Technical Q & A

Fire Resistance Rated Truss Assemblies

When fire resistance rated construction is required in a design, where do building designers find approved fire rated wood truss assemblies?

by WTCA Staff

With the growth in the use of wood trusses in commercial and multi-family construction, the building components industry is more often working with fire resistance rated construction as required by building codes. In this type of construction, floor and ceiling assemblies, as well as attic separation assemblies, sometimes need to have fire resistance ratings such as 1- or 2-hour ratings. These ratings are determined according to the ASTM E 119 test, and designs documented by approved sources meet the requirements of the building code.

The designs include variables such as truss depth, layers of gypsum, resilient channel, insulation allowed, suspended ceiling, ductwork, and sheathing thickness. Continued testing of new designs is providing more flexibility in designing fire resistance rated construction with wood trusses.

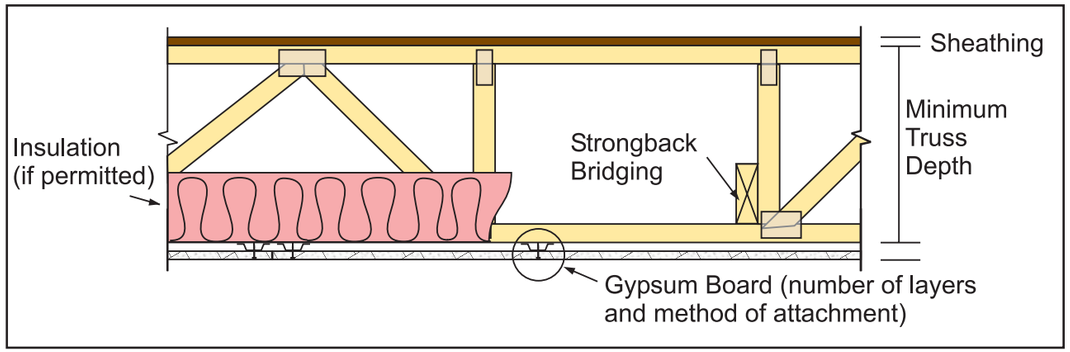

Figure 1.

As always, it is important that the building designer know the requirements for fire rated construction and the details of the fire rated assemblies before specifying the trusses. A good place for a building designer to start is WTCA's Fire & Wood Trusses webpage: **www.sbcindustry.com/fire.php**. There are links and documents for fire rated construction, including a pdf of the **Truss Technology in Building** brochure *Fire Resistance Rated Truss Assemblies.* This document provides summaries of construction details for fire rated wood truss assemblies and offers a quick way to zero in on the assemblies that could meet the needs of a building design.

Question

Is there a 1-hour rated ceiling assembly that uses only one layer of gypsum and no metal furring channel?

Answer

There are four assemblies shown in WTCA's *Fire Resistance Rated Truss Assemblies* document that meet these criteria:

1. **GA FC5517 and TPI/WTCA FC-392**[1]. This assembly does not include insulation. However, the assembly can be modified to accommodate insulation by increasing its depth by the depth of the proposed insulation and installing this insulation above the original depth of the assembly. This assembly requires wood blocking secured with metal clips to back the gypsum panel seams.
2. **NER 392 WTCA FR-SYSTEM 1™**. Like the previous example, this assembly does not include insulation, but can be modified to accommodate it. It also has backing behind the gypsum seams, but instead of wood blocking it uses FR-Quik Channel Sets™.
3. **WH TSC/FCA 60-06.** This assembly allows insulation installed low in the plenum space. It requires TrusGard Protective Channels to be applied to the bottom chord of each truss.
4. **NER-392 FR-SYSTEM 5™**. This assembly also allows insulation to be installed low in the plenum space. It requires a two-inch nominal wood shield member applied to the bottom of each truss, and FR-Quik Channel Sets as backing behind gypsum panel seams.

The building designer should consult the agency's documentation for complete information. For quick links to complete documentation of these assemblies, visit **Support Docs** at **www.sbcmag.info**.

Question

For fire separation, is there an approved truss assembly that could replace a non-structural 2x6 framed rake wall in the attic space?

