

What is blast-induced liquefaction testing?

Blast-induced liquefaction testing was used in the Ground Improvement Science Trials. The method involves detonating explosive charges in the ground to liquefy the surrounding soils.

Why undertake blast-induced liquefaction testing?

The blast-induced liquefaction testing was used to assess whether the shallow ground improvement methods being trialled were providing a suitable level of ground performance, to test whether the methods could reduce the effects of differential ground surface subsidence as a result of liquefaction occurring in the underlying soils.

How does blast-induced liquefaction testing work?

The method involves installing explosives at multiple depths in the ground below the constructed ground improvement test areas. Concrete blocks are put on the ground above to simulate the load that a house applies to the ground surface. The explosives are then detonated in a defined sequence to induce liquefaction of the soils beneath the ground improvement test areas.

How is blast-induced liquefaction testing useful?

The blast-induced liquefaction testing is capable of liquefying the soils to depths of approximately 10m - 12m beneath the ground improvement test areas (equivalent to the depth and extent of liquefaction caused by a large earthquake). Following liquefaction of the underlying soils, the soil structure consolidates into a denser arrangement, causing the ground to subside and water and sand to come to the surface. Because soil layers in the ground are not uniform, and because liquefaction can result in the ejection of soils to the surface, often the ground will subside unevenly causing undulations, tilting and distortions. It is these changes in the ground surface that cause a lot of the earthquake damage to house and foundations.

Prior to and following the blast testing, the ground improvement test areas were surveyed using a variety of high-precision techniques. The surveying was repeated after the blast test. This allowed the researchers to measure how well the ground had performed with different types of ground improvement methods. Test panels with no ground improvement were also tested to compare improved ground with non-improved ground. Ground improvement methods that work well result in a low level of uneven ground surface subsidence.



Ground improvement testing area ready for blasting

Blast-induced liquefaction testing assessed whether ground improvements reduced uneven ground surface subsidence

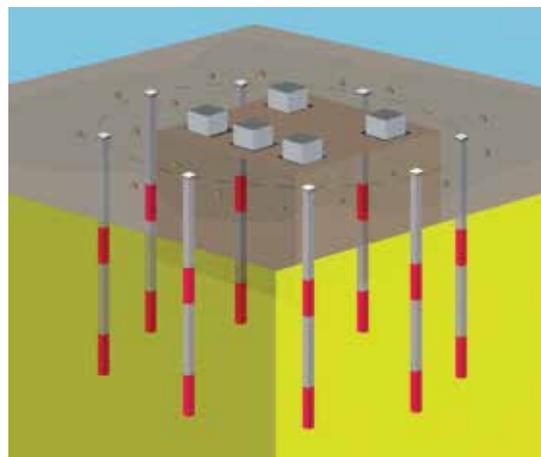


Diagram showing explosive charges (red) at multiple depths below the area of ground improvement