



e-ISSN:2582 - 7219



INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY RESEARCH IN SCIENCE, ENGINEERING AND TECHNOLOGY

Volume 4, Issue 12, December 2021



INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA

Impact Factor: 5.928



9710 583 466



9710 583 466



ijmrset@gmail.com



www.ijmrset.com



Design and Analysis of Industrial for K lift for Light Weight

Sakthi Priyan. S¹, Senthil Kannan. V², Sivasubramaniam. A. P³

UG Student, Department of Mechanical Engineering, Paavai Engineering College, Namakkal, Tamil Nadu, India¹

Assistant Professor, Department of Mechanical Engineering, Paavai Engineering College, Namakkal, Tamil Nadu, India²

Professor, Department of Mechanical Engineering, Paavai Engineering College, Namakkal, Tamil Nadu, India³

ABSTRACT: Mechanical fork lift is an improved and advance technology that helps brought about revolution in the mechanical industries today all heavy engineering company uses it. Widespread use of the forklift truck had revolutionized warehousing practices before the middle of the 20th century. A mixture of material handling systems is in the use, exact from that entirely physical to the onesthat are semi-automatic but manually controlled. Forklifts have revolutionized warehouse work. They made it possible for one person to move thousands of pounds at once. Well-maintained and safely operated forklifts make lifting and transporting cargo infinitely easier. This is the general description of a normal forklift truck. To enhances the technology further, this prototype module is constructed with electric drive there by the handling is made simple, also load carrying capacity get increases and the container can be placed accurately (precision position). This increases the safety of the operator.

I.INTRODUCTION

In general the forklift can be defined as a tool capable of lifting hundreds of kilograms of weight. A forklift is a vehicle similar to a small truck that has two metal forks on the front used to lift cargo. The forklift operator drives the forklift forward until the forks push under the cargo, and can then lift the cargo several feet in the air by operating the forks. The forks, also known as blades or tines, are usually made out of steel and can lift up to a few tons. Forklifts are machines that use levers and/or pulleys to lift significant weights. A fork lift one passes on the road may look like a fairly modern invention, but these machines have actually been used for at least the past 2000 years, if not longer. The Romans used forklifts to build huge monuments. Medieval churches were constructed with them. Also, the Egyptians may have used them to create pyramids. The modern version can be either simple or complex, and forklifts vary based on their application. To make the project work more realistic, much importance is given for practical orientation, therefore a prototype module is constructed for the demonstration purpose. This module simulates the real working system & based on this technology with slight changes in the structure & motor ratings, the system can be converted for real applications. The method of converting rotary to linear motion is implemented in the mechanism. The forklift is designed to move in all directions including reverse direction also.

II.LITERATURE REVIEW

KuldipKadade, VideetKamble, PriyankaChavan, PoojaChauhan, Dinesh Pargunde,"Design and Fabrication of Universal Driving Wheel with the application of Forklift: A Review"[1], This paper gives the review of different article paper which includes the design of different universal wheel, their specifications, kinematic analysis etc. Universal driving wheel is a centered wheel with angled rollers around the periphery of the wheel which enable the load carrier to shift sideways as well as diagonally without changing the direction of the wheel.

Sneha Vishnu More, "The study of Efficiency and Effectiveness of warehouse Management in the context of Supply Chain Management"[2], In supply chain management, modern warehousing firms and distribution centers are overwhelmed with information related to the flows and storage of goods and services. The efficient and effective utilization



of logistics and related information can enhance firms' ability to reduce costs while simultaneously improving customer satisfaction. Warehouse management system (WMS) are frequently implemented and used with these goals in mind.

AdityaVaidya, KrunalRotliwala, Mahesh Prajapati, Nikunj Patel, Rahul Rajpurohit,"Design Of Pedal Operated Wheel Drive Forklift"[3], Mechanical forklift is an improved and advance technology that helps brought about revolution in the mechanical industries today all heavy engineering company uses it. Widespread use of the forklift truck had revolutionized warehousing practices before the middle of the 20th century. A mixture of material handling system is in the use, exact from that entirely physical to the ones that are semi-automatic but manually controlled. Forklift have revolutionized warehouse work.

