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EXPERIMENTAL STUDY OF FLAT BELT CONVEYER SYSTEM IN BOTH DIRECTIONS WITH DIFFERENT LOAD CONDITION

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ABSTRACT

The flat belt conveyer system is a based-on belt drive mechanism which is used for material handling system and also useful in other application. In this paper, we study about the material handling in both direction such as forward motion and reverse motion using of D.C. motor drive system with different applied load condition. The several reading has taken during running condition of system.

1. INTRODUCTION

In this drive system, various components are connected on metallic frame and specifications are shown in Table.1. A flat belt are mounted on the cylindrical roller and lower portion of belt is attached with metallic hook, which is used for material handling system, the metallic hook has both direction such as forward motion and reverse motion using D.C. motor drive system with different applied load such as 5, 10,15 Kg respectively.

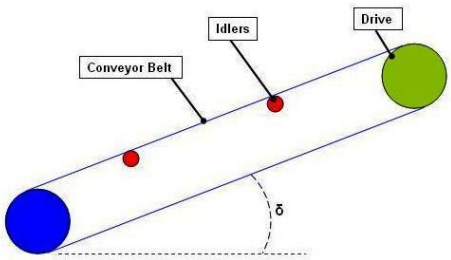

Figure 1: Flat belt conveyer system

2. EXPERIMENT PROCEDURES

During the experiment, First of all attached the applied load on lower portion of metallic hook for the purpose of the material handling in forward motion, after that switch of Gear head D.C. Motor has ON condition which is travel upto effective length of belt as 1500 mm (Forword direction) and finding the last position of effective length of belt the Gear head D.C. Motor has OFF condition. The weight is collected by hopper system. In reverse motion, switch of Gear head D.C. Motor has ON condition which is travel upto effective length of belt as 1500 mm (Reverse direction) and finding the initial position of effective length of belt and the Gear head D.C. Motor has OFF condition. The weight is attached on the metallic hook.

Figure 2: Ball Bearing (6204ZZ)

Figure 3: Flat Belt

Figure 4: Flat Roller

Table 1: Specification of components

Sr. No.	Components	Specification
1	Gear head Motor	12V.D.C., 200 R.P.M., 15Kgf Torque
2	Direction of Motor	Both side
3	Power supply	12V.D.C. SMPS based with 5 Amp.
4	Roller	Cylindrical Type
5	Bearing	6204ZZ, 4 Piece
6	Effective length of belt	1500 mm
7	Connection wire	3 mm
8	Frame	Metallic Type

3. RESULTS AND DISCUSSION

Table 2: Forward direction of D.C. Motor with applied Load 5 Kg.

Observation No.	Time (Hours)	Speed (R.P.M.)
1	2	200
2	4	200
3	6	200
4	8	200
5	10	200
6	12	200

