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Robot based mechanism cleaning between Railway track

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ABSTRACT

This paper aims to present a Robot Based mechanism for cleaning between the railway track. it is a cost efficient railway track cleaning machine which would prove to be a wonderful alternative to the current system in place if implanted. The proposal prototype is designed to overcome all the disadvantages of the current machine, and would help materialize the idea of super clean railway platform tracks across the nation. In this mechanism we used the vacuum technology for cleaning the track, in which all types of waste material like, human waste, empty plastic water bottles, waste paper etc. will be collect.

Keywords: Robot,railway track, human waste, waste paper, empty plastic water bottles, vacuum technology

1. INTRODUCTION

Indian Railways represent the pride of an Indian. Indian Railways is an Indian state-owned enterprise, owned and operated by the government of India through the Ministry of Railways. Railways have been good medium of transportation for its passengers since 1851 when it was introduced in India (Bombay to Thane). During these 150 years, it has approximately touched each and every part of the country. It covers about 1, 15,000 km with 7500 stations. As of December 2017; it transported over 27
million passengers daily. India is travelling towards the dream "clean and green". Mere words create no impact on people. precleaning by action is our motto; our railway track cleaning machine is keeps the railway track and its surroundings clean. This will motivate people to keep the city clean which will in turn help build a clean nation. Railway track cleaning machine is designed to provide the best cleaning facility with minimum power consumption and labour power. In view of promoting swacha bharat abhiyan ,we have come up with this cost and power efficient prototype.

2. TECHNOLOGY

- Vacuum technology and Rotating :- Stationary brush mechanical advantage (dry cleaning cycle) Rotating side brushes are used for collecting waste on side of track. The fixed front brush and Rotating front brush are used for collecting waste between rail tracks.
- Vacuum technology and Rotating :-Stationary brush mechanical advantage with water sprayer and cleaning. (wet cleaning cycle) The above combination is used for collecting waste during cleaning cycle.

- Brush striking strip & pin:-The Rotating front brush at both side end strip will striking on side pins which add mechanical advantage to lift collected waste under brush spaces ensuring high degree of waste collection.
- Wi-Fi technology:- It control the travel speed and direction of robot On-off condition of robot DC motor switch on off(brush and vacuum motor)
- Battery Technology:- Power to travel of robot, DC motor power, Vacuum motor power are supply by Central Battery.

3. **RELETED WORK**

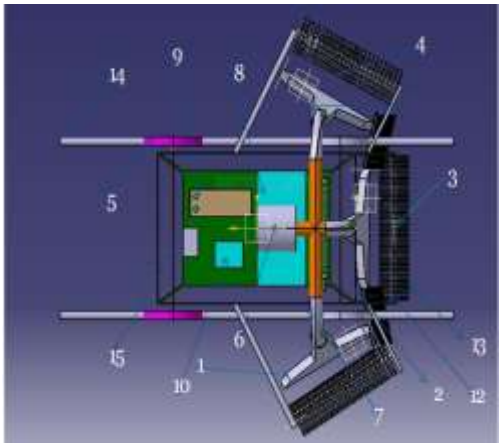

Fig .3.1

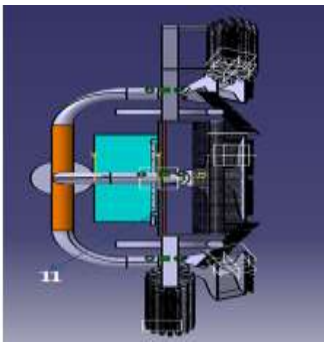

Fig.3.2

- **LIST OF COMPONENTS**

1 stationary side brush, 2 stationary front brush, 3 rotating front brush, 4 rotating side brush 5 track wheel, 6 vacuum cleaner , 7 vacuum duct branches, 8 attachable collection tank,9 battery,10 control panel, 11 water sprayer manifold, 12 striking pin, 13 striking brush strip, 14 rail track, 15 water drain attachment,

4. CONSTRUCTION AND WORKING

The construction details are shown in figure 3.1 and 3.2.

The control panel control the travel speed and direction of robot, On-off condition of robot & DC motor switch on off (brush & vacuum motor)

As soon as travel of robot starts the rotating front brush and side brush will try to collect the waste including plastic, paper, waste *etc*. this will throw the waste towards front vacuum duct. Also the left out between front and side rotating brush are restricted by side stationary and front brush close to bottom of vacuum duct side. The net effect of side and front rotating and stationary brush with vacuum technique ensure complete waste collection. In addition to this the front rotating brush has given side striking strips which strike side pins which adds mechanical advantage to lift and throw the waste towards vacuum duct. The working of robot is conducted in two cycle (dry cleaning and wet cleaning cycle).The frequency of dry cleaning cycle and wet cleaning cycle is decided as per requirement. The water spraying manifold is situated in between brush assembly to conduct wet cleaning cycle and during this cycle other component function same. A storage tank is given at vacuum motor side. This attachable storage tank with bottom slope advantage is placed.

5. DEPENDENCIES

- **Electrical Power Source:-**

It is used to run the vacuum cleaner, rotating middle brush, rorating side brush, water pump, wi-fi module, *etc.*

- **Wi-Fi Technology**

It is used to operate the mechanism

6. TECHNICAL SPECIFICATION

Mains connection	220–240 V
(AUS)	240 V
	1~50,60 Hz
Fuse protection (surge-proof)	10 A
Power (suction motor)	
P_{max}	1200 Watt
P_{nom}	1000 Watt
Air flow rate	68 l/s
Vacuum	200 mbar
Capacity	18 l
Max. water capacity	12 l
Length	390 mm
Width	290 mm
Height	490 mm
Weight without accessories	6 kg
Nominal width, accessory	Ø 35 mm
Sound level	72 dB(A)
Class of protection	II
Cable length	5 m

7. EFFECTIVE FEATURES OF ROBOT BASED WIRE-LESS RAILWAY TRACK CLEANING

- No direct Human involvement in Cleaning
- High degree collection and cleaning of waste
- Accidental safety
- Minimum wastage of water and maximum area coverage for cleaning
- Attachment for cleaning drainage
- Attachable collection tank
- Wireless operation
- No fatigue for operating
- Less Time consumption for overall cleaning as compared traditional
- cleaning
- Less skilled manpower required for operating the Robot
- Less operating cost compared to traditional cleaning

8. CONCLUSION AND FUTURE SCOPE

This mechanism suits almost all climatic conditions. It can be attached to an existing compartment of train or to a separate engine. This compartment can be made standalone and can be engineered with extremely low cost communication techniques to work without any external engine.

REFERNCES AND BIBLOGRAPHY

[1] Smart India Hackathon 2018 (Ministry Of Railway) government of india

[2] The Times of India (November 28, 2012) "Railways needs a bug to keep toilets clean
http://articles.timesofindia.indiatimes.com/28.11.2012

[3] Hand Book for C&W Supervisors released by Shri Harish Chandra Joshi General Manager North Central Railway on 27.8.2011

https://indianrlynews.wordpress.com/tag/railwaytracks-inrailway-stations.

[4] Guidance from Hafi Electra PVT. .LTD .Bhosari Pune Mharashtra India

[5] www.indianrailways.gov.in

[6]http://www.manualsdir.com/manuals/160009/karcher-a-2701.html?page=13