Response Of High Rise Buildings Under Long Period

High-Rise Security and Fire Life Safety
Public Buildings Service International Conference on Firesafety in High-Rise Buildings
A Computer Program to Analyze the Dynamic Response of High Rise Buildings to Nuclear Blast Loading

Tall Buildings

Improving the Earthquake Resilience of Buildings
Nonlinear Response of High-rise Buildings

Earthquake and Ambient Dynamic Response of a Modern High-rise Building

Recent Advances in the Design of Structures with Passive Energy Dissipation Systems

Passive vibration control plays a crucial role in structural engineering. Common solutions include seismic isolation and damping systems with various kinds of devices, such as viscous, viscoelastic, hysteretic, and friction dampers. These strategies have been widely utilized in engineering practice, and their efficacy has been demonstrated in mitigating damage and preventing the collapse of buildings, bridges, and industrial facilities. However, there is a need for more sophisticated analytical and numerical tools to design structures equipped with optimally configured devices. On the other hand, the family of devices and dissipative elements used for structural protection keeps evolving, because of growing

This book discusses performance-based seismic and wind-resistant design for high-rise building structures, with a particular focus on establishing an integrated approach for performance-based wind engineering, which is currently less advanced than seismic engineering. This book also provides a state-of-the-art review of numerous methodologies, including computational fluid dynamics (CFD), extreme value analysis, structural optimization, vibration control, pushover analysis, response spectrum analysis, modal parameter identification for the assessment of the wind-resistant and seismic performance of tall buildings in the design stage and actual tall buildings in use. Several new structural optimization methods, including the augmented optimality criteria method, have been developed and employed in the context of performance-based design. This book is a valuable resource for students, researchers and engineers in the field of civil and structural engineering.

Public Buildings Service International Conference on Firesafety in High-Rise Buildings

A Computer Program to Analyze the Dynamic Response of High Rise Buildings to Nuclear Blast Loading

The specialty section Earthquake Engineering is one branch of Frontiers in Built Environment and welcomes critical and in-depth submissions on earthquake ground motions and their effects on buildings and infrastructures. Manuscripts should yield new insights and ultimately contribute to a safer and more reliable design of building structures and infrastructures. The scope includes the characterization of earthquake ground motions (e.g. near-fault, far-fault, short-period, long-period), their underlying properties, their intrinsic relationship with structural responses, and the true behaviors of building structures under risks and uncertain ground motions. More specific topics include recorded ground motions, ground motions generated by motions, response spectra, stochastic modeling of ground motion, critical excitation, geotechnical aspects, soil mechanics, soil liquefaction, soil-structure interactions, pile foundations, earthquake input energy, structural control, passive control, active control, base-isolation, steel structures, reinforced concrete structures, wood structures, building retrofit, structural optimization, uncertainty analysis, robustness analysis, and redundancy analysis.

This eBook includes four original research papers, in addition to the Specialty Grand Challenge article, on the critical earthquake response of plastic-elastic structures under near-fault or long-duration ground motions which were published in the specialty section Earthquake Engineering. In the early stage of dynamic nonlinear response analysis of structures around 1960s, a simple hysteretic structural model and a simple sinusoidal earthquake ground motion input were dealt with together with random inputs. The steady-state response was tackled by an equivalent linearization method developed by Caughey, Iwan and others. In fact, the resonance plays a key role in the earthquake-resistant design and it has a strong effect even in case of near-fault ground motions. In order to draw the steady-state response curve and investigate the resonant properties, two kinds of repetition have to be introduced. One is a cycle, for one forced input frequency, of the initial guess of the steady-state response amplitude, the construction of the equivalent linear model, and the update of the equivalent linear model based on the computed steady-state response amplitude. The other is the sweeping over a range of forced input frequencies. This process is quite tedious. Four original research papers included in this eBook propose a new approach to overcome this difficulty. Kojima and Takewaki demonstrated that the equivalent linear response as continuation of free-vibrations under impulse input can be derived in a closed form by a sophisticated energy approach without solving directly the equations of motion as differential equations. While, as pointed out above, the approach based on the equivalent linearization method requires the repetition of application of the linearized equations, the method by Kojima and Takewaki does not need any repetition. The double impulse, triple impulse and multiple impulses enable us to describe directly the critical timing of impulses (resonant frequency) which is not easy for the sinusoidal and other inputs without a repetitive procedure. It is important to note that, while most of the previous methods employed the equivalent linearization of the structural model with the input unchanged, the method treated in this eBook transforms the input into a series of impulses with the structural model unchanged. This characteristic guarantees high accuracy and reliability even in the large plastic deformation range. The approach presented in this eBook is an epoch-making accomplishment to open the door for simpler and deeper understanding of structural reliability of built environments in the elastic-plastic range

