

What happens to the design of a truss when purlins are specified instead of plywood or OSB sheathing?

by WTCA Staff

The on-center spacing for roof trusses determines how a roof system should be braced and installed. Trusses used in residential and commercial roofs are most often spaced at 24 inches on-center (Figure 1) while trusses used in agricultural or post frame buildings are spaced at 48 inches on-center or often greater (Figure 2). Building Component Safety Information (BCSI) section B2 provides temporary bracing and handling guidance for trusses spaced up to 24 inches on-center and section B10 provides for wide on-center trusses used in post frame buildings. The bracing and installation differences depend on how the top chord of the truss will be permanently braced—by roof sheathing or by purlins.

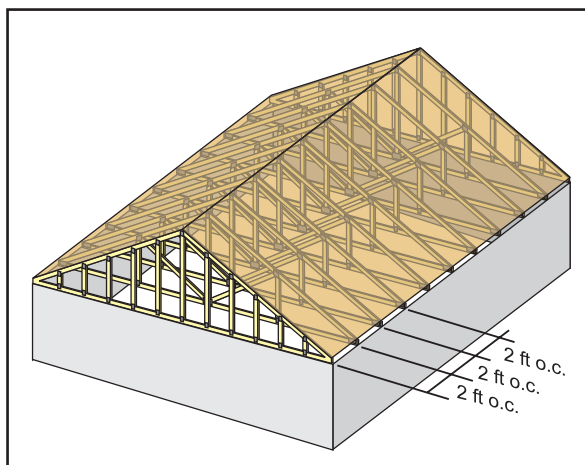


Figure 1. Roof trusses with directly applied roof sheathing like plywood or OSB.

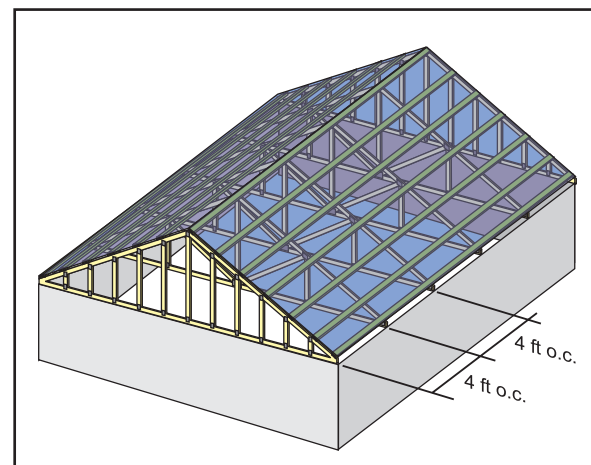
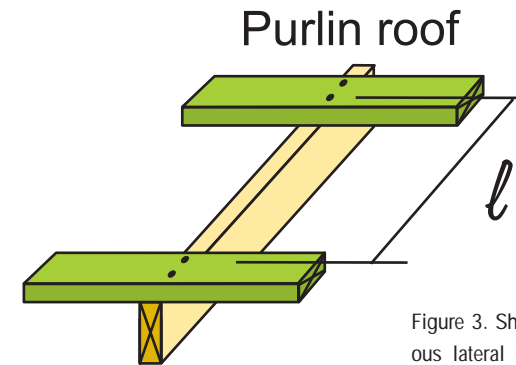
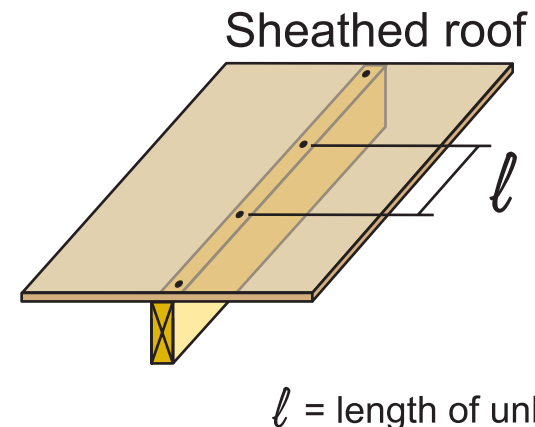


Figure 2. Roof trusses with wood purlins and a metal clad roof.



l = length of unbraced top chord

Figure 3. Sheathed roofs provide continuous lateral support along the top chord when the length of unbraced top chord is 12 inches or less.

When purlins are specified instead of structural panels, there are unbraced sections of top chord between purlins (Figure 3). There are limits to how long these unbraced sections can be, based on the design load and lumber species, size and grade. Some Truss Design Drawings will indicate what the maximum unbraced length (in other words purlin spacing) can be, but this is by no means an attempt to perform roof diaphragm design on the project. The National Frame Builders Association (NFBA) is developing a design procedure for metal clad wood framed roofs that should be able to assist Building Designers in completing roof diaphragm design more effectively. Gary Anderson, an agricultural engineering professor at South Dakota State University, is work-

ing on the NFBA design procedure. He will present his initial research findings at the Frame Building Expo, February 28 - March 2, 2007, in Indianapolis, IN.

If the Building Designer will be designing a purlin and metal clad roof system, they should be prepared to provide the Truss Manufacturer with specific information on the purlin spacing and coordinate the final truss design with the Truss Manufacturer to ensure the maximum unbraced lengths for top chords are not being exceeded by the purlin design. **SBC**

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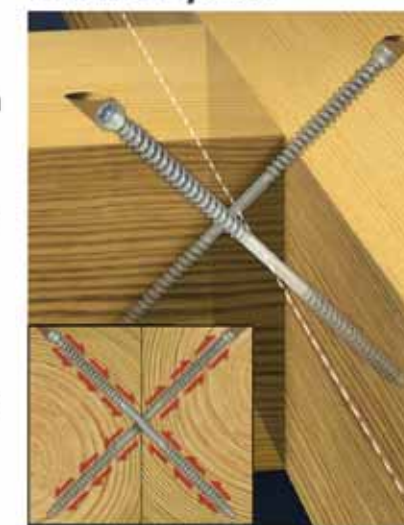
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Question

Does a truss design change when purlins are used instead of roof sheathing?

Answer

Most Building Designers will opt for plywood or OSB roof sheathing for top chords when the on-center spacing of the trusses is close enough to warrant it. Building Designers may use the IBC section 2304.7 on structural roof panels to determine allowable spans and loads and use section 2304.9 to determine fastener sizes and spacing. (Visit **Support Docs** at www.sbcmag.info to view these sections.)

The phrase "structural roof panel" means plywood or OSB sheets are attached directly to the top chord providing continuous lateral support along the length of the chord. Even when fasteners are spaced up to 12 inches on-center as permitted for the interior of panels according to IBC section 2304.9, the support for the top chord is considered continuous. The Truss Designer assumes the support is provided and is sufficient to hold the truss firmly in position so that it will not buckle under load. Truss Design Drawings contain notes stating this is the case. Some examples of notes are "top chord shall have properly attached structural panels," "it is assumed the top chord is laterally braced by the roof sheathing" or "top chord is permanently sheathed."

at a glance

- BCSI-B2 provides temporary bracing guidance for trusses spaced up to 24 inches on-center.
- BCSI-B10 offers temporary bracing guidance for wide on-center trusses such as those used in post frame buildings.
- Truss Designers note on Truss Design Drawings that truss top chords must be laterally braced by the roof sheathing to prevent the top chord from buckling.
- When purlins are specified, check with the Truss Designer to determine the maximum unbraced length of the top chord between purlins to avoid top chord buckling.

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