Design and Manufacturing of Telescopic Conveyor

Prof. S.F. Rathod[1], Mr. Siddhant Pandhre[2], Mr. Swarup Gajbhiye[3], Mr. Ravish Kumar[4], Mr. Brahmanand[5]

[1]*Professor, Dept. Of Mechanical Engineering, D.Y. Patil College of Engineering, Ambi, Pune, Maharashtra, India.*

[2,3,4,5]*B. E (Mechanical), Department of Mechanical Engineering, (D.Y. Patil College of Engineering), Ambi, Pune, Maharashtra, India.*

ABSTRACT

Industries are looking for machines which will save manpower, space, money and time for production. In many material handling equipment's, belt conveyors are popular and used in many industries. This paper overcomes the drawbacks of traditional belt system conveyors and introduces a new system with the help of a project on Design and Development of Telescopic conveyor. Our current attempt is towards fabricating of an economical telescopic unloader by adopting the exiting simple design procedure. It is a pneumatic & belt drive movable equipment for unloading heavy materials like boxes, High weight Bundles and Bags loading and & unloading purpose it is used, it will lift up to 0.1-meter height with the help of pneumatic cylinders & it will move to and fro direction up to1.5 meter with the help of belt drive this is working with the help of Geared motors. The capacity of this equipment is up to 300 kg as per our design it will vary. By using this equipment material unloading and loading capacity is 250to 300 kg/hr. The name of this equipment is Telescopic Truck Unloaded and loader. Easy to shift it from one place to another place with the help of trolley wheels with in plant and transportation is also easy for one location to other.

It is found that design of telescopic conveyor system works satisfactory to meet design point of view. It is reliable, compact, adjustable, saves working man- hours and increasing profitability of industries engaged in material handling.

Keywords: - *Conveyor, Extension, Material Handling, Pneumatic cylinder, Retraction, Telescopic.*

1. INTRODUCTION

A telescopic belt conveyor is an effective and ergonomic alternative to labor-intensive routines. Operators can move heavy packages into or out of a container rapidly with little effort. Extending telescopic belt conveyors can be used to load/unload any type of loose-loaded cargo - typically parcels, boxes, sacks & tyres. An intuitive on either side enables precise control of the boom's elevation and telescopic movement. Push buttons at the operator end to control activation, lights, belt direction etc.

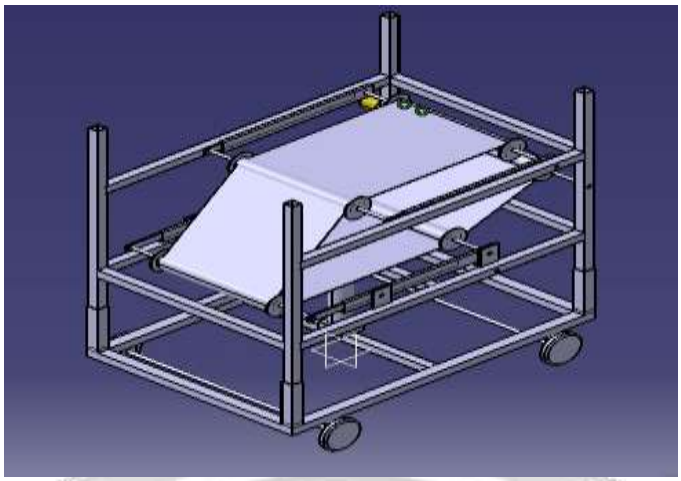

Fig. 1 Telescopic Conveyor

A telescopic belt conveyor is an effective and ergonomic alternative to labor-intensive routines. Operators can move heavy packages into or out of a container rapidly with little effort. Extending., telescopic belt conveyors can be used to load/unload typically parcels, boxes, sacks & tyres. An intuitive on either side enables precise control of the boom's elevation and telescopic movement. Push buttons at the operator end to control activation, lights, belt direction etc. Exceptionally small base sections combined with up to five extending sections enables us to provide conveyors to suit your requirements.

1.1 Literature Review

Nalam Surya Sandeep studied about, Reducing Manpower cost in industries, Space, Money and Time saving purpose every one preferring simple equipment for loading and unloading materials. For the past decade, material handling organizations has been introduced and applied as an option for different types of Unloaders. It is a simple yet effective means reliable and cost effective manner. Their present work deals with utilization of telescopic material unloader for reduce the Manpower cost, time saving and safe loading and unloading the materials in industries. Our current attempt is towards fabricating an economical telescopic material unloader by adopting the exiting simple design procedure.

