



Program of

# **The 15<sup>th</sup> *fib* International PhD Symposium in Civil Engineering 2024 Budapest**

**28-30 August 2024**

**Tentative schedule of the Symposium**

**v.14.08.2024**

**– to be continuously updated –**

**Scientific Committee**

**Organizing Committee**

**Participating Universities**

**Sponsored by**

# Program – Overview

|             | Day 0<br>Tuesday<br>27 August                          | Day 1<br>Wednesday<br>28 August             | Day 2<br>Thursday<br>29 August              | Day 3<br>Friday<br>30 August                |
|-------------|--|---|---|---|
| 08:00 08:30 |  | Registration                                |   |   |
| 08:30 09:00 |  | Opening Ceremony<br>Group photo             | Keynotes session                            | Technical Session 7:<br>5 parallel sessions |
| 09:00 09:30 |  |   |   |   |
| 09:30 10:00 |  |   |   |   |
| 10:00 10:30 |  | Coffee break                                |   |   |
| 10:30 11:00 |  | Technical Session 1:<br>5 parallel sessions | Technical Session 4:<br>5 parallel sessions | Technical Session 8:<br>5 parallel sessions |
| 11:00 11:30 |  |   |   |   |
| 11:30 12:00 |  |   |   |   |
| 12:00 12:30 |  | Lunch                                       |   |   |
| 12:30 13:00 |  |   |   |   |
| 13:00 13:30 |  |   |   |   |
| 13:30 14:00 | <i>fib</i> -course<br>UHPC materials and<br>structures | Technical Session 2:<br>5 parallel sessions | Technical Session 5:<br>5 parallel sessions | Technical Session 9:<br>4 parallel sessions |
| 14:00 14:30 |  |   |   |   |
| 14:30 15:00 |  |   |   |   |
| 15:00 15:30 |  |   |   |   |
| 15:30 16:00 |  | Coffee break                                |   |   |
| 16:00 16:30 |  |   |   |   |
| 16:30 17:00 |  | Technical Session 3:<br>5 parallel sessions | Technical Session 6:<br>5 parallel sessions | Closing Ceremony<br>Awards<br>Announcements |
| 17:00 17:30 |  |   |   |   |
| 17:30 18:00 |  |   |   |   |
| 19:00       | Welcome drink  |   | Banquet                                     |   |

Day 1

Wednesday

|       |       |  |   |   |   |   |
|-------|-------|--|---|---|---|---|
| 08:00 | 08:30 | Registration   |   |   |   |   |
| 08:30 | 09:00 |  |   |   |   |   |
| 09:00 | 09:30 | Opening Ceremony — György L. Balázs, Prof, <i>fib</i> Honorary President, <i>fib</i> President 2011-2012, Inventor of PhD Symposia: Objectives and history of the <i>fib</i> Symposia in Civil Engineering   |   |   |   |   |
| 09:30 | 10:00 | Hassan Charaf, Prof, Rector BME: AI governance and ecosystem at the BME — Balázs Kövesdi, Prof, Vice Dean of Research: Opening words by the Dear of the Faculty of Civil Engineering of BME  |   |   |   |   |
| 10:00 | 10:30 | László Kollár, Prof, Secretary General of Hungarian Academy of Sciences, Chairman of the „Vásárhelyi Pál” Doctoral School of Civil Engineering BME: Opening words — Szabolcs Farkas, president, The Hungarian Intellectual Property Office: Importance of PhD research as a possible source for intellectual properties — Steven Foster, Prof, University of New South-Wales, Sydney, Australia, President of <i>fib</i> , Co-Chairman of Scientific Committee: Opening words — Taking Group Photo |   |   |   |   |
| 10:30 | 11:00 | Coffee break   |   |   |   |   |
| 11:00 | 11:30 | Session 1-1  | Session 1-2   | Session 1-3   | Session 1-4                                     | Session 1-5   |
| 11:30 | 12:00 | Structural analysis, modeling and design   | Assessment and structural health monitoring             | Durability of existing concrete structures and durability for future structures | Innovations in concrete and concrete technology | Bridges, reservoirs, dams, tunnels and road constructions |
| 12:00 | 12:30 |  |   |   |   |   |
| 12:30 | 13:00 |  |   |   |   |   |
| 13:00 | 13:30 | Lunch  |   |   |   |   |
| 13:30 | 14:00 |  |   |   |   |   |
| 14:00 | 14:30 | Session 2-1  | Session 2-2   | Session 2-3   | Session 2-4                                     | Session 2-5   |
| 14:30 | 15:00 | Structural analysis, modeling and design   | Assessment and structural health monitoring             | Durability of existing concrete structures and durability for future structures | Innovations in concrete and concrete technology | Bridges, reservoirs, dams, tunnels and road constructions |
| 15:00 | 15:30 |  |   |   |   |   |
| 15:30 | 16:00 |  |   |   |   |   |
| 16:00 | 16:30 | Coffee break   |   |   |   |   |
| 16:30 | 17:00 | Session 3-1  | Session 3-2   | Session 3-3   | Session 3-4                                     | Session 3-5   |
| 17:00 | 17:30 | Structural analysis, modeling and design   | Innovations in metallic and non-metallic reinforcements | Durability of existing concrete structures and durability for future structures | Innovations in concrete and concrete technology | Composites for strengthening of concrete structures       |
| 17:30 | 18:00 |  |   |   |   |   |

