



toronto
july 25-29, 2010

9th US National and 10th Canadian
Conference on Earthquake Engineering:
Reaching Beyond Borders

9ième Conférence Nationale
Américaine et 10ième Conférence
Canadienne de Génie Parasismique:
Au delà des Frontières

Sponsoring Organizations:



Earthquake Engineering Research Institute



The Canadian Association for Earthquake Engineering
L'Association Canadienne du Génie Parasismique

Conference Program



Includes the 4th International Tsunami Symposium
sponsored by the Tsunami Society International

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A Warm Welcome to Toronto and the 9th US & 10th Canadian Conference on Earthquake Engineering 2010: Reaching Beyond Borders

It is our pleasure to extend a warm welcome to you to Toronto. We are privileged to host this distinguished gathering in Canada.

This is a historic occasion for the Earthquake Engineering Research Institute (EERI) and the Canadian Association for Earthquake Engineering (CAEE) to jointly host their national conferences on earthquake engineering: The 9th US National Conference and the 10th Canadian Conference on Earthquake Engineering. The conference theme is Reaching Beyond Borders, which recognizes that the earthquake hazard is not limited by borders and that effective seismic risk reduction and mitigation are international efforts without borders. It is also our pleasure to welcome members of the Tsunami Society International for holding the 4th International Tsunami Symposium at the same time and venue. Earthquakes and tsunamis represent significant hazards to both the United States and Canada, so it is natural to join together to understand and mitigate the risks to life and economy. The city of Toronto symbolizes the challenges we face in dealing with the central and eastern North American seismic hazard.

This conference has attracted international attention and participation. It is a truly reaching-beyond-borders event. Your contributions have created a very rich program, with 16 invited presentations and 780 technical papers (629 oral presentations) and (151 posters). The technical sessions cover many aspects of the discipline. We have

continued on next page



André Filiatrault
Organizing Committee
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New York, Department of
Civil, Structural and
Environmental Engineering
Director, MCEER



Ahmed Ghabarah
Organizing Committee
Co-Chair
Professor, McMaster
University, Hamilton,
Ontario, Department of
Civil Engineering
Consulting Chair in Design,
Construction and
Management in
Infrastructure Renewal

Un Accueil Chaleureux à Toronto et à la 9ième Conférence Nationale et 10ième Conférence Canadienne de Génie Parasismique: Au-delà des Frontières

Il nous fait plaisir de vous souhaiter la bienvenue à Toronto. Nous sommes privilégiés d'accueillir cette éminente assemblée au Canada.

Il s'agit d'une occasion historique pour le Earthquake Engineering Research Institute (EERI) et l'Association Canadienne du Génie Parasismique (ACGP) d'organiser conjointement leurs conférences nationales sur le génie parasismique: La 9ième Conférence Nationale et 10ième Conférence Canadienne de Génie Parasismique. Le thème du congrès est Au-delà des frontières, qui reconnaît que l'aléa sismique n'est pas limité par les frontières et que la réduction efficace des risques sismiques est un effort international qui ne connaît pas de frontières. Il est aussi notre plaisir d'accueillir les membres de l'International Tsunami Society pour la tenue conjointe de la 4ième Conférence sur les Tsunamis. Les séismes et les tsunamis représentent des risques importants pour les États-Unis et le Canada. Il est donc naturel de s'unir pour comprendre et atténuer les risques pour la vie humaine et l'économie. La ville de Toronto symbolise les défis auxquels nous sommes confrontés par l'aléa sismique du Centre et de l'Est de l'Amérique du Nord.

Cette conférence a attiré une participation internationale. C'est un événement scientifique important allant au-delà des frontières. Vos contributions ont créé un programme technique très riche avec 16 présentations invitées et 780 articles techniques (629 présentations orales) et (151 posters). Les séances techniques couvrent de nombreux

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Welcome continued

a special session on Wednesday morning dedicated to the Haiti and Chile 2010 events. There are a few organized sessions addressing topics of general interest. The multidisciplinary aspects of earthquakes and tsunamis include engineering, earth sciences, seismology, social sciences, government and regulatory authorities, and economics, as well as earthquake preparedness, relief efforts, and post-disaster planning. We are delighted to welcome colleagues from 45 countries. In addition, we have over 30 state-of-the-art exhibitors.

This conference provides the opportunity for presentations of recent advances in knowledge and state-of-the-art research and practice in the field of earthquake and tsunami hazard mitigation. It also brings colleagues from many different parts of the world together, stimulates interest, and encourages cooperation. It is always great to see old friends, renew old acquaintances, and make new contacts.

We would like to acknowledge the outstanding and tireless efforts over a two-year period of the members of both EERI and CAEE as well as the colleagues who volunteered their time to serve on the various organizing subcommittees that made this event possible. We are indebted to the co-chairs of the Technical Program Subcommittee for shouldering the greatest burden to ensure the highest quality technical content of the program. The conference is made possible in part by the generosity of our co-sponsors. We would also like to thank "you," the participants, who have travelled long distances and who contributed to the technical program. Your valuable contribution is what first and foremost makes a conference successful.

Toronto is a beautiful and vibrant city with much to see and do. Again, we would like to extend a warm welcome to our friends and guests and wish you a rewarding technical and social conference experience and a very pleasant and enjoyable time in Toronto.

aspects de la discipline. Nous avons une session spéciale mercredi matin consacrée aux séismes d'Haïti et du Chili qui se sont produits en 2010. Il ya quelques sessions spéciales pré-organisées abordant des sujets d'intérêt général. Les aspects multidisciplinaires des séismes et des tsunamis comprennent l'ingénierie, la science, la sismologie, les sciences sociales, les réglementations des autorités gouvernementales, l'économie, ainsi que la préparation face aux tremblements de terre, les efforts de secours et la planification post-catastrophe. Nous sommes ravis d'accueillir des collègues de 45 pays. En outre, nous avons plus de 30 exposants.

Cette conférence est l'occasion pour la présentation des développements récents dans la connaissance et l'état de l'art de la recherche et de la pratique en vue de réduire les risques associés aux tremblements de terre et aux tsunamis. Elle réunit également sous un même toit de nombreux collègues de différentes parties du monde, stimule l'intérêt et encourage la coopération. Il est toujours agréable de retrouver de vieux amis, de renouveler de vieilles connaissances et de nouer de nouveaux contacts.

Nous tenons à saluer les efforts remarquables et inlassables au cours d'une période de deux ans des membres de ACGP et EERI et les collègues qui ont offert leur temps pour servir sur les différents sous-comités d'organisation qui a rendu cet événement possible. Nous sommes redevables aux co-présidents du sous-somité technique d'avoir assumé une charge de travail colossale en vue d'assurer la meilleure qualité possible du contenu technique du programme. La conférence est rendue possible en partie grâce à la générosité de nos commanditaires. Nous tenons également à remercier les participants qui ont parcouru de longues distances et qui ont contribué au programme technique. Votre précieuse contribution est primordial à la réussite de la conférence.

Toronto est une ville magnifique et dynamique qui a beaucoup à offrir à ses visiteurs. Encore une fois nous tenons à vous souhaiter la bienvenue ainsi qu'une conférence enrichissante et un plaisant séjour à Toronto.



Ahmed Ghobarah
Conference Co-Chair
Co-Président de la Conférence



André Filiatrault
Conference Co-Chair
Co-Président de la Conférence

General Information



Assistance/Messages/Lost and Found: If you need assistance or lose anything during the conference, contact the conference staff at the registration desk in the foyer of Metro Centre, East and West.

A bulletin board will be available at the registration area for posting messages. The hotel numbers are: telephone 416/869-1600, fax 416/869-0573.

Business Services: A fully equipped Business Centre is located in the lower lobby of the hotel, accessible 24 hours a day through a guest room key. It offers access to computers, the Internet (25 cents/minute), laser printing, and black/white and color copying. During normal business hours, staff can also help with currency exchange and handling of packages. In case of emergency, the guest services manager on duty can assist.

Conference Proceedings: All conference registrants will receive a Proceedings CD and the conference program book, which are included in the registration fee. Additional copies of the CD may be purchased for \$50 during the conference at the EERI exhibit booth.

Exhibits/Exhibit Hours: Be sure to visit the conference exhibits in Metro West. See the Exhibits section of this program for information about exhibitors.

Hours:

Sunday, July 25, Reception (no-host bar)	7:00–9:00 p.m.
Monday, July 26	7:00 a.m.–5:30 p.m.
Tuesday, July 27	7:00 a.m.–5:30 p.m.
Wednesday, July 28	7:00 a.m.–5:30 p.m.
Thursday, July 29	7:00 a.m.–12:30 p.m.

Field Trips: See the Field Trips section of this program for full details of the tours to the Skydome (Sunday, 3:00 p.m.), CN Tower (Monday, 6:30 p.m.), and Niagara Falls (departing at 7:45 a.m. Friday).

Internet Access: All guest rooms have high-speed Internet access for CAD\$12.95 per day. The lobby has wireless high-speed Internet access at no charge for hotel guests or \$6/hour for visitors. Internet service is provided in the Business Centre at 25 cents/minute.

Name Badges: Conference attendees must wear their name badges at all times during the conference. Attendees will be asked to show their name badges to enter sessions and meal functions. If you lose your badge, with a proper ID you may obtain a replacement at the registration table.

Media Room: The media room is located in the Yonge Room on the street level of the conference centre. The Media Room will be open 7:00 a.m.–6:00 p.m. Sunday through Wednesday and 7:00 a.m.–12:00 noon on Thursday.

