

# Preparedness: Some campus buildings do not meet seismic requirements

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to 500 years.

It's an event we expect to see again, said University geology professor Ray Weldon.

The December 2004 magnitude-nine earthquake and tsunami in the Indian Ocean and the devastation wrought by hurricanes Katrina and Rita have increased the public's anxiety about natural disasters. Locally, Eugene and the University have focused attention on developing hazards mitigation and emergency response plans. On campus, several treasured, historical buildings are not up to seismic codes and could crumble in a large earthquake. City buildings holding critical facilities could partially collapse. A major earthquake may also destroy dams and trigger a tsunami that could wreak havoc on the University's coastal campus, while roadways and utilities may be out of service for days.

There are ways that people, the city and the University can prepare

for this catastrophic event, and many measures to mitigate the potential devastation of a subduction zone earthquake are already under way.

But Weldon said the absence of scientific input in emergency plans hampers planning. Not knowing for sure what to expect in the event of a major earthquake doesn't help either.

Politicians tend to deal only with political day-to-day problems, Weldon said. It is more difficult to deal with something that has a 10 percent chance of happening in 100 years.

This leads to "lack of preparation for a small probability, but catastrophic event," Weldon said.

## Dangers on campus

A recent study by the University's Oregon Natural Hazards Workgroup found several campus buildings will experience moderate to great damage in a massive earthquake. These buildings include Straub Hall, Prince Lucien Campbell Hall and McArthur Court.

Other buildings, such as Hendricks, Deady and Friendly halls, have a lesser, but still high risk of experiencing moderate damage.

Hendricks, Deady, Friendly, Gerlinger, Condon and other campus buildings contain unreinforced masonry bearing walls, which are generally brick exteriors with concrete or wood flooring. Unreinforced masonry buildings are particularly hazardous during a subduction zone earthquake with long durations of ground shaking, according to the Cascadia Region Earthquake Workgroup, a regional non-profit group.

In Feb. 2005, the Federal Emergency Management Agency gave a \$100,000 grant to the University to assess hazardous risks on campus and develop a plan for mitigation, said Andre LeDuc, ONHW program director.

Straub Hall is a high priority for retrofitting because the Department of Public Safety is located there. Straub Hall could potentially cripple

DPS' ability to respond to an emergency, LeDuc said.

Currently, DPS is only accessible through a tiny corridor between two older, damage-susceptible buildings. In the event of a major earthquake, DPS could be made inaccessible by falling debris from the buildings and a fire escape that could block the alley, LeDuc said.

The ONHW Natural Hazards Mitigation Plan discusses putting a potential DPS emergency command center outside of the Straub Hall location in preparation for an earthquake, LeDuc said.

ONHW has not performed any disaster mitigation planning for the Oregon Institute of Marine Biology in Coos Bay, but plans to in the future, LeDuc said.

## A city-wide catastrophe

A study by the city of Eugene estimated a subduction zone earthquake could cause \$1.6 billion to \$1.7 billion in building damages in Lane

County. Injuries are estimated to be about 2,700 for an earthquake during the day and 700 for an earthquake at night. Approximately 48 people will be killed during a daytime earthquake and more than 10,000 people will need emergency shelter, according to the study.

These numbers are based on data from the 1990 census. Information from the 2000 census may increase damage and casualty estimates by 14 percent, the study said.

Moist, sandy soil can liquefy during an earthquake, causing foundations to sink or shift and seriously damage buildings, bridges, roads and pipelines, CREW wrote in a 2005 report.

A study by the Oregon Department for Geology and Mineral Industries for the Eugene/Springfield area found hazardous soil covers 10 percent of the total area.

Two critical city buildings, a 911 call center and public works shop are located in this area, but were built with seismic considerations, said Chuck Solin, Eugene emergency program manager.

However, city hall, parking structures and community buildings are still a great risk, Solin said.

Built in the 1960s, city hall does not meet current seismic building codes and would be significantly damaged after a major earthquake, Solin said.

The majority of Eugene police vehicles are parked and stored beneath city hall. After a major earthquake, the building may partially collapse damaging and cutting off use of those vehicles, Solin said.

"They're toast," Solin said. Two previous ballot measure granting funds to rebuild police facilities failed, said Michael Penwell, Eugene facilities design and construction manager.

The city is currently involved in developing a plan to rebuild city hall, a process that could cost more than \$100 million.

If city hall is no longer operable after a major earthquake, then the city plans to relocate temporarily to the new public library, which was built to the most stringent seismic standards, Solin said.

## Threats to dams

A major earthquake could cause dams to break, according to the Eugene Multi-Hazard Mitigation Plan.

Lane County dams were designed and built in the 1940s to 1960s, the plan states, and were not built to current seismic code.

"In the mid 1960s, we didn't think earthquakes could happen in Oregon at all," Solin said.

Seismic considerations were completely absent in the design of Fern Ridge Dam, which was built in 1941 and is located on the Long Tom River, west of Eugene.


A liquefiable sand layer lies under the dam as part of the structure's foundation, said Jim Hinds, dam safety program manager for the Portland district of the Army Corps of Engineers.

This could cause the dam to move downstream, Hinds said.

Fern Ridge Dam is currently under repair for an insufficient drainage system, but the sand foundation will not be repaired at the same time because of lack of money, Hinds said. Evaluation of the foundation's danger is not complete and engineers don't know how it will affect the dam, Hinds said.

Failure of the Fern Ridge Dam would have a great impact on the Junction City area, but will not have a direct effect on Eugene, Hinds said.

Hills Creek Dam, built in 1962 and located on the Willamette River, will create the greatest potential havoc on the Eugene area, Hinds said, adding



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