UHPFRC 2013

2nd International Symposium on Ultra-High Performance Fibre-Reinforced Concrete (UHPFRC)

Designing and Building with UHPFRC: from innovation to large scale realizations

FINAL PROGRAM

October 1 - 3, 2013

MuCEM - Marseille (FRANCE)

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Presentation of the AFGC and the co-organizing institutions

The Association Française de Génie Civil (AFGC) is **an ideal place** for everyone involved in civil engineering (**engineers or technicians, architects, academics or students)** to meet and exchange ideas. The Association's aim is to link the world of materials to the world of structures, the world of education and research to the world of designing and building and to make the profession of Civil Engineering more appealing to young people. The founder members of the **AFGC** are the French Ministry of Public Works, professional construction and materials federations, and major public-sector and private-sector infrastructure developers. It currently has more than one thousand members (individual or group memberships). Through close contacts with the **IABSE** (International Association for Bridges and Structural Engineering), **RILEM** (International Union of Laboratories and Experts in Construction Materials, Systems and Structures), ***fib*** (International Federation for Structural Concrete) and the **ACI** (American Concrete Institute), the **AFGC** provides invaluable links between French civil-engineering research and practice and the international scientific community. The Association is a network through which French engineers and researchers working abroad can keep up with French know how. Its ambition is to promote French engineering throughout the world. Being decentralized, the **AFGC** enables members to easily benefit from activities organized by its **regional delegations**.

The **International Federation for Structural Concrete** (*fib* - fédération internationale du béton) is a non-profit organisation created in 1998 from the merger of the Euro-International Concrete Committee (CEB - Comité Euro-International du Béton) and the International Federation for Prestressing (FIP - Fédération Internationale de la Précontrainte). The parent organisations CEB and FIP existed independently since 1952. The objectives of *fib* as given in the statutes 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 shall be achieved 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, the production of recommendations for the design and construction of concrete structures, the information of members on the latest developments. The objectives shall be pursued in conjunction with the existing international technical associations and regional standardisation organisations.

RILEM, **The International Union of Laboratories and Experts in Construction Materials**, Systems and Structures, is a non profit-making, non-governmental scientific association founded in France in 1947, whose vocation is to contribute to progress in the construction sciences, techniques and industries. RILEM members include the leading building research and testing laboratories around the world with interests in industrial research, manufacturing and contracting, as well as a significant number of individual members from universities and industry. RILEM's focus is on construction materials and their use in building and civil engineering structures, covering all phases of the building process from manufacture to use and recycling of materials. RILEM meets these objectives through the work of its technical committees. Symposia, workshops and seminars are organised to facilitate the exchange of information and dissemination of knowledge.

RILEM publishes the journal *Materials and Structures*, the flagship of the association, which a unique international and interdisciplinary forum for new research findings on the performance of construction materials. The journal is dedicated to the publication of high quality reviewed papers examining the fundamental properties of building materials, their characterization and processing techniques, modeling, standardization of test methods, and the application of research results in building and civil engineering.

Many other publications, in the form of reports and proceedings, are produced and published on the website www.rilem.net for free.

Welcome to Marseille for UHPFRC 2013

"UHPFRC" international symposium was first organized in Marseille (France) in 2009 for synthesizing the know-how and applications related to Ultra-High Performance Fibre-Reinforced Concrete (UHPFRC). Four years later, projects and constructions using UHPFRC have definitively gained a growing importance in Europe and North America, as well as in Australia, Far East, and especially Japan.

"UHPFRC 2013" thus aims at updating and complementing experience gained in the knowledge and use of UHPFRC, based on recent practice: design of building structures, components, civil works and bridges; industrial realizations (both on site and in precast factories); and large-scale applications. More than eighty presentations detail the technical and scientific advances, focusing on major recent realizations; decisive use of UHPFRC in structural retrofitting and combination of UHPFRC with ordinary RC; durability and resistance of UHPFRC under severe on-site or laboratory conditions; prospective applications of UHPFRC in current or outstanding works; recent advances in UHPFRC structures design and ductility assessment; and recent results of constitutive characterization and mix optimization of UHPFRC.

