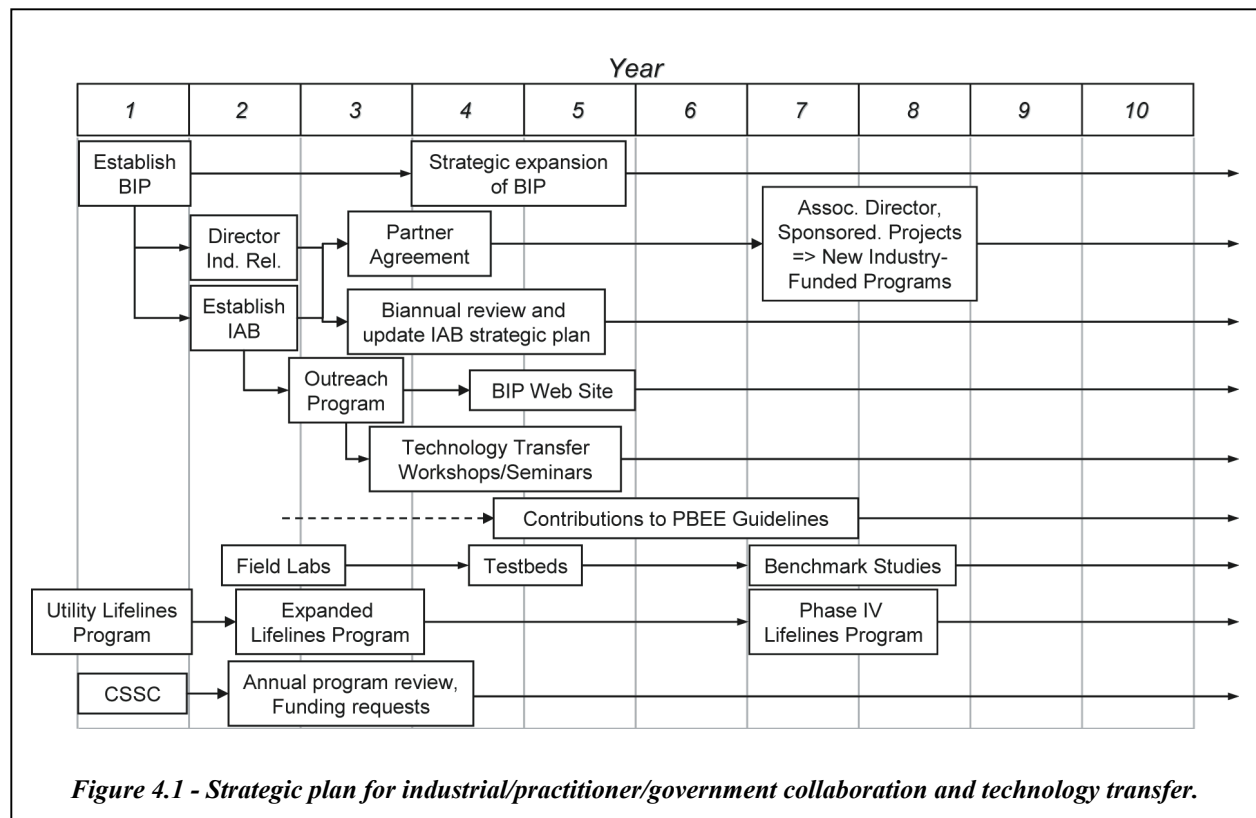


4. INDUSTRIAL/PRACTITIONER COLLABORATION AND TECHNOLOGY TRANSFER

4.1 Strategic Plan for Industry/Users Collaboration, Outreach, and Technology Transfer

Close collaboration between government, industry, design professionals, and other end-users of PEER products and knowledge are key to the success of the PEER program because they help identify and fill gaps in current knowledge; aid in the development and funding of sector-directed research programs; provide critical review of the strengths, weaknesses, opportunities, and threats relative to the PEER program; and facilitate timely and cost-effective outreach and technology transfer. Therefore, we have endeavored to develop an effective program with appropriate government and industry partners.

