

Canadian Society for Civil Engineering

30th CSCE Annual Conference

“2002 Challenges Ahead”

June 5-8, 2002
Montreal, Quebec, Canada

Volume 1 of 5

Printed from e-media with permission by:

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

ISBN: 978-1-60423-314-8

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



30th Annual Conference

Canadian Society for Civil Engineering (CSCE)

Montréal June 5-8, 2002



These proceedings of the 30th Annual CSCE Conference include 302 technical papers distributed between the general conference and the 3 specialty conferences. They are presented in the following order :

- General Conference
- 4th Structural Specialty Conference
- 4th Transportation Specialty Conference
- 2nd Material Specialty Conference

The material and information contained herein are published in the exact form given by the authors. Any statements or views here presented are those of the authors and are neither condoned nor rejected by the Canadian Society for Civil Engineering. Mention of trade names or commercial products does not constitute endorsement or recommendation for use.

Canadian Society for Civil Engineering

30th CSCE Annual Conference
2002

TABLE OF CONTENTS

VOLUME 1

General Conference

| | |
|--|-----|
| Rehabilitation of Warsak Hydro Electric Power Project For Future Sustainability | 1 |
| <i>Navid Ahmad, Bashir Ahmad Khan, B. Former Sr.</i> | |
| Hydrological Approach To Instream Flow Evaluation : A Sensitivity Analysis | 9 |
| <i>M. Allain, N. El-Jabi</i> | |
| Condition Assessment And Management of Municipal Sewers In Canada: State-Of-The-Practice | 18 |
| <i>Erez N. Allouche, Ph.D., Peter Freure</i> | |
| The Efficiency of Thermal Performance of The Desert Buildings – The Traditional House of Ghadames / Libya | 28 |
| <i>Maha S. Al-Zubaidi</i> | |
| Underground Buildings As A Strategy For Sustainable Development & Its Role In The Conservation of The Environment | 36 |
| <i>Maha S. Al-Zubaidi</i> | |
| Setting Priorities For Neighbourhood-Based Sewer Renewal In Edmonton, Alberta | 44 |
| <i>Samuel T. Ariaratnam, Ashraf El-Assaly, Herman Ng, Sid Lodewyk, Ken Chua</i> | |
| Negotiating Gravel And Cobbles Using Horizontal Directional Drilling | 52 |
| <i>Samuel T. Ariaratnam, Jason S. Lueke</i> | |
| Adsorption/Absorption Features of Peat Moss For Water Pollution Control - Feasibility Studies For St. John's Harbour Water Pollution | 60 |
| <i>Aarrthy M. Arunachalam</i> | |
| Enterprise Resource Planning In Construction: A Successful Implementation Process | 70 |
| <i>M. Attalla</i> | |
| La Gestion Des Rejets Miniers Dans Un Contexte De Développement Durable Et De Protection De L'environnement | 80 |
| <i>Michel Aubertin, Bruno Bussière, Louis Bernier, Robert Chapuis, Michel Julien, Tikou Belem, Richard Simon, Mamert Mbonimpa, Mostafa Benzaazoua, Li Li</i> | |
| Leachate Migration From Urmia Landfill Site, Iran, And Its Effect On The Quality of The Surrounding Soil And Groundwater | 90 |
| <i>K. Badv</i> | |
| Design For Construction Mitigation On The Central Artery/Tunnel Project | 97 |
| <i>Brian Brenner, Erich Thalheimer, Guido Schattaneck, Dave Druss And Gail Scot</i> | |
| Properties of Swirling And Non-Swirling Flows At Submerged Water Intakes | 107 |
| <i>E.C. Carriveau, R.E. Baddour, G.A. Kopp</i> | |

| | |
|---|------------|
| Development of Online Pavement Maintenance Management Decision Support System | 117 |
| <i>T. P. Chiang, J. D. Lin, J. Wu</i> | |
| A Comparison of The Roof Maintenance Management Systems of Two Public Sector Organizations | 129 |
| <i>J. Christian, L. Newton, T. Gamblin</i> | |
| The User's Perspective In Design And Construction of A Facility | 137 |
| <i>J. Christian, L. Newton</i> | |
| Environmental Considerations In Fulton Creek Drainage System | 147 |
| <i>Ken Chua, A. Fayi Zhou, Albert Kwan</i> | |
| Climate Change And Drainage Infrastructure Capacity In An Urban Catchment..... | 156 |
| <i>C. Denault, R.G. Millar And B.J. Lence</i> | |
| To Retrofit Or Rebuild, That Is The Question: Using Life-Cycle Energy Performance For Comparing Construction Options | 166 |
| <i>B. Dong, C.A. Kennedy, K. Pressnail</i> | |
| Hydraulic Jumps In Circular Conduits..... | 176 |
| <i>S. A. Ead, H. K. Ghamry</i> | |
| Biosorption of Heavy Metals Mixture By Biomass of Sulfate Reducing Bacteria..... | 186 |
| <i>El Bayaomy</i> | |
| Impact of Ph and Redox Potential Changes on Acidic Sulphate Soils | 193 |
| <i>Elektorowicz Maria, Cook Freeman, Rassam David</i> | |
| A Computer Module For Multi-Loaders-Multi-Trucks Fleet Selection For Earthmoving Projects | 200 |
| <i>K. El-Moslmani, S. Alkass, M. Al-Hussein</i> | |
| Settlement Domain Under Footings On Cohesionless Soil..... | 210 |
| <i>M. Kassem Elsamny, Ali Almasmoum, M. M. Mahdy</i> | |
| Compressibility of Cohesionless Soil Under Spread Footings..... | 219 |
| <i>M. Kassem Elsamny, Ali Almasmoum, M. M. Mahdy</i> | |
| Amélioration De La Représentation Des Contraintes D'exécution Par La Méthode Chronographique | 229 |
| <i>A. Francis, E. Miresco</i> | |
| Description Du Processus De Formation De La Brèche Lors De La Rupture D'une Digue Submergée..... | 239 |
| <i>M. Fuamba, C. Marche, C. Pelletier</i> | |
| An Integrated Macroeconomic Model For Urban Sustainable Development..... | 248 |
| <i>M.M. Fung, C.A. Kennedy</i> | |
| Une méthode de simulation numérique de l'évolution d'un tronçon de rivière subissant la rupture d'un barrage | 258 |
| <i>J. Gagnon, S. Leroueil, T. Mahdi, C. Marche, C. Thibault</i> | |
| The Statistical Considerations For The Numerical Computations of Non-Uniform Sediments | 268 |
| <i>Haitham K. Ghamry</i> | |
| Modeling The Impact of Construction Projects On Urban Environments | 283 |
| <i>A. Gilchrist, D. Cowan, And E.N. Allouche</i> | |

