# The Cure for Rising Trusses

*by Henri de Marne*

Thousands of houses built with roof trusses are experiencing a very noticeable crack in the drywall finish at the joints of interior walls and ceilings.

The separation generally begins to occur in the fall and remains throughout winter and early spring. It often disappears entirely during the late spring or summer.

This phenomenon is called by a variety of names: truss uplift, rising-truss, ceiling-partition separation, etc., but I prefer the name "rising-truss syndrome" coined a number of years ago by the NAHB Research Foundation. Somehow it seems to give it an extra dimension that is appealing.

Why does it occur? Is there a remedy? These are questions I am frequently asked by builders and homeowners as well.

A truss is a building component made of several parts that work with each other to transfer loads, thus permitting longer spans with smaller members.

When trusses are manufactured, stacked, stored, and installed, all their parts are in temperature and moisture equilibrium. But once the ceiling is insulated, the rules of the game change, particularly since levels of insulation are considerably higher now than they were 15 years ago.

During the warm and humid weather of late spring and summer all parts of the truss absorb moisture and expand. They are in a state of equilibrium similar to that present at the time of installation.

But as fall rolls on and the heat is turned on, the bottom chords, cozily nestled in fiberglass, cellulose, or rock wool insulation, begin to release the stored moisture at a faster rate than the top chords and webs which are exposed to colder air.

Thus, the bottom chords shrink in both length and width, while the other members remain in a cold and humid environment.

During the heating season, moisture from the living spaces is also slowly finding its way into the attic through joints, and holes in the vapor retarder. It migrates into the open attic space resulting in a sharp increase in relative humidity.

Consequently, the truss members not covered by insulation are bathed by cold and very moist air, which prevents their drying. The upper truss members may even absorb additional moisture. Thus the top chords retains their dimension or can even lengthen slightly while the bottom chord shrinks in length and width. The result is the familiar arching which causes the ceiling and wall to separate.

This problem is particularly acute in the first year of a house and may be less so in succeeding winters.

It is not a structural problem. The movement is actually very small, seldom exceeding a fraction of an inch. However, it distresses homeowners.

Truss uplift varies in degree depending on the type of wood used and how dry it was when the trusses were manufactured. Quality wood is not as prone to longitudinal expansion and contraction as juvenile or compression wood. Nor is kiln-dry wood, but it does occur to some degree with all types of wood.

### What *Not* To Do

Under no circumstances should you attempt to prevent this arching by attempting to mechanically fasten the bottom chords of trusses to the plates or studs of interior partitions. The result would be far worse than the small cracks that normally develop. The rising truss can pull up the top plate and damage the drywall at the top of the walls as the fasteners are pulled up. Or the entire interior wall can be pulled up causing a crack at the floor.

To repair the separation, do not shim the space between the bottom chord of the truss and the top plates. This may cause the interior walls to become bearing (without proper support underneath) when the trusses go down in the spring. And this in turn can cause the ends of the trusses to pull off the exterior bearing walls, cracking the joints there.

And certainly do not cut the webs to release the arching pressure.

### Prevention

The easiest and surest way to eliminate truss uplift is to omit all insulation in the attic—or at least reduce it considerably. This of course is impractical, so we'll look at other ways to minimize the problem.

- If trusses come with an upward camber built in, do not force them down to fasten them to the interior wall plates as this would increase the stresses later on. Shim them instead.
- When trusses are delivered, cover them up and, once erected, paper the roof immediately.
- Be as careful as you can installing the ceiling vapor retarder and seal all holes around pipes and wires to reduce convection of interior moist air into the attic. Some builders insist that there should be no ceiling vapor retarder so moisture can escape into the ventilated attic, a practice no authority I am aware of recommends. It is best to install the ceiling vapor retarder prior to erecting the interior partitions, instead of stapling it to the top partition plates, so it will not risk being torn if the trusses rise.
- Follow the *Recommended Specifications for the Application and Finishing of Gypsum Board* by the Gypsum Association (write for them at 1603 Orrington Ave., Evanston, IL 60201).

The Association recommends floating interior corners to minimize or eliminate nail popping caused by shrinkage and settlement of lumber and buildings.

To accomplish this, do not fasten ceiling drywall within 12 to 16 inches of the interior walls. Instead, rely on the taped corner joint to hold the drywall together, allowing the ceiling boards to flex as the bottom chords of the trusses arch. Better yet, use drywall clips to hold the drywall flush with the top plate—thus relieving the strain on the taped joint.

- Provide ample attic ventilation by means of continuous soffit and ridge venting with unobstructed air circulation at eaves. The air space at the eaves should be at least 1-1/2 inches deep.

### Cure

Where these precautions were not taken and damage has already occurred, probably the simplest permanent solution is to hide the crack with a slip-joint molding.

Nail, (or glue with a construction adhesive) the bed, crown, or cove mold to the bottom of the trusses only. The molding will follow the truss up and return down with it in the spring. The crack is still there, and, unfortunately, convection of warm moist interior air into the attic will still occur, but the crack will be hidden.

### Look First

Finally, don't jump to conclusions. Examine all cases of separation to determine whether they are due to the rising-truss syndrome or perhaps a more serious cause such as frost heave or expansive soil movement. ■

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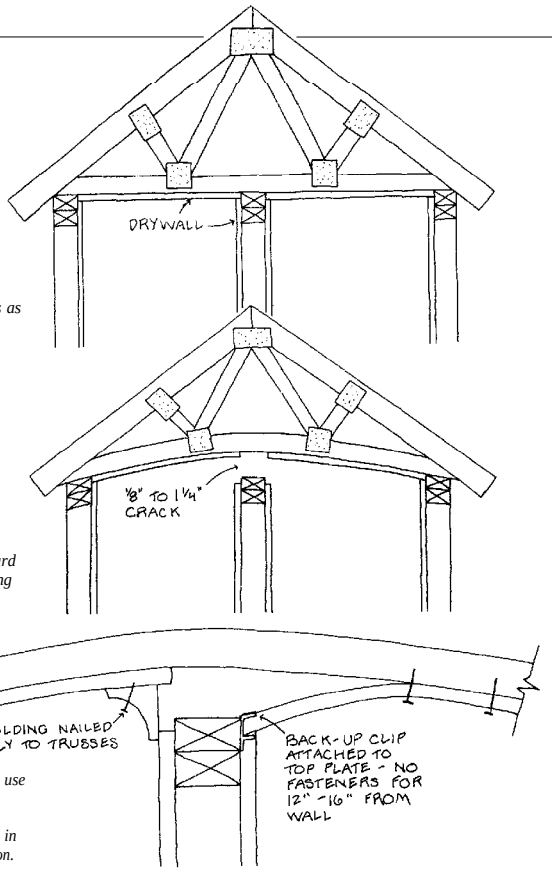


*The new truss as installed.*

*Arched upward the first heating season.*

*Two solutions: use a molding in retrofits, or a floating corner in new construction.*