Figure 4.1 presents the PEER strategic plan for collaboration and technology transfer to industry, practitioner, and government groups. This plan has developed continuously since its introduction in Year 2. The PEER strategy of collaboration is to seek out and engage key players in government, industry, and business sectors that will be adversely impacted by earthquakes; earthquake professionals who have valuable experience in earthquake mitigation and who will benefit from enhancing their professional expertise; and organizations with existing earthquake outreach and technology transfer programs who can benefit from technology transfer collaborations with PEER. Part of this strategy is to identify the needs and requirements (Figure 2.1) for PEER research, including practical delivery mechanisms that can be utilized by the end users. Another part is to engage practicing professionals with researchers including students, to enhance the research experience and create lasting partnerships between practitioner and researcher. A third essential part of this strategy is to identify and develop relationships that



result in funding of PEER research and technology transfer programs, with a goal to secure long-term funding to sustain the Center.

With reference to Figure 4.1, the first step in the implementation of our strategic plan was establishment in 1998 of the Business and Industry Partner (BIP) Program as a mechanism for enhancing the relevance of PEER research. When PEER was reorganized under the NSF ERC program in 1999, PEER formed the Implementation Advisory Board (IAB) as a select group of partners to formalize the review of our research and technology transfer activities.

PEER established the position of Director of Industrial Relations in 1999. Dr. Andrew Whittaker (now Associate Professor at the State University of New York, Buffalo) initially held that position. Following his departure from PEER, this function was temporarily overseen through a combined effort of the Center Director (Dr. Moehle), the Director of Public Relations and Outreach (Mr. Vaziri), and the Lifelines Program Manager (Dr. Riemer). In mid-2003, Dr. Riemer returned to his academic position within the Department of Civil and Environmental Engineering at UC Berkeley. We since have successfully recruited Dr. Yousef Bozorgnia into a newly defined position of Associate Director for Sponsored Projects and Technology Transfer. Dr. Bozorgnia's responsibilities include development and management of externally funded research programs and translation and transfer of research results to industry and government partners.

Another important development has been establishment in Year 3 of the office for Public Relations and Outreach under the direction of Mr. Parshaw Vaziri. The program supports a range of functions. It fosters communications within PEER, between PEER and the University, and between PEER and the outside community. It serves a public relations function, ensuring that inquiries are answered promptly and that news releases are prepared regularly and distributed widely. It organizes workshops, seminars, and meetings for a wide audience. Finally, it is responsible to create web-accessible information for our BIP members, providing access to research results and students.

One of the major objectives of the program is to establish sustained government and industry funding to the PEER research program. On the government side, we have worked continuously with the California Seismic Safety Commission (CSSC) to keep them informed of PEER activities and to keep PEER informed of needs within the State. The CSSC is an important link to the State for the purpose of maintaining the existing State matching funds and identifying new initiatives that may lead to additional funding. PEER works regularly with the CSSC to update its *California Earthquake Loss Reduction Plan*, thereby ensuring that PEER has a voice in the research and outreach directions of the State. The CSSC prepares written progress reports on PEER to the State legislature, and with those makes funding requests to sustain and grow the PEER program.

On the industry side, we established in 1997 a program known as the Utility Lifelines Program (see Chapter 2 for additional details). The Utility Lifelines Program originally was funded by the Pacific Gas & Electric Company (PG&E). Recognizing the need to expand the scope and funding base of the program, we worked with PG&E managers to propose and secure additional funding from the California Energy Commission (CEC). This was further expanded in Years 2 through 5 to include funding from the California Department of Transportation (Caltrans) and Federal Emergency Management Agency (FEMA). Given the expanded focus of the program,

we have renamed it the Lifelines Program. The current funding from CEC is programmed until around June 2004, with Caltrans funding extending beyond that date.

To provide guidance for the next phase of the Lifelines Program, we have assisted in re-establishing the Inter-Utility Seismic Working Group, with membership including: Bob Anderson (CSSC), Craig Riker (SempraUtilities), Denny Ostrom (Consultant), Don Willoughby (PG&E), Ed Matsuda (BART), James Wight (SempraUtilities), Leon Kempner (Bonneville Power), Pete Aguila (Southern California Edison), Phillip Mo (Southern California Edison), Ron Tognazzini (LADWP), and Woody Savage (USGS). We have convened two meetings of the IUSWG, in which they have served as the Lifelines Advisory Panel, reviewing our program and making recommendations on future research directions. Outcomes of these meetings have been directed to the California Energy Commission to guide their continued funding of the Lifelines Program. The IUSWG also has made excellent recommendations on additional funding sources, which we are pursuing.

