

American Society of Civil Engineers

# Structures Congress 2008: Crossing Borders

And 18<sup>th</sup> Analysis and Computation  
Specialty Conference

April 24-26, 2008  
Vancouver, British Columbia, 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](http://www.proceedings.com)

ISBN: 978-1-60560-349-0

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

## Copyright and Disclaimer

Any statements expressed in these materials are those of the individual authors and do not necessarily represent the views of ASCE, which takes no responsibility for any statement made herein. No reference made in this publication to any specific method, product, process or service constitutes or implies an endorsement, recommendation, or warranty thereof by ASCE. The materials are for general information only and do not represent a standard of ASCE, nor are they intended as a reference in purchase specifications, contracts, regulations, statutes, or any other legal document.

ASCE makes no representation or warranty of any kind, whether express or implied, concerning the accuracy, completeness, suitability, or utility of any information, apparatus, product, or process discussed in this publication, and assumes no liability therefore. This information should not be used without first securing competent advice with respect to its suitability for any general or specific application. Anyone utilizing this information assumes all liability arising from such use, including but not limited to infringement of any patent or patents.

Copyright © 2008 by the American Society of Civil Engineers.  
All Rights Reserved.

ASCE and American Society of Civil Engineers—Registered in U.S. Patent and Trademark Office.

American Society of Civil Engineers  
ASCE International Headquarters  
1801 Alexander Bell Drive  
Reston, VA 20191-4400 USA

Call Toll-Free in the U.S.: 1-800-548-2723 (ASCE)  
Call from anywhere in the world: 1-703-295-6300  
Internet: <http://www.pubs.asce.org>

This product was produced for the American Society of Civil Engineers by Omnipress.

Duplication of this product and its content in print or digital form for the purpose of sharing with others is prohibited without permission from the American Society of Civil Engineers.

### *Photocopies and reprints.*

You can obtain instant permission to photocopy ASCE publications by using ASCE's online permission service ([www.pubs.asce.org/authors/RightslinkWelcomePage.html](http://www.pubs.asce.org/authors/RightslinkWelcomePage.html)). Requests for 100 copies or more should be submitted to the Reprints Department, Publications Division, ASCE, (address above); email: [permissions@asce.org](mailto:permissions@asce.org). A reprint order form can be found at [www.pubs.asce.org/authors/reprints.html](http://www.pubs.asce.org/authors/reprints.html).

In no event will ASCE, Omnipress or its suppliers be liable for any consequential or incidental damages to your hardware or other software resulting from the installation and/or use of this product.

No part of the product navigation and "Help" files may be reproduced or used without written permission from Omnipress.

© 2007 Omnipress - All rights reserved.

American Society of Civil Engineers

Structures Congress 2008: Crossing Borders

## TABLE OF CONTENTS

### Volume 1

<b>Assessment of the Fatigue Threshold of Welded Details Subjected to Post-Weld Ultrasonic Impact Treatment</b> .....	1
<i>Sougata Roy, John W. Fisher</i>	
<b>Fatigue Analysis of Needle Peened Welds under Variable Amplitude Loading Conditions</b> .....	11
<i>Scott Walbridge</i>	
<b>Fatigue Enhancement of Welded Coverplates Using Carbon-Fiber Composites</b> .....	21
<i>Benjamin Kaan, Ron Barrett, Caroline Bennett, Adolfo Matamoros, Stan Rolfe</i>	
<b>Fatigue Resistance Enhancement and Residual Stress Modification of Welded Steel Structures by Various Post-Weld Treatments</b> .....	29
<i>Xiaohua H. Cheng, Ben T. Yen, John W. Fisher</i>	
<b>Experienced Gained and Lessons Learned from an Extensive Bridge Monitoring Research Project</b> .....	39
<i>Brent Vaughn, Brad Cross, Nader Panahshahi</i>	
<b>Problem Diagnosis and Retrofit of Lateral Bracing System of a Truss Bridge</b> .....	49
<i>Y. Edward Zhou, Amy Eitel Biegalski</i>	
<b>Results of In-Service Monitoring of a Sample of Typical Highway Bridges</b> .....	58
<i>Michael Rakowski, Brianna Brookes, Michael J. Chajes, Harry W. Shenton III</i>	
<b>Utilization of Strong Motion Accelerometers for Real Time Monitoring of Structural Properties</b> .....	64
<i>Marvin W. Halling, Zachary C. Hansen, Paul J. Barr, David Marchant</i>	
<b>Effect of Flexural Ductility on Shear Capacity</b> .....	71
<i>Rachel Howser, A. Laskar, Y. L. Mo</i>	
<b>One-Way Shear in Wide Concrete Beams with Narrow Supports</b> .....	80
<i>Adam S. Lubell, Evan C. Bentz, Michael P. Collins</i>	
<b>Recent Changes to Concrete Shear Strength Provisions of AASHTO-LRFD Bridge Design Specifications</b> .....	90
<i>Neil Hawkins, Daniel Kuchma</i>	
<b>Size and Scale Effects on the Shear Strength of Concrete Beams</b> .....	98
<i>Lesley H. Sneed, Julio A. Ramirez</i>	
<b>Designing Timber Bridge Superstructures: A Comparison of US and Canadian Bridge Codes</b> .....	100
<i>James "Scott" Groenier, James P. Wacker</i>	
<b>Feasibility of Rehabilitating Timber Bridges Using Mechanically Fastened FRP Strips</b> .....	109
<i>Alyssa E. Schorer, Lawrence C. Bank, Michael G. Oliva, James P. Wacker, Douglas R. Rammer</i>	
<b>FHWA's Covered Bridge Manual—Focused on Engineering and Construction</b> .....	119
<i>Phillip Pierce</i>	
<b>Sioux Narrows Bridge—Context Sensitive Replacement of a Heritage Timber Truss Bridge</b> .....	131
<i>Reno Radolli, Raymond Krisciunas</i>	
<b>Distributed Model Updating in Smart Wireless Monitoring Systems</b> .....	141
<i>Andrew Zimmerman, Jerome P. Lynch</i>	

<b>Suitability of Nondestructive Testing Methods for Structural Health Monitoring of Civil Infrastructures</b> .....	149
<i>Sreenivas Alampalli, Mohammed Ettouney</i>	
<b>Demolition of the Grace Memorial and Silas N. Pearman Bridges over Cooper River, South Carolina, USA—A Case Study</b> .....	155
<i>Sarbjeet Singh, Mehrdad Mirzakashani, Abdol Hagh</i>	
<b>Innovative Methods Used in the Design and Construction of the New Tacoma Narrows Bridge</b> .....	165
<i>Jeff A. Lavinder, Thomas Spoth</i>	
<b>Rapid Replacement of the Back River Bridge</b> .....	167
<i>Joseph E. Krajewski</i>	
<b>Structural Condition Assessment of the Herbert C. Bonner Bridge in Dare County, North Carolina</b> .....	172
<i>Mark Moore, Travis Green, Ted Bartelt</i>	
<b>A System for Rapid Precast Deck Construction</b> .....	182
<i>Hugh D. Ronald, Don Theobald</i>	
<b>Comparative Assessment with Detailed Models of Sliding versus Elastomeric Seismic Isolation in Typical Multi-Span Bridges</b> .....	188
<i>Murat Eröz, Reginald DesRoches</i>	
<b>Extending the Service Life of Bridges Using CFRP Laminates and Continuous Decks</b> .....	200
<i>Adel El-Safty</i>	
<b>Fatigue and Ultimate Testing Comparison of Two Fiber Reinforced Polymer Bridge Decks</b> .....	210
<i>David L. Brown, Jeffrey W. Berman</i>	
<b>Strengthening of Orthotropic Bridge Decks by SPS Technology</b> .....	217
<i>Gero A. Marzahn, Markus Hamme</i>	
<b>New Innovative Features of Maine’s First Cable Stay Bridge</b> .....	226
<i>Christopher J. Burgess</i>	
<b>Software Tool for Wind Design of Cable Stayed Bridges</b> .....	230
<i>Dorian Janjic, Johann Stampler, Andreas Domaingo</i>	
<b>The Golden Ears Bridge in Vancouver, BC</b> .....	240
<i>Don W. Bergman, Dusan Radojevic, Hisham Ibrahim</i>	
<b>Toledo’s I-280 Veterans’ Glass City Skyway: A Precast Concrete Landmark Bridge</b> .....	244
<i>Wade S. Bonzon</i>	
<b>A Reverse Curve Cable Stay Bridge in Jordan</b> .....	254
<i>C. Sankaralingam, S. Balaji</i>	
<b>Developments in Australasia in Precast Concrete Bridge Beam Technology</b> .....	262
<i>David Lloyd</i>	
<b>Non-Destructive Strength Evaluation of a Continuous, Reinforced Concrete Slab Bridge</b> .....	272
<i>David V. Jáuregui, Alicia Licon-Lozano</i>	
<b>The Effect of Temperature on the Effective Prestressing Force at Release for PCBT Girders</b> .....	274
<i>Charles Newhouse, Timothy Wood</i>	
<b>Experimentally Determined Continuous Displacement Influence Lines for Bridges</b> .....	284
<i>Jun Huang, Harry W. Shenton III</i>	
<b>Response of an Integral Abutment Bridge to Temperature Variations</b> .....	294
<i>Samir N. Shoukry, Gergis W. William, Mourad Y. Riad</i>	

