

IABSE Symposium 2017

Engineering the Future

IABSE Symposium Report Volume 109

Vancouver, Canada
21 - 23 September 2017

Part 1 of 5

ISBN: 978-1-5108-6424-5

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2017) by International Association for Bridge and Structural Engineering (IABSE)
All rights reserved.

Printed by Curran Associates, Inc. (2018)

For permission requests, please contact International Association for Bridge and Structural Engineering (IABSE) at the address below.

International Association for Bridge and Structural Engineering (IABSE)
c/o ETH Zurich
Honggerberg HIL E 21.3
Stefano-Francini-Platz 5
8093 Zurich
Switzerland

Phone: +41-44-633 2647

Fax: +41-44-633 1241

secretariat@iabse.org

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2633
Email: curran@proceedings.com
Web: www.proceedings.com



Table of Contents

Plenary Sessions	1
<i>Seismic Assessment and rational renovation of the structural heritage</i> Calvi, G. Michele.....	1
<i>Developments in the wind engineering of tall buildings</i> Irwin, Peter A.....	2
<i>Measuring, Monitoring and Evaluating Community Resilience using Remote Sensing Technologies</i> Eguchi, Ronald T.	3
<i>Challenge and Innovation of Long Span Bridges in China and over the World</i> Ge, Yaojun.....	5
Bearings and Expansion Joints	21
<i>Monitoring intrinsic forces of a steel multi-girder bridge with frozen expansion bearings through rehabilitation</i> Hasan, Istiaque; Dubbs, Nathaniel.....	21
<i>Innovative Bearing Design for Bridges</i> Watson, Ronald J.	29
<i>Expansion Joints and Bridge Bearings as Smart Monitoring Devices</i> Butz, Christiane; Okumusoglu, Deniz; Braun, Christian	35
<i>Innovative Expansion Joint Replacement for Burlington Bay Skyway</i> Ostrowski, Joseph; Sidky, Sherif; Lai, David	42
<i>Lions Gate Suspension Bridge Tower Joints Renewal</i> de Fleuriot, Eric; Guckel, Christian	49
<i>Lead Rubber Bearings for Seismic Isolation of Structures in Cold Climates - New Developments</i> Mendez-Galindo, Carlos; Moor, Gianni; Rassy, Samy;.....	54
Structural Concrete: Experiments	64
<i>Experimental Investigation of Post-cracked Flexural Behavior for PC Girder Bridges</i> Hu, Zhijian; Du, Reirei; Wu, Fei; Yuan, Shuaihua; Wang, Shaobin; Xiao, Donghua	64
<i>Experimental Performance of Composite Box Girder Bridges Decked with Full-Depth Precast Panels</i> He, Zhiqi; Liu, Zhao; Xing, Yuan; Chen, Yaosan; Ma, Zeng	76
<i>Experimental Study on Ductility and Hysteretic Energy of CIP and Precast Bridge Piers with High Strength Rebar</i> Zhuo, Weiding; Liu, Zhao; Zhang, Wenming; Zhang, Jiandong	81
<i>Experimental Studies on a Novel Structural Detailing of RC Frames to Resist Earthquake and Progressive Collapse</i> Lin, Kaiqi; Gu, Donglian; Lu, Xinzheng; Li, Yi.....	88
<i>Load carrying behaviour of beams with bent-up bars as shear reinforcement</i> Huber, Tobias; Huber, Patrick; Kollegger, Johann; Vill, Markus.....	96
<i>Experimental Study on a Precast SRC Rock Shed</i> Kitajima, Mikio; Maegawa, Koji; Ninomiya, Tetsuya; Hama, Akiko	102
Design of Structures for Earthquakes 1	110
<i>A New Pulse-Based E-R-μ Method for Predicting the Peak Seismic Response of Highly Nonlinear Bridge Structures</i> Koval, Viacheslav; Christopoulos, Constantin; Tremblay, Robert	110
<i>Innovative Solutions to Seismic Design Challenges for the SFOBB I-80 WB Ramps at Yerba Buena Island</i> Lee, Hohsing.....	120
<i>Seismic Performance and Failure Mechanism Study of Double Deck Bridges by Pushover Analysis</i> Zhang, Jie; Yi, Jiang; Li, Jianzhong.....	128



<i>Comparative Study of a Set of Codes for the Seismic Design of Buildings</i> Santos, Sergio H.C.; Giarlelis, Christos; Traykova, Marina; Bucur, Carmen; Zanaica, Luca; Lima, Silvio S.	136
<i>An efficient seismic retrofit for the Capodichino viaduct</i> Viviani, Marco; Viviani, Enrico; Mardegan, Andrea; Contin, Alessandro	144
<i>Seismic assessment of a vernacular rammed earth building</i> Librici, Camilla; Oliveira, Daniel V.; Silva, Rui A.	152
Structural Health Monitoring	159
<i>Wind-induced Modal Identification of the Bosphorus Bridge using SHM-Structural Health Monitoring Data</i> Bas, Selcuk; Apaydin, Nurdan M.; Catbas, F. Necat	159
<i>Thermal behaviour of a concrete cable-stayed bridge in Algeria</i> Santos, Luis Oliveira; Xu, Min; Vieira, Tiago	167
<i>Tunneling Appropriate Computational Models from Laser Scanning Data</i> Truong-Hong, Linh; Laefer, Debra F.	175
<i>Structural Monitoring of a Closure Strip in the Staged Construction of a Slab-on-Girder Bridge on Highway 401</i> Au, Alexander; Mermigas, Konstantinos Kris	183
<i>Traffic Response Pattern of Cable-Stayed Bridge as a Comparison Tool for SHM</i> Sokol, Milan; Venglar, Michal; Aroch, Rudolf; Kopáček, Alojz; Kyrinovič, Peter; Erdélyi, Ján; Šišmišová, Zuzana; Lamperová, Katarina	191
<i>A frequency domain tool for investigation of wind response of TLP suspension bridges</i> Papinutti, Mitja; Bruer, Arne; Marley, Mathias H.; Kvaleid, Jørgen; Hatami, Afshin; Pthal, Rakesh; Bhide, Shri	198
Structural Steel: Research and Design	206
<i>Experimental and Numerical Studies on Post-Fracture Behavior of Simply Supported Composite Twin I-Girder Bridges</i> Lam, Heang; Lin, Weiwei; Yoda, Teruhiko	206
<i>A New Improved Type of Friction Connection – An Experimental Study</i> Varedian, Mattias; Collin, Peter; Eriksson, Kjell	214
<i>Structural Efficiency of Cold-Formed Steel Beams with Stiffeners in the Web</i> Rodrigues, João Paulo C. Laím, Luís	222
<i>Simulating composite bridges with corrugated steel webs using spatial grid model</i> Xu, Dong; Lei, Jun; Turmo, José	230
<i>The Fatigue Research on Long Span Steel Bridge for High Speed Railway in China</i> Liu, Xiaoguang; Tao, Xiaoyan; Zhao, Xinxin	238
<i>Experimental Study on Mechanical Behavior of T-shape Stiffened Orthotropic Steel-concrete Composite Bridge Decks</i> Wang, Xiaojian; Su, Qingtian; Jiang, Xu; Qiang, Xuhong	245
Cable Stayed Bridges 1: Design and Rehabilitation	253
<i>Modal parameter identification of a curved cable-stayed model bridge based on EDA and DATA-SSI</i> Zhou, Xiaohang; Shan, Deshan; Li, Qiao	253
<i>A tensioning-belt-cable-bridge above the Kaponiggraben in Austria – design and realization</i> Olipitz, Michael	261
<i>Feasibility of timber-concrete composite road bridges with under-deck stay cables</i> Lyu, Zhan; Málaga-Chuquitaype, Christian; Ruiz-Teran, Ana M.	268
<i>Third Bosphorus Bridge-An Overview</i> Farooq, Abdul	276



<i>The 2nd Wuhu Yangzi River Bridge: a 806m Span Cable-stayed Bridge use U-Shape Anchoring System</i> Ma, Zuqiao; Hu, Ke; Shi, Xuefei; Ruan, Xin; Liu, Zhiqian	284
<i>Risk Based Inspection Method for Cable Supported Bridges</i> Colford, Barry; Canimore, Brett; Beabes, Shane	292
WC-4 Special Session: Quality Control for the Efficient Management of Existing Bridges	300
<i>Updating Life-Cycle Performance Model of Bridge based on Inspection Data</i> Lee, Jin Hyuk; Cha, Kyung Hwa; Ahn, Sang Mi; Kong, Jung Sik	300
<i>COST TU1406 – An overview of European Standardization on Quality Control of Road Bridges</i> Matos, José; Casas, Joan R.; Fernandes, Sérgio	304
<i>A novel Quality Control Framework for the management of existing bridges</i> Hajdin, Rade; Tanasić, Nikola; Kušar; Amado, João	312
<i>Performance Indicators for assessing RAMS SHEEP performance</i> Høj, Niels Peter; Stipanovic, Irina; Klanker, Giel	320
<i>A proposal for classification of key performance indicators for road bridges</i> Limongelli, Maria Pin; Orcesi, André	328
<i>Decision support for maintenance and upgrading of existing bridges</i> Honfi, Dániel; Leander, John; Björnsson, Ivar; Ivanov, Oskar L.; Plos, Mario; Zandi, Kamyab; Magnusson, Jonas; Lechner, Thomas; Gabriellsson, Henrik	336
Poster Session 1	346
<i>Recommendations for proof load testing of reinforced concrete slab bridges</i> Lantsoght, Eva; van der Veen, Cor; Hordijk, Dick; de Boer, Ane	346
<i>Development of a modular footbridge system with pre-tensioned CFRP reinforcement</i> Perse, Sophia; Stark, Alexander; Will, Norbert; Hegger, Josef	354
<i>Experimental Thin-Walled U-Profile Footbridge Made of UHPFRC</i> Tej, Petr; Kněž, Petr; Blank, Marek	361
<i>Structural Performance of Modern Timber Bridges In Japan</i> Honda, Hideyuki	366
<i>Izmit Bay Suspension Bridge – Wind Induced Vibrations</i> Inoue, Manabu; Takai, Yusuke; Uzun, Mecit Kerem; Kawakami, Takeshi	374
<i>Filling of strand corrosion products in cracked concrete based on accelerating corrosion method</i> Wang, Lei; Dai, Lizhao; Ma, Yafei; He, Xianfeng	381
<i>Rehabilitation of Deteriorated Timber Piles with Fiber Reinforced Polymer Composites</i> Menkulasi, Fatmir; Baghi, Hadi; Hall, David; Farzana, Nahid	389
<i>Continuously welded rails on temporary bridge decks</i> De Backer, Hans; Mys, Jan; Schotte, Ken	397
<i>Method for placing Prefabricated Slab Elements on Bridge Decks</i> Fuchs, Kerstin; Gaßner, Georg; Kollegger, Johann	405
<i>Effect of Residual Stresses on the Overall Buckling Behavior of Welded Box-section Columns under Axial Compression Loading</i> Hu, Ying; Adomako, Kumi G.; Feng, Liangliang; Shen, Le; Zhang, Weifu; Nie, Shidong; Cui, Jia; Xu, TanChuMin; Xu, Lei	413
<i>Rosedale Overhead: Functional Upgrades, Structural Rehabilitation and Seismic Retrofit</i> O'Hagan, Sean; Holmes, Keith; Saiedi, Reza; Khan, Saqib;; Hamersley, Bruce;	421
<i>Seismic Performance of Cross Laminated Timber (CLT) Platform Building by Incremental Dynamic Analysis</i> Shahnewaz, Md; Tannert, Thomas; Alam, Shahria M.; Popovski, Marjan	430
<i>Performance Analysis of Recycled and Natural Aggregate Concrete Column with Varying Design Parameters</i> Hossain, Mosharef; Alam, Shahria	437



