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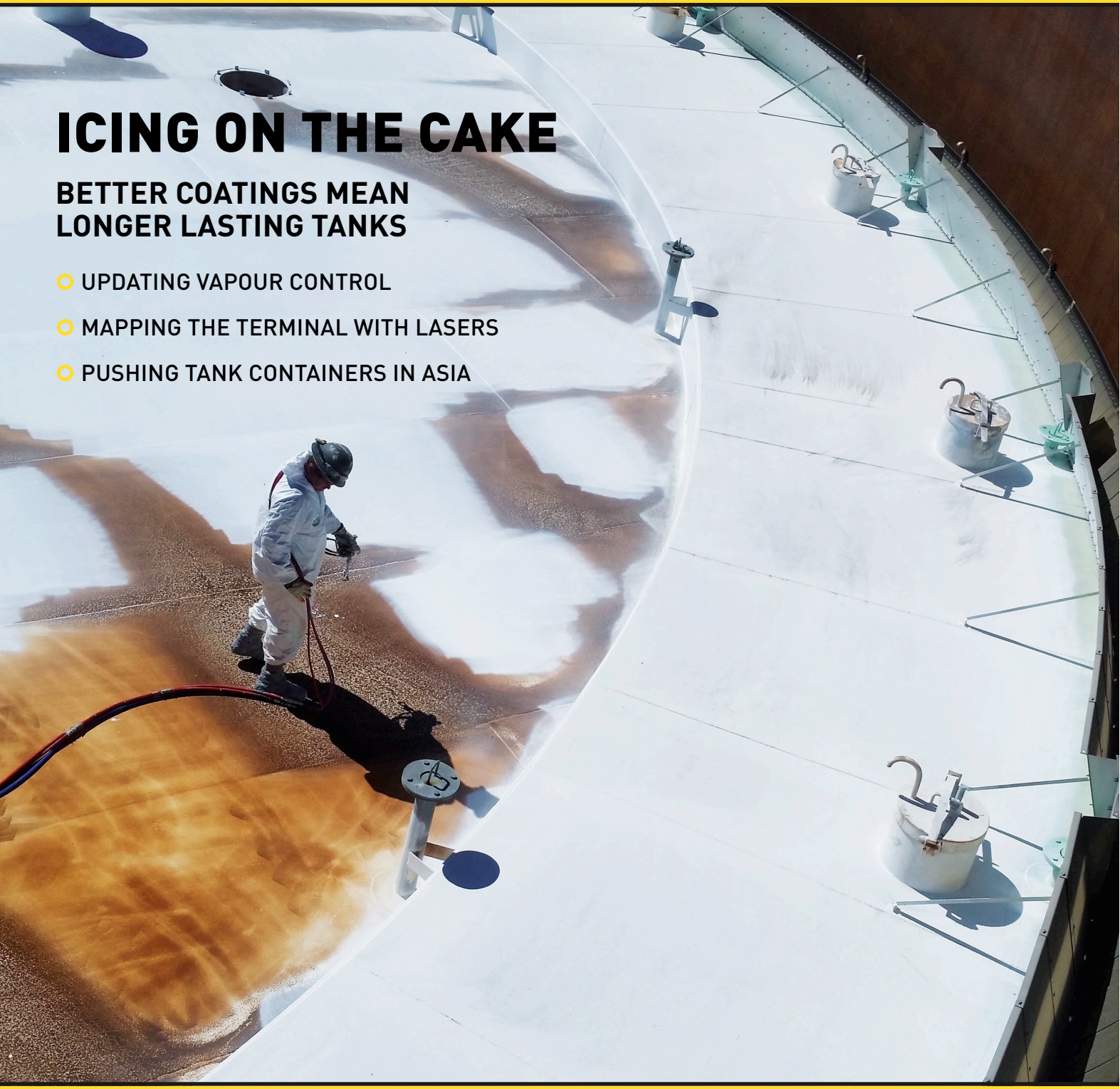

ICING ON THE CAKE

BETTER COATINGS MEAN LONGER LASTING TANKS

- UPDATING VAPOUR CONTROL
- MAPPING THE TERMINAL WITH LASERS
- PUSHING TANK CONTAINERS IN ASIA

THE INFORMATION SOURCE FOR THE INTERNATIONAL DANGEROUS GOODS PROFESSIONAL SINCE 1980

GET YOUR COAT

CORROSION • A NEW APPROACH TO TANK COATINGS GIVES A CERAMIC FINISH TO PREVENT DAMAGE AND THE POTENTIAL FOR CORROSION TO SPREAD

THOUSANDS OF PRODUCTS carried every day in bulk in tank trucks, rail tank cars or tank containers can cause corrosion. Many chemicals are aggressive to carbon steel and some are similarly corrosive to stainless steel. Some refined products and even crude oil can cause corrosion in transport tanks as well as in storage tanks, holding tanks and process vessels.

With the growth of onshore oil production in the US, through the exploitation of tight oil reserves, has come another problem for tank operators – highly corrosive brine. Unchecked corrosion of carbon steel tanks can lead to early replacement and maintenance and also poses a safety risk in terms of potential leaks, spills, and even fire and explosion.

