



*We develop seismic policies and share information to promote programs intended to reduce earthquake related losses.*



A non-profit earthquake consortium for the western states

**Summer 2017  
e-Newsletter**  
July 2017

**Western States  
Seismic Policy Council**

801 K Street, Suite 1236  
Sacramento, CA 95814  
Phone: 916-444-6816  
Fax: 916- 444-8077

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**NEWS**

**Many California Courthouses are at High Seismic Risk**

Many courthouses in the state of California fail to meet earthquake seismic safety standards, according to a report presented to the Judicial Council in May. Of the 227 structures included in the study, findings show that: 12 courthouses are at a very high seismic risk (defined as an imminent threat to occupants and total disruption of building systems); 44 courthouses are at high risk (defined as an extensive but not imminent threat to human life as well as extensive building damage with partial to total collapse being likely); and 60 courthouses are at moderate risk. Only 36% of the courthouses in the study were evaluated as acceptable in an earthquake, and 13% could not be evaluated due to incomplete information.

The cost of retrofitting the 12 very high risk structures is estimated to be up to \$400 million. If the 44 high risk structures were added, the price tag would jump to almost \$2 billion. “We need to address this,” said Brad R. Hill, administrative presiding justice of the California Court of Appeals, fifth appellate district. “We can’t be in a position, after a major earthquake, to have the public say, ‘What were you doing, and why didn’t you raise the alarm?’ We are raising the alarm.”

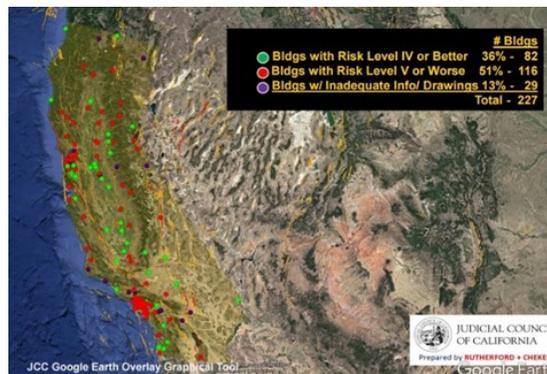


Image: Superior Courts of CA Seismic Assessment Program; map of at risk buildings.

Source: Judicial Council of CA—Rutherford & Chekene/Google Earth

To read the *Seismic Risk Rating of California Superior Court Buildings, Summary of Findings* report visit the Court Facilities Advisory Committee and Courthouse Cost Reduction Subcommittee meeting materials starting on page 82 of the pdf: [www.courts.ca.gov/documents/cfac-ccrs-20170517-materials.pdf](http://www.courts.ca.gov/documents/cfac-ccrs-20170517-materials.pdf)

References:

<http://www.ocreger.com/2017/05/17/many-california-courthouse-buildings-are-seismically-unsafe-state-study-says/>  
<http://sanfrancisco.cbslocal.com/2017/05/18/courthouses-california-seismic-risk/>  
<http://abc7.com/news/many-california-courthouses-pose-risk-during-earthquake-study-says/2009146/>

## Washington Mandates Earthquake & Tsunami Drills in Schools

On Thursday, May 4 Washington Governor Jay Inslee signed new legislation requiring state schools to conduct monthly safety drills. Schools within tsunami hazard zones are also required to have pedestrian evacuation drills. While the approved legislation only states that the drill “may incorporate an earthquake drill using the state-approved earthquake safety technique ‘drop, cover, and hold;’” Maximilian Dixon, Earthquake Program Manager for Washington Emergency Management Division, encourages all schools to participate in the Greater Washington ShakeOut conducted yearly on the third Thursday of October.

“Earthquakes are a threat that every corner of the state faces—from Spokane to the Long Beach Peninsula,” Dixon stated. “Children across the state benefit from learning how to drop, cover, and hold on.”

