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Development of Software for Reliability Based Design of Steel Framed Structures in Fire-Shaun Devaney 2015

Risk Based Design for Safe Development of Reliable and Environmentally Friendly Inland Water Transportation System-Dr. Oladokun S. Olanrewaju 2013-10-17 Water supports our planet and its vast resources need to be fully utilized to benefit human activities and his environment in a sustainable manner, most of inland water resources has been under utilised and under maintained. Maritime industry has made use of the ocean in a more much responsible manner for cross continental transportation of good. There are currently dire needs to find sensitive ways to mitigate challenge of global warming, climate changes and its associated impact, especially within the coastline. Various research works has proven that Inland Water Transportation represents the cleanest mode of transportation. Its use could reduce and mitigate carbon footage and other Green House Gases. Past system design and operation has followed conventional method. System has been addressed through reactive behaviour that has put system on probable risk and consequence in oblivion. Likewise, complexity of sustainable water transportation development demand design and operation that can be achieved by employing proactive method. That considers holistic system analysis approach. It has become important to address system associated risk, reliability and their life cycle through assessment of accident and pollution prevention, protection, control principle. Ageing, uncertainty and operational factors are also important system variables that need to be incorporated in risk close loop system. This book account for modelling of proactive technik and application of a top down risk and reliability based design that identifies assess, analyses and employ sustainability equity comparison leading to generic safety and environmental risk reliability model (SERM). SERM is a decision support system tool developed at University Technology Malaysia for the development of efficient and sustainable Inland Water Transportation System (IWT).

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.

Reliability of Geotechnical Structures in ISO2394-K.K. Phoon 2016-11-25 The latest 4th edition of the international standard on the principles of reliability for load bearing structures (ISO2394:2015) includes a new Annex D dedicated to the reliability of geotechnical structures. The emphasis in Annex D is to identify and characterize critical elements of the geotechnical reliability-based design process. This book contains a wealth of data and information to assist geotechnical engineers with the implementation of semi-probabilistic or full probabilistic design approaches within the context of established geotechnical knowledge, principles, and experience. The introduction to the book presents an overview on how reliability can play a complementary role within prevailing norms in geotechnical practice to address situations where some measured data and/or past experience exist for limited site-specific data to be supplemented by both objective regional data and subjective judgment derived from comparable sites elsewhere. The principles of reliability as presented in ISO2394:2015 provides the common basis for harmonization of structural and geotechnical design. The balance of the chapters describes the uncertainty representation of geotechnical design parameters, the statistical characterization of multivariate geotechnical data and model factors, semi-probabilistic and direct probability-based design methods in accordance to the outline of Annex D. This book elaborates and reinforces the goal of Annex D to advance geotechnical reliability-based design with geotechnical needs at the forefront while complying with the general principles of reliability given by ISO2394:2015. It serves as a supplementary reference to Annex D and it is a must-read for designing geotechnical structures in compliance with ISO2394:2015.

Design for Reliability-Dev G. Raheja 2012-07-20 A unique, design-based approach to reliabilityengineering Design for Reliability provides engineers and managerswith a range of tools and techniques for incorporating reliabilityinto the design process for complex systems. It clearly explainshow to design for zero failure of critical system functions,leading to enormous savings in product life-cycle costs and dramatic improvement in the ability to compete in globalmarkets. Readers will find a wealth of design practices not covered in typical engineering books, allowing them to think outside the boxwhen developing reliability requirements. They will learn toaddress high failure rates associated with systems that are notproperly designed for reliability, avoiding expensive andtime-consuming engineering changes, such as excessive testing,repairs, maintenance, inspection, and logistics. Special features of this book include: A unified approach that integrates ideas from computer scienceand reliability engineering Techniques applicable to reliability as well as safety,maintainability, system integration, and logistic engineering Chapters on design for extreme environments, developingreliable software, design for trustworthiness, and HALT influenceon design Design for Reliability is a must-have guide for engineersand managers in R&D, product development, reliabilityengineering, product safety, and quality assurance, as well as anyone who needs to deliver high product performance at a lowercost while minimizing system failure.

