

Cause Identification and Repair Method with Concrete for the Fatigue Crack of Existing Steel I-beam Bridge

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I-beam is the structural type used for the bridges of 1.3-6.7 meters short span. In this structural type, fatigue crack often initiates at the connection between web and bottom flange immediately above the bridge support. This fatigue crack initiation normally forces the bridge to be replaced with new one, since there is no effective repair method to prevent the crack propagation or re-initiation by reason of the uncertain mechanism.

In this research, we identified the mechanism of the fatigue crack initiation by conducting the loading test with full-scale I-beam bridge and FEM analysis. Based on this result, we proposed an unprecedented repair method for the fatigue crack, which covers the end of the girder with concrete. Moreover, we verified the effect and the durability of this repair method by the loading tests.