In 2013, Marseille, recognized as European capital of culture, has renewed its urban figure and shoreline with iconic architectural achievements. Among them, the Museum of European and Mediterranean Civilizations (MuCEM) constitutes an outstanding realization due to the systematic structural and decorative use of UHPFRC. The MUCEM, in hosting the venue of UHPFRC 2013 symposium, appears as a symbol of technical breakthrough and creativity for the worldwide engineering community.

On behalf of UHPFRC 2013 organizing and scientific committee, we are pleased and honoured to warmly welcome you to MuCEM in Marseille, France, for this AFGC-*fib*-RILEM international symposium, and wish you a pleasant stay in the oldest French town and a fruitful attendance to a reference event for creative building technology with UHPFRC.

Jacques Resplendino
Chairman of UHPFRC organizing committee

François Toutlemonde
Chairman of UHPFRC scientific committee

MuCEM in Marseille Harbour - ® Médiathèque Lafarge - Charles Plumey-Faye - Rudy Ricciotti (Architect)

Technical Program UHPFRC 2013

Tuesday October 1st	Wednesday October 2nd	Thursday October 3rd
	Amphitheater Chairman E Brühwiler *Structural analysis and shear resistance of UHPFRC members* Hall S Grünewald *Rebars anchorage and flexural behaviour and design* **8h30 – 10h00**	Amphitheater Chairman J Niwa *UHPFRC projects for buildings, large structures and components* **8h30 – 10h00**
	*Coffee Break **10h00 – 10h30***	*Coffee Break **10h00 – 10h30***
Registration **Welcome coffee** **11h30 – 14h00**	Amphitheater Chairman B Graybeal *UHPFRC applications in structures retrofitting* **10h30 – 12h00**	Amphitheater Chairman F Toutlemonde *Composite UHPFRC - regular concrete solutions* **10h30 – 12h00**
	Lunch Break (buffet) ***12h00 – 13h15***	*Lunch Break (buffet)* ***12h00 – 13h15***
Plenary Opening session Amphitheater Chairman G Balasz Welcome addresses *UHPFRC in 2013: achievements all over the world* **14h00 – 15h30**	Amphitheater Chairman N Roussel *Feedback from existing UHPFRC structures and durability performance* **13h15 – 14h45**	Amphitheater Chairman B Massicotte *UHPFRC projects and realizations for bridges* **13h15 – 14h45**
*Coffee Break **15h30 – 16h00***	*Break **14h45 – 15h00***	*Break **14h45 – 15h00***
Amphitheater Chairman A Muttoni *UHPFRC projects for civil structures and facilities* Hall Chairman M Schmidt *UHPFRC resistance at high temperature and material optimization* **16h00 – 17h30**	Amphitheater Chairman J Resplendino *Some major recently built UHPFRC achievements* **15h00 – 16h15**	Amphitheater Chairman F Dehn *UHPFRC future and unexpected prospective applications* **15h – 16h15** **Closure** **16h15 – 16h30**
*Coffee Break **17h30 – 18h00***	*Coffee Break **16h15 –16h45***	
-Amphitheater Chairman S Foster *Fibre contribution to UHPFRC tensile post-cracking capacity and related modelling* Hall Chairman BS Kim *UHPFRC optimized mix-design and associated properties* **18h00 – 19h30**	Amphitheater Chairman JM Tanis Plenary special session MuCEM **16h45 – 17h45**	
	Visit of the MuCEM and Banquet	

UHPFRC 2013 - Final Program

Tuesday, October 1st, 2013

Registration desk open from 11h30
Free time for lunch

14h00 - 15h30
Plenary Opening Session - Amphitheater

14h00 Welcome address - **Bruno Suzzarelli** MuCEM director
14h05 Opening address from AFGC - **Jean-Marc Tanis**
14h15 Encouragement address from RILEM - **Nicolas Roussel**
14h20 Encouragement address from fib - **György Balazs**

Chairman György Balazs

UHPFRC in 2013: achievements all over the world

14h25 The UHPFRC revolution in structural design and construction
La révolution des BFUP dans la conception et la réalisation des ouvrages
***Jacques RESPLENDINO**, François TOUTLEMONDE*

14h45 Innovative UFC structures in Japan
Nouvelles structures en BFUP au Japon
***Hiroyuki MUSHA**, Hikari OHKUMA, Takeshi KITAMURA*

