A diverse range of case histories and new developments is reviewed in ES&E’s semi-annual look at tanks, containment systems and spill management.

The importance of safety and design for fuel tanks

Natural disasters, acts of vandalism and terrorism, fires and explosions are all major concerns for building and facility owners storing fuel on site.

For above ground storage tanks, the Underwriters Laboratory (UL) 2085 listing has long been recognized as the “gold standard” for design safety. UL 2085-listed tanks provide fire protection (they have been fire tested at 2000 degrees for two hours), secondary containment, and protection from vehicle and projectile impact. But are the performance standards in this listing an adequate benchmark for what may happen in the real world?

Two recent incidents highlight the importance of having added protection and security. Both events took place at Department of Homeland Security facilities in the US. In each case a ConVault tank helped guard against catastrophic losses of property or life.

Tank explosion at US border patrol

New Mexico has seen three recent explosions within fuel tanks involving low sulfur diesel fuel. On June 28, 2010, a static spark produced an internal explosion within a 6,000 gallon ConVault tank containing low sulfur diesel fuel at the US Border Patrol in Santa Teresa, New Mexico. Two people were close to the tank, one sustained very minor injuries and the other person was not injured at all.

Fire destroys US Coast Guard boathouse

In July 2010, a huge fire completely destroyed a pier, boats, a service truck and a US Coast Guard boathouse at Menemsha Harbor on Martha’s Vineyard. The fire was only a few feet away from the marina fueling system, which included 500 and 1,000 gallon ConVault tanks. The thermal protection of the concrete as well as the shutoff and fusible link valve prevented this fire from becoming an even larger catastrophe.

Additional testing

ConVault ASTs carry the UL 2085 label but they step beyond the UL 2085 industry standard by offering added protection and performance verified by third party testing. They are designed with six inches of reinforced concrete protecting both the primary and secondary containment. In addition, they are designed with reinforcing rebar surrounding both the primary and secondary containment.
Blast effects analysis

ConVault tanks have also been the subject of a Blast Effects Analysis designed to determine the inherent blast resistance of the tank design.

Karagozian & Case conducted this analysis in which three different threat scenarios were investigated to determine the inherent blast resistance of the tanks. Scenarios were chosen to reflect blast safety distances recommended in FEMA’s Reference Manual to Mitigate Potential Terrorist Attacks against Buildings.

The scenarios investigated were: a) a blast from a vapor cloud such as might accumulate at a refinery; b) a blast from 50 lbs of High Explosive (HE) TNT as might be carried by a typical suicide bomber; and c) a blast from 500 lbs of High Explosive (HE) TNT representing a typical car bomb.

The tank passed all three tests. Overall, the Blast Effects Analysis indicated that the ConVault AST is very resistant to the effects of the blast loads considered. The reinforced concrete vault is a key design feature. The mass provided by the concrete outer shell protects the steel tank and greatly enhances the resistance to all blasts.

For more information, contact info@core-es.com
World Trade Center contractors switch tanks to avoid fuel spills

When Hank Berberat arrives at a typical construction site, he doesn’t usually find bystanders trying to enter the gates right behind him, to sneak a peek at what’s going on inside. But when the construction project in question is New York City’s World Trade Center (WTC) Memorial, it’s understandable that the general public may have an above-average level of curiosity.

The process of fueling excavators, dozers, and other construction vehicles at the WTC Memorial site is not as simple as driving up to a pump at the local gas station, as many of these machines are performing excavation and foundation work in a hole 85 feet deep. These logistics leave only one viable option for equipment fueling — using cranes to lower fuel tanks from grade level down to the bottom of the hole.

Traditional diesel storage tanks are not designed to be moved while full of fuel. As a result, many contractors will hire local welding shops, or bring in their own fabricators to modify the tanks with eye hooks, or other features to modify the tanks with eye hooks, or other features. Featuring internal baffling to minimize fuel surge while in transit, Transcube tanks are UL 142-approved and compliant with US Department of Transportation (DOT) standards for road transport of diesel fuel. The units are designed around the concept of preventing any fuel spillage or leakage, and are built with an inner tank completely enclosed within an outer wall structure that provides 110% secondary containment.

“Being able to transport a container while it still has fuel in it is a significant advantage,” said Berberat. “Standard tanks have to be emptied, but sometimes even with good planning there’s fuel left over. In one instance a local fuel company was delivering one of my rental Transcubes full of diesel to a jobsite every day. Because of site constraints and safety concerns, the contractors did not want the tank sitting there while they worked, so the fuel company immediately took it off site after it had fueled the equipment. The Transcube made that arrangement possible.”

As the name implies, Transcube tanks are rectangular in shape, like a box. This shape allows them to be stacked on top of one another to save space in rental yards or cramped jobsites.