

# REVIEW ON TRACK WORKERS SAFETY SYSTEM BASED ON IOT

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**Abstract** - The maintenance of track and track side infrastructure is considered to be most hazardous jobs in the rail industry. Track Workers Safety is the major concern as workers fatalities and accidents tend to occur every year despite all the safety measures. As the railway industry continue to expand, workers are often required to work long hours, which result in fatigue and major accidents. There are several incidents of accidents that happen while the track workers were doing the work for the maintenance of the railway track, mostly it happened because they were not able to get alert on time that train is coming on their way. The purpose of this study is to create a safety system for track workers and alert them before time so that they can move outside the track and no harm will be done. This study presents concluding remarks on the limitations of existing studies and provides recommendations for further research and appraisal practices

**Keywords:** - ESP8266, Laser sensor, Laser transmitter, Solar panels, Train detection, IOT.

## 1. INTRODUCTION :

The maintenance of track and track side infrastructure is considered to be most hazardous jobs in the rail industry. Track Workers Safety is the major concern as workers fatalities and accidents tend to occur every year despite all the safety measures. As the railway industry continue to expand, workers are often required to work long hours, which result in fatigue and major accidents. There are several incidents of accidents that happen while the track workers are doing the work for the maintenance of the railway track, mostly it happened because they were not able to get alert on time that train is coming on their way. The purpose of this study is to create a safety system for track workers and alert them before time so that they can move outside the track and no harm will be done. This study presents concluding remarks on the limitations of existing studies and provides recommendations for further research and appraisal practices.

## 2. DISCUSSION :

In the past few decades, the railway infrastructure has been widely changed in both urban and rural areas, safety has been a common goal for all railway workers and railway civil engineers. Every Year proper investigation and maintenance is done but measures had to be taken to avoid accidents. After having research it was found that to accomplish the above expectations, it is necessary to create awareness among the workers and engineers to avoid such

accidents. Our main focus is to avoid accidents and in this case, we created a safety zone for workers so that they can move aside quickly as the buzzer buzzes with the help of wi fi module and nodes. We also had discussed about various sensors like Vibration sensor, microwave sensors, Ultrasonic Sensors, Radar sensors, Object Detection Sensor but for creating prototype we cannot use these sensors therefore we used Laser sensor as it can be used for prototype and for realtime.

Developing Safety Management Systems for Track Workers Using Smart Phone GPS: paper presents the idea to prevent accidents of death and injury by notifying track workers of information of train approaching with its management of location information of trains and track workers. It is also designed to provide information signals for track workers by means of various pieces of safety equipment including vibration, sounds, LED, etc., in order to prevent sensory disorder in track workers. Such pieces of safety equipment are installed in safety jackets provided for track workers. The safety equipment plays the role of notifying track workers of train approaching by embodying a simple communication module by means of Bluetooth to allow it to be engaged in wireless communication with the built-in Bluetooth of smart phones.

Design and implementation of real-time wearable devices for a safety-critical track warning system : This paper presents the design and the prototype of the Mobile Terminal (MT), a wearable, real-time, wireless, safety-critical device which exploits information received from track monitoring devices to inform a worker about trains approaching the worksite. When a train is approaching, it is detected by a Train Presence Alert Device (TPAD), and a notification is sent to the MT. The MT dispatches an alert to the worker if he is in a dangerous area (called red zone; that is, he is located close to the track in which the train is approaching), and a warning if the worker is located in a non-dangerous area (a green zone).

Minimize Human Error and Protect Workers with Protran Technology Railway Worker Protection Systems: This Article depicts the idea of Protran Technology Roadway Worker Protection (RWP) Systems are secondary warning systems that provide advanced warning of approaching trains to wayside workers, as well as warnings to the train operators of workers present on the tracks. The Protran RWP systems are range based systems that use GPS location along with proprietary ranging RF technology to give the most accurate alerts possible. The Portable Protracker System utilizes train detectors which are positioned ahead of the work zone so that if primary safety protections are violated, the track workers will still be warned of the approaching train with both visual and audible alarms via the Protran Portable Warning Horn & Light (PWH&L) work crew device, Flagger Device used by the watchman/lookout, and track worker Personal Alert and Devices (PAD) when a train or other on-track vehicle is approaching the work area.

#### **a) AVAILABLE TECHNOLOGY :**

An IOT Based Track Workers Safety System is considered as a real time model. It can be installed on worksite which can help workers from accidents. Some technologies are available to prevent such accidents and injury similar to IOT.

PROTRON Technology a portable zone device This type of system includes a device that is non-permanently affixed to the rail or tri-pod near the rail which communicates with a device worn and/or carried by the worker on the tracks .This type of system detects a train as it passes the portable device and provides an advanced warning of the train approaching to the workers on the tracks.This type of system can be used on shared corridor

tracks and can be used in conjunction with a vehicle mounted system to provide total safety coverage from all approaching on-track vehicles.

GPS location providing function of the smart phone and a notification system is designed to notify track workers of train approaching information by using a simple Bluetooth module and safety jackets.

### **3. CONCLUSION AND FUTURE ENHANCEMENTS**

In this paper we present a review on track workers safety which can be used by workers and railway engineers. This project is looking for better track workers protection with technology. Many Systems are available in the market which are specially designed for track workers protection. The main objective of this project is to identify the best available technology or to suggest new systems that will help improve track workers safety and will not introduce any additional risk to the worksite. The proposed work ensures the safety of workers and railway engineers working on the track. This paper describes the general preventive measures targeted reduce railway workers' accidents because of the coming high-speed train. It discusses the existing countermeasures for reducing accidents. It is very cost efficient and components are easily available. The system is portable and easy to handle, due to which maintenance can be done easily. The proposed system is easy to understand so anyone can use it.

In this Study we have used only laser sensor but for real time on field Vibration sensors, Microwave sensors, Ultrasonic sensors, Radar sensors, Object Detection sensors can be used. The wifi module of higher range can be used for Larger distance and can be connected in network. One node can communicate with only two nodes so as many as sensors and buzzes can be added for longer distances and longer signals. This can be implemented in any geographical areas.

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Railway Track Crack Detection Using GPS and GSM

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