LIQUEFACTION TRIGGERING AND EFFECTS AT SILTY SOIL SITES
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Overview
• Several sites that CPT methods indicate should have liquefied did not exhibit manifestations of liquefaction during the Christchurch, NZ earthquakes.
• Those sites are mostly underlain by stratified deposit of silty soils.

Goals
• Identify characteristics of 55 sites in Christchurch that did or did not manifest liquefaction.
• Recommend adjustments to state-of-art liquefaction triggering procedures for silty soil sites.

Avondale Site
• Thick, hydraulically connected critical zone of clean sand.
• High LPI → Severe manifestation of liquefaction.

Gainsborough Site
• Highly stratified deposits of silty soil; discontinuous critical layers; thick critical zone absent.
• High LPI → Yet no manifestation of liquefaction.

Scope and Future Plan
• Investigate the geologic characteristics of silty soil sites that did not manifest liquefaction.
• Evaluate the soil-water response of stratified silty soil deposits through a nonlinear effective stress analysis using PM4Sand within OPENSEES.
• Propose new design guidelines.

Preliminary Findings
• Simplified triggering procedures can overestimate the hazard due to their incapability to assess the interaction between different critical layers.
• Continuity of critical layer plays an important role to initiate upward flow of water from a higher to lower state of excess pore water pressure.

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