15h00 Fifteen years of UHPC construction experience in precast bridges in North America
Quinze ans d'expérience en Amérique du Nord dans la construction en BFUP de ponts préfabriqués
***Vic H. PERRY**, Peter J. SEIBERT*

15h15 Rationalization of complex UHPFRC façade shapes
Concevoir des façades de géométrie complexe en BFUP
***Raphaël FABBRI**, Dominique CORVEZ*

15h30 - 16h00 coffee break

16h00 - 17h30
Parallel Technical Session - Amphitheater
Chairman Aurelio Muttoni

UHPFRC projects for civil structures and facilities

16h00 Conceptual design of an UHPFRC tower structure in segmental construction for offshore wind turbines
Avant projet de mât d'éolienne off-shore constitué de voussoirs BFUP assemblés
*Werner SOBEK, **Markus PLANK**, Björn FRETTLÖHR, Jochen RÖHM, Dominique CORVEZ*

16h15 Design of tall wind turbine towers utilizing UHPC
Conception de hauts mâts d'éoliennes en BFUP
***Sri SRITHARAN**, Grant M. SCHMITZ*

16h30 Design of offshore wind turbines with UHPC
Conception d'éoliennes off-shore en BFUP
*François-Xavier JAMMES, Xavier CESPEDES, Jacques RESPLENDINO, paper presented by **Luciano TOSINI***

16h45 Production of precast UHPFRC pavement cover plates in high-speed railway construction
Production de plaques préfabriquées couvre-tranchées en BFUP pour voie ferrée à grande vitesse
***Chunping GU**, Sujing ZHAO, Wei SUN, Qiannan WANG*

17h00 UHPFRC anchor plates and first application for strengthening a Rhine lock
Plaques d'ancrage en BFUP : première application pour le renforcement d'une écluse du Rhin
***Sebastian HOCK**, Hermann WEIHER*

17h15 Grooved fibre-reinforced ultra-high performance concrete: a new material for pavement long-lasting wearing courses
BFUP rainuré : un matériau nouveau pour des revêtements routiers de longue durée
***François DE LARRARD**, Thierry SEDRAN, Jean-François PETIT, Jean-Claude BLANCHARD, Pierre-Yves AUFFRET, Sylvain CHARLICART, Philippe PATILLOT, Matthieu DUVAL, Richard BLASZCZYK, Guy LEMONNIER*

17h30 - 18h00 coffee break

16h00 - 17h30
Parallel Technical Session - Hall
Chairman Michael Schmidt

UHPFRC resistance at high temperature and material optimization

16h00 Load-induced thermal strains in ultra-high performance concrete at elevated temperature
Fluage thermique transitoire du béton à ultra-hautes performances à haute température
Sriskandarajah SANCHAYAN, ***Stephen J. FOSTER***

16h15 Influence of the nature of the synthetic incorporated fibres in UHPFRC when subjected to fire conditions
Influence de la nature des fibres synthétiques incorporées au BFUP sur son comportement en cas d'incendie
Evariste OUEDRAOGO*, Yann MALECOT, Ludovic MISSEMER, Christian CLERGUE, Damien ROGAT*

16h30 Assessment of coupled thermo-mechanical behaviour of ultra-high performance concrete columns in case of fire
Vérification du comportement thermo-mécanique couplé de poteaux en BFUP en cas d'incendie
Matthias SIEMON*, Dietmar HOSSER*

16h45 UHPFRC reinforced with stainless steel fibres: from material optimization to structural component response
BFUP avec fibres inox : optimisation du matériau et réponse structurelle
Dominique CORVEZ*, Emmanuel FERRIER, Laurent MICHEL, Abdelkrim AMMOUCHE, Jean-Pierre COMMENE*

17h00 Can vacuum mixing replace heat curing in UHPFRC?
Le malaxage sous vide peut-il remplacer le traitement de cure thermique des BFUP ?
Jeroen DILS*, Veerle BOEL, Geert DE SCHUTTER*

17h15 Determination of conversion factors for compressive strength of UHPC measured on specimens of different dimensions
Détermination de facteurs de conversion de la résistance en compression du BFUP mesurée sur éprouvettes de taille différente
Josef FLADR, Iva BROUKALOVÁ, ***Petr BILY***

17h30 - 18h00 coffee break

18h00 - 19h30
Parallel Technical Session - Amphitheater
Chairman Stephen Foster

Fibre contribution to UHPFRC tensile post-cracking capacity and related modelling

