AUTOMATIC STEEL ROD CUTTING MACHINE BASED ON PLC AND SCADA

[1] Vasudevan K, [2] Rajkumar, [3]Karthick N, [4]Suresh B, [5]Prince Immanuel S

[1] Associate Professor, [2,3,4,5]Assistant Professor ,
[1,2,4,5] Dept of ECS , [3]Dept of MCA & SS,
VLB Janakiammal College of Arts and Science, Coimbatore, Tamil Nadu, India

Abstract : In this system it has been proposed an Automatic steel rod cutting machine instead of manual cutting machine. In the existing method, the work was carried out manually to align and cut the spiral steel rod. The proposed system is designed in such a way to reduce the manual work in terms of aligning and cut the spiral steel rod accurately by automation by the use of Programmable Logic Controller (PLC) and Supervisory Control and Data Acquisition (SCADA). The available raw steel rod materials are winded on the spindle for transporting conveyance. The automated cutting process will remove the misaligned areas of the steel rod and cut the rods based on the required length.

***IndexTerms* - PLC, SCADA, cutting machine, transport, steel rod.**

I. INTRODUCTION

The objectives of the proposed system are: i) To rectify the problems of existing system related to limit switch. ii) To automate the manual system by adding the specific features as essential to the existing system. iii) To monitor and control using PLC and SCADA system[1-2].

II. EXISTING SYSTEM

In the existing system, the cutting process done by semi automated machine. The inlet of machine will receive the misaligned steel rod and remove the bends of it. After removal of bends it sends the rod to the cutting phase. The cutting phase will do the cutting work when the rod presses the limit switch as the force from the steel rod actuates the limit switch. Due to this force the normal steel rod become misaligned. While cutting, sometimes the system may congest during which the machine is unable to continue the process which may require manual process. The manual control contains an individual control of Forward, Reverse control and cutting phase operation. By that way system congestion may be removed and again the machine will continue its regular processes.

III. DRAWBACK

- If once the rod reached the limit switch which may misaligned the rod.
- The position of the limit switch is fixed often manually.

IV. PROPOSED SYSTEM

Automatic steel rod cutting machine based on PLC and SCADA, which removes the misaligned areas of steel rod and cut the steel rod based on the required length set by operator.

a. Automatic control: The steel rod is fed to the machine inlet. The inlet receives the steel rod and forwarded to the mechanical bend removal setup. The mechanical setup contains the heavy rollers which will remove the bends in the rod and allows it to the cutting phase. Cutting phase cuts the rod, based on the setting length and repeat the process until process gets completed.

b. Supervisory Control And Data Acquisition (SCADA): SCADA is the software (GUI) [3-4] used to monitor and control the Automatic machine process. It also used for measuring the parameters like total count of cutting, machine on and off time and also parameters settings, alarm, etc.

In this system without changing the position of sensor, various setting point scan be fixed automatically through which we can get various lengths of the rod as we required. The limit switch is replaced by inductive proximity sensor. Inductive proximity sensor will measure the length based on the spindle rotation count. The spindle rotation will start when the inlet receive the steel rod. The spindle rotation is directly proportional to length of the rod. Once the rotation count reaches the set point level, the cutting phase will cut the rod automatically.

