OPERATING INSTRUCTIONS

Proving Ring Penetrometer

29-3739

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1 Introduction

1.1 The proving ring penetrometer is a cone type penetrometer which can be used in a number of applications. It serves as a rapid means for determining the penetration resistance of soils in shallow exploration work. The readings obtained in this method may be correlated to standard or modified compaction data for the compaction control in the field.

1.2 Trafficability relationships can be obtained for quick field evaluation of sites. Correlation with the CBR or bearing capacity tests must be established by the user.

1.3 In conjunction with the standard laboratory and field test, 29-3739 has proven to be an extremely useful tool for quick field checks and in reducing the volume of the more time consuming standard check test.

1.4 The instrument consists of a T-handle, penetration rod, proving ring of 1 kN capacity with dial indicator, and a removable cone point. The cone point has a base area of 645.16 mm^2.

1.5 The dial indicator furnished with this assembly is 78-5461, this model has a maximum reading feature. A clutch type brake attachment maintains the reading until the brake is manually released. Return of the dial hand to the zero position is accomplished by pressing the release button on the pointer stem housing.

2 Installation

2.1 Screw the handle onto the upper block of the proving ring using the bolt supplied.

2.2 Attach the extension to the lower block of the proving ring.

2.3 Attach the penetration point to the lower end of the extension rod.

3 Preliminary Setting

3.1 Inspection

3.1.1 Inspect the instrument before use to make sure that all nuts, bolts and joints are tight and that the dial gauge stem contacts the proving ring bearing block.

3.2 Zeroing the instrument

3.2.1 Allow the penetrometer to hang vertically from its handle while zeroing is carried out. Zeroing the dial indicator may be done by one of two methods.

One method is with the bearing point of the dial indicator stem making contact with the head of the knurled screw, any adjustment of the screw will allow zeroing to be accomplished.

A second method for zeroing the dial indicator is by adjustment of the dial face itself. This is done by releasing the knurled screw located on the upper left side of the dial housing. After rotation of the dial face to the zero position, be certain to tighten the knurled screw so as to maintain this position. This adjustment should be made only for small angles since extreme non-symmetry of the dial can cause confusion in reading.

3.3 Re-zeroing the instrument

3.3.1 When the rod is changed at any time or if any part is changed in the penetrometer, the instrument should again be zeroed as described in section 3.2.

4 Operation

4.1 Be certain that the dial indicator has been set to zero position. Select the site to be tested and clear the test location so that a flat and clean surface is available for testing.

4.2 Hold the assembly vertically on the test location. Grasping the handle firmly, push the cone point down into the soil at a steady uniform rate until the top of the cone goes just below the surface.

4.3 Record the dial indicator reading. Using the proving ring calibration chart, determine the maximum penetration. Refer to the conversion chart to read the kPa value.

Note: penetration resistance (bearing capacity) is obtained by dividing the penetration load by the cone base area.

4.4 Return the dial indicator reading to zero position as outlined in section 1.

4.5 In soils of very low resistance, it may be desirable to utilise a deeper penetration. The ring marks or other marks, which the user may wish to scribe on the extension, may be used as the stopping point rather than the top of the cone. These penetration depths allow correlation with laboratory tests as well as the standard penetration depth.

5 Precautions

5.1 The instrument should be kept vertical while making measurements.

5.2 Readings higher than the capacity of the dial should not be attempted since this will overstress the proving ring.

5.3 The instrument should never be withdrawn by the ring but always by the rod below the ring.

6 Care and Adjustment

6.1 General care

All parts of the penetrometer are plated for resistance to corrosion and should be relatively maintenance free. The penetrometer needs little care beyond keeping the instrument free from dirt and rust, keeping all parts tight, and frequently checking and, if necessary, re-zeroing the instrument. Particular care should be taken to see that no grit is caught between the extensometer arm of the dial and the lower mounting block.

6.2 Dial gauge

The dial gauge is a sensitive instrument which should be protected against water and rough usage. It should never be immersed in water and should be wiped dry as soon as possible after its use in rainy weather. When transported, the dial should be cushioned by wrapping it in paper or cloth.

6.3 Mounting block adjustment

If either or both mounting blocks should become loose and move, the entire ring assembly should be returned to ELE Service Department for calibration. Merely re-adjusting and re-tightening these blocks may or may not return the ring to its initial calibration and a calibration check is necessary in this case.

6.4 Cone replacement

Considerable use of the same cone may result in a rounding of its point. This will not affect the accuracy of the instrument necessarily, but if the base of the cone has had excessive wear or is deformed by hard usage, the cone should be replaced.

7 Special note

In areas where the cone can be driven only through a ½ or ¼ of the cone height (very high penetration resistance) with a force less than 1 kN (safety limit), the actual penetration resistance can be obtained by multiplying the corresponding load reading by an appropriate factor. For example, if the cone penetration is just ½ of the cone's height, multiply the corresponding load by 4 to get the actual penetration resistance. Multiply the corresponding load by 16 to get the penetration resistance, if the cone penetration is just ¼ of the cone height. (It is not generally recommended to take readings at fractional cone penetrations because of the unavoidable error in taking readings just when the penetration reaches exactly ¼, ½ etc., of the cone height).