International Journal of Emerging Technology and Advanced Engineering
Website: www.ijetae.com (ISSN 2250-2459, ISO 9001:2008 Certified Journal, Volume 7, Issue 4, April 2017)

Material Handling Equipment (Operated by Job Weight)

Prof. Darade P. P.[1], Bhivsan V. D.[2], Gadhe A. S.[3], Bodke Y. A.[4], Gadakh R. K.[5]

[1]*Assistant Professor, Savitribai Phule Pune University, SND COE & RC, Yeola, Dist-Nashik, Maharashtra, India*
[2,3,4,5]*UG Student, Savitribai Phule Pune University, SND COE & RC, Yeola, Dist-Nashik, Maharashtra, India*

Abstract— this paper gives idea about weight operated material handling device. Material handling is main operation in industry. Material handling involves transfer of jobs from one machine station to another storage and packaging. Weight operated material handling device has large load carrying capacity, less or no maintenance. This device has more reliability. This paper develops the problem of different types of material handling equipment in a typical material handling system. Spring operated material handling equipment has large load carrying capacity, easy maintenance and high reliability of operation. Material handling equipment is the media of transportation of material from one point to another in a commercial point or space. This material handling equipment paper is not only based on for material handling, it is not required external power i.e., electrical, it totally operate and depends on weight of material or job. Industrial material handling device are operate on electrical power but this device does not required electricity, it is operate on weight of job.

***Keywords*— Material Handling, Less Cost, Less Maintains.**

I. INTRODUCTION

Material handling is process of movement of job or material from one place to another place i.e. from one machine to another store room to machine shop or from machine shop to store. In many industries material handling is automated but it requires more electricity and it is main contribution of price of the product. Some small scale industries material handling is manually material handling is risk full or harm full to workers or manpower. This may lead to back pain or muscular pain. This material handling device eliminates the manual material for short distance between two machine stations. These material handling devices also reduce the pries of the product by minimizing material handling cost. These also reduce the cost of power. In this device potential energy of the job is used to transfer of the job.

Nowadays, major, medium as well as small local automotive manufacturing industries are experiencing rapid development in concept of technology and system applied, resulted by stronger domestic and global market demands. As the companies grow, the need for efficient material handling system also arises especially in the manufacturing area.

Material handling system is one of the basic components that complement the whole manufacturing operation. Material handling system basically refers to any equipment, activities and procedures related to the moving, storing, controlling and protecting of materials flow in a manufacturing system. It provides the manufacturing system with smooth material flow without excess inline and outline inventory. The material handling system is categorized as non value added (NVA) activities which implying that the less material handling involved is the better. However it is impossible to totally eliminate the material handling activities in any manufacturing operation. Hence an efficient and effective material handling system is always the ultimate objective by many companies. Material handling operations involve raw material movements, subassemblies; work in process (WIP), tools, finished products, and other support materials from one point to another in the plant. Basically material handling equipment is used to the picking an object from one place and travel to it and place at another location without much power of man wasting.

A material handling equipment is separated into four main parts:-

1) Storage and handling equipment,
2) Engineered systems,
3) Industrial trucks,
4) Bulk material handling.

According to industrial review the power or electricity which has been utilized for production out of which 32 to 35% of power is only utilized for material handling during the product ion which is unnecessarily wasted and hence the total value of final product will increases. So if we want to decrease the total value as well as the unnecessary electricity consumption either we have to reduce material handling or try for alternative handling like that this concept. As the first option has several limitations we are trying for alternative handling system like that weight operated material handling equipment.

II. PRINCIPLES OF MATERIAL HANDLING

- To minimize the movement of material in the production.

International Journal of Emerging Technology and Advanced Engineering
Website: www.ijetae.com (ISSN 2250-2459, ISO 9001:2008 Certified Journal, Volume 7, Issue 4, April 2017)

- To use the principle of containerization, unit load or palletisation and move optimum number of pieces at a time.
- To make use of mechanical devices and reduce manual work.
- To ensure safe, effective and flexible material handling.
- To arrange material and material handling devices in a manner, not to disturb the production activities.
- To make use of gravity forces for material movement, wherever possible.
- To ensure movement of the material without damage.
- To maintain the material handling devices in good working condition and maximum use of them.

As in our mechanism we used following Parts.

