

PROJECT REPORT

CONTROL OF RODENT IN AC PASSENGER COACHES



11th AMP - 07/08
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Synopsis :

AC Coaches are favorable breeding ground for rodents where as rodent menace is non existent in Non-AC Coaches. Present system of Rodent Control in the Coaching yards, Station yards and AC coaches is not effective because of the magnitude of the problem. Rodents are easily finding a safe and favorable shelter in AC coaches.

Proposed system focuses on deploying an "Always On" mechanism in AC Coaches which will trap rodents during the stabling of the rake in the yard as well as during the journey.

The system consists of using an inexpensive (Rs 25/= each) Glue Board available Off the Shelf in the market and placing it inside AC coaches in a cordoned off space below the inner berth at the half way of the coach. Rodents get trapped in these Boards and are disposed off along with the Board at the terminal stations.

The system has been tried in SRC with great success and only one incidence of rat in AC coaches has been reported since the system was first deployed in 2005. Though Railway Board directed all Zonal Railways to implement the SRC system, it met with partial success for want of a detailed specification and guideline to implement and operate the system and avoid failures. This project has been conceived to bridge the gap between the local success at SRC and facilitate its implementation in every coaching depots of Indian Railways

Introduction:

Rodents are nuisance to traveling passengers and potential health hazard. Some of the common diseases transmitted by rodents, either directly or indirectly, are Plague, Lassa Fever, Hemorrhagic Fever etc. It is worthwhile to mention that world wide 04 million rats are born everyday and the ratio of rats with human being is 10:1.

In July 2004, many complaints of rodents sighting in AC coaches of SRC coaching Depot were reported which set us thinking about possible ways and means of controlling/eliminating this menace. Conventional system were not effective enough as rodents were omnipresent and could easily sneak into AC coaches from Primary and Secondary Terminals. Therefore to overcome the shortcomings of present system, "On Board Rodent Control System" was developed. The idea was to have an "Always On" system in place which will trap rodent as and when it sneaked into AC Coaches.

Present System :

In the present system coaching yards and station yards are being targeted for rodent control with the help of poison tablets and mechanical traps. Apart from this, Glue Boards are laid in the Primary AC coaches during its Primary Maintenance in the yard. These Boards are removed when the rake is ready for dispatch for passenger service. This system is not effective because of the various maintenance activities going on in the coaching yard, rodents remain hidden in the AC coaches and come out in the night time when the coach is on run and passengers are settled. More over rodents also get inside the coach from secondary coaching Depots and Station yards or wherever the rake is stabled.

Data Collection:

A) Coaching Depot SRC :

AC Coach holding : 150

Since implementation of "On Board Rodent Control" in year 2005, only one Rodent complaint has been received till Nov-08.

B) Coaching Depot PUI :

AC Coach holding : 96

Since implementation of "On Board Rodent Control" from June 2008 following are the performance of PUI

	No of Rats Trapped	No of Passenger Complaints Received
June-08	62	15
Jul-08	65	16
Aug-08	55	12
Sep-08	52	13
Oct-08	43	11
Upto 10 th Nov	12	03

Following the methods prescribed below still better results could be obtained by PUI Depot

C) Tikiapara, Eastern Railway has also successfully implemented the System. Though data is not available their performance is also out-standing.

Proposed System:

