Computational Workflow for Geotechnical Modeling

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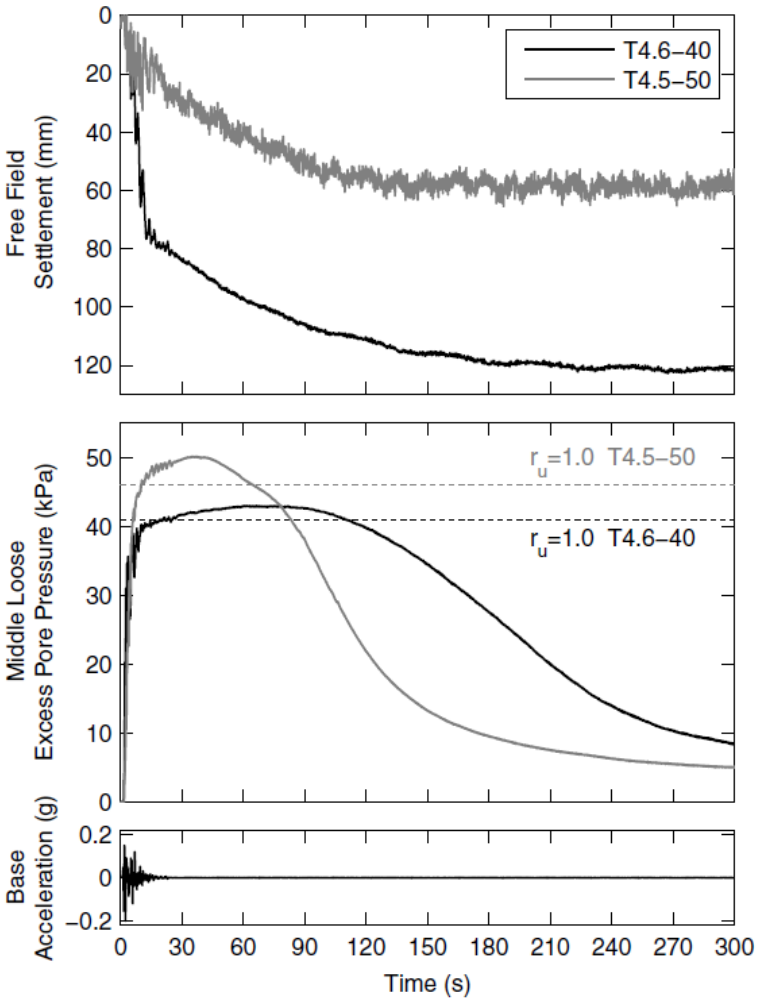
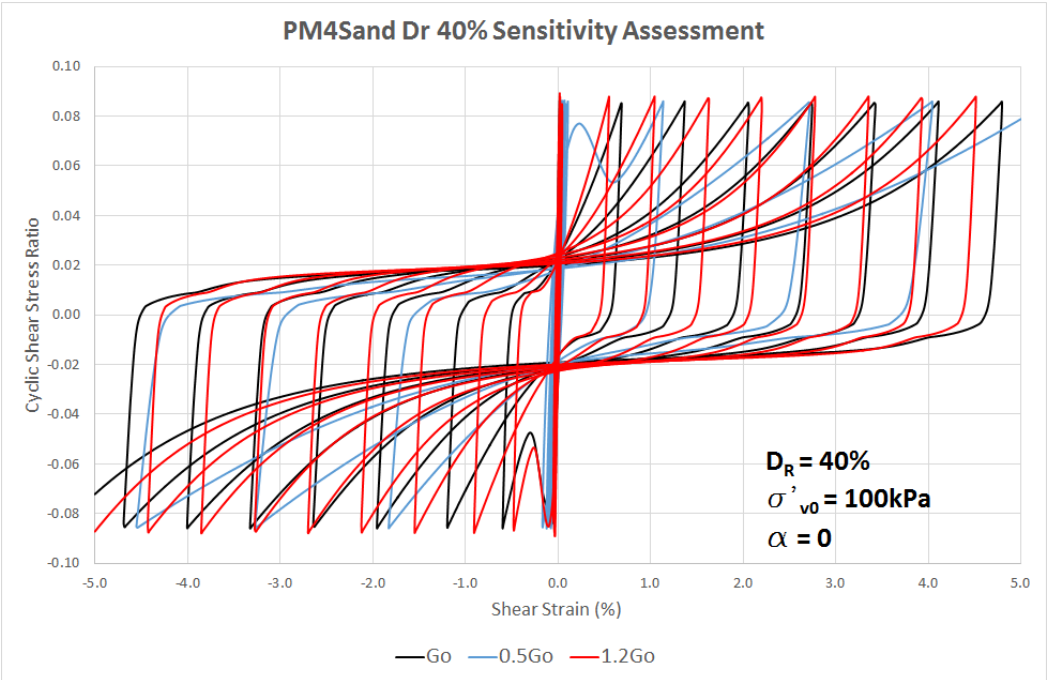
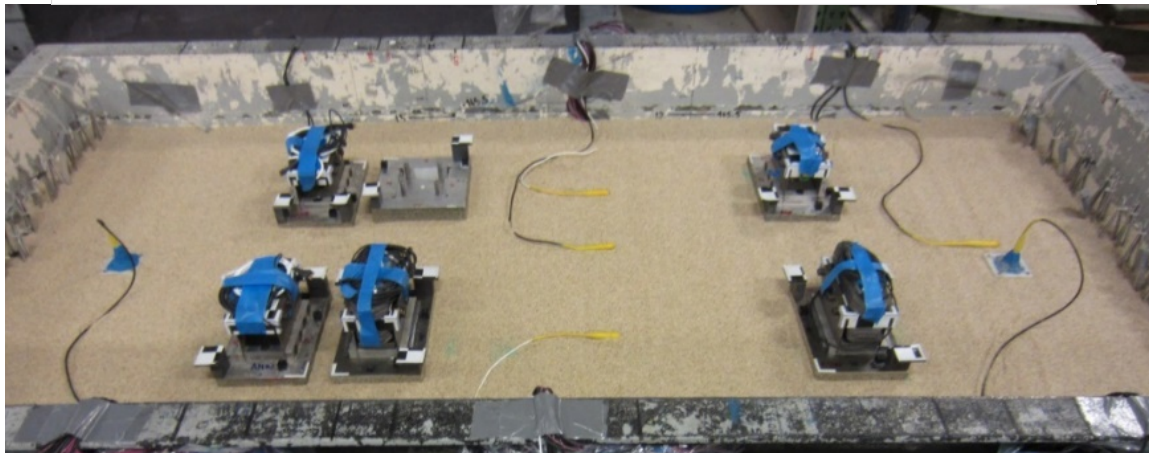
Examples: Validation of Liquefaction Models

