# Slope Stability And Stabilization Methods

*This book is an up-to-date review of research and practice on the use of vegetation for slope stabilization and control of surface erosion caused by water and wind. From a basic understanding of the principles and practices of vegetation growth and establishment, it describes how vegetation can be treated as an engineering material and used to solve erosion and slope stability problems.*

*A number of methods currently exist for the analysis and design of slopes. This book provides a critical review of these and offers several more appropriate approaches for overcoming numerical convergence and the location of critical failure surfaces in two-dimensional and three-dimensional cases. New concepts in three-dimensional stability analysis, finite element analysis and the extension of slope stability problems to lateral earth pressure problems are also addressed. It gives helpful practical advice and design resources in the form of recommendations for good analysis and design practice, design charts and tables for the engineer. Limitations are detailed of both limit equilibrium and the finite element method in the assessment of the stability of a slope, and guidance is provided for assessing the fundamental assumptions and limitations of stability analysis methods and computer modelling. The book provides ample examples to illustrate how this range of problems should be dealt with. The final chapter touches on design and its implementation on site. The emphasis is on the transfer of the design to its physical implementation on site in a holistic way, taking full account of the latest developments in construction technology. Engineering and construction problems tend to be pigeonholed into different classes of problem such as slope stability, bearing capacity and earth pressure behind retaining structures. This is quite unnecessary. This book offers a unified approach, which is conceptually, practically and philosophically more satisfying.*

*Authoritative, state-of-the-art guidance to soil strength and slope-stability analysis Through clear, concise language and practical examples, Soil Strength and Slope Stability describes state-of-the-art methods for the evaluation and analysis of soil strength, as well as design and stabilization of slopes in soil. The principles of limit equilibrium analysis and appropriate use of computer programs are emphasized. Methods are described for checking the results of complex analyses and for presenting results of slope stability analyses clearly. These are illustrated through many examples. Written by two recognized experts in the field, Soil Strength and Slope Stability features: Case histories of landslides, embankment failures, and excavation slope failures Principles that govern the shear strength of soils, including shear strength of municipal solid waste Methods for estimating and evaluating shear strengths based on back analysis of slope failures and stable slopes Explanations of the conditions that slopes must be designed to endure Detailed explanations of analysis methods for short-term and long-term stability, rapid drawdown, earthquakes, and partial consolidation A wide range of analysis methods, methods for verifying results, and advice on presenting the results of slope stability analyses, including the importance of using multiple and/or independent methods Methods for repairing failed slopes and stabilizing marginally stable slopes Visually informative with more than 250 illustrations, Soil Strength and Slope Stability is a complete and practical resource for geotechnical engineers, engineering geologists, civil engineers, geologists, environmental engineers, and students.*

*Slope Stability and Stabilization MethodsJohn Wiley & Sons*

*Earth and Rockfill Dams*

*Encyclopedia of Engineering Geology*

*Analysis and Design of Geotechnical Structures*

*Fundamentals and Methods*

*Slope Stability 2000*

Written by a leader on the subject, Introduction to Geotechnical Engineering is first introductory geotechnical engineering textbook to cover both saturated and unsaturated soil mechanics. Destined to become the next leading text in the field, this book presents a new approach to teaching the subject, based on fundamentals of unsaturated soils, and extending the description of applications of soil mechanics to a wide variety of topics. This groundbreaking work features a number of topics typically left out of undergraduate geotechnical courses.

