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Portable Bricks Transfer Conveyor Belt

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Abstract: ***In the process or manufacturing industry, raw materials and products need to be transported from one manufacturing stage to Another Material handling equipment are designed such that they facilitate easy, cheap, fast and safe loading and unloading with least human interference. For instance, belt conveyor system can be employed for easy handling of materials beyond human capacity in terms of weight and height.***

During the construction of slabs in civil structure, the continuous supply of construction material is needed. This is usually done with the help of labours, sometimes; a temporary material lift is fabricated for this. Both this process is labor intensive and costly. In this project we are undertaking design of material handling system which can supply construction material continuously to the top end of the construction site, and also to ensure the mobility of this system.

For more than 200 years, belt conveyors are in use in many industries, especially in mining, cement, steel and agricultural industries. Belt conveyors have had an increasing importance and use during the past century. Today, they have the significant role in mining, cement factories, grain manipulation, etc. By time, applications of transporting materials from one point to another extended its boundaries; by requiring longer transfer distances, much faster speeds and much higher capacities.

I. INTRODUCTION

The conveyor systems were first developed in 1892 by Thomas Robins for the coal industry. The main idea behind this invention was to assist material movement with minimum or zero human involvement. Conveyor systems are mechanical structures that transport material from one location to another. It consists of drive mechanisms such as motors to move a transport material, commonly a belt. Additional components can include chains, rollers, pulleys, and wheels.

It's the prototype project, it would not be a bad idea to consider this design for carrying bricks and goods up to 5 kg.

Material-handling process is that which relate to the movement of material, storage of good and products, arrangement and protection of storage throughout the process of Product industries. Material handling equipment is generally categorized into the following: storing and material handling, engineered systems, industrial trucks, and bulk material handling. Belt Conveyor is the material handling equipment to convey the material from one point to another using the belt drive. The material is fed on the belt at one end and it is discharged at other end. The conveyor belt changed the face of the industrial economy around the world. Today, it has significant uses in almost every industries, such as transportation and food services. A conveyer is a arrangement for handling bulk materials by following an assembly line of the material handling conveyer or elevator in horizontal, vertical or inclined direction. As stated in the 85% industrial units face difficulties in handling bulk material packaging. The difficulties usually occur when it is essential to convey a bulk material through a linear distance as well as a certain height. Conventional ways are responsible for material wasting, time wasting & above all a poor management. In order to overcome those draw backs Belt conveyers are used.

II. LITERATURE REVIEW

1) Abhijit Gaikwad (2017) **[**4] present research paper explained the difficulties faced by manual operation and feeding in various industries such that it is taken as well as not safe as per the human safety concern, hence the author suggested to use the belt conveyor for feeding purpose in order to reduce the human effort and to increase the speed of feeding in the system. The paper presented the benefits of conveyor belt such that reduced the labour cost as well as increased the material safety.
2) A.W. ROBERTS and A. HARRISON[6]This paper outlines recent research in the area of belt conveying A review of design trends associated with long overland conveyors is presented indicating the influence of economic and technical considerations in the design methodology. Aspects of conveyor dynamics are discussed and research and development work concerned with specific subjects including belt drum friction, rolling resistance and bulk solid and conveyor belt interaction

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A. Problem Statement

In the process or manufacturing industry, raw materials and products need to be transported from one manufacturing stage to another. Material handling equipment are designed such that they facilitate easy, cheap, fast and safe loading and unloading with least human interference.

For instance, belt conveyor system can be employed for easy handling of materials beyond human capacity in terms of weight and height.

B. Aim and Objective

Our main purpose is to reduce the cost and time required for the work. To reduce human effort. To make conveyor easily available for every purpose .

III. DESIGN OF MACHINE

An To design any machine or machine part the first thing is to The first stage of the design process is to understand the perspective of the target customer to identify and address the problem at hand.

A. Design of Frame

Frame

The upper body is made up of HDMR material .

(High Density Moisture Resistance)

It is water proof, easy to work as compared to metal.

Length = 1200 mm, Height = 169 mm

Thickness = 12 mm.

At motor side Height = 387.5 mm

For angle adjustment each hole = 4mm diameter

Total 10 holes, each hole is at 18 Degree .

Base material is of MS Steel.

