IABSE 2022 PRAGUE

IABSE

25–27 May 2022

IABSE Symposium Prague 2022

Challenges for Existing and Oncoming Structures

Preliminary Technical Programme

ORGANISED BY

CZECH GROUP OF IABSE

Czech Group IABSE

IN COOPERATION WITH

CZECH TECHNICAL UNIVERSITY PRAGUE

CTU CZECH TECHNICAL UNIVERSITY IN PRAGUE

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Programme at Glance

Wednesday, 25 May 2022

	Forum Hall	North Hall	Terrace 2 A	Terrace 2 B	South Hall 2 B
08:30	**Plenary Session:** Opening Ceremony				
09:00					
09:30	**Keynote Session:** Keynote Lectures I				
10:00					
10:30					
11:00	Coffee Break – Foyer/Exhibition Area				
11:30	**Special Session:** The Storstrøm Bridge in Denmark – Challenges in Design and Construction	**Scientific Session:** Advanced Bridge Solution	**Special Session:** Structural Steel Connection Design – Challenges and Vision	**Scientific Session:** Wind, Vibrations and Fatigue	**Scientific Session:** Experimental Design of Structures
12:00					
12:30					
13:00	Lunch – Foyer/Exhibition Area				
13:30					
14:00	**Special Session:** Ultra-High-Performance Concrete is Ready to Revolutionize	**Scientific Session:** Structural Health Monitoring	**Scientific Session:** Coming up Standards	**Scientific Session:** Seismic and Dynamic Design	**Scientific Session:** Diagnostics of Bridges
14:30					
15:00					
15:30	Coffee Break – Foyer/Exhibition Area				
16:00	**Scientific Session:** Railway Bridges	**Scientific Session:** Fatigue I	**Scientific Session:** Damage Repair and Retrofitting I	**Scientific Session:** Steel Connections	**Scientific Session:** Seismic Design and Testing
16:30					
17:00					
17:30	**Social Programme:** Welcome Reception – Foyer/Exhibition Area				
18:00					
18:30					
19:00					
19:30					

Thursday, 26 May 2022

	Forum Hall	North Hall	Terrace 2 A	Terrace 2 B	South Hall 2 B
09:00	**Keynote Session:** Keynote Lectures II				
09:30					
10:00					
10:30	Coffee Break – Foyer/Exhibition Area				
11:00	**Scientific Session:** Landmark Bridges	**Special Session:** Bridge Management System and Building Information Modelling: Challenges and vision 1	**Scientific Session:** Advanced Modelling I	**Scientific Session:** Fatigue II	**Scientific Session:** Strengthening of Bridges I
11:30					
12:00					
12:30	Lunch – Foyer/Exhibition Area				
13:00					
13:30					
14:00	**Scientific Session:** Assessment of Existing Bridges I	**Special Session:** Bridge Management System and Building Information Modelling: Challenges and Vision 2	**Special Session:** Membrane Structures – Recent Achievements in Practice and Standardization	**Scientific Session:** New Bridge Solutions	**Scientific Session:** Footbridges
14:30					
15:00					
15:30	Coffee Break – Foyer/Exhibition Area				
16:00	**Scientific Session:** Architecture and Structures	**Scientific Session:** Assessment of Existing Bridges II	**Scientific Session:** Bolts and Anchors	**Scientific Session:** Damage Repair and Retrofitting II	**Scientific Session:** Innovative Materials and Solutions
16:30					
17:00					
17:30					
19:30	**Social Programme:** Gala Dinner – Restaurant Mlýnec				
20:00					
20:30					
21:00					
21:30					
22:00					

Friday, 27 May 2022

	Forum Hall	North Hall	Terrace 2 A	Terrace 2 B	South Hall 2 B
09:00	**Keynote Session:** Keynote Lectures III				
09:30					
10:00					
10:30	Coffee Break – Foyer/Exhibition Area				
11:00	**Scientific Session:** Large Bridges	**Special Session:** New European Standardisation on Monitoring, Safety Assessment and Bridge Maintenance	**Scientific Session:** Advanced Modelling II	**Scientific Session:** Infrastructure Design	**Special Session:** Steel Structure Design Assisted by Finite Element Analysis
11:30					
12:00					
12:30	Lunch – Foyer/Exhibition Area				
13:00					
13:30					
14:00	**Scientific Session:** Dynamic Analysis of Bridges	**Scientific Session:** Composite and Non-steel Materials – Structures and Bridges	**Scientific Session:** Challenging Bridges	**Scientific Session:** Seismic Design	**Scientific Session:** Dynamics of Structures
14:30					
15:00					
15:30	Coffee Break – Foyer/Exhibition Area				
16:00	**Scientific Session:** Advanced Models of Structures and Bridges II	**Scientific Session:** Design by FEA	**Scientific Session:** Bridge Details and Solutions	**Scientific Session:** Modern Methods of Design and Models	**Scientific Session:** Bridges and Bridge Modelling
16:30					
17:00					
17:30					
17:45	**Plenary Session:** Closing Ceremony				
18:15					

Scientific Programme Itinerary

IABSE Symposium Prague 2022
25–27 May 2022

Wednesday, 25 May 2022

Plenary Session: Opening Ceremony

08:30–09:30 FORUM HALL

Keynote Session: Keynote Lectures I

09:30–11:00 FORUM HALL

Chairs: Pavel Ryjáček, *Czech Republic,*
Ysabel Guil Celada, *Spain*

09:30 **Carbon Concrete – Towards a climate neutral building industry**
Manfred Curbach, *Germany*

10:15 **Multilevel FEA and BIM for the design of structural steel**
František Wald, *Czech Republic*

Coffee Break

11:00–11:30 FOYER/EXHIBITION AREA

Special Session: The Storstrøm Bridge in Denmark – Challenges in Design and Construction

11:30–13:00 FORUM HALL

Chairs: Martin Svendsen, *Denmark,*
Marco Raimondi, *Denmark*

11:30 **The New Storstrøm Bridge – From tender requirements to reality**
Barbara MacAulay, *Denmark*

11:43 **Independent check and validation activities for the New Storstrøm Bridge**

Ysabel Guil Celada, *Spain*

11:56 **The New Storstrøm Bridge – Construction tolerances and precast structures installation challenges**

Marco Raimondi, *Denmark*

12:09 **The New Storstrøm Bridge – Pier Design**

Michael Needham, *United Kingdom*

12:22 **The New Storstrøm Bridge – Prestressed Box Girder Design**

Luca Cargnino, *Denmark*

12:35 **The New Storstrøm Bridge – Pylon and Stay Cable Design**

James Wharton, *United Kingdom*

12:48 **Discussion**

Scientific Session: Advanced Bridge Solution

11:30–13:00 NORTH HALL

Chairs: Pablo Tarín, *Spain,*
Nagy Zsolt, *Romania*

11:30 **Weathering Steel Bridges – the New European ECCS Design Guide**

Peter Hatke, *Germany*

11:45 **Economical Steel Bridges**

Martin Van Leeuwen, *Belgium*

12:00 **Structural stress analyses of long-span railway extradosed cable-stayed bridge based on rational construction state**