Includes Recommendations for Analysis, Design Practice, Design Charts, Tables, and More Using a unified approach to address a medley of engineering and construction problems, Slope Stability Analysis and Stabilization: New Methods and Insight, Second Edition provides helpful practical advice and design resources for the practicing engineer. This text examines a range of current methods for the analysis and design of slopes, and details the limitations of both limit equilibrium and the finite element method in the assessment of the stability of a slope. It also introduces a variety of alternative approaches for overcoming numerical non-convergence and the location of critical failure surfaces in two-dimensional and three-dimensional cases. What's New in the Second Edition: This latest edition builds on the concepts of the first edition and covers the case studies involved in slope stability analysis in greater detail. The book adds a chapter on the procedures involved in performing limit equilibrium analysis, as well as a chapter on the design and construction practice in Hong Kong. It includes more examples and illustrations on the distinct element of slope, the relation between limit equilibrium and plasticity theory, the fundamental connections between slope stability analysis and the bearing capacity problem, as well as the stability of the three-dimensional slope under patch load conditions. Addresses new concepts in three-dimensional stability analysis, finite element analysis, and the extension of slope stability problems to lateral earth pressure problems Offers a unified approach to engineering and construction problems, including slope stability, bearing capacity, and earth pressure behind retaining structures Emphasizes how to translate the conceptual design conceived in the design office into physical implementation on site in a holistic way Discusses problems that were discovered during the development of associated computer programs This text assesses the fundamental assumptions and limitations of stability analysis methods and computer modelling, and benefits students taking an elective course on slope stability, as well as geotechnical engineering professionals specializing in slope stability

The first comprehensive, practical guide to the selection,construction, and installation of soil bioengineering andbiotechnical slope protection Here is the ultimate guide to physically attractive,environmentally compatible, and cost-effective methods ofprotecting slopes from erosion and mass wasting. Lavishlyillustrated with more than 150 photographs and supplemented withscores of charts and tables, this book covers the entire subjectfrom general principles and background on the nature of soilerosion and mass movement to detailed information on rootstrengths, treatment selection, unit costs, critical tractivestresses, methods for harvesting and handling live cuttings, andmore. Four illustrated case studies, each addressing a different set ofproblems and solutions, demonstrate both the application ofparticular technologies and the site investigation, planning,scheduling, and organization required to complete these projectssuccessfully. This unique reference handbook * Reviews the horticultural and engineering underpinnings forbiotechnical and soil engineering treatments * Documents and explains the role of woody plants in stabilizingslopes against both surficial erosion and mass movement * Provides details on a broad range of soil bioengineering methods,including live staking, live fascines, brushlayering, live cribwalls, branchpacking, and live slope gratings * Describes various biotechnical methods and materials, includingthe incorporation of vegetation in erosion control blankets,flexible mats, cellular revetments (geocells), rock armor (riprap), and gabion and open-front crib walls * Summarizes the findings of the National ScienceFoundation-sponsored workshop to assess the state of the art anddetermine research needs For practicing professionals, researchers, and students ingeotechnical engineering, geology, soil science, forestry andforest engineering, landscape architecture, environmentalhorticulture, and restoration ecology, this book offers thorough,up-to-date coverage that is not available from any other singlesource.

Includes Recommendations for Analysis, Design Practice, Design Charts, Tables, and More Using a unified approach to address a medley of engineering and construction problems, Slope Stability Analysis and Stabilization: New Methods and Insight, Second Edition provides helpful practical advice and design resources for the practicing engineer. This text examines a range of current methods for the analysis and design of slopes, and details the limitations of both limit equilibrium and the finite element method in the assessment of the stability of a slope. It also introduces a variety of alternative approaches for overcoming numerical non-convergence and the location of critical failure surfaces in two-dimensional and three-dimensional cases. What s New in the Second Edition: This latest edition builds on the concepts of the first edition and covers the case studies involved in slope stability analysis in greater detail. The book adds a chapter on the procedures involved in performing limit equilibrium analysis, as well as a chapter on the design and construction practice in Hong Kong. It includes more examples and illustrations on the distinct element of slope, the relation between limit equilibrium and plasticity theory, the fundamental connections between slope stability analysis and the bearing capacity problem, as well as the stability of the three-dimensional slope under patch load conditions. Addresses new concepts in three-dimensional stability analysis, finite element analysis, and the extension of slope stability problems to lateral earth pressure problems Offers a unified approach to engineering and construction problems, including slope stability, bearing capacity, and earth pressure behind retaining structures Emphasizes how to translate the conceptual design conceived in the design office into physical implementation on site in a holistic way Discusses problems that were discovered during the development of associated computer programs This text assesses the fundamental assumptions and limitations of stability analysis methods and computer modelling, and benefits students taking an elective course on slope stability, as well as geotechnical engineering professionals specializing in slope stability"

