

# Railway Tracking Identification System Using Advance RFID Technology

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**Abstract:** The Indian Railways is world's fourth largest railway network within the world once USA, Russia and China. There is a severe downside of collisions of trains. So Indian railway is functioning during this side to market the shibboleth of "SAFE JOURNEY". A RFID based railway track finding system for railway has been proposed in this paper. In this system the RFID tags and reader area unit used that area unit hooked up within the tracks and engine consecutively. So Train engine mechanically get the info of path by receiving it from RFID tag and notice it. If path is correct then train still run heading in the right direction and if it's wrong, then a sign is generated and sent to the management station and once this engine mechanically stop during a minimum time and also the show of liquid crystal display show the "WRONG PATH". So the collision and accident of train will be avoided. With the assistance of this method the train engine would be programmed to maneuver in step with the necessity. The another feature of this method is automatic track changer by that the track long plane would move mechanically in step with handiness of trains.

**Keywords:** Collision Avoidance, Railway Track Finder, Readers, RFID, Tags, Track Atomization.

## 1. Introduction

The train accident typically happens as a result of human error and failure of the machines. The Indian railway losses Brodingnagian quantity of cash thanks to cancellation of trains throughout winter per annum. Also it's quite tough to run the trains properly throughout winter season. The main reason behind this problem is fog. The Indian Railways has worked on several technologies to beat these hindrances. The author has worked on a prototype that leads to innovative approach to tackle with the problem faced by railways. Although many inventions have taken place in Republic of India to curb draw back [the matter] of accidents and traffic problem in train. The ACD (Anti-collision device) is developed by konkan railways that uses the GPS technology for pursuit the position updates of the train. It is quite useful and in follow in southern region of Republic of India. But it's inadequate for detection of rail tracks separated by a distance of 10-15 feet as a result of limitations of accuracy of gps in our country. The ACD makes use of embedded controls and a GPS system thereby preventing collision between trains. However, this technique doesn't take into consideration factors supported the atmosphere. As a result, accidents due to other factors such as collapsing of bridges or derailment cannot be overcome. The author has

developed the system that uses the RFID technology to find the train. This epitome additionally ends up in atomization of railways to date. A new system just like the recording equipment in aeroplanes named knowledge faller is additionally put in within the system. Data work is that the activity and recording of physical or electrical parameters over an amount of your time. Data logger's area unit employed in a spread of applications like in-vehicle knowledge work, environmental monitoring, structural health monitoring, and machine condition monitoring. If in extreme case the accident happened the precise info regarding these parameters may be taken out in order that the fault may be notice. The author has additionally created the distinctive feature of automatic track changer which might rotate in line with the supply of trains on tracks. Here track changer suggests that the little piece of track that is employed to affix the tracks. The figure of the prototype gives better perception of it. The goal of this work is to style and implement a value effective system with the assistance of RFID and microcontrollers. This system is overall wireless that uses the wireless transmission technology. This system uses the applying of RFID that is value effective and have distinctive feature of identity. In this epitome the train is controlled with the assistance of microcontrollers. The train work in line with the instruction given by the microcontroller. The microcontrollers area unit programmed in line with the trail of train. Once the train starts running in line with the programmed it follow the trail that is predefined by the controller of the train. If the train chooses another path as a result of human error or track misplacing the train can mechanically stop within the restricted time in order that accidents caused by this reason can be avoided.

## 2. Objective of study

There are numerous studies carried on RFID primarily based track finding system. RFID system employed by previous authors for railway track finding, automation of railway, chase and identification, hindrance of accidents, advanced pre-warning system etc. RFID system is useful for railway services. In that system there are some subsection as follows.

### A. Microcontroller

A microcontroller is sort of a little pc on one computer circuit containing a processor core, memory and programmable

input/output peripherals. Program memory within the type of ferroelectric RAM, NOR flash or OTP storage is additionally usually enclosed on chip, additionally as a usually bit of RAM.

