What was this class about?

What will you take away from it?
I Historical lessons

Past earthquakes

1868: The “Great San Francisco Earthquake”

1906: The new “Great San Francisco Earthquake”

1989: Loma Prieta
1994: Northridge

1995: Kobe: a moderate earthquake in a modern environment

Today’s vulnerabilities

Hurricane Katrina: few believed a modern wealthy city could be destroyed by a natural disaster

Kobe: an earthquake in a modern city

http://earthquakes.berkeley.edu/eps20
EPS20: Earthquakes in your backyard – Prof. Richard Allen

I  Historical lessons
II  Earthquake science

Faults

Fault motion during 1999 Chi-Chi earthquake, Taiwan

Alquist-Priolo Earthquake Fault Zones

Earthquakes

Earthquake cycle
“the tectonic time bomb”

Seismograms

http://earthquakes.berkeley.edu/eps20
I  Historical lessons  
II  Earthquake science

Earthquake effects

- Liquefaction
- Ground shaking
- Fault displacement

III  Earthquake preparedness

- Prediction
- Forecasting
- Early warning

Planning for disasters

http://earthquakes.berkeley.edu/eps20
Earthquake safety at UC Berkeley

1997 SAFER Review

- 27% campus space rates as poor or very poor
- $700 mill to retrofit
- 20-30 years to complete
- total cost over $1.2 bill

High rise residence halls were already being retrofitted

Earthquake safety at UC Berkeley

Today

UC Berkeley Seismic Upgrade Program

- November 2005

http://earthquakes.berkeley.edu/eps20
Individuals make a difference

Mary Comerio
Urban and Regional Development, UC Berkeley

The Economic Benefits of a Disaster Resistant University

Along with other members of the UC Berkeley Seismic Review Committee, pressure applied to the university administration to tackle the earthquake hazard issue on campus ➔ billion dollar retrofit

Individuals make a difference

Arietta Chakos
The City of Berkeley

GetReadyBerkeley.org
No One’s Prepared Until Everyone’s Prepared
Retrofitting homes

Why is Berkeley high?
Activation by individuals
Translated into incentives for everyone: property transfer tax rebate for retrofits

Planning for disasters

Retrofit Rates for Single-Family Homes in Selected Bay Area Communities

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Apartment buildings

Berkeley Soft Story Program
- Inventory of hazardous buildings

Welcome to the official website of the CITY OF BERKELEY, CA. Berkeley is a city with a small population and a big reputation. In California alone, there are more than 30 million residents. Berkeley is one of the most diverse and active cities in the country. It is known for its vibrant arts and cultural scene, as well as its commitment to sustainability and social justice. Berkeley is a city where people from all walks of life come together to celebrate diversity and create a better future for everyone. Please visit About Berkeley to learn more about the City.

http://www.ci.berkeley.ca.us search for "soft story"
A comprehensive solution

1. Increase the understanding of the risk
   Those who retrofit
   • believe the risk of an earthquake in their neighborhood is high
   • have seen ground shaking maps
   • have experienced a major, damaging earthquake
   They also have earthquake insurance and food and water supplies

2. Clear explanations of what needs to be done
   Single most common reason for not retrofitting is "I don’t know what to do."
   There is a high correlation between those with a college education and those who retrofit

3. Financial incentives
   The high success in Berkeley is due to the tax rebate
   Wealthier families are also more likely to retrofit

City of Berkeley’s success

- High risk perception
  • retrofit of city buildings

- Widespread knowledge of what to do
  • high degree of education
  • neighbors have retrofit

City programs

ABAG "The Solution"

Planning for disasters

Losses
Repeat 1906
magnitude 7.9

$54 bill
Damage to buildings only (CGS)

$170 to $225 bill
All losses (RMS)

Building damage as % of replacement value

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<th>Damage Level</th>
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<th>Number</th>
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Losses
Hayward Fault
magnitude 6.9

$23 bill
Hayward N + S
Damage to buildings only (CGS)

But...
Probability of event on Hayward is higher than on San Andreas
The highest (proportional) loss is along the Hayward fault

Class goals
...to inform future leaders of our society about the various hazards associated with earthquakes, and to provide the necessary information for you to make intelligent decisions about earthquake mitigation options

Your charge
To be an earthquake-responsible citizen