Design for Reliability-Dana Crowe 2017-12-19 Today's marketplace demands product reliability. At the same time, it places ever-increasing demands on products that push the limits of their performance and their functional life, and it does so with the expectation of lower per-unit product costs. To meet these demands, product design now requires a focused, streamlined, concurrent engineering process that will produce a product at the lowest possible cost in the least amount of time. Design for Reliability provides a systematic approach to the design process that is sharply focused on reliability and firmly based on the physics of failure. It imparts an understanding of how, why, and when to use the wide variety of reliability engineering tools available and offers fundamental insight into the total design cycle. Applicable from the idea phase of the product development cycle through product obsolescence, Design for Reliability (DFR) concepts integrated with reliability verification and analytical physics form a coherent stage gate/phase design process that helps ensure that a product will meet customers' reliability objectives. Whether you are a high-volume manufacturer of consumer items or a low volume producer of military commodities, your goal is the same: to bring a product to market using a process focused on designing out or mitigating potential failure modes prior to production release. Readers of Design for Reliability will learn to meet that goal and move beyond solidifying a basic offering to the marketplace to creating a true competitive advantage.

Reliability-based Design-Singuresu S. Rao 1992 S.S. Rao presents the principles of reliability-based engineering and design in a simple and straight-forward approach. He addresses the design of mechanical components and systems; Monte Carlo simulation; reliability-based optimum design; strength-based reliability and interface theory; reliability testing; time-dependent reliability of components and systems; failure modes, event tree and fault tree analysis; quality control and reliability; modeling of geometry; weakest-link and fail-safe systems; maintainability and availability; extremal distributions; random variables and probability distributions; functions of random variables; and basic probability theory. With 254 illustrations and an index.

Executing Design for Reliability Within the Product Life Cycle-All Jammia 2019-11-13 At an early stage of the development, the design teams should ask questions such as, "How reliable will my product be?" "How reliable should my product be?" And, "How frequently does the product need to be repaired / maintained?" To answer these questions, the design team needs to develop an understanding of how and why their products fails; then, make only those changes to improve reliability while remaining within cost budget. The body of available literature may be separated into three distinct categories: "theory" of reliability and its associated calculations; reliability analysis of test or field data - provided the data is well behaved; and, finally, establishing and managing organizational reliability activities. The problem remains that when design engineers face the question of design for reliability, they are often at a loss. What is missing in the reliability literature is a set of practical steps without the need to turn to heavy statistics. Executing Design for Reliability Within the Product Life Cycle provides a basic approach to conducting reliability-related streamlined engineering activities, balancing analysis with a high-level view of reliability within product design and development. This approach empowers design engineers with a practical understanding of reliability and its role in the design process, and helps design team members assigned to reliability roles and responsibilities to understand how to deploy and utilize reliability tools. The authors draw on their experience to show how these tools and processes are integrated within the design and development cycle to assure reliability, and also to verify and demonstrate this reliability to colleagues and customers.

Modern Geotechnical Design Codes of Practice-Patrick Arnold 2012-12-01 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

Reliability Based Aircraft Maintenance Optimization and Applications-He Ren 2017-03-19 Reliability Based Aircraft Maintenance Optimization and Applications presents flexible and cost-effective maintenance schedules for aircraft structures, particular in composite airframes. By applying an intelligent rating system, and the back-propagation network (BPN) method and FTA technique, a new approach was created to assist users in determining inspection intervals for new aircraft structures, especially in composite structures. This book also discusses the influence of Structure Health Monitoring (SHM) on scheduled maintenance. An integrated logic diagram establishes how to incorporate SHM into the current MSG-3 structural analysis that is based on four maintenance scenarios with gradual increasing maturity levels of SHM. The inspection intervals and the repair thresholds are adjusted according to different combinations of SHM tasks and scheduled maintenance. This book provides a practical means for aircraft manufacturers and operators to consider the feasibility of SHM by examining labor work reduction, structural reliability variation, and maintenance cost savings. Presents the first resource available on airframe maintenance optimization Includes the most advanced methods and technologies of maintenance engineering analysis, including first application of composite structure maintenance engineering analysis integrated with SHM Provides the latest research results of composite structure maintenance and health monitoring systems

