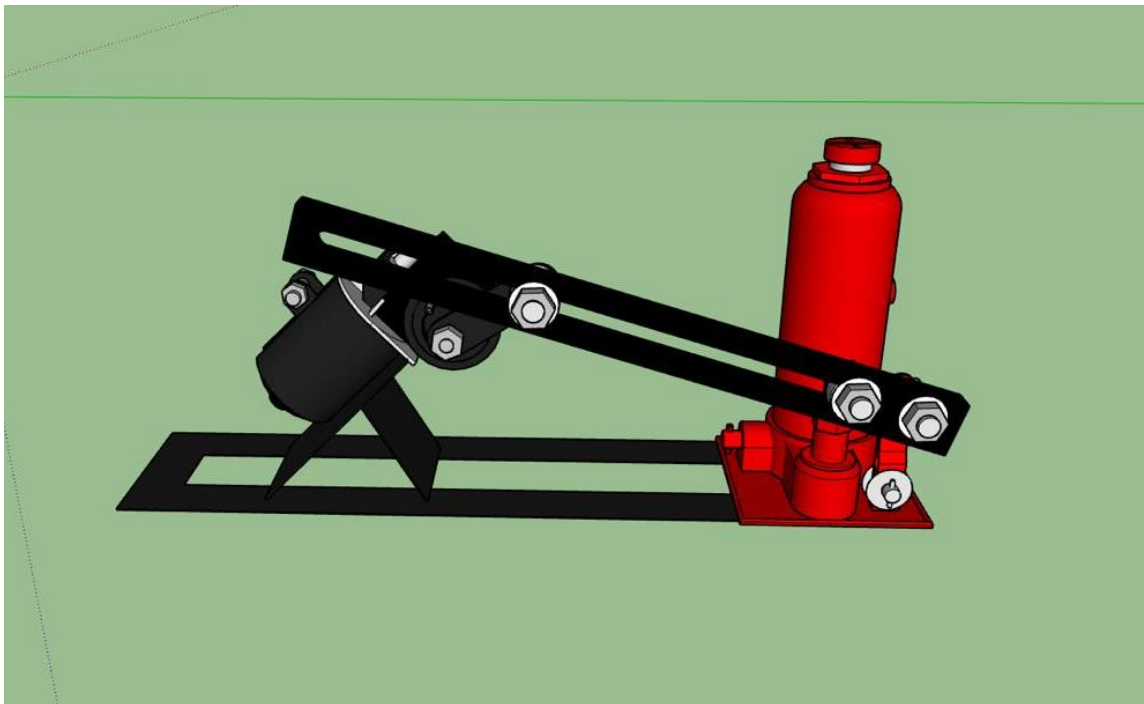


Figure 2.6.1: Jack & Go system

2.7 SUMMARY

As conclusion, this data and information allow to choose the best way of making Jack & Go that depending on size, power and so on. This also can be used to know the best sizing and other things in making a jack that can easily left a car. With all the comparison, we can create a better version of car jack to make it more helpful and convenient for the people who are having trouble operating the jack.

CHAPTER 3

METHODOLOGY

PREPARED BY: MUHAMMAD NAQIB BIN ZAINUL ABIDIN

3.1 INTRODUCTION

Research Methodology is a process used to collect information and data for the purpose of making business decisions. The methodology may include publication research, interviews, surveys and other research techniques, and could include both present and historical information. Before starting a project, some researches must be done. Methodology is the way of searching or solving the research problem. By doing survey on random people, various data can be collected and analyzed. From the data, it is easier to know and focus on the specific problems.

There are two types of data and that are primary and secondary. Primary data is a type of data which never existed before, hence it was not previously published. Primary data is collected for a specific purpose. Secondary data, on the other hand, refers to a type of data that has been previously published in journals, magazines, newspapers, books, online portals and other sources.

3.2 RESEARCH DESIGN

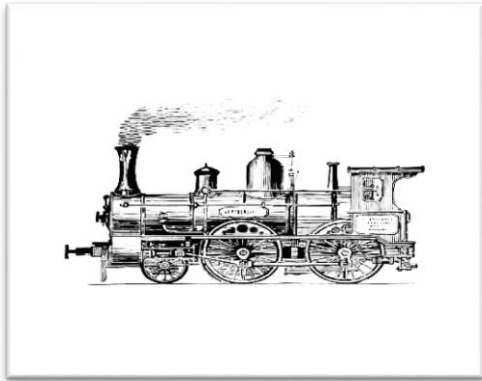


Figure 3.1.1: Old train

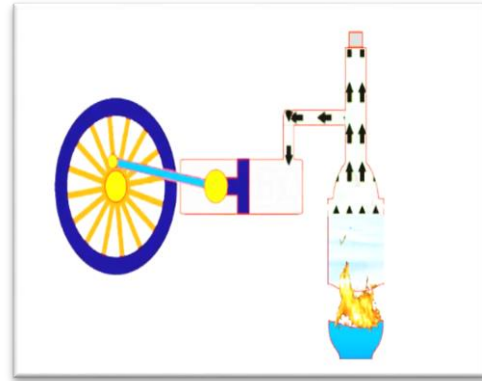
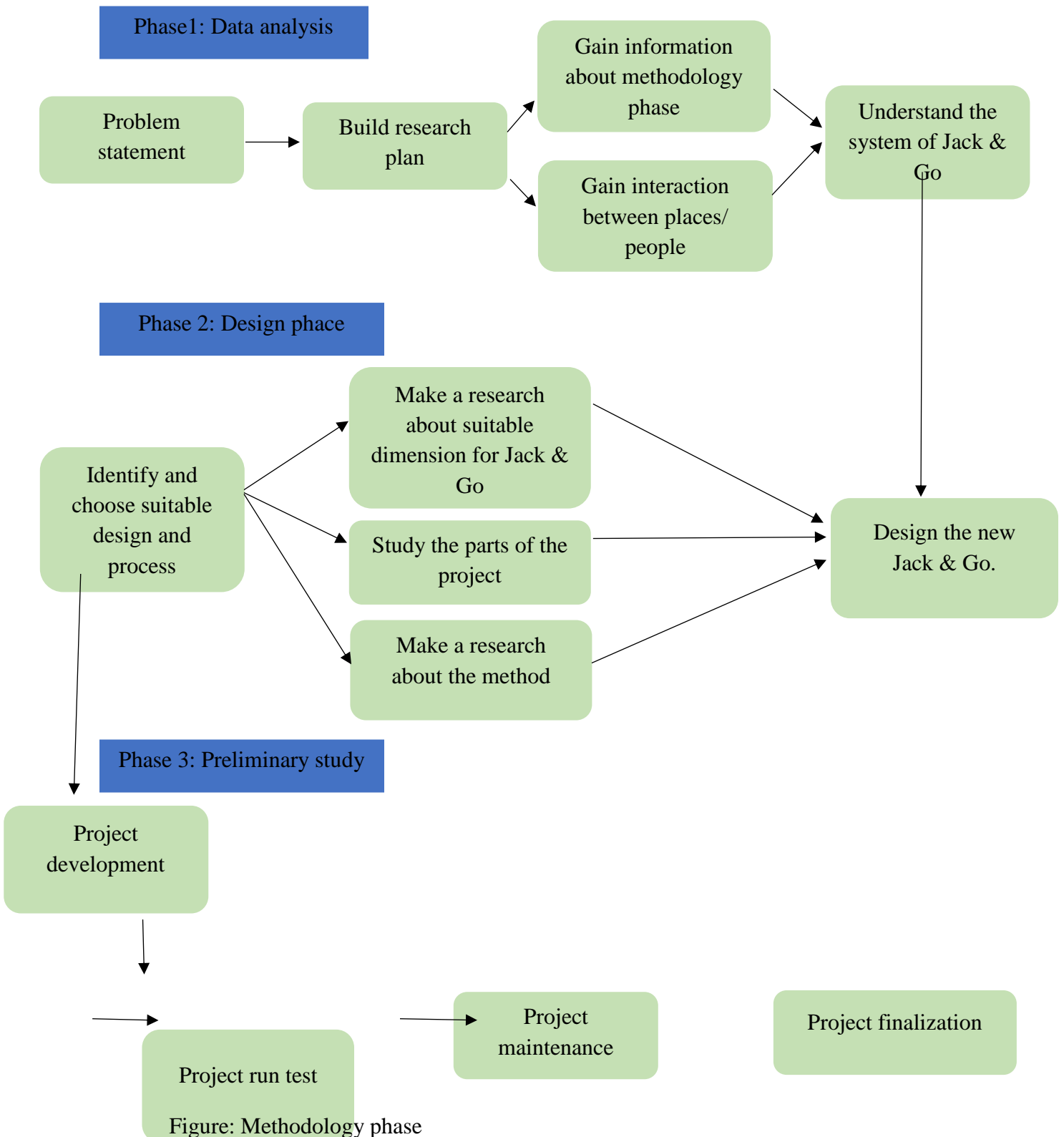


