

Traffic Monitoring System for Hair Pin Bends and Blind Sharp Turns using Plc

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Abstract – In this method driver alerting system for vehicle at hair pin bends and blind sharp turns to avoid accident and lose of human life. To give safe journey to tourist and local person while travelling at hill station and blind sharp turns in normal road. The paper mainly focused on the control and monitoring system in hilly area at hair pin bends and sharp turns with new invented technology with the help of automated system. The automated system would reduce the accident at hill station by utilizing the programmable logic controller. Passive infrared sensor takes care of heavy vehicle like lorry, Bus with respect to hairpin bends and sharp turns. To move indication vehicle of opposite side with help of traffic signal the vehicle come from the other end. Automated system take place quality and efficiency output .Thus, the proposed automated technology include PLCs and passive infrared sensor to develop driver alerting system and improve safety in the hair pin bends of hilly roads and sharp turns.

Keywords– Mcb, Smpls, Ab-Micro Logic 1400 Plc, Pir Sensor, Traffic Signal ,Buzzer.

I. INTRODUCTION

Nowadays industries sector are going through automation side everywhere industrial 4.0 automation technologies is used to increase the quality and efficiency input/ output and reduce human work some industries like process industries, chemical, oil gas etc it will increase safety for the works and good quality input and output. Quantity required is bulk amount but once we implemented it will come for life time.

Driver alerting is to avoid collision on hair pin bends and sharp turns using PLC. It will alert driver at the time of vehicle coming from opposite side at blind sharp turns and hair pins so both driver can slow their vehicles to avoid collision at hilly region and provide safe journey to passengers and local person in hilly area. Vehicles play major role in human life such as travel from one area to some other place. As per the previous paper, many collisions occur on hair pin bends and blind sharp turns due to invisible of vehicle coming from opposite direction and unconditional weather. In this paper we proposed advance automated technology control and monitoring the hill station area like hair pin bends and blind sharp turns with the help of programmable logic controller.

From the report and literature survey we have analysis that large number of collision occur at hilly region and blind sharp turns. This present invention paper mainly focus on monitoring and controlling the blind sharp turns and hairpin bends with the help of traffic signal and

buzzer insert at road. To avoid accident or collision of heavy vehicle by fixing sensor and traffic signal or buzzer sensor like passive infrared sensor (PIR) fixing at both side of the hair pin bends and blind sharp turns. This invention system mainly focus on to give signal like traffic controller or sound like buzzer to the heavy vehicle drivers at the hair pin bends and blind sharp turns. This method will avoid accident or minimize the vehicle collision occur in hair pin bends at hilly area and blind sharp turns.

II. RELATED WORK

1. Nikhil Acharya Etal, Implementation Of Collision Hairpin Bends, Volume-3, Issue-11, 2016.

The proposed system carries a set of proximity sensors, caution lighting fixtures combined with a convex reflect are mounted with the aid of the side of the street. It makes use of 4 IR sensors, which placed both aspect of the hairpin bend and micro controller are used to control the output primarily based on cord connections.LED is brought on thereby prioritizing the motors' motion.

2. R.Monisha Etal, Vehicle Movement Control And Accident In Hilly Track.Jcecs -2014.

In the proposed system some sensors, communication and GPS are used. GPS takes care of cars with appreciate to hairpin bend to determine the priority which vehicle have to move. Information between motors concerning pace, path and car type is captured through the algorithms is passed on the vehicle by using voice and visual show.

Speed of the automobile is routinely managed using GPS. In case automobile breakdown within the control region, the statistics is send to other vehicle for suitable action.

3. Mohit Arvind Etal, Driver Alert System - Volume-8, Issue-9s, July 2019.

In this paper the author proposed the use of timer based system to keep away from the coincidence in the hair pin bends with the usage of plc model. Due to invisible of other vehicle come from different side and unconditional climate situations. Automation of space control in car parking the usage of PLC and SCADA. The available space in parking location the usage of industries electronic tool like PLC, SCADA. To loss the human life.

4. Priyanka.N Etal, Implementation Of Critical Intimation System For Avoiding Accidents In Hairpin Curves & Foggy Areas November 2018.

