

GLOBAL CLIMATE & CATASTROPHIC RISK FORUM 2012

Executive Panel I

Lessons Learned From Earthquakes: Modeling, Regulation & Risk Management

October 17, 2012
12:45 pm – 1:45pm

HISTORY OF INFLUENTIAL EARTHQUAKES AND SIGNIFICANT LAWS & REGULATIONS IN CALIFORNIA

*Presented by George Yen
Chief, Rate Specialist Bureau
California Department of Insurance*

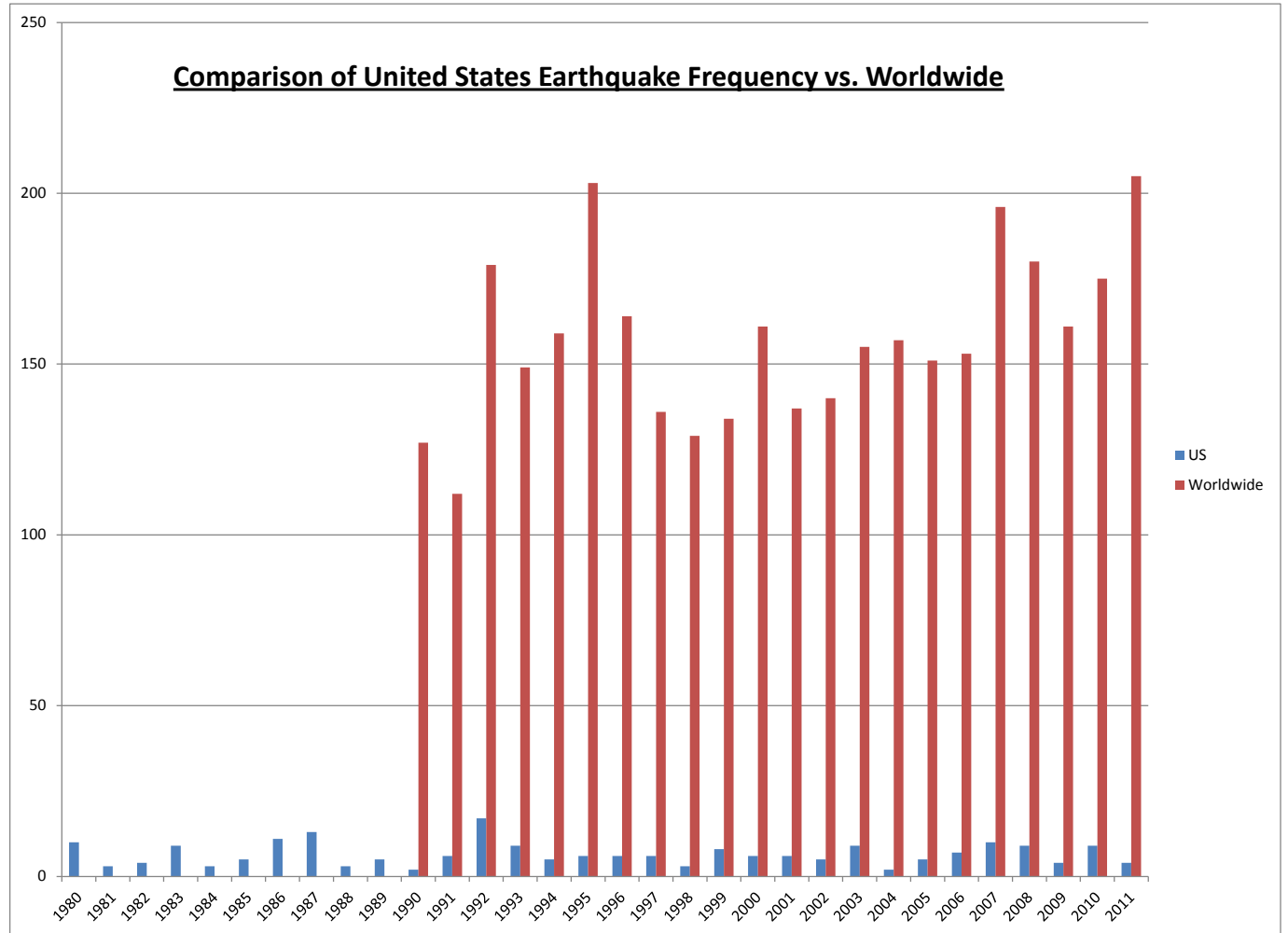
This paper is prepared by the author for the Global Climate and Catastrophe Risk Forum of 2012 sponsored by the Center for Insurance Studies and LA RIMS. The statements or opinions made in this paper are based on the author's own research. They do not necessarily reflect the official position of the California Department of Insurance.

