

Annual Conference of the Canadian Society for Civil Engineering 2012

Leadership in Sustainable Infrastructure

**Edmonton, Alberta, Canada
6-9 June 2012**

Volume 1 of 4

ISBN: 978-1-62276-800-4

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© (2012) by the Canadian Society for Civil Engineering
All rights reserved.

Printed by Curran Associates, Inc. (2013)

For permission requests, please contact the Canadian Society for Civil Engineering
at the address below.

Canadian Society for Civil Engineering
4920 de Maisonneuve Blvd. W. Suite 201
Montréal, QC
H3Z 1N1

Phone: (514) 933-2634
Fax: (514) 933-3504

info@csce.ca

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2634
Email: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

VOLUME 1

2012 ANNUAL GENERAL CONFERENCE

Flexure of a Layered Composite Plate with Local Defect	1
<i>H. Nikopour, A. P. S. Selvadurai</i>	
A Practical Method for Design of Pile Foundation under Dynamic Loads	9
<i>Yingcai Han, David (Ming) Yang</i>	
Explaining Storm Severity: A New Edmonton Rainfall Rating System	20
<i>Sid Lodewyk, Hongliang Wang</i>	
Coordinating the Points in 3D in and Around the Test Tank	30
<i>Mustafa Berber, Ben Metzger, Fraser Dalgleish</i>	
An Investigation of Surveys of I95 for Discrepancies of the Tangent Section North and South of CR 512	39
<i>Robert Loane, Troy Wright, Bill Arrata, Eric Wilhelm, Don Leone, Loren Gibson, Mustafa Berber</i>	
Sustainability Assessment of Prefabrication Construction Methods with Fuzzy AHP. A Case Study in Residential Building	47
<i>Reza Aliverdi, Abdollah Ardeshtir</i>	
An Experimental Investigation of Minimising Energy Head Losses in Expansions by Using a Hump	58
<i>Azita Najafi-Nejad-Nasser, S. Samuel Li</i>	
Minimum Source Dilution As A Method To Regulate Discharge Of Toxic Brine From Industries And Mining Processes	68
<i>Nadeem Ahmad, Raouf E. Baddour</i>	
Modelling Three-Dimensional Turbulent River Flow Around Bridge Piers	78
<i>Shaghayegh Pournazeri, S. Samuel Li, Fariborz Haghighat</i>	
A Comparison of Green Building Rating Systems: Living Building Challenge 2.0, LEED Canada NC 2009, Green Globes Canada, BREEAM SD5055 – Offices 2008	89
<i>Nigel Parker</i>	
Coupling of Random Field Theory and the Discrete Element Method in The Reliability Analysis of Geotechnical Problems	99
<i>Viet Tran, Mohamed Meguid, Luc Chouinard</i>	
A Comparison of IRI and Collision Rates in the Province Of Alberta	109
<i>Saleh Sharif Tehrani, Lynne Cowe Falls</i>	
Vertical Response Behaviour of Stable Unbonded Fiber Reinforced Elastomeric Isolators (SU-FREIs) with Holes in the Loaded Surface	118
<i>Niel Van Engelen, Michael Tait, Dimitrios Konstantinidis</i>	
Challenging Hazard Impact Factors To Turn Them Into Analytical Logics	128
<i>M. Taiebat, Y. Beliveau, K. Ku, J. Kovel</i>	
Bayesian Corrosion Growth Model Using In-Line Inspection Data	138
<i>Mohammad Al-Amin, Wenxing Zhou</i>	
Investigation of Seasonal Rainfall Variability over the Ethiopian Highlands: Teleconnection Between the Upper Blue Nile Basin Rainfall and the Oceanic Anomalies	148
<i>Mohamed Helmy Elsanabary, Thian Yew Gan</i>	
Climatic Change Adaptation Measures for Greater Moncton Area, New Brunswick, Canada	158
<i>Huixi Xie, Jacques Paynter</i>	
Pulsing Injection System for Optimal Subsurface Treatment Delivery	168
<i>Bonnie Derksen, Gopal Achari</i>	
Material Selection for FRP Bonded-Reinforced Concrete Elements	177
<i>Hasan Nikopour Deilami, Adrian Glowacki</i>	
An Ontology of Energy Efficiency and Renewable Energy Sources in Buildings	183
<i>Matija König, Vlado Stankovski</i>	
Re-Creating the Yukon Ditch Near Dawson City, Yukon	193
<i>Ken Johnson</i>	
White Pass and Yukon Railway: Yukon's Path to the Pacific	203
<i>Ken Johnson, Cal Sexsmith</i>	
Gold Dredging in the Klondike and Number 4	211
<i>Ken Johnson, Alistair Mackenzie</i>	
Yukon Sternwheelers and the SS Klondike	221
<i>Kenneth Johnson, Bernard Trevor</i>	
Experimental and Numerical Integrity Assessment of Cracked RC Beams Using NDT Impact-Echo Technique	231
<i>Nabil Dawood, Hesham Marzouk, Amgad Hussein</i>	
SPH Modeling of Tsunami-Like Solitary Waves and Resulting Hydrodynamic Forces on Vertical Walls	241
<i>Safinaz El-Solh, Ioan Nistor, Phillippe St-Germain</i>	
A CFD Study of the Selective Withdrawal Scenario	251
<i>Md. Rashedul Islam, David Zhu</i>	
A Proposal for Integrated Safety and Quality Management System Framework in Construction Companies	261
<i>Amin Alvanchi, Jim Kanerva</i>	

