

Load Carrying Capacity of Soils Reinforced with Encased Stone Columns

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Abstract : Stone columns are effectively used to improve bearing strength of soils and also for many geotechnical applications. In soft soils when stone columns are loaded they undergo large settlements due to insufficient lateral confinement. Use of geosynthetics encasement has proved to be a solution for this problem. In this paper, results of a laboratory experimental study carried out with model stone columns with and without encasement. Sand was used for making test beds, and grain size of soil varies from 0.075mm to 4.75mm. Woven geotextiles produced by Gareware ropes India with mass per unit area of 240gm/M² and having tensile strength of 52KN/m is used for the present investigation. Tests were performed with large scale direct shear box and also using scaled laboratory plate load tests. Stone column of 50mm and 75mm is used for the present investigation. Diameter of stone column, size of stones used for making stone columns is varied in making stone column in the present study. Two types of stone were used namely small and bigger in size. Results indicate that there is an increase in angle of internal friction and also an increase in the shear strength of soil when stone columns are encased. With stone columns with 50mm dia, an average increase of 7% in shear strength and 4.6 % in angle of internal friction was achieved. When large stones were used increase in the shear strength was 12.2%, and angle of internal friction was increased to 5.4%. When the stone column diameter has increased to 75mm increase in shear strength and angle of internal friction was increased with smaller size of stones to 7.9 and 7.5%, and with large size stones, it was 7.7 and 5.48% respectively. Similar results are obtained in plate load tests, also.

Keywords : stone columns, encasement, shear strength, plate load test

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