

## Chapter 2: Induction of bio-toilets in passenger coaches and implementation of Green Stations and Corridors

**Audit Objective 1: Whether IR has been able to adhere to the Action Plan and achieve the targets set for induction of bio-toilets in passenger coaches and implementation of Green Stations and Corridors?**

### 2.1 Decision for induction of bio-toilets in passenger coaches in IR

The JWG comprising of IR Engineers and DRDO bio-technologist for joint development of technology using DRDE bio-digester for toilet system on coaches of IR was formed by the Railway Board in March 2010. The JWG met every quarter, received feedback from the Zonal Railways and deliberated on various issues relating to design, induction, maintenance and upkeep of bio-toilets in passenger coaches.

In January 2011, 43 bio-toilets (three variants) were installed on 23 coaches in the Gwalior-Varanasi Bundelkhand Express on a trial basis. Based on tests/trials on these bio-toilets, JWG in their meeting (April and August 2011) suggested wide scale proliferation of two of the variants<sup>1</sup> on six rakes<sup>2</sup> with different types of coaches. Bio-toilets in these rakes were installed during February to April 2012.

For proper monitoring of the bio-toilets fitted in various coaches, a trial test scheme was issued by RDSO (after various amendments) in April 2013. This scheme was divided mainly into two parts viz. visual inspection and quality check of the effluent discharged from bio-toilets. The scheme required monitoring of trains fitted with bio-toilets for two POH periods i.e. 36 months and consolidated test/trial reports in the prescribed proforma were required to be submitted to RDSO by Zonal Railways on a half yearly basis. Monitoring parameters included inspection of mounting/securing arrangements of bio-digester tanks, leakage in joints and water pipe lines, adequacy of the provisions made for segregation of non-bio degradable items, functionality of flush buttons and levers, problem regarding foul odour, overall cleanliness, notices for users, emergency operations mechanism, performance of ejection system etc. and also quality parameters for effluents.

It was seen that details of feedback of performance of bio-toilets fitted in coaches were not documented/ maintained and reported to RDSO in the prescribed manner by any of the nominated Zonal Railways except NCR.

<sup>1</sup> Variant 2 (manual slider and P-trap) in five rakes and Variant 4 (solid-liquid separator design and with PLC) in one rake

<sup>2</sup>Indore-Gwalior Express, Lucknow-Mumbai Pushpak Express, Jammu Tawi-Indore Malwa Express, Nizamuddin-Indore Intercity Express, Mumbai-Varanasi Mahanagri Express and Guwahati-Chennai Egmore Express, these trains pertained to seven Zonal railways - CR, NR, NCR, NER, NFR, SR and WR

**However, before the test results in respect of these rakes could be analysed, JWG in their 4<sup>th</sup> meeting (November 2011) recommended large scale proliferation of 10,000 bio-toilets to be planned in the near future. Of these, the responsibility of induction of 2,500 bio-toilets each was assigned to ICF and RCF and the remaining were to be retrofitted by the Workshops. Railway Board also communicated (18 November 2011) an Action Plan for induction of IR-DRDO bio-toilets in passenger coaches in IR.**

## 2.2 Action Plan for induction of bio-toilets in passenger coaches

IR has planned to induct bio-toilets in passenger coaches through the following means:

- I. Fitment of bio-toilets in newly manufactured coaches by RCF, Kapurthala, ICF, Perambur, Modern Coach factory (MCF), Raebareli and BEML(a Central PSU, supplier of coaches)
- II. Retrofitment of bio-toilets in in-service passenger coaches during
  - a. Mid-life Rehabilitation<sup>3</sup> (MLR), which is done at three designated workshops in IR viz. Bhopal (WCR), Parel (CR) and Jhansi (NCR).
  - b. POH (POH) of coaches in Carriage Workshops in various Zonal Railways; and
  - c. Regular maintenance of coaches in the Coaching Depots.
  - d. Where bio-toilets have not been fitted in new coaches, but dual mounting arrangement<sup>4</sup> has been done i.e. a bracket has been provided on which bio-toilets can be fitted by Zonal Railways in Workshops, bio-toilets were to be retrofitted by the Zonal Railway Workshops.

Over the years, Railways have taken various steps towards induction of bio-toilets in passenger coaches, to be implemented by PUs and Zonal Railways. Year-wise Action Plan and action taken against the same are tabulated below:

Table 2 - Implementation of Action Plan since 2011-12		
Year	Action plan	Audit findings
2011-12	--	Bio-toilets were provided in 44 and 23 coaches by RCF and ICF respectively.
2012-13	2,500 coaches planned for fitment of bio-toilets 1. Fitment of 2,400 bio-toilets – 1,200 by RCF and 1,200 by ICF in two phases (600 in each phase). Fitment to be made after review of performance in first phase.	1307 bio-toilets in 546 coaches  30 bio-toilets retrofitted

<sup>3</sup> In MLR of coaches, major structural repairs and complete refurbishing of interiors are carried out with better quality material, once they have completed 12 - 15 years in service.

