Izmit Bay Suspension Bridge – Overview of the Project

Takeshi KAWAKAMI
IHI Infrastructure Systems
Osaka Japan
takeshi_kawakami@iis.ihi.co.jp

Masahiro YANAGIHARA
IHI Infrastructure Systems
Tokyo Japan
masahiro_yanagihara@iis.ihi.co.jp

Yasutsugu YAMASAKI
IHI Infrastructure Systems
Tokyo Japan
yasutsugu_yamasaki@iis.ihi.co.jp

Junichi SHAURA
IHI Infrastructure Systems
Osaka Japan
J_shaura@ihitr.com

Tomoo KASUGA
IHI Infrastructure Systems
Osaka Japan
tomoo_kasuga@iis.ihi.co.jp

Tunc CETINKAYA
IHI Infrastructure Systems
Osaka Japan
Tunc@ihitr.com

Summary
The scale of the bridge and the tight schedule in the EPC contract requires the state of the art and robust design and well proven but challenging construction method leading to the technical and financial success of the project. The papers deals with the project overview and the design development from the tender stage to the detailed design stage for the substructure and the superstructure.

Keywords: suspension bridge, large bridge construction; design development; aerodynamic stability, seismic response

1. Introduction

The Izmit Bay Suspension Bridge will carry the new Gebze-Orhangazi-Izmir motorway across the Sea of Marmara at the Bay of Izmit in northern Turkey as shown in Figure-1.

The NOMAYG joint venture formed by Nurol, Ozaltin, Makyol, Astaldi, Yulsel and Gocay, as a EPC implementing body to construct a 420 kilometer road including the Izmit Bay Suspension Bridge, called for Tender for the construction of the Izmit Bay Suspension Bridge in 2010. After the competition based the tender design developed by each Tenderer, the Izmit Bay Suspension Bridge was contracted to the consortium formed by IHI Infrastructure System and ITOCHU as Engineering-Procurement-Construction (EPC) project in July 2011.

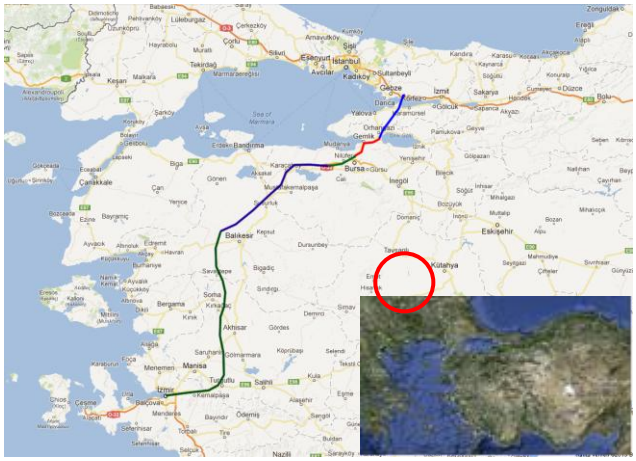

Figure-1 Location of Project

2. Tender Design

After the tender for the construction of the Izmit Bay Suspension Bridge was called by NOMAYG in April, 2010, the tender design was carefully developed for a suspension bridge situated in very seismic active area in accordance with the conditions to follow given in the Employer's Requirement prepared by AECOM-URS, a consultant to NOMAYG, which includes (1) the bridge type being suspension bridge, (2) the overall length between anchorage ranging from 2800 m to 3000m, (3) the main span of the suspension bridge ranging from 1550m to 1700m, (4) the navigation channel of 1000 m wide and 64 m high, (5) the north anchorage to be located on land, (6) the south anchorage to be located off shore on the south side of the peninsula and away from the secondary faults, (7) the deck to carry dual tree traffic lanes as shown in Figure 2, where the

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locations of foundations were carefully chosen based on the geotechnical investigation provided by NOMAYG.

The main span is 1550m and the side span is each 625m. The suspended deck is 2800 m long and continuous between two side span piers. The main cables are deviated at the side span piers toward the cable anchorages located below the deck of the transition spans. The anchor span of the main cable between the side span pier and the splay saddle is each 95 m. There are 120 m and 142 m transition spans on the north and the south.

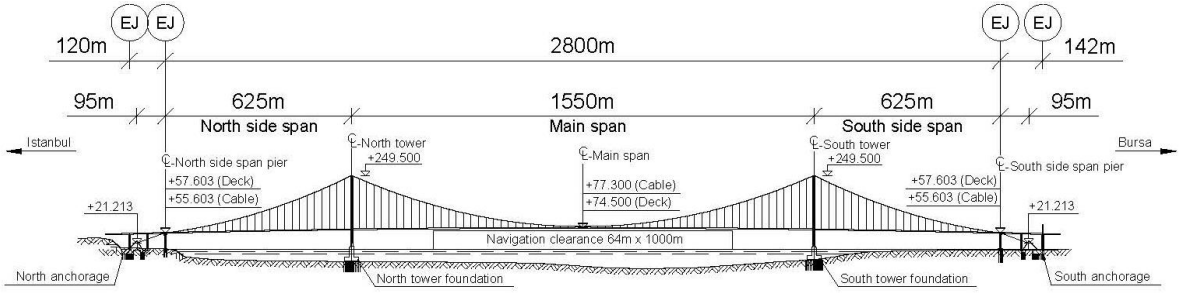

Figure-2 General Arrangement

3. Detailed Design

Since, the "Notice to Proceed" requesting the EPC Contractor to start the detailed design was issued by NOMAYG in September, 2011, the detailed design of the Izmit Bay Suspension Bridge started with the geotechnical investigation and the wind tunnel test.

The geotechnical investigation discovered a potential secondary fault at the planned location of the south anchorage, which resulted in the south anchorage shifted by 138.25m toward north in a safe zone between faults, the south side span pier shifted by 118m toward north, and two tower foundations shifted by 59m toward north, and the bridge configuration has been revised as shown in Figure 3.

The main span is 1550m and the side span is each 566m. The suspended deck is 2682 m long and continuous between two side span piers. The main cables are deviated at the side span piers toward the cable anchorages located below the deck of the transition spans. The anchor spans of the main cable between the side span pier and the splay saddle are 92.05 m and 67.25 m for the north and the south respectively. There are 120 m and 105 m transition spans on the north and the south.

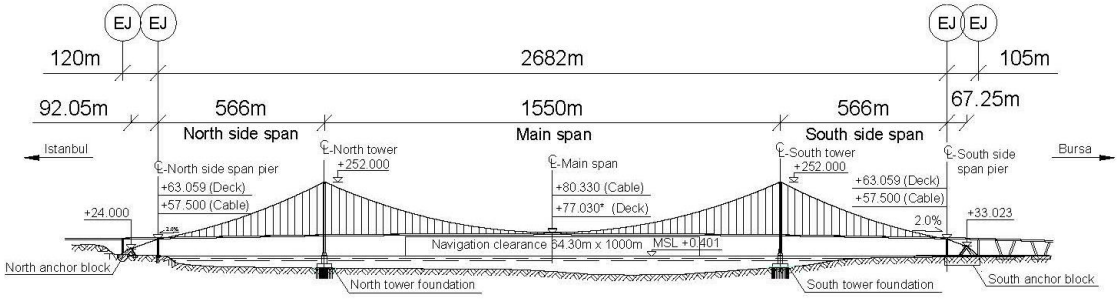

Figure-3 General Arrangement

4. Acknowledgement

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