

**National Earthquake Hazards Reduction Program (NEHRP)
Advisory Committee on Earthquake Hazards Reduction (ACEHR)
National Institute of Standards and Technology (NIST)**

May 24, 2021

Virtual Meeting Summary

Meeting Participants

ACEHR Members

Glenn Rix, Chair	Geosyntec Consultants, Inc.
Lucy Arendt, Vice Chair	St. Norbert College
Ann Bostrom	University of Washington
Robert Carey	Utah Division of Emergency Management
Gregory Deierlein	Stanford University
Susan Dowty	International Code Council
Robert Ezelle	Washington Military Department
Thomas Heausler	Consulting Structural Engineer
Ryan Kersting	Buehler
Anne Meltzer	Lehigh University
Danielle Mieler	City of Alameda
Jonathan Stewart	University of California, Los Angeles
Douglas Wiens	Washington University in St. Louis

NIST Management, Staff, and NEHRP Representatives

Joannie Chin	Acting Director, Engineering Laboratory
Jason Averill	Chief, Materials and Structural Systems Division (MSSD)
Judith Mitrani-Reiser	Associate Chief, MSSD
Steven McCabe	NEHRP Director, MSSD
John (Jay) Harris	Acting NEHRP Deputy Director, MSSD
Sissy Nikolaou	Group Leader, Earthquake Engineering Group (EEG), MSSD
Katherine Johnson	Earthquake Risk Mitigation Policy Analyst, EEG, MSSD
Tina Faecke	Designated Federal Officer for ACEHR

NEHRP Representatives from Partner Agencies

Luciana Astiz	National Science Foundation
Jacqueline Meszaros	National Science Foundation
William Blanton	Federal Emergency Management Agency
Michael Mahoney	Federal Emergency Management Agency
Gavin Hayes	United States Geological Survey

Registered Guests

Gregory Beroza	Stanford University
----------------	---------------------

I. Welcome

As Designated Federal Officer (DFO) for the Advisory Committee on Earthquake Hazards Reduction (ACEHR), Ms. Tina Faecke called the meeting to order at 1:00 pm ET, took roll call, and reviewed logistics related to the online meeting.

Committee Chairperson Dr. Glenn Rix reiterated the meeting goals: to discuss draft input provided for the ACEHR biennial report, continue to make progress, and assign additional tasks as needed. He thanked all who contributed to the draft.

II. Public Input Period

Faecke reported that no one from the public registered to speak.

III. ACEHR Biennial Report Discussion

Rix displayed and briefly reviewed the report outline to review progress, content, and the next steps in drafting their report due to the NIST Director by the end of September 2021.

Rix and Committee Vice Chairperson Dr. Lucy Arendt will complete the executive summary and introduction once the report content is developed since these sections will summarize the report and its themes. Other sections of the draft outline were discussed as noted below. Rix noted that the order of these sections may change during development of the draft report.

Assessment of Agency Progress Over the Past Two Years and Anticipated Future Activities

Section 1 - U.S. Government Accountability Office (GAO) NEHRP Assessment

- GAO recently initiated their second round of interviews with each NEHRP agency: NIST, the National Science Foundation (NSF), the Federal Emergency Management Agency (FEMA), and the U.S. Geological Survey (USGS). Each agency responded to verbal questions. NSF received and has responded to a set of written follow-up questions. The other agencies await GAO's follow up. GAO has a December 2021 statutory deadline for completing its NEHRP assessment report.
- The Committee agreed this report should simply acknowledge that these interviews are underway. Faecke noted that once the GAO assessment report is completed, it would be within ACEHR's scope to compare that report with ACEHR's recommendations. The Committee agreed to take that approach.

Section 2 - Interagency Coordinating Committee

There are no dates established for the next Interagency Coordinating Committee meeting, pending completion of the updated strategic plan and the outcome of the Administration's proposed infrastructure bill. ACEHR members agreed that their report should acknowledge recent Interagency Coordinating Committee meeting progress and express the hope that these meetings will continue on a regular basis.

Section 3 – Research Activities

- Disaster Resilience Research Grants (DRRG) program. The Committee agreed to note the strong collaboration between NIST and NSF. Dr. Jacqueline Meszaros noted that there had been an overwhelming response to the DRRG solicitation. Rix and Dr. Ann Bostrom will review the NIST-NSF presentation and extract information to convey the strong interest. The Committee agreed with Dr. Gregory Deierlein’s suggestion to include research activities in addition to the DRRG.
- NSF support for basic research in general (such as the National Hazards Engineering Research Infrastructure)
- NIST Center of Excellence on Resilience.

