BEI-2024

Bridge Engineering Institute Conference

July 22-25, 2024

Las Vegas, Nevada, USA

Final Program

BEI

An International Technical Society

Table of Contents

The Bridge Engineering Institute, An International Technical Society

Executive Committee

Yail Jimmy Kim
President
University of Colorado Denver
USA

Isamu Yoshitake
Vice-President
Yamaguchi University
Japan

Vanissorn Vimonsatit
Director
Macquarie University
Australia

Xuhui He
Director
Central South University
China

Diversity, Equity, and Inclusion (DEI) Committee

Su Taylor
Queen's University Belfast
United Kingdom

Catherine Armwood-Gordon
Tennes. State Univ.
USA

Monique Head
University of Delaware
USA

Eva Lantsoght
Delft Univ. of Technology
Netherlands

Jun Wang
Univ. of Hawaii
USA

International Advisory Committee and Secretary

Riadh Al-Mahaidi
Swinburne University of Technology, Australia

Brahim Benmokrane
University of Sherbrooke, Canada

Steve C.S.Cai
Louisiana State University, USA

Nien-Yin Chang
University of Colorado Denver, USA

Mark F. Green
Queen's University, Canada

Issam Harik
University of Kentucky, USA

Venkatesh Kodur
Michigan State University, USA

Urs Meier
EMPA, Switzerland

Hiroshi Mutsuyoshi
Saitama University, Japan

John Myers
Missouri University of S & T, USA

Antonio Nanni
University of Miami, USA

Steve Nolan,
Florida Department of Transportation, USA

Saiid Saiidi
University of Nevada Reno, USA

Jim Shiau
University of Southern Queensland, Australia

Johan L. Silfwerbrand
KTH Royal Institute of Technology, Sweden

Jongsung Sim
Hanyang University, Korea

Ertugrul Tacioglu
University of California Los Angeles, USA

Dan Tobias
Illinois Department of Transportation, USA

Mark Williams
Walter P. Moore
USA

Yongcheng Ji
Northeast Forestry University, China

Conference Organization

Conference Chair

Yail Jimmy Kim
University of Colorado Denver (USA)

Organizing Committee

Isamu Yoshitake (Chair)
Yamaguchi University (Japan)

Vanissorn Vimonsatit
Macquarie University (Australia)

Xuhui He
Central South University (China)

International Scientific Committee

Riadh S. Al-Mahaidi (Australia)
Toshihiko Aso (Japan)
Catherine Armwood-Gordon (USA)
Brahim Benmokrane (Canada)
Steve Cai (USA)
NY Chang (USA)
Matthew Chynoweth (USA)
Mark Green (Canada)
Masahide Matsumura (Japan)
Issam Harik (USA)
Monique Head (USA)
Venkatesh Kodur (USA)
Eva Lantsoght (Netherlands)
Urs Meier (Switzerland)
Hiroshi Mutsuyoshi (Japan)
John Myers (USA)
Antonio Nanni (USA)
Steven Nolan (USA)
Saiid Saiidi (USA)
Xianming Shi (USA)
Jim Shiau (Australia)
Johan L Silfwerbrand (Sweden)
Jongsung Sim (Korea)
Ertugrul Taciroglu (USA)
Su Tylor (UK)
Dan Tobias (USA)
Mark Williams (USA)
Wael Zatar (USA)

Overview of Conference Program

Monday, July 22		
Time	Event	Location
5:00 to 7:00 pm	Registration	Foyer
5:30 to 7:00 pm	Welcome Reception	Envoy

