

Blocking for Trusses at Braced Wall Panel Locations

by Jim Vogt, P.E.

**Understanding attaching
braced wall panels to roof
and floor framing.**

The wood framing details provided in the International Residential Code® (IRC®) are typically drawn assuming sawn lumber framing members. This can cause confusion about what to do when wood trusses are used. We recently received this question concerning the blocking requirements between trusses at the intersection of a braced wall panel. SBCA provides general details for blocking options with floor trusses in the *Building Component Safety Information* booklet, *BCSI*. The 2009 IRC now also includes prescriptive options for connecting the tops of braced wall panels to perpendicular roof trusses.

Question

According to the residential building code enforced in our area, blocking panels are required between framing members above and below the wall lines that are being used for bracing purposes. What is the purpose of this blocking and what do I need to do if I am using metal plate connected wood trusses?

Answer

The blocking you are referring to is required at locations where a braced wall panel intersects the roof or floor framing. The braced wall panels within a braced wall line are the primary vertical elements used to provide lateral load resistance to wind and seismic forces acting on a building.

The blocking is used to transfer the in-plane lateral loads from the braced wall panel through the floor to a braced wall panel or foundation below. The provisions for connecting the braced wall panels to the floor framing or foundation have been expanded in the 2009 IRC. Section R602.10.6 states:

R602.10.6 Braced wall panel connections. *Braced wall panels shall be connected to floor framing or foundations as follows:*

1. Where joists are perpendicular to a *braced wall panel* above or below, a rim joist, band joist or blocking shall be provided along the entire length of the *braced wall panel* in accordance with Figure R602.10.6(1). Fastening of top and bottom wall plates to framing, rim joist, band joist and/or blocking shall be in accordance with Table R602.3(1).
2. Where joists are parallel to a *braced wall panel* above or below, a rim joist, end joist or other parallel framing member shall be provided directly above and below the *braced wall panel* in accordance with Figure R602.10.6(2). Where a parallel framing member cannot be located directly above and below the panel, full-depth blocking at 16 inch (406 mm) spacing shall be provided between the parallel framing members to each side of the *braced wall panel* in accordance with Figure R602.10.6(2). Fastening of blocking and wall plates shall be in accordance with Table R602.3(1) and Figure R602.10.6(2).
3. Connections of *braced wall panels* to concrete or masonry shall be in accordance with Section R403.1.6.

Figures R602.10.6(1) and R602.10.6(2) are shown in Figure 1. They illustrate the connection requirements for a floor system using dimension lumber joists for the conditions where the braced wall panels are perpendicular and parallel to the floor framing, respectively.

at a glance

- ❑ The 2009 IRC contains new provisions in Section R602.10.6 to use blocking for connecting braced wall panels to floor truss and roof framing applications.
- ❑ Lateral load can be transferred from bottom chord bearing floor trusses is by attaching wood structural panel wall sheathing to the ends of the trusses, ribbon board, and the top plate of the wall below.
- ❑ Section R602.10.6 also includes prescriptive blocking provisions for roof trusses of varying heel heights for seismic design categories and wind speeds.
- ❑ Component manufacturers can reduce waste and save the framer time by supplying blocking panel products made from scrap lumber.

