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HOW AND WHY USE THE CISC CODE OF STANDARD PRACTICE FOR STRUCTURAL STEEL TO PREVENT AND RESOLVE PROJECT DISPUTES?

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Abstract

Don't we all want to prevent and resolve project disputes? Of course, we do! More importantly however, we first need to be informed and understand the effective tools that available to us and secondly, we must ensure that we integrate their usage in our projects. The purpose of this paper is not to give a detailed rendition of the articles of the CISC Code of Standard Practice, but rather to present a partial and cursory summary of some of the responsibilities and obligations of the key stakeholders, as outlined in the Code. A real case example serves as a good illustration of the critical importance in the Code, its application and effective use to prevent and/or resolve projet disputes. The Code has a plethora of information that is critical for projects, but this paper will cover a few items as food for thought for all stakeholders, such that they appreciate the importance of specifying this document in the contract documents.

What is the Code of Standard Practice?

The CISC Code of Standard Practice for Structural Steel (hereinafter CSP) is an effective and valuable tool: a compilation of usual industry practices relating to the design, fabrication and erection of structural steel. These practices evolve and are subject to change as improved methods replace those of an earlier period. The key takeaway is that this essential tool documents standard practices and aims to provide a proper guidance on current practices in the Canadian structural steel fabrication and erection industry and its clients. Major revisions have been included: BIM (electronic documents), AESSS, temporary bracing, conditions where lintels would be included in a steel contract, computations of units and mass and erection stability. The latest Eight edition was the update from the in-depth work by stakeholders and committee members which included steel fabricators, erectors, detailers, engineers, architects and general contractors.

The scope of the Code encompasses the standard industry practice with respect to the furnishing of structural steel, joist, and plate work, in the absence of provisions to the contrary contained in the contract. The CSP is divided into the following sections:

1. General Provisions
2. Classification of Material
3. Quotations and Contracts
4. Contract Documents
5. Fabrication and Erection Documents
6. Material, Fabrication, Inspection, Painting and Delivery
7. Erection

As a general overview, we all know that the formal "Contract" is the undertaking by the parties to perform their respective duties, responsibilities and obligations as prescribed in the contract documents, it represents the agreement between the parties, including all commercial terms and conditions governing the work (including schedule). These contract documents include drawings and specifications, computer models, electronic documents and other data, as prepared by the Engineer of Record (hereinafter EOR), showing member sizes and dimensions and all required forces for connection design, i.e. shears, axial forces, moments and torsions. (Mandatory requirements are references in the governing technical standard). The Issued-for-Construction Documents (hereinafter IFC) outline construction methods, erection sequences, erection and temporary bracing requirements, and other engineering details necessary for shipping, handling, erecting, and maintaining the stability of the structural steel frames.

One of important element to note is that as per the CSP the governing technical standards are as follows:

- 1) The provisions of the latest edition of CSA-S 16 "Limits States Design of Steel Structures" shall govern the design, fabrication and erection of steel structures except bridges;
- 2) The provisions of the latest edition of CSA-S6 "Canadian Highway Bridge Design Code", the "Ontario Highway Bridge Design Code" (in Ontario) or the American Railway Engineering Association's "Specifications for Steel Railway Bridges" shall govern the design, fabrication and erection of structural steel for bridges;
- 3) The provisions of the latest edition of CSA Standard W59 "Welded Steel Construction (Metal-Arc Welding)" shall govern arc welding design and practice. The provisions of other standards shall be applicable if called for in the Tender Drawings and Tender Specifications.

One key section of the CSP deals with discrepancies. Essentially, unless otherwise stated in the construction documents, the structural design documents and construction specifications for buildings, the construction specifications govern. For bridges, the structural design documents govern over construction specifications. In case of discrepancies between the structural design documents and design documents for other trades or disciplines, the structural design documents shall govern. When it has been agreed to use an electronic Building Information Model (BIM) as part of the construction documents, the BIM model shall govern for dimensions and geometry, while drawings shall govern for section sizes".

During the span of any project from the time the work is contemplated, the contract / contracts are awarded, the design work is progressed or completed, steel is fabricated and delivered, erection is executed, all the stakeholders that are involved in the process, become implicated in one way or another.

Some of the key issues that face Steel Fabricators

A steel fabricator is involved in the cutting, bending and assembling processes; the value-added process that involves the construction of structural components / structures from raw materials. However, depending on the terms and conditions of a given contract, it will be an eye-opener to see how the CSP identifies the differences and nuances of the various obligations of a Fabricator, which influences all stakeholders of a project.

When the client provides the structural drawings and specifications, the Fabricator shall not be responsible for determining the adequacy of the design nor be liable for the loss or damage resulting from an inadequate design, unless such requirements are outlined in the contract documents. He may however propose adequate connections and details, and, when required, components, members, or standardized assemblies, noting that even though proposed connections and design details may be prepared by the Fabricator's technical staff, the overall behaviour of the structure remains the responsibility of the designer of the structure.

A Fabricator shall be responsible for determining the erection procedure, for checking the adequacy of the connections for the uncompleted structure, and for providing erection bracing or connection details only when such procedure forms part of the contract.

One important nuance is that when an erection procedure is not part of the Fabricator's contract, he shall be informed by the client of the erection sequence to be used, which may influence the sequence and process of the manufacturing, however he shall not be liable for loss or damage resulting from faulty erection. If the erection of the structural steel is part of the Fabricator's contract, he then is required to supply all material warranted for temporary and for permanent connection of the component parts of the structural steel. When the erection of the structural steel is not part of the Fabricator's contract, unless otherwise specified in the tender documents, the Fabricator shall furnish appropriate bolts and nuts (washers, if required) for all field connections of steel to steel which are specified to be permanently connected. The CSP classifies and lists structural steel material.

