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Design and Fabrication of Portable Forklift

Nikhil Agnihotri¹, Harsh Vardhan Chaudhary², Md. Nazim³, Mo. Akiv⁴

^{1, 2, 3, 4}Under Graduate Student, Department of Mechanical Engineering Pranveer Singh Institute of Technology, Kanpur

Abstract: Objective: The objective of this project is to design and fabricate small model of a portable forklift which is light in weight, easy to use, more handy than conventional ones. The project is specifically designed for small scale industries.

Novelty Statement

1) Body to lifting weight ratio is better than conventional forklifts.

2) Pneumatic lifting mechanism is less complex than motorised gear mechanism and hydraulic mechanism.

Proposed Methodology: This prototype module is constructed with efficient pneumatic technology using pneumatic compressor cylinder arrangement there by, the operator can walk along with the forklift for better visibility & the container can be placed accurately. This increases the safety of the operator.

Beneficiary: It can be used by any person no specific skill is required to operate. Single person could shift weight from one place to another.

Closure statement: Portable fork lift is an improved and advance technology that helps brought about revolution in the mechanical industries. They made it possible for one person to move hundred of kgs at once.

Keywords: Forklift Structure, Pneumatic cylinder, Air Compressor, Solenoid valve, Relays, Button Switches, Ups Battery.

I. INTRODUCTION

This is a universal materials handling solution that enables one person operation to safely lift and load small equipment or bulky goods weighing up to 60kg. The unique design enables one person operation to lift and load directly into vehicles (trucks, vans, and cars) or to place equipment and small loads on bench tops. It eliminates awkward and dangerous one or two person lifts and reduces the incidence of back and other injuries caused by heavy lifting.

II. LITERATURE REVIEW

S.N	Title	Name of journal/patent	DOI/ ISBN Number	Year	Ref. Number
1	“Design and Fabricated Pneumatic Operated Forklift,”	K Nathakumar,	Vol.4, No.1 ISSN2319-5991	2015	1
2	“Failure of forklift forks”	Juan M Massone and Roberto E Boeri	Vol. 17, pp. 1062–1068.	2010	2
3	“Dynamic load model for fork-lift trucks”	Ehlanda A, Williams M S and Blakeborough A	Vol. 32, pp. 2693–2701	2010	3

In the article [1], The fork lift , which is one of the important equipment of modern logistics system, has become highly efficient equipment for mechanized loading and unloading.

In the article [2], We get answers to different type of loading failures occur in forks of forklifts.

In the article [3], We get answers to different kind of forklift dynamic loading conditions.

III. CONCLUSIONS DRAWN FROM THE LITERATURE

Portable 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 had revolutionized warehousing practices before the middle of the 20th century. Forklifts have revolutionized warehouse work.

IV. GAP OBSERVED

Earlier made forklifts of this type are heavy weight, not very handy, need large space to operate, high maintenance, high operating cost.

V. PROPOSED METHODOLOGY

S.N	Performed Stages	Time Duration
1	Literature Survey Search, Capture and synthesis relevant literature.	2 Weeks
2	Data Collection from Literature Finalise sampling plan. Develop data collection instrument. Carry out data collection.	2 Weeks
3	Data Analysis Data analysis for component selection.	1 Week
4	Market survey Selection of material with suitable specifications. Cost estimation	1 Week
5	Fabrication	3 Weeks
6	Testing and Analysis	2 Weeks
7	Writing Up Final draft of report. Review draft with Supervisor. Final editing. Printing, Binding and final submission.	3 Weeks

Table 1: costs of the equipment used in Portable Forklift

S.no	Equipment	Quantity	Cost(Rs)
1.	Pneumatic cylinder	1	4000
2.	Compressor	1	1500
3.	UPS Battery	1	500
4.	Solenoid valve	1	200
5.	Aluminium Rectangular pipe	-	5000
6.	Polyurethane PU Pipes	2 meter	500
7.	Hoses	2	450
8.	Button Switches	2	50
9.	Relay	2	200
Total			12500(approx.)

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