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EZ HYDRAULIC JACK

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CHAPTER 1 : INTRODUCTION

1.0 INTRODUCTION

We have been innovating our project is Ez hydraulic jack for lifting heavy goods such as home furniture especially for housewives who live alone at home as well as older women. This project is much less like the current car jack, but we have been innovating to lift the certain furniture so it is easy to divert, Ez hydraulic jack is new the new design we create and requires a flat surface and flat area to increase the item. The Ez hydraulic jack design is not like the existing jack car. It's easier, and easily to moving because the four wheels specifically for women. This has a loadable handle that can be adjusted according to the size and load material, the load size to be lifted has its limit. The second innovation is Ez has a place where users can easily use Ez hydraulic jack because it can raise the jack use hand and leg, they have two choice.

1.1 PROBLEM STATEMENT

Available jacks present difficulties for the elderly, women and are especially disadvantageous under adverse weather conditions. These presently available jacks further 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.

Moreover, the safety features are also not enough for operator to operate the present jack. Present car jack do not have a lock or extra beam to withstand the massive load of the car.

This is for the safety precaution in case if the screw break. 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 had problem with the tire in the middle of nowhere. The purpose of this project is to encounter these problems. The problem scissors jack is can lift car weight is only 400kg. However, the existing car jack only has one load lift.

1.2 OBJECTIVE

i. To design a car jack that is safe, reliable and able to raise and lower the height.

ii. To fabricate Ez hydraulic jack that can be used for heavy items such as home furnishings and fully automated with paddle and hand

iii. To analyse the reliability of the product advantages and weaknesses of existing car jack in the market

1.3 SCOPE AND LIMITATIONS

The scope and limitations are the limitations found in this hydraulic when handling it so that according to the ability of the iron to be made, the height and the goods to be lifted should be properly assessed. limit the need to be correct and fixed, if it does not make the correct limits it will cause problems on the project as broken or damaged.

i. The developed Ez hydraulic jack withstand below 100 kg of load

ii. Can lift furniture that has the space below

iii. Adjustable arm size 30cm each.

iv. This jack can use hand and leg to pressed repeatedly

CHAPTER 2 : LITERATURE REVIEW

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2.0 BOTTLE JACK (2006)

At Figure 1 a bottle jack is a type of hydraulic jack that is placed in a vertical position. This type of jack is used because of its high leverage and ability to fit into small spaces. A Bottle jack has a single lift rod, which acts as a piston. It's a very simple mechanism, you simply pump the arm of the jack and the piston will rise.

They have a whopping 50 tons lift capacity and are often deployed in the act of raising houses in a chained group of jacks, when using on a vehicle many people like to use a block of timber to help cushion the impact on the cars body of the relatively small (in comparison to a floor jack saddle) point of impact.

Figure 1 : bottle jack

2.1 THE PARTS OF BOTTLE JACK

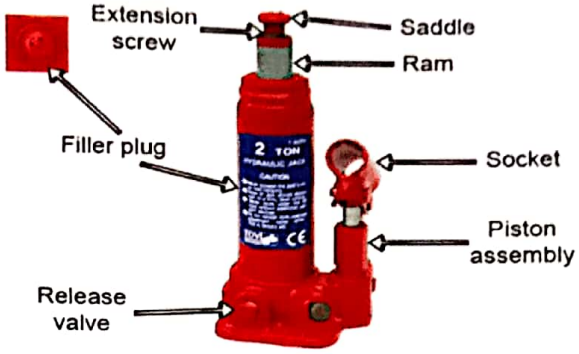


Figure 2 : parts of bottle jack

Bottle jack saddle

Figure 3 most bottle jacks have a serrated saddle that sits underneath the vehicle while it is being lifted. Serrated means it has a jagged edge, like a saw, for extra grip

Figure 3 : Bottle jack saddle

Bottle jack extension screw

The Figure 4 the extension screw can be extended for extra reach up to its maximum lift height. Turn the extension screw anti-clockwise to raise, and clockwise to lower.

Figure 4 : Bottle jack extension screw

Bottle jack ram

Figure 5 the ram extends when the jack is pumped, pushing the saddle against the underside of the vehicle to lift it.

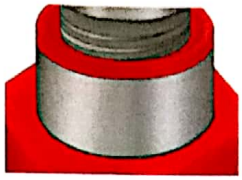


Figure 5 : Bottle jack ram

Bottle jack two piece handle

Figure 6 bottle jacks usually have a two piece handle that extends from a socket, and can be retracted again for easy storage. The jack handle will either contain a spring clip or a bayonet connector to enable it to slot together.

Figure 6 : Bottle jack two piece handle

Spring clip

Figure 7 with a spring clip connector, the clip needs to be pushed in to slot the two piece handle together. The spring clip will sit in an opening to lock both parts of the handle.

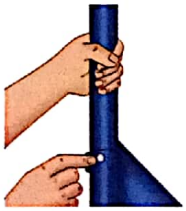


Figure 7 : spring clip

Bayonet connector

The bayonet connector in Figure 8 will contain two radial pins on one half of the handle and two L-shaped slots on the other half of the handle. The pins fit into the L-shaped slots locking the two halves of the handle in place.

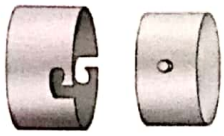


Figure 8 : bayonet connector

Bottle jack release valve

When the release valve is partially opened, In figure 9 it allows pressure to be released, causing the oil to run back into the reservoir inside the bottle jack. This enables the jack to be lowered. When the release valve is closed, it is ready to be raised.

Figure 9 : Bottle jack release valve

Bottle jack piston assembly (pump piston & cylinder)

In figure 10 the piston assembly consists of a pump piston and a cylinder. When the user lifts the jack handle, it lifts the pump piston drawing oil into the pump cylinder from the reservoir.Pushing the handle down forces the oil into the main cylinder, raising the main piston.

Figure 10 : Bottle jack piston assembly (pump piston & cylinder)

2.2 MATERIAL OF BOTTLE JACK

Steel

Steel in an alloy produced by adding carbon to iron. These alloy elements give steel its strength.

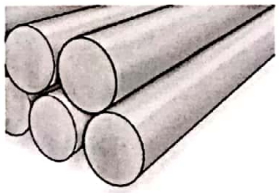


Figure 11 : steel

Heat treated steel

Heat treatment is carried out to change out to change the physical properties. This process involves heating or chilling, usually to extreme temperatures and achieves results such as hardening or softening.

The jacks are heat treated to harden the steel, which gives strength to the bottle jack, allowing them to withstand heavy loads and constant use.

2.3 BOTTLE JACKS WORKS

1. An upstroke of the jack handle draws oil into the pump cylinder.

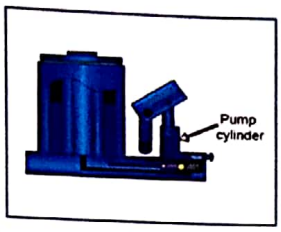


Figure 12 : oil into pump cylinder

2. A downstroke of the jack handle pushes pressured oil to the main cylinder causing it to raise the main piston.

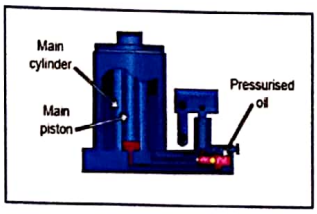


Figure 13 : handle push oil

3. After constant pumping of the jack the check valves will open and close with each motion.

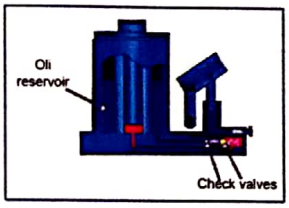


Figure 14 : check valve open close

4. The main piston keeps raising as the jack is pumped.

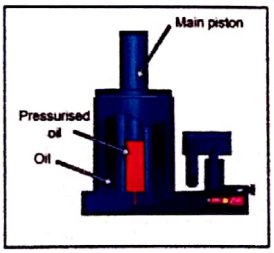


Figure 15 : jack is pumped

2.4 HI LIFT JACK (1895)

Hi-Lift Jacks, also known as in figure 16 high Lift and Farm Jacks (mainly because they are an invaluable tool for the farmer as they can be used for an almost endless number of tasks) are an extremely versatile Jack when it comes to lifting, levering, pulling or winching.

established in 1895 by the late Philip John Harrah, is one of the oldest companies in the state of Indiana, and is the parent company to both the Hi-Lift Jack Company, and the Kant-Slam Company.