Reliability of Structures-Andrzej S. Nowak 2012-10-12 Reliability of Structures enables both students and practising engineers to appreciate how to value and handle reliability as an important dimension of structural design. It discusses the concepts of limit states and limit state functions, and presents methodologies for calculating reliability indices and calibrating partial safety factors. It also

Reliability-based Structural Design-Seung-Kyum Choi 2006-11-15 This book provides readers with an understanding of the fundamentals and applications of structural reliability, stochastic finite element method, reliability analysis via stochastic expansion, and optimization under uncertainty. It examines the use of stochastic expansions, including polynomial chaos expansion and Karhunen-Loeve expansion for the reliability analysis of practical engineering systems.

Design for Reliability-Eric Bauer 2011-02-11 System reliability, availability and robustness are often not well understood by system architects, engineers and developers. They often don't understand what drives customer's availability expectations, how to frame verifiable availability/robustness requirements, how to manage and budget availability/robustness, how to methodically architect and design systems that meet robustness requirements, and so on. The book takes a very pragmatic approach of framing reliability and robustness as a functional aspect of a system so that architects, designers, developers and testers can address it as a concrete, functional attribute of a system, rather than an abstract, non-functional notion.

Product Integrity and Reliability in Design-John W. Evans 2011-06-28 The book develops the root-cause approach to reliability - often referred to as "physics of failure" in the reliability engineering field. It approaches the subject from the point of view of a process and integrates the necessary methods to support that process. The book can be used to teach first- or second-year postgraduate students in mechanical, electrical, manufacturing and materials engineering about addressing issues of reliability during product development. It will also serve practicing engineers involved in the design and development of electrical and mechanical components and systems, as a reference.

Reliability Based Analysis and Design for Civil Engineers-Devaraj V 2017-12-30 Reliability Analysis and Design for Civil Engineers is designed for beginners to understand the concepts in reliability engineering. The chapters are well planned beginning with probability and statistics. Application of probability concepts to assess the uncertainties in engineering is presented by different methods, at component level and system level. Design of structures for a specified target reliability to ensure safety and economy is presented.

Structural Safety and Reliability-Naruhito Shiraishi 1998

Optimization and Decision Support Systems in Civil Engineering-A. B. Templeman 1991

Reliability Analysis for Structural Design-Milan Holick? 2009-08-01 Reliability analysis for structural design provides an effective and consistent introduction of the theory of structural reliability. The wide involvement of the author in the development of such design standards at various levels results in his ability to introduce advanced concepts in a clear and practical manner. The book consequently not only provides an appreciation for the way in which reliability-based partial factor limit states design procedures are formulated in design standards, but also for ways in which these principles can be applied in design practice, particularly where high demands are placed on structural performance.

Product Development and Design for Manufacturing-John Priest 2012-04-16 "Outlines best practices and demonstrates how to design in quality for successful development of hardware and software products. Offers systematic applications tailored to particular market environments. Discusses Internet issues, electronic commerce, and supply chain."

