

# Concurrent Sessions



**MONDAY, JULY 26, 2010**

## **10:00 M1 Design and Assessment of Reinforced Concrete Buildings**

S. K. Ghosh, Hitoshi Shiohara Metro Centre

10:00 371  
*EVALUATION OF SHEAR WALL INDEXES FOR RC BUILDINGS*  
**Ahmet Yakut\*** (Middle East Technical University) Ozan Soydas (Middle East Technical University)

10:17 542  
*DISPLACEMENT BASED SEISMIC DESIGN OF CONCRETE WALL FRAME STRUCTURES*  
**Farrokh Fazileh\*** (Carleton University) Jagmohan Humar (Carleton University)

10:34 562  
*ON THE SEISMIC SHEAR DEMAND ON WALLS IN DUCTILE RC DUAL SYSTEMS*  
**Avigdor Rutenberg\*** (Technion - Israel Institute of Technology) Emad Nsieri (Yaron-Offir Engineers Ltd, Haifa 32000, Israel)

10:51 739  
*COMPARATIVE DESIGN OF REINFORCED CONCRETE SHEAR WALLS REGARDING DUCTILITY AND BUILDING CODES REQUIREMENTS*  
**Samer Jabbour\*** (Halsall Associates Limited) Dan Carson (Halsall Associates Limited)

11:07 822  
*AN OVERLOOKED FAILURE MECHANISM OF REINFORCED CONCRETE BEAM-COLUMN JOINTS*  
**Hitoshi Shiohara\*** (University of Tokyo) Fumio Kusahara (University of Tokyo)

11:24 1771  
*INTERRELATION OF AXIAL LOAD LEVEL AND CONFINING PRESSURE FOR MINIMUM DUCTILITY DESIGN OF CONCRETE COLUMNS*  
**J.C.M. Ho\*** (The University of Hong Kong)

## **10:00 M2 Dams and Levees**

Jean Proulx, Bassem Andrawes Marine Room

10:00 737  
*INFLUENCE OF SPATIAL VARIATIONS IN GROUND MOTION ON EARTHQUAKE RESPONSE OF ARCH DAMS*  
**Anil Chopra\*** (University of California, Berkeley) Jinting Wang (Tsinghua University, Beijing)

10:17 790  
*RESPONSE OF CONCRETE GRAVITY DAMS TO SPATIALLY VARYING EARTHQUAKE GROUND MOTIONS*  
**Aspasia Zerva\*** (Department of Civil, Architectural and Environmental Engineering, Drexel University) Junjie Huang (Department of Civil, Architectural and Environmental Engineering, Drexel University)

10:34 1211  
*A NEW SIMPLIFIED METHOD FOR EARTHQUAKE ANALYSIS OF GRAVITY DAMS*  
**Najib Bouaanani\*** (Ecole Polytechnique de Montreal) Benjamin Miquel (Ecole Polytechnique de Montreal)

10:51 1737  
*SEISMIC FRAGILITY ASSESSMENT OF CONCRETE GRAVITY DAMS USING NONLINEAR DYNAMIC ANALYSIS WITH MASSED FOUNDATION*  
**Mohsen Ghaemian\*** (Sharif University of Technology) Soha Mirzahosseini Kashani (Sharif University of Technology)

11:07 1056  
*A GIS-ENABLED APPROACH TO RISK-ASSESSMENT OF LEVEE SYSTEMS*  
**Adda Athanasopoulos-Zekkos\*** (University of Michigan) Mustafa Saadi (University of Michigan)

11:24 1113  
*KEY PARAMETERS FOR SINGLE-INPUT EARTHQUAKE ANALYSIS OF ARCH DAMS*  
**Jean Proulx\*** (Université de Sherbrooke) Carlos Ayala-Paredes (Université de Sherbrooke)

## **10:00 M3 Fiber-Reinforced Polymer Column Retrofit**

Chris Pantelides, Toshikatsu Ichinose Pier 5

10:00 1595  
*SURFACE BOND CHARACTERISTICS OF FRP SHEETS FOR SEISMIC RETROFIT APPLICATIONS*  
**Behnam Shadravan\*** (University of Ottawa, Ottawa, ON., Canada) Murat Saatcioglu (University of Ottawa, Ottawa, ON., Canada)

10:17 205  
*STRENGTH AND DEFORMATION OF RC COLUMN RETROFITTED USING ARAMID BELTS WITH LARGE SPACING*  
**Toshikatsu Ichinose\*** (Nagoya Institute of Technology) Nobuaki Hanai (Kyushu Sangyo University), Kazumasa Kosugi (Fibex Corporation), Mitsuhiro Takeda (Tohoku Gakuin University)

10:34 892  
*SEISMIC RETROFIT OF RECTANGULAR RC COLUMNS USING CFRP WRAPPING AND CFRP ANCHORS*  
**Min-Lang Lin\*** (National Center for Research on Earthquake Engineering, Taiwan) Keh-Chyuan Tsai (National Center for Research on Earthquake Engineering, Taiwan), Chih-Tsung Lin (National Taipei University of Technology), Pei-Ching Chen (National Center for Research on Earthquake Engineering, Taiwan), Ying-Han Wu (National Taipei Univ

10:51 757  
*PERFORMANCE-BASED DESIGN OF FRP JACKETS FOR PLASTIC HINGE CONFINEMENT OF CONCRETE COLUMNS*  
**Chris Pantelides\*** (University of Utah) Chris Pantelides (University of Utah), Domingo Moran (University of Utah)

11:07 687  
*EXPERIMENTAL STUDY OF CONCRETE COLUMNS CONFINED WITH SHAPE MEMORY ALLOYS*  
**Moochul Shin\*** (University of Illinois at Urbana-Champaign) Bassem Andrawes (University of Illinois at Urbana-Champaign)

11:24 DISCUSSION

\* Indicates presenting author

# Concurrent Sessions continued

**MONDAY, JULY 26, 2010** (continued)

**10:00 M4 Special Session: Changes in the Seismic Design of Wood Buildings to Reach New Heights**

John Van de Lindt, Steven Kuan Pier 4

10:00 433  
SIMPLIFIED PERFORMANCE-BASED SEISMIC DESIGN OF NEESWOOD CAPSTONE BUILDING AND PRE-TEST PERFORMANCE EVALUATION  
**WeiChiang Pang\*** (Clemson University) David Rosowsky (Rensselaer Polytechnic Institute), John van de Lindt (Colorado State University), Shiling Pei (Colorado State University)

10:17 1447  
EXPERIMENTAL TESTING OF A TWO-STOREY POST-TENSIONED  
**Michael Newcombe\*** (University of Canterbury) Stefano Pampanin (University of Canterbury), Andrew Buchanan (University of Canterbury)

10:34 1571  
SEISMIC BUILDING CODE PROVISIONS FOR MID-RISE WOOD-FRAME CONSTRUCTION IN BRITISH COLUMBIA, CANADA  
**Steven Kuan\*** (Building and Safety Policy Branch, BC Ministry of Housing and Social Development) Erol Karacabeyli (FPInnovations, Forintek Division, Western Region), Chun Ni (FPInnovations, Forintek Division, Western Region)

10:51 1662  
THE NEESWOOD PROJECT IN REVIEW  
**John van de Lindt\*** (Colorado State University) David Rosowsky (Rensselaer Polytechnic Institute), Andre Filiatrault (SUNY-Buffalo), Michael Symans (Rensselaer Polytechnic Institute), Rachel Davidson (University of Delaware)

11:07 1700  
X-LAM BUILDINGS SEISMIC PERFORMANCE: THE ITALIAN SOFIE PROJECT  
**Ario Ceccotti\*** (CNR-IVALSA, Italy) Carmen Sandhaas (TU Delft, The Netherlands), Motoi Yasumura (Shizuoka University, Japan)

11:24 DISCUSSION

**10:00 M5 Seismic Input and Analysis Strategies**

Haluk Sucuoğlu, Pierre Léger Harbour C

10:00 442  
INCREMENTAL DYNAMIC ANALYSIS OF NONLINEAR STRUCTURES: SELECTION OF INPUT GROUND MOTIONS  
**Pierre Léger\*** (Ecole Polytechnique de Montreal) Gaelle Kervegant (Ecole Polytechnique de Montreal), Robert Tremblay (Ecole Polytechnique de Montreal)

10:17 1653  
A STUDY ON THE DEPENDENCY OF SEISMIC INPUT ENERGY ON THE CHARACTERISTIC OF STRUCTURAL HYSTERETIC BEHAVIOR BY USING AN EXPLICIT HYSTERETIC MATHEMATICAL MODEL  
**Alireza Poursamad Bonab\*** (Earthquake Eng. Dept., Science & Reserach Branch of the Islamic Azad University (IAU), Tehran, Iran) Mahmood Hosseini (Int'l Inst. of Earthquake Eng. & Seismology (IIEES) and Islamic Azad University (IAU), Tehran, Iran)

10:34 1250  
EVALUATION OF PEAK AND RESIDUAL DRIFT DEMANDS IN REGULAR MULTI-STORY STEEL FRAMES SUBJECTED TO SOFT-SOIL GROUND MOTIONS  
**Jorge Ruiz-Garcia\*** (Universidad Michoacana de San Nicolas de Hidalgo)

10:51 43  
MULTI-MODE PUSHOVER ANALYSIS WITH GENERALIZED FORCE VECTORS  
**Haluk Sucuoğlu\*** (Middle East Technical University) M. Selim Günay (METU)

11:07 1795  
GEOSPATIAL-GEOTECHNICAL DATABASE OF BORING AND DENSE MICROTREMORS DATA FOR KANAGAWA PREFECTURE, JAPAN.  
**Mahmood Rahimian\*** (Kanagawa University, Japan.) Tsutomu Ochiai (Kozo Keikaku Eng. Inc.Japan.), Takumi Ishii (Tokyo Soil Research Co. Ltd., Japan), Manuel Navarro (Almeria University, Spain), Toshio Yamamoto (Kanagawa University, Japan.), Takahisa Enomoto (Kanagawa University, Japan.)

11:24 DISCUSSION

**10:00 M6 Seismic Behavior of RC Wall Elements and Systems**

Brian Smith, Raymond Foltz Harbour B

10:00 72  
SHAKING TABLE TESTS OF LOW-RISE RC WALLS WITH OPENINGS  
**W. Julian Carrillo Leon\*** (PhD Candidate, U. Nacional Autonoma Mexico & Assistant professor, U. Militar Nueva Granada, Colombia) Sergio M. Alcocer (Research professor, Instituto de Ingenieria, Universidad Nacional Autonoma de Mexico)

10:17 348  
SEISMIC BEHAVIOR OF A HYBRID PRECAST CONCRETE WALL SPECIMEN: MEASURED RESPONSE VERSUS DESIGN PREDICTIONS  
**Brian Smith\*** (University of Notre Dame) Yahya Kurama (University of Notre Dame)

10:34 746  
BEHAVIOR OF HIGH-PERFORMANCE FIBER-REINFORCED CEMENTITIOUS COMPOSITES FOR USE IN COUPLING BEAMS AND STRUCTURAL WALL SYSTEMS FOR EARTHQUAKE-RESISTANT DESIGN  
**Raymond Foltz\*** (University of Illinois at Urbana-Champaign) James LaFave (University of Illinois at Urbana-Champaign)

10:51 1141  
EXPERIMENTAL DAMAGE-TRANSPORT CORRELATIONS FOR UNIAXIALLY-LOADED REINFORCED CONCRETE WALLS  
**Travis Soppe\*** (W.E. Gundy and Associates Inc. (WEGAI)) Tara Hutchinson (Univeristy of California, San Diego)

11:07 692  
EXPERIMENTAL TESTING OF RC WALLS USING EXTENSIVE INSTRUMENTATION TO INVESTIGATE CYCLICAL NONLINEAR WALL BEHAVIOR  
**Christopher Hart\*** (University of Illinois at Urbana-Champaign) Kenneth Marley (University of Illinois at Urbana-Champaign), Anna Birely (University of Washington at Seattle), Daniel Kuchma (University of Illinois at Urbana-Champaign)

11:24 977  
TESTING OF RC WALLS USING ADVANCED LOAD-CONTROL AND INSTRUMENTATION METHODS  
**Kenneth Marley\*** (University of Illinois at Urbana-Champaign) Christopher Hart (University of Illinois at Urbana-Champaign), Daniel Kuchma (University of Illinois at Urbana-Champaign)

**MONDAY, JULY 26, 2010** (continued)**10:00 M7 Special Session: Highlights of Ongoing Activities of NEES Tools for Isolation and Protective Systems (TIPS) Project**

Keri Ryan, Troy Morgan Metro East

10:00 581  
THREE DIMENSIONAL MODELING OF TRIPLE FRICTION PENDULUM ISOLATORS

Tracy Becker\* (University of California, Berkeley) Stephen Mahin (University of California, Berkeley)

10:17 1058  
THE USE OF SEISMIC PERFORMANCE CLASSIFICATIONS IN THE OPTIMIZATION OF BASE ISOLATED BUILDINGS

Troy Morgan\* (Tokyo Institute of Technology) Stephen Mahin (University of California, Berkeley)

10:34 1561  
RESULTS OF A CROSS-DISCIPLINARY SURVEY ON ISOLATION SYSTEMS DECISION MAKING

Lucy Arendt\* (University of Wisconsin-Green Bay)

10:51 1563  
COMPARATIVE LIFE CYCLE ANALYSIS OF CONVENTIONAL AND BASE-ISOLATED THEME BUILDINGS

Keri Ryan\* (Utah State University) Prayag Sayani (Ghandi Consulting Engineers and Architects), Nhan D. Dao (Utah State University), Emad Abraik (Utah State University), Yolanda M. Baez (Utah State University)

11:07 1582  
PERFORMANCE LIMIT STATES OF SEISMICALLY ISOLATED BUILDINGS WITH ELASTOMERIC BEARINGS

Jose Sanchez (University at Buffalo), Gilberto Mosqueda\* (University at Buffalo), Armin Masroor (University at Buffalo), Keri Ryan (Utah State University)

11:24 1617  
COMPARATIVE SEISMIC RESPONSE OF CODE DESIGNED CONVENTIONAL AND BASE-ISOLATED BUILDINGS TO SCENARIO EVENTS

Nhan D. Dao\* (Utah State University) Keri Ryan (Utah State University), Emrah Erduran (NORSAR), Prayag Sayani (Ghandi Consulting Engineers and Architects)

**10:00 M8 Special Session: Structures in Fire and Earthquake**

Hossein Mostafaei, Y. L. Mo Regatta Room

10:00 659  
PERFORMANCE OF A SIX-STORY REINFORCED CONCRETE STRUCTURES IN POST-EARTHQUAKE FIRE

Hossein Mostafaei\* (National Research Council Canada) Toshimi Kabeyasawa (The University of Tokyo)

10:17 1291  
CONSTITUTIVE MODELS OF REINFORCED CONCRETE FOR FIRE-DAMAGED SEISMIC EVALUATION

YL Mo\* (University of Houston) Junming Zhou (Tongji University), Hemant Dhonde (University of Houston)

10:34 1298  
THERMAL BEHAVIOUR OF DAMAGED REINFORCED CONCRETE IN FIRE

Adam Irvine\* (University of Edinburgh) Martin Gillie (University of Edinburgh), Tim Stratford (University of Edinburgh)

10:51 1778  
STRUCTURAL PERFORMANCE OF LIGHT-FRAME WOOD BUILDINGS SUBJECTED TO POST-EARTHQUAKE FIRE EXPOSURE

Ashutosh Bagchi\* (Concordia University) Mohammad Hany Yassin (Concordia University), Venkatesh Kodur (Michigan State University)

11:08 1779  
PERFORMANCE OF STEEL MOMENT RESISTING FRAME BUILDINGS SUBJECTED TO POST-EARTHQUAKE FIRE EXPOSURE

Ashutosh Bagchi\* (Concordia University) Mohammad Hany Yassin (Concordia University), Venkatesh Kodur (Michigan State University)

11:25 DISCUSSION

**10:00 M9 Site and Basin effects**

Toshiro Maeda, John Cassidy Harbour A

10:00 688  
GROUND MOTION HAZARD EVALUATION FOR PERFORMANCE-BASED EARTHQUAKE ENGINEERING DESIGN OF TALL BUILDINGS

Marshall Lew\* (MACTEC Engineering and Consulting, Inc.)

10:17 1551  
THE EFFECTS OF SUBSURFACE STRUCTURE ON THE CONCENTRATION OF STRUCTURAL DAMAGE DURING THE 2007 NOTO-HANTO EARTHQUAKE

Toshiro Maeda\* (Waseda University) Ryo Shimizu (Ricoh)

10:34 698  
SITE-SPECIFIC RESPONSE ANALYSIS FOR DEEP SOIL BASINS

Simon Ghanat\* (Arizona State University) Edward Kavazanjian, Jr. (Arizona State University)

10:51 1502  
INVESTIGATION OF BASIN AND DIRECTIVITY EFFECTS IN BROADBAND SIMULATED GROUND MOTIONS

Lisa Star\* (UCLA) Jonathan Stewart (UCLA), Robert Graves (URS Corporation)

11:07 758  
THE IMPORTANCE OF GROUND-TRUTHING FOR EARTHQUAKE SITE RESPONSE

John Cassidy\* (Geological Survey of Canada) Marco Mucciarelli (Università della Basilicata, Potenza, Italy)

11:24 406  
ON THE CORRELATION OF SITE CLASSIFICATIONS ESTIMATED FROM SURFACE GEOLOGY, TOPOGRAPHIC SLOPE, AND SHEAR-WAVE VELOCITY MEASUREMENTS

B Shen-Tu\* (AIR Worldwide Corp) M Mahdyiar (AIR Worldwide Corp), Y Rong (AIR Worldwide Corp), K Shabestari (AIR Worldwide Corp), J Guin (AIR Worldwide Corp)

**10:00 M10 Special Session: Canadian Seismic Research Network**

Denis Mitchell, Gail Atkinson Pier 2 &amp; 3

10:00 245  
IMPACT OF RECENT DEVELOPMENTS ON PROBABLE GROUND MOTIONS FOR CANADIAN CITIES

Gail Atkinson\* (University of Western Ontario)

10:17 1042  
NETWORK FOR REDUCING CANADIAN URBAN SEISMIC RISK

Denis Mitchell\* (McGill University)

# Concurrent Sessions continued

## MONDAY, JULY 26, 2010 (continued)

10:34 1260

A STUDY OF SEISMIC RISK IN SOUTHWESTERN BRITISH COLUMBIA  
**Liam Finn\*** (University of British Columbia) Carlos Ventura (University of British Columbia)

10:51 1511

SEISMIC UPGRADE OF EXISTING STRUCTURES WITH SUPPLEMENTAL DAMPING AND ISOLATION SYSTEMS IN CANADA  
**Constantin Christopoulos\*** (University of Toronto) Robert Tremblay (Ecole Polytechnique, Montreal)

11:07 1594

SEISMIC MICROZONATION OF OTTAWA AND MONTRÉAL, CANADA  
**Darush Motazedian\*** (Carleton University) James Hunter (Geological Survey of Canada), Myriam Belvaux (McGill University), Luc Chouinard (McGill University), André Pugin (Geological Survey of Canada), M. Tremblay (McGill University), Siva Sivathayalan (Carleton University), Didier Perret (Geologic)

11:24 DISCUSSION

## 13:00 M11 Design and Assessment of Steel and Wood Buildings

Hans Rainer, Tom Sabol

Metro Centre

13:00 368

A BAYESIAN APPROACH TO PROBABILISTIC SEISMIC DEMAND ANALYSIS OF STEEL MOMENT-RESISTING FRAMES  
**Ardehshir Deylami\*** (Associated professor, Amir Kabir University of Tehran) Mehdi Banazadeh (Assistant professor, Amir Kabir University of Tehran), Mehdi Mahdavi Adeli (Ph.D. Student, Amir Kabir University of Tehran)

13:17 383

EVALUATION OF BUILDING PERIOD FORMULAS FOR STEEL MOMENT RESISTING FRAMES BASED ON APPARENT BUILDING PERIODS  
**Oh-Sung Kwon\*** (Missouri University of Science and Technology) Eung Soo Kim (Missouri University of Science and Technology)

13:34 555

ASSESSMENT OF DIFFERENT COLLAPSE MECHANISMS IN BRACED MOMENT RESISTING FRAMES USING SYSTEM SIMULATED RELIABILITY INDEX  
**Mehrdad Lotfollahi\*** (Department of Civil Engineering, Amirkabir University of Technology, Tehran, Iran) Mehdi Banazadeh (Department of Civil Engineering, Amirkabir University of Technology, Tehran, Iran), Mohammad Mehdi Alinia (Department of Civil Engineering, Amirkabir University of Technology, Tehran, Iran)

13:51 711

IMPROVED SEISMIC BRACED WALL REQUIREMENTS FOR CONVENTIONAL WOOD-FRAME BUILDINGS  
**Hans Rainer\*** (Rainer Dynamics) Chun Ni (FPInnovations - Forintek Division), Erol Karacabeyli (FPInnovations - Forintek Division)

14:07 1016

DEVELOPMENT OF CANADIAN SEISMIC DESIGN PROVISIONS FOR STEEL SHEATHED CFS FRAMED SHEAR WALLS  
**Colin Rogers\*** (McGill University) Nisreen Balh (McGill University), Cheryl Ong-Tone (McGill University), Kostadin Velchev (McGill University), Cheng Yu (University of North Texas)

## 13:00 M12 Concrete Frame Structures

Hirochi Noguchi, Kenneth Elwood

Harbour B

13:00 168

STUDY ON SHEAR STRENGTH OF RC BEAM-COLUMN JOINTS WITH ECCENTRIC BEAMS BY THREE-DIMENSIONAL FEM ANALYSIS  
**Hiroshi Noguchi\*** (Chiba University) Takashi Kashiwazaki (Chiba University), Jie Hong (JIP Techno Science Corporation)

13:17 738

SEISMIC FRAGILITY OF REINFORCED CONCRETE FRAME SYSTEM  
**Laura Lowes\*** (University of Washington) Jingjuan Li (University of Washington)

13:34 545

DAMAGE MEASURES FOR PERFORMANCE-BASED SEISMIC EVALUATION OF RC FRAME STRUCTURES  
**YeongAe Heo\*** (UC Davis) Sashi Kunnath (UC Davis)

13:51 652

ANALYTICAL VERIFICATION OF A SIMPLIFIED REINFORCED CONCRETE JOINT MODEL  
**Burcu Burak\*** (Middle East Technical University)

14:07 694

PRACTICAL MODELS FOR SIMULATING THE SEISMIC RESPONSE OF RC BEAM-COLUMN JOINTS  
**Anna Birely\*** (University of Washington) Laura Lowes (University of Washington), Dawn Lehman (University of Washington)

14:24 1487

AN INVESTIGATION INTO DUCTILITY DEFINITIONS FOR REINFORCED CONCRETE MEMBERS AND FRAMES  
**Hossein Daneshvar\*** (University of Alberta)

## 13:00 M13 Lifelines: Pipelines

John Eidinger

Marine Room

13:00 16

SEISMIC RISK ASSESSMENT AND MITIGATION DESIGN FOR AN EXISTING LIFELINE  
**Shuhei Wada\*** (Tokyo City University) Toshio Imai (Water Pipeline Dept., JFE Engineering Corp), Takeshi Koike (Tokyo City University)

13:17 98

THE CONSTRUCTION OF EARTHQUAKE DAMAGE ESTIMATION SYSTEM FOR CITY GAS SUPPLY SYSTEM AND THE USE  
**Masatsutsu Ota\*** (Supply Control & Crisis Management Dept. Toho Gas Co. Ltd.) Hiroyuki Furuta (Supply Control & Crisis Management Dept. Toho Gas Co. Ltd.)

13:34 422

CONSTRUCTION OF FRAGILITY CURVE FOR WATER DISTRIBUTION PIPES BASED ON DAMAGE DATASETS FROM RECENT EARTHQUAKES IN JAPAN  
**Yoshihisa Maruyama\*** (Chiba University) Fumio Yamazaki (Chiba University)

13:51 857

SPATIAL DISTRIBUTION OF DAMAGES TO BURIED PIPES FOLLOWING THE 2007 NIIGATA-KEN CHUETSU-OKI, JAPAN, EARTHQUAKE  
**Kota KIMISHIMA\*** (Chiba University, Japan) Yoshihisa MARUYAMA (Chiba University, Japan), Fumio YAMAZAKI (Chiba University, Japan)

**MONDAY, JULY 26, 2010** (continued)

14:07 1124  
 LARGE-SCALE TESTS FOR PROTECTIVE ENCLOSURE OF PIPELINE  
 CROSSING THE HAYWARD FAULT  
 Michael Palmer (Cornell University), **Thomas O'Rourke\*** (Cornell University), Harry Stewart (Cornell University), Nathaniel Olson (Stephens Associates)

14:24 1153  
 RESPONSE OF BURIED POWER TRANSMISSION CABLES TO  
 EARTHQUAKE-INDUCED TRANSVERSE PERMANENT GROUND  
 MOVEMENT  
**Alireza Ahmadnia\*** (University of British Columbia) Carlos Ventura (University of British Columbia), Dharma Wijewickreme (University of British Columbia)

**13:00 M14 Repair and Retrofit of Composite Frames**

Dan Palermo, Dimitrios Lignos Pier 5

13:00 1165  
 INNOVATIVE SEISMIC RETROFIT OF TWO HIGH-RISE BUILDINGS WITH  
 UNIQUE CHALLENGES  
**Saiful Islam\*** (Saiful/Bouquet, Inc.) Matthew Skokan (Saiful/Bouquet, Inc.), Sampson Huang (Saiful/Bouquet, Inc.)

13:17 1282  
 SEISMIC PERFORMANCE OF CONCRETE ENCASED STEEL BUILDINGS  
 WITH RIVETED JOINTS  
**Majid Naderi\*** (University of Auckland) Majid Naderi (University of Auckland)

13:34 880  
 SEISMIC UPGRADING OF DEFICIENT REINFORCED CONCRETE FRAMES  
 WITH INTERNAL STEEL FRAMES  
**Ramazan Ozelik\*** (Akdeniz University) Baris Binici (Middle East Technical University)

13:51 1232  
 HYBRID TESTING OF STEEL MOMENT RESISTING FRAME RETROFITTED  
 WITH HIGH PERFORMANCE FIBER REINFORCED CONCRETE INFILL  
 PANELS  
**Dimitrios Lignos\*** (Stanford University) Sarah Billington (Stanford University)

14:07 657  
 REPAIR AND RETROFIT OF NON-DUCTILE REINFORCED CONCRETE  
 FRAMES  
**Dan Palermo\*** (University of Ottawa) Frederic Caron (University of Ottawa)

14:24 DISCUSSION

**13:00 M15 Seismic Behavior and Analysis of Structures**

David Thambiratnam, Reza Kianoush Harbour C

13:00 1133  
 EFFECTS OF GROUND MOTION SCALING ON NONLINEAR HIGHER MODE  
 BUILDING RESPONSE  
**Richard Wood\*** (University of California, San Diego) Tara Hutchinson (University of California, San Diego)

13:17 1143  
 ESTIMATING BASE SHEAR VERSUS ROOF DRIFT CURVES USING  
 EARTHQUAKE-RESPONSE DATA  
 Bismarck Luna (Purdue University) **Ayhan Irfanoglu\*** (Purdue University)

13:34 931  
 RETROFIT OF SEMI-RIGID KHORJINEE CONNECTIONS WITH  
 HORIZONTAL PLATES  
**Behnam Heydari\*** (Amirkabir University of Technology) Ardeshir Deylami (Amirkabir University of Technology)

13:51 719  
 EFFECTS OF LIQUID LEVEL ON DYNAMIC RESPONSE OF RECTANGULAR  
 LIQUID CONTAINING STRUCTURES  
**J. Z. Chen\*** (Ryerson University) M. R. Kianoush (Ryerson University)

14:07 300  
 SEISMIC MITIGATION OF BUILDING STRUCTURAL SYSTEMS USING  
 PASSIVE DAMPERS  
**David Thambiratnam\*** (Queensland University of Technology) David Thambiratnam (Queensland University of Technology)

14:24 1424  
 AN EVALUATION OF INELASTIC RESPONSES OF HYSTERETIC SYSTEMS  
 UNDER BIDIRECTIONAL SEISMIC EXCITATIONS  
**C.S. Lee\*** (Dept. Civil and Environmental Engineering, University of Western Ontario) Hanping Hong (Dept. of Civil and Environmental Engineering, University of Western Ontario)

**13:00 M16 Special Session: School Retrofit Program**

Phil Gould, Carlos Ventura Pier 4

13:00 1670  
 PERFORMANCE-BASED APPROACH FOR SEISMIC RETROFIT OF  
 SCHOOLS IN BRITISH COLUMBIA  
**Carlos Ventura\*** (The University of British Columbia) Graham Taylor (TBG Seismic Consultants), Liam Finn (The University of British Columbia), Freddy Pina (The University of British Columbia)

13:17 1193  
 SEISMIC RISK ASSESSMENT TOOL FOR SEISMIC MITIGATION OF  
 SCHOOLS IN BRITISH COLUMBIA  
**Graham Taylor\*** (TBG Seismic Consultants Ltd.) Freddy Pina (The University of British Columbia), Carlos Ventura (The University of British Columbia), Liam Finn (The University of British Columbia)

13:34 1624  
 SELECTION OF GROUND MOTIONS FOR THE SEISMIC RISK  
 ASSESSMENT OF SCHOOLS IN BRITISH COLUMBIA, CANADA  
**Freddy Pina\*** (The University of British Columbia) Graham Taylor (TBG Seismic Consultants Ltd.), Carlos Ventura (The University of British Columbia), Liam Finn (The University of British Columbia)

13:51 1154  
 SITE RESPONSE ANALYSIS FOR THE SEISMIC RISK ASSESSMENT OF  
 SCHOOLS IN BRITISH COLUMBIA, CANADA  
**Freddy Pina\*** (The University of British Columbia) Graham Taylor (TBG Seismic Consultants Ltd.), Carlos Ventura (The University of British Columbia), Liam Finn (The University of British Columbia)

14:07 1047  
 THE BC SCHOOL SEISMIC RETROFIT PROGRAM - LESSON LEARNT AND  
 APPLICATION OF INNOVATIONS  
**Bishnu Pandey\*** (University of British Columbia) Carlos Ventura (University of British Columbia)

14:24 1676  
 SEISMIC RETROFIT STRATEGIES FOR HISTORICAL CLAY BRICK  
 MASONRY SCHOOL BUILDINGS; BRITISH COLUMBIA, CANADA  
**John Sherstobitoff\*** (Sandwell Engineering Inc.) Graham Taylor (TBG Seismic Consultants Ltd.), J. Shuttleworth (GENIVAR)

# Concurrent Sessions continued

**MONDAY, JULY 26, 2010** (continued)

---

## 13:00 M17 Analysis and Testing of Isolators

---

Gordon Warn, Hamid Toopchi-Nezhad Metro East

13:00 407  
STIFFNESS ANALYSIS OF FIBER-REINFORCED RUBBER ISOLATORS UNDER COMPRESSIVE LOADS: A FINITE ELEMENT APPROACH  
**Hamid Toopchi-Nezhad\*** (McMaster University) Michael J. Tait (McMaster University), Robert G. Drysdale (McMaster University)

13:17 137  
NUMERICAL STUDY ON THE STABILITY OF ELASTOMERIC SEISMIC ISOLATION BEARINGS  
**Gordon Warn\*** (Penn State University) Jared Weisman (Penn State University)

13:34 177  
USING ORTHOGONAL PAIRS OF RODS ON CONCAVE BEDS (OPRCB) AS A BASE ISOLATION DEVICE - PART (I): ANALYTICAL, EXPERIMENTAL AND NUMERICAL STUDIES OF OPRCB ISOLATORS  
**Mahmood Hosseini\*** (Int'l Inst. of Earthquake Eng. & Seismology (IIEES) and Islamic Azad University (IAU), Tehran, Iran) Amirhossein Soroor (Earthquake Eng. Dept., Science & Reserach Branch of the Islamic Azad University (IAU), Tehran, Iran), Zohreh Bayat (Guilan University, Rasht, Iran)

13:51 285  
SEISMIC RESPONSE EVALUATION FOR ISOLATED AND NON-ISOLATED BUILDINGS CONSIDERING POUNDING  
**Sayed Mahmoud\*** (Faculty of Engineering at Mataria, Helwan University, Cairo, Egypt) Robert Jankowski (Faculty of Civil and Environmental Engineering, Gdansk University of Technology, Gdansk, Poland)

14:07 1028  
DEVELOPMENT OF A NEW BASE ISOLATION SYSTEM FOR SEISMIC ISOLATION OF STEEL PALLET STORAGE RACKS  
**Robert Michael\*** (Penn State Erie, The Behrend College) Robert Michael (Penn State Erie, Corry Rubber Corporation), Jim Courtwright (Ridg U Rak), Ernie Ferro (Corry Rubber), Andre Filiatrault (University of Buffalo), Peter Higgins (Higgins & Associates), Assawin Wanitkorkul (Aurecon Consulting (Thailand) Co.)

