

# PBEE Practice and Needs Panel Discussion

Lloyd Cluff, PG&E  
Paul Somerville, URS  
Joe Maffei, R&C  
Ron Hamburger, SGH  
Tom Shantz, Caltrans  
Jim Malley, Degenkolb

# Overview – Jim Malley

- Many significant accomplishments in multiple areas
  - PBEE methodology, becomes foundation for application specific tasks, OpenSEES
  - Non-ductile concrete advances
  - Ground motion work, especially NGA
  - Procedure for quantifying system performance (ATC-63)
  - Lifelines, bridges and systems analysis applications
- Life beyond NSF looks bright!

# **Perspectives on 10 years of PEER Earthquake Engineering Research Lloyd Cluff – PG&E**

- Strategy to establish PEER 1995-96
- Role of California Seismic Safety Commission
- Role of Pacific Gas and Electric Company
- Lifelines component of PEER
- User needs-driven research agenda
- Public/Private/Partnerships (PPP)
- Leveraged funding

# Accomplishments and Future Directions

## Accomplishments

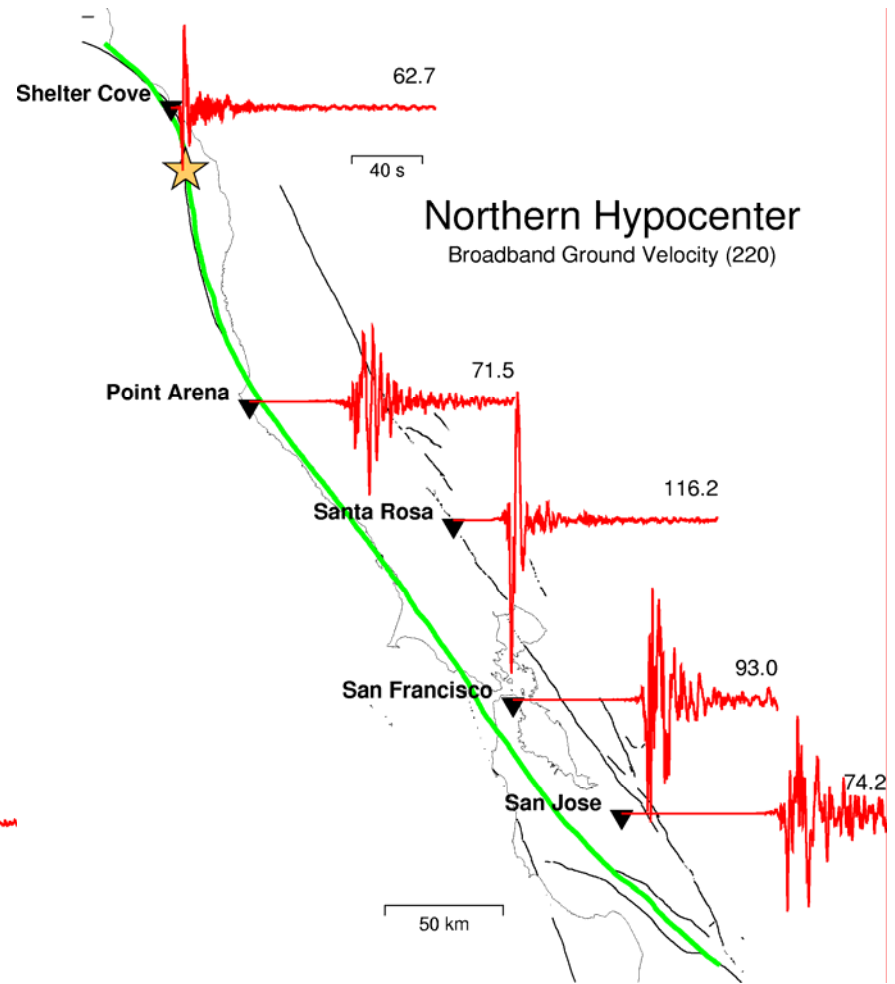
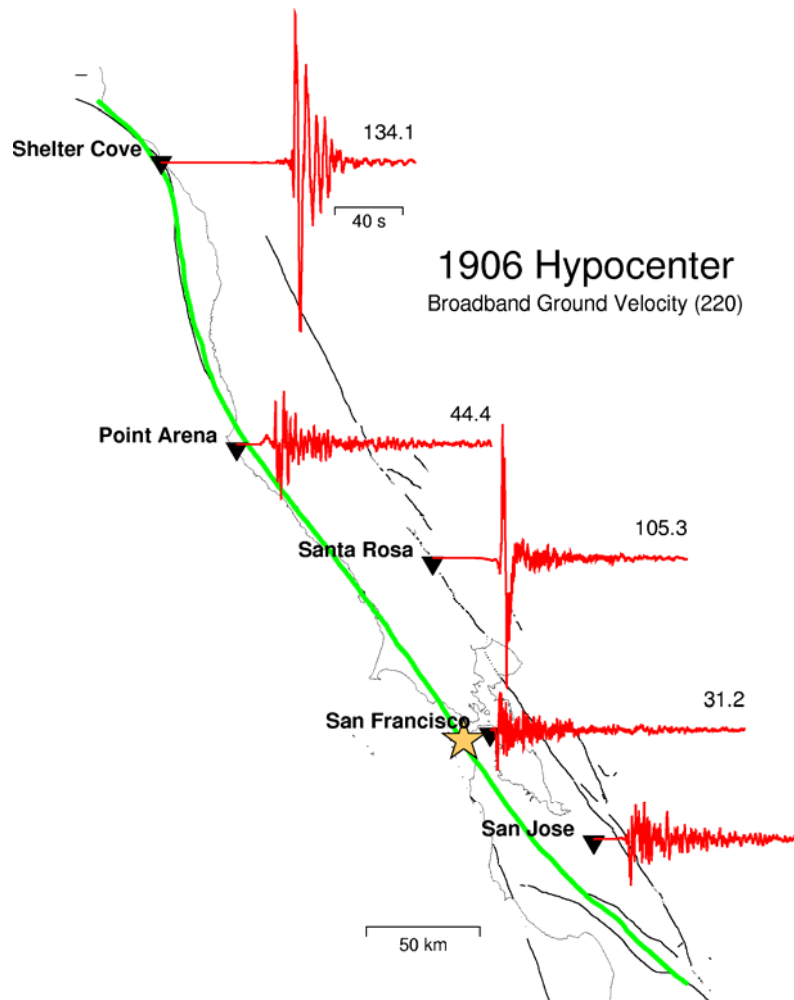
- Leveraged funding
  - PPP (PG&E, Caltrans, CEC, FEMA, BART) 1996 – 2007 ~\$12.5 million
- Implementation of research results
  - Useful research results that can be implemented
- Managing earthquake risks
  - Improve system performance

