



Frequency response of reinforcing bars: preliminary results

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This study deals with a preliminary analysis of the GPR synthetic response of reinforcing bars in the frequency domain. The FDTD approach was used to compare the power spectrum of a concrete block with no elements inside, a concrete block with a reinforcing bar (10mm diameter) and a concrete block with a void (10mm diameter). A Ricker excitation pulse of 2GHz was implemented to reproduce the response of a high frequency antenna commonly employed for reinforcement surveys.

The models produced respectively a homogeneous power spectrum with a frequency peak below the simulated central frequency (model with concrete only) a slightly distorted power spectrum (model with a 10mm diameter void) a power spectrum with multiple peaks (model with a 10mm diameter reinforcing bars).

The analysis was then carried out on a set of synthetic reinforcing bars with diameter ranging from 10 to 50mm (10 mm increment). The same response was observed with multiple peaks more and more pronounced as the diameter increases. The preliminary study can be furthered investigated to assess whether the reinforcement spectral analysis can be a valid tool to maximize the information return from radargrams beyond the simple visual analysis in the time domain.