

2001

PEER

ANNUAL MEETING



JANUARY 25-26, 2001
OAKLAND MARRIOTT CITY CENTER

the Pacific Earthquake Engineering Research Center



*An Earthquake Engineering Research Center
working to develop and disseminate
performance-based earthquake engineering methodology
to meet the safety and economic needs of
owners and society.*

*PEER is funded by the US National Science Foundation,
the State of California, and industry partners*

UC Berkeley Caltech Stanford UC Davis UC Irvine

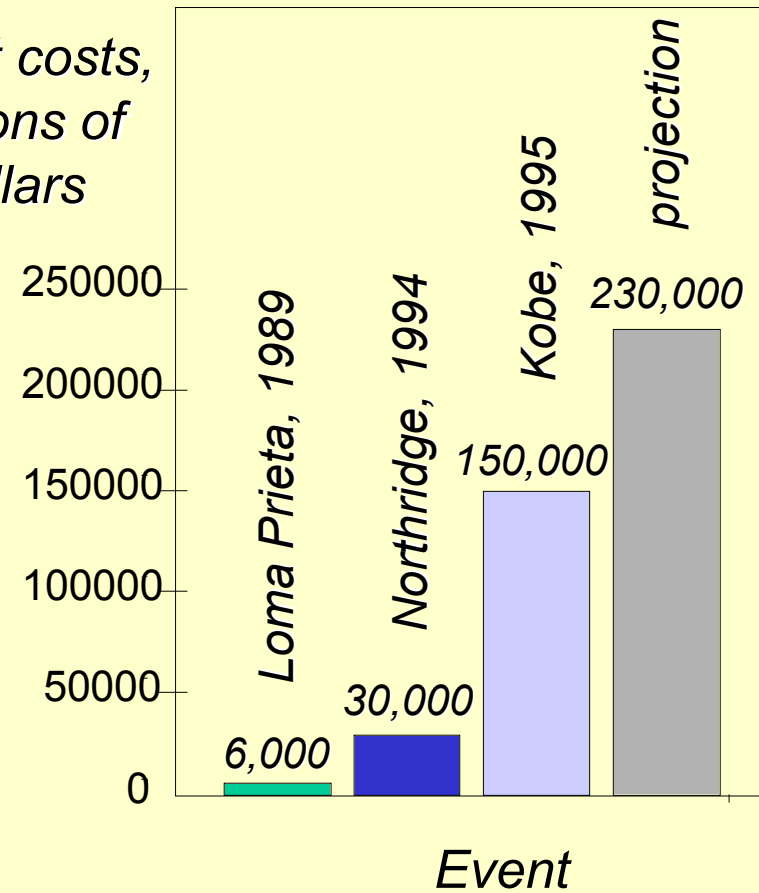
UCLA UCSD USC University of Washington

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Earthquake Losses



*Direct costs,
millions of
dollars*



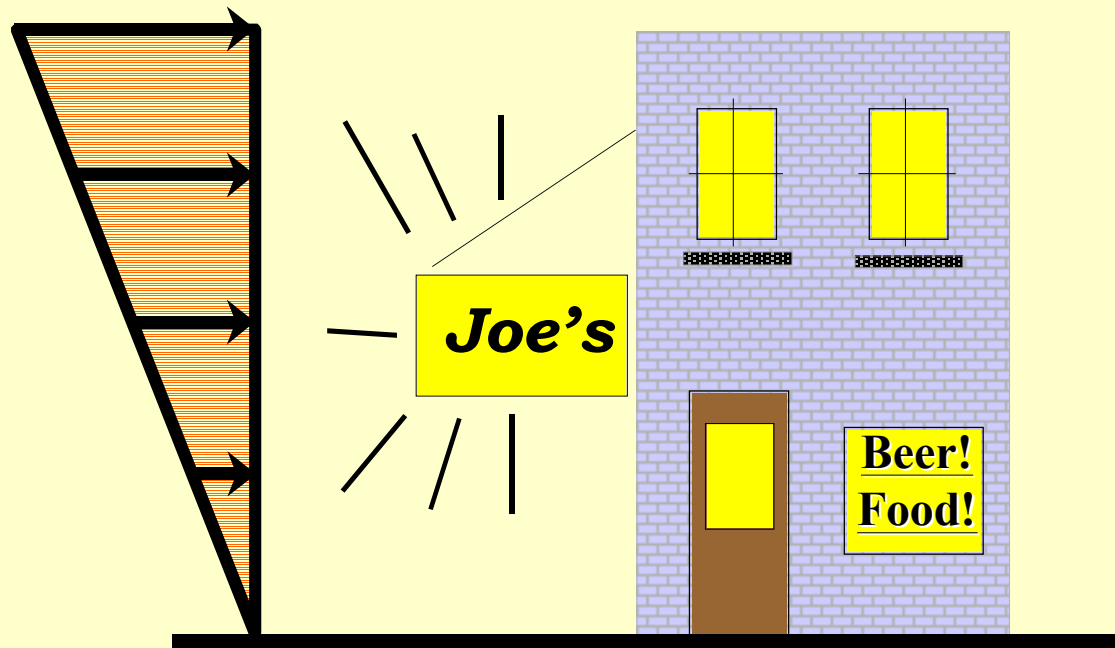
Performance Objectives



What objectives are most appropriate to individual owners and society?

What socio-economic and engineering tools can be used to achieve these objectives?

