A new understanding of limit theorem (Lower/Upper Bound Theorem) and its application to stability analysis

1989 Fiscal Year Final Research Report Summary

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Research Project

Project/Area Number

63550359

Research Category

Grant-in-Aid for General Scientific Research (C)

Allocation Type

Single-year Grants

Research Field

基礎・土質工学

Research Institution

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Keywords

limit analysis / perfect plasticity / lower / upper bound theorem / non-associated flow rule / bearing capacity / undrained strength / anisotropy / slip lines

Research Abstract

The bearing capacity of anisotropically consolidated clay is analyzed by the theory based on the limit theorem (Upper/Lower Bound Theorem) taking the effect of anisotropy of the undrained strength into account. Particularly, in this investigation, the limit theorem was generalized.
This generalization of the theory does not require the assumption of 'associated' flow rule. And then A method to search such admissible collapse mechanism was newly developed in this investigation. The limit analysis using this new method does not require the special technique to search the admissible collapse mechanism which is close to the exact solution. This method can form the admissible collapse mechanism without any artificial trial.

The variations of bearing capacity factors with Ko are given for various types of shear test. The bearing capacities calculated by the present theory show fairly good agreement with the experimental results. The undrained strength measured by shear tests should be corrected in connection with the strength anisotropy and the effect of shear rate when they are introduced in conventional stability analysis. The correction factors for strength anisotropy are given by using present theory for various kinds of test strength.

Research Products (6 results)

All | Other

All | Publications (6 results)

[Publications] 太田秀樹: "破壊への道程ー新しい土質力学の体系を求めてー" 第34回土質工学シンポジウム発表論文集、土質工学会. 23-26 (1989)

[Publications] Nishihara,A.and Ohta,H.: "Undrained bearing capacity of anisotropically consolidated clay" Proc.6th Numerical Methods in Geomechanics,Innsbruck. 1. 675-682 (1988)

[Publications] Ohta,H.,Nishihara,A.,Iizuka,A.,Morita,Y. Fukagawa,R.and Arai,K.: "Unconfined compression strength of soft aged clays" Proc.12th International Conference of Soil Mechnics and Foundation Engineering.1. 71-74 (1989)

[Publications] Nishihara, A. and Ohta, H.: "Undrained bearing capacity of anisotropically consolidated clay" Proc. 6th Numerical Methods in Geomechanics, Innsbruck, Vol.1, pp.675-682.

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[Publications] Ohta, H.: "approaches to the failure, ---- grope for new system of soil mechanics -----" Proc. 34th Symposium, JSSMFE pp.23-26, 1989.

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