



New Precast Concrete Segmental High-Speed Railway Bridges from Lianyungang to Xuzhou: Donghai Viaduct and Daxu Viaduct

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Abstract

Donghai Viaduct and Daxu Viaduct as parts of Lianyungang to Xuzhou high-speed railway bridge, are both the first high-speed railway continuous girder bridges using short-line precast segmental method in China. A big achievement of the project is realizing a high prefabricated proportion of 99.1% and 98.8% respectively for main bodies of both viaducts.

The Accelerated Bridge Construction with the precast segmental bridge technology, using the short-line match casting method and balanced cantilever construction method without closure pour at end spans in the Lianxu project, has built up a good basis for future projects.

This paper introduces several key factors during the construction process of Donghai Viaduct and Daxu Viaduct, including precast yards, construction method, geometry control and BIM, providing more choices for Accelerated Bridge Construction.

Keywords: high-speed railway; precast segmental bridge; prefabrication; geometry control; precast yard; Accelerated Bridge Construction.

1 Introduction

The new high-speed-rail line connects two cities Lianyungang (4.4 million people) and Xuzhou (8.6 million people), were built to reduce travel time from 2 hours to 45 minutes. Donghai Viaduct (Figure 1) and Daxu Viaduct (Figure 2), as parts of Lianyungang to Xuzhou high-speed railway bridge, were selected to be the pilot viaducts for scientific research of precast segmental high-speed railway bridge. Donghai Viaduct and Daxu Viaduct are both the first high-speed railway continuous girder bridges using short-line precast segmental method in China.

Realizing the needs of rapid development of high-speed railway and significant advantages of prefabrication technology, as well as facing the

research blank of precast segmental high-speed railway bridge in China [1], this pilot project was urgently started in August 2018, aiming at providing practice of industrialization technology of bridge design, prefabrication, erection and construction, and further verifying its feasibility and reliability.

The whole scientific research was officially completed in June 2020.

Donghai Viaduct is a three-span, 113.5m continuous rigid bridge with 40 segments, and Daxu Viaduct is a four-span, 161.1m continuous rigid bridge with 57 segments, both allowing a train speed of 350km/h. Short-line match casting method and segmental balanced cantilever construction method [2] were utilized on the both viaducts.