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AUTOMATIC TUBE LOADING SYSTEM TO GRINDING MACHINE

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Abstract -- Conveyer belt is the boon to the automation technology. For the manufacturing process of any product using automation, conveyer belt plays an important role.

Conveyer belts are rolled with the help of the motor whose speed is controlled using traditional methods or by using a PLC. This project emphasis on the monitoring and controlling the quality of the product which is being manufactured on the conveyer belt. With the help of sensors, the quality parameters are monitored and fed to the programmable logic controller (PLC). PLC is composed of a microprocessor. A power supply and input l output units. As the parameters of a product are monitored and controlled during its process, eventually the quality of the product is incremented, and the quality check of a product can also be skipped.

Key Words: Conveyer belts, Proximity Sensors, PLC, Stapper Drive, Stepper Moter, etc.

I. INTRODUCTION

In the early ages the speed control of the motor was attained by either changing the applied voltage or the frequency by using power electronic drives. Since technology for motion control of electric drives is available, the use of programmable logic controllers (PLCs) with power electronics in electric machine applications is used in the manufacturing and automation. This offers advantages such as lower voltage drop when turned on with near to unity power factor. PLCs in automation are used to reduce production cost and to increase quality and reliability. To develop industrial electric drive systems, it is necessary to use PLCs interfaced with power converters, personal computers, and other electric equipment.

Many applications of induction motors require besides the motor control functionality, the handling of several specific analog and digital I/O signals, to name a few: trip signals, on/off/reverse commands etc. To make electric drive system versatile PLC must be added to the system structure.

Every product has some parameters or its own specification to be maintained during its manufacturing process in order to increase the quality of the product. With the help of the sensor the

parameters can be monitored and given as feedback to the PLC so that the plc controls the variable frequency drive (VFD). Thus, the speed of the motor is controlled considering the parameters of the product.

The three main pillars of this project are mainly the Sensor Circuit, PLC and VFD. The sensor circuit reads and sense the original parameters of the product to be manufactured and gives it to the PLC as feedback making it a closed configuration system. PLC is used as an arithmetic processing unit, it takes the feedback from the sensing unit and then it performs the operation according to the feedback value. VFD Controls the speed of the motor so as the conveyer belt to perform the required actions on the product. VFD controls the speed of the motor by changing the frequency of the motor or by changing the applied voltage to the motor

Thus, in this way the speed control of the motor of conveyer belt would surely help improve the quality of the product manufacture using the automation.

II. Literature Review

The history of conveyor belts begins in the latter half of the 17th century. Since then, conveyor belts have been an inevitable part of material transportation. But it was in 1795 that conveyor belts became a popular means for conveying bulk materials. In the beginning, conveyor belts were used only for moving grain sacks to short distances.

The conveyor belt system and working were quite simple in the early days. The conveyor belt system had a flat wooden bed and a belt that traveled over the wooden bed. Earlier, conveyor belts were made of leather, canvas or rubber. This primitive conveyor belt system was very popular for conveying bulky items from one place to another. In the beginning of the 20th century, the applications of conveyor belts became wider

Hymle Goddard of Logan Company was the first to receive the patent for the roller conveyor in 1908. The roller conveyor business did not prosper. A few years Later, in 1919, powered and free conveyors were used in automotive production. Thus, conveyor belts became popular tools for conveying heavy and large goods within factories.

One of the turning points in the history of conveyor belts was the introduction

of synthetic conveyor belts. It was introduced during the Second World War, mainly because of the scarcity of natural materials such as cotton, rubber and canvas. Since then, synthetic conveyor belts have become popular in various fields.

The longest conveyor system in an Airport is the Dubai International Airport baggage handling system at 92km. It was installed by Siemens and commissioned in 2008, and has a combination of traditional belt conveyors and tray conveyors. With the increasing demand in the market, many synthetic polymers and fabrics began to beused in the manufacture of conveyor belts. Today, cotton, canvas, EPDM, leather, neoprene, nylon, polyester, polyurethane, urethane, PVC, rubber, silicone and steel are commonly used in conveyor belts. Nowadays, Industrial Mechanical the material used for making a conveyor belt is determined by its application.consists of two or more, pulleys with a continuous loop of material - 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. 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 industrial and agricultural materials, such

as grain, coal, ores, boxes etc. generally in outdoor locations. Generally companies providing general material handling type belt conveyors do not provide the conveyors for bulk material handling. In addition there are a number of commercial applications of belt conveyors such as those in grocery store

