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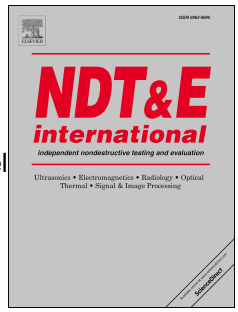

Ground penetrating radar response from voids: A demonstration using a simple model

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Ground Penetrating Radar Response from Voids:

A demonstration using a simple model

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ABSTRACT

A simple Ricker wavelet model can be used to illustrate some fundamental properties of the ground penetrating radar (GPR) response from both air- and water-filled voids. Reflections from the top and the bottom of a void overlap significantly, and generate one common characteristic of a void response: a “bright spot”, analogous to the “bright spot” observed in seismic exploration. For time delays equal to about half the pulsewidth, the reflected wavelets superimpose to yield maximum reflection amplitudes. The top reflected wavelet becomes completely separated from the bottom reflected wavelet when the void time delay exceeds twice the wavelet pulsewidth. The two wavelet reflections can be individually identified at earlier time delays, approximately equal to the wavelet pulsewidth. This is still substantial and explains why it is difficult to use GPR to infer void thicknesses, especially for air-filled voids.

Keywords: ground penetrating radar; voids; reflection; wavelet; superposition.

Word Count: Abstract: 138 words.