
Structural Steelwork

Grenfell Tower

LO1212-SPEC-004

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To be read in conjunction with
The National Structural Steelwork
Specification for Building Construction

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1.0 General

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- 1.1 All structural steelwork shall be constructed strictly in accordance with the drawings and schedules provided by the Engineer and the Architect, with this Specification and with the latest edition of BCSA "National Structural Steelwork Specification For Building Construction". Where there is conflict between the NSSS and Curtins drawings or Specification, Curtins drawings or Specification shall take precedence.
 - 1.2 The drawings and this Specification shall be regarded as the "Project Specification" referred to in the various sections of the BCSA "National Structural Steelwork Specification".

Nothing in this Specification should be taken as an instruction to adopt working methods which contravene the CDM Regulations, and all contract/sub-contractors are responsible for ensuring safe procedures which comply with the Regulations.
 - 1.3 In this Specification the term "Engineer" shall refer to the authorised representative of Curtins. The term "Contractor" shall refer to the Specialist Sub-Contractor responsible for the supply, delivery and (if specified) erection of the structural steelwork.
 - 1.4 Nothing in this Specification should be taken as an instruction to adopt working methods which contravene the CDM Regulations, and all Contractors/Sub-Contractors etc are responsible for ensuring safe procedures which comply with the Regulations. The Contractor shall comply and co-operate with the General Contractors Health and Safety Plan.

2.0 Materials

2.1 General

All materials used shall be fully in accordance with Section 2 of the BCSA "National Structural Steelwork Specification". Hot Rolled and Structural Hollow Sections shall be of the grade specified on the Engineer's drawings. Structural hollow sections shall be hot formed unless noted otherwise.

2.2 Certification

Manufacturer's test certificates shall be submitted by the Contractor prior to commencement of fabrication.

Where test certificates are not made available the Engineer may require material testing to be carried out, at the Contractor's expense, in accordance with BS EN 10025 and BS EN10210-1. Sufficient quantities of material shall be made available for testing as directed by the Engineer.

2.3 Supplies

The Contractor shall ensure that adequate supplies of all necessary materials are available to permit construction to proceed in accordance with their agreed programme.

2.4 Holding down bolts etc.

All Anchor Bolts, Holding Down Bolts, Rag Bolts etc. shall be supplied by the Contractor.

3.0 Drawings

3.1 General

All design, fabrication and erection drawings produced by the steelwork Contractor shall be prepared in accordance with Section 3.0 of the BCSA "National Structural Steelwork Specification". The Contractor shall obtain details and setting out etc by reference to the Engineer's, Architect's and other designer's drawings and information as necessary. The design, fabrication and erection drawings shall not be sub-contracted without the prior approval of the Engineer.

3.2 Design drawings

"Design Drawings" as defined by the National Structural Steelwork Specification will need supplementing by reference to Architect's or Service Engineer's (M&E) drawings unless noted otherwise.

The Structural Engineer's drawings indicate member types and sizes only. The drawings do not show full dimensions since it is the responsibility of the Contractor to derive these from the Architect's fully co-ordinated dimensioned drawings.

Unless noted otherwise, no connections are detailed since these are the responsibility of the Contractor. Any connections shown are for illustrative and explanatory purposes only.

The Engineer's construction information relates to steelwork members and connection forces associated with the permanent condition and do not allow for any unforeseen temporary loadcase situations relating to erection sequences or construction activities. It is the General Contractor's responsibility to review (with the Engineer) the Engineer's construction information with regard to the support of their associated construction activities. Any alteration required to the construction information due to the above will need to be approved by the Engineer.

3.3 Acceptance and responsibility

The Contractor shall submit to the Engineer copies in duplicate of all working drawings and sketches in good time before commencement of the work and in accordance with the designated programme. Calculations and drawings requested by the Engineer are for reference purposes only and are not for checking or approval. The Engineer may review the design and raise questions about the design/drawings but this shall not absolve the Supplier from their full responsibility for the adequacy of the design.

It shall be the Contractor's responsibility to obtain sufficient site dimensions to ensure that steelwork delivered to site will fit without any cutting, notching etc, on site. This requirement shall not be nullified because of any theoretical dimensions given on the Engineer's or Architect's drawings.

