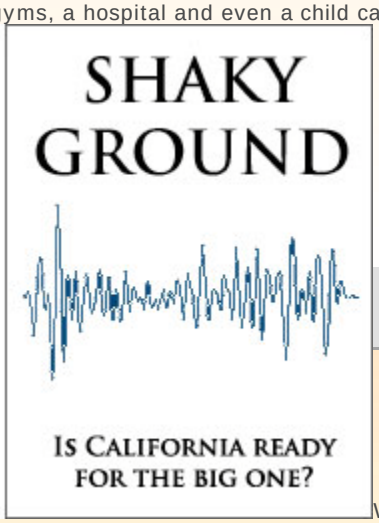
Public universities slow to address seismic hazards

March 18, 2010 | Erica Perez

Nearly 180 public university buildings in California used by tens of thousands of people have been judged dangerous to occupy during a major earthquake — including libraries, classroom buildings, student apartments, gyms, a hospital and even a child care center, a California Watch investigation has found.



While some significant earthquake risks have emerged only recently, university officials have known about seismic problems with the majority of their dangerous buildings for five years or more. In some cases, they've known for decades.

California Watch reviewed thousands of pages of documents and audits and interviewed seismic safety experts about both of the state's public university systems.

Among the findings:

- Dozens of new buildings have been built ahead of seismic safety projects that have languished. Projects with outside support, such as those receiving partial funding from donors, tend to get preference for state funding.
- CSU policies don't mandate fixing the most dangerous buildings first. A building at CSU Fullerton got funding for retrofitting in 1999, even though it was ranked 20th on the system's list of hazardous structures. Eight of the buildings that were ahead of it remain to be fixed.
- Rigid rules prohibit UC and CSU officials from using certain types of construction money on seismic repairs. Instead, both systems make due with limited pots of money for safety upgrades.

No public university in California has more seismically unsafe structures than UC Berkeley.

The campus, part of which sits on the active Hayward fault, has 71 occupied buildings that engineers say would sustain significant structural damage and endanger people's lives in a major quake.

Despite an aggressive effort to repair some buildings, UC Berkeley officials sent construction crews to remodel other unsafe buildings without making needed seismic repairs. And they moved offices for retired professors and research labs from a building that was considered low-risk to a structure deemed a higher risk.

The state's public universities have made progress toward protecting safety on campus. The vast majority of buildings are expected to pose only a small risk of causing injuries or deaths in a major quake.

Since 1979, the UC system has spent more than $1 billion shoring up seismically unsafe buildings, according to a university estimate.

The CSU system has spent more than $480 million on seismic projects since 1987, a California Watch analysis of university documents found.

But it has fallen far behind on some buildings, records show. Eighteen years after CSU began cataloguing its seismically dangerous structures, three liberal arts buildings at CSU Long Beach remain unfixed and occupied, posing a risk to the 1,500 students and faculty who pass through their doors on a typical school day.

CSU Long Beach has retrofitted four other buildings that posed high seismic risks. But instead of making repairs to its three liberal arts buildings, the university used state money to build other projects, including $120 million for two new science buildings and $32 million for a library addition.

The recent quakes in Chile and Haiti serve as a reminder that many buildings are vulnerable, even in a state with strict building codes. The United States Geological Survey predicts California will see one or more earthquakes of at least 6.7 magnitude over the next 30 years.

And there is nearly a 50-50 chance California will see an even more powerful quake of magnitude 7.5 or greater in the next 30 years, the USGS says.

Yet seismic fixes for some of California's campus buildings are at least a decade away.

Universities leave most risky buildings occupied, even though the structures could cause injuries or deaths in the event of a major earthquake. Vacating buildings would mean a decrease in the number of students who can enroll, said Thomas Kennedy, chief of architecture and engineering for the CSU system.

"You're balancing off a series of competing needs," Kennedy said. "Is there a risk in driving a car? You bet. But I drive every day. Is there a risk going into some buildings? Yes, there is. If we do that (close the buildings), that means we teach fewer students. Do we want to cut 50,000 students? Or do we want to go forward?"

No plans to move faster on seismic repairs

Officials say they would like to correct existing structures faster, but they can only afford to do a few projects at a time. The state budget crisis means no new projects proposed since 2009 have received funding.

