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The Editors of Tank Talk added a short feature article recently and will continue providing a, "Tank Talk Spotlight on Safety." Please write to info@steeltank.com if you have a topic that may be appropriate for industry readers.

The article below is devoted to the nation's infrastructure, a topic with references so vast that they are difficult to quantify or imagine, so please consider these fast facts:

Size: U.S. drinking water infrastructure (pipelines and aqueducts) comprise a grid of about 1 million miles. That is enough to circle the globe 40 times.

Leaks result in the loss of an estimated 7 billion gallons of clean drinking water daily.

Uptick in Infrastructure Failures Symptomatic of Age & Use

A number of water main ruptures have occurred in the past few months, and two of the largest were reported in Los Angeles and the Baltimore suburb of Dundalk, MD.

City engineers in Los Angeles are stumped by the cause of multiple failures over the last three months. The reason? They have not found a commonality among the incidents.

What is unusual is the increase in what are termed "major blowouts" in which pavement ruptures and the ensuing leaks cause problems and considerable damage. Two such blowouts occurred less than 72 hours apart in L.A. in September. The first sent water and mud shooting 10 feet into the air and nearby streets. The second created a sinkhole that nearly swallowed a fire truck when it responded to the scene.

A third blowout occurred in Los Angeles in November that caused a three-story geyser to erupt in the intersection of Van Nuys Blvd. and Sherman Way.

The unique aqueduct water distribution system that serves L.A. was completed in 1913. It remains an engineering marvel to some; however, time and extraordinary economic and geographic expansion are contributing to a growing number of multiple failures in the system.

ACT-100 Tanks Help Modernize Chicago's O'Hare International Airport

Long-time STI/SPFA member, Modern Welding Co., recently provided four 50,000 gallon, double wall ACT-100 tanks as part of an $8 billion expansion project at O'Hare International Airport in Chicago. The

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INDUSTRY EVENTS FIRST QTR. 2010

JAN 13 - 14
Marco Island, FL
SWPMTAC

JAN 30 - FEB 1 CA
STI/SPFA Annual Winter Meeting

FEB 7 - 10
Grapevine, TX
National Biodiesel Conference & Expo

ACT-100 steel/FRP composite tanks combine the structural integrity of a steel tank with a 100-mil fiberglass outer coating for long-lasting corrosion protection.

Produced at Modern's Owensboro, KY plant, the tanks measured 60 ft. long, were 12 ft. in diameter and weighed approximately 70,000 pounds (FIGURES 1 and 2, at right below).

The jet fuel storage tanks will be part of the cargo fuel system operation. In addition to these tanks, installed over a two-day period in October, Modern also provided an oil water separator tank system as part of the airport expansion project. Estimated to cost in excess of $15 billion, O'Hare projects the 10-year revitalization project will be completed in 2015.

The O'Hare project also calls for the reconstruction of the outdated runway system that is to be reconfigured similarly to that of the Dallas-Fort Worth, TX airport. According to published reports, the new layout is expected to cut delays at this major Midwest hub by 79 percent.

Two-Hour Fire Protected Fireguard Tank

Nearly twenty years ago, the Uniform Fire Code first introduced the concept of an aboveground shop-fabricated "protected" storage tank. The protected tank had to be performance tested at 2000 degrees Fahrenheit, with a minimal temperature increase within the tank during the test.

The purpose of the test was to safely assimilate an underground storage tank environment with aboveground tank installations that dispense motor vehicle fuels.

Third-party test laboratories followed with the development of construction standards, such as Underwriters Laboratories UL 2085.

Fire codes limited tank capacities to 12,000 gallons for storage and dispensing of gasoline and diesel at retail service stations. However, capacities of up to 20,000 gallons could dispense diesel fuel into motorized vehicles at fleet operations.

Steel Tank Institute developed the Fireguard tank in 1994 and has accumulated interesting statistics. Here is a sampling of STI's findings about users and facts that demonstrate that tanks have doubled in average size since then.

First, 15 percent of all Fireguard tanks are 12,000 gallons or larger. Second, government agencies have purchased Fireguard tanks as large as 50,000 gallons and such agencies purchase over 25 percent *of all Fireguard tanks*.

In addition, hospitals, schools and other institutions account for 10 percent of installations. Fuel for back-up power generation is a common Fireguard tank installation required or specified by hospitals and utility companies. Further, airports and marinas incorporate many UL 2085 tank installations, and over 50 percent of installed Fireguard tanks at airports are 10,000 gallon capacity or greater.

