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Design and Development of Portable forklift

Mr. Ruturaj R Jadhav[1], Mr. Omkar Y Jadhav[2], Mr. Naresh R Shelar[3], Mr. Sandesh S Desai[4], Prof. Mukesh A. Mane[5]
Department of Mechanical Engineering, Suman Ramesh Tulsiani Technical Campus, Faculty of Engineering

I. INTRODUCTION

A. Introduction

Now days due to heavy work load environment in the mechanical industrial lines workers are been depressed for carrying a heavy load, where the workers are prone to unhealthy conditions. Due to these factors some load carrying machines were developed in the recent past years. Like lift A forklift is a powered industrial truck used to lift and move materials over short distances. Forklifts are available at the market which requires more energy to operate, and cannot be used on the uneven surface.

Working in the mechanical workshops or any other large fabrication unit, where load is to carry (bars, plates, machined jobs etc.) from one unit of the factory to the other unit this device is useful. The total number of injuries per year (non-serious, serious, and fatal) is 96,785. The purpose of this project is to modify the design of the forklift in terms of its functionality and also human factors considerations. In this project we are designing forklift up to 500kg of lifting capacity. In the process of obtaining a suitable design, the customer needs will be translating to the engineering characteristic to obtain the concepts that need to be modified and fabricated. Most people are familiar with the basic forklift (Manually operated) that is still included as standard equipment with newest automated forklifts. Improvement in forklift is really needed to make it more efficient, user friendly, and practical to use, & most importantly high safety features. The In-plant goods carrier system is user friendly as designed. The device finds greater use in the industrial lines for transport of the machined jobs, carrying goods internally in the fabrication plant. Forklift is an industrial power truck used for lifting and transport materials. Through the steel fork under the load, the lifting and transportation have been done. At present, different kinds of forklift is available, according to the lifting weight of forklift is divided into small tonnage (0.5t) and (1t), middle tonnage (2t and 3t) and large tonnage (5t and above). The purpose of this project is to encounter these problems. In this project we are using two types of lifting mechanism to lift the load. Assumptions made in designing a forklift, the total load is distributed among the forks for forklift (up to 100kg).

B. Problem Definition

Humans have always needed to lift stuff, but haven't always known the means to do so effectively. Hoist were developed and used but we cannot use hoist to lift loads in few places. A hoist is just a system of chain and wenches on platform that could somewhat be moved. Hoist were great for lifting but not for much for moving from one place to another in few places. The platforms could get under lifted goods and then moved with a handle for transportation of machines in few places was our idea to minimize the labour work. Forklift help moves stuff that humans couldn't move easily. To overcome this problem, we are using Forklift to find the solution on how to design a forklift using the simplest and cheapest way while it is energy saving. Although there were many ways to solve this problem, we recommend that the design of forklift system is the practical way when we considered all the factors and consequences especially about the analysis to develop this product. Hence, this report had been prepared to recommend the design of the forklift that is user friendly and easier to operate as do not required too much money to develop this product.

II. LITURATURE SURVEY

Aashishkumar L Sharnangat, M. S. Tufail,(2017)' he said that the development of robotic forklift intended to operate alongside human personnel, handling palletized materials within existing, busy, semi structured outdoor storage facilities. The robot operates in minimally-prepared, semi structured environments, in which the forklift handles variable palletized cargo using only local sensing, and transports it while interacting with other moving forklifts.

LiaiPan (2017) , a, Qiulei Dub As a kind of industrial handling forklifts, forklift plays an indispensable role in people's life. Nowadays, in order to meet the needs of the people, the types of forklift are more and more. In this project, based on already the basic parameters of the push forward forklift tin the market, the working device of the forklift has been introduced.

