

Bay Area Best Practices in Earthquake Risk Reduction

Jurisdiction:	Berkeley
Name of policy:	Seismic Upgrades for Seniors, Disabled and Low-Income Homeowners
Risk addressed:	Berkeley has many residences that could be damaged or collapse in earthquakes. It can be particularly difficult for elderly, disabled or low-income residents to improve the seismic safety of their home.
Summary of policy:	Berkeley funded a non-profit organization to perform basic seismic safety upgrades to homes of seniors and the disabled. They also offered low-interest loans to disadvantaged groups for seismic upgrades, including landlords with low-income tenants.
Implementation:	The non-profit organization, originally established to conduct energy retrofits, expanded its work to include simple seismic safety upgrades. These include reinforcing chimneys, bracing cripple walls, anchoring the floor to the foundation, and strapping water heaters. The non-profit addresses approximately 6 to 10 homes per year.
Accomplishments:	This program, in concert with the City's other retrofit incentives, has led to nearly 40 percent of the private residences in Berkeley being made more seismically resistant.
Funding information:	The city generally provides \$40,000 to \$50,000 per year to the non-profit organization that assists with seismic upgrades. The low-income loans have not been popular in recent years.
Internet links:	http://www.ci.berkeley.ca.us/ContentDisplay.aspx?id=10480
Contact person:	Linda Salas 510-981-5417

Jurisdiction:	Berkeley
Name of policy:	Soft story building program
Risk addressed:	About 10 percent (4,950 units) of Berkeley's housing units, occupied by more than 10,000 people, are located in soft-story apartment buildings or open front stores. Soft-story buildings are often multi-family structures with openings for parking at the ground floor. These openings result in a far less sturdy wall in the ground story level than in the stories above and, when subjected to earthquake forces, this weak first story can be severely damaged and shift out of plumb or even collapse. Many of the city's low-income housing units are located in this type of structure.
Summary of policy:	An ordinance adopted in Winger 2005 requires owners of the buildings on the City's soft-story inventory to conduct engineering studies to identify structural retrofit solutions and their costs, in accordance with standards defined by the city. The studies will be conducted at owner expense. Further, owners are required to notify all tenants that they are occupying a potentially hazardous building. Owners can contest the designation of their building as a soft-story structure to avoid this requirement. At this time, there is no further requirement that owners structurally improve the seismic safety of their buildings.
Implementation:	The City, in February of 2001, obtained a FEMA grant to assess multi-unit soft story residential buildings and develop a program to reduce their vulnerability, building on an earlier effort in 1996. Under the direction of the City's Seismic Technical Advisory Group, a team of staff, outside experts and University of California students assessed soft story residential buildings with five or more residential units. They found that nearly half (over 200 structures) are expected to be red-tagged, uninhabitable and likely to require extensive repair or total replacement. Further, over 95 percent of soft story units may not be livable immediately following a large Hayward earthquake. This process led to the city's official inventory of soft story structures. Owners have two years from receiving notification to conduct the engineering studies.
Text of policy:	Link to web page
Date(s) of adoption and changes:	Adopted by the city council in fall 2005.
How was policy adopted:	Berkeley's program emerged as the result of a long process involving the city's voters, discussions with building owners and community members, and review by the many boards that advise the city's lawmaking process. Initially, the city attempted to raise funds to assist in the structural strengthening of soft story buildings through a ballot measure, but this was rejected by

voters by a slim margin, presumably because voters balked at funding upgrades for private buildings. Discussions followed to create legislation mandating owners retrofit their buildings, but this was deemed too challenging as the community's initial step. This led to the city to take a more pragmatic approach, beginning by requiring owners to assess their building's risk.

The city engaged in a collaborative process with building owners to develop the current program.

Accomplishments: All 317 wood frame buildings identified in the survey have been noticed, most between March and September 2006. Currently engineering reports have been submitted for about 130 buildings.

About 10 buildings on the building inventory were found not to have soft-story weaknesses. A further 20 buildings were removed from the inventory because they have fewer than 5 residential units.