PEER began negotiations with the California Earthquake Authority (which provides residential earthquake insurance in California) to fund a program to assess the methods used to set rates. We have signed a \$250,000 contract in March 2004 and will commence this project during Year 7. We will pursue continued funding from this and other organizations.

An important development in Year 4 was the formalization of the Business and Industry Partner Agreements. In the past, the agreement was an informal written agreement between the BIP partner and the PEER Center. In Year 4, PEER worked with the Implementation Advisory Board, the University of California Sponsored Projects Office, and the National Science Foundation to formalize the agreements to meet NSF and University requirements. Generic language for the agreements including rights and privileges of all parties was approved in April 2001. The new agreements formed the basis for membership in the BIP program starting in 2001.

The PEER leadership has aimed to contribute to the continued development of performance-based earthquake engineering guidelines and regulations. As part of our strategic plan, we have maintained close working relations with organizations responsible for such developments, including the Federal Emergency Management Agency (FEMA) and the Applied Technology Council (ATC). In 2001-2004 we collaborated with ATC/FEMA in the development of improved methods for nonlinear analysis of buildings. We also were successful in helping establish the structure of the new FEMA-funded program for Development of Guidelines for Performance-Based Earthquake Engineering (ATC 58). Two members of the PEER leadership team (Director Moehle and Thrust Leader May) have seats on the six-member ATC-58 Project Management Committee, Deputy Director Deierlein is a member of the Structural Products team. Two of our industry partners head up the Nonstructural Products and the Risk Management teams, ensuring an efficient path to implementation of the PEER PBEE methodology. Our research program efforts on building benchmarking (see Chapter 2) will contribute significantly to ATC 58.

In prior years the Implementation Advisory Board in its SWOT analyses recommended efforts to improve interactions between BIP members, researchers, and students. A strategic planning committee comprising Vanessa Camelo (Chair, Student Leadership Council), Gregory Deierlein (Deputy Director for Research), Ken Elwood (Berkeley Member of Student Leadership Council), James Malley (Chair, Implementation Advisory Board), Jack Moehle (Center Director), and

Gerard Pardoen (Assistant Director for Education in 2001) prepared the plan, including the following elements:

- *Earthquake Engineering Scholars Course* – As described in Chapter 3, PEER has been conducting an Earthquake Engineering Scholars Course for selected undergraduate students. During Year 5 we laid plans to include selected BIP members as presenters or discussion leaders in the course. This new direction has been very positive (see Chapter 3).
- *Methodology Testbeds/Benchmarks* – In Year 5 PEER established the PEER Methodology Testbeds under the recommendation of the Scientific Advisory Committee and the Implementation Advisory Board. These have evolved to the benchmarking study. These efforts have involved BIP members in intensive studies.
- *PEER Annual Meeting and Student Day* – The PEER Annual Meetings have attracted as many as 300 participants including researchers, students, BIP members, and the public. Starting in 2002, we convened a Student Day, which included meetings among students and BIP members, including oral and poster presentations about research and practice.
- *PEER Visiting Professional Program* – During Year 5 we developed and began to implement plans for the PEER Visiting Professional Program. Students and faculty at PEER core universities identify BIP partners whom they would like to invite as part of the program. The students plan the daylong meeting to include student/faculty/industry interactions and a seminar by the industry representative.

4.2 The PEER Business and Industry Partner Program

The PEER Business and Industry Partner (BIP) Program is the formal mechanism for engaging industry partners in the PEER programs. The program was initiated when the PEER Center was first established in 1998. As first established, PEER personnel recruited potential members annually and secured their membership through signatures on a form prepared by PEER. The agreement established a membership fee linked to company size and secured informal agreement of the partners to participate in PEER programs. The program was very successful in engaging the professional community in PEER activities. However, NSF, and subsequently UC Berkeley, deemed the program unsatisfactory because the agreement was not an officially approved contract of the University and because intellectual property rights were not included in the agreement.