<b>Seismic Monitoring of British Columbia Bridges</b> .....	304
<i>Sharlie Huffman</i>	
<b>Use of Wireless Sensors for Timber Trestle Railroad Bridges Health Monitoring Assessment</b> .....	315
<i>Fernando Moreu, Tomonori Nagayama</i>	
<b>Assessment of Seismic Retrofit Measures for Bridge Bearings</b> .....	323
<i>Monique C. Hite, Siddharth Srivastava</i>	
<b>Seismic Analysis and Parametric Study for a Continuous Seven Spans Post-Tensioned Bridge in Quito, Ecuador</b> .....	329
<i>Sameh Salib, Maged Ibrahim</i>	
<b>Performance Based Seismic Design for Movable Bridges</b> .....	335
<i>Beile Yin</i>	
<b>Seismic Retrofit of Bridge Columns Using Innovative Wrapping Technique</b> .....	344
<i>Bassem Andrawes, Moochul Shin</i>	
<b>Which Ground Motion Intensity Measure Is Most Appropriate for Conditioning Demand Models for Bridge Portfolios?</b> .....	354
<i>Jamie E. Padgett, Bryant G. Nielson, Reginald DesRoches</i>	
<b>Composite Steel Joists—Case Histories</b> .....	364
<i>Bob Steckel, Patrick L. Eagan</i>	
<b>An Introduction to Composite Steel Joists—Research and Behavior</b> .....	369
<i>David Samuelson, Perry S. Green</i>	
<b>SJI First Edition CJ-Series Standard Specifications for Composite Steel Joists, Weight Tables, Bridging Tables, and Code of Standard Practice—A Brief Overview</b> .....	376
<i>Perry S. Green, Michael Winarta</i>	
<b>Evaluation of Practical Methods for Analysis of Reinforced Concrete Walls</b> .....	385
<i>B. Doepker, L. N. Lowes, D. E. Lehman</i>	
<b>Modeling of Damaged Shear Walls for Post-Event Collapse Analysis</b> .....	395
<i>Yihai Bao, Sashi Kunnath, H. S. Lew</i>	
<b>Overview and Key Concepts of the ATC-63 Methodology</b> .....	401
<i>Charles A. Kircher, Jon A. Heintz</i>	
<b>ATC 63 Methodology for Evaluating Seismic Collapse Safety of Archetype Buildings</b> .....	411
<i>Gregory G. Deierlein, Abbie B. Liel, Curt B. Haselton, Charles A. Kircher</i>	
<b>Example Evaluation of the ATC-63 Methodology for Reinforced Concrete Special Moment Frame Buildings</b> .....	421
<i>Curt B. Haselton, Abbie B. Liel, Gregory G. Deierlein</i>	
<b>Example Evaluation of the ATC-63 Methodology for Wood Light-Frame System</b> .....	431
<i>Andre Filiatrault, Ioannis P. Christovasilis</i>	
<b>Design Guideline for Rounded Dovetail Connections</b> .....	441
<i>Thomas Tannert, Frank Lam</i>	
<b>Horizontal Joint Reinforcement Requirements for Brick Veneer in Seismic Design Categories E and F</b> .....	448
<i>Jocelyn Dickie, Scott Schiff</i>	
<b>Shear Capacity of FRP Stirrups in FRP-Reinforced Concrete Beams Based on Genetic Algorithms Approach</b> .....	458
<i>Hassan El Chabib, Moncef Nehdi</i>	
<b>Stability Analysis of Eccentrically Loaded Wood Beam-Columns</b> .....	467
<i>Xiaobin Song, Frank Lam</i>	

<b>Toward a Unified Approach to Anchorage in Reinforced Concrete Design</b> .....	473
<i>John F. Silva</i>	
<b>Behavior and Design of Anchorages for Unbonded Post-Tensioning Strands in Seismic Regions</b> .....	475
<i>Kevin Q. Walsh, Yahya C. Kurama</i>	
<b>Ductility Requirements for the Anchorage of Nonstructural Components</b> .....	485
<i>John F. Silva, Matthew S. Hoehler</i>	
<b>Inelastic Cyclic Testing of the Kaiser Bolted Bracket Moment Connection</b> .....	493
<i>Scott M. Adan, William Gibb</i>	
<b>Fire Performance of Reinforced Concrete Beams under Design Fire Exposure</b> .....	503
<i>Venkatesh Kodur, Monther Dwaikat</i>	
<b>Modeling High-Rise Steel Framed Buildings under Fire</b> .....	513
<i>Spencer E. Quiel, Maria E. M. Garlock</i>	
<b>Modeling the Behavior of Structural Columns under Fire Loading Effects</b> .....	523
<i>Anil Agarwal, Amit H. Varma</i>	
<b>Structural Performance of Stud Walls under Normal and Post-Earthquake Fire Exposure</b> .....	534
<i>Hany Yassin, Ashutosh Bagchi, Venkatesh Kodur</i>	
<b>Cyclic Testing and Modeling of Cold-Formed Steel—Special Bolted Moment Frame Connections</b> .....	543
<i>Chia-Ming Uang, Jong-Kook Hong, Atsushi Sato, Ken Wood</i>	
<b>Establishment of Capacity Design Requirements for Cold-Formed Steel—Special Bolted Moment Frames</b> .....	552
<i>Atsushi Sato, Chia-Ming Uang</i>	
<b>Overview of the Standard for Seismic Design of Cold-Formed Steel Structural Systems—Special Bolted Moment Frames</b> .....	562
<i>Helen Chen, Chia-Ming Uang, Reidar Bjorhovde, Bonnie Manley</i>	
<b>Bracing Connections</b> .....	569
<i>William A. Thornton, Larry S. Muir</i>	
<b>Design of Conventional- and Extended-Single-Plate Connections: AISC’s New Design Procedures</b> .....	577
<i>Christopher M. Hewitt</i>	
<b>Numerical Evaluation of New Reduced Beam Section Moment Connection</b> .....	582
<i>Ali Imanpour, Rasoul Mirghaderi, Farhad Keshavarzi, Bardia Khafaf</i>	
<b>State-of-the-Art Analysis of Frames with Reduced Beam Section Connections</b> .....	592
<i>Tony C. Bartley, Janice J. Chambers</i>	
<b>Steel Connection Design for Structural Integrity</b> .....	602
<i>Ronald O. Hamburger, Kurt Gustafson, Ned L. Cleland</i>	
<b>Dormant Curtain Wall Anchors: Relative Stiffness Oversights</b> .....	611
<i>Mark Schmidt, David Dunkman</i>	
<b>Durability Considerations in the Design of Stone Facades</b> .....	620
<i>Gabriel A. Jimenez</i>	
<b>Height Restrictions for Brick Veneer on Wood Frame Backing</b> .....	629
<i>Jocelyn Dickie, Scott Schiff</i>	
<b>Water Penetration of Debris-Impacted Residential Wall Cladding Systems</b> .....	635
<i>Warren Rohloff, Scott Schiff, Denis Brosnan</i>	
<b>An All Glass Cube in New York City</b> .....	645
<i>James O’Callaghan, Graham Coult</i>	

<b>Glass Bearing Walls—A Case Study and Further Development</b> .....	651
<i>Mark DuBois, David Shea</i>	
<b>Current Safety Acceptance Criteria in Codes and Standards—A Critical Review</b> .....	660
<i>Dimitris Diamantidis</i>	
<b>Development of a Bridge Live Load Model for Serviceability Limit States</b> .....	668
<i>Mayrai Gindy, Hani Nassif</i>	
<b>Structural Reliability: Rational Tools for Design Code Development</b> .....	673
<i>Sofia M. C. Diniz</i>	
<b>Use of Simulation in Structural Reliability</b> .....	683
<i>Fabio Biondini</i>	
<b>Behavior of Torsional Effects of Asymmetric Pyramid Shape High Rise Building in Seismic Zone</b> .....	691
<i>Bardia Khafaf, Rasoul Mirghaderi, Ali Imanpour, Farhad Kheshavarz</i>	

