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Concurrent Oral Sessions

TUESDAY, JULY 22



10:30 am - 12:00 pm

T01. Seismic Retrofit Of Soft-Story Woodframe Buildings: Testing, Analysis, And Policy Building Systems

Tikahtnu Á/B, FL3 Dena'ina

MODERATOR: John Van De Lindt, Colorado State University

DESCRIPTION: The final 30 minutes of the session will be a panel discussion on soft-story woodframe retrofit policy.

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John Van De Lindt, Colorado State University; Doug Rammer, RPI; Elaina Jennings, Simpson Strong Tie; Ershad Ziaei, Colorado State University; Gary Mochizuki, Structural Solutions; Jingjing Tian, Clemson University; Michael Symans, RPI; Mikhail Gershfeld, Western Michigan University; Pouria Bahmani, Colorado State University; Steve Pryor, Cal-Poly Pomona; Weichiang Pang, Forest Products Laboratory; Xiaoyun Shao, Clemson University;

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10:30 am - 12:00 pm **T02. Ground Failure During The 1964 Alaska Earthquake** Soil/Tsunami Tikahtnu E/F, FL3 Dena'ina

MODERATOR: Les Youd, Brigham Young University

DESCRIPTION: Ground failures during the 1964 Alaska earthquake were a seminal event in the development of geotechnical earthquake engineering; very little attention was paid by engineers to seismically generated ground failure prior to that event. Several major investigations were made of these failures by Harry Seed and other geotechnical engineers and by USGS and Corps of Engineers personnel. I began my career with USGS in 1967, only 3 years after the earthquake, where I was a colleague with many of the original investigators. I conducted several studies of these failures as part of my USGS research, relying heavily upon personal conversations with these investigators, all of whom are now retired from the profession and many have passed on. Thus presentations from original investigators are not possible; however, some of us who have studied their work are.

SEMINAL GROUND FAILURE INVESTIGATIONS FOLLOWING THE 1964 ALASKA EARTHQUAKE (ID 651) 55 Les Youd, Brigham young University;

GROUND DEFORMATION NEAR LANDSLIDES GENERATED BY 1964 ALASKA EARTHQUAKE (ID ORAL24A) N/A Scott Mcmullin, ;

BUILDING DAMAGE IN LANDLIDE AREAS OF ANCHORAGE FOLLOWING THE 1964 ALASKA EARTHQUAKE (ID ORAL24B) N/A *Michael Christianson, Civil Science Inc.*;

MAPPING SEISMIC LANDSLIDE HAZARDS IN ANCHORAGE, ALASKA (ID 402) 66 Randall Jibson, U.S. Geological Survey;



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MODERATOR: Mehmet Celebi, USGS

DESCRIPTION: This session aims to emphasize what has been learned from 2011 Tohoku event, discuss the seismological and earthquake engineering issues of these effects and how these issues may be addressed during design and analyses processes. Current state of knowledge of ground motion hazards and risks to built environment will be discussed and debated. Current tall building design recommendations in the US and other countries will be discussed. Furthermore, case studies of recorded responses of tall buildings during the Tohoku EQ will be presented.

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MODERATOR: Diane Foster, University of New Hampshire

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10:30 am - 12:00 pm **T05. School Safety** Building Safety Board Room, FL2 Dena'ina

MODERATOR: Phillip Gould, Washington University

CO-MODERATOR: Yumei Wang, Oregon Department of Geology and Mineral Industries



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SCHOOL HAZARD IDENTIFICATION AND RISK MITIGATION IN KODIAK AND RELATED ACTIVITIES OF ALASKA SEISMIC HAZARDS SAFEY COMMISSION (ID ORAL29A) N/A Laura Kelly, US Coast Guard;

KODIAK EXPERIENCE (ID ORAL29B) N/A *Bud Cassidy, Kodiak Island Borough*;

SCHOOL DESIGN IN GHANA-SEISMIC ISSUES (ID ORAL29C) N/A Cale Ash, Degenkolb Engineers;

BC SCHOOLS MITIGATION PROGRAM (ID ORAL29D) N/A John Sherstobitoff, Ausenco Sandwell;

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10:30 am - 12:00 pm **T08. Resilience Of Communities Including Infrastructures Interdependencies** Risk and Resilience Tubughneng' 3, FL2 Dena'ina

MODERATOR: Gian Paolo Cimellaro, Polytechnic University of Turin

DESCRIPTION: The aim of this special session is to answer the following question: How can the technical, operational and social elements of critical structures and infrastructure systems be integrated, designed and planned for disaster resilience against multiple hazards? Recent disasters such as hurricane Katrina in the U.S. in 2005, the 2010 Chile earthquake or the 2011 Tohoku earthquake in Japan, among others, have triggered the question about the role that the resilience of structures and infrastructural facilities should play for societies to rebound after threats or disasters, some of which cannot be averted. Designing resilient structural and infrastructural systems requires interdisciplinary collaborative efforts to formulate new approaches and metrics that jointly consider performance and post event functionality goals that enhance disaster resilience. The engineering and functional aspects of critical buildings and infrastructure systems should be developed considering their lifetime with respect to impacts from disasters, repair and retrofit interventions, and evolving urban dynamics. Resilient structural and infrastructural systems also require considering interdependencies with other systems, and ultimately how they affect the aftermath of emergencies and disasters. At this time, there are no explicit procedures that suggest how to guantify resilience for structures or in infrastructures in the context of multiple hazards, how to compare structures and systems with one another in terms of their resilience, or how to determine whether individual retrofit interventions on structures or facilities move them in the direction of becoming more resilient. This special session aims to attract academics, researchers, students, post-graduate students and professional engineers dealing with, but not limited to, topics in technical-socio-economic functionality of structures and infrastructures, probabilistic risk and resilience-based design principles for recommended practices and standards, environmental dependencies and interdependencies of individual and spatially distributed structures and infrastructures, optimal considerations in pre- and post-event retrofit and restoration, and resilience based decision support systems for existing and new construction and dependent infrastructures.

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1:30 pm - 3:00 pm **T12. Ground Failure And Liquefaction In The 1964 Niigata Earthquake** Soil/Tsunami Tikahtnu E/F, FL3 Dena'ina



NIGATA 1964 EARTHQUAKE (ID ORAL39A)

Kohji Tokimatsu, Tokyo Institute of Technology; Susumu Yasada, ; Takaji Kokusho, CHUO university;

1:30 pm - 3:00 pm **T13. Building Damage In Recent Earthquakes** Earthquake Lessons Tikahtnu C, FL3 Dena'ina

MODERATOR: Catherine French, University of Minnesota

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1:30 pm - 3:00 pm **T14. EERI/COSMOS Strong Motion Forum** Education Tikahtnu D, FL3 Dena'ina

MODERATOR: Marcia McLaren, Pacific Gas and Electric Company

CO-MODERATOR: Jamison Steidl, UC Santa Barbara

DESCRIPTION: This special session will follow on the successful EERI Strong Motion Forum, held at the EERI Annual meeting since the 1990s and the recent COSMOS Strong Motion Forum held in 2012 at the 15WCEE. The session will bring together data users and data providers to improve data awareness and showcase the development of new and innovative user tools to support the application of worldwide ground and structural strong motion data. The EERI Strong Motion Forum has long supported 1) SM instrument deployment in the United States and other strategic locations throughout the world, 2) development of uniform standards for the processing and interpretation of strong motion data, and 3) improved methods for data dissemination to engineers and geoscientists to better inform the public about seismic hazard. COSMOS is a global focal point of international leadership and cooperation for the acquisition, processing, dissemination, and application of the earthquake strong motion data. Topics will include: updates on innovative technologies for data recording in structures and from weak/strong motion networks; improvements in data repositories and dissemination tools; new features of ShakeMap, ShakeCast and Pager using real-time national and global data; international data providers, and international cooperation in strong motion monitoring and data dissemination; updates from international data providers on the current status of their monitoring activities, including any recent enhancements to their networks, and information on access to data. Following the presentations will be an open discussion on the future needs for user tools to help facilitate the use of strong motion data by practicing engineers and the earthquake engineering community in general, and a discussion on removing the barriers to worldwide strong motion data sharing and improving communication and collaboration among data providers and between the providers and data users.

PACIFIC GAS AND ELECTRIC COMPANY: STRONG MOTION DATA PROVIDER AND DATA USER (ID ORAL13A) N/A *Marcia Mclaren, PG&E*;

INTERNATIONAL COLLABORATION ON STRONG MOTION MONITORING AND DATA DISSEMINATION THROUGH COSMOS ACTIVITIES (ID ORAL13B) N/A



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Jamison Steidl, UC Santa Barbara;

THE IMPORTANCE OF REAL-TIME STRONG MOTION DATA FOR SHAKEMAP, SHAKECAST, AND PAGER (ID ORAL13C)

GROUND MOTION RECORDINGS AND ITS CHARACTERISTICS FROM LUSHAN EARTHQUAKE ON APRIL 20, 2013 (ID 721) (IM 721) (IM

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1:30 pm - 3:00 pm **T15. The Framed Infill Network** Building Safety Board Room, FL2 Dena'ina

MODERATOR: Janise Rodgers, GeoHazards International

DESCRIPTION: Brief update on Framed Infill Network activities and results to date, followed by technical presentations and discussion.

A ROCKING SPINE FOR ENHANCED SEISMIC PERFORMANCE OF REINFORCED CONCRETE FRAME BUILDINGS WITH INFILLS - NEES RESEARCH (ID 1384) JG Henry Burton, Stanford University; Gregory Deierlein, Stanford University;

PERFORMANCE BASED ASSESSMENT OF INFILL WALL EFFECTS ON CODE-DESIGNED REINFORCED CONCRETE FRAMES USING THE PACIFIC EARTHQUAKE ENGINEERING RESEARCH CENTER PERFORMANCE-BASED EARTHQUAKE ENGINEERING METHODOLOGY (ID ORAL1A)

DESIGN APPROACHES TO IMPROVE SEISMIC PERFORMANCE OF CONCRETE FRAMES WITH INFILL, INCLUDING ROCKING SPINES, GROUND STORY INTERVENTIONS, AND DAMPED INFILL PANELS (ID ORAL1B)

A SIMPLIFIED METHOD FOR THE ESTIMATION OF THE SEISMIC RESISTANCE OF RC FRAMES WITH WEAK INFILL PANELS -NEES RESEARCH (ID 1231)∰ € Andreas Stavridis, University at Buffalo; Austin Reese, University of Texas, Arlington;

SEISMIC PERFORMANCE ASSESSMENT OF MASONRY-INFILLED RC FRAMES RETROFITTED WITH ECC OVERLAYS - NEES

UPDATE ON INFILL FRAME ACTIVITIES (ID ORAL1C)

1:30 pm - 3:00 pm **T16. Analysis And Simulation** Response Assessment Kahtnu 1, FL2 Dena'ina

MODERATOR: Henri Gavin, Duke University

EARTHQUAKE ANALYSIS OF CONCRETE DAMS: FACTORS TO BE CONSIDERED (ID 897) A G Anil Chopra, University of California;

CYCLIC SHEAR-FLEXURE INTERACTION IN REINFORCED CONCRETE STRUCTURAL WALLS MODELING AND VALIDATION (ID 554)

Kristijan Kolozvari, California State University, Fullerton; John Wallace, University of California, Los Angeles; Kutay Orakcal, Bogazici University; Thien Tran, University of California, Los Angeles;

AN EFFICIENT APPROACH ON DYNAMIC-RESPONSE ANALYSES FOR STRUCTURAL SYSTEMS (ID 570) A I J Alin Radu, Cornell University; Mircea Grigoriu, Cornell University;

THE EFFECT OF EPISTEMIC UNCERTAINTIES IN THE ASSESSMENT OF SEISMIC COLLAPSE OF BUILDING STRUCTURES (ID 701)/### Î €

10th U.S. National Conference on Earthquake Engineering • Concurrent Oral Sessions



Andrew Hardyniec, Virginia Polytechnic Institute and State University; Finley Charney, Virginia Polytechnic Institute and State University;

THEORETICAL EVALUATION OF HYBRID SIMULATION FOR CLASSICAL PROBLEMS IN CONTINUUM MECHANICS - NEES RESEARCH (ID 1224)

Ahmed Bakhaty, University of California, Berkeley; Khalid Mosalam, University of California, Berkeley; M. Selim Gunay, University of California, Berkeley; Paul Drazin, University of California, Berkeley; Sanjay Govindjee, University of California, Berkeley;

FROM MODELING TO POST-PROCESSING: A FRAMEWORK FOR EFFICIENT NLRHA (ID 1723) G **Mahmoud Hachem, Degenkolb Engineers**; Chris Poland, Degenkolb Engineers; Gordon Wray, Degenkolb Engineers; Mark Sinclair, Consultant; Silvia Mazzoni, Consultant; Tim Graf, Simpson Gumpertz & Heger;

1:30 pm - 3:00 pm **T17. Performance Assessment Of Buildings** Risk Assessment Kahtnu 2, FL2 Dena'ina

MODERATOR: Mircea Grigoriu, Cornell University

PERFORMANCE-BASED SEISMIC ASSESSMENT AND RETROFIT OF LOW-RISE BUILDINGS (ID 1575) JOB JG Armin Bebamzadeh, University of British Columbia; Carlos E. Ventura, University of British Columbia; Michael Fairhurst, University of British Columbia;

ANALYTICAL MODELING FRAMEWORK FOR SEISMIC RISK ASSESSMENT OF UNREINFORCED MASONRY STRUCTURES (ID 771) ### €H Andrew Odonnell, University of Notre Dame; Alexandros Taflanidis, University of Notre Dame; Yahya Kurama, University of Notre Dame;

SEISMIC FRAGILITY ESTIMATES OF CONTROLLED HIGH-RISE BUILDINGS WITH MAGNETORHEOLOGICAL DAMPERS (ID 1418) **Jong-Wha Bai, California Baptist University**; Young-Jin Cha, Massachusetts Institute of Technology;

SEISMIC COLLAPSE ASSESSMENT OF DUCTILE AND NON-DUCTILE REINFORCED CONCRETE BUILDINGS IN ALASKA (ID 727) AMAG Abbie B. Liel, University of Colorado, Boulder; Meera Raghunandan, University of Colorado, Boulder;

COMPARATIVE LIFE CYCLE COST AND PERFORMANCE ANALYSIS OF STRUCTURAL SYSTEMS FOR BUILDINGS (ID 1356) A Person Terzic, PEER Center, UC Berkeley; Mary Comerio, UC Berkeley; Stephen Mahin, PEER Center, UC Berkeley;

1:30 pm - 3:00 pm **T18. Community Resilience Modeling And Programs** Risk and Resilience Tubughnenq' 3, FL2 Dena'ina

MODERATOR: Stephanie Chang, University of British Columbia

THEORIZING COMMUNITY RESILIENCE TO EARTHQUAKES (ID 269) A I € Scott Miles, Western Washington University;

QUANTIFYING THE PERFORMANCE OF HEALTHCARE FACILITIES IN DISASTERS: A MULTI-HAZARD APPROACH (ID 297) A Judith Mitrani-Reiser, Johns Hopkins University; Caitlin Jacques, Johns Hopkins University; Megan Boston, Johns Hopkins University;

SAFE ENOUGH? HOW BUILDING CODES PROTECT OUR LIVES BUT NOT OUR CITIES (ID 479) AND A CODES PROTECT OUR LIVES A CODES PROTECT

RESILIENT BUILDINGS: FROM CONCEPT TO REALITY (ID 1147) III 147) III H **Kate Stillwell, GEM Foundation**; Eric Von Berg, Newmark Realty Capital; Evan Reis, Hinman Consulting Engineers; Ron Mayes, Simpson Gumphertz & Heger;

ACTION IN THE FACE OF OVERWHELMING RISK (ID 1282) (3.) I Janise Rodgers, GeoHazards International; L. Thomas Tobin, GeoHazards International;

OVERVIEW OF THE OREGON RESILIENCE PLAN FOR NEXT CASCADIA EARTHQUAKE AND TSUNAMI (ID 1460) (10 14

1:30 pm - 3:00 pm **T19. Introduction To Engineering Uses Of Physics-Based Ground Motion Simulations** Earthquake Hazard Tubughnenq' 4, FL2 Dena'ina



TUESDAY, JULY 22

MODERATOR: Jack Baker, Stanford University

DESCRIPTION: Simulation of potential ground motions from large earthquakes, utilizing models of earthquake rupture sources and wave propagation, is an area of active research in the earth science community. Refinement and validation of these models requires collaboration between ground motion modelers and engineering users, and testing/rating methodologies for simulated ground motions to be used in engineering applications. This special session will provide the audience with an introduction to this field, with a focus on research activities coordinated by the Southern California Earthquake Center (SCEC). Presenters in this session are drawn from a variety of fields including earth scientists, computer scientists, and engineers. The session aims to provide a concise overview of this field in an effort to disseminate work on this topic to conference participants who might not be exposed to earth science research. Session speakers will to highlight the relation between traditional methods of ground motion simulations and new methods currently under development and evaluation.

ENGINEERING USES OF PHYSICS-BASED GROUND MOTION SIMULATIONS (ID 494) A € Jack Baker, Stanford University; Kim Olsen, San Diego State University; Nico Luco, US Geological Survey; Norman Abrahamson, Pacific Gas & Electric; Phil Maechling, University of Southern California; Robert Graves, US Geological Survey;

THE SOUTHERN CALIFORNIA EARTHQUAKE CENTER (ID ORAL18A)

THE SCEC BROADBAND PLATFORM: COMPUTATIONAL INFRASTRUCTURE FOR TRANSPARENT AND REPRODUCIBLE GROUND MOTION SIMULATION (ID ORAL18B) # E Phil Maechling, University of Southern California;

SIMULATION-BASED SEISMIC HAZARD ANALYSIS USING CYBERSHAKE (ID ORAL18C) HE Robert Graves, US Geological Survey;

CURRENT DIRECTIONS IN GROUND MOTION SIMULATION (ID ORAL18D)

GROUND MOTION SIMULATION VALIDATION FOR THE NGA EAST AND SOUTHWEST UNITED STATES SEISMIC HAZARD PROJECTS (ID ORAL18E) A Contract of California, Berkeley;

1:30 pm - 3:00 pm **T20. Experimental Investigations Of Structural Components I** Structural Testing Tubughnenq' 5, FL2 Dena'ina

MODERATOR: Richard Wood, University of Nebraska-Lincoln

APPLICATIONS OF CALCULATION CHANNEL FUNCTION IN HYBRID SIMULATION (ID 9) AND FI Shawn You, MTS Systems Co.;

EFFECT OF SPANDREL AND HANGING WALLS ON FLEXURAL CAPACITY OF REINFORCED CONCRETE COLUMNS WITH WING WALLS (ID 115)

Toshikazu Kabeyasawa, National Institute for Land, Infrastructure and Management; Shuji Kato, Earthquake Research Institute, The University of Tokyo; Toshimi Kabeyasawa, Earthquake Research Institute, The University of Tokyo; Youji Hosokawa, Earthquake Research Institute, The University of Tokyo; Youji Hosokawa, Earthquake Research Institute, The University of Tokyo; Youji Hosokawa, Earthquake Research Institute, The University of Tokyo; Youji Hosokawa, Earthquake Research Institute, The University of Tokyo; Youji Hosokawa, Earthquake Research Institute, The University of Tokyo; Youji Hosokawa, Earthquake Research Institute, The University of Tokyo; Youji Hosokawa, Earthquake Research Institute, The University of Tokyo; Youji Hosokawa, Earthquake Research Institute, The University of Tokyo; Youji Hosokawa, Earthquake Research Institute, The University of Tokyo; Youji Hosokawa, Earthquake Research Institute, The University of Tokyo; Youji Hosokawa, Earthquake Research Institute, The University of Tokyo; Youji Hosokawa, Earthquake Research Institute, The University of Tokyo; Youji Hosokawa, Earthquake Research Institute, The University of Tokyo; Youji Hosokawa, Earthquake Research Institute, The University of Tokyo; Youji Hosokawa, Earthquake Research Institute, The University of Tokyo; Youji Hosokawa, Earthquake Research Institute, The University of Tokyo; Youji Hosokawa, Earthquake Research Institute, The University of Tokyo; Youji Hosokawa, Earthquake Research Institute, The University of Tokyo; Youji Hosokawa, Earthquake Research Institute, The University of Tokyo; Youji Hosokawa, Earthquake Research Institute, The University of Tokyo; Youji Hosokawa, Earthquake Research Institute, The University of Tokyo; Youji Hosokawa, Earthquake Research Institute, The University of Tokyo; Youji Hosokawa, Earthquake Research Institute, The University of Tokyo; Youji Hosokawa, Earthquake Research Institute, The University of Tokyo; Youji Hosokawa, Earthquake Research Institute, The University of Tokyo; Youji Hosokawa, Eart

CYCLIC INELASTIC IN-PLANE BEHAVIOR OF CONCRETE FILLED STEEL SANDWICH PANEL WALLS (ID 420) A h i Michel Bruneau, University at Buffalo; Yasser Alzeni, University at Buffalo;

CYCLIC BEHAVIOR OF STRUCTURAL BASE PLATE CONNECTIONS WITH DUCTILE FASTENING FAILURE: COMPONENT TEST RESULTS (ID 499) AND I I Christopher Trautner, University of California - San Diego; Philipp Grosser, Hilti; Tara Hutchinson, University of California - San Diego;

EXPERIMENTAL INVESTIGATION OF THE SEISMIC PERFORMANCE OF EMBEDDED COLUMN BASES (ID 546) (ID 5

AN EXPERIMENTAL INVESTIGATION OF A WALL-TO-FLOOR CONNECTOR FOR SELF-CENTERING WALLS (ID 550) AND IN Jonathan Watkins, The University of Auckland; Richard Henry, The University of Auckland; Sri Sritharan, Iowa State University;

3:30 pm - 5:00 pm **T21. Nonlinear Analysis Of Buildings: Performance Predictions And Case Studies II** Building Systems Tikahtnu A/B, FL3 Dena'ina 10th U.S. National Conference on Earthquake Engineering • Concurrent Oral Sessions



MODERATOR: Dominic Kelly, Simpson Gumpertz & Heger

UC BERKELEY CALIFORNIA MEMORIAL STADIUM SEISMIC UPGRADE (ID 1065) II Rene Vignos, Forell/Elsesser Engineers, Inc.; Chris Petteys, Forell/Elsesser Engineers, Inc.; David Friedman, Forell/Elsesser Engineers, Inc.;

PERFORMANCE-BASED SEISMIC DESIGN AND SOIL-STRUCTURE INTERACTION: LESSONS FROM THE NEW SAN FRANCISCO AIR TRAFFIC CONTROL TOWER (ID 1127) A I I Lawronce Burkett, Butherford+Chekang, Andreas Schellenberg, ***: Ice Maffei Maffei Structural Engineering;

Lawrence Burkett, Rutherford+Chekene; Andreas Schellenberg, ***; Joe Maffei, Maffei Structural Engineering;

SEISMIC RESPONSE OF BUILDINGS WITH NON-UNIFORM STIFFNESS MODELED AS CANTILEVERED SHEAR BEAMS (ID 1212) Andres Alonso-Rodriguez, Mundial Seguros S.A; Eduardo Miranda, Stanford University;

EFFECT OF STRONG-COLUMN WEAK-BEAM RATIO AND COLUMN DEPTHS ON STEEL SPECIAL MOMENT FRAME BEHAVIOR (ID 1422) 1422) *Ozgur Atlayan, Virginia Tech*; *Finley A. Charney, Virginia Tech*;

3:30 pm - 5:00 pm **T22. Post 1964 Advances In Tsunami Risk Reduction** Soil/Tsunami Tikahtnu E/F, FL3 Dena'ina

MODERATOR: Lori Dengler, *Humboldt State University*

DESCRIPTION: A plenary session focusing on post Alaska 1964 advances in tsunami hazard assessment (including numerical modeling and paleotsunami studies), warning coordination (evaluation, real-time modeling and forecasting, messaging and dissemination) and tsunami mitigation (education, outreach, planning/zoning, evacuation strategies, recovery etc.).

ADVANCES AND CHALLENGES IN UNDERSTANDING THE TSUNAMI SOURCE (ID ORAL26A)

ADVANCES AND CHALLENGES IN UNDERSTANDING THE TSUNAMI SOURCE (ID ORAL26B) **Emile Okal, Northwestern University**;

ADVANCES AND CHALLENGES IN TSUNAMI GEOLOGY (ID ORAL26C)

ADVANCE AND CHALLENGES IN UNDERSTANDING THE INTERACTION OF TSUNAMIS AND STRUCTURES (ID ORAL26D) AND EXAMPLE INTERACTION OF TSUNAMIS AND STRUCTURES

3:30 pm - 5:00 pm **T23. 2011 Mineral Earthquake And Its Impact On Monumental Historic Structures In The Washington D.C Area** Earthquake Lessons

Tikahtnu C, FL3 Dena'ina

MODERATOR: Terry Paret, Wiss Janney Elstner Associates Inc.

DESCRIPTION: In addition to presentations on damage assessments and repair methodologies for some of the damaged structures, the session will cover the seismic vulnerability assessment of The Washington Monument and the seismology of the event and the region..

EXAMINATION OF CHARACTERISTICS OF GROUND SHAKING EXPERIENCED DURING THE MINERAL EARTHQUAKE, INCLUDING CONTRIBUTIONS OF LOCAL SITE RESPONSE EFFECTS ON OBSERVED DAMAGE. (ID 670)

THEN THE EARTH SHOOK AND TREMBLED... THE WASHINGTON NATIONAL CATHEDRAL IN THE AFTERMATH OF MINERAL (ID 1591) AN I H

Matthew Farmer, WISS, JANNEY, ELSTNER ASSOCIATES, INC.; Cortney Fried, WISS, JANNEY, ELSTNER ASSOCIATES, INC.;

SEISMIC VULNERABILITY ASSESSMENT OF THE WASHINGTON MONUMENT (ID 259)###11



TUESDAY, JULY 22

Terrence Paret, Wiss, Janney, Elstner Associates, Inc.; Debra Murphy, AMEC; Donald Wells, AMEC; John Egan, AMEC; Leo Panian, Tipping Mar; Mike Korolyk, Tipping Mar; Owen Rosenboom, Wiss, Janney, Elstner Associates, Inc.;

A CASE STUDY: POST-EARTHQUAKE STRUCTURAL ENGINEERING AMERICAS FIRST CATHEDRAL, BALTIMORE BASILICA (ID 506)/////i Í Matthew Daw, Keast & Hood;

THE 2011 VIRGINIA M 5.8 EARTHQUAKE: GROUND MOTION, DAMAGE, AND LESSONS LEARNED (ID 691)

3:30 pm - 5:00 pm **T24. Housner Fellows** Education Tikahtnu D, FL3 Dena'ina

MODERATOR: Cale Ash, Degenkolb Engineers

DESCRIPTION: Interactive session on leadership in seismic safety advocacy

LECTURE AND INTERACTIVE EXERCISE ON CONTEMPORARY LEADERSHIP FOR SEISMIC SAFETY ADVOCACY (ID ORAL42A)

3:30 pm - 5:00 pm **T25. Confined Masonry** Building Safety Board Room, FL2 Dena'ina

MODERATOR: Tim Hart, Lawrence Berkeley National Laboratory

DESCRIPTION: Confined masonry construction is among the least understood building structure systems in use today. Except for some Latin American countries and a few countries in Asia where confined masonry is commonly built, building code provisions for confined masonry are often incomplete or inadequate if they even exist at all. North American engineers do not get exposed to confined masonry until they are assigned a confined masonry project in a developing country and have to learn the system on the fly. Some engineers and builders in developing countries where confined masonry is common do not have the technical background to properly design and construct the structural elements. Engineers and government officials in developing countries where confined masonry used may not be aware of the benefits of confined masonry relative to similar but poorer performing systems such as unreinforced masonry. This session is intended to introduce confined masonry and the Confined Masonry Network to those not familiar with them and to provide the latest in technical guidelines and research to those who are familiar with confined masonry.

THE CONFINED MASONRY NETWORKS DESIGN AND CONSTRUCTION GUIDELINES (ID 938) III Tim Hart, Lawrence Berkeley National Laboratory; Svetlana Brzev, British Columbia Institute of Technology;

OVERVIEW AND ASSESSMENT OF ANALYSIS TECHNIQUES FOR CONFINED MASONRY (ID ORAL36A)

A NEW SHEAR STRENGTH DESIGN FORMULA FOR CONFINED MASONRY WALLS: PROPOSAL FOR THE MEXICAN CODE (ID 1162) ₩₩F€€

J J Perez-Gavilan, Instituto de Ingenieria, UNAM; Antonio Manzano, Instituto de Ingenieria, UNAM; Leonardo Flores, CENAPRED;

APPLICATION OF CONFINED MASONRY IN A MAJOR PROJECT IN INDIA (ID 1336) ###FFÍ **Sudhir Jain, IIT Gandhinagar**; Dhiman Basu, IIT Gandhinagar; Durgesh Rai, IIT Kanpur; Indrajit Ghosh, IIT Gandhinagar; Laksh Bhargava, (4) Central Public Works Department, Government of India; Svetlana Brzev, British Columbia Institute of Technology, Vancouver;

INTRODUCING CONFINED MASONRY TO HAITI THROUGH THE TRAINING OF WORKERS (ID 732) IN CONFINED MASONRY TO HAITI THROUGH THE TRAINING OF WORKERS (ID 732) IN CONFINED MASONRY TO HAITI THROUGH THE TRAINING OF WORKERS (ID 732) IN CONFINED MASONRY TO HAITI THROUGH THE TRAINING OF WORKERS (ID 732) IN CONFINED MASONRY TO HAITI THROUGH THE TRAINING OF WORKERS (ID 732) IN CONFINED MASONRY TO HAITI THROUGH THE TRAINING OF WORKERS (ID 732) IN CONFINED MASONRY TO HAITI THROUGH THE TRAINING OF WORKERS (ID 732) IN CONFINED MASONRY TO HAITI THROUGH THE TRAINING OF WORKERS (ID 732) IN CONFINED MASONRY TO HAITI THROUGH THE TRAINING OF WORKERS (ID 732) IN CONFINED MASONRY TO HAITI THROUGH THE TRAINING OF WORKERS (ID 732) IN CONFINED MASONRY TO DEVELOPMENT AND COOPERATION; SUBS Agency for Development and Cooperation; Confined and Coope

PRELIMINARY CONSIDERATIONS FOR THE APPLICATION OF FEMA P695 TO CONFINED MASONRY STRUCTURES (ID 1496)



3:30 pm - 5:00 pm **T26. Advances In Seismic Risk Assessment Of Civil Infrastructure Systems** Response Assessment Kahtnu 1, FL2 Dena'ina

MODERATOR: Helen Crowley, GEM Foundation

GROUND MOTION MODELING FOR RISK AND RELIABILITY ASSESSMENT OF SAN FRANCISCO INFRASTRUCTURE SYSTEMS (ID 516)

Jason Wu, Stanford University; Jack Baker, Stanford University;

CARBON FOOTPRINT OF POST-EARTHQUAKE BRIDGE REPAIR (ID 1359) III 1359) Kevin Mackie, University of Central Florida; Ahmed Elgamal, University of California San Diego; Murat Kucukvar, University of Central Florida; Omer Tatari, University of Central Florida;

PAVED WITH INCOMPLETE INTENTIONS: USING PREDICTIONS OF SEISMIC PERFORMANCE TO NAVIGATE THE BUMPY HIGHWAYS AND BYWAYS OF SEISMIC RISK IN THE LEGAL ARENA CASE NOTES FROM LAQUILA (2009) AND PASO ROBLES (2003) (ID 1153) ﷺ € (2007) (ID 1153) FF Engineers, Inc.; Mark White, Law Offices Of Mark N. White;

EFFECT OF INTENSITY BOUNDS ON THE SEISMIC SAFETY OF STRUCTURES (ID 954) AMAGE J Matjaz Dolsek, University of Ljubljana; Nusa Lazar, University of Ljubljana;

SEISMIC PERFORMANCE BY FRAGILITY SURFACES (ID 318) Mires J€ Mircea Grigoriu, Cornell University; Alin Radu, Cornell University; Cagdas Kafali, AIR Worldwide;

IMPROVING SEISMIC ASSESSMENTS BY QUANTIFYING DIMINISHED CAPACITY DURING THE USEFUL LIFE CYCLE OF STRUCTURES (ID 694) ###F€JJ Cynthia Perry, BFP Engineers, Inc.; Eduardo Fierro, BFP Engineers, Inc.; Mark White, Law Offices of Mark N. White;

3:30 pm - 5:00 pm **T27. Uncertainty Quantification And Propagation In Seismic Risk Assessment** Risk Assessment Kahtnu 2, FL2 Dena'ina

MODERATOR: Nilesh Shome, Risk Management Solutions

CALIBRATED RESPONSE SPECTRA FOR COLLAPSE ASSESSMENT UNDER MULTIVARIATE HAZARD AND STRUCTURAL RESPONSE UNCERTAINTIES (ID 666) WWWFFF€ Christophe Loth, Stanford University; Jack Baker, Stanford University;

UNCERTAINTY ANALYSIS OF DECISION MAKING FOR EARTHQUAKE EARLY WARNING APPLICATION IN ELEVATOR CONTROL (ID 790)

Stephen Wu, California Institute of Technology; James Beck, California Institute of Technology; Ming Hei Cheng, California Institute of Technology; Thomas Heaton, California Institute of Technology;

UNCERTAINTY ESTIMATION IN SEISMIC COLLAPSE ASSESSMENT OF MODERN REINFORCED CONCRETE MOMENT FRAME BUILDINGS (ID 867)/////FFHG Beliz Ugurhan, Stanford University; Gregory Deierlein, Stanford University; Jack Baker, Stanford University;

Benz Ogurnan, Stamord Oniversity, Gregory Delenein, Stamord Oniversity, Jack Baker, Stamord Oniversity,

UNCERTAINTY ESTIMATES FOR EARTHQUAKE HAZARD ANALYSIS THROUGH ROBUST SIMULATION (ID 907) MiFFI H Yajie Lee, ImageCat Inc.; Charles Huyck, ImageCat Inc.; Craig Taylor, ImageCat Inc.; William Graf, ImageCat Inc.; Zhenghui Hu, ImageCat Inc.;

CLOUD ANALYSIS REVISITED: EFFICIENT FRAGILITY CALCULATION AND UNCERTAINTY PROPAGATION USING SIMPLE LINEAR REGRESSION (ID 1665)

Fatemeh Jalayer, University of Naples Federico II; Gaetano Manfredi, University of Naples Federico II; Ludovica Elefante, University of Naples Federico II; Raffaele De Risi, University of Naples Federico II;

3:30 pm - 5:00 pm **T28. International Case Studies In Seismic Risk Assessment** Risk and Resilience Tubughnenq' 3, FL2 Dena'ina

