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CALIFORNIA

Progress Report for the California Earthquake Loss Reduction Plan

2002–2006

December 2003

California Seismic Safety Commission
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Sacramento, CA 95833
916-263-5506
SSC Publication No. 03-06

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TABLE OF CONTENTS

Executive Summary

The combined losses from the Loma Prieta and Northridge earthquakes reached over **$50 billion**. However, a repeat of the 1906 San Francisco earthquake could cause up to **$170 billion** in losses. These losses would exceed the State's annual operating budget.

To address the tremendous potential losses to the State, the California Seismic Safety Commission (CSSC) is responsible for the preparation and periodic updating of the State's strategic plan for seismic hazard mitigation, the *California Earthquake Loss Reduction Plan (Plan)*. To date, there has not been a comprehensive assessment of all seismic hazard mitigation activities undertaken in California. This document, the *Progress Report for the California Earthquake Loss Reduction Plan*, represents the first attempt to gauge the progress toward achieving each of the initiatives contained within the *Plan.* In addition, this report identifies state, local, and private funds committed to selected earthquake mitigation activities in the period from 1990 through 2002. This time period was selected because it includes several large-scale earthquake mitigation programs that were implemented after the 1989 Loma Prieta earthquake.

This Progress Report is based on information collected from a Commission survey of key State agencies, in which the Agencies were requested to identify their mitigation activities and any impediments to completing each program. Since 2001, CSSC staff also conducted interviews with representatives from private businesses, corporations, and utilities. This report does not include the cost estimates for offsetting structures to mitigate the impacts from fault rupture.

The results of the Commission's limited survey reveal that, from 1990 through 2002, Californians have committed at least **$19.0 billion** towards earthquake loss reduction. This is an average of about **$1.5 billion** per year over thirteen years. However, the total amount spent is likely to be substantially higher, since only a portion of all seismic hazard mitigation efforts have been reported to the Commission. The Commission found that of the 148 initiatives identified in the *Plan*, 7 are completed, 26 are underway, and 78 are ongoing and require a continuous commitment.

Both State and local agencies, and the private sector have made major financial commitments to mitigate seismic hazards or manage seismic risk. Smaller damaging earthquakes, such as Loma Prieta and Northridge, are expected to occur more frequently than larger earthquakes. As California continues to grow, earthquake losses will increase dramatically unless proper mitigation actions are implemented throughout the State.

Often State and local entities are in desperate need of assistance to fund mitigation after a disaster but are unable to provide the required local matching funds for Federal assistance. The Commission recommends that the Federal Emergency Management Agency and the Office of Emergency Services create a "Mitigation Bank" to allow the use of past mitigation efforts as 'credits' towards future mitigation opportunities. This "Mitigation Bank" would help these agencies meet the funding match based on their own, often substantial, prior investments in mitigation.

Appendix "A" summarizes the status of unreinforced masonry building seismic retrofit efforts through out the state. Appendix "B" contains a description of earthquake hazards in California and mitigation activities.

Introduction

Seismic Risk to California

California has over 600 well-documented active faults[1], but even that number does not cover all the faults with earthquake potential. In fact many earthquakes still occur on previously unknown faults, often because the causative fault does not extend to the ground surface and has never been observed before. Figure 1 shows the potential for earthquake related shaking in California. The map also reveals that the majority of Californians live in areas potentially subject to high levels of ground shaking. For example, a recently released study by the University of Southern California indicates that a portion of downtown Los Angeles may be underlain by a fault capable of producing a magnitude 7.2 to 7.5 earthquake[2]. An earthquake of this size in the Los Angeles Basin could produce damage and losses in excess of $100 billion (or equivalent to the size of the annual State budget). This would be a much larger and more damaging earthquake than the Northridge earthquake.

Commission's Task

The California Earthquake Hazards Reduction Act of 1985 requires the California Seismic Safety Commission to prepare and administer a program setting forth priorities, funding sources, amounts, schedules, and other resources needed to significantly reduce statewide earthquake hazards.

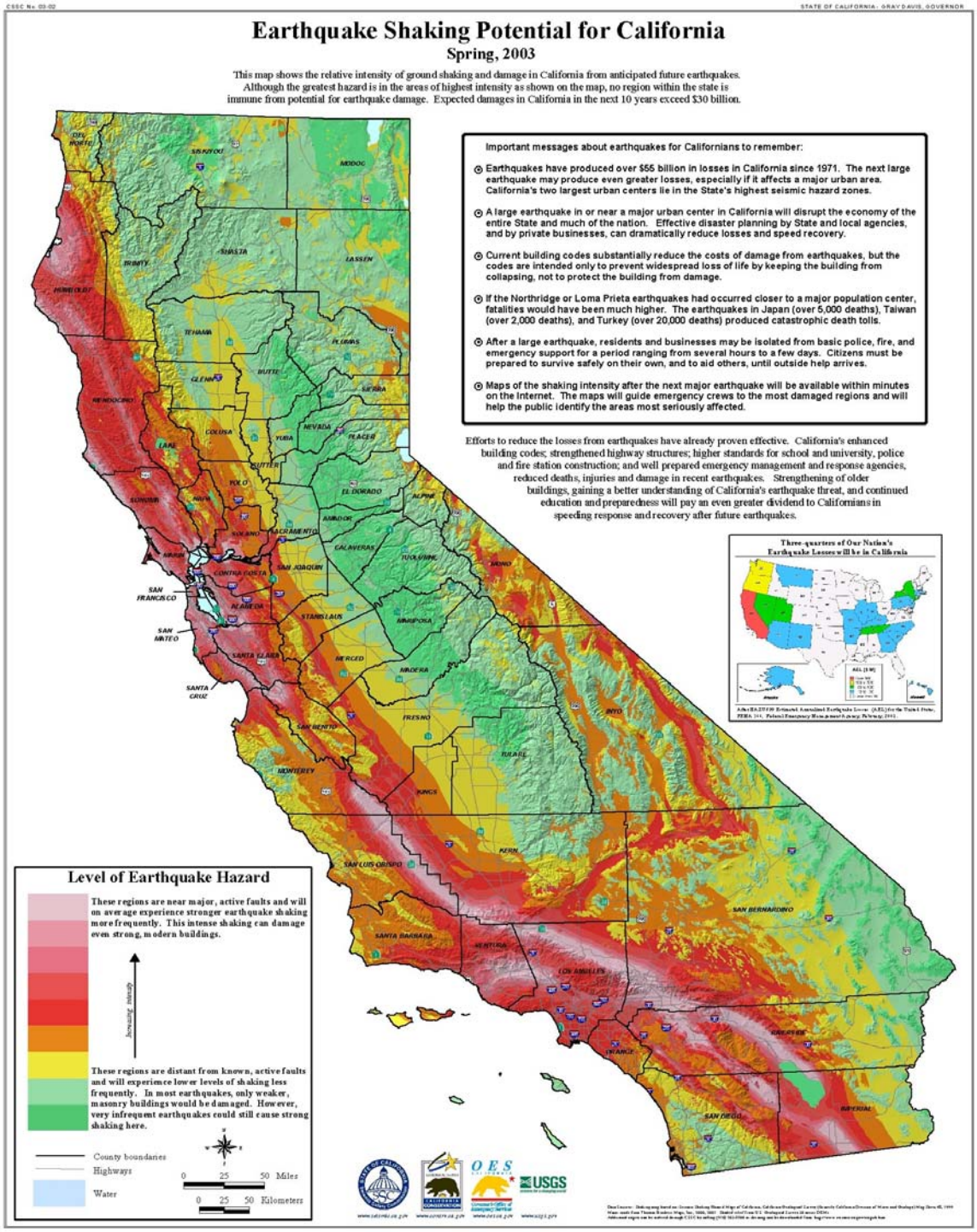
After the Loma Prieta earthquake in 1989, the Federal Emergency Management Agency (FEMA) required the state to provide an earthquake hazard reduction plan to maintain our eligibility to apply for post earthquake Hazard Grant Mitigation Program funds. The *California Earthquake Loss Reduction Plan (Plan)* is the State's strategic plan to reduce earthquake losses and speed recovery. This Plan recognizes the state's commitment to a multilevel partnership that includes government agencies, academic institutions, the private sector, and volunteer organizations.

In 2001, the Commission endeavored to track the progress of the recommended initiatives within the Plan. Commission staff sent questionnaires to key State agencies requesting that each agency identify its mitigation activities and impediments to implementing each initiative. Since 2001, CSSC staff has also conducted interviews with representatives from private businesses, corporations, and utilities.

Figure 1

Map of Earthquake Shaking Potential

[1] *Bryant personal communication, Sept. 2003*
[2] *California Geological Survey, Dolan et Al., 2003*

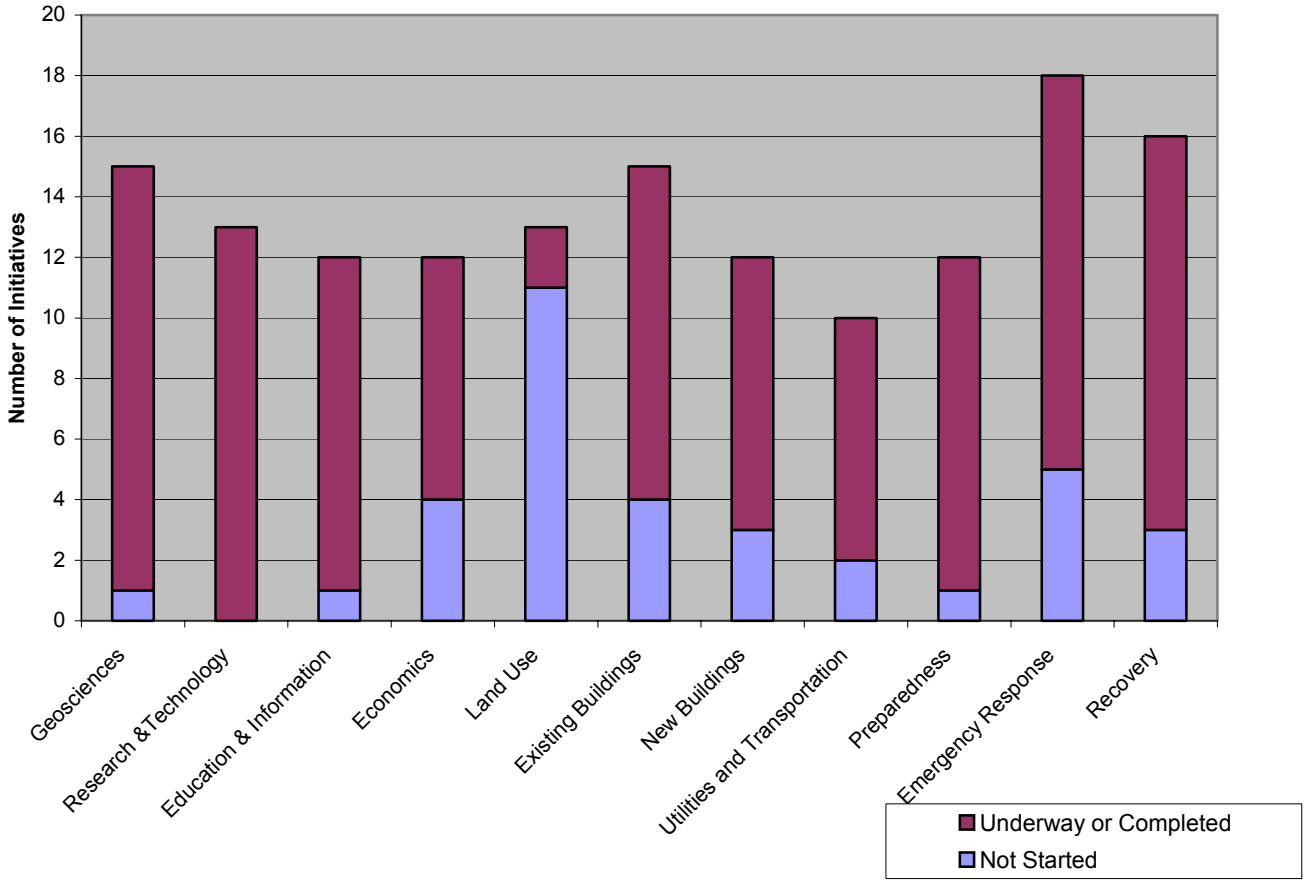


Survey Results

The results of this survey are presented in two parts. The first part is a summation of selected mitigation program costs. The second part presents the status of the 148 initiatives contained within the Plan. This

survey revealed that of the 148 initiatives in the Plan, 7 have been completed, 26 are underway, and 78 are ongoing but require a continuous commitment (Figure 2). At this time, the status of the remaining initiatives is unknown.

Figure 2
California Earthquake Loss Reduction Plan Initiative Progress Chart



Some tasks were originally intended as "stand alone" seismic hazard mitigation projects, while others may trigger non-seismic mitigation expenses as well. This indirect impact often occurs when retrofitting existing facilities that also need to be upgraded to current building code requirements. Therefore, the dollar amount presented for mitigation projects may include costs that are not applied directly to seismic hazard upgrades.

What is Mitigation?

FEMA defines "mitigation" as "any ***sustained*** action taken to reduce or eliminate the long-term risk to human life and property from hazards." Within FEMA's definition, the term ***sustained*** tends to limit mitigation to "brick and mortar" activities. FEMA excludes activities such as individual preparedness and emergency response.

In generating this document, the California Seismic Safety Commission interpreted "mitigation" as broad based actions that reduce earthquake risk and speed recovery. With this definition, responses to all initiatives contained within the Plan are considered as mitigating actions.

Construction and Mitigation Examples

Mitigation costs can be estimated in a number of ways. For example, during the period from 1990 - 2002, approximately **$575 billion** was spent on all new construction and alterations in California[3]. If the cost to meet seismic requirements in the State ranges between 1% and 4% of the total project cost, California should have spent somewhere between $5.75 and $23 billion to reduce or eliminate damage to new or retrofitted structures from earthquakes.

Table 1 illustrates mitigation progress by building type in California. Within the State, the cost of siting and design for building construction and alterations can vary. Building inventories are not universally required under State law; but this table reflects what is known about the disposition of various classes of buildings in terms of seismic evaluation and mitigation in California. The following represent some selected mitigation actions by State and local governments, and private industry requiring major financial commitments:

Schools

In 2002, the voters passed Proposition 47, a $13 billion State bond measure. It called for the sale of bonds for the construction of public schools. In California, siting, design, and construction of public schools are performed under requirements of the Division of State Architect that strengthen the effectiveness of the Uniform Building Code. The estimated additional cost for seismic hazard assessment and mitigation being done under this bond measure is approximately $680 million for K-12 grade schools and $55.0 million for community colleges, California State Universities and University of California campuses.

Hospitals

The Alquist Hospital Seismic Safety Act of 1994 expanded the scope of the 1973 Hospital Act. Under the Alquist Act all hospitals are required, as of January 1, 2008, to survive earthquakes without collapsing or posing the threat of significant loss of life. The Act further mandates that all existing hospitals be seismically evaluated and retrofitted or replaced by 2030, so that they are reasonably capable of providing uninterrupted services to the public after an earthquake. The Act also applies to all urgent care facilities (including those built prior to the 1973 Hospital Act) and affects 2,507 buildings on 475 campuses.[4] Estimates to comply with the Act range from $10-24 billion.

