Modelling of a major Composite Cable-stayed Bridge

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Summary

The second Jiaojiang Bridge is a composite cable-stayed bridge with the span arrangement of 70m+140m+480m+140m+70m. During the analysis, spatial grid model is adopted by the authors to undertake a research program focusing on the modelling and reinforcement design of the concrete upper plate of the composite box girder. The advantage of this model is that the stress results cover all the spatial effects including shear lag, statically indeterminate shear flow inside the side boxes and in the concrete upper plate.

Keywords: composite cable-stayed bridge; box girder; spatial grid model; concrete deck; reinforcement design

1. Introduction

The second Jiaojiang Bridge in Taizhou, Zhejiang Province of China started to be constructed from the spring of 2009. The Bridge Brunch of the Architectural Design Institute of Tongji University is the major designer of the project. The bridge is a composite cable-stayed bridge with the span arrangement of 70m+140m+480m+140m+70m, as shown in Fig.1.

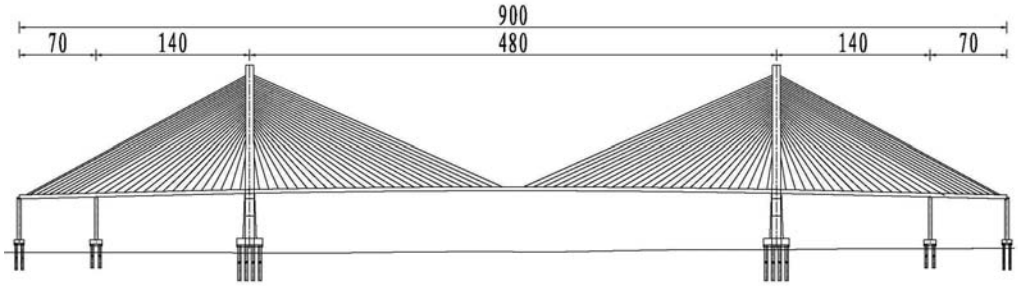

Fig. 1: Span arrangement of the second Jiaojiang Bridge

The composite deck, which has a total width of 39.5m, includes a concrete upper plate, four steel webs and two steel bottom plates forming two closed side boxes, as shown in Fig.2. The authors are undertaking a research program attached to the bridge project focusing on the modelling and reinforcement design of the concrete upper plate of the composite deck.

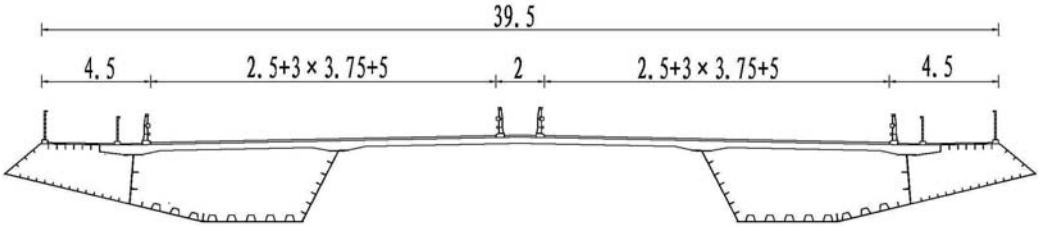

Fig. 2: Cross section of the composite box girder

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