

Design and Construction of The Jiayue Bridge in Chongqing, China

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Summary

Jiayue Bridge crosses the Jialing River at the core of the Chongqing Liangjiang New Area. It is selected to be a cable-supported girder bridge with a 250-meter main span after careful analysis of the surrounding landform and the demand for navigation. The aesthetics of the bridge is one of the important considerations in the schematic design. To harmonize with natural surroundings and to give the passengers a more pleasant view, Y-shaped tower is selected. The girder section is a single-cell concrete box with wide wing slabs on both sides. The stay cables are made of epoxy filled seven wire strands which can be replaced individually. The maximum force in one single cable is 1100 tons. The stay cable anchors on the tower are steel anchor boxes which are encased in the concrete tower walls. On the other side, the cables are anchored to the end of the wing slabs of the box girder. The Jiayue Bridge adopts a unique traffic organizing scheme which separates vehicle lanes and pedestrian paths into two deck levels. The pedestrian paths are located beneath the wing slabs of the upper deck. This arrangement not only makes pedestrians more comfortable, but also improves the traffic capacity on the upper deck by reducing disturbance to vehicles. The bridge has been opened to traffic since February 2010, after three years of construction.

Keywords: bridge design, construction, cable-supported girder bridge, Pedestrian Path Design.

1. Introduction

The main part of the city of Chongqing is surrounded by mountains, with the Yangtze and Jialing Rivers running through. Construction of transportation facilities is the key point to maintain the stability and development of the economy. It's planned to build an urban expressway network in Chongqing. The Jiayue Bridge crosses the Jialing River in the northern district of Chongqing. It's a key link on the so-called 1st transverse line of the urban expressway network.

2. Bridge Scheme Design

2.1 Span arrangement

The Jialing River goes through a deep valley at the proposed bridge location. The slope of the valley is about 35 degrees in the east and 20 degrees in the west. The bottom of the valley is close to east. The Jialing River is a ship channel of national class III. The navigation requires min. 220 m horizontal clearance and min. 10 m vertical clearance. The main span of the bridge is fixed to be 250 meters. The water level of the Jialing River in the Chongqing area varies significantly and seasonally. The difference between the high water level and the low water level can be as much as 30 meters. In order to avoid construction of deep water foundation, the ground elevation of the main piers in the east and west is 180.0 m and 167.0m, respectively. Its benefit is to lower prices and difficulties of the engineering.

2.2 Bridge type design

The Jiayue Bridge is relatively far from core region of the city. It's an important urban infrastructure