Asce 41 Seismic Rehabilitation Of Existing Buildings

Third Printing, incorporating errata, Supplement 1, and expanded commentary, 2013.

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

"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.

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.

Design Loads on Structures During Construction

Designing for Earthquakes

An Output of the CTBUH Performance Based Seismic Design Working Group

Risk Management Series; Design Guide for Improving Hospital Safety in Earthquakes, Floods, and High Winds

ASCE Standard, ASCE/SEI, 41-17, Seismic Evaluation and Retrofit of Existing Buildings

Interaction Between Structural and Geotechnical Engineers

Seismic Rehabilitation Methods for Existing Buildings covers various structures, effective parameters in seismic improvement, and other factors in seismic loading. The book offers guidance for a seismic reconstruction project based on the interpretation of publications FEMA 440, FEMA 172 and ATC 40. It includes real examples of completed and approved projects to stabilize the seismic improvement issues of existing buildings. Six perfectly executed examples, with complete refinement details, such as modeling, step-by-step improvement studies, and executive plans and seismic enhancement images are included. In essence, the book explains the classification of non-structural elements and how to carry out seismic reconstruction studies. Provides a fully functional way to evaluate, model and present details of a seismic rehabilitation plan for a building Presents real seismic refurbishment models and step-by-step methods for providing examples (including images, tables and charts)

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.

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.

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.

Minimum Design Loads for Buildings and Other Structures
Seismic Rehabilitation Methods for Existing Buildings
Fema P440a / June 2009
Flood Resistant Design and Construction
Performance-Based Seismic Bridge Design
NEHRP Guidelines for the Seismic Rehabilitation of Buildings

ABSTRACT OF THE DISSERTATION Experimental Study of a Non-Ductile Concrete Moment Frame Building Subjected to Biaxial Quasi-Static Seismic Loading by Elham MooreDoctor of Philosophy in Civil Engineering University of California, Los Angeles, 2021 Professor John Wright Wallace, Chair The ability of reinforced concrete (RC) columns to continue to deform with reduced capacity depends on the ability of the floor system to redistribute some of the axial load from heavily damaged element to adjacent members to prevent the collapse of the structure when that happens. Physical testing of columns, although does not fully capture the behavior of the building as a system, is the closest approach to simulate behavior of columns that undergo high constant or varying axial forces. That is by choosing boundary conditions that are representative of actual conditions, as accurately as possible. However, physical testing of a building subassembly is a more powerful tool to provide realistic information on the performance level of existing buildings under seismic loads, as well as to better demonstrate the governing failure modes of the system working together, rather than evaluating members individually. Two large-scale beam-column-slab subassemblies were tested under biaxial quasi-static, reversed cyclic loading are discussed in this report. The test specimens are replicas of elements from a non-ductile concrete moment frame building located on the UCLA campus, the Franz Tower (currently named the Pritzker Hall). The reinforced concrete building originally constructed in the late 60s consists of six levels with closely spaced perimeter columns supported on a transfer girder, with two open lower levels supported on a widely spaced column grid. The lateral force resisting system at the upper six levels consists of trapezoidal columns spaced at 4 ft. (1219 mm) on center along the perimeter of the structure, with trapezoidal beams spanning between the columns. Traditional retrofit techniques in accordance with the governing building codes and the University of California Seismic Performance Rating (UCSPC), suggested a high cost retrofit scheme with significant disruption to the architecture of the building. This is believed to be attributed to these main reasons: 1- The governing standard for seismic evaluation and rehabilitation of existing buildings, ASCE/SEI 41-13 Seismic Evaluation and Retrofit of Existing Buildings, herein referred to as ASCE 41-13, was conservative in predicting deformation capacity of building components when subjected to lateral (seismic) loading, especially when the building components fell under the non-conforming criteria, hence underestimating their performance. 2- The cross sections of the frame beams and columns were not rectangular which is the common type of cross section for typical moment frames. As a result, there was an inherent ambiguity in the capability of the non-linear modeling parameter offered by ASCE 41-13 to predict the performance achieved by the moment frames in the Franz Tower. 3- Another uncommon characteristic of this building was the aspect ratio of the moment frames (bay width/story height), which is less than 0.3 (with the beam span of 4 ft. (1219 mm) and column height of about 12. ft 9 in. (3886 mm), while aspect ratios of more than or equal to 1 are more common. Therefore, the beams were rigid and would not be able to sustain a double curvature deformation, as common in the moment frame beams. 4- The repetitive frame system around the perimeter of the building provided a high level of redundancy that was not observed in typical buildings, nor in the test data used to derive the ASCE 41-13 modeling parameters. To evaluate all the issues mentioned above, a detailed physical testing program was designed with an emphasis on obtaining the overall force-deformation backbone curve for the subassembly. In order to use the data obtained from the physical testing, it was imperative to recreate the experimental backbone curve in Perform-3D, by making necessary modifications to the modeling parameters of the building components. These modifications were based on the observed damage at each drift level, and at each building component, and included the plastic deformation capacity of the columns, flexural residual strength of the columns, and shear capacity of the beams. Those modifications were later applied to the Perform-3D model of the actual building in an attempt to assess its actual performance under seismic loading. This study presents the findings of the two biaxial tests conducted on two building subassemblies and reveals that the test specimens sustained damages beyond the Collapse Prevention and Life-Safety limits of ASCE 41-13. The specimens did not lose their gravity load-carrying capacity during the test (even after exceeding 2.5% lateral drift ratio), which also provided for a higher Expected Seismic Level Performance per UCSPR, performance rating III (seismic safety policy compliant). Finally, this study provides a holistic overview on the proposed retrofit program that includes downtime and repair costs in case of a major ground shaking, utilizing the FEMA P-58, Seismic Performance Assessment of Buildings, Methodology which was developed by the Applied Technology Council (ATC) and funded by FEMA. (ATC, 2020) This study includes building assessments per the Seismic Performance Prediction Program (SP3), including analyses per the governing standards, as well as analyses per the experimental test observations. Downtime and repair cost are of great importance to the public while not directly considered in ASCE 41-13 and other local building documents. Hence, the SP3 Risk Model Engine, was used to calculate the mean loss and time to regain function. Implementation of test data in the SP3 analysis input showed not only the retrofit program enhanced building performance in terms of life safety of the occupants, but it also showed lower expected loss, as well as significantly lower downtime in comparison to prescriptive retrofit methods.

