

Fhwa Rock Slope Reference Manual

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Cost-effective and Sustainable Road Slope Stabilization and Erosion Control Transportation Research Board

February issue includes Appendix entitled Directory of United States Government periodicals and subscription publications; September issue includes List of depository libraries; June and December issues include semiannual index

Gravel Roads Springer Science & Business Media

Rock falls can be a public safety issue. This book provides comprehensive information on identification of these hazards, and design and construction of protection methods. Rock Fall Engineering describes first, the theoretical background to rock fall behavior in terms of the impact and trajectory phases of rock falls, and second, how this information is applied to modeling of rock falls and the design of ditches, fences and sheds. The theory of rock fall behavior is verified by comparing the calculations with five carefully documented case studies. The book covers four main topics as follows: Describes causes of rock falls, including geology, climate and topography, and provides detailed documentation on rock fall impacts and trajectories at five sites with a wide variety of topographic and geologic features Discusses theory of impact mechanics, and its application to velocity and energy changes during impacts and trajectories Reviews methods of modeling rock fall events, and presents analyses for the five case studies Examines rock fall protection in terms of selecting appropriate method(s) for site conditions, and design principles in which the objective is to absorb impact energy in an efficient manner This book, which contains many worked examples, is of interest to practitioners and researchers working in the fields of geological engineering and natural hazards. Duncan C. Wyllie is a principal with Wyllie & Norrish Rock Engineers in Vancouver, Canada, and a registered professional engineer in British Columbia. He has worked on rock fall hazard projects involving the design and construction protection measures since the 1970s. He is the author of Foundations on Rock, Second Edition, and Rock Slope Engineering, Fourth Edition, both published by CRC Press.

FHWA Research, Development and Technology Implementation Catalog John Wiley & Sons

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.

Transportation Training Resources Catalog John Wiley & Sons

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.

Highway Subdrainage Design Transportation Research Board

Over 140 experts, 14 countries, and 89 chapters are represented in the second edition of the Bridge Engineering Handbook. This extensive collection highlights bridge engineering specimens from around the world, contains detailed information on bridge engineering, and thoroughly explains the concepts and practical applications surrounding the

Monthly Catalogue, United States Public Documents Taylor &

Francis

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.

Proceedings, Thirteenth Symposium on Rock Mechanics, Held at the University of Illinois, Urbana, Illinois, August 30-September 1, 1971

Evaluation of Soil and Rock Properties This document presents state-of-the-practice information on the evaluation of soil and rock properties for geotechnical design applications. This document addresses the entire range of materials potentially encountered in highway engineering practice, from soft clay to intact rock and variations of materials that fall between these two extremes. Information is presented on parameters measured, evaluation of data quality, and interpretation of properties for conventional soil and rock laboratory testing, as well as in situ devices such as field vane testing, cone penetration testing, dilatometer, pressuremeter, and borehole jack. This document provides the design engineer with information that can be used to develop a rationale for accepting or rejecting data and for resolving inconsistencies between data provided by different laboratories and field tests. This document also includes information on: (1) the use of Geographical Information Systems (GIS) and Personal Data Assistance devices for the collection and interpretation of subsurface information; (2) quantitative measures for evaluating disturbance of laboratory soil samples; and (3) the use of measurements from geophysical testing techniques to obtain information on the modulus of soil. Also included are chapters on evaluating properties of special soil materials (e.g., loess, cemented sands, peats and organic soils, etc.) and the use of statistical information in evaluating anomalous data and obtaining design values for soil and rock properties. An appendix of three detailed soil and rock property selection examples is provided which illustrate the application of the methods described in the document. **Manual for Design & Construction Monitoring of Soil Nail Walls** NHI Training Catalog **Transportation Training Resources Catalog** **Gravel Roads Maintenance and Design Manual** The purpose of this manual is to provide clear and helpful information for maintaining gravel roads. Very little technical help is available to small agencies that are responsible for managing these roads. Gravel road maintenance has traditionally been "more of an art than a science" and very few formal standards exist. This manual contains guidelines to help answer the questions that arise concerning gravel road maintenance such as: What is enough surface crown? What is too much? What causes corrugation? The information is as nontechnical as possible without sacrificing clear guidelines and instructions on how to do the job right. **FHWA Research and Development Implementation Catalog** **FHWA Publications** **NHI Catalog** **Slope Stability Reference Guide for National Forests in the United States** **FHWA research, development and technology implimentaiton catalog** **FHWA Research, Development and Technology Implementation Catalog** **FHWA Research, Development, and Technology Implementation Catalog** **Rock Slope Engineering, Fourth Edition** Fourth edition

A guide to using the Public Record Office (PRO) in England for English or Welsh genealogical research, providing an introduction to PRO record classes of interest to North American researchers and identifying PRO records available in North American institutions. Includes advice for finding sources of emigration and immigration records, with appendices on local record offices in England and Wales and useful addresses. Annotation copyright by Book News, Inc., Portland, OR.

FHWA Research, Development, and Technology Implementation Catalog DIANE Publishing

"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.

