Copyright

Copyright © 2026 Structural Engineers Association of California. All rights reserved. This publication or any part thereof must not be reproduced in any form without the written permission of the Structural Engineers Association of California.

"The International Building Code" and the "IBC" are registered trademarks of the International Code Council.

Publisher

Structural Engineers Association of California (SEAOC)
1201 J Street, Suite 200
Sacramento, California 95814
Telephone: (916) 447-1198
E-mail: seaoc@seaoc.org; Web address: www.seaoc.org

The Structural Engineers Association of California (SEAOC) is a professional association of four regional member organizations (Southern California, Northern California, San Diego, and Central California). SEAOC represents the structural engineering community in California. This document is published in keeping with SEAOC's stated mission:

> Empower our members and Member Organizations to advance the people, practice, and position of structural engineering.

Editor

International Code Council. The International Code Council is the leading global source of model codes and standards and building safety solutions that include product evaluation, accreditation, technology, codification, training and certification. The Code Council's codes, standards and solutions are used to ensure safe, affordable and sustainable communities and buildings worldwide. 888-ICC-SAFE (888-422-7233) www.iccsafe.org

Disclaimer

While the information presented in this document is believed to be correct, neither SEAOC, ICC, NCSEA nor their member organizations, committees, writers, editors, or individuals who have contributed to this publication make any warranty, expressed or implied, or assume any legal liability or responsibility for the use, application of, and/or reference to opinions, findings, conclusions, or recommendations included in this publication. The information provided in this manual does not necessarily reflect the opinions of ICC/SKGA in all aspects. The material presented in this publication should not be used for any specific application without competent examination and verification of its accuracy, suitability, and applicability. Users of information from this publication assume all liability arising from such use.

First Printing: July 2026

ISBN: 978-1-971077-12-3 (soft cover)
978-1-971077-13-0 (PDF download)

T033465

Suggestions for Improvement

Comments and suggestions for improvements are welcome and should be sent to the following:

Structural Engineers Association of California (SEAOC)
1201 J Street, Suite 200
Sacramento, California 95814
Telephone: (916) 447-1198
E-mail: seaoc@seaoc.org

Errata Notification

SEAOC has made a substantial effort to ensure that the information in this document is accurate. In the event that corrections or clarifications are needed, these will be posted on the SEAOC website at www.seaoc.org and on the ICC website at www.iccsafe.org.

SEAOC, at its sole discretion, may issue written errata.

Contents

IBC® SEAOC Structural/Seismic Design Manual

The *IBC® SEAOC Structural/Seismic Design Manual*, throughout its many editions, has served the purpose of illustrating good seismic design and the correct application of building code provisions. The manual has bridged the gap between the discursive treatment of topics in the *SEAOC Blue Book (Recommended Lateral Force Requirements and Commentary)* and real-world decisions that designers and engineers face in their practice.

The examples illustrate code-compliant designs engineered to achieve good performance under severe seismic loading. In some cases, simply complying with building code requirements may not ensure good seismic response. This manual presents various methods and procedures that extend beyond what one might use to comply with minimum code requirements and discussion of the reasons for using a specific method or procedure.

This manual comprises four volumes:

- Volume 1: Code Application Examples
- Volume 2: Examples for Light-Frame, Tilt-Up, and Masonry Buildings
- Volume 3: Examples for Concrete Buildings
- Volume 4: Examples for Steel-Framed Buildings

In general, the provisions for developing the design base shear, distributing the base-shear forces vertically and horizontally, checking for irregularities, and so on are illustrated in Volume 1. The other volumes contain more extensive design examples that address the requirements of material standards (for example, ACI 318 and AISC 341) that are adopted by the IBC. Building design examples in material-focused volumes intentionally omit repeating items addressed in Volume 1.

Each volume has been produced by a group of authors under the direction of a manager. The managers have assembled reviewers to ensure numerical accuracy and coordination with other SEAOC work and publications, most notably the *Blue Book*.

This manual is a valuable tool for engineers seeking to design buildings for good seismic response.

