



**NATIONAL INSTITUTE OF STEEL DETAILING, INC.**

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# GUIDELINES FOR SUCCESSFUL PRESENTATION OF STEEL DESIGN DOCUMENTS

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**... the Steel Detailers' Point of View**

## **NISD Mission Statement**

The National Institute of Steel Detailing (NISD) is an international association which advocates, promotes and serves the interests of the Steel Detailing Industry.

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## Preamble

There is a growing trend at steel construction seminars, conferences, panel discussions, and meetings, as well as in magazine articles, to explore the concerns of the construction community regarding the relationship between design documents, shop drawings, and successful steel construction. In recent years, economic, technical, staffing, scheduling, and competitive pressures have escalated to the point where the methods of preparing and releasing design documents have been altered. Design drawings often are released in an incomplete, inadequate format, which is constantly in need of clarification or revision. Those pressures have also severely restricted the detailing community's ability to provide timely, quality shop drawings. In turn, fabrication, erection, project acceptance, profits, and steel's position as the material of choice have all been compromised.

These "Guidelines" are offered as another tool to help mitigate the effects of those pressures. The goal of this document is to assist in providing the following benefits for steel projects:

1. Schedule maintenance or improvement.
2. Cost savings.
3. Reduced risk and improved safety.
4. Better trade integration and problem solving.
5. Improved quality.
6. More effective communication.
7. Accurate and competitive bids.
8. Minimization of errors and omissions.
9. Reduction in the frequency and costs of claims and litigation.
10. More efficient use of human resources.

To achieve this goal, the NISD has developed the attached checklist, which, from a steel detailer's point of view, will assist both the designer and the steel detailer in their endeavors toward successful steel construction. By permitting the design team to review the design documents for conformance

with the items indicated on this checklist, *prior to release for bid*, the above noted benefits can be realized.

It should be noted that this document is not meant to supersede project-specific contracts, codes and specifications, or, where applicable, the *AISC Code of Standard Practice*. Additionally, readers are encouraged to refer to the *NISD Industry Standard* publication as a more comprehensive resource for understanding the role of the steel detailer, the information the steel detailer needs for ordering material and providing shop drawings, and the terms and conditions that are considered acceptable.

## The Role of the Steel Detailer

Steel detailing is the preparation of shop fabrication drawings from structural and architectural design documents. The detailer is the interpreter of the engineering design, translating the designer's intent into the language of the steel fabrication industry. This interpretation involves the analysis, evaluation, organization, and communication of the structural design. Each and every part of the steel fabricator's scope of work is defined, from every bolt, weld, and dimension, to the assignment of an identifying mark for each component to facilitate member placement.

Although some steel fabricators maintain an in-house detailing office, it is common practice for fabricators to rely on the services of qualified independent detailing firms. To help assure that quality detailing procedures are utilized, fabricators' drawing rooms may be evaluated under the *AISC Certification Program* and independent drawing rooms under the *NISD Quality Procedures Program (QPP)*. In addition, all drawing rooms may have detailers certified by the *NISD Individual Detailer Certification (IDC) Program*. Firms with these programs in place affirm to the fabricator, architect, engineer, and owner that they are committed to following quality procedures in the production of the steel detail drawings.

## From Design Documents to Steel Details

The analogy of a steel detailer as an interpreter has been used to describe their function in the steel construction industry. It is the detailer who takes the information from the design documents, develops the mill orders and fabrication drawings, and provides other required supporting services. This information must be presented in a format that is required by the fabrication facility and members of the construction team. It may be said that the structural design documents are really a message to the detailer. The clarity of that message dictates the ability of the detailer to correctly interpret and provide the design information.

When the architect and engineer have completed their design of a steel frame structure, it is time for the structure to be produced. Typically, at the onset of a project, the steel detailer is the first subcontractor to begin using the design documents and one of the first to determine if the designs are complete and accurate.

The process used by the steel detailer is just as it is for making any other product. All of the component parts of the structure are gathered together into an organized system (Member Placement Plans) to be used by all detailers involved in the project. This includes individuals doing column details, beam details, braced frame details, girder details, horizontal and vertical bracing details, and many others, depending on the project at hand.