Figure 3.1.2: Rankine cycle

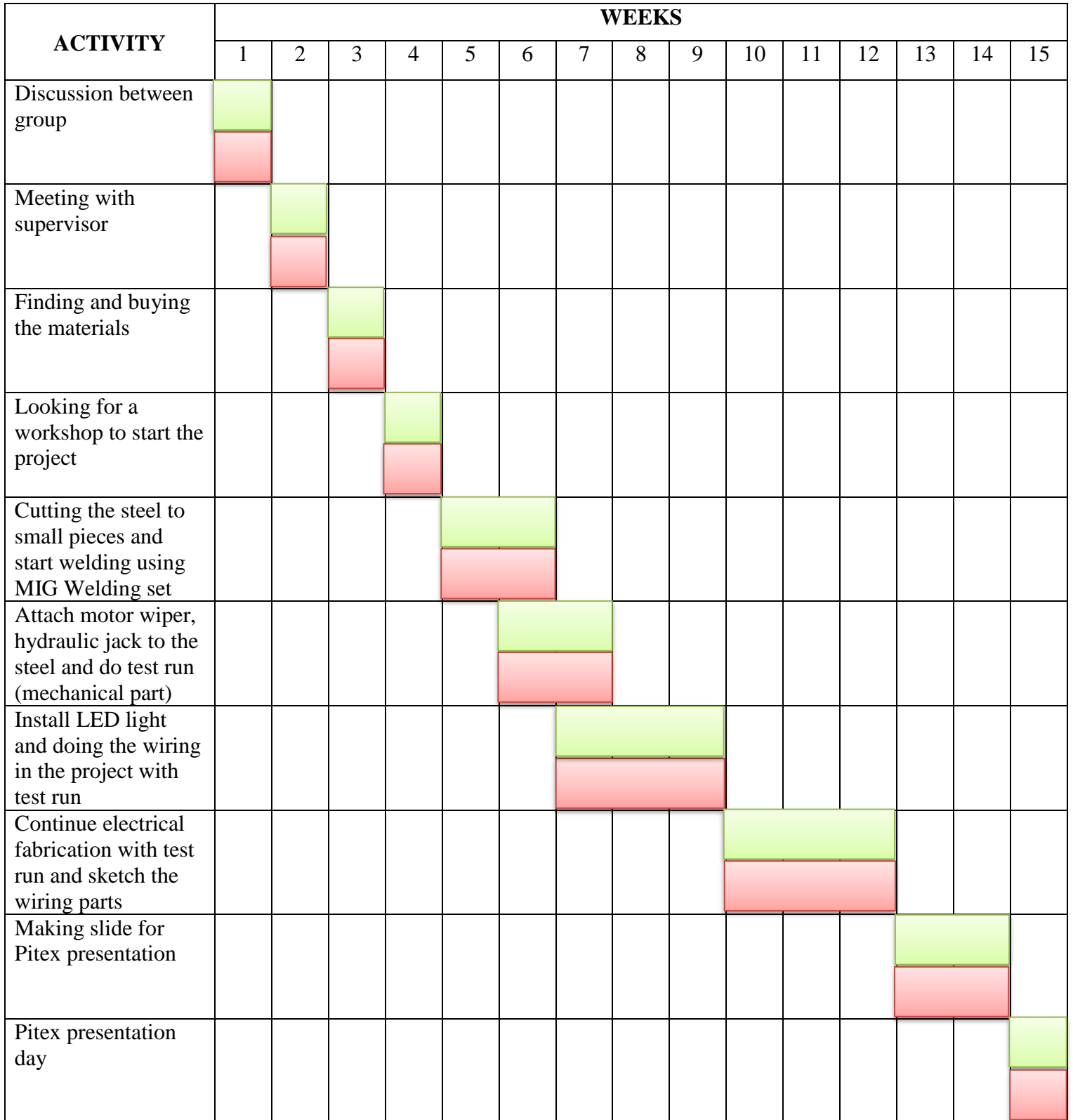
A steam engine is a heat engine that performs mechanical work using steam as its working fluid. The steam engine uses the force produced by steam pressure to push a piston back and forth inside a cylinder. This pushing force is transformed, by a connecting rod and flywheel, into rotational force for work. Steam engines are external combustion engines, where the working fluid is separated from the combustion products. The ideal thermodynamic cycle used to analyse this process is called the **Rankine cycle**. These locomotives are fueled by burning combustible material usually coal, wood, or oil to produce steam in a boiler.

Steam locomotives were first developed in the United Kingdom during the early 19th century and used for railway transport until the middle of the 20th century. Richard Trevithick built the first steam locomotive in 1802. The first commercially successful steam locomotive was built in 1812–13 by John Blenkinsop. Locomotion No. 1, built by George Stephenson and his son Robert's company Robert Stephenson and Company, was the first steam locomotive to haul passengers on a public railway, the Stockton and Darlington Railway in 1825. In 1830, George Stephenson opened the first public inter-city railway, the Liverpool and Manchester Railway. Robert Stephenson and Company was the pre-eminent builder of steam locomotives for railways in the United Kingdom, the United States, and much of Europe in the first decades of steam.

METHODOLOGY PHASE



3.3 GANTT CHART



3.4 FLOW CHART

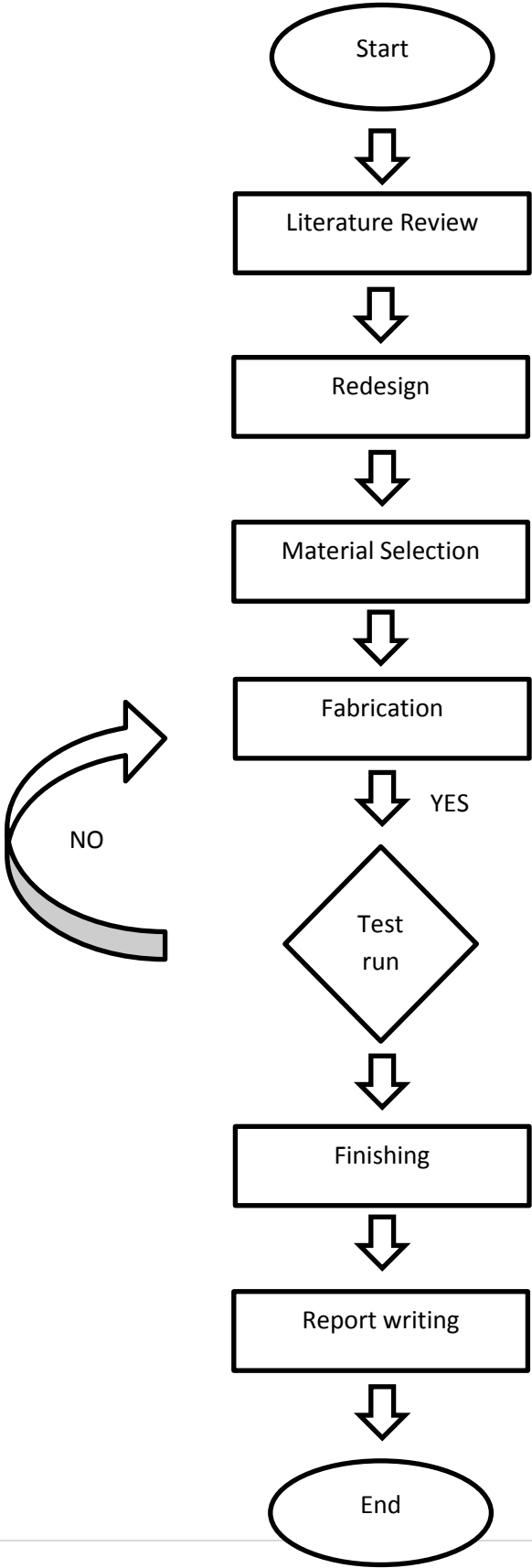


Figure 3.4.1: Flow Chart

3.5 FLOW CHART EXPLANATION

(i) Literature Review

The flow chart is very important to illustrate the sequence of operations to complete the work. It uses symbols to represent processes. Each step in the process is represented by a different symbol and contains a brief description of the process step. The top of the flow chart will start with the beginning. Then it was followed by a literature review. In this step it will discuss the use of current methods. It collects with a shovel and puts it in a sack. In addition, there is a list of the advantages and disadvantages of each method. By doing so, find out which ones are efficient and which take a short time in the collection.

Experimented Method

The design of the device is done on Inventor software and the necessary analysis is done on the Sketch up software. For the design part, the first design is less stable because the wiper motor is larger than the hydraulic jack. After design, both trigger (before and after) analysis and research modifications where factors such as stress, strained, stability are obtained and compared.

