ELE
International

Operating Instructions

TORVANE SHEAR DEVICE

Model: 26-2261 (CL-600A)

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MODEL 26-2261 (CL-600A)

I. GENERAL INFORMATION

The **Torvane Shear Device** enables the operator to rapidly determine the shear strengths of cohesive soils, either in the field or in the laboratory. Simple to use, it eliminates sample preparation and requires only a reasonably flat 2" minimum diameter surface.

The device has a stress range of zero to 2.5 kg/sq. cm (tons/sq.ft.), the approximate range of torque that can be easily applied by the fingers. The dial head is equipped with a mechanism to hold the maximum reading after release. The smallest division on the dial is in units of 0.1 kg./sq. cm, permitting visual interpolation to the nearest 0.05 kg/sq. cm.

The instrument is supplied with 3 interchangeable vanes and a carrying case. A supplied graph shows the correlation between readings of the Torvane and shear strength values by unconfined compression tests and triaxial tests.

II. APPLICATIONS

A. Suggested applications for evaluation of shear strength with the Torvane include 1) Ends of Shelby tube samples 2) Standard penetration samples 3) Split spoon samples 4) Chunk samples from test pits and backhoe excavations and 5) Sides of test pits and trenches.

B. The Torvane does not replace field and laboratory testing analysis.

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C. Accuracy of the Torvane is best for fully saturated cohesive soils whose un-drained strength is independent of normal pressure. The stress range permits it to be used for clays varying in consistency from very soft to stiff. Homogeneous clay in extensive laboratory testing indicates excellent agreement between the unconfined compression test and the Torvane.

D. The shear strength of a cohesive soil is dependent upon many factors, including rate of loading, progressive failure, orientation of the failure plane and pore water migration during testing. The Torvane does not eliminate the effects of any of the variables.

III. PROCEDURE

A. Prepare a flat surface on the cohesive undisturbed material.

B. Attach the vane of suitable range to the stem by pressing the end of the stem all the way into the square recess on the vane.

1. The standard vane (1" (25.4 mm) diameter) is for a range of 0 to 1.0 kg./sq. cm.

2. The sensitive vane (1-7/8" (47.6 mm) diameter) is for a range of 0 to 0.2 kg/sq. cm.

3. The high capacity vane (3/4" (19 mm) diameter) is for a range of 0 to 2.5 kg/sq. cm.

C. Check that the zero of the circular scale coincides with the index on the head. If it does not coincide, rotate the dial with fingertip on the embossed numbers in the counter clockwise direction until it stops at the index.

D. Press the Torvane carefully into the soil with the stem at right angles to the surface, to the depth of the blades.

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E. Maintaining a constant vertical load by finger pressure, slowly turn the knob at a constant rate to provide a torque on the vane.

NOTE: A rate of rotation so that failure develops in 5 to 10 seconds is recommended.

F. After the sample fails, read Torvane shear strength on the circular scale just against the index.

G. Multiply the reading by the proper scale factor to get the shear strength:

1. When the standard vane (1" (25.4 mm) diameter) is use, multiply the reading by 1.

2. When the sensitive vane (1-7/8" (47.6 mm) diameter) is used, multiply the reading by 0.2.

3. When the high capacity vane (3/4" (19 mm) diameter) is used, multiply the reading by 2.5.

H. Before making another test, re-zero the scale by rotating it with fingertip in the counterclockwise direction until it stops at the index.

I. Take readings at different spots (if possible) on the surface and calculate the average value.

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IV. LABORATORY USES

A. Before conducting unconfined compression tests or triaxial tests on undisturbed samples, cut the sample into segments 1/2" longer than the desired length, and perform the Torvane test on each end. Then trim the material disturbed by the test.

NOTE: It is easier to perform the Torvane test while the specimen is in the sampling tube, after trimming at one end.

B. Use the Torvane test as a control test to determine the shear strength prior to other testing.

C. In consolidation testing, after the specimen has been consolidated under a desired normal stress, remove the upper porous stone and determine the consolidated shear strength of the specimen using the Torvane.