- Several Projects



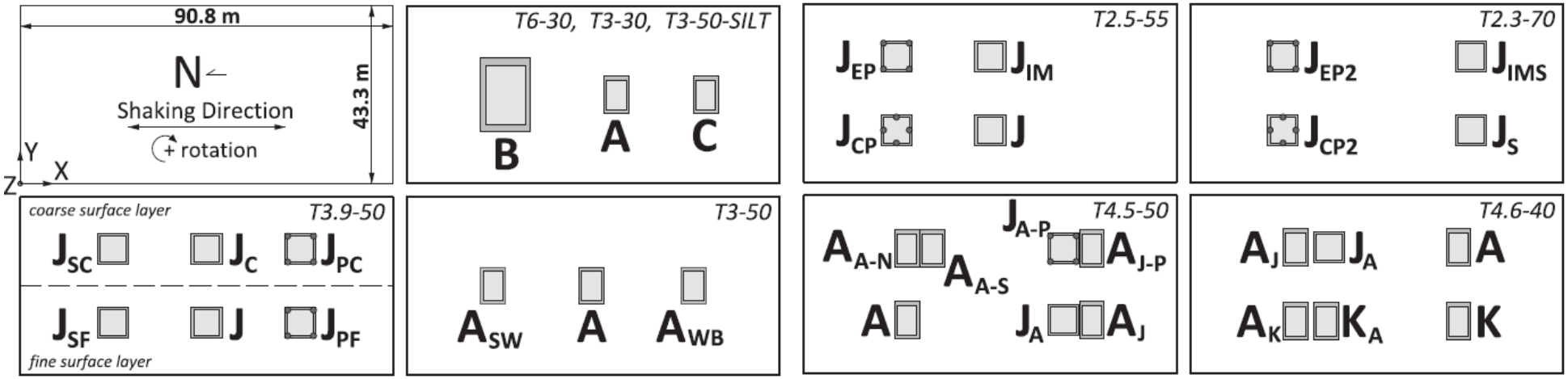




Data Availability

- Data from many centrifuge tests publically available
  - DesignSafe

- Allmond et al. (2015) example of compiling multiple (9) centrifuge tests by different investigators into common easy to use format
