TEST PROCEDURE

The test method is described in ASTM: D5778. This cone test method determines the resistance to penetration of a conical pointed penetrometer and the frictional resistance of a cylindrical sleeve located behind the conical point as the cone is advanced through subsurface soils at a slow and steady rate. The piezocone adds the measurement of pore pressure development behind the tip. The equipment provides a detailed record of cone resistance which is useful for evaluation of site stratigraphy, homogeneity and depth to firm layers, voids or cavities, and other discontinuities. In addition, the cone resistance and friction data can be used to estimate soil classification, and correlations with engineering properties of soils. The pore pressure readings also provide information on soil type and water table depth. Pore pressure dissipation, after a push, can also be monitored for correlation to soil consolidation and permeability. Therefore, the test provides a rapid means for determining subsurface conditions, and can be used for estimating engineering properties of soils for structures, and the behavior of soils under static and dynamic loads.

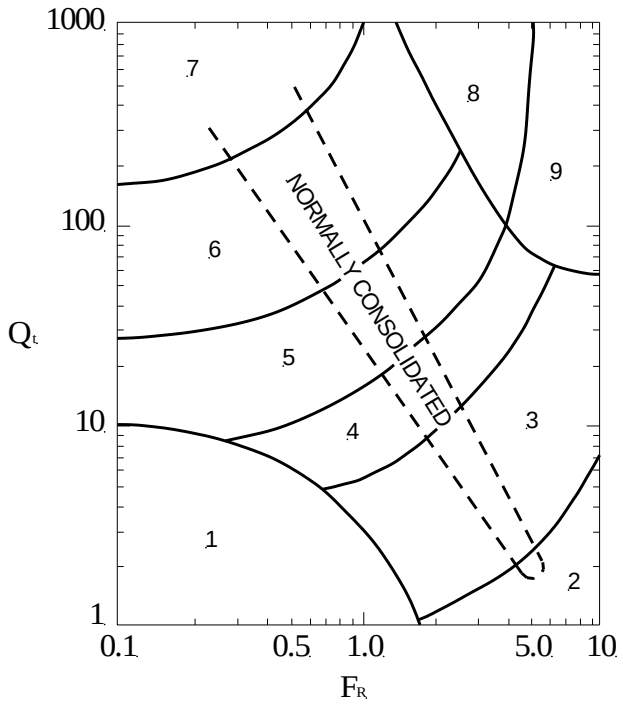
During the testing, a penetrometer tip with a conical point having a 60° apex angle and a cone base area of 10 cm^2 or 15cm^2 is advanced through the soil at a constant rate of 2 cm/sec. The friction sleeve is present on the penetrometer immediately behind the cone tip. The forces exerted on the conical point (cone) and the friction sleeve required to penetrate the soil are measured by electrical methods, at every 2 cm of penetration. The cone resistance (q_t) is calculated by dividing the measured total cone force by the cone base area. The friction sleeve resistance (f_s) is obtained by dividing the measured force exerted on the sleeve by its surface area. Pore pressure is measured directly behind the cone (U_2 position).

SOIL BEHAVIOR TYPE (SBT)

Soil Classification methods for the Cone Penetration Test is based on correlation charts developed from observations of CPT data and conventional borings. Please note that these classification charts are meant to provide a guide to Soil Behavior Type and should not be used to infer a soil classification based on grain size distribution.

The following chart is used to provide a Soil Behavior Type of the CPT Data.

Figure 1: Robertson CPT 1990 (Soil Behavior Type based on Friction Ratio)



The numbers corresponding to different regions on the charts represent the following soil behavior types:

1. Sensitive, Fine Grained
2. Organic Soils - Peats
3. Clays - Clay to Silty Clay
4. Silt Mixtures - Clayey Silt to Silty Clay
5. Sand Mixtures - Silty Sand to Sandy Si1t
6. Sands - Clean Sand to Silty Sand
7. Gravelly Sand to Sand
8. Very Stiff Sand to Clayey Sand
9. Very Stiff, Fine Grained

$$Q_t = \frac{q_t - \sigma_{vo}}{\sigma'_{vo}} \quad F_R = \frac{f_s}{q_t - \sigma_{vo}} \times 100\%$$

where . . .
Q_T.....normalized cone resistance
F_R.....normalized friction ratio

Note that engineering judgment and comparison with conventional borings is especially important in the proper interpretation of CPT data in certain geo-materials.