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Life-Cycle and Sustainability of Civil Infrastructure Systems contains the lectures and papers presented at the Third International Symposium on Life-Cycle Civil Engineering (IALCCE 2012) held in one of Vienna's most famous venues, the Hofburg Palace, October 3rd-6th, 2012. This volume consists of a book of extended abstracts (516 pp) and a DVD-ROM

An understanding of dynamic effects on structures is critical to minimize losses from earthquakes and other hazards. These three books provide an overview of essential topics in structural and geotechnical engineering with an additional focus on related topics in earthquake engineering to enable readers gain such an understanding. One of the ultimate objectives of these books is to provide readers with insights into seismic analysis and design. However, in order to accomplish that objective, background material on structural and geotechnical engineering is necessary. Hence the first two sections of the book provide this background material followed by selected topics in earthquake engineering. The material is organized into three major parts. The first section covers topics in structural engineering. Beginning with fundamental mechanics of materials, the book includes chapters on linear and nonlinear analysis as well as topics on modeling of structures from different perspectives. In addition to traditional design of structural systems, introductions to

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important concepts in structural reliability and structural stability are discussed. Also covered are subjects of recent interest, viz., blast and impact effects on structures as well as the use of fiber reinforced polymer composites in structural applications. Given the growing interest in urban renewal, an interesting chapter on restoration of historic cities is also included. The second part of the book covers topics in geotechnical engineering, covering both shallow and deep foundations and issues and procedures for geotechnical modeling. The final part of the book focuses on earthquake engineering with emphasis on both structures and foundations. Here again, the material covered includes both traditional seismic design and innovative seismic protection. And more importantly, concepts in modeling for seismic analysis are highlighted.

Dependability and cost effectiveness are primarily seen as instruments for conducting international trade in the free market environment. These factors cannot be considered in isolation of each other. This handbook considers all aspects of performability engineering. The book provides a holistic view of the entire life cycle of activities of the product, along with the associated cost of environmental preservation at each stage, while maximizing the performance.

The design of structural steel members has developed over the past century from a simple approach involving a few basic properties of steel and elementary mathematics to a more sophisticated treatment demanding a thorough knowledge of structural and material behavior. Steel Structures: Design and Behavior, 5/e strives to present in a logical manner the theoretical background needed for developing and explaining design requirements. Beginning with coverage of background material, including references to pertinent research, the development of specific formulas used in the AISC Specifications is followed by a generous number of design

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examples explaining in detail the process of selecting minimum weight members to satisfy given conditions.

A succinct, real-world approach to complete bridge system design and evaluation Load and Resistance Factor Design (LRFD) and Load and Resistance Factor Rating (LRFR) are design and evaluation methods that have replaced or offered alternatives to other traditional methods as the new standards for designing and load-rating U.S. highway bridges. Bridge Design and Evaluation covers complete bridge systems (substructure and superstructure) in one succinct, manageable package. It presents real-world bridge examples demonstrating both their design and evaluation using LRFD and LRFR. Designed for a 3- to 4-credit undergraduate or graduate-level course, it presents the fundamentals of the topic without expanding needlessly into advanced or specialized topics. Important features include: Exclusive focus on LRFD and LRFR Hundreds of photographs and figures of real bridges to connect the theoretical with the practical Design and evaluation examples from real bridges including actual bridge plans and drawings and design methodologies Numerous exercise problems Specific design for a 3- to 4-credit course at the undergraduate or graduate level The only bridge engineering textbook to cover the important topics of bridge evaluation and rating Bridge Design and Evaluation is the most up-to-date and inclusive introduction available for students in civil engineering specializing in structural and transportation engineering.

Advances in Civil Engineering and Building Materials presents the state-of-the-art development in: - Structural Engineering - Road & Bridge Engineering- Geotechnical Engineering- Architecture & Urban Planning- Transportation Engineering- Hydraulic Engineering - Engineering Management- Computational Mechanics- Construction Technology- Buildi

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The papers in this volume cover topics in the field of geoen지니어ing in arid lands. Topics include: coupled thermo-hydro-mechanical processes in geomechanics; sediment formation in marine environment; soil stability and stabilization techniques.