Cost-effective and Sustainable Road Slope Stabilization and Erosion Control

Biotechnical and Soil Bioengineering Slope Stabilization

Slope Stability and Erosion Control: Ecotechnological Solutions

Slope Stability and Stabilization Methods

*Rock Slope Engineering covers the investigation, design, excavation and remediation of man-made rock cuts and natural slopes, primarily for civil engineering applications. It presents design information on structural geology, shear strength of rock and ground water, including weathered rock. Slope design methods are discussed for planar, wedge, circular and toppling failures, including seismic design and numerical analysis. Information is also provided on blasting, slope stabilization, movement monitoring and civil engineering applications. This fifth edition has been extensively up-dated, with new chapters on weathered rock, including shear strength in relation to weathering grades, and seismic design of rock slopes for pseudo-static stability and Newmark displacement. It now includes the use of remote sensing techniques such as LiDAR to monitor slope movement and collect structural geology data. The chapter on numerical analysis has been revised with emphasis on civil applications. The book is written for practitioners working in the fields of transportation, energy and industrial development, and undergraduate and graduate level courses in geological engineering.*

*The stability of rock slopes is an important issue in both civil and mining engineering. On civil projects, rock cuts must be safe from rock falls and large-scale slope instability during both construction and operation. In open pit mining, where slope heights can be many hundreds of meters, the economics of the operation are closely related to the steepest stable slope angle that can be mined. This extensively updated version of the classic text, Rock Slope Engineering by Hoek and Bray, deals comprehensively with the investigation, design and operation of rock slopes. Investigation methods include the collection and interpretation of geological and groundwater data, and determination of rock strength properties, including the Hoek Brown rock mass strength criterion. Slope design methods include the theoretical basis for the design of plane, wedge, circular and toppling failures, and design charts are provided to enable rapid checks of stability to be carried out. New material contained in this book includes the latest developments in earthquake engineering related to slope stability, probabilistic analysis, numerical analysis, blasting, slope movement monitoring and stabilization methods. The types of stabilization include rock anchors, shotcrete, drainage and scaling, as well as rock fall protecting methods involving barriers, ditches, nets and sheds. Rock Slopes: Civil and Mining Engineering contains both worked examples illustrating data interpretation and design methods, and chapters on civil and mining case studies. The case studies demonstrate the application of design methods to the construction of stable slopes in a wide variety of geological conditions. The book provides over 300 carefully selected references for those who wish to study the subject in greater detail. It also includes an introduction by Dr. Evert Hoek.*

*"In the United States it is estimated that 75 percent of all roads are low volume roads maintained by some 35,000 local agencies. Low volume roads often omit surface slope protection, and this can lead to slope failure, erosion, and maintenance, safety, and ecological issues. This report presents information on cost effective and sustainable road slope stabilization techniques, with a focus on shallow or near surface slope stabilization and related erosion control methods used on low volume roads. To fully address this topic, planning and site investigation are discussed, as well as erosion control techniques, soil bioengineering and biotechnical techniques, mechanical stabilization, and earthwork techniques. Information presented in this report was obtained through an extensive literature review, and from survey and interview responses. From the survey responses, 30 individuals were interviewed based on the information they made available in the survey. A total of 25 interviews were conducted over the phone, and in two cases written responses were received"--Preface.*

*The purpose of this project is to create a user-friendly guide focusing on locally maintained slopes requiring reoccurring maintenance in Minnesota. This study addresses the need to provide a consistent, logical approach to slope stabilization that is founded in geotechnical research and experience and applies to common slope failures. Authors used input from Minnesota county engineers, case studies from site investigations throughout the state, and a parametric study of slope stability modeling parameters to develop stabilization recommendations. The project, beginning in September 2015, consisted of four primary research phases. In Task 1, researchers identified slopefor furtherer analysis via a survey sent to each county engineering department in the state. Responses provided site investigation locations. Researchers conducted site investigations and developed case studies to analyslope stabilizationion methods. Task 2 involved performing a literature review to identify slope stabilization methods. In Task 3,laboratory testing characterized soil properties from case study sites. Additionally, limit equilibrium method (LEM)models were developed for each slope to investigate different stabilization methods in a parametric study. In Task 4,modeling and analysis results were summarized for distribution to local government engineers. The target audience ofthe guide is county or local municipal engineers who do not have specialized geotechnical engineering experience. Theresearch does not address slope stability issues of the scale that require local municipalities to hire geotechnical engineering specialists. Authors intend the deliverable to assist with efficient stabilization of common recurring slopefailures along roadways.*