MODERATOR: Rachel Davidson, University of Delaware



TUESDAY, JULY 22

STUDY OF THE IMPACT OF A MAGNITUDE 9 CASCADIA SUBDUCTION ZONE EARTHQUAKE ON THE BRITISH COLUMBIA, CANADA (ID 1598), Mir Fi Î Arash Nasseri, AIR-Worldwide; Mesut Turel, AIR-Worldwide; Tao Lai, AIR-Worldwide; Yuejun Yin, AIR-Worldwide;

EARTHQUAKE HAZARD MODEL FOR LOSS ESTIMATION IN AUSTRALIA USING THE 2012 GA HAZARD DATA (ID 1136) **JAMM** FÌ J **Paul C. Thenhaus, EQECAT, Inc.**; David M. Smith, EQECAT, Inc.; Kenneth W. Campbell, EQECAT, Inc.; Mahmoud M. Khater, EQECAT, Inc.; Nitin Gupta, EQECAT, Inc.;

COST-BENEFIT ANALYSIS OF DIFFERENT RETROFIT STRATEGIES FOLLOWING A DISPLACEMENT-BASED LOSS ASSESSMENT APPROACH: A CASE STUDY (ID 328) ###Gee Donatello Cardone, University of Basilicata; Amedeo Flora, University of Basilicata; Benedetto Manganelli, University of Basilicata;

URBAN SEISMIC RISK ASSESSMENT OF SANTO DOMINGO: A PROBABILISTIC AND HOLISTIC APPROACH (ID 619) ###CFF Omar-Dar Cardona, Universidad Nacional de Colombia-Sede Manizales; Alex Barbat, Universidad Polit; Claudia-Patricia Villegas, INGENIAR Ltda.; Gabriel-Andr Bernal, Universidad Polit; Mario-Andr Salgado, Universidad Polit; Martha-Liliana Carre, Universidad Polit;

AFTERSHOCK RISK IN JAPAN FOLLOWING TOHOKU EARTHQUAKE (ID 480)/##FGGG Nilesh Shome, Risk Management Solutions; Chesley Williams, Risk Management Solutions;

3:30 pm - 5:00 pm **T29. BC Hydro Ground Motion Hazard Study** Earthquake Hazard Tubughnenq' 4, FL2 Dena'ina

MODERATOR: Kofi Addo, BC Hydro

DESCRIPTION: Development of a Western Canada Earthquake Catalogue Seismic characterization of the a) Cascadia subduction zone b) Crustal sources

SEISMIC SOURCE CHARACTERIZATION (ID ORAL23A) Dean Ostenaa, Fugro Consultants, Inc.;

CHARACTERIZING THE CASCADIA SUBDUCTION ZONE FOR SEISMIC HAZARD ASSESSMENTS (ID 1213) ###GH Ivan Wong, URS Corporation; Dean Ostenaa, Fugro Consultants; John Clague, Simon Fraser University; Judith Zachariasen, URS Corporation; Kathryn Hanson, AMEC; Martin Lawrence, BC Hydro; Martin Mccann, Jack R. Benjamin & Associates; Ram Kulkarni, URS Corporation; Robert Youngs, AMEC; Roland Laforge, Fugro Consultants;

GROUND MOTION CHARACTERIZATION FOR THE BC HYDRO SSHAC LEVEL 3 STUDY (ID 1343) ###G I **Nick Gregor, Consultant**; Kofi Addo, BC Hydro & Power Authority; Norman Abrahamson, University of California, Berkeley; Robert Youngs, AMEC Environmental & Infrastructure;

BC HYDRO SSHAC LEVEL 3 PSHA STUDY: MODEL IMPLEMENTATION & COMPUTATIONS (ID 1544) ###FG Í Valentina Montaldo Falero, AMEC E&I; Kofi Addo, BC Hydro; Robert Youngs, AMEC E&I;

3:30 pm - 5:00 pm **T30. Experimental Investigations Of Structural Components II** Structural Testing Tubughnenq' 5, FL2 Dena'ina

MODERATOR: Laura Lowes, University of Washington

SHAKE TABLE TESTING OF UNBONDED POST-TENSIONED PRECAST CONCRETE WALLS - NEES RESEARCH (ID 576) ### G Í Maryam Nazari, Iowa State University; Sri Sritharan, Iowa State University; Sriram Aaleti, University of Alabama, Tuscaloosa;

INTERIM REPORT ON TESTING OF TENSION-ONLY STEEL ANCHOR RODS EMBEDDED IN REINFORCED CONCRETE SLABS (ID 709)

Gary Mochizuki, Simpson Strong-Tie Company, Inc.; Kevin Moore, Simpson Gumpertz & Heger; Steven Pryor, Simpson Strong-Tie Company, Inc.; Geoffrey Laurin, Laurin Construction + Consulting; William Fennell, Scientific Construction Laboratories, Inc.;

BEHAVIOR OF AAC INFILLED RC FRAME UNDER LATERAL LOADING (ID 818) ####G Î Durgesh Rai, Indian Institute of Technology Kanpur; Supratik Bose, Indian Institute of Technology Kanpur;

CYCLIC LOADING PERFORMANCE OF SPECIAL TRUSS MOMENT FRAME WITH DOUBLE-CHANNEL CHORD MEMBERS - NEES RESEARCH (ID 1109)

Shih-Ho Chao, University of Texas at Arlington; Chatchai Jiansinlapadamrong, University of Texas at Arlington; Sanputt Simasathien, University of Texas at Arlington; Taichiro Okazaki, hokkaido University Kita;

TESTING SUPPORT CONNECTIONS OF 400 HOLLOW-CORE PRECAST CONCRETE FLOORS (ID 1273) ###FHE Samuel Corney, The University of Auckland; Jason Ingham, The University of Auckland; Rick Henry, The University of Auckland;

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EXPERIMENTAL VERIFICATION OF A ROLLING ISOLATION SYSTEM (ID 1405) ###FFJ Henri Gavin, Duke University; Gerard-Philippe Zehil, Duke University; P. Scott Harvey, Duke University;

Concurrent Oral Sessions



WEDNESDAY, JULY 23

10:30 am - 12:00 pm W01. The Canterbury Earthquake Sequence: Observations And Implications For Engineering Seismology And Geotechnical Engineering Earthquake Lessons

Tikahtnu A/B, FL3 Dena'ina

MODERATOR: Liam Wotherspoon, University of Auckland

CO-MODERATOR: Russell Green, Virginia Polytechnic Institute and State University

DESCRIPTION: The focus of this session will be on observations made following the Canterbury, New Zealand earthquake sequence and their resulting implications to the state of practice of engineering seismology and geotechnical engineering, both in the Canterbury region and beyond. This session is one of two synergistic sessions on the Canterbury earthquake sequence that is being proposed. The other session is entitled: The Canterbury Earthquake Sequence: Lessons for Response and Recovery and is being proposed by Dave Brunsdon and Ken Elwood. As the name for this latter session implies, it will primarily focus on the lessons learned about response and recovery issues from the Canterbury earthquake sequence. It is envisioned that the two sessions will be held sequentially (in the same room), with this session being held first and immediately followed by the Brunsdon-Elwood session. Also, it is anticipated that some of the presenters from this session will serve as panel members for the Brunsdon-Elwood session. The presenters for this session will be largely invited and papers will be optional. In lieu of submitting a paper to the conference, the presenters may opt to refer to papers that are to be published in the Earthquake Spectra Special Issue on the Canterbury earthquake sequence that is schedule for release in February 2014. An overview of potential presentations and authors is provided below.

GROUND MOTION CHARACTERISTICS OF THE 2010-2011 CANTERBURY EARTHQUAKES (ID ORAL30A) ### BE Brendon Bradley, University of Canterbury;

DEVELOPING RELIABLE DEEP VS PROFILES BENEATH CHRISTCHURCH - NEES RESEARCH (ID ORAL30B)

OVERVIEW OF SELECT LIQUEFACTION TRIGGERING CASE HISTORIES (ID ORAL30C) How BE Russell Green, Virginia Polytechnic Institute and State University;

PERFORMANCE OF FOUNDATIONS FOR RESIDENTIAL STRUCTURES (ID ORAL30D) HE Sjoerd Van Ballegooy, Tonkin & Taylor Ltd.;

LATERAL SPREADING-INDUCED DAMAGE TO SHORT-SPAN BRIDGES IN CHRISTCHURCH (ID ORAL30F) IN CHRISTCHURCHURCH

PERFORMANCE OF UNDERGROUND INFRASTRUCTURE (ID ORAL30G)

10:30 am - 12:00 pm **W02. The SAFRR Tsunami Scenario: The Use Of Science In Tsunami Decision Making** Soil/Tsunami Tikahtnu E/F, FL3 Dena'ina

MODERATOR: Stephanie Ross, USGS

CO-MODERATOR: Keith Porter, University of Colorado at Boulder

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DESCRIPTION: The SAFRR Tsunami Scenario is a hypothetical depiction of a M9.1 earthquake near the Aleutian Islands and the effects of the resulting tsunami on the people and the built and natural environment of coastal California. The scenario asks the question, how can the physical, engineering, environmental, ecological, and social sciences help coastal communities improve their resilience to tsunamis? Like the ShakeOut and ARkStorm scenarios before it, the Tsunami Scenario focuses on stakeholders: who are they, what measures of hazard, damage, loss, or other impacts do they care about, and how can the USGS and its partners in its Science Application for Risk Reduction (SAFRR) project provide answers to help make risk-management decisions? Stakeholders included major ports, marinas, coastal communities, firefighters and other public and private emergency managers, Caltrans, and people concerned with environmental and macroeconomic impacts of tsunamis. Panelists will discuss these topics, summarizing our data, methodologies and results. We will discuss the mitigation and preparedness efforts underway as a result of the scenario, and discuss the implications of the scenario for research and public policy.

OVERVIEW OF THE USGS SAFRR TSUNAMI SCENARIO (ID ORAL32A) #### DE Stephanie Ross, U.S. Geological Survey;

ENGINEERING AND ECONOMIC LESSONS OF THE SAFRR TSUNAMI SCENARIO (ID 809) A Keith Porter, CU Boulder; Anne Wein, USGS;

USE OF TSUNAMI SCENARIOS TO MINIMIZE OVER-EVACUATIONS FROM TSUNAMIS (ID ORAL32B)

PUBLIC POLICY ISSUES RAISED BY THE SAFRR TSUNAMI SCENARIO (ID ORAL32C) AND THE Laurie Johnson, Laurie Johnson Consulting/Research;

EVALUATION OF THE SAFRR TSUNAMI SCENARIO (ID ORAL32D)

CALIFORNIA STATE TSUNAMI MITIGATION EFFORTS (ID ORAL32E)

10:30 am - 12:00 pm **W03. Structural Collapse I** Buildings - New Tikahtnu C, FL3 Dena'ina

MODERATOR: Curt Haselton, Chico State University

SEISMIC COLLAPSE PREVENTION SYSTEM (ID 63) ###F F Johnn Judd, Virginia Tech; Finley Charney, Virginia Tech;

INTERMEDIATE-STORY COLLAPSE TEST OF REINFORCED CONCRETE BUILDINGS BY SUBSTRUCTURE PSEUDO-DYNAMIC METHOD (ID 101) III G

Takaya Nakamura, Niigata University; Manabu Yoshimura, Tokyo Metropolitan University;

NUMERICAL FRAMEWORK FOR SEISMIC COLLAPSE ASSESSMENT OF RIGID WALL FLEXIBLE DIAPHRAGM STRUCTURES (ID 282)

Maria Koliou, University at Buffalo, The State University of New York; Andre Filiatrault, University at Buffalo, The State University of New York; Dominic J. Kelly, Simpson Gumpertz & Heger; John Lawson, California Polytechnic State University, San Luis Obispo;

APPLICATION OF A COLLAPSE CAPACITY METHODOLOGY TO MOMENT RESISTING FRAMES WITH HIGH STRENGTH MATERIALS (ID 486) METH I Birhanu Bishaw, University of Utah; Luis Ibarra, University of Utah;

EFFICIENT COLLAPSE RISK ASSESSMENT FOR PERFORMANCE-BASED EARTHQUAKE ENGINEERING (ID 1468) ##### I Í Eduardo Miranda, Stanford University; Dimitrios Lignos, McGill University; Helmut Krawinkler, Stanford University; Laura Eads, Stanford University;

COLLAPSE ASSESSMENT OF MULTI-STORY BUILDINGS THROUGH HYBRID TESTING - NEES RESEARCH (ID 1472) **HEAD Eduardo Miranda, Stanford University**; Benjamin Fell, California State University, Sacramento; Dimitrios Lignos, McGill University; Gilberto Mosqueda, University of California, San Diego; Helmut Krawinkler, Stanford University; Javad Hashemi, State University of New York at Buffalo; Laura Eads, Stanford University; Miguel Negrete, University of New Hampshire; Ricardo Medina, University of New Hampshire; Shokoufeh Zargar, University of New Hampshire;

10:30 am - 12:00 pm **W04. Seismic Isolation I** Seismic Isolation Tikahtnu D, FL3 Dena'ina



WEDNESDAY, JULY 23

MODERATOR: Charlie Kircher, Kircher & Associates

EXPERIMENTAL STUDY ON BASIC CHARACTERISTICS AND FATIGUE PROPERTIES OF LEAD DAMPER FOR SEISMIC ISOLATION SYSTEM (ID 96)

Keiko Morita, Fukuoka University; Akira Yasunaga, Sumitomo Metal Mining Siporex Co., Ltd; Mineo Takayama, Fukuoka University;

PERFORMANCE OF TRIPLE-PENDULUM BEARINGS OBSERVED IN A FULL-SCALE SHAKE-TABLE TEST PROGRAM (ID 114)/##FI FÌ **Taichiro Okazaki, Hokkaido University**; Eiji Sato, National Research Institute for Earth Science and Disaster Prevention; Keri Ryan, University of Nevada, Reno; Stephen Mahin, University of California, Berkeley; Tomohiro Sasaki, National Research Institute for Earth Science and Disaster Prevention;

ISOLATION FOR TALL BUILDINGS, A JAPANESE CASE STUDY (ID 327) ISOLATION FOR TALL BUILDINGS, A JAPANESE CASE STUDY (ID 327) ISOLATION FOR TALL BUILDINGS, A JAPANESE CASE STUDY (ID 327) ISOLATION; GJ *Tracy Becker, Kyoto University*; Hiroki Hamaguchi, Takenaka Corporation; Masahiko Higashino, Takenaka Corporation; Masayoshi Nakashima, Kyoto University; Shunji Yamamoto, Takenaka Corporation;

ADVANCES IN LOW-COST SEISMIC ISOLATION WITH RUBBER (ID 422) ###FI HJ Dimitrios Konstantinidis, McMaster University; James Kelly, UC Berkeley;

EXPERIMENTAL INVESTIGATION OF UNBONDED FIBER REINFORCED ELASTOMERIC ISOLATORS WITH MODIFIED SUPPORT GEOMETRY (ID 592) / I € *Niel Van Engelen, McMaster University; Dimitrios Konstantinidis, McMaster University; Michael Tait, McMaster University;*

AMPLIFICATION IN THE RESPONSE OF LRB ISOLATED STRUCTURES DUE TO BIDIRECTIONAL EXCITATIONS DUE TO LEAD CORE HEATING (ID 358)///// F *Ugurhan Akyuz, Middle East Technical University*; *Gokhan Ozdemir, Anadolu University*;

10:30 am - 12:00 pm **W05. New And Novel Structural Systems I** Buildings - Retrofit Board Room, FL2 Dena'ina

MODERATOR: Shih-Ho Chao, The University of Texas at Arlington

MONOTONIC AND CYCLIC EXPERIMENTAL TESTING OF CONCRETE CONFINED WITH SHAPE MEMORY ALLOY SPIRALS (ID 578) **WWF**I I G **Qiwen Chen, University of Illinois at Urbana-Champaign**; Bassem Andrawes, University of Illinois at Urbana-Champaign;

NUMERICAL EVALUATION OF SEISMIC RESPONSE OF BUILDINGS EQUIPPED WITH PROPPED ROCKING WALL SYSTEMS (ID 594)

Afsoon Nicknam, ARUP; Andr Filiatrault, State University of New York at Buffalo;

DEVELOPMENT AND SEISMIC TESTS OF A CROSS-ANCHORED DUAL-CORE SELF-CENTERING BRACE USING STEEL TENDONS AS TENSIONING ELEMENTS (ID 812) III Chung-Che Chou, National Taiwan University;

R = 100? TOWARD CODIFICATION OF CONTROLLED ROCKING STEEL FRAMES (ID 839) ### € Constantin Christopoulos, University of Toronto; Lydell Wiebe, McMaster University;

DEVELOPMENT OF SEISMIC DESIGN PARAMETERS FOR HPFRC AND MULTI-MATERIAL BUILDINGS (ID 873) ### f f Bora Gencturk, University of Houston; Bora Acun, University of Houston; Ibrahim Kaymaz, University of Houston;

10:30 am - 12:00 pm **W06. Earthquake And Tsunami Engineering For Nuclear Plants** Building Safety Kahtnu 1, FL2 Dena'ina

MODERATOR: Peter Yanev, Yanev Associates LLC

THE GIANT TSUNAMI HAD BEEN FORESEEN, BUT WAS NOT INCLUDED IN THE DISASTER DESIGN IN FUKUSHIMA, JAPAN (ID ORAL15A)

USNRC INITIATIVES RELATED TO SEISMIC SAFETY IN AFTERMATH OF THE FUKUSHIMA-DAIICHI EVENT (ID ORAL15C) AND THE FU



COMPARED EFFECTS OF EARTHQUAKES, TSUNAMI AND AIRCRAFT CRASHES ON BASE-ISOLATED NUCLEAR STRUCTURES (ID ORAL15D)

10:30 am - 12:00 pm **W07. Development And Application Of Next-Generation Technical And Stakeholder** Codes and Standards Kahtnu 2, FL2 Dena'ina

MODERATOR: Chris Rojahn, Applied Technology Council

DESCRIPTION: This session will provide an overview of results from ongoing and recently completed federally funded ATC projects to develop and apply next-generation procedures and tools for seismic performance assessment of buildings, including (1) the recently completed FEMA P-58 documents on next-generation procedures and tools for seismic performance assessment of buildings, (2) new stakeholder documents for building owners and occupants to promote use and understanding of the FEMA P-58 technology; (3) related integrated procedures for measuring the environmental benefits of building seismic design and construction; and (4) use of these next-generation tools to benchmark the expected seismic performance of buildings designed and constructed in accordance with existing codes.

FEMA P58 SEISMIC PERFORMANCE ASSESSMENT OF BUILDINGS, VOLUME 1 METHODOLOGY; AND VOLUME 2-IMPLEMENTATION GUIDE (ID 492)///// G Ronald Hamburger, Simpson Gumpertz & Heger, Inc.;

FEMA P-58 PHASE 2 - DEVELOPMENT OF PERFORMANCE-BASED SEISMIC DESIGN CRITERIA (ID 1385) ## **Jon Heintz, Applied Technology Council**; Mike Mahoney, FEMA; Ron Hamburger, Simpson Gumpertz & Heger;

SEISMIC PERFORMANCE ASSESSMENT OF BUILDINGS - METHODOLOGY FOR ASSESSING ENVIRONMENTAL IMPACTS - AN OVERVIEW OF FEMA P58-4 (ID 885)///// I I Anthony Court, A B Court & Associates;

ESTIMATING LOSS OF FUNCTION FOLLOWING AN EARTHQUAKE USING THE FEMA P-58 METHODOLOGY (ID 1086) //// Í J John Gillengerten, Consulting Structural Engineer;

10:30 am - 12:00 pm **W08. Impact Of Seasonal Freezing On Seismic Engineering** Bridges/Lifelines Tubughneng' 3, FL2 Dena'ina

MODERATOR: Sri Sritharan, Iowa State University

CO-MODERATOR: Elmer Marx, Alaska Department of Transportation & Public Facilities

DESCRIPTION: In several high seismic regions around the world that experience seasonal freezing, large to great earthquakes have historically occurred in winter months (e.g., 1811-1812 New Madrid earthquake, 1964 Alaska earthquake and 1995 Kobe earthquake).

SEISMIC BEHAVIOR OF REINFORCED CONCRETE BRIDGE MEMBERS IN FREEZING CONDITIONS (ID 442) ### Î i € Luis Montejo, UPRM; James Nau, North Carolina State University; John Sloan, URS Corp; Lennie Gonzalez, Army Corps; Mervyn Kowalsky, North Carolina State University; Tasnim Hassan, North Carolina State University;

MODELLING THE EFFECTS OF SEASONAL FREEZING ON THE SEISMIC RESPONSE OF BRIDGES (ID 770) ###f 1 F Liam Wotherspoon, The University of Auckland; Michael Pender, The University of Auckland; Sri Sritharan, Iowa State University;

LATERAL RESPONSE OF TEST PILES IN FROZEN AND THAWED GROUND (ID 607) *WWF*Í JG *J. Leroy Hulsey, University of Alaska Fairbanks*; Elmer Marx, Alaska Department of Transportation & Public Facilities; Jacob Horazdovsky, PDC Inc Engineers; Zhaohui Yang, University of Alaska Anchorage;

SEISMIC DESIGN OF LATERALLY LOADED PILES IN FROZEN GROUND (ID 1101) AMARÎ H Zhaohui Yang, University of Alaska Anchorage; Elmer Marx, State of Alaska DOT & PF; Jacob Horazdovsky, University of Alaska Fairbanks; Leroy Hulsey, University of Alaska Fairbanks; Qiang Li, University of Alaska Anchorage;

10:30 am - 12:00 pm **W09. Ground Motion Prediction Equations** Earthquake Hazard Tubughnenq' 4, FL2 Dena'ina



WEDNESDAY, JULY 23

MODERATOR: Yousef Bozorgnia, UC Berkeley

FOURIER SPECTRA AND KAPPA0 (&[KAPPA]0) ESTIMATES FOR ROCK STATIONS IN THE NGA-WEST2 PROJECT (ID 268) ### Î FI **Olga-Joan Ktenidou, ISTerre, Grenoble, France**; Norman A. Abrahamson, University of California, Berkeley; Robert Darragh, Pacific Engineering and Analysis; Tadahiro Kishida, Pacific Earthquake Engineering Research Center; Walter Silva, Pacific Engineering and Analysis;

CAMPBELL-BOZORGNIA NGA-WEST2 HORIZONTAL GROUND MOTION MODEL FOR ACTIVE TECTONIC DOMAINS (ID 395) (ID 3

APPLICABILITY OF THE GROUND MOTION PREDICTION EQUATIONS TO THE 2011 TOHOKU EARTHQUAKE, M9.0, JAPAN (ID 523)

NON-ERGODIC STRONG GROUND MOTION ANALYSIS OF THE CANTERBURY EARTHQUAKES (ID 564)

EFFECT OF SITE RESPONSE ON THE CORRELATION STRUCTURE OF GROUND MOTION RESIDUALS (ID 1091) ###î Î Î Adrian Rodriguez-Marek, Virginia Tech; Maryam Motamed, Virginia Tech;

UPDATED GRAIZER-KALKAN GROUND MOTION PREDICTION EQUATIONS FOR WESTERN UNITED STATES (ID 1097) ###î î î Vladimir Graizer, U.S. Nuclear Regulatory Commission;

10:30 am - 12:00 pm **W10. Post Earthquake Assessment And Response** Post-Earthquake Tubughnenq' 5, FL2 Dena'ina

MODERATOR: Scott Miles, Western Washington University

POST-EARTHQUAKE ALARM SYSTEM BASED ON REAL-TIME CONTINUOUS RESPONSE SPECTRA EXCEEDANCE (ID 51) ###î Î J Derek Skolnik, Kinemetrics; Danny Harvey, BRTT; Kent Lindquist, BRTT; Mathias Franke, Kinemetrics; Mauricio Ciudad-Real, Kinemetrics;

U.S. GEOLOGICAL SURVEYS SHAKECAST: A CLOUD-BASED FUTURE (ID 346) A Geological Survey; Kuo-Wan Lin, U.S. Geological Survey; Loren Turner, Caltrans; Nebi Bekiri, International Atomic Energy Agency;

CAL VIVA: ASSESSING THE SEISMIC VULNERABILITY OF CALIFORNIAS STATE-OWNED BUILDINGS THROUGH PLANNING & ENGINEERING (ID 449) I F ENGINEERING (ID 449) I F Jill Nelson, Cal Poly San Luis Obispo; James Guthrie, Cal Poly San Luis Obispo;

POST-EARTHQUAKE LOSS CALCULATION FOR PACIFIC ISLAND COUNTRIES (ID 882) ## FG Ivan Gomez, AIR Worldwide; Akshay Gupta, AIR Worldwide; Carmine Galasso, Newcastle University; Daniel Duggan, AIR Worldwide;

RAPID ESTIMATE OF GROUND SHAKING INTENSITY BY COMBINING SIMPLE EARTHQUAKE CHARACTERISTICS WITH TWEETS (ID 901)

Mahalia Miller, Stanford University; Lynne Burks, Stanford University; Reza Zadeh, Stanford University;

DEVELOPMENT OF RESPONSE PLAN OF AIRPORT FOR MEGA EARTHQUAKES IN NEPAL (ID 1157) HG **Bishnu Pandey, British Columbia Institute of Technology**; Carlos Ventura, University of British Columbia; Justin Pummell, U.S. Army Corps of Engineers; Pablo Riofrio, Federal Aviation Administration; Sean Dowling, U.S. Army Corps of Engineers;

1:30 pm - 3:00 pm **W11. The Canterbury Earthquake Sequence: Lessons For Response And Recovery** Earthquake Lessons Tikahtnu A/B, FL3 Dena'ina

MODERATOR: Ken Elwood, University of British Columbia

CO-MODERATOR: Dave Brunsdon, Kestrel Group

DESCRIPTION: The focus of this session will be on lessons for future events in North America related to response and recovery.

CANTERBURY EARTHQUAKES - LESSONS FOR NORTH AMERICA: REGULATORY AND OVERVIEW (ID ORAL22A)

CANTERBURY EARTHQUAKES - LESSONS FOR NORTH AMERICA: POST-EARTHQUAKE BUILDING MANAGEMENT (ID ORAL22B)

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Bret Lizundia, Rutherford and Chekene; Peter Wood, NZ Civil Defence and Emergency Management;

POST-EARTHQUAKE BUILDING MANAGEMENT - RECOVERY PHASE (ID 520)

John Hare, Holmes Consulting Group; Jonathan Bray, UC Berkeley; David Brunsdon, Kestrel Group; Des Bull, Holmes Consulting Group; Graeme Beattie, BRANZ; Kevin Mcmanus, McManus Geotech; Mike Stannard, Ministry of Building, Innovation and Employment; Nick Traylen, Geotech Consulting; Rob Jury, Beca;

CANTERBURY EARTHQUAKES - LESSONS FOR NORTH AMERICA: RECOVERY MANAGEMENT AND RESILIENCE (ID ORAL22C) How BE Erica Seville, University of Canterbury; Stephanie Chang, University of British Columbia;

1:30 pm - 3:00 pm **W12. Site Response And Ground Failure** Soil/Tsunami Tikahtnu E/F, FL3 Dena'ina

MODERATOR: Ellen Rathje, The University of Texas at Austin

SEISMIC DISPLACEMENTS FOR THE DOWNTOWN ANCHORAGE SEISMIC RISK ASSESSMENT (ID 78) ### Î İ I Jonathan Bray, University of California, Berkeley; Jennifer Donahue, Geosyntec Consultants;

POST-CYCLIC RECOMPRESSION CHARACTERISTICS OF A CLAY SUBJECTED TO UNDRAINED UNI-DIRECTIONAL AND MULTI-DIRECTIONAL CYCLIC SHEARS (ID 94) A CLAY SUBJECTED TO UNDRAINED UNI-DIRECTIONAL AND **Hiroshi Matsuda, Yamaguchi University**; Do Quang Thien, Hue University of Sciences; Kazuhiro Nakahara, Yamaguchi University; Tran Huu Tuyen, Hue University of Sciences; Tran Thanh Nhan, Hue University of Sciences;

INCORPORATING EPISTEMIC UNCERTAINTIES INTO REGIONAL SEISMIC LANDSLIDE MAPS (ID 804) AMAGENTI I I Yubing Wang, The University of Texas at Austin; Ellen Rathje, The University of Texas at Austin;

MODELING THE SITE RESPONSE OF A DOWNHOLE ARRAY SITE IN ANCHORAGE, ALASKA (ID 951) ###T i i John Thornley, P.E., Golder Associates, Inc.; Utpal Dutta, Ph.D., University of Alaska, Anchorage; Zhaohui Yang, Ph.D., University of Alaska, Anchorage;

SEISMIC RESPONSE OF SHALLOW SITES IN EASTERN US: IMPLICATIONS TO THE STATE OF PRACTICE. (ID 1163) ### J J Sissy Nikolaou, Mueser Rutledge Consulting Engineers; Jesse Richins, Mueser Rutledge Consulting Engineers; Lysandra Lincoln, Mueser Rutledge Consulting Engineers; Menzer Pehlivan, Mueser Rutledge Consulting Engineers; Peter Deming, Mueser Rutledge Consulting Engineers;

APPLICATION OF DISCRETE ELEMENT MODELING FOR SIMULATION OF CYCLIC DIRECT SIMPLE SHEAR RESPONSE OF GRANULAR MATERIALS (ID 1194),∰T € Antone Dabeet, University of British Columbia; Dharma Wijewickreme, University of British Columbia; Peter Byrne, University of British Columbia: Columbia:

1:30 pm - 3:00 pm **W13. Structural Collapse II** Buildings - New Tikahtnu C, FL3 Dena'ina

MODERATOR: Dimitrios Lignos, McGill University

COLLAPSE BEHAVIOR OF STEEL COLUMNS UNDER COMBINED AXIAL AND LATERAL LOADING (ID 463)

INFLUENCE OF MINIMUM BASE SHEAR FORCE ON THE COLLAPSE RESISTANCE OF SUPER-TALL BUILDINGS (ID 514) A G **Xinzheng Lu, Department of Civil Engineering, Tsinghua University**; Lieping Ye, Department of Civil Engineering, Tsinghua University; Xiao Lu, Department of Civil Engineering, Tsinghua University;

RESERVE CAPACITY AND IMPLICATIONS FOR SEISMIC COLLAPSE PREVENTION FOR LOW-DUCTILITY BRACED FRAMES IN

MODERATE SEISMIC REGIONS (ID 1262) ## I I Larry Fahnestock, University of Illinois at Urbana-Champaign; Ali Davaran, Ecole Polytechnique, Montreal; Cameron Bradley, LeMessurier Consultants / Tufts University; Eric Hines, LeMessurier Consultants / Tufts University; Jessalyn Nelson, LeMessurier Consultants / Tufts University; Joshua Sizemore, University of Illinois at Urbana-Champaign; Robert Tremblay, Ecole Polytechnique, Montreal; Thierry Beland, Ecole Polytechnique, Montreal;



WEDNESDAY, JULY 23

1:30 pm - 3:00 pm **W14. Seismic Isolation II** Seismic Isolation Tikahtnu D, FL3 Dena'ina

MODERATOR: Dimitrios Konstantinidis, McMaster University

A CASE STUDY ON THE INITIAL COSTS AND LIFE CYCLE BENEFITS OF BASE ISOLATION FOR A LOW RISE OFFICE BUILDING -NEES RESEARCH (ID 717) Mill 1 J Matthew Cutfield, The University of Auckland; Keri Ryan, University of Nevada, Reno; Quincy Ma, The University of Auckland;

DESIGN AND TESTING OF A GAP DAMPER DEVICE TO MITIGATE RARE EARTHQUAKE POUNDING RESPONSE IN BASE-ISOLATED BUILDINGS (ID 918) (ﷺ È È **Taylor Rawlinson, Auburn University**; Hamed Zargar, University of Nevada, Reno; Justin Marshall, Auburn University; Keri Ryan, University of Nevada, Reno;

ON THE SEISMIC ANALYSIS OF STRUCTURES WITH FRICTION PENDULUM ISOLATORS SUBJECTED TO HORIZONTAL AND VERTICAL GROUND MOTIONS (ID 1084)/## JF Luca Landi, University of Bologna; Gianluca Grazi, University of Bologna; Pier Paolo Diotallevi, University of Bologna;

CORRECTION FACTOR FOR ESTIMATING THE MAXIMUM RELATIVE VELOCITY BASED ON PSEUDO VELOCITY (ID 1144) ###FJ&G Mauricio Sarrazin, University of Chile; Alexis Saez, University of Chile; Maria Moroni, University of Chile;

QUANTIFICATION AND CALIBRATION OF FUSE CAPACITY FOR ELASTOMERIC BRIDGE BEARINGS IN REGIONS WITH HIGH-MAGNITUDE EARTHQUAKES AT LONG RECURRENCE INTERVALS (ID 1152) Intervention of the state
DEVELOPMENT OF A LARGE-SCALE HYBRID SHAKE TABLE AND APPLICATION TO TESTING A FRICTION SLIDER ISOLATION SYSTEM - NEES RESEARCH (ID 1199) ## JG Andreas Schellenberg, UC Berkeley; Stephen Mahin, UC Berkeley; Tracy Becker, McMaster University;

1:30 pm - 3:00 pm **W15. New And Novel Structural Systems II** Buildings - Retrofit Board Room, FL2 Dena'ina

MODERATOR: Matthew Eatherton, Virginia Tech

NUMERICAL AND EXPERIMENTAL ASSESSMENT OF CHEVRON BRACED FRAMES WITH WEAK BEAMS - NEES RESEARCH (ID 961)

Andrew Sen, University of Washington; An-Chien Wu, National Center for Research on Earthquake Engineering; Chao-Hsien Li, National Center for Research on Earthquake Engineering; Charles Roeder, University of Washington; Daniel Sloat, University of Washington; Dawn Lehman, University of Washington; Jeffrey Berman, University of Washington; Keh-Chyuan Tsai, National Taiwan University; Lingli Pan, Tongji University;

PLASTIC HINGE RELOCATION USING THE RC SLOTTED-BEAM COLUMN CONNECTION (ID 816) AMAFJI Í Fadi Oudah, University of Calgary; Raafat El-Hacha, University of Calgary;

MODIFIED STRUCTURAL LAYOUTS FOR STAGGERED TRUSS FRAMING SYSTEMS USED IN SEISMICALLY ACTIVE AREAS - NEES RESEARCH (ID 1126) A THE RESEARCH (ID 1126

Shih-Ho Chao, University of Texas at Arlington; Kevin Moore, Simpson Gumpertz & Heger Inc.; Sanputt Simasathien, University of Texas at Arlington; Taichiro Okazaki, Hokkaido University;

SEISMIC COLLAPSE RESISTANCE OF SELF-CENTERING STEEL MOMENT RESISTING FRAME SYSTEMS - NEES RESEARCH (ID 1208)

James Ricles, Lehigh University; Omid Ahmadi, Lehigh University; Richard Sause, Lehigh University;

USE OF HIGH-STRENGTH REINFORCEMENT FOR EARTHQUAKE-RESISTANT CONCRETE STRUCTURES (ID 1216) ###FJÏ Í **Dominic Kelly, Simpson Gumpertz & Heger, Inc.**; Andres Lepage, University of Kansas; Andrew Taylor, KPFF Consulting Engineers; David Mar, Tipping Mar & Associates; Jose Restrepo, University of California, San Diego; Joseph Sanders, Charles Pankow Builders Ltd;

SEISMIC BEHAVIOR OF SINGLE ANCHORS IN PLASTIC HINGE ZONES OF RC COLUMNS - NEES RESEARCH (ID 1245) *Jian Zhao, University of Wisconsin, Milwaukee*; 10th U.S. National Conference on Earthquake Engineering • Concurrent Oral Sessions



MODERATOR: Vitor Silva, GEM

CO-MODERATOR: Anselm Smolka, GEM

DESCRIPTION: This Special Session will showcase the OpenQuake Platform and related resources that towards the end of 2014 will allow stakeholders worldwide to calculate, visualise and investigate earthquake risk, capture new data and share findings, as basis for increasing risk awareness and resilience to earthquakes. The platform integrates datasets, best-practice, open-source software and tools for holistic seismic risk assessment, that are being developed by hundreds of leading experts and professionals within the scope of the global collaborative Global Earthquake Model (GEM). This session will be chaired by Dr. Ross Stein (USGS) and Dr. Anselm Smolka (Secretary General of the GEM Foundation).

