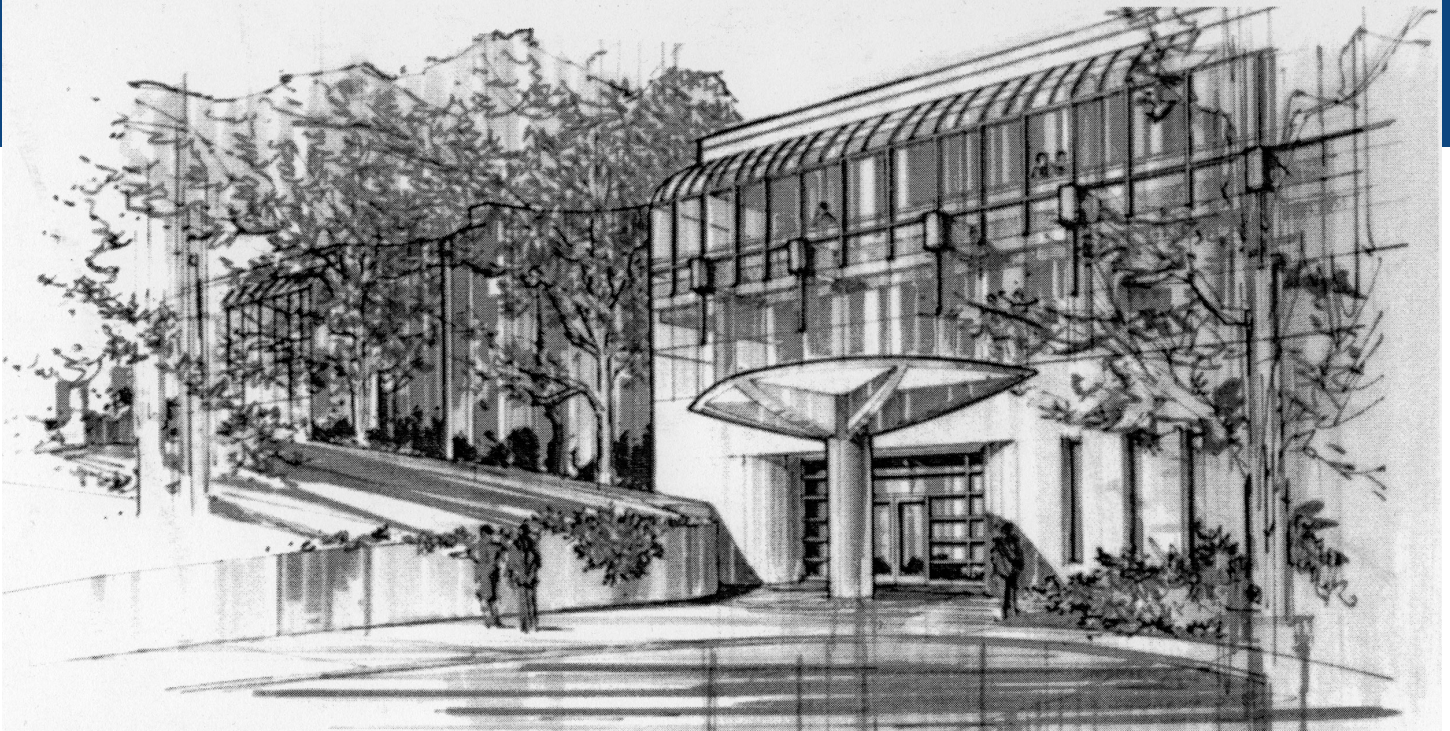




Compilation of Performance-Based Seismic Design Recommendations and Standards

HB-12(17)



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Members of ACI Committee 374, Performance-Based Seismic Design of Concrete Buildings, created and reviewed a series of helpful design aids for reinforced concrete.

Compilation of Performance-Based Seismic Design Recommendations and Standards

Overview

The following is a list of resources available for performance-based seismic design (PBSD) of buildings compiled by ACI Committee 374. The intention is to link this information to the ACI University website and the Committee 374 website, to provide a resource for ACI members to identify available guidelines, standards, and references for PBSD.