**B. RFID Tags**

RFID tag is an Identification system. It is used for Identification and Tracking purposes. This ID system uses small ratio frequency identification. RFID tag is chip of semiconducting material that are helpful for information storage, the coil is mounted on the plastic cowl. Each RFID tag has their unique.

**C. RFID Reader**

A radio frequency identification reader (RFID reader) is a device used to collect information from an RFID tag, in which radio waves are used to data transfer from tag to reader. RFID could be a technology sort of a barcodes in theory manner. RFID scanner to be read RFID tags at intervals ranges from three to three hundred feet. This technology is use for fast scanned and permits quick identification

**3. Schematic representation of the Identification of railway track**

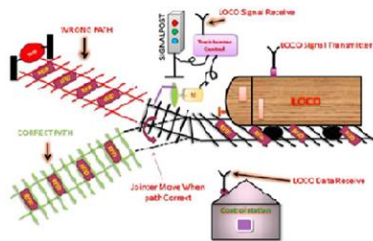


Fig. 1. Schematic representation of the RTFS (railway track finding system)

The image consists of a tiny low railway engine (loco) and a tiny low wagon. The engine size is unbroken consistent with the dimensions of circuits that square measure put in within the engine. The wagon is therefore created that the facility offers (batteries) may be place into it. The power offer is transferred to the circuits within the engine with the assistance of wire. The model of the image is shown in Fig One The balmy consists of following circuits

- Instrument panel.
- Information lumberjack circuit
- RFID reader circuit
- Track changer
- Track jointing plane management

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detection of rail tracks separated by a distance of 10–15 feet thanks to limitations of accuracy of GPS in our country. The ACD makes use of embedded controls and a GPS system thereby preventing collision between trains. However, this technique doesn't take into consideration factors supported the surroundings. As a result, accidents because of different factors like collapsing of bridges or mishap cannot be overcome. The project deals with a system that uses the RFID technology to find the train. This image additionally results in atomization of railways to date. a replacement system just like the recording machine in aero planes named information lumberjack is additionally put in within the system. information work is that the measurement and recording of physical or electrical parameters over an amount of your time. information loggers square measure utilized in a range of applications like in-vehicle information work, environmental observation, structural health observation, and machine condition observation. If in extreme case the accident happened the precise data regarding these parameters may be taken out in order that the fault may be found. The railway is manipulating new systems to reinforce its operating. Active and Passive RFID has done a good advancement in terms of applications. RFID has been utilized in multitudinous applications to date. the appliance of RFID is employed by several industries for trailing their product. Here passive RFID tags square measure used. The passive tag may be a RFID tag that doesn't contain battery, the facility is provided by the reader once it reaches in proximity with the tag. Once waves from the reader fall on a passive RFID tag, the convoluted antenna inside the tag starts to induce the force field. The tag attracts power from it, and forwards it to the circuits within the tag. The tag then sends the knowledge encoded within the tag's memory.

**4. Block diagram of subsystem in railway**

The railway is manipulating new systems to enhance its working. Active and Passive RFID has done a great advancement in terms of applications. RFID has been used in innumerable applications so far. Active RFID needs continuous power whereas Passive RFID is powered by the reader when RF energy is transferred from it to the tag. So here the author has used them for the implantation of new technology where RFID is implemented on the railway engine and the RFID tags are attached in the tracks between some specific distances. The main coil is in RFID reader with a power supply and RFID tag also has a coil and a small chip mainly RAM which contain the 12-bit unique code. RFID is one of the technology which is used for Automatic Identification like voice recognitions and smart card. It uses the principle of inductive coupling and electromagnetism and works without the physical contact between reader and tag. RFID works on the different frequency levels for different purposes.

The Indian Railways is working on the utilization of RFID for the betterment of transportation and signal handling. The application of RFID is used by many industries for tracking

their products. Here the author is using passive RFID tag. The passive tag is a RFID tag that does not contain battery, the power is supplied by the reader when it reaches in proximity with the tag. When waves from the reader fall on a passive RFID tag, the coiled antenna within the tag starts to induce the magnetic field. The tag draws power from it, and forwards it to the circuits in the tag. The tag then sends the information encoded in the tag's memory.