Interestingly, retail service stations open to the public, while perhaps the most visible Fireguard installations, constitute less than three percent of Fireguard installations, but 40 percent of these tanks are 10,000 gallons or larger.

FEB 15 - 17
Orlando, FL
National Ethanol Conference

FEB 16 - 18
Las Vegas, NV
WPMA Convention and C-Store Expo

MAR 8 - 10
Houston, TX
Introduction to ASME Section VIII Division 1 Pressure Vessel Code

MAR 14 - 18
San Antonio, TX
NACE International Corrosion Conference & Exposition

STI/SPFA EVENTS

MAR 29 - APR 2
Chicago, IL
STI SP001 Aboveground Tank System Inspector Training

PLEASE BE SURE TO VISIT
the **Publications Page** to view past issues of Tank Talk.

Industry Calendar

STI/SPFA Programs & Educational Events

O'Hare Int'l. Installs Four ACT-100 Tanks

FIGURE 1

Photo Credits Beth Jordan

FIGURE 2

Cargo Fuel System Replacement

October '09 Refinery Fire & Blast near San Juan Under Investigation by Chemical Safety Board

The U.S. Chemical Safety Board (CSB) announced that it will conduct a full investigation of the October 23 explosion and fire at Caribbean Petroleum Refining near San Juan, Puerto Rico (Click here for photos). A large vapor cloud ignited at the refinery and caused a blast that damaged homes and businesses over a mile away.

At the time of the incident, a tank was being filled with gasoline from a ship docked in San Juan Harbor. One possible cause under investigation is a release due to accidental overfilling of the tank. Employees at the facility did not know that the onsite, computerized, level monitoring system was not fully operational and were unaware of the impending emergency or the need to take preventative action. Gasoline spilled from the tank without detection.

On October 29, another major terminal tank fire occurred in Jaipur, India. The fire broke out when petroleum was transferred from the depot to a pipeline where a suspected leak may have caused the release. Twelve large tanks caught fire; many largely separated.

Close to a half million people had to be evacuated from the area and over twelve casualties were reported along with 150 injuries. It took more than 90 hours for the fire that resulted in $65 million in property damage and the loss of eight million liters of product to extinguish itself. A video and photos of the Jaipur terminal fire can viewed here.

In addition, the industry continues to react to a major terminal fire in Buncefield, U.K. in December 2005. A recent YouTube video provides an interesting theory about how local vegetation may have played a role in that major incident that is still garnering attention after four years.

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Uses For a Tank, *Who Knew?*

A talented engineer and super sleuth on STI/SPFA's staff sent a link to colleagues recently that captured their attention and gave new meaning to, "**USES FOR A TANK**," the subject of her email message.

Later, with a little more digging, another staffer located the individual behind the link (link shown below) and the website of a resourceful, talented sculptor named Cal Lane in upstate New York. The artist's self-description on the website that showcases extraordinary metalwork reads, in part:

I like to work as a visual devil's advocate, using contradiction as a vehicle for finding my way to an empathetic image, an image of opposition ... Fine, like tattered paper, the jagged edge of the thin metal becomes both an ancient and contemporary image, thereby appealing to both those who cling to history, and those who ignore it.

Next on tap for Cal Lane, former Professor of Sculpture at SUNY, Purchase, NY, is the "Montenegro Project" that involves cutting into a 62 foot submarine in Tivat, Montenegro. **Don't miss this slide show!**

SPOTLIGHT ON SAFETY

The Chemical Safety Board video, "Without Safeguards, Pressure Vessels Can Be Deadly" discusses improperly installed or modified pressure vessels have led to a number of serious chemical accidents, often in jurisdictions that have not adopted the ASME Boiler & Pressure Vessel Code.

Response to ULSD - Fact or Fiction?

The following is a response to an article in the **September-October 2009 issue of Tank Talk**, titled *Ultra Low Sulfur Diesel - Fact or Fiction?*

Dear Editor:

I felt several points in your recent article were incorrect.

1) Scientific justification has been published by several authors that many sulfur containing molecules in diesel inhibit metabolic processes of micro-organisms found in petroleum systems.

2) When diesel is in an emulsion with water, at the saturated point, it does contain more parts per million of water than gasoline, which is more than sufficient for micro-organisms to proliferate.

3) In the field, the only incidences of corrosion that I have observed in ultra low sulfur diesel occurred when extreme microbial growth, coupled with out-of-control water management practices, existed.

With a background in research in the field of corrosion, and with a PhD, my opinion is that the incidences of corrosion observed in the field clearly are microbial in nature, but not galvanic.