In the meantime, students and staff are using 28 CSU buildings even though they could collapse in a major earthquake.

An additional 38 occupied CSU structures are less likely to collapse, but would pose serious risk to life because of falling hazards, records show. These include Cal State Fullerton's Titan Gym and several apartment buildings in San Francisco State's University Park North. The apartments were partially retrofitted last year but still have structural problems, records show.

Among the riskiest structures are two buildings at CSU East Bay: Warren Hall and University Library. Warren Hall stands 13 stories tall, a visual focal point for the hilltop Hayward campus. It houses classrooms, administration offices and some student services, producing a steady stream of visitors. A campus official estimated the building has 500 occupants during peak hours.

The building looks out on a courtyard that serves as a bridge to the two-story library. On a recent weekday, some students waited in line for computers while others took naps in foam-padded chairs near the tightly packed bookshelves.

Student Samantha Johnson, 23, knew about Warren Hall's hazards, but she didn't know about the library.

"You just pray that nothing bad happens," she said.

Johnson said it seems irresponsible for the university and the state to leave Warren Hall unfixed. The building is heavily used by any student seeking assistance with financial aid, she said.

"Hopefully it doesn't hurt anybody, but it could. It's dangerous," Johnson said.

University officials can't pinpoint exactly how many people are occupying the most dangerous buildings at any given time, because class attendance varies and foot traffic ebbs and flows. Yet if all the risky CSU buildings were fully occupied, more than 35,000 people could be affected, according to facility reports and campus-provided estimates.

If a major quake were to topple a building on the list of known seismic hazards, university officials have emergency response systems that help them decide where to deploy search and rescue resources.

CSU Long Beach has some of the longest-standing seismic dangers of any CSU campus, with four buildings on the hazard list since at least 1994. CSU East Bay, Humboldt State University, Cal Poly Pomona and San Francisco State University have also known about some highly vulnerable buildings for at least a decade.

In the UC system, about 10 structures that could collapse in a big earthquake remain in use. More than 100 other buildings are occupied even though they would pose hazards.

Of the occupied buildings that pose hazards, nine are libraries, including UC Santa Barbara's Davidson Library, Cal State University Dominguez Hills' Cain Library and UCLA's Darling Biomedical Library. One is a UC Berkeley child-care center on Haste Street between Telegraph Avenue and Bowditch Street. Another is the UC Davis Medical Center.

Also at UC Davis, engineers with Rutherford & Chekene in 1998 found flaws in the main reading room of the Peter J. Shields Library, which was built in 1939. Even at night, students gather to study at the library's wooden tables, under the glow of large, hanging lamps.

The engineers predicted that the same 50-foot-high ceiling that makes the reading room bright and cavernous could seriously hurt someone. In a major quake, the ceiling plaster could crack severely, causing pieces to fall, the report said.

University officials have known about the seismic deficiencies since the engineering report was completed 12 years ago. When California Watch began asking about the building in November, campus officials said they were studying the issue but had no timetable for repairs. Last week, however, officials said they had approved a $294,000 project that will fix the ceiling within a year. Campus Architect Clayton Halliday said the timing had nothing to do with questions from California Watch.

There is no estimate for the total cost of future seismic repairs. But a few figures provide context. The CSU system expects to fund 15 retrofit projects in the next five years at a cost of more than $500 million.

UC Berkeley estimates it will spend more than $1 billion on seismic replacements and repairs through 2019. UCLA pegs its seismic construction costs at nearly $500 million for the same period.

The timeline could face further delays because the projects rely in part on state general obligation bond financing, and no new bond measure has been proposed.

Watchdogs have pushed for faster action. In 1990, a report from the state Seismic Safety Commission recommended a change in law that would require fixing or vacating all state-owned buildings with seismic hazards, including university buildings, by the year 2000. The recommendation never made it into state law.

Universities must seek seismic safety funds

The UC system owns more than 5,000 structures mostly built during the 1950s and 1960s. The CSU system includes about 2,200 buildings, more than half of which are at least 30 years old.

While the buildings were constructed to resist earthquakes at the time, engineers now know that some of these structures are dangerous because they were built before earthquake engineering evolved.

The universities are far from alone. Municipalities and state agencies throughout California have buildings that could collapse or injure someone in an unusually large earthquake.

