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EXPERIMENTAL STUDY AND ANALYSIS OF FLAT BELT CONVEYER SYSTEM WITH DIFFERENT WEIGHT CONDITION

Vishnu Dutta Tiwari [1]✉, Prof. Gouraw Beohar [2]

[1] M. Tech Student (Machine Design), Shri Ram Institute of Technology, Jabalpur (M.P.), India
[2] Professor, Shri Ram Institute of Technology, Jabalpur (M.P.), India

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ABSTRACT

A conveyor belt system essentially consists of an endless belt of elastic material connected between two flat pulleys and driven by the rotation of one of the pulleys by a direct current motor. Usually, the material is fed to the belt near the other end of the pulley. The moving belt that carries the material to the drive pulley tends to sag between the two end pulleys due to its own weight. Rubber conveyor belts are commonly used to transport items with uneven bottom surfaces, small items that fall between rolls, or product bags that sag between rolls.

1. INTRODUCTION

As the flat belt is always under tension, it is subject to elongation, which causes loosening of the pulleys and loss of tension and power. That is why some type of belt tensioning device is incorporated into the system. This tensioning device is known as a retraction arrangement. The system is inherently very simple. The conveyor system has achieved a dominant position in the transportation of bulk materials due to a number of inherent advantages, such as economy and operational safety, reliability, versatility and a virtually unlimited range of capacities. Conveyor belts are generally of fairly similar construction, consisting of a metal frame with rollers at each end of a flat metal bed.

Figure 1: Belt conveyor system

2. LITERATURE REVIEW

Ghazi Abu Taher (2014) - The conveyor belt and the cup elevator are the means to transport material from one place to another in a commercial space. The conveyor belt has a large load capacity, simplified design with a large coverage area, easy maintenance, and high operational reliability.

AG Thakur (2015) - This work presents an application of the concept of simultaneous engineering and the principles of design for manufacturing and design for assembly, several critical parts of conveyors were investigated for their cost of functionality and ease of assembly in the general conveyor system.

3. RESEARCH METHODOLOGY

The flat belt consists of more layers of material to provide linear strength and shape, the materials flowing over the moving belt with speed. Belt conveyor technology has also been used in the conveyor transport system, like many manufacturing assemblies' lines. Belt conveyors were the most commonly used in energy conveyors as they were the most versatile and the cheapest. This conveyor system used premium belt products of the highest quality, which reduces belt stretching and results in less maintenance due to tension adjustments.

4. PROPOSED METHODOLOGY

First of all, Reading the previous research paper and Finding the research gap in related papers, after this, select the experimental process. Data are achieving from run of test rig and found the optimum position during the operating of test rig.

5. EXPERIMENT PROCEDURES

During the experimental test, first, the material is filled in the hopper on the upper side for the purpose of handling material moving forward, after the gear head DC motor switch has the ON condition, which is to travel up to the effective length and find the last position of the effective belt length, the gear head DC motor is in the OFF condition. The martial is collected by the bottom side funnel system.

Figure 2: Flat Belt

Figure 3: Flat Roller

Table 1: Specification of components

Sr. No.	Components	Specification
1	Gear head Motor	12V.D.C., 150 R.P.M., 10Kgf Torque
2	Power supply	12V.D.C. Step down transformer based with 5 Amp.
3	Roller	Cylindrical Type
4	Frame	Metallic Type

6. RESULTS AND DISCUSSION

Table 2: Forward direction of D.C. Motor with weight (5 Kg) of material

Observation No.	Time (Hours)	Speed (R.P.M.)
1	2	150
2	4	150
3	6	150
4	8	150
5	10	150
6	12	150

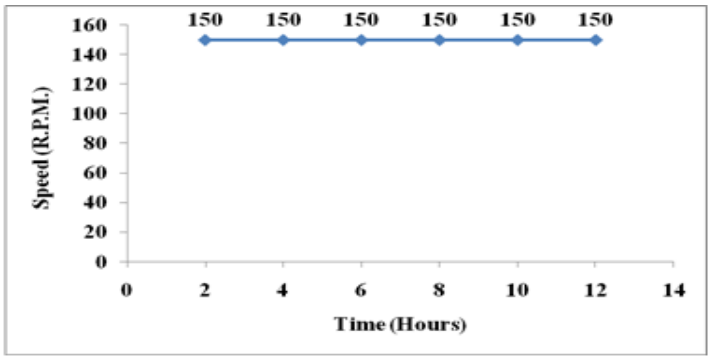

Figure 4: Forward direction of D.C. Motor with weight (5 Kg) of material.

