

Reliability And Statistics In Geotechnical Engineering

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Reinforced Concrete Structural Reliability - Ph.D, Mohamed Abdallah El-Reedy 2012-12-15

Structural engineers must focus on a structure's continued safety throughout its service life. Reinforced Concrete Structural Reliability covers the methods that enable engineers to keep structures reliable during all project phases, and presents a practical exploration of up-to-date techniques for predicting the lifetime of a structure. The book a

Risk and Reliability in Geotechnical Engineering - Kok-Kwang Phoon 2018-10-09

Establishes Geotechnical Reliability as Fundamentally Distinct from Structural Reliability Reliability-based design is relatively well established in structural design. Its use is less mature in geotechnical design, but there is a steady progression towards reliability-based design as seen in the inclusion of a new Annex D on "Reliability of Geotechnical Structures" in the third edition of ISO 2394. Reliability-based design can be viewed as a simplified form of risk-based design where different consequences of failure are implicitly covered by the adoption of different target reliability indices. Explicit risk management methodologies are required for large geotechnical systems where soil and loading conditions are too varied to be conveniently slotted into a few reliability classes (typically three) and an associated simple discrete tier of target reliability indices. Provides Realistic Practical Guidance Risk and Reliability in Geotechnical Engineering makes these reliability and risk methodologies more accessible to practitioners and researchers by presenting soil statistics which are necessary inputs, by explaining how calculations can be carried out using simple tools, and by presenting illustrative or actual examples showcasing the benefits and limitations of these methodologies. With contributions from a broad international group of authors, this text: Presents probabilistic models suited for soil parameters Provides easy-to-use Excel-based methods for reliability analysis Connects reliability analysis to design codes (including LRFD and Eurocode 7) Maximizes value of information using Bayesian updating Contains efficient reliability analysis methods Accessible To a Wide Audience Risk and Reliability in Geotechnical Engineering presents all the "need-to-know" information for a non-specialist to calculate and interpret the reliability index and risk of geotechnical structures in a realistic and robust way. It suits engineers, researchers, and students who are interested in the practical outcomes of reliability and risk analyses without going into the intricacies of the underlying mathematical theories.

Offshore Structural Engineering - Srinivasan Chandrasekaran 2017-12-19

Successfully estimate risk and reliability, and produce innovative, yet reliable designs using the approaches outlined in Offshore Structural Engineering: Reliability and Risk Assessment. A hands-on guide for practicing professionals, this book covers the reliability of offshore structures with an emphasis on the safety and reliability of offshore facilities during analysis, design, inspection, and planning. Since risk assessment and reliability estimates are often based on probability, the author utilizes concepts of probability and statistical analysis to address the risks and uncertainties involved in design. He explains the concepts with clear illustrations and tutorials, provides a chapter on probability theory, and covers various stages of the process that include data collection, analysis, design and construction, and commissioning. In addition, the author discusses advances in geometric structural forms for deep-water oil exploration, the rational treatment of uncertainties in structural engineering, and the safety and serviceability of civil engineering and other offshore structures. An invaluable guide to innovative and reliable structural design, this book: Defines the

structural reliability theory Explains the reliability analysis of structures Examines the reliability of offshore structures Describes the probabilistic distribution for important loading variables Includes methods of reliability analysis Addresses risk assessment and more Offshore Structural Engineering: Reliability and Risk Assessment provides an in-depth analysis of risk analysis and assessment and highlights important aspects of offshore structural reliability. The book serves as a practical reference to engineers and students involved in naval architecture, ocean engineering, civil/structural, and petroleum engineering.