(ii) Redesign

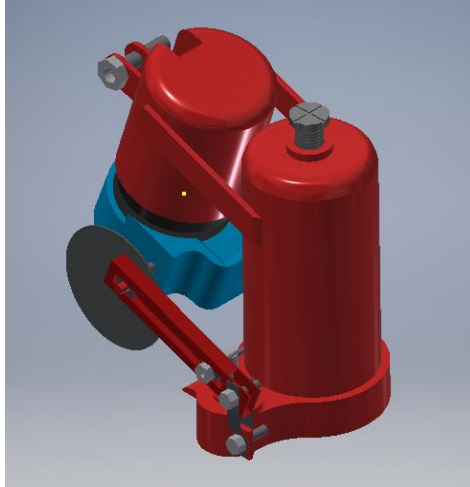


Figure 3.4.1: First design

The first design was to make it to a smaller design to make it easy to carry around or store at any place, light and simple. The idea came from an old train that use Rankine cycle to move. It uses force produced by steam pressure to push a piston back and forth inside a cylinder.

On the other hand, there are several advantages that are easy to use and easy to operate. This is because the pushing force is transformed, by a connecting rod and flywheel, into rotational force for work. But in the end, we need to change and improve the design because of it become unstable when it starts to operate.

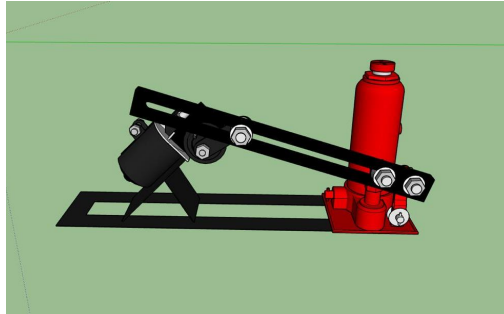


Figure 3.4.2: Final design

After a lot of researching and discussing, we have come to a final design. We choose this kind of design because it has more stability when operating the jack. It is also make it even more convenient when using it because it has a larger base so it would not be shaky when operating.

(iii) Material Selection

The correct component selection is important in designing the project to avoid the misuse of the materials or components used. In addition, in the selection of components, the safety aspect should also be emphasized as the project produced must be used safely. The component is used:

- 1) Hollow Steel



Figure 3.4.3: Square Hollow Steel

A hollow structural section (HSS) is a type of metal profile with a hollow cross section. HSS members can be circular, square, or rectangular sections, although other shapes such as elliptical are also available. HSS is only composed of structural steel per code. Rectangular and square HSS are also commonly called tube steel or box section. HSS, especially rectangular sections, are commonly used in welded steel frames where members experience loading in multiple directions. Square and circular HSS have very efficient shapes for this multiple-axis loading as they have uniform geometry along two or more cross-sectional axes, and thus uniform strength characteristics. This makes them good choices for columns. They also have excellent resistance to torsion.

2) Motor Wiper



Figure 3.4.4: Motor Wiper

Motor wiper is a perfect choice for this project. It was originally used for wiping the windscreen. Because of that, it gave us an idea to make it as a fluctuation movement of connecting rod into rotational force for work to pump the hydraulic oil in the hydraulic car jack automatically without using any human energy.

3) Hydraulic Jack



Figure 3.4.5: Bottle Jack

A jack is a mechanical device used as a lifting device to lift heavy loads or to apply great forces. A hydraulic jack uses hydraulic power which is the best solution for lifting heavy weight because hydraulic oil cannot be compressed or burned. Bottle jacks have a capacity of up to 50 tons and may be used to lift a variety of objects.

4) Bearing



Figure 3.4.6: Bearing

A bearing is a machine element that constrains relative movement to the desired motion and reduces friction between moving parts. The design of the bearing may, for example, provide for free linear movement of the moving part or for free rotation around a fixed axis; or, it may prevent a motion by controlling the vectors of normal forces that bear on the moving parts. Most bearings facilitate the desired motion by minimizing friction. Bearings are classified broadly according to the type of operation, the motions allowed, or to the directions of the loads (forces) applied to the parts.

5) Nuts & Bolts



Figure 3.4.7: Nuts & Bolts

A nut is a type of fastener with a threaded hole. Nuts are almost always used in conjunction with a mating bolt to fasten multiple parts together. The two partners are kept together by a combination of their threads' friction. Square nuts, as well as bolt heads, were the first shape made and used to be the most common largely because they were much easier to manufacture, especially by hand.

6) Mini Jumper



Figure 3.4.7: Mini Jumper

A jump start, also called a boost, is a method of starting a vehicle with a discharged or dead battery. A temporary connection is made to the battery of another vehicle, or to some other external power source. The external supply of electricity recharges the disabled vehicle's battery and provides some of the power needed to crank the engine. Therefore, we use this concept to supply the electricity to Jack & Go.

7) Button Switch



Figure 3.4.8: Button Switch On/Off

A switch is an electrical component that can "make" or "break" an electrical circuit, interrupting the current or diverting it from one conductor to another. The mechanism of a switch removes or restores the conducting path in a circuit when it is operated. A switch will have one or more sets of contacts, which may operate simultaneously, sequentially, or alternately. Therefore, we use switch button to cut off the power supply from the car battery.

8) LED Light



Figure 3.4.9: LED Light

LED light is an electric light for use in light fixtures that produces light using one or more light-emitting diodes (LEDs). LED lamps have a lifespan many times longer than equivalent incandescent lamps, and are significantly more efficient than most fluorescent lamps with some LED chips able to emit up to 303 lumens per watt. We use LED to illuminate the dark areas to have a better view and safety when changing the flat tire.

(iv) Fabrication

1. In the early stage, we brought hollow steel to workshop for welding. Before welding, we examine the sketch again to reconfirmed the design. For the first step, we cut the hollow steel to smaller pieces.

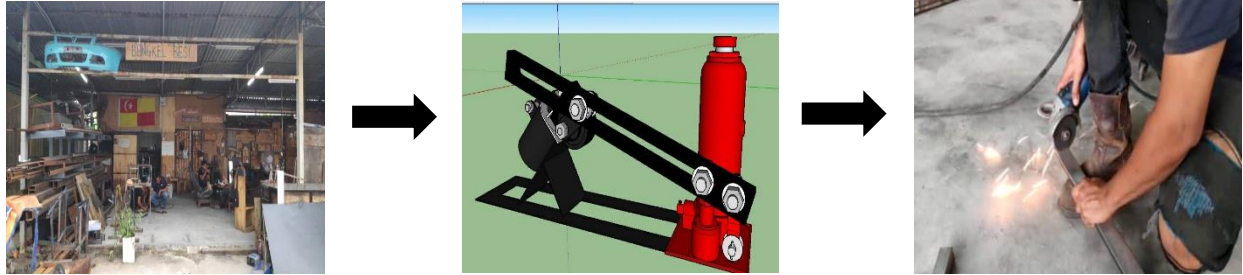


Figure: 3.4.10: Cutting the hollow steel

2. After cutting the steel, we started to combine the smaller pieces' steel together using MIG Welding. We also attach hydraulic jack, motor wiper and bearings together. (mechanical part)

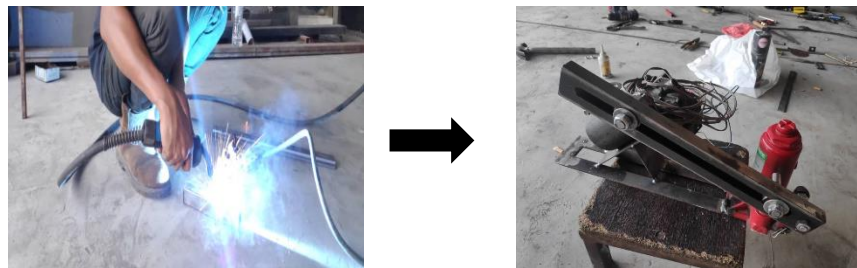


Figure 3.4.11: MIG Welding

3. Once we finished the mechanical part fabrication, we continue with electrical part. We started with doing the wiring for the power supply. In addition, LED light, mini jumper and switch button also will be installed.



Figure 3.4.12: Wiring

(v) Test Run

After all the installment, we start doing a couple of test run on sedan car whether it works or need some modification.



Figure 3.4.13: Test Run

(vi) Finishing

Lastly, after having a successful test run, we spray the casing for finishing to make it look more neat.



Figure 3.4.13: Finishing

The working principal of JACK & GO explained in electrical circuit.