14:24 DISCUSSION

### Panel

---

## 13:00 M18 Special Session: Structures in Fire and Earthquake Panel

---

Hossein Mostafaei, Y. L. Mo Regatta Room

13:00 1130  
STRUCTURES IN FIRE AND EARTHQUAKE  
**Solomon Tesfamariam\*** (The University of British Columbia | Okanagan)

13:00 DISCUSSION INCLUDING SPEAKERS FROM SESSION M8

---

## 13:00 M19 On the basis for Ground Motion Prediction Equations (GMPEs)

---

John Zhao, John Douglas Harbour A

13:00 219  
ASSESSING THE EPISTEMIC UNCERTAINTY OF GROUND-MOTION PREDICTIONS  
**John Douglas\*** (University of Iceland)

13:17 1122  
GEOMETRIC ATTENUATION FUNCTIONS FOR RESPONSE SPECTRA ACCOUNTING FOR SEISMOLOGICAL PARAMETERS  
**John Zhao\*** (GNS Science, New Zealand)

13:34 1226  
SPATIAL CORRELATION OF GROUND MOTION INTENSITY MEASURES FROM REAL AND SIMULATED ACCELEROGRAMS

**Nirmal Jayaram\*** (Stanford University) Jaesung Park (AIR Worldwide Corporation), Paolo Bazzurro (AIR Worldwide Corporation), Polsak Tothong (AIR Worldwide Corporation)

13:51 1127  
CORRELATION IN SPECTRAL ACCELERATIONS OF EUROPEAN GROUND MOTION RECORDS

**Gian Paolo Cimellaro\*** (Department of Structural & Geotechnical Engineering, Politecnico di Torino) Alessandro De Stefano (Department of Structural & Geotechnical Engineering (DISTR), Politecnico di Torino, Italy)

14:07 1497  
CHARACTERIZING SPATIAL CROSS-CORRELATION BETWEEN GROUND-MOTION SPECTRAL ACCELERATIONS AT MULTIPLE PERIODS  
**Jack Baker\*** (Stanford University) Nirmal Jayaram (Stanford University)

14:24 958  
AN OVERVIEW ON THE NUMERICAL/ANALYTICAL METHODS OF SITE RESPONSE ANALYSIS FOR THE CITY OF OTTAWA, CANADA  
**Kasgin Khareshi Banab\*** (Carleton University) Dariush Motazedian (Carleton University), Siva Sivathayalan (Carleton University)

---

## 13:00 M20 Special Session: The Future of the George E. Brown, Jr. Network for Earthquake Engineering Simulation (NEES)

---

Joy Pauschke, Thalia Anagnos Pier 2 & 3

13:00 1831  
NEES ACADEMY: AN EDUCATIONAL CYBERINFRASTRUCTURE FOR THE EARTHQUAKE ENGINEERING COMMUNITY  
**Thalia Anagnos\*** (San Jose State University) Sean Brophy (Purdue University)

13:17 1780  
INTERNATIONAL COLLABORATION - NETWORKING THE EARTHQUAKE ENGINEERING RESEARCH COMMUNITY INTO A GLOBAL FRAMEWORK  
**Julio Ramirez\*** (NEES Operations)

13:34 1832  
2020 VISION FOR EARTHQUAKE ENGINEERING RESEARCH  
**Shirley Dyke\*** (Purdue University) Bozidar Stojadinovic (University of California), Pedro Arduino (University of Washington), Maria Garlock (Princeton University), Nicolas Luco (U.S. Geological Survey), Julio Ramirez (Purdue University), Solomon Yim (Oregon State University)

13:51 1833  
NEES RESEARCH HIGHLIGHTS: 2004-2009  
**Ian Buckle\*** (University of Nevada-Reno) Julio Ramirez (NEES Operations Center)

14:07 1835  
NEES CYBERINFRASTRUCTURE: A FOUNDATION FOR INNOVATIVE RESEARCH AND EDUCATION  
Rudolf Eigenmann (Purdue University) **Thomas Hacker\*** (Purdue University), Ellen Rathje (University of Texas at Austin)

14:24 1827  
DEVELOPING THE 'PEOPLES' RESILIENCE FRAMEWORK FOR DEFINING AND MEASURING DISASTER RESILIENCE AT THE COMMUNITY SCALE  
**Chris S. Renschler\*** (National Center for Geographic Information and Analysis - MCEER - University at Buffalo) Amy E. Frazier (National Center for Geographic Information and Analysis - MCEER - University at Buffalo), Lucy A. Arendt (Professional Programs in Business - University of Wisconsin-Green Bay), Gian P. Cimellaro (Dept. of Structural & Geotechnical Engineering)

**MONDAY, JULY 26, 2010** (continued)**15:40 M21 Performance-Based and Displacement-Based Design**

Jag Humar Metro Centre

- 15:40 185  
A CRITICAL EVALUATION OF PERFORMANCE ASSESSMENT PROCEDURES IN THE LIGHT OF FIELD DATA  
**Abdullah Dilsiz\*** (Middle East Technical University, Turkey)
- 15:57 994  
DISPLACEMENT-BASED SEISMIC DESIGN OF STEEL PLATE SHEAR WALL SYSTEMS WITH RIGID-CONNECTED BEAMS  
**Swapnil B. Kharmale\*** (Indian Institute of Technology Bombay)  
Siddhartha Ghosh (Indian Institute of Technology Bombay)
- 16:14 1097  
EVALUATION OF PERFORMANCE-BASED ANALYSIS AND DESIGN METHODS FOR ASYMMETRICAL SHEAR WALL BUILDINGS  
**Rami Eid\*** (Halcrow Yolles) Agha Hasan (Halcrow Yolles)
- 16:31 1018  
CODES OF ASSESSMENT OF BUILDINGS: A COMPARATIVE STUDY  
**Stavroula Pantazopoulou\*** (Democritus University of Thrace, GREECE)  
Stamatina Chassioti (Democritus University of Thrace, GREECE), Despina Syntzirma (Democritus University of Thrace, GREECE)
- 16:48 DISCUSSION

**15:40 M22 Concrete Columns**

Catherine French, James Wight Harbour B

- 15:40 546  
SIMULATING BAR-BUCKLING IN RC COLUMNS UNDER SEISMIC LOADS  
**Zhiyu Zong\*** (UC Davis) Sashi Kunnath (UC Davis)
- 15:57 312  
SEISMIC BEHAVIOR OF CIRCULAR CONFINED CONCRETE COLUMNS  
**Shamim Sheikh\*** (University of Toronto) Jingtao Liu (University of Toronto)
- 16:14 1060  
MODELING THE DEGRADING SHEAR BEHAVIOR OF REINFORCED CONCRETE COLUMNS LEADING TO COLLAPSE  
**Matthew LeBorgne\*** (University of Texas at Austin) Wassim Ghannoum (University of Texas at Austin)
- 16:31 1079  
REINFORCED CONCRETE COLUMNS SUBJECTED TO LATERAL LOADS  
**Halll Sezen\*** (The Ohio State University) M.S. Lodhi (The Ohio State University)
- 16:48 1126  
USE OF STEEL BELTED AUTOMOBILE TIRES AS TRANSVERSE COLUMN REINFORCEMENT FOR IMPROVED SEISMIC PERFORMANCE  
**Murat Saatcioglu\*** (University of Ottawa) Adel Bugaldian (University of Ottawa)
- 17:05 1172  
DYNAMIC COLLAPSE OF REINFORCED CONCRETE COLUMNS  
**Chiun-lin Wu\*** (National Center for Research on Earthquake Engineering, Taiwan) Yuan-Sen Yang (National Taipei University of Technology), Shyh-Jiann Hwang (National Taiwan University), Chin-Hsiung Loh (National Taiwan University)

**15:40 M23 Special Session: Seismic Engineering of Controlled-Rocking Systems for Steel Framed Structures**

Jerome Hajjar, Robert Tremblay Harbour A

- 15:40 734  
HYBRID SIMULATION TESTING OF A CONTROLLED ROCKING STEEL BRACED FRAME SYSTEM  
**Matthew Eatherton\*** (University of Illinois at Urbana-Champaign) Jerome Hajjar (University of Illinois at Urbana-Champaign), Gregory Deierlein (Stanford University), Xiang Ma (Stanford University), Helmut Krawinkler (Stanford University)
- 15:57 1330  
SEISMIC PERFORMANCE OF A SELF-CENTERING ROCKING CONCENTRICALLY-BRACED FRAME  
**Richard Sause\*** (Lehigh University) James Ricles (Lehigh University), David Roke (Lehigh University), N. Brent Chancellor (Lehigh University), Nathan Gonner (Lehigh University)
- 16:14 1400  
DESIGN EXAMPLES USING MODE SHAPING SPINES FOR FRAME AND WALL BUILDINGS  
**David Mar\*** (Tipping Mar + Associates)
- 16:31 1492  
EXPERIMENTAL VALIDATIONS AND DESIGN OF SELF-CENTERING ENERGY DISSIPATIVE (SCED) BRACING SYSTEMS  
**Constantin Christopoulos\*** (University of Toronto) Robert Tremblay (Ecole Polytechnique, Montreal), Jeff Erochko (University of Toronto), Hyungjoon Kim (University of Seoul)

- 16:48 1526  
DEVELOPMENT OF SELF-CENTERING STEEL MOMENT-RESISTING FRAMES FOR DAMAGE-FREE SEISMIC RESISTANT DESIGN  
**James Ricles\*** (Lehigh University) Constantin Christopoulos (University of Toronto), Richard Sause (Lehigh University), Maria Garlock (Princeton University)

17:05 DISCUSSION

**15:40 M24 New and Different Retrofit Techniques**

Guney Ozcebe, Kian Karimi Pier 5

- 15:40 395  
SELECTIVE WEAKENING RETROFIT FOR EXISTING R.C. STRUCTURES – CONCEPT, VALIDATION AND DESIGN EXAMPLE  
**Weng Y Kam\*** (Department of Civil and Natural Resources Engineering, University of Canterbury, Christchurch) Stefano Pampanin (Department of Civil and Natural Resources Engineering, University of Canterbury, Christchurch), Des Bull (Department of Civil and Natural Resources Engineering, University of Canterbury, Christchurch)
- 15:57 489  
EFFECT OF EARTHQUAKE-PROOF REINFORCEMENT BY GROUND ANCHOR AND DAMPER ON AN EXISTING BRIDGE WITH HIGH PIER  
**Tongxiang An\*** (Institute for Science and Engineering, Waseda University, Japan) Osamu Kiyomiya (Waseda University, Japan), Tran Viet Hung (Waseda University, Japan)
- 16:14 647  
PROOF OF CONCEPT TESTING OF NARROW STEEL PLATE SHEAR WALL WITH TENSION BRACING FOR RAPID SEISMIC REHABILITATION  
**Masahiro Kurata\*** (University of Michigan) Roberto T. Leon (Georgia Institute of Technology), Reginald DesRoches (Georgia Institute of Technology), Masayoshi Nakashima (Kyoto University)

# Concurrent Sessions continued

## MONDAY, JULY 26, 2010 (continued)

- 16:31 1111  
SEISMIC RETROFIT OF A CITY HALL USING BUCKLING RESTRAINED BRACES BASED ON NONLINEAR ANALYSES INCLUDING SOIL-STRUCTURE INTERACTION  
**Matthew Skokan\*** (Saiful/Bouquet, Inc.) Sampson Huang (Saiful/Bouquet, Inc.), Saiful Islam (Saiful/Bouquet, Inc.), Metin Oguzmert (Saiful/Bouquet, Inc.)
- 16:48 364  
EXPERIMENTAL INVESTIGATION OF TWO NOVEL FRP RETROFIT SCHEMES FOR STRENGTHENING STEEL COLUMNS  
**KIAN KARIMI\*** (McMaster University) Michael Tait (McMaster University), Wael El-Dakhakhni (McMaster University)
- 17:05 1088  
COMPARISONS OF DIFFERENT RETROFIT TECHNIQUES WITH PSEUDO DYNAMIC TESTING  
**Guney Ozcebe\*** (Middle East Technical University) Baris Binici (Middle East Technical University), Ozgur Kurc (Middle East Technical University), Efe Kurt (Middle East Technical University), Erdem Canbay (Middle East Technical University)

### 15:40 M25 Seismic Response of Wood Buildings

Maria Parisi, Michael Symans Marine Room

- 10:00 69  
TWO-DIMENSIONAL SEISMIC ANALYSIS OF MULTI-STORY LIGHT-FRAME WOOD BUILDINGS  
**Andre Filiatrault\*** (University at Buffalo, SUNY) Ioannis P. Christovasilis (University at Buffalo, SUNY)
- 10:17 157  
SEISMIC VULNERABILITY INDICATORS FOR TIMBER ROOF STRUCTURES  
**Maria A. Parisi\*** (Politecnico di Milano) Claudio Chesi (Politecnico di Milano), Chiara Tardini (Politecnico di Milano)
- 10:34 873  
EVALUATION OF SHEAR RESISTANT PERFORMANCE OF MUD-PLASTERED WALLS ALL OVER JAPAN  
**Masato Nakao\*** (Yokohama National University) Yutaka Yamazaki (Japan Association for Building Research Promotion)
- 10:51 951  
DISPLACEMENT-BASED DESIGN OF SEISMICALLY-ISOLATED WOODFRAMED STRUCTURES  
**Michael Symans\*** (Rensselaer Polytechnic Institute) Jayesh Shinde (Rensselaer Polytechnic Institute), John van de Lindt (Colorado State University)
- 11:07 1537  
IN-PLANE BEHAVIOR OF FULL-SCALE DHAJII WALLS UNDER QUASI-STATIC LOADING  
**Qaisar Ali\*** (NWFP University of Engineering & Technology, Peshawar, Pakistan) Tom Schcher (University of Applied Sciences of Southern Switzerland SUPSI, Lugano, Switzerland), Muhammad Ashraf (NWFP University of Engineering & Technology, Peshawar, Pakistan), Akhtar Naeem (NWFP University of Engineering & Technology, Peshawar, Pakistan)
- 11:24 1508  
SEISMIC RESPONSE CONTROL OF WOODEN HOUSE PLACED ON SLIDING BASE  
**Satsuya Soda\*** (Waseda University) Yuji Miyazu (Waseda University)

### 15:40 M26 Case Studies in Seismic Response

M. Celebi Harbour C

- 15:40 1445  
INVESTIGATING THE SEISMIC BEHAVIOUR OF SPLIT-LEVEL BUILDING STRUCTURES  
**Vahid Khonsari\*** (Sharif University of Technology) George England (Imperial College London), Maysam Kiani (Sharif University of Technology)
- 15:57 1819  
ASSESSING A REAL 3D TURKISH RC BUILDING USING NONLINEAR STATIC PROCEDURES  
**Carlos Bhatt\*** (Instituto Superior Técnico, Technical University of Lisbon, Portugal) Rita Bento (Instituto Superior Técnico, Technical University of Lisbon, Portugal), Rui Pinho (University of Pavia, Italy)
- 16:14 979  
EVALUATION OF THE LEVEL OF SEISMIC PROTECTION OF AN 85-STORY CONCRETE SHEAR WALL BUILDING  
**Amir Poshnejad\*** (Ryerson University) Reza Kianoush (Ryerson University), Jamil Mardukhi (NCK Engineering Ltd.)
- 16:31 1285  
EXPERIMENTAL INVESTIGATION OF SEISMIC STABILITY OF POWER PLANTS IN CANADA  
**Lidija Krstevska\*** (Institute for earthquake engineering and engineering seismology) Ljubomir Tashkov (Institute for earthquake engineering and engineering seismology), Mihail Garevski (Institute for earthquake engineering and engineering seismology), Vladimir Gocevski (Hydro Quebec)
- 16:48 752  
THREE-DIMENSIONAL STIFFNESS DEGRADATION MODEL FOR PROGRESSIVE COLLAPSE ANALYSIS OF BRIDGES  
**Silvena Reshotkina\*** (Carleton University) Vietanh Phung (TranTech Engineering, LLC), David Lau (Carleton University)
- 17:05 DISCUSSION
- #### Oral-Panel Combined
- ### 15:40 M27 Special Session: Seismic School Safety—How to Reduce the Threat?
- Phil Gould, Yumei Wang Pier 4
- 15:40 1791  
SEISMIC DESIGN OF SCHOOL BUILDINGS IN COLORADO AND OTHER LOW TO MODERATE HAZARD AREAS: IS THE INTERNATIONAL BUILDING CODE ADEQUATE?  
**Rob Jackson\*** (URS)
- 15:57 1816  
OREGON'S SEISMIC MITIGATION GRANT PROGRAM: AKA COURTNEY GRANT  
**Yumei Wang\*** (Oregon Dept of Geology & Mineral Industries)
- 16:14 1818  
PERFORMANCE OF TEMPLATE SCHOOL BUILDINGS IN TURKEY AND PERU DURING EARTHQUAKES  
**Ayhan Irfanoglu\*** (Purdue University)
- 16:31 1828  
PANEL ON SEISMIC SAFETY OF SCHOOLS  
**Jim Alkins\*** (Alkins Project Services Inc.,)
- 16:37 1829  
PANEL ON SEISMIC SAFETY OF SCHOOLS  
**Gary McGavin\*** (McGavin Architecture)
- 16:43 1830  
PANEL ON SEISMIC SAFETY OF SCHOOLS  
**Janiele Maffei\*** (Consulting Structural Engineer)
- 16:49 DISCUSSION

**MONDAY, JULY 26, 2010** (continued)**15:40 M28 Full-scale Laboratory and Field Tests**

Damon Fick, Toshihide Kashima Regatta Room

15:40 152

SHAKE TABLE TESTING OF A FULL-SCALE LIGHT-FRAME WOOD APARTMENT BUILDING

John van de Lindt\* (Colorado State University) Shiling Pei (Colorado State University), Steven Pryor (Simpson Strong Tie Co), Hidemaru Shimizu (NIED-Japan)

15:57 399

CYCLIC LATERAL LOAD TEST TO FAILURE OF A FULL-SCALE THREE-STORY FLAT-PLATE REINFORCED CONCRETE STRUCTURE

Damon Fick\* (South Dakota School of Mines and Technology)

16:14 733

INTERACTION BETWEEN STRUCTURAL FRAME AND WALL CLADDING IN A SHAKE TABLE TEST OF A FULL SCALE FOUR STOREY BUILDING

Jose Centeno\* (University of British Columbia) Carlos Ventura (University of British Columbia), Otton Lara (University of British Columbia)

16:31 759

FULL SCALE DYNAMIC RESPONSE OF A RC BUILDING UNDER LOW-TO-MODERATE SEISMIC MOTIONS

Philippe Gueguen\* (LGIT/LCPC-University Joseph Fourier Grenoble (France)) Clotaire Michel (Applied Computing and Mechanics Laboratory (IMAC), EPFL Switzerland)

16:48 764

ANALYSIS OF SMALL FREQUENCY VARIATIONS IN TWO TWIN TOWERS USING AMBIENT VIBRATIONS

Ali Mikael\* (LGIT/CNRS University Joseph Fourier Grenoble (France)) Philippe Gueguen (LGIT/LCPC-University Joseph Fourier Grenoble (France)), Philippe Roux (LGIT/CNRS University Joseph Fourier Grenoble (France)), Pierre-Yves Bard (LGIT/LCPC-University Joseph Fourier Grenoble (France))

17:05 1187

DYNAMIC BEHAVIOR OF HACHINOHE CITY HALL BUILDINGS EXAMINED BASED ON STRONG-MOTION DATA

Toshihide Kashima\* (Building Research Institute, Japan)

**15:40 M29 New Behavior Modes for Isolated Systems**

Marios Panagiotou, Francisco Parisi Metro East

15:40 483

PERFORMANCE OF ROCKING CORE WALLS IN TALL BUILDINGS UNDER SEVERE SEISMIC DISPLACEMENTS

Gregory M. Nielsen\* (Arup) Ibrahim Almufti (Arup), Stephen A. Mahin (University of California, Berkeley), Michael R. Willford (Arup)

15:57 1173

UPLIFT IN BASE-ISOLATED BUILDINGS WITH FRICTION PENDULUM BEARINGS

Francisco Parisi\* (Rutherford &amp; Chekene) William Holmes (Rutherford &amp; Chekene), Thomas Lauck (Rutherford &amp; Chekene)

16:14 1065

THREE-DIMENSIONAL NONLINEAR DYNAMIC ANALYSIS OF MULTI-BASE SEISMICALLY ISOLATED STRUCTURES WITH UPLIFT POTENTIAL

Panayiotis Roussis\* (University of Cyprus) Panagiotis Tsopelas (University of Thessaly), Michael Constantinou (University at Buffalo)

16:31 1119

SEISMIC ISOLATION USING SINGLE AND DUAL SHEAR HINGING OF TALL CANTILEVER WALL BUILDINGS SUBJECTED TO STRONG GROUND SHAKING

Marios Panagiotou\* (University of California, Berkeley) Vladimir Calugaru (University of California, Berkeley)

16:48 927

SIMPLIFIED SEISMIC ANALYSIS AND EXPERIMENTAL STUDIES ON BUILDINGS WITH MID-STORY ISOLATION SYSTEM

Shiang-Jung Wang\* (Assistant Researcher, National Center for Research on Earthquake Engineering) Kuo-Chun Chang (Professor, National Taiwan University), Jenn-Shin Hwang (Professor, Taiwan University of Science and Technology), Bo-Han Lee (Ph. D. Student, National Taiwan University)

17:05 1386

A STUDY ON THE POSSIBILITY OF ROOF ISOLATION AS A TECHNIQUE FOR UPGRADING THE SEISMIC BEHAVIOR OF MASONRY BUILDINGS

Saeed Yousefi\* (Earthquake Eng. Dept., Science &amp; Research Branch of the Islamic Azad University (IAU), Tehran, Iran) Mahmood Hosseini (Int'l Inst. of Earthquake Eng. &amp; Seismology (IIEES) and Islamic Azad University (IAU), Tehran, Iran)

**15:40 M30 Ground Motion, Seismicity, and Seismic Risk**

Erol Kalkan, Maurice Lamontagne Pier 2 &amp; 3

15:40 378

CUMULATIVE SPECTRAL ACCELERATION-SPECTRAL DISPLACEMENT INTENSITY MEASURES OF GROUND MOTION

Arzhang Alimoradi (John A. Martin &amp; Associates, Inc. and California Institute of Technology) Erol Kalkan (United States Geological Survey)\*

15:57 702

RESERVOIR-TRIGGERED SEISMICITY IN THE CANADIAN SHIELD

Maurice Lamontagne\* (Natural Resources Canada) Dan Manescu (Hydro-Québec)

16:14 491

IMPACT OF VARIOUS SITE CONDITIONS AND SHALLOW SITE RESPONSE CALCULATION DIFFERENCES ON LOSS ANALYSIS FOR THE 1812 NEW MADRID TYPE EARTHQUAKES

Khosrow Shabestari\* (AIR Worldwide) Mehrdad Mahdyiar (AIR Worldwide), BingMing Shen-tu (AIR Worldwide), Yufang Rong (AIR Worldwide), Jayanta Guin (AIR Worldwide)

16:31 566

A METHODOLOGY FOR CONSTRUCTING SEISMIC FRAGILITIES BASED ON EXPERIMENTS AND MECHANICAL MODELS

Mircea Grigoriu\* (Cornell University)

16:48 966

REGIONAL RISK ASSESSMENT FOR SEISMIC DESIGN ALTERNATIVES – THE CASE OF MEMPHIS, TENNESSEE

Hyeuk Ryu\* (Stanford University) Erdem Karaca (Swiss Re), Nicolas Luco (U.S. Geological Survey), Troy Milburn (United States Army Corps of Engineers)

17:05 1043

GROUND MOTION PREDICTION EQUATION FOR YIELD STRENGTH AND INELASTIC DISPLACEMENT SPECTRA

Yousef Bozorgnia\* (PEER, UC Berkeley) Mahmoud Hachem (SOM), Kenneth Campbell (EQECAT)

# Concurrent Sessions continued

**TUESDAY, JULY 27, 2010**

## **08:00 T1 Seismic Isolation of Bridges**

Ahmed El Gamal, Nawawi Chouh Pier 2 & 3

08:00 319  
VARIABLE-FREQUENCY ROCKING BEARING FOR NEAR-FAULT SEISMIC ISOLATION

**Lyan-Ywan Lu\*** (National Kaohsiung First University of Science & Technology, Taiwan) I-Ling Yeh (National Kaohsiung First University of Science & Technology, Taiwan), Hsun Chang (National Kaohsiung First University of Science & Technology, Taiwan), Shih-Wei Yeh (National Kaohsiung First University of Science & Technology, Taiwan)

08:17 1697  
SEMI-ACTIVE CONTROL OF THE SEISMIC RESPONSE OF BUILDING FRAMES USING FUZZY CONTROL  
**Hamid Moharami\*** (tarbiat modares university) karim kazemi bidokhti (tarbiat modares university), amir fayezi (tarbiat modares university)

08:34 777  
BRIDGE-ABUTMENT-BACKFILL DYNAMIC INTERACTION MODELING BASED ON FULL SCALE TESTS  
**Ahmed Elgamal\*** (University of California, San Diego) Patrick Wilson (University of California, San Diego)

08:51 950  
TWO-DIMENSIONAL NONLINEAR SEISMIC ANALYSIS OF SOIL-WELL-PIER SYSTEM CONSIDERING SOIL NONLINEARITY  
Goutam Mondal (Indian Institute of Technology Kanpur), **Sudhir Jain\*** (Indian Institute of Technology Kanpur)

09:07 173  
A SIMPLE SOFTWARE FOR THE PRELIMINARY DESIGN OF SEISMICALLY ISOLATED R/C HIGHWAY OVERPASS BRIDGES  
**George Manos\*** (Aristotle University of Thessaloniki) Anastasios Sextos (Aristotle University of Thessaloniki), Stergios Mitoulis (Aristotle University of Thessaloniki), Martha Geraki (Aristotle University of Thessaloniki)

09:24 866  
DYNAMIC ANALYSIS OF SEISMIC-EXCITED ISOLATED BRIDGES IN THE ULTIMATE STATE  
**Tzu-Ying LEE\*** (National Central University) Pak-Leng Wong (National Central University), Ren-Zuo WANG (National Center for Research on Earthquake Engineering)

## **08:00 T2 Varied Aspects of Seismic Structural Response and Behavior**

Eduardo Miranda, David McCormick Harbour C

08:00 124  
STRUCTURAL IRREGULARITIES AND BUILDING CODES  
**Babak Baradaran-Seyed\*** (Halsall Associates Limited) Babak Baradaran-Seyed (Halsall Adssociates Limited)

08:17 363  
NONLINEAR MODAL ANALYSIS AND SUPERPOSITION  
**Kevin K.F. Wong\*** (National Institute of Standards and Technology) John L. Harris (National Institute of Standards and Technology)

08:34 668  
SENSITIVITY OF NBCC 2005 BASE SHEAR TO THE FUNDAMENTAL PERIOD  
**Damien Gilles\*** (McGill University) Ghyslaine McClure (McGill University)

08:51 795  
SEAOC'S EARTHQUAKE PERFORMANCE EVALUATION PROGRAM  
**David McCormick\*** (Structural Engineers Association of California Earthquake Performance Evaluation Program) Fred Turner (Structural Engineers Association of California Earthquake Performance Evaluation Program), Joseph Valancius (Structural Engineers Association of California Earthquake Performance Evaluation Program), Anthony Court (Structural Engineers Associ

09:07 954  
GUIDELINES FOR SEISMIC DESIGN OF TALL BUILDINGS  
Ronald Hamburger (Simpson Gumpertz & Heger Inc.) **Jack Moehle\*** (Univ. of California at Berkeley)

09:24 1820  
A STUDY OF SEISMIC RESPONSE OF A BUILDING DESIGNED FOR INTERMEDIATE SEISMIC HAZARD  
**Carlos Arteta\*** (Universidad del Norte) Jack Moehle (University of California, Berkeley)

## **08:00 T3 Response of Concrete Structures 1**

Shamim Sheikh, Gustavo Parra-Montesinos Harbour B

08:00 246  
SEISMIC DESIGN OF A MAJOR PRECAST CONCRETE STRUCTURE IN THE NEW MADRID SEISMIC ZONE  
**James Beavers\*** (James E Beavers Consultants) Taha Al-Shawaf (AREVA)

08:17 369  
A DETAILED EVALUATION ON DEGRADING BEHAVIOR OF STRUCTURAL SYSTEMS  
**Murat Altug Erberik\*** (Middle East Technical University) Burak Kurtman (Middle East Technical University)

08:34 435  
CYCLIC BEHAVIOR OF MECHANICALLY SPLICED SHAPE MEMORY ALLOY AND STEEL BARS  
**M. Shahria Alam\*** (University of British Columbia) Maged A. Youssef (University of Western Ontario), Moncef Nehdi (University of Western Ontario)

08:51 583  
SEISMIC PERFORMANCE OF REINFORCED CONCRETE FRAME STRUCTURES WITH AND WITHOUT MASONRY INFILL WALLS  
**Abbie Liel\*** (University of Colorado, Boulder) Siamak Sattar (University of Colorado, Boulder)

09:07 681  
CORRELATION BETWEEN STRENGTH AND STIFFNESS OF REINFORCED CONCRETE ELEMENTS AND ITS IMPLICATIONS ON DISPLACEMENT BASED SEISMIC DESIGN OF BUILDINGS  
**A. Gustavo Ayala\*** (Instituto de Ingeniería, UNAM, MÉXICO) Hugo Castellanos (Instituto de Ingeniería, UNAM, MÉXICO), José Barradas (Instituto de Ingeniería, UNAM, MÉXICO)

09:24 756  
USE OF DAMAGE MECHANICS IN PERFORMANCE BASED DESIGN  
**Patrick Paultre\*** (University of Sherbrooke) Luis Ignacio Cardona (University of Sherbrooke), Jacky Mazars (Institut Polytechnique de Grenoble)

**TUESDAY, JULY 27, 2010** (continued)**08:00 T4 Special Session: Large-Scale Testing of Steel Frame Structures**

Matthew Eatherton, Kazuhiko Kasai Harbour A

08:00 102  
CYCLIC RESPONSE OF THREE-STORY FULL-SCALE CONCENTRICALLY BRACED FRAME SYSTEM**Dawn Lehman\* (University of Washington)** Eric Lumpkin (University of Washington), Po-Chien Hsiao (University of Washington), Charles Roeder (University of Washington), KehChyuan Tsai (National Center for Earthquake Engineering), An-Chieh Wu (National Center for Earthquake Engineering), Chih-Yu W08:17 781  
EXPERIMENTAL STUDY OF TOMORROW'S STEEL BRACED FRAMES IN BUILDING STRUCTURES**Jiun-Wei Lai\* (University of California at Berkeley)** Stephen A. Mahin (University of California at Berkeley)08:34 1248  
LARGE-SCALE SHAKING TABLE TEST OF STEEL BRACED FRAME WITH CONTROLLED ROCKING AND ENERGY DISSIPATING FUSES**Greg Deierlein\* (Stanford University)** Xiang Ma (Stanford University), Matthew Eatherton (University of Illinois), Jerome Hajjar (University of Illinois), Helmut Krawinkler (Stanford University), Toru Takeuchi (Tokyo Institute of Technology), Mitsumasu Midorikawa (Hokkaido University), Kazuhiko08:51 1292  
FULL-SCALE E-DEFENSE SHAKE TABLE TESTS ON 5-STORY STEEL BUILDING WITH VARIOUS DAMPERS  
**Kazuhiko Kasai\* (Tokyo Institute of Technology)** Yoji Ooki (Tokyo Institute of Technology), Hiroshi Ito (Tokyo Institute of Technology), Shojiro Motoyui (Tokyo Institute of Technology), Masato Ishii (Nikken Sekkei Ltd.), Hitoshi Ozaki (Nikken Sekkei Ltd.), Tsuyoshi Hikino (NIED), Koichi Kajiwara (Tokyo Institute of Technology)09:07 1294  
SEISMIC COLLAPSE TEST OF A FULL-SCALE 4-STORY STEEL FRAME: PART 1 - TEST RESULTS  
Keiichiro Suita (Kyoto University), **Satoshi Yamada\* (Tokyo Institute of Technology)**, Motohide Tada (Osaka University), Kazuhiko Kasai (Tokyo Institute of Technology), Yuuichi Matsuoka (Nippon Steel Engineering Inc.), Yuko Shimada (Tokyo Institute of Technology)09:24 1740  
DYNAMIC PROPERTY EVALUATIONS OF FULL-SCALE 4-STORY STEEL FRAME USING PARALLEL FE-ANALYSIS  
**Masayuki Kohiyama\* (Keio University)** Makoto Ohsaki (Kyoto University), Tomoshi Miyamura (Nihon University), Daigoro Isobe (University of Tsukuba), Hiroshi Akiba (Allied Engineering Corporation), Muneo Hori (The University of Tokyo), Koichi Kajiwara (National Research Institute for Earth Scie**08:00 T5 Pipelines, Wharfs, and Off-Shore Structures**