Environmental Performance Indicator for Municipal River Impacts	265
<i>Ross Bulat, Sid Lodewyk, Liliana Malesevic</i>	
A Functional Information Management Model	272
<i>Ferzon Aziz, Jeff H. Rankin, Lloyd M. Waugh</i>	
Evaluation par la Méthode Deterministe de l'endommagement des Batiments en Fonction du Site d'implantation	282
<i>L. Bouzid, M. Hamizi, N. E. Hannachi</i>	
Simulating a Bioventing Reactor with a Fluid Dynamics Model Using a Universal Biodegradation Rate Coefficient (UBRC)	292
<i>Kevin Coffey, Alamgir Khan, Sondus Jamal, Richard Zytnar</i>	
Regional Intensity-Duration-Frequency Curves Derived from Ensemble Empirical Mode Decomposition and Scaling Property	302
<i>Chun-Chao Kuo, Thian Gan, Steven Chan, Janel Hanrahan</i>	
Preliminary Results of the Sign-Constrained Robust Least Squares Method in a Leveling Network	312
<i>Mevlut Yetkin, Mustafa Berber</i>	
Limitations of Chézy's Equation in River Hydraulics as it Relates to Channel Geometry and Flow Properties	318
<i>Jorge Orellana, Philippe Chang</i>	
Flow Monitoring Structure Design for Measurement of Surface Runoff	325
<i>Robert Wirtz, Manas Shome, Jessica Clark</i>	
The Construction Plan and its Optimization for Huzhou Tunnel of Nanjing-Hangzhou Passenger Dedicated Railway	334
<i>Peng Lu, Jingxiao Ai, Qingfan Liu</i>	
Optimization of Project Organization and Management of Passenger-Dedicated Railway Construction in China: A Case Study	344
<i>Peng Lu, Zheng Huang, Qingfan Liu</i>	
Integrated Value Engineering and Risk Analysis for Tunnelling Projects	354
<i>Hussien Al-Battaineh, Siri Fernando, Junhao Zou</i>	
Design Optimization of Combined Sewer Overflow Chamber Using Three-dimensional Modeling	364
<i>Sang Soo Han, Fayi Zhou, Zhi Chen</i>	
A Modified Linear, Two-Variable Regression Using Least Distance Square Method For Modeling Hydraulic/Hydrologic Data	374
<i>Shouhong Wu, Thian Gan</i>	
Validation of Regional Precipitation Indices Dynamically Downscaled from ERA-Interim Reanalysis Data by a Mesoscale Atmospheric Model	384
<i>Janel Hanrahan, Chun-Chao Kuo, Thian Gan, Steven Chan, Mohamed Elsanabary</i>	
An Integrated Framework for Quantitative and Qualitative Monitoring of Construction Equipment Emission	394
<i>R. Aliverdi, R. Shiftehfari, S. H. Lee, F. Peña-Mora, A. Ardestir</i>	
Regional Frequency Analysis of Low Flow Using L-moments for Labrador, Canada	404
<i>Shabnam Mostofi Zadeh, Leonard Lye, Amir Ali Khan</i>	
Drainage Asset Management Strategy (DRAMs)	414
<i>Peter Ho, Francis Wu, Gareth Lifton</i>	
Quantification and Characterization of Contaminants in Meltwater at Edmonton Snow Storage Facilities	424
<i>Matthew Stewart, Melissa E. Haveroen, Travis Hnidan, Alexander Holden, Ania C. Ulrich</i>	
Effect of Metakaolin on the Fresh And Mechanical Properties of Self-Consolidating Concrete	434
<i>Justin Mayo, Assem Hassan</i>	
Engineering For Pipes, Permafrost and People in Inuvik, NWT	443
<i>Ken Johnson</i>	
Maximizing the "Triple Bottom Line" in Civil Engineering Infrastructure Projects Using Sustainable Return On Investment (SROI)	450
<i>Stephane Larocque</i>	
Effect of Nano-Silica on the Rheological and Mechanical Properties of Cement Mortars	461
<i>Mohammed Nazief, Yasser Korany, Ahmed Mostafa Farag</i>	
Point to Area Rainfall Relations in the Context of Climate Change	469
<i>Alireza Zareie, Van-Thanh-Van Nguyen</i>	
Numerical Modeling of Subarial Landslide	479
<i>Hoda Ghamarian, Yee-Chung Jin</i>	
Use of Reclaimed Concrete Aggregate in New Concrete: Challenges & Opportunities	486
<i>Anto Sucic, Medhat Shehata</i>	
Evaluation of The Moment Magnifier and Load-Displacement Methods for Determining the Out-Of-Plane Total Factored Moment of Loadbearing Masonry Walls	496
<i>Michael Ross, Yasser Korany</i>	
Applicability of Hybrid Solar Collector Ground Source Heat Pump Systems	505
<i>Daniel Booy, Mark Ackerman, David Morrow, A. McDonald</i>	
A Multinational Evaluation of Contractual Agreements on Construction Waste Management	515
<i>Daylath Mendis, Kasun Hewage</i>	
Application of Decision Trees for Wave-Breaking Prediction of Tuned Liquid Dampers	524
<i>Reza Mirza Hessabi, Kamakshi Parwani, Oya Mercan</i>	
The Study of Bioretention Applications for Sustainable Urban Stormwater Management in Cold Climates	535
<i>Xiangfei Li, Zengkai Liu, Chengjin Wang, Tong Yu, Fayi Zhou</i>	
High Strength Glass Fiber Rebar in Foundations of High Voltage Power Transmission Infrastructure	543
<i>Carsten Heidrich, Christian Witt</i>	

A Proposed Downscaling Model for Climate Change Studies.....	549
<i>Heri Sulistiyo, Leonard Lye</i>	
Choix d'une éolienne pour Le Nord Canadien: Analyse Hiérarchique	559
<i>Christian Ramirez, Philippe Chang, George Akhras</i>	
MWDB Replacement Storm Trunk - Design and Construction Considerations	566
<i>Dave Krywiak, Wayne Pelz, Andreea Irimia</i>	
Sustainable Poverty Eradication Measures: The Intertwined Relationship of Income Poverty and Water Poverty	576
<i>Sania Mahtab, Naima Khan</i>	
Use of an Innovative Geocomposite to Reinforce Marginal Fill Soils in Southern Ontario	587
<i>Michael Simons, N. Cameron</i>	
Influence of Vibro Stone Column Reinforcement on the Seismic Bearing Capacity of Typical Quebec Soils	597
<i>Bertrand Galy, M. J. Noller, Denis Leboeuf, Denis Lessard</i>	
Geotechnical Aspects of the Seismic Safety Assessment and Retrofit of the Knight Street Bridge	607
<i>T. Thavaraj, Alex Sy, Bruce Hamersley, David Woolford</i>	
Anomaly Detection with Signal and Image Processing for Structural Health Monitoring.....	617
<i>Mustafa Gul, F. Necati Catbas</i>	
Benchmarking the Learning Curve For BIM: A Case Study.....	627
<i>Natalie Ho, Brogan Gordon-Cooper, Jennifer Eckert, Kyle Grutterink, Joseph Eisenlohr, Michael Kieth, Viktor Wierucki, Graham Chandler, Shabtai Issac, Farnaz Sadeghpour</i>	
Seismic Analysis of a Two Span Integral Abutment Bridge.....	637
<i>Mohammed Naimi</i>	
A Sustainable Management Approach for Neighbourhoods Prioritization – The City of Edmonton Case	646
<i>Ashraf El-Assaly, Peter Ho, Mohamed El-Hajj, Mohamed Elbarkoutky</i>	
What Is Dynamic Site Layout Planning?.....	655
<i>Mohsen Andayesh, Farnaz Sadeghpour</i>	
Urban Hydrological Response Units for Modelling Low Impact Development	665
<i>Marija Eric, C. Fan, Darko Joksimovic, James Li, M. Walters</i>	
Reliability Assessment of Ultra-Wide Band for Indoor Tracking of Static Resources on Construction Sites.....	675
<i>Reza Maalek, Farnaz Sadeghpour</i>	
Exploring the Concept of Bridge Functional Index in the Context of Climate Change Impacts on Transportation Infrastructure.....	685
<i>Anthony Ikpong, Ashutosh Bagchi</i>	
Quesnell Bridge Rehabilitation and Widening.....	695
<i>Malika Ali, Azita Azarnejad</i>	
Laboratory Experiments to Determine Frazil Ice Properties	705
<i>Vincent McFarlane, Mark Loewen, Faye Hicks</i>	
Information Integrating Sustainable Green Roofs with Building Modeling	715
<i>Ahmad Jrade, Omar Afana</i>	
Analysis of Shear Walls on Piled Raft Under Earthquake Excitations	725
<i>Walid Elkamash, Mohamed El Gendy, Rafeek Salib, Manhal Kandil</i>	
Effect Of Pouring Techniques On The Structural Performance Of Self-Consolidating Concrete Beams	735
<i>Ahmed Abouhussen, Assem Hassan, Amgad Hussein</i>	
Modeling the Effect Of Innovative Joining Technique on the Behaviour of Precast Concrete Shear Wall	745
<i>Mohamed El Semelawy, Ashraf El Damatty</i>	
Calgary Bow River Weir Project.....	755
<i>Chuck Slack, Dave Mack, Al Nilson</i>	
Engineering Characteristics of Strong Motion Records of the Riviere-Du-Loup Earthquake in Quebec, Canada	765
<i>Lan Lin, John Adams</i>	
Analysis of a 1.8 km tunnel in East-West Algerian Corridor for Stabilisation During Construction	775
<i>Mohammed Naimi</i>	
Blatchford Field and Hangar #14, Edmonton, Alberta.....	784
<i>Bernard Trevor</i>	
Location-Aware Resource-Driven Scheduling	791
<i>Nazila Roofgarci-Esfahan, Saeideh Razavi</i>	
Augmented Reality Technologies for Construction Site Progress	801
<i>Katherine Michaud, Jeff Rankin, Lloyd Waugh</i>	
High Service Temperature Characteristics of Asphalt Binders and Paving Mixes	810
<i>Lakshan Wasage, Jiri Statsna, Ludo Zanzotto</i>	
Adhesion Of Pseudomonas Aeruginosa To Conditioning Films	820
<i>Geelsu Hwang, Mohamed Gamal El-Din, Yang Liu</i>	
Effect Of Tornado Wind Speeds On Typical Traffic Signs	824
<i>Matthew Van Riesen</i>	

12TH INTERNATIONAL ENVIRONMENTAL SPECIALTY CONFERENCE

Reduction of Volatile Organic Compound (VOC) Emissions by Experimental Passive Biocovers: The Fate of Toluene as a Model VOC	829
<i>Abderrahim Lakhouit, Alexandre Cabral, Hubert Cabana</i>	