Registration: Paid registrants for the full conference have access to technical sessions, the Welcoming Reception (Sunday evening, July 25), one Luncheon (Tuesday, July 27), and one Banquet (Wednesday, July 28). Field trips incur additional costs. One-day registrants have access for one day of their choice to technical sessions; luncheon, the banquet, and field trips incur additional cost.

An itinerary planner is accessible online from <http://2010eqconf.org/>.

Registration Hours:

Sunday, July 25	12:00 p.m.–5:00 p.m.
Monday, July 26	6:00 a.m.–5:00 p.m.
Tuesday, July 27	7:00 a.m.–5:00 p.m.
Wednesday, July 28	7:00 a.m.–5:00 p.m.
Thursday, July 29	7:00 a.m.–12:00 p.m.

Social Program:

- **Welcoming Reception:** All registered participants and companions are cordially invited to attend a reception (no-host bar) following the Opening Session Sunday evening 7:00–9:00 p.m. in the Exhibit Hall (Metro West).
- **Luncheon:** See the Special Events section of this program for full details.
Tuesday, July 27, 11:40 a.m.–1:30 p.m. in Metro Centre/Metro East. All full-conference attendees will be provided with a Luncheon ticket in their registration packet.
- **Banquet:** See the Special Events section of this program for full details.
Wednesday, July 28, 5:30–10:00 p.m. at the Liberty Grand. Attendees will be provided with 2 drink tickets and a dinner ticket in their registration packets. Buses will begin departing from the hotel at 5:00 p.m. and continue until 6:00 p.m. Dinner will be served at 7:00 p.m. Buses will begin returning to the hotel at the end of the program at approximately 9:15 p.m. and will continue until 10:00 p.m.
- **Morning and Afternoon Refreshment Breaks:**
7:00–8:00 a.m. daily in the Exhibit Hall (Metro West): coffee and tea.
Mid-morning daily in the Exhibit Hall: half-hour breaks for coffee and sodas.
Mid-afternoon in the Frontenac Room with the poster sessions on Monday, Tuesday, and Wednesday: hour-long breaks with sodas, coffee, and tea.

Speaker Ready Room: Speakers can use the Bay Room on the street level of the conference centre to prepare for presentations from 6 a.m. to 6 p.m. One laptop will be available for your use in case you do not bring your own. If you need to revise your file in this room, please bring your own DVD, CD or flash drive.

General Information continued

The Westin Harbour Castle, Toronto

Plenary & Concurrent Sessions:

Metro Centre-Metro East

Exhibits: Metro West



CONVENTION CENTRE
SECOND FLOOR



HOTEL CONVENTION LEVEL
THIRD FLOOR

CONVENTION LEVEL

Concurrent Sessions

Hotel Convention Level

(3rd Floor):

Harbour A

Harbour B

Harbour C

Pier 2 & 3

*Pier 4**

*Pier 5**

Pier 7 & 8



HOTEL
SECOND FLOOR

MAIN LOBBY

Concurrent Sessions

Hotel Main Lobby (2nd floor):

*Marine Room**

*Regatta Room**

Concurrent Sessions: Queens Quay

Poster Sessions: Frontenac

Speaker Ready Room: Bay

Media Room: Yonge



CONVENTION CENTRE

LOWER LEVEL



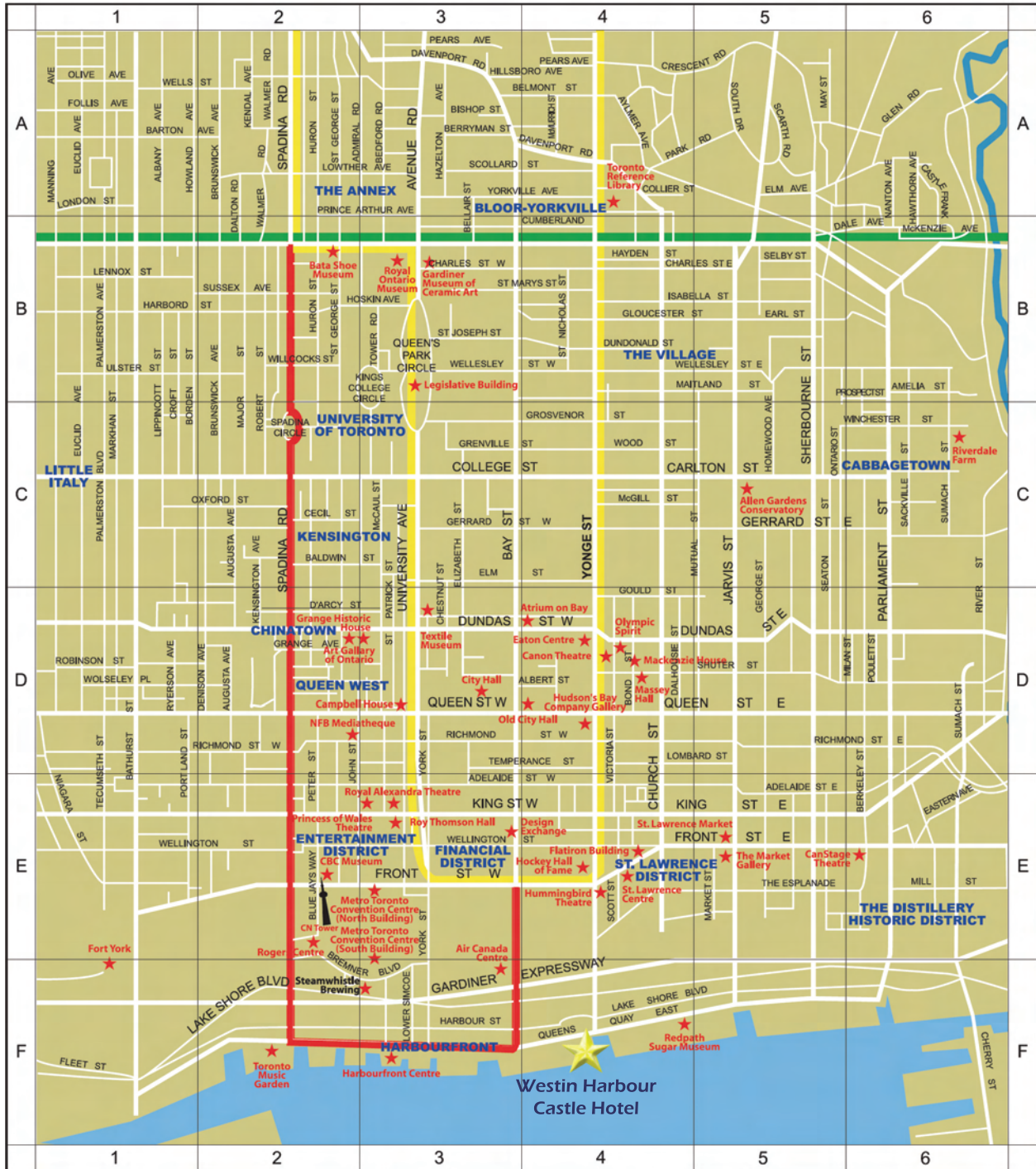
HOTEL

**These rooms will also be used for committee meetings during non-conference hours.*

Dockside Rooms will be used for committee meetings.



DOWNTOWN TORONTO AND ATTRACTIONS



LEGEND

- Subway
- Bloor-Danforth Line —
- Yonge-University Line —
- Harbourfront Streetcar —

★ Westin Harbour Castle Hotel

MAP IS NOT TO SCALE

Agenda-at-a-Glance



	Sunday 25-Jul	Monday 26-Jul	Tuesday 27-Jul	Wednesday 28-Jul	Thursday 29-Jul	Friday 30-Jul
7:00AM						
8:00AM	GES Move-In 7AM - 11PM	Plenary Session 8 - 9:30AM Metro Centre-East	Sessions T11-T20 8 - 9:40AM	Plenary Session: Haiti-Chile EQs 8 - 9:30AM Metro Centre-East	Sessions Th1-Th9 8 - 9:40AM	Niagara Falls Group Tour Bus departs hotel at 7:45AM and returns by 7:00PM
9:00AM		Break 9:30 - 10AM	Break 9:40 - 10:10AM	Break 9:30 - 10AM	Break 9:40 - 10:10AM	
10:00AM	Workshop for Young Researchers, Professionals, and Faculty Queens Quay	Sessions M1-M10 10 - 11:40AM	Sessions T11-T20 10:10 - 11:40AM	Sessions W1-W10 10 - 11:40AM	Closing Plenary Session 10:10AM - 12:30PM Metro Centre-East	Niagara Falls Power Plant 9:45AM - 12:15PM
11:00AM	Exhibitor Move-In 10AM - 5PM Metro West	Lunch 11:40 - 1:00PM	Conference Luncheon 11:40 - 1:30PM Metro Centre-East	Lunch 11:40 - 1:00PM		
12:00NOON		Sessions M11-M20 1:00 - 2:40PM	Sessions T21-T30 1:30 - 3:10PM	Sessions W11-W21 1:00 - 2:40PM		
1:00PM		Poster Session & Break 2:40 - 3:40PM Frontenac Room	Poster Session & Break 3:10 - 4:10PM Frontenac Room	Poster Session & Break 2:40 - 3:40PM Frontenac Room	Exhibit Move-Out 1:00 - 5PM	Lunch Niagara-on-the-Lake 1PM
2:00PM		Sessions M21-M30 3:40 - 5:20PM	Sessions T31-T40 4:10 - 5:50PM	Sessions W22-W31 3:40 - 5:20PM		
3:00PM	SkyDome Group Tour 3:00 - 4:00PM					
4:00PM						
5:00PM	Opening Plenary Session Metro Centre-East					
6:00PM						
7:00PM	Reception 7PM - 9PM Exhibit Hall: Metro West	CN Tower Group Tour 6:30 - 8:30PM		Conference Banquet 5:30 - 10:30PM Liberty Grand		
8:00PM						
9:00PM						
10:00PM						

Special Events



SUNDAY, JULY 25, 2010

Workshop for Young Researchers, Professionals, and Faculty

8:00 a.m.–4:30 p.m. Queens Quay
Due to space limitations, advanced registration is required

A workshop for young researchers, professionals, and faculty, organized by the Student Leadership Council (SLC) of EERI, will encourage interaction among the three groups through a blend of events that include breakfast, a technical session, lunch, and technical tours. Speakers include Jack Hayes, Scott Olson, Patrick Paultre, Joy Pauschke, Chris Poland, and Carlos Ventura. There will be presentations and guided tours by Halcrow, RJC Ltd., and the University of Toronto Department of Civil Engineering

The event is free to participants, thanks to the generous support of sponsors FEMA, Computers & Structures, Degenkolb Engineers, Digitexx, Kinemetrics, and PEER.