Starting in 2001, PEER established a more formal mechanism for the BIP program through a contractual agreement between the Partner and UC Berkeley. A generic agreement is included in the Appendix II. The main aspects of the agreement are:

- Formal statement of the interest of the Partner in joining PEER. The Partner selects a level of participation consistent with the company size and whether they are interested in intellectual property and licensing agreements. A different membership fee is associated with each membership level. Indirect costs are waived on all membership fees.
- A series of Partner benefits is defined. Those members joining at the Sustaining Member level receive the regular benefits plus early access to intellectual property.
- An Implementation Advisory Board is promised; members joining at the Sustaining Level have automatic membership on the Board.

As in the past, the BIP members are informed of PEER activities through regular mailings. They are encouraged to attend all research meetings, and are invited to the PEER Annual Meeting. We also convene at least once per year a BIP reception and dinner to recognize the contributions of the Partners.

Table 4 lists current Member, Affiliate, and Contributing members of the Business and Industry Program. A Member is an organization that has signed the membership agreement (Appendix II); An Affiliate is an organization that provides cash to the program under the PEER strategic plan but which has not signed the membership agreement. A Contributing organization provides other non-project-specific support to the Center. It is noteworthy that the organizations providing the primary funding to the Lifelines Program qualify as Affiliate Members; the contracts were executed prior to formalization of the BIP Program in 2001 and contracting complications prevented signing the formal BIP agreement at this time, even though these partners in all other practical measures are fully engaged in our BIP program.

Table 5 tracks the membership over the life of the BIP program. Note that the formal membership agreement (appendix II) was not executed until 2001. Membership prior to 2001 is based on the less formal partnership agreement.

4.3 Technology Transfer and Interactions With Various Organizations

Technology transfer and dissemination of PEER research findings, knowledge, developments and products to government, industry, and other end-users are important elements of PEER program.

An example of such activities is deep and broad interactions with numerous participants in PEER Lifelines project “Next Generation of Attenuation Models (NGA)”. In this project, various researchers are working to cast the next generation ground motion attenuation models. These models will be used in seismic hazard analysis and will form the basic data for seismic design according to the International Building Code (IBC). NGA quarterly workshops attract many participants from various organizations. For example, 43 people attended the most recent NGA workshop in March 2004. Also, 38 people attended the previous workshop held in December 2003, and 45 persons participated in the October 2003 NGA workshop. The participants represent organizations such as USGS, California Geological Survey, California Department of Transportation (Caltrans), California Division of Dams, California Energy Commission, Bay Area Rapid Transit (BART), various universities (such as UCLA, UC Davis, UC San Diego, UC Santa Barbara, University of Nevada at Reno, Caltech, among others), private sector (EQECAT, Inc.; Earth Mechanics, Inc.; AIR; URS Corporation; Geomatrix Consultants; Bechtel Corporation; and Pacific Gas & Electric Company). The success of NGA and other PEER projects is partly due to such serious interactions among various sectors involved in earthquake engineering.

4.4 Program for Public Relations and Outreach

PEER has established its Office of Public Relations and Outreach to serve several functions. It improves communications within PEER and between PEER participants, between PEER and the University, and between PEER and the outside community. It serves a public relations function, ensuring that inquiries are answered promptly and that news releases are prepared regularly and distributed widely. It organizes workshops, seminars, and meetings for a wide audience, as well as production of PEER publications and the *PEER Technical Report Series* (please refer to Table

4.1 to see the number of technical reports published by year). Finally, it is responsible to create web-accessible information for our BIP members, providing access to research results and students.

An exciting outreach opportunity is on the horizon for Year 8: the Earthquake Engineering Research Institute (EERI) has just informed Director Moehle that he has been selected as the **EERI Distinguished Lecturer for 2005**, speaking on the subject of Performance-Based Earthquake Engineering with an emphasis on progress made by PEER. This prestigious award includes a featured lecture at the EERI Annual Meeting, a paper in *EERI Spectra*, and funding to support multiple presentations of the Distinguished Lecture at EERI regional and student chapters in and outside the US during the year. We look forward to this opportunity to spread the word on the work of PEER.

