

Modifying Hydraulic Stacker

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Abstract: *Nowadays most of the companies /industries use material handling/lifting equipment's on a large scale. All companies use various types of plating and coating machines, every machine has its specific container according to its size which is not available in every company; so they use their own containers or storing equipment's with the help of lifting machines like crane, stackers, etc. for transferring material from one container to the other which leads to time wastage and has high accident chances. This should be stopped, and hence we modified the material handling/lifting equipment in this project.*

Keywords: Hydraulic Stacker, Container, Equipment

I. INTRODUCTION

It is a hydraulic stacker it comes under material handling it is used in small and large scale industries, malls and many more. It is the new concept of material handling earlier we used normal hydraulic stacker which was very basic having control system and forks to keep object and handle the material. In a small hydraulic system we have taken idea of this from hydraulic stacker used in big industries. We have made better version of hydraulic stacker called modifying hydraulic stacker. We have made it in such a way that the containers placed on the fork of hydraulic stacker which can move upward and downward and incline at a certain angle to load & unload the objects and material. We have made it in such a way that it can be modified easily without breaking it. The construction of this is very easy anyone can make it and also can modify it as per their needs. The main thing is it is cost effective so small scale industries can also afford to buy it. Maintenance of hydraulic jack is not costly and we use it carefully. If we not use it carefully there are chances of leakage in hydraulic and some frame problem if we put more load than the capacity of hydraulic jack. Hydraulic jack lift is future proof. If the customer wants more to add on in the hydraulic stacker it can be done.

Like electric motor to move hydraulic stacker upward & downward and it can also move forward and backward with the help of switches and remote controls. We can replace hydraulic jack according to our need. Below are the list of literature survey and components used in hydraulic stacker.

II. LITERATURE SURVEY

[1] According to Author(s) S K Likhie, Sanjay Kumar Sharma Data-book in Hydraulics is a unique book for students, teachers and practicing engineers and contains formulae, tables, graphs and nomographs which help in solving the problems in Hydraulics. It can be used by teachers/students during tutorial classes and by field engineers for finding solution of field problems. The book will improve teaching learning practices in the subject of Hydraulics. Graphs and nomographs will save considerable time, labour and repetitive calculation by practicing engineers. It will also help in checking of design of various hydraulics structures. It will be invaluable and indispensable book for imparting effective instructions to undergraduate and diploma level students and also to field engineers.

[2] According to K. P. Shah Construction, Working and Maintenance of Stackers and Reclaimers for Bulk Materials represents a significant collection of technical information about construction, working and maintenance of stackers and reclaimers for bulk materials. This information will help to achieve increased reliability at a decreased cost. Assemblage of this information will provide a single point of reference that might otherwise be time consuming to obtain. Most of the information given in this booklet is mainly derived from literature on the subject from sources as per the reference list given at the end of this booklet. For more information, please refer them. All information contained in this booklet has been assembled with great care. However, the information is given for guidance purposes only. The ultimate responsibility for its use and any subsequent liability rests with the end user.

[3] According CSCMP and Scott B Keller. The proper management of warehousing is vital to the fulfilment of customer demand and the ultimate success of a supply chain. Now, there's an authoritative and comprehensive guide to managing warehouse processes and operations in any supply chain. Authored by expert Scott Keller alongside the Council of Supply Chain Management Professionals (CSCMP), this reference brings together authoritative knowledge about all facets of warehouse process and operations supply management. The authors fully address each warehousing option, basic warehousing storage and handling operations, strategic planning, and the effects of warehousing design and service decisions on total logistics costs and customer service. Coverage includes: Basic warehousing management concepts and their essential role in demand fulfilment, including warehousing functions, efficiency, organizational roles, and benefits Key elements, processes, and interactions in warehousing operations management; including product handling, labour management, warehouse support, and extended value chain processes Principles and strategies for effectively planning and managing warehouse operations, including decisions about facility ownership, planning, and strategy Principles and strategies for designing materials handling operations in warehousing facilities, including dock and material handling equipment, AGVs, storage systems, order picking equipment, and more

Critical roles of technology, including warehouse management systems, Auto-ID, and emerging technology issues and capabilities. Best practices for assessing the performance of warehousing operations using standard metrics and frameworks

1st Component We have used hydraulic stacker : Stackers are used a hydraulic lift is a device for moving objects using force created by pressure on a liquid inside a cylinder that moves a piston upward. Incompressible oil is pumped into the cylinder, which forces the piston upward. When a valve opens to release the oil, the piston lowers by gravitational force.

The principle for hydraulic lifts is based on Pascal's law for generating force or motion, which states that pressure change on an incompressible liquid in a confined space is passed equally throughout the liquid in all directions.



A stacker is a large machine used in bulk material handling. Its function is to pile bulk material such as limestone, ores and cereals on to a stockpile. A reclaimer can be used to recover the material.

2nd Component We have used RHS -for making base plate of hydraulic stacker (rectangular hollow section). We have use it because of its smooth flat surface. This material is best for frame work. RHS is made up of stainless steel. This material is corrosion resistant, high durability, it has high tensile strength and this material can be recycle so it is environment friendly. Due to the rectangular shape of this type of hollow section, when joining to other flat surfaces sections only need to be conventional cut. RHS requires negligible edge preparation for welding or joining. This material is easily available in market.