Hi-Lift Jacks, also known as High Lift and Farm Jacks (mainly because they are an invaluable tool for the farmer as they can be used for an almost endless number of tasks are an extremely versatile Jack when it comes to lifting, levering, pulling or winching. 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).

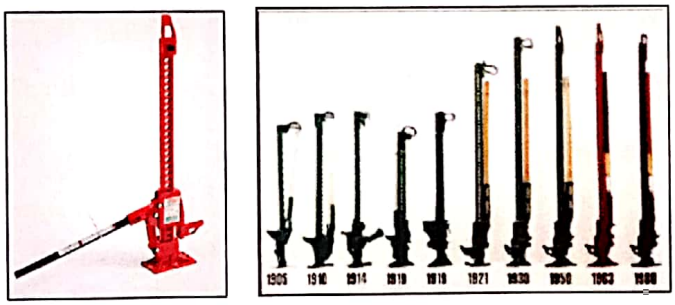


Figure 16 : hi lift jack

2.5 PARTS FOR HI LIFT JACK

High lift handle keeper and isolator

At figure 17 A handle keeper is the first accessory you should buy for your Hi-Lift Jack. Keepers are made from polyurethane and slide over the bar and handle to hold them separate and steady. With a secure mounting system, your jack will be silent.

The Hi-Lift Handle-Keeper holds the Hi-Lift jack handle to the upright steel bar, keeping it in place when not in use and eliminating rattling during transportation and storage. Crafted from rugged polyurethane material. Easily slips on and off for quick, no hassle removal when you need to use your jack. Unique design allows Handle-Keeper to be removed without taking off the top clamp-clevis. Molded in black.

Figure 17 : High lift handle keeper and isolator

Hi Lift Jack Repair Kit

This is one Hi-Lift accessory that you should always have in your toolbox. In figure 18 If your Hi-Lift's mechanical parts stop working smoothly or it breaks on the trail, you'll be glad to have some spare Hi Lift Jack parts in your tool box.

With enough use or time outside, the moving parts of your Hi-Lift will wear out. Sand, dirt, and rust can all affect your jack especially if you mount it outside your 4x4 without a cover. This kit includes:

- 2 climbing pins
- 2 springs for the climbing pins
- 2 cross pins

Figure 18 : High jack repair kit

Hi-Lift Jack Off Road Winch Kit Winching

In figure 19 It's not as fast as a regular winch, but it'll definitely help to get you out of a bind. This would also be handy for stabilizing your rig or keeping your rig from sliding to the side when you're using your cable winch up front.

Figure 19 : Hi lift jack road winch kit winching

The Jack Mate

In figure 20 The Jack Mate is a quick-attaching tool that works at the bottom or the top of your Hi Lift, adding extra functionality and strength to your recovery operations.

An accessory for your Hi-Lift Jack that both improves its existing functions and makes it more versatile. It's made by Rescue 42 and has been used for years in fire and rescue, farming, and industrial settings. In normal use it replaces the top clamp/clevis on your jack, adding significant strength and functionality.

Figure 20 : Jack mate

Hi Lift Jack Large Off Road Base

In Figure 21 Use it to keep from sinking into soft ground, sand, and mud. It's better than stacking rocks and can be used as a shovel if you're in a pinch.

You can buy a wide, lightweight accessory base plate that will go under your Hi-Lift and make it much more stable on flat surfaces. The Hi-Lift jack base is made of thick, lightweight plastic and is 16" x 16". The base does not attach to the bottom of the jack, instead having a recessed area for the jack's bottom

Figure 21 : hi lift jack large off road base

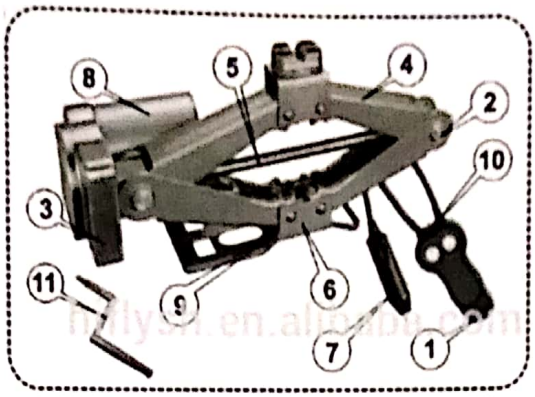
2.6 SCISSOR JACK (2014)

At figure 22 A scissor jack uses a simple theory of gears to get its power. At Figure 22 as the screw section is turned, two ends of the jack move closer together. Because the gears of the screw are pushing up the arms, the amount of force being applied is multiplied. It takes a very small amount of force to turn the crank handle, yet that action causes the brace arms to slide across and together. As this happens the arms extend upward. The car's gravitational weight is not enough to prevent the jack from opening or to stop the screw from turning, since it is not applying force directly to it.

The jack user inserts the handle into a point on the jack stand, and turns it, expanding or contracting the "scissor" pieces by threading them through a long, horizontal bolt. Another way that these types of jacks are convenient in a roadside situation is that the long handle piece makes it easier to access the jack when the vehicle is on the ground. The best jacks have adjustable handles so that the user can move the handle from one ground-side horizontal position to the other and then flip the handle over to continue moving the jack bolt in the same direction. This scissors jack in encouraged in 2014

Figure 22 : scissor jack

2.7 PARTS OF SCISSOR JACK



1. Switch Board / Controller
2. Screw
3. Gear Box
4. Stand Holder
5. Screw Bolt
6. Platform
7. Cigarette Plug
8. Motor
9. Overtravel Limit Switch
10. LED
11. Hand Crank

Figure 23 : Parts of scissor jack

2.8 HOW DOES SCISSOR JACK WORKS ?

A scissor jack is operated simply by turning a small crank that is inserted into one end of the scissor jack. This crank is usually "Z" shaped. The end fits into a ring hole mounted on the end of the screw, which is the object of force on the scissor jack. When this crank is turned, the screw turns, and this raises the jack. The screw acts like a gear mechanism. It has teeth (the screw thread), which turn and move the two arms, producing work. Just by turning this screw thread, the scissor jack can lift a vehicle that is several thousand pounds.

A scissor jack has four main pieces of metal and two base ends. The four metal pieces are all connected at the corners with a bolt that allows the corners to swivel. A screw thread runs across this assembly and through the corners. As the screw thread is turned, the jack arms travel across it and collapse or come together, forming a straight line when closed.

2.9 HOW TO USE THE SCISSOR JACK

I. Find a level spot and park

II. Assemble the scissor jack and check its functionality

III. Locate the best jacking spot on the car and place the scissor jack

IV. Just keep spinning

V. Place the jack stands if needed

VI. Once you're done, slowly lower the car

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2.10 HISTORY OF HYDRAULIC JACK

a) 1838

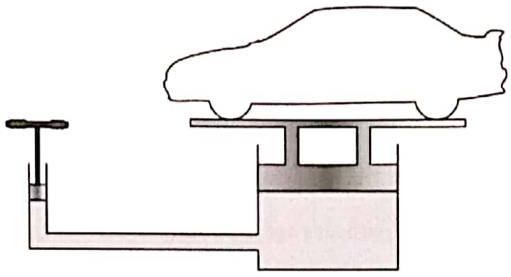


Figure 24 : Hydraulic jack (1838)

In 1838 William Joseph Curtis filed a British patent for a hydraulic jack. Hydraulic jacks are mechanical devices that uses hydraulic power and act as lifting devices in lifting heavy loads. Based on Pascal's Principle, a hydraulic jack uses a liquid to push against a piston. 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.

