

12,000 Gallon Underground Storage Tank Failure Investigation Finds Testing Company Responsible

Location: Atlanta, Georgia

Client: Transportation Company

Contract Amount: \$47,000

PROBLEM

A transportation company engaged a tank vacuum testing company to comply with the UST integrity testing requirements. During the test a loud *pinging noise* was observed. A second vacuum tank testing company was engaged and applied 0.84 inches of Hg vacuum and reported that the tank was tight. Remtech was engaged to determine if the tank had been damaged during testing by the initial testing company.

SOLUTION

Remtech exhumed the underground storage tank by vacuuming the tank pit overburden and gravel backfill with a vacuum truck. The tank bottom collapse signature was 30 ft long, 55 inches in width with a vertical deflection of 5.5 inches. The collapse signature mirrored a single-lobe tank buckle shape referenced in UST publications prepared for the Steel Tank Institute.

The interior of the tank was cleaned off and ground down at test points. Tank shell thicknesses were recorded with a Panametrics NDT 37 DL Plus with a Single Element Transducer and Ultragel II couplant. The original testing company's vacuum testing equipment had a vacuum relief setting of 5.5 psi and allowed a maximum vacuum pressure of 4 psi.

Remtech used the Roark Equation that predicted a collapse vacuum for this tank of - 2.729 psi (specified by Underwriters Laboratory Standards UL 58 and UL 1746). Recognized industry potential collapse pressures (range from -1.16 psi to <-3 psi).

Remtech conducted simulated vacuum failure demonstrations that mirrored tank collapse signatures referenced by the Steel Tank Institute, Underwriters Laboratory, and the actual tank collapse.

Flexure of UST tank shells weakens the steel and contributes to premature failure. Remtech prepared a root cause engineering report that concluded that the vacuum testing was responsible for the tank failure.

COST/BENEFITS

The vacuum tank testing company was using maximum vacuum of 4 psi that exceeds the predicted failure vacuum of this tank. The testing company reimbursed the transportation company for re-installation of a new tank, pump island and dispensers.



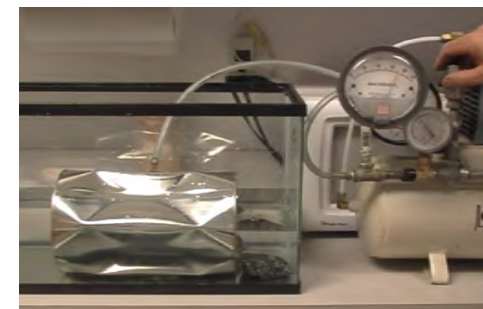
UST Exhumation with Vacuum Truck



Single-Lobe Tank Failure on UST Bottom



Single-Lobe Tank Failure Inside Tank & Tank Shell Thickness Testing



Remtech Bench-Scale Simulated Tank Failure