New Codes and Standards for Cold-Formed Steel Framing

Standard Products and Trade Practices Defined

By Jay W. Larson, P.E., F. ASCE

The widespread popularity of cold-formed steel framing (*Figure 1 right*) in partition wall and curtain wall framing has led to increasing demand for its use in structural framing. To enable this broader application, the American Iron and Steel Institute (AISI) in its role as an American National Standards Institute (ANSI) accredited standards development organization, has been actively turning state-of-the-art research and industry practices into a series of design and installation standards. In 2004, AISI released supplements or new editions to its entire suite of standards. In 2005, the AISI will complete a *Code of Standard Practice for the Cold-Formed Steel Structural Framing Industry* and a *Standard for Cold-Formed Steel Framing - Product Data*. These two documents will be a significant step forward for the steel industry. However, the real beneficiaries of this effort will be the designers and specifiers of cold-formed steel framing who will profit by having standard products and trade practices defined.

Current Standards on the Street

The AISI helps turn state-of-the-art research into industry practice by serving as an ANSI-accredited standards development organization. Its Committee on Framing Standards (COFS) has a mission to eliminate regulatory barriers, and to increase the reliability and cost competitiveness of cold-formed steel framing through improved design and installation standards. This relatively new organization published four new standards in 2001, addressing General Provisions, Header Design, Truss Design, and a Prescriptive Method for One and Two Family Dwellings. In 2004, the COFS updated each of these existing standards and completed two new standards addressing Lateral Design and Wall Stud Design. The COFS is also facilitating the development of a *Code of Standard Practice for the Cold-Formed Steel Structural Framing Industry* and a *Standard for Cold-Formed Steel Framing – Product Data.*

The **General Provisions** standard addresses those topics that are common to prescriptive and engineered design. It provides a link between all of the industry stakeholders and code enforcement agencies, ensuring everyone is "on the same page" with respect to the basic requirements of cold-formed steel framing. It provides general requirements for material, corrosion protection, products, member design, member condition, installation, and connections.

The **Header Design** standard provides design professionals with design methodologies for headers over door and window openings in buildings, based on testing at the National Association of Home Builders (NAHB) Research Center, the University of Missouri-Rolla and individual product manufacturers. Developed under the guidance of Dr. Roger LaBoube of the University of Missouri-Rolla, the Header Design standard provides general, design and installation requirements.

The **Truss Design** standard applies to cold-formed steel trusses used for load carrying purposes in buildings. The standard is not just for design. It also applies to manufacturing, quality criteria, installation and testing as they relate to the design of cold formed steel trusses (*Figure 2 below*). The requirements of the truss standard apply to both generic C-section trusses, as well as to the various proprietary truss systems, and were developed, in part, based on extensive research at the University of Missouri-Rolla.

The **Prescriptive Method for One- and Two-Family Dwellings** is an updated version of previous residential building code submittals that has gone through the rigorous consensus process that earned it ANSI recognition, giving it instant credibility and making it easily accepted by the various building codes. The standard incorporates the latest cost saving developments of the Steel Framing Alliance, such as the L-header, coupled with the latest engineering and load combination developments, such as the LRFD provisions of the AISI Specification.

Figure 2

The **Lateral Design** standard addresses general design requirements for walls and diaphragms that provide lateral support to a building structure. This standard addresses design requirements for shear walls (Type 1 - segmented and Type 2 - perforated), diagonal strap bracing (that is part of a structural wall), wall anchorage and diaphragms. Formerly, these requirements were scattered among various building code provisions, design guides, technical notes and research reports. This document pulls them together into one document that is recognized by the building codes. A companion **Commentary**, developed under the guidance of Dr. Reynaud Serrette of Santa Clara University,

