# Automatic Railway Toilet Flush System with Unmanned Railway Gate

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*Abstract - The aim of this project is to Automate unmanned railway gate using mechatronics. The objective of this project is to manage the control system of railway gate using the microcontroller. When train arrives at the sensing point signal is triggered at the railway crossing point so that the people get intimation that gate is going to be closed. Then the control system activates and closes the gate on either side of the track. Once the train crosses the other end control system automatically lifts the gate. For mechanical operation of the gates gear motors are employed. Here we are using embedded controller built around the phase change to use of read switch for the control according to the data pattern produced at the input port of the micro controller, the appropriate selected action will be taken.*

*Key ward: relays,Magnetic sensor,leds gear Motor Circuit,power controller,read switch.*

## 1. INTRODUCTION

Cleanliness has become priority issue in Indian Railways. In a recent poll conducted in the 160,000 citizen strong *circle* "Transform India with Modi", 50% of the respondents suggested that Improving Cleanliness of trains/stations should be the top priority for Government, ahead of Safety (35%), Reservation Systems (9%) and Hygienic Food (6%). This indicates that Indians are ready for a Clean India and a Cleaner Railways. Over 35,000 citizens in the Make Railways Better circle have given their inputs on various aspects of cleanliness including:

1. Civic Sense in Trains

2. Cleanliness in Trains and at Stations

3. Restricting entry on platforms and railway stations

### 1.1 Current Cleaning Practices in Indian Railways

Indian Railways have planned multi-pronged action by synergizing technology, education of users and provision of mechanized equipments. Various measures taken include introduction of mechanized cleaning process, award of rag picking/garbage disposal contracts, pay & Use toilet scheme etc.  Besides, inspections by various officials at the railway stations are also conducted to monitor cleanliness, to identify weak areas and take remedial measures.  Additional posts of Health Inspectors have been created during the last four years to ensure better supervision of cleanliness at railway stations.

Constant efforts are being made to improve the level of cleanliness in coaches. Following initiatives for improvement of hygiene and cleanliness in the trains have already been taken:

### 1.2 Intensive Mechanized cleaning of coaches in the coaching depots through professional agencies is being carried out. Heavy duty machines such as high pressure jet cleaners, floor scrubbers, vacuum suction cleaners etc. are deployed for the purpose. Presently a total of 115 depots have been identified for this work and this has already been implemented in 89 coaching depots on different Zonal Railways.

 (OBHS) has been prescribed in all Rajdhani, Shatabdi, Duronto & other important long distance Mail/Express trains for frequent cleaning of coach toilets, doorways, aisles & passenger compartments during the run of the trains. Under OBHS, the cleaning staff will be on-board. Passengers can call them to clean the coaches and toilets, if they are found dirty. A total of 535 trains have been identified for providing OBHS services. This scheme has been implemented on about 335 pairs of trains.

### 1.3 Disposable Bed Linen: The biggest problem with the existing cotton sets is their worn-out look due to repeated use. The zonal railways can buy bed linen only from the outlets of Khadi and Village Industries Commission and Association for Consumer Action on Safety & Health (ACASH). These organisations, sometimes, are not able to meet the replacement requirements. Hence, Synthetic disposable bed linen, instead of cotton ones, to be used; this could add to the fire load 64 mechanised laundries to be set up for washing cotton beddings. The Railways is planning to soon try disposable bed linen, on an experimental basis, in the Bangalore Rajdhani Express.

### 1.4 Bio-Toilets: However, bio-toilets are arguably the most complicated part of the Railways' cleanliness drive. A stainless steel bio-toilet set - with six chambers and costing Rs 90,000 is to be fitted beneath each of the four rest rooms in a train coach. These toilets have a colony of anaerobic bacteria that do not require oxygen to breathe. Aerobic bacteria, which survive on oxygen and have been used in some foreign trains, have proved unsuccessful in the Indian system. The friendly-bacteria technology,

developed by the Defence Research and Development Organisation for use in such toilets, breaks down faeces into methane and portable odourless liquid. This takes care of not only cleanliness but corrosion caused on railway tracks due to human droppings.

