Specifying Cast In Situ Frames to the NSCS

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National Structural Concrete Specification

- Definitive, simple and straightforward
- Agreed with designers and builders
- Follows the current codes and standards
- All the information collected together in one place
- Can be used with NBS
<table>
<thead>
<tr>
<th>BRITISH STANDARD</th>
<th>BS EN 13670:2009</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Execution of concrete structures</strong></td>
<td></td>
</tr>
</tbody>
</table>
Execution Specification for Concrete

From the Design Team’s point of view:

• What is wanted - functional or a beautiful, long lasting building
• How do you get there? What do you ask for?
• Construction - fresh concrete properties
• Construction - formwork, location and tolerances
• Strength - concrete and reinforcement properties
• Durability - concrete properties
• Appearance - while having the right fresh properties, strength and durability
Execution specifications:
BS EN 13670 & NSCS

Types of Finish
Hierarchy of Tolerances

Types of Finish
Hierarchy of Tolerances
Green Issues
• Part 1 Standard Specification (10 sections)
• Part 2 Project Specification: (2 sections)
• Part 3 Guidance
• Colour co-ordinated!
This part contains the standard specification clauses
Section 3 Definitions

The following definitions, in addition to those given in BS EN 13670: 2000, apply for the purpose of this specification.

3.1 Agreement, acceptance

When by or of the CA agreement or acceptance shall have the following limitations.

3.1.1 Samples

When given in respect of samples of materials, execution or proposals for methods of construction submitted in accordance with this Specification, shall not be interpreted as denoting any degree of satisfaction with the materials used, or the execution of the Works.

Section 4 Execution management

4.1 General requirements

4.1.1 Standards

Execution shall be in accordance with BS EN 13670 as supplemented by the Project Specification and all statutory requirements.

Where there is a difference between the requirements of BS EN 13670 and the Project Specification, the Project Specification takes precedence.

4.1.2 Materials

4.1.2.1 General

All materials used in the structure shall comply with the Project Specification and current versions of standards referred to therein. The CA may specify samples for testing and the Contractor shall arrange for such samples to be supplied, identified, stored and tested and the results delivered to the CA in accordance with the relevant standards and the Project Specification requirements.

4.1.2.2 Proprietary products and materials

These shall be used in accordance with the manufacturer's written instructions and relevant European Product Standards where available.

4.1.2.3 Third-party inspections

Allow reasonable access to the site for technical inspection by third parties at all times.

4.1.4 Water-receiving construction

Where water-receiving construction is specified, submit to the CA for approval. Details of the materials used and the execution, which are to be in accordance with BS 8102, and written confirmation from the supplier of the water-receiving materials that they will not be adversely affected by the proposed environment, concrete, curing and release agents, placing methods, joints, finishes, reinforcement and its supports details, or loads.

4.2 Documentation

4.2.1 Quality plan

Operate an agreed quality management system to BS EN ISO 9000 unless otherwise agreed with the CA. The system shall be accessible for audit.

If it is agreed that a quality management system to BS EN ISO 9000 is not required the Contractor shall prepare a quality plan for the project.

The Quality Plan shall be given to the CA for acceptance at least five working days before the works start.

4.2.2 Execution documentation

Produce the documents as required and provide one copy to the CA at the time stated in the NSCS Project Specification or no later than five working days after such is prepared.

4.2.3 Information coordination and availability

4.2.3.1 NSCS Project Specification

When NSCS Project Specification is revised all changes must be clearly identified.
8.2.2 Concreting in extreme conditions

8.2.2.1 Cold weather
For concreting in cold weather, air temperature below 5 °C, agree in advance with the CA any changes to the cement, admixtures or concrete temperature to prevent freezing of the concrete, to limit extended stiffening times and to maintain the required concrete strength development.

8.2.2.2 Hot weather
For concreting in hot weather, air temperature above 30 °C, agree in advance with the CA any changes to the cement, admixtures or concrete temperature to minimize high temperature rises and reduction in the useful working life of the fresh concrete.
10.5.2 **Verticality by storey of the structure**

Inclination of a column or wall at any level in a single- or multi-storey building.

Permitted deviation $\Delta$ for:
- $h \leq 10 \text{ m} = \text{the larger of } 15 \text{ mm or } h/400$
- $h > 10 \text{ m} = \text{the larger of } 25 \text{ mm or } h/600$

where $h =$ height of element in mm
Edition 4 NSCS

1. Scope
2. Bibliography
3. Definitions
4. Execution Management
5. Falsework and Formwork
6. Reinforcement
7. Prestressed Concrete
8. Concrete and Concreting
9. Precast Concrete
10. Geometric Tolerances
This part should be filled in for each project.

