

Asce 41 Seismic Rehabilitation Of Existing Buildings

This edited volume brings together findings and case studies on fundamental and applied aspects of structural engineering, applied to buildings, bridges and infrastructures in general. It focuses on the application of advanced experimental and numerical techniques and new technologies to the built environment. This volume is part of the proceedings of the 1st GeoMEast International Congress and Exhibition on Sustainable Civil Infrastructures, Egypt 2017.

Provides a three-tiered process for seismic evaluation of existing buildings in any level of seismicity. This standard is intended to serve as a nationally applicable tool for design professionals, code officials, and building owners looking to seismically evaluate existing buildings. It considers various aspects of building performance.

Earthquake engineering is the ultimate challenge for structural engineers. Even if natural phenomena involve great uncertainties, structural engineers need to design buildings, bridges, and dams capable of resisting the destructive forces produced by them. These disasters have created a new awareness about the disaster preparedness and mitigation. Before a building, utility system, or transportation structure is built, engineers spend a great deal of time analyzing those structures to make sure they will perform reliably under seismic and other loads. The purpose of this book is to provide structural engineers with tools and information to improve current building and bridge design and construction practices and enhance their sustainability during and after seismic events. In this book, Khan explains the latest theory, design applications and Code Provisions. Earthquake-Resistant Structures features seismic design and retrofitting techniques for low and high rise buildings, single and multi-span bridges, dams and nuclear facilities. The author also compares and contrasts various seismic resistant techniques in USA, Russia, Japan, Turkey, India, China, New Zealand, and Pakistan. Written by a world renowned author and educator Seismic design and retrofitting techniques for all structures Tools improve current building and bridge designs Latest methods for building earthquake-resistant structures Combines physical and geophysical science with structural engineering

The book presents research papers presented by academicians, researchers, and practicing structural engineers from India and abroad in the recently held Structural Engineering Convention (SEC) 2014 at Indian Institute of Technology Delhi during 22 – 24 December 2014. The book is divided into three volumes and encompasses multidisciplinary areas within structural engineering, such as earthquake engineering and structural dynamics, structural mechanics, finite element methods, structural vibration control, advanced cementitious and composite materials, bridge engineering, and soil-structure interaction. Advances in Structural Engineering is a useful reference material for structural engineering fraternity including undergraduate and postgraduate students, academicians, researchers and practicing engineers.

Introductory technical guidance for civil and structural engineers interested in design of buildings for progressive collapse, such as from seismic or explosive events. Here is what is discussed: 1. TIE FORCES 2. ALTERNATIVE PATH 3. REINFORCED CONCRETE BUILDING EXAMPLE 4. STRUCTURAL STEEL FRAME EXAMPLE 5. COMMENTARY.

Seismic Rehabilitation of Existing Buildings Amer Society of Civil Engineers

Performance-based Earthquake Engineering has emerged before the turn of the century as the most important development in the field of Earthquake Engineering during the last three decades. It has since then started penetrating codes and standards on seismic assessment and retrofitting and making headway towards seismic design standards for new structures as well. The US have been a leader in Performance-based Earthquake Engineering, but also Europe is a major contributor. Two Workshops on Performance-based Earthquake Engineering, held in Bled (Slovenia) in 1997 and 2004 are considered as milestones. The ACES Workshop in Corfu (Greece) of July 2009 builds on them, attracting as contributors world-leaders in Performance-based Earthquake Engineering from North America, Europe and the Pacific rim (Japan, New Zealand, Taiwan, China). It covers the entire scope of Performance-based Earthquake Engineering: Ground motions for performance-based earthquake engineering; Methodologies for Performance-based seismic design and retrofitting; Implementation of Performance-based seismic design and retrofitting; and Advanced seismic testing for performance-based earthquake engineering. Audience: This volume will be of interest to scientists and advanced practitioners in structural earthquake engineering, geotechnical earthquake engineering, engineering seismology, and experimental dynamics.

