

A closer look at design guidance from AISC.

A KID RUNS DOWN THE HALLWAY at school. Suddenly, another kid appears and declares, “Hey! You can’t run here.” And the retort: “Says who? The law? The school? You? Are you going to take me to jail or something? You can’t tell me what to do!”

Says who? Two simple words with deeper implications. So it is too in the design world. Engineers must look at all available information and weigh it, and ultimately use their own judgment to make decisions based on this information. The provider of the information and the process it undergoes are both important. Unfortunately, the process is often misunderstood. Luckily, there are multiple AISC resources that can help provide guidance.

A Wealth of Info

When you pick up your AISC *Steel Construction Manual*, you hold in your hand a wealth of information concerning structural steel design and construction, as within it are references to many thousands of other pages of information. But do you recognize that some of the *Manual* contains requirements and some of it contains recommendations? The *Manual* is a compilation of four segments: the *Manual* itself (Parts 1-15 and Part 17), the AISC *Specification for Structural Steel Buildings*, the RCSC *Specification for Structural Joints Using High-Strength Bolts* and the AISC *Code of Standard Practice for Steel Buildings and Bridges*. These four segments, though contained in a single volume, each carry different weight and meaning and are produced through different processes.

► **The Spec.** The AISC *Specification* is the highest-level AISC design document. It is created and approved by the AISC Committee on Specifications through an ANSI-accredited process in which: the committee membership is balanced among relevant interests, formal letter ballots must be cast, a public review is completed and all negative votes must be formally resolved by the Committee. The *Specification* is held to this high standard because it is ultimately adopted into law by reference, such as in the *International Building Code (IBC)*.

The *Specification* is accompanied by a Commentary. Though it is clearly stated that “the Commentary is not a part of ANSI/AISC 360-10, *Specification for Structural Steel Buildings* but is included for informational purposes only,” the information contained in the Commentary is often very useful in understanding the intention of

the AISC Committee on Specifications and also in addressing situations beyond the *Specification*’s scope. The Commentary is explanatory, guiding and helpful, but does not create a legal requirement.

► **The Manual.** Paraphrasing from the Foreword to the AISC *Manual*, it is the best known and most widely used document published by AISC and holds a highly respected position in engineering literature. That said, the AISC *Manual* is a very different document from the AISC *Specification*. Like the *Specification*, it too is approved by a committee: the AISC Committee on Manuals and Textbooks. Changes to it are made by vote of the Committee, but the process is simple majority rule and the resulting work is not submitted to ANSI for accreditation.

The *Manual* also differs from the *Specification* in that it is not adopted into law. The *Manual* provides recommendations, guidance and tools by which the requirements in the *Specification* can be satisfied and common problems in design and construction can be addressed. Where the *Specification* provisions are law, the *Manual* provisions are recommendations. The procedures in the *Manual* can be used, but other suitable alternatives also can be used.

► **The Bolt Spec.** The RCSC *Specification* (also known as the Bolt Specification) is created and approved by the Research Council on Structural Connections (RCSC) following procedures similar to those used by the AISC Committee on Specifications, but without submission for ANSI accreditation. The RCSC *Specification* is adopted by the AISC *Specification* in Sec-

Engineers must weigh all available information and ultimately use their own judgment to make decisions based on this information.

Larry Muir is a structural steel consultant in Atlanta and serves as Chair of the AISC Committee on Specifications’ Technical Committee 6 on Connections and is Chair of the AISC Committee on Manuals and Textbooks’ subcommittee M3 on the Design of Bolts, Welds and Affected Elements. He is also a consultant to the AISC Steel Solutions Center. You can reach him at larrymuir@larrymuir.com.



tion J3.1, which states, “Use of high-strength bolts shall conform to the provisions of the *Specification for Structural Joints Using High-Strength Bolts*...except as otherwise provided in this *Specification*.” It should be noted that the Bolt Spec is adopted except as otherwise noted in the *Specification*. Though there is an attempt to keep the *Specification* and the Bolt Spec in synch, discrepancies sometimes creep in. In such cases the AISC *Specification* provisions govern when the *IBC* applies.

It is worth noting that the *Specification* also adopts AWS D1.1 in a similar fashion through the J2 statement “All provisions of AWS D1.1/D1.1M apply under this *Specification*, with the exception that the provisions of the listed AISC *Specification* Sections apply under this *Specification* in lieu of the cited AWS provisions.”