We have coated frame with oil paint & anti rust powder coating.

3rd Component we have used is nut & bolts - This is one of the main component used in this and is used in every machinery which does heavy works. Nuts & Bolts are Fasteners.

Hexagonal Nut & Bolts are larger bolts with six side bolts. Six bolts attached with washer. This bolts head attached with collar this collar is provide the safety of shank. This bolts shank is longer with other bolts so this shank distribute the load capacity of hydraulic hand fork lift. Hexagonal bolts is fastly attached the wheel. In this bolts we use in hydraulic hand forklift channel attached, wheel, hydraulic rod.



As we all know nut and bolts are very important component so we have used it in our project. There are many types of nut bolts but we have used hexagonal nut & bolts because they are used with another shackles, bolts, screws, and other externally threaded components. Hex nuts, in combination with these other fasteners, are used to connect both metal and wood components to prevent tension and movement. We have used mild steel material nut & bolt for hydraulic hand fork lift.



4th Component we have used is hydraulic jack – this is also main component after nut & bolts because hydraulic is going to lift object as per requirement.

We have used hydraulic system of 1/1.5 ton as per our requirement.

The Torin BIG RED T30306 hydraulic long hit jack has a single piston pump and clevis base that is designed for residential and commercial use. Fits most garage/shop cranes, engine hoists, and more. The lifting range is 24-3/8" to 43-7/8" with a 3 ton (6,000 lb) load capacity. This long ram jack is constructed of heavy-duty steel with a heat-treated chrome cylinder for added strength. It features a high-quality glide-action pressure pump designed to lift with minimal muscle and effort and has an integrated built-in oil-bypass and overload valve that protects the hydraulic system from extending beyond its travel limits. Hydraulics are powered with a high-quality oil, which offers better corrosion resistance and high/low temperature flexibility, allowing the unit to operate at temperatures between 40 degrees Fahrenheit and 105 degrees Fahrenheit. The piston ram is treated and polished to resist skiving and utilizes a Y-style polyurethane sealing ring with backup ring, preventing the load from falling slowly. The clevis style base provides added versatility. After a thorough chemical wash to ensure a long-lasting finish and to help prevent rust, it's treated with a powder-coated, lead-free paint, providing a durable coating which is oil, grease, and dirt-resistant for easy cleanup. This unit is 100% factory tested for reliability and safety to meet and comply with ASME PASE safety standards..



5th Component we have used is Hydraulic Jack Stand:

Jack stands are an essential part of vehicle lifting. Jacks are designed to raise a load not hold it. Jack stands, on the other hand, are purpose-built to reliably hold static loads during routine maintenance. Users that fail to utilize jack stands are risking financial and bodily harm by doing so.

A stand whose height may be adjusted and which is used to support a container that has been raised by a jack. It has four sides and four vertices. Each vertex has angle equal to 90 degrees. The opposite sides are equal and parallel.



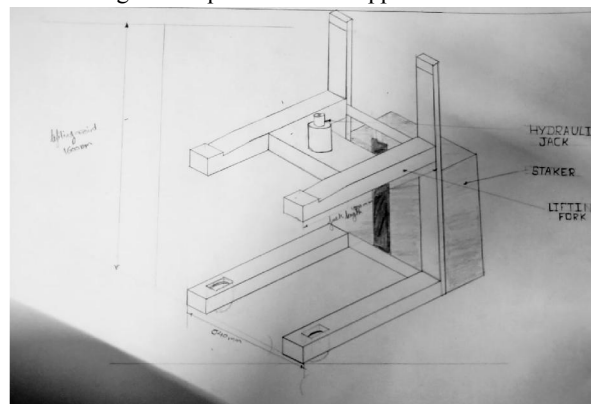
III. MATERIAL REQUIRED

3.1 List

1. Hydraulic Stacker
2. Welding & cutting machine
3. Hydraulic Jack
4. Hydraulic Jack Stand
5. Nut & bolts

IV. CONCLUSION

This is a Modified hydraulic Stacker with some basic modifications. This modification is made with a low cost which be affordable to small scale industries and it can be made in very short time with good quality and with proper inspection before giving to the customer. This can lift a load upto 1 ton easily which have a load bearing capacity and can withstand the load and also can be adjustable on upward and downward direction as per requirement as per need with the help of hydraulic. It can also incline at certain angle as required with a stopper.



4.1 Advantages & Disadvantages

Advantages	Disadvantages
Highly safe	Improper handling
It can be move	Oil problem

It can be move	Leakages
Need less man power	
Use at every department were it needs	
Low cost investment	

4.2 Future Enhancement

- Can increase hydraulic/load capacity
- Can develop hydraulic system
- Can add motor
- Can increase material quality
- Can be modified as per requirement.

4.3 Total Costing

- Hydraulic electric stacker: 50k to 1.5 lakhs
- Hydraulic Jack: 4k
- Hydraulic Jack Stand: 1500
- Nut & bolts: 60 Rs/Kg.
- Rectangular section: Rs 1000
- Total amount: Rs 156700

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