

## Structural Geology And Rock Engineering 552 Pages

This second edition of the successful Foundations on Rock presents an up-to-date practical reference book describing current engineering practice in the investigation, design and construction of foundations on rock. An extra chapter on Tension Foundations has been included. The methods set out are readily applicable to high rise buildings, bridges, dams and structures subject to uplift and turning loads. Foundations on Rock differs from the many texts and handbooks on soil foundations in that it focuses on the effect of geology on the stability and settlement of rock foundations. While the intact rock may be strong, defects in the rock such as faults, joints and cavities, and the deterioration of the rock with time, will have a significant effect on foundation performance. Methods of detecting such defects are described, and their implications for foundation design and treatment are elaborated.

This book offers a practical reference guide to soft rock mechanics for engineers and scientists. Written by recognized experts, it will benefit professionals, contractors, academics, researchers and students working on rock engineering projects in the fields of civil engineering, mining and construction engineering. Soft Rock Mechanics and Engineering covers a specific subject of great relevance in Rock Mechanics – and one that is directly connected to the design of geotechnical structures under difficult ground conditions. The book addresses practical issues related to the geomechanical properties of these types of rock masses and their characterization, while also discussing advances regarding in situ investigation, safety, and monitoring of geotechnical structures in soft rocks. Lastly, it presents important case histories involving tunnelling, dam foundations, coal and open pit mines and landslides.

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Rock Mechanics and Engineering: Prediction and Control of Landslides and Geological Disasters presents the state-of-the-art in monitoring and forecasting geotechnical hazards during the survey and design, construction, and operation of a railway. This volume offers the latest research and practical knowledge on the regularity of disaster-causing activities, and the monitoring and forecasting of rockfalls, landslides, and debris flow induced by rainfall and human activity. The book gives guidance on how to optimize railway design, prevent and control measures during construction, and geological hazard remediation. The book also advises engineers on how to achieve traffic safety on high-speed railways. Eleven chapters present best practices in the prediction and control of landslides and rockfalls in geological disasters, derived from years of geotechnical engineering research and practice on high-speed railways in China. High-speed railways bring characteristic geotechnical challenges including a complete maintenance system, a long railway line, and the subjection of the geological body to cyclic loads. Since the damage to the geological body is influenced by fatigue as well as rock and soil strength and hydrology, the study of geotechnical hazards to high-speed rail is very complex. Monitoring and predicting such hazards on high-speed railways is a significant challenge to their safe construction and operation. Presents the latest technical achievement and development trends in landslide and rockfall forecasting Considers the challenges of high-speed railways to the prediction and control of geotechnical hazards Gives both in-situ and laboratory tests for rockfalls, and considers the collapse process of rock slopes Describes the principles of slope monitoring with specific reference to high-speed rail Details an automatic monitoring system for geotechnical hazards to high-speed rail

Geology Applied to Engineering bridges the gap between the two fields through its versatile

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application of the physical aspects of geology to engineering design and construction. The Second Edition elucidates real-world practices, concerns, and issues for today's engineering geologists and geotechnical engineers. Both undergraduate and graduate students will benefit from the book's thorough coverage, as will professionals involved in assessing sites for engineering projects, evaluating construction materials, developing water resources, and conducting tests using industry standards. West and Shakoor offer expanded coverage of important topics such as slope stability and ground subsidence and significant fields in engineering geology, such as highways, dams, tunnels, and rock blasting. In order to allow for the diverse backgrounds of geologists and engineers, material on the properties of minerals, rocks, and soil provides a working knowledge of applied geology as a springboard to more comprehensive subjects in engineering. Example problems throughout the text demonstrate the practical applications of soil mechanics, rock weathering and soils, structural geology, groundwater, and geophysics. Thought-provoking and challenging exercises supplement core concepts such as determining shear strength and failure conditions, calculating the depth needed for borings, reading and analyzing maps, and constructing stratigraphic cross sections. This book is concerned with time-dependency in rock mechanics and rock engineering, whose spectrum is very wide. While the term "time-dependency" involves time-dependent behavior/rate-dependent behavior of rocks in a conventional sense, this book attempts to cover the spectrum as much as possible including coupled processes of thermal, hydrological and diffusions in rocks. It presents theoretical formulations, experiments, numerical formulation and examples of applications. Of paramount concern is the long-term response and stability of rock engineering structures, including for instance man-made and natural slopes and

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underground facilities such as tunnels and powerhouses. This work will be of interest to civil, mining and rock engineers, consulting engineers, professionals in computational mechanics, contractors, structural geologists/engineers, engineering geologists, petroleum engineers, and, to a lesser extent, architects.