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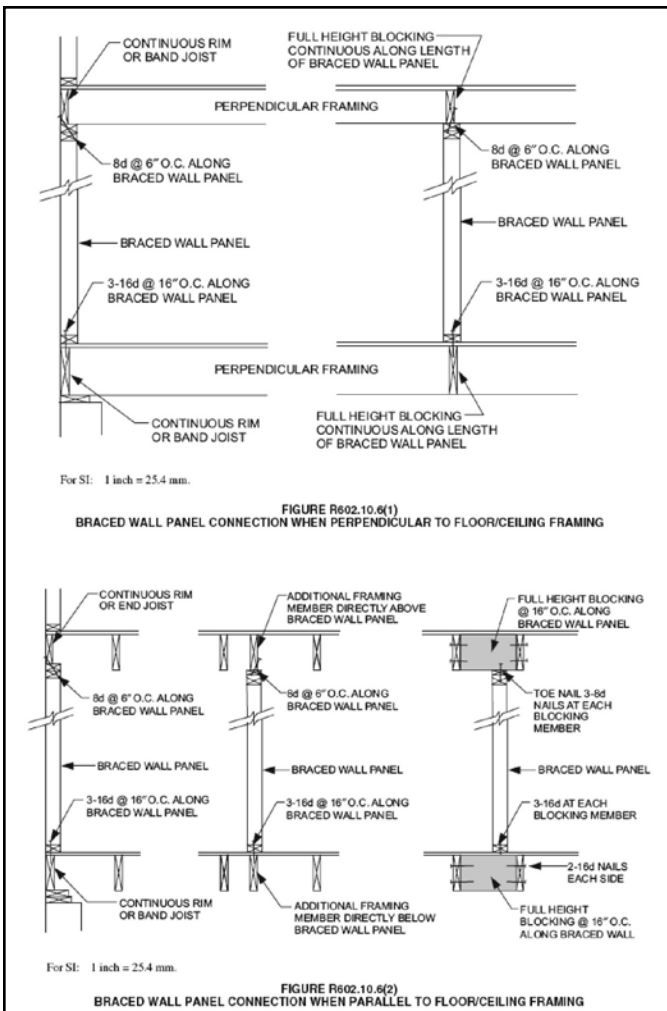


Figure 1. 2009 IRC braced wall panel connection options when perpendicular and parallel to the floor/ceiling framing.

If bottom chord bearing floor trusses are used as the floor framing, the simplest way to transfer the lateral load is by attaching wood structural panel wall sheathing (OSB or plywood) to:

1. The ends of the trusses,
2. The bottom plate of the wall above or ribbon board (if used), and
3. The top plate of the wall below using the nailing requirements for the braced wall panels.

In the absence of wood structural sheathing, metal plate connected blocking panels can be provided by the truss manufacturer (Figure 2) assuming the manufacturer is told the lateral load that the blocking panels must resist. An engineered rim board product (Figure 3) can also be used, assuming it matches the depth of the truss.

For interior braced wall panels, the open web configuration of a metal plate connected wood blocking panel offers the advantage of less interference with mechanical and plumbing runs.

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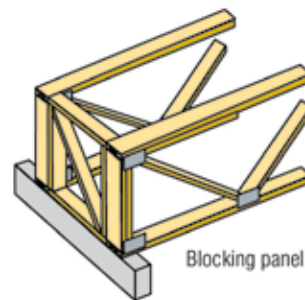


Figure 2. Metal plate connected wood blocking panel used to transfer in-plane lateral load.

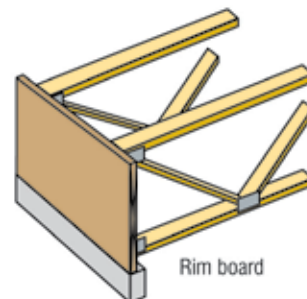


Figure 3. Rim board used to transfer in-plane lateral load.

Attaching Braced Wall Panels to Roof Framing

Section R602.10.6 includes the connection provisions for attaching braced wall panels to the roof framing. This section is new to the 2009 code and includes prescriptive blocking provisions for rafters and roof trusses of varying heel heights (i.e., the vertical depth at the outside face of the wall) for different seismic design categories (SDC) and wind speeds.

R602.10.6.2 Connections to roof framing. Exterior braced wall panels shall be connected to roof framing as follows.