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.

This full color manual is intended to explain the principles of seismic design for those without a technical background in engineering and seismology. The primary intended audience is that of architects, and includes practicing architects, architectural students and faculty in architectural schools who teach structures and seismic design. For this reason the text and graphics are focused on those aspects of seismic design that are important for the architect to know.

Reinforced concrete columns play a very important role in structural performance. As such, it is essential to apply a suitable analytical tool to estimate their structural behaviour considering all failure mechanisms such as axial, shear, and flexural failures. This book highlights the development of a fiber beam-column element accounting for shear effects and the effect of tension stiffening through reinforcement-to-concrete bond, along with the employment of suitable constitutive material laws.

Facing the Challenges in Structural Engineering

Design Guide for Improving Hospital Safety in Earthquakes, Floods, and High Winds

Seismic Assessment and Retrofit of Reinforced Concrete Columns

Proceedings of the 1st GeoMEast International Congress and Exhibition, Egypt 2017 on Sustainable Civil Infrastructures

Damping Technologies for Tall Buildings

National Earthquake Resilience

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.

The Encyclopedia of Earthquake Engineering is designed to be the authoritative and comprehensive reference covering all major aspects of the science of earthquake engineering, specifically focusing on the interaction between earthquakes and infrastructure. The encyclopedia comprises approximately 300 contributions. Since earthquake engineering deals with the interaction between earthquake disturbances and the built infrastructure, the emphasis is on basic design processes important to both non-specialists and engineers so that readers become suitably well informed without needing to deal with the details of specialist understanding. The encyclopedia’s content provides technically-inclined and informed readers about the ways in which earthquakes can affect our infrastructure and how engineers would go about designing against, mitigating and remediating these effects. The coverage ranges from buildings, foundations, underground construction, lifelines and bridges, roads, embankments and slopes. The encyclopedia also aims to provide cross-disciplinary and cross-domain information to domain-experts. This is the first single reference encyclopedia of this breadth and scope that brings together the science, engineering and technological aspects of earthquakes and structures.

Standard ASCE/SEI 24-05 provides minimum requirements for flood-resistant design and construction of structures located in flood hazard areas.