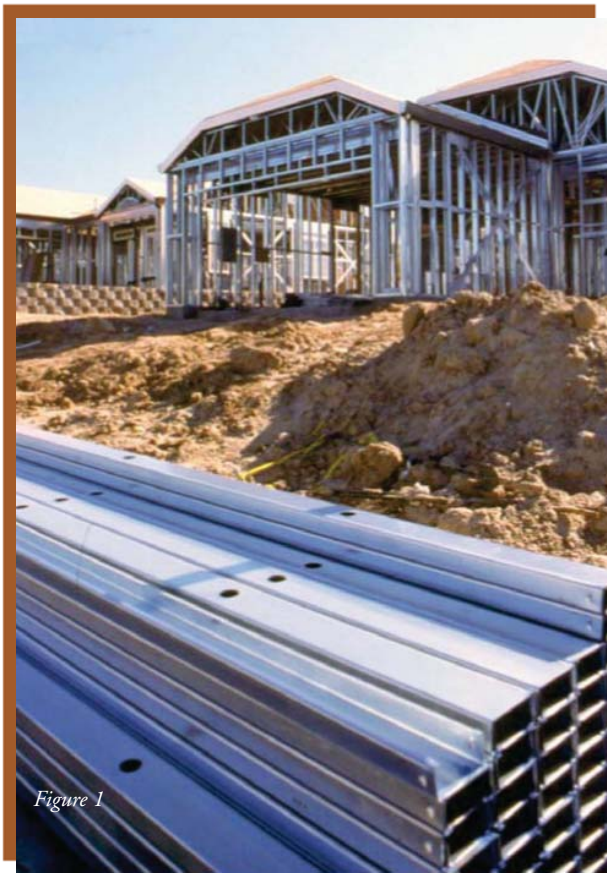

Figure 1

provides technical substantiation and explanation of the provisions.

The **Wall Stud Design** standard addresses general requirements, loading, design and installation of cold-formed steel wall studs. It includes such items as load combinations specific to wall studs, a rational approach for sheathing braced design, and methodologies for evaluating stud-to-track connections and deflection track connections.

New Standards on the Horizon

The COFS began development of an industry *Code of Standard Practice* in 2002. It will cover general requirements, classification of materials, plans and specifications, installation drawings, materials, manufacture and delivery, installation, quality control, and contractual relations. This document is being developed by the COFS and is being reviewed by several peer committees within the industry. It will define and set forth accepted norms of good practice for fabrication, and installation of cold-formed steel structural framing. It is not intended to conflict with or supercede any legal building regulations, but serves to supplement and amplify such laws and is intended to be used unless there are differing instructions in the contract documents. Other industries have such documents. This one is being patterned after these other documents, but is being tailored to the needs of our industry.

The COFS began development of an industry standard *Product Data* in 2004. This industry standard product data will facilitate the development of industry standard load and span tables, details, and other market-enabling tools such as design software and connection hardware. This standard will define cross-section shapes, dimensions and properties, along with material properties, manufacturing

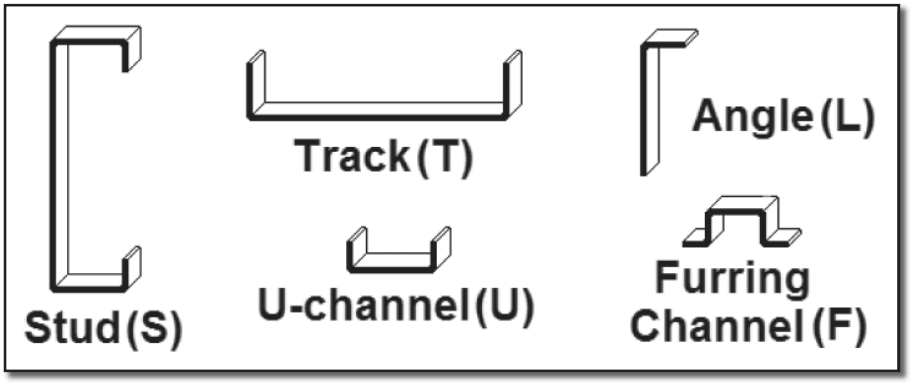

Figure 3

tolerances, product identification and product labeling requirements for cold-formed steel structural and non-structural framing members such as, but not limited to studs, joists, furring channels, cold-rolled channels and angles (*Figure 3*). This document is being developed as an ANSI standard by the COFS, but is also being reviewed by the Steel Stud Manufacturers Association and the Canadian Sheet Steel Building Institute.

Conclusions

The American Iron and Steel Institute has effectively leveraged its experience and expertise in standards development to support the growing needs of the cold-formed steel framing industry. Charged with a mission, to eliminate regulatory barriers and to increase the reliability and cost competitiveness of cold-formed steel framing through improved design and installation standards, the Committee on Framing Standards has built on the internationally recognized AISI *North American Specification for the Design of Cold-Formed Steel Structural Members* and has already developed and published six ANSI-accredited consensus standards. In 2005, two new documents will be added to this library. These documents are expected to have widespread application and building code acceptance in the very near future, and are readily available from the Steel Framing Alliance (**www.steelframingalliance.com**).▪

The members of the committee, sub-committees and task groups responsible for bringing these standards to fruition are to be commended for their time and effort. It is through the participation of representatives from steel producers, fabricators, users, educators, researchers, and building code officials in this consensus process that such progress is made. The partner organizations, Steel Framing Alliance, Light Gauge Steel Engineers Association, Steel Stud Manufacturers Association, Canadian Sheet Steel Building Institute and Center for Cold Formed Steel Structures, are to be thanked for their active participation. Particular gratitude is owed to the American Iron & Steel Institute and the Steel Framing Alliance, and their members, for their long-term vision for this market and financial support of this technical effort.

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