<i>A monolithic approach for modeling viscoelastic materials in civil engineering</i>	
Kraus, Michael A.; Niederwald, Michael; Siebert, Geralt	445
<i>Fire Resistance Performance of Prefabricated Composite Floor System Infilled with Phase Change Material</i>	
Park, Min Jae; Ju, Young K.; Min, Jeong Ki; Yoon, Sung Won;	454
<i>Energy Absorbing Connectors for Blast Resistant Design</i>	
Oswald, Charles; Bazan, Marlon	462
<i>The effect of constraining measures for road traffic on highway bridges</i>	
Nowak, Marcel; Fischer, Oliver	470
<i>Harnessing Results of Nonlinear Dynamic Soil Structure Interaction Analysis in Reinforcement Design of an Underground Rail Station</i>	
Tomek, Pavel; Chok, Kermin; McKenna, Colm; Freudenberger, Frank	480
<i>Northeast Anthony Henday Drive / Yellowhead Trail System Interchange– Design Challenges and Innovative Solutions</i>	
Tromposch, Eric; Lewis, Myles; MacLaggan, David	487
<i>Rehabilitation and Superstructure Replacement of the Miles Canyon Timber Suspension Bridge</i>	
Ellis, Reed; Cheng, Renyuan; Heal, Tyler	496
<i>Full Live Load Test of a Cable-Stayed Bridge</i>	
Trowland, Morgan T.; Robazza, Brook R.	N/A
<i>Multi span suspension bridge on floating foundations – behaviour under operation</i>	
Villoria, Bruno; Veie, Johannes; Holtberget, Simen Hellgre; Jena, Parthasarathi	509
<i>Life-Cycle Cost Analysis of Super Long-Span Cable-Stayed Bridges with Steel or CFRP Cables</i>	
Liu, Yue; Du, Guangli	517
<i>Polyurethane flexible plug expansion joints – Characteristics, benefits and case studies</i>	
Meng, Niculin; Gallai, Gustav; Baillés, Borja	524
Bridges Case Studies 1	532
<i>The Ordsall Chord, Manchester, UK – an overview</i>	
Duguid, Brian; Whiteaker, Mike.....	532
<i>Design and Erection of the Arrah-Chhapra Bridge</i>	
Robazza, Brook R.; Trowland, Morgan T.; Sohal, Gurpreet S.; Jeakle, David L.	540
<i>Static and Dynamic Study of a 700 m Long Catenary Bridge</i>	
Szabó, Gergely; Pálóssy, Miklós; Mátyássy, László.....	548
<i>Comparison of methods for determination of load-bearing capacity of I-73 and KA-73 precast concrete bridge beams</i>	
Lehký, David; Novák, Drahomír; Kucek, Martin; Nezval, Michal.....	556
<i>Hagwilget Bridge, Canada: Replacement of entire truss nodes under live traffic</i>	
Tarrell, Jack	562
<i>US 60 Smithland Bridge – Navigation Modeling</i>	
Hunley, Tony; Perkins, Taylor; Kuntz, Chris; Hyner, Matthew	570
Structural Concrete: Design	578
<i>Modelling of structures and joints for performance-based design</i>	
Ozola, Lilita	578
<i>Rational Reinforcement utilizing Post-tensioning Anchorage Devices in Horizontal Force Adjustment for Closure Pour</i>	
Ono, Shuhei; Matsunaga, Hideaki; Toshinami, Tatsuaki.....	584
<i>Modelling Beam-Column Joints for Progressive Collapse Analysis</i>	
Salgado, Rafael A; Guner, Serhan	592



<i>Formulated Tension Design for Post-tensioned Anchorage Zones and Relevant Equations in Chinese Concrete Bridge Design Code</i>	
Liu, Zhao; He, Zhiqi; Zhou, Linyun	600
<i>Enhanced strut-and-tie model for reinforced concrete pile caps</i>	
Mathern, Alexandre; Chantelot, Gautier; Svahn, Per-Ola; Kettil, Per; Rempling, Rasmus; Engström, Björn	607
<i>Refined Stress Check of Special Concrete Box Girder Bridges at Serviceability Limit State</i>	
Zhang, Yu; Xu, Dong.....	615
Structural Steel: Practical Issues and Case Studies	623
<i>Modular steel lamella roofs by Hugo Junkers - A lightweight structure from the 1920s</i>	
Tutsch, Joram; Barthel, Rainer	623
<i>Complexity Meets Craft: Fabrication and Erection Issues in Non Orthogonal Steel Structures</i>	
Boake, Terri Meyer.....	631
<i>The steel roof of the new Lille Stadium. Its mechanical scheme, assembly and erection sequences</i>	
de Ville de Goyet, Vincent; Gens, Frédéric, Seret, Sébastien, Duchêne, Yves.....	639
<i>Load Rating of a Steel Bridge by Inclination Measurement</i>	
Su, Di; Eid, Jonathan; Nagayama, Tomonori.....	647
<i>Designing the River Irwell Crossing – the UK’s first network arch bridge</i>	
Rusev, Rusi; Foster, Rufus; Abbott, Tim; Bistolas, Anthanasios	655
<i>Edge Distance for Mechanical Fastening of Steel Fatigue Cracks</i>	
Fujita, Masanori; Okazaki, Shunsuke; Miida, Yuki.....	663
Design of Structures for Earthquakes 2	670
<i>Cloud Accelerated Performance Based Seismic Design</i>	
Chok, Kermin; Tomek, Pavel; Clifton, Trent.....	670
<i>Calli Extradosed Bridge: Fast track project for an extradosed bridge in seismic area</i>	
Ozkul, Ozgur; Ozel, C. Noyan; Yayim, Cagri; Combescur, Etienne; Buchin-Roulie, Vanessa; Fabray, Nicolas; Erdogan, Julien	677
<i>Performance Based Seismic Design of Shape Memory Alloy Reinforced Concrete Bridge Pier</i>	
Billah, A.H.M Muntasir; Alam, Shahria	683
<i>Comparing Seismic and Tsunami Load Demands on Reinforced Concrete and Concrete Filled Steel Tube Bridges</i>	
Stephens, Max T.; Winter, Andrew; Motley, Michael R.; Lehman, Dawn E.	691
<i>Prediction of Post-Earthquake Damage of Reinforced Concrete Highway Bridges</i>	
Abo-El-Ezz, Ahmad; Nollet, Marie-José; Nastev, Miroslav.....	699
<i>Seismic Retrofitting of Existing Structures – Common Strategies and Case Studies</i>	
Mendez-Galindo, Carlos; Moor, Gianni; Baillés, Borja	707
Historic Structures 1	715
<i>Structural Evaluation and Load Rating of Lorne Bridge: A Historic Open-Spandrel Arch Bridge-Case Study</i>	
Salib, Sameh; Werner, Jonathan; Liu, Karen.....	715
<i>Stabilisation of the gravity structure of the Romanesque Abbey of Payerne Switzerland</i>	
Brühwiler, Eugen; Martin, David.....	722
<i>Historical Arched Stone Bridges and Their Long-Lasting History in Turkey and Balkans</i>	
Sert, Halide; Yılmaz, Süheyla; Nas, Mutluhan; Apaydin, Nurdan	730
<i>Reviving and Repurposing the Iconic TWA Flight Center</i>	
Buckley, Ian; Wilcoxon, Dan; Macht, Jeremy	738
<i>Preserving a Well-loved Heritage Structure</i>	
Walters, Ian; Leggett, Casey	746



<i>Current Status and Thinking of Chinese Ancient Bridges Protection</i>	
Peng, Bo; Wang, Dalei.....	754
Cable Stayed Bridges II: Analysis and Optimization	762
<i>The Use of Crossing Stay Cables to Add Stability to Towers of Multi Span Cable Stayed Bridges</i>	
Jackson, Chris	762
<i>Study on Tensional Countermeasures for the Parallel Strand Stayed Cable Based on the Equivalent Model with Series-parallel Connected Springs</i>	
Zhuang, Dongli; Xiao, Rucheng; Da, Xiao.....	770
<i>Parametric simulation of non-symmetric cable-stayed bridges</i>	
Jorquera-Lucerga, Juan Jose; Lozano-Galant, Jose Antonio; Turmo, Jose.....	777
<i>Analysis of cable-stayed bridge construction</i>	
Lozano-Galant, Jose Antonio; Xu, Dong; Turmo, Jose	785
<i>Influence of Curvature Radius on Static and Dynamic Characteristics of Curved Cable- stayed bridge</i>	
Zhang, Erhua; Shan, Deshan; Guo, Shan; Ren, JianXin; Li, Qi.....	793
<i>Numerical Study on 1200m-span Railway Cable-stayed Bridges with Four Different Girder Sections</i>	
Chen, Guorong; Dai, Gonglian; Liang, Jinbao; Yang, Linghao; Yue, Zhe; Liu, Wenshuo	801
WC-2 Special Session: Modern Wind Turbines - Challenges and New Design Technologies For Wind Turbine Structures	809
<i>Surrogate Modelling For Fatigue Damage of Wind-Turbine Blades Using Polynomial Chaos Expansions and Non-Negative Matrix Factorization</i>	
Mylonas, Charilaos; Abdallah, Imad; Chatzi, Eleni.....	809
<i>Fatigue assessment and damage detection of wind turbine structures by continuous health monitoring</i>	
Höffer, Rüdiger; Tewolde, Simon; Bogoevska, Simona.....	817
<i>Challenges for tower structures of modern wind turbines</i>	
Rauch, Marion; Knobloch, Markus.....	825
<i>Concrete towers out of semi-precast elements - erection of a prototype tower section</i>	
Fischer, Ilja; Schönweger, Maria Charlotte; Kollegger, Johann	833
<i>Dynamic Analysis of Innovative Hybrid Wind Mill Tower Considering Soil Structure Interaction</i>	
Shah, Hemal J.; Desai, Atul K.	838
Bentley Special Session: Advancing the Design, Engineering, Analysis and Operations of Bridges	846
<i>The Gamechanger: How BIM for Bridges triumphs over the competition and revolutionizes design workflows</i>	
Alestra, Michael	846
<i>Digital Delivery with Building Information Modeling for Bridges</i>	
Maier, Francesca	847
<i>What happens in BIM, stays in BIM</i>	
Schlereth, Kevin; Stone, Eric N.	848
<i>Going Digital: Increase Performance and Productivity Using A Common Data Environment</i>	
Tanase, Lee D.	849
Corrosion	850
<i>Optimizing Performance of Concrete Structures with Zinc Coat-ed Reinforcing Steel</i>	
Gagné, Martin; Pole, Shannon; Goodwin, Frank E.; Dallin, Gary.....	850
<i>Remaining Strength Evaluations and Reinforcement Methods of Plate Girders with Corrosion near Supports</i>	
Asao, Naoyuki; Fujii, Katashi; Ogami, Hiroshi	857
<i>Effect of corrosion on bond performance of corroded pretensioned prestressed concrete beams</i>	
Zhang, Jianren; Yi, Ju; Ma, Yafei; Wang, Lei; Peng, Hui	865