Day 2  
Thursday

|       |       |   |   |   |  |   |
|-------|-------|---|---|---|--|---|
| 08:00 | 08:30 | Registration  |   |   |  |   |
| 08:30 | 09:00 |   |   |   |  |   |
| 09:00 | 09:30 | Alexandra Strauss-Sieberth, Andreas Zitek, Teaching and Learning Center / Unit Didactic, BOKU University, Vienna: Potential influences of Artificial Intelligence on PhD procedures |   |   |  |   |
| 09:30 | 10:00 | György L. Balázs, Prof, fib Honorary President, BME: Challenges in concrete and concrete structures   |   |   |  |   |
| 10:00 | 10:30 | Luc Taerwe, Prof, Editor-in-chief: The publishing process of the fib journal Structural Concrete  |   |   |  |   |
| 10:30 | 11:00 | Coffee break  |   |   |  |   |
| 11:00 | 11:30 | Session 4-1   | Session 4-2   | Session 4-3   | Session 4-4  | Session 4-5   |
| 11:30 | 12:00 | Structural analysis, modeling and design  | Assessment and structural health monitoring         | Durability of existing concrete structures and durability for future structures | Sustainability of materials and structural systems, including heritage concrete structures | Life cycle assessment and design, rest life                       |
| 12:00 | 12:30 |   |   |   |  |   |
| 12:30 | 13:00 |   |   |   |  |   |
| 13:00 | 13:30 | Lunch   |   |   |  |   |
| 13:30 | 14:00 |   |   |   |  |   |
| 14:00 | 14:30 | Session 5-1   | Session 5-2   | Session 5-3   | Session 5-4  | Session 5-5   |
| 14:30 | 15:00 | Structural analysis, modeling and design  | Assessment and structural health monitoring         | Bridges, reservoirs, dams, tunnels and road constructions                       | Sustainability of materials and structural systems, including heritage concrete structures | Maintenance, retrofitting or strengthening of concrete structures |
| 15:00 | 15:30 |   |   |   |  |   |
| 15:30 | 16:00 |   |   |   |  |   |
| 16:00 | 16:30 | Coffee break  |   |   |  |   |
| 16:30 | 17:00 | Session 6-1   | Session 6-2   | Session 6-3   | Session 6-4  | Session 6-5   |
| 17:00 | 17:30 | Structural analysis, modeling and design  | Composites for strengthening of concrete structures | Durability of existing concrete structures and durability for future structures | Innovations in concrete and concrete technology  | Digitalization - 3D concrete printing                             |
| 17:30 | 18:00 |   |   |   |  |   |
| 19:00 |       | Symposium Banquet with cruise on the Danube   |   |   |  |   |

Day 3  
Friday

|       |       |   |   |  |   |   |
|-------|-------|---|---|--|---|---|
| 08:00 | 08:30 | Registration  |   |  |   |   |
| 08:30 | 09:00 |   |   |  |   |   |
| 09:00 | 09:30 | Session 7-1   | Session 7-2   | Session 7-3                              | Session 7-4                                     | Session 7-5   |
| 09:30 | 10:00 | Structural analysis, modeling and design  | Innovations in metallic and non-metallic reinforcements | Structural analysis, modeling and design | Innovations in concrete and concrete technology | Composites for strengthening of concrete structures |
| 10:00 | 10:30 |   |   |  |   |   |
| 10:30 | 11:00 | Coffee break  |   |  |   |   |
| 11:00 | 11:30 | Session 8-1   | Session 8-2   | Session 8-3                              | Session 8-4                                     | Session 8-5   |
| 11:30 | 12:00 | Structural analysis, modeling and design  | Assessment and structural health monitoring             | Structural analysis, modeling and design | Buildings and shells                            | Structural reliability and risk analysis            |
| 12:00 | 12:30 |   |   |  |   |   |
| 12:30 | 13:00 |   |   |  |   |   |
| 13:00 | 13:30 | Lunch   |   |  |   |   |
| 13:30 | 14:00 |   |   |  |   |   |
| 14:00 | 14:30 | Session 9-1   | Session 9-2   | Session 9-3                              | Session 9-4                                     |   |
| 14:30 | 15:00 | Structural analysis, modeling and design  | Assessment and structural health monitoring             | Structural analysis, modeling and design | Buildings and shells                            |   |
| 15:00 | 15:30 |   |   |  |   |   |
| 15:30 | 16:00 |   |   |  |   |   |
| 16:00 | 16:30 | Coffee break  |   |  |   |   |
| 16:30 | 17:00 | Marcelo Melo, Univ. of São Paulo, Brazil, Member of OC: <i>fib</i> YMG - Perspectives and projects for young researchers — János Levendoszky, Prof, BME, Vice-Rector for Research and Innovation: Closing words — Róbert Németh, Secretary of the „Vásárhelyi Pál” Doctoral School of Civil Engineering, BME: Closing words — Steven Foster, Prof. Univ. of New South Wales, Sydney, Australia, <i>fib</i> President, Co-chairman of SC: Closing words by <i>fib</i> and Wiley — Máté Tóth, PhD, Head of Business Unit Structural Retrofitting, fischer group, Co-convener of <i>fib</i> TG2.9.4, Working Party "Fatigue Loading", Corporate Representative in <i>fib</i> TG2.9: Closing words by the Diamond Sponsor — György L. Balázs, Prof, BME, Chairman of SC, Sándor Sólyom, PhD, BME, Co-chairman of SC: Evaluation of the Symposium and closing words — Prize Giving Ceremony — Photo of the winners — Giovanni Plizzari, Prof, Chairman of <i>fib</i> AAYE: Information about the <i>fib</i> Achievement Award for Young Engineers (AAYE) — |   |  |   |   |
| 17:00 | 17:30 |   |   |  |   |   |
| 17:30 | 18:00 | Marcelo Melo, Univ. of São Paulo, Brazil, Member of OC: Invitation to Conceptual Design 2025 Rio de Janeiro — Konrad Bergmeister, Alfred Strauss, BOKU University, Vienna: Invitation to PhD Symp 2026 Vienna — Delivery of Memorial Stone of the PhD Symposium 2026  |   |  |   |   |

