A PROJECT ON
USE OF BIO TOILETS in INDIAN RAILWAYS
&
IMPROVEMENT NEEDED

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Present World Scenario

- According to UNICEF : WHO estimates
- About $1/7^{th}$ of world population still openly defecate In India (60 %) in the absence of any toilet / latrine,. Global impact of poor sanitation on human health and infant / child death is profound. Estimated 10 million children under 5 - die globally every year - out of which 2.4 million are in India

Priorities are Different

- 60% (626 million) in India do not have toilets. This makes India the number one country in the world where open defecation is practiced. Indonesia with 63 million is a far second.
- **Problems of Open Defecation**

Problems of Open Defecation

Pollution of fecal matter with drinking water leads to contamination of food, fruits & vegetables and causes organic pollution & Aesthetic nuisance.

Water borne Diseases caused by fecal matter are:

- Viral gastroenteritis
- Typhoid
- Cholera epidemics
- Diarrhea (annually kills 5 Lakhs children)
- Viral hepatitis (100 cases per 100,000 people)

Need for Environmental Friendly Toilets by IR

- Unacceptable hygiene conditions, particularly at railway stations
- Preventing damages to tracks by way of corrosion
- Likeable sights at stations
- Environmental friendliness
- Eliminating manual scavenging

Ministry of Rural Development, Government of India, through its policy documents, has also decided to have total sanitation in the country and completely eliminate the practices leading to open defecation.

Types of Green toilets and efforts taken by IR till now

#	Type	Environment friendliness
1	Biological sewage treatment toilet system- • Microphor, USA by ICF in 1993 • Fitted by ICF on 2 ACCW and 6 GS coaches in 1993	Yes
2	Macerated & chemically treated toilet system • Rail Tech, Canada by RCF in 1998 • - Fitted by RCF on 8 conventional coaches in 1998	No
3	Vacuum toilet system. • EVAC, Sweden by RCF in 1995 • Fitted by RCF in one IRZ coach • Extensive High end technology and frequent post treatment	Yes
4	Zero discharge toilet system • IIT, Kanpur water recycling project • Frequent post treatment	Yes
5	Controlled discharge toilet system	No
6	Aerobic biological system • M/s Aikon in Rewa Express 68 toilets • -Since 2009-10	Yes
7	Anaerobic toilet system • Since 2011 • MoU between DRDE and IR • GWL-INDB Express (11125/26)/NCR- 67 toilets • LJN-CSTM/ Pushpak Express (12533/34)/NER-58 toilets. • INDB-JAT Malwa Express (12919/20)/WR- 53 toilets. • NZM-INDB Intercity Express ((12415/16)/NR- 60 toilets • CSTM-BSB Mahanagari Express (11093/94)/-58 toilets. • 44 toilets in Chennai-Guwahti express • 51 toilets in Bundelkhand Express	Yes

Benefits & Bacteria Used in Green Toilet

- Environment friendly.
- Preventing damages to tracks due to corrosion.
- Improved aesthetics at Railway Stations.
- **Bacteria used for Bio Toilets**
- **Anaerobic bacteria :** RCF is procuring to spec no MDTS 223. Bacteria is charged in tank 120 ltrs per tank , except SLR guard lavatory, Being a small tank , it is charged with 30 ltrs only.

