



Experimental Study on Bearing Capacity of Alkaline Activated Granular Asphalt Concrete Columns on Soft Soils

Erdawaty ^a, Tri Harianto ^a, A.B. Muhiddin ^a, Ardy Arsyad ^{a*}

^a Hasanuddin University, Jalan Poros Malino Km-6, Gowa 92171, Indonesia.

Received 21 September 2020; Accepted 21 November 2020

Abstract

In civil engineering, alternative materials showed rapid progress. Asphalt derived from Buton Island in Indonesia, also known as Asbuton, was located in the limestone bedrock. A large deposit of Asbuton could guarantee the supply of alternative construction materials. In that regard, Asbuton performance as an alternative material to several subjects needs to be analyzed. Therefore, this study was conducted to analyze Asbuton's behavior as a filler in a floating column model as a soft soil improvement concept. Asbuton added to sand and gravel mixture as filler and waterglass as a binder. CBR samples were tested to acquire the optimum composition with varied curing days namely 0, 3, and 7 days, following ASTM D-1883, followed by a compressive column model test which was based on ASTM D-2166. Finally, the column applied to the soft soil layer to be tested in a loading test, and the results are then compared for each composition. The results showed that the granular material's composition including Asbuton, the waterglass content, and the curing period significantly affect the engineering properties of the artificial column. The results revealed that the granular column with Asbuton with the addition of waterglass could increase soil's load capacity and reduce the settlement of soft soils.

Keywords: California Bearing Ratio (CBR); Soft Soils; Asbuton; Stone Column; Alkaline Activated.

1. Introduction

The soil conditions influence the stability of a structure. To increase the mechanical value of the soil, soil stabilization must be carried out, whether mechanically or chemically. Stone columns (or granular columns) are one type of mechanical soil improvement, which is now increasingly used for soil improvement. Soil improvement mechanisms depend mostly on soil type. Several methods are available for improving granular soils such as layered compaction [1]. But for soft soil, improvement methods could vary depending on a certain condition, such as material availability [2]. Considering the abundant amount of material and necessity to increase the stiffness of a stone column, this study was conducted to analyze the performance of Asbuton and waterglass-stabilized stone column with geogrid encasement in reducing settlement of soft soil layer due to static loading. The final result will be delivered systematically according to the general process which presented in several sections; Introduction to give the readers a brief review of the paper, Literature Study to provide supporting theories from previous study and findings, Methodology to state the process of the research, Result, and Discussion to represent the data gathered along with the research, and Conclusion to state our final finding and analysis result.

* Corresponding author: erdawatyerna@gmail.com

 <http://dx.doi.org/10.28991/cej-2020-03091623>



© 2020 by the authors. Licensee C.E.J, Tehran, Iran. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC-BY) license (<http://creativecommons.org/licenses/by/4.0/>).