- ❖ Spring
- ❖ Rack
- ❖ Pinion
- ❖ Wheel
- ❖ Axel
- ❖ Pedestal bearing
- ❖ Chine sprocket
- ❖ Chine
- ❖ M.S. plate
- ❖ Shaft

Manually operated systems:

- Power operated trucks.
- Hand trucks
- Cranes, monorails and hoists

Automated systems:

- Industrial robot.
- Transfer mechanisms in automated flow lines
- Dial indexing tables
- Automated guided vehicle systems
- Conveyors

III. CONSTRUCTION

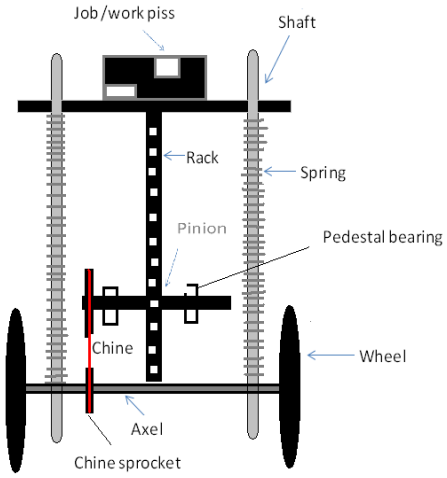


Figure 1:- Material handling equipment (operated by job weight)

Construction And Working

Process of manufacturing:-

1st we made a frame as our required size.

1) BASE PLATE: - These plates are mounted on frame with help of two supporters. On this plate we are mounting the wt.

2) RACK-After weight mounting rack is operated down ward direction,

3) PINION:-after rack operated down ward direction pinion get rotary motion here we get rotary motion..

4) Spur gear- spur gear is rotating machine part which is used to change speed and torque of the system. Set of spur gear is used to change the speed of the device.

5) Wheels- wheels are used to allow rolling motion of the device.

6) Main frame – main frame is supporting structure. Which support whole assembly which is mounted on wheel axle.

International Journal of Emerging Technology and Advanced Engineering
Website: www.ijetae.com (ISSN 2250-2459, ISO 9001:2008 Certified Journal, Volume 7, Issue 4, April 2017)

7) Chain & sprocket mechanism:- these mechanism is connected 1st shaft to wheel shaft using chain sprocket. Chain and sprocket is transmitting medium of rotary motion. This allows transmission of motion between gear boxes to wheel axle of the device.

8) SPRING-:- compression coil spring is used to retract the upper table of the device. Four coil springs are used to at four supports.

IV. Types Of Material Handling Equipment

1) Industrial trucks

Industrial trucks usually refer to operator driven motorized powered manually, warehouse vehicles, by gasoline. Mostly forklift trucks are common example of industrial trucks but certainly aren't the limit and extent of the category. Stock chasers and tow tractors are additional examples of industrial trucks. It widely use in the line of metallurgy, heavy manufacturing, coal, automotive assembly and so on. It is power can be direct current (DC) power and alternating current (AC) power.

Design features (related with design of a material handling system).

(a) Number of material handling equipment (MHE).
  (i) Type of flow path (unidirectional, bi-directional, combination).
  (ii) Location of pick-up and delivery points.
(b) Policy of material handling dispatching.
(c) Transportation batch size-number of parts in an unit of transportation load.
(d) Operational features (Related with operation of a material handling equipment).
(e) Operational schedule for material handling equipment.

These behaviors directly influence the performance of a manufacturing system. Considering such relationships between the material handling system and manufacturing performance, we have developed an approach to analyze the effectiveness of a material handling system. The effectiveness analysis consists of three stages. In first stage in, the current effectiveness level of material handling system is calculated. If the current level is not satisfactory, at the second stage identifies and prioritizes the potential components of material handling system that can bring improvements and reform in its effectiveness. In third stage the critical factors that cause the ineffectiveness of particular components are identified for further analysis (see Figure 2).

By utilising appropriate approaches, optimised recommendations are then deduced and guess for the critical factors identified at stage three. Literature is abundant with methods that are primarily based on minimizing some functions of acquisition costs. Very few researchers have developed methods that optimise the quantity of material handling equipment with respect to operational performance factors such as throughput time and utilization. Further, such performance and response factor are conducted and calculated without considering the inherent stochastic nature of the manufacturing system. In general, coming up or arrival of products to material handling system is a dependent of fluctuating product demand and processing rate of facilities. And similarly, the product handling rate of a material handling system or simply the service rate is also stochastic due to natural variations in service contrast and divergence in travelling distance and time for transferring different form of products. The first step in finds preliminary solution by considering the total time available and the total time required for loading, loaded travel unloading, empty travel and breakdown of the material handling system.

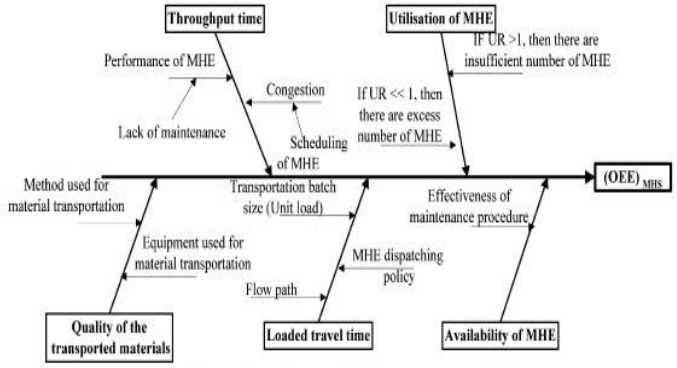


Figure 2:- Factors that determine the effectiveness of a MHS. [3]