Against such tank corrosion challenges, traditional polymer paints and epoxy-based coatings have long been used as physical barriers to keep corrosion promoters such as water and oxygen away from steel substrates. This works until the paint is scratched, chipped, or breached and corrosion promoters enter the gap between the substrate and coating.

Tank trucks and rail tank cars carrying waste from fracking operations are particularly at risk of such damage, as the produced water regularly contains sand and other sediments. Such damage can trap water, oxygen and other corrosion promoters, allowing corrosion to spread. Stainless steel is one solution but is costly – six times the price of carbon steel or even more.

A NEW SOLUTION

A new generation of anti-corrosion coatings - chemically bonded phosphate ceramics (CBPCs) – promise an alternative way of minimising tank damage, improving safety and extending tank life in the transport sector and beyond, while minimising maintenance and downtime.

In contrast to traditional polymer coatings that sit on top of the substrate, the new coating bonds through a chemical reaction with the substrate and slight surface oxidation actually improves the reaction, forming an alloy layer. This makes it impossible for corrosion promoters like oxygen and humidity to get behind the coating as they can with ordinary paints. The corrosion barrier is covered by a ceramic shell that resists corrosion, fire, water, abrasion, chemicals, and temperatures up to 400°F (205°C).

Although traditional polymer coatings mechanically bond to substrates that have been extensively prepared, if gouged, moisture and oxygen will migrate under the coating's film from all sides of the gouge. By contrast, the same damage to the ceramic-coated substrate will not spread corrosion because

CORRODED TANK INTERIORS (ABOVE) CAN QUICKLY AND SAFELY BE COATED WITH A CBPC TO REDUCE THE POTENTIAL FOR FURTHER DAMAGE THAT COULD PROVE COSTLY OR DANGEROUS

the carbon steel's surface is turned into an alloy of stable oxides. Once the steel's surface is stable (the way noble metals like gold and silver are stable) it will no longer react with the environment and corrode.

PROOF OF THE PUDDING

CBPC coatings are now being manufactured by EonCoat, based in Raleigh, North Carolina. The capabilities of the coatings were recently proved in an application at a tank cleaning facility in Dallas/Fort Worth, Texas, DFW Tank Cleaning. This full-service facility specialises in chemical cleaning so is aware of the importance of corrosion resistance.

This is particularly the case with DFW's flush tanks, which are used to hold the wastewater from the first flushes of tanks that the company cleans, which can include residual chemicals, until the wastewater is treated. Given its location, DFW is also doing a lot of business with carriers active in the shale oil sector.

Joe Svehlak, facility manager at DFW Tank Cleaning, explains: "Our corrosion protection for our 10,000-gallon flush tanks has to be particularly rugged because we mix the wastewater so it does not stratify, and sand, rocks, and even metal shavings can be present from the waste trailers we service. The corrosion protection also has to withstand the high-temperature, high-pressure water we often work with."

To improve corrosion control in the tanks, DFW contracted DC Metal Construction of Ennis, Texas to coat the tanks with EonCoat®. Svehlak is pleased with the results: "EonCoat has stood up really well to everything from chemicals and salty brine to abrasion, high-pressure water and heat. I believe it will double the life of our tanks while significantly lowering maintenance costs and downtime."

Svehlak also believes that EonCoat has potential in other applications in the supply chain. "Tanker truck and rail operations can benefit from the anti-corrosion coating's reliability," he says. "Its abrasion resistance would be a big plus to wastewater haulers or super sucker truck operators with vacuum tanks that may encounter metal chips, glass shards, etc. when cleaning out sumps. It would also resist tank corrosion when transporting petroleum products or even used restaurant waste such as oil, fat, or grease."

HOW IT WORKS

EonCoat consists of two, non-hazardous components that do not interact until applied by a plural spray system like those commonly used to apply polyurethane foam or polyurea coatings.

But the key to the coating's success is closer to the steel. Seen under a scanning electron microscope, EonCoat leaves no gap between the steel and the coating because the bond is chemical rather than mechanical. Since there is no gap, even if moisture were to get through to the steel due to a gouge, there is nowhere for the moisture to travel.

Bobby Hobbs, a foreman with DC Metal Construction, says: "Unlike traditional methods, the corrosion resistant coatings for mild steel have a double layer of protection. The tough, outside ceramic coating will not chip like paint and takes sandblasting to remove. The chemically bonded layer stops corrosion and will not allow corrosion promoters to spread."

Since the coating is inorganic, there are no volatile organic compounds (VOCs), no hazardous air pollutants (HAPs) and no odour. This means that the coating can be applied safely, even in confined spaces, and can be applied near continuing operations at the site, avoiding the need for excess downtime.

There is also almost no curing time needed, meaning tanks can be put quickly back into service. As Hobbs explains, "After appropriate tank preparation, we found that if we spray EonCoat in the morning the tank can be returned to service the same day because it applies in one coat and dries quickly." HCB

www.eoncoat.com