AUTOMATIC RAILWAY GATE CROSSING CONTROL USING PLC

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Abstract - In ours country, the many accident occurred to railwaygate crossing. The accident occurred due to the carelessness of manual operation and gatekeepers. To avoid the accidents they used automatic railwaygate crossing control using plc. The railwaygate 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 closed or open the railwaygate. 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 to indication purpose. The LED are used to railway platform. the train comes to the platform the some LED light are ON through a controller for safety of passengers and 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 in is 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 time before the arrival of train and even after the train in 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 detect the train and warn the road users about the arrival of train. If is found 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 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 is occur in the use of microcontroller. Because use of PLC in the automation accuracy is increase as well as operation time also increased. In this system whole operation is based on the sensor and their input to the PLC which sends the signal to open or close 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 of both crossings level are very severe. Therefore uses 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 send to the timer, the timer is connected to LED display near the gate. The displays 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 than the it sensor situated on that track gets high and a high signal is generated from the sensor by which the PLC generate a beep sound for a while and close 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 than the end side sensor which is sensor2 gets high and give
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.

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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.

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.

![Flowchart]

Arrival of Train

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Sensed By Capacitive Sensor

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Input to PLC

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Input to motor to close the gate

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Departure of Train

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Sensed by Sensor

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Input to PLC

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Input to Motor to Open the Gate