Currently, about 52 fifty-two buildings have seismically retrofitted or have building permits to conduct retrofits.

The Building Official will report on progress to Council in winter 2009 and will later recommend an ordinance mandating retrofit of buildings not meeting Chapter A4 IEBC.

Funding information: The costs to owners to conduct the required studies is estimated at \$3000 to \$10,0000.

Internet links: [Link to web page](#)

Contact person: Dan Lambert, Building Mitigation Manager
(510) 981-7406

Jurisdiction:	Berkeley
Name of policy:	Transfer tax rebates for seismic upgrades
Risk addressed:	This program addresses the risk to residential buildings. Older wood-frame homes and apartment buildings common in Berkeley have many seismic weaknesses, including inadequate bolting of exterior walls to the foundation, a weak or deteriorated foundation, inadequately braced cripple walls, and deteriorated wood from termite attack and dry rot.
Summary of policy:	By ordinance, the City of Berkeley created a program to rebate up to one-third of the transfer tax amount to be applied to earthquake upgrades on homes. The process begins once the homeowner makes safety improvements. When the owner wishes to sell the house and the sale amount has been determined, the buyer and seller place a portion of the real estate transfer tax amount in an escrow account to be drawn down after improvements are complete.
Implementation:	This program allows new home and apartment building owners to perform seismic upgrade of their buildings for little out-of-pocket expense. For example, for a home costing \$600,000 in Berkeley, 1/3 of the property transfer tax that can be applied toward seismic upgrade amounts to \$3,000. This amount can cover or significantly reduce the out-of-pocket cost to the homeowners on upgrades like bracing cripple walls, foundation repair, sill plate anchorage, mudsill repair, water heater anchoring, and brick chimney bracing. Perhaps not all of the seismic deficiencies will be addressed by a single owner, but as the properties change hands, and each new owner takes advantage of the economic incentive, the housing stock as a whole will be significantly safer over time. In addition, Berkeley offers a free tool lending program that will cut down the retrofit cost even more for do-it-yourselfers.
	This program is jointly administered by the Berkeley Planning and Finance Departments.
Text of policy:	Link to webpage
Date(s) of adoption and changes:	Began in 1990 and continues through updates.
How was policy adopted:	The Berkeley program was passed by voters with a simple majority of 50% in 1992. However, changes in state law now would require a super majority of 67% for this type of measure to pass.

Accomplishments: The Berkeley program is now 18 years old, and its effectiveness has made Berkeley one of the most improved cities for one- and two-family residence seismic safety in the Bay Area. This program, in concert with the City's other retrofit incentives, led to an estimated 40 percent of the private residences in Berkeley being made more seismically resistant by 2006. Some of these upgrades, however, are nonstructural, such as water heater strapping.

Updates: Not all of the upgrades conducted through this program had improved seismic safety significantly. The lack of adequate recognized standards for seismic upgrades led to some homeowners hiring contractors to do work that does not significantly increase structural seismic safety. To address these concerns, Berkeley adopted "Plan Set A" and other prescriptive, peer-reviewed standards and requires other projects to be engineered. These new standards ensure that all upgrades funded by this program lead to real increases in seismic safety.

Funding information: The resources for this program are the city and its taxpayers. As of July, 2008, upwards of 13,000 projects have been completed, representing over \$2M in permit fees waived (prior to the rescission of the waiver), and a transfer tax rebate totaling over \$12M. In addition, many homeowners paid for retrofit cost beyond the tax rebate amount, and some provided their own labor.

Internet links: <http://www.ci.berkeley.ca.us/contentdisplay.aspx?id=628>

[Model Plan Set A - Plans \(PDF, 941k\)](#)

[Model Plan Set A - Details \(PDF, 356k\)](#)

[Transfer Tax Rebate for Seismic Improvements brochure \(PDF, 293k\)](#)

<http://www.ci.berkeley.ca.us/ContentDisplay.aspx?id=6282>

[Declaration of Real Property Transfer Tax](#) - required to be eligible for Seismic Retrofit Refund

[Seismic Retrofit Program & Refund Guidelines](#) - what you need to do & when to do it

[Claim for Overpayment of Real Property Transfer Tax](#) - claim for refund of overpayment

Contact person: Dan Lambert 510-981-7406

Jurisdiction: **Berkeley**

Name of policy: **Unreinforced masonry building program**

Risk addressed: Unreinforced masonry (URM) buildings are at high risk of damage or collapse in earthquakes. Berkeley had about 700 at-risk URM buildings.