The most important concept to understand about the process is that steel detailing is a production line type of operation. When a steel detailer produces drawings, it is essential to have all of the information required for the assembly of the structure. When even one component is missing, it can have a serious impact on the detailer's production of shop drawings.

Keep in mind that there is a great difference between the creative process of making design drawings and the production process of making steel detail drawings.

When the design drawings are found to be incomplete or inaccurate, the detailing production process cannot run smoothly. Production becomes inefficient and fragmented. The once smooth-running production line has to stop, back up, and start again, and thus results in a lot of extra time in detail drawing production.

This list illustrates those significant elements of the design documents used by the detailer to furnish the required detailing services.

**From:  
Design Documents**

- All structural design documents.
- Foundation plan, column schedule, and associated sections.
- Structural framing plans and sections.
- General notes and project specifications.

**To:  
Steel Details**

- Job Standards. Complete shop detail and member placement drawings. Material procurement lists.
- Anchor rod plans and embedded material plans as well as shop details of embedded items.
- Member placement plans and sections.
- Job standards, painting requirements, special notes, material & weld requirements, bolting information, etc.

## Communication

The design document is the medium by which the architect/engineer communicates to the steel detailer (and other trades) the locations, sizes, stresses, and other requirements of every piece of steel in the project. If any of the information is missing, incomplete, or erroneous, the steel detailer has been spoken to in incomplete sentences. The detailer will then misunderstand the intent, misinterpret the meaning, or be unsure how to proceed. Communication is the key to all we do. To do their job, steel detailers require complete, checked, coordinated, design drawings, especially principal controlling dimensions and geometry. We rely on the designers to develop plans, sections, views, and details, which fully describe and illustrate the desired end product. Designers must assist the detailer as much as possible in connection development and should design moment, special, and heavy connections on the design drawings. If the fabricator or erector elect to make a change to the designed connection, they will have a frame of reference to discuss this with the engineer. It must be remembered that steel detailers produce shop drawings; this is the service they are trained for, and this is what they are paid for. Most steel detailers do not have the time, the financial resources, the legal authority, or the insurance to check or to complete design drawings or to do connection design. Steel detailers are totally dependent on the design team to communicate to them the data required to permit the successful completion of the project.

Just as architects and engineers use design documents to communicate with the steel detailer, the shop drawings and the approval process are methods the detailer uses to communicate with the reviewing agency or the engineer of record. Shop drawings must be checked to assure that all project requirements, codes, and specifications have been met. If the detailer fails to provide all the necessary information, the designers will be delayed and may require re-submittal of the drawings -- a delay and added expense to all parties involved, including the project owner.

The *AISC Code of Standard Practice* addresses the design requirements on the part of the engineering profession. Adherence to this code is a first step in successful communication with the Steel Detailer. Additionally, the NISD

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*Industry Standard* publication and the AISC publication *Working With Structural Steel In Schedule Driven Projects* are excellent sources of reference for detailers and designers alike.



## RFI - Request for Information

### (Documenting Design Deficiencies)

When design documents are incomplete, steel detail drawings cannot be completed and the orderly production of detail drawings is interrupted. Due to their exacting nature, shop detail drawings must be prepared with a performance criteria that endeavors to meet a “zero-defects” standard. This standard produces speed and economy in the fabrication process and in the erection process.

The state of the design documents issued for construction today frequently does not meet the “zero-defects” criteria necessary to the detailer and other suppliers. To correct this situation and construct a “paper trail” of information, it becomes necessary to use formal Requests for Information (RFI). The RFI may also be known as ECM (Engineering Clarification Memo) or DEO (Documentation of Errors and Omissions). Whatever form one chooses to use, the intent is the same; a question is asked due to missing and/or ambiguous information on the design documents, and an answer is needed to clarify the missing and/or ambiguous information.

Unfortunately, the RFI/ECM often becomes misused as a tool for the completion of design documents, rather than an instrument for clarification of completed design drawings.