*New Methods and Insight*

*New Methods and Insight, Second Edition*

*Landslides and Engineered Slopes. Experience, Theory and Practice*

*The Stability of Slopes*

*Proceedings of the 1st GeoMEast International Congress and Exhibition, Egypt 2017 on Sustainable Civil Infrastructures*

Landslides and Engineered Slopes. Experience, Theory and Practice contains the invited lectures and all papers presented at the 12th International Symposium on Landslides, (Naples, Italy, 12-19 June 2016). The book aims to emphasize the relationship between landslides and other natural hazards. Hence, three of the main sessions focus on Volcanic-induced landslides, Earthquake-induced landslides and Weather-induced landslides respectively, while the fourth main session deals with Human-induced landslides. Some papers presented in a special session devoted to "Subareal and submarine landslide processes and hazard" and in a "Young Session" complete the books. Landslides and Engineered Slopes. Experience, Theory and Practice underlines the importance of the classic approach of modern science, which moves from experience to theory, as the basic instrument to study landslides. Experience is the key to understand the natural phenomena focusing on all the factors that play a major role. Theory is the instrument to manage the data provided by experience following a mathematical approach; this allows not only to clarify the nature and the deep causes of phenomena but mostly, to predict future and, if required, manage similar events. Practical benefits from the results of theory to protect people and man-made works. Landslides and Engineered Slopes. Experience, Theory and Practice is useful to scientists and practitioners working in the areas of rock and soil mechanics, geotechnical engineering, engineering geology and geology.

Provides a complete guide to the study, design, construction and management of landslide and slope engineering measures for mountain roads, with emphasis on low-cost. The geographical focus is on the tropics and sub-tropics, but is also highly relevant to other regions where heavy rain, steep slopes and weak soils and rocks combine to create slope instability. The causes and mechanisms of landslides are described, and the hazards they pose to mountain roads are illustrated. Methods of desk study, field mapping and ground investigation are reviewed and illustrated, with emphasis on geomorphological and engineering geological techniques. The design and construction of alignments, earthworks, drainage, retaining structures, the stabilization of soil slopes and rock slopes, and the control of erosion on slopes and in streams covered. Slope management as part of road maintenance and operation is reviewed, and procedures for risk assessment and works prioritization are described.

Much of the research on fracture of rocks or rock-like materials conducted over the past two decades may be considered as "academic studies" of the general phenomenon of fracture. Yet, the understanding of this phenomenon is fundamental if a material is used in any engineering design, whether the aim is to prevent failure of the structure or to promote it. Fracture theories existing are generally empirical and derived from experimental results of laboratory test with simple boundary conditions. Because of the basic weakness of rock intension and because in general the environmental stresses in rock mechanics are compressive most of these theories consider fracture under compressive stress conditions. The Coulomb-Navier-, the Mohr-, the Griffith and the McClintock and Walsh criteria are typical examples and will be considered in the following. In addition the tendency during the past was in making accurate experiments under conditions of homogeneous stresses. To obtain information about the fracture behaviour with unequal principal stresses systems have to be used which involve inhomogeneous stresses. This case is of particular interest, since in practical rock mechanics we may expect conditions of highly inhomogeneous stresses. However, a consideration of such situations involve additional assumptions like the applicability of the theory of elasticity for calculating the stress field, which may be open to question. A distinction has to be made between fracture initiation and fracture propagation, since a detailed observation of the total fracture process in rock was possible by means of "stiff" and "servo-controlled" loading systems.