Bearing in mind that reinforced concrete is a key component in a majority of built environment structures, Concrete Buildings in Seismic Regions combines the scientific knowledge of earthquake engineering with a focus on the design of reinforced concrete buildings in seismic regions. This book addresses practical design issues, providing an integrated, comprehensible, and clear presentation that is suitable for design practice. It combines current approaches to seismic analysis and design, with a particular focus on reinforced concrete structures, and includes: an overview of structural dynamics analysis and design of new R/C buildings in seismic regions post-earthquake damage evaluation, pre earthquake assessment of buildings and retrofitting procedures seismic risk management of R/C buildings within urban nuclei extended numerical example applications Concrete Buildings in Seismic Regions determines guidelines for the proper structural system for many types of buildings, explores recent developments, and covers the last two decades of analysis, design, and earthquake engineering. Divided into three parts, the book specifically addresses seismic demand issues and the basic issues of structural dynamics, considers the "capacity" of structural systems to withstand seismic effects in terms of strength and deformation, and highlights existing R/C buildings under seismic action. All of the book material has been adjusted to fit a modern seismic code and offers in-depth knowledge of the background upon which the code rules are based. It complies with the last edition of European Codes of Practice for R/C buildings in seismic regions, and includes references to the American Standards in effect for seismic design.

This Preservation Brief provides information on how earthquakes affect historic buildings, how a historic preservation ethic can guide responsible retrofit decisions, and how various methods of seismic rehabilitation can protect human lives and historic structures. The Brief provides a description of the most common vulnerabilities of various building construction types and the seismic strengthening methods most often needed to remedy them. A glossary of technical terms is also provided at the end of the Brief. Undertaking the seismic rehabilitation of a historic building is a process that requires careful planning and execution, and the coordinated work of architects, engineers, code officials, contractors, and agency administrators. Project personnel working together can ensure that the architectural, structural, financial, programmatic, cultural, and social values of historic buildings are preserved, while rendering them safe for continued use.

Standard ASCE/SEI 41-06 presents the latest generation of performance-based seismic rehabilitation methodology.

The United States will certainly be subject to damaging earthquakes in the future. Some of these earthquakes will occur in highly populated and vulnerable areas. Coping with moderate earthquakes is not a reliable indicator of preparedness for a major earthquake in a populated area. The recent, disastrous, magnitude-9 earthquake that struck northern Japan demonstrates the threat that earthquakes pose. Moreover, the cascading nature of impacts-the earthquake causing a tsunami, cutting electrical power supplies, and stopping the pumps needed to cool nuclear reactors-demonstrates the potential complexity of an earthquake disaster. Such compound disasters can strike any earthquake-prone populated area. National Earthquake Resilience presents a roadmap for increasing our national resilience to earthquakes. The National Earthquake Hazards Reduction Program (NEHRP) is the multi-agency program mandated by Congress to undertake activities to reduce the effects of future earthquakes in the United States. The National Institute of Standards and Technology (NIST)-the lead NEHRP agency-commissioned the National Research Council (NRC) to develop a roadmap for earthquake hazard and risk reduction in the United States that would be based on the goals and objectives for achieving national earthquake resilience described in the 2008 NEHRP Strategic Plan.

National Earthquake Resilience does this by assessing the activities and costs that would be required for the nation to achieve earthquake

resilience in 20 years. National Earthquake Resilience interprets resilience broadly to incorporate engineering/science (physical), social/economic (behavioral), and institutional (governing) dimensions. Resilience encompasses both pre-disaster preparedness activities and post-disaster response. In combination, these will enhance the robustness of communities in all earthquake-vulnerable regions of our nation so that they can function adequately following damaging earthquakes. While National Earthquake Resilience is written primarily for the NEHRP, it also speaks to a broader audience of policy makers, earth scientists, and emergency managers.

Illustrated in full color throughout. The primary purpose of this document is to provide a selected compilation of seismic rehabilitation techniques that are practical and effective. The descriptions of techniques include detailing and constructability tips that might not be otherwise available to engineering offices or individual structural engineers who have limited experience in seismic rehabilitation of existing buildings. A secondary purpose is to provide guidance on which techniques are commonly used to mitigate specific seismic deficiencies in various model building types.

