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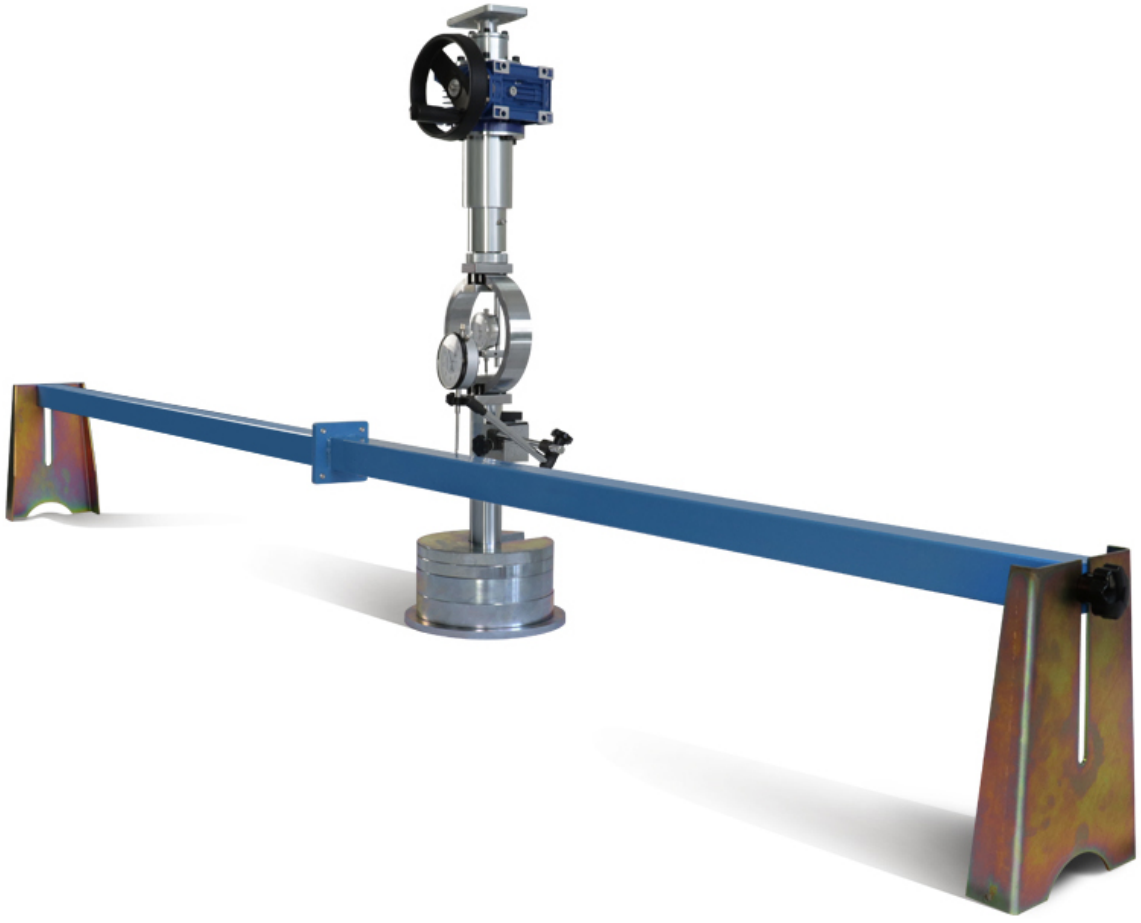
In-situ CBR test apparatus LCB-2

PRODUCT MANUAL



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I. Introduction

STANDARD: ASTM D4429 BS 1377 BS 1924 CNR UNI 10009

The In-situ CBR Test Apparatus LCB-2 is used to determine quickly and efficiently the bearing capacity of soils on road constructions, foundations, road subgrades. Load is applied through a mechanical jack and handwheel. Upper beam can be adjusted in height.

The working principle of the instrument is the use of rear axle load of not less than 60KN truck, with Jack loading, through penetration rod measured quantity of penetration and dynamo-meter measured load weight, the soil CBR value calculation of field.