An accident avoidance system is one that gives safety to the vehicle system has properly .to the driver and it'll reduces harm this will be utilized in every car with some change. The system is designed thinking about the regular vehicle consumer also can use it. Automobiles have come to be one of the best industrial achievements of mankind inside the past century however unluckily during journey they are lot of accidents and come to be sufferers. sensors deal with the place of the motors with recognize to the hairpin bend to decide the concern wherein cars need to flow first and it will be related to automobile pace differs.

5. D.Haripriya Accident Prevention System And Security For Vehicles - June 2014

This project especially on street accident happening due to bad indication of sign boards, drowsy state of drivers in each 2 wheeler and 4 wheeler .The eye blink sensor detects the drowsy state of drivers .The alcohol sensor detects the alcohol person from breath and prevents the engine by micro controller immediately. The light sensor detects the depth of the light.

III. PROPOSED SYSTEM

The existing method which is already designed for a hair pin bends and sharp turns by using microcontroller and sensor like inductive proximity sensor in the of NPN based method .we are designed the device to control and monitoring the hair pin bends and blind sharp turns by using programmable logic controller(PLC) and sensor like passive infrared sensor(PIR).The detection of vehicle in hair pin bends and sharp turns by using passive infrared sensor. If sensor senses the heavy vehicle like 12 wheel lorry ,bus etc,..Once the sensor active and signal is given as input to plc. As per the plc program the output will given as traffic signal. This proposed system help to avoid accident or collision for local person and provide safe journey tourist passenger. This method will alert driver when vehicle come from opposite side at blind spot and hair pin ,in that both driver can control their speed to

avoid accident or collision. From the report and literature survey we have analysis that large number of collision occur at hilly region and blind sharp turns. This present invention paper mainly focus on monitoring and controlling the blind sharp turns and hairpin bends with the help of traffic signal and buzzer insert at road. To avoid accident or collision of heavy vehicle by fixing sensor and traffic signal or buzzer sensor like passive infrared sensor (PIR) fixing at both side of the hair pin bends and blind sharp turns.

1. Block Diagram

The figure 1 show the block diagram for hair pin bends and sharp turns. Proposed model is based on automation system for hair pin bends and blind sharp turns and its complete work depend on program of PLC. PLC will be program from the software RSlogix 500 English. Hardware consists MCB, When heavy current is drawn the strip melts and opens the circuit and it is restored manually is demonstrated. SMPS is an electronic circuit which rectifies the bidirectional AC voltage to the unidirectional DC voltage.

It consists of mini transformer to step down the voltage, buck boost convertor for constant voltage and half wave rectifier for rectification. This is used to obtain regulated Dc voltage from the unregulated AC voltage. This supply of 24 V dc supplied is given to plc. For each turn four passive infrared sensors is fixed as per the distance of heavy vehicle like lorry, bus. These sensors sense the signal when vehicle in the range of 12 Cm to 20M. Then passes the signal to the PLC. Traffic signal will glow when any vehicle appear. The process done in milliseconds PLC is fast efficiency output and can operate large program. Thus PLC automation system use to avoid critical accidents in hair pin bends and sharp turns.

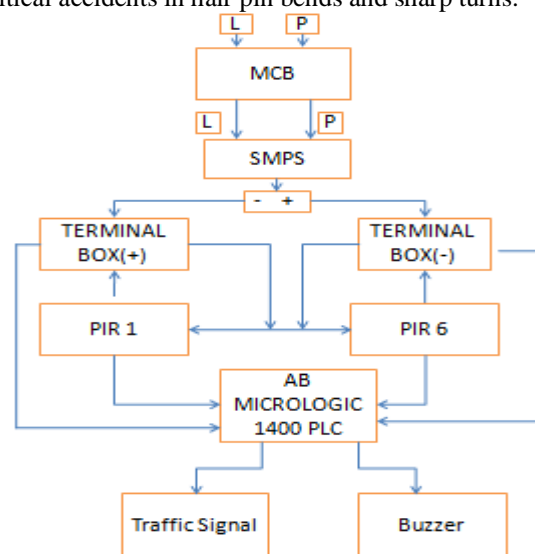


Fig.1. Block diagram for hair pin bends and sharp turns.