## Volume 2

<b>Design Compression Forces for Coupled Wall Structures</b> .....	700
<i>Patrick J. Fortney, Kent A. Harries, Bahram M. Shahrooz</i>	
<b>Design of a Residential Tower on Top of an Existing Parking Garage</b> .....	709
<i>Adam Abbes Yala, Ken Maschke, Kevin Jackson</i>	
<b>Structural Design Challenges for Plaza 66 Tower 2</b> .....	717
<i>Dennis C. K. Poon, Ling-en Hsiao, Steve Zuo, Yi Zhu</i>	
<b>Axial Restraint in Diagonally Reinforced Concrete Coupling Beams: An Analytical Investigation</b> .....	730
<i>Owen J. Bower, Gian A. Rassati</i>	
<b>Design of the Tallest Reinforced Concrete Structure in California—A 58-Story Residential Tower in San Francisco</b> .....	741
<i>Derrick D. Roorda, Nicolas J. Rodrigues</i>	
<b>Effects of Geometry on the Wind Response of Super-Tall Towers</b> .....	750
<i>Peter Irwin</i>	
<b>One Rincon Hill: Raising the Bar</b> .....	753
<i>Ron Klemencic, John Hooper, Ola Johansson</i>	
<b>Specifying High Performance Concrete for the Trump Tower: Chicago</b> .....	764
<i>William Baker, Stan Korista, Dane Rankin, Robert Sinn</i>	
<b>Waterview Tower: Finding the Right High-Strength Concrete Mix</b> .....	772
<i>Keith Mueller, Todd Ude, Thomas Suarez, R. Shankar Nair</i>	
<b>Agent Based Simulation of Human Movements during Emergency Evacuations of Facilities</b> .....	782
<i>Joseph L. Smith, James T. Brokaw</i>	
<b>Blast Resistant Design Using Advanced, State-of-the-Art Materials</b> .....	792
<i>Peter DiMaggio, Matt Kmetz</i>	
<b>Retrofit of Masonry Walls to Enhance Their Blast Resistance</b> .....	797
<i>John E. Crawford, Kenneth B. Morrill, Joseph M. Magallanes, Youcai Wu</i>	
<b>Utilizing Front Wall of Blast Resistant Building as an Entrance Fuse of Energy</b> .....	807
<i>Behzad Pilehchianlangroodi, Alireza Mirmezami, Abbas Ali Zakeri</i>	
<b>Assessment of Progressive Collapse Residual Capacity Using Pushdown Analysis</b> .....	817
<i>Kapil Khandelwal, Sherif El-Tawil</i>	
<b>Evaluation of Building with Severe Impact Damage: The Banker's Trust Building</b> .....	825
<i>Benjamin Wisniewski, David B. Peraza</i>	

<b>Progressive Collapse Analysis and Retrofit Design Using the Unified Facilities Criteria</b> .....	832
<i>Nathan C. Gould, Ben F. Harrison</i>	
<b>Progressive Collapse Analysis of a Steel Building with Pre-Northridge Moment Connections</b> .....	838
<i>Rupa Purasinghe, Cuong Nguyen, Kenneth Gebhart</i>	
<b>Unified Progressive Collapse Design Requirements for DOD and GSA</b> .....	848
<i>David Stevens, Brian Crowder, Bruce Hall, Kirk Marchand</i>	
<b>Behavior and Design of Intermediate HBE in Steel Plate Shear Walls</b> .....	858
<i>Bing Qu, Michel Bruneau</i>	
<b>Behaviour of Steel Plate Shear Walls with Composite Columns</b> .....	866
<i>Xiaoyan Deng, Mehdi Dastfan, Robert G. Driver</i>	
<b>Experimental Responses of Four 2-Story Narrow Steel Plate Shear Walls</b> .....	876
<i>Chou-Hsien Li, Keh-Chyuan Tsai</i>	
<b>Research Needs and Future Directions for Steel Plate Shear Walls</b> .....	886
<i>Jeffrey W. Berman, Laura N. Lowes, Taichiro Okazaki, Michel Bruneau, Keh-Chyuan Tsai, Robert G. Driver, Rafael Sabelli</i>	
<b>Retrofit of a Critical Care Facility in Los Angeles with Steel Plate Shear Walls</b> .....	896
<i>R. Jay Love, Kent Yu, Sean McNeill, Daniel Zepeda</i>	
<b>Application for the Rehabilitation of Seismically Deficient Reinforced Concrete Building 'Les Brises du Fleuve V'</b> .....	903
<i>Louis Crépeau, Éric Martin</i>	
<b>Steel Plate Shear Walls in the Upcoming 2010 AISC Seismic Provisions and 2009 Canadian Standard S16</b> .....	911
<i>Rafael Sabelli, Michel Bruneau, Robert G. Driver</i>	
<b>Experimental and Analytical Studies of a Steel Plate Shear Wall System</b> .....	921
<i>QiuHong Zhao, Abolhassan Astaneh-Asl</i>	
<b>Lateral Stiffness of Steel Shear Wall Systems</b> .....	931
<i>Yongjiu Shi, Abolhassan Astaneh-Asl</i>	
<b>Seismic Loading Behavior of Thin Steel Plate Walls</b> .....	941
<i>Mahmoud Rezai, Carlos E. Ventura</i>	
<b>Tests of Two Three-Story Ductile Steel Plate Shear Walls</b> .....	950
<i>Saied Sabouri-Ghomi, Majid Gholhaki</i>	
<b>Bridging of Open-Web Steel Joists and Joist Girders</b> .....	961
<i>Perry S. Green, Tim Holtermann</i>	
<b>Stability Bracing of Beams by Shear Diaphragms</b> .....	973
<i>Todd A. Helwig, Joseph A. Yura</i>	
<b>Use of Stability Braces in Floor System</b> .....	979
<i>Robert P. Krumpen III, Kristin Santamont</i>	
<b>Experimental Investigation of the Cyclic Behavior of Concrete Frame Joints Reinforced with Double-Headed Studs</b> .....	987
<i>Hatem Ibrahim, Mamdouh Elbadry</i>	
<b>Steel Reinforced Polymers Enhance Strength and Ductility of Beam-Column Joints under Seismic Loads</b> .....	997
<i>Ridvan Izi, Mamdouh Elbadry, Hatem Ibrahim</i>	
<b>Seismic Performance of Gravity Load Designed Reinforced Concrete Frames with Unreinforced Masonry Infill Walls</b> .....	1007
<i>Jose Centeno, Carlos Ventura, Simon Foo, Otton Lara</i>	

<b>Dynamic Characteristics of Tall Buildings in Vancouver, Canada</b> .....	1020
<i>Martin Turek, Carlos E. Ventura, Katherine Thibert</i>	
<b>Overview of the Bridging Guidelines for the Seismic Retrofit of BC Schools</b> .....	1030
<i>Timothy W. White, Graham W. Taylor, Carlos E. Ventura, William D. Finn</i>	
<b>Confederation Bridge Ice Force Monitoring</b> .....	1043
<i>Thomas Brown</i>	
<b>Structural Monitoring System for Assessing the Long-Term Behaviour of the Confederation Bridge</b> .....	1053
<i>Jian Huang, John Newhook</i>	
<b>Evaluation of Temperature Data of Confederation Bridge: Thermal Loading and Movement at Expansion Joint</b> .....	1063
<i>Dongning Li, Marc A. Maes, Walter H. Dilger</i>	
<b>Wind Engineering for the Confederation Bridge</b> .....	1073
<i>J. Peter C. King, Bilal Bakht, F. Michael Bartlett</i>	
<b>Bridges in Urban and Metropolitan Areas</b> .....	1082
<i>Juan A. Sobrino</i>	
<b>Seismic Design for the Sustainable City: A Report on Japanese Practice</b> .....	1092
<i>Akira Wada, Nobuyuki Mori</i>	
<b>Concrete Bridges Form and Function: Sungai Prai Bridge, Malaysia</b> .....	1100
<i>S. Srinivasan, Gopal Srinivasan</i>	
<b>Timber Engineered for C21 Architecture</b> .....	1108
<i>Michael Dickson, Richard Harris</i>	
<b>Bridge Design for Extreme Conditions</b> .....	1118
<i>David Harvey</i>	
<b>Comparative Studies of the Structural Fire Engineering Design of Steel and Composite Structures</b> .....	1128
<i>Roger Plank</i>	
<b>The Brighton i360 Viewing Tower Project</b> .....	1138
<i>John M. Roberts</i>	
<b>Application of Contemporary Structural Building Codes to Antiquated Materials</b> .....	1146
<i>Conrad Paulson</i>	
<b>ASCE-31 and ASCE-41: What Good Are They?</b> .....	1149
<i>Gary R. Searer, Terrence F. Paret, Sigmund A. Freeman</i>	
<b>Is the International Existing Building Code Morally Defensible?</b> .....	1157
<i>Gary R. Searer, Terrence F. Paret</i>	
<b>Pioneer Square Areaways</b> .....	1168
<i>Samir Chudgar</i>	
<b>Probabilistic Descriptions of In-Situ Roof to Top Plate Connections in Light Frame Wood Structures</b> .....	1170
<i>Bagyalakshmi Shanmugam, Bryant G. Nielson, David O. Prevatt</i>	
<b>Experimental Seismic Investigation of a Full-Scale Woodframe Building</b> .....	1180
<i>Andre Filiatrault, Ioannis P. Christovasilis, Assawin Wanitkorkul</i>	
<b>Gypsum Wall Damage Investigation</b> .....	1190
<i>Kurt McMullin, Dan Merrick</i>	
<b>Performance of Drywall Shear Walls: UC Irvine Tests</b> .....	1199
<i>Gary C. Hart, Ayse Hortacsu, Can Simsir, Anurag Jain</i>	
<b>Woodframe Seismic Response Analysis—Benchmarking with Buildings Damaged during the Northridge Earthquake</b> .....	1209
<i>John D. Osteraas, Akshay Gupta, Morgan Griffith, Brian McDonald</i>	