<sup>4</sup> RCF developed a design for dual mounting arrangement on which chute as well as Bio-tank can be mounted without altering the coach. In this design the coach is equipped with bolted chute mounted bracket and welded retention tank mountings. When the bio-toilet is to be fitted, only bolted chute mounting bracket will be required to be removed.

Table 2 - Implementation of Action Plan since 2011-12		
Year	Action plan	Audit findings
	2. Retrofitment of 100 bio-toilets at Bhopal Workshop	
2013-14	<ol style="list-style-type: none"> <li>1. RCF and ICF to turn out all ICF type conventional coaches with bio-toilets.</li> <li>2. All conventional passenger coaches except General Sleeper (GS) coaches are to be turned out with full complement of bio-toilets.</li> <li>3. MLR – All 840 conventional ICF type passenger coaches undergoing MLR</li> <li>4. RCF to expedite the provision of bio-toilets for trials in LHB coaches at war footing.</li> <li>5. Fitment of bio-toilets in 1460 DMA coaches by Workshops</li> </ol>	<ol style="list-style-type: none"> <li>1. Not achieved.</li> <li>2. Not achieved.</li> <li>3. 222 bio-toilets in 77 coaches</li> <li>4. Progress very slow. Fitment of bio-toilets in LHB coaches gained momentum in 2016-17.</li> <li>5. 432 bio-toilets in 120 coaches</li> </ol>
2014-15	Target –to induct 10,500 bio-toilets (say 2625 coaches)	No specific targets for PUs, ZRs and Workshops were given. However, number of bio-toilets inducted were: PUs: 1731 (coaches where full complement of bio-toilets fitted) 852 (coaches fitted with bio-toilets partially) Retrofitment in ZRs: 2,456 bio-toilets
2015-16	<p>Target –to induct 17,000 bio-toilets All coaches to be turned out with bio-toilets</p> <p>Retrofitment in ZRs: 12,308 bio-toilets</p>	<p>Number of bio-toilets inducted: PUs: 2517 out of 3344 coaches turned out were fitted with full complement of bio-toilets, 130 coaches partly and 697 with no bio-toilets.</p> <p>Retrofitment in ZRs: 7,083 bio-toilets</p>
2016-17	<p>Target –to induct 30,000 bio-toilets PUs: 10,000 (2,500 coaches) Retrofitment in ZRs: 20,000 bio-toilets</p>	<p>Number of bio-toilets inducted: PUs: 13,776 bio-toilets (3,439 coaches) Retrofitment in ZRs: 22,198 bio-toilets</p>

Railway Board while conveying (January 2015) the targets for fitment of bio-toilets in coaches during 2015-16 instructed all Zonal Railways to furnish an achievable 'Action Plan' for the year 2015-16. Railway Board further instructed (April 2016) all Zonal Railways to give the detailed action plan for retrofitment of bio-toilets for the year 2016-17.

***It was observed that none of the Zonal Railways prepared a specific documented Action Plan including significant elements such as identification of action to be taken, milestones, scheduled date of completion, monitoring responsibilities etc. taking into account crucial aspects such as number of trains/coaches/toilets in each coach.***

During Exit conference, Ministry stated (July 2017) that the main reasons for shortfall in targets was non-supply/delayed supply of bio-tanks by the vendors.

### 2.3 Fitment of bio-toilets in new coaches by PUs

There are three PUs manufacturing new passenger coaches in IR viz. ICF, Perambur, RCF, Kapurthala and MCF, Rae Bareli. Railway Board instructed (March 2013 and April 2013) RCF, Kapurthala and ICF, Perambur that all conventional ICF design coaches (except General Sleeper (GS) coaches) being turned out by PUs should invariably be fitted with full complement of four bio-toilets before turning them out. All GS coaches were to be provided with two bio-toilets only fitted diagonally, till the new improved suspension arrangement for GS coaches was approved and cleared for fitment of four bio-toilets. ICF started fitment of four bio-tanks in GS coaches from August 2014 and RCF from November 2014. In January 2015, Railway Board instructed all the three PUs to eliminate provision of direct discharge toilets in new coaches by end of 2016-17.

Audit examined the status of provision of bio-toilets in passenger coaches manufactured in these three PUs. It was seen that during 2010-11 to 2013-14, 2,953 coaches were turned out with 6,991 bio-toilets (either full or part complement) by RCF and ICF. In addition, BEML supplied 601 coaches fitted with 2,398 bio-toilets during 2013-15.