3.6 SCHEDULE OF WORK AND COST OF EQUIPEMENT

Serial No.	Task or operation	Approx. Time Required
1	Finalized the design of novel structure	2 weeks
2	Searching & availability of components	3weeks
3	Collecting the component from different shops	2week
4	Finalize and purchased stepper motor kit	2 weeks
5	Fabrication work of conveyer assembly	Work in progress
6	Electrical panel designing and part fixing	Work in progress

Table 3.6.1. Schedule of work

Serial No.	List of material	Quantity	cost
1.	Stepper motor kit (driver,power supply)	2each	60000
2.	Mechanical frame of conveyer with belt and pulley	1	10000
3.	Proximity sensor	2	1800
4.	PLC (logo siemens)	1	5000
5.	Bearing	2	320
6.	MCB	1	1500
7.	SMPS	1	1000

Table: 3.6.2. Component and Costing

3.7 Components Used

Fig.no. 1 Conveyer belt

Fig.no.2 Proximity Inductive Sensor

Fig. no. 3 Siemens logo plc

Fig no. 4 Power Supply

IV. WORKING

This system consist of conveyer belt assembly, stepper motor motor driver ,plc,relay and proximity sensors etc. A stepper motor governed by stepper driver is used to roll the conveyer belt. When no tube at feeding station then Sensing unit having inductive type proximity PNP NO sensor sensed signal and given it as an input to the PLC. then PLC interprets the signals. On the detection of the tube on conveyer the PLC sends an output signal to the stepper driver the stepper driver with respect to the signal start and stop the stepper motor.

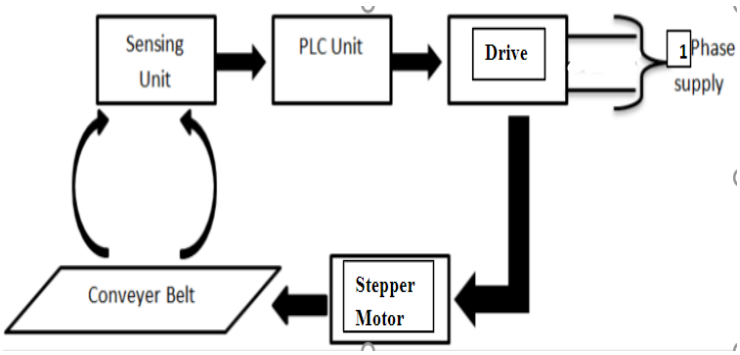

Fig.no. 4 Block Diagram of Working of conveyer belt

V. ADVANTAGES

1. To increased the accuracy so it can increase the product quality.

2. To system reduce cycle time it can increased the productivity.

3.To system reduces the manpower of that stage so its economical industry

4. To system also reduced the breakdown time of coneyer.

VII. CONCLUSION

After the completion of the experiment is can be concluded that the final quality of the product is increased and following conclusions can be made

1. It is a cost-effective project as the initial cost is high but has a very low maintenance cost.
2. As the quality increases the profit of the firm also increases
3. This system reduces the cycle time so it can increase the productivity
4. This system reduces the manpower of that stage so its economical for industry .

Hence a system can be used in the industries having a high turnover and are also those industries who have to maintain the high precision in their final products.

REFRENCES

1. Serhat Yilrnaz' "Speed Control of a Conveyor System by Means 6f Fuzzy Control Aided PLC", Institute of Electrical and Electronics Engineers, 1999

2. David R. Loker, "CONVEYOR CONTROL SYSTEM PROJECT" American Society for Engineering Education, AC 2011-1607, 2011

3. Chitra.S, "Conveyor Control Using Programmable Logic Controller," International Journal of
Advancements in Research & Technology, Volume 3, Issue 8, August-2014

4. Sanjeev Kumar Patti, "Automation of Belt Conveyor System," International Journal of Emerging Technology in Computer Science & Electronics (IJETCSE) ISSN: 0976-1353 Volume 23 Issue 6 –OCTOBER 2016.

5. Mr.Rajnikanth, "CONTROL OF CONVEYOR USING PLC," June 2016 , IJIRT , Volume 3 Issue 1

6. Kishan N. Chadotra, "Automation in Industry for speed control of conveyor belt Drive," 2018 IJNRD | Volume 3, Issue 4 April 2018