The state is also currently working on a preparedness campaign: Two Weeks Ready: Be Prepared. Build Kits. Help Each Other. To find out more information visit: <https://mil.wa.gov/preparedness>.

### References:

<https://mil.wa.gov/blog/news/post/coastal-schools-will-be-mandated-to-do-earthquake-tsunami-drills>  
<http://www.shakeout.org/washington>

There are so many ways to stay connected!

Online- [www.wsspc.org](http://www.wsspc.org)  
Twitter- [@WSSPC](https://twitter.com/WSSPC)  
Facebook- [www.facebook.com/WSSPC](https://www.facebook.com/WSSPC)

## Welcome to New FEMA Director, Brock Long



On Tuesday, June 20, with a 95-4 vote, the U.S. Senate confirmed Brock Long as the new FEMA director. Long was the Director of Alabama’s Emergency Management Agency from 2008-2011 where he developed the state’s response to H1N1 as well as serving as the Incident Commander during the Deepwater Horizon oil spill. Prior to that he was the FEMA Regional Hurricane Planner & Response Team Leader and was Georgia’s Emergency Management Agency’s Statewide Planner/ School Safety Coordinator. Before his nomination Long was the executive vice president of Hagerty Consulting, an emergency management consulting firm.

Senator Richard Burr of North Carolina said, “because of his experience, Brock understands it is the work done before the storm that saves lives.”

### References:

<http://www.washingtonexaminer.com/senate-confirms-trumps-nominee-to-lead-fema/article/2626487>  
<http://wgno.com/2017/06/20/senate-confirms-new-fema-administrator-as-tropical-storm-cindy-approaches-louisiana-coast/>  
[http://www.mynews13.com/content/news/cfnews13/news/article.html/content/news/articles/cfn/2017/6/20/brock\\_long\\_confirmed.html](http://www.mynews13.com/content/news/cfnews13/news/article.html/content/news/articles/cfn/2017/6/20/brock_long_confirmed.html)

## New Seismic Software—Fastest Seismic Simulation To-Date

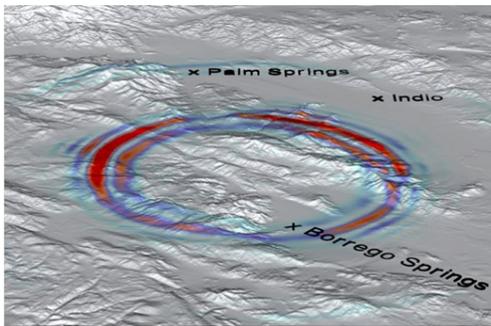


Image: Simulated seismic wave propagation along the San Jacinto fault zone via the new EDGE software.

Source: Alex Breuer, San Diego Supercomputer Center

A collaboration of researchers from California universities and Intel has resulted in software that has enabled them to perform the fastest simulation yet of earthquake ground motions. In addition to saving time and reducing costs, the advantage of the simulation, performing at one quadrillion calculations per second, is to incorporate increased frequency information of the seismic wave field. Obtaining higher frequencies of ground motions will “help us create simulations that can more accurately understand ground motions relevant for common dwellings, which is important in engineering more earthquake-resistant structures,” said Yifeng Cui, founder and director of SDSC High Performance Geocomputing Laboratory.

Using the new software, called EDGE (Extreme—Scale Discontinuous Galerkin Environment), gives researchers the ability to “run about two to almost five times the number of simulations”, said the lead researcher, Alexander Breuer, a postdoc from the San Diego Supercomputer Center.

The collaboration was announced in 2016 and involves researchers from San Diego State University, Southern California Earthquake Center, University of Southern California, and the University of California Riverside with Intel.

