

粘性土の非共軸性の定量化と極限解析への応用: 応力と塑性ひずみ増分の主軸のずれの重要

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1997 Fiscal Year Final Research Report Summary

Quantification of non-coaxiality in constitutive relationship of clays and its application to limit equilibrium problem

Research Project

Project/Area Number

08650571

Research Category

Grant-in-Aid for Scientific Research (C)

Allocation Type

Single-year Grants

Section

一般

Research Field

Geotechnical engineering

Research Institution

Kobe University (1997)
Kanazawa University (1996)

Principal Investigator

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Keywords

shear deformation / shear band / strain localization / non-coaxiality / soil / water coupled problem / strength / F.E.simulation

Research Abstract

Recently, localized deformation in geo-materials has attracted many researchers with expecting rational explanation of phenomena such as progressive failure and size effect of footing on bearing capacity. The mathematical formulation of initial-boundary value problem for saturated soil mass is presented and the finite element technique is applied to solve it under appropriate initial and boundary conditions. The elastoplastic Cam-clay model is employed for the soil skeleton. In this study the theoretical framework for the soil/water coupled problem is extended to the finite deformation field where bifurcation of solutions in an initial boundary value problem may occur. The discretization for governing equations is proposed. After examining the numerical stability of the finite element scheme, the triaxial compression shear test of a clay specimen is simulated under the plane strain condition. It is revealed that the shear band observed as the strain localization in clay specimen always develops with dilation, which can be called the localization of dilatancy. Moreover is examined the applicability of such non-linear soil/water coupled formulation in the engineering practice in this study.

Research Products (14 results)

All Other

All Publications (14 results)

- [Publications] 太田 秀樹 他: "軟弱地盤上に施工された高速道路盛土による変形とその数値シミュレーション" 地盤工学における逆解析の適用と施工管理に関するシンポジウム論文集. 123-132 (1997) ▼
- [Publications] Goren, S.他: "ジオシンセティックで補強された盛土構造物の変形挙動" 地盤工学における逆解析の適用と施工管理に関するシンポジウム論文集. 145-150 (1997) ▼
- [Publications] Ohta, H.et al.: "Seismic deamplifying effect of soft clay layers" Proc.of 14th Int.Conf.on Soil Mechanics and Foundation Eng.2. 859-862 (1997) ▼
- [Publications] 小林 一三, 他: "土/水連成有限要素解析に基づいた限界盛土高さ推定法" 土木学会論文集. 575 III-40. 207-217 (1997) ▼
- [Publications] 森川 嘉之, 他: "粘性土の等体積一面せん断強さ" 土木学会論文集. 582 III-41. 173-182 (1997) ▼
- [Publications] Ohta, H., et al.: "Interpretation of in-situ and laboratory tests on soft clays" Proc. of Int. Conf. on Site Characterization. (1998) ▼
- [Publications] Ohta, H., Iizuka, A., Ishikawa, I.And Sugai, K.: "Numerical simulation of soft clay deformation caused by construction of highway embankments" Proc.of Symposium on Application of Inverse Analysis and Construction Control, Japanese Society of Geotechnical Engineering (in Japanese). 123-132 (1996) ▼
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- [Publications] Kobayashi, I., Iizuka, A.and Ohta, H.: "Estimate method of ultimate embankment height on soft clay ground based on soil/water coupled finite element computations" Journal of Geotechnical Engineering, Japan Society of Civil Engineers (in Japanese). No.575/III-40. 207-217 (1997) ▼
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- [Publications] Ohta, H., Hirata, M., Iizuka, A., Yamakami, T., Yokota, Y.and Ohmori, K.: "Application of dilatancy models to soils reinforced by geosynthetics" Proc.of 6th International Conference on Geosynthetics. (in print). (1998) ▼
- [Publications] Iizuka, A., Kobayashi, I.and Ohta, H.: "Dilatancy localization in clay specimen under shearing" Proc.of 4th International Workshop on Localization and Bifurcation Theory for Soils and Rocks. (under submitting). (1998) ▼

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