

**National Earthquake Hazards Reduction Program
Advisory Committee on Earthquake Hazards Reduction
National Institute of Standards and Technology
Gaithersburg, Maryland
November 19–20, 2012**

Meeting Summary

Advisory Committee Members:

Chris Poland, Chair	Degenkolb Engineers
Norman Abrahamson	Pacific Gas & Electric Company
James Beavers*	James E. Beavers Consultants
Craig Davis	Los Angeles Department of Water & Power
Richard Eisner	Retired, Region Administrator, State of California
Robert Herrmann	Saint Louis University
John Hooper	Magnusson Klemencic Associates
Laurie Johnson	Laurie Johnson Consulting
Michael Lindell	Texas A&M University
Ronald Lynn	Clark County (NV) Department of Development Services
Jack Moehle*	University of California, Berkeley
Kenneth Stokoe	University of Texas at Austin
Brent Woodworth*	Emergency Preparedness Foundation
Mary Lou Zoback	Stanford University
Ralph Archuleta	Ex-officio member of ACEHR as Chair of the U.S. Geological Survey Scientific Earthquake Studies Advisory Committee (SESAC)

* Not in attendance

NEHRP ICC Member-Agency Representatives and NIST Support:

Patrick Gallagher	Under Secretary of Commerce for Standards and Technology and NIST Director
Willie May	NIST, Associate Director for Laboratory Programs
Shyam Sunder	NIST, Engineering Laboratory Director and ACEHR Designated Federal Officer
Howard Harary	NIST, Engineering Laboratory Deputy Director
Jack Hayes	NIST, NEHRP Director and ACEHR Alternate Designated Federal Officer
Steve McCabe	NIST, NEHRP Deputy Director
Steve Cauffman	NIST, Acting Chief, Materials and Structural Systems Division
Eric Letvin	NIST, Director, Disaster and Failure Studies Program
Nancy McNabb	NIST, Manager, Building and Fire Codes and Standards
Ed Laatsch	FEMA, Chief, Building Science Branch

Rick Fragaszy	NSF, Program Director, Geotechnical Engineering, Civil, Mechanical and Manufacturing Innovation Division
Bill Leith	USGS, Senior Science Advisor for Earthquake and Geologic Hazards
Tina Faecke	NIST, NEHRP Secretariat
Michelle Harman	NIST, NEHRP Secretariat
Brian Garrett	BRI Consulting Group

Speakers and Guests:

Wilson Bonner	American Geosciences Institute (AGI)
Jim Cagley	Cagley Associates
Kaitlin Chell	Caltech; Lewis-Burke Associates, LLC
Greg Deierlein	Stanford University
John Egan	Amec Environment & Infrastructure, Inc.
Bob Hanson	University of Michigan
Jim Harris	J.R. Harris & Company
Jon Heintz	Applied Technology Council
Bill Holmes	Rutherford & Chekene
Robert Pekelnicky	Degenkolb Engineers

Summary of Discussions

I. Opening Remarks

A. Introduction

Shyam Sunder welcomed attendees to this meeting of the Advisory Committee on Earthquake Hazards Reduction (ACEHR) and introduced the following new committee members: Craig Davis, Robert Herrmann, Laurie Johnson, Ronald Lynn, Kenneth Stokoe, and Mary Lou Zoback. Sunder summarized the meeting agenda, which included a panel discussion of needs related to the seismic vulnerability of existing buildings, program updates from the agencies participating in the National Earthquake Hazards Reduction Program (NEHRP), and planning for ACEHR's 2013 report to the NEHRP Interagency Coordinating Committee (ICC).

Sunder explained that the panel discussion would focus on technical issues that will help the NEHRP agencies formulate their technical plans related to existing buildings. A similar panel discussion focused on implementation issues related to existing buildings will be planned for a future ACEHR meeting. Sunder announced that the committee's discussion with NIST Director Pat Gallagher was being moved to a working lunch on November 20. He also noted that Willie May, NIST's Associate Director for Laboratory Programs, would intermittently attend portions of the meeting.

