

A Signature Bridge in a Congested Urban Area

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Summary

The future Mass Rapid Train System line 1 in Mumbai implemented by Mumbai Metro One Private limited (MMOPL), is an elevated line of 12 km long. This project needed a Signature Bridge. SYSTRA designed the line with U shape viaduct and this typical section was extended to this Signature Bridge.

It is set at the crossing with the Western Express Highway coming from the north to Bandra Worli Sea Link. It takes its name from this highway. Flying over two roadways, the highway and Andheri Kurla Road, it is set near the future WEH Station in a very congested site with heavy traffic, heavy crowds and inhabitants, with utilities underground and height limitation for the pylons due to the closeness of an airport. More, an environmental constraint consisting in a very aggressive atmosphere had to be integrated in the design.

WEH Bridge is a stay cable bridge of 5 spans: 23m, 23m, 86, 23m, 23m. It will support two tracks with a commercial speed of 80 km/h and 17t per axle. As long welded rails are used, the bridge is designed to avoid any dilatation device and to take into account seismic loads and the constraints of the UIC standards. Built with the cantilever method, the U shape deck implied a special design for the form traveler and specific stages of construction involved by the two intermediate piers working as anti-uplift piers.

An optimization of all elements was necessary to limit the weight and to provide a long life time in regard to the environmental constraint.

Keywords: Stay cable bridges, prestressing, scaffolding, bents, anti-uplift, traffic.

1. Introduction

Metro line 1 in Mumbai takes place in the north of Mumbai between Versova and Ghatkopar. This main line named VAG corridor for Versova-Andheri-Ghatkopar is long of 11,443 km in elevated alignment. It runs along the middle of the Andheri Curia Road. The site is near the Oman Sea and for a sustainable design it was imposed to observe a maximum open crack of 0,1mm following the IRS CBC 1997 standard.

The link to the airport was initially integrated but delayed and is not realized for the moment. The rolling stock includes coaches with a weight of 170 kN per axle, and boggy spaced by 12m.