"FAULTY RAILWAY TRACK DETECTION SYSTEM"

[1]Prof.Shishir S. Pande, [2]Prof.N.V.Ambhore
[1,2]Assistant Professor
[1,2]Electrical Engineering Department
[1,2]Sanmati Engineering College, Washim

Abstract : The objective of this project is to develop an embedded project to monitor the track fault in real time and intimate the station if there is any fault occurs. We have to generate three signals i.e. sine wave , square wave , distorted wave are injected on
track, these signals are flow continuously if signals are matched which will be ignored by the Electronic control unit. Any one tries to damage the track, then the signals does not matched so the control unit will detect it and pass a warning signal to the station using the RF network.

***Index Terms*- RF network, Transmitter, Receiver, Electronic Control Unit, Control Room, SPDT, DPDT, BJT**

I. INTRODUCTION

Higher requirements are set for safety and availability of both trains and tracks that can be achieved using this new concept. "Faulty Railway Track Dectation System".In this project we are trying to develop such a system which will help to find out any fault in track before the train to come, so that we will be able to reduce the accidents in rail due to faulty track. Higher requirements are set for safety and availability of both trains and tracks that can be achieved using this new concept "Faulty Railway Track Dectation System". In this project we are trying to develop such a system which will help to find out any fault in track before the train to come, so that we will be able to reduce the accidents in rail due to faulty The system would use analogue communication, allowing the system to provide broken track protection with the installation of a communication system.The proposed system would use wayside transmitter and receiver whose frequency 22 to 28 KHz and 42 to 48 MHz respectively, placed at some fixed distances.The track side Tx Rx will continuously monitor the track condition.

II COMPONENTS USED

1.1. Resistor

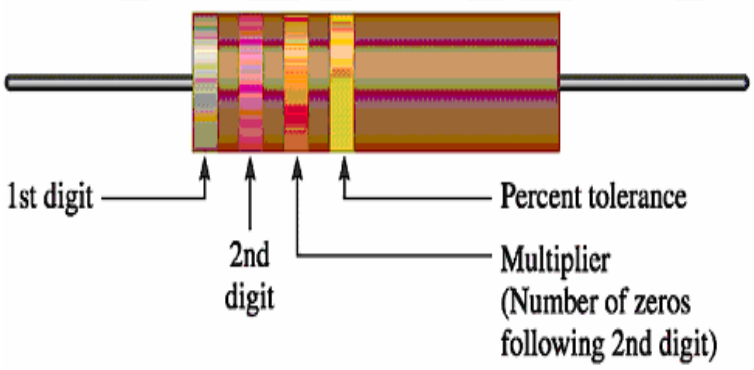

Fig 3.1.1 Resistor

A resistor is a two-terminal electrical or electronic component that resists an electric current by producing a voltage drop between its terminals in accordance with Ohm's law. The relationship between voltage, current, and resistance through a metal wire, and some other materials, is given by a simple equation called Ohm's Law

$$V = IR$$

where *V* is the voltage (or potential difference) across the wire in volts, *I* is the current through the wire in amperes,
and *R*, in ohms, is a constant called the resistance—in fact this is only a simplification of the original Ohm's law.

Materials that obey this law over a certain voltage or current range are said to be ohmic over that range. An ideal

resistor obeys the law across all frequencies and amplitudes of voltage or current.It is a passive circuit component or

elements which offers to flow of the current .