Opening Session Metro Centre-East
5:00 p.m.–7:00 p.m.

Welcoming Reception Exhibit Hall (Metro West)
7:00–9:00 p.m.

All registered participants and companions are cordially invited to attend a reception (no-host bar) following the Opening Session Sunday evening

TUESDAY, JULY 27, 2010

Conference Luncheon Metro Centre-East
11:40 a.m.–1:30 p.m.

*Ticket included in full conference registration fee.
Additional tickets available for \$50 at registration table.*

Lucy Arendt, Conference Events Subcommittee Co-Chair, moderator

Awards:

- The Duke Award, presented by Reginald DesRoches, chair of the Executive Committee of TCLEE.
- Tsunami awards, presented by George Pararas-Carayannis, president of the Tsunami Society International.

Luncheon speakers:

- Mike Allen of Adjeleian Allen Rubeli Limited, on the Skydome's retractable roof
- Jamil Mardukhi of NCK Engineering Limited, on the CN Tower.

TUESDAY & WEDNESDAY, JULY 27-28, 2010

4th International Tsunami Symposium Marine Room

Tuesday: Sessions T18, 10:10 a.m. • T30, 1:30 p.m.

Wednesday: Sessions W10, 10:10 a.m. • W21, 1:00 p.m.

See Concurrent Sessions Section for list of presentations.

WEDNESDAY, JULY 28, 2010

Banquet
5:30–10:00 p.m.

*Dinner and 2 drink tickets included in full conference registration fee.
Additional tickets available for \$150 at registration table.*

The Liberty Grand



- John Wilson, Conference Events Subcommittee Co-Chair, moderator
- Remarks by EERI President Farzad Naeim and CAEE President Murat Saatcioglu
- Banquet speakers: Colin and Julie Angus, recipients of National Geographic's 2007 Adventurer of the Year Award, who explore the world together using human-powered modes of transportation. Through exploration and adventure, they strive to motivate others to lead active and environmentally sustainable lifestyles.



- *Buses will begin departing from the hotel at 5:00 p.m. and continue until 6:00 p.m.*
- *Dinner will be served at 7:00 p.m.*
- *Buses will begin returning to the hotel at the end of the program at approximately 9:15 p.m. and will continue until 10:00 p.m.*

Plenary Sessions

Each of the conference's plenary sessions is intended to present a balanced view, considering earthquake science, engineering, and socio-economic aspects, with perspectives provided by speakers from the United States and Canada.

OPENING SESSION: SUNDAY, JULY 25, 2010

Metro Centre-East
5:00 p.m. – 7:00 p.m.

Welcome and Bienvenue

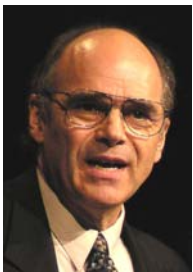
Ahmed Ghobarah and Andre Filiatrault

Conference Co-Chairs

U.S. Federal Programs

Because of the critical importance of the U.S. federal programs, the opening session will include brief presentations by agencies that are sponsoring the conference that briefly cover their missions, their specific interests, and major initiatives they are currently spearheading that could have a major influence on earthquake engineering research and practice.

- **The U.S. Department of Energy**
Steve McDuffie, Chief of Nuclear Safety, Office of the Under Secretary
- **The U.S. Nuclear Regulatory Commission**
Michael Case, Director, Division of Engineering, Office of Nuclear Regulatory Research



Chris D. Poland
*Chairman, CEO and
Senior Principal
Degenkolb Engineers,
San Francisco, California*

The 21st Century Goal for Seismic Safety: Resilient Cities

This talk will address the concept of resilient cities and how to define metrics to evaluate resilience, building on the community work that Poland has spearheaded in San Francisco in recent years. He will provide a historical perspective on how the concept of resilient cities has evolved, from the early concepts of earthquake resistant design to new perspectives brought by the new century.



Ronald H. Devall
*Senior Consultant
Read Jones Christoffersen Ltd.,
Vancouver, British Columbia*

The Role of Structural Consultants and Design Practitioners in the Development of Canadian Earthquake Codes

DeVall will present an overview of the Canadian Code System and the involvement of structural designers and engineering consultants in the development of earthquake code requirements for the Canadian National Building Code and its Canadian Standards Association design standards. He will also discuss implementation of research carried out by Canadian practitioners and their impact on the construction process

Overview of the U.S. National Earthquake Hazards Reduction Program

Jack Hayes, Director, NEHRP and the National Institute of Standards and Technology

MONDAY, JULY 26, 2010

Metro Centre-East
8:00 a.m. – 9:30 a.m.

Moderators:

Shamim Sheikh, Professor, University of Toronto
Catherine French, Professor, University of Minnesota
Technical Program Co-Chairs

The four Monday morning plenary session speakers will provide viewpoints on the hot topics and future directions for the fields of geotechnical and structural engineering, seismology and ground motions, and the social sciences.



Norman Abrahamson
*Senior Engineering Seismologist
Pacific Gas & Electric Company*

Scenario Spectra for Design Ground Motions and Risk Calculation

A common method for developing design spectra based on the probabilistic approach is uniform hazard spectra (UHS). Abrahamson will present a new approach for developing a suite of realistic scenario earthquake spectra. He believes that the choice of using a UHS rather than multiple spectra for the different



scenarios should be the decision of the engineering analyst, after determining whether requesting multiple scenario spectra is worth the additional analysis costs.



Ross W. Boulanger
Professor
Department of Civil &
Environmental Engineering
University of California at Davis

Future Directions in Geotechnical Earthquake Engineering

This talk will focus on five areas: predicting ground deformations, remediating ground deformations, predicting performance of soil-structure systems, resiliency and performance-based design, and sensing for risk reduction and resiliency. The potential in these areas is enhanced by advances and opportunities afforded by large-scale experimental facilities. Progress will also be affected by the interactions between teaching, research, and practice.



Carlos Ventura
Director, Earthquake Engineering
Research Facility
Professor, Department of Civil
Engineering
University of British Columbia
Vancouver

Understanding Interdependences Among Critical Infrastructures

The system of critical infrastructures constitutes the backbone of modern societies. After presenting a brief review of current research being done on the interdependencies of these infrastructures during large disasters, Ventura will discuss a methodology recently developed at the University of British Columbia in response to the need to develop knowledge, tools, and recommendations to support coordinated decision making.

Kathleen Tierney
Director
Natural Hazards Center



Professor of sociology
University of Colorado at Boulder

Societal Dimensions of Earthquakes and Other Disasters: Findings in Search of Theory

Social scientists have successfully developed and tested middle-range theories concerning hazards, disasters, and risk. However, advances have come at the expense of a more comprehensive theory of disaster vulnerability, impacts, and outcomes. Advances in vulnerability science and resilience studies have furthered the state of the art. Tierney will discuss how the application of world system theory at a global scale and socio-political ecology theory at national, regional, and local scales can result in further integration across space, time, and hazard types.

WEDNESDAY, JULY 28, 2010

THE HAITI AND CHILE EARTHQUAKES OF 2010

Metro Centre-East
8:00 a.m. – 9:30 a.m.

Moderated by Reginald DesRoches of the Georgia Institute of Technology, this session will provide insights that go well beyond the initial reconnaissance reports on these two major seismic events, covering geotechnical issues, social science aspects, the performance of reinforced concrete buildings, and the correlation of ground motion with damage.



Ellen M. Rathje
Associate Professor,
University of Texas, Austin

Haiti: Relationship between Geotechnical Conditions and Damage Patterns

On January 12, 2010 a magnitude Mw 7.0 earthquake struck the Port-au-Prince region of Haiti. The earthquake epicenter was located immediately west of the city of Port-au-Prince, and the damage induced by this event was extreme. The Geoenvironmental Extreme Events Reconnaissance Association (GEER) mobilized a team, funded by the U. S. National Science Foundation, to document the geotechnical and

Plenary Sessions continued

geological aspects of this event. This presentation will focus on the observations from the reconnaissance efforts as well as the subsurface information (i.e. shear wave velocity, soil types, CPT measurements) collected during the field campaign. Topics that will be discussed include geologic conditions as derived from our field work, shear wave velocities across the city and their relationship to damage patterns, and liquefaction along coastal areas.