Induction of bio-toilets in newly built coaches by RCF, ICF and MCF during the period of review is given below:

<b>Table 3 - Fitment of bio-toilets in new coaches manufactured by PUs</b>					
<i>Year</i>	<i>Production Unit</i>	<i>Number of coaches turned out</i>	<i>Number of coaches turned out with bio-toilets</i>	<i>Number of coaches turned out with bio-toilets partly</i>	<i>Number of coaches turned out without bio-toilets</i>
<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	<i>E</i>	<i>F</i>
<b>2014-15</b>	RCF, Kapurthala	1449	482	575	392
	ICF, Perambur	1629	1237	277	115
	MCF, Raebareli	140	12	0	128
	<b>Total</b>	<b>3218</b>	<b>1731</b>	<b>852</b>	<b>635</b>
<b>2015-16</b>	RCF, Kapurthala	1506	1123	58	325
	ICF, Perambur	1553	1253	72	228
	MCF, Raebareli	285	141	0	144
	<b>Total</b>	<b>3344</b>	<b>2517</b>	<b>130</b>	<b>697</b>

Table 3 - Fitment of bio-toilets in new coaches manufactured by PUs					
Year	Production Unit	Number of coaches turned out	Number of coaches turned out with bio-toilets	Number of coaches turned out with bio-toilets partly	Number of coaches turned out without bio-toilets
A	B	C	D	E	F
<b>2016-17</b>	RCF, Kapurthala	1411 <sup>5</sup>	1322	0	89
	ICF, Perambur	1679	1595	0	84
	MCF, Raebareli	558	522	0	36
	<b>Total</b>	<b>3648</b>	<b>3439</b>	<b>0</b>	<b>209</b>
<b>Grant total</b>		<b>10210</b>	<b>7687</b>	<b>982</b>	<b>1541</b>

As can be seen that during 2014-15 to 2016-17,

- Out of 10,210 coaches turned out by three PUs, full complement of bio-toilets was provided only in 7,687 coaches (75.28 per cent).
- In 982 coaches, all the four toilets were not fitted with bio-toilets.
- 1,541 coaches were turned out without bio-toilets. However, the number of coaches turned out without bio-toilets came down to 209 in 2016-17, as against 635 and 697 during 2014-15 and 2015-16 respectively.
- Of the 1,541 coaches turned out without bio-toilets, in 489<sup>6</sup> coaches provision for Dual Mounting Arrangement (DMA) was made. Zonal Railways were required to fit bio-toilets on the same in Workshops/Coaching Depots, but bio-toilets were not fitted.

It was further observed that

- In ICF, Perambur, bio-toilets were provided in all SLR and DSLR coaches turned out except in Guard cabins as the design of bio-toilets for Guard cabins was approved only in June 2015. Bio-toilets were not provided in Guards cabin of 170 and 72 SLR and DSLR coaches during 2014-15 and 2015-16 respectively. However, in 2016-17 all 101 SLRD coaches manufactured were fitted with bio-toilets in Guard cabin also.
- The design of bio-toilets for MEMU/DEMU coaches was approved in October 2015. However, out of 150 and 90 such coaches manufactured in ICF, Perambur during 2015-16 and 2016-17, bio-toilets were not provided in 89 and 42 coaches respectively. Overall 312 DEMU/MEMU coaches were received by Zonal Railways during the period of review, of which only 103 were fitted with bio-toilets.

<sup>5</sup> 80 coaches to be supplied to Bangladesh Railways excluded

<sup>6</sup> Up to September 2016

- Delay in finalization of design of bio-toilets for different type of coaches, non-materialization of supply orders for bio-tanks as well as decision to exhaust the stock of CDTS toilets already procured earlier were the reasons for non- fitment of bio-toilets in coaches manufactured by ICF, Perambur during the review period.

The design of bio-toilets for LHB coaches was approved by RDSO in 2012-13. RCF, Kapurthala was instructed by Railway Board (March 2013) to expedite the provision of bio-toilets for trials in LHB coaches on war-footing so as to eliminate direct discharge toilet system in new coaches at the earliest. Railway Board directed (14 January 2015) that bulk fitment of bio-toilets in LHB coaches was must to achieve the target set for 2015-16 and a step ahead towards the target of 2016-17. Railway Board directed all the three PUs to speed up fitment of bio-toilets in LHB coaches after resolving issues/problems faced by the Zonal Railways during in-service trials. The position of fitment of bio-toilets in LHB coaches was as follows:

Table 4 - Fitment of bio-toilets in new LHB coaches manufactured by PUs				
Year	Production Unit	Number of coaches turned out	Number of coaches turned out	
			with bio-toilets	without bio-toilets
A	B	C	D	E
2014-15	RCF, Kapurthala	349	30	319
	ICF, Perambur	65	1	64
	MCF, Raebareli	140	12	128
	<b>Total</b>	<b>554</b>	<b>43</b>	<b>511</b>
2015-16	RCF, Kapurthala	469	187	282
	ICF, Perambur	230	92	138
	MCF, Raebareli	285	141	144
	<b>Total</b>	<b>984</b>	<b>420</b>	<b>564</b>
2016-17	RCF, Kapurthala	457	398	59
	ICF, Perambur	400	400	0
	MCF, Raebareli	558	522	36
	<b>Total</b>	<b>1415</b>	<b>1320</b>	<b>95</b>
<b>Grand Total</b>		<b>2953</b>	<b>1783</b>	<b>1170</b>

As can be seen, 92 per cent of LHB coaches were turned out without bio-toilets in 2014-15, 57 per cent in 2015-16, while in 2016-17 only 6.7 per cent LHB coaches were turned out without bio- toilets.

