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!

Bozidar Stojadinovic: boza@ce.berkeley.edu