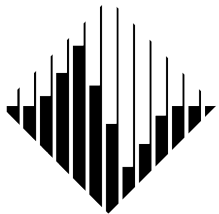


PEER Annual Meeting

3rd International Conference on Advances in Experimental Structural Engineering



PEER



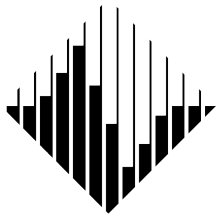
WELCOME

San Francisco, CA

October 15-16, 2009

PEER Annual Meeting

3rd International Conference on Advances in Experimental Structural Engineering



PEER



Stephen Mahin

Director

Pacific Earthquake Engineering Research Center

Byron and Elvira Nishkian Professor of
Structural Engineering

UC Berkeley

San Francisco, CA

October 15-16, 2009

International Association for Experimental Structural Engineering

□ Objectives

- Exchange of knowledge and to advance the practice of experimental structural engineering world wide in the service of the profession and society

□ Conferences

- 2005: Nagoya, Japan
- 2007: Shanghai, China
- 2009: San Francisco, USA



Chariman
Prof. Yoshito Itoh
Nagoya University



Secretary General
Prof. Xilin Lu
Tongji University

PEER: Pacific Earthquake Engineering Research Center

- ❖ PEER operated for 10 years as a university based center of excellence with funding from the US National Science Foundation
- ❖ Continues with funding from Federal, State and Local government agencies as well as from industry