Marine Structures Research Recommendations-National Research Council 1997-06-08

Recent Developments in Reliability-Based Civil Engineering-Achintya Halder 2006-02-13 Authored by the most active scholars in their respective areas, this volume covers the most recent developments, both theoretical and applicative, in multi-disciplinary reliability evaluation areas, many of which are cutting-edge and not discussed elsewhere in book form. The broad coverage includes the latest thoughts on design for low probability and high consequence events like the failure of the World Trade Center as well as risk acceptability based on the Life Quality Index. Other chapters discuss the development of the performance-based design concept, and the generally overlooked area of the reliability evaluation of bridges and offshore structures. Since the finite element method is routinely used for structural analyses, emphasis is put on discussing reliability evaluation using finite elements including consideration of the mesh-free finite element method. Corrosion and fatigue reliability evaluation techniques are other urgent issues that are dealt with in depth. Risk-based optimization using lifecycle cost analysis is presented. Among the many additional included topics, a chapter is devoted to health assessment of existing structures, currently one of the most active research areas. Contents:Risk and Risk Perception for Low Probability, High Consequence Events in the Built Environment (R B Corotis)/Socio-Economic Risk Acceptability Criteria (R Rackwitz)Reliability in Structural Performance Evaluation and Design (Y K Wen)Performance-Based Reliability Evaluation of Structure-Foundation Systems (M Chowdhury & A Haldar)Application of Probabilistic Methods in Bridge Engineering (M Ghosn)Stochastic Response of Fixed Offshore Structures (S-T Quek et al.)Application of Reliability Methods to Fatigue Analysis and Design (P H Wirsching)Probabilistic Models for Corrosion in Structural Reliability Assessment (R E Melchers)Seismic Risk Assessment of Realistic Frame Structures Using a Hybrid Reliability Method (J Huh & A Haldar)Meshfree Methods in Computational Stochastic Mechanics (S Rahman)Reliability Analysis Using Information from Experts (J Mohammadi & E Desantiago)Risk-Based Optimization of Life-Cycle Cost for Deteriorating Civil Engineering Infrastructures (R Rackwitz)Structural Health Assessment under Uncertainty (H Katkhuda & A Haldar) Readership: Undergraduates, graduates, researchers and practitioners in the field of reliability in civil, mechanical, offshore, materials, chemical and other related engineering areas. Keywords:Performance-Based Design;Low Probability High Consequence Events;Life Quality Index;Socio-economic Risk Acceptability Criteria;Reliability of Bridges;Fixed Offshore Structures;Stochastic Finite Element Analysis;Mesh-Free Finite Element Methods;Fatigue Analysis and Design;Corrosion;Structural Health Assessment;Reliability Analysis Using Information from Experts;Renewal Model in Reliability-Based Optimization;Lifecycle Cost AnalysisKey Features:Discussions on the most recent developments in multi-disciplinary risk and reliability engineering areasChapters authored by the most active scholars in the areaTopics covered are not available in other booksIncludes subjects reflecting the most recent research interests in the field SPI/CI International Conference and Exposition 1998-Technomic 1998-01-16 This book discusses how the excess value, of the products using braid, is captured in prosthetic limbs, aircraft and automotive components, commercial furniture, and trenchless sewer repair structures. It outlines the braided pultrusion process and also discusses impregnation states.

Warranty Data Collection and Analysis-Wallace R. Blischke 2011-07-28 Warranty Data Collection and Analysis deals with warranty data collection and analysis and the problems associated with these activities. The book is a both a research monograph and a handbook for practitioners. As a research monograph, it unifies the literature on warranty data collection and analysis, and presents the important results in an integrated manner. In the process, it highlights topics that require further research. As a handbook, it provides the essential methodology needed by practitioners involved with warranty data collection and analysis, along with extensive references to further results. Models and techniques needed for proper and effective analysis of data are included, together with guidelines for their use in warranty management, product improvement, and new product development. Warranty Data Collection and Analysis will be of interest to researchers (engineers and statisticians) and practitioners (engineers, applied statisticians, and managers) involved with product warranty and reliability. It is also suitable for use as a reference text for graduate-level reliability programs in engineering, applied statistics, operations research, and management.