INTRODUCING OPENQUAKE, THE INTERACTIVE PLATFORM FOR COLLABORATIVE EARTHQUAKE RISK ASSESSMENT (ID ORAL27A)

PRESENTATION OF THE MAIN PRODUCTS OF GEM (ID ORAL27B)

DEVELOPMENT OF THE GLOBAL EXPOSURE DATABASE (ID ORAL27C)

DEVELOPMENT OF THE GLOBAL EARTHQUAKE CONSEQUENCES DATABASE (ID ORAL27D) AND EXEMPLY SO, University of Cambridge;

USING GEMS DATASETS TO CALCULATE GLOBAL SEISMIC HAZARD (ID ORAL27E) AND THE Graeme Weatherill, GEM Foundation;

USING GEMS DATASETS TO CALCULATE GLOBAL SEISMIC RISK (ID ORAL27F)

1:30 pm - 3:00 pm W17. Emerging And Newly Available Tools, Guidance, And Proposed Applications For Seismic Hazard Mitigation Codes and Standards

Kahtnu 2, FL2 Dena'ina

MODERATOR: Chris Rojahn, Applied Technology Council

COST-BENEFIT ANALYSIS OF CODES AND STANDARDS FOR EARTHQUAKE-RESISTANT CONSTRUCTION IN MEMPHIS, TENNESSEE (ID 288) ###FJJI Ayse Hortacsu, Applied Technology Council; James Harris, JR Harris and Co.;

ATC-84 PROJECT: IMPROVED SEISMIC PERFORMANCE FACTORS FOR DESIGN OF NEW BUILDINGS (ID 536)

INCORPORATING SOIL-STRUCTURE INTERACTION INTO SEISMIC RESPONSE ANALYSES FOR BUILDINGS (ID 623) *Jonathan Stewart, UCLA*; Bret Lizundia, Rutherford and Chekene; Cb Crouse, URS Corporation; Farhang Ostadan, Bechtel; Farzad Naeim, John A. Martin & Associates, Inc.; George Mylonakis, University of Bristol; Jon Heintz, Applied Technology Council; Michael Givens, UCLA; Tara Hutchinson, UC San Diego;

IDENTIFICATION AND MITIGATION OF COLLAPSE PRONE OLDER CONCRETE BUILDINGS (ATC 78) (ID 753)

RAPID VISUAL SCREENING OF BUILDINGS FOR POTENTIAL SEISMIC HAZARDS: FEMA 154 AND FEMA 155 UPDATES (ID 1027) **Bret Lizundia, Rutherford + Chekene**; Ayse Hortacsu, Applied Technology Council; Barry Welliver, BHW Engineers; Brian Kehoe, Wiss Janney Elstner Associates, Inc.; Keith Porter, SPA Risk, LLC; Michael Griffin, CCS Group, Inc.; Sarah Durphy, Rutherford + Chekene;

1:30 pm - 3:00 pm **W18. Effect Of Ground Deformations On Pipelines** Bridges/Lifelines Tubughnenq' 3, FL2 Dena'ina

MODERATOR: Douglas Nyman, *DJ Nyman & Associates*



WEDNESDAY, JULY 23

DESCRIPTION: The first paper listed above is intended to be a general paper summarizing how TAPS was the first oil pipeline designed for seismic hazard mitigation and how it influenced development of the seismic engineering methodology for future projects.

DESIGN OF WELDED STEEL PIPELINE CROSSINGS OF THRUST FAULTS (ID 628) *A* (ID 628)

RESPONSE OF BURIED PIPELINES SUBJECTED TO GROUND DISPLACEMENTS UNDER DIFFERENT TRENCH BACKFILL CONDITIONS (ID 788) (ID 7

REGIONAL PIPELINE VULNERABILITY ASSESSMENT BASED UPON PROBABILISTIC LATERAL SPREAD HAZARD CHARACTERIZATION (ID 1022) (Consulting) G G Douglas Honegger, D.G. Honegger Consulting; Dharma Wijewickreme, University of British Columbia; Leslie Youd, Brigham Young University;

JOINTED PIPELINE RESPONSE TO EARTHQUAKE INDUCED GROUND DEFORMATION (ID 202) AMAGE H Brad Wham, Cornell University; Christina Argyrou, Cornell University; Dimitra Bouziou, Cornell University; Harry E. Stewart, Cornell University; Thomas D. Orourke, Cornell University; Timothy Bond, Cornell University;

1:30 pm - 3:00 pm **W19. Ground Motion Simulations** Earthquake Hazard Tubughnenq' 4, FL2 Dena'ina

MODERATOR: Jack Baker, Stanford University

SPECTRAL VARIABILITY AND ITS RELATIONSHIP TO STRUCTURAL RESPONSE ESTIMATED FROM SCALED AND SPECTRUM-MATCHED GROUND MOTIONS (ID 1200) A control of a contract of the control
SIMULATION OF ORTHOGONAL HORIZONTAL COMPONENTS OF NEAR-FAULT GROUND MOTIONS FOR SPECIFIED EARTHQUAKE SOURCE AND SITE CHARACTERISTICS (ID 229) IMAGEJÍ Mayssa Dabaghi, University of California, Berkeley; Armen Der Kiureghian, University of California, Berkeley;

DEVELOPMENT OF GROUND MOTION MODELS COMPATIBLE WITH GROUND MOTION PREDICTION EQUATIONS (ID 762)

EVALUATION OF SPECTRUM COMPATIBLE EARTHQUAKE RECORDS AND ITS EFFECT ON THE INELASTIC DEMAND OF CIVIL STRUCTURES (ID 777) ###CFFi Luis Montain, L. of Buarta Rico at Mayaguar: Barron Gascot, LL of Buarta Rico at Mayaguar:

Luis Montejo, U. of Puerto Rico at Mayaguez; Ramon Gascot, U. of Puerto Rico at Mayaguez;

SPECTRUM-COMPATIBLE SYNTHETIC TIME HISTORIES FOR CENTRAL AND EASTERN US USING A NEW HYBRID GROUND MOTION SIMULATION TECHNIQUE (ID 1100) MCFH Alireza Shahjouei, The University of Memphis; Shahram Pezeshk, The University of Memphis;

SIMULATION OF NEAR-FAULT GROUND MOTIONS USING FREQUENCY-DOMAIN DISCRETIZATION (ID 1487) AMAGENUM Marco Broccardo, UC Berkeley; Armen Der Kiureghian, UC Berkeley;

1:30 pm - 3:00 pm W20. Remote Sensing Technologies For Seismic Hazard Mapping And Post-disaster Response Post-Earthquake

Tubughnenq' 5, FL2 Dena'ina

MODERATOR: ZhiQiang Chen, University of Missouri System

LATERAL SPREAD DEFORMATIONS FROM THE 2011 CHRISTCHURCH, NEW ZEALAND EARTHQUAKE MEASURED FROM SATELLITE IMAGES AND OPTICAL IMAGE CORRELATION (ID 1142) A CORRELATION (ID 1142) FIELD Rathje, University of Texas; Jonathan Martin, University of Texas;

PREDICTIVE SEISMICALLY-INDUCED LANDSLIDE HAZARD MAPPING IN OREGON USING A MAXIMUM ENTROPY MODEL (MAXENT) (ID 917) ∰ €

Matt Obanion, Oregon State University; Michael Olsen, Oregon State University;

POST-EARTHQUAKE RECOVERY PLANNING: UNDERSTANDING AND SUPPORTING DECISION MAKING USING SCENARIO PLANNING (ID 1158)

Steve Platt, Cambridge Architectural Research Ltd.; Emily So, University of Cambridge; Enrica Verrucci, ImageCat Ltd.; John Bevington, ImageCat Ltd.; Massimiliano Pittore, Helmholtz-Centre Potsdam - German Research Centre for Geosciences (GFZ);



TESTING NATIONAL AND REGIONAL GEOSPATIAL LIQUEFACTION MODELS IN THE UNITED STATES (ID 1476)

A MICRO-UAV APPROACH TO EARTHQUAKE DISASTER SENSING: A CRITICAL REVIEW (ID 149)

CONSIDERING TOPOGRAPHY WHEN MAPPING LIQUEFACTION HAZARD WITH THE LIQUEFACTION POTENTIAL INDEX (ID 417) ###GGF€ Daniel Gillins, Oregon State University;

3:30 pm - 5:00 pm **W21. Aftershock Risks And Its Implication Due To The Recent Events In New Zealand And Japan** Earthquake Lessons Tikahtnu A/B, FL3 Dena'ina

MODERATOR: Nilesh Shome, RMS

CO-MODERATOR: Nicolas Luco USGS; Matt Gerstenberger GNS Science,

DESCRIPTION: A pair of talks on 1) aftershock hazard by seismologists 2) structural fragility/vulnerability including aftershocks, by structural engineers, 3) and incorporation of aftershocks in risk assessment, by risk modelers. Each pair of talks will be followed by discussion on issues based on the expertise of the speakers and those discussions will be moderated by one of the session chairs.

CONSIDERATION OF EARTHQUAKE TRIGGERING IN AN OPERATIONAL EARTHQUAKE FORECAST MODEL FOR CALIFORNIA (UCERF3) (ID ORAL28A) ## DE Nod Field United States Coolegical Survey:

Ned Field, United States Geological Survey;

EARTHQUAKE HAZARD FROM BOTH INDEPENDENT AND DEPENDENT EVENTS (ID ORAL28B)
TIME-DEPENDENT HAZARD FOR CANTERBURY, NEW ZEALAND AND MODELING OF EXPECTED GROUND MOTIONS (ID ORAL28C), Mille DE Matt Gerstenberger, GNS Science;

AFTERSHOCK RISKS SUCH AS THOSE DEMONSTRATED BY THE RECENT EVENTS IN NEW ZEALAND AND JAPAN (ID 1068) **Nilesh Shome, Risk Management Solutions**; Abbie Leil, University of Colorado - Boulder; John W. Van De Lindt, Colorado State University; Matt Gerstenberger, GNS Science; Ned (Edward) Field, United States Geological Survey; Nicolas Luco, United States Geological Survey; Oliver Boyd, United States Geological Survey;

3:30 pm - 5:00 pm **W22. PANEL: Ground Improvement Impact On Seismic Response Of Foundations And Structures** Soil/Tsunami Tikahtnu E/F, FL3 Dena'ina

MODERATOR: Muralee Muraleetharan, University of Oklahoma

CO-MODERATOR: Sri Sritharan, Iowa State University



WEDNESDAY, JULY 23

DESCRIPTION: We propose to bring together a panel of academics, practicing engineers, and ground improvement experts, covering both structural and geotechnical disciplines, and have short presentations and a lively discussion of issues related to research, education, and practice of seismic ground improvement and it benefits to seismic behavior of structures. The topics to be discussed will include: unique experimental research using NEES equipment, NEEShub and its role in seismic ground improvement research, design and construction of pile foundations in weak soils, soil-pile-structure interactions, soil-structure interaction education at undergraduate and graduate levels, and innovative soil-structure interaction educational modules for K-12 and undergraduate students.

ENHANCING SEISMIC RESPONSE OF FOUNDATIONS AND STRUCTURES THROUGH GROUND IMPROVEMENT: RESEARCH, EDUCATION, AND PRACTICE PANEL - NEES RESEARCH (ID ORAL7A) Amy Cetaro, University of Oklahoma; Arul K. Arulmoli, Earth Mechanics, Inc.; Elmer E. Marx, Alaska DOT&PF; Juan I. Baez, AGI; Kyle Rollins, Brigham Young University; Lee Marsh, Berger ABAM;

3:30 pm - 5:00 pm W23. Reinforced Concrete Shear Wall Buildings: Experimental Studies Structural Systems Tikahtnu C, FL3 Dena'ina

MODERATOR: Leonardo Massone, University of Chile

LARGE-SCALE TESTING OF STEEL REINFORCED CONCRETE (SRC) COUPLING BEAMS EMBEDDED INTO REINFORCED CONCRETE SHEAR WALLS (ID 703) Christopher Motter, UCLA; Dave Fields, Magnusson Klemencic Associates; John Hooper, Magnusson Klemencic Associates; John Wallace, UCLA; Ron Klemencic, Magnusson Klemencic Associates;

2010 E-DEFENSE FOUR-STORY REINFORCED CONCRETE AND POST-TENSIONED CONCRETE BUILDINGS - COMPARATIVE STUDY OF EXPERIMENTAL AND ANALYTICAL RESULTS - NEES RESEARCH (ID 805) ###GG I Zeynep Tuna, Istanbul Technical University; John Wallace, University of California, Los Angeles; Sofia Gavridou, University of California, Los Angeles; Taizo Matsumori, National Research Institute for Earth Science and Disaster Prevention; Takuya Nagae, National Research Institute for Earth Science and Disaster Prevention;

TESTS AND ANALYSES FOR SEISMIC PERFORMANCE EVALUATION OF R/C SHEAR WALLS FAIL IN BENDING WITH CONCRETE CRUSHING (ID 1303)

Naoki Yamamoto, Osaka University; Sohei Matsubara, Toyohashi University of Technology; Yasushi Sanada, Osaka University;

EXPERIMENTAL STUDY ON SEISMIC PERFORMANCE OF REINFORCED CONCRETE COUPLING BEAMS WITH DOUBLE-BEAM REINFORCEMENT LAYOUT (ID 1322) AND GÎ Î

Shih-Ho Chao, The University of Texas at Arlington; Pourya Alikhani, The University of Texas at Arlington;

EXPERIMENTAL STUDIES OF LONGITUDINAL REINFORCEMENT BUCKLING IN REINFORCED CONCRETE STRUCTURAL WALL BOUNDARY ELEMENTS - NEES RESEARCH (ID 1608) AMGG I Christopher Hilson, UCLA; Christopher Segura, UCLA; John Wallace, UCLA;

SEISMIC BEHAVIOR OF REINFORCED CONCRETE STRUCTURAL WALLS BASED ON THE JAPANESE DOMESTIC RESEARCH EFFORTS (ID 2) AMAGE Ì

Susumu Kono, Tokyo Institute of Technology; Hiroshi Fukuyama, Building Research Institute; Masanobu Sakashita, Kyoto University; Masanori Tani, Building Research Institute; Minehiro Nishiyama, Kyoto University; Susumu Takahashi, Nagoya Institute of Technology; Toshikatsu Ichinose, Nagoya Institute of Technology; Toshimi Kabeyasawa, The University of Tokyo; Yasushi Sanada, Osaka University;

3:30 pm - 5:00 pm W24. Seismic Isolation III Seismic Isolation Tikahtnu D, FL3 Dena'ina

MODERATOR: Ian Aiken, Seismic Isolation Engineering Inc.

RESEARCH AND DEVELOPMENT OF STEEL DAMPERS FOR BASE-ISOLATED STRUCTURES (NO. 3: HYSTERETIC BEHAVIOR AND PLASTIC DEFORMATION CAPACITY OF U-SHAPED STEEL DAMPERS UNDER 2D RANDOM LOADING HISTORIES) (ID 1256) Diana Ene, Tokyo Institute of Technology; Norihisa Kawamura, Nippon Steel & Sumikin Engineering Co., Ltd.; Satoshi Yamada, Tokyo Institute of Technology; Shoichi Kishiki, Osaka Institute of Technology; Yoshinao Konishi, Nippon Steel & Sumikin Engineering Co., Ltd.; Yuma Hoashi, Nippon Steel & Sumikin Engineering Co., Ltd.;

RESEARCH AND DEVELOPMENT OF STEEL DAMPERS FOR BASE-ISOLATED STRUCTURES (NO. 4: EVALUATION METHODS OF RESIDUAL FATIGUE LIFE OF U-SHAPED STEEL DAMPERS AFTER EXTREME EARTHQUAKE EXCITATION) (ID 1260) Masao Terashima, Nippon Steel & Sumikin Engineering Co., Ltd.; Diana Ene, Tokyo Institute of Technology; Norihisa Kawamura, Nippon Steel & Sumikin Engineering Co., Ltd.; Satoshi Yamada, Tokyo Institute of Technology; Shoichi Kishiki, Osaka Institute of Technology; Yoshinao Konishi, Nippon Steel & Sumikin Engineering Co., Ltd.; Yu Jiao, Tokyo University of Science;

SEISMIC RESPONSE OF THE CHRISTCHURCH WOMENS HOSPITAL ON 23 DEC 2011 - NEES RESEARCH (ID 1398) Henri Gavin, Duke University: Goeff Rodgers, University of Canterbury; Max Coar, Duke University; Robert Nigbor, UCLA; Stefanie Gutschmidt, University of Canterbury;

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INFLUENCE OF SITE EFFECTS AND SOIL-STRUCTURE INTERACTION ON SEISMIC ISOLATION OF BUILDINGS ON SOFT SOILS (ID 1437)

Luis Eduardo Perez Rocha, Instituto de Investigaciones Electricas; Arturo Tena Colunga, Universidad Autonoma de Mexico; Cuauhtemoc Cordero Macias, Comsion Federal de Electricidad; Javier Aviles Lopez, Instituo Mexicano de Tecnologia del Agua;

RESPONSE OF HYBRID ISOLATION SYSTEM DURING A SHAKE TABLE EXPERIMENT OF A FULL SCALE SEISMICALLY ISOLATED BUILDING - NEES RESEARCH (ID 1458) H Camila Coria, University of Nevada, Reno; Keri Ryan, University of Nevada, Reno;

EFFECT OF ISOLATOR INSTABILITY ON THE PERFORMANCE OF SEISMICALLY ISOLATED CURVED BRIDGE (ID 1580) ###GH I Eric Monzon, University of Nevada Reno; Ahmad Itani, University of Nevada Reno; Ian Buckle, University of Nevada Reno;

3:30 pm - 5:00 pm **W25. New And Novel Structural Systems III** Buildings - Retrofit Board Room, FL2 Dena'ina

MODERATOR: Lindsey Maclise, Forell/Elsesser Engineers Inc.

HIGH-PERFORMANCE FIBER REINFORCED CONCRETE COUPLING BEAMS: FROM RESEARCH TO PRACTICE - NEES RESEARCH (ID 1344)

Gustavo Parra-Montesinos, University of Wisconsin-Madison; Antonio Conforti, University of Brescia; Cary Kopczynski, Cary Kopczynski & Co.; James K. Wight, University of Michigan; Joe Ferzli, Cary Kopczynski & Co.; Monthian Setkit, University of Michigan; Remy Lequesne, University of Wisconsin-Madison;

SELF-CENTERING BUCKLING RESTRAINED BRACE DEVELOPMENT AND APPLICATION FOR SEISMIC RESPONSE MITIGATION (ID 1373)

Matthew Eatherton, Virginia Tech; David Miller, Degenkolb Engineers; Larry Fahnestock, University of Illinois Urbana-Champaign;

RESPONSE OF A HYBRID SMA REINFORCED CONCRETE SHEAR WALL (ID 1481) ###CHÌ Î Dan Palermo, York University; Alaa Abdulridha, University of Ottawa;

CYCLIC BEHAVIOR OF STEEL SHEAR LINKS USED IN REPLACEABLE COUPLING BEAMS (ID 1731) AMAGUI Xiaodong Ji, Tsinghua University; Qifeng Ma, Tsinghua University; Taichiro Okazaki, Hokkaido University; Yandong Wang, Tsinghua University;

CYCLIC BEHAVIOR OF DEEP SLENDER WIDE-FLANGE STEEL BEAM-COLUMNS ?UNDER COMBINED LATERAL DRIFT AND AXIAL LOAD (ID 887) A log and log an

HYSTERETIC BEHAVIOR OF H STEEL COLUMNS WITH LARGE WIDTH-THICKNESS RATIO UNDER BI-AXIS MOMENTS (ID 1756) (

3:30 pm - 5:00 pm **W26. Emerging Tools In Seismic Risk Assessment** Building Safety Kahtnu 1, FL2 Dena'ina

MODERATOR: Judith Mitrani-Reiser, Johns Hopkins University

RAPID ASSESSMENT OF EARTHQUAKE DAMAGE USING STRONG GROUND MOTION MAPS PROVIDED BY QUIQUAKE (ID 154) **Million IF Nobuoto Nojima, Gifu University**; Maki Koyama, Kyoto University; Masashi Matsuoka, Tokyo Institute of Technology;

PRESENTATION OF THE OPENQUAKE-ENGINE (RISK), AN OPEN SOURCE SOFTWARE FOR SEISMIC HAZARD AND RISK ASSESSMENT (ID 1610) ### I G Vitor Silva, GEM Foundation; Catalina Yepes, GEM Foundation; Helen Crowley, GEM Foundation; Rui Pinho, GEM Foundation;

A FRAMEWORK AND CASE STUDY FOR URBAN SEISMIC RISK FORECASTING (ID 1149) A G David Lallemant, Stanford University; Anne Kiremidjian, Stanford University; Kristhian Morales, Stanford University; Steven Wong, Stanford University;

SEISMIC LOSS EVALUATION FOR STRUCTURES IN DIFFERENT GEOGRAPHIC LOCATIONS (ID 908) (ID 908) A H Sanaz Saadat, The University of Memphis; Charles Camp, The University of Memphis; Shahram Pezashk, The University of Memphis;

MATH MODELING TO SUPPORT REGIONAL NATURAL DISASTER RISK MANAGEMENT (ID 1597) AMAGEMENT
A METHOD FOR THE RISK ASSESSMENT OF BUILDINGS DUE TO MULTIPLE HAZARD SOURCES AND CORRELATED FAILURE MODES (ID 1154)



WEDNESDAY, JULY 23

Miguel Jaimes, Instituto de Ingenier; Eduardo Reinoso, Instituto de Ingenier; Luis Esteva, Instituto de Ingenier;

3:30 pm - 5:00 pm **W27. Seismic Performance Assessment Of Existing Or New Buildings Using ASCE 41** Codes and Standards Kahtnu 2, FL2 Dena'ina

MODERATOR: Jay Harris, National Institute of Standards and Technology

CHANGES IN AND FUTURE DIRECTIONS OF ASCE 41-13 (ID 1131)

NONLINEAR ANALYSIS IN ACCORDANCE WITH ASCE 7-16 (PROPOSED) AND ASCE 41-13: COMPATIBILITIES, INCOMPATIBILITIES, AND NEEDED FUTURE WORK (ID 1715)

RECOMMENDED MODIFICATIONS TO THE SEISMIC ASSESSMENT PROVISIONS FOR STEEL FRAMES IN ASCE 41 (ID ORAL19A) How the Jay Harris, National Institute of Standards & Technology;

RECOMMENDED MODIFICATIONS TO THE SEISMIC ASSESSMENT PROVISIONS FOR CONCRETE SYSTEMS IN ASCE 41 (ID ORAL19B) # DE Jeff Dragovich, Consulting Structural Engineer;

3:30 pm - 5:00 pm **W28. Assessment And Design Of Curved And Skewed Brdiges** Bridges/Lifelines Tubughnenq' 3, FL2 Dena'ina

MODERATOR: David Sanders, University of Nevada Reno

EXPERIMENTAL EVALUATION OF SEISMIC PERFORMANCE OF SEAT-TYPE ABUTMENTS IN A CURVED HIGHWAY BRIDGE -NEES RESEARCH (ID 581)

Joseph Wieser, University of Nevada, Reno; Ian Buckle, University of Nevada, Reno; Manos Maragakis, University of Nevada, Reno;

Marios Panagiotou, University of California at Berkeley; Andreas Gerasimos Gavras, University of California at Davis; Andrew Sander, University of California at San Diego; Bruce Lloyd Kutter, University of California at Davis; Gabriele Guerrini, University of California at San Diego; Grigorios Antonellis, University of California at Berkeley; Patrick J Fox, University of California at San Diego;

IN-PLANE ROTATIONAL DEMANDS OF SKEWED BRIDGES DUE TO EARTHQUAKE INDUCED POUNDING (ID 1299) **Seku Catacoli, The University of British Columbia**; Carlos Ventura, The University of British Columbia; Mahdi Taiebat, The University of British Columbia; W.D. Liam Finn, The University of British Columbia;

NUMERICAL ANALYSIS OF A HORIZONTALLY CURVED BRIDGE MODEL (ID 1528) MC GJ Koji Kinoshita, gifu university; David Sanders, University of Nevada, Reno; Hartanto Wibowo, University of Nevada, Reno; Ian Buckle, University of Nevada, Reno;

SEISMIC-RESISTANT, ABC CONNECTION BETWEEN PRECAST CONCRETE COLUMNS AND DRILLED SHAFTS (ID 1556) Hint **Hung Tran, University of Washington**; John Stanton, University of Washington; Lee Marsh, BergerABAM Inc.; Marc Eberhard, University of Washington;

A NEW LOOK AT STRAIN LIMITS AND PLASTIC HINGE LENGTHS FOR REINFORCED CONCRETE BRIDGE COLUMNS (ID 128) AMME I I Chad Goodnight, North Carolina State University; James Nau, North Carolina State University; Mervyn Kowalsky, North Carolina State University;

3:30 pm - 5:00 pm **W29. Ground Motions And Structural Response** Earthquake Hazard Tubughnenq' 4, FL2 Dena'ina

MODERATOR: Brendon Bradley, University of Canterbury

FLING IN NEAR-FAULT GROUND MOTIONS AND ITS EFFECT ON STRUCTURAL COLLAPSE CAPACITIY (ID 190)

HAZARD-CONSISTENT GROUND MOTION DURATION: CALCULATION PROCEDURE AND IMPACT ON STRUCTURAL COLLAPSE RISK (ID 682) (1)

Reagan Chandramohan, Stanford University; Gregory Deierlein, Stanford University; Jack Baker, Stanford University;

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CHARACTERIZATION AND REPRESENTATION OF PULSE-LIKE GROUND MOTIONS USING WAVELET-BASED CUMULATIVE PULSE EXTRACTION (ID 348) MG I I Yuan Lu, University of California, Berkeley; Marios Panagiotou, University of California, Berkeley;

MODAL PUSHOVER-BASED GROUND MOTION SCALING PROCEDURE FOR UNSYMMETRIC-PLAN MULTI-STORY BUILDINGS (ID 391)

Jua[']n Reyes, Universidad de los Andes, Bogota, Colombia; Andrea Ria, Universidad de los Andes, Bogota, Colombia; Carlos Arango, Universidad de los Andes, Bogota, Colombia; Erol Kalkan, United States Geological Survey;

SCENARIO-BASED GROUND-MOTION SELECTION USING THE GENERALIZED CONDITIONAL INTENSITY MEASURE (GCIM) APPROACH (ID 635)

Karim Tarbali, University of Canterbury; Brendon Bradley, University of Canterbury;

3:30 pm - 5:00 pm **W30. Damage Assessment** Post-Earthquake Tubughnenq' 5, FL2 Dena'ina

MODERATOR: Kishor Jaiswal, Synergetics Inc

ENHANCED RAPID POST-EVENT ASSESSMENT OF BUILDINGS (ID 50) AMAG G€

Derek Skolnik, Kinemetrics; Ahmed Almarri, Abu Dhabi Municipality; Ali Shaaban Megahed, Abu Dhabi Municipality; Craig Goings, SGH; Dave Swanson, Reid Middleton; Erdal Safak, Kandilli Institute; Mark Sinclair, Degenkolb Engineers; Mauricio Ciudad-Real, Kinemetrics; Tim Graf, Degenkolb Engineers; Yavuz Kaya, Kandilli Institute;

PROGRESSIVE DAMAGE ACCUMULATION AND FATIGUE CONSIDERATIONS IN STRUCTURES SUBJECTED TO AN EARTHQUAKE AND AFTERSHOCK SEQUENCE (ID 910)/###C I G Geoffrey Rodgers, University of Canterbury; John Mander, Texas A&M University;

REVISION OF GUIDELINE FOR POST-EARTHQUAKE DAMAGE EVALUATION OF RC BUILDINGS IN JAPAN (ID 942) AMAGE I H Masaki Maeda, Tohoku University; Kazuto Matsukawa, University of tokyp; Yoshihiro Ito, Tohoku University;

POSTEARTHQUAKE SAFETY EVALUATION PROCEDURES FOR BHUTAN (ID 1400) ### î I

Janise Rodgers, GeoHazards International; Ayse Hortascu, Applied Technology Council; Bret Lizundia, Rutherford + Chekene; Karma Tshering, GeoHazards International; Sonam Yangdhen, Ministry of Works and Human Settlements, Royal Government of Bhutan; Yeshey Lotay, Ministry of Home and Cultural Affairs, Royal Government of Bhutan;

Concurrent Oral Sessions



THURSDAY, JULY 24

10:30 am - 12:00 pm **TH01. Reinforced Concrete Shear Wall Buildings: Behavior And Modeling I** RC Shear Wall Buildings

Tikahtnu A/B, FL3 Dena'ina

MODERATOR: Perry Adebar, University of British Columbia

EFFECTS OF BI-DIRECTIONAL LATERAL LOADINGS ON STRENGTH AND DEFORMABILITY OF REINFORCED CONCRETE WALLS WITH/WITHOUT BOUNDARY COLUMNS (ID 143)

Toshimi Kabeyasawa, University of Tokyo; Hiroshi Fukuyama, Building Research Institute; Masanori Tani, Building Research Institute; Mitsuharu Sato, Univesity of Tokyo; Shuji Kato, Univesity of Tokyo; Toshikazu Kabeyasawa, National Institute for Land and Infrastructure Management,; Youji Hosokawa, Univesity of Tokyo; Yousok Kim, Yonsei University;

SEISMIC PERFORMANCE AND MODELING OF POST-TENSIONED, PRECAST CONCRETE SHEAR WALLS (ID 470) MiG Ì I **Ahmet Can Tanyeri, University of California Berkeley**; Jack P. Moehle, University of California Berkeley; Takuya Nagae, National Research Institute for Earth Science and Disaster Prevention;

LATERAL BUCKLING IN REINFORCED CONCRETE WALLS (ID 493) MMC JÍ Pablo Parra, University of California Berkeley; Jack Moehle, University of California Berkeley;

EFFECTS OF END REGION CONFINEMENT ON SEISMIC PERFORMANCE OF RC CANTILEVER WALLS (ID 725) **###G** *Rafik Taleb, Tokyo Institute of Technology; Masanobu Sakashita, Kyoto University; Masanori Tani, Building Research Institute; Susumu Kono, Tokyo Institute of Technology;*

LATERAL LOAD BEHAVIOR OF A POST-TENSIONED COUPLED CORE WALL - NEES RESEARCH (ID 842) MCG FI Steven Barbachyn, University of Notre Dame; Kristen Peterson, Lehigh University; Michael Mcginnis, University of Texas at Tyler; Richard Sause, Lehigh University; Yahya Kurama, University of Notre Dame;

SHEAR DEMANDS OF STRUCTURAL WALLS (ID 977) *imid* G G Standard Control of California, Los Angeles; Sunai Kim, University Sunai Kim, University, Sunai Kim, Sunai

10:30 am - 12:00 pm **TH02. Highlights Of Recent U.S. Japan Collaborative NEES/E-Defense Projects** NEES Programs Tikahtnu E/F, FL3 Dena'ina

MODERATOR: Keri Ryan, University of Nevada Reno

DESCRIPTION: This session will use the traditional format of complementary presentations by a variety of speakers. In the session, one representative each from Japan and the U.S. will deliver coordinated presentations on recent E-Defense projects with a significant U.S. Japan collaborative component in each of the following areas: 1) high-performance reinforced concrete buildings, 2) underground structures, and 3) base-isolated buildings.

