

# WELL-CONTAINED

A Florida company is showing that robotics is the way forward when it comes to producing consistent quality containment systems



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**O**RGANIZATIONS that frequently deal with hazardous chemicals and other dangerous liquids such as in the oil & gas industries must have a spill containment system.

It's a relatively smart solution to keep chemicals and oils separate because if these chemicals spill out they can cause harm to the organization, the environment, the health of those working with the organization, and even members

of the public are also in jeopardy in the event of a spill. It becomes essential to prevent the spills and to prevent the chances of accidents and risks associated.

Polyurea spraying has long been seen as an effective way to provide an impermeable barrier to leaked product throughout the oil & gas industry and any industry where protecting the environment is required.

Traditionally, this has been applied on site, but there are a number of drawbacks to this.

For Total Containment Solutions, Inc (TCS), based in Fort Myers, Florida, USA, these drawbacks became an opportunity for innovation. TCS has long experience as a contractor supplying containment solutions to a range of industries. The firm's A-list clients included the US Navy, CSX, Exxon Corporation, Hess Corporation, and multiple airports throughout the U.S.

Through the years, TCS found out that on-site application occasionally throws up real challenges. First, existing ground >

conditions are not always ideal. TCS discovered this was the case when contracted to install a secondary containment area with an asphalt substrate. The asphalt had large cracks in the surface which made direct spray impossible.

Later on, TCS was contracted to install a liner for a large fracking fluid containment pit. This project of 450,000 sq ft was the start of RoboLiner®. TCS figured out that the worst way to measure the thickness of spraying the geotextile liner was in the field - a blowing can cause application fatigue and overspray. Such occurrences can lead to issues, says TCS founder Mike Whitener, including loss of profit, with the end result that the user doesn't know what he is really paying for.



**Each panel Roboliner comes with its own serial number for quality assurance and control**

The answer to that lay in automation.

### THE ROBOT

Even spraying the RoboLiner® in a controlled environment, hand spraying has its drawbacks: fatigue and manpower are the greatest issues.

TCS developed a robotic spraying machine, resembling a mini overhead bridge crane you might see in a steel foundry. Attached to the frame of the machine are the spray gun, material hoses and power lines. As the frame moves along the panel it ensures a consistent and precise amount of polyurea is sprayed over, such that each finished panel is identical in terms of quality, even if sizes might vary

### INTERMEDIATE SUBSTRATE

TCS opted for RoboLiner® as an intermediate substrate to line the containment area. Sections, or panels, of RoboLiner® were positioned over the substrate and seamed together in place with a coat of polyurea until every panel was bonded together.

Topography, too, is a factor. In the frack fluid pit, the bottom of the pond presented no problem, but the sloped sidewalls of the pit made it impossible for the applicators to stand on it and spray effectively.

Another challenge on this project was the steepness of the bare walls. This was somewhat the start of the pre-manufactured liners.

The geotextile was laid flat then spray panelled. The following day, the pre-sprayed liner was placed on the beam where the pre-spray seams needed to be attached.

A further problem was safety; there was a potential slip and fall hazard that was eliminated with the new process.

### BE PREPARED

The potential was significant. Through prefabrication and pre-spraying, the panels could be safely transported to the

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installation site, where they would only need to be sprayed together at the seams. The results would mean not only faster installation, but also a smaller crew, fewer spray rigs, and less supporting equipment and materials to be transported, stored and kept safe from the elements. Each panel would also come with its own serial number for quality assurance (QA) and quality control (QC).

But there was still a further step to take. Off-site preparation might protect against wind and rain, but why not also raise the bar in terms of spray consistency.

according to customer requirements.

"With the robot we are consistent with our spray and we can manufacture the finished product three times faster than what you can do in the field," says Whitener. "For the end users, they get a piece of material with a serial number that goes back to the day it was made, the measurements, thickness, hardness, all the necessary product data. Plus, it also cuts down on waiting time on site for curing."

Whitener says the machine can do the job of an eight-person spray crew. But this increase in efficiency and quality-assured product has allowed TCS to increase the deployment of manpower outside the factory engaged in installing the finished panels at more sites than were previously possible.

The quality assurance is reinforced by working with a select group of contractors to install the finished panels.

### LOGISTICS ADVANTAGE

The RoboLiner® system already has two US patents with a third pending, and two Canadian patents. Two robot sprayers (which the company manufactured itself) are now installed; one in the Fort Myers factory, the other in a partner company ➤

based in Dallas, Texas. Between the two sites, some 400,000 sq ft of liner can be manufactured each week, with the added advantage that should something untoward happen on one site the other can provide back up production to meet customer requirements.