**Thus, against a target of turning out 100 per cent passenger coaches with bio-toilets, three PUs in IR turned out 5.7 per cent coaches without bio-toilets in 2016-17. 6.7 per cent LHB coaches were also turned out without bio-toilets in 2016-17.**

During Exit conference Ministry stated (July 2017) that considering their earning potential, priority was given to the situation that the coaches are not kept idle just for want of fitment of bio-tanks due to short supply by the vendors. They stated that, in such cases it was ensured that coaches were turned out with Dual Mounting Arrangements so that bio-tanks could be easily retrofitted by Zonal Railways.

#### 2.4 Retro fitment of bio-toilets in existing coaches

Railway Board issued instructions from time to time (August 2012, November 2012, August 2014 and April 2015) to accelerate the process of retrofitting bio-toilets. Retrofitment of bio-toilets in existing coaches is to be done at various stages, during MLR of coaches in MLR workshops at Bhopal, Jhansi and Parel, during POH of coaches in 27 POH Workshops and in various Coaching Depots during maintenance of coaches. Looking to the slow pace of work by Zonal Railways (only 33.52 per cent), till the end of September 2015, Railway Board directed (December 2015) all Zonal Railways to put in earnest efforts to ensure achievement of target and even one bio-toilets less than the target would not be acceptable.

As on 1 April 2016, there are 54,506 passenger coaches in service in IR. Railway Board fixed a target for induction of 17,000 bio-toilets in coaches during 2015-16 and 30,000 bio-toilets during 2016-17. Audit examined the status of retrofitment of bio-toilets in passenger coaches by Zonal Railways as per target assigned by Railway Board during the past three years as detailed below:

Table 5 - Zonal Railway wise targets and achievement for retrofitment of bio-toilets during the review period							
Zonal Railway	2014-15		2015-16		2016-17		
	Target by RB	Achievement	Target by RB	Achievement	Target monitored by PMO	Internal targets by RB	Achievement
A	B	C	D	E	F	G	H
CR	no target	632	1412	1028	2000	4300	2222
ER	no target	210	352	193	1200	3300	1287
ECoR	no target	528	620	509	850	2450	968
ECR	no target	0	324	88	1200	3250	396
NCR	no target	34	268	84	500	1150	252
NFR	no target	0	396	71	850	2350	841
NWR	no target	119	560	165	850	2350	777
NER	no target	137	412	501	800	2200	1542
NR	no target	0	800	848	1800	5050	1048
SR	no target	0	1376	605	1950	5750	3189
SECR	no target	0	244	258	400	1000	336
SCR	no target	74	776	304	1400	3900	2122

Table 5 - Zonal Railway wise targets and achievement for retrofitment of bio-toilets during the review period							
		2014-15		2015-16		2016-17	
Zonal Railway	Target by RB	Achievement	Target by RB	Achievement	Target monitored by PMO	Internal targets by RB	Achievement
A	B	C	D	E	F	G	H
SER	no target	0	568	24	1050	3050	589
SWR	no target	172	232	242	850	2350	1829
WCR	no target	356	3188	2091	2850	3600	3977
WR	no target	194	780	72	1450	3950	823
<b>Total</b>	<b>no target</b>	<b>2456</b>	<b>12308</b>	<b>7083</b>	<b>20000</b>	<b>50000</b>	<b>22198</b>

It was observed that

- Railway Board had not fixed any specific Zone wise target for retrofitment of bio-toilets in 2014-15 despite allotting funds for this purpose. 2456 bio-toilets were fitted in 762 coaches during the year. The retrofitment was nil for ECR, NFR, NR, SR, SECR and SER. Against allotment of ₹ 50.58 crore, only ₹ 17.05 crore was utilized for induction of bio-toilets on all Zonal Railways (in respect of SR, the information was not made available).
- A target of retrofitment of 12308 bio-toilets for the year 2015-16 was fixed by Railway Board in April 2015. Against this, 7083 bio-toilets (57.54 per cent) were retrofitted by various Zonal Railways.
- For the year 2016-17, MR announced a target of induction of 30,000 bio-toilets. Of this, 20,000 bio-toilets were to be inducted through retrofitment. Railway Board fixed an internal target of induction of 60,000 bio-toilets during 2016-17, of which target for retrofitment was 50,000.
- As against the target of 20,000 bio-toilets and internal target of 50,000 bio-toilets, various Zonal Railways could achieve induction of 22,198 bio-toilets through retrofitment. While CR, ER, ECoR, NER, SR, SCR, SWR and WCR surpassed the targets fixed and monitored by PMO, there was a shortfall of 01 to 67 per cent in achievement of targets by other Zonal Railways. The shortfall was more than 30 per cent in ECR (67 per cent), NCR (49 per cent), NR (42 per cent), SER (44 per cent) and WR (43 per cent).
- Delay/non-supply and non-availability/shortage of bio-tanks, etc. were the main reasons for non-achievement of target for fitment of bio-toilets.