They concluded by using 2.2kw low capacity motor we designed and implemented 15ton/hour capacity Telescopic Material Unloader. The efficiency of Telescopic Material Unloader is higher than the Loader efficiency by design parameters. The average unloading capacity of this equipment is 18.5tonn/hour in the interval of 24hrs. [1]

R. K. Bhoyar studied about Belt conveyor is the transportation of material from one location to another. Belt Conveyor has high load carrying capacity, large length of conveying path, simple design, easy maintenance and high reliability of operation. In this paper the study is on adjustable height of belt conveyor for variable speed moving in different direction of a belt conveyor system. It transfers material in two different destinations from a single source. For that it is required to design all the components of belt conveyor like belt width, belt speed, pulley diameter, chute to transfer the material, etc. This paper attempts to discuss the generalized design consideration for adjustable radial belt conveyor. [2]

1.2 Problem Definition

Numerous different methods exist for loading and unloading material, all with the same intended result: to reduce manpower cost, safely to unload the material with in less time period. Some of the most common methods are loaders. Initially loader is used for loading materials it will not successes for loading and unloading purpose. By using loaders function and some of implementations Telescopic Material Unloader is designed.

1.3 Need

Have a problem with loading times at your dock.?

Have problems with the manpower required to load or

unload.?

Manually stack material from inside and into a truck?

Ergonomics is badly affected and it leads to health problems

In your work?

Have limited space in the loading and unloading area and no

dock exits?

People get injured carrying material in and out

Employee morale is low

1.4 Objectives

- To analyze the performance of traditional conveyors and modify it into telescopic conveyor system.
- Design and develop modified telescopic system for extension and retraction in both planes.
- Reduce loading and unloading time as well as human efforts in term of man-hours.
- Develop compact system that consumes minimum storage space and minimum energy.