**Day 1: Wednesday 28 August,  
11:00 - 13:00**

| Session 1-1<br>Topic: Structural analysis, modeling and design |  | Room 1   |
|--|--|--|
| 7  | Numerical prediction of the concentrated load-bearing capacity of 400 mm deep hollow core floor  | Miłosz Jeziorski and Wit Derkowski                               |
| 79   | Numerical analysis of precast concrete beam to column connections with relocated plastic hinge   | Bela Kovacs, Bogdan Heghes and Zoltan Kiss                       |
| 134  | Numerical modeling of two-chord concrete-filled steel tubular column under axial compression     | Josip Kovač-Striko, Aleksandar Landović and Arpad Čeh            |
| 82   | Reliability assessment of the robustness of reinforced concrete frame under column loss scenario | Elena Miceli, Luca Giordano, Paolo Castaldo and Giuseppe Mancini |

| Session 1-2<br>Topic: Assessment and structural health monitoring |  | Room 2   |
|---|--|--|
| 37  | Study of the influence of bond loss on shear strength in corroded reinforced concrete structures.              | Alejandro Frontera, Carlos R. Ribas, Antoni Cladera and Francesc Masdeu      |
| 62  | Modelling the Shear Behaviour of Reinforced Concrete Dapped-End Connections                                    | Sameera Hippola and Boyan Mihaylov   |
| 171   | Implementation of an experimental database for new phenomenological degradation laws for corroded steel rebars | Manuel Bartoli, Fabio Di Carlo and Zila Rinaldi                              |
| 39  | Practical application of the "Saw-Cut" technique on prestressed concrete beams under laboratory conditions     | Juan Antonio Mateu Sánchez, Juan Navarro Gregori and José Rocío Martí Vargas |

| Session 1-3<br>Topic: Durability of existing and future concrete structures |   | Room 3  |
|---|---|---|
| 6   | Determination of freeze-thaw induced damage in concrete by proton nuclear magnetic resonance (1H-NMR) | Vanessa Mercedes Kind, Sophie Unbehau, Matthias Müller, Horst-Michael Ludwig and Frank Dehn |
| 200   | Role of Cellulose Nanocrystals and Their Utilization in Cement-Based Composites                       | Ali Satar Jaber Al-Askary and Katalin Kopecskó  |
| 49  | Experimental Study on the Durability of Concrete Made with Artificial Aggregates                      | Dechen Wangmo, Giovanni Plizzari and Adriano Reggia   |
| 165   | Mechanical and durability performance of low carbon concrete with alternative pozzolanic binders      | Eliana Soldado, Hugo Costa, Ricardo Carmo and Eduardo Júlio                                 |

| Session 1-4<br>Topic: Innovations in concrete and concrete technology |   | Room 4  |
|---|---|---|
| 3   | Performance of one-part alkali-activated materials incorporating fly ash and slag                                     | Chenmeng Zhang, Dan V. Bompa, Suryakanta Biswal and Ying Wang                                   |
| 94  | Cement-based metamaterial with spiral perforations incorporating vibration attenuation characteristics                | Koichi Imagawa, Motohiro Ohno and Tetsuya Ishida  |
| 175   | Experimental Investigation of Utilizing Silicon Manganese Slag for Low-Carbon Mortar Production                       | Dileepa Hettiarachchi, Samindi Samarakoon, Kjell Fosså, Kidane Gebremariam and Khalifeh Mahmoud |
| 56  | Experimental study: Direct tensile, splitting tensile, and flexural behaviour of various UHPC specimens without notch | Jan Vesecký, Jan Kubát and Lukáš Vráblík  |

| Session 1-5<br>Topic: Bridges, reservoirs, dams, tunnels and road construction |  | Room 5   |
|--|--|--|
| 32   | Integration of Monitoring-Based Safety Assessments of Bridges into Digital Twins                                     | Maria Walker, Jan-Hauke Bartels, Pauline Esser and Steffen Marx                    |
| 133  | Options for strengthening the existing bridge structure using UHPFRC   | Jan Janoušek, Adam Froněk, Lukáš Vráblík and Jan L. Vítek                          |
| 187  | Design and analysis of a modular precast segmental footbridge with reinforcement and post-tensioning tendons of CFRP | Martin Rettinger, Luzia Koch, Alex Hückler and Mike Schlaich                       |
| 208  | Analytical and numerical investigations of the reinforcements of half-joint bridge beams.                            | Paolo Pizzini, Nico Di Stefano, Luca Facconi, Fausto Minelli and Giovanni Plizzari |

**Day 1: Wednesday 28 August**  
**14:00 - 16:00**

| Session 2-1<br>Topic: Structural analysis, modeling and design |  | Room 1   |
|--|--|--|
| 9  | Experimental investigation of the transition from tension to compression in reinforced concrete chords           | Simon Karrer, Karel Thoma and Walter Kaufmann                              |
| 34   | Experimental Research of Biaxially Bended Reinforced Concrete Columns Manufactured on Granite Sifting            | Olha Harkava and Andrii Pavlikov   |
| 89   | Experimental investigation of combined in-plane and out-of-plane shear in non-shear reinforced concrete elements | Jens Skovgaard Larsen, Henrik Brøner Jørgensen and Søren Gustenhoff Hansen |
| 118  | Experimental results of Delft blind prediction contest on shear behaviour of continuous precast girders          | Mohammed S. Ibrahim, Mauro Poliotti, Yuguang Yang and Max A.N. Hendriks    |

| Session 2-2<br>Topic: Assessment and structural health monitoring |  | Room 2   |
|---|--|--|
| 73  | Defects detection and performance evaluation of grouting sleeves based on ultrasonic echo testing and computer vision technology | Ziqi Xu, Xuefei Shi, Qi Xu and Pei Song                        |
| 93  | Quality control and assessment of novel concrete structures made of eco-efficient concrete                                       | Lisa Ptacek and Alfred Strauss                                 |
| 100   | Damage assessment of an RC arch bridge using Finite Element Analysis and proposal of bridge SHM system                           | Muhammad Fawad, Marek Salamak and Kalamani Koris               |
| 191   | Diagnosis and Prognosis of ISR-affected Concrete Sleepers  | Rennan Medeiros, Leandro Sanchez and Antonio Carlos Dos Santos |