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[3] *California Industry Research Board*
[4] *CSSC Hospital Seismic Safety Findings and Recommendations, 2001.*

Table 1
Mitigation Inventory by Building Type

Inventory Category	Number in Inventory	Development of Mitigation Program	Seismic Evaluation	Mitigation Goal	Mitigation Progress	Primary Responsible Agencies
By Occupancy or Jurisdiction						
Hospitals	2,673	●	◕	**NS** *2002* **LS** *2008* **IO** *2030*	◕ ◔ ○	OSHPD
Essential Services Facilities	?	○	○	**IO**		DSA, OES
Public Schools K-12**	70,000	●	●	**DC**	●	DSA
Public Schools 13-14	4,366	●	●	**DC**	●	DGS, DSA
Public Universities	10,000	●	●	**RR**	◓	UC, CSU
Other State Buildings	24,000?	◔	◔	Varies	○	DGS, et al
Non-State Reg. Bldgs	12 million	○	○	Varies	○	Local Govts and Special Districts
By Type of Construction						
URM Zone 4	25,515	●	◓	**RR**	◓	Loc. Govts
URM Zone 3	4,000 +/-	○	◔	**RR**	○	Loc. Govts
Tilt-ups	57,000	◔	◔	**RR**	◔	Loc. Govts
Non-Ductile Concrete	40,000	○		Varies		Loc. Govts
Apartments	360,000	○		**RR**		HCD
Dwellings: Single-Unit	1.5 million	○	○	**RR**	○	HCD

LEGEND

● Completed or Near Completion

◕ Substantially Completed

◓ Halfway Completed

◔ Partially Completed

○ Begun

IO Immediate Occupancy

DC Damage Control

LS Life Safety

RR Risk Reduction

NS Non-Structural

**In addition, public school facility managers have identified risks to life in early Field Act buildings constructed to now-outdated regulations. 7,537 K-12 buildings and 1,600 Community college buildings need further seismic evaluations and possibly retrofits.

Water Supply and Transmission

Water supply and transmission projects for earthquake mitigation are priorities throughout California. The new East Side Reservoir is completed and providing water to the greater Los Angeles Metropolitan Area. This reservoir is also intended to provide several months' supply of water to its customers in the event of a prolonged disruption from the State Water Project (California Aqueduct). The cost of the East Side (Diamond Valley) Reservoir project was approximately $2 billion. The $189 million East Bay Municipal Utility District water supply system seismic retrofit and the $3.6 billion San Francisco Public Utilities Commission seismic retrofit of the Hetch Hetchy water supply system are now underway.

Natural Gas Pipelines

Approximately 11,600 miles of natural gas pipelines are located in California. The Pacific Gas and Electric Company (PG&E) natural gas cast iron pipelines in the San Francisco Bay Area were recently replaced with pipes that are considered to be more earthquake resistant. Pacific Gas and Electric Company is still replacing portions of its older natural gas (pre-1931) pipelines throughout its entire service area. The total estimated cost of the gas line replacement project is $1.79 billion. PG&E has also retrofitted selected substations, switchyards, power plants, buildings and other structures since 1985.

Table 2
Selected Inventories for Lifelines and Transportation Systems

Inventory Category	Number or Miles	Mitigation Program	Seismic Evaluation	Mitigation Progress	Responsible State Agencies
Utilities	31,700 Mi. ET 11,600 Mi. NG	◓	◓	◓	CEC, PUC, Cal EPA
Dams	1200+	●	●	◕	DSOD
Ports and Harbors	10	◓	◓	◓	State Lands Commission and Coastal Commission
Highways	50,000 Mi.	◕	◕	◕	Cal Trans
Bridges-State	2,403	●	◕	◕	CalTrans
Bridges-Local	1,212	◕	◔	○	Local Jurisdictions (city or county)

LEGEND

● Completed or Near Completion

◕ Substantially Completed

◓ Halfway Completed

◔ Partially Completed

○ Begun

ET Electrical Transmission

NG Natural Gas Transmission

Table 2 presents an inventory of lifelines and associated mitigation programs along with the responsible State agencies. It also provides information on the number of miles of highways and utilities in the State along with the number of ports, harbors, dams, and State and locally owned bridges.

Bridges

Since 1990, the California Department of Transportation (Caltrans) has retrofitted 2,403 bridges, including two toll bridges. Local agencies have seismically retrofitted an additional 1,212 local bridges. The total cost for the State and local bridge seismic retrofit program completed as of 2002 was $4.2 billion.

Private Industry

The Anhauser-Bush Brewery in Van Nuys, California was damaged in the 1971 San Fernando earthquake. During the recovery period, the company lost a portion of its market share. The company recognized that earthquakes were a permanent threat to its market share and profitability. Therefore, in order to reduce production delays after earthquakes, the company implemented an $11 million seismic hazard mitigation program for the brewery. A cost benefit study indicated the direct and indirect loss from an earthquake could be approximately $750 million. This is a benefit-to-cost ratio of 68:1. Fortunately, the seismic hazard mitigation retrofit program was completed prior to the Northridge earthquake, the facility suffered only minor damage and the company did not lose additional market share.

Other Successes in Mitigation

Although mitigation can be easily observed in the form of construction and modernization, other forms of seismic hazard mitigation have taken place that cannot be readily measured in dollar figures. These activities are realized through emergency planning, research, and preparedness.

Homeowner's Earthquake Insurance

In 1996, nearly three years following the Northridge Earthquake, the California Legislature created the California Earthquake Authority. The CEA is a publicly managed, largely privately funded organization that provides catastrophic residential earthquake insurance and encourages Californians to reduce their risk of earthquake loss. The CEA is one of the world's largest residential earthquake-insurance providers, with about 730,000 policyholders and approximately $7 billion in claim-paying resources. The claims-paying resources available to the CEA come from accrued policy premiums, investment income, reinsurance, financial commitments from participating insurers and borrowed funds. Homeowners, mobile home owners, condominium owners or renters who wish to purchase CEA insurance do so through CEA participating insurers.

In addition to offering a range of earthquake insurance coverage options and maintaining the appropriate financial strength to meet its claims-paying obligations, the CEA helps to minimize earthquake damage before and after an earthquake. Key components of the Authority's Strategic Plan include educating residents to make informed decisions regarding earthquake preparedness and minimize potential earthquake damage by encouraging Californians to retrofit their homes and utilize other proven methods to mitigate loss.

Mapping and Identification of Faults and Seismic Hazards

California has over 600 named faults and many more unnamed faults. Mapping and dating of faults, determining the sizes of potential earthquakes, estimating the probability and intensity of ground shaking and thus forecasting the magnitude of the losses has given Californians a better understanding of the potential seismic hazards. California has been actively mapping faults and seismic hazards, such as areas prone to liquefaction or earthquake-induced landslides for a number of years. However, this effort is expected to continue for some time, subject to the availability of additional funding.

Shake Maps and Loss Estimation Modeling

The production of earthquake ground motion intensity maps, called ShakeMaps, has led to our ability to report the pattern of strong ground motion and intensity in a matter of minutes after a major earthquake. Emergency responders and utility and transportation officials use this map to help direct resources to regions affected by earthquakes. Shake Maps are also developed for emergency planning and preparedness exercises so that when coupled with earthquake loss modeling estimates, from programs such as FEMA's Hazards United States (HAZUS) program, responsible officials and their staffs can quickly estimate the scope of damages, both casualties and monetary losses within hours of the event.

Software for Shake Map is being upgraded so that areas of the State that are not well covered with ground motion sensors can be modeled with some estimation of ground motion between sensors. The program also has the need for upgrading existing sensors or the need for addition sensors. One of the limitations of HAZUS is that California does not have an accurate database of the buildings, facilities and activities in the State. This leads to areas of lower quality data in the HAZUS model databases. The HAZUS Model is being upgraded at this time, but it is up to California to obtain the data needed to make better use of the model.

Research

California, the Federal government, and private industry have been actively engaged in the study of the performance of buildings, facilities, and utility networks during and after earthquakes, in the behavior of soils and rock during the earthquake, and in the physics of what happens during earthquakes. By collecting and disseminating information on earthquake performances of buildings and facilities, Californians can improve seismic hazard mitigation, most directly by updating their building codes. Research has also led to the lowering of the cost of seismic hazard mitigation for structures such as bridges and multi-story buildings.

One example of the State's commitment to applied earthquake research is its support of the Pacific Earthquake Engineering Research Center (PEER). PEER was created through Commission sponsored legislation in 1996. The establishing language can be found in the Government Code, Section 8876.1.

PEER is an important US regional engineering research institution. Its purpose is to develop and disseminate state-of-the-art performance based earthquake engineering methodology to meet the safety, functionality, and economic needs of owners and society. In August 2003, the Commission's PEER Review Committee issued its latest report on PEER to the State Legislature and the Governor's Office.

Urban Search and Rescue

In 2002, AB 2002 (Alquist), the Urban Search and Rescue Emergency Advisory Committee was established to evaluate California's ability to extricate victims from collapsed structures. Guided by the California Seismic Safety Commission, the Committee created a strategy, plan, and recommendations addressing the resource needs of emergency urban search and rescue teams in California. The Committee, consisting of experienced professionals in the fields of firefighting, law enforcement, and Urban Search and Rescue, developed findings and recommendations to address the on-going equipment, training, and structural needs of State and local Urban Search and Rescue task forces.

Education and Outreach

Education and Outreach efforts have been undertaken by various organizations including: Southern California Earthquake Center, Earthquake Engineering Research Institute, Pacific Earthquake Engineering Research Center, American Society of Civil Engineers, Association of Engineering Geologists, Pacific Gas and Electric Company, Collaboration for Disaster Mitigation, Business and Industry Council for Emergency Planning, California Geological Survey, California Seismic Safety Commission, California Earthquake Authority, State of California, Governor's Office of Emergency Services, United States Geological Survey, and the Federal Emergency Management Agency. Their education and outreach has included activities such as helping children with science fair projects on earthquakes, advanced classes in the assessment and mitigation of seismic hazards, holding briefings for legislators on earthquake monitoring, and transferring hazard mitigation research results into building code requirements or guidelines.

In 2002, the State of California, along with the Commission and the Office of Emergency Services, and the Shizuoka Prefecture, Japan, established the California-Shizuoka Prefecture Cooperation Agreement pursuant to the friendly exchange of earthquake mitigation and technical information.

Cost of Mitigation

The following tables summarize the mitigation costs for selected projects in California. The expenditure amounts are based on information received from survey data and research by the Commission staff.

Table 3 illustrates the funding commitment of selected State organizations, local governments, and private industry to earthquake mitigation and recovery.

Table 3

Estimated Expenditures on Selected Earthquake Mitigation within California (1990 through 2002)

Programs and Projects	$Millions
Caltrans Bridge Retrofit, Replacement and Toll Bridge Program	3,248.00
Bridge Retrofit by Local Government	1,000.00
Caltrans Earthquake Research	52.00
Prop 122 –State Building Retrofits	223.50
Local Government Essential Services Building Retrofits	45.40
Technology Development	3.00
AB 300 Public School Survey	0.50
Alquist Act Hospital Evaluation and Retrofit Program	11.00
OES/DSA Nonstructural Pamphlet for Schools	0.05
OES Hazard Mitigation Program	70.00
DSA K-12 school seismic hazard and retrofit/design	1,550.00
Community College Seismic Evaluation Survey	0.90
UC Berkeley SAFER Program	250.00
CSU Seismic Retrofit Program	300.00
UC Seismic Retrofit Program	300.00
Dept of Insurance Retrofit Grants Program	6.40
Pacific Earthquake Engineering Research Center	20.00
PUC/CEC Earthquake Research	5.50
TriNet/CISN –	13.80
DWR Levee Study in the Delta	2.30
State Lands Commission Marine Oil Terminal Project	0.10
OES – New Operations Center	26.50
Department of Water Resources	
Seismic Instrument Operation	6.00
Water Project Review	7.00
Division of Safety of Dams	5.00
Office of Statewide Health Planning and Research	225.00
Public Utilities Commission	0.60
Seismic Safety Commission	10.00
Seismic Hazard Mapping Program	32.00
Strong Motion Instrument Program	45.00
University of California – Seismographic Station and Research Center	23.00
BART Retrofit Program	28.00
CEA Mitigation Program	5.4
Hospital seismic hazard mitigation 1989-2002 (all California hospitals)	7,120.00
City of LA ATC 50 Residential Grading Plan	1.00
San Francisco Bond Measure for URM Retrofits	350.00
Unreinforced Masonry Building Seismic Retrofits	1,730.00
San Francisco Community Action Plan for Seismic Safety	0.70
Los Angeles Historic Property Contracts Retrofit Program	2.50
East Side Reservoir Project (Los Angeles)	2,000.00
Local Match for FEMA post Northridge earthquake seismic hazard mitigation	249.70
Total	$18,970.61

Table 4 depicts California's future mitigation funding commitment through the year 2030. All of these projects are currently being developed or under construction.

Table 4
Selected Future Seismic Hazard Mitigation Commitments

Projects Underway or Obligated	**$Millions**
SB 1953 Hospitals Seismic Hazard Compliance (to be paid by hospital owners)	*10,000-24,000
Proposition 47 school construction and modernization seismic hazard assessment and retrofit	735
PG&E Projects	2,175
San Diego County Water Authority	827
San Francisco Public Utilities Commission	3,600
EBMUD Retrofit Program	189
East Bay Bridge Span Replacement Project	2,900
Carquinez Straights Bridge Replacement Project **	480
San Rafael Bridge Seismic Retrofit Project	484
Total	$21,390-$35,390

*denotes estimated range of expenses from 2002 through 2030.
** Bridge opened Nov. 2003

Table 5 identifies the amount of federal funding supplied to the State for earthquake mitigation and recovery since 1990. One of the major mitigation successes funded in cooperation with the Federal government has been the Seismic Hazard Mapping Program carried out by the California Geological Survey. This effort has continued since passage of the Seismic Hazards Mapping Act of 1990.

Table 5
Selected Federal Seismic Hazard Mitigation Investments in California 1990 to 2003

Principal Funding Sources	**$Millions**
FEMA (post-Northridge earthquake) includes $11 million in Seismic Hazard Mapping funds	760
United States Geological Survey	300
National Science Foundation	75
Federal Highway Funds*	940
Total	$2,075

* seismic hazard mitigation

Conclusions

In estimating the potential losses from future California earthquakes, it is important to note that the two moderate earthquakes that struck California most recently, the Northridge and Loma Prieta earthquakes, combined caused over $50 billion in losses. This report concludes that State and local agencies, and the private sector have made major financial commitments to mitigate seismic hazards since 1990. However, California still faces extraordinary threats from major urban earthquakes. A repeat of the 1906 San Francisco earthquake would cause an estimated $170 - $200 billion in losses. A major earthquake in the Los Angeles metropolitan region could cause losses in excess of $100 billion.

