2015 FINAL PROGRAM

ATC&SEI

2nd Conference on Improving the Seismic Performance of Existing Buildings and Other Structures

DECEMBER 10–12, 2015
HYATT REGENCY HOTEL
SAN FRANCISCO, CALIFORNIA

A State-of-the-Art Conference Organized by
the Applied Technology Council and
the Structural Engineering Institute of ASCE

Earn up to 14 Professional Development Hours

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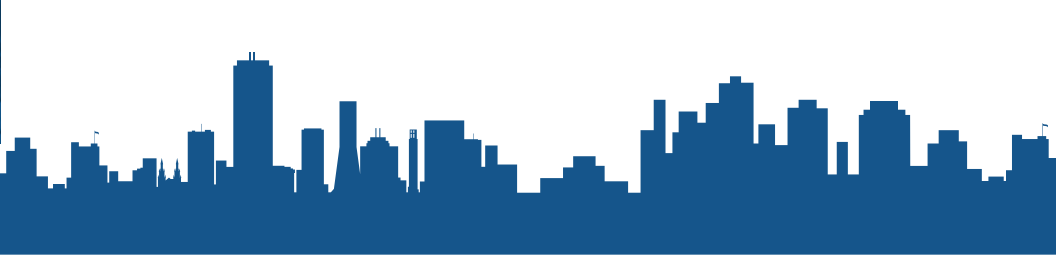

THURSDAY, DECEMBER 10, 2015

6:30 am – 6:00 pm	Registration	Market Street Foyer
7:45 am – 8:30 am	Light Continental Breakfast	Market Street Foyer
8:30 am – 10:00 am	**Opening Plenary Session**	Grand Ballroom B-C
10:00 am – 10:30 am	Refreshment Break	Pacific Concourse
10:00 am – 1:30 pm	Exhibit Hall Open	Pacific Concourse
10:30 am – 12:00 pm	**Concurrent Technical Sessions**	
12:00 pm – 1:30 pm	Lunch in Exhibit Hall	Pacific Concourse
1:30 pm – 3:00 pm	**Concurrent Technical Sessions**	
3:00 pm – 7:30 pm	Exhibit Hall Open	Pacific Concourse
3:00 pm – 3:30 pm	Refreshment Break	Pacific Concourse
3:30 pm – 5:00 pm	**Concurrent Technical Sessions**	
6:00 pm – 7:30 pm	**Opening Reception and Poster Session in Exhibit Hall**	Pacific Concourse

FRIDAY, DECEMBER 11, 2015

7:00 am – 5:00 pm	Registration	Market Street Foyer
7:30 am – 10:30 am	Exhibit Hall Open	Pacific Concourse
7:45 am – 8:30 am	Light Continental Breakfast	Pacific Concourse
8:30 am – 10:00 am	**Plenary Session**	Grand Ballroom B-C
10:00 am – 10:30 am	Refreshment Break	Pacific Concourse
10:30 am – 12:00 pm	**Concurrent Technical Sessions**	
12:15 pm – 1:30 pm	Luncheon with Speaker	Grand Ballroom B-C
12:00 pm – 3:30 pm	Exhibit Hall Open	Pacific Concourse
1:30 pm – 3:00 pm	**Concurrent Technical Sessions**	
3:00 pm – 3:30 pm	Refreshment Break	Pacific Concourse
3:30 pm – 5:00 pm	**Concurrent Technical Sessions**	
6:30 pm – 10:00 pm	**Awards Gala Honoring Champions of Earthquake Resilience**	Maritime Museum (Ticket required)

SATURDAY, DECEMBER 12, 2015

7:00 am – 1:00 pm	Registration	Market Street Foyer
7:45 am – 8:30 am	Light Continental Breakfast	Market Street Foyer
8:30 am – 10:00 am	**Plenary Session**	Grand Ballroom B-C
10:00 am – 10:30 am	Refreshment Break	Market Street Foyer
10:30 am – 12:00 pm	**Concurrent Technical Sessions**	
12:00 pm	Conference Adjourns	

Welcome

Welcome to the 2nd *Conference on Improving the Seismic Performance of Existing Buildings and Other Structures*, a joint conference organized by Applied Technology Council (ATC) and the Structural Engineering Institute (SEI) of the American Society of Civil Engineers (ASCE). The Conference Program Committee has assembled a technical program that includes case studies, emerging and innovative uses of new technologies and materials, standards and codes issues, and performance-based design methods.

Each day begins with a Plenary Session featuring internationally recognized specialists. On Thursday, **Kenneth J. Elwood** from the University of Auckland, New Zealand, will kick off the conference with his talk on *Post-Earthquake Decisions for Reinforced Concrete Buildings: Lessons from Canterbury and Emerging Challenges*. He will be followed by **Lucy Jones** of the U.S. Geological Survey, Pasadena, speaking on *Resilience By Design in Los Angeles*. Four concurrent technical sessions throughout the day will offer presentations on resilience and mitigation programs, concrete structures, nonlinear analysis, historic structures, emerging technologies, and standards and guidelines.

Thursday evening's **Opening Reception** features our Poster Session authors and provides an opportunity to have a dialogue with these authors while also visiting the conference's Exhibit Hall.

Friday's Plenary Session features **Curt Haselton** from California State University at Chico who will ask and discuss the question, *Can We Achieve Seismically Resilient Buildings (and Cities?) — A Look at Recent Industry Developments and How We May Leverage These Moving Forward.* This presentation will be followed by **William T. Holmes** of San Francisco speaking on *Simplified Seismic Evaluation of Older Concrete Frames for Collapse Potential.* Friday also features **Patrick Otellini** of the City and County of San Francisco as our Luncheon Speaker who will speak on *Our Resilience Challenge — Making San Francisco Safe Enough to Stay.* Four concurrent technical sessions will take place during this day: managing risk, soft-story buildings, nonstructural components, implementation case studies, and innovative solutions for retrofit.

Friday will end with a special evening event honoring the ***Champions of Earthquake Resilience Award Winners***, which will be held at the beautiful historic San Francisco Maritime Museum.

Our last day of the conference will feature Plenary speakers **David Mar** of Mar Structural Design, Berkeley, speaking on *Innovative Seismic Retrofit Solutions, with a Focus on New and Emerging Concepts (an Eye to the Future)* and **Laurie Johnson** of San Rafael with her closing plenary topic, *Building a Foundation for Resilience at the Community Level.* The third day of the conference will conclude after five concurrent technical sessions.

On behalf of the Program Committee, ATC, and ASCE/SEI, we thank you for your support. Have a great conference while also enjoying beautiful San Francisco!

Roberto Leon, *Program Committee Chair*

Laura Champion, *SEI Director*

Ayse Hortacsu, *ATC Director of Projects*

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THURSDAY, DECEMBER 10, 2015

8:30 am–10:00 am — **OPENING PLENARY** — Grand Ballroom B-C

- **K. Elwood:** *Post-Earthquake Decisions for Reinforced Concrete Buildings: Lessons from Canterbury and Emerging Challenges*
- **L. Jones:** *Resilience by Design in Los Angeles: The Los Angeles Mayor's Plan to Improve the Seismic Performance of Buildings*

Break in Exhibit Hall

Track	Resilience/Mitigation Programs—1	Concrete Structures/Nonlinear Analysis—2	Historic Structures/Emerging Technologies—3	Standards and Guidelines—4
	Bayview A	Bayview B	Seacliff A-B	Seacliff C-D
10:30 am–12:00 pm —A—	US Resiliency Council (USRC) and the Implementation of a Building Rating System	Modelling Reinforced Concrete Components and Buildings	Historic Masonry Structures	Performance-Based Seismic Evaluation of Reinforced Concrete Structures, in Conjunction with ASCE/SEI 41
Lunch in Exhibit Hall				
1:30 pm–3:00 pm —B—	Mitigation Programs for Schools and Other Buildings	Performance of Older Reinforced Concrete Buildings and Implications for Regional Mitigation	Innovative Approaches and Codes for Historic Structures	Future Directions of ASCE/SEI 41-13 and Other Seismic Evaluation Procedures
Break in Exhibit Hall				
3:30 pm–5:00 pm —C—	Seismic Resilience — Lessons from the Field	Analysis, Modeling, and Simulation for Performance-based Seismic Engineering: Next Generation of Nonlinear Modeling	Implementation of Emerging Technologies and Methods	Recent Updates to Standards and Guidelines
6:00 pm–7:30 pm	Poster Session and Opening Reception — Exhibit Hall — Pacific Concourse			

FRIDAY, DECEMBER 11, 2015

8:30 am–10:00 am — **PLENARY SESSION** — Grand Ballroom B-C

- **C. Haselton:** *Can We Achieve Seismically Resilient Buildings (and Cities)? A Look at Recent Industry Developments and How We May Leverage These Moving Forward*
- **W. Holmes:** *Simplified Seismic Evaluation of Older Concrete Frames for Collapse Potential*

Break in Exhibit Hall

Track	Managing Risk—5	Nonstructural/Wood Soft Story—6	Implementation Case Studies—7	Innovative Solutions for Retrofit—8
	Bayview A	Bayview B	Seacliff A-B	Seacliff C-D
10:30 am–12:00 pm —A—	Regional and Portfolio Analysis	Performance Assessment of Nonstructural Components & Systems	Evaluation and Retrofit of Existing Buildings: Tall Steel Building Case Studies	Earthquake Demands — Important Topics
12:15 pm–1:30 pm Grand Ballroom B-C	**LUNCHEON WITH LUNCH SPEAKER** — **P. Otellini:** *Our Resilience Challenge — Making San Francisco Safe Enough to Stay*			
1:30 pm–3:00 pm —B—	How the FEMA P-58 Methodology Can Inform Decision Makers	Experimental Evaluation of Nonstructural Components & Systems	Evaluation and Retrofit of Existing Buildings: California Case Studies	Performance Assessment of Tall Buildings
Break in Exhibit Hall				
3:30 pm–5:00 pm —C—	Recent Legal Developments Affecting Owners and Designers: Using Performance Targets to Manage Seismic Risk in the Legal Arena	Behind the Scenes of San Francisco's Mandatory Seismic Retrofit Program for Soft-Story Buildings	Evaluation and Retrofit of Existing Buildings: San Francisco Bay Area Case Studies	Retrofit Solutions for Masonry Structures
6:00 pm–7:30 pm	Awards Gala Honoring Champions of Earthquake Resilience — Maritime Museum (ticket required)			

