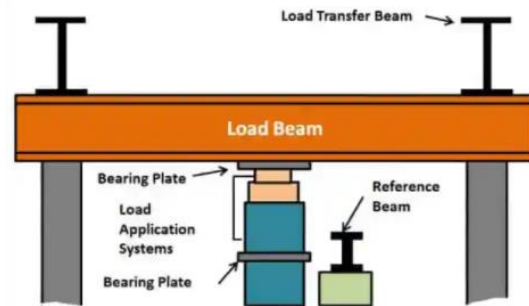


PILE LOADING TEST

Pile loading test is one of the most common methods for testing the actual in-situ load capacity of any pile. The test method involves the direct measurement of pile head displacement in response to a physically applied load. In this test, piles can be tested for compression, tension, or

lateral load



Pile Load Test Procedure

- The sets up for the load test on a pile consist of two anchor piles provided with an anchor girder or a reaction girder at their top as shown in Fig.
- The test pile is generally installed between two anchor piles in such a manner in which the foundation piles are to be installed.
- The test pit should be at least 3B or 2.5 m clear from the anchor piles.
- The load is applied through a hydraulic jack resting on the reaction girder. The measurements of the settlement of the pile are recorded with the help of three dial gauges, with respect to a fixed reference mark.
- The test is conducted after a period of 3 days after installation of the test pile in sandy soils, and after a period of one month after the installation of the test pile in silts and soft clays.
- This is because by driving the test pile the soil properties are altered and with the passage of time much of the original properties are restored.
- The load is generally applied in an equal amount of increment and that is about 20 % of the allowable load. Settlements should be recorded with three dial gauges.
- Each load increment is maintained till the rate of movement of the pile is not more than 0.1 mm per hour in sandy soils and 0.02 mm per hour in clay soils or a maximum of two hours (IS: 2911 — 1979).
- For each load increment settlements are observed at 0.5, 1, 2, 4, 8, 12, 16, 20, 60 minutes. The loading should be continued up to twice the safe load or the load at which the total settlement reaches a specified value.
- The load is removed in the same decrements at 1 hour interval and the final rebound is recorded after 24 hours after the entire load has been removed.

- The measured values of the settlement are plotted against the corresponding values of Load to obtain the load settlement curve. Fig. shows a typical load settlement curve (firm line) for loading as well as unloading obtained from a pile load test.

For given load, the net settlement (S_n) is given by,

$$S_n = S_t - S_e$$

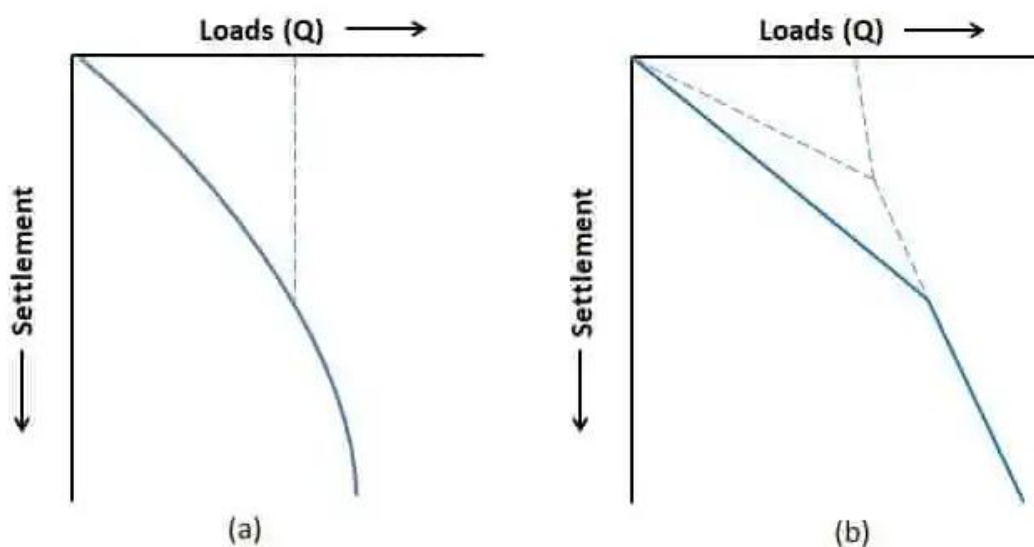
Where, S_n = Net Settlement

S_t = Total Settlement or Gross Settlement

S_e = Elastic Settlement (rebound)

Fig. shows two loads-settlement curves obtained from a pile load tests on two different soils. The ultimate load Q_u may be determined as the abscissa of the point where the load settlement curve changes to a steep straight line.

Alternatively, the ultimate load Q_u is the abscissa of the point of intersection of initial and final tangents of the load settlement curve. The allowable load is usually taken as one-half of the ultimate load.



Determination of Ultimate Load from Load Settlement Curve for Pile

According to **IS: 2911 a 1974 (Parta4)**, the allowable load may be taken as one of the following whichever is less.

- 50 % of the load at which the total settlement is 10 % of the diameter of the pile.
- Two—thirds of the final load at which total settlement is 12 mm.
- Two—thirds of the load which causes a net settlement of 6 mm.

The limiting settlement criteria are also sometimes specified. Under the load twice the allowable load, the net settlement should not exceed 20 mm or the gross settlement should not exceed 25 mm.