Kevin S. Moore, S.E.
Project Manager

Preface to Volume 2

Volume 2 of the 2024 *IBC SEAOC Structural/Seismic Design Manual* addresses the design of light-frame wood and cold-formed steel, concrete tilt-up, and concrete masonry wall building systems for seismic loading. These include the illustration of the design requirements for the shear walls and diaphragms, as were illustrated in previous editions, and important interfaces with the rest of the structure.

The design examples in this volume represent a range of structural systems and seismic systems. The design of each of these systems is governed by standards developed by the American Concrete Institute (ACI), the American Wood Council (AWC), The Masonry Society (TMS), and the American Iron and Steel Institute (AISI). The methods illustrated herein represent approaches consistent with the ductility expectations for each system and with the desired seismic response. In most cases, there are several details or mechanisms that can be utilized to achieve the ductility and resistance required, and the author of each example has selected an appropriate option. In many cases, alternatives are discussed. This Manual is not intended to serve as a building code or to be an exhaustive catalogue of all valid approaches and details.

This Manual is presented as a set of examples in which the engineer has considered the building code requirements in conjunction with the optimal seismic response of the system. The examples follow the guidelines of the SEAOC *Blue Book* and other SEAOC recommendations. The examples are intended to aid conscientious designers in crafting designs that are likely to achieve good seismic performance consistent with expectations inherent in the requirements for the systems.

Michael Cochran, S.E.
Volume 2 Manager

Acknowledgments

SEAOC is the author of the *IBC SEAOC Structural/Seismic Design Manual*. Each edition comes about through the effort of highly qualified structural engineers who contribute their expertise to writing, reviewing, and updating design examples to be consistent with best practices for seismic design. Each edition contains new examples as well as revisions to previous examples. As such, it is impractical to consistently assign authorship of examples, as most are the work, in varying degrees, of the original author and multiple later reviewers and revisers. Nevertheless, SEAOC gratefully acknowledges the contributions of these members to this volume over several editions.

Richard Bennett, Ph.D.
Wei Cheng, P.E.
Michael Cochran, S.E.
Anindya Dutta, Ph.D., S.E.
Chukwuma G. Ekwueme, Ph.D., S.E.
Jeff Ellis, S.E.
Doug Hohbach, S.E.
James Lai, S.E.
John Lawson, S.E.
Phil Line, P.E.
David McCormick, S.E.
Alan Robinson, S.E.
Buddy Showalter, P.E.
Tim Stauffer, S.E.
Doug Thompson, S.E.
Tom VanDorpe, S.E.
John Lawson, S.E.

References

Standards

ACI 318, 2019, *Building Code Requirements for Structural Concrete*, American Concrete Institute, Farmington Hills, Michigan.

AISI S100-16/S2, 2020. *North American Specification for the Design of Cold-Formed Steel Structural Members*. American Iron and Steel Institute, Washington, DC.

AISI S240-20, 2020. *North American Standard for Cold-Formed Steel Structural Framing*. American Iron and Steel Institute, Washington, DC 20036.

AISI S400-20, 2020. *North American Standard for Seismic Design of Cold-Formed Steel Structural Systems*. American Iron and Steel Institute, Washington, DC 20036.

American Wood Council, 2018, *National Design Specification for Wood Construction Including Supplements*, *NDS-18*. American Wood Council, Washington, DC.

American Wood Council, 2021, AWC *Special Design Provisions for Wind and Seismic*, American Wood Council, Washington, DC.

ASCE/SEI 7, 2016 with Supplement 1 and Supplement 3, *Minimum Design Loads and Associated Criteria for Buildings and Other Structures*, American Society of Civil Engineers, Structural Engineering Institute, Reston, Virginia.

ASCE/SEI 7/S1, December 12, 2018.

ASCE/SEI 7/S2, October 19, 2021.

ASCE/SEI 7/S3, November 3, 2021.

International Code Council, 2021. *International Building Code* (IBC). International Code Council, Washington, DC.

TMS 402-16, 2016. *Building Code Requirements for Masonry Structures*, The Masonry Society, Boulder, Colorado.

