

California State Senate

ALEX PADILLA
SENATOR, 20TH DISTRICT



March 1, 2013

Dear Colleague:

I am writing to request your support for Senate Bill 135, legislation I have authored to create a statewide earthquake early warning system in California.

Most Californians have experienced firsthand the effects of an earthquake. We remember the Loma Prieta, Northridge, Whittier Narrows, and Sylmar quakes. And, we all know that another major earthquake in California is not a matter of if, but when.

The stakes got higher when in January, the California Institute of Technology and the Japan Agency for Marine-Earth Science and Technology published a study which concluded for the first time that a statewide earthquake involving both the Los Angeles and San Francisco metropolitan areas may be possible.

While we cannot prevent an earthquake, we should do more to prepare ourselves. Earthquake early warning systems are in place, or in the works, in a number of earthquake prone nations including Japan, Taiwan, Mexico, Turkey, Italy, China and Romania. They not only save lives, they help mitigate damage.

Here in California, the California Institute of Technology, U.C. Berkeley, U.S. Geological Survey, California Geological Survey and others operate a demonstration earthquake early warning system called the California Integrated Seismic Network. SB 135 would build upon that progress and calls for a fully developed statewide system that would detect seismic activity, determine the progression and alert people in advance of an approaching earthquake to save lives and mitigate damage. It would provide Californians critical seconds and up to 60 seconds to assist loved ones, pull to the side of the road or exit a building. It would allow time to safely stop trains, power down critical infrastructure, and turn off industrial machines. Such a system would not only alert the public via television, radio and smartphones, it would speed the response of police and fire personnel by quickly identifying areas hardest hit by the quake.

Attached, please find a sample resolution in support of SB 135, a copy of the bill, and a fact sheet with more information. I look forward to working with you so that an earthquake early warning system becomes a reality in our state sooner, rather than later.

If I can be of any assistance, please contact me or my staff at (916) 651-4020.

Sincerely,

A handwritten signature in black ink that reads "Alex Padilla".

Senator Alex Padilla



RESOLUTION

WHEREAS, according to the United States Geological Survey, California is one of the most seismically active states, second only to Alaska; and

WHEREAS, California has experienced dozens of disastrous earthquakes that have caused fatalities, serious injuries, and significant economic loss; and

WHEREAS, ninety percent of the world's earthquakes and over eighty percent of the world's largest earthquakes occur along the Circum-Pacific Belt, also known as the Pacific Ring of Fire. The Pacific Ring of Fire includes the very active San Andreas Fault Zone in California; and

WHEREAS, the Uniform California Earthquake Rupture Forecast (UCERF) released in 2008 predicted a 99.7 percent likelihood of a magnitude 6.7 or larger earthquake in California in the next 30 years; and

WHEREAS, a 2013 study published by the Caltech and the Japan Agency for Marine-Earth Science and Technology discovered that a statewide California earthquake involving both the Los Angeles and San Francisco metropolitan areas may be possible; and

WHEREAS, Japan, Taiwan, Mexico, Turkey, Romania, Italy, and China either have or are working on earthquake early warning systems that are capable of saving lives and helping to mitigate loss; and

WHEREAS, California Emergency Management Agency, Caltech, California Geological Survey, University of California at Berkeley, United States Geological Survey, and others have been conducting earthquake early warning research and development in California and together they operate the California Integrated Seismic Network, which has a demonstration earthquake early warning capability; and

WHEREAS, by building upon the California Integrated Seismic Network and processing data from an array of sensors throughout the state, a fully developed earthquake early warning system would effectively detect the strength and progression of earthquakes and alert the public within seconds, up to 60 seconds, before potentially damaging ground shaking is felt; and

WHEREAS, the City/County of _____ must do all it can to better prepare for future earthquakes and that an earthquake early warning system should disseminate earthquake information in support of public safety, emergency response, and loss mitigation;

NOW, THEREFORE, BE IT RESOLVED, with the concurrence of the Mayor, that by the adoption of this Resolution, the _____ hereby SUPPORTS Senate Bill 1525 (Padilla) that would create an earthquake early warning system in California.

PRESENTED BY _____

SECONDED BY _____

Senator Alex Padilla

Fact Sheet

SB 135 – PADILLA

Earthquake Early Warning System

Summary

SB 135 would require the development of a comprehensive statewide earthquake early warning system in California.

Background

Ninety percent of the world's earthquakes and over eighty percent of the world's largest earthquakes occur along the Circum-Pacific Belt, also known as the Pacific Ring of Fire. The Pacific Ring of Fire includes the very active San Andreas fault zone here in California. The San Andreas is the "master" fault of an intricate fault network that cuts through rocks of the California coastal region. The entire San Andreas fault system is more than 800 miles long and extends to depths of at least 10 miles within the Earth.

Predictions from the Uniform California Earthquake Rupture Forecast released in 2008 states there is a 99.7% likelihood of a magnitude 6.7 earthquake and a 94% chance of a 7.0 magnitude earthquake in California within the next 30 years. In other words, a major earthquake in California is not a matter of *if*, but *when*.

In January, 2013, the California Institute of Technology and the Japan Agency for Marine-Earth Science and Technology published a study concluding for the first time that a *statewide* California earthquake involving both the

Los Angeles and San Francisco metropolitan areas may be possible.

While earthquakes cannot be predicted or prevented, using advanced science and technology we can detect seismic activity to provide an advanced warning, save lives and help mitigate damage.

The objective of earthquake early warning is to rapidly detect the initiation of an earthquake, estimate the level of ground shaking to be expected, and issue a warning before significant ground shaking begins. This can be done by detecting the first energy to radiate from an earthquake, the P-wave energy, which rarely causes damage. Using P-wave information, we can first estimate the location and the magnitude of the earthquake. We then use this to estimate the anticipated ground shaking across the region to be affected. The method can provide warning before the S-wave, which brings the strong shaking that usually causes most of the damage, arrives.

