



SUMMARY OF THE MEETING ON INDUSTRY-NEES COLLABORATION

October 9, 2003 - Faculty Center, University of Southern California
8:30am – 11:30am

INTRODUCTIONS AND ATTENDEES

At the initiative of the Civil Engineering Research Foundation (CERF), a small meeting was held on October 9, 2003 at the University of Southern California, which hosted the meeting. The focus group gathered some representatives of CERF's Corporate Advisory Board, as well as representatives of other large and small engineering consulting companies with an interest in earthquake engineering. The list of attendees is given below.

Name	Organization	Phone Number	E-mail Address
Amar Chaker	CERF	202 785 6449	achaker@cerf.org
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Jose Restrepo	UCSD	858 822 3392	jrestrepo@ucsd.edu
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Richard Hess	SEAOSC	562 799 9787	rlhess@hesseng.com
Marc Caspe	MCA	415 726 9295 541 941 1283	caspeco@juno.com
Harvey Bernstein	CERF	202 785 6421	hbernstein@cerf.org
Daniel Whang	UCLA	310 825 3492	dwhang@seas.ucla.edu
Robert Nigbor	USC	213 740 9165	nigbor@usc.edu

After welcoming words from Harvey Bernstein, President and CEO of CERF, Amar Chaker (CERF) briefly explained the purpose of the meeting, which was to discuss how the design and construction industry could become engaged in NEES research and help ensure that NEES research results could be applied in practice. He explained that the

new, world-class capacity NSF is investing in was meant to accelerate progress in earthquake engineering research. That capacity and the new “collaboratory” format used in the NEES program provide an opportunity for a fruitful collaboration with the design and construction industry.

NEES PROGRAM

Robert Nigbor (NEES Consortium and USC) explained what NEES is, the level of investment NSF is making in the NEES program, and the concept of the NEES collaboratory. He then highlighted the main features of the new experimental research facilities at the 15 NEES sites. He also explained that the NEES Consortium, Inc. was recently set up to manage NEES as a national shared-use research facility for the earthquake engineering community, and noted that both the recent National Research Council report¹ on NEES and the EERI Research and Outreach Plan² emphasized the need for industry participation. He indicated that it was anticipated that about half of the NEES capacity would be reserved for subsidized “NEES research” which is subject to the NSF review process and to the obligation of including an outreach and education component and of providing access to the data, while the other half of the capacity would be available at a cost for proprietary research.

UCSD FACILITY

Jose Restrepo (UCSD) presented the features of the large outdoor shaking table, and of the laminar soil shear box and refillable soil pit at Camp Elliott. With this facility, it will be possible to conduct real time shake table testing of large-scale structural systems including soil-structure interaction.

UCLA FACILITY

Daniel Whang (UCLA) presented the features of their state-of-the-art equipment for forced vibration testing and seismic monitoring of full-scale structural and geotechnical systems.

INDUSTRY DISCUSSION

The presentations were followed by a general discussion on how academia and industry can work together. In particular, the following issues and ideas were proposed by the industry representatives for consideration by NEES.

¹ *Preventing Earthquake Disasters: The Grand Challenge in Earthquake Engineering – A Research Agenda for the Network for Earthquake Engineering Simulation (NEES)*, Committee to Develop a Long-Term Research Agenda for the Network for Earthquake Engineering Simulation (NEES), Board on Infrastructure and the Constructed Environment, Division on Engineering and Physical Sciences, National Research Council, National Academy Press, 2003

² “Securing Society Against Catastrophic Earthquake Losses – A Research and Outreach Plan in Earthquake Engineering”, Earthquake Engineering Research Institute, April 2003

Is it possible to accelerate the procedures for access to the NEES experimental facilities (basically a fast track process) so that industry projects on tight deadlines might be able to have some testing done, the results of which can be used promptly on current commercial projects?

The normal NSF unsolicited proposal procedure requires teaming with an academic institution and usually takes at least six months for approval. NSF's GOALI (Grant Opportunities for Academic Liaison with Industry) program has a faster response time than the usual NSF unsolicited proposal procedure, and may be suitable for projects which have some of the necessary funds available. In some cases, it may be possible to use the "payload" concept, whereby an auxiliary research question is "piggy-backed" on an already planned experiment, at a very small incremental cost.