The state of the art in highway bridge engineering Fully updated with the latest codes and standards, including load and resistance factor design (LRFD), Bridge Engineering, Third Edition covers highway bridge planning, design, construction, maintenance, and rehabilitation. This thoroughly revised reference contains cutting-edge analytical, design, and construction practices, the most current information on new materials and methods, and proven, cost-effective maintenance and repair techniques. Real-world case studies and hundreds of helpful photos and illustrations are also included in this practical resource. BRIDGE

ENGINEERING, THIRD EDITION FEATURES

COMPLETE COVERAGE OF: Highway bridge structures

Project inception Project funding Design standards

Bridge inspection and site survey Physical testing As-

built plans and other record data Superstructure types

Deck types Wearing surface types Deck joint types

Design loads Design methods Internal forces Load

distribution Concrete deck slabs Composite steel

members Plate girder design Continuous beams

Protecting steel superstructures Load rating Prestressed

concrete Substructure design Abutments Piers Bearings

Managing the design process Contract documents

Bridge management systems

This book provides a detailed summary of bridge loads

from an international perspective. The authors cover all aspects from the methodology behind the calculation of bridge loads and the complex interactions between loads and bridges, to economic considerations. A wide range of bridge loads are covered, including highway vehicle loads, pedestrian l

Appropriate for civil engineering courses in structural steel design, the fourth edition of this classic text provides background for designing steel structural elements using the 1993 AISC Load and Resistance Factor Design (LRFD) and the 1989 AISC Allowable Stress Design (ASD) Specifications. As in previous successful editions, a logical sequence of topics is featured, making complex material easy to understand. Emphasis throughout is placed on the explanation of the LRFD approach involving "limit states" and factored loads. To provide secondary coverage for the major topics--such as tension members, axially loaded columns, beams, beam-columns, and composite construction--the ASD formulations are developed from the strength-related concepts of LRFD. Throughout the book, all concepts are illustrated by numerical examples using LRFD; for the most important concepts, examples using ASD are also included. Many new end-of-chapter problems and references round out the text's presentation. Learning Aids Large Quantity of Numerical Examples * Problems on Design Procedures * Chapter Introductions Supplements For the Instructor: "Solutions Manual," available only from your sales specialist. This Proceedings contains the papers presented at the International Conference on FRP Composites in Civil

Engineering, held in Hong Kong, China, on 12-15 December 2001. The papers, contributed from 24 countries, cover a wide spectrum of topics and demonstrate the recent advances in the application of FRP (Fibre-reinforced polymer) composites in civil engineering, while pointing to future directions of research in this exciting area.

Challenges, Opportunities and Solutions in Structural Engineering and Construction addresses the latest developments in innovative and integrative technologies and solutions in structural engineering and construction, including: Concrete, masonry, steel and composite structures; Dynamic impact and earthquake engineering; Bridges and

LOAD RATING HIGHWAY BRIDGES In accordance with Load and Resistance Factor Rating Method First Edition The first comprehensive text introducing the background theory along with the practical procedure of load rating highway bridges with the state-of-the-art Load and Resistance Factor Rating (LRFR) method. With its simplicity and complete contents on this subject, this is an indispensable text for both students and practicing engineers. The safety of bridges is essential to the traveling public. To ensure that bridges in our highway system function safely and serve properly, engineers need to inspect and assess the live load carrying capacity of the bridges. Based on the results of inspection and evaluation, decisions are made on load restriction, repair, retrofit or replacement. Load

rating, one of the critical tasks in this decision-making process, uses either an analytical method or non-destructive load testing to determine the live load carrying capacity of a bridge. This is a book solely concentrated on bridge load rating by using analytical load rating methods, with a focus on the LRFR method. The primary purpose of this book is to provide the basic concept of load rating highway bridges in terms of the LRFR method. The target readers are practicing engineers who want to acquire fundamental knowledge of the LRFR method. Bearing that in mind, the author attempts to strike a balance between theory and how-to.