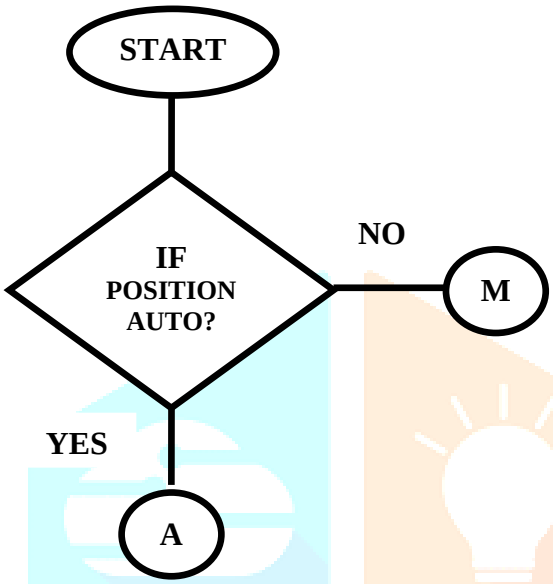

Figure1 Flow chart for a proposed system

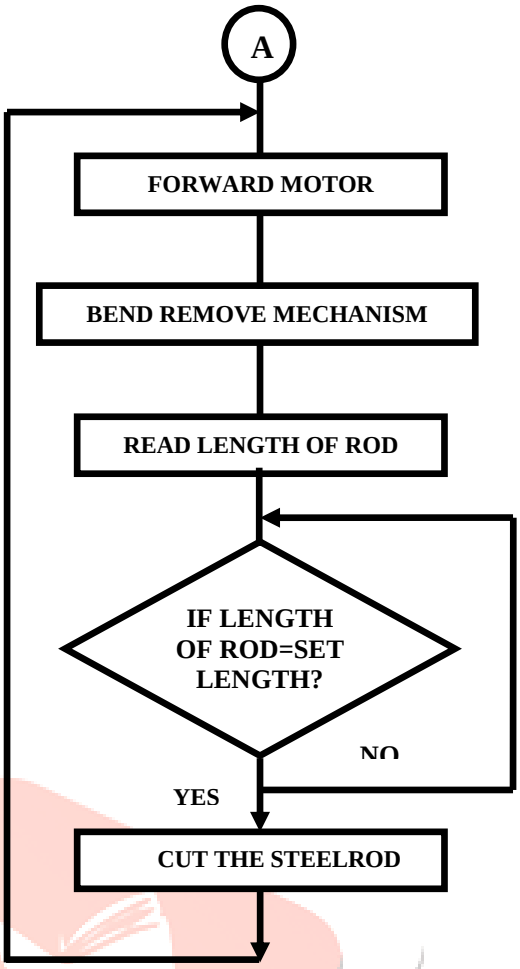

Figure2 Flow chart for a steel rod cutting

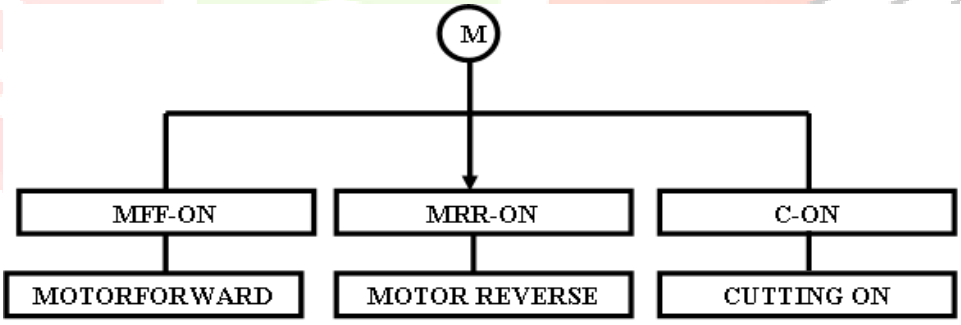

Figure3 Flow chart for a motor control

V. Conclusion

The proposed automatic steel rod cutting system is able to address the issues existed in the present system by involving PLC and SCADA. The possibility of Misalign the rod due to limit switch and the manual operation towards the change of position of the limit switch can be overcome by this.

In the proposed system PLC plays a major role towards the controlling of the entire system through the necessary software and hardware. In this SCADA plays a major role towards the monitoring of the entire operations and measuring, recording the various parameters. To conclude the proposed system can be considered to replace the existing one because of its accuracy and reliability.

References

[1] Ashish Tiwary and et al, "PLC Based Bottling System in Industrial Automation," Imperial Journal of Interdisciplinary Research (IJIR), vol.3(4), pp. 842- 847,2017.

[2] Yasar Birbir and H.Selcuk Nogay "Design and Implementation of PLC-Based Monitoring Control System for Three-Phase Induction Motors Fed by PWM Inverter" International Journal Of Systems Applications, Engineering & Development, vo1. 2(3), 2008

[3] A.M Gaur and et al, "PLC Based Automatic Control of Rheometer," International Journal of Control and Automation, vol.3(4) , 2010, pp. 11-20.

[4] Avvaru Ravi Kiran and et al, "The Principle of Programmable Logic Controller and its role in Automation", International Journal of Engineering Trends and Technology, Vol.4(3), 2013,pp.500-502