Guidelines for Evaluating Water in Pit Slope Stability is a comprehensive account of the hydrogeological procedures that should be followed when performing open pit slope stability design studies. Created as an outcome of the Large Open Pit (LOP) project, an international research and technology transfer project on the stability of rock slopes in open pit mines, this book expands on the hydrogeological model chapter in the LOP project's previous book Guidelines for Open Pit Slope Design (Read & Stacey, 2009; CSIRO PUBLISHING). The book comprises six sections which outline the latest technology and best practice procedures for hydrogeological investigations. The sections cover: the framework used to assess the effect of water in slope stability; how water pressures are measured and tested in the field; how a conceptual hydrogeological model is prepared; how water pressures are modelled numerically; how slope depressurisation systems are implemented; and how the performance of a slope depressurisation program is monitored and reconciled with the design. Guidelines for Evaluating Water in Pit Slope Stability offers slope design practitioners a road map that will help them decide how to investigate and treat water pressures in pit slopes. It provides guidance and essential information for mining and civil engineers, geotechnical engineers, engineering geologists and hydrogeologists involved in the investigation, design and construction of stable rock slopes.

Soil Testing, Soil Stability and Ground Improvement

Geotechnical Engineering

Rock Mechanics

Recent Advances in Modeling Landslides and Debris Flows

Civil Applications, Fifth Edition

**This is the first book to revisit geotechnical site characterization from a probabilistic point of view and provide rational tools to probabilistically characterize geotechnical properties and underground stratigraphy using limited information obtained from a specific site. This book not only provides new probabilistic approaches for geotechnical site characterization and slope stability analysis, but also tackles the difficulties in practical implementation of these approaches. In addition, this book also develops efficient Monte Carlo simulation approaches for slope stability analysis and implements these approaches in a commonly available spreadsheet environment. These approaches and the software package are readily available to geotechnical practitioners and alleviate them from reliability computational algorithms. The readers will find useful information for a non-specialist to determine project-specific statistics of geotechnical properties and to perform probabilistic analysis of slope stability.**

**Deals with the methods of assessing the stability of rock slopes and the techniques of improving the stability conditions of natural and artificial slopes which are at risk. It also describes survey and measurement methods to model the behaviour of rock masses.**

**This classic handbook deals with the geotechnical problems of rock slope design. It has been written for the non-specialist mining or civil engineer, with worked examples, design charts, coverage of more detailed analytical methods, and of the collection and interpretation of geological and groundwater information and tests for the mechanical properties of rock.**

**Analysis and design of geotechnical structures combines, in a single endeavor, a textbook to assist students in understanding the behavior of the main geotechnical works and a guide for practising geotechnical engineers, designers, and consultants. The subjects are treated in line with limit state design, which underpins the Eurocodes and most North America design codes. Instructors and students will value innovative approaches to numerous issues refined by the experience of the author in teaching generations of enthusiastic students. Professionals will gain from its comprehensive treatment of the topics covered in each chapter, supplemented by a plethora of informative material used by consultants and designers. For the benefit of both academics and professionals, conceptual exercises and practical geotechnical design problems are proposed at the end of most chapters. A final annex includes detailed resolutions of the exercises and problems.**

**Selected Papers from the 2009 GeoHunan International Conference, August 3-6, 2009, Changsha, Hunan, China**

**Rock Slope Engineering**

**Slope Stabilization and Repair Solutions for Local Government Engineers**

**Slope Stability Analysis and Stabilization: New Methods and Insight, Second Edition**

**Short Course on Slope Stability and Stabilization Methods**

**"Soil Strength and Slope Stability is the essential text for the critical assessment of natural and man-made slopes. Extensive case studies throughout help illustrate the principles and techniques described, including a new examination of Hurricane Katrina failures, plus examples of soil and slope engineering from around the world. Extraneous theory has been excluded to place the focus squarely on the practical application of slope design and analysis techniques, including information about standards, regulations, formulas, and the use of software in analysis."--pub. desc.**