Earthquake Frequencies

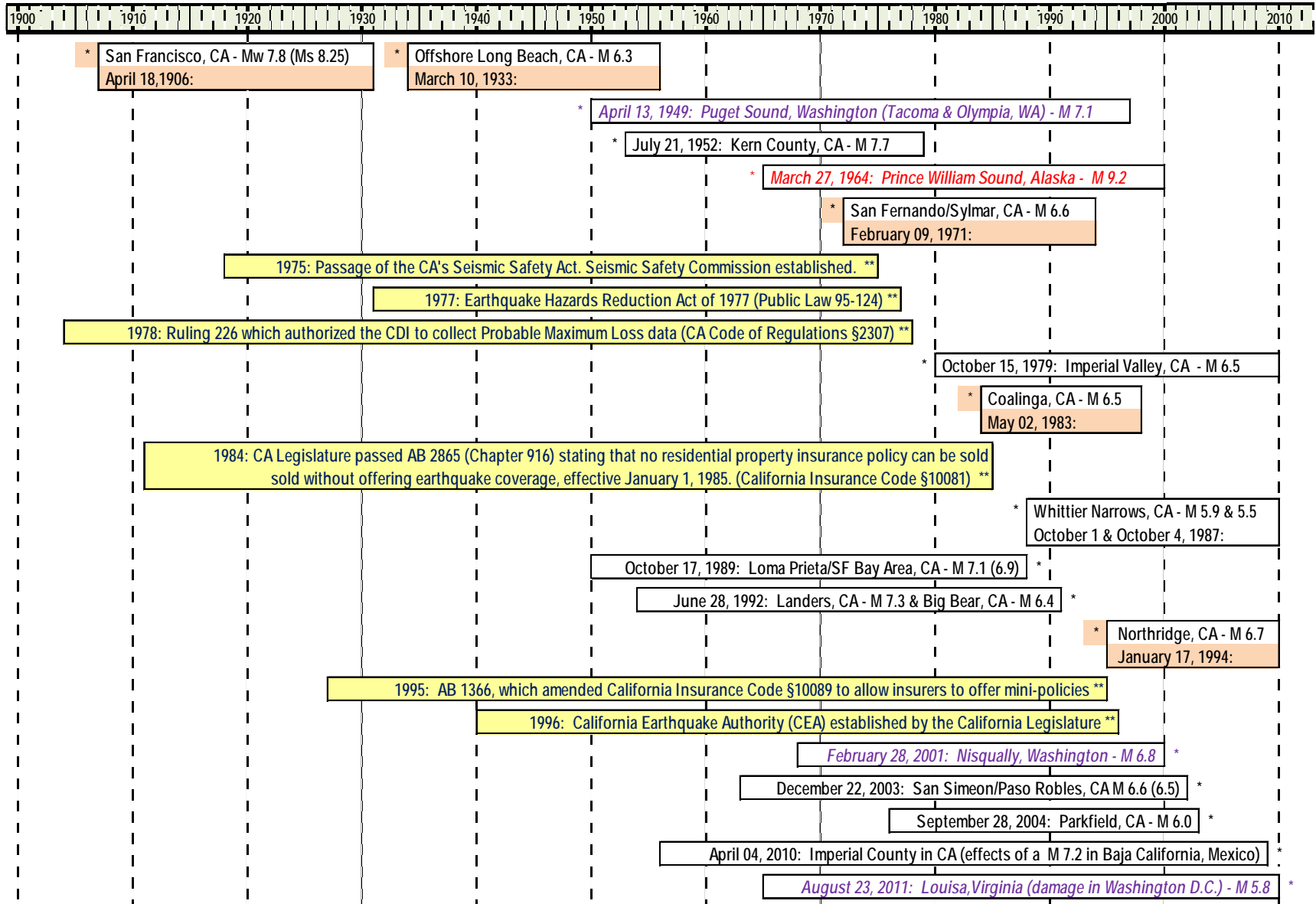
- USGS - monitors earthquakes
 - www.earthquake.usgs.gov/earthquakes/
- Worldwide
 - 157 per year with M6.0 and higher
- United States
 - 7 per year with M6.0+ between 1980-2011