The owner and inventor of hydraulic jack made a claim that his invention has the power to carry near 10 people on a single barrel of anthracite coal at speed of 14 mph . The jacks were operated by water or any other fluids as whiskey and whale oil, the heads device was the location for fluid reservoir. During the winter, other liquids tend to freeze and thicken hence the most applied fluid was whiskey and the name Whiskey Jack came into existence.

b) **1991**

Figure 25 : Floor jack

The first floor jack in the figure 25 is made in year 1991. These jack are primarily used to lift heavy equipment from the surface of the floor. It is more often used to change the tires of vehicles. Floor jack is known by different names such as garage jack and car jack. A floor jack is providing having an integrated tool kit. The jack operate by wheeling and sliding the jack under the car (these jacks have wheels and coasters, so they are very easy to maneuver. You do need to ensure the ground is as flat and hard as possible). Once in place under the designated lift point of your vehicle (refer to your owner's manual), the arm of the unit is pumped repeatedly. This pumping action suck oil out of the jack oil reservoir and forces it into the lift chamber, creating an increase in oil pressure and resulting in the saddle arm of the jack rising and lifting your car.

The advantages of the floor jack is can be raised to maximum height in a matter of seconds with just a few pumps of the handle. Next, they also have mobility advantages such as casters that let you roll them around on the floor. The floor jack have a power hydraulic motor weight only 10% to 20% of the motor and easy to achieve overload protection.

Disadvantages for floor jack is handling hydraulic fluids is messy, and it can be difficult to totally get rid of leaks in a hydraulic system. Next, for hydraulic system when the fluids leaks in hot areas, it may easily to catch fire. After that, the steel can also corrosive and also the floor jack have a larger footprint and manual system because must use hand to press the paddle , it's so tired to use hand when want to change the tires.

2.11 THE PARTS OF FLOOR JACK

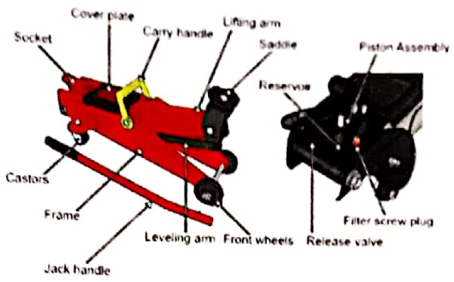


Figure 26 : part of floor jack

Jack handle

Figure 27 is handle jack. The handle enables pumping to lift a load. It is also used to open and close the release valve. Located at the bottom of the handle is a bayonet connector with an individual pin which will be inserted into an L-shaped slot on the socket

Figure 27 : handle jack

Jack saddle

Figure 28 is the jack saddle, the is main component in floor jack. The saddle is placed under the vehicle to enable lifting the car.

Figure 28 : jack saddle

Cover plate

Figure 29 is the cover plate that used to protect hydraulic system from any damage when the jack is use.

Figure 29 : cover plate

lifting arm

Figure 30 The lifting arm is connected to the saddle and raises when pumped. This gives the jack its maximum extension.

Figure 30 : lifting arm

Release valve

The release valve in figure 31 can be opened by turning it anti-clockwise. To close it, simply turn the valve clockwise. Opening the release valve allows pressure to be released, drawing the oil back into the reservoir. Closing the release valve will enable the jack to be ready for lifting.

Figure 31 : release valve

Piston assembly (Pump piston & cylinder)

Once the handle is lifted, the piston raises, bringing oil into the cylinder. Moving the handle downwards will push oil into the main cylinder, which raises the lifting arm.

Figure 32 : piston assembly

Reservoir

The oil reservoir is located on the inside of the jack where the oil is stored.

Figure 33 : reservoir

Castor wheels

Castors wheels in figure 34 designed to fit on to the bottom of larger objects. A trolley jack contains castors that swivel 360 degrees to easily move the jack in any direction without changing its orientation.

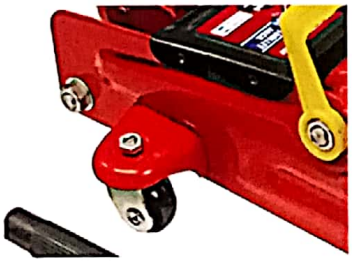


Figure 34 : castor wheels

2.12 THE FLOOR JACKS MADE

Mild steel

Mild steel is a type of carbon steel with a low amount of carbon it is actually also known as "low carbon steel."

Figure 35 : Mild steel

2.13 HOW FLOOR JACK WORK ?

i. place the floor jack under the vehicle.
ii. Insert the jack handle into the socket

iii. lock the jack handle position by turning the jack handle toward anti clockwise.

iv. place the floor jack under the vehicle.

v. Insert the jack handle into the socket

vi. lock the jack handle position by turning the jack handle toward anti clockwise.

vii. Move the jack handle up and down to move the saddle upwards to lift the vehicle.

viii. stop when the vehicle is lifted slightly.

ix. replace the vehicle's tire as usual.

x. When you have finished changing the tire. Remove the jack handle from the socket and place the jack handle on the release valve.

xi. Turn the jack handle anti clockwise to open the release valve. When the release valve opens, the pressure is released and the saddle drops slowly. Then the floor jack can be stored in the car

2.14 AIR HYDRALIC JACK

a) 1993

Air hydraulic jack is designed to handle heavy duty truck, trailer and cars. These jack is pneumatic hydraulic lifting equipment combined by liquid pressurization and telescopic hydraulic cylinder. The Air hydraulic jack is provide with two pairs of jaws, a lower pair of jaws and an upper jaws for a perfect grip. During lifting, both the pair are locked. The jack is only allowed to move upwards. During lifting the lower pair of jaws grip the trestle rod while the jack lift up. After completing the full stroke, the upper pair of jaws grip the trestle rod while the base of the jack move upward. During the process of lowering, any one of the pairs is always locked.

The advantage of hair hydraulic jack is overload safety valves prevent jack from being used beyond capacity. Telescoping ram and integrated filter to protect air motor. The jack have two or three position for adjust the height. The air hydraulic jack also constructed of high-grade steel and built to exacting standards for quality and durability.

Figure 36 : Air Hydraulic Jack

2.15 THE PARTS OF AIR HYDRAULIC JACK

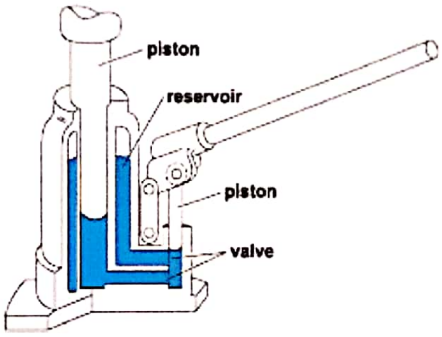


Figure 37 : part of the air hydraulic jack

Jack piston

Figure 38 jack piston reversed and force and transferred from the crankshaft to the piston for the purpose of compressing or ejecting the fluid in the cylinder.

Figure 38 : jack piston

Jack hoses

Jack hoses in figure 39 These jack hoses work to bring the wind to the jack and lift the saddle up and lift the vehicle. These jack hoses are made of rubber.

Figure 39 : jack hoses

Pressure gauge

Instrument for measuring the gas or air that is specified by the force that the fluid would exert, when at rest, on a unit area, such as pounds per square inch or newtons per square centimetre.

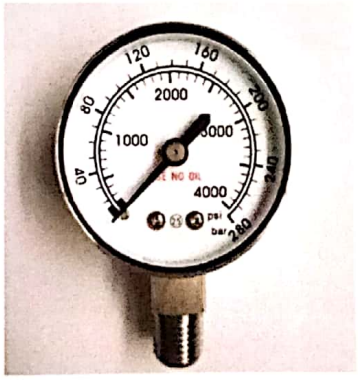


Figure 40 : pressure gauge

Release valve

when the release valve in figure 41 is turning to anti-clockwise, the pressure will released and the piston jack slowly lowering.

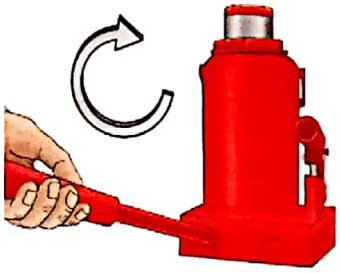


Figure 41 : release valve

2.16 THE AIR HYDRAULIC JACK MADE

Steel

a strong alloy of iron with carbon and usually other elements, used as a structural and fabricating material.