Length = 600 mm , width = 375 mm, height = 775 mm

Supporting bar = 450 mm from bottom, centre hole is at 750 mm from bottom.

IV. MATERIAL SELECTION

A. Material for Fabrication

Upper body : HDMR material

Lower body : MS Steel

B. Standard Parts Used

Belt Chain Drive

Motor

Pulley

Bearing

Belt

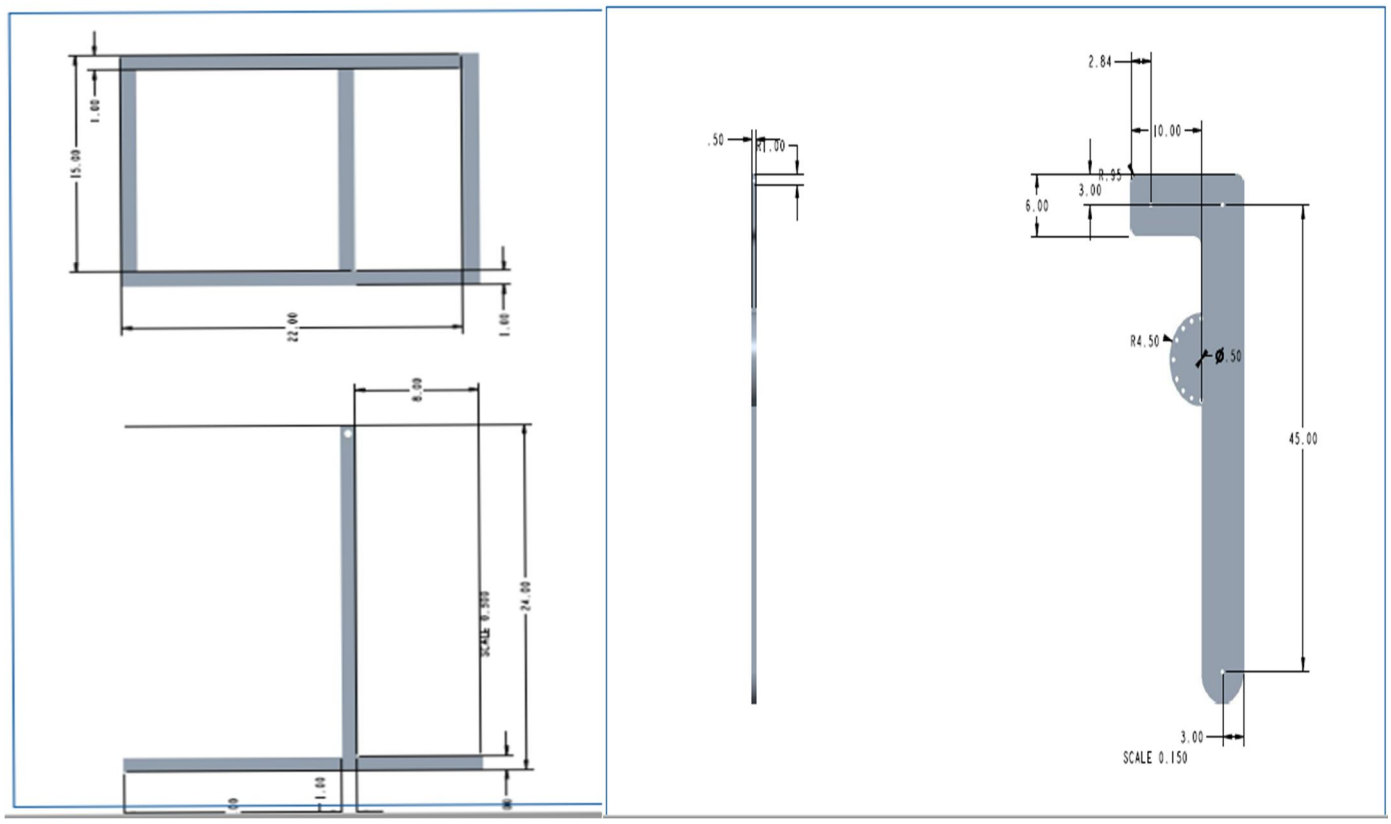
V. FABRICATION

A. Machine Components

1) Machine Frame

The frame is made up of mild steel and HDMR material. The required frame must be in light weight and able to sustain weight of brick.

