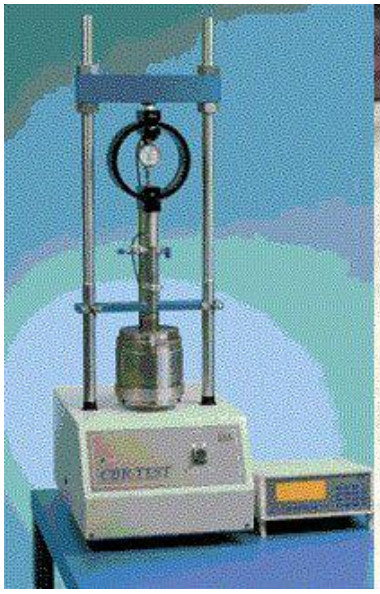
Experiment #13

California Bearing Ratio Test on Subgrade Soil -Procedure and Values

The California Bearing Ratio(CBR) test is a measure of resistance of a material to penetration of standard plunger under controlled density and moisture conditions. It was developed by the California Division of Highways as a method of classifying and evaluating soil- subgrade and base course materials for flexible pavements.

CBR test may be conducted in remoulded or undisturbed sample. Test consists of causing a cylindrical plunger of 50mm diameter to penetrate a pavement component material at 1.25mm/minute.

The loads for 2.5mm and 5mm are recorded. This load is expressed as a percentage of standard load value at a respective deformation level to obtain CBR value.



California Bearing Ratio Test on Subgrade Soil

The aim of this test is the determination of California Bearing Ratio value of the subgrade soil.

Apparatus for CBR Test

Loading machine-any compression machine can operate at constant rate of 1.25mm per minute can be used. Cylindrical moulds- moulds of 150mm diameter and 175mm height provided with a collar of about 50mm length and detachable perforated base.

Compaction rammer, surcharge weight-annular weights each of 2.5kg and 147mm diameter. IS sieve 20mm, Coarse filter paper, balance etc.

Procedure of California Bearing Ratio Test

Sieve the sample through 20mm IS sieve. Take 5 kg of the sample of soil specimen. Add water to the soil in the quantity such that optimum moisture content or field moisture content is reached.

Then soil and water are mixed thoroughly. Spacer disc is placed over the base plate at the bottom of mould and a coarse filter paper is placed over the spacer disc.

The prepared soil water mix is divided into five. The mould is cleaned and oil is applied. Then fill one fifth of the mould with the prepared soil. That layer is compacted by giving 56 evenly distributed blows using a hammer of weight 4.89kg.

The top layer of the compacted soil is scratched. Again second layer is filled and process is repeated. After 3rd layer, collar is also attached to the mould and process is continued.

After fifth layer collar is removed and excess soil is struck off. Remove base plate and invert the mould. Then it is clamped to baseplate.

Surcharge weights of 2.5kg is placed on top surface of soil. Mould containing specimen is placed in position on the testing machine.

The penetration plunger is brought in contact with the soil and a load of 4kg(seating load) is applied so that contact between soil and plunger is established. Then dial readings are adjusted to zero.

Load is applied such that penetration rate is 1.25mm per minute. Load at penetration of 0.5, 1, 1.5, 2, 2.5, 3, 4, 5, 7.5, 10 and 12.5mm are noted.

Standard Load Values for CBR Test

Penetration(mm)	**Standard Load(kg)**	**Unit Standard Load(kg/cm^2)**
2.5	**1370**	**70**
5	**2055**	**105**

7.5	**2630**	**134**
10.0	**3180**	**162**
12.5	**3600**	**183**

Observations during CBR Test

Weight of soil taken =

Weight of surcharge =

Area of plunger, A =

Proving Ring Calibration Factor =

Sl No.	Penetration(mm)	Proving dial reading	Load on plunger(kg)	Corrected load	Unit Loa

Result of California Bearing Ratio Test

1. **California Bearing Ratio at 2.5mm penetration =**
2. **California Bearing Ratio at 5.0mm penetration =**
3. **California Bearing Ratio of subgrade soil =**