

730m Main Span Combined Highway and Railway Cable-Stayed Bridge

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Summary

The Shanghai Yangtze Bridge, located over open water at the entrance of the Yangtze River, is currently under construction. A cable-stayed bridge solution with the main span of 730m is adopted to meet the navigational demands of the main channel. The bridge comprises the dual-direction 6-lane expressway and 2-lane traffic railways. In fact, the 730m cable-stayed bridge over the main channel is the longest-spanning bridge of its kind for combined highway and railway traffic. The technical standard is studied to ensure the safety of railway and comfortableness of passengers for the combined highway and railway on the same plane. As the symbolic structure at the mouth of the Yangtze River, it also needs to take the aesthetics into consideration greatly. This paper presents the design and technical characteristics of the main channel cable-stayed bridge.

Keywords: Shanghai Yangtze Bridge, cable-stayed bridge, combined highway and railway traffic bridge, safety and comfortableness, aesthetics

1. Project Overview

The Chongming Cross-River Passageway (illustrated in Fig. 1), in the northbound direction, traverses the southern waterway of the Yangtze River by tunnel, then crosses the northern waterway from Changxing Island to Chongming Island by bridge. Its total length is 25.5km. The Shanghai Yangtze Bridge spans the northern waterway with a total length of 16.55km, of which approximately 10km is over water.

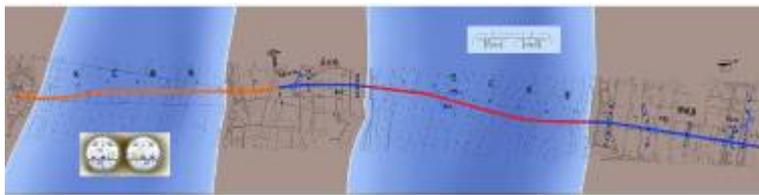


Fig. 1 General view of Chongming Passageway

The bridge design is based on the standard for dual-direction 6-lane expressway. The design vehicular speed is 100km/h and the width is 35.3m. In anticipation of the future development needs of Chongming Island and seeking to optimize the use of resources, the design takes into consideration railway traffic across the bridge. Therefore, the 3-m wide continuous emergency parking lanes on both sides are widened to 4.15m, resulting in a total deck width of 35.3m. This allows for future addition of two railway tracks beside the existing lanes (illustrated in Fig. 2).

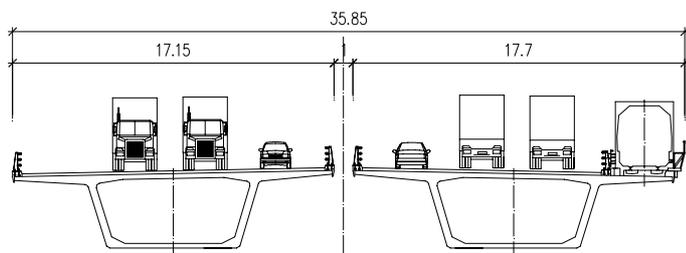


Fig. 2 Present and future layout of lanes

The Class I Highway Vehicular Load Standard was used for this design. The design train load is taken to be: 10 carriages per train, with each train 16.5m in length and carrying 48-t (full load). The load of the two railway track systems is 66kN/m, and the maintenance and escape passageway load is 10kN/m.