Number of Earthquakes, 6.0 or over

Year	US	Worldwide
1980	10	
1981	3	
1982	4	
1983	9	
1984	3	
1985	5	
1986	11	
1987	13	
1988	3	
1989	5	
1990	2	127
1991	6	112
1992	17	179
1993	9	149
1994	5	159
1995	6	203
1996	6	164
1997	6	136
1998	3	129
1999	8	134
2000	6	161
2001	6	137
2002	5	140
2003	9	155
2004	2	157
2005	5	151
2006	7	153
2007	10	196
2008	9	180
2009	4	161
2010	9	175
2011	4	205
Total	210	3,463
per year	6.56	157.41



INFLUENTIAL EARTHQUAKES in the UNITED STATES and SIGNIFICANT LAWS / REGULATIONS



Lessons Learned

- April 18, 1906 San Francisco EQ – M8.3
 - Stimulate EQ studies and insurance
 - No public policy – buildings continued being built in risky locations due to economic pressures & expediency
- March 10, 1933 Long Beach EQ – M6.3
 - 120 deaths, 600 injured, \$40 million damages
 - California Field Act
 - Set standards for seismic design / quality control of public schools constructions

Earthquake Prediction / Research

- March 27, 1964 Alaskan EQ - M9.2
 - President's Science & Technology Office Policy (OSTP) convened for EQ predictions research
 - No funding due to no assurance of accuracy and false prediction could actually pose potential problems
- February 9, 1971 San Fernando EQ – M6.6
 - Created CA Seismic Safety Commission in 1975
- Earthquake Reduction Act of 1977
 - To reduce EQ hazards and other purposes
 - President Carter assigned responsibility of implementation plan to OSTP
 - Report: “Earthquake Hazards Reduction: Issues for an Implementation Plan” by Office of Science and Technology Policy, Executive office of President raised 37 issues and solution

Government EQ Agencies

- California Seismic Safety Commission (CSSC)
 - advises Governor, Legislature, and state/local governments of EQ hazards
- USGS - issue EQ warning
- CGS – provide info on CA EQ and Seismic Hazard Mapping Program
- NEHRP (evolved from EHRP of 1977)-improves nation's understanding of EQ hazards and to mitigate EQ loss

National Earthquake Hazards Reduction Program (NEHRP)

<http://nehrp.gov>

- Federal Emergency Management Agency (FEMA)
- National Institute of Standards and Technology (NIST)
- National Science Foundation (NSF)
- United States Geological Survey (USGS)

Other Agencies

- National Oceanic and Atmospheric Administration (NOAA) – tsunami warnings
- State Governors – declare disaster areas
- Local fire department – deal with fire following EQ
- City planners – public utilities, water, and transportation for fire protection

California EQ PML Data Reporting Requirement

- 1971 San Fernando EQ (M6.6) caused concerns about insurers capacity in case of severe quakes occurs.
- Ruling 226 (CCR 2307)-1978
 - Authorized CDI to collect EQ Probable Maximum Loss Data
 - The first report CA EQ Zoning & PML Evaluation Program released in 1981
 - The latest CA PML report which covered 2002 to 2010 was released in May 2012, available at www.insurance.ca.gov.