18h00 Feedback of a ten years assessment of fibre distribution using K factor concept
Retour d'expérience sur une décennie d'évaluation de la distribution des fibres grâce au coefficient K
***Alain SIMON, Dominique CORVEZ**, Pierre MARCHAND*

18h15 Identification of UHPFRC tensile behaviour: methodology based on bending tests
Une méthodologie basée sur l'essai de flexion pour identifier le comportement en traction du BFUP
***Florent BABY**, Benjamin A. GRAYBEAL, Pierre MARCHAND, François TOUTLEMONDE*

18h30 Explicit back analysis method for quick determination of direct tensile strength in plate structural members
Méthode explicite d'analyse inverse pour une détermination rapide de la résistance en traction directe dans les plaques et éléments structurels minces
***Gilles CHANVILLARD**, Dominique CORVEZ*

18h45 Numerical modeling of UHPFRC mechanical behavior based on fiber orientation
Modélisation numérique du comportement du BFUP basée sur la prise en compte de l'orientation des fibres
*Sébastien DELSOL, **Jean-Philippe CHARRON***

19h00 Theoretical model for size and shape effect of UHPFRC in flexural tension considering tensile behaviour influenced by fibre orientation
Modélisation de l'effet d'échelle et de structure sur le BFUP fléchi prenant en compte l'influence de l'orientation des fibres sur le comportement en traction
Björn FRETTLÖHR

19h15 Analysis of a UHPFRC footbridge with a deck slab under bending by a novel fracture-micromechanics FEM model
Analyse d'une passerelle en BFUP avec flexion du hourdis grâce à un nouveau modèle micromécanique aux éléments finis
***Thomas GUENET**, Luca SORELLI, Dominique CORVEZ, Josée BASTIEN, François TOUTLEMONDE, Emmanuel FERRIER, Laurent MICHEL*

18h00 - 19h30
Parallel Technical Session - Hall
Chairman Byung Suk Kim

UHPFRC optimized mix-design and associated properties

18h00 Microstructural and performance-based criteria for UHPC with improved durability - Outcome of a coordinated research program in Germany
Microstructure et indicateurs performantiels pour des bétons à ultra-hautes performances (BUHP) de durabilité optimisée : résultats d'un programme national de recherche en Allemagne
Michael SCHMIDT

18h15 Flexural behaviour of UHPC beams reinforced with organic fibres and steel bars
Comportement en flexion de poutres en BUHP armé de fibres organiques et de barres d'acier
***Svatopluk DOBRUSKY**, Philippe LUSSOU, Gilles CHANVILLARD, Fabien PEREZ, Dominique CORVEZ*

18h30 Assessment of flexural behaviour of high-strength concrete reinforced with rebars and steel fibres
Evaluation du comportement en flexion du BHP armé et fibré
*Torsten MÜLLER, Hubertus KIESLICH, **Klaus HOLSCHEMACHER***

18h45 Mechanical properties of ultra-high performance hybrid fiber-reinforced cement-based composites
Propriétés mécaniques de BFUP à renfort fibré hybride
***Sukmin KWON**, Tomoya NISHIWAKI, Takatune KIKUTA, Hirozo MIHASHI*

19h00 Simulation of hydration processes and microstructure development of UHPFRC paste containing fly ash and silica fume
Simulation des processus d'hydratation et du développement de la microstructure de la pâte des BFUP comprenant des cendres volantes et de la fumée de silice
***Chunping GU**, Guang YE, Wei SUN*

19h15 Effects of the composing materials on the rheological and mechanical properties of ultra high performance concrete (UHPC)
Effet des constituants sur les propriétés rhéologiques et mécaniques du BFUP
***Kyung-Taek KOH**, Gum-Sung RYU, Jung-Jun PARK, Ki-Hong AN, Sun-Wook KIM,, Su-Tae KANG*

Wednesday, October 2nd, 2013

8h30 - 10h00
Parallel Technical Session - Amphitheater
Chairman Eugen Brühwiler

Structural analysis and shear resistance of UHPFRC members

8h30 Flexural and shear behaviour of structural elements in UHPFRC
Comportement en flexion et à l'effort tranchant d'éléments de structure en BFUP
***Joanna NSEIR, Lionel MOREILLON**, René SUTER*

