Challenges in Hong Kong – Zhuhai – Macao Bridge (HZMB) Hong Kong Link Road Project

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Summary

The Hong Kong Link Road (HKLR) is part of the prominent structure, Hong Kong-Zuhai-Macao Bridge (HZMB), connecting 3 vibrant cities in Southern China. The works which are administered under Highways Department of HKSAR comprises design and construction of approximately 9km of viaducts. About 7km of the viaducts are marine structures with three navigation channels.

The basic structural form of the viaducts is precast segmental prestressed concrete box girder. The span length of the viaducts ranges from 35m to 180m. Balanced cantilever method is selected due to the variability of the span lengths and flexibility in construction. The piers consist of both cast-insitu and precast concrete structures. The viaducts are supported on bored piles with diameters ranging from 2.2m to 2.8m. Foundation in areas with complex geology such as fault zones has posed a major challenge to the job. Some piles are over 100m long due to complex geology.

This paper presents the challenges and solutions employed in the design and construction of the viaducts. It describes the prestressed schemes employed in both the decks and piers with special details used in the formation of monolithic deck-column connections. The three main Challenges on the project were the erection in open sea, the vicinity of the Airport and enverinmental constraints.

Keywords: Precast segment, Durability, Seismic Design and Response, Sustainability.

1. Introduction

The Hong Kong – Zhuhai – Macao Bridge (HZMB) will be one of the longest cross-boundary sea-crossing road infrastructure in the world providing a direct land transport connection between two shores of the Pearl River Delta, linking Hong Kong in the east to Macao and Zhuhai in the west. It is an essential transport construction project included in “National High Speed Road Network Planning”. The Hong Kong Link Road (HKLR) under Highways Department’s Contract No. HY2011/09 is a prominent structure that serves to connect the Main Bridge of HZMB from the HKSAR Boundary to the Scenic Hill on the Airport Island in Hong Kong. The works comprises mainly design and construction of approximately 9.4km of viaducts supporting dual 3-lane carriageways. This 12.9 billion Hong Kong dollar contract was awarded to Dragages-China Harbour-VSL Joint Venture (DCVJV) in May 2012. YWL Engineering Pte Ltd was appointed as the Designer and construction engineering consultant for the marine viaducts under the Contract and Bouygues Travaux Publics was appointed as design in-charge for long-span viaducts.

The viaducts in this project consist of 115 spans and can be categorized into different character zones of structures. In the Western Waters, the viaducts are characterized by regular spans of typical 75m intertwined with two 1-way navigation spans of 150m. A grade-separated turnaround facility is proposed with slip roads in the form of single-lane viaducts diverging from the HKLR mainline carriageways on both sides forming an elevated junction in the middle of the viaducts. Towards the

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