There are various steps involved in the revision process of structural plans that have a direct impact on the costs and the schedule of the project. When Fabricators are faced with a revision, they must advise the client of any impact that such revision or change will have on the price and/or schedule of the existing contract, submitting also a description of the impact change in sufficient detail to permit evaluation and prompt approval by the client. Once there is an agreement between the Fabricator and client, the client must issue a change order or extra work order for the revision to the contract for the change in the work. The distinction that is outlined in the CSP is that even if there is a change order of revised contract documents or revisions, the client shall not release these revisions for construction, unless there is an agreement between the client and Fabricator of the cost and schedule impact, relating to the revision to the work.

At the age when everything is being rushed, we need to realize how important is the concept of completed drawings. IFC documents are required by the Fabricator to order material and for the preparation and completion of fabrication and erection documents. It is essential that the IFC documents conform to the requirements of CSA S16, Design of Steel Structures or S6 Canadian Highway Bridge Design Code, such that the drawings include the complete design of the structure with members suitably designated and located, including such dimensions and detailed description as necessary to permit preparation of the fabrication and erection documents. When this is, this is not the case there are complications that arise throughout the progress of a given project.

Lastly, is the issue of shop details. Shop details are to be prepared in advance of fabrication from the information on the approved IFC drawings, the connection design details, and the erection diagrams and shall provide complete information required by the Fabricator to complete the fabrication of various members and components of the structure, including the required material and product standards. These are submitted for review and approval by the EOR and shop drawing approval can be done using an appropriate BIM approval tool. When the shop details are furnished by the client, they must be delivered in time to permit fabrication to proceed in an orderly manner according to the time schedule agreed upon. In such cases, the Client shall be responsible for the completeness and accuracy of shop details so prepared, and accuracy of the BIM model and digital manufacturing data.

Some of the key issues that face the Engineers of Record (EOR)

When the client provides the structural drawings and specifications, the designer of the structure shall be responsible for determining the adequacy of the design and will be liable for the loss or damage resulting from an inadequate design. For any proposed connections and design details prepared by the Fabricator's technical staff, the overall behavior of the structure remains the responsibility of the designer of the structure.

The design Engineer must furnish design drawings drawn to a scale that adequately convey the required information. The drawings must include a complete design of the structure with members suitably designated and located, including such dimensions and detailed description as necessary to permit the preparation of fabrication and erection documents.

Structural design documents shall clearly designate the design standards used, the type or types of construction to be employed, shall show the category of the structural system used for seismic design, and shall designate the material or product standards applicable to the members and details depicted.

In addition, drawings shall give the governing combinations of shears, moments, pass-through forces, and axial forces to be resisted by the connections.

Where connections are not shown, the connections shall be assumed to be in accordance with the requirements of the governing technical standard/code. The tender documents shall clearly define the scope of work with respect to the responsibility to design structural steel connections.

Erection diagrams, non-standard connection design details, shop details, and field work details are normally submitted for review by the EOR. Connection design details and shop details are reviewed by the EOR for structural adequacy and to ensure conformance with the loads, forces and special instructions contained in the structural design documents. Shop details submitted by the Fabricator must be reviewed and approved by the EOR, does not relieve the Fabricator of the responsibility for accuracy of the detail dimensions on shop details, nor of the general fit-up of parts to be assembled.

The method of erection for a given project is usually selected to be the most efficient and economical method available to the Erector based on continuous operation consistent with the construction documents. The EOR shall include any erection conditions or other considerations that are required by the design concept and shall be responsible to review all erection diagrams and steel deck drawings. Temporary Bracing of the steel frame shall only be removed on instruction from the EOR.

Some of the key issues that face the Erector and the General Contractor (GC)

When the client provides the structural drawings and specifications, the Erector shall not be responsible for determining the adequacy of the design nor be liable for the loss or damage resulting from an inadequate design. An Erector shall provide and install the safety protection required for his own operations for his work forces to meet the safety requirements of applicable Acts or Codes. An Erector must report to the client any errors or discrepancies in the work of others, as discovered, that may affect erection of structural steel before or during erection.

It is up to the GC to indicate to the Fabricator and/or Erector the general construction execution plan, including the installation schedule for both structural and non-structural steel elements and requirements for temporary bracing.

Summary Remarks

It is evident that the current edition of the CISC Code of Standard Practice should always be included in the contract documents, as it represents the best practices for design, purchase, fabrication and erection of structural steel. The inclusion of the Code that delineates the best industry practices for steel construction serves to deter many key issues that may result in disputes or claims.

When the scope of the work and the obligations of the stakeholders are well identified then a dispute that arises is manageable. Let's arbitrarily take the case when there is a request for a change order. The Code outlines the definition of a change, the responsibilities of the parties involved, work progress, etc. In view of the clarity of information, the Code serves as a facilitator to mitigate any potential conflict, given that it provides a consensus for understanding and collaboration. The requirements outlined in the Code regarding the production of clear contract documents, drawings and specifications, proper and complete structural designs, proper coordination and a respected review and approval process help to level the playing field for all stakeholders and lowers the prospect of a contentious issue. The key takeaway is that of you want to increase the probability of success in a project, then specifying the CISC Code of Standard Practice is a must!

Reference:

Canadian Institute of Steel Construction, 2015. CISC Code of Standard Practice for Structural Steel. Eighth Edition.