International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 06 Issue: 04 | Apr 2019 www.irjet.net p-ISSN: 2395-0072

Semi-Electric Chain Hoist Stacker Trolley

Gaurav Shingte[1], Nikhil Shinde[2], Tanmay Marde[3], Vikrant Raut[4], Harshal Ahire[5]

[1,2,3.,4]*Student, Dept. of Mechanical Engineering, University of Mumbai, India*
[5]*Professor, Dept. of* Mechanical *Engineering, University of Mumbai, India*

Abstract - *The main aim of the project is to develop a trolley which will lift the loads automatically without extra human efforts with reduction in cost. We decided to convert a manual hydraulic trolley into a semi-automatic with simple mechanism. We also have to reduce a maintenance cost of the trolley. The trolley should have simple mechanism and efforts required to lift the dies must be reduced. The mechanism is designed to fit for any hydraulic manual trolley.*

Key Words: **Semi electric stacker, chain pulley block, 12V DC motor, effortless, easy operation**

1. INTRODUCTION

Semi-automatic chain hoist stacker is the new concept which is integration of all new trends in material handling. Trolley has a chain pulley block for the lifting heavy load instead of hydraulic systems. This new feature gives the ease of handling to the operator and ensures safety. Simple construction, lower cast, easy maintenance is the main features of the trolley. The lifting capacity of the trolley is more than 1.5 tones which is higher than the present trolleys used in the company.

1.1 Problem statement:

In manufacturing industry there are various types of dies available with various sizes and weight, the minimum and maximum weight of the dies are 100kg and 1500kg respectively. For the die carrying operation or transporting die from rack to the operation station they use material handling stacker trolley with the capacity of 1000kg. So the operation is easily done with the dies below 1000kg but it is not efficient for those dies which are large in weight up to 1500kg. For high weight dies they manually lift the die which is dangerous sometime, accident may happen. They want a stacker trolley with the minimum lifting capacity of 1.5 tones. They also want semi-automatic trolley for ease of lifting with minimum maintenance at lower cost

1.3 Objective:

1. To use for loading and unloading heavy material from storage system to workstation also loading heavy dies on press machine operated semi-automatically.

2. Eliminate accidents

3. Reduce stress and efforts

4. Eliminate redundant work, increasing capacity of handling dies.

5. Use of new technology.

6. Reduce cost of the product

2. IMPLEMENTATION:

Construction of the trolley can be divided into two parts:

1. frame construction
2. mechanism installation

a. Frame construction:

The whole trolley is made up of MS bright. Physical properties of MS bright are given bellow:

b. Mechanism installation:

Implementation of the mechanism starts with removing of the hydraulic mechanism of the trolley.

Lifting mechanism contains two main parts:

1. Chain hoist
2. Motor

Simple coupling is used to drive the chain hoist using motor. The coupling used is the simple nut bold coupling using two bolts.

b.1. Clamp:

Simple clamping mechanism is used. Clamp contains two bolts which connects the motor to the pulley of chain block. Procedure:

1. First we drilled holes of 3mm using bench vertical drilling machine. Then we performed tapping operation of 4mm bead. Then we cut the sheet of 1.5 mm in circle and drilled 5mm holes on it. These two components are clamped with screws.
2. Then we drilled the holes on the plate of 6 mm. and clamped the plate with the motor.

Table 1: comparison between trolleys

Parameters	hydraulic manual trolley	semi-automatic hydraulic stacker	semi-automatic chain hoist stacker
Weight(Kg)	350	400	322
Mechanism	Works on hydraulic mechanism	Works on hydraulic mechanism	Works on gear mechanism
Work type	Manual	semi-automatic	semi-automatic
Cost (Rs)	44000	150000	50000
Lift capacity(Kg)	1000	1500	1500

Table 2: components costs:

Tata battery 60AH 12v	5500	1
Emergency switch	180	1
Toggle switch	55	1
Limit switch	200	1
Bearing skf6204	720	4
Transportation	1000	
Chain pulley block	6000	1
Fabrication of stacker	32000	
caster wheel	2000	2
motor 12v 0.5hp	2000	1

2.1 Trolley before implementation:

2.2 Trolley after implementation:

2.3 New design:

3. CONCLUSIONS

1. Implementation of the concept is done successfully. The lifting mechanism worked without any interference with other components. Design is made as per requirement.
2. Cost associated with the implementation is reduced. Full prototype is implemented in Rs5000. with safety features. Efficiency of the trolley increased. Mechanism is successfully controlled using toggle switch.
3. Any hydraulic manual trolley can be converted to semi-automatic easily. The performance is verified in both software and hardware design.
4. It can be concluded that the model is safe and easy to manufacture and can be improved and used in large industries.

REFERENCES

[1] Material Handling Equipment Michael G. Kay Fitts Dept. of Industrial and Systems Engineering North Carolina State University January 12, 2012
[2] Material handling management, Vol4 (july-dec 2011)
[3] Bahale A.P., & Dr. S.S. Deshmukh. (2014, March) Improving material handling efficiency in Ginning machine manufacturing company
[4] Yaman, R. (2001). A knowledge based approach for selection of material handling equipment
[5] Rudenko.. Material handling equipment. Mir publisher Moscow

BIOGRAPHIES

Gaurav Ramesh Shingte,
Student, Dept. of Mechanical Engineering, University of Mumbai, India.

Nikhil Shashikant Shinde,
Student, Dept. of Mechanical Engineering, University of Mumbai, India

Tanmay Narhari Marde,
Student, Dept. of Mechanical Engineering, University of Mumbai, India

Vikrant Ravindra Raut,
Student, Dept. of Mechanical Engineering, University of Mumbai, India