Concurrent Causation and All-Risk Policy

- During 1982 & 1983 court decisions had developed the doctrine of “concurrent causation” with respect to “all risk” policy.
- The court ruled in favor of policyholders regarding a homeowner insurance “all-risk” coverage when two perils were concurrent proximate cause of loss, one peril is covered and another is not clearly excluded, then it is covered.
- In May 1983 Coalinga quake(M6.5), industry was concerned of bad faith and punitive damage suits

Mandatory Offer of EQ Insurance

- In 1984 Legislature Passed AB 2865 (CIC 10081 & §10088)
 - Insurers must notify policyholders that their homeowners policies do not cover EQ peril
 - Insurers must offer EQ insurance in writing
 - Must describe coverage, deductible, and premium
 - Coverage must meet mini standard as specify in CIC 10089.
 - The insured has 30 days from the date of mailing to accept the offer
- From 1984 till 1994 Northridge EQ
 - EQ policy mirrored property coverage portion of ISO homeowner HO series of Policies (HO-1, HO-2, HO-3, HO-4, HO-6, HO-8), deductible ranges from 5% to 10%.

EQ Mini Policy

- On January 17, 1994, Northridge EQ (M6.7) caused HO insurance crisis-insurers stop writing new homeowner policies or non-renew the exiting policies
- AB 1366 Amended CIC 10089 to allow Mini Policy – 1995
 - 15% deductible, appurtenant structure not cover.
 - personal property limit at \$5,000 and
 - Loss of Use (ALE) limit at \$1500
 - Insurers began selling mini policies in 1996, resolved the homeowner insurance availability crisis

California Earthquake Authority

- Formed in 1995-96 - authorized by AB 13, SB 1993, among others
 - Privately funded, publicly managed nonprofit since December 1, 1996
 - Governing Board:
 - 3 voting members: Governor, State Treasurer, and Insurance Commissioner
 - 2 non-voting members: Chairperson of Senate Rules Committee and Speaker of the Assembly
- By law, insurer can sell its own EQ policy or be a “Participating Insurer” (PI) of CEA to comply with mandatory EQ insurance offer
- Only PI can offer CEA EQ policy
- CEA offers only personal (residential) EQ insurance, no commercial policy. Commercial EQ insurer is free to write its own EQ insurance policy.
- Property owner must have companion HO or fire policy to be eligible for CEA’s policy
- Participating Insurers process all applications, policy renewals, collecting premiums and settling claims
- Property owner is free to buy EQ policy from non-CEA insurers.

CEA Basic EQ Policy

- Coverage A & B (Dwelling and Extensions to Dwelling coverage) – combined single limit (CSL) of Dwelling limit
- Coverage C (Personal Property Coverage) – from \$5000 up to \$100,000
- Coverage D (Loss of Use/Additional Living Expense (ALE)) - \$1,500 to \$25,000 (not subject to deductible)
- Coverage E Building Code Upgrade - \$10,000 included or purchase add'l \$10,000
- Deductible 10% or 15% of Dwelling limit
- 5% of dwelling limit available for emergency repairs (1st \$1,500 not subject to deductible), \$10,000 sublimit to stabilize the land, and 5% sublimit to remove debris
- CEA policies cover EQ shake damage, not tsunami or fire following an earthquake (even if caused by the earthquake).