Applied Civil Engineering Risk Analysis - Robb Eric S. Moss 2019-07-31

This updated edition retains its introduction to applied fundamental statistics, probability, reliability, and decision theory as these pertain to problems in Civil Engineering. The new edition adds an expanded treatment of systems reliability, Bayesian methods, and spatial variability, along with additional example problems throughout. The book provides readers with the tools needed to determine the probability of failure, and when multiplied by the consequences of failure, illustrates how to assess the risk of civil engineering problems. Presenting methods for quantifying uncertainty that exists in engineering analysis and design, with an emphasis on fostering more accurate analysis and design, the text is ideal for students and practitioners of a range of civil engineering disciplines. Expands on the class-tested pedagogy from the first edition with more material and more examples; Broadens understanding with simulations coded both in Matlab and in R; Features new chapters on spatial variability and Bayesian methods; Emphasizes techniques for estimating the influence of uncertainty on the probability of failure

Model Uncertainties in Foundation Design - Chong Tang 2021-03-17

Model Uncertainties in Foundation Design is unique in the compilation of the largest and the most diverse load test databases to date, covering many foundation types (shallow foundations, spudcans, driven piles, drilled shafts, rock sockets and helical piles) and a wide range of ground conditions (soil to soft rock). All databases with names prefixed by NUS are available upon request. This book presents a comprehensive evaluation of the model factor mean (bias) and coefficient of variation (COV) for ultimate and serviceability limit state based on these databases. These statistics can be used directly for AASHTO LRFD calibration. Besides load test databases, performance databases for other geo-structures and their model factor statistics are provided. Based on this extensive literature survey, a practical three-tier scheme for classifying the model uncertainty of geo-structures according to the model factor mean and COV is proposed. This empirically grounded scheme can underpin the calibration of resistance factors as a function of the degree of understanding – a concept already adopted in the Canadian Highway Bridge Design Code and being considered for the new draft for Eurocode 7 Part 1 (EN 1997-1:202x). The helical pile research in Chapter 7 was recognised by the 2020 ASCE Norman Medal.

Geotechnical Slope Analysis - Robin Chowdhury 2009-11-18

Freshly updated and extended version of Slope Analysis (Chowdhury, Elsevier, 1978). This reference book gives a complete overview of the developments in slope engineering in the last 30 years. Its multi-disciplinary, critical approach and the chapters devoted to seismic effects and probabilistic approaches and reliability analyses, reflect the distinctive style of the original. Subjects discussed are: the understanding of slope performance, mechanisms of instability, requirements for modeling and analysis, and new techniques

for observation and modeling. Special attention is paid to the relation with the increasing frequency and consequences of natural and man-made hazards. Strategies and methods for assessing landslide susceptibility, hazard and risk are also explored. Moreover, the relevance of geotechnical analysis of slopes in the context of climate change scenarios is discussed. All theory is supported by numerous examples. "...A wonderful book on Slope Stability....recommended as a reference book to those who are associated with the geotechnical engineering profession (undergraduates, post graduates and consulting engineers)..." Prof. Devendra Narain Singh, Indian Inst. of Technology, Mumbai, India "I have yet to see a book that excels the range and depth of Geotechnical Slope Analysis... I have failed to find a topic which is not covered and that makes the book almost a single window outlet for the whole range of readership from students to experts and from theoreticians to practicing engineers..." Prof. R.K. Bhandari, New Delhi, India

Geotechnical and Geophysical Site Characterization - An-Bin Huang 2008-04-04

Geotechnical and Geophysical Site Characterization collects the papers presented at the Third International Conference on Site Characterization (ISC 3) that took place in Taipei from April 1-4, 2008. The subjects covered include new developments in mechanical in-situ testing and interpretation techniques, statistical analysis of test data, geo

Numerical Methods in Geotechnical Engineering - Thomas Benz 2010-05-25

Numerical Methods in Geotechnical Engineering contains 153 scientific papers presented at the 7th European Conference on Numerical Methods in Geotechnical Engineering, NUMGE 2010, held at Norwegian University of Science and Technology (NTNU) in Trondheim, Norway, 2-4 June 2010. The contributions cover topics from emerging research to engineering pra

Safety, Reliability and Risk Analysis - R.D.J.M. Steenbergen 2013-09-18

During the last decade there have been increasing societal concerns over sustainable developments focusing on the conservation of the environment, the welfare and safety of the individual and at the same time the optimal allocation of available natural and financial resources. As a consequence the methods of risk and reliability analysis are becomi