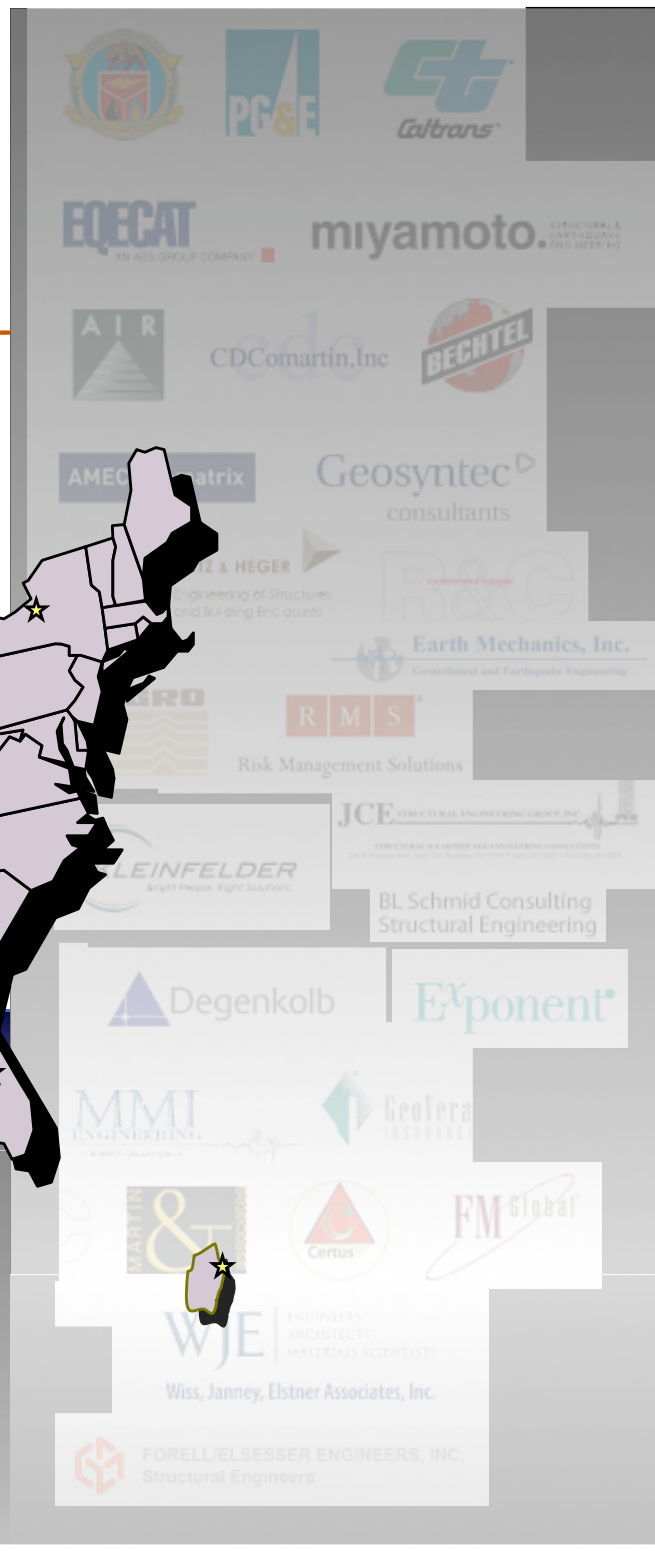
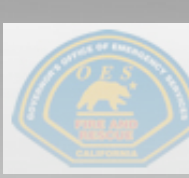
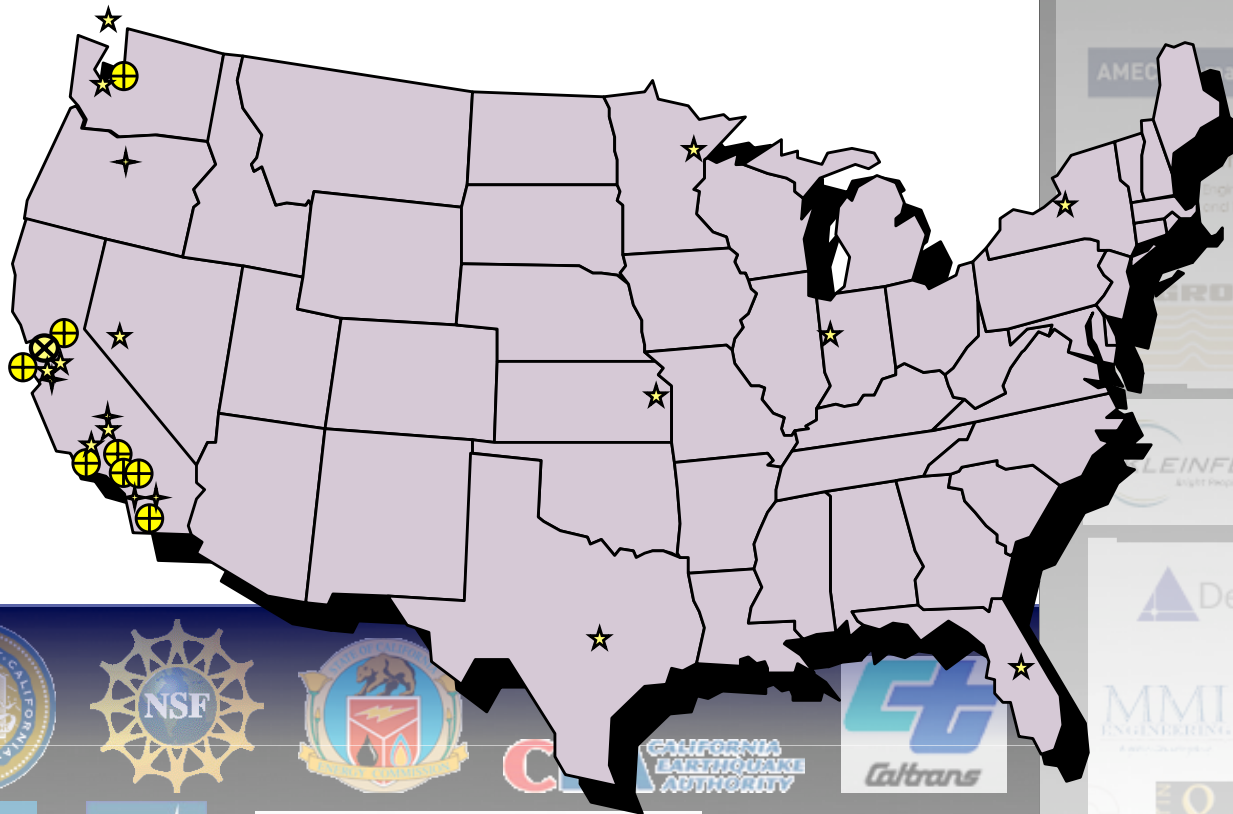
PEER recognized as California's primary earthquake engineering research arm by state's Seismic Safety Commission