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.

Seismic Evaluation of Existing Buildings

The Seismic Rehabilitation of Historic Buildings

Seismic Design and Retrofit of Bridges

Encyclopedia of Earthquake Engineering

Rapid Visual Screening of Buildings for Potential Seismic Hazards: Supporting Documentation

A Manual for Architects. Fema 454 / December 2006. (Risk Management Series)

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

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.

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.

In the 1994 M[subscript w] 6.7 Northridge and 1995 M[subscript w] 6.9 Kobe earthquakes, steel moment-frame buildings were exposed to an unexpected flaw. The commonly utilized welded unreinforced flange, bolted web connections were observed to experience brittle fractures in a number of buildings, even at low levels of seismic demand. A majority of these buildings have not been retrofitted and may be susceptible to structural collapse in a major earthquake. This dissertation presents a case study of retrofitting a 20-story pre-Northridge steel moment-frame building. Twelve retrofit schemes are developed that present some range in degree of intervention. Three retrofitting techniques are considered: upgrading the brittle beam-to-column moment resisting connections, and implementing either conventional or buckling-restrained brace elements within the existing moment-frame bays. The retrofit schemes include some that are designed to the basic safety objective of ASCE-41 Seismic Rehabilitation of Existing Buildings. Detailed finite element models of the base line building and the retrofit schemes are constructed. The models include considerations of brittle beam-to-column moment resisting connection fractures, column splice fractures, column baseplate fractures, accidental contributions from "simple"' non-moment resisting beam-to-column connections to the lateral force-resisting system, and composite actions of beams with the overlying floor system. In addition, foundation interaction is included through nonlinear translational springs underneath basement columns. To investigate the effectiveness of the retrofit schemes, the building models are analyzed under ground motions from three large magnitude simulated earthquakes that cause intense shaking in the greater Los Angeles metropolitan area, and under recorded ground motions from actual earthquakes. It is found that retrofit schemes that convert the existing moment-frames into braced-frames by implementing either conventional or buckling-restrained braces are effective in limiting structural damage and mitigating structural collapse. In the three simulated earthquakes, a 20% chance of simulated collapse is realized at PGV of around 0.6 m/s for the base line model, but at PGV of around 1.8 m/s for some of the retrofit schemes. However, conventional braces are observed to deteriorate rapidly. Hence, if a braced-frame that employs conventional braces survives a large earthquake, it is questionable how much service the braces provide in potential aftershocks.

Theory, Design Guidance and Case Studies

Dynamics, Volume Two

Advanced Design Examples of Seismic Retrofit of Structures

Effects of Strength and Stiffness Degradation on Seismic Response

Experimental Study and Retrofit of a Non-Ductile Concrete Moment Frame Building Subjected to Biaxial Quasi-Static Seismic Loading

ACI 562-19 Code Requirements for Assessment, Repair, and Rehabilitation of Existing Concrete Structures (ACI 562-19) and Comment

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 st 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.

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.

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 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 pos 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 resilie 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 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 haza 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 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. W National Earthquake Resilience is written primarily for the NEHRP, it also speaks to a broader audience of policy makers, earth scientists, and emergency managers.

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 earthquak

Guide for Seismic Rehabilitation of Existing Concrete Frame & Buildings and Commentary

Techniques for the Seismic Rehabilitation of Existing Buildings

Perspectives on European Earthquake Engineering and Seismology

Structural Rehabilitation of Old Buildings

Advances in Structural Engineering

Prepared by the Design Loads on Structures during Construction Standards Committee of the Codes and Standards Activities Division of the Structural Engineering Institute of ASCE Design loads during construction must account for the often short duration of loading and for the variability of temporary loads. Many elements of the completed structure that provide strength, stiffness, stability, or continuity may not be present during construction. Design Loads on Structures during Construction, ASCE/SEI 37-14, describes the minimum design requirements for construction loads, load combinations, and load factors affecting buildings and other structures that are under construction. It addresses partially completed structures as well as temporary support and access structures used during construction. The loads specified are suitable for use either with strength design criteria, such as ultimate strength design (USD) and load and resistance factor design (LRFD), or with allowable stress design (ASD) criteria. The loads are applicable to all conventional construction methods. Topics include: load factors and load combinations; dead and live loads; construction loads; lateral earth pressure; and environmental loads. Of particular note, the environmental load provisions have been aligned with those of Minimum Design Loads for Buildings and Other Structures, ASCE/SEI 7-10. Because ASCE/SEI 7-10 does not address loads during construction, the environmental loads in this standard were adjusted for the duration of the construction period. This new edition of Standard 37 prescribes loads based on probabilistic analysis, observation of construction practices, and expert opinions. Embracing comments, recommendations, and experiences that have evolved since the original 2002 edition, this standard serves structural engineers, construction engineers, design professionals, code officials, and building owners.