Jonathan Bray
Professor
University of California, Berkeley

Chile: Geo-Engineering Reconnaissance

The February 27, 2010 Maule, Chile earthquake (Mw = 8.8) is the fifth largest earthquake to occur since 1900. Its effects were felt along 600 km of the central Chile coast. Tectonic displacement of the hanging wall produced both uplift of over 2 m and subsidence of up to 1 m in coastal regions. The report of the NSF-sponsored Geo-engineering Extreme Events Reconnaissance (GEER) team includes a brief summary of engineering seismology and earthquake ground motions, a description of the use of remote sensing to provide insight into damage patterns, and an in-depth discussion of the important role of coastal uplift and subsidence resulting from the underlying tectonic movement. Seismic site effects were also important in this earthquake.

Soil liquefaction occurred at many sites, and often led to ground failure and lateral spreading. Several buildings were damaged significantly due to foundation movements resulting from liquefaction. Liquefaction-induced ground failure displaced and distorted waterfront structures, impacting the operation of key port facilities. Critical lifeline structures, such as bridges, railroads, and road embankments, were damaged by ground shaking and ground failure. The damage to some sections of Ruta 5, the primary North-South highway in Chile, was pervasive. Several key earth structures experienced some distress, and in one case a liquefaction-induced tailings dam failure produced a flow slide that killed a family of four.



Mary Comerio
Professor
University of California, Berkeley

Social and Economic Challenges for Recovery in Haiti

The January 12, 2010, Haiti earthquake caused a tragic loss of more than 230,000 lives and fractured the island nation physical, social and economic systems at all levels. More than 300,000 homes were destroyed or severely damaged, 1,500 schools and health centers collapsed, and most government and many commercial buildings were rendered unusable. Over 1.5 million Haitians (15% of the country's population) have been directly affected by the earthquake, with one million now living in temporary shelters and 500,000 relocated elsewhere. The earthquake's damage has been conservatively estimated at US \$10 billion, of which 40% is in housing. Recovery could take 10 years or more, and the process of managing the transition phases as well as the recovery is daunting, given the limited government resources. At the same time, Haitian authorities view the recovery as an opportunity to develop key industries (agriculture, tourism, ports and trade), reduce environmental hazards, develop appropriate infrastructure (water, sanitation, transportation), address land tenure issues, and build back better housing with schools, health clinics and other social services decentralized. The challenge will be to manage and coordinate developers and NGOs while keeping an open process in which citizens have political input and economic participation.



Patrick Paultre
Professor
University of Sherbrooke, Quebec

Performance of Buildings in the Haiti Earthquake

The Haiti earthquake officially caused casualties to about 3% of the total population of the country and 10% of the population of the capital Port-au-Prince. It left the capital city in an ongoing state of emergency. This talk will identify the causes of the catastrophe and offer suggestions for avoiding a future repetition. Examples from engineered buildings will identify the most common causes of failure. A multistory building that survived the earthquake is an example of what performed well during the earthquake.



Jack Moehle
Professor
University of California, Berkeley

Performance of Buildings in the Chile Earthquake

The Chile earthquake affected a region with a population exceeding eight million people. It earthquake exposed a vast inventory of buildings, highways, ports, airports, and other lifelines to the damaging effects of ground shaking, ground failure, and tsunami. It was, without a doubt, the largest and most significant earthquake engineering laboratory test in modern times. Most modern engineered facilities passed the test in flying colors, but a notable minority suffered disabling, and in some cases complete, damage. This talk addresses the successes and the failures, with emphasis on modern engineered concrete buildings, which are the predominant engineered building type in Chile. It looks to underlying effects including ground motion, architecture, and structural engineering. And it postulates implications for building codes and engineering practices.



Carlos Ventura
Professor
University of British Columbia, Vancouver

John Cassidy
Research Scientist
Geological Survey of Canada

Ground Shaking from the Chile Earthquake: Applications to Cascadia

The 2010 Chile earthquake provides a rare opportunity to compare strong shaking observations with damage patterns. This subduction earthquake was caused by up to 13 m of eastward slip of the Nazca plate beneath the South American plate. The rupture zone extended nearly 600 km along the Chile coast and covered the most populated region of the country — extending from south of Concepcion to just south of Valpraiso (near the latitude of Santiago). A devastating tsunami was generated that impacted the coast of Chile and also extended across the Pacific Ocean. As this is the type of earthquake that is expected along the Cascadia subduction zone of western Canada and the U.S., and given that modern building codes and construction styles in Chile and Cascadia are

very similar, the Canadian Association of Earthquake Engineers sent a team of 10 engineers and a seismologist to the earthquake zone to learn from this earthquake. This presentation will focus on sites where strong ground shaking was recorded (the data available to date range from about 0.1g to 0.66g). The general characteristics of the ground motions obtained in the region will be discussed and salient features of the records will be presented. Examples of the damage observed in the vicinity of the strong motion recordings will be presented and discussed. The relevance of this set of ground motions to the Pacific Northwest will be highlighted.

THE TSUNAMI EFFECTS OF THE HAITI AND CHILE EARTHQUAKES OF 2010

Marine Room
10:00 a.m. – 10:33 a.m.

Presentations on the tsunami effects of the Haiti and Chile earthquakes of 2010 will take place as part of Wednesday morning's session of the 4th International Tsunami Symposium in the Marine Room.

Engineering Significance and Lessons Learned from the Chile Earthquake and Tsunami

Murat Saatcioglu, Professor, University of Ottawa
Ioan Nistor, Assistant Professor, University of Ottawa

The Chile earthquake occurred as thrust-faulting along a highly stressed coastal segment of Chile's central seismic zone where active, oblique subduction of the Nazca tectonic plate below South America occurs at the high rate of 6.8 cm per year. The tsunami that was generated was highest in the Juan Fernandez Islands as well as in Talchuano, Dichato, and Pelluhue and on Robinson Crusoe Island, causing numerous deaths and destruction.

Overview of Chile/Haiti 2010 Earthquakes and Tsunamis: Assessment of Future Risks

George Pararas-Carayannis
President, Tsunami Society International

Comparison of the characteristics of the 2010 earthquake in Chile with the 1960 earthquake indicates substantial differences in source mechanisms, energy release, ruptures, spatial clustering and distributions of aftershocks, as well as in geometry of subduction and extent of crustal displacements on land and in the ocean.

The 2010 Haiti earthquake was an exceptional episode of sudden strain release over a wide area. A local tsunami generated from coastal subsidence ran inland for several hundred meters at Petit Paradis. Haiti is vulnerable to tsunamis originating from earthquakes along the Muertos Trench boundary, the Puerto Rico subduction margin, as well as from quakes near the Gulf of Gonave.

Plenary Sessions continued

CLOSING SESSION: THURSDAY, JULY 29, 2010

Metro Centre-East
10:10 a.m. – 12:30 p.m.

Moderators:

Ahmed Ghobarah and Andre Filiatrault
Conference Co-Chairs

Representing their disciplinary perspectives, each speaker in the Thursday morning closing plenary will summarize and assess the conference and discuss future needs, followed by open discussion. Each presentation will feature:

- Overview of the topic
- Critical evaluation of what has been presented and accomplished at the conference.
- Critique of current research in their area of emphasis, assessment of particular areas that are deemed especially valuable, and identification of weaknesses
- Expectations of what will be achieved in the next several years for the safety of earthquake-prone communities
- Insight into the direction of future research, and whether their insight is compatible with the future directions discussed in Monday's plenary session.



Seismology and Ground Motion:
Nicolas Luco
Research Structural Engineer
U.S. Geological Survey
Denver, Colorado



Geotechnical and Lifelines:
Jonathan Bray
Professor
Dept. of Civil Engineering
University of California, Berkeley



Structural:
William Holmes
Principal, Structural Engineer
Rutherford & Chekene
San Francisco, California



Tsunami:
Tad Murty
Adjunct Professor
Department of Civil Engineering
University of Ottawa, Ontario



Business and Social Sciences:
Lucy Arendt
Assistant Professor
Austin E. Cofrin School of Business
University of Wisconsin-Green Bay

Panel Discussion

Thank you and closing remarks by the moderators.

Committee Meetings



The following committee meetings are open to all conference attendees.

EERI Heritage and Existing Structures Committee (HESCo)

Monday, 7/26/2010
6:00 pm-8:00 pm
Pier 5

The agenda includes 1) a brief update on the situation in Haiti and how HESCo might help, and 2) discussion of the groundwork to initiate the World Heritage and Existing Structures Encyclopedia. The mission of this committee is to promote an improved understanding of the historic, economic, and sociological roles of existing and heritage buildings in relation to seismic safety objectives.

Straw Bale Tutorial Project

Monday, 7/26/2010
7:00 pm-9:00 pm
Marine Room

An initiative of the World Housing Encyclopedia, this tutorial will promote straw bale construction as a sustainable, appropriate technology for countries where climate and agricultural practices permit its use. The meeting is an opportunity for initial input into tutorial content and organization.

EAAE Task Group 11: Seismic Design, Assessment, and Retrofit of Bridges

Tuesday, 7/27/2010
3:00 pm-5:00 pm
Dockside 2

Andreas Kappos of the University of Thessaloniki, Greece, is coordinator of Task Group 11 of the European Association for Earthquake Engineering. Interested observers are welcome.

COSMOS Strong Ground Motion Forum

Tuesday, 7/27/2010
6:00 pm-7:30 pm
Marine Room

The focus of the forum discussion is "Development of Global Standards for Economically Achieving Quality Strong Ground Motion Measurements." This subject is of great importance, since large earthquakes over the past 5 years have resulted in many deaths and much economic damage, and yet there are very few quality ground motion records in the areas of strongest shaking. These records are key to assessing why damage occurred and to improving our seismic standards. A first step to obtain more and better

records and associated data about the recording instrument site is to have global standards for ground motion measurements and associated data which are economically feasible to achieve.