Computational Methods in Stochastic Dynamics-Manolis Papadarakis 2012-10-03 The considerable influence of inherent uncertainties on structural behavior has led the engineering community to recognize the importance of a stochastic approach to structural problems. Issues related to uncertainty quantification and its influence on the reliability of the computational models are continuously gaining in significance. In particular, the problems of dynamic response analysis and reliability assessment of structures with uncertain system and excitation parameters have been the subject of continuous research over the last two decades as a result of the increasing availability of powerful computing resources and technology. This book is a follow up of a previous book with the same subject (ISBN 978-90-481-9986-0) and focuses on advanced computational methods and software tools which can highly assist in tackling complex problems in stochastic dynamic/seismic analysis and design of structures. The selected chapters are authored by some of the most active scholars in their respective areas and represent some of the most recent developments in this field. The book consists of 21 chapters which can be grouped into several thematic topics including dynamic analysis of stochastic systems, reliability-based design, structural control and health monitoring, model updating, system identification, wave propagation in random media, seismic fragility analysis and damage assessment. This edited book is primarily intended for researchers and post-graduate students who are familiar with the fundamentals and wish to study or to advance the state of the art on a particular topic in the field of computational stochastic structural dynamics. Nevertheless, practicing engineers could benefit as well from it as most code provisions tend to incorporate probabilistic concepts in the analysis and design of structures.

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.

Proceedings - Offshore Technology Conference- 1999

Bearing Capacity of Roads, Railways and Airfields, Two Volume Set-Erol Tutumluer 2009-06-15 Bearing Capacity of Roads, Railways and Airfields focuses on issues pertaining to the bearing capacity of highway and airfield pavements and railroad track structures and provided a forum to promote efficient design, construction and maintenance of the transportation infrastructure. The collection of papers from the Eighth International Conference

Reliability Design of Mechanical Systems-Seongwoo Woo 2019-07-03 The revised edition of this book offers an expanded overview of the reliability design of mechanical systems and describes the reliability methodology, including a parametric accelerated life test (ALT) plan, a load analysis, a tailored series of parametric ALTs with action plans, and an evaluation of the final designs to ensure the design requirements are satisfied. It covers both the quantitative and qualitative approaches of the reliability design forming in the development process of mechanical products, with a focus on parametric ALT and illustrated via case studies. This new reliability methodology - parametric ALT should help mechanical and civil engineers to uncover design parameters improving product design and avoiding recalls. Updated chapters cover product recalls and assessment of their significance, modern definitions in reliability engineering, parametric accelerated life testing in mechanical systems, and extended case studies. For this revised edition, one new chapter has been introduced to reflect recent developments in analysis of fluid motion and mechanical vibration. Other chapters are expanded and updated to improve the explanation of topics including structures and load analysis, failure mechanics, design and reliability testing, and mechanical system failure. The broad scope gives the reader an overview of the state-of-the-art in the reliability design of mechanical systems and an indication of future directions and applications. It will serve as a solid introduction to the field for advanced students, and a valuable reference for those working in the development of mechanical systems and related areas.

Applied Methods of Structural Reliability-Milik Tichy 1993-07-31 A quarter of the century has elapsed since I gave my first course in structural reliability to graduate students at the University of Waterloo in Canada. Since that time on I have given many courses and seminars to students, researchers, designers, and site engineers interested in reliability. I also participated in and was responsible for numerous projects where reliability solutions were required. During that period, the scope of structural reliability gradually enlarged to become a substantial part of the general reliability theory. First, it is apparent that bearing structures should not be isolated objectives of interest, and, consequently, that constncted facilities should be studied. Second, a new engineering branch has emerged -reliability engineering. These two facts have highlighted new aspects and asked for new approaches to the theory and applications. I always state in my lectures that the reliability theory is nothing more than thematized engineering judgment. In fact, thanks mainly to probability and statistics, and also to computers, the empirical knowledge gained by Humankind's construction experience could have been transposed into a pattern of logic thinking, able to produce conclusions and to forecast the behavior of engineering entities. This manner of thinking has developed into an intricate network linked by certain rules, which, in a way, can be considered a type of reliability grammar. We can discern many grammatical concepts in the general structure of the reliability theory.

