CONDITION ASSESSMENT OF REINFORCED CONCRETE BRIDGE DECK USING GROUND PENETRATING RADAR

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Catastrophic bridge failure happens due to the lack of inspection, lack of design and extreme events like flooding and earthquake. Bridge Management System (BMS) is utilized to diminish such an accident with proper design and frequent inspection. Visual inspection cannot detect any subsurface defects, so use of Non-Destructive Evaluation (NDE) techniques remove these barriers as far as possible. Among all NDE techniques, Ground Penetrating Radar (GPR) has been proved as a highly effective device for detecting internal defects in reinforced concrete bridge deck. GPR is used for detecting rebar location and rebar corrosion in the reinforced concrete deck. GPR profile is composed of hyperbola series in which sound hyperbola denotes sound rebar and blur hyperbola or signal attenuation shows corroded rebar. Interpretation of GPR images is implemented by numerical analysis or visualization. Researchers recently found that interpretation through visualization is more precise than interpretation through numerical analysis, but visualization is time-consuming and a highly subjective process. Automating the interpretation of GPR image through visualization can solve these problems. After interpretation of all scans of a bridge, condition assessment is conducted based on the generated corrosion map. However, such a condition assessment is not objective and precise. Condition assessment based on structural integrity and strength parameters can make it more objective and precise. The main purpose of this study is to present an automated interpretation method of a reinforced concrete bridge deck through visualization technique. At the end, the combined analysis of the structural condition in a bridge is implemented.

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