EERI Learning from Earthquakes Program

R. Jay Love, S.E.
Chair - LFE Advisory Committee

Sponsored by the National Science Foundation

supported for 30 years

Learning from Earthquakes Advisory Committee

- Jay Love, Chair
- Loring Wyllie, past Chair
- Donald Ballantyne
- Nesrin Basoz
- Charles Eadie
- Jim Goltz
- John Meyer
- Kathleen Tierney
- T. Leslie Youd
- Susan Tubbesing, *Ex-officio*
- Marjorie Greene, Project Manager

Current NSF Grant

- 5 years (2001—2006)
- New Components
  - More emphasis on reconnaissance training, including safety training
  - Broaden pool of potential team members

NSF Grant Components

- New program of small grants
  - *Beyond Reconnaissance Grants*
  - *Lessons Learned over Time*
- Incorporate new technologies and equipment to improve collection and management of data

NSF Grant Components

- Data collection protocol workshop
- Integrate LFE program with Network for Earthquake Engineering Simulation (NEES)
- Update Field Guide: web-based
- Enhance web site

Earthquake Reconnaissance

- Typically contact members in region
- Team from U.S. within 3 days to 2 weeks
- Initial observations
- Multi-disciplinary teams

Decision to send teams

- Level of damage, type of structures, other interesting lessons (lifelines, emergency response, other)
- Other considerations: opportunities for collaboration, relevance of experience to U.S.

Reconnaissance process changing

- Instant notification via internet
  - USGS listserv
- Near-real time intensity mapping
  - USGS maps; country's Seismological Service
- Global communication
  - E-mail; colleagues with many contacts

Reconnaissance process changing

- Possibilities for Collaboration
  - Agreements between EERI and other societies of Earthquake Engineering (Example: Mexico)
  - More members with international experience, language skills

Reconnaissance process changing

- More information to manage and disseminate
  - Web-based
  - CDs (linking images and text. Could add sound, video, links to background information)

Reconnaissance process changing

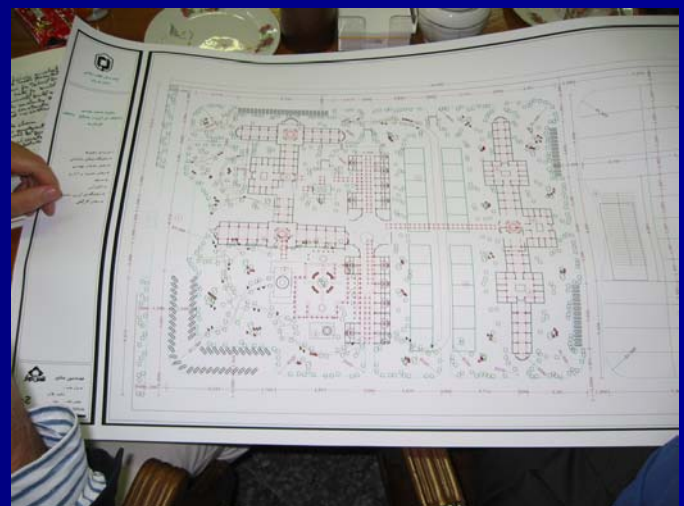
- Expanded funding required—more people, more earthquakes
- Travel easier
  - Expect to find many teams in the field (other organizations; private firms)

Working Towards Systematic Data Collection

- Big Picture
  - Action Plan for Data Collection and Management—where we want to go from here
  - Data Collection Systems using PDAs/tablet PCs
  - Remote sensing technologies
  - Virtual Clearinghouse

Information technology in data collection

- Collect observations from field in electronic format
  - Use standard forms on PDAs or computers
  - Digital photos, video, sound files (voice recordings)
  - Notes, reports, maps
- All electronic files geo-coded to a geographic point