Tall Buildings

Improving the Earthquake Resilience of Buildings
Nonlinear Response of High-rise Buildings

Earthquake and Ambient Dynamic Response of a Modern High-rise Building

Recent Advances in the Design of Structures with Passive Energy Dissipation Systems

Passive vibration control plays a crucial role in structural engineering. Common solutions include seismic isolation and damping systems with various kinds of devices, such as viscous, viscoelastic, hysteretic, and friction dampers. These strategies have been widely utilized in engineering practice, and their efficacy has been demonstrated in mitigating damage and preventing the collapse of buildings, bridges, and industrial facilities. However, there is a need for more sophisticated analytical and numerical tools to design structures equipped with optimally configured devices. On the other hand, the family of devices and dissipative elements used for structural protection keeps evolving, because of growing performance demands and new progress achieved in materials science and mechanical engineering. This Special Issue reflects 13 contributions related to the development and application of passive vibration control strategies for structures,
High-rise Building Structures

This book includes a collection of chapters that were presented at the International Conference on Earthquake Engineering and Structural Dynamics (ICESD), held in Reykjavik, Iceland between 12-14 June 2017. The contributions address a wide spectrum of subjects related to wind engineering, earthquake engineering, and structural dynamics. Dynamic behavior of ultra long span bridges that are discussed in this volume represent one of the most challenging and ambitious contemporary engineering projects. Concepts, principles, and applications of earthquake engineering are presented in chapters addressing various aspects such as ground motion modelling, hazard analysis, structural analysis and identification, design and detailing of structures, risk due to non-structural components, and risk communication and mitigation. The presented chapters represent the state-of-the-art in these fields as well as the most recent developments.

Fork Configuration Damper (FCDs) for Enhanced Dynamic Performance of High-rise Buildings

Many rural fire departments across the United States are now having to deal with fire emergencies in high-rise buildings. The purpose of this research was to understand how rural fire departments respond to fire emergencies in high-rise buildings. The research questions which were answered were: 1) What is the definition used by rural fire departments to describe a high-rise building? 2) How much equipment and manpower do rural fire departments respond with for reports of fire alarms at high-rise buildings? 3) Do rural fire departments conduct pre-fire planning inspections of high-rise buildings? 4) Do rural fire departments have written Standard Operating Procedures for response to high-rise fire emergencies?

Computational Modelling of Concrete Structures

Non-linear stochastic systems are at the center of many engineering disciplines and progress in theoretical research had led to a better understanding of non-linear phenomena. This book provides information on new fundamental results and their applications which are beginning to appear across the entire spectrum of mechanics. The outstanding points of these proceedings are Coherent compendium of the current state of modelling and analysis of non-linear stochastic systems from engineering, applied mathematics and physics point of view. Subject areas include: Multiscale phenomena, stability and bifurcations, control and estimation, computational methods and modelling. For the Engineering and Physics communities, this book will provide first-hand information on recent mathematical developments. The applied mathematics community will benefit from the modelling and information on various possible applications.

Wind Tunnel Testing of High-Rise Buildings

Foundation Systems for High-Rise Structures

Super Elements in High-rise Buildings Under Stochastic Wind Load

Simplified Dynamic Analysis of High-Rise Buildings


ERDA Energy Research Abstracts

This book highlights the applications of data mining technologies in structural dynamic analysis, including structural design, optimization, parameter identification, model updating, damage identification, in civil, mechanical, and aerospace engineering. These engineering applications require precise structural design, fabrication, inspection, and further monitoring to obtain a full life-cycle analysis, and by focusing on data processing, data mining technologies offer another aspect in structural dynamic analysis. Discussing techniques in time/frequency domain, such as Hilbert transforms, wavelet theory, and machine learning for structural dynamic analysis to help in structural monitoring and diagnosis, the book is an essential reference resource for beginners, graduates and industrial professionals in various fields.

