

# A Review: Design, Analysis & Optimization of Drag chain Conveyor

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**Abstract:-** The basic aim of this review has been conducted on the foremost of the time conveyor chain is underneath tension that causes failure of chain assembly that is that the major downside for industrial sector. Causes of this failure are improper style. In chain conveyors vibrations typically seem. These cause prejudicial effects in transference method and reduce the sturdiness of chains to check the vibrations, a multi-body simulation model has been developed, and during which natural philosophy components are wont to represent the dynamic effects. A spotlight was decisive material values needed for the model. These were known by physical phenomenon experiments. The focus of this paper redesigning the chain kind conveyor and eliminates the errors. Lesser power is required because of reduced load to the conveyor drive motor as a result of introducing opposing resistance bearing.

**Keywords:-** Chain Conveyor, CAD software, ANSYS, Design, Analysis, Ergonomics, Utilization, etc.

## 1. INTRODUCTION:-

A chain conveyor is a sort of conveyor system for moving material through production lines. Chain conveyors utilize a supercharged continuous chain arrangement, carrying a series of single pendants. The chain arrangement is driven by a motor, and also the material suspended on the pendants is sent. (Czech Republic, 2001)[4]

Conveyor is employed in several industries to move merchandise and materials between stages of a method. Victimization conveyor systems could be a great way to cut back the risks of contractile organ injury in tasks or processes that involve manual handling, as they scale back the requirement for repetitive lifting and carrying. Conveyors are classified into completely different classes those are as follows: (i) chute conveyor (ii) wheel conveyor (iii) roller conveyor (iv) chain conveyor (v) slat conveyor (vi) flat belt conveyor (vii) Magnetic belt conveyor (viii) troughed belt conveyor (ix) bucket conveyor (x) vibratory conveyor (xi) screw conveyor (xii) gas conveyor (xiii) cart heading in the right direction conveyor (xiv) tow conveyor (xv) tram conveyor (xvi) power and free conveyor (xvii) railway system (xviii) Sortation conveyor. (V.B.Bhandari, 2003)[1]

The aim of this paper is to develop a 3D model of a conveyor system and Analysis it. This may be done by planning with the assistance of Pro/E computer code. A CAD system which may be used for the idea style associate degree applicable CAD surroundings ought to be developed. And another purpose is to shorten the merchandise development time. (Bastani A. 1988)[2]

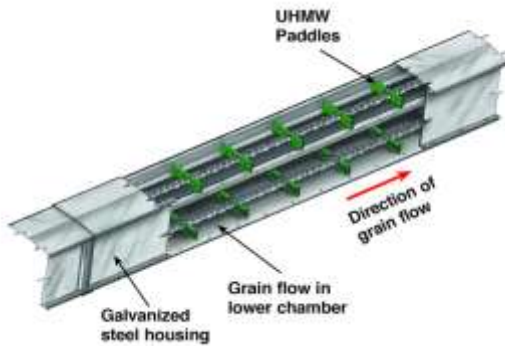
The improved methodology for style and production of conveyor elements relies on the minimization of materials, components and prices, victimization the foundations of style for manufacture and style for assembly. Results obtained on a check conveyor system verify the advantages of victimization the improved techniques. (Atmaca T. 1994)[6]

## 2. LITERATURE REVIEW:-

We could not find much of the literature directly related to Design, Modeling and Analysis of Conveyor System to Transport of cartons before and after the filling process and the precise Allocation. Few of the literatures are cited below.

(V.B.Bhandari, 2003)[1] The aim of this paper is to develop a 3D model of a conveyor system and Analysis it. 3D model helps inexact visualization, an idea about what actually looking after implementing the system, also after complete assembly we can modify as per the need of a customer. This can be done by designing with the help of Pro/E software.

(Bastani A. 1988)[2] In this paper, we analyze a multiple homogeneous server's closed-loop conveyor system with discrete and deterministic flow of material, taking into consideration the unit length of products. An analytical solution is provided to determine measures of the system performance under the steady-state condition.

