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Design and Construction of Multi-span Cable Stayed Bridge at Ambhora, near Nagpur, Maharashtra

Nirav Mody

nvm@spectrumworld.net

Spectrum Techno Consultants Pvt Ltd
Mumbai, India

HKS Durga Jithendra Bhattiprolu

jithendra.bhattiprolu@spectrumworld.net

Spectrum Techno Consultants Pvt Ltd
Mumbai, India

ABSTRACT

A multi-span cable stayed bridge is proposed over river Wainganga to re-establish the state highway link from Bhandara to Butibori. The location of the bridge is an important tourist and pilgrimage destination with lush green surroundings and backwaters of Gosekhurd Dam. The bridge has an overall length of 705m and deck width of 15.25m to accommodate 2 lanes of vehicular traffic and 3m+3m footpath for pedestrians. The structural arrangement of the bridge comprises 2 modules, with Module 1 of 420m and Module 2 of 280m length with span arrangements of 70m+140m+140m+70m and 70m+140m+70m respectively. The superstructure is cable stayed with RCC deck ladder type with an RCC pylon height of 30m above deck level. The pylon P3 at the center of the bridge is also proposed with Viewing Gallery 40m above deck level which is structurally independent from the main bridge. The Module 1 of the bridge is constructed by cantilever method for pylon P2 and anchored span method for pylon P1 and P3. The Module 2 of the bridge is constructed on staging. This paper discusses the design and construction aspects of the bridge along with staged construction analysis. This is one of the very few cable stayed bridges in India where all 3 methods of construction of a cable stayed superstructure are adopted in the same bridge.

Keywords: Cable stayed bridge, Multi-span, Cantilever construction

1 INTRODUCTION

The reservoir of Gosekhurd Dam is one of the largest by storage capacity in the draught prone Vidarbha region of Maharashtra state, India. Opened in 2008, the reservoir's high FRL meant most of the bridges upstream on the Wainganga River get submerged every monsoon season, cutting off the links between the already under-connected Nagpur and Bhandara districts of the state. State Highway 254 of Maharashtra, which connects the southern and south-eastern parts of the Nagpur district to the city of Bhandara bears a glaring gap of about 700m cut-off by the Wainganga River at the temple town of Ambhora.

In an urgent effort to address these inadequacies, the stage government commenced the project to build a high-level multi-span cable stayed bridge across the river. A five-span bridge with pylons spaced at 140m was proposed at the location.