practice guide

American Iron and Steel Institute

Code of Standard Practice for Cold-Formed Steel Structural Framing

Committee on Framing Standards

2006 EDITION

with Commentary

Endorsed by Association of the Wall and Ceiling Industries, Steel Framing Alliance, and Steel Stud Manufacturers Association

AWCI Steel Framing Alliance™ SSMA

Code of Standard Practice
for Cold-Formed Steel Structural Framing

September 2006

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Committee on Framing Standards

American Iron and Steel Institute
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DISCLAIMER

The material contained herein has been developed by the American Iron and Steel Institute Committee on Framing Standards. The Committee has made a diligent effort to present accurate, reliable, and useful information on trade practices for fabrication and installation of cold-formed steel structural framing. The Committee acknowledges and is grateful for the contributions of the numerous engineers, manufacturers, contractors and others who have contributed to the body of knowledge on the subject. Specific references are included in the *Code of Standard Practice* document.

With anticipated improvements in understanding of the behavior of cold-formed steel framing and the continuing development of new technology, this material will become dated. It is anticipated that AISI will publish updates of this material as new information becomes available, but this cannot be guaranteed.

No conflict between this *Code of Standard Practice* and any legal building regulation is intended. This *Code of Standard Practice* is intended only to supplement and amplify such legal building regulations and laws.

The materials set forth herein are for general purposes only. They are not a substitute for competent professional advice. Application of this information to a specific project, particularly if included as part of a contract, should be reviewed by competent legal counsel. Anyone making use of the information set forth herein does so at their own risk and assumes any and all liability arising there from.

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PREFACE

The American Iron and Steel Institute Committee on Framing Standards has developed this *Code of Standard Practice for Cold-Formed Steel Structural Framing* [*Code of Standard Practice*] to address trade practices for design, fabrication and installation of *cold-formed steel structural framing* products.

This *Code of Standard Practice*, as revised to date, defines and sets forth accepted norms of good practice and has been developed and reviewed by a peer committee of the *cold-formed steel structural framing* industry. The practices defined in this *Code of Standard Practice* are the commonly accepted standards of custom and usage for *cold-formed steel structural framing* fabrication and installation. This voluntary document is intended to be used by *owner's representatives*, *design professionals*, *contractors*, *construction managers*, *suppliers*, *manufacturers*, *installers* and others on individual projects that utilize *cold-formed steel structural framing*.

This *Code of Standard Practice* is not applicable to *non-structural members*, including but not limited to interior drywall framing, which is addressed by ASTM C645 and C754, or *structural steel*, structural steel joists, steel deck, *metal building systems* or rack structures, which are addressed by *AISC*, *SJI*, *SDI*, *MBMA* and *RMI*, respectively.

The Committee acknowledges and is grateful for the numerous engineers, manufacturers, contractors and others who have contributed to the body of knowledge on the subject. The Committee wishes to also express their appreciation for the support of the Association of the Wall and Ceiling Industries (AWCI) International, Steel Framing Alliance (SFA) and Steel Stud Manufacturers Association (SSMA).

The first edition of this *Code of Standard Practice* was published in 2005. This 2006 Edition includes new provisions on *revisions*, the *RFI* process, contract price adjustment and scheduling. A non-mandatory commentary, shown in gray boxes throughout the document, is also added to provide background and further explanation for the corresponding provisions.

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CODE OF STANDARD PRACTICE
FOR
COLD-FORMED STEEL STRUCTURAL FRAMING

A. GENERAL

A1 Scope

In the absence of specific instructions to the contrary in the *contract documents*, the trade practices that are defined in this *Code of Standard Practice* shall govern the design, fabrication and installation of *cold-formed steel structural framing*.

Commentary:
The practices defined in this *Code of Standard Practice* are the commonly accepted standards of custom and usage for the fabrication and installation of *cold-formed steel structural framing*, which generally represent the most efficient approach. This *Code of Standard Practice* is not intended to define a professional standard of care for the *owner's representatives* or change the duties and responsibilities of the *owner*, *contractor*, *design professionals* (i.e., architect or *structural engineer-of record*) from those set forth in the *contract documents*. Nor does it assign to the *owner* or *design professionals* any duty or authority to undertake responsibility inconsistent with the provisions of the *contract documents*.

Commentary:
This *Code of Standard Practice* is not applicable to *non-structural members*, including but not limited to interior drywall framing, which is addressed by ASTM C645 and C754, or *structural steel*, structural steel joists, steel deck, *metal building systems* or rack structures, which are addressed by *AISC*, *SJI*, *SDI*, *MBMA* and *RMI*, respectively. An extended list of non-applicable items is given in Section B2.

A2 Definitions

Where the following terms appear in this *Code of Standard Practice* in italics they shall have the meaning herein indicated. Where terms are not included, such terms shall have ordinary accepted meaning in the context for which they are intended.

AISC. American Institute of Steel Construction.

AISI. American Iron and Steel Institute.

Applicable Building Code. Building code under which the building is designed.

Approved. Approved by a building official or *design professional*.

Base Steel Thickness. The thickness of bare steel exclusive of all coatings.

Blocking. C-shaped track, break shape, or flat strap material attached to *structural members*, flat strap or sheathing panels to transfer shear forces.

Bracing. Structural elements that are installed to provide restraint or support (or both) to other framing members so that the complete assembly forms a stable structure.

CASE. Council of American Structural Engineers.

Clarification. An interpretation of the *contract documents* that have been *released for construction*, providing an explanation that neither revises the information that has been *released for construction* nor alters the cost or schedule of performance of the work.

Cold-Formed Sheet Steel. Sheet steel or strip steel that is manufactured by (1) press braking blanks sheared from sheets or cut length of coils or plates, or by (2) continuous roll forming of cold- or hot-rolled coils of sheet steel; both forming operations are performed at ambient room temperature, that is, without any addition of heat such as would be required for hot forming.

