Study and Performance of Belt Conveyor System with Different Type Parameter

Deepak Gupta
M. Tech Student
Department of Mechanical Engineering
Takshila Engineering College, Jabalpur (M.P.)

Dheeraj Dave
Head of the Department
Department of Mechanical Engineering
Takshila Engineering College, Jabalpur (M.P.)

Abstract

Material handling equipment are designed for many advantage such as easy, cheap, fast and safe loading and unloading condition. Belt conveyor systems are design for easy handling of materials in terms of weigh: and height. This paper discusses the design and considerations of belt conveyor system for sample weight, in terms of size, length, capacity and speed, roller diameter, location and arrangement of pulley, angle and axis of rotation, control mode, intended application, product to be handled.

Keywords: Material handling systems, Belt, Conveyors

I. INTRODUCTION

Different methods such as fork lifting, conveyors systems, crane, etc. has been identified for lifting or transporting bulk materials or products from one place to another in the manufacturing industries depending on the speed of handling, height of transportation, nature, quantity, size and weight of materials to be transported. The objective of this research work is to provide design data base for the development of a reliable and efficient belt conveyor system that will reduce cost and enhance productivity while simultaneously reducing dangers to workers operating them. Conveyor system is a mechanical system used in moving materials from one place to another and finds application in most processing and manufacturing industries such as: chemical, mechanical, automotive.

Conveyor systems are durable and reliable in materials transportation and warehousing, Based on different principles of operation, there are different conveyor systems namely: gravity, belt, screw, bucket, vibrating, pneumatic/hydraulic, chain, spiral, grain conveyor systems etc.

The choice however depends on the volume to be transported, speed of transportation, size and weight of materials to be transported, height or distance of transportation, nature of material, method of production employed. Material handling equipment ranges from those that are operated manually to semiautomatic systems and to the ones with high degree of automation. The degree of automation however depends on handling requirements.

Material handling involves movement of material in a manufacturing section. It includes loading, moving and unloading of materials from one stage of manufacturing process to another. A belt conveyor consists of an endless and flexible belt of high strength with two end pulleys (driver and driven) at fixed positions supported ‘by rollers.

II. DESIGN OF A BELT CONVEYOR SYSTEM

The design of a belt conveyor system takes into account the followings:

1) Dimension, capacity and speed
2) Roller diameter
3) Belt power and tension
4) Idler spacing
5) Pulley diameter
6) Motor
7) Type of drive unit

III. BELT

A belt is a loop of flexible material used to mechanically link two or more rotating shafts, most often parallel. Belts may be used as a source of motion, to transmit power efficiently, or to track relative movement. Belts are looped over pulleys and may have a twist between the pulleys, and the shafts need not be parallel. In a two pulley system, the belt can either drive the pulleys normally in one direction (the same if on parallel snails), or the belt may be crossed, so that the direction of the driven shaft is reversed (the opposite direction to the driver if on parallel shafts).As a source of motion, a conveyor belt is one application where the belt is adapted to continuously carry a load between two points.

IV. RESULT

Table - 4.1
Speed 15 R.P.M. Using of center shaft D.C. motor and Torque = 10Kgf

Sr.No.	*Distance between two axis of shafts , (in mm)*	*Weight as sample , (in Kg)*
1	*500*	*8*
2	*1000*	*7.5*
3	*1500*	*7*
4	*2000*	*6.5*
5	*2500*	*6*
6	*3000*	*5.5*

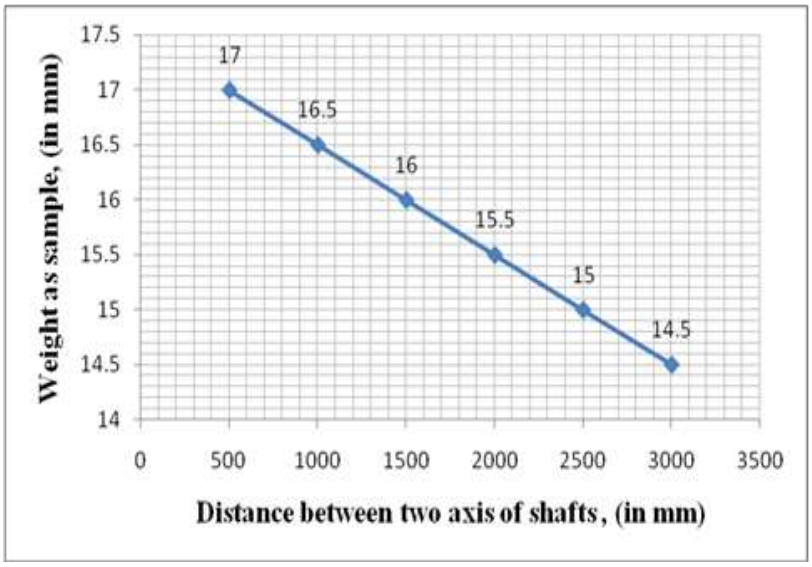

Fig. 4.1: Speed 15 R.P.M. Using of center shaft D.C. motor and Torque = 10Kgf

Table - 4.2
Speed 15 R.P.M. Using of center shaft D.C. motor and Torque = 15Kgf

Sr.No.	*Distance between two axis of shafts , (in mm)*	*Weight as sample , (in Kg)*
1	*500*	*12*
2	*1000*	*11.5*
3	*1500*	*11*
4	*2000*	*10.5*
5	*2500*	*10*
6	*3000*	*9.5*

