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Correlation Between Different Physical and Engineering Properties of Tropical Peat Soils from Sarawak

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ABSTRACT: The present paper describes the physical and engineering properties of tropical peat soils from Sarawak, Malaysia. Different physical properties such as organic content (OC), liquid limit (LL), fibre content (FC), specific gravity (G_s) and engineering properties (mainly the standard Proctor test) have been conducted on remoulded peat soil samples. The results show that, the value of LL, FC, Optimum Moisture Content (OMC) increases with an increase in OC. Also the results show that, G_s and MDD decrease with increasing values of OC. Furthermore, the plot of OC against G_s from the current study is compared with other researchers; whereby the correlation shows that R^2 values ranges from 0.71 to 0.95. This demonstrates that findings on local peat soils from Sarawak are in good agreement with other researchers as similar trends are observed. Consequently, geotechnical engineers can refer these correlations to comprehend the preliminary behavior of peat soil, where the geotechnical data are not readily available.

INTRODUCTION

Peat or highly organic soils are extreme soft and non-homogeneous. These soils are partly decomposed and fragmented remains of plants leaves, roots that have accumulated under water and fossilized. Normally the peat soils are formed in wetland bogs, moors, muskegs, mires, and peat swamp forests and they cover 5 to 8 % of the total land area of the Earth's surfaces. Among them about 8 to 11 % are tropical peat soils which includes Indonesia, Malaysia, Brazil, Uganda, Zambia, Zambia, Venezuela, and Zaire (Mesri & Ajlouni, 2007). Malaysia covers approximately 2.7 million hectares of peat lands and out of that about 1.66 million hectares (i.e. 61%) are located in the deltas and coastal plains of Sarawak. Peat soils of Sarawak occupy 13% of the total land area and most of the year; these areas are waterlogged (Mutalib et al., 1991). Due to the high water level in this area, it is very difficult to determine the physical and geotechnical properties of peat soil. Edil (1994) emphasizes on characterizing peat and organic soils by certain index properties, to provide a basis for comparison of results of mechanical tests. Hobbs (1986) also suggested that it is