There are also savings on logistics from prefabrication. A single truck-trailer can ship as much as 110,000 sq ft of finished panels which is more than enough to cover, say, the average tank farm installation.

The time taken to finish an installation depends on the difficulty of job, Whitener adds. Some 60,000 sq ft of untouched panels can be laid in the course of a day, but if penetrations have to be made to allow for pipes and tanks, this can drop to 15,000 sq ft a day. Nevertheless, Whitener reckons that in either case job completion takes about 30 percent less time than spraying by hand.

And, of course, for a facility operator less downtime during installation means the business can get back up and running quicker doing the job it is meant to do. And protecting the spraying process from the weather allows TCS to work deeper into the seasons, particularly winter.

“We can work pretty much all year round,” says Whitener.

Now having had five years of offering the RoboLiner® to the market, TCS is looking to expand its ability to supply into new markets. The primary market, not surprisingly, is North America. TCS already has a distribution agreement in Canada, allowing sites in, for example, the Alberta tar sands plays to benefit from the system.

TCS is also in negotiations with a company in Europe to strike an agreement for distribution across the Atlantic, and Whitener says a further goal is to have representation in both South America and Australia.

### ABSORBING STORY

But the story certainly doesn't end there. As so often happens when handling bulk liquids it is virtually impossible to prevent



‘We see the combination of RoboLiner as the containment system and Greensorb to pick up spills is going to be pretty unique’

the occasional small spill. By definition, secondary containment is there to prevent product from leaching into the ground. But a spill still needs to be cleaned up.

Recently, TCS has teamed up with a start-up company Sorbent Green LLC, based in South Carolina, to provide a value-added service. Sorbent Green's flagship product Greensorb is an all-natural, multi-purpose and, crucially, reusable absorbent.

Commonly, industrial sites have used crushed clay - sometimes known as cat litter - to clean up spills. But crushed clay is dusty and because the particles are usually of varying shapes and sizes not all the surface area absorbs the liquid.

However, Greensorb is comprised of organic material mined in the USA and manufactured with no artificial materials. The surface is as much as 30 percent larger than crushed clay making it

highly-absorbent, and naturally attracted to chemical, hydrocarbon and biological spilled liquids. It also has a gritty texture, which creates better traction on floors while it is absorbing the spill, reducing the risk of employees slipping on the wet surface.

Once absorption is complete, Greensorb converts the spill into a dry solid material that is easier to handle and generally less expensive to dispose of. A layer of crushed clay would have to be got rid of after just one use, but Greensorb can usually be reused. The number of times the product can be re-applied depends on the liquid it has to absorb, but Sorbent Green president Tom Uskup says it can be reused until all the particles turn into a dark brown colour. As long as light brown particles can be observed in the material, it can be re-applied to the next spill. >

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This ability to be used multiple times results in lower cost per use and reduces the total volume of waste that eventually has to be dealt with.

Greensorb can cope with a variety of spilled materials, including lube oils and lubricants, home heating oil, diesel, kerosene, hydraulic fluids, gear oil, transmission fluid, antifreeze, solvents, paints, most acids, and bio-based hydraulic fluids.

Independent laboratories have confirmed test results, and in America the product is accepted by the Occupational Safety and Health Administration, the Department of Agriculture, Environmental Protection Agency and Department of Energy.

"Crushed clay is usually a legacy product in many plants," says Uskup. "So when we find a potential customer using that we know we have a fair chance of convincing them to switch to Greensorb as it is both more efficient and cost-effective."

Several companies in the waste



industry started using the material a few years back, while other applications included sites as varied as the data centre for cell phone company Verizon and the Newport News shipyard.

## TOTAL CLEAN UP

A further development under way at the company is to add to Greensorb's functionality, by using it in conjunction with a bio-based solvent that the company already has in its product range.

This solvent has been successfully

used to clean fuel and oil stains on concrete, but Uskup says that the company found it also works very well with Greensorb. So far the main test grounds have been at airports, where small spills of aviation fuel are common. Greensorb is applied to the spill, then the bio-solvent is put to work to clean the surface and restore it its previous state.

Terminal loading racks look to be another obvious application area for this twin-product approach. "We're

excited about the potential of using both products on the same site," Uskup explains. "One big advantage is that it saves having to use a high pressure cleaner to tidy up the surface which is very wasteful in terms of water."

"We see the combination of RoboLiner® as the containment system and Greensorb to pick up spills is going to be pretty unique," says TCS's Whitener.

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