Engineers who are conducting or will perform load ratings of bridges can use this text as a reference in supplement to the AASHTO Manual for Bridge Evaluation (MBE). This book can also serve as a textbook or supplemental material for a senior level undergraduate or graduate course in bridge design and load rating. This text is divided into three major sections. The first section contains a brief introduction to bridge load rating (Chapter 1) and fundamentals of structural failure and structural reliability theory (Chapter 2). After completing this section, re

Many important advances in designing modern structures have occurred over the last several years. Structural engineers need an authoritative source of information that thoroughly and concisely covers the

foundational principles of the field. Comprising chapters selected from the second edition of the best-selling Handbook of Structural Engineering, Intelligent Vibration Control in Civil Engineering Structures provides readers with an all-encompassing view of the theoretical studies, design methods, real-world implementations, and applications relevant to the topic. The book focuses on design and property tests on different intelligent control devices, innovative control strategies, analysis examples for structures with intelligent control devices, and designs and tests for intelligent controllers. Focuses on the principles, methods, and applications of intelligent vibration control in civil engineering. Covers intelligent control, including active and semi-active control. Includes comprehensive contents, such as design and properties of different intelligent control devices, control strategies, and dynamic analysis, intelligent controller design, numerical examples, and experimental data. the undergraduate course in structural steel design using the Load and Resistance Factor Design Method (LRFD). The text also enables practicing engineers who have been trained to use the Allowable Stress Design procedure (ASD) to change easily to this more economical and realistic method for proportioning steel structures. The book comes with problem-solving software tied to chapter

exercises which allows student to specify parameters for particular problems and have the computer assist them. On-screen information about how to use the software and the significance of various problem parameters is featured. The second edition reflects the revised steel specifications (LRFD) of the American Institute of Steel Construction.

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 Although progressing very well over the last years, the design criteria for bored and auger piles are still not fully under control and in acceptable synergism with the real pile foundation behaviour. Although there has been a lot of research in the past years worldwide on deep foundation engineering, the strong and competitive market ha

Under the pressure of harsh environmental conditions and natural hazards, large parts of the world population are struggling to maintain their livelihoods. Population growth, increasing land utilization and shrinking natural resources have led to an increasing demand of improved efficiency of existing technologies and the development of new

ones. A

Continuing the tradition of the best-selling Handbook of Structural Engineering, this second edition is a comprehensive reference to the broad spectrum of structural engineering, encapsulating the theoretical, practical, and computational aspects of the field. The authors address a myriad of topics, covering both traditional and innovative approaches to analysis, design, and rehabilitation. The second edition has been expanded and reorganized to be more informative and cohesive. It also follows the developments that have emerged in the field since the previous edition, such as advanced analysis for structural design, performance-based design of earthquake-resistant structures, lifecycle evaluation and condition assessment of existing structures, the use of high-performance materials for construction, and design for safety. Additionally, the book includes numerous tables, charts, and equations, as well as extensive references, reading lists, and websites for further study or more in-depth information.

Emphasizing practical applications and easy implementation, this text reflects the increasingly global nature of engineering, compiling the efforts of an international panel of experts from industry and academia. This is a necessity for anyone studying or practicing in the field of structural engineering. New to this edition Fundamental theories of structural dynamics Advanced analysis Wind and earthquake-

resistant design Design of prestressed concrete, masonry, timber, and glass structures Properties, behavior, and use of high-performance steel, concrete, and fiber-reinforced polymers Semirigid frame structures Structural bracing Structural design for fire safety

A How-To Guide for Bridge Engineers and Designers Highway Bridge Superstructure Engineering: LRFD Approaches to Design and Analysis provides a detailed discussion of traditional structural design perspectives, and serves as a state-of-the-art resource on the latest design and analysis of highway bridge superstructures. This book is applicable to highway bridges of all construction and material types, and is based on the load and resistance factor design (LRFD) philosophy. It discusses the theory of probability (with an explanation leading to the calibration process and reliability), and includes fully solved design examples of steel, reinforced and prestressed concrete bridge superstructures. It also contains step-by-step calculations for determining the distribution factors for several different types of bridge superstructures (which form the basis of load and resistance design specifications) and can be found in the AASHTO LRFD Bridge Design Specifications. Fully Realize the Basis and Significance of LRFD Specifications Divided into six chapters, this instructive text: Introduces bridge engineering as a discipline of

structural design Describes numerous types of highway bridge superstructures systems Presents a detailed discussion of various types of loads that act on bridge superstructures and substructures

Discusses the methods of analyses of highway bridge superstructures Includes a detailed

discussion of reinforced and prestressed concrete bridges, and slab-steel girder bridges Highway

Bridge Superstructure Engineering: LRFD

Approaches to Design and Analysis can be used for teaching highway bridge design courses to undergraduate- and graduate-level classes, and as an excellent resource for practicing engineers.