Evaluating Bioventing Scale-Up Factors For Petroleum Hydrocarbons	839
<i>Alamgir Khan, Richard Zyner</i>	

VOLUME 2

Does the National Classification System for Contaminated Sites Accurately Characterise Risks?.....	849
<i>Ron Thiessen, Gopal Achari</i>	
Evaluating Performance of Tire-derived Aggregates When Used As Media for Leachate Collection and Drainage Systems.....	859
<i>Marcus Mwai, Kristine Wichuk, Daryl McCartney</i>	
Sustainable and Beneficial Options for Reusing Treated Wastewater in Muscat, Oman.....	871
<i>Mahad Baawain, Ahmed Sana, Rashid Al-Yahyai, Amal Al-Sabti</i>	
Understanding the Effect of Silver Nanoparticles on Wastewater Activated Sludge Microorganisms.....	881
<i>Xiaohui Sun, Zhiya Sheng, Yang Liu</i>	
Assessing the Temperature Contact Time Criteria and Turning Effect in Compost Sanitation	888
<i>Pulat Isobaev, Daryl McCartney, Kristine Wichuk, Norm Neumann</i>	
Leaching Characteristics of Cement Kiln Dust from Alberta.....	899
<i>Mahmoud Mahmoud, B. Rimes</i>	
Uncertainty Analysis of an Aquivalence-based Fate and Transport Model Using a Hybrid Fuzzy-probabilistic Approach	908
<i>Getnet D. Betrie, Rehan Sadiq, Kevin A. Morin, Solomon Tesfamariam</i>	
Photocatalytic Degradation of 2,4-D with a LED-based Photoreactor.....	917
<i>Linlong Yu, Gopal Achari, Cooper H. Langford</i>	
Pilot Study of UV Disinfection for Trickling Filter/Solids Contact Effluent	926
<i>David Lycon, Michael Celli, Stella Chiu</i>	
Comparison of MM5's Simulations with Other RCMs from the NARCCAP Multi-model Ensemble Simulations in Central Alberta	936
<i>Chun-Chao Kuo, Janel Hanrahan, Thian Gan, Steven Chan</i>	
Inactivation of Scarpie 263k by Ozone.....	946
<i>Ning Ding, Norman Neumann, Luke Price, Shannon Braithwaite, Aru Balachandran, Miodrag Belosevic, Mohamed Gamal El-Din</i>	
Application of Ultrasonic Soil Washing for the Remediation of Anthracene Contaminated Soil.....	957
<i>Ling Wang, Jianbing Li, Weikun Song, Shanshan Li, Wen Zhang</i>	
Modeling Dry Deposition Velocity of Gaseous Elemental Mercury to Cropland at Central Alberta	965
<i>Guangyu Men, Warren B. Kindzierski, Mohamed Gamal El-Din</i>	
Air Quality in Alberta Oil Sands Community of Fort Mckay Compared to Urban Residential Locations in Canada in 2009	974
<i>Warren Kindzierski, Md. Aynul Bari</i>	
Enhancing Energy Recovery from Waste: A Study on Enzyme Addition to Enhance Methane Gas Production	984
<i>Poornima Jayasinghe, Matthew Steele, Patrick Hettiaratchi, Anil Mehrotra</i>	
Greenhouse Gas Emissions Analysis of Biosolids Management Practices in Alberta	989
<i>K. Yan, S. Yu, D. McCartney, C. Felske, A. Mangory</i>	
Analysis Of Approaches To Determine Minimum Water Requirement For Healthy Household Environment	999
<i>Jamal Abu-Ashour</i>	
Water Reuse in Edmonton.....	1006
<i>Heather Zarski, Susan Ancel</i>	
Pilot Testing of Restaurant Grease Co-digestion with Municipal Wastewater Sludge	1016
<i>Vahid Razaviarani, Ian Buchanan, Shahid Malik, Hassan Katalambula</i>	
Application of Remote Sensing and GIS Analysis for Investigating Urbanization Induced Surface Water Body Change in and Around Dhaka City, Bangladesh	1026
<i>Siddhartho Shekhar Paul, Khaled Hasan, Sayd Humayan Akhter, Jianbing Li</i>	
Biochemical And Physical Characteristics Of Compost And Compost Based Materials Influencing Their Performance As Methanotrophic Biofilter Media	1034
<i>Uriel Mancebo, Patrick Hettiaratchi, Omar Hurtado</i>	
Selection of a Sewer Rehabilitation Method: A Risk-based Lifecycle Analysis	1043
<i>S. Akhtar, A. Shahriar, R. Sadiq</i>	
Best Practices for Managing Surface Water and Flooding: Applying Lessons Learned in the UK to Canada	1053
<i>Matthew Graham, James Ogilvie, T. Reid, Tamsin Mills</i>	
Monitoring of Residential Solid Waste Composting.....	1063
<i>Alireza Rajabpour Ashkiki, Christian Felske, Daryl McCartney</i>	
Degradation of a Model Naphthenic Acid, Cyclohexanoic Acid, by a Solar-Driven Advanced Oxidation Process at a Technical Scale.....	1074
<i>James R. Bolton, Po Yee Chan, Mohamed Gamal El-Din</i>	
Micropollutant Removal Using the UV/H₂O₂ Advanced Oxidation Process for Wastewater Reuse.....	1079
<i>Zengquan Shu, James R. Bolton, Rebecca Baldwin, Miodrag Belosevic, Mohamed Gamal El-Din</i>	
Vulnerability Assessment of Water Supply Systems: A Fuzzy Qualitative Comparative Analysis (fsQCA) Approach	1088
<i>A. Soltani, R. Sadiq</i>	
Do Nutrient Fluxes across Sediment Water Interface of Athabasca River Sediment Affect SOD in Winter?.....	1098
<i>Kusumakar Sharma, Preston McEachern, Tong Yu, David Zhu</i>	

