Method statements

No. 7.08

Scope

The purpose of this Guidance Note is to review the use of method statements in the construction of steel bridgeworks. In particular, it gives guidance on best practice for generation, review and control of the definitive form of the method statement used on site by the bridge contractor to carry out the work. The quality of that document is critical to building the bridge correctly in a safe planned manner.

Terminology

The term 'method statement' is used widely throughout the course of a project, from concept to completion, to refer to a range of quite different documents. For clarity in this Note, the following terms are defined:

Bridge Contractor: the organisation, often a specialist sub-contractor, that is directly responsible for erecting the bridgeworks.
Method statement: any document used in some manner to describe the erection method during the course of a project, from concept to completion.
Erection Method Statement: the Bridge Contractor's document that he uses for implementing the erection method.
Originator *(of method statement):* The person, usually an employee of the Bridge Contractor, who is responsible for the whole process of drafting and bringing to issue for construction the Erection Method Statement.

The term 'Safety Method Statement' is used in some HSE publications covering construction generally to describe a document used by a contractor to set out his safe system of work for a construction activity. As described below, the Erection Method Statement covers more than this.

Health and safety

The regulation of health and safety was rationalised in the Health and Safety at Work Act, 1974. Recognising that safety on construction sites was heavily influenced by decisions in the conceptual, detail design and procurement phases of a project, the HSE published its Guidance Note GS 28, Safe Erection of Structures (Ref 1) in 1984. For many years this set out good practice for all parties to a steelwork project, and in particular it covered the need, purpose and content of method statements in general terms. GS 28 was withdrawn in 1997

The introduction of the Construction (Design and Management) Regulations in 1994 and their revision in 2007 (Ref 2) placed the force of law on owners (Clients) and designers, as well as contractors, to have due regard to health and safety during construction, and for other phases of a project's life from inception to final demolition. The expectation of good practice became a legal requirement. Industry guidance on best practice is given in the BCSA *Guide to the erection of steel bridges*, published in 2005 [Ref 3].

The following points are basic to health and safety considerations for the methods and method statements for the erection of steel bridges:

- the designer of the bridge (as CDM defines) has to anticipate erection throughout, to ensure that erection is practicable and to minimise hazards and reduce risk as far as practicable
- the designer has to communicate unusual features, constraints and hazards, as well as his technical requirements, to the Bridge Contractor (through the supply chain)
- for any bridge project, the Principal Contractor's Construction Phase Plan (see the CDM Regulations for definitions) will require the Bridge Contractor to work to documented safe systems of work contained in a method statement
- all designers, for permanent works, for temporary works and for construction engineering, are required to cooperate with regard to health and safety.

Erection method

A new steel bridge is the product of the combined efforts of an owner and a set of designers and contractors. From concept to completion, there is a simple sequence of activities by the participants in which erection is the culmination, if not the conclusion. Consequently:

- the erection method is inextricably linked to the permanent works design
- the method has to be anticipated in all the preceding activities
- the choice of method determines much of what goes before erection.

Clear communication about method is as important as the drawings and the specification – the better the communication, the better the objectives of safety, economy and quality will be met.

Method statements are used to communicate the method up and down the contractual chain, for a variety of purposes throughout the procurement and construction phases.

Changes in the steel construction industry and technical advances in equipment mean that the Bridge Contractor may employ subcontract designers for temporary works and checking, subcontract erectors, and specialists for welding, heavy lifting, jacking and movement, amongst others. These subcontractors will contribute to the development of the method as well as its implementation.

This Guidance Note is primarily concerned with the culmination of this process, the method statement prepared by the Bridge Contractor to reflect all the requirements and constraints of the contract, his own assessment of hazard and risk, and his obligations under the Health and Safety at Work Act.

The Bridge Contractor's Erection Method Statement

Historically, bridge contractors' method statements have been technical documents with explicit control of safety of the works, but only implicit control of the health and safety of people.

In steel bridge building today, the Bridge Contractor's method statement has four essential functions to fulfil in setting out explicitly the plan for carrying out the work. The Erection Method Statement has to communicate:

1. clear instructions for site management and responsibilities
2. engineering instructions to site management for the work necessary to achieve the technical performance
3. the safe systems of work to undertake the potentially hazardous tasks inherent in steel erection.
4. the conduct, control and coordination of erection activities carried out by the specialist sub-contractors.

Production of the Erection Method Statement

The Bridge Contractor is engaged in dialogue about his method with the other parties from the start of his contract: he also has to carry out his own design and planning for construction. Only when the method is agreed and his design is substantially finished can the Erection Method Statement be written ready for use on site - and following on his own risk assessments.

The extent of the Bridge Contractor's design will depend on the scale and complexity of the bridge and will have considered:

- choice of method
- analysis of the structure for each stage;
- design of temporary works
- selection of equipment, plant and access systems
- resolution of the requirements of the contractors, utilities, and other stakeholders.

The Originator of the erection method statement should be an engineer with the appropriate knowledge and experience; he may or may not be the senior person directly responsible for the work on site. The Erection Method Statement should be checked and reviewed internally by engineers or managers for engineering, health and safety, and project considerations. It is probable that the statement will be checked by independent engineers under the terms of the contract (e.g. for the Network Rail procedure, the F002/F003 Certificate), but the Bridge Contractor should not rely on an independent review for technical validation of the method.

The Bridge Contractor needs time to consider all these matters, and the Principal Contractor must ensure that this is allowed for sufficiently in the Bridge Contractor's programme. The project programme also has to allow sufficient time for the external review of the Erection Method Statement.

