

Commission 8

Concrete

Chair:	Dehn (MFPA Leipzig, Germany)
Deputy-Chair:	Müller (Univ. Karlsruhe, Germany)
Members:	Belhoul (Lafarge, France), De Schutter (Ghent Univ., Belgium), Geiker (Technical Univ. of Denmark), Glavind (Danish Technological Institute, Denmark), Helland (Skanska Norge AS, Norway), Józsa (TU Budapest, Hungary), Mechtcherine (Technische Univ. Dresden, Germany), Silfwerbrand (CBI, Sweden), Ueda (Hokkaido Univ., Japan), Uomoto (University of Tokyo, Japan), Vandewalle (KU Leuven, Belgium), Walraven (TU Delft, The Netherlands),
Corr. Members:	Ashby (Concrete Challenges, Australia), Reddi (Gammon, India), Yarmakovskiy (NIIZhB Moscow, Russia)
Recent Meetings:	Avignon (April 04), Budapest (May 05), Naples (June 06), Cavtat (May 07), Amsterdam (May 08), London (May 09)
Recent Bulletins:	<i>fib</i> Bulletin 42: <i>Constitutive modelling of high strength / high performance concrete</i> (State-of-art report prepared by TG8.2, published 2008)

Terms of reference

Scope

The aim of the Commission is to collect and to validate information on the properties and the behaviour of the material concrete subjected to various types of loading and environmental conditions. The Commission focuses its attention both on classical types of concrete, in particular under unusual conditions, and on new types of concrete under all types of loadings and conditions. The properties of the concrete types considered should be formulated in such a way that it is possible to derive behavioural models and design recommendations for practical applications.

Areas of interest

- durability and corrosion of concrete;
- cements, concrete admixtures and additions;
- constitutive laws for high performance concretes;
- mechanical properties of concrete with recycled components;
- properties and behavioural modeling of ultra-high strength concrete, lightweight concrete, self-compacting concrete and fibre-reinforced concrete;
- environmental aspects of concrete;
- aspects of mixing, execution and curing;
- behaviour of concrete under very low and very high temperatures;
- code-type modeling, in particular for the New Model Code.

These activities need partially to be coordinated among other *fib* Commissions and international associations such as RILEM. Possibilities for joint Task Groups will be considered.

Working programme

- Task Groups will concentrate on the topics mentioned in the list above. They are expected to first write state-of-the-art reports on the topics considered. To this aim they collect and evaluate the available information and present it in a systematic way. If appropriate, chapters on existing practical application are added.
- Proposals are made for formulations of the behaviour of concrete which can be used in design recommendations. These proposals should, if possible, be formulated as extensions of the New Model Code.

- The Commission follows current developments in the building industry and at the universities and can decide to take action with regard to:
 - defining new areas of study;
 - recommending actions to resolve and prevent problems.

Task Group

TG 8.3 Fibre reinforced concrete

- Convener: Vandewalle (KU Leuven, Belgium)
- Secretary: Lambrechts (Bekaert s.a., Belgium)
- Members: Balázs (Budapest Univ. of Technology and Economics, Hungary), Banthia (Univ. of British Columbia, Canada), Barros (Univ. do Minho, Portugal), Ono (Kyoto Univ., Japan), Criswell (Colorado State Univ., USA), Dehn (MFPA Leipzig, Germany), Di Prisco (University of Milano, Italy), Falkner (Ingenieurbüro Dr. Falkner, Germany), Gettu (Indian Institute of Technology Chennai, India), Krstulovic-Opara (ArupEnergy, Houston, USA), Kusterle (FH Regensburg, Germany), Löfgren (Thomas Concrete, Gothenburg, Sweden), Mari Bernat (Univ. Politècnica de Catalunya, Spain), Massicotte (Univ. of Montreal, Canada), Pfyl (Pfyl Partner AG, Switzerland), Plizzari (Univ. of Brescia, Italy), Rossi (LCPC, France), Serna Ros (Univ. Politecnica Valencia, Spain), Silfwerbrand (CBI, Sweden), Stang (Technical University of Denmark, Denmark), Szabo (Budapest Univ. of Technology and Economics, Hungary), Tatnall (Synthetic Industries Inc., USA), Trottier (Dalhousie University, Halifax, Canada), Walraven (Delft Univ. of Technology, The Netherlands)
- Corr. Members: Parra-Montesinos (Univ. of Michigan, USA), Mobasher (Arizona State Univ., USA)
- Recent Meetings: Brussels (Dec 2004), Vancouver (Aug. 05), Ischia (June 06), Leipzig (Nov. 06), Atlanta (Apr. 07), Paris (Nov. 07), Brussels (Feb. 08 – together with TG 8.6), Valencia (Mar. 08), Paris (June 08 - together with TG 8.6), Chennai (Sep. 08)

Terms of reference

The Task Group collects and validates information on the behaviour of fibre reinforced concrete subjected to various types of loading and environmental conditions.

Concerning steel fibre reinforced concrete, the group will continue the work of the RILEM technical committee TC162-TDF Test and Design Methods for Steel Fibre Reinforced Concrete.

