Ground Motion Complexity And Scaling In The Near Field Of

Rockbursts and Seismicity in Mines 93
Publications of the Geological Survey
Complexity in Forecasting and Early Warning
Uncertainty Treatment in Performance Based Seismic Assessment of Typical Bridge Classes in United States
Probabilistic performance-based seismic design
National Earthquake Hazards Reduction Program, Annual Project Summaries, XXXVI
Earth Observations for Geohazards
Technical Discussions of Offsite Safety Programs for Underground Nuclear Detonations
Practical Deterministic and Probabilistic Approaches
The Determination of True Ground Motion from Seismograph Records
Open-file Report
Protection of Built Environment Against Earthquakes
Journal of Earthquake Prediction Research

Technical report
Methodology and Applications
Perspectives on European Earthquake Engineering and Seismology
Living on an Active Earth
Soil Dynamics and Foundation Modeling
Perspectives on Earthquake Science
Offshore and Earthquake Engineering
Volume 2
Research, Implementation, and Outreach
Microscopic and Macroscopic Simulation: Towards Predictive Modelling of the Earthquake Process
Geocomplexity and the Physics of Earthquakes
Living on an Active Earth
Three Volume Set
Handbook of Seismic Risk Analysis and Management of Civil Infrastructure Systems
Risk, Exposure, Response, and Resilience
Natural Hazards
Strong Ground Motion Seismology
Earthquake Source Physics on Various Scales
Energy Research Abstracts

SYNER-G: Systemic Seismic Vulnerability and Risk Assessment of Complex Urban, Utility, Lifeline Systems and Critical Facilities
Evaluating Earthquake Hazards in the Los Angeles Region--an Earth-science Perspective
Proceedings of the 3rd international symposium, Kingston, Ontario, 16-18 August 1993
Seismic Hazard and Risk Analysis
Coupled Site and Soil-Structure Interaction Effects with Application to Seismic Risk Mitigation
Strong-Motion Program Report, January-December 1985
Ground Motion and Variability from 3-D Deterministic Broadband Simulations

TRUJILLO SOSA

Rockbursts and Seismicity in Mines 93
World Scientific
This report describes a recommended methodology for reliably quantifying building system performance and response parameters for use in seismic design. The recommended methodology (referred to herein as the Methodology) provides a rational basis for establishing global seismic performance factors (SPFs), including the response modification coefficient (R factor), the

system overstrength factor, and deflection amplification factor (Cd), of new seismic-force-resisting systems proposed for inclusion in model building codes. The purpose of this Methodology is to provide a rational basis for determining building seismic performance factors that, when properly implemented in the seismic design process, will result in equivalent safety against collapse in an earthquake, comparable to the inherent safety against collapse intended by current seismic codes, for buildings with different seismic-force-resisting systems.

Publications of the Geological Survey CRC Press

Extreme Environmental EventsComplexity in Forecasting and Early WarningSpringer Science & Business Media

Complexity in Forecasting and Early Warning Birkhäuser

Soil Liquefaction during Recent Large-Scale Earthquakes contains selected papers presented at the New Zealand Japan Workshop on Soil Liquefaction during Recent Large-Scale Earthquakes (Auckland, New Zealand, 2-3 December 2013). The 2010-2011 Canterbury earthquakes in New Zealand and the 2011 off the Pacific Coast of Tohoku Earthquake in

Uncertainty Treatment in Performance Based Seismic Assessment of Typical Bridge Classes in United States Springer Science & Business Media

This book is a printed edition of the Special Issue "Earth Observations for Geohazards" that was published in

Remote Sensing

Probabilistic performance-based seismic design Birkhäuser

This volume collects several extended articles from the first workshop on Best Practices in Physics-based Fault Rupture Models for Seismic Hazard Assessment of Nuclear Installations (BestPSHANI). Held in 2015, the workshop was organized by the IAEA to disseminate the use of physics-based fault-rupture models for ground motion prediction in seismic hazard assessments (SHA). The book also presents a number of new contributions on topics ranging from the seismological aspects of earthquake cycle simulations for source scaling evaluation, seismic source characterization, source inversion and physics-based ground motion modeling to engineering applications of simulated ground motion for the analysis of seismic response of structures. Further, it includes papers describing current practices for assessing seismic hazard in terms of nuclear safety in low seismicity areas, and proposals for physics-based hazard assessment for critical structures near large earthquakes. The papers validate and verify the models by comparing synthetic results with observed data and empirical models. The book is a valuable resource for scientists, engineers, students and practitioners involved in all aspects of SHA.