Table 4.1
PEER Report Series

Year	# of Reports Published
1998	8
1999	14
2000	10
2001	16
2002	24
2003	10*

**as of April 2004; 2003 publication year runs from June '03 – July '04*

During the past year, the office of Public Relations and Outreach has continued its effort to increase the level of communication between the Center and its participants, as well increasing outreach to the earthquake engineering community. Highlights of outreach activities during the past year have included:

- Logistical management of PEER’s research workshops and meetings, including technical, informational, and organizational events
- Hosting a major international conference in July 2003, the *Ninth International Conference on Applications of Statistics and Probability in Civil Engineering*. Organizational activities have included the coordination of over 600 anonymous reviews of manuscripts submitted to the conference and coordination of over 40 technical sessions.
- Improving methods for information collection for the PEER Annual Report, including overseeing the creation of a web-based personal workspace and personnel survey for all PEER participants.
- A complete redesign of the PEER website, which is scheduled for rollout in April 2004.

PEER has sponsored or co-sponsored several events related to the progress and products of the PEER program as well as those related more broadly to performance-based earthquake engineering. Table 4.2 provides details of events in the past four years.

Table 4.2 Outreach Activities

Date of Event	Title of Event	Location	Type of Event	Description	# of Attendees
3/04	5 th New Generation Ground Motion Attenuation Workshop	Richmond, CA	Workshop	The NGA is a unique opportunity for the community of strong-motion seismologists and geotechnical engineers to make a significant step forward in predicting strong ground motions for WUS earthquakes.	43

Date of Event	Title of Event	Location	Type of Event	Description	# of Attendees
3/04	International Workshop on Nonlinear Soil Properties and Their Impact on Modeling Dynamic Soil Response	Richmond, CA	Workshop	Aimed to improve coordination between the Soil Response testing and modeling communities by addressing the following issues: What is the current status of soil testing for dynamic soil properties, and what are the major sources of bias and uncertainty? What is the current status of nonlinear soil property models? What is the current status of earthquake site-response modeling, as it relates to the need for new soil models and the quantification of uncertainties?	48
2/04	PEER Annual Meeting	Palm Springs, CA	Conference and Poster Session	Focused discussion sessions built around themes which crossed-over research thrust areas. Poster session for students to explain their projects to members of industry and other meeting attendees.	170
1/04	NEES/OpenSees Workshop	Richmond, CA	Workshop	A workshop aimed at showcasing the OpenSees framework for investigators involved with the NEES program.	35
1/04	11 Int'l Conference on Soil Dynamics & Earthquake Engineering/3 rd Int'l Conference on Earthquake Geotechnical Engineering* *Co-Sponsor	Berkeley, CA	Conference and poster session	International Conference on Soil Dynamics and Earthquake Engineering (SDEE), affiliated with the <i>Journal of Soil Dynamics and Earthquake Engineering</i> , has been held every two years for past 20 years. The last conference was held in Philadelphia in the USA in 2001. The international community organizing the conference consists of academia and practicing engineers in Singapore, USA, Japan and China. PEER was a co-sponsor of this event.	300
12/03	4 th New Generation Ground Motion Attenuation Workshop	Richmond, CA	Workshop	The NGA is a unique opportunity for the community of strong-motion seismologists and geotechnical engineers to make a significant step forward in predicting strong ground motions for WUS earthquakes.	38
12/03	Tri-Center Workshop on Geographically-Distributed Network Systems* *organized by MAE	Las Vegas, NV	Workshop	The second tri-center workshop, focusing on geographically-distributed network systems. Working group sessions included: <i>bridge performance, transportation networks, earthquake hazard categorization, and electric utility equipment and networks.</i>	55
12/03	ACI: Seismic Bridge Design and Retrofit for Earthquake Resistance* *Co-Sponsor	La Jolla, CA	Conference	An international conference bringing together some of the world's leading seismic experts	150
10/03	3 rd New Generation Ground Motion Attenuation Workshop	Richmond, CA	Workshop	The NGA is a unique opportunity for the community of strong-motion seismologists and geotechnical engineers to make a significant step forward in predicting strong ground motions for WUS earthquakes.	45