Praveen raj (2016) he pointed out that in the modern world though there are many developments in the field of engineering. Development of lift simplifies the effort of carrying heavy loads over stairs, it is not possible to use lift in all places like schools, college's constructional areas. This paper aims at developing a mechanism for easy transportation of heavy loads over stairs. The main objective is to find an efficient and user friendly method of carrying various objects through stairs using minimum effort from

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the user and to also provide a smooth movement while climbing the stair. A stair climber is manufactured with tri lobed wheel frames at both sides of the climber and three wheels on each side are used in the tri lobed frame. The wheel assembly is rotated by a gear- motor mechanism where a direct current (DC) gear motor is used to provide the necessary power for rotation and a pinion-gear mesh is used for reducing the rotating speed of the wheel.

III. RESULTS AND DISCUSSION

The overall system was evaluated by performing an end-to-end pick and place task. The objectives of the test are to verify performance and reliability of the Portable forklift systems, and demonstrate the implementation. The forklift was tasked with navigating to a bay containing a load, picking it up, then placing it in another bay. The test was conducted in an loading dock. The test was conducted as follows:

1) The forklift begins at one end of the loading dock, with a view of at least one localizing tag so the forklift is able to obtain a position.
2) Upon pressing switch, the forklift begins moving hook in upward direction.
3) After lifting load, we moved the forklift to the drop-off area and successfully unloaded the load.

In initial tests, the forklift was able to reliably operate under control using manual command. In current form, the forklift successfully delivers reliable, functional autonomous hardware and a fully functional stack to enable further research in specific areas of autonomy.

IV. FUTURE SCOPE AND OBJECTIVE

A. Scope and objective

1) Scope: This project is about the designing and fabricating the forklift. The types of forklift that we used in this project are linear actuator operated forklift as it is more reliable and easy to operate. In order to develop new concept of the forklift design, we have done some survey by discussing with the forklift user. The scopes of project were on the designing 50kg maximum lifting capacity of forklift. To achieve our new design goals, we need to do some work on the existing forklift design and what kind of product transportation is using. Based on that work, we need to find what the shortcomings of existing designs are. The new design offers both new and improvised features, over what is currently available.

2) Objective: The main objective of this work is to minimize the human effort by improving the design of lift. To fulfill the requirement of industry, to reduce the cycle time and improving the productivity of plant.

The following objective will focus in this work: -

a) To study the various types of lifting mechanism.
b) To study the technical specification, critical dimensions and manufacturing process of various components of lift.