Rock Mechanics and Rock Engineering: From the Past to the Future contains the contributions presented at EUROCK2016, the 2016 International Symposium of the International Society for Rock Mechanics (ISRM 2016, Ürgüp, Cappadocia Region, Turkey, 29-31 August 2016). The contributions cover almost all aspects of rock mechanics and rock engineering from theories to engineering practices, emphasizing the future direction of rock engineering technologies. The 204 accepted papers and eight keynote papers, are grouped into several main sections: - Fundamental rock mechanics - Rock properties and experimental rock mechanics - Analytical and numerical methods in rock engineering - Stability of slopes in civil and mining engineering - Design methodologies and analysis - Rock dynamics, rock mechanics and rock engineering at historical sites and monuments - Underground excavations in civil and mining engineering - Coupled processes in rock mass for underground storage and waste disposal - Rock mass characterization - Petroleum geomechanics - Carbon dioxide sequestration - Instrumentation-monitoring in rock engineering and back analysis - Risk management, and - the 2016 Rocha Medal Lecture and the 2016 Franklin Lecture Rock Mechanics and Rock Engineering: From the Past to the Future will be of interest to researchers and professionals involved in the various branches of rock mechanics and rock engineering. EUROCK 2016, organized by the Turkish National Society for Rock Mechanics, is a continuation of the successful series of ISRM symposia in Europe, which began in 1992 in Chester, UK.

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Engineering Rock Mechanics Part II: Illustrative Worked Examples can be used as an independent book or alternatively it complements an earlier publication called Engineering Rock Mechanics: An Introduction to the Principles by the same authors. It contains illustrative worked examples of engineering rock mechanics in action as the subject applies to civil, mining, petroleum and environmental engineering. The book covers the necessary understanding and the key techniques supporting the rock engineering design of structural foundations, dams, rock slopes, wellbores, tunnels, caverns, hydroelectric schemes and mines. There is a question and worked answer presentation with the question and answer sets collated into twenty chapters which match the subject matter of the first book.

This book is one out of 8 IAEG XII Congress volumes, and deals with the theme of applied geology, which is a critical theme for the global economy. In the international, multidisciplinary approach to major engineering projects (either to macro- or mega-scale), the application of geological investigation techniques is fundamental for properly selecting the location sites, planning the construction and maintaining the infrastructures. The contributions in this book include not only engineering constructions but also case studies related to large projects on geo-resources exploration and extraction (minerals, petroleum and groundwater), energy production (hydropower, geothermal, nuclear and others), transportation (railway and highway) and waste disposal as well as the environmental management of these and other activities. The Engineering Geology for Society and Territory volumes of the IAEG XII Congress held in Torino from September 15-19, 2014, analyze the dynamic role of engineering geology in our changing world and build on the four main themes of the congress: Environment, processes, issues, and approaches. The congress topics and subject areas of the 8 IAEG XII Congress

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volumes are: 1. Climate Change and Engineering Geology 2. Landslide Processes 3. River Basins, Reservoir Sedimentation and Water Resources 4. Marine and Coastal Processes 5. Urban Geology, Sustainable Planning and Landscape Exploitation 6. Applied Geology for Major Engineering Projects 7. Education, Professional Ethics and Public Recognition of Engineering Geology 8. Preservation of Cultural Heritage.

Engineering Geology is a multidisciplinary subject that interacts with other disciplines, such as mineralogy, petrology, structural geology, hydrogeology, seismic engineering, rock engineering, soil mechanics, geophysics, remote sensing (RS-GIS-GPS) and environmental geology. This book is the only one of its kind in the Indian market that caters to the students of all these subjects. Engineers require a deep understanding, interpretation and analyses of earth sciences before suggesting engineering designs and remedial measures to combat natural disasters, such as earthquakes, volcanoes, landslides, debris flows, tsunamis and floods. This book covers all aspects of engineering geology and is intended to serve as a reference for practicing civil engineers, geotechnical engineers, marine engineers, geologists and mining engineers. Engineering Geology has also been designed as a textbook for students pursuing undergraduate and postgraduate courses in advanced/applied geology and earth sciences. A plethora of examples and case studies relevant to the Indian context