Performance-Based Seismic Design (PBSD) is a structural design methodology that has become more common in urban centers around the world, particularly for the design of high-rise buildings. The primary benefit of PBSD is that it substantiates exceptions to prescribed code requirements, such as height limits applied to specific structural systems, and allows project teams to demonstrate higher performance levels for structures during a seismic event.However, the methodology also involves significantly more effort in the analysis and design stages, with verification of building performance required at multiple seismic demand levels using Nonlinear Response History Analysis (NRHA). The design process also requires substantial knowledge of overall building performance and analytical modeling, in order to proportion and detail structural systems to meet specific performance objectives.This CTBUH Technical Guide provides structural engineers, developers, and contractors with a general understanding of the PBSD process by presenting case studies that demonstrate the issues commonly encountered when using the methodology, along with their corresponding solutions. The guide also provides references to the latest industry guidelines, as applied in the western United States, with the goal of disseminating these methods to an international audience for the advancement and expansion of PBSD principles worldwide.

Solid design and craftsmanship are a necessity for structures and infrastructures that must stand up to natural disasters on a regular basis. Continuous research developments in the engineering field are imperative for sustaining buildings against the threat of earthquakes and other natural disasters. Performance-Based Seismic Design of Concrete Structures and Infrastructures is an informative reference source on all the latest trends and emerging data associated with structural design. Highlighting key topics such as seismic assessments, shear wall structures, and infrastructure resilience, this is an ideal resource for all academicians, students, professionals, and researchers that are seeking new knowledge on the best methods and techniques for designing solid structural designs.

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 their risk of collapse if hit by major earthquakes. The RVS handbook describes how to identify the structural type and key weakness characteristics, how to complete the screening forms, and how to manage a successful RVS program.

16th European Conference on Earthquake Engineering-Thessaloniki 2018

Performance-Based Seismic Design of Concrete Structures and Infrastructures

Providing Protection to People and Buildings

Research, Implementation, and Outreach

Performance Based Seismic Design for Tall Buildings

Quantification of Building Seismic Performance Factors

Because of their structural simplicity, bridges tend to beparticularly vulnerable to damage and even collapse when subjectedto earthquakes or other forms of seismic activity. Recentearthquakes, such as the ones in Kobe, Japan, and Oakland,California, have led to a heightened awareness of seismic risk andhave revolutionized bridge design and retrofit philosophies. In Seismic Design and Retrofit of Bridges, three of the world's topauthorities on the subject have collaborated to produce the mostexhaustive reference on seismic bridge design currently available.Following a detailed examination of the seismic effects of actualearthquakes on local area bridges, the authors demonstrate designstrategies that will make these and similar structures optimallyresistant to the damaging effects of future seismicdisturbances. Relying heavily on worldwide research associated with recentquakes, Seismic Design and Retrofit of Bridges begins with anin-depth treatment of seismic design philosophy as it applies tobridges. The authors then describe the various geotechnicalconsiderations specific to bridge design, such as soil-structureinteraction and traveling wave effects. Subsequent chapters coverconceptual and actual design of various bridge superstructures, andmodeling and analysis of these structures. As the basis for their design strategies, the authors' focus is onthe widely accepted capacity design approach, in which particularlyvulnerable locations of potentially inelastic flexural deformationare identified and strengthened to accommodate a greater degree ofstress. The text illustrates how accurate application of thecapacity design philosophy to the design of new bridges results instructures that can be expected to survive most earthquakes withonly minor, repairable damage. Because the majority of today's bridges were built before thecapacity design approach was understood, the authors also devoteseveral chapters to the seismic assessment of existing bridges,with the aim of designing and implementing retrofit measures toprotect them against the damaging effects of future earthquakes.These retrofitting techniques, though not considered appropriate inthe design of new bridges, are given considerable emphasis, sincethey currently offer the best solution for the preservation ofthese vital and often historically valued thoroughfares. Practical and applications-oriented, Seismic Design and Retrofit ofBridges is enhanced with over 300 photos and line drawings toillustrate key concepts and detailed design procedures. As the onlytext currently available on the vital topic of seismic bridgedesign, it provides an indispensable reference for civil,structural, and geotechnical engineers, as well as students inrelated engineering courses. A state-of-the-art text on earthquake-proof design and retrofit ofbridges Seismic Design and Retrofit of Bridges fills the urgent need for acomprehensive and up-to-date text on seismic-ally resistant bridgedesign. The authors, all recognized leaders in the field,systematically cover all aspects of bridge design related toseismic resistance for both new and existing bridges. * A complete overview of current design philosophy for bridges,with related seismic and geotechnical considerations * Coverage of conceptual design constraints and their relationshipto current design alternatives * Modeling and analysis of bridge structures * An exhaustive look at common building materials and theirresponse to seismic activity * A hands-on approach to the capacity design process * Use of isolation and dissipation devices in bridge design * Important coverage of seismic assessment and retrofit design ofexisting bridges