THE 2010 E-DEFENSE SHAKING TABLE TEST ON FOUR-STORY REINFORCED CONCRETE AND POST-TENSIONED CONCRETE BUILDINGS - NEES RESEARCH (ID 795)/### HJ

Takuya Nagae, National Research Institute for Earth Science and Disaster Prevention; Hitoshi Shiohara, The University of Tokyo; Jack Moehle, UC Berkeley; John Wallace, UCLA; Minehiro Nishiyama, Kyoto University; Richard Sause, Lehigh University; Susumu Kono, Tokyo Institute of Technology; Taizo Matsumori, National Research Institute for Earth Science and Disaster Prevention; Toshimi Kabeyasawa, The University of Tokyo; Wassim Ghannoum, The University of Texas at Austin;

LATERAL SOIL PRESSURES MEASURED AT THE 2012 SSI EXPERIMENT OF UNDERGROUND STRUCTURES IN MEDIUM DENSE SAND AT E-DEFENSE, JAPAN - NEES RESEARCH (ID ORAL4B) ### BE Anne Lemnitzer, UC Irvine ;

INFLUENCE OF VERTICAL EXCITATION IN THE NEES/E-DEFENSE BASE ISOLATION TESTS - NEES RESEARCH (ID ORAL4D)



10:30 am - 12:00 pm **TH03. Soil-structure Interaction** Soil/Tsunami Tikahtnu C, FL3 Dena'ina

MODERATOR: Katerina Ziotopoulou, University of California Davis

SOIL-STRUCTURE INTERACTION ANALYSIS OF THE MANHATTAN BRIDGE FOUNDATIONS (ID 232) *WWG* î F *Lelio Mejia, URS Ccorporation; Rajendram Arulnathan, URS Corporation; Sathish Murugaiah, URS Corporation; Thomas Thomann, URS Corporation;*

WHAT HAVE WE LEARNED AFTER A DECADE OF EXPERIMENTS AND MONITORING AT THE NEES@UCSB PERMANENTLY INSTRUMENTED FIELD SITES? - NEES RESEARCH (ID 253) AMAGI I G Jamison Steidl, UC Santa Barbara;

COMPARISON OF DESIGN PROCEDURES AND OBSERVED PERFORMANCE OF BRIDGES SUBJECT TO LATERAL SPREADING (ID 776) (ID 7

Brandenberg, University of California, Los Angeles;

FLUID EFFECTS ON ROCKING FOUNDATIONS IN DIFFICULT SOIL (ID 1032)

PERIOD OF INTEREST - THE CONFLUENCE OF SITE RESPONSE ANALYSIS AND SOIL-STRUCTURE INTERACTION (ID 1517) A atthew Bowers, SC Solutions; Hoss Hayati, URS Corp; Robb Moss, California Polytechnic State University;

10:30 am - 12:00 pm **TH04. Damping Devices** Damping Systems Tikahtnu D, FL3 Dena'ina

MODERATOR: Jeffrey Berman, University of Washington

SEISMIC RESPONSE OF SIX-STORY STEEL FRAME BUILDING WITH SELF-CENTERING ENERGY-DISSIPATIVE (SCED) BRACES COMBINED WITH LINEAR VISCOUS DAMPERS (ID 168) Constantia Christopoulos, University of Toronto;

SEISMIC BEHAVIOR OF REGULAR MOMENT RESISTING REINFORCED CONCRETE FRAMES WITH (ID 197) A Arturo Tena-Colunga, Universidad Aut; Horacio Nangullasm, Bowerbird Ingenier;

TESTING AND MODELING OF ISD-111H VISCOELASTIC DAMPERS UNDER WIND AND EARTHQUAKE LOADING (ID 595) **WWG** Í € **Yael Daniel, University of Toronto**; Constantin Christopoulos, University of Toronto; Michael Montgomery, University of Toronto;

PSEUDO-STATIC CYCLIC, SNAP BACK AND SHAKE TABLE TESTING OF PREWEC SELF-CENTERING WALL SYSTEMS (ID 946)
A DIRECT METHOD FOR THE DESIGN OF VISCOUS DAMPERS TO BE INSERTED IN EXISTING BUILDINGS (ID 1094)/##G I G Luca Landi, University of Bologna; Pier Paolo Diotallevi, University of Bologna; Simone Lucchi, University of Bologna;

SEISMIC PERFORMANCE ASSESSMENT OF STEEL FRAMES WITH ELASTOMERIC DAMPERS - NEES RESEARCH (ID 1324) A **Akbar Mahvashmohammadi, Lehigh University**; Ernest Ferro, Corry Rubber Corporation; James Ricles, Lehigh University; Richard Sause, Lehigh University; Robert Michael, Gannon University; Shannon Sweeney, Penn Sate Erie, Behrend College;

10:30 am - 12:00 pm **TH05. Innovations In Concrete Filled Tube Construction For Bridges** Bridges/Lifelines Board Room, FL2 Dena'ina

MODERATOR: John Stanton, University of Washington

IMPACT OF DIAMETER TO THICKNESS RATIO ON THE SEISMIC BEHAVIOR OF REINFORCED CONCRETE FILLED STEEL TUBES (ID 129) A Contraction of the Seise of the S

Mervyn Kowalsky, North Carolina State University; James Nau, North Carolina State University; Nicole King Brown, North Carolina State University;



THURSDAY, JULY 24

SEISMIC DESIGN OF CIRCULAR CONCRETE FILLED TUBE BRIDGE PIER CONNECTIONS FOR ACCELERATED BRIDGE CONSTRUCTION (ID 394) A GI€I Max Stephens, University of Washington; Charles Roeder, University of Washington; Dawn Lehman, University of Washington; Lisa

Berg, University of Washington;

SEISMIC DAMAGE ASSESSMENT OF BRIDGES WITH FOUNDATION EXPOSURE (ID 970) ###GJFI Shin-Tai Song, National Chung-Hsing University; Chia-Che Wu, National Chung-Hsing University; Wen-Hsiu Huang, National Chung-Hsing University;

CYCLIC TESTS OF MODULAR CFT BRIDGE PIERS (ID 1018)

Changsu Shim, Chung-Ang University; Chulhun Chung, Dankook University; Dongki Chung, Chung-Ang University; Dongwook Kim, Chung-Ang University; Ingyu Kim, Daewoo E&C;

BEHAVIOR AND STRENGTH OF PASSIVELY CONFINED CONCRETE FILLED TUBES (ID 1392) ###GIH Genda Chen, Missouri University of Science and Technology; Mostafa Fakharifar, Missouri University of Science and Technology; Zachary Woolsey, Missouri University of Science and Technology; Zhibin Lin, North Dakota State University;

SEISMIC PERFORMANCE OF CIRCULAR CONCRETE FILLED TUBE COLUMNS FOR ACCELERATED BRIDGE CONSTRUCTION (ID 1469)

Catherine Tucker, University of Utah; Luis Ibarra, University of Utah;

10:30 am - 12:00 pm TH06. Achieving Resilient Earthquake Resistant Design: Next-Generation Structural Systems And Their Validation Using Hybrid Simulation Experimental

Kahtnu 1, FL2 Dena'ina

MODERATOR: Jim Ricles, Lehigh University

CO-MODERATOR: Stephen Mahin, UC Berkeley

HYBRID SIMULATION OF STEEL BUILDINGS WITH STIFF ROCKING CORES FOR IMPROVED SEISMIC DRIFT DISTRIBUTION -NEES RESEARCH (ID 683) AMAGJÎ €

Alireza Sarebanha, University of California, San Diego, Bing Qu, California Polytechnic State University, San Luis Obispo; Gilberto Mosqueda, University of California, San Diego; Michael Pollino, Case Western Reserve University; Saman Sabzehzar, Case Western Reserve University;

DEVELOPMENT OF A FLOOR INERTIAL FORCE LIMITING ANCHORAGE SYSTEM BUILDING SEISMIC RESPONSE - NEES RESEARCH (ID 1375) AWWGJI F

Robert Fleischman, University of Arizona; David Mar, TIPPING MAR; Dichuan Zhang, Nazarbayev University; Giorgio Monti, Universita di Roma, La Sapienza; Joe Maffei, Maffei Structural Engineering; Jos Restrepo, University of California, San Diego; Richard Sause, Lehigh University:

APPLICATION OF HYBRID SIMULATION FOR EVALUATING DESIGN OF A ROCKING STEEL FRAME SYSTEM - NEES RESEARCH (ID 662) Á 🗰 GIÌ G

Matthew Eatherton, Virginia Tech; Gregory Deierlein, Stanford University; Jerome Hajjar, Northeastern University;

FULL-SCALE HYBRID TESTING OF A SOFT-STORY WOODFRAME BUILDING SEISMICALLY RETROFITTED USING SHAPE MEMORY ALLOY DEVICES IN SCISSOR-JACK BRACES - NEES RESEARCH (ID 909) Elaina Jennings, Colorado State University; Ershad Ziaei, Clemson University; John Van De Lindt, Colorado State University; Weichiang Pang, Clemson University; Xiaoyun Shao, Western Michigan University;

REAL-TIME HYBRID SIMULATION: VALIDATION OF PBD PROCEDURE FOR STEEL FRAMES WITH NONLINEAR VISCOUS DAMPERS - NEES RESEARCH (ID 597) AND LEES RESEARCH (ID 597)

Richard Sause, Lehigh University; Baiping Dong, Lehigh University; James Ricles, Lehigh University;

HYBRID SIMULATIONS OF SELF-CENTERING CONCENTRICALLY-BRACED FRAMES SUBJECT TO EXTREME GROUND MOTIONS -NEES RESEARCH (ID 1330) Brent Chancellor, Lehigh University; David Roke, University of Akron; James Ricles, Lehigh University; Richard Sause, Lehigh University;

10:30 am - 12:00 pm **TH07.** Nonstructural Component/System Performance **Building Systems** Kahtnu 2, FL2 Dena'ina

MODERATOR: Bob Bachman, Tobolski Watkins Engineering



DESCRIPTION: This session comprises technical presentations addressing the significant findings of recent studies on the response of different nonstructural components to earthquake loading from both system level and subsystem level testing including the full scale building level shake table testing conducted at both University of California at San Diego and University of California at Reno.

LANDMARK DATASET FROM THE BNCS PROJECT CONDUCTED AT THE NEES@UCSD (ID ORAL11A) # DE Tara Hutchinson, UCSD;

SEISMIC DEMANDS ON ACCELERATION-SENSITIVE NONSTRUCTURAL COMPONENTS USING RECORDED BUILDING RESPONSE DATA CASE STUDY - NEES RESEARCH (ID 1264)

Xiang Wang, UCSD; Joel Conte, UCSD; Robert Bachman, RE Bachman Consulting Structural Engineers; Rodrigo Astroza, UCSD; Tara Hutchinson, UCSD;

SYSTEM-LEVEL EXPERIMENTS ON CEILING/PIPING/PARTITION SYSTEMS AT UNR-NEES SITE - NEES RESEARCH (ID 216) A strategy of Nevada, Reno; Siavash Soroushian, University Siavash Soroushian, Siavash Soroushian, University Siavash Soroushian, University Siavas

A COMPARATIVE STUDY OF SUB-SYSTEM AND SYSTEM LEVEL EXPERIMENTS OF SUSPENSION CEILING SYSTEMS - NEES RESEARCH (ID 1206)

Siavash Soroushian, University of Nevada, Reno; Andrei Reinhorn, State University of New York, Buffalo; Esmaeel Rahmanishamsi, University of Nevada, Reno; Kipung Ryu, State University of New York, Buffalo; Manos Maragakis, University of Nevada, Reno;

EXPERIMENTAL STUDY ON THE SEISMIC PERFORMANCE OF PRESSURIZED FIRE EXTINGUISHING SPRINKLER PIPING SUBSYSTEMS - NEES RESEARCH (ID 77) A G Gilberto Mosqueda, University of California San Diego; Andre Filiatrault, SUNY-Buffalo; Yuan Tian, SUNY-Buffalo;

10:30 am - 12:00 pm **TH08. Repair And Retrofit Of Concrete Structures** Structural Systems Tubughnenq' 3, FL2 Dena'ina

MODERATOR: Santiago Pujol, Purdue University

SEISMIC PERFORMANCE OF SMA RETROFITTED MULTIPLE-FRAME RC BRIDGES SUBJECTED TO STRONG MAIN SHOCK-AFTERSHOCK SEQUENCES (ID 408) ∰ € H Wanching Huang, University of Illinois at Urbana-Champaign; Bassem Andrawes, University of Illinois at Urbana-Champaign;

Joel Parks, University of Utah; Chris Pantelides, University of Utah; Dylan Brown, University of Utah; Lawrence Reaveley, University of Utah; Mohammad Ameli, University of Utah;

SEISMIC RETROFIT OF DEFICIENT RC SEAR WALLS WITH FRP TOW SHEETS (ID 600) AMAGEST Carlos Cruz Noguez, CARLETON UNIVERSITY; Ahmed Hassan, CARLETON UNIVERSITY; David Lau, CARLETON UNIVERSITY; Ibrahim Shaheen, CARLETON UNIVERSITY; Joshua Woods, CARLETON UNIVERSITY;

STRENGTHENING WITH WING WALLS FOR SEISMICALLY SUBSTANDARD R/C BEAM-COLUMN JOINTS (ID 830) ###F€Î Yuebing Li, Osaka University; Yasushi Sanada, Osaka University;

AN INNOVATIVE FRP ANCHOR SYSTEM FOR THE SEISMIC RETROFIT OF REINFORCED CONCRETE SHEAR WALLS (ID 913) **JUNE FR Joshua Woods, Carleton University**;

CRITERIA AND METHODS FOR REDESIGN AND RETROFIT OF OLD STRUCTURES (ID 1433)/##FG Stavroula Pantazopoulou, University of Cyprus; Georgia Thermou, Aristotle University of Thessaloniki;

10:30 am - 12:00 pm **TH09. Seismic Hazard And Risk Analysis** Earthquake Hazard Tubughnenq' 4, FL2 Dena'ina

MODERATOR: Mark Petersen, USGS

ENGINEERING VALIDATION OF HYBRID BROADBAND GROUND MOTION SIMULATION USING HISTORICAL EVENTS (ID 1185) **//////** *Carmine Galasso, Newcastle University; Farzin Zareian, University of California, Irvine;*

STOCHASTIC SIMULATION OF SPATIALLY DISTRIBUTED GROUND MOTIONS USING WAVELET PACKETS AND KRIGING ANALYSIS (ID 1502) ANALYSIS (I



THURSDAY, JULY 24

SEISMIC RESPONSE OF A TALL BUILDING TO RECORDED AND SIMULATED GROUND MOTIONS (ID 1522) ## f G **Nenad Bijelic, Stanford University**; Gregory Deierlein, Stanford University; Ting Lin, Marquette University;

UPDATES TO THE 2014 NATIONAL SEISMIC HAZARD MAPS: A SUMMARY OF CHANGES TO SEISMIC SOURCE AND GROUND MOTION MODELS (ID 1698)

Mark Petersen, USGS; Arthur Frankel, USGS; Charles Mueller, USGS; Edward Field, USGS; Kathleen Haller, USGS; Kenneth Rukstales, USGS; Morgan Moschetti, USGS; Nicolas Luco, USGS; Oliver Boyd, USGS; Peter Powers, USGS; Rui Chen, CGS; Russel Wheeler, USGS; Sanaz Rezaeian, USGS; Stephen Harmsen, USGS; Yuehua Zeng, USGS;

EFFECTS OF GROUND-MOTION DURATION ON THE RESPONSE OF A 9-STORY STEEL FRAME BUILDING (ID 1037) **Andre Barbosa, Oregon State University**; Filipe Ribeiro, University of Nottingham; Luis Neves, University of Nottingham;

10:30 am - 12:00 pm **TH10. Steel Buildings I** Steel Buildings Tubughnenq' 5, FL2 Dena'ina

MODERATOR: Peter Lee, Skidmore Owings & Merrill

SEISMIC PERFORMANCE OF STEEL PLATE SHEAR WALLS CONSIDERING VARIOUS DESIGN APPROACHES (ID 319) ###FJÍ Ronny Purba, University at Buffalo; Michel Bruneau, University at Buffalo;

ADVANCES IN SELF-CENTERING STEEL PLATE SHEAR WALL TESTING AND DESIGN - NEES RESEARCH (ID 612) AND DESI

EXPERIMENTAL INVESTIGATIONS ON STEEL PLATE SHEAR WALLS USING BOX COLUMNS WITH OR WITHOUT INFILL CONCRETE (ID 802)

Chao-Hsien Li, National Center for Research on Earthquake Engineering; Chih-Han Lin, National Center for Research on Earthquake Engineering; Ching-Yi Tsai, National Taiwan University; Hsuan-Yu Huang, Natianl Taiwan University; Keh-Chyuan Tsai, National Taiwan University;

INELASTIC PERFORMANCE OF THE MODIFIED-HIDDEN-GAP CONNECTION FOR SQUARE HSS BRACE MEMBERS (ID 1010) (ID 101

STEEL PLATE SHEAR WALLS WITH COUPLING IN HIGH-SEISMIC REGIONS - NEES RESEARCH (ID 860)

CYCLIC AND DYNAMIC TESTING OF SELF-CENTERING STEEL PLATE SHEAR WALLS - NEES RESEARCH (ID 934)

1:30 pm - 3:00 pm **TH11. Reinforced Concrete Shear Wall Buildings: Behavior And Modeling II** RC Shear Wall Buildings Tikahtnu A/B, FL3 Dena'ina

MODERATOR: Toshimi Kabeyasawa, The University of Tokyo

NON-LINEAR RESPONSE ANALYSIS OF REINFORCED CONCRETE SHEAR WALLS USING MULTI-SPRINGS MACRO-MODELS (ID 1170)

Carolina Magna-Verdugo, University of California, Davis; Sashi Kunnath, University of California, Davis;

NUMERICAL MODELING AND SEISMIC DESIGN OF SLENDER CONCRETE WALLS - NEES RESEARCH (ID 1175) AMAGÎ Î Laura Lowes, University of Washington; Dawn Lehman, University of Washington; Joshua Pugh, EDG, Inc;

SEISMIC RESPONSE OF REINFORCED CONCRETE WALLS WITH LAP SPLICES (ID 1176) AMAGI Ì Enrique Villalobos, Purdue University; Santiago Pujol, Purdue University;

SEISMIC PERFORMANCE OF SHEAR WALL BUILDINGS WITH GRAVITY-INDUCED LATERAL DEMANDS (ID 1551), A Grant Comparisity of British Columbia; Don Anderson, The University of British Columbia; James Macauley, GS; Majid Baradaran Shoraka, The University of British Columbia; Michael Dupuis, RJC; Robert Simpson, GS;

CYCLIC BEHAVIOR OF SPECIAL REINFORCED CONCRETE SHEAR WALLS - NEES RESEARCH (ID 1611) ###+H€€ Thien Tran, University of California, Los Angeles; John Wallace, University of California, Los Angeles;



1:30 pm - 3:00 pm **TH12. NEEShub - Cyberinfrastructure For Data And Simulation** NEES Programs Tikahtnu E/F, FL3 Dena'ina

MODERATOR: Tom Hacker, Purdue University

DESCRIPTION: A number of earthquake engineering research activities have been developed through activities of NEES community collaborating on the NEEShub. This session will demonstrate a selected set of these activities and have them available for participants to explore in real time. The goal is to provide participants with enough information about the activities for use in their own research, education, and outreach activities. The session will be heavily advertised to both faculty and to EERI student chapters.

CYBERINFRASTRUCTURE FOR NEES - NEES RESEARCH (ID ORAL40A)

PROMOTING RE-USE OF EARTHQUAKE ENGINEERING DATA THROUGH THE NEESHUB - NEES RESEARCH (ID 1038) **Journ Browning, University of Kansas**; Thomas Hacker, Purdue University;

INTEGRATION OF A COMMUNITY TOOL IN THE NEESHUB - NEES RESEARCH (ID ORAL40B)

ADVANCED COMPUTATIONAL SIMULATION - NEES RESEARCH (ID ORAL40C)

INTEGRATION OF SIMULATION DATA WITHIN THE NEES PROJECT WAREHOUSE - NEES RESEARCH (ID ORAL40D)

1:30 pm - 3:00 pm **TH13. Structure-Soil-Structure Interaction Panel** Soil/Tsunami Tikahtnu C, FL3 Dena'ina

MODERATOR: Jonathan Bray, UC Berkeley

DESCRIPTION: The Tenth U.S. National Conference on Earthquake Engineering provides an exceptional opportunity to bring together researchers and engineers who could contribute to an informative discussion of SSSI issues. A 90 minute panel discussion session is proposed to address topics in SSSI. There will be six panel members and a chair who will orchestrate the session. Each panel member will have 10 minutes to present an aspect of SSSI. Their presentations will be followed by 30 minutes of discussion by the audience and panel members. Panel discussion will focus on practical implications of SSSI in earthquake engineering.

EXPERIMENTAL OBSERVATIONS OF STRUCTURE-SOIL-STRUCTURE INTERACTION (ID ORAL21A)

SIMULATION OF SITE-CITY INTERACTION EFFECTS DURING EARTHQUAKES IN THE LOS ANGELES BASIN (ID ORAL21B)

NUMERICAL ANALYSIS OF POTENTIAL FOR ELASTIC FOUNDATION-SOIL-FOUNDATION INTERACTION (FSFI) (ID ORAL21C)

IMPACT OF SEISMIC SSSI ON STRUCTURAL RESPONSE (ID ORAL21D)

APPLICATION OF 3D NON-LINEAR SSSI SIMULATION TO THE DESIGN OF THE TRANSBAY TRANSIT CENTER, SAN FRANCISCO (ID ORAL21E)

1:30 pm - 3:00 pm **TH14. Tuned Mass And Active Dampers** Damping Systems Tikahtnu D, FL3 Dena'ina
Concurrent Oral Sessions (continued)



THURSDAY, JULY 24

MODERATOR: Constantin Christopoulos, University of Toronto

SHAKING TABLE TESTS OF A MODEL STRUCTURE WITH SEMI-ACTIVE RESETTABLE DEVICES (ID 340) ##### Roberto Franco-Anaya, University of Guadalajara; Athol J. Carr, University of Canterbury; J. Geoffrey Chase, University of Canterbury;

A NOVEL VARIABLE FRICTION DEVICE FOR NATURAL HAZARD MITIGATION (ID 383)/##+H I Simon Laflamme, Iowa State University; Austin Downey, Iowa State University; Douglas Taylor, Taylor Devices; James Ricles, Lehigh University; Liang Cao, Iowa State University;

DYNAMIC TEST OF MULTIPLE TUNED MASS DAMPERS FOR VIBRATION CONTROL OF HIGH-RISE BUILDINGS (ID 1239) *Whith* Í *Chi-Chang Lin, National Chung-Hsing University*; *Ging-Long Lin, National Chung Hsing University*; *Hao-Yu Lung, National Chung Hsing University*;

OPTIMAL DESIGN OF SUPPLEMENTAL DAMPING DEVICES FOR NONLINEAR MDOF STRUCTURES BASED ON A NOVEL NONLINEAR DAMPING INDEX (ID 1269) III î Î Jian Zhang, University of California, Los Angeles; Wang Xi, University of California, Los Angeles;

AN INNOVATIVE TYPE OF TUNED LIQUID DAMPER (ID 1483) AMATI Ï **Rafael Ruiz, Pontificia Universidad Catolica de Chile**; Alexandros Taflanidis, University of Notre Dame; Diego Lopez-Garcia, Pontificia Universidad Catolica de Chile;

OPTIMUM SEISMIC DESIGN OF NONLINEAR ASYMMETRIC STRUCTURES CONTROLLED BY LARGE TUNED MASS DAMPERS. (ID 754)

Juan Aguirre, Pontificia Universidad Cat;

1:30 pm - 3:00 pm **TH15. New Materials For Use In Seismic Design Of Bridges** Bridges/Lifelines Board Room, FL2 Dena'ina

MODERATOR: Marc Eberhard, University of Washington

CYCLIC BEHAVIOR OF AS-BUILT AND CFRP WRAP RETROFITTED SQUARE REINFORCED CONCRETE BRIDGE COLUMNS (ID 69) A CH Selamawit Mehary, Portland State University; Peter Dusicka, Portland State University; Ramiro Bazaez, Portland State University;

DYNAMICS OF INELASTIC ISOLATED BRIDGES SUBJECTED TO ANALYTICAL PULSE GROUND MOTIONS (ID 447) ### FI Anastasios Tsiavos, ETH Zurich; Bozidar Stojadinovic, ETH Zurich; Kevin Mackie, University of Central Florida;

CONTROLLING THE SEISMIC DAMAGE IN BRIDGE COLUMNS USING STRUCTURAL FUSES (ID 543) A G Alireza Mohebbi, University of Nevada-Reno (UNR); David Sanders, University of Nevada-Reno (UNR); Keri Ryan, University of Nevada-Reno (UNR);

USE OF CU-BASED SUPERELASTIC ALLOYS FOR INNOVATIVE DESIGN OF REINFORCED CONCRETE COLUMNS (ID 872) **Bora Geneturk, University of Houston**; Seyyed Farshid Hosseini, University of Houston;

PARAMETRIC STUDY OF SEISMICALLY RETROFITTED BRIDGE RC COLUMNS USING SHAPE MEMORY ALLOYS (ID 902) Millinois at Urbana-Champaign;

EXPERIMENTALLY VALIDATED MODELING OF CONCRETE ACTIVELY CONFINED USING SMA REINFORCEMENT (ID 1225) AMATI Í Ï Qiwen Chen, University of Illinois at Urbana-Champaign; Bassem Andrawes, University of Illinois at Urbana-Champaign;

1:30 pm - 3:00 pm **TH16. Application Of Hybrid Simulation In NEESR Projects** Experimental Kahtnu 1, FL2 Dena'ina

MODERATOR: Xiaoyun Shao, Western Michigan University

CO-MODERATOR: Shirley Dyke, Pudue University

DESCRIPTION: Short presentations followed by panel discussions. The session will start with a short presentation from the identified participants (list below) for the first 30~45 minutes of the session. Each presenter will be required to include the essential hybrid simulation implementation aspects of their respective project and highlight the challenges and new developments. Then the session chairs will initiate a panel discussion around each application aspects (list above) and tried to answer the following two questions of each aspect as a group of earthquake engineering researchers: o What enabling role has hybrid simulation played in having an impact on civil engineering research and practice? o What are the desired features in these application aspects that will expand hybrid simulation applications to solve grand challenge problems?



NEESCOMM PERSPECTIVES ON ENABLING ROLES OF HYBRID SIMULATION - NEES RESEARCH (ID ORAL9A)

FRAMEWORK FOR COLLAPSE SIMULATION THROUGH SUBSTRUCTURE HYBRID TESTING - NEES RESEARCH (ID 1568)
HIGH-PRECISION DISPLACEMENT CONTROL FOR HYBRID SIMULATION OF THE SEISMIC RESPONSE OF STIFF REINFORCED CONCRETE SHEAR WALLS - NEES RESEARCH (ID 412) I J Catherine Whyte, ETH Zurich; Bozidar Stojadinovic, ETH Zurich;

Xiaoyun Shao, Western Michigan University;

VALIDATION OF A SEISMIC RETROFIT SYSTEM FOR LOW RISE STEEL MOMENT RESISTING FRAMES THROUGH HYBRID TESTING (ID ORAL9C)

A MODIFIED RUNGE-KUTTA INTEGRATION METHOD FOR COMPUTATIONAL DELAY IN REAL TIME HYBRID SIMULATION - NEES RESEARCH (ID 1029) #### J€ *Ge Ou, Purdue University*; Arun Prakash, Purdue University; Shirley Dyke, Purdue University;

1:30 pm - 3:00 pm **TH17. Building Non-Structural Components And Contents** Building Systems Kahtnu 2, FL2 Dena'ina

MODERATOR: Eduardo Miranda, Stanford University

SEISMIC TESTING OF NON-STRUCTURAL COMPONENTS AND ASSESSMENT OF THE PRESCRIBED RESPONSE SPECTRUM (ID 25) / I ← Shakhzod Takhirov, University of California at Berkeley; Amir Gilani, Miyamoto International; Lee Tedesco, United States Gypsum Company;

EXPERIMENTAL STUDIES ON THE SLIDING BEHAVIOUR OF BUILDING CONTENTS (ID 791) *Mini* FG **Rajesh Dhakal, University of Canterbury**; Brendon Bradley, University of Canterbury; Gregory Macrae, University of Canterbury; Trevor Yeow, University of Canterbury;

SIMPLIFIED ANALYTICAL MODELING OF A SUSPENDED CEILING SYSTEM - NEES RESEARCH (ID 853) (GH **Kipung Ryu, University at Buffalo**; Andrei M. Reinhorn, University at Buffalo;

EXPERIMENTAL CHARACTERIZATION OF TRAPEZE ASSEMBLIES SUPPORTING SUSPENDED NONSTRUCTURAL SYSTEMS (ID 905)///// H Richard Wood, University of Nebraska-Lincoln; Bernhard Kreidl, Hilti Corporation; Matthew Hoehler, Hilti Corporation; Tara Hutchinson, University of California, San Diego;

DEFINING RIGID VS. FLEXIBLE NONSTRUCTURAL COMPONENTS (ID 940) AMATÍ I I Brian Kehoe, Wiss, Janney, Elstner Associates Inc.;

STATION CHALLENGES ON SEISMIC QUALIFICATION OF STRUCTURES, SYSTEMS AND COMPONENTS IN CANADIAN NUCLEAR POWER PLANTS (ID 1355) AMA Í Í Amitabh Dar, Bruce Power; Dimitrios Konstantinidis, McMaster University; Wael El-Dakhakhni, McMaster University;

1:30 pm - 3:00 pm **TH18. Seismic Performance Of Reinforced Masonry Shear Wall Buildings** Structural Systems Tubughnenq' 3, FL2 Dena'ina

MODERATOR: Arturo Schultz, University of Minnesota

DESCRIPTION: Recent research has indicated that partially grouted masonry shear walls do not respond to seismic loading in the same manner as fully grouted masonry walls. Besides exhibiting different modes of failure, partially grouted shear wall tests have also illustrated lateral load capacities consistently lower than expected from shear strength formulas, that are applicable for gully grouted shear walls, in current building codes. In response to this hazardous situation, the NSF NEES program has initiated a research program to investigate the performance of partially grouted masonry walls, as well as to develop computational techniques to simulate their behavior and shear strength formulas and procedures that are amenable for building codes.

Concurrent Oral Sessions (continued)



THURSDAY, JULY 24

SHAKE-TABLE TESTS OF A THREE-STORY REINFORCED MASONRY SHEAR WALL STRUCTURE - NEES RESEARCH (ID ORAL8B)

FINITE ELEMENT ANALYSIS OF THE STRENGTH AND DEFORMATION CAPACITY OF PARTIALLY GROUTED REINFORCED MASONRY WALLS - NEES RESEARCH (ID ORAL8C)

SEISMIC TESTING OF PARTIALLY-GROUTED MASONRY SUB-ASSEMBLAGES - NEES RESEARCH (ID 1235D Catherine Johnson, University of Minnesota, Twin Cities; Arturo Schultz, University of Minnesota, Twin Cities;

1:30 pm - 3:00 pm **TH19. Site Response Analysis 1** Earthquake Hazard Tubughnenq' 4, FL2 Dena'ina

MODERATOR: Sheri Molnar, University of British Columbia

UNCERTAINTY OF SOIL PROPERTIES IN EARTHQUAKE GROUND-MOTION SITE RESPONSE ANALYSES (ID 299) **####1** i i **Zhihua Li, AMEC**;

DEVELOPING CORRELATION RELATIONSHIPS OF VS30 FOR USE IN SITE CLASSIFICATION IN TAIWAN (ID 637) (ID 637

DETERMINATION OF LIQUEFACTION IN TIME DOMAIN USING WAVELET ANALYSIS (ID 828) A Difference of the second sec

SOIL PROFILE CHARACTERIZATION OF CHRISTCHURCH STRONG MOTION STATIONS (ID 852) A Content of Canterbury; Clinton Liam Wotherspoon, The University of Auckland; Brady Cox, The University of Texas; Brendon Bradley, University of Canterbury; Clinton Wood, The University of Texas; Rolando Orense, The University of Auckland; Russell Green, Virginia Tech;

SITE CHARACTERIZATION FOR STRONG MOTION DATA OF THE 2011 TOHOKU, JAPAN EARTHQUAKE (ID 1661) **Saburoh Midorikawa, Tokyo Institute of Technology**; Hiroyuki Miura, Hiroshima University; Yoshihiro Nogi, Tokyo Institute of Technology;

A STRATEGY OF FRACTURE PATH/EARTHQUAKE PREDICTION BY USING MODIFIED DATA ASSIMILATION TECHNOLOGY (ID 1762)

Hao Chen, Institute of Engineering Mechanics, China earthquake administration; Lalith Wijerathne, University of Tokyo; Muneo Hori, Earthquake Research institute, University of Tokyo;

1:30 pm - 3:00 pm **TH20. Steel Buildings II** Steel Buildings Tubughnenq' 5, FL2 Dena'ina

MODERATOR: Luis Ibarra, University of Utah

SEISMIC PERFORMANCE OF CONCENTRICALLY BRACED FRAME CONNECTIONS - NEES RESEARCH (ID 1168) *Jeffrey Berman, University of Washington*; Charles Roeder, University of Washington; Dan Sloat, University of Washington; Dawn Lehman, University of Washington; Molly Johnson, University of Washington;

THE CFS-NEES EFFORT: ADVANCING COLD-FORMED STEEL EARTHQUAKE ENGINEERING - NEES RESEARCH (ID 1467) **Benjamin Schafer, Johns Hopkins**; Bonnie Manley, American Iron and Steel Institute; Cheng Yu, North Texas; Colin Rogers, McGill; Cris Moen, Virginia Tech; David Padilla-Llano, Virginia Tech; Deniz Ayhan, Johns Hopkins; Jiazhen Leng, Johns Hopkins; Kara Peterman, Johns Hopkins; Matt Eatherton, Virginia Tech; Matt Stehman, Johns Hopkins; Naru Nakata, Johns Hopkins; Peng Liu, Johns Hopkins; Rob Madsen, Devco Engineering; Steve Buonopane, Bucknell;

DOUBLE-HSS LINKS FOR ECCENTRICALLY BRACED FRAMES (ID 1493)

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Shih-Ho Chao, The University of Texas at Arlington; Brandon Price, The University of Texas at Arlington;

ISSUES ON USING WELDED BUILT-UP BOX COLUMNS IN STEEL SPECIAL MOMENT FRAMES (ID 1520) *Mini* J *Peter Lee, Skidmore, Owings & Merrill; Chia-Ming Uang, University of California, San Diego; Gulen Ozkula, University of California, San Diego; Mark Sarkisian, Skidmore, Owings & Merrill; Rupa Garai, Skidmore, Owings & Merrill;*

SEISMIC PERFORMANCE OF FULL-SCALE COLD-FORMED STEEL BUILDINGS - NEES RESEARCH (ID 1623) A JF *Kara Peterman, Johns Hopkins University*; Benjamin Schafer, Johns Hopkins University; Matthew Stehman, Johns Hopkins University; Narutoshi Nakata, Johns Hopkins University; Rob Madsen, Devco Engineering, Inc.; Steven Buonopane, Bucknell University;

3:30 pm - 5:00 pm **TH21. Concrete Walls - Observations From Recent Earthquakes And Laboratory Tests And Impacts On Practice** RC Shear Wall Buildings Tikahtnu A/B, FL3 Dena'ina

MODERATOR: John Wallace, UCLA

DESCRIPTION: The session will be organized into three parts - coupling beams (30 min), Wall flexure (30 min) and Wall shear (30 min). Two or three speakers will be give a total of about 20 minutes to make a case for some important findings and, more importantly, unresolved issues, and then the remaining 10 minutes for each topic will be for discussion and questions. Speakers will inlcude both university researchers and practising engineers. Ech speaker has been asked to seek input from others, so that their presentation provides a

DESIGN AND MODELING OF CONVENTIONAL RC AND SRC COUPLING BEAMS (ID ORAL20A)

DESIGN AND MODELING OF HIGH-PERFORMANCE COUPLING BEAMS (ID ORAL20B)

COUPLING BEAMS - CURRENT PRACTICE, ISSUES, AND OPPORTUNITIES (ID ORAL20C) AND DE John D. Hooper, Magnusson Klemencic Associates;