| Session 2-3<br>Topic: Durability of existing and future concrete structures |   | Room 3   |
|---|---|--|
| 159   | Microstructural degradation from freeze-thaw attack - spatial exposure history and effects on multiscale porosity | Markus Mahlbacher, Felix Mett, Matteo Broggi, Michael Beer and Michael Haist             |
| 19  | Structural performance of chloride corroded hybrid fibre-reinforced concrete under sustained loads                | Petar Bajić, Bruno Leporace-Guimil, Carmen Andrade, Nikola Tošić and Albert de la Fuente |
| 128   | Determining the chloride resistance of concrete -different rapid testing methods and their correlation            | Hannah Drenkard and Christian Fischer  |
| 33  | Analytical Assessment of the Bond Behaviour of pre-stressed Carbon Fiber Reinforced Polymer Strands in Concrete   | María Serrano-Mesa, Eladio Alejandro Martínez-Pina, Alex Hückler Mike Schlaich           |

| Session 2-4<br>Topic: Innovations in concrete and concrete technology |   | Room 4   |
|---|---|--|
| 14  | Use of fine recycled aggregate in sprayed concrete: Experimental study  | Zdeněk Hlavsa and Jan L. Vitek   |
| 158   | Experimental Investigation of Strength Relations in RCA Concrete  | Cecilie Kristensen, Jesper Harrild Sørensen, Linh Cao Hoang, Gregor Fischer and Lars Zenke Pørlov Hansen |
| 194   | Mechanical properties of mortar partly substituting fine aggregate with biomass bottom ash from fluidized bed boilers | Anders Hedegaard Jensen, Lisbeth M. Ottosen and Carola Edvardsen   |
| 196   | Performance-driven optimization of emissionlow watertight structural concrete using recycled aggregates               | Thomas Pichler, Konrad Bergmeister and Klaus Voit  |

| Session 2-5<br>Topic: Bridges, reservoirs, dams, tunnels and road construction |  | Room 5  |
|--|--|---|
| 69   | Material savings potential of the LT-bridge construction method for post-tensioned bridges                                     | Franz Untermarzoner, Michael Rath and Johann Kollegger                  |
| 111  | Experimental tests and numerical analysis of bridge columns reinforced with high performance fiber reinforced concrete (HPFRC) | Ivan Beltracchi, Adriano Reggia, Giovanni Metelli and Giovanni Plizzari |
| 190  | Structural behavior of corrosion-damaged existing bridges: design of the experiment  | Elisa Carleschi, Adriano Reggia, Fausto Minelli and Giovanni Plizzari   |
| 214  | Experimental results of sliding and welding tests in a novel construction method for steel-concrete composite bridges          | Dániel Gosztola and János Szép  |



**Day 1: Wednesday 28 August**  
**16:30 - 18:00**

|     |  |  |
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|     | Session 3-1<br>Topic: Structural analysis, modeling and design   | Room 1   |
| 12  | Correlation between requirements and performance metrics for concrete floor slabs  | Rebecca Ammann, Karel Thoma, Jaime Mata-Falcón and Walter Kaufmann |
| 44  | Analysis of the Effect of Hydration Heat in Massive Constructions: Experimental Measurement of the Spillway at Orlik Reservoir | Simona Potůčková, Milan Holý, David Čítek and Jiří Kolísko         |
| 184 | Significance of Soil Nonlinearity in Soil Structure Interaction  | Yaseen Shayah and László Kollár                                    |

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|-----|---|---------------------------------------|
|     | Session 3-2<br>Topic: Innovations in metallic and non-metallic reinforcements                                 | Room 2                                |
| 28  | Sensitivity assessment of the load-bearing capacity of FRP reinforced concrete columns                        | Lukas Bujotzek and Danièle Waldmann   |
| 130 | Resource-Efficient Basalt-Based Reinforcement with Innovative 3D-Design                                       | Angeliki Kosta and Konrad Bergmeister |
| 131 | Experimental and numerical analysis of the shear lag effect in basalt and glass fiber reinforced polymer bars | Szabolcs Szinvai and Tamás Kovács     |

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|-----|--|---|
|     | Session 3-3<br>Topic: Durability of existing and future concrete structures  | Room 3  |
| 99  | Reliability Analysis of Existing Post-tensioned Concrete Bridge Affected by Corrosion                                    | Aleš Mezera, Milan Holý and Miroslav Sýkora                                 |
| 101 | Experimental analysis of the seismic behavior of first floor frames of concrete buildings                                | Álvaro Ruiz Miguel, Luis Pallarés Rubio and Francisco Javier Pallarés Rubio |
| 150 | Sustainable use of post-demolition concrete as recycled aggregates and cement substitute: Recycling potential in Germany | Antonia Frank, Rebekka Volk and Frank Schultmann                            |

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|-----|---|---|
|     | Session 3-4<br>Topic: Innovations in concrete and concrete technology   | Room 4  |
| 124 | Comparative analysis on mechanical properties of concrete reinforced with waste fibres from end-of-life composite materials | Umar Ayaz Lone, Zhao Bin and Zhou Zucan                         |
| 22  | Load bearing behaviour of fastenings with effective embedment depth less than 30 mm   | Michael Yamandu Eckstein and Jan Hofmann                        |
| 10  | Structural fuse-based segmentation for limiting disproportionate building collapse: design requirements                     | Maria L. Gerbaudo, José Miguel Adam Martínez and Andri Setiawan |