B. Meeting Context and Goals

Committee Chair Chris Poland reviewed the statutory responsibilities of ACEHR. The committee is required to prepare and submit a report to the NEHRP ICC at least once every two years on the management and effectiveness of NEHRP, as well as on trends and developments in

science and engineering that are relevant to the program. Poland explained that, since ACEHR's inception in 2007, the committee has elected to submit an annual report to the ICC. The annual reports submitted in 2008, 2010, and 2012 were full reports with sections on relevant trends and developments, while those submitted in the alternate years have been brief letters to the ICC.

In remarks directed primarily toward the new members of the committee, Poland commented that the annual reports have given ACEHR the opportunity to influence how NEHRP is implemented because they are submitted directly to the agency director who is responsible for program implementation. The reports give ACEHR the opportunity to identify its recommendations on program priorities.

The Chair noted that in the course of this meeting, the committee would hear about the applied research that NIST has conducted through the NEHRP Consultants Joint Venture to accelerate improvements to seismic codes and standards for new buildings. The meeting also would feature discussions about the analogous research needed to enhance codes and standards for existing buildings, and these discussions could provide a focus for ACEHR's 2013 report to the ICC.

II. Panel Discussion: Engineering Needs for Existing Buildings

A. Introductory Remarks

The Chair outlined the context and focus of the discussion, which would be on identifying the most important research needed to cost-effectively improve the seismic safety of existing buildings in the United States. He noted that the committee should be formulating thoughtful, credible recommendations about how to further advance the performance of existing buildings and enable them to better support the recovery of communities struck by damaging earthquakes.

B. Content Related to Existing Buildings in the NEHRP Strategic Plan and the NRC Report

Jack Hayes described the content pertaining to existing buildings in the current (2009–2013) NEHRP strategic plan and in the report “National Earthquake Resilience: Research, Implementation, and Outreach” produced in 2011 by the National Research Council (NRC) to serve as a “road map” for implementing the NEHRP strategic plan and achieving national earthquake resilience. His remarks were based on the presentation slides available at http://www.nehrp.gov/pdf/ACEHRNov2012_Hayes.pdf.

Hayes noted that improving techniques for evaluating and rehabilitating existing buildings was one of nine strategic priorities included in the NEHRP strategic plan. These priorities identified potential growth areas for NEHRP, that is, areas that should receive more attention as funding permits. One of the 18 major task areas identified in the NRC report also focused on existing buildings. The report estimates that completing this work (Task 13: Techniques for Evaluation and Retrofit of Existing Buildings) would cost \$543.6 million over 20 years.

C. Outcomes of the 2007 NEHRP Workshop on Existing Buildings

Jon Heintz of the Applied Technology Council (ATC) spoke about the results of the September 2007 “NEHRP Workshop on Meeting the Challenges of Existing Buildings.” His remarks were based on the slides available at http://www.nehrp.gov/pdf/ACEHRNov2012_ATC71.pdf.

Information developed at the 2007 workshop, supplemented by research and interviews conducted by ATC, was later documented in two reports (ATC-71 and ATC-73).

The workshop planners identified four categories of challenges related to existing buildings: technical impediments, practical impediments, regulatory/public-policy issues, and research needs. Approximately 100 specific issues within these categories were discussed and prioritized by workshop attendees. Heintz identified specific issues that were emphasized by the attendees, summarized the common themes and trends that emerged from the breakout groups, and listed the major findings and conclusions that ATC derived from the workshop proceedings.

Heintz also discussed the action plan that ATC developed based on the workshop results. Intended to guide FEMA's work on existing buildings, the plan identified and described 28 activities that FEMA should pursue, organized under the following themes: (1) facilitate framework to update existing-building standards, (2) develop and improve actionable understanding of earthquake risk, (3) develop simplified evaluation and rehabilitation procedures, (4) improve education and training of engineering professionals, and (5) develop new products.

Heintz concluded his presentation by describing the research-needs challenges that were identified and prioritized at the workshop. The participants identified 50 specific research needs organized under seven research goals. Heintz reviewed the goals and the top 12 research needs, pointing out commonalities with the NRC report and with needs that NIST has begun to address through its NEHRP research program.