To create a flexible funded research environment conducive to fast tracking the needs of industry, it was suggested and discussed by the group, that a consortium of companies be established with each company providing an initial fixed level of funding to form a pooled fund to be used in conjunction with NSF matching funds. The fund would serve as a reserve that could be tapped in conjunction with NSF matching funds for fast-track physical testing, assuming a streamlined, accelerated review process could be put in place. Companies could add and use funds within the consortium to undertake research at NEES sites on a fast track since preliminary criteria would have been established and approved. Groups like CERF could serve as a liaison bringing the companies together and coordinating the project testing and funding with NEES. It was also proposed that other possible funding sources for the above pooled reserve could be FEMA and NIST.

Data from experiments is an enormous resource. Engaging industry can enhance that resource and represent a win-win proposition. For access to the NEES facilities on a subsidized basis, it is necessary to have "open data". Does the "open data" requirement represent a major concern?

Industry associations are not expected to have any problem in sharing data. For proprietary systems, this requirement could be a major problem. In some cases, liability issues may preclude "open data".

Regarding the data repository, it appears that raw data would be of little use to industry. Synthesized results would be more helpful. A "NEES Electronic Journal of Earthquake Engineering" is being considered for the timely dissemination of "distilled" information about tests. Industry could help structure, organize and manage the data that would be useful. It was also pointed out that the database is already configured to accept data from sources other than NEES.

What influence can we, from an industry standpoint, have on the research that is going on? How can we participate in it? How can we use it? How can the collaboration be time responsive, so that industry benefits as well?

NEES research may be of interest to the larger engineering consulting firms that specialize in new buildings. For the practicing structural engineers engaged in the seismic retrofit of smaller buildings, NEES research doesn't seem to have an impact. The need (or market) for retrofit of existing structures dwarfs the need (or market) for new construction. We should also recognize that actual buildings are not built the way researchers expect them to be built. Typically, graduates do not know about detailing and designing buildings so they can be built in the field. This puts in question the idea of a quantum leap in preventing earthquake damage. We need to tackle older buildings and focus more on retrofit. We need to look at existing infrastructure and at the way it is built. The NRC report is highly focused on retrofit and remediation techniques. Industry can have influence on the research itself, and provide enthusiastic input from practicing engineers, contractors, and manufacturers. Therefore, it was suggested that the guidelines for the operation of NEES take into account research applicable to the retrofit of facilities and engage the industry in that process.

SUMMARY COMMENTS

NEES can be pro-active and should strive to have an external (industry) board/committee, perhaps drawing on CERF's Corporate Advisory Board members and other appropriate earthquake engineering specialty companies. The Board/Committee could be coordinated and managed separately from NEES but be linked into the formal NEES process. Such a board/committee could provide industry/practitioner input in the process related to research projects NEES decides to recommend for review and funding by NSF. The group felt it would be useful to prepare a proposal to help define the role of such a board and its potential benefits to the overall mission of NEES. For instance, such a Board could maintain a list of industry experts in a variety of sub-disciplines who could be tapped by the various 15 NEES sites and university researchers as potential partners and/or consultants who can help meet the research needs of NEES. One of the advantages of an industry board or committee would be to support NEES activities enabling NEES to advise NSF and influence research priorities, factoring in opportunities for industry participation and research support, and provide to NSF a review checklist.

It is expected that the new code for hospitals will lead to the demolition of a number of existing hospitals. This could provide opportunities for full-scale testing of buildings up to failure. A similar situation exists for a large number of highway bridges arriving at the end of their service life. These types of infrastructure could become valuable test beds for research at minimal costs and could create excellent partnering opportunities for NEES researchers.

It was pointed out that additional participants need to be brought in, and it was suggested that CERF inform them of NEES activities: AWWA, Water Pollution Control groups or associations, API, ACI, ASCE, SEAOC, insurance and re-insurance entities (e.g. Factory Mutual, IBHS, Munich Re, Swiss Re), code writing organizations, building officials departments, and leaders in innovative techniques such as Hayward Baker. Participation of the above organizations may provide another funding stream and greater stakeholder involvement and benefits from NEES.

In summary, the industry representatives said they were looking to NEES to be:

- A central source for advice and guidance on earthquake engineering design guidelines, performance criteria and design approaches.
- A channel for performing numerical modeling using commercially available programs.
- A clearinghouse for a database of information and experts in the various sub-areas of earthquake engineering so that their expertise can be tapped by industry.
- A channel for performing post-construction verification tests and studies of large, high visibility projects (e.g. Maglev).