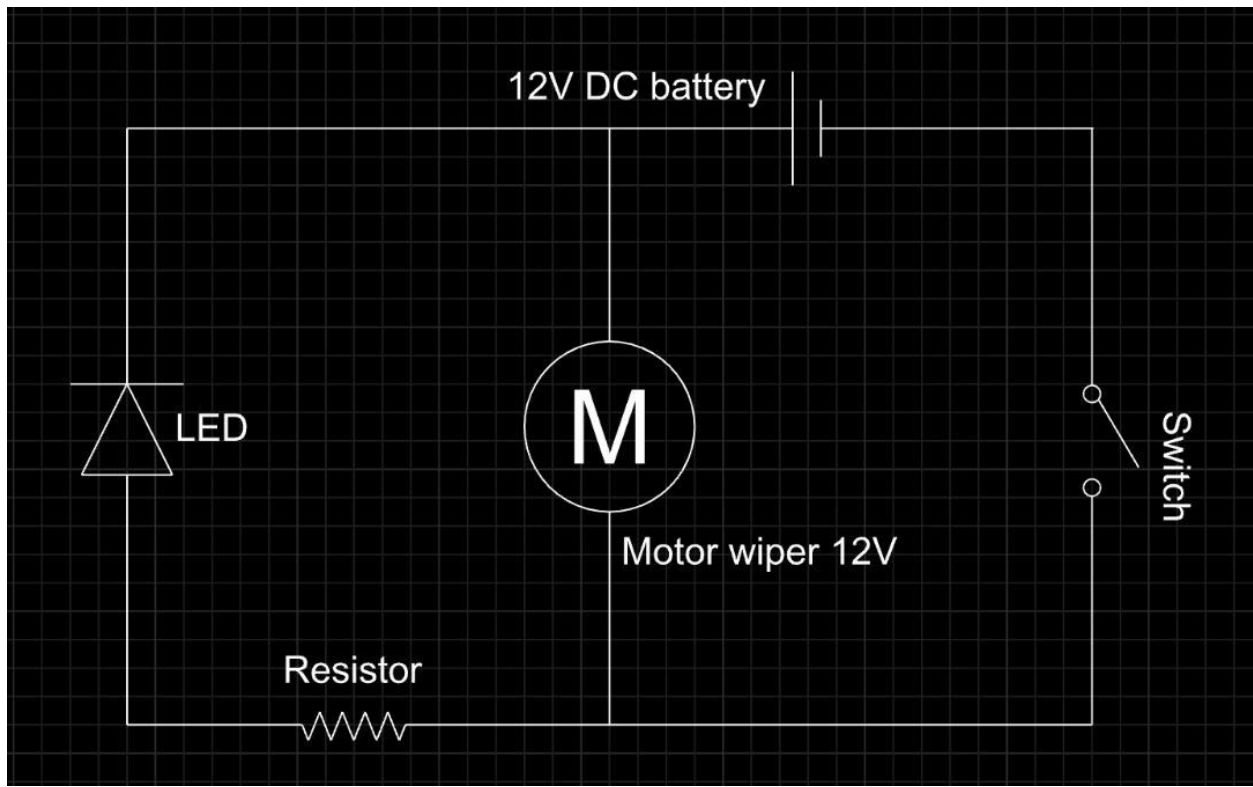
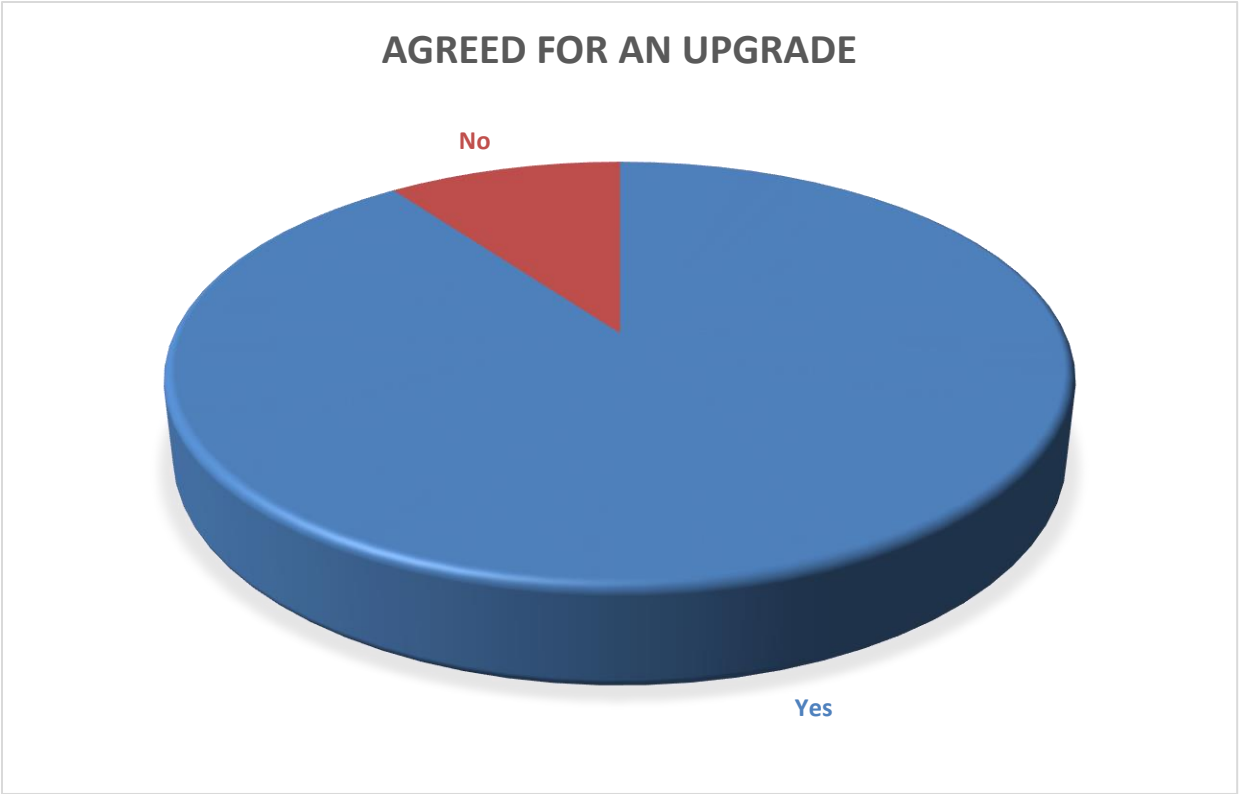


Figure 3.4.14: Electrical of Jack & Go circuit

Diagram above using AutoCAD software. JACK & GO work described below, It consists of 12v wiper motor, switch and LED Electric power used to run wiper motor with the help of 12 Volt DC battery. One wire from the 12V DC Battery is connected to a switch wire directly to the wiper motor. Therefore, wires from the wiper motor are connected to LED wires. Power from the 12V DC battery supply to the wiper motor from the 12V DC power supply. Therefore, introducing this project to the advantage of two marketable one is easy operation and avoided manual work.

3.6 PROJECT SURVEY



We were doing an open survey using Google Forms which means it is an online survey for our Jack & Go project to all people. We focus on 30 respondents which were consist of car users. As a result, 90 percent of them agreed on having an upgrade for the car jack.

3.7 COSTING

Materials	Quantity	Cost Per Unit (RM)	Total Cost (RM)
Hollow Steel	2 unit	30.00	60.00
Motor Wiper	1 unit	120.00	120.00
Wire	4 meter	3.00	12.00
Mini Jumper	1 unit	20.00	20.00
Switch Button	1 unit	10.00	10.00
Bearing	6 unit	6.00	36.00
Hydraulic Bottle Jack	1 unit	50.00	50.00
Nuts & Bolt	1 Packet	14.00	14.00

Total: RM322.00

3.8 SUMMARY

As conclusion, the methods that implemented in this project are the basic method that must be done in order to complete the project without fail. Base on the survey, most of the car users agreed on having an upgrade for the car jack to make it more convenient for them to use whenever they need it especially in an emergency situation. By using Jack & Go, it will increase the efficiency of the process when changing flat tire. In addition, it can also save time and energy.

CHAPTER 4

RESULT AND DISCUSSION

PREPARED BY: MUHAMMAD NAQIB BIN ZAINUL ABIDIN

4.1 INTRODUCTION

The origin of hydraulic jacks can be dated several years ago when Richard Dudgeon, the owner and inventor of hydraulic jacks, started a machine shop. In the year 1851, he was granted a patent for his hydraulic jack. In the year 1855, he literally amazed onlookers in New York when he drove from his abode to his place of work in a steam carriage. It produced a very weird noise that disturbed the horses and so its usage was limited to a single street. Richard made a claim that his invention had the power to carry near about 10 people on a single barrel of anthracite coal at a speed of 14 m.p.h. Dudgeon deserves a special credit for his innumerable inventions including the roller boiler tube expanders, filter press jacks, pulling jacks, heavy plate hydraulic hole punches and various kinds of lifting jacks.