CEA Choice Program

- Effective July 1, 2012
 - Can buy Coverage A&B only or
 - Add Personal Property Coverage C (i.e., A&B+C) or
 - Add Loss of Use / ALE (A&B+D) or
 - Add both C & D (A&B+C+D)
- CEA also offers mobilehome owners, renters, and condominium/townhome unit owners EQ policies.
- For details of CEA products, review CEA's policies at www.earthquakeauthority.com

Coverages	CALIFORNIA EARTHQUAKE AUTHORITY POLICIES			
	Homeowners	Homeowners Choice* (NEW Effective July 1, 2012)	Condominium	Renters
Coverage A & Coverage B - Combined Single Limit Dwelling and Extensions to Dwelling Coverage to repair, or in the event of a total loss, replace, an insured home when damage exceeds the coverage deductible, up to the policy limit.	Included Coverage	Included Coverage	Not Available	Not Available
Coverage Limit	Must be equal to the Coverage A limit on primary homeowners or mobilehome owners policy	Must be equal to the Coverage A limit on primary homeowners or mobilehome owners policy	Not Available	Not Available
Deductible	10% or 15% of your Coverage A & Coverage B - Combined Single Limit	10% or 15% of your Coverage A & Coverage B - Combined Single Limit	Not Available	Not Available
Coverage A - Building Property Coverage for repair or replacement of interior structural components when earthquake damage exceeds the deductible. Property covered includes built-in appliances, fixtures, some improvements, wall-to-wall carpeting, as well as other items.	Not Available	Not Available	Optional Coverage	Not Available
Coverage Limit	Not Available	Not Available	\$25,000	Not Available
Deductible	Not Available	Not Available	15% of your Building Property limit - \$3,750	Not Available
Coverage C - Personal-Property Coverage to replace personal property such as furniture and household items, when damage exceeds the coverage deductible, up to the policy limit.	Included Coverage	Optional Coverage	Optional Coverage	Included Coverage
Coverage Limit Options	\$5,000 \$25,000 \$50,000 \$75,000 \$100,000	\$5,000 \$25,000 \$50,000 \$75,000 \$100,000	\$5,000 \$25,000 \$50,000 \$75,000 \$100,000	\$5,000 \$25,000 \$50,000 \$75,000 \$100,000
Deductible	Personal property is paid if your covered dwelling loss exceeds your Coverage A deductible	10% or 15% of your Coverage C limit. Your personal-property deductible is waived if your covered dwelling loss exceeds your Coverage A deductible	\$750	\$750
Coverage D - Loss of Use Coverage for additional living expenses, if you are unable to live in your home as a result of earthquake damage, up to the policy limit. There is no deductible for Loss-of-Use Coverage.	Included	Optional Coverage	Optional Coverage	Included Coverage
Coverage Limit Options	\$1,500 \$10,000 \$15,000 \$25,000**	\$1,500 \$10,000 \$15,000 \$25,000**	\$1,500 \$10,000 \$15,000 \$25,000**	\$1,500 \$10,000 \$15,000 \$25,000**
Deductible	No deductible	No deductible	No deductible	No deductible
Coverage E - Loss Assessment Coverage for certain assessments an association may impose on all property owners to pay for exterior or structural repairs for earthquake damage when damage exceeds the deductible, up to the policy limit.	Not Available	Not Available	Optional Coverage	Not Available
Coverage Limit Options	Not Available	Not Available	\$25,000, \$50,000, or \$75,000	Not Available
Deductible	Not Available	Not Available	Your loss assessment deductible is 15% of the coverage limit chosen	Not Available
Building Code Upgrade Coverage Included Coverage Additional coverage which provides funds for bringing your home up to current building codes when repairing or replacing a home.	Included Coverage	Included Coverage	Included Coverage	Not Available
Coverage Limit Options	\$10,000 \$20,000***	\$10,000 \$20,000***	\$10,000	Not Available
Deductible	Building Code Upgrade Coverage is paid if your covered dwelling loss exceeds your Coverage A deductible	Building Code Upgrade Coverage is paid if your covered dwelling loss exceeds your Coverage A deductible	Building Code Upgrade Coverage is paid if your covered dwelling loss exceeds your Coverage A deductible	Not Available
Emergency Repairs Included Coverage Coverage for reasonable emergency repairs following an earthquake.	Included Coverage	Included Coverage	Included Coverage	Included Coverage
Coverage Limit	Coverage A & B - Combined Single Limit: Up to 5% of Coverages A & B Coverage C - Personal Property: Up to 5% of Coverage C	Coverage A & B - Combined Single Limit: Up to 5% of Coverages A & B Coverage C - Personal Property: Up to 5% of Coverage C	Coverage A - Building Property: Up to \$1,500** Coverage C - Personal Property: The lesser of \$1,000 or 5% of Coverage C	Coverage C - Personal Property: The lesser of \$1,000 or 5% of Coverage C
Deductible	Up to \$1,500 is not subject to any deductible**	Up to \$1,500 is not subject to any deductible**	Coverage A - Building Property: \$3,750 Coverage C - Personal Property: \$750	\$750