<i>Non-Destructive Testing for Detecting the Corrosions of External Post- Tensioned Tendons</i>	
Lee, Joo-Hyung; Cho, Jae-Yeol; Shin, Sung-Jin; Hong, Jeong-Mo; Lee, Jae-Hoon	873
<i>Life-cycle cost analysis of concrete structures reinforced with stainless steel reinforcing bars</i>	
Van Niejenhuis, Colin; Walbridge, Scott; Hansson, Carolyn;	880
<i>The durability and service life benefits of Stainless Steel Rebar and the underpinning properties and features – A stainless industry primer for owner’s, planners, specifiers, and designers on the technical and market realities</i>	
Huza, Richard	888
Structural Concrete: Repair	896
<i>Assessing the Impact of Improper Placement on Reinforced Concrete Beam Behaviour</i>	
Zhang, Jiachen; Brault, Andre; Hoult, Neil A.....	896
<i>Use of Extra Coating Thickness on Epoxy-Coated Bars in Concrete Deck Replacement</i>	
Villamizar, Sandra; Hull Henkhaus, Rachel E.; Ramirez, Julio	904
<i>Concrete Structure Assessment using ACI 562: History and Possible Next Steps</i>	
Bartlett, F. Michael	912
<i>Investigation of Causes of Cracks in a Precast Concrete Closed Spandrel Arch Bridge with Corrugated Section</i>	
Ong, Chong Yong; Choong, Kok Keong; Tan, Geem Eng; Thong, Chin Mun	920
<i>Bridge deck deflection: importance of early shrinkage</i>	
Menétrey, Philippe; Broquet, Claude; Pires, Francisco	928
<i>End Diaphragm Cracking of Box Girder Bridges due to Post-tensioning: Case Study</i>	
Maree, Ahmed F.; Sanders, David H.	936
Suspension Bridges	944
<i>IZMIT Bay Suspension Bridge – Advanced Post tensioning system</i>	
Inoue, Manabu; Yanagihara, Masahiro; Durmaz, Müslüm; Kara, Aydin; Bellikan, Erol; Pedersen, Flemming Michael; Löhning, Thomas	944
<i>Replacement of the Macdonald Bridge Suspended Spans: Fabrication and Field Construction Works</i>	
Radojevic, Dusan; Kirkwood, Keith F.	951
<i>Wind Load Evaluation based on the Field Measurement Data for the Design of a Suspension Bridge</i>	
Jung, Kilje; Kim, Chong Hyun; Kim, Gi Nam; Yoon, Eui Taek	959
<i>Spreading suspension cable at the Rhinebridge Emmerich, Germany</i>	
Boué, Andreas	965
<i>Cable Erection of Triple Pylons (multi-span) Suspension bridge, New Millennium Bridge</i>	
Yang, Kyuyoung; Kim, Jungin; Choi, Jinhyuk; Park, Taekwun; Kim, Jaehong.....	972
<i>Dehumidification – An Effective Strategy for Preserving the Cables of Suspension Bridges</i>	
Beabes, Shane R.; Colford, Barry R.; Bulmer, Mark J.	978
Modern Construction Methods	986
<i>The Mersey Gateway Project, UK – Delivery to completion</i>	
Hurrell, Iona; Hogarth, Dean; Williams, Barry.....	986
<i>Lessons learned from construction of several extradosed bridges</i>	
Bajo Pavía, Carlos; Martín-Tereso, Luis; Sanchez, Juan José; Herrero, J. Emilio; Franczewski, Tomasz; Stachura, Michal	994
<i>Considering constructability in precast construction</i>	
Wium, Jan; Mostert, Lourens.....	1002
<i>Constructing the Abraham Lincoln Bridge</i>	
Brestin, John; Osses, Claudio; Buch, Kevin; Finke, John.....	1010



<i>Innovative Technology of Yavuz Sultan Selim Bridge Design and Construction</i>	
Paik, Hansol; Kwak, Sungtae; Park, Wonjeong.....	1018
<i>Atal Bridge: Efficient Delivery of Construction Engineering Services Using Information Communication Technology</i>	
Trowland, Morgan T.; Robazza, Brook R.....	1026
Historic Structures 2	1034
<i>Contribution to Restoration Process of Structural Analysis Studies on Historic Bridges</i>	
Sert Halide; Nas, Mutluhan; Yılmaz, Süheyla; Apaydin, Nurdan	1034
<i>Engineering the Oculus – World Trade Center PATH Transportation Hub</i>	
Surtees, Tom; Petschke, Tobias; Viola, Joseph M.....	1042
<i>Back to the Future – Reconstruction and Revitalization of the BIKINI House in the Centre of Berlin</i>	
Pekoll, Oskar; Lippert, Marion	1050
<i>On the use minor and non-destructive methods for the safety evaluation of an historic RC bridge: the Bôco Bridge</i>	
Sánchez-Aparicio, Luis Javier; Bautista-De Castro, Álvaro; Ramos, Luís F.; Sena-Cruz, José	1058
<i>Dangerous synergies causing failures of historical structures</i>	
Drdácký, Miloš; Cacciotti, Riccardo; Slížková, Zuzana	1066
<i>Analysis of Confederation Bridge Pier Behaviour Following Blizzard Using Pier Tiltmeter Monitoring System</i>	
McCallum-Mantha, Brittany; Newhook, John; McGinn, Donald	1074
Slabs as Structural Members	1082
<i>Finite element investigation of the compressive membrane action effect on concrete slabs</i>	
Genikomsou, Aikaterini; Polak, Maria Anna.....	1082
<i>Field Testing and Computational Model Verification for Spread Slab Beam Bridges</i>	
Terzioglu, Tefvik; Hueste, Mary Beth; Mander, John	1089
<i>Experimental Research on Concentrated Load Transfer between Steel and Slender Reinforced Concrete Slabs by High Performance Saw- Tooth Connectors</i>	
Reimer, Andreas; Schmid, Volker; Al-kroom, Hussein.....	1098
<i>Parametric study and reliability-based evaluation of alternate load path design in reinforced concrete slabs</i>	
Droogné, Didier; Caspee, Robby; Taerwe, Luc; Herraiz, Borja	1106
<i>Fundamental study on half-width slab deck replacement method for an existing composite steel girder bridge</i>	
Kobayashi, Shunsuke; Yamaguchi, Takashi; Matsumoto, Takashi; Mitsukawa, Nobuhiro; Ogura, Tsukasa	1114
<i>Toward Practical Modelling of Reinforced Concrete Flat Slab Systems</i>	
Goh, Chong Yik M.; Hrynyk, Trevor D.....	1122
Impact of Climate Change	1130
<i>Building-Integrated Photovoltaic – Standardization and Testing</i>	
Rehde, Franziska; Weller, Bernhard	1130
<i>Intelligent Future Building Skins –Studies on a Flat Plate Photobioreactor Prototype</i>	
Albus, Elisabeth; Weller, Bernhard; Haskell, Jake; Sengewald, Timo	1138
<i>Assessing climate impact on reinforced concrete durability with a multi-physics model</i>	
Flint, Madeleine M.; Michel, Alexander.....	1145
<i>Timber Bridges – Load Carrying Behaviour According to climate changes</i>	
Franke, Steffen; Franke, Bettina; Schiere, Marcus; Müller, Andreas	1153
<i>Climate impact optimization in concrete bridge construction</i>	
Ekström, Daniel; Al-Ayish, Nadia; Simonsson, Peter; Rempling, Rasmus	1161
<i>Climate change: impact on snow load on structures and consequences on built environment</i>	
Croce, Pietro; Formichi, Paolo; Landi, Filippo; Marsili, Francesca	1169



WC-2 Special Session: Strengthening of Old Steel Bridges	1177
<i>Repair, Strengthening and Upgrading of Steel Bridges in The Netherlands</i>	
Snijder, H.H. (Bert); Hesselink, B.H. (Bert)	1177
<i>Prolife: Recalculating a steel railway bridge for determining strengthening measures, using an updated FEM model and site measurements.</i>	
Burg, Mark van de; Steenbrink, Arjen; Hesselink, B.H. (Bert)	1185
<i>Innovative strengthening of steel truss nodes by Ultra-High Performance Concrete</i>	
Ivanov, Stoyan; Geier, Roman; Rebelo, Carlos; Breda, Ricardo	1193
<i>Monitoring of a bridge strengthened with post-installed coiled spring pins</i>	
Hällmark, Robert; Collin, Peter; Petersson, Mats; Andersson, Erik	1201
<i>Testing of coiled spring pins as shear connectors</i>	
Hällmark, Robert; Collin, Peter; Möller, Mikael	1209
<i>A Technique for Strengthening Existing Continuous Non-Composite Steel Girder Bridges Using Post-Installed Shear Connectors and Inelastic Moment Redistribution</i>	
Ghiami Azad, Amir Rez; Kreitman, Kerry; Engelhardt, Michael; Helwig, Todd; Williamson, Eric	1217
Safety of Marine and Railway Infrastructure	1225
<i>Dynamic Analyses of Ship Impact to the New Bridge over Storstrømmen</i>	
Egede Andersen, Jacob; Talic, Edita; Kock, Henrik Bredah; Iqbal, Muhammad Rizwa	1225
<i>Assessment of the Structural Safety of the Schiphol Railway Tunnel</i>	
van der Sanden, Pieter; Scholten, Peter	1233
<i>Renovation of the Existing Lighthouse for New Radar System in the Gulf of Thailand</i>	
Buddee, Samard	1241
<i>Design and Launching of a Redundant Truss over a Busy Rail Yard</i>	
Furrer, Martin; Hasbrouck, Greg; Yuzna, Jack	1249
<i>Multi-span suspension bridge on floating foundations - behaviour under ship impact</i>	
Dørum, Cato; Sha, Yanyan; Storheim, Martin	1257
<i>Numerical simulation of protection barriers for bridge piers against ship collision</i>	
Aygül, Mustafa; Darholm, Thomas; Thorsell, Mikael	1264
Structural Behaviour under Seismic Conditions 1	1274
<i>Seismic Fragility Curves using Natural and Synthetic Ground Motions</i>	
Sarkar, Pradip; Davis, Robin; Pragalath, D.C. Haran	1274
<i>Seismic Performance of Concrete-Filled Double-Layer Steel Tubular Column under High Axial Load</i>	
Li, Wencong	1281
<i>A New Seismic Retrofitting Method for Steel Bridge Piers in Japan</i>	
Lin, Weiwei; Taniguchi, Nozomu; Satake, Shinya; Okubo, Fujikazu; Kubo, Takeaki	1289
<i>Structural design of a seismic isolated building in Matsumoto city</i>	
Kimura, Toshiaki; Nagai, Yuki; Sasaki, Mutsuro	1297
<i>Pretensioned, Rocking Bridge Columns for Accelerated Construction and Enhanced Seismic Performance</i>	
Thonstad, Travis; Mantawy, Islam M.; Eberhard, Marc O.; Stanton, John; Sanders, David H.	1304
<i>Seismic Performance of Perforated Steel Plate Shear Walls Designed According to Canadian Seismic Provisions</i>	
Barua, Kallol; Bhowmick, Anjan	1312
Structural Analysis 1	1320
<i>Three-Dimensional Non-Linear Analyses of Special Reinforced Concrete Moment Frames</i>	
Phillippi, Donald J.; Liuzza, Gabrielle	1320
<i>Influences on Determining Structural Reliability</i>	
Hertle, Robert; Brehm, Eric	1328