  - https://datacenterhub.org/resources/269



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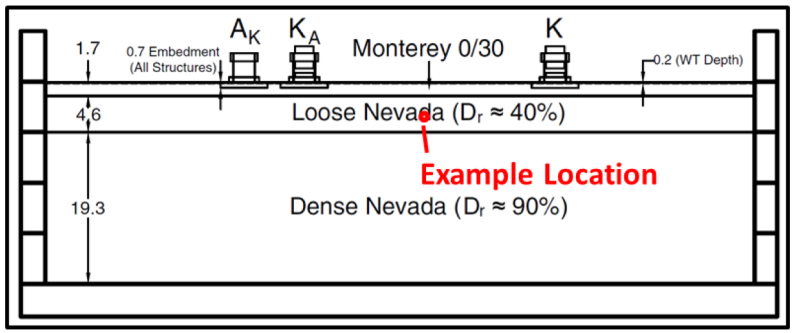
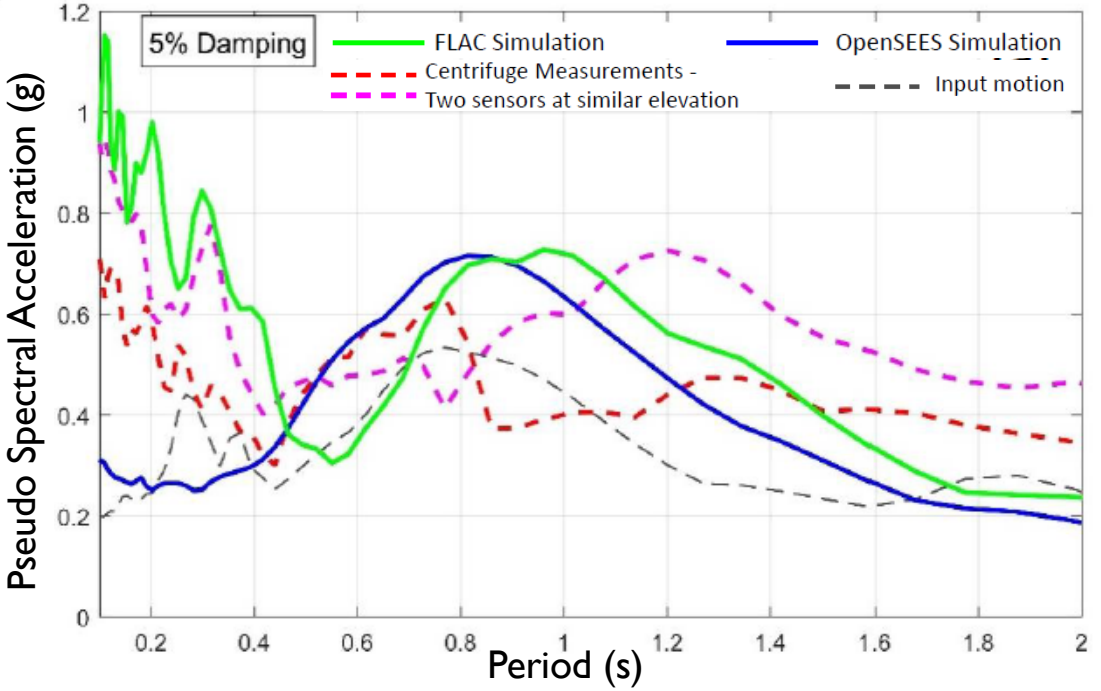
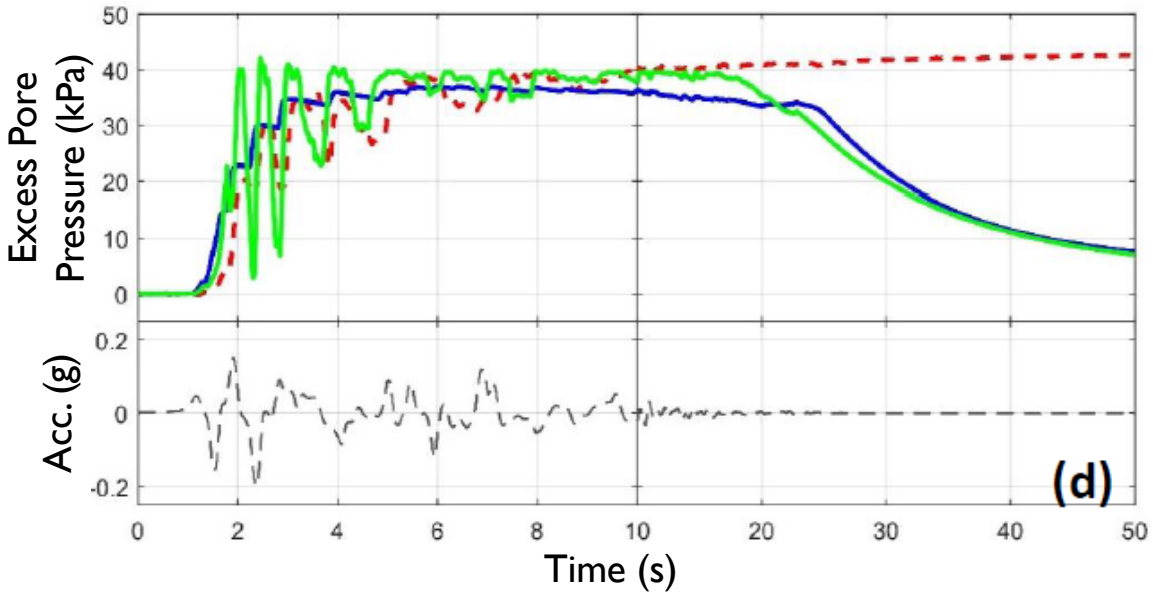
Validation of SFSI and liquefaction numerical simulations using centrifuge data