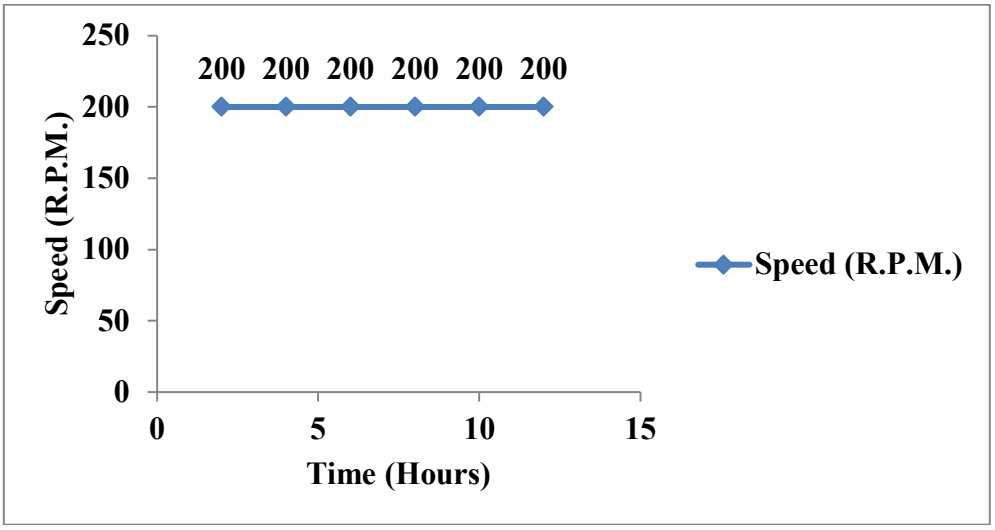

Figure 5: Forward direction of D.C. Motor with applied Load 5 Kg.

Table 3: Forward direction of D.C. Motor with applied Load 10 Kg.

Observation No.	Time (Hours)	Speed (R.P.M.)
1	2	200
2	4	200
3	6	200
4	8	200
5	10	200
6	12	200

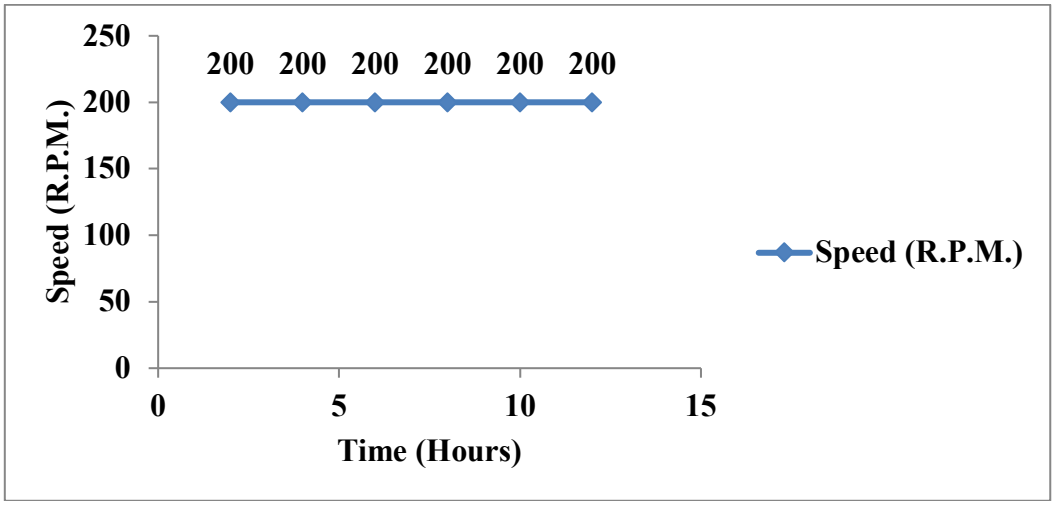

Figure 6: Forward direction of D.C. Motor with applied Load 10 Kg.

Table 4: Forward direction of D.C. Motor with applied Load 15Kg.

Observation No.	Time (Hours)	Speed (R.P.M.)
1	2	180
2	4	180
3	6	180
4	8	180
5	10	180
6	12	180