Dawn Lehman, Tom O'Rourke Marine Room

08:00 607  
PROBABILISTIC DEMAND MODEL AND FRAGILITY ESTIMATES FOR CRITICAL FAILURE MODES OF UN-ANCHORED STEEL STORAGE TANKS  
**Farhad Behnamfar\* (Isfahan University of Technology)** Farshad Berahman (WS ATKINS)08:17 980  
WATER SUPPLY SYSTEM DECISIONS FOR EARTHQUAKES  
**Thomas O'Rourke\* (Cornell University)** Natalia Romero (Cornell University), Michael Palmer (Cornell University), Amanda Bonneau (Private Consultant)08:34 1073  
DESIGN OF INTERDEPENDENT INTERFACES FOR LIFELINE SYSTEMS USING RESPONSE SURFACE INVERSE RELIABILITY METHODS  
**Xing Min\* (Rice University)** Leonardo Duenas (Rice University)08:51 1132  
IMPROVED PILE-TO-WHARF CONNECTIONS TO REDUCE SEISMIC DAMAGE OF WHARFS  
**Dawn Lehman\* (University of Washington)** Charles Roeder (University of Washington), Amanda Jellin (University of Washington), Emily Brackmann (University of Washington)09:07 970  
STRUCTURAL CONCRETE PILE-WHARF CONNECTIONS UNDER CYCLIC LATERAL LOADING  
Pablo Caiza (University of Illinois at Urbana-Champaign) Bassem Andrawes (University of Illinois at Urbana-Champaign), **James LaFave\* (University of Illinois at Urbana-Champaign)**09:24 119  
REGIONAL ESTIMATION OF SITE EFFECTS IN A COASTAL URBAN AREA USING A GIS FRAMEWORK  
**Chang-Guk Sun\* (Korea Institute of Geoscience and Mineral Resources)** Sung-Ho Chun (Daelim Industrial Co.), Jin-Soo Shin (Korea Institute of Geoscience and Mineral Resources), Hee-Il Lee (Korea Institute of Geoscience and Mineral Resources)**08:00 T6 Retrofit of Historic Buildings and Masonry**

Khaled Galal Pier 7 &amp; 8

08:00 593  
SEISMIC REHABILITATION OF REINFORCED MASONRY COLUMNS USING CFRP WRAPS  
**Nima Farnia\* (Concordia University)** Khaled Galal (Concordia University), Oscar Pekau (Concordia University)08:17 1540  
EXPERIMENTAL STUDY ON THE PERFORMANCE OF BRICK MASONRY PIERS BEFORE AND AFTER RETROFITTING WITH REINFORCED PLASTER  
**Ashraf Mohammad\* (NWFP University of Engineering & Technology Peshawar, Pakistan)** Qaisar Ali (NWFP University of Engineering & Technology Peshawar, Pakistan), Akhtar Naeem (NWFP University of Engineering & Technology Peshawar, Pakistan), Bashir Alam (NWFP University of Engineering & Technology Peshawar, Pakistan), Amjad Naseer (NWFP Un08:34 565  
SEISMIC EVALUATION AND RETROFIT OF A 7TH CENTURY HISTORIC BRICK MASONRY DOME IN SEMNAN  
**Alireza Mortezaei\* (Islamic Azad University-Semnan Branch)** Mehdi Zahrai (Tehran university)08:51 1733  
SEISMIC STRENGTHENING OF MASONRY INFILLED REINFORCED CONCRETE FRAMES WITH STEEL FIBER REINFORCEMENT  
**Erdem Canbay\* (Middle East Technical University)** Tugce Sevil (Middle East Technical University)

# Concurrent Sessions continued

## TUESDAY, JULY 27, 2010 (continued)

09:07 186

*ANALYTICAL INVESTIGATION OF EFFECT OF RETROFIT APPLICATION USING CFRP ON SEISMIC BEHAVIOR OF A MONUMENTAL BUILDING AT HISTORICAL CAPPADOCIA REGION OF TURKEY*

**Baki OZTURK\*** (Nigde University) Taner SENTURK (Nigde University), Can Yilmaz (Nigde University)

09:24 DISCUSSION

### 08:00 T7 Seismic Analysis and System Identification

Finley Charney, Shirley Dyke

Queens Quay

08:00 1442

*A CRITICAL REVIEW OF NUMERICALLY PREDICTED ACCELERATIONS IN NONLINEAR HYSTERETIC SYSTEMS*

**Lydell Wiebe\*** (University of Toronto) Constantin Christopoulos (University of Toronto)

08:17 1274

*DECENTRALIZED DAMAGE DETECTION IN A PLANAR FRAME*

**Manuel Ruiz-Sandoval\*** (Universidad Autonoma Metropolitana) Cesar Carpio (Universidad Autonoma Metropolitana)

08:34 454

*DISTRIBUTED MASS EFFECTS IN BUILDING POUNDING ANALYSES*

**Gregory Cole\*** (University of Canterbury) Rajesh Dhakal (University of Canterbury), Athol Carr (University of Canterbury), Desmond Bull (University of Canterbury)

08:51 290

*A MULTISCALE APPROACH TO MODELING DAMPING IN STRUCTURES*

**Adam Bowland\*** (Virginia Tech) Finley Charney (Virginia Tech), Cris Moen (Virginia Tech), Jordan Jarrett (Virginia Tech)

09:07 1324

*DYNAMIC BEHAVIOUR OF CONCRETE LIQUID TANKS UNDER HORIZONTAL AND VERTICAL GROUND MOTIONS USING FINITE ELEMENT METHOD*

Mehdi Moslemi (Ryerson University), **Amirreza Ghaemmaghani\*** (Ryerson University), Reza Kianoush (Ryerson University)

09:24 1373

*TELE-OPERATION SHAKE TABLE EXPERIMENTS IN EARTHQUAKE ENGINEERING FOR UNDERGRADUATE EDUCATION*

**Shirley Dyke\*** (Purdue University) Richard Christenson (University of Connecticut), Sandy Courter (University of Wisconsin)

### Oral-Panel Combined

### 08:00 T8 Special Session: Appropriate Building Technologies for Reducing Seismic Risk in Developing Countries (Panel)

Marjorie Greene, Sergio Alcocer

Pier 4

08:00 1414

*SHAKE TABLE TESTS ON TYPICAL STONE MASONRY BUILDINGS USED IN THE HIMALAYAN BELT*

**Qaisar Ali\*** (Earthquake Engineering Center N-WFP University of Engineering & Technology Peshawar Pakistan) Akhtar Naeem (NWFP University of Engineering & Technology, Peshawar, Pakistan), Muhammad Ashraf (NWFP University of Engineering & Technology, Peshawar, Pakistan), Awais Ahmad (NWFP University of Engineering & Technology, Peshawar, Pakistan), Bashir Alam (

08:11 1428

*CONFINED MASONRY: A CASE OF SUCCESS FOR REDUCING SEISMIC RISK*

**Sergio Alcocer\*** (Instituto de Ingenieria, Universidad Nacional Autónoma de México, UNAM)

08:21 1627

*NON-DUCTILE REINFORCED CONCRETE FRAME CONSTRUCTION AND ALTERNATIVE BUILDING TECHNOLOGIES FOR REGIONS OF HIGH SEISMIC RISK*

**Svetlana Brzev\*** (British Columbia Institute of Technology)

08:31 1689

*NICEE'S ROLE IN PROMOTING CONFINED MASONRY AS AN APPROPRIATE TECHNOLOGY FOR BUILDING CONSTRUCTION IN INDIA*

**Durgesh Rai\*** (Indian Institute of Technology Kanpur) Sudhir Jain (Indian Institute of Technology Gandhinagar)

08:41 1690

*SHEAR AND OUT OF PLANE BENDING STRENGTH OF REINFORCED ADOBE WALLS*

**Daniel Torrevalva\*** (Universidad Catolica del Peru)

08:51 1612

*STRAWBALE CONSTRUCTION: AN APPROPRIATE TECHNOLOGY FOR COUNTRIES WITH HIGH SEISMIC RISK*

**Martin Hammer\*** (Architect) Dmitry Ozeryansky (Ozeryansky Engineering/eeri)

09:01 DISCUSSION

### 08:00 T9 Inelastic Behavior of Components and Subassemblages

Mehrtash Motamedi, Mathew Speicher

Regatta Room

08:00 996

*CYCLIC RESPONSE OF CONCRETE COLUMNS REINFORCED WITH HIGH-STRENGTH STEEL*

**Jeffrey Rautenberg\*** (Purdue University) Santiago Pujol (Purdue University), Hooman Tavallali (Penn State University), Andres Lepage (Penn State University)

08:17 216

*RESIDUAL STRENGTH AND DEFORMATION CHARACTERISTICS OF CONFINED CONCRETE SUBJECTED TO ELEVATED TEMPERATURES*  
**UMESH SHARMA\*** (INDIAN INSTITUTE OF TECHNOLOGY ROORKEE, INDIA) KALEEM ZAIDI (INDIAN INSTITUTE OF TECHNOLOGY ROORKEE, INDIA), Pradeep Bhargava (INDIAN INSTITUTE OF TECHNOLOGY ROORKEE, INDIA), N.M. Bhandari (INDIAN INSTITUTE OF TECHNOLOGY ROORKEE, INDIA)

08:34 922

*INFLUENCE OF SLAB ON THE SEISMIC RESPONSE OF SUB-STANDARD DETAILED EXTERIOR REINFORCED CONCRETE BEAM COLUMN JOINTS*

**Patricio Quintana Gallo\*** (Department of Civil and Natural Resources Engineering, University of Canterbury, Christchurch) Weng Y Kam (Department of Civil and Natural Resources Engineering, University of Canterbury, Christchurch), Umut Akguzel (Department of Civil and Natural Resources Engineering, University of Canterbury, Christchurch), Stefano Pampanin (Department of Civil

08:51 982

*BEHAVIOR OF A SMA-BASED PARTIALLY RESTRAINED BEAM-COLUMN CONNECTION*

**Matthew Speicher\*** (Georgia Institute of Technology) Reginald DesRoches (Georgia Institute of Technology), Roberto T. Leon (Georgia Institute of Technology)

**TUESDAY, JULY 27, 2010** (continued)

09:07 448  
*IN-PLANE MONOTONIC AND CYCLIC TESTING OF STEEL ROOF DECK DIAPHRAGMS WITH NAILED AND WELDED CONNECTIONS*  
**Mehrtash Motamedi\*** (University of British Columbia) Carlos E. Ventura (University of British Columbia, Vancouver, BC., CANADA)

09:24 424  
*THREE-DIMENSIONAL TESTS OF A TWO-STORY, ONE-BAY BY ONE-BAY SPECIAL CONCENTRIC BRACED FRAME (SCBF): SPECIMEN DESIGNS AND DETAILS*  
**Keith Palmer\*** (University of Minnesota) Taichiro Okazaki (Hyogo Earthquake Engineering Research Center), Charles Roeder (University of Washington), Dawn Lehman (University of Washington)

**08:00 T10 Seismic Risk and Assessment**

Katsuichiro Goda, Maurizio Guadagnini Pier 5

08:00 116  
*AN EXAMPLE OF REGIONAL SEISMIC RISK ASSESSMENT WITH RELIABILITY ANALYSIS AND PROBABILISTIC MODELS*  
**Mojtaba Mahsuli\*** (University of British Columbia) Terje Haukaas (University of British Columbia), Carlos Ventura (University of British Columbia)

08:17 375  
*QUANTITATIVE SEISMIC RISK ASSESSMENT OF WOOD-FRAME BUILDINGS IN RICHMOND, BRITISH COLUMBIA*  
**Katsuichiro Goda\*** (University of Western Ontario) Gail M. Atkinson (University of Western Ontario)

08:34 473  
*A PROBABILISTIC MODEL FOR THE SEISMIC RISK OF BUILDINGS. APPLICATION TO ASSESS THE SEISMIC RISK OF BUILDINGS IN URBAN AREAS.*  
 Armando Aguilar (Technical University of Catalonia) **Luis Pujades\*** (Technical University of Catalonia), Alex Barbat (Technical University of Catalonia), Nieves Lantada (Technical University of Catalonia)

08:51 573  
*AN EFFICIENT SEISMIC INTENSITY MEASURE FOR SEISMIC RISK ANALYSIS OF STRUCTURES*  
**Ozan Cem Celik\*** (Middle East Technical University) Bruce R. Ellingwood (Georgia Institute of Technology)

09:07 1114  
*PROBABILISTIC MODELS FOR SEISMIC DAMAGE AND SUBSEQUENT LOSSES*  
**Shahrzad Talachian\*** (University of British Columbia) Terje Haukaas (University of British Columbia), Kenneth J. Elwood (University of British Columbia)

09:24 1505  
*A FRAMEWORK FOR EARTHQUAKE RISK ASSESSMENT FOR DEVELOPING COUNTRIES*  
**Maurizio Guadagnini\*** (Department of Civil & Structural Engineering, The University of Sheffield, Sheffield, UK) Shaukat Khan (Department of Civil & Structural Engineering, The University of Sheffield, Sheffield, UK), Iman Hajirasouliha (Department of Civil & Structural Engineering, The University of Sheffield, Sheffield, UK), Kypros Pilakoutas (Department of Civil

**10:10 T11 Bridge Design 1**

Sharlie Huffman, Marc Gerin Pier 2 & 3

10:10 793  
*REAL-TIME HYBRID TESTING OF SEISMIC PROTECTIVE SYSTEMS FOR BRIDGE STRUCTURES*  
**Cassandra Dion\*** (Ecole Polytechnique de Montreal) Najib Bouaanani (Ecole Polytechnique de Montreal), Robert Tremblay (Ecole Polytechnique de Montreal), Charles-Philippe Lamarche (Ecole Polytechnique de Montreal), Martin Leclerc (Ecole Polytechnique de Montreal)

10:28 1328  
*DYNAMIC BEHAVIOR OF THE JAMUNA MULTIPURPOSE BRIDGE CONSIDERING SOIL-STRUCTURE INTERACTION*  
**Raquib Ahsan\*** (Bangladesh University of Engineering and Technology) Samy Reza (Bangladesh University of Engineering and Technology)

10:46 502  
*RETROFITTING OF A STEEL ARCH BRIDGE WITH TMD METHOD IN BABOLSAR (IRAN)*  
**Zahra Tabrizian\*** (PhD candidate, Babol Noshirvani University of Technology, Babol, Iran) Amir Abbas Fatemi (PhD candidate, Science and Research Branch, Islamic Azad University, Tehran, Iran), Hossein Kayhani (PhD candidate, Science and Research Branch, Islamic Azad University, Tehran, Iran), Roohollah Ahmady Jazany (PhD candidate, International Inst

11:04 1035  
*SEISMIC ANALYSIS AND DESIGN OF PITT RIVER BRIDGE*  
**Don Kennedy\*** (Associated Engineering) Saqib Khan (Associated Engineering)

11:22 1364  
*SEISMIC RETROFIT ANALYSIS AND DESIGN OF THE CNR OVERHEAD*  
**Yuming Ding\*** (SNC Lavalin Inc) Samson Chan (SNC Lavalin Inc), Bill Szto (MoTI BC)

**10:10 T12 Aspects of Seismic Analysis**

Anil Chopra, Joann Browning Harbour C

10:10 421  
*ENERGY-BASED CRITERION FOR THE SELECTION OF THE SEISMIC INPUT FOR INELASTIC DYNAMIC ANALYSES*  
**Enrico Tomassoli\*** (Department of Civil Engineering and Environmental - University of Perugia) Marco Mezzi (Department of Civil Engineering and Environmental - University of Perugia)

10:28 498  
*COMPARISON OF ESTIMATED SEISMIC DEMAND THROUGH PROBABILISTIC AND INCREMENTAL DYNAMIC ANALYSIS*  
**Mehdi Banazadeh\*** (Assistant professor, Amir Kabir University of Tehran) Mehdi Mahdavi Adeli (Ph.D. Student, Amir Kabir University of Tehran), Ardeshir Deylami (Associated professor, Amir Kabir University of Tehran)

10:46 807  
*EVALUATION OF MODAL PUSHOVER ANALYSIS (MPA) FOR TALL BUILDINGS SUBJECTED TO TWO COMPONENTS OF GROUND MOTION*  
**Anil K. Chopra\*** (University of California, Berkeley) Juan C. Reyes (University of California, Berkeley)

11:04 909  
*ESTIMATION OF COLLAPSE CAPACITY AND COLLAPSE FRAGILITY USING MODAL PUSHOVER ANALYSIS*  
**Sang Whan Han\*** (Hanyang University) Ki-Hoon Moon (Hanyang University), Anil Chopra (University of California at Berkeley)

# Concurrent Sessions continued

**TUESDAY, JULY 27, 2010** (continued)

11:22 1524  
*EFFECTS OF X-BRACING RESISTANT SYSTEM CONFIGURATION ON LIMIT STATE BEHAVIOR IN STEEL FRAMES USING PUSHOVER ANALYSIS*  
**Peyman Shademan Heidari\*** (MSc graduate, Science and Research Branch, Islamic Azad University, Tehran, Iran) Hossein Kayhani (PhD candidate, Science and Research Branch, Islamic Azad University, Tehran, Iran), Roohollah Ahmady Jazany (PhD candidate, International Institute of Earthquake Engineering and Seismology, Tehran, Iran)

## **10:10 T13 Masonry-Infilled and RC Walls**

Gilberto Mosqueda, Benson Shing Harbour B

10:10 495  
*SHAKE TABLE TESTS OF A THREE-STORY MASONRY-INFILLED RC FRAME*  
**Andreas Stavridis\*** (UC San Diego) Ioannis Koutromanos (UC San Diego), Benson Shing (UC San Diego)

10:28 594  
*SHAKE TABLE TESTS AND REPAIR OF DUCTILE SLENDER REINFORCED CONCRETE SHEAR WALLS*  
**Iman GhorbaniRenani\*** (Ecole Polytechnique de Montreal) Robert Tremblay (Ecole Polytechnique de Montreal), Hossam El-Sokkary (Concordia University), Khaled Galal (Concordia University), Pierre Léger (Ecole Polytechnique de Montreal), Martin Leclerc (Ecole Polytechnique de Montreal)

10:46 992  
*SEISMIC PERFORMANCE OF UNREINFORCED MASONRY WALLS RETROFITTED WITH POST-TENSIONING TENDONS*  
Daniel Lazzarini (California Polytechnic State University, San Luis Obispo) **Peter Laursen\*** (California Polytechnic State University, San Luis Obispo), Cole McDaniel (California Polytechnic State University, San Luis Obispo)

11:04 1378  
*EFFECTS OF NONSTRUCTURAL PARTITION WALLS ON THE SEISMIC PERFORMANCE OF A MEDICAL FACILITY*  
Gilberto Mosqueda (University at Buffalo) Ryan Davies (University at Buffalo), **Rodrigo Retamales\*** (University at Buffalo), Andre Filiatraut (University at Buffalo)

11:22 1652  
*A SIMPLIFIED BEHAVIORAL MODEL FOR NONLINEAR SEISMIC ANALYSIS OF CONFINED MASONRY WALLS*  
**Fariman Ranjbaran\*** (Islamic Azad University (IAU), Islamshahr Branch, Tehran, Iran) Mahmood Hosseini (Int'l Inst. of Earthquake Eng. & Seismology (IIEES) and Islamic Azad University (IAU), Tehran, Iran)

## **10:10 T14 Special Session: Steel Structures, Anchors and Stainless steel**

Yihui Zhou, Charles Roeder Harbour A

10:10 1741  
*NON-STRUCTURAL COMPONENT PERFORMANCE IN FULL-SCALE 4-STORY BUILDING*  
**Yuichi Matsuoka\*** (Nippon Steel Engineering) Keiichiro Suita (Kyoto University), Satoshi Yamada (Tokyo Institute of Technology), Yuko Shimada (Tokyo Institute of Technology)

10:28 1743  
*NUMERICAL SIMULATION OF E-DEFENCE-SPECIMEN SUBJECTED TO VARIOUS RECORDED GROUND MOTIONS*  
**Motohide Tada\*** (Osaka University) Seiji Mukaide (Osaka University), Atsushi Mitani (Osaka University), Kazuhiko Kasai (Tokyo Institute of

Technology), Keiichiro Suita (Kyoto University), Satoshi Yamada (Tokyo Institute of Technology)

10:46 1589  
*BEHAVIOR OF POST-INSTALLED CONCRETE UNDERCUT ANCHORS SUBJECTED TO HIGH LOADING RATE AND CRACK CYCLING FREQUENCY*  
**Christoph Mahrenholtz\*** (Stuttgart University) Rolf Eligehausen (Stuttgart University), Akanshu Sharma (Bhabha Atomic Research Centre (BARC))

11:04 1647  
*MECHANICAL AND LOW-CYCLE FATIGUE BEHAVIOR OF STAINLESS REINFORCING STEEL FOR EARTHQUAKE ENGINEERING APPLICATIONS*  
**YIHUI ZHOU\*** (University at Buffalo-SUNY) YU-CHEN OU (National Taiwan University of Science and Technology), GEORGE C. LEE (University at Buffalo-SUNY), JEROME S. O'CONNOR (University at Buffalo-SUNY)

11:22 1340  
*PRESTRESSED BEAM-TO-COLUMN MOMENT CONNECTIONS USING CU-BASED SMA RODS*  
Ricardo Herrera (Universidad de Chile), Maria Ofelia Moroni (Universidad de Chile), Manfred Olea (Universidad de Chile), **Mauricio Sarrazin\*** (Universidad de Chile)

## **10:10 T15 Soil Stability**

Jonathan Pease Pier 5

10:10 803  
*ACTIVE WEDGE ANALYSIS OF SEISMIC PRESSURES FOR RETAINED SLOPES*  
**Jonathan Pease\*** (Kleinfelder) Dylan Menes (Summit Engineering Corp)

10:28 968  
*NUMERICAL STUDY OF SEISMIC EARTH PRESSURES IN CENTRIFUGE MODEL EXPERIMENTS*  
**Linda Al Atik\*** (UC Berkeley) Nicholas Sitar (UC Berkeley)

10:46 1033  
*APPLICATION OF DISPLACEMENT-BASED SEISMIC DESIGN APPROACH FOR MSE WALLS WITH UNEVEN REINFORCEMENT*  
Raj Siddharthan (University of Nevada, Reno), **Vishnan Gopalan\*** (Department of Water Resources, State of California), Saria Buhary (University of Nevada, Reno)

11:04 1170  
*FROZEN SOIL EFFECT ON THE OBSERVED GROUND MOTION CHARACTERISTICS*  
**Utpal Dutta\*** (University of Alaska Anchorage) Gang XU (Alaska Department of Transportation and Public Facilities), Zhaohui (Joey) Yang (University of Alaska Anchorage), Kenan Hazirbaba (Civil and Environmental Engineering)

11:22 1618  
*USER INTERFACE FOR PERFORMANCE-BASED EARTHQUAKE ENGINEERING: A SINGLE BENT BRIDGE PILOT INVESTIGATION*  
**Kevin Mackie\*** (University of Central Florida) Jinchi Lu (University of California, San Diego), Ahmed Elgamal (University of California, San Diego)

## **Panel**

### **10:10 T16 Special Session: Capacity for Seismic Risk Reduction in Developing Countries Panel**

Marjorie Greene, Andrew Charleson Pier 4

10:10 1365  
*CAPACITY BUILDING FOR SEISMIC RISK REDUCTION IN DEVELOPING COUNTRIES*  
**Andrew Charleson\*** (School of Architecture, Victoria University of Wellington)

**TUESDAY, JULY 27, 2010** (continued)

10:16 1390  
 A STRATEGIC WAY FOR PROMOTING IMPROVED SEISMIC RESISTANT TECHNIQUES TO INDONESIAN BUILDERS  
**Sugeng Wijanto\*** (PT. Gistama Intisemesta) Takim Andriano (Petra Christian University), Adhijoso Tjondro (Parahyangan Catholic University)

10:22 1471  
 LESSONS ON DISSEMINATION OF TECHNOLOGIES OF SEISMIC NON-ENGINEERED HOUSES  
**Tatsuo Narafu\*** (Information Center for Building Administration) Akihiko Tasaka (Ministry of Land, Infrastructure, Transport and Tourism), Yoshiyuki Nakajima (Embassy of Japan in Peru), Shizuko Matsuzaki (Ex-Volunteers Association for Architects), Keiko Sakoda (Ex-Volunteers Association for Architects), Hiroshi Imai (S)

10:28 1677  
 SOME RECENT CAPACITY BUILDING ACTIVITIES IN INDIA TOWARDS SEISMIC RISK REDUCTION  
**Sudhir Jain\*** (Indian Institute of Technology Gandhinagar)

10:34 1701  
 THE WORLD HOUSING ENCYCLOPEDIA: A MEANS TO STIMULATE SEISMIC RISK REDUCTION EFFORTS IN DEVELOPING COUNTRIES  
**Dominik H. Lang\*** (NORSAR/International Centre of Geohazards (ICG))

10:40 1787  
 A TRAINING PROGRAM TO BUILD SAFE AND HEALTHY ADOBE HOUSES AFTER THE PISCO 2007 EARTHQUAKE IN PERU  
**Marcial Blondet\*** (Catholic University of Peru) Julio Vargas (Catholic University of Peru), Alvaro Rubiños (Catholic University of Peru)

10:46 DISCUSSION

**10:10 T17 Damage Assessment Through Remote Sensing**

Ellen Rathje, Charles Huyck Queens Quay

10:10 969  
 SATELLITE OBSERVATIONS OF LANDSLIDES CAUSED BY THE 2008 WENCHUAN EARTHQUAKE IN CHINA  
**Ellen Rathje\*** (University of Texas) Lucas Carr (URS Corporation)

10:28 1315  
 TOWARDS QUANTIFYING MOVEMENT OF A MASSIVE LATERAL SPREAD USING HIGH-RESOLUTION SATELLITE IMAGE PROCESSING  
**Brady Cox\*** (University of Arkansas) Jackson Cothren (University of Arkansas), Adam Barnes (University of Arkansas), Joseph Wartman (Drexel University), Adrian Rodriguez-Marek (Washington State University), Jorge Meneses (Kleinfelder)

10:46 789  
 BUILDING DAMAGE DISTRIBUTION IN THE SOUTHERN PART OF BEICHUAN COUNTY BY THE 2008 WENCHUAN, CHINA, EARTHQUAKE DETECTED FROM SATELLITE OPTICAL IMAGES  
**Hiroyuki Miura\*** (Tokyo Institute of Technology) Saburoh Midorikawa (Tokyo Institute of Technology)

11:04 DISCUSSION

**10:10 T18 4th Int'l Tsunami Symposium: Tsunami Instrumentation and Warning System: Risk Analysis**

M.A. Baptista, E. Gica Marine Room

10:10 1839  
 OFFSHORE TSUNAMETER DATA ANALYSIS AND APPLICATIONS: DETIDING, QUALITY CONTROL AND MODEL VALIDATION  
**Natalia Donoho\*** (NOAA) Stephen Gill (NOAA), Katerina Glebushko (NOAA)

10:28 1836  
 MONITORING DETECTING AND WARNING OF TSUNAMIS  
**Maria Ana Baptista\*** (ISEL, IDL PORTUGAL) Luis Matias (FCUL, IDL), Fernando Carrilho (Instituto de Meteorologia), Alessandro Annunziato (Joint Research Centre, EU), Rachid Omira (Instituto Dom Luiz), Miguel Miranda (Instituto Dom Luiz)

10:46 1843  
 NOAA'S SHORT-TERM INUNDATION FORECAST FOR TSUNAMIS - VALIDATION OF THE INVERSION SCHEME AND USE FOR TSUNAMI HAZARD ASSESSMENT-  
**Edison Gica\*** (NOAA Center for Tsunami Research/JISAO-Univ of Washington) Michael C. Spillane (NOAA Center for Tsunami Research/JISAO-Univ of Washington), Donald B. Percival (Applied Physica Lab/Univ of Washington), Vasily V. Titov (NOAA/Pacific Marine Environmental Lab)

11:04 1837  
 TSUNAMI IMPACT ON NEWFOUNDLAND, CANADA, DUE TO FAR-FIELD GENERATED TSUNAMIS. IMPLICATIONS ON HAZARD ASSESSMENT  
**Jean Roger\*** (Ecole Normale Supérieure) Maria Ana Baptista (ISEL, IDL), David Mosher (Natural Resources Canada / Geological Survey of Canada), Héliène Hébert (CEA, DAM, DIF), Alexandre Sahal (Université Paris 1 Panthéon-Sorbonne)

11:22 1844  
 TOWARDS A NATIONAL TSUNAMI HAZARD MAP FOR CANADA: TSUNAMI SOURCES  
**Lucinda Leonard\*** (Geological Survey of Canada, Natural Resources Canada) Roy Hyndman (Geological Survey of Canada, Natural Resources Canada), Garry Rogers (Geological Survey of Canada, Natural Resources Canada)

**10:10 T19 Special Session: Historical Aspects of Earthquake Engineering**

Robert Reitherman, Art Heidebrecht Pier 7 & 8

10:10 1001  
 A SHORT HISTORY OF THE INVOLVEMENT OF US UNIVERSITIES IN EARTHQUAKE ENGINEERING  
**Robert Reitherman\*** (Consortium of Universities for Research in Earthquake Engineering)

10:28 341  
 EVOLUTION OF THE SEISMIC PROVISIONS OF THE NATIONAL BUILDING CODE OF CANADA  
**Art Heidebrecht\*** (McMaster University)

10:46 1657  
 THE EVOLUTION OF SEISMIC DESIGN PROVISIONS OF U. S. BUILDING CODES  
**William Holmes\*** (Rutherford & Chekene)

11:04 1810  
 BRIEF HISTORY OF RESEARCH IN EARTHQUAKE ENGINEERING AT CANADIAN UNIVERSITIES  
**Jagmohan Humar\*** (Carleton University)

11:22 DISCUSSION

# Concurrent Sessions continued

**TUESDAY, JULY 27, 2010** (continued)

## **10:10 T20 Special Session: Earthquake Damage and Control of Infrastructure in Urban Areas**

Bin Wu Regatta Room

10:10 1464

*EXPERIMENTAL STUDY ON THE SEISMIC BEHAVIOR OF A NOVEL TYPE OF ALL-STEEL BUCKLING-RESTRAINED BRACES*

**Bin Wu\*** (Harbin Institute of Technology) Junxian Zhao (Harbin Institute of Technology), Jinping Ou (Dalian University of Technology)

10:28 451

*BRIDGE SEISMIC DESIGN LESSONS LEARNED FROM WENCHUAN EARTHQUAKE OF CHINA*

**Han Wei\*** (Research Institute of Highway, Ministry of Communications, P. R. China) Kehai Wang (Research Institute of Highway, Ministry of Communications, P. R. China), Qian Li (Research Institute of Highway, Ministry of Communications, P. R. China), Jiangpeng Yang (Research Institute of Highway, Ministry of Communications, P. R. China)

10:46 452

*SEISMIC PERFORMANCE OF ARCH BRIDGE OBSERVED IN TANGSHAN EARTHQUAKE AND WENCHUAN EARTHQUAKE*

Qian Li (Research Institute of Highway, Ministry of Communications, P. R. China) Kehai Wang (Research Institute of Highway, Ministry of Communications, P. R. China), **Han Wei\*** (Research Institute of Highway, Ministry of Communications, P. R. China), Jiangpeng Yang (Highway Research Institute of China)

11:04 1527

*IN-SITU PUSHOVER TEST AND NUMERICAL SIMULATION OF AN EXISTING REINFORCED CONCRETE FRAME STRUCTURE*

Xilin LU (Tongji University) **Jiang Qian\*** (Tongji University), Tuo Lei (Tongji University), Liang LU (Tongji University), Guangye Zhao (Tongji University)

11:22 1710

*RECOVERABILITY ENHANCEMENT OF REINFORCED CONCRETE BRIDGE PIERS WITH FRP COMPOSITES*

**Zhishen Wu\*** (International Institute for Urban Systems Engineering, Southeast University) Gang Wu (International Institute for Urban Systems Engineering, Southeast University), Mohamed M. F. Fahmy (Department of Urban & Civil Engineering), Zeyang Sun (International Institute for Urban Systems Engineering, Southeast University)

## **13:30 T21 Bridge Design 2**

Armen Der Kiureghian, Rigoberto Burgueno Pier 2 & 3

13:30 1198

*COST-EFFECTIVENESS OF SEISMIC ISOLATION AND FIBER-REINFORCED CONCRETE IN TYPICAL BRIDGE CONSTRUCTION IN CALIFORNIA*

**Ady Aviram\*** (University of California, Berkeley) Kevin Mackie (University of Central Florida), Bozidar Stojadinovic (University of California, Berkeley)

13:47 1221

*TRAFFIC LOAD CAPACITY OF A BRIDGE DAMAGED IN AN EARTHQUAKE*

Vesna Terzic (University of California at Berkeley), **Bozidar Stojadinovic\*** (University of California, Berkeley)

14:04 1336

*SEISMIC BEHAVIOR OF REINFORCED CONCRETE FILLED STEEL TUBE PILE/COLUMN BRIDGE BENTS*

**Luis A. Montejo\*** (University of Puerto Rico at Mayaguez) Lennie A. González-Román (North Carolina State University), Mervyn J. Kowalsky (North Carolina State University)

