

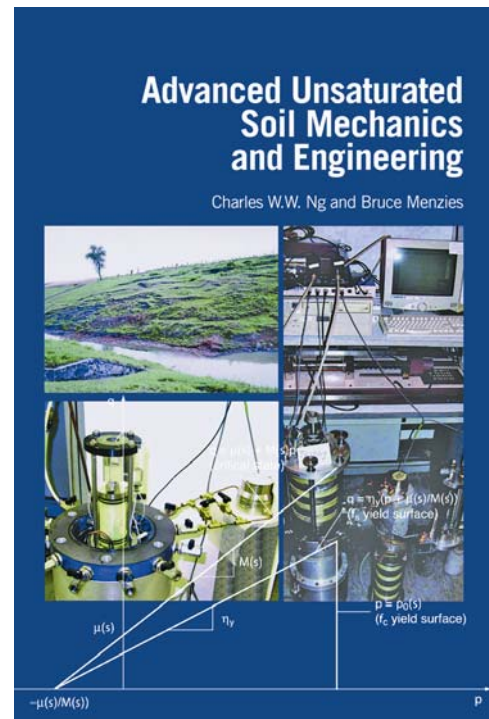
Advanced Unsaturated Soil Mechanics and Engineering

Charles W. W. Ng and Bruce Menzies

Analytical and comprehensive, this state-of-the-art book, examines the mechanics and engineering of unsaturated soils, as well as explaining the laboratory and field testing and research that are the logical basis of this modern approach to safe construction in these hazardous geomaterials; putting them into a logical framework for civil engineering and design.

It:

- illustrates the importance of state-dependent soil-water characteristic curves
- highlights modern soil testing of unsaturated soil behaviour, including accurate measurement of total volume changes and the measurement of anisotropic soil stiffness at very small strains
- introduces an advanced state-dependent elasto-plastic constitutive model for both saturated and unsaturated soil
- demonstrates the power of numerical analysis which is at the heart of modern soil mechanics
- studies and simulates the behaviour of loose fills from unsaturated to saturated states; explains the difference between strain-softening and static liquefaction, and describes real applications in unsaturated soil slope engineering
- includes purpose-designed field trials to capture the effects of two independent stress variables, and reports comprehensive measurements of soil suction, water contents, stress changes and ground deformations in both bare and grassed slopes
- introduces a new conjunctive surface and subsurface transient flow model for realistically analysing rainfall infiltration in unsaturated soil slopes, and illustrates the importance of the flow model in slope engineering.



October 2007: 234x156: 690pp
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Including constitutive and numerical modelling, this volume will interest students and professionals studying or working in the areas of geotechnical engineering and the built environment.

Contents

Part 1: Physical and Flow Characteristics of Unsaturated Soils 1. Basic Physics, Phases and Stress State Variables 2. Measurement and Control of Suction: Methods and Applications 3. Flow Laws, Seepage and State-Dependent Soil-Water Characteristics **Part 2: Collapse, Swelling, Strength and Stiffness of Unsaturated Soils** 4. Collapse and Swelling Caused by Wetting 5. Measurement of Shear Strength and Shear Behaviour of Unsaturated Soils 6. Measurement of Shear Stiffness **Part 3: State-Dependent Elasto-Plastic Modelling of Unsaturated Soils** 7. A State-Dependent Elasto-Plastic Critical State-Based Constitutive Model **Part 4: Field Trials and Numerical Studies in Slope Engineering of Unsaturated Soils** 8. Instrumentation and Performance: A Case Study in Slope Engineering 9. Engineering Applications for Slope Stability

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