Reliability and Risk Analysis in Civil Engineering - Niels C. Lind 1987

Probabilistic Approaches for Geotechnical Site Characterization and Slope Stability Analysis -

Zijun Cao 2016-08-06

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

Shovel-Truck Systems - Jacek M. Czaplicki 2008-11-17

This book provides a comprehensive analysis of the exploitation process of shovel-truck systems using modelling, analysis and calculations following specific procedures:- analyzing the reliability and accessibility of shovels- discussing the functioning of a truck-repair shop system- reliability of trucks- existence of haulers reserve- repair shop

Structural Reliability - Yan-Gang Zhao 2021-04-13

STRUCTURAL RELIABILITY Discover a new and innovative approach to structural reliability from two authoritative and accomplished authors The subject of structural reliability, which deals with the problems of evaluating the safety and risk posed by a wide variety of structures, has grown rapidly over the last four decades. And while the First-Order Reliability Method is principally used by most textbooks on this subject, other approaches have identified some of the limitations of that method. In Structural Reliability: Approaches from Perspectives of Statistical Moments, accomplished engineers and authors Yan-Gang Zhao and Dr. Zhao-

Hui Lu, deliver a concise and insightful exploration of an alternative and innovative approach to structural reliability. Called the Methods of Moment, the authors' approach is based on the information of statistical moments of basic random variables and the performance function. The Methods of Moment approach facilitates structural reliability analysis and reliability-based design and can be extended to other engineering disciplines, yielding further insights into challenging problems involving randomness. Readers will also benefit from the inclusion of: A thorough introduction to the measures of structural safety, including uncertainties in structural design, deterministic measures of safety, and probabilistic measures of safety An exploration of the fundamentals of structural reliability theory, including the performance function and failure probability A practical discussion of moment evaluation for performance functions, including moment computation for both explicit and implicit performance functions A concise treatment of direct methods of moment, including the third- and fourth-moment reliability methods Perfect for professors, researchers, and graduate students in civil engineering, Structural Reliability: Approaches from Perspectives of Statistical Moments will also earn a place in the libraries of professionals and students working or studying in mechanical engineering, aerospace and aeronautics engineering, marine and offshore engineering, ship engineering, and applied mechanics.

Reliability-Based Design in Geotechnical Engineering - Kok-Kwang Phoon 2008-04-25

Reliability-based design is the only engineering methodology currently available which can ensure self-consistency in both physical and probabilistic terms. It is also uniquely compatible with the theoretical basis underlying other disciplines such as structural design. It is especially relevant as geotechnical design becomes subject to increasing codification and to code harmonization across national boundaries and material types. Already some codes of practice describe the principles and requirements for safety, serviceability, and durability of structures in reliability terms. This book presents practical computational methods in concrete steps that can be followed by practitioners and students. It also provides geotechnical examples illustrating reliability analysis and design. It aims to encourage geotechnical engineers to apply reliability-based design in a realistic context that recognises the complex variabilities in geomaterials and model uncertainties arising from a profession steeped in empiricism. By focusing on learning through computations and examples, this book serves as a valuable reference for engineers and a resource for students.

Statistical Methods for QTL Mapping - Zehua Chen 2013-11-01

While numerous advanced statistical approaches have recently been developed for quantitative trait loci (QTL) mapping, the methods are scattered throughout the literature. Statistical Methods for QTL Mapping brings together many recent statistical techniques that address the data complexity of QTL mapping. After introducing basic genetics topics and statistical principles, the author discusses the principles of quantitative genetics, general statistical issues of QTL mapping, commonly used one-dimensional QTL mapping approaches, and multiple interval mapping methods. He then explains how to use a feature selection approach to tackle a QTL mapping problem with dense markers. The book also provides comprehensive coverage of Bayesian models and MCMC algorithms and describes methods for multi-trait QTL mapping and eQTL mapping, including meta-trait methods and multivariate sequential procedures. This book emphasizes the modern statistical methodology for QTL mapping as well as the statistical issues that arise during this process. It gives the necessary biological background for statisticians without training in genetics and, likewise, covers statistical thinking and principles for geneticists. Written primarily for geneticists and statisticians specializing in QTL mapping, the book can also be used as a supplement in graduate courses or for self-study by PhD students working on QTL mapping projects.

