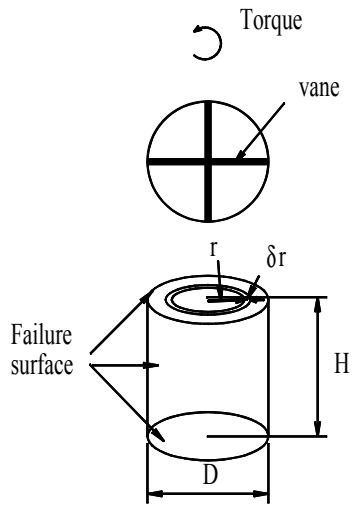## *Field Vane Tests[1]*

courses\443\d2.skd

Standard → four blades, $\dfrac{H}{D} = 2$

- H = 75 to 185 mm
- Blade thickness 1.6 - 3.2 mm
- Advance vane tip into the undisturbed soil ≥ 5 × hole diameter .
- Rotate vane at 6° per min. or less
- Complete test ≤ 5 min.[2]
- Very soft clays, 10 - 15 min.

Vane strength of isotropic soils

Torque from the vertical failure surface

$$T_v = c_u \pi.D.H\frac{D}{2}$$

The torque for two horizontal surfaces assuming uniform stress distribution

$$T_h = 2 \cdot c_u \int_0^{\frac{D}{2}} 2\pi \cdot r \cdot \delta r \cdot r = \pi \frac{D^3 c_u}{6}$$

$$T = T_v + T_h.$$

$$c_u = \frac{T}{\pi.D^2 \left(\dfrac{H}{2} + \dfrac{D}{6}\right)}$$

If H = 2D

$$c_u = 6T / 7\pi D^3.$$

Corrected C_u

$$C_{u\text{-corrected}} = \lambda c_{u\text{-field}}$$

$$\lambda = 1.7 - 0.54 \log(PI)$$

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[1] *Field vane shear tests are useful in soft cohesive deposits where much of the soil strength could be lost by sample disturbance. The test is not suitable for stiff clays, or soft clay containing layers or varves of cohesionless soils, pieces of gravel, wood, shells, etc.*

[2] *Time to failure 2 to 5 min. In Norway, the required time is 1 to 3 min. Once the maximum torque is reached, the value of remolded strength may be obtained after giving between ten and twenty five turns to the vane.*