

# **COLORADO EARTHQUAKE HAZARD MITIGATION COUNCIL**

## **Meeting Notes**

**November 21, 2024**

### **ZOOM Meeting**

1. **Attendees:** Sanaz Rezaeian, Enrique Chon, Oliver Boyd, Robin McGuire, Sean McGowan, Bill Bischof, Steve Boand (phone, part time), Michael Haughey, Will Levandowski, Matt Morgan (part time), Rob Jackson
2. **Approval of minutes from September 2024 meeting** motioned, seconded, and approved
3. **2023 National Seismic Hazard Model (NSHM) and associated future building code-related issues.** - Sanaz Rezaeian, Ph.D., USGS:

The current design ground motions in the U. S. Building Codes are based on the multi-period response spectra from the 2018 NSHM and have been further incorporated into the 2020 NEHRP Provisions, ASCE 7-22 and the 2024 / 2027 IBC.

The 2023 USGS NSHM is basically complete, but its adoption is dependent on balloting and decision making through the 2026 NEHRP process. Ultimately the 2023 NSHM will not show up in the building codes until the 2030 IBC. Notable effects on the model stem from the Earthquake Source Model Updates, e.g., Earthquake Rupture Forecast (ERF) and the Ground Motion Model Updates, e.g., NGA Subduction, Basin effects, NGA-East Bias Correction, CEUS Site Effects and Coastal Plain Amplification. Discussion of these parameters is outlined and detailed in the EERI Spectra, 2024, Vol. 40. This publication is based on version 3 of the NSHM which uses a “hard boundary” between the WUS and CEUS regarding ground motion attenuation. Version 6 is the current version and uses a soft boundary. Epistemic uncertainty is more thoroughly included in the current model. Ned Field (BSSA, 2023) discusses this broader estimate of uncertainties.

The 2026 NEHRP Issue Team-3 is looking at various options including deterministic capping. The current proposal would remove deterministic caps and define a uniform risk target. Initially proposed was to maintain a 1% risk of collapse in 50 years, as currently done, for the lower hazard levels and ramp up to a 1.5% risk for the higher hazard regions. This was rejected by the Provisions Update Committee. PUC accepted a 1.5% in 50-year risk at all periods and hazard levels. Rob Jackson pointed out that the Structural Engineers Association of Colorado voted against the 1.5% flat risk rate in the BSSC balloting since capping is not pertinent to the lower seismic regions and there seems to be little defense for a 50% increase in risk throughout the Conterminous United States.

Some 350 additional faults have been added to the model. Robin McGuire asked what the active fault criteria is for inclusion in the model. Sanaz said that Alex Hatem is the leading that effort.

Rob asked about the inclusion criteria for the 1882, 6.6M event. It is lumped into the gridded / background seismicity. The preliminary maps indicate that for Site Class C and better it is likely that northern central Colorado, where the earthquake is generally understood to have occurred, would allow Seismic Design Category A. For the default Site Class, the SDC-A break contours appear to be along the Front Range as it has been in the past. However, the results are yet to be seen depending on the PUC and ASCE adoption process. Although decreases are not large overall, Rob stated that the inflexibility of the ASCE 7, Chapter 11 tables do not allow for any uncertainties and are not scientifically based.

Sanaz suggested that local jurisdictions may need to more thoroughly address the local impacts of the code changes, i.e., perhaps to develop regional seismic policies and criteria.

Sanaz later provided the slides. These notes are not all inclusive.

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4. **The 2020 Building Resilient Infrastructure and Communities (BRIC) program and the Mitigation Project Proposal entitled “Colorado Earthquake Resilience Investigation – Code Review & Rapid Visual Screening Pilot Study.”** There are two elements to the project. Element 1 is a statewide examination of building codes applied to all K-12 public schools. Element 2 encompasses a pilot study of up to six critical infrastructure buildings using FEMA P-154. Field work in Summit County was completed October 27, 2023. Plan is to wrap this up soon.  
**Further discussion deferred since Emily Drosselmeyer could not attend and Steve Boand had phone difficulties.**
5. **CEHMC will participate in the National Forum for Seismic Safety Commissions (12/4 and 12/5) sponsored by CREW, CUSEC and NEHRP. Rob Jackson will present on behalf of CEHMC.**
6. **Discuss any new relevant seismic hazard updates for the state; new/ongoing projects, research, or any other topics of interest.**  
**Enrique mentioned that a new earthquake data set is being developed based on the 2008 information. This will include new detection algorithms. Rick Aster, former CSU department head, is involved in this work.**
7. **Possible future speakers.**
  - a. **Enrique Chon; Carbon Sequestration and induced earthquakes**
  - b. **Mark Zellman, Gore Range Frontal Fault trench report**

**2025 meeting schedule: Jan 16, March 20, May 15, July 17, Sept 18, and Nov 20**