

**CONSTRUCTION OF RCC BOX FOR LIMITED HEIGHT SUB WAY
IN LIEU OF UNMANNED LEVEL CROSSINGS.**

Presented by:

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SYNOPSIS:

There are large numbers of level crossings both manned and unmanned in Indian railways. Some of the level crossings can be closed by construction of limited height sub way, RUB or ROB. This paper deals with construction of limited height sub way by cut & cover method at unmanned LCNo. 95 in Chennai Division, S.Rly

1.0 INTRODUCTION:

On Indian Railways about 30% of consequential train accidents were at level crossings. In terms of causalities it contributes 60%. There are 34800 level crossing in Indian Railways out of which 16600 level crossings only have been manned and about 18200 are still as unmanned LCs. Most of the accidents taking place on unmanned level crossings. There fore U/M LC is most vulnerable. As per corporate safety plan all the unmanned LCs have to be manned.

For the construction of ROB / RUB, the TVU are minimum ONE lakh and the cost is also very high and time consuming. The manning of U/M LC may lead to further increase in maintenance cost. The TVU of most of the U/M LCs are below 6000 and where the road traffic consists of light vehicles. The construction of Limited height sub way is best suited and economic for elimination of U/M LC.

The Railway Board authorized the General Managers to sanction the work of LHS at a cost of Rs. 45 lakhs under plan head 30 “ Road safety fund” and 525 Nos. of U/M LC have been identified for LHS work.

2.0 IDENTIFICATION OF LEVEL CROSSINGS:

The criteria for selection for construction of LHS should be based on the followings.

2.1 Safety consideration – LC located in poor visibility and elimination of LC will increase safety.

2.2 Reduction in Number of LCs- Elimination of level crossing will yield substantial operational benefits.

2.3 Site feasibility

- a) Embankment height is Minimum 3m required.
- b) No water stagnation under bridge area and surrounding water table is low.
- c) Approach road is feasible.

2.4 TVUs: locations where TVU are less but have potential of getting manned.

2.5 Route: Rajdhani and shadabti routes are given priority.

3.0 CONSENT OF STATE GOVERNMENT:

For closer of LC under taking of district authorities is essential duly getting NOC from Thasildar or Gram Panchayat.

4.0 CRS SANCTION:

For closer of LC CRS sanction shall be obtained well in advance. The NOC obtained from concerned District Collector has to be submitted to CRS along with Application.

5.0 SANCTION OF WORK:

General Manager may sanction work of LHS under “safety works of Level Crossings” up to 45 lakhs. Works cost more than Rs. 45 lakhs shall be proposed under Works Programme with full justification.

This LC work was sanctioned vide PB 183 / 2007-08 (for 10 LCs Rs.11.49 Crores).

6.0 SIZE OF BOX:

Internal size of box will depend on the type of vehicles plying on particular level crossing. The dimensions of heavier road vehicles which are likely to ply are as under.

Road vehicle	Width in m	Height in M	Length in m
Lorry	2.56	3.33	7.57
Bus	2.76	3.39	10.6

In view of the above, where lorry and buses are plying minimum 3.66 m height is sufficient. But in villages where tractors are plying with loads of sugar cane even more height of up to 4.5 m may be considered where it is feasible. Width of opening can be kept 4 m to 5 m.

As per Railway Board guide lines the height is 2.5 m to 3.6 m and width is 4 m.

Southern Railway has developed the drawings for pre cast boxes vide Drg. No.

1. CBE / TP/ 237 / 06 for 4.5 M X 3.66 M and
2. CBE / TP / 244 /07 for 4.5 m X4.5 m opening.

6.1 DETAILS OF BOX AND SLABS:

Structure	Inner			Outer			Weight	Concrete Grade
	Width	Height	Length	Width	Height	Length		
Box (18Nos)	4.50 m	3.66 m	1.55 m	5.50 m	5.00 m	1.55 m	40MT	M 30
Slab (16 Nos)				6.00 m	0.25 m	1.50 m	5.60 MT	M 25
Slab (2Nos)				6.00 m	0.25 m	2.30 m	8.60 MT	M 25

Casting completed: January 2010

Erection completed: March 2011.