Date of Event	Title of Event	Location	Type of Event	Description	# of Attendees
9/03	Four Seasons Field Test Workshop	Los Angeles, CA	Workshop	The objectives of the workshop are to inform the community about the testing program, to solicit input from you regarding how our test plan can be optimized, and to identify potential "payload projects" (i.e., tests that could be performed in conjunction with the main test such as instrumentation of a particular non-structural element, etc.).	14
9/03	5 th US-Japan Workshop on PBEE Methodology for RC Buildings	Hakone, Japan	Workshop	An international level workshop to facilitate the exchange of the latest research and professional practice information on performance-based earthquake engineering.	28
9/03	Int'l Symposium Honoring Professor Shunsuke Otani* <i>*co-sponsor</i>	Tokyo, Japan	Conference	An international symposium celebrating Professor Shunsuke Otani's retirement from the University of Tokyo. Three PEER Research Committee members were guest speakers.	200
8/03	4 th Annual OpenSees User Workshop	Richmond, CA	Workshop	OpenSees is a software framework for developing applications to simulate the performance of structural and geotechnical systems subjected to earthquakes. The workshop is intended for those who wish to begin use of OpenSees and for more advanced users.	94
8/03	The Sixth US Conference and Workshop on Lifeline Earthquake Engineering (TCLEE)* <i>*co-sponsor</i>	Long Beach, CA	Conference and Poster Session	Workshop with specialists from all disciplines in the field to discuss what has been learned, to see the latest trends and developments and to understand how developments in lifeline earthquake engineering can reduce losses from other technological hazards.	200
7/03	2 nd New Generation Ground Motion Attenuation Workshop	Richmond, CA	Workshop	The NGA is a community of strong-motion seismologists and geotechnical engineers to make a significant step forward in predicting strong ground motions for WUS earthquakes.	40
7/03	Ninth International Conference on Applications of Statistics and Probability in Civil Engineering	San Francisco, CA	Conference	ICASP9 is the ninth in a series of international conferences aimed at bringing together scientists, educators, researchers and practitioners for a better understanding and management of uncertainty, risk and reliability in all aspects of civil engineering.	232
6/03	Tri-Center Workshop* <i>*organized by MCEER</i>	Los Angeles, CA	Workshop	First tri-center user workshop on application of loss estimation methodologies for transportation systems. Breakout sessions were held on <i>Damage and Performance Measures for Analysis of Highway Networks and Components</i> and <i>Data Availability and Analysis Methods for Bridges and Highway Networks</i> .	40

Date of Event	Title of Event	Location	Type of Event	Description	# of Attendees
6/03	Inter-Utility Seismic Working Group Meeting	Richmond, CA	Workshop	Inter utility Advisory Panel workshop for PEER Lifelines Program.	23
3/03	PEER Annual Meeting	Palm Springs, CA	Conference and Poster Session	Focused discussion sessions built around themes which crossed over research thrust areas. Poster session for students to explain their projects to members of industry and other meeting attendees.	169
3/03	PEER Workshop Shallow Foundations	Davis, CA	Workshop	To disseminate a summary of research findings from PEER research on shallow foundations and discuss a plan for future related research, and to receive feedback from structural engineers, practicing engineers and geotechnical peers on helpful direction in the ongoing development of procedures	20
1/02	1 st New Generation Ground Motion Attenuation Workshop	Richmond, CA	Workshop	The NGA is a unique opportunity for the community of strong-motion seismologists and geotechnical engineers to make a significant step forward in predicting strong ground motions for WUS earthquakes.	40
10/02	4 th US-Japan Workshop on Performance-Based Earthquake Engineering for Reinforced Concrete Building Structures	Toba, Japan	Workshop	This workshop brought together researchers and practitioners to discuss developments in performance-based earthquake engineering.	27
9/02	Lifelines Program Research Results and Implementation Briefing	Berkeley, CA	Seminar	This Briefing focused on the results and implementation of recent applied seismic research conducted by the PEER Lifelines Program. Emphasis was placed on the immediate and near-term benefits that stem from this research, and on means to maximize the value of these results through broad application by a spectrum of utilities and transportation systems.	50
9/02	OpenSees User and Developer Workshop	Berkeley, CA	Workshop	The first portion of the workshop was geared towards users who have little or no experience using OpenSees. The latter days were aimed at OpenSees code writers.	51
8/02	International Conference on Advances and New Challenges in Earthquake Engineering Research	Harbin and Hong Kong, China	Conference	ICANCEER focused on new advances in earthquake engineering and innovative solution approaches. Research for development and application of advanced technologies, and intelligent infrastructure engineering.	
7/02	Seventh National Conf. On Earthquake Engineering (7NCEE)* <i>*financial co-sponsor</i>	Boston, MA	Conference and Poster Session	Provides an opportunity for researchers and practitioners to share the latest knowledge and techniques for understanding and mitigating the effects of earthquakes.	750