Bruno Briseghella, *China*

12:15 **Methods and technologies for evaluating and minimising noise from road bridge expansion joints**

Simon Hoffmann, *Switzerland*

12:30 **Modular composite bridges with integral sheet piling abutments for a time efficient construction**

Mike Tibolt, *Luxembourg*

12:45 **Discussion**

Special Session: Structural Steel Connection Design – Challenges and Vision

11:30–13:00 **TERRACE 2 A**

Chair: Milan Veljkovic, *Netherlands*

11:30 **Experimental Database on Resistance of Hybrid Joints with High-strength Bolts and Epoxy Adhesive**

Hitoshi Moriyama, *Japan*

11:45 **Mechanical behavior of multi-row riveted joint partially replaced by high strength bolts**

Yu Chen, *Japan*

12:00 **Numerical and experimental analysis of hanger-arch connections for tied arch bridges with rolled sections**

Riccardo Zanon, *Luxembourg*

12:15 **Experimental study on the cooperative slip/bearing limit state of high-strength bolted frictional girder connection**

Ryo Sakura, *Japan*

12:30 **Development of Ductile Cast Iron Components to Shorten On-site Assembly of Existing Steel Earth-Retaining Beams**

Yuma Sugimoto, *Japan*

12:45 **Discussion**

Scientific Session: Wind, Vibrations and Fatigue

11:30–13:00 **TERRACE 2 B**

Chair: Alexandre Mathern, *Sweden*

11:30 **Active moment connection system for mitigating wind-induced vibrations**

Anurag Bura, *USA*

11:45 **Recent and future trends of onshore wind turbine foundations**

Jesus Armesto Barros, *Sweden*

12:00 **Development of an accurate low-cost device for structural vibration acquisition**

Seyedmilad Komarizadehasl, *Spain*

12:15 **Improving of fatigue assessment method for stud shear connectors using experimental data from studs' test of existing road bridge**

Nikolai Kozak, *Russian Federation*

12:30 **Collapse Fragility Development of Electrical Transmission Towers Subjected to Hurricanes**

Jerome Hajjar, *USA*

12:45 **Discussion**

Scientific Session: Experimental Design of Structures

11:30–13:00 SOUTH HALL 2 B

Chair: Abdelhamid Bouchair, *France*

11:30 **Experimental study of the shallow wide-flange steel beam-column under cyclic Loading with constant compressive axial fotce**

Atsushi Sato, *Japan*

11:45 **A state-of-the-art, flexible, easy-to-replace plug-type expansion joint for the Delaware Memorial Bridges**

Gustav Gallai, *Austria*

12:00 **Structural characteristics and analysis simulation of new Core Truss structure**

Shunichi Nakagawa, *Japan*

12:15 **Experimental Testing of Mechanical Splices for Titanium Alloy Bars**

Mustafa Mashal, *USA*

12:30 **Large-Scale Flexural Testing of Concrete Beams Reinforced with Conventional Steel and Titanium Alloy Bars**

Mustafa Mashal, *USA*

12:45 **Discussion**

Lunch

13:00–14:00 FOYER/EXHIBITION AREA

Special Session: Ultra-High-Performance Concrete is Ready to Revolutionize

14:00–15:30 FORUM HALL

Chair: Eugen Brühwiler, *Switzerland,*
Petr Tej, *Czech Republic*

14:00 **Short span UHPFRC railway bridge in Switzerland – from design to implementation**

Ngoc Thanh Trinh, *Switzerland*

14:15 **Design and construction of the "Chaumény" footbridge in posttensioned UHPFRC**

Eugen Brühwiler, *Switzerland*

14:30 **Development of timber–UHPC composite bridge system**

Milan Holý, *Czech Republic*

14:45 **Use of fibre reinforcement concrete for encased composite bridge sections – an opportunity?**

Riccardo Zanon, *Luxembourg*

15:00 **New UHPFRC footbridges in the Czech Republic**

Petr Tej, *Czech Republic*

15:15 **Discussion**

Scientific Session: Structural Health Monitoring

14:00–15:30 NORTH HALL

Chair: Robert Veit-Egerer, *Austria,*
Miloš Drdácký, *Czech Republic*

14:00 **Structural Health Monitoring of the Canakkale Bridge in Turkey, the largest monitoring system for the longer bridge in the world**

Stephane Joye, *France*

14:15 **Monitoring to secure the Ile-de-Ré Viaduct, France**

Stephane Joye, *France*

14:30 **Periodic assessment of an old concrete road bridge based on operational dynamic bridge behaviour with regard to structural integrity and the remaining load bearing capacity**

Robert Veit-Egerer, *Austria*

14:45 **A Framework for Automated Bridge Inspections and Assessments with Visual Sensing Technology**

Jerome Hajjar, *USA*

15:00 **Monitoring and assessment of bridge cable stays consisting of bundles of fully locked coil ropes**

Rudolf Aroch, *Slovakia*

15:15 **Discussion**

Scientific Session: Coming up Standards

14:00–15:30 TERRACE 2 A

Chair: Michael Schäfers, *Germany*

14:00 **Risk-Based Design of Bridges**
Dana Prochazkova, *Czech Republic*

14:15 **Shear design of composite columns with sheet metal sections**
Michael Schäfers, *Germany*

14:30 **From ETAG to EADs – The ongoing development of the European regulatory system governing the design and manufacture of bridge expansion joints**
Simon Hoffmann, *Switzerland*

14:45 **Beam-column behaviour of stainless steel I-section members**
Michal Jandera, *Czech Republic*

15:00 **Safety level of longitudinally stiffened plates under biaxial loading considering different launching bearings and eccentricities**
Nadine Maier, *Germany*

15:15 **Discussion**

Scientific Session: Seismic and Dynamic Design

14:00–15:30 TERRACE 2 B

14:00 **Seismic Performance Evaluation of an Existing Low-Rise RC Building after Strengthening using the Nonlinear Static Procedure**
Samard Buddee, *Thailand*

14:15 **Standardized Seismic Design of Modular High-rise Steel Structure Equipped with Viscous Dampers**
Gang Wang, *China*

14:30 **Development of simplified Bridge-Weigh-In-Motion based on displacement evaluation using an accelerometer**
Nanami Ashizawa, *Japan*

14:45 **Development of a 3D Finite-Element Modelling Technique Based on Data Processing Platform and Fatigue Analysis of Full-Scale Reinforced-Concrete Bridge Deck**
Taiju Yoneda, *Japan*

15:00 **Proposal of nonlinear buffeting analysis framework for long-span bridges using Volterra series-based non-stationary wind force model**
Aleena Saleem, *Japan*