SLENDER RC WALLS - IMPACT OF BIAXIAL LOADING AND SPLICES (ID ORAL20D) A

SLENDER WALLS, DETAILING OF THIN, ORDINARY BOUNDARY ELEMENTS (ID ORAL20E)

SLENDER WALLS, DETAILING OF THIN, ORDINARY AND SPECIAL BOUNDARY ELEMENTS (ID ORAL20F) Jack Moehle, University of California, Berkeley;

MODELING SHEAR IN COUPLED WALLS (ID ORAL20G)

SHEAR DESIGN OF REINFORCED CONCRETE STRUCTURAL WALLS FOR TALL BUILDINGS (ID ORAL20H) AND BUE Ron Hamburger, Simspon Gumpertz & Heger;

3:30 pm - 5:00 pm **TH22. Earthquake Engineering Education And Outreach Showcase** NEES Programs Tikahtnu E/F, FL3 Dena'ina

MODERATOR: Thalia Anagnos, San Jose State University

USING TSUNAMIS TO PUT ENGINEERING INTO STEM: COASTAL ENGINEERING MODULES FOR FORMAL AND INFORMAL EDUCATION (POSTER) (ID ORAL6A)

GEOTECHNICAL GRADUATE STUDENT SOCIETY - NEES@UC DAVIS OUTREACH COLLABORATION (POSTER) (ID ORAL6C) Diane Moug, University of California, Davis;

Concurrent Oral Sessions (continued)



THURSDAY, JULY 24

DEVELOPMENT OF EARTHQUAKE ENGINEERING CURRICULUM FOR HIGH SCHOOL STUDENTS USING LOW-COST SHAKE TABLES (POSTER AND HANDS-ON DISPLAY) (ID ORAL6D) AND DEVELOPMENT OF California, San Diego;

VISUAL LEARNING MODULES DEVELOPED FOR UNDERGRADUATE STRUCTURAL ENGINEERING AND CONSTRUCTION EDUCATION (HANDS-ON DISPLAY) (ID ORAL6E)

USING TOUCH INTERFACE TECHNOLOGY FOR SPATIAL VISUALIZATION TRAINING (POSTER AND HANDS-ON DISPLAY) (ID ORALGE)

Lelli Van Den Einde, University of California, San Diego;

EVALUATION OF STUDENT PERFORMANCE ON TOPICS IN EARTHQUAKE RESISTANT DESIGN (POSTER) (ID ORAL6G)

NEES INSTRUCTIONAL SHAKE TABLE FOR STEM LEARNING EXPERIENCES (POSTER AND HANDS-ON DISPLAY) (ID ORAL6H)

IMPACT OF THE HOWARD UNIVERSITY ENGINEERING AMBASSADOR PROGRAM (POSTER) (ID ORAL6I)

MAKE YOUR OWN EARTHQUAKE (POSTER) (ID ORAL6J) AND EDE Kelly Doyle, University of Nevada, Reno;

ENGAGING STUDENTS' CREATIVITY THROUGH A FRESHMAN DESIGN COURSE BASED ON NEESR PROJECT (POSTER) (ID ORAL6K)

Rupa Purasinghe, California State University, Los Angeles;

BRINGING CURRENT SEISMIC RESEARCH TO THE CLASSROOM USING THE STRUCTURALLY INSULATED PANEL SYSTEM IN AN UNDERGRADUATE STRUCTURES LAB (POSTER AND HANDS-ON DISPLAY) (ID ORAL6L)

NEESACADEMY: A RESOURCE FOR K-20 EDUCATION (POSTER) (ID ORAL6N) AND EDE Thalia Anagnos, San Jose State University;

3:30 pm - 5:00 pm **TH23. Tsunami Risk Assessment** Soil/Tsunami Tikahtnu C, FL3 Dena'ina

MODERATOR: Mike Mahoney, FEMA

BENCHMARKING, VALIDATION AND CALIBRATION OF NEWLY-DEVELOPED HAZUS TSUNAMI METHODOLOGY (ID 722) **####** €G **Ronald Eguchi, ImageCat, Inc.**; Fumio Yamazaki, Chiba University; Jawhar Bouabid, Chubb; Michael Eguchi, ImageCat, Inc.; Shunichi Koshimura, Tohoku University; William Graf, ImageCat, Inc.;

NEW BUILDING DAMAGE AND LOSS FUNCTIONS FOR TSUNAMI (ID 322)

NEW LIFELINES DAMAGE AND LOSS FUNCTIONS FOR TSUNAMI (ID 350) AMAGE and Loss FUNCTIONS FOR TSUNAMI (ID 350) AMAGE and Loss Function and Los

TSUNAMI HAZARD AND CASUALTY ESTIMATION MODEL (ID 407) #### Harry Yeh, Oregon State University;

EVACUATION PLANNING CONSIDERATIONS OF THE CITY OF HONOLULU FOR A GREAT ALEUTIAN TSUNAMI (ID 504)

TSUNAMI HAZARD MITIGATION ACTIVITIES IN CALIFORNIA (ID 1717)

Rick Wilson, California Geological Survey; Amanda Admire, Humboldt State University; Cynthia Pridmore, California Geological Survey; Edward Curtis, Federal Emergency Management Agency Region IX; Hong Kie Thio, URS Corporation; Jose Borrero, University of Southern California; Kevin Miller, California Office of Emergency Services; Lori Dengler, Humboldt State University; Martin Eskijian, California State Lands Commission - Retired; Patrick Lynett, University of Southern California;



3:30 pm - 5:00 pm **TH24. BRBs And Yielding Dampers** Damping Systems Tikahtnu D, FL3 Dena'ina

MODERATOR: Cameron Black, Seismic Isolation Engineering Inc.

SEISMIC PERFORMANCE OF BUCKLING-RESTRAINED BRACES USING WELDED END AND RECTANGULAR STEEL CASING (ID 125)

Pao-Chun Lin, National Center for Research on Earthquake Engineering; An-Chien Wu, National Center for Research on Earthquake Engineering; Keh-Chyuan Tsai, National Taiwan University;

EFFECTS OF POST-YIELD STIFFENING AND STRENGTHENING ON THE COLLAPSE PERFORMANCE OF NON-BUCKLING BRACED FRAMES (ID 879) ###1 €

Carlos De Oliveira, Cast Connex; Constantin Christopoulos, University of Toronto; Justin Binder, University of Toronto; Michael Gray, Cast Connex;

VALIDATION OF DESIGN METHOD FOR ALUMINUM SHEAR YIELDING DAMPER IN OPEN GROUND STORY RC FRAMES USING FULL SCALE TEST (ID 1044) A F **Durgesh Rai, Indian Institute of Technology Kanpur**; Rajarshi Maitra, Indian Institute of Technology Kanpur;

IMPACT OF BUCKLING RESTRAINED BRACES ON CATENARY ACTION IN STEEL FRAMED STRUCTURES (ID 1463)

3:30 pm - 5:00 pm **TH25. Lifeline System Performance** Bridges/Lifelines Board Room, FL2 Dena'ina

MODERATOR: Robert Nigbor, UCLA

THE IMPACT OF THE 2010-2011 CANTERBURY EARTHQUAKES ON THE CITY OF CHRISTCHURCHS WASTEWATER COLLECTION AND TREATMENT SYSTEM (ID 176)

David Wareham, University of Canterbury; Mike Bourke, Christchurch City Council;

ASSESSMENT OF AGING CORRECTION FACTORS FOR LIQUEFACTION RESISTANCE AT SITES OF RECURRENT LIQUEFACTION (ID 931)

Brett Maurer, Virginia Tech; Brendon Bradley, University of Canterbury; Misko Cubrinovski, University of Canterbury; Russell Green, Virginia Tech;

PERFORMANCE OF EARTHQUAKE RESISTANT DRINKING WATER PIPELINE DURING THE 2011 TOHOKU EARTHQUAKE IN JAPAN (ID 29) MINIMUM I I MARKANA I NA
Masakatsu Miyajima, Kanazawa University;

SEISMIC EVALUATION OF TRANSMISSION TOWER FOUNDATIONS AT RIVER CROSSINGS IN THE PORTLAND-COLUMBIA RIVER REGION (ID 1232)

Michael Beaty, Beaty Engineering LLC; Jason Bock, GRI; Kerry Cook, Bonneville Power Administration; Leon Kempner Jr., Bonneville Power Administration; Mike Greenfield, GRI; Scott Schlechter, GRI; Stephen Dickenson, New Albion Geotechnical, Inc.;

ANALYSIS OF BRIDGE PERFORMANCE SUBJECTED TO LATERAL SPREADING IN THE 2010 CHILE EARTHQUAKE (ID 1725) A Christian Ledezma, Catholic University of Chile; Daniel Gonzalez Paiz, Catrholic University of Chile; Kengo Kato, Oregon State University; Scott Ashford, Oregon State University;

SEISMIC STUDIES ON ELECTRICAL HIGH VOLTAGE TRANSFORMER BUSHING SYSTEMS INCORPORATING FLEXURAL STIFFENERS (ID 106) II J **Maria Koliou, University at Buffalo, The State University of New York**; Andre Filiatrault, University at Buffalo, The State University of New York; Andrei Reinhorn, University at Buffalo, The State University of New York;

3:30 pm - 5:00 pm **TH26. Development Of Hybrid Simulation** Experimental Kahtnu 1, FL2 Dena'ina

MODERATOR: Catherine Whyte, ETH Zurich

FREQUENCY RESPONSE ANALYSIS FOR ACTAUTOR TRACKING EVALUATION IN REAL-TIME HYBRID SIMULATIONS OF LARGE-SCALE MAGNETO-RHEOLOGICAL DAMPERS (ID 204) A J€ **Cheng Chen, San Francisco State University**;

Concurrent Oral Sessions (continued)



THURSDAY, JULY 24

MODELING AND IMPLEMENTATION OF DISTRIBUTED REAL-TIME HYBRID SIMULATION (ID 636) AMAGE Amin Maghareh, Purdue University; Ali Ozdagli, Purdue University; Shirley Dyke, Purdue University;

EXPERIMENTAL MODELING OF THE STRUCTURAL RESPONSE TO FIRE LOADS USING THE HYBRID SIMULATION TECHNIQUE (ID 730) HTTP://www.using.com/www.using.c

DEVELOPMENTS TOWARDS BROADENING THE APPLICATION RANGE OF REAL-TIME HYBRID SIMULATION - NEES RESEARCH (ID 1247)////IDG

Mehmet Gunay, UC Berkeley; Khalid Mosalam, UC Berkeley;

REAL-TIME HYBRID SIMULATION WITH FORCE-CONTROLLED ACTUATORS: AN APPLICATION TO SUBSTRUCTURE SHAKE TABLE TEST (ID 1272) Mill H Matthew Stehman, Johns Hopkins University; Narutoshi Nakata, Johns Hopkins University;

3:30 pm - 5:00 pm **TH27. Building Damage Prediction** Building Systems Kahtnu 2, FL2 Dena'ina

MODERATOR: Marc Eberhard, University of Washington

NONLINEAR STRUCTURAL ANALYSIS OF REINFORCED CONCRETE BUILDINGS SUFFERING DAMAGE FROM EARTHQUAKE AND SUBSEQUENT TSUNAMI (ID 48) AMA UI Î Panon Latcharote, Kochi University of Technology;

CONVENTIONAL AND UNBONDED POST-TENSIONED LATERAL FORCE RESISTING SYSTEMS - A COMPARATIVE ASSESSMENT OF EXPECTED PERFORMANCE AND LOSSES (ID 448) Million 1 Sofia Gavridou, University of California, Los Angeles; John Wallace, University of California, Los Angeles; Murat Melek, Arup;

STATIC EXPERIMENTAL TESTING TO DEFINE DAMAGE STATES OF PRECAST CONCRETE CLADDING - NEES RESEARCH (ID 763)/###11 i

Kurt Mcmullin, San Jose State University; Eugenia Tai, San Jose State University; Lokesh Patel, San Jose State University; Maggie Ortiz, San Jose State University; Pooja Nagar, San Jose State University; Siddaiah Yarra, San Jose State University; Tu-An Ma, San Jose State University;

EARTHQUAKE DAMAGE POTENTIAL DUE TO LOW-CYCLE FATIGUE IN R.C. MOMENT FRAME BUILDINGS (ID 1251) Anned Mantawy, University of Southern California; James Anderson, University of Southern California;

COMPARISON OF INDUSTRY-STANDARD NONLINEAR DYNAMIC ANALYSIS METHODS WITH OBSERVED DAMAGE ON A RC BUILDING (ID 1465)//// J J Aris Kozmidis, Arup; Kutay Orakcal, Bogazici University; Leonardo Massone, University of Chile; Murat Melek, Arup;

3:30 pm - 5:00 pm TH28 Nonlinear Analysis Of Building Models And Analysis Approaches

TH28. Nonlinear Analysis Of Building Models And Analysis Approaches Buildings - New Tubughnenq' 3, FL2 Dena'ina

MODERATOR: Jordan Jarrett, Virginia Tech

ACCIDENTAL TORSION IN NONLINEAR RESPONSE HISTORY ANALYSIS (ID 278) A €€€ Jordan Jarrett, Virginia Tech; Finley Charney, Virginia Tech; Reid Zimmerman, Rutherford + Chekene;

PROBABILISTIC SEISMIC DEMAND MODEL FOR RC FRAME BUILDINGS USING CLOUD ANALYSIS AND INCREMENTAL DYNAMIC ANALYSIS (ID 1021)

Solomon Tesfamariam, The University of British Columbia; Paolo P. Franchin, Sapienza University of Rome; Pathmanathan Rajeev, Monash University;

TIME-HISTORY ANALYSIS OF UNREINFORCED MASONRY WALLS IN OUT-OF-PLANE BENDING: INFLUENCE OF DIAPHRAGM FLEXIBILITY (ID 1092) A GHG Luca Landi, University of Bologna; Pier Paolo Diotallevi, University of Bologna; Rocco Gabellieri, University of Bologna;

A SIMPLE LINEAR RESPONSE HISTORY ANALYSIS PROCEDURE FOR BUILDING CODES (ID 1383) A € H Kevin Aswegan, Virginia Tech; Finley Charney, Virginia Tech;



MODELING THE DYNAMIC STRUCTURAL BEHAVIOR OF DUCTILE AND NON-DUCTILE REINFORCED CONCRETE FRAMES - NEES RESEARCH (ID 1394) ∰ € I Panos Galanis, U.C. Berkeley; Jack Moehle, U.C. Berkeley; Yoon Bong Shin, Seoul National University;

3:30 pm - 5:00 pm **TH29. Site Response Analysis 2** Earthquake Hazard Tubughneng' 4, FL2 Dena'ina

MODERATOR: Hiroshi Kawase, Kyoto University

SITE AMPLIFICATION OF GROUND MOTIONS DURING THE 2010 MW 7.2 EL MAYOR-CUCAPAH EARTHQUAKE USING THE H/V SPECTRAL RATIO METHOD (ID 640) A f í Yun Liao, Kleinfelder; Jorge Meneses, GEI Consultants;

ADVANTAGES OF ACTIVE LOVE WAVE TECHNIQUES IN GEOPHYSICAL CHARACTERIZATION OF SEISMOGRAPHIC STATION SITESCASE STUDIES IN CALIFORNIA AND THE CENTRAL AND EASTERN UNITED STATES (ID 878) ∰ € Î Antony Martin, GEOVision, Inc.; Alan Yong, United States Geological Survey; Lawrence Salomone, Pinnacle Specialty Group, Inc.;

APPLICATION OF HORIZONTAL-TO-VERTICAL (H/V) SPECTRAL RATIOS FOR BOTH MICROTREMORS AND EARTHQUAKE MOTIONS BASED ON THE DIFFUSE FIELD THEORY (ID 928) A e i Hiroshi Kawase, Kyoto University; Francisco S, Universidad Nacional Aut; Fumiaki Nagashima, Kyoto University; Shinichi Matsushima, Kyoto University;

OBSERVATIONS AND ANALYSIS OF TOPOGRAPHIC EFFECTS IN THE SEISMIC RESPONSE OF THE PORT HILLS FOLLOWING THE 2011 CHRISTCHURCH EARTHQUAKE (ID 1005)/₩₩ €JÏ *Caroline Francois-Holden, GNS Science*; Anna Kaiser, GNS Science; Chris Massey, GNS Science;

DEVELOPMENT OF AN EFFICIENT PROCEDURE FOR PROBABILISTIC EARTHQUAKE SITE CLASS DETERMINATION (ID 1578) A Sheri Molnar, University of British Columbia; Carlos Ventura, University of British Columbia; Liam Finn, University of British Columbia; Mahdi Taiebat, University of British Columbia;

ROLE OF DIGITAL GEOSTRUCTURES IN EARTHQUAKE SIMULATIONS AT DIFFERENT SCALES (ID 684) AMMA FFÌ David Frost, Georgia Institute of Technology;

3:30 pm - 5:00 pm **TH30. Testing Of Steel Structures** Steel Buildings Tubughneng' 5, FL2 Dena'ina

MODERATOR: Matt Eatherton, Virginia Tech

CYCLIC BEHAVIOR OF DEEP STEEL COLUMNS SUBJECTED TO LARGE DRIFTS, ROTATIONS, AND AXIAL LOADS (ID 226) AMM FG Shokoufeh Zargar, University of New Hampshire; Eduardo Miranda, Stanford University; Ricardo A. Medina, University of New Hampshire;

DEVELOPMENT OF LOADING PROTOCOLS FOR EXPERIMENTAL TESTING OF STEEL COLUMNS SUBJECTED TO COMBINED HIGH AXIAL LOAD AND LATERAL DRIFT DEMANDS NEAR COLLAPSE (ID 280) AMA FH Yusuke Suzuki, McGill University; Dimitrios Lignos, McGill University;

LINKED COLUMN STEEL FRAME SYSTEM PERFORMANCE VALIDATION USING HYBRID TESTING (ID 963) 4444 FI J Peter Dusicka, Portland State University; Arlindo Lopes, Portland State University; Jeffrey Berman, University of Washington, Seattle;

EXPERIMENTAL STUDY ON THE INTERACTION BETWEEN ELASTICITY AND ROCKING (ID 1298) *Mini* Fî € *Michalis Vassiliou, ETH Zurich*; *Bozidar Stojadinovic, ETH Zurich; Rico Truniger, ETH Zurich*;

HYBRID SIMULATION OF THE SEISMIC RESPONSE OF A STEEL MOMENT FRAME BUILDING STRUCTURE THROUGH COLLAPSE - NEES RESEARCH (ID 1605) AND F

Maikol Del Carpio Ramos, University of New York at Buffalo; Gilberto Mosqueda, University of California, San Diego; Javad Hashemi, University of New York at Buffalo;

NUMERICAL UPDATING ON COLLAPSE SIMULATION OF A FOUR-STORY BUILDING THROUGH HYBRID TESTING - NEES RESEARCH (ID 1062), The second
Miguel Negrete, UNIVERSITY OF NEW HAMPSHIRE; Eduardo Miranda, STANFORD UNIVERSITY; Gilberto Mosqueda, UNIVERSITY OF CALIFORNIA, SAN DIEGO; M. Javad Hashemi, STATE UNIVERSITY OF NEW YORK, BUFFALO; Ricardo A. Medina, UNIVERSITY OF NEW HAMPSHIRE;

Concurrent Oral Sessions



FRIDAY, JULY 25

11:30 am - 1:00 pm **F01. San Francisco Earthquake Safety Implementation Plan** Community Resilience

Tikahtnu A/B, FL3 Dena'ina

MODERATOR: Chris Poland, Chris D. Poland Consulting Engineer

DESCRIPTION: The San Francisco Earthquake Safety Implementation Program (ESIP) grew out of the Community Action Plan for Seismic Safety (CAPSS), a community derived set of recommendations aimed at improving the City

GETTING STARTED: UNDERSTANDING SAN FRANCISCO'S VULNERABILITIES AND MITIGATION (ID ORAL2A)

THE EARTHQUAKE SAFETY IMPLEMENTATION PROGRAM: WORK PLAN AND INITIAL TASKS RELATED TO STANDARDS, SOFT STORY BUILDINGS, PRIVATE SCHOOLS AND FACADES. (ID ORAL2C)

UTILIZING AVAILABLE DATA TO LAUNCH THE SOFT STORY RETROFIT PROGRAM (ID ORAL2D)

11:30 am - 1:00 pm **F02. Building Code Revisions Proposed In The 2014 NEHRP Provisions** Building Codes Tikahtnu E/F, FL3 Dena'ina

MODERATOR: David Bonneville, Degenkolb Engineers

DESCRIPTION: Seismic building code development in the U.S. starts in the Building Seismic Safety Council

THE NEHRP RECOMMENDED SEISMIC PROVISIONS - 2015 UPDATE (ID 883) ### FJH David Bonneville, Degenkolb Engineers; Andrew Shuck, Wiss, Janney, Elstner Associates;

DEFINING SEISMIC CODE PERFORMANCE EXPECTATIONS (ID ORAL3A)

RESPONSE-HISTORY ANALYSIS FOR THE DESIGN OF NEW BUILDINGS: A FULLY REVISED CHAPTER 16 METHODOLOGY PROPOSED FOR THE 2015 NEHRP PROVISIONS AND THE ASCE/SEI 7-16 STANDARD (ID 1716)

DIAPHRAGM RESPONSE TO AND DESIGN FOR EARTHQUAKE GROUND MOTIONS (ID 1426) AMM GFÎ Dominic Kelly, Simpson Gumpertz & Heger Inc; Satyendra Ghosh, SK Ghosh Associates Inc.;

CHANGES IN SEISMIC HAZARD MAPPING (ID ORAL3B)

DEVELOPMENT OF SIMPLIFIED SEISMIC CODE PROVISIONS (ID 755) (COB William Holmes, Rutherford + Chekene;

11:30 am - 1:00 pm **F03. Liquefaction And Mitigation** Liquefaction Tikahtnu C, FL3 Dena'ina

MODERATOR: Ross Boulanger, University of California Davis

PB LIQUEFY: A NEW ANALYSIS TOOL FOR THE PERFORMANCE-BASED EVALUATION OF LIQUEFACTION TRIGGERING (ID 87) A Revin Franke, Brigham Young University; Alexander Wright, Brigham Young University; Cody Hatch, Brigham Young University;

DISSIPATED & STRAIN ENERGIES IN UNDRAINED CYCLIC LOADING TESTS FOR LIQUEFACTION POTENTIAL EVALUATIONS (ID 171) A g J Yosuke Kaneko, CHUO University: Takaji Kokusho, CHUO University: 10th U.S. National Conference on Earthquake Engineering • Concurrent Oral Sessions



ASSESSMENT OF AGING CORRECTION FACTORS FOR LIQUEFACTION RESISTANCE AT SITES OF RECURRENT LIQUEFACTION (ID 931)

Brett Maurer, Virginia Tech; Brendon Bradley, University of Canterbury; Misko Cubrinovski, University of Canterbury; Russell Green, Virginia Tech;

CONSTITUTIVE MODELING OF LIQUEFACTION EFFECTS IN SLOPING GROUND (ID 1159) **A G** € **Katerina Ziotopoulou, University of California, Davis**; Akihiro Takahashi, Tokyo Institute of Technology; Manika Maharjan, Tokyo Institute of Technology; Michael Beaty, Beaty Engineering LLC; Richard Armstrong, California Department of Water Resources; Ross Boulanger, University of California, Davis;

CYCLIC MOBILITY AND POST-LIQUEFACTION BEHAVIORS OF GRANULAR SOILS UNDER CYCLIC LOADING: MICROMECHANICAL PERSPECTIVES (ID 1501)

Gang Wang, Hong Kong University of Science and Technology; Jiangtao Wei, Hong Kong University of Science and Technology;

11:30 am - 1:00 pm **F04. Recent Advances And Future Directions For Seismic Isolation** Seismic Isolation Tikahtnu D, FL3 Dena'ina

MODERATOR: Andy Taylor, *KPFF Consulting Engineers*

DESCRIPTION: This session will focus on describing the state-of-the-art of application of seismic isolation systems, the observed behavior of these systems, and projections for future advancements in seismic isolation technology.

SEISMIC BASE ISOLATION OF THE NUNOA CAPITAL BUILDING, THE TALLEST BASE ISOLATED RESIDENTIAL BUILDING IN THE AMERICAS (ID 615) AMA GJI

Ruben Boroschek, RBA; Mario Lafontaine, Rene Lagos Engineers; Rene Lagos Contreras, Rene Lagos Engineers; Rodrigo Retamales, RBA;

OBSERVED PERFORMANCE OF SEISMICALLY ISOLATED STRUCTURES IN THE MARCH 11, 2011 TOHOKU EARTHQUAKE (ID ORAL37A)

Kazuhiko Kasai, Tokyo Institute of Technology;

THE NEXT GENERATION OF CODES FOR SEISMIC ISOLATION IN THE UNITED STATES AND REGULATORY BARRIERS TO SEISMIC ISOLATION DEVELOPMENT. (ID 1095) HE Ronald Mayes, SGH Inc.;

SEISMIC ISOLATION OF SINGLE FAMILY HOMES: CURRENT TECHNOLOGY AND FUTURE APPLICATIONS (ID 501) ### HFI Andrew Taylor, KPFF Consulting Engineers;

DYNAMIC TESTING OF A LOW-COST SLIDING ISOLATION SYSTEM FOR LIGHT-FRAME RESIDENTIAL STRUCTURES - NEES RESEARCH (ID 263) A Diversity: Benjamin Fell, California State University at Sacramento: Eduardo Miranda, Stanford University:

Ezra Jampole, Stanford University; Benjamin Fell, California State University at Sacramento; Eduardo Miranda, Stanford University; Gregory Deierlein, Stanford University; Scott Swensen, Stanford University;

11:30 am - 1:00 pm **F05. Assessment And Retrofit Of Buildings** Buildings - Retrofit Board Room, FL2 Dena'ina

MODERATOR: Richard Wood, University of Nebraska-Lincoln

SEISMIC ASSESSMENT AND REHABILITATION OF EXISTING STEEL BRACED FRAMES DESIGNED IN ACCORDANCE WITH THE 1980 CANADIAN CODE PROVISIONS (ID 510) A HU **Robert Tremblay, Ecole Polytechnique of Montreal**; Sanda Koboevic, Ecole Polytechnique of Montreal; Yasaman Balazadeh Minouei, Ecole Polytechnique of Montreal;

REHABILITATION OF MAISON DUFORT: ADOPTING TRADITIONAL TECHNIQUES FOR SEISMIC RETROFITTING (ID 1043) A f € **Owen Rosenboom, Wiss, Janney, Elstner Associates, Inc.**; Stephen Kelley, Wiss, Janney, Elstner Associates, Inc.; Terrence Paret, Wiss, Janney, Elstner Associates, Inc.;

FEMA P-807: GUIDELINES FOR SEISMIC RETROFIT OF WEAK-STORY WOOD-FRAMED BUILDINGS - NEES RESEARCH (ID 1186) **////// H** F **David Mar, Tipping Mar, Structural Engineering**; Mike Korolyk, Tipping Mar, Structural Engineering;

A MODEL FOR PREDICTING PANEL ZONE DEFORMATION CAPACITY IN REHABILITATED STEEL MOMENT CONNECTIONS (ID 1397)

Concurrent Oral Sessions (continued)



FRIDAY, JULY 25

Chia-Ming Uang, University of California, San Diego; Colin Blaney, ZFA STRUCTURAL ENGINEERS; Dong-Won Kim, University of California, San Diego,

NUMERICAL MODELING OF URM INFILL WALLS RETROFITTED WITH EMBEDDED REINFORCING STEEL (ID 1705) MI H Rajendra Soti, Oregon State University; Andre Barbosa, Oregon State University; Andreas Stavridis, University of Buffalo;

SEISMIC REHABILITATION OF STEEL CONCENTRICALLY BRACED FRAMES USING STIFF ROCKING CORES (ID 338) Bing Qu, California Polytechnic State Univ.; Francisco Sanchez-Zamora, California Polytechnic State Univ.; Gilberto Mosqueda, University of California, San Diego; Juan Sanchez, California Polytechnic State Univ.; Michael Pollino, Case Western Reserve University;

11:30 am - 1:00 pm F06. Structural Design Methods And Performance Buildings/Risk Kahtnu 1, FL2 Dena'ina

MODERATOR: Kurt McMullin, San Jose State University

THE INFLUENCE OF THE GRAVITY SYSTEM FRAMING ON THE SEISMIC PERFORMANCE OF SPECIAL STEEL MOMENT FRAMES (ID 532) Á M I €

Francisco Flores, Virginia Tech; Finley Charney, Virginia Tech;

DIRECT PERFORMANCE-BASED SEISMIC DESIGN OF STRUCTURES USING YIELD FREQUENCY SPECTRA (ID 1079)### I FÎ Dimitrios Vamvatsikos, National Technical University of Athens; Mark Aschheim, Santa Clara University;

SEISMIC DESIGN OF CONCRETE BUILDINGS THE 2015 CANADIAN BUILDING CODE (ID 1413) AMAI G Perry Adebar, University of British Columbia; Denis Mitchell, McGill University; James Mutrie, Jones Kwong Kishi; Ronald Devall, Read Jones Christoffersen Ltd.:

DEVELOPMENT OF SEISMIC DESIGN METHODOLOGIES FOR RIGID WALL FLEXIBLE DIAPHRAGM STRUCTURES (ID 1443) John Lawson, Cal Poly San Luis Obispo; Andre Filiatrault, University at Buffalo, SUNY; Dominic Kelly, Simpson Gumpertz & Heger; Maria Koliou, University at Buffalo, SUNY;

EXAMINING THE APPLICABILITY OF DESIGN METHODS FOR LARGE PANELIZED ALL-WOOD ROOF DIAPHRAGMS UNDER SEISMIC LOADING (ID 1503) ANNA LLJ Weichiang Pang, Clemson University; Chun Ni, FPInnovations; John Lawson, California Polytechnic State University; Sami Pant, Clemson University:

WHEN NEW STRUCTURES FAIL: PARTIAL SEISMIC COLLAPSE OF THE ROYAL PALM RESORT AND OTHER REINFORCED CONCRETE STRUCTURES SHORTLY AFTER SUBSTANTIAL COMPLETIONDESIGN FLAWS, CONSTRUCTION DEFECTS AND LEGAL RAMIFICATIONS (ID 1712) A I΀

Mark White, Law Offices Of Mark N. White; John Osteraas, Exponent/Failure Analysis Associates;

11:30 am - 1:00 pm F07. Accelerated Bridge Construction Using Precast Components Bridges/Lifelines Kahtnu 2, FL2 Dena'ina

MODERATOR: Saiid Saiidi, University of Nevada Reno

GROUTED SPLICE SLEEVE CONNECTION ALTERNATIVES FOR PRECAST REINFORCED CONCRETE BRIDGE PIERS IN MODERATE-TO-HIGH SEISMIC REGIONS (ID 466) AMA I Ï F Chris Pantelides, University of Utah; Dylan Brown, University of Utah; Joel Parks, University of Utah; Mohammad Ameli, University of Utah;

NONLINEAR ANALYSIS OF HYBRID SLIDING-ROCKING POST-TENSIONED SEGMENTAL BRIDGES (ID 1135) XXXX I Ì G Petros Sideris, University of Colorado - Boulder; Amjad Aref, University at Buffalo, The State University of NY; Andre Filiatrault, University at Buffalo, The State University of NY;

EXPERIMENTAL INVESTIGATION INTO THE SEISMIC PERFORMANCE OF HALF-SCALE FULLY PRECAST BRIDGE BENT INCORPORATING EMULATIVE SOLUTION (ID 1471) ANA I JH Mustafa Mashal, University of Canterbury; Alessandro Palermo, University of Canterbury;

DEVELOPMENT OF A BRIDGE BENT SYSTEM FOR RAPID CONSTRUCTION AND ENHANCED SEISMIC PERFORMANCE (ID 1477) 🛲 Í €Í Marc Eberhard, University of Washington; Gunnsteinn Finnsson, EFLA Consulting Engineers; John Stanton, University of Washington; Mathew Schoettler, U.C.Berkeley; Olafur Haraldsson, University of Washington; Phillip Davis, KPFF;

EARTHQUAKE-RESISTANT TELESCOPIC PIPE PIN COLUMN BASE CONNECTIONS FOR ACCELERATED BRIDGE CONSTRUCTION (ID 1516) 🛲 Í FÎ

Saiid Saiidi, University of Nevada, Reno; Ali Mehrsoroush, University of Nevada, Reno;

A PRE-TENSIONED, ROCKING BRIDGE BENT FOR ABC IN SEISMIC REGIONS - NEES RESEARCH (ID 1534) 🛲 Í G



John Stanton, University of Washington; Bryan Kennedy, University of Washington; David Sanders, University of Nevada Reno; Islam Mantawy, University of nevada Reno; Jeffrey Schaefer, University of Washington; Marc Eberhard, University of Washington; Olafur Haraldsson, University of Washington; Travis Thonstad, University of Washington;

11:30 am - 1:00 pm **F08. Earthquake Resilience Of Tall Buildings** Buildings - New Tubughnenq' 3, FL2 Dena'ina

MODERATOR: Ying Zhou, Tongi University

DESCRIPTION: This special session is on earthquake resilience of tall buildings. Research progress on the topic, especially on the US-China collaboration projects supported by NEES and NSFC, will be reported. There will be three speakers from US and three from China. Each presentation will be 15min including Q&A.

A COMPARISON OF THE SEISMIC DESIGN OF TALL RC FRAME-CORE TUBE STRUCTURES IN CHINA AND THE UNITED STATES - NEES RESEARCH (ID 515) A I Î

Xinzheng Lu, Department of Civil Engineering, Tsinghua University; Linlin Xie, Department of Civil Engineering, Tsinghua University; Mengke Li, Department of Civil Engineering, Tsinghua University; Xiao Lu, Department of Civil Engineering, Tsinghua University;

EARTHQUAKE RESILIENCE OF TALL BUILDINGS USING REPLACEABLE ENERGY DISSIPATION MEMBERS (ID 1304) Ki I I Xilin Lu, Tongji University; Yung Zhou, Tongji University; Yuanjun Mao, Tongji University; Yun Chen, Tongji University;

STUDY AND APPLICATION OF METALLIC YIELDING ENERGY DISSIPATION DEVICES IN BUILDINGS (ID 566) ### 1 i i Hongnan Li, Dalian University of Technology; Gang Li, Dalian University of Technology; Suyan Wang, Dalian University of Technology;

THE REDI RATING SYSTEM: A FRAMEWORK TO IMPLEMENT RESILIENCE-BASED EARTHQUAKE DESIGN FOR NEW BUILDINGS (ID 1055) A line of the set of

Ibrahim Almufti, Arup; Michael Willford, Arup;

SEISMIC RESILIENCE OF TALL BUILDINGS BENCHMARKING PERFORMANCE AND QUANTIFYING IMPROVEMENTS - NEES RESEARCH (ID 1724) (II) Greg Deierlein, Stanford University; Jenni Tipler, Stanford University;

11:30 am - 1:00 pm **F09. Tsunami Social Science Research: Where We Are And Future Directions** Tsunami Tsubushapadi 4, EL2 Danalina

Tubughnenq' 4, FL2 Dena'ina

MODERATOR: Liesel Ritchie, University of Colorado at Boulder

DESCRIPTION: In the past decade, social science research on impacts of tsunamis, as well as tsunami awareness and preparedness, has increased substantially, fostered in part by support from the National Science Foundation, NOAA, USGS, and others. This session will provide a forum to examine the 'state of the state' in this important arena. Session speakers will provide brief overviews of their respective tsunami-related applied and basic research and outreach activities, followed by a panel discussion of gaps in current tsunami social science and possible directions for future studies. The session will conclude with ample time for audience participation in this dialogue.

