Stress Dilatancy Behaviour Of Frozen Sand In Direct Shear

Although progressing very well over the last years, the design criteria for bored and auger piles are still not fully under control and in acceptable synergism with the real pile foundation behaviour. Although there has been a lot of research in the past years worldwide on deep foundation engineering, the strong and competitive market ha

Instabilities in alpine permafrost: strength and stiffness in a warming regimevdf Hochschulverlag AG

Proceedings of the Third International Conference

Bibliography and Index of Geology

Snow and Ice-Related Hazards, Risks, and Disasters

International Offshore and Navigation Conference and Exhibition, Helsinki, Finland, 27-30 October 1986

Dokumentation Rheologie

A fundamental interpretation of soil behaviour

This book is loaded with rich and stimulating articles by a roster of brilliant scholars, reflecting some recent trends in the frontier research of geomechanics. This collection of 32 contributions stems from an international workshop on "Modern Trends of Geomechanics" held in Vienna. The contributions span a wide range of topics and an enormous range of physical scales, from micromechanics at grain scale to engineering problems at large scale; from laboratory and field testing over constitutive modelling to numerical analysis. The key features of this book are: thermodynamics, multiphase continua and transport phenomena; constitutive modelling, localized bifurcation, micropolar theory, unsaturated soil, viscous and cyclic behaviour; numerical and analytical methods; discrete element method, micromechanics, grain crushing and damage; laboratory and field testing, foundation and mining engineering. This book will be rewarding for anyone interested in the frontier research in geomechanics and geotechnical engineering, appealing to graduate students, researchers and engineers alike.

Snow and Ice-Related Hazards, Risks, and Disasters provides you with the latest scientific developments in glacier surges and melting, ice shelf collapses, paleo-climate reconstruction, sea level rise, climate change implications, causality, impacts, preparedness, and mitigation. It takes a geo-scientific approach to the topic while also covering current thinking about directly related social scientific issues that can adversely affect ecosystems and global economies. Puts the contributions from expert oceanographers, geologists, geophysicists, environmental scientists, and climatologists selected by a world-renowned editorial board in your hands Presents the latest research on causality, glacial surges, ice-shelf collapses, sea level rise, climate change implications, and more Numerous tables, maps, diagrams, illustrations and photographs of hazardous processes will be included Features new insights into the implications of climate change on increased melting, collapsing, flooding,

methane emissions, and sea level rise
Computational Multiphase Geomechanics
Proceedings of the ITA World Tunneling Congress, Amsterdam 2003.
Permafrost
Geotechnical Abstracts

Unstable Alpine Permafrost

Mechanics of Structured Media

This book contains papers, presented at the ITA World Tunnelling Congress 2003 held in Amsterdam, which reflects the state of the art with regard to research, analysis, design and practical experience in almost all fields of tunnelling and underground space construction.

Instabilities in alpine permafrost: strength and stiffness in a warming regime

New Permafrost and Glacier Research

CANCAM Proceedings

Mechanics of Geomaterial Interfaces

POLARTECH '86

Reclaiming The Underground Space - Volume 2

Soil rheology is a branch of soil mechanics investigating the origin of, and the time-dependent changes in the stressed and strained state of soil. The author of this book however interprets rheology as being the science concerned on the one hand with how the state of stress and strain is formed and altered in a body, and on the other, with the particulars of the body's behaviour failing to fit the traditional concepts of elasticity and plasticity. There are many instances where the actual behaviour of soil differs substantially from schematized concepts and by taking into account all the peculiarities of soil deformation, precise knowledge of soil properties can be obtained and analytical prediction thus improved. Such problems are tackled in this book. This book comprises three main parts. The first part deals with basic rheological concepts and terms, the physics of soil, principles of stress-strain theory, elasticity, plasticity and viscosity - all cardinal rheological properties. The second part explains the rheological processes taking place in soils, such as creep and long-term strength, which are examined by the author with allowance for nonlinear deformation. Along with the known phenomenological theories, attention is paid to the novel kinetic (physical) theory of deformations and long-term strength. The third part outlines the generalized theory of soil deformation. It explains why soil offers different resistances to tensional and compressional deformations and derives the generalized rheological equation of state, enabling the effect of the three stress tensor invariants on the changes in shape and volume to be taken into account. From the standpoint of the theory discussed, the penultimate chapter gives examples of solutions to some problems facing soil mechanics.

The final chapter reviews mathematical models representing the actual behaviour of soil under load and provides numerical solutions for engineering problems obtained with the aid of computer models. Thus the book provides a wealth of information which will be of interest both to the practising geotechnical engineer as well as to teachers and students.

