

Soil Testing

- **California Bearing Ratio**

The California bearing ratio (CBR) is a penetration test for evaluation of the mechanical strength of natural ground, subgrades and basecourses beneath new carriageway construction. The basic site test is performed by measuring the pressure required to penetrate soil

Test Method: IS: 2720 (P-16).

- **Direct Shear Test**

To determine the shearing strength of the soil. In many engineering problems such as design of foundation, retaining walls, slab bridges, pipes, sheet piling, the value of the angle of internal friction and cohesion of the soil involved are required for the design. Direct shear test is used to predict these parameters quickly.

Test Method: IS: 2720 (P-13)1986.

- **Modified Procter Compaction Test:**

The Proctor compaction test is a laboratory method of experimentally determining the optimal moisture content at which a given soil type will become most dense and achieve its maximum dry density.

Test Method: IS: 2720 (P-3,7)1980

- **Particle Size Distribution by Sieve Analysis:**

The objective of this test is to determine the relative proportions of different granular sizes as they are passing through certain sieve sizes.

Thus, the percentage of sand, gravel, silt and clay can be obtained from the sieve analysis test.

The sieve analysis (grain size analysis) is widely used in classification of soils. The data obtained from grain size distribution curves is used in the design of filters for earth dams and to determine suitability of soil for road/highway construction, embankment fill of dam, airport runway/taxiway, etc.

Test Method: IS: 2720 (P-4)1985

- **Particle Size Distribution by Hydrometer:**

Hydrometer test is the procedure generally adopted for determining the particle-size distribution in the soil for the fraction that is finer than sieve size 0.075 mm. The lower limit of the particle size determined by this procedure is about 0.001 mm.

Test Method:

- **Plasticity Index:**

The Plasticity Index is simply the numerical difference between the liquid limit and the plastic limit for a particular material and indicates the magnitude of the range of moisture content over which the soil remains plastic. It is a measure of the cohesive qualities of the binder resulting from the clay content. Also, it gives some indication of the amount of swelling and shrinkage that will result in the wetting and drying of that fraction tested.

Test Method: IS: 2720 (P-5)1985

- **Chloride Content:**

The effect of chloride concentration in soil on corrosion of reinforcing steel was evaluated by measuring corrosion potentials and corrosion current density.

Concrete in contact with soil bearing high levels of chloride could suffer from early ingress of this chloride, leading to corrosion of any embedded reinforcement. Measures of chloride levels in soils are often taken to check whether the soil will be suitable to be used adjacent to concrete.

Test Method: IS: 4032-1985

- **Triaxial Compression Test:**

This test helps in determining the shear testing of soils.

Test Method: ASTM D4767 - 11 / D2850

- **Linear Shrinkage:**

This test is used to measure the percentage decrease in dimension of a fine fraction of a soil when it is dried after having been moulded in a wet condition approximately at its liquid limit.

Test Method: IS: 2720 (P-6) 1972

- **Organic Matter Content:**

Organic matter is stable in the soil. It has been decomposed until it is resistant to further decomposition. Usually, only about 5 percent of it mineralizes yearly. That rate increases if temperature, oxygen, and moisture conditions become favorable for decomposition, which often occurs with excessive tillage. It is the stable organic matter that is analyzed in the soil test.

Test Method: IS: 2720 (P-22)1972

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- **Sulphate Content:**

This method determines the soluble sulfate content of soil by using turbidimetric techniques. The results are used to determine whether chemical stabilization (with lime, fly ash, cement kiln dust, etc.) of the tested soil is appropriate.

Test Method: IS: 2720 (P-27)1977



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