

Structures & Infrastructures

The scope of this advanced-level Book Series covers the entire spectrum of structures and infrastructures. Topics treated include research, development and application of the most advanced technologies for analyzing, predicting and optimizing the performance of structures and infrastructures. Themes featured are mathematical modeling, computer and experimental methods, practical applications in assessment and evaluation, construction and design for durability, decision making, deterioration modeling and aging, failure analysis, field testing, financial planning, inspection and diagnostics, life-cycle analysis and prediction, loads, maintenance strategies, management systems, nondestructive testing, maintenance and management optimization, specifications and codes, structural safety and reliability, system analysis, time-dependent performance, rehabilitation, repair, replacement, reliability and risk management, service life prediction, strengthening and whole life costing.

SERIES EDITOR

Prof. Dan M. Frangopol
Fazlur R. Khan Endowed Chair
of Structural Engineering and Architecture

Department of Civil and Environmental Engineering
Center for Advanced Technology for Large Structural
Systems (ATLSS)
Lehigh University, Bethlehem, PA, USA
dan.frangopol@lehigh.edu

ISSN 1747-7735



Seismic Performance of Concrete Buildings

Liviu Crainic and **Mihai Munteanu**, Technical University of Civil Engineering, Bucharest, Romania

Vol. 9, January 2013: 246 x 174: 350pp
Hb: 978-0-415-63186-0: **£95.00 \$149.95**

Examines essential aspects of the behaviour, analysis, design and detailing of different types of reinforced concrete structures (frames, walls) subjected to strong seismic activity. Presents fundamental aspects of reinforced concrete behaviour quantified through constitutive laws for monotonic and hysteretic loading. Basic concepts of post-elastic analysis like plastic hinge, plastic length, fiber models, and stable and unstable hysteretic behaviour are defined and commented upon, and several case studies are provided.



Moving Loads – Dynamic Analysis and Identification Techniques

Siu-Seong Law, Hong Kong Polytechnic University, Kowloon, Hong Kong, and **Xin-qun Zhu**, University of Western Australia, Crawley, WA, Australia

Vol. 8, February 2011: 246 x 174: 332pp
Hb: 978-0-415-87877-7: **£95.00 \$149.95**

Treats the fundamentals of moving loads problems, with detailed descriptions of the dynamic behaviour under moving loads, moving load identification problems, specialized techniques, and simple methods for universal application, while carefully taking into account the accuracy of identification and computation.



Design Decisions under Uncertainty with Limited Information

Efstratios Nikolaidis, University of Toledo, Toledo, OH, USA, **Zissimos P. Mourelatos**, Oakland University, Rochester, MI, USA, and **Vijitashwa Pandey**, University of Illinois at Urbana-Champaign, Champaign, IL, USA

Vol. 7, February 2011: 246 x 174: 538pp
Hb: 978-0-415-49247-8: **£95.00 \$149.95**

Illustrates practical design problem solving techniques in the aerospace and automotive engineering industries with a balanced approach explaining both the theoretical foundations of methods and their application to engineering design. Readers will learn a structured, risk-based approach for design under uncertainty when limited information is available, which tools are available and how to select and apply given a design decision problem.



Structural Identification and Damage Detection using Genetic Algorithms

Chan Ghee Koh and **Michael John Perry**, National University of Singapore, Singapore

Vol. 6, December 2009: 246 x 174: 164pp
Hb: 978-0-415-46102-3: **£45.99 \$72.95**

Presents readers with the background and recent developments required to conduct research and apply GA-based methods for parameter identification, model updating, and damage detection of structural dynamic systems. Demonstrates a novel strategy that focuses on structural identification problems with limited and noise contaminated measurements. Also presents parameter estimation of non-linear structural systems to illustrate the power and versatility of the GA-based identification strategy.



Damage Models and Algorithms for Assessment of Structures under Operating Conditions

Siu-Seong Law, Hong Kong Polytechnic University, Kowloon, Hong Kong, and **Xin-qun Zhu**, University of Western Australia, Crawley, WA, Australia

Vol. 5, September 2009: 246 x 174: 325pp
Hb: 978-0-415-42195-9: **£96.00 \$149.95**

Provides the suitable algorithms to convert collected data in order to gain knowledge of the condition of an infrastructure for maintenance scheduling purposes. Addresses developments in time response series and its derivatives including the wavelet-based impulse response function, also discusses loads on the structure in the conditions assessment. The treatment of uncertainties and the study of their propagation in the inverse problem of structural condition assessment are also discussed.



Frontier Technologies for Infrastructures Engineering

Edited by **Alfredo H.S. Ang**, University of California, Irvine, CA, USA, and **Shi-Shuenn Chen**, National Taiwan University of Science and Technology, Taipei, Taiwan

Vol. 4, April 2009: 246 x 174: 502pp
Hb: 978-0-415-49875-3: **£99.00 \$159.95**

Expert contributions on frontier technologies in the planning, design, construction, and maintenance of civil infrastructures. This volume cover life-cycle cost and performance, reliability, risk assessment and management, construction management, optimization methods role of maintenance, inspection, and repair, dynamics and system health monitoring, durability, fatigue and fracture, structural dynamics, corrosion technology for metal and R/C structures and concrete materials and structures.



Computational Analysis of Randomness in Structural Mechanics

Christian Bucher, Vienna University of Technology, Vienna, Austria

Vol. 3, April 2009: 246 x 174: 248pp
Hb: 978-0-415-40354-2: **£69.99 \$107.95**

Details the computational aspects of stochastic analysis within structural mechanics. Presents well-structured chapters on probability theory and statistics, regression and response surfaces, mechanical vibrations due to random excitations, response analysis of spatially random structures and on the computation of failure probabilities. For graduate students and structural analysts wishing to explore benefits of stochastic analysis.



Computational Structural Dynamics and Earthquake Engineering

Edited by: **Manolis Papadrakakis**, National Technical University of Athens, Athens, Greece, **Dimos C. Charmpis**, University of Cyprus, Nicosia, Cyprus, **Yannis Tsompanakis**, Technical University of Crete, Heraklion, Greece, and **Nikos D. Lagaros**, University of Thessaly, Volos, Greece

Vol. 2, December 2008: 246 x 174: 670pp
Hb: 978-0-415-45261-8: **£134.00 \$209.95**

Covers advanced computational methods and software tools used to tackle complex problems in dynamic/seismic analysis and design, and elucidates important application areas and the social impact of the scientific and technical fields involved.



Structural Design Optimization Considering Uncertainties

Edited by: **Yannis Tsompanakis**, Technical University of Crete, Heraklion, Greece, **Nikos D. Lagaros**, University of Thessaly, Volos, Greece, and **Manolis Papadrakakis**, National Technical University of Athens, Athens, Greece

Vol. 1, March 2008: 246 x 174: 656pp
Hb: 978-0-415-45260-1: **£159.00 \$249.95**

Presents the latest findings on structural optimization considering uncertainties. Contains contributed chapters dealing with probabilistic methods for optimal design of different structures and various considerations of uncertainties. Recommended to experts in civil, mechanical, naval and aerospace engineering and to those working on complicated cost-effective design problems.

THIS BOOK SERIES IS RELATED TO:



Structure and Infrastructure Engineering

Maintenance, Management, Life-cycle Design and Performance

Editor-in-Chief: **Dan M. Frangopol**, Lehigh University, Bethlehem, PA, USA

Print ISSN 1573-2479 – Online ISSN 1744-8980
Taylor & Francis, Volume 8, 2012
12 issues per year
www.tandfonline.com/nsie