

AUTOMATION ON PA GRADING MACHINE FOR CABLE FORMING

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Abstract – In the cable formation machine before this innovation the formation of cable were done by the human power due to which the cable wastage occurrence is more and requirement of human effort is also more this result to time consumption. This innovation is based on Cable formation techniques and how to make this technique by this innovation, only one user can operate whole machine single handed. In this machine, there are basically five components. There are two DC motors, first is for controlling drum movement and the one is for cutting process. There is a motor driver by which user can control motor's speed and direction. There is infrared sensor as encoder to encode the turns on drum. In this machine Arduino is use on behalf of other controller. The whole process is based on Arduino Uno which is a controller circuit to operate and control the machine, basically this innovation is very time saving and it requires less human effort. It is user friendly and cost effective to produce electric cable.

Key Words: Motor Driver, Encoder, IR Sensor and ARDUINO.

1 INTRODUCTION

Cable formation contains different methods like it is pull out by dies and then it is wound on the drum. The main problem is occur at the drum side because when the cable is out from the forming machine the wastage of the cable is more because that process is not automatic.

On the basis of this problem, we have found a solution for that we will make the machine automatically. So the wastage of cables will reduce. This will obtain by the encoder which will count the turns of drum.

1.1 Functional Principle:

Our aim is too fully automatic the process of cable forming. So the process will be time saving and it requires less human effort. It is user friendly and cost effective to produce electrical cable. So the overall production cost is reduce and time required is less.

1.2 Objectives

In PA grading machine there are different component which are used for automation purpose like conveyer belt, roller, cutter unite, cable holder, and drummer. This are the

mechanical parts of the PA grading machine also we are using an Ardiuno, IR sensor for encoder , L298 motor driver, two PMDC motors for automation purpose It is user friendly.

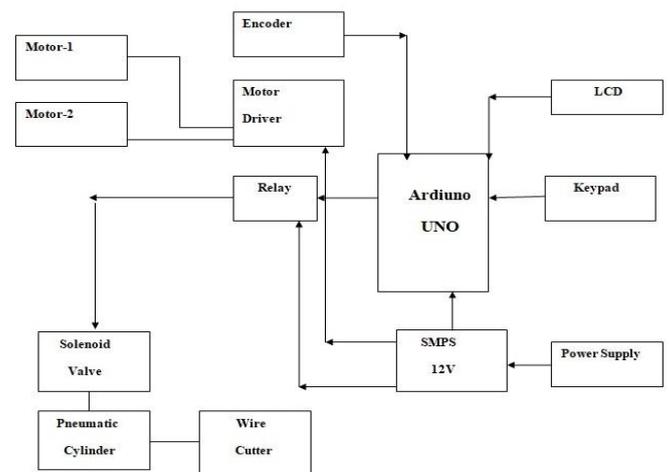


Figure 1 Block Diagram

The process requires less human effort. Cost effective, Energy saving, Perfect performance Multifunction

2. BLOCK DIAGRAM

DC motor A DC motor is any of a class of rotary electrical machines that converts direct current electrical energy into mechanical energy. The most common types rely on the forces produced by magnetic fields. Nearly all types of DC motors have some internal mechanism, either electromechanical or electronic; to periodically change the direction of current flow in part of the motor. Two DC motor are used one is for cutter and other is for drummer.

Motor Driver Motor driver is used for controlling the motor speed.

IR Sensor IR sensor is used to detect the motion.

Arduino Uno Arduino is an open source computer hardware and software company, project, and user community that designs, manufactures single-board microcontrollers and microcontroller kits for building digital devices and interactive objects that can sense and control objects in the physical world.

Drum It used to wound the cables.

Relay It is used to sensing the signals to energise the solenoid valve. It is operated on 12 volt.

Encoder It will encode the number of turns.

Solenoid Valve When the relay gives signal to the valve the valve will be pressurised by the air and the air pressure is cut out.

FLOW CHART

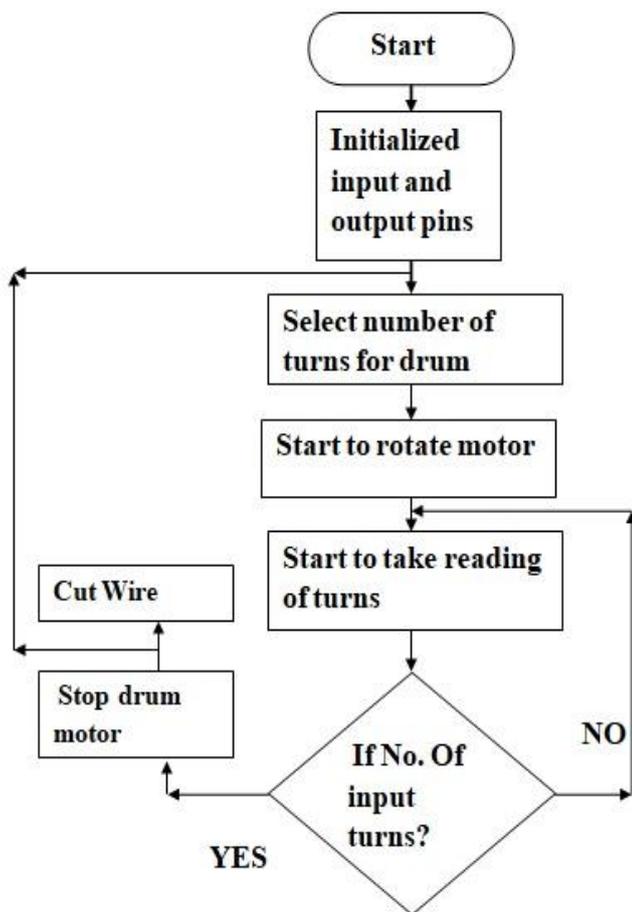


Figure 2 Flow Chart

Start: - In the process when the main supply is started the ON signal will be given to the machine.

