UHPFRC 2009

Final Invitation
Program - Registration

International Workshop on Ultra High Performance Fibre Reinforced Concrete
(UHPFRC)

Designing and Building with UHPFRC: State of the Art and Development

MARSEILLE (France)

November 17th and 18th, 2009

Sponsored by
The Symposium will take place in the "Hémicycle" of Urban Community Marseille Provence Métropole, located in "Les Jardins du Pharo".

**Hémicycle MPM**

**Jardins du Pharo**

**58, Boulevard Charles Livon**

**F-13007 Marseille (France)**

**ORGANIZATION COMMITTEE**

**Chairman:** Jacques RESPLENDINO

**Co-chairman:** François TOUTLEMONDE

**Members:**

- Jean-François BATOZ
- Christian CLERGUE
- Patrick GUIRAUD
- André MASCARELLI
- Christophe RAULET
- Nadget BERRAHOU
- Daniel FOISSAC
- Jocelyne JACOB
- Michel MOUSSARD
- René-Gérard SALE
- Martine BRESSO
- Bruno GODART
- Pierre MARCHAND
- Jacques PORTELATINE
- Jean-Michel TORRENTI
WELCOME TO UHPFRC 2009

The Association Française de Génie Civil (AFGC) and the fédération internationale du béton (fib) are pleased to invite you to an international Workshop on Ultra High Performance Fibre-Reinforced Concrete (UHPFRC), in Marseille on November 17th and 18th, 2009.

The Association Française de Génie Civil (AFGC) includes all actors in the field of civil engineering whether they are owners, designers, developers or researchers. The association links the world of materials to the world of structures, the world of education and research to the world of design and construction.

The AFGC has a Technical and Scientific Committee which coordinates interdisciplinary working groups in charge of the technical development of guidelines (guides on structure durability, guides on wooden structures, recommendations on self-compacting concrete, the first recommendations on UHPFRC published in 2002).

The association has close contacts with several civil engineering associations as in particular the fédération internationale du béton (fib). fib includes scientists, teachers, professionals involved in the research, design and maintenance of concrete structures. One of the association’s essential missions is to establish a model code used as a reference in the field of concrete structures.

Seven years after the publication of the AFGC – SETRA recommendations on Ultra High Performance Fibre-Reinforced Concretes (UHPFRC), the objective of the Workshop is to focus on the expertise and feedback from constructions made of UHPFRC, and to analyze development prospects.

After recalling the main characteristics and performance of these materials, the Workshop will present recent achievements in civil engineering, and building construction, in the field of both equipment and infrastructure:
- Presentation of recently completed structures in France and all over the world,
- Presentation of AFGC updated recommendations taking into account both recent discussions based on the Eurocodes and perspectives of fib 8.6 task group deliverable,
- Presentation of an outstanding project applying UHPFRC: the MuCEM which will be erected in Marseille and will have a structure made for the most part of UHPFRC.

The Symposium will provide an opportunity for all actors in construction that have been involved in UHPFRC projects to present their work.

The lectures and discussions will focus on the reasons of UHPFRC use (aesthetic, technical, structural reasons or reduction in environmental impacts), will review gained experience and will draw lessons for future work especially with respect to sustainable development issues.

On behalf of both associations and organizing committee, we wish you a great congress.

The AFGC president
Jean-Marc Tanis

The Chairman of the organization committee
Jacques Resplendino

The fib president
Michael N. Fardis
SCIENTIFIC COMMITTEE

Chairman: Jacques RESPLENDINO DIRMED, MEEDDAT France
Co-chairman: Pr Franz Josef ULM MIT USA
Co-chairman: Dr François TOULMONDE LPC France