Wheel Drive Forklift For Industrial Warehouse, "RajatRajendra Wade, Digvijay k. Take, Mahesh S, Deshmukh, Pranaw a. Raut"[4], In today's life, there's a good type pf forklift, from the big signification loading truck to the one that works among slim aisles. Forklift have become one in all the fundamental transportation tools we tend to use in ours lives. With all the forklift in existence, we discover that their square measure some enhancement that can be created to bring the self-propelled vehicle to a much better performance. Mechanical fork raise is associate improved and advance technology that helps caused revolution at intervals the mechanical industries these days all important engineering company uses it.

RajendraTrailokya, SanketShinde, Rahul Jadhav, SagarPujari, Prashant.D.Ingle, "Zero Degree Steering Forklift For Warehouse"[5], In traditional steering mechanism involves traditional steering principle. Its advantage is that it is very safe and even prime the propensity and balance of vehicle at very high immediacy. But it can't be used at highly sharp steers(i.e.steers at where has to rotate about an angle of 90 degree) or at steer where there is not enough space for the car or automobile to rotate. This that is arduousness connected with the traditional procedure of steering is completely replaced by installing a four wheel steering mechanism. Four wheel steering is comparatively new technology, that imposes transport propensity in little cars, sedan, SUV, heavy duties and other.

T.Ferreiral & I.A. Gorlach1, "DEVELOPMENT PF AN AUTOMATED GUIDED VEHICLE CONTROLLER USING A MODEL-BASED SYSTEMS ENGINNERING APPROACH"[6], In this research, a controller for an intelligent AGV-based material-handling system was developed using Visual Paradigm software, an MBSE tool. The AGV controller is capable of : Autonomous retrieval and delivery of SPS trolley. Effective non-contact collision detection and avoidance. Continuous operation for a duration of 16 hours before the need for battery charging. Safe operation in the working environment In addition to the above capabilities, the AGVs proved to be reliable when detecting control markers and responding to the input command received from them.

Ravi G. Kaithwas, Aniket A. Pattiwari, Rahul R. Ulmale, Ashish D. Wabhitkar, "TWO WHEEL AISLE FORKLIFT"[7], The purpose of this paper was to focus on the solving problems at the warehouse using forklift of carry load lighter weight and making it efficient n reduce the accident's happening in warehouse due to large forklifts. The two wheel asile forklift is designed keeping the centre of idea to increase work efficiency, reducing power Consumption, smaller dimension and hence aisle for movement in narrow space of warehouses, high safety factor, time saving application, easy controlling from on board.

Suman Kumar Das, M.K.pasan, "DESIGN AND METHODOLOGY OF AUTOMATED GUIDED VEHICLE-A REVIEW"[8],There are several possible directions for further research. We can improve the guided tape type AGV utilizing better navigation technique. It can be adopted any environment and cheap among autonomous robot. There is significant amount of difference between theoretical and practical work cycle value of time which can be optimized by adopting different methodology.

N.Ashok J. Dinesh Kumar, S.Mohamednizarudeen, "DESIGN AND ANALYSIS PF TWO WHEEL DRIVE FORKLIFT FOR INDUSTRIAL WAREHOUSES"[9], The project carried out by us made an impressing task in the field of production and manufacturing industries. It is very useful for having the scarp collecting vehicle, because they need not take any risk for park the vehicle. This project will reduce the cost involved in the concern. Project has been designed to perform the entire requirement task at the shortest time available.



A.J.Deokar, S.K.Kamble, G.P.Fagare, A.R.Naik, A.Y.Sutar, “HUMAN POWERED FORKLIFT”[10], We conclude that, this project wil helpful for small scale industries as it is easy to operate with less cost and indirectly it will save the labour cost. Savings resulting from the use of this machine will make it pay for itself with in short period of time and it can be a great companion in any field dealing with rusted and unused metals. It is mechanical device, does not required electricity as well as any external source of battery.