Photoreactivation of Microorganisms in the Wastewater Effluent	1104
<i>Shirin Shafaei, James R. Bolton, Mohamed Gamal El-Din</i>	
Dechlorination: Overview of Completed Projects at Two WTP's in Edmonton	1110
<i>Matthew McCrank, Alfredo Suarez, Gyn-Gyn Lee, Abhishek Bhargava, Stephen Craik</i>	
Managing Residual Solids from Edmonton's Water Treatment Plants	1120
<i>Wendell James, Saif Molla, Stephen Craik, Alfredo Suarez</i>	
Source Identification for Odours in the Downtown of City of Medicine Hat	1130
<i>Chwen-Jyh Jeng, Robert Scotten, Leon Burns</i>	
Engineering in an Emergency – Arviat, Nunavut - Reverse Osmosis System	1140
<i>Nisa Jayathilake, Lalith Liyanage</i>	
Advanced Oxidation Technologies applied to Drinking Water and Wastewater - An Introduction	1150
<i>James R. Bolton</i>	
Characteristics of Indoor and Outdoor Coarse Particles in Residences of Edmonton, Canada	1156
<i>Md. Aynul Bari, Warren B. Kindzerski, Marie Heroux, Lance Wallace, Morgan Macneill, Amanda Wheeler</i>	
A Stochastic Analytical Hierarchy Process for Supporting Nonpoint Source Pollution Control	1167
<i>Liang Jing, Bing Chen, Baiyu Zhang, Jisi Zheng, Pu Li</i>	
Advanced Oxidation for the Degradation of Cyclopentane Carboxylic Acid in Water	1177
<i>Jyoti Ghosh, Adel Guirgis, Gopal Achari, Cooper H. Langford</i>	
Coagulation/Flocculation/Sedimentation Treatment of the Oil Sands Process Affected Water	1183
<i>Parastoo Pourrezaei, Yingnan Wang, Leonidas A. Perez-Estrada, Jonathan W. Martin, Mohamed Gamal El-Din</i>	
Anaerobic Co-Digestion of OFMSW with Primary and Secondary Municipal Sludge	1191
<i>Sludge Efath Ara, Majid Sartaj, Kevin Kennedy</i>	
AD-Derived Biogas as a Renewable Energy Source for Electricity Production in Solid Oxide Fuel Cells at WWTPs	1201
<i>Jillian Lackey, Pascale Champagne, Brant Peppley</i>	
Environmental Interactions and Impacts of Treated Landfill Leachate Following Treatment with a Hybrid-passive System	1211
<i>Jack Wallace, Pascale Champagne, S. Speer, R. Plourde</i>	
Evaluation of Landfill Leachate Toxicity and Treatment System Performance at the Merrick Landfill	1221
<i>Andrew Evans, Pascale Champagne, Peter Hodson</i>	
Using Anaerobic Co-digestion Processes to Enhance Biogas Production from Municipal Organic Wastes at Wastewater Treatment Plants	1230
<i>Chenxi Li, Pascale Champagne, Bruce Anderson</i>	
Pollution Prevention in Offshore Oil and Gas Operations: Opportunities and Implementation	1240
<i>Ming Yang, Faisal I Khan</i>	
Integrated Health Risk Assessment of Fe/Mn Contamination in Groundwater - A Case Study	1254
<i>Jing Ping, Baiyu Zhang, Bing Chen, Bo Liu, Pu Li, Shu Liu</i>	
Development of a Sustainable Method to Reduce Carbon Dioxide Emissions by Bioconversion Into Methane	1264
<i>Najmeh Abedi, Xue Jiao Jiang, Catherine Mulligan, Laleh Yerushalmi</i>	
Examining Heat Transfer at the Sainte-Sophie Anaerobic Bioreactor Landfill, Quebec, Canada	1272
<i>James Bonany, Paul Van Geel, H. Burak Gunay</i>	
Ambient Trends in Urban Air Monitoring in Saskatchewan	1283
<i>Kevin McCullum, Imran Maqsood</i>	
7 Mile Landfill Environmental Upgrades-implementation of State-of-the-art Landfill Technologies Through Self Managed Approach	1293
<i>Iqbal Bhuiyan, Tony Sperling</i>	
Application of Field-Scale Methane Biofiltration Systems to Mitigate Low Volume Methane Emission	1304
<i>Mala Hettiarachchi, Patrick Hettiaratchi, Hiroshan Hettiarachchi</i>	
Lifecycle Analysis of Green Roofs	1314
<i>Fabrizio Bianchini, Kasun Hewage</i>	
A Waste Management System for Construction Companies	1324
<i>Xueqing Zhang, Yashuai Li</i>	
Construction Noise and Vibration Monitoring on the Web	1333
<i>Greg Bracci, Phil Stollery</i>	
Field Evaluation of a Uniflow Cyclone for of Suphfur Particulate Matter Control	1342
<i>Charles Zhang, Zhongchao Tan</i>	

9TH INTERNATIONAL TRANSPORTATION SPECIALTY CONFERENCE

Developing Innovative Roads Using Solar Technologies	1348
<i>Andrew Northmore, Susan Tighe</i>	
Determining the Optimal Spacing of AVI Detectors for Estimating Freeway Travel Times in Real-time	1356
<i>Yixin Hu, Bruce Hellenga</i>	
Vehicle Routing for Urban Snow Plowing Operation in Edmonton	1371
<i>Gang Liu, Yongfeng Ge, Tony Qiu</i>	
Impact of Severe Winter Conditions on Highway Truck Traffic	1381
<i>Hyuk-Jae Roh, Sandeep Datla, Satish Sharma</i>	
Investigating Speed-Flow-Density Relationships on Urban Arterials	1390
<i>Md. Ahsanul Karim, Tony Qiu</i>	

Testing Network-wide Traffic Assignment Capability of Improved Travel Demand Model Using Grid-based Space Disaggregation: New Brunswick Case Study	1406
<i>Riad Mustafa, Ming Zhong</i>	
Wireless Sensor Network Based Traffic Surveillance	1418
<i>Yongfeng Ge, Gang Liu, Tony Qiu</i>	
Estimating Asphalt Pavement Response under Various Tire Pressures and Loads Using Finite Element Analysis and Elastic Layer Theory	1428
<i>Qingsan Liu, Leonnie Kavanagh, Ahmed Shalaby</i>	
The Application and Implications of Using the Critical Strain Method to Design Haul Roads for Extremely Heavy Mining Trucks	1438
<i>Robert Douglas</i>	
Effect of Public Transit on Neighborhood Crimes	1446
<i>Richard Tay, Abul Azad, S. C. Wirasinghe, Stephen Hansen</i>	
Improvement of Traffic Speed Dynamics in METANET Model	1455
<i>Derek Yin, Tony Qiu</i>	
Pedestrian Gait Analysis Using Automated Computer Vision Techniques	1465
<i>Houman Hediye, Tarek Sayed, Mohamed H. Zaki, Greg Mori</i>	
The Sustainable Glenmore ComPASS Research Study	1476
<i>Ellen Morrison, David Sonmor, Gordon Lovegrove</i>	
Spatial Arrangement and Morphological Analyses for Extracting Urban Subzonal Land Uses using Very high Resolution Imagery	1485
<i>Seyed Ahad Beykaei, Ming Zhong, Yun Zhang</i>	
Prediction of Particulate Matter Dispersion in Urban Atmosphere Using Neural Network Models	1497
<i>Khandaker Hossain, Said Easa</i>	
Fleet Optimization for Aircraft Deicing Trucks	1505
<i>Varuna Adikariwattage, S. C. Wirasinghe, Alexandre De Barros, J. Ruwanpura</i>	
Analyzing Sensitivity of Freeway Capacity at a Complex Weaving Segment	1515
<i>Xu Wang, Md Hadizuzzaman, Tony Qiu</i>	
Simulation Based Evaluation of Variable Speed Limit Control	1526
<i>Md Hadizuzzaman, Tony Qiu</i>	
A Review of Future Transit Plans for the Calgary Metropolitan Region	1539
<i>Saeid Saidi, S. C. Wirasinghe, Lina Kattan</i>	
A Review of Sustainable Alternatives for Asphalt Materials in Saskatchewan	1554
<i>Roanne Kelln, Diana Podborochynski, Rieelle Haichert, Curtis Berthelot</i>	
Automated Classification of Road-User Movement Trajectories	1564
<i>Mohamed H. Zaki, Tarek Sayed</i>	
Database Development for Ontario's Local Calibration of the MEPDG for Flexible Pavements	1574
<i>Gulfam Jannat, Arnold Yuan, Medhat Shehata, Joseph Poniah, Warren Lee</i>	
Perpetual Pavement Designs: The Sustainable Alternative for Highway Design	1585
<i>Mohab El-Hakim, Susan Tighe</i>	
Innovative Design of Pedestrian and Bicycle Path at Freeway Interchanges	1595
<i>Adrian Lorion, Jonathan Andal, Mohammad Safwat Bari, Faroogh Naimi, Mohammed El Sayed, H. Nottbeck, T. Hewitt, Said Easa</i>	
Evaluating the Effect of Trucks on Roundabout Performance Using Microscopic Traffic Simulation Model	1605
<i>Chris Lee, Jason Dahl</i>	
Safety Innovation: Bike Activated Electronic Warning Sign 1st Canadian Trial Application	1615
<i>Gordon Lovegrove, Peter Kortegast, Faisal Siddiqui</i>	
Highway User Costs versus Traffic Volume Used in Provincial Highway Preservation Decision-making in Saskatchewan	1630
<i>Andrew Liu, Sudip Adhikari</i>	
Quantifying the Mobility Effects of Winter Road Conditions	1638
<i>Garrett Donaher, Liping Fu, Taimur Usman</i>	
Adverse Weather Impact on Traffic Mobility and Safety: Case Study for Edmonton in Canada	1649
<i>Md. Tazul Islam, Tony Qiu</i>	
A Proactive Road Safety Evaluation Tool of Increasing Bicycle Use: Macro-level Collision Prediction Models	1659
<i>Feng Wei, Gordon Lovegrove, Ahsan Alam</i>	
21st Century Bridge Management Systems – A New Method for Ranking Competing Projects and Programs	1671
<i>Anthony Ikpong, Ashutosh Bagchi</i>	
Comparison Of Regression And Artificial Neural Network Models Of Bus Dwell And Passenger Activity Times (Case Study: Tehran)	1681
<i>Moggan Motamed, Randy Machemehl, Shervin Babaei, Ahmad A. Tavakoly</i>	
Review and Verification of Pavement Distress Models in MTO PMS2 Based on In-Service Pavements Data	1692
<i>Arnold Yuan, Medhat Shehata, Ningyuan Li</i>	
Exploring The Safety Application Of Automatic Vehicle Identification Data	1702
<i>Mohamed Abdel-Aty, Mohamed Ahmed, Rongjie Yu</i>	