An understanding of the mechanical properties of unsaturated soilsis crucial for geotechnical engineers worldwide, as well as tothose concerned with the interaction of structures with the ground.This book deals principally with fine-grained clays and silts, orsoils containing coarser sand and gravel particles but with asignificant percentage of fines. The study of unsaturated soil is a practical subject, linkingfundamental science to nature. Soils in general are inherentlyvariable and their behaviour is not easy to analyse or predict, andunsaturated soils raise the complexity to a higher level. Evenamongst practicing engineers, there is often lack of awareness ofthe intricacies of the subject. This book offers a perspective ofunsaturated soils based on recent research and demonstrates howthis dovetails with the general discipline of soil mechanics. Following an introduction to the basic soil variables, thephases, the phase interactions and the relevance of soil structure,an up-to-date review of laboratory testing techniques is presented.This includes suction measurement and control techniques intriaxial cell testing. This is followed by an introduction tostress state variables, critical state and theoretical models inunsaturated soils. A detailed description of the thermodynamic principles asapplied to multi-phase materials under equilibrium conditionsfollows. These principles are then used to explore and develop afundamental theoretical basis for analysing unsaturated soils. Soilstructure is broken down into its component parts to developequations describing the dual stress regime. The critical statestrength and compression characteristics of unsaturated soils areexamined and it is shown how the behaviour may be viewed as athree-dimensional model in dimensionless stress-volume space. Theanalysis is then extended to the work input into unsaturated soilsand the development of conjugate stress, volumetric andstrain-increment variables. These are used to examine themicromechanical behaviour of kaolin specimens subjected to triaxialshear strength tests and lead to observations not detectable byother means. Unsaturated Soils: A fundamental interpretation of soilbehaviour covers a rapidly advancing area of study, researchand engineering practice and offers a deeper appreciation of thekey characteristics of unsaturated soil. It provides students andresearchers with a framework for understanding soil behaviour anddemonstrates how to interpret experimental strength and compressiondata. provides engineers with a deeper appreciation of keycharacteristics of unsaturated soils covers a rapidly advancing area of study, research andengineering practice provides students and researchers a framework for understandingsoil behaviour shows how to interpret experimental data on strength andcompression the limited number of books on the subject are all out ofdate

Mechanics of Structured Media

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Journal of Geotechnical Engineering

The Journal of Glaciology

KWIC Index of Rock Mechanics Literature, Part 2, 1969-1976

The Proceedings of the First (1990) European Offshore Mechanics Symposium

The proceedings of the 6th International Symposium on Mining in the Arctic, held in Greenland in 2001. The papers cover a wide variety of topics, including: mining exploration and exploitation; mining engineering and mine design; environmental impact of mining in the Arctic; and more.

Numerical methods are very powerful tools for use in geotechnical engineering, particularly in computational geotechnics. Interest is strong in the new field of multi-phase nature of geomaterials, and the area of computational geotechnics is expanding. Alongside their companion volume Computational Modeling of Multiphase Geomaterials (CRC Press, 2012), Fusao Oka and Sayuri Kimoto cover recent progress in several key areas, such as air-water-soil mixture, cyclic constitutive models, anisotropic models, noncoaxial models, gradient models, compaction bands (a form of volumetric strain localization and strain localization under dynamic conditions), and the instability of unsaturated soils. The text also includes applications of computational modeling to large-scale excavation of ground, liquefaction analysis of levees during earthquakes, methane hydrate development, and the characteristics of contamination using bentonite. The erosion of embankments due to seepage flow is also presented.

The Physics of Glaciers

A Potentially Important Natural Hazard - Variations of Geotechnical Behaviour with Time and Temperature

Special Report - Corps of Engineers, U.S. Army, Cold Regions Research and Engineering Laboratory

Rheological Fundamentals of Soil Mechanics

Canadian Geotechnical Journal

Summaries of Publications

Frozen Ground Engineering first introduces the reader to the frozen environment and the behavior of frozen soil as an engineering material. In subsequent chapters this information is used in the analysis and design of ground support systems, foundations, and embankments. These and other topics make this book suitable for use by civil engineering students in a one-semester course on frozen ground engineering at the senior or first-year-graduate level. Students are assumed to have a working knowledge of undergraduate mechanics (statics and mechanics of materials) and geotechnical engineering (usual two-course sequence). A knowledge of basic geology would be helpful but is not essential. This book will also be useful to advanced students in other disciplines and to engineers who desire an introduction to frozen ground engineering or references to selected technical publications in the field. BACKGROUND Frozen ground engineering has developed rapidly in the past several decades under the pressure of necessity. As practical problems involving frozen soils broadened in scope, the inadequacy of earlier methods for coping became increasingly apparent. The application of ground freezing to geotechnical projects throughout the world continues to grow as significant advances have been made in ground freezing technology. Freezing is a useful and versatile technique for temporary earth support, groundwater control in difficult soil or rock strata, and the formation of subsurface containment barriers suitable for use in groundwater remediation projects.