15:15 **Discussion**

Scientific Session: Diagnostics of Bridges

14:00–15:30 SOUTH HALL 2 B

Chairs: Vanessa Saback, *Sweden*,
Kouichi Takeya, *Japan*

14:00 **Subsurface defect detection in concretes by active infrared thermography**
Masoud Pedram, *United Kingdom*

14:15 **Crack monitoring by fibre optics and image correlation: a pilot study**
Vanessa Saback, *Sweden*

14:30 **Physics-informed Gaussian process model for Euler-Bernoulli beam elements**
Gledson Rodrigo Tondo, *Germany*

14:45 **Damage detection in concrete with coda wave interferometry using a 60 kHz ultrasonic signal**
Stefan Grabke, *Germany*

15:00 **Design of energy harvesting from temperature difference in concrete bridges**
Kouichi Takeya, *Japan*

15:15 **Discussion**

Coffee Break

15:30–16:00 FOYER/EXHIBITION AREA

Scientific Session: Railway Bridges

16:00–17:30 FORUM HALL

Chairs: Jakub Dolejš, *Czech Republic*,
Jindřich Potůček, *Czech Republic*

16:00 **Replacing of a steel bridge by a rotation around the longitudinal axis**
Jakub Dolejš, *Czech Republic*

16:15 **Structural analysis of a historical masonry arch railway bridge in Gata de Gorgos, using a commercial Finite Element Analysis software**
Pablo Tarín, *Spain*

16:30 **The design of the anchoring of the steel double track railway integral bridge in Mechelen contrasting the historical Vierendeel bridges**
Bart De Pauw, *Belgium*

16:45 **System identification and finite element model updating of a multi-span railway bridge with uncertain boundary conditions**
Emrah Erduran, *Norway*

17:00 **Railway bridges – Monuments in the network**

Johanna Monka, *Germany*

17:15 **Discussion**

Scientific Session: Fatigue I

16:00–17:30 NORTH HALL

Chairs: Lisa-Marie Gölz, *Germany,*
Philippe Van Bogaert, *Belgium*

16:00 **Fatigue behaviour of cracked concrete decks under cyclic shear loading**

Lena Stempniewski, *Germany*

16:15 **Fatigue analysis of existing railway bridges: strengthening through geometry improvement**

Hans Pétursson, *Sweden*

16:30 **Fatigue behaviour of tubular bracings in steel and composite bridges**

Lisa-Marie Gölz, *Germany*

16:45 **Experimental and numerical investigations on the fatigue behavior of high-strength concrete under combined shear-compression loading**

Henrik Becks, *Germany*

17:00 **The effect of undue transverse welding on the fatigue resistance of hanger connections for steel tied arch bridges**

Philippe Van Bogaert, *Belgium*

17:15 **Discussion**

Scientific Session: Damage Repair and Retrofitting I

16:00–17:30 TERRACE 2 A

Chairs: Rob Vergoossen, *Netherlands,*
Milan Veljkovic, *Netherlands*

16:00 **West Seattle bridge rehabilitation**

Jan Žitný, *Czech Republic*

16:15 **Re-using existing prefabricated prestressed concrete girders in new bridges**

Rob Vergoossen, *Netherlands*

16:30 **Structural Assessment of existing masonry arch bridges**

Thomas Harrewijn, *Netherlands*

16:45 **Shear performance of replaced bolt shear connectors used in prefabricated steel-concrete composite beams**

Milan Veljkovic, *Netherlands*

17:00 **D4R7. Prievoz Interchange refurbishment at Bratislava**

Wojciech Wlodzimirski, *Poland*

17:15 **Discussion**

Scientific Session: Steel Connections

16:00–17:30 TERRACE 2 B

16:00 **An experimental and numerical approach to investigate the load – deformation behavior of anchorages with headed fasteners in reinforced-concrete columns**

Taygun Firat Yolacan, *Luxembourg*

16:15 **An experimental investigation on base-plate joints of steel storage pallet racks**

Riccardo Zandonini, *Italy*

16:30 **Prototype of no-projected and Sandglass-shaped Bolt Having High Strength and Durability for Efficient Steel Structures Maintenance**

Tatsuya Hashimoto, *Japan*

16:45 **Investigating strength and stiffness of out-of-plane bending by biaxial testing of a nailed glulam connection**

Oskar Ranefjärd, *Sweden*

17:00 **New possibilities with the use of automated laser- laser-hybrid welding methods for steel bridges**

Johannes Veie, *Norway*

17:15 **Discussion**

Scientific Session: Seismic Design and Testing

16:00–17:30 SOUTH HALL 2 B

Chair: Taiki Giga, *Japan*

16:00 **Influence of design criteria on the seismic response of single-storey steel buildings**

Nicola Ceccolini, *Italy*

16:15 **Evaluation of Seismic Performance and Proposing the reinforcement methods for the Bridge with Rocking Piers Penetrating the Railway Platform**

Taiki Giga, *Japan*

16:30 **Experimental study of potential bearing uplift of long-span cable-stayed bridges under earthquakes**

Wei Guo, *China*

16:45 **Evaluation of bidirectional seismic input compatible with a maximum-direction target spectrum**

Alan Rivera-Figueroa, *Puerto Rico*

17:00 **Dynamic responses and failure pattern of suspended cable tray system through shaking table test**

Chen Wu, *China*

17:15 **Discussion**

Social Programme: Welcome Reception

17:30–19:30 FOYER/EXHIBITION AREA

Thursday, 26 May 2022

Keynote Session: Keynote Lectures II

09:00–10:30 FORUM HALL

Chair: Jan Vítek, *Czech Republic*

09:00 **UHPFRC is ready to revolutionize existing and new structures**

Eugen Brühwiler, *Switzerland*

09:45 **Extrapolation of test data in time, size and risk – a challenge for concrete design codes**

Zdeněk P. Bažant, *USA*

Coffee Break

10:30–11:00 FOYER/EXHIBITION AREA

Scientific Session: Landmark Bridges

11:00–12:30 FORUM HALL

Chair: Rasmus Rempling, *Sweden*

11:00 **Pelješac Bridge – design and construction**

Marjan Pipenbaher, *Slovenia*

11:15 **New Pumarejo bridge over Magdalena river**

Miguel Ortega, *Spain*

11:30 **The Design of the new Storstrom Bridge: design philosophy, structural concepts, fundamental design and innovative Construction Methods**

Mario de Miranda, *Italy*

11:45 **Process and methods for verification of performance requirements for transport infrastructure**

Rasmus Rempling, *Sweden*

12:00 **The New Little Belt Bridge – the role of the physical model and it's digital twin for the first suspension bridge in Denmark**

Baris Wenzel, *Germany*

12:15 **Discussion**

Special Session: Bridge Management System and Building Information Modelling: Challenges and vision 1

