World Academy of Science, Engineering and Technology
International Journal of Civil and Architectural Engineering
Vol:11, No:12, 2017

FEM and Experimental Studies on the Filled Steel I-Girder Bridge

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Abstract : Steel/concrete composite bridge with the concrete filled steel I-girder (CFIG) was proposed, and the bending and shear strength was studied by experiments and FEM analysis. The area surrounded by the upper and lower flanges and the web is filled with concrete in CFIG, which is used at the intermediate support of a continuous girder. The bending and shear tests of the CFIG were carried out, showing that the bending strength of CFIG was 2.8 times of the conventional steel I-girder and the shear strength was 3.0 times of the steel I-girder. Finite element models were established to clarify bending and shear behaviors and the load transfer mechanism of CFIG. FEM result agreed very well with the test results. The FEM model was also applied to simulate the shear tests of the CFIG specimens. A trail design was carried out for a four-span continuous highway bridge and the design method was established.

Keywords : bending strength, concrete filled steel I-girder, steel I-girder, FEM, limit states design and shear strength
Conference Title : ICACE 2017 : International Conference on Advances in Civil Engineering
Conference Location : Miami, United States
Conference Dates : December 14-15, 2017