8h45 Exploitation of test results to validate some formulas in the revised French recommendations for UHPFRC
Exploitation de résultats d'essais pour valider certaines formules des recommandations françaises révisées sur les BFUP
Bernard FOURE

9h00 Dowel action and shear strength contribution of high strength rebar embedded in UHPFRC
Effet de goujon et contribution à la résistance à l'effort tranchant d'armatures de haute résistance dans du BFUP
*Yulin XIAO, **Jun XIA**, Kevin MACKIE, Amir MIRMIRAN*

9h15 Punching shear resistance of UHPFRC slabs: Experimental works and design model
Résistance au poinçonnement de dalles en BFUP : expérimentations et modélisation
***Lionel MOREILLON**, René SUTER, Robert LE ROY*

9h30 Experimental investigation of pull-out response of composite connection made of UHPFRC material
Comportement expérimental à l'arrachement de connexions mixtes acier-BFUP
***Sadegh KAZEMI**, Roger CHENG*

9h45 Experiments and analysis of size and shape effect of UHPFRC subjected to axial and flexural tension
Etude expérimentale et théorique des effets d'échelle et de structure sur éléments de BFUP soumis à traction directe et par flexion
***Björn FRETTLÖHR**, Karl-Heinz REINECK, Hans-Wolf REINHARDT*

10h00 - 10h30 coffee break

8h30 - 10h00
Parallel Technical Session - Hall
Chairman Steffen Grünewald

Rebars anchorage and flexural behaviour and design

8h30 Characterization of rebars anchorage in UHPC
Caractérisation de l'ancrage des armatures dans le BFUP
***Ekkehard FEHLING**, Paul LORENZ*

8h45 Recent experimental investigations on reinforced UHPFRC for applications in earthquake engineering and retrofitting
Recherches expérimentales récentes sur les BFUP armés pour application en conception et réhabilitation parasismique
***François TOUTLEMONDE**, Alain SIMON, Philippe RIVILLON, Pierre MARCHAND, Florent BABY, Marc QUIERTANT, Aghiad KHADOUR, Julien CORDIER, Thomas BATTESTI*

9h00 Experimental investigation on UHP(FR)C beams with high strength reinforcement
Etude expérimentale de poutres en BFUP armées de barres de haute résistance
***Norbert RANDL**, Csaba SIMON, Tamás MESZÖLY*

9h15 Case study: tests on two UHPC I-girders and analysis of flexural behaviour
Etude de cas : essai de 2 poutrelles en I précontraintes en BFUP et analyse du comportement en flexion
*Niki CAUBERG, Claudia TRONCI, **Julie PIERARD**, Petra VAN ITTERBEECK, Pieter VAN DER ZEE*

9h30 A simple design approach for UHPFRC in bending
Une approche simplifiée pour le calcul du BFUP en flexion
***Torsten LEUTBECHER**, Ekkehard FEHLING*

9h45 Static and dynamic behaviour of hybrid panels and beams made of UHPFRC, wood and fiber reinforced polymer bars
Comportement statique et dynamique de dalles et poutres mixtes faites de BFUP, bois et armatures composites
***Emmanuel FERRIER**, Laurent MICHEL*

10h00 - 10h30 coffee break

10h30 - 12h00
Plenary Technical Session - Amphitheater
Chairman Benjamin Graybeal

UHPFRC applications in structures retrofitting

10h30 Performance of UHPFRC jackets for the seismic strengthening of bridge piers
Capacité de chemisages en BFUP pour le renforcement sismique de piles de pont
***Bruno MASSICOTTE**, Marc-André DAGENAIS, Fabien LAGIER*

10h45 Experimental and analytical investigation on failure behavior of steel plate – UHPFRC composite beams
Etude expérimentale et analytique du comportement à rupture de sections mixtes fléchies tôle d'acier – BFUP
***Yasuhiko SATO**, Ryosuke SHIONAGA, Yoshihiko NAKAMURA*

11h00 Using UHPFRC as a topping layer for orthotropic bridge decks: prototype validation
Emploi du BFUP en revêtement de tablier de pont à dalle orthotrope : validation sur prototype
*François TOUTLEMONDE, **Pierre MARCHAND**, Fernanda GOMES, Lamine DIENG*