The UC system adopted a policy in 1975 requiring chancellors to develop plans for fixing buildings that could fail in a major quake. The CSU system created a similar policy in 1993.

Both policies aim to ensure that people can exit buildings safely after a major earthquake. The magnitude and intensity of what would constitute a major quake varies by campus, depending on the location. At UC Berkeley, for example, "major" could be described as a 7.0 magnitude quake on the Hayward fault.

The UC system hired engineers in 1978 to identify risky buildings, and CSU appointed a panel of outside engineers to review their buildings in 1992. Both systems have since added more buildings to the list.

UC rates its buildings from "good" to "very poor," while the CSU system assigns risk levels from 1 to 7, with 7 being the most dangerous.

In the UC system, chancellors decide which projects to submit for state funding. Buildings that are in poor or very poor seismic condition are supposed to get high priority for funding. Meanwhile, chancellors are supposed to try to minimize use of these structures.

Each CSU campus chooses its priority projects for state funding and presents them to the chancellor's office. Under CSU policy, buildings labeled as collapse risks are supposed to get "urgent attention." Such buildings should be retrofitted "as soon as resources can be made available," according to a CSU document.

But you won't find seismic projects filling up the construction priority list.

That's partly because universities don't actually make seismic safety their number-one concern. They have other construction priorities. They want to build modern labs and accommodate growing enrollment.

"In a perfect world, we'd love to do everything," said Kennedy, the chief of architecture and engineering for the CSU system.

And not all seismic projects can be done at the same time. Even if more money was available, retrofits often require a building to be vacated. For campuses, this means finding space to temporarily house classrooms, offices and labs.

The state Legislative Analyst's Office usually suggests that any life safety projects be prioritized above other projects, said Mark Whitaker, fiscal and policy analyst for the office.

"But a lot of it is dictated by what the campuses put forward," he said.

The process doesn't always run smoothly. Sometimes campus planners disagree with the chancellor's office about just how dangerous their buildings are.

In one recent case, the chancellor's office labeled San Francisco State University's main parking garage as a collapse risk in a major quake after staffers discovered signs of structural problems on the fourth floor.

Although the university plans to fix the structure, a consulting structural engineer, who was hired by campus building officials, said the five-story garage poses no risk to occupants. The chancellor's office disagrees.

Dangerous buildings not always given funding priority

Even though the CSU system has a method for prioritizing seismically deficient buildings, the most dangerous ones in the system don't always get fixed first.

A 1997 internal audit found that the university had repaired some lower-priority structures before the most hazardous buildings.

California Watch found that the pattern has continued. Universities got funding for at least 10 lower-priority seismic projects ahead of other buildings that engineers identified as urgently in need of repairs.

One that skipped ahead in line was CSU Fullerton's humanities and social sciences building, which ranked 20th on a list of 25 dangerous structures in 1999.

Yet that year, the building got state funding for repairs ahead of the 19 other, riskier structures, such as Humboldt State University's theatre arts building, which was rated seventh on the list.

Situated on the east end of a tree-filled quad at CSU Fullerton, the cream-colored humanities building rises six stories high. The structure hasn't lost its 1969 look. Its façade bears resemblance to a steam radiator, with long vertical columns spaced evenly apart.

Despite its vintage appearance, the humanities building has modern safety capabilities. A $1.4 million strengthening project added new exterior shear walls designed to counteract earthquake loads.

Meanwhile, Humboldt State University has not fixed the theatre arts building, which has been a known earthquake collapse risk since at least 1999. The campus first requested state funding for the building in 2009, but no new projects were approved that year because of the state budget crisis. Humboldt plans to request funding again in 2011.

The building includes a 700-seat auditorium and classrooms that seat about 100, plus offices for the drama department.

Asked why Humboldt had waited until 2009 to request funding for theatre arts, a Humboldt State University spokesman deferred to Kennedy.

Kennedy said that buildings are not always fixed in order because seismic safety is not always everyone's top priority.

"You realize that (seismic) is an important issue, but it's probably not the most important issue as seen at any one time," he said.

UC Berkeley failed to address seismic dangers

Since 1980, UC Berkeley has spent 58 percent of its state construction funding to strengthen or replace seismically hazardous buildings, according to a California Watch analysis. That's more than $300 million in state money spent on seismic upgrades, not counting other sources of funding.