Human Response to Tall Buildings

High-Rise Security and Fire Life Safety, 3e, is a comprehensive reference for managing security and fire life safety operations within high-rise buildings. It spells out the unique characteristics of skyscrapers from a security and fire life safety perspective, details the type of security and life safety systems commonly found in them, outlines how to conduct risk assessments, and explains security policies and procedures designed to protect life and property. Craighead also provides guidelines for managing security and life safety functions, including the development of response plans for building emergencies. This latest edition clearly separates out the different types of skyscrapers, from office buildings to hotels to condominiums to mixed-use buildings, and explains how different patterns of use and types of tenancy impact building security and life safety. New to this edition: Differentiates security and fire life safety issues specific to: Office towers Hotels Residential and apartment buildings Mixed-use buildings Updated fire and life safety standards and guidelines Includes a CD-ROM with electronic versions of sample survey checklists, a sample building emergency management plan, and other security and fire life safety resources.

Guidelines for Design of Low-Rise Buildings Subjected to Lateral Forces

Since the 1960s, wind tunnel testing has become a commonly used tool in the design of tall buildings. It was pioneered, in large part, during the design of the World Trade Center Towers in New York. Since those early days of wind engineering, wind tunnel testing techniques have developed in sophistication, but these techniques are not widely understood by the designers using the results. As a direct result, the CTBUH Wind Engineering Working Group was formed to develop a concise guide for the non-specialist. The primary goal of this guide is to provide an overview of the wind tunnel testing process for design professionals. This knowledge allows readers to ask the correct questions of their wind engineering consultant. This design professional's guide is not an in-depth guide to the technical intricacies of wind tunnel testing, it focuses instead on the information the design community needs, including: a unique methodology for the presentation of wind tunnel results to allow straightforward comparison of results from different wind tunnel laboratories. Advice on when a tall building is likely to be sufficiently sensitive to wind effects to benefit from a wind tunnel test background for assessing whether design codes and standards are applicable details of the types of tests that are commonly conducted descriptions of the fundamentals of wind climate and the interaction of wind and tall buildings This unique book is an essential guide for all designers of tall buildings, and anyone else interested in the process of wind tunnel testing for tall buildings.
Across-wind response of high-rise buildings


Recent Advances and Applications of Seismic Isolation and Energy Dissipation Devices

The book deals with the geotechnical analysis and design of foundation systems for high-rise buildings and other complex structures with a distinctive soil-structure interaction. The basics of the analysis of stability and serviceability, necessary soil investigations, important technical regulations and quality and safety assurance are explained and possibilities for optimised foundation systems are given. Additionally, special aspects of foundation systems such as geothermal activated foundation systems and the reuse of existing foundations are described and illustrated by examples from engineering practice.

High-Rise Fire Protection Procedures

Dynamic Response of High-Rise Buildings Subjected to Wind Excitation

Structures in the New Millennium

Guidelines for Design of Low-Rise Buildings Subjected to Lateral Forces is a concise guide that identifies performance issues, concerns, and research needs associated with low-rise buildings. The book begins with an introduction that discusses special problems with low-rise buildings subjected to wind and earthquakes. Chapter 2 examines probabilistic methods and their use in evaluating risks from natural hazards. It also addresses the characteristics of wind and seismic forces and levels of risk implied by building codes. Wind forces are covered in more detail in Chapter 3, with discussions of wind force concepts and wind-structure interactions. Chapter 4 is devoted to earthquake forces and traces the development of building codes for earthquake resistant design. Chapter 5 describes the main framing systems used to resist lateral forces and discusses the code requirements for drift control. The designs and requirements for connections between building elements are assessed in Chapter 6. It includes examples along with several illustrations of suitable connections. The performance of non-structural elements during wind and earthquake forces is also examined in detail. This book serves as an important reference for civil engineers, construction engineers, architects, and anyone concerned with structural codes and standards. It is an excellent guide that can be used to supplement design recommendations and provide a design basis where there are no current requirements.