Building Technology Project Summaries-Center for Building Technology 1981

Robust Design Methodology for Reliability-Bo Bergman 2009-08-18 Based on deep theoretical as well as practical experience in Reliability and Quality Sciences, Robust Design Methodology for Reliability constructively addresses practical reliability problems. It offers a comprehensive design theory for reliability, utilizing robust design methodology and six sigma frameworks. In particular, the relation between un-reliability and variation and uncertainty is explored and reliability improvement measures in early product development stages are suggested. Many companies today utilise design for Six Sigma (DFSS) for strategic improvement of the design process, but often without explicitly describing the reliability perspective; this book explains how reliability design can relate to and work with DFSS and illustrates this with real-world problems. The contributors advocate designing for robustness, i.e. insensitivity to variation in the early stages of product design development. Methods for rational treatment of uncertainties in model assumptions are also presented. This book promotes a new approach to reliability thinking that addresses the design process and proneness to failure in the design phase via sensitivity to variation and uncertainty; includes contributions from both academics and industry practitioners with a broad scope of expertise, including quality science, mathematical statistics and reliability engineering; takes the innovative approach of promoting the study of variation and uncertainty as a basis for reliability work; includes case studies and illustrative examples that translate the theory into practice. Robust Design Methodology for Reliability provides a starting point for new thinking in practical reliability improvement work that will appeal to advanced designers and reliability specialists in academia and industry including fatigue engineers, product development and process/ quality professionals, especially those interested in and/ or using the DFSS framework.

Reliability Growth-Panel on Reliability Growth Methods for Defense Systems 2015-03-01 A high percentage of defense systems fail to meet their reliability requirements. This is a serious problem for the U.S. Department of Defense (DOD), as well as the nation. Those systems are not only less likely to successfully carry out their intended missions, but they also could endanger the lives of the operators. Furthermore, reliability failures discovered after deployment can result in costly and strategic delays and the need for expensive redesign, which often limits the tactical situations in which the system can be used. Finally, systems that fail to meet their reliability requirements are much more likely to need additional scheduled and unscheduled maintenance and to need more spare parts and possibly replacement systems, all of which can substantially increase the life-cycle costs of a system. Beginning in 2008, DOD undertook a concerted effort to raise the priority of reliability through greater use of design for reliability techniques, reliability growth testing, and formal reliability growth modeling, by both the contractors and DOD units. To this end, handbooks, guidances, and formal memoranda were revised or newly issued to reduce the frequency of reliability deficiencies for defense systems in operational testing and the effects of those deficiencies. "Reliability Growth" evaluates these recent changes and, more generally, assesses how current DOD principles and practices could be modified to increase the likelihood that defense systems will satisfy their reliability requirements. This report examines changes to the reliability requirements for proposed systems; defines modern design and testing for reliability; discusses the contractor's role in reliability testing; and summarizes the current state of formal reliability growth modeling. The recommendations of "Reliability Growth" will improve the reliability of defense systems and protect the health of the valuable personnel who operate them.

Computer-Based Design-Tamir Shahin 2002-08-30 A collection of papers from a conference held at Kings College, London. Computer-based Design focuses on all areas of design using computational methods and examines how all these individual tools can be integrated to produce a coherent design process. This volume also covers areas of manual design methods and modelling that are vital to the continuing development and evolution of the computer-aided design process. TOPICS COVERED INCLUDE Product design and modelling Design process Decision-making models Computer-assisted design systems Computer-assisted conceptual design Computer-assisted detailed design Computer assisted design for manufacture Design knowledge manipulation Engineering change Engineering design issues Fuzzy design Computer-aided design Industrial applications of design Advanced design applications Computational fluid dynamics Computer-based Design provides an excellent opportunity for an update on the latest techniques and developments from concept to advanced application in the design arena.

Structural Design Optimization Considering Uncertainties-Yannis Tsoupanakis 2008-02-07 Uncertainties play a dominant role in the design and optimization of structures and infrastructures. In optimum design of structural systems due to variations of the material, manufacturing variations, variations of the external loads and modelling uncertainty, the parameters of a structure, a structural system and its environment are not given, fi

Optimal Reliability Design-Way Kuo 2001 Provides a detailed introduction to systems reliability and reliability optimisation.