This report has been prepared in the framework of the Co-operation in Science and Technology (COST) Action C7 for Soil-Structure Interaction in the Urban Civil Engineering. Based on a survey in 13 European countries and with additional input from the COST C7 members, the report focuses on several aspects effecting the interaction between structural and geotechnical engineers. As the theoretical foundation for the interaction between both disciplines is laid during education, the civil engineering education system of several European countries are described and evaluated.

Seismic Rehabilitation of Existing BuildingsAmer Society of Civil Engineers

This book is a collection of invited lectures including the 5th Nicholas Ambraseys distinguished lecture, four keynote lectures and twenty-two thematic lectures presented at the 16th European Conference on Earthquake Engineering, held in Thessaloniki, Greece, in June 2018. The lectures are put into chapters written by the most prominent internationally recognized academics, scientists, engineers and researchers in Europe. They address a comprehensive collection of state-of-the-art and cutting-edge topics in earthquake engineering, engineering seismology and seismic risk assessment and management. The book is of interest to civil engineers, engineering seismologists, seismic risk managers, policymakers and consulting companies covering a wide spectrum of fields from geotechnical and structural earthquake engineering, to engineering seismology and seismic risk assessment and management. Scientists, professional engineers, researchers, civil protection policymakers and students interested in the seismic design of civil engineering structures and infrastructures, hazard and risk assessment, seismic mitigation policies and strategies, will find in this book not only the most recent advances in the state-of-the-art, but also new ideas on future earthquake engineering and resilient design of structures. Chapter 1 of this book is available open access under a CC BY 4.0 license.

HEaRT 2015

Evaluation of Contemporary Design of Reinforced Concrete Lateral Resisting Systems Using Current Performance Objective Assessment Criteria

Asce 7-98

A Retrofitting Framework for Pre-Northridge Steel Moment-frame Buildings

NEHRP Recommended Provisions (National Earthquake Hazards Reduction Program) for Seismic Regulations for New Buildings and Other Structures: Commentary

Recent Advances in Earthquake Engineering in Europe

This present book describes the different construction systems and structural materials and elements within the main buildings typologies, and it analyses the particularities of each of them, including, at the end, general aspects concerning laboratory and in-situ testing, numerical modeling, vulnerability assessment and construction maintenance.

Damping Technologies for Tall Buildings provides practical advice on the selection, design, installation and testing of damping systems. Richly illustrated with images and schematics, this book presents expert commentary on different damping systems, giving readers a way to accurately compare between different device categories and gain and understand the advantages and disadvantages of each. In addition, the book covers their economical and sustainability implications. Case studies are included to provide a direct understanding on the possible applications of each device category. Provides an expert guide on the selection and deployment of the various types of damping technologies Drawn from extensive contributions from international experts and research projects that represent the current state-of-the-art and design in damping technologies Includes 25+ real case studies collected with very detailed information on damping design, installation, testing and other building implications

Minimum Design Loads and Associated Criteria for Buildings ...

Seismic Rehabilitation of Existing Buildings

Historical Earthquake-Resistant Timber Framing in the Mediterranean Area