

## **FAST TRACK CONSTRUCTION OF ROB**

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### **Accidents at Level Crossings on Indian Railways**

- Level crossings contribute approximately 40% of consequential train accidents.
- In terms of casualties, they contribute more than 70%.
- Most of the accidents take place on unmanned level crossings.
- Therefore unmanned level crossings are most vulnerable.
- These Level crossings are potentially unsafe locations, congestion points for road-rail users and operationally bottlenecks for Railways, causing loss of line capacity by about 5%.

### **Elimination of Level Crossings (CS No.128 of IRPWM dt. 05.03.12 )**

A detail survey of existing manned & U/M LCs should be done with a view to eliminate them by –

- Construction of sub way with adequate drainage arrangement.
- Construction of road along railway boundary to divert the road traffic to nearest LC / bridge
- Closure of low TVUS gates
- Construction of ROB / RUB as per para 925

### **As per budget speech of Hon. MR in 2012**

60 to 70 % of total casualties occur on Un-manned level crossings.

To fast track elimination of level crossings in next five years it is decided to set up -

**“Rail Road Grade Separation Corporation of India”**

### **Criteria for replacement of existing LCs with ROB/RUB IRPWM (Para- 925)**

Census should be **One lakh** per day for replacement with ROB/RUB on cost sharing basis.

Relaxation can be given –

- a) Suburban section having high frequency of train.
- b) Near station where detention to road traffic is very high.

### **ROB is better than RUB/LHS**

- The problem due to water-logging /drainage during rainy season is avoided.
- There is no restriction of height for road vehicles. Vehicles like tractors bullock carts loaded with more height material like sugarcane/grass can go easily.
- Block time very much reduced because no excavation ,safe as no falling earth etc.
- Speed restriction period during the construction work is reduced.

### **Construction of ROB with RCC Boxes and track in the RCC Boxes**

- RCC BOXES FOR A BARREL LENGTH OF 9.0M(6X1.5M) LIKE A TUNNEL
- The RCC box is cast near the worksite.
- After cutting the track, the box is placed in position and the track linking is completed.
- The entire operation is done under traffic and/or OHE block.
- The approaches can be constructed later with Reinforced Earth Retaining Panels.

### **R.C.C BOX SIZE**

- For single line width of 5.3m (As per SOD,  $2.36+2.36 = 4.72\text{m}$  is sufficient but feedback from tunnels experience it is recommended as 5.3m) and a height of 7.0m (6.25m clearance plus track structure of 0.75m)
- It should be designed for the IRC-06 loading



### **Lane width and Gradients on approach**

- 3.5m for lane plus footpath and parapet wall up to 1m width on both sides
- Generally 5% gradient (1 in 20) can be adopted for roads up to class II

### **APPROACHES WITH REINFORCED EARTH RETAINING WALLS**

- Approach road length depends upon the rail level difference with approach road level. If the level difference is 7.5m the approach length shall be 150m.
- Approach road construction with Reinforced Earth Panels with interlocking pre-cast Concrete blocks as used in PVNR Express way.
- Reinforced earth is a construction technology invented in the early 1960s.
- It is a cohesive material of great strength and stability formed by the association of granular soil and reinforcement.
- Through friction, the mechanical properties of soil are improved by reinforcement with steel/Geo-grids, etc.

Types of reinforcing materials used are :-

- (a) Metal strips and rods,
- (b) Geo-textile strips & sheets and grids,
- (c) Wire grids.

These materials are fastened to the facing unit and extended into the backfill for some distance. The Reinforced Earthwork can be completed very quickly (about  $45\text{m}^2$  to  $90\text{m}^2$  per shift including compaction of backfill).

- You can see the facing units used in . Fig 1-4
- The metal rods which were used were fastened to those hexagonal units which are shown in the above picture.
- The purpose of the facing units, is to maintain appearance and also to avoid soil erosion at the face of the earth block between the reinforcements.
- It is assumed that there is no load imposed by retained fill on the rear of facing units.
- The Reinforced earth Steel is a construction material consisting of a frictional backfill material and linear reinforcing strips, usually placed horizontally.
- The reinforcements, which are capable of withstanding high tensile forces, restrain the lateral deformation of the reinforced mass.
- The mechanism of soil-to-reinforcement stress transfer is friction between the soil and reinforcement surfaces.
- M30 grade concrete was used for casting of face panels.
- Filter media used between the face panels has a  $\phi$  value of 35°.
- 2 GI strips from opposite face panels have been used as reinforcement and they are joined at the centre with nuts & bolts.