Cold-Formed Steel. See *Cold-Formed Sheet Steel*.

Cold-Formed Steel Structural Framing. The elements of the structural frame, as given in Section B1 of this *Code of Standard Practice*.

Component Assembly. A fabricated assemblage of *cold-formed steel structural members* that is manufactured by the *component manufacturer*, which may also include *structural steel* framing, sheathing, insulation or other products.

Component Design Drawing. The written, graphic and pictorial definition of an individual *component assembly*, which includes engineering design data.

Component Designer. The individual or organization responsible for the engineering design of *component assemblies*. Also referred to as *truss designer* on projects involving *trusses*, but hereinafter will be referred to as *Component Designer*.

Component Manufacturer. The individual or organization responsible for the manufacturing of *component assemblies* for the project. Also referred to as *truss manufacturer* on projects involving *trusses*, but hereinafter will be referred to as *Component Manufacturer*.

Component Placement Diagram. The illustration supplied by the *component manufacturer* identifying the location assumed for each of the *component assemblies* which references each individually designated *component design drawing*.

Construction Manager. The individual or organization designated by the *owner* to issue contracts for the construction of the project and to purchase products.

Contract Documents. The documents, including, but not limited to, *plans* and *specifications*, which define the responsibilities of the parties involved in bidding, purchasing, designing, supplying, and installing *cold-formed steel framing*.

Contractor. The individual or organization that is contracted to assume full responsibility for the construction of the structure.

Design Load. Applied *load* determined in accordance with either *LRFD load combinations* or *ASD load combinations*, whichever is applicable.

Design Professional. An individual who is registered or licensed to practice their respective design profession as defined by the statutory requirements of the state, province or territory in which the project is to be constructed.

Discrepancy. Any conflicts or omissions within the *contract documents*, or conflicts between the *contract documents* and *applicable building codes*, standards of good engineering or industry practice.

Drawings. See *Plans* and *Installation Drawings*.

Embedded Anchor. A structural anchor or device (bolt, strap, plate, etc.) intended for fastening *cold-formed steel structural framing* to masonry or concrete that is installed prior to hardening of the grout or concrete.

Framing Contractor. See *installer*.

Framing Material. Steel products, including but not limited to *structural members* and *prefabricated structural assemblies*, ordered expressly for the requirements of the project.

General Contractor. See *Contractor*.

Installation Drawings. Drawings that show the location and installation of the *cold-formed steel structural framing*.

Installer. Party responsible for the installation of *cold-formed steel* products.

Commentary:
While this *Code of Standard Practice* was patterned after a similar document by the AISC, care was taken to use terminology to avoid confusion between material suppliers, fabricators and trades. Therefore, the term *installer* is used in reference to *cold-formed steel structural framing* versus the term erector typically used in reference to *structural steel*.

Lateral Force Resisting System. The *structural* elements and connections required to resist racking and overturning due to wind and/or seismic forces imposed upon the structure in accordance with the *applicable building code*.

Material Supplier. An individual or entity responsible for furnishing *framing materials* for the project.

MBMA. Metal Building Manufacturers Association.

Metal Building System. A complete integrated set of mutually dependent components and assemblies that form a building. As defined by the *MBMA*, a *metal building system* includes the primary and secondary framing, covering, and accessories, all of which are manufactured to permit inspection on site prior to assembly or installation.

Non-Structural Member. A member in a steel framed assembly which is limited to a transverse (out-of-plane) load of not more than 10 lb/ft^2 (480 Pa), a superimposed axial load, exclusive of sheathing materials, of not more than 100 lb/ft (1460 N/m), or a superimposed axial load of not more than 200 lbs (890 N).

Owner. The individual or entity organizing and financing the design and construction of the project.

Owner's Representative. The *owner* or individual designated contractually to act for the *owner*.

Owner's Representative for Construction. The *owner* or the entity that is responsible to the *owner* for the overall construction of the project, including its planning, quality and completion. This is usually the *contractor*, *construction manager* or similar authority at the job site.

Owner's Representative for Design. The *owner* or the entity that is responsible to the *owner* for the overall structural design of the project. Also referred to as *building designer*, but hereinafter will be referred to as *Owner's Representative for Design*. This is usually the *Structural Engineer-of-Record*.

Plans. Drawings prepared by the *design professional* for the *owner* of the project. These drawings include but are not limited to floor plans, framing plans, elevations, sections, details and schedules as necessary to define the desired construction.

Post-installed Anchor. A structural anchor or device (bolt, clip, angle, bracket, etc.) intended for fastening *cold-formed steel structural framing* to hardened masonry or concrete. For anchorage to concrete, these anchors are installed after the concrete has achieved sufficient stiffness to be sawn or drilled.

Receiving Entity. The individual or entity responsible to the *owner's representative for construction* for accepting or rejecting furnished *framing materials*, and proper storage of received *framing materials* on the job site.

Release for Construction. The release by the *owner's representative*, permitting the *component manufacturer and*/or *installer* to commence work under the contract, including ordering *framing material* and preparing *installation drawings*.

Revision. An instruction or directive providing information that differs from information that has been *released for construction*. A *revision* may, but does not always, impact the cost or schedule of performance of the work.

RFI. Request for Information. A written request for information or *clarification* generated during the bidding, design or construction phases of the project.

RMI. Rack Manufacturers Institute.

SDI. Steel Deck Institute.

Specialty Designer. The *design professional*, individual or organization having responsibility for the design of the specialty items. This responsibility shall be in accordance with the state's, province's or territory's statues and regulations governing the professional registration and certification of architects or engineers. Also referred to as *component designer*, specialty engineer, delegated engineer, design engineer, registered engineer, and engineer, but hereinafter will be referred to as *Specialty Designer*. The requirement for a *Specialty Designer* is typically called out on architectural *specifications* or structural general notes. The *Specialty Designer* is typically not the *Structural Engineer-of-Record*.

