

Practical Rock Mechanics By Steve Hencher

Rock mechanics is a field of applied science which has become recognised as a coherent engineering discipline within the last two decades. It consists of a body of knowledge of the mechanical properties of rock, various techniques for the analysis of rock stress under some imposed perturbation, a set of established principles expressing rock mass response to load, and a logical methodology for applying these notions and techniques to real physical problems. Some of the areas where application of rock mechanics concepts have been demonstrated to be of industrial value include surface and subsurface construction, mining and other methods of mineral recovery, geothermal energy recovery and subsurface hazardous waste isolation. In many cases, the pressures of industrial demand for rigour and precision in project or process design have led to rapid evolution of the engineering discipline, and general improvement in its basis in both the geosciences and engineering mechanics. An intellectual commitment in some outstanding research centres to the proper development of rock mechanics has now resulted in a capacity for engineering design in rock not conceivable two decades ago. Mining engineering is an obvious candidate for application of rock mechanics principles in the design of excavations generated by mineral extraction. A primary concern in mining operations, either on surface or underground, is loosely termed 'ground control', i. e. Praise for the Second Edition: "This is the book that the dewatering sector really needs - it is reliably based on sound theory and profound understanding of the physical processes, yet is presented in a very accessible and user-friendly manner. It draws on many, many decades of experience, and yet is utterly up to date. . . . It is a one-stop shop for the dewatering practitioner - who can nonetheless rest assured that the theoretical basis of the methods presented is flawless." — Professor Paul L. Younger, FGS, FICE, C.Geol., C.Eng., FEng, University of Glasgow, Scotland, UK "The best reference on this topic available . . . and will prove useful to a wide variety of readers ranging from junior construction engineers or dewatering contractors to theoretical hydrogeologists and environmental managers. It is rare that a book is able to bridge the gap between theoretical design guidance and practical application." — S.N. Sterling, University of Waterloo, Canada The extensively updated Groundwater Lowering in Construction: A Practical Guide to Dewatering, 3rd Edition offers practical advice on all phases of groundwater control systems, from planning and design, through installation and maintenance, and ultimately decommissioning. The expertise provided in this book can help you improve working conditions, increase project viability, save time and reduce excavation costs. Designers and managers of construction and engineering projects are given the tools necessary to effectively control groundwater. The content is divided into three sections - Principles, Design and Construction. The Principles section explains the fundamentals of groundwater flow as it relates to civil engineering excavations. The Design section explores in extensive detail site investigation, permeability assessment methods and groundwater control strategies. Chapters in the Construction section describe dewatering and exclusion techniques, and examine the complete life cycle of a groundwater control scheme, including monitoring, maintenance and decommissioning. This section incorporates eleven case histories from the authors' casebook. The 3rd edition has been greatly revised and updated, and contains more than 200 new illustrations. The new content covers: Permeability of soils and rocks Groundwater problems for excavations in rock Groundwater control for tunnelling projects, such as shafts and cross passages Methods for assessing permeability Decommissioning of dewatering systems Optimisation of groundwater control schemes. The new, expanded content offers valuable direction that can give you a true competitive advantage in the planning and execution of temporary and permanent dewatering works for excavation and tunnelling. Written for practising engineers, geologists and construction managers, as well as postgraduate engineering students, this revamped manual on design and practice presents numerous case studies and extensive references to enhance understanding. Martin Preene is a groundwater consultant, based in the UK. He has more than 30 years' experience working on dewatering and groundwater control projects worldwide. The late Pat Cashman was the leading British exponent of groundwater control for his generation, championing a practical and straightforward approach for more than forty years. An Ideal Source for Geologists and Others with Little Background in Engineering or Mechanics Practical Rock Mechanics provides an introduction for graduate students as well as a reference guide for practicing engineering geologists and geotechnical engineers. The book considers fundamental geological processes that give rise to the nature of rock masses and control their mechanical behavior. Stresses in the earth's crust are discussed and methods of measurement and prediction explained. Ways to investigate, describe, test, and characterize rocks in the laboratory and at project scale are reviewed. The application of rock mechanics principles to the design of engineering structures including tunnels, foundations, and slopes is addressed. The book is illustrated throughout with simple figures and photographs, and important concepts are illustrated by modern case examples. Mathematical equations are kept to the minimum necessary and are explained fully—the book leans towards practice rather than theory. This text: Addresses the principles of rock mechanics as it applies to both structural geology and engineering practice Demonstrates the importance of and methods of geological characterisation to rock engineering Examines the standard methods of rock mechanics testing and measurement as well as interpretation of data in practice Explains connections between main parameters both empirically as well as on the basis of scientific theory Provides examples of the practice of rock mechanics to major engineering projects Practical Rock Mechanics teaches from first principles and aids readers' understanding of the concepts of stress and stress transformation and the practical application of rock mechanics theory. This text can help ensure that ground models and designs are correct, realistic, and produced cost-effectively.