The results of the Commission's limited survey reveal that much has been done to reduce earthquake risk and speed recovery in California since 1989. Californians have committed at least **$19 billion** in state funds since 1989 towards earthquake loss reduction. This is an average of about **$1.5 billion** per year over thirteen years.

Challenges for seismic hazard mitigation at the governmental level usually stem from constraints due to funding availability and matching fund requirements. One of the principal drawbacks encountered is the delay from the submittal for mitigation assistance funding to the time when the federal funding becomes available. What has happened in some cases is that local governments have not been able to hold onto or generate their share of seismic hazard mitigation funds once funding assistance does become available.

Recommendation

As California continues to grow and develop property and resources, our risk exposure to earthquakes grows. In the face of this escalating risk, the Seismic Safety Commission makes the following recommendation to help ensure that seismic hazard mitigation and earthquake risk management efforts increases to keep pace with increased seismic risk exposure in California:

- Create a 'mitigation bank' through the Federal Emergency Management Agency and the Office of Emergency Services for use of the mitigation efforts as 'credits' towards future disaster funding qualifications.

To help state and local governments qualify for mitigation assistance funding, the mitigation bank would be used to collect "credits" based upon an agreed percentage of the final cost of the seismic hazard mitigation. The credits would be available to State, local governmental agencies, and special districts to have FEMA incur part of the local cost share for seismic hazard mitigation.

California Earthquake Loss Reduction Plan Progress Report Inventory of Participating Organizations

(by Initiative)

Through June 30, 2003

California Seismic Safety Commission

Geosciences Element

Effective land use planning and design must recognize the geologic environment and identify earthquake hazards. Every major earthquake yields new geologic data. Planning, design, and construction are not adequately incorporating this new knowledge, however. Most advances have been motivated from reaction to disasters rather than from good risk reduction strategies based on current and proven geoscience knowledge.

Objectives

To continue to improve the structural performance of new and existing buildings and utility and transportation systems through effective use of current geoscience knowledge. To ensure consistent application of that knowledge and to continuously improve risk reduction strategies based on application of the most current knowledge available.

Overall Element Progress: Progress has been slow and steady to date; however, cut backs in federal funding is threatening the disruption of near term efforts due to loss of personnel and resources.

Geosciences Initiatives

Objective: *Full Application of Geosciences*

Strategies and Initiatives

1.1 Improve Use of Current Geoscience Knowledge

1.1.1 **Ensure efficient, accurate, and reliable completion of the statewide Seismic Hazard Mapping Program for California's high-risk, developed and developing areas. Utilize independent review and acceptance of appropriate procedures to compile the data and construct the maps. Include end users and others affected as part of the independent review.**

Priority: **Critically Important**
Approximate Time Required: **10 years**

Participating Organizations: CDMG, OES, Geotechnical Engineering Community, Geological Community

Potential Stakeholders: All county and city planning and building departments, Real Estate Industry, Insurance Industry, CEA, Financial I Industry USGS, and SCEC

Status: Underway

UNDERWAY

Remarks: Funding for the Seismic Hazards Mapping Program in FY 2003 may be reduced due to the loss of FEMA funding. Not all faults in California are well understood at this time.

***Benefits:** Greater understanding of seismic hazards allows for prudent planning and design of structures and buildings in areas of high seismicity

1.1.2 Include, as part of the Seismic Hazard Mapping Act, continuous identification and mapping of all potential seismic sources.

Priority: Very Important

Participating Organizations: CDMG, OES

Potential Stakeholders: All county and city planning and building departments, Geotechnical Engineering and Geological Communities, CEA, DOI, USGS, SCEC

Status: Underway

Remarks: Some stakeholders will have interests focused in localized areas, whereas others will have interest in identification and mapping of potential seismic sources throughout the state.

UNDERWAY

1.1.3 Develop uniform standards for installing and maintaining strong motion instruments, including timely and effective processing and disseminating of the resulting data, for purposes of real time notification and earthquake engineering as a part of the Strong Motion Instrument Program.

Priority: Very Important

Participating Organizations: CSMIP, OES, CISN, COSMOS, ANSS

Potential Stakeholders: PG&E, SCE, CEA

Status: Underway

Remarks: This initiative has been started but is under funded to the point of being impeded by the low level of funding. The CEA uses the data from these instruments for initial loss estimates.

UNDERWAY

1.1.4 Require Federal and State dam owners to comply with and pay for strong motion instrumentation of their dams as a part of the Strong Motion Instrumentation Program.

Priority: Important

Participating Organizations: DWR, DSOC, and USBR

Potential Stakeholders: USACOE, PG&E, LADWP, ANSS, CISN

Status: Not required.

Remarks: This initiative is now partially performed on a voluntary basis.

1.1.5 Encourage owners of hazardous waste and municipal solid waste containment facilities to pay for strong motion instrumentation of their facilities as part of the Strong Motion Instrument Program.

Priority: Important

Participating Organizations: CIWMB, DTSC, City of LABoS

Potential Stakeholders: BFI, All Waste, Nor Cal Waste Systems

Status: Underway

Remarks: Several landfills in southern California have planned to install strong motion instruments or are in the process of installing the instruments.

UNDERWAY

1.1.6 Expand the network of strong motion reference stations in major urban areas throughout California so there will be one per zip code to provide information critically needed for emergency response and post-earthquake evaluation of structures.

Priority: Very Important

Participating Organizations: TriNet, OES, CISN, ANSS

Potential Stakeholders: COSMOS, CEA

Status: Underway

Remarks: Funding is too low for the completion of the strong motion reference system within the next five years

UNDERWAY

1.2 Apply Consistent Geoscience Standards

1.2.1 Require local governments to provide consistent application and enforcement of the Seismic Hazard Mapping Program and the Alquist-Priolo Earthquake Fault Zone Act criteria in all zoning and building code applications.

Priority: Very Important

Participating Organizations: CDMG

Potential Stakeholders: OPR, all county and city planning and building departments

Status: Underway

Remarks: CEQA review requirements for projects in the State require that seismic hazards be addressed when the project is proposed to the reviewing agency.

UNDERWAY

1.2.2 Incorporate geoscience knowledge and peer review in planning, design and construction processes at the initial phase of public consideration and that the application of site-specific data is a required element of all projects.

Priority: Very Important

Participating Organizations: All county and city planning and building departments, OPR, and SCEC

Potential Stakeholders: CDMG, USGS, OES, AEG

Status: Underway

Remarks: None

UNDERWAY

1.2.3 Ensure that the design of new, and the performance of existing, facilities (including major transportation and utility systems, and hazardous material facilities) address the appropriate earthquake hazards.

Priority: Important

Participating Organizations: All county and city planning and building departments, OPR, SCEC, CEC, CPUC, Cal EPA and USEPA

Potential Stakeholders: ASCE, CalBO, DSA, AEG, OES, CDMG

Status: Underway

Remarks: CEQA and California regulations call for facilities to address earthquake hazards.

UNDERWAY

1.3 Show Cost Effectiveness

1.3.1 Develop and implement effective educational and informational programs demonstrating the cost effectiveness of using site-specific data in designing new and retrofitting existing facilities. Make use of existing case histories where possible.

Priority: Important

Participating Organizations: EERI, ATC, FEMA, SSC, CEA DOI, OES, UC Berkeley

Potential Stakeholders: PEER, SCEC

Status: Underway

Remarks: UC Berkeley has an earthquake-engineering certificate offered through their extended university course work with the school of engineering.

UNDERWAY

1.3.2 Develop and implement effective educational and informational programs aimed at the technical professions to increase their understanding of strong motion phenomena including near-source and ground deformation. Demonstrate success in the use of good standard of practice by the technical professions.

Priority: Very Important

Participating Organizations: PEER, SCEC, ASCE, AEG, US and CSU, Calif. Boards of Registration for Professionals, GSA, AIA

Potential Stakeholders: All county and city planning and building departments, OPR, ASCE, and AEG

Status: Underway

Remarks: UC Berkeley has an earthquake-engineering certificate offered through their extended university course work with the school of engineering.

UNDERWAY

1.3.3 Develop and implement effective educational and informational programs demonstrating the cost effectiveness of the use of data to provide accurate planning scenarios for earthquake preparedness and response planning.

Priority: Important

Participating Organizations: OES, CDMG, FEMA, SCEC, ABAG, CDM

Potential Stakeholders: All city and county emergency management personnel

Status: Underway

Remarks: Recent analysis of the earthquake Hazard United States, modeling efforts done for the February 2001 Nisqually earthquake point out that damage estimates using the HAZUS model are sensitive to the quality of the geological information and other forms of information input to the model. The better the geological data input the less uncertainty there is in the models output with respect to geological information. UC Berkeley has an earthquake-engineering certificate offered through their extended university course work with the school of engineering.

UNDERWAY

Geosciences Initiatives

1.4 Support Ongoing Research

1.4.1 Develop data necessary to provide accurate and useful planning scenarios to reduce the risk from seiches and tsunami hazards.

Participating Organizations: OES, NOAA, NSF, SCEC, SSC, Local Governments, State Lands Commission, Cal. Coastal Commission, USC, LLNL

Potential Stakeholders: CDMG, USGS, FEMA

Status: Underway

Remarks: Research regarding tsunami generation along the coast of California is underway through several studies.

UNDERWAY

1.4.2 Support geoscience research that can be used to reduce earthquake risk and losses.

Priority: Important

Participating Organizations: OES, NOAA, NSF, SCEC, USC, Local Governments, State Lands Commission, Cal. Coastal Commission, Port of Long Beach, Port of Los Angeles, United States Navy, LLNL, PEER, CDMG, USGS, FEMA, PG&E, Caltrans

Potential Stakeholders: SCE, SDG&E, SCG, DOI, CEA, Earthscope

Status: Underway

Remarks: The initiative is underfunded. Geoscience research varies from seismic hazard assessment, to full-scale static and dynamic testing of piers in deep silt.

UNDERWAY

1.4.3 Improve methods of assessing the cost effectiveness of geoscience information in earthquake loss reduction policy.

Priority: Very Important

Participating Organizations: USGS, CGS, CSSC and SCEC

Potential Stakeholders: PEER, DOI, CEA, and NSF

Status: Underway

Remarks: The USGS/CGS LUPN project based on Watsonville, California and the Loma Prieta earthquake has helped identify the cost effectiveness of geoscience information.

UNDERWAY

Research & Technology Element

Earthquake professionals and decision makers still do not have sufficient knowledge to implement effective measures to protect our communities from earthquake losses. Many continue to rely on outdated or ineffective technologies and methods. Several factors have contributed to the problem:

1. Financial support for research has not kept pace with the need;
2. Research on issues critical to California has been inadequate; and
3. Mechanisms to validate, adopt and implement research findings are insufficient.

Objective: To develop and sustain research that identifies cost-effective methods to improve seismic safety. To facilitate the implementation of validated research findings.

Overall Element Progress:

Research & Technology Initiatives

Objective: *Cost-effective Methods to Improve Seismic Safety*

Strategies and Initiatives: 2.1 Support risk reduction research

2.1.1 **Support and co-fund California-based seismic research programs funded by federal agencies or the private sector.**

Priority: **Critically Important**
Duration: **Ongoing**

Participating Organizations: SCEC, PEER, PG&E, Cal(?) BHT, CalTrans, OES, CEC, and EPRI

Potential Stakeholders: CISN, CUREE, PEER, Government, Business, and Industry Partners including CalTrans, CEA, CDI, CEC, DSA, Factory Mutual, OES, OSHPD, PG&E, SoCal Edison, NSF, NIST, NEHRP, FEMA

Status: Underway

Remarks: The CEA continues to fund earthquake mitigation research through Caltech.

***Benefits:** CalTrans estimates their $6.5 million per year investment in research yields $15 to $30 million per year in benefits or reduced losses.

2.1.2 Update and carry out the Seismic Safety Commission's *Research and Implementation Plan for Earthquake Risk Reduction in California.* Include provisions for 1) public oversight and priority-setting functions; 2) researchers who work with end users to implement the plan; and 3) research that is conducted by other public and private parties.

Priority: Important

Participating Organizations: CSSC, SCEC, PEER, USGS, CalTrans, CEC, PG&E, SCE

Potential Stakeholders: CISN, CUREE, PEER, Government, Business, and Industry Partners including CalTrans, CEA, CDI, CEC, DSA, Factory Mutual, OES OSHPD, PG&E, SoCal Edison, NSF, NIST, NEHRP, FEMA

Status: Underway

Remarks: CSSC plans to complete the update with the help of stakeholders in 2002

UNDERWAY

2.1.3 Expand and fund problem-focused research directed at providing information about seismic safety in California, with priority on integrated, multidisciplinary research efforts. Maintain a specific implementation element in the program to facilitate and encourage the incorporation of existing and new knowledge into professional practice.

Priority: Very Important

Participating Organizations: SCEC, PEER, USGS, NSF, FEMA, CDM, CEA

Potential Stakeholders: CISN, CUREE, PEER, SCEC, Red Cross, OES, OSHPD, DSA, DWR

Status: Underway

Remarks: CISN, CUREE, PEER, and SCEC have efforts underway in problem-focused research, however, funding is limiting progress.

UNDERWAY

2.1.4 Continue support of problem-focused research by PEER to provide the technical basis for development of performance-based building codes, standards, and practices.

Priority: Important

Participating Organizations: SCEC, NSF, CalTrans, State Legislature, OES, CEC

Potential Stakeholders: CUREE, PEER, CISN

Status: Underway

Remarks: PEER and CUREE have efforts started for a few building and bridge types.

UNDERWAY

2.1.5 Establish a program to systematically gather perishable data from damaging earthquakes, including strong ground motion, ground deformation and failure, facility performance, and impacts.

Priority: Very Important

Status: Underway

Participating Organizations: SCEC, ASCE, EERI, PEER, COSMOS

Potential Stakeholders: PG&E, CDMG, USGS, OES Post-Earthquake Information Clearinghouse, CISN, CUREE, PEER, Government, Business and Industry Partners including CalTrans, CEA, CDI, CEC, DSA, Factory Mutual, OES, OSHPD, PG&E, SoCal Edison, NSF, NIST, NEHRP, FEMA

Remarks: Discussions among stakeholders have identified this need for systematic data gathering to substantiate improvements in earthquake safety practices.

2.2 Ensure applicability to risk reduction

2.2.1 Apply cost-effective defense and space technologies to earthquake risk reduction efforts.

Priority: Important

Participating Organizations: SCEC, LLNL, CIT2, OCIP, CalTrans, CDM

Potential Stakeholders: CIT2, LLNL, OCIP CISN, CUREE, PEER, CEC, Government, Business and Industry Partners including CalTrans, CEA, CDI, CEC, DSA, Factory Mutual, OES, OSHPD, PG&E, SoCal Edison, NSF, NIST, NEHRP, FEMA

Status: Underway

Remarks: Self-healing communication links and miniaturized bridge sensors have been used on several bridges in California for assessment on technology.

2.2.2 Require all state-funded seismic research to include active participation by earthquake professionals and decision makers from the outset through implementation and dissemination.