| | |
|---|-----|
| Cost Overrun in Reconstruction/Rehabilitation of Institutional Community Centers | 295 |
| <i>Sami Haddad, Mohamed Attalla</i> | |
| A Component-Based Framework For Integrated AEC/FM Project Systems | 304 |
| <i>Mahmoud R. Halfawy, Thomas Froese</i> | |
| An Integrated Framework For GIS-Based Civil Infrastructure Management Systems | 313 |
| <i>Mahmoud R. Halfawy, David Pyzoha, Taymour El-Hosseiny</i> | |
| Managing Project Documents Using Virtual Web Centers | 323 |
| <i>Mamoon M. Hammad</i> | |
| Application of Fldwav (Floodwave) Computer Model To Solve For Power Canal Rejection Wave For Simple And Complex Cases | 332 |
| <i>P.C. Helwig</i> | |
| On The Capability of Rhamnolipids For Oil Spill Control of Surface Water | 340 |
| <i>L. Holakoo, C.N. Mulligan</i> | |
| Virtual 3D Conceptual Cost Estimating Model | 348 |
| <i>A. Jade, S. Alkass</i> | |
| Best Practices Under The New National Guide To Sustainable Municipal Infrastructure | 356 |
| <i>Guy Gosselin, Dwayne Kalynchuk</i> | |
| Hydraulic Performance of Damaged-End CSP Culverts | 367 |
| <i>J.A. Kells</i> | |
| Variation In The Nutrient Content of Plants In A Constructed Treatment Wetland System | 376 |
| <i>J.A. Kells, G.J. Putz, J.N. Hilderman</i> | |
| Influence of kinematic interaction on the seismic behavior of piles | 386 |
| <i>F.Khoshnoudian</i> | |
| The Men Who Built The First Ship Canal And Locks At Sault St. Marie | 395 |
| <i>Kraig Knutson, Cliff J. Schexnayder</i> | |
| Development of A Decision Support System For Building Maintenance Management | 405 |
| <i>R. Langevine, S. Abourizk, M. Allouche</i> | |
| Use of Artificial Intelligence Techniques For The Estimation of Cyanobacteria (Blue-Green Algae) Concentrations | 415 |
| <i>N. Lauzon, B. J. Lence, H. R. Maier</i> | |
| Amélioration Des Previsions D'un Modele Numerique De Fonte De Neige A L'aide D'images Satellites NOAA-AVHRR | 425 |
| <i>S. Lavallée, A. Caron, F.P. Brissette, R. Leconte, B. Larouche</i> | |
| The Use of GIS in the Monitoring of the Hydrogeologic Regime: A Case Study Involving the Downtown Core of the City of Montreal | 433 |
| <i>Guyline Lebel, A.P.S. Selvadurai</i> | |
| Denosing of Streamflow Series Affected By Tides Using Wavelet Methods | 442 |
| <i>Y.H. Lim, L.M. Lye</i> | |
| Modelling of Surface Heave Contributing Factors In Directional Boring Operations | 452 |
| <i>Jason S. Lueke, Samuel T. Ariaratnam</i> | |

| | |
|---|-----|
| Design of Experiments In Civil Engineering: Are We Still in the 1920's? | 462 |
| <i>L.M. Lye</i> | |
| Liquefaction Studies: A Review | 472 |
| <i>Ali A. Mahmood, Catherine N. Mulligan</i> | |
| The Teaching of Design, Safety And Environmental Issues On Civil Engineering Degree Programmes | 482 |
| <i>J. Manning</i> | |
| Shahid Abbass Pour Dam Curtain Wall Operation | 489 |
| <i>Mohammad T. Mansoori-Kia</i> | |
| Integrated Monte Carlo/Ann Model For Markup Estimating | 495 |
| <i>Dr. M. M. Marzouk</i> | |
| A Study of Construction Cost Sources | 503 |
| <i>B. Y. McCabe, J. O'Grady, F. Walker</i> | |
| Liquidated Damages: The "Do's and Don'ts" from an Owner's Perspective | 512 |
| <i>Clark R. McCormick</i> | |
| Using Of Silicate Based Grouts To Improve The Behavior Of Sand Soil | 522 |
| <i>H. M. Meshmesh, K. Mahmoud</i> | |
| Financing of Infrastructure | 528 |
| <i>M. Saeed Mirza, Lamya Amleh</i> | |
| Sustainable Infrastructure And Civil Engineering Education | 537 |
| <i>M. Saeed Mirza, Lamya Amleh</i> | |
| Using Simulation For Improving Productivity of Drainage Operations | 544 |
| <i>Y. Mohamed, S. Abourizk, M. Al-Hussein, J. Roesch, A. Bowen</i> | |

VOLUME 2

| | |
|---|-----|
| Computerized Maintenance Management System For Low-Slope Roofs | 550 |
| <i>G. Morcou, H. Rivard</i> | |
| Repair of Damietta Bridge Foundations Using Micro-Piles: A Case Study | 560 |
| <i>Usama A. Morsy</i> | |
| Geotechnical Aspects, Options Evaluation and Safety Analyses for Assiut Barrage, Egypt | 570 |
| <i>U. A. Morsy, M. M. Hamza, E. A. Rae, N. F. Nashed</i> | |
| Web-Based Integrated Project Control | 580 |
| <i>O. Moselhi, J. Li, and S. Alkass</i> | |
| Wastewater Treatment In Poland: State-Of-The-Art Biological Nutrient Removal (BNR) Processes Take Over | 589 |
| <i>J. A. Oleszkiewicz</i> | |
| Hierarchical Graphical User Interfaces: Representation of AEC/FM Information Compared To Cad | 596 |
| <i>T. D. O'Reilly, L. M. Waugh, T. M. Froese, J. H. Rankin</i> | |
| An Optimal Design Storm Pattern For Urban Runoff Estimation In Southern Quebec | 606 |
| <i>N. Peyron, V-T-V. Nguyen, G. Rivard</i> | |
| Reflections On The Financial History of Toronto's Urban Water Infrastructure | 616 |
| <i>S. Pharasi And C.A. Kennedy</i> | |