Development and Application of Nonlinear Dissipative Device in Structural Vibration Control

Topics covered within this set of conference proceedings include: structural analysis - theory and methods; structural design - concept, technique and codes of practice; structural forms - concept and application; and construction of structures.

High-Rise Buildings under Multi-Hazard Environment

Critical Earthquake Response of Elastic-Plastic Structures Under Near-Fault or Long-Duration Ground Motions: Closed-Form Approach via Impulse Input

Engineers are always interested in the worst-case scenario. One of the most important and challenging missions of structural engineers may be to narrow the range of unexpected incidents in building structural design. Redundancy, robustness and resilience play an important role in such circumstances. Improving the Earthquake Resilience of Buildings: The worst case approach discusses the importance of worst-case scenario approach for improved earthquake resilience of buildings and nuclear reactor facilities. Improving the Structural Resilience of Buildings: The worst case approach consists of two parts. The first part deals with the characterization and modeling of worst or critical ground motions on inelastic structures and the related worst-case scenario in the structural design of ordinary simple building structures. The second part of the book focuses on investigating the worst-case scenario for passively controlled and base-isolated buildings. This allows for detailed consideration of a range of topics including: A consideration of damage of building structures in the critical excitation method for improved building-earthquake resilience, A consideration of uncertainties of structural parameters in structural control and base-isolation for improved building-earthquake resilience, and New insights in structural design of super high-rise buildings under long-period ground motions. Improving the Earthquake Resilience of Buildings: The worst case approach is a valuable resource for researchers and engineers interested in learning and applying the worst-case scenario approach in the seismic-resistant design for more resilient structures.

Outrigger Design for High-Rise Buildings

This book presents a simple analytical method based on the extended rod theory that allows the earthquake resistance of high-rise buildings to be easily and accurately evaluated at the preliminary design stage. It also includes practical software for applying the extended rod theory to the dynamic analysis of actual buildings and structures. High-rise buildings in large cities, built on soft ground consisting of sedimentary rock, tend to have low natural frequency. If ground motion due to an earthquake occurs at distant hypocenters, the vibration wave can be propagated through several sedimentary layers and act on skyscrapers as a long-period ground motion, potentially producing a resonance phenomenon that can cause severe damage. Accordingly, there is a pressing need to gauge the earthquake resistance of existing skyscrapers and to improve their seismic performance. This book was written by authors who have extensive experience in tall-building seismic design in Japan. The software included enables readers to perform dynamic calculations of skyscrapers’ resistance to vibrations. As such, it offers a valuable resource for practitioners and engineers, as well as students of civil engineering.

Rural Response to High Rise Fire Emergencies

Design of Modern Highrise Reinforced Concrete Structures

Outrigger systems are rigid horizontal structures designed to improve a building’s stability and strength by connecting the building core or spine to distant columns, much in the way an outrigger can prevent a canoe from overturning. Outriggers have been used in tall, narrow buildings for nearly 500 years, but the basic design principle dates back centuries. In the 1880s, as buildings grew taller and more ambitious, outrigger systems eclipsed tubular frames as the most

Page 3/4
popular structural approach for supertall buildings. Designers embraced properly proportioned core-and-outrigger schemes as a method to offer far more perimeter flexibility and openness for tall buildings than the perimeter moment or braced frames and bundled tubes that preceded them. However, the outrigger system is not listed as a seismic lateral load-resisting system in any code, and design parameters are not available, despite the increasingly frequent use of the concept. The Council on Tall Buildings and Urban Habitat's Outrigger Working Group has addressed the pressing need for design guidelines for outrigger systems with this guide, a comprehensive overview of the use of outriggers in skyscrapers. This guide offers detailed recommendations for analysis of outriggers within the lateral load-resisting systems of tall buildings, for recognizing and addressing effects on building behavior and for practical design solutions. It also highlights concerns specific to the outrigger structural system such as differential column shortening and construction sequence impacts. Several project examples are explored in depth, illustrating the role of outrigger systems in tall building designs and providing ideas for future projects. The guide details the impact of outrigger systems on tall building designs, and demonstrates ways in which the technology is continuously advancing to improve the efficiency and stability of tall buildings around the world.