The following can be specified:
- Concrete types
- Concrete finishes
- Formwork
- Other materials
- Responsible sourcing
<table>
<thead>
<tr>
<th>Section P1</th>
<th>Information to be supplied TO the Constructor</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1.1</td>
<td>General information</td>
</tr>
<tr>
<td>P1.2</td>
<td>Design</td>
</tr>
<tr>
<td>P1.3</td>
<td>Drawings and calculations</td>
</tr>
<tr>
<td>P1.4</td>
<td>Execution management</td>
</tr>
<tr>
<td>P1.5</td>
<td>Materials</td>
</tr>
<tr>
<td>P1.6</td>
<td>Project requirements</td>
</tr>
<tr>
<td>P1.7</td>
<td>Water-resisting construction</td>
</tr>
<tr>
<td>P1.8</td>
<td>Concrete</td>
</tr>
<tr>
<td>P1.9</td>
<td>Surface finishes</td>
</tr>
<tr>
<td>P1.10</td>
<td>Precast concrete</td>
</tr>
<tr>
<td>P1.11</td>
<td>Prestressed concrete construction</td>
</tr>
<tr>
<td>P1.12</td>
<td>Deflection allowances</td>
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<tr>
<td>P1.13</td>
<td>Further information</td>
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<table>
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<tr>
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<td>Materials</td>
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</table>
National Structural Concrete Specification for Building Construction

Fourth edition complying with BS EN 13670: 2009

NSCS Guidance
“Sustainable construction - Cement

The specification must achieve a balance, which ensures workability, durability, appropriate rate of strength gain and, for visual concrete, the required colour.”
Finishes:

- **Basic**
- **Ordinary (equivalent to Type A)**
- **Plain (equivalent to Type B)**
- **Special**

- **Reference Panels for Ordinary and Plain finishes are located around the country**
Execution Management

- The flow of information is essential on any construction project. A good project needs well managed information.

- Table P1.3 has been retained to cover issue of drawings and documents.

- Table P1.4.2 has been added - indicating when certification and checking information is to be provided.
### Drawings & calculations

(P1.3)

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**Footnotes**

1 Types of construction:
   - RC: Reinforced concrete
   - PCE: Precast concrete elements
   - PCP: Precast concrete piles
   - PSC: Precast concrete slabs
### Execution documentation (P1.4.2)

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Prestressed Concrete

- The NSCS now incorporates the CARES model prestressing specification
- The document is coordinated with the ENs for grout and the ETAG requirements for stressing
Post-tensioned concrete

Model Specification
for the Design and Performance of Post-Tensioned Concrete Floors in Building Structures
For use in the UK
Tolerances

- Tolerances MUST be thought about carefully as there is no fixed system that can be applied to give the “right” answer every time.
- This section can be read as “stand alone” in the NSCS as it brings together normative and informative EN tolerances.
- Tolerances are “right” for a typical building and need more care in other cases.
**Typical storey**

Deviations 2, 3 & 4 are governed by the ‘box’ principle and are less than 50 mm as BS EN 13670: 2009, Cl. 10.1.(5)

**Deviation 3 less deviation 2** must be less than 15 mm or h/400 (Cl.10.5.2 of NSCS Standard Specification)

**Deviation 4 less deviation 3** must be less than 10 mm or t/30 (Cl. 10.5.3. of NSCS Standard Specification) This is a ‘corrective tolerance’ to ensure that:

**Deviation 4 less deviation 2** is less than 10 mm (Cl.10.5.1 of NSCS Standard Specification)

**Bottom storey – special case**

Deviation 2 must be less than 10 mm from the intended Design position (Cl. 10.5.1 of NSCS Standard Specification)

**Deviation 1** for the base (substructure), not the superstructure, must be less than 25 mm from the intended design position (Cl. 10.3.1 of NSCS Standard Specification)
In a multi-storey structure the columns can therefore only deviate over 10 mm/storey in complying with Cl.10.5.1 of NSCS Standard Specification, although there is greater verticality tolerance. Any ‘drift’ in one direction will be limited by the need to satisfy the requirements of Cl.10.2.1 of NSCS Standard Specification.

**Note**

There are two situations where mutually compliant tolerances may cause a problem and they must be defined in NSCS Project Specification.

1. Where a combination of column height and thickness allows the tolerance for verticality from Cl. 10.5.2 of NSCS Standard Specification and offset from Cl. 10.5.3 prevents the tolerance for position in Cl. 10.5.1 being achieved.

2. Where a combination of column height and thickness and verticality of adjacent columns have divergent tolerances from Cl. 10.5.2 of NSCS Standard Specification would prevent the distance between columns at the top in Cl. 10.5.6 being achieved.

**Rotational tolerance**
Concrete Finishes

- The BS8110 types of surface finish A, B & C with finish classes 1, 2 & special have been replaced.
- BS EN 13670 has basic, ordinary, plain and special concrete finishes for formed **and** unformed surfaces
- For formed surfaces the definitions are developments of the BS 8110 descriptions for Types A and B and NBS descriptions of plain smooth and fine smooth finishes.
- The “plain” is intended to be suitable as an exposed finish almost “as struck”, but not a super quality architectural finish which must be a special.
Concrete Specification

- Teamwork is the key - only with all of the team engaged will the client get the right result

- A great specification can be spoilt by poor application

- A poor specification can produce a great result - sometimes even when this is not required
Thank You

Any Questions