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|    | Session 3-5<br>Topic: Composites for strengthening of concrete structures  | Room 5  |
| 27 | Properties Analysis of Electrically Cured Fiber-Reinforced Fly Ash-Slag Geopolymer Composites with Diverse Activators              | Beyza Aygun, Turhan Bilir, Turgay Cosgun, Mucteba Uysal and Elif Burcu Deliktas |
| 35 | Effect of Nano-SiO <sub>2</sub> On Electrical Cured Metakaolin-Granulated Blast Furnace Slag Based Geopolymers with fiber addition | Yusuf Gokcegoz, Mucteba Uysal and Beyza Fahriye Aygun                           |
| 59 | Tensile behavior of textile-reinforced mortar solutions made from natural hemp fibres.   | Kevin Isaac Escobar, Juan Murcia-Delso and Eva Oller Ibars                      |

**Day 2: Thursday 29 August,  
11:00 - 13:00**

|    |  |  |
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|    | Session 4-1<br>Topic: Structural analysis, modeling and design   | Room 1   |
| 13 | A Parametric Design of Reinforced Concrete Structures  | Vittoria Borghese, Silvia Santini, Camillo Nuti and Cristoforo Demartino |
| 20 | Analysis of former and new Eurocode 2 shear provisions for concrete members without transverse reinforcement                       | Sam Coppens, Robby Caspeepele and Roman Wan-Wendner                      |
| 24 | Higher-order beam theories based on Carrera unified formulation for damage analysis of reinforced concrete structures              | Jiahui Shen, Mário Rui Arruda and Alfonso Pagani                         |
| 43 | Engineering models for determining the Residual load-bearing capacity of reinforced concrete components after high dynamic loading | Vahan Zohrabyan and Thomas Braml   |

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|-----|---|---|
|     | Session 4-2<br>Topic: Assessment and structural health monitoring   | Room 2  |
| 75  | Performance assessment procedures for dynamically loaded reinforced concrete-steel connections                                  | Maximilian Granzner and Alfred Strauss            |
| 112 | Behavior and modelling of as-built and retrofitted reinforced concrete beam-column joints considering transverse beams and slab | Margaritis Tonidis                                |
| 119 | Safety of existing bridges with a long period of good service based on the theory of reliability                                | Marcelo Melo, Fernando Stucchi and Camila Candido |
| 132 | A new approach to improve safety of exceptional transportation: a proof of concept (POC) in the framework of NRRP               | Alessia Abbozzo, Giulio Zani and Marco di Prisco  |

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|    | Session 4-3<br>Topic: Durability of existing and future concrete structures   | Room 3   |
| 55 | Numerical study on the effect of freeze-thaw damage on wet fatigue performance of reinforced concrete beams                 | Yanyue Qin, Kai Matsutani and Yuya Takahashi                                     |
| 74 | Restraint-Induced Cracking in Edge-Restrained Walls: A Comparative Study of Numerical Simulations and Experimental Findings | Karim El Khoury, Robert Vollum and Bassam Izzuddin                               |
| 57 | Analysing corrosion of reinforced concrete elements in cracked stage under sustained loads                                  | Muhammad Bilal, Giovanni Giacomo Bosetti, Antonio Conforti and Giovanni Plizzari |
| 63 | Tension stiffening behaviour of stainless steel reinforcing bars  | Hamish Moodley, Zhanpeng Zhao and Sheida Afshan                                  |

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|     | Session 4-4<br>Topic: Sustainability of materials and structural systems, including heritage concrete structures                                      | Room 4   |
| 16  | Recycled polypropylene fibre reinforced concrete: assessment of the mechanical properties of recycled aggregates and recovered fibres in new concrete | Guangzhi Liu, Nikola Tošić and Albert de la Fuente |
| 87  | The potential of carbonated recycled aggregates towards more sustainable concrete construction  | Johannes Hron and Konrad Bergmeister               |
| 125 | Applicability of fasteners in recycled aggregate concrete   | Zdravka Mikulic and Konrad Bergmeister             |
| 206 | Valorization of Waste Slurries: Aqueous Carbonation of Recycled Fines in Industrial Waste Water   | Daniella Mehanni and Ildiko Merta                  |

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|-----|---|---|
|     | Session 4-5<br>Topic: Life cycle assessment and design, rest life   | Room 5  |
| 47  | Circular rehabilitation methodology - sustainable construction and demolition waste management                | Ana Antunes, Hugo Costa, Ricardo Carmo and Eduardo Júlio      |
| 81  | Re-anchorage behaviour of ruptured tendons in bonded post-tensioned members                                   | Liyi Pan, Ryota Kurihara, Satoshi Tsuchiya and Tetsuya Ishida |
| 145 | The effect of temperature on the static compressive strength of HPC and the consequence on fatigue resistance | Martin Markert, Hanna Schiewe and Harald Garrecht             |
| 146 | Effects of different RC aggregates on the fatigue behaviour of high-strength concrete                         | Hanna Schiewe, Martin Markert and Harald Garrecht             |

**Day 2: Thursday 29 August**  
**14:00 - 16:00**

|     |  |   |
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|     | Session 5-1<br>Topic: Structural analysis, modeling and design   | Room 1  |
| 21  | Shear mechanism of Ultra-High Performance Fiber Reinforced Concrete under Shear Loading                                  | Kefiyalew Zerfu and Fujiyama Chikako                |
| 36  | Shear behaviour of UHPFRC deep beams using a two-parameter kinematic approach  | Yasas Lamawansa, Eissa Fathalla and Boyan Mihaylov  |
| 18  | Modeling the bond-slip effect in RC Column with Plain Reinforcement Bars   | Tilong Shan, Ozgur Yurdakul and Routil Ladislav     |
| 156 | Refinement of Engineering Models Through Experimental Findings on Textile-Strengthened Concrete Plates under Impact Load | Nicholas Unger, Birgit Beckmann and Manfred Curbach |