D. ASCE 41 Overview

Robert Pekelnicky of Degenkolb Engineers spoke about the new American Society of Civil Engineers (ASCE) standard on existing buildings. His remarks were based on the slides available at http://www.nehrp.gov/pdf/ACEHRNov2012_ASCE41a.pdf. "Seismic Evaluation and Retrofit of Existing Buildings" (ASCE 41-13) was developed over the last three years by the 120-member ASCE/SEI Seismic Rehabilitation Standards Committee. The new standard combines two previous ASCE standards: "Seismic Evaluation of Existing Buildings" (ASCE 31-03) and "Seismic Rehabilitation of Existing Buildings" (ASCE 41-06).

Pekelnicky noted that the new standard includes more than 100 updated technical provisions, which are described in a paper that was distributed to ACEHR members at the meeting ("ASCE 41-13: Seismic Evaluation and Retrofit ~~Rehabilitation~~ of Existing Buildings"). In developing the updated standard, the ASCE committee also identified a number of research needs that must be addressed to further improve the standard. These research topics, which Pekelnicky reviewed, concern the following: calibrating collapse-prevention performance; developing global building-acceptance criteria; revising modeling parameters, especially for reinforced-concrete shear wall and reinforced-masonry wall buildings; investigating effects of soil liquefaction on buildings; retrofitting nonstructural components; calibrating screening and deficiency-correction procedures; revising the one-size-fits-all knowledge factor for material variability; developing screening procedures that can accurately identify killer buildings; and further developing nondestructive testing procedures and knowledge about the performance of steel and concrete frames with brick infill and nonductile concrete frames.

E. Practitioner Perspectives on Technical Needs Related to Existing Buildings

Bill Holmes of Rutherford & Chekene and Jim Harris of J.R. Harris & Company spoke as experienced engineering practitioners on their observations about research and technical needs related to existing buildings. Narrative summaries of their remarks are available at http://www.nehrp.gov/pdf/ACEHRNov2012_Holmes.pdf and http://www.nehrp.gov/pdf/ACEHRNov2012_Harris.pdf, and associated slides presented by Harris are at http://www.nehrp.gov/pdf/ACEHRNov2012_Harris2.pdf.

Holmes discussed seven areas in which additional technical information is needed for engineering practitioners. These areas concerned (1) globally based, as opposed to current component-based, building evaluation and retrofit methodologies; (2) the ability to better predict collapse and thereby identify high-priority retrofits; (3) the effects of large vertical ground motions on brittle structural components; (4) nondestructive in-situ testing methods and guidance regarding what testing really needs to be done; (5) the detection of hidden post-earthquake structural damage and hidden pre-earthquake structural deterioration; (6) how to adequately repair many types of earthquake-induced structural damage; and (7) guidance for evaluating and retrofitting buildings on liquefiable sites.

While acknowledging the need for the research and technical information so far addressed in the discussion of existing buildings, Harris spoke about engineers' needs for additional information, particularly in areas other than the west coast. History suggests that the hazard in the New Madrid Seismic Zone, for example, may include multiple large earthquakes in sequence. Engineers need more information about the nature of this and other seismic hazards that are not associated with plate boundaries.

F. Research Perspective on Technical Needs Related to Existing Buildings

Greg Deierlein of Stanford University presented some of the observations that researchers have made about engineering needs related to existing buildings. His remarks were based on the slides available at http://www.nehrp.gov/pdf/ACEHRNov2012_Deierlein2.pdf, and on a narrative handout available at http://www.nehrp.gov/pdf/ACEHRNov2012_Deierlein.pdf.

Deierlein highlighted some recent study findings that have relevance to existing buildings. Using a performance-based assessment framework to benchmark the comparative seismic performance of new and old (1967) classic reinforced-concrete buildings, it was found that while the probability of collapse was 30 times greater over 50 years in the old building than in the new, expected annualized direct dollar losses were only 2 times greater in the old building. This indicates that retrofits should focus on reducing collapse risk and the kinds of major structural damage that would render buildings uninhabitable.