Date of Event	Title of Event	Location	Type of Event	Description	# of Attendees
5/02	UC Berkeley–CUREE Symposium in Honor of Professors Ray Clough and Joseph Penzien	Berkeley, CA	Conference	PEER co-sponsored this conference featuring advances in earthquake engineering in recognition of the notable contributions of the honorees.	193
4/02	Third National Seismic Conference and Workshop on Bridges and Highways	Portland, OR	Conference	PEER co-sponsored this conference featuring current national and regional practices and research on earthquake-resistant bridges.	351
4/02	Large-Scale Unbonded Braced Frame Assemblies Briefing	Berkeley, CA	Workshop	PEER organized this program in collaboration with the UC Berkeley Office of Capital Projects to review a testing program on large-scale unbonded braced frame assemblies.	52
1/02	PEER Annual Meeting	Oakland, CA	Conference and Poster Session	Research digests presented recent results and progress in the PEER research program. A special session was convened for PEER students to present their research to members of PEER's BIP program. A BIP Banquet honored current members.	240
10/01	Seismic Risk and Communication: WSSPC Annual Conference 2001	Sacramento, CA	Conference	PEER co-sponsored this conference with primary focus on communication of earthquake risk.	300
9/01	Pier Testing Briefing	Richmond, CA	Workshop	PEER organized this program in collaboration with the UC Berkeley Office of Capital Projects to review an upcoming pier test program.	45
8/01	3 rd US-Japan Workshop on Performance-Based Earthquake Engineering for Reinforced Concrete Building Structures	Seattle, WA	Workshop	This workshop brought together researchers and practitioners to discuss developments in performance-based earthquake engineering.	36
5/01	2 nd National Earthquake Ground-Motion Mapping Workshop	San Francisco, CA	Workshop	PEER co-sponsored this workshop aimed at providing input to USGS on ground motion mapping.	75
1/01	OpenSees User's Workshop	Richmond, CA	Workshop	PEER organized this meeting to introduce OpenSees to PEER researchers and others.	36
1/01	PEER Annual Meeting	Oakland, CA	Conference and Poster Session	This meeting featured focus papers on PEER's general mission and scope, in plenary, breakout, and poster sessions.	274
12/00	Business and Industry Partners Banquet	Berkeley, CA	Seminar	Technical presentations on current PEER research, a discussion on the BIP program, and a report from the Implementation Advisory Board.	52

Date of Event	Title of Event	Location	Type of Event	Description	# of Attendees
11/00	Performance-Based Earthquake Engineering and Risk Management Workshop	Richmond, CA	Workshop	PEER convened this meeting to discuss aspects of risk management as they relate to various financial instruments.	15
10/00	Workshop on Critical Ground Motion Parameters for Structural and Geotechnical Performance Indices	Richmond, CA	Workshop	This workshop was organized to build a consensus among PEER researchers on ground motion Intensity Measures.	40
9/00	2 nd US-Japan Workshop on Performance-Based Earthquake Engineering for Reinforced Concrete Building Structures	Sapporo, Japan	Workshop	This workshop brought together researchers and practitioners to discuss developments in performance-based earthquake engineering.	26
8/00	Non-Structural Components Workshop	Irvine, CA	Workshop	This workshop was held to help develop a research plan for the coordinated study of nonstructural components with the PBEE framework.	30
3/00	US-Japan Workshop on the Effects of Near-Field Earthquake Shaking	San Francisco, CA	Workshop	Presentation of results of recent research in the U.S. and Japan related to the effects of near-field earthquake shaking.	155
3/00	Performance Based Engineering Concepts for Bridges	Stanford, CA	Workshop	Workshop organized to development a framework for PBEE of bridges.	28