

INFLUENCE OF CORROSION OF REBARS CAUSED BY CHLORIDE INDUCED DETERIORATION ON FATIGUE RESISTANCE IN RC ROAD BRIDGE DECK

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Reinforced concrete (RC) road bridge decks have recently been found to suffer from serious damage due to the combined action of spreading of deicing salt and fatigue caused by the live load. To investigate this problem, the influence of rebar corrosion on the fatigue resistance of RC road bridge decks is investigated in this study both experimentally and analytically. First, specimens representing a full-sized RC road bridge deck were prepared and three methods of accelerated testing for chloride-induced deterioration (CID) were applied. Then the relationship between rebar corrosion condition in each specimen and its fatigue resistance was investigated by carrying out a wheel load tracking test. Next, the influence on fatigue fracturing in RC road bridge decks of differences in degree of corrosion between upper rebars and lower rebars was investigated using 3-D nonlinear finite element analysis. The experimental and analytical results revealed that the fatigue resistance of a RC bridge deck clearly declines even when corrosion of the rebars reaches just 5%, and that corrosion of the upper rebars is the dominant factor affecting the fatigue resistance of an RC bridge deck, rather than that of lower rebars.

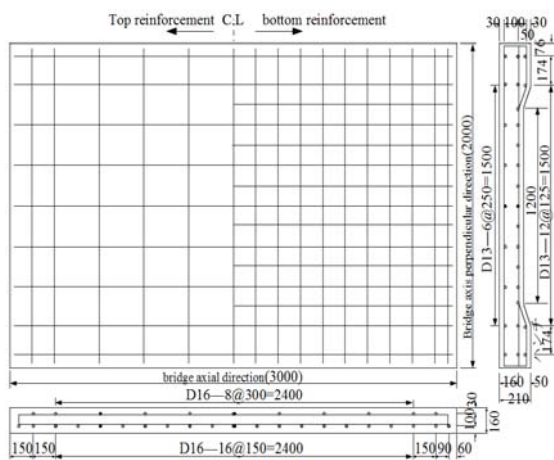


Fig. 1 Specimen summary

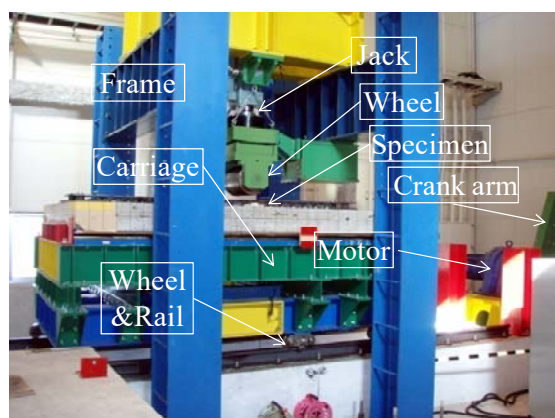


Fig. 2 Overview of wheel loading machine

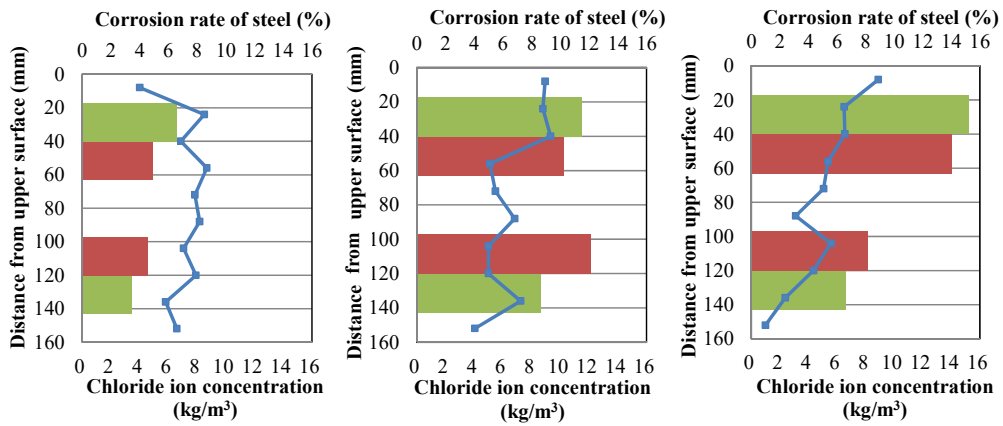


Fig. 3 Results of accelerated CID test (methods A, B, and C from left to right)

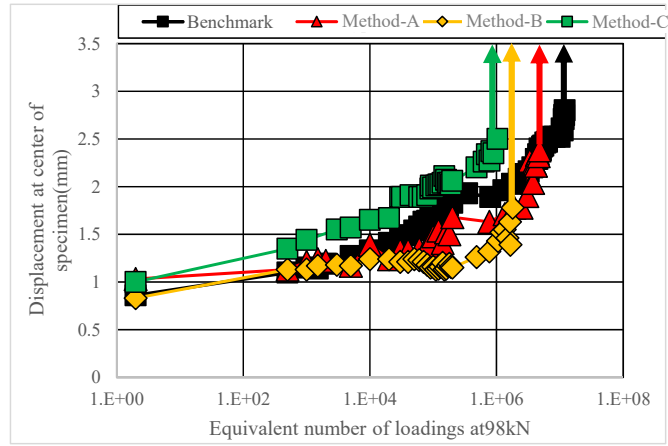


Fig. 4 Results of wheel loading test on specimens subjected to CID