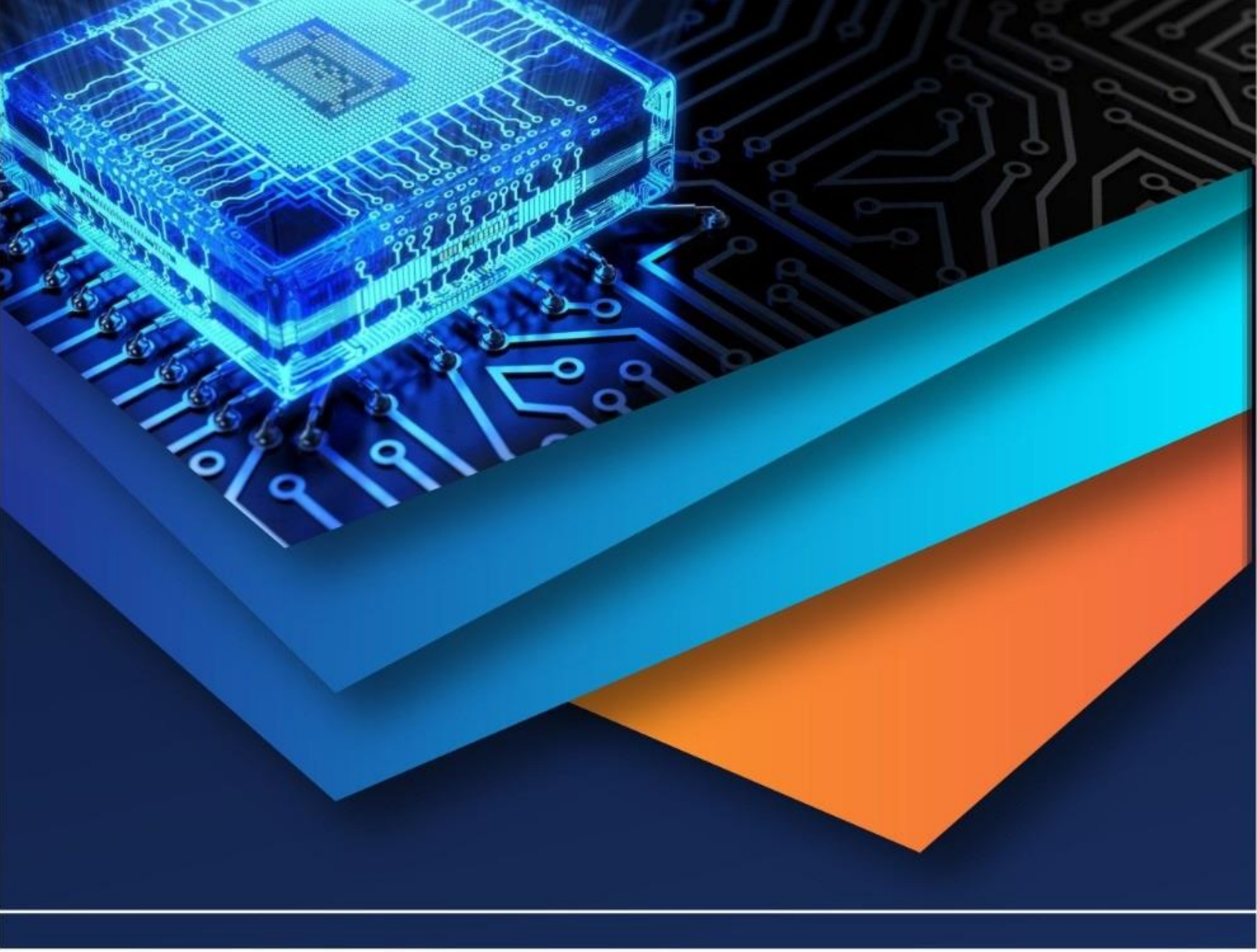
The design of lift will be analyzed by using analysis tool for validation.

V. CONCLUSION

This project will helpful for small scale industrialists as it is easy to operate with less cost and indirectly it will save the labor cost. Savings resulting from the use of this machine will make it pay for itself with in short period of time& it can be a great companion in any field dealing with rusted and unused metals. Researchers have done tremendous work in the area of trolley design with greater reliability, protection and robust design also design was adequate and costs reduced. Trolleys used in many areas like in hot rolled product handling, grain feeding trolley, in casting industries, shopping malls etc., much more work is still needed to make use of trolleys in different areas. Future Research includes research on forklift's weight change and stability during the turning and speeding up process, and developing a shifting counterweight automatically adjust the balance of the forklift.

REFERANCES

[1] Mr. V.B.Bhandari, "Design of machine element", Tata Mc- Graw Hill Publication, 3rd Edition 2010.
[2] Mr. P.S.Gill, "Design Data Book", 3rd Edition.P. S. Thakare, P. G. Mehar, Dr. A. V. Vanalkarand Dr. C. C. Handa, "Productivity Analysis of Manually Operated and Power Operated Sheet Bending Machine: A Comparative Study",International Journal of Engineering Research and Applications (IJERA), ISSN: 2248-9622, Vol. 2,Issue 2, Mar-Apr 2012, PP.111-114.
[3] Failure of Forklift Forks, Juan M. Massone and Roberto E. Boeri, Engineering Failure Analysis 17 (2010) 1062–1068.
[4] Michael G. Kay, Material Handling Equipment (McGraw-Hill, 2nd Edition, 2012).
[5] P. Jey Praveen Raj, P. M. Mohamed Fuge, R. Paul Caleb, G. Natarajan**,** Design and Fabrication of Stair Climbing Trolley, International Journal for Scientific Research and Development,*6(2),* 2016, 50 - 53.



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