A. Balachandra, C. Hayden, C. McGann, L. Wotherspoon

- FLAC using PM4Sand constitutive model (Ver 3)
- OpenSEES using PDMY02 constitutive model







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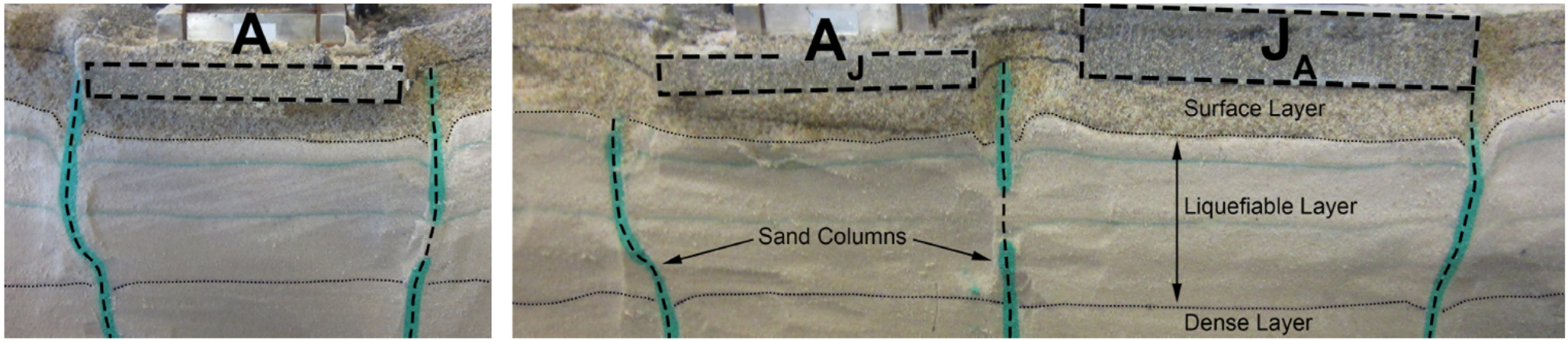
New Zealand Tools and Procedures for Seismic Effective Stress Analysis

