Is it acceptable to place a scissor truss adjacent to a flat-bottomed gable on an exterior wall?

The answer is NO. The gable truss should be the same scissor profile as the common scissor. See Figure 1 below for an example of this scenario.

Figure 1

Why is this practice discouraged and what does the code say about it?

Chapter 23, Section 2308.5.1 of the IBC 2018 code states the following:

> **Size, height and spacing.** The size, height and spacing of studs shall be in accordance with Table 2308.5.1 except that utility-grade studs shall not be spaced more than 16 inches (406mm) o.c., or support more than a roof and ceiling, or exceed 8 feet (2438 mm) in height for exterior walls and load-bearing walls or 10 feet (3048 mm) for interior non load-bearing walls. Studs shall be continuous from a support at the sole plate to a support at the top plate to resist loads perpendicular to the wall. The support shall be a foundation or floor, ceiling or roof diaphragm or shall be designed in accordance with accepted engineering practice.

Chapter 6, Section R602.3 of the IRC2018 similarly states the following:

> Studs shall be continuous from support at the sole plate to a support at the top plate to resist loads perpendicular to the wall. The support shall be a foundation or floor, ceiling or roof diaphragm or shall be designed in accordance with accepted engineering practice.

The key element of these code passages is that the top of the wall must be supported at the roof or ceiling diaphragm. When the end wall is constructed such that the top plate is level with the exterior walls, there is no diaphragm at the intersection of the wall and a flat-bottomed gable truss (see photo in Figure 1 above).

Page 50 of the BCSI-B3 states the following:

⚠ CAUTION A Flat Bottom Chord Gable End Frame used with adjacent Trusses that have sloped bottom chords (see figure B3-42B) creates a hinge in the wall/gable interface that is below the Bottom Chord plane diaphragm. This condition is prohibited by some Building codes because adequate Bracing of this condition is difficult and sometimes impossible. Special end wall Bracing design considerations are required by the Building Designer if the Gable End Frame profile does not match the adjacent Trusses.

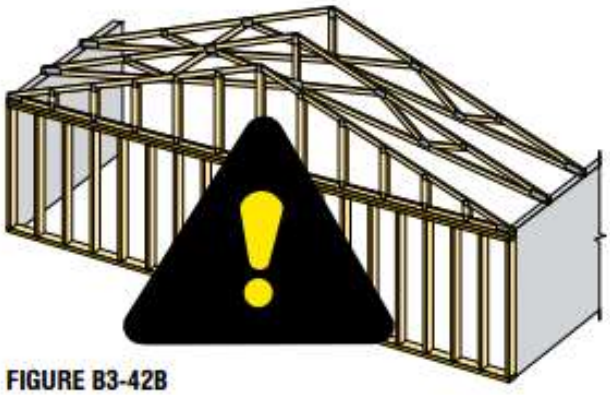
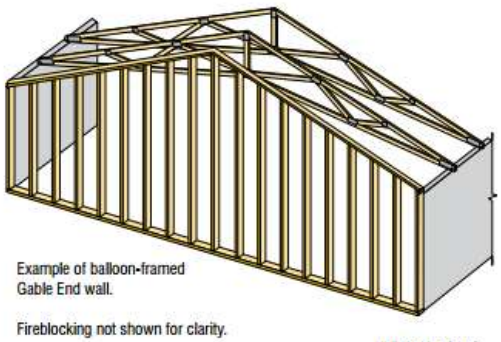


FIGURE B3-42B

What is the best way to design a gable end frame to eliminate this bracing issue?
Best practices show that a Building Designer has better design options at their disposale. One method is to design a balloon-framed end wall, which will completely eliminate any need for a gable end frame. Another method is to use a gable end frame, but to make it match the profile of the adjacent scissor trusses so that the bracing can be installed correctly.

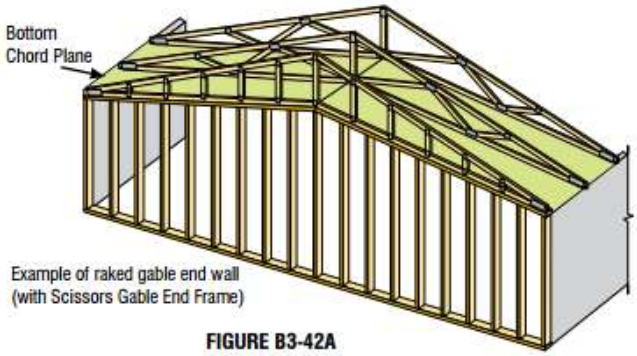
See Figures B3-41 and B3-42A below from BCSI-B3 for examples of each of these solutions:



Example of balloon-framed Gable End wall.

Fireblocking not shown for clarity.

FIGURE B3-41



Example of raked gable end wall (with Scissors Gable End Frame)

FIGURE B3-42A

What is the risk of continuing to install scissor trusses next to flat bottomed gable ends?

1. Not all Professional Engineers are willing to seal trusses containing this scenario. If a Professional Engineer does put their seal on this, there may be a note calling attention to said scenario on the truss drawing in which it will state that the lateral bracing is the responsibility of the Engineer of Records.

2. Due to the lack of proper lateral bracing and the hinge created across the bottom of the flat bottomed gable end, this gable end truss will have very little resistance to any horizontal pressure/lateral loads that might be applied on the wall during inclimate weather. See Figure 2 as an example.

Figure 2

For additional information, or if you have questions, please contact the MiTek Engineering department.