Members:
- Bendt AARUP CRC Technology Denmark
- Pr Paul ACKER Lafarge France
- Laurent BOUTILLON VINCI France
- Pr Eugen BRUEHWILER EPFL Switzerland
- Pr Myriam CARCASSES INSA Toulouse France
- Danièle CHAUVEL EDF France
- Dr Christian CLERGUE Vicat France
- Pr Ekkehard FEHLING Univ. Kassel Germany
- Bernard FOURE CEBTP France
- Dr Hanz Rudolf GANZ VSL Switzerland
- Pr Ian GILBERT Univ. New South Wales Australia
- Dr Benjamin GRAYBEAL FHWA USA
- Pr Makoto KATAGIRI Taiheiyo Cement Corporation Japan
- Pierre MARCHAND SETRA France
- Pr Bruno MASSICOTTE Ecole polytechnique Montréal Canada
- Dr Pierre PIMIENTA CSTB France
- Pr Karl Heinz REINECK Univ. Stuttgart Germany
- Dr Pierre ROSSI LPC France
- Dr Patrick ROUGEAU CERIB France
- Pr Yasuhiro SATO Univ. Hokkaido Japan
- Pr Lutz SP AROVITZ TU-Graz Austria
- Yoshihiro TANAKA Taisei Corporation Japan
- Thierry THIBAUX Eiffage France
- Pr Joost WALRAVEN TU-Delft Netherlands

GENERAL INFORMATION

• CONFERENCE LANGUAGES
The languages of the symposium will be either English or French. Simultaneous translations into English and French will be provided.

• REGISTRATION
Registration to the UHPFRC 2009 Symposium includes attendance to the two-day conference, conference proceedings (CD-Rom and printed volume with summaries), lunches and coffee breaks.

To attend the Gala Banquet on November 17th at Saint Jean Fortress, you must fill in a specific registration form. The fees will be 40 € VAT per person (participants or accompanying persons). The registration is compulsory as places are limited. (See attached registration form). Please send the attached registration forms with payment to the Secretariat of AFGC by October 16th 2009.

For bank transfers, please specify your name and AFGC-UHPFRC 2009. Include a copy of the bank transfer with your form.

Any costs or fees for payments by bank transfer will be at the delegate’s expense.
**HOTELS**

If you wish to book one of the following hotels, you must make your own reservation.

<table>
<thead>
<tr>
<th>Name of the Hotel</th>
<th>Address and phone number</th>
<th>Website</th>
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<tr>
<td>of Marseille LePharo</td>
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<tr>
<td>3* New Hotel Vieux Port</td>
<td>3bis, rue Reine Elisabeth - 13 MARSEILLE</td>
<td><a href="http://www.new-hotel.com/VieuxPort">www.new-hotel.com/VieuxPort</a></td>
</tr>
<tr>
<td>3* Mercure Marseille Centre</td>
<td>1, rue Neuve Saint-Martin - 13 MARSEILLE</td>
<td><a href="http://www.accorhotels.com">www.accorhotels.com</a></td>
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**POSTERS PRESENTATION AND COMMERCIAL EXHIBITION**

An exhibition of posters with an opportunity to present documents, posters, samples, specimens and innovating materials, will take place in the hall near to the Hémicycle.

Contacts:
- Christophe Raulet +33 (0)4 42 12 41 30 – christophe.raulet@diades.fr
- Martine Bresso +33 (0)4 42 24 76 96 – martine.bresso@developpement-durable.gouv.fr

**OUTDOOR TECHNICAL EXHIBITION**

A technical exhibition presenting large UHPFRC prototypes from both structural and architectural applications will take place in the MuCEM greenfield located nearby Saint Jean Fortress. In particular, to be exposed:

- Six prototypes of 6 m high tree columns of the MuCEM,
- Several suitability test elements of structures recently built in UHPFRC,
- Specimens of components made by industrials and manufacturers.

Contacts:
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- Martine Bresso-Tel.: +33 (0)4 42 24 76 96 - martine.bresso@developpement-durable.gouv.fr

**ACCESS TO « JARDINS DU PHARO »**

58, Boulevard Charles Livon - 13007 - Marseille

Taxis: Taxis Radio Marseille - Tel :+33 (0)4 91 02 20 20
- Taxis Tupp Radio - Tel: +33 (0)4 91 05 80 80

Public transports and car park: see following maps
Summary of the Program

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<td><strong>POSTERS</strong></td>
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Tree racks in Marseille City Hall Square.
Architect: F. Hammoutène
8:30 am: Welcome of participants
9:30 am: Opening address
   Jacques Resplendino (BFUP 2009), Hanz Rudolf Ganz (fib), Jean-Marc Tanis (AFGC)

Opening Session
Chairman: Franz Josef Ulm
10:00 am: Introduction: what is UHPFRC?
   Jacques Resplendino
10:10 am: Science as a decisive input for modern building art: multi-scale approaches, chemistry, non-linear mechanics, topology, engineering sciences and how they interact with innovation in cement materials
   Franz Josef Ulm
10:25 am: UHPFRC: historical perspective and outstanding realizations
   Gérard Birelli