TMS 602-16, 2016. *Specification for Masonry Structures*, The Masonry Society, Boulder, Colorado.

Other References

ACI 551, 2021. *Pitfalls of Deviating from ACI 318 Slender Wall Provisions*—TechNote (ACI PRC551.3-21), Tilt-Up Concrete Technical Committee, American Concrete Institute, Farmington Hills, Michigan.

ACI 551.2R-15, 2015. *Guide for the Design of Tilt-up Concrete Panels*. American Concrete Institute, Farmington Hills, Michigan.

ACI 551.1R-14, 2014. *Guide to Tilt-up Concrete Construction*. American Concrete Institute, Farmington Hills, Michigan.

AISI D100-17, 2017, *AISI Manual*, *Cold-Formed Steel Design*. American Iron and Steel Institute, Washington, DC.

AISI D110-16, 2016, *Cold-Formed Steel Framing Design Guide*. American Iron and Steel Institute, Washington, DC.

American Wood Council, 1996, *Wood Construction Manual*. Leesburg, VA.

APA—The Engineered Wood Association, 1997, *Design/ Construction Guide—Diaphragms and Shear Walls*. From L350, Engineered Wood Association, Tacoma, Washington.

APA—The Engineered Wood Association, 2007, *Diaphragms and Shear Walls*. Engineered Wood Association, Tacoma, Washington.

APA—The Engineered Wood Association, 1993, revised, *Wood Structural Panel Shear Walls*. Report 154, Engineered Wood Association, Tacoma, Washington.

APA—The Engineered Wood Association, 1994, *Northridge*, *California Earthquake*. Report T-94-5. Engineered Wood Association, Tacoma, Washington.

APA—The Engineered Wood Association *Performance Standard For Wood-Based Structural Use Panels*. PS2-04. National Institute of Standards and Technology, Washington, DC.

APA—The Engineered Wood Association, 1997, *Plywood Design Specifications*, From Y510, Engineered Wood Association, Tacoma, Washington.

APA—The Engineered Wood Association, 1988, *Plywood Diaphragms*, Research Report 138. American Plywood Association, Tacoma, Washington.

APA—The Engineered Wood Association, 2002. *Effect of Green Lumber Framing on Wood Structural Panel Shear Wall Performance*. APA Report T2002-53. American Plywood Association, Tacoma, Washington.

APA—The Engineered Wood Association, 2005, *Using Narrow Pieces of Wood Structural Panel Sheathing in Wood Shear Walls*, *APA T 2005–08*, The Engineered Wood Association, Tacoma, Washington.

APA—The Engineered Wood Association, 2011, *Evaluation of Force Transfer around Openings—Experimental and Analytical Studies*, APA, Tacoma, Washington.

Applied Technology Council, 1995, *Cyclic Testing of Narrow Plywood Shear Walls ATC R-1*. Applied Technology Council, Redwood City, California.

Applied Technology Council, 1981, *Guidelines for Design of Horizontal Wood Diaphragms*, ATC-7. Applied Technology Council, Redwood City, California.

Applied Technology Council, 1980, *Proceedings of a Workshop on Design of Horizontal Wood Diaphragms*, ATC-7-1. Applied Technology Council, Redwood City, California.

Arevalo, Ricardo, 2012, *Tie-Down Systems for Multi-Story Wood Structures*, Wood Design Focus, Fall 2012, Forest Products Society, Madison, Wisconsin.

Bendsten, B.A. and W.L. Galligan, 1979, *Mean and Tolerance Limit Stresses and Stress Modeling for Compression Perpendicular to Grain in Hardwood and Softwood Species*, Research Paper FPL 337. US Department of Agriculture, Forest Service, Forest Products Laboratory, Madison, Wisconsin.

Bendsten, B.A. and W.L. Galligan, Vol. 29, No. 2: Pg. 42–48, 1979, *Modeling and Stress-Compression Relationships in Wood in Compression Perpendicular to Grain*. U.S. Department of Agriculture, Forest Products Research Society (Forest Products Society) Forest Products Journal, Madison, Wisconsin.