More information:
www.peer.berkeley.edu

The screenshot shows the PEER website homepage. At the top is the PEER logo and the text 'PACIFIC EARTHQUAKE ENGINEERING RESEARCH CENTER'. Below this is a navigation bar with links: HOME, ABOUT PEER, NEWS, EVENTS, RESEARCH, PRODUCTS, LABORATORIES, PUBLICATIONS, NISEE, BIP MEMBERS, EDUCATION, FAQs, LINKS. A search bar is located on the right side of the navigation bar. The main content area features a large image titled 'Simulation and information technologies for earthquake engineering' with the text 'developed by PEER'. Below this image is a 'Latest News' section with several bullet points: '- Call for Papers for the 3rd International Conference on Advances in Experimental Structural Engineering', '- Registration is now open for the Free Briefing about the L'Aquila, Italy Earthquake in San Francisco on June 4th, 2009', '- Call for Nominations for the 2009 SP Prize For Excellence in the Practice of Geotechnical Engineering', '- PEER Researchers Kramer and Mayfield awarded 2009 ASCE Norman Medal', and '- New PEER Report Published: PEER 2008/09 - NGA Model for Average Horizontal Component of Peak Ground Motion and Response Spectra'. Below the news section is an 'Upcoming Events' section with three entries: 'May 22 2009 OpenSees Parallel Workshop 09 - May 22, 2009 - Richmond, California', 'June 4, 2009 Briefing about the L'Aquila, Italy Earthquake from the EERI/GEER/ATC/PEER Reconnaissance team - San Francisco, CA', and 'June 8, 2009 Caltrans and PEER Seismic Research Seminar - Sacramento, CA'. On the right side of the homepage, there are several promotional boxes: 'Breaking News' for 'Caltrans and PEER Seismic Research Seminar' on June 8, 2009; '3rd International Conference on Advances in Experimental Structural Engineering' with a 'CALL FOR PAPERS' deadline of June 15, 2009; '2009 PEER ANNUAL MEETING' with 'REGISTRATION OPEN'; and 'Tall Buildings Initiative' with a sub-section 'PEER Leads Tall Buildings Initiative' and a small image of tall buildings.

Grand Challenge Research

PEER is a strong university, government, professional and industry alliance



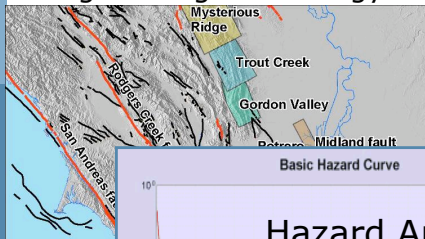
PEER's Mission

- Advance and apply performance-based earthquake engineering tools to meet the needs of various stakeholders
- Problem-focused, multi-disciplinary research built upon foundation of engineering and scientific fundamentals
- Close partnerships with government, industry and engineering professionals
- Strong international research collaboration, focusing on Pacific Rim

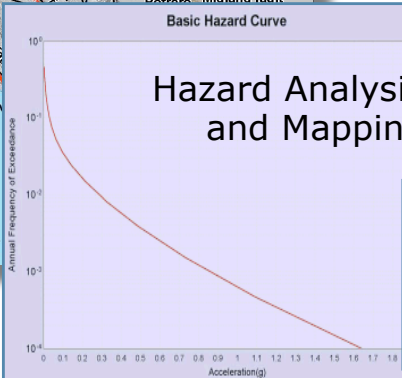


Integrated PBEE methodology

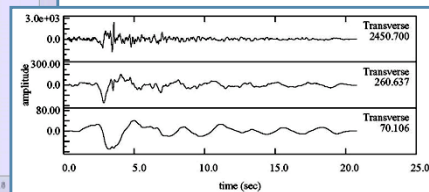
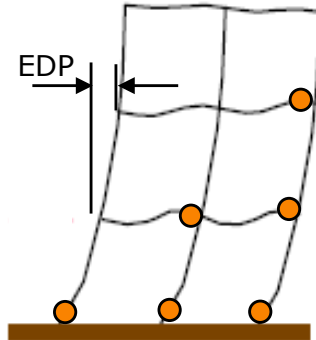
Engineering Seismology