SATURDAY, DECEMBER 12, 2015

8:30 am–10:00 am — **PLENARY SESSION** — Grand Ballroom B–C

- **D. Mar:** *Innovative Seismic Retrofit Solutions, with a Focus on New and Emerging Concepts (an Eye to the Future)*
- **L. Johnson:** *Building a Foundation for Resilience at the Community Level*

Break in Market Street Foyer

Track	Napa Earthquake—9	Resilience Framework—10	Steel Structures Retrofit —11	Case Studies—12	Future Directions—13
	Bayview A	Bayview B	Pacific Concourse L-O	Seacliff A–B	Seacliff C-D
10:30 am–12:00 pm	Performance Assessment of Single-Family Dwellings Impacted by the 2014 South Napa Earthquake and the Need to Promote Effective Mitigation Policies	NIST Disaster Resilience Framework	Retrofit of Steel Structures	Evaluation and Retrofit of Existing Buildings: Case Studies of Various Building Occupancies	Future Directions

THURSDAY, DECEMBER 10, 2015

8:30 am – 10:00 am

Opening Plenary Session

Grand Ballroom B-C

Speaker: Kenneth J. Elwood, *Department of Civil and Environmental Engineering, University of Auckland, New Zealand*

■ *Post-Earthquake Decisions for Reinforced Concrete Buildings: Lessons from Canterbury and Emerging Challenges*

Description: Observations of RC building performance in recent earthquakes with a special focus on the devastating events in Christchurch, New Zealand. These events have highlighted the complexity of post-earthquake decisions for damaged buildings and the impacts on communities. The presentation will reflect on factors influencing demolition decisions and emerging challenges for the earthquake engineering community.

Biography: Prof. Ken Elwood currently serves as the MBIE (Ministry for Business Innovation and Employment) Chair in Earthquake Engineering at the University of Auckland, New Zealand. Formerly of the University of British Columbia, Ken was drawn to New Zealand to pursue the numerous opportunities for research and implementation in earthquake risk reduction. Among other activities in New Zealand, Ken is helping to manage a three-year research program initiated by the New Zealand Government to investigate the performance of concrete buildings in the Christchurch earthquake, including improved procedures for assessing repairability. Ken is actively involved in research related to the seismic response of existing concrete and masonry buildings. Ken received his Ph.D. in Civil Engineering from the University of California, Berkeley in 2002. He is a member of several national and international code committees including the seismic provisions of ACI 318. Ken is a member of the Earthquake Engineering Research Institute (EERI) Board of Directors and Chair of the EERI Learning from Earthquakes program.

Speaker: Lucy Jones, *U.S. Geological Survey, Pasadena, California*

■ *Resilience by Design in Los Angeles*

Description: The Los Angeles Mayor's plan to improve the seismic performance of buildings includes (1) mandatory and voluntary ordinances pertaining to retrofit of vulnerable soft-story wood-frame buildings and older concrete buildings, and (2) implementation of a seismic rating system for buildings.

Biography: Dr. Lucy Jones has been a seismologist with the US Geological Survey and a Visiting Research Associate at the Seismological Laboratory of Caltech since 1983. She currently serves as Science Advisor for Risk Reduction in the Natural Hazards Mission of the US Geological Survey, leading long-term science planning for natural hazards research, and the SAFRR Project: Science Application for Risk Reduction to apply USGS science to reduce risk in communities across the Nation. She led a partnership between the USGS and the City of Los Angeles to create solutions to four of the most significant seismic vulnerabilities in the City. Dr. Jones has authored over 100 papers on research seismology with primary interest in earthquake statistics and integrated disaster scenarios, especially in southern California, including leading the science projects that created the ShakeOut Earthquake Scenario, the Great ShakeOut Drill and the ARkStorm Scenario. Dr. Jones received a Bachelor of Arts degree in Chinese Language and Literature, Magna Cum Laude, from Brown University in 1976 and a Ph.D. in geophysics from the Massachusetts Institute of Technology in 1981.

10:30 am – 12:00 pm

Session 1A: US Resiliency Council (USRC) and the Implementation of a Building Rating System

Moderator: Ron Mayes, *Ph.D., P.E., M.ASCE*

Track: Resilience / Mitigation Programs

Room: *Bayview A*

This session will have four presentations that will cover all aspects of the US Resiliency Council (USRC) and the current rating system for the earthquake performance of buildings.

- *The USRC – Goals and Objectives, Organization and Founding Principles*
  Ron Mayes, *Ph. D., P.E., M.ASCE, SGH;* **Evan Reis,** *Hinman Consulting Engineers*
- *The USRC Building Rating System — Why a Rating System, Who Uses It, What Information Does It Provide and How Does It Maintain Long Term Credibility*
  Ron Mayes, *Ph.D., P.E., M.ASCE, Ph. D., SGH;* **Evan Reis,** *Hinman Consulting Engineers*
- *The ASCE 41-13 Evaluation Methodology and Its Translation into the USRC Rating System*—This presentation will describe the details of the evaluation methodology developed by the SEAONC Buildings Rating Committee and adopted by the USRC – SEAONC BRC
- *The FEMA P58 Evaluation Methodology and the Modifications Needed to Translate into the USRC Rating System*
  Curt Haselton, *Ph. D., P.E.*

Session 2A: Modeling Reinforced Concrete Components and Buildings

Moderator: Dimitrios Lignos, *Ph.D*

Track: Concrete Structures / Nonlinear Analysis

Room: *Bayview B*

- *Nonlinear Truss Modeling Method for the Analysis of Shear Failures in Reinforced Concrete and Masonry Structures*
  Mohammadreza Moharrami, *M.Sc.;* **Ioannis Koutromanos,** *Ph.D., A.M. ASCE, Virginia Tech;* **Marios Panagiotou,** *Ph.D., University of California, Berkeley*
- *Performance Evaluation for Beam-Column Joints in Reinforced Concrete Building Frames*
  Jong-Su Jeon, *Ph.D., Georgia Institute of Technology;* **Laura Lowes,** *Ph.D., A.M.ASCE, University of Washington, Seattle;* **Reginald DesRoches,** *Ph.D., M.ASCE, Georgia Institute of Technology*
- *Nonlinear Analysis for Earthquake Performance Assessment of Reinforced Concrete Walls*
  Dawn Lehman, *Ph.D.;* **Laura Lowes,** *Ph.D., A.M.ASCE;* **Zach Whitman,** *EIT, University of Washington;* **Joshua Pugh,** *Ph.D., Seattle University*
- Gravity Load Collapse and Vulnerability of Existing Buildings
  Halil Sezen, *Ph.D., P.E., M.ASCE, Ohio State University*

Session 3A: Historic Masonry Structures

Moderator: Richard C. Dreyer, *S.E.*

Track: Historic Structures/Emerging Technologies

Room: *Seacliff A-B*

- *Evaluations, Repairs, and Retrofits of Historic Structures in the Mid-Atlantic Following the 2011 Mineral, VA Earthquake*
  Matthew Daw, *P.E., LEED AP, Keast & Hood,* **Craig Swift,** *P.E., S.E., LEED AP, University of Virginia,* **Laura Burke,** *EIT, MEng, Keast & Hood*
- *Seismic Performance-Based Assessment of Historical Masonry Buildings: The PERPETUATE Guidelines*
  Sergio Lagomarsino, Serena Cattari, *University of Genoa*
- *Mitigating Seismic Risks in Historical Masonry: An Example Project*
  Ihsan Engin Bal, *Ph.D.,* **Eleni Smyrou,** *Ph.D.;* **Burcu Gunes,** *Ph.D.,* **Alper Ilki,** *Ph.D., Istanbul Technical University*

Session 4A: Performance-Based Seismic Evaluation of Reinforced Concrete Structures, in Conjunction with ASCE/SEI 41

Moderator: Siamak Sattar, *Ph.D., A.M.ASCE*

Track: Standards and Guidelines

Room: *Seacliff C-D*

This panel will focus on the state of practice, and practical implementation challenges in the evaluation and design of reinforced concrete buildings in the context of Performance – Based Seismic Engineering (PBSE). The panel will discuss the detail of the recent improvements related to reinforced concrete buildings in ASCE/SEI 41 as well as the larger issue regarding the consistency between PBSE standards and more traditional approaches.

Panel members (alphabetical order):

- *Assessment of ASCE/SEI 41 Reinforced Concrete Column Provisions Using Shaking Table Tests*
  Ken Elwood, *Ph.D., P.E., C.Eng., University of Auckland*
- *Updates to ACI 369 Seismic Evaluation and Retrofit of Existing Reinforced Concrete Buildings*
  Wassim Ghannoum, *A.M.ASCE, University of Texas Austin*
- *Discrepancy Between the Implementation of Performance-Based Seismic Engineering Approaches and ASCE/SEI 7 for High-Rise Reinforced Concrete Buildings in Los Angeles*
  Tony Ghodsi, *Englekirk Structural Engineers*
- *Assessment of the Intended Structural Performance Levels Between ASCE/SEI 41 and ASCE/SEI 7 for an 8-Story Reinforced Concrete Special Moment Frame Building*
  Siamak Sattar, *Ph.D., A.M.ASCE, National Institute of Standards and Technology*

