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Bridging Pamban Strait near Rameshwaram Island in India

Pont sur le détroit de Pamban, Inde

Die Brücken über die Pamban Meerenge, Indien

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1. INTRODUCTION

This bridge linking the Tamilnadu Main land and the Island of Rameshwaram is the longest bridge across Open Sea in India. The scope of work consisted of completing major portion of the bridge which was partly executed by a local contractor and left on account of technical and other problems. The completion of this bridge was a formidable challenge on acccount of the Open Sea as also the area being prone to frequent cyclonic storms, one of which had resulted in disruption of the initial work.

2. SALIENT FEATURES

This bridge consists of 53 non-navigational simply supported spans on Mandapam side and 12 non-navigational spans on Pamban side each of 27.13 M with 9 additional viaduct spans of 27.58 M on a curvature across a Railway track underneath. The bridge also provides one navigation span of 115.21 M and 2 adjacent anchor spans of 68 M with 2 non-navigational spans of 40.69 M one each on either side of the navigation span.

3. DESIGN ASPECTS

The bridge provides for a 7.5 M roadway for vehicular traffic with 1.57 M footway on either side. The simply supported spans consists of 4 Nos. of precast PSC girders while the navigation and anchor spans consist of a single cell box girder of 5.5 M width with projecting deck slab covering the full width of roadway and footway and kerb amounting to 11.10 M.

The bridge is designed for the critical of the following live loads :

i) Crowd load of 500 Kg. per sq.m. over the entire width of carriageway and footpaths.

ii) Two lanes of Class A with crowd load on footpaths.

iii) One lane of Class 70R with crowd load on footpaths.

The box superstructure is also designed for temperature differential as per BS:5400 - Part 4. Untensioned mild steel reinforcement is provided in the box decking to cater for 15 percent loss in prestress in addition to the losses worked out as per codal stipulations.

Tetron spherical bearings (S3) manufactured by M/s.Freyssinet International, France are provided below suspended spans. The bearings were chosen since they can accommodate rotation upto 3 degrees and are made of aluminium alloy hence corrosion-resistant.

Since the bridge is located in an aggressive marine environment, special care had to be taken in specification, design and detailing of various components of the bridge.

4. CONSTRUCTION ASPECTS

The PSC girders for simply supported spans were precast and launched into position and the decking was cross-prestressed after casting the gap slabs. The original scheme envisaged precasting of the PSC girders with flanges just short of touching each other which were transversely prestressed after filling in the gap with dry mortar. Since this resulted in threading difficulties for the transverse cables on account of the differential hogging, the scheme was altered to introduce an insitu gap between the flanges to provide a smooth transition for the transverse cables.

The box superstructure was constructed by the cantilever method. Extreme precaution and precamber control was necessary to ensure matching of part of decking cast over rigid support of staging at the anchor pier and the decking cast on the main navigation pier with cantilever construction gantries.

Mild steel reinforcement is given anti-corrosive treatment developed by CECRI, Karaikudi.

The bridge has been instrumented for the temperature and stress monitoring in the navigation spans.