Traditional Approach

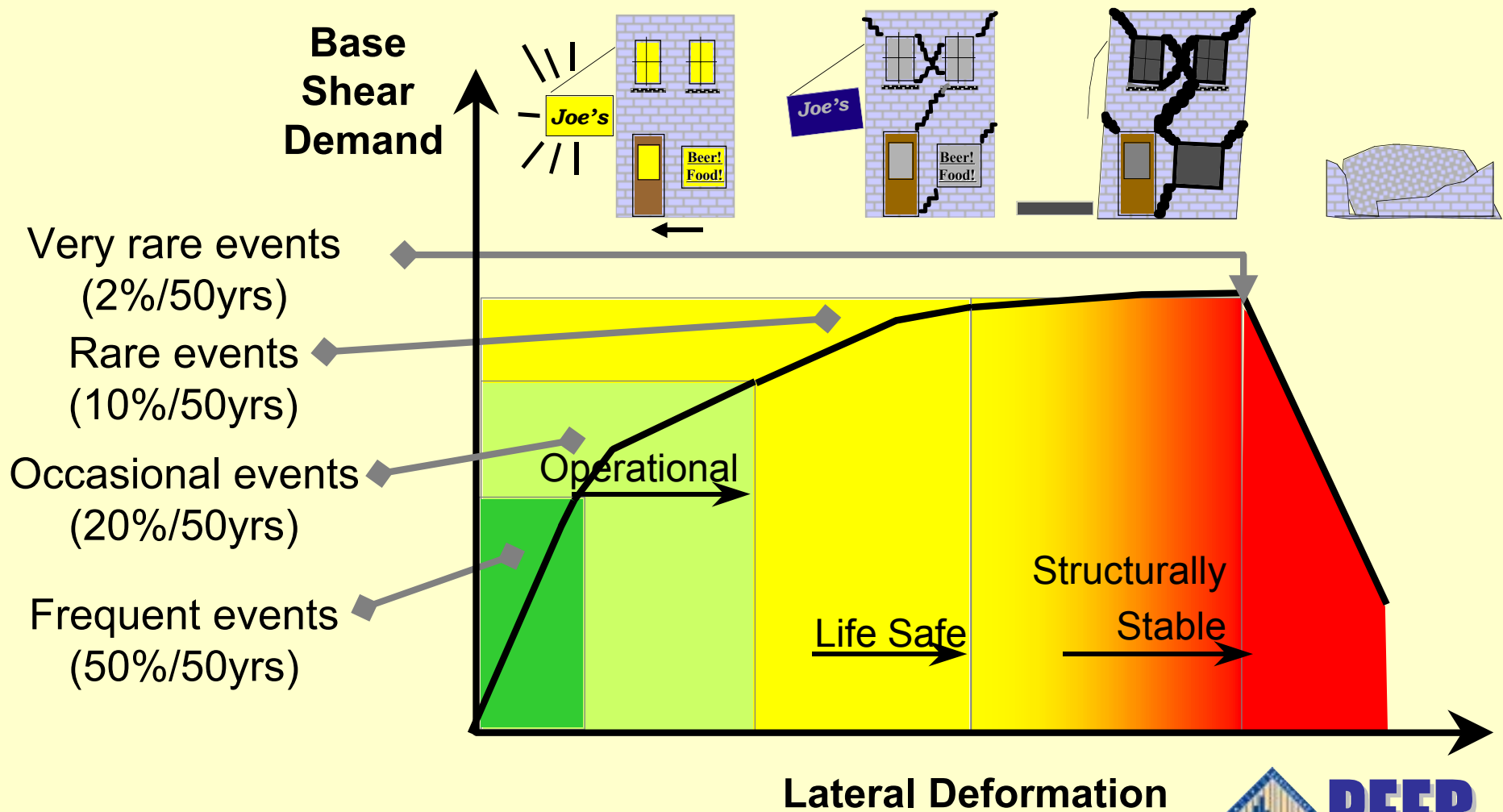


- Linear analysis model
- Simplified design base shear
- Prescriptive details
- Uncertain outcomes
- Owners informed of code conformance, but not building performance