## Future Directions

- Lifeline interdependencies during earthquakes
  - Highways and bridges/Power utilities/Water supply
- System performance
  - Individual lifelines
  - Lifeline groups

We do not have recorded time histories for the design earthquake in most parts of the western United States.

We need to rely on simulated time histories like those below.

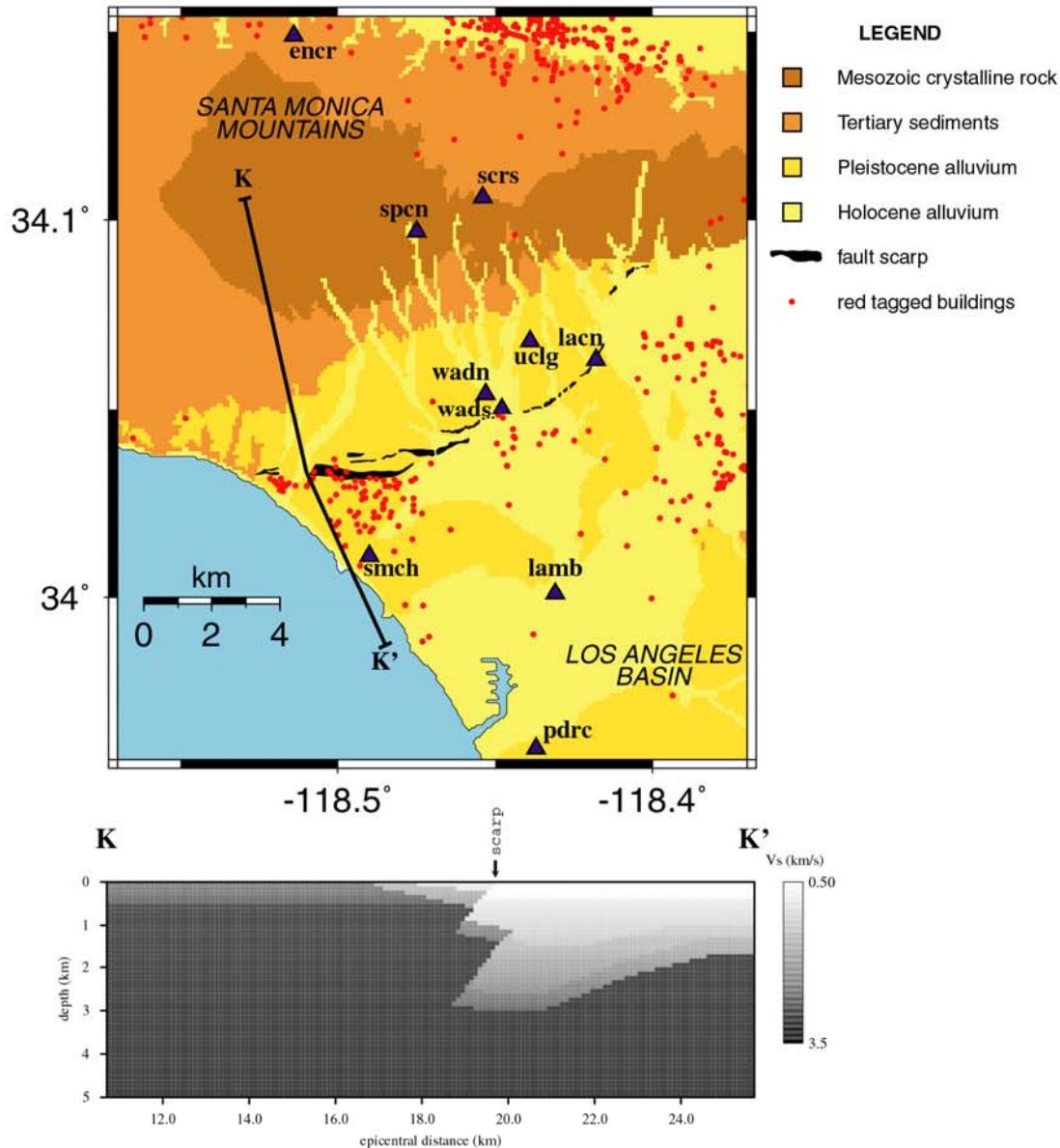


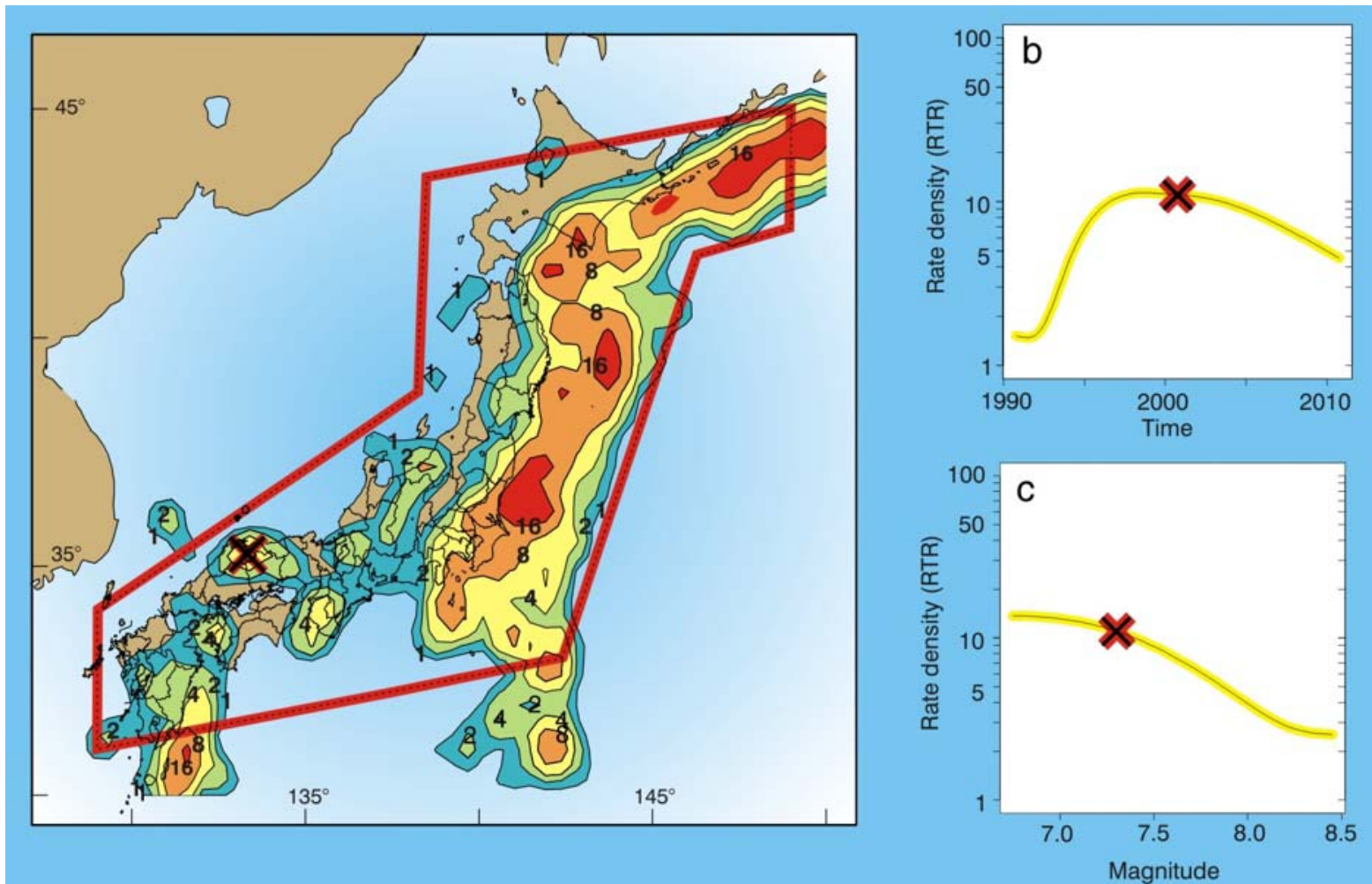
# Northridge Earthquake

Red tagged buildings occurred in clusters

The Sherman Oaks cluster is not understood