Hazard Analysis and Mapping



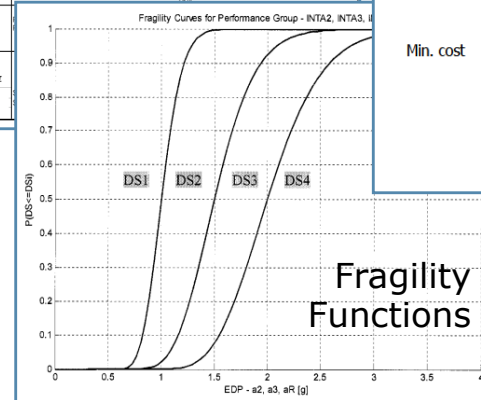
HPC simulation



Ground motion selection and scaling

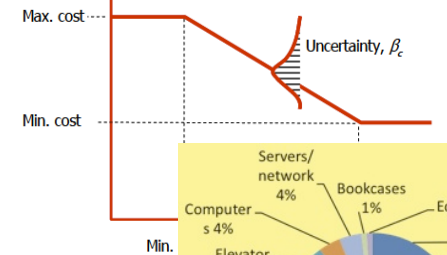
Performance Databases

BASIC COMPOSITION	DAMAGES STATES		
	DS1	DS2	DS3
No. of square feet of flexurally controlled RC concrete shear walls in each direction			
DESCRIPTION	Flexural cracks < 3/16" Shear (diagonal) cracks < 1/16" No significant spalling No fracture or buckling of rf Not structurally significant	Flexural cracks > 1/4" Shear (diagonal) cracks > 1/8" Moderate spalling/loose cover No fracture or buckling of rf Insignificant residual drift/shortening	Max. crack widths > 3/8" Significant spalling/loose cover Fracture or buckling some of rf Significant residual drift/shortening Repair in place impractical
ILLUSTRATION (example photo or drawing)			
MEDIAN EDP (intensity drift)	1.5%	3.0%	6.0%
BETA	0.2	0.3	0.4
CORRELATION (%)		70%	
REPAIR MEASURES			
CONSEQUENCE FUNCTION Cost per sq ft of wall for repair Max. cost up to lower quantity Min. cost over upper quantity Beta (cost)			

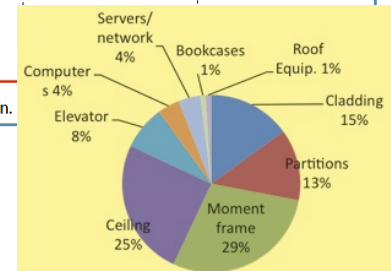


Fragility Functions

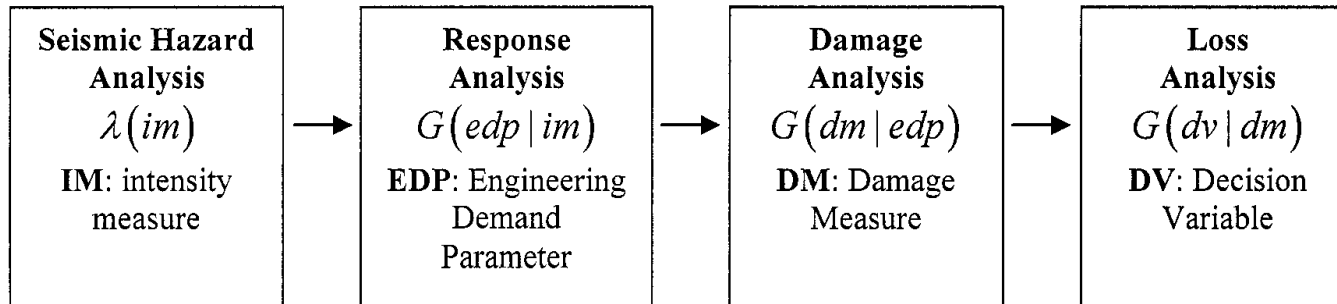
Unit Cost, \$



Consequence Functions



Loss Assessment



Probabilistic Assessment of:

- ✓ Cost of repair and loss of function
- ✓ Duration until restoration of service
- ✓ Casualties
- ✓ Sustainability

$$\lambda(DV > dv) = \int \int \int G(dv | dm) dG(dm | edp) dG(edp | im) | d\lambda(im)$$

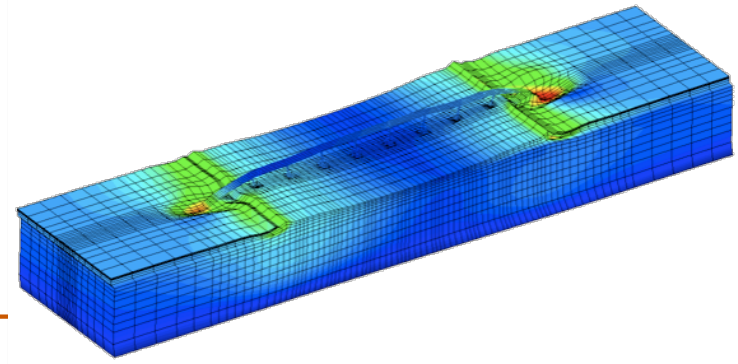
Scope of Activities

- Vulnerable existing buildings
 - Inventories
 - Evaluation
 - Impact assessment
 - Retrofit strategies

- New Buildings
 - Performance assessment and design criteria for tall buildings
 - Sustainable and natural hazard resilient buildings