1.2. RELAY

Relay is a device by means of which an electric circuit can be controlled (opened or closed) by the change the same circuit or other circuit' Thus a relay is an electrically operated switch. Current flowing through the coil of the relay creates a magnetic field which attracts a lever and changes the switch contacts. The coil current can be on or off so relays have two switch positions and they are double throw (changeover) switches. Relays allow one circuit to switch a second circuit which can be completely separate from the first. For example a low voltage battery circuit can use a relay to switch a 230V AC mains circuit. There is no electrical connection inside the relay between the two circuits, the link is magnetic and mechanical. The coil of a relay passes a relatively large current, typically 30mA for a 12V relay

3.3. CAPACITOR

Fig 3.3.5.1 Capacitor

The function of capacitor is to stored the charge & it is a electrical device. The charge is stored in the electric field between a pair of closely spaced conductors (called 'plates'). When voltage is given to the capacitor, the electric charges of equal magnitude, but opposite polarity are build up on each plate. Capacitors are used in the electrical circuits as a energy-storing devices. Capacitors are also be used to separate high-frequency and low-frequency signals and this makes them useful in electronic filters. Capacitors are occasionally referred to as condensers. Electrons cannot easily pass directly across the dielectric from one plate of the capacitor to the other as the dielectric is carefully chosen so that it is a good insulator. When there is a current through a capacitor, electrons accumulate on one plate and electrons are removed from the other plate. This process is commonly called 'charging' the capacitor, even though the capacitor is at all times electrically neutral. The charge on capacitor is given by Q = CV.

3.4. LIGHT EMITTING DIODE

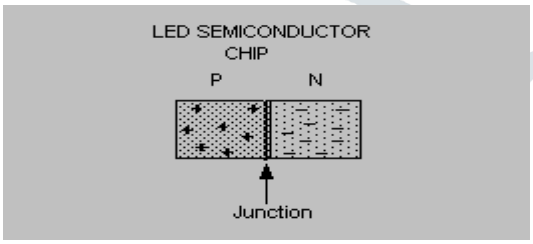

Fig 3.4.1 Led

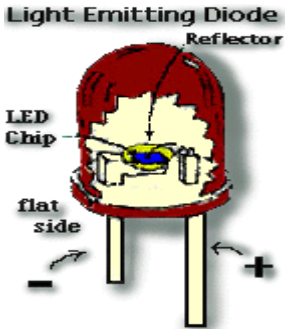

fig 3.4.2 Led

LED's are the light emitting diode that emitted the light when it is connected in to a circuit. They are frequently used as "pilot" lights in electronic appliances to indicate whether the circuit is closed or not. A clear (or often colored) epoxy case enclosed the heart of an

LED, the semi-conductor chip. The two wires extending below the LED , or the "bulb" indicates that how the LED should be connected in to the circuit. The negative side of an LED is marked in two ways:

1) by the *flat side* of the bulb.

2) by the lower side of bulb the two wires extending from the LED. The negative lead should be connected to the negative terminal of a battery. LED's operated at relatively low voltages between 1v and 4 volts, and it draw the currents between about 10 and 40 milli-amperes. Voltages and currents substantially above these values can melt a LED chip

III. PRINCIPLE AND OPERATION

1. From control room (CR), inject the signal into the track.
2. Transmitter takes the track signal and transmit to the receiver.
3. Receiver receives that transmitted signal and with the help of electronics devices such as frequency to voltage (F/V) converter
   and A to D converter (ADC), the digital code will be generated.
4. The code will be given to the micro controller.

5. The code will be already predefined in the micro controller and with the incoming code the corresponding output will be displayed on the display unit.
6. Display unit will show the warning signal if the track is broken and buzzer will also activate.
7. And at that time train will automatically slow down and stops.

