

## IRC Code Change Proposal Alert

### The Current 12 feet of Wall Bracing will Become 24 feet if RB148 is Adopted!

#### Issue

The purpose of this Tech Matters is to alert you to a residential building code issue that, if adopted, could have a significant impact. However, you have an opportunity now to help avoid this problem and influence better building solutions.

**Why should I be concerned?** In 2000, the International Residential Code (IRC) was first introduced to the building and code enforcement community. It included wall bracing provisions that greatly upgraded bracing amounts for moderate to high seismic regions of the country. Wall bracing for wind loading was not changed significantly for the IRC mainly because it is limited to low hazard wind regions with design wind speed of less than 110 mph, gust.

The wall bracing requirements in the IRC 2000, 2003 and 2006 editions, however, introduced significant changes from past practice primarily through the introduction of the concept of braced wall lines versus the traditional concept of building sides together with upgraded seismic requirements and a switch to percentages of bracing based on braced wall line, length and spacing. This caused significant impacts to building design, material usage, and construction.

In addition to the usually considered "hard construction cost" impacts, soft cost impacts included the necessary redesign of many standardized house plans offered by national builders and architectural plan firms. Some of these firms have just recently gone through this process to update to the 2003 and 2006 codes. These costs, reported anecdotally by one firm, can be as much as \$250,000 not including the industry-wide consequences of backlogged permitting offices and delayed projects in re-approving these standardized plans.

Now, the ICC is again considering a significant change in the IRC wall bracing provisions for the 2009 code development cycle (For **Proposed Changes** [Click here](#) and then scroll down to the IRC in the right hand column and pick the "[RB144 to RB168](#)" document). The proposal in question is labeled as "RB148-07/08."

#### Impact

**What is the impact of proposal RB148-07/08?** If proposal RB148 is approved, the amount of bracing that will be required in each braced wall line of a building will be typically increased by a factor of 2 or more in the lowest hazard areas of the country (e.g., most of the U.S.). In other words, where 12 feet of wall bracing may have been required in the past, 24 feet of the wall line will now require bracing.

Please see the attached PDF entitled "Comparison of Proposed Required Wind Bracing Amounts To Historic Required Wind Bracing Amounts" that was prepared by APA's Zeno Martin to help understand the impacts of RB148 and the need to consider adjustments. There are commentary comments provided

that will help the reader understand the background needed to help evaluate the comparisons made and whether or not RB148 is ready to be adopted as language for the IRC.

In addition, important engineering background on the calculation of existing IRC bracing amounts and difficulties in reconciling whole building tests with code-compliant engineering analyses is found in the following linked Wood Design Focus article -- "[The Story Behind IRC Wall Bracing.](#)" From a practical standpoint, an editorial comment is also provided below to relate the implications of RB148 to actual construction experience and observed performance of homes.

Should RB148 be adopted as 2009 code language, the new language will require many changes to existing building plans including new and different wall assembly details, revised window and door layouts or sizes, more interior wall lines that now need bracing and current wall lines with more bracing, and increased engineering costs due to greater inability to comply with the prescriptive requirements of the IRC.

### Recommended Corrective Action

**What can I do?** Code changes like RB148 should be made only when there is a depth of evidence that is consistent with solving a current life safety need or a well known technical deficiency within the code that new and thoughtfully analyzed data does expose. These are both primary drivers behind building code changes. Additionally if this process is not done carefully, the unintended consequence is that there will be no material increase in safety or performance at a greater cost to society than there should be. At this time and without being modified as was intended, RB148 does not meet this criterion for good code development. It should be disapproved. If you agree with this concern, you can (in order of effectiveness):

1. Attend the ICC code hearings and express your opinion about RB148-07/08 to the code development committee on February 18-20, 2008 in Palm Springs, California (the item will likely be heard on February 19<sup>th</sup>).
2. Contact your professional or trade organization and be sure that your concerns are adequately represented at the hearings.
3. Send a response to this e-mail (or your questions) to [jcrandell@aresconsulting.biz](mailto:jcrandell@aresconsulting.biz) with a brief statement of your opposition to RB148. A more formal letter response may have greater effect (use the content of this e-mail if desired).

The IRC code development hearings are scheduled for February 18-20 in Palm Springs, California. This hearing will consider revisions for a new 2009 edition of the IRC. Once the process is complete, the 2009 edition will begin being adopted across the country next year!

This Tech Matters has been prepared for the Foam Sheathing Coalition by:

Jay Crandell, P.E.  
ARES Consulting  
West River, MD

### Editorial Commentary – Food for Thought

A very real question that should be asked and answered by every individual is: Is the magnitude of any code change and the impact thereof justified? To put this question into context of the statistical and technical basis for wall bracing; if the wall bracing amounts currently in the IRC and in prior codes are really wrong by a factor of two in actual application, the implied probability of collapse, used for wind design loads in the IRC, for any given existing home would be such that we should be seeing over 2,700 homes collapsing each day in the low wind hazard areas of our country! (see "Think about it...")

discussion below). In reality, this is not the situation we observe. While there may be specific conditions where carefully targeted improvements are needed to address wind bracing concerns, RB148 goes well beyond a practical solution to those specific conditions. Available full scale whole building tests conclude that the magnitude of wall bracing increases proposed in RB148 are unjustifiable. RB148 should be disapproved until the judgment and theory behind its bracing amount calculations can be better justified and brought into closer agreement with actual whole building performance and successful practice.

*Think about it...Is the sky falling?*

It is important to note that this analysis is based on the assumption that all existing buildings or some major portion of existing buildings have bracing amounts that are at the code minimum. While this assumption is not necessarily accurate, it reflects a minimum benchmark from which the effectiveness of the code is measured in actual practice. The intent of what follows is to give a plausible characterization of what RB148 means in terms of actual building experience within an order of magnitude.

There are about 50,000,000 existing single family housing units mostly in the low wind hazard regions of the U.S. For these homes, a typical 90 mph design wind speed is associated with a 1 in 50 year probability (or a 0.02 annual probability of exceedance). This is the basis of safe design in the IRC. Because this design wind speed is required to be resisted with a minimum safety factor of about 2, then the doubling of bracing amounts in RB148 suggests that existing homes (new and old) in the low hazard region have been built with essentially no safety factor (i.e., will be at capacity limit) for a 90 mph design wind event (e.g., severe thunderstorm gust front). In other words, we should see homes routinely collapsing in design wind events across the nation. Since a design wind event has an annual probability of 0.02 for each building site, the total number of marginal to complete collapses in a given year should be on the order of  $0.02 \times 50,000,000 = 1,000,000$  homes per year or 2,740 homes per day!

**FSC Structural Framing Technical Contact Information**

Contact Name	Cell Phone	Office Phone	Email Address
Jay Crandell, PE	301-466-7420	410-867-9617	<a href="mailto:jcrandell@aresconsulting.biz">jcrandell@aresconsulting.biz</a>