The pace of the work intensified after 1997, when a team of engineering firms reevaluated every building for earthquake safety. Since that time, 91 percent of Berkeley's state construction funding has gone to seismic

projects. Among California's public universities, only UCLA has spent more state construction money on seismic fixes than UC Berkeley.

The campus has now strengthened more than 50 buildings, making UC Berkeley safer in the event of a major quake.

However, over the past several years, the university has also remodeled or upgraded buildings with known seismic dangers without fixing the structural deficiencies.

Edward Denton, the university's vice chancellor of facilities services, said the university generally won't move people to a building that's in worse condition than the building they're in.

But that's exactly what happened in 2005, when the university relocated labs and offices for retired professors from a building that had a low seismic risk to one that was rated a higher risk, according to UC Berkeley documents.

The project took labs and professors out of Davis Hall North, which was being replaced by a new, state-of-the-art headquarters for the Center for Information Technology Research in the Interest of Society. They moved into the seismically hazardous Davis Hall South in 2005. UC Berkeley officials could not say how many people were relocated.

Denton defended the move, saying the university made Davis Hall South safer with a partial retrofit in 2004. But he acknowledged that even after that construction project, the building is still rated "poor."

In most of the projects involving "poor" structures, the university shuffled people from one seismically hazardous building to another.

In 2002, then-UC Berkeley Chancellor Robert M. Berdahl approved $633,000 to remodel office space in the basement of the seismically risky Giannini Hall.

The university had originally planned to move staffers from the seismically "poor" Mulford Hall to Barker Hall, rated "good." Instead, the university moved these people to Giannini Hall in 2003.

According to a 1997 report authored by three engineering firms, the three-story Giannini Hall, which was constructed in 1930, would crack significantly in a violent earthquake. Pieces could fall on to people from above.

In an earlier case, the university moved animal research facilities out of the "poor" rated Tolman Hall in 1994 and remodeled the ground floor to accommodate human psychobiology research. That move freed up space for an institute that moved from an off-campus location into Tolman, without fixing the building's structural deficiencies.

Denton said he would be surprised if any remodel to a "poor" building had expanded its usage, because the square footage of the building didn't increase. But he couldn't say how many people used the buildings before and after each renovation.

Denton also said that it's a good thing when the university remodels parts of seismically hazardous buildings, even if the work doesn't fix structural problems. That's because the work secures potential falling hazards, such as ceiling tiles and bookshelves, he said.

"The occupants of that renovated space are actually in, I think, better shape than someone who isn't," Denton said.

The university plans to begin repairing Tolman Hall in 2012, although that project will depend on state funding. Meanwhile, the campus doesn't plan on fixing Giannini Hall or Davis Hall South for a long time. Neither building is in the 10-year plan, meaning retrofitting will likely have to wait until after 2019.

Private donations play major role in renovations

Some building officials from different universities acknowledge projects with partial outside funding move to the front of the line for state money because the state can get new construction at a discount.

California Watch found several cases where buildings that leveraged funding from donors won state construction money ahead of seismic retrofits that had been on the radar for years.

While the donor-funded buildings did not necessarily cause campuses to delay seismic repairs, the externally supported projects certainly progressed faster.

At CSU East Bay, for example, the campus won $11.5 million in state funding in 2002 for a new building for the college of business and economics – a project for which the university had raised more than $10 million in private donations.

It's unclear how long the capital campaign had been in the works. But campus officials had known for at least three years about problems with Warren Hall, the administration and classroom building that could collapse in a major quake. The Hayward fault runs through the campus.

Warren Hall was on a 1999 list of buildings under investigation by the CSU's Seismic Review Board because of newly discovered dangers.

Campus officials argued that the signature business program needed its own space and up-to-date technology. Previous requests for state money had been unsuccessful.

However, when the campus brought donor funding to the table, including $5 million from the Wayne and Gladys Valley Foundation, the state kicked in the rest.

The Wayne and Gladys Valley Business and Technology Center was the first new classroom building on campus in more than 30 years when it opened in 2007. With plasma screens and a presentation center that seats 250 people, it became a favorite spot for hosting guests and events.