1:30 pm – 3:00 pm

Session 1B: Mitigation Programs for Schools and Other Buildings

Moderator: Brian Tucker

Track: Resilience/Mitigation Programs

Room: *Bayview A*

- *Large Scale World Bank Seismic Risk Reduction Program for Public Buildings in Metro Manila, Philippines*
  Amir Gilani, *Ph.D. S.E., M.ASCE,* **Kit Miyamoto,** *Ph.D.. S.E., F.ASCE, Miyamoto International*
- *Three Case Studies of School Seismic Evaluations in the Midwest*
  Jeffrey Mitchell, *EIT,* **Alan Scott,** *P.E., S.E., M.ASCE, KPFF Consulting Engineers*
- *Effectively Improving School Seismic Safety: Examples from the U.S. and Abroad*
  Veronica Cedillos, *P.E., Applied Technology Council;* **Brian Tucker,** *Ph.D, GeoHazards International*
- *Performance-Based Retrofit of School Buildings in British Columbia, Canada — An Update*
  Carlos Ventura, *Ph.D., P.E., M.ASCE;* **Armin Bebamzadeh,** *Ph.D.;* **Michael Fairhurst,** *Graduate Student Researcher, University of British Columbia;* **Graham Taylor,** *Ph.D., TBG Seismic Consultants Ltd; W.D.;* **Liam Finn,** *Ph.D., P.Eng., University of British Columbia.*

Session 2B: Performance of Older Reinforced Concrete Buildings and Implications for Regional Mitigation

Moderator: Thalia Anagnos, *Ph.D., A.M.ASCE*

Track: Concrete Structures/Nonlinear Analysis

Room: *Bayview B*

- *Developing a Building Inventory to Inform Mitigation Priorities and Strategies*
  Thalia Anagnos, *Ph.D, A.M.ASCE, San Jose State University;* **Mary Comerio,** *M.Arch., M.S.W., UC Berkeley*
- *Performance of Older Concrete Buildings — Lessons from Recent Research*
  Wassim Ghannoum, *University of Texas at Austin*
- *Perspectives of the Los Angeles Mayor's Technical Task Force*
  Michael Mehrain, *Ph.D., S.E., Mehrain Naeim International*
- *Implementation of Mitigation Policy*
  Ifa Kashefi, *Ph.D., S.E., Los Angeles Department of Building and Safety*

Session 3B: Innovative Approaches and Codes for Historic Structures

Moderator: Kevin D. O'Connell, *P.E., S.E., M.ASCE*

Track: Historic Structures/Emerging Technologies

Room: *Seacliff A-B*

- *Introduction to the California Historical Building Code*
  Una Gilmartin, *P.E.;* **Alan Dreyfuss,** *Architect AIA, Wiss Janney Elstner Associates, Inc.*
- *Beneficial Uses and Misuses of the California Historical Building Code*
  Kelly Cobeen, *P.E., S.E., M.ASCE;* **Gwenyth Searer,** *S.E.;* **Kent Sasaki,** *S.E., Wiss Janney Elstner Associates, Inc.*
- *Historic Desmond Building Retrofit — A Case Study of the Seismic Retrofit of a Concrete Building in the Los Angeles Area*
  Zhaoshuo Jiang, *Ph.D, P.E., LEED, San Francisco State University;* **Mark Sarkisian**, *P.E., S.E., LEED;* **Neville Mathias,** *P.E., S.E.;* **Rupa Garai,** *P.E., S.E., LEED;* **John Lyrenmann,** *P.E., Skidmore, Owing & Merrill LLP*
- *Seismic Isolation and Structural Retrofit of Haitian Heritage Cathedrals*
  Amir Gilani, *Ph.D. P.E., S.E., M.ASCE;* **Kit Miyamoto,** *Ph.D., S.E., F.ASCE, Miyamoto International*

Session 4B: Future Directions of ASCE/SEI 41-13 and Other Seismic Evaluation Procedures

Moderator: Ayse Hortacsu, *P.E., M.ASCE*

Track: Standards and Guidelines

Room: *Seacliff C-D*

This panel will focus on the implementation and future developments regarding the ASCE/SEI 41 standard, *Seismic Evaluation and Retrofit of Existing Buildings,* and other seismic evaluation procedures, currently under development. The panel will include the following presentations:

The most recent ASCE/SEI 41 standard was published in 2013 and has been met with enthusiasm from the practice. To aid with implementation of the updated standards, the Applied Technology Council (ATC) is conducting a project that will develop design examples based on the procedures in ASCE/SEI 41-13. **Bret Lizundia,** Director of the ATC-124 Project developing seismic retrofitting guidance, will provide an overview of the project.

While ASCE/SEI 41-13 is in effect, the ASCE committee on Retrofit of Existing Buildings Standards continues to work on improving the standard based on current knowledge and prepare the next version of the standard due out in 2017. **Robert Pekelnicky,** *P.E., S.E., M.ASCE,* Chair of the ASCE commitee on Retrofit of Existing Buildings Standards, will provide a summary of the committee's work looking forward to the 2017 edition.

In addition, a new methodology that can be used to investigate an existing concrete building and determine whether it is an "exceptionally high seismic risk" building is under development. The methodology requires the engineer to estimate drift demands and drift capacities of key components in the structure, e.g., columns or slab-column connections. These drift demands and capacities are used to compute column ratings, which are then used to determine story ratings and, finally a building rating. These ratings represent the likelihood of collapse for the column, story or building, respectively, and vary between 0 and 1. The drift demands depend on the building strength, period, and the expected drift distribution. The drift capacities are based experimental data quantifying failure of different types of reinforced concrete components with varying levels of detailing. The methodology also accounts for torsional irregularities and lap-splice deficiencies. It is intended to be simple enough that it does not require development computer model. The current draft of the methodology applies only to frame structures, but it is being extended to include buildings with structural walls in the future. The methodology is currently under development by the FEMA-funded ATC-78 project. **Cody Harrington** of University of Colorado Boulder will describe an overview of the methodology.

3:30 pm – 5:00 pm

Session 1C: Seismic Resilience — Lessons from the Field

Moderator: Fred Turner, *P.E., S.E., M.ASCE*

Track: Resilience/Mitigation Programs

Room: *Bayview A*

- *San Francisco's Earthquake Safety Implementation Program: Lessons from the First Four Years*
  David Bonowitz, *S.E.*
- *Protecting Businesses through the QuakeSmart Community Resilience Program*
  Barbara Harrison, *CAE, Federal Alliance for Safe Homes (FLASH),* Tim Smail, *Federal Alliance for Safe Homes (FLASH)*
- *Seismic Risk Management in the New Zealand Context*
  Rob Jury, *CPEng;* Helen Ferner, *S.E, CPEng, Beca Ltd.*
- *Residential Mitigation: Building a Complete Solution for California Homeowners*
  Janiele Maffei, *S.E., California Earthquake Authority*

Session 2C: Analysis, Modeling, and Simulation for Performance-Based Seismic Engineering: Next Generation of Nonlinear Modeling

Moderator: Steven L. McCabe, *Ph.D., P.E., M.ASCE*

Track: Concrete Structures/Nonlinear Analysis

Room: *Bayview B*

This panel will focus on an ongoing project funded by the National Institute of Standards and Technology (NIST) through the Applied Technology Council (ATC) to develop the next generation of nonlinear component modeling parameters, including backbone curves, and a set of guidelines on nonlinear modeling of reinforced concrete and steel structures as an important step in the implementation of Performance–Based Seismic Engineering (PBSE). This study addresses the nonlinear modeling of various structural systems including: structural steel moment frame, reinforced concrete moment frame, reinforced concrete structural wall, masonry, and wood buildings. The project team is formed of 40 experts from industry and academia. The project is conducted in three phases including: (1) assessment and calibration of generalized component models; (2) development of guidelines for nonlinear analysis of structural steel moment frames; and (3) development of guidelines for nonlinear analysis of reinforced concrete moment frames. The project goal is to develop suggested improvements to the ASCE/SEI 41 modeling and acceptance criteria. The session will comprehensively discuss the findings of this project in the form of four presentations. The session discussion will help the practitioners and building code developers to learn more about the gap between research and practice as well as improvements on of the nonlinear modeling of buildings both in terms of component and system modeling.

Panel members (in alphabetical order) and their topics of presentation are as follows:

Ronald Hamburger, *P.E., F.SEI, Simpson Gumpertz & Heger* will talk about the assessment and calibration of the next generation of generalized component models. **Greg Deierlein** *Stanford University* will talk about the nonlinear modeling and analysis of structural steel moment frames.

Curt Haselton, *P.E., Chico State University* will talk about the nonlinear modeling and analysis of structural concrete moment frames.

Laura Lowes, *Ph.D., A.M.ASCE and* **Dawn Lehman** *University of Washington* will talk about the recommendations for updating ASCE 41 for assessment of reinforced concrete structural wall buildings, using experimental and numerical results.

Session 3C: Implementation of Emerging Technologies and Methods

Moderator: Robert Pekelnicky, *P.E., S.E., M.ASCE*

Track: Historic Structures/Emerging Technologies

Room: *Seacliff A-B*

- *Seismic Retrofit of a High-Rise Steel Moment Resisting Frame Using Viscous Dampers*
  Shanshan Wang, *Ph.D., student, UC Berkeley;* **Jiun-Wei Lai,** *Ph.D.,* **Matthew Schoettler,** *Ph.D., Pacific Earthquake Engineering Research (PEER) center;* **Stephen Mahin,** *Ph.D., UC Berkeley*
- *An Innovative Method for the Seismic Retrofitting of Existing Steel Moment Frame Structures Using SidePlate Technology*
  Behzad Rafezy, *Ph.D.,* **Quang Huynh**, *P.E.;* **Henry Gallart,** *P.E., S.E., SidePlate Systems, Inc.;* **Mohammad Kheirollahi,** *MSc, Sahand University of Technology*
- *Retrofit of Steel-Frame Buildings using Enhanced Gravity-Frame Connections*
  Johnn Judd, *P.E., University of Wyoming;* **Finley Charney,** *Ph.D., P.E.,F.SEI, F.ASCE Virginia Tech;* **Steven Pryor,** *P.E., S.E., M.ASCE, Simpson Strong-Tie Company*
- *Modeling Performance of Rehabilitated Extremely Damaged Concrete Columns and Masonry Wall for Analysis and Design*
  Guillermo Huaco, *Ph.D.;* **Cardno Haynes Whaley**; **James Jirsa,** *Ph.D., P.E., M.ASCE, The University of Texas at Austin*