Though the Railways is installing bio-toilets on both conventional train coaches and the latest Linke Hofmann Busch (indigenised German technology) ones, it is only by 2016-17 that all new coaches will have such toilets.

**1.5 Clean Train Station scheme** has been prescribed for limited mechanized cleaning attention to identified trains during their scheduled stoppages enroute at nominated "Clean Train Stations" with focus on cleaning and disinfecting of toilets, doorways and aisles. 30 Clean Train Stations have been nominated by Railway Board on different Zonal Railways. 28 of these have been commissioned and are functional.

**1.6 Setting up of mechanized laundries for washing linen**: 54 locations have been identified to set up Mechanized laundries for improving the quality of washing of bed rolls. While 29 numbers shall be managed departmentally, 21 numbers are being outsourced. Mechanized laundries have already been set up at 16 locations. Contracts for setting up laundries at 7 locations are in advanced stage and tender are under process at 12 locations.

**1.7 Pest and rodent control in trains:** The contract for pest and rodent control in coaches is already in place in 125 coaching depots out of 127 identified coaching depots on IR. To improve effectiveness of the pest and rodent control, measures are being regularly reviewed. Major constraint is vulnerability of coaches for entry of pest and rodents at coaching depots, station yards etc.

**1.8 Cleanliness at Stations**: In view of the high density of passenger traffic, maintenance of cleanliness at stations is a major challenge for Indian Railways. However, Indian Railways accord very high priority for ensuring proper standards of cleanliness at stations

## 2. SYSTEM MODEL

**This is the Automatic Control Of Unmanned Railway Gate**



## 3. WORKING METHODOLOGY

Present project is designed using 8051 microcontroller to avoid railway accidents happening at unattended railway gates, if implemented in spirit. This project utilizes two powerful IR transmitters and two receivers; one pair of transmitter and receiver is fixed at up side (from where the train comes) at a level higher than a human being in exact alignment and similarly the other pair is fixed at down side of the train direction. Sensor activation time is so adjusted by calculating the time taken at a certain speed to cross at least one compartment of standard minimum size of the Indian railway. We have considered 5 seconds for this project. Sensors are fixed at 1km on both sides of the gate. We call the sensor along the train direction as 'foreside sensor' and the other as 'after side sensor'. When foreside receiver gets activated, the gate motor is turned on in one direction and the gate is closed and stays closed until the train crosses the gate and reaches aft side sensors. When aft side receiver gets activated motor turns in opposite direction and gate opens and motor stops. Buzzer will immediately sound at the fore side receiver activation and gate will close after 5 seconds, so giving time to drivers to clear gate area in order to avoid trapping between the gates and stop sound after the train has crossed.

## 4. CONCLUSION

The system is small, simple and good for wireless equipment control. The microcontroller based equipment controller can switch on or off up to four devices at desired time interval set by user in the transmitter. The devices can be controlled remotely from the distance up to 30 metres from the transmitter. The RF receiver module can receive the signal transmitted from a distance up to 9 metres(30feet). The range can be increased up to 30 metres using a good antenna. In this project the time out range is 00 to 99 seconds, which can easily be modified to extend the time duration in the delay subroutine of the assembly language code.

## 5. FUTURE SCOPE

The electrical devices can be controlled using wireless equipment control without the use of wires. The messiness caused by the wires is reduced. This is cost-effective also. The device can switch on or off up to four devices at a desired time interval set by the user in the transmitter. The number of devices can be increased by increasing the relay. The devices can be controlled remotely from a distance up to 30 metres from the transmitter. For increasing the range a good antenna with longer range can be used. The source code can also be written in embedded C language which makes error detecting in the code easier

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