Priority: Very Important

Participating Organizations: SCEC

Potential Stakeholders: PEER, CEC, AIA-CC, ATC, CISN, CUREE, EERI, SEAOCC

Status: Underway

Remarks: This practice is becoming the norm as communication between researchers and users is emphasized.

2.2.3 Promote links between earthquake research organizations and industry to evaluate the performance of new technologies, components, and systems.

Priority: Important

Participating Organizations: PEER, SCEC, BIP, CDM

Potential Stakeholders: AIA-CC, ATC, CISN, CUREE, EERI, PEER, SEAOC, Government, Business and Industry Partners including CalTrans, OES, OSHPD, PG&E, SoCal Edison, NSF, NIBS, NIST, NEHRP, FEMA

Status: Underway

Remarks: Funding support from governments business and industry would increase if these links were strengthened. The CEA continues to fund earthquake mitigation research through Caltech.

2.2.4 Work with federal agencies and research organizations to support development of education programs for design professionals, building officials, and decision makers who implement research results.

Priority: Very Important

Participating Organizations: OES, SCEC, CDM

Potential Stakeholders: CDMG, CISN, CUREE, PEER, Government, Business and Industry Partners including CalTrans, CEA, CDI, CEC, DSA, Factory Mutual, OES, OSHPD, PG&E, SoCal Edison, NSF, NIBS, NIST, NEHRP, FEMA

Status: Underway

Remarks: The time to transfer research results into practice can be shortened with these efforts. The CEA continues to fund earthquake mitigation research through CUREE.

2.2.5 Promote programs of continuing education through existing professional associations to communicate research results to design professionals and land-use planners.

Priority: Very Important

Participating Organizations: SCEC, CDM

Potential Stakeholders: ATC, CISN, CUREE, PEER, Government, Business and Industry Partners including CalTrans, CEA, CDI, CEC, DSA, Factory Mutual, OES, OSHPD, PG&E, SoCal Edison, NSF, NIST, NEHRP, FEMA

Status: Underway

Remarks: California can make significant improvements in earthquake safety by simply applying currently available research results.

2.3 Demonstrate value of research for improving seismic safety

2.3.1 Document the effectiveness of research for improving seismic safety using laboratory tests, seismic simulations, and post-earthquake investigations. Communicate that information to design professionals, researchers, policy makers, and the public.

Priority: Very Important

Participating Organizations: SCEC

Potential Stakeholders: CalTrans, IEEE, NSF, NIST

Status: Underway

Remarks: Outreach support for this initiative is critical to ensure that research is useful and used.

UNDERWAY

2.4 Coordinate Research Activities

2.4.1 Convene workshops, seminars, and public hearings involving users of earthquake research to help establish priorities for reducing earthquake risk. Ensure the results of these activities will be reflected in research objectives, plans, and priorities.

Priority: Very Important

Participating Organizations: SCEC

Potential Stakeholders: ATC, EERI, AIA-CC, BOMA, SEAOC, CCGO, GSA, OES, FEMA, DOI, CEA

Status: Underway

Remarks: PEER, SCEC, CISN and CUREE have limited access to users and funds to reach them so they must strengthen collaboration with other potential stakeholders. The CEA continues to fund earthquake mitigation research through Caltech.

UNDERWAY

2.4.2 Maintain a database of California earthquake research activities, investigations, and research results that are relevant to California's needs.

Priority: Important

Participating Organizations: CSSC

Potential Stakeholders: PEER, CUREE, SCEC, USGS, CDMG, WSSPC, NISEE, CISN

Status: Underway

Remarks: Since NISEE engineering library funding is at risk alternative funding sources are needed. The CEA continues to fund earthquake mitigation research through Caltech.

UNDERWAY

Education & Information Element

Policy makers, professionals, and the public have an increasing awareness of earthquake risks but are still not adequately prepared for making effective decisions in reducing seismic risk. Consistent educational programs and information dissemination systems are still lacking.

Objective

To initiate a comprehensive strategy for education and information sharing that will increase the knowledge of policy makers, professionals, and members of the public enabling them to make effective decisions about reducing losses from earthquakes and encourage them to undertake effective implementation action.

Overall Element Progress:

Education & Information Initiatives

Objective: *Increased Knowledge to Make Effective Decisions*

Strategies and Initiatives:

3.1 Promote Competency of Licensed Professionals

3.1.1 Require licensing renewal for all professionals associated with siting, design, inspection and construction of structures to include adequate continuing education criteria for all applicable seismic safety issues.

Priority: Very Important

Participating Organizations: DCA, SCSA, DWR, SCEC.

Potential Stakeholders: Professionals and the Public

Status: Underway

UNDERWAY

Remarks: DWR is required to provide construction inspector training and testing programs. DWR requires professional engineering licenses for its engineering design/analysis managers. The Contractors State License Board (CSLB), the Board for Professional Engineers and Land Surveyors (BPELS), Board for Geologist and Geophysicists (BGG), and the California Architects Board (CAB), currently require education and training in seismic safety issues as a pre-requisite to examination. SCEC, OES, and FEMA provide informal continuing education programs and workshops that contribute to the competency of licensed professionals.

Education & Information Initiatives

3.1.2 Integrate earthquake loss reduction principles in all appropriate land use, design and construction related professional education programs as a part of the basic curricula.

Priority: Important

Participating Organizations: SCEC, CDM

Potential Stakeholders: The Public

Status: Underway

Remarks: SCEC published *Putting Down Roots in Earthquake Country* about living with the threat of earthquakes in Southern California. KTLA TV partnered with SCEC and produced *Care and Prepare* which was a streamlined version, in both English and Spanish and distributed through McDonald's restaurants through Southern California.

Remarks (cont'd): SCEC's InstalNET distributes a newsletter and website which provide SCEC news, earthquake information, and in-depth converage of earthquake research. SCEC has conducted earthquake related field trips for professionals in concert with local radio stations airing one-minute educational segments and managed the CUREE-Caltech Woodframe Project funded by FEMA and produced three videos, a newsletter, and media interaction. Future SCEC plans to produce a public booklet on the Los Angeles Risk, , an LA guide to local faults in the area. Through joint efforts between SCEC, CUREE, and IRIS, an Electronic Encyclopedia of Earthquakes will be available in the future to provide a large amount of scientific data.

Education & Information Initiatives

3.2 Increase Public Awareness

3.2.1 Develop educational approaches and tools in seismic hazard mitigation including earthquake fundamentals, seismic hazards identification, safety information about potentially hazardous building contents, workplace safety, emergency plans, and risk assessment techniques and tools for those responsible for facilities operation and management.

Priority: **Critically Important**
Time to accomplish: **5 years.**

Participating Organizations: DSA, RESD, Red Cross, ATC, EERI, SoCal Edison, SCEC, CDM.

Potential Stakeholders: Government, Industry, and the Public

Status: Underway

Remarks: The SSC published "Incentives to Improve California's Earthquake Safety". EERI published "Incentives and Impediments to Improving the Seismic Performance of Buildings"and "Investigating Incentives to Improve the Implementation of Performance Based Seismic Design in New and Existing Buildings" DSA intends to develop educational seminars for architects and engineers to promote seismically safe building designs. RESD states that training is provided to state inspection staff on Gravitational Load Path (structural engineering components) and on earthquake response training to incease the pool of professionals trained to assess building safety after earthquakes. The CEA publicizes mitigation awareness and earthquake preparedness on its website: www.earthquakeauthority.com. The CEA develops tools and educational approaches to highlight the importance of mitigation and preparedness. Examples would include development and distribution of mitigation brochure in conjunction with the Governor's Office of Emergency Services; the creation of Public Service Announcements; articles and media packets to reporter; and conduct interviews.

***Benefits:**

3.2.2 Provide tools to media practitioners to ensure reporting accuracy and to increase the level of understanding among reporters and writers.

Priority: Important

Participating Organizations: OES, USGS, CISN

Potential Stakeholders: Government, Industry and the Public

Status: Completed

COMPLETED

Remarks: TriNet in Southern California developed technology to improve shakemap formatting for use in broadcast reporting. The CEA publicizes mitigation awareness and earthquake preparedness on its website: www.earthquakeauthority.com. The CEA develops tools and educational approaches to highlight the importance of mitigation and preparedness. Examples would include development and distribution of mitigation brochure in conjunction with the Governor's Office of Emergency Services; the creation of Public Service Announcements; articles and media packets to reporter; and conduct interviews.

3.2.3 Provide educational tools to homeowners aimed at increasing awareness of fundamental seismic risks, and to encourage implementation of mitigation efforts.

Priority: Very Important

Participating Organizations: SSC, OES, CAR, Southern California Earthquake Center (SCEC), CDM

Potential Stakeholders: The Public

Status: Completed

COMPLETED

Remarks: The Seismic Safety Commission publishes "The Homeowner's Guide to Earthquake Safety" and the Commercial Property Owner's Guide to Earthquake Safety" and the Association of Realtors distributes the publications. The Governor's Office of Emergency Services also publishes a Homeowner's Guide to Earthquake Preparedness. SCEC publishes "Putting Down Roots in Earthquake Country" about living with the threat of earthquakes in Southern California. The CEA publicizes mitigation awareness and earthquake preparedness on its website: www.earthquakeauthority.com. The CEA develops tools and educational approaches to highlight the importance of mitigation and preparedness. Examples would include development and distribution of mitigation brochure in conjunction with the Governor's Office of Emergency Services; the creation of Public Service Announcements; articles and media packets to reporter; and conduct interviews.

Education & Information Initiatives

3.2.4 Develop and communicate information about 1) demonstrated strategies for cost-effective seismic mitigation techniques, and 2) programs and incentives for reducing losses.

Priority: Important

Participating Organizations: DSA, SSC, DOI, EERI, SCEC, CDM

Potential Stakeholders: Government, Industry and the Public

Status: Underway

Remarks: The SSC published "Incentives to Improve California's Earthquake Safety". DOI publishes various consumer brochures on earthuake insurance and residential property insurance and on how to prevent being defrauded by an unscrupulous contractor. EERI published "Incentives and Impediments to Improving the Seismic Performance of Buildings"and "Investigating Incentives to Improve the Implementation of Performance Based Seismic Design in New and Existing Buildings" SCEC published Putting Down Roots in Earthquake Country about living with the threat of earthquakes in Southern California. The CEA publicizes mitigation awareness and earthquake preparedness on its website: www.earthquakeauthority.com. The CEA develops tools and educational approaches to highlight the importance of mitigation and preparedness. Examples would include development and distribution of mitigation brochure in conjunction with the Governor's Office of Emergency Services; the creation of Public Service Announcements; articles and media packets to reporter; and conduct interviews.

3.2.5 Provide education programs in the higher educational systems that increase knowledge and awareness of earthquake fundamentals, loss reduction, preparedness, and response issues.

Priority: Important

Participating Organizations: DOE, California Colleges, SCEC, CDM

Potential Stakeholders: The Public

Status: Underway

Remarks: SCEC's Undergraduate Internship Program has provided opportunities for undergraduate students to work alongside 49 scientists.

Education & Information Initiatives

3.3 Inform Public Officials

3.3.1 Conduct educational sessions including workshops for officials from State, city, and county as well as other community based organizations, institutions and agencies, on vulnerability assessment and loss reduction measures.

Priority: Very Important

Participating Organizations: DSA, CSMIP, OES, EQE, USGS, ATC, CDMG, DCA, SCEC, CDM

Potential Stakeholders: Local Officials and the Public

Status: Underway

Remarks: DSA intends to expand their inspector training program and keep it up to date with forthcoming code changes.
CSMIP holds educational seminars each year with participation by engineers and building officials to communicate practical results from strong motion studies. The Contractors State License Board (CSLB), the Board for Professional Engineers and Land Surveyors (BPELS), Board for Geologist and Geophysicists (BGG), and the California Architects Board (CAB) has an ongoing contact program with building officials around the state to educate and raise awareness. The CEA publicizes mitigation awareness and earthquake preparedness on its website: www.earthquakeauthority.com. The CEA develops tools and educational approaches to highlight the importance of mitigation and preparedness. Examples would include development and distribution of mitigation brochure in conjunction with the Governor's Office of Emergency Services; the creation of Public Service Announcements; articles and media packets to reporter; and conduct interviews.

3.3.2 Develop and disseminate information on how public officials can establish and manage community coalitions to support loss reduction.

Priority: Important

Participating Organizations: SSC, OES, ABAG, FEMA, CDM

Potential Stakeholders: Local government, CBOs

Status: Unknown

Remarks:

3.3.3 Require continuing education in all applicable seismic safety issues for building officials.

Priority: Important

Participating Organizations: OES, FEMA, CALBO

Potential Stakeholders: Local building departments

Status: Underway

Remarks: OES & FEMA sponsor training after earthquakes

UNDERWAY

3.4 Strengthen K-12 Earthquake Programs

3.4.1 Implement cohesive K-12 curriculum elements on earthquake fundamentals and mitigation as an integral part of the State's educational standards. The dual aim of this effort is that California schools will produce an informed public and new generations of scientists, planners, legislators, communicators, and business leaders.

Priority: Important

Participating Organizations: DOE, SCEC, NSF, CEA

Potential Stakeholders: Teachers, Students, Parents and the Public

Status: Underway

Remarks: SCEC currently in working on a middle school curriculum video entitled "Seismic Sleuths which will be aired Learning Channel. The State Department of Education states that most high school Earth Science classes provide such instruction to students. Also, there is curriculum from FEMA relating to earthquakes and their causes appropriate for K-8 students.

UNDERWAY

3.4.2 Provide pre-service and in-service training of teachers relating to earthquake fundamentals, loss reduction, preparedness and response issues within the sciences, environment, mathematics, history/social science, and language arts curricula.

Priority: Very Important

Participating Organizations: DOE, SCEC, FEMA, OES

Potential Stakeholders: Students

Status: Underway

Remarks: SCEC hosted training for teachers to use FEMA's Tremor Troop and Seismic Sleuths curricula (see 3.4.1 above). SCEC produced Earhtquake Preparedness for Schools which was a workshop attended by teachers and administrators in K-12 schools. The DOE's Education Support Systems Division provides crisis response training utilizing the same process for earthquake response preparation.

UNDERWAY

Economics Element

With respect to earthquakes, model codes, design construction, and retrofit have been driven by life safety standards. This approach has provided a high degree of life safety, but the preservation of property and the impact on economic value has been largely ignored. Earthquakes have caused economic losses that could have been significantly reduced if the State had had more effective policies that protect the functionality of buildings and infrastructure.

Objectives

To emphasize policies in design, construction and retrofit practices that protect property, contents, and functionality in both public and private sector facilities including infrastructure. To develop incentives for cost-effective loss reduction.

