

**NERC Partnership Spotlight - Sean McGowan, PE - FEMA Region VIII
Earthquake Program Manager & Building Science Lead**

Q: What is the background/history of your organization?

A: The Federal Emergency Management Agency (FEMA) was created in 1979 to coordinate federal support to states in their efforts to prepare for, respond to, recover from, and mitigate all hazards. I think most readers are familiar with our disaster-related roles, so I'll briefly describe our mitigation efforts. FEMA's Mitigation staff work towards reducing the impacts of, and ideally preventing, future natural disasters. We deliver training on earthquake retrofits, manage new floodplain mapping projects, inform building code updates, award grants to state and local governments to improve their resilience to natural hazards, help communities build back better after disasters, provide technical expertise for disaster response and exercises, and provide a variety of other technical services to states.

FEMA is broken up into ten Regions. Our office in Denver is the hub for FEMA Region VIII, which includes Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming. This Regional system allows us to better understand the hazards affecting our states, respond more quickly to disasters, and develop strong collaborative relationships with state and local partners.

Q: How did you get interested in research/disaster safety/response and recovery/resilience?

A: I'd known somewhere deep down that I wanted to pursue structural engineering before I could even read, but I became specifically interested in earthquake engineering during an Engineers Without Borders trip to Peru halfway through college. Many residents live in brittle adobe houses in areas of very high seismic hazard. This was very disconcerting to me, and inspired an interest in cost-effective mitigation techniques to reduce seismic risk. It also planted a seed in the back of my mind that engineering alone can't make society safer. Effective public policy, support from the public, and effective mitigation outreach and education are also necessary for true resilience to natural hazards.

I started my career with seven exciting years on the U.S. Geological Survey's National Seismic Hazard Modeling Project and Engineering Risk Analysis Project. I then transferred to the FEMA Region VIII office where I serve as the Region VIII Earthquake Program Manager and Building Science Lead. I find FEMA's Mitigation work at the nexus of engineering and public policy extremely fascinating, and think it's where I can help effect the greatest impact on public safety.

Q: What do you see to be the future of earthquake science/engineering/research/outreach/response and recovery to increase resiliency? What do you think is moving the cause of resilience forward?

A: I see a number of trends emerging. Two that particularly interest me are:

As we continue to gather new knowledge from each disaster, the boundaries between traditional disciplines are continuing to blur. For example, data that engineers gain from post-earthquake forensic studies and shake table testing are being used to inform municipal policy decisions that will have important resilience implications. We're already seeing policies being enacted to mitigate the risk of non-ductile concrete, soft story, and unreinforced masonry structures. Engineers who foresee policy implications, and policymakers who keep pace with scientific and engineering advancements, will have opportunities to contribute to high-leverage policy decisions that are going to shape our resilience for decades. It's an exciting time in our field!

As resilience policies like retrofit programs gain momentum they will also generate considerable public interest and awareness. As citizens learn more about earthquake risk they will start to more seriously factor it into housing decisions. We'll start to see landlords pricing the costs of retrofits (and ideally also the corresponding reduced insurance premiums) into rental rates. My hope is that consumers will begin incorporating resilience into housing decisions, much like LEED has helped facilitate with its green building-rating program. A number of resilience groups are emulating the LEED rating system. My guess is that the market will begin to account for the resilience rating system(s) that best inform consumers. Once that takes off I think we'll be able to say that resilience has truly "arrived".

Q: Can you tell us about a specific project your organization is working on in earthquake safety/science/engineering/research/resilience/outreach field?

A: We rely heavily on the expertise of our partners at the U.S. Geological Survey to inform our response and recovery efforts in the aftermath of damaging earthquakes. But, we also engage extensively during quiescent periods (affectionately referred to as "Peace Time") to ensure that we're prepared ahead of time to use the best available science during emergency response and recovery. One excellent example involves aftershocks. In the aftermath of a damaging earthquake, emergency managers must rapidly respond while operating under the assumption that strong aftershocks will occur and decay with time. However, traditional aftershock decay models lack the spatial component necessary for mitigating risks when staging and deploying critical resources and staff for disaster response. These high-leverage decisions must therefore be made in an environment of significant threat and high uncertainty.

Thankfully, the USGS is developing Operational Aftershock Forecasting models capable to identifying geographic areas of elevated aftershock hazard in the hours/days/weeks/months following a major earthquake. As you can imagine, this information has important implications for where to set up shelters for survivors as well as where to stage responders and critical supplies. We'll unfortunately never have perfect advance notice of aftershocks to guide these kinds of decisions, but having Operational Aftershock Forecasting data would go a long way towards helping FEMA keep as many survivors and responders safe as possible. A number of us at FEMA Region VIII and at FEMA HQ are partnering with USGS staff in Menlo Park, CA and Golden, CO to help make this a reality.

Another interesting program is Fix the Bricks, which is the centerpiece of a FEMA Pre-Disaster Mitigation grant awarded to Salt Lake City, UT. Homeowners living in unreinforced masonry (URM) dwellings in Salt Lake City can receive FEMA funding to cover a significant portion of seismic retrofit costs. We're particularly emphasizing the strengthening of roof/wall connections to enhance life safety. This unreinforced masonry retrofit guide, complete with AutoCAD design

details, is provided to interested homeowners and contractors by the Utah Seismic Safety Commission. Fix the Bricks has had strong public interest and even has a wait list. Utah residents

and their government officials are taking their high seismic hazard very seriously, and this program is just one of many successful mitigation efforts going on now in Utah.

Q: Do you have any other comments or words of wisdom for our readers?

A: I'd encourage you to revisit your insurance to make sure it aligns with your needs. Earthquake and flood insurance are usually not included in a standard homeowner's policy. Unfortunately, many disaster survivors find that out the hard way, which is pretty heartbreaking.

We are all potentially first responders, so I'd encourage readers to take steps now to prepare for earthquakes and other natural disasters. FEMA provides preparedness tips for a variety of potential disasters at Ready.gov. There are also a number of ways to get involved; for example, Community Emergency Response Teams (CERT) are groups of local citizens trained to assist their communities until help arrives. They receive training in fire safety, light search and rescue, basic disaster response and medical skills, and team organization. These skills can help save the lives of your family members and neighbors if disaster strikes.

You can contribute to this effort by emailing info@flash.org today, and thank you in advance for your ideas and suggestions.