



A New Solution for Fabrication & Erection of Composite Box Girder of Cable-Stayed Bridge

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Abstract

Quanzhou bay bridge is a sea-crossing approach which is located on the southeast coast of China near Quanzhou city. The main bridge is a cable-stayed bridge with steel-RC composite box girder and main span 400m. Unlike the traditional wet joints between RC decks of composite segments, a new solution with dry joints for fabrication and erection of composite girder segments was used in Quanzhou bay bridge. The steel box girder segments and RC decks were fabricated separately at first. The composite segments were assembled and the steel part and RC part were combined. Because of the dry joints, the composite segments must match with each other. The fabrication and assembling works are all done in the factory. Then the integral composite segments were transported to the bridge site and erected by deck crane. Segments were connected by temporary prestressed steel bars after the deck joints were daubed with epoxy glue. The joints at steel part of composite girder were welded finally. The new solution can omit concrete pouring and casting at the construction site and improve the efficiency and quality of composite segments erection. The impact on environment during construction procedure is also reduced.

Keywords: composite girder; cable-stayed bridge; dry joint; segments; fabrication; erection.

1 Introduction

Quanzhou bay bridge is a sea-crossing approach which is located on the southeast coast of China near Quanzhou city in Fujian province. The main bridge is a cable-stayed bridge with two separated steel-concrete composite girder. The two double door shaped RC pylons are both 157.1m high, and the 5 continuous spans arrange as 70+130+400+130+70m(Figure 1), and 288 cables in 4 planes are in all parallel wires system.

The separated PK typed streamlined flat steel-concrete composite girder with full width 23.85m and height 3.5m (Figure 2) is composed of concrete deck and open steel box girder. The steel part of segments are connected by welding and the concrete decks are connected by dry joints just like the segmental concrete bridges constructed in short-line method. The deck and steel box of each segment were prefabricated in the factory and combined in the assembling yard, then transported to the site and installed by deck crane. The 166 segments of the full bridge had a