Shop Drawings. Drawings for the production of individual *component assemblies* for the project.

Specifications. Written instructions, which, with the *plans*, define the materials, standards, design of the products, and workmanship expected on a construction project.

SJI. Steel Joist Institute.

SSMA. Steel Stud Manufacturers Association.

Standard Cold-Formed Steel Structural Shapes. *Cold-formed steel structural members* that meet the requirements of the SSMA *Product Technical Information* or AISI *North American Standard for Cold-Formed Steel Framing – Product Data.*

Commentary:
The AISI *North American Standard for Cold-Formed Steel Framing – Product Data* was introduced in 2006. While the industry is encouraged to migrate to this new document, it is recognized that the SSMA document is also applicable and has widespread acceptance.

Structural Engineer-of-Record. The *design professional* who is responsible for sealing the *contract documents*, which indicates that he or she has performed or supervised the analysis, design and document preparation for the structure and has knowledge of the requirements for the load-carrying structural system.

Structural Member. A member that resists *design loads*, as required by the *applicable building code*, except when defined as a *non-structural member*.

Structural Steel. The elements of the structural frame defined as *structural steel* by *AISC* in the Code of Standard Practice for Steel Buildings and Bridges.

Sub-Contractor. The individual or organization with whom a *contractor* has contracted to furnish, install and/or install a portion of the project.

Submittals. Items required by the *contract documents* to be submitted by the *contractor* or *sub-contractor*. These include but are not limited to *component design drawings*, *component placement diagrams* and/or *installation drawings*. *Submittals* are usually not a part of the *contract documents* but are a work effort requirement of the documents.

Truss. A coplanar system of *structural members* joined together at their ends usually to construct a series of triangles that form a stable beam-like framework. See *component assembly*.

Truss Designer. Also referred to as *truss* engineer, design engineer and registered engineer, but hereinafter referred to as *truss designer*, is an individual or organization responsible for the design of *cold formed steel trusses*.

Truss Manufacturer. An individual or organization engaged in the manufacturing of site-built or in-plant *trusses*.

A3 Referenced Documents

The following documents or portions thereof are referenced within this *Code of Standard Practice* and shall be considered part of the requirements of this document.

1. AIA 201, *General Conditions of the Contract for Construction (1997)*, American Institute of Architects, Washington, DC.
2. AISI GP-2004, *Standard for Cold-Formed Steel Framing – General Provisions*, American Iron and Steel Institute, Washington, DC.
3. AISI TRUSS-2004, *Standard for Cold-Formed Steel Framing – Truss Design*, American Iron and Steel Institute, Washington, DC.
4. AISI PRODUCT-2006, *North American Standard for Cold-Formed Steel Framing – Product Data*, American Iron and Steel Institute, Washington, DC.
5. ASTM A1003/A1003M-05, *Standard Specification for Sheet Steel, Carbon, Metallic and Non-Metallic Coated for Cold-Formed Framing Members*, ASTM International, West Conshohocken, PA.
6. ASTM A780-01, *Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings*, ASTM International, West Conshohocken, PA.
7. ASTM C645-06, *Standard Specification for Nonstructural Steel Framing Members*, ASTM International, West Conshohocken, PA.
8. ASTM C754-04, *Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products*, ASTM International, West Conshohocken, PA.

9. ASTM C955-06, *Standard Specification for Load-Bearing (Transverse and Axial) Steel Studs, Runners (Tracks), and Bracing or Bridging for Screw Application of Gypsum Panel Products and Metal Plaster Bases*, ASTM International, West Conshohocken, PA.

10. SSMA, *Product Technical Information*, 2001 Edition, Steel Stud Manufacturers Association, Chicago, IL.

A4 Responsibility for Design

Commentary:
Prior to this *Code of Standard Practice*, design responsibilities for *component assemblies* were defined in several overlapping industry documents, which included the AISI *Standard for Cold-Formed Steel Framing – Truss Design*, LGSEA Council Technical Note 551f on *Specifying Trusses*, and STCA *Standard Practices and Recommended Guidelines on Responsibilities for Construction using Cold-Formed Steel Trusses and Components*. Where the AISI *Standard for Cold-Formed Steel Framing – Truss Design* is referenced by the *applicable building code*, those responsibilities would be legally binding unless modified. However, design responsibilities for other types of *cold-formed steel structural framing* were only partially defined in several *CASE* documents, which included the *National Practice Guidelines for Structural Engineer of Record* and *National Practice Guidelines for Specialty Structural Engineers*.

Commentary:
A key point of this *Code of Standard Practice* and the documents used in its development is that although design may be delegated, the *structural engineer-of-record* is responsible for the overall structural integrity of the system when completed.

A4.1 The *design professionals* are responsible for the suitability and adequacy of all aspects of design. The *design professionals* and/or the *owner* shall have a right to solicit designs, *plans*, *specifications* and/or data from the *component manufacturer*, *installer* and/or *specialty designer*, but the responsibility for the safety of the structure, property and conformance to *applicable building codes* and standards remains with the *design professionals* of record.

A4.2 If the *contract documents* require that the *installer* and/or *specialty designer* prepare designs, *plans* and/or *specifications*, the *contract documents* shall state clearly and precisely the exact requirements, including all *applicable building codes* and design requirements and all other regulatory requirements. The *design professional* of record assumes the responsibility for these designs. The *design professionals* of record shall confirm that the effect of the *specialty designer's* work conforms to the intent of the *structural engineer of record* on the overall project. The *design professional* of record shall coordinate the work of all the *specialty designers* with the *design professionals'* work and/or that of other *specialty designers* to ensure compatibility and integrate the connection and conformity of the components designed by the different *specialty designers*. This coordination includes, but is not limited to, addressing the forces and reactions as identified by the *specialty designer* that are transmitted to those elements of the structure that are not designed by the *specialty designer*.