Overall Element Progress:

Economics Initiatives

Objective: *Emphasize Earthquake Mitigation Policies that Recognize Economic Value*

Strategies and Initiatives

4.1 Demonstrate Cost Effectiveness

4.1.1 **Develop economic models and real case studies that demonstrate the cost-effectiveness of specific design, construction, and retrofit methods based on increased levels of property, contents, functionality, and tax base protection. Make those findings available to the policy-makers, and the lending, insuring and taxing agencies.**

Priority: **Critically Important**
Time to accomplish: **3 to 5 years**

Participating Organizations: SCEC, CDM

Potential Stakeholders: OES, DOF, PEER, CDMG, CDI, CEA, FEMA

Status: Underway

***Remarks:**

***Benefits:** This is essential to justify loss reduction measures.

UNDERWAY

4.1.2 Develop reliable simulation models that demonstrate the cost-effectiveness of enhanced performance standards.

Priority: Very Important

Participating Organizations: CDI

Potential Stakeholders: OES, CDMG, CEA, DOF, FEMA

Status: Underway

Remarks:

UNDERWAY

Economics Initiatives

4.2 Develop Incentives

4.2.1 Establish State and local revenue generating policies to provide incentives for cost effective loss reduction.

Priority: Very Important

Participating Organizations:

Potential Stakeholders: Cities and counties, ICC, CSAC, DoF

Status: Underway

Remarks: The CEA offers incentives for mitigation implementation.

UNDERWAY

4.2.2. Work with the mortgage lending industry to establish objective criteria in which increased seismic performance of structures is incorporated into mortgages and underwriting practices.

Priority: Very Important

Participating Organizations: CBA, CMA

Potential Stakeholders: Insurance industry, homeowners, CEA, lending industry

Status: Unknown

Remarks:

4.2.3 Work with the insurance industry to establish objective criteria in which increased seismic performance of structures is incorporated into insurance and underwriting practices.

Priority: Very Important

Participating Organizations: CDI

Potential Stakeholders: CEA, ATC, CoLA, IBHS

Status: Underway

Remarks: The CEA works directly with the insurance industry in aspects of mitigation and offers incentives for mitigation implementation.

UNDERWAY

4.2.4 Identify and eliminate Federal, State and local regulatory and financial disincentives for seismic retrofit.

Priority: Very Important

Participating Organizations: SSC

Potential Stakeholders: EERI, BOMA, PARMA, DOF

Status: Underway

Remarks:

UNDERWAY

Economics Initiatives

4.2.5 Define measurable goals for economic loss reduction as a result of increased incentives.

Priority: Very Important

Potential Stakeholders: PEER, CUREE, CDI, CEA, ATC, DoF, D of Commerce

Status: Underway

Participating Organizations:

Remarks:

4.3 Include Property Protection in Model Codes

4.3.1 Incorporate cost effective seismic design standards in model codes based on protection of property and functionality.

Priority: Very Important

Potential Stakeholders: AIA-CC, SEAOC, ATC, CalBO, ICC, CBSC, DSA, OSHPD, NFPA, ASCE

Status: Underway

Participating Organizations:

Remarks:

4.3.2 Develop statewide constituency to establish the cost-effective levels of property-based performance codes.

Priority: Important

Potential Stakeholders: CBA, CMA, Chamber, DoF, AIA-CC, SEAOC, ATC, CalBO, ICC, NFPA, ASCE

Status: Unknown

Participating Organizations:

Remarks:

4.3.3. Define measurable goals for economic loss reduction as a result of performance based codes and standards.

Priority: Very Important

Potential Stakeholders: CBA, CMA, Chamber, DoF, AIA-CC, SEAOC, ATC, CalBO, ICC, NFPA, ASCE, OES-IC, CDI, CEA

Status: Unknown

Participating Organizations:

Remarks:

4.4 Protect Functionality of Infrastructure

4.4.1 Establish public policy that incorporates increased seismic design standards in the design construction, and operation of infrastructure, based on the need to maximize functionality after earthquakes.

Priority: Very Important

Participating Organizations: SCEC

Potential Stakeholders: CBA, CMA, Chamber, DoF, AIA-CC, SEAOC, ATC, CalBO, ICC, NFPA, ASCE, OES-IC, CDI, CEA, CPUC, CEC, DWR, CalTrans

Status: Underway

Remarks:

Economics Initiatives

4.4.2 Define measurable goals for economic loss reduction as a result of increased standards.

Priority: Very Important

Participating Organizations:

Potential Stakeholders: CBA, CMA, Chamber, DoF, AIA-CC, SEAOC, ATC, CalBO, ICC, NFPA, ASCE, OES-IC, CDI, CEA

Status: Unknown

Remarks:

Land Use Element

Efficient use of land is one of the most critical issues in effective loss reduction and recovery from the disastrous effects of earthquakes. Because the risk of loss from earthquakes increases as the population increases, several areas of concern emerge with respect to land use: 1) generally, seismic hazard knowledge is neither adequately incorporated nor consistently applied in land use decision making; 2) acceptable levels of seismic performance in new developments are not clearly understood; 3) environmental review procedures are not adequately addressing seismic hazards; and 4) developments subject to inundation due to potential dam or levee failure or tsunami effects are not adequately identified and protected.

Objective

To improve land use planning to achieve optimum balance between the needs for the State's population and economic growth and the constraints imposed by seismic hazards.

Overall Element Progress:

Land Use Initiatives

Objective: *Achieve Balance Between Growth & Seismic Hazards*

Strategies and Initiatives

5.1 Incorporate Seismic Hazard Data in General Plans

5.1.1 **Require geotechnical and geological reports addressing seismic hazards for all subdivisions pending completion and adoption of mapping under the Seismic Hazards Mapping Act for any jurisdictional area.**

Priority: **Critically Important**
Time to accomplish: **2 years**

Participating Organizations: OPR, ICBO, all county and city planning and building departments

Potential Stakeholders: Residential developers, insurance industry, CEA, OES, real estate industry, finance industry, APA, AICP

Status: Unknown

Remarks: Certain county or city building officials may require geological and or geotechnical reports on a case-by-case basis.

***Benefits:**

5.1.2 Amend the State Planning law to require local governments to review and update the safety element every five years (or sooner if appropriate) to incorporate the most recent geologic and technical information available.

Priority: Very Important

Participating Organizations: SCEC, CSSC

Potential Stakeholders: All county and city planning departments, insurance industry, real estate industry

Status: Unknown

Remarks:

5.2 Strengthen CEQA Process

5.2.1 Amend the California Environmental Quality Act (CEQA) Guidelines, including Appendix G and Appendix I, to explicitly require initial studies and Environmental Impact Reports (EIRs) to address and provide for adequate mitigation of seismic hazards.

Priority: Very Important

Participating Organizations: OPR

Potential Stakeholders: All city and county planning and building departments, all state regulatory and construction entities that oversee construction or build, maintain, and operate facilities, the engineering and geological communities

Status: Unknown

Remarks:

5.2.2 Require the seismic hazards portion of initial studies and EIRs to be prepared by appropriate technical experts.

Priority: Very Important

Participating Organizations: Licensing boards for geologists and for engineers, OPE, ASCE, AEG

Potential Stakeholders:

Status: Unknown

Remarks:

5.2.3 Give local government emergency managers opportunity to review initial studies and EIRs so that seismic hazards may be adequately identified.

Priority: Very Important

Participating Organizations: City and county emergency management officials

Potential Stakeholders: OPR, CDMG, CEMA, OES, AICP

Status: Unknown

Remarks:

Land Use Initiatives

5.3 Develop Mitigation Techniques

5.3.1 Require local governments to list and catalog, in accordance with geological data, seismic and geologic hazards reports submitted to them with normal environmental, sub-division, and other project review procedures. Make reports available to the public as required by the Public Information Act.

Priority: Important

Participating Organizations:

Potential Stakeholders: The engineering and geological communities, ACSE, AEG, SCEC, PEER, COSMOS, CDMG, CalBO, USGS, AICP, planning and building officials.

Status: Unknown

Remarks: Current GIS initiatives in local governments (like San Jose) may result in a searchable database that will enhance public access

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5.3.2 Amend the State Planning Law to establish policies and mitigation requirements in safety elements of local general plans, related to the use, occupancy, and rehabilitation of buildings that are considered seismically vulnerable.

Priority: Very Important

Participating Organizations:

Potential Stakeholders:

Status: Unknown

Remarks:

5.3.3 Review potential tsunami hazards, prepare inundation maps and recommend appropriate mitigation strategies and responsibilities.

Priority: Important

Participating Organizations: SCEC, Ca. Coastal Commission, CDMG, Tsunami Research Center at USC, PMEL, OES, FEMA, NSF, and CSLC

Potential Stakeholders: All coastal city and county governments.

Status: Unknown

Remarks: Mapping project underway is primarily for use in planning evacuation routes.

5.3.4 Encourage general plan policies to recognize the aggregate effect of potential seismic hazards on adjacent uses and consider appropriate mitigation.

Priority: Very Important

Participating Organizations: CDMG

Potential Stakeholders: Real Estate Industry, Insurance Industry

Status: Unknown

Remarks:

Land Use Initiatives

5.4 Protect Areas from Inundation

5.4.1 Require owners, developers, and flood control districts to prepare and revise inundation maps every ten years in light of major new downstream development. Amend land use laws to require current and updated dam inundation maps to be available, and reviewed, before approving development of critical facilities and large-scale developments.

Priority: Important

Participating Organizations: OPE, All city and county planning departments, DWR, DSOD

Potential Stakeholders: FEMA, OES

Status: Not Started

Remarks:

5.4.2 Require proponents of critical facilities and major large-scale developments located downstream of dams to review the latest inundation maps and update the maps as necessary in light of their development.

Priority: Important

Participating Organizations: All city and county planning departments

Potential Stakeholders: Cal ISO, DSOD, DWR, OES

Status: Not Started

Remarks: Required under CEQA

5.4.3 Amend statute to impose sanctions on dam owners who fail to prepare and submit inundation maps as required.

Priority: Important

Participating Organizations:

Potential Stakeholders: USBR, PG&E, irrigation districts, SCE, USCOE, DWR, OES

Status: Unknown

Remarks:

5.4.4 Amend the State Planning Law to require that State and local agencies make specific findings known regarding the acceptability of inundation hazards before approving development of critical facilities and major large-scale developments.

Priority: Important

Participating Organizations:

Potential Stakeholders: USBR, PG&E, irrigation districts, SCE, USCOE, DWR, OES, OPR, AICP

COMPLETED

Status: Completed

Remarks: Required under CEQA

Existing Buildings Element

Many of California's existing buildings, including homes, are vulnerable to damage or collapse from earthquakes. Most seismic retrofit projects to date have focused appropriately on life safety and have not significantly reduced the potential loss to property, personal disruption, and productivity. Continuing occurrence of earthquake damage to older and recently constructed buildings clearly demonstrates the need for heightened awareness of the benefit of increased performance levels beyond that of life safety.

Objective

To initiate aggressive efforts toward reducing loss of life and vulnerability of property in existing buildings. To ensure that all existing high-occupancy and essential services buildings are upgraded to remain occupiable following earthquakes.

Overall Element Progress:

Existing Buildings Initiatives

Objective: *Upgrade Vulnerable Buildings and Structures*

Strategies and Initiatives

6.1 Provide Incentives To Retrofit

6.1.1 **Encourage economic incentives, such as improved mortgage terms, reduced insurance rates, and positive tax benefits, for upgrading structural and non-structural elements in buildings.**

Priority: **Critically Important**
Time to accomplish: **10 years**

Participating Organizations: DOI, CEA

Potential Stakeholders: Home owners, private hospital and building owners, local government building code enforcement agencies

Status: Unknown

Remarks: Legislation to exempt retrofits from property tax increases was recently enacted. The CEA and insurance industry offer a retrofit discount on earthquake policies to homeowners who have retrofitted their homes for earthquakes.

***Benefits:** Economic incentives for structural upgrades reduce their vulnerability to damage due to earthquakes.

6.1.2 Amend the California Building Code to allow upgrading of the structural and non-structural elements of buildings without triggering other code upgrade requirements, providing the work is intended to improve seismic performance.

Priority: Important

Participating Organizations: DSA, RESD, BSC

Potential Stakeholders: CBSC, School Districts, Community College Districts, building owners, State and Local government building code enforcement agencies, CALBO

Status: Not Started

Remarks: DSA has started the development of a Building Rehabilitation Code for upgrading the life safety elements of a building without triggering other code requirements.

6.1.3 Amend local regulations to allow increased use or area in consideration of seismic retrofit.

Priority: Important

Participating Organizations: ICBO, BSC

Potential Stakeholders: State and local government building code enforcement agencies, CALBO, ACIA, AGIC, CSLB, CBSC, ATC, CTI

Status: Unknown

Remarks:

6.2 Initiate Broad Educational Efforts

6.2.1 Develop and implement continuing education programs aimed at raising the standards of those responsible for enforcing seismic design principles. This includes building inspectors, plan checkers, and others involved in the construction trades.

Priority: Very Important

Participating Organizations: SEAOC, CalBO

Potential Stakeholders: Local government buildings, state agencies with buildings

Status: Underway

Remarks: SEAOC and CalBO periodically conduct training seminars to their members in seismic design and seismic retrofit of buildings.

6.2.2 Develop and implement plans to increase the building owner's general knowledge of and appreciation for the value of seismic upgrading of the structural and non-structural elements of a building.

Priority: Very Important

Participating Organizations: DSA, CalBO, CASH

Potential Stakeholders: School districts, hospital owners, State local government building code enforcement agencies

Status: Underway

Remarks: DSA distributes information seminars and participation in professional organizations and in the CASH annual conference.

Existing Buildings Initiatives

6.3 Develop Effective Methodologies

6.3.1 Continue efforts to develop reliable and practical methodologies and codes for: 1) minimum prescriptive retrofit standards; and 2) enhanced performance-based retrofit standards for the structural and non-structural elements of all types of existing public and private buildings, including essential services buildings and higher educational institutions, that can provide cost-effective improved seismic resistance.

Priority: Very Important

Participating Organizations: DSA, RESD, OES

Potential Stakeholders: Private and public buildings, owners, ICC, CALBO

Status: Underway

Remarks: California Building Code provides performance-based code on seismic retrofit for state buildings, including UC and CSU. DSA has a certification program for water heater braces and gas shut-off valves and is revising the non-structural hazards booklet in cooperation with OES.

UNDERWAY

6.4 Upgrade Vulnerable Buildings and other Structures

6.4.1 Report to the public the changes in understanding of the seismic vulnerability of selected buildings, or conditions that warrant wide attention. Address the problems learned through continual study of earthquake effects on buildings. Include methods to handle the technical, administrative, and public policy issues they present.

Priority: Very Important

Participating Organizations: DSA, CDMG

Potential Stakeholders: Private and public building owners, PEER, CUREE, CALBO

Status: Underway

Remarks: DSA has recently completed the surveying portion of AB300 that mandated review of pre-1976 for vulnerability to earthquake safety. CDMG conducts the Strong Motion Participation Program for government and private buildings in the state.

UNDERWAY

6.4.2 Ensure that essential service and hospital buildings remain occupiable and the time to regain full operability is minimized. Operation includes the continuance of all utility services and systems necessary for proper function of such facilities.