EERI Ad Hoc Committee on Seismic Safety of Schools

Tuesday, 7/27/2010
7:00 pm-9:00 pm
Pier 5

The purpose of this committee is to promote the seismic hazard resistance of schools. Its goals are (1) to reduce schoolchildren's risk from earthquake hazards, (2) to foster the establishment of official implementation programs and timelines for student safety, (3) to serve as an idea transfer conduit between EERI and its resources and a diverse outside audience that forms the stakeholder group for seismic safety in schools, and (4) to determine the implications of considering schools as shelters. This meeting's agenda will include developing a committee roster, reviewing the committee's history, purpose, vision statement, a proposed action plan, and responses to the plan.

Confined Masonry Network

Tuesday, 7/27/2010
6:00 pm-8:00 pm
Regatta Room

An initiative of the World Housing Encyclopedia, the Confined Masonry Network promotes seismically safe and economical housing worldwide by bringing quality confined masonry into the design and construction mainstream. The network is an ever-expanding group of global experts in design and construction of confined masonry with backgrounds in architecture, engineering, and education. The meeting will focus on the performance of confined masonry in recent earthquakes and on the development of global design and construction guidelines.

Field Trips



The tours of the Skydome and the CN Tower will be complemented by technical presentations on those facilities during the conference luncheon on Tuesday, July 27.



Technical Tour – Sunday, July 25, 3:00-4:00 p.m.

Sky Dome, Group Tour

The SkyDome, now known as the Rogers Centre, features the world's first fully retractable roof that has enabled it to become one of the most versatile entertainment centers in the world.

Tickets: Adults: \$16; Seniors (65+) \$12; Youth (12-17); \$12; Children (5-11) \$10



Technical Tour – Monday, July 26, 6:30-8:30 p.m.

CN Tower, Group Tour

The CN Tower is the signature icon of Toronto's skyline, which was at the time of construction, the tallest free-standing structure on land in the world, and remains the tallest in the Americas.

Tickets: Adults: \$20; Seniors (65+) \$18; Children (4-12) \$14



Post Conference Tour – Friday, July 30

Bus departs hotel 7:45 a.m./Returns by 7:00 p.m.

Niagara Falls Power Plant Group Tour

This full-day post-conference technical tour will visit Niagara Falls Power Plant, one of the first hydro-electric power plants. The trip will include lunch with leisure time at Niagara Falls and Niagara-on-the-Lake.

Fee: \$75 per person

Visit the registration table to see if there is space available on any of these tours.

Exhibits



EXHIBIT HOURS	Sunday, July 25 7:00 p.m. – 9:00 p.m.	Tuesday, July 27 7:00 a.m. – 6:00 p.m.	Thursday, July 29 7:00 a.m. – 1:00 p.m.
	Monday, July 26 7:00 a.m. – 6:00 p.m.	Wednesday, July 28 7:00 a.m. – 6:00 p.m.	

302 USGS	103 Kinemetrics	105 COSMOS	107 EERI	109 SPI/ Housing	111 Nanometrics	113 Lounge	115 Schnell S.P.A	117 Schnell S.P.A	119 Qanser	121 Eucentre Foundation	123 Fyfe Co	125 Dynamic Testing

203 Pall Dynamics	205 Wiss Janney Elstner	207 FEMA
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METRO WEST BALLROOM

219 CAEE	221 PEER	223 Kamatics
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Applied Technology Council (ATC)

BOOTH: 218

201 Redwood Shores Pkwy, Suite 240
Redwood City, CA 94065 USA • 650-595-1542
www.ATCouncil.org

The Applied Technology Council is a non-profit corporation founded in the early 1970s to develop and promote state-of-the-art, user-friendly engineering resources and applications for use in mitigating the effects of natural and other hazards on the built environment. To date, ATC has produced more than 100 major resource documents for the structural engineering profession, including the technical basis for current standards of practice for the seismic design, evaluation, rehabilitation, and damage repair of buildings.

Canadian Association for Earthquake Engineering (CAEE)

L'Association Canadienne du Génie Parasismique (ACGP)

BOOTH 219

c/o Dept of Civil Engineering, The University of Ottawa,
161 Louis Pasteur Street, Ottawa, ON, K1N6N5 CANADA
905- 525-9141 ext 24913
www.cae.e.uottawa.ca

The Canadian Association for Earthquake Engineering is a national, nonprofit, independent, interdisciplinary technical society open to all interested engineers, geoscientists, archi-

tect, researchers, educators, designers, planners, economists, social scientists, public officials, government and building code officials. The primary objective of CAEE/ACGP is to foster earthquake engineering practice and research through a communication network, sponsoring national earthquake engineering conferences and other technical meetings, and encouraging and facilitating the application of research into engineering practice.

Consortium of Organizations for Strong-Motion Observation Systems (COSMOS)

BOOTH: 105

c/o PEER, 1301 South 46 Street, Bldg 454, Room 121
Richmond, CA 94804 USA • 510-665-3437
www.cosmos-eq.org

The Consortium of Organizations for Strong-Motion Observation Systems is a non-profit organization whose mission is to promote the development and dissemination of verifiable, internationally accepted standards for the acquisition and processing of earthquake strong-motion data including application by design professionals, and to advocate for greater deployment of strong-motion measurement systems within the built environment. NOTE: The COSMOS Strong-Motion Forum to be held on July 27 at 6:00 pm in the Marine Room.

Exhibits continued

Digitexx Data Systems

BOOTH: 208/210
13880 N Northsight Blvd, Suite 109
Scottsdale AZ 85260 USA • 621-242-1198
www.digitexx.com

Digitexx Data Systems, Inc. is the world pioneer and leader in real-time communication for Structural Health Monitoring applications. Founded in 2001, Digitexx provides a wide variety of products and services that include customized monitoring systems and server/client software and earthquake data analysis. In addition, Digitexx specializes in Strong Motion/Network upgrades advancing stand-alone accelerograph networks to real-time monitoring systems. Over the last 10 years, we have partnered with researchers in academia, government agencies and structural engineering firms to provide a *self-sufficient* system for the continuous inspection of structures with minimal labor involvement. Our mission is not simply to detect structural failure, but also to provide an early indication of physical damage before the damage leads to failure. The Digitexx suite of products provides the communication engine across multiple parties to initiate response plans immediately.

Dynamic Isolation Systems, Inc. (DIS)

BOOTH: 220
885 Denmark Drive, Suite 101
McCarran, NV 89434 USA • 775-359-3333
www.dis-inc.com

Dynamic Isolation Systems (DIS) is the leader in the field of seismic isolation around the world. DIS has completed over 300 projects in 15 countries including several historic structures, hospitals, emergency centers, residential buildings and bridges. The firm has been at the forefront of development and propagation of seismic isolation for the past 25 years. Its expertise stems from its vast design experience, emphasis on making a quality seismic product, superior manufacturing techniques and extensive testing of the product.

Dynamic Testing and Equipment

BOOTH: 125
360 LaVoy Rd., Erie, MI 48133 USA
734-847-2649
www.dynamic-testing.com/

Dynamic Testing and Equipment specializes in building servo-hydraulic components for the structural testing industry along with single and multi-degree of freedom vibration systems. Advanced servo-controllers have the capability to operate the multi-degree of freedom seismic test systems as well as working in the Open-Fresco environment.

Earthquake Engineering Research Institute (EERI)

BOOTH: 107
499 14th Street, Suite 320, Oakland, CA 94612 USA
510-451-0905
www.eeri.org

As the principal national society of engineers, geoscientists, architects, planners, public officials, and social scientists concerned about earthquakes and their effects, EERI fosters communication to bridge the gap between new knowledge, design, practice, and policy. EERI produces a wide variety of both print and audio-visual materials, including a quarterly professional journal, a monthly *Newsletter*, videodownloads, and CD-ROMs on earthquake-related topics.

EERI/IAEE World Housing Encyclopedia (WHE)

BOOTH: 109
499 14th Street, Suite 320
Oakland, CA 94612 USA
510-451-0905
www.world-housing.net

The WHE is a uniquely successful global network of individuals committed to making communities safer in earthquakes. The network is a web-based freely available resource of housing construction technologies and practices in seismically active countries of the world. Participants contribute reports on housing construction types as well as develop tutorials on various construction materials. The WHE also has several special projects including the confined masonry network, collaboration with the USGS PAGER project.

European Centre for Training and Research in Earthquake Engineering (EUCENTRE)

BOOTH: 121
Via Ferrata 1, 27100 Pavia, ITALY
+390382516911
www.eucentre.it

The EUCENTRE - European Centre for Training and Research in Earthquake Engineering - is based in Pavia (Italy). It aims to promote, sustain and oversee training and research in Reduction of Seismic Risk. The EUCENTRE works along with the ROSE School www.roseschool.it - International Centre for Post-Graduate Training and Research in Earthquake Engineering and Engineering Seismology. The EUCENTRE supports these activities through the Experimental Lab and manages updated international publications through the IUSS Press www.iusspress.it.



Federal Emergency Management Agency (FEMA)

BOOTH: 207
 500 C Street, S.W., Room 416
 Washington, DC 20472 USA • 202-646-2794
www.fema.gov

FEMA provides leadership and support to reduce losses from all types of hazards through a program of mitigation, preparedness, response, and recovery. FEMA's activities under the National Earthquake Hazard Reduction Program (NEHRP) contribute to the mission of the Program mission: "To develop, disseminate, and promote knowledge, tools, and practices for earthquake risk reduction – through coordinated, multidisciplinary, interagency partnerships among the NEHRP agencies and their stakeholders – that improve the Nation's earthquake resilience in public safety, economic strength, and national security.