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Dimensions of Machine Frame

2) Motor

Motor type :

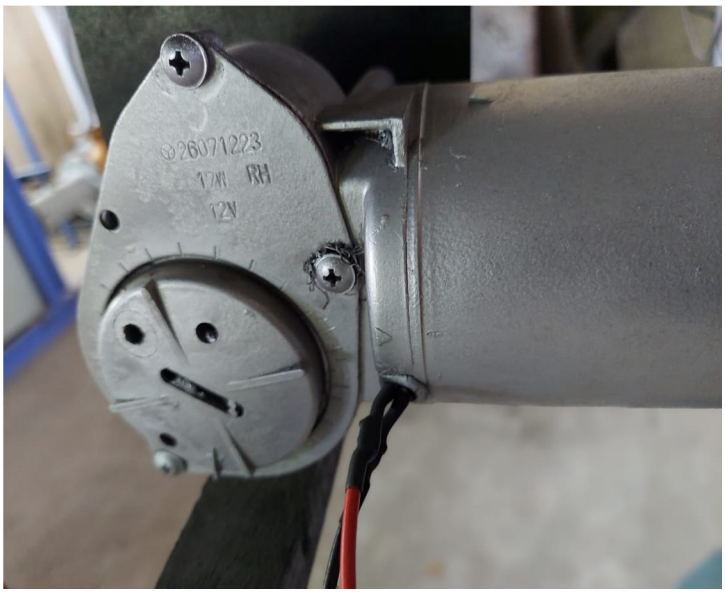
Viper motor [worm gear mechanism is used]

Motor is used from TATA 407.

Working voltage = 12 volt DC [Ampere] 6A

Motor RPM = 45 RPM

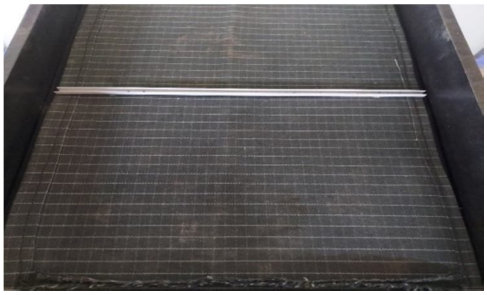
Torque = 16 N



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3) Belt & Chain Drive

Belt material: Canvas belt.
They are made waterproof by treating with linseed oil.
width = 300 mm
length = 2450 mm
Below the canvas belt there is Bakelite
material sheet is used.
Gear (sprockets) and chain drive used
to transmit power from motor to pulley.

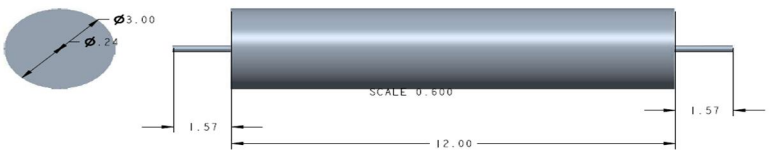




4) Pulley

Material used PVC pipe [poly vinyl chloride]
with HDMR packing.

Diameter = 75 mm
Length = 300 mm
Shaft diameter = 10 mm
Length of shaft = 350 mm



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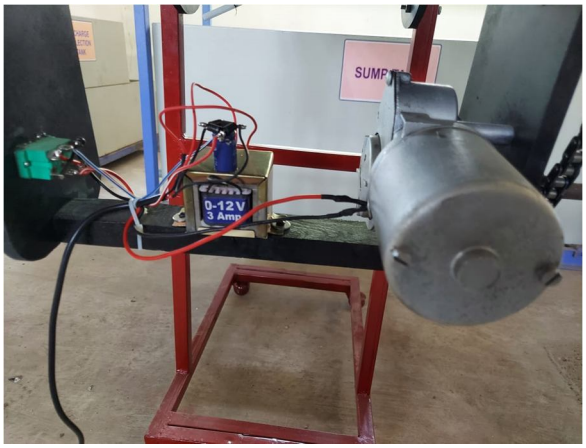
5) Bearing