Priority: Very Important

Participating Organizations: DSA, RESD, Cal ISO, BSC

Potential Stakeholders: private and public building owners, CALBO

Status: Underway

Remarks: DSA and RESD adopted and implemented a retrofit standard that is Division IIIR of the California Building Code. A new standard was promulgated by DSA and adopted by the CBS in December 2000.

UNDERWAY

Existing Buildings Initiatives

6.4.3 **Identify and prioritize all seismically vulnerable public and private buildings. Establish a mitigation plan to reduce the risk posed by those buildings, including structural and non-structural elements, equipment and contents. The most vulnerable and the most essential buildings should be addressed as the highest priority.**

Priority: **Critically Important**

Time to accomplish: **10 years**

Participating Organizations: DSA, RESD, DWR, CDM

Potential Stakeholders: Private and public building owners, CALBO

Status: Underway

Remarks: All state buildings as well as UC, CSU, and Community College buildings have been surveyed and categorized. DSA has completed the surveying portion of pre-1976 school buildings. The SAFER mitigation program focuses on existing residential dwellings and offers incentives for participating in the program – in terms of reduced insurance rates and partially subsidized retrofits.

***Benefits**: Improving seismic safety of vulnerable buildings reduces injury and loss of life due to seismic hazards.

6.4.4 Adopt, by legislation, Appendix Chapters 5 and 6 of the Uniform Code for Building Conservation, or comparable sections of successor documents, for the seismic retrofit of tilt-up buildings and older homes.

Priority: Very Important

Participating Organizations: DSA, BSC

Potential Stakeholders: Home owners and private and public building owners, state and local building code enforcement agencies

Status: Unknown

Remarks: Adoption of these chapters requires legislation.

6.4.5 Adopt modifications to the building code, including the Historic Building Code, to require seismic retrofit of seismically vulnerable buildings when major modifications, alterations, or additions to the building occur that require issuance of a building permit.

Priority: Important

Participating Organizations: DSA, RESD

Potential Stakeholders: Private and public building owners, CALBO, state and local building code enforcement agencies

Status: Underway

Remarks: Modifications have been included in the latest version of Title 24, California Building Code

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6.4.6 Enforce the California Building Standards Code for all modifications, alterations, or additions to state-owned buildings.

Priority: Important

Participating Organizations: DSA, RESD

Potential Stakeholders: CBSC, State-owned essential service buildings and other state-owned buildings

Status: Underway

Remarks: DSA is enforcing this code for essential service buildings and RESD is the enforcement agency for most other state-owned buildings.

6.4.7 Encourage building occupants, leaseholders, mortgage providers, and insurers, to require building owners to disclose seismic risks and the options to mitigate them prior to executing new or continuing financial commitments in connection with the building use.

Priority: Important

Participating Organizations: RESD, DSA

Potential Stakeholders: State leased buildings, private building owners, CMA, CBA, BOMA

Status: Underway

Remarks: Executive Order 86-90 requires state leased structures be evaluated by a licensed structural engineer before newer renewed leases.

6.4.8 Adopt legislation to require compliance with the current Unreinforced Masonry (URM) Law in accordance with the Uniform Code for Building Conservation (UCBC).

Priority: Important

Participating Organizations: ICBO, CBSC, ICC

Potential Stakeholders: Public and private URM building owners

Status: Not Started

Remarks: Legislation is required for compliance

6.4.9 Develop and adopt post-earthquake repair and retrofit standards for damaged buildings.

Priority: Very Important

Participating Organizations: DSA, RESD

Potential Stakeholders: Public and private building owners, CALO, CBSC, ICC, SEAOC, ATC

Status: Underway

Remarks: DSA enforces current standards for post earthquake repair and retrofit of damaged buildings.

KEEP BLANK

New Buildings Element

Earthquake protection of new buildings based on providing life-safety and collapse resistant structures has been reasonably successful in moderate earthquakes. Protection of property and economic loss control has not received as much emphasis and is not yet as successful. As a result, property and economic loss due to earthquake damage to recently completed buildings and contents has been unacceptable. Losses have been due to: 1) limited knowledge of the performance of materials and systems; 2) lack of a complete approach to seismic design including all elements of buildings and their contents; and 3) inadequate quality control of design and construction. The damage from recent earthquakes clearly demonstrates the need for continued improvement in these three areas to achieve cost-effective seismic performance of new construction.

Objective

To achieve more consistent levels of safety by developing techniques that provide higher levels of earthquake resistance that will reduce potential property losses, minimize environmental damage, and protect the economic viability of the State.

Overall Element Progress:

New Buildings Initiatives

Objective: *Increased Reliability for Life Safety and Property Protection*

Strategies and Initiatives

7.1 Include All New Buildings

7.1.1 Require that all State, local agencies, and special districts have construction projects regulated by independent building code enforcement entities with enforcement, citation, and stop-work authority. Assign government officials to be responsible for enforcement of codes and regulations.

Priority: Very Important

Participating Organizations: DSA

Potential Stakeholders: Special Districts, cities and counties, CBSC, CalBO, ICBO, CSAC, LCC, CSDA, SDRMA, UC, CSU, State Agencies that own facilities

UNDERWAY

Status: Underway

Remarks: Most jurisdictions require these however there are many notable exceptions including some state agencies, special districts, and publicly owned projects.

7.1.2 Require public utilities, essential facilities, public owned facilities and hazardous waste facilities not currently regulated under the Alquist Priolo Earthquake Fault Zone Act and the Seismic Hazards Mapping Act to incorporate mitigation for earthquake induced site instability.

Priority: Very Important

Participating Organizations: DWR, DSA, DTSC

Potential Stakeholders: CDMG, Municipal and Private Utilities, CPUC, Special Districts, CSDA, SDRMA, State agency facility owners, Legislature

Status: Underway

Remarks: This would generally require changes in state law except where jurisdictions can take their own initiative to clarify or expand their authority.

UNDERWAY

7.2 Develop Integrated Approach to Design

7.2.1 Clarify the California Building Code to assign responsibility for seismic resistance design coordination and quality assurance during construction of all building elements and components.

Priority: Very Important

Participating Organizations: DSA

Potential Stakeholders: DGS, HCD, CBSC

Status: Underway

Remarks: The Field Act for public schools and the Hospital Seismic Safety Act have these requirements but regulations for other occupancies are not clear or consistent.

UNDERWAY

7.2.2 Implement training, quality control, and enforcement procedures to ensure that all new construction is built in accordance with the design and the building code.

Priority: Very Important

Participating Organizations: DSA

Potential Stakeholders: CalBO, CalBO Training Institute, ACIA, ICC, ICBO ATC

Status: Underway

Remarks: Recent change in state law provides a funding source to train local government code enforcers. This effort should be expanded to include other jurisdictions.

UNDERWAY

New Buildings Initiatives

7.3 Adopt California-Specific Standards

7.3.1 **Amend statute to allow California to adopt seismic specific amendments to national model building codes that meet the specific needs of the state and that apply to all State and local jurisdictions.**

Priority: **Critically Important**
Time to accomplish: **2 years**

Participating Organizations:

Potential Stakeholders: CBSC, CalBO, Legislature

Status: Not Started

Remarks: Changes in state law are required

***Benefits:** Would provide California the flexibility and authority to ensure public safety when national model codes do not meet the state's needs.

7.3.2 Amend the California Building Code to require that seismic design strategies of public and private acute-care hospital facilities be applied to equipment and contents as well as structural and non-structural elements so that they remain functional after an earthquake.

Priority: Very Important

Participating Organizations: SCEC

Potential Stakeholders: OSHPD, CHA, CHCF, Hospital Owners

Status: Unknown

Remarks: Currently only heavy equipment anchorage is regulated.

7.3.3 Ensure that essential service and hospital buildings can continue to operate in the event of earthquakes, as required by current law, including the continuance of all utility services and systems necessary for proper operation of the facility.

Priority: Very Important

Participating Organizations: DSA, CALISO, SCEC

Potential Stakeholders: Cities, counties, CSAC, League, CSDA, Special Districts, Utilities, PUC

Status: Underway

Remarks: Current regulations and practice are not typically based on ensuring system performance and essential services are vulnerable to lengthy losses of utilities.

7.3.4 Amend the California Building Code to require independent professional review for important, irregular, complex, special-occupancy, and critical facilities, and for all buildings where mandated enhanced performance objectives are required.

Priority: Important

Participating Organizations: DSA

Potential Stakeholders: CBSC, cities, counties, Special Districts, Legislature, State agencies that regulate facilities.

Status: Underway

Remarks: Reviews by many jurisdictions can lack independence and/or professional qualifications.

7.3.5 Amend statute to allow any interested party to submit proposed seismic specific amendments to the California Building Code for consideration and adoption by the California Building Standards Commission.

Priority: Important

Participating Organizations:

Potential Stakeholders: CBSC, Legislature, CALBO, State agencies that regulate buildings

Status: Not Started

Remarks: Changes in state laws required

7.3.6 Require every Building Department to have an appropriately licensed design professional, on staff or under contract, for advice regarding structural and seismic safety issues.

Priority: Very Important

Participating Organizations:

Potential Stakeholders: CALBO, cities and counties, LCC, CSAC, Legislature, DCA, Licensing Boards

Status: Underway

Remarks: Change in State law required.

7.4 Do Performance-Focused Research

7.4.1 Provide substantial, continuing support to develop the knowledge and practice basis for developing performance-based design procedures for buildings and systems.

Priority: Important

Participating Organizations: DWR, DSA, CSMIP, CDI, SCEC

Potential Stakeholders: PEER, ATC, ICC, SEAOC, AIA, BOMA, CBSC

Status: Underway

Remarks: Lack of investment will slow this development and limit the reliability of new buildings during and after earthquakes.

New Buildings Initiatives

7.4.2 Provide continuing support to develop performance-based design and construction procedures for buildings and systems, participating with other organizations to the extent practical.

Priority: Important

Participating Organizations: DSA, PEER, ATC, SEAOC

Potential Stakeholders: CALBO, EERI, NEHRP

Status: Underway

Remarks: Initial results are to be review for use in ATC-58 project.

Utilities & Transportation Element

Utilities and transportation systems can experience severe disruptions under earthquake conditions: 1) major supply lines and high-volume routes are insufficiently resistant to earthquakes or lack adequate redundancy (alternate systems); and 2) when secondary lines and routes are seismically vulnerable and alternate systems are overwhelmed by earthquake damage. Primary concerns about utilities include the critical lack of redundancy or upgrading in public and private facilities. This applies to water and wastewater (including dams), natural gas, communications, and electrical systems. Transportation concerns are similar and include highway bridges, roadways, railroads, airports and harbors. Significant disruption of these systems would cause extensive long-term economic losses, societal disruption, and personal danger.

Objective

To ensure that all public and private utilities and transportation systems can withstand earthquakes to the degree that they will be able to: 1) provide protection of life; 2) limit damage to property; and 3) provide for the resumption of system functions as soon as practicable. The intent of this objective is to limit the impact to only short-term interruptions, with minimal life loss and economic disruption to the affected regions.

Overall Element Progress: Progress to date has been limited since not all utilities have participated in developing or employing mitigation techniques.

Utilities & Transportation Initiatives

Objective: *Protect Life, Limit Property Damage, and Resume Functions*

Strategies and Initiatives

8.1 Ensure Performance Standards

8.1.1 Establish and/or update performance standards for system and facility design, construction, maintenance, operation, and inspection of all public and private utility and transportation systems. Include related critical facilities and consideration of the interdependency between systems. Include minimum performance standards for critical wireless systems such as cellular telephones, the Internet, and emergency radios, including their related fiber optics, towers and emergency power. Include minimum performance standards for natural gas pipelines, oil pipelines, refineries, and electrical transmission lines. Include minimum performance standards for water conveyance systems, tunnels, elevated roadways, rail systems, and ports.

Priority: Very Important

Participating Organizations: IEEE, FHWA, AASHTO, CalTrans, ICBO, DWR, ASCE, Port of Long Beach and the Port of Los Angeles.

Potential Stakeholders: CEC, PG&E, SCE, LADWP, East Bay MUD, SFPUC, SMUD, BPA, WAPA, SDG&E, SoCal Gas, Colorado River Project, USDOT, Petrochemical Facility Owners, CPUC

Status: Underway

Remarks: Performance standards have been developed by some utility and transportation organizations for their systems but no efforts have been made for developing uniform performance standards for all types of utilities.

8.1.2 Require utilities that are not regulated by the California Public Utilities Commission (PUC) to adopt the equivalent seismic performance standards required of utilities that are regulated by the PUC. (Editor's Note: To be Confirmed by Commissioner Klein)

Priority: Very Important

Participating Organizations: ICBO, DOE

Potential Stakeholders: SMUD, WAPA, USDOT, MID IID, TIP

Status: Unknown

Remarks: With the exception of electric power lines and natural gas pipelines, the utilities are already under the jurisdiction of the host county or city. The counties and cities use the uniform building code/California building code and local ordinances for regulating utility construction. These codes tend to supercede the PUC requirements for seismic performance requirements. Legislation will be required to require enforcement of these standards.

8.1.3 Require public and private utilities and transportation systems to address the earthquake hazards identified in the Alquist Priolo Earthquake Zone Act and the Seismic Hazards Mapping Act

Priority: Important

Participating Organizations: DWR, Caltrans, DOE, CDMG, CEC

Status: Unknown

Potential Stakeholders: All public and private utilities and transportation system owners in California, PUC, Cal ISO

Remarks: Natural gas transmission lines seismic design guidelines should be available through the American Lifelines Alliance in 2002. CDMG and USGS periodically upgrade seismic hazard maps to reflect current knowledge. New projects in California that are subject to CEQA review are required to address earthquake hazards.

8.2 Mitigate Secondary Effects

8.2.1 Develop and implement a comprehensive educational program aimed at instructing providers and users about potential secondary hazards inherent in disruption or failure of a system. Include all forms of secondary hazards such as, but not limited to those, from major transportation spills of hazardous materials, natural or liquefied petroleum gas leaks at mobile home parks, electrically ignited fires, and unbraced gas water heaters.

Priority: Important

Participating Organizations: UC Berkeley, USC, PEER, DSA, OES, CDM

Potential Stakeholders: All building and facility owners in the state, the engineering and geological communities, school districts, hospital owners, transportation systems, CDMG, OES, USDOT, PUC

Status: Underway

Remarks: None

8.2.2 Educate local governments and the public on the application of gas safety devices such as automatic shut-off valves.

Priority: Very Important

Participating Organizations: DSA, RESD SCG, SDG&E, PG&E, and gas transmission and distribution companies

Potential Stakeholders: CPUC, CEC, USDOT, OES, SFPUC, school districts, home owners and the Gas Research Institute

Status: Completed

Remarks: Shut off valves are required for all school buildings. DSA has implemented program to certify shut-off for general use.

COMPLETED

8.3 Evaluate and Prioritize Mitigation Measures

8.3.1 Develop effective methods of minimizing utility system disruption from earthquake damaged transmission and distribution lines (gas, oil, electrical, water and waste water) including earthquake activated shutoff and restart, monitoring and management systems.

