

## Slope Stability And Stabilization Methods Thomas Lee

*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.*

*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.*

*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, 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.*

*This work comprehensively treats soil & rock slope engineering in one volume. It focuses on getting the fundamentals right, explaining simple methods of stability analysis, and applying them to a wide range of practical applications.*

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

*Understanding and Reducing Landslide Disaster Risk*

*Landslides*

*Slope Stability Engineering*

*Soil Strength and Slope Stability*

*Slope Stability, Retaining Walls, and Foundations*

*The idea of information on research and development carried out on bamboo has emerged with the paradigm shift in the area of utilization of natural fibres in various industries. Technological advancements in bamboo sustenance have involved chemical and physical modification that has led to products of high-performance index. This book provides the latest research developments in many aspects of bamboo process, manufacture and commercialization potential. Apart from the interest to facilitate a complete assessment of bamboo as well as assist readers in achieving their goals, this book is intended to be of value to both fundamental research and also to practicing scientists and will serve as a useful reference for researchers, agricultural practitioners and organizations involved in the bamboo-based industry.*

*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.*

*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 User'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 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.*

*The Stability of Slopes*

*Encyclopedia of Engineering Geology*

*Artificial Intelligence: Concepts, Methodologies, Tools, and Applications*

*Stability Analysis and Probabilistic Assessment*

*Subsurface Drainage for Slope Stabilization*

*Failure Mechanism and Stability Analysis of Rock Slope*

*This book presents in-depth coverage of laboratory experiments, theories, modeling techniques, and practices for the analysis and design of rock slopes in complex geological settings. It addresses new concepts in connection with the kinematical element method, discontinuity kinematical element method, integrated karst cave stochastic model-limit equilibrium method, improved strength reduction method, and fracture mechanics method, taking into account the relevant geological features. The book is chiefly intended as a reference guide for geotechnical engineering and engineering geology professionals, and as a textbook for related graduate 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*

*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*

*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.*

*Handbook of Slope Stabilisation*

*Current and Future Prospects*

*Soil Mechanics for Unsaturated Soils*

*New Methods and Insight*

*Recent Advances in Modeling Landslides and Debris Flows*

*A Practical Guide for Erosion Control*

*The principles and concepts for unsaturated soils are developed as extensions of saturated soils. Addresses problems where soils have a matrix suction or where pore-water pressure is negative. Covers theory measurement and use of the fundamental properties of unsaturated soils--permeability, shear strength and volume change. Includes a significant amount of case studies.*

*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 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 a part of ICL new book series 'ICL Contribution to Landslide Disaster Risk Reduction' founded in 2019. Peer-reviewed papers submitted to the Fifth World Landslide Forum were published in six volumes of this book series. This book contains the followings: • Five keynote lectures • Recent development in physical modeling of landslides • Recent development in numerical modeling of landslide development in soil and rock testing techniques, application and analysis methods • Recent advancements in the methods of slope stability and deformation analyses • Recent development in disaster risk assessment Prof. Binod Tiwari is a Vice President of the International Consortium on Landslides (ICL). He is the Associate Vice President for research and sponsored project and Professor of civil at the California State University, Fullerton, California, USA. Prof. Kyoji Sassa is the Founding President and the Secretary-General of the International Consortium on Landslides (ICL). He has been the Editor-in-Chief of International Journal Landslides since its foundation in 2004. Prof. Peter Bobrowsky is the President of the International Consortium on Landslides. He is a Senior Scientist of Geology Canada. Prof. Kaoru Takara is the Executive Director of the International Consortium on Landslides. He is a Professor and Dean of Graduate School of Advanced Integrated Studies (GSAIS) in Human Survivability (Shisu-Kan), Kyoto University.*

*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 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 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 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 stability analysis 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 this book. The authors would like to thank Yip C.J., Wei W.B., Li N.L., Li L.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.*

*Investigation and Mitigation*

*Short Course on Slope Stability and Stabilization Methods*

*Rock Slope Stability*

*Rock Slope Engineering*

*Proceedings of the International Symposium, IS-Shikoku '99*

*Third Edition*

*Ongoing advancements in modern technology have led to significant developments in artificial intelligence. With the numerous applications available, it becomes imperative to conduct research and make further progress in this field. Artificial Intelligence: Concepts, Methodologies, Tools, and Applications provides a comprehensive overview of the latest breakthroughs and recent progress in artificial intelligence. Highlighting relevant technologies, uses, and techniques across various industries and settings, this publication is a pivotal reference source for researchers, professionals, academics, upper-level students, and practitioners interested in emerging perspectives in the field of artificial intelligence.*

