

# AUTOMATIC RAILWAY GATE CROSSING CONTROL USING PLC

Mr.K.P.Varade<sup>1</sup> and Miss. Nikita P. Tarle<sup>2</sup>

<sup>1</sup>Assistants professor, Sir Visvesvaraya Institute of Technology, Nashik

<sup>2</sup>Dept. of Electrical Engineering, Sir Visvesvaraya Institute of Technology, Nashik, Maharashtra, India

\*\*\*

**Abstract** - In our country, many accidents occurred at railway gate crossings. The accidents occurred due to the carelessness of manual operation and gatekeepers. To avoid the accidents they used automatic railway gate crossing control using PLC. The railway gate control by using the PLC (programmable logic controller). In this project deals with two things, first deal with reduction of time for which closed and open the gate, and second deal with to provide safety to the road users and saving the electricity.

The hardware components are used such as PLC, relay card, DC motor, sensors, LED, indication lamp and buzzer. The PLC is programmable logic controller for using controlling and communication components of faults detection system. The relay cards are used to functionally close and open the contacts. The DC motor is used to close or open the railway gate. The sensors are used to sense the arrival of the train, fault detection and signal passing to the PLC and other components. The indication lamp and buzzer are used for indication purpose. The LED are used on railway platform. When the train comes to the platform, some LED lights are ON through a controller for the safety of passengers and when the train is passing through the platform, the LED is off. Therefore, we save the electricity.

**Key Words:** LED, PLC, Sensor, DC Motor

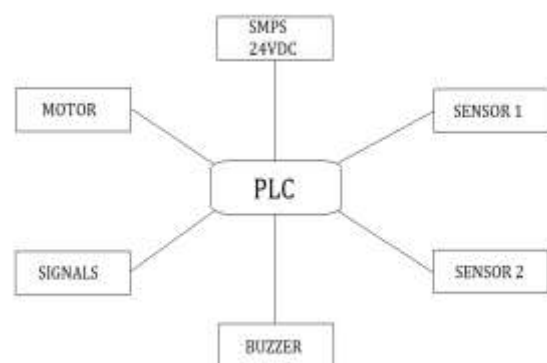
## 1. INTRODUCTION

It proposes a unique and economical method for improving the safety of our level crossings. Road accidents at a railway gate is a leading cause of death and injury worldwide. Surveys conducted by Indian Railway found that about 18% of total railway accidents are at crossing accidents of which majority occurs at passive railway crossings. The operation of railway gates at level crossings is unreliable nowadays. Primarily the road users have to wait a very long time before the arrival of train and even after the train has left. And secondly the accidents that occur by the carelessness of the road users or due to the time errors occur by the gatekeepers.

In this project, we detect the train and warn the road users about the arrival of train. If a green signal is given for the train to pass, otherwise a red signal is given to slow down. After they are cleared, the gate is closed and the train is passed. We will make sure that the train is passed and reopen the gate. The system deals with two things. Firstly, to provide safety to the road users by reducing the accidents and secondly, it deals with the reduction of time for which the gate is being kept closed. In the automatic

railway gate control system, at the level crossing the arrival of the train is detected by the sensor placed at some distance from the gate. Hence, the time for which it is closed is less compared to the manually operated gates and also reduces the human worker. In this project we are using PLC to avoid the error which occurs in the use of microcontroller. Because the use of PLC in automation, accuracy is increased as well as operation time also increased. In this system, the whole operation is based on the sensor and its input to the PLC which sends the signal to open or close the operation of the railway gate operating DC motor. In recent days, the accidents in railway gate crossing level are increasing. There are two types of crossing level: Manned and unmanned. The accidents occurring at both crossing levels are very severe. Therefore, we use simple mechanical and electrical components to control the railway gate. The sensor detector which is placed at a few distances away from the gate detects the train and sends the signal to the controller. From the controller, the signal is sent to the timer, the timer is connected to LED display near the gate. The display shows the time remaining for closing or opening of the gate according to the necessary situation. Thus, a highly secured and safe automated level crossing at low cost, which requires no human monitoring.

