

A GUIDE TO THE
2012 IRC[®]
WOOD WALL BRACING PROVISIONS



A Guide to the 2012 IRC Wood Wall Bracing Provisions

ISBN: 978-1-60983-300-8

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First printing: September 2012

Printed in the United States of America

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PREFACE

A Guide to the 2012 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 third) 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 2012 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 APA, worked closely with the ICC, the ICC Ad Hoc Wall Bracing Committee and industry representatives to identify and explain the key elements of bracing and to demystify the prescriptive bracing provisions of the IRC.

While some content in this 2012 edition of the guide has been carried over from the 2006 and 2009 editions, the format of the book has changed significantly. Previous editions were divided into chapters by subject, which was adequate but not optimal for the reader who wanted to quickly search for discussion on a specific code section. To better accommodate this type of use, the 2012 guide has been reorganized into four chapters:

- **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 2012 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 2012 IRC won't be necessary for referencing these additional provisions.) Even the experienced user of the bracing provisions may be surprised to learn how these provisions are tied to other sections of the code!
- **CHAPTER 3** is the heart of the *Guide to the 2012 IRC Wood Wall Bracing Provisions*. The ICC was kind enough to allow the authors of this book to completely reproduce all of IRC Sections R602.10-R602.12 bracing provisions 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 171).

- **CHAPTER 4** features numerous whole-house design scenarios that offer application examples of various bracing methods used together in modern house plans. For consistency with the previous edition of the guide, the 2012 examples are similar to those provided in 2009, with a few revised scenarios and solutions. For example, one scenario is “solved” using the new IRC Section R602.12 *Simplified wall bracing* provisions. Other scenarios have been altered to allow for more examples based on Wind Exposure C.

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 **2012 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 third printing of the 2012 IRC.

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

EDWARD KEITH, P.E., the Senior Engineer for APA’s Technical Services Division, co-authored the 2006 and 2009 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 28 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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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. Prior to joining APA, Roatch was a commercial construction superintendent and residential framer. He holds a BA degree in Marketing.

ICC staff members who contributed to this publication include **SANDRA HYDE, P.E.**, Staff Engineer, and **JOHN HENRY, P.E.**, Principal Staff Engineer. Their contribution ran the gambit from technical to philosophical with a lot of encouragement and invaluable support. With a short production schedule for this edition, and in spite of a reduced staff and accelerated code cycle, their input was invaluable to the process and the quality of this guide.

The ICC Technical Services Department also deserves recognition for providing technical reviews of the content and working behind the scenes to keep this publication on track. Special thanks to **LARRY FRANKS, P.E.**, for providing the numerous insights and interpretations needed to complete this guide.

The authors would have been lost 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. **KELLY DEVLIN**, Writer & Web Specialist, served as lead editor and project coordinator for both the 2012 and 2009 editions of the guide. **RICK SAMPHAO**, Graphic Designer, was the book's lead designer. Additional support was provided by **MARY TRODDEN**, Typographer, and **MARILYN THOMPSON**, Market Communications Director.

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, and **DREXEL HERMANN, P.E.**, Structural Frame Engineer, Weyerhaeuser Company.

HOW TO USE THIS GUIDE

When reading *A Guide to the 2012 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 orange 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 65) 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 103-124).
- 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 221).
- To view a two-page summary of the IRC bracing methods, refer to the **2012 IRC BRACING METHODS OVERVIEW** table on page 264.

R602.10.1.3 Spacing of braced
shall be in accordance with Table
rior of the building shall be permi

s shown in **FIGURE 3.1**, braced w
s. New to the 2012 IRC, the
IRC Table R603.10.1

70 CHAPTER 3
R602.10.1.3

44 CHAPTER 2
R301.2.2.2.1

FIGURE 2.8

**Maximum dead
load weight**