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have been included for better understanding of the geological challenges faced by engineers. New in this Edition• The concept of watershed and the depiction of watershed atlas of India• Latest findings by the Indian Bureau of Mines• Recent developments in coastal engineering and innovative structures• New types of protective structures to guard against tsunamis• Role of geology in building smart cities• Environmental legislation in India

"Engineering geology is the application of the geology to engineering study for the purpose of assuring that the geological factors regarding the location, design, construction, operation and maintenance of engineering works are recognized and accounted for. In recent years, advances in technology and knowledge of geology have resulted in the accessibility of civil engineering project and high resolution to identify. Producing the earthquake in sea triggered the tsunami. An earthquake may serve as a warning that a tsunami is coming, and so may a rapid fall or rise in coastal waters. Earthquakes are an unavoidable natural hazard, but proper planning and a well-informed and well prepared public can reduce their impact. Construction of dam, tunnel, reservoir and other civil engineering projects under the consideration of safety precaution, and using material are more stable, durable and economical due to the knowledge of geology. The field of Geological Engineering includes a wide range of activities including the geological

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characterization of complex foundations of major buildings and structures, development of natural resources (mining, water, hydroelectricity, forestry, oil and gas), investigation and assessment of groundwater movement and quality, the engineering safety of major infrastructure (dams, reservoirs, offshore drilling platforms, pipelines, roads and railways), and the assessment of geohazard risk (landslides, earthquakes, volcanoes, and the stability of natural dams). It also contains aspects of such fields as project finance and insurance, land-use planning, forensic geological engineering, and the application of geological knowledge to the repair and preservation of cultural heritage sites. This volume Engineering Geology aims to understand the structure of the Earth and its surface features, what causes earthquakes and tsunamis, and why volcanoes form and erupt. It discusses about minerals, which form the building blocks of rocks, and how rocks are made and destroyed. It presents emphasis on applied geomorphology and structural geology, applied geophysics and geochemistry, environmental geology and hydrogeology, land use planning, natural hazards, remote sensing techniques, soil and rock mechanics and applied geotechnical engineering. This book will appeal to academic scientists, industry and applied researchers, and policy and decision makers."

Earthquake fault zones exhibit hierarchical damage and granular structures with

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evolving geometrical and material properties. Understanding how repeated brittle deformation form the structures and how the structures affect subsequent earthquakes is a rich problem involving coupling of various processes that operate over broad space and time scales. The diverse state-of-the-art papers collected here show how insight can come from many fields including statistical physics, structural geology and rock mechanics at large scales; elasticity, friction and nonlinear continuum mechanics at intermediate scales; and fracture mechanics, granular mechanics and surface physics at small scales. This volume will be useful to students and professional researchers from Earth Sciences, Material Sciences, Engineering, Physics and other disciplines, who are interested in the properties of natural fault zones and the processes that occur between and during earthquakes.

Applied Geology is a multidisciplinary subject that interacts with other disciplines, such as mineralogy, petrology, structural geology, hydrogeology, seismic engineering, rock engineering, soil mechanics, geophysics, remote sensing (RS-GIS-GPS), environmental geology, etc. This book, entitled Applied Geology, is the only one of its kind in the Indian market that caters to the needs of all these subjects. This book covers all aspects of Applied Geology and is intended to serve BTech students. A plethora of examples and case studies relevant to the

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Indian context have been included for better understanding of the geological challenges faced by engineers.

This book is a collection of papers presented at the 1st Kyoto International Symposium on Underground Environment entitled "Role of Geo-technology to the Underground Environment". Consists of nine keynote papers, thirty-one technical papers and fifteen papers resulting from the poster presentations, each covering a vital aspect of underground engineering.

From the reviews: "...one of the charms of this book is that it is different from both structural geology text books and mechanics texts. Bayly has brought these two fields together admirably, with great intelligence, imagination and originality. For this reason alone, I think all active structural geologists, whether in research or teaching, and particularly those concerned with theory, should read this book." (Journal of Structural Geology)

Rock fractures control many of Earth's dynamic processes, including plate-boundary development, tectonic earthquakes, volcanic eruptions, and fluid transport in the crust. An understanding of rock fractures is also essential for effective exploitation of natural resources such as ground water, geothermal water, and petroleum. This book combines results from fracture mechanics, materials science, rock mechanics, structural geology, hydrogeology, and fluid

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mechanics to explore and explain fracture processes and fluid transport in the crust. Basic concepts are developed from first principles and illustrated with worked examples linking models of geological processes to real field observations and measurements. Many additional examples and exercises are provided online, allowing readers to practise formulating and quantitative testing of models. Rock Fractures in Geological Processes is designed for courses at the advanced undergraduate and graduate level but also forms a vital resource for researchers and industry professionals concerned with fractures and fluid transport in the Earth's crust.