10:50 am: Discussion

2nd Session:
UHPFRC Applications: renewed architectural opportunities
Chairman: Paul Acker
11:00 am: Opportunities opened for the architect
   R. Ricciotti
11:30 am: Villa Navarra
   R. Ricciotti, P. Mazzacane
11:40 am: Bus control center at Thiais
   D. Marrec
11:50 am: UHPFRC net panels: shrinkage control in view of decorative shapes optimization
   D. Stoeux, L. Guingot, L. Jacques
12:00 am: The future roof of Jean Bouin stadium
   R. Ricciotti, G. Lamoureux, C. Thiriet, P. Revillon

12:10 am: Discussion
12:30 am: Lunch on site and Poster exhibition

3rd Session
UHPFRC Applications: Structures demonstrating the extension of present limits (part 1)
Chairman: Jean-Marc Tanis
2:00 pm: The « Devil’s footbridge »
   F. Teply, P. Mazzacane, R. Ricciotti
2: 10 pm: Gärtnerplatz- Bridge over River Fulda in Kassel - Multispan Hybrid UHPC - Steel Bridge
   E. Fehling

2: 20 pm: PS34 overpass on A51 Motorway
   O. Delauzun, L. Linger, C. Clergue, D. Rogat

2:30 pm: Innovation and Application of UHPFRC Bridges in Japan
   Y. Tanaka

2:50 pm: UHPFRC: Global Perspective from a Specialist Construction Company
   M. Rebentrost

3:05 pm: Discussion

**UHPFRC Applications: Structures demonstrating the extension of present limits (part 2)**

**Chairman: Thierry Kretz**

3:15 pm: Road Bridge WILD - UHPFRC for a Precast Arch Structure
   L. Sparowitz, M. Reichel, B. Freytag, W. Zimmerman

3:25 pm: UHPC in the U.S. Highway Transportation Infrastructure
   B. Graybeal

3:40 pm: The « ITE » UHPC girder, an economical and durable alternative to encased steel girders
   T. Thibaux, D. de Matteis, R.G. Salé

3:50 pm: Application of the « MIKTI » UHPC waffle deck concept for a bridge at Livron-Loriol
   F. Tavakoli, S. Bouteille, F. Toutlemonde

4:00 pm: UHPC-Prototype for a Flexible Modular Temporary High Speed Railway Bridge in Austria
   M. Reichel, G. Altersberger, L. Sparowitz

4:10 pm: Effective Use of UHPC for Deep Foundation Piles
   S. Sritharan, T. Vander Voort, M. Suleiman

4:20 pm: Discussion

4:30 pm: Coffee break and Poster session

**4th Session**

**UHPFRC Applications: New equipments and components for building and civil structures (part 1)**

**Chairman: Charles Baloche**

5: 00 pm: CRC – precast applications of Ultra High Performance Fibre-Reinforced Concrete
   B. Aarup

5: 15 pm: UHPFRC application for prevention of thermal bypass
   T. Burkhel, J. Daliphard, N. Ruault, M. Behloul, A. Birault

5:25 pm: A UHPFRC solution for fire-resistant technical floors
   P. Mazzacane, T. Lagrange, J.F. Batoz

5:35 pm: Sustainable Roof elements: a proposal offered by cementitious composite technology
   M. di Prisco, M. Colombo, L. Ferrara, A. Magri

5:45 pm: UHPFRC sunshades: an elegant solution for controlling thermal comfort
   J.Y. Jousselin, L. Guingot, L. Jacques
5:55 pm: Investigation of UHPFRC Slabs under Blast Loads
   C. Wu, D. Oehlers, M. Rebentrost, G. Wight

6:05 pm: Discussion

**UHPFRC Applications: New equipments and components for building and civil structures (part 2)**

**Chairman:** Thierry Thibaux

6:15 pm: Experience with prefabricated UHPFRC in the Netherlands
   S. Grünewald, R. Weyns, J. Dekkers

6:30 pm: Optimization of precast bridge paprapets made of UHPFRC
   J.P. Charron, E. Niamba, B. Massicotte

6:40 pm: Complex façade elements made of UHPFRC
   R. Suter, L. Moreillon

   V. Perry, G. Weiss

7:00 pm: Fibre-reinforced gravel-enriched white topping, a UHPFRC-type material for long-lasting pavements
   F. de Larrard