2. Components Required

Table I: .components required for Hardware tool.

S.NO	Components name
1	Allen Bradley micro logic 1400-plc
2	Passive infrared sensor(PIR)
3	MCB
4	SMPS
5	Terminal Boxes
6	Connecting wire as required
7	Traffic signal and buzzer

From the Table 3.1 shows the component for hardware tool. Each component has different function in this process of controlling and monitoring the hair pin bends and sharp turns. Components involved in this project are AB-ML1400 PLC, MCB, SMPS, traffic signal and buzzer.

3. Components Range

Table II: components range for proposed system.

S.NO.	Components	Range
1	Allen Bradley micro logic 1400-plc	20 Digital I/p 12 Digital o/p
2	Passive infrared sensor(PIR)	12 cm to 25M PIR sensor
3	MCB	C4
4	SMPS	i/p- 200-240 VAC , o/p- +24VDC
5	Terminal boxes	As per required
6	Connecting wire as required	1 &1.5 sq.mm
7	Traffic signal and buzzer	24 v dc

From the table 3.2 show that the components range for the proposed system

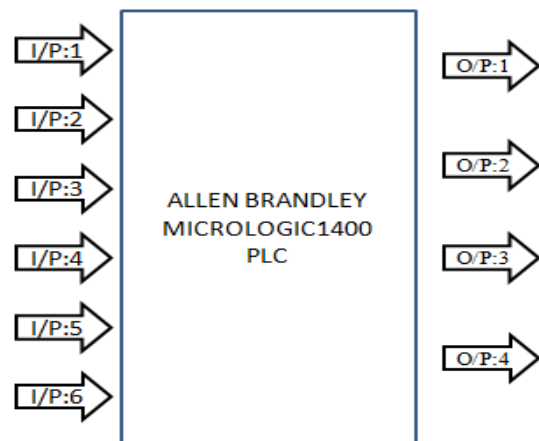
IV. COMPONENTS DESCRIPTION

1. Programmable Logic Controller

A PLC is user friendly device used to monitor inputs, and depending upon their state make decisions based on logic, to control its outputs for automates the process. It is applied for industrial automation 4.0, process control and manufacturing systems. The process done in milliseconds PLC is fast efficiency output and can operate large program. Thus PLC automation system use to avoid critical accidents in hair pin bends and sharp turns. The input signal and output signal will give based upon the plc program and saved in memory and output will work based upon the signal



Fig.2. AB-ML 1400 PLC.



Input : 1 – passive infrared 1
Input : 2 - passive infrared 2
Input : 3 - passive infrared 3
Input : 4 - passive infrared 4
Input : 5 - passive infrared 5
Input : 6 - passive infrared 6

Output : 1 –traffic signal (alert Driver)
Output : 2 –traffic signal (alert Driver)
Output : 3 – traffic signal (alert Driver)
Output : 4 – traffic signal (alert Driver)

2. Miniature Circuit Breaker

The figure 4.2 shows automatically switch off electrical circuits when high voltage appear and mainly avoid damage occur in electronic parts. It also used instead of fuse wire. MCB is used to protect the electrical parts and electronic. It automatically allow and block the during high voltage condition appear. In voltage, it works maximum 220-250V and for current, it works maximum 125A. It has two different breakers, like single pole breakers, it protects 20V electrical circuit and double pole breakers, it protects 240V branch circuit. Here, we use Single pole breaker to prevent from circuit damage. Molded circuit breaker which shut down the devices assemble in the mould case and it also cut off the electric current in case of overload and short circuit. When heavy current is drawn the strip melts and opens the circuit and it is restored manually is demonstrated .It is similar to miniature circuit breaker but it has high range. This is

used for the protection for the switched mode power supply and the field devices.



Fig.3. Miniature circuit breaker.