The Santa Monica and West LA cluster is related to the edge of the LA Basin formed by the Santa Monica fault





**Earthquake forecast for Japan just before the 2000 Tottori earthquake**

**The forecast showed high probability for that earthquake (marked by the cross) and the 2004 Niigata Chuetsu earthquake to the northeast**

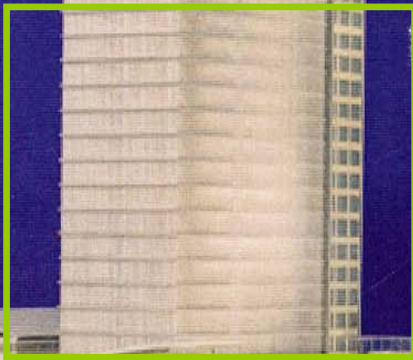
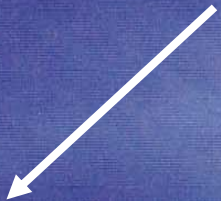








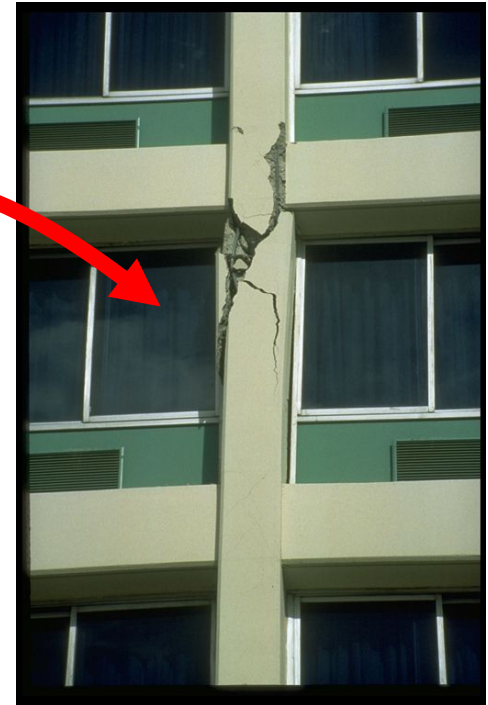
STEEL GRAVITY FRAMING







# Collapse Prediction in Evaluation Guidelines



# Performance Evaluation Approach