| | |
|--|------------|
| Selection of A Robust Distribution For Regional Flood Frequency Analysis | 626 |
| <i>J. Pokhrel, L. M. Lye</i> | |
| Characteristics of Counter Flowing Wall Jets | 634 |
| <i>A.S. Ramamurthy, Diep Vo, M. Tudor, C. Zhai</i> | |
| Étude Des Risques Et Des Effets Domino Produits Par La Défaillance D'un Aménagement Hydroélectrique..... | 640 |
| <i>B. Robert</i> | |
| Dynamic Planning For Site Layout..... | 650 |
| <i>Farnaz Sadeghpour, Osama Moselhi, Sabah Alkass</i> | |
| An Integrated Approach For Risk Management of Drilling Waste Discharges In The Marine Environment | 655 |
| <i>R. Sadiq, T. Husain, B. Veitch, N. Bose</i> | |
| Developing Sustainability Criteria For Civil Engineering Systems | 665 |
| <i>H. Rahme Sahely, C.A. Kennedy, B.J. Adams</i> | |
| Transfer of Shear Loads at a Fracture: Influence of Profile, Contact Friction and Separation of Compatible Surfaces | 674 |
| <i>A.P.S. Selvadurai, Q. Yu, E. El Hindy</i> | |
| Mechanics of the Indentation of a Fluid Saturated Porous Elastic Medium Susceptible to Damage..... | 684 |
| <i>A. Shirazi, A.P.S. Selvadurai</i> | |
| Understanding Risk Management | 694 |
| <i>S. P. Simonovic</i> | |
| Educating Young Women..... | 706 |
| <i>V. Straka</i> | |
| Civil Engineering In The Nineteen Fifties | 711 |
| <i>V. Straka, A.D. Mackenzie</i> | |
| Effects of Aggregated Simulation Area Scale In Watershed Simulation Using The Slurp Model..... | 720 |
| <i>G. E. Susilo</i> | |
| Improving Risk Modeling Using Belief Networks..... | 728 |
| <i>Z. Tang, B. McCabe</i> | |
| On Selection of Probability Distributions For Representing Extreme Precipitations In Southern Quebec | 738 |
| <i>D. Q. Tao, V. T. V. Nguyen, A. Bourque</i> | |
| Une Méthodologie Pour La Validation, En Temps Réel, Des Données De La Qualité : Application Aux Réseaux D'assainissement..... | 746 |
| <i>M. Temimia, S. Bennis</i> | |
| Resource Allocation Improvement Using Simulation And Belief Networks..... | 756 |
| <i>A. Van Tol, S. M. Abourizk</i> | |
| Optimizing The Performance of Sewage Treatment Plants At Canadian Military Facilities..... | 766 |
| <i>N. Vlachopoulos, J.M. Pouliot, D. Chapman</i> | |
| Modelling The Hydraulics And Sediment Transport On Steep Rivers | 776 |
| <i>P.Wang , R.Kahawita, T.T. Quach</i> | |

| | |
|---|-----|
| Modeling of Thermal Front Movement At The Sussex Health Centre ATES Site, Sussex, N.B. | 783 |
| <i>T. K. Wiesel, M. G. Satish, F. Cruickshanks</i> | |
| Modeling a Dam-break Episode on the Toce River (Italy) using a Hydraulic Simulation Software Package | 788 |
| <i>Min Yan, Rene Kahawita</i> | |
| Getting Back To Nuts And Bolts: Developing Sustainable Residential Homes Through Optimization | 794 |
| <i>J. L. Zachariah, C. A. Kennedy</i> | |
| Concrete Bored Piles Construction Productivity Assessment Using Regression Analysis | 803 |
| <i>Tarek M. Zayed, Daniel W. Halpin</i> | |
| Effects of Trapped Air During Rapid Filling of Partially Full Pipes | 812 |
| <i>F. Zhou, Ph.D., F.Hicks, Ph.D., P. Steffler, Ph.D.</i> | |

4th Structural Specialty Conference

| | |
|---|-----|
| Repair of Cracked Concrete Foundations of Telecommunication Structures | 822 |
| <i>H.A. Abdalla</i> | |
| Evaluation of An Approximate Method For Multinormal Integration | 832 |
| <i>Y. An, M. D. Pandey</i> | |
| Performance of Wood I-Joists Under Moderate Sustained Loading for 5 Years | 842 |
| <i>L. Bach, J.J.R. Cheng, H.A. Khoo, J. B. Bach</i> | |
| The Effect of FRP Wraps on the Tensile Strength of Plain and Reinforced Concrete Beams | 852 |
| <i>Moataz Badawi, Khaled Soudki</i> | |
| Numerical Examination of Compressive In-Plane Strength of Corroded Plates | 862 |
| <i>Mohammed R Bahaari</i> | |
| Transverse Confinement of Deck Slabs By Metallic Stay-In-Place Forms | 871 |
| <i>Baidar Bakht, Aftab A. Mufti, Gamil Tadros</i> | |
| Review of A23.3 Equation 14-1 For Concrete Wall Design | 878 |
| <i>F.M. Bartlett, R.E. Loov, C.M. Allen</i> | |
| Décalage En Cisaillement Dans Les Cornières Jumelées | 888 |
| <i>D. Bauer, A. Benaddi</i> | |
| Matrice De Gestion Structurale Des Quais Du Port De Montreal | 898 |
| <i>C. Beaubien, M. Lucic, Y. Richer</i> | |
| Structural Assessment of Piers From Lateral Impact | 906 |
| <i>Jean-Guy Béliveau, Christopher Inaba</i> | |
| Experimental Study And Numerical Modelling of The Fire Resistance of Wood-Stud Wall Assemblies | 916 |
| <i>N. Benichou, V. K. R. Kodur, M. A. Sultan</i> | |
| What is the Proper Layout of Studrails in Slab-Column Connections? | 926 |
| <i>Gerd Birkle, Anita Clauss, Dr. Walter Dilger</i> | |
| Neural Network Predictions of Wind Flow Over Complex Terrain | 936 |
| <i>G.T. Bitsuamlak, T. Stathopoulos, C. Bédard</i> | |

