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A Review Paper On Bio Toilets in Indian Railways

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Abstract: For the Indian railway, disposing of human waste is a very significant issue. Human waste has also been treated with chemical treatment and incineration as solutions to the issue. All of these methods, meanwhile, are either unsanitary or not realistic replacements. Restricted in its ability to address the sanitation issue is the controlled discharge toilet system. The utilization of bio-toilet systems is a smart strategy for ensuring the sanitary conditions of their biodegradation process. The track should have a pleasing visual look, and any annoyance caused by human excrement can be removed. Moreover, water is conserved, and corrosion brought on by feces can be lessened. By adopting a green toilet system, we may use anaerobic bacteria to biodegrade solid waste into clean water, which is then chlorinated.

1. INTRODUCTION:

Being India's lifeline, Indian Railway plays a crucial role. Since 1852, railways have been India's most significant development in terms of infrastructure. India's railway system is the only viable and dependable land-based means of transportation. One of the largest rail networks in the world is that of India. The Indian Railways have a Vision 2020 plan that will put an emphasis on high-speed train introduction, environmental sustainability, network expansion, capacity creation, train safety, and technological excellence. There are a lot of difficulties. It seeks to create a world-class rail infrastructure and technology comparable to those of the USA, China, Japan, and other nations.The restroom system is a crucial component of every regional or intercity train, and its dependability is essential. The train cannot be placed into operation without functional restrooms. Human waste disposal is a major issue in high-altitude regions. The excrement is collected and applied to the ground as fertilizer in non-glacier regions. Human waste has also been subjected to chemical treatment and incineration in an effort to solve the issue. All of these solutions, however, are either unsanitary or not realistic replacements.Biological treatment is an attractive approach for solving the problems, but decreased metabolic activities of the micro-organisms, freezing of the substrate non-availability of conventional energy sources and hilly terrains are some of the hurdles which need to be solved to make the process practically possible. IR-DRDO has developed an innovative technology for the disposal of human waste in an eco-friendly manner at high altitude locations at low temperatures. The process culminates into treated effluent, which is free from pathogens and is also environmentally friendly.

2. GET PAPER REVIEWED:

Kartik Kumar Soni, Amit Kumar, and Ankit Kumawt: This paper investigates the success of Indian Railways as a whole depends on sanitation, which has grown to be a need throughout time. Responsible authorities are making efforts in this area as well by conducting field tests and posting notices in restrooms asking passengers not to flush when the train is at a stop. Our suggested model (FFEM) won't impose any limitations on its user. Even when the train is still on the station, passengers are free to use the restroom whenever they wish. Also, it turns human waste into biogas energy, which may be used to power the lamp post at the platform (if necessary) or for other advantageous uses. The use of this technology will not only provide an alternative energy source while resolving the largest open toilet problem in the world (Indian Railways).

Mr.S.A.Burande1, Prof. J.J. Salunke "ANALYTICAL STUDY OF VACUUM CONTROLLED GREEN TOILET SYSTEM FOR INDIAN RAILWAYS": It is possible to conserve water by using vacuum green toilets. Unhygienic surroundings were replaced with clean, healthful surroundings. It is possible to tackle the issue of

offensive odor and poor odor in restrooms. It is possible to maintain a better environment for the biodegradation process. The future of the Indian Railway toilet system is the vacuum green toilet system.

Jayshri S. Nandardhane, Shadab S. Patel, Ashwini V. Khobragade, A.A.Dhole "Bio-Toilet used in Indian Railway": Human excrement is transformed into methane and water when it comes into touch with bacteria through a sequence of anaerobic digestion-hydrolysis-acidogenesis-methanogenenesis steps. Carbohydrates, protein, and fat are the main ingredients of feces. the train's onboard bio restroom. Environmental protection and eco-friendliness are achieved. The visual appearance of tracks should be pleasing, and any annoyance caused by human excrement can be removed. Using bio-toilets may reduce the corrosion cost caused by fecal matter.

Dr. Mohula Mullick "THE IMPACT OF GREEN TECHNOLOGY ON INDIAN RAILWAYS WITH RESPECT TO RETROFITTING OF BIO TOILETS": Almost 4,000 bio-toilets are now being deployed in trains. All new coaches were equipped with either bio toilet systems or brackets that can hold bio-toilets in order to transition to environmentally friendly restrooms entirely by 2021–2022. During the testing period, bio-toilets were heavily criticized for their systems' slow waste treatment. In the long term, bio-toilets will be more
cost-effective and hygienic. In order to keep the area surrounding the toilet seat clean, IR is developing ideas for flushing. In addition, in Clean Train Stations, air-water jets are regularly used to clean the restrooms.The idea relies on the cooperation of the passengers, who are asked to refrain from using the toilet pan as a trash can.
Plastic bottles, tea cups, rags, sanitary napkins, diapers, plastic bags, and gutkha pouches are all readily blocked in bio-toilets. Toilets are one of the 17 special areas that railways have recognized as having the potential to attract significant private and international investment. The installation of bio-toilets in passenger coaches, the construction of automated laundry facilities, and other services like train cleaning are all permitted under the rules established by the government under its Foreign Direct Investment program.

Dr.T.THEGALEESAN & Dr.R.LATHA "THE GREEN BUSINESS PRACTISES OF INDIAN RAILWAYS (THE BIO TOILETS: A MORAL SUASION)": The bio-toilets at Indian Railways were made possible by the "Made in India" program. Scientists from DRDO and engineers from Indian Railways worked together to build it. The program is an illustration of how technology created for defense uses has been used to civil applications.
Also, the cooperation between the DRDO, RDSO and the field units of the Indian Railways has aided this technological adaptation and wide-scale implementation. We, as users, also benefit from the same moral persuasion when we use the green toilet systems that our Indian railroads have installed as part of their drive to sanitary progress. Neither the government nor any foreign organizations have imposed such a requirement on the Indian Railways. While open defecation is the sole issue that this study addresses, future research can focus on addressing other issues like plastic, medical waste, metal, and so forth.

3. REFERENCE

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