the PEER review
volume 3 number 2
SUMMER 2003

A LOOK AT STATISTICS AND PROBABILITY IN CIVIL ENGINEERING
ICASP9 COMES TO SAN FRANCISCO

The July 6–9, 2003 **Ninth International Conference on Applications of Statistics and Probability** (ICASP9) in San Francisco, CA provided a forum for engineers, scientists, educators, researchers and practitioners to come together for a better understanding and management of uncertainty and risk in all aspects of civil engineering. Held every fourth year under the auspices of the Civil Engineering Risk and Reliability Association, CERRA, these conferences have become the premier international venues for the exchange of information on research results and novel practice in the field of risk and reliability analysis in civil engineering. ICASP9 was co-sponsored by PEER, the University of California, Berkeley's Department of Civil and Environmental Engineering, and CERRA; the conference organization, logistics, and Secretariat functions were managed by the PEER Outreach Office. Professor **Armen Der Kiureghian** (UC Berkeley) played a pivotal role in the conference, leading the effort to bring ICASP9 to the SF Bay Area, being involved in most aspects of the planning and logistics, and also serving in other valuable roles such as Co-Chair of the Conference Program Committee. The other Co-Chairs of the Conference Program Committee were Professors **Samer Madanat** and **Juan Pestana** (UC Berkeley).

The focus of ICASP9 is on advances in theory and practice for assessment of risk and for risk reduction. Broad areas of application are considered, including earthquake, structural, geotechnical, materials, transportation, environmental and wind engineering.

Previous ICASP conferences were held in Hong Kong (1971), Aachen (1975), Sydney (1979), Florence (1983), Vancouver (1987), Mexico (1991), Paris (1995) and Sydney (1999). At the conclusion of the 1999 Sydney conference, the Board of Directors of CERRA invited the delegate from the University of California, Berkeley to hold the next conference in the San Francisco Bay Area. Although many attendees at previous conferences have been Americans, this was the first time that an ICASP was held in the United States.

The Conference brought together a truly international group of specialists in risk and reliability. The participants included delegates from Algeria, Australia, Austria, Belgium, Canada, China, Colombia, Czech Republic, Denmark, Finland, France, Germany, India, Iran, Ireland, Israel, Italy, Ivory Coast, Japan, Korea, Lebanon, Lithuania, Mexico, Morocco, the Netherlands, New Zealand, Norway, Poland, Russia, Singapore, Spain, Switzerland, Sweden, Taiwan, Tunisia, Turkey, the United Kingdom and the United States. At the conclusion of the conference, it was announced that the delegation from Japan would host the next installment in the ICASP series, ICASP10, tentatively scheduled for 2007.

The initial announcement of ICASP9 drew over 300 abstracts. The Conference Program Committee reviewed these abstracts and those that were found to be relevant to the objectives of the Conference and were accepted. In the second phase, over 260 full-length manuscripts were received and reviewed by two anonymous reviewers for its technical soundness, originality and clarity. The reviews formed the basis for a final decision on each manuscript by the Program Committee. This process yielded the final 229 manuscripts, which successfully passed this rigorous review process. The conference Proceedings contain all of the technical and keynote papers in a 2-volume (1800+ pages) hardcover series, along with a CD-ROM containing electronic versions of the manuscripts. Copies may be purchased directly from Millpress Science Publishers at: **http://www.millpress.com**

2004 PEER ANNUAL MEETING
RETURN TO THE DESERT

After a successful visit to Palm Springs, CA for the 2003 Annual Meeting, it was decided that the **2004 PEER Annual Meeting** would be held again in Palm Springs on February 20–21, 2004.

The venue for the next year's meeting is the same as the 2003 meeting— the Palm Springs Riviera Resort. After closing down for over 6 months to complete renovations to their guest rooms, the Riviera has recently re-opened to the public. The renovated facilities should make our stay in Palm Springs more comfortable and pleasurable.

Please note that all PEER-funded researchers and students are expected to attend the Annual Meeting. Lodging for PEER participants will be handled through the PEER Outreach Office, as was done for the 2003 meeting.

Registration, as is always the case for PEER Annual Meetings, will be free and open to any individuals interested in the PEER program. Information on registration, the meeting agenda/program, student poster guidelines, lodging arrangements, ground transportation to the Riviera, and other meeting-related material will be available on the PEER website by November.

TESTBED STUDIES CONCLUDING
INVESTIGATIONS TO BE COMPLETED IN 2004

PEER plans in 2004 to complete investigations begun in 2001 of the testbed facilities used to exercise and illustrate our second–generation performance based earthquake engineering methodology (PBEE-2). The testbeds include two buildings, two bridges, a highway network, and a university campus. Each of these investigations is being documented in a report that shows how PEER's PBEE-2 methodology produces a probabilistic relationship between a measure of ground-motion intensity (IM) such as damped elastic spectral acceleration, and one or more measures of system-level facility performance, referred to as decision variables (DV), such as repair cost, number of fatalities, or post-earthquake operability.

