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Quake early-warning system could be built with water bond funds

David Perlman

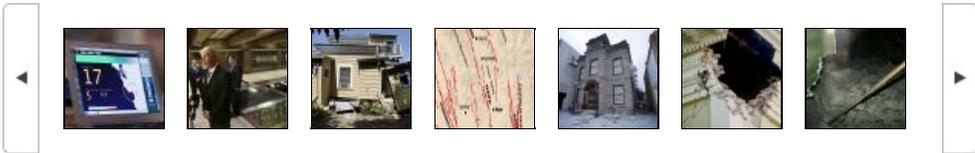
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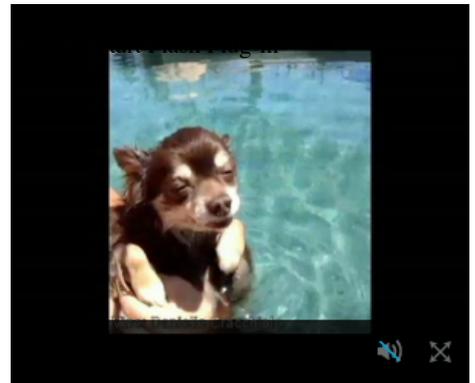
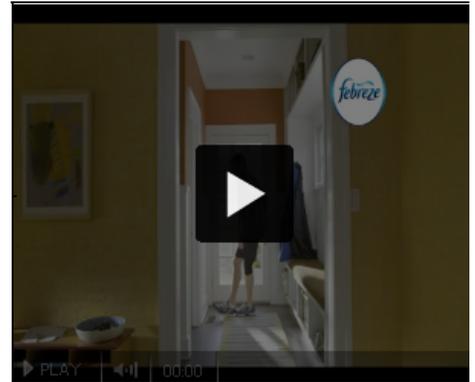
Richard Allen, UC Berkeley Seismological Laboratory director, speaks during a press conference on BART's earthquake preparedness at the Embarcadero BART station on Monday, August 25, 2014 in San Francisco, Calif. Photo: Lea Suzuki, The Chronicle | Buy this photo



The money needed to complete California's proposed earthquake early-warning system could well come from the billion-dollar water bond issue now on the November ballot, lawmakers in Sacramento and the scientists developing it said Monday.

Sunday's early-morning Napa quake could serve as the impetus for locking down the estimated \$80 million it would take to build the warning system that was approved by the Legislature last year and signed by Gov. Jerry Brown without funding.

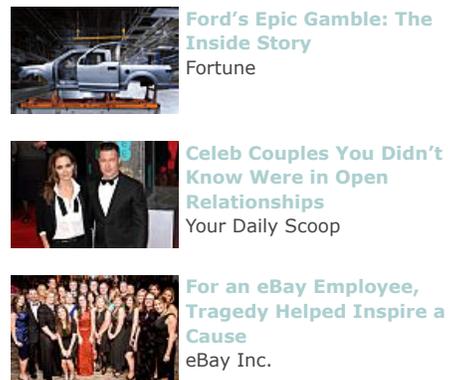
"I'm hoping yesterday's earthquake shows everyone the urgency on which to act to secure the funding," said state Sen. Alex Padilla, D-Pacoima (Los Angeles County), who authored



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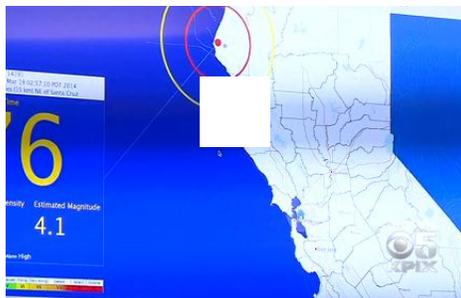
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the bill to create the system.

Padilla said he planned to meet with Mark Ghilarducci, director of the state Office of Emergency Services, to push the idea.

Proposition 1

Proposition 1 would authorize more than \$7 billion in general obligation bonds for state water supply infrastructure projects, including public water system improvements, drinking water protection and watershed protection and restoration. On that basis, Padilla and others said, it makes sense to use a fraction of the money to develop a system that would give officials time to protect water sources in the event of a major quake.

Richard Allen, director of UC Berkeley's Seismological Laboratory and a leading

developer of the statewide early-warning system, said Monday an incomplete version operated superbly Sunday as the magnitude 6.0 earthquake began to rupture the ground under what scientists believe is the West Napa Fault near the Napa Valley city of American Canyon.

Allen said measurements he took showed Berkeley would have had at least 10 seconds warning that danger was coming had the system been fully operational. It would have given residents of San Francisco 12 to 14 seconds of warning, at least enough time to "duck, cover and hold" before the ground started shaking, Allen said.

"There couldn't be a clearer signal that the system works," he said, "so let's get it funded, already."

Although the law requires the state to complete an early-warning system, it is up to the Office of Emergency Services to find the money without tapping the state's general fund.