<b>Structural Identification of Constructed Systems: An Integrated Approach by the ASCE Committee</b> .....	1219
<i>F. Necati Catbas, Franklin L. Moon, A. Emin Aktan</i>	
<b>Analytical Modeling and Parameter Identification</b> .....	1228
<i>Ian F. C. Smith, Hae-Bum Yun</i>	
<b>Structural Identification of Constructed Systems: Experimental Considerations</b> .....	1238
<i>James M. W. Brownjohn, Y. Fujino, D. Inaudi, Z. Wu</i>	
<b>System Identification of Constructed Facilities: Challenges and Opportunities across Hazards</b> .....	1251
<i>Tracy Kijewski-Correa, Ertugrul Taciroglu, James L. Beck</i>	
<b>Current Programs in American Post-Secondary Wood Design Education</b> .....	1261
<i>Robert J. Taylor, Debra Larson</i>	
<b>Faculty Lead Study Abroad: Wood Engineering in Sweden</b> .....	1263
<i>Sutton F. Stephens</i>	
<b>Pedagogic Strategies for Wood Engineering in an Interdisciplinary Setting</b> .....	1272
<i>Peggi Clouston</i>	
<b>The Changing Nature of Students and Universities: Opportunities for Timber Engineering Education in the U.S.</b> .....	1277
<i>Steven M. Cramer, Dan L. Wheat, Robert J. Taylor</i>	
<b>Wood Education in Civil Engineering—The View from Lake Superior</b> .....	1283
<i>William M. Bulleit</i>	
<b>Developing a Computer Assisted Multi-Disciplinary Decision Making Platform</b> .....	1290
<i>Jason Charalambides</i>	
<b>Engineers Teaching Structural Principles to Architecture Students</b> .....	1300
<i>Ken Maschke, Mark Koenigs</i>	
<b>How a Collaborative Architecture Influences Structural Engineering Education</b> .....	1309
<i>Keith E. Hedges, Anthony S. Denzer</i>	
<b>Preparing Graduates to be Effective Contributors in a Structural Engineering Office</b> .....	1319
<i>Nathan C. Gould, Phillip L. Gould</i>	
<b>Air-Blast Failure Criteria for Columns Using Finite Element Methods</b> .....	1324
<i>Arturo Montalva, Jessica Godinho, Shalva Marjanishvili</i>	
<b>Mathematical Simulation of 50-Year Snow Drift Loads</b> .....	1334
<i>John Cocca, Michael O'Rourke</i>	
<b>Response of a Low Rise Steel Building to Air Blast</b> .....	1343
<i>Young Seo Hwang, James C. Anderson</i>	
<b>Inelastic Dynamic Finite-Element Design of Bollard Systems to Impact Loading</b> .....	1355
<i>Huston Dawson, Darren Tennant</i>	
<b>Inelastic Dynamic Finite-Element Design of Glazed Facade Systems for Blast Loading</b> .....	1365
<i>Ross Cussen, Peggy Van Eepoel</i>	
<b>Background to the Environmental Wind Engineering Committee</b> .....	1376
<i>Richard Aynsley</i>	
<b>Background to the Structural Wind Engineering Committee</b> .....	1380
<i>Leighton Cochran</i>	
<b>Creation of the ASCE Technical Council on Wind Engineering</b> .....	1383
<i>Nicholas P. Jones</i>	
<b>Cross-Border Connections: Guideline Documents, Codes, and Standards for Wind</b> .....	1385
<i>P. A. Irwin</i>	

<b>Cross-Border Wind Engineering Contributions: ASCE 7—A Case-in-Point</b> .....	1388
<i>Ted Stathopoulos</i>	
<b>Wind Driven Rain Forces on Buildings and Structures</b> .....	1395
<i>Charles R. Norman</i>	

### Volume 3

<b>Wind Speed Analysis of Greensburg, KS Tornado</b> .....	1411
<i>William L. Coulbourne</i>	
<b>Wind-Driven Rain as a Design Parameter</b> .....	1420
<i>Joel Wolf, Morgan Griffith</i>	
<b>Cable-Stayed Façade Structure with Welded Borosilicate Glass Tubes</b> .....	1427
<i>Freek Bos, Cecile Giezen, Fred Veer, Christian Louter</i>	
<b>Detailing Evaluation of Existing Concrete Structures</b> .....	1437
<i>Javeed Munshi</i>	
<b>Using Acoustic Emissions to Detect Damage in Historical Stone Masonry</b> .....	1444
<i>Jack C. Healy</i>	
<b>Structural Elegance</b> .....	1454
<i>Richard R. Bradshaw</i>	
<b>The Life and Works of Eero Saarinen</b> .....	1463
<i>Ronald Shaeffer</i>	
<b>The Role of Aesthetics in Bridge Design</b> .....	1472
<i>Santiago Rodriguez</i>	
<b>Sustainability Attributes of Bio-Based Structural Building Products</b> .....	1474
<i>Kenneth E. Bland, David S. Gromala, Robert T. Brooks</i>	
<b>Sustainable High Performance Concrete Buildings</b> .....	1482
<i>Iyad (Ed) M. Alsamsam, Lionel Lemay, Martha G. VanGeem</i>	
<b>The Structural Engineer’s Role in Selecting Sustainable Materials: The Steel Industry’s Perspective</b> .....	1493
<i>Don Allen, Christopher Hewitt</i>	
<b>Structural Testing of High Thermal Mass Walls Used in Sustainable Designs</b> .....	1501
<i>Ali M. Memari, Steve V. Grossenbacher, Lisa D. Iulo</i>	
<b>The Basics of Life Cycle Assessment (LCA) for Structural Engineers</b> .....	1510
<i>Stephen G. Buonopane</i>	
<b>Design by Analysis of Innovative Navigation Structures</b> .....	1517
<i>Kerry T. Slattery, Guillermo A. Riveros</i>	
<b>Dynamic Nonlinear Finite Element Analysis of Blast Resistant Concrete Buildings in Petrochemical Facilities</b> .....	1527
<i>Song F. Jan, Orhan Gurbuz</i>	
<b>Advanced Analysis Topics for Blast Resistant Buildings in Petrochemical Facilities</b> .....	1535
<i>Darrell D. Barker</i>	
<b>Blast Hardened Retrofit Details for Petrochemical Buildings</b> .....	1539
<i>J. W. Wesevich, E. M. Gasulla</i>	
<b>Blast Response of Portable Buildings in Petrochemical Facilities</b> .....	1547
<i>Ali Sari, Darrell Barker</i>	
<b>Design of Modular Blast-Resistant Steel-Framed Buildings in Petrochemical Facilities</b> .....	1557
<i>Paul B. Summers</i>	

<b>General Update of the ASCE Report: Design of Blast Resistant Buildings in Petrochemical Facilities</b> .....	1564
<i>William L. Bounds</i>	
<b>Update to Response Criteria for Blast Resistant Buildings in Petrochemical Facilities</b> .....	1568
<i>Charles J. Oswald</i>	
<b>Analysis of Interfacial Fracture between Concrete and Rock in Gravity Dam</b> .....	1576
<i>Abdelkader Draï, B. B. Bouiadjra</i>	
<b>Investigation and Repair of Ethanol Plant Mat Foundation Distress</b> .....	1587
<i>Daniel Larson</i>	
<b>Kern River #1 Hydro System—Forebay Upgrade and Rehabilitation</b> .....	1597
<i>M. Luis Piek, Jon Y. Kaneshiro, Terry L. Fallesen, David Van Horsen</i>	
<b>Design of Reinforced Concrete Chimneys for Earthquake Forces</b> .....	1609
<i>Javeed Munshi</i>	
<b>Approximation for Seismic Analysis of Not-Flat-Bottom Axisymmetric Tanks</b> .....	1617
<i>Atis A. Liepins, Gunjeet Juneja</i>	
<b>Controversial Issues in Seismic Design of Liquid-Containing Structures</b> .....	1627
<i>William C. Sherman</i>	
<b>Design Considerations for Large Prestressed Water Reservoirs</b> .....	1638
<i>Karl C. Kuebitz, Ramon E. Lucero</i>	
<b>Design of Environmental Engineering Concrete Structures Based on Strain Limit and Crack Control</b> .....	1648
<i>Javeed Munshi</i>	
<b>Why Does My New Concrete Tank Leak?</b> .....	1655
<i>Charles Hanskat</i>	
<b>Estimating Power Outages during Hurricanes Using Semi-Parametric Statistical Methods</b> .....	1660
<i>Seth Guikema, Seung-Ryong Han, Steven Quiring</i>	
<b>Modeling and Prediction of Failure of Transmission Lines Due to High Intensity Winds</b> ....	1669
<i>Horia Hangan, Eric Savory, Ashraf El Damatty, Jon Galsworthy, Craig Miller</i>	
<b>Networked Infrastructure Performance for the 2006 Hanukkah Eve Storm</b> .....	1677
<i>Dorothy A. Reed</i>	
<b>Understanding How Overhead Lines Respond to Localized High Intensity Wind Storms</b> .....	1684
<i>Ghyslaine McClure, Sébastien Langlois, Jan Rogier</i>	
<b>Loading and Response of Offshore Wind Turbine Support Structures: Prediction with Comparison to Measured Data</b> .....	1694
<i>K. Mittendorf, Bert Sweetman</i>	
<b>Reliability Analysis and Design Procedures for Offshore Wind Turbines</b> .....	1704
<i>Puneet Agarwal, Lance Manuel</i>	
<b>Simplified Procedure for Seismic Analysis of Reinforced-Concrete Piles in Marine Oil Terminals</b> .....	1713
<i>Rakesh K. Goel</i>	
<b>Analyses of the Reasons of Roissy Terminal 2E Collapse in France Using Deterministic and Reliability Assessments</b> .....	1725
<i>Roy Feghaly, Wassim Raphael, Fouad Kaddah</i>	
<b>Design Parameters Governing Performance of Low Rise Reinforced Concrete Frame Structures Subjected to External Blast Loading</b> .....	1735
<i>T. Tadepalli, C. Mullen</i>	

