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REHABILITATION OF EMBANKMENT DAMS AND FOUNDATIONS



US Army Corps
of Engineers

EQEN II WORKSHOP

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Goals

- Improve *site characterization* techniques
- Better define guidance for earthquake *ground motions*
- Evaluation of *remediation* techniques
- Technology transfer
 - Develop lessons learned database
 - Leverage with other agencies
- Develop performance based criteria for tolerable damage and acceptable risk



Desired Products

Site Characterization

- Modernize penetration tests
 - automatic recording of delivered energy
 - energy and force measurement at the sampler
- Better correlation of SPT, CPT, BPT, LPT, Vs data
- Improve lab capability for special tests
- Correlation between laboratory and insitu measurements
- Evaluation of non-destructive geophysical methods and ability to determine liquefaction

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Desired Products

Site Characterization (cont.)

- **Effect of high confining stress and sloping ground on liquefaction potential and strength loss for all soils**
- **Validation of the Chinese criteria**
- **Refine post earthquake shear strength evaluation for all soils**
- **Correlations between CPT and post earthquake strengths**
- **Develop correlation between strength and earthquake parameters**

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Desired Products

Ground Motions

- Earthquake ground motion analysis and design systems, study must be completed & maintained (EQAS) H
- Method to evaluate lateral forces and displacements of retaining walls due to large peak accelerations H
- More information on latest seismological factors such as fling and directivity M
- Unification of ground motion requirements from geotechnical and structural point of view H
- Access to software for conducting PSHA including deaggragation M



Desired Products

Remediation

- Screening tool for seismic risk analysis
- Access various existing models for deformation analysis to compare results
- Develop a new constitutive model for soil behavior WRT deformation analysis
- Access various remedial measures WRT cost and effectiveness
 - Tie in with case histories

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Desired Products

Remediation (cont'd)

- Develop guide specifications for ground improvement techniques
- Need more cost effective techniques for ground improvement
 - Test the above techniques
- Think globally when looking for ideas
- Guidelines for post construction evaluation
- Policy requirement to have design engineer onsite during remediation Screening tool for seismic risk analysis

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Desired Products

Miscellaneous

- System wide evaluation of remediation activities
- Cross agency training courses and funding



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OBSTACLES

Funding

why, earthquakes are rare

increase awareness

show impacts

make directive

more education and involvement in O&M's budget

be persistent

lobby congressman

inform locals

seek other funding

