

Laboratory Model Tests on Encased Group Columns

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Abstract : There are several ground treatment techniques which may meet the twin objectives of increasing the bearing capacity with simultaneous reduction of settlements, but the use of stone columns is one of the most suited techniques for flexible structures such as embankments, oil storage tanks etc. that can tolerate some settlement and used worldwide. However, when the stone columns in very soft soils are loaded; stone columns undergo excessive settlement due to low lateral confinement provided by the soft soil, leading to the failure of the structure. The poor performance of stone columns under these conditions can be improved by encasing the columns with a suitable geosynthetic. In this study, the effect of reinforcement on bearing capacity of composite soil has been investigated by conducting laboratory model tests on floating and end bearing long stone columns with l/d ratio of 12. The columns were reinforced by providing geosynthetic encasement over varying column length (upper 25%, 50%, 75%, and 100% column length). In this study, a group of columns has been used instead of single column, because in the field, columns used for the purpose always remain in groups. The tests indicate that the encasement over the full column length gives higher failure stress as compared to the encasement over the partial column length for both floating and end bearing long columns. The performance of end-bearing columns was found much better than the floating columns.

Keywords : geosynthetic, ground improvement, soft clay, stone column

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