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Research Paper

Solar Powered Crack Detector Applicable For Tracks

Engineering

KEYWORDS : Situationawareness, socialrobots

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ABSTRACT

In this ever changing world, every manufacturer is moving towards lean technology to make his product much more fitter against heavy competition.This project relates to the location of singular points in the automatic control of railway tracks. According to a possible embodiment, the railway carriage carrying the control equipments is provided with sensor, orientated to detect the crack. Once the crack is detected, the carriage will stop the movement and produce signal, informing the operator

1. INTRODUCTION

Since all these days, there have been train accidents occurring all around the world due to cracks on the railway tracks. This had resulted in huge loss of human life.So, it is necessary to overcome this issue. We came with an idea of introducing an infra-red sensors in front of the testing engine to check the metal continuity on the surface of thetracks. If a crack is detected than the sensor sends an signal to the timer circuit which is connected to the engine and this stops the motion of the train.

II. COMPONENTS

Infra-red sensor :

An **Infra-red sensor** is a device that reacts to Infra-red (IR) radiation. There are two basic types of sensors, namely, thermal and photonic (photo detectors). Thermal effects of the incident IR radiation are influenced by many temperature-dependent-phenomena. Thermocouples and thermopiles use the thermo-electric effect. In IR spectrometers the pyroelectric detectors are the most widespread.The materials in these are semiconductors with narrow band gaps. Incident IR photons can cause electronic excitations. In photoconductive detectors, the resistivity of the detector element is monitored. Photovoltaic detectors contain a p-n junction on which photoelectric current appears upon illumination.

IN4007 DIODE:

This is a simple, very common rectifier diode. Often used for reverse voltage protection, the 1N4007 is a staple for many power, DC to DC step up, and breadboard projects. 1N4007 is rated for up to 1A/1000V.

DC MOTOR:

This is a 12V, 5rpm motor which is fitted to the timer circuit. This motor rests on the housing provided on the U frame and is coupled to the worm and drives it. The motor runs only intermittently and so the power consumption is less.

TIMER CIRCUIT

The tracking system consists of two timer circuits in series. Both are identical and are fitted with relays. A 12V supply is needed for its operation. The relay in the first circuit is adjusted for a time interval of one hour and that in the second is adjusted to rotate the motor shaft for 255˚. In short, the motor shaft rotates through 255˚ for every one hour.

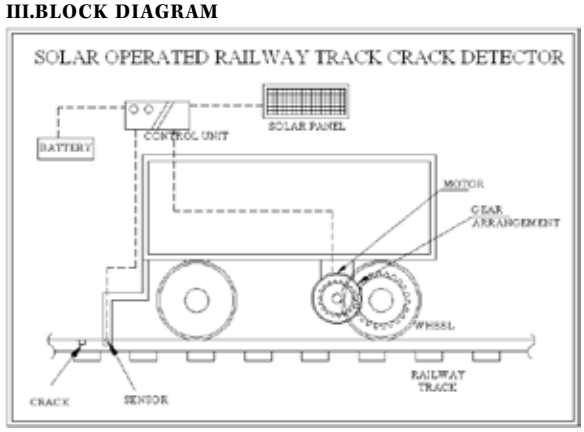
BATTERY:

A 24 volt lead acid battery is used to store the power produced by the solar panel. The battery is connected to the timer circuit for automatic movement of solar panel

SOLAR PANEL:

The solar panel is just a series of solar cells connected in series. The solar cells are made of wafer thin crystalline silicon. The operation of these cells is based on photovoltaic effect. These convert the solar radiation incident on them into electricity which is used to charge a battery and glow a fluorescent bulb. The solar panel used in this project is of 24V capacity. The panel is held on the wooden blocks fitted on the adjustment rod.

III.BLOCK DIAGRAM



IV. WORKING PRINCIPLE

This project pertains to a process for monitoring the condition of rail on train tracks and more specifically has the object of the identification of defects detected by monitoring equipment on the tracks to be checked to allow maintenance crews to subsequently find these defects.

Two medal sensors are fixed in the wheels of the train is used to find out the crack on the rail. Each sensor will produce the signal related position with the rail. If the track is said to be normal on its position when both the sensor gives the constant sensed output. If any one misses their output condition to fail then there is defect on that side. It will inform this by giving alarm. Where sensors and alarm should connected to the microcontroller I/O lines and microcontroller is programmed to our needs. The response time and sensitivity of photonic detectors can be much higher, but usually these have to be cooled to cut thermal noise.

ADVANTAGES

Low cost
Reliable
Compact in size
Can be run without a driver

LIMITATIONS

Internal cracks can't be detected

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Low operating speed

APPLICATIONS

Solar operated railway crack detectors are employed in areas where rails are laid out,

Railway Tracks

AGV- Automatic Guided Vehicles Track

V. CONCLUSION

Inthisstudy,wehaveempiricallydemonstratedthatthe location of singular points in the automatic control of railway tracks. According to a possible embodiment, the railway carriage carrying the control equipments is provided with sensor, orientated to detect the crack. Once the crack is detected, the carriage will stop the movement and produce signal, informing the operator about the presence of an imminent obstacle

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