Initialized Input and Output Pin: - It will give the start signal to the motor pin.

Select Number of Turns for Drum: - In this process the no. Of turns for the drum will start selecting.

Start to Rotate Motor: - Then the motor will start working.

Start to Take Reading of Turns: - Start to calculating no. of turns.

If Num. Of Input Turns: - If the no. of turns are calculated correctly then the drummer motor will stop or if not then it will calculate it again.

Cut Wire: - If the turns are proper and drum motor is stopped then the cutter motor will cut the wire if not it will again counts the no. of turns for drum.

4. RESULTS

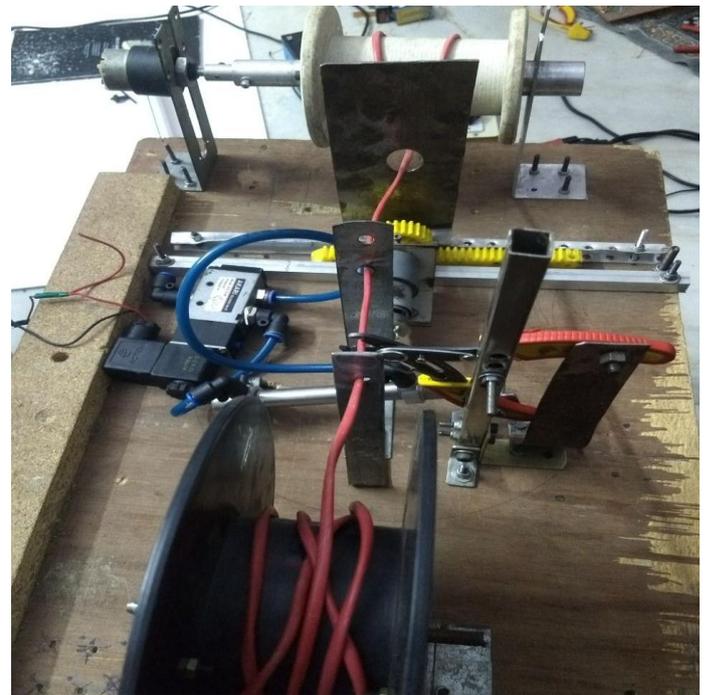


Figure 3 Hardware

The figure show the implementation of P.A grading m/c for cable forming in this there is a smps which convert 230v AC to 12v DC for the working process of circuit. The cable coil which is extended to the drummer which will count the number of turns and the extension of wire from coil to drummer is done by the motor. The reerpinone wheel will set the cable on the drummer with the help of another motor. The encoder and IR sensor is mounted with the drummer which will count the drummer rotation (1 rotation=1turn). After every 1000 turns the relay will sense will operate the pneumatic solenoid value due to which the air pressure will generated in pneumatic cylinder which will pressure the cutting m/c and cut the cable.

6. CONCLUSIONS

From this project we conclude that using automation for cable forming we can reduce the cable wastage occurs due to the manual operation. So, to reduce this loss we try to make the machine using different component like conveyer belt, cutter, rollers, cable holder, and drummer. Using this component we made a model of the machine. Also we are using Arduino Uno, IR sensor, L298 Motor driver which can

provide an automation for a cable forming. In this semester we made a prototype at a output of the cable forming machine called a turns per revolution unite. In this model we are using different components which is explain in a report. Using the components calculated turns of motor which can be fixed in a programming when the rotation of motor will be stop at time second motor will start to run for a cutting purpose automatically through automation. Due to which the cable formation will be done accurately with less effort and with reduction in cost.

REFERENCES:-

- Abhishek Dwivedi, Avanish Dwivedi, "Role of Computer and Automation in Design and Manufacturing for Mechanical and Textile Industries", August 2013, IJITEE, Vol-3, Issue-3 pp. 2278-3075.
- Tajinder Singh Bedi, Ranjan Upadhyaya, "A Study of Automated Textile Industry: Opportunity and Challenges in Punjab", July-Sept 2015, IJMBS, Vol-5, Issue-3, pp. 2230-9519.
- Mohapatra Sanjay (2010), "Business Process Automation", PHI learning Pvt. Ltd., New Delhi.
- S.R. DEB (2013), "Robotics Technology and Flexible Automation", Tata McGraw Hill Pvt. Ltd., New Delhi.
- Jayavardhana Gubbi, Rajkumar Buyya, "IoT:A vision, architectural elements, and future directions", Future Generation Computer Systems 29(2013) 1645-1660.
- Prateep Misra, Arpan Pal "Unlocking the values of the Internet of Things(IoT)-A platform Approach", Tcs Innovation Labs
- P.J.Agrell, W.L.Berry, "Production management in the era of Internet of Things", January 2015, IJPE, Vol-159, pp.1-358.