14:21 1392

*PRACTICAL APPLICATION OF ADVANCED SEISMIC ANALYSIS OF STRUCTURES IN PRODUCTION PROJECT ENVIRONMENT*

**Hassan Sedarat\*** (SC Solutions, Inc.) Alexander Kozak (SC Solutions, Inc.), Alex Krimotat (SC Solutions, Inc.), Ahmad Itani (University of Nevada, Reno)

14:37 88

*SEISMIC PROGRESSIVE COLLAPSE ANALYSIS ON REINFORCED CONCRETE BRIDGES*

**David T. Lau\*** (Carleton University) Hartanto Wibowo (University of Nevada, Reno)

14:54 791

*AXIAL-SHEAR-FLEXURE INTERACTION HYSTERETIC MODEL FOR RC BRIDGE COLUMNS UNDER COMBINED ACTIONS*

**Jian Zhang\*** (University of California, Los Angeles) Shi-Yu Xu (University of California, Los Angeles)

## **13:30 T22 Loss Estimation and Other Aspects of Seismic Response**

Bijan Mohraz, Nicolas Luco

Harbour C

13:00 226

*GENERATED SEISMIC SIGNALS FOR CANADIAN SOIL CLASSES COMPATIBLE WITH THE DESIGN SPECTRA OF 2005 NATIONAL BUILDING CODE / PROPOSITION DE SIGNAUX SISMQUES GÉNÉRÉS COMPATIBLES AUX SPECTRES DE DIMENSIONNEMENT DU CNBC 2005*

**Tewfik Benazza\*** (École de Technologie Supérieure) Omar Chaallal (École de Technologie Supérieure)

13:17 388

*LOSS ESTIMATION OF MULTI-MODE DOMINATED STRUCTURES FOR A SCENARIO OF EARTHQUAKE EVENT*

**Nilesh Shome\*** (Risk Management Solution) Nicolas Luco (USGS)

13:34 685

*DAMAGE-BASED SPECTRAL MATCHING*

Bijan Mohraz (Southern Methodist University) **Mofid Nakhaei\*** (Southern Methodist University)

13:51 936

*AN ASSESSMENT OF SITE AMPLIFICATION FACTORS FOR THE WESTERN UNITED STATES*

**Yin-Nan Huang\*** (Nanyang Technological University) Andrew Whittaker (University at Buffalo, The State University of New York), Nicolas Luco (United States Geological Survey)

14:07 1223

*INFLUENCE OF RESIDUAL DISPLACEMENTS ON BUILDING LOSS ESTIMATION*

**Eduardo Miranda\*** (Stanford University) Marc Ramirez (AIR Worldwide)

14:24 1470

*POTENTIAL BENEFITS OF AN ENERGY FACTOR DISPLACEMENT-BASED DESIGN APPROACH*

**Timothy Sullivan\*** (University of Pavia, Italy)

## **13:30 T23 Response of Concrete Structures 2**

Patrick Paultre, Kent Harries

Harbour B

13:00 810

*EFFECTS OF STRONG-MOTION DURATION ON THE RESPONSE OF REINFORCED CONCRETE FRAME BUILDINGS*

**Lan Lin\*** (Geological Survey of Canada) Nove Naumoski (Public Works and Government Canada), Murat Saatcioglu (University of Ottawa), Simon Foo (Public Works and Government Canada)

**TUESDAY, JULY 27, 2010** (continued)

13:17 823  
SYSTEM-LEVEL ACCEPTANCE CRITERIA FOR SEISMIC ASSESSMENTS OF  
PRE-1970 REINFORCED CONCRETE BUILDINGS

**Majid Baradaran Shoraka\*** (University of British Columbia) Kenneth J. Elwood (University of British Columbia), Terje Haukaas (University of British Columbia)

13:34 842  
FRAGILITY CURVES FOR REINFORCED CONCRETE BUILDINGS USING  
HIGH DIMENSIONAL MODEL REPRESENTATION

**Meher Prasad Anumolu\*** (Indian Institute of Technology Madras, Chennai) Vipin Unnithan Unnikrishnan (Indian Institute of Technology Madras, Chennai), Bhairavavajula Nageswara Rao (Indian Institute of Technology Madras, Chennai)

13:51 848  
NONLINEAR STATIC SEISMIC ANALYSIS AND ITS VALIDATION USING  
DAMAGE DATA FROM REINFORCED-CONCRETE SCHOOL BUILDINGS  
**Yi-Hsuan Tu\*** (National Cheng Kung University, Taiwan) Tzu-Wei Liu (National Center for Research on Earthquake Engineering), Lai-Cheng Ao (National Cheng Kung University, Taiwan), Pei-Lin Yeh (National Cheng Kung University, Taiwan)

14:07 882  
EVALUATION OF FAILURE MODES OF R.C. BUILDINGS  
Stylianios Pardalopoulos\* (Demokritos University of Thrace), Georgia Thermou (Aristotle University of Thessaloniki), **Stavroula Pantazopoulou\*** (Demokritos University of Thrace)

14:24 903  
EARTHQUAKE SIMULATION TESTS OF A 1:5 SCALE PILOTI-TYPE LOW-  
RISE RC RESIDENTIAL BUILDING MODEL  
**HAN SEON LEE\*** (Korea University) DONG WOOK JUNG (Korea University), KYUNG BO LEE (Korea University), HEE CHUL KIM (Kyung Hee University), YOUNG HAK LEE (Kyung Hee University), KI HAK LEE (Sejong University)

**13:30 T24 Experimental Evaluation of Steel Components**

Jeff Berman, Charles-P. Lamarche Harbour A

13:30 845  
EXPERIMENTAL EVALUATION OF CONCENTRICALLY-BRACED FRAME  
BEAM-COLUMN CONNECTION FLEXURAL RESPONSE

**Larry Fahnestock\*** (University of Illinois at Urbana-Champaign) Christopher Stoakes (University of Illinois at Urbana-Champaign)

13:47 1008  
DYNAMIC TESTS OF 0.76 & 0.91 MM STEEL DECK DIAPHRAGMS FOR  
SINGLE-STORY BUILDINGS

**Robert Massarelli\*** (McGill University) John Franquet (McGill University), Kishor Shrestha (McGill University), Robert Tremblay (Ecole Polytechnique de Montreal), Colin Rogers (McGill University)

14:04 1040  
EVALUATION OF THE BENDING BEHAVIOR OF HOLLOW STRUCTURAL  
SECTION (HSS) MEMBERS FOR SEISMIC APPLICATIONS  
**Jason McCormick\*** (University of Michigan) Matthew Fadden (University of Michigan)

14:21 1068  
EXPERIMENTAL TESTS ON CYCLIC BEAM-COLUMN INTERACTION  
STRENGTH OF CONCRETE-FILLED STEEL TUBES  
Roberto Leon (Georgia Institute of Technology) Tiziano Perea (Georgia Institute of Technology), Mark Denavit (University of Illinois at Urbana-Champaign), **Jerome Hajar\*** (University of Illinois at Urbana-Champaign)

14:37 1069  
DYNAMIC TESTING AND ANALYSES OF WOOD SHEATHED / CFS FRAMED  
SHEAR WALLS

**Iman Shamim\*** (McGill University) Denise Morello (McGill University), Colin Rogers (McGill University)

14:54 1488  
LARGE SCALE TEST OF A MODULAR STEEL PLATE SHEAR WALL WITH  
PARTIALLY ENCASED COMPOSITE COLUMNS

**Mehdi Dastfan\*** (University of Alberta) Robert G. Driver (University of Alberta)

**13:30 T25 Soil-Structure Interaction and Soil Stability**

Kenneth Stokoe, Lynn Salvati Pier 5

13:30 307  
KEMESS MINE TAILINGS STORAGE FACILITY - INVESTIGATION AND  
EVALUATION OF LIQUEFACTION POTENTIAL

**Andrew Witte\*** (AMEC) Todd Martin (AMEC Earth & Environmental), Blair Gohl (Explosive Compaction Inc.)

13:47 362  
MODELING THE DYNAMIC PROPERTIES OF CEMENTED SAND FOR SITE  
RESPONSE ANALYSIS

**Lynn Salvati\*** (Jacobs Associates) Luling Yang (MWH Global)

14:04 1006  
FIELD MEASUREMENTS OF LINEAR AND NONLINEAR SHEAR MODULI OF  
CEMENTED ALLUVIUM

**Kenneth Stokoe\*** (The University of Texas at Austin) Kwangsoo Park (University of Texas at Austin), Wonseok Seo (GS Engineering & Construction Co. Ltd.), Michael Schuhen (Sandia National Laboratories)

14:21 1217  
EVALUATION OF VOLUMETRIC THRESHOLD STRAIN CONSIDERING  
NOISY FEEDBACK SIGNALS FROM SIMPLE SHEAR DEVICE

**Eric Yee\*** (UCLA) Jonathan Stewart (UCLA), Frederic Schoenberg (UCLA)

14:37 127  
SEISMIC ANALYSIS OF RCC CANTILEVER RETAINING WALL  
Mahua Chakrabarti\* (Veermata Jijabai Technological Institute) **Paresh Mestri\*** (VJTI & Tata Power)

14:54 DISCUSSION

**13:30 T26 Special Session: Recent Advances in Hybrid Simulation**

Gilberto Mosqueda, James Ricles Queens Quay

13:30 13  
SUBSTRUCTURING TECHNIQUES FOR HYBRID SIMULATION OF  
COMPLEX STRUCTURAL SYSTEMS

**Maria Cortez-Delgado\*** (University at Buffalo) Gilberto Mosqueda (University at Buffalo), Tao Wang (Institute of Engineering Mechanics, China)

13:47 120  
DISTRIBUTED ONLINE HYBRID TEST OF A FOUR-STORY STEEL MOMENT  
FRAME USING FLEXIBLE TEST SCHEME

**Gilberto Mosqueda\*** (University at Buffalo) Tao Wang (Institute of Engineering Mechanics), Andres Jacobsen (Disaster Prevention Research Institute), Maria Cortez-Delgado (University at Buffalo)

# Concurrent Sessions continued

## TUESDAY, JULY 27, 2010 (continued)

14:04 1108  
ADVANCED IMPLEMENTATION OF NONLINEAR CONTROL ALGORITHMS FOR SHAKING TABLE TESTS  
**T.Y. Yang\*** (University of British Columbia) Andreas Schellenberg (University of California, Berkeley)

14:21 1522  
PERFORMANCE ASSESSMENT OF BUILDING SYSTEMS WITH ELASTOMERIC DAMPERS USING REAL-TIME HYBRID SIMULATION  
**James Ricles\*** (Lehigh University) Theodore Karavasilis (Lehigh University), Richard Sause (Lehigh University), Cheng Chen (Lehigh University)

14:37 1024  
UK-NEES - DISTRIBUTED HYBRID TESTING BETWEEN BRISTOL, CAMBRIDGE AND OXFORD UNIVERSITIES: CONNECTING STRUCTURAL DYNAMICS LABS TO A GEOTECHNICAL CENTRIFUGE.  
**Mobin Ojaghi\*** (Oxford University) Ignacio Lamata Martinez (Oxford University), Matt Dietz (Bristol University), Martin Williams (Oxford University), Tony Blakeborough (Oxford University), Adam Crewe (Bristol University), Colin Taylor (Bristol University), Gopal Madabhushi (Cambridge University)

14:54 1257  
MIXED AND SWITCH DEGREE-OF-FREEDOM CONTROL IN HYBRID SIMULATION  
**Bozidar Stojadinovic\*** (University of California Berkeley) Hong Kim (University of California Berkeley), Catherine Whyte (University of California Berkeley)

### 13:30 T27 Special Session: Seismic Risk Assessment and Management of Civil Infrastructure

Solomon Tesfamariam, Jamie Padgett Regatta Room

13:30 1781  
RAPID OBSERVATION OF VULNERABILITY AND ESTIMATION OF RISK (ROVER): END-TO-END SEISMIC RISK MANAGEMENT SOFTWARE  
**Keith Porter\*** (University of Colorado at Boulder and SPA Risk LLC)

13:47 1239  
SEISMIC SCREENING OF BUILDINGS IN CANADA  
**Murat Saatcioglu\*** (University of Ottawa) Mohammad Shooshari (University of Ottawa), Simon Foo (Public Works and Government Services Canada)

14:04 1145  
SEISMIC LIFE-CYCLE COST ANALYSIS OF AGED BRIDGES  
**Jamie Padgett\*** (Rice University) Jayadipta Ghosh (Rice University)

14:21 1814  
RISK MODELS TO QUANTIFY COST EFFECTIVENESS OF REPLACING AGING WATER PIPES  
**John Eidinger\*** (G&E Engineering Systems Inc.)

14:38 1507  
RISK-BASED SEISMIC RETROFIT PRIORITIZATION OF REINFORCED CONCRETE CIVIC INFRASTRUCTURE: CASE STUDY FOR STATE OF OREGON SCHOOLS AND EMERGENCY FACILITIES  
**Solomon Tesfamariam\*** (The University of British Columbia | Okanagan) Yumei Wang (Oregon Dept of Geology and Mineral Industries), Murat Saatcioglu (University of Ottawa)

14:55 1600  
SEISMIC EVALUATION METHODOLOGY ISSUES  
**Brian Kehoe\*** (Wiss, Janney, Elstner Associates, Inc.)

### 13:30 T28 Isolated Systems

Eric Ko, Masayoshi Nakashima Pier 4

13:30 303  
FULL-SCALE SHAKING TABLE TEST OF A HOSPITAL MADE OF A BASE-ISOLATED FOUR-STORY CONCRETE STRUCTURE  
**Sachi Furukawa\*** (Kyoto University) Eiji Sato (E-Defense, National Research Institute for Earth Science and Disaster Prevention), Kouichi Kajiwara (E-Defense, National Research Institute for Earth Science and Disaster Prevention), Xiaodong Ji (Tsinghua University), Masayoshi Nakashima (Nation)

13:47 460  
RESPONSE OF ISOLATED RC BUILDINGS UNDER BIDIRECTIONAL NEAR-FAULT GROUND MOTIONS  
**Ugurhan Akyuz\*** (Middle East Technical University) Gokhan Ozdemir (Middle East Technical University)

14:04 619  
OPTIMUM SELECTION OF ISOLATOR PROPERTIES FOR EFFECTIVE MITIGATION OF SEISMIC RISK FOR BRIDGES  
**Memduh Karalar\*** (Middle East Technical University) Murat Dicleli (Middle East Technical University)

14:21 556  
POLE ASSIGNMENT USING PSO-SA HYBRID ALGORITHM FOR SLIDING MODE CONTROL ON ISOLATED BRIDGES WITH COLUMNS OF IRREGULAR HEIGHT  
**Po-Chuan Chen\*** (PhD Candidate, Dept. of Civil Engineering, National Central University, Taiwan) Tzu-Ying Lee (Assistant Professor, Dept. of Civil Engineering, National Central University, Taiwan), Der-Shin Juang (Professor, Dept. of Civil Engineering, National Central University, Taiwan)

14:37 1379  
BASE ISOLATED STRUCTURE - THE NEW SAN FRANCISCO  
**Eric Ko\*** (Arup San Francisco)

14:54 445  
DESIGN CONSIDERATIONS FOR A BASE ISOLATED STRUCTURE WITH TRIPLE FRICTION PENDULUM ISOLATORS: ISTANBUL SABIHA GÖKÇEN INTERNATIONAL AIRPORT TERMINAL BUILDING  
Atila Zekioglu (Arup North America Ltd.) **Huseyin Darama\*** (Arup North America Ltd.), Baris Erkus (Arup North America Ltd.)

### 13:30 T29 Seismic Hazards 1: A Global Overview

Zehra Cagnan, Yousef Bozorgnia Pier 7 & 8

13:30 785  
EVALUATING THE SEISMIC HAZARD IN ANCHORAGE, ALASKA  
**Ivan Wong\*** (URS Corporation) Timothy Dawson (URS Corporation), Mark Dober (URS Corporation), Youssef Hashash (Department of Civil and Environmental Engineering, University of Illinois)

13:47 436  
PROBABILISTIC SEISMIC HAZARD ASSESSMENT FOR SOUTH PACIFIC ISLANDS  
Yufang Rong (AIR Worldwide Corporation), Mehrdad Mahdyari (AIR Worldwide Corporation), **Bingming Shen-Tu\*** (AIR Worldwide Corporation), Khosrow Shabestari (AIR Worldwide Corporation), Jay Guin (AIR Worldwide Corporation)

14:04 867  
SPECTRAL ACCELERATION ATTENUATION FOR SEISMIC HAZARD ANALYSIS IN IRAN  
**Hamid Safari\*** (Dept. of Civil Engineering, Kobe University) Yasuko Kuwata (Dept. of Civil Engineering, Kobe University), Shiro Takada (Dept. of Civil Engineering, University of Tehran), Abbas Mahdavian (Water Engineering Department, Power and Water University of Technology of Tehran)

**TUESDAY, JULY 27, 2010** (continued)

14:21 753  
SEISMIC HAZARD IN WESTERN CANADA FROM GLOBAL POSITIONING SYSTEM STRAIN RATE DATA  
**Lucinda Leonard\*** (Geological Survey of Canada) Stephane Mazzotti (Geological Survey of Canada), John Cassidy (Geological Survey of Canada), Garry Rogers (Geological Survey of Canada), Stephen Halchuk (Geological Survey of Canada)

14:37 1775  
SEISMIC HAZARD ANALYSIS AND ROCK GROUND MOTIONS FOR A SITE IN DUBAI  
**Ayman Shama\*** (Parsons Corporation)

14:54 133  
SEISMIC HAZARD OF EASTERN MEDITERRANEAN REGION  
**Zehra Cagnan\*** (Middle East Technical University Northern Cyprus Campus) Sinan Akkar (Middle East Technical University)

**13:30 T30 4th Int'l Tsunami Symposium: Tsunami Engineering: Experimental Modeling**

L. Amir, Tad Murty Marine Room

13:30 1855  
FORECAST ALGORITHM FOR INTERPLATE GENERATED TSUNAMIS CALIBRATED BY DRAG FORCE TRANSPORT OF EASTER ISLAND MONOLITHS  
**Salvador Farreras\*** (CICESE Research Center of Mexico) MODESTO ORTIZ (CICESE Research Center of Mexico)

13:47 1853  
NUMERICAL MODELING OF TSUNAMI WAVES IN FRENCH WEST INDIES  
**Narcisse Zahibo\*** (University of the French West Indies and Guiana) Efim Pelinovsky (Institute of Applied Physics), Irina Nikolkina (University of the French West Indies and Guiana)

14:04 1846  
THE EARTHQUAKE AND TSUNAMI OF 365 A.D. IN THE EASTERN MEDITERRANEAN SEA  
**George Pararas-Carayannis\*** (Tsunami Society International) Charles L. Mader (Mader Consulting Co.)

14:21 1840  
ESTIMATION OF TSUNAMI FORCES ON INFRASTRUCTURE: FIELD INVESTIGATIONS AND PHYSICAL AND NUMERICAL MODELING  
**Ioan Nistor\*** (Dept. of Civil Engineering, University of Ottawa) Dan Palermo (Dept. of Civil Engineering, University of Ottawa), Murat Saatcioglu (Dept. of Civil Engineering, University of Ottawa), Tad Murty (Dept. of Civil Engineering, University of Ottawa)

14:37 1850  
ON-SHORE HYDRAULIC LOADS: EARTHQUAKE EXCITED TSUNAMIS  
**Angelo Thurairajah\*** (Structural Consulting)

14:54 DISCUSSION

**16:10 T31 Seismic Performance of Bridges 1**

David Lau, Don Kennedy Pier 2 & 3

16:10 111  
BIDIRECTIONAL-RESISTANT DUCTILE END DIAPHRAGMS FOR STRAIGHT STEEL BRIDGES  
**Oguz C. Celik\*** (Istanbul Technical University) Michel Bruneau (University at Buffalo)

16:27 208  
PERFORMANCE OF BRIDGE REINFORCED CONCRETE COLUMNS UNDER COMBINED ACTIONS THROUGHOUT SHAKE TABLE TESTING  
**Juan G. Arias-Acosta\*** (University of Nevada, Reno) David H. Sanders (University of Nevada, Reno)

16:44 1280  
EFFECTS OF POUNDING AND SKEWNESS ON SEISMIC RESPONSES OF MULTI-SPAN HIGHWAY BRIDGES USING FRAGILITY FUNCTION METHOD  
**Jian Zhang\*** (University of California, Los Angeles) Yili Huo (University of California, Los Angeles)

17:01 405  
NON-LINEAR BRIDGE RESPONSE TO DIFFERENTIAL SUPPORT MOTIONS  
**Katerina Konakli\*** (University of California, Berkeley) Armen Der Kiureghian (University of California, Berkeley)

17:18 644  
SEISMIC BEHAVIOR OF A HALF-THROUGH STEEL ARCH BRIDGE SUBJECTED TO GROUND MOTIONS AND FAULT DISPLACEMENT  
**TOSHITAKA YAMAO\*** (Kumamoto University) TATSUYA SHO (Obayashi Corporation), YOSHIE TSUJINO (Obayashi Corporation), Taiji Mazuda (Kumamoto University)

17:35 701  
SEISMIC PERFORMANCE OF HIGH-STRENGTH-CONCRETE HOLLOW BRIDGE PIERS UNDER MULTI-DIRECTIONAL LOADING  
**Xuejian Liu\*** (Michigan State University) Rigoberto Burgueno (Michigan State University), Eric Hines (Tufts University)

**16:10 T32 Special Session: Seismic Design Codes in the US and Canada**

Rafael Sabelli, Jag Humar Harbour C

16:10 296  
COMPARISON OF US AND CANADIAN CODE REQUIREMENTS FOR SEISMIC DESIGN OF STEEL BUILDINGS  
**Rafael Sabelli\*** (Walter P Moore) Brian Dean (Walter P Moore)

16:27 297  
IMPROVED SEISMIC ANALYSIS OF LIGHT-FRAMED MULTI-STORY RESIDENTIAL BUILDINGS WITH REFERENCE TO U.S. AND CANADIAN CODES  
**Doug Hohbach\*** (Hohbach-Lewin, Inc.) Sam Shiotani (Hohbach-Lewin, Inc.)

16:44 161  
THE 2010 AISC SEISMIC PROVISIONS  
**James Malley\*** (Degenkolb Engineers)

17:01 1387  
PROPOSALS FOR THE SEISMIC DESIGN PROVISIONS OF 2010 NATIONAL BUILDING CODE OF CANADA  
**Jagmohan Humar\*** (Carleton University) John Adams (Geological Survey of Canada), Robert Tremblay (Ecole Polytechnique), Colin Rogers (McGill University), Stephen Halchuk (Geological Survey of Canada)

17:18 1768  
SEISMIC DESIGN OF STEEL STRUCTURES IN ACCORDANCE WITH CSA-S16-09  
**Robert Tremblay\*** (Ecole Polytechnique) Michel Bruneau (SUNY Buffalo), Robert Driver (University of Alberta), Andy Metten (Bush, Bohlman & Partners), Jim Montgomery (Cohos Evamy), Colin Rogers (McGill University)

17:35 DISCUSSION

# Concurrent Sessions continued

**TUESDAY, JULY 27, 2010** (continued)

## 16:10 T33 Response of Concrete Structures 3

Jack Moehle, Ayhan Irfanoglu Harbour B

16:10 926  
*SEISMIC FRAGILITY OF OPEN GROUND STOREY BUILDINGS IN INDIA*  
**Devdas Menon\*** (IIT Madras) Robin Davis (IIT Madras), Tushar K. Padhy (IIT Madras), Meher Prasad A. (IIT Madras)

16:27 1011  
*ESTIMATING SEISMIC DEMANDS ON GRAVITY-LOAD COLUMNS IN CONCRETE SHEAR WALL BUILDINGS*  
**Poureya Bazargani\*** (The University of British Columbia) Perry Adebar (The University of British Columbia)

16:44 1066  
*INFLUENCE OF ORIENTATION OF RECORDED GROUND MOTION COMPONENTS ON THE REINFORCING STEEL AREA IN CONCRETE FRAME ELEMENTS*  
**Asimina Athanatopoulou-Kyriakou\*** (Aristotle University of Thessaloniki) Konstantinos Kostinakis (Aristotle University of Thessaloniki), Ioannis Avramidis (Aristotle University of Thessaloniki)

17:01 1191  
*VARIATION OF SMALL AMPLITUDE VIBRATION DYNAMIC PROPERTIES WITH DISPLACEMENT IN REINFORCED CONCRETE STRUCTURES*  
**Ayhan Irfanoglu\*** (Purdue University) Fabian Consuegra (Janssen and Spaans Engineering)

17:18 1517  
*EVALUATION OF SEISMIC SAFETY OF EXISTING REINFORCED CONCRETE BUILDINGS IN WESTERN REGION OF TURKEY*  
**Kasim Korkmaz\*** (Suleyman Demirel University) Ayhan Irfanoglu (Purdue University), Ali Haydar Kayhan (Pamukkale University), Aykut Deniz (Tech.-Eng. Service)

17:35 1769  
*RESPONSE MODIFICATION FACTOR FOR REINFORCED CONCRETE (RC) LIQUID CONTAINING STRUCTURES*  
**Reza Kianoush\*** (Ryerson University) Reza Sadjadi (Ryerson University)

## 16:10 T34 Seismic Performance of Steel Components and Connections

Greg Deierlein, Swaminathan Krishnan Harbour A

16:10 335  
*EFFECT OF CONTINUITY PLATE ARRANGEMENT ON SEISMIC BEHAVIOR OF PANEL ZONE WITH UNEQUAL BEAM DEPTH FOR INTERIOR COLUMNS IN SMRFS*  
**Roohollah Ahmady Jazany\*** (PhD candidate, International Institute of Earthquake Engineering and Seismology, Tehran, Iran) Hossein Kayhani (PhD candidate, Science and Research Branch, Islamic Azad University, Tehran, Iran), Amir Abbas Fatemi (PhD candidate, Science and Research Branch, Islamic Azad University, Tehran, Iran), Zahra Tabrizian (PhD candidate, Babol Noshirvani University)

16:27 778  
*CYCLIC EVOLUTION OF DAMAGE AND BEAM-COLUMN INTERACTION STRENGTH OF CONCRETE-FILLED STEEL TUBE BEAM-COLUMNS*  
**Jerome Hajar\*** (University of Illinois at Urbana-Champaign) Mark Denavit (University of Illinois at Urbana-Champaign), Tiziano Perea (Georgia Institute of Technology), Roberto Leon (Georgia Institute of Technology)

16:44 1139  
*SEISMIC PERFORMANCE AND DESIGN OF BRACED FRAME GUSSET PLATE CONNECTIONS*  
**Charles Roeder\*** (University of Washington) Dawn Lehman (University of Washington), Jacob Powell (University of Washington), Po-Chien Hsiao (University of Washington)

17:01 1327  
*SEISMIC PERFORMANCE OF STEEL BUILD-UP BATTEN COLUMNS*  
**Mehran Seyed Razzaghi\*** (Islamic Azad University, Qazvin Branch) Mohammad Ali Jafari (Niroo Research Institute, NRI), Hojatallah Ahmadpour (Islamic Azad University, South Tehran Branch)

17:18 1086  
*REDUCED LINK SECTIONS FOR IMPROVING THE DUCTILITY OF ECCENTRICALLY BRACED FRAME LINK-TO-COLUMN CONNECTIONS*  
**Jeffrey Berman\*** (University of Washington) Taichiro Okazaki (Hyogo Earthquake Engineering Research Center (E-Defense)), Heidrun Hauksdottir (EFLA Consulting Engineers)

17:35 1659  
*INVESTIGATION OF REPLACEABLE SACRIFICIAL STEEL LINKS*  
**Peter Dusicka\*** (Portland State University) Gregory Lewis (Portland State University)

## 16:10 T35 Soil-Foundation Interaction

Sri Sritharan, Anne Lemnitzer Pier 5

16:10 241  
*A SIMPLE NONLINEAR DESIGN MODEL FOR DRILLED SHAFTS IN COHESIVE SOIL*  
**Aaron Shelman\*** (Iowa State University) Sri Sritharan (Iowa State University)

16:27 1179  
*IMPACT OF SHEAR-FLEXURE INTERACTION ON P-Y CURVES OF PILE FOUNDATIONS*  
**Anne Lemnitzer\*** (California State University Fullerton) Leonardo Massone (University of Chile), John Wallace (UCLA)

16:44 1453  
*FACTORS INFLUENCING DEFORMATION MODE OF PILES IN LIQUEFACTION-INDUCED LATERAL SPREADING TEST USING E-DEFENSE FACILITIES*  
**Hiroko Suzuki\*** (Tokyo Institute of Technology) Masayoshi Sato (National Institute for Earth Science and Disaster Prevention), Kentaro Tabata (National Institute for Earth Science and Disaster Prevention), Kohji Tokimatsu (Tokyo Institute of Technology)

17:01 1623  
*COMBINED EFFECTS OF GROUND DISPLACEMENT AND INERTIAL FORCE ON PILE STRESSES IN CENTRIFUGE MODEL TESTS*  
**Youhao Zhou\*** (Tokyo Institute of Technology) Hiroko Suzuki (Tokyo Institute of Technology), Kohji Tokimatsu (Tokyo Institute of Technology)

17:18 780  
*ESTIMATION OF DEPTH OF ENGINEERING BEDROCK USING MICROTREMORS OBSERVED ON GROUND SURFACE*  
**Terumasa OKAMOTO\*** (The University of Tokushima) Osamu TSUJIIHARA (Wakayama National College of Technology)

17:35 DISCUSSION

**TUESDAY, JULY 27, 2010** (continued)**16:10 T36 Experimental Methods**Salman Saeed, Derek Skolnik Queens Quay16:10 1076  
*ESTIMATING DYNAMIC STRAINS IN SOIL GENERATED BY THE LARGE MOBILE SHAKERS AT NEES@UTEXAS***Farn-Yuh Meng\*** (University of Texas at Austin) Brady Cox (The University of Arkansas), Kwangsoo Park (The University of Texas at Austin), Kenneth Stokoe (The University of Texas at Austin)16:27 1388  
*A CRITICAL ASSESSMENT OF INTERSTORY DRIFT MEASUREMENTS*  
**Derek Skolnik\*** (KMI) John Wallace (UCLA)16:44 1081  
*SYNCHRONIZATION OF AMBIENT VIBRATIONS DATA FROM TESTS ON LARGE BUILDINGS OBTAINED BY MULTIPLE DATA ACQUISITION SYSTEMS*  
**Salman Saeed\*** (McGill University) Luc Chouinard (McGill University)17:01 484  
*TIME STEP OPTIMIZATION FOR DISTRIBUTED HYBRID SIMULATION BETWEEN UNIVERSITY OF CALIFORNIA-BERKELEY AND UNIVERSITY OF AUCKLAND*  
**Catherine Whyte\*** (University of California - Berkeley) Liam Wotherspoon (Institute of Earth Science and Engineering), Hong Kim (University of California - Berkeley), Bozidar Stojadinovic (University of California - Berkeley), Quincy Ma (University of Auckland)

17:35 DISCUSSION

**16:10 T37 Special Session: Seismic Risk Assessment and Management of Civil Infrastructure 2**John Cassidy, Solomon Tesfamariam Regatta Room16:10 1318  
*METHODS, MODELS, AND SOFTWARE FOR SEISMIC RISK ASSESSMENT*  
**Terje Haukaas\*** (University of British Columbia) Mojtaba Mahsuli (University of British Columbia)16:27 1489  
*FUZZY MODEL OF THE LIFE-CYCLE ANALYSIS OF BUILDING IN SEISMIC REGIONS*  
**Solomon Tesfamariam\*** (The University of British Columbia Okanagan) Mauricio Sanchez-Silva (Universidad de Los Andes)16:44 1341  
*DESIGN OF CAT-IN-A-BOX PARAMETRIC EARTHQUAKE CAT BOND TRIGGERS*  
**Guillermo Franco\*** (AIR Worldwide)17:01 1678  
*COLLABORATIVE EFFORT TO ESTIMATE COLLAPSE FRAGILITY FOR BUILDINGS WORLDWIDE: THE WHE-PAGER PROJECT*  
**Dina D'Ayala\*** (University of Bath) Kishor Jaiswal (USGS), David Wald (USGS), Keith Porter (University of Colorado Boulder), Marjorie Greene (EERI)17:18 1095  
*DEVELOPMENT OF A SEMI-EMPIRICAL LOSS MODEL WITHIN THE USGS PROMPT ASSESSMENT OF GLOBAL EARTHQUAKES FOR RESPONSE (PAGER) SYSTEM*  
**Kishor Jaiswal\*** (USGS, Contracted by Synergetics, Inc) David Wald (USGS)17:35 1240  
*SIMPLIFIED DRIFT-BASED SEISMIC FRAGILITY ASSESSMENT OF CONFINED MASONRY BUILDINGS*  
**Jorge Ruiz-García\*** (Universidad Michoacana de San Nicolás de Hidalgo) Amador Terán-Gilmore (Universidad Autónoma Metropolitana), Oscar Zuñiga-Cuevas (Universidad Autónoma Metropolitana)**16:10 T38 Seismic Design with Supplemental Damping Systems**Chen Cheng, Amir Gilani Pier 416:10 166  
*INNOVATIVE CONFIGURATIONS AND MORPHOLOGIES USING DISSIPATING BRACING SYSTEMS*  
**Marco Mezzi\*** (University of Perugia)16:27 359  
*SEISMIC DESIGN AND RETROFIT PROCEDURE FOR TOTAL ACCELERATIONS AND INTER-STORY DRIFTS REDUCTION OF BUILDINGS WITH PROTECTIVE SYSTEMS*  
**Oren Lavan\*** (Technion - Israel Institute of Technology)16:44 731  
*INITIAL PARAMETER DEVELOPMENT FOR MULTI-PHASE PERFORMANCE-BASED PASSIVE CONTROL SYSTEMS*  
**Justin Marshall\*** (Auburn University)17:01 1015  
*SEISMIC RESPONSE OF NONSTRUCTURAL ELEMENTS IN STRUCTURES WITH ENERGY-DISSIPATION SYSTEMS*  
**Eleni Pavlou\*** (University of Cyprus) Michael Constantinou (University at Buffalo), Panayiotis Roussis (University of Cyprus)17:18 1725  
*FRAGILITY CURVES FOR CONCRETE FRAME BUILDINGS WITH PASSIVE CONTROLLERS*  
**Orlando Cundumi Sanchez\*** (Caribbean University) Sylvia Teresa Laboy Rodriguez (University of Puerto Rico, Mayagüez)17:35 146  
*VISCOUS DAMPER LIMIT STATES AND COLLAPSE ANALYSIS OF STEEL FRAME BUILDINGS WITH DAMPERS*  
Kit Miyamoto (Miyamoto International) **Amir Gilani\*** (Miyamoto International), Arika Wada (Tokyo Institute of Technology)**Oral-Panel Combined****16:10 T39 Special Session: Using Technology to Influence Individual, Social, Organizational, and Community Behavior before and after an Earthquake (Panel)**Lucy Arendt, Jerome Lynch Marine Room16:10 1811  
*USING TECHNOLOGY TO INFLUENCE INDIVIDUAL, SOCIAL, ORGANIZATIONAL, AND COMMUNITY BEHAVIOR BEFORE AND AFTER AN EARTHQUAKE EVENT*  
**Charles Huyck\*** (ImageCat, Inc.) Walter Svekla (Imagecat, Inc.)16:27 1813  
*WIRELESS SENSING TECHNOLOGIES FOR PRE-EARTHQUAKE EVENT MITIGATION AND POST-EARTHQUAKE EVENT RESPONSE*  
**Jerome Lynch\*** (University of Michigan)16:44 1826  
*ROLE OF TECHNOLOGY IN DEVELOPING AND RECOMMENDING EARTHQUAKE ALERTING PROTOCOLS*  
**Douglas Bausch\*** (FEMA Region VIII) David Wald (USGS)

17:01 DISCUSSION

# Concurrent Sessions continued

**TUESDAY, JULY 27, 2010** (continued)

## **16:10 T40 Seismic Hazards 2: Evaluation of Methodologies**

Stephen Halchuk, John Adams Pier 7 & 8

16:10 286  
*CONSERVATISM IN INTRAPLATE PSHA STUDIES*  
**Roger Musson\* (BGS)**

16:27 439  
*IMPLICATIONS OF ITS CHOICE FOR CANADIAN SEISMIC HAZARD AND SEISMIC RISK APPLICATIONS*  
**Stephen Halchuk\* (Geological Survey of Canada, Natural Resources Canada)** John Adams (Geological Survey of Canada, Natural Resources Canada)

16:44 856  
*DESIGN SPECTRA FOR USE IN PROBABILITY-BASED DESIGN WITH EQUIVALENT LINEARIZATION TECHNIQUE*  
**Yasuhiro Mori\* (Nagoya University)** Kota Ibuki (Nagoya University), Maya Ooba (Shimizu Co. Ltd.)