|     |   |   |
|-----|---|---|
|     | Session 5-2<br>Topic: Assessment and structural health monitoring   | Room 2  |
| 137 | Concrete-to-concrete interface behaviour in precast girder bridges made continuous: deficiencies and challenges | Emilia Antonia Andrade Borges, Yuguang Yang, Marco Roosen and Max Hendriks                        |
| 152 | Effect of temperature on the mechanical and physical properties of lining concrete in nuclear waste disposal    | Shamseldin Abdo, Tri Phung, Mingzhe Tang, Robby Caspeelee, Suresh Seetharam and Roman Wan-Wendner |
| 154 | An experimental investigation on shrinkage and the restraint offered by steel reinforcement                     | Imogen Ridley, John Forth and Nikolaos Nikitas  |
| 203 | Reinforced concrete dapped-end beams' strength assessment: comparison of analytical and numerical methods       | Valentina Picciano and Giuseppe Santarsiero   |

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|-----|--|---|
|     | Session 5-3<br>Topic: Bridges, reservoirs, dams, tunnels and road construction   | Room 3  |
| 52  | Towards design optimization of tunnel joints – use of DIC on partially loaded fiber reinforced concrete specimens          | Angel Denia, Andrea Monserrat, Xavier Torelló and Albert de la Fuente |
| 78  | Temperature monitoring in massive concrete structures  | Vít Němčič and Jan Vitek  |
| 91  | Theoretical and Numerical Analysis of Shear force Distribution in Joint between Corrugated Steel Web and Concrete Top Slab | Haochu Cai, Sihao Wang and Yuqing Liu                                 |
| 105 | Experimental investigations on the shear load-bearing behaviour of ground dry joints                                       | Clara Schramm, Florian Füll, Dennis Birkner and Steffen Marx          |

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|     | Session 5-4<br>Topic: Sustainability of materials and structural systems, including heritage concrete structures                     | Room 4  |
| 41  | Investigation into the mechanical performance of concrete foundations affected by Alkali-Silica Reaction                             | Sylvain Langlois, Amelie Fau, Maroua Maaroufi and Farid Benboudjema |
| 102 | Pozzolanic reactivity of mechanically activated construction and demolition waste  | Cornelius Ngandu, Ákos Debreczeni and Gábor Mucsi                   |
| 116 | The effect of metakaolin content on the fire resistance of concrete  | Zubair Yousuf and Viktor Hlavička                                   |
| 98  | Analysis and sustainable reuse of the concrete structural systems of the European network of architectural heritage of the Cold War. | Alessandra Vazzoler, Giovanni Plizzari and Olivia Longo             |

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|     | Session 5-5<br>Topic: Maintenance, retrofitting or strengthening of concrete structures   | Room 5   |
| 67  | Evaluation of fibre orientation of sprayed Ultra-High Performance Fibre Reinforced Shotcrete (UHPFRSC) with an opto-analytical approach | Maximilian Kronau, Andre Strotmann, Sören Faustmann, Jörg Jungwirth and Oliver Fischer |
| 177 | A Genetic Algorithm to optimize seismic retrofit interventions on existing RC structures  | Francesco Nigro and Enzo Martinelli  |
| 180 | Integrated renovation of reinforced concrete buildings through cold-formed steel panels with burring holes                              | Michelle Gualdi, Andrea Belleri, Alessandra Marini and Atsushi Sato                    |
| 228 | Enhancing properties of concrete structures by using slurry infiltrated fiber concrete  | Wisam Alzweehm and György L. Balázs  |

**Day 2: Thursday 29 August**  
**16:30 - 18:00**

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|     | Session 6-1<br>Topic: Structural analysis, modeling and design   | Room 1  |
| 25  | Experimental investigation of welded reinforcement grids for partial area loading                                  | Fabian Morger and Walter Kaufmann                   |
| 46  | Model uncertainty for steel welded box section beams   | Erzsébet Bärnkopf, Balázs Kövesdi and Balázs Somodi |
| 222 | The Influence of the Partitioning Web Plate on the Increase of the Ductility of the Steel-Concrete-Steel Structure | Roman Kubát and Petr Bílý                           |

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|     | Session 6-2<br>Topic: Composites for strengthening of concrete structures                             | Room 2  |
| 30  | Prediction of ultimate debonding strain for FRP sheet bonded to concrete utilizing numerical analysis | Mitsuhiko Ozaki and Yasuhiko Sato                             |
| 168 | Bond behaviour of carbon textile reinforced concrete  | David Sandmann and Steffen Marx                               |
| 221 | Improving tensile and UV resistance properties of GFRP based on enhanced multiphase structures        | Yinlong Cao, Yanqun Sun, Peng Zhang, Jiuwen Bao and Yifei Cui |

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|     | Session 6-3<br>Topic: Durability of existing and future concrete structures        | Room 3   |
| 216 | Assessing Shrinkage in Limestone-Enhanced Concrete                                 | Abdelraouf Kenai, William Wilson, Luca Sorelli and Arezki Tagnit-Hamou                       |
| 139 | Innovative precast eco-HD-LWAC composite walls. Development of dry-connections     | Ricardo Martins, Ricardo Do Carmo, Hugo Costa, Eduardo Júlio, André Furtado and Romain Sousa |
| 121 | Durability of short hemp fibre reinforced fly ash-based alkali-activated materials | Bojan Poletanovic and Ildiko Merta   |

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|     | Session 6-4<br>Topic: Innovations in concrete and concrete technology  | Room 4   |
| 60  | Fibre-reinforced sprayed concrete for use in permanent tunnel lining application   | Mesfin Zenebe Gezahegn, Giuseppe Tiberti, Trabucchi Ivan and Giovanni Plizzari |
| 85  | Concept and Realisation of Direct Tensile Tests on Steel Fibre Reinforced Concrete (SFRC) with main Focus on Ease of Execution | Sören Faustmann and Oliver Fischer   |
| 170 | Functionally Graded Beams: A Parametric Study and Eco-design Methodology   | Salma Es-Satte, Syed Yasir Alam, Jean-Michel Torrenti and Ahmed Loukili        |