The detailer, in an effort to meet project schedules, must make a thorough search of the design documents for information. During the bidding stage, it is extremely difficult to identify those items that result in inadequate design drawings, requiring the detailer to factor in the time and cost of any deficiencies. Such problems are found during the meticulous procedure of detailing, which often occurs long after award of prime contracts. First, the detailer must identify the problem. Next, the detailer must analyze the problem in order to ask an intelligent question.

Additional manpower or supervision may be required to confirm the action of the individual discovering the problem, before the question may be

forwarded. It may be necessary for sketches or supplemental drawings to be produced to illustrate the problem. Once an RFI is submitted, it means the detailer has exhausted all available resources and has a legitimate question. The exacting nature of detailing requires exact information. To make this process effective, 100% effort is required of all on the construction team to research and answer the question -- not only promptly, but also completely. The frequency of their development can easily make the hours for the detailing process multiply by 2, 4, or more times the normal amount, which may result in delays in the ordering of material and in the delivery of shop drawings. The outcome is additional compensation owed to the detailer, especially if the delay requires the detailer to demobilize, reassign, and remobilize personnel. There is obviously a potential impact to the fabricator's, the erector's, and the owner's schedules and profits as well.

Therefore, with regard to inadequate design drawings, the NISD recommends the detailing community take these positions:

1. It is the responsibility of the owner to allow the design professional both adequate time and financial resources to prepare a complete set of design documents.
2. It is the responsibility of the design professional to provide the owner with complete and accurate design documents that give thorough information (per *AISC Code of Standard Practice*) that allows the detailer to correctly interpret the design intent and to produce quality drawings.
3. It is the responsibility of the Detailer to inform the fabricator (client) of the inadequacies of the design documents during the shop drawing process and the detailing cost and schedule impact of those inadequacies.
4. It is the responsibility of the fabricator (client) to inform the contractor/owner of those same inadequacies and the resulting cost and schedule impact. (Please note: Staff hours, which are misutilized or must be reassigned, result in extra costs. Extra charges may result without the addition of drawings or material.)

5. It is the detailer's responsibility to produce shop drawings, not to check or coordinate contract documents. Should the client desire the detailer to perform such an activity or to prepare Engineering Clarification Memos (RFI), such activities shall be considered as extra work for which the detailer is entitled to compensation. Unless otherwise agreed to, the detailer's right to be paid is not contingent upon the client being reimbursed.

## Economic Benefits of Complete Design Documents

As shown in the preceding pages, there is definitely a challenge facing the steel detailing profession. During the past two decades, outside interests have increasingly influenced construction contract documents and the assignment of tasks associated with design and quality assurance of fabricated structural steel framing for buildings.☞

Often overlooked by those outside interests are the economic benefits of complete design documents. These benefits include but are not limited to:

1. Maintenance of schedule. ☞
2. Minimization of errors and omissions. ☞
3. More accurate competitive bids. ☞
4. Minimization of duplication of effort. ☞
5. Lower suppliers' costs, resulting in lower overall cost of project.☞
6. Clearly defined responsibilities. ☞
7. Minimization of field errors. ☞
8. Reduction in revision costs and delays. ☞
9. Elimination of costly startups, RFIs, clarification, and verification. ☞
10. Reduction in demobilization and remobilization. ☞
11. Increased morale among suppliers. ☞

Not to be forgotten is the increasing popularity of the “fast-track” construction process. Most often, this “schedule-driven” mentality does not allow design professionals sufficient time for preparation of complete contract documents. The contractor bidding process, including steel detailing, deteriorates into one of speculation rather than a meticulous estimate of the work to be done. Speculative bidding breeds uncertainty, and uncertainty increases bid prices. Incomplete design drawings also increase the chance that they will be misinterpreted. The fast-track project quickly can become plagued with increased costs and delayed schedule -- with greater potential for disputes, claims, and litigation.  $\supseteq$  If certain elements cannot be finalized, the engineer of record at least should inform the fabricator/detailer, architect, and contractor as to what has or has not been completed on the design drawings.  $\subsetneq$  In any event, those portions of design information, which are released, should be checked and coordinated.

