

Commission 10

Construction

Chair:	van der Horst (BAM Infraconsult, The Netherlands)
Deputy-Chair:	to be nominated
Secretary:	Schmitt (SNCF - IGOA, France)
Members:	Burtet (VSL, Switzerland), Cayron (Bouygues Travaux Publics, France), Contreras (Arup, Spain), Fischer (TU Munich, Germany), Heggade (Gammon, India), Herrero (Ferrovial – Agromán, Spain), Imberty (Ministère de l'Équipement, France), Klein (T ingenierie SA, Switzerland), Magyar (Hídépítő, Hungary), Mancini (Politecnico Torino, Italy), Portenseigne (Bouygues Travaux Publics, France), Primault (Vinci Construction, France), Rombach (Techn. Univ. of Hamburg-Harburg, Germany), Sanchez (Roughan & O'Donovan, Ireland), Srinivasan (Arup, United Kingdom), Turmo (Univ. Politecnica de Catalunya, Spain)
Corr. Members:	Curtis (RTR Bridge Construction Services), Buron Meastro (IECA, Spain), Geiker (Techn. Univ. of Denmark, Denmark), Jensen (MT Højgaard, Denmark), Magyar (Hídépítő, Hungary), Mancini (Politecnico Milano, Italy), Öberg (NCC AB, Sweden), Tassin (International Bridge Technologies, USA)
Recent Meetings:	Paris (Oct. 06), Paris (Oct. 07), Amsterdam (May 08), Paris (Nov. 08), London (June 09), Paris (March 10), Paris (May 10), Paris (January 11), Paris (March 11), Paris (May 11), Paris (Nov. 11)
Recent Bulletins:	<i>fib</i> Bulletin 48: <i>Formwork and falsework for heavy construction</i> (Guide to good practice prepared by former TG 10.2, published 2009)

Names of *fib* members are given in bold

Terms of reference

Scope

The Commission addresses state-of-the-art basic principles of the construction process of concrete structures at site. It also reflects on anticipated developments, which could have a significant influence for construction. The objective is to develop awareness regarding aspects which have an impact on safety, serviceability, durability and environmental issues of concrete structures to be built at site, and to provide information as how to handle the basic principles. The output will be presented as internationally harmonized reports.

Areas of interest

The areas of interest have been developed from the viewpoint that the construction process has two main components: perception-related aspects and process aspects. The perception-related aspects comprise materials, workmanship, formwork and scaffolding, curing of concrete, concrete surface, testing and monitoring, high performance concrete, special technologies, specifications and training/education. The process related aspects comprise the construction process of concrete structures, quality management and life cycle management.

Each of the areas can be summarized as follows:

1. The *construction process* of concrete structures, including process management, environmental aspects, traceability of products and activities, preparation and workmanship, the construction phase and its impact on durability, strategic choice of materials
2. *Quality management*: principles and criteria, guidelines for implementation. ISO 9000-2000 principles, global versus detailed process/indicators
3. *Materials*: packaging, transportation, storage and handling
4. *Workmanship*: mixing, casting and post casting treatment of concrete, detailing and installation of reinforcement and of prestressing, both steel and carbon reinforcement
5. *Formwork and scaffolding*: principles, systems and details, design, erection and striking

6. *Curing of concrete*: moisture curing of concrete and early age crack control, cooling and heating of concrete, protection of the concrete surface after casting
7. *Concrete surface*: quality and texture
8. *Testing, monitoring and control* during construction: destructive / non destructive testing, in-situ monitoring, crack width control
9. *Life cycle management (LCM)* (construction phase aspects only): basic principles, birth certificate, demolition plan
10. *Special materials*: high performance concrete (strength and workability)
11. *Special technologies*: equipment and robots, ICT in construction (4D Cad, Cam, Data communication and project management)
12. *Specifications for materials and workmanship*
13. *Training and education*

Working programme

The first Commission 10 publication, *fib* Bulletin 48, “Formwork and falsework for heavy construction” (Guide to good practice) was published in January 2009.

The work of the Commission is currently focused on preparing a state of art information and the design specifications for precast segmental construction of bridges. The main aspects that will be considered are related to the construction, to the assembly and to the design both of segments and bridges, with internal and external or mixed prestressing. The following aspects will be considered in detail:

- concreting and curing of precast elements: one sequence concreting, partial concreting, concreting position, delay or conditions for the first move of the element, curing of element, surface preparation or treatment before coupling or glueing of the joint;
- transportation and storage of different segments;
- assembling by means of: launching girder, four wheel winches acting on the top of the deck, crane trucks acting from the bottom, tower cranes mounted on rails or a combination of previous systems; if necessary with use of temporary stays;
- temporary prestressing during the assembling and epoxy resin (or other material) used during the coupling of joints, ducts coupling, thightness in the joints;
- shear keys design and their distribution along the perimeter;
- positioning of anchorages of construction and continuity tendons;
- deviators for external prestressing;
- camber in construction and geometry corrections for the cantilever (construction on a jack system and final adjustment before the connection of bearings);
- conceptual design in the choice of span sequences, geometrical profile (constant of variable depth);
- use of extremity counterweight for orographic reasons;
- prestressing layout for internal, external and mixed prestressing;
- particular design models for the ULS, to be adopted in presence of joint opening and different type of prestressing;
- durability aspects related to the use of tendon anchorages within the joints, to the ducts to be used for internal tendons, in particular crossing the joints and to the type of duct grouting.

The resulting bulletin will summarize the experience cumulated in construction of precast segmental bridges all around the world and will give to the designer a guide to conceive economical and performance based bridges assembled by precast segments. Publication is targeted for 2012.