Investigation and Study of Prestressed Continuous Beam Arch Bridge in China's High-speed Railway

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Summary

To reduce the use of farm land, protect the ecological balance and avoid bad foundation, the bridge applied to China High-speed railway is in larger proportion. The spanning capacity of bridge is crucial when across rivers and other obstacles, as a result, long-span continuous arch bridge becomes one of the feasible schemes.
Continuous composite arch bridge as a new structure is composed of different type of structures such as continuous beam bridge, arch bridge and composite structure. The beam-arch combined structure possess the advantages of bearing load, the good stiffness of the structure, less height of architecture and mature construction methods, and this type of bridge will become one of the most competitive bridges in the future. This paper reviews the application of continuous beam arch composite bridge and explains the designing characteristics of China High-speed Railway, including design parameters, Mechanics, aesthetics and traffic. In addition, taking the continuous beam-arch combined structure of the Songhua River Bridge and Sandy Bay Waterway Bridge as the research background, the introduces were done in detail on the beam-arch combined structure, including the design parameters, structure styles, construction technology and key technology of high speed railway continuous beam arch bridge for providing the reference to the similar works.

Keywords: bridge engineering; High-speed railway; prestressed continuous beam; arch bridge; design parameters.

1. The Current Situation of prestressed concrete continuous beam arch bridge in China's high-speed railway

1.1 The importance and characteristics of bridges in high-speed railway

By the end of 2012, the national railway mileage reached 110000 kilometers [1]. The proportion of bridges in Guangzhou-Zhuhai intercity reaches the largest of 90% or more. And the bridge proportion in Beijing-Tianjin intercity is 88% [1]. The total length of the Beijing-Shanghai high-speed railway is 1318 km, while the length of bridges is 1060 km [1] and reached 80% of the total length of the railway. The Kunshan large bridge with the length of 164.8 km made a record of high-speed railway bridge in our country, and was also the longest bridge in the world. In recent years, the form of bridge is varied in high-speed railways, such as slant leg rigid frame, composite arch, v-shape rigid frame, beam combination etc., has been developed rapidly. The investigation

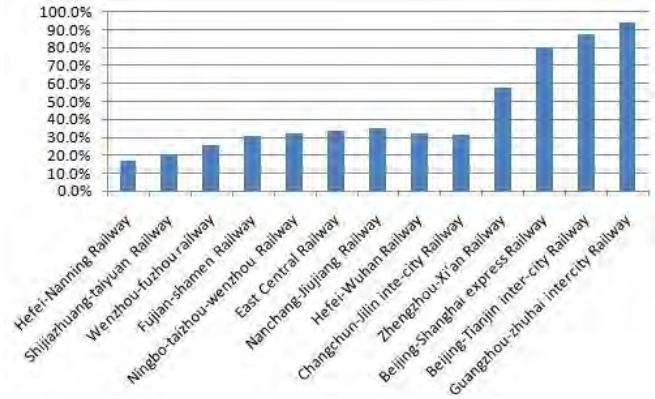

Fig. 1: The proportion of bridge in High-speed railway

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