

Resolving a Conflict in Seismic Requirements for Non-building Structures

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An inconsistency exists between Chapter 22 of the 2006/2009 *IBC* and Chapter 15 of ASCE/SEI 7-05, but a logical resolution is now available.

CHAPTER 16 of the 2006 and 2009 editions of the *International Building Code (IBC)* both reference the 2005 edition of ASCE/SEI 7, *Minimum Design Loads for Buildings and Other Structures*, for seismic requirements of buildings, non-building structures and nonstructural components. In ASCE/SEI 7, Chapters 12 and 15 specify height limitations and restrictions on seismic force-resisting systems (SFRS), including several structural steel systems, and adopt specific detailing standards that are to be followed depending on the assigned Seismic Design Category (SDC). *IBC* Section 2205.2, also references structural steel detailing standards that are to be followed depending on the assigned SDC. For the majority of structural steel SFRS, the detailing requirements specified in ASCE/SEI 7 and those specified in *IBC* Chapter 22 are in harmony. However there is one situation related to non-building structures where an inconsistency exists between the two documents.

In ASCE/SEI 7, the seismic requirements were completely reorganized with a new Chapter 12 dealing specifically with the design requirements for buildings and a new Chapter 15 dealing specifically with design requirements of non-building structures, including a section that deals with SFRS similar to buildings. In this particular section, options are permitted for the design of non-building structures with relaxed height limits and detailing restrictions if significantly higher seismic forces are used. One permitted option allows structural steel non-building structures assigned to SDC D, E or F to be designed using only ANSI/AISC 360-05, *Specification for Structural Steel Buildings*, (rather than ANSI/AISC

341-05, *Seismic Provisions for Structural Steel Buildings*, Part I) if the extremely low Response Modification Coefficient, *R*, value of 1 or 1.5 is used. This provision directly conflicts with Section 2205.2.2 of the *IBC*, which requires that AISC 341, Part I be used for all structural steel structures, including non-building structures that are assigned to SDC D, E and F.

In reviewing the development of both documents, it can be concluded that the inconsistency between *IBC* Chapter 22 and ASCE/SEI 7 Chapter 15 was clearly unintentional and went undiscovered during the processing of both the 2006 and 2009 editions of the *IBC*. When it was discovered, a code change was developed to eliminate the inconsistency in *IBC* Section 2205.2.2. This proposal was accepted in the 2012 edition of the *IBC*. The revised Section 2205.2.2 of the *IBC* reads as follows:

2205.2.2 Seismic Design Category D, E or F. Structural steel structures assigned to *Seismic Design Category D, E or F* shall be designed and detailed in accordance with AISC 341, except as permitted in ASCE 7, Table 15.4-1.

The underscored phrase shows what has been added. For jurisdictions that currently enforce the 2006 or 2009 editions of the *IBC*, the authors recommend that the simple revision now in Section 2205.2.2 of the 2012 *IBC* be observed for structural steel designs of non-building structures in their jurisdictions.

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