

Automatic Ream Handling System for An Effective Storage in Paper Industry

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Abstract

Now-a-days there are more techniques used for the movement of the materials from one place to another place in an industries. This technique is used to provide the automation of handling materials. The aim of our project is to transport the ream from shrink wrapping machine to the storage system. The conveyor is built for the transport of reams. In the conveyor, the hydraulic pushers, motors, proximity sensors, inductors, stopper plates are used. When the ream from shrink machine is recognized by the sensor, conveyor gets started. The overall operation of this system is controlled by the PLC.

Keywords - PLC (programmable Logic Controller), Hydraulic pusher, Norton motor, stopper plates, inductors, proximity sensors.

I. INTRODUCTION

The 500 sheets of paper packed in a bundle is known as ream. In industry, many raw materials are needed for the production of plain paper. They used wood and bagasse as raw materials for the production of paper. After the production of paper, the quantity of sheets are packed in a bundle and then it gets wrapped by the shrink wrapping machine. After the reams are taken to the storage system manually. It is a tedious task because it take more time to carry the reams to the storage system from the shrink wrapping machine.

The author designed an automation system with the help of roller conveyor. It is a conveyor with metal rods fixed in it. The rods are gets rolled and it moves the reams from shrink wrapping machine to the storage system.

II. LITERATURE REVIEW

There are more number of systems are used in the industries for the movement of the objects from one place to another place. In [1] the author has used an Integrated Fuzzy Logic Controller with Programmable Logic Controller for the movement of the objects. The main drawback of this system is that it is not accurate and rigorous. In [2] the author has used a multisensor with Fuzzy Logic Controller for the picking and placing of the objects. The main drawback of this system is that it is not accurate. In [3] the author used a speech control robotic arm for the process of objects picking and placing. The

drawback of this paper is it will not able to handle an objects with heavy weight. In [4] the author has used an plastic conveyor for moving the materials for sewing. The main drawback of this paper is that the plastic conveyor is not suitable for the heavy objects movements. It gets lost its stiffness quickly. In [5] the author has used a conveyor belt system for the movement of the objects. The main drawback of this paper is that it takes more time for the process.

A. Existing System

In an industry, hydraulic trolley, works with the help of an hydraulic pressure is used for the movement of reams from shrink wrapping machine to the storage system manually. So it has high complexity, more time consumption and increased human risk. Due to this disadvantage, we are building a conveyor to carry the ream from one place to another place, controlled with the help of PLC.

III. PROPOSED SYSTEM

A conveyor is controlled by the PLC. The proposed system consists of hydraulic pusher, Norton motor, stopper plate, proximity sensor and indicator.

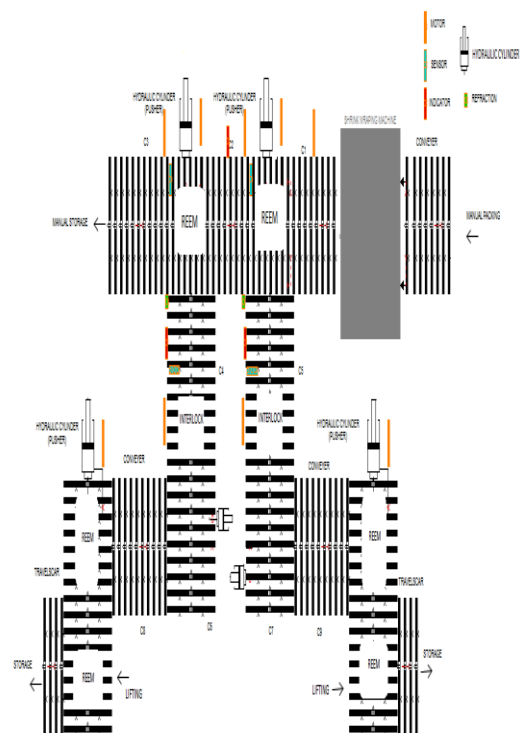


Figure 1. conveyor setup for the movement of reams from shrink wrapping machine to the storage system

A. Roller Conveyor

A roller conveyor consists of a metal rods and it gets rotated once the signal is received from the PLC. The roller gets rolled with the help of Norton motor fixed under the conveyor. When the motor gets started with the help of the command signal from the PLC, the metal rods gets rolled and the ream gets moved.

