



Smart indications of explosive objects, obstacle & crack on track in railway system

C.Thamilarasi, *Assistant Professor*

S.Divya, J.Kowshika, A.Sangeetha, U.G.Students

Shree Venkateshwara hi-tech Engineering college, Gobi

Email id:divyaprabudeva@gmail.com

ABSTRACT- Now a day's human using over bridges for crossing the rail and manual controlling mechanism for the railway gates. But most of the passengers not utilizing this facility and they will cross the rail directly and leads to accidents. And the crack occurred in Rail also lead to cause an Accident. And the train could be exploded by some terrorist. In our project, it is introducing a new intelligent Train which reduces accidents, derailling & colliding and make an easy and Safe Travel for passengers from one place to another places. And then seat availability in each compartment should known by passengers through mobile phones. And also identify in which compartment the electronic device got problem.

I.INTRODUCTION

The Railway network is the world's biggest transport system. The Indian Railways is one of the largest railway networks in the world. There have been many accidents occurs in the railway network system. Most of the accidents occurred due to the collision between the trains and detrain. The proposed system is used to predict that kind of collision between trains and prevents them from occurring.

By preventing these kinds of accidents more number of lives can be saved. Because of these cases in the railways we considered collisions

are the most dreaded accidents. It is very difficult to stop such a collision, because of speed of the train, which need a lead distance to stop. Collision occurred by two ways due to human error.

RAILWAY accidents, such as collisions, conflicts, and derailments, happen all over the world and cause great losses to society. According to published reports, 48 serious railway accidents occurred between 1971 and 2011 in China. Of these accidents, 6 were caused by collisions, 15 by conflicts, and 8 by derailments. The other 19 out of the 48 accidents occurred for other reasons, such as fire or explosion. In total, 885 people were killed and 2668 were injured. Serious accidents have also occurred in other parts of the world, e.g., the Eschede high-speed train accident in Germany in 1998, a train derailment accident in 2005 in Japan, and a Los Angeles, CA, USA, train collision accident in 2008. There are three other railway accidents that occurred due to human errors or improper operations. On April 29, 1997, the 324- and 818-passenger trains collided in Rongjiawan Station in China. The investigation conducted afterward showed that a signalman illegally sealed a connection-terminal point switch using a diode in his maintenance work, which destroyed the signaling equipment's interlocking logic. The 324-passenger train's route was set simultaneously to

the 818-passenger train, which resulted in a serious accident with a death toll of 126 people and 230 people injured.

On December 14, 2004, two passenger trains collided in India's northern Punjab state, killing 50 people and injuring about 150.

The accident was caused by the grossly negligent stationmaster. He arranged the same route for a train through the station with a local passenger train on the tracks.

On April 28, 2008, a train accident occurred on the Jiaoji Railway Line in China because the signaling system and operators did not implement a temporary speed restriction (TSR) correctly. A passenger train derailed due to speeding on curves and collided with another passenger train travelling in the opposite direction.

Passenger rail systems are vital components of the nation's transportation infrastructure, encompassing rail transit (heavy rail, commuter rail, and light rail), and intercity rail.¹ In the United States, passenger rail systems provide approximately 14 million passenger trips each weekday, and commuters rely on these systems to provide efficient, reliable, and safe transportation.² Terrorist attacks on passenger rail systems around the world—such as the March 2010 Moscow, Russia subway bombings, and the July 2006 passenger train bombing in Mumbai, India that resulted in 209 fatalities—highlight the vulnerability of these systems. Additionally, the administration's Transborder Security Interagency Policy Committee, Surface Transportation Subcommittee's recently issued Surface Transportation Security Priority Assessment stated that the nation's transportation network was at an elevated risk of attack and that recent plots against passenger rail highlight the lengths terrorists will go to defeat security measures put in place after September 11, 2001

II.RELATED WORKS

Now a day's human using over bridges for crossing the rail and manual controlling

mechanism for the railway gates. Most of the accidents occurred for damage of crack and carelessness of driver. A railway signaling system provides MAs and train route information while ensuring train safety and monitoring train operation. The control objectives are train speed, train position, railway points, and signaling aspects. The safety critical aspects of the signaling system include train tracking interval, interlocking, train speed restriction, TSR, and so on. Parallel monitoring achieves a double application control for all critical subjects.

III.METHODOLOGY

In the Train Identification Chip (TIC) inbuilt with GSM (Global System for Mobile Communication) module is used to communicate between the train and the Train Traffic Control Station. The TIC in the train and TTC on track at certain distances can make the assurance of train safety at each check point crossings. In the TTC [Train Tracking Chip] we have fixed the scratch pad. This scratch pad is the sensor which will give necessary signals to tracking of the train.

The scratch pad is done by defining 9 pins, this pins are spring type will access the moving train. The pin holds the data about the checkpoint, train track number and direction of the moving trains. The total TTC module is placed in the railway track. The TIC module is a module which is placed in the moving trains which consists a scratch reader.



Fig1. Crack in the track

This GSM has the link between the train and the control station and vice versa. This module in the train when moving, the scratch reader will scratch the scratch pad in the track. This will retains at every checkpoints.

In each checkpoint the details of the trains are communicated to the control station therefore the collision between the trains can be prevented. The messaging between the Train and TTCS is controlled by a PIC Microcontroller.