1.5 Parts used in assembled model

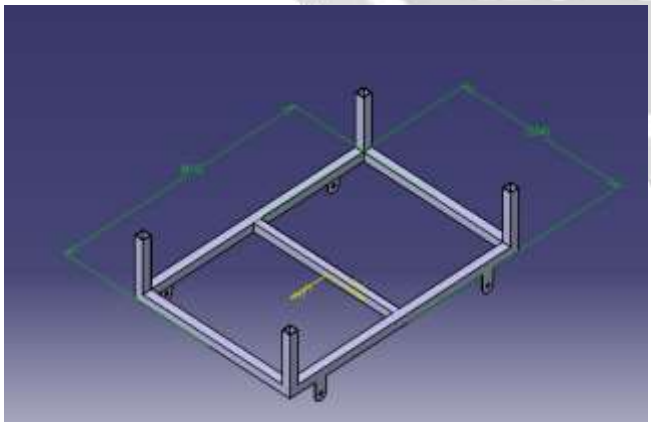

Fig 2. Base Frame

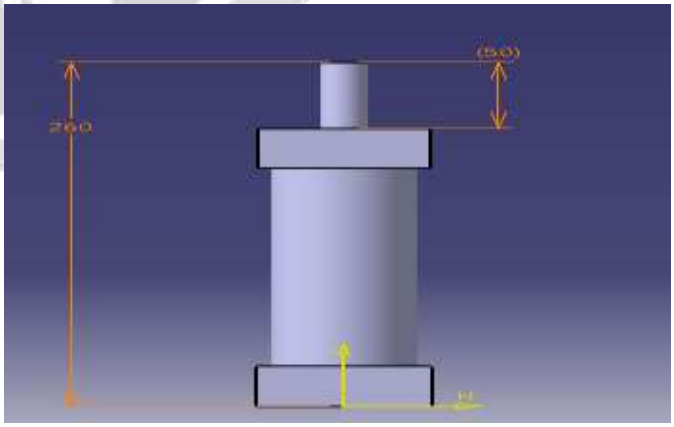

Fig 5. Pneumatic Cylinder

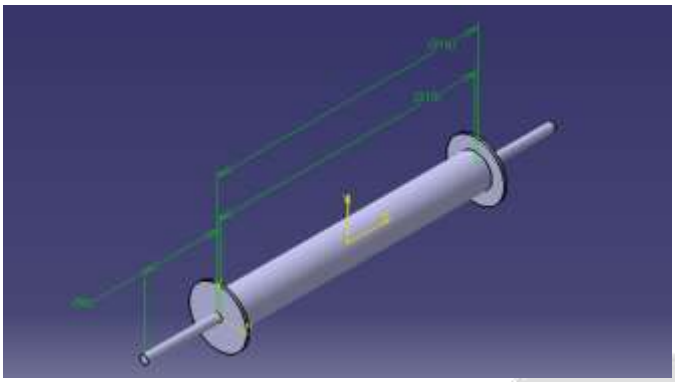

Fig 3. Rollers

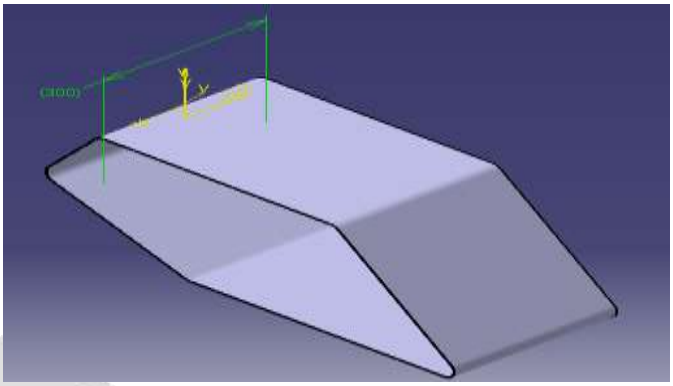

Fig 6. Belt

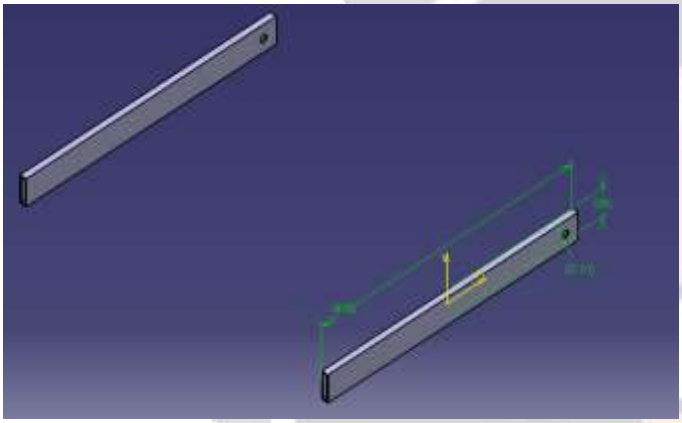

Fig 4. Telescopic Sliders

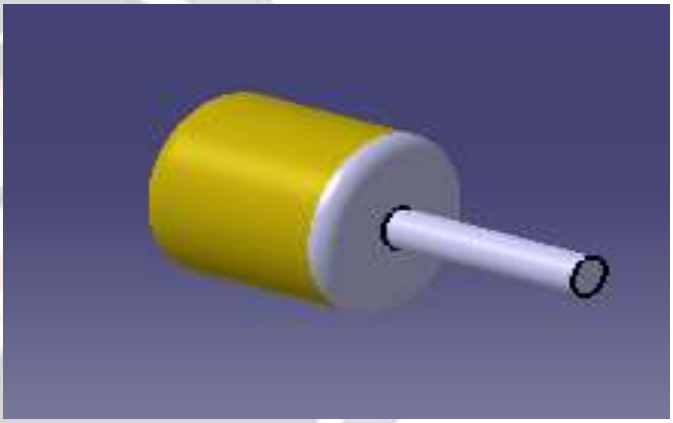

Fig 7. Motor

1.5 Working

Conveyor belts are basically wide belts attached in a loop to two or more turning rotors driven by motors. The loop system is the actual conveyor belt, and is generally made of two or more layers of rubber material, one layer to give shape and structure to the belt system and one to allow it to transport the load safely. This conveyor is generally attached to two wheels, called as rotors, which are spun by motors. The rotor turns, the conveyor belt will turn due to the intense friction between the rotor wheel and the belt system. The turning motion of the rotor causes one side of the belt to move in one direction, while the other moves in the opposite direction. It means that both wheels always be moving in relatively the same direction, either clockwise or counter-clockwise. the two rotor wheels moved in opposite directions, the conveyor belt would not travel at all. In our project there are 3 stages of conveyor. At 1st stage conveyor is fix at one end. For second and third forward motion pneumatic cylinder is used. When pneumatic cylinder activated, slider is move in outward position. locking is providing by using screw-nut system.

2. RESULTS AND DISCUSSIONS

This paper deals with study of telescopic conveyor and results are plotted by experimenting on the set up. This set up has been manufactured by us and then various experiments have been conducted.

3.CONCLUSION

We designed and developed telescopic conveyor which is not in existence in India in much of industries. This system helps the industry to reduce its material handling time and makes it efficient too. From the experiment it is concluded that Velocity of telescopic conveyor system is 13% greater than conventional conveyor system. Operation Time required for transfer the material in telescopic conveyor system is 33% less than conventional conveyor system. Space required for storage of telescopic conveyor system is 62% less than conventional conveyor system hence system is very compact. Telescopic conveyor system saves 80% manpower in loading and unloading operations.

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AUTHORS

First Author – Professor S.F. Rathod, Dept. Of Mechanical Engineering, D.Y. Patil College of Engineering, Ambi, Pune, Maharashtra, India

Second Author – Mr. Siddhant Pandhre, student, B. E (Mechanical), Department of Mechanical Engineering, (D.Y. Patil College of Engineering), Ambi, Pune, Maharashtra, India, siddhant9990@gmail.com.

Third Author – Mr. Swarup Gajbhiye, student, B. E (Mechanical), Department of Mechanical Engineering, (D.Y. Patil College of Engineering), Ambi, Pune, Maharashtra, India, swarupfcc@gmail.com

Fourth Author- Mr. Ravish Kumar, student, B. E (Mechanical), Department of Mechanical Engineering, (D.Y. Patil College of Engineering), Ambi, Pune, Maharashtra, India, singhravish98@gmail.com

Fifth Author- Mr. Brahmanand, student, B. E (Mechanical), Department of Mechanical Engineering, (D.Y. Patil College of Engineering), Ambi, Pune, Maharashtra, India,singhbrahmanand12@gmail.com