

State of California
Alfred E. Alquist



Annual Report for 2009
(Commission approved January 14, 2010)



California Seismic Safety Commission
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Senator Alfred E. Alquist
Seismic Safety Commission
Founder



State Senator Al Alquist was born on August 2, 1908 in Memphis, Tennessee. Senator Alquist was elected to the State Assembly in 1962, and four years later, the State Senate, where he served for 30 years.

The Commission will not let his legacy be in vain, but will continue supporting his efforts. He laid a strong foundation and his courage and leadership will be profoundly missed by all whose lives he touched.

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2009 Annual Report
Seismic Safety Commission

Executive Summary

The Alfred E. Alquist Seismic Safety Commission (Commission) is the central seismic resource and guardian for the State of California and acts as adviser to the Governor and the Legislature on earthquake policy. The Commission provides California with cost-effective recommendations to reduce earthquake losses and speed recovery, and it ensures that seismic safety remains a priority.

Dedicated to reducing earthquake risk and speeding recovery for the people of California since 1975, the Commission investigates earthquakes, reports on earthquake-related issues, and evaluates and recommends to the Governor and Legislature policies needed to reduce earthquake risk and to ensure a coordinated framework for establishing earthquake safety policies and programs in California.

Even with the Commission's leadership and support in reducing losses and speeding recovery, California must continue to make significant progress toward earthquake safety. Mitigation programs implemented in California, other states, and in many nations have reduced the losses from earthquakes.

The Commission's actions in 2009 continued to reduce hazards and improve post-earthquake recovery capabilities in California. The Commission's vision for 2010 is to (1) continue the crusade to help ensure that more Californians are prepared, (2) utilize every resource available to mitigate and plan for seismic events, and (3) work to continue yearly statewide preparedness exercises that build upon the lessons learned to help reduce injuries and loss of life when the next earthquake occurs.

Mission Statement

To provide decision makers and the general public with cost-effective recommendations to reduce earthquake losses and expedite recovery from damaging earthquakes.

Vision Statement

To provide leadership in implementing and achieving the goals and objectives in the *California Earthquake Loss Reduction Plan*, including to advance learning about earthquakes and risk reduction in both the short and long term, advance the earthquake resistant designs of buildings and other important structures, and advance the preparedness and emergency response systems for earthquakes.

Commission Membership

- | | |
|---|---------------------------------|
| 1. Honorable Mark Church <i>Chair</i>
<i>San Mateo County Supervisor</i> | <i>Local Government</i> |
| 2. William Chubb, Vice Chair | <i>Public Utilities</i> |
| 3. Senator Elaine Alquist
James Schwab, <i>Representative</i> | <i>State Senate</i> |
| 4. Assemblyman Sam Blakeslee
Sally Kay, <i>Representative</i> | <i>State Assembly</i> |
| 5. Sharron Leon | <i>Emergency Services</i> |
| 6. John L. Littrell, PE | <i>Mechanical Engineering</i> |
| 7. Elizabeth Mathieson, CEG | <i>Geology</i> |
| 8. Gary McGavin, AIA | <i>Architectural Planning</i> |
| 9. Tina Curry, <i>State Representative</i> | <i>CalEMA</i> |
| 10. Ali Sadre M.S.C.E., S.E. | <i>Structural Engineering</i> |
| 11. Michael Stevens | <i>Insurance</i> |
| 12. David Thorman, AIA, <i>State Representative</i> | <i>State Architect</i> |
| 13. David Walls, <i>State Representative</i> | <i>Building Standards</i> |
| 14. Vacant | <i>Cities/Building Official</i> |
| 15. Vacant | <i>Geotechnical Engineering</i> |
| 16. Vacant | <i>County Government</i> |
| 17. Vacant | <i>Cities Government</i> |
| 18. Vacant | <i>Seismology</i> |
| 19. Vacant | <i>Social Science</i> |
| 20. Vacant | <i>Fire Protection</i> |

Commission Staff

Richard J. McCarthy, *Executive Director*
Robert Anderson, *Senior Engineering Geologist*
Sue Celli, *Executive Secretary and Office Manager*
Karen Cogan, *Administrative Manager, Annual Report Editor*
Dave King, *Legislative & Special Projects Manager*
Henry Reyes, *Structural Engineer (Special Projects)*
Fred Turner, *Senior Structural Engineer*