<b>Forensic Investigation of a Bridge Construction Scaffolding Collapse</b> .....	1742
<i>Adel El-Safty, Michael Zinszer, George Morcous</i>	
<b>Identifying Sampling Protocols for Forensic and Structural Evaluations of Existing Structures</b> .....	1752
<i>Danielle D. Kleinhans, Kurt A. Keifer</i>	
<b>A Total Strain Based Hysteretic Material Model for 2D Planar Reinforced Concrete Structures</b> .....	1761
<i>GunJin Yun, Thomas G. Harmon, Shirley J. Dyke, Migeum So</i>	
<b>Ductility Capacity Models for Buckling-Restrained Braces Using a Bayesian Methodology</b> .....	1771
<i>Blake M. Andrews, Larry A. Fahnestock, Junho Song</i>	
<b>An Enclosure for the European Extremely Large Telescope</b> .....	1781
<i>Gaizka Murga, Alberto Fernández, Amaia Zarraoa, Michael Schneermann</i>	
<b>Large Constructions and Bridge Abutments: Solutions with Geosynthetic Reinforced Earth</b> .....	1792
<i>Andreas Herold, Taner Aydo?mu?, Heiner Sander</i>	
<b>Performance-Based Seismic Design of an Industrial Storage Rack System</b> .....	1802
<i>Babak Alavi, Akshay Gupta</i>	
<b>Retractable Stadium Roofs and Flooring</b> .....	1812
<i>Barton L. Riberich</i>	
<b>Use of Chinese Steel for Heavy Industrial Projects</b> .....	1822
<i>Peter Carrato, Robert P. Krumpfen III</i>	
<b>Constructing Probable Wind and Water Damage Sequences from Timelines—The Technical Perspective</b> .....	1832
<i>Douglas A. Smith, J. Arn Womble, Franklin T. Lombardo</i>	
<b>Effective Forensic Engineering Investigations of Hurricane “Wind vs. Water” Disputes: Techniques and Tools</b> .....	1842
<i>Samuel D. Amoroso, Russell J. Coco Jr.</i>	
<b>Field Evaluation of Damage from Wind and Flooding</b> .....	1850
<i>David L. Teasdale</i>	
<b>Use of Emerging Remote-Sensing Technologies to Determine Neighborhood Wind/Water Damage Patterns</b> .....	1860
<i>J. Arn Womble, Douglas A. Smith, Beverley J. Adams</i>	
<b>A Proposed Design Method for Wood Piles Used in Residential Construction</b> .....	1870
<i>Laura K. Wendling, Dan L. Wheat, Robert B. Gilbert, Sam W. Nelson</i>	
<b>Full-Scale 3D Wall Bracing Tests</b> .....	1880
<i>Thomas D. Skaggs, Zeno A. Martin, Edward L. Keith, Borjen Yeh</i>	
<b>The Importance of Proper Detailing and Design on the Performance of Wood Assemblies Exposed to the Environment</b> .....	1890
<i>Judson A. Taylor, David P. Kuivanen</i>	
<b>Problems with the Partially Engineered House</b> .....	1905
<i>Leonard J. Morse-Fortier</i>	
<b>Principles of Mechanics Model for Wood Structural Panel Portal Frames</b> .....	1911
<i>Zeno Martin, Thomas D. Skaggs, Edward L. Keith, Borjen Yeh</i>	
<b>Behavior of Concrete Deep Beams with High Strength Reinforcement</b> .....	1920
<i>Juan de Dios Garay, Adam S. Lubell</i>	
<b>Experimental and Numerical Studies of Impact Behavior of Fiber Lightweight Aggregate Concrete</b> .....	1930
<i>Yaghoob Farnam, Mehrdad Mahoutian, Soheil Mohammadi, Mohammad Shekarchi</i>	

<b>Hollow Centrifugal Concrete Filled Steel Tubular Members in Industrial Structure Application</b> .....	1940
<i>Huaizhong Wang</i>	
<b>Thermal and Creep Characteristics of Bio-Based Composite Beams</b> .....	1945
<i>Timothy J. Strickland, Harry W. Shenton III</i>	
<b>Seismic Masonry Veneer: Quazi-Static Testing of Wood Stud Backed Clay Masonry Veneer Walls</b> .....	1955
<i>William M. McGinley, Sameer Hamoush</i>	
<b>Comparison of In-Plane Lateral Load Resistance of Interior Steel Stud and Wood Stud Light-Frame Walls</b> .....	1965
<i>Ali M. Memari, Bohumil Kasal, Andrew R. Adams, Harvey B. Manbeck</i>	
<b>Earthquake Simulator Testing and Evaluation of Suspended Ceilings: Standard and Alternate Perimeter Installations</b> .....	1975
<i>Amir Gilani, Andrei Reihorn, Tony Ingratta, Bob Glasgow, Oren Lavan</i>	
<b>Evaluation of Non-Structural Partition Walls and Suspended Ceiling Systems through a Shake Table Study</b> .....	1985
<i>Jason McCormick, Yuichi Matsuoka, Peng Pan, Masayoshi Nakashima</i>	
<b>Investigation of Seismic Performance of Timber Shear Walls with Spray-Applied Polyurethane Foam</b> .....	1995
<i>Darius Dodge, Charles Chadwell</i>	
<b>Seismic Behavior of Low Yield Point Steel Plate Shear Wall</b> .....	2005
<i>Sheng-Jin Chen, Chyuan Jhang</i>	
<b>Concepts and Calculations Based on the New MBMA/AISC Guide to Frame Design Using Web-Tapered Members</b> .....	2015
<i>Yoon Duk Kim, Donald W. White</i>	
<b>Consideration of the Effects of Loading and Frame Configuration Using the Direct Analysis Method</b> .....	2025
<i>Duane D. Becker</i>	
<b>Overview of the MBMA/AISC Design Guide—“Frame Design Using Web-Tapered Members”</b> .....	2034
<i>Richard Kaehler</i>	
<b>Research on Cyclic Behavior and Design of Metal Buildings</b> .....	2037
<i>Chia-Ming Uang, Jong-Kook Hong</i>	
<b>Bending Behaviour of Curved Thin-Walled Panels</b> .....	2046
<i>Nashwa M. Yossef, M. Hassanen, M. A. Dabaon, M. H. El-Boghdadi, M. Alaghoury</i>	
<b>Design and Construction for Dense Urban Areas—Structural Engineering Challenges in NYC</b> .....	2057
<i>Dan Eschenasy</i>	
<b>Development of Structural Insulated Panel Standards</b> .....	2067
<i>Borjen Yeh, Thomas Williamson, Edward Keith</i>	
<b>The Structural Performance of Large Joint-Less Reinforced Concrete Five-Sided Box Modules</b> .....	2077
<i>Luis A. Prieto-Portar</i>	
<b>Avoiding Disproportionate Collapse in High-Rise Buildings</b> .....	2088
<i>Uwe Starossek</i>	
<b>Measures of Structural Robustness—Requirements and Applications</b> .....	2098
<i>Uwe Starossek, Marco Haberland</i>	

