April 25, 2015

Honorable Jay Nixon  
Governor  
State of Missouri

MSSC 2014 Report on the State of Missouri’s Earthquake Preparedness For Major Earthquakes

Dear Governor Nixon:

In 1993, the Missouri Seismic Safety Commission (MSSC) was established consisting of 17 members, 15 appointed professionals from architecture, planning, fire protection, public utilities, electrical engineering, mechanical engineering, structural engineering, soils engineering, geology, seismology, local government, insurance, business, the American Red Cross and emergency management, one Missouri House appointed member and one Missouri Senate appointed member to work with various levels of government to help Missourians take steps to prepare for and reduce the effects of an earthquake. The mission of the MSSC is to review Missouri’s current preparedness for major earthquakes and to make recommendations to mitigate their impact. This report summarizes the activities conducted by Commission’s Members during 2014 in executing that mission.

Missouri Seismic Safety Commissioners volunteer to serve until replaced by newly appointed representatives. The following is a list of currently serving commissioners and highlights positions with vacant appointments that need to be made:

<table>
<thead>
<tr>
<th>Representing</th>
<th>Name</th>
<th>Term Ends</th>
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</thead>
<tbody>
<tr>
<td>Architecture</td>
<td>Mr. Art Bond, AIA, NCARB</td>
<td>Term Expires July 1, 2010</td>
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<tr>
<td>Electrical Engineering</td>
<td>Dr. Philip Gould, PE</td>
<td>Term Expires July 1, 2012</td>
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<tr>
<td>Fire Protection</td>
<td>Mr. John Mallot</td>
<td>Term Expires July 1, 2012</td>
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<tr>
<td>Insurance</td>
<td>Mr. Miles “Joe” Green</td>
<td>Term Expires July 1, 2012</td>
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<tr>
<td>Local Government</td>
<td>Mr. Joel P. Evans</td>
<td>Term Expires July 1, 2012</td>
</tr>
<tr>
<td>Public Utilities</td>
<td>Mr. Donald W. Shaw, PE</td>
<td>Term Expires July 1, 2012</td>
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<tr>
<td>Seismology</td>
<td>Dr. Eric Sandvol</td>
<td>Term Expires July 1, 2012</td>
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<tr>
<td>Soils Engineering</td>
<td>Dr. Raymond Bailey, RG, PE</td>
<td>Term Expires July 1, 2010</td>
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<tr>
<td>Structural Engineering</td>
<td>Mr. James D. Palmer, PE, SE</td>
<td>Term Expires July 1, 2010</td>
</tr>
<tr>
<td>Planning</td>
<td>Dr. Greg Hempen, PE, RG</td>
<td>Term Expires July 1, 2010</td>
</tr>
</tbody>
</table>

Commission Officers:
Chairman – Dr. Eric Sandvol, Columbia  
Vice-Chairman – Joel Evans, Sikeston  
Secretary – John Mallott, Kennett

Commission Website:  
http://mssc.missouri.edu/
The State of Missouri has taken important steps to prepare for and reduce the effects of a major earthquake as reflected in the Strategic Plan for Earthquake Safety in Missouri, first published by the MSSC in 2007. The report presented below summarizes the activities of the commission during 2014 in the continued implementation and support of this plan and highlights the current preparedness efforts to mitigate the effects of a major earthquake.

Past earthquakes have caused great damage in the central region of the United States, and there is broad agreement in the scientific community that there is a continuing concern for a major earthquake that would put structures and communities in Saint Louis and southeast Missouri vulnerable to damage from severe ground shaking. The fall SEMA Newsletter reported that "New National Seismic Hazard Maps Show Missouri is Still Vulnerable to Damaging Earthquakes." USGS updated seismic hazard map below shows this vulnerability.
The earthquake threat to Missouri cannot be ignored. The Strategic Plan for Earthquakes in Missouri developed tangible, practical recommendations and procedures to prepare Missouri for future earthquakes as well as other hazards, such as tornadoes and strong storms, at the same time. This consisted of Five Objectives with specific implementation strategies. MSSC commissioners met once each quarter to evaluate current progress in achieving the goals as indicated below.

Objective 1: Increase Earthquake Awareness and Education

Strategy 1.1 - Promote Awareness among the general public.
- Participated and supported the 20th annual "Earthquakes: Mean Business" seminar at St. Louis University in February. Participation included the assistance of some members in planning the event, as well as having an exhibit booth and speakers at the event.
- Participated in an earthquake awareness day on February 16th at the West Park Mall in Cape Girardeau.
- Commissioners participated in earthquake awareness day at the Saint Louis Science Center.
- Commissioners were available for news interviews promoting the Great Central U.S. ShakeOuts in February and October and the need for earthquake preparedness.
- Toured new earthquake exhibit in May at New Madrid Historical Museum.
- Maintained the MSSC website (http://mssc.missouri.edu/) providing Missourians access to earthquake information.
- Participated and helped with the Forces of Nature event at the Rockbridge Planetarium on November 9, 2013.