Commission Authority

The California Seismic Safety Commission was established in 1975 to advise the Governor, Legislature, state and local agencies, and the public about strategies to reduce earthquake risk (Government Code §8870, et seq.). The Commission reports through the State and Consumer Services Agency and consists of 20 commissioners chosen for their technical expertise and experience. The Governor appoints 15 commissioners, the Senate and the Assembly each choose a representative from their respective memberships (2), and three (3) state agencies are represented (*Governor's Emergency Management Agency, California Building Standards Commission, and the Office of the State Architect*).

Elected Officers

In 2009, the Commission elected Mark Church as Chairman and William Chubb as Vice Chairman. Their terms are approximately one year.

Commission Funding

Chapter 49, Statutes of 2006 (AB 1809, Committee on Budget), was language in a budget trailer bill that extended the sunset date on the Insurance Fund that supports the Commission from July 1, 2009 until July 1, 2012. The Commission's operational budget for fiscal year (FY) 2009-10 is \$1.3 million with an additional \$2.0 million in monies to be used exclusively for the Earthquake Research and Projects Program.

Commission Review of San Francisco Public Utility Commission's Water System Improvement Plan

The San Francisco Public Utilities Commission (SFPUC) initiated a \$4.3 billion program to install a new dam and pipelines, repair existing pipelines and facilities and construct new earthquake fault crossings after it determined the Hetch Hetchy Water System was

vulnerable to earthquakes. By enabling legislation, the SFPUC is required to make annual reports and provide notice to the Seismic Safety Commission of any changes resulting in delays, additions, or deletions in the work or scheduling of the SFPUC's Water System Improvement Program (WSIP). It is intended to significantly reduce the risk from major earthquakes of the loss of water supply to over 2.4 million people in the greater San Francisco Bay region.

The SFPUC continues to experience significant delays in its WSIP. A Commission review of the latest delays and changes to the program has been underway during 2009 and will be released in early 2010.

Post-Earthquake Recovery Initiative

California could experience a significant loss of market share in the global economy after a major metropolitan earthquake. To ensure that impacts are minimized and do not result in long-term economic and social disruption, the Seismic Safety Commission has launched an evaluation of California's disaster recovery policies. So far, the Commission has heard suggestions from the Business Executives for National Security and the City and County of San Francisco regarding their priorities for speeding recovery following future disasters. The Commission is attempting to identify gaps in existing recovery policies considering the impacts to all public and private sectors in the state. It plans to develop recommendations on how to best fill those gaps. Pre-disaster planning, multi-agency coordination, and public-private partnerships will help ensure effective recovery and minimize future losses. The Commission expects to adopt a proposed initiative in 2010.

Multi-Hazard Mitigation Planning

The Seismic Safety Commission has taken the lead in compiling a summary of statewide efforts to reduce future earthquake losses through federal, state, and local government and private sector investments in pre-earthquake loss reduction. While earthquakes occur less frequently than fires, floods, and many other natural hazards, earthquakes account for the greatest combined losses of deaths, injuries and property damage in California. Significant mitigation efforts include the unreinforced masonry building retrofit program, the bridge and dam retrofit programs, public schools and hospitals programs, and major improvements to other utilities and lifelines throughout California. These are compiled along with information about efforts to address other hazards in the California's Multi-Hazard Mitigation Plan that is coordinated by the California Emergency Management Agency (CalEMA). An effective multi-hazard mitigation program will help California set better priorities, prepare for disasters more effectively and ensure that the state maximizes its eligibility for Federal Public Assistance and Mitigation funds. But more importantly, these efforts save lives, reduce property losses, and speed recovery after future earthquakes.

