

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 / 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.*

Keywords: Power supply, motor, AC-DC, PLC

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. PLC's 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 a 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.

II. LITERATURE SURVEY

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.

III. SYSTEM DESIGN AND CONSTRUCTION

Motor

The stepper motor is an electromagnetic device that converts digital pulses into mechanical shaft rotation. Advantages of step motors are low cost, high reliability, high torque at low speeds and a simple, rugged construction that operates in almost any environment. The main disadvantages in using a stepper motor is the resonance effect often exhibited at low speeds and decreasing torque with increasing speed.

Stepper motor Specifications

Types	Bipolar(BH86 SH 118-6004 HL-10)
Operating voltage	24-170 volts dc
Operating current	6 amp
Rated Temperature	-10 to 40 °c
Weight with gearbox (kgs)	7.5kgs
Holding torque	8.7 Nm

PLC

A programmable logic controller (PLC) or programmable controller is an industrial computer that has been ruggedized and adapted for the control of manufacturing processes, such as assembly lines, machines, robotic devices, or any activity that requires high reliability, ease of programming, and process fault diagnosis. Dick Morley is considered as the father of PLC as he had invented the first PLC, the Modicon 084, for General Motors in 1968.

PLCs can range from small modular devices with tens of inputs and outputs (I/O), in a housing integral with the processor, to large rack-mounted modular devices with thousands of I/O, and which are often networked to other PLC and SCADA systems.

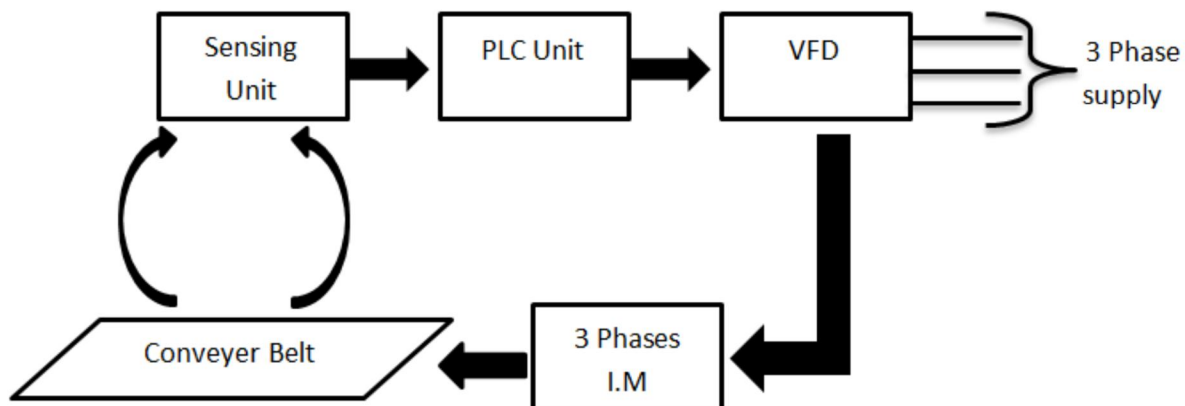


Fig. 1 Block Diagram of Working of conveyer belt

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

IV. 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 increased the productivity
4. This system reduce 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.

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