16. SOIL EXPLORATION

SOIL SAMPLE AND SAMPLERS

The soil samples can be of two types: disturbed and undisturbed. A disturbed sample is that in which the natural structure of soils get partly or fully modified and destroyed, although with suitable precautions the natural water content may be preserved. Such a sample should, however, be representative of the natural soil by maintaining the original proportional of the various soil particles intact. An undisturbed sample is that in which the natural structure and properties remain preserved.

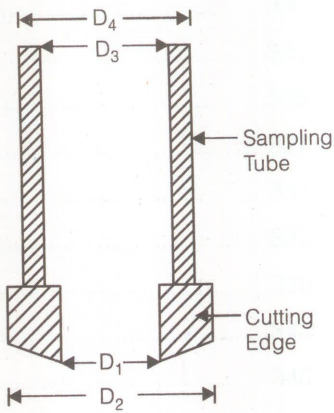
For the purpose of consistency limit, specific gravity, grain size distribution either undisturbed samples or representative samples should be used, whereas for coefficient of permeability, consolidation parameters and shear strength parameters undisturbed samples should be used.

(i) Inside Clearance

$$C_i = \frac{D_3 - D_1}{D_1} \times 100 \quad 1 < C_i < 3$$

(ii) Outside Clearance

$$C_0 = \frac{D_2 - D_4}{D_4} \times 100 \quad 0 < C_0 < 2$$



(iii) Area Ratio (A_r)

$$A_r = \frac{D_2^2 - D_1^2}{D_1^2} \times 100$$

A_r < 20% for stiff fomation, A_r < 10% for soft clays

(iv) Recovery Ratio (L_r)

$$L_r = \frac{\text{Recovered length of sample}}{\text{Penetrations length of sample}}$$

$L_r = 1 \rightarrow$ Good recovery

$L_r < 1 \rightarrow$ Compressed

$L_r > 1 \rightarrow$ Swelled

where, D_3 = Inner dia of sampling tube

D_4 = Outer dia of sampling tube

D_1 = Inner dia of cutting edge

D_2 = Outer dia of cutting edge

SEISMIC METHOD

$$D = \frac{d}{2}\sqrt{\frac{V_2 - V_1}{V_2 + V_1}}$$

where, d is distance between two stations

D is depth of strata

V_1 is velocity of direct wave

V_2 is velocity of refracted wave

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