World Academy of Science, Engineering and Technology
International Journal of Geotechnical and Geological Engineering
Vol:13, No:03, 2019

Improvement of Soft Clay Using Floating Cement Dust-Lime Columns

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Abstract : The two main criteria that control the design and performance of footings are bearing capacity and settlement of soil. In soft soils, the construction of buildings, storage tanks, warehouse, etc. on weak soils usually involves excessive settlement problems. To solve bearing capacity or reduce settlement problems, soil improvement may be considered by using different techniques, including encased cement dust–lime columns. The proposed research studies the effect of adding floating encased cement dust and lime mix columns to soft clay on the clay-bearing capacity. Four experimental tests were carried out. Columns diameters of 3.0 cm, 4.0 cm, and 5.0 cm and columns length of 60% of the clay layer thickness were used. Numerical model was constructed and verified using commercial finite element package (PLAXIS 2D, V8.5). The verified model was used to study the effect of distributing columns around the footing at different distances. The study showed that the floating cement dust lime columns enhanced the clay-bearing capacity with 262%. The numerical model showed that the columns around the footing have a limit effect on the clay improvement.

Keywords : bearing capacity, cement dust – lime columns, ground improvement, soft clay
Conference Title : ICSMEG 2019 : International Conference on Soil Mechanics and Engineering Geology
Conference Location : Tokyo, Japan
Conference Dates : March 25-26, 2019