1. Parallel rafters or roof trusses shall be attached to the top plates of *braced wall panels* in accordance with Table R602.3(1).
2. For SDC A, B and C and wind speeds less than 100 miles per hour (45 m/s), where the distance from the top of the rafters or roof trusses and perpendicular top plates is 9 1/4 inches (235 mm) or less, the rafters or roof trusses shall be connected to the top plates of *braced wall lines* in accordance with Table R602.3(1) and blocking need not be installed. Where the distance from the top of the rafters and perpendicular top plates is between 9 1/4 inches (235 mm) and 15 1/4 inches (387 mm) the rafters shall be connected to the top plates of *braced wall panels* with blocking in accordance with Figure R602.10.6.2(1) and attached in accordance with Table R602.3(1). Where the distance from the top of the roof trusses and perpendicular top plates is between 9 1/4 inches (235 mm) and 15 1/4 inches (387 mm) the roof trusses shall be connected to the top plates of *braced wall panels* with blocking in accordance with Table R602.3(1).
3. For SDC D₀, D₁ and D₂ or wind speeds of 100 miles per hour (45 m/s) or greater, where the distance between the top of rafters or roof trusses and perpendicular top plates is 15 1/4 inches (387 mm) or less, rafters or roof trusses shall be connected to the top plates of *braced wall panels* with blocking in accordance with Figure R602.10.6.2(1) and attached in accordance with Table R602.3(1).
4. For all seismic design categories and wind speeds, where the distance between the top of rafters or roof trusses and perpendicular top plates exceeds 15 1/4 inches (387 mm), perpendicular rafters or roof trusses shall be connected to the top plates of *braced wall panels* in accordance with one of the following methods:
 - 4.1. In accordance with Figure R602.10.6.2(2),
 - 4.2. In accordance with Figure R602.10.6.2(3),
 - 4.3. With full height engineered blocking panels designed for values listed in American Forest and Paper Association (AF&PA) Wood Frame Construction Manual for One- and Two-Family *Dwellings* (WFCM). Both the roof and floor sheathing shall be attached to the blocking panels in accordance with Table R602.3(1).
 - 4.4. Designed in accordance with accepted engineer-