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|     | Session 6-5<br>Topic: Digitalization – 3D concrete printing                                   | Room 5   |
| 108 | Characteristics of 3D Printed Concrete  | Marwah Thajeel and György Balázs                             |
| 189 | Image-based analysis of fresh concrete open-channel-flow for obtaining rheological properties | Christian Vogel, Max Coenen, Tobias Schack and Michael Haist |
| 223 | Connections between single elements made by 3D printed concrete                               | Stefan Mitrovic and Ivan Ignjatovic                          |

**Day 3: Friday 30 August,  
09:00 - 10:30**

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|     | Session 7-1<br>Topic: Structural analysis, modeling and design   | Room 1   |
| 95  | Seismic Performance of Coupled Transfer Structures: The Effect of Stiffness in Coupling Beams                                  | Jahyung Koo and Honggun Park   |
| 4   | Concrete notch failures in timber-concrete composite deck - Incremental Upper Bound Modelling                                  | Peter Kolt Rasmussen, Linh Cao Hoang, Jesper Harrild Sørensen and Bent Feddersen |
| 153 | An analytical method to evaluate effects of screw connectors on effective bending stiffness of Timber-Concrete Composite slabs | Laura Corti and Giovanni Muciaccia   |

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|     | Session 7-2<br>Topic: Innovations in metallic and non-metallic reinforcements                                    | Room 2   |
| 40  | Effects of semi-cyclic loading on reinforced concrete beams strengthened with Iron-Based Shape-Memory Alloy bars | Antoni Mir Pons, Sandra del Río-Bonnín, Carlos Ribas, Joaquín G. Ruiz-Pinilla and Antoni Cladera |
| 61  | Experimental study of Precast Segmental Bridge keyed joints using two types of post-tensioned fasteners          | Rogelio Franco Segarra, José Luís Bonet Senach and Pedro Miguel Sosa                             |
| 151 | Recycled Aggregate Concrete reinforced with a Novel Fiber Cocktail   | Makrini Macha and Konrad Bergmeister   |

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|     | Session 7-3<br>Topic: Structural analysis, modeling and design  | Room 3  |
| 65  | Structural Performance Investigation Of Beams, Columns And Beam-Column Joints Using Slag-Based Concrete               | Han-Se Moon, Do-Hun Kim, Kwang-Won Jo, Hyeon-Jong Hwang, Chang-Soo Kim, Jae-Hong Jeong, Chan-Kyu Park and Hong-Gun Park |
| 123 | Exploring Alkali-Silica Reaction Effects on Concrete Bond Strength: Literature Review and Novel Experimental Approach | Jesper Kierkegaard Hansen, Søren Gustenhoff Hansen and Henrik Brøner Jørgensen  |
| 144 | Physicochemical characterization of synthesized Calcium-Aluminium-Silicate-Hydrate phase                              | An Thai Nguyen, Delphine Durce, Quoc Tri Phung and Elke Gruyaert  |

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|     | Session 7-4<br>Topic: Innovations in concrete and concrete technology   | Room 4  |
| 192 | De-airing of fresh concrete – Unraveling the mechanisms of a very old problem                                       | Bastian Strybny, Julian Link, Marcus Zuber, Michael Haist, Max Coenen and Tobias Schack |
| 207 | Negative Emission Pathways Through CO2 Uptake of Powders in Concrete: A Preliminary Study on Influencing Parameters | Bayram Tutkun and Ildiko Merta  |
| 212 | Fuzzy Logic and Push-Out Test Innovations for Fiber-Reinforced Self-compacting Concrete Assessment                  | Vahid Shafaie, Oveys Ghodousian, Géza Herczeg and Majid Movahedi Rad                    |

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|     | Session 7-5<br>Topic: Composites for strengthening of concrete structures                               | Room 5  |
| 48  | Experimental Investigation of Flexural Behavior of Composite Castellated Steel Beams                    | Ali Mansi, László Dunai and Alaa Al-Zuhairi           |
| 80  | Advancements and Challenges in Composite Steel and Concrete Structures: A Focus on Adhesive Connections | Alexandre Rocha, José B. Aguiar and Isabel B. Valente |
| 211 | A new confinement configuration of conventional steel hoops with carbon fiber mesh for HSC columns      | Yedidya Shachar, Rami Eid and Avraham Dancygier       |

**Day 3: Friday 30 August**  
**11:00 - 13:00**

| Session 8-1<br>Topic: Structural analysis, modeling and design |   | Room 1   |
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| 42   | A risk-based framework for enhancing the robustness of building structures through segmentation | Giacomo Caredda, Nirvan Makoond, Manuel Buitrago, Juan Sagaseta, Marios Chryssanthopoulos and Jose M. Adam |
| 50   | Butt joints of highly reinforced concrete columns   | Johannes Glaßner and Nguyen Viet Tue   |
| 64   | Effect of aspect ratio in shear-friction strength of squat wall                                 | Jaehan Oh and Honggun Park   |
| 70   | Symmetry sensibility of a snap-through problem  | Márton Módis and Flórián Kovács  |

| Session 8-2<br>Topic: Assessment and structural health monitoring |   | Room 2  |
|---|---|---|
| 162   | Bridge vertical deflection evaluation using clinometers data obtained by Micro Electro-Mechanical Systems (MEMS) sensors. | Francesco Filippo Bico, Fabio Di Carlo and Alberto Meda |
| 172   | Satellite-Based Structural Monitoring for Bridges Safety Assessment and Maintenance Optimization                          | Teresa Celozzi, Fabio Di Carlo and Alberto Meda         |
| 186   | Analysis of a stock of reinforced and prestressed concrete bridges – The case of the A3 highway (Southern Italy)          | Carmine Lupo and Luigi Petti                            |
| 217   | Inspection of bridges in the Province of Brescia, Italy: a critical discussion  | Luca Longinotti, Nico Di Stefano and Fausto Minelli     |