TSUNAMI SOCIAL SCIENCE RESEARCH: WHERE WE ARE AND FUTURE DIRECTIONS PANEL (ID ORAL25A) A District Chris Gregg, East Tennessee State University; Cindi Preller, NOAA; David Johnston, Joint Centre for Disaster Research GNS Science/Massey University; Duane Gill, Oklahoma State University; Nate Wood, U.S. Geological Survey; Sherri Brokopp Binder, NOAA; Steve Meinhold, University of North Carolina, Wilmington ;

11:30 am - 1:00 pm **F10. Testing Of Concrete Structures** Experimental Tubughnenq' 5, FL2 Dena'ina

MODERATOR: Jack Moehle, UC Berkeley

EXPERIMENTAL AND ANALYTICAL RESPONSE OF RC WALL BOUNDARY ELEMENTS (ID 361) *iii* J Leonardo Massone, University of Chile; Pablo Herrera, University of Chile; Pablo Polanco, University of Chile;

STRUCTURAL HEALTH MONITORING USING STRONG AND WEAK EARTHQUAKE MOTIONS (ID 713) A €€ Ruben Boroschek, University of Chile; Antonio Aguilar, Ruben Boroschek and Associates; Pablo Leon, University of Chile;

Concurrent Oral Sessions (continued)



FRIDAY, JULY 25

PRELIMINARY RESULTS FOR NEESR FULL-SCALE RC COLUMN TESTS UNDER COLLAPSE-CONSISTENT LOADING PROTOCOLS - NEES RESEARCH (ID 863) AMA Î FG

Alireza Nojavan, University of Minnesota; Arturo E. Schultz, University of Minnesota; Curt Haselton, California State University, Chico; Guillermo Palacios, The University of Texas at Arlington; Sanputt Simasathien, The University of Texas at Arlington; Shih-Ho Chao, The University of Texas at Arlington; Xuejian Liu, The University of Texas at Arlington;

EXPERIMENTAL RESPONSE OF BOUNDARY ELEMENTS OF CODE-COMPLIANT REINFORCED CONCRETE SHEAR WALLS - NEES RESEARCH (ID 864)

Carlos Arteta, Universidad del Norte; Duy To, University of California Berkeley; Jack Moehle, University of California Berkeley;

EXPERIMENTAL CAMPAIGN OF REINFORCED CONCRETE WALLS WITH NON-SEISMIC DETAILING (ID 1230) A f H **Matias Hube, Pontificia Universidad Catolica de Chile**; Andres Marihuen, Pontificia Universidad Catolica de Chile; Bozidar Stojadinovic, Swiss Federal Institute of Technology; Juan Carlos De La Llera, Pontificia Universidad Catolica de Chile;

PERFORMANCE OF INTERLOCKING COMPRESSED EARTH BLOCK INFILL IN CONFINED MASONRY CONSTRUCTION (ID 11) ### Î I Î Peter Laursen, Cal Poly San Luis Obispo; Bing Qu, Cal Poly San Luis Obispo; Daniel Jansen, Cal Poly San Luis Obispo; Ivan Castro, Cal Poly San Luis Obispo;

5-in-5 Sessions

TUESDAY, JULY 22



5:30 pm - 6:45 pm **Modeling And Analysis Of Buildings** Structural Testing Kahtnu 1, FL2 Dena'ina

MODERATOR: Eduardo Miranda, Stanford University

EQUIVALENT STRUCTURAL DAMPING OF DRIFT-SENSITIVE NONSTRUCTURAL BUILDING COMPONENTS (ID 91) A f Í Í **David Welch, UME School - IUSS Pavia**; Andre Filiatrault, University at Buffalo, The State University of New York; Timothy Sullivan, University of Pavia / EUCENTRE;

INHERENT DAMPING MODELS FOR SDOF SYSTEMS (ID 225) A î î î Choungyeol Seo, Bechtel; Richard Sause, Lehigh University;

DYNAMIC SEISMIC RESPONSE AND DESIGN OF SINGLE-STOREY STRUCTURES WITH FLEXIBLE STEEL ROOF DECK DIAPHRAGMS (ID 387)///// Î Î Î Robert Tremblay, Ecole Polytechnique; Colin Rogers, McGill University; Simon Trudel-Languedoc, Ecole Polytechnique;

TOOLS FOR MODELING THE LATERAL RESPONSE OF SQUAT REINFORCED CONCRETE SHEAR WALLS (ID 667) (ID 667) Carlos Adorno-Bonilla, UPRM; Aidcer Vidot-Vega, UPRM; Manuel Miranda, BNL;

DEVELOPMENT OF A FINITE ELEMENT MODEL FOR PARTIALLY GROUTED REINFORCED MASONRY (ID 825) A J J Laura Redmond, Georgia Institute of Technology; Andreas Stavridis, University of Buffalo; Reginald Desroches, Georgia Institute of Technology;

PUSHOVER-BASED PROCEDURE FOR APPROXIMATE SIMULATION OF SYSTEM FAILURE MODES OBSERVED DUE TO GROUND MOTIONS (ID 1276) AN I FF

Matjaz Dolsek, University of Ljubljana; Marko Brozovic, University of Ljubljana;

BAYESIAN FRAGILITIES FOR A BUILDING-PARTITION WALL COUPLED SYSTEM (ID 1279) (III GG **Richard Wood, University of Nebraska-Lincoln**; Chang Hoon Lee, Cornell University; Mircea Grigoriu, Cornell University; Tara Hutchinson, University of California, San Diego;

NUMERICAL SIMULATION OF THE SEISMIC RESPONSE OF STEEL X-BRACED FRAMES WITH SINGLE SHEAR BOLTED CONNECTIONS (ID 1350) III H Robert Tremblay, Ecole Polytechnique; Ali Davaran, Ecole Polytechnique; Sophie Decaen, Ecole Polytechnique;

5:30 pm - 6:45 pm **Computing/Analysis** Building Systems Kahtnu 2, FL2 Dena'ina

MODERATOR: Andreas Schellenberg, UC Berkeley

DEFORMATION LIMIT STATES FOR LONGITUDINAL BAR BUCKLING IN RC CIRCULAR COLUMNS CONSIDERING THE EFFECT OF SEISMIC LOAD HISTORY (ID 130) (II
ANALYSIS OF DYNAMICAL SYSTEMS WITH PATH-DEPENDENT NONLINEARITIES USING MATLAB ODE SOLVERS (ID 574) ANALYSIS OF DYNAMICAL SYSTEMS WITH PATH-DEPENDENT NONLINEARITIES USING MATLAB ODE SOLVERS (ID 574) ANALYSIS OF DYNAMICAL SYSTEMS WITH PATH-DEPENDENT NONLINEARITIES USING MATLAB ODE SOLVERS (ID 574) ANALYSIS OF DYNAMICAL SYSTEMS WITH PATH-DEPENDENT NONLINEARITIES USING MATLAB ODE SOLVERS (ID 574) ANALYSIS OF DYNAMICAL SYSTEMS WITH PATH-DEPENDENT NONLINEARITIES USING MATLAB ODE SOLVERS (ID 574) ANALYSIS OF DYNAMICAL SYSTEMS WITH PATH-DEPENDENT NONLINEARITIES USING MATLAB ODE SOLVERS (ID 574) ANALYSIS OF DYNAMICAL SYSTEMS (ID 574) ANALYSIS
IMPACT OF VISCOUS DAMPING MODELS ON NONLINEAR RESPONSE OF SDOF SYSTEMS (ID 740) AND IT I I Mervyn Kowalsky, North Carolina State University; Umut Hasgul, North Carolina State University;

NONLINEAR STRUCTURAL VIBRATION UNDER BI-DIRECTIONAL RANDOM EXCITATIONS WITH INCIDENT ANGLE THETA BY TAIL EQUIVALENT LINEARIZATION METHOD. (ID 840) (IIII) in the second se

IMPLEMENTATION OF CORROSION DAMAGE MODELS IN NONLINEAR FIBRE BEAM-COLUMN ELEMENT (ID 966) Mili J J **Mohammad Mehdi Kashani, University of Bristol**; Adam Crewe, University of Bristol; Laura Lowes, University of Washington; Nicholas Alexander, University of Bristol;

PREDICTION OF SHEAR FAILURE IN RC SHEAR WALLS USING THE TWO-DISCRETE-ELEMENTS SHEAR DEFORMATION THEORY (ID 815)/## I FF

5-in-5 Sessions (continued)



TUESDAY, JULY 22

Fadi Oudah, University of Calgary; Raafat El-Hacha, University of Calgary;

FINITE ELEMENT SIMULATION OF BRICK MASONRY BUILDING UNDER SHOCK LOADING (ID 1089) AMA Ì GG **R.N. Dubey, IIT Roorkee**; A. Joshua Daniel, IIT Roorkee;

ANALYTICAL EVALUATION OF IN-GROUND PLASTIC-HINGE LENGTH AND DEPTH FOR PILES IN MARINE OIL TERMINALS (ID 238) ANALYTICAL EVALUATION OF IN-GROUND PLASTIC-HINGE LENGTH AND DEPTH FOR PILES IN MARINE OIL TERMINALS (ID 238) ANALYTICAL EVALUATION OF IN-GROUND PLASTIC-HINGE LENGTH AND DEPTH FOR PILES IN MARINE OIL TERMINALS (ID 238) ANALYTICAL EVALUATION OF IN-GROUND PLASTIC-HINGE LENGTH AND DEPTH FOR PILES IN MARINE OIL TERMINALS (ID 238) ANALYTICAL EVALUATION OF IN-GROUND PLASTIC-HINGE LENGTH AND DEPTH FOR PILES IN MARINE OIL TERMINALS (ID 238) ANALYTICAL EVALUATION OF IN-GROUND PLASTIC-HINGE LENGTH AND DEPTH FOR PILES IN MARINE OIL TERMINALS (ID 238) ANALYTICAL EVALUATION OF IN-GROUND PLASTIC-HINGE LENGTH AND DEPTH FOR PILES IN MARINE OIL TERMINALS (ID 238) ANALYTICAL EVALUATION OF IN-GROUND PLASTIC-HINGE LENGTH AND DEPTH FOR PILES IN MARINE OIL TERMINALS (ID 238) ANALYTICAL EVALUATION OF IN-GROUND PLASTIC-HINGE LENGTH AND DEPTH FOR PILES IN MARINE OIL TERMINALS (ID 238) ANALYTICAL EVALUATION OF IN-GROUND PLASTIC-HINGE LENGTH AND DEPTH FOR PILES IN MARINE OIL TERMINALS (ID 238) ANALYTICAL EVALUATION OF IN-GROUND PLASTIC-HINGE LENGTH AND DEPTH FOR PILES IN MARINE OIL TERMINALS (ID 238) ANALYTICAL EVALUATION OF IN-GROUND PLASTIC-HINGE LENGTH AND DEPTH FOR PILES IN MARINE OIL TERMINALS (ID 238) ANALYTICAL EVALUATION OF IN-GROUND PLASTIC-HINGE LENGTH AND DEPTH FOR PILES IN MARINE OIL TERMINALS (ID 238) ANALYTICAL EVALUATION OF IN-GROUND PLASTIC-HINGE LENGTH AND DEPTH FOR PILES IN MARINE OIL TERMINALS (ID 238) ANALYTICAL EVALUATION OF IN-GROUND PLASTIC-HINGE LENGTH AND DEPTH FOR PILES IN MARINE OIL TERMINALS (ID 238) ANALYTICAL EVALUATION OF IN-GROUND PLASTIC-HINGE LENGTH AND DEPTH FOR PILES IN MARINE OIL TERMINALS (ID 238) ANALYTICAL EVALUATION OF IN-GROUND PLASTIC-HINGE LENGTH AND DEPTH FOR PILES IN ANALYTICAL EVALUATION OF INGE ANALYTICAL EV

5:30 pm - 6:45 pm **Seismic Isolation** Building Safety Tubughneng' 3, FL2 Dena'ina

MODERATOR: Tracy Becker, Kyoto University

SEISMIC PERFORMANCE OF SLIDING CONTENTS IN BASE-ISOLATED BUILDINGS (ID 17) A Dimitrios Konstantinidis, McMaster University; Dimitrios Konstantinidis, McMaster University;

OPTIMUM SEISMIC DESIGN OF NONLINEAR ASYMMETRIC STRUCTURES CONTROLLED BY LARGE TUNED MASS DAMPERS. (ID 754)

Juan Aguirre, Pontificia Universidad Cat;

DIRECT ASSESSMENT OF THE NONLINEAR SEISMIC RESPONSE OF RC FRAMES WITH VISCOUS DAMPERS (ID 1088) I Í Í Luca Landi, University of Bologna; Omar Fabbri, University of Bologna; Pier Paolo Diotallevi, University of Bologna;

THE EFFECTS OF RESIDUAL DISPLACEMENT ON GAP DAMPER PERFORMANCE (ID 1244) (ID

RESEARCH AND DEVELOPMENT OF STEEL DAMPERS FOR BASE-ISOLATED STRUCTURES (NO. 2: EVALUATION OF PLASTIC DEFORMATION CAPACITY OF U-SHAPED STEEL DAMPERS FOR BASE ISOLATED STRUCTURES UNDER 2D HORIZONTAL LOADING) (ID 1246)

Masao Terashima, Nippon Steel & Sumikin Engineering Co., Ltd.; Diana Ene, Tokyo Institute of Technology; Norihisa Kawamura, Nippon Steel & Sumikin Engineering Co., Ltd.; Satoshi Yamada, Tokyo Institute of Technology; Shoichi Kishiki, Osaka Institute of Technology; Yoshinao Konishi, Nippon Steel & Sumikin Engineering Co., Ltd.;

SEISMIC FRAGILITY CURVES FOR THE SHELL BASE CONNECTION OF UNANCHORED STEEL LIQUID STORAGE TANKS WITH ENERGY DISSIPATION DEVICES (ID 1366) []]

Jos Colombo, Pontificia Universidad Cat; Jos Almaz, Pontificia Universidad Cat;

MULTI-MODE RESPONSE OF BASE-ISOLATED RIGID BLOCKS TO GROUND EXCITATION (ID 1654) Mil Ì JJ Spyroula Odysseos, University of Cyprus; Panayiotis Roussis, University of Cyprus;

5:30 pm - 6:45 pm **Soils/Foundation** Risk Assessment Tubughnenq' 4, FL2 Dena'ina

MODERATOR: Ellen Rathje, The University of Texas at Austin

RISK OF SEISMIC DEFORMATION OF A 1960S ROCKFILL DAM IN LEBANON (ID 419) *MMA* J€J Justin Phalen, AMEC Environment & Infrastructure; Eric Viala, Engility (formerly: International Resources Group); Faiz Makdisi, AMEC Environment & Infrastructure; Jian Hu, AMEC Environment & Infrastructure; Nabil Amacha, Litani River Authority;

INFLUENCE OF THE DYNAMIC SOIL STRUCTURE INTERACTION ON THE INELASTIC RESPONSE OF STEEL FRAMES. (ID 896) JGG Luciano Roberto Fernandez-Sola, Universidad Autonoma Metropolitana; David Davalos-Chavez, Universidad Autonoma Metropolitana; Edgar Tapia-Hernandez, Universidad Autonoma Metropolitana;

IMPROVED TWO-STEP METHOD FOR SEISMIC ANALYSIS OF STRUCTURES (ID 898) ### JHH *Alidad Hashemi, Bechtel National Inc.; Jaspal Saini, Bechtel Power Corporation; Luis Moreschi, Bechtel Power Corporation; Sanjeev R. Malushte, Bechtel Power Corporation;*

ENERGY-BASED LIQUEFACTION POTENTIAL EVALUATION COMPARED WITH STRESS-BASED METHOD (ID 935) ### JI I Takaji Kokusho, CHUO university; Yuuki Mimori, CHUO university;

MULTIPLE STRUCTURE-SOIL-STRUCTURE INTERACTION AND COUPLING EFFECTS IN BUILDING CLUSTERS (ID 1026) ### JÍ Í *Ricardo Taborda, University of Memphis*; Jacobo Bielak, Carnegie Mellon University; Yigit Isbiliroglu, Carnegie Mellon University;

KINEMATIC LOADING AND CURVATURE DEMAND FOR PILES IN NON-UNIFORM SOIL PROFILES (ID 1498) AND CURVATURE DEMAND FOR PILES IN NON-UNIFORM SOIL PROFILES (ID 1498) AND CURVATURE DEMAND FOR PILES IN NON-UNIFORM SOIL PROFILES (ID 1498) AND CURVATURE DEMAND FOR PILES IN NON-UNIFORM SOIL PROFILES (ID 1498) AND CURVATURE DEMAND FOR PILES IN NON-UNIFORM SOIL PROFILES (ID 1498) AND CURVATURE DEMAND FOR PILES IN NON-UNIFORM SOIL PROFILES (ID 1498) AND CURVATURE DEMAND FOR PILES IN NON-UNIFORM SOIL PROFILES (ID 1498) AND CURVATURE DEMAND FOR PILES IN NON-UNIFORM SOIL PROFILES (ID 1498) AND CURVATURE DEMAND FOR PILES IN NON-UNIFORM SOIL PROFILES (ID 1498) AND CURVATURE DEMAND FOR PILES IN NON-UNIFORM SOIL PROFILES (ID 1498) AND CURVATURE DEMAND FOR PILES IN NON-UNIFORM SOIL PROFILES (ID 1498) AND CURVATURE DEMAND FOR PILES IN NON-UNIFORM SOIL PROFILES (ID 1498) AND CURVATURE DEMAND FOR PILES IN NON-UNIFORM SOIL PROFILES (ID 1498) AND CURVATURE DEMAND FOR PILES IN NON-UNIFORM SOIL PROFILES (ID 1498) AND CURVATURE DEMAND FOR PILES IN NON-UNIFORM SOIL PROFILES (ID 1498) AND CURVATURE DEMAND FOR PILES (ID



Eng Sew Aw, AMEC; Fenggang Ma, Washington State Department of Ecology DSO; John Egan, AMEC; Joseph De Larios, AMEC;

5:30 pm - 6:45 pm **Bridges** Earthquake Lessons Tubughnenq' 5, FL2 Dena'ina

MODERATOR: John Stanton, University of Washington

PRELIMINARY PARAMETRIC STUDY OF THE EFFECTS OF LIVE LOAD ON SEISMIC RESPONSE OF HIGHWAY BRIDGES - NEES RESEARCH (ID 152)

Ian Buckle, University of Nevada, Reno; Danielle Sanford, University of Nevada, Reno; David Sanders, University of Nevada, Reno; Hartanto Wibowo, University of Nevada, Reno;

Sherif Beskhyroun, The University of Auckland; Bo Li, The University of Auckland; Nawawi Chouw, The University of Auckland;

IMPACTS OF THE 1811-1812 EARTHQUAKES ON EXISTING TRANSPORTATION NETWORKS IN MEMPHIS AREA (ID 388) AMA JJJ Adel Abdelnaby, University of Memphis; Anteneh Yohannes, University of Memphis; Farzaneh Raji, University of Memphis; Sabya Mishra, University of Memphis;

DEVELOPMENT OF CYCLIC LOADING PROTOCOL FOR BRIDGE COLUMNS CONSIDERING SUBDUCTION ZONE MEGA EARTHQUAKES (ID 686) A GREAT CONSTRUCTION FOR THE CONSTRUCTION F

IN SITU DYNAMIC PROPERTIES OF AN IN-SERVICE BRIDGE USING FORCED VIBRATION TESTING (ID 698) A CF Liam Wotherspoon, University of Auckland; Jason Ingham, University of Auckland; Lucas Hogan, University of Auckland; Sherif Beskhyroun, University of Auckland;

SEISMIC RESPONSE PREDICTION OF BRIDGES USING INCREMENTAL DYNAMIC ANALYSIS WITH SUBDUCTION ZONE AND CRUSTAL GROUND MOTION RECORDS (ID 800)

Payam Tehrani, McGill University; Denis Mitchell, McGill University; Gail Atkinson, University of Western Ontario; Katsuichiro Goda, University of Bristol; Luc Chouinard, McGill University;

DEVELOPING A SOIL-BRIDGE INTERACTION MODEL FOR STUDYING THE EFFECTS OF LONG-DURATION EARTHQUAKE MOTIONS (ID 944), 4 H

Andre R. Barbosa, Oregon State University; H. Ben Mason, Oregon State University; Kyle Romney, Oregon State University;

NON-LINEAR DYNAMIC AND STATIC ANALYSIS OF SIX SPAN RC BOX GIRDER BRIDGE WITH HIGH HOLLOW PIERS: DISCUSSION AND COMPARISON (ID 1000) AND COMPARISO

Radenko Pejovic, Faculty of civil engineering, University of Montenegro; Jelena Pejovic, Faculty of civil engineering, University of Montenegro; Nina Serdar, Faculty of civil engineering, University of Montenegro;

MODELING FRAMEWORK FOR SOIL-BRIDGE SYSTEM RESPONSE DURING SEQUENTIAL EARTHQUAKE AND TSUNAMI LOADING (ID 1056)

H. Benjamin Mason, Oregon State University; Andre Barbosa, Oregon State University; Michael Scott, Oregon State University; Trevor Carey, Oregon State University;

5-in-5 Sessions



WEDNESDAY, JULY 23

5:30 pm - 6:45 pm **Structural Design And Building Performance** Buildings - New Kahtnu 1, FL2 Dena'ina

MODERATOR: Ken Elwood, University of British Columbia

EVALUATING RESPONSE MODIFICATION FACTORS OF OPEN-FRAMES STEEL PLATFORMS (ID 193) ∰ €Î Î Yasser Salem, California State Polytechnic University, Pomona; Ahmed Nasr, California State University Long Beach;

PERFORMANCE-BASED SEISMIC ASSESSMENT OF UNREINFORCED MASONRY BUILDINGS IN NEW YORK CITY (ID 748) A Juan Aleman, ARUP; Gilberto Mosqueda, University of California San Diego;

SEISMIC PERFORMANCE OF INTERMEDIATE MOMENT FRAMES WITH RBS-B CONNECTIONS (ID 858) A €JÍ Sang Whan Han, Hanyang University; Bozidar Stojadinovic, ETH Z; Ki Hoon Moon, Hanyang University;

DUCTILE DESIGN OF SLENDER REINFORCED CONCRETE STRUCTURAL WALLS (ID 877) A State University of Alabama, Tuscaloosa; Hongbo Dai, University of Delaware; Sri Sritharan, Iowa State University;

SEISMIC REPERCUSSIONS: IEBC CODE REQUIREMENTS REGARDING ADDITIONS AND ALTERATIONS (ID 1040) ### FFH **Owen Rosenboom, Wiss, Janney, Elstner Associates, Inc.**; Gwenyth Searer, Wiss, Janney, Elstner Associates, Inc.;

PERFORMANCE OF STEEL FRAMED STRUCTURES WITH INFILLED CORRUGATED PLATE DAMPERS (ID 1311) ### FG Hsieh-Lung Hsu, National Central University; Yu-Chen Li, National Central University;

EVALUATION OF ASCE/SEI 7 PROVISIONS FOR DETERMINATION OF SEISMIC DEMANDS ON NONSTRUCTURAL COMPONENTS (ID 1323) A FH Bing Qu, California Polytechnic State Univ.; Charles Chadwell, California Polytechnic State Univ.; Rakesh Goel, California Polytechnic State Univ.;

COMPARATIVE DESIGN OF SCBFS USING AISC 341-05 AND AISC 341-10 (ID 1485) AND AISC 341-10 (ID 1485

SEISMIC PERFORMANCE OF ROOF MOUNTED SPIRES (ID 1730) Min Fi H Tim Graf, Simpson Gumpertz & Heger; Brent Maxfield, Client; Chris Poland, Degenkolb Engineers; Phil Davis, KPFF;

EFFECT OF INFILL PANELS ON THE RESPONSE MODIFICATION FACTOR OF STEEL STRUCTURES (ID 1735) **//////** FÎ I **Elnaz Barikani, Kharazmi University**; Ali Massumi, Kharazmi University;

5:30 pm - 6:45 pm **Experimental Methods** Building Safety Kahtnu 2, FL2 Dena'ina

MODERATOR: Gilberto Mosqueda, UC San Diego

EXPERIMENTAL APPLICATIONS OF 3D POSITION MONITORING SYSTEMS FOR EARTHQUAKE ENGINEERING RESEARCH (ID 131)

Chad Goodnight, North Carolina State University; James Nau, North Carolina State University; Mervyn Kowalsky, North Carolina State University; Nicole King Brown, North Carolina State University; Steven Fulmer, NCSU;

AN EXPERIMENTAL STUDY OF DAMAGE DETECTION USING REMOVABLE BRACES - NEES RESEARCH (ID 579) A FÌ Ì Graham Archer, Cal Poly SLO; Cole Mcdaniel, Cal Poly SLO;

INTUITIVE REAL-TIME COMPENSATION ALGORITHM FOR ACTUATOR CONTROL ERRORS IN FAST PSD TEST (ID 811) ### FJÎ Ronald Gultom, The University of Auckland;

STRUCTURAL IDENTIFICATION AND VIBRATION PROBLEMS IN BUILDINGS WITH DOME ROOFS (ID 1049) Minea Viad, University of Bucharest, Faculty of Physics; Ion Vlad, Technical University of Civil Engineering Bucharest;

USE OF COMPREHENSIVE INSTRUMENTATION IN STRUCTURAL EXPERIMENTS FOR MODEL VALIDATION OF INELASTIC SYSTEMS - NEES RESEARCH (ID 1124)

Anahid Behrouzi, University of Illinois at Urbana-Champaign; Michael Bletzinger, University of Illinois at Urbana-Champaign;

SCANNER TECHNOLOGY FOR DOCUMENTATION OF DISPLACEMENT STATES OF EXPERIMENTAL TEST SPECIMENS - NEES RESEARCH (ID 1261)



Kurt Mcmullin, San Jose State University; Eugenia Tai, San Jose State University; Selim Gunay, University of California at Berkeley; Shakhzod Takhirov, University of California at Berkeley; Siddaiah Yarra, San Jose State University;

APPLICATION OF LASER SCANNING TO STRUCTURAL TESTING IN EARTHQUAKE ENGINEERING, FIELD SURVEY, AND STRUCTURAL ASSESSMENT OF AN EARTHQUAKE AFTERMATH (ID 1266) G € Shakhzod Takhirov, UC Berkeley; Khalid Mosalam, UC Berkeley;

CYCLIC TESTING OF BOLTED CONTINUOUS I-BEAM-TO-HOLLOW SECTION COLUMN CONNECTIONS (ID 1760) (ID 17

5:30 pm - 6:45 pm **Structural Behavior And Performance** Buildings - Retrofit Tubughnenq' 3, FL2 Dena'ina

MODERATOR: Joseph Maffei, Maffei Structural Engineering

SEISMIC CHARACTERISTICS OF PRE-1980 TALL REINFORCED CONCRETE BUILDINGS IN VANCOUVER (ID 303) AMAGentia General Anti-*Jeff Yathon, University of British Columbia*; Ken Elwood, University of British Columbia; Perry Adebar, University of British Columbia;

THE INFLUENCE OF GRAVITY COLUMN CONTINUITY ON THE COLLAPSE PERFORMANCE OF SPECIAL STEEL MOMENT FRAMES

Francisco Flores, Virginia Tech; Finley Charney, Virginia Tech;

SEISMIC EVALUATION OF RELAYS IN MOTOR-CONTROL-CENTER TYPE CABINETS IN TAIWAN NUCLEAR POWER PLANTS (ID 948)

Juin-Fu Chai, NCREE; Fan-Ru Lin, NCREE; Ming-Yi Chen, National Taiwan University; Pai-Fang Chou, National Taipei University of Technology; Wen-I Liao, National Taipei University of Technology; Yin-Nan Huang, National Taiwan University; Zih-Yu Lai, NCREE;

IMPROVING THE SEISMIC PERFORMANCE OF DIAGRID STEEL STRUCTURES USING FRICTION MASS DAMPER (ID 978) AMM GJÎ Garlan Ramadhan, Oregon State University; Andre Barbosa, Oregon State University;

IMPROVED ESTIMATION OF FLOOR SPECTRA IN RC WALL BUILDINGS (ID 1113) ## HE Timothy Sullivan, University of Pavia; Paolo Calvi, University of Toronto;

EVALUATION OF SERVICEABILITY LIMIT STATES IN MULTI-STORY BUILDINGS SUBJECTED TO PULSE-LIKE EARTHQUAKE GROUND MOTIONS (ID 1214) AND HT Andres Alonso-Rodriguez, Mundial Seguros S A: Eduardo Miranda, Stanford University:

Andres Alonso-Rodriguez, Mundial Seguros S.A; Eduardo Miranda, Stanford University;

COUPLING-BEAM EFFECT ON THE SEISMIC RESPONSES OF THREE DIMENSIONAL RC WALL-TYPE BUILDING STRUCTURES (ID 1288) MM HGJ Kyung Ran Hwang, Korea University; Han Seon Lee, Korea University;

ANALYTICAL SIMULATION OF SHAKE-TABLE RESPONSES OF A 1:5 SCALE 9-STORY RC PILOTI-TYPE RESIDENTIAL BUILDING MODEL (ID 1290) ∰ H €

Han Seon Lee, Korea University; Hye In Lee, Korea University; Kyung Ran Hwang, Korea University;

5:30 pm - 6:45 pm **Damage Assessment** Seismic Isolation Tubughnenq' 4, FL2 Dena'ina

MODERATOR: Andreas Stavridis, University at Buffalo

SEISMIC EVALUATION AND RETROFIT OF TWO 1930S REINFORCED CONCRETE WATER RESERVOIRS (ID 1714) *James Newell, SEFT Consulting Group*; Don Ballantyne, Ballantyne Consulting; Kent Yu, SEFT Consulting Group; Tyler Clary, City of Vancouver;

EXTRACTING EMPIRICAL CAPACITY CURVES FROM BUILDING EARTHQUAKE RESPONSE DATA (ID 37) AMA H G **Jeffrey Dowgala, Purdue University**; Ayhan Irfanoglu, Purdue University;

RECOMMENDATIONS FOR THE USE OFBIM METHODS FOR MANAGEMENT OF POST-EARTHQUAKE DAMAGE DATA (ID 180) HI H **Anna Birely, Texas A&M University**; Eduardo Pereira, Texas A&M University;

5-in-5 Sessions (continued)



WEDNESDAY, JULY 23

FEASIBILITY STUDY ON SEISMIC RESPONSE ESTIMATION OF DAMAGED R/C BUILDINGS BASED ON OBSERVATION DATA AND NUMERICAL ANALYSIS (ID 320) A G **Ho Choi, The University of Tokyo**; Yasuhiro Watanabe, Toyohashi University of Technology; Yasushi Sanada, Osaka University; Yoshiaki Nakano, The University of Tokyo;

PRACTICAL COLLAPSE ASSESSMENT FOR REINFORCED CONCRETE STRUCTURES BASED ON SEISMIC RESPONSE SPECTRUM (ID 522)///// HUH *Kazuto Matsukawa, The University of Tokyo; Masaki Maeda, Tohoku University;*

VALIDATION OF SEISMIC DAMAGE STATES FOR REINFORCED CONCRETE BUILDINGS (ID 945) AMM I € Saurabh Shiradhonkar, Indian Institute of Technology Bombay; Ravi Sinha, Indian Institute of Technology Bombay;

AFTERSHOCK FRAGILITY ANALYSIS OF A REINFORCED CONCRETE SHEAR WALL USING UPDATED NONLINEAR MODEL (ID 1191)///// I FÍ Wei Song, The University of Alabama;

SEISMIC PERFORMANCE EVALUATION OF AN UNREINFORCED MASONRY BUILDING IN SWITZERLAND (ID 1198) I Ĝ Ueli Von Rotz, ETH Zurich; Bozidar Stojadinovic, ETH Zurich; Svetlana Brzev, BCIT; Tony Yang, University of British Columbia;

5:30 pm - 6:45 pm **Advances In Tools And Application Of Seismic Performance Assessment** Earthquake Lessons Tubughneng' 5, FL2 Dena'ina

MODERATOR: Kevin Mackie, University of Central Florida

THE GENERATION OF EARTHQUAKE DAMAGE PROBABILITY CURVES FOR RECOVERY TIME OF SCHOOL BUILDINGS IN TAIWAN (ID 126) Mil II George C. Yao, National Cheng Kung Univ.; Li-Mei Hsueh, National Cheng Kung Univ.; Ying-Lieh Tu, National Cheng Kung Univ.;

AN ANALYTICAL APPROACH TOWARDS MODELING THE RECOVERY AND RECONSTRUCTION AFTER THE 2011 TOHOKU EARTHQUAKE AND TSUNAMI (ID 409) A 1 I Ï Yoshifumi Yamamoto, RMS; Pooya Sarabandi, RMS;

DIFFERENT APPROACHES TO MODEL ECONOMIC DIMENSION OF COMMUNITY RESILIENCE (ID 1683) (I 1) Gian Paolo Cimellaro, Politecnico di Torino; Chris Renschler, University at Buffalo (SUNY); Davide Martinelli, Politecnico di Torino;

BENEFIT COST STUDY FOR UNIQUE TRANSIT STRUCTURES (ID 235) ## I Î J

Thomas Horton, San Francisco Bay Area Rapid Transit District; Donald Duggan, G&E Engineering Services Inc.; Mark Salmon, MGE Engineering Inc.; Michael Mcrae, Jacobs Associates;

EXAMINATION OF SEISMIC PERFORMANCE ASSESSMENT PROCEDURES FOR RC BUILDINGS IN TURKEY (ID 567) AMMA I Ì € Ahmet Yakut, Middle East Technical University;

EARTHQUAKE RISK MODELING FOR THE EVALUATION OF LOSSES TO PROPERTY OWNERS IN THE METROPOLITAN AREA OF SHIRAZ (ID 652)

Mehdi Sadeghi, Science and Research Branch, Islamic Azad University; Mohsen Ghafory-Ashtiany, IIEES - International Institute of Earthquake Engineering and Seismology; Naghmeh Pakdel-Lahiji, Science and Research Branch, Islamic Azad University; Stefan Hochrainer-Stigler, IIASA - International Institute for Applied Systems Analysis;

SOCIAL VULNERABILITY AND INTEGRATED RISK ASSESSMENT WITHIN THE GLOBAL EARTHQUAKE MODEL (GEM) (ID 1307) A GLOBAL EARTHQUAKE MODEL (GEM) (ID 1307) Christopher Burton, GEM Foundation; Bijan Khazai, Center for Disaster Management and Risk Reduction Technology; Vitor Silva, GEM Foundation;

QUANTITATIVE DAMAGE AND LOSS ESTIMATION OF HIGH RISE BUILDING SYSTEMS WITH REINFORCED CONCRETE FLAT SLABS (ID 1404) IF€

Aysegul Gogus, Arup; Huseyin Darama, Arup; Murat Melek, Arup; Thomas Kang, Seoul National University;

Poster Sessions

Tuesday Poster Session Layout Map (5:00 p.m.–7:00 p.m.)

