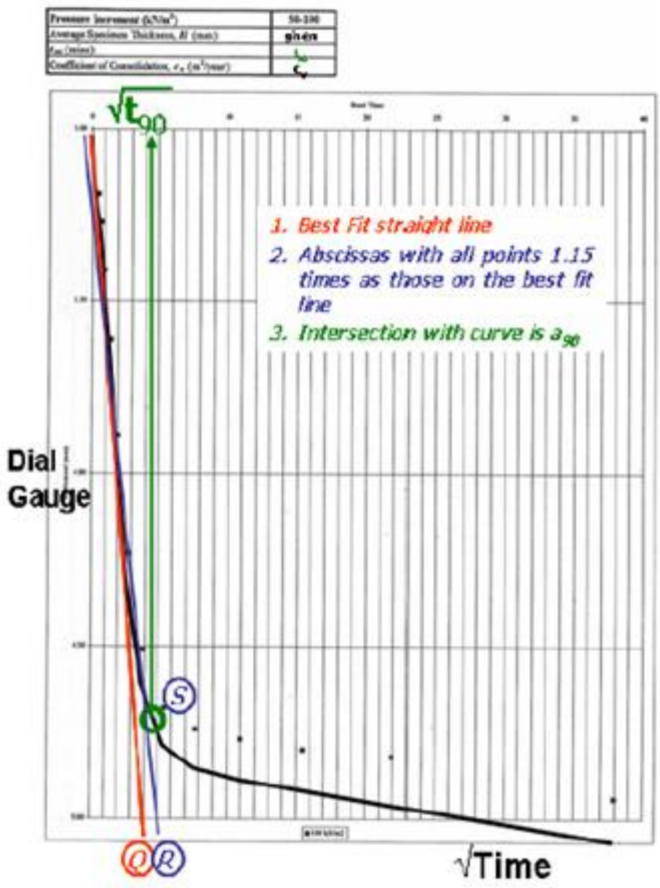
LECTURE 28

Square-root – time curve fitting method



$$C_v = \frac{0.848 \times H^2}{t_{90}}$$

Log-time curve fitting method

1. Plot the dial reading and square root of time i.e T for a pressure increment as shown in figure.

2. Draw a tangent PQ to the initial portion of the plot as shown in fig.

3. Draw a line PR such that OR=1.15OQ.

4. The intersection of the line PR with the second portion of the curve i.e point S is marked.

5. The time corresponding to point S represent √t90 (Square root of time for 90% consolidation)

$$T_v = \frac{C_v t}{H^2}$$

$$C_v = \frac{T_v H^2}{t}$$

For $U_z > 60\%$ $T_v = 1.781 - 0.933 \log_{10}(100 - U\,\%)$

$T_v = 0.848$

$$C_v = \frac{0.848 H^2}{t_{90}}$$

Time Rate of consolidation-

We know that

$$T_v = \frac{C_v\ t}{H^2}$$

$$t = \frac{T_v\ H^2}{C_v}$$

For a given degree of consolidation (U) ---T_v is Constant

$$t \propto \frac{H^2}{C_v}$$

Therefore the time required for a given degree of consolidation is proportional to the length of the drainage path

If the time required to reach a certain degree of consolidation is measured in the laboratory on a sample obtained from the field

The time taken by the field deposit of known thickness can be predicted by using

$$t_f = \frac{H_f^{\,2}}{H_L^{\,2}} \times t_L$$

t_f = Time required for field consolidation
t_L = Time required for laboratory consolidation
H_F = Thickness of soil in the site
H_L = Thickness of laboratory sample