IV BLOCK DIAGRAM

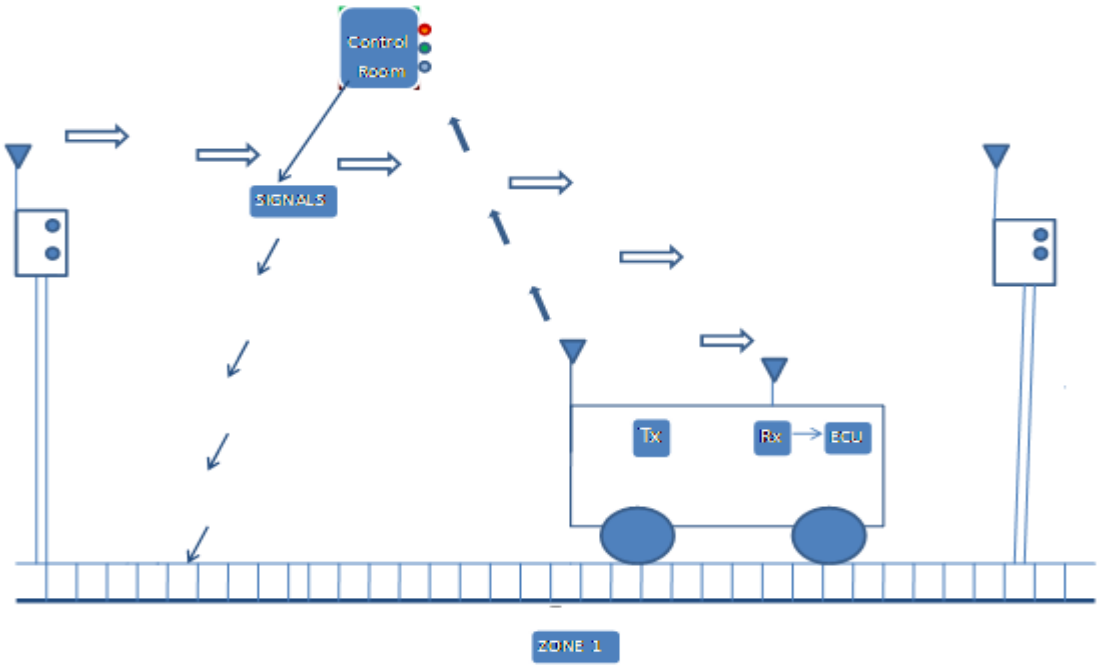

Fig:-.4.1 Main block diagram

V. APPLICATION

- It can be used to detect the broken, faulty or lose track.
- When the track is broken, then it will stop the train.
- It can be used for Bus bar fault detection.
- It can also be used for Cable fault detection.
- It can be used for data, signal transferring and to get the warning.

VI. CONCLUSION

In this project faulty tracks of trains are identified and with the help of this project we can reduce accidents, deaths, injuries, and property damage related to track and other infrastructure failures. So we design such type of railway track where it would be easier to find any fault in the path of the railway track. So with the help of this concept it can be easier to find any fault in the railway tracks and stop the train, and hence we can save the train from being accidental by the implementation of this concept.

REFERENCES

[1] Avinash. Vanimireddy, D. ArunaKumar ,IJETT - Volume4 Issue7- July 2013 Automatic Broken Track Detection Using LED-
LDR Assembly,

[2] K. Vijayakumar, S. R. Wylie, J. D. Cullen, C.C. Wright, A. I. Shamma'a Noninvasive rail track detection system using Microwave sensor

[3] Paper L. Beales, Track system requirements,_ Railway Group Standards, GC/RT5021, Railway Safety, London,Oct.2003

[4] H.Ben Brown, Jr. Gregg Podnar, Mel Siegel, A concept for reducing railway accidents. February, 2005

[5] IJREAT International Journal of Research in Engineering & Advanced Technology, Volume 1, Issue 1, March, 2013

[6] Indian Railways' Vision 2020 & White Paper presented unprecedented thrust on safety issues Year-end Review-2009.

[7] C. Esveld, "Modern Railway Track". Second Edition, MRT Productions. 2001

[8] K.Vijayakumar, S.R.Wylie, J.D.Cullen, C.C. Wright, A.I. AI-Shamma, Non invasive rail track detection system using Microwave sensor

[9] Prof. M Dhanasekar,Wirtu,L Bayissa & M Dhanasekar., Computing. High speed detection of broken rails, rail cracks and
surface faults .

[10] Komal B. Dandge, Prof. G.R.Gidveer "Automatic Broken Rail Crack Detection Scheme", International Journal of Engineering Research and Applications, ISSN : 2248-9622, Vol. 4, Issue 11(Version - 6), November 2014, pp.01-06.