Snow and Ice-Related Hazards, Risks, and Disasters, Second Edition, provides you with the latest scientific developments in sea level rise, permafrost degradation, rock/ice avalanches, glacier surges, glacial lake outburst floods, ice shelf collapses, climate change implications, causality, impacts, preparedness and mitigation. The book takes a geo-scientific approach to the topic while also covering current thinking about directly related social scientific issues that can affect ecosystems and global economies. Special emphasis is placed on the rapidly progressing effects from global warming on the cryosphere, perspectives for the future and latest scientific advances, and technological developments. Presents the latest research on causality, glacial surges, ice-shelf collapses, sea level rise, climate change

implications, and more Contains numerous tables, maps, diagrams, illustrations and photographs of hazardous processes Features new insights on the implications of climate change, including increased melting, collapsing, flooding, methane emissions, and sea level rise

Unsaturated Soils

Safety and Reliability

G é otechnique

Mining in the Arctic

Proceedings of the ESREL 2003 Conference, Maastricht, the Netherlands, 15-18 June 2003

Modern Trends in Geomechanics

Developments in Geotechnical Engineering Volume 26: Ground Freezing presents the proceedings of the First International Symposium on Ground Freezing, held in Bochum, Germany on March 8-10, 1978. It summarizes progress in the application of the ground freezing technique in geotechnical engineering, with a focus on engineering with frozen soils and related frost research problems. It includes papers that discuss phase transformation of water, thermodynamics, heat and mass transfer, and mathematical models. The laboratory and theoretical studies of thermophysical and mechanical properties are discussed as well. Organized into 43 chapters, this volume begins with an overview of the freezing and thawing of soils, earth, and rock, and the engineering applications of the favorable properties of frozen ground. It then discusses the mechanical properties of artificially frozen soil for construction purposes, the principles of mechanical and thermal behavior of frozen soil, and the design and calculation of frozen soil-structures. Furthermore, it explains the calculation and dimensioning of refrigeration plants and monitoring of frost penetration. The methods and instrumentation for determining the locations of boundaries of frozen soils and the factors affecting the formation of soil cryogenic textures upon artificial active and passive soil freezing are described. The book also details the influence of salts in the pore water in freezing soils and explains how clay microstructure affects the amount of unfrozen water. In addition, it presents the physicomechanical and thermomechanical properties of frozen coarse-grained soil with sandy clay aggregate. This book will be a valuable source of information for scientists and engineers.

These proceedings contain two hundred and eighteen papers representing the work of authors from countries across the world. They cover a wide range of research and applications in safety and reliability issues that concern all types of systems, processes and structures.

Deep Foundations on Bored and Auger Piles - BAP V

Proceedings of the 6th International Symposium, Nuuk, Greenland, 28-31 May 2001
Applied Mechanics Reviews
Proceedings of the ... International Offshore Mechanics and Arctic Engineering Symposium
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Preprint Volume for ... Canadian Geotechnical Conference

The Ground Engineer's Reference Book provides the most comprehensive survey of ground engineering in a practical and assimilable form for the practicising engineer. It systematically covers all aspects of the subject: properties and behaviour of ground; ground treatment; investigation; construction methods; numerical methods and modelling. Each of the specialized contributions is supported by numerous references, diagrams and tables and is comprehensively illustrated throughout. * The most detailed study of ground engineering available * Written by more than 50 international experts * Practical guidance and solutions based on professional experience

