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# THE TRAIN SETBACK OBSTRUCTION SYSTEM

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**Abstract**— Over the range of the most recent decade different railroad occurrences and fatalities have happened in India and around the world. Following these train debacles, there has been a lot of open trade about security on the Indian railroads. These episodes have raised issues with respect to the sensibility of the success of the railroad structure. The critical sorts of rail disasters are an outcome of a thing on track or track break. The present system used in The Indian Railways isn't prepared for turning away these two sorts of noteworthy rail incidents. In this way, there is a need to outline another setback protect system in the Indian Railways. The train setback obstruction system is such a structure, that is fit for envisioning these two critical sorts of rail incident. It contains an equipment which can perceive any sort of thing on track, any track break, supreme weight applied on the track. In the wake of recognizing any of the above it will send radio signal both to the control room and the upcoming train on the track through repeated RF signals.

**Keywords**— Object recognition, Track crack detection, Mass on track calculation, RF communication devices.

## I. INTRODUCTION

### A. Background –

Over the scope of the latest decade distinctive railroad events and fatalities have occurred in India and around the globe. Following these train calamities, there has been a great deal of open exchange about security on the Indian railways. These scenes have raised issues as for the reasonableness of the accomplishment of the railroad structure[1]. The basic sorts of rail fiascos are a result of a thing on track or track break. The present framework utilized in The Indian Railways isn't set up for dismissing these two sorts of significant rail occurrences.

Along these lines, there is a need to plot another difficulty secure framework in the Indian Railways. The train setback obstruction system is such a framework.

The Train setback obstruction system is a blessing to the Indian Railroads. This framework will be useful in averting significant two sorts of rail mishaps: -

- 1)Object on Track
- 2)Track crack

The Train setback obstruction system consists of a circuitry which provides the following function: -

- 1)Object on track detection
- 2)Track crack detection
- 3)Mass on track calculation

[2] Kyriakidis M. et al.(2015) proposed that Throughout the years, an enormous number of railroad mishaps have happened because of corrupted human execution and human blunder and basically the assignments of train drivers and signalers have continued as before.

## II. METHODOLOGY

### A. Object on track detection framework

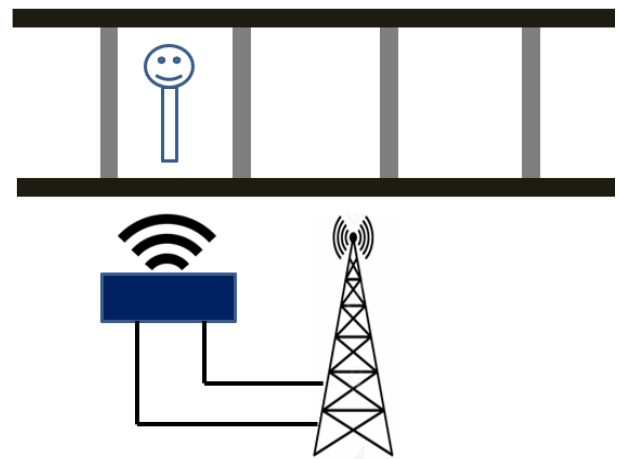


Fig.1. Object on track detection

At the point when any kind of object is available on the rail track then the object on track detection framework gets a feeling of the item present on the track. At that point further it sends a notice to the control room just as to any upcoming train on the track. The object on track detection structure comprises of a framework which has the ability to detect any sort of item on the railroad track either stationary or moving. In the wake of detecting any item for multiple minutes it will send alarming signals to the control room and any train close by (Fig.1). At the point when the control room will get warning about the object on track then it will make some necessary move. At the

point when the train will get warning that something is there on the track further then it will allude to the mass on track calculation system which will tell the net mass on track. On the off chance that the mass on the track is more prominent than 50kg, at that point the train's breaking framework will get dynamic. The sensors used for the object detection are: -

- 1) Infra-Red proximity sensors
- 2) Pyro electric Infra-Red motion sensors

[3] Mayilvaganan and Devaki (2014) have proposed a system for detection of elephant movement in forest border areas using a hyperbolic circular array.

[4] Prabu and Thilagavathy (2016) have proposed that animals can be sensed on railway tracks by laying acoustic sensors on the tracks.

[5] Pawar Yogesh et al.(2018) have proposed that All items and living things transmits infrared beams above supreme zero temperature. These infrared beams are most certainly not noticeable to individuals by unaided eyes, yet this radiation can be recognized by electronic gadgets intended for such a reason. Pyro electric Infrared Sensors (PIR) are the sensors which are most widely used for cheap surveillance

[6] Yun j. et al. (2014) have proposed that Pyro electric infrared (PIR) sensors are notable inhabitation locators. They have been broadly utilized for human following frameworks, because of their minimal effort and power utilization, little structure factor what's more, unpretentious and security safeguarding cooperation