11h15 Innovative solution for strengthening orthotropic decks using UHPFRC: The Illzach Bridge
Une solution innovante pour renforcer les tabliers orthotropes à l'aide de BFUP : le pont d'Illzach
*Ziad HAJAR, **Marco NOVARIN**, Claude SERVANT, Grégory GENEREUX, Davy PRZYBYLA, Daniel BITAR*

11h30 Rehabilitation and strengthening of existing RC structures with UHPFRC: various applications
Réhabilitation et renforcement de structures existantes en béton armé au moyen de BFUP : applications diverses
***Lionel MOREILLON**, Philippe MENETREY*

11h45 Strengthening of hydraulic structures with UHPC
Renforcement d'ouvrages hydrauliques à l'aide de BFUP
***Louis GUINGOT**, Djamel DEKHIL, Pierre SOULIER*

12h00 - 13h15 lunch break

13h15 - 14h45
Plenary Technical Session - Amphitheater
Chairman Nicolas Roussel

Feedback from existing UHPFRC structures and durability performance

13h15 Durability study of the first PC bridge constructed with ultra high strength fiber reinforced concrete in Japan
Etude de la durabilité du premier pont précontraint construit en BFUP au Japon
***Katsuya KONO**, Hiroyuki MUSHA, Tetsuo KAWAGUCHI, Akira ERIGUCHI, Satoshi TANAKA, Tadashi KOBAYASHI, Masayuki IKEDA*

13h30 Long term carbonation of UHPC
Carbonatation à long terme des BFUP
*Carmen ANDRADE, Julio E. TORRES-MARTIN, paper presented by **Jean-Michel TORRENTI***

13h45 Tension-softening behavior and chloride ion diffusivity of cracked ultra high strength fiber reinforced concrete
Comportement adoucissant et diffusivité des ions chlorures dans le BFUP fissuré
***Katsufumi HASHIMOTO**, Takashi TOYODA, Hiroshi YOKOTA, Katsuya KONO, Tetsuo KAWAGUCHI*

14h00 Long-term material performance checked on world's oldest UHPFRC road bridges at Bourg-lès-Valence
Performances à long terme du matériau d'après les plus anciens ponts routiers en BFUP de Bourg-lès-Valence
***François TOUTLEMONDE**, Pierre ROENELLE, Ziad HAJAR, Alain SIMON, Romain LAPEYRERE, Renaud-Pierre MARTIN, Sandrine RAMANICH, Lénaïc BARON*

14h15 Durability evaluation of different types of UHPC
Evaluation de la durabilité de différents types de BFUP
***Julie PIERARD**, Bram DOOMS, Niki CAUBERG*

14h30 Durability, low and high temperature behavior of ultra-high performance fibre reinforced concrete
Durabilité et comportement du BFUP à haute et basse température
***Emmanuel FERRIER**, Laurent MICHEL, Dominique CORVEZ*

14h45 - 15h00 break

15h00 - 16h15
Plenary Technical Session - Amphitheater
Chairman Jacques Resplendino

Some major recently built UHPFRC achievements

15h00 A UHPFRC cladding challenge: the Fondation Louis Vuitton pour la création "Iceberg"
Le défi du revêtement de façade en BFUP de la Fondation Louis Vuitton
*Simon AUBRY, **Philippe BOMPAS**, Bernard VAUDEVILLE, **Dominique CORVEZ**, Thibault LAGRANGE, Patrick MAZZACANE, Annabelle BRIZOU*

15h15 Precast thin UHPFRC curved shells in a waste water treatment plant
Fines coques courbes préfabriquées en BFUP dans une usine de traitement d'eaux usées
*Gérard DELPLACE, Ziad HAJAR, **Alain SIMON**, Sandrine CHANUT, Luc WEIZMANN*

15h30 Roofing of the Jean Bouin Stadium in UHPFRC
La couverture en BFUP du stade Jean Bouin
*Patrick MAZZACANE, Romain RICCIOTTI, **Guillaume LAMOUREUX**, **Dominique CORVEZ***

15h45 A new roof for the Olympic Museum at Lausanne, Switzerland
Une nouvelle toiture pour le Musée Olympique à Lausanne (Suisse)
***Aurelio MUTTONI**, Ueli BRAUEN, Jean-Luc JAQUIER, Dominique MOULLET*