Session 4C: Recent Updates to Standards and Guidelines

Moderator: Peter W. Somers, *P.E., M.ASCE*

Track: Standards and Guidelines

Room: *Seacliff C-D*

- *Third Edition Update of FEMA P-154: Rapid Visual Screening for Potential Seismic Hazards*
  Bret Lizundia, *S.E., Rutherford + Chekene;* **Sarah Durphy,** *S.E., Estructure;* **Mike Griffin**, *P.E., CCS Group;* **William Holmes,** *S.E., Rutherford + Chekene;* **Ayse Hortacsu,** *P.E., Applied Technology Council;* **Brian Kehoe,** *S.E., Wiss Janney Elstner Associates;* **Keith Porter,** *Ph.D., SPA Risk, LLC;* **Barry Welliver,** *S.E., BHW Engineers*
- *AISC 341 Appendix 1: Seismic Evaluation and Retrofit of Existing Steel Seismic Force Resisting Systems*
  John Harris, *Ph.D., S.E., P.E., SECB, F.SEI, M.ASCE, NIST*
- *FEMA P807: Guidelines for Seismic Retrofit of Weak-Story Wood-Frame Buildings*
  David Mar, *S.E., Mar Structural Design*
- *FEMA ROVER Version 2 and ROVER ATC-20, Mobile Earthquake Safety Software*
  Keith Porter, *Ph.D., P.E., M.ASCE, University of Colorado at Boulder and SPA Risk LLC;* **Sidney Hellman,** *Ph.D., Instrumental Software Technologies Inc.;* **Ayse Hortacsu,** *P.E., Applied Technology Council*

FRIDAY, DECEMBER 11, 2015

8:30 am–10:00 am

Plenary Session

Grand Ballroom B-C

Speaker: Curt Haselton, *Department of Civil Engineering, California State University at Chico, California*

■ *Can We Achieve Seismically Resilient Buildings (and Cities)? A Look at Recent Industry Developments and How We May Leverage These Moving Forward*

Description: A discussion of building seismic evaluation and loss estimation methods, with a focus on recent technical developments that could both transform the approach to loss estimation and support resilience-based design.

Biography: Dr. Haselton is Professor and Chair in Civil Engineering at California State University, Chico, and Co-Founder of the Seismic Performance Prediction Program (SP3) and Haselton Baker Risk Group. Dr. Haselton's research is in the area of performance-based earthquake engineering, with focuses on building code development, collapse safety assessment, ground motion selection and scaling, damage and loss estimation, and the treatment of uncertainties. Dr. Haselton was recently the chair of the Building Seismic Safety Council team to rewrite Chapter 16 of ASCE/SEI 7, *Minimum Design Loads for Buildings and Other Structures*.

Speaker: William T. Holmes, *Structural Engineer, San Francisco, California*

■ *Simplified Seismic Evaluation of Older Concrete Frames for Collapse Potential*

Description: The seismic life-safety risk from older concrete buildings, particularly frames, is well known. Current evaluation methods based on component performance are reasonable to measure damage, but conservative to predict global collapse. For several years, FEMA, through ATC, has sponsored development of a simplified method to estimate the probability of collapse that can be used to rank older concrete buildings for the purpose of identifying the truly dangerous ones. A probabilistic collapse evaluation method for frame buildings will be presented that is comparable in effort to a Tier 2 evaluation according to ASCE/SEI 31. The method is currently being extended to include consideration of walls.

Biography: Mr. Holmes obtained his M.S. from Stanford University in 1963 and joined Rutherford + Chekene, Consulting Engineers, in 1965. Mr. Holmes has been responsible for the structural design or seismic retrofit of a wide variety of buildings as well as being active in significant research and development in structural and seismic engineering. He had a key role in the conceptual development of the *NEHRP Guidelines for the Seismic Rehabilitation of Buildings* (now ASCE/SEI 41). He also chaired the Provision Update Committee, responsible for updating the *NEHRP Recommended Provisions for Seismic Regulations for New Buildings*, 1997 and 2000 editions. He retired from Rutherford + Chekene in 2010 but remains active in projects for the Applied Technology Council and the Building Seismic Safety Council.

10:30 am – 12:00 pm

Concurrent Sessions

Session 5A: Regional and Portfolio Analysis

Moderator: Bill Graf, *M.S., P.E.*

Track: Managing Risk

Room: *Bayview A*

- *Quantification of Uncertainty in Estimation of Building Lateral Stiffness and Its Effects on Estimated Economic Loss Due to Seismic Excitation*
  Angie Harris, *Graduate Student, University of California, Irvine;* **Farzad Naeim,** *Ph.D., P.E., M.ASCE, Esq., Farzad Naeim, Inc.;* **Farzin Zareian,** *Ph.D, University of California, Irvine*
- *A Move Toward Improved Portfolio Seismic Risk Assessment Methods for the Practicing Engineer*
  D. Jared DeBock, *Ph.D., California State University, Chico;* **Abbie B. Liel,** *Ph.D., P.E., M.ASCE, University of Colorado, Boulder.*
- *Evaluating the Joint Seismic Performance of Critical Facilitates Using Portfolio Analysis Tools*
  Mahmoud Hachem, *Ph.D., P.E., S.E., M.ASCE, Degenkolb Engineers*
- *Seismic Loss Assessment Procedure for Masonry Buildings*
  Daria Ottonelli, *Ph.D., Student;* **Sergio Lagomarsino; Serena Cattari,** *Assistant Professor, University of Genoa*

Session 6A: Performance Assessment of Nonstructural Components and Systems

Moderator: Robert Pekelnicky, *P.E., S.E., M.ASCE*

Track: Nonstructural/Wood Soft Story

Room: *Bayview B*

- *An Assessment of Seismic Floor Accelerations in Wood Shear Wall Buildings*
  Jeena Jayamon, *Master of Science, Virginia Tech;* **Philip Line,** *P.E, American Wood Council;* **Finley Charney,** *Ph.D., P.E.,F.SEI, F.ASCE, Virginia Tech*
- *Nonstructural Engineering for Structural Engineers: A Primer for Performing Nonstructural Seismic Evaluations of Existing Buildings*
  Erik Bishop, *P.E., M.ASCE;* **Dave Swanson,** *P.E., S.E., F.SEI, M.ASCE:* **Brian Matsumoto,** *P.E., S.E., Reid Middleton, Inc.*
- *Performance of Architectural Precast Concrete Building Facade Under Seismic Loading; Influence of Initial Design Drift*
  Kurt McMullin, *P.E., Ph.D.;* **Anh Thuy Le,** *Graduate Student;* **Suian Andrade Meira,** *Research Student, San Jose State University*
- *Experimental and Analytical Study of the Dynamic Characteristics of Architectural Precast Concrete Cladding Systems*
  Elide Pantoli; Tara Hutchinson, *Ph.D., P.E., UCSD*

Session 7A: Evaluation and Retrofitting of Existing Buildings: Tall Steel Buildings Case Studies

Moderator: Matthew Schoettler, *Ph.D.*

Track: Implementation Case Studies

Room: *Seacliff A-B*

- *Proposed Changes to Steel Column Evaluation Criteria for Existing Buildings*
  Dan Bech, *P.E., S.E., M.ASCE;* **Bill Tremayne,** *S.E.,* **Jonas Houston,** *P.E., Holmes Culley*
- *Seismic Assessment and Retrofit of a 35 Story Steel Building Having Pre-Northridge Connections*
  Stephen Mahin, *Ph.D.;* **Jiun Wei Lai,** *Ph.D.;* **Matthew Schoettler,** *Ph.D.;* **Shanshan Wang,** *Graduate Student, University of California*
- *Evaluation and Remediation of Pre-Northridge Steel Moment Frame Column Splices*
  Allen Nudel, *S.E.;* **Steve Marusich,** *S.E.;* **Masume Dana,** *S.E.;* **Ali Roufegarinejad,** *Ph.D, Forell/Elsesser Engineers*
- *Seismic Evaluation & Retrofit of a 1970's High-rise Welded Moment Frame Structure — A Performance Based Approach*
  Leo Panian, *S.E.;* **Mike Korolyk,** *S.E.;* **Nick Bucci,** *S.E., Tipping Structural Engineers*

Session 8A: Earthquake Demands — Important Topics

Moderator: Jonathan Stewart, *Ph.D., P.E., M.ASCE*

Track: Innovative Solutions for Retrofit

Room: *Seacliff C-D*

- *Evaluation of Direction of Loading Provisions Using Seismically Instrumented Buildings*
  Reid B. Zimmerman, *P.E.;* **Bret Lizundia,** *S.E.;* **Saeed Fathali,** *Ph.D., P.E., Rutherford + Chekene*
- *Considerations for Incremental Dynamic Analysis Procedures*
  Patxi Uriz, *Ph.D., P.E.;* **Troy Morgan,** *Ph.D., P.E., Exponent*
- *Influence of Ground Motion Duration on the Performance Assessment of Buildings*
  Reagan Chandramohan, *Ph.D., Student;* **Jack Baker,** *Ph.D.;* **Gregory Deierlein,** *Ph.D., P.E., Stanford University*
- *NSF NEESR Full-Scale Ductile RC Columns Subjected to Collapse-Consistent Loading Protocols: Learning from the Test Data and Recommendations for Simulating Collapse Behavior and Estimating Building Collapse Safety*
  Katherine Fitzgerald, *Haselton Baker Risk Group;* **Curt Haselton,** *Ph.D., P.E., California State University, Chico*
- *System Level Collapse Resistance of Existing RC Structures Subjected to Severe Pulse-Type Ground Motion*
  Mehrdad Sasani, *Ph.D., P.E.;* **Justin Murray,** *Ph.D., Candidate, Northeastern University*

12:15 pm – 1:30 pm

Luncheon

Grand Ballroom B-C

Speaker: **Patrick Otellini,** *Chief Resilience Officer, City and County of San Francisco, California*

- *Our Resilience Challenge — Making San Francisco Safe Enough to Stay*

Description: In 2012, San Francisco Mayor Edwin Lee began the implementation of the Community Action Plan for Seismic Safety's 30-year Earthquake Safety Implementation Program aimed at reducing the City of San Francisco's exposure to the risks posed by earthquakes. San Francisco's Chief Resilience Officer and Director of Earthquake Safety will discuss several of the efforts underway to help strengthen San Francisco in the face of future disasters ranging from soft-story retrofits to private school evaluations.

