iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 5 **Issue:** XI **Month of publication:** November 2017

DOI:

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor:6.887
Volume 5 Issue XI November 2017- Available at www.ijraset.com

Design and Fabrication of 360^0 Rotating Belt Conveyor with Up Down Mechanism

E. Shireesh Kumar[1], Dr. Smt. G.Prasanthi[2]
[1]*PG Research Scholar, Product Design, Mechanical Engineering, JNTUA College of Engineering, Ananthapuramu, Andhra*
[2]*Professor of Mechanical Engineering and Director, Industrial Relations & Placements and School of Continuing & Distance Education, JNTUA, Ananthapuramu, Andhra Pradesh, India,*

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 insure 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 360^0 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: D.C Motor, U Clamps, Belts, Roller, Nuts, Bolts.

I. 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. But a prototype model of a 360^0 rotating belt conveyor belt with up-down mechanism is designed.

II. MODELLING AND ASSEMBLY OF 360^0 ROTATING CONVEYOR BELT WITH UP DOWN MECHANISM.

PTCreo formerly known as PRO/ENGINEER is a parametric integrates 3D CAD/CAM/CAE solution created by Parametric Technology Corporation (PTC). It is the world's leading CAD/CAM /CAE software, gives a broad range of integrated solutions to cover all aspects of product design and manufacturing. It was the first to market with parametric, feature-based, associative solid modeling software. The application runs on Microsoft windows platform, and provides solid modeling, assembly modeling and drafting, finite element analysis, direct and parametric modeling, NC and tooling functionality for mechanical engineers

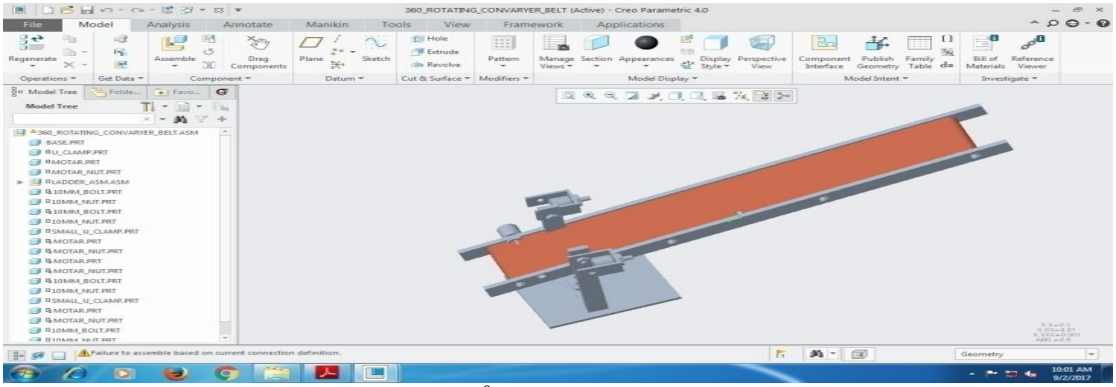


Fig: 2.1 Modeling and Assembly of 360^0 Rotating Conveyor Belt With Up Down Mechanism

©IJRASET (UGC Approved Journal): All Rights are Reserved

ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor:6.887
Volume 5 Issue XI November 2017- Available at www.ijraset.com

III. DESCRIPTION OF PROTOTYPE MODEL

Aluminum has lower density and higher thermal co-efficient. Hence aluminum material sticks are opted for the prototype construction. An embedded system is a system which is going to do a predefined specified task.

A. The main basic components are

1) 12V Dc Motors
2) 12v 7.5Ams battery
3) Wheels
4) Conveyor Belt
5) Bearings
6) Switche
7) Aluminum strips

B. DC Motor Principle

A machine that converts DC Electrical power into mechanical power is known as a D.C. motor. This operation is based on the principle that when a current carrying conductor is placed in a magnetic field, the conductor experiences a mechanical force. The direction of this force is given by Fleming's left hand rule and magnitude is given by; F = BI .There is no constructional difference between a D.C. motor and a D.C. generator. The same D.C. machine can be run as a generator or motor.



Fig:3.1 D.C.Motor

C. Conveyor Belt

A conveyor belt is the carrying medium of a belt conveyor system. A belt conveyor system consists of two or more pulleys (sometimes referred to as drums), with an endless loop of carrying medium the conveyor belt that rotates about them. One or both of the pulleys are powered, moving the belt and the material on the belt forward. The powered pulley is called the drive pulley while the unpowered pulley is called the idler pulley. There are two main industrial classes of belt conveyors; Those in general material handling such as those moving boxes along inside a factory and bulk material handling such as those used to transport large volumes of resources and agricultural materials such as grain,salt,coal,ore and more.