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### References:

<https://www.rdmag.com/article/2017/06/novel-seismic-software-sheds-light-earthquake-paths>

[http://www.sdsc.edu/News%20Items/PR20170306\\_seismic\\_simulations.html](http://www.sdsc.edu/News%20Items/PR20170306_seismic_simulations.html)

[http://www.sdsc.edu/News%20Items/PR20160209\\_earthquake\\_center.html](http://www.sdsc.edu/News%20Items/PR20160209_earthquake_center.html)

## USGS Releases Plan to Advance Subduction Zone Science

The U.S. Geological Survey has published Circular 1428, a new blueprint for advancing science and resilience related to subduction zone hazards, entitled *Reducing Risk Where Tectonic Plates Collide – A Plan to Advance Subduction Zone Science*. This new Plan describes how the USGS may leverage scientific and technologic developments, address its stakeholder needs, and maximize capabilities through partnerships – with the overall goal of reducing the risks posed by subduction zone events. The Plan is featured on the USGS main webpage, and a quick summary of the Plan is provided in an accompanying Fact Sheet. All these publications may be accessed by clicking on the links below.

At present the Plan will provide guidance for USGS programs, and hopefully, a means of furthering discussions and collaborations with our partners. To the latter end, the USGS welcomes your feedback and ideas about how to best realize both the Plan’s specific and broadest goals; please send these to [gomberg@usgs.gov](mailto:gomberg@usgs.gov).

### References:

*Fact Sheet 2017-3024:* <https://pubs.er.usgs.gov/publication/fs20173024>

*Circular 1428:* <https://pubs.er.usgs.gov/publication/cir1428>

*USGS Featured Story:* <https://www.usgs.gov/> and <https://www.usgs.gov/news/usgs-publishes-a-new-blueprint-can-help-make-subduction-zone-areas-more-resilient>

## HAZARDS MITIGATION & PREPAREDNESS

### Updated USGS Earthquake Monitoring Strategy

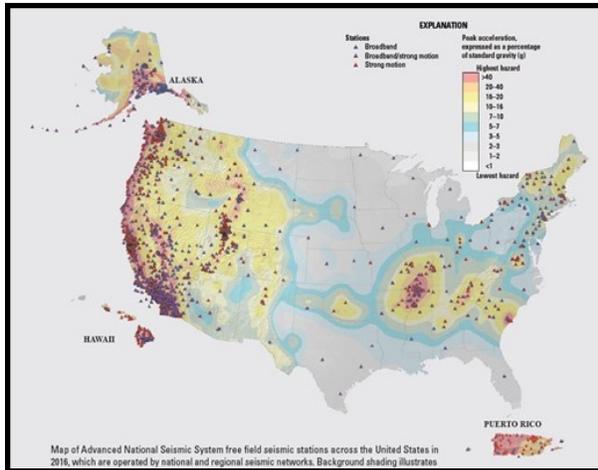


Image: Map of ANSS free-field stations across the U.S. in 2016.

Source: USGS.gov

The “Advanced National Seismic System—Current Status, Development Opportunities, Priorities, 2017-2027” is a new strategic plan that has recently been released by the U. S. Geological Survey Earthquake Hazards Program. The Advanced National Seismic System (ANSS) has three main focus areas:

- 1) improving robustness of essential services;
- 2) retaining capacity for future innovations; and
- 3) developing capacities to improve further earthquake safety and support response & recovery across the nation. Three specific priorities for the program are to ensure readiness in an earthquake crisis; advance earthquake safety in urban areas; and expand the observational database for earthquake risk reduction.

Earthquakes threaten an estimated 143 million lives yearly across the US and they could potentially leave behind \$4.5 billion in losses

*Continued*

annually. These numbers have the possibility to be strongly reduced when communities understand and mitigate their risk.

#### References:

<https://www.usgs.gov/news/updated-usgs-earthquake-monitoring-strategy-released>

<https://pubs.er.usgs.gov/publication/cir1429>

### American Red Cross “Prepare Out Loud” Campaign

The American Red Cross, Cascades Region “Prepare Out Loud” campaign is designed to change the way people think about preparedness. Their website states “To Prepare Out Loud means taking simple steps to prepare yourself and your family for a disaster and sharing how you’re preparing with others.”