<i>Live Load Distribution Factors for a Lightweight Movable Bridge Deck System</i>	
Baghi, Hadi; Menkulasi, Fatmir; Parker, Jacob	1336
<i>Column Removal Analysis of Bare Steel Gravity Frames Using Connection Behaviour from Physical Tests</i>	
Oosterhof, Steven A; Nethercot, David A; Driver, Robert G	1344
<i>Numerical Analysis of Stress Concentration Factors of CFRP- Strengthened Fillet Welded T-joints</i>	
Qitong, Yu; Lewei, Tong	1353
<i>Design Challenges Related to Providing Lateral Load Resistance to Existing Buildings in Accordance with Current Building Codes</i>	
Duntemann, John F.; Sfura, Jon F.; Hesam, Pedram.....	1361
Architectural and Structural Considerations in Design	1369
<i>Shaping Forces; the symbiotic relation between structure and architecture</i>	
Smits, Joris	1369
<i>The Shenzhong Link – A synthesis of architectural and structural design</i>	
Forsberg, Torben; Jensen, Poul Ove	1375
<i>Plus-Energy façades with smart materials for future building envelopes</i>	
Horn, Sebastian; Weller, Bernhard; Seeger, Julia	1383
<i>Securing visual quality and architectural intent while aiming for an affordable tender design - the procurement of the Mersey Gateway Crossing</i>	
Halaczek, Bartlomiej; Knight, Martin.....	1391
<i>Enabling a New Architectural Paradigm with Performance Based Design of a Base Isolated Sculptural Office Tower</i>	
Tomek, Pavel; Nulman, Amie; Chok, Kermin; Zekioglu, Atila	1398
<i>Bridge Aesthetics: Two examples from India</i>	
Guliani, RB Singh	1406
Bridges Case Studies 2	1414
<i>Cross-Sections of long Composite Bridges – Performance based Design</i>	
Reintjes, Karl-Heinz	1414
<i>Sir Ambrose Shea Lift Bridge – Newfoundland and Labrador, Canada</i>	
Ajrab, jack; McCall, Joanne; O'Connell, Ryan	1422
<i>Conceptual Design, Detailed Design, and Construction of the Terwillegar Park Stressed Ribbon Footbridge</i>	
Ellis, Reed; MacLaggan, David; Savard, Carl; Reske, Jason.....	1429
<i>A Baseline Study of a Major Viaduct in Toronto, Canada, for Strategic Planning for the Superstructure Replacement/Rehabilitaion of Elevated Structures</i>	
Lam, Wilson; Li, Edward.....	1437
<i>Veterans Home Bridge Rehabilitation</i>	
Arellano, Eduardo; Skabar, Kip; Kishimoto, Yuki	1445
<i>Construction of the Terwillegar Park Stressed-Ribbon Footbridge</i>	
Paulsen, Michael; Shields, Rowan, Cuperlovic, Nikola.....	1453
Fibre Optic Sensing	1461
<i>Performance assessment of embedded distributed optical fiber sensors in reinforced concrete structures</i>	
Barrias, António; Casas, Joan R.; Villalba, Sergi	1461
<i>Distributed Deflection Measurement of Reinforced Concrete Elements Using Fibre Optic Sensors</i>	
Brault, Andre Rober; Nurmi, Sara; Hoult, Neil A.	1469
<i>Distributed Sensing to Assess the Impact of Support Conditions on Slab Behaviour</i>	
Nurmi, Sara; Mauti, Gabriella; Hoult, Neil A.....	1478



<i>Distributed fibre optic sensor system to measure the progressive axial shortening of a high-rise building during construction</i>	
de Battista, Nicholas; Harvey, Ross; Cheal, Nick	1486
<i>Prestress Loss Monitoring Using Long-Gauge Fiber Optic Sensors</i>	
Abdel-Jaber, Hiba; Glisic, Branko	1494
<i>Method for Validation of long-term Temperature Measurements from Sensors</i>	
Abdel-Jaber, Hiba; Glisic, Branko	1499
Challenges with a Deteriorating Major Structure – The Existing Champlain Bridge	1505
<i>The Existing Champlain Bridge - Overview of Issues – The Owner's Perspective</i>	
Carlin, Glen P.	1505
<i>The Existing Champlain Bridge – Instrumentation, Monitoring and Load Tests</i>	
Tinawi, Rene; Lavigne, Dominic; Crépeau, Louis; Sobhani, Ehsan	1513
<i>The Existing Champlain Bridge – Assessment Using Refined Analyses</i>	
Mitchell, Denis; Cook, William D.; Massicotte, Bruno; Yildiz, Emre	1521
<i>The Existing Champlain Bridge - Assessment of Structural Deficiencies</i>	
Griezic, Andrew; de la Puente, Alejandro; Lizotte, Jean de Gaspé; Lasheras, Gustavo; Demers, Francois	1529
<i>The Existing Champlain Bridge - Strengthening Measures</i>	
Griezic, Andrew; Pepin, Francois; Lizotte, Jean de Gaspé; Lasheras, Gustavo; Demers, Francois	1537
<i>The Existing Champlain Bridge – Developing a Customized Inspection and Assessment Methodology</i>	
Zhang, Cheng; Langlois, Anne-Marie, Breaban, Andrei	1545
Poster Session 2	1553
<i>Design of instrumented bearings for direct measure of bridge live loads</i>	
Dubbs, Nathaniel C.	1553
<i>Extending Building Façade Performance Requirements for Blast: Hazard and Injury Assessment Investigations</i>	
Marchand, Kirk A; Davis, Carrie E; Conrath, Edward J.; Hadjioannou, Michalis; Earl, William R.	1561
<i>Aerodynamics challenges and solutions for structures of unique architecture</i>	
Solovev, Sergei	1569
<i>The Ordsall Chord, Manchester, UK – digital delivery of design</i>	
Duguid, Brian; Hyde, Jason; Pullan, Howard	1576
<i>Flexural Performance of Two-Way Concrete Slabs Reinforced with Carbon Fiber Grid</i>	
Aljazaeri, Zena R.; Alghazali, Hayder H.; Myers, John J.	1584
<i>Key Techniques for Performance-based design of metro depot covered structure</i>	
Jia, Jian; Liu, Chuanping; Xu, Xiaobing; Zhang, Zhibin; Xie, Xiaolin; Liu, Kai	1592
<i>The Third Bosphorus Bridge - Its longitudinal and transversal behavior</i>	
de Ville, Vincent; Duchêne, Yves	1599
<i>Derailment of an overhead gantry for the erection of precast concrete girders</i>	
Hingorani, Ramon; Tanner, Peter	1607
<i>Retrofit of Concrete Members with CFRP Rod Panels (CRP 195)</i>	
Jawdhari, Akram; Harik, Issam	1615
<i>Unique access system engineering innovation leads to important milestone at MLC Centre</i>	
Stathis, Paul; Buchin-Roulie, Vanessa; Watson, John	1623
<i>Comparative Study between Reversely and Forwardly Constrained Optimal Design Method for Tall building Structure</i>	
Ma, Zhuang; Zhao, Xin	1630
<i>Numerical Evaluation of Moment Live Load Distribution Factors in NEXT D Beam Bridge</i>	
Semendary, Ali A.; Jawdhari, Akram R.	1636



<i>Northeast Anthony Henday Drive / Yellowhead Trail Interchange Flyover Ramp Bridges</i> Lewis, Myles.....	1644
<i>Assessment of efficiency of intensity measures for performance- based travelling fire design</i> Teslim-Balogun, Adeyanju; Málaga-Chuquitaype, Christian; Stafford, Peter J.	1652
<i>Finite Element Analysis of Bearing Plinth in Different Sizes</i> Shujun, Fang; Qionglin, Zhao; Liu, Shenbin; Sun, Yushi	1659
<i>Deflection estimation of a steel box girder bridge using multi-channel acceleration measurement</i> Nagayama, Tomonori; Zhang, Chunbo.....	1667
<i>A Study on Parameter of Steel Strain of Precast Reinforced Concrete with Joint</i> Park, Jongho; Hong, Sungnam; Park, Sun-Kyu; Choi, Jinwoong.....	1675
<i>Ultimate load of cylindrically curved panels under uniform compression at straight edge and the influence of curvature</i> Guo, Hui; Zeng, Zhibin; Lu, Xiaoguang; JU, Xiaochen; Zhao, Xinxin.....	1683
<i>Experience of duplex stainless steels as construction materials in bridges: Results of seven inspections</i> Mameng, Sukanya Häg; Tigerstrand, Claes; Larsson, Tobias; Gedge, Graham; McCray, Jonathan	1691
<i>Hybrid structure for the ArtLab EPFL pavilion</i> Menétrey, Philippe; Maas, Joachim	1699
<i>Using game engines in visualizations and simulations of the bridges in the E39 fjord crossings project.</i> Madsen, Preben Ren	1707
<i>5th LNG Tank In Zeebrugge Terminal (Belgium)</i> Bañares, Miguel; Nieto, Javier; Aramburu, Mikel; D'Angiuro, Ivan; Esquius, Marc ; Lázaro, Ángel	1711
<i>Conceptual Design of Salmon River Replacement Bridge</i> Rebel, C.P. (Ken); Singh, Raj; Abercromby, Pia	1718
<i>Pendulum-type bearings / seismic isolators – solutions and case studies</i> Spuler, Thomas; Brüninghold, Max; Mendez-Galindo, Carlos	1726
Shear in Concrete Members	1734
<i>Opening effect on punching shear strength of RC slabs</i> Balomenos, Georgios; Genikomsou, Aikaterini; Polak, Marianna	1734
<i>A Critical Take on Eurocode 2 Concerning the Assessment of Shear Capacity of Reinforced and Prestressed Concrete</i> Hertle, Thomas; Gebbeken, Norbert; Hertle, Robert	1742
<i>Punching/Shear Strength of a Full-scale Tested Bridge Deck Slab</i> Shu, Jiangpeng; Plos, Mario; Nilenius, Filip; Zandi, Kamyab; Bagge, Niklas; Johansson, Morgan	1750
<i>Punching shear behaviour of edge column connections in continuous flat slabs</i> Einpaul, Jürgen; Vollum, Robert; Ramos, António	1758
<i>Comparison of Shear Design Provisions of Structural Concrete Members Used in Various Approaches</i> Wei, Sihang; Kuchma, Daniel.....	1766
<i>Discrete modeling of reinforced and prestressed concrete beams under shear loads</i> Wan-Wendner, Lin; Vorel, Jan; Strauss, Alfred; Cusatis, Gianluca; Wan-Wendner, Roman	1774
Structural Behaviour Under Seismic Conditions 2	1782
<i>Effectiveness of FRCM System in Strengthening Reinforced Masonry Walls Subjected to Cyclic Loading</i> Al-Jaberi, Zuhair; Myers, John J; ElGawady, Mohamed.....	1782
<i>Shaking Table Test Using Scaled Model of Reinforced Concrete Column Considering Time Variation from Similitude Conditions</i> Park, Jamin; Cho, Jae-Yeol.....	1790
<i>Role of the Floor System in the Cyclic Response of Steel Gravity Framing</i> Donahue, Sean; Engelhardt, Michael; Clayton, Patricia; Williamson, Eric; Helwig, Todd.....	1798