Bodwell, Patrick A., 2021. *Roof Structure Design Guide*, Verco Decking Inc., Phoenix, Arizona.

Brandow, Gregg E., Chukwuma G. Ekwueme and Gary C. Hart, 2009. *Design of Reinforced Masonry Structures*, Concrete Masonry Association of California and Nevada, Sacramento, California.

Breyer, Donald E., Kenneth J. Fridley, David G. Pollock, Jr. and Kelly E. Cobeen, 2007. *Design of Wood Structures ASD*. McGraw-Hill Book Co., New York, New York.

Bugni, David A., 1999, *"A Linear Elastic Dynamic Analysis of a Timber Framed Structure."* Building Standards, International Conference of Building Officials, Whittier, California.

Building Seismic Safety Council, 2003, *National Earthquake Hazard Reduction Program*, *Recommended Provisions for Seismic Regulations for New Buildings*, Parts 1 and 2. Building Seismic Safety Council, Washington, DC.

Cobeen, K.E., 1996, "Performance Based Design of Wood Structures." Proceedings: Annual SEAOC Convention. Structural Engineers Association of California, Sacramento, California.

Coil, J., 1999, "Seismic Retrofit of an Existing Multi-Story Wood Frame Structure," Proceedings: Annual SEAOC Convention. Structural Engineers Association of California, Sacramento, California.

Commins, A. and Gregg, R., 1996, *Effect of Hold Downs and Stud-Frame Systems on the Cyclic Behavior of Wood Shear Walls*, Simpson Strong-Tie Co., Pleasanton, California.

Commins, Alfred D., August 2008, *Rod Tie-Down Systems*, *Part 5-Inspection*, Structure Magazine, National Council of Structural Engineers Associations (NCSEA).

Cook, J., 2010, "Simplified Analysis of Wood Shear Walls with Multiple Openings" Proceedings: Annual SEAOC Convention. Structural Engineers Association of California, Sacramento, California.

Cook, R.A., 1999, "Strength Design of Anchorage to Concrete." Portland Cement Association, Skokie, Illinois.

Countryman, D., and Col Benson, 1954, *1954 Horizontal Plywood Diaphragm Tests*. Laboratory Report 63, Douglas Fir Plywood Association, Tacoma, Washington.

CUREe, 1999, *Proceedings of the Workshop on Seismic Testing*, *Analysis*, *and Design of Wood Frame Construction*. California University for Research in Earthquake Engineering.

Dolan, J.D., 1996, *Experimental Results from Cyclic Racking Tests of Wood Shear Walls with Openings*. Timber Engineering Report No. TE-1996-001. Virginia Polytechnic Institute and State University, Blacksburg, Virginia.

Dolan, J.D. and Heine, C.P., 1997a, *Monotonic Tests of Wood Frame Shear Walls with Various Openings and Base Restraint Configurations*. Timber Engineering Report No. TE-1997-001, Virginia Polytechnic Institute and State University, Blacksburg, Virginia.

Dolan, J.D. and Heine, C.P., 1997b, *Sequential Phased Displacement Cyclic Tests of Wood Frame Shear Walls with Various Openings and Base Restrain Configurations*. Timber Engineering Report No. TE-1997-002, Virginia Polytechnic Institute and State University, Blacksburg, Virginia.

Dolan, J.D., and Heine, C.P., 1997c, *Sequential Phased Displacement Test of Wood Frame Shear Walls with Corners*. Timber Engineering Report No. TE-1997-003, Virginia Polytechnic Institute and State University, Blacksburg, Virginia.

Earthquake Engineering Research Institute, 1996, "Northridge Earthquake of January 17, 1994," *Reconnaissance Report*, *Earthquake Spectra*. Vol. 11, Supplement C. Earthquake Engineering Research Institute, Oakland, California.

Ellis, Jeff, August 2012, "Designing Cold-Formed Steel Framed Lateral Force-Resisting Systems," *Structure* magazine. National Council of Structural Engineers Associations (NCSEA).