“Prepare Out Loud” programs are free to the public; in May there were two successful presentations: Monday, May 1 at Southwestern Oregon Community College in Coos Bay and Thursday, May 25 at the Pearson Air Museum in Vancouver. A disaster preparedness resource guide tailored for Oregon and southern Washington is available here: <https://p.widencdn.net/5rdg1y/redcrossprepareguide> and download the Red Cross Emergency App onto your phone or electronic device.

#### References:

<http://www.redcross.org/news/event/local/or/Prepare-Out-Loud>

[http://www.flashalertnewswire.net/images/news/2017-05/1190/104621/News\\_Release\\_-\\_Prepare\\_Out\\_Loud\\_Vancouver.pdf](http://www.flashalertnewswire.net/images/news/2017-05/1190/104621/News_Release_-_Prepare_Out_Loud_Vancouver.pdf)

[kcbj.com/news/local/prepare-out-loud-free-presentation-in-coos-bay-to-focus-on-earthquake-preparedness](http://kcbj.com/news/local/prepare-out-loud-free-presentation-in-coos-bay-to-focus-on-earthquake-preparedness)

## RESILIENCE AND RECOVERY

### Seismic Rehabilitation Grants Awarded

Oregon's Seismic Rehabilitation Grant Program has awarded \$153.6 million to 100 schools and 47 emergency services facilities in its second round of funding to prepare the structures to withstand a major earthquake. The Seismic Rehabilitation Grant Program is a state competitive grant program that provides funding for the seismic rehabilitation of critical public buildings, particularly public schools and emergency services facilities. Eligible facilities include, but are not limited to: public K-12 schools, community colleges, education service districts, and first responder buildings (including hospitals with acute inpatient care facilities).

In 2016, Oregon received \$50 million which helped fund 41 school retrofit projects. Senate President Peter Courtney stated, "In the last year, we have more than tripled Oregon's investment in the seismic safety of our schools. It's taken 15 years to get here. It's still not enough. Hundreds of schools still need to be upgraded."

To view a list of the 2017 grant recipients visit:  
<http://www.orinfrastructure.org/Infrastructure-Programs/Seismic-Rehab/0417SeismicAward.pdf>

#### References:

<http://www.orinfrastructure.org/Infrastructure-Programs/Seismic-Rehab/>

<https://www.oregon.gov/newsroom/Pages/NewsDetail.aspx?newsid=1999>

## RESEARCH

### Thrust Faulting Opening Explains Large Slip

The lack of shallow seismicity in the subduction zone and its apparent frictional stability (as suggested from laboratory experiments) seems at odds with the observed large scale thrust faulting in shallow depths in the Tohoku earthquake of 2011. A team of engineers and scientists from Caltech and Ecole Normale Supérieure in Paris conducted laboratory experiments to explain this paradox. They discovered evidence that as the rupture propagates upward toward the Earth's surface along the thrust fault, the hanging wall suffers more damage from higher accelerations and may twist away from the footwall, opening up a gap that relieves the friction and allows the fault to slip great distances.

Most models of thrust faulting constrain the sides of the fault so that separation of the sides of the fault is not possible. Now that the separation of the fault has been observed experimentally, with the potential for large slip, there are implications for the size of the tsunami wave that could be generated.

