

THE EFFECT OF MOISTURE ON GROUND PENETRATING RADAR (GPR) DATA FROM ASPHALT ROAD PAVEMENTS

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ABSTRACT

The presence of moisture in asphalt road pavements can cause damage to the material, particularly by reducing the cohesion between binder and aggregate. Hence, the ability to detect areas where excessive moisture may be present, or where moisture ingress into pavement structures may be occurring, is important for the maintenance of asphalt pavements. This is particularly relevant as climatic trends in the UK suggest an increase in total rainfalls and an increase in the frequency of very wet weather.

The dielectric properties of asphalt are heavily influenced by the amount of water in the material, and it is possible to calculate the dielectric constant from ground penetrating radar (GPR) data, although it is often difficult to quantify accurate moisture amounts.

This paper describes a series of laboratory tests conducted using a number of asphalt core samples taken from in-service roads, to determine the relationship between moisture content and the dielectric values determined from GPR data. It has been possible to observe and quantify the asphalt dielectric constant as it changes as a result of changing moisture content.

It is possible to use information from this study to assist in estimating moisture amounts from GPR data obtained from in-service asphalt road pavements. The work can be applied to GPR pavement moisture investigations in order to more accurately assess moisture amounts and thus to determine locations of possible moisture ingress within asphalt pavements.

KEY WORDS: GPR, radar, dielectric, moisture, asphalt.