Many more people are coming to live in earthquake-prone areas, especially urban ones. Many such areas contain low-rise, low-cost housing, while little money is available to retrofit the buildings to avoid total collapse and thus potentially save lives. The lack of money, especially in developing countries, is exacerbated by difficulties with administration, implementation and public awareness. The future of modern earthquake engineering will come to be dominated by new kinds of measuring technologies, new materials developed especially for low-rise, low-cost buildings, simpler and thus lower cost options for retrofitting, cost cutting and raising public awareness. The book covers all the areas involved in this complex issue, from the prevention of total building collapse, through improvement techniques, to legal, financial, taxation and social issues. The contributors have all made valuable contributions in their own particular fields; all of them are or have been closely involved with the issues that can arise in seismic zones in any country. The recent research results published here offer invaluable pointers to practicing engineers and administrators, as well as other scientists whose work involves saving the lives and property of the many millions of people who live and work in hazardous buildings.

This edited volume is an up-to-date guide for students, policy makers and engineers on earthquake engineering, including methods and technologies for seismic hazard detection and mitigation. The book was written in honour of the late Professor Jai Krishna, who was a pioneer in teaching and research in the field of earthquake engineering in India during his decades-long work at the University of Roorkee (now the Indian Institute of Technology Roorkee). The book comprehensively covers the historical development of earthquake engineering in India, and uses this background knowledge to address the need for current advances in earthquake engineering, especially in developing countries. After discussing the history and growth of earthquake engineering in India from the past 50 years, the book addresses the present status of earthquake engineering in regards to the seismic resistant designs of bridges, buildings, railways, and other infrastructures. Specific topics include response spectrum superposition methods, design philosophy, system identification approaches, retaining walls, and shallow foundations. Readers will learn about developments in earthquake engineering over the past 50 years, and how new methods and technologies can be applied towards seismic risk and hazard identification and mitigation.

Modern seismic design is strictly governed by building code requirements, such as those found in ASCE/SEI 7-10, Minimum Design Loads for Buildings and Other Structures. Similarly, modern seismic assessment of existing buildings (and seismic rehabilitation) is governed by requirements found in ASCE/SEI 41-06, Seismic Rehabilitation of Existing Buildings. However, few studies have examined the agreement between code requirements for design and assessment. The following report is a pilot investigation into the correlation between design and assessment methods for reinforced concrete lateral systems. The report focuses on 'Special Reinforced Concrete Moment Resisting Frames' and 'Special Reinforced Concrete Shear Walls'. The parent project aims to relate design and assessment for a broad spectrum of building layouts and heights, for both reinforced concrete and structural steel lateral resisting systems.

Rehabilitation of heritage monuments provides sustainable development and cultural significance to a region. The most sensitive aspect of the refurbishment of existing buildings lies in the renovation and recovery of structural integrity and public safety. The Handbook of Research on Seismic Assessment and Rehabilitation of Historic Structures evaluates developing contributions in the field of earthquake engineering with regards to the analysis and treatment of structural damage inflicted by seismic activity. This book is a vital reference source for professionals, researchers, students, and engineers active in the field of earthquake engineering who are interested in the emergent developments and research available in the preservation and rehabilitation of heritage buildings following seismic activity.

This book presents a selection of the best papers from the HEaRT 2015 conference, held in Lisbon, Portugal, which provided a valuable forum for engineers and architects, researchers and educators to exchange views and findings concerning the technological history, construction features and seismic behavior of historical timber-framed walls in the Mediterranean countries. The topics covered are wide ranging and include historical aspects and examples of the use of timber-framed construction systems in response to earthquakes, such as the gaiola system in Portugal and the Bourbon system in southern Italy; interpretation of the response of timber-framed walls to seismic actions based on calculations and experimental tests; assessment of the effectiveness of repair and strengthening techniques, e.g., using aramid fiber wires or sheets; and modelling analyses. In addition, on the basis of case studies, a methodology is presented that is applicable to diagnosis, strengthening and improvement of seismic performance and is compatible with modern theoretical principles and conservation criteria. It is hoped that, by contributing to the knowledge of this construction technique, the book will help to promote conservation of this important component of Europe's architectural heritage.