<i>Analysis on Fabricated Concrete Frame with Replaceable Energy Dissipation Connectors</i> Xie, Luqi; Wu, Jing; Li, Chunyu; Xia, Tianyang.....	1805
<i>Improving seismic performance of the non-structural light steel framing systems using sliding bolted connections</i> Shahini, Marzie; Saedi, Gholamreza; Mirghaderi, Rasoul; Forodi, Majid; Changizi, Karim.....	1811
<i>Seismic Performance of Columns with Grouted Couplers in Idaho Bridges</i> Ebrahimpour, Arya; Earles, Barbara.....	1817
FRP Structural Members	1824
<i>Development, testing and construction of the hybrid FRP composite – concrete road bridge</i> Siwowski, Tomasz W; Rajchel, Mateusz; Kaleta, Damian.....	1824
<i>Durable design of a 42m full FRP footbridge for Bergen, Norway</i> Tromp, Leisbeth; van IJselmuiden, Kees; Boeters, Ton; Persson, Stian.....	1832
<i>FRP composite bridges provide optimal solutions in urban areas</i> Schutte, William; Said, Mozafar; Blom, Kees.....	1839
<i>Member Stiffness for Frame Analysis of GFRP Reinforced Concrete Structures</i> Bischoff, Peter H.....	1847
<i>Bracing of large GFRP frames with very slender GFRP panels</i> Macchi, Niccolò; Zwicky, Daia.....	1855
<i>Static and dynamic performance of an orthotropic-deck pultruded fibre-reinforced polymer footbridge</i> Caprani, Colin; Satasivam, Sindu; Ahmadi, Ehsan; Ngan, Jun Wei; Zhang, Shaohua; Bai, Yu.....	1863
Structural Analysis 2	1871
<i>Designing with big DATA – Design, Analysis and Fabrication of a Complex Geometry Gridshell</i> Correa, Cristobal.....	1871
<i>Methodology for selection of production method in an early stage – improved conceptual design process</i> Karlsson, Mats; Rempling, Rasmus; Gylltoft, Kent; Plos, Mario.....	1879
<i>The imminent Future of Parametric Nodes</i> Mohsen, Alamir; Knaack, Ulrich.....	1887
<i>Long term deflections of Paudèze Bridges</i> Menétrey, Philippe, Pires, Francisco; Moreillon, Lionel.....	1895
<i>Analytical Study Assessment of a Bridge with Pretensioned Rocking Columns for Rapid Construction</i> Mantawy, Islam M.; Thonstad, Travis; Sanders, David H.; Stanton, John F.; Eberhard, Marc O.....	1903
<i>Smartcoco Research Project</i> Mengeot, Pierre; Degee, Herve; Plumier, Andre.....	1911
Structural Timber 1	1918
<i>Composite Beams of Steel and Timber</i> Bradford, Mark; Hassanieh, Amirhossein; Valipour, Hamid.....	1918
<i>Structural Performance Of Modern Timber Bridges In Japan</i> Honda, Hideyuki.....	1926
<i>Robustness of Multi-Storey Timber Buildings</i> Mpidi Bitu, Hercend; Tannert, Thomas.....	1934
<i>Innovative Solutions for Mid-rise Residential Passive House Wood Structure</i> Wong, Jermyn.....	1942
<i>Comparison of CLT Design Methods to Composite Beam Theory</i> Schultz, Joshua.....	1949
<i>Development of a Two-way Column-supported Flat Plate in Cross Laminated Timber</i> Schneider, Brett H.; Forrest, Aaron; Vobis, Yasmin; Croteau, David; Oberholzer, Mathias.....	1957



Bridges and Vibrations	1965
<i>Wind Response of the New Varodd Bridge Balanced Cantilever</i> Svendsen, Martin N; Kolstrøm, Arne Øyvind; Møller, Randi N.	1965
<i>Ambient Vibration Testing of the Hawkshaw Bridge</i> Araki, Yumi; Arjomandi, Kaveh; Simpson, Robert.....	1973
<i>Vibration Testing of Scaled Cable-Stayed Bridges</i> Padilha, Diego; Araki, Yumi; Arjomandi, Kaveh; McGinn, Jared	1981
<i>Transverse Acceleration causing damage in a masonry arch bridge</i> Nichols, John; Tomor, Adrienn.....	1989
<i>Flutter derivatives identification on a very large scale aeroelastic deck model</i> Diana, Giorgio; Rocchi, Daniele; Argentini, Tommaso; Omarini, Simone	1997
<i>Changing Bridge Aerodynamics under Nonstationary Winds</i> Wu, Teng	2006
Fatigue: Cables, Orthotropic Deck, and Long Span Bridges	2014
<i>Fatigue Damage Assessment of Stay Cables for Light Rail Transit Bridges</i> Coughlin, Reid; Jiang, Jianping	2014
<i>Fatigue inspection for orthotropic steel deck with infrared thermography</i> Okumura, Atsuhiko; Mizokami, Yoshiaki; Moriyama, Akira; Otou, Tokihide; Sakagami, Takahide; Izumi, Yui	2022
<i>Fatigue Performance Evaluation of Severely Corroded Steel Strands</i> Park, Yeun Chul; Kim, Chul Young; Yoo, Seung-min.....	2030
<i>A Critical Fatigue Crack in a Long-Span Truss Bridge; Cause Investigation and Measures</i> Nishikawa, Takafumi; Wang, Qu; Tashiro, Daiki; Nakamura, Shozo; Okumatsu, Toshihiro	2035
<i>Optimal Design and Fatigue Performances of Innovative Corrugated Orthotropic Steel Deck Plate-RPC Layer Composite Deck Structure</i> Zhang, Qinghua; Cheng, Zhenyu; Liu, Yiming; Bu, Yizhi; Li, Qiao	2043
<i>Fretting Fatigue Analysis of Bridge Stay Cables at Saddle Supports using Multiaxial Stress-Based Approaches</i> Mohareb, Sherif; Goldack, Arndt; Schlaich, Mike; Walbridge, Scott	2051
The New Bridge Over the Saint Lawrence River in Montreal, Canada	2059
<i>The New Champlain Bridge Corridor Project – Needs, Owner</i> Mailhot, Guy	2059
<i>The New Champlain Bridge – Performance and Design Criteria</i> Nader, Marwan; Sanjines, Alex; Choi, Carol; Duxbury, James.....	2067
<i>Design of the Cable-Stayed Bridge Signature Span of the New Champlain Bridge</i> Nader, Marwan; Baker, George; Patel, Hardik; Shi, Sam; Ingham, Tim.....	2075
<i>The New Champlain Bridge: Technical Challenges in Design of the Approach Viaducts</i> McGain, Zachary; Goulmot, Damien; Demirdjian, Sevak; Tremblay, Marco.....	2083
<i>Highway Approaches of the New Champlain Bridge Corridor</i> Demirdjian, Sevak; Najjar, Nicolas; Cloutier, Jocelyn	2090
<i>Innovative Means and Methods for the New Champlain Bridge</i> Osborne, Gonzalo; Rogerson, Jeff; Guitard, Frédéric; Mylocopos, André.....	2098
Reinforced and Prestressed Concrete	2106
<i>Shear Strengthening of Pile Cap Girders Using Carbon Fiber Reinforced Polymer (CFRP) Strips</i> Shekarchi, William; Jirsa, James O; Ghannoum, Wassim	2106



<i>Numerical simulation of long-term creep tests on prestressed beams</i> Van Mullem, Tim; Reybrouck, Nicky; Criel, Pieterjan; Taerwe, Luc; Caspeele, Robby	2113
<i>Assessment of the shear strength of existing post-tensioned bridges</i> Huber, Patrick; Huber, Tobias; Kollegger, Johann	2120
<i>Experimental and Numerical Investigations on the Shear Capacity of Existing Prestressed Concrete Bridges</i> Fischer, Oliver; Schramm, Nicholas; Gehrlein, Sebastian	2126
<i>Adaptive Prestressed Structures realized by utilization of Artificial Intelligence Techniques</i> Schnellenbach-Held, Martina; Steiner, Daniel.....	2133
<i>Seismic collapse safety of RC circular bridge pier retrofitted with fibre reinforced polymer</i> Parghi, Anant; Alam, Shahria M.....	2141
Innovative Structural Concepts 1	2149
<i>Research on the dynamic properties of piled structures using the neural networks and the support vector machines</i> Deng, Haoyun; Jin, Xinyang; Gu, Ming	2149
<i>Botín Art Center in Santander, Spain</i> Lorenzo, José Maria; Sánchez, José Luis	2155
<i>Calgary Airport Trail Tunnel Temperature Monitoring</i> Murdoch, Nathan; Azarnejad, Azita; Sharma, Ved; Kroman, Jadwiga	2163
<i>A Unique Approach to Rejuvenating a High-Rise Building with Deteriorating Precast Cladding</i> Campbell, Mark	2171
<i>Design and Construction of a Lagoon Bank Protection Structure with Precast Counterfort Wall System</i> Tan, Geem Eng; Ong, Tai Boon; Choong, Kok Keong; Ong, Chong Yong	2180
<i>Structural Widening of 2-Span Continuous Prestressed Concrete Bridge: Structural and Seismic Implications</i> Philp, John	2188
Seismic Protection of Structures	2196
<i>A Novel Methodology for Optimum Seismic Performance-based Design of Friction Energy Dissipation Devices</i> Nabid, Neda; Hajirasouliha, Iman; Petkovski, Mihail	2196
<i>Numerical Study of the Seismic Behaviour of Variable Friction Base Isolation Systems</i> Calvi, Paolo M.; Timsina, Sandip	2204
<i>Seismic isolation of La Meynard Hospital, Martinique</i> Cynober, Charles; Vezin, Jean-Marc	2212
<i>Seismic Protection of the Eskişehir City Hospital in Turkey</i> Arranz, Raul; Braun, Christian; Huber, Peter	2219
<i>Shaking Table Test on a Super Long-span Cable-stayed Bridge Subjected to Spatially Varying Ground Motions</i> Xie, Wen; Sun, Limin; Xia, Ye.....	2226
<i>Seismic Retrofit of the McIlraith Bridge</i> O'Connell, Ryan; Ajrab, Jack.....	2234
<i>Former Dominion Archives Building Seismic Upgrade Case Study</i> Koop, Julien; Jabbour, Samer; Carson, Daniel	2241
Pedestrian Bridges	2248
<i>Vibration control of footbridges under pedestrian loading using tuned mass damper systems with eddy current damper technology</i> Saige, David; Engelhardt, Jürgen; Katz, Sebastian.....	2248
<i>New Pedestrian Overpass at Husum Station</i> Andersen, Ulrik Sloth; Saberi, Mogens	2256



