COMPARATIVE STUDY OF SOIL'S MOISTURE CONTENT DETERMINED BY OVEN-DRYING AND MICROWAVE-DRYING

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ABSTRACT

Conventional oven heating method has been always used as the standard method in determination of soil moisture content; it is operated at a temperature of 105±5°C. However, the time used to determine the soil moisture content by using conventional oven is lengthy, it takes about 24 hours. So, if assessments of soil moisture content are needed quickly, microwave oven heating method can be used. In this study, a model of SAMSUNG MW71B microwave oven with various power controlled setting was used.

In order to examine the reliability of the microwave oven heating method, a comparative study on determination of soil moisture content by conventional oven heating method and microwave oven heating method were conducted and discussed. The different types of soil range from granular soils to cohesive soils were used in this study. Five sets of soils have been obtained from the field for this investigation too. A summary of laboratory testing programme such as particle size analysis, plastic limit test, liquid limit test that used to define or classified the types of soils were discussed in this project. Besides that, the standard test methods of conventional oven heating method and microwave oven heating method that established by American Society for testing and materials were described. The soils specimen used in this study will be mixed with different amount of water and tested.

Differences between moisture content determined using conventional oven and microwave oven were compared and discussed in the latter part of the project. A series of data that have been determined and investigated were stated in the project too. Statistical analysis were used to assess the results of soil moisture content by determine its mean values and standard deviation values. Also, advantages and disadvantages of both methods have been discussed. Comparison of moisture content determined in the microwave oven heating method with those determined by the conventional oven heating method showed a comparable results, generally, the differences are insignificant. The effects of sample' size and cohesiveness of soil were influenced the time required to dry the soil and the accuracy of results respectively.