

**U.S. HOUSE OF REPRESENTATIVES
COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY
SUBCOMMITTEE ON RESEARCH AND TECHNOLOGY**

HEARING CHARTER

A Review of the National Earthquake Hazards Reduction Program

**Tuesday, July 29, 2014
10:00 a.m. – 12:00 p.m.
2318 Rayburn House Office Building**

Purpose

On Tuesday, July 29, 2014 the Subcommittee on Research and Technology of the Committee on Science, Space, and Technology will hold a hearing to examine strengths, weaknesses, challenges, and accomplishments of the National Earthquake Hazards Reduction Program (NEHRP). NEHRP is a cross-agency effort to reduce the long-term risks from earthquakes.

Witnesses

Panel I:

- **Dr. John R. Hayes, Jr.**, Director, National Earthquake Hazards Reduction Program, National Institute of Standards and Technology (NIST)
- **Dr. Pramod P. Khargonekar**, Assistant Director, Directorate of Engineering, National Science Foundation (NSF)
- **Dr. David Applegate**, Associate Director for Natural Hazards, U.S. Geological Survey (USGS)
- **Mr. Roy E. Wright**, Deputy Associate Administrator for Mitigation, Federal Emergency Management Agency (FEMA)

Panel II:

- **Dr. Julio A. Ramirez**, Professor of Civil Engineering, NEES Chief Officer and NEEScomm Center Director, George E. Brown Jr., Network for Earthquake Engineering Simulation (NEES), Purdue University
- **Dr. William U. Savage**, Consulting Seismologist, William Savage Consulting, LLC
- **Mr. Jonathon Monken**, Director and Homeland Security Advisor, Illinois Emergency Management Agency
- **Dr. Andrew S. Whittaker**, Professor and Chair, Director MCEER; Department of Civil, Structural and Environmental Engineering, University at Buffalo, State University of New York

Hearing Overview

Every state has the potential for earthquakes, but “42 of the 50 states have a reasonable chance of experiencing damaging ground shaking from an earthquake in 50 years (the typical lifetime of a building).”¹ Researchers have found that 16 states, which have historically experienced earthquakes with a seismic magnitude of 6 or greater (a “strong” earthquake) on the Richter scale, have a relatively high likelihood of experiencing damage.

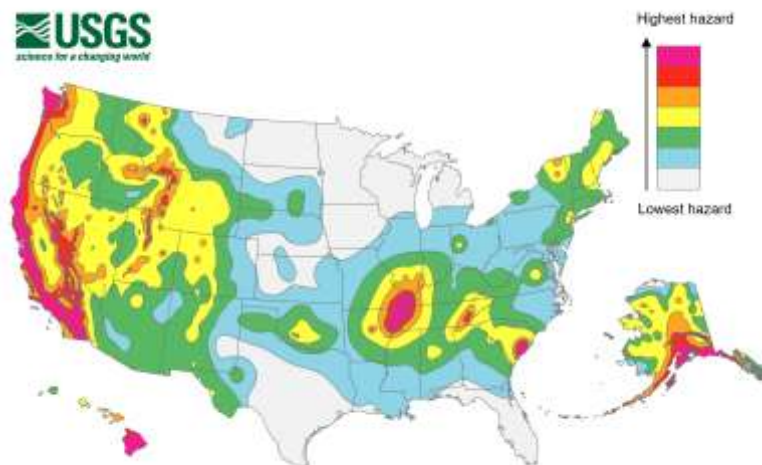
Earthquakes are unique among natural hazards in that they strike without warning compared to hurricanes, tornados, and other storms. Earthquakes proceed as cascades, in which the primary effects of the earth’s faulting and ground shaking induce secondary effects such as landslides, liquefaction, and tsunami—which set off destructive processes with manmade structures and the local populace. The death and destruction from strong, major, and great earthquakes (ranging from 6 to 9+ on the Richter scale) can reverberate for decades.

Update of the United States National Seismic Hazards Maps²

Earlier this month the USGS updated the U.S. National Seismic Hazard Maps. These maps reflect the current understanding of where earthquakes will occur in the future, how often they will occur, and their severity. Portions of all 50 states are vulnerable to earthquake hazards, although risks vary across the country and within individual states. The hazard is especially high along the west coast, intermountain west, and in several active regions of the central and eastern U.S., such as near New Madrid, MO, and Charleston, SC.