| | |
|--|------|
| Parametric Study of Dynamic Response of Resilient Track For Transit System | 945 |
| <i>L. Bizindavyi, Z. Fang, M.F. Green, T.I. Campbell, R. J. Anderson, A. Moucessian</i> | |
| Predicting The Initiation And Propagation of Corrosion In Reinforced Concrete Structures | 955 |
| <i>O. Burkan Isgor, A.Ghani Razaqpur</i> | |
| Field Testing of An Integrated Resilient Trackwork System | 964 |
| <i>T. I. Campbell, M. F. Green, D. Swanson, A. Moucessian, H. Skoblenick</i> | |
| La Réhabilitation Sismique Des Édifices Municipaux À La Ville De Québec | 974 |
| <i>André Caron, Luc Jolicoeur</i> | |
| Replacement of A 206-Foot Railway Span At St. Anne De Bellevue, Quebec | 984 |
| <i>A. Chantelois, B. Begin, B. Cote</i> | |
| Construction D'un Pont Ferroviaire En Béton Précontraint Rues Peel Et De La Commune, Montréal | 994 |
| <i>A. Chantelois, B. Cote</i> | |
| Discussion of Design Provisions of Welded Tension Members In Design Standards | 1004 |
| <i>J.J.R. Cheng, H.A. Khoo, A. Lemenhe</i> | |
| CFRP Wraps in Repair of Corroded RC Columns under Harsh Environment | 1014 |
| <i>A.S. Debaiky, M. F. Green, B. B. Hope</i> | |
| Variation In Concrete Contribution To Shear Strength With Changes In Failure Angle Plane | 1024 |
| <i>Ahmed El Metwally, Robert E. Loov</i> | |
| Évaluation, Vérification Et Conception De Structures À L'aide De Technologies Modernes | 1033 |
| <i>Rachik Elmaraghy, Louis Maltais, David Langis</i> | |
| Impact Test of Gfrp Reinforced Concrete Bridge Barriers With New Non-Metallic Connection | 1043 |
| <i>Ehab El-Salakawy, Frédéric Brière, Radhouane Masmoudi, Brahim Benmokrane</i> | |
| Flexural Behaviour of Concrete Beams Reinforced With Carbon Frp Composite Bars | 1053 |
| <i>Ehab El-Salakawy, Chakib Kassem, Brahim Benmokrane</i> | |
| Field Application of Frp Composite Bars As Reinforcement For Bridge Decks | 1062 |
| <i>Ehab El-Salakawy, Chakib Kassem, Brahim Benmokrane</i> | |
| Terra Nova Structural Design Approach, Model Testing and Computer Models | 1072 |
| <i>A. Ewida, G. Lever, S. Power</i> | |
| Analysis of Composite Beams With Web Opening | 1083 |
| <i>Ezzat H. Fahmy, Ahmed A. Hassanein</i> | |
| Staged Construction of Soil-Steel Structure With Temporary Geosynthetic Retaining Walls | 1093 |
| <i>S. Finlay, D. Lowry, S. Riley, C. Alston</i> | |

VOLUME 3

| | |
|--|------|
| Block Shear Failure of Coped Steel Beams | 1100 |
| <i>C. R. Franchuk, R. G. Driver, G. Y. Grondin</i> | |
| Double-Head Studs As Shear Reinforcement In Beams | 1110 |
| <i>R. B. Gayed, A. Ghali</i> | |

| | |
|---|------|
| Assessment of The Web Crippling Resistance Factor In The Cold Formed Steel Design Standard | 1120 |
| <i>Rafik R. Gerges</i> | |
| Large Displacement Analysis of Curved Beams | 1130 |
| <i>Rafik R. Gerges, A. A. El Damatty</i> | |
| Dynamic Response of Antenna-Supporting Structures | 1139 |
| <i>G. Ghodrati Amiri, A. Boostan</i> | |
| Humidité Dans Les Dalles De Béton Sur Sol : Problématiques Et Réhabilitations | 1148 |
| <i>P. Gouslisty, N.L. Journeaux</i> | |
| Atlantic Avenue Station Complex Rehabilitation | 1158 |
| <i>L. G. Silano, A. Grigoryan</i> | |
| Testing And Evaluation of Fatigue Damaged Girders | 1167 |
| <i>Gilbert Y. Grondin, Robbie Fraser, Mark D'andrea</i> | |
| Laboratory Tests of Deep Composite Wood-Concrete Beam And Deck Specimens | 1177 |
| <i>R. Gutkowski, J. Balogh, C. Rogers, R. Saribeiro</i> | |
| Bridge Load Rating Using An Integrated Load Testing And Finite Element Analysis Approach: A Case Study | 1186 |
| <i>M.R. Halfawy, T. Wipf, D. Wood, A. Abu-Hawash, B. Phares</i> | |
| Investigation of Prestressed Concrete Girders Strengthened With Externally Bonded Carbon Fibre Sheets | 1195 |
| <i>A. Harraq, K. W. Neale, P. Paultre</i> | |
| Shear Retrofitting of Rc Girders With Composites | 1205 |
| <i>M. Hassan, A. Bouselham, M.-J. Nollet, O. Chaallal</i> | |
| Design Economics of HPC Girder Bridges Prestressed With CFRP Tendons | 1214 |
| <i>Mostafa A. Hassanain, Mahmoud M. Reda Taha</i> | |
| Mechanical Anchorage of Studs In Concrete: Experiments And Numerical Analyses | 1224 |
| <i>A. Haufe, A. Ghali</i> | |
| New Philosophy in Steel Bridge Design and Fabrication | 1234 |
| <i>David Henkle</i> | |
| Use of Stud Shear Reinforcement In Concrete Beams With Dapped Ends | 1239 |
| <i>R. Herzinger, M.M. El-Badry</i> | |
| CFRP Reinforced Masonry Walls Subjected To Out-Ofplane Loading | 1249 |
| <i>C. R. Hoepfner, B. F. Sparling, L. D. Wegner, K. Sakr</i> | |
| Application of Translation Process And Orthogonal Series Expansions In Reliability Analysis | 1259 |
| <i>H. P. Hong</i> | |
| CFRP Sheets For Strengthening Full-Scale Severely Damaged Concrete Structures | 1267 |
| <i>U. Honorio, R.G. Wight, M.A. Erki</i> | |
| Design of Concrete Shear Wall Buildings For Earthquake Induced Torsion | 1273 |
| <i>J.L. Humar, S. Yavari</i> | |
| Block Shear Failure of Bolted Gusset Plates | 1283 |
| <i>Bino Baljit S. Huns, Gilbert Y. Grondin, Robert G. Driver</i> | |
| End Condition Effects On The Strength of HSC Cylinders | 1293 |
| <i>Amgad Hussein, Hesham Marzouk</i> | |

