

Pre-Cast RCC Underpass box structure for Railway Track Crossings

**Mr. Vishwasu Gopalraje¹, Mr. Vhawal Tejas², Mr. Kurnawal Ganesh³,
Mr. Dharmadhikari Varad⁴**

¹Civil Engineering, Trinity Academy of Engineering, Pune, India

²Civil Engineering, Trinity Academy of Engineering, Pune, India

³Civil Engineering, Trinity Academy of Engineering, Pune, India

⁴Civil Engineering, Trinity Academy of Engineering, Pune, India

Abstract: The intersection of railway track and the road at the same level is referred to a level crossing. In the urban areas the level crossing are generally monitored by qualified railway personnel who monitor the train movement and close the level crossing gate to stop the interfering road traffic but such closing of gates leads to congestion in road traffic and also causes loss of time to road users. Road under bridge and road over bridge are considered as solutions for avoiding level crossings of roads and railway track. There are 3 main methods in construction of road under bridge. Box pushing method, Cut and cover method, Rolling technique using RH girder. In this we discuss about the implements, soil friction, effects required, capacity of jacks and there uses, skew angles and at square angles.

Keywords: Under Bridge, Level Crossing, Box Pushing Method and RUB etc...

INTRODUCTION

With the increase of railways and roadways, there are bound to be few places where they intersect each other and as these intersects appear we have to provide few crossing between them, traditionally we provide either an overpass or signal crossing in them, the major drawbacks of these techniques are that they require a large amount of time to be constructed and during this time the railway track

METHODOLOGY

• **Box Pushing Method**

Are to be shut down, and as the increasingly busy schedule of the railways its becoming more and more difficult to keep the tracks closed and on the other hand the problem with traffic signals is that they come with a risk factor, signal crossing are prone to accidents, many of human Open excavation is carried out for construction of Thrust bed. The Thrust bed and Thrust Beam and keys are designed in R.C.C. to resist the required Thrust exerted by Jacking force and transfer it to soil at bottom and sides. In cohesive soils even shallow piles are required to transfer the load. Provision for Jacking supports is made by providing suitable Pockets in the bed to accommodate pins supports. On completion of Jacking the thrust bed is utilized as floor bed, and soil is left in place.

Fabrication of Front Shield and Rear Shield

It is fabricated for cutting action and to provide support, to prevent caving in of soil.

It is provided by anchoring steel plates on the face of bottom slab of RCC box to suitably distribute the jacking load.

Box Casting And Pushing

The RCC Box is cast in segments of convenient lengths of Total pushing length. The Box section is designed as per IRS / IRC codes of practice for loading. Concrete grade normally kept as M-35