Regarding shortfall in retrofitment of existing coaches against the internal targets of Railway Board of 50000 for the year 2016-17, Ministry during Exit Conference stated (July 2017) that the fixing of targets on higher side was to



build pressure on Zonal Railways and to accelerate the pace of fitment of bio-toilets.

About the targets for induction of bio-toilets for the next few years, Ministry stated that targets for the next three years were 40,000 (2017-18), 60,000 (2018-19) and 30,000 (2019). It was also stated that the coaches completing their codal life and likely to be condemned by 2019 were not planned for retrofitment of bio-toilets.

Details of allotment vis-à-vis utilization of fund for retro fitment of bio-toilets over IR for the period 2014-15, 2015-16 and 2016-17 was as under:

Table 6 - Year wise funds allotted and utilised for fitment/retro fitment of bio-toilets (₹ in crore)			
Year	Funds allotted	Fund utilized	% Underutilization
A	B	C	D
2014-15	50.58	17.05	66.29
2015-16	94.30	66.65	29.32
2016-17	221.11	108.65	50.86

While funds were made available for induction of Bio-toilets during the above period, the same could not be spent and there were savings of 29 to 66 per cent.

Zonal Railway wise review of allotment and utilisation of funds (**Annexure 2**) revealed that:

- Funds allotted were fully utilized by ER only during 2014-15 to 2016-17.
- Nine Zonal Railways (CR, NR, NCR, NER, NFR, NWR, SER, SWR and WR) had not utilized funds allotted to them and variation was more than 10 per cent.
- The main reasons for non-utilization of funds during the relevant years were non availability/ non- procurement of bio-tanks and other related accessories required for fitment/retrofitment of bio-toilets.
- In WR, out of ₹ 8 crore allotted during 2015-16, only ₹ 0.85 crore (10.62 per cent) was utilized and the balance amount of ₹ 7.15 crore (89.38 per cent) was surrendered. ECR utilised only ₹ 0.69 crore (17.35 per cent) out of ₹ 4 crore allotted to them in 2015-16.
- In SER, an amount of ₹ 3.99 crore (19 per cent) only was utilised for fitment of bio-toilets, out of allotted funds of ₹ 20.91 crore during the period from 2014-15 to 2016-17.

**Thus, the percentage utilistaion of funds allotted for retrofitment of bio-toilets remained between 33 per cent and 71 per cent during the past three years. Zonal Railways did not utilise funds allotted to them and could not achieve the targets set by Railway Board for retrofitment of bio-toilets.**

Ministry agreed that most of the Zonal Railways could not utilise funds allotted for bio-toilets, due to non-supply/delay in supply of bio-tanks by vendors.

#### 2.4.1 Retrofitment of bio-toilets during Mid-Life Rehabilitation (MLR)

Three workshops namely Parel, CR, Jhansi, NCR and Bhopal, WCR undertake MLR of coaches. Railway Board from time to time (October 2012, March 2013 and April 2015) directed concerned Zonal Railways to accelerate retro fitment of bio-toilets during MLR by inducting bio-toilets in all eligible coaches<sup>7</sup> undergoing MLR in the Workshops. The number of coaches and bio-toilets retrofitted during MLR in the last three years was as follows:

Table 7 - Retrofitment of bio-toilets in coaches during MLR								
Year	Mid- life rehabilitation (MLR) workshops	Number of coaches targeted for fitment of bio-toilets during MLR	Actual number of coaches which underwent MLR	Number of coaches fitted with bio-toilets	Number of bio-toilets fitted	Number of coaches fitted with bio-toilets		Number of coaches not provided with any bio-toilets
A	B	C	D	E	F	With full complement	Partly	I
2014-15	Parel (CR)	No targets	113	36	72	0	36	77
	Jhansi (NCR)	No targets	0	0	0	0	0	0
	Bhopal (WCR)	No targets	579	96	356	82	14	483
	<b>Total</b>	<b>0</b>	<b>692</b>	<b>132</b>	<b>428</b>	<b>82</b>	<b>50</b>	<b>560</b>
2015-16	Parel (CR)	202	127	41	111	15	26	86
	Jhansi (NCR)	40	12	10	40	10	0	2
	Bhopal (WCR)	692	587	448	1673	407	41	139
	<b>Total</b>	<b>934</b>	<b>726</b>	<b>499</b>	<b>1824</b>	<b>432</b>	<b>67</b>	<b>227</b>
2016-17	Parel (CR)	192	145	124	442	111	13	21
	Jhansi (NCR)	39	39	38	147	37	1	1
	Bhopal (WCR)	642	650	614	2249	553	61	36
	<b>Total</b>	<b>873</b>	<b>834</b>	<b>776</b>	<b>2838</b>	<b>701</b>	<b>75</b>	<b>58</b>
<b>Grand total</b>		<b>1807</b>	<b>2252</b>	<b>1407</b>	<b>5090</b>	<b>1215</b>	<b>192</b>	<b>845</b>

