



STEEL INDUSTRY
GUIDANCE NOTES

Stability of Temporary Bracing

It is mandatory under the Health & Safety at Work Act to provide steel erectors with a safe system of work. This SIGNS highlights the factors that underpin a safe system of working, the objectives of a method statement and the Engineer's and the Steelwork Contractor's responsibilities. The transmission of information is crucial to the safe running of any project and key extracts from the National Structural Steelwork Specification on the critical information required for temporary bracing are included.

A safe system of working

Four factors underpin a safe system of work:

- a sound plan – a written erection method statement forming the basis of a safe system of work,
- adequate resources – people, suitable equipment selected and tested,
- competent individuals – selection of suitably trained and experienced operatives and supervisors,
- a chain of command – enabling clear instructions and briefings to be given.

The erection method statement

It is the steelwork contractor who employs the steel erectors and dictates their method of work. So it is the steelwork contractor who is responsible for the erection method statement that is used on site. In order to do this, three principal safety objectives must be addressed:

- to ensure individual pieces and the part-erected structure stands up throughout the construction stage,
- to operate cranes and other plant to lift and position safely,
- to provide safe working positions for erectors and safe access to/egress from those positions.

The first of these objectives requires an understanding of structural design principles and of the structure being erected. But it is often not the steelwork contractor who is responsible for designing the structure, and hence he is reliant on the drawings and information on the design of the structure issued by an independent structural designer – the Engineer.

The Engineer's responsibility

Generally, the Engineer will have configured the structure as a permanent works design. However, the CDM Regulations make it clear that it is insufficient for him to ignore the safety implications of the part-erected structure. Hence, his scheme design should be conceived with at least one safe method of erection in mind.

As the originator of the scheme design the Engineer is best placed to understand how the design "works", and clause 2.1.1.2 of BS 5950-1 requires that a designer who is responsible for the overall stability of the structure should be clearly identified.

This clause states that this designer should ensure the compatibility of the structural design and detailing between all those structural parts and components that are required for overall stability, even if some or all of the structural design and detailing of those structural parts and components is carried out by another designer. In determining a sequence of erection, this designer can identify the crucial stability issues of concern for the part-erected structure.

This does not take any responsibility away from the steelwork contractor for providing and managing a safe system of erection work, but it does make the Engineer responsible for providing suitable design information to enable the steelwork contractor to decide how the work will be safely undertaken. The steelwork contractor is responsible for designing the temporary works, but he needs key information from the Engineer to do this.

There are many situations where, during the erection sequence, temporary works are needed to ensure stability. For instance, necessary supports may be missing if the permanent works condition is for the steel to be attached to concrete shear walls that are to be completed later.

Design information

The requirements for transmission of the critical design information are made clear in the BCSA's National Structural Steelwork Specification for Building Construction [NSSS]. Key extracts for clauses 1.2A, 1.4 and 8 of the NSSS are given below:

Information required by the Steelwork Contractor

1.2A (vi) Details and locations of any temporary works assumed by the Engineer in the design.

1.4 (vii) An outline of the method of erection envisaged by the Engineer, giving the sequence for erecting the structure taking into account any phasing of The Works, including positions on the structure where temporary bracing, metal decking or other restraints are needed to provide stability to individual members or the structure until walls, floors or other non-steel structures are in position (in accordance with 8.4.1).

1.4 (viii) A description of any temporary works and any special requirements for temporary bracing required by the Engineer to comply with (vii) above; the stage when it is no longer necessary, or whether it is to be left in position after completion of the steelwork.

8.4.1 Temporary restraints until permanent features are built

The Engineer shall advise the Steelwork Contractor of positions on the structure where temporary bracing,

metal decking or other restraints are needed to provide stability to individual components or the structure until walls, floors or other nonsteel structures are in position.

The Steelwork Contractor shall design and provide the temporary bracing or restraints. The Engineer shall provide sufficient information to enable the Steelwork Contractor to design the necessary temporary works.

8.4.2 Other temporary restraints used by Steelwork Contractor

If the Steelwork Contractor uses temporary restraints during erection which do not substitute for permanent features, they may be removed after the structure has been lined, levelled and plumbed provided that sufficient steelwork and/or permanent bracing has been erected to ensure the stability of the structure under the worst expected conditions of dead, imposed and wind loading.

Further guidance

The framing arrangements for many structures fall into one of two common types, and BCSA has provided guidance on these. The BCSA Code of Practice for Erection of Low Rise Buildings and the BCSA Code of Practice for Erection of Multi-Storey Buildings are available on www.steelconstruction.org. Both codes include specific guidance on issues likely to affect stability during erection and the Engineer may assume that competent steelwork contractors would be familiar with this guidance.

Key Points

1. A safe system of working requires a sound plan, adequate resources, competent people and a chain of command.
2. The Steelwork Contractor is responsible for the steelwork erection method statement used on site.
3. The Engineer's scheme design should be conceived with at least one safe method of erection in mind.
4. The designer who is responsible for the overall stability of the structure should be clearly identified.

Further sources of Information

For further information:

1. National Structural Steelwork Specification for Building Construction, 5th Edition, BCSA & SCI Publication No. 203/07, 2007
2. BCSA Code of Practice for Erection of Low Rise Buildings, BCSA Publication No. 36/04, 2004
3. BCSA Code of Practice for Erection of Multi-Storey Buildings, BCSA Publication No. 42/06, 2006