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A Review-Vertical Material Handling Machine

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ABSTRACT

The aim of this paper is to suggest machine used for material handling other than old machine. The value of land has increased, so to use space effectively different manufacturing processes are carried out at different level and also their packing lines are also different. For example manufacturing processes of soaps, wafers, biscuits and cookies etc. The goods are manufactured at lower level and are stored at higher level as to utilise each and every inch of the space available effectively. To fulfil this need material handling system is required to transfer material in vertical direction from lower level to higher level which can transfer material with an ease from lower to higher level.

Keywords: Vertical Machine, Material Handling, Crank, Piston, Motor

1. INTRODUCTION

Material handling involves short-distance movement that usually takes place within the confines of a building such as a plant or a warehouse and between a building and a transportation agency. It can be used to create time and place utility through the handling, storage, and control of material, as distinct from manufacturing, which creates form utility by changing the shape, form, and makeup of material.

1.2 Principles of Material Handling

There are five principle of material handling.

1. Planning Principle. All MH should be the result of a deliberate plan where the needs, performance objectives, and functional specification of the proposed methods are completely defined at the outset.

2. Work Principle. MH work (defined as material flow multiplied by the distance moved) should be minimized without sacrificing productivity or the level of service required of the operation.

3. Ergonomic Principle. Human capabilities and limitations must be recognized and respected in the design of MH tasks and equipment to ensure safe and effective operations.

4. Space Utilization Principle. Effective and efficient use must be made of all available (cubic) space

5. Automation Principle. MH operations should be mechanized and/or automated where feasible to improve operational efficiency, increase responsiveness, improve consistency and predictability, decrease operating costs, and to eliminate repetitive or potentially unsafe manual labour.

1.3 TYPES OF MATERIAL HANDLING MACHINE

1. Horizontal Axis Material Handling Machine.

2. Vertical Axis Material Handling Machine.

1.3.1. Horizontal Axis Material Handling Machine.

It is a Horizontal Axis Machine used to transport and handle material from one place to another place.

1.3.2. Vertical Axis Material Handling Machine.

It is a Vertical Axis Machine which is used to transport and handle material from one level to another level.

1.4 VERTICAL HANDLING MATERIAL MACHINE

The Vertical Material Handling Machine is a Material Handling machine which is used to transport small material from a lower level manufacturing line to a higher level storage racks where the material can be stored.

The machine uses crank and piston mechanism to transfer material which is operated by the external source of energy that is motor.

At the top of the piston a place is provided to place the load and that is lifted after every 180 degree of rotation the material is transferred to next piston and after reaching the peak height it is unloaded at the rack.

The machine is placed on the strong base which is used to absorb the shocks and provide stability to the system.

The Machine is used for transferring small loads like snacks, biscuits, soaps, powder and light weight packets.

The main objective of Vertical Material Handling Machine is transfer material up to a desire height with less effort, within confined space reducing the floor area and reducing the time.

2. PRESENT SCENARIO

AbhilashaDongre[1]
In this paper a material-handling system was as defined asmovement, handling, storage and controlling ofmaterials throughout the manufacturing process. Themain purpose of using a material handling system isto ensure that the material in the right amount iscarefully delivered to the desired destination at theright time at minimum cost. Material handling assuch is not a production process and hence does notadd to the value of the product but it costs 30-75% ofthe total product cost. An efficiently designedmaterial handling system ensures the reduction inoperation cost, manufacturing cycle time, MH cost,delay and damage.

Nilesh Bodkhe[2]From these paper main object of research behind the conventional method of material handling equipment they have also gives some kind of idea replacing conventional method by pneumatic system .pneumatic conveying system depend on mass flow rate. Material and air mixed and conveyed through pipeline loop .some situated number of bends provided for flexibility. Researcher had observed structures of pneumatic conveying system are induction circuit, pressure circuit, closed circuit. Component of feeding hopper, prime mover, blower, conveyer system venturimeter.