Scope of Activities



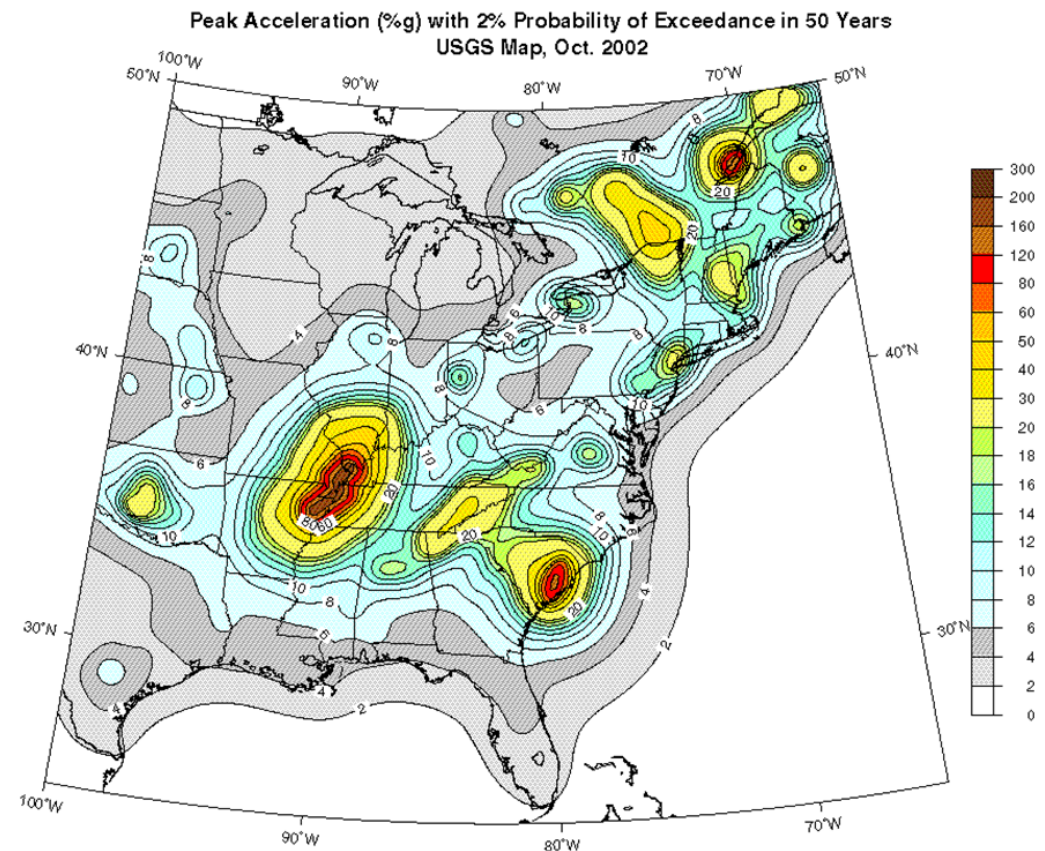
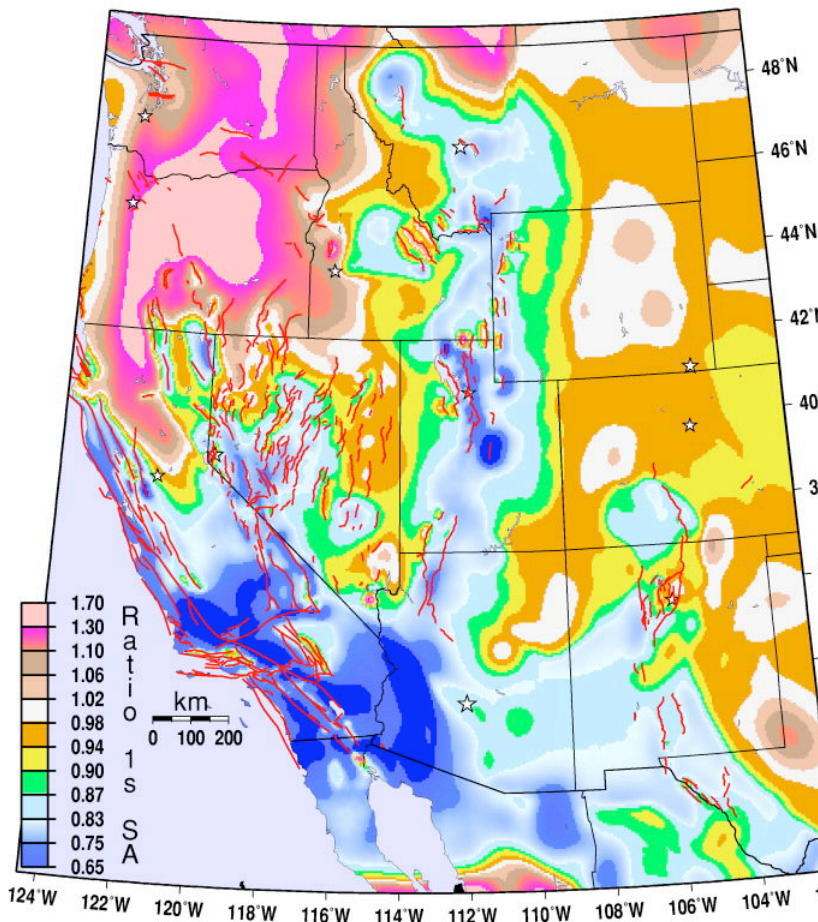
- High Performance Simulation
- Transportation Systems
 - Highway bridges and systems
 - High-speed rail systems
- Lifeline systems
 - Earthquake hazard assessment
 - Electrical power generation and distribution systems
 - Fuel storage facilities