California currently has the California Integrated Seismic Network (CISN), which is a demonstration earthquake early warning system. A fully developed system would process data from an array of sensors throughout the state. The system would effectively detect the strength and the progression of earthquakes, alert the public within seconds and provide up to 60 seconds advanced warning before potentially damaging ground shaking is felt.

Early warning systems are in place, or in the works, in a number of earthquake prone nations including Japan, Taiwan, Mexico, Turkey, Italy, China and Romania. Their success has been demonstrated in recent earthquakes.

Japan's earthquake early warning system provided the public with critical advanced warning of the 9.0 magnitude earthquake in March 2011. Earthquake warnings were automatically broadcast on television and radio, and 52 million people received the warning on their smartphones. Millions more downloaded the early warning app after the quake to receive warnings in advance of large aftershocks.

The warnings allowed people to take cover, assist loved ones, pull to the side of the road or exit a building. The system brought bullet trains to a stop, and triggered the automatic shutdown of operations at critical companies. A professor at the University of Sendai received a text message of the warning and was able to warn his students to duck for cover before the shaking began and the light fixtures fell from the ceiling.

Earthquake early warning systems not only alert the public, they also speed the response of police, fire and other safety personnel by quickly identifying areas hardest hit by the quake.

Existing Law

Current California law is silent on the development of an earthquake early warning system.

This Bill

This bill would designate The Office of Emergency Services, in collaboration with the California Institute of Technology (Caltech), the California Geological Survey, the University of California Berkeley, the United States Geological Survey, and others, to develop a comprehensive statewide earthquake early warning system in California.

Introduced by Senator Padilla

January 28, 2013

1

An act to add Section 8587.8 to the Government Code, relating to earthquake safety.

LEGISLATIVE COUNSEL'S DIGEST

SB 135, as introduced, Padilla, Earthquake early warning system.

There is in state government, pursuant to the Governor's Reorganization Plan No. 2, operative July 1, 2013, the Office of Emergency Services. Existing law requires the office to develop and distribute an educational pamphlet for use by kindergarten, any of grades 1 to 12, inclusive, and community college personnel to identify and mitigate the risks posed by nonstructural earthquake hazards.

This bill would require the office, in collaboration with various entities, including the United States Geological Survey, to develop a comprehensive statewide earthquake early warning system in California.

Vote: majority. Appropriation: no. Fiscal committee: yes.

State-mandated local program: no.

The people of the State of California do enact as follows:

- 1 SECTION 1. The Legislature finds and declares the following:
2 (a) According to the United States Geological Survey, California
3 is one of the most seismically active states, second only to Alaska.
4 (b) California has experienced dozens of disastrous earthquakes,
5 which have caused loss of life, injury, and economic loss. Some
6 of the most significant earthquakes in California's history include:

1 (1) The 1906 San Francisco earthquake, which, at a magnitude
 2 of 7.8, resulted in an estimated 3,000 deaths and over \$500 million
 3 in property losses.
 4 (2) The 1971 San Fernando earthquake, which, at a magnitude
 5 of 6.7, resulted in at least 65 deaths and caused property damage
 6 of over \$500 million.
 7 (3) The 1989 Loma Prieta earthquake, which, at a magnitude
 8 of 6.9, rocked the bay area and caused 63 fatalities and over \$6
 9 billion in property damage.
 10 (4) The 1994 Northridge earthquake, which, at a magnitude of
 11 6.7, claimed the lives of 60 people and caused estimated property
 12 damage of between \$13 and \$32 billion.
 13 (c) About 90 percent of the world's earthquakes and over 80
 14 percent of the world's largest earthquakes occur along the
 15 Circum-Pacific Belt, also known as the Pacific Ring of Fire. The
 16 Pacific Ring of Fire includes the very active San Andreas Fault
 17 Zone in California.
 18 (d) The Uniform California Earthquake Rupture Forecast
 19 (UCERF) released in 2008 predicted a 99.7 percent likelihood of
 20 a magnitude 6.7 or larger earthquake in California in the next 30
 21 years.
 22 (e) A 2013 study published by the Caltech and the Japan Agency
 23 for Marine-Earth Science and Technology discovered that a
 24 statewide California earthquake involving both the Los Angeles
 25 and San Francisco metropolitan areas may be possible.
 26 (f) Japan, Taiwan, Mexico, Turkey, Romania, Italy, and China
 27 either have or are working on earthquake early warning systems
 28 that are capable of saving lives and helping to mitigate loss.
 29 (g) The Office of Emergency Services, Caltech, California
 30 Geological Survey, University of California at Berkeley, United
 31 States Geological Survey, and others have been conducting
 32 earthquake early warning research and development in California.
 33 They operate the California Integrated Seismic Network, which
 34 has a demonstration earthquake early warning capability.
 35 (h) By building upon the California Integrated Seismic Network
 36 and processing data from an array of sensors throughout the state,
 37 a fully developed earthquake early warning system would
 38 effectively detect some strength and progression of earthquakes
 39 and alert the public within seconds, sometimes up to 60 seconds,
 40 before potentially damaging ground shaking is felt.

1 (i) An earthquake early warning system should disseminate
 2 earthquake information in support of public safety, emergency
 3 response, and loss mitigation.
 4 SEC. 2. Section 8587.8 is added to the Government Code, to
 5 read:
 6 8587.8. The Office of Emergency Services, in collaboration
 7 with the California Institute of Technology (Caltech), the California
 8 Geological Survey, the University of California Berkeley, the
 9 United States Geological Survey, and others, shall develop a
 10 comprehensive statewide earthquake early warning system in
 11 California.