In the highly competitive subcontracting marketplace, owners, design professionals, and general contractors must anticipate that omission or ambiguity of information at the bid stage may produce justifiable change orders, claims for "extras," disputes, cost escalations, and delays. The end result of all these escalating adjustments to fees and schedule is often a higher final cost for the project than would have been achieved had the design followed a more conventional course. Thus the message for owners and architects: Limiting the structural engineer of record's scope of services, through financial and/or time constraints, may be false economy.

Ultimately, one way or another, the owner must understand that there is a premium to be paid for short-circuiting the design process.

- $\supseteq$  “Effective Contract and Shop Drawings” by Emile W. J. Troup, published in the May 1999 issue of *Modern Steel Construction* and presented at Session 8 of the AISC 1999 NASCC also by Emile W. J. Troup.
- $\subsetneq$  “Economical Design of Steel Structures.” Charles Carter, P.E. with AISC.
- $\subset$  “Working with Structural Steel in Schedule Driven Projects,” published by AISC March 1996.

## Checklist – What Should a Complete Set of Design Documents Contain?

The following is a list of minimum information design documents should include. Design professionals and their staff should use this list to double-check the completeness of their design documents. In addition, all must recognize that the engineer of record is fully responsible for the design and adequacy of all connections.

- o Complete base plate and anchor rod requirements including base plate elevations for all columns, type of leveling system for all columns: material grade, diameter, embedment, hole pattern and size of holes, plate orientation, weld requirements. (Suggest standardization of base plate and anchor rod sizes and use of square bolting patterns.)
  - o Bracing gusset plates should not interfere with anchor bolts.
  - o Provide sizes and material grade of all members, beams, columns, and bolts, etc. Simplicity and repetition result in cost savings. Standardize the use of A992 steel for mill orders. Specify, not infer, special requirements such as fracture critical material, charpy V-notch testing, etc., on **all** required members and pieces.
  - o Verify orientation of columns on each plan.
  - o Provide specific column, truss, and girder splice details and location.
  - o Dimensions locating structural steel should be shown clearly on **all** plans; checked for accuracy, especially principal controlling dimensions and geometry.
  - o The structure's geometry should close.
  - o The structural drawings should be coordinated with architectural and mechanical requirements.
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- o The design should promote repetition of members.

- All structural items should be clearly located and identified on confirmed structural documents. No reference should be made to other drawings.
- The specifications should be customized to **this project**. They should be in agreement with the drawings.
- Provide clear direction as to the use or prohibition of design drawings or CAD files for member placement drawings.
- It is recommended that the specifications include a requirement to use pre-qualified fabricators and pre-qualified steel detailing professionals. (*The NISD Quality Procedures Program* or *AISC Certification Program* can be helpful on this point.)
- All connections: Specify whether design is based on ASD or LRFD.
- Simple shear connections: Always show end reactions (composite or non-composite). Special connection types, and axial or torsional loads, if any to be fully developed.
- Provide fully developed bracing connections: Show axial loads (+ or -) and whether or not one-third increases in stresses are permissible.
- Provide fully developed moment connections: Show shear and moments (ft-kips), axial loads, all reinforcement of main members (or at least, clear and complete connection and joint reinforcement requirements) and whether or not one-third increases in stresses are permissible.
- Provide fully developed truss connections: Shears, moments, and axial loads depending on function of truss.
- The camber information should be complete.
- Ensure the feasibility of member erectability.
- Treat roof and floor opening frames as separate entities to be designed, detailed, fabricated, and erected as freestanding items.
  
- Clearly indicate location, type, and limits of fireproofed members.

- o Special cleaning, fireproofing, and painting systems (type, color, exposed, etc.) and locations should be clearly located and identified on design drawings.
  
- o Clearly specify special safety and/or erection aids or codes in effect.



## Conclusion

**W**e sincerely hope this document has provided you a greater understanding of those items detailers find necessary for the efficient prosecution of steel structures. We trust that you have gained a better understanding of the positive contribution NISD and the detailing community can make once given more clearly defined information. To that end, we believe we have provided a guide beneficial to the successful completion of structural steel projects.

