



Izmit Bay Suspension Bridge – Main Cable Anchorages

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Abstract

This paper describes the concept development and subsequent detailed design of the anchorages for the Izmit Bay suspension bridge with a main span of 1550 m. The significant variation in foundation conditions at the two ends of the bridge required completely different concepts for the anchorages. In particular at the south end of the bridge an innovative solution was developed where the main part of the anchorage was built within a huge excavation pit shaped like a "guitar" formed by 30 m deep diaphragm walls. As explained in the paper this solution was driven by the aim to safeguard against a potential secondary seismic fault occurring in the ground just below the anchorage. The long term durability and in particular the corrosion protection of the large number of post-tensioning tendons used to transfer the main cable tension to the bottom of the anchorages was a major concern. The paper describes an innovative solution based on use of dehumidification to deal with this challenge.

Keywords: Suspension Bridge; Anchorages; Seismic Design; Secondary fault; Diaphragm wall; Dehumidification.

1 Introduction

The Izmit Bay suspension bridge will be located in Turkey between the Diliskelesi peninsula on the north side of Izmit Bay and the Hersek peninsula on the south side. With a main span of 1550 m, (see Fig. 1), it will be the 4th longest spanning suspension bridge in the world by the planned time of inauguration in early 2016. The bridge is part of the new Gebze-Orhangazi-Bursa-Izmir motorway across the Sea of Marmara at the Bay of Izmit.

2 Challenges for the main cable anchorages design

The most important challenges for design of the anchorages for the Izmit Bay suspension bridge are as follows:

- Complex and different foundation conditions
- Severe seismic conditions including potential secondary faults.
- Construction in deep excavation pits below ground water level.
- Short construction period
- Durability in marine environment

The foundation conditions at the position of the two main cable anchorages differ significantly. At the north side dolomitic limestone is found at the ground level which made it possible to construct the anchorage on land in a filled up area in front of a rock outcrop. However, for the south anchorage the construction site was placed near the coastline at a shallow water depth up to around 5 metres with soil consisting of a kilometre