Abstracts

Time Effects on One-dimensional Consolidation Analysis

by

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Abstract

Two secondary compression models are examined by analysis and one-dimensional consolidation test in clays of different drainage distances. Scale effects on one-dimensional consolidation taking account of secondary compression are influenced by the increase in effective stress during consolidation. Observed consolidation time curves agree with calculated results of the secondary compression model expressed by the function of consolidation elapsed time and the effective stress.

Keywords: One-dimensional consolidation, Constitutive model, Scale effect, Difference method, Secondary compression

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Flow Characteristics around a Rotating Circular Cylinder

with Arc Grooves

by

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Abstract

In this paper, we clarified flow characteristics around a rotating circular cylinder with arc grooves. In this study, thirty-two arc grooves are set on the test cylinder surface, and the pressure of the cylinder surface is measured with the Reynolds number $Re=0.4 \times 10^2-1.8 \times 10^4$, and rotation of 0–4500 rpm. The drag coefficient $C_D$ and the lift coefficient $C_L$ are calculated from the pressure distribution. In the case of a rotating smooth cylinder, $C_D$ is constant until the spin rate ratio $\alpha$ (a=rotating speed/uniform flow velocity) $=0.4$ and $C_D$ decreases afterwards at $0.4<\alpha<1.0$ in $Re=1.0 \times 10^5$. $C_L$ increases as $\alpha$ increases. However, as $\alpha$ further increases, $C_L$ decreases to the minimum value, and $C_L$ increases again with the increase in $\alpha$. As the spin rate ratio $\alpha$ increases, $C_D$ of the circular cylinder with arc grooves increases after it decreases once at $Re=0.4 \times 10^3-0.6 \times 10^3$. $C_L$ of the circular cylinder with arc grooves increases monotonically with the increase in $\alpha$. These phenomena are due to changes in separation points, and the separation points are clarified from the pressure distribution and flow visualization by the spark tracing method. Moreover, the flow around a rotating circular cylinder with grooves became clear by flow visualization.

Keywords: Rotating circular cylinder, Fluid force, Separation, Spark tracing method

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