7:10 pm: Ultra-High Performance Concrete crossarms for high voltage transmission lines
   R. El-Hacha, H. Abdelazeem, I. Cariaga

7:20 pm: New Bridge Construction Deck Systems using Hybrid FRP-UHPC
   A. Elmadhy, R. El-Hacha, N. Shrive, V. Perry

7:30 pm: Discussion

**7:45 pm: Departure to MUCEM and Saint Jean Fortress**

The area around the forts is believed to have been inhabited since antiquity but it was not until the 13th Century that the Hospitallers of the Order of Saint John of Jerusalem (later the Knights of Malta) settled here and gave their name to the quarter. Some remains of their presence may still be seen. King René had the huge square tower erected following the attack by the armies of Aragon in 1423. It was built where the Maubert tower had stood and was used to protect the entrance to the port. The navigation light-tower was built in 1644 and the Chevalier de Clerville built the fort as part of Louis XIV’s instructions that formed the large-scale plans for Marseille. He had a flood-proof pit dug to isolate the fort from the city. The fort was used as a garrison and later as a prison during the Revolution. During the Second World War the German army used the fort as an ammunition store. In 1944 the store exploded causing major damage to the fort itself and to the Pont Transbordeur. The fort became a National Heritage Site in 1964.
8:00 pm to 9:00 pm
Night visit in the MuCEM with an outdoor exhibition of prototypes made with UHPFRC.

9:00 pm to 11:00 pm: Gala Banquet at Saint Jean Fortress
Wednesday, November 18th

5th Session

UHPFRC for extending the lifespan of structures
Chairman: Bruno Godart
8:00 am: Composite UHPFRC-Concrete construction for more durable structures
   E. Denarié, E. Brühwiler
8:10 am: Seismic retrofitting of bridge piers with UHPFRC jackets
   B. Massicotte, G. Boucher-Proulx
8:20 am: Application of ultra-high-strength fiber reinforced concrete for irrigation channel repair works
   T. Ono
8:30 am: UHPFRC application in structural strengthening of buildings and civil structures
   T. Thibaux
8:50 am: Discussion

Active topics in UHPFRC Research and Development
Chairman: Joost Walraven
9:00 am: Early-age Creep and Shrinkage Behavior of UHPC under Variable Curing Regimes
   T.M. Ahlborn, E.M. Nyland, C.G. Gilbertson
9:10 am: Ultra High Performance Concrete for prestressed elements: Interest of creep prediction
   P. Francisco, F. Benboudjema, P. Rougeau, J.M. Torrenti
9:20 am: Rheology and casting of cementitious fibre reinforced fibre materials: from isotropy to anisotropy
   N. Roussel, L. Martini, Pierre Rossi
9:30 am: Discussion

Field experience and recent advances in UHPFRC knowledge
Chairman: Pierre Rossi
9:40 am: Field experience from UHPFRC beams within an air cooling tower: In-situ strength and durability parameters evolution
   F. Toutlemonde, M. Carcasses, M. Lion
9:50 am: Behaviour of the UHPFRC at High Temperatures
   P. Pimienta, J.C. Mindeguia, A. Simon
10:00 am: An overview of research advances from 2002 to 2008 concerning UHPFRC, in view of updating AFGC Recommendations
   F. Toutlemonde, F.J. Ulm, B. Fouré, M. Carcasses, P. Marchand, J. Resplendino
10:20 am: Discussion

10:30 am: Coffee break and Poster session
6th Session
Technical recommendations, codes and standards
Chairman: Hanz Rudolf Ganz
11:00 am: Updated AFGC recommendations
  J. Resplendino
11:10 am: fib recommendations in progress
  J. Walraven
11:20 am: Updated AFGC recommendations: chapter « Materials »
  A. Simon
11:35 am: Updated AFGC recommendations: chapter « Structural design »
  P. Marchand
11:55 am: Updated AFGC recommendations: chapter « Durability »
  M. Carcasses
12:10 am: Discussion

UHPFRC and sustainable construction
Chairman: Christian Cremona
12:20 am: Available data: an overview
  P. Marchand
12:30 am: An example of recycling possibilities
  T. Sedran, C. Durand, F. de Larrard
12:40 am: An example of UHPFRC environmental footprint in terms of CO₂ and power consumption
  J.F. Batoz
12:50 am: Discussion

