

UNIVERSITI TEKNOLOGI MARA

**EVALUATION OF SOIL DEGRADATION
DUE TO GPR AMPLITUDE WAVE AND
ELECTRICAL CONDUCTIVITY OF SOIL**

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Dissertation/thesis submitted in fulfillment
of the requirements for the degree of
Bachelor of Surveying Science and Geomatics (HONS)

JANUARY 2018

AUTHOR'S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

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ABSTRACT

Soil contamination that affected by the present of hydrocarbon product is one of the most popular environmental issues. The present of petroleum hydrocarbon in the soil will change the soil physical properties, due to the penetration of hydrocarbon in the subsurface through soil particle. Thus, the presence of hydrocarbon will replace the position of the water in the subsurface material. As a consequence, hydrocarbon will change the electrical properties of the soil such as the dielectric constant and electrical conductivity, which this process also will change the image of subsurface. Hence, due to evaluation the change of subsurface image, the use of Ground Penetrating Radar (GPR) signal that controlled by the electrical properties of soil can be used to determine the electrical conductivity of soil. In addition, the aim of this study is detect the presence of soil contamination that affected by the hydrocarbon. In relation to achieved the aim, the objective of this study is to analyses the GPR amplitude wave and electrical conductivity of uncontaminated and contaminated soil, and to evaluate the accuracy of electrical conductivity of soil using GPR. In this study, the method use is the manipulation of radar signal, using the experiment collected by the GPR instrument. In addition, the investigation site involved in this study is simulation site with the size (2.0 m x 2.6 m x 1.5 m) that is in uncontaminated and contaminated ground condition and also the fuel pump station. The measurements for the data collection use the MALA GPR that having the frequency 800 MHz for the both investigation site. The result will be present to shows that the contamination of soil is effected by both GPR amplitude wave and electrical conductivity. Consequently, the outcome of this study is the GPR amplitude wave at contaminated area with the value -66 are difference with the uncontaminated area with value -304. Besides that, it also represents the electrical conductivity at contaminated area with the value 0.077420 mS/m are difference with the uncontaminated area with the value 0.077500 mS/m.

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