Fig:3.2 Conveyor Belt

©IJRASET (UGC Approved Journal): All Rights are Reserved

ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor:6.887
Volume 5 Issue XI November 2017- Available at www.ijraset.com

IV. FABRICATION OF MODEL

In this experiment initially a base plate was arranged. For this base plate L-clamp arrangement was fixed. To this L clamp wheels are arranged which can be run by D.C motor. Wheels can be moved both forward and backward directions by means of Battery and D.C motor .If both the Positive terminals of Battery and Motor and at the same time Negative terminals of Battery and Motor are connected forward motion can be done. If the signs can be interchanged backward motion will be done.At the centre of the base plate 1cm radius hole is arranged. In this hole a U-clamp arrangement would be done. This U-clamp made by the Aluminum plate. For this U-clamp a conveyor belt is fixed. To turn the conveyor belt in 360 degrees rotation a vertical motor is arranged. The Up Down mechanism of conveyor belt would be done with the help of Power Screw Mechanism. This mechanism converts Rotary motion to linear motion.

V. WORKING OF MODEL

The equipment consists of a base plate supported with 4 wheels for mobile operation. This plate is fitted with a clamping arrangement over which a belt conveyor is arranged. The clamp can be rotated for 360^0 degrees movement. There is an arrangement for the conveyor belt to tilt up and down. All the movements of the equipment are controlled by the D.C motor.Eight motors are assembled for these operations. To turn the conveyor belt in 360 degrees rotation a vertical motor is arranged. All the equipments used in this assembly are run with the help of battery. In this assembly the components arranged can be handled with a hand held device.

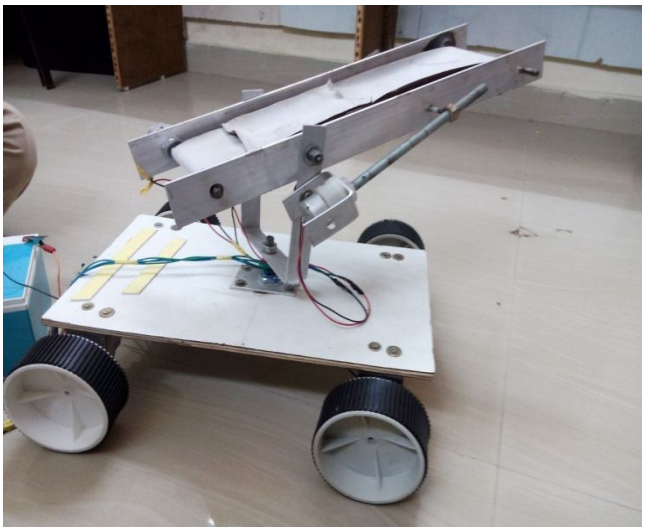


Fig: 3.3 Final assembly modelSpecifications

Table 1

S.NO	TYPE	Components	RPM
1	DC Motor	Wheel	100
2	DC Motor	Rotating	50
3	DC Motor	Rolling	60
4	DC Motor	Lifting	60

VI. CONCLUSIONS

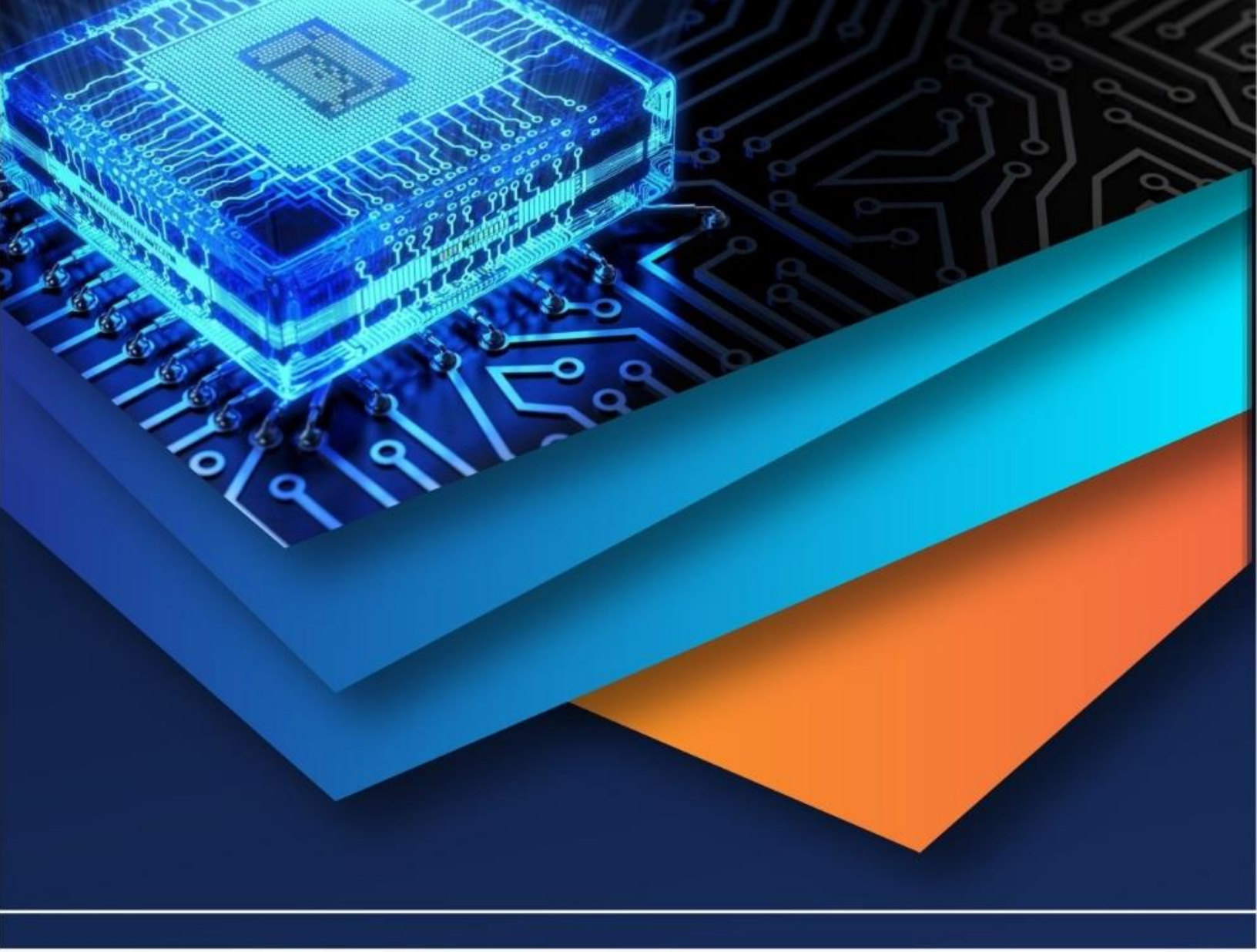
Any machine must be inexpensive and easy to build if it is to be accepted by the society. This need is recognized and a "360° rotating conveyor belt with up-down mechanism" is designed for Prototype model. This machine will only contain parts that are readily available and in use regularly. This eliminates 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.

