

**Oregon**  
**Interpretive Ruling 93-13 Revised June 1, 1994**  
**TRUSSES**

Requested by: PPPI MANUAL REVIEW COMMITTEE

**ISSUE OR REQUEST**

The following are often asked questions on how trusses are regulated:

- Q1:** The code does not define a "truss." What is the definition of a truss?  
**Q2:** Where does the building official get authority to regulate trusses?  
**Q3:** Where are the technical requirements for testing and designing trusses?  
**Q4:** Why are trusses usually required to be stamped by an Oregon engineer or architect?  
**Q5:** Can an owner build his own trusses using a reference book design?  
**Q6:** How is the building official assured that trusses fabricated off the construction site comply?  
**Q7:** How are manufactured trusses identified?  
**Q8:** Does the code allow building officials to authorize job fabricated trusses?  
**Q9:** If a homeowner wishes to design and construct trusses for his or her own use, can the building official authorize?  
**Q10:** Can trusses be recognized as prefabricated components?  
**Q11:** The bottom chord of the truss has been split by toenails used to connect the truss to the wall framing. Can the building official ask: that the damaged trusses be replaced?

**APPLICABLE CODE SECTIONS**

ORS 455.010 (6), Oregon Structural Specialty Code, Sections 306(a)14, and (f), Section 2303(a) and (b), Section 2504, 2510 Tables 25-A-1 and Tables 25-A-2, *UBC Standard* 25-17,25.1744.25-18, Part V, 25.1825 and 26.1838(b)4

**AI:** It is true there is no definition of a truss in the Oregon Structural Specialty Code (OSSC) or its companion *Uniform Building Code Standards*. However, Section 401 OSSC says, in part, "Where items are not defined, they shall have their ordinary accepted meanings within the context with which they are used. *Webster's Third World New International Dictionary of the English Language, Unabridged*, copyright 1986, shall be considered. as providing ordinary accepted meanings."

Truss is defined, in part, in this dictionary as "3b: An assembly of members (as beams, bars, rods) typically arranged in a triangle or combination of triangles to form a rigid framework (as for supporting a load over a wide area) that cannot be deformed by the application of exterior forces without deformation of one or more of its members."

**A2:** Section 2303(a) and (b) (in part) are key to truss design.

Section 2303(a) General. All buildings and portions thereof shall be designed and constructed to sustain, within the stress limitations specified in this code, all dead loads and all other loads specified in this chapter or elsewhere in this code. Impact loads shall be considered in the design of any structure where impact loads occur

**EXCEPTION:** Unless otherwise required by the building official, buildings or portions thereof which are constructed in accordance with the conventional framing requirements specified in Chapter 25 of this code shall be deemed to meet the requirements of this section.

(b) Rationality. Any system or method of construction to be used shall be based on rational analysis in accordance

with well-established principles of mechanics. Such analysis....”

These sections specify two concepts for the design of wood structures.

- A. The general case requires calculated systems using Section 2303(b) to resist loads referenced in Section 2303(a).
- B. Section 2303(a) Exception, permits deviation from the general rule and allows the building official to authorize construction with minimum calculations using conventional framing requirements as specified in Wood, Chapter 25.
- C. A third alternative found in Section 107 allows the building official to test prototypes. If the prototype sustains the loads required by the code, others built of the same plan and specifications can be authorized.

Much construction is designed to "B" above. Truss designs are not specified in the conventional framing requirements and so must be designed using either "A" or "C". Conventional framing uses "rule of thumb" principles. Larger members are substituted with larger factors of safety in lieu of detailed analysis and understanding of the way the building carries load. In contrast, the general case requires rigorous analysis and understanding of the way the building carries load. With rational design the amount of material is reduced and the safety factors are smaller. Trusses fall in the design category. Materials are used sparingly and more sophisticated principles of physics and mechanics are used to analyze how the building carries the load with special attention to connections.

**A3:** There are no "specification" truss designs in the Structural Specialty Code. Trusses are designed using engineering design principles and the allowable unit stresses for the materials. For wood these are specified in Table 25-A-1 and 25-A-2 (see Sec. 2504 *OSSC*). Connectors are specified in Section 2510. Each type of connector references one of the standards in the *Uniform Building Code Standards*. U.B. C. Standards is a companion document to the *Uniform Building Code* which is adopted at the same time as the *Uniform Building Code* and is part of the Oregon Structural Specialty Code.

Without access to a current edition of the U.B.C. Standards, a building official cannot effectively regulate truss construction.

**A4:** Code Section 302 (b) states, in part:

" ... The building official shall require plans, computations and specifications to be prepared and designed by an engineer or architect licensed by the state to practice as such."

**... EXCEPTION 2.** Plans and specifications prepared and designed by an engineer or architect licensed by the state to practice as such are not required for the following work, provided the building official determines that the work is not of a highly technical nature or there is no unreasonable potential risk to life and/or safety of the structure:

- A. The erection, enlargement or alteration of any building, or any appurtenance thereto, where the resulting building has a ground area of 4,000 square feet or less and is not more than 20 feet in height from the top surface of the lowest floor to the highest interior overhead finish (ORS 671.030).
- B. A single-family dwelling or farm building.
- C. Alterations or repairs that do not involve the structural part of the building.

