

**Recommended Action for Dealing with Section R602.10.5,  
Continuous Wood Structural Panel Sheathing, of the 2003 and 2006 IRC  
as Supported by the ICC 2007 Supplement**

Applicability

This recommendation is intended for use in jurisdictions that are adopting or have already adopted the 2003 or 2006 International Residential Code® (IRC®). This recommendation is intended to clarify a provision in Section **R602.10.5** that is confusing, creates a serious error when interpreted incorrectly and potentially limits the choices of proven and accepted wall bracing techniques. This recommendation is limited to areas within the prescriptive wind or seismic zones of the IRC, excluding only Seismic Design Category D.

Issue

Section **R602.10.5, Continuous wood structural panel sheathing**, contains provisions for using wood structural panel sheathing, such as plywood or oriented strand board (OSB), as a method of providing Braced Wall Panels in a Braced Wall Line. The text in this section of both the 2003 and 2006 IRC creates a mandatory, and thus exclusionary, use of wood structural panels by requiring that “*all sheathable areas of all exterior walls and interior braced wall lines*” be continuously sheathed with wood structural panels whenever the continuous wood structural panel method is used anywhere on a building. This exclusionary use must occur even when only one wall may require use of this bracing method (e.g., a garage opening wall or street-facing wall with many openings requiring narrower than 48-inch-wide braced wall panels). The current language effectively excludes the use of other code-compliant wall bracing methods and sheathing products on all other walls of such buildings and unintentionally limits the use of proven and accepted wall bracing techniques. The language is written in a confusing manor and creates a serious error when interpreted incorrectly by:

- Inappropriately restricting the ability to use various proven and accepted wall bracing options and materials for wall construction in homes per IRC Section R602.10;
- Makes it more costly and difficult for builders to voluntarily offer “above-code” energy efficient homes such as Energy Star;
- Makes it more costly and difficult for builders to participate in voluntary green building programs that are growing in interest.  
Prevents “free market” competition within the construction materials market by retaining exclusionary and technically unjustified language.

## Recommended Corrective Action

Many code jurisdictions have corrected, or are in the process of correcting, the errant 2003 and 2006 IRC code language by striking the following language from Section R602.10.5:

### *Suggested Revision to the 2003 and 2006 IRC Language*

(2003 and 2006 IRC Language) R602.10.5 Continuous wood structural panel sheathing. When continuous wood structural panel sheathing is provided in accordance with Method 3 of R602.10.3 ~~on all sheathable areas of all exterior walls, and interior braced wall lines, where required~~, including areas above and below openings, braced wall panel lengths shall be in accordance with Table R602.10.5. Wood structural panel sheathing shall be installed at corners in accordance with Figure R602.10.5. The bracing amounts in Table R602.10.1 for Method 3 shall be permitted to be multiplied by a factor of 0.9 for walls with a maximum opening height that does not exceed 85 percent of the wall height or a factor of 0.8 for walls with a maximum opening height that does not exceed 67 percent of the wall height.

*Revise note 'c' of Table R602.10.5 as follows (2006 IRC only):*

c. Walls on either or both sides of openings in garages ~~attached to fully sheathed dwellings~~ shall be permitted to be built in accordance with Section R602.10.6.2 and Figure R602.10.6.2 except that a single bottom plate shall be permitted and two anchor bolts shall be placed at 1/3 points. In addition, tie-down devices shall not be required and the vertical wall segment shall have a maximum 6:1 height-to-width ratio (with height being measured from top of header to the bottom of the sill plate). This option shall be permitted for the first story of two-story applications in Seismic Design Categories A through C.

By striking this language, the requirements for Braced Wall Panels using the continuous wood structural panel sheathing method return to their intended purpose as originally developed and adopted in the 2000 IRC, which were based on research funded by NAHB and the U.S. Department of Housing and Urban Development (HUD).

**Please make this relatively simple amendment to your building code today.**

## IBC 2007 Supplement Background in Support of Suggested Revision

### Key Definitions

The following definitions are taken from the 2006 IRC and may be helpful when reviewing the content of this document.

**Braced Wall Line.** A series of braced wall panels in a single story constructed in accordance with Section R602.10 for wood framing or Section R603.7 or R301.1.1 for cold-formed steel framing to resist racking from seismic and wind forces.

**Braced Wall Panel.** A section of a braced wall line constructed in accordance with Section R602.10 for wood framing or Section R603.7 or R301.1.1 for cold-formed steel framing, which extend the full height of the wall.