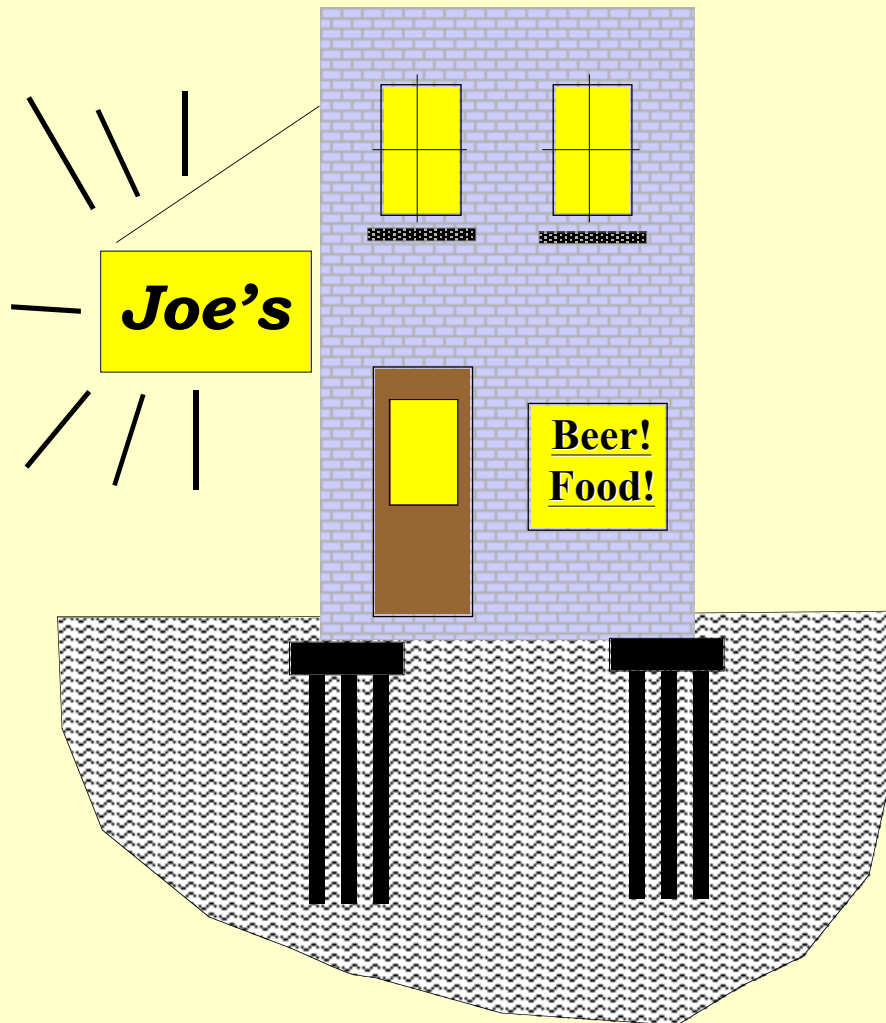
$$V = \frac{ZICS}{R} W$$

Joe's Bar and Grill courtesy of Ron Hamburger

A Near-Term Vision of PBEE

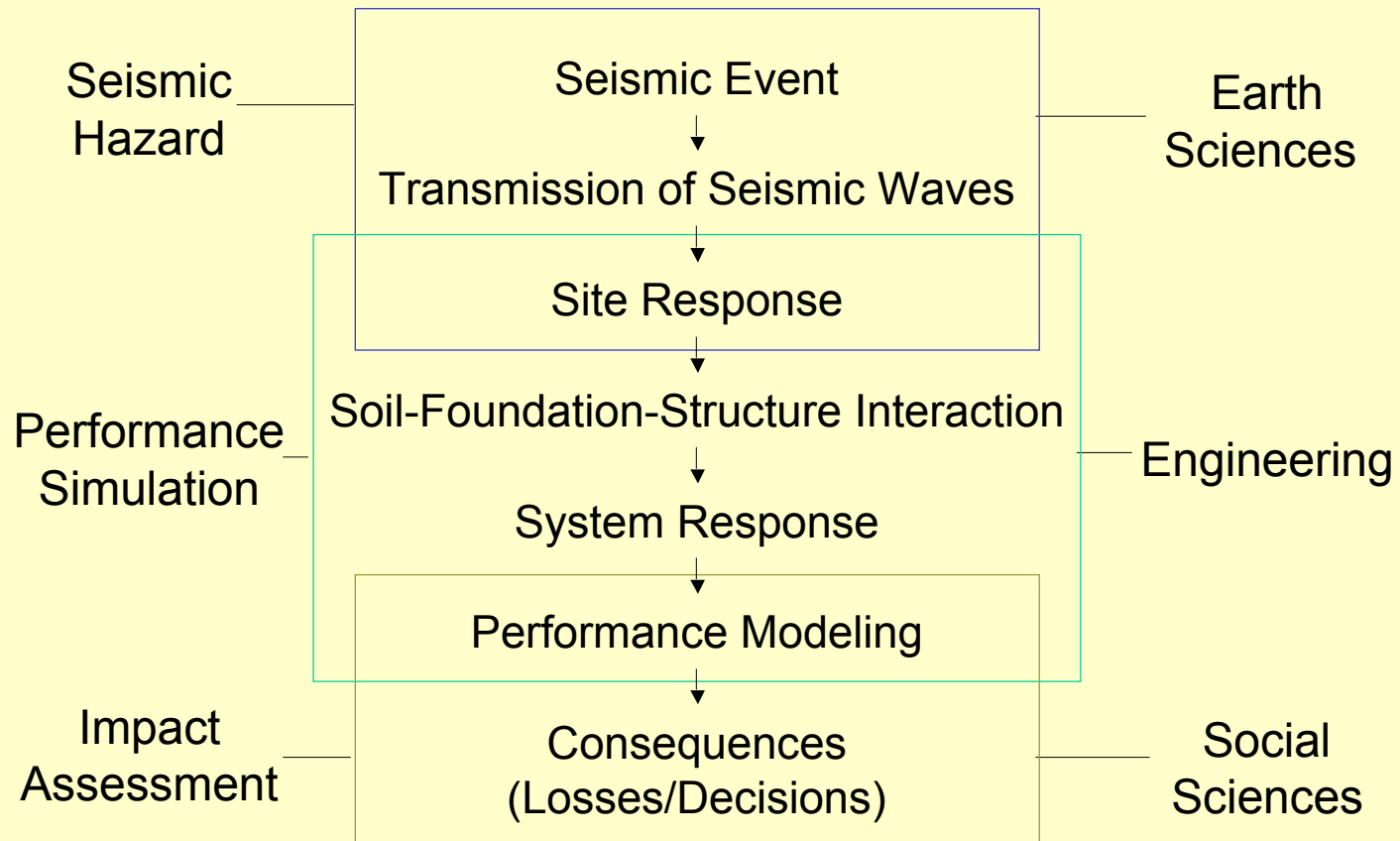


Longer-Range Vision of PBEE



1. Complete simulation