*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*

*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.*

*"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.*

*Developments and Applications : Proceedings of the International Conference on Slope Stability*

*A Short Course in Soil and Rock Slope Engineering*

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

*Analysis and Design of Geotechnical Structures*

*Slope Stability Analysis and Stabilization*

*Rock Slope Stability Analysis*

*A major revision of the comprehensive text/reference Written by world-leading geotechnical engineers who share almost 100 years of combined experience, Slope Stability and Stabilization, Second Edition assembles the background information, theory, analytical methods, design and construction approaches, and practical examples necessary to carry out a complete slope stability project. Retaining the best features of the previous edition, this new book has been completely updated to address the latest trends and methodology in the field. Features include: All-new chapters on shallow failures and stability of landfill slopes New material on probabilistic stability analysis, cost analysis of stabilization alternatives, and state-of-the-art techniques in time-domain reflectometry to help engineers plan and model new designs Tested and FHA-approved procedures for the geotechnical stage of highway, tunnel, and bridge projects Sound guidance for geotechnical stage design and planning for virtually all types of construction projects Slope Stability and Stabilization, Second Edition is filled with current and comprehensive information, making it one of the best resources available on the subject--and an essential reference for today's and tomorrow's professionals in geology, geotechnical engineering, soil science, and landscape architecture.*

*New Methods in Geotechnical Engineering IX contains 204 technical and scientific papers presented at the 9th European Conference on Numerical Methods in Geotechnical Engineering (NUMGE2018, Porto, Portugal, 25–27 June 2018). The papers cover a wide range of topics in the field of computational geotechnics, providing an overview of recent developments on scientific achievements, innovations and engineering applications related to or employing numerical methods. They deal with subjects from emerging research to engineering practice, and are grouped under the following themes: Constitutive modelling and numerical implementation Finite element, discrete element and other numerical methods. Coupling of diverse methods Reliability and probability analysis Large deformation - large strain analysis Artificial intelligence and neural networks Ground flow, thermal and coupled analysis Earthquake engineering, soil dynamics and soil-structure interactions Rock mechanics Application of numerical methods in the context of the Eurocodes Shallow and deep foundations Slopes and cuts Supported excavations and retaining walls Embankments and dams Tunnels and caverns (and pipelines) Ground improvement and reinforcement Offshore geotechnical engineering Propagation of vibrations Following the objectives of previous eight thematic conferences, (1986 Stuttgart, Germany; 1990 Santander, Spain; 1994 Manchester, United Kingdom; 1998 Udine, Italy; 2002 Paris, France; 2006 Graz, Austria; 2010 Trondheim, Norway; 2014 Delft, The Netherlands), Numerical Methods in Geotechnical Engineering IX updates the state-of-the-art regarding the application of numerical methods in geotechnics, both in a scientific perspective and in what concerns its application for solving practical boundary value problems. The book will be much of interest to engineers, academics and professionals involved or interested in Geotechnical Engineering.*

*Residual soils are found in many parts of the world. Like other soils, they are used extensively in construction, either to build upon, or as construction material. They are formed when the rate of rock weathering is more rapid than transportation of the weathered particles by e.g., water, gravity and wind, which results in a large share of the soil. This volume draws on the experience and extensive research of an international authorship to bring together details on slope stability, causes of landslides, landslide prevention, new techniques for assessing and predicting stability, new methods for stabilising slopes and the special considerations for coastal situations.*

*Concepts, Methodologies, Tools, and Applications*

*Slope Stability and Stabilization Methods*

*Sustainable Slope Stabilisation using Recycled Plastic Pins*

*New Methods and Insight, Second Edition*

*Numerical Methods in Geotechnical Engineering IX*

*Soil Testing, Soil Stability and Ground Improvement*

*This Special Report is a greatly expanded edition of a previous report on landslides (Special Report 176, "Landslides: Analysis and Control") published in 1978. The new report, which has been designed with an even broader international scope, contains comprehensive, practical discussions of field investigations, laboratory testing, and stability analysis procedures and technologies; comprehensive references to the literature; and discussions of case studies, state-of-the-art techniques, and research directions. The report is presented in five sections: (1) Principles, Definitions, and Assessment; (2) Investigation; (3) Strength and Stability Analysis; (4) Mitigation; and (5) Special Cases and Materials. 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.*