VOLUME 3

Selection of Automated Data collection Technologies Using Multi Criteria Decision Making Approach for Pavement Management Systems.....	1712
<i>Zaid Alyami, Mehran Kafi Farashah, Susan Tighe</i>	
Evaluating Pavement Performance for Network Level Pavement Management: Provincial/State vs. Municipal, What is the Difference?.....	1722
<i>Mehrān Kāfi Fārashah, Zāid Alyāmī, Suān Tīghe</i>	
A Comparative Study: Alberta Transportation Pavement Design Procedure vs. MEPDG	1732
<i>Jhuma Saha, Alireza Bayat, Hamid Soleimani</i>	
Safety Performance of Traffic Signals with End-of-Green Flash Interval: Abu Dhabi Case Study.....	1742
<i>Mohamed Sarhan, Atef Garib, Hussain Al Harthi</i>	
A Meta-analysis of the Correlation Between Driving Fatigue and Electroencephalogram	1752
<i>Hui Zhang, Xinpeng Yan, Chaozhong Wu</i>	
Pedestrian Collision Avoidance Method Based on Cooperative Vehicle Infrastructure Systems.....	1757
<i>Nengchao Lv, Chaozhong Wu, Tony Qiu, Xu Wang</i>	
Feasibility of Using Speed as a Winter Road Maintenance Performance Measure for Rural Highways	1767
<i>Lalita Thakali, Luchao Johnny Cao, Garrett Donaher, Liping Fu</i>	
Effect of Inclement Weather Conditions on Macroscopic Traffic Behaviour	1777
<i>Tae-Jung Kwon, Liping Fu, Kamal Hossain</i>	
Construction Work Zone Traffic Management using Connected Vehicle Systems.....	1787
<i>Arash Olia, Pedram Izadpanah, Saeideh Razavi</i>	
Simulation of Rail line - Road Intersections Using SimFC	1797
<i>Jamal Siadat, Janaka Ruwanpura, Faisal Arain</i>	
Effect of Vehicle Types on Capacity of Signalized Intersections: An Urban Street Performance Case Study Using Mini Buses as Main IPT in Libya	1807
<i>Hadi M. Omar Shandoul, Ahmed M. Gadi, Jalal Abuhameda</i>	
Estimating Transit Vehicle Delays Caused by Signalized Intersections Using Archived AVI/APC Data	1817
<i>Fei Yang, Bruce Hellings</i>	
Warm Bituminous Mixes: Way To Sustainable Pavements	1832
<i>Ambika Behl, Sunil Bose, Girish Sharma, Gajendar Kumar,</i>	

3RD INTERNATIONAL STRUCTURAL SPECIALTY CONFERENCE

Seismic Pounding and Safe Separation Distance Between Adjacent Steel Buildings	1842
<i>G. Nasseem, M. El-Assaly, H. El- Ghazaly</i>	
Fort Edmonton Footbridge - Erection Engineering for a Pedestrian Suspension Bridge.....	1852
<i>Sean Brown, Jim Montgomery, Mike Rozendaal</i>	
Progressive Collapse Resistance of Steel Gravity Frames Considering Floor Slab Effects	1862
<i>Amirhoushang Jamshidi, Robert Driver</i>	
Effect of Isolation Bearing's Modeling on Seismic Response Prediction of Base Isolated Multi-Span Highway Bridge.....	1872
<i>Muhammad Kashif Razzaq, Yoshiaki Okui, Hiroshi Mitamura, Takashi Imai</i>	
Extending Limits Of Applicability For Integral Abutment Bridges.....	1882
<i>Navid Nikravan, Khaled Sennah</i>	
Flexural Creep Effects On Permanent Wood Foundation Made Of Structural Insulated Foam-Timber Panels.....	1892
<i>Mahmoud Sayed Ahmed, Khaled Sennah</i>	
Development of Prefabricated Bridge Girder System with Closure Strips Incorporating GFRP Ribbed-Surface Bars	1902
<i>Imad Eldin Khalafalla, Khaled Sennah</i>	
MIDPLY Portal Frame As Lateral Bracing Systems In Light-Wood Frame Buildings.....	1912
<i>Abdullah Al Mamun, Ghasan Doudak, Chun Ni, Mohammad Mohammad</i>	
Vehicle Crash Testing on PL-3 Concrete Bridge Barrier Reinforced with Sand-coated GFRP Bars with Headed Ends.....	1922
<i>K. Sennah, H. R. Khederzadeh</i>	
Ultimate Load Tests on PL-3 Bridge Barrier Reinforced with Gfrp Bars with Ribbed Surface and Headed Ends.....	1932
<i>Khaled Sennah, Ekaterina Tropynina, Zaki Mahmoud</i>	
Seismic Response of Single-storey Buildings with Flexible Diaphragms	1942
<i>Jag Mohan Humar, Marjan Popovski</i>	
Seismic Performance Evaluation of Multi-column Bridge Bent Retrofitted with Composite Materials	1953
<i>Abu Hena Md Muntasir Billah, Shahria Alam</i>	
Rapid Seismic Vulnerability Assessment Method for Schools in Quebec	1964
<i>Helene Tischer, Denis Mitchell, Ghyslaine McClure</i>	
Optimal Retrofitting Method Selection for RC Frame Structures: A Case Study	1974
<i>A. B. M. Rafiqul Haque, Shahria Alam</i>	
Glass-Containing Translucent Concrete.....	1983
<i>Mohamed N. Abou-Zeid, Ezzat H. Fahmy, Muhammad El-Haggan, Norhan El-Shakhs, Aya El-Malky, Ziad Bassiouny</i>	
Long Time Multipliers for Estimating Time-Dependent Deformations of Concrete Members	1993
<i>Andrew Scanlon, Laura Cohen, Anusha Gullapalli, Kyle Karschner, Je Il Lee, Mark Scanlon</i>	