Section 4 – Effectiveness of ACEHR Meeting Reporting

Rix volunteered to take the lead in drafting the language on the improved collaborative agency reporting focused around the NEHRP Strategic Plan and progress toward goals rather than separate agency activities.

Section 5 - Agency Implementation/Progress to Fulfill their Mission

This section should focus on assessing and providing examples of what the agencies have done. In addition to the list included in the draft report outline, additional agency programs and related issues were identified as follows:

- Expand the “Codes and Standards” list covering new buildings, to include codes and standards for existing buildings, specifically:
 - ASCE 41 design examples FEMA P-2006, [Example Application Guide for ASCE/SEI 41-13 Seismic Evaluation and Retrofit of Existing Buildings](#)
 - [Applied Technology Council \(ATC\)-140 project, Update of Seismic Evaluation and Retrofit of Existing Buildings Guidance](#), developing input for the current ASCE 41 update cycle
 - FEMA P-2082, *Edition and ASCE 7-22*
 - FEMA P-2156, [The Role of the NEHRP Recommended Seismic Provisions in the Development of Nationwide Seismic Building Code Regulations](#)
- Rix emphasized that this section should recognize key activities for each of the agencies. ACEHR members agreed to focus on assessing and providing examples of what the agencies have done.
- Under the earthquake response and recovery bullet, Mr. Ryan Kersting will highlight FEMA P-2055, [Post-disaster Building Safety Evaluation Guidance](#).
- Under the earthquake risk reduction and preparedness bullet, Kersting will highlight the FEMA Building Resilient Infrastructure and Communities (BRIC) program as part of the agency’s hazard mitigation grants efforts.
- Mr. Robert Carey will focus on the section addressing agency implementation, being sure to note agency accomplishments and areas where more attention is needed. These could lead to recommendations.
- Following a suggestion by Mr. Robert Ezelle, the agencies were asked to nominate what they consider as the top two or three things which the Committee could use as a basis for recommendations. Rix welcomed input from the agencies for items which are not on the list.

- Meszaros of NSF asked how the ACEHR report is different from the NEHRP report to Congress. Bostrom suggested the Committee report emphasize the synergy with the other NEHRP agencies (e.g., DRRG) and NSF's role of funding basic research. The NEHRP reports to Congress highlight the broader impacts of NSF's research on society (e.g., Convergence) and the role of the agency's research contributing to hazards mitigation. Committee members agreed with this emphasis.

Section 6 - NEHRP Strategic Plan (may move this section up)

- Dr. Steven McCabe reported that the text of the NEHRP strategic plan should be completed by the middle of the summer for review by the NEHRP agencies. If there is an Interagency Coordinating Committee meeting in August, the agencies will need to come to a consensus by early July so that the draft can be provided in advance of the meeting. After the Interagency Coordination Committee's review and approval, the strategic plan will be sent out for public comments. ACEHR members agreed the draft plan should be disseminated *broadly* for public comment. Ms. Susan Dowty wanted to ensure public transparency for the development of the final strategic plan.
- Dr. Judith Mitrani-Reiser reminded ACEHR of the added efficiencies of managing the statutory programs at NIST. This is particularly true of earthquake combined with building collapse or other hazards.
- Bostrom suggested that ACEHR include a sentence or two on how the agencies have tried to mitigate "brain drain" issues and mention the steps agencies (particularly USGS and FEMA) have taken to address the issue via succession planning. This is also an issue being addressed in the USGS Scientific Earthquake Studies Advisory Committee and GAO reports.

Key Initiatives

The Committee agreed on the three main topics in this section. The Committee reviewed the draft material and agreed to a few additions listed below by section.

Section 1 - Functional Recovery and Community Resilience

- Kersting stressed the importance for the NEHRP agencies to encourage collaboration within the agencies on this topic as well as consistent terminology in their communications, especially with the variety of webinars being offered. It was agreed that establishing common terminology among the agencies is essential. The Committee agreed this issue could be a potential recommendation.
- Deierlein reminded the Committee that social equity aspects of community resilience should be recognized; others among the Committee agreed this issue should be included in the report.
- Mr. Michael Mahoney asked Rix to add the FEMA funded ATC-138 project, *Support of Performance-Based Seismic Design of Buildings*. Material from that project is being used as part of the evaluation process for buildings to determine their level of functionality.

Section 2 – Lifelines

- Carey reviewed activities in and around Utah, including a Cybersecurity and Infrastructure Security Agency (CISA) Regional Resiliency Assessment Program

(RRAP) activity resulting in steps to upgrade water systems to improve functionality post event. Carey will draft text to include these related CISA activities in the report.