Faherty, Keith F., and Williamson, Thomas G., 1995, *Wood Engineering Construction Handbook*. McGraw-Hill, Washington, DC.

Federal Emergency Management Agency, 2021, *Seismic Design of Rigid Wall-Flexible Buildings*: *An Alternate Procedure*, *Second Edition*. FEMA P-1026. Federal Emergency Management Agency, Washington, DC.

Federal Emergency Management Agency, 2021, *Seismic Design of Rigid Wall-Flexible Buildings*: *An Alternate Procedure*, *Second Edition*. FEMA P-1026. Federal Emergency Management Agency, Washington, DC.

Ficcadenti, S.K., T.A. Castle, D.A. Sandercock, and R.K. Kazanjy, 1996, "Laboratory Testing to Investigate Pneumatically Driven Box Nails for the Edge Nailing of 3/8" Plywood Shear Walls," Proceedings: Annual SEAOC Convention. Structural Engineers Association of California, Sacramento, California.

Foliente, Greg C., 1994, *Analysis*, *Design and Testing of Timber Structures under Seismic Loads*. University of California Forest Products Laboratory, Richmond, California.

Foliente, Greg C., 1997, *Earthquake Performance and Safety of Timber Structures*. Forest Products Society, Madison, Wisconsin.

Forest Products Laboratory, 2010, *Wood Handbook Publication FPL—GTR—113*. Madison, Wisconsin.

Ghosh, A., S. Pryor, and R. Arevalo, June 2006, "Multistory Light-frame Construction: Understanding Tiedown Systems," *Structure* magazine. National Council of Structural Engineers Associations (NCSEA).

Goers R. and Associates, 1976, *A Methodology for Seismic Design and Construction of Single-Family Dwellings*. Applied Technology Council, Redwood City, California.

Gupta, R., H. Redler, and M. Clauson, 2007. "Cyclic Tests of Engineered Shear Walls with Different Bottom-plate and Anchor-bolt sizes (Phase II)." Department of Wood Science and Engineering, Oregon State University, Corvallis, Oregon.

Haygreen, J.G. and Bowyer, J.L., 1989, *Forest Products and Wood Science—An Introduction*. University of Iowa Press, Ames, Iowa.

Hess, R., 2008, "For What Planet Is This Code Written?," *Structure* magazine, November. National Council of Structural Engineers Associations (NCSEA).

Hohbach, D., S. Shiotani, 2012. *Improved Seismic Analysis of Wood Light-Framed Multi-Story Residential Buildings*, Wood Design Focus, Fall 2012, Forest Products Society, Madison, Wisconsin.

Ju, S. and Lin, M., 1999, "Comparison of Building Analysis Assuming Rigid or Flexible Floors," Journal of Structural Engineering. American Society of Civil Engineers, Washington, DC.

Knight, Brian, June 2006, *High-Rise Wood Frame Construction*. *Structure magazine*. NCSEA.

Kong, H, Eatherton, M, and Schafer, B, 2019. "Design of Fixed Base Hollow Structural Section Columns Subjected to Large Seismic Drift," Proceedings of the Annual Stability Conference, April 2019, Structural Stability Research Council, St. Louis, Missouri.

Lawson, J., 2019, "Improving the Accuracy of Wood Diaphragm Deflection Computations and Its Impact on ASCE 41 Pseudo-Lateral Force Estimates," SEAOC 2019 Convention Proceedings, Structural Engineers Association of California, Squaw Valley, California.

Lawson, John, 2007, "Deflection Limits for Tilt-up Wall Serviceability," *Concrete International*, American Concrete Institute. September.

Lawson, J., Koliou, M., Filiatrault, A., and Kelly, D., 2018. "The Evaluation of Current Wall-to-Roof Anchorage Force Provisions for Single-story Concrete and Masonry Buildings with Lightweight Flexible Diaphragms," SEAOC 2018 Convention Proceedings, Structural Engineers Association of California, Palm Desert, California.