Scope of Activities: Seismic Hazard Characterization

NGA-West

Ratio of 2007 to 2002 $S_a(T=1s)$ 2%/50 years



Funding from NRC, EPRI and others

PEER and EERI Student Leadership Council



Tokyo Tech
CUEE

SIMPSON GUMPERTZ & HEGER
Engineering of Structures
and Building Enclosures

SOM

Skidmore, Owings & Merrill LLP

Degenkolb

The sessions for young researchers is held in conjunction with the PEER Annual Meeting and the 3rd International Conference on Advances in Experimental Structural Engineering.

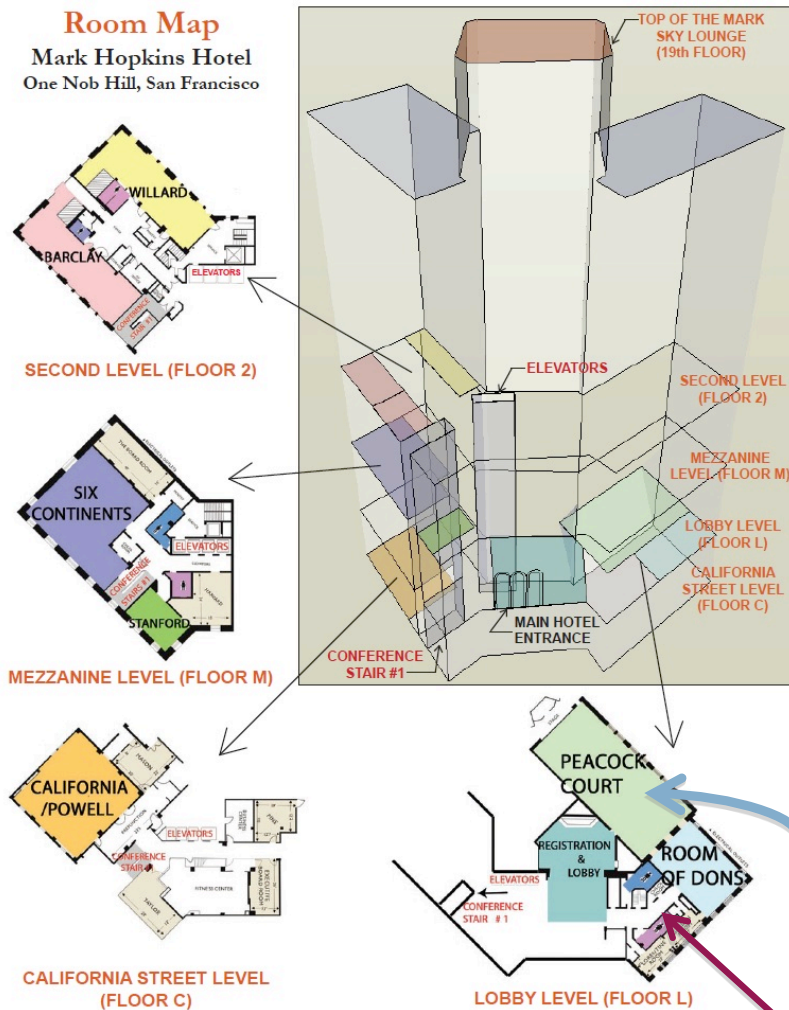


Design office visit
Seminar & poster session
Construction site visit
Meet designers



