PLC BASED AUTOMATED CONVEYOR ASSEMBLY LINE

Mrs. Dnyadada Hire[1],Mr. Utkarsh Amar[2],Ms. Kajal Modake [3],Ms.Sana Mulani[4]

Assistant Professor, Department Of E&T C,,DYPIEMR,Akurdi,Pune[1],

Student of BE(E&TC) ,DYPIEMR,Akurdi,Pune[2],

Student of BE(E&TC) ,DYPIEMR,Akurdi,Pune[3],

Student of BE(E&TC) ,DYPIEMR,Akurdi,Pune[4]

ABSTRACT

As we know the importance of the human life so to keep the human life in the factories the use of plc based conveyor belt assembly line is very important. A programmable logic controller (PLC) is a digital computer used for automation of electromechanical processes, which is a type of computer family and they have commercial and industrial applications. The development of programmable logic controller (PLC) makes it possible to do the required changes to the program without changing the electrical circuit connections. The Siemens s7-300 series programmable Logic controller is used to mechanize the system. This paper presents an automation of Conveyor belt logic using a programmable logic controller. For this system s7-300 PLC (CPU 313c) used and software for programming used is sematic manager.

Index Terms — PLC, conveyor motor, s7-300, function block, functional block diagram.

I.INTRODUCTION

The PLC has its origin in the motor manufacturing industries. Manufacturing processes were partially automated by the use of rigid control circuits electric, hydraulic and pneumatic. With the help of microcomputers, it was realized that if the computers could switch things on or off and respond to a pattern of inputs, then the changes could be made by simply reprogramming the computer and so the PLC was born. Programmable Logic Controller(PLC) is an industrial computer control system that continuously monitors the state of inputs and then make a decision based on the custom program to control the state of the output devices.Almost any production line, machine function, or process can be greatly enhanced using this type of control system. The biggest benefit of PLC is that it has ability to change and replicate the operation or process by collecting and communicating vital information.

II.LITERATURE REVIEW

NAME	AUTHOR	YEAR	DESCRIPTION
PLC Based Industrial Crane Automation & Monitoring	Prof. Burali Y. N.	2015	In this paper we are using PLC to control the crane movements.
Research and Design of monitoring system for belt conveyor	Qing Lu, Xiaohui Wang,	2014	This paper includes design of monitoring system for belt conveyor
Conveyer control using PLC	Chitra.S,Lecturer, Department of Electronics and Communication Engg	2014	PLC is used in almost every aspect of industry to expand and enhance production.
Automation of conveyor using PLC	Ashwini Bhiungade, ME Electronics (Digital system) Savitribai Phule Pune University	2015	In this paper ,automation of conveyor is observed with the help of PLC.
Automated wheel assembly system using PLC	J. Dilipsingh , S. Jeyanthi , R. S. Jagadeesh, second year, Associate professor, BE final year, Jeppiaar Engg college, Chennai.	2014	The automated wheel assembling system reduces human effort time, energy. The continous work is done with the robot accurately.

III.METHODOLOGY

This project is a framework demonstrating the car manufacturing plant which is automated by using PLC. While the entire process is being supervised on SCADA. The different sensors used in the system takes care of unnecessary operation. The system is completely monitored using SCADA and plant may be stopped or controlled through SCADA in case of emergency. The plant is controlled by programmable logic controller. The PLC is the core of the whole automated system. The instructions to the PLC are fed using Ladder Logic programming language. The software used in this programming is SIMATIC and the communication software used is SIMATIC Communication for windows operating systems. After the program is written and successfully driven in the OFFLINE mode then it is downloaded on PLC using the communication software as per the program written. When the car is detected in the input side the conveyor motors switches ON and thus the conveyor belt starts moving in the forward direction. Motor automatically stops when the car reaches the exact location under the crane. Then the crane switches ON and the framing of car takes place. There are different stations for different body parts Once the framing part is done correspondingly signal is sent to plc to move the

conveyor drive. Proximity sensor in used for sensing the car. In our project dc motor drive system is being used while in industries ac motor drive systems are used. When the car is sensed by the sensor, a signal is sent to the PLC which stops the drive motors and after the framing process is over, the PLC again starts the drive motors to move the conveyor. On the end of conveyor another mechanism is in place to move away the framed car from the conveyor belt. The conveyor moves till the presence of other car is sensed by the proximity sensor. At the end of conveyor another sensor is placed to count the number of car framed so as to know the production rate of the plant. The different stages in framing car process can be supervised on the SCADA in the computer. The entire process can be altered from SCADA screen itself, like start/stop of the conveyor motors, working of the different proximity sensors or even an emergency stops. This is made possible by the communication cable used which is RS 232. This cable is made link between Wonder ware In Touch software and PLC used. Thus SCADA provides complete control over the project without even touching the hardware components, thus working as a remote control. This is a very important feature of automation where in case of any error or disruption the process can be rectified or stopped using SCADA only.
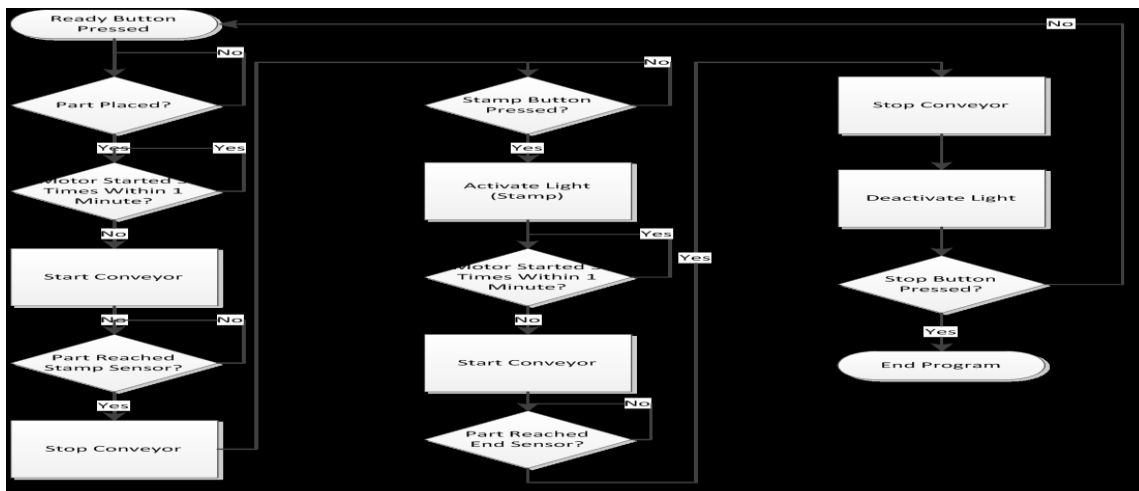