V. SPECIFICATIONS

Vane Driver	1.6" (41 mm) diam. x 3.2" (81 mm) l. with vane attached
Dial Scale	1 kg/sq. cm (tons/sq. ft) x 0.05 subdivisions
Sensitive Vane	0-0.2 kg/sq. cm (tons/sq. ft.); 1.875" (47.6 mm) diam.
Standard Vane	0-1.0 kg/sq. cm (tons/sq. ft.); 1" (25.4 mm) diam.
High-Capacity Vane	0-2.5 kg/sq. cm (tons/sq. ft.); 0.75" (19 mm) diam.
Carrying Case	Plastic; 6" w. x 4" d. x 2" h. (152 x 102 x 51 mm)
Weight	Net 10.5 oz. (300 g)

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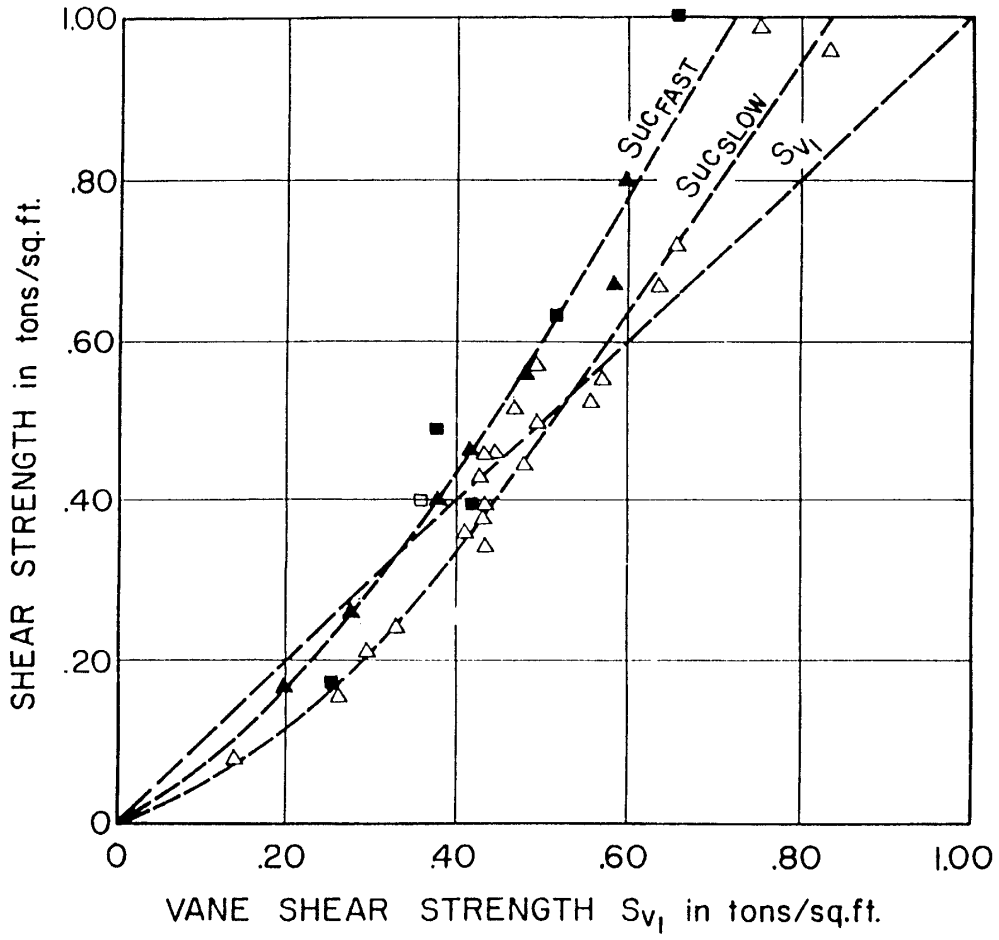
FIGURE 1



LEGEND

△ $S_{UC_{SLOW}}$ - Unconfined compression test, slow test: Suc = 1/2 qu

▲ $S_{UC_{FAST}}$ - Unconfined compression test, quick test: Suc = 1/2 qu

■ S_Q - Triaxial compression test, Q test: $S_Q = 1/2\,(\sigma_1 - \sigma_3)max.$

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