



The new method strengthen U-shape girders by UHPC thin layer

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Abstract

As a new type of bridge structure, prestressed concrete U-shape girders are extensively applied in urban elevated roads, railways and highways in China. However, there are problems remained for the structure of U-shape girders including large shear lag effect, poor torsional and integrity performance, which result in the emergence of various cracks on prefabricated bridge decks. Taking the strengthening of Hujia highway in Shanghai as a construction example, a strengthening method of U-shape girders by UHPC (ultra high performance concrete) is proposed in this paper. The UHPC layer was poured under the prefabricated bridge deck for repairing cracks and it has proved to improve the carrying capacity of the U-shape girders. In order to demonstrate the feasibility of UHPC layer strengthening method, a local plate finite element model is built to analyze the local effect. The UHPC plate bending experiment and in-field loading test are carried out to prove that the carrying capacity and strengthening effect of UHPC layer are remarkable.

Keywords: U-shape girder; UHPC; finite element analysis; bending capacity experiment; in-field loading test