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CONSOLIDATION BEHAVIOUR OF LIME-CEMENTED BENTONITE

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***Abstract*— Settlement is one of the important issues in geotechnical engineering. The settlement issue in construction is of importance due to crack and possible collapse matters. This study focuses on the behaviour of cemented bentonite in respect to each load. The results showed that cement and lime reduced the settlement of bentonite.**

Keywords— **Consolidation, Bentonite, Cement**

I. INTRODUCTION

Settlement is a common issue in urban area [1-5]. Compression of the soil can cause disastrous impacts on human life. One-dimensional consolidation test is a method to experiment the settlement rate in geotechnical laboratories [6-15]. Coefficient of consolidation (Cv) and compression index are two characteristics that can achieved through the consolidation test [16-25]. There are many methods to reduce the settlement behavior of the soil [26-37]. Addition of agents such as cementitious products is a method to reduce this destructive behavior [38-50]. Addition of some other products such as recycled tire, sawdust, and GGBFS has shown effective in reduction of the settlement behavior of soil [51-66]. This study aims to investigate effect of lime on improvement of consolidation characteristic of the cemented bentonite.

II. MATERIALS

Three materials were mixed together to generate the appropriate mixture to be tested. The materials are well defined as:

a) Bentonite:

The bentonite clay which was sourced from supplier with Cu=1.3 was selected for this study.

b) Cement

Given popular usage of Portland cement. The selection was made in favor of Portland cement (PC).

c) Lime

The lime selected for this study was based on major ingredient as Cao of approximately 80%.

III. COMPACTION TESTING

Table 1 shows the compaction characteristics of the mixes.

Table 1 Compaction characteristics of mixes

Sample Id	PC%	Lime	OMC %	MDD
B-PC-L1	2	1	42	1.24
B-PC-L3	2	3	47	1.2
B-PC-L5	2	5	51	1.18

IV. CONSOLIDATION

The consolidation device called odometer was used to measure the consolidation coefficient of the mixes. Fig. 1 to 4 presents the effect of cement and lime in the bentonite Cv and Cc indices for the mixtures.

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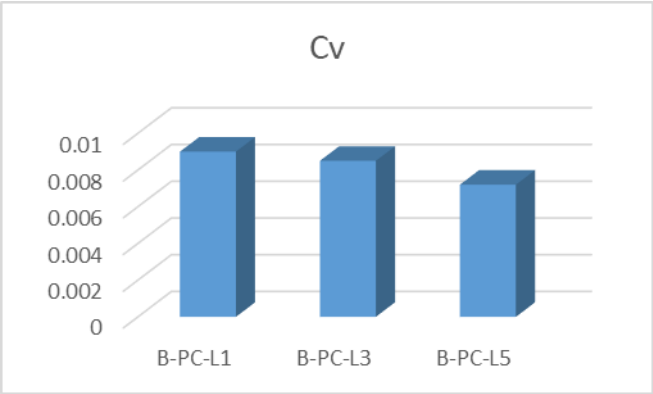

Fig. 1 coefficient of consolidation (Cv) variations

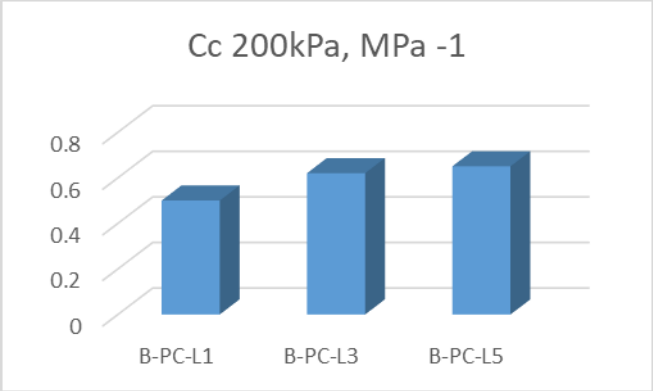

Fig. 2 Compression index (Cc) under 200 kPa and 1 MPa normal stress.

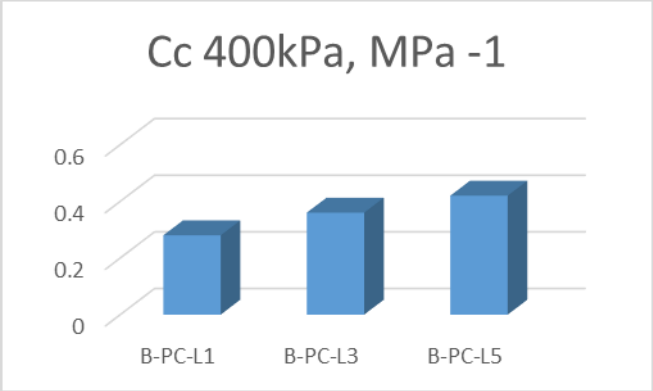

Fig. 3 Compression index (Cc) under 400 kPa and 1 MPa normal stress.

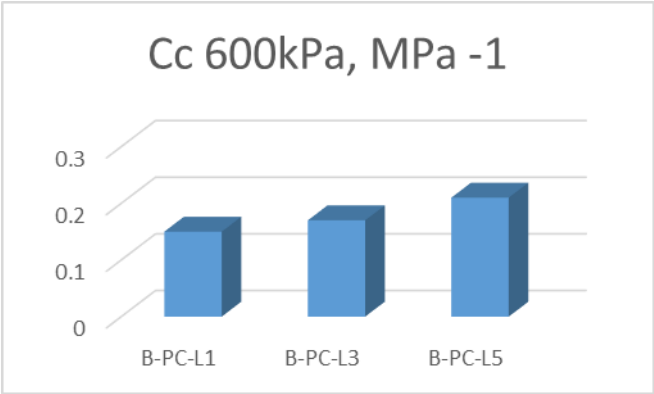

Fig. 4 Compression index (Cc) under 600 kPa and 1 MPa normal stress.

V. CONCLUSION

A series of consolidation test was conducted, and the results showed that Cv decreased with increasing in lime percentage and the Cc was increased in different pressure.

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