Probabilistic Methods in Geotechnical Engineering - K.S. Li 2020-08-19

The proceedings of this conference contain keynote addresses on recent developments in geotechnical reliability and limit state design in geotechnics. It also contains invited lectures on such topics as modelling of soil variability, simulation of random fields and probability of rock joints. Contents: Keynote addresses on recent development on geotechnical reliability and limit state design in geotechnics, and invited lectures on modelling of soil variability, simulation of random field, probabilistic of rock joints, and probabilistic design of foundations and slopes. Other papers on analytical techniques in geotechnical reliability, modelling of soil properties, and probabilistic analysis of slopes, embankments and foundations.

Applications of statistics and probability - Civil engineering reliability and risk analysis - M. Lemaire 1995-01-01

ICASP-7 is concerned with applications of statistics and probability in all domains of civil engineering, structural engineering and material sciences. Organized every four years since 1971, ICASP-7 brings together scientists, researchers and engineers devoted to a better understanding of uncertainty in civil engineering. The proceedings include papers selected by the national and international scientific committees. Both applied and theoretical papers deal with a large variety of topics such as: Soil mechanics and geotechnical engineering, mechanics of materials, mechanics of structures, environmental engineering and natural hazards, modeling of naturally occurring, accidental and service loads in the applications fields; decision theory, optimization techniques and codes, reliability theory, random processes and geostatistical methods, inverse problems and identification in the theoretical field.

Probability, Statistics, and Decision for Civil Engineers - Jack R Benjamin 2014-07-16

"This text covers the development of decision theory and related applications of probability. Extensive examples and illustrations cultivate students' appreciation for applications, including strength of materials, soil mechanics, construction planning, and water-resource design. Emphasis on fundamentals makes the material accessible to students trained in classical statistics and provides a brief introduction to probability. 1970 edition"--

Risk and Variability in Geotechnical Engineering - Michael A. Hicks 2007

This book presents cutting edge techniques for characterising, quantifying and modelling geomaterial variability in addition to methods for quantifying the influence of this variability on the performance of geotechnical structures. It includes state-of-the-art refereed journal papers by leading international researchers along with written and informal discussions on a selection of key submissions that were presented at a Symposium at the Institution of Civil Engineers on 9th May 2005.

Performance Confirmation of Constructed Geotechnical Facilities - A. J. Lutenecker 2000

GSP 94 contains 37 papers presented at a Specialty Conference on Performance Confirmation of Constructed Geotechnical Facilities, held in Amherst, Massachusetts, April 9-12, 2000.

Reliability and Risk Analysis in Civil Engineering - University of Waterloo. Institute for Risk Research 1987

Applications of Statistics and Probability - Maurice Lemaire 1995

Geotechnical Safety and Risk V - T. Schweckendiek 2015-10-09

Geotechnical Risk and Safety V contains contributions presented at the 5th International Symposium on Geotechnical Safety and Risk (5th ISGSR, Rotterdam, 13-16 October 2015) which was organized under the auspices of the Geotechnical Safety Network (GEOSNet) and the following technical committees of the of the International Society of Soil Mechanics and Geotechnical Engineering (ISSGME): • TC304 Engineering Practice of Risk Assessment & Management • TC205 Safety and Serviceability in Geotechnical Design • TC212 Deep Foundations • TC302 Forensic Geotechnical Engineering Geotechnical Risk and Safety V covers seven themes: 1. Geotechnical Risk Management and Risk Communication 2. Variability in Ground Conditions and Site Investigation 3. Reliability and Risk Analysis of Geotechnical Structures 4. Limit-state design in Geotechnical Engineering 5. Assessment and Management of Natural Hazards 6. Contractual and Legal Issues of Foundation and (Under)Ground Works 7. Case Studies, Monitoring and Observational Method The 5th ISGSR is the continuation of a series of symposiums and workshops on geotechnical risk and reliability, starting with LSD2000 (Melbourne, Australia), IWS2002 (Tokyo and Kamakura, Japan), LSD2003 (Cambridge, USA), Georisk2004 (Bangalore, India), Taipei2006 (Taipei, Taiwan), the 1st ISGSR (Shanghai, China, 2007), the 2nd ISGSR (Gifu, Japan, 2009), the 3rd ISGSR (Munich, Germany, 2011) and the 4th ISGSR (Hong Kong, 2013).