17:01 925  
*ESTIMATED SEISMIC DESIGN VALUES FOR CANADIAN MISSIONS ABROAD*  
**John Adams\* (Geological Survey of Canada, Natural Resources Canada)** Stephen Halchuk (Geological Survey of Canada, Natural Resources Canada), Ahmed Awatta (Infrastructure Risk Management Program, Foreign Affairs and International Trade Canada)

17:18 1129  
*SENSITIVITY OF DESIGN SPECTRUM FOR BRITISH COLUMBIA TO DIFFERENT LEVELS OF PROBABILITY OF EXCEEDANCE*  
**Manuel Archila\* (The University of British Columbia)** Carlos Ventura (The University of British Columbia), Freddy Pina (The University of British Columbia), Jose Centeno (The University of British Columbia)

17:35 260  
*SITE RESPONSE ANALYSIS INCORPORATED IN PROBABILISTIC SEISMIC HAZARD ASSESSMENTS*  
**Stavroula Kontoe\* (Imperial College London)** Myrto Papaspiliou (Imperial College London), Julian Bommer (Imperial College London)

**WEDNESDAY, JULY 28, 2010****10:00 W1 Seismic Performance of Bridges 2**

Liam Wotherspoon, Mohamed ElGawady Metro Centre

10:00 250  
EFFECT OF SKEW ON THE SEISMIC RESPONSE OF RC BOX-GIRDER BRIDGES

**Ahmed Abdel-Mohti\*** (Ohio Northern University) Gokhan Pekcan (University of Nevada Reno)

10:17 200  
GOLDEN GATE BRIDGE RESPONSE – A PRELIMINARY STUDY WITH LOW AMPLITUDE EARTHQUAKE DATA

**Mehmet Celebi\*** (USGS) Christopher Stephens (USGS), Erol Kalkan (USGS)

10:34 669  
ANALYTICAL FRAGILITY CURVES FOR SEISMICALLY AND NON-SEISMICALLY DESIGNED MULTI-SPAN CONTINUOUS CONCRETE GIRDER BRIDGES IN MODERATE SEISMIC ZONES

**Karthik Ramanathan\*** (Georgia Institute of Technology) Reginald DesRoches (Georgia Institute of Technology), Jamie Padgett (Rice University)

10:51 1052  
SUBSTRUCTURE IRREGULARITY FOR DIFFERENT TYPES OF BRIDGES SUBJECTED TO SEISMIC ACTION

**Consuelo Gómez-Soberón\*** (Universidad Autónoma Metropolitana) Daymaru Salas-Mengchún (Universidad Autónoma Metropolitana)

11:07 1269  
IMPACT OF MODELLING ASSUMPTIONS FOR ASSESSING THE SEISMIC RESPONSE OF TWIN BRIDGES CONSIDERING SOIL-STRUCTURE INTERACTION IN 3D SPACE

**Anastasios Sextos\*** (Aristotle University Thessaloniki) Periklis Faraonis (Aristotle University Thessaloniki), Evangelos Katsanos (Aristotle University Thessaloniki)

11:24 1638  
EVALUATION OF AVAILABLE FORCE REDUCTION FACTORS FOR CONCRETE BRIDGES

**A Kappos\*** (Aristotle Univ. of Thessaloniki) T Paraskeva (Aristotle Univ. of Thessaloniki), J Moschonas (Aristotle Univ. of Thessaloniki)

**10:00 W2 Special Session: Evaluation of Collapse Performance - Example Applications of the FEMA P695 (ATC-63) Methodology**

Charles Kircher, Jon Heintz Harbour C

10:00 1734  
OVERVIEW AND KEY CONCEPTS OF THE FEMA P-695 (ATC-63) METHODOLOGY

**Charles Kircher\*** (Kircher & Associates) Jon Heintz (Applied Technology Council)

10:17 1735  
EXAMPLE APPLICATION OF THE ATC-63 METHODOLOGY FOR THE COLLAPSE PERFORMANCE EVALUATION OF WOOD LIGHT-FRAME SYSTEMS

**Andre Filiatrault\*** (University at Buffalo, SUNY) Ioannis Christovasilis (University at Buffalo, SUNY)

10:34 1738  
EXAMPLE COLLAPSE PERFORMANCE EVALUATION OF STEEL CONCENTRICALLY BRACED SYSTEMS

**Stephen Mahin\*** (Univ. of California, Berkeley) Chui-Hsin Chen (Univ. of California, Berkeley)

10:51 1757  
EXAMPLE APPLICATION OF THE FEMA P695 (ATC-63) METHODOLOGY FOR THE COLLAPSE PERFORMANCE EVALUATION OF REINFORCED MASONRY SHEAR WALL STRUCTURES

**P. Benson Shing\*** (University of California, San Diego) Ioannis Koutromanos (University of California, San Diego)

11:07 1765  
EXAMPLE APPLICATION OF THE FEMA P695 (ATC-63) METHODOLOGY FOR THE COLLAPSE PERFORMANCE EVALUATION OF REINFORCED CONCRETE SPECIAL MOMENT FRAME BUILDINGS

**Curt Haselton\*** (California State University, Chico) Abbie Liel (University of Colorado, Boulder), Gregory Deierlein (Stanford University)

11:24 DISCUSSION

**10:00 W3 Special Session: RC Wall Systems - State of the Art and Practice – Part I: Slender Wall Testing and Modeling**

John Wallace, Tosikazu Kabeyasawa Harbour B

10:00 773  
INVESTIGATION OF THE SEISMIC RESPONSE OF SLENDER PLANAR CONCRETE WALLS

**Laura Lowes\*** (University of Washington) Anna Birely (University of Washington), Ken Marley (University of Illinois), Chris Hart (University of Illinois), Dan Kuchma (University of Illinois), Dawn Lehman (University of Washington)

10:17 813  
STRENGTH AND DEFORMABILITY OF REINFORCED CONCRETE COLUMNS WITH WING WALLS

**Toshimi Kabeyasawa\*** (Earthquake Research Institute, University of Tokyo) Toshiyazu Kabeyasawa (Earthquake Research Institute, University of Tokyo), Yousook Kim (Earthquake Research Institute, University of Tokyo), Toshinori Kabeyasawa (Wada-giken corporation), Bae Kunkuk (Earthquake Research Institute, University of Tokyo), Pha

10:34 1713  
SIMPLIFIED MODELING OF RC STRUCTURAL WALLS FOR USE WITH PBE  
**Beth Brueggen\*** (Wiss, Janney, Elstner Associates, Inc., Irvine, TX) Catherine French (University of Minnesota, Twin Cities, MN)

10:51 1506  
NONLINEAR ANALYSIS OF T-SHAPED CONCRETE WALLS SUBJECTED TO MULTI-DIRECTIONAL LOADING

**Jonathan Waugh\*** (HNTB) Sri Sriharan (Iowa State University)

11:07 1824  
SEISMIC BEHAVIOR OF RC STRUCTURAL WALLS AND EUROCODE 8 PROVISIONS

**Matej Fischinger\*** (University of Ljubljana) Klemen Rejec (University of Ljubljana), Tatjana Isakovic (University of Ljubljana)

11:24 1148  
EFFECTIVE STIFFNESS OF HIGH-RISE CANTILEVER SHEAR WALLS  
**Ehsan Dezhdar\*** (University of British Columbia) Perry Adebar (University of British Columbia)

**10:00 W4 Seismic Design and Performance of Steel Structures**

Maria Garlock, Colin Rogers Harbour A

10:00 306  
DESIGN OF STEEL PLATE SHEAR WALLS CONSIDERING BOUNDARY FRAME MOMENT RESISTING ACTION

**Bing Qu\*** (California Polytechnic State University) Michel Bruneau (University at Buffalo)

# Concurrent Sessions continued

## WEDNESDAY, JULY 28, 2010 (continued)

- 10:17 584  
RELIABILITY-BASED EVALUATION OF DESIGN PROCEDURE FOR STEEL SELF-CENTERING MOMENT FRAMES  
**Gordana Hering\* (Princeton University)** Maria Garlock (Princeton University), Erik Vanmarcke (Princeton University)
- 10:34 660  
DESIGN PHILOSOPHY FOR STEEL STRUCTURES IN MODERATE SEISMIC REGIONS  
**Eric Hines\* (Tufts University)** Larry Fahnestock (University of Illinois, Urbana-Champaign)
- 10:51 666  
ENERGY-BASED DESIGN OF STEEL BUILDING FRAMEWORKS USING NONLINEAR TIME HISTORY ANALYSIS  
**Yusong Xue\* (University of Waterloo)** Yanglin Gong (Lakehead University), Lei Xu (University of Waterloo), Donald E. Grierson (University of Waterloo)
- 11:07 750  
UNITED STATES COURTHOUSE: APPLICATION OF PERFORMANCE BASED DESIGN TO AN ECCENTRICALLY BRACED FRAME STRUCTURE  
**Thomas A Sabol\* (Englekirk and Sabol Consulting Structural Engineers, Inc.)** Diana Nishi (Englekirk and Sabol Consulting Structural Engineers, Inc.), Paul Kagoo (Englekirk and Sabol Consulting Structural Engineers, Inc.)
- 11:24 805  
OPTIMAL DESIGN OF FRICTION DAMPERS FOR MULTI-STOREY BUILDINGS  
**Lucia Tirca\* (Concordia University)** Juan-David Morales (Concordia University), Ge-Li Guo (Concordia University), Liang Chen (Concordia University)

## 10:00 W5 Special Session: Soil Liquefaction

Jonathan Bray, Liam Finn Pier 2 & 3

- 10:00 1100  
EXPERIMENTAL INSIGHT INTO LIQUEFACTION-INDUCED BUILDING SETTLEMENT  
**Jonathan Bray\* (U C Berkeley)** Shideh Dashti (U C Berkeley), Juan Pestana (U C Berkeley), Michael Riemer (U C Berkeley), Dan Wilson (U C Davis)
- 10:17 1431  
CYCLIC SHEAR RESPONSE OF LOW PLASTIC FRASER RIVER SILT  
**Dharma Wijewickreme\* (University of British Columbia)**
- 10:34 1660  
EVALUATION OF LIQUEFACTION POTENTIAL BY SIMPLIFIED METHOD WITH PROBABILISTIC GROUND ACCELERATIONS  
**W. D. Liam Finn\* (University of British Columbia)** Adrian Wightman (BGC Engineering, Inc.)
- 10:51 1663  
PERFORMANCE-BASED LIQUEFACTION HAZARD EVALUATION  
**Steve Kramer\* (University of Washington)** Yi-Min Huang (Landau Associates)
- 11:07 1784  
IN SITU LIQUEFACTION TESTING USING SEQUENTIAL DETONATION OF EXPLOSIVES  
**Blair Gohl\* (Explosive Compaction Inc.)** Todd Martin (AMEC Earth and Environmental), John Sully (MEG Consulting Ltd.)
- 11:24 DISCUSSION

## 10:00 W6 Socio-Economic Issues of Public and Commercial Buildings

- Susan Tubbesing Pier 5
- 10:00 1683  
URBAN EARTHQUAKES AND BUSINESSES IN NEW ZEALAND: LEARNING FROM THE 2007 GISBORNE EARTHQUAKE  
**Felicity Powell\* (Central Laboratories, Opus International Consultants)** Abigail Allan (Central Laboratories, Opus International Consultants), Vince Dravitzki (Central Laboratories, Opus International Consultants)
- 10:17 964  
DEVELOPMENT OF SEISMIC RISK ASSESSMENT POLICIES FOR PUBLIC/PRIVATE STAKEHOLDERS  
**Tom Stevens\* (Halsall Associates Ltd.)** Dan Carson (Halsall Associates Ltd.)
- 10:34 1635  
COST SAVINGS FROM IMPROVED SEISMIC EVALUATION, A CASE STUDY.  
**Jeff Soulages\* (Intel Corporation)** Kenneth Mark Sinclair (Degenkolb Engineers), Michael Braund (Degenkolb Engineers)
- 10:51 802  
A CRITICAL EXAMINATION OF DESIGN REVIEW FOR SEISMIC ISOLATED BUILDINGS  
**Keri Ryan\* (Utah State University)** Lucy Arendt (University of Wisconsin, Green Bay), Desiray Larsen (Utah State University)
- 11:07 DISCUSSION

## 10:00 W7 Metallic Yielding Damping Systems

Ian Aiken, Bozidar Stojadinovic Metro East

- 10:00 595  
CAST STEEL YIELDING FUSE FOR CONCENTRICALLY BRACED FRAMES  
**Michael Gray\* (University of Toronto)** Constantin Christopoulos (University of Toronto), Jeffrey Packer (University of Toronto)
- 10:17 210  
A THERMOPLASTIC DAMAGE MODEL FOR METALLIC ENERGY DISSIPATION DEVICES  
**Gary Dargush\* (University at Buffalo, SUNY)** Dongkeon Kim (University at Buffalo, SUNY)
- 10:34 1401  
CELLULAR-SOLID SHEAR WALLS UNDER SEISMIC EXCITATIONS  
**Panos Tsopelas\* (University of Thessaly)** Liliang Chen (The Catholic University of America)
- 10:51 1640  
FEASIBILITY STUDY OF A SEISMIC DAMAGE-RESISTANT SYSTEM FOR MODULAR STEEL STRUCTURES  
**John Jing\* (University of Auckland)** Charles Clifton (University of Auckland), John Butterworth (University of Auckland)
- 11:07 1185  
SHAKING TABLE TESTING OF A POST-TENSIONED TENDON FRAME RETROFITTED WITH METALLIC SHEAR PANEL DISSIPATOR  
**Mobin Ojaghi\* (Oxford University)** Matt Dietz (University of Bristol), Olafur Oddbjornsson (University of Bristol), Colin Taylor (University of Bristol), Martin Williams (Oxford University), Tony Blakeborough (Oxford University)
- 11:24 DISCUSSION

**WEDNESDAY, JULY 28, 2010** (continued)**10:00 W8 Special Session: SMIS/EERI Workshop on Hospitals and Natural Hazards**

Eduardo Reinoso, James Jirsa Regatta Room

10:00 1705  
THE ROLE OF MODERN TECHNOLOGIES TO SAFEGUARD HOSPITALS DURING EARTHQUAKES**Arturo Tena-Colunga\*** (Universidad Autónoma Metropolitana) Omar Villegas-Jiménez (Udde Engineering de Mexico)10:17 1708  
VULNERABILITY AND SEISMIC RISK: CONSIDERATIONS FOR CALIFORNIA HOSPITALS**Mary Comerio\*** (UC Berkeley)10:34 1712  
SEISMIC, TSUNAMI AND HURRICANE RISK OF HOSPITALS IN MEXICO**Eduardo Reinoso\*** (Instituto de Ingeniería, UNAM) Miguel Jaimes (Instituto de Ingeniería, UNAM), Mario Ordaz (Instituto de Ingeniería, UNAM)10:51 1731  
SMIS-EERI Workshop on Safe Hospital under Natural Hazards  
Amador Teran-Gilmore (Sociedad Mexicana de Ingeniería Sismica),  
**James Jirsa\*** (Earthquake Engineering Research Institute)

11:07 DISCUSSION

**10:00 W9 Near Fault effects**

Hongjun Si, Masumitsu Kuse Pier 4

10:00 1403  
SIMULATION OF EARTHQUAKE MOTION AT NEAR FIELD REGION OF THE PAST DISASTROUS EARTHQUAKES**Masumitsu KUSE\*** (Gifu University) Masata SUGITO (Gifu University), Shinji KAWADE (Gifu Prefectural Government)10:17 467  
EVALUATION OF HANGING WALL EFFECTS ON GROUND MOTION ATTENUATION RELATIONSHIP CORRECTING THE SITE EFFECTS  
**Hongjun Si\*** (Kozo Keikaku Engineering Inc.) Hideaki Tsutsumi (Japan Nuclear Energy Safety Organization), Saburoh Midorikawa (Tokyo Institution of Technology)10:34 596  
DAMPING COEFFICIENTS FOR THE SINGLE-DEGREE-OF-FREEDOM (SDOF) SYSTEM SUBJECTED TO NEAR-FAULT SEISMIC EXCITATIONS  
**George Mavroeidis\*** (The Catholic University of America) Derek Hubbard (The Catholic University of America)10:51 512  
PREDICTION OF MW=7 EARTHQUAKE IN TEHRAN, USING EMPIRICAL GREEN FUNCTIONS  
**Ali Golara\*** (International Institute of Earthquake Engineering and Seismology (IIEES), Iran) Hossein Kayhani (Science and Research Branch, Islamic Azad University, Iran), Roohollah AhmadyJazany (International Institute of Earthquake Engineering and Seismology, Iran)11:07 528  
PREDICTION OF MW=6.2 KOJOUR EARTHQUAKE IN NORTH OF IRAN, USING EMPIRICAL GREEN FUNCTIONS  
**Roohollah Ahmady Jazany\*** (International Institute of Earthquake Engineering and Seismology, Iran) Ali Golara (International Institute of Earthquake Engineering and Seismology (IIEES), Iran), Hossein Kayhani (Science and Research Branch, Islamic Azad University, Iran)

11:24 DISCUSSION

**10:00 W10 4th Int'l Tsunami Symposium: Chile and Haiti Earthquake Tsunami Impacts/Numerical Modeling**

N. Zahibo, Z. Xu Marine Room

10:00 Special Presentation  
THE TSUNAMI EFFECTS OF THE HAITI AND CHILE EARTHQUAKES OF 2010**Murat Saatcioglu\*** (University of Ottawa), Ioan Nistor\*, (University of Ottawa), George Pararas-Carayannis\* (Tsunami Society International)10:34 1852  
THE STUDY OF INDIAN OCEAN TSUNAMI 26 DECEMBER 2004 ; ANALYSIS OF NATURE OF SEISMIC SOURCE FOR THE EARTHQUAKE  
**Raissa Mazova\*** (Nizhny Novgorod State Technical University) Leopold Lobkovsky (P.P.Shirshov Institute of Oceanology, Russian Academy of Sciences), Broneslav Kisel'man (Nizhny Novgorod State Technical University), Natalia Baranova (Nizhny Novgorod State Technical University)11:07 1856  
DISCRETIZED GLOBAL OPERATORS AND ALL-SOURCE GREEN'S FUNCTIONS OF SHALLOW WATER EQUATIONS FOR REAL-TIME SIMULATIONS OF TSUNAMI ARRIVALS**Zhigang Xu\*** (Maurice Lamontagne Institute, Fisheries and Oceans Canada)11:24 1842  
GRAIN-SIZE AND THIN SECTION CHARACTERISTICS OF TSUNAMI SEDIMENTS FROM KHAO LAK, THAILAND  
**Chanchai Srisutam\*** (Royal Irrigation Department, Thailand) Jean-Frank Wagner (University of Trier)**13:00 W11 Seismic Performance of Bridges 3**

Larry Fahnstock, Yuming Ding Metro Centre

13:00 700  
INELASTIC WEB CRUSHING CAPACITY OF HIGH-STRENGTH-CONCRETE STRUCTURAL WALLS**Rigoberto Burgueno\*** (Michigan State University) Xuejian Liu (Michigan State University), Eric Hines (Tufts University)13:17 105  
CYCLIC PERFORMANCE OF SHEAR-CRITICAL REINFORCED CONCRETE BEAMS RETROFITTED WITH CARBON FRP  
**Michael A. Colalillo\*** (University of Toronto) Shamim A. Sheikh (University of Toronto)13:34 774  
SEISMIC VULNERABILITY EVALUATION OF HIGHWAY BRIDGES IN QUEBEC USING FRAGILITY CURVES  
Patrick Paultre (University of Sherbrooke) **Danusa Haick Tavares\*** (University of Sherbrooke), Nathalie Roy (University of Sherbrooke), Jamie Padgett (Rice University)13:51 1599  
SEISMIC BEHAVIOUR OF RECTANGULAR R/C BRIDGE COLUMNS UNDER BIDIRECTIONAL EARTHQUAKE COMPONENTS  
**Amar Khaled\*** (Ecole de Technologie Superieure) Bruno Massicotte (Ecole Polytechnique of Montreal), Robert Tremblay (Ecole Polytechnique of Montreal)14:07 343  
THE IMPACT OF FREEZING WINTER TEMPERATURES ON SEISMIC RESPONSE OF BRIDGE COLUMNS  
**Liam Wotherspoon\*** (University of Auckland) Sri Sritharan (Iowa State University), Michael Pender (University of Auckland)

# Concurrent Sessions continued

## WEDNESDAY, JULY 28, 2010 (continued)

14:24 875  
QUASI-STATIC AND PSEUDO-DYNAMIC TESTING OF ROCKING SPREAD FOOTINGS FOR BRIDGES  
**Hsiao-Hui Hung\*** (National Center for Research on earthquake engineering) Kuo-Chun Chang (National Taiwan University), Kuang-Yen Liu (National Center for Research on earthquake engineering), Hsiu-Chun Wang (National Taiwan University)

**W12** Cancelled

### 13:00 W13 Special Session: RC Wall Systems - State of the Art and Practice -- Part II: Low-rise Wall and Coupling Beam Testing and Modeling

John Wallace, Perry Adebar Harbour B

13:00 826  
SEISMIC BEHAVIOR AND MODELING OF FLAT-PLATE GRAVITY FRAMING IN TALL BUILDINGS  
**Jack Moehle\*** (University of California, Berkeley) Tony Yang (University of British Columbia), Gabriel Hurtado (University of California, Berkeley)

13:17 1465  
EXPERIMENTAL AND ANALYTICAL ASSESSMENT OF SHEAR-CONTROLLED WALL RESPONSES  
**Leonardo M. Massone\*** (University of Chile) Kutay Orakcal (Bogazici University), John W. Wallace (University of California Los Angeles)

13:34 786  
SHEAR STRENGTH AND DRIFT CAPACITY OF HIGH-PERFORMANCE FIBER REINFORCED CONCRETE LOW-RISE WALLS SUBJECTED TO DISPLACEMENT REVERSALS  
Adamantia Athanasopoulou (University of Michigan) **Gustavo Parra-Montesinos\*** (University of Michigan)

13:51 1575  
TESTING AND MODELING OF DIAGONALLY REINFORCED CONCRETE COUPLING BEAMS  
**David Naish\*** (UCLA) John Wallace (UCLA)

14:07 684  
SEISMIC DETAILING AND BEHAVIOR OF COUPLED-WALL SYSTEMS WITH HIGH-PERFORMANCE FIBER-REINFORCED CONCRETE  
**Remy Lequesne\*** (University of Michigan) James Wight (University of Michigan), Gustavo Parra-Montesinos (University of Michigan)

14:24 1164  
VERTICAL REINFORCEMENT REQUIRED IN SQUAT CONCRETE SHEAR WALLS  
**Perry Adebar\*** (University of British Columbia) Afshin Esfandiari (WorleyParsons Westmar)

### 13:00 W14 Seismic Performance of Systems

Ernesto Cruz, Yusong Xue Harbour A

13:00 259  
EFFECTS OF FIRE FOLLOWING EARTHQUAKE ON STEEL MOMENT RESISTING COVERED VERSUS UNCOVERED STRUCTURES  
**Elnaz Peyghaleh\*** (K.N.Toosi University of Technology) Masoud Ziaei (K.N.Toosi University of Technology), Mohammad Reza Zolfaghari (K.N.Toosi University of Technology)

13:17 309  
SEISMIC RESPONSE OF CODE-DESIGNED MEDIUM-RISE SLENDER, MOMENT-RESISTING FRAME STEEL BUILDINGS IN SOFT SOILS  
**Arturo Tena-Colunga\*** (Universidad Autónoma Metropolitana)

13:34 330  
SEISMIC BEHAVIOR OF CODE-DESIGNED STEEL MOMENT RESISTING CONCENTRICALLY BRACED FRAMES (MRCBFS) IN SOFT SOILS  
**Edgar Tapia\*** (Universidad Autónoma Metropolitana) Arturo Tena-Colunga (Universidad Autónoma Metropolitana)

13:51 800  
SHAKEOUT 2008: Tall Steel Moment Frame Building Response  
**Swaminathan Krishnan\*** (California Institute of Technology) Matthew Muto (California Institute of Technology)

14:07 808  
NONLINEAR TIME-HISTORY ANALYSIS OF A POWER BOILER SUPPORT STRUCTURE UNDER EARTHQUAKE LOADING  
**Ernesto Cruz\*** (Pontificia Universidad Católica de Chile) Rodrigo Garcia (EQCO, Earthquake Engineering Consultants), Dania Valdivia (EQCO, Earthquake Engineering Consultants)

14:24 1087  
DEVELOPMENT OF A RECENTERING STEEL PLATE SHEAR WALL AND ADDRESSING CRITICAL STEEL PLATE SHEAR WALL RESEARCH NEEDS  
**Patricia Clayton\*** (University of Washington) Jeffrey Berman (University of Washington), Laura Lowes (University of Washington), Michel Bruneau (University at Buffalo), Larry Fahnstock (University of Illinois at Urbana-Champaign), Keh-Chyuan Tsai (National Taiwan University)

### 13:00 W15 Special Session: Scenarios with Planning, Response, and Recovery

Ivan Wong, Thalia Anagnos Pier 4

13:00 1039  
PROMOTING THE DEVELOPMENT AND USES OF EARTHQUAKE SCENARIOS  
**Ivan Wong\*** (URS Corporation) Marjorie Greene (Earthquake Engineering Research Institute), Susan Tubbesing (Earthquake Engineering Research Institute), Elizabeth Lemersal (U.S. Geological Survey)

13:17 1554  
DEVELOPMENT OF EARTHQUAKE LOSS SCENARIOS FOR TWO MEDITERRANEAN CITIES  
**A Kappos\*** (Aristotle Univ. of Thessaloniki) G Panagopoulos (Aristotle Univ. of Thessaloniki), A Sextos (Aristotle Univ. of Thessaloniki), K Stylianidis (Aristotle Univ. of Thessaloniki), V Papanikolaou (Aristotle Univ. of Thessaloniki), L Kouris (Aristotle Univ. of Thessaloniki)

13:34 1815  
DEVELOPING AND IMPLEMENTING SHAKEMAP SCENARIOS  
**Douglas Bausch\*** (FEMA) Jesse Rozelle (FEMA), McNabb Sean (FEMA), David Wald (USGS)

13:51 73  
EARTHQUAKE DAMAGE SCENARIOS FOR URBAN AREAS  
**Atilla Ansal\*** (Bogazici University, Kandilli Obs. & Earthquake Research Inst.) Asli Kurtulus (Bogazici University, Kandilli Obs. & Earthquake Research Inst.), Gokce Tonuk (Bogazici University, Kandilli Obs. & Earthquake Research Inst.)