A4.3 If the *contract documents* specify *trusses*, the design responsibilities defined in the *AISI Standard for Cold-Formed Steel Framing - Truss Design* shall apply. If the *contract documents* specify *component assemblies* other than *trusses*, the *contract documents* shall define the responsibility for design of the *component assemblies*. If the *contract documents* require that the *component manufacturer* be responsible for the design of the *component assemblies*, the *contract documents* shall state clearly and precisely the exact requirements, including all *applicable building codes* and design requirements and all other regulatory requirements. The *owner's representative for design* assumes the responsibility for these designs.

Commentary:
For *lateral force resisting systems*, the design responsibilities of the *structural engineer-of-record* include but are not limited to design of roof/floor diaphragms, lateral load transferring elements (sometimes referred to as shear transfer bracing), main lateral force resisting elements and foundations, as well as compliance of the overall structure with *applicable building codes*.

When the design of lateral load transferring elements is to be performed by a *specialty designer* or *component designer*, the *structural engineer-of-record* must specify the following:

(1) magnitude of lateral load to be transferred;
(2) load path (i.e., where loads originate and where they are to be transferred);
(3) bearing material and conditions; and
(4) any special requirements for the design of the transferring elements.

The *structural engineer-of-record* must also provide for the following in the design and detailing of the building:

(1) horizontal, vertical or other deflection due to lateral loads; and
(2) support and anchorage accommodating horizontal and vertical reactions due to lateral loads.

A4.4 If the *owner* chooses not to hire a *design professional*, the *owner* is responsible for the suitability, adequacy and legality of all aspects of design in the *plans* and *specifications*. In this case, the *owner* is responsible for the review and approval of *submittals*.

A4.5 The *contactor* or *sub-contractor* shall not be required to provide professional services which constitute the practice of architecture or engineering unless such services are specifically required by the *contract documents* for a portion of the work or unless the *contractor* or *sub-contractor* needs to provide such services in order to carry out the *contractor's* or *sub-contractor's* responsibilities for construction means, methods, techniques, sequences and procedures.

Commentary:
The provisions of Section A4.5 were based AIA 201 Section 2.12.10; however, references to the *contractor* were expanded to include both the *contractor* and *sub-contractor*.

B. CLASSIFICATION OF MATERIALS

B1 Definition of Cold-Formed Steel Structural Framing

Cold-formed steel structural framing shall consist of the elements of the structural frame that are shown in the *contract documents*, essential to support the design loads and described as:

- *Cold-formed steel structural members*.
- *Cold-formed steel component assemblies*.
- *Bracing* and *blocking* necessary for the *cold-formed steel structural framing* or to provide stability for *cold-formed steel structural members*.
- Connection methods, hardware (fasteners, connectors, and *post-installed anchors*) and processes necessary for the installation of *cold-formed steel structural framing*.
- *Lateral force resisting system*.
- Welding materials and processes related to the fabrication or installation of *cold-formed steel structural framing*.

Commentary:
The items listed in Section B1 are normally fabricated and/or installed by the *component manufacturer* or *installer*, and thereby defines the scope of this *Code of Standard Practice*.

B2 Other Items

Cold-formed steel structural framing shall not include other items that are not generally described in Section B1, even where such items are shown in the structural *plans* or are attached to the *cold-formed steel structural framing* unless specifically identified by item in the *contract documents*. Other items include but are not limited to:

- Awnings.
- Blocking for other attachments, such as door, window, cabinet, handrail, plumbing, awnings, storefront, glazing and other systems.
- Building cleaning equipment and equipment anchor support.
- Cables for permanent *bracing* or suspension systems.
- *Cold-formed steel* concrete form decking.
- *Cold-formed steel* floor decking.
- *Cold-formed steel non-structural framing*.
- *Cold-formed steel* roof decking.
- *Cold-formed steel* wall sheathing, except as part of a *lateral force resisting system*.
- Chimney support framing.
- Concrete slab edge forms.
- Drywall and plaster trims and accessories.
- Eave struts deployed as a component of a *metal building system*.
- Edge angles, plates, embeds and *structural steel* supports necessary for the support of suspended *cold-formed steel structural framing*.
- *Embedded anchors*.
- Expansion and control joints.
- Fastening systems for ceiling, wall, floor and roof sheathing materials.
- Fire, smoke and draft stopping.
- Flagpole support framing.
- Girts deployed as a component of a *metal building system*.

- Handrails and handrail support members.
- Insulation products.
- Interior drywall (*non-structural*) framing.
- Mechanical equipment support framing.
- *Metal building systems*.
- Metal panels deployed as a component of a *metal building system*.
- Miscellaneous metal.
- Opening framing, if made from other than *standard cold-formed steel structural shapes*.
- Open-web steel joists.
- Plaster lathing, except where included with a *prefabricated structural assembly*.
- Purlins deployed as a component of a *metal building system*.
- Sheathing, unless part of a *prefabricated structural assembly*.
- Stairs, stair landings and stair railings.
- Stair component support framing.
- *Structural steel* framing.
- *Structural steel* lintels, if job-site installed.
- *Structural steel* plate.
- Support framing for cables.
- Support framing for sign structures.
- Suspended ceiling systems, proprietary or pre-engineered.
- Window washing supports.

Commentary:
The items listed in Section B2 are normally not fabricated and/or installed by the *component manufacturer* or *installer*. When such items are contracted to be provided by the *component manufacturer* or *installer*, coordination will normally be required between the *component manufacturer* or *installer* and other material suppliers and trades.

C. CONTRACT DOCUMENTS

Commentary:
Contract documents vary greatly in complexity and completeness. Nonetheless, the *component manufacturer* and/or *installer* must be able to rely upon the accuracy and completeness of the *contract documents*. This allows the *component manufacturer* and/or *installer* to provide the *owner* with bids that are adequate and complete.