11:00–12:30 NORTH HALL

Chairs: Vanja Samec, *Austria,*
Rade Hajdin, *Switzerland*

11:00 **BIM and BMS: current status and challenges**

Rade Hajdin, *Switzerland*

11:15 **From data to bridge information model**

Eetu Partala, *Finland*

11:30 **Geometry as a common ground for BMS and BIM**

Dušan Isailović, *Serbia*

11:45 **Creating digital twins of existing bridges through AI-based methods**

M. Saeed Mafipour, *Germany*

12:00 **Bridge Condition Assessment Based on Image Data and Digital Twins**

Marcel Helmrich, *Germany*

12:15 **Discussion**

Scientific Session: Advanced Modelling I

11:00–12:30 TERRACE 2 A

Chair: Wolfgang Bachofner, *Austria,*
Jörg-Martin Hohberg, *Switzerland*

11:00 **Long-term concrete strain measurements of large-scale experiments exposed to environmental effects**
Wolfgang Bachofner, *Austria*

11:15 **Strength assessment of prestressed concrete sections under the combined action of internal forces**
Filip Svoboda, *Czech Republic*

11:30 **Analysis of Machine Learning for Detect Concrete Crack Depths Using Infrared Thermography Technique**
Young K. Ju, *Republic of Korea*

11:45 **Rehabilitation of Earth Retaining Wall for Slope Failure due to Strength Reduction and Seismic Accelleration, Considering Nonlinear Soil-Structure Interaction**
Jörg-Martin Hohberg, *Switzerland*

12:00 **Modelling rebar-concrete interaction, (bond) with a mesh-objective equivalent transition layer scheme for FE analysis of RC structures**
Hongning Ye, *United Kingdom*

12:15 **Discussion**

Scientific Session: Fatigue II

11:00–12:30 TERRACE 2 B

Chair: Atte Mikkonen, *Finland,*
Dana Procházková, *Czech Republic*

11:00 **Study on the Improvement of Fatigue Durability of Steel Box Girder Corner Plate by Peening at the Un-welded Area**
Takamitsu Nishishiba, *Japan*

11:15 **Cracking and Fatigue in Heavy Loaded Prestressed Concrete Bridge in Sweden**
Jaime Gonzalez-Libreros, *Sweden*

11:30 **Experimental investigations of welding induced temperature gradients and distortions in a segment of OSD**
Arvid Maarleveld, *Netherlands*

11:45 **Behavior of Othotropic Steel-UHPC Composite Bridge Deck under Cyclic Loading**

Zhanchong Shi, *China*

12:00 **Verification of fatigue load model for stay cables**

Atte Mikkonen, *Finland*

12:15 **Discussion**

Scientific Session: Strengthening of Bridges I

11:00–12:30 SOUTH HALL 2 B

Chairs: Paul Herrmann, *Austria,*
Dimitra Achillopoulou, *Greece*

11:00 **Refurbishment, Strengthening and Retrofitting of Façades to increase Seismic Resistances**

Matthias Roik, *Germany*

11:15 **Strengthening of road composite bridge using Fe-SMA**

Jakub Vůjtěch, *Czech Republic*

11:30 **Refurbishment of Franzensbrücke in Vienna- retrofitting a historical steel arch bridge with composite plate in between limited time frame, restrictive urban environment and challenging structural requirements**

Paul Herrmann, *Austria*

11:45 **Efficiency of adhesive layers in strengthening schemes or concrete elements**

Dimitra Achillopoulou, *Greece*

12:00 **Influence of Material Stiffness on Bond Behaviour for CFRP and BFRP Strips Glued to Concrete Surface**

Szymon Grzesiak, *Germany*

12:15 **Discussion**

Lunch

12:30–14:00 FOYER/EXHIBITION AREA

Scientific Session: Assessment of Existing Bridges I

14:00–15:30 **FORUM HALL**

Chair: Miguel Ortega, *Spain*,
Ioannis Retzepis, *Germany*

14:00 **The assessment and condition survey of concrete prestressed bridges in the Czech railway network**
Pavel Ryjáček, *Czech Republic*

14:15 **Evaluation Methods for the Existing Infrastructure in Germany**
Ioannis Retzepis, *Germany*

14:30 **Condition assessment of the steel riveted roof structure of heritage value building in Sofia, Bulgaria**
Dimitar Dakov, *Bulgaria*

14:45 **Assessment and retrofitting of existing infrastructures in urban area**
Theodoros Tzaveas, *Qatar*

15:00 **Equilibrium verification of a steel bridge based on wind tunnel testing, traffic and wind speed probabilistic model**
Jan Žitný, *Czech Republic*

15:15 **Discussion**

Special Session: Bridge Management System and Building Information Modelling: Challenges and Vision 2

14:00–15:30 **NORTH HALL**

Chair: Vanja Samec, *Austria*

14:00 **Enhancement in Indian Bridge Management System (IBMS) using analytics within BIM data model**
Sachidanand Joshi, *India*

14:15 **Information is for Life not just for BIM Models**
Philip Jackson, *United Kingdom*

14:30 **BMS and BIM: the Portuguese scenario**
José Matos, *Portugal*

14:45 **Transportation Infrastructure Mega Project in China Upgrading the 4th Ring Transportation Corridor in Zhengzhou, Henan, China**
Gernot Komar, *USA*

15:00 **Correlation between early- and later-age performance indices of early frost-damaged concrete**

Liu Dongyun, *Sweden*

15:15 **Discussion**

Special Session: Membrane Structures – Recent Achievements in Practice and Standardization

14:00–15:30 TERRACE 2 A

Chair: Jörg Uhlemann, *Germany,*
Vipul Surana, *India*

14:00 **Design-driven Uniaxial and Biaxial Tensile Testing of Knitted Fabrics Applied to Construction**

Alara Kutlu, *Italy*

14:15 **European harmonized design for membrane structures**

Jörg Uhlemann, *Germany*

14:30 **Developing weathering induced ageing strength modification factors for PVC-coated polyethylene terephthalate fabrics**

Hastia Asadi, *Germany*

14:45 **Comparison of Stainless Steel with HYSD Rebars**

Vipul Surana, *India*

15:00 **FC Cincinnati, TQL Stadium featuring an elegant, efficient roof over a complex seating arrangement and a structural façade supporting state-of-the-art dynamic lighting technology was built to a fast-track schedule**

Joe Darcy, *United Kingdom*

15:15 **Discussion**

Scientific Session: New Bridge Solutions

14:00–15:30 TERRACE 2 B

Chair: Niklas Schweer, *Germany*

14:00 **Design and construction of the Second Hinterrhein Bridge**

Andreas Galmarini, *Switzerland*

14:15 **Effects of Truck Platooning on Highway Bridges**

Marian Ralbovsky, *Austria*

14:30 **Design and structural behavior analysis of a balanced cantilever bridge with a below suspended bicycle and pedestrian bridge**
Niklas Schweer, *Germany*

14:45 **Building bridges from thin-walled pre-cast elements**
Franz Untermarzoner, *Austria*

15:00 **Integral VFT-RS composite bridges – Efficient standard highway overpasses**
Riccardo Zanon, *Luxembourg*