## Volume 4

<b>Nonlinear Dynamic Analysis for the Structural Robustness Assessment of a Complex Structural System</b> .....	2108
<i>Franco Bontempi, Luisa Giuliani</i>	
<b>On Structural Robustness, Redundancy, and Static Indeterminacy</b> .....	2118
<i>Fabio Biondini, Dan M. Frangopol, Stefano Restelli</i>	
<b>Snow Induced Ponding of Toyota Pavilion Canopy, Montage Mountain, PA</b> .....	2128
<i>Paul Gossen, David Chen, Wenxiao Shan, David Campbell</i>	
<b>Structures Using Uncurved or Minimally Curved Tensioned Fabric Membranes</b> .....	2135
<i>Craig G. Huntington</i>	
<b>Predicting Train-Induced Vibrations in Multi-Story Buildings</b> .....	2145
<i>Masoud Sanayei, Cory R. Brett, Jeffrey A. Zapfe, Eric E. Ungar, Eric M. Hines</i>	
<b>Experimental Validation of Building Vibration Propagation Using a Four-Story Laboratory Model</b> .....	2155
<i>Michael F. Hughes, Masoud Sanayei, James A. Moore, Jeffrey A. Zapfe, Robert D. White</i>	
<b>Long-Term Thermal Performance of a CFRP-Reinforced Bridge Deck</b> .....	2165
<i>Erin Santini Bell, Jesse Sipple, Joseph Yost</i>	
<b>Reliability of a 4-Story Steel Moment-Resisting Frame against Collapse Due to Seismic Excitations</b> .....	2175
<i>Dimitrios G. Lignos, Farzin Zareian, Helmut Krawinkler</i>	
<b>Study of Building Collapse for Performance-Based Design Validation</b> .....	2185
<i>Bruce Maison, Kazuhiko Kasai, Gregory Deierlein</i>	
<b>Approximate Analysis Methods for Modeling Structural Collapse</b> .....	2195
<i>Daniel Williams, Eric B. Williamson</i>	
<b>Comparing Seismic Collapse Safety of Modern and Existing Reinforced Concrete Frame Structures in California</b> .....	2200
<i>Abbie B. Liel, Curt B. Haselton, Gregory G. Deierlein</i>	
<b>Behavior of Steel Building Structures under Realistic Fire Loading</b> .....	2208
<i>Sangdo Hong, Amit H. Varma, Anil Agarwal, Kuldeep Prasad</i>	
<b>An Experimental Study on the Behaviour of Full-Scale Composite Steel Frames under Furnace Loading</b> .....	2220
<i>Yuli Dong, Kuldeep Prasad</i>	
<b>Performance Based Structural Fire Engineering for Modern Building Design</b> .....	2222
<i>Darlene Rini, Susan Lamont</i>	
<b>A Rational Benefit/Cost Approach to Evaluating Structural Mitigation for Wind Damage: Learning “the Hard Way” and Looking Forward</b> .....	2234
<i>Samuel D. Amoroso, Jason P. Fennell</i>	
<b>Impact of the 2004 Hurricane Season on the Florida Public Hurricane Loss Model</b> .....	2244
<i>Jean-Paul Pinelli, Shahid Hamid, Kurt Gurley, Gonzalo Pita, Chelakara Subramanian</i>	
<b>Investigation of Thunderstorm Winds on an Instrumented Building</b> .....	2254
<i>Franklin T. Lombardo, Douglas A. Smith</i>	
<b>Lessons Learned from Structural Damage Investigations—A Case Study of 2003 Missouri-Kansas Tornadoes</b> .....	2262
<i>Bogusz Bienkiewicz</i>	
<b>Monitoring of Hurricane Wind Pressures and Wind Speeds on a Residential Home Roof with Wireless Instrumentation</b> .....	2272
<i>Ivica Kostanic, Chelakara Subramanian, Jean-Paul Pinelli, Larry Buist, Antonio Velazquez, Adam Wittfeldt</i>	

<b>Design and Analytical Validation of Post-Tensioned Column Bases</b> .....	2282
<i>Hoseok Chi, Judy Liu, Maria Garlock</i>	
<b>Predictor-Corrector Algorithm for Multi-Site Hybrid Simulation</b> .....	2288
<i>GunJin Yun, Jamshid Ghaboussi, Youssef Hashash</i>	
<b>Real-Time Hybrid Testing Using an Unconditionally Stable Explicit Integration Algorithm</b> .....	2298
<i>Cheng Chen, James M. Ricles</i>	
<b>Concept of Buckling Restraint of Steel Braces with Fiber Reinforced Polymers</b> .....	2308
<i>Peter Dusicka, Ben Wiley</i>	
<b>Improved Seismic Design of Concentrically Braced Frames and Gusset Plate Connections</b> .....	2315
<i>Dawn Lehman, Charles Roeder</i>	
<b>Influence of Brace Slenderness on the Fracture Life of Rectangular Tubular Steel Bracing Members Subjected to Seismic Inelastic Loading</b> .....	2325
<i>Robert Tremblay</i>	
<b>Numerical Modelling and Performance Assessment of Concentrically Braced Steel Frames</b> .....	2335
<i>Chui-Hsin Chen, Juin-Wei Lai, Stephen Mahin</i>	
<b>Test of a Full Scale Concentrically Braced Frame with Multi-Story X-Bracing</b> .....	2345
<i>Jake Powell, Kelly Clark, Keh-Chyuan Tsai, Charles Roeder, Dawn Lehman</i>	
<b>Assessing Damage of a Reinforced Concrete Structural Element Using System Identification</b> .....	2355
<i>Vincent P. Chiarito, Bradford A. Steed</i>	
<b>Remote Monitoring on Internal Condition of Buried Pipe Infrastructures</b> .....	2363
<i>Anil Agrawal, Krishnamurthy Ramalingam, Akira Kawaguchi, Stella Rozelman, Frank Kulcsar, Najibullah Farooqi</i>	
<b>Remote Sensing and Field Reconnaissance for Rapid Damage Detection in Hurricane Katrina</b> .....	2373
<i>J. Arn Womble, Beverley J. Adams, Shubharoop Ghosh, Carol J. Friedland</i>	
<b>Review of Remote Sensing for Condition Assessment and Damage Identification after Extreme Loading Conditions</b> .....	2383
<i>Andrew Prinaris, Sreenivas Alampalli, Mohammed Ettouney</i>	
<b>Results of Recent E-Defense Tests on Full-Scale Steel Buildings: Part 1—Collapse Experiments on 4-Story Moment Frames</b> .....	2393
<i>Keiichiro Suita, Satoshi Yamada, Motohide Tada, Kazuhiko Kasai, Yuichi Matsuoka, Eiji Sato</i>	
<b>Results of Recent E-Defense Tests on Full-Scale Steel Buildings: Part 2—Collapse Simulation and Blind Analysis Contest</b> .....	2403
<i>Makoto Ohsaki, Kazhiku Kasai, Yuich Matsuoka, Jingyao Zhang</i>	
<b>Results of Recent E-Defense Tests on Full-Scale Steel Buildings: Part 3—Experiments on Dampers and Frame Subassemblies</b> .....	2411
<i>Kazuhiko Kasai, Yoji Ooki, Shojiro Motoyui, Toru Takeuchi, Koichi Kajiwara, Eiji Sato</i>	
<b>Results of Recent E-Defense Tests on Full-Scale Steel Buildings: Part 4—Experiments Utilizing of Multipurpose Test Bed</b> .....	2423
<i>Toru Takeuchi, Kazuhiko Kasai, Mitsumasa Midorikawa, Yuichi Matsuoka, Takeshi Asakawa, Iaso Kubodera, Yuji Kurokawa, Hirotaka Ando, Shoichi Kishiki</i>	
<b>Performance Based Design of Wood Structures—Designing for Durability</b> .....	2435
<i>Rakesh Gupta, Paul Morris, Borjen Yeh, Phil Line</i>	
<b>Performance-Based Design for Wood Residential Construction Subjected to Snow Loads</b> .....	2443
<i>Yue Li, William M. Bulleit</i>	

