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# Design and Analysis of Rub by Box Pushing Technology

Lonari Rupali[1], Nilewar Vaishnavi[2], Ashish Gund[3], Khurusane Ruturaj[4], V.C. Patil

[1234]*Student of JSPMS Imperial College of Engineering and Research, Wagholi Pune, India.*
*Assistant Professor, Civil Engineering. JSPMS Imperial College of Engineering and Research, Maharashtra, Pune,*

***Abstract –*** *This project title design and analysis of Road Under Bridge and execution of cross traffic works in railways is carried out by the box pushing technique. Its explains the methodology involved in execution of Box Pushing Technique. In this method pre cast is prepaid by using STAD PRO software and there are two important structures used in this method i.e., thrust bed, pre cast box. Road under bridge and road over bridges are considered as solution for avoiding level crossing of railways and roadways.*
***Key Words:*** *RUB, Box Pushing Technique, STAD PRO, ROB, Design.*

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## I. INTRODUCTION

In railways whenever there is need to make an underpass, either any type of crossing or road under bridges programmed is for widening of railways and roadways etc. box pushing method is used. In this technique work is done without any interruption to railways and roadways traffic and as compare to another method this is conventional method. In India transportation is one of the main objectives in infrastructure. In 1853 the first railway was introduced from Bombay to Thane. In 1951 the Indian railway becoming the largest network in the world. Each zonal railway is made of certain no of div and each having divisional headquarters. A most important pat of railways system is crossing. With the growing urbanization increase the roadways network and the demand of providing road under bridges by eliminating level crossing is on the rise. To construct such opening with least obstruction not only to the train service but also to the public and related to other infrastructure is a challenge to the Railway Engineers.

## II. FUTURE SCOPE OF PROJECT

This is the present need for the future expansion box is cast-insitu as there are no tracks and it can be done easily, instead of present box pushing technique.
Now-a-days the work is done on RCC Box, pre-stressed concrete is also be done, hence the reinforcement can be reduced greatly, and cost of public service commission is more.

## III. METHODOLOGY

NO. 1 EXCAVATION

- The site is excavated at certain depth below ground level so that box provided enough clearance for a vehicle to pass through it. And gradient for road is 1 in 40.
- Generally, the excavation is done mechanically by using hydraulic excavator.
- The excavation is done in highly populated area where blasting is not possible. And hence should be safe.
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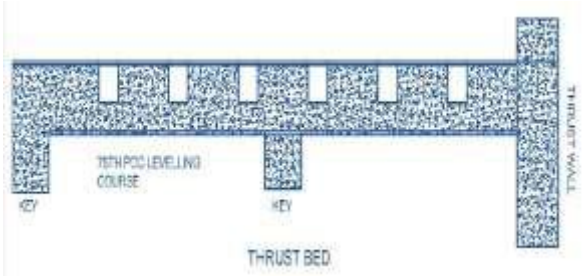
NO. 2 LAYING OF THRUST BED

The one of the important stages in box pushing technique. And in this method reaction force is transfer hydraulic jack and then it transfers it to soil.
Jacking support is providing by the suitable pockets in the bed to accommodate pin supports. After completion of jacking the thrust bed is used as floor bed, and that's why it is left in place.




NO. 3 CASTING OF RCC BOX

First the pre cast box is cast in segment of convenient length. And this is design as per IRS codes of practice for 25T. Generally, the grade of concrete is kept as M35. The first RCC precast box is cast over well set and levelled the thrust bed.

NO. 4 PUSHING OPERATION OF BOX

To construct opening below the ground the box pushing is done by providing precast units, without disturbing surrounding like traffic and structures.
The thrust bed is made up of thin film of grease and thick gauge plastic sheet and the bottom of box is avoiding frictional resistance. And all of this is done before casting of bottom slabs of the box.
When the quality of soil is poor the drag sheet system is also considered for less resistance.
In this operation jacking the front unit is pushed into the embankment and then the excavation is done.
The average rate of pushing box is 1m in 24hrs.

NO. 5 FOUNDATION OF ROAD
When the box pushing is done, the road is open for traffic, and this road made from concrete and bitumen.

## IV. EFFECT

**ADVANTAGES**

In this technique there is no obstruction to the railways and roadway traffic expect the speed limit.
Multiple rail lines are construct in box pushing technique.
Less time required for completion of project work and the night working is also possible it also help to reduce the time period for the project.
Heavy machineries are not used in cut and cover method it may reduce the cost of project.

**DISADVANTAGE**

Skilled super vision and trained staff is required
We can no change the alignment of box its difficult to rectify initially
There is a no scope for night working.
In hard strata is very difficult to construct the road under bridge.
When the lateral and vertical alignment of box is getting disturb then it is difficult to correct it.

## V. CONCLUSION

- It requires frequent monitoring and close observation for safety of construction.
- This is the easiest and fastest method & also economical method.
- Construction joints are less as compare another method.
- The alignment of the road is totally depending on hydraulic jack force.

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