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LABORATORY AND FIELD TESTING OF LIME COLUMN TECHNIQUE IN BANGKOK SOFT CLAY

Haron Bin Ibrahim

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by

HARON BIN IBRAHIM

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Examination Commitee:

Prof. A.S. Balasubramaniam (Chairman)
Dr. P. Noppadol
Dr. Jiro Kuwano

Haron Ibrahim

Nationality : Malaysian
Previous Degree : B.Sc.(civil)
U.M.I.S.T. Manchester,
England.
Scholarship Donor : ASEAN - US

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ABSTRACTS

This experimental study covers primarily construction technique involved in the installation of lime columns and the evaluation of the load capacity in the A.I.T campus. Fourteen lime columns with an average lime content of 5, 10 and 15% were installed in the field with high Calcium hydrated Lime ($Ca(OH)_2$) as its stabilizer. Eight lime columns were load tested, with diameters of 0.15 m and 0.30 m. The lengths of the lime columns were 4, 6 and 8 m with curing period of 4, 6 and 8 weeks before load test were performed. The ultimate load ranges from 1.2 to 2.4 ton, with the ultimate load of 2.4 ton obtained from the 0.3 m, 15%, 8 m length column, cured over 8 weeks. This represented an increase of 2.4 times over the ultimate load of the untreated soil. The effect of length, curing period, diameter and lime content were also investigated.

Field vane shear and Dutch cone penetration tests were also performed to monitor the effect of the installation procedure and its relative effectiveness with lime stabilization. Laboratory test conducted on laboratory prepared samples and also those obtained from the field indicated the effectiveness of lime treatment which resulted in an increase in strength and lower compressibility with lime treatment.

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I INTRODUCTION

1.1 General

For construction of highways and approach roads on soft compressible clays, the traditional technique to overcome such engineering difficulties was to extend the load to a suitable bearing strata by means of deep foundations . An alternative was to redesign the structure and its foundations for support by the poor soil. These approaches may not be either feasible or economical. Soil stabilization techniques which are basically an insitu method of increasing the soils bearing capacity and reduction in settlement are highly preferable in this instances.

The lime column technique has thus been developed to reduce the settlement of mainly light structures such as road embankments, runways, small dam embankments, oil storage tanks and other lightly loaded structures.

The lime column technique for soil stabilization is relatively new in its presently developed form and as so far, the data available about the applications of lime column methods and the design procedure used for calculating bearing capacity and settlements are based on laboratory and field observation at sites in Sweden and Finland only. BROMS & BOMAN (1977a) therefore cautions to first ascertain the applicability for potential suitable soils in the areas where experience with this method is not available.