

A Review paper on 360° Rotating Belt Conveyor with Up and Down Mechanism.

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ABSTRACT

Bulk material transportation requirements have continued to stress the belt conveyor industry to carry higher tonnages, larger distances and more diverse routes. In order to keep up these criteria significant technology advances have been incorporated in the field of the belt conveyor design, analysis and numerical simulation. The application of traditional components in non-traditional applications requiring horizontal curves and intermediate drives have changed and expanded belt conveyor possibilities. Examples of complex conveying applications along with the numerical tools required to ensure reliability and availability will be reviewed. This work indicates the new developments in belt conveyor technology. The present work deals with the new trend in the field of belt conveyor system. A 360° rotating belt conveyor system has been designed for prototype operation and the details of the design, fabrication, modeling and economies of the rotating belt conveyor system is presented in this work.

KEYWORDS:Conveyor Belt System, Modification in conveyor belt, 360° Conveyor belt system.



INTRODUCTION

A conveyor system is a part of mechanical handling equipment that moves materials from one location to another. Conveyors are especially useful in applications involving the transportation of heavy or bulky materials. Conveyor systems allow quick and efficient transportation for a wide variety of materials, which make them very popular in the material handling and packaging Material handling is an important sector of industry, which is consuming a considerable proportion of the total power supply. Belt conveyors are being employed to form the most important parts of material handling systems because of their high efficiency of transportation. It is significant to reduce the energy consumption or energy cost of material handling sector. This task mainly depends on the improvement of the energy efficiency of belt conveyors. Now in industries only fixed type belt conveyors are available.

LITERATURE REVIEW

A. Design of Conveyor Belt System” IJSETR, July 2018 by Ms Sayali Todkar, Prof. Milind Ramgiri, JSPMs RSCOE.

There is serious demand for movement packages in industries. The material handling system design becomes utmost important. This paper focus on study of detail design of three roller belt conveyor system used for coal processing industry with design capacity of 4400 TPH and speed of conveyor with 4.64 m/s. The purpose of paper is to design and analyze safe and efficient pulley for conveyor system. It consists of tension calculation on pulley and stress analysis of pulley. The maximum stresses calculated are less than allowable limits, so the design is safe. The conveyor system was used for maximum speed 4.623 m/s at maximum load capacity is drawback of system.

B. “STRUCTURAL AND DISCRETE ELEMENT ANALYSIS OF COAL MINE CONVEYOR SYSTEM” Acta Technica Napocensis Vol. 61, Issue III, September, 2018 by Ismail BOGREKCI, Hilmi Saygin SUCUOGLU, Pinar DEMIRCIOGLU, Ogulcan TURHANLAR

The aim of this paper is to determine the relationships between the operation speed and occurred stresses on the designed coal mine conveyor system. The purpose of the paper is to show that the operation speeds of the conveyor system has a significant effect on the loads acting on the system and structure. The CAD Model of the conveyor system was created. The loads caused from the granular material were calculated with DEM (Discrete Element Method) analysis. The structural analysis was applied to the system with Finite Element Analysis (FEA) Method through the results from DEM analysis. The relationship between the operation speed and occurred compressive forces, stress and strain values has been found through DEM and FEA analysis. Dimension changes caused to stress concentration in pulley region. These results showed that the operation speed had a significant effect on the loads that act on the system and structure.

C. “A Comparative study on the Cost-Effective Belt Conveyors for Bulk Material Handling.” Science direct , Energy procedia 142(2017) 2754-2760, Date - 21-24 August 2017,

In this research paper Gabriel Fedorko has analysed the force ratios in conveyor belt of classic belt conveyor. In the Conveyor system conveyor belt is playing important role for transportation. The belt is most expensive part of the conveyor, when conveyor belt is running throughout the roller friction between the conveyor belt and driving drum is consume the more power and increase the cost of the system, to overcome this problem he is symmetrically distributed the stress using analysis.

D. “PORTABLE LOW PROFILE DRIVE OVER TRUCK DUMP CONVEYOR SYSTEM” Brent J. Gausman, Patent No – US 8, 684,161 B2 , Date of patent – Apr. , 1,2014.