# Appendix

## Poor/Inadequate Design Drawings

Reference: NISD Industry Standard

Section 1.2 on page 2 states, "In recent years economic, technical and competitive pressures have prompted experimentation with methods of preparing and releasing design documents. In some cases this has resulted in the release of incomplete design drawings (e.g. lacking thorough design detail development) that have impacted the detailing industry as well as steel fabrication and other trades. In today's highly competitive marketplace, the steel detailing firm cannot subsidize the cost of completing the design and still remain competitive. This document was undertaken to provide a comprehensive and explicit standard that would define which range of services are *routine* and which constitute *extra work*."

The N.I.S.D. *Code of Ethics and Standard Practices* (page 5 of the Industry Standard) states in Item 8 under *Relations with Clients*, "*The detailer will stipulate that the detailing will be guided solely by the information set forth in the engineer's design drawings and specification, unless the Engineer has made reference therein (by specific page and paragraph number) to information appearing in architectural drawings and or specifications or in other material furnished to the detailer in connection with the job.*" In Item 4 under *Relations with Engineers*, the *Code of Ethics and Standard Practices* goes on to say, "*The detailer will inform the Engineer of any errors or ambiguous information on the design drawings that may be discovered while detailing, but shall not be responsible for these errors or misinformation if not discovered.*"

Item 3 of Section 2.1 (page 8) states, "...pressure to reduce design activity costs tend to limit the resources allocated to producing design drawings. Thus, they frequently do not include vital information. The man hours required to develop this data is simply transferred from the design professional to the steel detailing firm. This trend continues. Consequently, the steel detailing firm must develop information management and documentation systems that enable it to accomplish its task with less input. Since the extent of this task is indeterminate at the time a project is bid, the steel detailing firm's information management system must provide for the recovery of costs incurred in providing this service."

*Benchmark Services* are identified in Section 3.2.1 (page 13) including Item 5 which states, "Provides for services only to the extent of 'known and/or completed' information contained in the design documents supplied at bid time, making no accommodation for incompleteness or ambiguity of the design drawings." Item 6 goes on to say, "All information furnished after detail drawings have been prepared shall be incorporated when the information is made available. The time and expense of performing this work shall be treated as Extra Work or may be done in the field at *no* expense to the steel detailing firm."

Section 3.3.4 **Primary Causes of Extra Work** (page 17) lists **Defective Contract Documents** as **Item A**. Categories of Defective Contract Documents include:

"Lack of adequate design information

Drafting errors:

On Design Drawings, dimensional errors, misplacement of dimensions, and other incorrect presentation.

Defects or deficiencies in specifications resulting in irrelevant or meaningless information.

Inconsistencies and conflicts preventing clear communication of the design intent.

Design or Technical errors:

Geometry that does not close.

Misinformation in contract specifications (e.g. obsolete technical references, conflicting paint specifications, incorrect bolting or welding procedures, etc).

Design impossibilities. Inaccurate arrangement of members or elements such that unerectable or unachievable objects are specified."

Section 4.7 (page 26) under **Design documents** states, "The American Institute of Steel Construction (AISC) publication, *Code of Standard Practice for Steel Buildings and Bridges*, Section 3, Plans and Specifications, sets forth the minimum requirements for completeness in contract drawings. This document is widely cited in project specifications and drawings and is the basis for the consensus of steel detailers regarding completeness and accuracy in design documents. Unless specifically defined otherwise, the base estimate only covers what is specifically shown in the design documents."