#### References:

<http://www.nature.com/nature/journal/v545/n7654/full/nature22045.html>

<http://m.caltech.edu/news/earthquakes-can-make-thrust-faults-open-violently-and-snap-shut-56641>

## Rose Canyon Fault Studies Lead to Reassessment of Activity

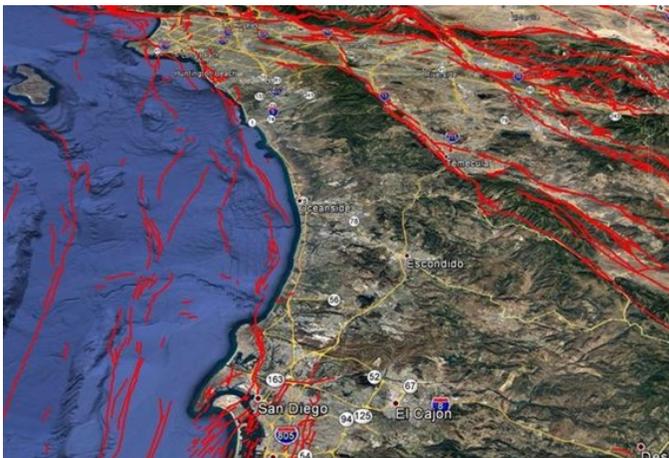
In the fall of 2016 San Diego State University (SDSU) scientists Tom Rockwell and doctoral student Drake Singleton dug and studied a 160-foot long trench on the Presidio Hills Golf Course in San Diego, California. They spent months studying the sediment for traces of past earthquake activity. The SDSU researchers discovered that the Rose Canyon fault produces more earthquakes than previously thought, generating quakes of 6.5-6.8 magnitude once every 700 years as opposed to the previous analysis that such quakes only happened every 1,000-1,500 years.

They also discovered from another site in Old Town that an 1862 earthquake estimated at magnitude 6 had ruptured the ground surface there. The Rose Canyon fault extends from San Diego Bay through Old Town, across Mission Valley and then eventually offshore at La Jolla. An abstract of the results were submitted to the Geological Society of America.

### References:

<http://www.latimes.com/local/california/la-me-san-diego-quake-20170601-htm1story.html>

<http://www.sandiegouniontribune.com/news/science/sd-me-rose-canyon-20170531-story.html>



*Image: This map shows the general route of the Newport-Inglewood/Rose Canyon fault system*

*Source: California Geological Survey/Google Maps*

## Rose Canyon and Newport-Inglewood Faults Connected Offshore

Researchers have discovered a link between two California faults that has raised the potential for larger earthquakes. The offshore connected segments of the Rose Canyon and Newport-Inglewood faults could produce a 7.4 quake; generating damage to the Southern California coastline underneath Los Angeles, Orange and San Diego counties. A quake of this magnitude would be about 30 times more powerful than the 1933 Long Beach quake that killed 120 people (measured at a 6.4 magnitude). Scientists had previously believed that the faults were roughly 3 miles apart, however new evidence from a study by Valerie Sahakian, a researcher now at the U.S. Geological Survey, shows that the gap is only 1 ¼ miles.

### References:

<http://www.latimes.com/local/california/la-me-san-diego-quake-20170601-htm1story.html>

<http://www.sandiegouniontribune.com/news/science/sd-me-newport-fault-20170307-story.html>

<http://ktla.com/2017/03/09/scientists-say-magnitude-7-4-temblor-could-reach-from-l-a-to-san-diego/>

## ADDITIONAL RESOURCES & PUBLICATIONS

### Guide to Identify & Manage Seismic Risks of Buildings for Local Government

On March 9, 2017 the Alfred E. Alquist California Seismic Safety Commission released *Guide to Identify & Manage Seismic Risks of Buildings for Local Government*, a publication addressing ways that local governments can identify and manage seismic risks. It focuses on ‘Collapse Risk’ buildings - buildings that can cause fires, damage other properties, threaten neighborhoods and roads, and present the greatest risk of injuries and death during and/or following an earthquake. The publication covers a broad four-step process to manage these buildings: 1) create opportunities for education, dialogue, and public/private participation in decisions about buildings; 2) estimate the size and nature of the collapse risk; 3) develop and consider options for identifying and mitigating collapse risks; and 4) consider associated management issues.