2. Defined performance objectives
 - Identified performance states
 - Annual probabilities of achieving them
3. Informed owners

Scope



Framework Equation

Mean Annual Frequency: $DV > \text{Performance Target}$

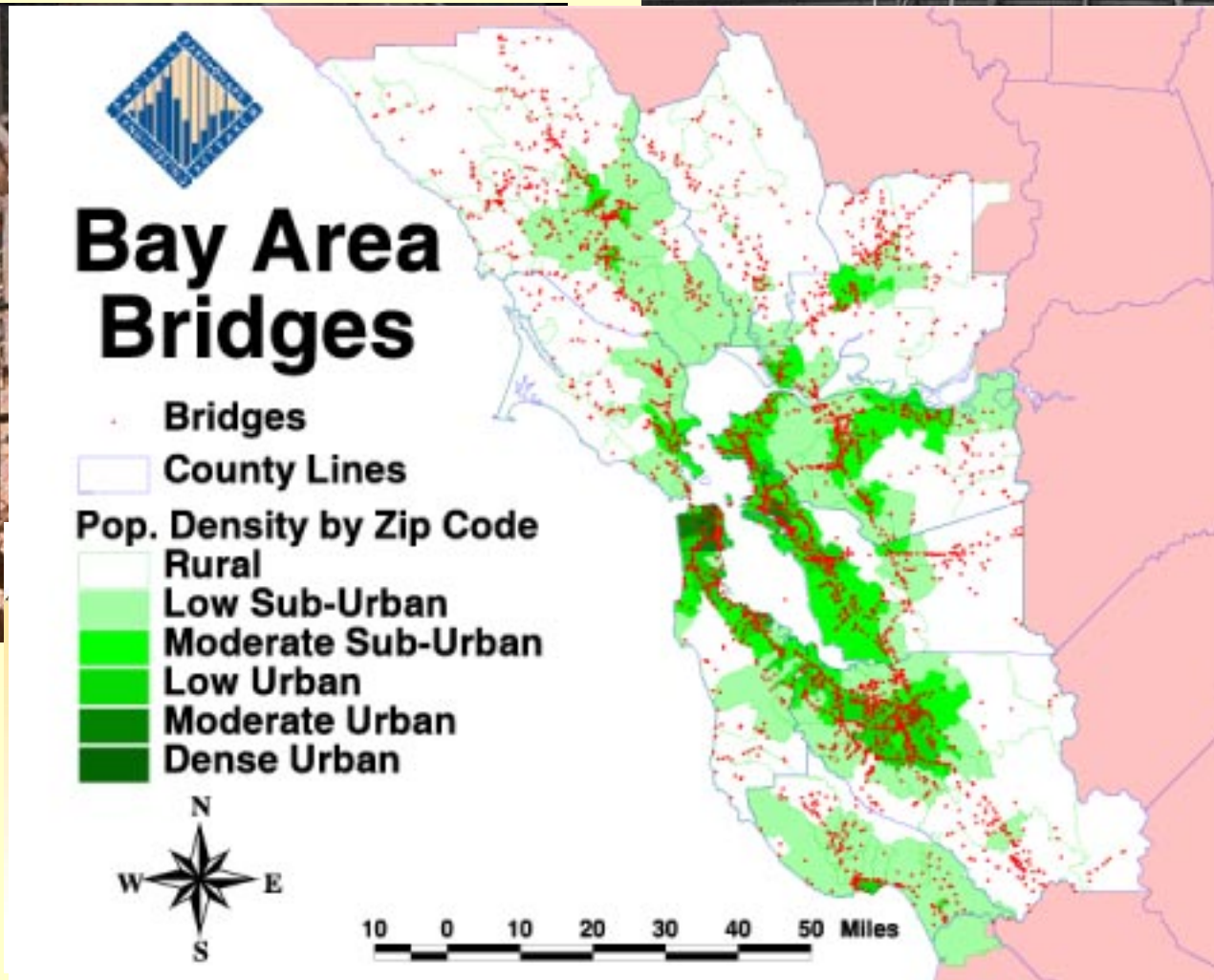
$$v(DV) = \iint \underbrace{G(DV | DM)}_{\text{DV Decision Variable}} \parallel \underbrace{dG(DM | IM)}_{\text{DM Damage Measure}} \parallel \underbrace{d\lambda(IM)}_{\text{IM Intensity Measure}}$$