Railway Board fixed targets for fitment of bio-toilets during MLR in April 2015 and April 2016 for the years 2015-16 and 2016-17 respectively. No targets were fixed for the year 2014-15. It was observed that

- During the period of review, 2,252 coaches underwent MLR in the three MLR Workshops at Parel, Jhansi and Bhopal. Of these, only 1,407 coaches (62.47 per cent) were fitted with bio-toilets including 1,215 with full complement and 192 were partly fitted with bio-toilets.
- In Bhopal Workshop of WCR, out of 1816 coaches which underwent MLR during the period of review, 658 coaches (36.23 per cent) were not fitted with bio-toilets.

<sup>7</sup>Type of coaches for which clearance for fitting bio-toilets was given by RDSO

- In Parel workshop of CR, out of 385 coaches which underwent MLR during the period of review, in 184 coaches (47.79 per cent), bio-toilets were not fitted.
- In Jhansi Workshop of NCR, (MLR activities started only from 2015-16 onwards) three out of 51 coaches were not fitted with bio-toilets.
- Further, design for bio-tanks to be fitted on ICF/RCF built SLRD coaches were received only in March 2016 and subsequently the same was incorporated in the tender for supply, fitment and commissioning of bio-toilets retention tanks. As a result, in CR only 13 SLRD coaches were fitted with bio-toilets during the review period. In WCR, 186 SLR/DSLRL coaches underwent MLR, of which 114 coaches were turned out without bio-toilets.

***There has been an improvement in number of coaches fitted with bio-toilets during MLR and the percentage of coaches in which bio-toilets were retrofitted during MLR increased from 19 per cent in 2014-15 to 93 per cent in 2016-17. However, non-achievement of targets in 2014-15 and 2015-16 was mainly due to limited availability of bio-tanks.***

#### **2.4.2 Retrofitment of bio-toilets during POH in Carriage Workshops**

For retrofitment of bio-toilets during POH of coaches received in various Carriage Workshops, coaches provided with Dual Mounting Arrangement (DMA) i.e. coaches already provided with mounting brackets by PUs and turned out without bio-tanks were required to be provided with bio-tanks during POH in Zonal Railways. Also coaches in which headstocks of both sides were replaced during POH were to be fitted with bio-toilets. It was estimated that only one to two per cent of the coaches POHed would require replacement of headstock of both sides. Further, partly fitted coaches (coaches initially turned out by PUs with less than four toilets) were also required to be provided with the full complement of bio-toilets during POH.

It was seen that Railway Board fixed targets only in terms of budget allocation and expenditure for the year 2014-15 and an amount of ₹ 40 crore was distributed to Zonal Railways (August 2014). For the year 2015-16, Railway Board (April 2015) fixed Zonal Railway wise targets in terms of coaches fitted with Dual Mounting Arrangement (DMA) and coaches eligible for head stock replacement as 2143 coaches. For 2016-17, targets were fixed (April 2016) in terms of bio-toilets, as 16,800 bio-toilets.

The year-wise targets and achievement for the retrofitment of bio-toilets during POH for 25 Workshops of 14<sup>8</sup> Zonal Railways (**Annexure 3**) were as follows:

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<sup>8</sup> NCR and SECR do not have any Carriage Workshops

Table 8 – Targets and achievement of retrofitment of bio-toilets in Carriage Workshops						
Zonal Railway	Target for 2014-15 (in terms of allotted funds (₹ in crore)/bio-toilets <sup>9</sup> )	Bio-toilets retrofitment by Workshop	Target for 2015-16 (in terms of coaches/bio-toilets <sup>10</sup> )	Bio-toilets retrofitment by Workshop	Target for 2016-17 (in terms of bio-toilets)	Bio-toilets retrofitment by Workshop
A	B	C	D	E	F	G
CR	2.0/80	86	151/604	110	1300	908
ECR	1.0/40	0	81/324	0	1200	260
ECoR	2.0/80	56	155/620	83	850	968
ER	2.5/100	210	88/352	193	1200	893
NCR	1.0/40	No Workshop	27/108	No Workshop	400	No Workshop
NER	2.0/80	87	103/412	246	800	864
NFR	1.5/60	0	99/396	25	850	669
NR	2.5/100	0	200/800	196	1800	859
NWR	3.5/140	89	140/560	135	850	410
SCR	3.5/140	74	194/776	302	1400	2122
SECR	6.0/240	No Workshop	61/244	No Workshop	400	No Workshop
SER	2.0/80	0	142/568	24	1050	383
SR	3.0/120	143	344/1376	407	1950	2043
SWR	2.0/80	172	58/232	242	850	2128*
WCR	2.0/80	0	105/420	0	450	0
WR	3.5/140	194	195/780	72	1450	321
<b>Total</b>	<b>40.0/1600</b>	<b>1111</b>	<b>2143/8572</b>	<b>2035</b>	<b>16800</b>	<b>12828</b>