Behaviour of Steel Structures in Seismic Areas is a comprehensive overview of recent developments in the field of seismic resistant steel structures. It comprises a collection of papers presented at the seventh International Specialty Conference STESSA 2012 (Santiago, Chile, 9-11 January 2012), and includes the state-of-the-art in both theory and practice.

Advanced Design Examples of Seismic Retrofit of Structures provides insights on the problems associated with the seismic retrofitting of existing structures. The authors present various international case studies of seismic retrofitting projects and the different possible strategies on how to handle complex problems encountered. Users will find tactics on a variety of problems that are commonly faced, including problems faced by engineers and authorities who have little or no experience in the practice of seismic retrofitting. Provides several examples of retrofitting projects that cover different structural systems, from non-engineered houses, to frame buildings Presents various retrofitting methods through examples Provides detailed, step-by-step design procedures for each example Includes real retrofit projects with photos of the details of various retrofitting techniques Contains several modeling details and hints making use of various software in this area

Safety, Reliability, Risk and Life-Cycle Performance of Structures and Infrastructures contains the plenary lectures and papers presented at the 11th International Conference on STRUCTURAL SAFETY AND RELIABILITY (ICOSSAR2013, New York, NY, USA, 16-20 June 2013), and covers major aspects of safety, reliability, risk and life-cycle performance of str

"TRB's National Cooperative Highway Research Program (NCHRP) Synthesis 440, Performance-Based Seismic Bridge Design (PBSD) summarizes the current state of knowledge and practice for PBSD. PBSD is the process that links decision making for facility design with seismic input, facility response, and potential facility damage. The goal of PBSD is to provide decision makers and stakeholders with data that will enable them to allocate resources for construction based on levels of desired seismic performance"--Publisher's description.

In the past, facilities considered to be at the end of their useful life were demolished and replaced with new ones that better met the functional requirements of modern society, including new safety standards. Humankind has recently recognised the threats to the environment and to our limited natural resources due to our relentless determination to destroy the old and build anew. With the awareness of these constraints and the emphasis on sustainability, in future the majority of old structures will be retrofitted to extend their service life as long as feasible. In keeping with this new approach, the EU's Construction Products Regulation 305/2011, which is the basis of the Eurocodes, included the sustainable use of resources as an "Essential Requirement" for construction. So, the forthcoming second generation of EN-Eurocodes will cover not only the design of new structures, but the rehabilitation of existing ones as well. Most of the existing building stock and civil infrastructures are seismically deficient. When the time comes for a decision to prolong their service life with the help of structural and architectural upgrading, seismic retrofitting may be needed. Further, it is often decided to enhance the earthquake resistance of facilities that still meet their functional requirements and fulfil their purpose, if they are not earthquake-safe. In order to decide how badly a structure needs seismic upgrading or to prioritise it in a population of structures, a seismic evaluation is needed, which also serves as a guide for the extent and type of strengthening. Seismic codes do not sufficiently cover the delicate phase of seismic evaluation nor the many potential technical options for seismic upgrading; therefore research is on-going and the state-of-the-art is constantly evolving. All the more so as seismic evaluation and rehabilitation demand considerable expertise, to make best use of the available safety margins in the existing structure, to adapt the engineering capabilities and techniques at hand to the particularities of a project, to minimise disruption of use, etc. Further, as old structures are very diverse in terms of their materials and layout, seismic retrofitting does not lend itself to straightforward codified procedures or cook-book approaches. As such, seismic evaluation and rehabilitation need the best that the current state-of-the-art can offer on all aspects of earthquake engineering. This volume serves this need, as it gathers the most recent research of top seismic experts from around the world on seismic evaluation, retrofitting and closely related subjects.

