STUDY ON INFLUENCE OF MOISTURE CONTENT IN CEMENT STABILIZED SERIAN SOIL

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Abstract
The aim of the study is to investigate the strength development of cement stabilized Serian soil at varying moisture content. The soil sample was mixed with 10 % of cement by dry weight of soil and added with different percentage of water to replicate field site conditions. The water content used were the lower limit of Optimum Moisture Content (0.7 OMC), Optimum Moisture Content (OMC), and an upper limit of Optimum Moisture Content (1.27 OMC) which were 19.5%, 28%, and 35.5% respectively. Compaction test performed on the natural and cement stabilized soil. The Atterberg limits also were performed for natural soil and cement stabilized the soil. The Unconfined Compression Strength (UCS) was conducted to examine the effect of compressive strength. Consolidated Isotropic Undrained (CIU) Triaxial test with various confining pressures was conducted for cement stabilized soil. The Atterberg limits improved for stabilized soil compared to natural soil. The cement stabilized soil mixed 1.27 OMC achieved highest compressive strength and exhibit higher deviator stress from Triaxial test and followed with mixed at OMC and finally at 0.7 OMC. From Scanning Electron Microscopy (SEM) observation, cement stabilized soil had better inter-cluster cementation bonding and reduced pore spaces.

Keywords: *Cement; Clay; Stabilization; Triaxial; and Unconfined Compression Strength*

INTRODUCTION

The soft soil consists of low strength, high water content, high compressibility and high deformability typically causing difficulties in geotechnical applications (Haofeng et al., 2017). In general, the soft soil is widely deposited in the State of Sarawak (Taib et al., 2016). Soil stabilization is an effective technique to improve the engineering properties of soils, especially in soft soils. Typically, soil stabilization is accomplished by blending and mixing the stabilizer with the problematic soil which leads to improvement in engineering properties (Olufowobi et al., 2014). In general, soil stabilization is divided into mechanical stabilization and chemical stabilization (Garber and Hoel, 2009). Chemical stabilization is widely used in improving the problematic soil due to the potential to improve load bearing capacity and to improve the shear strength of the soil more than conventional method (Marto et al., 2014; Latifi et al., 2016a).

In addition, cement and lime is the traditional stabilizers that have been used for stabilizing the soil (Basha et al., 2005; Latifi et al., 2016b). Cement provides highly effective way in clay soil stabilization which is typically benefited with high strength gains. Moreover, cement also provides hydration products which also increase the strength of the soil as well as maintain the permanence of the stabilization treatment (Prusinski and Bhattacharja, 1999). Cement stabilization mechanisms typically involve in four processes which are cementitious hydration, cation exchange, flocculation-agglomeration and pozzolanic reaction (Prusinski and Bhattacharja, 1999). Chemical reaction produces cementitious products such as Calcium Silicate Hydrate (CSH) and Calcium Aluminate