Summary List

1. ASCE/SEI 41-13 "Seismic Evaluation and Retrofit of Existing Buildings"
2. SEI/ASCE 31-03 "Seismic Evaluation of Existing Buildings"
3. FEMA P-58-1 "Seismic Performance Assessment of Buildings"
4. FEMA P695 "Quantification of Building Seismic Performance Factors" (Project ATC-63)
5. FEMA 356 "Prestandard and Commentary for the Seismic Rehabilitation of Buildings"
6. PEER/ATC 72-1 "Modeling and Acceptance Criteria for Seismic Design and Analysis of Tall Buildings"
7. Recommendations for the Seismic Design of High-rise Buildings (CTBUH)
8. "An Alternative Procedure for Seismic Analysis and Design of Tall Buildings Located in the Los Angeles Region," Los Angeles Tall Building Structural Design Council
9. ASCE 43-05 "Seismic Design Criteria for Structures, Systems and Components in Nuclear Facilities"
10. "Seismic Design of Cast-in-Place Concrete Special Structural Walls and Coupling Beams" NIST GCR 11-917-11REV-1
11. "Seismic Design of Reinforced Concrete Mat Foundations" NIST GCR 12-917-22
12. "Seismic Design of Cast-in-Place Concrete Diaphragms, Chords, and Collectors" NIST GCR 10-917-4
13. "Seismic Design of Reinforced Concrete Special Moment Frames" NIST GCR 8-917-1
14. "Case Studies of the Seismic Performance of Tall Buildings Designed by Alternative Means" Task 12 Report for the Tall Buildings Initiative, PEER
15. "Requirements and Guidelines for the Seismic Design of New Tall Buildings using Non-Prescriptive Seismic-Design Procedures," Administrative Bulletin: AB-083, SEAONC
16. "Guidelines for Performance-Based Seismic Design of Tall Buildings," PEER
17. FEMA 274 "NEHRP Commentary on the Guidelines for the Seismic Rehabilitation of Buildings"

Key

The following items are provided for each document summary. Most items are self-explanatory. A description of each item is provided to assist the reader in locating information of interest.

<i>Document Title</i>	Title of the document.
<i>Report Number</i>	Report number provided by sponsoring organization, when applicable.
<i>Year</i>	Year published.
<i>Author(s)</i>	Where a committee, organization or task group is responsible for developing the document; the author is listed as that group. If individual authors are responsible, then the individual names are provided.
<i>Organization</i>	Sponsoring organization for developing the document.
<i>URL as of March 2016</i>	Link to website where document can be found or purchased as of March 2016.
<i>Scope</i>	The extent of the subject matter included in the document.
<i>Abstract</i>	Summary of the contents of the document.
<i>Performance Levels</i>	A list of performance levels included in the document.
<i>Notes</i>	Additional details to supplement the abstract.
<i>Comments</i>	Additional information about the basis, application, or intended use of the document; or other background that may be of interest to the user.
<i>Superseded documents</i>	Previous versions of the document. The current document is intended to replace the documents listed in this field.
<i>Update Frequency</i>	If the document is updated on a regular basis, information on frequency is provided.
<i>Status</i>	Information regarding document development or planned updates.
<i>Free of Charge?</i>	Many documents can be downloaded free of charge. If there is a cost, that information is provided, but the user should check for any updates.
<i>Keywords</i>	Several key words are provided to identify significant features of the document and to assist the sure in identifying appropriate documents for particular situations.