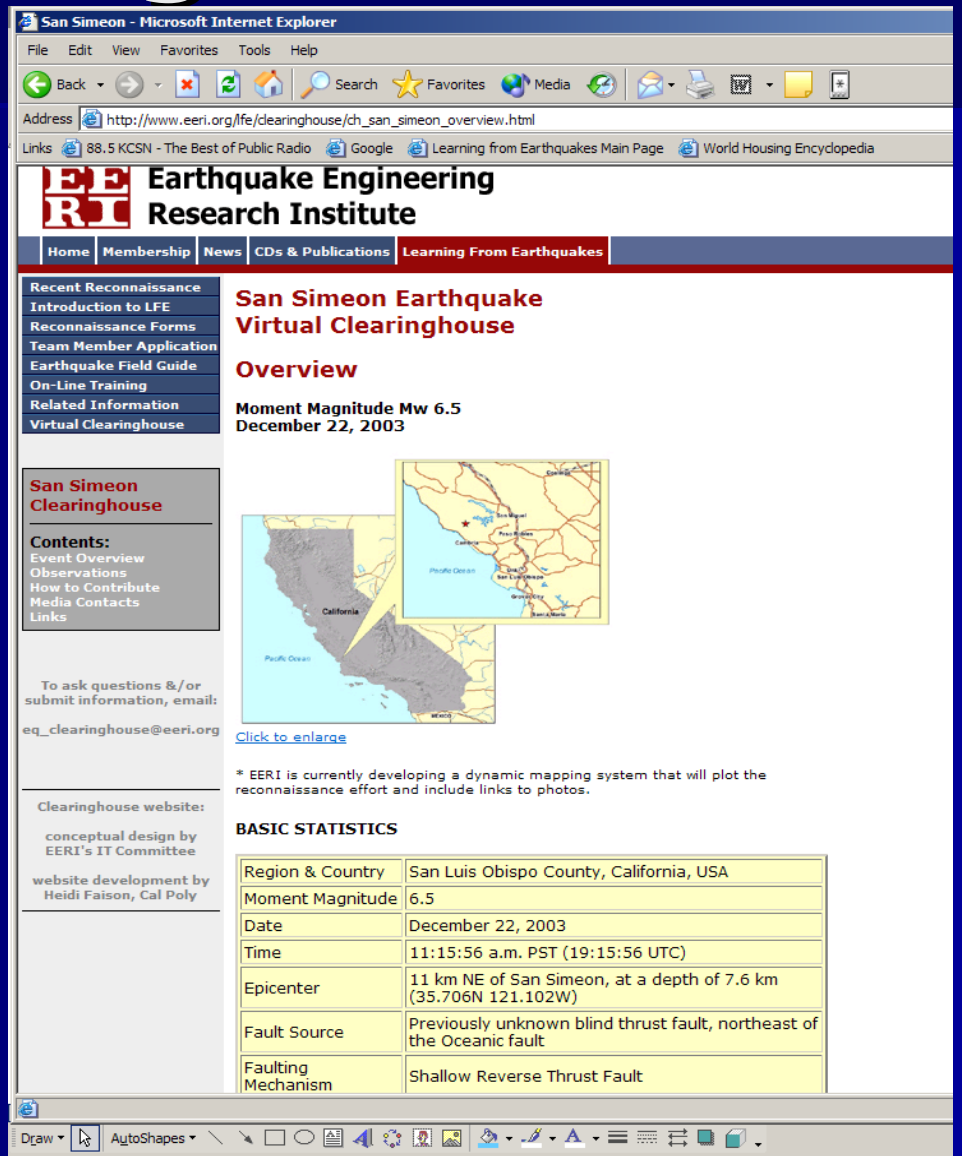


Expanded uses of IT

- GIS-based map information from standardized forms
- Indicate which geographic points also have other information available
- Information collected in central, searchable database

Virtual Clearinghouse

- EERI and USGS have clearinghouse responsibility
- Coordinating research in various disciplines
- EERI takes a lead role in international earthquake reconnaissance



Recent Reconnnaissance
Introduction to LFE
Reconnaissance Forms
Team Member Application
Earthquake Field Guide
On-Line Training
Related Information
Virtual Clearinghouse

San Simeon Clearinghouse

Contents:
Event Overview
Observations
How to Contribute
Media Contacts
Links

To ask questions &/or submit information, email:

eq_clearinghouse@eeri.org

San Simeon Earthquake Virtual Clearinghouse

Observations

The virtual clearinghouse attempts to accumulate earthquake data quickly. Therefore, the information in this clearinghouse is meant to be preliminary and reflects the authors' opinions at the time of writing, which may change over time.

Sidewalk damaged by lateral spreading, Norswing Dr., Oceano

OVERVIEW REPORTS AND PRESENTATIONS*

- EERI Preliminary Reconnaissance Report (03/04)
- Preliminary Report on the San Simeon Earthquake by Rakesh K. Goel, Cal Poly State University (12/24/04)
- Overview of Damage--Preliminary Report PowerPoint Presentation by Abe Lynn, Cal Poly State University
- San Simeon Earthquake Overview PowerPoint Presentation by Fred Turner, California Seismic Safety Commission
- CISN Earthquake Report by the California Integrated Seismic Network
- San Simeon Earthquake Reconnaissance Report for The Collaborative for Disaster Mitigaton by Guna Selvaduray and Jessica Tran, San Jose State University (12/26/03)

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Observations: Damage Data for Geosciences

INITIAL OBSERVATIONS

Geology

- Geologic Observations Report by Timothy McCrink, California Geological Survey; Lewis I. Rosenberg, San Luis Obispo County Planning and Building Department; Kevin Schmidt, U.S. Geological Survey & Jerome Treiman, California Geological Survey (07/09/04)

Geotechnical Engineering

- Geotechnical Consequences of the Mw=6.5 San Simeon Earthquake by Robb Eric S Moss, Fugro West Inc. (07/09/04)

Seismology

- Strong Ground Motion Data from the 2003 San Simeon Earthquake by Anthony Shakal and Vladimir Graizer, California Geological Survey (07/09/04)
- Report by CISN on its operation during the San Simeon Earthquake by CISN: California Integrated Seismic Network (04/05/04)

PRESENTATIONS

No data currently available.