G. Perspectives of Other Panelists

The Chair invited comments on technical needs related to existing buildings from three other guest panelists: Jim Cagley of Cagley Associates, John Egan of Amec Environment & Infrastructure, Inc., and Bob Hanson, professor emeritus at the University of Michigan. Their remarks were based on narrative handouts that are available at <http://www.nehrp.gov/pdf/>

[ACEHRNov2012_Cagley.pdf](#), http://www.nehrp.gov/pdf/ACEHRNov2012_Egan.pdf, and http://www.nehrp.gov/pdf/ACEHRNov2012_Hanson.pdf.

Cagley suggested that criteria specified in the new edition of the “Standards of Seismic Safety for Existing Federally Owned and Leased Buildings” (ICSSC Recommended Practice 8 [RP 8], December 2011) could be used in both public and private spheres to determine which existing buildings should be evaluated in areas of low seismicity. This would eliminate the need to evaluate buildings assigned to seismic design categories A and B, and even some buildings assigned to category C if certain criteria are met. Cagley also described some lessons learned in the 2011 Mineral (VA) earthquake.

Egan discussed needs related to geotechnical engineering. He stated that communication between structural and geotechnical engineers needs to improve so that foundation characterizations are appropriately integrated into existing-building evaluations and retrofit designs. With regard to liquefaction, he said that it is not sufficient to simply determine whether the potential for liquefaction is present at the levels of ground shaking being considered. Soil behaviors that lead to liquefaction may be likely, and may themselves be damaging. Approaches are needed for evaluating the potential for these behaviors and their effects, and for integrating the behaviors into foundation modeling parameters.

Hanson spoke about an illustrative project involving the evaluation and retrofit of existing school buildings in British Columbia (BC). Prompted by the concerns of a BC parent, the provincial legislature looked into upgrading the seismic resistance of school buildings in the province. They determined that the province could presently afford to retrofit no more than 10 percent of its schools. Structural upgrades will proceed over the next 10 years, overseen by a technical review board tasked to ensure that each upgrade is designed according to project guidelines and is not over- or under-designed.

H. Panel/Committee Discussion of Priority Tasks for Existing Buildings

The Chair asked each panelist and ACEHR member (in alphabetical order by last name) to identify two or three of the needs discussed during the preceding panel presentations that they feel are “high-impact items” that should be priorities in NEHRP’s research and development (R&D) efforts related to existing buildings. Their responses were compiled into the list of 17 items shown below.

List of High-Impact R&D Priorities for Existing Buildings*

(Items are not ranked by importance; the item numbers serve only to identify each item)

1. Non-ductile concrete frames and identify characteristics of killer buildings
2. Provisions of RP 8 [for areas] of lower seismicity
3. Better assessment tools for better modeling and characterization of analysis (how we evaluate building performance) New and existing buildings. Benchmark fragility (activity A21) **

4. Soil Structure Interaction with low-rise versus high-rise. ***Better integration of structural and geotechnical methodologies and permanent ground deformations. Synergy of pre- and post-earthquake investigation
5. Risk and strategy and identifying priorities (target computational tools)
6. Barriers to mitigation of earthquake risk and ways to improve the safety with more innovative systems and low cost (life safety issue) Incremental solution (activity A12)* Better understanding of local developers, builders, and construction workers and their perception of the benefits; vulnerabilities
7. FEMA P-58 evaluate overall performance (calibration) Need an extension of building modeling to capture low-rise stiff-frame buildings Expand FEMA fragility (component) database to include more existing buildings—difficult to model collapse loss—look at economic loss
8. Behavior of low-rise buildings (improve analytical predictions for engineering decisions)
9. Development of earthquake building rating system (activity A1) ****with broad stakeholder participation (convince policy makers of impact) address barriers
10. Improvement of existing ASCE 41 tools—create issue teams to translate research into practice (activity A11)
11. Collect, curate, and archive building inventory data in all seismic regions to facilitate regional loss estimation and to focus research on the most common high-risk building and structural types. Benchmarking of tier 1 and tier 2 procedures.**
12. Improve methods to identify structural damage and repair damage (including hidden damage)
13. In situ testing of behavior of existing buildings and build inventory of tests
14. Other nondestructive testing techniques within structures to identify damage
15. Develop building stock resiliency related to community resilience, including lifeline services
16. Better characterization of risk, impact on communities
17. Better assessment tools and guidelines that support mitigation; define what is a threat to the public

