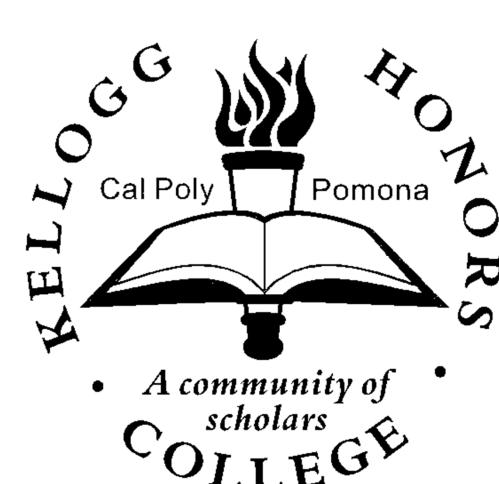
Evaluation of Buildings and Retaining Walls



Pre-Earthquake Investigations Scalpoly Eduardo Jose Vega, Civil Engineering

Kellogg Honors College Convocation 2013 Mentor: Dr. William Kitch



□ Background and Purpose □

Current Situation:

- ◆Rush to collect data after and earthquake
- ◆Lack of synchronization, collaboration, and cohesion in efforts
- Need for streamlined procedure and central database
- ◆Need for pre-earthquake references of structures of performance analyses
- ◆Lack of understanding of effects of seismic earth pressures on retaining walls

Purpose:

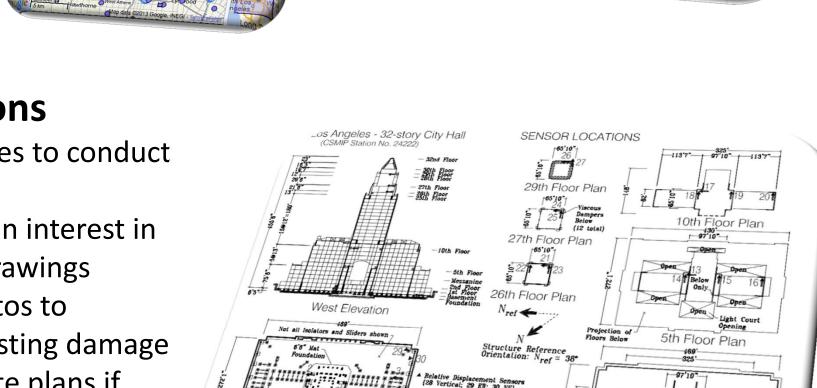
- ◆To assess current earthquake data storage system
- ◆To develop evaluation criteria and procedure for pre-earthquake investigations of buildings and retaining walls
- To conduct pre-earthquake investigations for reference for future seismiq ormance analyses





Preliminary Research

- •Literature review of current earthquake databases •Identification of structures and retaining walls of interest •Gather information on structures for evaluation
 - Location/Coordinates Building Purpose
 - •CGS Station Identification
 - Liquefaction Hazard
 - Closet Active Fault
 - Distance to Fault



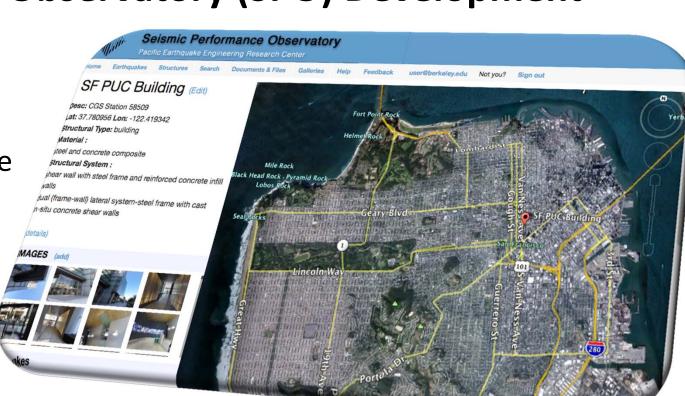
Los Angeles Police Department 3-story LAPD 911 Bidg CGS - CSMIP Station 24053 34.0517 N 118.242 W

Pre-Earthquake Investigations

- Coordinate and plan visit of structures to conduct pre-earthquake investigations •Gather materials and identify areas in interest in
- structure if possible based off plan drawings Conduct investigation by taking photos to document current conditions and existing damage Document observations and annotate plans if necessary

Data Entry + Seismic Performance Observatory (SPO) Development

- Organize photos, notes, and annotations
- Enter data into SPO
 - Create structure input Upload photos to specific structure's page
 - Attach notes to individual images
 - Classify any damage using database's taxonomy
 - •Link any earthquake data to relevant structures in preparation for any postearthquake investigations



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□ Investigations Summary □

Investigations Over Summer 2013



- 1. Great Western Savings
- 2. Berkeley Parking Structure
- 3. San Francisco PUC
- 4. Berkeley City Hall
- 5. Berkeley Police Department
- 6. Hearst Mining Building
- 7. Hayward City Hall

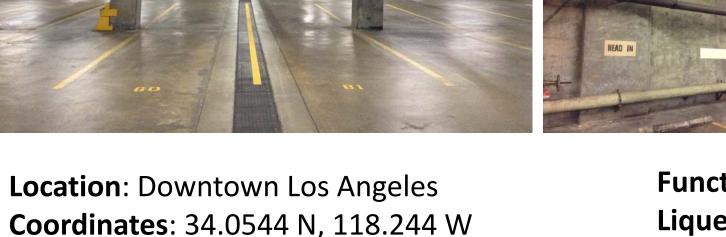
Downtown Los Angeles Courthouse Parking



Closest Active Fault: Raymond Fault

Instrumentation: None

Distance to Fault: 4.4 miles



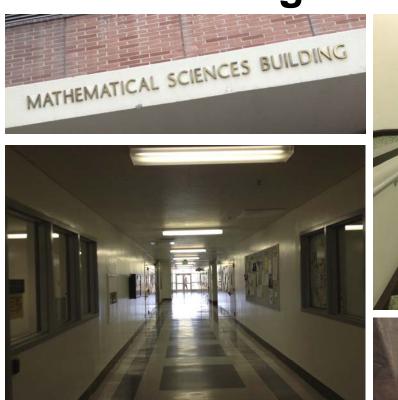


Function: Underground Parking Structure **Liquefaction Hazard**: None Material: Concrete Wall Type: Subterranean basement walls

UCLA Mathematical Sciences Building



Location: UCLA Campus, Westwood, Los Angeles **Coordinates**: 34.0694 N, 118.443 W **Instrumentation**: CGS - CSMIP Station 24231 Closest Active Fault: Rose Canyon Fault **Distance to Fault**: 1.3 miles



Function: School Building **Liquefaction Hazard**: None Material: Concrete/Steel Structural System: Moment resisting steel frame, concrete shear walls

Conclusions []

Results/Current State of SPO

- Completed pre-earthquake investigations for various buildings and retaining walls •Created reference for use in future seismic
- performance analyses
- Developed usable archive for storage and organization that will help facilitate use of data in future studies
- •SPO still in pre-beta form but still usable to those with access to the database
- •Plans to further develop SPO to be available for full academic use in progress

Future Work/Potential Use

•Pre-earthquake references can be used to better understand seismic performance of structures in the event of a significant ground motion.

•The effects of seismic earth pressures on subterranean basement walls can be better understood in future studies using the data from the investigations.

□ References □

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http://www.strongmotioncenter.org/ •Earthquake Engineering Research Institute, "Post-Earthquake Investigation Field Guide." Last modified 2010. Accessed June 27, 2012. http://www.eeri.org/site/lfe-field-

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