(\* figure includes retrofitment of 299 bio-toilets in coaches of Central Railway)

It was observed that

- In the year 2014-15, Workshops of five Zonal Railways viz. ECR, NFR, NR, WCR and SER had not done any retrofitment work during POH of coaches. Workshops of two Zonal Railways achieved the targets to the extent of 63.57 per cent (NWR) and 52.86 per cent (SCR) only.
- The overall achievement of 25 Workshops for the year 2015-16 against the target of Zonal Railways was 23.76 per cent only.
  - Workshops of ECR and WCR did not undertake any retrofitment work.
  - Workshops of three Zonal Railways viz. NFR, SER and WR could achieve less than 10 per cent of targets set for them.
  - In Workshops of four Zonal Railways viz. CR, ECoR, NR and NWR the achievement was below 25 per cent of the targets.
- As regards the achievement for the year 2016-17,

<sup>9</sup> The number of bio-toilets have been arrived at by dividing total funds allotted by ₹10 lakh (rate per coach/4 bio-toilets)

<sup>10</sup> Number of bio-toilets arrived at by multiplying number of coaches with four

- Workshops of ECR and WR achieved less than 25 *per cent* of the target set by Railway Board for Zonal Railways.
- Workshops of NR and SER could achieve less than 50 *per cent* of their targets.
- Workshops of SWR, SCR, NER, ECoR and SR achieved more than 100 *per cent* of their target for retrofitment work.
- None of the Workshops of Indian Railway had carried out scheduled maintenance of bio-toilets.
- While reviewing (June 2014) the performance of bio-toilets fitted in passenger coaches, Railway Board instructed (August 2014) all MLR/POH Workshops to put in earnest efforts for retrofitment and ensure that no coach having headstock of both sides replaced was turned out without bio-toilets. However, in eight Zonal Railways (CR, ER, NR, NER, SR, SCR, SER and SWR) 303 coaches were provided with Dual Mounting Arrangement (DMA) at the time of replacement of head stock during POH, but none of these were retro fitted with bio-toilets.

***Thus, in 2016-17, as against a target of 16800 bio-toilets for retrofitment during POH in Carriage Workshops, various Zonal Railways could induct 12828 bio-toilets. Due to delays in procurement of bio-tanks, bio-toilets could not be fitted in coaches as targeted. Non-standardization of design by the Railway Administration also led to non-provision of bio-toilets in coaches as targeted. There is a need to streamline the procurement process to ensure receipt of material on time and achievement of targets set.***

On the issue of POH in the carriage workshop and scheduled maintenance not being carried out by any of the Zonal Railways, Ministry during Exit Conference stated (July 2017) that during the first POH after inductions of bio-toilets, there may not be a need for any maintenance work. Audit however stated that CAMTECH guidelines have specifically prescribed schedule maintenance of bio-tanks during POH and this should be followed. Ministry stated that the guidelines of schedule maintenance of bio-toilets during POH is being revised by CAMTECH in consultation with DRDO.

As regards standardization of design of bio-toilets, Ministry stated that as of now the design S-trap with 100 mm pan dia is standardized, but as and when improved versions would come, the design would undergo changes.

## 2.5 Implementation of Green Train Stations and Green Corridors

The concept of Green Train Stations and Green Corridors was introduced by the Railways to minimize the impact on environmental hygiene through elimination of direct discharge of human waste from toilets in coaches onto tracks and aprons, thereby avoiding corrosion and increase the life of track. As per norms of Green Train Station all the originating, terminating, bypassing and platform return trains should have 100 *per cent* bio-toilet fitted coaches. The tracks on the Green Corridor are to be made free from human waste discharge. Railway Board in its agenda for CME's conference held on 24 and 25 April 2015 had advised Zonal Railways to nominate at least one station as Green Train Station or a section as Green Corridor in their Railway. Further, Zonal Railways were advised to consolidate bio-toilet fitted coaches in Rakes for better monitoring of performance of bio-toilets. All concerned Railways were required to take necessary action to convert /replace coaches having direct discharge toilets with bio-toilets in all trains bound for Green Train Stations/moving in the Green Corridor.

