

Dated 25 July 2024



UHPFRC 2024

Menton (French Riviera), Oct. 21-23, 2024

organized by  AFGC
Association Française de Génie Civil

Designing, Building and Retrofitting with UHPFRC : Innovative achievements looking to the future

Research, standards and regulations at the service of innovation

A material for the environment: durability, saving resources, reducing CO2 emissions

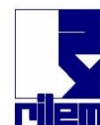


Mareterra © SAM Anse du Portier

TENTATIVE PROGRAMME

October 21 - 23, 2024

Menton (FRANCE)
Le Palais de l'Europe



Objectives

Seven years after the 2017 Ultra-High Performance Fiber Concrete (UHPFRC) conference held in Montpellier, under the auspices of fib and AFGC, focused on the know-how and applications carried out with UHPFRC, it is clear that projects and constructions using UHPFRCs have experienced a marked increase in Europe, in North America and in Asia.

The objective of the 2024 UHPFRC International Symposium organized in Menton by AFGC, under the auspices of RILEM, IABSE, fib and ACI Chapter of Paris, is to update additional experience acquired in the knowledge and use of UHPFRCs:

- design of structures, elements and works
- retrofitting and repair of structures
- industrial realization
- large-scale applications.

The symposium will present the most recent concrete realizations in civil engineering, building and in the field of equipment and infrastructure, in new construction and rehabilitation.

It will deal with regulations and standards developed at the international level to facilitate the design, justify the safety and the reliability of structures.

It will detail the performance offered by these materials towards environment: use in the field of eco-design, saving of resources, durability, reduction of CO2 emissions, life cycle analysis, etc.

Welcome to Menton for UHPFRC 2024

The symposium will be held in the Palais de l'Europe in the city of Menton : 8 avenue Boyer, F-06506 Menton, France. This congress center is located in Menton downtown in a former Casino built in 1908 and totally refurbished for providing efficient meeting spaces.

Menton is accessible via the international « Nice Côte d'Azur » airport, at about 30mn driving time by motorway. Menton is located less than 30 mn-away from Monaco, San Remo (Italy) or Nice and accessible by road or train. Accomodation in Menton can be found in 30 hotels (over 1000 rooms).

A technical visit of UHPFRC applications in Monaco and the French Riviera will be organized during the symposium.



Palais de l'Europe of Menton

Scientific Committee

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Dr François TOUTLEMONDE (Univ. Gustave Eiffel) France



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UHPFRC 2024 – Program at a glance

Monday October 21	Tuesday October 22		Wednesday October 23
8:30-10:00 Registration	8:30-10:00 Parallel Technical Sessions		8:30-10:00 Plenary Technical Session
	Bridges	Material and Structural innovations	Students Projects
10:00-11:30 Opening Ceremony + one keynote AFGC-RILEM-fib-ACI-IABSE addresses	10:30-12:00 Parallel Technical Sessions		10:30-12:00 Parallel Technical Sessions
	UHPFRC cases / Qualification & Durability	Structural tests	Structural tests and design
12:00-13:00 2 Keynote lectures			
13:00-14:30 Lunch	12:00-13:30 Lunch		12:00-13:30 Lunch
14:30-16:00 Technical Session Bridges	13:30-15:00 Technical Session Buildings		13:30-15:00 Technical Session Bridges
16:30-18:00 Technical session UHPFRC cases	15:15-16:15 Technical Session UHPFRC in Monaco projects		15:15-16:45 Technical session Design
Welcome cocktail	Technical Visit Gala Dinner		16:45-17:00 Closure / Students Project Award



Cannes Multiplex Cinéma © Lisa Ricciotti

Presentation of the AFGC and the co-organizing institutions



The **Association Française de Génie Civil (AFGC-French Association for Civil Engineering)** 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. It currently has more than 1280 members. Its ambition is to promote French engineering throughout the world.



Founded in 1904, the **American Concrete Institute (ACI)** is a leading authority and resource worldwide for the development and distribution of consensus-based standards, technical resources, educational programs, and proven expertise for individuals and organizations involved in concrete design, construction, and materials, who share a commitment to pursuing the best use of concrete. ACI has over 101 chapters, among which the ACI Paris chapter for French-speaking European countries, and nearly 20,000 members spanning over 120 countries.



