

ONE-DIMENSION CONSOLIDATION ANALYSIS OF SOFT SOILS
UNDER EMBANKMENT LOADED WITH VARIABLE COMPRESSIBILITY
AND PERMEABILITY

Author: *Pham Minh Vuong, Nguyen Hong Hai*

Danang Architecture University; vuongpm@dau.edu.vn
University of Science and Technology, The University of Danang; nhhai@dut.edu.vn

Abstract:

Terzaghi's 1D consolidation theory is commonly used for evaluation of consolidation characteristics of soft soils. Several simplifying assumptions have been made to resolve differential equation for one-dimension consolidation. Particularly, the assumption of constant value for coefficient of consolidation C_v during consolidation process is one of the major limitations in Terzaghi's theory; it is not entirely consistent with reality. In this paper a one-dimensional nonlinear partial differential equation is derived for prediction of consolidation characteristics of soft clays considering variable values for C_v based on linear relationships for e -Log(σ') and e -Log(k). The nonlinear partial differential equation has been solved by a finite different method. An example has been implemented to show that the result of average degree of consolidation is different from calculating nonlinear consolidation theory and Terzaghi's theory.

Key words: Terzaghi's 1D consolidation; Permeability; Compressibility; Pore water pressure; Nonlinear consolidation theory.