Forum8

BOOTH: 108
 Western Office, 344-354 Gray's Inn Road
 London WC1X 8BP UK • +44 (0)20 7164 099
www.forum8.com

FORUM8 produces state-of-the art 3D VR software and is at the forefront of Interactive 3D Visual Simulation technology. Established in 1987 this award winning Japanese company now has offices and partners in every continent servicing a range of rapidly expanding engineering markets from its extensive portfolio of products. FORUM8's philosophy is based on exceeding customer expectations of service, support and product innovation.

Fugro William Lettis & Associates

See Risk Engineering Inc.

Fyfe Co. LLC

BOOTH: 123
 8380 Miralani Dr.
 San Diego, CA 92126 USA
 858-642-0694
www.fyfeco.com

Fyfe Company LLC, manufacturer of the Tyfo® Fibrwrap® Advanced Composite System, is the first externally bonded Fiber Reinforced Polymer (FRP) system ever used for the strengthening, repair, and restoration of masonry, concrete, steel, and wooden structures. The Tyfo® Fibrwrap systems are specialized carbon, glass, aramid, and hybrid fabrics combined with resins which, in unique combination, create the proven advanced composite system. Tyfo® Advanced Composites are used for structural strengthening, including seismic retrofit, pipe rehabilitation, structural preservation, comprehensive force protection, blast mitigation, and environmental protection.

GeoSIG, Ltd.

BOOTH: 118
 Europastrasse 11, 5504 Othmarsingen, SWITZERLAND
 +41 44 810 21 50 or 800-978-7263 (USA)
www.GeoSIG.com

GeoSIG provides a wide range of strong-motion monitoring and alarm systems for dams, bridges, high-rises, power plants, and other structures; and seismic instrumentation for regional and national networks. GeoSIG strives to provide seismic monitoring solutions that satisfy each customer's needs with the highest possible levels of performance, durability, and reliability.

Güralp Systems, Ltd.

BOOTH: 102
 12 Southwood Dr., Orinda, CA 94563 USA
 925-254-1357
www.guralp.com

Güralp Systems Ltd is a world leader in the design and manufacture of low-noise broadband seismometers, accelerometers, digitizers and networking equipment for science and engineering. We develop and build surface, borehole and ocean bottom instruments. Founded in 1985, our instruments are in use on all continents and in nearly all ocean basins. We are the supplier of choice to universities, research organizations and government institutions all over the world, including international organizations.

Hayward Baker Inc.

BOOTH: 116
 1130 Annapolis Rd., Suite 202
 Odenton, MD 21113 USA
 410-551-8200 or 800-456-6548
www.haywardbaker.com

Hayward Baker is the leading geotechnical construction contractor in North America and has performed liquefaction mitigation at thousands of sites for both new construction and existing structures. Hayward Baker is a member of the international Keller group of companies and is ranked #1 Specialty Foundation contractor by Engineering News-Record.

International Code Council

BOOTH: 112
 900 Montclair Rd., Birmingham, AL 35213 USA
 888-422-7233
www.iccsafe.org

International Code Council, a membership association dedicated to building safety and fire prevention, develops the codes used to construct residential and commercial buildings, including homes and schools. Most U.S. cities, counties and states that adopt codes choose the International Codes developed by the International Code Council.

Exhibits continued

Kamatics Corp

BOOTH: 223

1330 Blue Hills Ave., Bloomfield, CT 06002 USA

860-243-9704

www.kamatics.com

Kamatics Corporation, a subsidiary of Kaman Corporation, located in Bloomfield CT, is a leader in the design and manufacture of high technology mechanical products, such as self-lubricated bearings and driveline couplings, used in aviation, marine, hydropower and other industrial applications.

Kinemetrics Inc.

BOOTH: 103/202

222 Vista Ave., Pasadena, CA 91107 USA

626-795-2220

www.kinemetrics.com

Since 1969, Kinemetrics, Inc. has been the world leader in seismic instrumentation for structural and environmental monitoring systems. As an ISO 9001:2008 Quality-Management-System certified company, Kinemetrics currently provides the highest quality manufacturing of reliable, robust and cutting-edge technology products. The Open Systems & Services group at Kinemetrics utilizes the company's unique experience to design, develop, integrate, install, and maintain state-of-the-art structural and environmental monitoring solutions from large turn-key system networks to municipal code-compliant building installations.

Layne GeoConstruction

BOOTH: 222

22537 Coleman's Mill Rd., Ruther Glen, VA 22546 USA

888-79-LAYNE

www.laynegeo.com

Layne GeoConstruction, a division of Layne Christensen Company, is a specialty geotechnical construction company, offering a wide array of service capabilities. A commitment to solution-driven innovation positions Layne GeoConstruction as a leader in jet grouting, drilled micropiles, limited mobility grouting, permeation grouting, tie-back anchors, vibratory ground improvement and stone columns. Real time monitoring can be utilized in the providing of many of these services.

MCEER

BOOTH: 204

University at Buffalo, The State University of New York
360 LaVoy Rd., 133A Ketter Hall, Buffalo, NY 14260 USA

716-645-3391

www.mceer.buffalo.edu

MCEER, based at the University at Buffalo, is a national center of excellence that conducts multidisciplinary research, education, and outreach to develop and disseminate new knowledge, tools and technologies for intelligent infra-

structure renewal, and resilience against earthquakes, multiple hazards, and extreme events.

Nanometrics Inc.

BOOTH: 111

250 Herzberg Rd., Kanata, ON K2K 2A1 CANADA

613-592-6776

www.nanometrics.com

Nanometrics is the world's largest manufacturer and integrator of specialty instruments, software and data communications systems for seismological monitoring. Users with mission-critical environmental and earthquake surveillance requirements that demand the highest possible data quality, reliability and availability deploy Nanometrics products with confidence. Nanometrics real-time and portable systems are in use on every continent and in more than 100 countries by government institutions, universities and test ban treaty monitoring organizations.

Network for Earthquake Engineering Simulation (NEES)

BOOTH: 214/216

207 S. Martin Jischke Drive, West Lafayette, IN 47907 USA

765-496-6180

www.nees.org

NEES is an NSF-supported, shared-resource, integrated network featuring 14 earthquake engineering experimental facilities which are available for testing on-site, in the field, or through telepresence. It offers leading-edge cyberinfrastructure for research and education leading toward innovation to reduce losses from earthquakes by improving the seismic design and performance of the U.S. civil infrastructure. Equipment sites include: shake tables, geotechnical centrifuges, a tsunami wave basin, unique large-scale testing laboratories, and mobile and permanently installed field equipment.

National Information Centre of Earthquake Engineering (NICEE)

BOOTH: 110

Indian Institute of Technology Kanpur
Dept of Civil Engineering, Kanpur 208016, INDIA
+915122597717

www.nicee.org

The National Information Center of Earthquake Engineering (NICEE) at Indian Institute of Technology Kanpur (India) is intended to collect and maintain information resources, publications, and audio-visual material on earthquake engineering and to make these available to the interested professionals, researchers, academicians and others, as well as to undertake other outreach activities with a view to mitigate earthquake disasters.

**Pall Dynamics Ltd.**

BOOTH: 203

100 Montevista, D.D.O., Montreal,
Quebec H9B 2Z9 CANADA • 514-421-2605
Toll free 1-888-421-7255 Canada & USA

www.palldynamics.com

Pall Dynamics Limited is a world leader in manufacturing quality friction dampers for seismic control of buildings. The first building with seismic dampers was built with Pall Friction dampers (1987). Pall friction dampers have been used in more than 200 buildings all over the world, including Boeing Commercial Airplane Factory near Seattle and Moscone West Convention Center in San Francisco.

Pacific Earthquake Engineering Research Center (PEER)

BOOTH: 221

325 Davis Hall MC 1792, University of California
Berkeley, CA 94720 USA • 510-642-3437

peer.berkeley.edu

The Pacific Earthquake Engineering Research Center (PEER) is a multi-institutional research and education center with headquarters at the University of California, Berkeley. Investigators from over 20 universities, several consulting companies, plus researchers at various State and Federal government agencies contribute to research programs focused on performance-based earthquake engineering in disciplines including structural and geotechnical engineering, geology/seismology, lifelines, transportation, risk management, and public policy.

Quanser

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119 Spy Court, Markham, ON L3R5H6 CANADA
905-940-3575

www.quanser.com

Quanser offers the world's best collection of Shake Tables for engineering education and research. Our easy to use, hands-on experiments eliminate the use of hydraulics and provide clean and highly flexible platforms for structural dynamics and other related disciplines. Quanser solutions are used in more than 2,000 universities, research labs and commercial organizations worldwide. For more information on how Quanser helps students put theory to practice and provides unique technology to enable researchers, visit our website.

R.J. Watson Inc.

BOOTH: 106

78 John Glenn Drive, Amherst, NY 14228 USA
716-691-3301

www.rjwatson.com

R. J. Watson specializes in the design, manufacture, and testing of high load multi-rotational bearings, seismic isolation bearings, joint sealing systems, waterproofing membranes, and high strength fiber-reinforced polymer composites used to strengthen and rehabilitate structural members such as columns, beams, walls, piles, girders, and slabs.

Refraction Technology Inc.