15:15 **Discussion**

Scientific Session: Footbridges

14:00–15:30 SOUTH HALL 2 B

Chair: Vojtěch Kolínský, *Czech Republic,*
Pablo Tarín, *Spain*

14:00 **New Prague footbridge connecting the districts of Holešovice and Karlín**
Petr Tej, *Czech Republic*

14:15 **Neby Bru: one footpath, three ways of sustainability**
Pablo Tarín, *Spain*

14:30 **Analysis of the Florida University Pedestrian Bridge Collapse**
Vojtěch Kolínský, *Czech Republic*

14:45 **Bru over Otra, a new footbridge in Kristiansand (Norway)**
Birger Opgård, *Norway*

15:00 **Pedestrian bridge over the River Elbe in Hradec Králové**
Jiří Keclík, *Czech Republic*

15:15 **Discussion**

Coffee Break

15:30–16:00 FOYER/EXHIBITION AREA

Scientific Session: Architecture and Structures

16:00–17:30 FORUM HALL

Chair: Petr Tej, *Czech Republic,*
Elif Ünalan, *Kuwait*

16:00 **Above Or Below – This Is The Question**
Cezary Bednarski, *United Kingdom*

16:15 **1 Triton Square – Structural reuse for low-carbon architecture**
Eric Sturel, *United Kingdom*

16:30 **Education City Stadium, Doha, Qatar**
Johanna Isaksson, *United Kingdom*

16:45 **3D scanning applications in structural design**
Zsolt Nagy, *Romania*

17:00 **Challenges of a Bridge Design in Tight Urban Areas**
Elif Ünalan, *Kuwait*

17:15 **Discussion**

Scientific Session: Assessment of Existing Bridges II

16:00–17:30 NORTH HALL

Chair: Jaroslav Odrobiňák, *Slovakia,*
Jaime Gonzalez-Libreros, *Sweden*

16:00 **Stochastic degradation model analysis for prestressed concrete bridges**
José Matos, *Portugal*

16:15 **Trough constructions on arched bridges**
Conrad Pelka, *Germany*

16:30 **Torsion of a Norwegian bridge with partial box-action – a case study**
Victor Vestman, *Sweden*

16:45 **Evaluation of Riveted Railway Bridge Using Experimental-Numerical Analyses**
Jaroslav Odrobiňák, *Slovakia*

17:00 **Assessment of available methodologies to evaluate residual prestressing forces in concrete bridges**
Angélica María Agredo, *Sweden*

17:15 **Discussion**

Scientific Session: Bolts and Anchors

16:00–17:30 TERRACE 2 A

Chair: František Wald, *Czech Republic*

16:00 **Quasi-static load bearing behaviour of hybrid grouted joints**
Jakob Boretzki, *Germany*

16:15 **Proposal of Ultrasonic Bolt Axial Force Evaluation Method Using Machine Learning and Signal Processing**

Kensho Hirao, *Japan*

16:30 **Advancement of Eddy Current Based Evaluation of Axial Force of High-Strength Bolts**

Ayako Akutsu, *Japan*

16:45 **Durability of Rock and Soil Anchor Kits Using Prestressing Steel Strands**

Xiaomeng Wang, *Switzerland*

17:00 **Improvement of high slip coefficient of the combined joint using adhesive and high strength frictional bolts**

Sae Fukutsuji, *Japan*

17:15 **Discussion**

Scientific Session: Damage Repair and Retrofitting II

16:00–17:30 TERRACE 2 B

Chair: Rudolf Aroch, *Slovakia*

16:00 **Rehabilitation and Strengthening of Bridges over Boa Vista River**

Marcelo Melo Filho, *Brazil*

16:15 **Potential of memory steel reinforcement for shear strengthening of concrete bridge girders with I-sections**

Muhammad Arslan Yaqub, *Belgium*

16:30 **Repair effect of externally bonded CFRP on propagation life of fatigue cracks initiated at in-plane welded gusset joints**

Atsushi Matano, *Japan*

16:45 **Temperatures during weld repair in orthotropic steel decks**

Rudolf Aroch, *Slovakia*

17:00 **Influence of anchor length and drilled hole on mechanical behaviour of masonry column structures strengthened with bonded anchor**

Daisuke Sasaki, *Japan*

17:15 **Discussion**

Scientific Session: Innovative Materials and Solutions

16:00–17:30 SOUTH HALL 2 B

Chairs: Mario Rando Campos, *Norway,*
Cosmin Chiorean, *Romania*

16:00 **Fly ash Based Banana Fiber-reinforced Geopolymer Mortar**
Vincent Pilien, *Philippines*

16:15 **Mechanical performance of Alkali Treated Kawayan Tinik Bamboo Fiber Textile**
Roneh Glenn Libre Jr., *Philippines*

16:30 **SporX – Design and construction of a ten-storey timber building in Drammen, Norway**
Mario Rando Campos, *Norway*

16:45 **Control of fatigue in hydraulic steel structures**
Ryszard Daniel, *Netherlands*

17:00 **Analysis and Design of Link Slab in Steel-Concrete Composite Bridge**
Liang XIAO, *China*

17:15 **Discussion**

Friday, 27 May 2022

Keynote Session: Keynote Lectures III

09:00–10:30 FORUM HALL

Chairs: Birger Opgård, *Norway,*
Michal Jandera, *Czech Republic*

09:00 **The bridges in Italy: how to manage the infrastructural heritage guaranteeing safety and sustainability**
Marco Di Prisco, *Italy*

09:45 **Steel structure design assisted by finite element analysis**
László Dunai, *Hungary*

Coffee Break

10:30–11:00 FOYER/EXHIBITION AREA

Scientific Session: Large Bridges

11:00–12:30 **FORUM HALL**

Chair: Bartlomiej Halaczek, *United Kingdom*

11:00 **Braila Suspension Bridge: Construction Methodology of the Pylons**
Oguz Berber, *Romania*

11:15 **The new City Bridge in Drammen, Norway: Designing a new urban landmark for an extreme environment**
Bartlomiej Halaczek, *United Kingdom*

11:30 **Reconstruction of the Vilemov Viaduct on the railway line Rumburk-Sebnitz**
Marek Rusňák, *Czech Republic*

11:45 **The new City Bridge of Drammen: An structural insight**
Birger Opgård, *Norway*

12:00 **Quisi Bridge: a new route for the railway line in Alicante, Spain**
Manuel Sánchez-Solís, *Spain*

12:15 **Discussion**

Special Session: New European Standardisation on Monitoring, Safety Assessment and Bridge Maintenance

11:00–12:30 **NORTH HALL**

Chair: Diego Lorenzo Allaix, *Netherlands*

11:00 **Standardization of structural performance monitoring: existing documents and open questions**
Maria Pina Limongelli, *Italy*

11:15 **Review of surveying and non-destructive techniques for the condition assessment of in-service bridges**
Ana Sánchez Rodríguez, *Spain*