National Earthquake Hazards Reduction Program, Annual Project Summaries, XXXVI Springer Science & Business Media

In the last ten to fifteen years a vast amount of research has been undertaken to improve on earlier methods for analysing the seismic reliability of structures. These efforts focused on identifying aspects of prominent relevance and disregarding the inessential ones, with the goal of producing methods that are both more efficient and easier to use in practice. Today this goal can be said to be substantially achieved. During these years scientific activity covered all of the many aspects involved in such a multi-disciplinary problem, ranging from seismology, to geotechnics, to structural analysis and economy, all of them to be consistently organised into a probabilistic framework. As the output of this research was dispersed into a multitude of technical papers, fib Commission 7 thought it worthwhile to select the essential aspects of this large body of knowledge and to present them into a coherent and accessible document for structural engineers. To this end a task group of specialists was formed, whose qualifications come from their personal involvement in the above-mentioned developments throughout this period of time. From its inception the group decided that the bulletin should have had a distinct educational character and provide a clear overview of the methods available. The outcome is a compact volume that starts by introducing the concepts and definitions of performance-based engineering, continues with two chapters on assessment and design, respectively,

presenting the methods in detail accompanied by illustrative examples, and concludes with an appendix with sample programming excerpts for their implementation. It is believed that at present fib Bulletin 68 represents a unique compendium on probabilistic performance-based seismic design.

Earth Observations for Geohazards Springer Science & Business Media These proceedings include the latest developments in research and practice in the area of mining-induced seismicity. Three themes are explored: strong ground motion and rockburst hazard; mechanics of seismic events and stochastic methods; and monitoring of seismicity and geomechanical modelling.

Technical Discussions of Offsite Safety Programs for Underground Nuclear Detonations Extreme Environmental EventsComplexity in Forecasting and Early Warning SYNER-G, a multidisciplinary effort funded by the European Union, allowed the development of an innovative methodological framework for the assessment of physical as well as socio-economic seismic vulnerability and risk at urban and regional level. The results of SYNER-G are presented in two books both published by Springer, the present and a second one, entitled “SYNER-G: Typology Definition and Fragility Functions for Physical Elements at Seismic Risk: Buildings, Lifelines, Transportation Networks and Critical Facilities”(*), which provides a comprehensive state-of-the-art of the fragility curves, an alternative way to

express physical vulnerability of elements at risk. In this second volume of SYNER-G, the focus has been on presenting a unified holistic methodology for assessing vulnerability at systems level considering interactions between elements at risk (physical and non-physical) and between different systems. The proposed methodology and tool encompasses in an integrated fashion all aspects in the chain, from hazard to the vulnerability assessment of components and systems and to the socio-economic impacts of an earthquake, accounting for most relevant uncertainties within an efficient quantitative simulation scheme. It systematically integrates the most advanced fragility functions to assess the vulnerability of physical assets for buildings, utility systems, transportation networks and complex infrastructures such as harbours and hospitals. The increasing impact due to interactions between different components and systems is treated in a comprehensive way, providing specifications for each network and infrastructure. The proposed socio-economic model integrates social vulnerability into the physical systems modelling approaches providing to decision makers with a dynamic platform to capture post disaster emergency issues like shelter demand and health impact decisions. Application examples at city and regional scale have provided the necessary validation of the methodology and are also included in the book. The present volume, with its companion

volume on fragility functions, represent a significant step forward in the seismic vulnerability and risk assessment of complex interacting urban and regional systems and infrastructures. These volumes are not only of interest to scientists and engineers but also to the insurance industry, decision makers and practitioners in the sector of civil protection and seismic risk management. (*) Pitilakis K, Crowley E, Kaynia A (eds) (2014) SYNER-G: Typology definition and fragility functions for physical elements at seismic risk, Series: Geotechnical, Geological and Earthquake Engineering 27, ISBN 978-94-007-7872-6, Springer Science+Business Media, Dordrecht. **Practical Deterministic and Probabilistic Approaches** Springer