Meeting Logistics

Room Map
Mark Hopkins Hotel
One Nob Hill, San Francisco



← PEER Reception and Poster Session at Top of the Mark

Sessions are color coded to Room Map

Thursday October 15, 2009						
8:00 - 9:00 am Breakfast and Check-in (LOBBY TERRACE)						
9:00 - 10:30 am Opening Keynote Session moderated by <i>Steve Mahin, Director of the Pacific Earthquake Engineering Research Center (PEACE/COURT)</i>						
New Technologies Utilizing PBEE <i>Ross Steinbocker (University of California Berkeley)</i>		Wise Dynamic Testing for Enhanced Understanding of Structures <i>Akira Wada (Tokyo Institute of Technology)</i>		Past, Present and Future of PBEE <i>Craig Doldener (Stanford University)</i>		
11:00 - 12:30 pm Concurrent Sessions						
PEACOCK COURT: Lab Building Design - Guidelines and Case Studies <i>PBEE Annual Meeting Section</i> Moderator: <i>Perjal Vastu, John A. Moran @ Anastasi, Inc.</i> - Guideline Overview, Ron Hemburger (Simpson Gumpertz & Heger) - Case Study #1, John Hoopes (Magnusson Kneer Associates) - Case Study #2, Tony Ghobad (Engelbick Partners) - Case Study #3, Anindya Dutta (Simpson Gumpertz & Heger)	SIX CONTINENTS: Teshed Trials: PBEE Assessment of Bridges <i>PBEE Annual Meeting Section</i> Moderator: <i>Jai Cera, UC San Diego</i> - Overview of Bridge PBEE Methodology/Pilot Case Studies, Kevin Mackie (University of Central Florida) - PBEE of Bridges on Soils Susceptible to Lateral Spreading (Finite Element Analysis), Pedro Arkinho (University of Washington) - Reconstructing Technologies, Sarah Billington (Stanford University)	CALIFORNIA/POWELL: Damper and Isolator Testing <i>JAESSE Section</i> Moderator: <i>Mark Sackel, Degenkolb Engineers</i> - Full-Scale Tests on Viscous-Added Performance of 4-Story Building with Various Dampers Commercially Available, Kamiko Kasai (Tokyo Institute of Tech.) - Long-Term Performance Test of Laminated Rubber Bearing for Seismic Isolation System, Koko Morita (Fukuoka University) - Experimental Validation of Performance-Based Seismic Design of Building System with Dampers Using Real-Time Hybrid Simulation, James Hilder (Lehigh Univ.) - In-Situ Monitoring of the Force-Output of Fluid Dampers: Experimental Investigation, Nirva Makris (Univ. of Patras)	BARCLAY: Hybrid Testing of Steel Structures <i>JAESSE Section</i> Moderator: <i>Stefan Hirt, Institute of Technology</i> - Real-Time Dynamic Hybrid Testing for Sub-Structure Interaction Analysis, Chuan Zhang (Tsinghua University, Beijing) - Environment-Independent Software Framework for Hybrid Simulation: Case Studies, Andrew Schellenberg (University of California Berkeley) - International Hybrid Testing of Concentric Steel Braced Frames, Jun Wu Li (University of California Berkeley) - Validating Performance of Self-Centering Steel Frame Systems Using Hybrid Simulations, Richard Sause (Lehigh University)	WILLARD: PBEE Modeling Issues in Geotechnical Engineering <i>PBEE Annual Meeting Section</i> Moderator: <i>Ilse Bodeg, UC Davis</i> - Nonlinear Static Ground Response Analytic Protocols and Verification Against Array Data, Jon Stewart (University of California Los Angeles) - Modeling Issues in Nonlinear Deformation Analysis of Liquefaction Problems, Ross Boulanger (University of California Davis) - Intensity Measures for Geotechnical Modeling and PBEE Applications, Steve Kramer (University of Washington) Discussion		
12:30 - 2:00 pm Lunch (ROOM OF THE DONS)						
2:00 - 4:45 pm Concurrent Sessions						
PEACOCK COURT: Future Challenges/Projects I <i>PBEE Annual Meeting Section</i> Moderator: <i>Steve Mahin, PBEE Center</i> - An Overview of NRC Seismic Research Program, Richard Brune-Lugo (Nuclear Regulatory Commission) - Opportunities and Challenges in Seismic Insurance in California, Tim Robinson (California Earthquake Authority) - Fire, Charlie Swerthoff (SBA Risk, LLC) - PBEE Challenges to Buildings, Craig Cornsaris (CD-Cornerstone, Inc.) - Lessons, Said Sahh-Man (URS Corp.) - Global Earthquake Model (GEM), Kate Silwell (Former Executive Director of GEM)	SIX CONTINENTS: Simulation and IT Tools in PBEE <i>PBEE Annual Meeting Section</i> Moderator: <i>Parviz Lavan, UC Davis</i> - OpenSees, Frank McCorma (OpenSees) - BuildingTab: A Real-Time Interface for Numerical Simulation in OpenSees, Silvia Mazzoni (OpenSees) - OpenSees PL-PBEE, Ahmed Elghayour, (University of California San Diego) - DGML, Rob Young (AMEC Geomatics) - STRATA: A Program for Site Response Analysis That Incorporates Fracture Mechanics, Ekin Rahpe (University of Texas) - NGA-Based Calibrated Seismic Hazard Map, Tom Shuen (California Department of Transportation)	CALIFORNIA/POWELL: Improved Characterization of Ground Motion Hazards <i>PBEE Annual Meeting Section</i> Moderator: <i>Christine Cook, URS Corp.