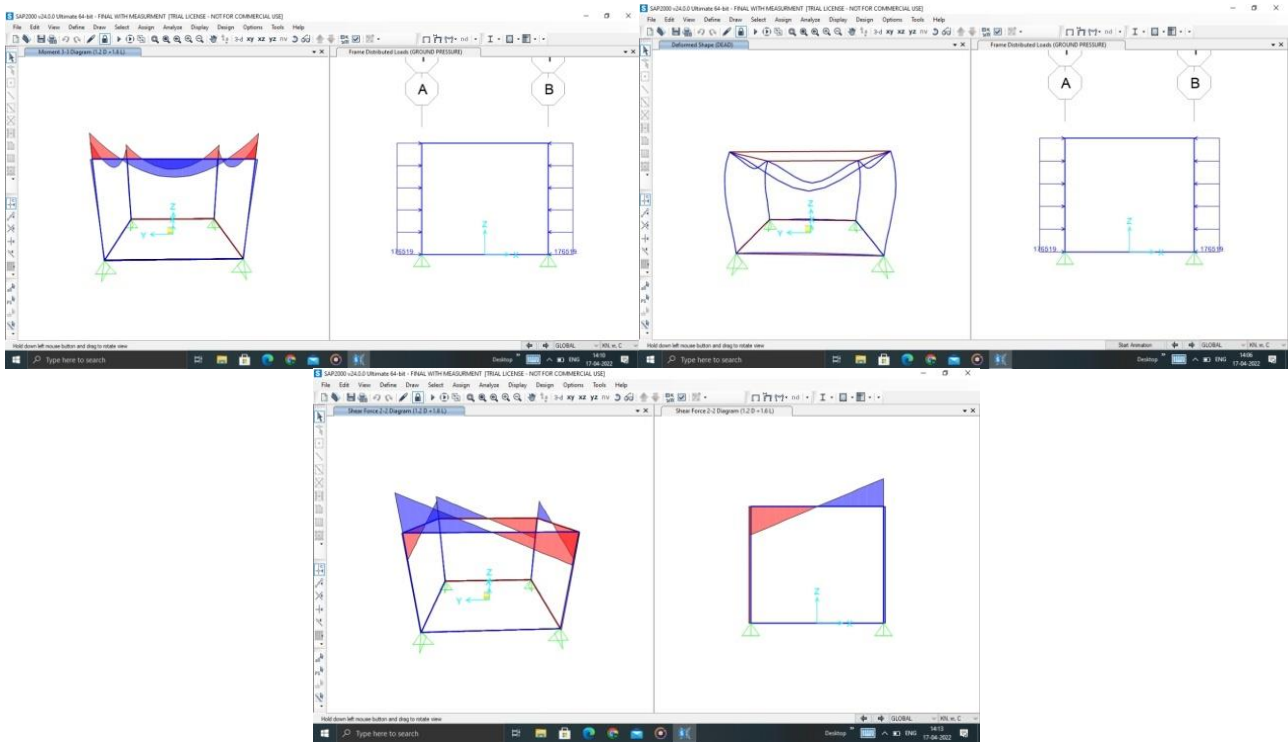
Pushing Operation of the Box

The purpose of pushing of Box is to form a horizontal opening below ground or through embankments, can say a tunnel, by providing precast box units underground or an embankment, without disturbing the overhead amenities, like traffic & structures. To reduce the frictional resistance, a thin film of Grease and thick gauge plastic sheet is provided between the top of the thrust bed & Bottom of the Box. This is done before casting of the Bottom slab of the box. A glossy Epoxy layer is also provided to reduce friction on the top and prevent the disturbance of the mass over box to

least during progress of pushing. Where mass of embankment is less or the soil is of poor quality, drag sheet system is also considered for least resistance of friction and disturbance of mass above box.

Miscellaneous works by hydraulic equipment's

The entire box pushing system is matter of proper selection of hydraulic equipment, as tremendous driving force is required for pushing of medium to large size of Boxes. So for this, number of Jack units are provided in series for distribution of pushing load evenly on the face of the concrete, and all Jacks are operated simultaneously with a common power pack, which supplies uniform flow of pressure through network of hydraulic pipes of required pressure capacity, commencing from front unit to rear unit. Jacking force is applied in sequence.



I. DESIGN

SR. NO.	PARTICULARS	DETAILS
1	Size of the box	7.5 m × 5.15 m
2	Thickness of top slab	0.6 m
3	Thickness of bottom slab	0.6 m
4	Thickness of end vertical walls	0.75 m
5	Effective Height	5.75 m
6	Effective span	8.25 m
7	Support condition	Simply Supported

PRECAUTIONS

Cutting edge of front shield is fabricated with adequate thickness of steel plate and the front edges of the steel plate are sharpened to facilitate penetration into the soil. To prevent caving of earth during excavation quantity of earth shall be removed to barest minimum duly following the slop of cutting edge. Guide channels to be provided in the thrust bed to guide the segments to ensure straight alignment. The level of the boxes should be continuously checked. The Speed limit should be set to 20 km/h at the site of construction. The work should be stopped when a train is passing over the work.



CONCLUSION

- Box pushing work means at least partly working in blind, so problems usually come up during execution of work.
- Box pushing work requires close supervision and monitoring and quite often the unsafe conditions develop at these sites.
- Track must be watched regularly to see signs of heaving, settlement, misalignment etc.
- LWR must be cut and site isolated during box pushing.
- Work must be done under block protection / caution order only.

REFERECNES

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