

Steel Design Simplified

The 2005 AISC *Specification for Structural Steel Buildings* brings the best of ASD and LRFD together in a single, unified document.

By Charles J. Carter, P.E., S.E.

The 2005 AISC *Specification for Structural Steel Buildings* (AISC 360-05) is like no other standard created in recent memory. Work on it began four years ago with the realization that the dichotomy between LRFD and ASD had to be eliminated. The AISC Committee on Specifications accepted the challenge of producing a combined specification that would feature the best of both. The committee prioritized simplicity as a key objective for its work, while maintaining the canons of safety and efficiency.

It was a smooth, though laborious, process that was accomplished faster than any previous AISC *Specification*. Past-chairman Stan Lindsey and current chairman Jim Fisher worked tirelessly with the task committee chairs and other committee members to keep activities on schedule and to help resolve issues of conflict.

Two-thirds of the committee was composed of practitioners and industry representatives, one-third of educators and researchers. Looking back, it is astounding to contemplate the amount of work these AISC volunteers put into the creation of this document. AISC, the engineering community, and the steel construction industry owe a debt of gratitude to these people.

This article is the first in a series that will give insight into the 2005 AISC *Specification* and the next AISC *Manual of Steel Construction* that will be built around it. The series will continue through each issue of *MSC* this year.

Where Did They Put That?

One of the major accomplishments in the 2005 AISC *Specification* is the way it has been organized to achieve familiarity. The chapter headings are almost all consistent with the 1980s editions of the AISC *Specification*:

- A. General Provisions
- B. Design Requirements

- C. Stability Analysis and Design
- D. Design of Members for Tension
- E. Design of Members for Compression
- F. Design of Members for Flexure
- G. Design of Members for Shear
- H. Design of Members for Combined Forces and Torsion
- I. Design of Composite Members
- J. Design of Connections
- K. Design of HSS and Box Member Connections
- L. Design for Serviceability
- M. Fabrication, Erection, and Quality Control

It is written in a roadmap format and organized according to the cross-section the user wants to design. The applicable design criteria are presented sequentially from “most likely to control” to “least likely to control,” covering the vast majority of all practical cases.

The “Appendices” have been revamped. The less frequently used topics have been removed from the main body of the text and placed in “Appendices,” which include:

1. Inelastic Analysis and Design
2. Design for Ponding
3. Design for Fatigue
4. Structural Design for Fire Conditions
5. Evaluation of Existing Structures
6. Stability Bracing for Columns and Beams
7. Direct Analysis Method

Several of these sections will be highlighted in coming issues of *MSC*:

- May—Fire design
- June—HSS & single angle provisions
- July—Composite columns
- September—Simplified design of beams
- October—Stability

How About Some Help?

Next month’s issue will feature more information about the *Specification’s* “User Notes.” In one early meeting, the committee reflected on how good it would be if every 2005 AISC *Specification* user could hear the insights shared by

committee members in discussing a provision. This struck a chord with designers’ wishes that the requirements be easily understood and applied. But what could be done? The *Specification* must be direct code language, and helpful guidance often gets lost in the commentary. Then a brainstorm gave birth to “User Notes”—non-mandatory sentences and short paragraphs interspersed throughout the 2005 AISC *Specification* to provide concise and practical guidance in the application of the provisions.

So That’s What They Meant!

Beyond “User notes,” “Commentary” is also a wonderful thing. I am told (but cannot claim with certainty) that AISC was first to innovate with the inclusion of “Commentary.” What a great idea! Today the commentary on the 2005 AISC *Specification* continues to provide useful and explanatory background information for the specification provisions. But unlike recent versions, in which the commentary received little or no attention, the 2005 edition “Commentary” was cleaned up and modernized. The resulting compilation is a useful and helpful resource for users of the 2005 AISC *Specification*.

It’s Just that Easy!

In the December 2005 issue, we’ll feature a summary of the ultimate simplicity made possible by the 2005 AISC *Specification*. Early on, the committee struggled with the wishes of the engineering community and steel construction industry: “Give us a document that is simple to use (like ASD), but that lets me get down to the gnat’s eyelash when I need to make something work (like LRFD).” What a challenge! Thankfully, the 2005 AISC *Specification* makes this possible.

As written, the 2005 AISC *Specification* is as detailed as possible, but its format can be reduced to a much simplified set of requirements by considering only the applications steel designers will use reg-

ularly and by applying some conservative assumptions. To that end, AISC is developing two 5" by 8" cards called *Basic Design Values*. The cards cover the typical applications of W-shapes, HSS, pipe, connections, and analysis requirements. All equations fit comfortably with ASD and LRFD. Information is presented in a way that makes sense to those who like to see equations in stress format, as well as to those who like to see them in strength format (more on this in the October issue). Also, there isn't an equation on the cards longer than the front half of my thumb!

The More the Merrier

The July 2005 issue will feature an article explaining the addition of "other structures" to the scope of the 2005 AISC

Specification. Most designers of these other structures use the AISC *Specification* in their designs. Some have been asked subsequently to defend their use of the AISC *Specification* because its scope was stated as for buildings only. This change will allow greater flexibility to apply its provisions to other structures that have building-like structural systems and components.

A Perfect Match

In addition to combining LRFD and ASD, the 2005 *Specification* also integrates the provisions from the previously separate AISC specifications covering single-angle members and HSS. There is no longer a need to find provisions in a separate document, or in the back pages of the AISC *Manual*. The 2005 AISC *Specifi-*

cation is also fully coordinated with the 2005 AISC *Seismic Provisions* and the 2005 AISC *Code of Standard Practice*. ★

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The 2005 AISC *Specification for Structural Steel Buildings (AISC 360-05)* will be available in April 2005 as a free download from the AISC web site, www.aisc.org. The corresponding AISC *Manual of Steel Construction* will be available for purchase in late 2005.

**In SpecWise next month:
A Sneak Peek at User Notes**