California Earthquake Authority's Multi-Disciplinary Research Team

The Commission entered into a second agreement for services with the California Earthquake Authority (CEA) in 2009. The agreement lasts through 2010 and provides the CEA the services of the Commission's Senior Engineering Geologist on a half-time basis to work with the CEA's Multidisciplinary Research Team (MRT). MRT focuses on seismic hazard issues related to earthquake loss estimates used for determining the expected annualized loss for the CEA's portfolio. Work on the Uniform California Earthquake Rupture Forecast (UCERF) program and refinement of ground motion prediction models known as the Next Generation Attenuation relations (NGA) both continue to be supported by the CEA. Potential spinoffs from such activities are envisioned to help reduce uncertainties in the hazard component of the assessment of earthquake risk to the California Earthquake Authority's portfolio and may be included in a future update of the California Building Code.

The Commission Provides Letter of Support to Coachella Valley Emergency Managers Association for Federal Stimulus Fund

The Commission issued a letter supporting the Coachella Valley Emergency Managers Association's request for a \$2.6 million federal stimulus grant to install earthquake early warning devices in strategic locations in local schools and fire stations. The Association has partnered with local school districts and public safety entities to develop the national's first fully operational earthquake early warning system named CREWS for the Coachella Regional Early Warning system. The intent is to create an expanded network of over 80 earthquake early warning detection and alert devices in the Coachella Valley to provide advanced notification to hundreds of thousands of people.

Statewide Drop, Cover, and Hold Earthquake Exercise

This year's exercise was built on the momentum of last year's drop cover and hold earthquake exercise in which a simulated earthquake in Los Angeles was enacted. This year the entire State of California unified and held the exercise on October 15, 2009 and close to 7 million people participated. In addition, the San Francisco Bay Area commemorated the 20-year anniversary of the Loma Prieta earthquake in which 62 people died and about 3,757 people were injured. The local San Francisco awareness campaign was entitled "The Big Rumble" which proved very successful during that same week.

Public Education and Outreach efforts included an internet website with comprehensive information and registration capabilities, billboards, radio and television spots.

The Commission was pleased to see a significant increase in the number of state government employees registered to participate. Efforts were made within the state government business continuity community to organize office drills. Several large Sacramento-based state offices conducted first-time exercises.

Commission Partnership with Seccion Amarilla Spanish Yellow Pages

The Seismic Safety Commission began partnering with Seccion Amarilla (formerly Enlacé) Spanish Yellow Pages in the spring of 2007. Seccion is the largest Spanish business directory in California. The Commission's preparedness information appeared in the Seccion Amarilla's Sacramento and Los Angeles Community Sections in 2009.

The Seismic Safety Commission Extends Support to UC San Diego's High Performance Five-Story Shake Table

The Commission extended its support in concept to UC San Diego for a \$5.5 million collaborative project with other universities and industry groups to assess fire safety and structural integrity of healthcare facilities after an earthquake. The first three years of the effort will entail constructing on an existing shake table a full-scale five-story office building with an acute-care component, and the fourth year will focus on fire safety aspects. The test structure will include a fully functional elevator, a component that has never been tested in conjunction with building performance. The Commission prepared a letter of support to the National Science Foundation (NSF) urging funding for the project. In August, NSF awarded UC San Diego the grant.

The Commission Supports Research Proposal by California Public Television

The Commission extended conceptual support to California Public Television in proposing a public-private partnership to encourage emergency preparedness. The concept is for 1) a multi-faceted outreach strategy of primetime programs on earthquakes and fires, 2) an integrated website, and 3) social marketing programs with partner channels. The goal is to provide education and community outreach, encourage interaction, and spur individuals to become more aware and get prepared.

The Governor's Insurance Advisor also supported this concept and the Department of Insurance, CalEMA, and California firefighters are involved in creating the programs.

The American Insurance Association is providing funding to PBS and assisting in developing the proposal. Once approved by the Commission, \$300,000 will be applied to the project from the Commission's Research Fund. Commission representatives continue to work with its partners in developing this project.

Earthquake Hazards and Reducing Risk Along the California/Mexico Border

In an attempt to strengthen California and Mexico mutual aid capabilities, the Commission engaged in conversation with Mexico representatives, Mr. Daniel de la Rosa, Secretary of Public Safety, State of Baja, Mexico, and Mr. George Bressler, Adjunct Faculty, Viz Center, San Diego State University. There is a continual need for the U.S. and Mexico to develop relationships focused on common language, common interests, and common needs. Both Mexico and Canada provide firefighting and response aid to the U.S., and are mutual partners. Mexico has provided help to the U.S. on some occasions with the US government using emergency centers to coordinate efforts. An area of concern to both Mexico and California is the possible failure of the Rodriquez Dam near Tijuana.