Summary of policy: In 1994, Berkeley identified about 700 URM structures, used for both commercial and residential purposes. In response to a state law, the City instituted an Unreinforced Masonry Safety program consisting of identifying such buildings and mandatory retrofit deadlines based on a building's designated risk category.

Implementation: In 2001, Berkeley began officially alerting property owners who had not complied with this law. This led to significant increase in compliance. At the time of writing, 22 properties remain unretrofitted. The City has been threatening to issue administrative citations and to lien properties, but hopes these measures will not be necessary.

Text of policy: [Link to webpage](#)

Date(s) of adoption and changes: Program began in 1991.

How was policy adopted: By City Council action through the adoption of a local ordinance

Accomplishments: Since the program's original inception in 1991, owners have improved seismic resistance or demonstrated adequate reinforcement in over 600 of 700 buildings initially designated as URMs in Berkeley. At the time of writing, only 22 buildings remain to be retrofitted or demolished. Although this program has brought substantial increases in safety, even upgraded URM buildings are still vulnerable to extensive damage in earthquakes.

Funding information: Some city funds can be used through the property transfer tax seismic rebate program as partial funding for upgrades. The city made a loan to one non-profit and waives building permit fees for certain non-profit buildings.

Internet links: http://www.ci.berkeley.ca.us/bmc/berkeley_municipal_code/title_19/38/020.html

Contact person: Dan Lambert, Planning Department 510-981-7400

Jurisdiction:	Fremont
Name of policy: Low interest loans for seismic upgrades	
Risk addressed:	Fremont, like many cities, mandated owners of unreinforced masonry buildings to seismically retrofit their structures. This can be a financial burden for some owners.
Summary of policy:	The Commercial Rehabilitation Loan Program provides 0% interest loans for seismic retrofits. Loans are for a maximum of \$320,000 to commercial property owners in the Redevelopment Project Areas of Centerville, Irvington and Niles. Loans are made for a 15-year term and are secured by the property through a Deed of Trust. They also cover fees and other pre-development costs and provide a construction manager. The Redevelopment Project Areas cover about 10% of the City.
Implementation:	Program began as incentive for mandatory with retrofitting URM, along with URM. Loans were about 4% when the program began.
Date(s) of adoption and changes:	Revised in May 2004
How policy was adopted:	Approved by Redevelopment Board by Resolution, originally as an incentive for mandatory URM program.
Accomplishments:	Still had to use enforcement to get compliance with URM regulations. Currently as part of general loan program, about 12 buildings including the URMs.
Updates:	Eliminated interest in May 2004 to encourage use.
Funding information:	Tax increment funds.
Internet links:	http://www.fremont.gov/Construction/Redevelopment/default.htm#CRL
Additional comments:	Program was aimed at 'mom and pop' landlords living on income earning buildings free and clear. However, this audience has shown less interest than expected interested because of requirements that accompany loans, such as requiring prevailing wages. During recent years, current low-interest bank loans without such requirements have been more attractive to building owners.
Contact person:	Jennifer Andersen, 510 494-4518, jandersen@ci.fremont.ca.us