*Homeowners Choice policy available for policyholders with new and renewal policies effective on or after July 1, 2012.

**Available for policyholders beginning with new and renewal policies that are effective on or after January 1, 2012.

***Coverage limit not available for Mobilehomes.

Note: For claims that exceed your CEA policy deductible, you needn't spend money out-of-pocket before becoming eligible for payment on your claim.

EQ Insurance Rate

- Per \$1000 of Dwelling Limit
- Rates are subject to regulatory Prior Approval
- Rating Factors
 1. Number of stories of the building – one story or more than one story
 2. Type of Foundation – slab, raised, or other
 3. Construction Types – wood frame or masonry
 4. Year of Construction
 5. ZIP Code of the property
 6. Choice of deductible or increased limit

CEA Earthquake Policy Rate

zip code	city	territory	HO-3 premium*	HO-3 Rate (per 1,000)	Condo-1**	Condo-1 Rate (per 1,000)	Condo-2***	Condo-2 Rate (per 1,000)	Renter****	Renter Rate (per 1,000)
92236	Coachella	2	\$1,536.00	\$3.07	\$703.00	\$14.06	\$898.00	\$17.96	\$207.00	\$4.14
92543	Hemet	4	\$1,246.00	\$2.49	\$703.00	\$14.06	\$898.00	\$17.96	\$207.00	\$4.14
92410	San Bernardino	5	\$1,514.00	\$3.03	\$703.00	\$14.06	\$898.00	\$17.96	\$207.00	\$4.14
92501	Riverside	6	\$864.00	\$1.73	\$703.00	\$14.06	\$898.00	\$17.96	\$207.00	\$4.14
90638	La Mirada	7	\$731.00	\$1.46	\$482.00	\$9.64	\$604.00	\$12.08	\$157.00	\$3.14
92336	Fontana	8	\$1,161.00	\$2.32	\$703.00	\$14.06	\$898.00	\$17.96	\$207.00	\$4.14
91350	Santa Clarita	11	\$981.00	\$1.96	\$703.00	\$14.06	\$898.00	\$17.96	\$207.00	\$4.14
91311	Chatsworth	12	\$831.00	\$1.66	\$703.00	\$14.06	\$898.00	\$17.96	\$207.00	\$4.14
91320	Thousand Oaks	13	\$555.00	\$1.11	\$482.00	\$9.64	\$604.00	\$12.08	\$157.00	\$3.14
93101	Santa Barbara	15	\$581.00	\$1.16	\$482.00	\$9.64	\$604.00	\$12.08	\$157.00	\$3.14
93940	Monterey	18	\$209.00	\$0.42	\$168.00	\$3.36	\$202.00	\$4.04	\$65.00	\$1.30
95062	Santa Cruz	19	\$533.00	\$1.07	\$482.00	\$9.64	\$604.00	\$12.08	\$157.00	\$3.14
94060	Pescadero	20	\$761.00	\$1.52	\$482.00	\$9.64	\$604.00	\$12.08	\$157.00	\$3.14
94117	San Francisco	22	\$1,224.00	\$2.45	\$703.00	\$14.06	\$898.00	\$17.96	\$207.00	\$4.14
94114	San Francisco	23	\$757.00	\$1.51	\$482.00	\$9.64	\$604.00	\$12.08	\$157.00	\$3.14
94515	Calistoga	24	\$687.00	\$1.37	\$482.00	\$9.64	\$604.00	\$12.08	\$157.00	\$3.14
95501	Eureka	25	\$757.00	\$1.51	\$482.00	\$9.64	\$604.00	\$12.08	\$157.00	\$3.14
95409	Santa Rosa	26	\$860.00	\$1.72	\$482.00	\$9.64	\$604.00	\$12.08	\$157.00	\$3.14
91915	Chula Vista	27	\$173.00	\$0.35	\$168.00	\$3.36	\$202.00	\$4.04	\$65.00	\$1.30
		Average	\$840.05	\$1.68	\$542.00	\$10.84	\$685.47	\$13.71	\$168.37	\$3.37

