National Forum for Seismic Safety Commissions

December 4 and 5, 2024

Notes

Contents

Who Participated in the National Forum?

Forum participants included representatives from:

- *Alaska Seismic Hazards Safety Commission*
- *Arkansas Governor's Earthquake Advisory Council*
- *Arizona Council on Earthquake Safety*
- *California Seismic Safety Commission*
- *Colorado Earthquake Hazard Mitigation Council*
- *Missouri Seismic Safety Commission*
- *Montana Earthquake Working Group*
- *Oregon Seismic Safety Policy Advisory Commission*
- *West Tennessee Seismic Safety Commission*
- *Utah Seismic Safety Commission*
- *Washington Seismic Safety Subcommittee*
- *Supporting agencies and organizations, including:*
    - *Cascadia Region Earthquake Workgroup (CREW) – CREW.org*
    - *Central U.S. Earthquake Consortium (CUSEC) – CUSEC.org*
    - *Federal Emergency Management Agency (FEMA); National Earthquake Hazards Reduction Program (NEHRP)*
- *States/territories that don't yet have a seismic safety commission but are interested in starting one*

DAY 1 – December 4

Welcome & Introductions

The forum facilitator for Day 1 (Kyra Nourse, Project Coordinator for CREW) welcomed participants and acknowledged FEMA-National Earthquake Hazards Reduction Program (NEHRP) as the source of the grants that made it possible for CREW and CUSEC to host the forum.

Pascal Schuback, Executive Director of CREW (crew.org):

- Welcomed attendees
- Introduced CREW and briefly explained CREW's role as the western-region consortium under FEMA-NEHRP.
- Expressed the hope that the forum would provide an opportunity for sharing, constructive dialogue, and collaboration among the seismic safety commissions.

Brian Blake, Executive Director of CUSEC (cusec.org):

- Welcomed attendees
- Introduced CUSEC and briefly explained CUSEC's role as the eastern-region consortium under FEMA-NEHRP.
- Highlighted the forum as an opportunity to learn about the activities and programs of the seismic safety commissions in other states and regions.
- Observed that the last time a national meeting of state seismic safety commissions took place was 20 years ago (in 2004 at the National Earthquake Conference).
- Expressed the hope that this week's virtual forum might be the start of similar future opportunities for the commissions to meet, learn about one another's programs, and share best practices.

Presentation – *Alaska Seismic Hazards Safety Commission, Barrett Salisbury*

Barrett Salisbury is Earthquake and Tsunami Hazard Program Manager at the Alaska Division of Geological and Geophysical Surveys (which is part of the Department of Natural Resources). He is also the current chair of the Alaska Seismic Hazards Safety Commission.

About the commission:

- Began in 2002 with Alaska House Bill 53 (passed by the 22nd Alaska legislature and signed into law by Governor Knowles, effective September 29th, 2002 – a few months before the M7.9 Denali Earthquake in central Alaska); this established the commission with nine members in the office of the governor.

- 2003: Governor Murkowski issued an executive order transferring the commission to the Department of Natural Resources.
- 2005: the first nine members were appointed to the commission; first meeting: Oct. 28th.
- 2006: House Bill 83 added two additional local government positions, for a total of 11 seats on the commission. That stands today.
- Initial sunset date of the original commission = 2012; it has been extended multiple times.
- In summary: the commission has 11 members; commissioners are appointed by the governor. Members serve three-year terms, with the option for reappointment. Commission seats are specific; for example:
    - Three local government seats from seismically active areas – effectively anywhere in Alaska. (Currently have a representative from Valdez and Palmer, and one vacancy.)
    - Seats for:
        - Department of Military and Veterans Affairs (currently filled by state Department of Homeland Security and Emergency Management).
        - Insurance industry representative (currently vacant).
        - Federal agency. (Since the beginning of the commission, held by a representative from US Coast Guard).
        - Three public and restricted seats, reserved for experts in geology, seismology, hydrology, geotechnical or structural engineering, or emergency management. (Currently have two engineers and one vacancy.)
        - University of Alaska system (one seat) – recently vacated, so looking now for a new U of A representative).
        - Department of Natural Resources, Division of Geological and Geophysical Surveys.
- The Department of Natural Resources is charged with providing staff to support the commission; covers administration and budget, a little help with travel, and website maintenance.
- Commissioners by statute serve without compensation, but are entitled to per diem and travel expenses for commission meetings.

Powers & duties:

The commission's powers and duties are outlined in a separate state statute; they include:

- Recommend goals and priorities for seismic hazard mitigation to the public and private sectors.
- Recommend policies to the governor and legislature, including research programs, mapping and monitoring programs.
- Offer advice on coordinating disaster preparedness and hazard mitigation.
- Gather, analyze, disseminate information of general interest on seismic hazards.
- Establish and maintain working relationships with other public and private agencies.

- Review predictions and warnings issued by the federal government or other institutions (not common anymore).
- Review seismic hazard notifications.
- Recommend that the governor issue notifications if appropriate. (The commission has never done that.)

The commission may:

- Advise the governor and legislature on items related to budgets.
- Conduct public hearings.
- Appoint committees from its membership or external advisory committees.
- Accept grants and contributions.

Regular operations:

- Run by a chair and a vice chair, elected by commission members annually (can be reelected to serve as chair or vice chair for up to three years).
- Meets at least six times per year – twice in person. Most of the budget goes to the two in-person meetings: i.e., a $10,000 per year budget for travel (that is a governor's earmark on a portion of the Division of Geological and Geophysical Surveys' general fund, so it's not a separate appropriation).
- By the commission's own rules, the commission reports annually to the governor and legislature on notable seismicity, major issues, the commission's recommendations and any problems.
- As needed, the commission issues policy recommendations.
- The commission undergoes periodic, extensive legislative audits (the last one was 4-5 years ago). The commission is in the middle of its "sunset" window and has about 4.5 years until the next legislative audit.

Work, accomplishments, and current focus:

- See the website seismic.alaska.gov for:
    - Accomplishments
    - DNR-required notifications for meeting announcements, minutes, and agendas.
    - Policy recommendations
- Focus since 2018: a magnitude 7.1 earthquake that occurred in Alaska's densest population center, so the commission's current focus is on building code adoption and enforcement; also on getting a better handle on critical infrastructure in Alaska in order to make sure it's resilient. Currently working with Alaska Department of Homeland Security and Emergency Management to utilize NEHRP-ISEA (individual state earthquake assistance grant funding) to explore building code adoption and enforcement issues.

Long-term activity:

- Starting in 2010, the commission focused on school facilities and identifying at-risk schools with rapid visual screening, recommended that funding be allocated for seismic risk mitigation.
- 2011: some groundwork for basic seismic safety, including development of an earthquake research program; earthquake engineering licenses for PE licensure, and identifying and prioritizing vulnerable buildings.
- Due to severity of potential impacts on Alaska from a Pacific Northwest earthquake, another focus is response policy recommendations and developing a post-earthquake technical clearinghouse.
- 2013: again focused on school facilities.
- 2014: it was suggested that the Division of Geological and Geophysical Surveys develop/update a field investigation guide for earthquake response.
- 2015 – mostly reiterations [see presentation PowerPoint slide].
- 2020, in response to November 30th earthquake: resilient critical infrastructure and improving building code adoption and enforcement.

Issues and challenges:

- Alaska has many small population centers with limited resources distributed throughout a huge area with very high seismic hazard. Even in dense population centers (e.g., Anchorage), Alaska has a patchwork of code adoption and enforcement. Attempts to consolidate code adoption and enforcement under one roof have failed; it's distributed between the Fire Marshal, Dept. of Labor, and Alaska Housing Finance Corporation.
    - State Fire Marshal is precluded by law from adopting residential building codes for three-plexes or smaller, so individual homes have no residential building code. Even with adopted codes in certain places, there is no code inspection (people in those jurisdictions rejected proposals to implement inspection measures).
- Biggest issue: 2018 M7.1 earthquake gave people a false sense of security. It was only 50 or 60% of the design earthquake. So, concerns around potential impacts of the next moderate or great earthquake in south-central Alaska (where population is higher).

Presentation – *Montana Earthquake Working Group, Yann Gavillot*

Yann Gavillot is a research geologist at the Montana Bureau of Mines and Geology.