- QuakeCoRE FP2
- Identify NZ-related numerical studies to enhance integration across different related efforts.
- Validation and verification of constitutive model in OpenSees and FLAC.
- Benchmarking of liquefaction constitutive model(s) through participation in 2019 LEAP round
- Summary report of NZ-specific advanced computational tool(s) for site response and soil-structure interaction.

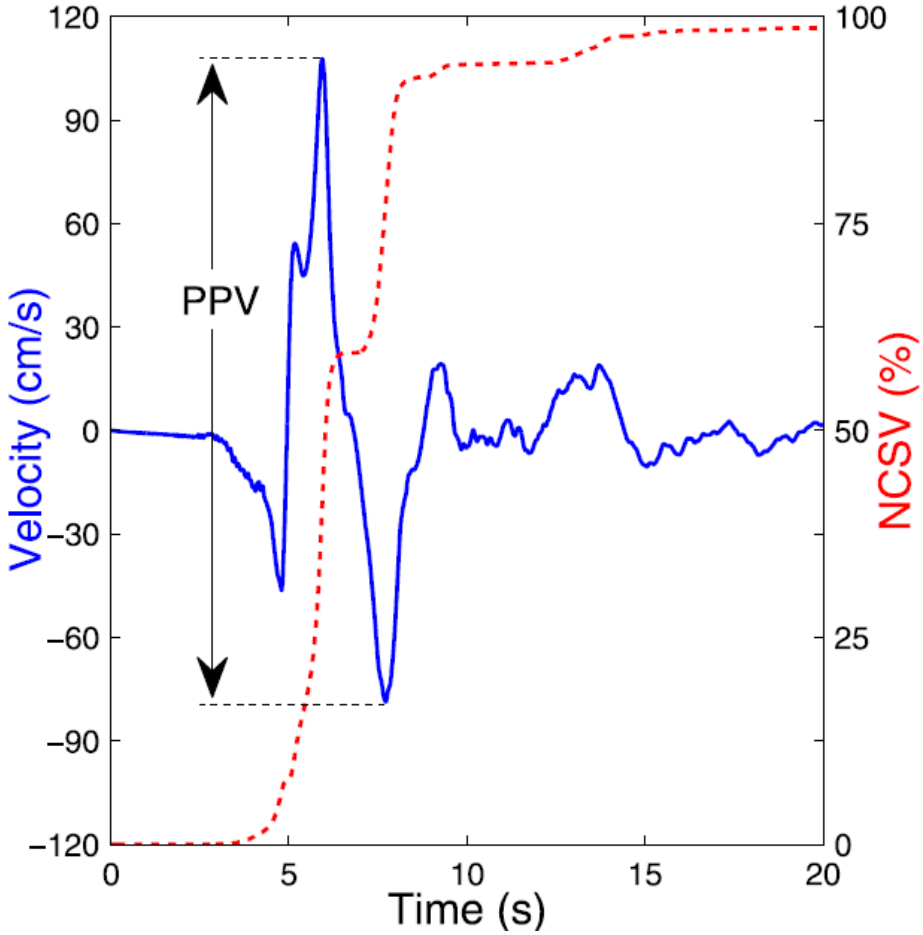
Numerical Modelling of SSSI Validated against Centrifuge Experiments

- Validate SSSI numerical models against centrifuge tests involving liquefaction.
- Perform sensitivity analyses of parameters for adjacent structures, input ground motions, and soil profiles.
- Develop more comprehensive and robust conclusions on liquefaction-induced SSSI effects.



Ground Motion Selection for Geotechnical Systems

- Explore the impacts of ground motions selection methods on geotechnical systems through numerical modelling.
- Pulse and non-pulse motions, effect of spectral matching
- Simulated vs. recorded



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Thank You