| Session 8-3<br>Topic: Structural analysis, modeling and design |  | Room 3   |
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| 77   | Anchoring of steel components using concrete dowels in wall-type components                    | Manuel Koob, Jens Minnert and Wolfgang Kurz                      |
| 142  | A simplified spring model for the design of fastening systems                                  | Sebastian Geiger and Jan Hofmann                                 |
| 147  | Use of numerical simulations for the design of fasteners – limitations and way forward         | Johannes Holder, Hitesh Lakhani and Jan Hofmann                  |
| 157  | Investigation of the Behaviour of Demountable Shear Connectors Embedded in Concrete and Mortar | Krisztián Király, Levente Borsi, Nauzika Kovács and László Dunai |

| Session 8-4<br>Topic: Buildings and shells |  | Room 4   |
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| 17   | Experimental assessment of static and dynamic properties of a new sustainable composite floor                                    | Ervin Halilovic and Wit Derkowski  |
| 72   | Experimental study of the seismic behaviour of intermediate-story frames in buildings filled with concrete blocks                | Jorge Ignacio Garces Arroyo, Francisco Javier Pallarés Rubio and Luis Pallarés Rubio |
| 92   | Experimental investigation on seismic performance of light infill masonry wall with prefabricated formwork constructed RC frames | Cheng Yin and Bin Zhao   |
| 84   | Cyclic Loading Test for Reinforced Concrete Columns with 700MPa Reinforcement  | Mok-In Park and Hong-Gun Park  |

| Session 8-5<br>Topic: Structural reliability and risk analysis |  | Room 5  |
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| 15   | Input for a rapid risk assessment methodology for existing flood-prone bridges                           | Zdenek Shanel, Özgür Yurdakul, Ladislav Routil and Maria Pregnolato |
| 54   | Reliability analysis of concrete crack leakage based on computational fluid dynamics                     | Yousang Lee and Hong-Gun Park                                       |
| 86   | Loss Assessment Study of the Base Station Towers in Beşiktaş District of Istanbul Using HAZTURK Software | Omer Bilginer and Himmet Karaman                                    |
| 71   | Computational determination of pressure coefficients of an anticlastic tensile membrane surface          | Richárd Joao Rosa and Krisztián Hincz                               |



**Day 3: Friday 30 August**  
**14:00 - 16:00**

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|     | Session 9-1<br>Topic: Structural analysis, modeling and design  | Room 1   |
| 51  | Design Forces for Punching Shear Verification in Thick Raft Foundations with Special Regard to Partial Safety Factors | Yolcu Sever and Dirk Schlicke                                |
| 113 | Punching shear of post-tensioned steel fibre reinforced concrete elevated slabs without longitudinal reinforcement    | Chiara Gaddi, Matteo Colombo and Marco di Prisco             |
| 160 | Shear Resistance of Prestressed Beams: Experimental Validation and Parametric Nonlinear Analysis                      | Jaroslav Baran, Viktor Borzovič and Fernando Gonzalez-Vidoso |
| 201 | Robustness of prestressed concrete columns  | Jonas Knitl  |

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|     | Session 9-2<br>Topic: Assessment and structural health monitoring   | Room 2   |
| 53  | Solving Inverse Problems using Machine Learning-aided Optimization Method   | Bohumil Šplíchal, David Lehký, Hana Šimonová, Barbara Kucharczyková and Katarína Lamperová |
| 174 | Utilizing IoT, ML and AI to Extend the service life of RC Structures and develop Maintenance Strategy             | Saeideh Faghfouri and Alfred Strauss   |
| 136 | Digital performance and lifetime assessment of concrete structures interacting with soil, environment and climate | Benjamin Täubling-Frueux and Alfred Strauss  |
| 229 | Digital Twin-Based Health Monitoring and Damage Detection for Reinforced Concrete Bridges                         | Asseel Al-Hijazeen and Kálmán Koris  |

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|     | Session 9-3<br>Topic: Structural analysis, modeling and design   | Room 3  |
| 173 | Adjustment of sensitivity factors for the assessment of reinforced concrete Portal-Frame underpass short span bridge | Midula Alam, Francis Lavergne, Silvia Ientile, André Orcesi and Franziska Schmidt |
| 183 | Switch-free Harmonic Vibrations of Multi-Degree-of-Freedom Piecewise Linear Elastic Structures                       | Bilal Alzubaidi   |
| 185 | Design-Based Material Optimisation of Reinforced Concrete Structures   | Jeff Larsen, Peter Noe Poulsen, John Forbes Olesen and Linh Cao Hoang             |
| 220 | A Computer Vision Method to Measure Distribution of Crack Characteristics in Reinforced Concrete Elements            | Morteza Hagh, Stephen Foster and Hamid Vali Pour                                  |

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|     | Session 9-4<br>Topic: Buildings and shells   | Room 4  |
| 106 | Influence of surface characteristics on the connection of reused concrete members with detachable dry joints                 | Ben Stöhr and Alexander Stark                                     |
| 109 | A Rapid Digital Pre-design Process for Functionally Graded Concrete With Mineral Void Formers                                | Carl Niklas Haufe, David Nigl, Benedikt Strahm and Lucio Blandini |
| 110 | Modular construction using precast concrete elements: Investigations on the erection of prestressed modular shell structures | Felix Hofmann and Alexander Stark                                 |
| 140 | Nonlinear Modeling and Machine Learning for Interstorey Damage State Classification in 10-Story RC Frame Building            | Filip Đorđević and Marko Marinković                               |