

Workshop on Implementation of SCEC Earthquake Hazard Research Results in Earthquake Engineering Research and Practice

October 22, 2003

Oakland, California

The objective of this Workshop was to expand the interface between the Southern California Earthquake Center (SCEC) and organizations that can use SCEC knowledge in their research and practice in earthquake engineering and related disciplines. The workshop was designed to identify what kinds of scientific knowledge about earthquake hazards are useful to this community, to identify problems/ issues/ needs/ opportunities that lie at the interface, and to identify how SCEC can engage in collaborative research with this community to produce useful knowledge. Information technology is an important component of this interface.

The workshop participants included representatives of Federal and State government agencies that sponsor and use research in earthquake science and engineering (FEMA, FHWA, NSF, USGS; CEA, CGS, COES, CSSC); earthquake engineering organizations, consortia and centers (CUREE, EERI, MAE, MCEER, NEES, PEER, PEER-Lifelines), as well as practicing engineers and SCEC and USGS scientists.

The morning plenary session included presentations on key problems, issues, needs, and opportunities at the interface between earthquake science and earthquake engineering. Much of the presentation and discussion was focused on optimizing the parameters (intensity measures) that are used to describe earthquake ground motions for input into seismic response analysis of soils and structures. This discussion took place within the framework of Performance Based Seismic Engineering, whose ongoing development and application in practice were described. Interface projects that are currently underway, that have been proposed for funding, and that are solicited in the 2004 SCEC RFP, were summarized, and the OpenSHA project was described in some detail.

In the afternoon, breakout discussions focused on identification of potential collaboration projects, and on potential strategies for organizing and funding collaboration. Key issues at the interface include the optimal selection of ground motion intensity measures, and the scaling of ground motion time histories used in structural response analyses. The deployment of instruments on the ground and in structures in the ANSS (Advanced National Seismic System) was identified as a key need and opportunity for collaboration at the interface. The growing need for suites of ground motion time histories for experimentation (e.g. by NEES, the Network for Earthquake Engineering Simulation) and for design by practitioners was recognized. Analysis of the system response of spatially distributed systems such as lifelines require spatial descriptions of ground motion scenarios, providing an important computational challenge and opportunity to earthquake scientists.

One of the key suggestions for collaboration was for end-to-end simulation from the earthquake source through to structural response (“rupture to re-bar”). This would require coordination of existing simulation and information technology capabilities in earthquake science and earthquake engineering. Another key suggestion for collaboration was to use a suite of Index Buildings that would help quantify the changing levels of seismic risk that accompany real or perceived

changes in the seismic hazard as represented for example in time-dependent hazard estimates and building code revisions. The SAC steel moment frame buildings and the PEER Testbed buildings and bridges are examples of such Index Buildings.

An agenda of the workshop, list of participants, presentations that were made, and summaries of the ensuing discussions, can be found on the SCEC Website.