Fig.No.1 FLOW CHART FOR AUTOMATED CONVEYOR BELT ASSEMBLY LINE USING PLC
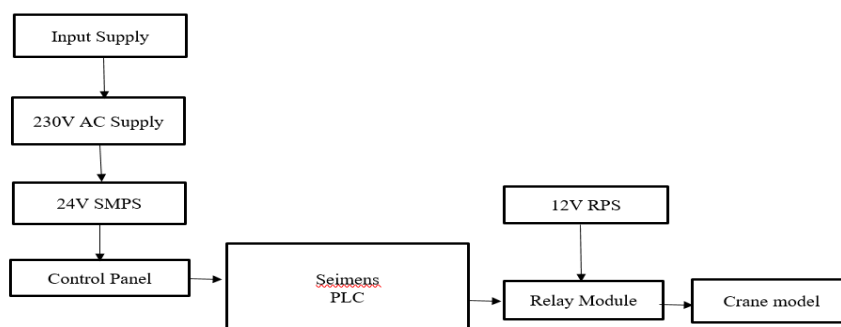
IV.BLOCK DIAGRAM

Fig.No.2 BLOCK DIAGRAM OF AUTOMATED CONVEYOR BELT ASSEMBLY LINE USING PLC

V.COMPONENTS USED TO IMPLEMENT IDEA

1. Siemens PLC S7-300

2. Conveyor belt

3. Sensors

4. Scissor Lifts

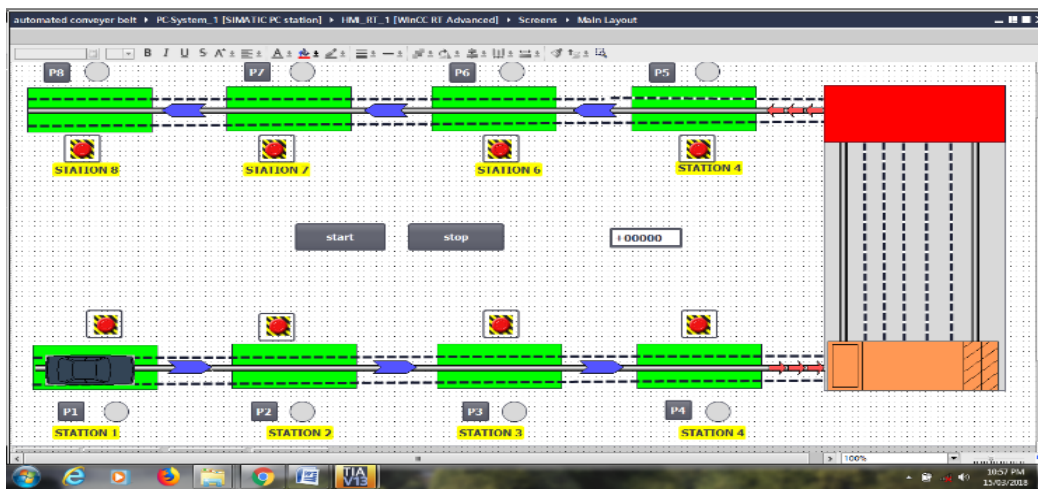## VI.FINAL RESULTS OF PLC BASED AUTOMETED CONVEYOR ASSEMBLY LINE

Fig. Main layout

VII.ADVANTAGES

1. Trouble shooting aids make programming easier and reduce downtime.
2. Cost effective for controlling complex system.
3. Flexible and be reapplied to control other system quickely and easily.
4. Trouble shooting aids make programming easier and reduce downtime.

VIII.APPLICATIONS

1. PLC Applications
2. Automotive Industry
3. Beverage Industry
4. Marine Industry
5. Packaging Industry
6. Intelligent Motor Control
7. Motor Control Applications

IX.CONCLUSION

The intent of this project is to create PLC based automated conveyor assembly line system based on given description. During this project we gained the knowledge about various processes directly utilized in the industries such as automation system in which we specifically learnt about Programmable Logic Controller (PLC).

REFERENCES

[1].John W. Webb, Ronald A. Reis, *Programmable Logic Controllers*,5th Edition 2003 Gray Dunning, "Introduction to programmable Logic Controllers," Delmar ThomsonLearning1998.

[2].SIEMENS programming handbook.

[3].Aa. Bryan, E.A. Bryan *Programmable Controllers Theory*,(5) Neal Babcock, "Beginner's Guide to PLC Programming, "modern media, 2008 (1) Goo, L., Pecan, R., "Design Projects in a Programmable Logic Controller (PLC) Course in Electrical Engineering Technology", ASEE Annual Conference & Exposition, 2008

[4].Johnson, C. D., *Process Control Instrumentation Technology*, Prentice Hall, 2006