II. Technical parameters

Capacity of mechanical jack capacity	60KN
Stroke of mechanical jack	80mm
Capacity of load ring	50KN
CBR Penetration piston	φ50mm
Dial indicator	0~30mm
Annular surcharge weight	φ254mm 4.5kg
slotted surcharge weight	4.5kg 2 pcs; 9kg 2 pcs

III. Test of Procedure

1. Prepare the general surface area to be tested by removing from the surface loose and dried material which is not representative of the soil to be tested. Produce a test area which is as smooth and horizontal as practicable. Where nonplastic base materials are encountered, extreme care shall be taken not to disturb the test surface. Spacing of the penetration tests shall be such that operations at one point will not disturb the soil at the next point to the penetrated. This spacing may range from a minimum of 7.0in(175mm) in plastic soils to 15 in. (380mm) in coarse granular soils.

2. Locate the truck so that the center of the bearing attachment is directly over the surface to be tested. Install the mechanical screw test jack with the swivel to the underside of the reaction

attachment. Place the truck jacks under each side of the truck and lift the truck so that little or no weights rests on the rear springs, making sure that the truck is level across the back.

3. Position the mechanical screw jack to the correct position for the test, and connect the proving ring to the end of jack. Then, attach the piston adapter to the bottom of the proving ring, connect the necessary number of extensions to come within 125mm of the surface to the tested, and connect the penetration piston. Clamp the jack in place. Check the level mounted on the jack to be certain the assembly is vertical and adjust it if necessary.

4. Place the 4.5kg surcharge plate beneath the penetration piston so that when the piston is lowered it will pass through the center hole.

5. Seat the penetration piston under a load of approximately 21kPa. For rapid setting, use the high gear ration of the jack. For base materials with an irregular surface, set the piston on the thinnest practical layer of fine limestone screening or plaster of paris.

6. If necessary, in order to achieve a smooth surface, raise the surcharge plate while the seating load is on the piston and evenly spread clean fine sand to a depth of 3 to 6mm over the surface to be covered by the plate. This serves to distribute the weight of the surcharge uniformly.

7. Add surcharge weights to the surcharge plate so that the unit load is equivalent to the load intensity of the material or pavement which will overlie the sub-grade or base, or both, except that the minimum weight applied shall be the 4.5 kg surcharge plate plus one 9kg surcharge weight.

8. Attach the penetration dial clamp to the piston so that the dial rests upon the dial support.

9. Set the dial gauge to Zero.

10. Apply the load to the penetration piston so that the rate of penetration is approximately 1.3mm/min. Record the deflection of the proving ring or load cell reading at each 0.64mm increment of penetration to the nearest 111kN, to a final depth of 12.7mm. In homogeneous soils, penetration depths greater than 7.62mm frequently many be omitted. Compute the stress for each increment of penetration in percent.

11. At the completion of the test obtain a sample at the point of penetration and determine its water content. A density determination should also be made at a location about 100 to 150mm away from the point of penetration. The density and water content shall be determined in accordance

with the applicable test methods.

IV. Calculation

1. Stress penetration Curve-Calculate the penetration stress for each penetration increment as applied force divided by piston area. Plot the stress versus penetration curve for each increment of penetration, as shown in Fig. 1. In some instances the stress penetration curve may be concave upward initially because of surface irregularities or other cause, and in such cases the zero point shall be adjusted as shown in Fig. 1.

2. CBR- Using corrected stress values taken from the stress penetration curve for 2.54mm and 5.08mm penetrations, calculate the bearing ratios for each by dividing the corrected stresses by the standard stresses of 6.9Mpa and 10.3Mpa respectively, and multiplying by 100. Also, calculate the bearing ratios for the maximum stress. If the penetration is less than 0.2 in, interpolating the standard stress. The CBR reported for the soil mixture is normally the bearing ration at 2.54mm penetration. When the bearing ration at 5.08mm penetration (or at maximum penetration if less than 0.2 in.) is greater, return the test. If the check test gives a similar result, the CBR is then taken as the bearing ratio determined at 5.08mm or at maximum penetration. No other bearing rations may be identified as CBR values.

