A Quick and Simplified Method for the Determination of the Safe Bearing Capacity of Soils*

by

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For the estimation of safe bearing capacity of in situ soils, the authors have evolved a statistical relationship adopting presumptive bearing pressures from the building codes for various soils. But it is seen from the experience gathered the bearing pressures of soils are chiefly governed by the stress history, ground water-level fluctuations, grain-size and shape, mineralogical effects. The writers are surprised to see that in spite of several limitations with regard to in situ load test, an arbitrary value of 1 kg/cm^2 for clayey soil and 2 kg/cm^2 for sandy soils and gravels were adopted. Further more, in the writers opinion the stress applied in ranges of 1 kg/cm^2 to 2 kg/cm^2 are within the elastic limit only and the evaluation of the ultimate bearing pressure from the formula does not yield to the actual values that obtained from the full scale load test. The authors main aim was to develop a quick and simplified method but still the use of loading arrangement by truck is suggested.

In addition to the author's work, the writers would like to add further information on simplified method of arriving safe bearing capacity from the void ratio, consistency, classification tests either from the German standards or the Russian chart.

References

SCHULTZ-MUHS (1967) : "Allowable Bearing Capacity from the Consistency Index According to DIN 1054 (1959)."

BANERJEE, A.K. and BANERJEE, K.C. (1959) : "Analysis of Soil Test Data for the Permissible Design Pressure of Foundation by Russian Method." Bulletin of INSSMFE, June 1959 issue.

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The authors have taken great pains in collecting data from the large number of load tests performed in Tamil Nadu and have tried to correlate these to give a simple relationship between safe bearing capacity *B* and the settlement under specific load (2 kg/cm^2 in case of sandy soils and 1 kg/cm^2 in case of clays). The relationship obtained has resulted in rather over-simplification of a complicated phenomenon, because while obtaining the relationship some important factors involved at each load test site have apparently not been taken into consideration. These are as described below :—

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(i) Size and Shape of Loading Plates

The size and shape of the loading plate has got large influence not only on the bearing capacity but also on the settlement. But it will be seen from Tables I to IV that in the load tests used for obtaining relationship, loading plates used not only were of different shapes (square and circular) but also were of different sizes (the smallest being 30 cm² and largest being 61 cm diameter). The variation of size and shape occurs even for the same type of material.

(ii) Position of the Water-table

For the data recorded in Tables I and IV, the position of water-table in each case relative to the loading plate has not been given.

(iii) Size of the Pit

For the simplified test suggested by the authors the size of the pit recommended is 150 cm × 150 cm whereas the size of the pits adopted for the load tests (listed in Tables I and IV) used for obtaining the relationship, was 550 cm × 360 cm. The overburden pressure will be different in two cases.

The authors have not given in the papers if the factors, listed above, were duly considered by them while obtaining the relationship ?