Commentary:
One of the *owner's* responsibilities is to ensure proper communication of all facts throughout the planning and construction phases of the project between all parties involved. The *contract documents* (i.e., architectural plans, structural plans, *specifications* and structural notes) are the primary method of communication. It is the *owner's* responsibility to properly define the scope of work. When the *owner* releases *plans* or *specifications* for construction, the *component manufacturer* and/or *installer* rely on the fact that these are the *owner's* requirements for his project.

Commentary:
Critical requirements that are necessary to protect the *owner's* interest, that affect the integrity of the structure or that are necessary for the *component manufacturer* and/or *installer* to proceed with their work must be included in the *contract documents*. In some cases, however, the *owner* can benefit when reasonable latitude is allowed in the *contract documents* for alternatives that can reduce cost without compromising quality.

C1 Responsibilities

C1.1 The *owner's representative* shall furnish to the *component manufacturer* and/or *installer* a set of *contract documents* of current issue including addenda showing the type of support supplied, method of attachment, correct dimensions, and required size and spacing.

C1.2 If *contract documents* are not available, the *owner's representative* shall provide complete information as specified in Section A4.2.

C1.3 The *contract documents* may require the *component manufacturer* and/or *installer* to submit a complete design for *approval* prior to the commencement of construction. In the process of this submittal, the *component manufacturer* and/or *installer* shall bring to the attention of the *owner's representative*, any conflicts within the construction documents. The *owner's representative*, must present clear instructions to the *component manufacturer* and/or *installer* on how to resolve each conflict. Changes resulting from such conflicts shall be handled in accordance with Section H6.

C1.4 Architectural *plans* shall be legible, shall indicate the design intent of *cold-formed steel structural framing*, and shall include at a minimum the location of *cold-formed steel structural framing*, constraints on member size (e.g., web depth), wall and other assembly types, non-standard spacing and location requirements.

C1.5 Structural *plans* shall show the *structural member* locations, sizes, reinforcing and connections in sufficient scale and detail to enable the construction of the building in a reasonable sequence by a competent *contractor* experienced in the techniques of construction for the specified materials. Structural *plans* may refer to architectural *plans* for dimensions, where appropriate. Elevations, sections and details should be of appropriate scale, number

and extent to portray clearly the relationship of members to each other and their interconnection(s). Care should be taken to determine that details noted "typical" are applicable to the project or condition being portrayed.

C2 Limit of Responsibility

The *owner's* construction documents are assumed to be correct in all details, and the *component manufacturer's* and/or *installer's* responsibility is limited to furnishing products in accordance with these documents and this *Code of Standard Practice*. Any change to these *contract documents* must be authorized in writing by the *owner's representative*.

Commentary:
It should not be the responsibility of the *component manufacturer* or the *installer* to compare the *contract documents* (i.e., architectural plans, structural plans, *specifications* and structural notes) against each other in order to verify consistency. This is the responsibility of the *owner* or the *owner's representative(s)*.

C3 Jurisdiction

Where state and local boards or other regulatory agencies have jurisdiction, the *owner* is to indicate such information in the *contract documents*.

C4 Discrepancies

When a *discrepancy* is discovered in the *contract documents* in the course of work by the *contractor*, *component manufacturer*, *installer* and/or any other parties involved with the construction, the entity finding the discrepancy shall promptly notify the *owner's representative for construction* so that the *discrepancy* can be resolved by the *owner's representative for design*. Such resolutions shall be timely so as not to affect the work of the *component manufacturer* and/or *installer*. Changes resulting from such *discrepancies* shall be handled in accordance with Section H6.

Commentary:
While it is the responsibility of the *component manufacturer* and/or *installer* to report any *discrepancies* that are discovered in the *contract documents*, it is not the responsibility of the *component manufacturer* and/or *installer* to discover *discrepancies*, including those that are associated with the coordination of the various disciplines. The quality of the *contract documents* is the responsibility of the entities that produce those documents.

C5 Revisions

Revisions to the *contract documents* shall be made either by issuing new *contract documents* or by reissuing the existing *contract documents*. In either case, all *revisions*, including *revisions* that are communicated through responses to *RFIs* (see Section H4) or the review process (see Section D3), shall be clearly and individually indicated in the *contract documents*. If new *contract documents* are issued due to *revisions*, the parties issuing the new *contract documents* shall submit them to the *owner* or the *owner's representative* for distribution. The *contract documents* shall be dated and identified by *revision* number. Revised *contract documents* shall be identified by the same number throughout the duration of the project, regardless of the *revision*. See also Section H6.

Commentary:
Revisions to the *contract documents* can be made by issuing sketches and supplemental information separate from the *contract documents*. These sketches and supplemental information become amendments to the *contract documents* and are considered new *contract documents*. All sketches and supplemental information must be uniquely identified with a number and date as the latest instructions until such time as they may be superseded by new information. When *revisions* are made by revising and re-issuing the existing *contract documents*, a unique revision number and date must be added to those documents to identify that information as the latest instructions until such time as they may be superseded by new information. The same unique *drawing* number must identify each *drawing* throughout the duration of the project so that *revisions* can be properly tracked, thus avoiding confusion and miscommunication among the various entities involved in the project. When *revisions* are communicated through the annotation of *submittals*, such changes must be confirmed in writing by one of the aforementioned methods. This written confirmation is imperative to maintain control of the cost and schedule of a project and to avoid potential errors in fabrication and installation.