Sloshing Characteristic of Rectangular Concrete Tanks Under Seismic Loading	2004
<i>Ima Tavakkoli Avval, M. Reza Kianoush, Amirreza Ghaemmaghami</i>	
Investigation and Modeling of Chloride-induced Concrete Corrosion on Highway Bridge.....	2014
<i>Weng Changnian, Yu Jian</i>	
Long-term Performance of Reinforced Concrete Beams with GFRP Bars Subjected to Aggressive Environments	2023
<i>Yeonho Park, Guillermo Ramirez, Ali Abolmaali</i>	
Advanced Implementation of Nonlinear Control Algorithms for Shake Table Tests	2033
<i>Tony Yang, Andreas Schellenberg, Thomas Duke</i>	
Influence of Modular Ratio on the Bond Stress Distribution along a Reinforcing Bar	2043
<i>Augustine Benson, Michael Bartlett</i>	
Development of Seismic Hazard Compatible Vulnerability Functions for Stone Masonry Buildings	2053
<i>Ahmad Abo-El-Ezz, Marie-Jose Nollet, Miroslav Nastev</i>	
Numerical Analysis of LIPUS Propagation Through Dentoalveolar Structure.....	2062
<i>Behzad Vafaeian, Saleh Al-Daghreer, Samer Adeeb, Tarek El-Bialy</i>	
Fox Drive Retaining Wall: A Staged, Permanent Concrete Tieback Wall with Shotcrete, Soil Nails, and Ground Anchors	2072
<i>Yingyi Li, Gary Krivik</i>	
Partially-Repaired Reinforced Concrete Beams with Exposed Flexural Reinforcement	2082
<i>Trevor Scott, Michael Bartlett</i>	
Rehabilitation of the West Nose Creek Bridge in Calgary, Alberta	2092
<i>Mohamed Sorour, Yousef Zaher, Desmond Njie</i>	
Influence of Shrinkage Restraint on Short Term and Residual Deflection of Reinforced Concrete	2101
<i>Mohammad Darabi, Peter Bischoff, Troy Stafford</i>	
A Reliability Assessment Approach for Real-Time Hybrid Simulation Results	2110
<i>Cheng Chen, Rahul Sharma</i>	
Analysis and Testing of Gerber Frames for Lateral Stability	2120
<i>Farhood Nowzartash, Nizar Markiz, Magdi Mohareb</i>	
Material Modeling of High Damping Rubber in Finite Element Method.....	2130
<i>Farshad Hedayati Dezfuli, M. S. Alam</i>	
Optimal Design of Stay Cables in Cable-Stayed Bridges	2140
<i>Mahmoud Hassan, Charles-Darwin Annan, Glen W. Norlander</i>	
Estimating Building Slab Deflections Accounting for Typical Construction Practice: An Experimental Study	2150
<i>Perry Adebar</i>	
Application of DOE Methodologies to the FEA of a Payload Suspended on Drill Pipe from a Semi-Submersible Drill Rig	2160
<i>Leonard Lye, Duane Hawkins</i>	
Beyond Design Basis Seismic Evaluation of Nuclear Power Plants at Bruce Site.....	2169
<i>Amitabh Dar, James Hanna</i>	
Distortional Lateral Torsional Buckling Analysis for Beams of Wide Flange Cross-section	2179
<i>Rusul Hassan, Magdi Mohareb</i>	
Reliability of RC Beams Considering Shear-moment Interaction	2189
<i>Wenxing Zhou, Ning Zhang</i>	
Damage Accumulation in Reinforced Concrete Structures Due to Mainshock and Aftershock Earthquakes	2199
<i>Konrad Duerr, Solomon Tesfamariam</i>	
Structural Analysis, Design and Cost Estimate of Different Girder Options for a Swing Type Movable Bridge.....	2209
<i>A. Khan, A. Naeem, S. Rehman, W. Sultan, A. Palaganas, S. Salib, K. Sennah</i>	
Progressive Failure Analysis of Transmission Lines Under Tornado Loading.....	2220
<i>Ahmed Altalmas, Ashraf El Damatty, Ahmed Hamada</i>	
For Fixed ACL Lengths, the ACL Force Varies with Relative Bone Orientations: A Finite Element Model.....	2230
<i>Mohammad Atarod Pilambaraei, Mojtaba Kazemi, Josh Rosvold, Leping Li, Cyril Frank, Nigel Shrive</i>	
Optimization of Aggregate Gradiation Combinations to Improve Concrete Sustainability and Durability	2241
<i>Majella Anson-Cartwright, R. Doug Hooton</i>	
Seismic Performance of Moment Resisting Steel Frames retrofitted with GFRP Plates	2250
<i>Mohammad Al Amin Siddique, Ashraf El Damatty</i>	
Experimental Investigation of Cracking in Two-Way Reinforced Concrete Panels	2262
<i>Armin Ziari Shalmani, M. Reza Kianoush</i>	
Seismic Qualification of Structures, Systems and Components in a Canadian Nuclear Power Plant.....	2272
<i>Amitabh Dar, Brian McKinnon, Dimitrios Konstantinidis</i>	
Seismic Vulnerability Assessment of Non-structural Components using Bow-Tie Analysis	2282
<i>Tammeen Siraj, Anjuman Shahriar, Solomon Tesfamariam</i>	
Sensitivity Of Guyed Transmission Line Towers To Turbulent Downburst Loads	2292
<i>Mohamed Darwish, Ashraf El Damatty</i>	
Performance Assessment of Reinforced Concrete Columns under Fire Loadings	2307
<i>Qusay Al-Chatti, Solomon Tesfamariam</i>	
Experimental and Numerical Analysis of Augmented Locking Plate Fixation Repair for Proximal Humeral Fractures.....	2317
<i>Farhana Begum, Muntasir Kainat, Roxanne Chow, Lauren Beaupre, Jason Carey, Samer Adeeb, Martin Bouliane</i>	
Seismic Design Considerations For Underground Station Structures	2326
<i>Jianzhong Gu, Yi Li</i>	

Use of Industrial Waste Materials for Producing Mortar and Concrete Mixes.....	2335
<i>Djihan Hassan, Ezzat Fahmy, Yousry Shaheen, Mohamed Abou-Zeid,</i>	
Real-time Hybrid Simulation Implementation with a User Programmable Computational/Control Platform.....	2345
<i>Ali Ashasi Sorkhabi, Sheldon Kryger, Oya Mercan</i>	
GFRP Tubes As Stay-in-place Formwork to Enhance Column Blast Resistance.....	2356
<i>Y. Qasrawi, P. J. Heffernan, A. Fam</i>	
Fatigue Truck Calibration for Bi-linear Fatigue Design Curves	2363
<i>Ahmed Mostafa Farag, Gilbert Grondin</i>	
Shear Behaviour of SFRC Slabs Longitudinally Reinforced with High-Performance Steel	2373
<i>Laura Talboys, Adam Lubell</i>	
Plant Life Management and Design of the Prestressed Concrete Bridges Using Advanced Post-Tensioning System.....	2383
<i>Veronica De Luca, Erick Osorio, Julian Cousins, Harallamb Kucuqi Kucugi, Homayoun Abrishami</i>	
An Assistive Sit-to-Stand Knee-Ankle-Foot-Orthosis	2393
<i>Jonathon Schofield, Samer Adeeb, Eric Parent</i>	
Behaviour of Profiled Composite Walling System Under Elevated Temperatures	2402
<i>Antonio Taormina, Khandaker M. A. Hossain</i>	
Relationships among Mechanical Properties of Concrete Containing Crumb Rubber as Partial Replacement to Fine Aggregate	2410
<i>B. S. Mohammed, K. M. A. Hossain, N. J. Azmi</i>	
Active Nondestructive Health Monitoring Using Embedded Multifunctional Piezoceramic Sensors	2419
<i>D. Hughi, H. Marzouk, N. Dawood</i>	
Measurement of Initial Imperfection of Energy Pipeline using 3D Laser Scanner	2429
<i>Muntaseer Kainat, Samer Adeeb, Roger Cheng, James Ferguson, Michael Martens</i>	
Numerical and Experimental Study of Retrofit System to Increase Uplift Capacity of Light-Framed Wood Roofs	2440
<i>Ryan Jacklin, Ashraf El Damatty</i>	
Module Rigging Assembly Dynamic Finite Element Analysis.....	2450
<i>Lindsey Westover, Jacek Olearczyk, Ulrich Hermann, Samer Adeeb, Yasser Mohamed</i>	
Flexural Stiffness of RC Beams during Fire Events	2460
<i>S. F. El-Fitiany, Maged Youssef</i>	
Influence of Terra Cotta Infill Walls and Partitions on the Seismic Response of Pre-1970 Buildings: A Case-study of a Montréal Hospital	2469
<i>Amin Asgarian, Ghyslaine McClure</i>	
Effect of the Stress-Strain Relationship on the P-M Interaction Diagrams of Partially Grouted Reinforced Masonry Walls	2480
<i>Hadi Moosavi, Yasser Korany</i>	
Structural Behavior of UHPFRC Beams without Stirrups	2487
<i>Kirillos Wahba, Hesham Marzouk, Nabil Dawood</i>	
Fracture Energy properties of Ultra High Performance Fiber Reinforced Concrete	2497
<i>Kirillos Wahba, Hesham Marzouk, Nabil Dawood</i>	
Assessment of Reinforced Concrete Bridge Girders with Significant Soffit Spalling	2506
<i>Jeffrey Luckai, Scott Walbridge, Maria Anna Polak</i>	
Performance Evaluation of RC Slender Columns under Lateral Loading.....	2516
<i>Afrin Hossain, Shahria Alam, Ahmad Rteil</i>	
Risk Management Framework for Assessment of Seismic Retrofits	2526
<i>Qusay Al-Chatti, Solomon Tesfamariam</i>	
Seismic Assessment of Steel Braced Frames Using Advanced Hybrid Simulation Techniques	2537
<i>Robert Tremblay, Yan Jiang, Martin Leclerc, Lucia Tirca</i>	
Wood-frame vs. Compressed Earth Block Construction: Which Alternative is Better?	2547
<i>Amy Jenkins Swan, Ahmad Rteil, Gordon Lovegrove</i>	
Shear Behavior of SFRC and SCFRC Beams	2557
<i>Mustafa Mohammed-Saeed, Hassan Aoude</i>	

