

Environment Friendly Green Toilets on Indian Railways Passenger Coaches

Toilets currently used on Passenger Coaches of Indian Railways are of flush type, in which human waste is discharged directly on the tracks. This makes the ecosystem unhygienic, besides resulting in corrosion of track fittings. To overcome this problem, IR is carrying out field trials with various types of Environment Friendly Green Toilets. By use of such toilets, we will have no human waste on railway tracks and therefore, cleaner and greener station premises and tracks.

Controlled Discharge Toilet System (CDTS) discharges waste on the run only after the train speed reaches 30 kmph. Discharge takes place away from the station, helping in keeping the stations clean. 5300 CDTS have been installed in 1900 coaches so far.

More than 40000 coaches are used regularly for passenger service over Indian Railways. Toilet systems are one of the most critical passenger amenities, especially in the long distance passenger travel. Keeping this population of the coaches in view, IR has to operate approximately 1,60,000 toilets, round the clock, on coaches moving at speeds of 100Kmph plus, with drastic space constraints and a demanding user profile. Developing suitable technologies for IR's conditions is posing its own problems due to typical operating constraints such as need for universal interoperability of coaches within a type and peculiar toilet habits of users such as excessive use of water and use of toilets as dust bin. The issue of scalability of various technologies selected for implementation also poses challenges.

An action plan involving a multi-pronged strategy for development of green toilets was evolved in Jan' 2010. It included signing of Memorandum of Understanding (MoU) with Defence Research and Development Organisation (DRDO) so that DRDO bio-technologists and Indian Railway's Mechanical Engineers could work together to take care of problems faced during the trials. The technology being developed uses special strains of bacteria to biodegrade human waste into harmless and odourless products.

A Joint Working Group consisting of IR Engineers and DRDO biotechnologists for joint development of technology using DRDE bio-digester for toilet system on coaches of IR was formed in March 2010. Four design variants were jointly developed by IR & DRDO and 43 toilets based on three design variants were introduced in service in Gwalior-Varanasi Bundhelkhand Express on 18th January, 2011. Further, 14 toilets in 8 coaches based on the fourth design option have been inducted in service in the beginning of August'2011. Integral Coach Factory (ICF) has also developed designs and prototype rake is being turned out in September, 2011 for service in Guwahati- Chennai Egmore Express. Five more rakes will be turned out by RCF Kapurthala by March'2012. IR is targeting

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a total of more than 500 green toilets in service by March'2012. 43 IR-DRDO prototype biotoilets have completed eight months of service. Their performance has been reviewed by the joint working group and based on encouraging results, induction of about 2500 more biotoilets has been recommended.

Several other efforts are also in hand in parallel. One such effort is development of a prototype train rake based on Zero Discharge Toilet System (ZDTS) developed by IIT/Kanpur and Research Development and Standards Organisation (RDSO)/Lucknow. Another effort is provision of vacuum toilets in two rakes of Shatabdi express. ZDTS uses both recycling and evacuation & is at the second stage of prototyping. Vacuum toilet technology is a standard in developed railway systems. These technologies are more expensive due to inherent complexities and requirement of extra infrastructure at the terminals. Their deployment is envisaged in premium trains only. The benefit of retention-evacuation technologies is that no discharge is made on tracks at all.