Biography: **Patrick Otellini** is the Chief Resilience Officer (CRO) for the City and County of San Francisco tasked with developing the city's resiliency strategy in conjunction with the 100 Resilient Cities initiative pioneered by the Rockefeller Foundation. Mr. Otellini was originally appointed by Mayor Ed Lee in October of 2012 as the Director of San Francisco's Earthquake Safety Implementation Program. This public policy-driven group has recently passed unanimously approved pieces of legislation that range from mandatory retrofits of soft-story buildings to postearthquake repair standards with the goal of making San Francisco more resilient in the face of disaster. Prior to his appointment, Mr. Otellini was a Senior Associate with A.R. Sanchez-Corea & Associates, San Francisco's premier permit and code consulting firm. His work there included the management of the permit and inspection process for over $2 billion worth of construction in San Francisco. He is a Certified Building Inspector through the International Code Council (ICC) and a Certified Fire Protection Specialist through the National Fire Protection Association (NFPA). Patrick lives in San Francisco with his wife and two children. He received his Bachelor's Degree in Political Science from Westmont College.

1:30 pm – 3:00 pm

Session 5B: How the FEMA P-58 Methodology Can Inform Decision Makers

Moderator: **Keith Porter,** *Ph.D., P.E.*

Track: Managing Risk

Room: *Bayview A*

- *Using PBEE to Assess and Improve Performance of Different Structural Systems for Steel Buildings*
  Vesna Terzic, *Ph.D., California State University Lon Beach;* **Stephen Mahin,** *Ph.D.;* **Mary Comerio,** *Ph.D., University of California Berkeley*
- *Damage and Loss Estimation of Pre-70 Reinforced Concrete Frame Buildings with FEMA P-58: A Case Study*
  Donatello Cardone, *Ph.D.;* **Giuseppe Perrone,** *Ph. D., University of Basilicata*
- *Building Loss Estimation Methods — A Comparisons of Methods and Recommendations for the Future*
  Dustin Cook, *Haselton Baker Risk Group;* **Curt Haselton,** *Ph.D., P.E., California State University, Chico*

Session 6B: Experimental Evaluation of Nonstructural Components and Systems

Moderator: Elide Pantoli, *S.M.ASCE*

Track: Nonstructural/Wood Soft Story

Room: *Bayview B*

- *Seismic Evaluation of Drywall Suspended Ceilings Using Shake Table Testing and Finite Element Analysis*
  Amir Gilani, *Ph.D., S.E., Miyamoto International;* **Shakhzod Takhirov,** *Ph.D., University of California Berkeley;* **Yelena Straight,** *P.E., USG Interiors LLC*
- *Seismic Evaluation of Lay-in Panel Suspended Ceilings Using Static and Dynamic and Assessment of the Alternate Perimeter Clip Installation*
  Shakhzod Takhirov, *Ph.D., P.E., University of California, Berkeley;* **Amir Gilani,** *Ph.D., S.E., Miyamoto International;* **Yelena Straight,** *P.E., USG Interiors LLC*
- *Recent Experimental and Analytical Studies on Seismic Performance of Ceiling/Piping/Partition Systems at UNR*
  Esmaeel Rahmanishamsi, *M.S.,* **Craig Jenkins,** *B.Sc.;* **Siavash Soroushian,** *Ph.D.;* **"Manos" Maragakis,** *Ph.D., University of Nevada, Reno*
- *Experimental Developments on Isolation/Energy Dissipation Platforms for the Seismic Protection of Equipment in Multistory Facilities*
  Claudia Marin-Artieda, *Ph.D., P.E.;* **Xing Han,** *Ph.D., Howard University*
- *Seismic Protection of Floor-Mounted Equipment: A Shake Table Study*
  Maryann Phipps, *S.E.;* **Chiara McKenney,** *P.E., Estructure*

Session 7B: Evaluation and Retrofit of Existing Buildings: California Case Studies

Moderator: Ben Mohr, *S.E.*

Track: Implementation Case Studies

Room: *Seacliff A-B*

- *Seismic Retrofit of UC Berkeley's Historic Bowles Hall*
  Karl Telleen, *S.E.;* **Joe Maffei,** *Ph.D., S.E. Maffei Structural Engineering;* **Theresa Dias,** *AIA, Pyatok Architects;* **John Baker,** *P.E., Bowles Hall Foundation*
- *Seismic Retrofit of an Iconic San Francisco High Rise*
  Bill Tremayne, *S.E.;* **Zander Sivyer,** *S.E.;* **Nina Mahjoub,** *P.E., Holmes Culley*
- *UC Berkeley Units 1,2 & 3: The Seismic Retrofit of Twelve Concrete Towers in One Summer*
  David Mar, *S.E., Mar Structural Design*
- *Bethel Tower Seismic Retrofit — The Miracle Project*
  Amber Zamora, *M.S.;* **Steven Saunders,** *Saunders Construction, Inc.*

Session 8B: Performance Assessment of Tall Buildings

Moderator: Grace Kang, *S.E.*

Track: Innovative Solutions for Retrofit

Room*: Seacliff C-D*

- *Design Decision Support for Steel Frame Buildings Through Earthquake-Induced Loss Assessment*
  Seong-Hoon Hwang, *Ms.C;* **Ahmed Elkady,** *M.Eng.;* **Dimitrios Lignos,** *Ph.D., A.M.ASCE, McGill University*
- *Progress on Resilience-Based Seismic Design and Assessment Supported by Advanced Prediction of Building Damage, Repair Cost, and Building Closure Time*
  Curt Haselton, *Ph.D., P.E., California State University, Chico*
- *Quantifying the Impact of Seismic Retrofit and Other Mitigation Measures in Existing Tall Buildings in San Francisco by Means of A Time-Based Seismic Performance Assessment*
  Carlos Molina Hutt, *P.E., University College London;* **Gregory Deierlein,** *Ph.D., P.E., Stanford University;* **Ibbi Almufti,** *P.E., S.E.;* **Michael Willford,** *Arup Fellow, Arup*
- *Evaluation and Retrofit of Older Concentrically Braced Frames*
  Andrew Sen, *M.S.C.E., University of Washington;* **Ryan Ballard,** *B.S.C.E., KPFF Consulting Engineers;* **Dan Sloat,** *M.S.C.E., Degenkolb;* **Molly Johnson,** *M.S.C.E., Simpson Gumpertz & Heger;* **Charles Roeder,** *Ph.D., P.E., F.SEI, M.ASCE;* **Dawn Lehman,** *Ph.D.;* **Jeffrey Berman,** *Ph.D., University of Washington*

3:30 pm – 5:00 pm

Session 5C: Recent Legal Developments Affecting Owners and Designers: Using Performance Targets to Manage Seismic Risk in the Legal Arena

Moderator: Andrew Scott

Track: Managing Risk

Room: *Bayview A*

- *Precedential Consequences of the Recent Myrick Lawsuit: Using ASCE 7-10 and ASCE 41-13 Performance Targets to Manage Seismic Risk in the Legal Arena*
  Mark White, *Esq., Law Offices of Mark N. White;* **John Osteraas,** *Ph.D., Exponent, Inc.;* **Eduardo Fierro,** *P.E.;* **Cynthia Perry,** *P.E., BFP Engineers, Inc.*
- *Precedential Consequences of the Recent Beacon Lawsuit: Foreseeing Harm to Third Parties Caused by Unsatisfactory Seismic Performance of a Flawed Design*
  Mark White, *Esq., Law Offices of Mark N. White;* **John Osteraas,** *Ph.D, Exponent, Inc.;* **Eduardo Fierro,** *P.E.;* **Cynthia Perry,** *P.E., BFP Engineers, Inc.*
- *Performance Based Engineering and Evaluation of Existing Buildings — Potential Legal Ramifications*
  David Ojala, *S.E., P.E., LEED AP, CWI, M.ASCE*; **John Osteraas,** *Ph.D., P.E., F.ASCE, Exponent — Failure Analysis Associates, Inc.*
- *Professional Negligence of Engineers Providing Seismic Retrofit Design Services*
  Joshua Kardon, *Ph.D., S.E., F.ASCE, Joshua B. Kardon + Co. Structural Engineers;* **Mark Gilligan,** *S. E., Mark K. Gilligan, Structural Engineer*

Session 6C: Behind the Scenes of San Francisco's Mandatory Seismic Retrofit Program for Soft-Story Buildings

Moderator: David Bonowitz, *S.E.*

Track: Nonstructural/Wood Soft-Story

Room: *Bayview B*

- *Discussion of FEMA P-807 for Retrofit of Soft-Story Buildings*
  Bruce Maison, *S.E., Consulting Engineer;* **Brian McDonald,** *Ph.D., S.E., Exponent Inc.;* **David McCormick,** *S.E., Simpson Gumpertz & Heger Inc.;* **Marko Schotanus,** *Ph.D., S.E., Rutherford + Chekene;* **Jonathan Buckalew,** *S.E., Nabih Youssef Associates*
- *Example Case Studies of Soft-Story Retrofits Using the San Francisco Ordinance*
  Jonathan Buckalew, *S.E., Nabih Youssef Associates;* **Brian McDonald,** *Ph.D., S.E., Exponent Inc.;* **David McCormick,** *S.E., Simpson Gumpertz & Heger Inc.;* **Marko Schotanus,** *Ph.D., S.E., Rutherford & Chekene;* **Bruce Maison,** *S.E., Consulting Engineer*
- *Pounding of San Francisco-type "Soft Story" Midblock Buildings*
  Marko Schotanus, *Ph.D., S.E., Rutherford+Chekene Consulting Engineers;* **Bruce Maison,** *S.E., Consulting Engineer;* **Brian McDonald,** *Ph.D., S.E., Exponent Inc.*
- *Numerical and Full-Scale Experimental Validation of Soft-Story Wood-Frame Buildings Retrofit Procedures*
  Pouria Bahmani, *Ph.D., Candidate, EIT;* **John van de Lindt,** *Ph.D., F. ASCE, Colorado State University;* **Steven Pryor,** *P.E., S.E.;* **Gary Mochizuki,** *P.E., S.E., Simpson Strong-Tie;* **Mikhail Gershfeld,** *P.E., S.E., Cal Poly Pomona University*

