

Liquefaction Evaluation Methods

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Contributors

- US Participants
 - Virginia Tech: Russell Green and Brett Maurer
 - University of Texas: Brady Cox
 - University of Arkansas: Clint Wood
 - UC Berkeley: Jon Bray, et al.
 - Cornell University: Thomas O'Rourke, et al.
- NZ Participants
 - University of Canterbury: Misko Cubrinovski, Brendon Bradley, Sarah Bastin, et al.
 - University of Auckland: Liam Wotherspoon, et al.
 - Tonkin and Taylor: Sjoerd van Ballegooy, Mike Jacka, et al.
- Funding: NSF, GEER, USGS, EQC, University of Canterbury, University of Auckland, Virginia Tech ...

Objectives

- To use liquefaction data from the 2010-2011 Canterbury Earthquake Sequence (and the 14 Feb 2016 earthquake) to evaluate the efficacy of liquefaction triggering evaluation procedures
 - CPT-based procedures
 - Robertson & Wride (1998); Moss et al. (2006); Idriss & Boulanger (2008); Boulanger & Idriss (2014)
 - Vs-based procedures
 - Andrus & Stokoe (2000); Kayen et al. (2013)
 - Liquefaction Damage Index Frameworks
 - Liquefaction Potential Index (LPI); Liquefaction Severity Number (LSN); Ishihara LPI (LPI_{ISH})

Status

- Select case histories were used and Receiver Operator Characteristic (ROC) analyses performed within the damage index frameworks of large datasets from the 2010 M_w 7.1 Darfield and 2011 M_w 6.2 Christchurch earthquakes to evaluate efficacy of:
 - CPT-based procedures
 - Robertson & Wride (1998); Moss et al. (2006); Idriss & Boulanger (2008)
 - Vs-based procedures
 - Andrus & Stokoe (2000); Kayen et al. (2013)
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Future Work

- Process data from 2016 M_w 5.7 Valentine's Day earthquake and repeat analyses, to include the assessment of the Boulanger & Idriss (2014) CPT-based liquefaction triggering evaluation procedure
- Perform geoslicing at sites where severity of liquefaction was excessively over-predicted during the CES
- Develop revised liquefaction evaluation procedure and damage index framework

Thank You

Questions???