1:00 pm: Lunch on site and Poster exhibition

7th Session: The MuCEM Project
Chairman: Jean-Claude Dumont
2:30 pm: Presentation, from the owner's point of view
  A Bies
2:45 pm: Design
  R. Ricciotti, J. Portelatine
3:25 pm: Tests on prototype specimens
  P. Rivillon
3:50 pm: Discussion

Closing Session
4:00 pm: Synthesis of the contributions
  Using UHPFRC for design and building: gained knowledge and perspectives for research needs, design trends and improvement of construction techniques for sustainable UHPFRC construction
  Jacques Resplendino, François Toutlemonde
4:15 pm: Farewell address
  Awards
  Jean-Marc Tanis
SCIENTIFIC CONTRIBUTIONS PRESENTED AS POSTERS

A Study of UHPFRC for the Application in Curtain Walls
C. Everett, G. Wight, M. Rebentrost

Repair of concrete structures using high performance fiber-reinforced concrete
M. Skazlic

Structural Applications utilizing Hybrid Fiber Reinforced Composites
C.P. Ostertag

Ant colony optimisation for UHPC performance concrete structures
M. Flint, S. Grünewald, J. Coenders

Sustainability aspects of traffic bridges made from UHPFRC - State-of-the-art and challenges for concrete technology
T. Stengel

Investigation of Biaxial Stress States of Ultra-High Performance Concrete Bridge Girders through Small Panel Testing and Finite Element Analysis
K.C. d’Alessandro, C.L. Roberts-Wollmann, T.E. Cousins, E.D. Sotelino

«UHPFRC net panels» in Chartres - Photo Eiffage
PROGRAM OF THE ACCOMPANYING PERSONS

November 17\textsuperscript{th} (Tuesday)

Visit 1: 10:00 am to 12:00 am: Around the Old Port

Marseille can claim 2,600 years of existence and therefore qualifies as France’s oldest city. In 600 B.C., Greeks from Phocaea (in present-day Turkey) arrived in the Lacydon creek which was then inhabited by people belonging to the Ligurian branch of the Celts. According to legend, Massalia (as the Greeks named Marseille) was the result of a love story, that of Protis the Greek and Gyptis, daughter of the Ligurian chieftain. She rejected princes and fortune-hunters and chose the handsome adventurer.

Visit 2: 2:30 pm to 5:30 pm: The Cabanons’ path

Vallon des Auffres, Malmousque, Pointe Rouge, Callelongue.

November 18\textsuperscript{th} (Wednesday)

Visit 3: 9:30 am to 12:30 am: The Panier district and its artisans

Walking by the Old Port of Marseille, you will be in the heart of the City, from the Town Hall to the Hotel-Dieu, going through the Montée des Accoules and the Vieille Charité and also going off the Panier district. Many artisans display their skills, a way to open up to the future.

Visit 4: 2:30 pm to 4:30 pm: Notre-Dame de la Garde

Tradition has it, but there is no proof, that the look-out post exists since prehistorical times and more probably since the Roman era. In the 15th century decree of Charles II d’Anjou enumerates the Garde hill in the lists of relays.

Buses provide the transfers during the visits; a bilingual English-French guide will also be provided for each visit. The accompanying persons will have lunch with the participants at the Pharo.

The registration fees for the four visits are 140 € including VAT per person; the fees include the guided visits, transfers and lunches.

The organization committee reserves the right to change or cancel the sightseeing tours if the minimum number of visitors is not reached.
UHPFRC 2009

VENUE
Hémicycle MPM – Jardins du Pharo
58, Boulevard Charles Livon – F-13007 Marseille (France)

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François Toutlemonde - Tel.: +33 (0)1 40 43 53 97
E-mail: francois.toutlemonde@lcpc.fr

Posters Presentation and Commercial Exhibition
Contacts :
Christophe Raulet- Tel.: +33 (0)4 42 12 41 30 - christophe.raulet@diades.fr
Martine Bresso- Tel.: +33 (0)4 42 24 76 96 - martine.bresso@developpement-durable.gouv.fr

Outdoor Technical Exhibition
Contacts :
Patrick Guiraud-Tel.: +33 (0)1 55 23 01 08 - p.guiraud@cimbeton.net
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