Earthquakes represent a major risk to buildings, bridges and other civil infrastructure systems, causing catastrophic loss to modern society. Handbook of seismic risk analysis and management of civil infrastructure systems reviews the state of the art in the seismic risk analysis and management of civil infrastructure systems. Part one reviews research in the quantification of uncertainties in ground motion and seismic hazard assessment. Part twi discusses methodologies in seismic risk analysis and management, whilst parts three and four cover the application of seismic risk assessment to buildings, bridges, pipelines and other civil infrastructure systems. Part five also discusses methods for quantifying dependency

between different infrastructure systems. The final part of the book considers ways of assessing financial and other losses from earthquake damage as well as setting insurance rates. Handbook of seismic risk analysis and management of civil infrastructure systems is an invaluable guide for professionals requiring understanding of the impact of earthquakes on buildings and lifelines, and the seismic risk assessment and management of buildings, bridges and transportation. It also provides a comprehensive overview of seismic risk analysis for researchers and engineers within these fields. This important handbook reviews the wealth of recent research in the area of seismic hazard analysis in modern earthquake design code provisions and practices

Examines research into the analysis of ground motion and seismic hazard assessment, seismic risk hazard methodologies Addresses the assessment of seismic risks to buildings, bridges, water supply systems and other aspects of civil infrastructure

The Determination of True Ground Motion from Seismograph Records

National Academies Press

The accuracy of earthquake source descriptions is a major limitation in high-frequency (>1 Hz) deterministic ground motion prediction, which is critical for performance-based design by building engineers. With the recent addition of realistic fault topography in 3D simulations of earthquake source models, ground motion can be deterministically calculated more

realistically up to higher frequencies. We first introduce a technique to model frequency-dependent attenuation and compare its impact on strong ground motions recorded for the 2008 Chino Hills earthquake. Then, we model dynamic rupture propagation for both a generic strike-slip event and blind thrust scenario earthquakes matching the fault geometry of the 1994 Mw 6.7 Northridge earthquake along rough faults up to 8 Hz. We incorporate frequency-dependent attenuation via a power law above a reference frequency in the form Q_0f^n ,with high accuracy down to Q values of 15, and include nonlinear effects via Drucker-Prager plasticity. We model the region surrounding the fault with and without small-scale medium complexity in both a 1D layered model characteristic of southern California rock and a 3D medium extracted from the SCEC CVMSi.426 including a near-surface geotechnical layer. We find that the spectral acceleration from our models are within 1-2 interevent standard deviations from recent ground motion prediction equations (GMPEs) and compare well with that of recordings from strong ground motion stations at both short and long periods. At periods shorter than 1 second, Q(f) is needed to match the decay of spectral acceleration seen in the GMPEs as a function of distance from the fault. We find that the similarity between the intraevent variability of our simulations and observations increases when small-scale heterogeneity and plasticity are included, extremely important as

uncertainty in ground motion estimates dominates the overall uncertainty in seismic risk. In addition to GMPEs, we compare with simple proxy metrics to evaluate the performance of our deterministic models and to determine the importance of different complexities within our model. We find that 3D heterogeneity, at both the long and short scale-lengths, is necessary to agree with data, and should be included in future simulations to best model the ground motion from earthquakes.