Tuesday, July 23		
Time	Event	Location
8:45 to 9:00 am	Opening Ceremony	Chancellor I
9:00 to 9:45 am	Plenary Speech I (Hiroshi Mutsuyoshi)	Chancellor I
9:45 to 10:30 am	Plenary Speech II (Thien Tran)	Chancellor I
10:30 to 11:00 am	Coffee Break	Chancellor II
11:00 to 12:00 pm	Parallel Session A-1 (Modeling and Advanced Analysis I)	Chancellor I
	Parallel Session A-2 (Performance Evaluation I)	Envoy
12:10 to 1:30 pm	BEI Lunch	Chancellor II
1:40 to 3:00 pm	Parallel Session A-3 (Materials and Performance I)	Chancellor I
	Parallel Session A-4 (Fatigue and Durability)	Envoy
3:00 to 3:30 pm	Coffee Break	Chancellor II
3:30 to 5:10 pm	Parallel Session A-5 (Monitoring I)	Chancellor I
	Parallel Session A-6 (Field Testing and Case Studies)	Envoy
6:30 to 9:00 pm	BEI Meeting	Invitation Only

Wednesday, July 24		
Time	Event	Location
8:40 to 10:00 am	Parallel Session B-1 (Materials and Performance I)	Chancellor I
	Parallel Session B-2 (Modeling and Advanced Analysis II)	Envoy
10:00 to 10:30 am	Coffee Break	Chancellor II
10:30 to 11:50 am	Parallel Session B-3 (Repair and FRP Composites)	Chancellor I
	Parallel Session B-4 (Modeling and Advanced Analysis III)	Envoy
12:00 to 1:20 pm	BEI Lunch	Chancellor II
1:30 to 2:50 pm	Plenary Speech III (Peter Weber)	Chancellor I
	Plenary Speech IV (Steve Cohn)	Chancellor I
3:00 to 4:00 pm	Parallel Session B-5 (Monitoring II)	Chancellor I
	Parallel Session B-6 (Experimental Techniques I)	Envoy
4:00 to 4:30 pm	Coffee Break	Chancellor II
4:30 to 5:10 pm	Parallel Session B-7 (Monitoring III)	Chancellor I
	Parallel Session B-8 (Experimental Techniques II)	Envoy
5:30 to 8:00 pm	BEI Dinner	Chancellor II

Thursday, July 25		
Time	Event	Location
9:00 to 10:20 am	Parallel Session C-1 (Modeling and Advanced Analysis IV)	Chancellor I
	Parallel Session C-2 (Ultra-High Performance Concrete)	Envoy
10:20 to 11:20 am	Parallel Session C-3 (Performance Evaluation II)	Chancellor I
	Parallel Session C-4 (Railway Bridges)	Envoy
11:30 to 11:45 am	Closing Ceremony	Chancellor I

Conference Information

Registration

Registered attendees may pick up their name badges and other necessary materials from the information desk in the conference venue.

Las Vegas Monorail Ticket

Registered attendees may pick up their three-day unlimited monorail tickets at designated locations: from 4:00 pm to 5:00 pm July 22 at the Harrah's & The LINQ Monorail Station and from 5:30 pm to 7:00 pm July 22 at Embassy Suites

Administration Desk

BEI staff will be available at the administration desk during the conference (July 22 to 25, 2024).

Proceedings

Accepted papers are published in the Proceedings of BEI-2024. Attendees can download electronic copies from the conference webpage. Because BEI is a non-profit organization and is committed to the advancement of state-of-the-art knowledge, the Proceedings are available for free.

Name Badges and Tickets

Only registered attendees with name badges will be permitted to attend the BEI-2024 functions. Tickets will be required for all functional activities such as Welcome Reception, BEI Lunch, and Gala Dinner. It is noted that BEI will not reissue a ticket if one loses it.

Welcome Reception

The Welcome Reception of BEI-2024 will be held at Envoy from 5:30 to 7:00 pm, July 22, 2024. Cocktails, wine, non-alcohol beverages, and Hors D'oeuvres will be provided to registered attendees and invited personnel. A cash bar may be available for those who prefer to purchase drinks.

Coffee Breaks

All attendees can join coffee breaks during the intermission of parallel sessions.

BEI Lunch

Plated course meals will be served to registered attendees and invited personnel.

BEI Dinner

Plated course meals will be served to registered attendees and invited personnel.

Internet

Wi-Fi will be available in the conference venue for free.