D. INSTALLATION DRAWINGS

D1 Owners Responsibility

D1.1 When the project is *released for construction*, the *owner's representative* shall provide complete *contract documents* and relevant information, including addenda and other related drawings such as window shop drawings and architectural metal panel drawings, in a timely manner for the installation of *cold-formed steel structural framing* and, if required, preparation of *component design drawings* and *installation drawings*. A scope of work for items required, having been agreed upon at the time of the contract, shall also be incorporated with these documents. This scope shall include and indicate all items that are to be fabricated and installed.

D1.2 If the *owner's representative* requests that *submittals* be prepared before the timely submittal of any other required documents, such as window shop drawings or architectural metal panel drawings, any changes required due to the differences between these drawings and the assumptions made in preparation of the *submittals* will be the responsibility of the *owner's representative*. Delays in obtaining required information can extend the schedule agreed to at time of contract.

D2 Component Manufacturer and/or Installer Responsibility

D2.1 The *component manufacturer* and/or *installer* shall submit *submittals*, with supporting calculations, when required by and per the *contract documents*, on a schedule formulated and agreed to at time of contract.

Commentary:
The *component manufacturer* and/or *installer* should be permitted to use the services of a *specialty designer* or independent detailer to produce *shop drawings* and/or *installation drawings* and to perform other support services.

Commentary:
When the *component manufacturer* and/or *installer* provides a schedule for *submittals*, it must be recognized that this schedule may be affected by *revisions*, response time to *RFI*(s) and resolution of *discrepancies*.

D2.2 Requests for supplemental structural support elements, such as miscellaneous structural steel and/or embedded items, shall be submitted by the *component manufacturer* and/or *installer* and handled in accordance with Section H6. Delays in obtaining confirmation of such requests can extend the schedule agreed to at time of contract.

D3 Review Process

Commentary:
Upon receipt of *shop drawings* from different trades, the *owner's representative* must review each *submittal*, or delegate such review in order to assure continuity and completeness. The different trade *submittals* shall be reviewed in conjunction with all the *submittals* to insure conformity and identify conflicts or "gray" areas not covered by any trade but necessary to integrate the different trades.

D3.1 The *owner's representative* shall return to the *component manufacturer* and/or *installer* one set of the *submittals* indicating one of the following: approved (no exception taken), approved as noted (re-submittal not required), revise and resubmit or rejected.

D3.2 If modifications are required, the *component manufacturer* and/or *installer* and *specialty designer,* if retained by the *component manufacturer* and/or *installer*, shall have at least fourteen (14) calendar days for incorporating the required changes.

D3.3 If modifications with re-submittal are required, the *submittals* shall be resubmitted to the *owner's representative* for review after all required modifications and/or corrections have been executed.

Commentary:
If such modifications involve a single item or minor changes, only those items need be revised and resubmitted. These *revisions* may be appended to the original *submittals*. For example, if one *component assembly* design among several designs is incorrect, that design should be revised and resubmitted. However, if the design criteria have to be revised, all the *component assembly* designs based on that criteria must be revised and resubmitted. *Revisions* to the *component design drawings* can be made by issuing sketches and supplemental information separate from the *component design drawings*.

D3.4 Should modifications be required which were not part of the agreed to scope of work, the *component manufacturer* and/or *installer* shall submit in writing the extra costs for this additional work (including but not limited to engineering, material, labor, overhead and profit), for approval by the *owner's representative*.

D3.5 The *component manufacturer* and/or *installer* shall not proceed with any work until all *drawings*, modifications and extra charges are resolved, except those portions of the work where all parties have agreed to the completeness and correctness of all drawings, modifications, and any extra charges.

Commentary:
The intent of this section is to protect all parties from potential risks and costs associated with proceeding prior to the resolution of issues.

D3.6 It is the responsibility of the *owner's representative*, to assure that the above approval process is coordinated with the proper sequence for submittal and project schedule.

D4 Responsibility

D4.1 Approval by the *owner's representative* of *submittals* prepared by the *component manufacturer* and/or *installer* indicates that the *component manufacturer* and/or *installer* has correctly interpreted the contract requirements and is released to start fabrication and

installation. The *owner's representative* is responsible for adequacy of designs, structural configurations, material and code requirements. The above approval constitutes the *owner's* acceptance of this responsibility.

D4.2 Approval by the *owner's representative* of *submittals* does not relieve the *component manufacturer* and/or *installer* of the responsibility for accuracy of dimensions on *submittals*, nor the general fit-up of parts to be assembled in the field, nor for providing acceptable workmanship.

Commentary:
When the *component manufacturer* and/or *installer* intends to make a submission of an alternate to what is shown in the *contract documents*, the *component manufacturer* and/or *installer* must notify the *owner* or *owner's representative* in advance. This will allow the parties involved to schedule the review of the alternate for impact on cost, schedule and benefits. This evaluation by the *owner* or *owner's representative* may result in the rejection of the alternate. However, if alternate *submittals* are approved, this constitutes acceptance by the *owner* of materials, criteria or designs that may differ from those required by the *contract documents*.

E. MATERIALS

E1 Structural Members

E1.1 *Structural members* shall be of the grade, *base steel thickness* and coating specified by the *approved* design. However, steel of a higher grade, *base steel thickness*, or coating may be substituted for the grade, *base steel thickness*, or coating as specified, unless specifically prohibited in the *contract documents*.

E1.2 *Structural members* shall be of the size and shape specified by the *approved* design. Changes in size and/or shape shall require the approval of the *owner's representative for design*.

E1.3 *Structural members* shall comply with the manufacturing tolerances listed in ASTM C955.

E1.4 *Component assemblies* shall have *structural members* that are cut and assembled in accordance with the tolerances prescribed in the *AISI Standard for Cold-Formed Steel Framing – General Provisions*. *Trusses* shall have *structural members* that are cut and assembled in accordance with the additional requirements of the *AISI Standard for Cold-Formed Steel Framing - Truss Design*.