During November 2014 to August 2015, six stations were identified for development as Green Train Stations. Five sections were also nominated for Green Corridors. These are given in the table below:

Zonal Railway	Name of Green Stations notified	Date of notification	Target date of implementation	Name of Green Corridor notified, if any			Actual date of implementation
				From	To	Distance in kms	
1	2	3	4	5	6	7	8
NR	Sri Mata Vaishno Devi, Katra	07/08/2015	30/01/2016	Jammu Tawi	Sri Mata Vaishno Devi, Katra	78	Not yet implemented
SR	Rameswaram	07/08/2015	02/10/2015	Rameswaram	Manamadurai	114	24/07/2016
SCR	Machilipatnam	25/05/2015	Not available	Gudivadam	Machilipatnam	37	Not yet implemented
SWR	Mysuru	24/11/2014					Not yet implemented
WR	Okha	07/08/2015	15/10/2015	Okha	Kanalus	141	19/10/2016
	Porbandar	07/08/2015	02/12/2015	Porbandar	Wansjaliya	34	19/10/2016

It was observed that

- Implementation of the concept of Green Train Station has been initiated only on three stations so far, except Sri Mata Vaishno Devi Katra (NR), Machilipatnam (SCR) and Mysuru (SWR). Though identified for development as Green Train station in 2014-15 and 2015-16, due to lack of adequate number of coaches fitted with bio-toilets serviced, the concept of Green Train Station is yet to take off on these three stations as on 31 March 2017.

- In NR, out of the total 14 pairs of trains originating, terminating, bypassing and platform return trains from Sri Mata Vaishno Devi, Katra, only three trains were fully equipped with bio-toilets while nine trains were partially equipped with bio-toilets and the remaining two trains did not have any bio-toilets fitted. Sri Mata Vaishno Devi, Katra thus, did not fulfill the criteria for Green Train Station.
- In SR, Railway Board proposed to extend Rameswaram to Manamadurai Green corridor up to Tiruchchirappalli covering a total distance of 264 km and action was initiated (October 2016) by SR Administration to ensure that all the trains passing through Tiruchchirappalli-Manamadurai section had coaches fitted with bio-toilets. However, not all originating and terminating trains at Rameswaram Station were those equipped with 100 *per cent* bio-toilets despite the station having been declared as a Green Train Station.
- In SCR, 89 coaches with bio-toilets were to be inducted to run on the Green Corridor as identified in May 2015. Due to change in rake composition/ conversion of rakes with conventional coaches as 'DEMU' as on 31 March 2017, 97 coaches were run on the Green Corridor and out of these, 84 coaches (86.6 *per cent*) were fitted with bio-toilets and remaining 13 coaches (13.4 *per cent*) were run without bio-toilets in the notified Green corridor.

During the joint inspections of the nominated Green Train Stations and Green Corridors, it was observed that

- In NR, Train No. 14033 Jammu Mail jointly inspected on arrival at Sri Mata Vaishno Devi Katra terminating station. Bio-toilets had been provided only in six out of 23 coaches. Nine bio-toilets were found chocked and foul smell was emanating from 14 bio-toilets.
- In SR, Train No.16101 Chennai Egmore-Rameswaram Express was jointly inspected on arrival at Rameswaram station. One coach (Coach No.95106) of this train had conventional toilet, though instructions had been issued by Railway Board that toilets in all coaches of trains dealt with at Green Train Station should be fitted with bio-toilets. Human waste was found on the cement concrete (CC) apron at the station.
- In SCR, bio-toilets were not provided in coaches of all the trains originating and terminating at nominated Green station or passing through the identified Green Corridor 'Machilipatnam-Gudivada-Machilipatnam'.



- In WR, two bio-toilets of Train No. 19573 Jaipur-Okha Express inspected at Okha and 11 bio-toilets in Train No. 19264 Delhi Sarairohila-Porbandar Express inspected at Porbandar were found in bypassed condition. Further, 12 bio-toilets in Jaipur-Okha Express and six bio-toilets in Delhi Sarai Rohila-Porbandar Express inspected at Okha and Porbandar respectively were found choked. Dustbins were not available in 39 bio-toilets of Jaipur-Okha Express at Okha, whereas, in Delhi Sarairohila-Porbandar Express dustbins were not available in 34 bio-toilets. Stickers were found pasted in all the coaches in the train inspected at Okha except 12 bio-toilets, whereas in train inspected at Porbandar, stickers were found torn and illegible in 20 bio-toilets. In WR, at Okha station, during joint inspection, coach No.14443GS of Train No.15636 Guwahati-Okha Dwarka Express was found being run without full complement of bio-toilets. At Porbandar station coach No.920040, 920058 and 940082 of Train No.19216 Porbandar to Mumbai Central, Saurashtra Express were found being run only with conventional toilets. Further, several bio-toilets in trains remained in bypassed position without being set right for repeated trips on the Green Corridor.

***Thus, the nominated stations and corridors did not adhere to the necessary conditions laid down for Green Train Stations and Green Corridors.***

During Exit Conference Ministry stated (July 2017) that Zonal Railways having Terminus stations (last Railway station) were to be identified as Green Train Stations. These have been identified and Zonal Railways are working on the plan. As regards, the issue of non-adherence of 100 *per cent* bio-toilets fitted trains running on Green Corridors, Ministry stated that sometimes due to operational constraints, coaches with conventional toilets are attached in replacement of coaches with bio-toilets marked sick, as per the availability of rolling stock in the concerned Coaching Depot at that time.