Award Events

Selected individuals will be congratulated with award certificates during the BEI lunch.

Disclaimer

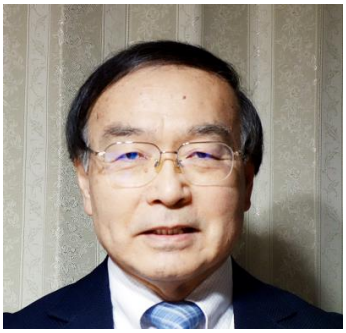
The Bridge Engineering Institute, An International Technical Society, will do its very best to accommodate the need of all attendees. However, the Institute denies any responsibilities and accepts no liability whatsoever for any circumstance related to this conference.

Plenary Speakers
(alphabetical order)

Dr. Stephen A. Cohn
Colorado Department of Transportation, USA

Dr. Stephen A. Cohn leads the Applied Research and Innovation Branch in the Colorado Department of Transportation's (CDOT) Division of Transportation Development. He serves as Colorado's state representative to the Transportation Research Board of the National Academies, and is a member of the Research Advisory Committee to the AASHTO's Special Committee on Research and Innovation. Dr. Cohn holds a Ph.D. from the Massachusetts Institute of Technology in Atmospheric Science, M.S. degrees from the University of Colorado in Business Administration and Finance, and bachelor's degrees from the University of Maryland in Physics and Astronomy.

Plenary Speakers
(alphabetical order)



Professor Hiroshi Mutsuyoshi, Ph.D.
Saitama University, Japan

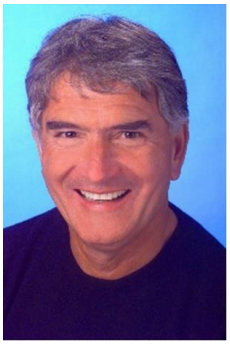
Dr. Hiroshi Mutsuyoshi is a Professor Emeritus and a Visiting Professor at Saitama University, Saitama, Japan. He is also a Visiting Professor at Dalian University of Technology in China (till 2024 March). He received his doctoral engineering degree from the University of Tokyo, Tokyo, Japan. His research interests include bridge engineering, earthquake engineering for reinforced concrete structures, application of new materials to concrete structures and retrofitting and rehabilitation of existing concrete structures. Professor Mutsuyoshi is a Fellow of ACI and was a chair of committee on “Cables for cable supported bridges” of fib Commission 5. He has been awarded the JSCE Yoshida Prize (the highest prize for research in concrete engineering in Japan) for Excellent Paper in 1986, 1993, 1995, and 1996, the JSCE Tanaka Prize (the highest prize for research in bridge engineering in Japan) for Excellent Paper in 2016 and 2019, and the JSCE Achievement Prize in 2023; the JPCI prize for Excellent Paper in 1994 and for Technical Development in 2002; and the JCI Meritorious Deed Prize in 2009. He received the Medal for the Contribution of Education to Vietnam from Ministry of Education, Vietnam in 2016. He has been many chairs of committees on concrete in JSCE, JCI and JPCI. He is a professional engineer in Japan and an Executive Professional Civil Engineer (JSCE).

Plenary Speakers
(alphabetical order)

Mr. Thien Tran, P.E.
Colorado Department of Transportation, USA

Mr. Thien Tran leads various research programs in the Applied Research and Innovation Branch in the Colorado Department of Transportation's (CDOT) Division of Transportation Development. These programs include Structures, Hydraulics Hydrology, Geotechnical Geohazards, and Pavement and Materials. Recently, he also focuses on two other areas: alternate fuels and their impacts on transportation infrastructures and the applications of new and support technologies such as machine learning/AI and cybersecurity in transportation. Thien Tran receives his M.Sc. in Civil Engineering from the University of Florida, an MBA, and M.Sc. in Cybersecurity from Webster University, and his B.Sc. in Civil Engineering from the University of Alberta, Canada.