</i> - Progress on Ground Motion Selection and Modification, Curt Haselton (California State University Chico) - Treatment of Near-Fault Directivity in PBEE and Ground Motion Selection, Jack Baker (Stanford University) - Simulation of Synthetic Ground Motions for Specified Earthquake and Site Characteristics, Suresh Kiranjan (University of California Berkeley) - Comparison of Recorded and Simulated Strong Ground Motions, Jon Stewart (University of California Los Angeles) - Comparison of NGA Prediction and Recorded Motions in Wenchuan, China Earthquake, Yousef Bozorgnia (PBEE Center) - ShakeAlert: Developing the Prototype Earthquake Early Warning System for California, Peggy Hildner (University of California Berkeley)	BARCLAY: Bridge and Bridge Element Testing <i>JAESSE Section</i> Moderator: <i>Charles Eade, University of Washington</i> - Real-Time Hybrid Testing of Laminated Rubber Dampers for Seismic Retrofit of Bridges, Akira Iguchi (Kyoto University) - Evaluation of Bridge Post-Earthquake Traffic Load Carrying Capacity Using Hybrid Simulation, Benoit Struelens (University of California Berkeley) - Experimental and Analytical Study on High-Performance Buckling Restrained Brace Dampers for Bridge Engineering, Teodoro Usami (Meiji University) - Dynamic Characterization of Seismic Response of Bridge Bearings, Dimitris Koussoulas (University of California Berkeley) - Experimental Investigation on the Seismic Response of Bridge Girders and Cable-Deck Interaction, Maria Rosana Mancos (University of Basil) - Equipment of Steel Cable-Pylon Anchorage System of Longspan Bridge, Ching Wu (Tsing University)	WILLARD: Steel Frame Tests <i>JAESSE Section</i> Moderator: <i>Robert Tremblay, IREQ Polytechnique</i> - Contributions to Collapse Prediction of Steel Moment Frames Through Recent Earthquake Simulator Collapse Tests, Dimitrios Lignos (Stanford University) - New Dynamic Testing Method on Braced Frame Subassemblies with Slipping Connections, Shuichi Kishiki (Tokyo Tech.) - Simulating the Performance of Multi-Story Concentrically Braced Frame Systems, Devin Lehman (Univ. of Washington) - Fundamental Examination on Hysteretic Model of Steel Members by Experimental Results of Shaking Table Test, Kazuhiko Yamada (Tokyo Tech.) - Dynamic Characterization of Skewly Semi-Rigid Connections, Using Forced Vibration Test of 1/2 - Scaled Model of a 4-Story Steel Structures, Homin Kim (And University) - Three-Dimensional Shaking Table Tests on Seismic Response of Redwood-Scale Steel Beating Frames, Miriamona Miderova (Hokkaido University)	STANFORD: Testing of Timber, Glass, and Nonstructural Components <i>JAESSE Section</i> Moderator: <i>Lee Nohlgans, National Institute for Fire & Infrastructure Management</i> - Approach to Cycling Testing of Load Bearing Wood-Framed Laminated Glass Panels, Koko Zanic (University of Illinois) - Combined Non-Destructive and Destructive Tests for the Mechanical Characterization of Old Structural Timber Elements, Pedro Negro (I.C.T.) - Report on Laboratory Testing of Anchor Bolts Connecting Wood Sill Plates to Concrete with Minimum Edge Distances, Gary Michalski (SILICON) - Test Standard and Seismic Qualification Requirements for Suspended Ceilings, Amir Gilani (Mitsubishi International) - Automatic System Identification Techniques for Structural Health Monitoring Applications, Ryan O'Connell (Cedron University) - Shake Table Testing of a Full-Scale Light-Framed Wood Condominium, John van de Lindt (Colorado State University)	



Coffee breaks in registration area
Restrooms noted on floor plans