B. Hydraulic Pusher

When the ream is recognized by the sensor at the end of the one conveyor, it sends signals to the PLC, then the PLC stops the rolling of metal rods, and then stopper plate acts and stop the ream at the place. Then the Hydraulic pusher gets activated by the PLC and it pushes the ream to the next conveyor.

C. Proximity Sensor

The ream is identified with the help of this sensor. The sensor is fixed in the conveyor at the required places. The proximity sensor identifies the ream with the help of sending the signals and the reflection of the signals back from the ream to the sensor. After it recognizes the ream, it sends the signal to the PLC.

D. Stopper Plate

The stopper plate is the metal plate fixed under the conveyor. When the signal to the stopper plate from the PLC is received, it acts at the place of the end of the conveyor and then it stops the ream movement.

E. Norton Motor

Norton motor is a high speed and high specification motor. The roller conveyor is rolled with the help of this motor. The speed of the motor is high and it is capable of achieving reduced time consumption for the movement of reams. The motor gets activated with the help of PLC. It is fixed under the conveyor.

F. Programmable Logic Controller

It is used to control the overall operation of the handling of reams from shrink wrapping machine to the storage system. All the signals are send to the PLC only and then it controls the hardware devices such as hydraulic pusher, Norton motor and the conveyor.

IV. OPERATING PRINCIPLE

The main work of this system is to carry the ream from one place to another place. The process is outlined as follows: ream comes away from the shrink machine - the ream is sensed by the proximity sensor-sends signal to PLC-starts the roller conveyor-

bundle reach the end-sense by the proximity sensor-sends signal to PLC-stops the roller conveyor and stopper plate acts-PLC send signal to hydraulic pusher-The pusher push the ream to the next conveyor.

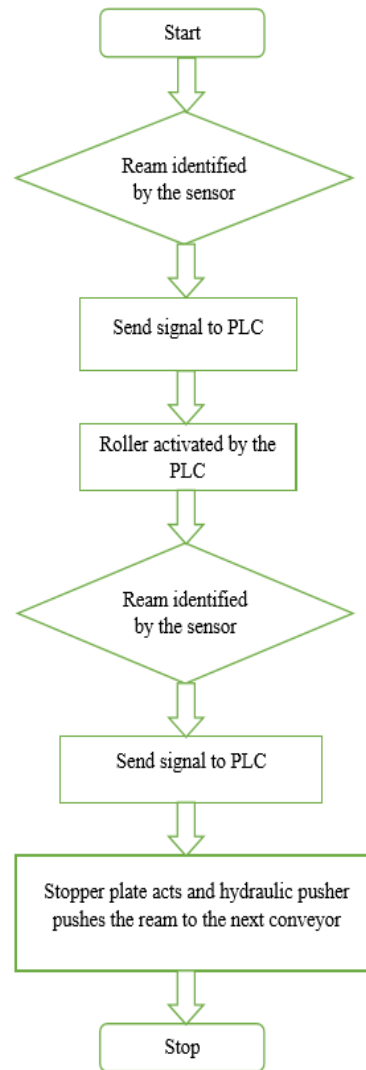


Figure 2. Flow chart for the process of handling of reams

V. RESULT AND DISCUSSION

The conveyor is support for the heavy bundles also. Each and every command signals are given to the software and hardware devices by the use of PLC only. This will help in the industries for the easy transport of the reams. The time consumption is reduced and it overcomes the human effort.

VI. CONCLUSION

As a result of this project work, it is able to move the reams from the shrink machine to the storage system without the use of any manual effort. The PLC microcontroller is used to achieve the high

precision control. By using this conveyor setup there is no need of any other manual work. This automation has a great future ahead.

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