The Rapid Visual Screening (RVS) handbook can be used by trained personnel to identify, inventory, and screen buildings that are potentially seismically vulnerable. The RVS procedure comprises a method and several forms that help users to quickly identify, inventory, and score buildings according to the risk of collapse if hit by major earthquakes. This third edition includes extensive updates including: Update of the Basic Scores and Score Modifiers Update of the ground motion definitions Preparation of additional reference guides Inclusion of additional building types that are prevalent Inclusion of additional considerations, such as nonstructural hazards, existing retrofits, building additions, and adjacency Addition of an optional electronic scoring methodology and more. Related products: Natural & Environmental Disasters resources collection is available here: <https://bookstore.gpo.gov/catalog/natural-environmental-disasters> Other products produced by the U.S. Department of Homeland Security, Federal Emergency Management Administration (FEMA) are available here: <https://bookstore.gpo.gov/agency/federal-emergency-management-agency-fema>

This book collects 5 keynote and 15 topic 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 twenty state-of-the-art papers 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 Third Ambraseys Distinguished Award Lecture given by Prof. Robin Spence in honor of Prof. Nicholas N. Ambraseys. 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 content 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.

The Bled workshops have traditionally produced reference documents providing visions for the future development of earthquake engineering as foreseen by leading researchers in the field. The participants of the 2011 workshop built on the tradition of these events initiated by Professors Fajfar and Krawinkler to honor their important research contributions and have now produced a book providing answers to crucial questions in today's earthquake engineering: "What visible changes in the design practice have been brought about by performance-based seismic engineering? What are the critical needs for future advances? What actions should be taken to respond to those needs?" The key answer is that research interests should go beyond the narrow technical aspects and that the seismic resilience of society as a whole should become an essential part of the planning and design process. The book aims to provide essential guidelines for researchers, professionals and students in the field of earthquake engineering. It will also be of particular interest for all those working at insurance companies, governmental, civil protection and emergency management agencies that are responsible for assessing and planning community resilience. The introductory chapter of the book is based on the keynote presentation given at the workshop by the late Professor Helmut Krawinkler. As such, the book includes Helmut's last and priceless address to the engineering community, together with his vision and advice for the future development of performance-based design, earthquake engineering and seismic risk management.

One of the primary goals of the Federal Emergency Management Agency (FEMA) and the National Earthquake Hazards Reduction Program (NEHRP) is to encourage design and construction practices that address the earthquake hazard and minimize the potential damage resulting from that hazard. This document, Effects of Strength and Stiffness on Degradation on Seismic

Response (FEMA P440A), is a follow-on publication to Improvement of Nonlinear Static Seismic Analysis Procedures (FEMA 440). It builds on another FEMA publication addressing the seismic retrofit of existing buildings, the Prestandard and Commentary for Seismic Rehabilitation of Buildings (FEMA 356) and the subsequent publication, ASCE/SEI Standard 41-06 Seismic Rehabilitation of Existing Buildings (ASCE 41). The goal of FEMA 440 was improvement of nonlinear static analysis procedures, as depicted in FEMA 356 and ASCE 41, and development of guidance on when and how such procedures should be used. It was a resource guide for capturing the current state of the art in improved understanding of nonlinear static procedures, and for generating future improvements to those products. One of the recommendations to come out of that work was to fund additional studies of cyclic and in-cycle strength and stiffness degradation, and their impact on response and response stability. This publication provides information that will improve nonlinear analysis for cyclic response, considering cyclic and in-cycle degradation of strength and stiffness. Recent work has demonstrated that it is important to be able to differentiate between cyclic and in-cycle degradation in order to more accurately model degrading behavior, while current practice only recognizes cyclic degradation, or does not distinguish between the two. The material contained within this publication is expected to improve nonlinear modeling of structural systems, and ultimately make the seismic retrofit of existing hazardous buildings more cost-effective.