| | |
|--|------|
| Experimental Measurements of Water Pressure In Concrete Cracks Due To Seismic Loading | 1303 |
| <i>F. Javanmardi, P. Léger, R. Tinawi</i> | |
| Material Properties of Historical Bridge Steel | 1313 |
| <i>J. Jelinek, F.M. Bartlett</i> | |
| Mechanical Properties of 3D Wall Panels Under Shear And Flexural Loading | 1323 |
| <i>Mohammad Z. Kabir, Mohsen Hashemi Nasab</i> | |
| Utilisation De La Protection Cathodique Pour La Lutte Contre La Corrosion Des Aciers D'armature | 1332 |
| <i>N. Kadoum, S. Dontigny</i> | |
| Relevé De Potentiel : Outil D'aide À L'entretien Des Structures | 1342 |
| <i>N. Kadoum, M. Hassaim</i> | |
| Experimental Evaluation of Seismic Response of Woodframe Residential Construction | 1348 |
| <i>M. H. K. Kharrazi, C. E. Ventura, H. G. L. Prion, G. W. Taylor, J. F. Lord, M. Turek</i> | |
| Design of A Pedestrian Bridge – An Amalgamation of Public, Aesthetic And Technical Aspects | 1357 |
| <i>Jadwiga Kroman, Gamil Tadros</i> | |
| Supporting A Heavy Temporary Gravity Load On The Top Floor of A Building Structure By Several Floors Underneath | 1365 |
| <i>Louis C.H. Lam</i> | |
| Les Implications Structurales Dans Le Redéveloppement De L'édifice Eaton Centre-Ville | 1372 |
| <i>Normand Leboeuf</i> | |
| Computer Aided Stability Analysis of Gravity Dams | 1382 |
| <i>M. Leclerc, P. Léger, R. Tinawi</i> | |
| Effets du retrait-fluage sur les structures en béton précontraint | 1392 |
| <i>Denis Lefebvre</i> | |
| Les Ponts Macquet Au Québec : Un Héritage À Conserver | 1402 |
| <i>Jean Lefrançois, Marie-Christine Dandois</i> | |
| Beam – Column Behaviour of Cold-Formed Steel Lipped Channel Sections | 1412 |
| <i>Lixin Li, K.S.(Siva) Sivakumaran</i> | |
| FE Model Calibration of A 48-Story Building In Vancouver Using Ambient Vibration Measurements | 1422 |
| <i>J-F Lord, C.E. Ventura</i> | |
| The Influence of Column Bases Flexibility On The Seismic Response of Steel Framed Structures | 1432 |
| <i>O. Maan, A. Osman</i> | |
| Developments In External Post-Tensioning | 1442 |
| <i>S. Macovei-Benczur, D.M. Rogowsky</i> | |
| Software For The Design of Reinforced Earth Retaining Substructures | 1452 |
| <i>K. A. Mahmoud, H. A. Meshmesha</i> | |
| Projet De Remplacement Du Tablier Du Pont Jacquescartier Conception Et La Construction | 1461 |
| <i>Guy Mailhot, Adel R. Zaki</i> | |

| | |
|---|------|
| Inelastic Behaviour of Partially Concrete-Filled Steel Hollow Sections | 1474 |
| <i>Iraj H.P. Mamaghani, J.A. Packer</i> | |
| The World Trade Center Collapse: A Defensive-Design Perspective | 1484 |
| <i>Iraj H.P. Mamaghani, Khaled Sennah, Reza Kainoush, Daniel Linzell</i> | |
| Effects of The Constitutive Law On Cyclic Behaviour of Steel Members | 1493 |
| <i>Iraj H.P. Mamaghani</i> | |
| Using Strain Gages To Measure Stresses In Renovated Bridge | 1503 |
| <i>R. Masih</i> | |
| Comparisons of Strength Design Methods For Reinforced Concrete Columns | 1510 |
| <i>S. A. Mirza, E. A. Lacroix</i> | |
| Experiments On Seismic Response of High-Strength Concrete Members | 1520 |
| <i>D. Mitchell, P. Paultre</i> | |
| Structural Monitoring In Marine Environments | 1530 |
| <i>J. Monkman, J. P. Newhook</i> | |
| Design of Building Structures At The Conceptual Stage With Computers: Integrating Structural Framing Layout With 3D Architecture | 1538 |
| <i>Rodrigo Mora, Hugues Rivard, Claude Bédard</i> | |
| Experimental Investigation of Precast Composite FRC Deck Slabs | 1548 |
| <i>A. A. Mufti, B. Bakht, J.P. Newhook</i> | |
| Behaviour of Transversely Loaded Fillet Welds Made With Filler Metals Without Specified Toughness | 1557 |
| <i>Anthony K.F. Ng, Robert G. Driver, Gilbert Y. Grondin</i> | |
| Evaluation of Long-Term Effects In Steel Composite Girders With Pre-Cast Pre- Stressed Concrete Deck Slabs | 1567 |
| <i>A. Osman</i> | |
| Plastic Design of Square Hollow Structural Steel Sections | 1576 |
| <i>M. E. Mohareb, I. F. Ozkan</i> | |
| Plastic Design of Steel Pipe Sections Under General Stress Resultant Combinations | 1586 |
| <i>I. F. Ozkan, M. E. Mohareb</i> | |
| An Approximate Method To Calculate Buckling Load of Rigid- Jointed Truss Structures | 1596 |
| <i>F.M. Tangorra, M. Pandey</i> | |
| Friction Dampers For Seismic Rehabilitation of Eaton Building, Montreal | 1606 |
| <i>C. Pasquin, N. Leboeuf, T. Pall</i> | |
| Load Limiters for Overhead Lines | 1616 |
| <i>A. B. Peabody, G. McClure</i> | |
| Evaluation De L'etat De Sante Des Structures De Beton Par Les Technologies Acoustiques Et Electromagnetiques | 1626 |
| <i>J. Rhazi, S. Laurens, B, J.P. Balayssac, G. Ballivy</i> | |
| Grille D'analyse Du Ministère Des Transports Du Québec Pour Évaluer La Valeur Patrimoniale Des Structures | 1634 |
| <i>G. Richard, J. Normandeau</i> | |
| Examination of Minimum Flexural Reinforcement For GFRP Reinforced Concrete Beams | 1644 |
| <i>G. A. Sarazin, J. P. Newhook</i> | |