Section 5.3 on **Pre-production documents** (pages 30-31) discusses inadequate design document at great length. It states in the first paragraph, "Before a single line can be drawn or a single drawing issued to the shop, there are routine questions to be asked that are not answered in the original construction documents." The second paragraph goes on to say,

"Appropriate forms provide a logical means of organizing, simplifying and assimilating the information being gathered." The fourth paragraph continues, "Checklists can be used to simplify this process. The series of forms entitled **RFI Checklist - Ref.: Original Contract Documents** contain questions concerning the general quality and completeness of the design documents. The substance of these questions is drawn from the *AISC Code of Standard Practice for Steel Buildings and Bridges*, the industry standard for contracting for structural steel construction. Following are topics of the **RFI Checklist** forms:

**General Analysis of Structural Design Documents** (EXHIBIT 5.3C-1)

**Analysis of Structural Steel general Notes and Specifications** (EXHIBIT 5.3C-2)

**Analysis of Dimensioning** (EXHIBIT 5.3C-3)

**Analysis of Connections** (2 sheets) (EXHIBIT 5.3C-4a, 5.3C-4b)

**Conflicts Between Basic Structural Connections** (EXHIBIT 5.3C-5)

**Analysis of "Miscellaneous/FOB" Connections** (EXHIBIT 5.3C-6)

**"Miscellaneous/FOB" Not Connected to Main Structure** (EXHIBIT 5.3C-7)"

The fifth paragraph addresses the importance of a timely "Pre-Bill" (also referred to as Material Take-off, Advance Bill of Material, Mill Order, etc.) and states, "This survey and analysis process is intended to provide an overview of the general condition of the design documents." The sixth paragraph supports this by saying, "In order to meet production and project schedule objectives, the Pre-Bill needs to be complete and accurate. *The AISC Code of Standard Practice* states the following:

*'The contract documents can be assumed to provide complete structural steel design plans clearly showing the work to be performed and giving the size, section, material grade and the location of all members, floor levels, column center and offsets, and camber of members, with sufficient dimensions to convey accurately the quantity and nature of the structural steel to be furnished.'*

The seventh paragraph summarizes by stating, "The **Pre-Bill RFI Checklist for Columns** (EXHIBIT 5.3D), **Pre-Bill Checklist for Beams** (EXHIBIT 5.3E) and **Pre-Bill RFI Checklist for Miscellaneous** (EXHIBIT 5.3F), are forms used to track **RFIs** created as a result of missing or incomplete information revealed during the preparation of the Pre-Production Bill of Material. When information required to produce the Pre-Bill is lacking, it is certain that insufficient information has been provided to produce shop drawings."

### **Communication & Coordination** **(Team member at start-up meeting)**

In Section 1.1 **Statement of Purpose**, the N.I.S.D. Industry Standard states, "A prime objective is to improve understanding and communication between the detailing industry and the construction industry as a whole."

Section 1.2 goes on the say; "Here is an opportunity to smooth the way to improved understanding and cooperation between the steel detailing firm and the client. Equally important is the establishment of boundaries and guidelines between the steel detailing firm and the rest of the construction project team. Although the steel detailing firm contracts with the client, its services are often impacted by participants to the project with whom there are no direct contractual ties. Thus this document is a means of communicating the standards of practice of the steel detailing industry."

The third paragraph in Section 2.2 states that, "Direct access and early participation with the engineer smoothes the way for more efficient approval review. This approach also helps establish agreement on responsibility for design and accuracy of fabrication dimensions." The fifth paragraph of that same section elaborates by stating, "With its expanded capabilities, the steel detailing firm can assist construction industry clients in more ways. The construction industry can benefit by:

- Identifying the detailing process as a project critical path task.

- Evaluating the variety of services the steel detailing firm offers in addition to preparing shop drawings.

- Using qualified professional steel detailing organizations.

- Capitalizing on the resources of steel detailing professionals by making them a member of the construction team."

Section 2.3 **The steel detailing firm: A member of the construction team**, discusses the variety of ways in which detailing firms contribute to the construction team. EXHIBIT 2.3-1 THE STEEL DETAILING FIRM as Service Vendor to Steel Subcontractor, EXHIBIT 2.3-2 THE STEEL DETAILING FIRM as Subcontractor to the General Contractor, and EXHIBIT 2.3-3 THE STEEL DETAILING FIRM as Service Vendor to Structural Engineer or Designer/Builder are flowcharts which describe the contractual and communication lines between the steel detailing firm and various team members. "The flowcharts show that each relationship places a different emphasis on the steel detailing firm's role. The type of project, project plan, and approach to project management all influence the level of participation of the steel detailing firm." The last paragraph in Section 2.3 concludes, "As in other construction disciplines, the best method of ensuring responsiveness and cooperation among team members is to structure contractual links that match the desired lines of communication. An increasing number of projects have seen improved performance by maximizing the participation of the steel detailing firm in construction team processes."