Plenary Speakers
(alphabetical order)



Mr. Peter Weber
ceEntek Pte Ltd, Singapore

Mr. Weber is a high-tech entrepreneur and investor with activities in the US, Asia, and Europe. Over the last years Peter has resigned from public and private company Boards and is focused on revolutionizing Ultrahigh Performance Concrete. ceEntek Pte Ltd, the company Mr. Weber started in Singapore in 2011 is the technology leader in Ultrahigh Performance Concrete, UHPC based on its proprietary carbon Nanofibers technology. The new generation of UHPC, UHPC2.0^{TM} does not require silica fume, quartz flour and other admixtures typically used. Mr. Weber's background is in high tech with focus on microprocessor technology. He will tell you that there are many communalities between semiconductors and UHPC.

Conference Venue

The Embassy Suites by Hilton Convention Center Las Vegas
Address: 3600 Paradise Road, Las Vegas, NV 89169, USA
Phone: 1-702-893-8000

Las Vegas Monorail Station: Boingo Station at Las Vegas Convention Center (seven min. on foot)

Shuttle to the Las Vegas Convention Center, LV Monorail, and Fashion Show Mall every hour from 7:30 a.m. until 10:30 p.m. (Times subject to change)

Parking

Self-parking:	$17.00 per day On-site
Valet parking:	$20.00
EV charging:	Nearby, 1 miles
Secured:	Not available
Covered:	Not available
In/out privileges:	Available
Parking details:	Digital Key Use, Stop by Front Desk

Transportation

Airport shuttle	Not available
Harry Reid International Airport:	2 miles
Henderson:	15 miles

What's nearby

Bellagio:	1.20 miles
Boulevard Mall:	0.50 miles
Circus Circus Grand Slam Cyn:	0.70 miles
City Center:	1 mile
Cowabunga Water Park:	9.40 miles
Fashion Show Mall:	1 mile





Technical Program

Monday, July 22

General	Location: Envoy
5:00 to 7:00 pm	Registration/Welcome Reception

Tuesday, July 23

General	Location: Chancellor I
8:45 to 9:00 am	Opening Ceremony Moderated by **Yail Jimmy Kim**, University of Colorado Denver, USA
9:00 to 9:45 am	Plenary Speech I: **Hiroshi Mutsuyoshi**, Saitama University, Japan Moderated by **Yail Jimmy Kim**, University of Colorado Denver, USA
9:45 to 10:30 am	Plenary Speech II: **Thien Tran**, Colorado Department of Trans., USA Moderated by **Vanissorn Vimonsatit**, Macquarie University, Australia

Break	Location: Chancellor II
10:30 to 11:00 am	Coffee Break

Parallel Session A-1 **(Modeling and Advanced Analysis I)**	Location: Chancellor I
Chair: **Hiroshi Mutsuyoshi**, Saitama University, Japan	
11:00 to 11:20 am	Development of Shrinkage and Creep Prediction Model for SCC (B4TW-SCC) and Implementation in Bridge Design Software Wen-Cheng Liao and Jenn-Chuan Chern
11:20 to 11:40 am	Digital Twin Models for the Maintenance of PSC Bridges Chi-Ho Jeon, Ki-Tae Park, and Chang-Su Shim
11:40 to 12:00 pm	Analysis of Yield Strength Change According to Pipe Specimen Processing Min Hyun Seong, Seo Jin Heo, and Jin-Kook Kim

Parallel Session A-2 **(Performance Evaluation I)**	Location: Envoy
Chair: **Thien Tran**, Colorado Department of Transportation, USA	
11:00 to 11:20 am	Load Testing and Rating of an RC Bridge without Structural Plans Cody Hutchinson, Abheetha Peiris, and Issam Harik
11:20 to 11:40 am	Determining the Origin of Concrete Cracking in an Existing Railway Bridge Hans De Backer and Amelie Outtier
11:40 to 12:00 pm	High Load Multi-Rotational Disk Bearings for Bridges Ronald Watson and Jay Conklin

Lunch	Location: Chancellor II
12:10 to 1:30 am	BEI Lunch Moderated by **Vanissorn Vimonsatit**, Macquarie University, Australia