History/origins:

- Started with talking during a coffee break among colleagues at the Montana Bureau of Mines and Geology (MBMG) and identifying the need for meetings or groups that can gather agencies to talk about earthquake hazards. Montana had no such meetings/groups. They created the Geohazards Workshops, starting in 2022 in Butte;

then in Helena in 2023, and most recently (2024) in Missoula, where they gathered agencies and universities to:
    - Talk about earthquake hazards.
    - Get to know each other.
    - Get to know what Montana Bureau of Mines and Geology is doing and:
        - What could be the next steps.
        - What sort of things they can work together to build (e.g., either as a working group or potentially as a seismic commission).
- The Montana state geological survey initiated the Montana Earthquake Working Group in May of 2024. They're thinking of forming a formal commission in future. They're also interested in looking at neighboring states to see how what they're doing might be applied or adapted to fit Montana.

Meetings:

- The working group meets annually during the Montana Geohazards Workshop, which is held every spring and was the initial motivation for forming the working group.
- Ultimately, the plan is for the working group to meet quarterly, or at least more often than annually within each subcommittee.

Mission/Purpose:

- The group formulated a mission statement, based on consensus during the last meeting; this is still being fine-tuned. The main purpose behind forming the working group is to provide a source of information about earthquake hazards that can help people make better decisions.
- The Montana Bureau of Mines and Geology is not a regulatory agency and does not provide policy recommendations. So, they will just try to provide information and ensure that information is available for their partners/other agencies to utilize to take the next step. The objective is just to provide the science, which will hopefully be used to make science-informed decisions.

Structure & membership:

- The group defined their structure in a recent meeting.
- Currently have a core group & strategic plan; core consists of three members of the working group: Montana Bureau of Mines and Geology, EERI, and Montana Disaster and Emergency Services.
- So far, the working group has:
    - About eight official member agencies/orgs that have signed a "letter of interest".
    - About 7+ prospective members who are interested, or who are trying to sign this letter in the next few months.
- In addition to Montana Bureau of Mines and Geology, EERI, and Montana Disaster and Emergency Services, the group includes representation from the University of Montana,

the state department of transportation, the state library, some local school districts, and the Rocky Mountain Lab (a federal research lab); and they're working on adding other prospective members, including counties.

- Three subcommittees or interest groups: hazards research, mitigation strategies, and outreach. Each is headed by a leader or co-leaders [see PowerPoint slide].
    - Hazards research: will focus on providing information about the hazards (earthquakes and landslides)
    - Mitigation: led by Montana Disaster and Emergency Services; help from FEMA and others.
    - Outreach: This subcommittee is trying to build outreach capabilities. (FEMA has been helping in this; the schools have been a big, big help.
- Website: The working group has a draft website (built in the geological survey) and plans to have a logo.

Accomplishments:

- Provided some individualized sessions on earthquake hazards for particular counties.
- Talked about establishing working groups.
- Had training programs/sessions sponsored by FEMA.
- Had field trips and a lot of great discussions.
- Ratified the Montana Earthquake Working Group.
- Were invited by Ravalli County to present research on active faults that had not been recognized in the past.
    - Presented to over 140 people from a local town.
    - Had input from the local chief and the county emergency services.
- The Hellena Public School District (a member of the working group):
    - Applied for a grant from FEMA.
    - Consulted Hagerty Consulting regarding a school inventory to identify seismic retrofit needs.
    - Training took place last year (i.e., how to recognize buildings that are susceptible to damage).
    - Looking now to see if this can be done as a pilot study in Montana.

Funding:

- MBMG used a little funding from their own FEMA grants to fund the workshops.
- The Montana Earthquake Working Group is not funded; members are all volunteers.
- The Working Group is hoping to set up a framework that will allow them to support travel and operations for the working group.

Presentation – *Washington Seismic Safety Subcommittee, Alex Steely*

Alex Steely is Assistant Director for Geologic Hazards and Mapping at the Washington Geological Survey.

Structure:

Washington's commission is a subcommittee of the Emergency Management Council, which is formally instituted and advises the Governor. The subcommittee presents recommendations to the Emergency Management Council, which presents recommendations to the governor's office.

Members & partners include:

- Washington Emergency Management Division and the Washington Geological Survey (lead agencies)
- Department of Transportation
- Pacific Northwest Seismic Network
- Engineering departments of universities
- USGS
- Washington Office of Superintendent of Public Instruction
- key partners from cities and counties (e.g., emergency management).
- EERI
- Building officials

Meetings & mission:

- Meets quarterly
- Advises governor (via Emergency Management Council) on matters related to seismic resilience

Mode/approach:

- Divides members and partners (and others who are interested in working with the Subcommittee) into work groups. Currently has two main work groups:
    - One focused on unreinforced masonry.
    - One focused on school seismic safety.

Current efforts/projects:

- Unreinforced Masonry Buildings. Washington has a lot of URMs, especially in urban areas.
    - URM inventories. Working now on different processes for conducting inventories, from volunteer efforts to formal approaches; working also with the Washington State Department of Archaeology and Historic Preservation on setting up a portal and catalog of URMs.

    - Incentives for URM retrofits. One project (led by the city of Seattle) is pushing for studies on tax incentives and other options that help people do something about their URMs.
- School seismic safety. State legislature approved funds for seismic retrofits of schools (this was the result of decades of both recommendations and "lobbying" efforts).
    - The Seismic Safety Subcommittee (SSC) advises on which schools are selected to move through the grant process.
    - Washington Geological Survey collects site data at school campuses across the state to give engineers base information for designing those schools.
    - SSC is discussing how to integrate earthquake early warning in schools.

Challenges:

- Because progress is slow, members and partners can feel discouraged, so a core challenge is how to maintain momentum and the "vitality of interest" required to keep these initiatives alive over time. & and implementation. Given the subcommittee's organizational structure, it doesn't have the kind of "legal foothold" required to push for getting things done (i.e., it provides information to the Emergency Management Council, which can present it to the governor; but no one is obliged to listen).

Timeline of major events for Washington's Seismic Safety Subcommittee (refer to slide 25).

Facilitated Discussion – How do we affect change? (Facilitator: Barrett Salisbury, Alaska)

Discussion Questions

- How can a seismic safety commission make the jump from making recommendations to moving legislators?
- What strategies for educating the public could help?
- What role could incentive programs for individuals or businesses play?
- What can we learn from parallels or partnerships with other "change-based" programs like resilient energy-efficient construction?
- Where can we find funding to support these efforts?
- How can a seismic safety commission affect change after an earthquake?

Additional Questions Raised

- How do we make the jump from sending out emails and policy recommendations to actually making these changes?
- When speaking to the public, how do we explain "sense of urgency" versus "the sky is falling"?
- What is the coordination (if any) with these commissions and Business Emergency Operations Centers (BEOC) or P3 Public Private Partnership groups in states?

Discussion Notes

Challenges

- Lack of change/progress: Problems are still major, and recommendations made years or even decades ago are still relevant, because no actions were taken to address them.
- Resistance: people/property owners reject recommendations and implementation, etc. (i.e., reject being "told what to do")
- Expense: Addressing the problems is expensive.
    - This can be especially challenging in rural areas; access to materials, resources, and expertise can also be more challenging in rural areas.
- Infrequency of earthquakes in many states makes it difficult to keep seismic mitigation front-of-mind and high on the priority list.
    - In spite of existing outreach and education efforts, people in many areas where earthquakes are infrequent don't realize they live in an earthquake zone.

Issues & Observations

- Disincentives will not work (i.e., in certain social environments/communities/states).
    - For example, lack of residential building codes in jurisdictions that refuse to adopt them makes it more difficult to get funding from the federal government after a disaster; but even when that fact is communicated to people, it doesn't motivate change.
- California is far ahead of other states, so it's a difficult model for other states: other states may need to look elsewhere for possible interim steps.
    - Frequency of earthquakes in California may explain why they're so far ahead of other states in seismic matters (mitigation, preparedness, codes & regulations, etc); although other factors must play a part (e.g., population density in particular; also many older structures that had/have serious problems in earthquakes), because Alaska also has high seismic hazard and frequent earthquakes.
    - Regarding California's program for retrofitting homes: Started very small, back in 2016 (retrofitted four, then eight); now over 28,000 homes retrofitted. One factor: they were able to get the retrofit standard into the building code, so there was a standard that the program could be set to. It's an elective code (locally adoptable, and people doing a retrofit on their own are not required to do it to that standard), but to receive money from the grant program, recipients must adhere to that code.
    - Sources of funding: *California Earthquake Authority* is required to put aside a certain percentage of their profits for mitigation activities; another source is grant funding from HMGP.
        - www.earthquakeauthority.com/prepare-your-house-earthquake-risk/brace-and-bolt-grants
            - Brace + Bolt
            - Strengthen Your House

        - Soft-Story Retrofit Grant Program
    - Note: Salt Lake City, Utah, also has a retrofit grant program; it's called Fix the Bricks; this is for unreinforced masonry (URM) homes.