The sleek, new building has a modern look – a crisp, white rectangle with grey accents. It's within sight of Warren Hall, which still hasn't been fixed.

Administrators thought the money to fix Warren Hall would come earlier.

In 2004, then-President Norma Rees said in a column in the student newspaper that the campus would use money from Proposition 55, a voter-approved, general-obligation bond measure, to fix the aging structure. But that didn't happen, in part because the project grew more complicated.

The campus is now putting finishing touches on a $43 million student services building that will allow the university to relocate some of the occupants of Warren Hall later this year.

Still, Warren Hall itself remains unfixed and will continue to house classrooms and offices. It's now the campus' top priority for state funding, but the project may have to wait years for construction money because of the state budget crunch.

Kennedy said donors sometimes make offers to help pay for specific projects, giving the state a coupon for discounted construction – and that's something universities and the Legislature pay attention to.

"If someone is trying to balance something out and says, 'I'll give you $10 million to consider this,' that has to be taken into consideration," he said.

He could not recall a single time that a donor gave money for seismic repairs, or that a university launched a capital campaign around a seismic repair project.

Bonds, endowments not used for retrofitting

Officials from both university systems say they can't fix dangerous academic buildings with the money they use to build parking structures, recreation centers or campus housing. They finance those projects through bonds, which use future fee revenue to pay for the resulting debt service.

And administrators say donors generally aren't likely to bankroll seismic retrofits.

"The donors believe it's the state's responsibility to fix seismic," Denton said.

As a result, seismically hazardous buildings can languish on the wait list for state funding while workers erect dorms funded by revenue bonds or buildings funded by wealthy alumni.

The UC system and its campuses have combined endowment assets of $7.8 billion and the CSU system has $717 million, according to their most recent annual reports. Neither system could name a case in which a campus used interest from these endowments to pay for seismic construction.

Whitaker of the Legislative Analyst's Office said there's no reason why campuses couldn't use available endowment funds to fix hazardous buildings.

"It just depends on what their priorities are and how much is available," Whitaker said.

Even when it comes to the limited pots of money that the universities can use to fund retrofits, seismic safety doesn't always take precedence.

CSU Long Beach got funding to build a new science building in 2004, even though the university and the CSU system had known for at least a decade that the school's liberal arts complex was a collapse risk. That's because the campus had been planning an overhaul of the science complex since the early '90s, said Susan Brown, the campus' director of physical planning and construction management.

The three liberal arts buildings, constructed in 1954 and 1955, are clustered together at the south end of campus. The two-story buildings are long and rectangular with two uninterrupted rows of large windows stacked on top of each other, giving each building the appearance of a slice of sheet cake.

The windows contribute to the structural weaknesses and make the building less likely to survive a major earthquake, according to a 2008 CSU document. Experts with Englekirk & Sabol Consulting Engineers told the

university the buildings could see significant structural damage and areas of collapse, according to a 1993 seismic evaluation.

The liberal arts buildings are hardly eye-catching or prominent, but they're highly trafficked, with an estimated 1,500 people taking classes, working in offices, or providing student services every day.

The university won more than $1 million in state funding in 2005 to strengthen the buildings with shear walls and concrete infill, but lost the construction money to a bureaucratic mix-up.

Long Beach spent $102,000 of the state funding on a design for a three-phase project, only to find in 2007 from the state Department of Finance that the deadline to use the construction funding would expire before the project could be completed. Long Beach had to give the rest of the money back to the state, records show.

Brown explained it as a miscommunication about the deadline.

Their first attempt stymied, campus planners worked with consultants and the chancellor's office to devise a much grander proposal.

The university hired HMC Architects to weigh the pros and cons of strengthening the existing structures vs. replacing them with one large building with more lecture space. The 2008 feasibility study recommended the more expensive replacement project, describing it as a way to maximize campus real estate.

The university ultimately embraced that approach. Officials now plan a two-phase project that will cost an estimated $69 million.

The project comes in spite of the CSU's own policy, which says that structures rated as hazardous as Long Beach's liberal arts buildings need to be fixed urgently, regardless of other improvements officials may want to make to the building down the road.

The first phase is now on the priority list for state funding, but it will likely be several years before construction begins because of a backlog in projects.