3.0 Drawings

3.4 Erection clearances

The erection clearance for cleared ends of members connecting steel to steel shall not be greater than 2mm at each end. Where web cleats are not used this may be increased to 3mm.

3.5 Camber

Cambers, including any anticipated erected displacements, shall be agreed between the Engineer and the Contractor during the preparation of the fabrication details, or as detailed in the Project Specification.

4.1 Design

Connections extra to those indicated on the drawings shall not be permitted unless written permission is obtained from the Engineer.

All connections (including base plates and holding down bolts) shall be designed and detailed by the Contractor from the loads, moments and shears supplied by the Engineer and including any other forces arising during erection in order to maintain the steel frame in a stable condition.

Where specific details or limitations to a connection are required they shall be supplied by the Engineer. All designs and details shall be in accordance with the current edition and relevant section of Eurocode 3 Design of Structural Steelwork and the UK National Annex to Eurocode 3.

In accordance with the National Structural Steelwork Specification the Steelwork Contractor shall ensure that no part of the structure is permanently distorted by stacking of materials or temporary erection loads during the steel frame and decking erection process.

The General Contractor shall ensure that no other contractor shall place loads on the partly erected structure without the permission of the Contractor.

Steelwork detailed to support elements off shelf angles fixed to both sides of the member will require end connections capable of supporting loads applied to the member in the temporary condition. The Contractor should check with the Engineer that the connection forces and member design is capable of supporting the temporary loads associated with this condition.

Where steelwork is detailed to support elements off shelf angles fixed to only one side of the member, the Contractor should check with the Engineer that the connection forces and member design has been designed to suit the associated torsional forces.

The General Contractor is responsible for providing the Engineer and Contractor with information regarding the erection sequence of subsequent elements (e.g. floor slabs etc.) to ensure all temporary loads can be accommodated by the end connection design by the Contractor.

4.2 Bolting

All bolts and bolting procedures shall be in accordance with the BCSA "National Structural Steelwork Specification".

The Contractor must indicate on their drawings the degree of tightening required for all bolted connections. The degree of bolt tightening shall not exceed the safe capacity of the bolt.

4.0 Connections

4.3 Welding

4.3.1 General

All welding consumables, processes, procedures and testing shall be in accordance with the BCSA "National Structural Steelwork Specification".

Oxy-Acetylene welding of structural steelwork is not permitted.

4.3.2 Welding engineer

The Contractor shall appoint a competent Welding Engineer to ensure that all welding is carried out in accordance with this Specification.

4.3.3 Site welding

Before commencing any site welding operations the Contractor shall provide written notification to the Engineer who may then inspect the preparation and alignment of steelwork members.

Site welding may only be commenced upon receipt of the Engineer's written approval.

Upon removal of all slag, spatter, etc. site welds shall be protected with one coat of linseed oil, pending inspection and approval by the Engineer. All oil shall be thoroughly cleaned off prior to application of the specified paint protection system.

5.0 Workmanship

5.1 General

All workmanship shall be fully in accordance with the relevant sections of the BCSA "National Structural Steelwork Specification".

5.2 Supervision

The Contractor shall ensure that all stages of the work are supervised by, in the Engineer's opinion, a suitably qualified and experienced supervisor.

5.3 Defective work

Structural Steelwork details not approved by the Engineer or not in accordance with the Engineer's drawings and this Specification shall be classed as defective.

Defective work shall be removed from the site and replaced to the Engineer's instructions.

The cost of carrying out these remedial operations shall be borne by the Contractor.

5.4 Columns in direct bearing

Bearing and butt ends of stanchions or column shafts shall be accurately machined, square with the axis, over the whole area of contact.

5.5 Appearance

All exposed steelwork shall be of neat appearance. The Contractor should confirm with the Engineer, Architect or Main Contractor the requirement for grinding/removal of marks to provide a neat appearance. In addition, exposed steelwork sections should be identified from stock selection to obtain the straightest sections where possible.

5.6 Tubes

All tubes shall be sealed unless noted otherwise.

6.0 Erection

6.1 Responsibility for erection

The erection of the structural steelwork shall be carried out by:-

a) **The Contractor**

In the case of a supply, deliver and erect tender (specified in the invitation to tender).

b) **The General Contractor**

In the case of a supply and deliver only tender (specified in the invitation to tender).