IMAGES & MAPS

- Photo Gallery by Lew Rosenberg, County Geologist, San Luis Obispo County (1/21/04)
- Photo log by Bijan Khazai, Geotechnical Engineering, UC Berkeley
- Ground Acceleration Map created by USGS
- Map of Aftershock Epicenters created by USGS

Revising Reconnaissance Data Collection Forms

- Earth science forms
- Building forms

(available on EERI web site and in Accela system)

Building Structures--General Building Information

Event/Date: _____ Investigator: _____

Short description of observation: _____ Date of observation: _____

Location

Address Number Street (indicate street, road, avenue, lane, etc.)	Additional Address (room, suite, floor, etc.)	City	State	Zip	Country

Alternative description or name:_____

Map Reference

Latitude	Longitude	Direction	Thomas Bros. Page No.

Overall damage rating of the structure?

- ☐ None
- ☐ Slight
- ☐ Moderate
- ☐ Severe
- ☐ Collapse

Building type? (adapted from FEMA 310)

- ☐ Wood light frame
- ☐ Wood frame, commercial & industrial
- ☐ Steel moment frame
- ☐ Steel-braced frame
- ☐ Steel light frame
- ☐ Steel light frame with infill masonry shear walls
- ☐ Concrete moment resisting frame
- ☐ Concrete shear walls
- ☐ Concrete frame with infill masonry shear walls
- ☐ Precast/tilt-up concrete shear walls
- ☐ Precast concrete frame
- ☐ Reinforced masonry bearing walls
- ☐ Unreinforced masonry bearing walls
- ☐ Other _____

Building era?

- ☐ Pre-1936
- ☐ 1937-1974
- ☐ 1975-1988
- ☐ Post-1988

How accessible is the building?

- ☐ Unknown
- ☐ Full
- ☐ Limited

Building occupancy?

- ☐ Residential
- ☐ Commercial
- ☐ Industrial
- ☐ Educational
- ☐ Governmental
- ☐ Vacant
- ☐ Unknown
- ☐ Other_____

Stories above grade?

- ☐ 1-3
- ☐ 4-7
- ☐ 8-14
- ☐ 15-30
- ☐ 31-40+

Basement stories?

- ☐ 0
- ☐ 1
- ☐ 2
- ☐ 3 - 5
- ☐ 5 +

Building size?

- ☐ Small (<3,000 ft^2 and 280 m^2)
- ☐ Medium (3,000–10,000 ft^2 and 280–930 m^2)
- ☐ Large (>10,000 ft^2 and 930 m^2)

Site sloped?

- ☐ Yes

Ground Deformation Form

Event/Date: _____ **Investigator:** _____

Short description of observation: _____ **Date of observation:** _____

I. Location (please be as detailed as possible)

Descriptive: _____

Address Number Street (indicate street, road, avenue, lane, etc.)	Additional Address (room, suite, floor, etc.)	City	State	Zip	Country

Map Reference

Quad	Latitude	Longitude	Thomas Bros. Page No.	Grid	Station ID

II. General Ground Deformation:

General description: _____

Time of observation: _____

Fissures or cracks in soil or rock:
☐ None ☐ Few ☐ Many
☐ Widespread ☐ Unknown

Settlement/Vertical Displacement:
☐ Unknown ☐ Yes ☐ No

Compression Features:
☐ Unknown ☐ Yes ☐ No

Extension Features:
☐ Unknown ☐ Yes ☐ No

Horizontal Offset:
☐ Unknown ☐ Yes ☐ No

Movment at or toward a Steep Slope:
☐ Unknown ☐ Yes ☐ No

Buckled or cracked pavement/ground:
☐ Unknown ☐ Yes ☐ No

Broken Buried Utilities:
☐ Unknown ☐ Yes ☐ No

Broken, Distorted or Offset above-ground Utilities:
☐ Unknown ☐ Yes ☐ No

Foundation Damage:

Average Vertical Displacement (cm): _____

Average Horizontal Displacement
Compression (cm): _____

Average Horizontal Displacement
Extension (cm): _____

Slope Angle of Ground:
☐ Flat (< 1/2 degree)
☐ Gentle (10:1 to 4:1)
☐ Gentle/Moderate (4:1 to 2:1)
☐ Moderate (2:1 to 1:1)
☐ Moderate/Steep (1:1 to 1/2:1)
☐ Steep (> 60 degrees)

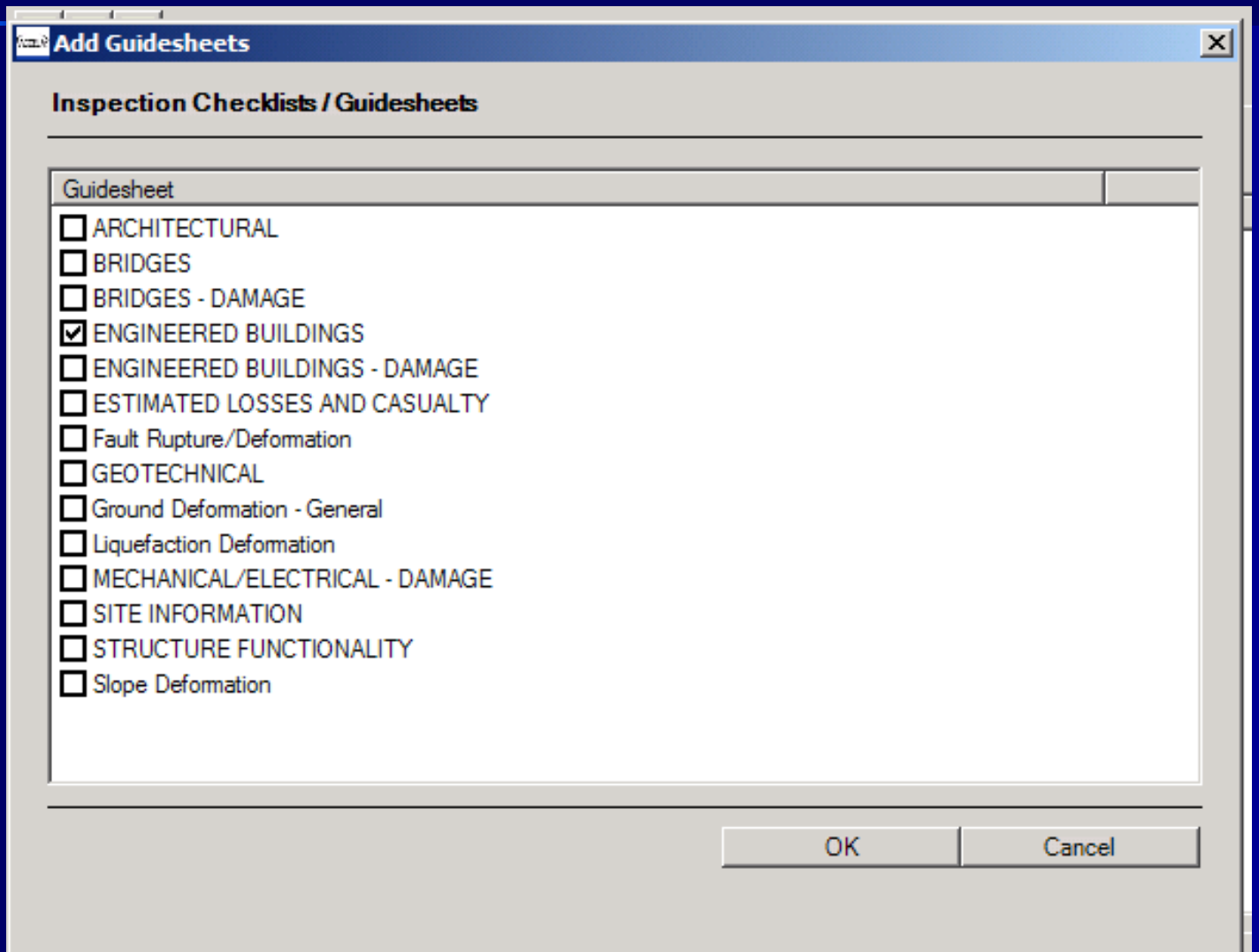
Downslope Direction:
☐ N ☐ NE ☐ E ☐ SE
☐ S ☐ SW ☐ W ☐ NW

Severity:
☐ Unknown
☐ None
☐ Low (< 1 cm)
☐ Moderate (1 cm - 10 cm)
☐ High (> 10 cm)

Electronic Data Collection

- Prototype system developed by Accela
- Data entered on iPACs or laptops

Guidesheets currently available



Upcoming Tests of System

- Parkfield
  - IT Committee volunteers
  - ImageCat's VIEWS system
- From Video
  - Geocoded footage from hurricanes in Florida
  - Footage from earthquake in India