Reliability Engineering-Alessandro Birolini 2013-08-15 This book shows how to build in, evaluate, and demonstrate reliability and availability of components, equipment, systems. It presents the state-of-the-art of reliability engineering, both in theory and practice, and is based on the author's more than 30 years experience in this field, half in industry and half as Professor of Reliability Engineering at the ETH, Zurich. The structure of the book allows rapid access to practical results. This final edition extend and replace all previous editions. New are, in particular, a strategy to mitigate incomplete coverage, a comprehensive introduction to human reliability with design guidelines and new models, and a refinement of reliability allocation, design guidelines for maintainability, and concepts related to regenerative stochastic processes. The set of problems for homework has been extended. Methods & tools are given in a way that they can be tailored to cover different reliability requirement levels and be used for safety analysis. Because of the Appendices A6 - A8, the book is also self contained from a mathematical point of view, and can be used as a text book or as a desktop reference, with a large number of tables (60), figures (190), and examples (210 of which 70 as problems for homework) to support the practical aspects.

Development of Distributed Systems from Design to Application and Maintenance-Bessis, Nik 2012-12-31 "This book is a collection of research on the strategies used in the design and development of distributed systems applications"--Provided by publisher.

Engineering Risk Assessment with Subset Simulation-Siu-Kui Au 2014-04-10 This book starts with the basic ideas in uncertainty propagation using Monte Carlo methods and the generation of random variables and stochastic processes for some common distributions encountered in engineering applications. It then introduces a class of powerful simulation techniques called Markov Chain Monte Carlo method (MCMC), an important machinery behind Subset Simulation that allows one to generate samples for investigating rare scenarios in a probabilistically consistent manner. The theory of Subset Simulation is then presented, addressing related practical issues encountered in the actual implementation. The book also introduces the reader to probabilistic failure analysis and reliability-based sensitivity analysis, which are laid out in a context that can be efficiently tackled with Subset Simulation or Monte Carlo simulation in general. The book is supplemented with an Excel VBA code that provides a user-friendly tool for the reader to gain hands-on experience with Monte Carlo simulation. Presents a powerful simulation method called Subset Simulation for efficient engineering risk assessment and failure and sensitivity analysis Illustrates examples with MS Excel spreadsheets, allowing readers to gain hands-on experience with Monte Carlo simulation Covers theoretical fundamentals as well as advanced implementation issues A companion website is available to include the developments of the software ideas This book is essential reading for graduate students, researchers and engineers interested in applying Monte Carlo methods for risk assessment and reliability based design in various fields such as civil engineering, mechanical engineering, aerospace engineering, electrical engineering and nuclear engineering. Project managers, risk managers and financial engineers dealing with uncertainty effects may also find it useful.

Structural Seismic Design Optimization and Earthquake Engineering: Formulations and Applications-Plevris, Vagelis 2012-05-31 Throughout the past few years, there has been extensive research done on structural design in terms of optimization methods or problem formulation. But, much of this attention has been on the linear elastic structural behavior, under static loading condition. Such a focus has left researchers scratching their heads as it has led to vulnerable structural configurations. What researchers have left out of the equation is the element of seismic loading. It is essential for researchers to take this into account in order to develop earthquake resistant real-world structures. Structural Seismic Design Optimization and Earthquake Engineering: Formulations and Applications focuses on the research around earthquake engineering, in particular, the field of implementation of optimization algorithms in earthquake engineering problems. Topics discussed within this book include, but are not limited to, simulation issues for the accurate prediction of the seismic response of structures, design optimization procedures, soft computing applications, and other important advancements in seismic analysis and design where optimization algorithms can be implemented. Readers will discover that this book provides relevant theoretical frameworks in order to enhance their learning on earthquake engineering as it deals with the latest research findings and their practical implementations, as well as new formulations and solutions.

Prediction and Simulation Methods for Geohazard Mitigation-Fusao Oka 2009-05-07 The last decades have shown a remarkable increase in the number of heavy rains, typhoons and earthquakes. These natural phenomena are the main causes for geohazards. As a result the mitigation of geohazards has become a major research topic in geotechnical engineering, and in recent years simulation-based predictions and monitoring tools have been

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