Strategy 1.2 - Promote Awareness among key professionals in critical fields.
- Commissioner spoke to attendees at the Society of American Military Engineers & at The Infrastructure Security Partnership conference in February in St. Louis.
- Commissioners assisted with an MSSC exhibit booth and helped with a presentation at the MO Association of School Administrations/MO School Boards Association conference in October at Lake of the Ozarks.
- Commissioners participated in an October meeting in Poplar Bluff with Three Rivers College officials, designed to encourage the college to be more involved in local earthquake awareness efforts, including the 2014 Great Central U.S. ShakeOut.

Strategy 1.3 - Promote Awareness among K-12 students.
- Visited schools for earthquake presentations and to participate in drills associated with the Great Central U.S. Shakeout in February and March.
- Sponsored the annual Show-Me ShakeOut poster contest for Missouri students in grades 3-5. This included setting up and promoting the contest, judging all entries, and presenting awards at schools. Three St. Francis Xavier students won the earthquake poster contest.
- Sponsored exhibit booth with earthquake awareness information at SEMO District Fair in Cape Girardeau in September.
- The MU Geology club combined with a Commissioner ran a short activity to help Boy Scouts and 4-H students understand how and why earthquakes happen.
Objective 2: Reduce Earthquake Hazard Through Mitigation

Strategy 2.1 - Promote adoption/enforcement of technically sound & feasible Bldg codes.
- Monitored and offered input for support of Missouri House Bill 161 and Senate Bill 24, which allowed for the establishment of local building standards.

Strategy 2.2 – Identify existing essential facilities and schools susceptible to EQ damage.
- Sponsored a pilot study using volunteers and rapid visualization screening that reported on the vulnerability of school facilities to failure in a seismic or high wind event. The study identified the vulnerability of a majority of the older school facilities in southeastern region of Missouri, noted inexpensive corrections that should reduce school children’s and staff person’s morbidity and mortality from future earthquakes, and recommended that the school districts in the 46 counties and City of Saint Louis that are considered to be “at risk” from a major earthquake request an enhanced Rapid Visual Assessment (RVA) screening under the auspices of MSSC using volunteer professionals provided by professional societies or contract for an evaluation by a qualified engineer.
- MSSC planned pilot school assessment project was presented at the 2013 Earthquake Engineering Research Institute (EERI) Schools Committee program.
- A Commissioner co-hosted the 2014 EERI Program Seismic Safety of Schools Committee’s round table panel discussion.

Objective 3: Improve Emergency Response

Strategy 3.2 – Promote Community Emergency Response Teams (CERTs) statewide.
- A grant, endorsed by the MSSC, from the Green Foundation allowed a Commissioner to provide training and material to four central Missouri counties for a grassroots, all-hazards, preparedness and response program (Map Your Neighborhood). Those four rural counties (Audrain, Cole, Montgomery & Osage Counties) will have some ability to be better prepared for the next local disaster.

Objective 4: Improve Recovery

Strategy 4.3 – Promote funding and training of post earthquake bldg inspection vol.
- MSSC recommended that the Governor support legislation that would provide funds for SEMA to support travel expenses for volunteers and support staff to coordinate the assignment of teams to conduct Rapid Visual Assessment (RVA) screening evaluations and training for team leaders.

Objective 5: Assess Earthquake Hazards

Strategy 5.4 – Support earthquake-hazard studies.
- Commissioners participated on the Saint Louis Area Earthquake Hazards Mapping Project working group to develop earthquake hazards maps of the Saint Louis area. Hazard maps of the Saint Louis area are scheduled for public release in 2014.
- MSSC submitted a letter supporting funding the Division of Geology and Land Survey’s 2014 National Earthquake Hazards Reduction Program (NEHERP) Proposal. Projects in the proposal would better define liquefaction risk in Missouri. Liquefaction is considered to be a major potential source of damage in southeastern Missouri, and the projects would produce a refined definition of the liquefaction hazard. This data would be incorporated into emergency planning, potentially reducing losses due to liquefaction during a major earthquake.
Major earthquakes are rare, but can affect a large geographical area, challenging the state resources to respond. The lessons learned from past U.S. earthquakes have demonstrated the significant burden placed on surviving families, businesses, utilities and state agencies. Preparation now will yield significant reductions in fatalities, casualties, damaged structures, business failures, and state infrastructure losses from earthquakes. The same actions will also reduce the impact of other natural hazards. The MSSC will endeavor to continue making progress towards achieving the objectives presented in the Strategic Plan for Earthquake Safety during the next twelve months.

Respectfully submitted,

Eric Sandvol, Ph.D.
2015 Chairman, Missouri Seismic Safety Commission

Ray Bailey,
2014 Chairman, Missouri Seismic Safety Commission