Literature Survey of Railway Track Crack Detection and Anti-Collision System

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ABSTRACT

The largest railway networks in the world is in India , over a distance of 1,15,000 km in distance, all over India. However it is not reliable and passenger safety Indian Railways is not up to global standards. A recent study revealed that over 25% of the track length is in need of replacement due to the development of cracks on it. Manual detection of tracks is difficult and not fully effective owing to much time consumption and requirement of skilled technicians. This project is analysis for the crucial situation which occurs in the automatic train system. In the railway surveying in many accidents cause multiple damage for life and also our property. Thus this project is to implement and analize crack detection,obstracles, gate control and water lodging on track. Whether the track stipulation is good or not for use the Proximity Sensor to check it. Secondary for them to avoid the obstacle crossing in train track, when the train is come.The main objective of this project the multi sensor railway track geometry surveying system.
Keywords: PS-Proximity sensor, PLC-Programmable logic controller

INTRODUCTION

The train system is that one proficient way to travelling one place to another place. The assessment of cost is also easy to pay for all strata. In that train security process will be easily implemented, by solving the two issues. Because train travel needs more security compared to other travelling vehicle. Track damage created is more frequent causes in the train. To avoid this Proximity sensor can be used.

This works successfully in automatics security system. For gate control process by using PROXIMITY SENSOR to maintain the gate action by servo motor. Here switch will be used to control the train speed when the train is come near the gate. Power supply always given to the controller. It consist of 3 wires.The capacity of sensing of Proximity sensor is 8mm .The maximum voltage capacity of Proximity sensor is 6 to 36 volt DC .

If the wiring the high voltage wire, it will causes miss-operation or damage.It should be separately wired or should be individual wiring chase in principle.

This is for any object is over crossing in front of the train that time to detect this one. And then using the PROXIMITY sensor to measure the distance among object and train. By Using PLC for water on the tract we are using float sensor it can sense the water flow rate and it will disconnect the supply of train for avoiding accident. In our project model we are using NC Switch to consider that track is crack.

We are detecting crack on rail tracks by using electrification of rail track It help to detect the cracks or breakages in railway tracks if any before the train passess and the alert signal is sent to the train operator. Automation plays an important role in all industries.

- To achieve Quick Response
- To reduce man power
- To increase the system efficiency
- To reduce the work load
- To achieve grater accuracy
- To reduce the time of operation

I. METHODOLOGY

A **Programmable Logic Controller**, **PLC**, or **Programmable Controller** is a digital computer used for automation in this proposed project. These controller are specially designed to survive in harsh situation and shielded from heat, cold , dust and moisture etc. PLC consist of a microprocessor which is programmed using the computer
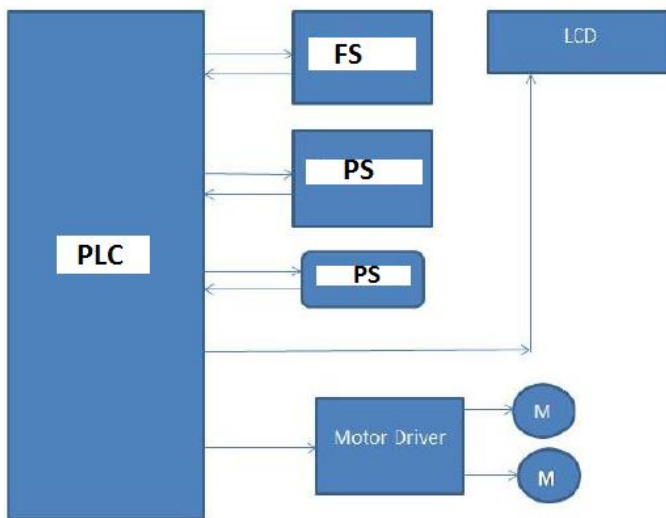
language .The program is written on