LRFD Steel Design Using Advanced Analysis uses practical advanced analysis to produce almost

identical member sizes to those of the Load and

Resistance Factor Design (LRFD) method. The main advantage of the advanced analysis method is that

tedious and sometimes confusing separate member capacity checks encompassed by the AISC-LRFD

specification equations are not necessary. Advanced analysis can sufficiently capture the limit state

strength and stability of a structural system and its individual member directly. While the use of elastic

analysis is still the norm in engineering practice, a new generation of codes is expected to adopt the

advanced analysis methodology in the near future, leading to significant savings in design effort. In

recent years, the continued rapid development in

computer hardware and software, coupled with an increased understanding of structural behavior, has made it feasible to adopt the advanced analysis techniques for design office use. Drs. Chen and Kim, both experienced and respected engineers, contribute their expertise to this text, which is intended for both the graduate student and the practicing engineer. Previous knowledge of the subject is not necessary, but familiarity with methods of elastic analysis and conventional LRFD design is expected. The advanced analysis in the book is presented in a practical and simple manner, with attention directed to both analysis and design, emphasizing the direct use of the methods in engineering practice. This is a great introduction to an exciting new trend in structural engineering!

The Arabian Gulf oil and gas production reserves have made it one of the world's strategic producers since the early 1960s, with many of the existing platforms stretched beyond their original design life. Advances in drilling technology and reservoir assessments have extended the requirement for the service life of those existing platforms even further. Extension of the life span of an existing platform requires satisfactory reassessment of its various structural components, including piled foundations. The American Petroleum Institute Recommended Practice 2A (API RP2A) is commonly used in the Arabian Gulf for reassessment of existing platforms.

The API guidelines have been developed for conditions in the Gulf of Mexico, the waters off Alaska and the Pacific and Atlantic seabords of the USA. However, the Arabian Gulf conditions are fundamentally different to those encountered in US waters. Hence, there is a need to develop guidelines for reassessment of existing offshore structures to account for the specific conditions of the Arabian Gulf. This thesis performs statistical analyses on databases collected during this research from existing platforms to calibrate relevant load and resistance factors for the required guidelines. The developed guidelines are based on established approaches used in developing international codes and standards such as API RP2A-LRFD. The outcome of this research revolves around the following three main issues: 1. Calibration of resistance factors for axial capacity of piles driven in the carbonate soils 2. Development of open area live loads (OALL) on offshore platforms 3. Effect of extreme storm conditions on the reliability of existing platforms in the Arabian Gulf The outcomes of this research are expected to have a profound influence on reassessment of existing platforms in the Arabian Gulf.

Earthquakes are nearly unique among natural phenomena - they affect virtually everything within a region, from massive buildings and bridges, down to the furnishings within a home. Successful

earthquake engineering therefore requires a broad background in subjects, ranging from the geologic causes and effects of earthquakes to understanding the imp

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

The latest in bridge design and analysis—revised to reflect the eighth edition of the AASHTO LRFD specifications Design of Highway Bridges: An LRFD Approach, 4th Edition, offers up-to-date coverage of engineering fundamentals for the design of short- and medium-span bridges. Fully updated to incorporate the 8th Edition of the AASHTO Load and Resistance Factor Design Specifications, this invaluable resource offers civil engineering students and practitioners a comprehensive introduction to the latest construction

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methods and materials in bridge design, including Accelerated Bridge Construction (ABC), ultra high-performance concrete (UHPC), and Practical 3D Rigorous Analysis. This updated Fourth Edition offers: Dozens of end-of-chapter worked problems and design examples based on the latest AASHTO LRFD Specifications. Access to a Solutions Manual and multiple bridge plans including cast-in-place, precast concrete, and steel multi-span available on the Instructor's companion website From gaining base knowledge of the AASHTO LRFD specifications to detailed guidance on highway bridge design, Design of Highway Bridges is the one-stop reference for civil engineering students and a key study resource for those seeking engineering licensure through the Principles and Practice of Engineering (PE) exam.

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