Session 7C: Evaluation and Retrofit of Existing Buildings: San Francisco Bay Area Case Studies

Moderator: Joe Maffei, *Ph.D., S.E., M.ASCE*

Track: Implementation Case Studies

Room: *Seacliff A-B*

- *The Shocking Secrets of Rocking Shear Walls*
  Benjamin Mohr, *S.E.,* **Stephen Harris,** *S.E., SGH*
- *Probabilistic Seismic Evaluation and Retrofit Design of a 16-Story Laboratory Complex Using Project-Specific Demand Parameters*
  Lawrence Burkett, *Rutherford+Chekene;* **Joe Maffei,** *Ph.D., S.E., M.ASCE, Maffei Structural Engineering;* **Andreas Schellenberg,** *Ph.D., P.E., UC Berkeley*
- *UCSF Clinical Sciences Building: Seismic Rehabilitation Case Study*
  Stephen Marusich, *S.E.,* **Mason Walters,** *S.E.;* **Ryan Cooke,** *Ph.D., Forell/Elsesser Engineers*
- *Nonlinear Dynamic Evaluation of a Hospital Stair Tower with SSI and Pounding Effects*
  Kevin Moore, *S.E.*; **Stephen Bono,** *S.E.*; **Anindya Dutta,** *Ph.D., S.E, Simpson Gumpertz & Heger*

Session 8C: Retrofit Solutions for Masonry Structures

Moderator: Roberto Leon, *Ph.D., P.E., F.ACI., F.IABSE, F.SEI, F.ASCE*

Track: Innovative Solutions for Retrofit

Room: *Seacliff C-D*

- *Description of Major Types of Unreinforced Masonry Buildings in New York City and Older American Cities*
  Tim Lynch, *P.E., NYCDOB*
- *Out-of-Plane Seismic Performance of URM Walls with Retrofitted Parapets and Flexible Diaphragms*
  Juan Aleman, *P.E., ARUP;* Gilberto Mosqueda, *Ph.D., UCSD;* Andrew Whittaker, *Ph.D., P.E., S.E., UB*
- *Analytical and Experimental Study of Seismic Performance of URM Walls and Infilled RC Frame Retrofitted with Near Surface Mounted Steel Bars*
  Rajendra Soti, *EIT;* Andre Barbosa, *Ph.D., P.E., OSU;* Andreas Stavridis, *Ph.D., UB*
- *Collapses of Masonry Structures Under Non-extreme Loads*
  Dan Eschenasy, *P.E., F.SEI, NYCDOB*

Champions of Earthquake Resilience: Awards Gala Benefitting ATC Endowment Fund and SEI Futures Fund

December 11, 2015, The San Francisco Maritime Museum

The Awards Gala will honor Champions of Earthquake Resilience. The purpose of the event is to recognize recent* innovative earthquake engineering programs and projects that have (or will have) substantial impact on public safety and property loss reduction and the proceeds will benefit the ATC Henry J. Degenkolb Endowment Fund and the SEI Futures Fund.

The Gala will take place at the historic San Francisco Maritime Museum.

The winning projects and programs were selected by an independent jury and comprise the following categories:

1. **Community Earthquake Safety Programs**
2. **Extraordinary Innovation in Seismic Protection of Lifeline Systems**
3. **Public- and Private-Sector Research and Development (R&D) Programs**

*Within the past five to ten years.

Separate tickets are required for this event, see the Registration Desk for more information.

SATURDAY, DECEMBER 12, 2015

8:30 am – 10:00 am

Plenary Session

Grand Ballroom B-C

Speaker: David Mar, *Mar Structural Design, Berkeley, California*

■ *Innovative Seismic Retrofit Solutions with a Focus on New and Emerging Concepts (an Eye to the Future)*

Description: The stars are aligning in the universe of structural engineering. Peer-reviewed performance-based high-rise designs are becoming commonplace, proving in the market that sophisticated (non-prescriptive) engineering adds value. Incremental Dynamic Analysis, via FEMA P-695, sets the stage to understand collapse risk, offering the opportunity to cull deficient structural systems and introduce better systems. Finally, the FEMA P-58 loss estimating methodology connects the circuit between design (the world of engineers) and loss prevention (the world of our clients). These advances combine to create a fertile environment for innovation and invention. This talk explores new and emerging designs in these exciting times.

Biography: Mr. Mar has a wealth of experience designing innovative structural systems. He believes the key to successful projects is striving to create holistic designs that optimize the architectural program and structural performance while controlling construction costs. To these ends, his designs are often inventive and technically ingenious, at the forefront of high-performance seismic and sustainable design. Mr. Mar demonstrated this approach in his role as the technical director for FEMA P-807, *Guidelines for the Seismic Retrofit of Weak-Story Multi-Unit Wood-Framed Structures*. His out-of-the-box thinking resulted in a comprehensive design methodology that yields high-performance retrofits at a low-cost, thus solving one of structural engineering's most vexing class of problems. He received his undergraduate and master's degrees from University of California, Berkeley. In 1998 David was honored with SEAONC's H.J. Brunier Award for Outstanding Achievement in Structural Design.

Speaker: Laurie Johnson, *Planning and Research Consultant, San Rafael, California*

■ *Building a Foundation for Resilience at the Community Level*

Description: Over the past decade, the concept of community-scale disaster resilience has gained increasing attention both nationally and internationally. In essence, efforts to build community resilience consider not only how to ensure a community is better able to withstand shocks but that it is also able to restore function quickly and even adapt to new conditions resulting from the shocks. This presentation will consider examples of community-scale resilience planning and implementation efforts and essential elements of a strong community resilience program.

Biography: Dr. Johnson is an internationally recognized urban planner specializing in disaster recovery and catastrophe risk management. She began her planning career working with San Francisco Bay Area communities that would soon be struck by the 1989 Loma Prieta earthquake. Since that time, she has developed an extensive portfolio of disaster resilience and recovery expertise for a range of hazards both in the United States and around the world, and she has researched or helped to manage recovery following many of the world's major urban disasters, including the 2011 Tohoku, Japan earthquake and tsunami, 2010 and 2011 Christchurch, New Zealand earthquakes, and 2005 Hurricane Katrina. In 2006, she was a lead author of the recovery plan for the City of New Orleans following Hurricane Katrina and then coauthored the book, Clear as Mud: Planning for the Rebuilding of New Orleans. Dr. Johnson currently serves as Chair of the Advisory Committee for the National Earthquake Hazard Reduction Program (ACEHR), and is a member of the Steering Committee for Geotechnical Extreme Event Reconnaissance (GEER) and the Board of Directors of San Francisco Planning and Urban Research Association (SPUR), a member-supported nonprofit organization promoting good planning and good government in the San Francisco Bay Area. She holds a Doctor of Informatics from Kyoto University, Japan as well as a Master of Urban Planning and B.S. in Geophysics, both from Texas A&M University.

10:30 am–12:00 pm

Session 9: Performance Assessment of Single-Family Dwellings Impacted by the 2014 South Napa Earthquake and the Need to Promote Effective Mitigation Policies

Moderator: Michael Mahoney

Track: Napa Earthquake

Room: *Bayview A*

This panel session will discuss the performance of buildings in the 2014 South Napa earthquake with a focus on wood-frame single-family dwellings and highlight the need for a mechanism for conducting simplified seismic assessment of these types of buildings. Maryann Phipps will summarize the performance of residential construction in the 2014 South Napa earthquake, as reported in the FEMA P-1024, *Performance Assessment of Buildings and Nonstructural Components.* Colin Blaney will present best practices for retrofit of cripple walls, intended for homeowners and building professionals. Next, Janiele Maffei and Kelly Cobeen will discuss the necessity for a system to inform residents of homes in any area that has great seismic hazard to the methodology set forth in FEMA P-50, *Simplified Seismic Assessment of Wood-Frame Single-Family Dwellings.* This document provides the necessary information (guidance and forms) to develop a Seismic Performance Grade. The panel will discuss the need to motivate legislation to make it mandatory to obtain this Seismic Performance Grade for each residence, for example at the time of sale.

Panelists:

Maryann Phipps, *S.E., Estructure*

Colin Blaney, *ZFA Structural Engineers*

Kelly Cobeen, P.E., S.E., M.ASCE, Wiss Jenney, Elstner Associates, Inc.

Janiele Maffei, *P.E., M.ASCE, California Earthquake Authority*

Session 10: NIST Disaster Resilience Framework

Moderator: Chris Poland, *P.E., S.E., F.SEI, M.ASCE*

Track: Resilience Framework

Room: *Bayview B*

The NIST Disaster Resilience Framework 1.0 was published in April 2015 for public comment. It is the culmination of 18+ months' work by a team of over 20 writers and NIST Disaster Resilience Fellows aimed at guiding communities through the process of defining what they need from their built environment in order to be resilient in the face of natural, technological and human caused hazards. The framework links community's social institutions with clusters of buildings and infrastructure systems that are needed during the response, recovery and rebuilding phases and identifies how soon they are needed after a hazard event to facilitate resuming function. It supports actionable understanding at the community level and also points to the need for consistent design and evaluation standards and tools across the built environment.

Discussion will focus on the process contained in the framework and take aways, including community perspective on resilience as opposed to an individual projects view, and understanding of how they can assist their community in becoming resilient.