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Surface and Underground Project Case Histories

Practical Rock Mechanics

Drystone Retaining Walls

Petroleum Rock Mechanics

A Rigorous and Definitive Guide to Soil Liquefaction Soil liquefaction occurs when soil loses much of its strength or stiffness for a time—usually a few minutes or less—and which may then cause structural failure, financial loss, and even death. It can occur during earthquakes, from static loading, or even from traffic-induced vibration. It occurs worldwide and affects soils ranging from gravels to silts. From Basic Physical Principles to Engineering Practice Soil Liquefaction has become widely cited. It is built on the principle that liquefaction can, and must, be understood from mechanics. This second edition is developed from this premise in three respects: with the inclusion of silts and sandy silts commonly encountered as mine tailings, by an extensive treatment of cyclic mobility and the cyclic simple shear test, and through coverage from the "element" scale seen in laboratory testing to the evaluation of "boundary value problems" of civil and mining engineering. As a mechanics-based approach is necessarily numerical, detailed derivations are provided for downloadable open-code software (in both Excel/VBA and C++) including code verifications and validations. The "how-to-use" aspects have been expanded as a result of many conversations with other engineers, and these now cover the derivation of soil properties from laboratory testing through to assessing the in situ state by processing the results of cone penetration testing. Downloadable software is supplied on www.crcpress.com/product/isbn/9781482213683 Includes derivations in detail so that the origin of the equations is apparent Provides samples of source code so that the reader can see how complex-looking differentials actually have pretty simple form Offers a computable constitutive model in accordance with established plasticity theory Contains case histories of liquefaction Makes available downloads and source data on the CRC Press website Soil Liquefaction: A Critical State Approach, Second Edition continues to cater to a wide range of readers, from graduate students through to engineering practice.

Papers cover: laboratory and in-situ testing; coupled effects and permeability; creep damage and dilatancy; constitutive modelling; crushed salt behaviour; numerical modelling; storage and disposal projects; mining applications; case studies; and salt pillars and cavities.

The purpose of these guidelines for investigating geologic hazards and preparing engineering-geology reports, is to provide recommendations for appropriate, minimum investigative techniques, standards, and report content to ensure adequate geologic site characterization and geologic-hazard investigations to protect public safety and facilitate risk reduction. Such investigations provide important information on site geologic conditions that may affect or be affected by development, as well as the type and severity of geologic hazards at a site, and recommend solutions to mitigate the effects and the cost of the hazards, both at the time of construction and over the life of the development. The accompanying suggested approach to geologic-hazard ordinances and school-site investigation guidelines are intended as an aid for land-use planning and regulation by local Utah jurisdictions and school districts, respectively. Geologic hazards that are not accounted for in project planning and design often result in additional unforeseen construction and/or future maintenance costs, and possible injury or death.

Rock Mechanics, Theory-experiment-practice

Soil Liquefaction

Drilling Operations and Well Design

Comprehensive Rock Engineering: Principles, Practice and Projects

Ore Deposit Geology

Steve Hencher presents a broad and fresh view on the importance of engineering geology to civil engineering projects. Practical Engineering Geology provides an introduction to the way that projects are managed, designed and constructed and the ways that the engineering geologist can contribute to cost-effective and safe project achievement. The new

Petroleum Rock Mechanics: Drilling Operations and Well Design, Second Edition, keeps petroleum and drilling engineers centrally focused on the basic fundamentals surrounding geomechanics, while also keeping them up-to-speed on the latest issues and practical problems. Updated with new chapters on operations surrounding shale oil, shale gas, and hydraulic fracturing, and with new sections on in-situ stress, drilling design of optimal mud weight, and wellbore instability analysis, this book is an ideal resource. By creating a link between theory with practical problems, this updated edition continues to provide the most recent research and fundamentals critical to today's drilling operations. Helps readers grasp the techniques needed to analyze and solve drilling challenges, in particular wellbore instability analysis Teaches rock mechanic fundamentals and presents new concepts surrounding sand production and hydraulic fracturing operations Includes new case studies and sample problems to practice Winner of the 2004 Claire P. Holdredge Award of the Association of Engineering Geologists (USA).The only book to concentrate on the relationship between geology and its implications for construction, this book covers the full scope of the subject from site investigation through to the complexities of reservoirs and dam sites. Features include inter

