

**Advisory Committee on Earthquake Hazards Reduction**  
**National Earthquake Hazards Reduction Program**

December 22, 2010

The Honorable Patrick D. Gallagher  
Director  
National Institute of Standards and Technology  
Building 101, Room A1134  
100 Bureau Drive  
Gaithersburg, MD 20899-1000

Reference: ACEHR Bicentennial Statement Related to the  
200<sup>th</sup> Anniversary of the New Madrid Earthquakes

Dear Dr. Gallagher:


At our fall Advisory Committee on Earthquake Hazards Reduction (ACEHR) meeting in Memphis, Tennessee we dedicated a day to understanding the seismic hazard in the New Madrid region and how it is being addressed by that community. We learned that there are a number of issues that deserve the continuing attention of the National Earthquake Hazards Reduction Program (NEHRP) agencies and have summarized our findings and recommendations in the enclosed bicentennial statement.

We hope that you and the NEHRP Interagency Coordinating Committee (ICC) find these recommendations compelling and will incorporate them into the ongoing activities of the Program. Further, we believe that these recommendations will be useful to those working to achieve earthquake resilience and request that they be shared broadly with that region and beyond.

We appreciate your support for NEHRP and your leadership of the ICC. I would like to have the opportunity to represent ACEHR at the next ICC meeting, and to participate in the discussions related to our 2010 Annual Report on the Effectiveness of NEHRP and this bicentennial statement. Please contact me if you have any questions or comments.

Sincerely,

Signed by Chris D. Poland



Chris D. Poland, SE, NAE  
Chair  
Advisory Committee on Earthquake Hazards Reduction  
National Earthquake Hazards Reduction Program

Enclosure

cc: Charles H. Romine



## **National Earthquake Hazards Reduction Program (NEHRP) Bicentennial Statement**

*Offered for the Kickoff of the  
200<sup>th</sup> Anniversary of the New Madrid Earthquakes  
February 11, 2011  
by the NEHRP Advisory Committee on Earthquake Hazards Reduction (ACEHR)*

Major earthquakes have occurred in the past—and will continue to do so in the future—not only in the western but also in the central and eastern United States. Two hundred years ago, some of the nation’s largest historical earthquakes occurred in the New Madrid seismic region, which affects portions of Arkansas, Illinois, Indiana, Kentucky, Mississippi, Missouri, and Tennessee. The expected size and frequency of earthquakes throughout the United States, including the New Madrid region, have been assessed in a formal way using the results of comprehensive earth science studies, and this information forms the basis for risk mitigation and preparedness activities.

The National Earthquake Hazards Reduction Program (NEHRP) was enacted by the Congress of the United States in 1977 to coordinate earthquake programs for preparedness, mitigation, response, and recovery. In the subsequent 33 years, significant investments have been made through NEHRP in earth science and earthquake engineering, resulting in building codes and technologies that can prepare and protect us from future earthquakes. The NEHRP Advisory Committee on Earthquake Hazards Reduction (ACEHR) congratulates those who have advocated for creating earthquake resilience in the New Madrid region. In addition to the continuation of earthquake-related monitoring and research in this region, the Committee recommends the following:

1. Use the bicentennial to spark collaborations and inaugurate new programs that engage the public agencies and private entities responsible for seismic safety in the New Madrid region.

There is clear geologic evidence for the recurrence of large and damaging earthquakes in this region every few hundred years, which makes this a region of high seismic hazard that demands our attention. The bicentennial is a singular opportunity to draw the attention of policy makers, scientists, engineers, and the general public to the need to increase preparedness for the next large earthquake in the region. Disasters do not discriminate and will affect all aspects of society, the economy, the environment, and infrastructure. Addressing the challenges of earthquakes requires an open and honest exchange of information combined with collaboration among all stakeholders. Dedicating ourselves to doing what is necessary to identify risks, save lives, minimize losses, and protect the best interests of the communities in which we live is a responsibility that must be shared and addressed in a nonpartisan, factual, and collaborative manner.

At the November 9, 2010 ACEHR meeting, concerns were expressed by members of the Memphis engineering community and representatives of the Kentucky Geological Survey about the high levels of hazard embodied in U.S. Geological Survey (USGS) maps for the New Madrid region and the potential design and construction costs associated with design-level earthquake ground motions. ACEHR acknowledges the local community concerns, and assigns a high priority to addressing the issues raised about the high hazard levels and attendant costs. It appears that the effects of New Madrid hazards on structural design and associated construction costs are not clearly understood by many design professionals. ACEHR therefore encourages educational programs, including workshops on current and forthcoming building codes, with an emphasis on their implications for the New Madrid area.