* The references to numbered activities (e.g., activity A21) refer to activities listed in “NEHRP Workshop on Meeting the Challenges of Existing Buildings, Part 3: Action Plan for the FEMA Existing Buildings Program” (ATC-71).

III. NEHRP Updates

A. NEHRP Consultants Joint Venture Research Project Summaries

Jon Heintz presented an overview of the NEHRP Consultants Joint Venture (NCJV) research program. His remarks were based on the slides available at http://www.nehrp.gov/pdf/ACEHRNov2012_Heintz.pdf. The NCJV program has been a major part of NIST’s Earthquake Risk Mitigation R&D Program since the former was initiated in 2007. In that year, NIST issued a five-year task-order contract to NCJV, which is a partnership between ATC and the Consortium

of Universities for Research in Earthquake Engineering (CUREE). Although the contract recently expired in September 2012, a number of multiyear projects initiated under the contract are still under way.

Heintz described the organizational structures used for the program and for the individual task-order research projects implemented through the program. As of June 2012, the NCJV program had initiated 26 task-order projects totaling \$7.7 million; these projects have produced 16 reports that have contributed to model-building-code provisions for new buildings, seismic standards for existing buildings, engineering conferences (local, national, and international), projects funded by other NEHRP agencies, and a number of doctoral dissertations.

B. NEHRP Responses to ACEHR's 2012 Recommendations

Shyam Sunder spoke on behalf of the NEHRP ICC about the NEHRP agencies' collective responses to the recommendations submitted to them in ACEHR's 2012 annual report on NEHRP effectiveness. These recommendations largely related to three main subjects: program resources, priority NRC tasks, and NIST's earthquake research program.

Sunder noted that NIST recently implemented a new system of allocating overhead expenses, a change that has made employees somewhat less expensive and contract labor more expensive. He does not expect this to have a significant effect, however, on the balance between internal and extramural earthquake research at the agency. He also reported that the NEHRP Secretariat at NIST is no longer receiving the monetary and staff support that it formerly received from the other NEHRP agencies. This could have some impact on the level of program support that the Secretariat is able to provide in the future.

Sunder closed by reviewing some of NIST's noteworthy contributions to NEHRP since it began serving as lead agency for the program in 2006. He also expressed appreciation, on behalf of the ICC, for the contributions made by ACEHR during this period. Although the program has not yet been able to fully implement all of the committee's recommendations, the NEHRP agencies' existing and planned program activities are in alignment with those recommendations.

C. Update on NEHRP Activities at NIST

Hayes' remarks on NEHRP activities at NIST were based on the slides available at http://www.nehrp.gov/pdf/ACEHRNov2012_NEHRP.pdf. NIST has two roles within NEHRP, serving both as lead agency for the program and as a provider of applied research needed to meet program goals. Hayes' remarks focused primarily on NEHRP's collective activities and accomplishments, which the lead agency is responsible for coordinating and reporting on. He described the recent changes in ACEHR's membership and discussed the annual budgets for NEHRP since 2005.

NEHRP recently submitted its latest annual report to Congress, which describes the program's activities and accomplishments during FY 2011. Hayes highlighted the 2011 completion of the NRC report, which NEHRP commissioned to provide a 20-year road map for program activities. He also noted that the program is developing an updated strategy for coordinating post-earthquake investigations, as well as a road map for lifelines research and implementation, both through NCJV projects. Some of NIST's recent activities that are related to, but do not fall

within, its NEHRP work were also mentioned by Hayes, including the 2012 completion of the ICSSC RP 8 document, meetings with seismic experts from Japan and China, and the development of the NIST Disaster and Failure Studies Program.