Open-file Report Academic Press Bridge networks are expensive and complex infrastructures and are essential components of today's transportation systems. Despite the advancement in computer aided modeling and increasing the computational power which is increasing the accessibility for developing the fragility curves of bridges, the complexity of the problem and uncertainties involved in fragility analysis of the bridge structures in addition to difficulties in validating the results obtained from the analysis requires precaution in utilization of the results as a decision making tool. The main focus of this research is to address, study and treatment of uncertainties incorporated in various steps of performance based assessments (PBA) of the bridge structures. In this research the uncertainties is divided into three main categories. First, the uncertainties that come from ground motions time and frequency content alteration because of scarcity of the recorded ground motions

in the database. Second, uncertainties associated in the modeling and simulation procedure of PBA, and third uncertainties originated from simplistic approach and methods utilized in the conventional procedure of PBA of the structures. Legitimacy of the scaling of ground motions is studied using the response of several simple nonlinear systems to amplitude scaled ground motions suites. Bias in the response obtained compared to unscaled records for both as recorded and synthetic ground motions. Results from this section of the research show the amount of the bias is considerable and can significantly affect the outcome of PBA. The origin of the bias is investigated and consequently a new metric is proposed to predict the bias induced by ground motion scaling without nonlinear analysis.

Protection of Built Environment Against Earthquakes Springer Science & Business Media

Earthquake rupture is a process of remarkable complexity. Over the past few decades, scientists have become aware of its high variability on all scales as well as its wide dynamic range. At the same time, a thorough understanding of the seismic source process is a key element of reliable earthquake ground motion prediction. The present book contains a comprehensive collection of contributions originating from the 2012 ECGS Workshop Earthquake Source Physics on Various Scales, held in Luxembourg. The seventeen articles in this volume cover theoretical and

observational aspects of the earthquake source process, ranging from tiny, laboratory-generated M -6 events to the source complexity and radiated energy of the world's greatest earthquakes. Among other aspects, the papers provide new insights into the relationship of earthquake recurrence time with fault frictional parameters, how the results of lab-based friction experiments relate to observational source studies, and how geometrical source complexity can be quantified. In particular, several papers are devoted to the question whether small and large earthquakes scale self-similarly or if they show differences in their dynamic source characteristics, which is one of the most hotly debated aspects of modern seismology. The volume provides an integrated view of the current state-of-the-art knowledge on the earthquake source process on all scales and will be useful to students and professional researchers who are interested in these phenomena.

Journal of Earthquake Prediction Research BoD – Books on Demand

The destructive force of earthquakes has stimulated human inquiry since ancient times, yet the scientific study of earthquakes is a surprisingly recent endeavor. Instrumental recordings of earthquakes were not made until the second half of the 19th century, and the primary mechanism for generating seismic waves was not identified until the beginning of the 20th century. From this recent start, a range of laboratory, field, and theoretical investigations have

developed into a vigorous new discipline: the science of earthquakes. As a basic science, it provides a comprehensive understanding of earthquake behavior and related phenomena in the Earth and other terrestrial planets. As an applied science, it provides a knowledge base of great practical value for a global society whose infrastructure is built on the Earth's active crust. This book describes the growth and origins of earthquake science and identifies research and data collection efforts that will strengthen the scientific and social contributions of this exciting new discipline.

Technical report SAGE

This book presents a comprehensive topical overview on soil dynamics and foundation modeling in offshore and earthquake engineering. The spectrum of topics include, but is not limited to, soil behavior, soil dynamics, earthquake site response analysis, soil liquefactions, as well as the modeling and assessment of shallow and deep foundations. The author provides the reader with both theory and practical applications, and thoroughly links the methodological approaches with engineering applications. The book also contains cutting-edge developments in offshore foundation engineering such as anchor piles, suction piles, pile torsion modeling, soil ageing effects and scour estimation. The target audience primarily comprises research experts and practitioners in the field of offshore engineering, but the book may also be beneficial for graduate students.