The erector shall provide all tackle, plant and packing necessary for the erection of the steelwork, including any temporary bracing specified by the Contractor on their fabrication details.

6.2 Method statement

The erector shall submit to the Engineer a method statement for erection in good time prior to commencement, to include consideration of safety issues.

6.3 Workmanship

Erection of the structural steelwork shall be carried out in accordance with Sections 8.0 and 9.0 of the BCSA "National Structural Steelwork Specification".

6.4 Temporary bracing

Temporary bracing and/or strutting shall be provided by the Contractor wherever necessary to resist all erection forces, wind, sway, temporary excessive loads during construction and all other erection conditions without over-stressing the permanent works.

In addition, temporary bracing shall be provided at the discretion of the General Contractor, or as directed by the Engineer, to be left in place until after the completion of the structural works where the building works contributes to the stability of the works.

The Contractor shall be responsible for the design and supply of all temporary bracing and shall discuss with the General Contractor the implications of its use with a view to minimising the effect on progress of the general building works.

6.5 Removal of temporary bracing

Temporary bracing shall be left in position until the whole building, in the opinion of the Engineer, is stable without it. This may be after the erector has left the site.

Dismantling and subsequent removal from the site of the temporary bracing (including making good at cleats etc) shall be covered in the tender figure. No further money shall be paid to the erector for a special visit to remove bracing.

6.6 Acceptance of erected steelwork

The General Contractor shall check that on completion of erection, the steelwork conforms in all aspects with this Specification and drawings. Any remedial measures necessary to ensure that the steelwork conforms to this Specification and drawings shall be carried out and accepted by the General Contractor before any other work is carried out on adjacent cladding, flooring etc.

The erector shall, when the steelwork has been approved by the General Contractor, remove from the site all materials brought by him and not used in the work.

7.0 Corrosion Protection

7.1 Specification

All structural steelwork shall be prepared and protected, in accordance with Curtins "LO1212-SPEC-005 Painting of Steelwork" and with the "National Structural Steelwork Specification".

7.2 Remedial work

Protective coatings disturbed in transporting steelwork to site or during construction shall be made good to the satisfaction of the Engineer to restore the full preparation and paint system.

In the case of severe damage occurring to the protective coatings at any stage before hand-over of the building, the Contractor shall submit for approval his method statement for remedial works to ensure that the full protective specification is achieved and that touched-up areas of exposed steelwork are not noticeable on completion.

7.3 Treatment of galvanised surfaces

All galvanised or other rust proofed surfaces requiring paint treatment shall, prior to painting, be cleaned and degreased then etched using British Rail T wash or similar.

7.4 Galvanised tubes

Vent holes shall be provided as necessary and sealed later with an approved sealing plug.

8.0 Work Required of the General Contractor

8.1 Grouting of base plates

When the stanchions have been finally plumbed and levelled to the satisfaction of the General Contractor, they shall completely fill the space under the base plates with a non-shrink cementitious grout or a proprietary expanding grout to meet the required strength (40 N/mm² unless noted otherwise) and to ensure full filling of all voids. The General Contractor shall obtain the Engineer's approval of the grout mix prior to commencing grouting operations.

8.2 Site dimensions

The General Contractor shall be responsible for checking all site dimensions and informing the Contractor, prior to fabrication of the steelwork, of any variations in the support structure as built.

8.3 Erection of steelwork by general contractor

It shall be the responsibility of the General Contractor to erect all steelwork in accordance with Section 7 of this Specification when the structural steelwork is on a supply and delivery basis only by the Contractor.

When responsible for erection of the steelwork the General Contractor shall carry out all touching-up of the shop applied elements of the paint protection system in accordance with Curtins "Specification for the Corrosion Protection of Structural Steelwork".

8.4 Shop applied protection system - exposure period

The General Contractor is to obtain from the Contractor details of the anticipated life expectancy of the shop applied paint under site exposure conditions and to ensure that this is compatible with erection and site painting programmes.

Just before the expiry date of this site exposure period, it shall be in the General Contractor's interest to check that the paintwork is acceptable.

After the exposure period has expired it shall then be the responsibility of the General Contractor to ensure that measures are taken to stop further deterioration of the steelwork painting system.

8.5 Below ground steelwork

Unless otherwise noted on the Engineer's drawings, all steelwork below ground level shall be encased in 100mm minimum thickness concrete of grade RC35.