The **International Federation for Structural Concrete (fib - fédération internationale du béton)** has been created in 1998 from the merger of the Euro-International Concrete Committee and the International Federation for Prestressing. 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 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.



RILEM, The International Union of Laboratories and Experts in Construction Materials, Systems and Structures, is a 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 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*, and many other publications, in the form of reports and proceedings.



The **International Association for Bridge and Structural Engineering (IABSE)** is a scientific / technical Association comprising members in 100 countries and counting 58 National Groups worldwide. Founded in 1929 it has its seat in Zurich, Switzerland. The President of IABSE (2022-2025) is Tina Vejrum, Denmark. IABSE deals with all aspects of structural engineering: the science and art of planning, design, construction, operation, monitoring and inspection, maintenance, rehabilitation and preservation, demolition and dismantling of structures, taking into consideration technical, economic, environmental, aesthetic and social aspects. The term 'Structures' includes bridges, buildings and all types of civil engineering structures, composed of any structural material.



Palais de la Plage - © JBP - J.Resplendino

Monday October 21 - 10:00 AM – 1:00 PM
Amphitheater : Opening session and plenary lectures

Registration desk open from 8:30 AM

8:30 AM – 10:00 AM Registration - Welcome Coffee

10:00 AM Opening Ceremony

Welcome address from AFGC, **Claude LE QUÉRÉ**, *the President of AFGC*
Welcome address by City of Menton
Encouragement address from ACI
Encouragement address from *fib*
Encouragement address from IABSE
Encouragement address from RILEM

11:00 AM Overview of structures made of UHPC developed in France
Resplendino Jacques, Simon Alain, Rivoal Jean-Nicolas, Frécon Jérôme, Toutlemonde François

11:30 AM – 12:00 AM Coffee break

12:00 AM Completion of first UHPC rehabilitation of entire suspension bridge deck
McDonagh Michael, Boukaram Sam, Scindia Shekhar, Tewelde Abate, Foden Andrew

12:30 AM Ultra-high-performance fiber-reinforced cementitious composite for the preservation, strengthening, and transformation of existing buildings
Bertola Numa, K pfer C lia , Schiltz Philippe, Br hwiler Eugen

1:00 PM – 2:30 PM Lunch break

Monday October 21 - 2:30 PM – 4:00 PM
Technical session: Bridges

Amphitheater

2:30 PM Riddes Viaduct
Boiron Laurent, Hardegger Daniel, Moreillon Lionel

2:45 PM Contractor's approach on the use of UHPFRC for bridges rehabilitation and strengthening
Haidar Khalil, Geraud Vincent, Giroud Christophe, Tafforeau Jean-Louis, Gery David

3:00 PM The Fornaci viaduct strengthening using UHPFRC
Attanasi Gabriele, Mina Stefano

3:15 PM First application of UHPFRC applied to bridge in Belgium: the retrofitting of the Soudromont road bridge
Franssen Renaud, Minette Damien, Braun Emilie, Chantry Julien

3:30 PM UHPFRC application for FEDRO's bridge maintenance and construction
Spasojevic Ana, Caron Renaud, Cuennet St phane

3:45 PM UHPFRC struts for strengthening and widening bridge decks
M n trety Philippe, Moreillon Lionel, Chollet Olivier

4:00 PM – 4:30 PM Coffee break

Monday October 21 - 4:30 PM – 6:00 PM

Technical Session: UHPFRC Cases

Amphitheater

- 4:30 PM A precast UHPFRC system for efficient construction of durable port docks
Camacho Esteban, Lopez Juan Angel, Galàn Fernando, Coll Hugo
- 4:45 PM Application of UHPFRC for the renewal of railway slab tracks
Trouillet Jean-Georges, Hochuli Antonina, Brühwiler Eugen
- 5:00 PM UHPFRC Transition piece for offshore wind turbines
Bounhour François, Tourlet Hervé, Collet Pascal, Lebrun François
- 5:15 PM Corrugated steel pipe reinforcement with UHPC pouring with a sliding concrete formwork
Frecon Jérôme, Flaus Anthony, Meaude Constance
- 5:30 PM Shotcrete UHPFRC: 5 years feedback and perspectives
Floquet Arnaud, Amanjean Elsa, Rivoal Jean-Nicolas, Jaillet Cédric
- 5:45 PM Shotcrete UHPFRC: an improved material/process to ease repair and reinforcement without formwork
Blachier Christian, Rivoal Jean-Nicolas, Jaillet Cédric, Halin Olivier, Bonnet Emmanuel