16h00 Construction of the U-shaped truss footbridge over the Ovejas ravine in Alicante
Construction de la passerelle triangulée en U sur le ravin Ovejas à Alicante
*Juan Angel LOPEZ, **Pedro SERNA**, Juan NAVARRO-GREGORI, Esteban CAMACHO*

16h15 - 16h45 coffee break

16h45 - 17h45
Plenary Special Session « MuCEM »- Amphitheater
Chairman Jean-Marc Tanis

16h45 MuCEM: the ambition and expectations of the owner and operator
MuCEM : programme et attentes de la maîtrise d'ouvrage
Jean-Pierre DUFAY, Gérard GAZON

16h55 MuCEM: the architect's project
MuCEM : le projet de l'architecte
Rudy RICCIOTTI, Reichert TILMAN

17h10 MuCEM: from design to supervision of the execution
MuCEM : de la conception à la maîtrise d'œuvre d'exécution
Jacques PORTELATINE

17h20 MUCEM: the builders' perspective
Le MUCEM: point de vue des constructeurs
Patrick MAZZACANE, ***Romain RICCIOTTI, François TEPLY****, Eric TOLLINI,* ***Dominique CORVEZ***

17h45 - 19h00 guided tour of the MuCEM (structural and architectural achievements)

20h00 - 22h30 banquet

Photo J. Portelatine

Thursday, October 3rd, 2013

8h30 - 10h00
Plenary Technical Session - Amphitheater
Chairman Junichiro Niwa

UHPFRC projects for buildings, large structures and components

8h30 UHPFRC in large span shell structures
Le BFUP dans des structures de voûtes et coques de grande portée
*Richard N. TER MATEN, **Steffen GRÜNEWALD**, Joost C. WALRAVEN*

8h45 CFRP tendons in UHPFRC – Bond behaviour and applications to folded and curved shells
Câbles composites à fibres de carbone dans du BFUP – Adhérence et application dans des coques courbes ou repliées
***Alexander STARK**, Josef HEGGER*

9h00 Fundamental study on construction systems for complete reuse using UHPFRC blocks
Etude d'un nouveau système constructif à partir de composants BFUP réutilisables
***Hiroshi ITO**, Tomoya NISHIWAKI, Sukmin KWON, Takatune KIKUTA*

9h15 UHPFRC cladding for the Qatar National Museum
Bardage en BFUP pour le Musée National du Qatar
Philippe MENETREY

9h30 Construction of two precast power units in UHPFRC
Construction de deux unités de recharge électrique préfabriquées en BFUP
***Bernd DOMER**, Michel NOVERRAZ, Claude ZUBER*

9h45 An assessment of the steel fibre distribution to load bearing capacity of lost shuttering slabs made from UHPFRC
Evaluation de la distribution des fibres en vue de la capacité portante de prédalles en BFUP
***Milan RYDVAL**, Jiri KOLISKO, Miroslav VOKAC, Petr HUNKA*

10h00 - 10h30 coffee break

10h30 - 12h00
Plenary Technical Session - Amphitheater
Chairman François Toutlemonde

Composite UHPFRC - regular concrete solutions

10h30 Fatigue behaviour of composite R-UHPFRC – RC structural members
Comportement en fatigue de poutres mixtes béton armé ordinaire – BFUP armé
***Tohru MAKITA**, Eugen BRÜHWILER*

10h45 Analytical modelling of R-UHPFRC – RC composite members subjected to combined bending and shear
Calcul de poutres mixtes béton armé – BFUP armé sous sollicitations combinées de flexion et d'effort tranchant
***Maléna BASTIEN-MASSE,** Eugen BRÜHWILER, Tohru MAKITA*

11h00 Experimental investigation on shear behavior of RC beams using UFC U-shaped permanent formwork
Etude expérimentale du comportement à l'effort tranchant de poutres en béton armé coulées dans des augets en BFUP servant de coffrages perdus
***Puvanai WIROJJANAPIROM**, Koji MATSUMOTO, Katsuya KONO, Junichiro NIWA*

11h15 Formwork development using UHPFRC
Développement de coffrages perdus en BFUP
***Sung-Gul HONG**, Sung-Hoon KANG*