Lawson, J. and Koliou, M., 2020. "Evaluating Second Order Effects in Rigid Wall-Flexible Roof Diaphragm Buildings," *Earthquake Spectra*, Earthquake Engineering Research Institute, Oakland, California, Vol. 36, Issue 4, November 2020.

Line, P., Hohbach, D., and Waltz, N., 2020, SEAOC Convention Proceedings, In-plane Racking Strength Tests of Wood-frame Wood Structural Panel Shear Walls Using 10d "Short" Nails.

Maguire, M. and Al-Rubaye, S, 2022, "Tilt-Up Partially Composite Insulated Wall Panels", Report to the Tilt-Up Concrete Association, Mount Vernon, Iowa.

Matteri, Dominic, 2009, *5 Over 1 High-Rise Podium Structures*, Wood Solutions Fair Presentation.

Matteson, Thor, 2004, *Wood-Framed Shear Wall Construction*. International Code Council, Country Club Hills, Illinois.

Mendes, S., 1987, “Rigid versus Flexible: Inappropriate Assumptions Can Cause Shear Wall Failures!” Proceedings: Annual SEAOC Convention. Structural Engineers Association of California, Sacramento, California.

Mendes, S., 1995, “Lessons Learned from Four Earthquake Damaged Multi-Story Type V Structures,” Proceedings: Annual SEAOC Convention. Structural Engineers Association of California, Sacramento, California.

Murphy, Michael, 2012, *Shrinkage Challenges with Mid-Rise Construction*, Wood Design Focus, Fall 2012. Forest Products Society, Madison, Wisconsin.

Nelson, R.F. and S.T. Patel, 2003, “Continuous Tiedown Systems for Wood Panel Shear Walls in Multistory Structures,” *Structure* Magazine, March. NCSEA.

Rose, J.D., 1998, *Preliminary Testing of Wood Structural Panel Shear Walls under Cyclic (Reversed) Loading*. Research Report 158, APA—Engineered Wood Association, Tacoma, Washington.

Rose, J.D., and E.L. Keith, P.E., 1996, *Wood Structural Panel Shear Walls with Gypsum Wallboard and Window [Sheathing Standard*, *Sec*. *2.3.3]*. Research Report 158. APA—The Engineered Wood Association, Tacoma, Washington.

SCCACI/SEAOSC, 1982, *Report of the Task Committee on Slender Walls*, Southern California Chapter American Concrete Institute and Structural Engineers Association of Southern California, Los Angeles, California. September.

Schmid, Ben L. (1996), *Three-Story Wood Apartment Building—1994 Northridge Earthquake Buildings Case Studies Project*, Seismic Safety Commission, State of California. Sacramento, California.

SEAOC, 1999, *Acceptable Diaphragm-Rigidity Assumptions for Distribution of Horizontal Forces in Light-Frame Construction*. Structural Engineers Association of California, Sacramento, California.

SEAOC, 1997, *Seismic Detailing Examples for Engineered Light-Frame Timber Construction*. Structural Engineers Association of California, Sacramento, California.

SEAOC, 1999, *Guidelines for Diaphragms and Shear Walls*. Structural Engineers Association of California, Sacramento, California.

SEAOC, 1999, *Plan Review—Codes and Practice*. Structural Engineers Association of California, Sacramento, California.

SEAOC Blue Book, 1999, *Recommended Lateral Force Requirements and Commentary*, Structural Engineers Association of California, Seventh Edition, Sacramento, California.

SEAOC Seismology Committee, 2009, “Anchor Bolts in Light-frame Construction at Small Edge Distances,” June, M5, M6, M7 in the *SEAOC Blue Book*: *Seismic Design Recommendations*, Structural Engineers Association of California, Sacramento, California. http://www.seaoc.org/bluebook/index.html

SEAOC Seismology Committee, 2008, "Light-frame Wall Hold-downs," August, in the *SEAOC Blue Book*: *Seismic Design Recommendations*, Structural Engineers Association of California, Sacramento, California. www.seaoc.org/bluebook/index.html

SEAOC Seismology Committee, 2019. "Tilt-up Buildings," The *SEAOC Blue Book*: *Seismic Design Recommendations*. Structural Engineers Association of California, Sacramento, California at: www.seaoc.org/bluebook/index.html

SEAOC Seismology Committee, 2007, "Wood-framed Shear Walls with Openings," May, in the *SEAOC Blue Book*: *Seismic Design Recommendations*, Structural Engineers Association of California, Sacramento, California. www.seaoc.org/bluebook/index.html

SEAOSC, 1979. *Recommended Tilt-up Wall Design*, Structural Engineers Association of Southern California, Los Angeles, California. June.