14:07 DISCUSSION

### 13:00 W16 Special Session: Seismic Risk Reduction of Nonstructural Building Components 1

George Yao, Philip Caldwell Regatta Room

13:00 540  
CODE REQUIREMENTS FOR IMPROVED SEISMIC PROTECTION OF NONSTRUCTURAL COMPONENTS IN THE UNITED STATES  
**Robert Bachman\*** (Robert E. Bachman Consulting Structural Engineers)

**WEDNESDAY, JULY 28, 2010** (continued)

- 13:17 147  
CURRENT CODE REQUIREMENTS AND QUALIFICATION TEST STANDARD DEVELOPMENT FOR SUSPENDED CEILING  
**Amir Gilani\*** (Miyamoto International) Shakhzod Takirov (Pacific Earthquake Engineering Research Center), Robert Bachman (RE Bachman consulting structural engineer)
- 13:34 1196  
CURRENT PRACTICES AND CODE REQUIREMENTS FOR BUILDING SYSTEMS SEISMIC RESTRAINTS  
**Karl Peterman\*** (Vibro-Acoustics)
- 13:51 480  
NON-STRUCTURAL SEISMIC CODE PROVISIONS - IMPROVEMENTS NEEDED  
**John Eidinger\*** (G&E Engineering Systems Inc.)
- 14:07 1161  
NEED FOR OBJECTIVE TEST STANDARDS FOR SIMPLIFYING CODE COMPLIANCE AND VERIFICATION  
**Philip Caldwell\*** (Schneider Electric) Jeffery Gatscher (Schneider Electric)
- 14:24 1237  
ASSESSMENT OF THE NATIONAL BUILDING CODE OF CANADA SEISMIC DESIGN REQUIREMENTS FOR OPERATIONAL AND FUNCTIONAL COMPONENTS USING FLOOR RESPONSE SPECTRA  
**Murat Saatcioglu\*** (University of Ottawa) Mohammad Shooshtari (Bu-Ali Sina University), Simon Foo (Public Works and Government Services Canada), Nove Naumoski (University of Ottawa)

**13:00 W17 Social Scientific Perspectives on Seismic Awareness and Risk Management**

Janise Rodgers, Tom Stevens Pier 5

- 13:00 1057  
SYSTEMIC UNCERTAINTIES AND DECISION SUPPORT APPLICATIONS IN REGIONAL SEISMIC LOSS ANALYSES  
**Joshua Steelman\*** (University of Illinois at Urbana-Champaign) Jerome Hajjar (University of Illinois at Urbana-Champaign)
- 13:17 163  
EARTHQUAKE RISK PERCEPTION AMONG STAKE-HOLDERS IN MUMBAI, INDIA  
**Ravi Sinha\*** (Indian Institute of Technology Bombay) Dilip Chaudhari (Indian Institute of Technology Bombay), Vaibhav Desai (Indian Institute of Technology Bombay), Sagar Rai (Indian Institute of Technology Bombay)
- 13:34 1604  
DIFFUSING SEISMIC SAFETY  
**Janise Rodgers\*** (GeoHazards International) Veronica Cedillos (GeoHazards International), L. Thomas Tobin (GeoHazards International), Brian Tucker (GeoHazards International), Hari Kumar (GeoHazards International)
- 13:51 1014  
SEISMIC RISK REDUCTION IN VENEZUELAN SCHOOLS  
**Oscar López\*** (IMME, Central University of Venezuela) Ángelo Marinilli (IMME, Central University of Venezuela), Ricardo Bonilla (IMME, Central University of Venezuela), Norberto Fernández (IMME, Central University of Venezuela), Jean Domínguez (FUNVISIS, Ministry of Science and Technology), Gustavo Coronel ( )
- 14:07 DISCUSSION

**13:00 W18 Advanced Damping Systems I**

Richard Sause, Mike Tait Metro East

- 13:00 598  
MULTIPLE GAIN-SCHEDULED FUZZY-CONTROLLED MAGNETORHEOLOGICAL DAMPERS FOR VIBRATION REDUCTION OF MULTI-DEGREE-OF-FREEDOM STRUCTURES  
**Claudia Mara Dias Wilson\*** (New Mexico Institute of Mining and Technology)
- 13:17 939  
EXPERIMENTAL EVALUATION OF STEEL MRF PERFORMANCE WITH LARGE SCALE PASSIVE MAGNETO-RHEOLOGICAL DAMPERS FOR SEISMIC HAZARD MITIGATION USING REAL-TIME HYBRID SIMULATION  
**Cheng Chen\*** (San Francisco State University) James Ricles (Lehigh University), Richard Sause (Lehigh University), Theodore Karavasilis (Lehigh University)
- 13:34 1074  
DEVELOPMENT OF A LARGE-SCALE MR DAMPER MODEL FOR SEISMIC HAZARD MITIGATION ASSESSMENT OF STRUCTURES  
**Yunbyeong Chae\*** (Department of Civil and Environmental Engineering, ATSS Center, Lehigh University, PA 18015) James M. Ricles (Lehigh University), Richard Sause (Lehigh University)
- 13:51 32  
DESIGN OF OPTIMUM TMD SYSTEMS FOR SDOF AND MDOF STRUCTURES SUBJECTED TO EARTHQUAKE BASE EXCITATIONS  
**Abdulsalam AL-Janabi\*** (AL-Tahadi University) Mohamed AL-Taweel (AL-Tahadi University, Sirt, LIBYA)
- 14:07 255  
COUPLED TUNED MASS DAMPERS FOR THE MODAL CONTROL OF ONE-WAY ASYMMETRIC BUILDINGS  
**Jui-Liang Lin\*** (National Center for Research on Earthquake Engineering, Taiwan) Keh-Chyuan Tsai (National Center for Research on Earthquake Engineering, Taiwan)
- 14:24 139  
VISCIOUS DAMPERS AT EXPANSION JOINTS FOR SEISMIC PROTECTION OF BUILDINGS  
**Yasser Salem\*** (California State Polytechnic University, Pomona) Maria Feng (University of California, Irvine)
- 13:00 W19 Earthquake and Multihazard Design**
- Halil Sezen Pier 2 & 3
- 13:00 948  
COMPARISON OF A NEW PHYSICS-BASED SIMULATION MODEL AND THE HAMADA EQUATIONS IN DETERMINING POST-EARTHQUAKE FIRE SPREAD  
**Sizheng Li\*** (University of Delaware (Newark)) Rachel Davidson (University of Delaware (Newark)), Selina Lee (Validus Re)
- 13:17 749  
SEISMIC RESPONSE OF A 5-MW WIND TURBINE: THE SHAKEOUT SCENARIO  
Ian Prowell (University of California, San Diego), **Ahmed Elgamal\*** (University of California, San Diego), Jason Jonkman (National Wind Technology Center (NWTC))
- 13:34 1514  
ADVANCED MODELLING OF JOINTED PRECAST CONCRETE CONNECTIONS WITH UNBONDED POST-TENSIONED PRESTRESS  
**John Mander\*** (Texas A&M University) Geoffrey Rodgers (University of Canterbury), J Geoffrey Chase (University of Canterbury)

# Concurrent Sessions continued

## WEDNESDAY, JULY 28, 2010 (continued)

13:51 1287  
ON MULTI-HAZARD CONSIDERATIONS IN DESIGN OF STRUCTURES  
**Mohamad Saadeghvaziri\*** (NJIT) Nicholas Carlson (NJIT)

14:07 1402  
EXPERIMENTAL INVESTIGATION OF THE PROGRESSIVE COLLAPSE OF A STEEL POST-TENSIONED ENERGY DISSIPATING FRAME  
Antonios Tsitos (University at Buffalo) **Gilberto Mosqueda\*** (University at Buffalo), Andre Filiatrault (University at Buffalo), Andrei Reinhorn (University at Buffalo)

14:24 1082  
PROGRESSIVE COLLAPSE RESPONSE OF BUILDINGS AND MULTI HAZARD MITIGATION  
**Hali Sezen\*** (The Ohio State University) Brian Song (The Ohio State University), Kevin Giriunas (The Ohio State University)

### 13:00 W20 Strong Motion Data and Use

Chris Cramer, Gang Wang Harbour C

13:00 222  
GENERATING AN ARTIFICIAL GROUND MOTION USING (RBF) NEURAL NETWORK AND WAVELET ANALYSIS  
**Gholamreza Ghodrati Amiri\*** (Iran University of Science & Technology) Azita Asadi (Iran University of Science & Technology)

13:17 697  
A DATABASE OF EASTERN NORTH AMERICA GROUND MOTIONS FOR THE NEXT GENERATION ATTENUATION EAST PROJECT  
**Chris Cramer\*** (CERI, University of Memphis) Jerome Kutliroff (CERI, University of Memphis), Donny Dangkua (CERI, University of Memphis)

13:34 358  
BASELINE CORRECTION MADE EASIER USING AN AUTOMATED METHOD BASED ON THE WAVELET TRANSFORM  
**Andrew Chanerley\*** (University of East London) Nicholas Alexander (University of Bristol), Benedikt Halldorson (University of Iceland), Ragnar Sigbjornsson (University of Iceland), Roy Perryman (University of East London)

13:51 920  
SELECTING AND SCALING OF REAL ACCELEROGRAMS TO REDUCE THE SCATTER IN DYNAMIC RESPONSE  
**Bekir Özer Ay\*** (Middle East Technical University) Sinan Akkar (Middle East Technical University)

14:07 1115  
TIME VS. FREQUENCY DOMAIN GROUND MOTION MODIFICATION: EFFECTS ON SITE RESPONSE ANALYSES AND SEISMIC DISPLACEMENTS  
**Dimitrios Zekkos\*** (University of Michigan) Stephanie Guisbert (University of Michigan), Ahmed Nisar (MMI Engineering)

14:24 1270  
A GROUND MOTION SELECTION AND MODIFICATION METHOD PRESERVING CHARACTERISTICS AND ALEATORY VARIABILITY OF SCENARIO EARTHQUAKES  
**Gang Wang\*** (Hong Kong University of Science and Technology)

### 13:00 W21 4th Int'l Tsunami Symposium: Tsunami Preparedness - Numerical Modeling

L. Leonard, I. Charvet Marine Room

13:00 1854  
AN EVALUATION OF INFRASTRUCTURE FOR TSUNAMI EVACUATION IN PADANG, WEST SUMATRA, INDONESIA  
**Veronica Cedillos\*** (GeoHazards International) Nathan Canney (Stanford University), Gregory Deierlein (Stanford University), Scott Henderson (Tipping Mar), Febrin Ismail (Andalas University), Andi Syukri (Andalas University), Jason Toth (Stanford University), Kelly Wood (Stanford University)

13:17 1845  
LOCAL SITE CONDITIONS INFLUENCING EARTHQUAKE INTENSITIES AND SECONDARY EFFECTS IN THE SEA OF MARMARA REGION - APPLICATION OF STANDARDIZED REMOTE SENSING AND GIS-METHODS IN DETECTING POTENTIALLY VULNERABLE AREAS TO EARTHQUAKES, TSUNAMIS AND OTHER HAZARDS  
**George Pararas-Carayannis\*** (Tsunami Society International) Barbara Theilen-Willige (Berlin University of Technology, Institute of Applied Geosciences), Helmut Wenzel (3VCE Holding GmbH)

13:34 1838  
APPRAISAL OF THE 1790 ALBORAN TSUNAMI SOURCE IN THE WEST MEDITERRANEAN SEA AS INFERRED FROM NUMERICAL MODELLING: INSIGHTS FOR THE TSUNAMI HAZARD IN ALGERIA  
**Lübna Amir\*** (USTHB-FSTGAT) Armando Cisternas (Univ. of Chile)

13:51 1847  
ANALYTICAL SOLUTIONS OF TSUNAMI WAVES INDUCED BY SEA FLOOR COLLAPSES  
**K.T. CHAU\*** (The Hong Kong Polytechnic University)

14:07 1848  
ADVANCES IN PHYSICAL MODELLING OF NEARSHORE TSUNAMI WAVES AND THEIR IMPACT USING A UNIQUE TSUNAMI GENERATOR  
**Ingrid Charvet\*** (UCL) Tiziana Rossetto (UCL), William Allsop (HRWallingford), Tristan Lloyd (UCL), Tristan Robinson (UCL), David Robinson (HRWallingford)

14:24 1851  
A GEOMETRIC MODEL FOR PROPAGATION OF TSUNAMI WAVES  
**Swedaranyam Rajasekaran\*** (Mathematics Department, B S Abdur Rahman University) E Syed Mohamed (Computer Science & Engineering Department, B S Abdur Rahman University)

### 15:40 W22 Seismic Performance of Bridges 4

Hassan Sedarat Metro Centre

15:40 539  
A REVIEW OF PERFORMANCE REQUIREMENTS FOR BRIDGES  
**Marc Gerin\*** (Consultant) Tuna Onur (RMS)

15:57 597  
CONSEQUENCE OF NON-UNIFORM SITE FOR BRIDGE RESPONSE  
**Nawawi Choww\*** (The University of Auckland) Hong Hao (The University of Western Australia)

16:14 740  
PROBABILISTIC PERFORMANCE-BASED SEISMIC RISK ASSESSMENT OF CANADIAN BRIDGES - A PILOT STUDY  
**Charlotte Waller\*** (Carleton University) David Lau (Carleton University)

16:31 1263  
SEISMIC MONITORING OF BRIDGES IN BRITISH COLUMBIA  
**Sharlie Huffman\*** (BC Ministry of Transportation) Carlos Ventura (University of British Columbia), Martin Turek (TVP Engineering Ltd.)

**WEDNESDAY, JULY 28, 2010** (continued)

16:48 1277  
**SEISMIC REHABILITATION OF THE HERON ROAD BRIDGE**  
**Sylvain Montminy\*** (Delcan Corporation) Jack Ajrab (Delcan Corporation), Paul Bradford (PB Engineering)

17:05 DISCUSSION

**15:40 W23 Numerical Modeling of the Seismic Behavior of Steel Components and Systems**

Arturo Tena-Colunga, Bing Qu Harbour A

15:40 327  
**FINITE ELEMENT INVESTIGATION AND DESIGN RECOMMENDATIONS FOR PERFORATED STEEL PLATE SHEAR WALLS**  
**Ronny Purba\*** (University at Buffalo) Michel Bruneau (University at Buffalo)

15:57 1007  
**AN INNOVATIVE SEISMIC PERFORMANCE ENHANCEMENT TECHNIQUE FOR STEEL BUILDING BEAM-COLUMN CONNECTIONS**  
**Tasnim Hassan\*** (North Carolina State University) Samiuddin Syed (North Carolina State University)

16:14 1080  
**EFFECTS OF TORSION ON THE SEISMIC RESPONSE OF CONCENTRICALLY BRACED STEEL FRAMES**  
**Keri Ryan\*** (Utah State University) Emrah Erduran (NORSAR)

16:31 1107  
**SEISMIC DEMANDS ON THREE-STORY SCBF SYSTEMS - COMPARISON OF FIBER-BASED MODEL AND FINITE ELEMENT-BASED MODEL**  
**Chui-Hsin Chen\*** (UC Berkeley) Yuli Huang (UC Berkeley), Stephen Mahin (UC Berkeley)

16:48 1493  
**DETECTING FAILURE EVENTS IN BUILDINGS: A NUMERICAL AND EXPERIMENTAL ANALYSIS**  
**Vanessa Heckman\*** (California Institute of Technology) Monica Kohler (University of California at Los Angeles), Thomas Heaton (California Institute of Technology)

17:05 1590  
**EXPERIMENTAL AND NUMERICAL STUDY ON THE POTENTIAL FOR COLUMN SIZE REDUCTION IN CAPACITY DESIGNED MULTI-STORY BRACED STEEL FRAMES**  
**Charles-P. Lamarche\*** (Université de Sherbrooke) Robert Tremblay (École Polytechnique de Montréal)

**15:40 W24 Seismic Analysis and Performance of Masonry**

James LaFave, Sudhir Jain Pier 5

15:40 1144  
**SEISMIC FRAGILITY ASSESSMENT OF RESIDENTIAL ANCHORED BRICK VENEER WALLS**  
 James LaFave (University of Illinois at Urbana-Champaign), **Dziugas Reneckis\*** (Thornton Tomasetti, Inc.)

15:57 84  
**SHAKING-TABLE TESTING OF SINGLE-STORY CLAY MASONRY VENEER WOOD-FRAME BUILDING**  
**P. Benson Shing\*** (University of California San Diego) Hussein O. Okail (University of California San Diego), Seongwoo Jo (University of Texas Austin), Richard E. Klingner (University of Texas Austin), William M. McGinley (University of Louisville), David McLean (Washington State University)

16:14 525  
**EXPERIMENTAL INVESTIGATION OF THE CYCLIC BEHAVIOUR OF UNREINFORCED MASONRY SPANDRELS**  
**Alessandro Dazio\*** (ETH Zürich) Katrin Beyer (ETH Zürich), Ahmad Abo El Ezz (ETH Zürich)

16:31 1305  
**USE OF SMALL-SCALED BURNT CLAY BRICKS FOR SHAKE TABLE TESTS OF MASONRY WALLS**  
**Vaibhav Singhal\*** (Indian Institute of Technology Kanpur) Durgesh Rai (Indian Institute of Technology Kanpur)

16:48 188  
**NUMERICAL INVESTIGATION OF THE DYNAMIC AND EARTHQUAKE BEHAVIOR OF BYZANTINE AND POST-BYZANTINE BASILICAS**  
**George Manos\*** (Aristotle University of Thessaloniki) Vasilios Soulis (Aristotle University of Thessaloniki), Olympia Felekidou (Aristotle University of Thessaloniki), Vasiliki Matsou (Aristotle University of Thessaloniki)

17:05 DISCUSSION

**15:40 W25 Special Session: Soil-Structure-Engineering Interaction**

Bruce Kutter, Stephen Mahin Pier 4

15:40 1416  
**INTRODUCTION TO A NEW DESIGN PROCEDURE FOR ORDINARY BRIDGES WITH ROCKING FOUNDATIONS**  
**Bruce Kutter\*** (University of California, Davis) Lijun Deng (University of California, Davis), Sashi Kunnath (University of California, Davis)

15:57 957  
**SOIL-FOUNDATION-STRUCTURE INTERACTION EFFECTS ON MODEL BUILDINGS WITHIN A GEOTECHNICAL CENTRIFUGE**  
**Jonathan Bray\*** (University of California at Berkeley) Henry Mason (University of California at Berkeley), ZhiQiang Chen (University of California at San Diego), Katherine Jones (University of California at Berkeley), Nicholas Trombetta (University of California at San Diego), Tara Hutchinson (University of California, San Diego)

16:14 1614  
**COMPUTATIONAL MODELING OF SOIL-FOUNDATION STRUCTURAL SYSTEMS**  
**Ahmed Elgamal\*** (University of California, San Diego) Linjun Yan (Saiful/Bouquet Structural Engineers), Jinchi Lu (University of California, San Diego), Zhaohui Yang (California Department of Transportation), Thomas Shantz (California Department of Transportation), Joel P. Conte (University of California, San Diego)

16:31 1666  
**IMPACT OF FOUNDATION MODELING ON THE ACCURACY OF RESPONSE HISTORY ANALYSIS OF BUILDINGS**  
**Jonathan Stewart\*** (UCLA) Salih Tileyliglu (Diaz Yourman and Associates), Farzad Naeim (John A Martin and Associates), Arzhang Alimoradi (John A Martin and Associates)

16:48 244  
**NONLINEAR SEISMIC ANALYSIS AND ASSESSMENT OF BC PLACE STADIUM**  
**Mahmoud Rezaei\*** (EQ-Tec Engineering Ltd.) Adam Patterson (Genivar), Glenn Hubick (Genivar)

17:05 1543  
**EFFECT OF SOIL-STRUCTURE INTERACTION ON FORCE REDUCTION FACTORS OF R/C FRAME STRUCTURES**  
**Amir Halabian\*** (Isfahan University of Technology) Masoomeh Erfani (Isfahan University of Technology)

# Concurrent Sessions continued

**WEDNESDAY, JULY 28, 2010** (continued)

## 15:40 W26 Special Session: Seismic Risk Reduction of Nonstructural Building Components 2

Ghyslaine McClure, Simon Foo Regatta Room

15:40 963  
SHAKE TABLE TESTING ON MOVEABLE OFFICE PARTITIONS WITHOUT TOP RESTRAINT

**Ghyslaine McClure\*** (McGill University) Wen-Chun Huang (National Cheng Kung University, Tainan, Taiwan (ROC)), George C. Yao (National Cheng Kung University, Tainan, Taiwan (ROC))

15:57 1376  
EXPERIMENTAL SEISMIC FRAGILITY ASSESSMENT OF LIGHT GAUGE STEEL STUDDED GYPSUM PARTITION WALLS

**Rodrigo Retamales\*** (University at Buffalo) Ryan Davies (University at Buffalo), Gilberto Mosqueda (University at Buffalo), Andre Filiatrault (University at Buffalo)

16:14 744  
IMPROVING THE DYNAMIC PERFORMANCE OF OFCs DURING EXTREME VIBRATION CONDITIONS

Hugon Juarez Garcia (University of British Columbia) **Carlos E. Ventura\*** (University of British Columbia)

16:31 993  
ASSESSING THE POST-EARTHQUAKE FUNCTIONALITY OF CRITICAL BUILDINGS IN MONTREAL (QUÉBEC)

**Jordan Cappai\*** (McGill University) Ghyslaine McClure (McGill University), Richard Shapiro (McGill University), Meng Li (McGill University), Guillaume Dunlop-Brière (McGill University), Pierre Keller (École Nationale des Sciences et Techniques Appliquées de Paris)

16:48 384  
THE EXPERIMENTAL STUDY OF THE CONSTRUCTION METHODS FOR STONE VENEERS IN TAIWAN

**Fan-Ru Lin\*** (NCREE, National Center for Research on Earthquake Engineering) George C. Yao (NCKU, National Cheng Kung University), Shyh-Jiann Hwang (NTU, National Taiwan University), Chien-Chuang Tseng (NCREE), Pu-Wen Weng (NCREE)

17:05 1319  
SEISMIC PERFORMANCE OF STAIR ASSEMBLIES  
**Christopher Higgins\*** (Oregon State University)

## 15:40 W27 Special Session: Mitigating Risk Due to Older Concrete Buildings

Jack Moehle, Thalia Anagnos Harbour B

15:40 229  
BEHAVIOR OF REINFORCED CONCRETE CORNER BEAM-COLUMN JOINTS WITHOUT TRANSVERSE REINFORCEMENT

**Sangjoon Park\*** (University of California, Berkeley) Khalid M. Mosalam (University of California, Berkeley)

15:57 1616  
SEISMIC RESPONSE OF OLDER REINFORCED CONCRETE CORNER JOINTS

**Jack Moehle\*** (University of California, Berkeley) Wael Hassan (University of California, Berkeley), Sangjoon Park (University of California, Berkeley), Ricardo Lopez (University of Puerto Rico Mayaguez), Khalid Mosalam (University of California, Berkeley)

16:14 1628  
SHAKE TABLE TESTS ON THE COLLAPSE OF RC FRAMES SUBJECTED TO MODERATE AND HIGH AXIAL LOADS

**Soheil Yavari\*** (University of British Columbia) T Lin (National Taiwan University), Ken Elwood (University of British Columbia), Chiun-lin Wu

(NCREE), Shyh-Jiann Hwang (National Taiwan University), B Bayhan (University of California, Berkeley), Jack Moehle (University of California, Berkeley)

16:31 1636  
EFFECT OF LONGITUDINAL REINFORCEMENT RATIO ON THE FAILURE MECHANISM OF R/C COLUMNS MOST VULNERABLE TO COLLAPSE  
**Adolfo Matamoros\*** (University of Kansas) Charles Woods (University of Kansas)

16:48 1732  
AXIAL FAILURE OF REINFORCED CONCRETE COLUMNS  
**Julio Ramirez\*** (Purdue University) Kurt Henkhaus (Purdue University), Santiago Pujol (Purdue University)

17:05 DISCUSSION

## 15:40 W28 Advanced Damping Systems II

Michael Wesolowsky, Cameron Black Metro East

15:40 35  
FRICTION DAMPERS FOR THE SEISMIC CONTROL OF AN UNDERGROUND PASTE PLANT IN INDONESIA  
**Andrew Sivilla\*** (JDA Consultants Inc.) Joseph Delle Donne (JDA Consultants Inc.)

15:57 385  
THREE-DIMENSIONAL SHAKING TABLE TESTS ON THREE-STORY REDUCED-SCALE STEEL ROCKING FRAMES  
**Mitsumasa Midorikawa\*** (Hokkaido Univ.) Tadashi Ishihara (National Institute for Land and Infrastructure Management), Tatsuya Azuhata (National Institute for Land and Infrastructure Management), Shigemitsu Takai (Nishimatsu Corp.), Motoi Kanagawa (Nishimatsu Corp.), Hirotake Hori (Hokkaido Univ)

16:14 1565  
SEISMIC DESIGN AND PERFORMANCE OF STEEL MRFs WITH ELASTOMERIC DAMPERS  
**Theodore Karavasilis\*** (University of Oxford) Richard Sause (Lehigh University), James Ricles (Lehigh University)

16:31 1485  
THERMAL- AND STRAIN-RELATED BEHAVIOUR OF A SHAPE MEMORY ALLOY UNDER EARTHQUAKE LOADING  
**Michael Wesolowsky\*** (RWDI, Guelph ON) John Wilson (McMaster University, Hamilton ON)

16:48 159  
ANALYSIS AND TESTING OF CABLES MADE OF CUALBE SMA  
**María Ofelia Moroni\*** (Universidad de Chile) Felipe Beltran (Universidad de Chile), Cristian Cruz (Universidad de Chile), Ricardo Herrera (Universidad de Chile)

17:05 1361  
EXPERIMENTAL AND ANALYTICAL STUDY OF ASYMMETRIC STRUCTURES WITH DIFFERENT VISCOUS DAMPER DISTRIBUTION  
Mohammad Reza Mansoori\* (International Institute of Earthquake Engineering and Seismology (IIEES)) **Abdol Reza Sarvghad Moghadam\*** (International Institute of Earthquake Engineering and Seismology (IIEES)), Hassan Naseri (International Institute of Earthquake Engineering and Seismology (IIEES))

## 15:40 W29 Damage Assessment and Repair of Buildings

Doug Hohbach, Carlos Ventura Marine Room

15:40 49  
DOWNTIME DATA ON RESIDENTIAL BUILDINGS AFTER NORTHRIDGE AND LOMA PRIETA

**Mary Comerio\*** (University of California Berkeley) Howard Blecher (University of California Berkeley)

**WEDNESDAY, JULY 28, 2010** (continued)

15:57 679  
 EARTHQUAKE GROUND MOTION INDICES FOR EARLY DAMAGE ESTIMATION OF WOODEN HOUSES IN JAPAN  
**Sachie HOSHI\*** (Chiba University) Yoshihisa MARUYAMA (Chiba University), Fumio YAMAZAKI (Chiba University)

16:14 682  
 EVALUATION OF EARTHQUAKE DAMAGE IN WOOD-FRAMED STRUCTURES

**Terrence Paret\*** (Wiss, Janney, Elstner Associates, Inc.) John Osteraas (Exponent Failure Analysis Associates, Inc.), Kelly Cobeen (Wiss, Janney, Elstner Associates, Inc.), Gary Searer (Wiss, Janney, Elstner Associates, Inc.), Sigmund Freeman (Wiss, Janney, Elstner Associates, Inc.), Owen Rosenboom (Wiss, Janney)

16:31 415  
 EXPLORING BARRIERS TO MITIGATION BY HOMEOWNERS  
**Guna Selvaduray\*** (San Jose State University) James Lee (San Jose State University), Crystal Paul (San Jose State University)

16:48 167  
 A TALE OF THREE CITIES  
**Polat Gülkan\*** (Department of Civil Engineering and Director, Earthquake Engineering Research Center, METU) Beyhan Bayhan (Department of Civil Engineering and Earthquake Engineering Research Center, METU)

17:05 DISCUSSION

**15:40 W30 Post-Earthquake Response and Preparedness and Education**

Graham Archer, Jerome O'Connor Pier 2 & 3

15:40 387  
 EARTHQUAKE DISASTER EDUCATION FOR SUSTAINABLE DEVELOPMENT  
 Yasamin O. Izadkhah (International Inst. of Earthquake Engineering and Seismology (IIEES)) **Mahmood Hosseini\*** (International Inst. of Earthquake Engineering and Seismology (IIEES))

15:57 396  
 FULL-SCALE, REAL-TIME BUILDING DYNAMICS LABORATORY  
 Cole McDaniel (California Polytechnic State University, San Luis Obispo)  
**Graham Archer\*** (California Polytechnic State University, San Luis Obispo)

16:14 767  
 ENGINEERING APPLICATIONS OF REAL-TIME GROUND MOTION MONITORING  
**John Cassidy\*** (Geological Survey of Canada) Andreas Rosenberger (Geological Survey of Canada), Garry Rogers (Geological Survey of Canada)

16:31 1420  
 THE USE OF DETOURS AS A MITIGATING MEASURE FOR DISASTER RISK REDUCTION OF INTER-CITY ROAD SYSTEMS  
**Mahdi Behniafard\*** (Transportation Eng. Dept., Science & Reserach Branch of the Islamic Azad Univ. (IAU) Iran) Mahmood Hosseini (Int'l Inst. of Earthquake Eng. & Seismology (IIEES) and Islamic Azad University (IAU), Iran)

16:48 64  
 PREPARING FOR THE UNEXPECTED IN NEW YORK STATE: DEVELOPMENT OF AN EARTHQUAKE RESPONSE PLAN TO ASSESS POTENTIAL BRIDGE DAMAGE  
**Jerome O'Connor\*** (University at Buffalo) Sreenivas Alampalli (New York State Dept. of Transportation)

17:05 1610  
 BUILDING OCCUPANCY RESUMPTION PROGRAM FOR POST-EARTHQUAKE DAMAGE ASSESSMENT AND RECOVERY  
**Scott M. Adan, Ph.D., P.E., S.E.\*** (Senior Project Manager, Simpson Gumpertz & Heger) David L. McCormick, S.E. (Principal, Simpson Gumpertz & Heger)

**15:40 W31 Ground Motion Parameters**

Ken Campbell, Vladimir Grazier Harbour C

15:40 1149  
 EMPIRICAL GROUND MOTION ATTENUATION RELATIONSHIPS FOR MAXIMUM INCREMENTAL VELOCITY  
**Jaime Guaman\*** (University of Notre Dame) David Kirkner (University of Notre Dame), Yahya Kurama (University of Notre Dame)

15:57 46  
 ESTIMATION OF CUMULATIVE ABSOLUTE VELOCITY (CAV) FROM A RECENTLY COMPILED STRONG GROUND-MOTION DATABASE FOR TURKEY  
**Sinan Akkar\*** (Middle East Technical University) Polat Gülkan (Middle East Technical University)

16:14 1004  
 GROUND MOTION PREDICTION EQUATIONS FOR CUMULATIVE ABSOLUTE VELOCITY (CAV) USING THE PEER-NGA STRONG MOTION DATABASE  
**Kenneth Campbell\*** (EQECAT, Inc.) Yousef Bozorgnia (Pacific Earthquake Engineering Research Center)

16:31 568  
 EXTENDING AND TESTING GRAIZER-KALKAN GROUND MOTION ATTENUATION MODEL BASED ON ATLAS DATABASE OF SHALLOW CRUSTAL EVENTS  
**Vladimir Graizer\*** (U.S. Nuclear Regulatory Commission) Erol Kalkan (U.S. Geological Survey), Kuo-Wan Lin (U.S. Geological Survey)

16:48 861  
 PREDICTION OF HORIZONTAL RESPONSE SPECTRA OF STRONG GROUND MOTIONS IN IRAN AND ITS REGIONS  
**Hossein Sadeghi\*** (Earthquake Research Center, Ferdowsi University of Mashhad) Ahmad Shooshtari (Earthquake Research Center, Ferdowsi University of Mashhad), Mohammad Jaladat (Earthquake Research Center, Ferdowsi University of Mashhad)

17:05 762  
 BAYESIAN INVERSION OF MICROTREMOR ARRAY DISPERSION DATA FOR VS STRUCTURE ON THE FRASER RIVER DELTA, BRITISH COLUMBIA  
**Sheri Molnar\*** (University of Victoria) Stan Dosso (University of Victoria), John Cassidy (Natural Resources Canada)

# Concurrent Sessions continued

**THURSDAY, JULY 29, 2010**

## **08:00 Th1 Seismic Performance of Bridges 5**

Michel Bruneau, George Manos Metro Centre

08:00 1413  
*SEISMIC BEHAVIOR OF PRECAST POST-TENSIONED SEGMENTED FRAMES*

**Mohamed ElGawady\* (WSU)** Ahmad Shalaan (Washington State University), Haitham Dawood (WSU)

08:17 1834  
*BRIDGE BEARING FUSE SYSTEMS FOR REGIONS WITH HIGH-MAGNITUDE EARTHQUAKES AT LONG RECURRENCE INTERVALS*  
**E. T. Filipov\* (University of Illinois at Urbana-Champaign)** J. S. Steelman (University of Illinois at Urbana-Champaign), J. F. Hajjar (University of Illinois at Urbana-Champaign), J. M. LaFave (University of Illinois at Urbana-Champaign), L. A. Fahnestock (University of Illinois at Urbana-Champaign)

08:34 1542  
*SEISMIC EVALUATION OF SKEW BRIDGE WITH FRICTION TYPE RUBBER BEARINGS - EXPERIMENTS AND CASE STUDIES*  
**Chih-Hung Lu\* (National Taiwan University)** Kuo-Chun Chang (Dept. of Civil Engineering, National Taiwan University), Kuang-Yen Liu (Center for Research on Earthquake Engineering), Wei-Chin Cheng (Dept. of Civil Engineering, National Taiwan University)

08:51 1302  
*STRUCTURAL FUSE CONCEPT FOR BRIDGES*  
**Michel Bruneau\* (University at Buffalo)** Samer El-Bahey (University at Buffalo)

09:07 1499  
*SEISMIC PERFORMANCE OF PRECAST SEGMENTAL BRIDGES*  
**Petros Sideris\* (State University of New York at Buffalo)** Myrto Anagnostopoulou (State University of New York at Buffalo), Amjad Aref (State University of New York at Buffalo), Andre Filiatrault (State University of New York at Buffalo)

09:24 1249  
*DYNAMICS OF A POST-TENSIONED ROCKING BLOCK*  
**Bozidar Stojadinovic\* (University of California Berkeley)** Clement Barthes (University of California Berkeley), Matias Hube (University of California Berkeley)

## **08:00 Th2 Performance-Based Plastic Design**

Subhash Goel, Shih-Ho Chao Harbour A

08:00 344  
*PERFORMANCE BASED PLASTIC DESIGN (PBPD) OF RC SPECIAL MOMENT FRAME STRUCTURES*  
Wen-Cheng Liao (University of Michigan) **Subhash C. Goel\* (University of Michigan)**

08:17 523  
*AN ENERGY SPECTRUM METHOD FOR SEISMIC EVALUATION OF STRUCTURES*  
**Subhash C. Goel\* (University of Michigan)** Wen-Cheng Liao (University of Michigan), Mohammad Bayat (University of Texas, Arlington), Sutat Leelataviwat (University of Technology, Thailand)

08:34 591  
*PERFORMANCE-BASED PLASTIC DESIGN METHOD FOR BUCKLING-RESTRAINED BRACED FRAMES*  
**Shih-Ho Chao\* (University of Texas at Arlington)** Dipti Ranjan Sahoo (University of Texas at Arlington)

08:51 1131  
*FURTHER DEVELOPMENT OF PERFORMANCE-BASED PLASTIC DESIGN METHOD FOR CONCENTRICALLY BRACED FRAMES*  
**M. Reza Bayat\* (University of Texas, Arlington)** Shih-Ho Chao (University of Texas, Arlington), Subhash C. Goel (University of Michigan, Ann Arbor)

09:07 487  
*PERFORMANCE-BASED DESIGN APPROACH FOR DUCTILE KNEE-BRACED MOMENT FRAMES*  
**Sutat Leelataviwat\* (King Mongkut's University of Technology Thonburi)** Jarun Srechai (Chulalongkorn University), Bunyarit Suksen (Worley Parsons, Thailand), Pennung Warnitchai (Asian Institute of Technology)

09:24 DISCUSSION

## **08:00 Th3 Seismic Vulnerability of Masonry Structures**

Jorge Ruiz-Garcia, Svetlana Brzev Pier 5

08:00 1494  
*DEVELOPMENT OF A GLOBAL DESIGN GUIDELINE FOR CONFINED MASONRY BUILDINGS IN REGIONS OF HIGH SEISMIC RISK*  
**Svetlana Brzev\* (British Columbia Institute of Technology)** Roberto Meli (UNAM)

08:17 703  
*SIMPLIFIED VULNERABILITY ASSESSMENT OF HISTORICAL CITY CORES - THE EXAMPLE OF THE CITY OF XANTHI*  
**Dimitrios Vamvatsikos\* (University of Cyprus)** Stavroula Pantazopoulou (Demokritus University of Thrace)

08:34 967  
*FRAGILITY FUNCTIONS FOR SEISMIC RISK IN REGIONS WITH MODERATE SEISMICITY*  
**Marcelo Oropeza\* (École Polytechnique Fédérale de Lausanne)** Clotaire Michel (École Polytechnique Fédérale de Lausanne), Pierino Lestuzzi (École Polytechnique Fédérale de Lausanne)

08:51 252  
*USE OF NONLINEAR STATIC ANALYSIS FOR THE DISPLACEMENT-BASED ASSESSMENT OF CONFINED MASONRY BUILDINGS*  
Amador Teran-Gilmore (Universidad Autonoma Metropolitana) **Jorge Ruiz-Garcia\* (Universidad Michoacana de San Nicolas de Hidalgo)**, Oscar Zuñiga-Cuevas (Universidad Autonoma Metropolitana)

09:07 863  
*UNSYMMETRIC-PLAN MASONRY BUILDINGS: PUSHOVER VS NONLINEAR DYNAMIC ANALYSIS*  
**Giuseppe Faella\* (Second University of Naples)** Aldo Giordano (University of Naples Federico II), Mariateresa Guadagnuolo (Second University of Naples)

09:24 418  
*EXPERIMENTAL STUDY ON DYNAMIC BEHAVIOR OF TIMBER ROOF MASONRY HOUSE MODELS RETROFITTED BY PP-BAND MESHES*  
**Navaratnarajah Sathiparan\* (University of Tokyo)** Paola Mayorca (University of Tokyo), Kimiro Meguro (University of Tokyo)

## **08:00 Th4 Soils, Foundation and Stability**

Russell Green, Dharma Wijewickreme Pier 4

08:00 661  
*THREE DIMENSIONAL NUMERICAL MODEL FOR NONLINEAR EARTHQUAKE RESPONSE OF CLAY SLOPES*  
**Mahdi Taiebat\* (University of British Columbia)** Amir Kaynia (Norwegian Geotechnical Institute), P. Dimmock (BP Exploration), M. Senders (Woodside Energy Ltd.)

