

Design of Stiffening Girder for Taizhou Yangtze River Highway Bridge

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Summary: Taizhou Yangtze River Highway Bridge is the first three-pylon two-span suspension bridge with the main span over 1000 meters in the world. The structural system of the stiffening girder is complicated. The stiffening girder adopts flat streamline steel closed box girder which has well wind-resistant capability and is technically mature besides beautiful appearance. The girder width is 39.1m and the height at the central line of the bridge is 3.5 m. In this paper, the structural system, structure design, structure calculation and erection of the stiffening girder are introduced emphatically.

Keywords: suspension bridge, stiffening girder, structural system, structure design

1. Briefs of project

Taizhou Yangtze River Highway Bridge (Fig. 1) is located in the middle of Jiangsu section of Yangtze River, between Jiangyin Bridge and Runyang Bridge, linking Taizhou City in the north and Zhenjiang City and Changzhou City in the south. The main bridge of Taizhou Bridge is a continuous suspension bridge with three towers and two spans of $2 \times 1080\text{m}$. The stiffening girder of the main span consist of flat streamline steel box girders, with a total width of 39.1m and center height of 3.5m. The stiffening girder bridge deck is provided with a convex vertical curve with $R=43200\text{m}$.

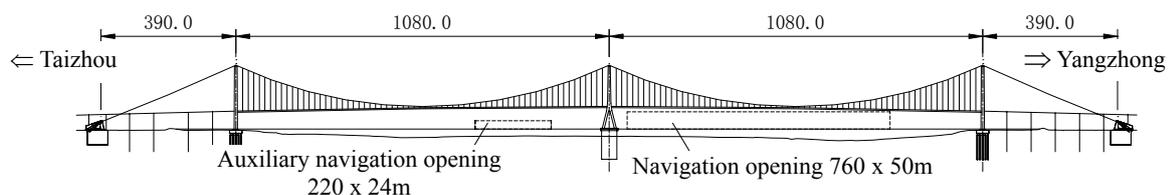


Fig. 1: General layout of Taizhou Bridge

2. Structure system

The restricting system for stiffening girder of Taizhou Bridge is comprised of longitudinal horizontal elastic cables at the middle tower, no vertical bearing is provided at the middle tower to reduce the negative bending moment of stiffening girder, vertical restricting structure is provided at the middle tower to limit the excessive transversal torsion of stiffening girder; transversal anti-wind bearings are provided at all three main towers, vertical bearings against tension and compression are provided on the lower transversal beam of side towers; and expansion joints are provided at the connection of stiffening girder with the approaching bridge.