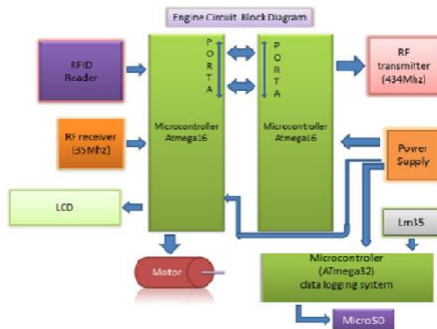


Fig. 2. Block Diagram Representation of Subsystem in Train

#### A. Microcontroller (89s51)

This is the foremost necessary phase of the project, i.e. the microcontroller 8051. The controller is answerable for detection and polling of the peripherals standing. It is answerable for creating choices for opening/closing the door/windows. It is answerable for prioritizing all the devices connected thereto. The AT89S51 is a low-power, high-performance CMOS 8-bit microcontroller with 8K bytes of in-system programmable Flash memory. It has got thirty-two I/O lines, Watchdog timer, two data pointers, three 16-bit timer/counters, six-vector two-level interrupt architecture, a full duplex serial port, on-chip oscillator, and a clock circuitry. It is the key a part of the system that controls all the operation of the circuit like digital display interfacing, square wave generation. It additionally decides the messages to be displayed on the digital display together with the time period that they must be displayed on the digital display. Microcontroller additionally decides the frequency of sq. wave output. A microcontroller is sort of a tiny laptop on one computer circuit containing a processor core, memory and programmable input/output peripherals. Program memory within the kind of ferroelectric RAM, NOR flash or OTP read-only storage is additionally typically enclosed on chip, additionally as a generally touch of RAM.

#### B. Positioning of RFID Tag

The tag should be mounted on the surface of train such that it is easily detected by the reader and it should be made sure that the reader on any account does not miss the tag. The ideal position would be on the top of the train in the front engine. But since 2.45GHZ can pass through many materials including metals and other opaque objects, it can also be placed inside the train. Another tag can also be placed on the other side of the train so that even if one tag fails (though the probability is very

low), the reader can detect the other train. The RFID tag consists of

- The chip of silicon that contains data.
- The coil and chip is installed on the plastic cover.
- The chip is joined to an antenna due to which code is transmitted.

RFID tag is an Identification system. It is used for Identification and Tracking purposes. This ID system uses small ratio frequency identification. RFID tag is chip of silicon which are useful for data storage, the coil is mounted on the plastic cover. Each RFID tag has their unique.

#### C. Positioning of RFID Reader

The reader is placed adjacent to the track mounted on a pole some distance (approx.7km) away from the gate. There is also another reader fixed on the other side of the gate some distance away (approx.7km). The reader should be placed well away from the gate. So we chose 7km considering the factors like closing the gate, alarm before closing and transmission delay. Even after this if a vehicle gets stuck, we use Obstacle Detection to warn the train driver. Vinoth kumar C et al. / International Journal of Engineering and Technology (IJET) ISSN. A radio frequency identification reader (RFID reader) is a device used to collect information from an RFID tag, in which radio waves are used to data transfer from tag to reader. RFID is a technology like a barcodes in theory manner. RFID reader to be read RFID tags within ranges from 3 to 300 feet. This technology is use for quick scanned and enables fast identification.

#### D. Results and analysis

The image is tested for the work that is given thereto and represented within the paper. This is a contemporary approach towards atomization of railways. Each part has worked with success. This work conferred by author is more practical once use at the sensible level. Here image has performed well with the concept that it's created. The management station within the image may be a nearest station that keeps the total data concerning the train. The ATIS (Automatic Train Identification System) is developed by engineers of china is quite successful in tracking of good train.

### 5. Conclusion

This paper presented the railway tracking identification system using advance RFID technology

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