TG 8.3 will develop recommendations and identify research needs for all types of fibres. In the new *fib* Model Code (extending the existing Model Code 90), the material ‘Fibre Reinforced Concrete’ will be included. Since both strain hardening and strain softening FRC are to be considered TG 8.3 and TG 8.6 prepare together the necessary paragraphs. Also an *fib* bulletin will be written to give more background information and details.

Task Group

TG 8.6 Ultra high performance fibre reinforced concrete

- Convener: Walraven (Delft Univ. of Technology, The Netherlands)
- Members: Aarup (CRC Technology, Denmark), Behloul (Lafarge, France), Bunje (Kassel Univ. and Fehling & Jungmann GmbH, Germany), Dehn (MFPA Leipzig, Germany), Denarié (EPF Lausanne, Switzerland), Fehling (IBB Fehling + Jungmann GmbH, Germany), Greiner (Bilfinger + Berger AG, Germany), Grunewald (Delft Univ. of Technology and Hurks Beton, The Netherlands), Jungwirth (Schmitt Stumpf Frühauf and Partner, Germany), Lagerblad (CBI, Sweden), Ma (Leipzig Univ., Germany), Muttoni (EPF Lausanne, Switzerland), Redaelli (EPF Lausanne, Switzerland), Resplendino (Ministry

of Transport, France), Rossi (LCPC, France), Schmidt (Kassel Univ., Germany), Shionaga (IHI Co. Ltd., Japan), Simon (Eiffage, France), Skazlic (Univ. of Zagreb, Croatia), Stürwald (Kassel Univ., Germany), Thibaux (Eiffage, France), Tue (Leipzig Univ., Germany), Weisse (Ingenieurbaukontor Schreiber & Partner Leipzig GmbH, Germany)

Corr. Members: Braam (Delft Univ., The Netherlands), Brühwiler (EPF Lausanne, Switzerland), Causse (Vinci, France), Chanvillard (Lafarge, France), Gambarova (Univ. Milano, Italy), Graybeal (FHWA, USA), Holschemacher (Univ. of Applied Sciences, Leipzig, Germany), Kaptijn (Ministry of Traffic and Transport, The Netherlands), Katagiri (Taiheyo Cement, Japan), Lambrechts (Bekaert s.a., Belgium), Leutbecher (Kassel Univ., Germany), Sato (Hokkaido Univ., Japan), Toutlemonde (LCPC, France), Ulm (Massachusetts Institute of Technology, USA)

Recent Meetings: Delft (May 04), Kassel (Sept. 04), Lyon (Jan. 05), Leipzig (June 05), Paris (Oct. 05), Lausanne (Mar. 06), Aalborg (Sept. 06), Milano (May 07), Marseille (Nov. 07), Kassel (Mar. 08), Varenna (Sept. 08)

Terms of reference

The Task Group will write design recommendations for concretes with a strength $> 120 \text{ N/mm}^2$, applicable to concrete with fibres of various nature, such as steel, polyacrylic, polypropylene etc. or combinations thereof.

The work of Task Group 8.6 will be co-ordinated with the work of *fib* Task Group 8.3 *Fibre reinforced concrete* that develops guidelines for fibre reinforced concrete in strength classes $\leq 120 \text{ N/mm}^2$. Through common members there is also co-ordination with the work of the RILEM Technical Committee on High Performance Fibre Reinforced Cementitious Composites (TC HFC).

The format will be as close as possible to the format of the New Model Code for concrete structures presently under preparation by *fib* SAG 5 so that both can be used in a complementary way.

Task Group

TG 8.7 Code-type models for concrete behaviour

Convener: Müller (Univ. Karlsruhe, Germany)

Secretary: Burkart (Univ. Karlsruhe, Germany)

Members: Cervenka (Cervenka Consulting, Czech Republic), Curbach (Technische Univ. Dresden, Germany), Dehn (MFPA Leipzig, Germany), Gehlen (Univ. Stuttgart, Germany), Glavind (Danish Technological Institute, Denmark), Gylltoft (Chalmers Univ. of Technology, Sweden), Helland (Skanska Norge AS, Norway), Koenders (Delft Univ. of Technology, The Netherlands), Mechtcherine (Technische Univ. Dresden, Germany), Reinhardt (Univ. Stuttgart, Germany), Walraven (Delft Univ. of Technology, The Netherlands)

Recent Meetings: Karlsruhe (May 08), Stuttgart (Nov. 08), Dresden (April 09)

Terms of reference

Similar to the Model Code 90, the new *fib* Model Code will include a chapter on the constitutive and durability related behaviour and properties of concrete. For the time being, this chapter in MC 90 deals primarily with ordinary structural concrete. Due to the great progress in concrete technology in recent years, new types of concrete are produced more and more in practice. However, there is still a lack in compiling the gained knowledge and in particular in presenting the behaviour of these concretes in a code-type manner. In addition, new concrete models have been developed in the recent past which have to be evaluated critically in view of writing the new Model Code.

The major target of the Task Group consists in developing a code-type presentation of the constitutive and durability related behaviour of concrete to be included in the new model code. This target comprises the compilation and evaluation of available concrete models and the development of new models complying with the framework of the new *fib* Model Code. The obtained results will be presented in a Bulletin and will directly contribute to the work of *fib* SAG 5.

