EXPERIMENTAL FIELD DEVELOPMENT FOR GPR APPLICATION

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Abstract

This work aims to define parameters and the creation of an experimental field in CEFET-MG *Campus* Curvelo that simulates the real conditions of the urban context for the application and study of the Ground Penetrating Radar (GPR) method in a controlled environment. This experimental field predicts the presence of several buried hydraulic pipes, as well as asphalt paving layers and construction and demolition waste. The choice of materials to make up the experimental field occurred through bibliographic studies, according to their applicability.

In the urban context, the presence of several buried pipes with varied specifications and depths is very common. In places where there was no project, may occur when improvement, maintenance or expansion of the infrastructure is carried out, the drilling of these pipes due to identification failures. In addition, the observation of leaks can be noticed only in advanced stages of the damage caused by such occurrences. The GPR can be used as a solution in these cases, besides serving as a conference tool in the recovery and execution of paving services.

The GPR is a technique that allows the imagetion of the soil based on the emission and reception of electromagnetic waves, which propagate in different ways according to the medium. This is a non-destructive test, so there isn't need for drilling and displacement of soil, being a practice of easy and quick execution.

Through the detection and interpretation of pulses reflected in the discontinuities of the interfaces, the necessary subsidies for the diagnosis regarding the pipes are obtained. The focus is to use the results and interpretation of the GPR profiles to characterize the simulated subsurface. Therefore, a GPR behavior pattern can be defined (in terms of texture, amplitude, slope, shape and frequency of reflections) for hydraulic pipes, and thus identify them, more accurately, in any region of use. This tool can be used as an instrument for decision making for future research and facilitate the obtaining of answers in the field, without the need for the use of invasive investigation methods.

The experimental field will have an area of 3.0m wide by 3,0m long, having a depth of 1,20m. The pipes will be buried: PEAD of 63 mm in diameter and 60 cm deep, PVC of 100 mm in diameter and 80 cm deep, PVC of 250 mm in diameter and 120 cm deep and cast iron of 50 mm in diameter with 80 cm depth.

By using GPR in a controlled environment, you can identify the behavior of radargrams for different conditions in order to develop a database. This can be used as a reference for future interpretations of profiles obtained in different real areas. This information is fundamental to support remediation actions in situations of the urban context, such as: engineering works, geotechnics and contamination of the environment, considering the properties/composition of the material, diameters and depths. In addition, the existence of construction and demolition waste and asphalt paving conditions can be identified.