*

Construction Type	Foundation Type	Number of Stories	Increased Building Code Upgrade	Hazard Reduction Discount	Dwelling (Deductible)	Personal Property (Deductible)	Loss of Use
Years 1990 Or Later (Wood Frame)	Slab	> One	No	N/A	\$500,000	\$5,000	\$1,500
					15% (\$75,000)	Coverage applies after Coverage A deductible is met	

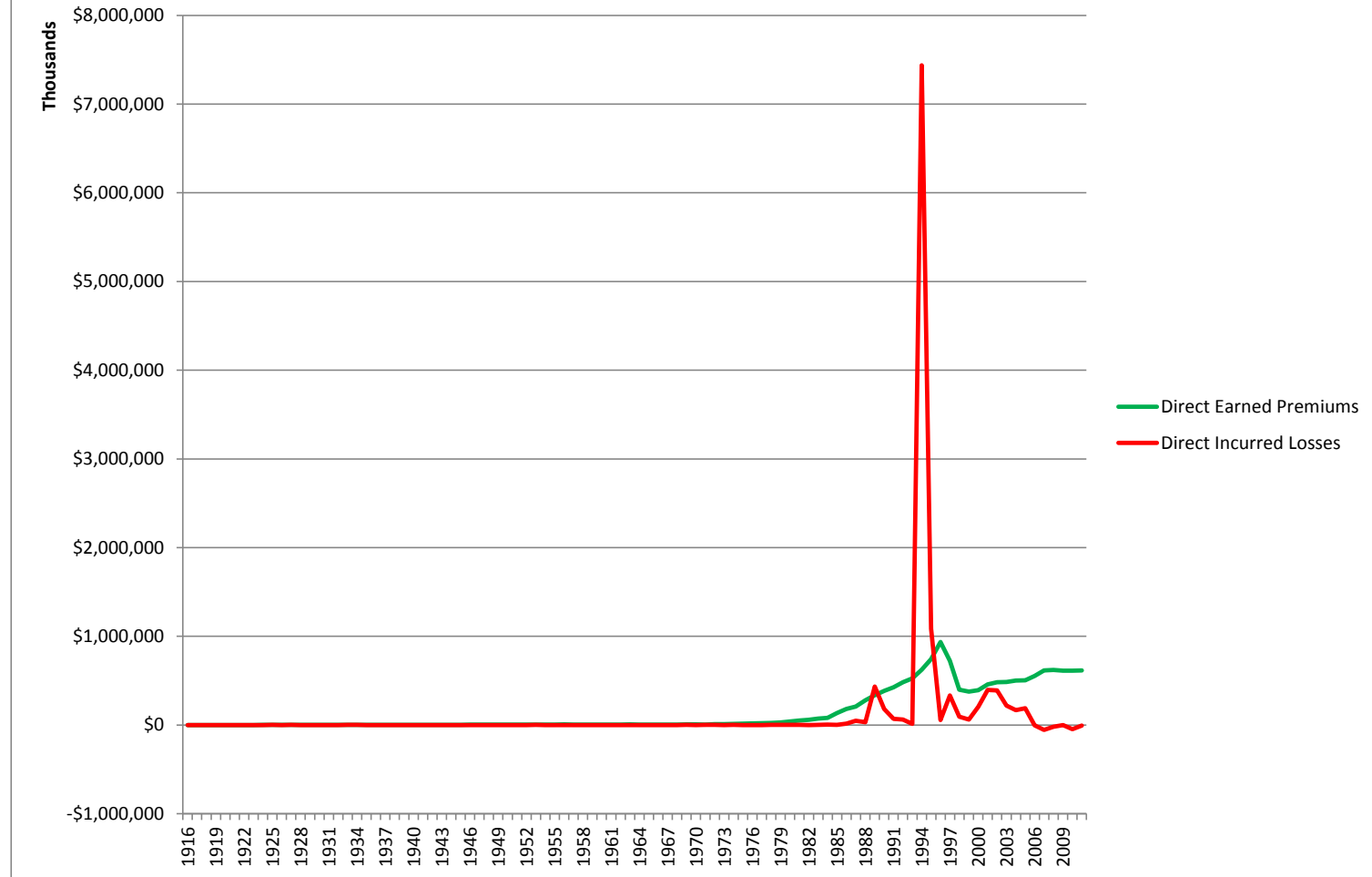
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Building Property (Deductible)	Personal Property (Deductible)	Loss of Use	Loss Assessment (Deductible)
No Coverage	\$50,000 (\$750)	\$1,500	\$50,000 (\$7,500)