Engineering Geology is a multidisciplinary subject which interacts with other disciplines, such as mineralogy, petrology, structural geology, hydrogeology, seismic engineering, rock engineering, soil mechanics, geophysics, remote sensing (RS-GIS-GPS), environmental geology, etc. Engineers require a deeper understanding, interpretation and analyses of earth sciences before suggesting engineering designs and remedial measures to combat natural disasters, such as earthquakes, volcanoes, landslides, debris flows, tsunamis, and floods. This book covers all aspects of Engineering Geology and is intended to serve as a reference for practicing civil engineers and mining engineers. Engineering Geology has also been designed as a textbook for students pursuing

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undergraduate and postgraduate courses in advanced/applied geology and earth sciences. A plethora of examples and case studies relevant to the Indian context have been included, for better understanding of the geological challenges faced by engineers.

Harmonising Rock Mechanics and the Environment comprises the proceedings (invited and contributed papers) of the 12th ISRM International Congress on Rock Mechanics (Beijing, China, 18-21 October 2011). The contributions cover the entire scope of rock mechanics and rock engineering, with an emphasis on the critical role of both disciplines in sustain

A modern quantitative approach to structural geology and tectonics for advanced students and researchers.

This series, under the editorship of Professor H.J. Zwart, will deal with all topics within this field, such as: micro structures, large scale tectonics, experimental structural geology, fabrics, rock mechanics, and modelling in structural geology. The aim is to publish advanced level reference books to provide state-of-the-art reviews of these and other aspects of structural geology. This series will be of value to researchers and professionals in structural geology, rock mechanics, petroleum geology and tectonophysics. This first volume in the series deals with the mechanics of tectonic faulting and its central theme is the formation of faults

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in the tectonic stress field and the interaction between faults and stresses. The author, Dr. G. Mandl, was one of the top research people with Shell International Research. Part I of the book deals with the mechanical genesis of general fault features, such as fault shape and antithetic, precursory and secondary faulting and elaborates on these more general aspects within the context of specific tectono-mechanical models for extensional faulting and thrusting. Besides critical reviews, Part I contains a number of new or hitherto unpublished results, in particular on model experiments and numerical analyses. The central chapter of Part II presents a full introduction into mechanical theory and rock plasticity - the theory most adequate to tectonic faulting and therefore forming the backbone of the book. Besides presentations of basic concepts of stress and strain, special chapters are devoted to poro-elasticity and fluid flow through porous rocks. This branch of geomechanics requires a multidisciplinary approach that combines continuum mechanics, rock mechanics and structural geology, and applies theoretical, numerical and experimental methods, together with the study of field cases. The book has evolved from such multidisciplinary research and is written for structural geologists, petroleum geologists, engineering geologists, rock engineers and geophysicists whose work demands a similar approach. In addition, the book is intended to encourage mechanical engineers and even

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mathematicians to enter the fascinating and in parts still untilled fields of tectono-mechanical processes in the Earth's crust. The book is richly illustrated by drawings, photographs and reproductions of seismic records.

The practical application of structural geology in industry is varied and diverse; it is relevant at all scales, from plate-wide screening of new exploration areas down to fluid-flow behaviour along individual fractures. From an industry perspective, good structural practice is essential since it feeds into the quantification and recovery of reserves and ultimately underpins commercial investment choices. Many of the fundamental structural principles and techniques used by industry can be traced back to the academic community, and this volume aims to provide insights into how structural theory translates into industry practice. Papers in this publication describe case studies and workflows that demonstrate applied structural geology, covering a spread of topics including trap definition, fault seal, fold-and-thrust belts, fractured reservoirs, fluid flow and geomechanics. Against a background of evolving ideas, new data types and advancing computational tools, the volume highlights the need for structural geologists to constantly re-evaluate the role they play in solving industrial challenges.