In geology, permafrost or permafrost soil is soil at or below the freezing point of water (0 °C or 32 °F) for two or more years. Ice is not always present, as may be in the case of nonporous bedrock, but it frequently occurs and it may be in amounts exceeding the potential hydraulic saturation of the ground material. Most permafrost is located in high latitudes (i.e. land in close proximity to the North and South poles), but alpine permafrost may exist at high altitudes in much lower latitudes. The extent of permafrost can vary as the climate changes. Today, approximately 20% of the Earth's land mass is covered by permafrost (including discontinuous permafrost) or glacial ice. A glacier is a large, slow-moving mass of ice, formed from compacted layers of snow, that slowly deforms and flows in response to gravity and high pressure. The word glacier comes from French via the Vulgar Latin glacia, and ultimately from Latin glacies meaning ice. Glacier ice is the largest reservoir of fresh water on Earth, and second only to oceans as the largest reservoir of total water. Glaciers cover vast areas of polar regions, are found in mountain ranges of every continent, and are restricted to the highest mountains in the tropics. The processes and landforms caused by glaciers and related to them are referred to as glacial. The process of glacier growth and establishment is called glaciation. Glaciers are sensitive monitors of climate conditions and are crucial to both world water resources and sea level variation. This book presents the latest research on both permafrost and glaciers.

Proceedings of the International Symposium on the Mechanical Behaviour of Structured Media, Ottawa, May 18-21, 1981
Ground Freezing
Engineering Design and Construction
Ground Engineer's Reference Book
An Introduction to Frozen Ground Engineering
Behaviour of Off-shore Structures

Includes reports of the Society's meetings.

The subject of geomaterial interfaces recognizes the important influences of the interface behaviour on the performance of interfaces involving cementaceous materials such as concrete and steel, ice-

structure interfaces, concrete-rock interfaces and interfaces encountered in soil reinforcement. During the past two decades, the subject of geomaterial interfaces has attracted the concerted attention of scientists and engineers both in geomechanics and applied mechanics. These efforts have been largely due to the observation that the conventional idealizations of the behaviour of interfaces between materials by frictionless contact, bonded contact, Coulomb friction or finite friction tend to omit many interesting and important influences of special relevance to geomaterials. The significant manner in which non-linear effects, dilatancy, contact degradation, hardening and softening, etc., can influence the behaviour of the interface is borne out by experimental evidence. As a result, in many instances, the response of the interface can be the governing criterion in the performance of a geomechanics problem. The primary objective of this volume is to provide a documentation of recent advances in the area of geomaterial interfaces. The volume consists of subject groupings which cover ice-structure, soil-structure and steel-concrete interfaces, mechanics of rock and concrete joints and interfaces in discrete systems.

Hydrodynamics and Structural Mechanics, Tubular Joints and Fatigue, TLP, Offshore Systems, Pipelines and Risers, Cables and Mooring, Ice-structure Interactions

... International Conference, Proceedings

Abstract Journal in Earthquake Engineering

5th International Symposium on Deep Foundations on Bored and Auger Piles (BAP V), 8-10 September 2008, Ghent, Belgium, Book + CD-ROM

This updated and expanded version of the second edition explains the physical principles underlying the behaviour of glaciers and ice sheets. The text has been revised in order to keep pace with the extensive developments which have occurred since 1981. A new chapter, of major interest, concentrates on the deformation of subglacial till. The book concludes with a chapter on information regarding past climate and atmospheric composition obtainable from ice cores.

Alpine permafrost exists at high altitude at lower latitudes, such as in the Swiss Alps. Accelerating climate change, including rising mean annual air temperature and extreme rainfall conditions in alpine regions induces permafrost degradation. The warming of permafrost causes accelerated creep of rock glaciers, due to increased unfrozen water content and higher deformability of the ice phase. Recently, the development of deepening depressions has been observed in several rock glaciers in Switzerland, and the changes in land surface characteristics and drainage systems may initiate slope instabilities in rock glaciers. The main aim of this thesis is to characterise the strength and stiffness of alpine frozen soil in rock glaciers. To this end, the geotechnical response, such as creep and failure of frozen soil was investigated through a triaxial stress path testing programme with novel measurement systems for detecting acoustic emissions and measuring volumetric change. In addition, the resistance to crack initiation and

propagation was investigated through a beam bending test programme on rectangular artificially frozen soil specimens, using the acoustic emission measurement system. The evaluation of laboratory tests on artificially frozen soil specimens implied that the development of deep depressions in rock glaciers occurs through differential creep and thermal degradation, and that the rate of deformation has the potential to lead to instabilities in rock glaciers. A comparison of the simulation results with the experimental data demonstrated that the semi-coupled model was successful in simulating the most important aspects of the temperature-dependent stress-strain relationship for the frozen soil behaviour that was measured at the element scale. This thesis contributes to an understanding of the variations in geotechnical response of alpine permafrost, by investigating the behaviour of artificially frozen soil specimens experimentally and numerically with time and temperature under specific stress paths. However, further investigations are necessary to assess the long-term stability of rock glaciers affected by climate change.