

Numerical Simulation and Laboratory Tests for Rebar Detection in Reinforced Concrete Structures using Ground Penetrating Radar

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Abstract : The aim of this paper is to use Ground Penetrating Radar (GPR) as a non-destructive testing (NDT) method to increase its accuracy in recognizing the geometric reinforced concrete structures and in particular, the position of steel bars. This definition will help the managers to assess the state of their structures on the one hand vis-a-vis security constraints and secondly to quantify the need for maintenance and repair. Several configurations of acquisition and processing of the simulated signal were tested to propose and develop an appropriate imaging algorithm in the propagation medium to locate accurately the rebar. A subsequent experimental validation was used by testing the imaging algorithm on real reinforced concrete structures. The results indicate that, this algorithm is capable of estimating the reinforcing steel bar position to within (0-1) mm.

Keywords : GPR, NDT, Reinforced concrete structures, Rebar location.

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