The USGS offers seismicity maps and historical data that can be viewed by region and state at the following sites:

- <http://earthquake.usgs.gov/earthquakes/states/seismicity/>
- <http://earthquake.usgs.gov/earthquakes/region.php>



¹ http://www.usgs.gov/blogs/features/usgs_top_story/new-insight-on-the-nations-earthquake-hazards/

² http://www.usgs.gov/blogs/features/usgs_top_story/new-insight-on-the-nations-earthquake-hazards/ and <http://pubs.usgs.gov/of/2014/1091/>

The National Earthquake Hazards Reduction Program (NEHRP)

In 1977, Congress passed the Earthquake Hazards Reduction Act (P.L. 95-124) establishing NEHRP as a long-term earthquake risk reduction program for the United States. The original program focused on research to understand and predict earthquakes. NEHRP's focus was changed in 1990, when Congress decreased the emphasis on earthquake prediction, expanded the program objectives, and required federal agencies to adopt seismic safety standards.

Currently, four federal agencies have responsibility for long-term earthquake risk reduction under the NEHRP program: NIST, FEMA, NSF, and USGS. Program activities are focused on four broad areas: supporting the development of effective earthquake hazard reduction measures; promoting the adoption of these measures by federal, state, and local governments; improving the basic understanding of earthquakes and their effects on people and infrastructure; and developing and maintaining the Advanced National Seismic System (ANSS), the George E. Brown Jr. Network for Earthquake Engineering and Simulation (NEES), and the Global Seismic Network (GSN).

An Interagency Coordinating Committee on Earthquake Hazards Reduction is responsible for the strategic planning, management, and coordination of NEHRP. Each agency's primary responsibilities within NEHRP are as follows:

- **NIST** is the lead NEHRP agency and has responsibility for the planning and coordination of the program. NIST also promotes earthquake resistant design and construction practices through building codes, standards, and construction practices.
- **FEMA** assists other agencies and private-sector groups to prepare and develop earthquake risk modeling tools, and aids the development of performance-based codes for buildings and other structures.
- **NSF** supports basic research to improve the safety and performance of buildings and structures using the research facilities of NEES and other institutions engaged in earth sciences, engineering, and social sciences relevant to understanding the causes and impacts of earthquakes.
- **USGS** conducts research to assess the causes and effects of earthquakes, produces national and regional seismic hazards maps, and monitors and rapidly reports on earthquakes and their shaking intensities in the U.S. and abroad. The USGS maintains the ANSS and the GSN.

National Earthquake Hazards Reduction Program (NEHRP) Funding (dollars in millions)

Agency	FY09 Authorized*	FY09 Enacted	FY10 Enacted	FY11 Enacted	FY12 Enacted	FY13 Enacted	FY13 Enacted	FY15 Request
<i>NIST</i>	14.6	4.1	4.1	4.1	4.1	3.9	3.9	3.9
<i>NSF</i>	64.7	56.0	55	55.3	53.2	52.2	51	52.2
<i>USGS</i>	88.9	61.2	62.8	61.4	59	55.6	58.7	59
<i>FEMA</i>	23.6	9.1	9.0	7.8	7.8	7.8	7.8	7.8
Total:	191.8	130.4	130.9	128.6	124.1	119.5	121.4	122.9

The last year to provide an authorization for NEHRP was fiscal year 2009. The House passed reauthorization legislation (H.R. 3820) in the 111th Congress, but the bill was not considered by the Senate. In the 112th Congress, the Committee on Science, Space, and Technology favorably reported reauthorization legislation (H.R. 3479).

The National Research Council's "National Earthquake Resilience" Report³

In 2011, the National Research Council released a report titled "National Earthquake Resilience: Research, Implementation, and Outreach." The report defined earthquake resilience to "encompass both pre-and post-disaster actions that, in combination, will enhance the robustness and the capabilities of all earthquake vulnerable regions of our nation to function adequately following damaging earthquakes."⁴

The report identified 18 tasks ranging from basic research to community-oriented applications to make up a roadmap of goals for NEHRP. Tasks range from conducting additional research on the physics of the earthquake process to conducting collaborative research on earthquake resilient lifeline systems. The report recommended the immediate initiation of these tasks, based on availability of funds. The report further concluded that while the four NEHRP agencies comprise the core for earthquake research, they only constitute a portion of the overall national research enterprise. Other agencies also operate facilities and support research that contributes to NEHRP goals. State and local governments and the private sector play a critical role in the implementation of NEHRP information. "NEHRP will have accomplished its fundamental purpose – an earthquake-resilient nation – when those responsible for earthquake risk and for managing the consequences of earthquake events use the knowledge and services created by NEHRP and other related endeavors to make our communities more earthquake resilient."⁵

³ National Research Council, *National Earthquake Resilience: Research, Implementation, and Outreach*. National Academy of Sciences, 2011. <http://www.nehrp.gov/pdf/nrc2011.pdf>

⁴ Ibid, p. 2-3.

⁵ Ibid. p. 189.