VOLUME 4

| | |
|---|-------------|
| Single- And Multi-Strand Steel Anchorage Systems For CFRP Tendons / Stays | 1654 |
| <i>Ezzeldin Y. Sayed-Ahmed</i> | |
| Analytical Study of The Effects of Tendon Layout On The Performance of Post-Tensioned Two-Way Slab Systems | 1664 |
| <i>A.J. Schokker, S.C. Lee, A. Scanlon</i> | |
| One North American Standard For The Design of Cold Formed Steel Structures | 1673 |
| <i>Reinhold M. Schuster</i> | |
| Compression Tests On Large Solid Steel Round Bars | 1683 |
| <i>Khaled Sennah, John Wahba</i> | |
| Strength Assessment of Reinforced Concrete Beams with Debonded Reinforcement and Confinement with CFRP Wraps | 1691 |
| <i>Hazem Sharaf, Khaled Soudki</i> | |
| Nonlinear Behaviour Analysis of A Three Bay Frame With Deep Beams Subjected To Monotonically Increasing Loads | 1701 |
| <i>Mohsen A. Shayanfar, M. S. Mirza</i> | |
| An Investigation On The Behaviour of The Modified Beamto-Column Connections By Means of Non-Linear Finite Element Method | 1715 |
| <i>M. A. Shayanfar, A. Mohammadi</i> | |
| Centre Street Bridge Innovative Deck Slab | 1722 |
| <i>P.L. Shrive, J. P. Newhook, T.G. Brown, N. G. Shrive, G. Tadros, J. Kroman</i> | |
| Equivalent Mechanical Model Simulating Dynamic Characteristics of Conical Steel Tanks | 1731 |
| <i>A.M.I. Sweedan, A.A. El Damatty</i> | |
| The Dynamic Properties of A Tuned Liquid Damper Using An Equivalent Amplitude Dependent Tuned Mass Damper | 1741 |
| <i>M.J. Tait, A.A. El Damatty, N. Isyumov</i> | |
| Méthodes Expérimentales Et Numériques Utilisées Pour L'évaluation Du Pont Suspendu De L'île D'orléans | 1751 |
| <i>Martin Talbot</i> | |
| Dissipating Seismic Input Energy In Low-Rise Steel Buildings Through Inelastic Deformations In The Metal Roof Deck Diaphragm | 1761 |
| <i>R. Tremblay, C.A. Rogers, H.S. Essa, E. Martin</i> | |
| Ductility of Pretensioned Concrete Beams With Hybrid Frp/Stainless Steel Reinforcements | 1771 |
| <i>Dorian P. Tung, T. Ivan Campbell</i> | |
| Dynamic Evaluation of a 17th Century Church | 1781 |
| <i>M. Turek, C.E. Ventura</i> | |
| Seismic Retrofit of Muctc Building, Palais Des Congres | 1791 |
| <i>S. Vezina, L. Assaad, T. Pall</i> | |
| The Effect of Exposure On Wind Loading of Buildings | 1801 |
| <i>K. Wang, T. Stathopoulos</i> | |
| Peak Response of MDOF Systems With Uncertain Psdf of Seismic Excitation | 1811 |
| <i>S.S. Wang, H.P. Hong</i> | |

| | |
|--|------|
| Reliability of Reinforced Concrete Columns Under Axial Load And Biaxial Bending | 1819 |
| <i>W. Wang, H.P. Hong</i> | |
| The Theory of Reinforced Concrete Stochastic Finite Element Method And Its Application To Structure Reliability Evaluation On Massive Concrete None-Bar Structure | 1828 |
| <i>Liu Xing, Wu Fan, Yu Jiang Tao</i> | |
| Random finite element analysis of large deformation problems of Space Trusses | 1838 |
| <i>Zhu Yiwen, Li Wei, Cai Yuanqi</i> | |

4th Transportation Specialty Conference

| | |
|---|------|
| Evaluation of The Bond Characteristics Between Asphalt Concrete Layers | 1847 |
| <i>R.M. Abd El-Naby, S.M. Easa</i> | |
| Evaluation of The Shear Strength of Asphalt Concrete Mixes: Experimental Investigation | 1855 |
| <i>R.M. Abd El-Naby, A.M. Abd El-Aleem, S. H. Saber</i> | |
| Design And Development of A Computer Simulation Tool To Collect Data That Support Hybrid Travel Models Under Atis | 1864 |
| <i>M. Abdel-Aty, M. Abdalla</i> | |
| Calibration of A Florida Nested-Logit Mode-Choice Model | 1874 |
| <i>M. Abdel-Aty, H. Abdelwahab</i> | |
| Framework For Developing A Safety Evaluation Algorithm For Signalized Intersections In Abu Dhabi (Uae) Using Artificial Intelligence | 1885 |
| <i>Hussain Al-Harthei, Atef M. Garib, A. O. Abd El Halim</i> | |
| Towards Establishing an Overall Safety-Based Geometric Design Consistency Measure | 1895 |
| <i>M. Awatta, Y. Hassan</i> | |
| Development of A Methodology For Assessing The Technical And Economic Benefits of Asphalt Pavement Laboratory Equipment | 1905 |
| <i>S. Chan, S. L. Tighe</i> | |
| A Method For Measuring Impacts On Customers of A Subway Breakdown | 1915 |
| <i>Robert Chapleau</i> | |
| Multiple Uses of Large-Scale Origin-Destination Surveys, With A Totally Disaggregate Approach: The Montreal Experience | 1925 |
| <i>Robert Chapleau</i> | |
| Sustainable Transportation in Winnipeg | 1935 |
| <i>Allison Cook, Jennifer Malzer, Andrew Cowan, Alan Clayton</i> | |
| Asset Valuation Methodologies and Performance Measurement in Life-Cycle Analysis | 1943 |
| <i>Lynne Cowe Falls, Ralph Haas</i> | |
| Analytical Model For Intersection Sight Distance On 3D Highway Alignments | 1953 |
| <i>Essam Dabbour, Said Easa, Yasser Hassan, A. O. Abd El Halim</i> | |
| Optimum Vertical Curves For Highway Profiles using Nonlinear Optimization | 1965 |
| <i>Essam Dabbour, Kaarman Raahemifar, Said Easa</i> | |
| Safety of Direct Left-turns onto Major Arterials | 1974 |
| <i>S. Dissanayake, J. Lu, N. Castillo</i> | |

