

Quake stirs debate over building codes

Some urge caution, others say standards should change immediately

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How quickly can California learn from the disaster in Japan?

That's the debate among structural engineers, who expect to see the quake and tsunami lead to changes in California building codes.

Local structural engineer **Kit Miyamoto** — who was in Japan for a conference when the disaster struck — suggests immediate action.

“The private sector doesn't need to wait for government to act,” he said in an interview this week following his return to Sacramento. After observing the devastation first-hand, he's urging architects and building owners, including homeowners, to go beyond the current building codes.

In touring the devastation, “What I learned is that civilization is very fragile,” said Miyamoto, founder of [Miyamoto International](#) in West Sacramento. “There was no food, no fuel. Finally I found a little ramen restaurant that was open because they had a propane tank.”

But others say lessons from natural disasters don't come quickly, and rash decisions could confuse the public.

“I'm urging a sense of caution, as much as I want to draw attention to seismic issues,” said **Ryan Kersting**, a structural engineer at Buehler & Buehler Structural Engineers in Sacramento. It can take years to draw meaningful conclusions, he said.

And then there are the ethical questions, weighing costs and benefits.

“You have to balance the risk versus what you are willing to spend,” said **Hans Strandgaard**, project manager and principal engineer at [CH2M Hill](#) in Sacramento, and an expert in bridge engineering. “This is something we do in everyday life. But the cost to society is big for events of that magnitude.”

Then add to the mix the inability to predict an unprecedented event.

“We can only plan for what we can expect,” Strandgaard said. “The trouble is, our recorded history of events, even with international data, is maybe 100 years. That's not very much time in the big scheme of things.”

In addition to re-evaluating earthquake measures, California also might want to reassess its risk of a tsunami, which caused most of the damage in Japan. **Stephen Pelham**, president of the [Structural Engineers Association of California](#), said the state doesn't have the subduction zones typically associated with the destructive waves, but the presence of such zones in the Pacific Northwest could prompt a closer look.

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California has no building codes directly addressing a tsunami event, said **Dave Walls**, executive director of the California Building Standards Commission. The 11-member commission updates the state's building codes on a 18-month cycle; the latest cycle started in December, meaning there could be an opportunity to address the issue before new codes are adopted, probably in October.

It's a healthy debate, experts say.

"Structural engineering is a learn-by-doing field," said Pelham, an engineer and principal at [Barrish Pelham & Associates](#). That means the greatest lessons often are learned from the tremors themselves, rather than in a lab or on a computer.

When it comes to which method is better, quick or thorough, it turns out that California has done both.

Following the 1994 Northridge earth-quake, engineers quickly realized certain methods of welding beams to columns failed miserably, Walls said. That prompted the standards commission to halt such methods. But Kersting said that in-depth analysis over the next few years, the kind that follows most major seismic events, refined the industry's understanding. The result was a building code that spelled out a safer way to connect those beams and columns, he said.

National experts, led by the [Federal Emergency Management Agency](#), typically convene and begin a long process of analysis. Participants include the National Earthquake Hazards Reduction Program and Structural Engineers Association of California. Kersting chairs the latter group's seismology committee.

One thing that's beyond debate is that regulations cannot make buildings earthquake proof. All the engineers interviewed for this article said there's a misconception that building codes strive for such a standard.

Building codes often are adopted to prevent loss of life or total collapse, but they don't ensure that a particular building or bridge will be operable following a large quake, said Strandgaard.

He stressed the need for backup systems that anticipate catastrophes, such as the loss of power and backup generators at the Fukushima Daiichi nuclear power plant in Japan that led to radiation leaks and fears of a meltdown.

Structural engineers also agree that when it comes to buildings, newer is better. Most believe that California's current codes largely are up to snuff. The danger, however, comes from older unreinforced masonry buildings that have not been retrofitted. So far, California hasn't tackled the issue, other than for critical structures like hospitals.

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As he toured the damage in Japan, Miyamoto saw older concrete buildings turned to dust while modern ones held up well. He was in Japan to present at an earthquake engineering conference at the Tokyo Institute of Technology when the earthquake struck.

His most profound moment came at Arahama Beach, where he once camped as a boy.

“The whole district does not exist any more,” he said. “The beach is gone. It really hit home for me. A way of life has been destroyed.”

mshaw@bizjournals.com | 916-558-7861

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