Geophysical Abstracts

A Field Guide for Geotechnical Engineers

Practical Engineering Geology

Rock Mechanics

Groundwater Lowering in Construction

APCOM'99, Computer Applications in the Mineral Industries

(Guitar Educational). Steve Vai reveals his path to virtuoso enlightenment with two challenging guitar workouts, which include scale and chord exercises, ear training, sight-reading, music theory and much

more. These comprehensive workouts are reprinted by permission from Guitar World magazine.

Practical Rock MechanicsCRC Press

This new edition has been completely revised to reflect the notable innovations in mining engineering and the remarkable developments in the science of rock mechanics and the practice of rock engineering

taht have taken place over the last two decades. Although "Rock Mechanics for Underground Mining" addresses many of the rock mechanics issues that arise in underground mining engineering, it is not a text exclusively for mining applications. Based on extensive professional research and teaching experience, this book will provide an authoritative and comprehensive text for final year undergraduates and commencing postgraduate students. For professional practitioners, not only will it be of interests to mining and geological engineers, but also to civil engineers, structural mining geologists and geophysicists as a standard work for professional reference purposes.

A Practical Guide

Books in Print

Practical Engineering Geology and Practical Rock Mechanics Set

Characteristics of Geologic Materials and Formations

Basic and Applied Salt Mechanics

For underground mining

Traditional textbooks on rock mechanics often fail to engage students in the learning process as such books are packed with theory that students are unlikely to use in their future employment. In contrast, this book delivers the fundamentals of rock mechanics using a more practical and engaging project-based approach which simulates what practitioners do in their real-life practice. This book will be of great help to those who would like to learn practical aspects of rock mechanics and better understand how to apply theory to solve real engineering problems. This book covers geology, rock mechanics principles, and practical applications such as rock falls, slope stability analysis and engineering problems in tunnels. Throughout the whole book, the reader is engaged in project-based work so that the reader can experience what rock mechanics is like and clearly see why it is an important part of geotechnical engineering. The project utilizes real field and laboratory data while the relevant theory needed to execute the project is linked to each project task. In addition, each section of the book contains several exercises and quiz questions to scaffold learning. Some problems include open-ended questions to encourage the reader to exercise their judgement and develop practical skills. To foster the learning process, solutions to all questions are provided to allow for learning feedback.

Soil nailing is an in situ soil reinforcement technique that can be used to enhance the stability of slopes, retaining walls, embankments, and excavations. It involves installation of closely spaced, relatively slender unstressed tension-carrying structural elements into the ground to stabilize the soil mass. These elements, which are called soil nails, comprise steel or other engineering materials such as fiber reinforced polymer. Soil nailing did not gain popularity until the 1970s when engineers started to realize that the technique could offer an effective, robust, and economical reinforcing system for a variety of ground conditions. More importantly, the track record has been excellent in that no major collapses have been reported in properly designed and well-constructed soil nailed structures so far. Considerable experience and knowledge of the technique have been gained in the past few decades through systematic technical development work comprising laboratory tests, numerical modeling, physical modeling, site trials and field monitoring covering design, and construction practices. Soil Nailing: A Practical Guide consolidates the experience and advances made in the development and use of the soil nailing technique and encourages a wider adoption of the technique by practitioners. The book is intended for use by postgraduate students, researchers, and practicing civil and geotechnical engineers, who wish to have a more in-depth and fundamental understanding of the theory and practice behind the technique. It presents the basic principles of the technique as well as state-of-the-art knowledge and recommended standard of good practice in respect of design, construction, monitoring, and maintenance of soil nailed structures.

