

An aerial photograph of a vast, arid desert landscape. The terrain is characterized by deep, winding, and branching cracks that create a complex, maze-like pattern across the reddish-brown soil. The lighting is dramatic, with long shadows cast by the ridges and into the crevices, emphasizing the rugged and fractured nature of the ground. The overall color palette is dominated by warm, earthy tones of red, orange, and brown.

# The Case for Earthquake Resilience

*Why Safer Structures  
Protect and Promote  
Social and Economic Vitality*

Feb. 23, 2018

## EXECUTIVE SUMMARY

With a \$2.4 trillion gross domestic product, a population of nearly 40 million and a rich diversity of lucrative industries, California boasts the sixth largest economy on the planet. It is also a region famous for its earthquakes, with the risk of experiencing widespread economic and social devastation at any moment. The best way to guard against that threat is to prepare for it – making our cities safer by identifying and retrofitting our vulnerable structures.

Hurricane Katrina, so far, represents the nation’s most devastating natural disaster. Yet the U.S. Geological Survey estimates that an even bigger event – a 7.8-magnitude earthquake in Southern California – would result in more than 1,800 deaths, 50,000 injuries and \$200 billion in damage, with long-lasting social and economic impacts. According to the USGS, the odds are stacked against California in terms of a major earthquake striking within the next 30 years: 99 percent for a magnitude 6.7 temblor, and 46 percent for a magnitude 7.5 quake.

The displacement of potentially tens of thousands of residents can have a devastating impact on a society, its housing market and its broad economic stability. This situation is further complicated when the homes lost reflect a large proportion of a community’s affordable housing stock. People without homes have a harder time reporting for work and that can hamper business activity. The potential impacts on small business, which employs 56.8 million people representing 48 percent of the U.S. workforce, is particularly troublesome when considering that many of these enterprises occupy the very buildings that are at risk of failure during an earthquake.

Safety is of course the primary concern. However, there are real financial considerations affecting building owners. Legal precedent now places liability on building owners, as in the case of an unreinforced masonry building in Paso Robles where the courts found the owners liable for the deaths of two occupants (even though the building technically complied with the city’s retrofit ordinance). Other lawsuits stemming from the collapse of balconies and decks also show that building owners may be held responsible for a structure’s safety even if local jurisdictions have not passed specific ordinances requiring mitigation of unsafe conditions. The simple fact of knowing a building may be unsafe and not taking action may be grounds enough to assign blame through negligence.

The urgency to address these concerns has prompted a new movement called the Seismic Resilience Initiative, (SRI). This working group, led by the United States Resiliency Council, includes BizFed, Local California Building Department Leaders, the Structural Engineers Association of California and others, and is receiving technical assistance from the California Seismic Safety Commission, California Office of Emergency Services, the California Department of Insurance and the International Code Council. Its mission is to promote statewide regulations that will identify buildings that are known to present a heightened seismic risk of death, injury and damage based on their age, structural system, size and location.

Both the State of California Seismic Safety Commission and the Structural Engineers Association of California agree that California must improve the performance of our built environment through resilience-based design and seismic retrofits.

Researchers at Caltech recently determined that for every dollar spent in retrofitting soft-story structures, property owners could expect to save up to seven dollars, not including loss to contents, alternate living expenses or deaths and injuries – all of which would significantly increase cost-to-benefit ratios. FEMA found similar cost benefits in a two-year analysis of seismic retrofit scenarios applied to a variety of building types in locations throughout the United States.

Many West Coast cities, from San Diego to Seattle, recognize the economic value of preserving structures by retrofitting them in a manner that will safeguard them during an earthquake. Financial incentives such as density bonuses, reductions in development standards and relief from nonconforming provisions can incentivize building owners to perform upgrades that promote building safety and revitalize communities for greater economic impacts. Resilience isn't just good for society, it's good for business.

Los Angeles Mayor Eric Garcetti in 2015 pushed for the nation's most sweeping earthquake retrofit laws, requiring seismic fortification of pre-1978 wood-frame soft-story buildings and pre-1977 non-ductile concrete structures. This came on the heels of retrofit ordinances in San Francisco, Berkeley, and other cities. Since then, additional cities have adopted or are considering similar policies of their own.

The White House, in its National Security Strategy dated December 2017, listed the promotion of American resilience against natural disaster as one of the country's primary security issues for the coming year. The National Science and Technology Council, in characterizing the elements of disaster-resilient communities, identifies as the top priority to recognize and understand the impacts of relevant hazards.

Meanwhile, important legislation inspired by SRI and introduced Feb. 15, 2018 by California Assemblyman Adrin Nazarian, a longtime advocate for earthquake preparedness, aims to help cities identify buildings in their communities that could be at significant risk during a major quake, and to establish funding sources to help cover the costs to cities impacted by the law. AB 2681 will provide a "snapshot" of California's vulnerabilities and the potential impacts we face as a state; and it will spotlight communities where there is an urgency to address the matter. The legislation includes:

1. Developing criteria to identify seismically vulnerable building types.
2. Directing building departments to develop an initial list of potentially vulnerable buildings.
3. Notifying building owners that they may have potentially vulnerable buildings.
4. Directing noticed owners to assess the vulnerability of the structure.
5. Building and maintaining a statewide data repository of potentially vulnerable buildings.
6. Identifying possible funding mechanisms to offset costs to building departments.

For more information or to support the Seismic Resiliency Initiative, please visit [www.usrc.org](http://www.usrc.org). Public participation is welcome.