Pushing the limits of U shaped viaducts

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Summary

The Pragati-Maidan viaduct, is an extradosed railway bridge with a main span of 93 m. The deck cross-section has a U shape, which permits a perfect integration of the metro system in the superstructure.

The extradosed cables are covered by a concrete beam that allows to consider them as internal prestressing. This beam also increases the stiffness of the main span.

This bridge is the first of its kind to be erected using the cantilever construction method, and it is the first extradosed bridge ever built in India.

Keywords:Extradosed, prestressed concrete, Railway Bridge, U shape deck, cantilever construction.

1. Introduction

For the extension of the U shaped viaduct of the 3rd Line of Delhi Metro (India), DMRC was confronted to the crossing of 5 railway tracks with very high constraints: sharp plan curvature, railway vertical clearance, impossible location of intermediate piers, no possible interruption of the railway traffic, and minimum span length of 93 m… In addition to the technical difficulties, time was not an ally: the line opening date was scheduled within less than one year.

All these constraints have not allowed DMRC to use the typical structures of the line 3 viaduct, which had been designed by Systra [1].

Systra has then proposed a very innovative and economic solution, which will allow a very fast construction thanks to the use of the same cross section as for typical viaduct, and by means of only coventional materials.

The segmental extradosed bridge has been erected using for the lateral spans the same construction method than for typical viaduct (span by span), and cantilever construction for main span.

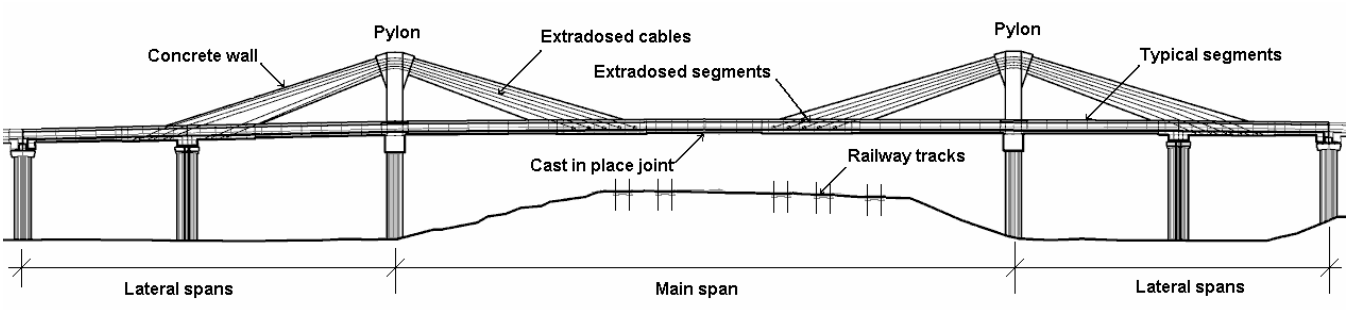

Fig. 1 *General elevation of extradosed bridge*

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