Ideas to Try

- Incentive programs
    - Pairing seismic resilience with existing change-based programs like energy-efficient construction (e.g., inspect a house for energy efficiency tax breaks and do some seismic resilience checks at the same time).
- Communicate that adopting the latest building code requirements saves $11 for every $1 invested (see FEMA study).
- When there is a seismic event, try to capitalize on it.
    - However, this can be tricky: if the earthquake's effects don't significantly impact people (low damage, quickly repaired, felt in unpopulated or low-population areas, etc.), then people may get more complacent about the hazard. Also, the window of time for public attention is short, whereas a lot of recommended measures take long-term attention and commitment to implement.
- Take incremental steps: for example:
    - If building codes are a tough sell, start by doing the zoning but maybe without the regulatory component; have the maps and the information available.
- Focus on working county by county, rather than attempting to implement things statewide. That way, the approach can be adjusted to suit the attitudes, culture, politics, and other circumstances of each county. Start with a pilot study, which can then be a model to lead with in other counties.
- Work on creating an "earthquake culture" in which people are aware that they live in a seismically hazardous area because they see signs of it everywhere and the signs normalize it – that is, actual standardized signage (as in Japan, Chile, and Mexico): e.g., signs on elevators that instruct people what to do in case of fire and in case of an earthquake; painted areas on the ground that indicate safe areas where people can gather after an earthquake, signs on bridges that say if there's an earthquake, don't cross the bridge until it has been inspected, etc. A primary function of the signage is to raise awareness and change perceptions of where we live. Start at the state-level: get the state to take care of its buildings and infrastructure; then counties and cities. As awareness increases, people start asking questions and having expectations about building design/resilience of homes, apartment buildings, etc. (Note that signage is currently being used in many coastal communities to raise awareness of the tsunami hazard.)
- Communications & public outreach (see also "Resources"):
    - Utilize communication professionals (e.g., to generate outreach products such as videos, pamphlets, social media campaigns, and T.V. and radio ads)
    - Consult social scientists to develop effective, targeted messaging.
    - Tailor communications to different audiences in order to get traction.

- Compare preparing for an earthquake to preparing for more familiar hazards, such as a storm or even a kitchen fire, and point out that preparing for an earthquake also prepares you for other hazards.
- State programs/agencies may work with public information officers (PIOs).
- Make use of partnerships with other agencies and organizations. E.g., working with the office of the state insurance commissioner, as in Missouri; or in Utah, working with the nonprofit *Envision Utah*.
- Oregon launched a new public education preparedness program called "Be 2 Weeks Ready" (www.oregon.gov/oem/hazardsprep/Pages/2-Weeks-Ready.aspx)

Suggested Best Practices for a Seismic Safety Commission

- Right-size your goals and objectives to fit both your circumstances and your needs.
- Identify who has the authority and responsibility to work on those goals and objectives, and who has capacity and interest.
- Find a champion to take the lead. The secret to success in many instances is the project champion – someone who provides leadership, has the right connections, is able to bend the ear of a key stakeholder, get the funding, or pull a coalition together.
- Identify the steps required to reach your goal and map out your milestones. (Include outreach and education among your first steps.)

Resources

Earthquake Country Alliance and the Great ShakeOut: *Free education materials & availability to help (e.g., to put together programs and materials, especially starting at the school-age level)*

- www.earthquakecountry.org/sevensteps/
- www.shakeout.org

FEMA/NEHRP: *Note: It is possible to request that FEMA include targeted messages in the Building Sciences Division's listservs and GovDelivery (messages are sent out to the entire earthquake community that subscribes).*

- National Earthquake Technical Assistance Program (webpage)
- National Earthquake Hazards Reduction Program (webpage)
- FEMA Distribution Warehouse (webpage)
- FEMA Building Science Resource Library (webpage)
- FEMA Media Library (webpage)

FEMA Building Resilient Infrastructure and Communities (BRIC) Funds:

- Main webpage
- "State/Territory and Tribal Building Code Plus-Ups" (webpage)

Introduction – *West Tennessee Seismic Safety Commission, Nathan Moran*

(See also notes for Day 2 for the primary presentation.)

The West Tennessee Seismic Safety Commission was tasked to initiate, with the assistance of state, federal, and local governments, a program to prepare the state for responding to a major earthquake.

The commission was created as a subset of the University of Memphis, Center for Earthquake Research and Information (CERI), which provides administrative support and information on earthquake hazards to the commission. The commission, in turn, provides that information to other government agencies for policy decisions. The commission also feeds information to CERI about public input and about what the public would like CERI to do also.

Members

12-member board appointed as follows:

- 2 chosen by the Speaker of the House of Representatives
- 2 chosen by the Speaker of the Senate
- 8 appointed by the governor.

The commission must include the following professional areas: architecture, fire protection, public utilities, engineering, geology or seismology, local government, insurance, business, emergency health services, nonprofit, emergency assistance, local education, and emergency management.

Presentation – *California Seismic Safety Commission, Annde Ewertsen*

Annde Ewertsen is Executive Director of the California Seismic Safety Commission.

Structure/origins:

- Established in 1975 by law.
- Reorganized in 2020 under the California Governor's Office of Emergency Services.

Meetings:

- Currently, the commission meets quarterly.
- Required to meet at least three times per year.

Members:

- 10 commissioners

- Appointed by the governor, representing local government, social services, public utilities, planning, insurance, structural engineering, fire protection, and emergency services. Currently have two vacancies.
- A member of the Senate and a member of the Assembly
- Representatives of four state agencies, including the Building Standards Commission, state architect, and California Governor's Office of Emergency Services (Cal OES).

Mission: To improve seismic safety and resilience of California communities by providing resources and guidance, facilitating research, and fostering collaboration in earthquake preparedness, mitigation, and recovery.

Functions and activities:

- Guide policies, educate and support research, foster collaboration, and protect lives, property, and the built environment from seismic hazards.
- Collaborate with different entities, including EERI, the California Earthquake Clearinghouse, different FEMA working groups, SCEC and ECA, ShakeAlert, and the Structural Engineering Association of California, among others.
- Advisory roles, including Building Code Development, California Public Utilities Commission, California Strong Motion Instrumentation Program, State Historical Building Safety Board, and Global Earthquake Model (GEM).

Examples of projects:

- A report on the Ferndale earthquake sequence in northern California. Available at https://ssc.ca.gov
- A two-part project:
    - First, a report (likely out by April) on lessons from historical earthquakes. This looks at large earthquake doublets or triggered earthquakes around the world, with implications for California.
    - Second, a regional Scale Consequence Assessment of Earthquake Sequence Scenarios in California (also likely out in April). Looking at doublets or triggered scenarios. Includes looking at building damage, economic loss casualties, power grid, and healthcare issues. Interested in examining potential compounding damage resulting from two very large sequential earthquakes, as happened in Turkey. California's assessment looks at two specific scenarios.
        - Northern California scenario: earthquakes on Hayward and Calaveras faults, both over M7, one triggering the other.
        - Southern California scenario: similarly, earthquakes on Newport-Inglewood fault and Palos Verdes faults.
    - Working with In-Core (Interdependent Networked Community Resilience Modeling Environment), utilizing the software that they have available.