**IUTAM Symposium on Nonlinear Stochastic Dynamics and Control**

This book presents the results of a Japanese national research project carried out in 1988-1993, usually referred to as the New RC Project. Developing advanced reinforced concrete building structures with high strength and high quality materials under its auspices, the project aimed at promoting construction of highrise reinforced concrete buildings in highly seismic areas such as Japan. The project covered all the aspects of reinforced concrete structures, namely materials, structural elements, structural design, construction, and feasibility studies. In addition to presenting these results, the book includes two chapters giving an elementary explanation of modern analytical techniques, i.e. finite element analysis and earthquake response analysis.

**Nuclear Science Abstracts**

**Inelastic Response of High-rise Buildings to Tornadoes**

This book is a printed edition of the Special Issue "Development and Application of Nonlinear Dissipative Device in Structural Vibration Control" that was published in Applied Sciences

**Evaluation of Building Resilience under Earthquake Input Using Single, Double and Multiple Impulses**

This eBook is a third in a series of books on the critical earthquake response of elastic or elastic-plastic structures under near-fault or long-duration ground motions, and includes four original research papers which were published in the specialty section Earthquake Engineering in 'Frontiers in Built Environment'. Several extensions of the first eBook and the second eBook are included here. The first article is on the earthquake resilience of residential houses after repeated ground motions with high intensity. The 2016 Kumamoto earthquake brought a significant impact on the earthquake resilience of residential houses under repeated ground motions with high intensity in a few days. The necessary strength upgrade withstanding two repeated high-intensity ground motions was found to be 1.5. The second article is concerned with the smart enhancement of earthquake resilience of building structures under both near-fault and long-duration ground motions. A hybrid system of base-isolation and building connection control was proposed and its earthquake resilience to near-fault and long-duration ground motions was evaluated by a double impulse and a multiple impulse. It was demonstrated that the base-isolation is effective for near-fault ground motions and the building connection system using passive dampers is effective for long-duration ground motions. The third article is related to the robustness evaluation of elastic-plastic base-isolated high-rise buildings. The fourth article is an extension of the previously proposed energy balance approach to a bilinear elastic-plastic single-degree-of-freedom system under a long-duration sinusoidal ground motion. A historical difficulty in nonlinear vibration posed by Caughey (1960) and Iwan (1961) has been overcome in a smart manner after half a century. The approach presented in this eBook, together with the previous eBooks, is an epoch-making accomplishment to open the door for simpler and deeper understanding of structural reliability and resilience of built environments in the elastic-plastic and nonlinear range.

**Dynamic Response of High-rise Building Subject to Wind Excitation**

The structural challenges of building 800 metres into the sky are substantial, and include several factors which do not affect low-rise construction. This book focusses on these areas specifically to provide the architectural and structural knowledge which must be taken into account in order to design tall buildings successfully. In presenting examples of steel, reinforced concrete, and composite structural systems for such buildings, it is shown that wind load has a very important effect on the architectural and structural design. The aerodynamic approach to tall buildings is considered in this context, as is earthquake induced lateral loading. Case studies of some of the world's most iconic buildings, illustrated with full colour photographs, structural plans and axonometrics, will bring to life the design challenges which they presented to architects and structural engineers. The Empire State Building, the Burj Khalifa, Taipei 101 and the HSB Turning Torso are just a few examples of the buildings whose real-life specifications are used to explain and illustrate core design principles, and their subsequent effect on the finished structure.

**Tall Buildings**

**Proceedings of the Fourth International Conference on Wind Effects on Buildings and Structures**

**Data Mining in Structural Dynamic Analysis**

**Recent Advances and Applications of Hybrid Simulation**

Describes developments in the areas of meteorology, aerodynamics and structural engineering, which effects the wind on buildings and structures.

**Proceedings of the International Conference on Earthquake Engineering and Structural Dynamics**

Copyright code: fc83aa92966cf25e0b42a6c846a2c618