E2 Fasteners and Connection Hardware

E2.1 Fasteners shall be at minimum the type and size specified by the *approved* design. Use of a larger than specified fastener shall be permitted, providing that the minimum spacing and edge distance requirements of the larger fastener are met and the strength requirements of the specified fastener are met.

E2.2 Connection hardware (i.e., connectors and *post-installed anchors*) shall be as specified in the *approved* design, except for substitutions approved by the *owner's representative for design*.

E3 Preparation of Material

E3.1 Cutting shall be by sawing, abrasive cutting, shearing, plasma cutting or other *approved* methods. Proper methods of cutting are to be selected by the *installer*, unless otherwise specified in the *contract documents*.

E3.2 In the manufacture and/or fabrication of *structural members* and connection hardware, mechanical braking, bending or forming is permitted.

E4 Member Identification

Structural members shall be identified in accordance with the product identification requirements for framing members defined in the *AISI Standard for Cold-Formed Steel Framing - General Provisions*.

E5 Special Marking

Component assemblies shall be marked, as necessary, to document such items as proper orientation, special bearing conditions and permanent *bracing* requirements. Alternatively, it shall be acceptable for the *specialty designer* to provide this information to the *installer* by means of indications on the *component placement diagrams*.

E6 Camber

Component assemblies will only be provided with camber if specified by the *specialty designer*.

F. INSTALLATION

F1 Scope

Items of *cold-formed steel* to be installed shall be enumerated in the *contract documents*.

F2 Site Conditions

Commentary:
This section is deemed important for the safety and efficiency of the *installer* and the *installer's* crew, as well as for the protection of the people, property, etc., which may be present at the site at the time of installation.

F2.1 The *installer* shall be permitted to use the most efficient and economical method and sequence of installation or assembly available consistent with the *contract documents*. When the *owner* contracts separately with a *component manufacturer* and *installer*, the *owner* is responsible for coordinating work between *contractors*.

F2.2 The *installer* shall examine areas and conditions under which *framing materials* are to be installed. Work shall not proceed until unsatisfactory conditions have been corrected by those responsible.

F2.3 The *owner's representative for construction* shall provide and maintain adequate access necessary for equipment and *framing materials* to be installed. The *owner's representative for construction* shall provide the *installer* level, convenient, and adequate space to safely use the necessary equipment and install the *framing materials*.

F2.4 The *contractor* shall coordinate *installation drawings*, resolution of dimensional problems, compatibility of various trades and/or installation.

F3 Delivery, Handling and Storage of Materials

F3.1 It is the *receiving entity's* responsibility to verify that *framing materials* arrive in good condition. If *framing materials* arrive at a destination in a damaged condition, the *receiving entity* shall promptly notify the *material supplier* or *component manufacturer* prior to unloading the *framing material*, or promptly upon discovery and prior to installation.

F3.2 It is the *contractor's* and/or the *installer's* responsibility to verify the framing material is not damaged and meets the project *specifications* and/or *approved submittals* before installation. The *material supplier* or *component manufacturer* shall be responsible solely for the replacement of damaged material or material that does not meet the project *specifications* and/or *approved submittals*. If the *contractor* and/or the *installer* installs damaged material then the *contractor* and/or the *installer* assumes the cost of repairing or installing new materials. At no time will the consequential costs to be assumed by the *material supplier* or *component manufacturer* exceed the selling price of the particular material in question.

F3.3 Damage caused by improper storage or handling of *framing materials* on the job site is not the responsibility of the *material supplier* or *component manufacturer*.

F3.4 Proper storage of *framing materials* on the job site is the responsibility of the *receiving entity*, and requires that *framing materials* not be in direct contact with the ground and are protected from the elements. Adequate drainage and ventilation shall be provided to minimize the formation of "wet storage stain" or "white rust".

F3.5 Proper handling of *framing materials* on the job site is the responsibility of the *contractor* and *installer*, and requires that care be exercised to not cause significant damage to the metallic coating. Bare steel exposed at minor scuffs and scratches is generally protected by the zinc's ability to provide cathodic protection and does not require any repair; however, significant damage to the metallic coating, such as is caused by field welding, must be repaired in accordance with Section F4.

F4 Field Modifications and Repairs

F4.1 If the *contractor*, *sub-contractor* or any others modify or damage *framing materials*, that party is responsible for all costs necessary to analyze and, when necessary, correct the situation.

F4.2 Installation of holes in the *webs* of *structural members* is limited to the size, configuration, and location as specified in the *approved* design or recognized design standard. Any *webs* of *structural members* with holes violating the above requirements must be evaluated by the *design professional*.

F4.3 Field repairs to damaged *structural members* shall be made in accordance with the *design professional's* recommendation. The *design professional* may request that the *specialty designer* provide recommendations on field repairs, with final approval by the *design professional*.

F4.4 Repairs to the metallic coating, when required, shall be in accordance with ASTM A780.

F4.5 Changes orders resulting from such *approved* field modifications or repairs shall be handled in accordance with Section H6.

F5 Installation Tolerances

F5.1 *Structural members* and *component assemblies* shall be installed in accordance with the tolerances prescribed in the *AISI Standard for Cold-Formed Steel Framing – General Provisions*.

F5.2 *Trusses* shall be installed in accordance with the additional requirements of the *AISI Standard for Cold-Formed Steel Framing – Truss Standard*.

G. QUALITY CONTROL

G1 General

G1.1 *Material suppliers* and *component manufacturers* shall maintain a properly documented quality control program to assure that their work is performed in accordance with this *Code of Standard Practice* and relevant ASTM and AISI standards.

Commentary:
If the *component manufacturer* and/or *installer* produce *structural members* using on-site mechanical braking, bending, or forming, they have in effect assumed the role of the *material supplier* and these provisions would apply.

G1.2 The *contractor* shall maintain a quality control program so that the work performed by the *installer* can be completed in accordance with this *Code of Standard Practice* and the *contract documents*, and *submittals*.