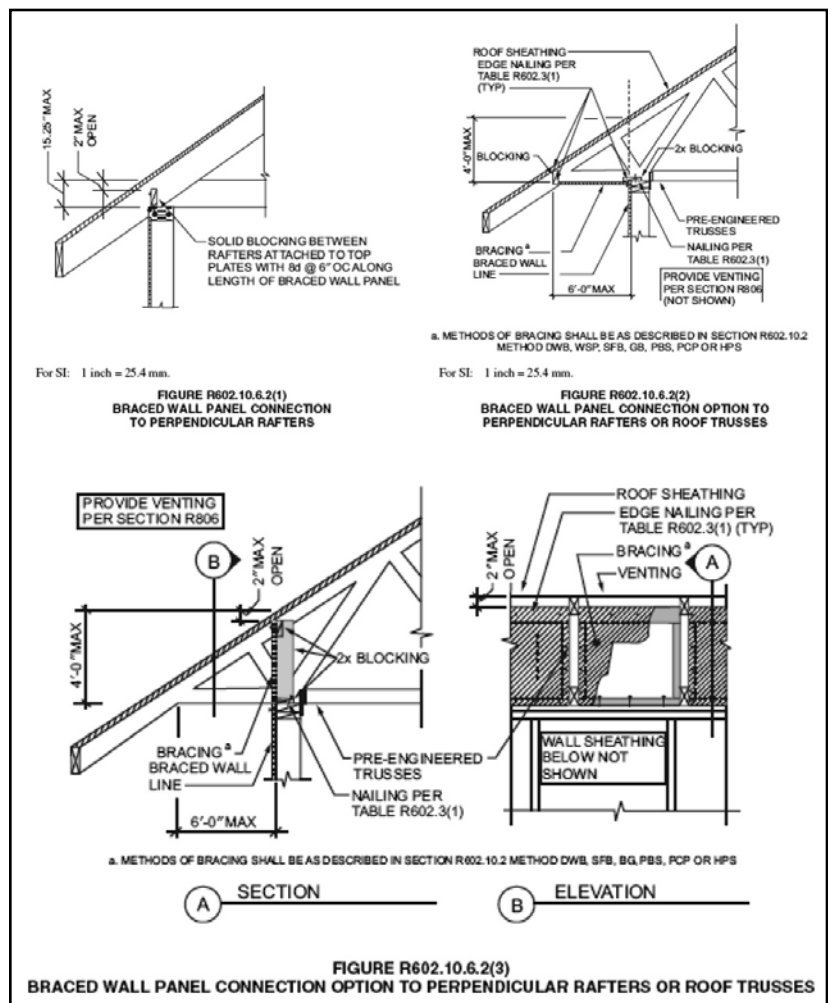


Figure 4. Braced wall panel connection options to perpendicular rafters or roof trusses per the 2009 IRC.

ing methods. Lateral support for the rafters and ceiling joists shall be provided in accordance with Section R802.8. Lateral support for trusses shall be provided in accordance with Section R802.10.3. Ventilation shall be provided in accordance with Section R806.1.

Figure 4 illustrates several braced wall panel connection options for rafters or trusses perpendicular to the wall. Note in Figures R602.10.6.2(2) and R602.10.6.2(3) that the acceptable bracing methods include several of the allowable methods used to construct the braced wall panels: diagonal wood boards (DWB), wood structural panels (WSP), structural fiber-board sheathing (SFB), gypsum board (GB), particleboard sheathing (PBS), Portland cement plaster (PCP), and hardboard panel siding (HPS). Also note that the maximum allowable heel height for these prescriptive details is 4'. For greater heights, an engineered solution is required, which could include a metal plate connected blocking panel as shown in Figure 5.

Component manufacturers should review this section of the code and consider supplying blocking panel products made with the leftover lumber pieces from the manufacturing process. It might also be possible to manufacture and inventory certain depths of blocking panels for use with common floor truss

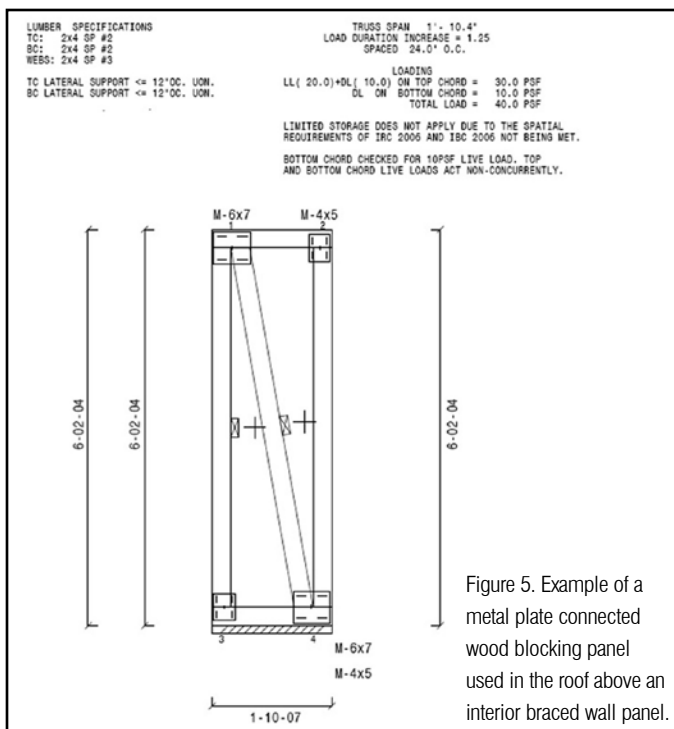



Figure 5. Example of a metal plate connected wood blocking panel used in the roof above an interior braced wall panel.

depths. This is an opportunity to reduce waste, add a product line and provide customers with an efficient and cost-effective way to comply with building code requirements. **SBC**

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