The recent crisis in the financial markets has exposed serious flaws in management methods. The failure to anticipate and deal with the consequences of the unfolding collapse has starkly illustrated what many leaders and managers in business have known for years; in most organizations, the process of forecasting is badly broken. For that reason, forecasting business performance tops the list of concerns for CFO's across the globe. It is time to rethink the way businesses organize and run forecasting processes and how they use the insights that they provide to navigate through these turbulent times. This book synthesizes and structures findings from a range of disciplines and over 60 years of the authors combined practical experience. This is presented in the form of a set of simple strategies that any organization can use to master the process of forecasting. The key message of this book is that while no mortal can predict the future, you can take the steps to be ready for it. 'Good enough' forecasts, wise preparation and the capability to take timely action, will help your organization to create its own future. Written in an engaging and thought provoking style, Future Ready leads the reader to answers to questions such as: What makes a good forecast? What period should a forecast cover? How frequently should it be updated? What information should it contain? What is the best way to produce a forecast? How can you avoid gaming and other forms of data manipulation? How should a forecast be used? How do you ensure that your forecast is reliable? How accurate does it need to be? How should you deal with risk and uncertainty What is the best way to organize a forecast process? Do you need multiple forecasts? What changes should be made to other performance management processes to facilitate good forecasting? Future Ready is an invaluable guide for practicing managers and a source of insight and inspiration to leaders looking for better ways of doing things and to students of the science and craft of management. Praise for Future Ready "Will make a difference to the way you think about forecasting going forward" —Howard Green, Group Controller Unilever PLC "Great analogies and stories are combined with rock solid theory in a language that even the most reading-averse manager will love from page one" —Bjarte Bogsgnes, Vice President Performance Management Development at StatoilHydro "A timely addition to the growing research on management planning and performance measurement." —Dr. Charles T. Horngren, Edmund G. Littlefield Professor of Accounting Emeritus Stanford University and author of many standard texts including Cost Accounting: A Managerial Emphasis, Introduction to Management Accounting, and Financial Accounting "In the area of Forecasting, it is the best book in the market." —Fritz Roemer, Leader of Enterprise Performance Executive Advisory Program, the Hackett Group

Soil Nailing

An Introduction

Applied Rock Mechanics and Ground Stability

Proceedings

Proceedings of the 24th U.S. Symposium on Rock Mechanics, Held at Texas A&M University, June 20-23, 1983

Bulletin of the Association of Engineering Geologists

Permeability is the primary control on fluid flow in the Earth's crust and is key to a surprisingly wide range of geological processes, because it controls the advection of heat and solutes and the generation of anomalous pore pressures. The practical importance of permeability - and the potential for large, dynamic changes in permeability - is highlighted by ongoing issues associated with hydraulic fracturing for hydrocarbon production ("fracking"), enhanced geothermal systems, and geologic carbon sequestration. Although there are thousands of research papers on crustal permeability, this is the first book-length treatment. This book bridges the historical dichotomy between the hydrogeologic perspective of permeability as a static material property and the perspective of other Earth scientists who have long recognized permeability as a dynamic parameter that changes in response to tectonism, fluid production, and geochemical reactions.

Applied Rock Mechanics and Ground Stability is a textbook intended for engineering students. It may also be used by practical engineers as a quick reference on methodologies and design principles. It is meant to be simple and easy to use, to help students who have little practical experience understand the concepts.The author attempts to balance fundamental knowledge and practical applications. Examples are provided after introduction of concepts or methods to demonstrate their applications. The second edition has taken all suggestions from the previous version into consideration. A new chapter on application of numerical modelling in mining and geomechanics is also added as a brief introduction.

Tunnelling provides a robust solution to a variety of engineering challenges. It is a complex process, which requires a firm understanding of the ground conditions as well as the importance of ground-structure interaction. This book covers the full range of areas related to tunnel construction required to embark upon a career in tunnelling. It also includes a number of case studies related to real tunnel projects, to demonstrate how the theory applies in practice. New features of this second edition include: the introduction of a case study related to Crossrail's project in London, focussing on the Whitechapel and Liverpool Street station tunnels and including considerations of building tunnels in a congested urban area; and further information on recent developments in tunnel boring machines, including further examples of all the different types of machine as well as multi-mode machines. The coverage includes: Both hard-rock and soft-ground conditions Site investigation, parameter selection, and design considerations Methods of improving the stability of the ground and lining techniques Descriptions of the various main tunnelling techniques Health and safety considerations Monitoring of tunnels during construction Description of the latest tunnel boring machines Case studies with real examples, including Crossrail's project in London Clear, concise, and heavily illustrated, this is a vital text for final-year undergraduate and MSc students and an invaluable starting point for young professionals and novices in tunnelling.