Parallel Session A-3 **(Materials and Performance I)**	Location: Chancellor I
Chair: **Yongcheng Ji**, Northeast Forestry University, China	
1:40 to 2:00 pm	Decarbonisation of Concrete– A Systematic Bottom-up Approach Harish Kumar Srivastava, Sillawat Sathorn, Vanissorn Vimonsatit, and Simon Martin Clark
2:00 to 2:20 pm	Effects of DEF Expansion on Compressive Strength Performance of Hardened Cementitious Materials Kennosuke Sato, Takuto Koike, and Shigehiko Saito
2:20 to 2:40 pm	Experimental Investigation on Evaluation Method of Mechanical Properties of 3D Printed Concrete In-Beom Park, Seung-Ryong Ryu, Jun-Mo Yang, and Chunho Chang
2:40 to 3:00 pm	POD-Based Analysis of the Pressure Field of Elongated Hexagonal Cylinders Huan Li, Ruixiang Jiang, and Xuhui He

Parallel Session A-4 **(Fatigue and Durability)**	Location: Envoy
Chair: **Takashi Yamane**, Kyokuto Kowa Corporation, Japan	
1:40 to 2:00 pm	Evaluating Fatigue Durability of a Newly Developed Semi-Rigid Prestressed Concrete Slab Joint Using Wheel Load Running Test Mohammad Emran Nasery and Tatsuhiko Mimoto
2:00 to 2:20 pm	Prediction of Deterioration Rate with Potential Fatigue Damage Due to Truck Overloads in Bridge Lifecycle Cost Analysis Bora Jang and Jamshid Mohammadi
2:20 to 2:40 pm	Fatigue Performance of Orthotropic Steel Decks Composited with Steel Fiber Reinforced Concrete Zhiwen Zhu and Ruixu Zhu
2:40 to 3:00 pm	Research on Fatigue Properties of Basalt Fiber Cement Stabilized Macadam Wei Li, Peifeng Cheng, Wenme Zhao, Zhanming Zhang, and Qijing Xia

Break	Location: Chancellor II
3:00 to 3:30 pm	Coffee Break

Parallel Session A-5 **(Monitoring I)**	Location: Chancellor I
Chair: **Issam Harik**, University of Kentucky, USA	
3:30 to 3:50 pm	Monitoring Bottom Slab Stresses at Closure Segment of Post-Tensioned Box Bridges Constructed with Balanced Cantilever Method Alp Caner
3:50 to 4:10 pm	Neural Network Modelling for Stress Concentration Factors of CFST K-Joints under Three Loading Conditions Saurabh Bajracharya, Shozo Nakamura, and Takafumi Nishikawa
4:10 to 4:30 pm	Bridge Assessment Using MCFT: Determination of Load Multiplying Factors for Optimal Shear Adequacy Vanissorn Vimonsatit and Koon Wan Wong
4:30 to 4:50 pm	Experimental and Numerical Study on Noise Radiation of the Single-Gap Bridge Expansion Joint Xiaodong Song, Xihao Chen, and Guangqi Li
4:50 to 5:10 pm	Ground Penetrating Radar for Concrete Reinforcement Corrosion Detection Using Artificial Intelligence Bill Mathers and Maddalena Giammattei

Parallel Session A-6 **(Field Testing and Case Studies)**	Location: Envoy
Chair: **Steve Nolan**, Florida Department of Transportation, USA	
3:30 to 3:50 pm	The Use of Engineered Cementitious Composite (ECC) Deck Overlay at Curry Street Bridge, Windsor, Ontario, Canada: Lessons Learned and Challenges Philip Loh and Don Gardonio
3:50 to 4:10 pm	Case Study on GFRP Reinforced CIP Flat Slab with CFRP Prestressed Concrete Soldier Pile Walls and GFRP Reinforced Precast Panels Joseph Losaria, Steven Nolan, and Andra Diggs
4:10 to 4:30 pm	Characterizing Bridge and Culvert Deterioration in Arizona Using National Bridge Inventory Data Vaishnavi Kandgule and Ben Dymond
4:30 to 4:50 pm	Development of Streamlining Technology for Deck Removal of Steel Composite Girder Bridges Honoka Ishikawa, Takahisa Shigematsu, and Takashi Yamane
4:50 to 5:10 pm	Foundations for Success through Adaptability, Resilience, and Sustainability Steven Nolan, Thomas Cadenazzi, Marco Rossini, Michel Chalhoub, and Antonio Nanni

