

# Practical Design of Shield Tunnel Lining

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**Abstract**— Segmental lining is the support system for shield TBM excavated tunnels. Pre-cast concrete segments are assembled inside the shield, to form a ring. The segmental ring becomes the support structure of the tunnel. The 2 dimensional uniform beam model and 3 dimensional segmental lining model subjected to various loads are reviewed in this article. Real time example of an irrigation TBM tunnel crossing under two broad gauge rail lines has been considered. Present study has been carried out with 2 dimensional segmental lining model subjected to static loads, 3 dimensional construction stage analysis and segmental lining subjected to dynamic train loads.

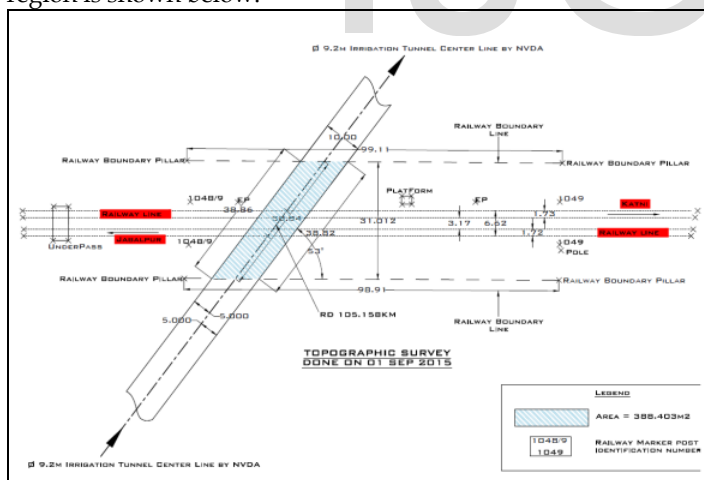
**Index Terms**— Segmental lining design, 3 dimensional TBM segmental lining analysis, Practical TBM segmental lining design, Tunnel lining subjected to dynamic train loads on surface

## 1 INTRODUCTION

The present study considers an irrigation tunnel which involves tunneling with tunnel boring machine (TBM) and consists of segmental concrete lining. The tunnel is located in Madhya Pradesh state of India. At a certain stretch along the alignment of the tunnel, there is an operational railway track. Apart from other loads tunnel lining is also subjected to dynamic train loads.

The TBM driven tunnels are segmented because of the ground conditions and are constructed mainly from reinforced concrete segments. The excavation of the ground and the placement of the segments are carried out by Tunnel Boring Machine itself. Between the segments, longitudinal and circumferential joints are situated.

The general layout plan of the region is shown below:



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