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Design, Construction and Assessment

A Critical State Approach, Second Edition

Petrophysics

Take a Detailed Look at the Practice of Drystone Retaining Wall Construction**Drystone retaining walls make very efficient use of local materials, and sit comfortably in their environment. They make an**

important contribution to heritage and to the character of the landscape, and are loved by many people who value the skill and ingenuity that has gone

Surface and Underground Project Case Histories

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.

Engineering Geology and Construction

Proceedings of the 5th Conference on Mechanical Behaviour of Salt, Bucharest, 9-11 August 1999

Proceedings of the ... Annual Symposium on Engineering Geology & Geotechnical Engineering

Rock Mechanics Through Project-Based Learning

Guitar World Presents Steve Vai's Guitar Workout

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Petrophysics is the science of evaluating the rock and fluid properties of oil, gas and water reservoirs through the acquisition of physical samples, electrical, chemical, nuclear and magnetic data acquired by surface logging, downhole coring, and drilling and wireline sondes. The evaluation, analysis and interpretation of this data is as much an art as a science as it requires an understanding of geology, chemistry, physics, electronics, mechanics and drilling technology. The techniques have been developed over the last 100 years primarily by the oil and gas industry, but the principles are equally relevant in coal mining, hydrogeology and environmental science. This book is firmly aimed at students of geology and petroleum engineering looking for a practical understanding of the background and workflows required to complete a petrophysical study of a well, a reservoir or a field. Petrophysics is log analysis constrained by geology, and if we ignore the rocks we risk making poor investment decisions.

We want to give you the practice you need on the ACT McGraw-Hill's 10 ACT Practice Tests helps you gauge what the test measures, how it's structured, and how to budget your time in each section. Written by the founder and faculty of Advantage Education, one of America's most respected providers of school-based test-prep classes, this book provides you with the intensive ACT practice that will help your scores improve from each test to the next. You'll be able to sharpen your skills, boost your confidence, reduce your stress-and to do your very best on test day. 10 complete sample ACT exams, with full explanations for every answer 10 sample writing prompts for the optional ACT essay portion Scoring Worksheets to help you calculate your total score for every test Expert guidance in prepping students for the ACT More practice and extra help online ACT is a registered trademark of ACT, Inc., which was not involved in the production of, and does not endorse, this product.

This book is intended for engineering students as a textbook. It may also be used by practical engineers as a quick reference on methodologies and design principles. It is meant to be simple and easy to use, to help students who have little practical experience understand the concepts. The author attempts to balance fundamental knowledge and practical applications. Examples are provided after introduction of concepts or methods to demonstrate their applications.

For Underground Mining

2016GUIDELINES FOR INVESTIGATING GEOLOGIC HAZARDS AND PREPARING ENGINEERING-GEOLOGY REPORTS, WITH A SUGGESTED APPROACH TO GEOLOGIC-HAZARD ORDINANCES IN UTAH

A Practical Guide to Dewatering

Introduction to Tunnel Construction

Applied Rock Mechanics and Ground Stability, 2nd Ed.

Rock Fall Engineering

Rock mechanics is a multidisciplinary subject combining geology, geophysics, and engineering and applying the principles of mechanics to study the engineering behavior of the rock mass. With wide application, a solid grasp of this topic is invaluable to anyone studying or working in civil, mining, petroleum, and geological engineering. Rock Mechani

Properly understanding and characterizing geologic materials and formations is vital for making critical engineering decisions. Identifying and classifying rock masses and soil formations allows reasonable estimation of their characteristic properties. Comprising chapters from the second edition of the revered Geotechnical Engineering Investigation

Mapping closely to how ore deposit geology is now taught, this textbook systematically describes and illustrates the major ore deposit types, linking this to their settings in the crust and the geological factors behind their formation.

Written for advanced undergraduate and graduate students with a basic background in the geosciences, it provides a balance of practical information and coverage of the relevant geological sciences, including petrological, geochemical, hydrological and tectonic processes. Important theory is summarized without unnecessary detail and integrated with students' learning in other topics, including magmatic processes and sedimentary geology, enabling students to make links across the geosciences. Students are supported by further reading, a comprehensive glossary, and problems and review questions that test the application of theoretical approaches and encourage students to use what they have learnt. A website includes visual resources and combines with the book to provide students and instructors with a complete learning package.

McGraw-Hill's 10 ACT Practice Tests, Second Edition

Crustal Permeability

How to Master Business Forecasting