Panelist Include:

Erica Kuligowski, *Ph.D., National Institute of Standards and Technology*

Kent Yu, PhD, *SE, PE, Principal, SEFT Consulting Group*

Adrienne Sheldon, *P.E., AECOM*

David Mizzen, *Applied Research Associates*

Session 11: Retrofit of Steel Structures

Moderator: Dawn E. Lehman, *Ph.D.*

Track: Steel Structures Retrofit

Room: *Pacific Concourse L-O*

- *Evaluation of Chevron Concentrically Braced Frames with Weak Beams*
  Andrew Sen, *M.S.C.E., University of Washington;* **Keith Palmer,** *Ph.D., Simpson Gumpertz & Heger;* **Lingli Pan,** *Ph.D., Candidate, Tongji University;* **Charles Roeder,** *Ph.D., P.E., F.SEI, M.ASCE;* **Dawn Lehman,** *Ph.D.;* **Jeffrey Berman,** *Ph.D., University of Washington*
- *Development and Validation of a Computational Model of the Self-Centering Beam Moment Frames (SCB-MF)*
  Matthew Eatherton, *S.E. Ph.D.;* **Abhilasha Maurya,** *M.S., Virginia Tech*
- *Design and Construction of Controlled Rocking Steel Braced Frames in New Zealand*
  Lydell Wiebe, *Ph.D., McMaster University*

Session 12: Evaluation and Retrofit of Existing Buildings: Case Studies of Various Building Occupancies

Moderator: Michael Wright, *P.E., S.E.*

Track: Case Studies

Room: *Seacliff A–B*

- *Seismic Retrofit of Machine Shop at Puget Sound Naval Shipyard & Intermediate Maintenance Facility*
  Scott Neuman, *P.E., S.E.,* **John Hochwalt,** *P.E., S.E.,* **Greg Varney,** *P.E., S.E., KPFF Consulting Engineers*
- *Case Study, Seattle Starbucks Roastery Seismic Upgrade*
  Michael Wright, *P.E., S.E., MA Wright, llc;* **Lara Simmons**, *P.E., S.E., LRS Engineering*
- *Seismic Upgrades for US Naval Hospitals and Medical Facilities - Case Studies*
  David Swanson, *P.E., S.E.,* **Kenneth O'Neill,** *P.E.,* **Lance Lum,** *P.E.,* **Erik Bishop**, *P.E.,* **Brian Matsumoto**, *P.E., S.E., Reid Middleton, Inc.;* **Russell Kent**, *P.E., Naval Hospital Bremerton;* **Rita Johnson,** *P.E.,* **Sasan Asadyari,** *P.E.,* **Kenneth Schwalbe,** *P.E., Naval Medical Center San Diego;* **Jason Schechter,** *P.E., Naval Hospital Yokosuka Japan;* **Amy Cole,** *R.A, Naval Facilities Command - Far East*
- *Seismic Retrofit of Four Story Wood Framed Condominium Building*
  John Coil, *S. E., John Coil Associates, Inc.*

Session 13: Future Directions

Moderator: Jon Heintz, *S.E., M.ASCE*

Track: Future Directions

Room: *Seacliff C-D*

- *Strengthening Design-Based Education: A Case Study for Teaching Seismic Retrofit Strategies Using Historic Buildings and FEMA Documents*
  Ben Hays, *P.E., S.E., University of Virginia*
- *Research Needs to Fill the Research-to-Practice Gap for Existing Buildings*
  Siamak Sattar, *Ph.D.;* **Steven McCabe,** *Ph.D., P.E.;* **John Hayes,** *Ph.D., P.E., National Institute of Standards and Technology*
- *Future Performance-Based Provisions for New Buildings and Their Applicability to Existing Buildings*
  Robert Pekelnicky, *P.E., S.E., M.ASCE, Degenkolb Engineers*
- *Understanding and Supporting Stakeholder Decisions About Seismic Risk: Insights from the ATC 58-2 Project*
  Laura Samant, *Laura Samant Consulting*

THURSDAY & FRIDAY, DECEMBER 10-11, 2015

6:00 pm–7:30 pm Thursday, December 10 —*Authors will be present*

7:30 am–3:30 pm Friday, December 11

Exhibit Hall–Pacific Concourse

- *Experimental Seismic Performance Assessment of Hospital Building Contents*
  Luigi di Sarno, *Ph.D., University of Sannio*
- *Modal Pushover-based Scaling Procedure of Ground Motion Records for Nonlinear Response History Analysis of Structures: Experimental Validation*
  Erol Kalkan, *Ph.D., United States Geological Survey;* **Yahya Kurama,** *PhD., University of Notre Dame;* **Juan Carlos Reyes,** *Ph.D., Universidad de Los Andes;* **Andrew O'Donnell,** *University of Notre Dame*
- *Enhanced Seismic and Local Buckling Restraining Behavior of Concrete-filled Steel Tubular (CFST) Columns*
  Iraj Mamaghani, *Ph.D., P.Eng.;* **Fokruddin Ahmad,** *MS;* **Basha Dorose,** *MS, University of North Dakota*
- *Seismic Response of SMf Steel Building: Comparison Between Conventional Design and Damper Solution*
  Amir Gilani, *Ph.D., S.E.,* **Kit Miyamoto,** *Ph.D., S.E., Miyamoto International*
- *Multi-Criteria Decision Analysis of Seismic Rehabilitation Techniques from a Performance-Based Engineering Perspective*
  Saeed Nozhati, *M.S.;* **Ting Lin,** *Ph.D., Marquette University*
- *Improved Seismic Response of Buildings with Rigid Walls and Flexible Wood Roof Diaphragms through a New Seismic Design Approach Based on Distributed Diaphragm Yielding*
  Maria Koliou, *Ph.D;* **Andre Filiatrault,** *Ph.D., Eng., University at Buffalo, The State University of New York;* **Dominic J. Kelly,** *P.E., Simpson Gumpertz & Heger;* **John Lawson,** *S.E., California Polytechnic State University—San Luis Obispo*
- *Evaluation of Collapse Indicators for Reinforced Concrete Buildings Vulnerable to Strong Ground Motion*
  Nick Skok, *M.S.C.E, Degenkolb Engineers;* **Santiago Pujol,** *Ph.D, P.E., Purdue University*
- *A Comparison of Low-Amplitude Ambient and Earthquake Responses of a 64-Story Building in San Francisco, CA, Show Differences in Fundamental Response*
  Mehmet Celebi, *Ph.D., P.E., United States Geological Survey*
- *A Bridge from ASCE 41-13 to HAZUS Earthquake Models*
  William Graf, *P.E;* **Yajie Lee,** *M.S., ImageCat, Inc.*
- *Strength of Reinforced Concrete Buildings Subjected to Seismic Motions*
  Jinhan Kwon, *Ph.D., Candidate;* **Wassim Ghannoum,** *Ph.D, The University of Texas at Austin*
- *Alterations and Seismic Upgrade: The Building Code as Mitigation Policy*
  David Bonowitz, *S.E.;* **David Bonowitz,** *S.E.;* **David McCormick,** *S.E., Simpson Gumpertz Heger;* **Peter Somers,** *S.E., Magnusson Klemencic Associates*
- *Seismic Evaluation and Retrofit Design of Airport Passenger Terminal Building*
  Naveed Anwar, *Ph.D., Asian Institute of Technology;* **Jose A. Sy,** *Sy^2+Associates, Inc.;* **Thaung Htut Aung,** *Mir Shabir Talpur, Asian Institute of Technology*
- *Structural Identification of a Two-Story Infilled RC Building at Different Damage States*
  Seyedsina Yousefianmoghadam, *Ph.D., Candidate, University at Buffalo;* **Mingming Song,** *Ph.D., Candidate, Tufts University;* **Andreas Stavridis,** *Ph.D., University at Buffalo;* **Babak Moaveni,** *Ph.D., Tufts University*

- *Experimental Investigation on the Seismic FRP Retrofit of Realistic Full-Scale RC Beam-Column Joints*
  Daniel Pohoryles, *M.Sc.;* **Jose Melo,** *Ph.D., Tiziana Rossetto, Prof., University College London;* **Humberto Varum,** *Prof., University of Porto;* **Dina D'Ayala,** *Prof., University College London*
- *Damage and Failure Fragility Functions for Slender Reinforced Concrete Structural Walls*
  Anna Birely, *M.S.C.E., Texas A&M University;* **Laura Lowes,** *Ph.D., University of Washington;* **Dawn Lehman,** *Ph.D., University of Washington*
- *BRBM Frames: An Improved Approach to Seismic Resistant Design Using Buckling-Restrained Braces*
  Leo Panian, *S.E.;* **Nick Bucci,** *S.E.;* **Bill Janhunen,** *S.E., Tipping Structural Engineers*
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  Ali Roufegarinejad, *Ph.D.;* **Masume Dana,** *S.E., Forell/Elsesser Engineers*
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  Sissy Nikolaou, *Ph.D., P.E., MRCE;* **Ramon Gilsanz,** *P.E., S.E., F.SEI, GMS;* **Dimitrios Iliadelis,** *P.E.;* **Menzer Pehlivan,** *Ph.D., MRCE;* **Akbar Mahvashmohammadi,** *EIT, GMS;* **Sanaz Saadat,** *Ph.D., GMS;* **Marina Moretti,** *Ph.D., UTH;* **Anastasios Sextos,** *Ph.D., AUTH;* **Panos Tsopelas,** *Ph.D., NTUA*
- *Assessment of Ground Motion Duration Effects on the Seismic Response of Plan-Asymmetric Buildings*
  Andre Belejo, *Ph.D., Candidate;* **Andre Barbosa,** *P.E., Ph.D., Oregon State University*
- *Interactive Seismic Map of Los Angeles*
  Anders Carlson, *Ph.D., S.E.;* **Brittany Moffett,** *Student;* **Travis Longcore,** *Ph.D., USC;* **Krista McPherson,** *Student, USC*
- *California Building Officials' Interim Guidance on Barricading and Stabilization of Buildings with Substantial Damage in Disasters*
  Fred Turner, *S.E., CA Seismic Safety Commission;* **David Khorram,** *P.E., City of Long Beach;* **Timothy Koutsouros,** *S.E., Santa Monica*
- *Experimental Investigation on Seismic Retrofit of Existing Reinforced Concrete Buildings Using Steel Plate Shear Walls*
  Chao-Hsien Li, *Master;* **An-Chien Wu,** *Master, National Center for Research on Earthquake Engineering;* **Keh-Chyuan Tsai,** *Ph.D., National Taiwan University*
- *Seismic Retrofit of Industrial Precast Concrete Structures Using Friction Dampers: A Case Study from Turkey*
  Suat Yildirim, *MS;* **Aras Kalyoncuoglu,** *Ph.D. Canditate, Promer Consulting Engineering Ltd. Co.;* **Baris Erkus,** *Ph.D., P.E. (California), Istanbul Technical University;* **Yuksel Tonguc,** *MS, Promer Consulting Engineering Ltd. Co.*
- *Post-Earthquake Seismic Retrofit Programs for Improved Reconstruction*
  M. Lisbeth Blaisdell, *P.E., S.E.;* **Elizabeth Hausler Strand,** *Ph.D., Build Change;* **K. Mark Sinclair,** *S.E., Sinclair Engineering*

