A GUIDE TO THE

2015 IRC® Wood Wall Bracing Provisions

APA

ICC INTERNATIONAL CODE COUNCIL

A Guide to the 2015 IRC Wood Wall Bracing Provisions

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And

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PREFACE

A Guide to the 2015 IRC Wood Wall Bracing Provisions is jointly published by the International Code Council® (ICC) and *APA – The Engineered Wood Association* with the shared goal of promoting the accurate understanding and correct application of the *International Residential Code®* (IRC) for safer buildings and communities.

More specifically, this (the fourth) edition of the guide was developed to help building designers, builders, building officials and others using the code in the application of the lateral bracing requirements of the 2015 *International Residential Code®* (IRC). While bracing is just one of many important factors to consider when designing, performing plan review, building, or inspecting a structure, it is a common source of confusion and misapplication. The authors of this publication, a team of wall bracing experts from ICC and APA, have worked closely with the former ICC Ad Hoc Wall Bracing Committee and industry representatives over five code cycles to identify and explain the key elements of bracing and to demystify the prescriptive bracing provisions of the IRC.

Content from the 2012 edition of the guide has been carried over to the 2015 edition. The book format remains unchanged. Each page contains a reference to the section discussed at the top of the page. Sections are listed in numerical order for ease of use.

- ***CHAPTER 1*** provides background and theoretical information on the subject of wall bracing. While familiarity with the reasoning behind the wall bracing provisions will benefit all users in the application of the bracing requirements, this chapter will be of particular interest to the reader who is seeking a greater understanding of related theory and engineering principles.
- ***CHAPTER 2*** reviews the 2015 IRC provisions that are related to bracing, but are located outside of the Sections R602.10-R602.12 bracing provisions. While some of these other provisions are referenced in IRC Sections R602.10-R602.12 and others are not, they have all been compiled in this chapter in order to permit the stand-alone use of this guide. (In other words, when using this book, a copy of the 2015 IRC won't be necessary for referencing these additional provisions.) Even the experienced user of the bracing provisions may be surprised to learn how the bracing provisions are tied to other sections of the code.

- ***CHAPTER 3*** is the heart of the *Guide to the 2015 IRC Wood Wall Bracing Provisions*. The IRC Sections R602.10-R602.12 bracing provisions are completely reproduced in this chapter. After each excerpted section of the code, we provide an explanation of that section. This discussion is often accompanied by illustrations, tables and/or examples; essentially, whatever is needed to help better clarify the section. For quicker reference, the IRC Section addressed on any given page is annotated at the top of that page. For example, if you are looking for discussion on IRC Section R602.10.6.5.1 *Length of bracing*, simply thumb through pages until you locate "R602.10.6.5.1" printed on the top-outside corner (in this case, on page 198).
- ***CHAPTER 4*** features numerous whole-house design scenarios that offer application examples of various bracing methods used together in modern house plans. Some of the 2015 examples are similar to those provided in 2012, with revised scenarios and solutions. For example, there are three scenarios "solved" using the IRC Section R602.12 *Simplified wall bracing* provisions and the building plans used for the design scenarios for Section R602.10. This allows comparison of the requirements of Wall Bracing and Simplified Wall Bracing. For some dwellings, using the Simplified Method greatly decreases time spent on determining wall bracing. For others, Simplified Wall Bracing does not work.

Beyond these four chapters, this guide reviews additional bracing concepts that can be helpful when dealing with more complex applications. Drag struts/collectors, bracing for T- and L-shaped buildings (also known as the multiple-rectangle method) and interpolation are addressed in appendices following ***CHAPTER 4***. For quick reference, a two-page summary of all of the addressed bracing methods is provided in the ***2015 IRC BRACING METHODS OVERVIEW*** at the very end of this book.

Immediately following this preface is an instructional page titled ***HOW TO USE THIS GUIDE***. This page provides guidance on how and where to locate specific code section discussions, examples and the additional information provided within this guide.

Note that this guide is based on the content of the first printing of the 2015 IRC and includes errata posted through March 2015.

The authors and reviewers of this publication have over 50 combined years of bracing experience:

SANDRA HYDE, P.E., is a Senior Staff Engineer for the International Code Council where she develops books and seminars about the structural provisions of the *International Residential Code* (IRC) and *International Building Code* (IBC). Sandra has worked on development and review of the 2012 and 2015 editions of the Significant Changes to the IRC and the 2006, 2009, 2012 and 2015 editions of the Guide to the IRC Wood Wall Bracing Provisions. She has created seminars for these books as well as other structural topics. Sandra is a registered engineer in the states of Idaho and California.

EDWARD KEITH, P.E., the Senior Engineer for APA's Technical Services Division, co-authored the 2006, 2009 and 2012 editions of *A Guide to the IRC Wood Wall Bracing Provisions*. Keith graduated from Stanford University with an MS in Structural Engineering and has more than 30 years experience in wood engineering, product development and building code development. He has served on numerous national committees, including the SBCCI Standards for Hurricane Resistant Residential Construction (SSTD-10) and Seismic Resistant Construction (SSTD-13), as well as the ICC Ad Hoc Wall Bracing Committee. Keith is registered in the states of Florida and Washington.

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MERRITT KLINE is the lead Product Support Specialist for the APA Engineered Wood Product Support Help Desk. His responsibilities include providing recommendations for the proper selection and application of engineered wood products in residential and commercial construction. Kline has over 19 years of experience helping builders, designers and code officials to interpret and comply with building code provisions.