Subsection A,B, and C of Exception 2 are taken from the statutes known as the Architects Law. As in "A" above, any building over 4,000 square feet in ground area or more than 20 feet in height from the top surface of the lowest floor to the highest interior overhead finish, is required to be designed by an engineer or architect. Trusses in this area must also be designed by an architect or engineer. In addition to the requirements in the Architects Law, the building official is required to ask for architect- or engineer-designed trusses in buildings smaller than 4,000 square feet or 20 feet in height unless the building official determines that work is not of a highly technical nature or there is no unreasonable potential risk to life and/or safety of the structure. Most building officials find that truss design is of a highly technical nature where there is a reasonable potential risk to life and/or safety and so require trusses to be designed by an architect or engineer.

**A5:** If the builder can satisfy the building official under Exception 2, the building official may authorize use of such standard designs.

**A6:** V.B.C. Standard Section 25.1744 requires sporadic nonscheduled. in-plant inspection for light metal plate connected. wood trusses. "Each truss manufacturer shall retain an approved agency having no financial interest in the plant being inspected. to make nonscheduled inspections of the truss fabrication and delivery operations. The inspections shall cover all phases of the truss operation, including lumber storage, handling, cutting, fixtures, presses or rollers, fabrication bundling and banding, handling and delivery." Section 25.1743(c) of the V.B.C. Standard 25-17 requires members to be graded lumber.

For bolted trusses there are no quality control procedures in the U.B. C. Standards. Bolted trusses are normally large enough that they require job site fabrication and would be subject to the normal on-site inspection process. The building official also has access to special inspection under Section 306(a)14, Special Cases. Work which, in the opinion of the building official, involves unusual hazards as part of the special inspection process, may be accomplished under Section 306(f) which provides for approved fabricators and an elaborate set of controls which the building official may implement.

The building official plays a key role in enforcing special inspection requirements specified in the Standards. The building official must specify that the trusses were inspected as specified in the code.

**A 7:** V.B.C. Standard 25-18, Part V, Section 25.1825, requires trusses fabricated. of plywood components to be identified with an appropriate trademark of the approved independent inspection and testing agency. Light metal plates are required to be identified with the plate manufacturer's name. (See UBC Standard 25-17, Section 25.1738(b)4.) Trusses fabricated with light metal plates are not required to be marked by the in-plant inspection agency; however, a definition of "approved agency" is an established and recognized agency regularly engaged in conducting tests or furnishing inspection services once such agency has been approved by the building official. International Conference of Building Officials has a long list of quality control agencies. In general, each is required to have a logo or stamp. Again, the building official is the key to the control system by demanding evidence that the manufacturer has employed an approved agency.

**A8:** The building official may authorize job fabrication of the trusses. Quality control must be provided by:

1. Direct inspection by the building official;
2. Fabricator retaining an approved quality control agency as specified in U.B.C. Standard 25-17, Section 25.1744; or
3. Requiring special inspection as detailed in Section 306(a)12, Special Cases, and Section 306(f).

**A9:** As specified in Section 302(b), Exception 2, the building official may waive the requirement for an architect or engineer's design on single-family residential buildings when the official determines the work is not of a highly technical nature or there is no unreasonable potential hazard to life and/or safety. The building official, therefore, may authorize a homeowner to use a handbook design or prepare his own plan. The building official is reminded of the complexity of truss design. If the design has been approved, the building official has the authority to authorize such fabrication. We suggest careful inspection of first trusses so assembled.

**A10:** ORS 455.010(6) says in part, a prefabricated structure is "a building or subassembly which has been in whole or substantial part manufactured or assembled using closed construction at an offsite location to be wholly or partially assembled on a site; .... "

A truss is a building component and may be part of a component system. A building component, such as a truss, by itself is not normally regulated as a prefabricated structure since they are usually open and the building official may examine them at the site; ...

**All:** Reduction in cross connections may be critical. The building official may require damaged trusses to be repaired or replaced. The method of truss connection should be specified by the design professional and may include "hurricane clips."

**References:** Requested by Walter Friday, April 1982.

Original Board Approval July 21, 1982.

Original Signed by Warren J. Hearle, Administrator, November 30, 1982.

Interpretive Ruling 93-13 signed by Gary J. Wicks, July 30, 1993.

## **BOARD FINDINGS**

This interpretation is authorized by ORS 455.060, Rulings on Acceptability of Materials, Designs or Methods of Construction and Attorney General's Opinion OP-5208 issued October 1, 1981, which advised the statute permits authoritative interpretations of existing code requirements.

## **RULING**

The above answers and finding are accepted as interpretations to the questions asked.

(signed June 23, 1994)

Jack Talbott, Chair  
Building Codes Structures Board

The recommendations and findings of the Building Codes Structures Board are accepted and adopted.

(signed June 27, 1994)

Gary J. Wicks, Administrator  
Building Codes Division