Methodology and Applications Elsevier

Published by the American Geophysical Union as part of the Geophysical Monograph Series, Volume 120. Earthquakes in urban centers are capable of causing enormous damage. The January 16, 1995 Kobe, Japan earthquake was only a magnitude 6.9 event and yet produced an estimated $200 billion loss. Despite an active earthquake prediction program in Japan, this event was a complete surprise. Similar scenarios are possible in Los Angeles, San Francisco, Seattle, and other urban centers around the Pacific plate boundary. The development of forecast or prediction methodologies for these great damaging earthquakes has been complicated by the fact that the largest events repeat at irregular intervals of hundreds to thousands of years, resulting in a limited historical record that has frustrated phenomenological studies. The papers in this book describe an emerging alternative approach, which is based on a new understanding of earthquake physics arising from the construction and analysis of numerical simulations. With these numerical simulations, earthquake physics now can be investigated in numerical laboratories. Simulation data from numerical experiments can be used to develop theoretical understanding that can be subsequently applied to observed data. These methods have been enabled by the information technology revolution, in which fundamental advances in computing and communications are placing vast computational resources at

our disposal.

Perspectives on European Earthquake Engineering and Seismology fib Fédération internationale du béton

Seismic hazard and risk analyses underpin the loadings prescribed by engineering design codes, the decisions by asset owners to retrofit structures, the pricing of insurance policies, and many other activities. This is a comprehensive overview of the principles and procedures behind seismic hazard and risk analysis. It enables readers to understand best practises and future research directions. Early chapters cover the essential elements and concepts of seismic hazard and risk analysis, while later chapters shift focus to more advanced topics. Each chapter includes worked examples and problem sets for which full solutions are provided online. Appendices provide relevant background in probability and statistics. Computer codes are also available online to help replicate specific calculations and demonstrate the implementation of various methods. This is a valuable reference for upper level students and practitioners in civil engineering, and earth scientists interested in engineering seismology.

Living on an Active Earth CRC Press

In this volume, we report new results about various theories and methods of integral equation, boundary value problems for partial differential equations and functional equations, and integral operators including singular integral equations, applications of boundary value problems and integral

equations to mechanics and physics, numerical methods of integral equations and boundary value problems, theories and methods for inverse problems of mathematical physics, Clifford analysis and related problems. Contents:Some Properties of a Kind of Singular Integral Operator for K-Monogenic Function in Clifford Analysis (L P Wang, Z L Xu and Y Y Qiao)Some Results Related with Möbius Transformation in Clifford Analysis (Z X Zhang)The Scattering of SH Wave on the Array of Periodic Cracks in a Piezoelectric Substrate Bonded a Half-Plane of Functionally Graded Materials (J Q Liu, X Li, S Z Dong, X Y Yao and C F Wang)Anti-Plane Problem of Two Collinear Cracks in a Functionally Graded Coating–Substrate Structure (S H Ding and X Li)A Kind of Riemann Boundary Value Problem for Triharmonic Functions in Clifford Analysis (L F Gu)A New Dynamical Systems Method for Nonlinear Operator Equations (X J Luo, F C Li and S H Yang)A Class of Integral Inequality and Application (W S Wang)An Efficient Spectral Boundary Integral Equation Method for the Simulation of Earthquake Rupture Problems (W S Wang and B W Zhang)High-Frequency Asymptotics for the Modified Helmholtz Equation in a Half-Plane (H M Huang)An Inverse Boundary Value Problem Involving Filtration for Elliptic Systems of Equations (Z L Xu and L Yan)Fixed Point Theorems of Contractive Mappings in Extended Cone Metric Spaces (H P Huang and X Li)Positive Solutions of Singular Third-Order Three-Point Boundary Value Problems (B Q Yan and