Introductory technical guidance for civil engineers and structural engineers interested in design of buildings to mitigate progressive structural collapse under earthquake or explosive loading conditions. Here is what is discussed: 1. INTRODUCTION 2. ALTERNATIVE RATIONAL ANALYSIS 3. LOAD AND RESISTANCE FACTOR DESIGN FOR ALTERNATE PATH METHOD 4. PRIMARY AND SECONDARY COMPONENTS 5. FORCE- AND DEFORMATION-CONTROLLED ACTIONS 6. EXPECTED AND LOWER BOUND STRENGTH 7. MATERIAL PROPERTIES 8. COMPONENT FORCE AND DEFORMATION CAPACITIES 9. REMOVAL OF LOAD-BEARING ELEMENTS FOR THE ALTERNATE PATH METHOD 10. STRUCTURE ACCEPTANCE CRITERIA 11. LINEAR STATIC PROCEDURE 12. NONLINEAR STATIC PROCEDURE 13. NONLINEAR DYNAMIC PROCEDURE 14. DEFINITIONS AND COMMENTARY

The objective of the "Design Guide for Improving Hospital Safety in Earthquakes, Floods, and High Winds" is to inform and assist design professionals, hospital administrators, and facility managers in implementing sound mitigation measures that will decrease the vulnerability of hospitals to disruptions caused by natural hazard events. The intent of the Design Guide is to provide its audience with state-of-the-art knowledge on the variety of vulnerabilities faced by hospitals exposed to earthquakes, flooding, and high-winds risks, as well as the best ways to mitigate the risk of damage and disruption of hospital operations caused by these events.

The rehabilitation of any structure is necessary, if the potential strength, as on the date, of the structural element or the global strength, found less than proposed, thereby reducing the factor of safety. The reduction in factor of safety alarms the danger signal during the event of disaster especially like earthquake. The ageing of the admixtures of the building components, environmental effects on the materials, repeated excessive or the change in the stresses reduces the strength. The change of use causing undesired change in nature and or of quantity of loading, change made in seismic zone, by national bodies, are the other factors that contribute in reduction of potential strength of the building. The compliance of potential strength is a cyclic process and in turns the process of rehabilitation. The evaluation of strength, of rehabilitated building, is the process contributed by the materials used, the methodology adapted, the workmanship, and the required rehabilitated strength. In this paper focus, and emphases, placed on explaining efficient, economical, eco-friendly and optimistic use these factors. Devastative earthquake that rock the Gujarat region, selected to collect the information about the current scenario, in respect of above referred factors and the awareness level among the affected citizens. The information collected from technical professionals, the implementers, and the end users, by method of literature reviews and on the expert advice. A case study is conducted; that explains the advantage of retrofitted building in the form of higher safety level for users, and extended longevity of the serviceable life of the building. Further, maintaining lower level of carbon emission, and ratable value for the tax calculation of the building. Key words: - 1) Reduction in strength 2) Eco-friendly 3) Optimum utilization criteria 4) The decision-making process

This book is focused on the seismic vulnerability assessment methods, applied to existing buildings, describing several behaviors and new approaches for assessment on a large scale (urban area). It is clear that the majority of urban centers are composed of old buildings, designed according to concepts and rules that are inadequate to the seismic context. How to assess the vulnerability of existing buildings is an essential step to improve the management of seismic risk and its prevention policy. After some key reminders, this book describes seismic vulnerability methods applied to a large number of structures (buildings and bridges) in moderate (France, Switzerland) and strong seismic prone regions (Italy, Greece). Contents 1. Seismic Vulnerability of Existing Buildings: Observational and Mechanical Approaches for Application in Urban Areas, Sergio Lagomarsino and Serena Cattari. 2. Mechanical Methods: Fragility Curves and Pushover Analysis, Caterina Negulescu and Pierre Gehl. 3. Seismic Vulnerability and Loss Assessment for Buildings in Greece, Andreas J. Kappos. 4. Experimental Method: Contribution of Ambient Vibration Recordings to the Vulnerability Assessment, Clotilde Michel and Philippe Guéguen. 5. Numerical Model: Simplified Strategies for Vulnerability Seismic Assessment of Existing Structures, Cédric Desprez, Panagiotis Kotronis and Stéphane Grange. 6. Approach Based on the Risk Used in Switzerland, Pierino Lestuzzi. 7. Preliminary Evaluation of the Seismic Vulnerability of Existing Bridges, Denis Davi. About the Authors Philippe Guéguen is a Senior IFSTTAR Researcher at ISTERRE, Joseph Fourier University Grenoble 1, France

Standard ASCE/SEI 41-17 describes deficiency-based and systematic procedures that use performance-based principles to evaluate and retrofit existing buildings to withstand the effects of earthquakes.

