



STEEL INDUSTRY
GUIDANCE NOTES

Design Information for Constructional Steelwork Projects

One vital issue which is relevant to all parties involved in a construction project is timely and accurate information. This is equally true for steel construction where the Steelwork Contractor can only do the work and properly fulfil the contract conditions if the necessary technical information is complete and provided to an agreed programme. Additionally, the new CDM Regulations place responsibilities on designers to ensure schemes are safe to erect. Ensuring the correct information is provided on a timely basis will minimise retrofit on site resulting in less risk to personnel. This note sets out some of the key issues needed to ensure timely and accurate information.

Early identification of the project team

To achieve the correct design information everyone throughout the supply chain needs to understand exactly what they have to do, the level of detail required and the date by which the information is to be provided. The process of establishing this will be a dialog between the project partners. This process can be made easier by assembling the project team at an early stage.

To achieve quick lead-in and efficient working it is necessary to have other major sub-contractors appointed at the same time as the Steelwork Contractor. On a short lead-in project (say eight-weeks or less) the dimensions of the roof and wall cladding systems, doors, glazing, pre-cast units etc will need to be finalized within the first two weeks.

Encourage team working

By encouraging team working between members of the supply chain, it is possible to capture learning on one project and use it successfully on the next. A well run supply chain will result in greater efficiency of all participants, producing better quality and lower costs as the team develops.

Design Team meetings

A series of quick fire 'Design Team meetings' in the critical early weeks is the best way to co-ordinate the project design. All major specialist need to be there, together with the architects and other relevant professionals.

Avoiding late and expensive variations

Late and expensive variations should be avoided by the early identification of the design requirements. Constructional steelwork in particular is produced by a factory based manufacturing process that is highly mechanised

and automated. Consequently steelwork manufactured in the factory tends to be made very efficiently. For example it is estimated that a hole drilled in the factory costs a few pence but the same hole drilled on site once the steelwork is erected can cost several hundred pounds. Remember that 3D CAD systems require the model to be complete prior to fabrication details being produced.

Minimizing waste

Much wastage can be cut out of the system if there is good information available from the start.

National Structural Steelwork Specification

The National Structural Steelwork Specification (NSSS) lists the information that should be provided to the Steelwork Contractor and greater detail is given in the BCSA/ACE joint publication 'Allocation of Design Responsibilities in constructional Steelwork Projects'. The check lists contained in these two documents are too long to be included here but some of the more important items are described below.

a. A brief description of the structure

A concise description of the structural form of the building including the means by which the designer expects to provide stability for the structure will enable the Steelwork contractor prepare appropriate design details and programme fabrication.

b. Purpose of the structure

Ensure the Steelwork Contractor has a clear picture of the purpose of the building and is aware of its working environment as this will make it easier for him to prepare appropriate design details and programme fabrication.

c. Architectural steelwork

Steelwork which is to be used architecturally and which will be exposed to view should be drawn to the attention of the Steelwork Contractor. Other areas which deserve special attention and which should be communicated to the Steelwork Contractor include:

- Where concealed steelwork in cavity walls may be exposed to moisture through condensation
- If unusual loading patterns or intensities apply
- If greater than normal deflection could be expected
- If there is a possibility of settlement of foundations

d. The intended purpose of the structure

The finished structure will have a functional use that will sometimes be obvious from the title and drawings but in other cases a description of the intended purpose may be necessary.

e. Design standards, forces and dimensions

The design standards to be used can be left to the discretion of a competent designer, however the client may wish to state a preference. It is considered that most designers will use BS 5950 but some may use BS 449 while others may have begun to use Eurocode 3.

To allow the design of the connections, the forces, moments and their combinations should be provided without the Steelwork Contractor having to study pages of design calculations or computer output.

Design drawings showing all dimensions relevant to the Steelwork Contractor.

f. Details of the site

A block-plan giving details of site access for steelwork is

a necessity. In addition any peculiarities of the site should be made known to the Steelwork Contractor.

g. Connection design

The dividing line between member design and connection design has often been found to be a grey area in steelwork contracts. For this reason, both the NSSS and the 'Allocation of Design Responsibilities in Constructional Steelwork Projects' give a comprehensive list of information that is considered necessary for connection design to be made by a competent person.

It is good practice for the engineer to provide typical details of the connections that were envisaged when making the design. The engineer is responsible for the design of the structure and this includes the type of connections used. The Steelwork Contractor is accountable for dimensional and arithmetic accuracy of his own work but the engineer must ensure that the connections adopted are compatible with the design.

The design standards for connection detailing must be that used for member frame design and this information must be given to the Steelwork Contractor.

h. Design drawings

Design drawings or electronic equivalents are the best method of proving the Steelwork Contractor with information for connection design and are preferred to design calculation sheets, computer output or long descriptive clauses.

A list of drawings should be given in the Project Specification. Subsequent drawings made as the contract proceeds should be duly marked as being additional to those stated in the Project Specification and the Steelwork Contractor advised which drawings have been updated and revised

Key Points

1. The Project Team should be assembled at an early stage
2. Team working should be encouraged to benefit from greater efficiency of all participants, better quality and lower costs
3. Late and expensive variations should be avoided by the early identification of the design requirements.
4. The National Structural Steelwork Specification and the Allocation of Design Responsibilities in Constructional Steelwork Projects should be used to identify the information needed by the Steelwork Contractor.

Further sources of Information

1. **National Structural Steelwork Specification for Building Construction, 5th Edition, BCSA & SCI publication No. 203/07**
2. **Allocation of Design Responsibilities in Constructional Steelwork Projects, BCSA/ACE joint publication (To be published)**