Hydrosystems Engineering Reliability Assessment and Risk Analysis - Yeou-Koung Tung 2006

This is the first book to integrate reliability analysis and risk assessment with the planning, design, and management of hydrosystems (dams, levees, storm sewers, etc.). Requiring only a basic knowledge of probability and statistics, readers will be able to determine how hydrosystem structures will perform under various circumstances.

Reliability-Based Design in Geotechnical Engineering - Kok-Kwang Phoon 2014-04-21

Reliability-based design is the only engineering methodology currently available which can ensure self-consistency in both physical and probabilistic terms. It is also uniquely compatible with the theoretical basis underlying other disciplines such as structural design. It is especially relevant as geotechnical design becomes subject to increasing codification and to code harmonization across national boundaries and material types. Already some codes of practice describe the principles and requirements for safety, serviceability, and durability of structures in reliability terms. This book presents practical computational methods in concrete steps that can be followed by practitioners and students. It also provides geotechnical examples illustrating reliability analysis and design. It aims to encourage geotechnical engineers to apply reliability-based design in a realistic context that recognises the complex variabilities in geomaterials and model uncertainties arising from a profession steeped in empiricism. By focusing on learning through computations and examples, this book serves as a valuable reference for engineers and a resource for students.

Safety Factors and Reliability: Friends or Foes? - Isaac Elishakoff 2012-09-22

Have you ever wondered where the safety factors come from? Why is it that deterministic analysis has reached a very sophisticated level, but in the end empirical factors are still needed? Is there a way to select them, rather than assigning them arbitrarily as is often done? This book clearly shows that safety factors are closely related with the reliability of structures, giving yet another demonstration of Albert Einstein's maxim that "It is incomprehensible that Nature is comprehensible". The book shows that the safety factors are much more comprehensible if they are seen in a probabilistic context. Several definitions of the safety factors are given, analytical results on insightful numbers are presented, nonprobabilistic safety factors are shown, as well as their estimates derived by the inequalities of Bienayme, Markov, Chebushev and Camp-Meidell. A special chapter is devoted to important contributions by Japanese experts. This volume will help to critically re-think the issue of safety factors, which can create a false feeling of security. The deterministic paradigm can be enhanced by incorporating probabilistic concepts wisely where they are needed without treating all variables as probabilistic ones. The book shows that there is a need of their integration rather than separation. This book is intended for engineers, graduate students, lecturers and researchers.

Modern Geotechnical Design Codes of Practice - Patrick Arnold 2013

The ground is one of the most highly variable of engineering materials. It is therefore not surprising that geotechnical designs depend on local site conditions and local engineering experience. Engineering practices, relating to investigation and design methods site understanding and to safety levels acceptable to society, will therefore vary between different regions. The challenge in geotechnical engineering is to make use of worldwide geotechnical experience, established over many years, to aid in the development and harmonization of geotechnical design codes. Given the significant uncertainties involved, empiricism and engineering