"I view it as a disappointment in terms of not being able to implement the (first) project, but I believe the bigger project that we have will do better for the university," Brown said.

In the meantime, students use the buildings every day, taking classes in topics such as child and adolescent development, and world geography.

Erica Perez reported this story.

E-mail

This story was edited by Mark Katches and Robert Salladay and copy edited by William Cooley.

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March 24, 2010

When the earth shakes, it is recorded on a Richter Scale. When we think of "real" earthquakes, we think of the movie type such as the 1906 quake that rocked San Francisco. The San Andreas Fault moved and that was the earthquake. Landslides, meteors striking the earth, mine collapses and the collapse of underground cavities where water or oil have been removed also are recorded as earthquakes. The recent earthquakes east of Oklahoma City are examples of cavity collapses where oil had been removed. The mine collapse that trapped miners in Utah was also recorded as an earthquake. When an earthquake is the result of a fault

movement, it is usually at least ten miles deep. Underground collapses are usually very shallow. The mine collapses around Reno, Nevada are recorded as earthquakes. Shallow earthquakes cause relatively more damage than deep earthquakes as there is less mass to cushion the shock. Two shallow collapses were the Landers Earthquake of June 28, 1992 and the Northridge Earthquake of January 17, 1994. Fault earthquakes are preceded by underground magma flows. The magma from the core of the earth fills the fault and if there is enough pressure on the fault, and if there is enough pneumatic pressure, the fault shifts and thus, the earthquake. A magma flow is like an antenna and the energy given off by the magma is painful. It bothers some people and some animals. In 1983, I learned that I was sensitive to underground magma flows that can trigger earthquakes, or, become volcanoes if the magma reaches the surface. Since then, I have detected more than a hundred significant earthquakes, and a volcano, before they happened. On January 5, 2010, I was recorded live on KRCRTV, Redding, California. When asked what underground magma flows that I detected, I reported five. Those five are still active and could produce seismic activity: 1. 30 miles west of Red Bluff, CA; 2. Near the CA-OR border, near the Pacific Coast; 3. Due north, probably Mt. St. Helens; 4. Northeast, probably Yellowstone NP; 5. About 50 miles east of Redding, California, probably near Lassen Peak. Lassen Peak formed after Mt. Tehama exploded many decades ago. For what its worth, after appearing on TV on 1/5/10, more than 50 small 2.5+ earthquakes were recorded near Yellowstone National Park. Some magma flows take many months, even over a year, before anything happens. And, some magma flows produce only small earthquakes, or even none at all. Note: After an earthquake happens, people within a few hundred miles can notice that they feel better. A certain ache or pain will just be gone. This also happens when huge earquakes happen anyhwhere on Planet Earth. Before earthquakes I get a migraine headache and a very stiff neck. Two times I went to a chiropractor, complaining about my stiff neck. Both times the Chiro told me that my neck was too stiff to adjust. When asked what was happening, I told hime that I was detecting a magma flow toward the SF Bay Area. The two visits were Friday, October 13, and Monday, October 16, 1989. On Tuesday, October 17, 1989, the Loma Prieta earthquake shook the Bay Area. The epicenter was two miles from Aptos, CA, east of Santa Cruz. I remember SF Mayor Art Agnos calling it the San Francisco earthquake. I think he wanted recovery funds to go to San Francisco. Anyhow, I did not even return to the chiropractor as my headache and stiff neck went away. After many more earthquakes, I was on Oprah as she was doing a program on "people who get premonitions." I am now living in Redding, California and if anyone who reads this is curious, feel free to e-mail me at jerry.hurley@att.net

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perchecreek

May 19, 2010

Much of the information compiled by California Watch on the seismic safety of California campus buildings is available on the side bar to this article. Unfortunately, there does not appear to be a single, written document containing this information, and so the information is cumbersome to access. For example, descriptions of individual buildings can only be accessed by following a link to a page containing a map provided by Google. Each building's description can then be accessed by clicking on an icon, in response to which a pop-up window opens. This format makes it impossible to scan all buildings quickly, or to redistribute the information, or to use it in other contexts. Hence, the usefulness of the research that California Watch did is limited. Please be so kind as to provide a single text or pdf document that contains the entire set of information compiled by California Watch on California campus seismic safety, including a table of contents, index, and citations.

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