**Earthwork projects are critical components in civil construction and often require detailed management techniques and unique solution methods to address failures. Being earth bound, earthwork is influenced by geomaterial properties at the onset of a project. Hence, an understanding of the in-situ soil properties is essential. Slope stability is a common problem facing earthwork construction, such as excavations and shored structures. Analytical methods for slope stability remain critical for researchers due to the mechanical complexity of the system. Striving for better earthwork project managements, the geotechnical engineering community continues to find improved testing techniques for determining sensitive properties of soil and rock, including stress-wave based, non-destructive testing methods. To minimize failure during earthwork construction, past case studies and data may reveal useful lessons and information to improve project management and minimize economic losses. This volume is part of the proceedings of the 1st GeoMEast International Congress and Exhibition on Sustainable Civil Infrastructures, Egypt 2017.**

**The definitive guide to the critical issue of slope stabilityand safety Soil Strength and Slope Stability, Second Editionpresents the latest thinking and techniques in the assessment ofnatural and man-made slopes, and the factors that cause them tosurvive or crumble. Using clear, concise language and practicalexamples, the book explains the practical aspects of geotechnicalengineering as applied to slopes and embankments. The new secondedition includes a thorough discussion on the use of analysissoftware, providing the background to understand what the softwareis doing, along with several methods of manual analysis that allowreaders to verify software results. The book also includes a newcase study about Hurricane Katrina failures at 17thStreet and London Avenue Canal, plus additional case studies thatframe the principles and techniques described. Slope stability is a critical element of geotechnicalengineering, involved in virtually every civil engineering project,especially highway development. Soil Strength and SlopeStability fills the gap in industry literature by providingpractical information on the subject without including extraneoustheory that may distract from the application. This balancedapproach provides clear guidance for professionals in the field,while remaining comprehensive enough for use as a graduate-leveltext. Topics include: Mechanics of soil and limit equilibrium procedures Analyzing slope stability, rapid drawdown, and partialconsolidation Safety, reliability, and stability analyses Reinforced slopes, stabilization, and repair The book also describes examples and causes of slope failure andstability conditions for analysis, and includes an appendix ofslope stability charts. Given how vital slope stability is topublic safety, a comprehensive resource for analysis and practicalaction is a valuable tool. Soil Strength and Slope Stabilityis the definitive guide to the subject, proving useful both in theclassroom and in the field.**

**This text methodically demonstrates the basic rules for the design criteria of earthfill and rockfill dams. It expertly guides the reader from preliminary work through the design of various embankment dams and on to the construction and finally the control of safety in completed structures.**

**Proceedings of Sessions of Geo-Denver 2000 : August 5-8, 2000, Denver, Colorado**

**Slope Stability Analysis and Stabilization**

**Rock Slope Stability**

**Slope Engineering for Mountain Roads**

**Slope Stability, Retaining Walls, and Foundations**

GSP 101 contains 26 papers on slope stability presented at sessions at Geo-Denver 2000, held in Denver, Colorado, August 5-8, 2000.

The new edition of this successful book has been thoroughly revised to take account of recent advances in our understanding of slope stability and instability.

Slope Stability Analysis by the Limit Equilibrium Method: Fundamentals and Methods presents basic principles for the safe design of constructed or natural earth slopes. The limit equilibrium method is the most common approach for analyzing slope stability in both two and three dimensions. This method identifies potential failure mechanisms and derives factors of safety for a particular geotechnical situation. It is an appropriate choice for assessing the stability of retaining walls shallow and deep foundations earth and rock dams surface mining sites and potential landslides. The fundamentals of slope stability encompass slope movements and methods for stability analysis mechanics of slope failure and factors of safety laboratory and field methods to determine the shear strength of soils estimation of phreatic surfaces and remedial measures for correcting slides. Methods of stability analysis cover simple formulas for determining the factor of safety for plane failures stability charts methods of slices for two-dimensional analysis three-dimensional analysis techniques and reliability of slope design. An appendix provides a preview of a companion product LEAME Software and Usera's Manual: Analyzing Slope Stability by the Limit Equilibrium Method a computer program for performing the slope stability analysis presented in this work (available from American Society of Civil Engineers). The clear presentation of the principles of slope stability analysis ensures that this work will be a frequently consulted reference for practicing engineers. The wealth of worked examples and problem sets make this a suitable textbook for senior and graduate students in soil mechanics and geotechnical engineering.