X Liu)Modified Neumann Integral and Asymptotic Behavior in the Half-Space (Y H Zhang, G T Deng and Z Z Wei)Piecewise Tikhonov Regularization Scheme to Reconstruct Discontinuous Density in Computerized Tomography (J Cheng, Y Jiang, K Lin and J W Yan)About the Quaternionic Jacobian Conjecture (H Liu)Interaction Between Antiplane Circular Inclusion and Circular Hole of Piezoelectric Materials (L H Chang and X Li)Convergence of Numerical Algorithm for Coupled Heat and Mass Transfer in Textile Materials (M B Ge, J X Cheng and D H Xu)Haversian Cortical Bone with a Radial Microcrack (X Wang)Spectra of Unitary Integral Operators on L2(ℝ) with Kernels k(xy) (D W Ma and G Chen)The Numerical Simulation of Long-Period Ground Motion on Basin Effects (Y Q Li and X Li)Complete Plane Strain Problem of a One-Dimensional Hexagonal Quasicrystals with a Doubly-Periodic Set of Cracks (X Li and P P Shi)The Problem About an Elliptic Hole with III Asymmetry Cracks in One-Dimensional Hexagonal Piezoelectric Quasicrystals (H S Huo and X Li)The Second Fundamental Problem of Periodic Plane Elasticity of a One-Dimensional Hexagonal Quasicrystals (J Y Cui, P P Shi and X Li)The Optimal Convex Combination Bounds for the Centroidal Mean (H Liu and X J Meng)The Method of Fundamental Solution for a Class of Elliptical Partial Differential Equations with Coordinate Transformation and Image Technique (L N Wu and Q Jiang)Various Wavelet Methods for Solving Fractional Fredholm–Volterra Integral Equations (P

P Shi, X Li and X Li) Readership: Researchers in analysis and differential equations. Keywords:Integral Equations;Boundary Value ProblemsKey Features:Provides new research progress on these topics

Soil Dynamics and Foundation Modeling
Springer

Natural Hazards - Risk, Exposure, Response, and Resilience demonstrates advanced techniques to measure risks, exposures, responses, and solutions to hazards in an array of communities. Eleven original research reports by international scholars on hazard assessment and management are organized into four sections: studies assessing risk using in-depth modeling and technological detection to provide insight into problems associated with earthquakes, torrential rains, and nuclear power plant safety; studies revealing the spatial distributions of exposure and impacts from an assortment of hazards; studies examining human response to increased awareness of the patterns of hazard; and a study demonstrating assessment of resilience of sociotechnological systems to natural hazards. This volume contributes new conceptual and practical commentaries to assess, mitigate, and plan for disasters.

Perspectives on Earthquake Science
Springer Science & Business Media

Proceedings of the NATO Advanced Research Workshop on Coupled Site and Soil-Structure Interaction Effects with Application to Seismic Risk Mitigation Borovets, Bulgaria 30 August - 3

September 2008

Offshore and Earthquake Engineering Cambridge University Press

This book collects 4 keynote and 15 theme lectures presented at the 2nd European Conference on Earthquake Engineering and Seismology (2ECEES), held in Istanbul, Turkey, from August 24 to 29, 2014. The conference was organized by the Turkish Earthquake Foundation - Earthquake Engineering Committee and Prime Ministry, Disaster and Emergency Management Presidency under the auspices of the European Association for Earthquake Engineering (EAEE) and European Seismological Commission (ESC). The book's nineteen state-of-the-art chapters were written by the most prominent researchers in Europe and address a comprehensive collection of topics on earthquake engineering, as well as interdisciplinary subjects such as engineering seismology and seismic risk assessment and management. Further topics include engineering seismology, geotechnical earthquake engineering, seismic performance of buildings, earthquake-resistant engineering structures, new techniques and technologies, and managing risk in seismic regions. The book also presents the First Professor Inge Lehmann Distinguished Award Lecture given by Prof. Shamita Das in honor of Prof. Dr. Inge Lehmann. The aim of this work is to present the state-of-the art and latest practices in the fields of earthquake engineering and seismology, with Europe's most respected

researchers addressing recent and ongoing developments while also proposing innovative avenues for future research and development. Given its cutting-edge conten t and broad spectrum of topics, the book offers a unique reference guide for researchers in these fields. Audience: This book is of interest to civil engineers in the fields of geotechnical and structural earthquake engineering; scientists and researchers in the fields of seismology, geology and geophysics. Not only scientists, engineers and students, but also those interested in earthquake hazard assessment and mitigation will find in this book the most recent advances.