Each study includes a hazard analysis, a structural analysis using PEER's OpenSees platform, a damage analysis that draws on PEER laboratory testing and databases, and a loss analysis that relates damage to DV. The analyses are probabilistic, accounting for uncertainties in each analytical stage between IM and DV. We have developed and documented several approaches for propagating these uncertainties through these analyses. The approaches range from simple deterministic sensitivity studies referred to as tornado-diagram analyses to sophisticated first- and second-order reliability methods (FORM and SORM). Testbed reports and other PEER publications present the quantification and treatment of these uncertainties.

Rigorous treatment of uncertainty represents one of the defining advances PEER has brought to PBEE, along with truly system-level evaluation of performance in terms of direct interest to owners and other facility stakeholders.

Each testbed investigation involves a team of collaborating researchers led by a PEER investigator. Professor **Helmut Krawinkler** (Stanford) is leading the research into the performance of a 1960s-era nonductile reinforced-concrete moment-frame building in Van Nuys, CA (below). The investigation of

the UC Science Building--a modern reinforced concrete building housing advanced organismal biology laboratories--is led by Professor **Mary Comerio** (UC Berkeley). An older AASHTO-Caltrans-girder highway bridge over Humboldt Bay, near Eureka, CA, is being studied by a team led by Professors **Joel Conte** and **Ahmed Elgamal** (UC San Diego). Professors **Gregory Fenves** and **Stephen Mahin** (UC Berkeley), along with Professor **Sashi Kunnath** (UC Davis), are leading the research into the performance of a recently built post-tensioned concrete box-girder bridge on Interstate 880 in Oakland, CA (below).

Research teams also include other PEER faculty and one or more Business and Industry Partners (BIP). The participation of BIPs brings two important features to our studies: on the one hand, an independent critique for practitioners of the value that PEER can offer to practice; and on the other, a sanity check for PEER faculty about the results and practicality of our research products. BIP findings will be summarized in trade journals for the benefit of practitioners, as well as in our testbed reports for academic consideration. The reader can expect these publications in the next year or so. Details of investigations of the the four single-structure testbeds, including in-progress testbed reports, contact information, crosscutting topics, and other testbed issues, can currently be found at **http://www.peertestbeds.net**. Other PEER publications, such as reports of laboratory testing, damage databases, and propagation of uncertainty, can be found at **http://peer.berkeley.edu/publications/**

PEER STUDENTS DESCEND ON SANTA BARBARA
THE 2003 SLC RETREAT

On the weekend of August 23rd, the Annual PEER **Student Leadership Council** (SLC) Retreat was held in Santa Barbara. The purpose of the retreat was to get new members acquainted with current members, to plan the upcoming year and to elect new officers. After the formal meeting, SLC members spent the afternoon ocean kayaking, biking and enjoying all that Santa Barbara had to offer. A great time was had by all!

PEER's SLC group has grown dramatically in the past year. Since the 2002 SLC retreat, the group has grown to 22 members, a majority of whom have an officer role. This group is representative of the diverse backgrounds of PEER students, with half of the group being female, and several members born in foreign countries.

Michael Gebman (UC San Diego) was selected as SLC President, replacing outgoing President **Patxi Uriz** (UC Berkeley). Other key officers for the 2003/2004 academic year are: **Samuel (Case) Bradford** (Caltech), Internet Chair; **Jack Baker** (Stanford), Annual Report/SWOT Chair; **Emily Guglielmo** (UC Berkeley), Secretary; **Lijuan (Dawn) Cheng** (UC San Diego), Seismic Competition; **Alberto Salamanca** (UCLA), Historian; **Leonardo Massone** (UCLA), Mentoring; **Dongdong Chang** (UC Davis), Outreach. These are just a few of the students involved; a full list can be found at: **http://peer.berkeley.edu/people/slc_03.html.**

PEER would like to give special thanks to Patxi Uriz for his leadership as SLC President last year, and all of our returning and new members for their involvement with PEER and the SLC.

More information about the SLC can be found at: **http://peer.berkeley.edu/students**

AWARDS AND HONORS

IAB member **Robert Bachman** (RE Bachman SE) and Thrust Area 3 Leader Professor **Helmut Krawinkler** (Stanford) were among five individuals inducted into the *College of Fellows of the Structural Engineers Association of California* in recognition of their significant achievements in the area of structural engineering and standards development.

Thrust Area 1 co-Leader Professor **Mary Comerio** (UC Berkeley) has been made a *Visiting Erskine Fellow* at the University of Canterbury in Christchurch, New Zealand. She will spend part of her sabbatical in the Department of Civil Engineering, teaching and giving public lectures.