Priority: Important

Participating Organizations: PG&E, PEER, SCE, Cal ISO, LADWP, BPA, SDG&E, CDM

Potential Stakeholders: Transmission line owners, utility distributions systems, WAPA, Cal ISO WSCC, NERC, FERC, DOE, OCIP, OES, EOB, CEC, PUC, SFPUC, SCG

Status: Underway

Remarks: Cal ISO works with participating transmission owners, utilities distribution companies and generators to support seismic improvements

UNDERWAY

8.3.2 Develop methods to ensure effective inter-provider coordination for maintaining and restoring critical systems to reasonable levels of service subsequent to damaging earthquakes. Encourage the voluntary actions of existing and future inter-provider seismic working groups, consisting of representatives of each type of utility and transportation provider.

Priority: Important

Participating Organizations: PG&E, Cal ISO, SCE, SDG&E, SMUD, BPA

Potential Stakeholders: Electric and natural gas transmission line owners, utility distribution system companies, utility providers, WSCC, NERC, FERC, DOE, OES, EOB, CEC, CPUC, SFPUC, DWR.

Status: Underway

Remarks: The major electric utilities on the west coast have an inter-utility seismic hazards working group where they lend a hand to one another as needed on seismic hazards and on disruptions after earthquakes.

UNDERWAY

Utilities & Transportation Initiatives

8.4 Retrofit Critical Systems

8.4.1 Identify potentially vulnerable public and private primary water supply and distribution facilities, including State and Federally regulated dams, and public and private levees. Upgrade vulnerable systems to ensure timely reactivation of essential systems after damaging earthquakes.

Priority: Very Important

Participating Organizations: PG&E, SCE, DWR, USBR, USCOE

Potential Stakeholders: LAPWP, DSOD, DWR, SFPUC, EBAYMUD, Cal FED, various irrigation and water service districts, dam and levee owners, and all cities and counties.

Status: Underway

Remarks: Upgrade of systems requires State or Federal legislation. Analysis of dams and water storage and supply systems underway on a pilot study level.

8.4.2 Identify potentially vulnerable major transportation arteries that have minimal redundancy whose service disruption would cause significant hardship on the communities served. Establish functional priorities and upgrade or replace as appropriate to ensure restoring major arteries to reasonable levels of service.

Priority: Very Important

Participating Organizations: CalTrans, FHWA, OES, Amtrak, Railroads, PEER

Potential Stakeholders: State, Federal and local government transportation systems, CPUC

Status: Underway

Remarks: Upgrade or replacement of this system requires legislation

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8.4.3 **Identify potentially vulnerable public and private utility systems including electric, gas, oil, water, and communication. Upgrade vulnerable systems to ensure the operation and timely restoration of essential systems to reasonable levels of service.**

Priority: **Critically Important**
Time to accomplish: **5 years**

Participating Organizations: Cal ISO, CPUC, CEC, DOT, FERC, PG&E

Potential Stakeholders: All county and city emergency planners, Pacific Bell, ATT Wireless, SBC Communication, FEMA, OCIP, BPA, SCE, LADWP, SDG&E, SCG, WAPA, OES, BPA, DWR.

Status: Underway

Remarks: DWR has recently identified and prioritized vulnerable SWP facilities and is in the process of retrofitting the structural elements of these facilities to meet current seismic design code standards. The CEC has identified electric transmission system areas that need upgrading to relieve electric transmission congestion

***Benefits:** Ensures the timely restoration of essential systems to reasonable levels of service.

KEEP BLANK

Preparedness Element

Individual business owners, and corporate decision-makers do not fully understand the potential loss of life, property personal dislocation, social disruption, and economic losses resulting from earthquakes. Several areas are of concern: 1) limited awareness of the potential for loss of life and property; 2) a false sense of security based on the assumption that the government will protect against all economic losses; 3) no clear understanding that a problem really exists ("It won't happen to me"); 4) an attitude that fails to recognize the need for self-reliance ("Preparedness starts at home") expressing itself instead as "There is nothing I can do about it"; and 5) limited knowledge of what to do and how to pay for it.

Objective

To increase understanding of the consequences (personal loss, social disruption, and economic impact) that can result from earthquakes. To increase understanding of the options for mitigation, and the need to take action. To develop a comprehensive approach to preparedness for individuals, business owners, and corporate decision makers.

Overall Element Progress:

Preparedness Initiatives

Objective: *Comprehensive Approaches to Preparedness*

Strategies and Initiatives

9.1 Increase Understanding of Potential Impact

9.1.1 Develop information for individuals, families, and the business sector, about the human and economic impact of earthquakes. Disseminate consistent information in appropriate forms and languages.

Priority: Very Important

Participating Organizations: Red Cross, OES, SCEC, CDM

Potential Stakeholders: The Public

UNDERWAY

Status: Underway

Remarks: SCEC has provided efforts in this area (see Initiatives 3.2.1. and 3.2.2.) Local government and National ARC and CDM are on the Internet.

9.1.2 Develop information for Community Based Organizations about the impact of earthquakes on their organizations and those they serve. Include information about actions they can take to prepare for and mitigate the effects.

Priority: Important

Participating Organizations: Red Cross, OES, SCEC, CDM

Potential Stakeholders: The Public

Status: Completed

COMPLETED

Remarks: SCEC has provided scientific speakers to give presentations to many Community Based Organizations in southern ?California. Materials provided include "Putting Down Roots in Earthquake Country." SCEC plans on continued loaned-scientists for community organizations: BAYNET – Cort's; Regional OES – State website

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9.2 Develop Comprehensive Approach

9.2.1 Encourage Community Based Organizations to expand training programs for individuals in preparedness so that they can effectively help their constituents to reduce potential losses and continue to serve them after an earthquake.

Priority: Important

Participating Organizations: Red Cross, local fire departments, SCEC

Potential Stakeholders: The Public

UNDERWAY

Status: Underway

Remarks: SCEC provides scientific expertise to community-based organizations in greater L.A. which motivates idnvidials to prepare (see Intiaitive 9.1.2 above

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9.2.2 Extend scope of the existing Home Owner's Guide to include all multi-family housing.

Priority: Important

Participating Organizations: SSC, OES, CDM

Potential Stakeholders: The Public

Status: Not done

Remarks: Funding constraints have not allowed for the development of a statewide document for seismic safety and multifamily housing structures (condos and apartments).

9.2.3 Develop public policy establishing a comprehensive program for seismic upgrading of private homes. Include procedures for strapping water heaters, reinforcing masonry chimneys, bolting foundations, bracing cripple walls and strengthening weak (soft story) configurations.

Priority: Important

Participating Organizations: SSC, DOI, CEA, local government

Potential Stakeholders: The public

Status: Completed

Remarks: Not in code yet but…The CEA should be part of the public policy debate on establishing a comprehensive program for seismic upgrading of residential buildings.

UNDERWAY

9.2.4 Encourage voluntary seismic inspections (including estimates of the cost for correcting deficiencies) at the time of resale of any residential property as part of the Home Warranty inspection process.

Priority: Important

Participating Organizations: CAR, local governments

Potential Stakeholders: The Public

Status: Underway

Remarks: ABAG study

UNDERWAY

9.3 Encourage Individuals to Act

9.3.1 Promote the establishment of Community Emergency Response Team (CERT) programs in all communities throughout the State.

Priority: Important

Participating Organizations: Local government, SCEC

Potential Stakeholders: The Public

Status: Underway

Remarks: BAYNET, www.citizencorps.gov. SCEC will work with local and state government agencies to provide information and programs to educate CERT groups about earthquakes. (See initiative 3.2.1. and 3.2.2).

UNDERWAY

9.3.2 Expand the scope of Neighborhood Watch programs to include earthquake preparedness and neighborhood earthquake response information in all communities in the state.

Priority: Important

Participating Organizations: Red Cross, OES, local government, SCEC

Potential Stakeholders: The public

Status: Underway

Remarks: SCEC will work with local and state government agencies to provide information and programs to educate CERT groups about earthquakes. (see initiative 3.2.1. and 3.2.2).

UNDERWAY

9.3.3 Develop economic and regulatory incentives for home and business owners to facilitate and reward actions that will reduce potential losses, such as securing non-structural elements, contents, and fixtures that pose potential hazards.

Priority: Very Important

Participating Organizations: SSC, CDM

Potential Stakeholders: The Public

Status: Underway

Remarks: Legislation was introduced to the State Legislature and failed

UNDERWAY

9.3.4 Develop and maintain a state presence on the Internet that spotlights earthquake preparedness, inviting discussion and informing the public about regulations, methods and procedures for loss reduction. Include related public-domain documents.

Priority: Important

Participating Organizations: SSC, DSA, CSMIP, OES, PEER, ATC, DOI, CDM

Potential Stakeholders: The Public

Status: Completed

Remarks: These entities provide excellent internet sites and are updated continuously. CSMIP will make it possible for engineers and response officials to have rapid access to processed strong motion information, to assist in damage assessment, and provide the basis for informing the public and engineers, in between events, about earthquake shaking and structure response. The CEA should be part of the public policy debate on establishing a comprehensive program for seismic upgrading of residential buildings.

COMPLETED

Preparedness Initiatives

9.4 Improve K-12 School Preparedness

9.4.1 **Require compliance with the Standardized Emergency Management System (SEMS). Ensure school and district boards and administrators develop and implement school emergency plans and staff training as required by the current Education Code.**

Priority: **Critically Important**
Time to accomplish: **3 to 5 years**

Participating Organizations: DOE, OES, SSC

Potential Stakeholders: The Public

Status: Requirement in place, code not enforced.

Remarks: Education Code section 35296 states that the governing board of each school district and the county superintendent of schools of each county shall establish an earthquake emergency procedure system, and may work with the Office of Emergency Services and the Seismic Safety Commission to develop the system. The education code does not give DOE authority to enforce this education code section – legislative mandate is needed.

***Benefits:** Enables clear and consistent management of emergency response for schools and school districts.

9.4.2 Ensure school and district boards and administrators to implement the requirements for minimizing nonstructural hazards, and ensuring a sufficient stockpile of water and other critical supplies to be used for first aide, sanitation, and food.

Priority: Very Important

Participating Organizations: DOE, DSA, SCEC

Potential Stakeholders: Teachers, Parents, Students and Community

Status: Underway

Remarks: DSA distributed to school district administrators, board members and design professionals a publication regarding nonstructural hazard mitigation at annual CASH Conferences. Small group presntations at conferences, and discussions with design profesionals as part of the plan approval process have offered opportunities to discuss and mitigate the potential for damage or injuries caused by nonstructural hazards. There are limited opportunities for training large groups of school district representatives outside the annual CASH conference. SCEC produces Earthquake Preparedness for Schools which is a workshop intended for teachers and administrators in K-12 schools which give earthquake basics, earthquake preparedness, and nonstructural hazards. San Jose held two school workshops in 1991 & 1993 but nothing since. (See initiative 3.4.2.)

KEEP BLANK

Emergency Response Element

Emergency management and response systems continue to improve with each event; however, systems can be further strengthened through greater collaboration and partnership with and between public, private, non-profit agencies, and the community. Deficiencies still exist in: 1) resources needed for better communication during an event; 2) resources in and coordination among the public and private medical response system; 3) resources for sustained search and rescue operations; 4) reliable and timely information management; and 5) adequate and sustained resources for emergency management at all levels of government. Federal funding for terrorism preparedness and response may provide funding for some of these initiatives.

Objective

To improve emergency management and response systems.

Overall Element Progress:

Emergency Response Initiatives

Objective: *Improved Emergency Management and Response Systems*

Strategies and Initiatives

10.1 Improve Communications

10.1.1 **Provide interoperable upgraded regional and local emergency communications, including: 1) mutual-aid channels for police, fire, and emergency medical services; 2) regional emergency communications councils with authority to establish regional standards for emergency communication; and 3) response and recovery public broadcast channels for the public.**

Priority: **Critically Important**
Time to accomplish: **3 years**

Participating Organizations: OES, Local law & fire departments, CDF, DWR, Fire & Police Departments of Santa Clara

Potential Stakeholders: The public, first responders

Status: Underway

Remarks: In progress in Santa Clara County led by Palo Alto PD Deputy Chief, countywide committee. OES is authorized by legislation but not funded.

***Benefits:** Translators enable emergency response teams to communicate with each other with existing equipment. (Field coordination between PD & FD during disaster in Santa Clara county.)

10.1.2 Provide more efficient use of the wireless rapidly changing cellular, and potential satellite, telephone system during emergencies. Include priority access to wireless cellular service for emergency use, the deployment of portable wireless satellite cell sites, and limited public access to wireless cellular phone service during emergency and the possible extension of communications ability by use of other emergency technologies.

Priority: Very Important

Participating Organizations:

Potential Stakeholders: State and local emergency management services, City, State, and Federal governments. Cellular phone companies.

Status: Underway

Remarks:

UNDERWAY

10.1.3 Equip all operational areas local government operations area to both send and receive Emergency Digital Information Systems (EDIS) messages.

Priority: Important

Potential Stakeholders:

Status: Unknown

Remarks:

Participating Organizations:

10.2 Improve Medical Response

10.2.1 Provide sustainable resources including funding for regional planning personnel and other improvements in the medical and health mutual aid system.

Priority: Very Important

Participating Organizations: State OES, County Health Departments in Region II

Potential Stakeholders: The Public

Status: Underway

Remarks: In Santa Clara county lead is Barbara Center, Contra Costa EMS.

UNDERWAY

10.2.2 Integrate public and private outpatient clinics, skilled-nursing facilities, and specialty clinics in the local medical and health disaster response system.

Priority: Very Important

Participating Organizations: Santa Clara County Health Officer

Potential Stakeholders: The Public, patients and staff at facilities

Status: Underway

Remarks: Written plan completed in Santa Clara County. Funding problems for organization to participate; no incentives.

UNDERWAY

10.2.3 Provide adequate training for non-governmental staff and personnel providing medical and health disaster response in accordance with the Standardized Emergency Management System Approved course of Instruction and the Hospital Emergency Incident Command System.

Priority: Very Important

Participating Organizations: State EMS, County Health Departments

Potential Stakeholders: The Public, patients and staff at health care facilities

Status: Underway

Remarks: Underway in San Mateo County and Santa Clara County. Funding problems for organizations to participate; JACHO new regulations regarding community integration of emergency planning may provide some incentive.

UNDERWAY

10.3 Improve Search and Rescue

10.3.1 Establish and maintain strategically located search and rescue training facilities to provide real-time preparedness training for emergency response personnel that are properly equipped and staffed.

Priority: Very Important

Participating Organizations:

Potential Stakeholders:

Status: Underway

Remarks: OES and Commission completed Phase 1 need assessment. AB2002 introduced in legislation on3/8/02 by Assemblywoman Alquist

UNDERWAY

10.3.2 Ensure that all teams have a complete cache of specialized urban search and rescue equipment.

Priority: Very Important

Participating Organizations:

Potential Stakeholders:

Status: Underway

Remarks: see 10.3.1

UNDERWAY

10.3.3 Improve emergency response coordination between all State and local levels of government, emergency response organizations, and supporting private sector entities.