6:00 PM – 7:30 PM Welcome cocktail

Tuesday October 22 - 8:30 AM – 10:00 AM

Parallel technical sessions

Registration desk open from 8:00 AM

Amphitheater - Bridges

- 8:30 AM New Pleyel interchange UHPFRC footbridge
Gellée Aymeric, Tatat Frédéric, Yacoubi Mehdi
- 8:45 AM UHPFRC overlay with polymer fibers on foot path bridge in Germany
Sagmeister Bernhard
- 9:00 AM The pylons repair of 'pont de Bourgogne': an example of use of UHPFRC on existing concrete affected by delayed ettringite formation
Odin Jean-Michel, Haidar Khalil, Gery David, Giroud Christophe
- 9:15 AM Feedback on the implementation of UHPFRC as overlay on two French highway bridges: recommendations for a correct UHPFRC execution
Toutlemonde François
- 9:30 AM ABC replacement of five multispan Texas bridges reopens each bridge within 11 days using UHPC closure pours
Frécon Jérôme, Tzabari Hannah
- 9:45 AM Major UHPC projects – Contractor's perspective
Hardegger Daniel, Laurent Boiron

Room for parallel sessions - Material and structural innovations

- 8:30 AM Experimental investigation on key properties of innovative UHPFRC containing different alternative recycled constituents
Manafpour Ali Reza, Kasaei Jamil, Esmaeili Jamshid
- 8:45 AM Enhancing electrical conductivity of UHPFRC with carbon fibres
Abrishambaf Amin, Atay Timy, Zimmermann Gregor, Weber Markus
- 9:00 AM UHP-FRCM: innovating bridge strengthening
Abutahnat Yazan, Sorelli Luca, El Refai Ahmed
- 9:15 AM UHPFRC-prefabricated elements for building and infrastructure construction-saving in resource and embodied energy compared to reinforced concrete
Olipitz Michael
- 9:30 AM Optimal design of multi-span composite floors made of CLT and UHPFRC: minimizing material usage and environmental impact
Emami Hossein, Sorelli Luca, Auclair Samuel, Blanchet Pierre, Orr John
- 9:45 AM Optimisation of UHPC girder for medium-span highway bridges
Leela Aparna Devi Kondapalli, Hanurag Reddy Devireddy, Balakrishnan Bijily

10:00 AM – 10:30 AM **Coffee break**

Tuesday October 22 - 10:30 AM – 12:00 AM
Parallel technical sessions

Amphitheater - UHPFRC Cases / Qualification and durability

- 10:30 AM Durable retrofitting for highly loaded bus lanes using Ultra-High Performance Fibre Reinforced Concrete (UHPFRC) as Ultra-Thin White-topping (UTW)
Jungwirth Jörg, Strotmann Andre, Sikorski Oliver, Vogt Stefan, Braun Mattias
- 10:45 AM Mechanical behavior of a 3 m-high precast UHPFRC retaining wall
Charron Jean-Philippe, Sylvestre Danny, Massicotte Bruno
- 11:00 AM On-site protecting ability demonstration of UHPFRC giant tiles
Marchiol Albert, Lamoureux Guillaume, Mazzacane Patrick, Lauge Jean-Christophe, Frecon Jérôme, Geffray Fanny, Toutlemonde François
- 11:15 AM Study of UHPFRC waterproofing performance on two French bridges
Généreux Grégory, Naudan Michaël, Pittet Romain, Croze Aurélien, Simian Benjamin
- 11:30 AM Ultra-high performance shotcrete under combined loading from uniaxial tensile stress and chloride exposure
Pollner Toni, Kustermann Andrea, Dauberschmidt Christoph
- 11:45 AM 18-years field durability experience of a non-protected UHPFRC bridge segment
Pons Tony, Terrade Benjamin, Guéguen-Minerbe Marielle, Omikrine-Metalssi Othman, Toutlemonde François