    - Looking at three cities and three scenarios to determine how resilient an area is; in particular, examining how areas that are underserved or socially, economically vulnerable struggle to recover with/without aid through FEMA. So, the assessment looks at how they recover with no aid, with aid that comes relatively quickly from FEMA, and with aid that comes at some time in the future.
- A fire station seismic vulnerability inventory. Sent a questionnaire to the 3,200 fire stations in California; have received responses from 1100. Intending to:
    - See how they adhere to the 1986 Essential Services Act (whether they were built before or after that).
    - Look at associated building codes and do a risk assessment using hazard data inputs.
    - Provide resulting data to the fire stations. (If they choose to seek funding for mitigation, they can use the data when doing their BCAs.
- Contracted with Earthquake Country Alliance and through SCEC to have them utilize their film *Quake Heroes* (about the 1994 Northridge earthquake); the Seismic Safety Commission is funding the outreach to underserved communities and helping to fund dubbing the film into Spanish and Chinese.
- Funding a shake-table test in San Diego, looking at cold-formed steel structures.
    - Also doing a live fire test after they've shaken it.
    - The commission helped fund a UAV portion to help UAV pilots provide good footage for engineers to review after an earthquake.
- Recently got approval to
    - Do an “earthquakes and climate change” workshop (March 4 & 5).
    - Have a study funded that will look at ways to reduce post-earthquake ignitions through seismic gas safety shutoff devices; specifically identifying regions and where it might be cost beneficial.
- Awarded a BRIC grant under their Building Code Plus-Up program to look at mobile homes – to recommend an updated code for mobile homes and manufactured homes, which suffer a disproportionate share of damage after earthquakes.
- Publications (available in English and Spanish from the commission’s website):
    - Homeowners Guide to Earthquake Safety (California law requires that this be provided to all homeowners when they purchase a home)
    - Commercial Property Owners Guide to Earthquake Safety, and they're available in English and Spanish on our website (https://ssc.ca.gov).
    - Outsmart Disaster (to help businesses determine how they can become more resilient before an earthquake).

Presentation – *Utah Seismic Safety Commission, Adam Hiscock*

Adam Hiscock is an earthquake geologist with the Utah Geologic Survey; he also serves as staff to the Utah Seismic Safety Commission.

History:

- The original Utah Seismic Safety Advisory Council was founded in 1977 and lasted until 1981.
- It was followed by the Earthquake Task Force of the Utah Advisory Council from 1989 to 1991.
- The Utah Earthquake Advisory Board: 1991 to 1994.
- Official founding of the current Utah Seismic Safety Commission in 1994: active since 1994; authorized by a Utah Legislative statute 63C-6-101.

Members:

- 15 volunteer members, including representatives of:
    - Envision Utah, a non-profit planning organization that brings together businesses, government, and community organizations for future growth and planning.
    - Utah section of the American Society of Civil and Geotechnical Engineers.
    - Structural Engineers Association of Utah.
    - American Public Works Association
    - American Institute of Architects.
    - Utah League of Cities and Towns.
    - Scientific organizations, including:
        - Utah Geological Survey, which provides technical scientific information regarding earthquake, hazard and risk in Utah.
        - University of Utah Seismograph Stations, which runs Utah's statewide seismograph station network.
        - new: the Utah State University Earthquake Engineering Research Center, which is part of USSC.
    - Federal ex-officio member organizations: FEMA and the USGS.
    - Utah Department of Transportation
    - Governor's Office of Planning and Budget
    - Utah Division of Facilities and Construction Management
    - Utah Insurance Department
    - Utah Division of Emergency Management
    - Utah State Board of Education. Led by a chair and two vice chairs. (Current chair is Robert Grow; vice chairs are Jessica Chappell and Steve Bowman)
- Staffed by personnel from the Utah Geological Survey (currently Adam Hiscock) and the Utah Division of Emergency Management; staff help the commission meetings function, facilitate publications, etc.

Meetings:

- Usually meets quarterly.
- Currently meeting a little more frequently than that

Function:

Advise the Utah legislature, governor, state and local government agencies, and the private sector on earthquake safety issues.

Mission:

- Review earthquake-related hazards and risks to the state of Utah and its inhabitants.
- Prepare recommendations to identify and mitigate those hazards and risks.
- Prioritize recommendations and present and promote them to state and local governments for adoption as policy or loss reduction measures.
- Act as a source of information, with those concerned with earthquake safety. See website: earthquakes.utah.gov – built and launched after the 2020 magnitude 5.8 Magna Earthquake to serve as a central hub of earthquake safety information and also technical earthquake geology information for the public.
- Promote earthquake loss reduction measures and legislation.
- Produce periodic strategic seismic planning documents that help monitor progress towards achieving the goal of seismic risk reduction in the State of Utah.

Examples of recent projects and reports (available at earthquakes.utah.gov):

- 2025 report and recommendations to the Utah legislature (in production): a yearly document summarizing the commission's recommendations for seismic safety to the legislature and state government.
- The Utah K-12 Public Schools URM inventory report (2022).
- Mitigation Endorsement Report for Utah's URM schools.
- Putting Down Roots in Earthquake Country
    - Updated a couple of years ago with new information about the Magna Earthquake; also with the addition of some other fast-growing parts of the state of Utah that lie on hazardous fault lines).
    - Produced a Spanish language version.
- Wasatch Front Unreinforced Masonry Risk Reduction Strategy.
- A homeowner URM retrofit guide. (Working on an update.)

Future of the Utah Seismic Safety Commission (USSC):

During the last legislative session, the state legislature voted to sunset the USSC, effective January 1, 2025. Since 1994 – for 30 years – the USSC has been a very active commission, with active participation from all commission members. Commission members are currently trying to figure out alternative pathways to keep the commission active. Possible alternative pathways being considered include moving the USSC to an executive branch agency, such as the Utah Department of Natural Resources (which includes the Utah Geological Survey), or the Division of Emergency Management. Such a move will require an adjustment of the statute, so the USSC is working towards that.

Facilitated Discussion – What are common pitfalls and hot-button issues? (Facilitator: Jeri Young Ben-Horin, Arizona)

Discussion Questions

What are common pitfalls and hot-button issues? For example:

- How do we successfully address and navigate opposition to our work so that we can fulfill our mission?
- Where does the opposition come from and what is motivating it?

Additional Questions Raised

- People prioritize when allocating their most precious resources (i.e., time, money, and attention): they are being asked to take action on a lot of other things besides earthquake preparedness; and they're likely to be more complacent if they experience an earthquake that doesn't do much damage or cause much disruption. How can we harness this instead of battling it?

Discussion Notes

Challenges

- Keeping the commission up and running over time, through changes in staffing, membership, resources, and political support.
    - Maintenance and continuity are especially difficult for commissions that have no funding.
    - Commissions that are authorized by the state legislature or by the governor can be sunsetted; or their ability to function may be impacted by budget cuts (e.g., loss of staffing or funds for members' per diem/travel to meetings).
- Lack of authority:
    - Some commissions are not formally or directly authorized – i.e., by the state legislature in statute, or by an executive order of the governor).
    - Some commissions lack a direct line to the governor and/or state legislature.
    - Some commissions can only make recommendations and coordinate people; they have no authority to implement or require implementation.
- Opposition resulting from:
    - Infrequency of earthquakes in populous areas, so earthquakes aren't front-of-mind for people/decision-makers (consequently, there's no sense of urgency and earthquakes are considered a low priority).
    - Resistance to adoption of building codes.
        - People prioritize economic growth (i.e., without restrictions).

        - People don't want to be told what to do. (In some states/areas, imposing requirements tends to alienate people.)
    - Resistance to identifying—and making public—unreinforced masonry (URM) buildings, because then the URMs must be retrofitted or replaced, which will cost money.
    - The perception that strengthening or replacing seismically inadequate or unsafe buildings in high-hazard areas is insurmountable.
        - New modeling/maps have revealed even greater hazard/risk in many areas, and consequently the need for even higher design standards for new buildings.
            - The time lag for incorporating new seismic design requirements into International Building Code means that a new building that meets today's standard will no longer meet code in six years. This could result in resentment/resistance/pushback.
        - Messaging about the extent of the problem may increase the perception that it's just too big and too expensive, so people don't want to hear about it ("warning fatigue").
- Stiff competition for funding:
    - Earthquakes are treated as a lower priority than other hazards (e.g., flooding, wildfires) and other needs.
    - Some states have no statewide building code, only varying adoption by local jurisdictions; this makes it difficult to qualify for BRIC funding (although FEMA has recently begun to loosen some of those requirements).

Ideas to Try

- Start small, with the "low-hanging fruit;" for example:
    - Inventory URM public schools and other public buildings; apply for small FEMA/BRIC grants to work with small cities and tribes to conduct such inventories, thereby acquiring the data needed to take the next step (e.g., seek funding for retrofitting or replacing dangerous buildings).
    - Prioritize inventories and resulting recommendations; for example, focus on identifying and retrofitting school buildings that will serve as community shelters in an emergency.
    - If structural retrofitting and replacement are not currently feasible, show inventoried schools how they can address their non-structural elements first; provide them with some resources to do it.
- Don't recommend/push for changes to or adoption of building codes statewide/nationally; instead, operate at a local jurisdiction-by-jurisdiction basis to:
    - Work on ensuring that critical facilities, schools, bridges, and other public structures are up to current seismic code.