- Mahoney reported that FEMA and NIST have separate, but coordinated, lifeline development activities ongoing with the same program manager (Craig Davis). The ATC roadmap, [*Earthquake-Resilient Lifelines: NEHRP Research, Development and Implementation Roadmap*](#) (NIST GCR 14-917-33) initiated these activities.

Section 3 - Earthquake Early Warning (EEW) and Social Science Research

- Rix noted that the length of this draft section may need to be reduced for the report, but applauded the extensive thought.
- Dr. Jonathan Stewart highlighted three key points:
 - Great progress has been made in EEW systems since 2019, particularly in the northwest part of the country.
 - EEW can be beneficial, depending on earthquake proximity to populations.
 - Much research has gone into developing the technology and trying to get it to work effectively, but there is a lack of research in how end users apply that information (e.g., stopping elevators and trains). There are many opportunities here, including public education.
- Dr. Douglas Wiens noted the value of improvements in ocean sensors and new technologies (e.g., artificial intelligence) which would offer more time to act on early warnings for offshore earthquakes.

Emerging Topics and Issues

These areas are not quite as mature as those covered in the previous section, but they are important, have the potential to advance the field, and should be brought to the attention of the agencies.

Section 1 - Multihazard approaches

- a. *Existing and new buildings and infrastructure.* The Committee reviewed the draft outline and text and decided to make minor adjustments so that the following points would be made with minimal text to elaborate:
 - Retrofits and upgrades to existing buildings holistically (energy upgrades, flood, wildfire, hurricane, seismic retrofits). Need to consider affordability and preventing displacement, not just thinking about seismic retrofits in a vacuum. Consider rehabilitation or retrofit of historical buildings as an example of a complicating factor.
 - Potentially expanding work on functional recovery for earthquakes to address other hazards.
 - Recognizing that designers need quantifiable information about future hazards resulting from climate change to design new buildings effectively.
 - Striking a delicate balance between sustainable design/upgrades and mitigating seismic vulnerabilities or even functional recovery. This includes the concepts of retreat versus recovery.
 - Social equity issues related to multihazard approaches.

- b. *Learning from the pandemic.* Dr. Anne Meltzer explained the items listed under this subsection are issues affecting earthquake preparedness. The Committee may want to move a summary of this topic to the report introduction. ACEHR agreed to include the drafted text with one expansion. Carey mentioned the difficulty of obtaining access to a private citizen's home during the pandemic for post-earthquake inspections.
- c. *Secondary hazards of earthquakes.* Meltzer noted that a key point in the area is that planners should consider secondary impacts. There were no other comments for this subsection.
- d. *Synergies with planning for other hazards.* Rix removed "landslides" from this topic to focus on wildfires, floods, and hurricanes and clarify that these hazards are separate versus secondary hazards.

Section 2 - Climate change

This section may require some consideration of whether to include some of them in other report sections to eliminate duplication.

- Ms. Danielle Mieler agreed to move the multihazard list from this subsection to the previous subsection on "Multihazard approaches".
- The issue of the effects of groundwater changes on earthquake risk was added.
- The Committee discussed how efforts to mitigate climate change may have an effect on the built environment and how that will affect earthquake risks. Examples include: changes to power, gas, and other energy distribution systems; the effect of changes in land use (e.g., retreating from coastal areas) on liquefaction and tsunami risk; and the effects of battery and energy storage technologies. Members agreed to include this point in the report.

Section 3 - Data-driven models, new data sources, machine learning, new sensing technology

There were no additional comments for this subsection.

Recommendations

Carey included some draft recommendations for consideration. Rix stated the Committee will discuss recommendations at length once the report content is developed. He noted that it would be premature to consider recommendations at this point.

Appendices may be used to cover topic details included in the main body of the document.

Appendices

The Committee agreed to table discussion of the appendices until the August meeting since considering some of the material currently in the main body of the report may be moved to the appendix. Members then will have a better sense of what should be included in the appendices.

Rix noted that the draft document includes raw material on additional topics that were identified, along with an accumulation of references. He clarified that appendices and references would not count toward the 10-page report goal.

IV. Closing Remarks

Faecke reported the next ACEHR meeting is August 10, 2021, from 1-4 EDT, which is the final meeting before the report is due. The focus for the Committee members between now and June 30 is to convert bulleted topics within the main body of the outline into paragraphs. Rix and Arendt will work with the draft paragraphs to develop a completed draft report for individual members to review prior to the August 10th meeting.

Rix will update the draft outline based on today discussions. Faecke will distribute the revised draft outline to all members, who will expand their bullet points within the main body (not the appendices) and then email those revised sections to Faecke with a copy to Rix and Arendt by June 30.

V. Adjournment

The meeting was adjourned at 3:58 pm EDT.