BOOTH: 114

1600 10th St., Suite A, Plano, TX 75074 USA
214-440-1265

www.reftek.com

Refraction Technology, Inc. (REF TEK) manufactures high quality, advanced technology seismic instrumentation for customers worldwide, since 1975. More than 5,500 REF TEK instruments are in use by PASSCAL participating users and other research organizations. REF TEK 125A "The Texan", 130 Series Broadband Seismic, Strong Motion Recorders, Structural Monitoring Systems and 131A accelerometers are the ultimate instruments for both weak and strong motion applications. REF TEK recorders can be used for both the stand-alone and network configurations without any hardware modification.

Risk Engineering, Inc.

BOOTH: 100

4155 Darley Ave. #A, Boulder, CO 80305-6536 USA
303-499-3000

www.riskeng.com

Risk Engineering, Inc., provides software and consulting expertise for natural-hazards based engineering risk analysis. We specialize in advanced applications serving the geotechnical, structural, and environmental engineering communities along with the banking and insurance Industries. Our company has been actively engaged in risk studies since 1984. Please visit our website for more information.

Exhibits continued

Schnell S.P.A.

BOOTH: 115/117

Via Borghetto, 2 -zona Ind. San Liberio
61030 Montemaggiore al Metauro (PU) ITALY
+39 0721 878711

www.schnell.it

Schnell has become a leading industrial group worldwide in the field of automatic machines and software for rebar processing. It is a manufacturing company of rebar processing machinery and plants, such as automatic stirrup benders, bending/cutting machines, cutting benches, straighteners, shaping centres, cage making machines, and complete mesh processing plants.

Seismic Energy Products, L.P.

BOOTH: 120

518 Progress Way, Athens, Texas 75751 USA
903-675-8571

www.sepbearings.com

Nation's largest manufacturer of seismic isolation bridge bearings, elastomeric bridge bearings, and Fluorogold® Teflon® slide bearings.

Taylor Devices Inc

BOOTH: 206

90 Taylor Drive, North Tonawanda, NY 14120 USA
716-694-0800

www.taylordevices.com

Taylor Devices is the World leading manufacturer of Fluid Viscous Damping Devices, Shock Transmission Units and Tuned Mass Dampers for earthquake, wind and vibration protection of buildings, bridges and many other structures. Other products include Lock-up Devices, Fluid Viscoelastic Dampers, cable dampers, liquid springs, crane buffers and virtually any other custom shock absorber product imaginable!

THK America Inc.

BOOTH: 122/124

200 East Commerce Dr., Schaumburg, IL. 60173 USA
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USGS

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12201 Sunrise Valley Drive, Reston, VA 20192, USA
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The U.S. Geological Survey (USGS) is a partner in the four-agency National Earthquake Hazards Reduction Program (NEHRP) led by the National Institute of Standards and Technology. The USGS role in NEHRP is to provide earthquake science information and knowledge in support of reducing deaths, injuries, and property damage from earthquakes. The USGS delivers hazard assessments to support risk characterization and building codes, rapid post-earthquake information for emergency response, and targeted research on earthquake processes and effects.

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Sessions-at-a-Glance



Sunday, July 25, 2010

Monday, July 26, 2010

Opening Plenary Session 17:00–19:00 <i>Metro Centre-East</i>	Monday Plenary Session 8:00–9:30 <i>Metro Centre-East</i>
Welcome and Bienvenue	Scenario Spectra for Design Ground Motions and Risk Calculation
U.S. Federal Programs: Dept. of Energy, Nuclear Regulatory Commission	Future Directions in Geotechnical Earthquake Engineering
The 21st Century Goal for Seismic Safety: Resilient Cities	Understanding Interdependencies Among Critical Infrastructures
The Role of Structural Consultants and Design Practitioners in the Development of Canadian Earthquake Codes	Societal Dimensions of Earthquakes and Other Disasters: Findings in Search of Theory
Overview of the U.S. National Earthquake Hazards Reduction Program	

Monday, July 26, 2010

Oral Sessions

Room/Track	10:00 - 11:40	Room/Track	13:00 - 14:40	Room/Track	15:40 - 17:20
Metro Centre BS	M1. Design & Assessment of Reinforced Concrete Buildings	Metro Centre BS	M11. Design & Assessment of Steel & Wood Buildings	Metro Centre BS	M21. Performance-Based & Displacement-Based Design
Marine LL	M2. Dams & Levees	Harbour B RC	M12. Concrete Frame Structures	Harbour B RC	M22. Concrete Columns
Pier 5 RE	M3. Fiber-Reinforced Polymer Column Retrofit	Marine LL	M13. Lifelines: Pipelines	Harbour A ST	M23. Special Session: Seismic Engineering of Controlled-Rocking Systems for Steel Framed Structures
Pier 4 WB	M4. Special Session: Changes in the Seismic Design of Wood Buildings to Reach New Heights	Pier 5 RE	M14. Repair & Retrofit of Composite Frames	Pier 5 RE	M24. New & Different Retrofit Techniques
Harbour C NIT	M5. Seismic Input & Analysis Strategies	Harbour C NIT	M15. Seismic Behavior & Analysis of Structures	Marine WB	M25. Seismic Response of Wood Buildings
Harbour B RC	M6. Seismic Behavior of RC Wall Elements & Systems	Pier 4 SEP	M16. Special Session: School Retrofit Program	Harbour C NIT	M26. Case Studies in Seismic Response
Metro East PS	M7. Special Session: Highlights of Ongoing Activities of NEES Tools for Isolation & Protective Systems (TIPS) Project	Metro East PS	M17. Analysis & Testing of Isolators	Pier 4 SEP	M27. Special Session: Seismic School Safety -- How to Reduce the Threat?
Regatta MH	M8. Special Session: Structures in Fire & Earthquake	Regatta MH	M18. Special Session: Structures in Fire & Earthquake Panel	Regatta EX	M28. Full-Scale Laboratory & Field Tests
Harbour A GM	M9. Site & Basin effects	Harbour A GM	M19. On the Basis for Ground Motion Prediction Equations (GMPEs)	Metro East PS	M29. New Behavior Modes for Isolated Systems
Pier 2 & 3 PPF	M10. Special Session: Canadian Seismic Research Network	Pier 2 & 3 PPF	M20. Special Session: The Future of the Network for Earthquake Engineering Simulation (NEES)	Pier 2 & 3 SR	M30. Ground Motion, Seismicity, & Seismic Risk

Poster Session 14:40 - 15:40 <i>Frontenac Room</i>			
ST	Seismic Design & Performance of Steel Structures	SEP	Lessons Learned from Recent Earthquakes
BR	Seismic Design & Performance of Bridges	PER/DAR	Post-Earthquake Response, Damage Assessment, & Recovery
WB	Seismic Response of Wood Buildings	SEP	Public Policy & Seismic Awareness
PS	Protective Systems	SEP	Education
PS	Energy Dissipation Systems	SEP	Preparedness

TOPIC TRACKS:

BR: Bridge Structures
 BS: Buildings, Structural & Nonstructural Systems
 DAR: Damage Assessment & Recovery
 MH: Earthquake & Multiple Hazard Design
 EX: Experimental Methods
 GM: Ground Motion
 LL: Lifelines, incl. Dams, Levees, Ports

MA: Masonry Buildings
 NS: Non-Structural Components
 NIT: Numerical Research, Information Technology, & Collaborative Tools
 PPF: Past, Present, & Future Overview
 PER: Post-Earthquake Response
 PS: Protective Systems, Seismic Isolation, Energy Dissipation & Control Systems

RC: Reinforced Concrete Buildings
 RE: Repair & Retrofit of Structures & Foundations
 SR: Seismicity, Seismic Hazard Assessment, Seismic Risk
 SEP: Socio-Economic Issues, Education, & Public Policy
 SSI/SF: Soil Structure Interaction/Soils, Foundations
 ST: Steel Buildings
 TSU: Tsunami - 4th Int'l Tsunami Symposium
 WB: Wood Buildings

