



Technical Q & A

Second Story Wall Girders

by Steve Kennedy, Lumber Specialties

One component manufacturer shares how he handles the question of wall girders in second story framing.

This installment of **Technical Q & A** was submitted by Steve Kennedy, an engineer at Lumber Specialties in Dyersville, IA. Framers and general contractors sometimes request that he modify the framing plans to include wall girders in second story framing. He finds he must explain that in many cases, wall girders cannot be used because it is nearly impossible to brace the compression top chord of a girder when it is placed in a wall. He recommends moving the girder into the lower roof framing as he explains below.

Question

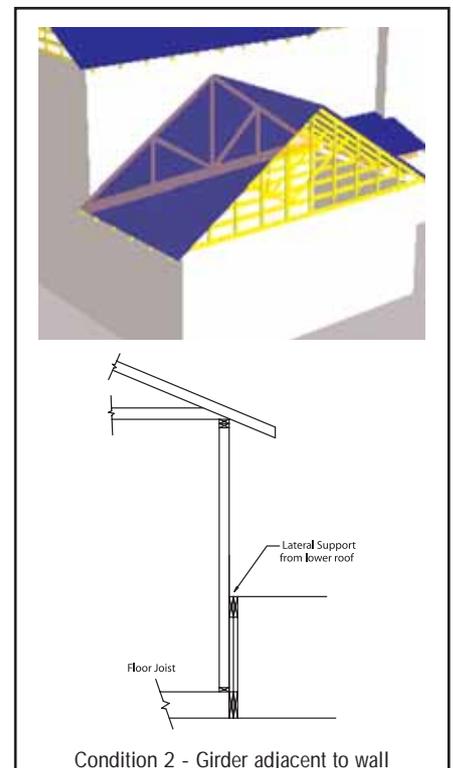
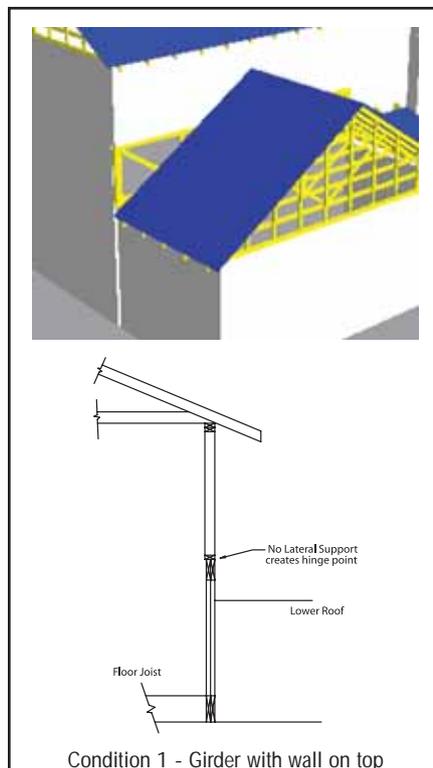
How important is it to brace the top chord of a girder truss? Can a wall sitting on top of a girder, running parallel, provide adequate bracing?

Answer

The answer to the first question is that top chord bracing is very important. The answer to the second question is no, the wall by itself cannot provide adequate bracing for the girder truss. The top chord(s) of girder trusses can see very high compressive forces, which in turn, can cause the chord to buckle out of plane. Adequate sheathing or bracing **MUST** be provided to resist these buckling forces. A wall running parallel to the girder truss, even if it is sheathed, typically cannot resist these types of forces. The second floor wall, as shown in Condition 1, cannot provide lateral resistance for the girder truss. The girder should be designed to match the lower triangular trusses, as shown in Condition 2, so that the sheathing from this section can be attached directly to the top chord of the girder and provide necessary bracing for the top chord.

at a glance

- ❑ Generally, wall girders cannot be used in second story framing because it is nearly impossible to brace the compression top chord of a girder when it is placed in a wall.
- ❑ The top chord(s) of girder trusses can experience very high compressive forces, which can cause the chord to buckle out of plane.



One should always check the truss design drawing for bracing requirements. Some truss design drawings will specify the on-center bracing requirements for the truss chords when no sheathing is directly applied; other truss design drawings just assume that sheathing continuously braces the chords. If the drawings do not specifically mention sheathing or bracing, one can only assume that the chords must be sheathed. Listed below is an example of a sheathing/bracing note from a wall girder truss design drawing.

BRACING	
TOP CHORD	2-0-0 oc purlins (2-5-10 max.): 1-5, except end verticals.
BOT CHORD	Rigid ceiling directly applied or 10-0-0 oc bracing.
JOINTS	1 Brace at Jt(s): 1, 5

If the truss is designed to be installed as shown in condition 1, there is no way to provide top chord lateral braces at the 2-5-10 maximum on center spacing. Other than the bracing requirements, there are several other reasons why one might prefer to keep the wall girder outside of the second floor wall:

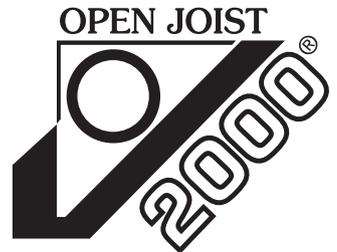
1. The contractor avoids cutting each stud to fit the adjacent roof truss girder shape.
2. It is difficult to insulate the wall cavity between the girder webs.
3. It is difficult to run electrical and mechanical items through the girder truss.
4. Cracks in the drywall can easily form between the girder truss and wall transition.

When the girder is placed outside of the wall, additional loads will be transferred to the bottom chord of the girder and the hangers used to attach the floor members to the girder bottom chord must be sized accordingly. Ultimately, the final decision regarding girder location needs to be addressed by the Building Designer (e.g., the owner, architect, engineer, or the contractor of the building) in concert with the Truss Designer. **SBC**

Steve Kennedy has over twenty years of experience in the metal plate connected wood truss industry. He has worked for several component manufactures and two plate suppliers. Steve has volunteered on numerous WTCA committees. While studying to earn his engineering degree at the University of Wisconsin (GO BADGERS!), Steve worked closely with Professor Cramer on truss related research projects. To pose a question for this column, call the WTCA technical department at 608/274-4849 or email technicalqa@sbcmag.info.

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