



United States Society on Dams (USSD)
Annual Meeting, Denver, Colorado, April 21-24, 2020
Workshop: Thursday, April 23rd, 8:30 am – 4:30 pm

Earthquake Shaking and Ground Failure Hazards for Dams, including Automated Real-time Inspection Prioritization

This will be an informational and collaborative workshop on seismic hazards, particularly post-earthquake situational awareness concerning dams. The content will include: an update on USGS Probabilistic Seismic Hazard (PSHA) Maps, description of USGS real-time earthquake information tools pertinent to dams (including ShakeMap/ShakeCast and ground-failure models); and discussion of the state-of-the art for fragility assignments needed to use of near real-time, post-earthquake dam safety inspection prioritization tools. The target audience is regulators, owners/operators, and consultants. Discussions will continue with an optional, late-afternoon visit to a local brewery.

Workshop Organizing Committee:

Justin Smith, FERC; Kuo-wan Lin and David Wald, U.S. Geological Survey; Mark Schultz (USACOE), Zara Plasencia (Zamini Consultants), Mark Meremonte (USBR)

Agenda

- 1. Welcome and Introductions [8:30 am]** (Lelio Mejia, Zara Plasencia, and David Wald)
 - a. Welcome (Lelio Mejia, Earthquakes Committee Chair)
 - b. Introduction (Zara Plasencia, Earthquakes Committee YP Vice Chair)
 - c. Goals-Response focus, but built on design and risk studies (David Wald, USGS)

- 2. Understanding the 2018 USGS Probabilistic Seismic Hazard Assessment (PSHA) [8:45]** (Nico Luco, USGS)
 - a. Overview and 2018 Update to USGS Probabilistic Seismic Hazard Assessment
 - b. Deterministic/probabilistic/scenarios/deaggregation/hazard tools
 - c. PSHA Intensity Measures and connection to ShakeMap (GMPE's, IM's, deaggregation)
 - d. Beyond USGS PSHA: Site Specific SHA for Dams* (Brett Heppermann, USACE)
 - e. Q/A and facilitated discussion

BREAK [10:00 – 10:15]

* Prequel to next year potential USSD Session on site-specific SHA for Dams.

3. **Real-time earthquake information and notification products and tools [10:15]**
 - a. Overview of earthquake information products, ShakeMap/Cast, DYFI, PAGER, Scenarios, Aftershocks (David Wald, USGS)
 - b. Ground Failure Product – current status report (Kate Allstadt, USGS)
 - c. ShakeMap & ShakeCast – Under the hood: Technical background, Operational considerations, Software and Installation (D. Wald, K. Lin, D. Slosky; USGS)
4. **User experiences with ShakeCast (David Wald, USGS) [11:00]**
 - a. Use cases, examples, users
 - b. Protocols for inspection/response
 - c. Fragilities, and goals for fragilities

Lunch [12:00 pm – 1:00 pm]

5. **Ground motion intensity measures (Eric Thompson, USGS; Richard Armstrong, CSUS) [1:00]**
 - a. Efficiency and Sufficiency; multiple-metrics, superstructure vs components
 - b. Future Metrics, including duration (AI, CAV)
6. **Development of dam fragilities (Mark Schultz, USACE) [1:30]**
 - a. Background: Case histories, failure modes; embankment vs concrete
 - b. State-of-art of fragilities – empirical, models for displacement calculations, yield accelerations, expert opinion, etc.
 - c. Fragilities for generic dams and those with detailed structural information
 - d. Future directions: spectral periods, multiple-metrics, superstructure vs components
 - e. Grouping rather than dam-specific fragilities. Generic curves for owners
7. **Options/Considerations for dam monitoring/seismographs (Jamie Steidl, USGS) [2:30]**
 - a. Options for ground truth, free-field, structure monitoring
 - b. Best practices for free-field and structural monitoring (Mark Meremonte, USBR)
 - c. Options for networking (sharing data with USGS/ShakeMap)
 - d. Interest from the dam community

Break [3:00 — 3:30]

8. **Moving Forward – Group Discussion (Justin Smith, FERC) [3:30]**
9. **Closing (Zara Plasencia, Zamini Consultants) [4:25 – 4:30]**