**THURSDAY, JULY 29, 2010** (continued)

08:17 1177

THE INFLUENCE OF NEAR-FAULT RUPTURE DIRECTIVITY ON LIQUEFACTION

**Russell Green\*** (Virginia Tech) Jongwon Lee (Virginia Tech)

08:34 1350

ANALYSIS OF SOIL NAILED WALLS UNDER DYNAMIC EXCITATIONS USING FINITE DIFFERENCE METHOD

**Amir Halabian\*** (Isfahan University of Technology) Ali M. Sheikhabaehi (Isfahan University of Technology), S. Hamid Hashemolhosseini (Isfahan University of Technology)

08:51 291

PROCEDURE TO EVALUATE LIQUEFACTION-INDUCED SETTLEMENT BASED ON SHEAR WAVE VELOCITY

**Fred Yi\*** (CHJ Incorporated)

09:07 1545

SHAKE TABLE STUDY OF SOIL- FOUNDATION-STRUCTURE INTERACTION (SFS) EFFECTS IN ROCKING AND HORIZONTAL MOTIONS OF THE BUILDING STRUCTURES

**Naghdali Hosseinzadeh\*** (International Institute of Earthquake Engineering and Seismology (IIEES))

09:24 198

DYNAMIC OCEAN WATER AND BACKFILL PORE WATER PRESSURES AGAINST A VERTICAL CAISSON DURING 2003 TOKACHI-OKI EARTHQUAKE

**Isao Ishibashi\*** (Old Dominion University) Samip Pant (Old Dominion University)

**08:00 Th5 Seismic Analysis of Concrete Structures**

Laura Lowes, Curt Haselton

Metro East

08:00 123

NONLINEAR FIBER-BASED ANALYSIS OF RECTANGULAR CONCRETE WALLS DESIGNED WITH DIFFERENT ANCHORAGE DETAILS

**Sri Sritharan\*** (Iowa State University) Sriram Aaleti (Iowa State University)

08:17 831

CONSTITUTIVE MODEL FOR BUCKLING OF TRANSVERSALLY RESTRAINED LONGITUDINAL BARS IN REINFORCED CONCRETE COLUMNS

**Mohamed Talaat\*** (Senior Engineer, Simpson Gumpertz and Heger, Inc.) Khalid Mosalam (Professor, University of California, Berkeley)

08:34 1608

ANALYSIS OF THE CYCLIC BEHAVIOR OF MASONRY-INFILLED RC FRAMES USING THE FINITE ELEMENT METHOD

**Ioannis Koutromanos\*** (Univ. of Calif., San Diego) Andreas Stavridis (Univ. of Calif., San Diego), P. Benson Shing (Univ. of Calif., San Diego)

08:51 1454

INELASTIC MODELING OF RC STRUCTURAL WALLS

**Mohamed ELNADY\*** (Mansoura University, Egypt) Ahmed GHOBARAH (McMaster University, Canada)

09:07 289

NONLIN-EQT: AN INTERACTIVE SOFTWARE TOOL FOR EARTHQUAKE ENGINEERING EDUCATION

**Finley Charney\*** (Virginia Tech) Adam Bowland (Virginia Tech), Cris Moen (Virginia Tech), Jordan Jarrett (Virginia Tech)

09:24 DISCUSSION

**08:00 Th6 Seismic Risk Reduction of Nonstructural Building Components 3**

Bob Bachman, Murat Saatcioglu

Regatta Room

08:00 426

FLOOR ACCELERATION DEMAND IN REINFORCED CONCRETE FRAME STRUCTURES WITH MASONRY INFILL WALLS

**Fabrizio Mollaioli\*** (University of Rome "La Sapienza", Italy) andrea lucchini (University of Rome "La Sapienza"), Silvia Bruno (University of Rome "La Sapienza"), Adriano De Sortis (Dipartimento della Protezione Civile, Servizio Sismico Nazionale, Roma, Italy), Paolo Bazzurro (AIR Worldwide)

08:17 434

A PROPOSED FRAMEWORK FOR EFFICIENT DELIVERY OF SEISMIC RESTRAINT DESIGNS FOR MECHANICAL AND ELECTRICAL EQUIPMENT AND ITS POTENTIAL COST SAVINGS

Brea Williams (Halsall Associates Ltd.) Richard Levesque (Halsall Associates Ltd.), **Tom Stevens\*** (Halsall Associates Ltd.), Jason Kitchen (HTS Engineering Ltd.)

08:34 910

EVALUATION OF SEISMIC DAMAGE RISK OF ELEVATOR ROPE IN HIGH-RISE BUILDING BASED ON CCQC METHOD

**Masayuki Kohiyama\*** (Keio University) Tetsuya Kita (Keio University), Asami Mitsui (Keio University)

08:51 978

STRUCTURAL AND NON-STRUCTURAL SEISMIC VULNERABILITY ASSESSMENT FOR SCHOOLS AND HOSPITALS BASED ON QUESTIONNAIRE SURVEYS: CASE STUDIES IN CENTRAL AMERICA AND INDIA

**Dominik H. Lang\*** (NORSAR) Maria Isabella Verbicaro (Universita degli Studi di Napoli 'Federico II'), Yogendra Singh (Indian Institute of Technology Roorkee), JSR Prasad (Indian Institute of Technology Roorkee), David Wong Diaz (Universidad Tecnologia de Panama), Manuel Gutierrez (

09:07 1109

PROBABILISTIC SEISMIC DEMAND EVALUATION OF ACCELERATION-SENSITIVE NONSTRUCTURAL COMPONENTS MOUNTED ON STRUCTURAL WALL SYSTEMS AND FRAME STRUCTURES

**Ricardo Medina\*** (University of New Hampshire) Joshua Clayton (University of New Hampshire)

09:24 1252

REPAIR COST ANALYSIS OF MULTISTORY BUILDINGS WITH PRECAST CONCRETE CLADDING

**Jeffrey Hunt\*** (University of California Berkeley) Bozidar Stojadinovic (University of California Berkeley)

**Oral-Panel Combined****08:00 Th7 Special Session: Mitigating Risk Due to Older Concrete Buildings Panel**

Jack Moehle, William Holmes

Harbour B

08:00 48

LOS ANGELES INVENTORY OF NONDUCTILE CONCRETE BUILDINGS FOR ANALYSIS OF SEISMIC COLLAPSE RISK HAZARDS

**Thalia Anagnos\*** (San Jose State University) Mary Comerio (University of California Berkeley), Christine Goulet (URS Corporation), Judith Steele (UC Berkeley), Jonathan Stewart (UCLA)

# Concurrent Sessions continued

08:17 1609

*BUILDING A VOLUNTEER ENGINEERING NETWORK: THE EXPERIENCE OF THE CONCRETE COALITION*

Craig Comartin (CDComartin Inc) **David McCormick\* (Simpson Gumpertz & Heger Inc)**, David Bonowitz (Structural Engineer), Marjorie Greene (EERI)

08:34 1482

*MITIGATING RISK OF OLDER CONCRETE BUILDINGS - POLICY AND IMPLEMENTATION*

**Mary Comerio\* (U.C. Berkeley)** Peter May (University of Washington), William Holmes (Rutherford & Chekene), Craig Comartin (CDComartin Inc), Lucy Arendt (University of Wisconsin - Green Bay), Carlos Ventura (University of British Columbia)

## 08:00 Th8 Structural Health Monitoring

Ahmed Ghoborah

Pier 2 & 3

08:00 1406

*DEVELOPMENT OF FRAGILITY FUNCTIONS FOR STEEL MOMENT FRAMES USING WAVELET BASED DAMAGE SENSITIVE FEATURES FROM STRUCTURAL HEALTH MONITORING*

**Hae Young Noh\* (Stanford University)** Dimitrios Lignos (Stanford University), Krishnan Nair (Stanford University), Anne Kiremidjian (Stanford University)

08:17 1523

*HEALTH MONITORING OF NATIONAL HERITAGE FIVE STORY WOOD PAGODA BY IMAGE PROCESSING AND VIBROMETERS.*

**Tadashi Mikoshiba\* (NIED)** Chikahiro Minowa (NIED), Yasushi Niitsu (Tokyo Denki University), Toshikazu Hanazato (Mie University)

08:34 1326

*DAMAGE EVOLUTION ASSESSMENT OF A 6-STORY MASONRY BUILDING DURING AFTERSHOCKS AFTER WENCHUAN EARTHQUAKE*

**Chenxi Mao\* (Institute of Engineering Mechanics, China Earthquake Administration)** Hui Li (School of Civil Engineering, Harbin Institute of Technology), Wensong Zhou (School of Civil Engineering, Harbin Institute of Technology), Jinping Ou (School of Civil & Hydraulic Engineering, Dalian University of Technology)

08:51 1186

*EXPERIMENTAL VERIFICATION OF A BIO-INSPIRED STRUCTURAL HEALTH MONITORING SYSTEM*

**Tzu Kang Lin\* (National Center for Research on Earthquake Engineering)** Kuo-Chun Chang (National Taiwan University), Anne Kiremidjian (Stanford University)

09:07 DISCUSSION

## 08:00 Th9 Shaking and Damage

Siva Sivathasan, Koduru Smitha

Harbour C

08:00 125

*GROUND MOTION STUDY FOR AN ESSENTIAL FACILITY*

**Siva Sivathasan\* (Leighton Group, Inc. and Cal Poly Pomona)** Siva Sivathasan (Leighton Group, Inc. and Cal Poly Pomona)

08:17 610

*INFLUENCE OF GROUND MOTION SELECTION AND SCALING ON SEISMIC RESPONSE OF BUILDINGS*

**Sanda Koboevic\* (Ecole Polytechnique de Montreal)** Kim Guilini-Charette (Ecole Polytechnique de Montreal), Pierre X. Castonguay (Ecole Polytechnique de Montreal), Robert Tremblay (Ecole Polytechnique de Montreal)

08:34 735

*SYNTHETIC EARTHQUAKE GROUND MOTIONS FOR SPECIFIED SEISMIC DESIGN SCENARIO*

**Sanaz Rezaeian\* (University of California, Berkeley)** Armen Der Kiureghian (University of California, Berkeley)

08:51 1337

*DEVELOPMENT AND VALIDATION OF GROUND-MOTION ATTENUATION RELATIONSHIP FOR LARGE-MAGNITUDE SUBDUCTION EARTHQUAKES*

**Kusnowidjaja Megawati\* (Nanyang Technological University)** Tso-Chien Pan (Nanyang Technological University)

09:07 1767

*INFLUENCE OF SPECTRAL NONSTATIONARITY ON STRUCTURAL DAMAGE*

**Smitha Koduru\* (BC Hydro)**

09:24 475

*STOCHASTIC SIMULATION OF EARTHQUAKE GROUND MOTION FOOTPRINTS CONSTRAINED BY RECORDED DATA AND MMI INTENSITY MAPS*

**Mehrdad Mahdyiar\* (AIR Worldwide Corporation)** Boyko Dodov (AIR Worldwide Corporation), Bingming Shen-Tu (AIR Worldwide Corporation), Khosrow Shabestari (AIR Worldwide Corporation), Jay Guin (AIR Worldwide Corporation), Yufang Rong (AIR Worldwide Corporation)

# Poster Sessions



**MONDAY, JULY 26, 2010**

## **14:40 Seismic Design and Performance of Steel Structures**

Frontenac

M1-1 24  
*SEISMIC BEHAVIOR OF BRB FRAMES UNDER NEAR FAULT EXCITATIONS*  
**Seyed Mehdi Zahrai\*** (University of Tehran) Davoud Vafaei (University of Tehran), Mohammad Ebrahim Shemshadian (University of Tehran)

M1-2 45  
*NONLINEAR BEHAVIOUR OF DIAGONALLY STIFFENED STEEL PLATE SHEAR WALLS*  
**Erfan Alavi\*** (International Institute of Earthquake Engineering and Seismology) Fariborz Nateghi (International Institute of Earthquake Engineering and Seismology)

M1-3 503  
*ANALYTICAL MODELING OF PANEL ZONE SEISMIC BEHAVIOR FOR DIFFERENT CONTINUITY PLATE FORMATION BASED ON SAC96 EXPERIMENTS*  
**Roohollah Ahmady Jazany\*** (International Institute of Earthquake Engineering and Seismology, Iran) Hossein Kayhani (Islamic Azad University, Iran), Ali Golara (International Institute of Earthquake Engineering and Seismology (IIEES), Iran)

M1-4 519  
*SEISMIC PERFORMANCE OF REDUCED BEAM SECTION MOMENT FRAMES CONSIDERING RECORD-TO-RECORD UNCERTAINTIES*  
**Seyed Alireza Jalali\*** (Amir Kabir University of Technology) Mehdi Banazadeh (Amir Kabir University of Technology), Ali Abolmaali (University of Texas Arlington)

M1-5 1063  
*EQUIVALENT SHEAR LINK MODELING AND PERFORMANCE ANALYSIS OF COLD FORMED STEEL STRUCTURES UNDER EARTHQUAKE LOADING*  
**Nouredine Bourahla\*** (University Saad Dahlab Blida, Algeria) Tahar Boukhamacha (University Saad Dahlab Blida, Algeria), Ahmed Attar (University Saad Dahlab, Blida, Algeria), Naouel Allal (ALRIM, Algiers, Algeria)

M1-6 1370  
*ENERGY-BASED DAMAGE INDEX AND CYCLIC DRIFT CAPACITY FOR STEEL STRUCTURES*  
**Eden Bojorquez\*** (Universidad Autonoma de Sinaloa) Alfredo Reyes (Universidad Autonoma De Sinaloa), Amador Teran-Gilmore (Universidad Autonoma Metropolitana), Sonia Ruiz (Universidad Nacional Autonoma de Mexico)

M1-8 1188  
*SEISMIC BEHAVIOR OF HIGH-PERFORMANCE FIBER-REINFORCED CONCRETE BRIDGE PIERS*  
**Ady Aviram\*** (University of California, Berkeley) Bozidar Stojadinovic (University of California, Berkeley), Gustavo Parra-Montesinos (University of Michigan)

M1-9 843  
*LOAD BEARING CAPACITIES OF STEEL BRIDGE PIERS SUBJECTED TO LONG-DURATION TIME MOTIONS*  
**Takeshi Kitahara\*** (Kanto Gakuin University) Kentaro Tanaka (Kanto Gakuin University), Takashi Yamaguchi (Osaka City University)

M1-10 1444  
*DEVELOPMENT OF BRIDGE FRAGILITY CURVES USING UPDATED DAMAGE STATES*  
Jazalyn Dukes (Georgia Institute of Technology), Reginald Desroches (Georgia Institute of Technology), **Karthik Ramanathan\*** (Georgia Institute of Technology)

M1-11 68  
*INELASTIC SEISMIC DISPLACEMENTS OF PILE SUPPORTED BRIDGES LOCATED IN EASTERN NORTH AMERICA*  
**Dominic Gagnon\*** (Ecole Polytechnique de Montreal) Pierre Léger (Ecole Polytechnique de Montreal), Robert Tremblay (Ecole Polytechnique de Montreal), Vincent Latendresse (Teknika-HBA, Consulting Eng.)

M1-12 1099  
*IMPROVEMENT IN SEISMIC CONFIGURATION OF SLENDER REINFORCED CONCRETE WALL PIERS ON ISOLATED FOOTINGS*  
**Kaustubh Dasgupta\*** (Indian Institute of Technology Guwahati) C.V.R. Murty (Indian Institute of Technology Hyderabad)

## **14:40 Seismic Design and Performance of Bridges**

Frontenac

M2-1 1142  
*CONCRETE FILLED STEEL BRIDGE PIERS FOR IMPROVED SEISMIC PERFORMANCE AND RAPID CONSTRUCTION*  
**Charles Roeder\*** (University of Washington) Dawn Lehman (University of Washington)

M2-2 438  
*EXPERIMENTAL INVESTIGATION OF FRP RC SUB-ASSEMBLY WITH SMA BAR IN THE PLASTIC HINGE REGION OF BEAM*  
**M. Shahria Alam\*** (University of British Columbia) Moncef Nehdi (University of Western Ontario), Maged A. Youssef (University of Western Ontario)

M2-3 620  
*IMPROVED EFFECTIVE DAMPING EQUATION FOR EQUIVALENT LINEAR ANALYSIS OF SEISMIC-ISOLATED BRIDGES*  
**Memduh Karalar\*** (Middle East Technical University) Murat Dicleli (Middle East Technical University)

M2-4 380  
*EVALUATION OF GROUND MOTION INTENSITY MEASURES FOR THE FRAGILITY CURVES OF ORDINARY HIGHWAY BRIDGES IN TURKEY*  
**Ahmet Yakut\*** (Department of Civil Engineering, Ankara, Türkiye) Ozgur Avsar (Earthquake Research Department, General Directorate of Disaster Affairs, Ankara, Türkiye)

M2-5 1192  
*STRUCTURAL PERFORMANCE OF SEISMICALLY ISOLATED AND FIBER-REINFORCED CONCRETE BRIDGES*  
**Ady Aviram\*** (University of California, Berkeley) Kevin Mackie (University of Central Florida), Bozidar Stojadinovic (University of California, Berkeley)

M2-6 211  
*A COMPUTATIONAL PLATFORM FOR SEISMIC PERFORMANCE ASSESSMENT OF PRECAST CONCRETE SEGMENTAL BRIDGE COLUMNS WITH SHEAR RESISTANCE CONNECTING STRUCTURE*  
**Tae-Hoon Kim\*** (Daewoo Institute of Construction Technology) Se-Jin Park (Daewoo Institute of Construction Technology), Young-Jin Kim (Daewoo Institute of Construction Technology), Hyun Mock Shin (Sungkyunkwan University)

M2-7 775  
*SEISMIC DESIGN/CONSTRUCTION OF LIFELINE BOX GIRDER BRIDGE - SAN FRANCISCO BAY BRIDGE APPROACH SPAN REPLACEMENT*  
**Xiaoyun Wu\*** (IDC Consulting Engineers, Inc.) Hasan EL-NATUR (Caltrans (California Department of Transportation)), Mohan Char (AECOM)

# Poster Sessions continued

## MONDAY, JULY 26, 2010 (continued)

M2-8 1448

ON THE SELECTION OF FLUID VISCOUS DAMPERS FOR SEISMIC PROTECTION OF BRIDGES

**Jose J. Alvarez\*** (Universidad Michoacana de San Nicolas de Hidalgo)

Sergio Campos (Universidad Michoacana de San Nicolas de Hidalgo), Manuel Jara (Universidad Michoacana de San Nicolas de Hidalgo), Jose Jara (Universidad Michoacana de San Nicolas de Hidalgo)

M2-9 1682

SEISMIC RETROFITTING AND INCREASING BEARING CAPACITY OF STEEL TRUSS RAILWAY BRIDGE'S DECK IN IRAN

**Benyamin Mohebi\*** (Iran University of Science & Technology)

Gholamreza Ghodrati Amiri (Iran University of Science & Technology), Seyed Ali Razavian Amrei (Iran University of Science & Technology)

M2-10 251

ANALYTICAL FRAGILITY CURVES FOR SKEWED HIGHWAY BRIDGES

**Ahmed Abdel-Mohti\*** (Ohio Northern University) Gokhan Pekcan

(University of Nevada Reno)

### 14:40 Seismic Response of Wood Buildings

Frontenac

M2-12 482

STUDY ON EFFECT OF ORTHOGONAL WALL OF JAPANESE TRADITIONAL WOODEN APARTMENT, NAGAYA, MODELS CONSIDERING FLOOR STIFFNESS

Akira Yamada (Hirata Structural Engineers, Inc.) **Sanshiro Suzuki\*** (Kansai University)

M2-13 490

REPORT ON LABORATORY TESTING OF ANCHOR BOLTS CONNECTING WOOD SILL PLATES TO CONCRETE WITH MINIMUM EDGE DISTANCES

**Gary Mochizuki\*** (Structural Solutions, Inc.) Andrew Fennell (Scientific Construction Laboratories, Inc.), Kevin Moore (Certus Consulting, Inc.), Philip Line (URS Corporation), Thomas VanDorpe (VanDorpe Chou Associates, Inc.), Thomas Voss (Scientific Construction Laboratories, Inc.)

### 14:40 Protective Systems

Frontenac

M3-1 890

SHAKING TABLE TEST OF SEMI-ACTIVE MASS DAMPER USING MR DAMPER

**Pei-Yang Lin\*** (National Center for Research on Earthquake Engineering, Taiwan)

Hung-Wei Chiang (National Center for Research on Earthquake Engineering, Taiwan)

M3-2 662

EXPERIMENTAL STUDY OF BI-DIRECTIONAL SPRING UNIT IN ISOLATED FLOOR SYSTEMS&[PI]

Michel Bruneau (State University of New York at Buffalo) Shenlei Cui (State University of New York at Buffalo), **Amarnath Kasalanati\*** (Dynamic Isolation Systems, Inc.)

M3-3 642

SEISMIC RESPONSE ANALYSES OF FOLDED CANTILEVER SHEAR STRUCTURE

Ercan Serif Kaya (Kumamoto University), Takuro Katayama (Sojo University), **Toshitaka Yamao\*** (Kumamoto University)

M3-4 844

SEISMIC BASE ISOLATION IN ROMANIA

**Ion Vlad\*** (Technical University of Civil Engineering Bucharest)

M3-5 935

DEVELOPMENT OF MID-STORY ISOLATED STRUCTURE IN CHINA

**Xiangyun HUANG\*** (Guangzhou University, China) Fulin ZHOU (Guangzhou University, China), Xuehai LUO (Guangzhou University, China), Jian Liu (Guangzhou University, China)

M3-6 1762

NUMERICAL EVALUATION OF BASE-ISOLATED STRUCTURES WITH OPTIMIZED DISTRIBUTION OF LRB AND FPS ISOLATORS

**Hosein Naderpour\*** (Semnan University) Gholamreza Ghodrati Amiri (Iran University of Science & Technology), Seyed Rohollah Hoseini Vaez (Semnan University)

M3-7 874

USING ORTHOGONAL PAIRS OF RODS ON CONCAVE BEDS (OPRCB) AS A BASE ISOLATION DEVICE - PART (II): APPLICATION TO

**Zohreh Bayat\*** (Guilan University, Rasht, Iran) Mahmood Hosseini (Int'l Inst. of Earthquake Eng. & Seismology (IIEES) and Islamic Azad University (IAU), Tehran, Iran), Amirhossein Soroor (Islamic Azad University (IAU) Iran)

M3-8 1059

ROCKING ISOLATION OF BLOCK-LIKE OBJECTS UNDER DYNAMIC BASE EXCITATION

**Panayiotis Roussis\*** (University of Cyprus) Eleni Pavlou (University of Cyprus), Elisavet Pisiara (University of Cyprus)

### 14:40 Energy Dissipation Systems

Frontenac

M3-9 361

PRELIMINARY STUDY OF OPTIMAL PLACEMENT OF VISCOUS DAMPERS IN BUILDINGS

**Jessica Whittle\*** (University of Oxford) Martin S. Williams (University of Oxford), Tony Blakeborough (University of Oxford)

M3-10 742

PARAMETRIC STUDY ON THE EFFICIENCY OF SINGLE AND MULTIPLE TUNED MASS DAMPER SYSTEMS

**Ihussain Abubakar\*** (AL-Tahadi University) Abdulsalam AL-Janabi (AL-Tahadi University)

M3-11 798

PRE-DESIGN OF VISCOELASTIC DISSIPATING DEVICES TO REDUCE THE TRANSVERSE DISPLACEMENTS OF AN URBAN CABLE-STAYED BRIDGE

**J. Antonio López-Meza\*** (Universidad Nacional Autonoma de Mexico) Sonia E. Ruiz (Universidad Nacional Autonoma de Mexico), Francisco L. Silva (Instituto Mexicano del Petróleo), Luis Esteva (Universidad Nacional Autonoma de Mexico)

M3-12 898

A COMPARISON BETWEEN SHEAR TYPE METALLIC AND FLUID VISCOUS ENERGY DISSIPATION DEVICES USING REAL-TIME HYBRID TESTING

**Mobin Ojaghi\*** (University of Oxford) Jessica Whittle (University of Oxford), Martin S. Williams (University of Oxford), Anthony Blakeborough (University of Oxford)

M3-13 1360

SEISMIC RESPONSE CONTROL OF WOODEN HOUSE WITH SMALL KNEE-BRACE OIL DAMPERS

**Yuuji Miyazu\*** (Waseda University) Satsuya Soda (Waseda University)

M3-14 1651

OPTIMUM USE OF VISCOUS DAMPERS IN MULTI-STORY STEEL BUILDINGS FOR UPGRADING THEIR SEISMIC BEHAVIOR

**Amir Masoud Malek\*** (Islamic Azad University (IAU), Iran) Mahmood Hosseini (Int'l Inst. of Earthquake Eng. & Seismology (IIEES) and Islamic Azad University (IAU), Tehran, Iran)

**MONDAY, JULY 26, 2010** (continued)

M4-1 346

FRAGILITY ANALYSIS OF STRUCTURES WITH CONTROLLED ROCKING BEAM-COLUMN CONNECTIONS AND VISCOUS DAMPERS

Gian Paolo Cimellaro\* (Politecnico di Torino) Hwasung Roh (University at Buffalo, SUNY)

**14:40 Lessons Learned from Recent Earthquakes**

Frontenac

M4-2 149

LESSONS LEARNED FROM THE 2008 SICHUAN EARTHQUAKE AND APPLICATION TO THE RETROFIT PROGRAM IN ISTANBUL, TURKEY

Kit Miyamoto (Miyamoto International) Amir Gilani\* (Miyamoto International), Peter Yanev (Global Risk Miyamoto)

M4-3 218

A STUDY ON BAM EARTHQUAKE RECONSTRUCTION: AN EXPERIENCE IN URBAN SCALE EARTHQUAKE RECONSTRUCTION

Mohammad Reza Ghayamghamian\* (IIEES) Zhila Pooyan (IIEES)

**14:40 Post-Earthquake Response, Damage Assessment, and Recovery**

Frontenac

M4-4 1794

ANALYSIS OF 10 YEARS RESTORATION PROCESS AFTER A BIG DISASTER, STORY OF 1995 HANSHIN-AWAJI EARTHQUAKE, KOBE, JAPAN

Takahisa Enomoto\* (Kanagawa University) Toshio Yamamoto (Kanagawa University), Kunihiro Amakuni (Pacific Consultants Co. Ltd.), Manuel Navarro (Almeria University)

M4-5 232

FUNDAMENTAL STUDY ON THE DEVELOPMENT OF ALGORITHM FOR ROAD DAMAGE ESTIMATION DUE TO NATURAL DISASTERS USING PROBE-CAR DRIVING DATA

Takeyasu SUZUKI\* (University of Yamanashi) Naoaki OHSHIMA (Falcon Co., Ltd.)

M4-6 533

USING SHAKEMAP AND SHAKECAST FOR POST-EARTHQUAKE RESPONSE AND DAMAGE ASSESSMENT

Kuo-Wan Lin\* (U.S. Geological Survey) David Wald (U.S. Geological Survey), Loren Turner (Caltrans)

M4-7 1312

AUTOMATIC DAMAGE LOCALIZATION OF BUILDINGS BASED ON DOMINANT FREQUENCY SHIFTS THROUGH INCOMPLETE MEASUREMENTS

Chi-Chang Lin\* (National Chung Hsing University) Ging-Long Lin (National Chung Hsing University), Chin-Te Liang (National Chung Hsing University), Jer-Fu Wang (921 Earthquake Museum of Taiwan)

**14:40 Public Policy and Seismic Awareness**

Frontenac

M4-8 192

PROMOTING SEISMIC RETROFIT IMPLEMENTATION THROUGH THE PROPERTY MARKET PLACE

Temitope Egbelakin\* (University of Auckland) Suzanne Wilkinson (University of Auckland, New Zealand)

M4-9 1593

A PROPOSED RATING SYSTEM FOR EXPECTED EARTHQUAKE PERFORMANCE OF BUILDINGS

Doug Hohbach\* (Hohbach-Lewin, Inc.) Kate Stillwell (Kate Stillwell), Ron Mayes (Simpson Gumpertz &amp; Heger, Inc.)

