

Individual Truss Marking – Is it a Building Code Requirement?

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Introduction:

On January 1, 2008, the 2007 edition of the *California Building Code (CBC)*¹ was adopted for use and replaced the 2001 edition of the *CBC*. The 2007 edition represented a rather significant change because it incorporated, by adoption, the 2006 edition of the *International Building Code (IBC)* with California amendments. Prior editions of the *CBC* were based on the *Uniform Building Code (UBC)*.

In 2000, the *IBC* became available for adoption by local and state jurisdictions. The *IBC*, together with the other codes in the International Code family, were developed with the intention of harmonizing the three regional codes (see **Figure**) into a single building code that would apply to the entire country.

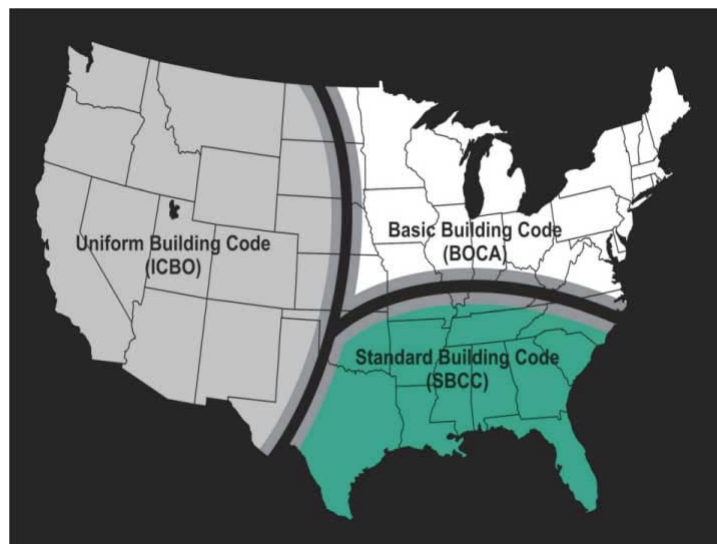


Figure: The three Building Codes (and the approximate locations where they were adopted) that were replaced by the International Building Code (IBC).

The new International Codes were intended to provide consistent standards for safe construction and eliminate differences between the three different predecessor codes by developing codes without regional limitations. When it became time to update the 2001 *California Building Code*, it was decided that the code would be based on the 2006 *IBC*. Currently, the *IBC* is adopted at the state or local level and serves as the basis of the codes in all 50 states². In creating one building code out of three, the *IBC* does not contain all of the provisions that were required under the *UBC*, *Standard Building Code*, and the *BOCA National Building Code*.

¹ The *California Building Code* is also referred to as the California Code of Regulations, Title 24.

² www.iccsafe.org/images/png/map-IBC.jpg



Prepared with assistance from the California Structural Building Components Association – a local chapter of SBCA.

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Issue:

The *1997 UBC* included the following statement in Section 2321 - Metal Plate Connected Wood Truss Design:

1997 UBC Section 2321.4

Marking. Each truss shall be legibly branded, marked or otherwise have permanently affixed thereto the following information located within 2 feet (610 mm) of the center of the span on the face of the bottom chord:

1. Identity of the company manufacturing the truss.
2. The design load.
3. The spacing of trusses.

Neither the *Standard Building Code* nor the *BOCA National Building Code* included such a labeling requirement for metal plate connected wood trusses. The *UBC* is the only code that has ever discussed labeling trusses for design load, spacing, or manufacturer. No edition of the *IBC* or *International Residential Code (IRC)* has ever included language similar to that of the *1997 UBC* Section 2321.4.

Conclusion:

The *2007 California Building Code* is based on the *2006 IBC*. Some of the requirements that were part of the *2001 CBC*, which was based on the *1997 UBC*, no longer exist under the current *2007 CBC* version of the *IBC*.

The requirement to permanently mark each truss bottom chord has followed the long tradition in the United States of using the truss design drawing to define the loads that are applied to the series of trusses that make up a roof assembly. This is due to the complexity of the applied loads that building designers expect trusses to accommodate. These loads include, but are not limited to, snow and snow drift, concentrated, girder, wind, uplift, and the variety of load combinations that the building code requires to be checked. Truss marking as defined by the *1997 UBC* is challenging due to this complexity, and the fact that the load defined within the mark may not be the controlling design load. (The controlling design load is the critical truss capacity defining load and should be known.)

Given that the truss design drawing is the key to understanding why the truss has been designed in the a certain manner, truss marking has become harder to manage and archaic; therefore, truss marking is no longer a requirement of the *2007 CBC*.

In addition to changes to the truss marking requirement, the **Appendix** contains a comparison between the *2001 CBC* and the *2007 CBC* requirements as they relate to metal plate connected wood trusses.