Jurisdiction:	Livermore
Name of policy:	Unreinforced masonry program
Risk addressed:	Unreinforced masonry buildings are at risk of collapse in earthquakes.
Summary of policy:	URMs were identified and divided into 3 categories. Chapter 15 of Livermore Municipal Code required that all identified buildings employ registered engineers to investigate and report the buildings' seismic vulnerabilities and complete structural repairs by the end of 2001. Permit fees were waived.
Date(s) of adoption and changes:	Adopted 1989 Revised 1998 to extend timelines.
How policy was adopted:	Adopted through code development process.
Accomplishments:	16 URMs demolished, 40 buildings retrofitted, 1 building vacant with permit for retrofit. 100% effective.
Updates:	No need for updates or changes; all URMs in Livermore have been addressed.
Funding information:	Funding was through Building Division, Community Development Dept. budget. No estimate of cost or staff time available.
Internet links:	http://www.ci.livermore.ca.us/ http://www.codepublishing.com/CA/Lvmore.pdf
Additional comments:	Lack of opposition to the ordinance was due largely to the activism of the then head of the Livermore Downtown Main St. Association, Barbara Mason, who promoted the program with local business owners.
Contact person:	Stephan Kiefer, Building Official; Phone 925-960-4414; email: sakiefer@ci.livermore.ca.us ; Jim Russell, code consultant, 925-687-1974, jerussel.luddite@worldnet.att.net

Jurisdiction:	Oakland
Name of policy:	Unreinforced masonry building program
Risk addressed:	Oakland had 1,612 unreinforced masonry buildings at risk of collapse in earthquakes.
Summary of policy:	Oakland's URM ordinance mandates that building owners upgrade to a "bolts plus" standard. This standard reduces risk to passersby from falling building components, but may leave the buildings vulnerable to significant damage. The city provided an incentive for owners to upgrade to the higher UCBC Appendix Chapter 1 standard by allowing buildings to be transferred to more lucrative uses, such as live-work lofts.
Implementation:	Oakland set deadlines for compliance with retrofit mandates based on use and occupancy. Building Services Division staff worked with owners to help them comply with this ordinance. When the number of unretrofit buildings had dropped to about 100, the city began to send out enforcement notices and charge small fees, which spurred some owners to take action. Many owners were impacted by Title 24 requirements to add handicap accessible ramps and bathrooms, which caused considerable expense and served as a disincentive.
Text of policy:	http://www.bpcnet.com/cgi-bin/hilite.pl/codes/oakland/_DATA/TITLE15/Chapter_15_28_UNREINFO_RCED_MAS.html
Date(s) of adoption and changes:	
How policy was adopted:	Oakland began to inventory its URM buildings in 1988, but had limited resources. After the 1989 Loma Prieta earthquake impacted the city, more resources for inventorying became available. Volunteers from AIA and SEOC participated in street level surveys of buildings to identify URMS and collect information about use, historic importance, and whether they had bearing walls. After the city's URMS were identified, two large community meetings and several stakeholder committee meetings were held to discuss with building owners how to address this risk. The city hired a consultant to examine how requiring retrofits might impact the city, including costs, engineering issues, impacts on use, and rental issues. Initially, building owners strongly opposed requiring retrofits (some suggested that economic impact of retrofit mandates would be more damaging than the impacts of Loma Prieta), but at the end of the process they were supportive of city programs.
Accomplishments:	As of 2003, 89% of Oakland's URM buildings had been retrofit or demolished. Over two hundred buildings met the voluntary UCBC Appendix Chapter 1 standard. Many of the buildings that remained to be addressed were vacant brownfield buildings, for which any action

would trigger clean-up requirements that are more costly than the value of the property.

Funding information:

Actual costs of seismic upgrades conducted shortly after ordinance was enacted were 40-50% lower than originally estimated because a number of contractors from all over the state focused on this type of work. This built efficiencies in their work and produced competition for jobs. The city unsuccessfully attempted to create a Mello-Roos assessment district to provide low-interest loans for URM upgrades but could not get underwriting for the program due to risks. In redevelopment areas, some funds to assist retrofits were available from other programs already in place.

Internet links:

http://www.bpcnet.com/cgi-bin/hilite.pl/codes/oakland/_DATA/TITLE15/Chapter_15_28_UNREINFO_RCED_MAS.html

Additional comments:

Many communities mandated higher structural standards for URM retrofits than Oakland's bolts-plus standard. The bolts-plus standard leaves upgraded buildings vulnerable to significant damage in the next earthquake. Despite the success of this program, building owners may be reluctant to support similar programs to address other types of hazardous buildings. Oakland wants to be business friendly and additional regulations may make the city appear to regulate more strictly than surrounding communities.