DV Decision Variable

DM Damage Measure

IM Intensity Measure

Scope

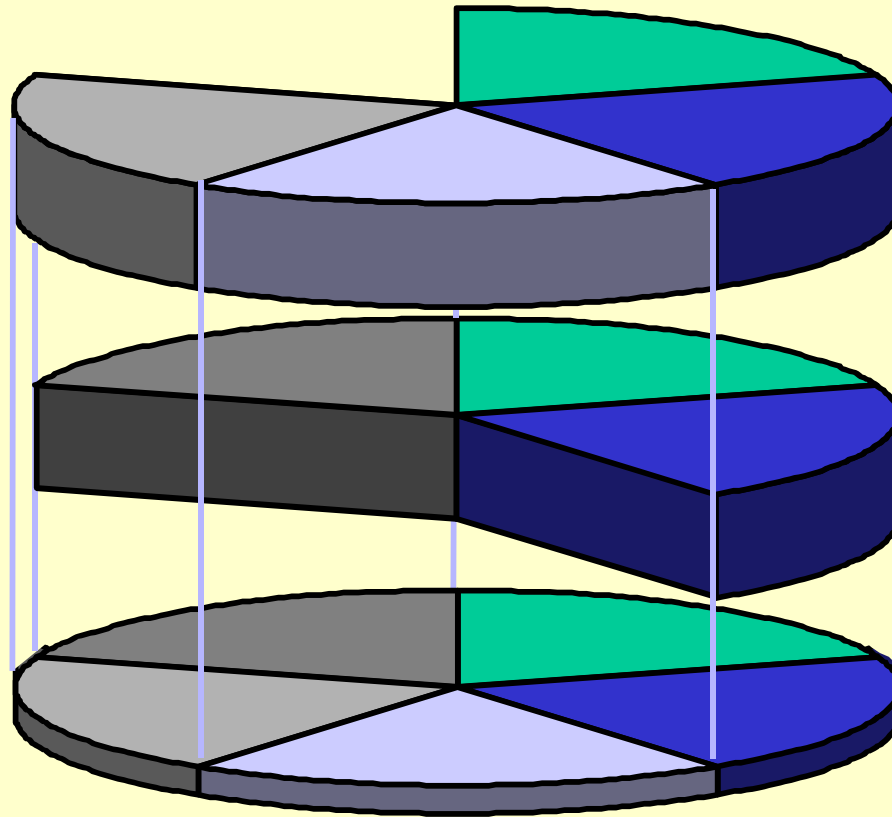


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PEER Programs



Core Program
(NSF, CA, Wa)

Lifelines Program
(PG&E, CEC, Caltrans)

**Business and
Industry Partner
Program**
(over 20 partners)

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- Purpose
 - Meeting of PEER Researchers
 - Technology transfer
 - Input from earthquake professionals
- Format
 - Plenary sessions
 - Poster sessions
 - Thrust Area meetings