11:30 **Numerical model updating of an ageing bridge based on multidisciplinary experimental campaign**
Brais Barros González, *Spain*

11:45 **Review of the current state of standardisation on monitoring, data-informed safety assessment and decision-making regarding maintenance of the transport infrastructure**
Diego Lorenzo Allaix, *Netherlands*

12:00 **Future perspectives of standardisation for a safe European transport infrastructure**

Diego Lorenzo Allaix, *Netherlands*

12:15 **Discussion**

Scientific Session: Advanced Modelling II

11:00–12:30 TERRACE 2 A

Chairs: Richard Stroetmann, *Germany*,
Martina Eliášová, *Czech Republic*

11:00 **Advanced modeling of concrete bridges**

Jan Cervenka, *Czech Republic*

11:15 **New beam element for horizontally curved steel-concrete composite box girder bridges**

Iván Campo-Rumoroso, *Spain*

11:30 **Toward crack-based assessment of shear-distressed reinforced concrete infrastructure**

Jarrod Zaborac, *USA*

11:45 **Design for Manufacturing and Assembly-Oriented Parametric Modelling of Prefabricated Bridges**

Cuong Nguyen, *Republic of Korea*

12:00 **Discussion**

Scientific Session: Infrastructure Design

11:00–12:30 TERRACE 2 B

Chair: Michele W.T. Mak, *United Kingdom*,
Michal Jandera, *Czech Republic*

11:00 **New reinforcement concept for radial joints of precast tunnel segments**

Clemens Proksch-Weilguni, *Austria*

11:15 **Influence of large-scale asperities on the stability of concrete dams**

Adrian Ulfberg, *Sweden*

11:30 **Assessment of scour risk in hydraulic infrastructures. A bridge case study**

Ana Margarida Bento, *Portugal*

11:45 **Shear design in concrete beams without transverse reinforcement – A comparative study**

Michele W.T. Mak, *United Kingdom*

12:00 **Fatigue-resistant design of modular bridge structures made of precast concrete elements**

David Schaarschmidt, *Germany*

12:15 **Discussion**

Special Session: Design Assisted by Finite Element Analysis

11:00–12:30 SOUTH HALL 2 B

Chair: László Dunai, *Hungary,*
Mohammad Ashour, *Kuwait*

11:00 **Finite element analysis of wind turbine tower with a tapered cross-section using various finite element models**

Mohammad Ashour, *Kuwait*

11:15 **Application of ABAQUS secondary development in finite element analysis of rebar behavior in reinforced concrete member**

Wang Yang, *China*

11:30 **Evaluation of Prestressed Reinforced Concrete Slab Punching Shear Using Finite Element Method**

Zhi Zhang, *USA*

11:45 **Numerical Investigation of Slab-Column Connections with Various Reinforcement Ratios**

Hadi Panahi, *Canada*

12:00 **Nonlinear analysis of reinforced concrete structural elements**

Ananth Ramaswamy, *India*

12:15 **Discussion**

Lunch

12:30–14:00 FOYER/EXHIBITION AREA

Scientific Session: Dynamic Analysis of Bridges

14:00–15:30 FORUM HALL

Chairs: Martin Svendsen, *Denmark,*
Antonia M. Kohl, *Germany*

14:00 **Advanced analysis of a pedestrian bridge and considerations on crowd-structure interaction**

Antonio De Luca, *USA*

14:15 **The New Storstrøm Bridge – Nonlinear Dynamic Ship Impacts**

Martin Svendsen, *Denmark*

14:30 **Vehicle-bridge interaction: Influence of the train type on the dynamic response of bridges due to a train crossing**

Antonia M. Kohl, *Germany*

14:45 **Effect of skew wind on curved long-span floating bridges**

Pål Grøthe Sandnes, *Norway*

15:00 **Approach for the mathematical calculation of the damping factor of railway bridges with ballasted track**

Andreas Stollwitzer, *Austria*

15:15 **Discussion**

Scientific Session: Composite and Non-steel Materials – Structures and Bridges

14:00–15:30 NORTH HALL

Chair: Martina Eliášová, *Czech Republic,*
Nora Susanne Bies, *Germany*

14:00 **Kagraner Steg – new GFRP pedestrian bridge in Vienna**

Stoyan Ivanov, *Bulgaria*

14:15 **Tensile strength of the bent portion of GFRP rebars**

Nora Susanne Bies, *Germany*

14:30 **Tests of glass banister panels with embedded laminated connections**

Michaela Zdražilová, *Czech Republic*

14:45 **Stability and Resistance of Hybrid Composite Glass Structures under Seismic and Temperature Loads**

Nikoleta Stamataki, *Greece*

15:00 **Adhesive two-part acrylate steel-glass and aluminium-glass connection – influence of temperature and thickness of adhesive layer**

Markéta Zikmundová, *Czech Republic*

15:15 **Discussion**

Scientific Session: Challenging Bridges

14:00–15:30 TERRACE 2 A

Chair: Miguel Ortega, *Spain*,
Oguz Berber, *Romania*

14:00 **Balanced cantilever bridge, 125 m maximum span, in a high risk seismic area, at Wiwili, Nicaragua**
Jose Luis Sanchez Jimenez, *Spain*

14:15 **Evaluation of a Non-Prismatic Open Cross-Section Arch for the Toronto Port Lands Bridges**
Jonathan Werner, *Canada*

14:30 **Functionality, aesthetics and structural efficiency integrated into the design for an outstanding bridge on the access to the new T4 Terminal at Barajas Airport (Madrid)**
Miguel Ortega, *Spain*

14:45 **D4R7. New Danube Crossing at Bratislava**
Luis Martin-Tereso, *Spain*

15:00 **Addressing design and construction challenges for a complex elevated interchange over the sea**
Michael Tapley, *Hong Kong*

15:15 **Discussion**

Scientific Session: Seismic Design

14:00–15:30 TERRACE 2 B

Chairs: Peter Paul Hoogendoorn, *Spain*,
Katrina Mae Montes, *Japan*

14:00 **Nonlinear soil–structure interaction analysis of retaining walls subjected to pulse-like earthquakes**
Andrea Cruz-Chamorro, *Puerto Rico*

14:15 **Nonlinear Behavior Identification of HDR Bearing using Neural Network for Seismic Structural Design**
Katrina Mae Montes, *Japan*

14:30 **Wind and seismic design of steel preheater towers in cement plants. Adjusting ductility capacity to ductility demand for non-seismic design**
Peter Paul Hoogendoorn, *Spain*

14:45 **A Hysteretic Model of Compressive and Tensile Behavior for Laminated Rubber Bearings**
Seita Komori, *Japan*

15:00 **A thermo-mechanical coupled model of hysteresis behavior of HDR bearings**
Yuqing Tan, *Japan*