The Foundation Engineering Handbook - Manjriker Gunaratne 2006-01-13

Great strides have been made in the art of foundation design during the last two decades. In situ testing, site improvement techniques, the use of geogrids in the design of retaining walls, modified ACI codes, and ground deformation modeling using finite elements are but a few of the developments that have significantly advanced foundation engineering in recent years. What has been lacking, however, is a comprehensive reference for foundation engineers that incorporates these state-of-the-art concepts and techniques. The Foundation Engineering Handbook fills that void. It presents both classical and state-of-the-art design and analysis techniques for earthen structures, and covers basic soil mechanics and soil and groundwater modeling concepts along with the latest research results. It addresses isolated and shallow footings, retaining structures, and modern methods of pile construction monitoring, as well as stability analysis and ground improvement methods. The handbook also covers reliability-based design and LRFD (Load Resistance Factor Design)-concepts not addressed in most foundation engineering texts. Easy-to-follow numerical design examples illustrate each technique. Along with its unique, comprehensive coverage, the clear, concise discussions and logical organization of The Foundation Engineering Handbook make it the one quick reference every practitioner and student in the field needs.

Probabilistic Methods in Geotechnical Engineering - D. V. Griffiths 2007-12-14

Learn to use probabilistic techniques to solve problems in geotechnical engineering. The book reviews the statistical theories needed to develop the methodologies and interpret the results. Next, the authors explore probabilistic methods of analysis, such as the first order second moment method, the point estimate method, and random set theory. Examples and case histories guide you step by step in applying the techniques to particular problems.

Numerical Methods in Geotechnical Engineering - Michael A. Hicks 2014-05-29

Numerical Methods in Geotechnical Engineering contains the proceedings of the 8th European Conference on Numerical Methods in Geotechnical Engineering (NUMGE 2014, Delft, The Netherlands, 18-20 June 2014). It is the eighth in a series of conferences organised by the European Regional Technical Committee ERTC7 under the auspices of the International

Analyzing Uncertainty in Civil Engineering - Wolfgang Fellin 2004-10-08

This volume comprehensively addresses the issue of uncertainty in civil engineering, from design to construction. Current engineering practice often leaves uncertainty issues aside, despite the fact that new scientific tools have been developed in the past decades that allow a rational description of uncertainties of all kinds, from model uncertainty to data uncertainty. It is the aim of this volume to take a critical look at current engineering risk concepts in order to raise awareness of uncertainty in numerical computations, shortcomings of a strictly probabilistic safety concept, geotechnical models of failure and their construction implications, actual construction, and legal responsibility. In addition, a number of the new procedures for modelling uncertainty are explained. The book is a result of a collaborate effort of mathematicians, engineers and construction managers who met regularly in a post-graduate seminar at the University of Innsbruck during the past years.

Probability, Statistics, and Reliability for Engineers and Scientists - Bilal M. Ayyub 2016-04-19

In a technological society, virtually every engineer and scientist needs to be able to collect, analyze, interpret, and properly use vast arrays of data. This means acquiring a solid foundation in the methods of data analysis and synthesis. Understanding the theoretical aspects is important, but learning to properly apply the theory to real-world p

Basics of Foundation Design - Bengt Fellenius 2017-03-17

The "Red Book" presents a background to conventional foundation analysis and design. The text is not intended to replace the much more comprehensive 'standard' textbooks, but rather to support and augment these in a few important areas, supplying methods applicable to practical cases handled daily by practising engineers and providing the basic soil mechanics background to those methods. It concentrates on the static design for stationary foundation conditions. Although the topic is far from exhaustively treated, it does intend to present most of the basic material needed for a practising engineer involved in routine geotechnical design, as well as provide the tools for an engineering student to approach and solve common geotechnical design problems.

Degrees of Belief - Steven G. Vick 2002-01-01

Observing at a risk analysis conference for civil engineers that participants did not share a common language of probability, Vick, a consultant and geotechnic engineer, set out to not only examine why, but to also bridge the gap. He reexamines three elements at the core of engineering the concepts