Ph.D. candidate **Paul Cordova** (Stanford) was selected as the *2003-2004 NEHRP Graduate Fellow in Earthquake Hazards Reduction* by the Earthquake Engineering Research Institute.

Professor **Allin Cornell** (Stanford), **Fatehmeh Jalayer** (Caltech), SAC Chair **Ron Hamburger** (SGH, Inc.), and Professor **Douglas Foutch** (University of Illinois) were awarded the *2003 ASCE Normal Medal* for their paper on "The Probabilistic Basis for the 2000 SAC/FEMA Steel Moment Frame Guidelines."

Professor **Yannis Dafalias** (UC Davis) was awarded a grant from Kajima Foundation to visit as a Guest Scholar in the Graduate School of Kyoto University to deliver lectures in soil and continuum mechanics.

PEER Deputy Director for Research Professor **Gregory Deierlein** (Stanford) was awarded the *2003 Raymond Reese Research Prize*, the *2002 ASCE Norman Medal*, and the *2002 AISC Special Achievement Award*.

Former UC Berkeley graduate students **Kenneth Elwood** and **Terje Haukaas** have each accepted Assistant Professor appointments in the Department of Civil Engineering at the University of British Columbia.

M.S. candidate **Chad Harden** (UC Irvine) was a recipient of a *SEAOSC Spring 2003 Graduate Scholarship*.

Professor **Anne Kiremidjian** (Stanford) was awarded the *2003 C. Martin Duke Award* from ASCE in "recognition of outstanding contributions to the advancement of lifeline earthquake engineering.

Professor **Juan Pestana** (UC Berkeley) was awarded the *2003 Walter L. Huber Civil Engineering Research Prize* from ASCE for "physical and numerical modeling of soil with applications to geotechnical, offshore and earthquake engineering.

Former UC Davis graduate student **Zhaohui Yang** has accepted an Assistant Professor appointment at the University of Alaska, Anchorage.

UNIVERSITY OF CALIFORNIA
PACIFIC EARTHQUAKE ENGINEERING RESEARCH CENTER
MC 3580
BERKELEY, CALIFORNIA 94720-3580

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WEB SPOTLIGHT: THE PEER STRUCTURAL PERFORMANCE DATABASE

As a new regular feature, in each issue of The PEER Review *we'll highlight noteworthy additions to the PEER website.*

This month's **Web Spotlight** features the PEER Structural Performance Database, or SPD. This site provides the results of over 400 cyclic, lateral-load tests of reinforced concrete columns. The database describes tests of:

- spiral or circular hoop-reinforced columns
- rectangular reinforced columns
- columns with or without splices

The SPD was created under the direction of Professor **Marc Eberhard** of the University of Washington, and may be accessed at: http://nisee.berkeley.edu/spd/ •••

NEWS DIGEST

- PEER hosted the **Fourth OpenSees User Workshop** on August 21–22, 2003 at PEER headquarters in Richmond. The workshop was attended by over 75 participants. For more information on OpenSees or upcoming User Workshops, please visit: **http://opensees.berkeley.edu**
- PEER was a co-sponsor of the September 8-9, 2003 International Symposium Honoring Professor Shunsuke Otani, held in Tokyo. Among the guest speakers were PEER Research Committee members Professors **Helmut Krawinkler** (Stanford), **Stephen Mahin** (UC Berkeley), and **Jack Moehle** (UC Berkeley).
- **Year 7** of the PEER Core Research Program began on October 1, 2003 and concludes September 30, 2004.
- The **Fifth US-Japan Workshop on Performance-Based Earthquake Engineering Methodology for Reinforced Concrete Buildings** was held September 10–11, 2003 in Hakone, Japan. PEER is a co-sponsor of this series of invitational workshops. Proceedings from the earlier iterations of this workshop are available as PEER Reports; for more information please refer to: **http://peer.berkeley.edu**
- Presentations from the PEER Lifelines Program at the TCLEE 2003 conference are available at: **http://peer.berkeley.edu/lifelines/tclee2003/tclee_present.html**
- The **2004 PEER Annual Meeting** will be held February 20–21, 2004 at the Palm Springs Riviera Resort. This is the same venue that hosted the 2003 Annual Meeting. Please check the PEER website soon for updates at **http://peer.berkeley.edu** •••

THE PEER REVIEW
Published quarterly by the Pacific Earthquake Engineering Research Center, which is administered under the Engineering Research Centers Program of the National Science Foundation under award number EEC-9701568 to the University of California, Berkeley.

PEER Center Director: Jack P. Moehle

The PEER Review Editor: Parshaw Vaziri

Contributors to this issue: Michael Gebman, Silvia Mazzoni, Keith Porter, Alberto Salamanca

PEER
1301 South 46th Street
Richmond, CA 94804-4698
Tel: 510.231.9554
Fax: 510.231.9471
Email: peer_ctr@peer.berkeley.edu
Web: http://peer.berkeley.edu

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