

OPERATING INSTRUCTIONS

H-60 Field Inspection Vane Tester

26-3335

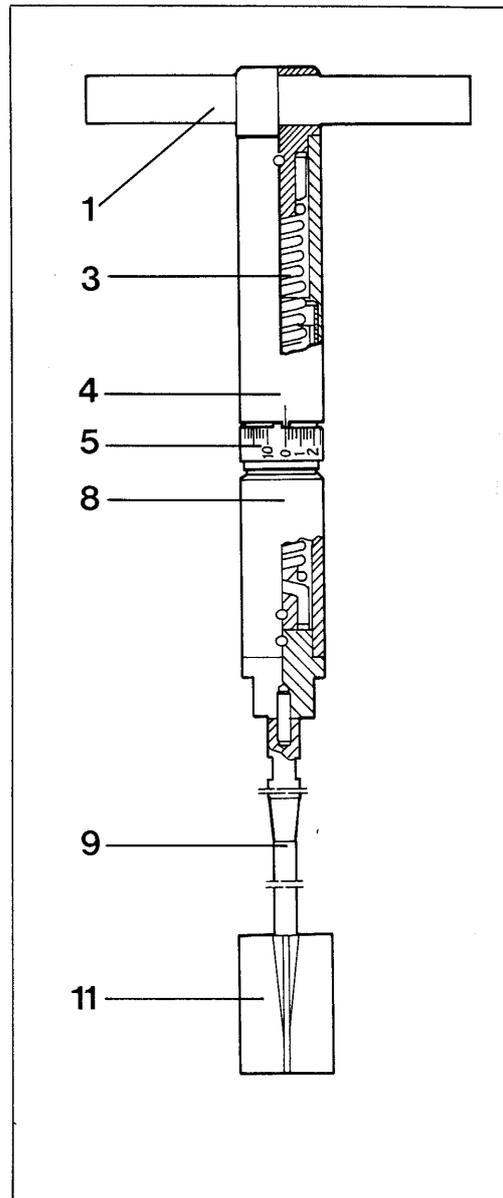
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1 Introduction

- 1.1 The Inspection Vane Borer is used to measure the insitu undrained shear strength in clays. It is primarily intended for use in trenches and excavations at a depth not influenced by drying and excavation procedure.
- 1.2 The range of the instrument is from 0 to 260 kPa when three different sizes of vanes are used. The accuracy of the instrument should be within 10% of the reading.



2 Description

- 2.1 The measuring part of the instrument is a spiral-spring (3), (maximum torque transmitted 38 kg/cm). When the handle (1) is turned, the spring deforms and the upper part (4) and the lower part (8) of the instrument get a mutual angular displacement. The size of this displacement depends on the torque which is necessary to turn the vane (11). By means of a graduated scale (5), the shear strength of the clay is obtained.

- 2.2 The lower and upper halves of the instrument are connected by means of threads. The scale (5) is also supplied with threads, and follows the upper part of the instrument by means of two lugs. The zero-point is indicated by a line on the upper part (4). When torque is applied, the scale-ring follows the upper part of the instrument, and when failure in the clay is obtained, the scale-ring (5) will remain in its position due to the friction in the threads.
- 2.3 Three sizes of the four-bladed vanes (11) are used:
16 x 32 mm (extra) – multiply readings by a factor of 2,
20 x 40 mm (standard) – direct readings,
25.4 x 50.8 mm (extra) – multiply readings by a factor of 0.5,
which makes it possible to measure shear strength of 0 to 260, 0 to 130 and 0 to 65 kPa respectively.
- 2.4 The 'area ratio' of the vanes are 14, 16.5 and 24% (ratio of cross sectional area of vane to the area to be sheared).
- 2.5 The vane blades are welded to a vane-shaft (9) which again is extended by one or more 0.5 m long rods. The connection between the shaft rods and the instrument is made by threads. To make the connections as straight as possible, the rods have to be screwed tight together and threads cleaned of dirt.
- 2.6 The maximum shear strength that can be measured with the inspection vane is 260 kPa. In clays with this shear strength, a force of about 40 to 50 kilos is required to press the vane down into the clay. The vane-shaft is designed to take this force, but if extension rods are used, precautions against buckling are required.

3 Operation

- 3.1 Connect required vane (11) and extension rods to the inspection vane instrument.
Note: while screwing vane or rods to instrument hold onto **lower** part.
- 3.2 Push vane into the ground to the required depth.
Note: do not twist inspection vane during penetration.
- 3.3 Make sure that the graduated scale (5) is set at zero-reading.
- 3.4 Turn handle (1) clockwise.
Note: Turn as slowly as possible with constant speed.
- 3.5 When the lower part (8) follows the upper part (4) around or even falls back, failure and maximum shear strength is obtained in the clay at the vane.
- 3.6 Holding handle firmly, allow it to return to zero-position.
Note: do not allow the handle to spring back.
- 3.7 Note the reading on the graduated scale.
Note: do not touch or in any other way disturb the position of the graduated ring till the reading is taken.
- 3.8 Write down the reading together with position of hole and depth.
- 3.9 Turn the graduated scale anti-clockwise back to zero position.
- 3.10 To determine the re-moulded shear strength, the following procedure is used:
- 3.10.1 Turn the vane quickly at least 25 revolutions.

- 3.10.2 Zero the scale and take at least two measurements by turning the instrument as slowly as possible. The minimum value is considered the correct one.
- 3.10.3 Push the vane down to next position. If necessary screw on another extension rod.
- 3.10.4 Repeat the above measurement procedure (3.3 to 3.10).
- 3.10.5 When the last reading is taken, pull the vane up. If the clay is comparatively soft, this can be done by hand, gripping the handle. In harder clays, some mechanical device might be necessary. Then it is advisable to connect this device directly to the connection rods (not to instrument).

4 Special Procedure

- 4.1 When measuring the shear strength at greater depths, the friction between the clay and the extension rods can be appreciable, and must be taken into consideration.
- 4.2 To measure this friction, extension rods and a vane-shaft without a vane (dummy) are pushed into the ground to the depths required for shear force measurements. The friction is then measured in the same way as when using vanes (3.3 to 3.9). The friction-value thus obtained is used to evaluate the actual shear strength from the measured shear strength.
- 4.3 To penetrate through firm layers, a pre-boring with a rod with the same diameter as the vane may be helpful.

5 Maintenance

- 5.1 The inspection vane is very simply designed, and does not require much attention. But it is most important that it is kept out of dirt and as clean as possible.