3. Switched Mode power supply

The figure 4.3 shows SMPS is an electronic circuit which rectifies the bidirectional AC voltage to the unidirectional DC voltage. It consists of mini transformer to step down the voltage, buck boost convertor for constant voltage and half wave rectifier for rectification. This is used to obtain regulated Dc voltage from the unregulated AC voltage.

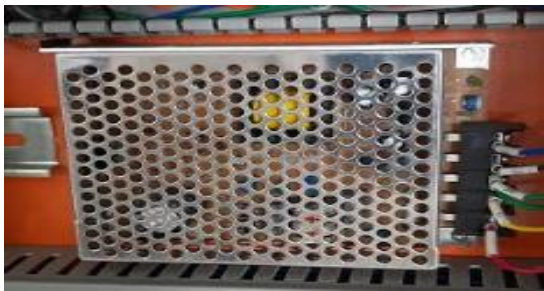


Fig.4. switched mode power supply.

4. Passive Infrared Sensor

The figure 4.4 shows Passive Infrared Radiation (PIR) sensor detect the adjustment in infrared radiation object in its range. As indicated by the adjustments in radiation, there will be an adjustment in the voltages created which was amplified and used to turn ON the sensor pass the signal.



Fig.5. passive infrared sensor.

V. RESULT AND ANALYSIS

The figure 5.1 & 5.2 shows result for the proposed system Hilly area they have many critical hair pin bends and blind sharp turns, nowadays many accident are occur in hilly region this lead to loss of human life . To avoid accident and collision driver alerting system is

implemented in this project. The Implementation of project with the help of monitoring the heavy vehicle like 12 wheel lorry and bus etc, these are the major parameter we have control and monitoring and it will helpful for heavy vehicle drivers, tourist drivers and local people through indicate vehicles from opposite side with the help traffic signal show the vehicle from the opposite end.

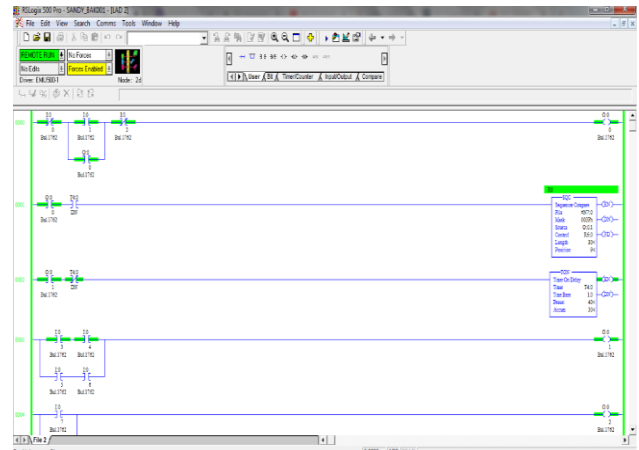


Fig.6. Simulation Result for Proposed System.

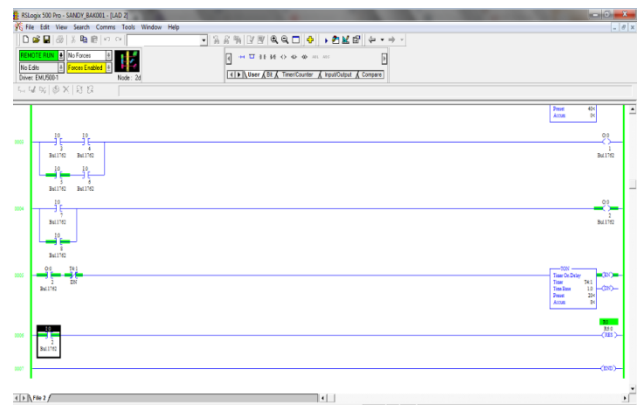


Fig.7. Simulation Result for Proposed System.

VI. CONCLUSION AND FUTURE SCOPE

An intelligent traffic monitoring system for hair pin bends and blind sharp turns has been done in this work. This system is applied for real time at hill station for hair pin bends and sharp covering the above mentioned concepts. In future work we are planning vibration motor is attached to steering when the vehicle appear in the opposite direction. And also whole process is control and monitoring using SCADA. This will also help government to control the accident in hilly area and avoid traffic in hill station.

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