Widely regarded as the most authoritative and comprehensive book in its field, the fourth edition of *Fundamentals of Rock Mechanics* includes new and substantially

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updated chapters to this highly praised text. Extensively updated throughout, this new edition contains substantially expanded chapters on poroelasticity, wave propagation, and subsurface stresses. Features entirely new chapters on rock fractures and micromechanical models of rock behaviour. Discusses fundamental concepts such as stress and strain. Offers a thorough introduction to the subject before expertly delving into a fundamental, self-contained discussion of specific topics. Unavailable for many years, now back by popular demand. An Instructor manual CD-ROM for this title is available. Please contact our Higher Education team at

[HigherEducation@wiley.com](mailto:HigherEducation@wiley.com) for more information. Reviews: "With this attention to detail, and rigorous adherence to clarity and exactness in description, this edition will consolidate the standing achieved by the earlier editions as a most authoritative and comprehensive book in its field. It will continue to serve as a leading reference work for geoscientists interested in structural geology, tectonics and petrophysics as well as for civil, mining and petroleum engineers." (Petroleum Geoscience) "...I consider this book to be an invaluable reference for studying and understanding the fundamental science at the base of rock mechanics. I believe this to be a must-have textbook and I strongly recommend it to anyone, student or professional, interested in the

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subject." (Rock Mechanics and Rock Engineering) "An excellent book, very well presented, and is a must for the shelves of serious engineers and scientists active or interested in the fields of rock mechanics and rock engineering....

Highly recommended." (South African Geographical Journal, 2008)

When dealing with rock in civil engineering, mining engineering and other engineering, the process by which the rock fails under load should be understood, so that safe structures can be built on and in the rock. However, there are many ways for loading rock and rock can have a variety of idiosyncracies. This reference book provides engineers and researchers with the essential knowledge for a clear understanding of the process of rock failure under different conditions. It contains an introductory chapter explaining the role of rock failure in engineering projects plus a summary of the theories governing rock failure and an explanation of the computer simulation method. It subsequently deals in detail with explaining, simulating and illustrating rock failure in laboratory and field. The concluding chapter discusses coupled modelling and the anticipated future directions for this type of computer simulation. An appendix describing the RFPA numerical model (Rock Failure Process Analysis program) is also included. About the Authors Chun'an Tang has a PhD in Mining Engineering and is a Professor at the School of Civil & Hydraulic Engineering at

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Dalian University of Technology in China. He is an advisor for design and stability problem modelling in mining and civil rock engineering and Chairman of the China National Group of the International Society for Rock Mechanics. John Hudson is emeritus professor at Imperial College, London and is active as an independent consultant for Rock Engineering Consultants. He has a PhD in Rock Mechanics and completed over a 130 rock engineering consulting assignments in mining and civil engineering. He is a fellow at the Royal Academy of Engineering in the UK and President of the International Society for Rock Mechanics.

The exploration and extraction of the earth's resources are key issues in global industrial development. In the 21st century, emphasis has increasingly been placed on geo-engineering safety, engineering accountability and sustainability. With focus on rock engineering projects, Structural Geology and Rock Engineering uses case studies and an integrated engineering approach to provide an understanding of projects constructed on or in rock masses. Based on Professors Cosgrove and Hudson's university teaching at Imperial College London, as well as relevant short course presentations, it explains the processes required for engineering modelling, design and construction. The first half of the book provides step-by-step presentations of the principles of structural geology and rock mechanics with special emphasis on the integration between the two

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subjects. The second half of the book turns principles into practice. A wealth of practical engineering examples are presented, including evaluations of bridge foundations, quarries, dams, opencast coal mining, underground rock engineering, historical monuments and stone buildings. This up-to-date, well-illustrated guide is ideal for teachers, researchers and engineers interested in the study and practice of rock-based projects in engineering.

