LECTURE 27

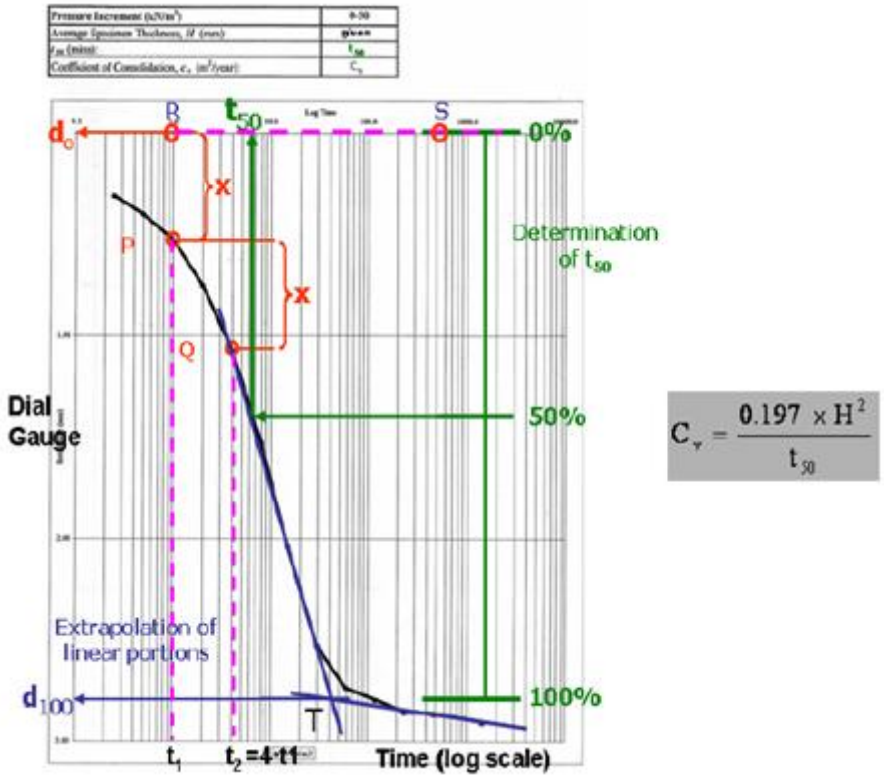
Determination of coefficient of consolidation (Cv) from laboratory data-

The coefficient of three graphical procedure are used

1. Logarithm of time method
2. Square root of time method
3. Hyperbola method

Log – time curve fitting method

The basis for this method is the theoretical (Uz) versus log Tv curve and experimental dial gauge reading and log t curves are similar.



$$C_v = \frac{0.197 \times H^2}{t_{50}}$$

Log-time curve fitting method

Steps

1. Plot the dial reading of compression for a given pressure increment versus time to log scale
2. Plot two points P and Q on the upper portion of the consolidation curve (say compression line) corresponding to time t1 and t2 such that t2=4t1
3. Let x be the difference in dial reading between P and Q. locate R at a vertical distance x above point P
4. Draw a horizontal line RS the dial reading corresponding to this line is d0 which corresponds with 0% consolidation.

5. Project the straight line portion of primary and secondary consolidation to intersect at point T. The dial reading corresponding to T is d100 and this corresponds to 100% consolidation.

6. Determine the point V on the consolidation curve which corresponds to the dial reading of $\frac{d_0 + d_{100}}{2} = d_{50}$. The time corresponding to point V is t_{50} i.e time for 50% consolidation.

7. Determine C_v from $C_v = \frac{T_v H^2}{t}$

For 50% U_z $T_v = 0.197$ $\left(Tv = \frac{\pi}{4}\left(\frac{U_z}{100}\right)^2 \right)$

$$C_v = \frac{0.197 H^2}{t_{50}}$$