Table 3: Forward direction of D.C. Motor with weight (10 Kg) of material.

Observation No.	Time (Hours)	Speed (R.P.M.)
1	2	150
2	4	150
3	6	150
4	8	150
5	10	150
6	12	150

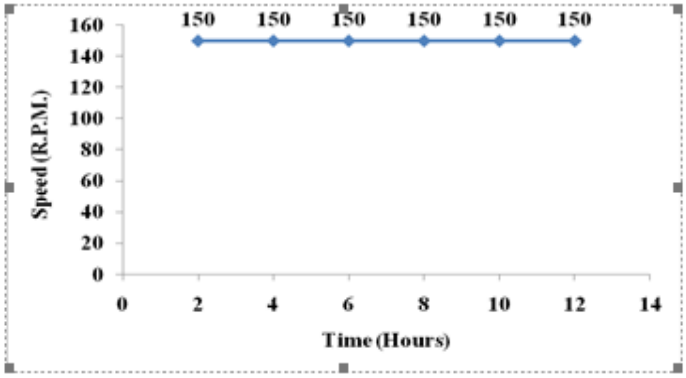

Figure 5: Forward direction of D.C. Motor with weight (10 Kg) of material.

Table 4: Forward direction of D.C. Motor with weight (15 Kg) of material

Observation No.	Time (Hours)	Speed (R.P.M.)
1	2	130
2	4	130
3	6	130
4	8	130
5	10	130
6	12	130

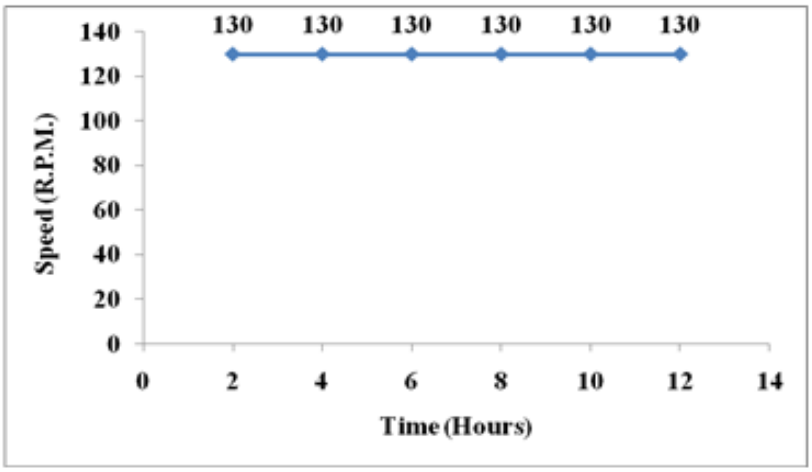

Figure 6: Forward direction of D.C. Motor with weight (15 Kg) of material.

7. CONCLUSION AND FUTURE SCOPE

7.1. CONCLUSION

In this article, we look at material handling in the forward direction of the roll, such as moving forward using 12 V.D.C. motor with different material weight, such as 5,10,15 Kg respectively. During the forward movement of the roller, we found the ideal position using the applied load of 10 kg with the roller speed kept constant as 150 R.P.M. and after that, when the applied load increases to 15 kg, the speed of the roller is reduced to 130 R.P.M.

7.2. FUTURE SCOPE

1) To study about material handling using chain drive system with vehicle assembly.

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CONFLICT OF INTEREST

The author have declared that no competing interests exist.

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