General	Invitation only
6:30 to 9:00 pm	BEI Meeting

Wednesday, July 24

Parallel Session B-1 **(Materials and Performance I)**	Location: Chancellor I
Chair: **Isamu Yoshitake**, Yamaguchi University, Japan	
8:40 to 9:00 am	Effects of Supplementary Cementitious Materials on Strength and Design of Precast Concrete Bridge Elements and Associated Structures Sillawat Sathorn, Harish Srivastava, and Vanissorn Vimonsatit
9:00 to 9:20 am	Analysis of Heating Performance and Flexural Strength Properties of Electrically Conductive Cement Composites Gwanghee Heo, Jong-Gun Park, and Dong-Ju Seo
9:20 to 9:40 am	Measurement of Gas Permeability Coefficient of Concrete for Carbonation Prediction Kyeong Ho Kim, Dongkook Park, and Young Bok Ryu
9:40 to 10:00 am	Development of Reduced Cementitious Materials Concrete (RCMC) Mixture for Bridge Decks and Rails Soumitra Das, George Morcous, and Jiong Hu

Parallel Session B-2 **(Modeling and Advanced Analysis II)**	Location: Envoy
Chair: **Shozo Nakamura**, Nagasaki University, Japan	
8:40 to 9:00 am	Analysis of Live Load Distribution for Two-Girder Bridges with Floor Beams and Stringers Saron Hagos, Byungik Chang, and Frezer Ayele
9:00 to 9:20 am	Design of Multifunctional Space Structures Hans De Backer and Amelie Outtier
9:20 to 9:40 am	Three-Dimensional Direct Numerical Simulation on the Bridge Local Scour around a Cylinder Based on SPH Method Wen Xiong, Rongzhao Zhang, and C.S. Cai
9:40 to 10:00 am	Research on Crack Damage Model and Size Effect of Flexible Fiber Reinforced Recycled Concrete Yongcheng Ji, Yanmin Jia, Dayang Wang, Yanwei Jia, and Qijing Xia

Break	Location: Chancellor II
10:00 to 10:30 am	Coffee Break

Parallel Session B-3 **(Repair and FRP Composites)**	Location: Chancellor I
Chair: **Vanissorn Vimonsatit**, Macquarie University, Australia	
10:30 to 10:50 am	Carbon Fiber Reinforced Polymer (CFRP) Reinforcement of the Cowen Park Bridge, WA using the Fyfe Tyfo FRP Systems Tim Sapienza and Marty Mashlakian
10:50 to 11:10 am	Strengthening of RC Beams with UHPFRC Incorporating GFRP Rebars Wajdi Ammar, Yail J. Kim, and Thi Ha

Parallel Session B-3 **(Repair and FRP Composites)**	Location: Chancellor I
11:10 to 11:30 am	Prefabricated FRP Panels for Repair of Bridges with Minimal Traffic Disruption Mo Ehsani
11:30 to 11:50 am	FE Simulations of Pull-Out test for CFRP Cable Anchoring Sockets Masaki Ono, Riku Matsumoto, Masakazu Sugimoto, and Isamu Yoshitake