With organizations and individuals increasingly dependent on the Web, the need for competent, well-trained Web developers and maintainers is growing. Helping readers master Web development, Dynamic Web Programming and HTML5 covers specific Web programming languages, APIs, and coding techniques and provides an in-depth understanding of the underlying concepts, theory, and principles. The author leads readers through page structuring, page layout/styling, user input processing, dynamic user interfaces, database-driven websites, and mobile website development. After an overview of the Web and Internet, the book focuses on the new HTML5 and its associated open Web platform standards. It covers the HTML5 markup language and DOM, new elements for structuring Web documents and forms, CSS3, and important JavaScript APIs associated with HTML5. Moving on to dynamic page generation and server-side programming with PHP, the text discusses page templates, form

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processing, session control, user login, database access, and server-side HTTP requests. It also explores more advanced topics such as XML and PHP/MySQL. Suitable for a one- or two-semester course at the advanced undergraduate or beginning graduate level, this comprehensive and up-to-date guide helps readers learn modern Web technologies and their practical applications. Numerous examples illustrate how the programming techniques and other elements work together to achieve practical goals. Online Resource Encouraging hands-on practice, the book's companion website at <http://dwp.sofpower.com> helps readers gain experience with the technologies and techniques involved in building good sites. Maintained by the author, the site offers: Live examples organized by chapter and cross-referenced in the text Programs from the text bundled in a downloadable code package Searchable index and appendices Ample resource listings and information updates

Every engineering structure, whether it's a building, bridge or road, is affected by the ground on which it is built. Geology is of fundamental importance when deciding on the location and design of all engineering works, and it is essential that engineers have a basic knowledge of the subject. Engineering Geology introduces the fundamentals of the discipline and ensures that engineers have a clear understanding of the processes at work, and how they will impact on what

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is to be built. Core areas such as stratigraphy, rock types, structures and geological processes are explained, and put in context. The basics of soil mechanics and the links between groundwater conditions and underlying geology are introduced. As well as the theoretical knowledge necessary, Professor Bell introduces the techniques that engineers will need to learn about and understand the geological conditions in which they intend to build. Site investigation techniques are detailed, and the risks and risk avoidance methods for dealing with different conditions are explained. \* Accessible introduction to geology for engineers \* Key points illustrated with diagrams and photographs \* Teaches the impact of geology on the planning and design of structures

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.

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

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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.

"This book is intended as a reference book for advanced graduate students and research engineers in block-in-matrix rocks (bimrocks) or soil and rock mixtures (SRMs) or rock and soil aggregate (RSA). Bimrocks are complex formations characterized by competent rock inclusions floating in a weaker matrix. Typical types of bimrocks include a series of mixed geological or engineering masses such as m $\hat{a}$ elanges, fault rocks, coarse pyroclastic rocks, breccias, sheared serpentines and waste dump mixture. Bimrock is especially different from the general soil and rock material, and the detection of the damage and fracture is still wide open to innovative research. Globally, there is widespread interest in investigating the geomechanical behaviors of bimrocks, such as deformation and strength characteristics, damage and fracture evolution and stability prediction of bimrock construction. However, the meso-structure factors control the whole mechanical properties of bimrocks, the source of the macroscopic deformation phenomenon is the meso-structural changes. Therefore, evaluation of the mesoscopic physical and mechanical properties, together with advanced testing technique, are attractive research topics in rock mechanics. As a result, comprehensive macroscopic and mesoscopic experimental investigations should be conducted to reveal the damage and fracturing mechanical behaviors of

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bimrock. The readers of this work can gain new insights into the meso-structural changes of bimrocks subjected to different stress paths. The book is expected to improve the understanding of the mesoscopic damage and fracturing mechanisms of bimrocks and can be helpful to predict the stability of rock structures where rock mass is subjected to complex loading conditions"--

Structural Geology is a groundbreaking reference that introduces you to the concepts of nonlinear solid mechanics and non-equilibrium thermodynamics in metamorphic geology, offering a fresh perspective on rock structure and its potential for new interpretations of geological evolution. This book stands alone in unifying deformation and metamorphism and the development of the mineralogical fabrics and the structures that we see in the field. This reflects the thermodynamics of systems not at equilibrium within the framework of modern nonlinear solid mechanics. The thermodynamic approach enables the various mechanical, thermal, hydrological and chemical processes to be rigorously coupled through the second law of thermodynamics, invariably leading to nonlinear behavior. The book also differs from others in emphasizing the implications of this nonlinear behavior with respect to the development of the diverse, complex, even fractal, range of structures in deformed metamorphic rocks. Building on the fundamentals of structural geology by discussing the

