

Push-in Vane

The shear vane

The shear vane was developed to measure in situ, the undrained shear strength, the S_u of clays generally with the strength consistency of very soft to firm.

Vane apparatus

The vane apparatus used by Lankelma is the 'Norwegian' Geonor penetration vane. This apparatus incorporates a protection shoe at its leading edge which not only protects the vane but also cleans the vane automatically before each measurement. There is therefore no need to withdraw the vane between measurements to check its condition or to clean it since the protective shoe also performs a 'self cleaning' function between tests.

In its simplest form, the vane apparatus consists of 4 blades arranged in a cruciform, attached to the end of a rod. The vane rods are pushed into the soil and the assembly rotated. For each test the relationship between the turning moment, or torque, and the angular rotation is determined.

Undrained shear strength

When the vane is rotated the soil fails along a cylindrical surface passing through the edges of the vane as well as along the horizontal surfaces at the top and bottom of the blades. From the measured torque the undrained shear strength of the soil can be determined if the dimensions of the vane are known.

Standardisation

Experience has shown that the shear strength measured by the vane will vary according to the time elapsed between installing the vane and the commencement of shearing. In general the strength will increase with time and it is therefore important that the test procedure is standardised.

It is recommended that shearing should commence between 3 and a maximum of 5 minutes after the vane has been installed. The rate of shearing should be between 0.1 degree and 0.2 degree per second and this usually corresponds to a test duration of between 2 and 15 minutes. Increasing the rate of strain will result in an over estimate of strength.

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Remoulded strength

The repeat test for measuring the remoulded strength should be undertaken between 3 minutes and a maximum of 5 minutes after the peak strength has been performed and after quickly rotating the vane 12 times.

Vane sizes

2 vane sizes are available for testing; 110mm x 55mm and which is applicable for soils of firm consistency and 130mm x 65mm which is applicable for soils of very soft to soft consistency.

The ratio of the initial peak strength and the remoulded strength is a measure of the sensitivity of the soil.

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