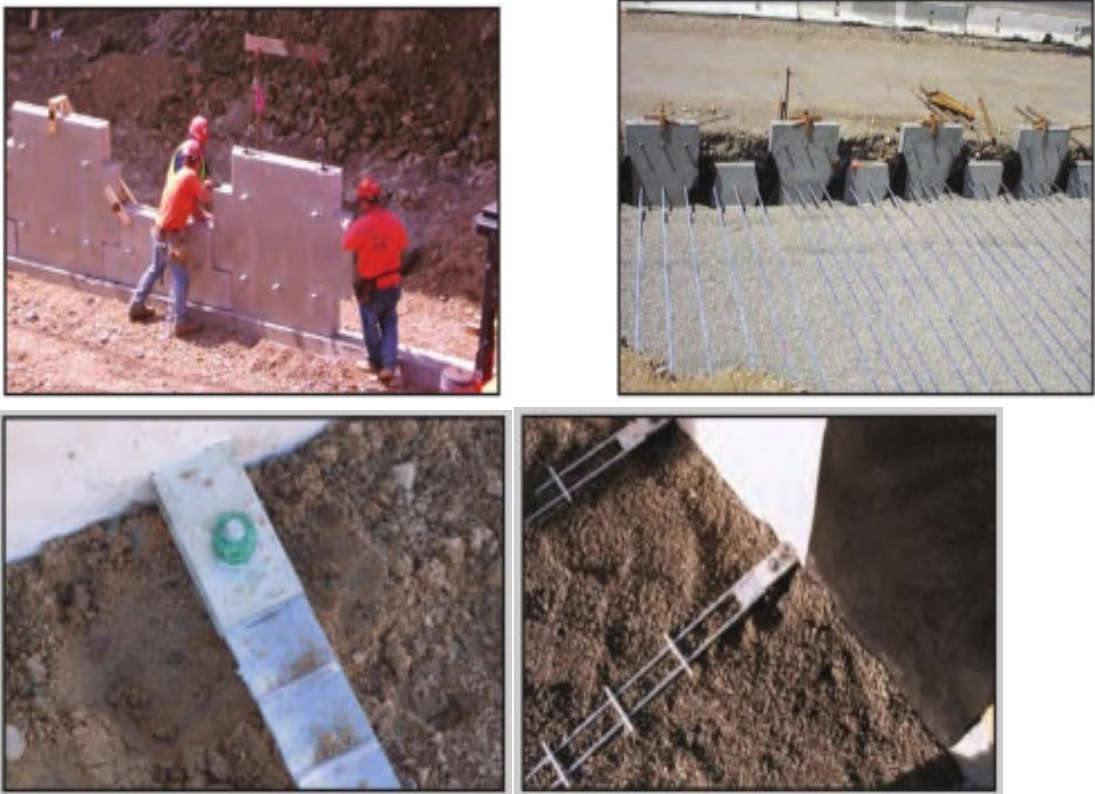


Fig 1-4



## **RECENT INITIATIVES REGARDING CONSTRUCTION OF ROAD OVER/ UNDER BRIDGES ON COST SHARING BASIS:**

Recently, following initiatives have been taken by the Ministry of Railways to encourage construction of Road Over/Under Bridges in lieu of busy level crossings.

i) Sharing of cost for four lane ROB/RUBs • Since Jan 2003, Rly. shares 50% cost of 4 lane ROB/RUB provided minimum TVU of the level crossing is 3 lakhs comprising not less than 6000 road vehicle units. • And, Road Authority agree for the four laning of the approach portion also.

ii) Sharing cost of widening of two lane existing Road Over/Under Bridges • Since Jan 2003, Rly shares 50% cost of widening of existing two lane ROB/RUBs to four lane Road Over/Under Bridges also, provided, that the TVU level is not less than 5 lakh comprising not less than 10,000 road vehicle units. • In addition, an incremental increase of two lakh TVUs comprising 4000 road vehicle units must have taken place since the construction of the two lane Road Over Bridge.

iii) Sharing of cost of Road Over Bridge where State Govt. can raise their share through commercial means. • Since May 2002, Railways share 50% cost of the ROB where State Govt. may raises its 50% share through commercial means like collection of toll or commercial utilization of space under the ROB outside the Railwayland.

iv) Standardization of width of ROB/RUB as per latest MORTH norms • Since Sept. 2002, Railways agreed to share as per the latest norms of MORTH for National Highways ROB width as 9.5 m with two raised curbs of 0.75 m or 7.8m with two foot path each on either side or crash barriers.

### **CONCLUSION**

Recent horrible accidents at level crossing at Mirzapalli, Anantapur are warn us the necessity of earliest elimination of level crossings. LCs at Class II roads can be eliminated with this method of fast track construction of ROB and LCs at class III roads with LHS.

Thank you



