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AN ENHANCED CRACK DETECTION SYSTEM FOR RAILWAY TRACK

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ABSTRACT—

In this project we introduced the integration of railway track surveying system. In our proposed system it is used to detect the railway crack. This project consists of IR sensor& fire sensor. The IR sensor is used to detect the crack and as well as distances, fire sensors used to detect the fire accidents. To communicate the received information, we make use of a GSM modem. The GSM module is being used to send the current latitude and longitude data to the relevant authority as an SMS.The importance of this project is applicable both day & night time detection process applicable both day & night time detection process.

I. INTRODUCTION

In India most of the commercial transport is being carried out by the railway network and therefore as any problem occurred during transportation the major damage is getting occurred to the economy-non withstanding a social life. The Indian railway network today has a track length of 113,617 kilometers (70,598mi).over a route of 63,974 kilometers (39,752 mi) and7, 083 stations [11]. It is the fourth largest railway networking the world exceeded only by those of the United States, Russia and China. The rail network traverses every length and breadth of India and is known carry over 30 million passengers and 2.8 million tons of freight daily. Despite boasting of such impressive statistics, the Indian rail network is still on the growth trajectory trying to fuel the economic needs of our nation. In terms of the reliability and safety parameters, we have not yet reached truly global standards. Though rail transport in India growing at a rapid pace, the associated safety infrastructure facilities have not kept up with the aforementioned proliferation. Our facilities are inadequate compared to the international standards and as a result, there have been frequent derailments that have resulted in severe loss of valuable human lives and property as well l[6]. The principal problem has been the lack of cheap and efficient technology to detect problems in the rail tracks and of course, the lack of proper maintenance of rails

which have resulted in the formation of cracks in the rail sand other similar problems caused by anti-social elements which jeopardize the security of operation of rail transport [4].In general, there exist three main categories of techniques excitingly used for damage identification and condition monitoring of Railway tracks. These include: • Graphical inspections • Non-destructive testing technologies such as acoustic emissions or ultrasonic methods, magnetic field methods, radio graphic, eddy Existing techniques, thermal field methods, dye penetrate, fiber optic sensors of various kinds • Shuddering-based global methods.

Graphical inspection is the primary technique used for defect identification in tracks, and is effectively used in specialized disciplines. The successful implementation of this method generally requires the regions of the suspected damage to be known as a first step, and be readily accessible for physical inspection. As a result, this method can be costly, time consuming and ineffective for large and complex structural systems such as the rail track [3]. NDT techniques have resulted in a number of tools for us to choose from. Among the inspection methods used to ensure rail integrity, the common ones are ultrasonic inspection and eddy Existing inspection.

Ultrasonic Inspections are common place in the rail industry in many foreign countries. It is a relatively well understood technique and was thought to be the best solution to crack detection [6].The Ultrasonic Broken Rail Detector system is the first and only alternative broken rail detection system developed, produced and implemented on a large scale.

II. EXISTING SYSTEM

In the Existing System uses the concept of LDR (Light Dependent Resistor) to detect the cracks. The LED will be attached to one side of the rails and the LDR to the opposite side in the existing approach. When cracks during normal operation, and hence the LED does not fall LDR, LDR resistance is high. After falling of the LED light after LDR, LDR resistance is reduced and the reduction of the amount of light intensity will be nearly proportional. As a consequence, when light from the LED deviates from its path due to the presence of a crack or a break, a sudden decrease in the resistance value of the LDR ensues. This change in resistance indicates the presence of a crack or some other similar structural defect in the rails. In order to detect the Existing location of the device in case of detection of a crack, a GPS receiver whose function is to receive the Existing latitude and longitude data is used. To communicate the received information, a GSM

modem has been utilized. The function of the GSM module being used is to send the Existing latitude and longitude data to the relevant authority as an SMS .The robot is driven by four DC motors. With this Existing system only latitudes and longitudes of the broken track will only be received so that the exact location cannot be known [6].

III. PROPOSED METHOD

This technique is used for outside of base station. Measuring distance between two rail tracks IR sensors are used to detect the crack in the track. If anyone pursuing on the track means they stop the surveying work IR sensors used to detect the crack in railway track. Two IR sensors are fixed in front of the train is used to find out the crack on the rail. Each sensor will produce the signal related position with the rail. Infrared (IR) transmitter is one type of LED which emits infrared rays generally called as IR transmitter. Similarly IR Receiver is used to receive the IR rays transmitted both IR transmitter. One important point is both IR transmitter and receiver should be placed straight line to each other. If the track is normal on its position both the sensor gives the constant Sensed output. If anyone misses their output condition to fail then there is defect on that side. It will inform this by giving alarm and also fire sensor are used to detect the fire.

If the fire is detected automatically spread the water over a fire detected surface. The GSM module is being used to send the current latitude and longitude data to the relevant authority as an SMS. The importance of this project is applicable both day & night time detection process.

IV. CONCLUSION

The various types of sensors are used in this paper .The ultrasonic sensor is to measure the crack and track distances. And it's have the high efficiency and it has been done using proteus electronic simulation package. Therefore Train collisions, derailing rail track accidents are avoided. Flame detectors respond to the production of one or a combination of ultra-violet or infrared spectrums of electromagnetic radiation. Infrared waves are not visible to the human eye. It detects the crack in the track. Hence it is expected that, major train mishaps can be prevented and human life saved if this system is implemented.

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