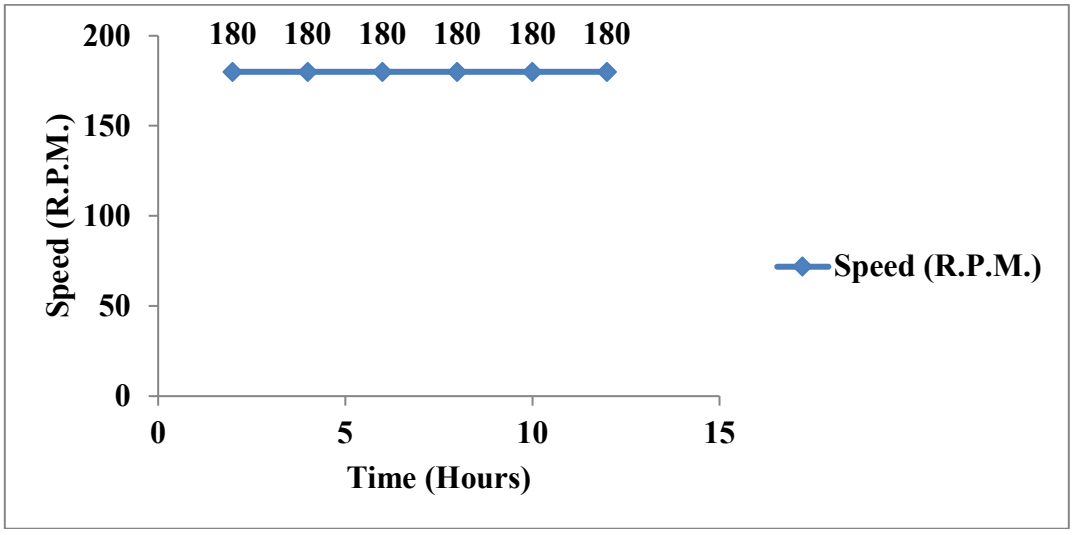

Figure 7: Forward direction of D.C. Motor with applied Load 15Kg.

Table 5: Reverse direction of D.C. Motor with applied Load 5 Kg.

Observation No.	Time (Hours)	Speed (R.P.M.)
1	2	200
2	4	200
3	6	200
4	8	200
5	10	200
6	12	200

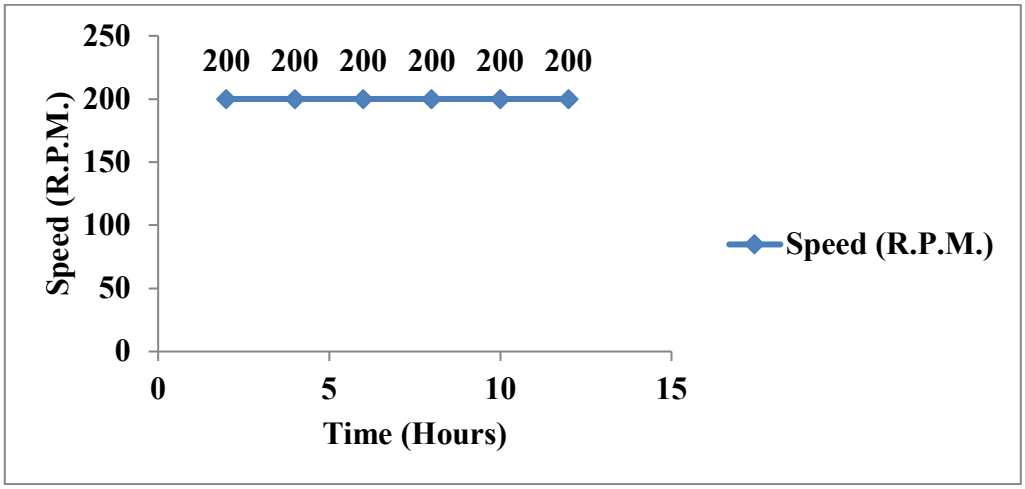

Figure 8: Reverse direction of D.C. Motor with applied Load 5 Kg.

Table 6: Reverse direction of D.C. Motor with applied Load 10 Kg.

Observation No.	Time (Hours)	Speed (R.P.M.)
1	2	200
2	4	200
3	6	200
4	8	200
5	10	200
6	12	200