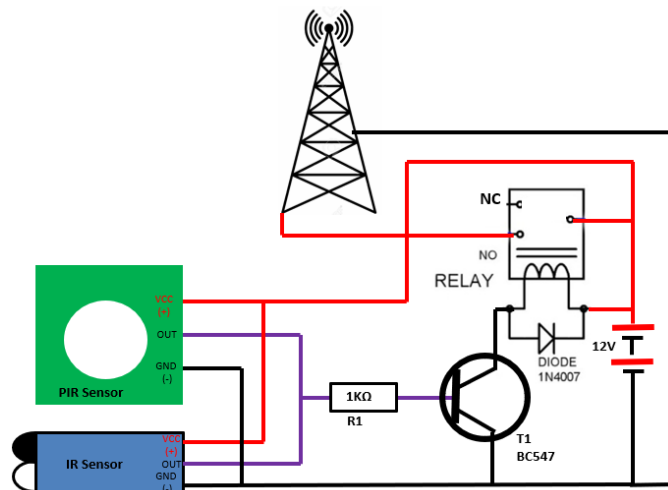


Fig.2. Object on track detection framework block diagram

As seen in fig.2 the P.I.R. and the I.R. sensors are connected to a microcontroller and the microcontroller is then connected with a RF transmitter.

**B. Track crack detection framework –**

When there is a track split in the railroad track then the track crack detection framework will detect it and send the alarming signals to the control room and any upcoming train on the track through radio correspondence system.

If the control room will receive the alarming signal then it will block the railway track and get it repaired as soon as possible.

If any upcoming train will receive the alarm that there is a track break further on the track then it's automatic braking system will get into work and the train will stop as soon as possible

The diagram for track crack detection when there is no track breakage is given in Fig 3 and the diagram for track crack detection when there is a track crack is given in Fig. 4

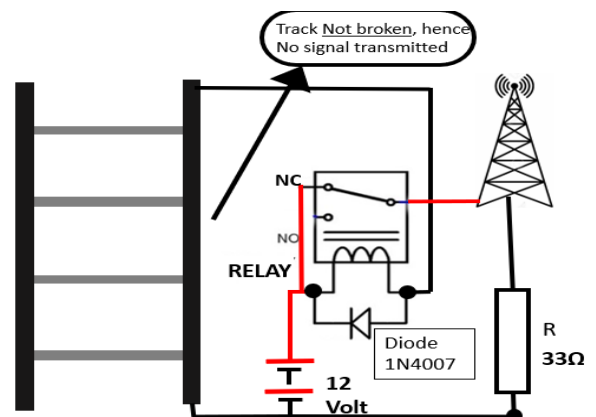


Fig. 3. No track crack

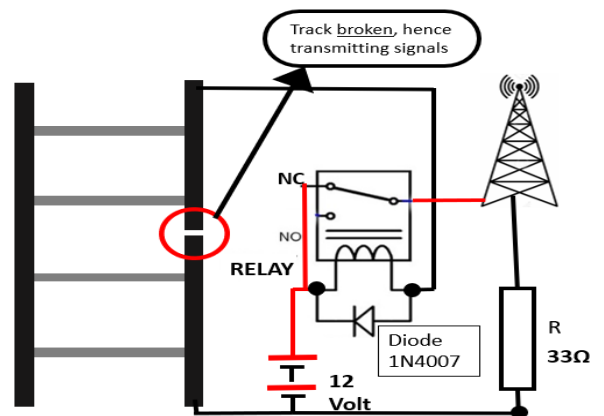


Fig. 4. Track crack

**C. Mass on track calculation framework –**

The mass on track detection framework consists of a load cell and an amplifier which have the capability to calculate the net weight on the railway track. When there will be any object detected on the railway track then it will calculate the mass and decide either to stop the train or to keep it moving

- [5] Pawar Y., Chopde A., Nandre M.(2018),”Motion detection using PIR sensors” ,IRJET ,pg. 4753-4756
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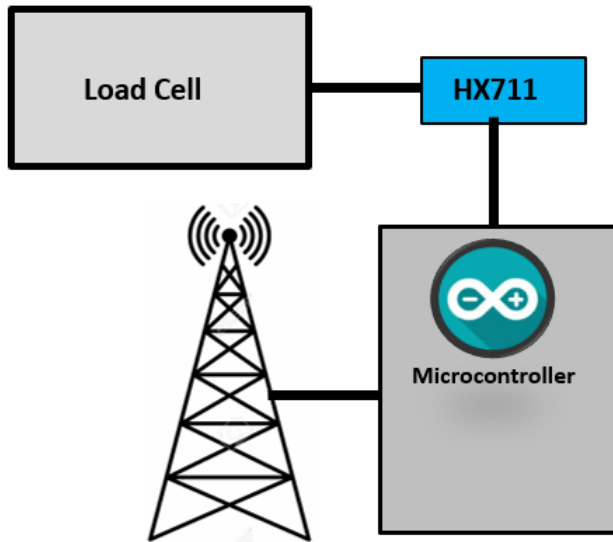


Fig. 5 Mass on track calculation framework

**III. RESULTS AND DISCUSSION**

When this project will be implemented in The Indian Railways .it will prevent two major types of rail accidents i.e. object on track and track crack. Prevention of these two types of railway accident will lead to decrease in human fatalities. This will save a lot of money of government which the government gives as a compensation to the dead or the injured. The saved money can be used in implementation of the train setback obstruction system.

**IV. REFERENCE**

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