VOLUME 4

Fatigue Testing and Analysis of As-Welded and Retrofitted Web Stiffeners in Steel Highway Bridges	2567
<i>Kasra Ghahremani, Scott Walbridge</i>	
Effect of Seismic Detailing and Steel Fibres on the Blast Resistance Behaviour of Reinforced Concrete Columns	2577
<i>Russell Burrell, Sarah De Carufel, Hassan Aoude, Murat Saatcioglu</i>	
Structural Deep Slab Bridge with Fiber Reinforced Concrete.....	2587
<i>Mohamed Ouahla, Frédéric Légeron, Marc Demers, Ehsan Ahmed</i>	
Finite Element Modelling of Beam-Column Joints Strengthened with Steel-Reinforced Polymers for Seismic Resistance	2597
<i>Maryam Mahmoodi, Mamoudou El-Badry</i>	
Seismic Design of Concrete Shear Wall Buildings in Canada: the Outlook for 2014.....	2608
<i>Perry Adebar</i>	
State-of-the-Art in Nonlinear Modeling of Concrete Frame Structures under the Combined Effect of Ultimate Loading and Reinforcement Corrosion	2618
<i>Amina Mohammed, Husham Almansour, Beatriz Martin-Perez</i>	

Optimum Design Data Base for Cable-stayed Bridges.....	2628
<i>Mahmoud Hassan, Ashraf El Damatty, Ashraf Nassef</i>	
Anchorage of Stirrups in Prestressed Concrete Bridge Girders.....	2640
<i>Perry Adebar, Macarious Hui, Ian Graham</i>	
Comparing Flexural Capacity of Reinforced Masonry Members in Different Codes.....	2648
<i>Bishoy Alfy Samy, Salah Sarhat, E. G. Sherwood</i>	
Finite Element Analysis of Shear Friction of Concrete Strengthened with External Steel-Reinforced Polymer Composites	2658
<i>Maryam Mahmoodi, Mamdouh El-Badry</i>	
Design and Construction of a 30-metre-high Glazing Wall Supported by Cable Trusses	2667
<i>Georg Josi, Jim Montgomery, Jeff Dibattista, Gord Anderson, Dejan Erdevicki</i>	
Responses of Isolated Building with MR Dampers and Fuzzy Logic	2677
<i>F. Khoshnoudiana, A. Molavi Tabrizi, T. Y. Yang</i>	
Restrained Shrinkage in Concrete Flexural Elements	2684
<i>Michael Bartlett, Graeme Johnston</i>	
Development and Validation of a Three Dimensional Finite Element Structure-Tuned Liquid Damper Model System	2694
<i>Islam Soliman, Michael Tait, Ashraf El Damatty</i>	
Deck Reconstruction of the Honoré Mercier Bridge A Major Rehabilitation Challenge	2704
<i>Sevak Demirdjian, Adel R. Zaki, Guy Mailhot</i>	
Behaviour of WT Connections under Combined Shear, Moment, and Tension	2714
<i>Hossein Daneshvar, Robert Driver</i>	
Compressive Arching and Tensile Catenary Action in Steel Shear Connections Under Column Removal Scenario	2725
<i>Hossein Daneshvar, Steven Oosterhof, Robert Driver</i>	
Uncertainty Modelling of Shear Tab Connections	2735
<i>Smitha Koduru, Robert Driver</i>	
Erection of the Deh Cho Bridge	2746
<i>T. G. Davies, E. F. Pradilla, R. W. Welch, C. D. A. Ross</i>	
Erection Engineering for the BC Place Stadium Roof	2756
<i>Michael Schmaus</i>	
Fragility Relationships For Probabilistic Performance Based Seismic Risk Assessment Of Bridge Inventories.....	2765
<i>David Lau, Charlotte L. Waller, Kandasamy Vishnukanthan, Siva Sivathayalan</i>	
Issues Related to the Design and Construction of Curved Steel Bridges	2775
<i>Munzer Hassan, Nathalie Chagnon, Dennis Bascopé</i>	
Condition Assessment of a Timber Bridge Substructure Using Vibration-based Methods and Pattern Recognition Techniques.....	2785
<i>Cameron Beauregard, Bruce Sparling, Leon Wegner</i>	
Ductility Study on the Slenderness Effects of SFRP Wrapped Concrete Columns	2795
<i>Khaled Abdelrahman, Raafat El-Hacha</i>	
Deformability and Ductility of Reinforced Concrete Beams Strengthened with NSM-CFRP Reinforcements	2803
<i>Hamid Omran, Raafat El-Hacha</i>	
Evaluation of the Post-Fatigue Behaviour of RC Beams Strengthened in Flexure using Prestressed NSM CFRP Rods.....	2813
<i>Fadi Oudah, Raafat El-Hacha</i>	
Effect of Varying Overlap Lengths of SFRP and CFRP Sheets on Confined Concrete Cylinders	2822
<i>Mohammad Mashrik, Raafat El-Hacha</i>	
Effect of Age at Loading and Load Arrangement on Immediate Deflections of One-Way Slabs	2832
<i>Jeil Lee, Mark Scanlon, Laura Cohen, Andrew Scanlon</i>	
Real Time Hybrid Simulation Of Electrical Insulator Posts Using A Smart Shacking Table And Comparison With Full Dynamic Testing	2840
<i>Selim Gunay, Mohamed Moustafa, Khalid Mosalam</i>	
P-I Diagrams for Steel Plate Shear Wall Systems	2850
<i>Hassan Moghimi, Robert Driver</i>	
Finite Element Modeling and Analysis of Light-gauge Steel Plate Shear Walls	2860
<i>Arghya Chatterjee, Anjan Bhownick, Ashutosh Bagchi</i>	
Fatigue of Connections with Staggered Rivet Holes	2870
<i>Christian Wokem, Gilbert Grondin</i>	
Stability of Straight Steel Plate Girders in Construction	2880
<i>Robert Gale</i>	
Beam Axial Force Demand Evaluation for Low-seismic Steel Plate Shear Walls	2890
<i>Hassan Moghimi, Robert Driver</i>	
Implications of the Use of Spectral Acceleration as Intensity Measure in Probabilistic Seismic Demand Analysis.....	2900
<i>Lan Lin</i>	
Designing for Longevity: Hot-Dip Galvanized Steel Performance in Soil and Atmospheric Exposure	2910
<i>Melissa Lindsley, Philip Rahrig, Thomas Langill</i>	
The Assessment and Retrofit of a Vulnerable Pin Hanger Bridge in the City of Calgary	2921
<i>Russell Martin, Donald Kennedy</i>	
Effect of Seismic Design Level and Building Height on the Robustness of Steel Frame Structures Prone to Progressive Collapse.....	2930
<i>Seyed Javad Mirvalad, Khaled Galal</i>	