<i>US Olympic Museum</i>	
Potapova, Lana; Carter, Matt; Jensen, Merica; Any Nielsen; Krager, Kathleen; Phipps, Ryan	2265
<i>Reliability under the Serviceability Limit State of Footbridges Subjected to Human-Induced Vibrations</i>	
Dey, Pampa; Walbridge, Scott; Narasimhan, Sriram	2272
<i>Test and Simulation of Pedestrian-induced Vibrations in a Double-arch Footbridge with Curved Girder</i>	
Yang, Zheng; Jia, Buyu; Yu, Xiaolin; Yan, Quansheng	2280
<i>The dynamic evaluation of composite materials footbridges</i>	
Drygala, Izabela; Dulinska, Joanna M.; Polak, Maria Anna	2285
Structural Timber 2	2293
<i>Long-Term Performance of PresLam Frames: Are Post-Tensioning Losses really an Issue?</i>	
Granello, Gabriele; Palermo, Alessandro; Pampanin, Stefano	2293
<i>Bending, vibration and long-term performance of timber-concrete- composites floors</i>	
Gerber, Adam; Tannert, Thomas	2301
<i>The development of timber as a construction material for bridges in Norway</i>	
Veie, Johannes; Stensby, Trond Arne; Dyken, Tormod; Aartun, Yngve	2308
<i>Uncertainty of Visual Inspection on the Reliability Analysis of Timber Elements</i>	
Sousa, Helder S; Ribeiro, Sérgio; Matos, José C.; Branco, Jorge M; Lourenco, Paulo B	2314
<i>Case Study: University of British Columbia's 18-storey TallWood House at Brock Commons</i>	
Fast, Paul; Jackson, Robert	2322
<i>Simplifying Complex Problems: Use of Parametric Tools to Design and Build Complex Wood Structures</i>	
Voulpiotis, Konstantinos; Epp, Lucas	2330
Structural Glass	2338
<i>Extending Glass Façade Performance Predictions for Natural and Man- made Hazards Using Accessible High-Fidelity Formulations</i>	
Marchand, Kirk A; Davis, Carrie E; Sammarco, Eric L.; Bui, Joeny	2338
<i>Case Studies of Reinforced and Post-tensioned Glass Beams</i>	
Engelmann, Michael; Weller, Bernhard	2347
<i>Effect of Regrinding on the Edge Strength of Tempered Glass</i>	
Lohr, Katharina; Weller, Bernhard	2354
<i>Glass Failure Prediction Model for Out-of-Plane Bending of Waterjet- Drilled Holes</i>	
Schultz, Joshua; Knowles, John; Morse, Stephen	2362
<i>Building with Glass as Structural Element in Alpine Areas</i>	
Siebert, Barbara; Herrmann, Tobias	2370
<i>Comparison of Unconventional Testing Methods for Mechanical Characterization of Polymeric Materials in Modern Glass Structures</i>	
Drass, Michael; Schuster, Miriam; Schneider, Jens	2378
WC-7 Special Session: Sustainable Structures in Practice	2386
<i>Sustainable Bridges – Implementing Owner Sustainability Requirements</i>	
Martin, Andrew	2386
<i>Low Level Road Bridges: A Sustainable Project</i>	
Wee, Frances; Kishimoto, Yuki; Arellano, Eduardo; Dunford, Eric; Skabar, Kip;	2392
<i>Holistic Consideration of the Sustainability on Steel-Concrete-Compo- site Motorway and Railway Bridges</i>	
Kuhlmann, Ulrike; Pascual, Ana M.; Breunig, Stephanie	2402
<i>How can a Bridge Engineer contribute to a sustainable infrastructure?</i>	
Gabler, Markus	2410



IStructE Special Session: Adding Value Through Innovation in Structural Design	2419
<i>Adding value through innovation in structural design: 1 – Introduction, with reference to innovation in bridge design</i>	
Firth, Ian.....	2419
<i>Adding value through innovation in structural design: 2 – Innovative design of timber structures</i>	
Fast, Paul.....	2423
<i>Adding value through innovation in structural design: 3 – Creativity and innovation in building structures</i>	
Franck, Lee	2429
<i>Adding value through innovation in structural design: 4 – Three Novel Applications of Bridge Isolation Bearings near Vancouver, BC</i>	
Harvey, David.....	2436
<i>Adding value through innovation in structural design: 5 – Digital Workflows and Emerging Computational Design Tools</i>	
Leach, Jon	2444
Durability	2451
<i>Sustainable retrofitting of existing buildings in peripheral residential districts of big European cities</i>	
Traykova, Marina; Traykova, Vesela.....	2451
<i>A Meso-scale Numerical Model for Predicting Chloride Diffusivity in Concrete</i>	
Hu, Shouwang; Peng, Jianxin; Zhang, Jianren; Peng, Hui.....	2458
<i>Concepts for Durable Post-Tensioned Bridges over Highways in Ontario, Canada</i>	
Mermigas, Konstantinos Kris	2466
<i>Short and long-term behaviour of RC slabs strengthened with prestressed CFRP laminate strips</i>	
Sena-Cruz, José; Correia, Luís; França, Paulo; Michels, Julien	2475
<i>The 5% Solution</i>	
Malhotra, Ashok; Carson, Daniel; Funnell, Scott; Koop, Julien	2483
<i>Durability assessment of reinforced concrete structures due to chloride ingress up and beyond induction period</i>	
Šmilauer, Vit; Hájková, Karolina; Jendele, Libor; Červenka, Jan.....	2488
Structural Strengthening and Retrofit Case Studies	2496
<i>Shear and flexural strengthening of existing bridges with textile reinforced mortar</i>	
Adam, Viviane; Herbrand, Martin; Hegger, Josef	2496
<i>Innovative solution for bridge strengthening (for widening and compliance to new codes) by modification of initial static scheme</i>	
Buchin-Roulie, Vanessa; Kaczkowski, Nicolas; de Courcelles, Charles; Toth, Miklos	2504
<i>Condition Assessment and Renewal Options Analysis for the Queensborough Bridge</i>	
Leggett, Casey; Martin, Tony; Friesen, Kevin.....	2512
<i>Post-Earthquake Analysis, Retrofit, and Future Performance of the Centinela Building</i>	
Sanchez, Telmo Andres; Paredes, Patricio; Camino, Santiago; Guzman, Juan Francisco; Paredes, Raul.....	2520
<i>Strengthening of a Twin Arch Bridge in Goa, India for Stability</i>	
Roy, Sougata; Bhowmick, Alok; Singh, Chandra Deo	2528
<i>Fort Nelson River Bridge Superstructure Replacement & Substructure Strengthening</i>	
Amiel, Chad; Rebel, C.P.; Singh, Raj.....	2536
Fatigue and Fracture: Design and Assessment	2543
<i>Simulating ductile crack growth in carbon steel using an extended finite element method (XFEM)</i>	
Hassan, Muhammad Shariq; Salawdeh, Suhaib; Goggins, Jamie	2543
<i>Fatigue damage evaluation using S-N curves obtained by different data fitting methods</i>	
Leonetti, Davide; Hashemi, Bahman; Allaix, Diego; Maljaars, Johan	2551



<i>Assessment of the brittle fracture behaviour of old mild steel structures</i> Stroetmann, Richard; Sieber, Lars	2559
<i>Fatigue Evaluation and Parametric Study on Orthotropic Steel Deck Composed of a New-Type of U-rib with Upset Webs</i> Luo, Pengjun; Zhang, Qinghua; Bu, Yizhi; Li, Qiao; Xu, Gongyi	2567
<i>Fatigue Design of high stressed aluminum structures under cyclic loading</i> Rengstl, Mathias; Radlbeck, Christina; Mensinger, Martin	2578
<i>Fatigue Performance of a Precast Hybrid FRP-Reinforced Bridge Truss Girder System</i> El-Badry, Mamdouh; Moravvej, Mohammad; Joulani, Parham	2584
Innovative Structural Concepts 2	2592
<i>Comparative Assessment of Bridges designed according to Balanced Lift Method and Balanced Cantilever Method</i> Gaßner, Georg; Fuchs, Kerstin; Kollegger, Johann	2592
<i>Columbia River Skywalk – Turning a Need into a Landmark</i> Gubbins, Julie; Cap, Roman; Alca, Nedim	2599
<i>ABC on LBJ Express Project – Innovative bent cap design and beam placement</i> Gonzalez Fernandez, Jesus; Dacal, Ignacio Navarro; Beneitez, Jose Emilio Herrero	2607
<i>Robust Bridge Design Framework to Blast, Fire, and other Extreme Threats</i> Mueller, Kevin; Marjanishvili, Shalva	2615
<i>Upgrading the Yellowhead Highway in Jasper National Park</i> Woolford, David; Gagnon, Darrel	2623
<i>Shrinkage and Creep of Mega Concrete Filled Steel Tubular Column in Super Tall Steel Building</i> Fang, Baoyi; Zhao, Xin; Yuan, Juyun	2629
Novelty in Construction	2635
<i>A manufacturing process approach to construction: design and application of a composite system for modular buildings</i> Chaillan, Gilles; Condon, Patrick; Poirriez, Catherine; Wu, Sophie	2635
<i>Creative Construction Method for an Attractive Tied Arch</i> Hamersley, Bruce; Wu, William; O'Reilly, James	2642
<i>Accelerated Bridge Construction (ABC) in Idaho: The State-of-the-Art Bridge Technologies, Current Practice and Future Research</i> Mashal, Mustafa; Aguilar, Irvin; Ebrahimpour, Arya; Ruminski, Leonard	2650
<i>Quality Control Plans for Girder and Frame Bridges</i> Linneberg, Poul; Masovic, Snezana; Hajdin, Rade	2659
<i>3D Non-Linear FE Model for a high Capacity Saw-tooth Connector</i> Al-kroom, Hussein; Schmid, Volker; Reimer, Andreas	2667
<i>Construction monitoring and control for Jiaomen River arch bridge in Guangzhou</i> Zhu, Shiyao; Yan, Quansheng; Yu, Xiaolin; Jia, Buyu	2675
Fibre Reinforced Concrete and Polymer Composites in Structures	2683
<i>Conceptual design and construction of lightweight R-UHPFRC bridges</i> Brühwiler, Eugen	2683
<i>Case Study of Two U.S. Bridge Projects Using Prefabricated Bridge Elements Connected with Ultra-High Performance Fiber-Reinforced Concrete (UHPFRC)</i> Nault, Gregory J.	2691
<i>Punching resistance of flat slabs strengthened with an added layer of UHPFRC</i> Bastien-Masse, Malena; Einpaul, Jürgen	2699