The ***Suggested Revision to the 2003 and 2006 IRC Language*** provided above is consistent with the “over-hauled” provisions included in Section **R602.10 Wall bracing** of the newly published 2007 Supplement to the International Residential Code. **Relevant sections of the 2007 Supplement state (underline and highlight added for emphasis):**

**R602.10.1 Braced wall lines.** Braced wall lines, both interior and exterior, shall be provided with braced wall panels in the percentage and location specified in this section.

**Braced wall panels shall be in accordance with one of the bracing methods specified in Section R602.10.2.**

**R602.10.2 Braced wall panel construction methods.** The construction of braced wall panels shall be in accordance with one of the following methods:

1. Nominal 1-inch-by-4-inch (19.1 mm by 88.9 mm) continuous diagonal braces let in to the top and bottom plates and the intervening studs or approved metal strap devices installed in accordance with the manufacturer's specifications. The let-in bracing shall be placed at an angle not more than 60 degrees (1.06 rad) or less than 45 degrees (0.79 rad) from the horizontal.
2. Wood boards of 5/8-inch (15.9 mm) net minimum thickness applied diagonally on studs spaced a maximum of 24 inches (610 mm). Diagonal boards shall be attached to studs in accordance with Table R602.3(1).
3. Wood structural panel sheathing with a thickness not less than 3/8 inch (9.5 mm) for 16-inch (406 mm) or 24-inch (610 mm) stud spacing. Wood Structural panels shall be installed in accordance with Table R602.3(3) and Table R602.3(1).
4. One-half-inch (12.7 mm) or 25/32-inch (19.8 mm) thick structural fiberboard sheathing applied vertically or horizontally on studs spaced a maximum of 16 inches (406 mm) on center. Structural fiberboard sheathing shall be installed in accordance with Table R602.3(1).
5. Gypsum board with minimum 1/2-inch (12.7 mm) thickness placed on studs spaced a maximum of 24 inches (610 mm) on center and fastened at panel edges including top and bottom plates at 7 inches (178 mm) on center with the size nails specified in Table R602.3(1) for sheathing and Table R702.3.5 for interior gypsum board.
6. Particleboard wall sheathing panels installed in accordance with Table R602.3(4) and Table R602.3(1).
7. Portland cement plaster on studs spaced a maximum of 16 inches (406 mm) on center and installed in accordance with Section R703.6.
8. Hardboard panel siding when installed in accordance with Table R703.4.

**Exception:** Alternate braced wall panels constructed in accordance with Sections R602.10.3.2.1 or R602.10.3.2.2 shall be permitted to replace any braced wall panel in any of the above methods of braced wall panels.

**R602.10.2.1 Braced wall panel interior finish material.** Braced wall panels shall have gypsum wall board installed on the side of the wall opposite the bracing material. Gypsum wall board shall be not less than 1/2 inch (12.7 mm) in thickness and be fastened in accordance with Table R702.3.5 for interior gypsum wall board.

**Exceptions:**

1. Wall panels that are braced in accordance with Method 5.
2. Wall panels that are braced in accordance with Section R602.10.3.2 .

3. When an approved interior finish material with an in-plane shear resistance equivalent to gypsum board is installed.
4. For Methods 2, 3, 4, 6, 7, and 8, gypsum wall board is permitted to be omitted provided the percentage of bracing in Table R602.10.1(1) is multiplied by a factor of 1.5.

the alternate braced wall method of Section R602.10.3.2, or the continuous structural panel sheathing method of Section R602.10.4. **Bracing method shall be permitted to vary as follows:**

**1. Variation in bracing method from story to story is permitted.**

**2. Variation in bracing method from braced wall line to braced wall line within a story is permitted,** except that continuous structural panel sheathing shall conform to the additional requirements of Section R602.10.4.

**3. In Seismic Design Categories A and B, and detached dwellings in Seismic Design Category C, variation in bracing method within a braced wall line is permitted.** The required sheathing percentage for the braced wall line with mixed sheathing types shall have the higher bracing percentage, in accordance with Table R602.10.1(1), of all types of bracing used. Wall lines using continuous wood structural panel sheathing shall conform to the additional requirements of Section R602.10.4.