- *Revisiting the Northridge and San Fernando Earthquakes Considering Non-Ductile Concrete Buildings*
  Anders Carlson, *S.E., Ph.D., USC;* **Lucile Jones,** *Ph.D., USGS;* **Brittany Moffett,** *Student, USC*
- *Performance of Residential Wood-Frame Buildings During the 2014 South Napa (California, US) Earthquake*
  Andre Barbosa, *Ph.D., P.E;* **Rakesh Gupta,** *Ph.D.;* **Michael Olsen,** *Ph.D.;* **Patrick Burns,** *EIT, Oregon State University*
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  Chiara McKenney, *M.S., E.I.T., Estructure;* **Maryann Phipps,** *S.E., Estructure;* **Ayse Hortacsu,** *P.E. Applied Technology Council;* **John Gillengerten,** *S.E;* **Mike Mahoney,** *Senior Geophysicist, Federal Emergency Management Agency*
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  Stefania Degli Abbati, *Ph.D., Student;* **Serena Cattari,** *Assistant Professor;* **Sergio Lagomarsino,** *University of Geno*
- *Seismic Assessment and Retrofit of Woodframe Shearwall School Buildings in British Columbia, Canada*
  Armin Bebamzadeh, *Ph.D.;* **Carlos Ventura,** *Ph.D., P.E.;* **Michael Fairhurst,** *Research Assistant, University of British Columbia*

Pacific Concourse–Exhibit Hall Floor Plan

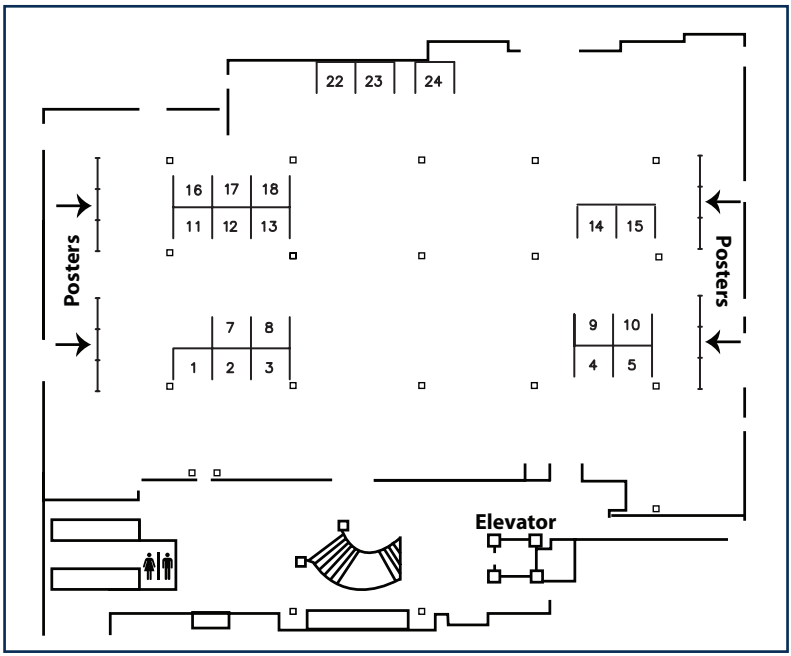

Exhibit Hall Schedule

Thursday 10:00am – 7:30pm | Friday 7:30am – 3:30pm

Please refer to Exhibit Hall Floor Plan on page 29.

ATC – Booth 16

www.atcouncil.org

The Applied Technology Council (ATC) is a nonprofit corporation with a mission to develop and promote state-of-the-art, user-friendly engineering resources and applications for use in mitigating the effects of natural and other hazards on the built environment.

Atlas Tube – Booth 4

www.atlastube.com

Atlas Tube, a division of JMC Steel Group, is the largest privately held hollow structural steel (HSS) manufacturer in North America.

CoreBrace – Booth 22

www.corebrace.com

CoreBrace buckling-restrained braces (BRB) are a sustainable and cost effective solution to improve the seismic performance of new and retrofit structures and have been used internationally for earthquake risk mitigation.

Dynamic Isolation Systems – Booth 15

www.dis-inc.com

Dynamic Isolation Systems (DIS) DIS is the world leader in providing seismic solutions for structures with lead rubber isolators, viscous wall dampers and low mass isolation for sensitive equipment.

EERI – Booth 7

www.eeri.org

The Earthquake Engineering Research Institute is a national, nonprofit, technical society of engineers, geoscientists, architects, planners, public officials, and social scientists. EERI members include researchers, practicing professionals, educators, government officials, and building code regulators.

Federal Emergency Management Agency (FEMA) – Booth 17

www.fema.gov

FEMA is responsible for developing effective earthquake risk-reduction tools and promoting their implementation, as well as for supporting the development of disaster-resistant building codes and standards.

Fibrwrap Construction Services, Inc.—Booth 12

www.fibrwrap.com

Fibrwrap Construction is your complete source for structural repair, strengthening and restoration. With over 20 years of experience, Fibrwrap specializes in the application of advanced composites and is certified in the installation of Fyfe Company's Tyfo® Fibrwrap® system.

Haselton Baker Risk Group LLC—Booth 2

www.hbrisk.com

Haselton Baker Risk Group produces software that allows for advanced design and assessment methods to be placed directly in the hands of engineers and risk professionals.

International Code Council (ICC)—Booth 24

www.iccsafe.org

ICC is a member-focused association dedicated to helping the building safety community and construction industry provide safe and affordable construction through development of codes and standards.

Kinemetrics Open Systems & Services—Booth 14

www.kmioss.com

Kinemetrics Open Systems & Services provides Earthquake Business Continuity Solutions allowing users to make rapid and intelligent decisions during state of emergencies.

Leewens Corporation—Booth 1

www.leewens.com

Leewens Corporation is a professional industrial contractor and specializes in installation of specialty coatings, liners, carbon fiber wrap for structural strengthening, epoxy and urethane injection, roofing, waterproofing, concrete polishing, and concrete repair.

Maurer AG—Booth 3

www.maurer.eu

The MAURER Group is a German specialist for structural protection systems producing bridge bearings, expansion joints, dampers and seismic devices.

MiTek Builder Products—USP/Hardy Frame/Zone 4—Booth 8

www.mitekbuilderproducts.com

MiTek Builder Products is a division of MiTek USA, Inc, and provide a full line of structural components and connectors for gravity and lateral (seismic/wind) load resisting systems of Wood/CFS light framed construction.

EXHIBITORS

QuakeWrap, Inc. — Booth 5

www.QuakeWrap.com

QuakeWrap® provides the savings, speed, versatility, and durability owners, engineers, and contractors need to repair and strengthen vital infrastructures on time and within budget.

Saunders Construction, Inc. — Booth 13

www.SaundersSeismic.com

A specialty contractor for over 35 years, Saunders Construction, Inc. performs seismic/earthquake retrofits and structural repairs for all types of buildings.

Simpson Strong-Tie — Booth 11

www.strongtie.com

For more than 50 years, Simpson Strong-Tie has focused on creating structural products that help people build safer and stronger homes and buildings. Simpson Strong-Tie products are known for their consistent quality and availability as well as for helping structures resist high winds, hurricanes and seismic forces.

Structural Engineering Institute (SEI) — Booth 18

www.asce.org/SEI

Established in 1996, the mission of the Structural Engineering Institute (SEI) of the American Society of Civil Engineers (ASCE) is to advance our members' careers, stimulate technological advancement, and improve professional practice.

Structural Technologies — Booth 23

www.structuraltechnologies.com

Established in 1996, the mission of the Structural Engineering Institute (SEI) of the American Society of Civil Engineers (ASCE) is to advance our members' careers, stimulate technological advancement, and improve professional practice. SEI drives the practical application of cutting edge research by improving coordination and understanding between academia and practicing engineers.

Williams Form Engineering Corporation — Booth 9

www.williamsform.com

Williams Form Engineering Corporation has been offering ground anchors, concrete anchors, post tensioning systems, and concrete forming hardware to the construction industry for over 90 years.

Registration Information

The Registration Desk is located in the Market Street Foyer and will be open during the following hours:

Thursday, December 10	6:30 am–6:00 pm
Friday, December 11	7:00 am–5:00 pm
Saturday, December 12	7:00 am–1:00 pm

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Tickets are required for special events. Where tickets are required, please be sure to bring your tickets with you to each event as you will not be admitted without a ticket.

Professional Development Hours

In order to obtain a certificate for Professional Development Hours (PDH), please go to registration desk to pick up the PDH form. Please fill out this form and return it to the PDH box at the Registration Desk BEFORE you leave the conference. Following the conference, you will receive an e-mail with your certificate. Only registered attendees are eligible.

Proceedings

You can pick up your complimentary copy of the Proceedings CD at the ATC and SEI booths in the Exhibit Hall prior closing of Exhibit Hall at 3:30 p.m. Friday, December 11, 2015.

Meeting Room Overcrowding

ATC-SEI and the Hyatt Regency personnel are required to follow local regulations and may ask participants in rooms filled to capacity to exit the room until other attendees leave.

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Cooperating Organizations

American Concrete Institute

Council of American Structural Engineers

Earthquake Engineering Research Institute

Federal Alliance for Safe Homes

The Institution of Structural Engineers

Insurance Institute for Business & Home Safety

MAECENTER Creating a Multi-hazard Approach to Engineering

MCEER Earthquake Engineering to Extreme Events

National Council of Structural Engineers Associations

Office of Statewide Health Planning and Development

PEER Pacific Earthquake Engineering Research Center

SPUR

California Seismic Safety Commission

Structural Engineers Association of California

WSSPC Western States Seismic Policy Council

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