15:15 **Discussion**

Scientific Session: Dynamics of Structures

14:00–15:30 SOUTH HALL 2 B

Chairs: Lara Bettinelli, *Austria,*
Marco Martino Rosso, *Italy*

14:00 **Alternative approach for additional damping in dynamic calculations of railway bridges under high-speed traffic**
Lara Bettinelli, *Austria*

14:15 **Dynamic Analysis and Innovative Design of a Kilometer Long Highway Bridge under Extreme Landslide Generated Wave Loadings**
Jianping Jiang, *Canada*

14:30 **Vibration response due to group movements on a footbridge**
Mehdi Setareh, *USA*

14:45 **Prediction of the floor vibration response due to walking excitation**
Mehdi Setareh, *USA*

15:00 **Indirect estimate of concrete compression strength framework with FE model updating and operational modal analysis**
Marco Martino Rosso, *Italy*

15:15 **Discussion**

Coffee Break

15:30–16:00 FOYER/EXHIBITION AREA

Scientific Session: Advanced Models of Structures and Bridges II

16:00–17:30 FORUM HALL

Chair: Richard Stroetmann, *Germany*

16:00 **Development of an orthotropic composite slab system for road bridges**
Richard Stroetmann, *Germany*

16:15 **Externally prestressed concrete: anchor block 3D yield design**

Agnès Fliscounakis, *France*

16:30 **A kinematics-based model for complete behaviour of RC dapped-end connections governed by re-entrant corner cracks**

Chathura Rajapakse, *Belgium*

16:45 **On the use of Volterra series for modelling of nonlinear self-excited forces**

Henrik Skyvulstad, *Norway*

17:00 **Discussion**

Scientific Session: Design by FEA

16:00–17:30 NORTH HALL

Chair: Paweł Hawryszków, *Poland*

16:00 **Parametric Study of Existing Concrete Trough Bridges using non-linear Finite Element Analysis**

Silvia J. Sarmiento, *Sweden*

16:15 **Relating stress concentrations in triangular steel bridge piers to simple beam models**

Philippe Van Bogaert, *Belgium*

16:30 **Full-scale Fatigue Simulations for Reinforced Concrete Bridge Slabs with Multi-scale Multi-chemo Physics FEM system**

Yuya Takahashi, *Japan*

16:45 **Computational sensitivity analysis for structural model assessment under consideration of the construction stage process**

Martin Fusseder, *Germany*

17:00 **Discussion**

Scientific Session: Bridge Details and Solutions

16:00–17:30 TERRACE 2 A

Chair: Stephan Fasching, *Austria,*
Vojtěch Stančík, *Czech Republic*

16:00 **Horizontal bracing in steel I-girder bridges with composite concrete decks**

Victor Vestman, *Sweden*

16:15 **An engineering approach to analyze displacement rate in embedded rail system coupled with bridge**

Vojtěch Stančík, *Czech Republic*

16:30 **The role of key structural components such as bearings, expansion joints, dampers and STUs in addressing the challenges faced by railway bridges**

Filip Kostelecký, *Czech Republic*

16:45 **Semi-precast segmental bridge construction method: Construction of a protoype and shear tests on cross-frames**

Stephan Fasching, *Austria*

17:00 **Discussion**

Scientific Session: Modern Methods of Design and Models

16:00–17:30 TERRACE 2 B

Chair: Cosmin Chiorean, *Romania,*
Bidhan Chandra Roy, *India*

16:00 **Ultimate and Nominal Strength Capacity Evaluation of Composite Sections with Arbitrary Shapes at Elevated Temperatures**

Cosmin Chiorean, *Romania*

16:15 **Cost and process optimization of precast segmental bridges in Israel**

Jindrich Potucek, *Czech Republic*

16:30 **Historic Building Information Modeling for Conservation and Management: A case for using HBIM for Heritage Conservation as part of Urban Infrastructure**

Bidhan Chandra Roy, *India*

16:45 **Discussion**

Scientific Session: Bridges and Bridge Modelling

16:00–17:30 SOUTH HALL 2 B

Chairs: Francesco Presta, *United Arab Emirates,*
Xavier Gamme, *Belgium*

16:00 **Design of a flyover for the SAAR Interchange in Bahrain**

Francesco Presta, *United Arab Emirates*

16:15 **Load Sharing System Performance considering Each Member contribution for Plate Girder Bridges with Corrosion Damages**

Ryoga Oura, *Japan*

16:30 **Design and behavior analysis of a long free expansion length, multi-span, V-shaped pier supported bridge**

Xavier Gamme, *Belgium*

16:45 **Loss of cable – design criteria for cable stayed bridges**
Atte Mikkonen, *Finland*

17:00 **New developments in the design of Z-shaped steel sheet pile walls**
Alexander Enders, *Germany*

17:15 **Practical Guidance for Design of Steel Truss Footbridges**
Abhijith Raghuraj Nair, *India*

17:30 **Discussion**

Plenary Session: Closing Ceremony

17:45–18:15 FORUM HALL

List of Posters

PS-01 **Design methodology for Roads Bridges located on Chilean copper miner roads**

Matias A. Valenzuela[1], Francisco Hernandez[1]

[1] *Pontificia Universidad Católica de Valparaíso, Construction Engineering, Valparaíso, Chile*

PS-02 **Quantifying the Environmental Impact of Railway Bridges Using Life Cycle Assessment: A Case Study**

Majid Al-Gburi[1], Jaime Gonzalez-Libreros[1], Gabriel Sas[1], Martin Nilsson[1]

[1] *Luleå University of Technology, Division of Structural and Fire Engineering- Department of Civil- Environmental and Natural Resources Engineering, Luleå, Sweden*

PS-03 **State of the art of typologies of piers and abutments of existing Chilean road bridges, considering the risk of scour**

Matias A. Valenzuela[1], Carlos Gaete[1]

[1] *Pontificia Universidad Católica de Valparaíso, Construction Engineering, Valparaíso, Chile*

PS-04 **Laser- and laser-hybrid welding of steel bridge structures**

Cato Dørum[1], Johannes Veie[1], Tore Askeland[2]

[1] *Norwegian Public Roads Administration, Construction, Hamar, Norway*
[2] *Norwegian Public Roads Administration, Construction, Otta, Norway*

PS-05 **An analysis of the potential for improving cement efficiency through functionally graded concrete elements**

Jessica Forsdyke[1], Mar Giménez Fernández[1], Janet Lees[1]

[1] *University of Cambridge, Department of Engineering, Cambridge, United Kingdom*

PS-06 **Resolution improvement of Low-Cost MEMS accelerometer by aligning Simulatanouns sensors**

Seyedmilad Komarizadehasl[1], Fidel Lozano[2], Mahyad Komary[1], Jose Antonio Lozano-Galant[2], Jose Turmo[1]

[1] *Universitat Politècnica de Catalunya, Department of Civil and Environment Engineering, Barcelona, Spain*
[2] *Univesidad de Castilla-La Mancha, Department of Civil Engineering, Castilla-La Mancha, Spain*

