One-dimensional consolidation analysis based on log(t) and $\dot{e}$ soil models

by

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Abstract

Two types of secondary compression model are examined by numerical analyses for one-dimensional consolidation. By comparison with calculated results, it is found that the two models exhibit completely the same consolidation behavior. In order to explain secondary compression behavior, most studies have used numerous rheological models expressed by the logarithm of time. Although these models called log(t) models are widely used, it is reported that a major difficulty is encountered with the log(t) models when the origin of time must be defined. To avoid such a problem regarding the starting time of secondary compression, some researchers recommend the use of the $\dot{e}$ model because void ratio rate is not a relative quantity but an absolute one. However, it may be very difficult , if not , impossible to precisely incorporate the $\dot{e}$ model with a one-dimensional consolidation equation expressed by the excess pore pressure. This paper described a new analytical method for introducing $\dot{e}$ models into Mikasa's consolidation equation. The validity of the assumption used in the analysis is examined and the limitations of the above two models are discussed.

Keywords: One-dimensional consolidation, Secondary compression, Clay, Finite difference method

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