Contact person:

Calvin Wong, Oakland Building Services Division, Calvin Wong at 510-238-4794 or cwong@oaklandnet.com.

Jurisdiction:	Palo Alto
Name of policy: Zoning incentives for retrofits	
Risk addressed:	Potentially hazardous buildings
Summary of policy:	Following passage of the 1986 seismic hazards identification program, zoning laws were modified to permit expansion of the floor area of downtown buildings included in the program if the owner performs the necessary seismic strengthening. Such retrofitted buildings are also exempt from on-site parking requirements.
Date(s) of adoption and changes:	Adopted 1986 - no changes
How policy was adopted:	A detailed description of the process is contained in Earthquake Hazard Identification and Voluntary Mitigation: Palo Alto's City Ordinance and is available from the Building Div, Planning & Community Environment Dept.
Accomplishments: A number of buildings in the program have been voluntarily retrofitted to take advantage of these incentives.	
Updates:	None anticipated
Funding information:	City funded the modifications, which were developed as a result of and complement to the 1986 seismic hazard mitigation ordinance.
Internet links:	http://www.city.palo-alto.ca.us/
Contact person:	Fred Herman, CBO, Phone: 650-329-2550, email: fred.herman@cityofpaloalto.org

Jurisdiction:	St. Helena
Name of policy:	Reimbursement of architectural fees for retrofits
Risk addressed:	Financial incentive to reduce costs of seismic retrofits of historical buildings, particularly unreinforced masonry buildings (URMs).
Summary of policy:	St. Helena reimbursed architectural fees for seismic upgrades of historic buildings, up to a maximum of \$1.00 per square foot.
Implementation:	By ordinance
Date(s) of adoption and changes:	1998
How policy was adopted:	By ordinance.
Accomplishments:	This was by far St. Helena's most meaningful and motivating incentive.
Updates:	None.
Funding information:	The maximum amount reimbursed was estimated to be \$222,000 over a six year period for 30 buildings.
Internet links:	http://city.ci.st-helena.ca.us/section.cfm?id=27
Additional comments:	Also contact Cindy Heitzman, former building official, now Executive Director of the California Preservation Foundation cheitzman@californiapreservation.org
Contact person:	Kathy Woods, Building Permit Technician, 707-968-2792 and Eric Seabrook, Building Official, 707-967-2792 building@ci.st-helena.ca.us

Jurisdiction:	San Francisco
Name of policy:	Unreinforced masonry building program
Risk addressed:	San Francisco had about 2000 unreinforced masonry buildings at risk of collapse in earthquakes.
Summary of policy:	Inventory following 1989 Loma Prieta earthquake identified buildings thought to be URM's. Buildings were classified into 4 risk categories depending upon soils, density, and use. Owners of URM buildings were required to have a structural analysis performed by a registered civil or structural engineer or licensed architect, and, if the building did not meet the minimum code standards specified, the owner must structurally strengthen the building or have the building demolished in accordance with the program implementation schedule. The schedule required that work on buildings in all categories be completed by Feb. 2006, with a possibility of a maximum 2-year extension upon approval. Voters approved a bond measure to provide low-interest loans to owners of URM buildings.
Text of policy:	San Francisco Building Code Provisions based on the UMB ordinance are in Vol. I, Chapters 16B, 16C, 16D, & 17 and can be found on the internet by going to the following website and clicking on the appropriate chapters: http://www.amlegal.com/nxt/gateway.dll?f=templates&fn=default.htm&vid=amlegal:sf_building
Date(s) of adoption and changes:	Inventory of URM's began in 1985. In 1989, voters approved a bond measure to provide low-interest loans for retrofits of URM's. Mandatory retrofit program launched in 1992.
How policy was adopted:	Negotiations with building owners associations resulted in building owners being willing to support a mandatory URM retrofit program if the City passed a bond measure to provide low interest loans for such work.
Accomplishments:	Of approximately 2000 URM's, approximately 150 buildings are not in complete compliance with the law as of June 2008. According to the Department of Building Inspection, many of these buildings have completed retrofits but have unresolved disability access issues or payment of fees. Approximately 100 URM's were demolished. Few URM building owners took advantage of the loan program due to complex loan qualification requirements.
Funding information:	The City of San Francisco approved the sale of \$350 million in