Success stories and the four-step process are presented in detail at:

[http://www.seismic.ca.gov/pub/CSSC\\_Seismic\\_Risk\\_Bldg\\_Guide\\_Exec\\_Summ\\_Final\\_Mar\\_9\\_2017.pdf](http://www.seismic.ca.gov/pub/CSSC_Seismic_Risk_Bldg_Guide_Exec_Summ_Final_Mar_9_2017.pdf)



*Image: Collapse of Alexandria Building after 2014 South Napa earthquake.*

*Source: State of California Seismic Safety Commission*

### BESR/COSG Webinar—Cascadia Megaquake

The Board on Earth Sciences and Resources’ (BESR) Committee on Seismology and Geodynamics (COSG) have developed a three part webinar series. The webinar series will look at the science and engineering associated with the 800-mile Cascadia Subduction Zone. Part One took place on Thursday, May 18 (12:00PM Pacific); it covered current science on earthquake sources and related hazards. The presenters were Dr. Kelin Wang from the Pacific Geoscience Center/Geological Survey of Canada and Dr. Joan Gomberg from the University of Washington/U.S. Geological Survey. To view the recording visit: <http://dels.nas.edu/resources/static-assets/besr/images/Cascadia%20Megaquake%20-%20Part%20One.mp4>.

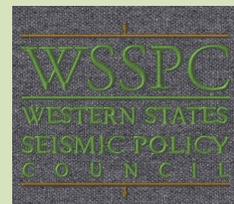
Part Two will cover current strategies to mitigate loss of life and it will take place Wednesday, August 16 (12:00PM Pacific). The presenters will be Yumei Wang a Geotechnical Engineer/Oregon Department of Geology and Mineral Industries and Timothy Walsh an Assistant State Geologist/ Washington Geological Survey. And, Part Three will cover emerging opportunities to reduce uncertainty and provide early warning; the date and presenter are TBD.

For more information visit: <http://dels.nas.edu/global/besr/BESR-webinar>

### WSSPC Logo Wear

A special selection of men’s and women’s shirts emblazoned with the WSSPC logo is now available for order directly from Lands End:

<https://business.landsend.com/store/wsspc/>.



## PEOPLE & TRANSITIONS

### WSSPC Welcomes New Members

- **Gerard Fryer**, Retired Senior Geophysicist, National Oceanic and Atmospheric Administration, now Hawaii Earthquake and Tsunami Advisory Committee (HETAC) Chair
- **Delila Bruno**, Administrator, Montana Disaster and Emergency Services
- **Kelly Johnston**, Director, Yukon Emergency Measures Organization
- **Brent Nichols**, Emergency Management Specialist III, Alaska Department of Homeland Security & Emergency Management
- **Nadene Wadsworth**, Deputy State Hazard Mitigation Officer, Montana Department of Military Affairs

## CONFERENCES, WORKSHOPS & EVENTS

**Southern California Earthquake Center (SCEC) Annual Meeting**  
September 10-13, 2017

**Association of Environmental & Engineering Geologists (AEG) 60<sup>th</sup> Annual Meeting**  
September 10-16, 2017  
Colorado Springs, CO  
For more information: <http://www.aegannualmeeting.org/>

**NEMA 2017 Annual Forum**  
September 28-October 1, 2017  
Scottsdale, Arizona  
For more information: <https://www.nemaweb.org/index.php/forums-meetings/save-the-date>

**Geological Society of America (GSA)**  
October 22-25, 2017  
Seattle, Washington  
For more information: <http://community.geosociety.org/gsa2017/home>

**WSSPC Board Meeting**  
December 7, 2017  
Sacramento, California

**American Geophysical Union (AGU) Fall Meeting**  
December 11-15, 2017  
New Orleans, Louisiana

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If you have a newsworthy item for our e-Newsletter, please forward it to  
Erin Mommsen Program Manager at: [emommsen@wsspc.org](mailto:emommsen@wsspc.org)