Fig.1 PLC interface with motors & sensors

A visual programming language known as the ladder logic was created to program the plc. Both sensor (Proximity & Float sensor) connected with plc. In this project we required fast switching so this is the main reason for using plc . When any water comes on track of railway line detected by sensor suddenly plc will trip and give signal to us that there is breakage of line. Similarly in case of Proximity sensor , when any object come in front of train then plc will trip and give us a signal of any one is there in front of the train. Programming a PLC is easier than wiring the relay control panel.PLC can be reprogrammed. Conventional controls must be rewired and are often scrapped instead. PLC takes less floor space then relay control panels.A PLC has facility for extensive input/output arrangements.Maintenance of the PLC is easier, and reliability is greater. PLC can be connected to the plant computer systems more easily than a relay. PLC has very few hardware failures compared to electromechanical relay.

In the fast developing country, people are facing many accidents; it would be undesirable for any nation to losing their life for unwanted cause. Railways are one of the important transports in India. There is a need for manual checking to detect the crack on railway track and always railway personnel takes care this issue, even though the inspection is made regularly. Sometimes the crack may un-notice. Because of this the train accidents or derailment may occur. In order to avoide this situation and automate the railway crack detection has been proposed. Here NC is used to detect the crack in our

prototype model of railway track by measuring distance from track to switch, if the distance is greater than the assigned value the PLC identifies there is a crack, also it tells the exact the location of the crack by the formula "DISTANCE=SPEED*TIME". While the checking process is going on, the train may approach, it is identified by the vibration sensor and gives alarm to the PLC, thereby shrinks the size of the robot between the two tracks. After the train has crossed it returns to its normal position and continue its checking process.

Thus this project is to implement in two way to save the train travel. Whether the track stipulation is good or not for use the Proximity Sensor to check it. Secondary for them to avoid the obstacle crossing in train track, when the train is come.To control the main region in train system have been the gate level operation to using DC MOTOR in real time analysis .This is accurately done by using the PLC tool to get the better result.The main objective of this project the multi sensor railway track geometry surveying system.

II. RESULTS AND DISCUSSION

The principal and operation is very simple when any fault occur in the railway track like breakage of line at any point then vibrating will detect the gape and give us a signal about the fault. Fault can be observe with help of signal and seen be locopilot. Similarly when object came in front of the train then proximity sensor will detect the image of object and give us a signal about the object in terms of alarm and driver will stop the train.Also when there is water lodging on track float sensor will sens and gile alarm.

III. CONCLUSION

By using PLC for purpose of railway track inspection and crack detection, it will have a great impact in the maintenance of the tracks which will help in preventing train accidents to a very large extent.This will help in maintenance and monitoring the condition of railway tracks without any errors and thereby maintaining the tracks in good condition, preventing train accidents to very large extent railway track crack detection

autonomous vehicle is designed in such a way that it detects the cracks or deformities on the track which when rectified in time will reduce train accidents.

IV. REFERENCES

[1] S. Ramesh,"Detection of Cracks and Railway Collision Avoidance System", International Journal of Electronic and Electrical Engineering ISSN 0974- 2174 Volume 4, Number 3 (2011), pp. 321-327

[2] V.Radha, Sreedevi, V.Sandhya " An Innovative Railway Track Surveying System for Accident Reduction" ISSN 2319-8885 Vol.03,Issue.44 December 2014, Pages:8907-8910.

[3] K.N.Sreekumar , G.Sankar , M.Kumaresan " Robust Railway Crack Detection Scheme Using ARM IRTRDS Algorithm" .Journal of NanoScience and NanoTechnology | Vol 2 | Issue 5 | Spring Edition | ISSN 2279 0381 .

[4] Mr. N. Sambamurthy et al Int. Journal of Engineering Research and Applications ISSN : 2248-9622, Vol. 3, Issue 6, Nov-Dec 2013, pp.1592-1597

[5] Athira Ajith, Aswathy K S, Binoy Kumar H, Dantis Davis, Lakshmi S Pai, Janahanlal P Stephen "Innovative Railway Track Surveying With Sensors and Controlled By Wireless Communication" IJREAT International Journal of Research in Engineering and Advanced Technology, Volume 2, Issue 2, Apr-May, 2014.