<i>Strengthened Unreinforced Masonry (URM) structures with Ultra High Performance Fibre Reinforced (UHPFRC) layers under axial in-plane and horizontal out-of-plane loading</i> Lampropoulos, Andreas; Tsioulou, Ourania; Dritsos, Stephanos	2707
<i>Strengthening of plain concrete beams using Strain Hardening Geopolymer Composites (SHGC) layers</i> Al-Majidi, mohammed Haloo; Lampropoulos, Andreas; Cundy, Andrew B.	2715
<i>Effectiveness of UHPFRC cover for the seismic strengthening of deficient bridge piers</i> Massicotte, Bruno; Jolicoeur, Olivier; Ben Ftima, Madhi; Lagier, Fabien	2723
Bridges Case Studies 3	2731
<i>Design of Gothenburg's new landmark bridge</i> Ekholm, Kristoffer; Darholm, Thomas	2731
<i>Four High Performance Concrete Deck Configurations for Louisiana's Movable Bridges</i> Menkulasi, Fatmir; Baghi, Hadi; Montes, Carlos; Parker, Jacob; Sandrock, Jean-Paul; Gomez, Sergio	2739
<i>Grayston Pedestrian Bridge: A Shared Perspective of South Africa's Connectivity and the Challenges of Getting There</i> Klassen, Darryl; Ptak, Jonah	2747
<i>Bridge scour monitoring: challenges and opportunities</i> Farooq, Mohammed; Azhari, Faezeh; Banthia, Nemkumar	2755
<i>The 102nd Avenue Bridge over Groat Road – Design Concept and Challenges</i> Andermatt, Matthias; Grondin, Gilbert; Ramsay, Bob; Habel, Katrin; Kanji, Shiraz.....	2763
<i>Special Accommodation for Structural Steel Coating of Burlington Bay Skyway</i> Wang, David; Ostrowski, Joseph; Lo, Chak; Sidky, Sherif	2771
Challenges with Building Long Suspension Bridges	2779
<i>Latest Practices for Existing Long-Span Suspension Bridges</i> Lee, Hohsing; Beabes, Shane R.; Colford, Barry R.	2779
<i>Detail design of Chacao Bridge in Chile</i> Jakobsen, Svein Erik; Rønvik, Jarle; Grøv, Ole; Nordnes, Andreas; Eltvik, Liv; Cheikh Mhamed, Aymen;	2786
<i>Some aspects of Chacao Bridge design</i> Pich, Benedicte; Gogny, Eric; Mauris, Georges; Zahir, Omar; Byun, Hyung-Kyoon; Montens, Serge; Cheikh Mhamed, Aymen; Jakobsen, Svein Erik.....	2792
<i>Service Life of Concrete Structures for the Longest Suspension Bridge in South America</i> Langlois, Anne-Marie; Valenzuela, Matias A.; Edvardsen, Carola	2800
<i>Challenges with Building the Longest Suspension Bridge in South America – Overview of Issues – The Owner's Perspective</i> Valenzuela, Matias A; Vallejo, Ignacio; Vasquez, Raul; Canales, Holguer; Jensen, Lars.....	2808
<i>Service Life Performance Design of Chacao Bridge</i> Jensen, Jakob Laigaar; Jensen, Lars; Valenzuela, Matias; Vásquez, Raul.....	2816
Bridges - Behaviour and Design	2824
<i>Proof load testing of the viaduct De Beek</i> Lantsoght, Eva; Koekkoek, Rutger; Yang, Yuguang; van der Veen, Cor; de Boer, Ane; Hordijk, Dick	2824
<i>Testing Bridges to Failure – Experiences</i> Hägström, Jens; Bagge, Niklas; Nilimaa, Jonny; Sas, Gabriel; Blanksvärd, Thomas; Täljsten, Björn; Elfgrén, Lennart; Puurula, Arto; Rydberg- Forsbeck, Lahja; Carolin, Anders.....	2832
<i>Determination of dynamic properties of railway bridges through forced excitation</i> Lachinger, Stefan; Vorwagner, Alois; Reiterer, Michael; Fink, Josef; Bruschetini-Ambro, Sebastian-Zoran	2840
<i>Robustness-based assessment of railway masonry arch bridges</i> Neiva, Diana; Moreira, Vicente N; Matos, Jose C.; Oliveira, Daniel V.	2848



<i>Behavior of transition plates crossing high-speed railway bridge joints in Germany</i>	
Zhang, Sisi; Marx, Steffen; Wenner, Marc	2856
<i>High toughness RC railway viaduct with columns reinforced by arranging a spiral rebar inside of the longitudinal bars</i>	
Sugita, Kiyotaka; Osawa, Shogo; Kuwakino, Kosuke; Tsukishima, Daisuke	2864
Innovative Structural Concepts 3	2872
<i>Debris barrier design using energy-balance techniques</i>	
Gygax, Adrian	2872
<i>Besiktas stadium roof: innovative design and construction method</i>	
Grandi, Andrea; Erdogan, Julien-Erdem; Yayim, Cagri; Mese Gencalp	2881
<i>Organic Prestressing Impact in Multi-Span Large Deck Construction</i>	
Pacheco, Pedro; Coelho, Hugo; Resende, André; Carvalho, Diogo	2890
<i>Design, construction and strengthening of shell structures made by folding</i>	
Woerd, Jan Dirk van de; Geßner, Stephan; Hegger, Josef; Chudoba, Rostislav	2898
<i>New Dynamic Center Piece for Montréal Delivers on All Challenges</i>	
Schueller, Matthias; Montminy, Sylvain; Gastoni, Vincent; Fortier, Jimmy	2906
<i>Concept, Realization and Monitoring of an advanced space structure</i>	
Reich, Stefan; Ebert, Jan	2914
Analysis and Optimization	2922
<i>Analysis and optimization of a continuous composite bridge with uplift-restricted and slip-permitted connectors</i>	
Li, Zheng-Yuan; Tao, Mu-Xuan; Nie, Jian-Guo; Fan, Jian sheng	2922
<i>Optimization of Sealing Plates for Hanger Connections at Tied Arch Bridges</i>	
Pfaffinger, Marjolaine; Mensinger, Martin	2930
<i>Rayleigh-Ritz/Finite Element Analysis of Plates by Singularity Functions</i>	
Baraka, Miljenko	2937
<i>Finite Element Model Update of Cable Supported Bridges Using Large Scale Global Optimization Technique</i>	
Park, Wonsuk; Park, JunYong	2950
<i>Optimization of the curved pylon</i>	
Mikkonen, Atte	2958
<i>Self-anchored Suspension Bridge Model Updating with Artificial Neural Network and Modified Particle Swarm Optimization</i>	
Xia, Zhiyuan; Li, Aiqun; Li, Jianhui; Duan, Maojun	2966
Building Vibrations and Damper Design	2974
<i>Numerical analysis of vertical pipe damper</i>	
Javanmardi, Ahad; Ibrahim, Zainah; Ghaedi, Khaled; Khatibi, Hamed	2974
<i>Signal stationarization technique in output-only damping identification</i>	
Kim, Sunjoong; Kim, Ho-Kyung	2981
<i>Design and Commissioning of a New Liquid Damper System for Wind- Induced Vibrations of Buildings</i>	
Ghisbain, Pierre; Mendes, Sebastian; Pinto, Marguerite; Malsch, Elisabeth; Scarangelo, Thomas	2988
<i>Development of post-installed mass damper for automated warehouse</i>	
Yasukawa, Machiko; Takaki, Masayoshi; Kitamura, Haruyuki; Matsuda, Yoriyuki; Sato, Daiki	2996
<i>Optimizing Nonlinear Damper Performance for Multi-Mode Cable Vibration Control based on Forced Vibration Responses</i>	
Sun, Limin; Chen, Lin	3004



<i>Design example of mid-story-isolated skyscraper with the viscous dampers to reduce the response acceleration in lower part of the building</i> Nakamizo, Daiki; Asakawa, Takeshi; Koitabashi, Yuichi	3010
Floating Suspension Bridges	3018
<i>Basic design for a Submerged Floating Tube Bridge across the Digernessundet</i> Eidem, Mathias; Minoretti, Arianna; Xiang, Xu; Fjeld, Anette	3018
<i>Hydrodynamic analysis of the submerged floating tunnels under irregular waves</i> Kim, Seungjun; Won, Deokhee	3025
<i>Dynamic Analysis of a Suspension Bridge with a Floating Girder</i> Choi, Dong-Ho; Gwon, Sun-Gil	3033
<i>Concept overview of a multi-span suspension bridge on floating foundations</i> Villoria, Bruno Holtberget, Simen Hellgre; Dørum, Cato; Veie, Johannes; Jena, Parthasarathi; Madsen, Preben	3037
<i>Effect of Triangle Cables Configuration on the Behavior of Reinforced Concrete Submerged Floating Tunnel under Hydrodynamic Load</i> Wahyuni, Endah; Komara, Indra; Suswanto, Budi	3045
<i>Coupled wind and wave load analyses of multi-span suspension bridge supported by floating foundations</i> Papinutti, Mitja; Aas-Jakobsen, Ketil; Kaasa, Lars Halvo; Bruer, Arne; Marley, Mathias Huus; Veie, Johannes; Holtberget, Simen Hellgre	3052
Concrete Materials and Effects on Structural Performance	3060
<i>Sustainable Serviceability of Structural Concrete</i> Ghali, Amin; Gayed, Ramez B.	3060
<i>Anisotropic Concrete Compressive Strength</i> Hansen, Søren Gustenhof; Jørgensen, Henrik Brøne; Hoang, Linh Ca	3068
<i>Assessment of the crack propagation in reinforced concrete</i> Meinhardt, Marcel; Keuser, Manfred	3076
<i>Geometric effects on Ultrasonic Pulse Velocity Method for Structural Assessment – Experimental Study on Mortar Specimens</i> Wiciak, Piotr; Cascante, Giovanni; Polak, Maria Aanna	3084
<i>Aggregate effect in fastening applications</i> Ninčević, Krešimir; Czernuschka, Lisa-Marie; Marcon, Marco; Boumakis, Ioannis; Wendner, Roman	3092
<i>An experimental study of crack development in flexural reinforced concrete members</i> Rasmussen, Annette Beedholm; Sørensen, Bjarke Würtz; Skov, Mikkel; Rasmussen, Peter Kolt; Hagsten, Lars Germa	3099
Application of Ultra High-Performance Concrete	3107
<i>Dynamic Response of Adjacent Prestressed Concrete Box Beam Bridge utilizing Reinforced UHPC Shear Keys</i> Semendary, Ali A.; Steinberg, Eric P.; Walsh, Kenneth K.	3107
<i>An innovative metro viaduct using UHPC</i> Montens, Serge; Olive, Jérôme; Gautier, Pierre-Etienne; Bernardi, Sébastien	3114
<i>Structural Behaviour of UHPC with Micro-Reinforcement</i> Prager, Melanie; Schnellenbach-Held, Martina	3122
<i>Development of prestressed T-beams made of textile reinforced UHPC</i> Preinstorfer, Philipp; Kromoser, Benjamin; Kollegger, Johann	3130
<i>The new method strengthen U-shape girders by UHPC thin layer</i> Liu, Chao; Ji, He; Wang, Junyan; Liu, Guoping	3136
<i>Flexural Performance of the UHPC Deck in a Novel Steel-UHPC Composite Girder</i> Wang, Yan; Shao, Xudong; Zhang, Dengjing; Cui, Bing; Wang, Yi	3142



