Cable-stayed Bridge over the Odra River in Wroclaw, Poland

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Summary

The largest bridge along the motorway ring road of Wroclaw is a cable-stayed structure over the Odra River near Redzin water stage of fall. The river flows there in its main bed, while inland navigation uses additional water channels. An island, where the pylon of the new bridge is situated, is located between the river and the channels. The bridge is 1742 m long and consists of a 610 m long southern flyover, a 612 m long cable-stayed main bridge with separate decks suspended to one 122 m high pylon and a 520 m long northern flyover. The superstructure of the main bridge consists of two box girders made of prestressed concrete, one for each carriageway of the highway. The height of the girder is 2.50 m, which is about 1/100th of the main span length. The decks are supported by 80 pairs of stay cables connected to the pylon made of reinforced concrete. The bridge with a deck area of approximately 65 000 m^2 was constructed within 36 months.

Keywords: concrete bridge; cable-stayed bridge; construction technology.

1. Introduction

The motorway ring road of Wroclaw is a very important part of the urban communication network of the agglomeration (4th biggest city of Poland), being the outer transit route [1, 2]. The largest bridge structure along the ring road is the Redzinski Bridge, crossing the Odra River near Redzin stage of fall. The route of the motorway through this area was the effect of social protests against other alternative solutions. This resulted in the necessity of building a large span bridge, allowing for the unconstrained modernization of Redzin water stage of fall in the future.

The bridge consists of three substructures [1] (Fig. 1):
- E1 southern flyover: 610 m long, 11 span continuous beam (box girders), made of prestressed concrete, span lengths 40 + 2 x 52 + 56 + 6 x 60 + 50 m;
- M2 cable-stayed main bridge: 612 m long, span lengths 50 + 2 x 256 + 50 m, with two separate superstructures made of prestressed concrete, suspended to a single 122 m high pylon;
- E3 northern flyover: 520 m long, 9 span continuous beam (box girders), made of prestressed concrete, span lengths 50 + 7 x 60 + 50 m.

The longitudinal axis of the bridge in horizontal plane is not constant. It is straight for E1 flyover and the main bridge, and curved for E3 flyover. The vertical clearance under the bridge is 15.5 m.

The superstructure of the main bridge, presented in Fig. 2, consists of two separate box girders made of prestressed concrete (one for each carriageway of the motorway), suspended to an H-

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