Note from Contributing Editor of *Tank Talk:* At a recent ASTM D02 Fuels committee meeting, the subject of corrosion related to ULSD was again discussed. *There are many theories as to why the corrosion may be occurring, but no conclusions have been reached so far.*

EPA Regs Mandating Reduction in Nitrogen Oxide in Diesel Exhaust Became Effective JAN 1, 2010

New Environmental Protection Agency regulations took effect on January 1, 2010 mandating reductions in nitrogen oxide from diesel exhaust. One popular method that engine designers are adapting to reduce emissions is the use of an ultraclean urea SCR to remove nitrogen oxide. This requires a diesel exhaust fluid (DEF) tank in the vehicle's engine AND in the construction of DEF tanks at service stations (for replenishing the urea mixture in trucks and other diesel-powered vehicles).

The problem is that leaching occurs when urea comes in contact with mild carbon steel and non-ferrous materials like aluminum, copper, lead, and zinc. This leaching contaminates the contents of the urea tank thus inhibiting the necessary reaction to eliminate emissions. As a result, urea tanks should only be constructed of additive-free polymers and stainless steels.

Leading stainless steel producer, Outokumpu, has several grades of stainless steel accepted under the ISO 22241-3 standard for urea tanks. These grades include 304, 321, 316L, 316Ti, 316LMo, 317L, 904L, 2205 Code Plus Two, and LDX 2101®. According to Poul-Erik Arnvig, VP Market Development for Outokumpu, urea DEF truck tanks, storage tanks, dispersion piping, and pumps also need to be "climate controlled," both heated and cooled, because the DEF freezes at 11 degrees Farenheight and begins to degrade when temperatures rise above 90 degrees F.

STI/SPFA maintains a monthly list of **Tank Use Mishaps** on its website, www.steeltank.com.

STI has a strong interest in safety for its members, their employees, communities and the public at large. By providing details of unfortunate incidents and accidents, individuals and organizations are informed and the level of awareness of the hazards with the storage and use of petroleum and chemicals is raised.

RESOURCES FOR Subscriber Review

Free Petroleum Storage Tank Workshops offered by Texas Commission on Environmental Quality

EPA's Final Amendments to SPCC Rule for AST's

SIGMA's 2009 Statistical Report on SIGMA Members' Petroleum Sales & Operations

Read Wisconsin Department of Commerce Storage Tank Information

Arnvig reports that stainless steel is ideally suited for DEF tank construction. As he explains, "stainless steel does not corrode or leach. And it can withstand the temperature requirements for DEF. The alloys used to create stainless steel cause an invisible, nano-thin film that naturally covers the stainless. This film creates the barrier that prohibits the leaching of metal ions into the liquid contained within a stainless tank, pump, or pipe."

For several years, a major European automaker has been using Outokumpu's proprietary LDX 2101 for construction of their urea truck tanks, adds Arnvig. LDX 2101, developed by Outokumpu to address the historic price volatility of nickel, contains one-fifth the nickel content of ASTM 316L - while delivering nearly twice the strength and similar pitting corrosion resistance - at lower cost. Arnvig believes LDX 2101 offers the optimal balance between price and safe, long-term performance with regard to the physical and chemical demands put on a DEF tank.

For more information on Outokumpu's stainless steels for urea tank construction please visit the Outokumpu website. STI/SPFA and the Managing Editor of *Tank Talk* thank Affiliate Member, Outokumpu, Inc. for contributing this article on a very important industry topic.

KLM Breaks Duel-Fuel Barrier with Passengers On Board

KLM's demonstration flight in November, 2009 lasted approximately one hour and carried a number of Dutch government officials and industry partners. This was the first time passengers have been on board a biofuels demonstration flight.

A spokesman reported, "This serves as a marked step towards achieving sustainability. We still have a long way to go in relation to biofuels for aviation." By investing in this manner, he further asserted that KLM has demonstrated its significant leadership role. The airline is reportedly pursuing the development of biokerosene in accordance with stringent financial, technological and ecological criteria.

In December 2009, an Air New Zealand Boeing 747 test flight used a 50 percent mix of biofuel from the plant jatropha. Following this, Continental Airlines flew one of its Boeing 737 aircraft on a mix of 50 percent algae and jatropha. Japan Airlines flew a Boeing 747 with a 50 percent blend of biofuel made from camelina, jatropha and algae. The first biofuels trial flight took place in February 2008 when Virgin Airlines tested a fuel mix made from babassu palm and coconut oil.