Risk Assessment in Geotechnical Engineering - Gordon A. Fenton 2008-09-02

NEW PROBABILISTIC APPROACHES FOR REALISTIC RISK ASSESSMENT IN GEOTECHNICAL ENGINEERING. This text presents a thorough examination of the theories and methodologies available for risk assessment in geotechnical engineering, spanning the full range from established single-variable and "first order" methods to the most recent, advanced numerical developments. In response to the growing application of LRFD methodologies in geotechnical design, coupled with increased demand for risk assessments from clients ranging from regulatory agencies to insurance companies, authors Fenton and Griffiths have introduced an innovative reliability-based risk assessment method, the Random Finite Element Method (RFEM). The authors have spent more than fifteen years developing this statistically based method for modeling the real spatial variability of soils and rocks. As demonstrated in the book, RFEM performs better in real-world applications than traditional risk assessment tools that do not properly account for the spatial variability of geomaterials. This text is divided into two parts: Part One, Theory, explains the theory underlying risk assessment methods

in geotechnical engineering. This part's seven chapters feature more than 100 worked examples, enabling you to develop a detailed understanding of the methods. Part Two, Practice, demonstrates how to use advanced probabilistic tools for several classical geotechnical engineering applications. Working with the RFEM, the authors show how to assess risk in problems familiar to all geotechnical engineers. All the programs used for the geotechnical applications discussed in Part Two may be downloaded from the authors' Web site at www.engmath.dal.ca/rfem/ at no charge, enabling you to duplicate the authors' results and experiment with your own data. In short, you get all the theory and practical guidance you need to apply the most advanced probabilistic approaches for managing uncertainty in geotechnical design.

Applications of Statistics and Probability in Civil Engineering - Jun Kanda 2007

This book address current and developing theories, applied research, and innovative applications in broad areas including reliability theory, uncertainty modeling and analysis, stochastic method, life cycle assessment, performance-based engineering, and risk assessment and management.

Evaluation of Soil and Rock Properties - P. J. Sabatini 2004-10-01

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.

Applied Civil Engineering Risk Analysis - Robb Eric Shedwick Moss 2013-09-09

This book provides an introduction to applied fundamental statistics, probability, reliability, and decision theory as these pertain to problems in Civil Engineering and related fields (e.g., Environmental Engineering, Engineering Geology, Engineering Seismology, etc.).

Reliability and Statistics in Geotechnical Engineering - Gregory B. Baecher 2005-08-19

Risk and reliability analysis is an area of growing importance in geotechnical engineering, where many variables have to be considered. Statistics, reliability modeling and engineering judgement are employed together to develop risk and decision analyses for civil engineering systems. The resulting engineering models are used to make probabilistic predictions, which are applied to geotechnical problems. Reliability & Statistics in Geotechnical Engineering comprehensively covers the subject of risk and reliability in both practical and research terms * Includes extensive use of case studies * Presents topics not covered elsewhere--spatial variability and stochastic properties of geological materials * No comparable texts available Practicing engineers will find this an essential resource as will graduates in geotechnical engineering programmes.

GeoCongress 2006 - Don DeGroot 2006

The adoption and integration of information technologies in practice and academia has had significant impact on all aspects of the field of geotechnical engineering including field characterization, laboratory characterization, numerical simulation, data management, subsurface visualization and geotechnical education. The 300 papers contained in the GeoCongress 2006 CD ROM proceedings showcase recent advancements in all geo-applications as a result of the adoption of information technologies, and explore future opportunities for the geo-industry. Topics include: sensing methods and devices; measurement of soil properties; advanced sensing and monitoring techniques for earthwork QA/QC; applications of X-ray

computed tomography; sensing and data management tools for pavement systems; monitoring and control of deep foundation construction; innovations in retaining structure construction; soil structure--contact and interaction; analysis and uncertainty in wave testing; geostatistics: applications and visualizations; data management standards; data management systems and applications; GIS based site characterization and geohazard analysis; neural networks modeling for geotechnical systems; uncertainty in probabilistic seismic hazard analysis; numerical modeling and analysis: soil and rock behavior; modeling and control of deep

foundation construction; large scale computations and simulations; probabilistic modeling and design; multi-scale earthquake modeling; blast effects on below-grade walls and underground structures; modeling of complex deep foundation systems; engineered earth structures; numerical modeling and analysis for pavement systems; earth retaining structures: intelligent design; modeling and characterization of deep soil cement; modeling of soil improvement; simulations for education and training; imaging based quantification; and 3-D visualization.