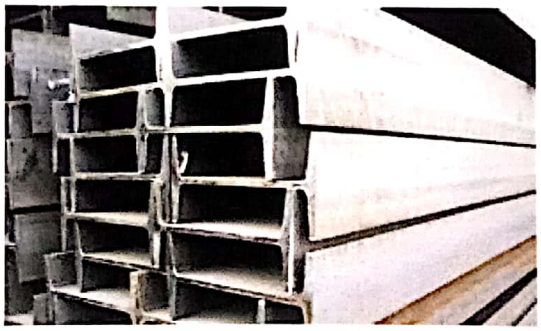


Figure 42 : steel

2.17 INFLATABLE JACK

a) 1995

An inflatable is an object that can be inflated with a gas, usually with air, An Inflatable jack was made in year 1995 the inventor of this jack is John H.Cox and Ralph L.Miller. Inflatable jack is an air bag that is inflated by compressed air in order to lift the object. Inflatable jack can lift from smaller object such as automobile to the larger object like an airplane. These jack has three level pressure system. Low pressure jack are operated at 7.25 psi for high vertical lift in a large surface area but lower lifting area. Medium pressure are operated at 15 psi. High pressure system have higher lifting capacities, operated at 90 psi to 145 psi.

In a high-pressure inflatable, structural limbs like pillars and arches are built out of a tough, flexible material and then inflated at a relatively high pressure. Low pressure inflatables, are slightly pressurized environments completely held up by internal pressure.

Figure 43 : Inflatable Jack

2.18 HOW INFLATABLE JACK WORK

i. place the inflatable jack under the vehicle you want to lift.

ii. Take the tube compressor and compress the air into the inflatable jack to lift the inflatable jack

iii. Change the tire

iv. open the valve on the inflatable jack to release the air pressure inside the inflatable jack

v. stored the inflatable jack

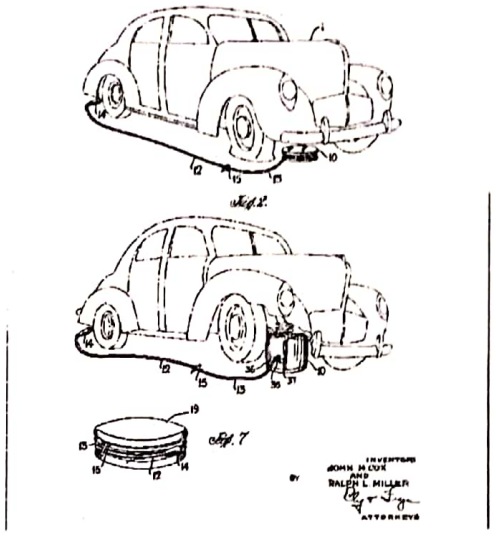


Figure 44 : how inflatable jack work

- PREPARED BY: MUHAMMAD SAIFULLAH AHMAD (08DMP17F1065)

2.19 THE HISTORY ABOUT HYDRAULIC JACK

The first car jack was the hydraulic jack was the car jack to be used to lift a car or heavy cargo this is encouraged 1851. A hydraulic jack is a jack 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.

On July 8, 1851, inventor, and founder Richard Dudgeon was awarded a patent for 'portable hydraulic presses. These jacks were operated by water or any other fluids as whiskey and whale oil; the heads device was the location for fluid reservoir. During the winter, other liquids tend to freeze and thicken hence the most applied fluid was whiskey and the name Whiskey Jack came into existence.

Figure 45 : Hydraulic jack

2.20 SCREW JACK (1934-1985)

It was the earliest car jack invented by William Joseph Curtis in 1838. A jackscrew, or screw jack, is a type of jack that is operated by turning a lead screw. It is commonly used to lift moderately heavy weights, such as vehicles; to raise and lower the horizontal stabilizers of aircraft; and an adjustable supports for heavy loads, such as the foundations of houses.

Figure 46 : screw jack

2.21 PARTS OF SCREW JACK

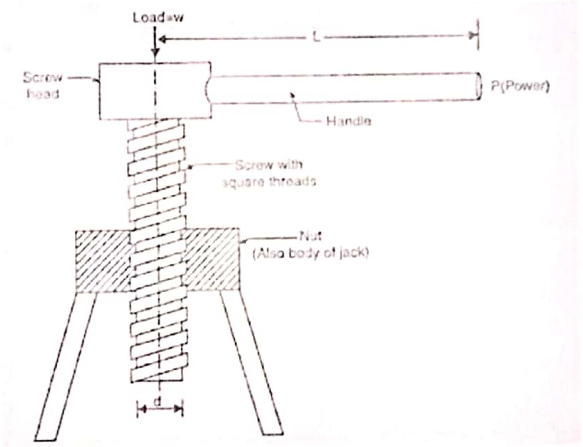


Figure 47 : parts of screw jacks

Screw head

Height-adjustable connections between load-bearing tower and superstructure.

Figure 48 : screw head

Screw jack handle

Handle is long circular bar like structure, use to rotate nut

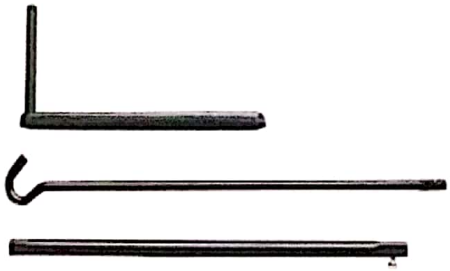


Figure 49 : screw jack handle

Screw

A screw is a mechanism that converts rotational motion to linear motion, and a torque (rotational force) to a linear force. It is one of the six classical simple machines.

Figure 50 : screw

Nut

Relative motion between screw and nut, which cause a friction

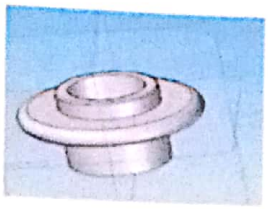


Figure 51 : Nut

2.22 WHAT ARE SCREW JACK MADE OF ?

Carbon steel and stainless steel

Figure 52 : carbon steel and stainless steel

2.23 HOW A SCREW JACK WORKS

A screw jack is a gearbox assembly (either worm gear or bevel gear) and a transmission product (lead screw, ball screw or roller screw) which through use of a motor is used to convert rotary into linear motion. They can be used to push, pull, tension, lock, unlock, tilt, pivot, roll, slide and lift or lower loads, anything from a few kilos to thousands of tonnes.

Screw jacks are essential components in automated machinery. Safety and legislative concerns drive the automation of handling and lifting of heavy loads, particularly in regions which have developed workplace and health and safety legislation. The trend to electromechanical actuation from hydraulic actuation.

Screw jacks usually operate in high-load applications. The competing technology at high loads tends to be hydraulics; however, hydraulics are less energy-efficient than electro-mechanical actuation provided by screw jacks. Hydraulic systems waste energy as the fluid circulates at constant pressure, regardless of the amount of work required to be carried out by hydraulic positioning.

A hydraulic jack or ram requires a constant pressure to maintain its position when holding a load in place. By contrast, an electric motor used to power a screw jack uses energy only when it drives the load to a required position.

Advantages

An advantage of jackscrews over some other types of jack is that they are self-locking, which means when the rotational force on the screw is removed, it will remain motionless where it was left and will not rotate backwards, regardless of how much load it is supporting. This makes them inherently safer than hydraulic jacks, for example, which will move backwards under load if the force on the hydraulic actuator is accidentally released.

Limitations

- Screw jacks are limited in their lifting capacity.

- Increasing load increases friction within the screw threads.

- A fine pitch thread, which would increase the advantage of the screw, also reduces the speed of which the jack can operate.

- Using a longer operating lever soon reaches the point where the lever will simply bend at its inner end.

2.24 MOTORCYCLE JACK (2006 - 2010)

This Jack is used for lifting a motorcycle in a stable manner to enable cleaning, modifications or repairs on your motorbike to be performed easily. Motorcycle jack is a manually operated mechanical machine with only purpose of lifting motorcycle to a certain height that allows better servicing and maintenance of vehicle. Though, it is necessary to know the type of lift jack required for your bike before purchasing one. Different jacks have different lifting range. Depending on your motorcycle model, it is essential to have one with sufficient enough lifting height that allows for easy servicing and maintenance.