Sessions-at-a-Glance continued

Tuesday, July 27, 2010

Oral Sessions

Room/Track	8:00 - 9:40	Room/Track	10:10 - 11:40
Pier 2 & 3 <i>BR</i>	T1. Seismic Isolation of Bridges	Pier 2 & 3 <i>BR</i>	T11. Bridge Design 1
Harbour C <i>BS</i>	T2. Varied Aspects of Seismic Structural Response & Behavior	Harbour C <i>BS</i>	T12. Aspects of Seismic Analysis
Harbour B <i>RC</i>	T3. Response of Concrete Structures 1	Harbour B <i>RC</i>	T13. Masonry-Infilled & RC Walls
Harbour A <i>ST</i>	T4. Special Session: Large-Scale Testing of Steel Frame Structures	Harbour A <i>ST</i>	T14. Special Session: Steel Structures, Anchors & Stainless steel
Marine <i>LL</i>	T5. Pipelines, Wharfs, & Off-Shore Structures	Pier 5 <i>SSI/SF</i>	T15. Soil Stability
Pier 7 & 8 <i>RE</i>	T6. Retrofit of Historic Buildings & Masonry	Pier 4 <i>SEP</i>	T16. Special Session: Capacity for Seismic Risk Reduction in Developing Countries Panel
Queens <i>NIT</i>	T7. Seismic Analysis & System Identification	Queens <i>DAR</i>	T17. Damage Assessment Through Remote Sensing
Pier 4 <i>SEP</i>	T8. Special Session: Appropriate Building Technologies for Reducing Seismic Risk in Developing Countries (Panel)	Marine <i>TSU</i>	T18. 4th Int'l Tsunami Symposium: Tsunami Instrumentation & Warning System: Risk Analysis
Regatta <i>EX</i>	T9. Inelastic Behavior of Components & Subassemblages	Regatta <i>PPF</i>	T19. Special Session: Historical Aspects of Earthquake Engineering
Pier 5 <i>SR</i>	T10. Seismic Risk & Assessment	Pier 7 & 8 <i>EX</i>	T20. Special Session: Earthquake Damage & Control of Infrastructure in Urban Areas
Room/Track 13:30 - 15:10			
Pier 2 & 3 <i>BR</i>	T21. Bridge Design 2	Pier 2 & 3 <i>BR</i>	T31. Seismic Performance of Bridges 1
Harbour C <i>BS</i>	T22. Loss Estimation & Other Aspects of Seismic Response	Harbour C <i>BS</i>	T32. Special Session: Seismic Design Codes in the US & Canada
Harbour B <i>RC</i>	T23. Response of Concrete Structures 2	Harbour B <i>RC</i>	T33. Response of Concrete Structures 3
Harbour A <i>ST</i>	T24. Experimental Evaluation of Steel Components	Harbour A <i>ST</i>	T34. Seismic Performance of Steel Components & Connections
Pier 5 <i>SSI/SF</i>	T25. Soil-Structure Interaction & Soil Stability	Pier 5 <i>SSI/SF</i>	T35. Soil-Foundation Interaction
Queens <i>NIT</i>	T26. Special Session: Recent Advances in Hybrid Simulation	Queens <i>EX</i>	T36. Experimental Methods
Regatta <i>SEP</i>	T27. Special Session: Seismic Risk Assessment & Management of Civil Infrastructure 1	Regatta <i>SEP</i>	T37. Special Session: Seismic Risk Assessment & Management of Civil Infrastructure 2
Pier 4 <i>PS</i>	T28. Isolated Systems	Pier 4 <i>PS</i>	T38. Seismic Design with Supplemental Damping Systems
Pier 7 & 8 <i>SR</i>	T29. Seismic Hazards 1: A Global Overview	Marine <i>PER/SEP</i>	T39. Special Session: Using Technology to Influence Individual, Social, Organizational, & Community Behavior before & after an Earthquake (Panel)
Marine <i>TSU</i>	T30. 4th Int'l Tsunami Symposium: Tsunami Engineering: Experimental Modeling	Pier 7 & 8 <i>SR</i>	T40. Seismic Hazards 2: Evaluation of Methodologies

Poster Session 15:10 - 16:10 <i>Frontenac Room</i>			
<i>LL</i>	Lifelines	<i>SSI/SF</i>	Soils, Foundations, Soil-Structure Interaction & Soil Stability
<i>LL</i>	Dams & Ports	<i>EX/NIT</i>	Experimental Methods, Information Technology, & Collaborative Tools
<i>RE</i>	Repair & Retrofit of Structures & Foundations	<i>NIT</i>	Numerical Research

TOPIC TRACKS:

BR: Bridge Structures
BS: Buildings, Structural & Nonstructural Systems
DAR: Damage Assessment & Recovery
MH: Earthquake & Multiple Hazard Design
EX: Experimental Methods
GM: Ground Motion
LL: Lifelines, incl. Dams, Levees, Ports

MA: Masonry Buildings
NS: Non-Structural Components
NIT: Numerical Research, Information Technology, & Collaborative Tools
PPF: Past, Present, & Future Overview
PER: Post-Earthquake Response
PS: Protective Systems, Seismic Isolation, Energy Dissipation & Control Systems

RC: Reinforced Concrete Buildings
RE: Repair & Retrofit of Structures & Foundations
SR: Seismicity, Seismic Hazard Assessment, Seismic Risk
SEP: Socio-Economic Issues, Education, & Public Policy
SSI/SF: Soil Structure Interaction/Soils, Foundations
ST: Steel Buildings
TSU: Tsunami - 4th Int'l Tsunami Symposium
WB: Wood Buildings



Wednesday, July 28, 2010

Plenary Session 8:00–9:30 Metro Centre-East	
THE HAITI AND CHILE EARTHQUAKES OF 2010	
Haiti: Relationship between Geotechnical Conditions and Damage Patterns	Performance of Buildings in the Haiti Earthquake
Chile: Geo-Engineering Reconnaissance	Performance of Buildings in the Chile Earthquake
Social and Economic Challenges for Recovery in Haiti	Ground Shaking from the Chile Earthquake: Applications to Cascadia

Oral Sessions

Room/Track	10:00 - 11:40	Room/Track	13:00 - 14:40	Room/Track	15:40 - 17:20
Metro Centre BR	W1. Seismic Performance of Bridges 2	Metro Centre BR	W11. Seismic Performance of Bridges 3	Metro Centre BR	W22. Seismic Performance of Bridges 4
Harbour C BS	W2. Special Session: Evaluation of Collapse Performance — Example Applications of FEMA P695 (ATC-63) Methodology	Harbour B RC	*W13. Special Session: RC Wall Systems — State of Art & Practice Part II: Low-Rise Wall & Coupling Beam Testing & Modeling	Harbour A ST	W23. Numerical Modeling of the Seismic Behavior of Steel Components & Systems
Harbour B RC	W3. Special Session: RC Wall Systems - State of Art & Practice Part I: Slender Wall Testing & Modeling	Harbour A ST	W14. Seismic Performance of Systems	Pier 5 MA	W24. Seismic Analysis & Performance of Masonry
Harbour A ST	W4. Seismic Design & Performance of Steel Structures	Pier 4 PER/SEP	W15. Special Session: Scenarios with Planning, Response, & Recovery	Pier 4 SSI-SF	W25. Special Session: Soil-Structure-Engineering Interaction
Pier 2 & 3 SSI-SF	W5. Special Session: Soil Liquefaction	Regatta NS	W16. Special Session: Seismic Risk Reduction of Nonstructural Building Components 1	Regatta NS	W26. Special Session: Seismic Risk Reduction of Nonstructural Building Components 2
Pier 5 SEP	W6. Socio-Economic Issues of Public & Commercial Buildings	Pier 5 SEP	W17. Social Scientific Perspectives on Seismic Awareness & Risk Management	Harbour B RC	W27. Special Session: Mitigating Risk Due to Older Concrete Buildings
Metro East PS	W7. Metallic Yielding Damping Systems	Metro East PS	W18. Advanced Damping Systems I	Metro East PS	W28. Advanced Damping Systems II
Regatta MH	W8. Earthquake & Multihazard Design	Pier 2 & 3 MH	W19. Special Session: SMIS/EERI Workshop on Hospitals & Natural Hazards	Marine DAR	W29. Damage Assessment & Repair of Buildings
Pier 4 GM	W9. Near Fault Effects	Harbour C GM	W20. Strong Motion Data & Use	Pier 2 & 3 PER/SEP	W30. Post-Earthquake Response & Preparedness & Education
Marine TSU	W10. 4th Int'l Tsunami Symposium: Chile & Haiti Earthquake Tsunami Impacts & Numerical Modeling	Marine TSU	W21. 4th Int'l Tsunami Symposium: Tsunami Preparedness - Numerical Modeling	Harbour C GM	W31. Ground Motion Parameters

*W12 CANCELLED

Poster Session 14:40 – 15:40 Frontenac Room	
MH	Earthquake and Multiple Hazard Design
RC	Reinforced Concrete Buildings
MA	Performance of Masonry
NS	Nonstructural Building Components
BS	Seismic Design Codes and Criteria
GM	Ground Motion and Seismicity
SR	Seismic Hazard Assessment and Seismic Risk
EX	Experimental Research
NIT	Hybrid Simulation

Thursday, July 29, 2010 Oral Sessions

Room/Track	8:00 - 9:40
Metro Centre/BR	Th1. Seismic Performance of Bridges 5
Harbour A/ST	Th2. Performance-Based Plastic Design
Pier 5/MA	Th3. Seismic Vulnerability of Masonry Structures
Pier 4/SSI-SF	Th4. Soils, Foundation and Stability
Metro East/NIT	Th5. Seismic Analysis of Concrete Structures
Regatta/NS	Th6. Seismic Risk Reduction of Nonstructural Building Components 3
Harbour B/RC	Th7. Special Session: Mitigating Risk Due to Older Concrete Buildings Panel
Pier 2 & 3/DAR	Th8. Structural Health Monitoring
Harbour C/GM	Th9. Shaking and Damage

Closing Plenary Session 10:10–12:30 Metro Centre-East

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 & 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
Dariush 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
Masatsugu 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 Khaeheshi 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 & Chekene) William Holmes (Rutherford & Chekene), Thomas Lauck (Rutherford & 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 & Research 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)

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

Erol Kalkan, Maurice Lamontagne Pier 2 & 3

15:40 378

CUMULATIVE SPECTRAL ACCELERATION-SPECTRAL DISPLACEMENT INTENSITY MEASURES OF GROUND MOTION

Arzhang Alimoradi (John A. Martin & 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 & 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 Torrealva* (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
Raajib 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 SISMiques 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 Eiding* (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
Pourea 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 2John 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), Evagelos 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) Toshiyuki 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 Ingenieria, UNAM) Miguel Jaimes (Instituto de Ingenieria, UNAM), Mario Ordaz (Instituto de Ingenieria, UNAM)10:51 1731
SMIS-EERI Workshop on Safe Hospital under Natural Hazards
Amador Teran-Gilmore (Sociedad Mexicana de Ingenieria 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 & 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 Carbone (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

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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)

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