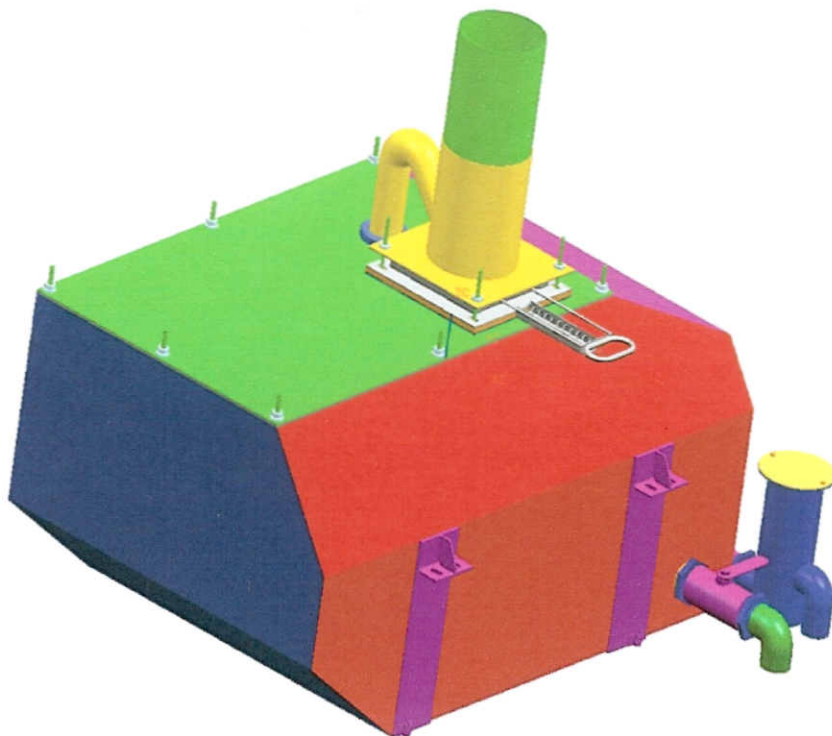
Indian Railways is also setting up a unit of Environment Friendly toilets technology at Motibagh workshop at Nagpur in SEC Railways. As far as IR-DRDO bio-toilets efforts are concerned, various organizations have played critical role in this endeavour. Apart from DRDO Scientists, engineers from various Railways units viz. Rail Coach Factory, RDSO, North Central Railway, Integral Coach Factory, Northern Railway and Indian Railways Centre for Advanced Maintenance Technology have made important contributions and are continuing to do so.

Annexure-1 shows a 3-dimensional model and photograph of a bio-toilet fitted on a coach. Passengers have an important role to play in the success of bio-toilets. It is important that Bio-toilets are not used as garbage bins and waste such as bottles, napkins, poly bags etc. is not thrown in the toilets. In general, toilets are not to be used when train is on the station. These requests are also displayed as notices in the train toilets as shown in Annexure-2.

Indian Railways is striving to achieve the long term objectives of elimination of induction of new coaches with direct discharge toilets by the end of 12th Five Year Plan and covering of all passenger coaches with green toilets in a little over 10 years by the end of 13th Five Year Plan provided no significant setback is experienced during the development & induction process.

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IR-DRDO Bio-toilet tank: Design variant with manual slider valve




Bio-toilet (developed jointly by IR & DRDO) fitted on a coach of Gwalior-Varanasi Bundelkhand Express



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Notices displayed in Bio-toilets



निवेदन
यह बायो टॉयलेट है।

1. कृपया शौचालय में बोटल, नैपकिन, पौलीबेग, कपड़ा इत्यादि न डालें।
2. शौच के बाद कृपया फ्लश को अवश्य चलायें, अन्यथा शौचालय चोक हो जायेगा।
3. चोक होने पर ऊपर लगे तार लूप को खींचें। कृपया इस हरित - अभियान में हमें सहयोग प्रदान करें।

बेहतर रखरखाव के लिए
कृपया बोटल, डायपर, नैपकिन, ब्लेड इत्यादि न फेंकें।
सफाई के लिए
कृपया फिनायल, ब्लीचिंग पाउडर इत्यादि का प्रयोग न करें।

- यात्री कृपया डिब्बों एवम् शौचालयों को साफ रखें।
- गाड़ी जब स्टेशन पर खड़ी हो तो कृपया शौचालयों का उपयोग न करें।
"आपके सहयोग के लिए धन्यवाद"
- PASSENGERS ARE REQUESTED TO KEEP THE COACHES AND TOILETS CLEAN.
- PLEASE DO NOT USE THE TOILETS WHEN THE TRAIN STOPS AT THE STATION.

" THANKS FOR YOUR CO-OPERATION "

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