Technical innovation of Xihoumen cable-stayed suspension bridge

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ABSTRACT

Xihoumen Highway and Railway Bridge is located in Zhejiang Province, on the eastern coast of China. The bridge carries 250km/h double-track high-speed railway and 6-lane Highway, and both the highway and railway were arranged at the same deck level. The physics conditions of the bridge are complex. The maximum water depth at the bridge site is 93m, the design basic wind speed is 44.8m/s, the maximum wave height is 8.81m, and the bedrock is exposed in seabed. The main bridge is a cable-stayed suspension cooperation system bridge with a main span of 1488m, with a total length of 2664m.The bridge adopts spatial main cable, the transition zone of stay cable and hanger rope was innovatively adopted; three separate steel box cross section with excellent wind resistance performance and comprehensive wind resistance measures were adopted for stiffening girder. The stiffening girder erection scheme of synchronous erection of both cable-stayed section and suspension section and closure in transition zone is adopted; The construction depth of bridge foundation has exceeded 60m for the first time in China, and a complete set of technology for the design and construction of 6.3m super-large diameter hollow bored pile foundation has been initiated. The bridge is planned to be completed in 2028, and will become the largest highway and railway bridge in the world.

Keywords: cable-stayed suspension cooperation system, spatial main cable, wind resistance, deep water foundation

https://doi.org/10.2749/istanbul.2023.0966