    - For privately owned buildings, provide information and recommendations ("best practices") so owners make an informed choice.
- Work on targeted outreach and education to raise awareness of the earthquake hazard first, thereby laying the groundwork and explaining the need for recommended preparedness/mitigation actions.
    - One example is educating school-age children about the earthquake hazard and parents of school-age children about the hazard and the need to retrofit or replace unsafe school buildings.
        - Historically, this is well received by parents, who want to protect their children.
        - Capturing adults' attention with this issue can increase awareness of the earthquake hazard generally and open the way to preparedness/mitigation in other arenas.
        - A seismic-safety inventory of public schools to identify what needs retrofitting can be a means of making a work group's/commission's other seismic safety policy efforts more visible.
- Make progress where you can given current circumstances: If the commission encounters pushback in a given project area (e.g., URM schools), focus more of the commission's efforts on a less controversial project (e.g., retrofitting aqueducts) where progress can be made.
- Engage social scientists in the work that the commission does, because applying lessons from the social science field can help the commission navigate human behavior and communicate more effectively.
- Try recalibrating messaging (e.g. presented to state legislators) to emphasize economic resilience in order to gain more leverage, interest, and commitment. For example, characterize the seismic preparedness recommendations as necessary for the state to recover quickly and "be open for business the day after an earthquake." That is, find out what points the legislators (or other target audiences) care about, focus on those, and tell them what they can do to help.
- Rank preparedness as "good, better, best" when educating the public, and point out that small steps can help with multiple hazards (e.g., an earthquake kit contains supplies that can be helpful for power outages and other emergencies, too). Consider developing plans that people can follow to build up their preparedness in manageable increments (i.e., manageable in terms of both time and money).

Ideas for Future National Forums or Meetings for Seismic Safety Commissions

- Continue this conversation (re. identifying and overcoming opposition and avoiding pitfalls) amongst seismic safety commissions and state earthquake programs (e.g., perhaps at the 2025 National Earthquake Program Managers meeting in Alaska).
- Hold a meeting to help seismic safety commissions learn how to obtain BRIC funding for projects.

Resources

- CREW, with the Washington Emergency Management Division, is in the process of creating a guide to conducting a URM inventory; the guidance will be field-tested and designed for use by local jurisdictions in any state.
- Video: “Utah leaders shut down seismic safety commission, despite earthquake experts’ warnings” (The Salt Lake Tribune): https://www.youtube.com/watch?v=PNg6RsxMCyg

DAY 2 – December 5

Welcome & Reconvene

The forum facilitator for Day 2 (Brian Blake, Executive Director of CUSEC) welcomed participants and acknowledged FEMA-National Earthquake Hazards Reduction Program (NEHRP) as the source of the grants that made it possible for CUSEC and CREW to host the forum.

Pascal Schuback, Executive Director of CREW (crew.org):

- Announced that a M7.0 earthquake had just occurred off the coast of Humboldt County in Northern California; this earthquake prompted a tsunami alert.
    - Links of interest:
        - USGS earthquake summary.
        - Earthquake Notification Service (ENS): earthquake.usgs.gov/ens/
        - www.tsunami.gov

Brian Blake, Executive Director of CUSEC (cusec.org):

- Welcomed attendees
- Introduced CUSEC and briefly reviewed CUSEC's role as the eastern-region consortium (including US Virgin Islands and Puerto Rico) under FEMA-NEHRP, working on earthquake risk reduction, outreach and education, mitigation, and multi-state planning for earthquakes.
- Mentioned that three seismic safety commissions from CUSEC's region are taking part in the forum and are on the agenda to present their commissions today: Tennessee, Arkansas, and Missouri.
- Observed that the last time a national meeting of state seismic safety commissions took place was 20 years ago (in 2004 at the National Earthquake Conference).

Pascal Schuback:

- Welcomed attendees
- Announced a change in the agenda: Maximilian Dixon, Hazards and Outreach Program Supervisor at Washington Military Department, Emergency Management Division, was scheduled to facilitate the first discussion of the day, but he was called away due to the tsunami alert. *(Note: The discussion was subsequently removed from the agenda.)*
- Expressed the hope that the forum would benefit not only seismic safety commissions, but also state earthquake programs and others involved in earthquake mitigation and safety. In particular, the forum is an opportunity to help unify, and to collaborate across state borders and identify commonalities, including the kind of support and funding that's needed.

Presentation – *Arkansas Governor's Earthquake Advisory Council, Martha Kopper*

Martha Kopper is with the Arkansas Office of the State Geologist where she works on geohazards, including earthquakes, landslides, and sinkholes. She is also the chair of the Arkansas Governor's Earthquake Advisory Council (GEAC).

Structure / Authorization:

Initially established in 1984, the Governor (Bill Clinton) issued an executive order setting up the advisory council.The authority of the Governor's Earthquake Advisory Council now resides under the Department of Public Safety - Division of Emergency Management (ADEM). It was authorized under Act 247 of the 1989 Legislative Session HB 1154.

Purpose:

- Establish a state earthquake preparedness program.
- Continued assessment by proper scientific authorities of seismic risk to the state.
- Training and education of state and local government officials, employees, and citizens regarding preparation and protective measures.
- Planning, coordination, guidance, and collaboration with the federal government and other states.
- Dissemination of information.

Members of the council:

About 125 members, including:

- State, federal, and local agencies (e.g., Arkansas Department of Transportation)
- Healthcare
- Businesses
- Volunteer organizations
- Civil and structural engineers

Neither the governor nor the legislature chooses members or directs who will serve; rather council members can invite/nominate someone for membership and the council will vote on the nomination.

Meetings:

- Two per year; currently held in spring and fall.
- The council invites university students and faculty to attend.
- Average attendance is 75.

Mission & Vision:

- Vision: to advise and engage the governor and people of Arkansas about effects of seismic activities.
- Mission: to provide education resources, support, guidance for whole-community seismic activity planning, preparedness, mitigation/resilience and post-activity response and recovery within Arkansas.
- Core Values: Collaboration, community, expertise, integrity

Arkansas seismicity:

- New Madrid Seismic Zone
- Seismicity across the state (approximately 84 earthquakes recorded last year, ranging from about M0.5 to M3.8)
- Reservoir induced seismicity

Initiatives/projects/programs:

- With assistance from CUSEC, the council is comparing notes with neighboring seismic safety commissions (i.e., Missouri Seismic Safety Commission and West Tennessee Seismic Safety Commission).
- The council set up a workgroup, which established strategic plans for the council.
- The council is working with USGS to develop a workshop at which they'll explain recent changes to the National Seismic Hazard model map. (Scheduled for March 7, 2025.)
- Rapid Visual Screening of public buildings (e.g., administration, government buildings, critical facilities, maybe some schools).
- Last year, they met individually with the directors of various city chambers of commerce in northeast Arkansas and invited them to attend a QuakeSmart meeting, but none participated. This year, they have some funding to go to the State Chamber of Commerce in order to network and increase awareness so people recognize the council.
- Collaborated with Department of Elementary and Secondary Education and with the director of the Arkansas Division of Emergency Management to get legislation passed in 2021 to require earthquake drills in schools. Working now on implementation and on increasing participation in the Great ShakeOut earthquake drill.
- Other strategic plans:
    - Enhance preparedness, understanding, education
    - Support earthquake hazard mitigation
    - Collaborate with stakeholders to improve emergency response
    - Collaborate with stakeholders to improve recovery efforts
    - Evaluate hazards associated with earthquakes (e.g., research on landslides to inform emergency response personnel about routes to take or avoid)

Challenges:

- Trying to get out a public service announcement following an earthquake. For example, the council prepared a public service announcement following the Turkey earthquakes, but their respective state agencies didn't understand the purpose/importance and declined to send it out.

Next steps:

- Complete the council's strategic plans:
  - Add Memorandums of Understanding with collaborating agencies
  - Select a core planning group (expecting to do this in December 2024)
  - Develop a 5-Year Plan
- For the council's outreach and education efforts, focus on businesses and healthcare.