Appendix
Comparison Between 2001 and 2007 Title 24 – Some Items of Interest
Specific Sections Highlighted in RED Text

Overall Code			
Section (Edition)	2007 Edition	2001 Edition	Comment
	Based on 2006 IBC format & layout	Based on UBC format & layout	Information in Chapters is inclusive. No longer need to reference different volumes
	Design & fabrication of metal plate connected wood trusses per ANSI/TPI 1-2002	Design & fabrication of metal plate connected wood per ANSI/TPI 1-1995	
Chapter 16 – Structural Design			
Section (Edition)	2007 Edition	2001 Edition	Comment
	ASCE 7-05	ASCE 7-95 Chapter 6 (Wind)	2007 edition of Title 24 References 2005 edition of ASCE 7, <i>Minimum Design Loads for Buildings and Other Structures</i>
1603 (07)	Information on Construction Documents		Establishes minimum information required on construction documents in terms of the location and magnitude of design loads
1605.2 (07)	LRFD Load Combinations - revised to ASCE 7-05		
1605.3 (07)	ASD Load Combinations - revised to ASCE 7-05		
1607.5 (07)	Partition Load is now considered a live load and has been reduced from 20 psf to 15 psf per ASCE 7-05		
Table 1607.1 (07)	Minimum Uniformly Distributed and Concentrated Live Loads	Tables 16-A, 16-B & 16-C	Single Table now includes much of the minimum live load information formerly found in three tables
Table 1607.1 (07)	Added 300 lbs. concentrated roof load consideration. Increased exposed bottom chord concentrated load from 200 lbs. to 300 lbs.		Could affect design where uniform roof live loads are light
	Footnotes i, j & k provide design considerations for Uninhabitable attics without storage, with limited storage and habitable attics for one- and two-family residences		These provisions are from the BOCA National Building Code & are new to California
1608 (07)	Snow loads - includes no provisions, references ASCE 7-05		Will require evaluation of ice-dams at roof eaves & new consideration of drift surcharge at gable roofs
1609 (07)	Wind loads - references ASCE 7-05	Wind loads - references ASCE 7-95	
1611.2 (07)	Ponding instability. Includes provisions for the design of roofs with a slope less than ¼ inch per foot to include verification of adequate stiffness to preclude progressive deflection in accordance with Section 8.4 of ASCE 7		
1611.3 (07)	Controlled Drainage. Includes provisions for roofs to support additional weight of water resulting hardware used to control the rate of drainage		

1613 (07)	Earthquake Loads – design provisions per ASCE 7-05 excluding Chapters 14, <i>Material Specific Seismic Design and Detailing Requirements</i> & Appendix 11A, <i>Quality Assurance Provisions</i>		
Chapter 16A (07)	Structural Design		Structural Design provisions for applications regulated by DSA-SS
Chapter 23 – Wood			
Section (Edition)	2007 Edition	2001 Edition	Comment
Chapter 23 (07)	Wood		No longer Chapter 23A for applications regulated by DSA-SS. DSA-SS amendments are included in Chapter 23
2303.4 (07)	Trusses	2304.4.4 & Division V	Section 2303.4 replaces Sections 2304.4.4 & Division V – Design Standards for Metal Plate Connected Wood Truss Truss marking provisions of 2321.3 are no longer required
Table 2304.9.1 (07)	Fastening Schedule		Added actual nail sizes to standard naming convention.
2305 (07)	General Design Requirements for Lateral-Force-Resisting Systems		Allows use of AF&PA SDPWS for lateral design subject to the limitations of the code
2308 (07)	Conventional Light-Frame Construction		Replaces provisions of Division IV- Conventional Light-Frame Construction
2308.2	<p>Limitations - Establishes limitations for which the conventional light-frame construction provisions are based, including:</p> <ol style="list-style-type: none"> 1. number of stories ≤ 3, 2. bearing wall floor-to-floor height $\leq 11'-2"$, 3. Loads <ol style="list-style-type: none"> 3.1 Average dead load ≤ 15 psf, 3.2 Live load for floors ≤ 40 psf, 3.3 Ground snow loads ≤ 50 psf, 4. Wind speed ≤ 100 mph, 5. Roof trusses & rafters with spans between bearing ≤ 40 ft, 6. the conventional light-frame construction provisions are not permitted for Occupancy Category IV buildings, 7. Limits on irregular structures in Seismic D or E, 8. Special restrictions for applications governed by DSA-SS and OSHPD 1,2 & 4 		Note this provision is limited by the allowable loads that the prescriptive walls & headers can support and does not mean that trusses are limited in Title 24 to 40 ft spans
2308.3 (07)	Braced Wall Lines – Spacing not to exceed 35 ft		Was 34 feet if basic wind speed ≤ 80 mph & and Seismic Zones 0, 1, 2 & 3, and 25 ft if basic wind speed > 80 mph or Seismic Zone 4

2308.10.1 (07)	Wind uplift. Roof assemblies shall have rafter and truss ties to the wall below. Resultant uplift loads shall be transferred to the foundation using a continuous load path. The rafter or truss to wall connection shall comply with Tables 2304.9.1 and 2308.10.1		Adds prescriptive requirements for uplift
Table 2308.10.1 (07)	New table with required rating of approved uplift connectors for various wind speeds and roof spans		Table values are based wind loading on end zones using the Main Wind Force Resisting System – Simplified Procedure of ASCE 7-05



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