



Incorporation of Materials' Attenuation Effect into the Relative Permittivity Calculations Using GPR

Salih Serkan Artagan (1) and Vladislav Borecky (2)

(1) Anadolu University, Eskişehir, Turkey (ssartagan@anadolu.edu.tr), (2) University of Pardubice, Pardubice, Czech Republic (vladislav.borecky@upce.cz)

Ground Penetrating Radar (GPR) has been one of the most potent non-destructive techniques (NDT) for determining the properties of building materials. In GPR research, the utmost governing parameter is relative permittivity. Several studies have shown that relative permittivity can be related to technical properties of building materials and subgrade soils. There are several methods to determine the relative permittivity using GPR. One of these methods commonly used in transport infrastructure field is the approach called as Reflection Coefficient Method (RCM). RCM uses amplitude values observed in layer interfaces of different materials to calculate the relative permittivity. However, this method works accurately for the surface layer only. For underlying layers, this method becomes less accurate due to the omission of attenuation effects in upper layers. In this article, we incorporate the attenuation of several building materials into the RCM calculation process in order to compare the results between the standard and thus modified methods with the known thicknesses of surveyed materials' interfaces.