*"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.*

*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.*

*Proceedings of the 9th European Conference on Numerical Methods in Geotechnical Engineering (NUMGE 2018), June 25-27, 2018, Porto, Portugal*

*New Insight and Methods*

*Bamboo*

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

*Cost-effective and Sustainable Road Slope Stabilization and Erosion Control*

*Hand Out*

*This collection of papers covers a wide range of relevant issues and aspects of slope stability engineering from both practical and scientific points of view from the Proceedings of the International Symposium on Slope Stability Engineering : Is--Shikoku'99 : Matsuyama, Shikoku, Japan, 8-11 November, 1999.*

*The definitive guide to the critical issue of slope stabilizing 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 practical examples, 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 extraneousinformation 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*

*Stability is the definitive guide to the subject, providing useful both in theclassroom and in the field.*

*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.*

*Landslides and slope failure are common in the US and rest of the world. The landslides cause significant damage to infrastructure and millions of dollars are required each year to fix the slope. A sustainable and costeffective option to stabilise the slope can have significant benefits, as it will reduce the cost of maintenance and when using recycled pins, it may help the environment at the same time. The recycled plastic pin is made from recycled plastic bottles and other plastic waste. Several demonstration projects already proved the effectiveness of RPP as an alternative option to fix slope failure, with a maximum failure depth of 7-8 ft. In this book, every detail of the slope stabilisation technique using recycled plastic pins, including the design techniques and several case studies, are included. This will help to explain the basics of this important technique and will be used as reference to design the slope stabilisation scheme using recycled plastic pins.*

*Slope Stability and Erosion Control: Ecotechnological Solutions*

*Slope Stabilization and Erosion Control: A Bioengineering Approach*

*Slope Stability and Reliability Analysis*

*Slope Engineering*

*Fundamentals and Methods*

*Slope Stability Analysis by the Limit Equilibrium Method*

*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: MMOLADE (Multiscale modelling of landslides and debris flows, www.mmolade.com), REVENUES (Numerical Analysis of Slopes with Vegetations, http://www.revenues-eu.com) and HYDROBRIIL (Integrated Risk Assessment of Hydrologically-Driven Landslides, www.boku.ac.at/197/).*

*Rainfall-induced landslides are common around the world. With global climate change, their frequency is increasing and the consequences are becoming greater. Previous studies assess them mostly from the perspective of a single discipline--correlating landslides with rainstorms, geomorphology and hydrology in order to establish a threshold prediction value for rainfall-induced landslides; analyzing the slope's stability using a geomechanical approach; or assessing the risk from field records. Rainfall Induced Soil Slope Failure: Stability Analysis and Probabilistic Assessment integrates probabilistic approaches with the geotechnical modeling of slope failures under rainfall conditions with unsaturated soil. It covers theoretical models of rainfall infiltration and stability analysis, reliability analysis based on coupled hydro-mechanical modelling, stability of slopes with cracks, gravels and spatial heterogenous soils, and probabilistic model calibration based on measurement. It focuses on the uncertainties involved with rainfall-induced landslides and presents state-of-the-art techniques and methods which characterize the uncertainties and quantify the probabilities and risk of rainfall-induced landslide hazards. Additionally, the authors cover: The failure mechanisms of rainfall-induced slope failure Commonly used infiltration and stability methods The infiltration and stability of natural soil slopes with cracks and colluvium materials Stability evaluation methods based on probabilistic approaches The effect of spatial variability on unsaturated soil slopes and more*

*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.*

*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 thehorticultural 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, and 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.*

*A Bioengineering Approach*

*Handbook of Tropical Residual Soils Engineering*

*Rainfall-Induced Soil Slope Failure*

*Volume 4 Testing, Modeling and Risk Assessment*

*Biotechnical and Soil Bioengineering Slope Stabilization*

*Slope Stability and Earth Retaining Walls*