Since decades ago, Hydraulic become a compulsory equipment among all industrial manufactures over the world. Thus, many inventing ideas were created based on hydraulics theory like hydraulic bottle jack, long ram jack, etc.

From a current bottle hydraulic jack, we invented Jack & go which is the combination of hydraulic, mechanical and electrical system. And, we did found that it operated efficiently.

4.2 DATA COLLECTION

Instruction: Please read each statement below and answer the questions given with honesty and carefully. Please tick (/) in the box provided.

SECTION A

RESPONDENT BACKGROUND

1. Gender : Male () Female ()
2. Age : 18-29 () 30-39 () 40-49 () 50 and above ()

SECTION B

1. Do you own a car or drive a car?
() Yes No ()
2. Do you able to use the existing car jack?
() Yes No ()
3. Do you exhausted when changing tire?
() Yes No ()
4. Do you find it difficult to use a car jack?
() Yes No ()

4.3 ANALYSIS OF SURVEY

This is the result from 30 individual respondents.

QUESTION 1

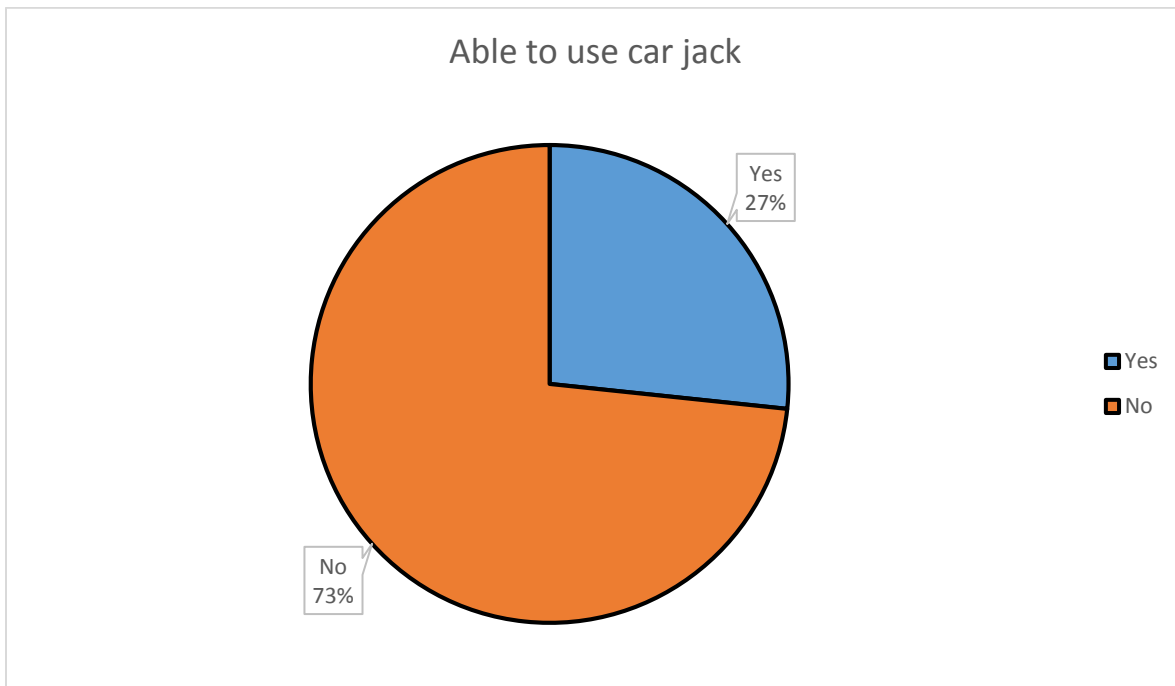


Figure 4.3.1

In this question, we asked the respondents whether they are able to use the provided car jack or not. Most of them having a hard time when operating the jack especially for women and elderly because they do not know how to use or have the strength to use the jack.

QUESTION 2

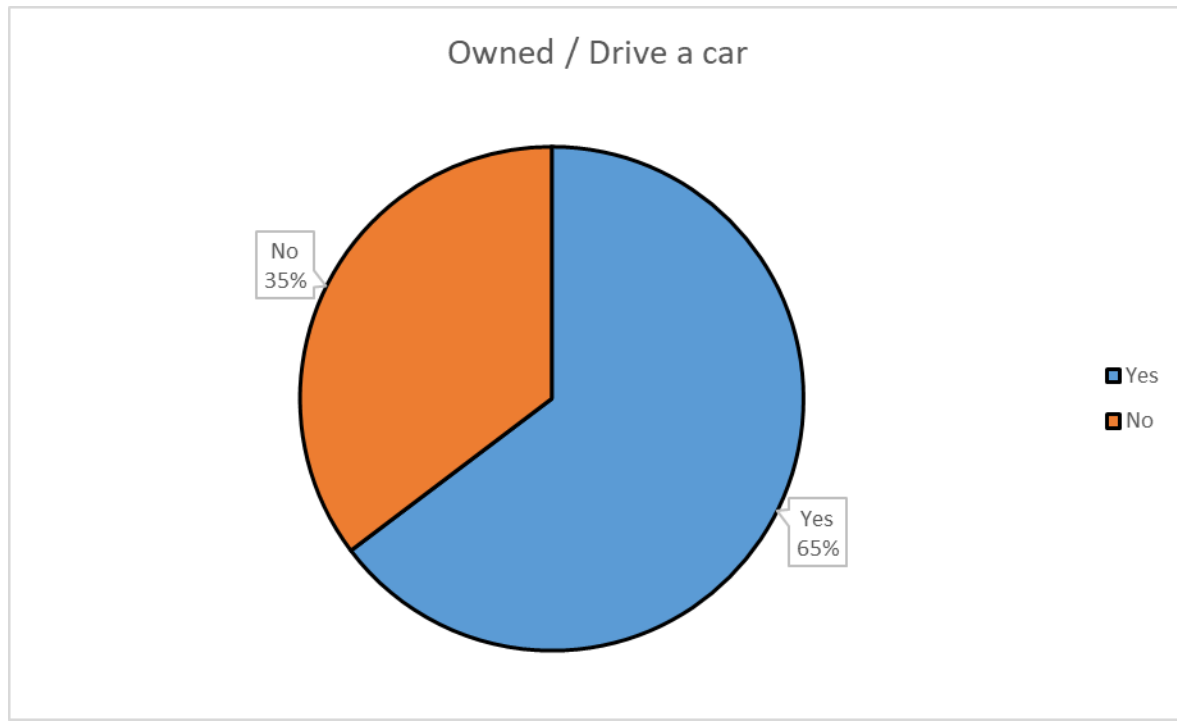


Figure 4.3.2

This question is for knowing whether the respondents have the experience of driving or owned a car. The purpose of this question is for getting the best respond from the respondent base on their own experience. Thus, this can maximize our project purpose to help them using car jack.

QUESTION 3

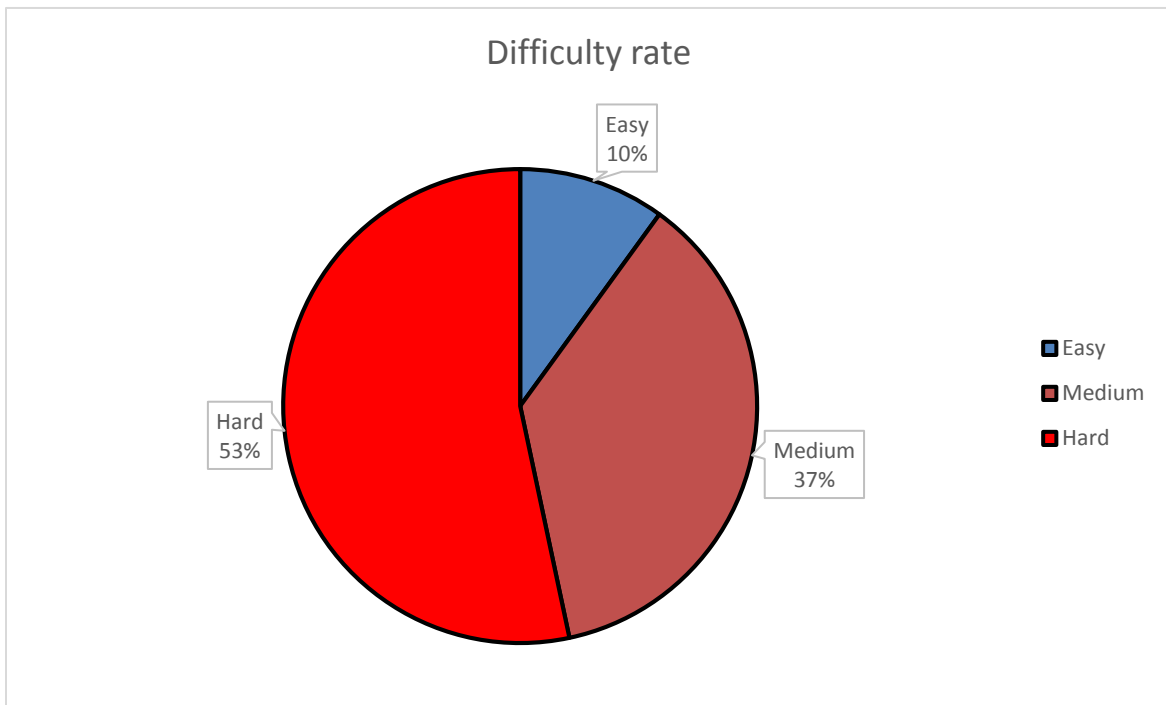


Figure 4.3.3

In this question, we let the respondents themselves rate the difficulty when operating the car jack. Out of 30 respondents, 53 percent was rated as hard to operate the provided jack. For medium level received 37 percent and the rest of the respondents rate it as easy which was only 10 percent.