Figure 53 : motorcycle jack

2.25 PART OF MOTORCYCYLE JACK

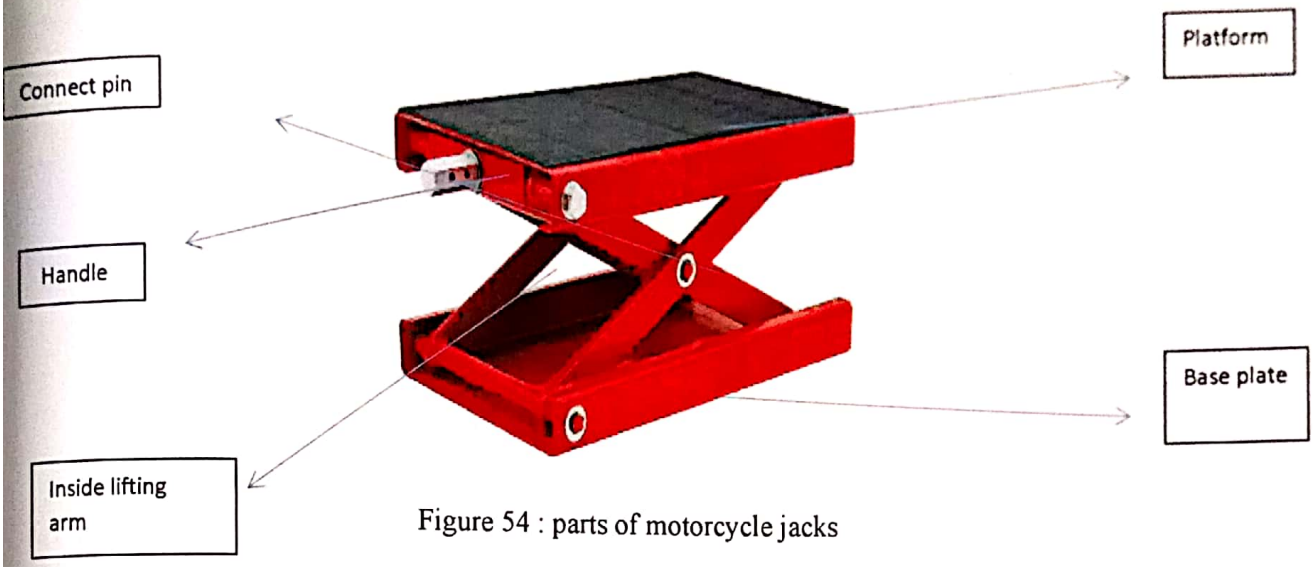


Figure 54 : parts of motorcycle jacks

Connect pin

To connect the movement between the platform and the base plate .

Handle

Pressing handle to press up and down to make motorcycle jack move easily

Base plate

To support heavy loads.

Platform

The place where the goods are placed on top is made of rubber fabric

2.26 MOTORCYCLE JACK MADE FROM

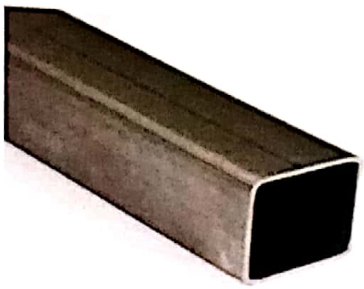


Figure 55 : Square hollow steel

2.27 HOW TO USE MOTORCYCLE JACK

Advantages

- Straightforward and easy to operate.

- Manufacturer provides detailed instructions

-To elevate your motorcycle to the target height.

-Durability and can saving money.

Limitations

-Bit hard or impossible to lift without adjustments.

- Might cause serious injuries if your motorcycle suddenly falls.

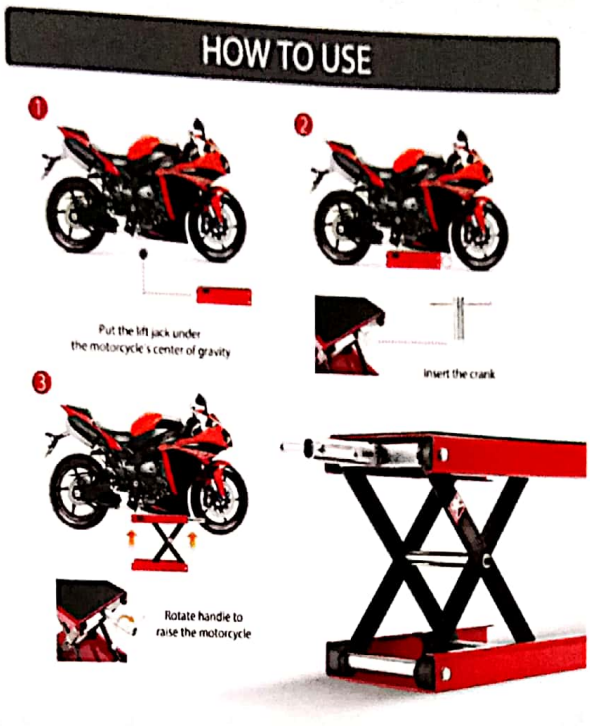


Figure 56 : how to use motorcycle jacks

2.28 BLACK SERVICE JACK (2015)

This unique tire jack features a compact design with the versatility of a full-sized model. The Sunned XL20 Black Service Jack has a dual pump which allows for faster lifting. Its handle has a bumper pad as a safety feature. The tire jack even has a joint release mechanism that's universal to provide you with more accurate control.

Figure 57 : black service jack

2.29 PART OF BLACK SERVICE JACK

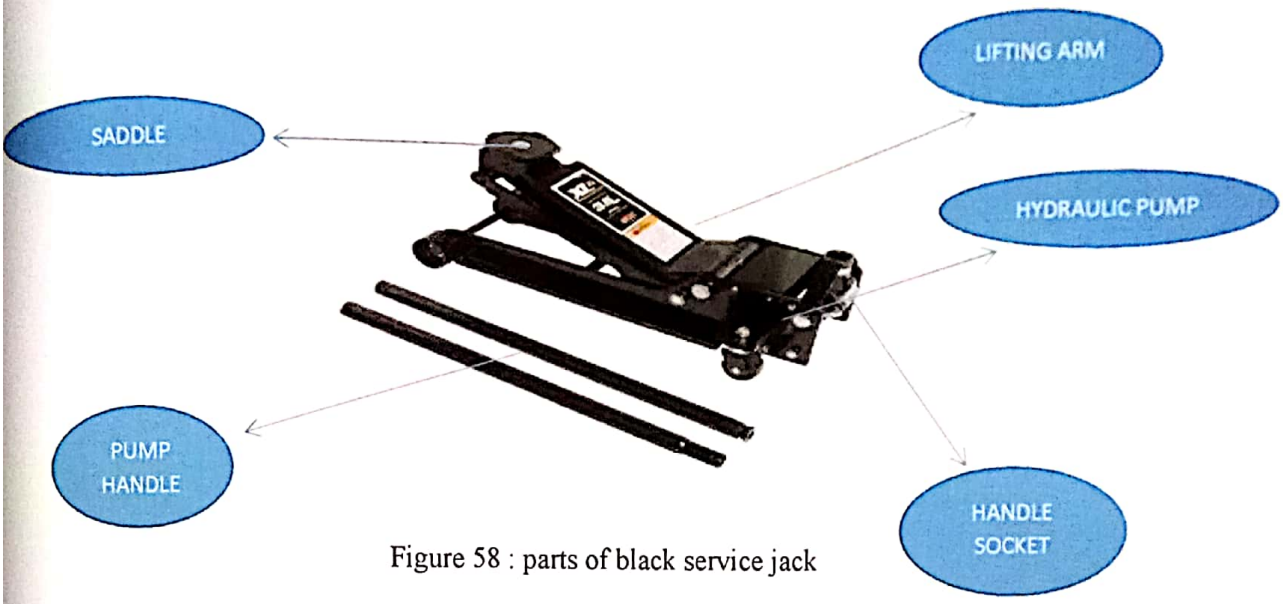


Figure 58 : parts of black service jack

Saddle

Black services jack have a saddle that is placed under the vehicle to enable lifting.

