



Research on Sectional Optimization Design of Fabricated Bent Cap of Urban Viaduct

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Abstract

With the rapid development of national transportation infrastructure, viaduct has been widely used in the construction of urban expressway. The prefabricated bridge scheme has significant advantages in such areas as traffic organization, construction period and environmental protection. Taking a project under construction in Jiangsu as an example, this paper compares and analyzes the impact of various bent cap segmental forms on the project construction, and provides for optimization design schemes, with the aim of providing reference for the design of Urban Viaduct of similar type in the future.

Keywords: fabricated bent cap; subsection; optimization design.

1 Development status of bridge assembly technology domestically and abroad

In recent years, with the strengthening of the green construction concept, prefabricated bridges have the characteristics of standardized design, industrial construction, short construction period, strong traffic protection ability and environment-friendly. They are widely used in the field of Urban Expressway Viaduct. The superstructure, lower bent cap, pier column, pile foundation and other components of the bridge are prefabricated in the factory according to the design size and reinforcement mode. After various components are transported to the site, they form an overall bridge structure after a series of processes such as installation and connection.

Scholars in China and abroad have carried out some research on the bridge fabricated technology, such as Won Deok Hee and others have studied the mechanical behaviour of the prefabricated pipe

pier cap beam at the consolidation of the pier beam^[1]; Zhao Zhuo and others analysed the seismic performance of fabricated piers connected with UHPC materials through ABAQUS numerical simulation^[2]; Wang Quanqing studied the seismic performance of assembled bridges of mountain roads in high intensity areas^[3]; Mr. Wang. R and others analysed the seismic performance of grouting sleeve connection between pier column segments^[4]; Rehounek. Lubos and others optimized and analysed the spiral reinforcement configuration of fabricated pier^[5]; Motaref and kavianipour studied the socket connection between Precast Pier and precast foundation, and filled the joint gap with high-strength cement slurry^{[6][7]}; Xu Yan and others studied the minimum reasonable socket depth of socket precast assembled pier^[8]; Sha Lixin and others verified the linear elasticity and nonlinearity of different segment schemes of fabricated inverted T-shaped bent cap by finite element numerical simulation^[9]; Yan Xingfei and others carried out experimental research on the flexural performance of the