This Geotechnical Special Publication contains 35 peer-reviewed technical papers presented at the GeoHunan International Conference: Challenges and Recent Advances in Pavement Technologies and Transportation Geotechnics, which took place in Changsha, Hunan, China, from August 3 to 6, 2009. This proceedings examines topics such as: Ø soil stabilization Ø dynamic behavior of soils and foundations Ø earth retaining walls Ø slope stability This publication will be valuable to geotechnical engineering professors and students, as well as geotechnical engineers and professionals

Slope Engineering

Unsaturated and Saturated Soils

Rock Slope Stability Analysis

Slope Stability Analysis by the Limit Equilibrium Method

Fourth Edition

**Landslides and debris flows belong to the most dangerous natural hazards in many parts of the world. Despite intensive research, these events continue to result in human suffering, property losses, and environmental degradation every year. Better understanding of the mechanisms and processes of landslides and debris flows will help make reliable predictions, develop mitigation strategies and reduce vulnerability of infrastructure. This book presents contributions to the workshop on Recent Developments in the Analysis, Monitoring and Forecast of Landslides and Debris Flow, in Vienna, Austria, September 9, 2013. The contributions cover a broad spectrum of topics from material behavior, physical modelling over numerical simulation to applications and case studies. The workshop is a joint event of three research projects funded by the European Commission within the 7th Framework Program: MUMOLADE (Multiscale modelling of landslides and debris flows, www.mumolade.com), REVENUES (Numerical Analysis of Slopes with Vegetations, http://www.revenues-eu.com) and HYDRODRIL (Integrated Risk Assessment of Hydrologically-Driven Landslides, www.boku.ac.at/igt/).**

**A comprehensive guide for mining and construction engineers responsible for rock slope stability. This book focuses on rock slope stability, with sections on geological data collection, geotechnical data collection and analysis, surface water and groundwater effects, kinematic and kinetic stability analysis, rock slope stabilization techniques, and rock slope instrumentation and monitoring. Because of the discontinuous nature of rock, the design of stable rock slopes is as much an art as it is applied engineering. Experience can only be achieved from the proper utilization of these theories of soil and rock mechanics, structural geology, and hydrology. Rock Slope Stability is invaluable for engineering geologists, geotechnical engineers, mining engineers, civil engineers, and mine managers-- as well as anyone else dedicated to engineering slopes that are stable and safe and that enable a financial return.**

**Slope stability is always a very important topic in many developed and highly congested cities, particularly for many cities in China where slope failures have killed many people with significant loss of properties. The author has also participated in different types of slope stability research and consultancy works in different countries, and has published two books entitled Soil Slope stability analysis and stabilization new methods and insights and Frontier in civil engineering, vol.1, Stability analysis of geotechnical structures which are well favoured by many students, engineers and researchers. The author also frequently receives email about the details of the more innovative slope stability analysis methods, stabilization and monitoring system, as well as the procedures in the numerical implementation of some of the stability analysis methods. In views of the various improvements in the theory of slope stability analysis over the years, the author would like to write a new book on slope stability analysis and slope reliability analysis, and the new materials will be useful to both students, engineers as well as researchers. In this book, different methods of slope stability analysis will be discussed in a broad sense. Following that, the limit equilibrium and finite element methods will be discussed in more details, as these two methods are the methods commonly used for practical works. Detailed procedures for limit equilibrium analysis will be provided to aid the students in learning, while the program SLOPE2000 will be introduced for the solution of more complicated problems. Some interesting engineering cases will be illustrated in this book. The author will also try to introduce the use of distinct element slope stability method, which is a technique still far from practical applications, but it does offer some insights which are not possible with the other methods. Following that, the author will introduce the importance of reliability slope stability analysis, which is an important issue for cities with complicated ground conditions and high water table. Due to the intensive computation required for reliability analysis, the author has proposed many improvements to various reliability assessment methods in order to maintain a balance between accuracy and time of computation. The central core of SLOPE 2000 and SLOPE 3D for two-dimensional and three-dimensional slope stability analysis as introduced in this book are developed mainly by the author, while there are many research personnel who have helped in various works associated with the research works. The authors would like to thank Yip C.J., Wei W.B., Li N., Li L. Li D.Z. and Liu L.L. for the helps in preparing parts of the works and the preparation of some of the figures in this book.**

