

DEVELOPMENT OF BRICK FROM MUD FLOOD: MECHANICAL
PROPERTIES AND MORPHOLOGY CHANGES

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To;

My Parent

&

My family...

**Thanks for your pray, attention and spiritual
support...**

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ABSTRACT

After the flood event, there is lots of debris and muds were found along the affected area. Soil treatment is an alternative method used to utilize the mud flood to increase the strength of the material to produce bricks. In this study, a series of laboratory test was conducted to determine the optimum mixture stabilizer of non-traditional additives called “SH-85” to stabilize mud flood soil to form a brick. The mud flood soil sample was taken from Kuala Krai, Kelantan after the flood event. Basic test such as Atterberg limit test, specific gravity test, sieve and hydrometer were carried out to determine the physical properties of mud flood soils thus used for soil classification. Unconfined Compressive Strength (UCS) test was conducted for treated and untreated of mud flood soils which were used to assess the engineering properties of the stabilized soil. The proportions of stabilizer added were 3, 5, and 10% from the soil weight and tested at 0, 3 and 7 days curing periods. Based on the results, it was found that the used of stabilizer could increase the soil strength. To achieve minimum values of crushing strength for bricks 2750 kPa, additional 2% of sodium nitrate was added to soil with 10% of SH-85 and cured for 3 days at 105 °C temperature. Microstructure analyses were conducted using Energy-Dispersive X-Ray spectrometry (EDX) and field-emission scanning electron microscopy (FESEM) tests. FESEM results show that the void of untreated soil was filled by a new cementations product and show the presence of white colour lumps in treated soil. This finding indicates that the mixture of SH-85 stabilizer and sodium nitrate is suitable for the mud flood soil to become bricks for building construction.

ABSTRAK

Selepas peristiwa banjir, terdapat banyak serpihan dan lumpur telah ditemui di sepanjang kawasan yang terjejas. Rawatan tanah adalah salah satu kaedah alternatif yang boleh digunakan untuk memanfaatkan banjir lumpur bagi meningkatkan kekuatan bahan untuk menghasilkan batu bata. Dalam kajian ini, satu siri ujian makmal telah dijalankan untuk menentukan campuran optimum penstabil bahan tambahan bukan tradisional yang dikenali sebagai "SH-85" untuk menstabilkan tanah banjir lumpur bagi membuat bata. Sampel tanah banjir lumpur telah diambil dari Kuala Krai, Kelantan selepas kejadian banjir. Ujian asas seperti ujian had Atterberg, ujian graviti tentu, ujian tapisan dan hidrometer telah dijalankan untuk menentukan sifat-sifat fizikal tanah banjir lumpur dan digunakan untuk pengelasan tanah. Ujian kekuatan mampatan tak terkurung (UCS) telah dijalankan pada tanah banjir lumpur yang dirawat dan tidak dirawat untuk menilai ciri-ciri kejuruteraan tanah. Kadar penstabil yang ditambah adalah 3, 5, dan 10% daripada berat tanah dan diuji pada 0, 3 dan 7 hari pengawetan tempoh. Hasil kajian mendapati bahawa penstabil yang digunakan boleh meningkatkan kekuatan tanah. Untuk mencapai nilai minimum kekuatan bata iaitu 2750 kPa, 2% natrium nitrat telah ditambah kepada tanah dengan 10% kadar SH-85 dan diawet selama 3 hari pada suhu 105 °C. Analisis mikrostruktur telah dijalankan dengan menggunakan tenaga serakan X-Ray spektrometri (EDX) dan ujian lapangan pelepasan elektron imbasan mikroskop (FESEM). Keputusan FESEM menunjukkan bahawa kekosongan tanah yang tidak dirawat telah dipenuhi dengan produk cementations baru dan juga menunjukkan kehadiran ketulan warna putih di dalam tanah yang dirawat. Kajian ini menunjukkan bahawa campuran SH-85 penstabil dan natrium nitrat sesuai untuk menjadikan tanah banjir lumpur sebagai batu bata untuk pembinaan bangunan.