NHI Training Catalog CRC Press

The first book on the subject written by a practitioner for practitioners. **Geotechnical Instrumentation for Monitoring Field Performance** **Geotechnical Instrumentation for Monitoring Field Performance** goes far beyond a mere summary of the technical literature and manufacturers' brochures: it guides reader through the entire geotechnical instrumentation process, showing them when to monitor safety and performance, and how to do it well. This comprehensive guide: * Describes the critical steps of planning monitoring programs using geotechnical instrumentation, including what benefits can be achieved and how construction specifications should be written * Describes and evaluates monitoring methods and recommends instruments for monitoring groundwater pressure, deformations, total stress in soil, stress change in rock, temperature, and load and strain in structural members * Offers detailed practical guidelines on instrument calibrations, installation and maintenance, and on the collection, processing, and interpretation of instrumentation data * Describes the role of geotechnical instrumentation during the construction and operation phases of civil engineering projects, including braced excavations, embankments on soft ground, embankment dams, excavated and natural slopes, underground excavations, driving piles, and drilled shafts * Provides guidelines throughout the book on the best practices

Special Report - Transportation Research Board, National Research Council CRC Press

This document presents state-of-the-practice information on the evaluation of soil and rock properties for geotechnical design applications. This document addresses the entire range of materials potentially encountered in highway engineering practice, from soft clay to intact rock and variations of materials that fall between these two extremes. Information is presented on parameters measured, evaluation of data quality, and interpretation of properties for conventional soil and rock laboratory testing, as well as in situ devices such as field vane testing, cone penetration testing, dilatometer, pressuremeter, and borehole jack. This document provides the design engineer with information that can be used to develop a rationale for accepting or rejecting data and for resolving inconsistencies between data provided by different laboratories and field tests. This document also includes information on: (1) the use of Geographical Information Systems (GIS) and Personal Data Assistance devices for the collection and interpretation of subsurface information; (2) quantitative measures for evaluating disturbance of laboratory soil samples; and (3) the use of measurements from geophysical

testing techniques to obtain information on the modulus of soil.

Also included are chapters on evaluating properties of special soil materials (e.g., loess, cemented sands, peats and organic soils, etc.) and the use of statistical information in evaluating anomalous data and obtaining design values for soil and rock properties. An appendix of three detailed soil and rock property selection examples is provided which illustrate the application of the methods described in the document.

Geotechnical Site Characterization Transportation Research Board
The geology in Ohio is characterized by the presence of gently dipping, harder, more competent strata (siltstones, sandstones, limestones) alternating with softer, less competent strata (claystones, mudstones, shales). This type of stratigraphy is highly susceptible to differential weathering which results in undercutting of the competent layers by erosion of the incompetent layers. Undercutting promotes a variety of slope movements such as rockfalls, plane failures, and wedge failures that may not occur otherwise. Many of the slope failures in Ohio initiate as plane failures and wedge failures in competent strata at higher elevations and descend as rockfalls. The frequency and size of these falls depend upon joint spacing within the competent unit and the extent by which it has been undercut. The undercutting-induced failures can be quite hazardous because of their instantaneous occurrence, high speed, and occasionally large volume of rock involved. There are many road cuts in Ohio, however, where closely jointed rock units lead to rockfalls without the presence of undercutting. This study was undertaken to develop a rating matrix that could be used to rank order the slopes in terms of their hazard potential with respect to rockfalls.

Handbook of Slope Stabilisation CRC Press

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.

Drilled Shafts CRC Press

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.

Geotechnical Instrumentation for Monitoring Field Performance

Transportation Research Board

This synthesis will be of interest to geotechnical, bridge construction, and maintenance engineers and others interested in design, construction, and maintenance of embankment approaches to bridge abutments. Information is provided on available techniques to minimize problems associated with the bump at the end of the bridge. The transition from a roadway to a bridge structure entails design, construction, and maintenance problems. This report of the Transportation Research Board describes those problems as well as the many solutions that are applicable to specific situations.

Rock Slope Engineering, Fourth Edition CRC Press

The purpose of this manual is to provide clear and helpful

information for maintaining gravel roads. Very little technical help is available to small agencies that are responsible for managing these roads. Gravel road maintenance has traditionally been "more of an art than a science" and very few formal standards exist. This manual contains guidelines to help answer the questions that arise concerning gravel road maintenance such as: What is enough surface crown? What is too much? What causes corrugation? The information is as nontechnical as possible without sacrificing clear guidelines and instructions on how to do the job right.

The Deep Mixing Method CRC Press

This book presents state-of-the-practice information on the design and installation of cement-grouted ground anchors and anchored systems for highway applications. The anchored systems discussed include flexible anchored walls, slopes supported using ground anchors, landslide stabilization systems, and structures that incorporate tiedown anchors. This book draws extensively in describing issues such as subsurface investigation and laboratory testing, basic anchoring principles, ground anchor load testing, and inspection of construction materials and methods used for anchored systems. This book provides detailed information on design analyses for ground anchored systems. Topics discussed include selection of design earth pressures, ground anchor design, design of corrosion protection system for ground anchors, design of wall components to resist lateral and vertical loads, evaluation of overall anchored system stability, and seismic design of anchored systems. Also included in this book are two detailed design examples and technical specifications for ground anchors and for anchored walls.

FHWA research, development and technology implementation catalog

Evaluation of Soil and Rock Properties

Design and Construction of Bridge Approaches

This document is the sixth in a series of Geotechnical Engineering Circulars (GEC) developed by the Federal Highway Administration (FHWA). This Circular focuses on the design, procurement and construction of shallow foundations for highway structures. The intended users are practicing geotechnical, foundation and structural engineers involved with the design and construction of transportation facilities.

Soil Strength and Slope Stability

The Deep Mixing Method (DMM), a deep in-situ soil stabilization technique using cement and/or lime as a stabilizing agent, was developed in Japan and in the Nordic countries independently in the 1970s. Numerous research efforts have been made in these areas investigating properties of treated soil, behavior of DMM improved ground under static and d

Bridge Engineering Handbook

"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.