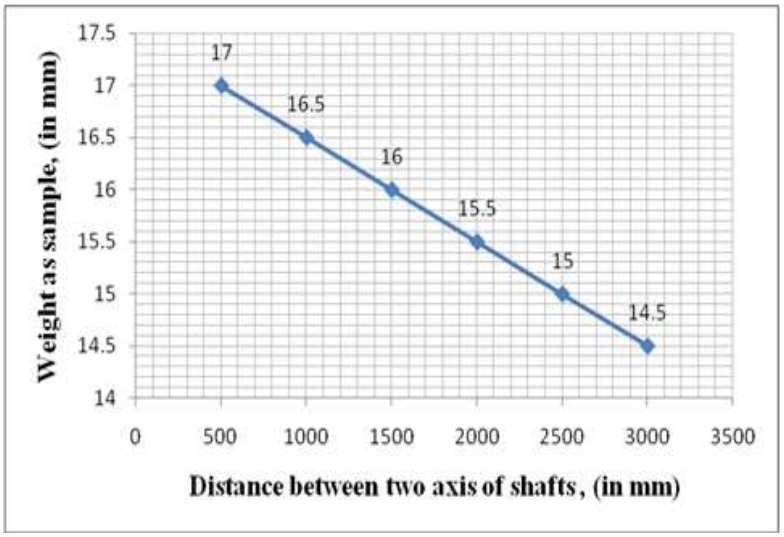

Fig. 4.2: Speed 15 R.P.M. Using of center shaft D.C. motor and Torque = 15Kgf

Table - 4.3
Speed 15 R.P.M. Using of worm drive type gear box based D.C. motor and Torque = 20Kgf

Sr.No.	*Distance between two axis of shafts , (in mm)*	*Weight as sample , (in Kg)*
1	*500*	*17*
2	*1000*	*16.5*
3	*1500*	*16*
4	*2000*	*15.5*
5	*2500*	*15*
6	*3000*	*14.5*

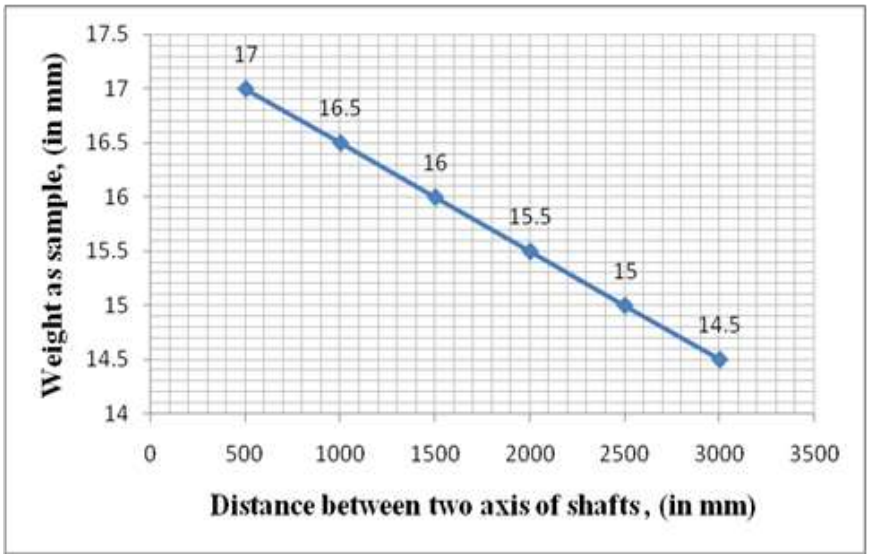

Fig. 4.3: Speed 15 R.P.M. Using of worm drive type gear box based D.C. motor and Torque = 20Kgf

V. CONCLUSION

A belt conveyor system with two rollers can be developed for handling the weight. The belt conveyor system is designed with high degree of automation, loading, movement and unloading efficiency. These are very flexible, safe, with low initial, and maintenance cost. We are find out the maximum handling weight 17 Kg by using of Distance between two axis of shafts , (500 mm) .which are shown in table .4.3.

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