PEER: Transportation Systems Research Program

Spring 2011 Researcher Meeting

Meeting Goals

- Assess the status of ongoing projects
- Discuss short, medium and long-term research plan

Meeting Objectives

- Review the results of recently completed PEER projects.
- Establish the status of ongoing PEER projects.
- Introduce the new projects and let the new PIs connect with the current PIs.
- Discuss research needs and formulate a TRSP research plan.

Project Review

- Three groups:
  - Bridge structures
  - Geotech issues
  - Methodology and modeling

Bridge Structures

- High-performance bridge columns:
  - Restrepo: precast concrete dual-shell steel columns
  - Eberhard: precast bridge bents
  - Panagiotou: foundation uplift (rocking)
  - Roeder: Pile-to-Wharf connections
  - Ostertag/Billington: HPFRC
  - Ostertag: Self-compacting HPFRC

Bridge Structures

- Bridge systems:
  - Mahin: seismically isolated modular bridges
  - Stojadinovic: seismic ABC

Geotech Issues

- Boulanger: soil lateral spreading effect on bridges
- Elgamal: mitigation of lateral spreading
- Brandenberg: simulation of global bridge response with lateral spreading

Geotech Issues/Methodology

- Ground motions:
  - Baker: GM studies for transportation systems
  - Stewart: GM studies for PBEE analyses

Methodology and Modeling

- Mosalam: 3D confinement of circular bridge columns
- Der Kiureghian: stochastic near- and far-field gms for PBEE
- Der Kiureghian: Bayesian framework for PBEE of transportation systems
- Taciroglu: Skewed bridges

Last RFP

- GM studies
- Ground deformations
- Underground construction
- Learning from past earthquakes
- Resilient bridge columns
- Next-Generation bridge systems
- Methodology

New Projects

- Learning from earthquakes:
  - Brandenberg: liquefaction and lateral spreading effect on bridges (Baja California)
  - Bray: liquefaction induced damage (Chile)
- Geotech issues:
  - Underground construction (Kramer)

New projects

- Bridge systems/columns:
  - Stanton: pre-tensioned bridge columns with HPFRC
- Methodology:
  - Deierlein: effect of long-duration motions on structural performance
  - Der Kiureghian: synthetic near-fault gms

Research Needs

- Given where we are now, what are the research needs to be met:
  - In the next 1-2 years:
    - Next RFP
  - In the next 3-5 years
    - Persistent research themes in the RFP
  - In the next 5-10 years
    - Strategic research directions for maximum impact on bridge construction

Meeting Organization

- General session:
  - Ground motions selection and scaling
- Breakouts:
  - Bridge structures (hp columns)
  - Geotech
  - Methodology and Modeling
- Breakout review
- Discussion: research needs
- Coordination with other PEER/Caltrans work

Thank you!

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