QUESTION 4

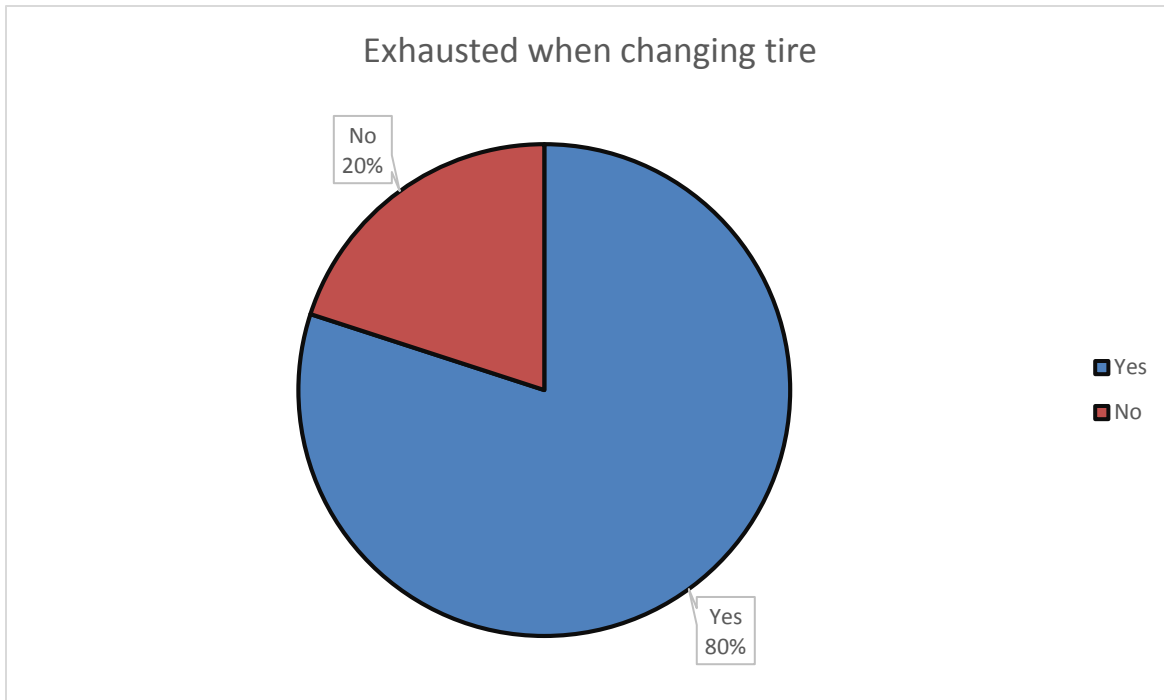


Figure 4.3.4

In this figure is about the energy that been used when changing the tire. Most of the respondents are exhausted when operating it which received 80 percent out of 30 respondents. The rest of 20 percent voted for not getting tired.

DEMOGRAPHY PROFILE OF RESPONDENTS

GENDER

As shown in Table, of the respondents from the Statistics conducted, 67% were female while 33% were male.

When comparing these results, the ratio of women is higher than that of men. In general, there are more women than men who have trouble using a car jack.

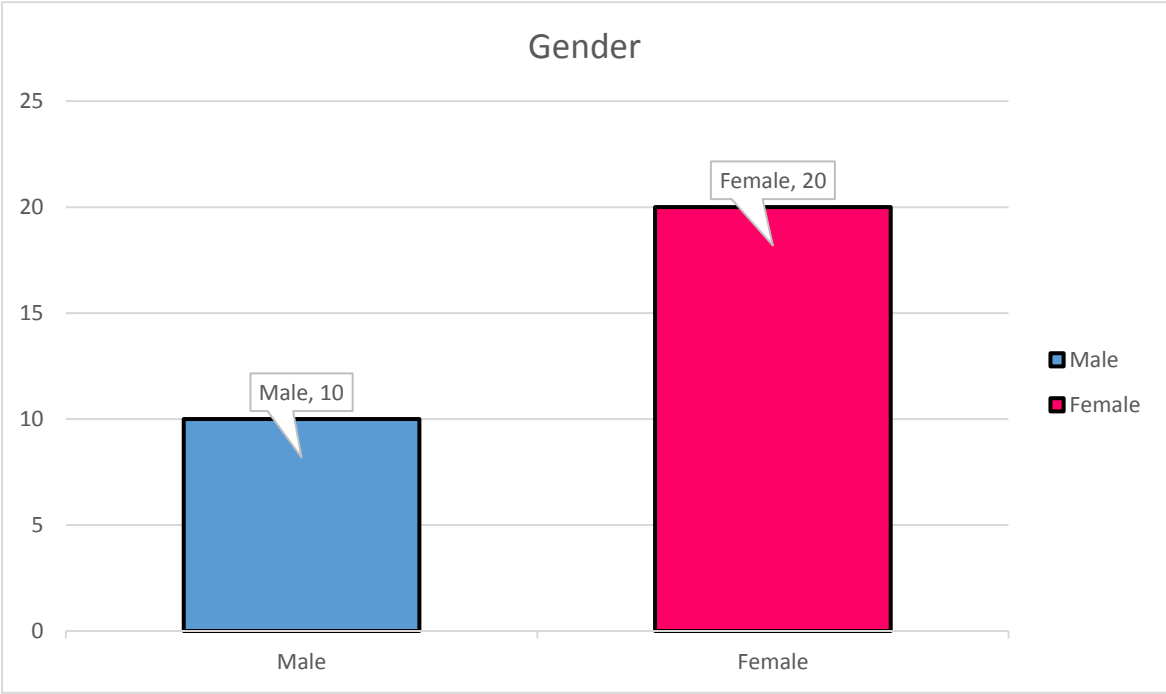


Figure 4.3.5: Bar Chart of Gender

AGE

The age distribution of respondents participating in this study is provided in the Table.

This sample is targeted at 18 and over 50 years old. The study found that 18-29 year olds responded better than others. this is because this group knows better about using the existing car jack.

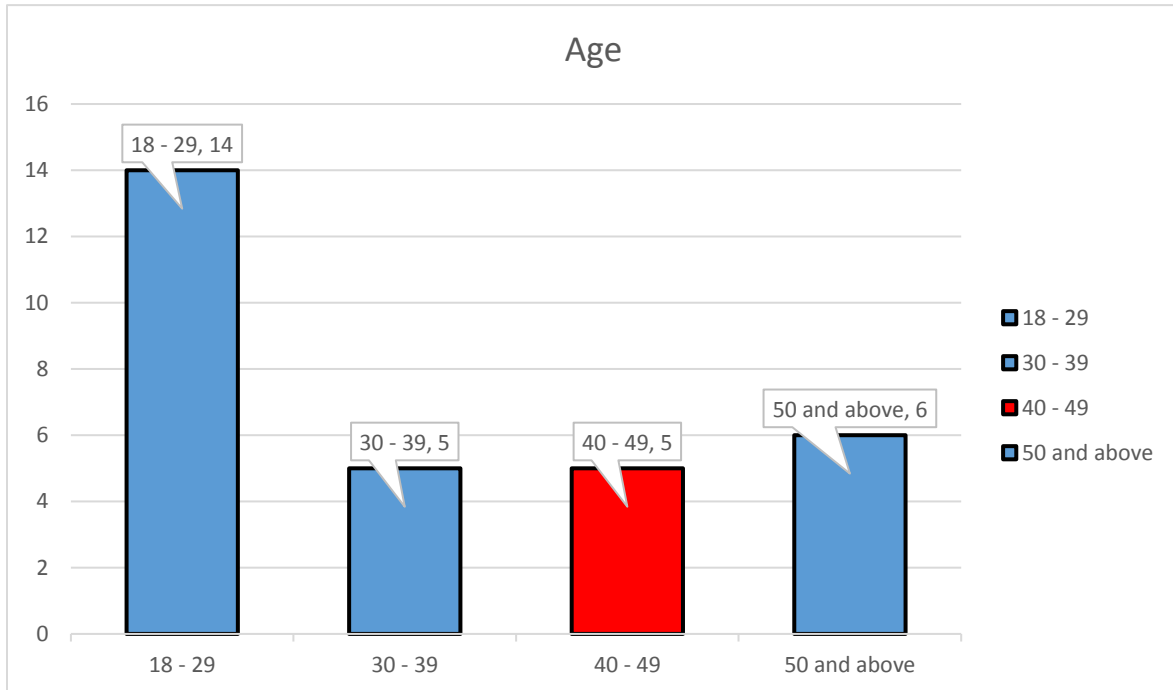


Figure 4.3.6: Bar Chart of Age

4.4 REASERCH FINDING

Based on response rates above, 8 of 10 peoples were exhausted when raise their car using hydraulic jack. 90% of hydraulic car jack user requestion for an innovation. In addition, most of users feeling so hard in raising their cars using hydraulic car jack. This project was aim to solves all these stated problems.

