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## Finite element studies on new composite bridge using concrete filled steel I-girder

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A new steel/concrete composite girder was proposed and applied to continuous girder bridges. The area surrounded by the upper and lower flanges and the web is filled with concrete (CFIG: Concrete filled I-section Girder) at the intermediate support. This CFIG prevents lateral torsional buckling of the lower flanges and the lower part of filled concrete resist the negative bending. Bending and shear tests were performed with CFIG and CCG (Conventional composite girder) models. The maximum bending and shear strength of the filled concrete model was more than two times the conventional steel model. FEM analysis was conducted for the experimental models, which agreed with the test results and clarified the load transfer mechanism of CFIG. A design example with CFIG was carried out for a four-span continuous highway bridge and compared with an equivalent CCG bridge, which showed that the thickness of the flanges and web of CFIG can be less than 70% at the intermediate support and 10% at the mid-span of the CCG bridge. This study shows that the proposed concrete filled steel I-girder is feasible and economical compared with the conventional plate girder bridge.

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