The title of this document, FEMA 356 Prestandard and Commentary for the Seismic Rehabilitation of Buildings, incorporates a word that not all users may be familiar with. That word—prestandard—has a special meaning within the ASCE Standards Program in that it signifies the document has been accepted for use as the start of the formal standard development process, however, the document has yet to be fully processed as a voluntary consensus standard. The preparation of this prestandard was originally undertaken with two principal and complementary objectives. The first was to encourage the wider application of the NEHRP Guidelines for the Seismic Rehabilitation of Buildings, FEMA 273, by converting it into mandatory language. Design professionals and building officials thus would have at their disposal a more specific reference document for making buildings more resistant to earthquakes. This volume fully meets this first objective. The second objective was to provide a basis for a nationally recognized, ANSI-approved standard that would further help in disseminating and incorporating the approaches and technology of the prestandard into the mainstream of design and construction practices in the United States. How successfully this volume achieves the second objective will become apparent with the passage of time, as this prestandard goes through the balloting process of the American Society of Civil Engineers. Several additional related efforts were ongoing during the development of this prestandard. A concerted effort was made to gather any new information produced by these endeavors. Topics varied considerably, but typically covered approaches, methodologies, and criteria. Whenever an analysis of the new information disclosed significant advances or improvements in the state-of-the-practice, they were included in this volume. Thus, maintaining FEMA 273 as a living document—a process to which FEMA is strongly committed—is continuing.

A comprehensive resource to sustainability and its application to the environmental, industrial, agricultural and food security sectors. Sustainability fills a gap in the literature in order to provide an important guide to the fundamental knowledge and practical applications of sustainability in a wide variety of areas. The authors – noted experts who represent a number of sustainability fields – bring together in one comprehensive volume the broad range of topics including basic concepts, impact assessment, environmental and the socio-economic aspects of sustainability. In addition, the book covers applications of sustainability in environmental, industrial, agricultural and food security, as well as carbon cycle and infrastructural aspects. Sustainability addresses the challenges the global community is facing due to population growth, depletion of non-renewable resources of energy, environmental degradation, poverty, excessive generation of wastes and more. Throughout the book the authors discuss the economics, ecological, social, technological and systems perspectives of sustainability. This important resource:

- Explores the fundamentals as well as the key concepts of sustainability;
- Covers basic concepts, impact assessment, environmental and socio-economic aspects, applications of sustainability in environmental, industrial, agricultural and food security, carbon cycle and infrastructural aspects;
- Argues the essentiality of sustainability in ensuring the propitious future of earth systems; and
- Authored by experts from a range of various fields related to sustainability.

Written for researchers and scientists, students and academics, Sustainability: Fundamentals and Applications is a comprehensive book that covers the basic knowledge of the topic combined with practical applications.

This book is a collection of select papers presented at the Tenth Structural Engineering Convention 2016 (SEC-2016). It comprises plenary, invited, and contributory papers covering numerous applications from a wide spectrum of areas related to structural engineering. It presents contributions by academics, researchers, and practicing structural engineers addressing analysis and design of concrete and steel structures, computational structural mechanics, new building materials for sustainable construction, mitigation of structures against natural hazards, structural health monitoring, wind and earthquake engineering, vibration control and smart structures, condition assessment and performance evaluation, repair, rehabilitation and retrofit of structures. Also covering advances in construction techniques/ practices, behavior of structures under blast/impact loading, fatigue and fracture, composite materials and structures, and structures for non-conventional energy (wind and solar), it will serve as a valuable resource for researchers, students and practicing engineers alike.

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