Commentary:
Items under the *contractor's* quality control that may affect the *installer's* performance include but are not limited to the following:

- Tolerances and quality of work by other trades that precede the *installer's* work
- Placement of *embedded anchors* and/or bearing plates
- Clean and unobstructed work areas
- Timeliness and completeness of work by other trades

G1.3 The *installer* shall maintain a quality control program so that their work is performed in accordance with this *Code of Standard Practice* and the *contract documents*. The *installer* shall be capable of performing the necessary installation or assembly and provide the equipment, personnel and management for the scope, magnitude and required quality of each project. The *installer* shall employee sufficient qualified personnel to properly complete the work required by the *contract documents*.

G2 Material Inspection

G2.1 The *receiving entity* shall verify that the *framing materials* delivered meet the requirements of the *contract documents*.

G2.2 The *receiving entity* shall check the *framing materials* to verify that the *framing materials* have been properly labeled as required by Section E4.

G3 Workmanship

The quality of workmanship expected for the *cold-formed steel structural framing* product shall be specified in the *contract documents*.

H. CONTRACTUAL RELATIONS

H1 Presentation of Proposals

All proposals for furnishing *framing material* shall be made on a sales contract form. After acceptance by the *owner*, these proposals must be accepted or executed by a qualified official of the *component manufacturer* and/or *installer*. Upon such acceptance, the proposal becomes a contract.

H2 Acceptance of Proposals

All proposals shall have a specified term of acceptance. If the proposal is not accepted within this term the proposal becomes invalid.

H3 Terms of Payment

The terms of payment for the work to be completed shall be specified in the *contract documents*.

H4 The RFI Process

When *RFIs* are issued, the process shall include the maintenance of a written record of inquiries and responses related to interpretation and implementation of the *contract documents*, including the *clarifications* and/or *revisions* to the *contract documents* that result, if any. *RFIs* shall not be used for the incremental *release for construction* of *contract documents*. When *RFIs* involve *discrepancies* or *revisions*, see Sections C4 and C5.

Commentary:
The *RFI* process is most commonly used during the detailing process, but can also be used to forward inquiries by the *component manufacturer* and/or *installer* or to inform the *owner's representatives* in the event of a *component manufacturer* and/or *installer* error and to develop corrective measures to resolve such errors. The *RFI* process is intended to provide a written record of inquiries and associated responses but not to replace all verbal communication between the parties on the project. *RFIs* should be prepared and responded to in a timely fashion so as not to delay the work of the *component manufacturer* and/or *installer*. Discussion of the *RFI* issues and possible solutions between the *component manufacturer* and/or *installer* and *owner's representatives* often can facilitate timely and practical resolution. Unlike *shop drawing* and *installation drawing submittals* in Section D2, *RFI* response time can vary depending on the urgency of the issue, the amount of work required by the *owner's representatives* to develop a complete response, and other circumstances such as building official approval. *RFIs* should be prepared in a standardized format, including *RFI* number and date, identity of the author, reference to a specific *drawing* number (and specific detail as applicable) or *specification* section, the needed response date, a description of a suggested solution (graphic depictions are recommended for more complex issues), and an indication of possible schedule and cost impacts. *RFIs* should be limited to one question each (unless multiple questions are interrelated to the same issue) to facilitate the resolution and minimize response time. Questions and proposed solutions presented in *RFIs* should be clear and complete. *RFI* responses should be equally clear and complete in the depictions of the solutions, and signed and dated by the responding party.

Commentary:
Unless otherwise noted, the *component manufacturer* and/or *installer* can assume that a response to an *RFI* constitutes a *release for construction*.

H5 Revisions to the Contract Documents

Revisions to the *contract documents* shall be confirmed by change order, in accordance with Section H6. Unless otherwise noted, the issuance of a *revision* to the *contract documents* shall constitute authorization by the *owner* that the *revision* is *released for construction*.

H6 Change Orders

The *owner's representative for construction* shall review the change order within fourteen (14) days, or sooner if the decision delays the project schedule, and issue a formal response. The *owner's representative for construction's* compensation of the *component manufacturer* and/or *installer* for conflicts, *discrepancies* and *approved* field modifications and repairs shall not be delayed due to the *owner's representative for construction's* negotiations with the *contractor* determined to be at fault.

Commentary:
These change orders may be necessitated by any conflicts, in accordance with Section C1; *discrepancies*, in accordance with Section C4; *revisions*, in accordance with Section C5; delivery, handling and storage of materials, in accordance with Section F3; or field modifications and repairs, in accordance with Section F4.

H7 Contract Price Adjustment

When the scope of work and responsibilities of the *component manufacturer* and/or *installer* are changed from those previously established in the *contract documents*, an appropriate modification of the contract price shall be made. In computing the contract price adjustment, the *component manufacturer* and/or *installer* shall consider the quantity of work that is added or deleted, the modifications in the character of the work and the timeliness of the change with respect to the status of material ordering, detailing, fabrication and installation operations.

Requests for contract price adjustments shall be presented by the *component manufacturer* and/or *installer* in a timely manner and shall be accompanied by a description of the change that is sufficient to permit evaluation and timely approval by the *owner*.

H8 Scheduling

The contract schedule shall state:

- When the *contract documents* will be *released for construction*
- When the job site will be ready, free from obstructions and accessible to the *installer*, so that installation can start at the designated time and continue without interference or delay caused by the *owner's representative for construction* or other trades.

The *component manufacturer* and/or *installer* shall advise the *owner*, *owner's representatives for design* or *owner's representatives for construction*, in a timely manner, of the effect any *revision* has on the contract schedule.

If the fabrication or installation is significantly delayed due to *revisions* to the requirements of the contract, or for other reasons that are the responsibility of others, the *component manufacturer* and/or *installer* shall be compensated for the additional costs incurred.

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