Parallel Session B-4 **(Modeling and Advanced Analysis III)**	Location: Envoy
Chair: **Mohammad Nasery**, Kyokuto Kowa Corporation, Japan	
10:30 to 10:50 am	Numerical Simulation of Cyclic Degradation of Injected Connectors for Fiber-Polymer Composite Decks Angeliki Christoforidou, Abishek Baskar, and Marko Pavlovic
10:50 to 11:10 am	Durability of a Solid Slab Bridge with Overlays Incorporating BFRP Grids Jun Wang and Yail J. Kim
11:10 to 11:30 am	Integration of Bridge Diagnostic Load Tests into an Undergraduate Civil Engineering Curriculum to Attract the Next Generation of Bridge Engineers Jenna Hays and Ben Dymond
11:30 to 11:50 am	Topology Optimization of Bridges under Random Traffic Loading Using Stochastic Reduced-Order Models Kaiming Luo, Xuhui He, and Haiquan Jing

Lunch	Location: Chancellor II
12:00 to 1:20 pm	BEI Lunch

General	Location: Chancellor I
1:30 to 2:15 pm	Plenary Speech III: **Peter Weber**, ceEntek, Singapore Moderated by **Steve Nolan**, Florida Department of Transportation, USA
2:15 to 2:50 pm	Plenary Speech IV: **Steve Cohn**, Colorado DOT, USA Moderated by **Issam Harik**, University of Kentucky, USA

Parallel Session B-5 **(Monitoring II)**	Location: Chancellor I
Chair: **Jun Wang**, University of Hawaii, USA	
3:00 to 3:20 pm	Enhancing Ground Penetrating Radar through Point Cloud Data for Detecting Embedded Elements in Concrete Bridge Deck Priyam Chowdhury and Adriana Carolina Trias Blanco
3:20 to 3:40 pm	AI-Enriched Ultrasonic Guided Wave Decoding for Early-Stage Corrosion-Induced Structural Damage Detection Hong Pan, Li Shang, Zi Zhang, Xuanyu Zhou, Fujian Tang, Qi Cao, and Zhibin Lin

Parallel Session B-5 (Monitoring II)	Location: Chancellor I
3:40 to 4:00 pm	Non-Destructive Testing for Timber Bridges Thi Ha and Yail J. Kim

Parallel Session B-6 (Experimental Techniques I)	Location: Envoy
Chair: **Pengru Deng**, Central South University, China	
3:00 to 3:20 pm	Research on Integrity Detection of Bridge Pile Foundations Using Borehole Seismic Wave Method Liangjun Hu, Yongqiang Shi, Jun Yang, and Yongxiao Du
3:20 to 3:40 pm	Experiments on Flexural Behavior of Reinforced Concrete (RC) Beam Manufactured with 3D Printed Permanent Formwork (3DPF) Tae-Kyung Kim, Sangwoo Oh, Jinsuk Lee, Won-Jun Dong, Mak Bunleang, Seongcheol Choi, and Chang-Su Shim
3:40 to 4:00 pm	Pull-Out Test of CFRP Cable Anchoring Sockets Masakazu Sugimoto, Masaki Ono, and Isamu Yoshitake

Break	Location: Chancellor II
4:00 to 4:30 am	Coffee Break

Parallel Session B-7 (Monitoring III)	Location: Chancellor I
Chair: **Yongcheng Ji**, Northeast Forestry University, China	
4:30 to 4:50 pm	Evaluation of Vibration Characteristics of the Deteriorated Real Bridges by Measuring Constant Microtremors S. Higashi, T. Kyutoku, Y. Akira, Y. Kimura, and T. Yamaguchi
4:50 to 5:10 pm	Coastal Bridge Design & Construction in Extremely Aggressive Environments Steve Nolan, Bruno Vasconcelos, and Andrew DeVault

Parallel Session B-8 (Experimental Techniques II)	Location: Envoy
Chair: **Vanissorn Vimonsatit**, Macquarie University, Australia	
4:30 to 4:50 pm	Hybrid Strengthening of RC Beams using TRECC Plate Ridho Surahman, Yi Wang, Chaoyang Zhou, Kohei Nagai, and Tamon Ueda
4:50 to 5:10 pm	Time-Dependent Bond of Concrete and Near-Surface-Mounted Carbon Fiber-Reinforced Polymer with Inorganic Resins Wajdi Ammar and Yail J. Kim

