Blast induced liquefaction testing has been recognized as a useful in-situ soil liquefaction testing and a soil compaction technique since blast techniques has been employed over fifty years in geotechnical engineering fields. However, predicting pore water pressure is still difficult because the mechanism is not fully understood. The objectives of this research is to model the small size blast testing and to measure stress-strain behavior of sand under blast load propagations with considering the effect of confining stress and relative density on pore water pressure response and corresponding soil deformations.

In order to model explosives and soils in small scale size, the soil element that mimics an in-situ soil condition under propagation of blast loads was set up using the transparent cylinder and the small charge of primers with loose-dense saturated sand. 209 and M209 primers were used as a small charge explosive and were placed on the bottom of the cylinder. The high frequency piezometers and accelerometers were placed inside of the specimen to measure stress and strain of soil elements. All procedures to ignite primers were followed to SAAMI recommendations.

The results showed that increasing of relative density and confining stress decreased the peak and residual pore water pressure. This clearly indicates that both factor is critical on the contract-dilatant behavior of sands under blast load propagations. In addition, the acceleration records showed that the soil and pore water were mainly vibrated by only compressive waves, not shear waves, which indicates that the mechanism of blast induced liquefaction is different from the one of earthquake induced liquefaction.