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nonlinear processes that operate during the deformation and metamorphism of rocks in the Earth's crust, the book's concepts help geoscientists and graduate-level students understand how these processes control or influence the structures and metamorphic fabrics-providing applications in hydrocarbon exploration, ore mineral exploration, and architectural engineering. Authored by two of the world's foremost experts in structural geology, representing more than 70 years of experience in research and instruction Nearly 300 figures, illustrations, working examples, and photographs reinforce key concepts and underscore major advances in structural geology

Engineering in Rock Masses is a 26-chapter text that deals with the behavior, investigation, and construction of rock masses. The first chapters review the properties, behavior, classification, and occurrence of groundwater in rock masses. The subsequent chapters discuss the stress analysis, exploration, laboratory testing, geophysical methods, and instrumentation in these materials. These topics are followed by discussions of slope stability, rockfall problems, settlement and bearing capacity, subsidence, and seismic movements of rocks and rock masses. This work also evaluates the role of pumping system, ground freezing, grouting, rock anchors, drilling, blasting, and open excavation. The remaining chapters look into the rock masses' tunneling, underground

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chambers, shafts, socketed foundations, and retaining structures. This book will be of great value to practicing civil and mining engineers, engineering geologists, and researchers.

This book has following unique features that distinguish it from other works from the same area: 1) Investigates the influence of fissure geometry on strength failure and crack evolution behaviour of real rock material; 2) Analyzes the effect of pre-experiment high-temperature treatment on fracture mechanical behaviour of rock material with a single fissure or two parallel fissures; 3) Compares quantitatively simulated results using discrete element modelling and experimental results of fracture mechanical behaviour of rock material with two fissures; 4) Constructs the relationship between crack evolution processes and acoustic emission distribution of pre-fissured rock material under entire deformation; and 5) Discusses the crack evolution mechanism of pre-fissured rock material with respect to different confining pressures. This book can become the reference for technicians in the field of geotechnical engineering, mining engineering and geology engineering. At the same time, this book can be regarded as a good reference for scientific researchers carrying out fissured rock mechanics and correlated specialties.

Rock Slope Engineering covers the investigation, design, excavation and

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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.

A pioneering single-semester undergraduate textbook that balances descriptive and quantitative analysis of geological structures.

Widely regarded as the most authoritative and comprehensive book in its field, the fourth edition of *Fundamentals of Rock Mechanics* includes new and

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substantially updated chapters to this highly praised text. Extensively updated throughout, this new edition contains substantially expanded chapters on poroelasticity, wave propagation, and subsurface stresses. Features entirely new chapters on rock fractures and micromechanical models of rock behaviour. Discusses fundamental concepts such as stress and strain. Offers a thorough introduction to the subject before expertly delving into a fundamental, self-contained discussion of specific topics. Unavailable for many years, now back by popular demand. An Instructor manual CD-ROM for this title is available. Please contact our Higher Education team at [HigherEducation@wiley.com](mailto:HigherEducation@wiley.com) for more information. Reviews: "With this attention to detail, and rigorous adherence to clarity and exactness in description, this edition will consolidate the standing achieved by the earlier editions as a most authoritative and comprehensive book in its field. It will continue to serve as a leading reference work for geoscientists interested in structural geology, tectonics and petrophysics as well as for civil, mining and petroleum engineers." (Petroleum Geoscience) "...I consider this book to be an invaluable reference for studying and understanding the fundamental science at the base of rock mechanics. I believe this to be a must-have textbook and I strongly recommend it to anyone, student or professional, interested in the subject." (Rock Mechanics and Rock Engineering) "An excellent

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book, very well presented, and is a must for the shelves of serious engineers and scientists active or interested in the fields of rock mechanics and rock engineering.... Highly recommended." (South African Geographical Journal, 2008)

This book provides a comprehensive overview of this multi-disciplinary subject, which has interaction with other disciplines, such as mineralogy, petrology, structural geology, hydrogeology, seismic engineering, rock engineering, soil mechanics, geophysics, remote sensing (RS-GIS-GPS), environmental geology, etc.

Given the recent advances in site investigation techniques, computing, access to information and monitoring, plus the current emphasis on safety, accountability and sustainability, this book introduces an up-to-date methodology for the design of all types of rock engineering projects, whether surface or underground.

Guidance is provided on the nature of the modeling to support design and the information required for design; also included is a procedure for technical auditing of the modeling and design together with the related protocol sheets. Written by two eminent authors, clearly structured and containing many illustrations, this volume is intended for consulting engineers, contractors, researchers, lecturers and students working on rock engineering projects.

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