**A comprehensive, one-stop synthesis of landslide science, for researchers and graduate students in geomorphology, engineering geology and geophysics.**

**Types, Mechanisms and Modeling**

**A Practical Guide for Erosion Control**

**A Bioengineering Approach**

**Soil Strength and Slope Stability**

**Hand Out**

***This book aims to assist in choosing ecotechnological solutions for slopes that are prone to a variety of mass movements e.g. shallow failure or erosion. The book reviews the types of problematic slopes that may occur and describes briefly the nature of mass movements and the causes of these movements. There is focus on the use of vegetation to stabilize soil on slopes prone to mass movements. The book also introduces new ecotechnological methods, and case studies are discussed.***

***This volume addresses the multi-disciplinary topic of engineering geology and the environment, one of the fastest growing, most relevant and applied fields of research and study within the geosciences. It covers the fundamentals of geology and engineering where the two fields overlap and, in addition, highlights specialized topics that address principles, concepts and paradigms of the discipline, including operational terms, materials, tools, techniques and methods as well as processes, procedures and implications. A number of well known and respected international experts contributed to this authoritative volume, thereby ensuring proper geographic representation, professional credibility and reliability. This superb volume provides a dependable and ready source of information on approximately 300 topical entries relevant to all aspects of engineering geology. Extensive illustrations, figures, images, tables and detailed bibliographic citations ensure that the comprehensively defined contributions are broadly and clearly explained. The Encyclopedia of Engineering Geology provides a ready source of reference for several fields of study and practice including civil engineers, geologists, physical geographers, architects, hazards specialists, hydrologists, geotechnicians, geophysicists, geomorphologists, planners, resource explorers, and many others. As a key library reference, this book is an essential technical source for undergraduate and graduate students in their research. Teachers/professors can rely on it as the final authority and the first source of reference on engineering geology related studies as it provides an exceptional resource to train and educate the next generation of practitioners.***

***The field of slope engineering encompasses slope stability analysis and design, movement monitoring, and slope safety management and maintenance. Engineers in this field are concerned with landslides and other gravity-stimulated mass movements. Their job is to frequently evaluate existing and proposed slopes to assess their stability. As such, this book provides information on remote sensing in landslide detection, tunnel face stability, stability analysis and maintenance of cut slopes, design techniques in rock and soil engineering, statistical models for landslide risk mapping, slope stability analysis in open-pit mines, ecological engineering for slope stabilization, and asphalt-stabilized strengthening in open-pit coal mining.***

***This book is aimed at the practising engineer and engineering geologist working in tropical environments, where lands lides are mainly triggered by rain fall. This book is based on a similar work published in 1999 in Portuguese, which became the Rio de Janeiro Slope Manual. This book is an engineering guide for the design of slopes and stabilisation works in rocks and residual soils. It evolves from the cumulative experience gathered by several engineers and geologists who faced severe slope problems. The authors' experience throughout Central and South America (Costa Rica, Argentina, Bolivia, Peru, Ecuador and Venezuela) and the Far East, especially Hong Kong and Malaysia, was used as a foundation for writing this book. The work also benefits enormously from the time spent in Hong Kong in 1996 and 1997 by the first editor on sabbatical at the City University of Hong Kong, and the discussions he had with many colleagues from the Geotechnical Engineering Office (GEO) of the Hong Kong Government, especially Dr. A. Malone, Mr. w.K. Pun, Dr. A. Li, Mr. K. Ho, and Mr. y.c. Chan among others.***

***Handbook of Slope Stabilisation***

***Slope Stabilization and Erosion Control: A Bioengineering Approach***

***Proceedings of the 12th International Symposium on Landslides (Napoli, Italy, 12-19 June 2016)***

***Guidelines for Evaluating Water in Pit Slope Stability***

***Slope Stability and Reliability Analysis***

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