PS-07 **Solution to relieve urban traffic Congestion "CHANDIGARH-KHARAR ELEVATED ROAD – A Case Study"**

Harpreet Singh[1], Suniti Rautela[1]

[1] *B&S Engineering Consultants Pvt Ltd, Bridge Design, Noida, India*

PS-08 **Application of Damped Outriggers in Renovation of Super Tall Building Structures**

Daohang Hu[1], Xin Zhao[2], Gang Wang[1]

[1] *Tongji University, Department of Structural Engineering, Shanghai, China*
[2] *Tongji University, Department of Structural Engineering, Shanghai, China*

PS-09 **The Implementation Potentials of BIM in Bridge Maintenance Workflows**

Sebastian Baumgartner[1], Omar El-Mahrouk[1], Markus Vill[1]

[1] *University of Applied Sciences FH Campus Wien, Building and Design, Vienna, Austria*

PS-10 **Combined LoD – Definition for Bridge Maintenance and 3D City Maps**

Omar El-Mahrouk[1], Sebastian Baumgartner[1], Markus Vill[1]

[1] *University of Applied Sciences FH Campus Wien, Building and Design, Vienna, Austria*

PS-11 BIM authoring and Data Models for Bridge Maintenance Systems in Korea

Changsu Shim[1], Roh Kitae[2], Ns Dang[3]

[1] Chung-Ang University, Dept. of Civil- Env. & Urban, Seoul, Republic of Korea
[2] Chung-Ang University, Dept. of Civil Engineering, Seoul, Republic of Korea
[3] Chung-Ang University, Dept. of Civil Eng., Seoul, Republic of Korea

PS-12 Instabilities in slender flanged cruciform steel columns. Analysis and evaluation of the influence of external and internal restraints on torsional and distortional buckling

Peter Paul Hoogendoorn[1], Ignacio Ares Gestal[1], José Antonio Franco López[2]

[1] MSFPA, Engineering Department, Madrid, Spain
[2] MSFPA, Technical Director, Madrid, Spain

PS-13 Fabrication of a device testing bonded joint strength under combined stress

Kumiko Kiyono[1], Thay Visal[2], Nakamura Hitoshi[1], Horii Hisakazu[3]

[1] Tokyo Metropolitan University, Graduate School of Urban Environmental Sciences- Department of Civil and Environmental Engineering, Hachioji-shi, Japan
[2] Utsunomiya University, Department of Civil Engineering and Regional Design, Utsunomiya-shi, Japan
[3] Konishi Co.- Ltd., Osaka Research Institute, Osaka-shi, Japan

PS-14 Experimental and numerical study on unequal lateral impact behavior of RC circular members

Khalil Al-Bukhaiti[1], liu Yanhui[1], Zhao Shichun[1]

[1] Southwest Jiaotong University, School of Civil Engineering, Chengdu, China

PS-15 Izmit Bay Suspension Bridge- Response of Active Mass Damper Using Finite Element Analysis

Oguz Berber[1]

[1] Bridge Engineer, Tecnhical Department, Braila, Romania

PS-16 Data-informed building design using artificial intelligence

Linda Cusumano[1], Rasmus Rempling[1], Robert Jockwer[1], Mats Granath[2], Nilla Olsson[3]

[1] Chalmers University of Technology, Architecture and Civil Engineering, Gothenburg, Sweden
[2] Gothenburg University, Department of Physics, Gothenburg, Sweden
[3] NCC Building Sweden AB, Technology and Sustainability, Malmö, Sweden

PS-17 Hyperbox modeling for externally bonded CFRP beams

Alvin Chua[1], Jason Maximino Ongpeng[1], Kathleen Aviso[2]

[1] De La Salle University, Civil Engineering, Manila, Philippines
[2] De La Salle University, Chemical Engineering, Manila, Philippines

PS-18 Seismic detailing of single span bridges to AASHTO for the state of Nevada, US

Pradeep Kancharla[1], Gopalakrishnan Sivasamynathan[2], Gajanan Wagle[3]

[1] Design Engineer- Atkins- member of the SNC-Lavalin Group-, Transportation - Bridges, 10th Floor- Safina Towers- 3 Ali Asker Road- Bangalore 560052- Karnataka- INDIA, India
[2] Lead Engineer- Atkins- member of the SNC-Lavalin Group, Transportation - Bridges, 10th Floor- Safina Towers- 3 Ali Asker Road- Bangalore 560052- Karnataka- INDIA, India
[3] Technical Head- Atkins- member of the SNC-Lavalin Group-, Transportation, 10th Floor- Safina Towers- 3 Ali Asker Road- Bangalore 560052- Karnataka- INDIA, India

PS-19 Experimental Study of Link Slab in Steel-Concrete Composite Bridge

Liang Xiao[1], Qingtian Su[1], Fuyu Wang[1]

[1] Tongji University, College of civil engineering, Shanghai, China

PS-20 Investigation of damage in reinforced concrete deck slabs of an existing bridge through ambient vibration measurements and finite element analysis

Sania Gohar[1], Yasunao Matsumoto[1], Satoru Sakuma[2]

[1] Saitama University, Civil and Environmental Engineering, Saitama, Japan
[2] East Nippon Expressway Co.- Ltd., Kanto Regional Head Office, Saitama, Japan

IABSE Symposium Prague 2022 – "Challenges for Existing and Oncoming Structures": *"Assessment of scour risk in hydraulic infrastructures. A bridge case study"*

The social and economic impact of bridges is of utmost importance to society. These infrastructures' safety is dependent on having stable foundations (piers and abutments), which are frequently unseen underwater and often subjected to high velocity flows. These flows can cause scouring in the vicinity of bridge foundations, which has been appointed to be the cause of numerous bridge collapses worldwide, with damaging consequences. In 2001, a hazardous accident registered in Portugal with the Hintze Ribeiro bridge's failure caused 59 casualties.

Acknowledging the impossibility of totally preventing or eliminating scour at pier foundations, a comprehensive assessment of the associated risk is essential to defining the designing and inspection procedures. Despite decades of research, there are still many uncertainties affecting bridge foundations' design process, mainly due to the stochastic nature of flood events influencing the hydrologic and hydraulic characteristics. Assessing the risk associated with scour requires understanding the type of events that could occur during the bridge lifetime. Such assessment is also crucial for bridge maintenance.

Therefore, in the present research, a methodology for assessing and rating risk associated with scour at bridge foundations is applied in a Portuguese bridge case study. The three-step methodology comprises: (i) the hydrological modelling of extreme events; (ii) the computation of flow and scour variables to model river behaviour; and (iii) the assignment of a qualitative risk rating based on the relationship between relative scour depth and the vulnerability of the infrastructure in question. The developed methodology's application aimed to further support and validate its potential to assess the risk of scour at bridge foundations. The methodology can be incorporated into regular bridge inspections and be used for providing support to decision-making for scheduling rehabilitation and maintenance actions for large bridge portfolios.

Ana Margarida Bento

30.03.2021