## 2. WORKING



### Block Diagram of Model

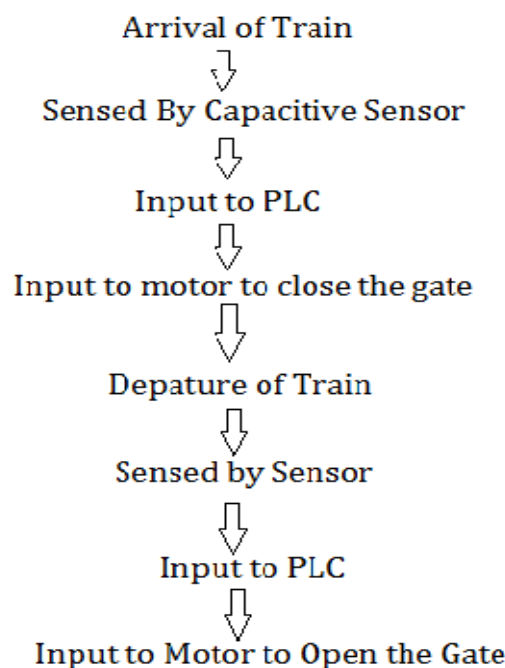
When any train is coming from any one side, then the sensor situated on that track gets high and a high signal is generated from the sensor by which the PLC generates a beep sound for a while and closes the barriers for the traffic and the traffic signal gets amber by which the train can cross the gate easily. And when the train passes out from the crossing, then the end side sensor which is sensor 2 gets high and gives

a signal to PLC by which the PLC opens the barriers and the signals comes in its normal positions (off position).

The working of this system is fully controlled by the programming so that every decision taken by the PLC executes an action and all other timing and actions should be accurate.

We can see here in the system that a buzzer is connected by which the alert sound is generated before closing the barriers so that the accidents can be minimized and the security level can be increased.

The combinations of input, output, timers and the memory bits in the program makes the proper work of the system by which the all working of the system is done .Here we require 24V input voltage for PLC .For the forward and reverse operation of the DC motor we reverse the voltage so here we have connected a combination of two relays to take a forward and reverse voltage for the desired operation and the movement of the barriers of the system.



**3. CONCLUSIONS**

The accidents are avoided at places there is no person to manage the railway crossing gates. Here we use the DC motor to open and close the gates automatically when it rotates clockwise or anticlockwise direction to operate the gate automatically. When the train arrives in a particular direction the sensor senses and generates appropriate signal, then at the same time the PLC provides certain output signal to the DC motor to function. When the signal from PLC is sent to the DC motor rotates to function open/close the gate according to the signal output from sensor.

Nowadays the railway protection system can be done either by manual process (or) by semiautomatic process using embedded system technology. The intention of the propose idea is to provide control for the above discussed five parameters like track change, track collision, track crack, gate control and traffic light indication using single PLC installed. This system provides a railway system for protection purpose.

**ACKNOWLEDGEMENT**

I feel great pleasure to present the dissertation entitled as “AUTOMATIC RAILWAY GATE CROSSING CONTROL USING PLC” but it would be unfair on our part if we do not acknowledge efforts of some of the people, without the support of whom this work would not have been a success.

Very first I am greatly thankful to my respected project guide Mr.Kiran P Varade Assistant Professor of Electrical Engineering Department for permitting me to use the all available facilities for successful work of dissertation.

I would like to express my sincere gratitude to respected Mr.Nadeem B Shaikh, HOD of Electrical Engineering Department, & Dr.Mukesh K. Kumawat Project Coordinator and Prof.(Dr).Y.R.Kharde Principal of SVIT, Chincholi for finding out time and helping me in this project work.

I am also thankful to all Teaching and Non-Teaching staff member of Electrical Engineering department who has helped me directly or indirectly during this work.

Last but not least I wish to express my gratitude to my loving parents / friends and all well-wishers for their moral support during completion of this project work.

**REFERENCES**

- [1] R.Gopinathan and B. Siva Shankar ISSN: 0976-1353 Volume 8 Issue 1-April 2014,“PLC BASED RAILWAY LEVEL CROSSING GATE CONTROL.”
- [2] B.Brailson Mansingh, Intelligent Systems and Control (ISCO), 2015 IEEE 9<sup>th</sup> International Conference,“Automation in unmanned railway level crossing.”
- [3] Mr. P. Kiran Kumar and Mr. B.S. Shivashankar in International Journal of Engineering Research and General Science Issued on April 2015. PLC based automatic fault detection of railway track and accident avoidance system