

A Study on Factors Influencing the Determination of Moisture Content of Fibrous Peat

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Abstract- Fibrous peat is an undrained peat that usually possesses very high moisture content. However, not all experimental procedures are applicable for determination of moisture content of fibrous peat. This research is aimed at examining the determination of insitu moisture content of fibrous peat using field measurements. The peat soil samples were collected at shallow depths from Asajaya at Kota Samarahan and Taman Kopodims at Matang , Kuching Sarawak by using peat auger. The laboratory tests such as determination of moisture content, fiber content, particle density and ash content were conducted on the collected samples in order to establish relationships between the parameters. Undisturbed peat samples from Matang were subjected to falling head permeability test to determine the saturated permeability. The saturated sample were then allowed to drain freely to simulate the moisture loss possible during sampling when samples were brought out of boreholes. The test results showed that moisture content varies according to the drying temperature and position of the soil sample (top, middle and bottom) during sampling. Comparing samples from both locations, peat soil from Kota Samarahan possessed higher moisture content. The saturated permeability of peat sample was in the range of 2.62 – 3.05 cm/s. The free draining trial showed that moisture loss during sampling significantly influence the moisture content measurement. The variation in value of moisture content for fibrous peat may occurs due to several factors such as existing ground water table, sampling method by boring, existing standard test procedure which is not suitable for peat soils requirement and also because of the physical properties which varied according to depth of soil.

Keywords: Moisture content, fibrous peat, permeability, field measurement

I. INTRODUCTION

MOISTURE or water content is one of the most distinctive properties of peat as most of the physical characteristics of the peat are related to the amount of moisture present. There are many methods available for determination of moisture content of soils. However, not all test equipment and experimental procedures used with these methods are applicable in the case of fibrous peat soil as they are normally designed considering inorganic soils. Fibrous peat, which is also known as fibrist, is an undrained peat that usually possesses very high moisture content due to its high organic content and void ratio. Most of the peat materials are in fully saturated state as the ground water table is at a shallow depth.

The most common laboratory test for determination of moisture content of soil is the oven-drying method complying with British Standard (BS 1377 – 2: 1990) or American Society for Testing and Materials (ASTM D 2216). ASTM method D-2216 which determines the free water or pore water content as a percentage based on moist and oven dried soil weight differences may generate erroneous information for soils with a high organic material content [1]. The BS 1377 – 2: 1990 also states that a microwave oven should not be used as definitive method in determining the moisture content of soils containing organic matter such as peat. This is caused by the difficulty in ensuring temperature of soil does not exceeds 110 °C. However, peat soil samples may experience particle burning even at temperatures well below 110 °C.

Another factor of importance is the method of sampling by boring which may affect the measurement of field moisture content. This is because once a sample is taken at the particular point, the soil has been disturbed and its properties may be altered. This introduces another variable, the heterogeneity of the soil into the moisture measurements; also there may be internal migration of water or moisture loss during sampling. The loss of moisture due to free draining during removal of the sample from the borehole also may be of importance. As a result of the above, factors that will significantly affect the determination of moisture content of fibrous peat must be identified. The use of present testing techniques for peat moisture is unsatisfactory, and therefore it is necessary to establish more reliable methods for obtaining the moisture content of fibrous peat in the field.

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