Figure 59 : saddle

Lifting arm

He lifting arm is connected to the saddle and raises when pumped. This gives the jack its maximum extension.

Figure 60 : lifting arm

Pump handle

The handle enables pumping to lift a load – it is also used to open and close the release valve.

Figure 61 : pump handle

Hydraulic pump

Once the handle is lifted, the piston raises, bringing oil into the cylinder.

Figure 62 : hydraulic pump

Handle socket

He jack handle will slot into the socket and enable the user to pump the jack to lift a load.

Figure 63 : handle socket

2.30 HOW TO USE BLACK SERVICE JACK

Step 1

Locate the jacking point, which is usually found about one foot behind or in front of the wheel on which you are working. Check your owner's manual if you have trouble locating it.

Step 2

Stack the plywood and place the stack on the ground where you plan to use the hydraulic jack.

Step 3

Set the jack on a stable point on the plywood stack.

Step 4

Loosen the wheel you plan to work on before you jack up the car. Otherwise, the force you will exert to loosen the wheel may cause the jack to tip over.

Step 5

Release the locking mechanism located on the hydraulic jack handle. This mechanism allows you to lock the handle safely when it's not in use.

Step 6

Jack up the car by operating the lever on the hydraulic jack. Move the lever or jack handle up and down to raise the car about 1 1/2 inches off the ground.

Step 7

Place the jack stand under the axle-stand point underneath the car but never under the axle itself. Check the owner's manual if you are not sure where the axle-stand points are located.

Step 8

Remove the jack stand when you are finished working on the car. Lower the car until the jack is no longer supporting its weight

2.31 THE MATERIAL USE FOR EZ HYDRAULIC JACK

HYDRAULIC JACK

The first car jack was the hydraulic jack was the car jack to be used to lift a car or heavy cargo this is encouraged 1851. A hydraulic jack is a jack 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.

ADVANTAGES

- can be raised to maximum height
- Power hydraulic motor weight only 10% to 20% of the motor
- Easy to achieve overload protection

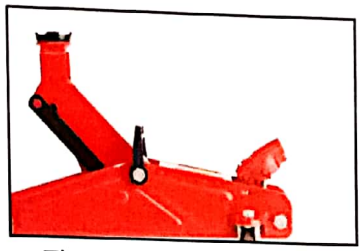


Figure 64 : hydraulic jack

MILD STEEL PLATE

Mild steel is a type of carbon steel with a low amount of carbon – it is actually also known as "low carbon steel." Although ranges vary depending on the source, the amount of carbon typically found in mild steel is 0.05% to 0.25% by weight, whereas higher carbon steels are typically described as having a carbon content from 0.30% to 2.0%. If any more carbon than that is added, the steel would be classified as cast iron.

Mild steel is not an alloy steel and therefore does not contain large amounts of other elements besides iron; you will not find vast amounts of chromium, molybdenum, or other alloying elements in mild steel. Since its carbon and alloying element content are relatively low, there are several properties it has that differentiate it from higher carbon and alloy steels.

ADVANTAGES

- Cost - effective
- Weldable
- Ductile
- Recyclable

Figure 65 : mild steel plate

SQUARE HOLLOW SECTION

Square hollow sections or square tubes are cold formed and welded from either hot rolled, cold rolled, pre-galvanized or stainless steel. Square and rectangular steel tubes have the advantage of being stronger in bending while a round hollow sections has more stiffness in twisting.

ADVANTAGES

- Corrosion protection
- Fire protection by water circulation and concrete-filling

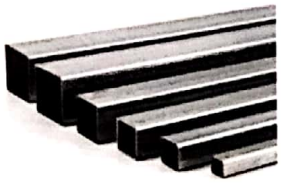


Figure 66 : square hollow section

WING BOLT AND NUT

A wing nut, wing nut or butterfly nut is a type of nut with two large metal "wings", one on each side, so it can be easily tightened and loosened by hand without tools.

ADVANTAGES

- Easier inspection
- Easier replacement of parts

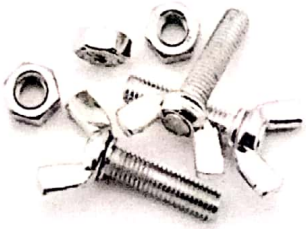


Figure 67 : wing bolt and nut

SQUARE RUBBER

ADVANTAGES

- Easy to maintenance
- Softness
- Water resistant
- Easy installation

Figure 68 : square rubber

STEEL CUTTING SAW

abrasive saw, also known as a cut-off saw or chop saw, is a power tool which is typically used to cut hard materials, such as metals, tile, and concrete. The cutting action is performed by an abrasive disc, similar to a thin grinding wheel.

Figure 69 : steel cutting saw

MIG WELDER

Gas metal arc welding (GMAW), sometimes referred to by its sub types metal inert gas (MIG) welding or metal active gas (MAG) welding, is a welding process in which an electric arc forms between a consumable wire electrode and the work piece metal(s), which heats the work piece metal(s), causing them to melt and join.

Figure 70 : MIG welder

METER TAPE

A tape measure or measuring tape is a flexible ruler and used to measure distance.It consists of a ribbon of cloth, plastic, fibre glass, or metal strip with linear-measurement markings. It is a common measuring tool. Its design allows for a measure of great length to be easily carried in pocket or toolkit and permits one to measure around curves or corners. Today it is ubiquitous, even appearing in miniature form as a keychain fob, or novelty item. Surveyors use tape measures in lengths of over 100 m(300+ ft).

Figure 71 : meter tape

WELDING HELMETS

Welding helmets are most commonly used with arc welding processes such as shielded metal arc welding, gas tungsten arc welding, and gas metal arc welding. Welding helmets can also prevent retina burns, which can lead to a loss of vision.

Figure 72 : Welding helmets

GLOVE

Gloves which cover the entire hand or fist but do not have separate finger openings or sheaths are called mittens. Mittens are warmer than gloves made of same materials because finger maintain their warmth better when they are a contact with each other. Reduced surface area reduced heat loss. Gloves protect and comfort our hands against cold and heat, damage by friction, abrasion or chemicals and disease or in turn to provide a guard for what a bare hand should not touch.