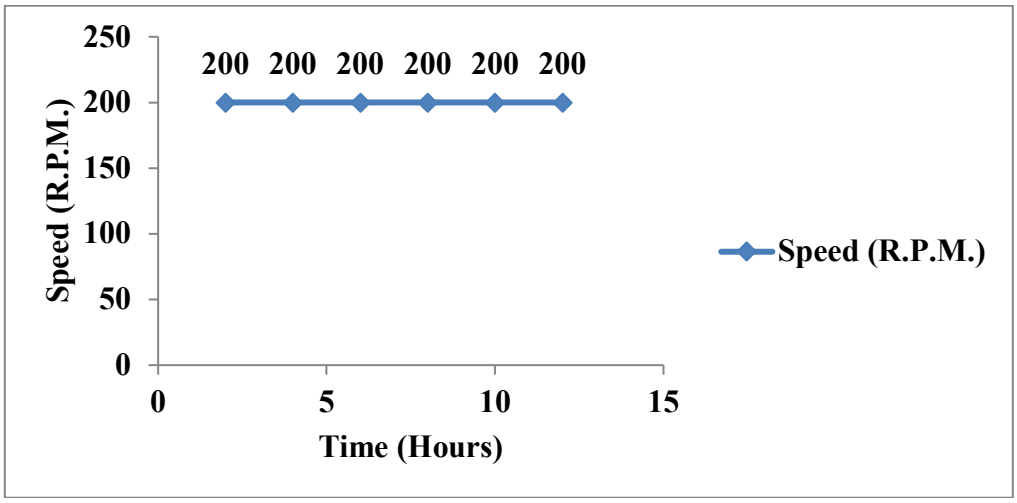

Figure 9: Reverse direction of D.C. Motor with applied Load 10 Kg.

Table 7: Reverse direction of D.C. Motor with applied Load 15Kg.

Observation No.	Time (Hours)	Speed (R.P.M.)
1	2	175
2	4	175
3	6	175
4	8	175
5	10	175
6	12	175

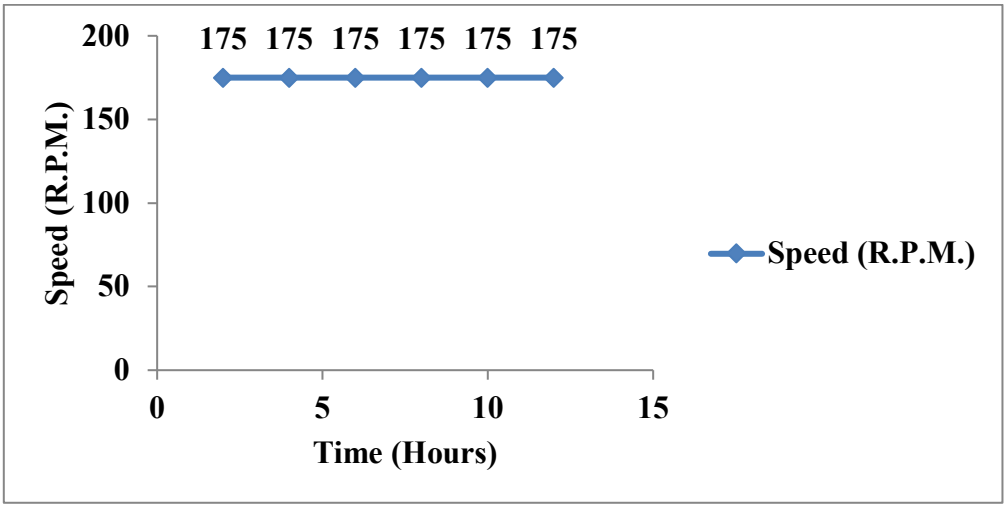

Figure 10: Reverse direction of D.C. Motor with applied Load 15Kg.

4. CONCLUSION

In this paper, we are observed about the material handling in both direction of roller such as forward motion and reverse motion using of 12 V.D.C. motor with different applied load such as 5, 10,15 Kg respectively. During forward motion of roller, we are find out the optimum position using applied Load 10 Kg with speed of roller is kept constant as 200 R.P.M. and after this when applied load in increase as 15 Kg then speed of roller is reduce as 180 R.P.M. and During reverse motion of roller, we are find out the optimum position using applied Load 10 Kg with speed of roller is kept constant as 200 R.P.M. and after this when applied load in increase as 15 Kg then speed of roller is reduce as 175 R.P.M.

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CONFLICT OF INTEREST

The author have declared that no competing interests exist.

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