In the proposed system, a Glue Board called " TRUBLE GUM" manufactured by

Pest Control of India Pvt Limited,

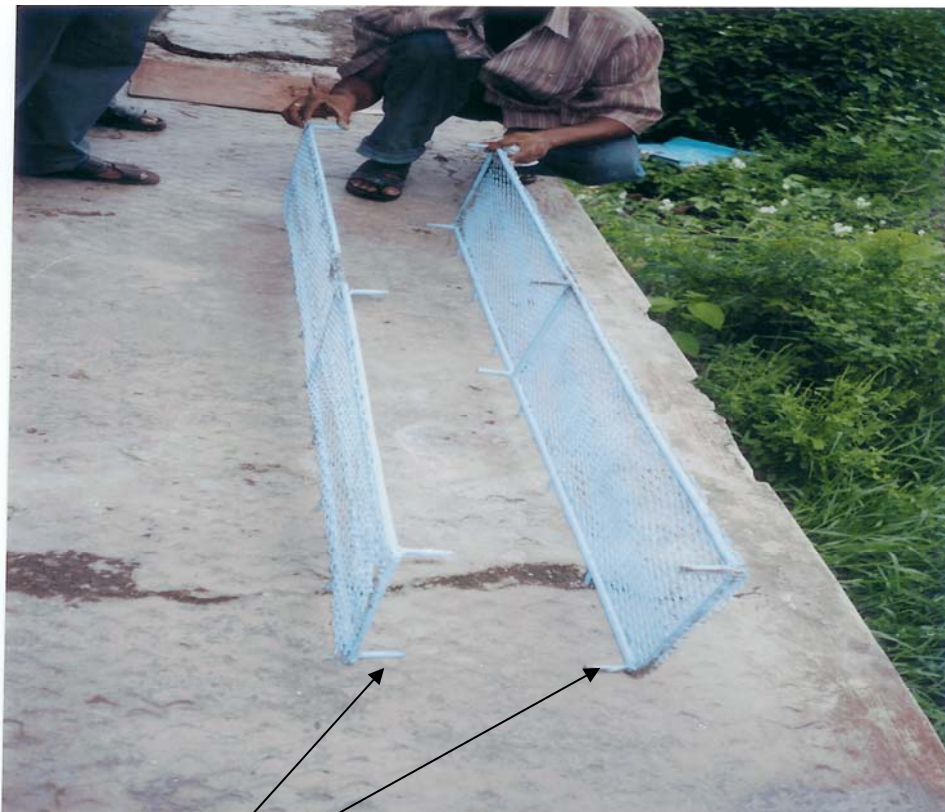
Reg. Office 36, Yusuf Building, M G Road, Mumbai 400001,

www.pcilindia.com

has been used. Photograph of the Glue Board has been pasted on next page.



To use these Boards, a 4 to 5" wide area is cordoned off below the partition walls of berth no 21 and 25 in conventional two tier AC coaches. (Berth nos. are not sacrosanct. Idea is to provide a strip of glue boards ,below one of the inner berths, in the middle along the coach length). A set of 1" square, wire screens of 9" height and six feet long is required for this work as illustrated in the photograph below :-



9" wide and 6 feet long wire screens to be fitted below inner berths at the coach centre

2.5" bars/pins, 4 to 6 mm dia

The screens are welded with 4 mm rods of 2.5" length in horizontal directions (6 rods per screen) and 4 mm rods of 3" to 4" length in vertical direction at

every 6" to 8" interval along the length of the screen. These two screens are fitted below the long berth, one screen from each side of existing partition below the berth. The purpose of providing these two screens is to create an enclosure for laying Glue Boards inside a confined space in such a manner that :

- 1) Passenger luggage do not come in contact with Glue Boards as the glue is very sticky and water proof and creates nuisance if got stuck up with passenger suitcase, footwear, limbs or clothing etc. **Warning :- All the vertical rods must touch the coach floor to ensure this. It has been seen during implementation that some of the rods are not touching the floor and Glue Board slips out of the confined space and get stuck up with the passenger luggage.**
- 2) Rats can freely move over these Glue Boards but can not cross below the berth without crossing these boards.

The final system after fitting the screens and laying Glue Boards inside it, looks like the photograph pasted below :-



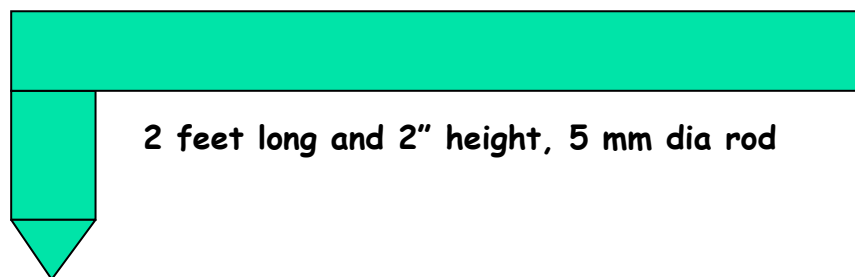
Photograph of final system after fitting the screens and laying Glue Boards inside it

These 4 mm dia bars are provided to create a 3 to 4" gap Between coach floor and wire screen. All bars/pins must Touch coach floor. 6"to 8" interval between two adjacent bars.