Figure 73 : Glove

CHAPTER 3 : METHODOLOGY

3.0 INTRODUCTION

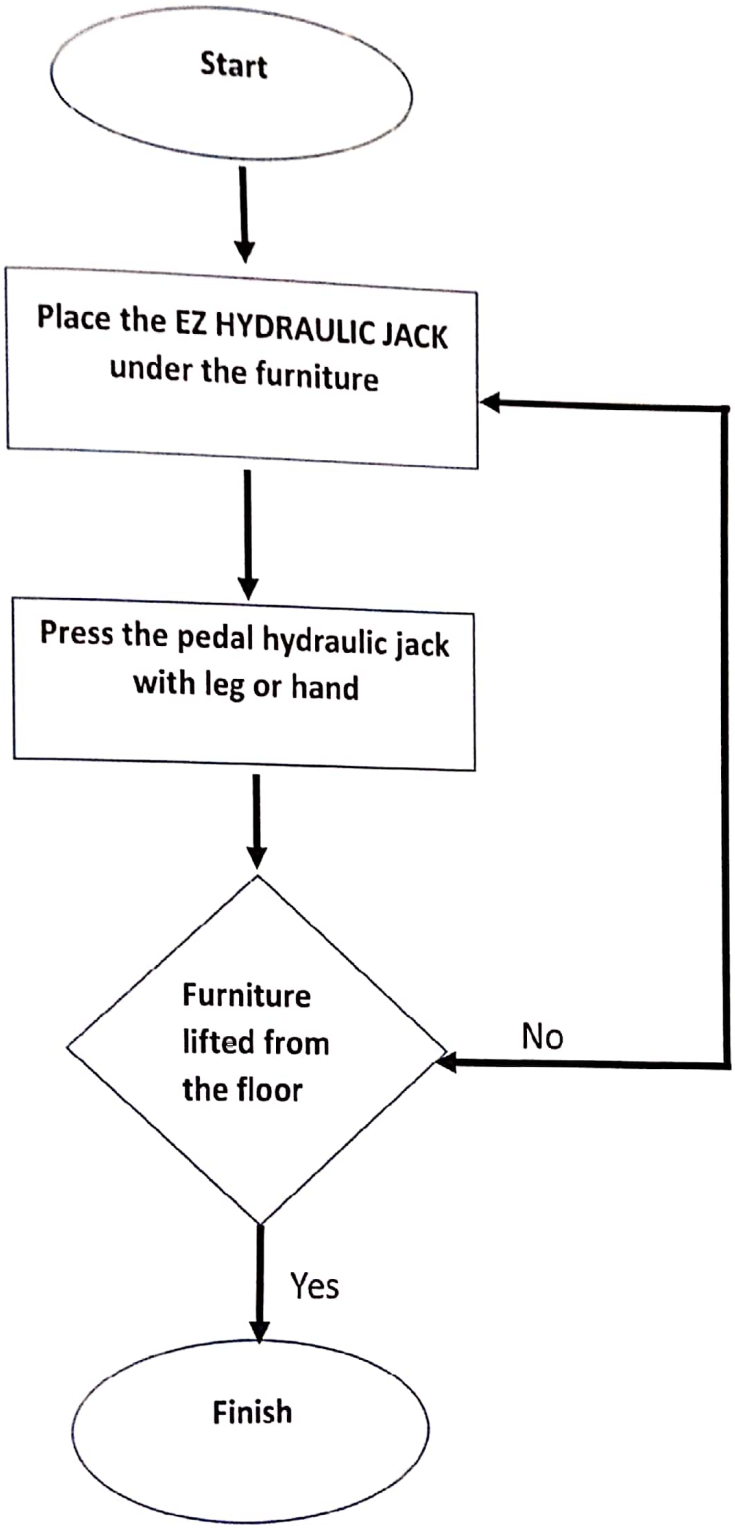
A methodology is a model, which project managers employ for the design, planning, implementation and achievement of their project objectives. There are different project management methodologies to benefit different projects.

A repeatable process with project-specific methods, best practices, rules, guidelines, templates, checklists, and other features for building quality systems that are manageable and deliver value to the organization

Is the systematic, theoretical analysis of the methods applied to a field of study. It comprises the theoretical analysis of the body of methods and principles associated with a branch of knowledge. Typically, it encompasses concepts such as paradigm, theoretical model, phases and quantitative or qualitative techniques.

A methodology does not set out to provide solution it is therefore, not the same as a method. Instead, a methodology offers the theoretical underpinning for understanding which method, set of methods, or best practices can be applied to a specific case, for example, to calculate a specific result.

3.1 FLOWCHART FOR EZ HYDRAULIC JACk



3.2 DRAWING

1. Overview drawing of ez hydraulic jack

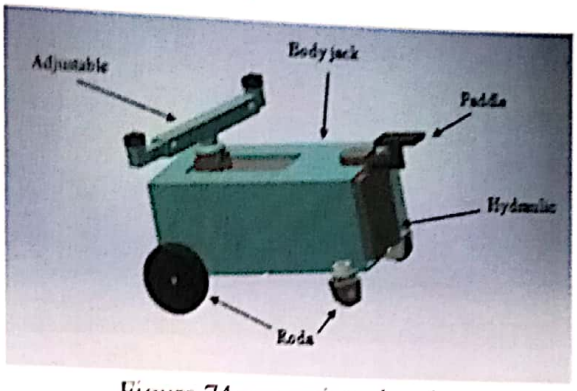


Figure 74 : overview drawing

2. View ez hydraulic jack from right side

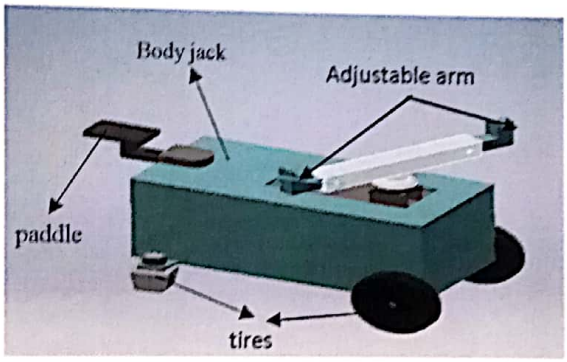


Figure 75 : view from left side

3. Ez hydraulic jack view from above

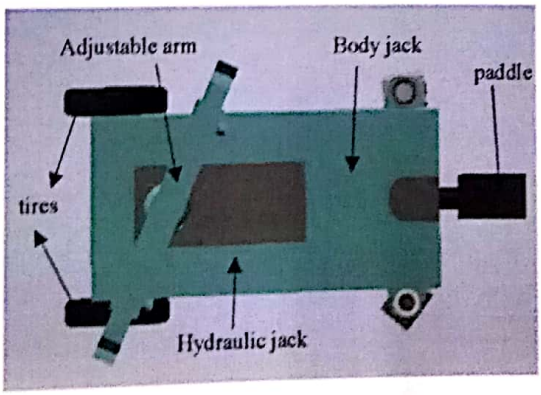


Figure 76 : view from above

4. The view from the front

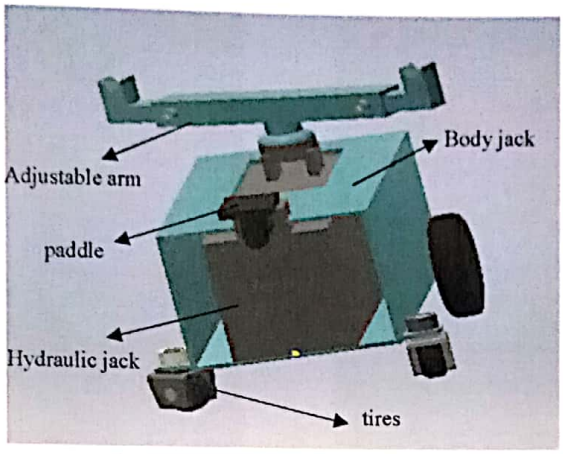


Figure 77 : view from the front

5. The view ez hydraulic jack from the left side

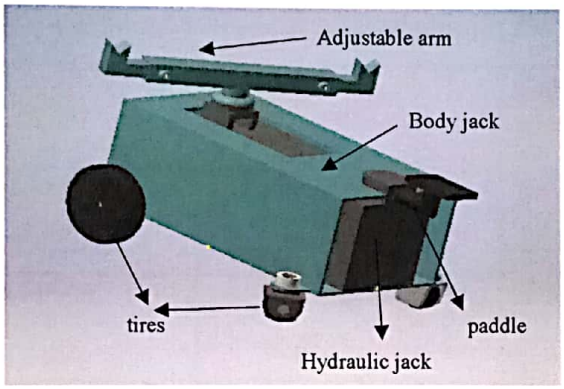


Figure 78 : view from left side

3.3 PROJECT

Figure 79 : Ez hydraulic jack

3.4 BUDGET

Item	Quantity	Capital budget
Hydraulic Jack	1	RM180.00
Mild Steel Plate	5	RM 60.00
Wing Bolt And Nut	5	RM 5.00
Square Hollow Section	3	RM 60.00
Square Rubber	2	RM 5.00
Welding And Cutting Process		RM 100.00
Cleaning And Paint		RM 20.00
		Total : Rm 480.00

3.5 GANTT CHART 1

BIL	ACTIVITIES	DURATION (WEEKS)														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Introduction i. Generating idea															
	ii. Project title section															
	iii. Identify the problem statement															
	iv. Study the project objectives															
	v. Discussion with supervisor															
	vi. Writing a chapter 1															
2	Literature Review i. Define a suitable subtopics refer to the project															
	ii. Make a previous research															
	iii. Discussion with supervisor															
	iv. Writing a chapter 2															
3	Methodology i. Writing Methodology															
	ii. Discussion with supervisor															
	iii. Presentation 1															

Expected time

Time achieved

3.6 GANTT CHART 2

IL	ACTIVITIES	DURATION (WEEKS)														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1.	Briefing Project															
	Material preparation															
	Research about workshop															
	Measuring The Material															
	Cutting															
	Welding Process															
2.	Discussion with supervisor															
	Testing project															
3.	Final Presentation															
	PITEX															
	Writing Report i. Report 1															
	Writing Report i. Report 2															

Expected time

Time achieved

3.7 ANALYSIS AND CONCLUSION PROJECT

FEEDBACK FORM

POLITEKNIK MALAYSIA
SULTAN SALAHUDDIN ABDUL AZIZ SHAH

Borang soal selidik ini dibuat untuk mendapatkan maklum balas dari pengguna yang menggunakan Ez hydraulic jack kami serta kajian berkenaan tahap menampung berat perabot dan boleh membantu pengguna untuk mengangkat dan mengalihkan perabot di rumah dengan mudah terutamanya untuk lelaki dan wanita yang berumur. Kerjasama tuan puan untuk menjawab borang soal selidik amat dihargai.