2. Develop a plan to achieve earthquake resilience.

Earthquake resilience starts at the local level, with individuals, families, businesses, and earthquake program managers working together. Many of the tools and procedures needed to create disaster-resilient communities exist and are continually being refined. Achieving resilience, however, requires a new, more collaborative approach than currently exists. Adoption and implementation of current building codes, alignment of diverse lifeline systems around common performance objectives, and strong community support for adopting policies that foster resilience are needed.

3. Base resilience plans on a clear and defensible statement of current risk and targeted resilience goals, with broad scientific and engineering professional acceptance.

The New Madrid region has a high seismic risk because of the known potential for large earthquakes combined with the many high-occupancy, collapse-prone buildings in areas vulnerable to strong ground shaking. The appropriate level of potential earthquake shaking has been debated among earth scientists, and the most appropriate minimum design standard has been debated among engineers, and some differences of opinion exist. However, there is broad scientific consensus among earthquake professionals that large-magnitude earthquakes have occurred and will continue to occur in this region and that they could produce significant damage. The NEHRP Advisory Committee recommends that the NEHRP agencies engage other earthquake professionals in making a clear and defensible statement of current seismic risk and goals for reducing that risk in the New

Madrid region. In addition, it will be advantageous to examine the high hazard levels in USGS maps via an independent review for the New Madrid area and explore ways to improve communication of the hazards and their effects on structural design.

4. Adopt the latest model building codes and standards as a fundamental step toward achieving resilience in the building stock.

For decades NEHRP has been a valuable resource for introducing new construction techniques and innovative design methods to improve the resistance of buildings to earthquakes. The most effective way to transfer that considerable, accumulated knowledge into broad practical application is through adoption of the model building codes and national standards. Hundreds of national experts assist in developing these codes and standards, and literally thousands of others review them, ensuring that they include the best information for prudent design, construction, and rehabilitation of the building stock. The latest editions of the most widely adopted building codes and standards (2009 IBC and ASCE/SEI 7-10) represent the most efficient and cost-effective safety regulations available for new buildings; ASCE/SEI 31-03 and ASCE/SEI 41-06 provide the same for existing buildings.

The new national seismic hazard design value maps found in ASCE/SEI 7-10 are recommended for use in the New Madrid seismic zone. The previous national design value maps have specified a design value based upon the level of ground motion at one level of probability, which is only a first-order approximation of the risk presented by the seismic hazard at a location. The new, risk-targeted design maps are a closer measure of the anticipated risk. One result of these risk-targeted maps is that the design values are reduced from those shown on the previous editions of the national design value maps in the mid-Mississippi Valley.

5. Base disaster preparedness plans on both likely and worst-case earthquake scenarios.

While there is the possibility of a recurrence of the 1811–12 sequence of earthquakes for which some disaster planning would be prudent, disaster preparedness should focus on more likely moderate to large earthquakes that are expected to occur in the next several decades, a period when most currently occupied structures will be in use. The inventory of vulnerable structures, constructed with inadequate consideration of earthquake effects, is immense and includes many hospitals, schools, armories, commercial and residential structures, and lifelines. Disaster planning should include community preparedness, government coordination, and participation of the private and nonprofit sectors in building the capacity to respond to and recover from a disaster. States should enhance their mutual aid systems to move local resources to communities in need. Local governments should partner with community service organizations and faith sectors to provide vital services for vulnerable populations.

6. Participate in national efforts to demonstrate cost-effective implementation of the latest building codes.

The National Institute of Standards and Technology is undertaking a cost-benefit analysis of codes and standards for earthquake-resistant construction in the Midwest. The NEHRP Advisory Committee endorses this study and recommends that it be undertaken with strong input from local practicing engineers.

7. Motivate owners, architects, engineers, and contractors to recognize that enforcement of building codes, including special inspections where required, is essential to achieving the performance objectives of the codes.

Business and facility owners expect their investment in buildings, inventory, and human capital to be protected from the damaging effects of an earthquake if their facilities meet local building codes. This requires not only adoption of the latest building codes, but also code enforcement, peer reviews on special projects, and implementation of appropriate quality control programs.

Even though ACEHR recommends adoption of the current earthquake standards, it is also recommended that a dialogue be established among community members on what constitutes acceptable levels of risk and appropriate technologies for reducing risk in new and existing buildings and infrastructure in the Midwest. Further, ACEHR urges earthquake professionals nationwide to cooperate, collaborate, determine the best path toward mitigation, and speak with a common voice before all levels of government and private industry. ACEHR strongly supports all of the excellent New Madrid bicentennial activities that are being undertaken to protect the public and communities from earthquakes.