III.METHODOLOGY OF PROPOSED SURVEY

When the operator stands on the base frame and activates the push button located at the hand lever which starts the dc motor which is coupled to the wheel mounted shaft, this makes the fork lift to displace from its rest position to loading position. The carrier link is connected to the load by the movement of fork lift and the lifting of load is done by the activation of pulley connected to the belt drive with the help of dc motor, when the desired height had reached the lock pins gets engaged with the lifted carrier link and makes the load to rest in the desired position

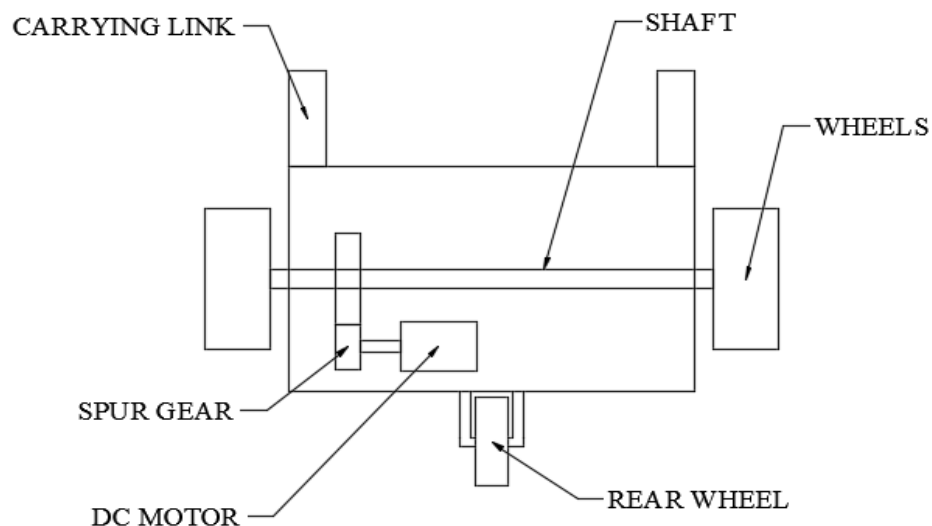


Figure 1. 2D Diagram

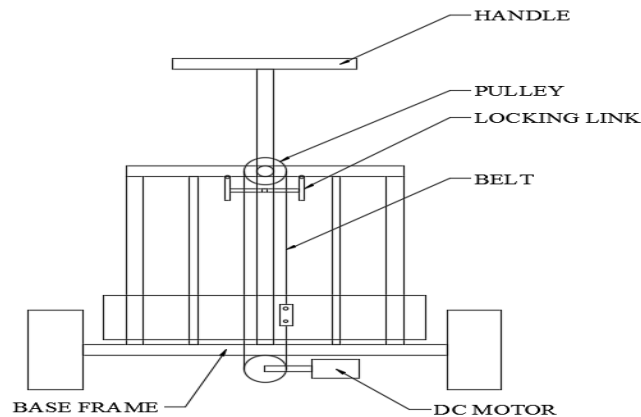


Figure 2. Base Diagram

SPROCKET

Chain drive is a way of transmitting mechanical power from one place to another. It is often used to convey power to the wheels of a vehicle, particularly bicycles and motorcycles. It is also used in a wide variety of machines besides vehicles.

Most often, the power is conveyed by a roller chain, known as the **drive chain** or **transmission chain**, passing over a sprocket gear, with the teeth of the gear meshing with the holes in the links of the chain. The gear is turned, and this pulls the chain putting mechanical force into the system.

Sometimes the power is output by simply rotating the chain, which can be used to lift or drag objects. In other situations, a second gear is placed and the power is recovered by attaching shafts or hubs to this gear. Though drive chains are often simple oval loops, they can also go around corners by placing more than two gears along the chain; gears that do not put power into the system or transmit it out are generally known as idler-wheels.