Section 2.4 **The steel detailing firm and the design team: Relationship, expectations and responsibilities** states, "Although most contractual forms provide no direct contractual tie between the design team and the steel detailing firm, the strenuous technical demands of the construction process require earnest cooperation between them. In the absence of

contractual ties, the spirit of cooperation is often the most binding force in this relationship." The fourth paragraph of this section goes on to say, "...there are other ways in which the design team and the steel detailing firm can jointly advance the progress of the project:

1. By placing the steel detailing firm in a closer contractual relationship to the engineer of record.
2. By introducing the detailer's expertise into the earlier stages of the design process.
3. By using the steel detailing firm's skills to develop trade specific solutions to problems such as geometry, connection development, and development of details for interface between trades.
4. Through improved communication reducing the extensive requirements of shop drawing submittals (e.g. determining which detail drawings actually need to be seen by the engineer of record)."

**Section 2.5 Comments on contractual cooperation: The steel detailing firm and the project objective** summarizes the detailing firm's position beautifully by stating, "Over time, the steel detailing firm has moved from serving only the steel subcontractor to an informational, technical resource to the entire construction project...This document is intended to reinforce, in the strongest possible terms, the desire of the steel detailing industry to be a fully enfranchised participant in the construction industry. Steel detailing indeed contributes a vital function in the efficient management of a construction project.... As their 'leading trade' status is recognized, it is also important to acknowledge that the steel detailing firm is responsible for a critical task. Critical path Method (CPM) terminology defines a task on the critical path as one having no slack time and that cannot be delayed without delaying the project completion date. The project team must be as willing to cooperate and support the steel detailing firm's critical task as it would any other critical task. The orderly progress of the project depends on it. The NISD "Code of Ethics and Standard Practices" asserts the responsibility and obligation of member firms to cooperate fully in the communication of project information with other members of the project team. This cooperation is extended on both a contractual and professional basis. Formal acknowledgement by others of the services provided by steel detailing firms will not only benefit specific projects; it will benefit the construction industry as a whole.

### **Connection Design Responsibility**

The NISD Code of Ethics and Standard Practices reprinted on page 5 requires under *Relations with Engineers* Item 2 that *"The detailer will obtain the Engineer's approval of strength of all connections before details are started, recognizing the Engineer's professional responsibility for the integrity of the structure and the strength and safety of all members, including connections."*

Section 2.4 clearly states NISD's position in the second paragraph: "As the Engineer of Record, the structural engineer must review and approve every connection on a project. In most states, legal statutes make this process the exclusive professional responsibility of the structural engineer of record. Other persons simply do not have the proprietary knowledge of the design to make informed design decisions." It goes on in the third paragraph to state, "However, the steel detailing firm can be a tremendous resource for the execution of the design. The steel detailing firm is more suited to interpret the design than to engineer it. For example, when in possession of pertinent design data, the steel detailing firm may provide calculations for end connections as well as methods for executing them." It goes on to strongly clarify this position by stating, "Nevertheless, the calculations should be reviewed and approved by the engineer of record. Relieving the engineer of certain functional processes is not intended to relieve responsibility for the design. NISD members agree that in states where there is no statutory injunction against it, the steel detailing firm can provide calculations on connections for approval by the responsible engineer," and adds, "However, sealing of calculations and/or shop drawings by a Professional Engineer (P.E.) employed by the steel detailing firm is *not* recommended."

**Section 3.2.1 Identifying the steel detailing firm's services** Section B. *Elective Services* reinforces the above position in Item 10 where it states, "Where not in violation of a legal statute, prepare design calculations for approval and acceptance of responsibility by the engineer of record. NOTE: Sealing of calculations and/or shop drawings by a Professional Engineer (P.E.) employed by the steel detailing firm is *not* recommended."