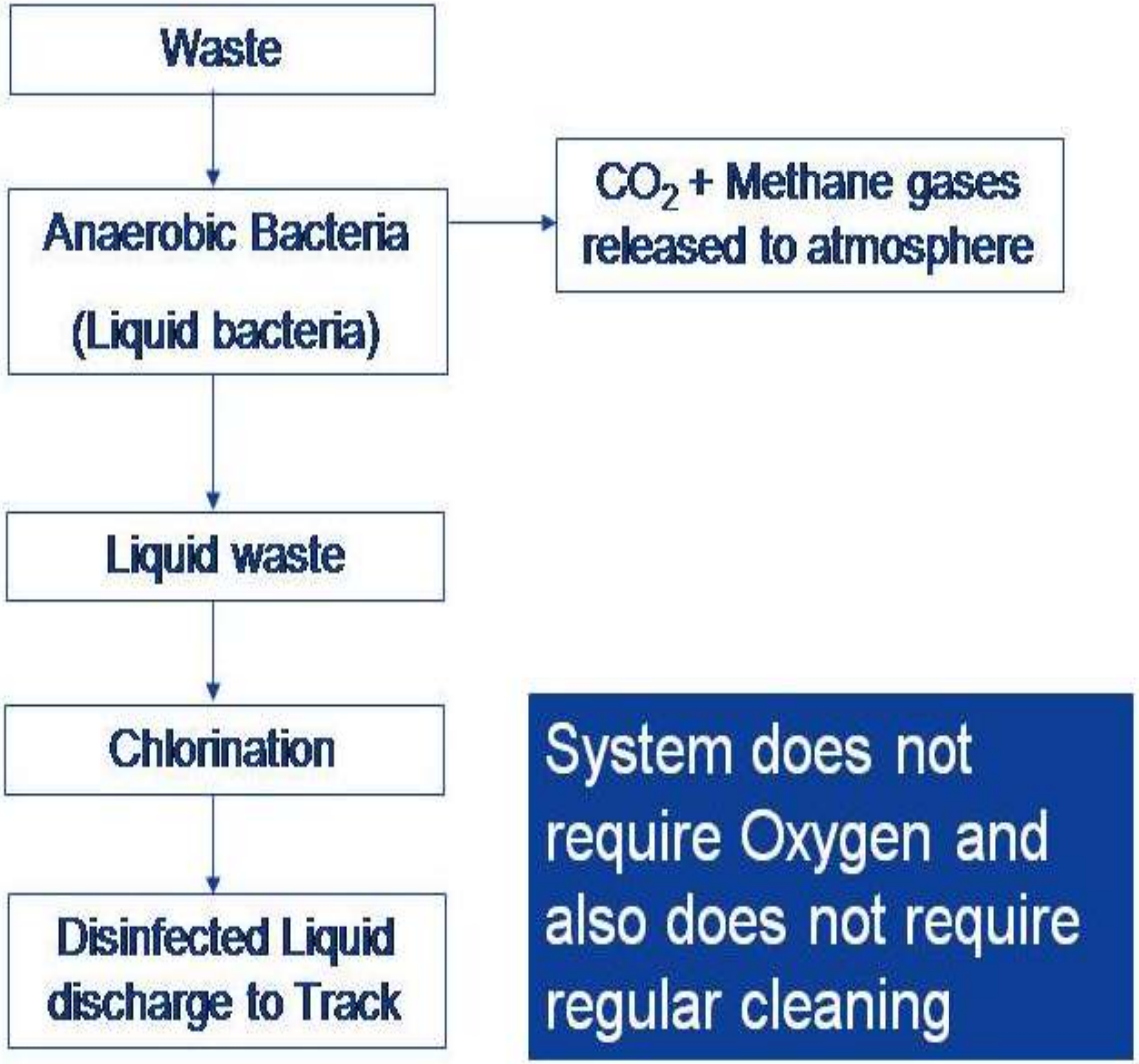
Characteristic of bacteria :

- Can process doubling its population within 6 to 8 hrs.
- Dominates and de-compose matter into liquid and gases.
- Can be kept for 3-4 months at ambient temperature in bio digester tank.
- Can withstand sub zero temperature as well as up to 60 degree centigrade.
- Cold temperature would not affect the inside processing because Anaerobic process is exothermic in nature & thus in cold regions, heat will be available inside the chamber because of chemical process.

Advantages of Bio-Digester &

- No bad smell in toilets from the tanks.
- No infestation of Cockroaches & flies.
- Fecal matter in the tank not visible.
- No clogging of digester.
- Effluent is free from off odour and solid waste.
- No maintenance required.
- Reduction in organic matter by 90%.
- No requirement of adding bacteria/ enzyme.
- No need of removal of solid waste.

Working of Anaerobic System



System does not require Oxygen and also does not require regular cleaning

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