

The Influenced of Localized Corrosion on the Natural Frequency in the Reinforced Concrete Beam

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ABSTRACT

This study presents the use of natural frequency for the identification of damage location in detecting the location and severity of corrosion in reinforced concrete beam models. The simply supported beam was modeled with five different corrosion factors, f using DIANA Release 9.1 software. The simulation models was applied in uncorroded beam (Beam UC) and corroded beam with corrosion factor of 8 % (Beam LD8), 16 % (Beam LD16), 32 % (Beam LD32), and 64 % (Beam LD64). The total span of 2200 mm with 20 locations in the steel bar was analyzed for localized corrosion including the distance near to supports. The technique was necessitated with the performance of linear, nonlinear, and eigenvalue analysis. The ratio of frequency drop of $f_{\text{corrode/uncorrode}}$ was obtained to visualize all modes at the corroded location. The results of frequency drop illustrated that the poorest location of corrosion was detected at x/L between 0.4 and 0.7. It can be concluded, the ratio of $f_{\text{corrode/uncorrode}}$ can be used to damage indicator to detect the localized corrosion.

KEYWORDS: Finite element analysis; Natural frequency; DIANA software; Eigenvalue analysis

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