Answer

Fire Resistance Rated Truss Assemblies shows an assembly, UL U338 (see Figure 2), that is used in this situation. With one layer of 5/8" gypsum on each side, it has a 1-hour rating. Though a summary description of this assembly can be seen in the document, the building designer should also see a more detailed description on **Support Docs** at **www.sbcmag.info**.

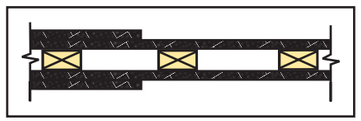

Figure 2.

Question

As originally designed by the architect, 18" deep open web floor trusses cross and bear on a 2-hour fire rated wall in the center of the building. The structural engineer wants to change this for fire separation, rotating the trusses to be parallel with the wall. Should the architect's original design be acceptable to the city building official?

Answer

This depends on whether the floor-ceiling assembly also has a 2-hour fire rating. If it is not rated or it has a lower rating, the trusses can't penetrate the 2-hour rated wall. The wall must form a continuous fire rated partition from floor to roof. To do so, it must run from the top of one floor to the underside of the floor sheathing of the floor above (see Figure 3). The engineer' s suggestion to rotate the trusses to be parallel with the wall is then appropriate.

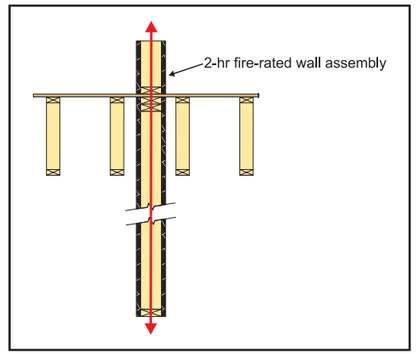

Figure 3. Continuity.

If the floor-ceiling assembly has a 2-hour fire rating, the 2-hour wall can be penetrated by the trusses. In this case the combination of rated wall and rated ceiling creates compartments that contain fire (see Figure 4). Then the architect's original design should be acceptable to the building official.

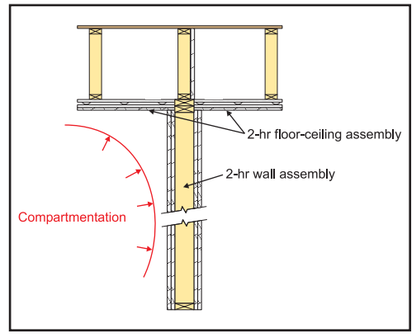

Figure 4. Compartmentation.

However, if the fire rated wall is defined as a Fire Barrier Wall (IBC 702.1 Definitions - see Figure 5) according to the code, the engineer's design would be required whether or not the floor-ceiling assembly has a 2-hour fire rating. If the wall is a Fire Barrier Wall, it must penetrate the floor structure "to the underside of the floor or roof slab or deck above" (IBC 706.4 Continuity). SBC

To pose a question for this column, call the WTCA technical department at 608/274-4849 or email technicalqa@sbcmag.info.

FIRE BARRIER. A fire-resistance-rated wall assembly of materials designed to restrict the spread of fire in which continuity is maintained.

Figure 5.

at a glance

- These ratings are determined according to the ASTM E 119 test and designs documented by approved sources meet the requirements of the building code.
- A good place for a building designer to start is WTCA's Fire & Wood Trusses web page: www.sbcindustry.com/fire.php.

[1] This report can be ordered from the Truss Plate Institute at www.tpinst.org.

STRUCTURAL BUILDING
COMPONENTS™
THE FUTURE OF FRAMING

www.sbcmag.info

Dear Reader:

The mission of ***Structural Building Components Magazine (SBC)*** is to increase the knowledge of andto promote the common interests of those engaged in manufacturing and distributing of structuralbuilding components to ensure growth and continuity, and to be the information conduit by stayingabreast of leading-edge issues. SBC will take a leadership role on behalf of the component industryin disseminating technical and marketplace information, and will maintain advisory committees consisting of the most knowledgeable professionals in the industry. The opinions expressed in SBCare those of the authors and those quoted solely, and are not necessarily the opinions of any of theaffiliated associations (SBCC, WTCA, SCDA& STCA) .

Truss Publications, Inc.

6300 Enterprise Lane • Suite 200 • Madison, WI 53719
608/310-6706 phone • 608/271-7006 fax
www.sbcmag.info • admgr@sbcmag.info