<b>Performance-Based Design of Residential Structures for Flood</b> .....	2449
<i>John W. van de Lindt, Mason A. Taggart</i>	
<b>Performance-Based Design of Wood Frame Structures for Wind</b> .....	2457
<i>John W. van de Lindt, Thang N. Dao</i>	
<b>Tiered Approach to Performance-Based Seismic Design of Wood Frame Buildings</b> .....	2466
<i>Weichiang Pang, Shiling Pei, Hongyan Liu, John van de Lindt, David Rosowsky</i>	
<b>Design of a New Steel-Framed Building Using ASCE 7 Damper Provisions</b> .....	2477
<i>H. Kit Miyamoto, Amir Gilani</i>	
<b>Design Requirements for Prequalified Steel Moment Connections: Their Historic Development and Present-Day Use</b> .....	2487
<i>Christopher M. Hewitt, Ronald O. Hamburger</i>	
<b>Evaluation of ASCE-41 Nonlinear Static Procedure Using Recorded Motions of Reinforced-Concrete Buildings</b> .....	2494
<i>Rakesh K. Goel, Charles Chadwell</i>	
<b>Integral Bridges—Development of a Constitutive Soil Model for Soil Structure Interaction</b> .....	2505
<i>James Banks, Alan Bloodworth, Thomas Knight, Jeffery Young</i>	
<b>Seismic Design and Performance of the FedEx A380 Hangar Facility</b> .....	2514
<i>John L. Peronto, Thomas D. Poulos, Leonard Martin Joseph, Robert Stadler</i>	
<b>Excerpts from Risk Management for A/E's</b> .....	2530
<i>Eric L. Singer, Karen Erger</i>	
<b>A New Testing Method for Fatigue of Reinforced Concrete Beam</b> .....	2540
<i>Te-Hung Liu, Chao-Wei Tang, Hui-Wen Liao, How-Ji Chen</i>	
<b>A Novel Structure to Protect Against Explosive Loads</b> .....	2547
<i>Jameel Ahmad</i>	
<b>A Structural Damage Detection Method Based on Subset Selection and Evolutionary Computation</b> .....	2551
<i>Gun Jin Yun, Kenneth Ogorzalek, Shirley J. Dyke, Wei Song</i>	
<b>A Study on Hysteretic Characteristic of Arc-Shaped Damper</b> .....	2561
<i>Tsuguhiro Shimabata, Isao Shimada, Hajime Ohuchi, Hisao Tsunokake, Yuki Nakata</i>	
<b>Active Control in a High-Rise Building under Multidirectional Wind Loads</b> .....	2571
<i>Aly Mousaad Aly, Ferruccio Resta, Alberto Zasso</i>	
<b>Algorithm for Optimal Design of Adjacent Buildings Connected by Fluid Viscous Devices</b> .....	2582
<i>Gian Paolo Cimellaro, Andrei M. Reinhorn</i>	
<b>An Inelastic Model for Low Cycle Fatigue Prediction in Steel Braces</b> .....	2592
<i>Ali Davaran, Narges Easazadeh Far</i>	
<b>Analysis and Design of the Roof Structure of Table Tennis Gymnasium for the 2008 Olympic Games</b> .....	2603
<i>Jiemin Ding, Zhijun He</i>	
<b>Analytical Investigation of Mixed BRBF and SCBF Braced Steel Frames</b> .....	2613
<i>Ali Davaran, Javad Hasanzadeh</i>	
<b>Analytical Investigation of Steel Slit Panels for Lateral Resistance of Steel Frame Buildings</b> .....	2622
<i>Gustavo Cortés, Judy Liu</i>	
<b>Behavior and Modeling of Concrete Columns Confined by External Post-Tensioned Strips</b> .....	2627
<i>Hasan Moghaddam, Kypros Pilakoutas, Maysam Samadi, Saiid Mohebbi</i>	

<b>Behavior Characteristic of Hypar Shaped Space Truss with Some Removed Members .....</b>	<b>2637</b>
<i>Jin-Woo Kim, Jeung-Hwan Doh, Yong-Hee Lee</i>	
<b>Behaviour of Baked Clay Structural Beam Panels .....</b>	<b>2647</b>
<i>Abdul Aziz Ansari, Mahmood Memon</i>	
<b>Compressive Stress-Strain Behavior of R/C Concrete Columns Using Opposing Spirals .....</b>	<b>2655</b>
<i>L. A. Marvel, J. C. West, R. A. Hindi</i>	
<b>Crack Propagation Evaluation of Polymer Composite FRP Panels Subjected to Static and Cyclic Loading .....</b>	<b>2665</b>
<i>Ömer O. Erbay, Phillip A. Sharff</i>	
<b>Damage Assessment of Homes and Buildings from an Engineering Point of View .....</b>	<b>2675</b>
<i>Charles R. Norman</i>	
<b>Effect of Mid-Connection Detail on the Behavior of Cross-Bracing Systems .....</b>	<b>2687</b>
<i>Ali Davaran, Nader Hoveidae</i>	
<b>Elastoplastic Analysis and Ductility Evaluation of Steel Tubular Columns Subjected to Cyclic Loading .....</b>	<b>2695</b>
<i>Iraj H. P. Mamaghani, Mohammad Khavanin, Ersoz Erdogan, Luke Falken</i>	
<b>Fire and Concrete Structures .....</b>	<b>2707</b>
<i>David N. Bilow, Mahmoud E. Kamara</i>	
<b>Ice Forces on Inclined Bridge Piers .....</b>	<b>2717</b>
<i>Kenton W. Braun, Dempsey S. Thieman</i>	
<b>Joining of Ultra High Performance Concrete (UHPC) Units by Gluing .....</b>	<b>2727</b>
<i>Christian Muehlbauer, Konrad Zilch</i>	
<b>Live Load Distribution Factors for Cast-in-Place Concrete Box Girder Bridges .....</b>	<b>2737</b>
<i>Ryan Doerrer, Riyadh Hindi</i>	
<b>Nonlinear Analysis for Progressive Collapse Investigation on Reinforced Concrete Framed Structures .....</b>	<b>2747</b>
<i>Luisa Giuliani, Vivian Prisco</i>	
<b>Numerical Evaluation of Through Plate Beam to Box Column Connection .....</b>	<b>2757</b>
<i>Farhad Keshavarzi, Rasoul Mirghaderi, Ali Imanpour, Bardia Khafaf</i>	
<b>Performance Evaluation of a Mechanically Fastened Fiber Reinforced Polymer Deck .....</b>	<b>2767</b>
<i>Rita Rodríguez-Vera, Nicolas Lombardi, Judy Liu</i>	
<b>Preservation of Historical Walser Houses in Alagna Valsesia, Italy .....</b>	<b>2774</b>
<i>Sara Ganzerli, Luigi Ganzerli</i>	
<b>Production of Sintered Fine Sediment Lightweight Aggregate .....</b>	<b>2781</b>
<i>Chung-Ho Huang, Hsiein-Sheng Peng, Cheng-I Lin, Tzong-Yueh Yang</i>	
<b>Reducing Beam Section by Corrugated Webs for Developing a Connection of Specially Moment Resisting Frame .....</b>	<b>2787</b>
<i>Rasoul Mirghaderi, Saeid Sobhan, Shahabeddin Torabian</i>	
<b>Reinforced Glass Beams: Effect of Increased Temperatures on the Glass-to-Reinforcement Adhesive Bond .....</b>	<b>2797</b>
<i>Christian Louter, Dieter Callewaert, Jan Belis, Fred Veer, Freek Bos</i>	

## Volume 5

<b>Relation between Porosity and Compressive Strength of Slag Concrete .....</b>	<b>2806</b>
<i>An-Shun Cheng, Tsong Yen, Yu-Wen Liu, Yeong-Nain Sheen</i>	

<b>Research on the Shrinkage Deformation and Crack Development of High-Strength High-Performance Concrete Containing Silica Fume .....</b>	<b>2814</b>
<i>Chao-Shun Chang, Chung-Hao Wu, Tsong Yen, Tsao-Hua Hsu</i>	
<b>Road Surface Roughness Generation by Power Spectral Density in Bridge Design .....</b>	<b>2821</b>
<i>Sukhvarsh Jerath, Sanjay Gurav</i>	
<b>Sophisticated Non-Linear 4D Structural Analysis for Cable-Stayed Bridges.....</b>	<b>2828</b>
<i>Dorian Janjic, Heinz Bokan, Harald Sorsky</i>	
<b>The Accelerated Method for Estimating Corrosion of Reinforced Concrete Structure in Seawater .....</b>	<b>2836</b>
<i>Wen-Po Tsai, How-Ji Chen, Huang-Hsing Pan, Kuan-Chung Hsu</i>	
<b>The Role of Data Mining Techniques in the Prediction of Hurricane Damages .....</b>	<b>2845</b>
<i>N. O. Nawari</i>	
<b>Truss Analogy Analysis of Beam Seats for a Cut-and-Cover Tunnel .....</b>	<b>2856</b>
<i>George Inverso, Matthew P. Smith</i>	
<b>Vertical Vibration Isolation Device Using Constant Load Supporting Mechanism .....</b>	<b>2866</b>
<i>Takehiko Asai, Yoshikazu Araki, Takeshi Masui, Nobutoshi Yoshida</i>	
<b>IT-Enhanced Laboratory Experience within a Mechanical Engineering Undergraduate Curriculum .....</b>	<b>2877</b>
<i>Constantin Chassapis, El-Sayed Aziz, Sven K. Esche</i>	
<b>Technology Based Hybrid Classes for Multiple Applications.....</b>	<b>2894</b>
<i>Stanley D. Lindsey</i>	
<b>Integration of New Teaching Methodologies into a Laboratory Based Course .....</b>	<b>2896</b>
<i>Adam Phelps, Laura Sliger, Steve Degracia, Sara Ganzerli</i>	
<b>Optimizing Resources in Undergraduate Research.....</b>	<b>2907</b>
<i>Sara Ganzerli, Paul De Palma, Shannon Overbay, Ann Kilzer, Ryan Datteri, Sean Fitzgerald</i>	
<b>ParaStruc: A New Parallel Structural Analysis Framework, Concept, and Implementation.....</b>	<b>2919</b>
<i>Ammar T. Al-Sayegh, Elisa D. Sotelino</i>	
<b>Extensions of OpenSees for Bridge Management Applications.....</b>	<b>2929</b>
<i>Michael H. Scott</i>	
<b>Implementation of Building Information Modeling (BIM) on the Renovation of the Art Gallery of Alberta in Edmonton, Alberta .....</b>	<b>2939</b>
<i>Derrick Roorda, Mei Kuen Liu</i>	
<b>Nonlinear Structural Analysis Using Software Design Patterns.....</b>	<b>2954</b>
<i>Frank McKenna, Michael H. Scott, Gregory L. Fenves</i>	
<b>A Multifaceted Approach to Introductory Structural Analysis Instruction .....</b>	<b>2969</b>
<i>Gregory R. Miller</i>	
<b>A Transformational Approach to Teaching Matrix Structural Analysis, and Visual Implementation Using Mathcad.....</b>	<b>2976</b>
<i>Finley A. Charney</i>	
<b>Leveraging the Integrated Programming and Visualization Features of Mathcad in Teaching Advanced Structural Analysis .....</b>	<b>2993</b>
<i>Gary Consolazio</i>	
<b>Seismic Performance of Seismic-Isolated Building for Long-Period Ground Motion and Limited Performance of Seismic Isolator .....</b>	<b>3007</b>
<i>Haruyuki Kitamura, Yasuo Takenaka, Kazuo Tamura</i>	