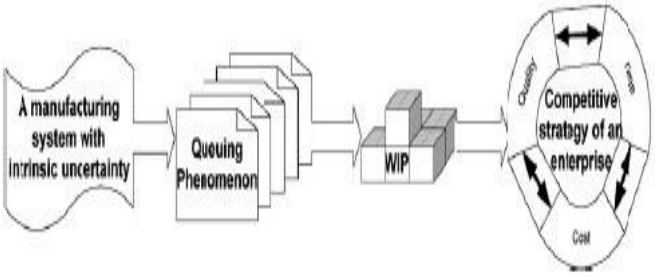


Figure 3:-Relationship between the uncertainty and performance factors. [3]

International Journal of Emerging Technology and Advanced Engineering
Website: www.ijetae.com (ISSN 2250-2459, ISO 9001:2008 Certified Journal, Volume 7, Issue 4, April 2017)

A well established approach to quantify the variations in a queuing theory, manufacturing system, is utilized to evaluate the operational performance factors

Advantages

- Unobstructed movement.
- Flexibility.
- No any one power required.
- Lower investment.
- Labor cost is minimum.
- Maintenance is easy.
- A system is easy to interface with other system.

Applications

- Storage and distribution systems.
- Assembly line operation
- Flexible manufacturing systems
- Miscellaneous application

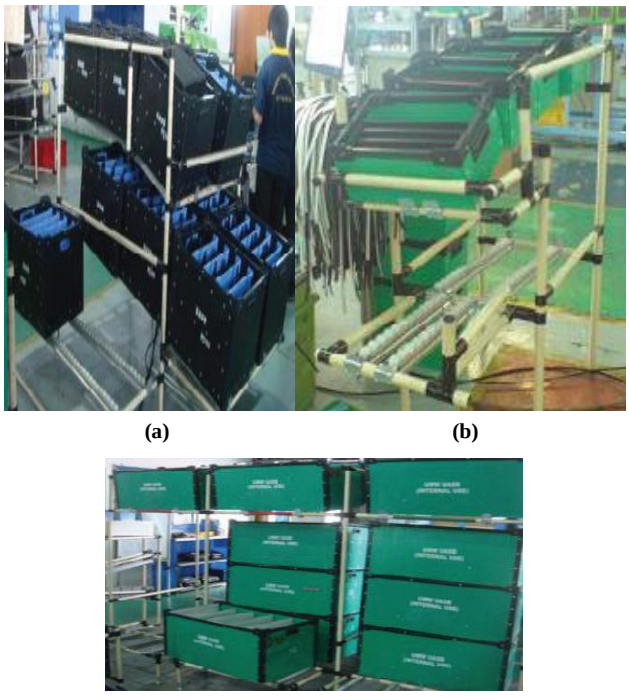
Now in indusriy in various concepts used by material handling equipment like that following concept:-

The Concept Of Gravity Flow Rack System (GFR)

G.F.R. is one of type of rack that can be use metal shelves, with rollers wheels to move material on it by using gravity.

There are different sizes of poly-boxes for different sizes of components, thus the gravity flow rack was designed according to the following details:-

1) Location size
2) Poly boxes weight, length, width and height
3) Standard quantity per poly box
4) Number of poly-boxes used per hour
5) Delivery frequency and quantity
6) Cycle time for each delivery process
7) Maximum poly boxes quantity on the GFR at one time.



(a) **(b)**

(c)

Figure 4:- GFR System: a) Large Components, b) Medium Components c) FG Poly-boxes. [1]

Implementation experience-:

The materials handling system implementation was initiated to improve the company's or industries distribution operations worsening performance.

V. Conclusion

We conclude that we completed project named "Material handling equipment (operated by job weight)" It works on the self weight of job object which has to be transfer from one place to another place without using electricity or fuel. By using this system we save energy as well as save cost. The most important thing we conserving our energy.

REFERENCES

[1] Unruly Hayati A., Ahmed Jaffar, Noriah Yusoff, Ahmad Naufal Adnan, Gravity Flow Rack's Material Handling System for Just-In-Time (JIT)Production, Procedia Engg. 41 (2012) 1714 –1720.

[2] A.R. Maske, Mahadhan M. Jadhav, Laximan B.Shinde and Yogesh N. Sule-Patil, Design and Fabrication of Spring Operated Material Handling Equipment, Volume 3, ISSN: 2394-9333

[3] D. Raman, Sev V. Nagalingam, Bruce W. Gurd, Grier C. I. Lin, Quantity of material handling equipment-A queuing theory based approach, Robotics and Computer-Integrated Manufacturing 25 (2009) 348–357.

[4] S.S. Chakravorty- Improving distribution operations: Implementation of material handling systems Int. J. Production Economics 122 (2009) 89–106.

[5] Machine design book – R.S. Khurmi.

[6] Hand book of material handling.