

Design and Construction of Main and Crescent Bridges in Palm Jebel Ali

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Summary

This project, located in Palm Jebel Ali of Dubai, consists of the construction of two main sea bridges and two crescent sea bridges to connect artificial islands to the main land. Main bridges consist of M1 (1,200m, 4 lanes X 2) and M3 (1,450m, 4 lanes X 2). Main bridges have five continuous spans ($5@50 = 250\text{m}$) and their superstructure (precast box girder) were erected using a launching gantry. Crescent bridges consist of C1 (380m X 2) and C4 (380m X 2). Crescent bridges have eight continuous spans ($40 + 6@50 + 40 = 380\text{m}$) and their superstructure (cast-in-situ box girder) were constructed using a full staging method. Basic design specification of this project was AASHTO LRFD. Some of AASHTO LRFD requirements such as load and durability were modified to meet the client's requirements. In addition, the Middle East regional conditions were also considered employing the standards and reports of British Standards and Port Customs and Free Zone Corporation, Civil Engineering Department (PCFC, CED). In this paper, general characteristics of main and crescent bridges have been explained first. Then, the technical specifications employed in this project have been briefly introduced. Useful information to the employment of design specification in the Middle East region is provided.

Keywords: Precast Segmental Method; Full Staging Method; AASHTO LRFD Bridge Design Specification; Palm Jebel Ali; AASHTO LRFD; Design Standards

1. Introduction

This project, located in Palm Jebel Ali of Dubai, constructs 2 main bridges and 2 crescent bridges to connect artificial islands to the main land, which is shown in Figure 1. The completion of construction was scheduled as 2012. Client was Nakheel and contract type was Design and Build (Lump Sum). Design and construction was controlled by Samsung C&T Corporation and the supervision was conducted by Parsons. The leading design consultant was Halcrow.

A fast-track method was employed. In the fast-track method, construction process is divided into several phases. In each phase, construction is started right after finishing a design. This method can reduce a construction period and provide chances to employ advanced technologies. For this project, this paper briefly presents general characteristics, design criteria such as loading parameters and design loads, material and finishes and construction specification.