Priority: Important

Participating Organizations: OES

Potential Stakeholders:

Status: Underway

Remarks: OES work with private sector in reviewing emerging technology for emergency response. CSTI is doing SEMS ongoing training. The CEA distributes public information products, including news releases and public service announcements – both pre- and post-earthquake. The CEA sent all California radio stations English and Spanish versions of a PSA. Following a major earthquake, any radio station can air the post-event PSAs directing people how to process a claim.

UNDERWAY

10.3.4 Evaluate the need for expanded urban search and rescue capability, which could include additional teams and/or support to local urban search and rescue providers.

Priority: Important

Participating Organizations: SSC, OES, City and County Fire Departments, CA USAR teams

Potential Stakeholders:

Status: Completed

Remarks: see 10.3.1

COMPLETED

10.3.5 Provide adequate resources for maintenance and replacement of specialized urban search and rescue equipment cache.

Priority: Very Important

Participating Organizations:

Potential Stakeholders:

Status: Underway

Remarks: See 10.3.1

UNDERWAY

10.4 Improve Emergency Management Capability

10.4.1 Improve the capability and quality of computer simulation models for projecting where to expect damage in the immediate aftermath of an earthquake.

Priority: Very Important

Participating Organizations: OES, CISN, UC Berkeley, Cal Tech, CG Survey, SJSU CDM and Santa Clara County & cities, FEMA

Potential Stakeholders: The Public, first responders, building officials

Status: Underway

Remarks:. Using federal funding provided through State OES CDM is using graduate students to inventory soft story buildings in Santa Clara County. This inventory will be added as real data to the HAZUS system. There is also a HAZUS users group in the Bay Area that is working to improve data and applications for HAZUS.

UNDERWAY

10.4.2 Finalize procedures and training for use of Emergency Managers Mutual Aid (EMMA). Ensure input from local emergency officials. Include criteria for selection and methods for reimbursement.

Priority: Important

Participating Organizations: State OES

Potential Stakeholders: The Public, emergency managers, first responders

Status: Underway

Remarks: New EMMA regulations just issued by State OES

UNDERWAY

10.4.3 Develop and distribute coordinated public informational products for governmental public information officers and news media representatives' pre- and post-earthquake use.

Priority: Important

Participating Organizations:

Potential Stakeholders:

Status: Unknown

Remarks: The CEA distributes public information products, including news releases and public service announcements – both pre- and post-earthquake. The CEA sent all California radio stations English and Spanish versions of a PSA. Following a major earthquake, any radio station can air the post-event PSAs directing people how to process a claim.

10.4.4 Develop emergency response and recovery public information that is broadcast ready.

Priority: Important

Participating Organizations:

Potential Stakeholders: State OES, local OES

Status: Unknown

Remarks: The CEA distributes public information products, including news releases and public service announcements – both pre- and post-earthquake. The CEA sent all California radio stations English and Spanish versions of a PSA. Following a major earthquake, any radio station can air the post-event PSAs directing people how to process a claim.

10.4.5 Develop improved tools and technologies for use by emergency responders to make accurate and rapid initial damage assessments.

Priority: Very Important

Participating Organizations: OES, CISN

Potential Stakeholders: FEMA, State OES, Local OES – see 10.4.1

Status: Underway

Remarks: Merging of CISN and HAZUS is underway

10.4.6 Develop sustainable funding sources for adequate emergency management at all levels of government.

Priority: Very Important

Participating Organizations:

Potential Stakeholders:

Status: Unknown

Remarks:

10.4.7 Develop procedures and training for use by emergency managers when providing or receiving mutual aid. Ensure input from local emergency managers, and include criteria for selection and methods for reimbursement.

Priority: Important

Participating Organizations:

Potential Stakeholders:

Status: Unknown

Remarks: See 10.4.2

Recovery Element

Recovery methods have improved with each earthquake; however, there are still a number of deficiencies that impair effective and speedy recovery and have resulted in unacceptable levels of personal and financial loss. Deficiencies exist in: 1) funding for effective management of the recovery process (including mitigation) 2) adequate interim shelter and housing, particularly for those with special needs; 3) plans and resources to accommodate interim and long-term post-earthquake housing; and 4) adequate knowledge and preparation by the public, business and service sectors for effective recovery.

Objectives

To establish and fund a statewide earthquake recovery plan aimed at social and economic recovery in the public and private sectors through better and more responsive plans, procedures and utilization of resources.

Overall Element Progress:

Recovery Initiatives

Objective: *Statewide Recovery Plan and Implementation*

Strategies and Initiatives

11.1 Establish Statewide Strategic Recovery Plan

11.1.1 Develop a strategic Statewide Disaster Recovery Plan.

Priority: Very Important
Time to accomplish: 2 to 3 years

Participating Organizations: OES, DOF, Dept of Housing & Community Development, SSC, Red Cross

Potential Stakeholders: OES, all cities and counties

Status: Underway

Remarks: OES plans to complete this using existing budget funds in 2001-2002

UNDERWAY

11.1.2 Identify and secure sources of funding for disaster recovery and mitigation.

Priority: Very Important

Participating Organizations: CDI, CEA, OES, FEMA, SSC, DOF

Potential Stakeholders: Local government

Status: Underway

Remarks:

UNDERWAY

11.1.3 Maintain and augment, as necessary, provisions for continued human services such as interim housing, feeding, medical care, and psychological assistance.

Priority: Very Important

Status: Underway

Participating Organizations: ABAG, Dept of Housing & Community Dev., Red Cross, OES, EMSA

Potential Stakeholders: All Californians

Remarks:

11.1.4 Develop a public and private partnership program for incorporating disaster assistance recovery teams including appropriate specialties such as psychology, nursing, communications, clergy, building inspection, etc., into local emergency plans, including coverage of all areas of assurance and all jurisdictional levels.

Priority: Important

Participating Organizations: OES, Nonprofit orgs, rep disciplines, cities & counties, LCC, CSAC, EMSA

Potential Stakeholders: Local communities

Status: Underway

Remarks: The CEA works with public and private sector organizations to implement pre-earthquake training and drills for purposes of coordinating actual responses.

11.1.5 Plan for shelter, interim housing and other recovery needs unique to people with special needs, including frail, elderly, disabled, and others.

Priority: Important

Status: Underway

Participating Organizations: EMSA, OES, Red Cross, ABAG, Dept of Housing & Community Dev., San Francisco Health Department Disaster Registry

Potential Stakeholders:

Remarks: Registry is kept at the Fire Battalion headquarters with the person with "special needs" area.

11.1.6 Establish the definition of the emergency period of a disaster to include the beginning phases of recovery, the organizational responsibilities, the use and coordination of volunteer assistance, and other elements as necessary.

Priority: Important

Participating Organizations: OES, FEMA, Cities, Counties

Potential Stakeholders:

Status: Underway

Remarks:

11.1.7 Develop comprehensive operational guidelines tailored to the needs of each region for the effective removal, recycling and/or disposal of rubble after earthquakes.

Priority: Important

Status: Underway

Participating Organizations: State & local governments, FEMA

Potential Stakeholders: Local government & business communities

Remarks:

11.1.8 Update and distribute the state's earthquake recovery manuals for local governments.

Priority: Important

Status: Underway

Participating Organizations: OES

Potential Stakeholders: Local governments

Remarks: Nearly complete

11.2 Expand Interim and Long-term Housing Capability

11.2.1 **Establish plans for accommodating large displaced populations on an interim basis by using military facilities, publicly owned parks and recreational facilities, manufactured housing, and other appropriate options.**

Priority: **Critically Important**
Time to accomplish: **5 years**

Participating Organizations: ABAG, OES, Red Cross, Dept of Housing & Community Dev

Potential Stakeholders:

Status: Underway

Remarks:

***Benefits:** This preplanning will dramatically shorten recovery times and costs after future major earthquakes.

11.2.2 Develop guidelines and incentives for landlords to make existing vacancies available for interim housing.

Priority: Important

Status: Underway

Participating Organizations: ABAG, OES, Red Cross, Dept of Housing & Community Dev., Cities, Counties

Potential Stakeholders: Landlords

Remarks:

11.2.3 Develop and maintain a database of actual housing losses and recovery costs from all earthquakes.

Priority: Important

Status: Underway

Participating Organizations: CDI, OES-Individual Assistance, EERI, USGS, ATC, Red Cross, PEER, CEA, FEMA, HCD, HUD

Potential Stakeholders: State, Federal, and local governments

Remarks:

11.2.4 Develop a strategy for use of manufactured housing in a post disaster environment.

Priority: Important

Status: Underway

Participating Organizations: ABAG, OES, Red Cross, FEMA, HCD, HUD

Potential Stakeholders:

Remarks: See 11.2.1

11.3 Expedite Permitting and Rebuilding Process

11.3.1 Develop guidelines to help local governments expedite the permitting and rebuilding process through the use of "one-stop" centers. This process will minimize the disruption of individuals and businesses and accomplish personal and economic recovery in the fastest time possible.

Priority: Important

Participating Organizations: Cities, Counties, OES, CalBO, ICC, FEMA

Potential Stakeholders:

Status: Underway

Remarks:

11.3.2 Develop a model plan, standards and training for post-disaster permitting of repairs and modifications.

Priority: Important

Participating Organizations:

Potential Stakeholders: OES, Cities, Counties, ATC, CalBO, FEMA

Status: Unknown

Remarks:

11.3.3 Develop an implementation strategy (such as training manuals etc.) to disseminate the information regarding the permitting and rebuilding process (11.3.1) and the standards for repairs and modifications (11.3.2).

Priority: Important

Participating Organizations: OES, Cities, Counties, CalBO, ATC, FEMA

Potential Stakeholders:

Status: Unknown

Remarks:

11.4 Provide Accurate and Timely Information

11.4.1 Identify stakeholders and develop a strategy to integrate into emergency and recovery management public information.

Priority: Important

Participating Organizations: CDI, OES, FEMA

Potential Stakeholders:

Status: Unknown

Remarks:

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Acronyms for Participating Organizations

May 16, 2003

Acronym	Name
AASHTO	American Association of State Highway & Transportation Officials
ABAG	Association of Bay Area Governments
ACIA	American Construction Inspectors Association
AEG	Association of Engineering Geologists
AGIC	Arizona Geographic Information Council
AIA	American Institute of Architects
AIA-CC	American Institute of Architects-California Council
AICP	American Institute of City Planners
ANSS	Advanced National Seismic System
APA	American Planning Association
ASCE	American Society of Civil Engineers
ATC	Applied Technology Council
BFI	Browning Ferris Industries
BGG	Board for Geologist and Geophysicists
BOMA	Building Owner and Managers Association
BPA	Bonnieville Power Administration
BPELS	Board for Professional Engineers and Land Surveyors
BSSC	Building Seismic Safety Council
CAB	California Architects Board
Cal BHT	California Business, Housing, and Transportation Agency
CALBO	California Building Officials
Cal ISO	California Independent System Operator
CASH	Coalition for Adequate School Housing
CBA	California Builders Association
CBSC	California Building Standards Commission
CCGO	California Council of Geoscience Organizations
CDI	California Department of Insurance
CDM	Collaborative for Disaster Mitigation at San Jose State University
CDMG	California Division of Mines and Geology (Now CGS)
CEA	California Earthquake Authority
CEC	California Energy Commission
CEMA	California Emergency Managers Association
CEQA	California Environmental Quality Act
CERT	Community Emergency Response Team
CGS	California Geological Survey
CISN	California Integrated Seismic Network
CIT2	Ca. Institute for Telecommunications and Information Technology
City of LABoS	City of Los Angeles Bureau of Sanitation
CIWMB	California Integrated Waste Management Board
CMA	California Maritime Academy
CoLA	County of Los Angeles
COSMOS	Consortium of Organizations for Strong-Motion Observation Systems
CPUC	California Public Utilities Commission
CSAC	California State Association of Counties
CSDA	California Special Districts Association

CSLB	Contractors State License Board
CSLC	California State Lands Commission
CSSC	California Seismic Safety Commission
CSMIP	California Strong Motion Instrumentation Program
CSU	California State Universities
CTI	Computer Technology Institute
CUREE	Consortium of Universities for Research in Earthquake Engineering
DCA	Department of Consumer Affairs
DOE	United States Department of Energy
DOF	Department of Finance
DOI	Department of Insurance
DSA	Division of the State Architect
DSOC	Divisional Safety Officers' Committee
DSOD	Department of Water Resources, Division of Safety of Dams
DTSC	Department of Toxic Substance Control
DWR	Department of Water Resources
East Bay MUD	East Bay Municipal Utility District
EERI	Earthquake Engineering Research Institute
EIRs	Environmental Impact Reports
EMSA	Emergency Medical Services Authority
EOB	The Electricity Oversight Board
EPRI	Electric Power Research Institute
EQE	Earthquake Engineering International
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission

FHWA	Federal Highway Administration
GSA	Geological Society of American
HAZUS	Hazards United States
HCD	Housing and Community Development Department
HUD	Housing and Urban Development Department
IBHS	Institute of Business and Home Safety
ICBO	International Conference of Building Officials
ICC	International Code Council
IEEE	Institute of Electrical and Electronic Engineers
IID	Imperial Irrigation District
IRIS	Incorporated Research Institutions for Seismology
LADWP	City of Los Angeles Department of Water and Power
LCC	League of California Cities
LLNL	Lawrence Livermore National Laboratories
MID	Modesto Irrigation District
NEHRP	National Earthquake Hazards Reduction Program
NERC	North American Electric Reliability Council
NFPA	National Fire Protection Association
NIBS	National Institute of Building Standards
NISEE	National Information Service for Earthquake Engineering
NIST	National Institute of Standards and Technology
NOAA	National Oceanic and Atmospheric Administration
NSF	National Science Foundation
OCIP	Office of Critical Infrastructure Protection
OES	Governor's Office of Emergency Services

OES-IA	Office of Emergency Services-Individual Assistance
OPR	Office of Planning and Research
OSHPD	Office of Statewide Health Planning and Development
PARMA	Public Agency Risk Managers Association
PEER	Pacific Earthquake Engineering Research Center
PG&E	Pacific Gas and Electric Company
PMEL	Pacific Marine Environmental Laboratory
PUC	Public Utility Commission
RESD	Real Estate Service Division
SCSA	State and Consumer Services Agency
SCE	Southern California Edison
SCEC	Southern California Earthquake Center
SCG	Southern California Gas Company
SDG&E	San Diego Gas and Electric
SDRMA	Special District Risk Management Authority
SEAOC	Structural Engineers Association of California

SEAOCC	Structural Engineers Association of Central California
SFPUC	San Francisco Public Utility Commission
SMUD	Sacramento Municipal Utility District
SSC	Seismic Safety Commission
TIP	Targeted Industry Partnerships
UC	University of California
US	United States
USACOE	United States Army Corps of Engineers
USBR	United States Bureau of Reclamation
USC	University of Southern California
USCOE	United States Army Corps of Engineers
USDOT	United States Department of Transportation
USGS	United States Geological Survey
WAPA	Western Area Power Administration
WSSPC	Western States Seismic Policy Council