Room for parallel sessions - Structural tests

- 10:30 AM Cyclic responses of post-heated UHPFRC columns: experimental tests and computational models
Huang Bo-Jun, Hung Chung-Chan
- 10:45 AM Dynamic response of UHPFRC for protective structures
Cadoni Ezio, Dotta Matteo, Forni Daniele
- 11:00 AM Crack-bridging effect in the repair and strengthening of pre-damaged reinforced concrete structures using Ultra-high Performance Fibre-Reinforced Shotcrete (UHPFRSC)
Strotmann Andre, Puth Cornelius, Jungwirth Jörg
- 11:15 AM High cycle tensile fatigue behavior of UHPFRC
Zhan Jian, Nussbaumer Alain, Brühwiler Eugen
- 11:30 AM Punching-shear strength of concrete slabs reinforced with a layer of UHPC
Vincens Baptiste, Redaelli Dario
- 11:45 AM Design of precast bridge columns meeting seismic performance requirements for ABC
Massicotte Bruno, Long Corentin, Lewis Gabriel, Darveau Philippe

12:00 AM – 1:30 PM Lunch break

Tuesday October 22 - 1:30 PM – 3:00 PM

Plenary session: Buildings

Amphitheater

- 1:30 PM Proposal of an engineering design approach for non-metallic fiber reinforced concrete through experimental study and numerical modelling on UHPFRC
Nana Serge, Rivoal Jean-Nicolas, Zhou FuLei, Herbé Simon, Starostina Darja, Bonnet Emmanuel, Trucy Laurence
- 1:45 PM The UHPFRC prestressed stair_opera house in Shanghai (CN)
Zhao Yuchao, Zhao Yanni, Liu Tianan
- 2:00 PM Complex molds and blast resistant façade on Central Bank of Iraq
Garrau Sylvain, Kohen Beni, Maraşli Muhammed
- 2:15 PM Comparing UHPFRC and Sprayed GRC for architectural applications
Herbé Simon
- 2:30 PM Weight saving on the HYLO Tower
Garrau Sylvain, Kohen Beni, Maraşli Muhammed
- 2:45 PM Beyond traditional building: the synergy of merging ultra-high-performance concrete in modular construction
Awassa Oumaima, El-Hacha Raafat, Perry Vic

3:00 PM – 3:15 PM Short break

Tuesday October 22 – 3:15 PM – 4:15 PM

Plenary Session: UHPC implementation in Monaco – preliminary explanations to the visit

Amphitheater

- 3:15 PM Low carbon HPC and UHPFRC used in Mareterra Project
Resplendino Jacques, Verbauwhede Maryline, Brouard Gregory, Hirsinger Christophe, Adeline Regis
- 3:30 PM Mareterra - UHPFRC used for underwater Eco-design
Resplendino Jacques, Hirsinger Christophe, Adeline Regis
- 3:45 PM Mareterra – UHPC footbridge of the entertainment Marina
Resplendino Jacques, Hirsinger Christophe, Adeline Regis
- 4:00 PM UHPFRC used for the heavy restructuring of the 40 piers of the Spélugues complex in Monaco
Paille Ludovic, Simon Alain, David Daniel, Nguyen Jean-Luc

4:15 PM – 7:00 PM

TECHNICAL VISIT IN MONACO

7:00 PM – 11:00 PM

GALA DINER

The gala dinner organized on Tuesday October 22 will be held on the rooftop of the Fairmont Monte Carlo in Monaco.

Fairmont



Wednesday October 23 - 8:30 AM – 10:00 AM

Plenary session – Special students' projects

Registration desk open from 8:00 AM

Amphitheater - Students' Projects

- 8:30 AM Prestressed timber-concrete (UHPRC) composite bridge solution for the footbridge of Brignoud
Clara SWOROWSKI – Supervisor *Raphaël RABUSSIER*
- 8:45 AM The Sioule viaduct
Wesley Consty BIATCHO TCHABEU, *Aaron Gaius TSAKEM DONGMO*, *Viscael Bostyl FEUDJIEU* – Supervisors *Alain SIMON*, *Pascal BODET*
- 9:00 AM Comparison between a reinforced concrete solution and UHPC for the arches of the project "LES ARCHES MAILLOT"
Loïc SANTINI, *Colin DAVY*, **Clotilde GAILLEDROT** – Supervisor *Dominique VIE*
- 9:15 AM Surface aspect of UHPRC for design and architectural purposes
Aysegül Mine KOCA – Supervisor *Anthony FLAUS*
- 9:30 AM Repair and rehabilitation of underground infrastructures with sprayed UHPRC
Darja STAROSTINA – Supervisors *Jean-Nicolas RIVOAL*, *Serge NANA*
- 9:45 AM A sustainable architectural material for the redevelopment of public spaces and heritage sites
Betsy SANORES – Supervisors *Esteban ASTUDILLO DE LA VEGA*, *Carlos BARBA*