| | |
|--|-------------|
| Challenges of El Azhar Road Tunnels Project In Cairo | 1982 |
| <i>Dr. Eng Mokbel, M. El Shafie</i> | |
| The Challenges of The Underground Metro Projects In Egypt, Past, Present And Future | 1989 |
| <i>Dr. Eng Mokbel, M. El Shafie</i> | |
| Development of Deterioration Models For The Primary Highway Network In Alberta, Canada..... | 1997 |
| <i>Ashraf El-Assaly, Samuel T. Ariaratnam, Les Hempsey</i> | |
| Characterizing Bus Transit Passenger Waiting Times | 2007 |
| <i>Wei Fan, Randy B. Machemehl</i> | |
| A Microsimulation Model of Truck Speeds On Grades..... | 2017 |
| <i>John C Fry, Jeremy E Woolley, Michael A P Taylor</i> | |
| Vehicle Stability On Combined Horizontal And Vertical Alignments | 2027 |
| <i>G. Furtado, S.M. Easa, A.O. Abd El Halim</i> | |
| Long-Term Evaluation of The Gorham Roundabout | 2037 |
| <i>Per Gårder</i> | |
| Superpave Implementation Across Canada 1994-2001 | 2047 |
| <i>S. N. Goodman</i> | |
| Economic Analysis of Intermittent Passing Lane Geometric Design For Low Volume Rural Highways | 2056 |
| <i>D.D. Gransberg, E.Silay, I Karaca</i> | |
| ANALYSIS OF LAND USE IMPACTS OF THE YONGE AND UNIVERSITY Subway Lines In Toronto..... | 2065 |
| <i>Y. Grinspun, E.J. Miller</i> | |
| Le secteur des transports et le défi des changements climatiques au Quebec | 2075 |
| <i>Martin Hotte</i> | |
| Effect of Asphalt Concrete Raveling On Pavement Roughness..... | 2083 |
| <i>Hozayen Ahmed Hozayen</i> | |
| Laboratory Monitoring of Corrosion Rate In Portland Cement Concrete Specimens Subjected To Chloride Attack..... | 2093 |
| <i>M. E. Ismail, H. R. Soleymani</i> | |
| Current Status of Accelerated Flowable Fill in the Pavement Section..... | 2103 |
| <i>Adnan Javed, Weibert Lovencin, Fazil T. Najafi</i> | |
| Modèle D'évaluation Des Impacts Des Travaux Routiers Sur Les Usagers De La Route | 2112 |
| <i>J. K. Jones, K. G. Baass</i> | |
| The Disposal of Used Oil, Spilled Crude Oils And Their Associated Sorbent Materials..... | 2122 |
| <i>Michael T. Jones, Fazil T. Najafi</i> | |
| Contrôle De La Qualite Sur Les Matériaux Dans Les Couches De Chaussée (Revêtement Exclu)..... | 2132 |
| <i>Mariam Kassogue, Gilles Hebert, Michel Massiera</i> | |
| Performance of A Road Base Constructed With Shredded Rubber Tires | 2142 |
| <i>R. A. Khan, A. Shalaby</i> | |
| Evaluation of Typical Asphalt Paving Mixtures In Manitoba | 2152 |
| <i>T. Law, A. Shalaby, D. Watson, S. Hilderman, S. Kass</i> | |

| | |
|--|------|
| The Israeli Guide For Calculating The Surcharge Pressure Required For Pavement Structures Laid On Swelling Clay Soils | 2162 |
| <i>M. Livneh, N. A. Livneh</i> | |
| Are Laboratory Conditions Representative of Field Conditions? – A Closer Look At Grain Crushing. | 2172 |
| <i>M. S. Lowery, M. Zeghal</i> | |
| Precise Determination of Vessel Squat And Under-Keel Clearance | 2180 |
| <i>S. Michaud, B. Morse, R. Santerre, A. Taschereau, J. Siles</i> | |
| A Microsimulation Model of Urban Systems | 2189 |
| <i>E.J. Miller</i> | |
| Geotechnical Investigation of Pavements | 2195 |
| <i>C. Mirza</i> | |

VOLUME 5

| | |
|--|------|
| Comparing The Use of Artificial Neural Networks And Case-Based Reasoning In Modeling Bridge Deterioration. | 2205 |
| <i>G. Morcoux</i> | |
| Implications of Settlement Patterns On Travel Behaviours: A Totally Disaggregate Empirical Study In The Greater Montreal Area | 2214 |
| <i>Catherine Morency, Robert Chapleau,</i> | |
| Modelling of Concrete Pavement Dowel-Slab Interaction | 2224 |
| <i>Scott Murison, Ahmed Shalaby, Aftab A. Mufti</i> | |
| Ultra-Thin Whitetopping In Canada: State-Of-Practice | 2234 |
| <i>Scott Murison, Ahmed Shalaby</i> | |
| Current Status of Traffic Management At Workzones | 2243 |
| <i>Fazil T. Najafi, Jessica Davis</i> | |
| The Current Status of Roundabouts | 2248 |
| <i>F.T. Najafi, I. Jivacate</i> | |
| Assessing Inline Skating | 2255 |
| <i>J. C. Pernia, J. J. Lu, E. Birriel, T. A. Petritsch</i> | |
| Development of A C-LTPP Pavement Performance Model For Asphalt Overlays | 2263 |
| <i>C.M. Raymond, R.C. Haas, L. Rothenburg</i> | |
| Evaluation of Rutting Trends In The Big Quill Saskatchewan Reduced Tire Pressure Experiment | 2273 |
| <i>A. Reggin, A. Shalaby</i> | |
| Roundabout Studies In Kansas | 2283 |
| <i>E.R. Russell, G. Luttrell, M. Rys</i> | |
| A Statistical Approach For Winter Maintenance Operations: A Case Study For The City of Ottawa | 2293 |
| <i>A. Sherif, Y. Hassan, M. Alkoka</i> | |
| Serviceability Evaluation of The Primary Highways In Alberta | 2303 |
| <i>Hamid R. Soleymani, Thomas P. Keettikkal, Titov M. Igorevich</i> | |
| Visual Pattern Database (VIPD): New Understanding of The Sequences In Design And Construction | 2313 |
| <i>Ravi S. Srinivasan, Fazil T. Najafi, Prem A. Srinivasan, Kavitha Arunachalam, Jayasubha Lakshmanan</i> | |

| | |
|---|------|
| Correcting Roadway Lighting Designed By Luminance And Small Target Visibility Methods For Variations In Highway Geometry | 2319 |
| <i>R. Stempok, Gransberg, B K. Burkett</i> | |
| Current Status of The Development And Use of Portland Cement Concrete Performance Related Specifications | 2328 |
| <i>Rajarajan Subramanian, Fazil T Najafi</i> | |
| Les Chaussées En Béton De Ciment À Transports Québec | 2337 |
| <i>D. Thébeau</i> | |
| The Role of Safety In Asset Valuation | 2348 |
| <i>S. Tighe, L. Cowe Falls</i> | |
| Geographic Information System For Transportation Operations: Models And Specificity | 2358 |
| <i>M. Trépanier, R. Chapleau, B. Allard</i> | |
| Effects of Trip Generator Relocation: A Methodology Based On Household Surveys | 2368 |
| <i>M. Trépanier, R. Chapleau, B. Allard, C. Morency</i> | |
| Impacts of Freeway Accidents On Traffic Operations | 2378 |
| <i>A.R. Tsyganov, R.B. Machemehl</i> | |
| Cost And Time Overruns In Highway Construction | 2388 |
| <i>S. M. Vidalis, F.T. Najafi</i> | |
| Modern Roundabouts | 2398 |
| <i>Michael Wallwork, Sue Newberry</i> | |
| A Survey Study of Current Pavement-Related Truck Characteristics In Texas | 2402 |
| <i>Feng Wang, Randy B. Machemehl, Robert F. Inman, Zhanmin Zhang, C. Michael Walton</i> | |
| Investigation of Asphalt Pavement Rutting At Two Canadian Airfields | 2413 |
| <i>M. Wensel, A. Shalaby, M. Thiessen, V. Mah</i> | |