Abhijeet R.Maske[3]Material handling devices which have operated by spring have high load carrying capacity, compact design and ease in maintenance. Also for this equipment no need external power for working. According to industrial review the power which has been utilized for production out of which 32 to 35% of power is only utilized for material handling during the production which is unnecessarily wasted and hence the total cost of final product will increases. So if we want to decrease the total cost as well as the unnecessary power consumption either we have to reduce material handling or try for alternative handling. From the problem for the material handling us need more human effort and need of more electrical energy author get this solution of spring operated material handling equipment.

Dennis B. Webster[4] A technique is represented which can be used to design or assist in design of, an integrated materials handling system for manufacturing facility or a major department of the facility. The developed procedure selects the material handling system to be used to perform a given set of moves in order to minimise the system

cost associated with the handling assuming the plant arrangement remains fixed.

A. Daniel J Fonseca, Gopal Uppal & Timothy J Greene [5]
The major objective of this paper was to illustrate how Conveyor equipment selection is a complex, and sometimes, tedious task since there are literally hundreds of equipment types and manufacturers to choose from. The expert system approach to conveyor selection provides advantages of unbiased decision making, greater availability, faster response, and reduced cost as compared to human experts. This paper discusses the development of a prototype expert system for industrial conveyor selection.

Satbeer Singh Bhatia[6] Author told in this paper helical compression springs are generally used to absorb the energy due to the impacts and to form a flexible link which deflects under loading and restore the objects to the normal position where the disturbing forces are removed.

Ghazi Abu Taher[7]In this paper author conveys that belt conveyor has huge load carrying capacity, large covering area simplified design, easy maintenance and high reliability of operation. During the project design stage for the transport of raw materials or finished products, the choice of the method must favor the most cost effective solution for the volume of material moved; the plant and its maintenance; its flexibility for adaptation and its ability to carry a variety of loads and even be overloaded at times. A bucket elevator or conveyer is a mechanism for hauling flow able bulk materials by following an assembly line in horizontal, vertical or inclined direction. The difficulties mainly arise when it is necessary to convey a bulk material through a linear distance as well as a certain height.

Chetan P. Chaudhari[8] In this paper author explains about bearing is a machine element which supports another moving machine element (known as journal). It permits a relative motion between the contact order to reduce frictional resistance and wear and in some cases to carry away the heat generated, a layer of fluid may be provided. The lubricant used to separate the journal and bearing is usually a mineral oil refined from petroleum, but vegetable oils, silicon oils, greases etc., may be used. Bearings can be split into two groups: Rolling bearings and Sliding bearings. Rolling bearings attempt to eliminate friction and sliding between surfaces in a junction by introducing interfaces such as balls or rollers which rotate or roll in as opposed to sliding.

SangmeshPattar[9]This paper highlights spring is a flexible element used to exert a force or a torque and, at the same time, to store the energy. The spring which is considered in the paper is a part of automobile horn, where the horn is used for maintain safe distance and it is subjected to varying load. The spring is analyzed through analytical and finite element method to check the variation in the deformation value as well as maximum shear stress value.

Mr. SantanuChakarborthy[10]
says about study and create an adaptive design of semi-flexible screw conveyor using conventional specifications and standards. In this paper as stated above Screw Conveyors are used in a variety of situations. Some of these situations require material to be transported over a large distance or at considerable heights. Till date various concepts have been developed to satisfy the need of a flexible screw conveyor. Like, in April 1958, Inventors Marion H Fennimore and Ivan J Stephenson invented a Flexible Screw Auger for Conveying grain. One of the most difficult problems encountered with conveyors having flexible sections therein is that of bunching or folding of the flexible tubing at the inside of a bend. Such folding tends to restrict the flow of material within the tube. He has chosen to develop a Screw Conveyor model with three stages connected by universal joints.

Kumbhar P.M. [11]From this paper researcher told about various material equipment which based on the operation mainly discussed with foundry .they have also carried material system classified on material orientation method orientation ,function orientation .they also gives material handling system important principal like as planning, space, ergonomics, ecology, unit load, economy, standardization, safety , gravity, layout, etc. also

gives classification of equipment based on product like as conveyer crane, wheel, bracket.

2. SUMMARY

It can be concluded from the literature review that the vertical material handling machine designed with the help of crank and piston mechanism will occupy less space and along with that it would be more convenient to transfer small load to a greater height with this machine.

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