CAEE Special Session: Opportunities and Innovations in the Performance Based Seismic Design and Retrofit of Bridges	3150
<i>Innovative Design and Construction of Special Guideway Structures for Vancouver's New Evergreen Line SkyTrain Extension</i>	
O'Hagan, Sean; Burke, Monica; Jiang, Jianping	3150
<i>A Case Study on Evaluating the Performance Criteria of the 2014 Canadian Highway Bridge Design Code</i>	
Ashtari, Sepideh; Ventura, Carlos; Finn, W.D. Liam; Kennedy, Don;	3159
<i>Canadian Code Framework for Performance Based Seismic Design of Bridges</i>	
Mitchell, Denis	3167
<i>Opportunities in the Performance Based Seismic Design of Bridges in British Columbia</i>	
Kennedy, Don; Dowling, Jason; Du, Helen	3175
<i>Application of Performance Based Design to Highway and Transit Structures</i>	
Gerin, Marc; Khan, Saqib	3183
<i>Evergreen Line Performance Based Design – An Owner's and Designer's Perspective</i>	
Hamersley, Bruce; Khan, Saqib; Jiang, Jianping	3191
Innovative Structural Concepts 4	3199
<i>Eglinton Crosstown and Evergreen Line LRTs - Structural Design on Mass Transit Projects</i>	
Ding, Yuming; Woodhead, Roger; Chan, Samson	3199
<i>Incremental launching method for bridges of Northern Marmara Motorway, Turkey</i>	
Scotto, Giulio Maria; Grandi, Andrea; Erdogan, Julien-Erdem; Alpman, Aydin; Yayim, Cagri; Ozkul, Ozgur	3206
<i>Replacing damaged PSC Suspended span of Varsova Bridge across Vasai Creek on NH-8, Mumbai, India</i>	
Gupta, M.L.; Bhide, D.A.; Dongre, Prashant	3214
<i>Transforming the former Waterloo International Terminal for commuter services</i>	
Leon Alonso, Alberto; Vermes, Andras; Palmer, Ian; Slavchev, Nikolay; Bee, Stuart; Curran, Tom	3222
<i>Design and Detailing of Advanced Composite Rehabilitation with and without Anchorage</i>	
Arnold, Scott; Wagner, Amber	3231
<i>T3 Minneapolis – America's Largest Modern Mass Timber Building</i>	
Brown, Justin Rober; Epp, Lucas	3237
Structural Monitoring and Assessment	3245
<i>Quantifying the value of monitoring for post-earthquake emergency management of bridges</i>	
Limongelli, Maria Pin; Omenzetter, Piotr; Yazgan, Ufuk; Soyoz, Serdar	3245
<i>Identification of Bridge Surface Roughness Profile Using Drive-by Technique</i>	
Zhan, Ying; Au, Francis T.K.	3253
<i>Error analysis of structural system identification by observability method</i>	
Jun, Lei; Xu, Dong; Lozano-Galant, Jose Antonio; Nogal, Maria; Turmo, José	3261
<i>Contributing human and organizational factors for damage of Bos & Lommer plaza in Amsterdam</i>	
Terwel, Karel	3269
<i>Practicability of New and Innovative Products – Method for the Evaluation of Innovative Façade Components</i>	
Langner, Normen; Kleuderlein, Jonas; Kukovec, Sara	3277
<i>Fatigue Damage Identification in Precast Truss Girders Using Relative Wavelet Entropy</i>	
Moravvej, Mohammad; El-Badry, Mamdouh	3283
Bridges: innovative solutions	3291
<i>Artificial seabed; a mooring concept for crossing long and deep waterways</i>	
Reiso, Marit; Bjerås, Morten; Søreide, Tore Helge; Høyland, Kolbjørn; Frydenlund, Tonje;	
Hasle, Martin; Furu, Trond; Bjuhr, Jonas	3291



<i>Field Load Test of Cable Crane for a Record-breaking Cable-stayed Bridge</i>	
Yu, Xiangmin; Chen, Dewei.....	3299
<i>Innovative bridge cables for the reduction of ice-shedding risk</i>	
Matejicka, Lubomir; Georgakis, Christos T.; Schwarz, Andreas; Egger, Philipp.....	3306
<i>Wind Buffeting in Time Domain Analysis of Long-Span Bridges using RM Bridge</i>	
Hatami, Afshin; Pathak, Rakesh; Bhide, Shri	3314
<i>Radial Floating Ice Deflector: An Innovative Approach</i>	
Wei, Debin; Tasaka, Tom; Karas, Roman; Lim, Sherry; Seniuk, Mark	3325
<i>U Shape Anchoring System: Concept Design and Key Experiments</i>	
Hu, Ke; Shi, Xuefei; Ruan, Xin; Ma, Zuqiao;	3333
Fire Response of Structures	3340
<i>Modeling of Bonding for Epoxy Resins between Steel Rebar and Concrete at Elevated Temperatures</i>	
Pothisiri, Thanyawat	3340
<i>Fire Design Methodology for Cold-Formed Steel C-Section Flexural Members</i>	
Laím, Luís; Rodrigues, João Paulo C.....	3348
<i>Mechanical Properties of Stainless Steel Bolts at Elevated Temperatures</i>	
Hu, Ying; Bo Yang, Cheng; Cui, Jia; Yang, Y.B. ; Teh, Lip H.....	3356
<i>Performance-Based Assessment and Mitigation of Fire Hazard for Bridges</i>	
Imani, Reza; Ghisbain, Pierre; Sideri, Jenny; Balsamo, Luciana; Ashrafi, Ali.....	3364
<i>Numerical modelling of slab-column concrete connections at elevated temperatures</i>	
Al Hamd, Rwayda; Gillie, Martin; Wang, Yong	3372
<i>Performance-based fire design and the U.S. prescriptive guidelines: A comparative study</i>	
Elhami-Khorasani, Negar; Fang, Chenyang; Gernay, Thomas.....	3377
Risk and Safety	3384
<i>Safety level evaluation for existing rockfall protection gallery Rieinertobel</i>	
Custer, Rocco; Schubert, Matthias; Hess, Reto; Schellenberg, Kristian.....	3384
<i>Modified traffic load models for reassessment of short-span highway bridges</i>	
Nowak, Marcel; Fischer, Oliver.....	3392
<i>Seismic Risk Assessment of Bridges in Jakarta Transportation Networks using Incremental Dynamic Analysis</i>	
Cripstyani, Mutiara Puspahat; Guntorojati, Ireng; Pramudy, Dimas; Kristiawan, S.A.; Sangadji, Senot.....	3401
<i>CROSS International</i>	
Soane, Alastair	3409
<i>Resilience-based design and damage-resistant technologies for an enhanced seismic performance of bridges</i>	
Sarkis, Ana; McHaffie, Brandon; Palermo, Alessandro	3417
<i>The Probabilistic Analysis of Vienna Stadium Roof Structure</i>	
Rosko, Peter; Kralik, Juraj	3425
Arch Structures	3433
<i>Concrete arch stability by the nominal stiffness method</i>	
Van Bogaert, Philippe; Schotte, Ken	3433
<i>Walton Bridge – a new arch bridge over the River Thames, UK</i>	
Smith, David A.; Hendy, Chris; Wheatley, Rob; Chiarello, Manuela	3439
<i>Design of Kouchigawa Bridge on the Shin-Tomei Expressway - a Steel- Prestressed Concrete Composite Multiple-span Balanced Arch Bridge</i>	
Kuroda, Kenji; Kawakami, Tetsuharu; Aizawa, Shinichi; Yoshito, Maeda; Yoshida, Tadahiro.....	3451
<i>The Lusail Feature Arch</i>	
Lyttle, Peter.....	3459
<i>A New Tied Arch to Replace a Rural Mississippi River Crossing</i>	



Hasbrouck, Greg; Furrer, Martin	3467
<i>Integrating Aesthetic Design and Structural Engineering on a Signature Bridge</i>	
Lima, Kris; Prozniak, Steven; Clare, Donna; Montgomery, C. James	3475
Soil Structure Interaction	3483
<i>Composite Pile Foundation in Bridge: Code recommendation and Chilean experience</i>	
Trucco, Pablo; Valenzuela, Matias A.	3483
<i>Single Row Piles in Integral Bridge Foundations: Challenges and Solutions</i>	
Mukherjee, Debabrata; Jain, Abhishek; Balaji, Manju	3491
<i>Soil Structure Interaction and Performance Based Design for the Port Mann Cable Stayed Bridge</i>	
Lund, Hans; Mitchell, Robert	3499
<i>Soil-Structure-Pipe Interaction Analysis and Inelastic Design of the Port Mann Water Supply Tunnel Shaft and Pipe – Case Study</i>	
Sherstobitoff, John; Zimmerman, Derek; Atukorala, Upul; Mitchell, Allen	3507
<i>Unique Design Considerations for Mechanically Stabilized Earth Walls in Transportation Widening Applications</i>	
Brabant, Keith	3514
<i>Detailed Design of the Urban Tunnels Under Las Glorias Square, Barcelona</i>	
Rui-Wamba, Javier; García, Carlos; Bañares, Miguel; Nieto, Javier; Castro, Luis; Esquius, Marc	3522
SEI/ASCE Special Session: Structural Engineering Global Interoperability	3529
<i>Structural Engineering Global Interoperability – What and Why</i>	
Bell, Glen	3529
<i>Structural Engineering Global Interoperability – Codes and Standards</i>	
Ghosh, S. K.	3530
<i>Structural Engineering Global Interoperability – Knowledge Sharing</i>	
Alsamsam, Iyad; Mahamid, Mustafa; Ellis, Anne	3531
<i>Structural Engineering Global Interoperability – Professional Qualification and Licensure</i>	
Dusenberry, Donald	3532