



Steel-concrete Composite Cable-stayed Bridge—Main Crossing Bridge of Nanjing Jiangxinzhou Yangtze River Bridge

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Abstract

The main bridge of Nanjing Jiangxinzhou Yangtze River Bridge is in the form of a cable-stayed bridge with three towers and two main spans, with a total length of 1796m and a main span of 600m. The towers and main beams are all composite structures, which is the first all-steel-concrete composite cable-stayed bridge in the world. The bridge originally develops the steel shell-concrete composite tower, investigates coarse aggregate reactive powder concrete (CA-RPC), and applies it to the main girder to form a lightweight and high-performance beam. Numerous technologies have been achieved in new materials, new structures, new processes, and many other aspects. The unique structural concept has significantly increased the factory manufacturing speed, which not only reduces the work and labour cost 25% but also reduces the amount and loss of materials during construction, which has made contributions to the development of cable-stayed bridges.

Keywords: cable-stayed bridge; steel shell-concrete composite structure tower; steel-CA-RPC composite beam; bridge design; construction technology.

1 Introduction

Nanjing Jiangxinzhou Yangtze River Bridge is the world's first cable-stayed bridge with a steel-concrete composite structure for its towers and beams. It originally applied the steel shell-concrete composite structure tower, which effectively

improves the structural performance, durability, and industrialization degree of the tower manufacturing. Meanwhile, CA-RPC has been developed and applied to the main girder of the bridge to form a lightweight and high-