Hayes discussed the status of the legislation that authorizes the continuation of NEHRP. Pending congressional enactment of new program authorization legislation, P.L. 108–360 (National Earthquake Hazards Reduction Program Reauthorization Act of 2004) remains in effect, although the act’s funding authorizations expired in 2009.

Hayes concluded his remarks with some additional updates on NIST’s research activities under NEHRP. Now that the 5-year NCJV contract period has expired, NIST has begun the solicitation process for a successor contract. In addition, NIST contracted with the Building Seismic Safety Council to produce a new draft R&D road map for NIST’s earthquake research program (to replace the ATC–57 plan from 2003). This document will soon be made available on the NEHRP website for a 30-day public comment period, and Hayes welcomed comments from ACEHR members. Hayes closed by reviewing the ongoing NCJV projects that were initiated in FY 2012 and the new in-house and extramural research planned for FY 2013.

D. Update on NEHRP Activities at FEMA

Ed Laatsch provided an update on NEHRP activities at FEMA, basing his remarks on the slides available at http://www.nehrp.gov/pdf/ACEHRNov2012_FEMA.pdf. He began by reviewing FEMA’s role in NEHRP, including its statutory responsibilities under the latest (2004) program authorization legislation. He also reviewed FEMA’s allocated annual budgets for NEHRP programming since FY 2010.

FEMA continues to spearhead NEHRP’s efforts to increase implementation of the latest earthquake risk reduction knowledge, tools, and techniques. Laatsch highlighted the agency’s recent accomplishments in developing and disseminating seismic design guidance and tools for new and existing buildings; in monitoring and supporting the enhancement and adoption of seismic-resistant building codes; in supporting the development and delivery of earthquake risk reduction training for rising numbers of public and private stakeholders; in maintaining cooperative agreements with States, regional earthquake consortia, and others to support execution of earthquake risk reduction programs and activities; and in providing technical assistance and informational support for disaster response efforts. He noted that the assistance that FEMA NEHRP staff provided in the wake of the 2011 Mineral, VA, earthquake was very helpful in increasing the visibility of FEMA’s NEHRP activities among Federal officials in Washington, DC, where the quake was felt.

E. Update on NEHRP Activities at USGS

Bill Leith presented an update on NEHRP activities at USGS, basing his remarks on the slides available at http://www.nehrp.gov/pdf/ACEHRNov2012_USGS.pdf. He outlined the role of USGS in NEHRP and noted that in recent years, a series of very visible seismic events worldwide has raised the visibility of earthquake science. This spotlight on earthquakes has generated tremendous growth in use of the USGS Earthquake Hazards Program (EHP) website and the USGS Earthquake Notification Service, as well as additional demand for EHP resources in support of congressional hearings, major earthquake response exercises, and unprecedented

levels of participation in the ShakeOut earthquake response drills. Demand also remains high for EHP's R&D efforts, which currently encompass regular updates to the USGS national seismic hazard maps, ongoing work on a prototype earthquake early warning system, and research on induced seismicity, earthquakes in the Eastern States, and aftershock probability forecasts.

Leith discussed recent developments related to the USGS Advanced National Seismic System (ANSS). The number of ANSS stations increased at an accelerated pace in recent years thanks to an injection of economic stimulus funding. Station numbers rose from 886 in FY 2009 to 2,564 in FY 2012. For the past two years, ANSS has been testing the California Integrated Seismic Network (CISN) Shake Alert earthquake early warning system. The goal is to convert Shake Alert from a demonstration to a prototype system over the next three years, with support from the State of California and the Gordon and Betty Moore Foundation. ANSS is also advancing the seismic instrumentation of buildings through projects with the California Geological Survey and the U.S. Department of Veterans Affairs. Leith said that monitoring in the central and eastern United States (CEUS) may be improving through the addition of 150–200 seismic stations. These stations are to be made permanent following their use in the Transportable Array supported by NSF, USGS, and NASA.