10:00 AM – 10:30 AM **Coffee break**

Wednesday October 23 - 10:30 AM – 12:00 AM

Plenary technical session

Amphitheater - Structural tests and design

- 10:30 AM Tension stiffening and cracking of rebar-reinforced coarse aggregate ultra-high performance concrete (R-CA-UHPC) members
Shi Zhanchong, *Su Qingtian*, *Kanstad Terje*
- 10:45 AM Shear behavior of steel dowel connector in thin UHPRC element
Shen Xiujiang
- 11:00 AM Study on static performance and damage characteristics of precast BFRPC permanent capping beam formwork structure
Gong Yafeng, *Bi Haipeng*, *Li Fayang*, *Hu Xinpeng*, *Feng Wenxu*
- 11:15 AM Investigation on the effects of surface preparation on bond between UHPRC and concrete
Kita Yushi, *Yamashita Takahisa*, *Watanabe Shinya*, *Makita Tohru*
- 11:30 AM Punching shear tests and finite element analysis of RC bridge slabs repaired with UHPRC overlay
Matsumoto Takashi, *Heng Chikhoeung*, *Mitamura Hiroshi*
- 11:45 AM Direct and inverse analysis to assess the post-cracking behaviour law of UHPRC
Marchand Pierre

12:00 AM – 1:30 PM **Lunch break**

Wednesday October 23 - 1:30 PM – 3:00 PM

Plenary technical session: Bridges

Amphitheater

- 1:30 PM UHPC reinforcement of grouted prestressed tendon
Roibet Adrien, Simon Alain
- 1:45 PM Numerical simulation: a tool for innovation in UHPFRC bridges
Ménétreay Philippe, El Jisr Hammad, Moreillon Lionel
- 2:00 PM Cast-on site UHPFRC for the rehabilitation of existing structures - Feedback over 20 years of exposure to chlorides
Denarié Emmanuel, Sofia Lionel, Rudaz Jacques
- 2:15 PM UHPFRC clamp for PT tendon
Roibet Adrien, Hamparian Serge, Brouilly Ludovic
- 2:30 PM Delaware Memorial Bridge - The largest UHPC overlay deck rehabilitation project in the United States
Seibert Peter S, Brindley Gilbert S.
- 2:45 PM Štvanice Footbridge in Prague - Construction and innovation
Tej Petr, Mourek Jan

Wednesday October 23 - 3:15 PM – 4:45 PM

Plenary technical session: Design

Amphitheater

- 3:15 PM UHPFRC structural design guidance in the United States
Graybeal Benjamin, Helou Rafic
- 3:30 PM Prediction of multiple-cracking in fiber-reinforced concrete using Weibull theory
Gontero Romain, Sellier Alain, Vidal Thierry, Millard Alain, Sorelli Luca
- 3:45 PM A design methodology for high stiffness, strength, ductility, and durability in UHPFRC flexural members with fiber-reinforced polymer rebars
Kaka Venkatesh, Chao Shih-Ho
- 4:00 PM Non-linear finite analysis of ribbed vaulted floor made of ecological UHPFRC
Aljawhary Mohammad, Sorelli Luca, Briseghella Bruno
- 4:15 PM Fatigue behavior of UHPFRC and its implementation for design
Brühwiler Eugen, Zhan Jian
- 4:30 PM Failure mechanism of threaded anchors in UHPFRC as simulated by finite element analysis
Hochuli Antonina, Brühwiler Eugen

Wednesday October 23 – 4:45 PM – 5:00 PM

Amphitheater

Closure session / Student Project Award

Closing address, thanks and prospective
François TOUTLEMONDE, Jacques RESPLENDINO



Mareterra- Cantilevered part of the Renzo © SAM Anse du Portier



Reinforcement of the Spelugues piers © J.Resplendino