SEAOSC/COLA, 1994. *1994 Northridge Earthquake (Structural Engineers Association of Southern California/City of Los Angeles) Special Investigation Task Force*, Tilt-up Subcommittee. Final report dated September 25, 1994.

Shiotani, S., D. Hohbach, J. Roberts, 2011, *Lateral System for Multi-Unit Construction*, Wood Products Council Workshops.

Shipp, John and D. Thompson, 2001 *Timber Design I*, *II*, *and III*, *Volumes VIII*, *IX*, *and X*. Professional Engineering Development Publications, Inc., Irvine, California.

Simpson, William T. 1998. *Equilibrium Moisture Content of Wood in Outdoor Locations in the United States and Worldwide*. *Res*. *Note FPL-RN-0268*. Forest Products Laboratory, Madison, Wisconsin.

Skaggs, T.D. and Z.A. Martin, 2004. "Estimating Wood Structural Panel Diaphragm and Shear Wall Deflection." *Practice Periodical on Structural Design and Construction*. ASCE, May 2004.

SJI 100, 2020. *Standard Specification for K-Series*, *LH-Series*, *and DLH-Series Open Web Steel Joists and for Joist Girders*, *American National Standard SJI 100-2020*. Steel Joist Institute, Florence, South Carolina.

Steinbrugge, J., 1994, "Standard of Care in Structural Engineering Wood Frame Multiple Housing," Proceedings: Annual SEAOC Convention. Structural Engineers Association of California, Sacramento, California.

Technical Coordinating Committee for Masonry Research (TCCMAR), 1985. James Noland—Chairman, *U.S.-Japan Coordinated Program for Masonry Building Research*, U.S. Research Plan.

Thompson, D.S., 2009, *Four-story Wood-frame Structure over Podium Slab*. Woodworks, Tacoma, Washington.

Thompson, D.S., 2012, *Five-story Wood-frame Structure over Podium Slab*, Woodworks, Tacoma, Washington.

Thompson, D.S., 2012, *2009 IBC Structural/Seismic Design Manual*, *Volume 2*, *Design Examples 1*, *2 & 3* Structural Engineers Association of California. Sacramento, California.

VanDorpe, Tom and Andy Fennell. 2010, *2010 Building Code Update Re-tooling Your Office for Changes to the 2010 California Building Regulations that Affect Light-Frame Structures*. Orange, California.

Washington Association of Building Officials and Structural Engineers Association of Washington (WABO/SEAW) Liaison Committee, 2013, *White Paper 9-2013*: *Threaded Rod Holdown Systems in Wood Frame Buildings*, Seattle, Washington. www.wabo.org/waboseaw-white-papers

Western Wood Products Association (WWPA), November 2002, *Tech Notes Report No*. *10-Shrinkage Calculations for Multi-Story Wood Frame Construction*, Portland, Oregon.

WWPA, 1990, Dimensional Stability of Western Lumber, Portland, Oregon.

Yousefi, Ben, Son, James, and Sabelli, Rafael, 2005. *Structural Engineering Review Manual* (2005 Edition), BYA Publications, Santa Monica, California.

How to Use This Document

Equation numbers in the right-hand margin refer to the one of the standards (e.g., ACI 318, ASCE 7 or IBC). The default standard is given in the heading of each section of each example; equation numbers in that section refer to that standard unless another standard is explicitly cited.

Abbreviations used in the "Code Reference" column are

§ – Section T – Table

F – Figure Eq – Equation