

Parametric Study for Optimal Design of Hybrid Bridge Joint

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Abstract : Mixed structure, which is a kind of hybrid system, is incorporating steel beam and prestressed concrete beam. Hybrid bridge adopting mixed structure have some merits. Main span length can be made longer by using steel as main span material. In case of cable-stayed bridge having asymmetric span length, negative reaction at side span can be restrained without extra restraining devices by using weight difference between main span material and side span material. However angle of refraction might happen because of rigidity difference between materials and stress concentration also might happen because of abnormal loading transmission at joint in the hybrid bridge. Therefore the joint might be a weak point of the structural system and it needs to pay attention to design of the joint. However, design codes and standards about the joint in the hybrid-bridge have not been established so the joint designs in most of construction cases have been very conservative or followed previous design without extra verification. In this study parametric study using finite element analysis for optimal design of hybrid bridge joint is conducted. Before parametric study, finite element analysis was conducted based on previous experimental data and it is verified that analysis result approximated experimental data. Based on the finite element analysis results, parametric study was conducted. The parameters were selected as those have influences on joint behavior. Based on the parametric study results, optimal design of hybrid bridge joint has been determined.

Keywords : parametric study, optimal design, hybrid bridge, finite element analysis

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