Talk on Consolidation Settlement

GEOTECHNICAL ENGINEERING TECHNICAL DIVISION

by Ir. Dr Chan Swee Huat and Ir. Yee Thien Seng

THE Geotechnical Engineering Technical Division had recently organised an evening talk on "Consolidation Settlement" at the Tan Sri Prof. Chin Fung Kee Auditorium, Wisma IEM. The talk was delivered by Ir. Dr. Chan Swee Huat and a total of 51 participants had attended the talk.

The speaker started his talk with an introduction to the geographical areas in Peninsular Malaysia found with soft soils. He then explained the three components of settlement, namely the immediate settlement, consolidation settlement and secondary compression settlement. In particular, the consolidation process the dissipation of excess pore water pressure with time and accompanied by volume change, was illustrated using a piston and spring analogy.

The speaker then described and illustrated how the one-dimensional consolidation test is performed to determine the compression parameters. It was highlighted that the specific gravity (or particle density) value of soil is important in a consolidation test and must be specifically measured (not just assumed) so that the realistic consolidation parameters can be obtained.

The determination of pre-consolidation pressure using the Casagrande's procedure and the determination of co-efficient of consolidation using the Taylor's Root Time method (Figure 1) and Casagrande's Log Time method (Figure 2) were also illustrated in detail. In general, the Taylor's Root Time method is often more popular because of its simplicity and its lesser variation in determining the co-efficient of consolidation.
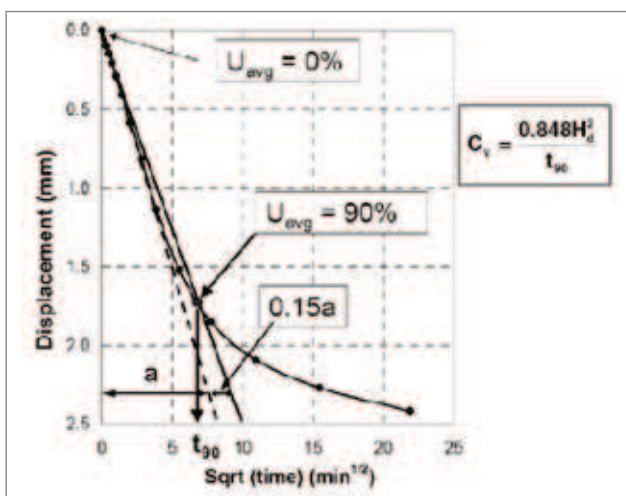

Figure 1: Taylor's Root Time method

On the other hand, the Casagrande's Log Time method requires a straight line to be drawn in the secondary compression region, which may require extended testing time for exhibition of clear secondary compression effect, and can be difficult because secondary compression effect does not necessarily produce a straight line.
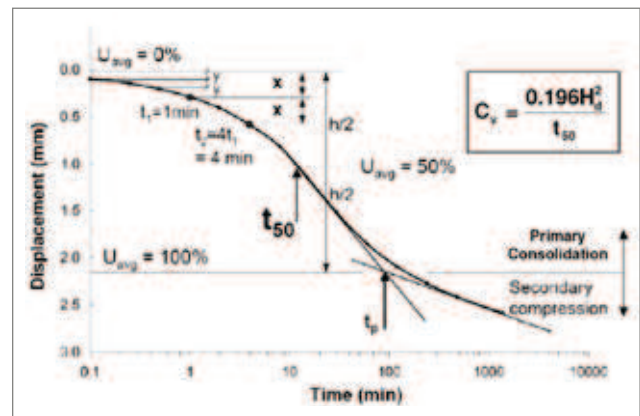

Figure 2: Casagrande's Log Time method

The speaker subsequently demonstrated how the consolidation settlement can be calculated in the case of normally consolidated soils and over-consolidated soils. After detailed outline of the basis behind the Terzaghi's one-dimensional consolidation theory and solution, the speaker discussed and demonstrated how the time rate of consolidation settlement can be estimated. Throughout the talk, example problems were regularly used for the demonstration of various calculations.

At the end of the talk, the speaker was fielded with a number of questions from the audience. Lastly, a token of appreciation was presented to the speaker. The seminar ended with a big round of applause from the floor. ∎