Ball bearing
Outer diameter = 25 mm
Inner diameter = 10 mm



6) Power Unit

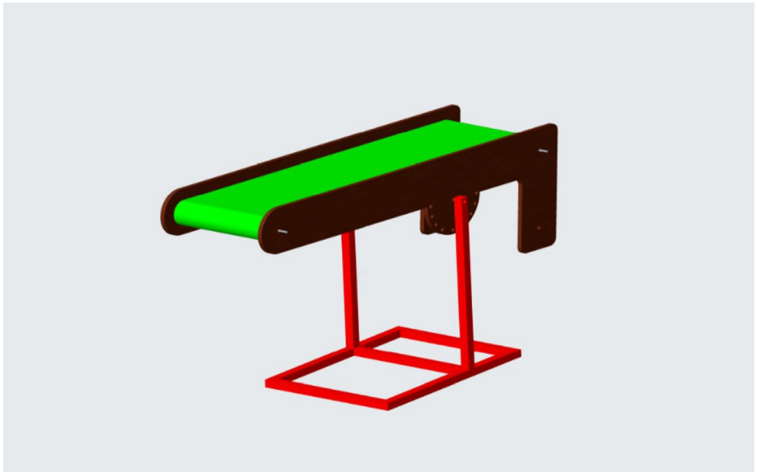
It consist of Motor
Working voltage = 12 volt DC [Ampere] 6A
Motor RPM = 45 RPM
Torque = 16 NM
Transformer = 12 volt 3 A
Reverse forward switch.



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7) Fabricated Machine





VI. RESULT

A. Manual Brick Transfer Cost

Amount paid to the labour for a day = Rs.300 per labour
Total number of labour required in general =6
Total amount paid to the labour=6*300=Rs.1800
Total cost in one day=Rs.1800

B. Portable Brick Transfer Machine

Amount paid to the labour = Rs.300
Total cost = Total cost of electric + Amount paid to the labour + Maintenance
= 200+300+150
= Rs.650
Amount saved by one day =1800-650
=Rs.1150

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C. Advantages

1) One of the cheapest conveyors.
2) Simple and easy to use Can have changes in elevation.
3) Can be loaded from any place along the belt.
4) Reduce labour cost
5) Unskilled worker can operate- No skilled person required for operating this machine
6) Safety to use- during the working if any problem occurs in the machine we can easily find it.
7) Adjustable Cutting mechanism- The Cutting mechanism of this machine is adjustable. We can remove this mechanism very easily so it can be change, repair and replace with other mechanism also.

D. Disadvantages

1) The simplicity means very limited features.
2) Belt can be difficult to clean and generally does not leave a very successful result.
3) Sticky material can get stuck on the belt and transfer to the return side, the rolls, idlers and pulleys.

VII. CONCLUSION

A conveyor belt is a material handling system designed to move supplies, materials, and components using an efficient and effortless process that saves on time, energy, and cost.
During the test run of the prototype project it was realized that it would not be a bad idea to consider this design for carrying bricks and goods up to 5 kg.