2nd Material Specialty Conference

| | |
|--|------|
| Interaction of Silica Fume And Polypropylene Fibers In High Performance Concrete | 2422 |
| <i>M. N. Abou-Zeid, E. H. Fahmy, M. T. Massoud</i> | |
| Corrosion of Concrete In Farm Buildings | 2432 |
| <i>Vivian F. Assaad, Jan C. Jofriet, Satish C. Negi, Gordon L. Hayward, Les J. Evans</i> | |
| Stress-Strain Behavior of Connections For Partially Composite Wood-Concrete Floors And Deck Systems | 2441 |
| <i>J. Balogh, M. Wieligmann, R. Gutkowski, P. Halle</i> | |
| Frost-Resistance of Concrete Incorporating Coarse Aggregates Made of Recycled Concrete | 2449 |
| <i>M.A. Bérubé, M. Angers, J. Frenette, B. Marquis</i> | |
| Impact Response of An Ultra-High Strength Cement Composite | 2459 |
| <i>V. Bindiganavile, N. Banthia, B. Aarup</i> | |
| Segmental Concrete Pavements For Municipal And Heavy Use Industrial Or Port Applications | 2468 |
| <i>R. J. Burak</i> | |
| La Mesure Du Module Complexe Des Enrobés Bitumineux | 2476 |
| <i>A. Carter, D. Perraton</i> | |

| | |
|---|------|
| Éléments De Réponse Face Aux Problèmes De Pompabilité Du Béton | 2486 |
| <i>F. Chapdelaine, D. Beaupré</i> | |
| Remote Monitoring of A Rehabilitated Concrete Highway Bridge – 5 Years of Results | 2494 |
| <i>D. Cusson, S. Qian, R. Glazer, T. Hoogeveen</i> | |
| Analyse Du Comportement De Resurfaçages Adhérents Utilisés Pour Réparer Des Dalles En Béton Armé | 2504 |
| <i>R. Gagné, M. Lemieux, M.-A. Guindon, A. Popic</i> | |
| Durability of Fibre–Optic Sensors In Rc Beams With External Frp Reinforcement | 2514 |
| <i>C. Gheorghiu, P. Labossière, A. Raïche</i> | |
| Diagnostic Et Reparation D’un Pont En Beton Arme | 2524 |
| <i>A. Guettala, S. Benmebarek</i> | |
| A New Composite Rod For The Reinforcement of Concrete | 2533 |
| <i>S.V. Hoa</i> | |
| A Truck Terminal Built for the Future | 2543 |
| <i>D.S. Hopkins, R.E. Munro, R. Parizeau, S. Nathanson. Muirhead</i> | |
| L’expérience Du Ministère Des Transports Du Québec Avec Le Béton Autoplaçant (1997-2001) | 2549 |
| <i>A. Hovington</i> | |
| Determine Steel Properties For Large Strain From A Standard Tension Test | 2556 |
| <i>H.A. Khoo, J.J.R. Cheng, T.M. Hruday</i> | |
| Steel Fibers Reinforced Concrete For Slabs On Ground: From Knowledge To Application | 2566 |
| <i>Luc Lemoyne</i> | |
| Formulation Optimale Du Remblai Sans Retrait | 2576 |
| <i>Claude Lupien, Richard Gagné, Yanick Martin</i> | |
| Trends In Coal Combustion Products (CCP) Use In North America | 2586 |
| <i>J.H. Maclean</i> | |
| Mechanical Properties of Heavyweight, High Strength Concrete | 2587 |
| <i>M. Mahdy, P.R.S. Speare, A. H. Abdel-Reheem</i> | |
| Fatigue Properties of Heavyweight, High Strength Concrete | 2596 |
| <i>M. Mahdy, P.R.S. Speare, A. H. Abdel-Reheem</i> | |
| Shielding Properties of Heavyweight, High Strength Concrete | 2606 |
| <i>M. Mahdy, P.R.S. Speare, A. H. Abdel-Reheem</i> | |
| Predicting The Performance of Concrete Structures Exposed To Chemically Aggressive Environments - Field Validation | 2616 |
| <i>J. Marchand, E. Samson, Y. Maltais, R.J. Lee</i> | |
| Effects of FRP Wrapping On The Bond Strength of Corroded Steel Reinforcing Bars | 2629 |
| <i>Stanley Ng, Brent C. Craig, Khaled A. Soudki</i> | |
| Ultra-High Performance Concrete, With Ductility | 2638 |
| <i>Henry Nowodworski, Kris Rosiak</i> | |
| Innovative Design For Manure Storage Facilities | 2647 |
| <i>M. Onofrei, A.A. Mufti, M.G. Britton, A. Bogdanovic</i> | |
| The Effect of Polypropylene Films On The Durability of Concrete | 2659 |
| <i>A.E. Richardson, J. Knapton</i> | |

| | |
|--|------|
| La caractérisation et l'application du module réversible des matériaux granulaires de chaussée au ministère des Transports du Québec..... | 2669 |
| <i>C. Robert, F. Doucet, D. St-Laurent</i> | |
| The Role of Polymer Additives In Extrusion of Fiber-Cement Composites..... | 2679 |
| <i>Yixin Shao, Jun Qiu</i> | |
| What Is The Most Efficient Way To Activate The Reactivity of Fly Ashes? | 2687 |
| <i>Caijun Shi, Yixin Shao</i> | |
| Using Fly Ash And Slag To Improve The Stabilization Properties of Cement Waste Forms | 2697 |
| <i>Roger Spence, John Barton</i> | |
| Formulation D'un Enrobé Bitumineux Coloré Pour Le Québec Et Performance En Laboratoire | 2705 |
| <i>M. St-Jacques, M. Bertrand</i> | |
| Revêtements Colorés: Expériences Françaises Et Développement Possible Au Canada | 2714 |
| <i>M. St-Jacques, Y. Brosseaud</i> | |
| Quantitative Assessment of Impact of Layer Moduli On Surface Deflections | 2724 |
| <i>D. F. Stolle, M. Pavini</i> | |
| Penetration Resistance of Hybrid Fibre Reinforced Concrete Under Low Velocity Impact Loading..... | 2733 |
| <i>Piti Sukontasukkul, Sidney Mindess, Nemkumar Banthia</i> | |
| État De La Situation De La Signalisation Horizontale Au Quebec | 2742 |
| <i>Michel Tremblay</i> | |
| Effect of Elongated Particles On The Resilient Modulus of Mineral Aggregates..... | 2752 |
| <i>Morched Zeghal, Walaa E. I. Khogali</i> | |

Author Index