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Technical Edge

"Hinged Trusses" by Pat McGuire

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PHOTO COURTESY OF PATRIOT HOMES**

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It is the best of times. It is the worst of times. (Please excuse me, Charles Dickens.) It is the best of times for truss manufacturers. The economy is good. We're all busy.

Surprisingly, it is the worst of times for many manufacturers of factory built housing. Over the years they have based their business on affordable pricing. The economy is so good now, that many of their potential customers can afford traditional on-site built houses. These homeowners perceive site-built as superior in large part because factory builders have let themselves become identified with the low end of the market. Factory built housing manufacturers are also learning that Americans really prefer complicated and interesting roof lines. Of course, this is nothing new to truss manufacturers. When was the last time you produced a straight run of 5/12's and two gables for a house?

So, housing manufacturers are searching for ways to upgrade their product in the eyes of consumers. Perhaps the greatest challenge they face is the fact that their units

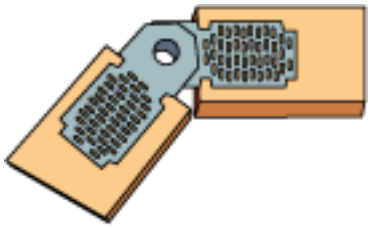

**FIGURE 1. A HINGED PLATE FROM MITEK
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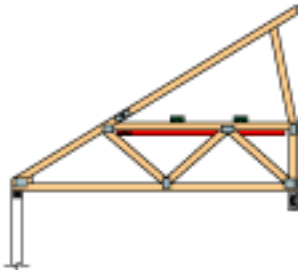

**FIGURE 2. UNSHEATHED COMPRESSION CHORDS MUST BE STABILIZED WITH LATERAL BRACES (GREEN)
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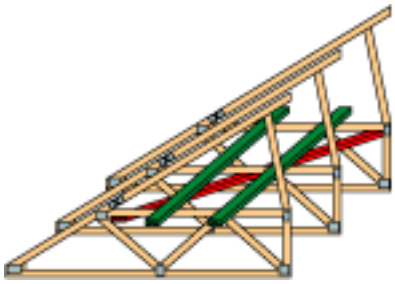

**FIGURE 3. THE SYSTEM OF LATERAL BRACES MUST BE STABILIZED WITH DIAGONAL BRACES (RED) EVERY 20 FEET PER WTCA'S WARNING POSTER AND TPI's HIB-91.
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must be able to be transported over the highway. Thus,
one traditional way of achieving a more interesting roof line is gaining prominence—hinged metal plate connected trusses. (See Figure 1.) The trusses are manufactured with a “hinge plate” splice in the top chord. In the field the truss is unfolded to produce a high pitched roof line. See the photos, courtesy of Patriot Homes.

In a standard truss the top chord carries both bending and axial forces. The structural design of the typical hinged truss differs because, in effect, the hinged truss has two top chords. (See Figure 2.) The top chord from the hinge plate to the peak carries almost all the bending forces produced by the weight of the shingles, sheathing, snow, etc. The long horizontal “web” carries almost all of the compression force caused by these loads. Every truss manufacturer knows that long compression members need to be laterally braced or they will buckle. Unfortunately, many factory builders do not have a good understanding of this.

First, if you start to talk about lateral braces, you will only get blank stares. You have to call them “rat runs” before anyone begins to understand you. Many manufacturers who use hinged trusses also do not understand the importance of stabilizing the entire lateral bracing system. WTCA's Commentary on Permanent Bracing does a good job of explaining that it takes X braces, or their equivalent, to keep all the webs from buckling in the same direction. (See Figure 3.) WTCA has also developed “Web Member Permanent Bracing: Brace It for Stability,” as part of its Truss Technology for Builders series to communicate this information (see sample below).

So the bad news is that we have a whole new set of customers to educate about permanent bracing. The really good news is that all manufacturers of factory built housing must have strong quality control programs. Once we educate the factory builders we are virtually assured that the lateral braces will be installed and stabilized correctly from that time forward.

Pat McGuire, P.E. is Vice President of Borkholder Buildings, Nappanee, Indiana.
Mr. McGuire also served as President of WTCA in 1995.

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