bonds to cover the cost of loans made to owners of unreinforced masonry buildings to pay for retrofitting. URM building owners pay for strengthening or demolition.

Internet links: <http://www.sfgov.org/site/uploadedfiles/moed/pdf/generalloaninfo.pdf>

Additional comments: Gary Ho is currently working on updating the UMB information and hopes to have it completed by mid-April.

Contact person: Y.Y. Chew 415-558-6101, Mgr UMB Program
Serena Fong 415-558-6196 DBI UMB clerk
Gary Ho 415-558-6083, UMB plan checker

Jurisdiction:	San Francisco
Name of policy:	Community Action Plan for Seismic Safety (CAPSS)
Risk addressed:	Building damage and resulting social and economic disruption following an earthquake.
Summary of policy:	The purpose of the CAPSS project is to provide DBI a plan of action, or policy road map, to reduce earthquake risks in existing buildings regulated by DBI and to develop repair and rebuilding guidelines to expedite post-earthquake recovery. Successful risk reduction activities need to be based on technically sound information and make sense financially, culturally and politically to be implemented. CAPSS engages political and community leaders, social scientists, economists and engineers to find out which mitigation approaches make sense in all these ways and are, therefore, good public policy.
Implementation:	The CAPSS project is managed by the Department of Building Inspection and guided by a volunteer Advisory Committee made up of community members.
	The Applied Technology Council (ATC) has contracted with the Department of Building Inspection to conduct the CAPSS project. ATC is a non-profit organization that develops and promotes state-of-the-art, user-friendly engineering resources and applications to mitigate the effects of natural and other hazards on the built environment. ATC has assembled a team of consultants with diverse specialties to work on this project.
Text of policy:	N/A
Date(s) of adoption and changes:	Started in 2001; stopped in 2003 due to conflict. Resumed in April 2008. The project will be complete in August 2010.
How policy was adopted:	Adopted by Building Inspection Commission, approved by Board of Supervisors
Accomplishments:	The first project report is due on January 31, 2009.
Updates:	The CAPSS project resumed work in April of 2008. In July 2008, Mayor Gavin Newsom issued an Executive Directive asking the project to focus first on recommending ways to reduce risk in wood frame buildings with "soft" or weak first stories. This building type experienced some dramatic collapses in the Marina neighborhood during the 1989 Loma Prieta earthquake. Thousands of similar buildings throughout the city could be damaged by a larger or closer earthquake. The project will identify policies to make these

buildings safer at the end of January 2009.

Next, the project will focus on analyzing risks caused by other building types and ways to reduce those risks. Concurrently, improved guidelines for repairing and rebuilding after earthquakes will be developed. These activities are slated for completion by June 2010.

Timeline for deliverables:

January 2009 – Complete report identifying policies to reduce risk of soft story buildings

January 2010 - Complete report *San Francisco's Earthquake Risk*

March 2010 - Formulate post-earthquake repair and retrofit requirements

June 2010 - Recommend seismic risk mitigation programs

August 2010 - Finalize the Community Action Plan for Seismic Safety

Funding information: Funded by Strong Motion Instrumentation Program funds. The total cost of the project, including work conducted between 2001 and 2003 and current work is approximately \$1.5 million.

Internet links: <http://www.sfcapss.org>

Contact person: City & County of San Francisco Department of Building Inspection (DBI); Laurence Kornfield, Chief Building Inspector, DBI – 415-558-6244

Chris Rojahn, Director, Applied Technology Council – 650-595-1542