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Bridge across Mond Creek near Ratnagiri, Maharashtra, India

Pont sur le Mond Creek, Inde

Die Brücke über den Mond Creek, Indien

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1. INTRODUCTION

This prestressed concrete long span bridge could be called the first of its kind to adopt Limit State Philosophy with partially prestressed decking.

The long span continuous bridge proposal finally adopted is a modification to the original contract which consisted of 4 Nos. of 45.56 M of intermediate spans and 2 Nos. of 42.75 M end spans. There were 6 Nos. of well foundations with depth varying of 10 M to 30 M. As soon after starting the foundations, the subsoil exploration revealed that the wells required substantial sinking, to reach the sound rock. It was also realised that there were difficulties in precasting the PSC beams on the banks. This led to a long span continuous deck with a lighter weight to ensure the foundations, already undertaken, would meet with the design requirements. Therefore, a partially prestressed concrete decking was a necessity. As the prevailing IRC codes did not permit such lattitude, the authorities agreed for a Class 2 structure as defined in BS:5400.

2. SALIENT FEATURES

267.70 M long bridge consists of two intermediate spans of 92.20 M each and two end spans of 42.65 M each. The continuous decking between abutments provides for a 7.5 M clear roadway. The decking is supported on C.S. rocker-cum-roller bearings at the abutments and the penultimate piers. The decking is monolithic with a central pier, about which it is symmetrical.

All the piers are of plate type and supported on the well foundations with 7.8 M diameter for the penultimate and 8.5 M for the central pier.

The superstructure consists of single cellular box of overall width of 4.5 M over the webs and 8.10 M at the deck level. The box depth varies from 4.925 M at the piers to 2.065 M at the ends.

At the abutments, the end 3.0 M of box decking is widened to three cell box of 7.83 M overall width and is filled up with plum concrete to counter any uplift at the abutments. Further, the dirt wall of the abutment has been provided with a bearing beam at the top to hold down the articulated half joint of the webs. This was done as a measure of abundant precaution.

3. DESIGN

The bridge is designed for IRC 2 lanes of Class A or Single lane of Class 70R/AA loadings.

The superstructure is designed following the guidelines of BS:5400 Part 1,2 & 4 - 1978 as a Class 2 type structure. The IRC roadway loadings were considered equivalent to as BS Normal traffic loadings, for consideration of safety factors only, in the design.

4. CONSTRUCTION

All the well foundations were constructed by the sand island method except the central well, which was floated and sunk at location by the floating caisson method.

The superstructure was constructed insitu by using conventional cantilever construction gantries. The temporary supports were constructed on the either side of the piers directly over well steining. Sand jacks were fixed over each of the temporary columns. The segments were cast in 3.0 M on the either side of piers in such a manner that only one pair of temporary columns come into operation all the time. The rollers of rocker-cum-roller bearings over penultimate supports, P1 & P5, were frozen during the cantilever construction.

The continuity units of 5.1 M over the abutments were first cast on staging and the temporary supports were released. The central continuity units of 2.5 M were cast by extending cantilever construction gantries from one of the mating cantilever arms. The rollers were defreezed before the stressing of continuity cables.

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