Brent J. Gausman , Invented the PORTABLE LOW PROFILE DRIVE OVER TRUCK DUMP CONVEYOR SYSTEM, It is commonly used where there is need to transport and store materials at a variety of location. This portable conveyor is receiving the bulk material from a transport vehicle and deposit this through the grate onto the conveyor belt system. It is portable and easy to set up system so it is widely use agriculture industry and road construction projects.

E. Avinash Nadivale, Omkar Kumbhar, Aniket Kherade, Amar Kolekar. “A Review of Automatic Conveyor System” IJARSE, Volume No.7, March2018.

This research paper, discusses about various automatic conveyor systems. The automatic, semi-automatic and manual material handling system are compared with parameters like time and human effort. Automatic conveyor system is basically used to reduce human efforts, increase productivity, reduce time, and reduce accidents with the help of sensors and monitoring. The working of different conveyor systems like belt, screw,



bucket, spiral, pneumatic, wire mesh are discussed. So, the automatic conveyor systems are more beneficial in terms of cost, time, manpower and safe for material handling.

F. Deepak Gupta and Dheerav Dave “Study and Performance of Belt Conveyor System with Different Type Parameter” IJRST, Volume 2, November 2015.

Deepak Gupta and Dheeraj Dave have designed a belt conveyor system considering different parameters to check the performance and effectiveness of the system. It includes system capacity, sample weight, speed, roller diameter, location and arrangement of pulley. Belt conveyor system uses DC motor and worm gear drive gearbox to perform the operation. Different sample weights have handled in this conveyor system using different distances between two axes of shafts. 17 kg weight is the maximum weight handled by the system using 500mm distance between two axes of shafts.

G. A.S.Patil “Design & Fabrication of 90° conveyor system for material handling in Industries” IOSR Journal of Mechanical and Civil Engineering (IOSR-JMCE) e- ISSN: 2278-1684,p-ISSN: 2320-334X PP. 12-17.

S. Patil has design the 90-degree conveyor belt system for transporting material in 90 degrees which made easier to handle & to atomized in small scale industries. This conveyor belt system is use instead of fixed conveyor belt system it uses in any place like industry, warehouses, food industry. And the installation as well as maintenance charges are decreased place of number of fixed belt conveyor. So, this concept of 90° conveyor belt system is better than fix conveyor but it can be modified and increase angle of rotation from 90°.

H. “TRUCK MOUNTED EXTENSIBLE CONVEYOR SYSTEM” United States Patent James H. Esch (10) Patent No . : US 9 , 783 , 093 B1 (45) Date of Patent : Oct . 10 , 2017.

James H. Esch invented a TRUCK MOUNTED EXTENSIBLE CONVEYOR SYSTEM for transporting industrial building or residential buildings material in this concept a conveyor is mounted on truck and can be loaded from back of truck for delivering material to front side of truck at some height. In his system length of the conveyor can be extend as per the convenient length. single person also can operate this setup. so, this system is very useful to operate in different locations when needed in this system we have opportunity to move it angular direction as well so it will become very much convenient to deliver material outside of the truck which previously only was in front side.

SUMMARY

The purpose of this study was to show the requirement for bulk material transportation through conveyor belt system and need to increase its efficiency and ease in operation. Belt conveyor is most popular equipment to achieve material flow from start to end point. It is often said that Material handling only adds to the cost of a product. The value of a product can increase after Material handling has taken place. The purpose of paper is to design and analyze safe and efficient pulley for conveyor system. This paper discusses about various operation parameters and there effect on belt conveyor system like tension calculation on pulley and stress analysis of pulley, the operation speeds of the conveyor system have a significant effect on the loads acting on the system and structure, the roller friction between the conveyor belt and driving drum have impact on operation, the 90° conveyor belt system is better than fix conveyor but it can be modified and increase angle of rotation from 90°. The review shows that there is need to develop the conveyor belt system for efficient, reliable and fast operation.

CONCLUSIONS

Any machine must be inexpensive and easy to build if it is to be accepted by the society. This need is recognized and a "360° rotating conveyor belt with up-down mechanism" is designed for Prototype model. This machine will only contain parts that are readily available and in use regularly. This eliminates the need to order or import components just for conveying the product. Thus a "360° rotating conveyor belt with up-down mechanism" is designed and prototype model is fabricated using D.C motors, batteries and remaining parts



with in low cost. The automatic, semi-automatic and manual material handling system are compared with parameters like time and human effort.

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