**14:40 Education**

Frontenac

M4-10 153

LEARNING EARTHQUAKE RESISTANT ARCHITECTURE: FIRST HAND

Vinodkumar Shah\* (CEPT University) Muktirajsinhji Chauhan (CEPT University)

M4-11 955

MODEL LATERAL SUPPORT SYSTEMS UNDER SEISMIC LOADING FOR EARTHQUAKE ENGINEERING EDUCATION

ALI PORBAHA\* (California State University, Sacramento)

**14:40 Preparedness**

Frontenac

M4-12 972

A RAPID VISUAL SEISMIC ASSESSMENT PRECEDURE FOR RC FRAME BUILDINGS IN INDIA

Sudhir Jain\* (Indian Institute of Technology Kanpur) Keya Mitra (Bengal Engineering and Science University, Shibpur, India), Manish Kumar (IITKanpur), Mehul Shah (CEPT University, Ahmedabad, India)

M4-13 184

APPLICATION OF NEURAL NETWORKS ON RECENT DEVELOPMENT OF THE EARTHQUAKE EARLY WARNING SYSTEM FOR TAIWAN

Chu-Chieh Lin\* (National Center for Research on Earthquake Engineering) Zhe-Ping Shen (National Center for Research on Earthquake Engineering)

M4-14 1849

TSUNAMI WAVEBAG

Laura Boffi\* (Polytechnic of Turin)

# Poster Sessions continued

**TUESDAY, JULY 27, 2010**

**14:40 Lifelines**

Frontenac

- T1-1 130  
*FIRE FIGHTING PERFORMANCE IN A CONGESTED URBAN AREA UNDER SEISMIC RISKS*  
**Kenta Nomura\*** (Tokyo city university) Toshio Imai (JFE engineering Corp), Takeshi Koike (Tokyo City University)
- T1-2 213  
*NUMRICAL SIMULATION OF SEISMIC RESPONSE OF UNDERGROUND UTILITY TUNNEL ON SHAKING TABLE TEST UNDER NON-UNIFORM EARTHQUAKE WAVE EXCITATION*  
**Luzhen JIANG\*** (Tongji University, Shanghai, China) Jun CHEN (Tongji University), Jie LI (Tongji University)
- T1-3 196  
*RESILIENCE OF WASTEWATER PIPELINES IN EARTHQUAKES*  
**Mohammad Reza Zare\*** (University of Auckland) Suzanne Wilkinson (University of Auckland)
- T1-4 1649  
*VULNERABILITY OF TANKS UNDER SEISMIC ACTIONS*  
**Luis Eduardo Perez Rocha\*** (Electrical Research Institute) Ismael Eduardo Arzola Nuño (Electrical Research Institute), Marco Aurelio Fernández Torres (Electrical Research Institute)
- T1-5 1466  
*A QUICK SEISMIC ASSESSMENT METHOD FOR JACKET TYPE OFFSHORE STRUCTURES BY COMBINING PUSH-OVER AND NONLINEAR TIME HISTORY ANALYSES*  
**Somayyeh Karimiyan \*** (IIEES) Mahmood Hosseini (Int'l Inst. of Earthquake Eng. & Seismology (IIEES), Tehran, Iran), Morteza Karimiyan (Islamic Azad University)
- T1-6 603  
*INTEGRATED HAZARD ANALYSIS METHODOLOGY TO STUDY INTERDEPENDENCIES AMONG CRITICAL INFRASTRUCTURES*  
Hugon Juarez Garcia (University of British Columbia) **Carlos E. Ventura\*** (University of British Columbia), Jorge Hollman (BC Hydro), Jose R. Marti (University of British Columbia)
- T1-8 801  
*EXAMINING EARTHQUAKE-RELATED TRANSPORTATION DISRUPTION IN METRO VANCOUVER*  
**Karthick Pathman\*** (UBC - School of Community and Regional Planning) Stephanie Chang (UBC), Mojtaba Mahsuli (UBC), Terje Haukaas (UBC)
- T1-9 1409  
*PROBABILISTIC ASSESSMENT OF COINCIDENCE OF EARTHQUAKE DAMAGE TO COLLOCATED LIFELINES*  
**Nobuoto Nojima\*** (Gifu University, Japan)

**14:40 Dams and Ports**

Frontenac

- T1-10 517  
*SEISMIC SAFETY EVALUATION OF GATED SPILLWAYS: MODELLING HYDRODYNAMIC PRESSURES ON GATES*  
**Pierre Léger\*** (Ecole Polytechnique de Montreal) Carlos Melo (University of Brasilia), Lucian Stefan (Ecole Polytechnique de Montreal), Lineu Pedroso (University of Brasilia), Najib Bouaanani (Ecole Polytechnique de Montreal)
- T1-11 1525  
*SAFETY EVALUATION METHOD FOR CONCRETE DAM AGAINST SURFACE DISPLACEMENT OF EARTHQUAKE FAULT*  
**Yoshiaki Ariga\*** (Hirosaki University)

**14:40 Repair and Retrofit of Structures and Foundations**

Frontenac

- T2-1 275  
*UNDERPINNING OF RAFT SLAB FOUNDATION FOR SEISMIC REMEDIATION USING JET GROUTING AND ITS QA METHODS*  
**Blair Gohl\*** (MEG Consulting Ltd.) Ped Zabeti (BC Hydro)
- T2-2 488  
*SEISMIC PERFORMANCE OF SHAPE MEMORY ALLOY REINFORCED CONCRETE FRAMES*  
**Mahmoud Elfeki\*** (The University of Western Ontario,) Maged Youssef (The University of Western Ontario)
- T2-3 544  
*USE OF SMA AND BUCKLING RESTRAINED BRACES TO REDUCE SEISMIC RESIDUAL DEFORMATIONS IN LOW-RISE RC FRAMES*  
**Maged Youssef\*** (The University of Western Ontario) Mohamed Mashaly (The University of Western Ontario), Hamdy Abouelfath (Alexandria University)
- T2-4 1101  
*A SEISMIC FRAGILITY ANALYSIS OF SINGLE-STORY UNREINFORCED MASONRY RESIDENTIAL STRUCTURES IN TRINIDAD AND TOBAGO*  
**Richard Clarke\*** (University of the West Indies)
- T2-5 1034  
*SEISMIC ASSESSMENT AND RETROFIT OF THE KNIGHT STREET BRIDGE*  
**Shane Cook\*** (Associated Engineering) Don Kennedy (Associated Engineering), Saqib Khan (Associated Engineering)
- T2-6 1661  
*SEISMIC STRENGTHENING OF RC BUILDINGS USING CFRP*  
**Iman Hajirasouliha\*** (The University of Sheffield, UK) Reyes Garcia Lopez (The University of Sheffield, UK), Kypros Pilakoutas (The University of Sheffield, UK), Maurizio Guadagnini (The University of Sheffield, UK)
- T2-8 736  
*SELECTIVE SEISMIC REHABILITATION OF RC INTERIOR BEAM-COLUMN JOINTS WITH FRP COMPOSITES*  
**Chris Pantelides\*** (University of Utah) Yasuteru Okahashi (Corebrace), Lawrence Reaveley (University of Utah)
- T2-9 824  
*EVALUATION OF PROGRESSIVE COLLAPSE IN URM-INFILLED RC FRAMES WITH AND WITHOUT FRP RETROFIT: 3-D COMPUTATIONAL SIMULATION OF A ONE STORY BUILDING*  
**Mohamed Talaat\*** (Simpson Gumpertz & Heger, Inc.) Wassim Naguib (Simpson Gumpertz & Heger, Inc.)
- T2-10 148  
*SEISMIC RETROFIT OF THE LAX THEME BUILDING WITH A MASS DAMPER*  
Kit Miyamoto (Miyamoto International) **Amir Gilani\*** (Miyamoto International), Stephan Mahin (University of California, Berkeley)
- T2-11 1246  
*FIRE-FOLLOWING EARTHQUAKE RISK OF JAKARTA*  
**Widjojo Prakoso\*** (University of Indonesia)

**14:40 Soils, Foundations, Soil-Structure Interaction and Soil Stability**

Frontenac

- T3-1 760  
*PROCEDURE TO EVALUATE SEISMIC SETTLEMENT IN DRY SAND BASED ON SHEAR WAVE VELOCITY*  
**Fred Yi\*** (CHJ Incorporated)

**TUESDAY, JULY 27, 2010 (continued)**

- T3-2 22  
REDUCING LIQUEFACTION RISK IN THE SANDY SHORE OF CASPIAN SEA BY USING STEEL PILE DRIVING  
**Yahya Ahadi\*** (International University of Jolfa)
- T3-3 265  
CYCLIC TRIAXIAL TESTING OF A WELL GRADED COMPACTED LIMESTONE ROCKFILL  
**Hamid Fallah\*** (Poyry Energy AG)
- T3-4 838  
COHERENCY OF QUALITY FACTOR OF SUBSURFACE GROUND IDENTIFIED USING VERTICAL ARRAY RECORDS OF EARTHQUAKE MOTIONS  
**Yusuke YAMANAKA\*** (Nagaoka University of Technology) Osamu TSUJIHARA (Wakayama National College of Technology)
- T3-5 1036  
EFFECTS OF SITE AMPLIFICATION ON THE SEISMIC VULNERABILITY OF TYPICAL QUEBEC CITY'S BRIDGES  
**Bertrand Galy\*** (Ecole de Technologie Supérieure) Amar Khaled (Ecole de Technologie Supérieure), Marie-José Nollet (Ecole de Technologie Supérieure)
- T3-6 1601  
DEFINITION OF S-WAVE VELOCITY STRUCTURE USING MICROTREMORS AND SPAC METHOD APPLIED IN CHILPANCINGO, GUERRERO, MÉXICO.  
**Alonso Gomez Bernal \*** (Universidad Autonoma Metropolitana) Andres Gama Garcia (Universidad Autonoma Metropolitana), Jorge Aguirre Gonzalez (Universidad Nacional Autonoma de Mexico)
- T3-7 1244  
EFFECT OF FREQUENCY ON THE EQUIVALENT VISCOUS DAMPING RATIO OF SOILS AT SMALL CYCLIC STRAINS  
**Kentaro Tabata\*** (National Research Institute for Earth Science and Disaster Prevention) Mladen Vucetic (University of California, Los Angeles)
- T3-8 1736  
SEISMIC SITE CLASS DETERMINATION USING MULTICHANNEL ANALYSIS OF SURFACE WAVES (MASW) METHOD  
**Ali Nasser-Moghaddam\*** (Inspec-Sol Inc.) Ali Nasser-Moghaddam (Inspec-Sol Inc), Joseph Bennett (Inspec-Sol Inc.)
- T3-9 1611  
ASSESSMENT OF SSI EFFECTS ON A SEISMICALLY ISOLATED MULTI-SPAN BRIDGE UNDER BI-DIRECTIONAL SEISMIC EXCITATION  
**Panos Tsopelas\*** (University of Thessaly) Alper Ucak (The Catholic University of America), George P. Mavroeidis (The Catholic University of America), Gokhan Pekcan (University of Nevada-Reno)
- T3-10 178  
ON PREDICTION OF DYNAMIC PILE BEHAVIOR  
**Shamsher Prakash\*** (MST) Vijay Puri (SIU, Carbondale, IL)
- T3-11 356  
BEHAVIOUR OF A PILE SUPPORTED STRUCTURE UNDER STRONG GROUND MOTION CONSIDERING LIQUEFACTION OF THE SOIL MEDIUM  
**Bal Krishna Maheshwari\*** (Indian Institute of Technology Roorkee) Rajib Sarkar (Indian Institute of Technology Roorkee)
- T3-12 717  
SOIL-STRUCTURE INTERACTION FOR SEISMIC ANALYSIS OF A NUCLEAR FACILITY  
**Jun Zheng Chen \*** (CH2M HILL) Dario Rosidi (CH2M HILL), Lester Lee (Ares Corporation)

T3-13 932  
STUDY ON THE EARTHQUAKE RESISTANCE BEHAVIOR OF STRUCTURE IN MOUNTAINOUS REGION AFFECTED BY SOIL-STRUCTURE INTERACTION  
**Li-ping Liu\*** (Chongqing University, China) Jun Chen (Chongqing University, China), Ying-min Li (Chongqing University, China), Rui-xian Zhao (Chongqing University, China)

T3-14 1606  
FULL-SCALE FIELD TEST ON LIQUEFACTION-INDUCED DAMAGE OF RUNWAY PAVEMENT BY CONTROLLED BLAST TECHNIQUE  
**Hiroshi Nakazawa\*** (Port and Airport Research Institute) Takahiro Sugano (Port and Airport Research Institute)

T4-1 1272  
E-DEFENSE SHAKING TABLE TEST ON THE BEHAVIOR OF LIQUEFACTION-INDUCED LATERAL SPREADING OF LARGE-SCALE MODEL GROUND WITH A PILE-FOUNDATION STRUCTURE BEHIND QUAY WALL  
**Masayoshi Sato\*** (National Research Institute for Earth Science and Disaster Prevention) Kentaro Tabata (National Research Institute for Earth Science and Disaster Prevention)

T4-2 1273  
E-DEFENSE SHAKING TABLE TESTS ON THE BEHAVIOR OF A PILE-FOUNDATION STRUCTURE IN LARGE-SCALE MODEL GROUND UNDER MULTI-DIMENSIONAL MOTIONS  
**Kentaro Tabata\*** (National Research Institute for Earth Science and Disaster Prevention) Masayoshi Sato (National Research Institute for Earth Science and Disaster Prevention)

T4-3 1331  
CORRECTION FACTORS FOR OBTAINING MODIFIED RESPONSE SPECTRA TAKE INTO ACCOUNT SOIL-STRUCTURE INTERACTION EFFECTS  
**Luis Restrepo\*** (Integral S. A.) Juan Olarte (Universidad Nacional de Colombia), Manuel Villarraga (Universidad Nacional de Colombia)

#### 14:40 Experimental Methods, Information Technology, and Collaborative Tools

Frontenac

T4-4 897  
BENCHMARK BUILDING MODEL FOR STRUCTURAL CONTROL AND DAMAGE IDENTIFICATION  
**Pei-Yang Lin\*** (National Center for Research on Earthquake Engineering, Taiwan) Hung-Wei Chiang (National Center for Research on Earthquake Engineering, Taiwan), Chin-Hsiung Loh (National Taiwan University)

T4-5 372  
APPROXIMATE METHODS FOR ESTIMATING HYSTERETIC ENERGY DEMAND ON UNIAXIAL PLAN-ASYMMETRIC BUILDINGS  
**Siddhartha Ghosh\*** (Indian Institute of Technology Bombay) Manish Rathore (Indian Institute of Technology Bombay), Amarnath Roy Chowdhury (Indian Institute of Technology Bombay)

T4-6 571  
SYSTEM IDENTIFICATION BY INTRODUCING A NEW ENHANCED HILBERT-HUANG TRANSFORM METHOD  
**OMID BAHAR\*** (International Institute of Earthquake Engineering and Siesmology (IIEES)) Soheil Ramezani (IIEES)

T4-8 776  
MODELING ELASTIC AND INELASTIC, CRITICAL- AND POST-BUCKLING BEHAVIOR OF BRACING MEMBERS  
**Swaminathan Krishnan\*** (California Institute of Technology)

T4-9 835  
DEVELOPMENT OF AUTOMATIC MODELING SYSTEM FOR SIMULATION OF EMERGENCY EVACUATION BEHAVIOR  
**Osamu TSUJIHARA\*** (Wakayama National College of Technology)

# Poster Sessions continued

**TUESDAY, JULY 27, 2010** (continued)

## **14:40 Numerical Research**

---

Frontenac

T4-10 86

*IDENTIFICATION OF DYNAMIC PROPERTIES OF DAMS USING SYSTEM IDENTIFICATION TECHNIQUES AND REAL EARTHQUAKE EXCITATIONS*

**Amir Meshkat\*** (Sharif University of Technology) Ali Bakhshi (Sharif University of Technology)

T4-11 1306

*RESPONSE OF MULTI-STORY STRUCTURES TO NEAR-FAULT GROUND MOTIONS AND EQUIVALENT PULSES*

**Reza Sehhati\*** (BergerABAM) Adrian Rodriguez-Marek (Washington State University), William cofer (Washington State University), Mohamed ElGawady (Washington State University)

T4-13 1658

*INTRINSIC FREQUENCY AND ANALYSIS OF NON-STATIONARY SIGNALS*

**Ping Gu\*** (Parsons)

T4-14 1123

*QUANTITATIVE EFFECTS OF SOFT-STORY IN LOW MASONRY BUILDINGS IN THE MEXICAN PACIFIC COASTS*

**Raul Gonzalez Herrera\*** (Universidad de Ciencias y Artes de Chiapas)

Jorge Aguilar Carboney (Universidad Autonoma de Chiapas), Carlos Narcia Lopez (Universidad de Ciencias y Artes de Chiapas), Alejandro Ruiz Sibaja (Universidad Autonoma de Chiapas)

T4-12 1450

*NONLINEAR STRUCTURAL RESPONSE IN RC PIERS: A COMPARISON BETWEEN FULL SCALE EXPERIMENTS AND FIBER ELEMENT MODEL ANALYSIS*

**Yoshitaka Kai\*** (FORUM Co., Ltd.) Hiroki Aoto (Musashi Institute of Technology), Hiroto Matsuyama (FORUM Co., Ltd.), Hiromichi Yoshikawa (Musashi Institute of Technology)

**WEDNESDAY, JULY 28, 2010****14:40 Earthquake and Multiple Hazard Design**

Frontenac

W1-1 194

FERROCEMENT GEODESIC DOME SHELTER (FEGEDS) FOR EARTHQUAKE RESISTANT AFFORDABLE HOUSING

**Uday Kumar, Natakala\* (Meenakshi Sundararajan Engineering College)**

W1-2 1512

INFLUENCE OF HF2V DAMPING DEVICES ON THE PERFORMANCE OF THE SAC3 BUILDING SUBJECTED TO THE SAC GROUND MOTION SUITES

**J Geoffrey Chase\* (University of Canterbury)** Geoffrey Rodgers (University of Canterbury), Gregory MacRae (University of Canterbury), Tobias Bacht (University of Canterbury), Rajesh Dhakal (University of Canterbury), Jonathan Desombre (University of Canterbury)

W1-3 449

EFFECT OF EXTERNAL HIGH STRENGTH HOOPS ON SEISMIC RETROFIT OF LOW STRENGTH CONCRETE R/C COLUMN UTILIZING ROUND REBAR

**Wencong Li\* (Fukuoka University)**

W1-4 504

SEISMIC RESTORATION OF HISTORICAL ISLAMIC MONUMENTS

**Ashraf Osman\* (Cairo University)**

W1-5 741

USE OF STEEL ANCHORS IN FRP REHABILITATION SYSTEMS

**Ashraf Biddah\* (UAE University)** Ahmed Ghobarah (McMaster University)**14:40 Reinforced Concrete Buildings**

Frontenac

W1-8 237

EXPERIMENTAL STUDY ON DAMAGE QUANTIFICATION OF R/C MEMBERS UNDER EARTHQUAKES

**Noriyuki TAKAHASHI\* (The University of Tokyo)** Eri TAKAHASHI (Sumitomo Mitsui Construction CO.,LTD), Yoshiaki NAKANO (The University of Tokyo)

W1-9 816

COLLAPSE SIMULATION OF REINFORCED CONCRETE BUILDINGS WITH ASFI APPROACH

**Toshikazu Kabeyasawa\* (The University of Tokyo)** Toshimi Kabeyasawa (The University of Tokyo), Yousok Kim (The University of Tokyo)

W1-10 837

SIMPLIFIED PROCEDURE FOR RESIDUAL DISPLACEMENT PREDICTION OF R/C STRUCTURES USING EARTHQUAKE RESPONSE SPECTRA

**Risa Kuwahara\* (The University of Tokyo)** Noriyuki Takahashi (The University of Tokyo), Ho Choi (The University of Tokyo), Yoshiaki Nakano (The University of Tokyo)

W1-11 928

EVALUATION OF PERIOD FORMULAS FOR SHEAR WALL BUILDINGS

**Ahmet Yakut\* (Middle East Technical University)** Ilker Kazaz (Middle East Technical University)

W1-12 428

PREDICTION OF STRUCTURAL RESPONSE IN REINFORCED CONCRETE FRAMES SUBJECTED TO EARTHQUAKE GROUND MOTIONS

**Nirmal Jayaram\* (Stanford University)** Paolo Bazzurro (AIR Worldwide), Fabrizio Mollaioli (University of Rome "La Sapienza", Italy), Adriano De Sortis (Dipartimento della Protezione Civile, Servizio Sismico Nazionale, Roma, Italy), Silvia Bruno (University of Rome "La Sapienza", Italy)

W1-13 1041

EFFECTIVENESS EVALUATION OF POSITIVE REINFORCEMENT IN BEAM ELEMENTS OF MOMENT-RESISTANT FRAMES SUBJECTED TO SEISMIC LOADS

**Victor I. Fernandez-Davila\* (Universidad Nacional de Ingenieria)** Andres Lopez (Universidad Central de Chile)

W1-14 1289

ANALYSIS OF A SQUAT CONCRETE WALL, DIFFERENCE IN TRANSLATION DURING SEISMIC EXCITATION DUE TO FOUNDATION SUPPORT

**Eythor Thorhallsson\* (Reykjavik University)** Indridi Rikhardsson (Reykjavik University), Adalsteinn Olafsson (Reykjavik University), Helgi Olafsson (Reykjavik University)

W2-1 1433

A CODE COMPARATIVE STUDY ON SEISMIC POUNDING OF ADJACENT BUILDINGS WITH APPLICATIONS

**Haitham Eletrabi\* (Auburn University, USA)** Mohamed Abdel-Mooty (The American University in Cairo, Egypt), Mashhour Ghoneim (Cairo University, Egypt)

W2-2 456

TEST OF REINFORCED CONCRETE BEAM-COLUMN JOINTS RETROFITTED WITH CARBON FIBER-REINFORCED POLYMER STRANDS

**Fumio Kusuhara\* (The University of Tokyo)** Hitoshi Shiohara (The University of Tokyo)

W2-3 1457

PERFORMANCE ON SHEAR STRENGTH OF REINFORCED CONCRETE ECCENTRIC BEAM-COLUMN JOINTS SUBJECTED TO SEISMIC LOADING

**Toshio Matsumoto\* (Technical Research Institute Ando Corporation)** Hiroshi Nishihara (Technical Research Institute Ando Corporation), Masato Nakao (Yokohama National University), Juan Jose Castro (Osaka University)

W2-4 906

EXPERIMENTAL STUDY ON RC COLUMNS DAMAGED UNDER EXPOSURE TO THE MARINE ENVIRONMENT IN OKINAWA

**Hiroyuki FUNAKI\* (University of the Ryukyus)** Tetsuo YAMAKAWA (University of the Ryukyus), Kozo NAKADA (University of the Ryukyus), Yoshitomo YAMADA (University of the Ryukyus)

W2-5 1012

PLASTICITY-BASED NONLINEAR FINITE ELEMENT ANALYSIS OF REINFORCED CONCRETE COLUMNS WITH INADEQUATE SEISMIC DETAILING

**Adolfo Matamoros\* (University of Kansas)** Eric Sammarco (University of Texas)

W2-6 1377

FINITE ELEMENT MODELING OF SEGMENTED COLUMNS UNDER LATERAL LOADING

**Mohamed ElGawady\* (WSU)** Haitham Dawood (WSU)

W2-7 217

INVESTIGATION OF THE SEISMIC VULNERABILITY OF EXISTING RC BUILDINGS WITH MASONRY INFILL WALLS

**Stavroula Pantazopoulou\* (Demokritos University of Thrace)** Georgia Thermou (Aristotle University of Thessaloniki)**14:40 Seismic Design Codes and Criteria**

W2-8 249

DISPLACEMENT-BASED PRELIMINARY DESIGN OF LOW-RISE BUILDINGS STIFFENED WITH BUCKLING-RESTRAINED BRACES

**Amador Teran\* (Universidad Autonoma Metropolitana)** Neftali Virto (Alonso y Asociados)

# Poster Sessions continued

## WEDNESDAY, JULY 28, 2010 (continued)

W2-9 543  
DETERMINISTIC AND PROBABILISTIC ASSESSMENT FOR SEISMIC PERFORMANCE OF EXTERIOR BEAM-COLUMN JOINTS WITH HEADED BARS  
**Thomas Kang\*** (University of Oklahoma) Nilanjan Mitra (IIT Kharagpur)

W2-10 1335  
CAPACITY AND DEMAND EVALUATION OF MOMENT FRAMES WITH DIFFERENT HYSTERETIC BEHAVIOR  
**Zhenhua Huang\*** (University of North Texas) Douglas Foutch (University of Illinois at Urbana-Champaign)

W2-11 1498  
INVESTIGATION OF SEISMIC POUNDING OF ADJACENT MULTI-STORY REINFORCED CONCRETE BUILDINGS  
**Haitham Eletrabi\*** (Graduate Student, Structural Engineering Department, Cairo University, Egypt) Mohamed Abdel-Mooty (Professor, Dept. of Construction and Architectural Engineering, The American University in Cairo, Egypt), Mashhour Ghoneim (Professor, Structural Engineering Department, Cairo University, Egypt)

W2-12 1301  
PROPER CONFIGURATION OF CENTERS FOR TWO DIRECTIONAL ASYMMETRIC SINGLE STORY BUILDINGS  
A.S. Moghadam (International Institute of Earthquake Engineering and Seismology (IIIES)) **Armin Aziminejad\*** (International Institute of Earthquake Engineering and Seismology (IIIES))

### 14:40 Nonstructural Building Components

Frontenac

W3-1 457  
A COMPARISON OF TWO SEISMIC RISK EVALUATION METHODS (ASCE 31 & CSA S832) FOR OPERATIONAL & FUNCTIONAL COMPONENT (NONSTRUCTURAL) SYSTEMS IN CANADA AND THE USA.  
**Amir Mohseni\*** (Paradigm Engineering Inc.) Jay Lewis (Terra Firm Earthquake Preparedness Inc.), Sina Haghdoust (Ericsson)

W3-2 459  
SEISMIC BEHAVIOR OF KITCHEN FURNITURE IN HIGH-RISE BUILDING DUE TO LONG-PERIOD GROUND MOTION  
**Saburoh Midorikawa\*** (Tokyo Institute of Technology) Tetsuro Hatsuoka (Tokyo Institute of Technology), Hiroyuki Miura (Tokyo Institute of Technology), Toshiyuki Masatsuki (Kozo Keikaku Engineering Inc.)

### 14:40 Hybrid Simulation

Frontenac

W3-3 940  
ACTUATOR DELAY COMPENSATION FOR REAL-TIME HYBRID SIMULATION INVOLVING MULTIPLE LARGE-SCALE SERVO-HYDRAULIC ACTUATORS  
**Cheng Chen\*** (San Francisco State University) James Ricles (Lehigh University)

W3-4 1592  
A GENERAL FORCE-BASED HYBRID SIMULATION FORMULATION  
**Xiaoyun Shao\*** (Western Michigan University)

### 14:40 Experimental Research

Frontenac

W3-5 347  
CONSEQUENCE OF CRACK DEVELOPMENT FOR DYNAMIC BEHAVIOUR OF COIR FIBRE REINFORCED CONCRETE STRUCTURES  
**Majid Ali\*** (Department of Civil and Environmental Engineering, The University of Auckland, New Zealand) Nawawi Chouh (Department of Civil and Environmental Engineering, The University of Auckland, New Zealand)

W3-6 514  
A COMPARATIVE EXPERIMENTAL STUDY ON THE PERFORMANCE EVALUATION OF INFILLED RC FRAMES USING QUASI-STATIC AND PSEUDO-DYNAMIC TESTING METHODS  
**Cem Yalcin\*** (Bogazici University) Hasan Ozkaynak (Istanbul Technical University), Ercan Yuksel (Istanbul Technical University), Ahmet Anil Dindar (Istanbul Kultur University)

W3-7 606  
PERFORMANCE OF SANDWICH COMPOSITE MEMBERS SUBJECTED TO EARTHQUAKES  
**H. L. Hsu\*** (Dept. of Civil Engineering, National Central University, Taiwan) J. L. Juang (Dept. of Civil Engineering, National Central University, Taiwan), C. L. Chen (Dept. of Civil Engineering, National Central University, Taiwan)

W3-8 622  
EXPERIMENTAL COMPARISONS OF THE SEISMIC PERFORMANCE OF R/C FRAMES INFILLED WITH DIFFERENT KINDS OF MASONRY BLOCKS  
**Maidiawati Maidiawati\*** (Graduate Student, Toyohashi University of Technology) Yasushi Sanada (Associate Professor, Toyohashi University of Technology)

W3-9 654  
SEISMIC BEHAVIOUR OF SMA REINFORCED CONCRETE BEAMS  
**Dan Palermo\*** (University of Ottawa) Alaa Abdulridha (University of Ottawa), Simon Foo (Public Works and Government Services Canada)

W3-10 1010  
SYSTEM IDENTIFICATION AND SEISMIC RESPONSE PREDICTION OF TORSIONALLY COUPLED BUILDINGS  
**Ravi Sinha\*** (Indian Institute of Technology Bombay) Ganesh Narayan Hegde (Goa Engineering College)

W3-11 1673  
INTERIOR BEAM-COLUMN JOINTS WITH WIRE STRANDS SUBJECTED TO REVERSE CYCLIC LOADS  
**Seung-Hun Kim\*** (Hanbat National University) Sang-Su Ha (Kangnam University), Jeong-Ho Moon (Hannam University), Li-Hyung Lee (Chungwoon University)

### 14:40 Seismic Hazard Assessment and Seismic Risk

Frontenac

W3-12 704  
THE ST. LOUIS AREA EARTHQUAKE HAZARDS MAPPING PROJECT - SLAEHMP  
**Chris Cramer\*** (CERI, University of Memphis) SLAEHMP Technical Working Group (CERI, University of Memphis)

W3-13 1017  
A STUDY ON SITE-SPECIFIC UNIFORM HAZARD RESPONSE SPECTRUM IN PROBABILITY SEISMIC HAZARD ANALYSIS  
**Yu-Wen Chang\*** (National Center for Research on Earthquake Engineering, Taipei, Taiwan) Wen-Yu Jean (National Center for Research on Earthquake Engineering), Chin-Hsiung Loh (National Taiwan University), Juin-Fu Chai (National Center for Research on Earthquake Engineering)

W3-14 1562  
EFFECT OF GROUND MOTION SUITES ON THE SEISMIC FRAGILITY OF A THREE-SPAN CONTINUOUS STEEL GIRDER BRIDGE  
**Timothy Wright\*** (Georgia Institute of Technology) Karthik Ramanathan (Georgia Institute of Technology), Reginald DesRoches (Georgia Institute of Technology), Jamie Padgett (Rice University)

**WEDNESDAY, JULY 28, 2010** (continued)

W4-1 501  
RAPID ASSESSMENT OF SEISMIC VULNERABILITY OF BANDAR ABBAS IN SOUTH OF IRAN

**Amir Abbas Fatemi\*** (PhD candidate, Science and Research Branch, Islamic Azad University, Tehran, Iran) Zahra Tabrizian (PhD candidate, Babol Noshirvani University of Technology, Babol, Iran), Roohollah Ahmady Jazany (PhD candidate, International Institute of Earthquake Engineering and Seismology, Tehran, Iran), Hossein Kayhani (PhD candidate, Science and Research

W4-2 587  
DETERMINATION OF DRIFT HAZARD CURVES OF STEEL MOMENT-RESISTING FRAMES FOR TERRITORY OF TEHRAN CITY

**Mehdi Banazadeh\*** (Assistant Professor, Amir Kabir University) Mehdi Mahdavi Adeli (Lecturer, Islamic Azad University, Shoushtar Branch), Ardeshir Deylami (Associated Professor, Amir Kabir University of Tehran)

**14:40 Ground Motion and Seismicity**

Frontenac

W4-3 220  
ON THE USE OF AFTERSHOCKS WHEN DERIVING GROUND-MOTION PREDICTION EQUATIONS

**John Douglas\*** (University of Iceland) Benedikt Halldórsson (University of Iceland)

W4-4 754  
3D GROUND MOTION IN THE GEORGIA BASIN REGION OF SW BRITISH COLUMBIA FOR PACIFIC NORTHWEST SCENARIO EARTHQUAKES

**Sheri Molnar\*** (University of Victoria) John Cassidy (Natural Resources Canada), Stan Dosso (University of Victoria), Kim Olsen (San Diego State University)

W4-5 463  
DEVELOPMENT AND VERIFICATION OF NEW SITE CLASSIFICATION SYSTEM AND SITE COEFFICIENTS FOR THE REGIONS OF SHALLOW BEDROCK IN KOREA

**Dong-Soo Kim\*** (KAIST) Sei-Hyun Lee (KAIST), Yun-Wook Choo (KAIST), Hong-Gun Park (Seoul National University)

W4-8 589  
CHARACTERISTICS OF EARTHQUAKE-INDUCED DIFFERENTIAL GROUND MOTIONS IN THE NEAR-FAULT REGION

**George Mavroeidis\*** (The Catholic University of America) Apostolos Papageorgiou (University of Patras)

W4-9 715  
CLASSIFICATION OF EARTHQUAKE DAMAGES IN BUILDINGS USING A GENETIC ALGORITHM PROCEDURE

**Anaxagoras Elenas\*** (Democritus University of Thrace, Department of Civil Engineering) Petros Alvanitopoulos (Democritus University of Thrace, Department of Electrical & Computer Engineering), Ioannis Andreadis (Democritus University of Thrace, Department of Electrical & Computer Engineering)

W4-10 1180  
AN EMPIRICAL BRACKETED DURATION RELATIONSHIP FOR CENTRAL/EASTERN NORTH AMERICA

**Russell Green\*** (Virginia Tech) Jongwon Lee (Virginia Tech)

W4-11 919  
COMPILATION OF DIGITAL STRONG MOTION DATA FOR EASTERN CANADA

**Lan Lin\*** (Geological Survey of Canada, Natural Resources Canada) John Adams (Geological Survey of Canada, Natural Resources Canada)

W4-12 135  
SEISMOLOGICAL BASIS OF THE BRAZILIAN STANDARD FOR SEISMIC DESIGN

**Sergio Hampshire C. Santos\*** (Federal University of Rio de Janeiro) Silvio de Souza Lima (Federal University of Rio de Janeiro), Fernanda C. Moreira da Silva (Tecton Engenharia)

W4-13 1157  
NEAR-FAULT STRONG-MOTION ARRAY RECORDINGS OF THE MW 6.3 ÖLFUS EARTHQUAKE ON 29 MAY 2008 IN ICELAND

Benedikt Halldórsson (University of Iceland) Ragnar Sigbjörnsson (University of Iceland), **Andrew Chanerley\*** (University of East London, United Kingdom), Nicholas Alexander (University of Bristol)