Solutions to improve the transfer of information and resources between the U.S. and Mexico were discussed, along with unmanned aerial vehicles, Internet pathways, sharing images, geolocating vehicles, and voice, email, chat, and texting capabilities. Representatives from the Governor's Office and CalEMA in Sacramento are expected to explore joint project possibilities.

The Seismic Safety Commission

Earthquake Research Program

In 2007, the Commission received \$6.5 million of the California Research Assistance Fund (CRAF) settlement for seismic projects. These non-General Funds are designated for earthquake risk reduction projects and are being administered and awarded through the *Commission's Earthquake Research Program*. Projects in 2009 included:

Field Act Building Performance Study

The Commission issued a paper on the Field Act entitled *The Future of the Field Act for Public Schools* about nine years ago and recently completed a report entitled *The Field Act and Public School Construction: A 2007 Perspective*. The project recommended by the Commission in the 2007 report called for comparative research to be conducted to evaluate the differences, if any, in the earthquake performance of public school buildings constructed to Field Act standards and buildings constructed to non-Field Act standards (Uniform Building Code and International Building Code, or California Building Code) that have been subjected to damaging earthquakes. The resulting study conducted by San Jose State University, focused on earthquakes that have occurred since 1940 and was based on published literature; no primary data collection was intended to be part of this study.

The primary findings from this study are that Field Act public school buildings affected by earthquakes:

- Have incurred a substantially lower level of damage as compared with other buildings of similar age and construction, in the same vicinity and experiencing similar shaking intensity, including private school buildings or pre-Field Act buildings, some of which were damaged to the point where they had to be demolished;
- Generally suffered relatively minor to no earthquake-caused structural damage;
- Showed very few instances of structural failure that could have been potentially life threatening;
- Have served as the primary source for disaster shelters in regions that have experienced significant damage, including epicentral regions that had MMI IX or X ground shaking intensity;

- Incurred damage that was primarily limited to nonstructural items, such as ceilings and lighting fixtures, and building and classroom furniture and supplies.

Commission Contribution \$350,000

Matched Funds: No funds were leveraged due to the Commission's important need for an independent review.

Commission Funding to Office of Public School Construction for Field Act Structural Reports

The Office of Public School Construction (OPSC) is developing a program that provides funding for structural reports to the school districts that have public K-12 school buildings identified by the Division of the State Architect (DSA) that may be at risk during a seismic event and to develop a more systematic and cost-effective approach to determine the seismic safety status of school facilities.

This knowledge will be applied to the process of grant awards. The results of this pilot program will be communicated to school districts to assist in proceeding with seismic objectives and ultimately enable the district to determine if it meets the criteria to qualify for AB 127 funding, thereby leveraging the \$199.5 million to mitigate seismic vulnerability of qualifying facilities.

Commission Contribution: \$200,000. The Commission provided sole funding. No funds were leveraged due to the Commission's important need for an independent review.

Preparedness Survey

This survey identified the current state of household earthquake mitigation and preparedness for the state for selected racial and ethnic minorities within different geographical areas of the state. Contributing partners that provided matching funds were CalEMA, and private industry. The study's recommendations focus on improving household preparedness and mitigation. The following were findings from the survey:

- The existence of numerous, uncoordinated programs makes it difficult for the public to identify clear and consistent messages on which they can act.
- The actions that Californians have taken to get ready for earthquakes are relatively evenly distributed across the state. People in the high-risk northern and southern California counties have not done more or less than people in low-risk areas of the state.
- The actions Californians have taken that are consistent with getting ready for earthquakes are more likely to have been performed for a variety of reasons -- not just earthquakes.

