

Bearing Capacity Correlation by Using Dynamic Cone Penetrometer Test and California Bearing Ratio Test for Mining Equipment Recommendation

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ABSTRACT

Coal mining in Indonesia has grown larger in the late century. According to a great market demand to fulfill coal supply, the coal mining company increases the coal production. Therefore, the coal mine area would be expanded to increase coal production and it needs study. Furthermore, one of the studies is bearing capacity study which is required to expand pit area. Purpose of this study is to determine the correlation of two bearing capacity methods and give the recommendation for appropriate mining equipment in field. Dynamic Cone Penetrometer (DCP) test and California Bearing Ratio (CBR) test are two methods, which are compared to obtain the best value of bearing capacity. Clay, coal, sandy clay materials are tested as sample materials. The result of this study indicates that bearing capacity value from DCP test is higher than CBR test. An increment and degresion of bearing capacity value of DCP test are not followed by CBR test, it can be concluded that bearing capacity value of CBR test is used as basic reference to recommend the mining equipment. As the result, ground pressure of mining equipment would not be more than 124kPa, as recommendation.

Keywords : bearing capacity, DCP test, CBR test, correlation

INTRODUCTION

To expand mining area requires several studies, one of them is bearing capacity study. This study aims to provide a mine equipment recommendation that could be applied in the mine are. PT. Senamas Energindo Mineral (PT. SEM) one of the mining company would like to do this study. PT. SEM is a mining company located in Central Kalimantan with an Mining Business Permitted Area approximately 2000Ha. PT. SEM will expand the mining area in Pit 2 and Pit 3, thus it will needs bearing capacity for some existing material. Studies of bearing capacity required testing that could be done either insitu or laboratory with certain condition.

OBJECTIVES

The objectives of this study is to determine the mine equipment recommendation based on materials bearing capacity in Pit 2 and Pit 3 of PT. SEM.

METHODOLOGY

This study tested bearing capacity using insitu or laboratory test. Insitu bearing capacity test is using Dynamic Cone Penetrometer (DCP). Laboratory test for bearing capacity using California Bearing Ratio test (CBR).

Firstly sampling point has been determined. After that, DCP test could be done at the location. After completing DCP test, followed by material sampling at the same point for CBR test.

For any laboratory test, sample always need preparation phase. Therefore, before entering CBR test,

the sample must be prepared. Once the preparation has done, continued for physical test and proctor test.

After getting the bearing capacity value from both testing, the result will be correlated by using scatter diagram and linier regression. The correlation result used as a basic recommendation for determining mine equipment.

SOIL DEFINITION

Soil has several definitions in several disciplines. According to civil engineering expert, soil is defined as a natural aggregate of mineral grains that can be mechanically separated as soluble in water. According to experts in geological engineering, soil definition is the result of weathering of rock material that can be caused by plants. From those opinions could be concluded that soil is the result of weathering of rock material consisting of organic and inorganic material (Terzaghi, 1996).

Soil Classification

Soil has a certain grain size that can determine the type of soil. Determination of the type of soil called soil classification (Terzaghi, 1996). Existing soil classification methods vary, but the commonly used method is the Unified Soil Classification System (USCS). USCS soil classification method introduced by Casagrande (1948) further refined by the U.S. Corps of Engineer and Bureau of Reclamation (USBR) in 1963 in Soil Mechanics for Engineering Practices by Karl Terzaghi (1996).