©IJRASET (UGC Approved Journal): All Rights are Reserved

REFERENCES

[1] MeshramPradnyaratna A, Dr. SahuA R, "Design, Modelling and Analysis of conveyor system used for transportation of Cartons", International Journal of Research in Advent Technology, Vol.4, No.1, E-ISSN: 2321-9637. January 2016.
[2] Aniket. A. Jagtap et al "Design of Material Handling Equipment: Belt Conveyor System for Crushed Biomass Wood Using V Merge Conveying System" Ijmerr Vol. 4, No. 2, Issn 2278 – 0149, April 2015.
[3] Mr. Rajratna A. Bhalerao1, Dr. R.J. Patil2 "Transient And Mode Shape Analysis Of Gravity Roller Conveyor For Weight Reduction" Ijiset - International Journal Of Innovative Science, Engineering & Technology, Vol. 1 Issue 5, July 2014. Issn 2348 – 7968.
[4] 1pawar Jyotsna, 2d.D.Date, 3pratik Satav"Design And Optimization Of Roller In Belt Conveyor System For Weight Reduction"Irf International Conference, 01st June-2014, Pune, India, Isbn: 978-93-84209-23-0
[5] G.Velmurugan, Dr.E.Palaniswamy, M.Sambathkumar "Conveyor Belt Troubles (Bulk Material Handling)" International Journal of Emerging Engineering Research and Technology, Volume 2, Issue 3, PP 21-30, June 2014
[6] Nannaware D.K. and Kharde R.R, "Design and Optimization of Roller Conveyor System", International Journal of Scientific & Engineering Research, July-2014, Volume 5, Issue 7, pp. 1254-1258.
[7] Ananth K N and Rakesh V "Design and Selecting Proper Conveyor Belt", Int. Journal of Advanced Technology, April-June, 2013, Vol. 4, No. 2, pp. 43-49.
[8] M.S. Deepak, R. Kandasamy, Dr. R. Thenmozhi Investigation of lateral – torsional buckling of Cold-formed steel c-channel sections , (IETED-II, Vol 4, May 2012).
[9] Anwar BadawyBadawy Abu-Sena , Mohamed Salah Al-Din Soliman, Omer Nazmi Ali Abdel-NabiBehaviours And Resistance Of Beam Column Structural Elements (Journal of Constructional Steel Research 71 (2012) Pg 171–181)
[10] S. M. Shinde and R.B. Patil s" Optimization Technique Used For The Roller Conveyor System For Weight Reduction" International Journal Of Engineering Research & Technology (Ijert) Vol. 1 Issue 5, July - 2012 Issn: 2278-0181.
[11] Cao Hung Pham, Gregory J. Hancock Experimental investigation & direct strength design of high strength complex C-section in pure bending (University of Sydney, ISSN-1833-2781, Jan. 2012)
[12] S. M. Shinde and R.B. Patil " Weight Optimization And Material Saving Of The Roller Conveyor System" International Journal Of Engineering Research & Development, Vol1,August 2012,Issn:2278-0211
[13] M. A. Alspaugh, "Latest Developments In Belt Conveyor Technology" Minexpo 2004, Las Vegas,Nv, Usa. September 27, 2004.
[14] S. Gaikwad, 2e.N. Aitavade "Static Analysis Of A Roller Of Gravity Rollerconveyor For Structural Strength & Weight Optimization"Gaikwad, Et Al., International Journal Of Advanced Engineering Technology E-Issn 0976-3945.

©IJRASET (UGC Approved Journal): All Rights are Reserved



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089 (24*7 Support on Whatsapp)