Presentation – *Arizona Council on Earthquake Safety (ACES), Jeri Young Ben-Horin*

Jeri Young Ben-Horin is a research and development scientist at the Arizona Geological Survey and vice chair of the Arizona Council on Earthquake Safety.

History/Structure:

- The present Arizona Council on Earthquake Safety (ACES) was resurrected about 10 years ago from a previous council, which included various professors and structural engineers.
  - One factor that spurred interest in reforming ACES was the occurrence of several earthquakes in Arizona in 2014 (a M5.3 and a M4.1)
  - ACES worked initially with the Western States' Seismic Policy Council (WSSPC) to guide and improve ACES' efforts. *(Note: WSSPC is no longer extant.)*
- Organizers: Chairperson (Dr. R. Arrowsmith), Vice-chair (Dr. Jeri Ben-Horin)
- No state mandate or connections to the Governor's Office.
- Budget – no state funding; some funding from FEMA-NEHRP.
- Arizona Department of Emergency Management is supportive of ACES and helps keep earthquakes in the state hazard mitigation plan (also encourages counties to include earthquakes in their county hazard mitigation plans).

Members & attendees:

- 10 to 20 members (membership numbers go up and down; tend to increase after an earthquake), including:
  - county, city, and tribal emergency managers
  - Arizona Dept. of Emergency Management
  - University of Arizona

    - Northern Arizona University
    - Arizona State University geologists and seismologists
    - Arizona Geological Survey
- A representative from FEMA Region 9 often attends the meetings
- ACES makes an effort to include the tribes in Arizona

Meetings:

- Quarterly: 3 to 4 meetings per year
- Purpose: to inform members of ongoing seismicity, hazards projects, and outreach efforts; to provide assistance with earthquake scenarios for planning; and to give "primers" on earthquakes in Arizona.

Mission:

To provide a platform for professional and community stakeholders to address earthquake science, hazards and risk that can impact the safety and resilience of AZ.

Projects and noteworthy achievements:

- Various hazard projects that students, through universities, present and collaborate on.
- Helping counties* (e.g., Yavapai and Coconino) with realistic earthquake scenarios for the purpose of mitigation planning. (*also tribes, schools, and other local officials)
- URM projects for Yuma, Flagstaff, Tucson, Prescott, and the Hualapai Tribe.
    - Looking at the building stock by:
        - Examining available city & county records (these were incomplete and sometimes contradictory).
        - Some "boots on the ground" (i.e., for Flagstaff and the Hualapai reservation) to view the buildings.
        - Focusing on pre-1978 buildings.
        - Differentiating between residences vs. community buildings; industrial buildings; schools, churches, and public places.
        - Identifying construction materials (when possible).
    - Providing reports of the results to the cities and tribe
- Coordinating ShakeOut each October (since 2012). Future plans to make short demo videos for social media. (Also note: Arizona's governor said he would make a day in October "Earthquake Awareness Day.")
- Arizona Earthquake Clearinghouse (a recent project – it was finished last year):
    - Inspired by California's clearinghouse; some guidance was provided by Utah.
    - Also inspired by the need to clarify who is going to inform different government officials, and who will be responsible for communicating with the news outlets after an earthquake.
    - The clearinghouse is "a digital repository that collates and publishes data gathered by geoscientists, emergency responders, civil engineers, policymakers, and other

stakeholders working in response to Arizona earthquakes." (Link to the Arizona Earthquake Clearinghouse)
    - Types of data collected include seismic data, photos, and descriptions of damage (photos and descriptions may be submitted by the public).
    - It uses ArcGIS. (To set it up as AZ did requires some background in GIS.)
    - It exists within a permanent data repository provided by the Arizona State Land Department.
    - Access:
        - There is a public-facing side for one level of information sharing.
        - There is a "gatekeeper" – so anyone wanting to join the clearinghouse to access the data must make a request and be admitted.
    - It involves various partners. (They continue to work on getting others involved.)
    - Used a "dummy earthquake" (based on the Duncan earthquake) to:
        - Troubleshoot and refine features such as question surveys for the public.
        - Determine how to partition the various kinds of data (e.g., science data versus generic data like photos of damage).
- "Arizona Is Earthquake Country" publication:
    - Brainchild of Mike Conway (now retired); involved collaboration with Utah.
    - Available for download (link to ACES webpage)
- Social Media Posts – FB, Instagram, X

Note: Some discussion of clearinghouses followed (differing types, functions, purposes), including mention of the development of a clearinghouse in the central U.S. (contact Brian Blake, Executive Director of CUSEC, for more information) as well as a clearinghouse in Idaho (contact Heidi Tremayne of EERI, heidi@eeri.org, for more information). See also Earthquake Engineering Research Institute (EERI) clearinghouses: link to EERI webpage.

Presentation – *Oregon Seismic Safety Policy Advisory Commission, Tiffany Brown & Allison Pyrch*

Tiffany Brown is the emergency manager for Lane County, Oregon, and a local government stakeholder and current chair of the Oregon Seismic Safety Policy Advisory Committee (OSSPAC). Allison Pyrch is a geotechnical engineer with Stantec and current vice chair of OSSPAC.

Origins & structure:

OSSPAC was formed in 1991 as a result of a directive from the Oregon legislature in response to the Loma Prieta earthquake in California.

Meetings:

OSSPAC meets every other month, starting in January.

Members:

18 members, including:

- 6 from state agencies/government of Oregon – i.e., Transportation, Land Conservation & Development, Geology & Mineral Industries, Consumer & Business Services, Environmental Quality (which is an ad hoc member as it isn't specified in OSSPAC's bylaws), a House Representative, and a Senate Representative
- Governor's State Resilience Officer (not part of the membership, but included in organization)
- Members representing local government, utilities, first responders, schools, utilities, multi-housing, building owners, banking/insurance, structural engineering
- 3 public members (e.g., Allison Pyrch from Santec)

Oregon universities are not named in bylaws as members, but OSSPAC regularly engages with them.

Mission & priorities:

- Influence decisions and policies regarding pre-disaster mitigation (earthquakes and tsunamis).
- Increase public understanding of earthquake hazard, risk exposure, and vulnerability through education.
- Respond to new studies and issues.

Challenges:

- Lack of earthquake culture: haven't had a lot of earthquakes in Oregon, and it's hard to convince people to prepare for a hazard they haven't experienced.
- Earthquake education to develop a culture of earthquake preparedness/resilience has so far not been sufficient/successful or applied broadly enough.
- Resistance around building codes.
- Competing priorities for funding (e.g., social service issues, agency issues, wildfires – some can help with all-hazard preparedness and response, such as development of mass care; but earthquake-ready infrastructure is a priority that gets eclipsed).
- Continuity:
    - Members come and go over time (taking their connections with them)
    - Coordination with state legislators waxes and wanes; influence and experience-level of legislators who are members of OSSPAC is variable.
    - Change of governor can mean change in interest/support from governor's office.
- Critical Energy Infrastructure (CEI) Hub: a tank farm on the banks of the Willamette River in downtown Portland that holds all of Oregon's fuel. (Oregon has no refineries; the fuel comes from Washington via pipeline.) The fuel tanks are on liquefiable soil. In an earthquake, this hub poses a public safety hazard, an environmental hazard, and a fuel scarcity problem.

- Tsunami risk to people and buildings in the inundation zone.
- Bridges and other infrastructure built before 1994 were built with only minor-earthquake design – not up to code standard for expected Cascadia earthquake.

Strategies/efforts/undertakings initiated or supported by OSSPAC:

- Leverage earthquakes elsewhere (e.g., Japan's 2011 Tohoku earthquake and tsunami) and media attention (e.g., public broadcasting documentary on Cascadia, New Yorker article on Cascadia)
- Focus on expected Cascadia subduction zone earthquake.
    - In 2013, the state directed OSSPAC to develop a 50-year Oregon resilience plan:
        - It's an assessment of the state of coastal communities, business, critical buildings, transportation, energy, communications, and water/wastewater; analyzing expected time to recover (months to years) after a Cascadia earthquake, economic impact, and displacement of people. This resilience document has been the seminal document for a lot of planning in Oregon.
        - It's well known and utilized (e.g., for grant applications) by emergency managers, public works officials, etc.
    - OSSPAC produced subsequent reports and recommendations on particular elements (i.e., mass care and displacement, CEI hub mitigation, tsunami resilience, single-family home retrofits, insurance and retrofits for homeowners).
- State "islanding" for emergency response planning (i.e., around post-earthquake landscape of areas/populations that will become isolated as a consequence of transportation failures resulting from landslides and other damage).
- Got the state legislature to pass seismic requirements for fuel tanks (to ensure that tanks are either retrofitted or replaced); fuel storage facilities above a certain size must have mitigation plans that meet specifications regarding acceptable spillage per tank.
    - It took a lot of time (20 years), contributions from a lot of partners, and several attempts to achieve this; the effort included many conversations with tank holders and legislators and a lot of research and presentations to help people understand the issue and its importance.
    - Integral steps:
        - a hazard mitigation plan; hazard and vulnerability analysis of tank facilities.
        - legislation that directed the Oregon Department of Energy to analyze energy resilience and solutions, which trickled down to grant opportunities for every county in the state to start developing fuel/energy resilience plans.
        - Multnomah County did a study that identified the environmental impacts and the insurance that would be required to deal with the aftermath.
    - This only applies to tank facilities that store more than 2 million gallons of fuel, so there is still work to be done to extend it to other types of facilities and hazardous materials.
- Other ongoing statewide and local fuel planning.