A cut model of coach berth showing the location of 'Wire Screen'
Wire Screen

As vertical rods are required to touch the coach floor and there is not much space inside the cage, placing the glue boards inside 'the cage' is a bit tricky. The Boards should be slid from one end and moved inside the cage with the help of a 'L' shape punch as per the drawing given below :-



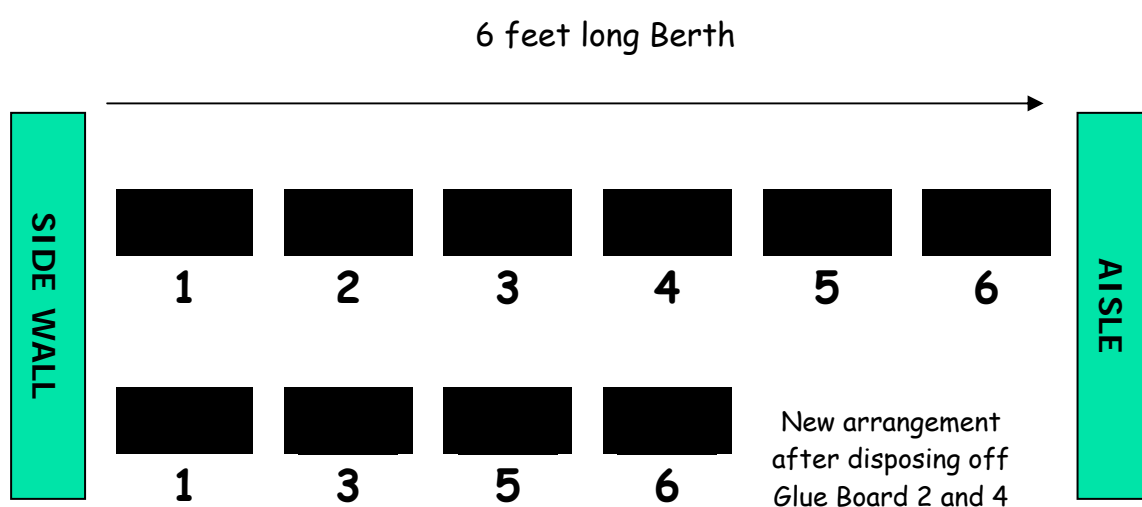
Replacement of Glue Boards :-

1) IF A RAT IS FOUND TRAPPED ON THE GLUE BOARD :

Glue Board is to be disposed off along with the rat as soon as a rat is trapped on it. Glue Boards need to be inspected at Primary as well as Secondary terminal at the end of the journey by the coach attendant. and if any rat is found trapped the Glue Board along with the rat is to be disposed off. However different set of rules apply for replacement of Glue Boards at Primary and Secondary Depots.

a) At Secondary End/Depot :-

At Secondary End/Depot, the remaining Glue Boards are to be placed side by side from the "Side Wall" end and vacant space left due to removal of Glue Board(s) will be moved to the Aisle End. This has been illustrated below:



Note : There should be no gap between adjacent Glue Boards.

If Glue Board No 2 and 4 need to be disposed off due to rat(s) trapped in it, new arrangement of the Boards will be as shown above.

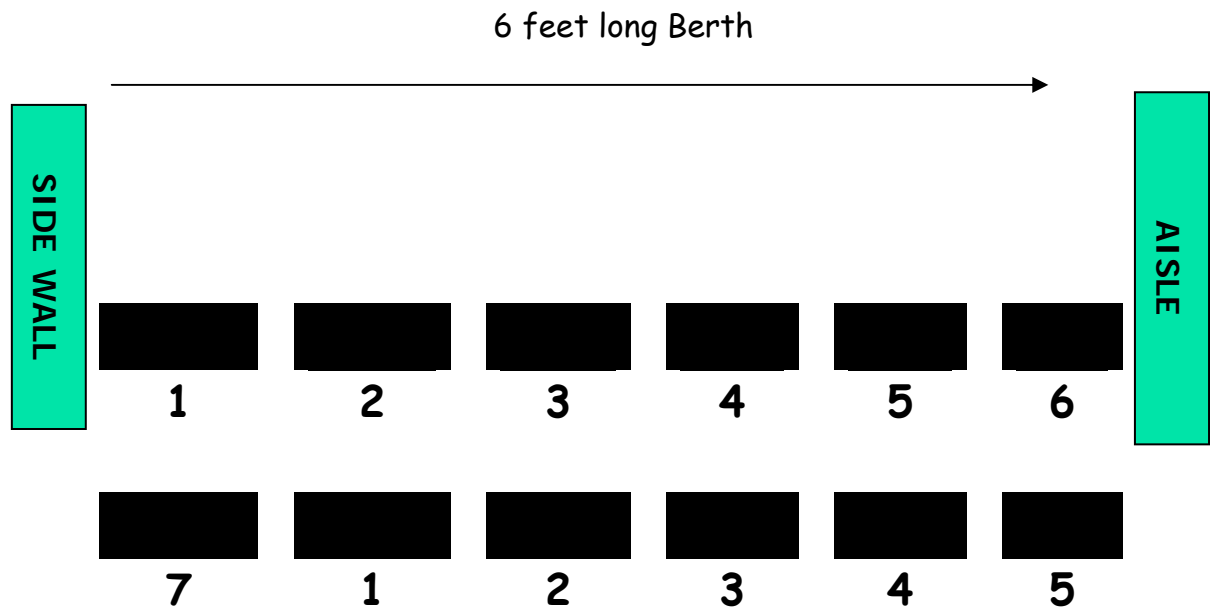
b) At Primary Depot:

At Primary Depot the remaining Glue Boards will be moved on the Aisle Side and fresh Boards will be placed on the Side Wall End ie from Primary Depot the train will start with six Glue Boards in each AC coach.

2) IF NO RAT IS TRAPPED (Only at Primary Depot):

If no rat is found trapped at the end of a round trip or after 24 Hrs whichever is later, one Glue Board from the "Aisle End" is removed and

remaining Glue Boards are slid towards Aisle End to create space for a fresh board to be placed at the Side Wall end. This has been illustrated in the sketch below :



REMOVE BOARD No 6. SLIDE ALL THE REMAINING BOARDS TOWARDS THE AISLE END AND PLACE A FRESH BOARD AT No 7.

Since Glue Boards lose their effectiveness due to formation of dust layer on the glue, one board should be replaced in every round trip. By following the above system all new boards will be on the side wall (inner) end where probability of rodent movement is maximum and oldest board will be at the aisle end where probability of rodent movement is minimum. This will also help in inspection of the system and ensuring that Glue Boards are being replaced in every trip.

Warning : The Glue Boards must be checked by AC Coach attendant at the Secondary End. Since the AC is switched off at the terminal station a rat caught in the Glue Board starts decaying fast and can produce foul smell and severe discomfort to passengers during return trip. Normally a rat does not die within 24 hrs of getting trapped. Very small rats do die within a few hrs.

For First AC and LHB coaches where there is no gap below the partition walls for rats to move from one. In such coaches a separate portable cage with glue boards can be placed below the berth as shown in the photographs below :





Implementation Plans :

The system can be implemented at Primary Coaching Depot, POH shops and at PUs for speedy coverage of all AC coaches. One welder and one fitter is sufficient to retrofit four coaches per day with wire screen. Only precaution is that the vertical rods should be at 6" intervals and all of them must touch the coach floor. If any rod is not touching the ground, one more rod can be welded at its place touching the floor of the coach. 2 mm electrode with Low current to be used to minimize spatter. Adjoining area to be covered before welding to prevent coach damage due to welding. Alternatively nut bolt or any suitable system may also be used to fit wire screen if the final objective of creating a cage which allows rats to move freely but prevents contact of passenger luggage with glue board is fulfilled.

Fixed cost of providing a wire screen per AC coach is approximately Rs. 950/= per coach (Rs 800 for wire screen and Rs 150/= for 6 Glue Boards). Recurring cost of providing the Glue Board is as per actual consumption. Once the rodents are eliminated, one board per coach per day will be consumed for each Primary AC coach dispatched from a Primary Depot on a day.

For SRC Coaching Depot with a primary holding of 150 AC coaches and daily dispatch of 50 AC coaches the cost breakup is :-

A) Fixed Cost : $150 \times \text{Rs. } 950.00 = \text{Rs. } 1,42,500/=$

B) Recurring Cost :

Cost of one Glue Board	Rs. 25/=
Primary AC coaches dispatched per day -	50

Yearly running cost = Rs. 25/= x 50 x 365
= Rs. 4.56 lacs.

Benefits:

The system is capable of ensuring a rodent free travel to comfort sensitive passengers of AC coaches at a nominal cost. The system empowers Primary Maintenance Depots to ensure a rodent free coach despite rodent proliferation in the various coaching yards where its rake is stabled.

Conclusions:

1. The above methodology for controlling rodents in AC coaches is easily implementable in all C&W examination points. This is cost effective as no additional man power is required.
2. The implementation of the scheme would reduce passenger complaints and thereby improve railways image.
3. The system has been effectively tried at SRC coaching Depot and only one complaint has been received in last three years, Railway Board/RDSO may be approached for issuing necessary instructions to implement the scheme for all coaching depots of Indian Railways.