



## **fib Symposium 2016**

# **Performance-based approaches for concrete structures**

*Materials technology, structural design, analytical modelling, conformity assessment and testing*

**21 – 23 November 2016, Cape Town, South Africa**

### **AIMS AND OUTLINE**

The fib symposium 2016 is intended to bring together practising engineers, scientists, specifiers, concrete technologists, researchers and others from around the world to share knowledge and experience on current developments in concrete technology and structural concrete design, with a particular focus on performance-based approaches.

The symposium will run over 3 days and feature oral presentations by authors of all accepted papers, as well as keynote addresses by leading international experts. Following the conference, workshops on selected topics will be organised, exposing delegates to practical information and hands-on experience. The event will include a tourist programme for conference delegates and accompanying persons, as well as various social functions including a conference dinner.

### **LOCAL ORGANIZING COMMITTEE**

- Prof. Hans Beushausen, University of Cape Town, co-Chair
- Prof. Billy Bosshoff, University of Stellenbosch, co-Chair
- Prof. Mark Alexander, University of Cape Town, co-Chair

### **PERFORMANCE BASED DESIGN**

Recent advances in concrete materials technology, structural system and component design, and construction technology have increased the demand for innovative design concepts for concrete structures. From a material's perspective, traditional requirements for constituent materials, limiting w/b-ratios and cement contents are often no longer applicable for modern construction and modern types of concretes. With the advancement of testing methods for fresh and hardened concrete properties, performance-based design and specification of concrete and concrete structures are approaching and already frequently applied.

Performance based approaches are based on evaluating relevant concrete material properties using relevant test methods or model predictions. In combination with, and eventually as a replacement for traditional prescriptive design methods, performance concepts offer powerful means to improve the design for concrete durability and mechanical properties.

Traditional design methods often fail to consider modern and innovative concrete technology, including high performance concrete, self-compacting concrete, light- or heavy-weight concrete, sustainable mixes with minimized cement contents, concretes for aggressive environments, etc. In these fields, performance concepts offer powerful tools for the application and development of modern concrete technology.

## **TECHNOLOGICAL BACKGROUND**

Globally, the structural engineering and concrete construction industries are facing a number of challenges that will change the way that concrete structures are designed and constructed in the future. The effects of environmental changes, global warming, and natural disasters on national infrastructures are increasingly apparent and need to be addressed urgently. In addition, many existing structures are reaching the end of their design service life or deteriorate prematurely, which results in many structures needing revised structural design, service life extension, efficient repair, strengthening and rehabilitation. Furthermore, requirements for sustainability are becoming a central and integral part in modern structural and materials design.

The above challenges need to be met with innovative technology and creative thinking. New design methods such as performance-based design and updated structural models can help to address some of these issues. Novel mix design and concrete production techniques, as well as more efficient use of available resources need to be developed and implemented. The fib Symposium 2016 intends to address these matters and showcase how modern, innovative design and technology can help creating a sustainable and durable concrete infrastructure for future generations.

South Africa is a perfect host for an event addressing the themes of the symposium. As one of the worldwide leading emerging economies, South Africa is facing significant challenges with respect to infrastructure development and provision of housing for low-income communities, representing the situation in many of the other large emerging economies around the world. Novel concrete technology and construction methods are commonly adopted from overseas, providing the grounds for international cooperation and exchange of knowledge. Additionally, South Africa has always been influenced by European structural design procedures and is expected to adapt the Eurocode in the near future. The exchange between the regional industry in Southern Africa and international leading structural engineers, researchers and concrete technologists is expected to support the efforts to channel future developments in concrete design and application towards meeting the global requirements for sustainability, durability and structural safety.

## **IMPORTANT DEADLINES**

Submission of abstracts: 31 May 2015

Notification of acceptance: 31 July 2015

Submission of full papers: 31 January 2016

Notification of paper acceptance: 31 March 2016

Early-bird registration: 31 June 2016

Final registration: 31 October 2016

## **CONFERENCE VENUE**

The conference will be held on the historic campus of the University of Cape Town, the oldest university in South Africa, which is situated on the slope of Devils Peak overlooking both the Atlantic and the Indian Ocean. State of the Art conference facilities, beautiful architecture and a breath-taking setting against the mountains make this a perfect event location for national and international delegates.

## THEMES

### Modelling and testing of concrete properties

- Constitutive modelling of concrete
- Load-dependent deformations
- Load-independent deformations
- Early deformations
- Thermal behaviour and temperature effects
- Deterioration processes
- Rheology
- Test methods for performance assessment

### Materials technology

- Modern types of concrete
- Innovative mix design
- Novel mix constituents
- Binary and ternary blended cements
- Concrete with low cement content
- Chemical admixtures
- Provisions in the fib MC2010

### Structural design aspects

- Design concepts
- Structural modelling
- Experiences with the fib MC 2010
- Adaptation of the Eurocode in South Africa

### Durability and service life

- Concrete durability aspects
- Durability test methods
- Service life design models
- Effective use of protective coatings
- Novel repair materials and techniques
- Service-life extension methods
- Case studies

### Sustainability aspects

- Mix design and efficient use of resources
- Recycled materials in concrete production
- Recycling of concrete

### Construction systems

- Concrete curing technology
- Technology for fast-track construction
- Case studies

### Model code

- Developments in constitutive models
- Provisions for performance testing in MC2010
- Experiences in the application of MC2010

## **fib – The International Federation for Structural Concrete**

The fib (Fédération internationale du béton / International Federation for Structural Concrete), formed by 43 national member groups and about 1,000 individual or corporate members, is a not-for-profit association committed to advancing the technical, economic, aesthetic and environmental performance of concrete structures worldwide. The Headquarters of the fib are located in Lausanne, Switzerland.

The objectives of fib are to develop at an international level the study of scientific and practical matters capable of advancing the technical, economic, aesthetic and environmental performance of concrete construction. These objectives are achieved, amongst others, by the stimulation of research, the synthesis of findings from research and practice, the dissemination of the results by way of publications, guidance documents and the organisation of international congresses and symposia, and the production of recommendations for the design and construction of concrete structures.

The fib Symposium is an annual event, organized by fib National Member Groups in varying locations around the globe and bringing together the local concrete industry and a large group of international concrete experts and structural engineers.

### **ACCOMMODATION AND TOURS**

Cape Town offers a vast range of hotels and guest lodges of all categories. For participants of the fib Symposium 2016 and their guests, special rates will be negotiated with a number of hotels. Delegates can decide whether they want to stay close to the conference venue or in the heart of the touristic centre of Cape Town, the V&A Waterfront. Free bus transfer between hotels and the university will be arranged.

A designated tour operator is available to assist conference delegates with all questions, bookings and problems relating to national and international travel, day trips, accommodation and car rental. Details will be provided on the conference website.