By varying the diameter of the input and output gears with respect to each other, the gear ratio can be altered. For example, when the bicycle pedals' gear rotate once, it causes the gear that drives the wheels to rotate more than one revolution.

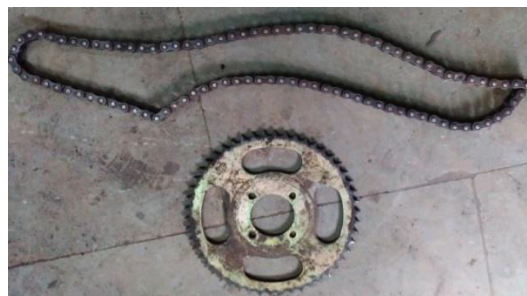


Figure 3. Chain and Sprocket



IV.CONCLUSION AND FUTURE WORK

The development of Mechanical forklift assures the ergonomically comfort to the operator or worker and to reduces time required for manual lifting and handling. It lifts the maximum load of 200 Kg at maximum height 1250mm. This increases efficiency of productivity & it provide safety of operator while handling of the material.

REFERENCES

- [1] KuldipKakade, VideetKamble, PriyankaChavan, PoojaChauhan, DineshPargunde, "Design and Fabrication of Universal Driving Wheel with the application of Forklift; A Review", International Journal of Scientific & Engineering Research, ISSN 2229-5518 Volume 9, Issue 5, May-2018.
- [2] Sneha Vishnu More, "The study of Effectiveness of Warehouse Management in the context of Supply Chain Management", International Journal of Engineering Technology, Management and Applied Sciences, ISSN 2349-4476, Volume 4, Issue 8, August 2016.
- [3] AdityaVaidya, KrunalRotliwala, Mahesh Prajapati, Nikunj Patel, Rahul Rajpurohit, "Design of Pedal Operated Wheel Drive Forklift", International Journal of Design and Manufacturing Technology (IJDMT), ISSN:0976-7002, Volume 9, Issue 1, Jan-April,pp,17-22.
- [4] 3 Wheel Drive Forklift For Industrial Warehouse,"RajatRajendra Wade, Digvijay K. Take, Mahesh S. Deshmukh, Pranaw A. Raut", International Research Journal of Engineering and Technology (IRJET), ISSN: 2395-0056 Volume: 05 Issue: 02, Feb-2018.
- [5] RajendraTrailokya, SanketShinde, Rahul Jadhav, SagarPujari, Prashant.D.Ingle, "Zero Degree Steering Forklift For Warehouse", International Journal of Scientific & Engineering Research, ISSN 2229-5518, Volume 9, Issue 5, May-2018.
- [6] Table 4.1: Basic of Square Threads in mm, Khurmi Gupta.
- [7] Yogendra Panta et al,"Static Analysis of a forklift", ASEE North Central Section Confrence, American Society for Engineering Education, 2015,pp-1-12.
- [8] FAN Jie et al,"Design of an Electric Forklift", Computer Aided Drafting and Manufacturing, Vol.25,No.3, September 2015,pp-39-42.
- [9] Sachin Ugale et al," Design, Development and Modelling pf Forkllift", International Journal pf Engineering Research & Technology, ISSN: 2278-0181, Vol.3, Issue 4, April 2014,pp-1234-1238.
- [10] Sachin Ugale et al, "Design and Structure Analysis of Mechanical Forklift using ANSYS softmware,"International Journal of Research in Advent Technology, E-ISSN:2321-9637, Vol.2,



INNO SPACE
SJIF Scientific Journal Impact Factor
Impact Factor:
5.928

ISSN

INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA



INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY RESEARCH IN SCIENCE, ENGINEERING AND TECHNOLOGY



9710 583 466



9710 583 466



ijmrset@gmail.com

www.ijmrset.com