Summary #1

<i>Document Title</i>	Seismic Evaluation and Retrofit of Existing Buildings
<i>Report Number</i>	ASCE/SEI 41-13
<i>Year</i>	2014
<i>Author(s)</i>	American Society of Civil Engineers Committee 41
<i>Organization</i>	Structural Engineering Institute/American Society of Civil Engineering
<i>URL as of March 2016</i>	http://www.asce.org/templates/publications-book-detail.aspx?id=6728
<i>Scope</i>	Seismic Evaluation of Existing Buildings
<i>Abstract</i>	ASCE/SEI 41-13 is a combination of ASCE/SEI 31-03 and ASCE/SEI 41-06 into a single standard. This combined standard has eliminated any inconsistencies that existed between the two superseded standards. The Tier 1 checklists have been modified and reorganized, and the Tier 2 methodology has been expanded. While mostly an effort to combine ASCE/SEI 31-03 and ASCE/SEI 41-06 into a single document, a number of significant technical changes have been included including more emphasis on nonlinear response history analysis, provisions for buckling-restrained braces, expanded liquefaction provisions, rocking foundation analysis procedure, updated URM provisions, and a fully updated chapter on seismic isolation and energy dissipation. An effort has been made to align ASCE/SEI 41-13 with ASCE/SEI 7 with the addition of the Basic Performance Objective Equivalent to New Building Standards (BPON). The revised standard includes performance objectives for equivalence to the design of new buildings. This set of performance objectives is intended to provide a link between ASCE 7 and ASCE 41 when a seismic evaluation or upgrade is required to be equivalent to a new building. The nonstructural performance levels were significantly changed to reflect actual earthquake performance and to better align with the intent of ASCE/SEI 7.
<i>Performance Levels</i>	Immediate Occupancy (IO); Life Safety (LS); and Collapse Prevention (CP); Damage Control; Limited Safety.
<i>Notes</i>	A combination of ASCE/SEI 41-06 and ASCE/SEI 31-03
<i>Comments</i>	
<i>Superseded documents</i>	ASCE/SEI 41-13 replaced ASCE/SEI 41-06 "Seismic Rehabilitation of Existing Buildings (2005)" and ASCE 31-03 "Seismic Evaluation of Existing Buildings (2003)".
<i>Update Frequency</i>	3 years
<i>Status</i>	
<i>Free of Charge?</i>	\$220.00 List / \$165.00 ASCE Member
<i>Keywords</i>	Seismic evaluation, seismic rehabilitation, backbone curves, analytical component modeling, nonlinear response history analysis, capacity design, hysteretic modeling

Summary #2

<i>Document Title</i>	Seismic Evaluation of Existing Buildings
<i>Report Number</i>	SEI/ASCE 31-03
<i>Year</i>	2003
<i>Author(s)</i>	American Society of Civil Engineers Committee 31
<i>Organization</i>	Structural Engineering Institute/American Society of Civil Engineering
<i>URL as of March 2016</i>	http://www.asce.org/templates/publications-book-detail.aspx?id=8113
<i>Scope</i>	Seismic Evaluation of Existing Buildings
<i>Abstract</i>	Seismic Evaluation of Existing Buildings provides a three-tiered process for seismic evaluation of existing buildings to either the Life Safety or Immediate Occupancy Performance Level. Design professionals will learn how to determine whether a building is adequately designed and constructed to resist seismic forces. All aspects of building performance are considered and defined in terms of structural, nonstructural, and foundation/geologic hazard issues. The design of mitigation measures is not addressed in this Standard. ASCE/SEI 31-03 is intended to replace FEMA 310, Handbook for Seismic Evaluation of Buildings—A Prestandard (1998). This Standard was written to: reflect advancements in technology; incorporate the experience of design professionals; incorporate lessons learned during recent earthquakes; be compatible with FEMA 356, Prestandard and Commentary for the Seismic Rehabilitation of Buildings (2000); be suitable for adoption in building codes and contracts; be nationally applicable; and provide evaluation techniques.
<i>Performance Levels</i>	Life Safety Immediate Occupancy
<i>Notes</i>	
<i>Comments</i>	
<i>Superseded documents</i>	ASCE/SEI 31-03 replaced FEMA 310, Handbook for Seismic Evaluation of Buildings—A Prestandard (1998) and will be replaced by ASCE/SEI 41-13 “Seismic Rehabilitation of Existing Buildings (2014). This document has been superseded by ASCE/SEI 41-13.
<i>Update Frequency</i>	
<i>Status</i>	
<i>Free of Charge?</i>	No (\$165)
<i>Keywords</i>	Seismic evaluation