Reviewing an Erection Method Statement
In most projects that include steel bridgework, the Erection Method Statement will be reviewed externally by the main contractor (Principal Contractor), the engineers responsible for the permanent works (Designer) and for supervision of the works (e.g. the Employer's Project Manager), and by stakeholders with activity on the site (e.g. Network Rail or a river authority). **Each of them has their own responsibilities for work on the site and obligations under the health and safety legislation and these responsibilities cannot be overridden by the terms of the contract.**

It is important that each party ensures that the review is carried out by a competent person in a co-operative and expeditious manner. The purpose of the exercise is to enable the Bridge Contractor to implement his plan in the knowledge that it is sound and for each party to fulfil its role safely and efficiently.

It is recommended that each external reviewer, in applying their own knowledge, experience and concerns:

- tests the method by working through it line by line, visualising the action in detail,
- does not assume that something is correct because other reviewers have signed it off,
- is constructively critical with the question "what if?" in mind,
- refers any questions which cannot be answered and any assumptions which have to be made back to the Originator.

What to look for in the Erection Method Statement
Faced with an Erection Method Statement for review, ask the following questions of it.

Are the purpose and scope of the Erection Method Statement clearly expressed?

- is it a controlled document from an effective quality management system?
- what is covered?
- what is excluded?

Are the necessary and sufficient supporting documents referenced?

- are there meaningful sketches and drawings of erection sequence and temporary works?
- what contract drawings and specifications are required for erection?
- are crane duties documented?
- what project-specific regulations or policies apply?

Is health and safety policy adequately described?

- is the contractor's safety policy invoked?
- are special hazards identified (e.g. power lines and hazardous products), and are procedures to deal with them in place?
- who is responsible for safety on the site for these works?
- are generic work procedures in place for common activities covering techniques and safety measures? (e.g. for tightening bolts, slinging, welding, use of hydraulic jacks)
- what evidence is there of a documented risk assessment?
- have the residual risks identified in the Construction Phase Plan and the Bridge Contractor's assessments been allowed for?

Is management of the works clearly identified and assigned?

- who is in charge of the works?
- who specifically is in charge of each critical operation? (e.g. crane lift, launch, jacking operation)?
- what are the arrangements for control and communication for each critical operation?
- are responsibilities for interfaces and supporting or dependent activities defined? (e.g. with the Main Contractor or Engineer's Representative)
- are there formal arrangements for coordination with all on site?
- are handover or permit-to-work procedures defined?
- what engineering back-up is provided to deal with unforeseen problems?

Are the site, the structure and the logic of the scheme adequately described for a competent site manager to understand the method, its constraints and limitations?

Is the construction logic clear and sufficient?

- are options allowed for, or is unnecessary logic imposed?
- are hold points and acceptance criteria properly identified?

Note: It is usually most convenient if the method is set out as a series of short, well-defined phases with each phase covered by:

- a brief narrative describing (preferably in the present tense) the activity, conduct and timing from a defined start point
- a list of the necessary preparatory actions and checks including those by others
- the essential sequence of all necessary actions given as instructions in the imperative tense with all necessary qualifications (e.g. "lift … until…")
- the acceptance criteria for completion of the phase.

Are the preparations for each stage of operation properly described?

- what equipment and plant are required?
- what preparations are required by others?
- are adequate contingency arrangements provided for?

Are the instructions for each stage of operation clear, explicit and unambiguous?

Is the Erection Method Statement complete?

- are all safe systems of work covered, or identified for the site manager to prepare them? (i.e. by explicit content, by the contractor's documented generic work instructions, or by site procedures for planning and risk assessment.)
- does the Erection Method Statement anticipate all known or possible hazards?
- does it take account of any relevant matters in the Construction Phase Plan?
- are the activities of the Bridge Contractor's sub-contractors identified and fully integrated into the statement, with the necessary supporting data?

Acceptance

Acceptance of the Erection Method Statement for implementation requires an established project procedure for dealing with and closing out reviewers' comments and queries, prioritised as necessary

On a subjective level, there are sometimes issues of style, undue brevity, superfluous material and presentation. The originator should be required to address these only if they are significant to the ultimate use of the document.

Having completed a review there are two acceptance criteria that should be tested:

(1) Is the Erection Method Statement, with its reference documents, complete and sufficient for a competent site manager with no previous information to implement it as a safe system of work? (It is not unknown for personnel to be introduced to a project, especially on small bridges, at a late stage.)

(2) If challenged, can the originator and the reviewers demonstrate from the Erection Method Statement how it satisfies all the technical, safety and management requirements? (One could be faced with a lawyer!) A documented record of review/ comment is most effective in this regard.

Change control

The Erection Method Statement is finalised and submitted for review near the end of the contractor's design and planning work, so that it will reflect fully the conditions under which the work is done. It is inevitable, however, from the nature of civil engineering construction that plans change – preceding work may be delayed, access may be lost after bad weather, major plant may become unavailable – in which case the method statement will require revision, unless such change is anticipated by options in the text.

As for any other controlled document, change to the Erection Method Statement would be carried out by the Originator and would under-

go the same review process as before. This may need to be dealt with urgently: a change can be required at the last minute, yet be a very practical problem that needs understanding and co-operation to expedite the solution whilst maintaining the integrity of the construction process.

NOTE

The Erection Method Statement is a vital document in bridge building; it is the Bridge Contractor's document, but it requires the whole project team's contribution to ensure its validity; a large part of the value of preparing and reviewing a Method Statement is acquired during the process itself.

References

1. Health and Safety Executive, Guidance Note GS 28, HMSO, 1984 *(withdrawn Dec 1997)*.
2. Managing health and safety in construction, CDM Regulations 2007, Approved Code of Practice. HSE Books 2007.
3. The British Constructional Steelwork Association, BCSA Guide to the erection of steel bridges (publication 38/05), 2005