Task Group

TG 8.8 Structural design with flowable concrete

Convener: Grunewald (TU Delft, The Netherlands)

Members: (tentative) Barragan (BASF, Italy), Barros (Univ. of Minho, Portugal), Behloul (Lafarge, France), Beitzel (IBU Trier, Germany), Billberg (CBI Stockholm, Sweden), Dehn (MPFA Leipzig, Germany), Den Uijl (TU Delft, The Netherlands), Di Prisco (Politecnico di Milano, Italy), Domone (Univ. College London, UK), Freytag (TU Graz, Austria), Geiker (DTU Lyngby, Denmark), Gettu (Indian Institute of Technology Madras, India), Hammer (Sintef, Norway), Kanstad (NTNU, Norway), Laranjeira (UP Catalunya, Spain), Martinie (LCPC, France), Nunes (Univ. de Porto, Portugal), Obladen (Strukton, The Netherlands), Roussel (LCPC, France), Sato (Hakkaido Univ., Japan), Schmidt (BAM, Germany), Sonebi (Queen's Univ. Belfast, UK), Stähli (Concretum Zürich, Switzerland), Stang (DTU Lyngby, Denmark), Vandewalle (Katholieke Universiteit Leuven, Belgium), Walraven (TU Delft, The Netherlands), Zilch (Technische Univ. München, Germany)

Recent Meetings: Ghent (April 09)

Terms of reference

Scope

Flowable concretes (self-compacting or highly flowable) have evolved to a commonly applied building material. In spite of significant experience with flowable concrete problems still occur during casting and the service life of concrete structures. The flow (initiated by vibration and/or the weight of concrete) can affect the structural behaviour of hardening or hardened concrete. In order to obtain a high flowability the mixture composition has to be adjusted and optimised. The effect of fibres on the characteristics of flowable concrete will be considered in a subgroup of *fib* TG 8.8.

The main objectives of *fib* Task Group 8.8 are to write a state-of-the-art report and a recommendation on the structural design with flowable concretes. The performance of a structure with flowable concrete depends not only on material characteristics, but also on the production method and the structure itself. Areas of structural design where flowable concretes differ from traditional vibrated concrete have to be identified. Four aspects will be considered in order to describe structural behaviour:

- mechanical characteristics
- local effects (i.e. close to the concrete surface or reinforcement bars)
- effects of orientation/segregation due to the flow/vibration
- how to optimise the mixture composition of and production techniques for flowable concrete

Working programme

fib TG 8.8 consists of two subgroups: 'plain concrete' and 'fibre reinforced concrete'; both groups meet together. The second group will focus on the effect of orientation and distribution of fibres on the characteristics of flowable concrete, whereas other relevant aspects will be considered by the first group. The duration of the commission is four years (the first meeting was held in April 2009). The work is divided in three phases: 1) orientation, 2) compilation and comparison (output: State-of-art report) and 3) translation (output: Recommendation).

Task Group

TG 8.9 Aesthetics of concrete surfaces

Convener: Lohaus (Leibniz Univ. Hannover, Germany)

Members: Heck (Technische Univ. Graz, Austria), Motzko (Technische Univ. Darmstadt, Germany), Reinisch (Doka GmbH, Austria)
Further members to be invited.

Recent Meetings:

Terms of reference

Scope

The notion of attractive concrete is subjective and varies according to the viewer. In order to have a basis for the work of TG 8.9, it is necessary to limit the requirements regarding the appearance of concrete surfaces. Because attractive concrete has been established in recent years by well-known architects as having a homogenous and smooth appearance, the work will be focused on this kind of visible concrete surfaces.

An attractive concrete surface is observed within the context of the surfaces of the whole building. The resulting impression depends considerably on the viewing distance and lighting conditions. Therefore the utilization of the building is important when evaluating a concrete surface. The realization of an attractive concrete surface is influenced by many different factors, including concrete technology, concrete formwork and formwork material, the application of a releasing agent, the method of operation on-site, logistical conditions during transportation of the concrete and concreting, as well as climatic influences and the coordination of all persons involved in the building process.

Objectives

TG 8.9 will formulate a state of the art report how attractive concrete is defined and built. The final aim is to create a generally accepted recommendation or guideline for attractive concrete with a homogenous appearance. This generally accepted recommendation or guideline will be characterized by classifying attractive concrete in different categories. The limit of its objective performance will be considered as well as the consequences on the effort on-site and the planning of structural framework.

Work programme

Phase 1 (duration: two years)

During the first work step it will be necessary to collect and evaluate test results and practical experience with attractive concrete. Out of this the influences on the appearance of a visible surface should be discussed and determined how far they can be controlled in the planning process and during the execution. The results will be summarized in a state of the art report.

Phase 2 (duration: two years)

Based on the parameters coming out of phase 1 as well as existing national regulations and recommendations, categories for attractive concrete surfaces will be developed in the second phase. These categories will result in a generally accepted recommendation or guidelines for attractive concrete with a homogenous and smooth appearance. The type of publication for these guidelines is still to be established.