Dena'ina Convention Center, Second Floor

- 1. Bridges, Lifelines, & Fire
- 2. Buildings
- 3. Retrofit
- 4. Experiment & Simulation
- 5. Advanced Structural Systems
- 6. Recent Earthquakes
- 7. Resilience & Policy
- 8. Risk & Loss
- 9. Geotech
- 10. Seismic Hazard





Poster Sessions (continued)



TUESDAY, JULY 22

05:00 pm - 07:00 pm Bridge Structures FL2 Dena'ina

NUMERICAL SIMULATION FOR SHAKING TABLE TESTS OF BRIDGES WITH EXPOSED PILE FOUNDATION (ID 645) AMA Í GF **Chun-Yao Wang, National Chung-Hsing University**; Shin-Tai Song, National Chung-Hsing University; Kuang-Yen Liu, National Ceneter for Research on Earthquake Engienering;

STRUCTURAL BEHAVIOR AND RESPONSE ANALYSIS OF ARAMID FIBER-REINFORCED POLYMER REINFORCED BRIDGE COLUMN UNDER COMBINED LOADING (ID 671) A H€ Steve Efe, Morgan State University; Monique Head, Morgan State University;

APPLICATION OF SIMPLIFIED PROCEDURES IN THE SEISMIC ASSESSMENT AND PERFORMANCE-BASED DESIGN OF CONTINUOUS LONG-SPAN RC BRIDGES (ID 1676) I G **Marco Escamilla, National Autonomous University of Mexico,**; A Gustavo Ayala, National Autonomous University of Mexico,;

05:00 pm - 07:00 pm Buildings, Structural and Non-Structural Systems I Buildings, Structural and Non-Structural Systems

FL2 Dena'ina

PROPOSED NEW APPROACH FOR THE SEISMIC EVALUATION TESTING OF SUSPENDED CEILING SYSTEMS (ID 24) Amir Gilani, Miyamoto International; Lee Tedesco, United States Gypsum Company; Shakhzod Takhirov, University of California at Berkeley;

FRAGILITY FUNCTIONS AND SEISMIC PERFORMANCE OF PERUVIAN THIN RC WALL BUILDINGS (ID 41) ### Í Í Í Luis Quiroz Torres, Chiba University; Yoshihisa Maruyama, Chiba University;

THE CAPACITY SPECTRUM METHOD: EVALUATION AGAINST THE MEASURED RESPONSE OF A NINE-STORY STRUCTURE - NEES RESEARCH (ID 109) Mil 1 Î Ying Wang, Purdue University; Santiago Pujol, Purdue University;

ESTIMATING THE PEAK INELASTIC DISPLACEMENT OF STEEL SMRF DETERIORATING STRUCTURES SUBJECTED TO SERIES OF STRONG GROUND MOTIONS (ID 110) The DE Pedram Khajehhesameddin, Purdue University; Thomas Hacker, Purdue University; Ayhan Irfanoglu, Purdue University;

SEISMIC VULNERABILITY ASSESSMENT OF STEEL PIPE SUPPORT STRUCTURES (ID 192) III I Yasser Salem, California State Polytechnic University, Pomona; Ahmed Nasr, California State University Long Beach;

QUANTIFYING PARAMETERS THAT ENSURE LARGE DEFORMABILITY OF EARTHQUAKE RESISTANT RC BUILDINGS IN HIGH SEISMIC REGIONS (ID 222) A J J Palissery Sunitha, Indian Institute of Technology Madras; C.V.R Murty, Indian Institute of Technology Madras; Rupen Goswami, Indian Institute of Technology Madras;

IMPROVED DESIGN OF CONCRETE FLAT-SLAB BUILDINGS FOR SEISMIC EFFECTIVENESS AND PREVENTION OF BLAST INDUCED PROGRESSIVE COLLAPSE (ID 247) (

SEISMIC SHEAR-MOTION FEATURES AND PARAMETRIC IDENTIFICATION OF MUILTI-STORY BUILDINGS (ID 249) A Î FÎ Ruichong Zhang, Colorado School of Mines;

EFFECTS OF BRACING CONFIGURATION ON SEISMIC BEHAVIOR OF TALL STEEL STRUCTURES SUBJECTED TO EARTHQUAKE GROUND MOTIONS (ID 286) A di Gina and a

DEVELOPMENT OF A SOFT LAYER FOR SEISMIC RESPONSE MODIFICATION OF STRUCTURAL MASONRY WALLS (ID 287) AMA Î HJ **Nebojsa Mojsilovic, ETH Zurich**; Bozidar Stojadinovic, ETH Zurich;

THE REASONS FOR THE TRENDS IN TORSIONAL EFFECTS IN ASYMMETRIC-PLAN BUILDINGS (ID 382) ### Î É Jui-Liang Lin, National Center for Research on Earthquake Engineering; Keh-Chyuan Tsai, National Taiwan University; Ming-Chieh Chuang, National Center for Research on Earthquake Engineering;

SEISMIC PERFORMANCE OF DAMAGED BUILDINGS IN 2010 CHILE OFFSHORE MAULE EARTHQUAKE (ID 385) *i* € **Tomoya Matsui, Toyohashi University of Technology**; Satoshi Kumagai, Toyohashi University of Technology; Naoki Kawai, Toyohashi University of Technology;



EXPERIMENTAL AND ANALYTICAL STUDY OF INNOVATIVE SHAPE MEMORY ALLOY-BASED FRP COMPOSITE REINFORCEMENT FOR SEISMIC APPLICATIONS (ID 396), II F Bassem Andrawes, University of Illinois at Urbana-Champaign; Adeel Zafar, University of Illinois;

HYSTERETIC BEHAVIOR OF LIGHTLY REINFORCED WALLS FOR HOUSING (ID 426) Military University, UMNG; Sergio M. Alcocer, Julian Carrillo, New Granada Military University, UMNG; Fabian Echeverri, New Granada Military University, UMNG; Sergio M. Alcocer, National University of Mexico, UNAM;

ROTATION, MATERIAL STRAINS, AND ENERGY DISSIPATION CHANGES OF RC FRAMES AT DIFFERENT PERFORMANCE LEVELS ESTABLISHED IN THE ASCE 41-06 SEISMIC REHABILITATION CODE (ID 526), I JH Aidcer Vidot-Vega, UPRM; Merangeli Morales, UPRM;

SEISMIC BEHAVIOR OF UNBONDED POST-TENSIONED MASONRY WALLS (ID 529) #### ï € Mohamed Elgawady, Missouri University of Science and Technology;

DEVELOPMENT OF A ROCKING-PERIOD CENTERED PROTOCOL FOR SHAKE TABLE TESTING OF STIFF COMPONENTS (ID 688) Tara Hutchinson, University of California, San Diego; Christine Wittich, University of California, San Diego;

INELASTIC DEFORMATION RATIOS FOR NONSTRUCTURAL COMPONENTS SUBJECTED TO FLOOR ACCELERATIONS (ID 767) III GÎ Juan Obando, Pontificia Universidad Catolica de Chile; Diego Lopez-Garcia, Pontificia Universidad Catolica de Chile;

QUALITY ISSUES OF SEISMIC RESTRAINTS FOR NON-STRUCTURAL BUILDING COMPONENTS SUBJECT TO EXTREME CONDITIONS (ID 778) A TH Martin Deveci, Acrefine Engineering;

SEISMIC QUALIFICATION OF ROCKING OBJECTS IN CANADIAN NUCLEAR POWER PLANTS (ID 845) Amitabh Dar, Bruce Power; Wael El-Dakhakhni, McMaster University; Dimitrios Konstantinidis, McMaster University;

SEISMIC BEHAVIOR OF WELDED UNREINFORCED FLANGE-WELDED WEB MOMENT CONNECTIONS (ID 859) **Sang Whan Han, Hanyang University**; Ki Hoon Moon, Hanyang University; Jin Jung, Hanyang University;

05:00 pm - 07:00 pm Buildings, Structural and Non-Structural Systems II Buildings, Structural and Non-Structural Systems FL2 Dena'ina

EVALUATION OF COLLECTOR DESIGN FOR CONCRETE DIAPHRAGMS (ID 933) ### Î Î H Jeremiah Legrue, Hohbach-Lewin, Inc.;

SIMPLIFIED METHOD OF SEISMIC DAMAGE PREDICTION AND VISUALIZATION FOR R/C BUILDING STRUCTURES (ID 941) ### II I Noriyuki Takahashi, Tohoku University;

MODELLING AND EXPERIMENTAL PLAN OF REINFORCED CONCRETE WALLS WITH MINIMUM VERTICAL REINFORCEMENT -NEES RESEARCH (ID 991) A I I Yigiu Lu, The University of Auckland; Richard Henry, The University of Auckland; Quincy Ma, The University of Auckland;

EXTENSION OF DISPLACEMENT-BASED ASSESSMENT TO INFILLED RC FRAMES (ID 993) *MMA* i Jî *Luca Landi, University of Bologna*; Pier Paolo Diotallevi, University of Bologna; Annalisa Tardini, University of Bologna;

HIGH-YIELD-DRIFT STEEL MOMENT FRAMES (ID 1036) *∰* i € **Paul Richards, Brigham Young University**; Daniel Miller, Brigham Young University;

EXPERIMENTAL STUDY OF TARGET DEMANDS TO MINIMIZE SEISMIC INDUCED CONTENT DISRUPTION - NEES RESEARCH (ID 1054)

Jean Guzman Pujols, University of Nevada, Reno;

COMPREHENSIVE EVALUATION OF POST-TENSIONING ANCHORAGE SYSTEMS FOR SEISMIC RESILIENT ROCKING WALL STRUCTURES - NEES RESEARCH (ID 1132) (I G *Eric Musselman, Villanova University; Matthew Fournier, University of Minnesota Duluth; Sri Sritharan, Iowa State University; Daniel Abramson, University of Minnesota Duluth;*

SEISMIC RESPONSES OF STRUCTURES RETROFITTED WITH SPSW SYSTEMS USING LYP INFILL PLATES (ID 1263) I J Jian Zhang, University of California, Los Angeles; Tadeh Zirakian, University of California, Los Angeles;

Poster Sessions (continued)



TUESDAY, JULY 22

THE NEXT GENERATION SEISMIC DESIGN FOR REINFORCED CONCRETE BEAM-COLUMN JOINTS (ID 1277) A li € Hitoshi Shiohara, The University of Tokyo; Fumio Kusuhara, The University of Tokyo;

TYPOLOGY OF BUILDINGS IN INDIA FOR SEISMIC VULNERABILITY ASSESSMENT (ID 1294) I G **Ravi Sinha, Indian Institute of Technology Bombay**; Rohan Shinde, Indian Institute of Technology Bombay; Mahendra Meena, Indian Institute of Technology Bombay; Ashish Sapre, Indian Institute of Technology Bombay; Alok Goyal, Indian Institute of Technology Bombay;

OBSERVATIONS AND FINDINGS FROM FIELD SURVEYS FOR SEISMIC VULNERABILITY ASSESSMENT OF BUILDINGS IN WESTERN INDIA (ID 1295) AMA I H

Ravi Sinha, Indian Institute of Technology Bombay; Ashish Sapre, Indian Institute of Technology Bombay; Rohan Shinde, Indian Institute of Technology Bombay; Mahendra Meena, Indian Institute of Technology Bombay; Alok Goyal, Indian Institute of Technology Bombay; Bomba

SHEAR STRENGTH PREDICTION OF REINFORCED CONCRETE DEEP BEAMS WITH WEB OPENINGS (ID 1353) AMA Ì JH **Chien Chuang Tseng, National Taiwan University**; Shyh-Jiann Hwang, National Taiwan University;

ON THE INFLUENCE OF IN-PLANE DAMAGES ON THE OUT-OF-PLANE BEHAVIOR OF UNREINFORCED MASONRY STRUCTURES (ID 1402) ₩₩ J €

Kiarash Dolatshahi, Sharif University of Technology; Alireza Mahdizadeh, State Organization of Schools Renovation Development and Mobilization of Iran; Mohammad Yekrangnia, Sharif University of Technology;

PARAMETRIC STUDY OF AXIALLY LOADED REINFORCED CONCRETE COLUMNS (ID 1438) AMM JFI Charles Chadwell, California Polytechnic State University; Sean Hart, California Polytechnic State University;

NEURAL NETWORK FOR LOCALIZATION OF MASS AND RIGIDITY CENTERS FROM DYNAMIC RESPONSES OF BUILDINGS (ID 1451)

Nouredine Bourahla, University Saad Dahlab Blida; Naouel Allal, ALRIM; Ismail Derbal, University Saad Dahlab Blida;

DESIGN OF GRAVITY-LOAD RESISTING FRAMES FOR SEISMIC DISPLACEMENT DEMANDS (ID 1494) *WWM* JH **Perry Adebar, University of British Columbia**; James Mutrie, Jones Kwong Kishi; Ronald Devall, Read Jones Christoffersen Ltd.;

SEISMIC REHABILITATION OBJECTIVES AND UPGRADING STRATEGY FOR MEDICAL EQUIPMENT AND NONSTRUCTURAL COMPONENTS IN A HOSPITAL (ID 1614)

Juin-Fu Chai, National Center for Research on Earthquake Engineering (NCREE); Zhen-Yu Lin, National Center for Research on Earthquake Engineering (NCREE); Fan-Ru Lin, National Center for Research on Earthquake Engineering (NCREE); Jenn-Shin Hwang, National Taiwan University of Science and Technology;

DEVELOPMENT AND VALIDATION OF ENHANCED PERFORMANCE ACTIVE INELASTIC LINKS FOR DUCTILE SEISMIC SYSTEMS (ID 1621)

Dmitry Volynkin, The University of Auckland; G. Charles Clifton, The University of Auckland; Peter Dusicka, Portland State University;

SEISMIC RESPONSE AND PROTECTION OF STEEL STORAGE RACK PALLETED MERCHANDISE (ID 1667) AMA JÎ Ì Michael Pollino, Case Western Reserve University; Robert Michael, Gannon University; Yuan Gao, Case Western Reserve University;

05:00 pm - 07:00 pm **Experimental Methods** Experimental Methods FL2 Dena'ina

PSEUDO DYNAMIC TEST RESULTS OF A CONCRETE GRAVITY DAM (ID 257) AMM JÏ J *Alper Aldemir, Middle East Technical University*; Ozgur Kurc, Middle East Technical University; Erdem Canbay, Middle East Technical University; Baris Binici, Middle East Technical University; Yalin Arici, Middle East Technical University;

TEST METHOD FOR EVALUATING THE EFFECT OF ARTIFACTS ON SEISMIC BEHAVIOR OF MOMENT FRAMES (ID 258) AMA JÌ J **Ebrahim Abbas, Virginia Tech**; Matthew Eatherton, Virginia Tech;

A NEW METHOD OF SHAKING TABLE TEST OVERCOMING THE LAW OF SIMILARITY ON REDUCED STEEL FRAME (ID 475) A CONTRACT STREAM (ID 475) A

AN INVESTIGATION OF BOND-SLIP BEHAVIOR OF REINFORCING STEEL SUBJECTED TO INELASTIC STRAINS (ID 849) AN INVESTIGATION OF BOND-SLIP BEHAVIOR OF REINFORCING STEEL SUBJECTED TO INELASTIC STRAINS (ID 849) AN INVESTIGATION OF BOND-SLIP BEHAVIOR OF REINFORCING STEEL SUBJECTED TO INELASTIC STRAINS (ID 849) AN INVESTIGATION OF BOND-SLIP BEHAVIOR OF REINFORCING STEEL SUBJECTED TO INELASTIC STRAINS (ID 849) AN INVESTIGATION OF BOND-SLIP BEHAVIOR OF REINFORCING STEEL SUBJECTED TO INELASTIC STRAINS (ID 849) AN INVESTIGATION OF BOND-SLIP BEHAVIOR OF REINFORCING STEEL SUBJECTED TO INELASTIC STRAINS (ID 849) AN INVESTIGATION IN A STATE University;

AMBIENT VIBRATIONAL ANALYSIS OF AURELIANA COLUMN (ID 1012) A €0G Paolo Clemente, ENEA; Giacomo Buffarini, ENEA; Giovanni Bongiovanni, ENEA; Fernando Saitta, ENEA;

CONSTRUCTION AND LOAD RATING OF LARGE CAPACITY REACTION FLOOR-WALL ASSEMBLY FOR LATERAL LOAD TESTING AT IIT KANPUR (ID 1148)

Durgesh Rai, Indian Institute of Technology Kanpur; Sudhir Jain, Indian Institute of Technology Gandhinagar, Ahmedabad; Cvr Murty, Indian Institute of Technology Jodhpur, Jodhpur; Dipanshu Bansal, State University of New York at Buffalo;



SEISMIC TESTING OF PREWEC SYSTEMS WITH FLOOR INTERACTION (ID NEES5) AND DE *Qingzhi Liu, University of Minnesota, Twin Cities*;

05:00 pm - 07:00 pm **Fire Following Earthquakes** Fire Following Earthquakes FL2 Dena'ina

USING OPENSEES FOR ANALYZING A 9-STORY STEEL BUILDING UNDER POST-EARTHQUAKE FIRES (ID 1219) *Maria Garlock, Princeton University*; Negar Elhami Khorasani, Princeton University;

DAMAGE MECHANISMS IN CEMENTITIOUS COATINGS FOR STEEL MEMBERS (ID 1752) *imit* € Í **Suwen Chen, tongji university**; Li-Ming Jiang, The University of Edinburgh; Asif Usmani, The University of Edinburgh; Guo-Qiang Li, tongji university;

05:00 pm - 07:00 pm **Ground Motion, Seismicity, Seismic Hazard Assessment** Ground Motion, Seismicity, Seismic Hazard Assessment FL2 Dena'ina

SEISMICITY OF THE MIDDLE EAST: A REVISION ON THE SEIMICITY PARAMETERS (ID 19) A €Î Î Mehdi Zare, IIEES; Pouye Yazdi, Universidad Politecnica de Madrid; Hamideh Amini, IIEES;

DIRECTIONALITY OF STRONG GROUND MOTION DURATIONS (ID 275) ﷺ € Ï Jongwon Lee, Arup;

REASSESSMENT OF PREHISTORIC EARTHQUAKE ACCELERATIONS AT SAMPIT AND GAPWAY IN THE SOUTH CAROLINA COASTAL PLAIN (ID 291) A
S-WAVE VELOCITY PROFILES OF THE EAST SAN FRANCISCO BAY AREA OBTAINED BY GEOPHYSICAL METHODS (ID 432) A Content Hayashi, Geometrics; Seth Shuler, California State University, East Bay; Rania Aql, California State University, East Bay; Mitchell Craig, California State University, East Bay;

USGS UPDATE OF EARTHQUAKE LOADING DATA PROVIDED IN 2013 EDITION OF UNIFIED FACILITIES CRITERIA 3-301-01: STRUCTURAL ENGINEERING (ID 1164) ### F€ Sean Mcgowan, U.S. Geological Survey; Sanaz Rezaeian, U.S. Geological Survey; Nicolas Luco, U.S. Geological Survey;

NON-LINEAR AMPLIFICATION CHARACTERISTICS DURING EARTHQUAKES AT K-NET AOM007 (ID 1309) FGF Shunichi Kataoka, Hirosaki University;

A LOW-POWER AUTONOMOUS DIGITAL ACCELEROGRAPHREPLACEMENT FOR THE SMA (ID 1377) **FF** Anthony Shakal, Calif. Geological Survey; Carl Petersen, Calif. Geological Survey; Troy Reitz, Calif. Geological Survey;

EFFICACY OF GEODETIC DATA FOR ESTIMATING EARTHQUAKE RECURRENCE (ID 1513) A FI € Martin Mccann, Jack A Benjamin Associates Inc.; Robert Youngs, AMEC Geomatrix; Roland Laforge, Fugro Consultants Inc.; Dean Ostenaa, Fugro Consultants Inc; Martin Lawrence, BC Hydro; Dan Oconnell, Fugro Consultants Inc.;

SEISMIC FLOOR DESIGN SPECTRA GUIDELINE FOR HYDRO FACILITIES (ID 1631) ### F G Andreas Felber, BC Hydro; Soheil Razavi Darbar, BC Hydro; Bob Schubak, BC Hydro;

BC HYDRO SSHAC LEVEL 3 STUDY: ADJUSTMENT OF SEISMIC HAZARD (BASED ON VS30 OF 760 M/SEC) FOR HARD ROCK SITES (ID 1555)### Fi H Desite Comparison and Applying (Action of Adda, BC) (Index) Math Silve, Desite Comparison and Applying and

Robert Darragh, Pacifc Engineering and Analysis; Kofi Addo, BC Hydro; Walt Silva, Pacifc Engineering and Analysis;

RELATIONSHIP BETWEEN LIQUEFACTION OCCURRENCE RATIO AND STRONG GROUND MOTION DURATION FOR THE 2011 OFF THE PACIFIC COAST OF TOHOKU EARTHQUAKE. (ID 38) FI I Shigeki Senna, NIED; Masashi Matsuoka, Tokyo Tech Institute; Kazue Wakamatsu, Kanto-Gakuin Univ;

BUILDINGS AND INFRASTRUCTURE PLANS DAMAGE CAUSED BY THE 11 AUGUST 2012, QARADAGH (ID 76) AMAGE FÌ I Ebad Ghanbari, Univ. of Tabriz;

Poster Sessions (continued)

IONCEE

TUESDAY, JULY 22

05:00 pm - 07:00 pm

Information Technology and Collaboration Tools

FL2 Dena'ina

THE CALIFORNIA EARTHQUAKE CLEARINGHOUSE: ESTABLISHING PROTOCOLS FOR DATA COLLECTION AND SHARING AFTER THE NEXT DAMAGING CALIFORNIA EARTHQUAKE (ID 1634) ### FJH Maggie Ortiz, EERI; Marjorie Greene, EERI; Anne Rosinski, California Geological Survey;

05:00 pm - 07:00 pm Lessons Learned from Recent Earthquakes Lessons Learned from Recent Earthquakes

FL2 Dena'ina

FAILURE MODES OF MASONRY INFILL WALLS AND INFLUENCE ON RC FRAME STRUCTURE UNDER EARTHQUAKE - NEES RESEARCH (ID 807)

Wu Xiaobin, China southwest architectural design and research insititute; Zhang Shulu, China southwest architectural design and research insititute; Feng Yuan, China southwest architectural design and research insititute;

PERFORMANCE OF MID-RISE REINFORCED CONCRETE BUILDINGS DURING THE CANTERBURY EARTHQUAKE SEQUENCE (ID 904) AMA GFI

Can Simsir, Weidlinger Associates Inc.; Behnam Arya, Weidlinger Associates Inc.; Anurag Jain, Weidlinger Associates Inc.;

SEISMIC PERFORMANCE OF LOW-RISE PRE-ENGINEERED BUILDINGS WITH TILT-UP AND MASONRY FA (ID 906) Anurag Jain, Weidlinger Associates, Inc.; Cellaletin Simsir, Weidlinger Associates, Inc.; Behnam Arya, Weidlinger Associates, Inc.;

A SIMPLIFIED APPROACH TO QUANTIFY DAMAGE CONTRIBUTION OF INDIVIDUAL EVENTS IN CANTERBURY EARTHQUAKE SEQUENCE (ID 1220) A Contract of the American International Internatio

Behnam Arya, Weidlinger Associates Inc.; Anurag Jain, Weidlinger Associates Inc.; Can Simsir, Weidlinger Associates Inc.;

STUDY ON CASUALTY AND TSUNAMI EVACUATION BEHAVIOR IN ISHINOMAKI CITY - QUESTIONNAIRE SURVEY FOR THE 2011 GREAT EAST JAPAN EARTHQUAKE - (ID 1280) AND G Ï

Hitomi Murakami, Yamaguchi University; Taku Mikami, Tono Research Institute of Earthquake Science; Seiichi Sato, Nippon Koei; Yozo Goto, The University of Tokyo; Takashi Wakihama, Yamaguchi University; Sumio Yanagihara, Okumura Corporation;

05:00 pm - 07:00 pm **Lifelines** FL2 Dena'ina

COMPARISON OF THE OBSERVED AND ESTIMATED FRAGILITY OF THE WATER DISTRIBUTION SYSTEM OF SENDAI CITY, MIYAGI PREFECTURE DURING THE 2011 TOHOKU EARTHQUAKE (ID 626) (A Comparison of Comparison) (Comparison) (Compariso

05:00 pm - 07:00 pm **Post-Earthquake Response, Damage Assessment, and Recovery** Post-Earthquake Response, Damage Assessment, and Recovery FL2 Dena'ina

DAMAGE INDEX OF ANGLE BRACE BASED ON RESIDUAL DEFORMATION (ID 265) A G Ì Nobuhiko Tatsumi, Osaka Institute of Technology; Shoichi Kishiki, Osaka Institute of Technology;

WAVE METHOD FOR SYSTEM IDENTIFICATION AND HEALTH MONITORING OF BUILDINGS EXTENSION TO FITTING TIMOSHENKO BEAM MODEL (ID 306)/### G i Mahdi Ebrahimian, University of Southern California; Maria Todorovska, University of Southern California;

DEVELOPMENT OF THE RESIDUAL SEISMIC CAPACITY EVALUATION SYSTEM WITH CAPACITY SPECTRUM METHOD (ID 326)
SEISMIC DEFORMATION DEMANDS ON SHEAR WALLS IN FRAME-WALL SYSTEMS (ID 588) AMA H∈€ ?Lker Kazaz, Erzurum Technical University;

DETECTION OF BUILDING SIDE-WALL DAMAGE CAUSED BY THE 2011 TOHOKU, JAPAN EARTHQUAKE TSUNAMIS USING HIGH-RESOLUTION SAR IMAGERY (ID 798) ###F *Wen Liu, Tokyo Institute of Technology*; Takashi Nonaka, PASCO Corporation; Fumio Yamazaki, Chiba University; Masashi Matsuoka, Tokyo Institute of Technology; Tadashi Sasagawa, PASCO Corporation;

WAVELET BASED DAMPING IDENTIFICATION FROM NOISE CONTAMINATED SIGNALS (ID 1015) HGG Luis Montejo, U. of Puerto Rico at Mayaguez; Carlos Gaviria, U. of Puerto Rico at Mayaguez;



EARTHQUAKE HAZARD MITIGATION IN KENTUCKY (ID 1635) Min HH Issam Harik, University of Kentucky; Ann Sardo, tesardo@aol.com; Thomas Sardo, PARSONS;

05:00 pm - 07:00 pm **Repair and Retrofit** Repair and Retrofit FL2 Dena'ina

VERIFICATION ON SEISMIC EVALUATION MODELS OF REINFORCED CONCRETE FRAME WITH BRICK INFILL (ID 142) ## I **Tsung-Chih Chiou, National Center for Research on Earthquake Engineering**; Fu-Pei Hsiao, National Center for Research on Earthquake Engineering; Shyh-Jiann Hwang, National Center for Research on Earthquake Engineering;

OPTIMAL ALLOCATION OF FUNDING FOR SEISMIC RETROFITTING MEASURES (ID 285) A H Í Gordon Woo, RMS; Warner Marzocchi, INGV; Anna Maria Lombardi, INGV;

SEISMIC EVALUATION AND REHABILITATION OF A CONCRETE SHEAR WALL BUILDING USING STRUCTURAL RELIABILITY THEORY (ID 702) M A I Gregg Brandow, Brandow & Nastar, Inc.; Gary Hart, Weidlinger Associates Inc.; Nick Delli Quadri, None; Kidong Park, Weidlinger Associates Inc.; Marshall Lew, AMEC Environment & Infrastructure; Lauren Carpenter, WHL Consulting Engineers;

HISTORICAL REINFORCED CONCRETE HIGH-RISE BUILDINGS (ID 1067) H Í *Claudio Chesi, Politecnico di Milano*; Valentina Sumini, Politecnico di Milano; Maria Parisi, Politecnico di Milano;

STRUCTURAL RETROFIT OF FOOTBRIDGE WITH COMPOSITE MATERIALS (ID 1071) AND A Prota, University of Naples; Maria Isabella Vericaro, University of Naples; Alberto Balsamo, University of Naples; Ivano Iovinella, University of Naples;

SEISMIC REHABILITATION OF THE HISTORIC SMOKESTACK AT HEART MOUNTAIN RELOCATION CENTER (ID 1123) ### HJI Owen Rosenboom, Wiss, Janney, Elstner Associates, Inc.; Sigmund Freeman, Wiss, Janney, Elstner Associates, Inc.; Kari Klaboe, Wiss, Janney, Elstner Associates, Inc.; Lawrence Graham, Thornton Thomasetti; Jerry E. Maly, Wiss, Janney, Elstner Associates, Inc.;

SEISMIC RETROFIT OF SHEAR CRITICAL BEAM-COLUMN JOINTS IN EXISTING CONCRETE BUILDINGS - NEES RESEARCH (ID 1535) ### I €

Wael M. Hassan, American University in Cairo; Amal Bilal, HBRC;

CASE STUDY DESIGN AND CONSTRUCTION OF CONFINED MASONRY HOUSES IN INDONESIA (ID 1461) AMM I GF Tim Hart, Lawrence Berkeley National Laboratory; Gordon Goodell, Build Change; Elizabeth Hausler Strand, Build Change;

MODELING OF NONLINEAR BEHAVIOR OF CONFINED MASONRY USING DISCRETE ELEMENTS (ID 774) Anna Lang, UC San Diego; Gianmario Benzoni, UC San Diego;

05:00 pm - 07:00 pm **Resilient Communities and Cities** Resilient Communities and Cities FL2 Dena'ina

TOWARDS ASSESSING THE RESILIENCE OF A COMMUNITY IN SEISMIC EVENTS USING AGENT BASED MODELING (ID 296) *Mini* 1 H *Megan Boston, Johns Hopkins University; Judith Mitrani-Reiser, Johns Hopkins University; Caitlin Jacques, Johns Hopkins University; Zhang Liu, Johns Hopkins University;*

IMPROVING COMMUNITY RESILIENCE THROUGH PUBLIC-PRIVATE PARTNERSHIP: THE BORP STRATEGY (ID 1146) II David Cocke, SAFEq Institute; Samuel Mengelkoch, SAFEq Institute; Matthew Bogaard, Dreamworks Animation SKG;

05:00 pm - 07:00 pm **Risk and Loss Assessment** Risk and Loss Assessment FL2 Dena'ina

OPTIMIZING RESILIENCE: PERFORMANCE BASED ASSESSMENT OF RETROFITS FOR WOOD-FRAME HOUSING IN SAN FRANCISCO (ID 304) A I I Í Zahraa Saiyed, MIT;

SEISMIC PERFORMANCE ASSESSMENT OF TALL BUILDING USING QUANTITATIVE PERFORMANCE MEASURE (ID 337) A 1 1 1 Dong-Chul Lee, Chang Minwoo Structural Consultants; Jong-Ho Kim, Chang Minwoo Structural Consultants; Chee-Kyeong Kim, Sunmoon University; Taejin Kim, Chang Minwoo Structural Consultants;

Poster Sessions (continued)



TUESDAY, JULY 22

IMPLICATIONS ON SEISMIC HAZARD AND RISK ASSESSMENT OF TWO CITIES OF COLOMBIA AS RESULT OF A LITHOSPHERIC TEARS PROPOSAL IN THE NAZCA PLATE (ID 354)

Omar-Dar Cardona, Universidad Nacional de Colombia-Sede Manizales; Daniela Zuloaga, Illinois Institute of Technology; Carlos A. Vargas, Universidad Nacional de Colombia-Sede Bogot; Mario-Andr Salgado, Universidad Polit; Gabriel-Andr Bernal, Universidad Polit;

COMPARISON OF THE EFFECT OF EPSILON AND ETA BASED RECORD SELECTION ON FRAGILITY CURVES IN THE CASE OF AN IRREGULAR STEEL FRAME WITH CONCRETE SHEAR WALLS (ID 759) ∰ (€ Hamid Kazemi, Iranian Construction Engineering Organization, Province of Khorasan Razavi;

DAMAGE TO OIL STORAGE TANKS DUE TO TSUNAMI OF THE MW9.0 2011 OFF THE PACIFIC COAST OF TOHOKU, JAPAN EARTHQUAKE (ID 967) M Dispatch (Indiana) A Construction of Simonal Dispatch

Ken Hatayama, National Research Institute of Fire and Disaster;

PREDICTIONS OF PERFORMANCE OF SEISMICALLY VULNERABLE STRUCTURES BEFORE AND AFTER REMEDIATION: HELPING OWNER TO DEVELOP PRACTICAL STRATEGIES FOR MANAGING SEISMIC RISK IN THE LEGAL ARENA (ID 1120) I GJ Mark White, Law Offices Of Mark N. White; John Osteraas, Exponent/Failure Analysis Associates;

UNCERTAINTY QUANTIFICATION AND SENSITIVITY ANALYSIS OF EARTHQUAKE CASUALTIES (ID 1414) A f **Î** *Maurizio Gobbato, Risk Management Solutions, Inc.; Nilesh Shome, Risk Management Solutions, Inc.; Wei Meng Yeo, Risk Management Solutions, Inc.;*

05:00 pm - 07:00 pm **Seismic Isolation, Energy Dissipation and Control Systems** Seismic Isolation, Energy Dissipation and Control Systems FL2 Dena'ina

SEISMIC ISOLATION OF 200 YEAR OLD HERITAGE CATHEDRALS IN HAITI (ID 23) ###1 I *H Kit Miyamoto, Miyamoto International*; Devis Sonda, Miyamoto International, Italy; Akira Wada, Tokyo Institute of technology; Amir Gilani, Miyamoto International;

CYCLIC TESTING OF STEEL-CORE BUCKLING-RESTRAINED BRACES (BRBS) HAVING SIMPLE END DETAILS AND INFILLED WITH HIGH STRENGTH GROUT (ID 105) AND INFILLED WITH Content of the strength of the strengt of the strength of the strength of the strength of the streng

Oguz C. Celik, Istanbul Technical University; Cigdem Avci Karatas, Ministry of Environment and Urbanization;

BUCKLING-MODE NUMBER AND COMPRESSIVE-TO-TENSILE STRENGTH RATIO OF BUCKLING-RESTRAINED BRACES (ID 660) *i* i ∈ *Mitsumasa Midorikawa, Hokkaido University*; Taichiro Okazaki, Hokkaido University; Ryota Iizuka, Kanagawa University; Takuya Wakayama, Kajima Corp.; Mamoru Iwata, Kanagawa University; Tetsuhiro Asari, Hokkaido University;

EXPERIMENTAL STUDY ON REDUCED-LENGTH BUCKLING-RESTRAINED BRACES UNDER SLOW-CYCLIC LOADING (ID 741) AND I F Dipti Ranjan Sahoo, Indian Institute of Technology Delhi; M. Safeer Pandikkadavath, Indian Institute of Technology Delhi;

SEISMIC BEHAVIOR OF A STEEL COUPLED BEAM MOMENT FRAME BASED ON NONLINEAR ANALYSES (ID 1118) ### Í JF Ying-Cheng Lin, University of Alabama in Huntsville; Sara Vahid, University of Alabama in Huntsville;

05:00 pm - 07:00 pm **Socio-Economic Issues and Public Policy** Socio-Economic Issues and Public Policy FL2 Dena'ina

LIFE, LIMB, AND THE PURSUIT OF ARCHITECTURE USING PRODUCT DESIGN TO POSITIVELY INFLUENCE POST-DISASTER TRANSITIONAL HOUSING AMONG IMPOVERISHED OR DISPLACED POPULATIONS (ID 1741) A G *Brijhette Farmer, State University of New York at Buffalo*;

05:00 pm - 07:00 pm Soils, Foundations, Soil-Structure Interaction, and Slope Stability Soils, Foundations, Soil-Structure Interaction, and Slope Stability FL2 Dena'ina

ROCKING BEHAVIORS OF SDOF STRUCTURES ON SHALLOW FOUNDATION VIA CENTRIFUGE TEST (ID 819)/## Î FH Jeong-Gon Ha, KAIST; Jin-Sun Lee, Wonkwang Univ.; Mintaek Yoo, Univ. of California; Seong-Bae Jo, KAIST; Dong-Soo Kim, KAIST;



05:00 pm - 07:00 pm **Subduction Zone Mega Earthquake** Subduction Zone Mega Earthquake FL2 Dena'ina

AN EXTENDED GLOBAL CATALOGUE OF GIANT (MW 8.8) EARTHQUAKES (ID 1600) AND I fund Onur, OSC; Robert Muir-Wood, Risk Management Solutions, Inc.;

Poster Sessions

WEDNESDAY, JULY 23

Wednesday Poster Session Layout Map (5:00 p.m.–7:00 p.m.)