1. Jantina : Lelaki ☐ Perempuan ☐

2. Umur : 20-30 ☐ 31-40 ☐ 41-50 ☐ 51-60 ☐

3. Pernahkah anda melihat Jack seperti ini : YA ☐ TIDAK ☐

Arahan : Sila tandakan (/) pada satu jawapan sahaja, Sila pastikan anda menanda pada setiap pernyataan.

1	2	3	4	5
Sangat Tidak Setuju	**Tidak Setuju**	**Kurang Setuju**	**Setuju**	**Sangat Setuju**

BIL	PERNYATAAN	1	2	3	4	5
1	Rekabentuk Ez hydraulic jack ini kemas dan baharu					
2	Ez hydraulic jack ini memudahkan kerja mengalihkan perabot 100kg kebawah					
3	Penggunaan tangan dan kaki dapat menaikkan jack dengan baik					

4	Berat Ez hydraulic jack ini mudah diangkat					
5	Ez hydraulic jack ini mudah dinaikkan dan digerakkan					
6	Ez hydraulic jack ini sesuai untuk lelaki dan wanita					
7	Dapat menampung beban perabot dengan baik					
8	Mudah diselengara dan disimpan					
9	Sesuai digunakan di rumah atau di bengkel					
10	Ez hydraulic jack ini hanya memerlukan seorang untuk dikendalikan					

CADANGAN

3.8 PERCENTAGE ANALYSIS FROM FEEDBACK FORM

a) Our team does research on 15 people and we focus on women using our ez hydraulic jack. We get 53% women and 47% men

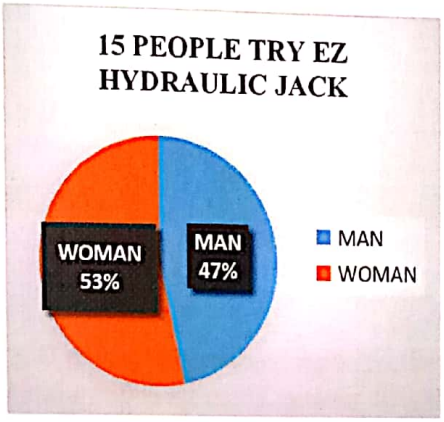


Figure 80 : people try ez hydraulic jack

b) The second analysis is by age. We do the research on the age shown in figure 81 and we do research on aged women and men to make sure our hydraulic jack is even usable.

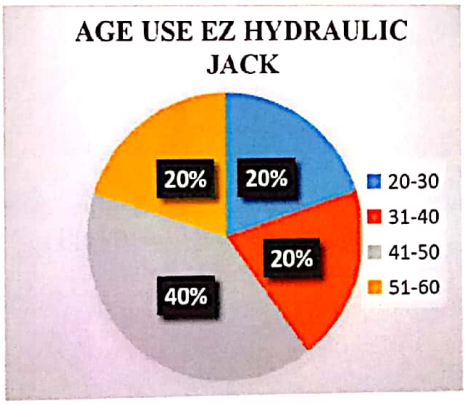


Figure 81 : Age

c) The third research was whether our project could hold under 100kg, and our analysis was 7/15 people agreed, 5/15 disagreed and 3/15 disagreed that our project could carry under 100kg.

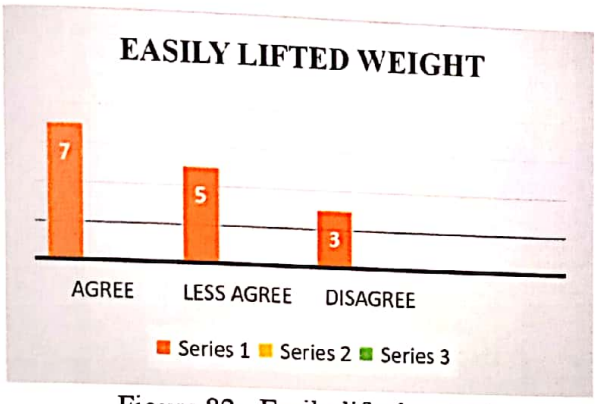


Figure 82 : Easily lifted weight

d) The research in figure 83 is what percentage agree on the use of feet and hands. The analysis on figure 37 shows 60% agreeing against 40% disagreeing on both.

Figure 83 : use legs and hands

e) Figure 84 shows that our ez hydraulic jack is easy to move by 61% agree our ez hydraulic jack is easy to move when using it.

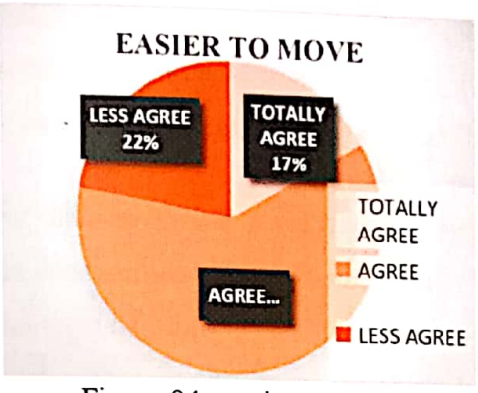


Figure 84 : easier to move

f) Figure 85 shows the use and sale rate. As many as 10/15 agree that this ez hydraulic jack can be easily repaired and maintained in the event of a malfunction. Second is a good sale in domestic and industry and as many as 11/15 people agree on the sale of our ez hydraulic jack. Thirdly, many disagree that our hydraulic jack is one that can handle it.

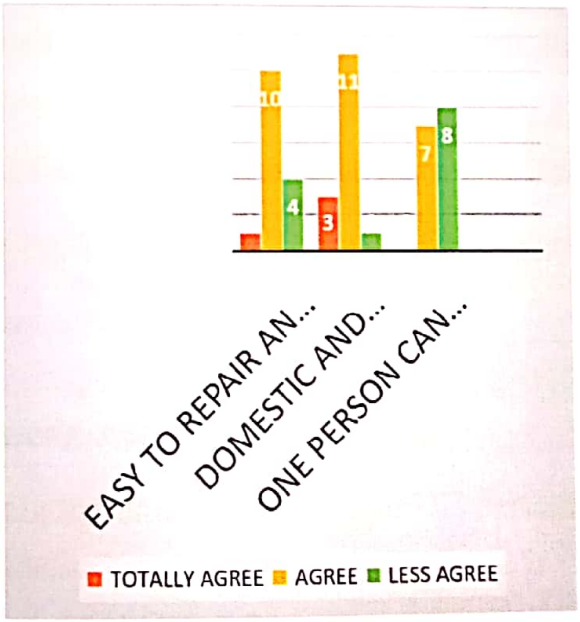


Figure 85 : function and market

3.9 CONCLUSION

Jacking a heavy items is not difficult at all. If you take all the necessary safety precautions and follow all the steps correctly, you have nothing to worry about. On the other hand, as extensive as the process may be, if you don't follow all the steps, you're risking damaging your car or worse, injuring yourself badly.

The difference in our innovation is that we have a foot-keeper and can use hand to raise the jack too, that does not get tired to bending and the strength of the legs is stronger than the hand but this jack can use hand too when your leg tired and it can lift the jack. The design for adjustable arm can open for 30 cm left and right to adjust the size of the furniture.

3.10 REFERENCE

- https://www.google.com/search?q=hydraulic+jack&oq=hydraulic+jack+&aqs=chrome..69i57j0l6.12924j0j7&sourceid=chrome&ie=UTF-8
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