- The activities they have done tend to focus on easier preparations, with few households reporting more complicated or costly actions such as structural reinforcement of homes, securing contents, or investment in earthquake insurance.
- Most residents do not believe most earthquake myths, but substantial numbers believe myths that could threaten life and safety during an earthquake, for example, believing that standing in doorways or running outside reduces risk
- Much of the information is disseminated passively or infrequently. Coordination would increase effectiveness.
- The amount of information people hear, read, and see determines whether they prepare and mitigate.
- Failure to discriminate between levels of preparedness and motivation may explain why some dissemination efforts miss their audience.

Commission Contribution \$350,000
Matched Funds: \$400,000

Tall Buildings Initiative, Pacific Earthquake Engineering Research Center.

This project will help California's local governments address earthquake vulnerabilities of tall buildings in California. Recently, several cities in coastal California were confronted with an increase in the construction of high-rise buildings. To meet architectural requirements and achieve construction economy, many of these designs do not follow the prescriptive building code provisions but instead use an alternative design clause in the California Building Code. Unfortunately, there is no industry standard to guide these alternative designs of tall buildings, which causes concern about the reliability and insured losses in major earthquakes, schedule delays, and cost uncertainties. In some cities, building departments have prohibited tall buildings from being designed under these alternative provisions.

Recognizing this situation, several organizations and leading engineers have joined together under the leadership of the Pacific Earthquake Engineering Research Center (PEER) to form the Tall Buildings Initiative (TBI). The Seismic Safety Commission is providing \$350,000 to this initiative to help develop consensus earthquake performance objectives, ground motion selection procedures, computer modeling procedures, acceptance criteria, and, ultimately, guidelines suitable for adoption by building code publishers and local jurisdictions. Workshops and recommendations for the design of new tall buildings will be issued in the spring of 2010.

Commission Contribution Up to \$350,000
Matched Funds: \$1,040,000

Distant Tsunami Threat to the Ports of Los Angeles and Long Beach

This project examines the tsunami threat potential from earthquake sources around the Pacific Rim that may cause high current velocities inside the harbors at the Ports of Los Angeles and Long Beach.

The National Oceanic and Atmospheric Administrations (NOAA) Center for Tsunami Research developed a tsunami forecast capability for use in warning operations. The Port of Los Angeles is one of NOAA's locations where a high-resolution tsunami inundation model has been developed for real-time forecasting. The results will be useful in assessing the tsunami hazard to the Ports of Los Angeles and Long Beach from Cascadia Subduction Zone-generated tsunamis and other tsunamis with distant sources.

This project will be completed by the Spring of 2010.

Commission Contribution \$50,000

Matched Funds: \$50,000

Status of Seismic Safety Commission Research/
Projects as of 11/19/09

Project Name	Description	CSSC Funds	Amount Leveraged (Partner Contributions)	Contractor	Status
The Los Angeles Earthquake: Get Ready	Disseminated public information and outreach regarding earthquake preparedness activities for the Shakeout in collaboration with other expert advisors and project partners.. Served as a "prototype" for the first Statewide Shakeout held on 10/15/09.	\$250,000	\$1,510,000 USGS, SCEC, CEA, And 31 other partners	The Art Center College of Design	Completed December 2008
Household Preparedness Survey	Survey of the state of household earthquake mitigation and preparedness in 2008 for selected racial and ethnic minorities, and different geographical areas at high risk. Partnership with the OES, California Volunteers, Governor's Office Insurance Advisor, Office of Homeland Security, and the University of California at Los Angeles.	\$350,000	CalEMA \$350,000 Institute for Home & Business Safety \$35,000, Southern California Association of Governments \$15,000	University of California, Los Angeles	Completed Spring 2009 At Agency
Tall Buildings Initiative	Developing seismic performance objectives and alternative design acceptance criteria for future tall buildings.	\$350,000	CA Geological Survey/SMIP \$100,000 CA Governor's OES \$100,000, LA Dept of Building & Safety \$200,000, NSF through PEER \$500,000, USGS \$130,000, The Charles Pankow Foundation \$250,000 FEMA \$50,000	Pacific Earthquake Engineering Research Center	Underway Completion Date May 2010
Tsunami Risk to Los Angeles/Long Beach Harbor	Estimated current velocities within the Ports of Los Angeles/Long Beach from multiple sources around the Pacific Basin.	\$50,000	NOAA \$50,000	National Oceanic and Atmospheric Admin./Univ. of Washington	Underway Completion Date: Jan 2010
Performance of Field Act Buildings	Evaluated the differences in the earthquake performance of public schools constructed to Field Act standards and buildings constructed to non-Field Act standards.	\$350,000	\$0 No partnerships; requested by CSSC	San Jose State University	Completed October 2009 At Agency
Pilot program for Evaluation of the Most Seismically Vulnerable California Public School Facilities	Developing a workable template that provides a standard procedure for an efficient, effective, consistent, and standardized method for seismic evaluation of vulnerable public school buildings at a minimum cost.	\$200,000	Assists in release of \$199 million in Prop 1D funds	Office of Public School Construction (See Attached)	Completion Date January 2011
PBS Educational Programming	Program for Public Television on how to take action to reduce injuries and damage from earthquakes	\$300,000	CSSC \$300,000 CEA \$250,000 CalEMA \$500,000 American Insurance Assoc. \$20,000	PBS Television	Contract under development (TBD)
TOTAL		\$1,850,000	\$4,375,000		