7.0 SITE DETAILS:

ZONE	: Southern Railway
DIVISION	: Chennai (MAS)
SECTION	: Chennai Central – Gudur Jn.
ROUTE	: Chennai Central – New Delhi, Group “A” – Rajdhani Route
LC NO.	: 95
Km / TP	: 129 / 12-14
TVU	: 2432 DT: 03/2008.
FORMATION HEIGHT	: 5.0 m
LINE	: Down & Up line – 25 kV AC Electrified section
Distance bet. Track	: 15 m

8.0 EXECUTION METHODOLOGY:

The method of construction of LHS depending on the location of LC, bank height and traffic density. Some of them are as under:

1. Placement of pre cast box segments by cut & cover method under traffic block
2. Placement of pre cast box segment after inserting RH girder
3. Box pushing
4. Box pulling
5. In-situ construction of box after inserting RH girder

The LC s where bank height is more than 3 m are identified and grouped together for calling of tender duly deciding the methodology.

The method of “Placement of pre cast box segments after cut open the formation under traffic block” is discussed as under.

9.0 CUT & COVER METHOD:

9.1 Pre Block activities:

1. Impose SR of 20 kmph at the site on which line LHS work is to be taken up (Down line) and 30 kmph on adjacent line (Up line) to ensure safety.

2. Preliminary works like isolation of LWR rails and fish plating the joints, clearing of approach site for easy movement of cranes, etc.

3. Keep the boxes near to the site duly leaving way for poclain machine movement to remove the excavated earth.

4. Arrange and keep the Crawler cranes of 100 T capacities along with one stand by crane. In addition to that 20 T crane was available to keep the base slabs nearby and Poclain 200-2Nos.

5. Ensure the necessary fittings, links, wire rope, wooden blocks are available at site.

6. Ensure adequate ballast is available.

7. Apply for the traffic block of 7 hours along with power block. The breaks up details for traffic block are as below.

a. Removal of track assembly and ballast - $\frac{1}{2}$ hour

b. Earth work excavation – 2 Hours

c. Placing of boxes over slabs of 4 Nos. – 4 Hours

d. Earth filling and track linking – $\frac{1}{2}$ hour

9.2 During Block activities:

1. After getting line block, protect the track with Engineering hand signals and detonators.
2. Remove the fish plates and isolate the track panel.
3. The OHE wire was lowered up to track level and tied away from site.
4. With the help of crane, the track assembly was lifted and kept away from the site.
5. With the use of poclain / JCB the ballast was collected and kept in between the track and adjacent to the site.
6. Now earth work excavation started with two Poclain / JCB.
7. Check up the earth is removed fully up to the proposed depth and required width.
8. The ground was levelled and sand filled of 10cm thickness.
9. The centre line and edge of RCC slab was marked with lime.
10. The RCC slab was lifted and placed using crane at proper position.
11. The RCC box was lifted and placed over the slab duly ensuring the centre line.
12. Similarly other boxes also placed.
13. Then earth filling at the sides of boxes was done duly keeping the gunny bags at the sides.
14. The ballast was spread over the boxes and track assembly was refixed and refixing of OHE was ensured.
15. The track was packed manually, track parameters checked and traffic block was cancelled.



9.3 Post blocks activities:

1. After consolidation of track and proper boxing of ballast, the track was destressed and welded.
2. Similarly the work on other line (Up line) was also carried out.
3. Then the track was restored to normal speed.
4. The finishing works, approach road work and other allied works were carried out.



10.0 CONCLUSION:

The construction of limited height subways is a right step in right direction to eliminate the LCs and increase the safety standards of Railways as well of the road users. The cost Rs ONE crore is very less as compared to full fledged ROB's cost, which will be in the range of 10 to 20 crores. The benefit of subways is fast and immediate.