- The Oregon Department of Aviation developed a fuel tax that has provided emergency planning supplies for all hazards, including seismic. Also started four resilience assessments at key airports.
- Seismic retrofits of PDX (largest airport, in Portland): e.g., one of their runways by 2030 or 2040 (the issue is liquefiable soils).
- Oregon Department of Transportation (ODOT) – looking at bridges; identified backbone system: instead of cyclically retrofitting in random places, ODOT focuses on specific corridors and prioritizes funding so as to open key areas as quickly as possible.
- Oregon Department of Geology and Mineral Industries (DOGAMI): hazard mapping and damage assessments, as well as identification of post-earthquake "islands" for recovery planning (accessible to cities and counties for local planning).
- Retrofitting of public buildings (i.e., schools, state government buildings, police and fire departments): Oregon has a state program for retrofitting that provides matching retrofit funds for police, fire, and schools; hoping to open that up to public works facilities soon.
- Provided (via California) training in Oregon on post-disaster safety assessment of buildings. Now working on developing/implementing Oregon's own training program.
- Review of the 2013 Oregon Resilience Plan with a view to publishing an update:
    - Analysis of what's working and what hasn't.
    - Identification of trends or reasons for success, and for the converse.
    - Addition of a new chapter entitled *Community and Social Resilience*.

Presentation – *Missouri Seismic Safety Commission, Jeff Briggs*

Jeff Briggs is the Missouri earthquake program manager, located in the Missouri State Emergency Management Agency (SEMA). He is also the coordinator and staff support person for the Missouri Seismic Safety Commission.

History/structure:

- Created by state law in 1993.
- Members are appointed by the governor and approved by the state senate.
- Has a connection with the Governor's Advisory Council.

Members:

17 members, including:

- 2 state legislators (one from the state house; one from the senate).
- 15 members representing areas/entities spelled out in statute: architecture; planning; fire protection; public utilities; electrical, mechanical and structural engineering; soils engineering; geology; seismology; local government; insurance; business; Red Cross; public education; emergency management.
- New chair: Dave Hoffman, Missouri University of Science and Technology

Meetings:

- Meets four times per year.

Duties:

- Prepare the state to respond to earthquakes.
- Advise the governor and state officials.
- Recommend program changes.
- Write and provide an annual report to the governor on the state's earthquake readiness.
- Sponsor training and other activities to promote earthquake readiness.

Funding:

- There is no funding dedicated to this commission.
- There's no funding at the state level for earthquake work of any kind.
- All of the commissioners are volunteers.
- Jeff Briggs, as state earthquake program manager, can:
    - Utilize some funding from FEMA-National Earthquake Hazards Reduction Program (NEHRP) to support the commission by funding some modest efforts in outreach and other mitigation programs.
    - Offer (from SEMA) to cover some travel expenses and facilitate some meetings.

Projects/programs/successes:

- Started a program in 2013 to provide free seismic evaluations for critical infrastructure. Focused on schools in the southeast quadrant of Missouri (the high seismic zone).
    - It involves:
        - Contracting with a structural engineer.
        - Reaching out through the commission's contacts to local officials in southeast Missouri to offer these free structural assessments.
    - Intention: encourage recipients either to do low-cost or non-structural improvements, or apply for grant money to retrofit.
    - Since 2013, more than 200 school structures were evaluated
    - This year, the program will be folded into a larger program coordinated by CUSEC, permitting evaluation of a larger quantity of buildings; also expansion beyond schools to include critical facilities infrastructure (e.g., hospitals, water treatment plants, utilities, fire stations).
- Earthquake Insight Field Trip (sponsored by the commission nearly every year since 2005; next scheduled for April 2025) = A guided tour of New Madrid Seismic Zone, focusing on geology and structures in the Bootheel of Missouri; also goes to southern Missouri and into Arkansas, western Tennessee, and western Kentucky.
    - Brainchild of a champion/previous member of the Seismic Safety Commission.
    - Concept: Involve decision makers (e.g., insurance or other business representatives, scientists, academics, policy makers, other people of influence)

so they learn about the risk and see evidence of previous earthquakes, increasing awareness and inspiring policy changes.

- Earthquake Summit (annual since 2019; next summit is scheduled for March 2025) – a professional development conference:
    - A joint effort by the commission and SEMA; Jeff Briggs is principal organizer.
    - Invites anyone with professional interest in earthquakes (e.g., emergency managers, first responders, utility representatives, transportation, public healthcare (that's a big one), academics and researchers)
    - Open to the whole of the New Madrid Seismic Zone. Participation from surrounding states increases each year.
    - Presentations on earthquake risk, mitigation activities/options, best practices from around the country, experiences of people who have dealt with earthquakes elsewhere, or other natural disasters that might be applicable.
    - Last year's summit: about 400 attendees.

Challenges:

- Lack of funding.
- Apathy (a population that has never experienced a big earthquake).
- Competing with other perils (flooding, tornadoes, winter weather) for attention and resources.
- Constantly reminding people in order to raise awareness and encourage preparedness.
- Commission vacancies & the arduous process to get members appointed & reappointed.
    - Currently have six vacancies (11 of 17 seats filled; a quorum of seven is required to have a meeting).
    - Members:
        - Are appointed for 4 years; then must be reappointed.
        - Must be vetted by the governor's office, Missouri Boards and Commissions Office.
        - Must be nominated by the governor and approved by the Senate.
    - Statute allows existing commissioners to stay beyond four years until someone is appointed; helpfully, some committed volunteers have remained; but filling vacancies would bring in some "fresh blood and new ideas."

Presentation – *West Tennessee Seismic Safety Commission, Gary Patterson*

Gary Patterson is a geologist who worked formerly as Director of Education and Information at the Center for Earthquake Research and Information at the University of Memphis; he is now in the new Center for Disaster Resiliency and Recovery at the University of Memphis. He is the executive director of the West Tennessee Seismic Safety Commission.

Purpose of the commission:

- Work with emergency managers (e.g., counties).
    - Look at hazard mitigation plans; identify gaps between response and capability.
    - Help address gaps.
    - Assist with submitting hazard mitigation grant applications.

Focus area:

- West Tennessee (New Madrid Seismic Zone)

Funding:

- Leverages private sector partnerships (e.g., Assisi Foundation of Memphis, American Association of Blacks in Energy, local utilities, Mid-South Association of Business Continuity Planners).
- Has a budget, with funding provided by the state legislature.

Projects/activities/strategies:

- Events such as community disaster preparedness fairs.
- Support development of volunteer organizations that respond to disasters (e.g., Red Cross and Salvation Army).
- Produce and distribute public service announcements and social media posts (e.g., in preparation for ShakeOut).
- Partner with state emergency management.
- Sponsor meetings with state legislators to update them on commission activities (i.e., invite legislators to a lunchtime meeting and provide lunch).
- Produced a documentary in 2012 about the New Madrid earthquakes of 1812.
    - Part of the bicentennial.
    - Seen by millions and received a tele-award.
- Following Tennessee Emergency Management Agency (TEMA) guidance, take a multi-hazard approach to earthquake outreach and education.

Presentation – *Colorado Earthquake Hazard Mitigation Council, Rob Jackson*

Rob Jackson is a structural engineer with Amentum and co-chair of the Colorado Earthquake Hazard Mitigation Council (CEHMC).