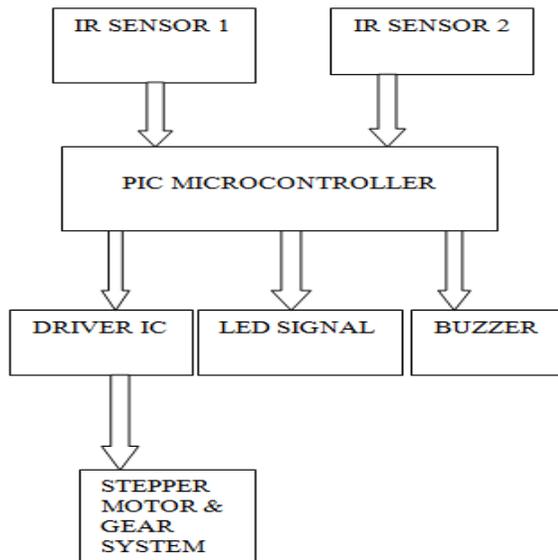


Fig.2.Block diagram of proposed system

In that existing system, IR sensors used to sense the object on track & give buzzer sound in toll gates. And blinking the LED when the presence of object on the track nearby the gate. Also the carelessness or absence of the gate keeper, it may lead to accidents at the railway crossings.

IV.PROPOSED SYSTEM

In that proposed system, it detects human or animals (any objects) on the track and any cracks up to **100m**.And in that time automatically reduces the train speed and slowly engine get OFF. And it find any disconnected loads of electronic devices in the train and give information through the computer system to control room.

Seat availability in each compartment is measured by zigbee transmitter and give information to passengers through mobile phones by zigbee receiver. By using of explosive detector, to findout any metal objects in the train

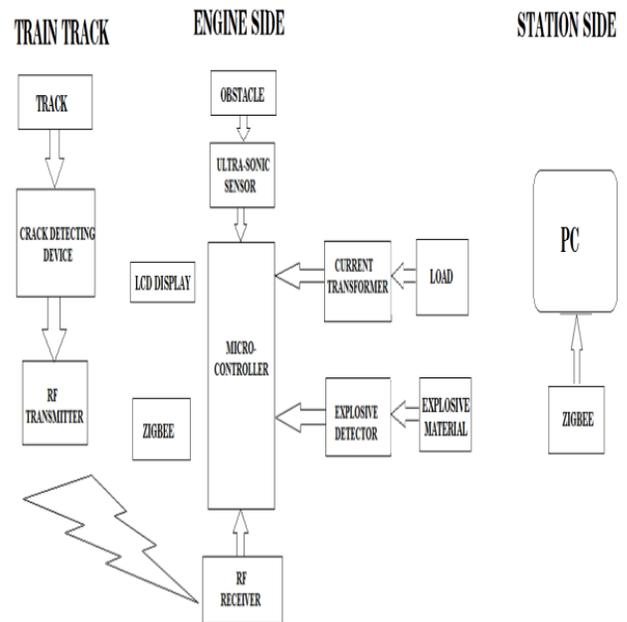


Fig.3.Block diagram of proposed system

With a help of RF transmitter and receiver identifying track fault and intimated to the control room. The objects are identified by using of ultrasonic sensor, and frequently intimate the status of the track. By using of CT the disconnected loads are identified. Above all parameters are send to the PC using of zigbee.

By using of explosive detector the metal objects are identified and send information to the control room. An ultrasonic sensor transmits ultrasonic waves into the air and detects reflected waves from an object. It can placed in front of the train and it produces the sound waves & it does not be heard by human. Sound waves from the ultrasonic sensor fall on the obstacle and reflected by it. By the time duration of sending&reflecting the sound waves, the distance of obstacle can be identified. The range of RF transmitter and receiver is 434 MHz when it works pairly.

It is used to detect the crack on track. RF transmitter is placed on the rail & RF receiver is placed inside the train. If RF transmitter detects the crack or any damage on the rail, it sends that message to the RF receiver.

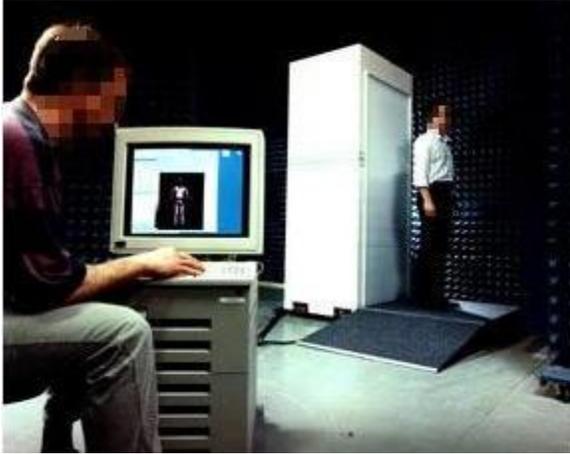


Fig.4.Metal detection

Metal detector is used to find out any explosive or metal objects in the train. It can be placed entrances of the each compartment.so,It scans each passengers who enters into the train. It can be easily identify the terrorist. PIC Microcontroller is used to control RF Transmitter&Receiver, Current transformer, Ultrasonic sensor, Explosive detector, LCD display etc. Current transformer is used to control all electronic components into the train. LCD is the display; it interfaces with microcontroller.LCD with 1 controller having 4 pins. And it supports most of 80 characters. It displays some characters, numbers. LCD Display is used to display some information like OBSTACLE NEARBY when any obstacle occur on the rail.

V.CONCLUSION

There is a rise in number of train accidents caused due to human errors. In order to avoid such accidents, an automatic train control system without any human operators is proposed. In this project we are introducing a new intelligent Train which reduces accidents and make an easy and Safe Travel for passengers from one place to other place.

The proposed system consists a detection system (Ultra-Sonic Sensor), Crack detecting device (With RF Transmitter and Receiver), Current Transformer, Explosive Detector, microcontroller unit, To preventing trains from derailling, Terrorist and Collision on railways.

VI.REFERENCE

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