11h30 Uniaxial compressive strength of durable hybrid pier with UHPCC permanent form
Résistance en compression simple de pieu hybride durable avec coffrage perdu en BFUP
***WU Xiangguo**, YU Qun, ZHAO Xinyu, ZHENG Wenzhong, HAN Sangmook*

11h45 Innovative UHPC-normal concrete composite bridge deck
Tablier de pont innovant combinant béton ordinaire et BFUP
*Sriram AALETI, **Sri SRITHARAN**, Ahmad ABU-HAWASH*

12h00 - 13h15 lunch break

13h15 - 14h45
Plenary Technical Session - Amphitheater
Chairman Bruno Massicotte

UHPFRC projects and realizations for bridges

13h15 UHPC in the U.S. highway infrastructure: experience and outlook
Le BFUP dans les infrastructures routières aux Etats-Unis : bilan et perspectives
Benjamin A. GRAYBEAL

13h30 Trial construction of UHPC highway bridge
Réalisation pilote d'un pont routier en BFUP
Sung Yong PARK*, Sung Tae KIM, Jeong Rae CHO, Jeong Woo LEE, Byung Suk KIM*

13h45 Parkbridge: optimization of a slender bridge in UHPFRC
Parkbridge : optimisation d'un pont en BFUP ultra-élancé
Steffen GRÜNEWALD*, Hans KÖHNE, Maurice NIO, Matteo SERAFINI, Anja VERDONK, Rogier VAN NALTA, Rob HUIJBEN, Viktor MECHTCHERINE, Lukasz DUDZIAK, Leo GIELBERT*

14h00 Express bridge deck and light duty bridge
Tablier et passerelle Express
Yves BRUGEAUD

14h15 FDN modular UHPFRC bridges
Ponts modulaires FDN en BFUP
Dil TIRIMANNA, ***Jan FALBR***

14h30 Application of ultra high performance concrete to cable stayed bridges
Application des BFUP pour les ponts à haubans
Byung Suk KIM, Seoungwook KIM, Young-Jin KIM, Sung Yong PARK, Kyung-Taek KOH, Changbin JOH

14h45 - 15h00 break

15h00 - 16h15
Plenary Technical Session and Closure - Amphitheater
Chairman Frank Dehn

UHPFRC future and unexpected prospective applications

15h00 UHPFRC solutions for the retrofit of nuclear reactor containment walls
Solutions BFUP de réparation des parois d'enceintes de confinement de réacteurs nucléaires
Dominique CORVEZ, Benoît MASSON

15h15 Rejuvenation of maritime signalisation structures with UHPFRC
Emploi des BFUP pour la rénovation d'ouvrages de signalisation maritime
***Emmanuel DENARIE**, Damien JACOMO, Nicolas FADY, Dominique CORVEZ*

15h30 Structural behaviour of UHPFRC cellular beams
Comportement structurel de poutres ajourées en BFUP
*Lionel MOREILLON, Joanna NSEIR, **João TOMÁS**, René SUTER*

15h45 Experimental determination of the load-bearing behaviour of dry joints between precast elements made of UHPFRC
Détermination expérimentale du comportement résistant de joints secs entre éléments préfabriqués en BFUP
*Werner SOBEK, **Markus PLANK**, Dominique CORVEZ, Karl-Heinz REINECK*

16h00 Multiple impact penetration of ultra high performance cementitious composites
Résistance des BFUP à la pénétration sous impacts répétés
***Jianzhong LAI**, Yaoyong ZHU, Sheng XU, Xujia GUO*

16h15 - 16h30
Closure session – Amphitheater

Conclusions and Acknowledgements – Some insight in future application of UHPFRC
Conclusions et remerciements - Quelques perspectives concernant l'application des BFUP
François Toutlemonde, Jacques Resplendino

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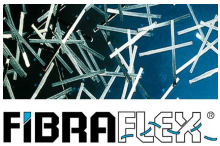

Venue

MuCEM
1 esplanade du J4
13002 Marseille – France

Access: 15 minutes walk from Metro stops "Vieux Port" (Blue line) or "Joliette" (Red line)

Banquet

The banquet will take place on **Wednesday 2nd October** on the upper terrace of the MuCEM from **8:00 pm to 10:30 pm** after enjoying a visit of the MuCEM (structural and architectural achievements).

Photo Patrick Guiraud

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