Building Property (Deductible)	Personal Property (Deductible)	Loss of Use	Loss Assessment (Deductible)
\$25,000 (\$3,750)	\$50,000 (\$750)	\$1,500	\$50,000 (\$7,500)

Personal Property (Deductible)	Loss of Use
\$50,000 (\$750)	\$1,500

CALIFORNIA EARTHQUAKE INSURANCE DIRECT EARNED PREMIUMS AND INCURRED LOSSES



References

- Steinbrugge, Karl V., and S. T. Algermissen. *Earthquake Losses to Single-Family Dwellings: California Experience*. Washington D.C.: U.S. Geological Survey Bulletin 1939. Manuscript approved for publication, April 18, 1990.
- Steinbrugge, Karl V., *Earthquake Hazard in the San Francisco Bay Area: A Continuing Problem in Public Policy*. Berkeley: Institute of Governmental Studies, 1968.
- Steinbrugge, Karl V., William K. Cloud, and Nina H. Scott, *The Santa Rosa, California, Earthquake of October 1, 1969*. Washington D.C.: National Earthquake Information Center, 1970.
- Steinbrugge, Karl V., and the Working Group on Earthquake Hazards Reduction, *Earthquake Hazard Reduction: Issues for an Implementation Plan*. Washington D.C.: The White House Office of Science and Technology Policy, 1978.
- Steinbrugge, Karl V. *Earthquakes, Volcanoes, and Tsunamis. An Anatomy of Hazards*. New York: Skandia America Group, 1982.
- Zeilinga de Boer, Jelle, and Donald Theodore Sanders, *Earthquakes in Human History*. Princeton: Princeton University Press, 2005.
- *California Earthquake Zoning – Probable Maximum Loss Evaluation Program Report*, May 2012.

Web Source for Earthquake and Emergency Planning Information

- U. S. Geological Survey (USGS): www.earthquake.usgs.gov/
- National Oceanic and Atmospheric Administration (NOAA): www.noaa.gov/
- California Department of Insurance: www.insurance.ca.gov
- California Earthquake Authority: www.earthquakeauthority.com
- California Seismic Safety Commission: www.seismic.ca.gov
- California Geological Survey: www.consrv.ca.gov/cgs

EQ Emergency Planning Information

- Federal Emergency Management Agency: www.fema.gov
- American Red Cross: www.redcross.org
- Great California Shakeout EQ Drill: www.shakeout.org