With designs and development of ideas, this project having concent from publics and users.

4.5 RESULT

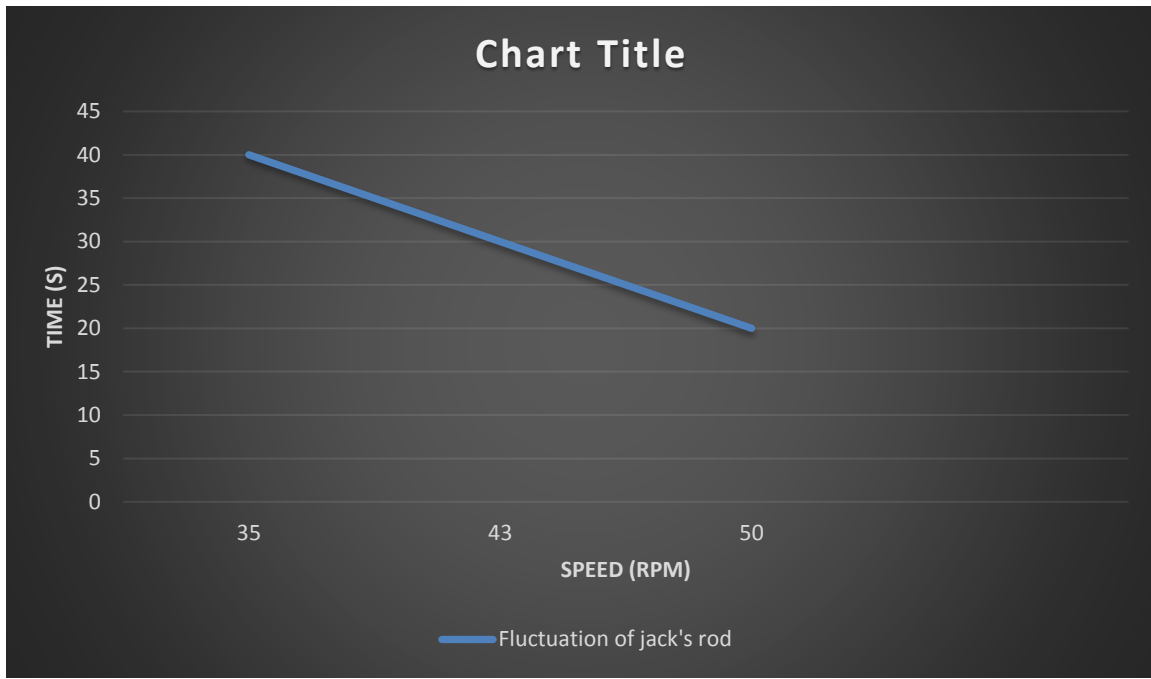


Figure 4.5.1: Line Graph

After a long discussion and some test run, we finally got to collect the data that we need. The aim to this project is to investigate the relationship between time taken for the jack to raise the rod and the speed of motor wiper to move. Base on the line graph, we can see that the faster the speed of the motor wiper the less time taken for the car jack to lift a car.

At the 35 RPM which is the lowest speed, the time taken is 40 seconds to completely lift a car. While at 43 RPM is 30 seconds. This proves that the faster the velocity the quicker it will be. Lastly, the fastest speed is at 50 RPM. With this speed, the best time recorded is only 20 seconds which is the best result that we collected.

4.6 ADVANTAGES OF HYDRAULIC JACK

Hydraulic systems transmit power by utilizing the pressure of fluid within a sealed system. The brakes on cars and trucks, wheelchair lifts, hydraulic jacks and wing flaps on aircraft typically employ hydraulic systems. Many manufacturers use hydraulic systems because they have many advantages over mechanical and electrical systems like offering up a lot of power in a small space, but if the fluid leaks from the system, this creates a problem and a disadvantage in the system, in that it won't work at all.

A hydraulic system is an efficient transmitter of power for many reasons. Firstly, its simple levers and push buttons make it easy to start, stop, accelerate and decelerate. This also allows for control accuracy. Also, because it is such a fluid system, without any cumbersome gears, pulleys or levers, it easily copes with a huge weight range. It provides a constant force, regardless of changes in speed. For the most part, hydraulic systems are simple, safe and economical because they use fewer moving parts compared to mechanical and electrical systems, which makes them easier to maintain. Hydraulic systems are safe to use in chemical plants and mines because they do not cause sparks.

1. Easier to use - A hydraulic car jack is much more easy to use. It makes use of hydraulic fluid which is non-toxic and long lasting. It is more reliable. It is so much easier to raise a car lift when the hydraulic motor is there to do all the work for you. All you need to do is simply press the “Up” or “Down” button, and your car would be easily lifted.
2. Technological convenience - The technological ease which you get while using hydraulic car jack is unmatched. It is only important to consider that you have to work only on an even surface, so as to maintain proper safety.
3. Get an even lift every time - Whenever you use hydraulic jacks for cars, get an even lift each time. This is one of the most important, unique and convenient feature. The best part of using a hydraulic car jack is contributed to a safer and elegant car lift.
4. The tool helps to lift loads with the minimum of effort. A hydraulic piston inside the jack uses mechanical advantage to lift the load on the jack. Use of tools for doing work helps one to finish the work fast and achieve better accuracy. So much so there is a belief that a workman cannot rise above his tools. This is why one must always supply high-quality tools to all the workers.

4.7 DISADVANTAGE OF HYDRAULIC JACK

Hydraulic systems also have some drawbacks. Handling hydraulic fluids is messy, and it can be difficult to totally get rid of leaks in a hydraulic system. If hydraulic fluid leaks in hot areas, it may catch fire. If hydraulic lines burst, they can cause serious injuries. Take care when handling hydraulic fluids, as too much exposure can lead to health issues. Hydraulic fluids are also corrosive, but some types are less so than others. For example, two main types of brake fluid are available for hydraulic mountain bikes, DOT fluid and mineral oil. Due to its non-corrosive properties, mineral oil is less likely to destroy a bike's paintwork. To keep your hydraulic system in its prime, periodically check hydraulic systems for leaks, lubricate when necessary, and change filters and seals as required.

1. It is susceptible to failure if the oil seals are worn out, this can cause serious problems
2. It has relatively slow speed
3. Hydraulic oil can emit unpleasant odor when become too warm due to overuse
4. It can overheat fairly quick
5. Hydraulic oil leak can cause soil and water pollution

4.8 CHALLENGE OF JACK

- Existed 12V DC motor in Jack & Go cannot lift the hydraulic piston on certain level. This phenomenon caused by torque of motor as existed torque in 12VDC motor was 14Nm. To minimize the problem, 12VDC motor with higher torque or another type of bearing should be use.
- Existed bearings movement were not run smoothly. Quality of bearing used in Jack & go were not good enough to handle the rotation of motor. Another high quality of bearing should be used to help in rotation if 12VDC motor.
- Existed bottle hydraulic was not in high quality. In addition, the maximum of the load for this bottle hydraulic is 2000kg/2 ton. This matters making problems in lifting the load even the load is not reaching 2ton.



Figure 4.8.1

4.9 DISCUSSION

Base on research, it was observed that at no load condition the device performed with minimum time, subsequently varying loads of (1 ton – 5 ton) was introduced at a lifting speed of 2650rpm which reduces as the hydraulic piston comes in contact with the load, the loads were lifted with ease showing that the loads lifted are within the capacity range for which the device can lift. The varying loads of 1 ton and 2 tons were lifted up to a regulated height as desired depending on the required space for the underneath equipment maintenance to be carried out. When lifting the loads of 3 ton, 4 ton and 5 ton respectively it was observed that the increase in the time of lifting indicated an addition of extra load.