**R602.10.4 Continuously-sheathed braced wall line using Method 3 (wood structural panel).** Continuously sheathed braced wall lines using wood structural panels shall comply with this section. Different bracing methods shall not be permitted within a continuously sheathed braced wall line. **Other bracing methods prescribed by this code shall be permitted on other braced wall lines on the same story level or on different story levels of the building.**

**Exception:** All exterior braced wall lines shall be continuously sheathed where required by Section R602.10.4.7.

**R602.10.4.7 Continuously-sheathed braced wall lines.** Where a continuously-sheathed braced wall line is used in Seismic Design Categories D0, D1, and D2 or regions where the basic wind speed exceeds 100 miles per hour, all other exterior braced wall lines in the same story shall be continuously sheathed.

## Conclusion

The 2007 ICC Supplement Language was developed by the ICC Ad Hoc Committee on Wall Bracing (AHC-WB) to specifically address the issues with the previous IRC wall bracing language. This ad hoc committee was established by the ICC Board in March, 2006 due to the convincing concerns raised about the wall bracing provisions in the International Residential Code. The 2007 supplement language will form the basis for the development of the 2009 IRC. The consensus process used to develop this language included a joint effort of the ICC Ad Hoc Committee on IRC Wall Bracing (<http://www.iccsafe.org/cs/cc/ahc-wb/>), NAHB, Virginia Building Officials, AF&PA, APA, Simpson Strong-tie, the Foam Sheathing Coalition and others. The ***Suggested Revision to the 2003 and 2006 IRC***

**Language** is consistent with similar amendments or interim corrections that have been previously made or are in progress in a number of states including Georgia, Indiana, Michigan, North Carolina, Ohio, Pennsylvania, South Carolina, and Virginia.

This approach fully restores the ability for builders to use all code-compliant bracing options in the code, gives appropriate flexibility in the design and construction of homes, removes confusing language minimizes the erratic enforcement of the code, and promotes fair market competition among various wall assembly and bracing products.

As such, this allows designers and builders to use the best code-approved wall assemblies to achieve or exceed all objectives of the code for a given building inclusive of safety, affordability, energy efficiency, and other factors.

**Please make this relatively simple amendment to your building code today.**

***Technical References:***

1. HUD, 2001. Whole Structure Testing and Analysis of a Light-Frame Wood Building. U.S. Department of Housing and Urban Development, Washington, DC.
2. ICC-ES. Acceptance Criteria for Racking Shear Evaluation of Proprietary Sheathing Materials Used as Braced Wall Panels (AC 269). ICC Evaluation Service, Inc. ([www.icc-es.org](http://www.icc-es.org))
3. HUD, 1997. Performance of Long Wood-Frame Shear Walls with Varying Opening and Base Restraint Configurations Including Anchor Bolts, Hold-downs, and Corner Framing. U.S. Department of Housing and Development, Washington, DC. ([www.huduser.org](http://www.huduser.org))
4. HUD, 1998. The Performance of Perforated Shear Walls with Narrow Wall Segments, Reduced Base Restraint, and Alternative Framing Methods. U.S. Department of Housing and Urban Development, Washington, DC. ([www.huduser.org](http://www.huduser.org))
5. HUD, 1999. Perforated Shear Walls with Conventional and Innovative Base Restraint Connections. U.S. Department of Housing and Urban Development, Washington, DC. ([www.huduser.org](http://www.huduser.org))
6. HUD, 2001. Wood Shear Walls with Corners. U.S. Department of Housing and Urban Development, Washington, DC. ([www.huduser.org](http://www.huduser.org))
7. HUD, 2003. Light-Frame Wood Shear Walls with Various Overturning Restraints. U.S. Department of Housing and Urban Development, Washington, DC. ([www.huduser.org](http://www.huduser.org))
8. ICC Ad Hoc Committee on Wall Bracing ([www.iccsafe.org/cs/cc/ahc-wb](http://www.iccsafe.org/cs/cc/ahc-wb))
9. ICC 2007 Supplement <http://www.iccsafe.org/cs/codes/2007-08cycle/2007Supplement/IRC07S.pdf>.
10. National Association of Home Builders (NAHB) article regarding resolution of the 'all walls' issue, [www.nbnnews.com/NBN/issues/2006-04-03/Front+Page/4.html](http://www.nbnnews.com/NBN/issues/2006-04-03/Front+Page/4.html)

If you have any questions regarding the above technical references and justification presented in this report, please do not hesitate to contact Jay Crandell, P.E., ARES Consulting (410-867-9617, [jcrandell@aresconsulting.biz](mailto:jcrandell@aresconsulting.biz)).

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