Early-warning systems are now operating successfully in Mexico and Japan. And Japan's system was credited with saving thousands of lives when the magnitude 9 Tohoku earthquake destroyed the Fukushima nuclear power plant in March 2011.

The systems are linked to the first fast-moving seismic waves that a quake generates and that travel through the ground far faster than the slower and dangerous seismic waves that cause ground-shaking. By picking up those first "P waves" at the outset, a warning system can alert distant areas up to 60 seconds before a quake strikes.

In a fully operating system, signals that dangerous ground-shaking is imminent would automatically and instantly reach public agencies like fire departments and hospitals and transit systems like BART - where trains have already been automatically slowed and even stopped during system tests. Public schools would also receive alerts. Tokyo's early warnings are broadcast automatically and can be linked to privately owned smartphones.

The epicenter of Sunday's quake is apparently on the West Napa Fault, but scientists cannot yet be positive of which fault strand actually ruptured, said David P. Schwartz, a senior research geologist at the U.S. Geological Survey in Menlo Park.



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That's because the fault is not a single clear line in the Earth's crust running down the Napa Valley for 25 miles, as many people think and as an 8-year-old map indicates. It has many fragments, and tracing its full length accurately would require the best seismic detective work for clues to quakes that may have struck millions of years ago, Schwartz said.

Quakes' markers

"The edges of hills, the terraces that streams cut in the distant past, aircraft images, and the occasional trenches that geologists have dug to uncover signs of ancient quakes - these all help to suggest where an earthquake probably once hit," he said.

Under the Alquist-Priolo act of 1972, the State Geological Survey must create detailed maps of all the "active" seismic faults in California, and property owners must disclose any seismic hazards on their land so buyers can know of any dangers they're facing, Schwartz explained.

Geological epochs

But the word "active" only means faults where earthquakes are known to have struck within the past 14,000 years - a period known as the Holocene. Meanwhile, geologists creating other types of fault maps can seek evidence that goes back 2.5 million years or more through what's known as the Quaternary period - and those maps are fragmentary at best, he said.

It will take much more field work in coming weeks before scientists from the USGS and their colleagues from the State Geological Survey can pinpoint precisely where Sunday's pre-dawn quake ruptured 7 miles beneath the ground in the Napa Valley, Schwartz said.

David Perlman is The San Francisco Chronicle's science editor. E-mail: dperlman@sfgchronicle.com

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chiree_ Rank 132

It blows my mind that a state with a budget of almost \$100b, has to struggle to build an \$80m early warning system. It seems like a total no-brainer and possibly the most efficient use of state money ever.

The whole, '10 seconds isn't a lot' argument isn't very valid in my book. That's plenty of time to stop trains, put highway warnings, for individuals to shelter, stop surgeries, automatically cut off gas lines, etc. Japan's early warning system is credited with saving many lives in Tokyo...
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mybob Rank 241

"it makes sense to use a fraction of the money to develop a system that would give officials time to protect water sources in the event of a major quake."

That's just a lie. The "warning" would be at most a few seconds. What exactly can anyone do in that time to protect our water sources? Nothing. Use the money to fix the infrastructure as it was intended. And needed.

4 hours ago 0 Likes

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mybob Rank 241

Lots of money. Almost no benefit. None of the damage we saw would have been prevented, and probably none of the injuries either. Why don't we fix our levee system instead. If we get an earthquake that takes out the levees that protect our drinking water a lot more people will be in much worse trouble. Or we could use the money on any of the other necessary infrastructure projects we desperately need.

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ernmeister Rank 405

Of course it makes sense. Use funds designated for other purpose for your favorite project. It's CA, after all.

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mcbane Rank 593

This is why I vote "no" on nearly every bond issue. They always use the money to go on a spending binge unrelated to the bond purpose and later we find out that there are no funds remaining to properly implement whatever the bond was intended to accomplish.

6 hours ago 2 Likes

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ernmeister Rank 405

@mcbane A lesson sadly learned by age. The legislature has no accountability at all in these matters. As long as we give them money, they find a way to spend it. The current pension deficit is a massive and frightening overhang, and they pretend it does not exist. Just spend spend and spend.

5 hours ago 1 Like

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fennario4899 Rank 81

@ernmeister "As long as we give them money, they find a way to spend it"
Yeah, on things like roads and earthquake warning systems. Can't have that!

4 hours ago 0 Likes

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jamesalin Rank 3661

how about a earthquake warning bond to pay for the earthquake warning system. Water bond stuff should pay for water stuff

12 hours ago 5 Likes

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DannCoulter Rank 9

@TeaAmerica

Be nice TA, he has two (or is it three now?) business' to run.

While posting here 20 hours a day.

Not to mention doing exhaustive research on every post I make.

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jamesalin Rank 3661

@TeaAmerica what are you talking about?

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