Progress Report on California's Earthquake Loss Reduction Plan

The California Earthquake Loss Reduction Plan (Plan) 2007-2011 was last revised and released in January 2007. This Plan continues to identify current and proposed seismic safety efforts, goals, and priorities for the State through 2011. The Plan satisfies three needs:

- Reduces earthquake loss.
- Advises the executive branch on overall priorities and implementation strategies
- Supports the state's requirement to update the Governor's Office of Emergency Services Statewide Multi-Hazard Mitigation Plan.

The Plan is a living document that continues to evolve. Here is a summary of progress made in 2009:

Strategic Plan Element	Plan Initiative	Brief Project Description
Geosciences	1.4.	A research project to reassess the tsunami threat potential from a Pacific Rim earthquake that causes high ocean current velocities inside the Ports of Los Angeles and Long Beach.
Research Technology, & New Buildings	2.1 2.2 7.2 7.3	Development of consensus performance objectives for tall buildings, ground motion selection and scaling procedures, modeling procedures, acceptance criteria, and, ultimately, guidelines suitable for seismic design of tall buildings for adoption by building codes and local jurisdictions
Existing Buildings Preparedness	6.4.1 9.4	Comparative research conducted by San Jose State University, to evaluate the differences, if any, in the earthquake performance of public school buildings constructed to Field Act standards and buildings constructed to Uniform Building Code Standards.
Existing Buildings & Preparedness	6.4.1	SSC direct funding for Division of the State Architect (DSA) for a program that provides funding for structural reports to the school districts that have public school buildings identified by DSA that meet the criteria of the Most Vulnerable category 2 buildings
Education, Information & Preparedness	3.2 9.1 9.3	A research project to determine the current state of household earthquake mitigation and preparedness for the state for selected racial and ethnic minorities, and different geographical areas at high risk. The Commission partnered with California Emergency Services and Homeland Security, and California Volunteers.
Education, Information & Preparedness	3.1 3.2 9.1 9.2 9.3	California conducted a state-wide Drop Cover and Hold earthquake exercise in October, increasing earthquake awareness and readiness among the public and emergency planners and responders.

Strategic Plan Element	Plan Initiative	Brief Project Description
Research & Education & Information	2.3.1 3.2 3.2.3	Commission support for UC San Diego's High Performance Five Story Shake Table
Emergency Response	10.1.1 10.4.2 10.4.7	Commission awareness and support of earthquake hazards and reducing risk along the California/Mexico Border
Geosciences, Research & Technology	1.1.3 2.1.1 2.1.3 2.2.3	Commission support to Coachella Valley Emergency Managers Association for Federal Stimulus Fund for Earthquake Early Warning system
Utilities, Transportation, Geosciences, Economics, Land Use, Existing & New Buildings	5.3 5.4 6.4 1.2.3 4.1	Multi-hazard Mitigation Planning
Recovery & Economics	4.1 4.2 4.3 4.4 11.1 11.2 11.3 11.4	Post-earthquake Recovery Initiative
Utilities & Transportation	8.1 8.3 8.4	Review of SFPUC's Water System Improvement Program