F. Update on NEHRP Activities at NSF

Rick Fragaszy provided an update on NEHRP activities at the National Science Foundation, basing his remarks on the slides available at http://www.nehrp.gov/pdf/ACEHRNov2012_NSF.pdf. He noted that most of the agency's support for NEHRP research is administered by the Engineering (ENG) and Geosciences (GEO) Directorates.

Fragaszy organized his update around the recommendations directed to NSF in ACEHR's 2012 annual report. He stated that NSF currently supports many funding opportunities for interdisciplinary, coordinated basic research on resiliency and socioeconomic issues related to hazards. Opportunities are found among ENG and GEO core research programs (e.g., ENG Infrastructure Management and Extreme Events Program), through NSF's support for engineering research centers and science and technology centers (e.g., Southern California Earthquake Center), and in research solicitations such as the NSF 12–610 Hazards SEES. The purpose of the Hazards SEES program is to “catalyze well-integrated interdisciplinary research in hazards-related science and engineering to improve understanding of natural hazards and technological hazards linked to natural phenomena, mitigate their effects, and better prepare for, respond to, and recover from disasters.” The anticipated FY 2013 budget for this program is \$23.75 million.

ACEHR's 2012 report recommended that NSF continue to support the George E. Brown, Jr. Network for Earthquake Engineering Simulation (NEES) and NEES-based research beyond September 2014. Fragaszy described NSF's plans to support “second generation” NEES operations and use during fiscal years 2015 through 2019 with a network consisting of four to six experimental facilities. Another of ACEHR's 2012 recommendations asked NSF to commit to supporting post-earthquake reconnaissance investigations and follow-on research for significant seismic events occurring worldwide. Fragaszy noted that NSF supports immediate reconnaissance and the dissemination of reconnaissance findings through RAPID awards and

associated grantee workshops, as well as through supplements to existing grants and through core-program awards.

G. USGS SESAC Update

Ralph Archuleta, who chairs SESAC, spoke about several issues that dominated SESAC’s October meeting. These issues were related to induced seismicity, earthquake early warning and operational forecasting, and the national seismic hazard maps. Archuleta’s remarks were based on the slides available at http://www.nehrp.gov/pdf/ACEHRNov2012_Archuleta.pdf.

IV. Final Committee Discussion

The Chair polled committee members on their three top choices from among the 17 high-impact R&D priorities for existing buildings that the committee had identified earlier in the meeting. Below is the tally of votes cast for each of the 17 items (item numbers correspond to those in the list included above under “Panel/Committee Discussion of Priority Tasks for Existing Buildings”).

Polling Results

Item	Votes Received
1	0
2	0
3	8
4	2
5	0
6	2
7	1
8	0
9	9
10	0
11	2
12	1
13	1
14	0
15	1
16	0
17	1

Item numbers 3 (Better assessment tools...) and 9 (Development of earthquake building rating system...) were clearly deemed the highest priorities by the committee. The committee noted that item 3 “feeds into” item 9, in the sense that better assessment methods will be an essential prerequisite to a viable system for rating the expected seismic performance of buildings, and that these items should be discussed in the 2013 ACEHR report to the ICC.

The Chair asked the members to consider what other topics should be addressed in the committee’s report. The consensus of the committee was that the four topics listed below should be the focus of the report. The member names in parentheses are the volunteers enlisted by the Chair to take the lead in writing about each topic for the report.

- (1) Existing-building R&D priorities 3 and 9. (Hooper)
- (2) The future of NEES (concern about whether the facility reductions being considered for second-generation NEES operations will leave adequate experimental capacity for earthquake engineering research). (Stokoe)
- (3) The need to maintain the outreach and implementation component of NEHRP (in the face of declining NEHRP funding at FEMA). (Eisner)
- (4) The need to follow up on the findings generated to date about induced seismicity. (Abrahamson)

Noting that the ICC plans to meet in January 2013 for the first time since January 2012, the committee also decided to try to issue ACEHR's 2013 report in January rather than in May as in years past. To enable this expedited delivery, the report will be formatted as a letter rather than as a full report.