ROGER ROATCH is a Senior Engineered Wood Specialist for APA and is based in Gig Harbor, Washington. Roatch has managed the Western Region of the APA Field Services Division and currently serves the Pacific Northwest region on behalf of APA. His areas of specialty include post-frame construction, building science, jobsite forensics and IRC wall bracing. He is an ICC wall bracing seminar instructor and has presented on the topic throughout the Pacific Northwest. Roatch has co-authored the 2012 and 2015 editions of A Guide to the IRC Wood Wall Bracing Provisions. He also is the Program Developer of the online APA Wall Bracing Calculator, and APA Simplified Wall Bracing Calculator. Prior to joining APA, Roatch was a commercial construction superintendent and residential framer. He holds a BA degree in Marketing.

The book would not exist without the efforts of APA's Market Communications team, which developed the figures, edited the text, designed the pages and coordinated production of this guide. ***ANGELINE DOLLAR,*** graphic designer, was the book's lead designer. Additional support was provided by ***ANDREW STERNARD,*** senior graphic designer, ***MARILYN THOMPSON,*** market communications director, and ***DANA OHLER***, writer and editor.

And last, but certainly not the least, ICC and APA would like to express our gratitude to those from other industry organizations who provided their invaluable time and expertise to thoroughly reviewing and improving this publication. Our thanks go out to ***GARY EHRLICH, P.E.,*** Program Manager, Structural Codes and Standards, National Association of Home Builders.

International Code Council

The International Code Council is a member-focused association. It is dedicated to developing model codes and standards used in the design, build and compliance process to construct safe, sustainable, affordable and resilient structures. Most U.S. communities and many global markets choose the International Codes.

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APA – The Engineered Wood Association

Founded in 1933 and based in Tacoma, Washington, APA represents approximately 162 plywood, oriented strand board, glulam timber, wood I-joist, Rim Board, and structural composite lumber mills throughout the U.S. and Canada. Its primary functions are quality auditing and testing, applied research, and market support and development.

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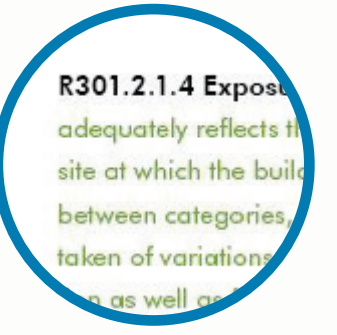
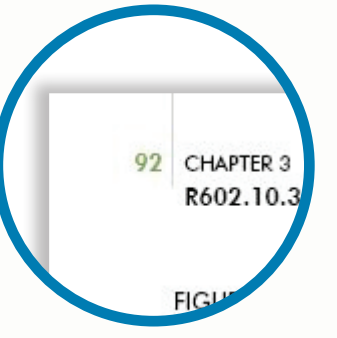
HOW TO USE THIS GUIDE

When reading *A Guide to the 2015 IRC Wood Wall Bracing Provisions*, it will be helpful to keep the following in mind:

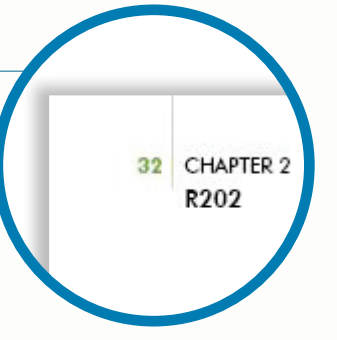


- Excerpts from the *International Residential Code*® (IRC) are printed in green text.

- Inline references to chapters, figures and tables that appear in this guide are printed in ***BOLD, ITALICIZED CAPS*** to distinguish them from references to the IRC. For example, ***FIGURE 3.2*** is a reference to the second figure in ***CHAPTER 3*** of this guide. ***TABLE 2.4*** refers to the fourth table in ***CHAPTER 2***.



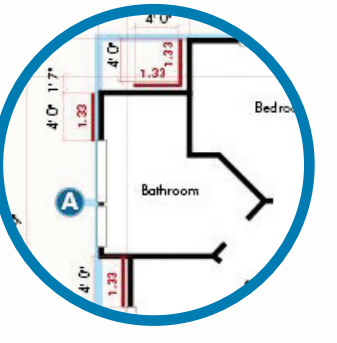
- If you have a question about a specific section in the IRC Sections R602.10-R602.12 bracing provisions, go directly to ***CHAPTER 3*** (beginning on page 75) and look for that section number printed on the top-outside corner of the page.



- To learn about an IRC provision related to bracing but outside of the IRC Sections R602.10-R602.12 bracing provisions, refer to ***CHAPTER 2*** (beginning on page 29) and look for that section number printed on the top-outside corner of the page.

- To learn more about the history, theoretical information and engineering principles behind the IRC bracing provisions, refer to ***CHAPTER 1***.

- To see examples of how to use the bracing length and related adjustment tables to determine the length of bracing, go to the ***CHAPTER 3*** examples (pages 119-146).



- To review whole-house design scenarios with application examples of various bracing methods used together in modern house plans, go to ***CHAPTER 4*** (beginning on page 249).

- To view a two-page summary of the IRC bracing methods, refer to the ***2015 IRC BRACING METHODS OVERVIEW*** table on page 310.