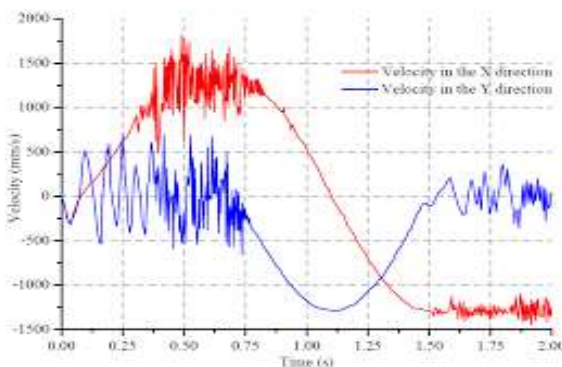


**Fig.1:-** Drag Chain Conveyor

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(Atmaca T. 1994)[6] In this paper, our work has been devoted to study the continuous model of a conveyor system. We present an approximate method to analyze the conveyor system in which the workstations have infinite capacity queues to obtain the mean system time, the mean number of work pieces in the system, the probability that a cell is occupied by a work piece and conveyor's throughput.

(John R. English, [11] this paper provides an analysis of the reliability and availability of two common designs of the line-shaft roller conveyor. The first is a standard design in which each roller is belted directly to a spinning line shaft under the conveyor. The main reason for this design is that the upper belts are faster to replace than belts connected to the line shaft, thus increasing system availability.



**Fig.2:-** Vibration Analysis

(S.H. Masood, 2005)[3] This paper presents an application of the concept of concurrent engineering and the principles of design for manufacturing and design for assembly. Several critical conveyor parts were investigated for their functionality, material suitability, strength criterion, cost, and ease of assembly in the overall conveyor system.

(T.T. Kwo, 1958)[5] The purpose of this paper is to demonstrate that a simple loop conveyor can be operated smoothly without any difficulty provided only a few simple principles applicable to practically all types of conveyors are observed. In this presentation, simulation methods for the analysis of conveyor operations and expressions for the design of conveyors are also developed and explained.

(C. Sekimoto)[9] It is necessary to develop a system which utilizes the concept design data at the early stage for the whole process of the product development. The purpose of this project is to improve the product quality by the sufficient design study iteration at the early stage of design. A CAD system which can be used for the concept design and an appropriate CAD environment should be developed.

(Dima Nazzal, 2007)[13] This paper discusses literature related to models of conveyor systems in semiconductor fabs. A comprehensive overview of simulation-based models is provided. It is concluded that new analytical and simulation models of conveyor systems need to be developed to understand the behavior of such systems and bridge the gap between theoretical research and industry problems.

(M. A. Alspaugh, 2004)[7] This paper presents the latest development in belt conveyor technology & the application of traditional components in non-traditional applications requiring horizontal curves and intermediate drives have changed and expanded belt conveyor possibilities.

(Satish Vithoba Gaikwad, 2013-14)[15] In this paper, the study is carried out on an existing conveyor system. In this, the mechanical elements of the roller conveyor system designed individually and tested in the assembly environment. The structure should be tested for external forces acting on the entire assembly.

(Somnath Kolgiri 2016) [16] Ergonomics typically is familiar to be kin to being furthermore their employment. In larger extension, ergonomics inspects human behavioral, mental, further physiological capabilities, moreover limitations. Experts in the area of ergonomics typically devise plans, modern practice terrains, or innovation established process worlds, or change conventional process surroundings based on the studies on the being capabilities besides limitation. The inherent postulate of

ergonomics is that job demands should not exceed worker's capabilities and limitations to ensure that they would not be exposed to work stresses that can adversely affect safety and health as well as the industry's productivity. The objective of an ergonomics program is to provide a safe and productive workplace to the worker's comfort to fulfill the goals and objectives of the organization. The focus of ergonomics implementation should remove barriers to quality, productivity and safe human performance by fitting products, tasks, and environments to people instead of forcing the person to adapt to the work.

### 3. CONCLUSION:-

In the design and manufacturing mechanical conveyor systems, there is a considerable dearth of research work in conveyor design optimization and especially a lack of application of modern techniques to the design improvement in such systems. In order to improve the costs and lead times in the conveyor system, a complete breakdown analysis of a test conveyor has been conducted to evaluate the high spending areas in conveyor manufacturing.

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