The sizes of the lifted loads were determined as specified by the equipment (load) manufacturer. Testing the device with varying loads indicated its behavior and response to varying loads. It was also observed that in order to enhance adequate mechanical advantage of hydraulic jack during lifting operations, the jack piston should be placed directly under the lift point of the load in order to make proper contact with it before the actual lifting operation. During the lowering of the Load, it was observed that immediately the hydraulic valve was unlocked, the weight of the load pushed down the hydraulic piston down to its normal height, and then the device removed from its position under the load. For the loads lifted, it was also observed that with adequate power in the battery, the system could lift a load severally, subsequently the vibrations experienced reduces as the hydraulic piston comes in contact with the load.

4.10 SUMMARY

Using descriptive statistics, this chapter presents the background of using a car jack respondent, the information provided in this chapter indicates that the selected sample is

widely represents the research we have been studying, how many people use cars, how many people know how to use a car jack and how difficult it is to use a car jack. Therefore, by asking these survey questions we are able to solve the problems faced by car users especially the use of car jack when the car is damaged by tires.

In addition, based on the survey we studied there were many problems especially for women and senior citizens to handle car jack. Also, from the survey questions we can get more ideas to solve the problems faced by the group.

CHAPTER 5

CONCLUSION AND RECOMMENDATION

5.1 INTRODUCTION

The origin of hydraulic jacks can be dated several years ago when Richard Dudgeon, the owner and inventor of hydraulic jacks, started a machine shop. In the year 1851, he was granted a patent for his hydraulic jack. In the year 1855, he literally amazed onlookers in New York when he drove from his abode to his place of work in a steam carriage. It produced a very weird noise that disturbed the horses and so its usage was limited to a single street. Richard made a claim that his invention had the power to carry near about 10 people on a single barrel of anthracite coal at a speed of 14 m.p.h. Dudgeon deserves a special credit for his innumerable inventions including the roller boiler tube expanders, filter press jacks, pulling jacks, heavy plate hydraulic hole punches and various kinds of lifting jacks.

Since decades ago, Hydraulic become a compulsory equipment among all industrial manufactures over the world. Thus, many inventing ideas were created based on hydraulics theory like hydraulic bottle jack, long ram jack, etc.

From a current bottle hydraulic jack, we invented Jack & go which is the combination of hydraulic, mechanical and electrical system. And, we did found that it operated efficiently.

5.2 CONCLUSION

The modification of this car jack is to help elderly and handicapped even women to operate a jack in an emergency. By using this jack, it will save time and energy when changing tire or doing maintenance on the side rode. Thus, it can also reduce the possibility of getting injuries such as backache. But the main part is about the safety. It is dangerous to be on the side rode so maintenance needs to be done quickly to avoid from an unwanted event.

This Smart Jack is safe to use after doing some testing and calculation under some specification. The torque of the jack is strong enough to be able to lift a vehicle with maximum load of 2-ton. This is more specifically for cars since the weight is around that point. It is also very ergonomics which is the most fundamental concept of designing an item. After spending a lot of time and energy for this project, we hope it will be useful for people who is having trouble using jack especially in emergency and safe from harms.

5.3 RECOMMENDATION

1. When people use the jack especially women and the elderly can lift easily because when it is lightweight the work of maintenance work is easy to do.
2. Automatic wire roller needs to be added so that it can easily roll the wire back to the wire roller. The purpose of the wire roll is to make the design look neat.
3. Increase scope to higher capacity to lift heavier vehicles such as SUVs, trucks and buses.

5.4 SUMMARY

As a conclusion, after all discussion through the analysis of data, we can conclude that this project gives a lot of benefits to the public especially to the women and elderly because they do not know or have the strength to operate the provided car jack. This project can help them changing the flat tire on the side of the road without using a lot of time and energy. Besides, it can also reduce the risk of getting backache or involve in something bad such as getting rob or hit by other car. Therefore, this project hopefully can help the people who are not used of using the car jack.

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APPENDIX



Finding the materials



MIG welding set



Power supply



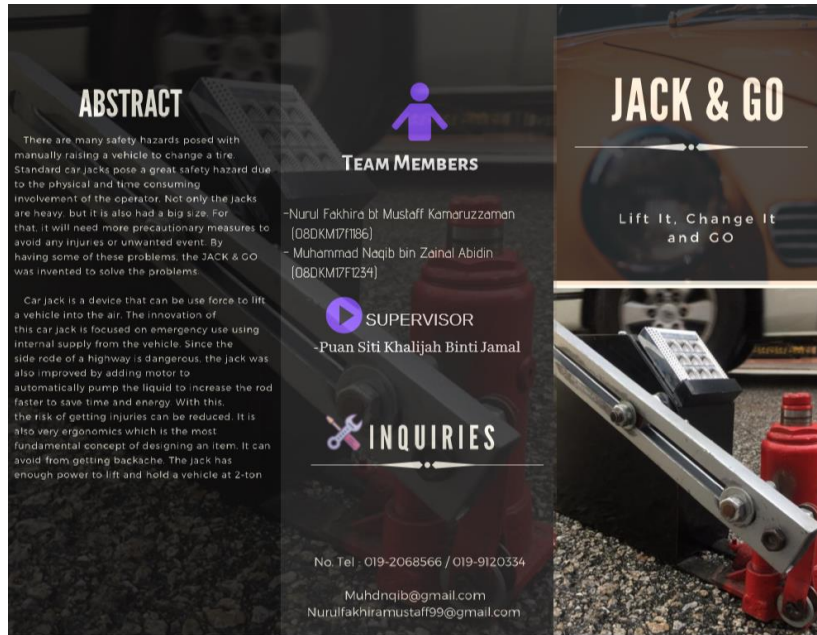
First design



Test run






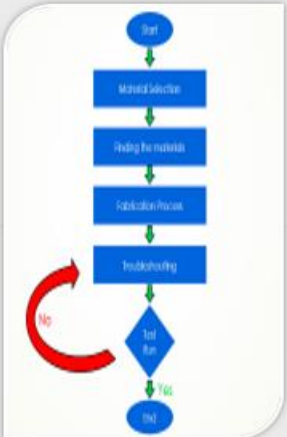

Final design



Brochure (front page)



Brochure (back page)

 <p>KEMENTERIAN PENDIDIKAN TINGGI PITEX INVENTION & INNOVATION TECHNOLOGY EXPOSITION</p>	<h1 style="text-align: center;">JACK & GO</h1>	 <p>SULTAN SALAHUDDIN ABDUL AZIZ SHAH</p>
<p>Ketua Penyelidik / Pecipta (Main Researcher / Inventor)</p> <p>DR. SITI KHALIJAH BINTI JAMAL</p>	<p>Nama Kumpulan Penyelidik / Pecipta Bersama (Researchers/Inventors Groups)</p> <p>NURUL FAKHIRA BINTI MUSTFF KAMARUZZAMAN (08DKM17F1189) MUHAMMAD NAQIB BINZAINUL ABIDIN (08DKM17F1234)</p>	<p>E-Mel (E-mail)</p> <p>nurulfakhiramustaff99@email.com mubdnqib@email.com</p>
<p>Info Grafik (Graphical Information)</p> 	<p>Deskripsi Produk Abstrak (Product Description/ Abstract)</p> <p>Jack & Go is a device that can lift or jack a light car. This device is equipped with 12v motor wiper, square hollow steel, bearings and hydraulic jack for jacking process. It use electricity which will be obtained from the car battery to make it for auto pump. When the electricity is connected, the steel will start to make a circle fluctuation movement to pump the hydraulic oil in the hydraulic jack to raise the rod for lifting car. This jack also equipped with switch on/off button for safety. There is also LED light which is very helpful when operating the jack in the dark or at night. It will light up a certain area to make it visible for the user and others when changing the flat tire on the side of the road at night.</p>	
<p>Pernyataan Masalah (Problem Statement)</p> <ul style="list-style-type: none"> ➤ Huge human effort required ➤ Difficulties in repairman ➤ Time taking process 	<p>Objektif (Objectives)</p> <ul style="list-style-type: none"> ➤ To make it convenient to use ➤ To conserve energy and save time ➤ To use a motor to make the jack operates automatically 	<p>Metodologi (Methodology)</p> 
<p>Potensi Market (Market Potentials)</p> <ul style="list-style-type: none"> ➤ Sedan car / light car users ➤ Workshops 	<p>Harta Intelek (IP) (Intellectual Property)</p> <p>Industrial Design : Autodesk Inventor</p> <p>Copyright : LY2019006027</p> <p>Kolaborasi Industri / Instituti (Industrial / Institution Collaboration)</p> <p>I Hand Enterprise +6012-7577417</p>	
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Pitex poster



Pitex booth



Achievement