Dena'ina Convention Center, Second Floor

- 1. Bridges & Lifelines
- 2. Buildings
- 3. Retrofit
- 4. Experiment & Simulation
- 5. Advanced Structural Systems
- 6. Recent Earthquakes
- 7. Tsunami
- 8. Risk & Loss
- 9. Geotech
- 10. Seismic Hazard







05:00 pm - 07:00 pm Bridge Structures Bridge Structures FL2 Dena'ina

NEW DESIGN DETAIL FOR DUCTILE STEEL BRIDGE SUBSTRUCTURE SYSTEMS (ID 127) Mil î l î Mervyn Kowalsky, North Carolina State University; Steven Fulmer, North Carolina State University; James Nau, North Carolina State University; Elmer Marx, Alaska DOT&PF;

FRP CONFINEMENT OF HIGH STRENGTH SELF-CONSOLIDATING CONCRETE (ID 542) (III) 1 (III) **Mohamed Elgawady, Missouri University of Science and Technology**; Kamal Khayat, Missouri University of Science and Technology;

VULNERABILITY EVALUATION OF COMMON SIMPLE-SUPPORTED HIGHWAY BRIDGES (ID 687) ### 11 i M Consolaci G, Universidad Aut; Ivan Soria, Universidad Aut;

NUMERICAL APPROACHES IN MODELING SOIL-FOUNDATION INTERACTION OF TALL BRIDGES (ID 783) AMA Î Ï J Mohammad Reza Falamarz Sheikhabadi, Drexel University; Aspasia Zerva, Drexel University;

SEISMIC VULNERABILITY OF AN IRREGULAR BRIDGE WITH ELASTOMERIC PADS: A CASE STUDY (ID 803) A Durgesh Rai, Indian Institute of Technology Kanpur; Nirav Thakkar, Indian Institute of Technology Kanpur;

SEISMIC FRAGILITY OF MULTI-SPAN SIMPLY SUPPORTED BRIDGE WITH DROP SPANS AND STEEL BEARINGS (ID 1031) IT Durgesh Rai, Indian Institute of Technology Kanpur; Neha Parool, Indian Institute of Technology Kanpur;

NON-LINEAR ANALYSIS OF A BRIDGE SUBJECTED TO A LARGE EARTHQUAKE (ID 1133) A G Mauricio Sarrazin, University of Chile; Maria Moroni, University of Chile; Jorge Villarroel, University of Chile;

SEISMIC INFLUENCE ON THE SHORT SPAN STEEL BRIDGE DESIGN (ID 1155) *H Edgar Tapia-Hernandez, Universidad Aut*; *Michael Barker, University of Wyoming*; *Tiziano Perea, Universidad Aut*; *Karl Barth, West Virginia University*;

SIGNIFICANCE OF GROUND MOTION INCIDENCE ANGLE IN SEISMIC DESIGN OF BRIDGES (ID 1171) 4 I I Marta De Bortoli, University of California Irvine; Tom Shantz, Caltrans; Farzin Zareian, University of California Irvine;

SEISMIC MONITORING ON THE CURVED PORTION OF AN ELEVATED RAILWAY (ID 1207) (1 i i i **David Muri, Instituto de Ingenier**; Jos Camargo P, Instituto de Ingenier; Carlos Humberto Huerta Carpizo, Instituto de Ingenier; Abraham Roberto S, Instituto de Ingenier; Carlos Cruz Noguez, Carleton University;

CHARACTERIZATION OF THE CYCLIC BEHAVIOR OF HEAVILY CORRODED STEEL BRIDGE BEARINGS (ID 1317) Jason Mccormick, University of Michigan; Xiaohu Fan, University of Michigan;

05:00 pm - 07:00 pm Buildings, Structural and Non-Structural Systems Buildings, Structural and Non-Structural Systems FL2 Dena'ina

NON-LINEAR FINITE ELEMENT MODELING OF RC FRAME-MASONRY WALL INTERACTION UNDER CYCLIC LOADINGS (ID 81) A (I) € **Rabab AI Louzi, Purdue University**; Ghadir Haikal, Purdue University; Ayhan Irfanoglu, Purdue University;

NON-LINEAR FEM ANALYSIS FOR CES SHEAR WALLS (ID 113) A DE SUBAR WALLS (ID 113) A DE SUBAR VILLE SUBAR

MOMENT CAPACITY OF REINFORCED CONCRETE INTERIOR BEAM-COLUMN JOINTS BASED ON A THEORY OF FLEXURAL RESISTANCE OF JOINTS (ID 336), I JF **Fumio Kusuhara, The University of Tokyo**; Hitoshi Shiohara, The University of Tokyo;

THREE-STAGE MULTISCALE NONLINEAR DYNAMIC ANALYSIS PLATFORM FOR BUILDING-LEVEL LOSS ESTIMATIONS (ID 393) A G In Ho Cho, University of Colorado at Boulder; Keith Porter, University of Colorado at Boulder;

FREE FIELD RACKING DEFORMATION METHODOLOGY APPLIED TO THE DESIGN OF SHALLOW TUNNEL STRUCTURES IN HIGH RISK SEISMIC AREAS. PRACTICAL CONSIDERATIONS. (ID 508) FH **Jose-Luis Sanchez Jimenez, TYPSA**;

REINFORCED CONCRETE WALL BOUNDARY ELEMENT LONGITUDINAL REINFORCING TERMINATION (ID 603) ### Ì G

Poster Sessions (continued)



WEDNESDAY, JULY 23

Sunai Kim, University of California, Los Angeles; John W. Wallace, University of California, Los Angeles;

SEISMIC STUDY OF HYBRID SHEAR WALL (ID 769) I H Xiaopu Shen, Anhui University of Architecture; Jay Shen, Illinois Institute of Technology; Lifeng Xu, Illinois Institute of Technology;

A METHOD TO ESTIMATE THE DRIFT RESPONSE OF FLAT-PLATE STRUCTURES SUBJECTED TO STRONG GROUND MOTIONS (ID 772) (I

Damon Fick, Montana State University;

SEISMIC RESPONSE OF HILL BUILDINGS SUBJECTED TO BI-DIRECTIONAL EXCITATION (ID 846) I Í Í Yogendra Singh, Indian Institute of Technology Roorkee; Dominik Lang, NORSAR; Veereswara Yeluguri, Indian Institute of Technology Roorkee;

EVALUATION OF SEISMIC CODE SPECIFICATIONS USING STATIC NONLINEAR ANALYSES OF ARCHETYPE BUILDINGS (ID 915) *Luis Yamin, Universidad de los Andes; Raul Rincon, Universidad de los Andes; Juan Reyes, Universidad de los Andes; Alvaro Hurtado, Universidad de los Andes; Juan Pulido, Universidad de los Andes; Alex Barbat, Universidad Polit;*

NUMERICAL ANALYSIS OF THE SEISMIC PERFORMANCE OF STEEL FRAMES INFILLED WITH COMPOSITE PANELS - NEES RESEARCH (ID 987) A 1 I

Hou Hetao, School of Civil Engineering; Wu Minglei, School of Civil Engineering; Zhou Jian, School of Civil Engineering; Li Jingjing, School of Civil Engineering; Liu Haining, School of Civil Engineering; Lv Zhonglong, School of Civil Engineering;

ASSESSING THE EFFECT OF SPECTRAL SHAPE ON NONLINEAR RESPONSE OF REINFORCED CONCRETE MOMENT RESISTING FRAMES (ID 989) AMA I I I

Saber Ale Saheb Fosoul, University of Isfahan; Hossein Tajmir Riahi, University of Isfahan; Nima Hatami, University of Isfahan;

INCREMENTAL DYNAMIC ANALYSIS OF A GRAVITY DAM (ID 992) AMA Ì JJ Berat Feyza Soysal, Middle East Technical University; Yalin Arici, Middle East Technical University;

TIME-HISTORY ANALYSIS OF TERMINAL 2 OF THE CHENGDU SHUANGLIU AIRPORT UNDER MULTI-SUPPORT AND MULTI-DIMENSION SEISMIC EXCITATION (ID 997) IIII See Dingsong Zhou, China Southwest Architectural Design and Research Institute Co; Kejian Xiao, China Southwest Architectural Design

and Research Institute Co; Yuan Feng, China Southwest Architectural Design and Research Institute Co; EFFECTS OF THE SEISMIC VERTICAL COMPONENT ON STRUCTURAL BEHAVIOR AN ANALYTICAL STUDY OF CURRENT CODE PRACTICES AND POTENTIAL AREAS OF IMPROVEMENT (ID 1107) AND JOF Masume Dana, Forell/Elsesser Engineers; Ali Roufegarinejad, Forell/Elsesser Engineers; Paul Littler, Holmes Culley; Jonas Houston,

Holmes Culley; Michael Greer, SIRVE S.A.; Chris Davis, Degenkolb Engineers; Y.N. Chen, Degenkolb Engineers; Andrew Cussen, Nautilus Group Inc.;

INELASTIC SEISMIC RESPONSE OF MOMENT FRAMES IN SOFT SOILS WITH CONCRETE-FILLED TUBE COLUMNS (ID 1134) IG **Tiziano Perea, Universidad Aut**; Jose Ramon Quezada, Graduate Student; Roberto Leon, Virginia Polytechnique Institute and State University; Edgar Tapia-Hernandez, Universidad Aut;

COMPARISON BETWEEN SEISMIC DEMAND MODELS AND INCREMENTAL DYNAMIC ANALYSIS FOR LOW-RISE AND MID-RISE REINFORCED CONCRETE BUILDINGS (ID 1363)/## JI H Jong-Wha Bai, California Baptist University; Mary Beth Hueste, Texas A&M University; Paolo Gardoni, University of Illinois at Urbana-Champaign;

COMPRESSION FAILURE OF THIN CONCRETE SHEAR WALLS WITH OVERHANGING WALL ABOVE (ID 1479) JII Perry Adebar, University of British Columbia; Maryam Mahmoodi, University of British Columbia;

ASSESSMENT OF MACRO-MODELING TOOLS FOR SEISMIC PERFORMANCE OF MASONRY INFILLED REINFORCED CONCRETE FRAMES (ID 1549) A I I Wael M. Hassan, American University in Cairo; Shady Girges, American University in Cairo;

GRAPHIC DYNAMIC EARTHQUAKE RESPONSE ANALYSIS OF ONE-WAY ASYMMETRIC SYSTEMS (ID 1572) JI Î Marco Faggella, sapienza university of rome;

EFFECTS OF SHEAR WALL RATIO ON THE SEISMIC BEHAVIOUR OF BUILDINGS HAVING INADEQUATE SEISMIC RESISTANCE -NEES RESEARCH (ID 1652)/JIII Í Yurdakul, Anadolu University; Onur Tunaboyu, Anadolu University; Av, Anadolu University;

A STUDY ON SEISMIC CAPACITY OF OVERHEAD TRANSPORTATION SYSTEMS IN A HIGH-TECH FAB (ID 1669) **George Yao, National Cheng Kung University**; Wen-Jyun Chou, National Cheng Kung University; Chin-Lian Tsai, INNOLUX CORPORATION; Wei-Jen Lin, INNOLUX CORPORATION; Jyh-Chau Wang, INNOLUX CORPORATION;

05:00 pm - 07:00 pm **Experimental Methods** FL2 Dena'ina



CHARACTERIZATION OF FLUID VISCOUS DAMPERS FOR SHOCK EXCITATION (ID 960) A Generation (ID 960) Contemporation (ID 960) Contemp

QUASI-STATIC CYCLIC TESTING OF OLDER VULNERABLE CONCENTRICALLY BRACED FRAMES (ID 1800)

05:00 pm - 07:00 pm

Ground Motion, Seismicity, Seismic Hazard Assessment

Ground Motion, Seismicity, Seismic Hazard Assessment FL2 Dena'ina

A 100-POINT SYSTEM FOR SELECTING AND RANKING NATURAL EARTHQUAKE RECORDS FOR ENGINEERING ANALYSIS (ID 182)

Andreas Felber, BC Hydro; Kofi Addo, BC Hydro;

DEPTH-DEPENDENT SITE FACTORS WITH SOIL NONLINEAR EFFECTS (ID 217) A G ⊂ C hi-Chin Tsai, National Chung Hsing University; Tadahiro Kishida, Pacific Earthquake Engineering Research Center (PEER);

SEISMIC HAZARD ANALYSIS FOR QARAOUN DAM IN THE BEKAA VALLEY, LEBANON (ID 456) A J Courtney B. Johnson, AMEC Environment & Infrastructure, Inc.; Faiz I. Makdisi, AMEC Environment & Infrastructure, Inc.; Debra G. Murphy, AMEC Environment & Infrastructure, Inc.;

EMBEDDED FAULTS: A NEW ALTERNATIVE FOR INCORPORATING GEOLOGIC DATA IN SEISMIC SOURCE ZONE MODELING (ID 458) (I

Dean Ostenaa, Fugro Consultants, Inc.; Robert Youngs, AMEC Environmental & Infrastructure; Martin Lawrence, BC Hydro; Martin Mccann, Jack R. Benjamin & Associates;

AN EFFICIENT RECORD SELECTION PROCEDURE FOR THE ESTIMATION OF MEDIAN SEISMIC DEMANDS (ID 632) A € F Neal Kwong, UC Berkeley;

EFFECTS OF LATERAL HETEROGENEITY ON SITE-RESPONSE ANALYSIS USING MICROTREMORS (ID 739) A G Tae-Seob Kang, Pukyong National University; Hyun-Ho Jang, Pukyong National University; Francisco J. Ch, Universidad Nacional Aut;

CHANGE IN SEISMIC RISK IN THE ZONE OF MAULE AFTER THE FEBRUARY 27, 2010 EARTHQUAKE IN CHILE (ID 797) ###€JG Jorge Crempien-Laborie, Universidad de los Andes;

EARTHQUAKE HAZARD AND RISK ASSESSMENT TOOL USING MONTE-CARLO SIMULATION TECHNIQUES (ID 833) **///// FeH Christian Kaufmann, Bauhaus-University Weimar**; Jochen Schwarz, Bauhaus-University Weimar;

EVALUATION OF THE DYNAMIC RESPONSE OF STRUCTURES TO THE REAL, SYNTHETIC AND MODIFIED ACCELEROGRAMS USING S-TRANSFORM (ID 848)

Mohsen Ghafory-Ashtiany, International Institute of Earthquake Engineering & Seismology; Salar Arian Moghaddam, International Institute of Earthquake Engineering & Seismology;

SIMULATION OF EARTHQUAKE GROUND MOTION FOCUSING ON DEEPER SUBSURFACE STRUCTURE OF LOCAL REGION (ID 926) AMA FG

Masumitsu Kuse, Gifu university; Masata Sugito, Gifu university;

SEISMIC EARTH PRESSURES ON INVERTED T-SHAPE RETAINING STRUCTURES VIA DYNAMIC CENTRIFUGE TESTING (ID 939) **Seong-Bae Jo, KAIST**; Dong-Soo Kim, KAIST; Jeong-Gon Ha, KAIST; Jin-Sun Lee, Wonkwang Univ.;

DUAL VERSUS AMPLITUDE SCALING IN NONLINEAR TIME-HISTORY ANALYSIS. (ID 1130) History Fi Ì Juan-Enrique Martinez-Rueda, University of Brighton; Farzaneh Hamedi, Imam Khomeini International University;

THE BC HYDRO SSHAC LEVEL 3 SEISMIC SOURCE MODEL (ID 1215) AND FÍ Ï

Martin Lawrence, BC Hydro; Dean Ostenaa, Fugro Consultants Inc; Ivan Wong, URS Corporation; Bert Swan, AMEC Geomatrix; Robert Youngs, AMEC Geomatrix; Kathryn Hanson, AMEC Geomatrix; William Lettis, Lettis Consultants International Inc.; Jeff Unruh, Lettis Consultants International Inc.; Judith Zachariasen, URS Corporation; Susan Olig, URS Corporation; John Clague, Simon Fraser University; Roland Laforge, Fugro Consultants Inc.; Martin Mccann, Jack R. Benjamin & Associates Inc.;

ENFORCEMENT THE DESIGN METHOD BASED IN THE ENERGY BALANCE TO CALCULATE ENERGY SPECTRA (ID 1351) I Victor Fernandez, PONTIFICIA UNIVERSIDAD CATOLICA DEL PERU; Jenny Avenda, PONTIFICIA UNIVERSIDAD CAT;

PROBABILISTIC FAULT DISPLACEMENT HAZARD ANALYSIS SENSITIVITY ANALYSES AND RECOMMENDED PRACTICES FOR DEVELOPING DESIGN FAULT DISPLACEMENTS (ID 1358)

Poster Sessions (continued)



WEDNESDAY, JULY 23

Donald Wells, AMEC; Vikram Kulkarni, AMEC;

THE ALTERNATIVE CHARACTERISTIC (AC) MODEL AS IMPLEMENTED FOR THE BC HYDRO SSHAC 3 SEISMIC SOURCE MODEL (ID 1515) ₩ FJ€

Roland Laforge, Fugro Consultants Inc.; Robert Youngs, AMEC Geomatrix; Martin Lawrence, BC Hydro; Kofi Addo, BC Hydro;

05:00 pm - 07:00 pm **High Performance Computing and Simulation** High Performance Computing and Simulation FL2 Dena'ina

COMPARISON OF EQUIVALENT-LINEAR SITE RESPONSE ANALYSIS SOFTWARE (ID 252) A Comparison of EQUIVALENT-LINEAR SITE RESPONSE ANALYSIS SOFTWARE (ID 252) Comparison of Comparis

NONLINEAR 3D BI-AXIAL STRUCTURAL VIBRATION UNDER BI-DIRECTIONAL RANDOM EXCITATIONS BY TAIL EQUIVALENT LINEARIZATION METHOD. (ID 824)///// GFG Mohsen Ghafory-Ashtiany, INTERNATIONAL INSTITUTE of EARTHQUAKE ENGINEERING and SEISMOLOGY, IIEES; Reza Raoufi,

Monsen Ghatory-Ashtiany, INTERNATIONAL INSTITUTE of EARTHQUAKE ENGINEERING and SEISMOLOGY, ILEES; Reza Raouti, Department of Civil Engineering, Science and Research Branch, Islamic Azad University, Tehran, Iran;

HIGH PERFORMANCE COMPUTING PLATFORM FOR PERFORMANCE-BASED SEISMIC ASSESSMENT AND RETROFIT DESIGN OF BUILDINGS (ID 1480) AND GOH Armin Bebamzadeh, University of British Columbia; Carlos E. Ventura, University of British Columbia; Michael Fairhurst, University of British Columbia:

PERFORMANCE-BASED SEISMIC DESIGN OF BRIDGES USING HIGH PERFORMANCE COMPUTING TOOLS (ID 1727) A GH **Armin Bebamzadeh, University of British Columbia**; Mahdi Taiebat, University of British Columbia; Amin Rahmani, University of British Columbia; Carlos E. Ventura, University of British Columbia; W. D. Liam Finn, University of British Columbi;

05:00 pm - 07:00 pm **Information Technology and Collaboration Tools** Information Technology and Collaboration Tools FL2 Dena'ina

05:00 pm - 07:00 pm Lessons Learned from Recent Earthquakes Lessons Learned from Recent Earthquakes FL2 Dena'ina

LESSONS FROM THE 2010-2011 EARTHQUAKE SEQUENCE IN CANTERBURY, NEW ZEALAND (ID 200) 4 G Í **Mark Pierperkarz, MRP Engineering, LLC**; Craig Weaver, US Geological Survey; John Hare, Holmes Consulting Group; David Johnston, GNS Science/Massey University; Kelvin Berryman, GNS Science; Joan Gomberg, US Geological Survey; Robert Williams, US Geological Survey;

RESPONSE OF INDUSTRIAL EQUIPMENT SUPPORTED IN STRUCTURES WHEN SUBJECT TO LARGE EARTHQUAKES (ID 1390) A G Í *Ernesto Cruz, EQCO Earthquake Engineering Consultants;* Veronica Miranda, EQCO Earthquake Engineering Consultants; Dania Valdivia, EQCO Earthquake Engineering Consultants;

05:00 pm - 07:00 pm **Lifelines** FL2 Dena'ina

FULL-SCALE TESTING OF HIGH-VOLTAGE ELECTRICAL EQUIPMENT: (ID 26) AMAG G Î Shakhzod Takhirov, University of California at Berkeley; Eric Fujisaki, Pacific Gas and Electric; Amir Gilani, Miyamoto International;

PERFORMANCE OF WATER PIPELINES RETROFITTED WITH CURED IN PLACE PIPE LINER TECHNOLOGY UNDER TRANSIENT EARTHQUAKE MOTIONS - NEES RESEARCH (ID 490) A d i Zilan Zhong, University at Buffalo; Thomas Orourke, Cornell University; Brad Wham, Cornell University; Dimitra Bouziou, Cornell University; Andre Filiatrault, University at Buffalo; Amjad Aref, University at Buffalo; Harry Stewart, Cornell University;

05:00 pm - 07:00 pm **Post-Earthquake Response, Damage Assessment, and Recovery** Post-Earthquake Response, Damage Assessment, and Recovery FL2 Dena'ina



ANALYTICAL STUDY ON THE SEISMIC PERFORMANCE OF A RC BUILDING WITH STRUCTURAL WALL DURING THE MAY 19, 2011 SIMAV, TURKEY EARTHQUAKE (ID 1388) Milling GJJ Onur Tunaboyu, Anadolu University; Ozgur Avsar, Anadolu University;

A CLOSED-FORM APPROXIMATION TO ADAPTIVE STRUCTURAL FRAGILITY TO AFTERSHOCKS (ID 1649) A CLOSED-FORM APPROXIMATION TO ADAPTIVE STRUCTURAL FRAGILITY TO AFTERSHOCKS (ID 1649) H ⊂ J **Raffaele De Risi, University of Naples Federico II**; Gaetano Manfredi, University of Naples Federico II; Andrea Prota, University of Naples Federico II; Domenico Asprone, University of Naples Federico II; Fatemeh Jalayer, University of Naples Federico II; Hossein Ebrahimian, University of Naples Federico II;

05:00 pm - 07:00 pm **Repair and Retrofit** Repair and Retrofit FL2 Dena'ina

IMPROVEMENT OF ANGLE BOLTED CONNECTIONS BY THE ADDITIONAL FILLET WELDING (ID 266) Here Yuika Kawano, Osaka Institute of technology; Shoichi Kishiki, Osaka Institute of technology;

SEISMIC VULNERABILITY OF TRADITIONAL BUILDINGS: THE EFFECT OF ROOF-MASONRY WALLS INTERACTION (ID 1074) AG

INNOVATIVE EMERGENCY REPAIR STUDY ON SEVERELY DAMAGED BRIDGE COLUMNS USING SHAPE MEMORY ALLOY SPIRALS (ID 1105) AND A DAMAGED BRIDGE COLUMNS USING SHAPE MEMORY ALLOY SPIRALS (ID 1105) AND A DAMAGED BRIDGE COLUMNS USING SHAPE MEMORY ALLOY SPIRALS (ID 1105) AND A DAMAGED BRIDGE COLUMNS USING SHAPE MEMORY ALLOY SPIRALS (ID 1105) AND A DAMAGED BRIDGE COLUMNS USING SHAPE MEMORY ALLOY SPIRALS (ID 1105) AND A DAMAGED BRIDGE COLUMNS USING SHAPE MEMORY ALLOY SPIRALS (ID 1105) AND A DAMAGED BRIDGE COLUMNS USING SHAPE MEMORY ALLOY SPIRALS (ID 1105) AND A DAMAGED BRIDGE COLUMNS USING SHAPE MEMORY ALLOY SPIRALS (ID 1105) AND A DAMAGED BRIDGE COLUMNS USING SHAPE MEMORY ALLOY SPIRALS (ID 1105) AND A DAMAGED BRIDGE COLUMNS (ID 1105) AND A DAMAGED BRIDGE COLUMNS (ID 1105) AND A DAMAGED BRIDGE COLUMNS (ID 1005) AND A DAMAGED BRIDGE A DAMAGED BRIDGE COLUMNS (ID 1005) AND A DAMAGED B

05:00 pm - 07:00 pm **Resilient Communities and Cities** Resilient Communities and Cities FL2 Dena'ina

INNOVATIVE EMERGENCY REPAIR STUDY ON SEVERELY DAMAGED BRIDGE COLUMNS USING SHAPE MEMORY ALLOY SPIRALS (ID 1105)

RISK MANAGEMENT STRATEGIES FOR MANAGING NATURAL DISASTER RISKS: A CASE STUDY IN SHIRAZ CITY, IRAN (ID 995) H J **Naghmeh Pakdel-Lahiji, Science and Research Branch, Islamic Azad University**; Mohsen Ghafory-Ashtiany, IIEES - International Institute of Earthquake Engineering and Seismology; Mehdi Sadeghi, Science and Research Branch, Islamic Azad University; Stefan Hochrainer-Stigler, IIASA - International Institute for Applied Systems Analysis;

05:00 pm - 07:00 pm **Risk and Loss Assessment** Risk and Loss Assessment FL2 Dena'ina

QUALIFICATION OF SEISMIC RISK STUDIES ON THE BASIS OF INSTRUMENTALLY VERIFIED VULNERABILITY FUNCTIONS FOR R.C. BUILDING TYPES (ID 108) A € Jochen Schwarz, Bauhaus-Universit; Cemal M. Genes, Zirve University; Lars Abrahamczyk, Bauhaus-Universit;

EVALUATION OF A PORT OPERATIONS MODEL USING THE 2012 WEST COAST PORT STRIKE AS DISRUPTION DATA - NEES RESEARCH (ID 679) III F Lindsay Ivey-Burden, University of Virginia;

ESTIMATING RISK FOR SANTIAGO, CHILE DUE TO DEEP INTRAPLATE AND INTERFACE EARTHQUAKES (ID 715) *i* € *Freddy Pina, PBRV Consulting Ltd.; Paulina Gonzalez, USACH;*

DEVELOPING STRUCTURAL ANALYSIS MODELS USING BAYESIAN METHODS (ID 1221) A J Gary Hart, Weidlinger Associates Inc.; Bruce Ellingwood, Colorado State University; Anurag Jain, Weidlinger Associates Inc.; Kidong Park, Weidlinger Associates Inc.; Joel Conte, University of California San Diego; Kevin Wong, National Institute of Standards and Technology;

DATABASES AND SOFTWARE FOR FINANTIAL RISK ASSESSMENT IN MEXICO (ID 1228) AMA I €€ Eduardo Reinoso, Institute of Engineering, UNAM; Miguel Angel Jaimes, UNAM; Mario Ordaz, UNAM; Benjamin Huerta, ERN;

05:00 pm - 07:00 pm Seismic Isolation, Energy Dissipation and Control Systems

Seismic Isolation, Energy Dissipation and Control Systems FL2 Dena'ina

APPLICATIONS OF SEISMIC DAMPERS TO SPECIAL MOMENT FRAMES (ID 27) AND IFF **H Kit Miyamoto International**; Amir Gilani, Miyamoto International;

Poster Sessions (continued)



WEDNESDAY, JULY 23

NONLINEAR ROOFTOP TUNED MASS DAMPER FRAME (ID 44) *iiii* 1 GF Jerod Johnson, University of Utah; Lawrence Reaveley, University of Utah; Chris Pantelides, University of Utah;

SEISMIC PERFORMANCE OF ATTACHED EQUIPMENT IN A BASE ISOLATED BUILDING (ID 596) IHG Niel Van Engelen, McMaster University; Dimitrios Konstantinidis, McMaster University; Michael Tait, McMaster University;

DAMPING OF SEISMIC VIBRATIONS OF A 3D ASYMMETRICAL BUILDING MODEL WITH MULTIPLE TMDS (ID 599) **K** I H **Kai Chen, Florida Tech**; Razvan Rusovici, Florida Tech; Hector Gutierrez, Florida Tech; Jean-Paul Pinelli, Florida Tech;

MULTI-OBJECTIVE DESIGN OF FLUID VISCOUS DAMPERS USING LIFE-CYCLE COST CRITERIA (ID 766) Mil I *Alexandros Taflanidis, University of Notre Dame; George Mavroeidis, University of Notre Dame; Ioannis Gidaris, University of Notre Dame;*

PLACEMENT OF BILINEAR HYSTERETIC ENERGY DISSIPATION DEVICES FOR PASSIVE SEISMIC CONTROL OF RC STRUCTURES (ID 821) A 1 Í Durgesh Rai, Indian Institute of Technology Kanpur; Puneet Chugh, Indian Institute of Technology Kanpur;

THE EFFECT OF SLIP ON THE COMPRESSIVE BEHAVIOR OF UNBONDED RUBBER PADS: A FINITE ELEMENT APPROACH (ID 874) XXXX I Î Î

Saman Rastgoo Moghadam, McMaster University; Dimitrios Konstantinidis, McMaster University;

A NEW NONLINEAR SYSTEM FOR THREE-DIMENSIONAL ISOLATION OF VIBRATIONS IN STRUCTURES AND EQUIPMENT (ID 1193)

Jos Almaz, Pontificia Universidad Cat;

RESEARCH AND DEVELOPMENT OF STEEL DAMPERS FOR BASE-ISOLATED STRUCTURES (NO.1: PLASTIC DEFORMATION CAPACITY AND HYSTERETIC BEHAVIOR OF U-SHAPED STEEL DAMPERS UNDER UNI-AXIAL DYNAMIC CYCLIC LOADINGS) (ID 1236)

Diana Ene, Tokyo Institute of Technology; Yoshinao Konishi, Nippon Steel & Sumikin Engineering Co., Ltd.; Norihisa Kawamura, Nippon Steel & Sumikin Engineering Co., Ltd.; Satoshi Yamada, Tokyo Institute of Technology; Shoichi Kishiki, Osaka Institute of Technology; Yu Jiao, Tokyo University of Science; Yuma Hoashi, Nippon Steel & Sumikin Engineering Co., Ltd.;

ANALYTICAL STUDY OF SHEAR SLOTTED BOLTED CONNECTION IN MOMENT RESISTING FRAMES (ID 1296) A field Kiarash Mohtasham Dolatshahi, Sharif University of Technology; Seyed Rasoul Mirghaderi, University of Tehran; Mohammad Taghi Nikoukalam, University of Tehran;

CASE STUDIES ON THE SEISMIC PROTECTION OF EQUIPMENT IN ESSENTIAL BUILDINGS - NEES RESEARCH (ID 1381) (ID 1

OPTIMAL ARRANGEMENT OF VISCO-ELASTIC DAMPERS IN MASS ISOLATED SYSTEM (ID 1579) *i* H€ **Erfan Alavi, Sazeh Consultants**; Mojtaba Alidoost, Sazeh Consultants;

INVESTIGATION OF THE RELATIONSHIP BETWEEN THE MECHANICS OF SEISMIC ISOLATION SYSTEMS AND THE USE OF VERTICAL AND VERTICAL-HORIZONTAL GROUND MOTIONS (ID 1645) I € Andreas Schellenberg, UC Berkeley; Jenna Wong, UC Berkeley; Stephen Mahin, UC Berkeley;

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Soils, Foundations, Soil-Structure Interaction, and Slope Stability

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INCORPORATING SOIL-FOUNDATION-STRUCTURE INTERACTION EFFECTS THROUGH A DECOUPLED ANALYSIS FOR THE SESIMIC DESIGN OF A PILE SUPPORTED BUILDING AT A SOFT SOIL SITE WITH HIGH IMPEDANCE EFFECT (ID 71) AND I G King Chin, GeoEngineers, Inc.; Luke Ruggeri, CoughlinPorterLundeen; Bryan Zagers, CoughlinPorterLundeen;

BEHAVIOR OF MODEL PILE IN SATURATED SLOPING GROUND IN SHAKING TABLE TEST (ID 74) *final* i H **Chia-Han Chen, National Center for Research on Earthquake Engineering**; Cheng-Hsing Chen, National Taiwan University; Tzou-Shin Ueng, National Taiwan University;

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