V. Report: test data sheets(Example in Fig.2)

1. Test location
2. Material
3. Depth of test
4. Stress-penetration curve
5. Corrected bearing ratio at 2.54mm penetration
6. Corrected bearing ratio at 5.08mm penetration
7. Water content and test method used
8. Density and test method used

9. Name of personnel performing test

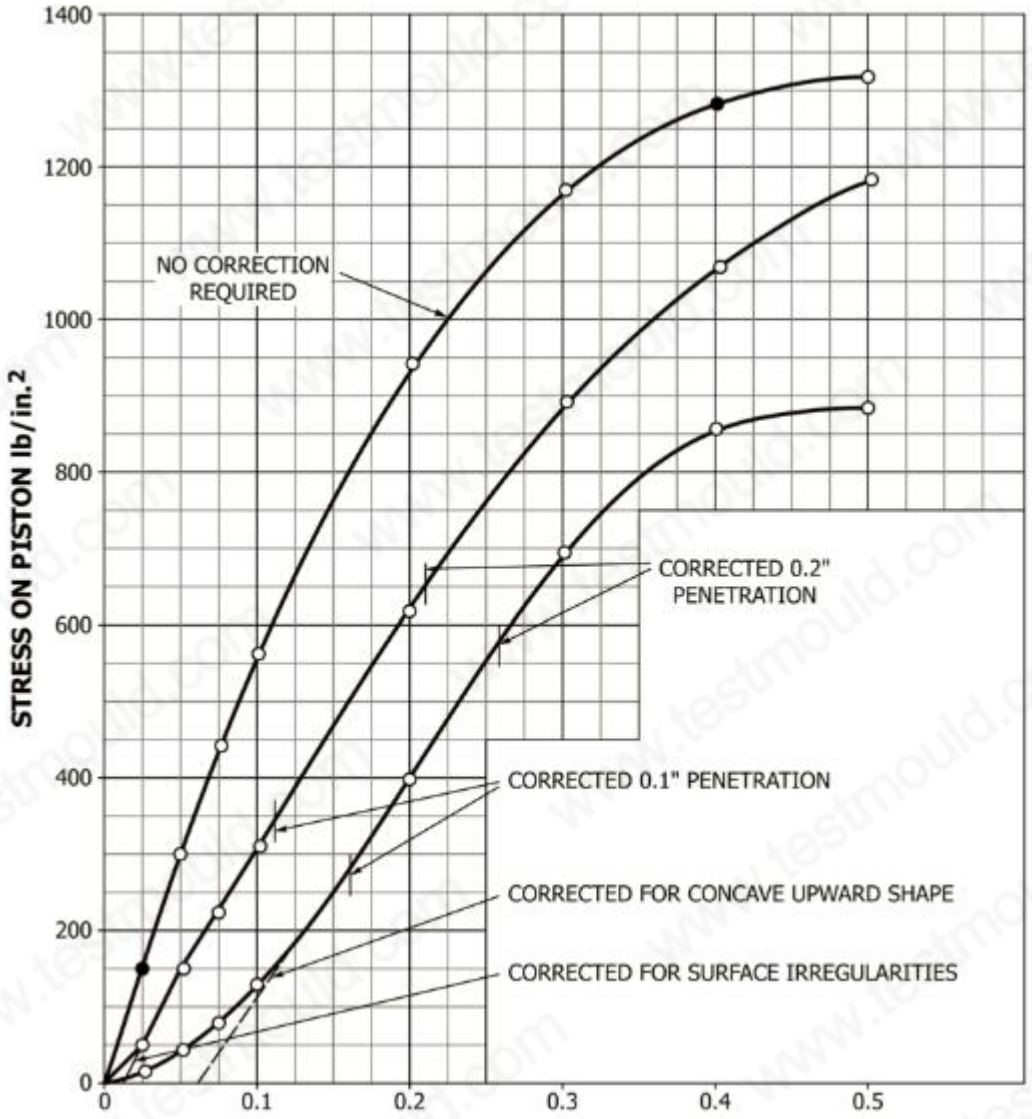

Fig.1

Project:	Date of Test:
Test Location:	Material Description:
Test Depth:	Penetration Piston Diameter: Area:

Penetration Load Data		
Measured Penetration	Measured Load	Calculated Stress

Stress-Penetration Curve

Density: Test Method:	Water Content: Test Method:
Corrected Bearing Ratio at 0.1-in (2.54-mm):	Corrected Bearing Ratio at 0.2-in (5.08-mm):
Comments:	
Test Performed by: Date:	Reviewed By: Date:

Fig.2

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