

12. BEARING CAPACITY OF SOIL BY PLATE LOAD BEARING TEST.
(IS : 1888 – 1982)

INTRODUCTION:

This is the method of conducting the load test on soils and the evaluation of bearing capacities and settlement from this test. This method assumes that down to the depth of influence of stresses the soil strata is reasonably uniform. This should be verified by boring or sounding.

Apparatus:

The apparatus consists of bearing plates, loading equipment and instruments to measure the applied loads and resulting settlement.

a) Bearing plates: Consist of a mild steel 75 cm in diameter and 1.5 to 2.5 cm thickness, and few other plates of same thickness, but smaller diameters (usually 60, 45, 30 and 22.5 cm dia.) used as stiffeners.

b) Loading equipment: Consist of a reaction or dead load and a hydraulic jack. The reaction frame may suitable be loaded to give the needed reaction load on the plate. The load applied may be measured either by a proving ring and dial gauge assembly or a pressure gauge connected to the output end of the hydraulic jack.

c) Settlement measurements: May be made by means of three or four dial gauges fixed on the periphery of the bearing plate from an independent datum frame. The datum frame should be supported far from the loaded area.

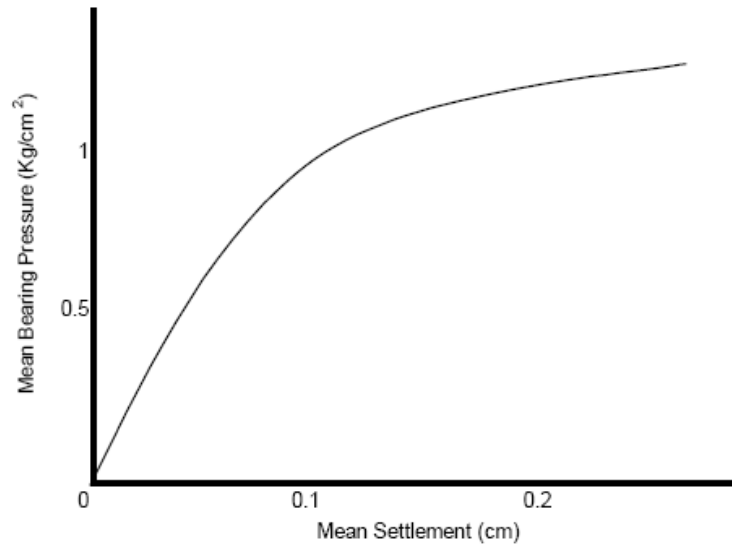
Procedure:

The test site is prepared and loose material is removed so that the 75 cm diameter plate rests horizontally in full contact with the soil sub-grade. If the modulus of sub-grade reaction of natural ground is needed, the topsoil may be removed up to a depth of about 20 cm before testing.

The plate is seated accurately and then a seating load equivalent to a pressure of 0.07 kg/cm^2 (320 kg for 75 cm diameter plate) is applied and released after a few seconds. The settlement dial readings are now noted corresponding to zero load. A load is applied by means of the jack, sufficient to cause an average settlement of about 0.25 mm. When there is no perceptible increase in settlement or when the rate of settlement is less than 0.025 mm per minute (in the case of soils with high moisture content or in clayey soils) the load dial reading and the settlement dial readings are noted. The average of the three (or four) settlement dial readings is taken as the average settlement of the plate corresponding to the applied load.

The load is then increased till the average settlement increase to a further amount of about 0.25 mm, and the load and average settlement readings are noted as before. The procedure is repeated till the settlement is about 1.75 mm or more.

Bearing pressure-settlement curve:



Calculations:

A graph is plotted with the mean settlement versus bearing pressure (load per unit area) as shown in above. The pressure 'p' (kg/cm²) corresponding to a settlement $s = 0.125$ cm is obtained from the graph. The modulus of sub grade reaction 'K' is calculated from the relation.

$$K = \frac{p}{0.125} \text{ kg/cm}^2/\text{cm or kg/cm}^3.$$