



Code Connection

40-Foot Truss Span Limitation in IBC 2308

by WTCA Staff

IBS Section 2308 details a 40-foot span limitation. Does it apply to wood trusses?

Component manufacturers occasionally pose questions regarding the 40-foot truss span limitation in the International Building Code (IBC). The issue involves the IBC code requirements in Section 2308.1 and 2308.2 that typically relate to the use of conventional framing for commercial or multi-family construction projects because one- and two-family residential projects generally use the IRC:

SECTION 2308

CONVENTIONAL LIGHT-FRAME CONSTRUCTION

2308.1 General. The requirements of this section are intended for conventional light-frame construction. Other methods are permitted to be used provided a satisfactory design is submitted showing compliance with other provisions of this code. Interior non-load bearing partitions, ceilings and curtain walls of conventional light-frame construction are not subject to the limitations of this section. Alternatively, compliance with the following standard shall be permitted subject to the limitations therein and the limitations of this code: *American Forest and Paper Association (AF&PA) Wood Frame Construction Manual for One- and Two-Family Dwellings (WCFM)*.

2308.2 Limitations. Buildings are permitted to be constructed in accordance with the provisions of conventional light-frame construction, subject to the following limitations, and to further limitations of Sections 2308.11 and 2308.12.

5. Roof trusses and rafters shall not span more than 40 feet (12 192 mm) between points of vertical support

Does this 40-foot span limitation apply to metal plate connected wood trusses? It may, but typically does not. Structures designed using the IBC often use the broadly written code requirements providing for greater engineering design flexibility (these exist in the full IBC), rather than the very limited design constraints of the wood light-frame construction prescriptive requirements of Section 2308. If the structure is designed using the general provisions of the IBC, there is no code limit for truss span. However, if the structure is designed using only the prescriptive design tables included in Section 2308 (see sidebar on page 25 for complete list), the span limitation between points of support would apply to both trusses and rafters. The tables included in Section 2308 (e.g., Table 2308.9.5, Header and Girder Spans for Exterior Bearing Walls) were developed based on certain span and load limitations. If structural elements longer than 40' are installed on the structure using these tables, other structural elements intended to resist gravity and lateral loads may be over-stressed. And note that the limitation here applies to the individual span of a truss or rafter, not the width of the building. A truss or rafter may be designed for intermediate bearing(s), allowing for greater building widths (e.g., 80' or 120').

We should clarify the difference between prescriptive and engineered design.

- Prescriptive design is most appropriate for structures where the services of an engineer or architect are not required and all the structural member load resistance requirements can be based on tables or specific code requirements. These structures are subject to size and/or load limitations so that these general tables can apply.
- Engineered design may be used for any size or type of structure and design load

at a glance

- ❑ Structures designed to the IBC often use the broadly written code requirements that provide greater engineering design flexibility.
- ❑ Structures may also be designed using a combination of both prescriptive and engineered methods as indicated in IBC Section 2308.1.
- ❑ Structures may be designed within the prescriptive requirements of Section 2308. Limitations can be found in the sidebar on page 25.

requirements. Design is limited by individual material design properties as allowed by the building code. The member design properties and sizing to resist loads are usually based on the methodology found in a referenced standard (e.g., ASTM D5456 or ANSI/TPI 1-2002).

Structures may also be designed using a combination of both prescriptive and engineered methods as indicated in 2308.1: "Where other methods are used, satisfactory designs must be submitted showing compliance with the other provisions of the code." Portions of a structure may be designed using the most appropriate method, as long as the appropriate limitations placed on all the load resisting elements and selected from section 2308 tables are considered. This will allow the lateral and vertical design loads to be safely transferred to the foundation.

Regardless of whether the structure is designed using engineered methods or prescriptive methods and their respective limitations, metal plate connected wood trusses are designed per IBC section 2303.4, which references ANSI/TPI 1 and enables manufacturers to meet the IBC and IRC code requirements where trusses are the structural element of choice. **SBC**

For more information about how to get involved in the code process, contact WTCA staff at 608/274-4849 or codes@woodtruss.com.

Limitations to Note:

Structures designed within the prescriptive requirements of Section 2308 Conventional Light-Frame Construction are limited as follows:

- 3 stories above grade
- Maximum bearing wall height of 10 feet
- Average dead load not to exceed 15 psf for roofs, exterior walls, floors and partitions
- Live loads not to exceed 40 psf
- Ground snow not to exceed 50 psf
- Wind speed not to exceed 100 mph, except in Exposure Categories A & B wind speed not exceed 110 mph
- Roof trusses and rafters not to exceed 40 foot span between supports
- Not permitted for buildings in Seismic Design Category B, C, D, E or F for Seismic Use Group III
- Limited in irregular structures in Seismic Category D or E

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