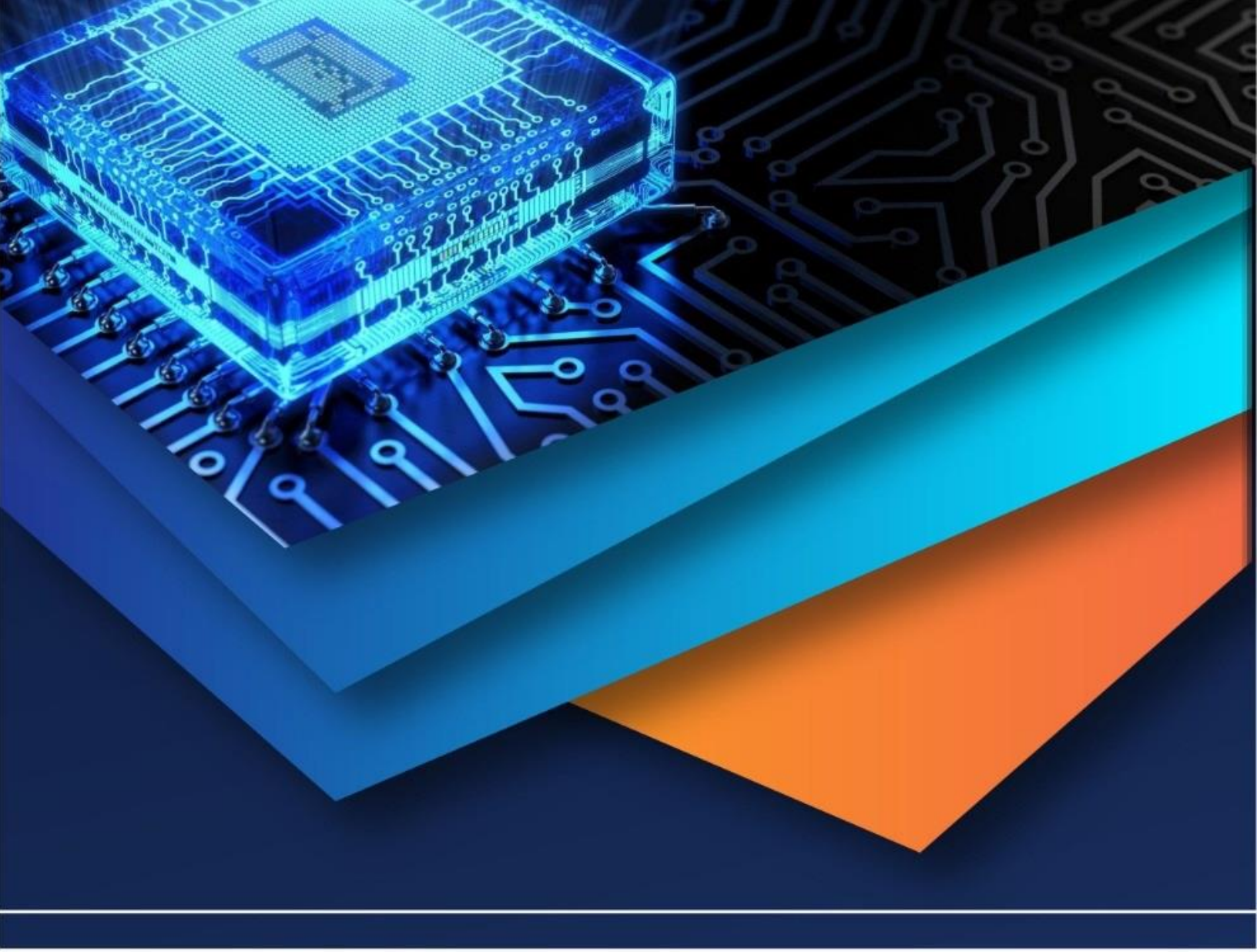
We have learn how to make conveyor system ,with the help of different components.

1) Labour requirement is reduced.
2) Time consumed is less.

REFERENCES

[1] https://en.wikipedia.org/wiki/Gear
[2] Seema S. Vanamane*, Pravin A. Mane**"Design, Manufacture and Analysis of Belt Conveyor System used for Cooling of Mould", Lecturer, Department of Mechanical Engineering, Walchand College of Engineering
[3] Ghazi Abu Taher1, Yousuf Howlader2, Md. Asheke Rabbi3, Fahim Ahmed Touqir4 "Automation of Material Handling with Bucket Elevator and Belt Conveyor", Department of Industrial Engineering and anagement Khulna University of Engineering & Technology
[4] Konakalla Naga AnanthDESIGN AND SELECTING THE PROPER CONVEYOR-BELTforMechanical Engineering Departments, KLU Guntur
[5] Salave, V. IV., I. S., Dalvi, A. B. B. B. H. and Arulkar, A. C. P. (2017) 'To Design and Analysis of 360 Degree Rotating Conveyor Belt with Up- Down Mechanism : A Review ' , 5(08), pp. 263 – 265.
[6] S, Memane Vijay, P. N. S. B. and PG (2015) 'Design and Analysis of Belt Conveyor System of Sugar Industry for Weight Reduction', Journal of Emerging Technologies and Innovative Research (JETIR), 2(5), pp. 1473–1477.
[7] Gupta, D. (2015) 'Study and Performance of Belt Conveyor System with Different Type Parameter', 2(06), pp. 29–31.
[8] B. Kharag, A. (2015) '[Kharage , 4(4): April, 2015]', 4(4), pp. 296–301.
[9] Sangolkar, R. N. and Kshirsagar, V. P. (2015) 'Modeling and Analysis of Industrial Belt Conveyor System Using Creo Parametric and Ansys Software', 3(4), pp. 178–181.

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