<b>Applying Seismic Isolation to Buildings in Japan—Retrofitting and Middle-Story Isolation</b> .....	3019
<i>Masanori Tasaka, Nobuyuki Mori, Hiroshi Yamamoto, Katsuhide Murakami, Toshiyuki Sueoka</i>	
<b>An Innovative Application of Base Isolation Technology</b> .....	3030
<i>Anindya Dutta, John F. Sumnicht, Ronald L. Mayes, Ronald O. Hamburger, Ahmet Citipitioglu</i>	
<b>Introduction to NEES TIPS: Tools for Isolation and Protective Systems</b> .....	3043
<i>Keri L. Ryan, Stephen A. Mahin, Gilberto Mosqueda</i>	
<b>Assessment of Numerical and Experimental Errors in Hybrid Simulation</b> .....	3059
<i>Mehdi Ahmadzadeh, Gilberto Mosqueda</i>	
<b>Hybrid Simulation of the Gravity Load Collapse of Reinforced Concrete Frames</b> .....	3072
<i>Majid Baradaran Shoraka, Arnaud Y. Charlet, Kenneth J. Elwood, Terje Haukaas</i>	
<b>Verification of Hybrid Simulation through On-Line Monitoring of Experimental Errors</b> .....	3089
<i>Tony Y. Yang, Gilberto Mosqueda, Bozidar Stojadinovic</i>	
<b>Verification Test of a Hybrid Test System with Distributed Column Base Tests</b> .....	3099
<i>Tao Wang, Jason McCormick, Masayoshi Nakashima</i>	
<b>Structural Performance Updating and Optimization with Conflicting Objectives under Uncertainty</b> .....	3111
<i>Dan M. Frangopol, Luís C. Neves</i>	
<b>Optimization of Multiple Shape Memory Alloy Devices by a Genetic Algorithm for Seismic Response of a Tall Structure</b> .....	3121
<i>Osman E. Ozbulut, Paul Roschke</i>	
<b>Evaluation of Seismic Energy in Structures with Rigid-End Offsets</b> .....	3131
<i>Kevin Wong, Ruifen Liu</i>	
<b>Automated Risk-Based Seismic Design Method for Optimal Structural and Non-Structural System Performance</b> .....	3141
<i>Hugo A. Rojas, Shahram Pezeshk, Christopher M. Foley</i>	
<b>Stable Adaptive Control of Seismically Excited Nonlinear Structures</b> .....	3152
<i>Budhaditya Hazra, Sriram Narasimhan, Mahesh Pandey</i>	
<b>Analytical Study of SDOF Systems with Superelastic Shape Memory Alloy Properties</b> .....	3162
<i>Matthew Speicher, Reginald DesRoches, Roberto T. Leon</i>	
<b>Vibration Tests of a Three Story Benchmark Structure with Vibration Control Devices that Generate Power</b> .....	3173
<i>Taichi Matsuoka, Katsuaki Sunakoda, Hiramoto Kazuhiko, Paul N. Roschke</i>	
<b>Experimental Investigation of Super-Elastic Semi-Active Damping for Seismically Excited Structures</b> .....	3183
<i>David Shook, Paul Roschke, Pei-Yang Lin, Chin-Hsiung Loh</i>	
<b>Seismic Performance Assessment of Woodframed Structures with Energy Dissipation Systems</b> .....	3193
<i>Jayesh K. Shinde, Michael D. Symans, Hongyan Liu, John W. van de Lindt</i>	
<b>Evaluating Performance in Seismic Isolated Buildings Using Performance Indexes</b> .....	3202
<i>Prayag J. Sayani, Keri L. Ryan</i>	
<b>Seismic Performance Assessment of a Passive Control Technology for Bridges Using Shape Memory Alloys</b> .....	3214
<i>Jamie E. Padgett, Reginald DesRoches</i>	
<b>Satisfying Drift and Acceleration Criteria with Multi-Stage Friction Pendulum Isolation Systems</b> .....	3225
<i>Troy A. Morgan, Stephen A. Mahin</i>	

<b>Fragility Function of Base Isolated Highway Bridges</b> .....	3235
<i>Jian Zhang, Yili Huo</i>	
<b>Performance Based Seismic Design of Steel Braced Frame System with Self-Centering Friction Damping Brace</b> .....	3252
<i>Songye Zhu, Yunfeng Zhang</i>	
<b>Analytical Evaluation of Various Passive Isolation Systems on Seismic Performance of a Low-Cost Chilean Masonry House</b> .....	3265
<i>Rachel Husfeld, Paul Roschke, Maria Ofelia Moroni</i>	
<b>Cyclic Elastoplastic Analysis and Stability Evaluation of Steel Braces of Hollow Section</b> .....	3275
<i>Iraj H. P. Mamaghani</i>	
<b>Solution Techniques for Nonlinear Equilibrium Equations</b> .....	3287
<i>Morteza A. M. Torkamani, Mustafa Sonmez</i>	
<b>Dimensional Analysis of Linear Soil-Foundation-Structure System Subjected to Near-Fault Ground Motions</b> .....	3304
<i>Jian Zhang, Yuchuan Tang</i>	
<b>Modelling Post-and-Beam Wooden Buildings under Seismic Loads</b> .....	3318
<i>Minghao Li, Frank Lam</i>	
<b>Predictive Models for Damping in Buildings: The Role of Structural System Characteristics</b> .....	3331
<i>Audrey Bentz, Tracy Kijewski-Correa</i>	
<b>Amplitude Dependency of Damping in Buildings</b> .....	3343
<i>Yukio Tamura, Akihito Yoshida</i>	
<b>Models for the Median and Variability of Building Damping Based on Basic Building Properties</b> .....	3353
<i>William P. Fritz, Nicholas P. Jones, Takeru Igusa</i>	
<b>Cyclic Softened Membrane Model for Prestressed Concrete</b> .....	3366
<i>Arghadeep Laskar, Jun Wang, Thomas T. C. Hsu, Y. L. Mo</i>	
<b>Lattice Discrete Particle Model (LDPM) for Fracture Dynamics and Rate Effect in Concrete</b> .....	3382
<i>Gianluca Cusatis, Andrea Mencarelli, Daniele Pelessone, James T. Baylot</i>	
<b>Single Degree of Freedom Characterization of Impact Load on Continuous Systems</b> .....	3393
<i>Jimmy Chan, Arturo Montalva, Shalva Marjanishvili</i>	
<b>Numerical Analysis of High Strength Concrete Columns Subjected to Wave Impact Loads and Eccentric Compression</b> .....	3405
<i>M. Jayakumar, Krish P. Thiagarajan, B. Vijaya Rangan</i>	
<b>Effects of Random Properties on the Stability and System Reliability of Steel Frames</b> .....	3414
<i>Stephen G. Buonopane</i>	
<b>Dynamic Pull-Out Test Simulations Using the Lattice Discrete Particle Model (LDPM)</b> .....	3425
<i>Gianluca Cusatis, Daniele Pelessone, James T. Baylot</i>	
<b>Semi-Lagrangian Galerkin Reproducing Kernel Formulation and Stability Analysis for Computational Penetration Mechanics</b> .....	3439
<i>J. S. Chen, Y. Wu, P. C. Guan, Kent T. Danielson, T. R. Slawson</i>	
<b>Study of Soil-Structure Interaction Response to Nearby Explosions by Coupled 2D Godunov—Variational Difference Approach</b> .....	3455
<i>D. Z. Yankelevsky, V. R. Feldgun, Y. S. Karinski</i>	
<b>A Numerical Study of Wind Loads on Large Highway Sign Structures</b> .....	3470
<i>George Constantinescu, Asghar Bhatti, Talia Tokyay</i>	

**Field and Wind Tunnel Experiments to Evaluate Wind-Induced Cladding and Structural Loads on a Low Wooden Building** ..... 3479  
*Ioannis Zisis, Ted Stathopoulos*

**Pulp CFD: Hollywood, the Elephant, and the Acronym** ..... 3494  
*Thomas Scott, David Banks*

**Modeling of High Intensity Winds** ..... 3503  
*Horia Hangan, Pooyan Hashemi-Tari, Jongdae Kim*

**Author Index**