► **The Code.** The AISC *Code of Standard Practice for Steel Buildings and Bridges* is prepared by the AISC Committee on the Code of Standard Practice. The membership of the AISC Code Committee is balanced by interest but to date, the process has not involved ANSI accreditation. This is expected to change in the 2016 version, which is planned to be ANSI accredited.

The AISC *Code* does not address design but rather the most efficient approach to buying and selling fabricated structural steel. As stated in its scope, “In the absence of specific instructions to the contrary in the contract documents, the trade practices that are defined in this *Code* shall govern the fabrication and erection of structural steel.” As the AISC *Code* generally will set the contractual requirements, engineers and contractors should make themselves familiar with its provisions. It is amazing how often disputes arise over issues that are clearly anticipated and addressed by the AISC *Code*. A lot of problems can be avoided simply by adhering to its provisions and writing specific requirements in the contract documents when an alternative approach is needed for a specific project.

► **What about Seismic?** Both the *Manual* and the *Specification* make reference to the ANSI/AISC 341-10, the AISC *Seismic Provisions for Structural Steel Buildings* and provide guidance as to its application. Like the *Specification*, the *Seismic Provisions* is approved by the AISC Committee on Specifications through an ANSI-accredited process. Its sister “Manual” document is the AISC *Seismic Design Manual*. Like the *Specification* the *Seismic Provisions* is adopted into law, and like the *Manual* the *Seismic Design Manual* provides guidance.

There is a third steel document that applies to seismic design: ANSI/AISC 358-10, the AISC *Prequalified Connections for Special and Intermediate Steel Moment Frames for Seismic Applications*. This document is approved by the AISC Connection Prequalification Review Panel through an ANSI-accredited process and is adopted through several references by the *Seismic Provisions*.

► **Design Examples.** The AISC Design Examples are reviewed and approved by the AISC Committee on Manuals in a process similar to that by which the *Manual* itself is approved. Like the *Manual* the Design Examples should be viewed as guidance, not as requirements. This is well-stated in the Preface to the Design Examples: “These design examples are intended to demonstrate an approach to the design and are not intended to suggest that the

approach presented is the only approach. The committee responsible for the development of these design examples recognizes that designers have alternate approaches that work best for them and their projects. Design approaches that differ from those presented in these examples are considered viable as long as the *Specification*, sound engineering and project specific requirements are satisfied.”

► **Design Guides.** To date AISC has published 26 Steel Design Guides. These documents contain a wealth of information in a format that allows far greater depth and breadth than the *Manual*. The Steel Design Guides generally are produced under the auspices of the Manual Committee, except when the topic requires that a separate committee or task group take responsibility. Though these documents are typically written by individuals, they are reviewed by a large number of expert engineers, fabricators and others as appropriate. The Steel Design Guides represent the work of the listed author(s) and are not produced as consensus documents.

► **Engineering Journal.** The articles that appear in AISC’s *Engineering Journal* are written by the listed authors and are peer-reviewed by invited reviewers. There is no formal committee involvement in the process, though the reviewers usually are members of AISC committees with expertise in the areas of the submitted papers. Often a paper in *Engineering Journal* begins or documents the process of change in the AISC *Specification*, AISC *Manual*, etc.

► **NASCC proceedings.** Conference proceedings are not subject to a rigorous review, other than the selection of the authors and the topics by the conference organizing committee. Nonetheless, the information in these papers can be quite helpful and relevant.

► **This magazine.** *Modern Steel Construction* articles like this one are not peer-reviewed but rather are reviewed by AISC staff and sometimes undergo additional review by experts when requested by AISC staff.

► **ePubs.** The foregoing documents and many thousands of pages of others are available at www.aisc.org/epubs. Some documents are free downloads to all. The rest are free to AISC members.

► **Steel Solutions Center.** A selection of the questions and answers received and answered by the AISC Steel Solutions Center staff are published in *MSC’s Steel Interchange* (see page 9 for this month’s installment). We answer, on average, 200 questions a month, with three out of four coming from structural engineers. Whenever possible, our answers cite information in AISC, RCSC, AWS, ASTM and other relevant documents. However, it is recognized that these documents cannot possibly address every situation and a service is only useful if it can provide help in real-world situations. We strive to do the latter with full recognition that answers are needed now, not later. Our committee members generously volunteer their help when asked and our staff always collaborates to create, review and share the best available information.

AISC provides valuable design information, whether it be written by an individual or approved by a committee, to engineers in various formats. Regardless of the source—no matter the “who” that’s doing the “saying”—the engineer must ultimately understand and agree with the procedures that are used in their designs. **MSC**