BEI Dinner	Location: Chancellor II
5:30 to 8:00 pm	Gala Dinner Moderated by **Xuhui He**, Central South University, China

Thursday, July 25

Parallel Session C-1
(Modeling and Advanced Analysis IV)
Location: Chancellor I

Chair: **Isamu Yoshitake**, Yamaguchi University, Japan

9:00 to 9:20 am	Determination of MCFT-Based Shear Strength for Shear Load Rating of Concrete Bridges: the Effects of Using Load-Dependent Strengths Koon Wan Wong and Vanissorn Vimonsatit
9:20 to 9:40 am	Study on Prediction Method for Bridges Using Markov Chain Analysis Jui Jerin, Syota Nakashima, Yoshikazu Akira, and Toshinobu Yamaguchi
9:40 to 10:00 am	Cyclic Hardening Parameters for the Buckling-Restrained Brace Hysteretic Model in CSi Bridge Muslim Abdulkarim and Joel Lanning
10:00 to 10:20 am	Load Distribution in Bridges under Corrosion and Differential Settlement Jun Wang, Yail J. Kim, and Ashley Kershner

Parallel Session C-2
(Ultra-High Performance Concrete)
Location: Envoy

Chair: **Peter Weber**, ceEntek, Singapore

9:00 to 9:20 am	The First UHPC Piles Project in Ontario, Canada Philip Loh and Don Gardonio
9:20 to 9:40 am	Ultra-High Performance Concrete: A New Solution for Bridge Infrastructure Design, Construction, and Repair Rafic Helou and Benjamin Graybeal
9:40 to 10:00 am	Evaluation of Hollow-Core-FRP-Concrete-Steel (HC-FCS) Column and Footing Connection Using a Socket Connection Filled with UHPC Omar Yadak, Royce Floyd, and Jeffrey Volz
10:00 to 10:20 am	Performance of UHPFRC-Based Steel Attachment for Resisting Shear Load Acting on Prestressed Concrete Girder Ke Li, Pengru Deng, Xuhui He, and Takashi Matsumoto

Parallel Session C-3
(Performance Evaluation II)
Location: Chancellor I

Chair: **Steve Cohn**, Colorado Department of Transportation, USA

10:20 to 10:40 am	Behavior of End Zones in Prestressed Concrete Girders Thi Ha, Yail J. Kim, and Wajdi Ammar
10:40 to 11:00 am	Load Distribution of Reinforced Concrete Box Culverts During Springtime Thaw Conditions John DeGonda, Lauren Linderman, Benjamin Dymond, and Brock Hedegaard
11:00 to 11:20 am	GIS-Based Risk Assessment Framework for Enhancing Energy Pipeline Infrastructure Resilience: A Case Study in North Dakota Xuanyu Zhou, Hong Pan, Zi Zhang, and Zhibin Lin

Parallel Session C-4 (Railway Bridges)	Location: Envoy
Chair: **Yi Wang**, Central South University, China	
10:20 to 10:40 am	Comparing Full Scale Laboratory Tests with Actual Bridge Monitoring to Study Bridge–Track Interaction Hans De Backer and Amelie Outtier
10:40 to 11:00 am	Repair of Timber Piles in Canadian Rail Bridges Mo Ehsani, Bryan Gallagher, and Ryan Herbert
11:00 to 11:20 am	Collision Analysis between Trains Derailed at Different High Speeds and Bridge Protective Wall Yixiong Xiong, Pengru Deng, and Xuhui He

General	Location: Chancellor I
11:30 to 11:45 pm	Closing Ceremony Moderated by **Isamu Yoshitake**, Yamaguchi University, Japan

Sponsors

NATIONAL ACADEMIES *Sciences Engineering Medicine*

TRB TRANSPORTATION RESEARCH BOARD

TriDurLE

National Center for Transportation Infrastructure Durability & Life-Extension

Note

The Bridge Engineering Institute
An International Technical Society
www.beibridge.org