Investigations for the Retrofit of the Honore-Mercier Bridge, Montreal	2940
<i>Nicholas Laidlaw, Lan Lin</i>	
Probabilistic Wind Model for Regional Reliability-Based Fatigue Evaluation of Sign Support Structures	2950
<i>Joseph Diekfuss, Christopher M Foley</i>	
Estimation of Progressive Collapse Potential for Shear Wall Buildings	2960
<i>Omer Yagob, Khaled Galal, Nove Naumoski</i>	
Experimental Evaluation of the Robustness of Flexible WT Steel Connections	2974
<i>Christopher Raebel, Christopher M Foley, A. D. Friedman</i>	
Evaluation of Modal Pushover Analysis Procedure for Steel Plate Shear Walls	2983
<i>A. K. Bhowmick</i>	
Lessons Learned from the First Large Scale Use of Cross Laminated Timber As Tall Shear Walls in Western Canada	2993
<i>Mark Porter, Robin Zirnhelt, Benny Neylon</i>	
Seismic Performance Assessment Of Vertical Irregular R.C. Buildings, For Various Ground Motion Characteristics	3003
<i>Mohamed Elassaly</i>	
New Developed FRP-Headed Rebars for Infrastructure Applications	3013
<i>H. M. Mohamed, M. Zaki, B. Benmokrane</i>	
Design and Construction of the First Worldwide Two-Way Flat Slab Parking Garage Reinforced with GFRP Bars	3023
<i>Brahim Benmokrane, Ehab Ahmed, Christian Dulude, Eric Boucher</i>	
Hybrid Reinforced Concrete Bridge Deck Slab of 410 Overpass Bridge in Quebec: Construction and Testing	3032
<i>Ehab Ahmed, Brahim Benmokrane</i>	
Metrics of Bridge Serviceability	3042
<i>Bala Balakrishnan</i>	
Effect of Bond Area on Strengthening Efficiency of FRP-stiffened Thin-walled Steel Beams	3049
<i>Ayman Okeil, G Broussard, M. R Ferdous</i>	
Analytical Assessment of Stability of Unbraced Column in Two-Panel Concentrically Braced Frames	3057
<i>Ali Imanpour, Tremblay Robert</i>	
Retrofit of Structural Steel Columns using FRP-Concrete Composite Systems	3067
<i>Joel Linde, Michael Tait, Saiedeh Razavi, Wael El-Dakhakhni</i>	
Vortex Shedding Analysis of a Tapered 13 m Single Davit Light Pole according to CAN/CSA S6-06 and AASHTO LTS-5	3077
<i>Theresa Holden, Bob Ramsay</i>	
Mechanical Behavior of Shear Walls: a New Technique for Reinforcement According to the Developed Principal Stresses	3087
<i>A. Kezmani, S. Boukais, M. Hamizi, L. Bouzid</i>	
Effect of RBS Connection on the Behavior of Steel Plate Shear Walls	3097
<i>Pouya Salem, Mohamad Mehdi Alinia</i>	
Fatigue Performance of Coped Steel Beams, Retrofitted with Carbon Fibre Reinforced Polymers	3107
<i>Syed Mobeen, Theresa Holden, Roger Cheng</i>	
Load-Slip Response of Gypsum Board-to-Stud Fastener Connections in Shear	3117
<i>Daniel Grenier, Michael Bartlett</i>	
Seismic Effects on Deep Beams in a Reinforced Concrete Building	3127
<i>Md Shahnewaz, Ahmad Rteil, Shahria Alam</i>	
Validation of the Accuracy of Finite Element Analysis Models of a Guyed Telecommunication Mast with Ambient Vibration Measurements	3136
<i>Mahtab Ghafari Osgoe, Ghyslaine McClure, Xiao Hong Zhang, Daniel Gagnon</i>	
Numerical Comparison between FRP and TRM for Seismic Retrofitting	3147
<i>P. K. M. Moniruzzaman, Ahmad Rteil</i>	
Fabrication of the Deh Cho Bridge Pylons	3157
<i>Paul King, P. Eng.</i>	

1ST INTERNATIONAL CONFERENCE FOR SUSTAINING PUBLIC INFRASTRUCTURE

Quantifying Financial Impacts of New Suburban Development: A Case Study	3167
<i>Dinu Alex, Bradley Leeman, Konrad Siu</i>	
Edmonton's North LRT Extension: Sustainability throughout the Project Life Cycle	3177
<i>Brad Smid, Mark Perry, Allan Neill, Mike Woodland</i>	
Assessing the Ability of Integrated Decision-Making to Improve Canadian Municipal Infrastructure Sustainability	3187
<i>Amy Vaillancourt, Jeff Rankin, Bruce Wilson</i>	
Optimizing Infrastructure Renewal – Edmonton's Risk-Based Infrastructure Management System (RIMS)	3197
<i>Hussien Al-Battaineh, Bradley Leeman, Konrad Siu</i>	
The Neighbourhood Renewal Program: A City of Edmonton Sustainable Infrastructure Success Story	3207
<i>Hussien Al-Battaineh, Steve Aguiar</i>	
Sustainable Concrete made with FRP Scrap Aggregate (FSA)	3217
<i>Emma Slater, Shahria Alam</i>	
A Multi-criteria Decision-making (MCDM) Framework for Prioritizing Damaged Infrastructure and Services Facilities in Egypt Using Sustainability Objectives	3228
<i>Mohamed Elbarkouky, Samer Ezeldin, Ashraf El-Assaly</i>	

Sustainable Practice in Infrastructure Management through Route Optimization for Preventive Maintenance of Sewer System.....	3239
<i>Hamid Zaman, Ahmed Bouferguene, Mohamed Al-Hussein, Carl Lorentz, Leo Girard</i>	
“Em-Green” Building Rating System: A Sustainability Measure for Canadian Construction Projects Based on Energy Methodology	3249
<i>Navid Hossaini, Kasun Hewage</i>	
Use of Geotextiles in Drainage of Pavements and Outdoors Structures	3260
<i>Wissam Saleh, Mohamed N. Abou-Zeid, Ezzat H. Fahmy, Ahmed Salem, Ahmed Farid, Ahmed Ghanima</i>	
Development of a Sewer Upgrading Strategy for the City of Edmonton	3270
<i>Christopher Jones, Mohammad Tarig, Faruk Kharadi, Dave Krywiak</i>	
Sewer Deterioration Modelling: Difficulties and Challenges	3280
<i>Abra Ens</i>	
Framework of Sustainability indicators for Public Water Systems	3291
<i>Ali Ghamsari-Esfahani, Thomas Froese, Dana Vanier</i>	
Identification and Qualification of Health, Safety and Environmental Risks on Construction of Projects in Iranian Petroleum Industry	3301
<i>Parisa Mohammadi, Ehsan Heshmati, Hossein Sharif, Alireza Ahmadian Fard Fini,</i>	
Quality Function Deployment (QFD) for Bridge Maintenance	3311
<i>Aman Bolar, Solomon Tesfamariam, Rehan Sadiq</i>	
Infrastructure Challenges and Way Forward: An Innovative Framework for Sustainability Assessment with Application in Stormwater Systems	3321
<i>Jyoti Upadhyaya, Edwin Tam, Nihar Biswas</i>	
A Need For A Sustainable Asset Management Framework For Hydroelectric Run-Of-River Infrastructure	3334
<i>Amir Shoolestani, Dana Vanier, Thomas Froese</i>	
Tool for Evaluating the Sustainability of Wastewater Treatment Systems	3344
<i>Mahmood Alimahmoodi, Catherine Mulligan, Anupama Chalise, Vaughn Grey, Robert Noel-De-Tilly</i>	
Transportation Project Prioritization	3354
<i>Andrew Anderson, Daniel Vriend</i>	
Sustainability Challenges in the Department of National Defence	3364
<i>Linda Newton, Kevin Nelson, Marc Desjardins</i>	
Toward Sustainability in Life Cycle Management of Road Assets	3374
<i>Ralph Haas, Lynne Cove Falls</i>	
Beneficial use of Plastic Pipe in Sustainable Stormwater Infrastructure	3384
<i>Sabrina Spataro, Jonathan Hubler, Y. Grace Hsuan, Kimberlee Marcellus</i>	
Life Cycle Assessment for Sustainable Design of Precast Concrete Commercial Buildings in Canada	3394
<i>M. L. Marceau, L. Bushi, J. K. Meil, M. Bowick</i>	
The Graphical Modeling As a Support Tool for Planning and Monitoring Sustainable Construction Projects and Public Infrastructure.....	3406
<i>Jean-Louis Queguiner, Adel Francis, Charles Queguiner, Edmond Miresco</i>	
Probabilistic Life Cycle Simulation Model of the Performance of Asbestos Cement Water Mains	3416
<i>Gordon Sparks, Kent Kostuk, P. N. Christensen, Loretta Gette</i>	
Sustainable Urban Pavement Management Framework: A Chilean Case Study	3424
<i>Aleli Osorio, Susan Tighe, Alondra Chamorro, Carlos Videla</i>	
Author Index	