History/structure:

- Origins in 1963 (in response to some damaging earthquakes); formally organized as the Earthquake Subcommittee of the Colorado Natural Hazards Mitigation Council
- Currently ad hoc (link to website)

Members:

- 17 elected members
- Approximately 80 colleagues

Meetings:

- 6 meetings/year
- Presentations every 2 months (topics such as changes to USGS mapping, building codes and seismic design categories, etc.)

Mission:

- Increase public awareness of Colorado earthquake hazards.
- Provide oversight/review of seismic issues, standards, and practices.
- Improve the characterization of Colorado's earthquake hazard in order to mitigate the associated risk and vulnerability of Colorado's population and infrastructure to earthquakes.

Initiatives/projects/programs

- 2020 Building Resilient Infrastructure and Communities (BRIC) program and mitigation project proposal: “Colorado Earthquake Resilience Investigation – Code Review & Rapid Visual Screening Pilot Study”
    - Element 1: statewide examination of building codes applied to all K-12 public schools.
    - Element 2: pilot study of up to six critical infrastructure buildings using FEMA P-154.
        - Rapid visual screening of school buildings in Summit County, near the Gore Range Frontal Fault. (unreinforced masonry buildings)
- Policy Recommendation to the Colorado Division of Fire Prevention and Control on the Seismic Design of Public Schools
- Letters of support for NEHRP, ShakeOut, and local seismic investigations

Key challenges:

- Lack of awareness of the Colorado earthquake hazard – i.e., the historic 1882 magnitude 6.6 event as representative of potential future risk.
- Concerns that current seismic design categories specified for Colorado do not accurately correspond with seismic hazard/risk.
- Persuading people to pay attention to historic earthquakes and mitigate, when the building code says you don’t really have to design for earthquakes.
- Pressure (e.g., from special interests) to not amend the building code.

Facilitated Discussion – How do we build support for commissions and their work? (Facilitator: Martha Kopper, Arkansas)

Discussion Questions

How do we build support for commissions and their work?

- What benefits or "selling points" should we promote to persuade decision makers and the public that a seismic safety commission is needed in our state/territory?
- Who do we need to convince?
- How can seismic safety commissions in different states help and support one another?

Discussion Notes

Challenges

- How to address situations where buildings are constructed or mitigated to meet current seismic code, but then research reveals the hazard is greater so subsequent code is higher and the completed building project no longer complies. This is a challenge for communications/messaging and motivating people to invest time and resources in seismic mitigation.

Issues & Observations

- It's important to persuade:
    - The highest levels of emergency managers in your state. They are the people who can promote or persuade the decision makers and provide budgets that allow a commission to function and do things.
    - Large businesses/business leaders in the state.
    - State legislators.
    - The governor.
- Persuade the constituents that they deserve to have a seismic safety commission looking out for them, they deserve to have safe homes and safe public buildings, and their kids deserve to be in safe school buildings; these constituents will then pressure legislators to make decisions that will make it so. (But persuading the public of this is the tricky part.)
- Incorporating earthquakes into an all-hazard approach to public outreach and education can improve readiness, preparedness, and resiliency for all.
- By collaborating with their state's seismic safety commission, an earthquake program manager or other state agency person can:
    - Enhance the authority/credibility of whatever project or program they're undertaking; that is, "sponsorship" by the seismic safety commission gives it the backing of an officially sanctioned commission of experts.
    - Benefit from the commission members' insights, expertise, and connections.

Ideas to Try

- Tailor “selling points” for particular audiences: e.g., “business resilience” is a selling point to appeal to businesses and encourage earthquake preparedness and mitigation; also showcase the role of businesses in the resilience of the whole community.
    - Example: Anheuser-Busch retrofitted their California facility just before the Northridge earthquake and so didn’t have to reconstruct their building or lay off their workers; instead, they were able to make water for impacted communities. Anheuser-Busch subsequently retrofitted their facility in St. Louis.
- Include emergency managers of large businesses as members of the seismic safety commission.
- Include representatives from public works departments as members of seismic safety commissions: they are the first responders for repairing roads and bridges, provide inspectors, restore water, and much more; and they oversee infrastructure recovery projects after a disaster, as well as pre- and post-disaster mitigation projects.
- Engage/include the state’s department of education in the state seismic safety commission and participate in school safety conferences.
    - Encourage earthquake drills and disseminate preparedness information in schools (this can filter up to the parents).
    - Recruit and train high school students for community emergency response teams (CERT).
- Reach out to relevant agency staff (e.g., the state earthquake program manager) and suggest that the commission could be involved, be a sounding board, or be listed as a sponsor of their seismic resilience/preparedness/mitigation project/program – e.g., to lend it credibility.
- Seismic safety commissions could support one another by:
    - Identifying topics and issues that they have in common and participating in future workshops (either national or regional) to discuss them.
    - Find a way to employ a full-time person (a professional in communications/social science or a professional legislative liaison) to assist commissions.
- As a potential funding resource for the commission or the commission’s projects/programs, look into corporations (e.g., State Farm) that offer community development grants.

Resources

- EERI has some info on classroom education and outreach: www.eeri.org/schools/sesi-classroom-education-and-outreach

Wrap Up Day 2 – Closing Remarks

Reminder that this two-day forum was made possible with funding from FEMA National Earthquake Hazards Reduction Program.

Jon Foster (FEMA National Earthquake Hazards Reduction Program), speaking on behalf of Bill Blanton, provided closing remarks and thanked everyone for participating—for sharing best practices, discussing the challenges, and building a lot of great connections—and for their dedication to promoting seismic safety and resilience. He also:

- Acknowledged the work of CUSEC and CREW, in particular: Brian Blake and Pascal Schuback.
- Pointed to FEMA resources that participants can access to enhance their work:
    - National Earthquake Technical Assistance Program
    - FEMA Publications library
    - Earthquake State Assistance Grant program

Brian Blake (CUSEC) and Pascal Schuback (CREW) thanked the commissions again for their work; invited participants to take a post-event survey; and acknowledged:

- Natasha McAllister and Brenna Morse of CUSEC for providing meeting support during the forum.
- Kyra Nourse (CREW) for her work organizing the forum.

2024 National Seismic Safety Commission Forum – Attendee Survey Results

The 2024 National Seismic Safety Commission Forum attendee survey results indicate the forum was well-received and succeeded at fostering collaboration and information-sharing among seismic safety commissions. Survey respondents, comprised mostly of members or staff of seismic safety commissions, praised the forum for its structure, engagement, and opportunities to network. However, suggestions for improvement focused on strategic discussions and more balanced presentations. Here is a detailed summary with key highlights and attendee feedback:

1. Participation and Engagement

- Majority of attendees (70%) were members or staff of seismic safety commissions.
- The event attracted stakeholders like elected officials, supporting agency representatives, and those interested in forming commissions.
- High levels of interest in continued participation, with 100% of respondents keen on future forums.

2. Event Feedback

Positive Aspects:

- Effective pre-forum communications and streamlined registration process.
- High-quality virtual platform and audio-visual arrangements.
- Facilitated discussions and attendee interaction were appreciated.

Critical Comments:

- Presentations by commission representatives had inconsistent lengths; guidelines for presenters could improve this.
- More strategic brainstorming was desired, with less focus on individual commission updates.
- Suggestions for deeper, actionable discussions to move from challenges to solutions.

3. Session and Timing Evaluations

- Attendees found the forum length, session durations, and breaks generally appropriate.
- Day 1 discussions could have benefited from extended time for deeper exploration.
- Facilitated topics like "Affecting Change" were highly engaging, while others had varied feedback.

4. Key Highlights

Survey respondents indicated the most valuable aspects of the forum included:

- Connecting the seismic safety community for shared learning.
- Innovative ideas, such as Tennessee's briefing on resilience solutions.
- A highly functional chat feature that enhanced real-time interaction.

Future topics of interest include:

- Quaternary fault mapping.
- Statewide resilience planning and building codes.
- Collaboration across state lines to address shared challenges.

5. Overall Impressions and Suggestions

- Attendees applauded the forum as well-organized, constructive, and inspiring.
- Feedback emphasized the need for earlier agenda sharing and a more solution-focused approach.
- One attendee encapsulated the sentiment: “Less Eeyore, more Tigger!” urging a shift toward optimism and proactive brainstorming.

In summary, the forum successfully provided a platform for seismic safety commissions from across the nation to connect and learn, with opportunities for growth in fostering actionable outcomes and deeper discussions in future events.