TREATMENT PLANT OPERATOR
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APRIL 2012

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John LaRocca, Superintendent of wastewater operations Village of Roselle, Ill.

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Secure Seal

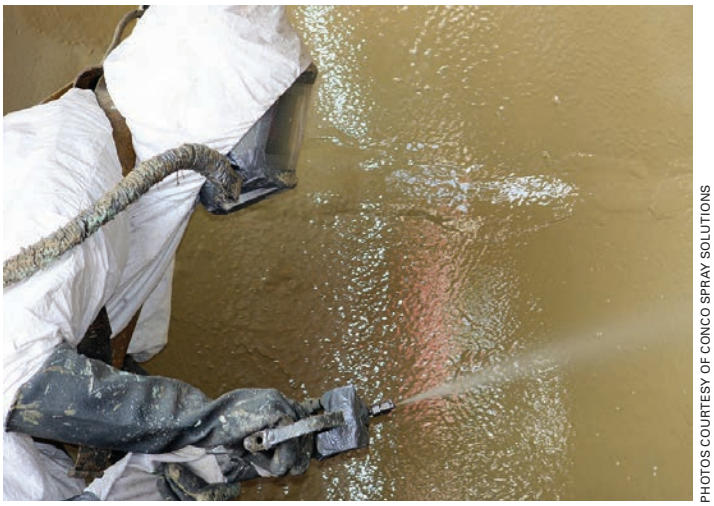
A SPRAY-ON POLYURETHANE COATING HELPS A TREATMENT PLANT REHABILITATE A BUILDING HOUSING A CHEMICAL STORAGE SYSTEM

By Mary Shafer

The sludge transfer chemical feed system at the Southport Advanced Wastewater Treatment Plant serving metro Indianapolis, Ind., needed an overhaul.

Three 4,000-gallon fiberglass-reinforced plastic closed-vessel tanks inside the building stored ferrous chloride, which is pumped into the sludge being conveyed from Southport to the city's Belmont plant to control odors caused by hydrogen sulfide.

By June 2010, the 9-foot-diameter, 12-foot-tall chemical storage tanks had significantly exceeded their design life and had developed small cracks that allowed the corrosive chemical to leak out. In addition, small spills from tank filling had corroded the concrete floors beneath and walkways around the tanks. Two chemical metering pumps and various other metal HVAC, plumbing and electrical equipment were also badly corroded and needed replacement.



PHOTOS COURTESY OF CONCO SPRAY SOLUTIONS

A Conco Spray Solutions crew member applies SprayWall structural polyurethane lining to the tank structure.

REPAIR, NOT REPLACE

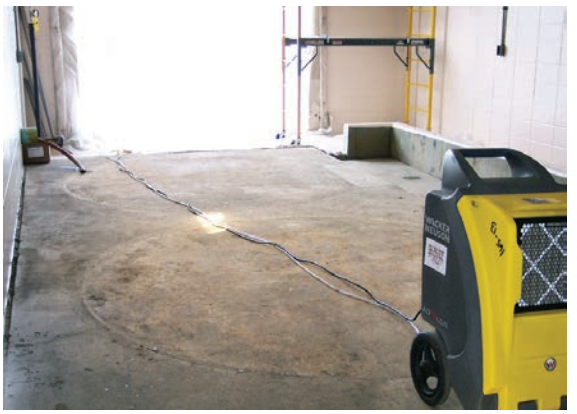
CH2M HILL designed and executed the overhaul. Project manager Matthew Thomas thought it made sense to gut the corroded metal parts to make way for repair and coating of the concrete floor, instead of tearing the whole building down. "It's a separate building, only used for storage, so we could take it offline and keep operations going," Thomas says.

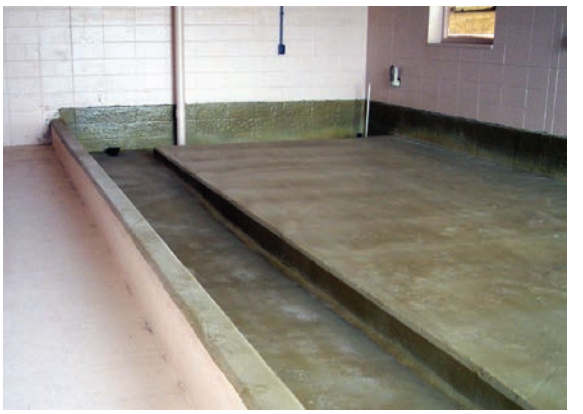
"Time constraints were a primary consideration. We were trying to limit the shutdown to a few months in spring, when we could get everything installed and finished and bring the tanks back online before the weather got too warm. SprayWall could be applied in one to two days after surface preparation."

MATTHEW THOMAS

Because the building would remain a chemical storage unit, it was imperative to protect the new concrete from more spill-related corrosion. Traditional epoxy paint was deemed too thin to protect adequately. Heavier-duty epoxies were considered, but adhesion to the concrete substrate around joints and cracks was a concern.

The city and CH2M HILL had experience with SprayWall polyurethane from Sprayroq and chose that product. "Because it's sprayed on so thick, we could almost make a kind of bathtub effect in our containment area and seal it up," says Thomas.





LEFT: The sludge transfer room during preliminary cleaning and preparation. RIGHT: The rehabilitated and protected substrate surface after application of SprayWall.

Share Your Idea

TPO welcomes news about interesting methods or uses of technology at your facility for future articles in the How We Do It column.

Send your ideas to editor@tpomag.com or call 877/953-3301.

TIME CRITICAL

"Time constraints were a primary consideration," Thomas recalls. "We were trying to limit the shutdown to a few months in spring, when we could get everything installed and finished and bring the tanks back online before the weather got too warm. SprayWall could be applied in one to two days after surface preparation."

That consisted of cleaning the concrete floor and concrete block walls, then repairing all corrosion damage. Most of the concrete had only surface pitting, but a few spots had a couple of inches of material missing. Crews used a cement mortar patching compound to smooth the surface before grooves were cut to aid coating adhesion.

Patching took about a week, and the material cured for 28 days. Because the polyurethane requires a clean, dry substrate to adhere and cure properly, a portable dehumidifier was used to stabilize the room after the patch had cured.

Sprayroq director of business development Chip Johnson, P.E., working with Thomas and Conco Spray Solutions, a Sprayroq Certified Partner, planned a 480-square-foot application. Based on stress and deflection factors calculated to accommodate three new 8-foot-diameter tanks, Johnson settled on a coating thickness of 250 mils.

He specified grooves in the surface every 48 inches to ensure proper adhesion, and a 12-inch vertical wall tie-in to be built after the tanks were installed. The original wall had to be knocked out to enable tank replacement. The cost estimate for the application was $12,000.

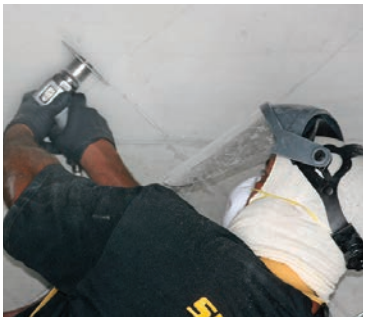
ONE SPRAY DAY

The Conco team completed the main floor and sidewalls application in a single spray pass in one workday. For slip protection, sand was sprinkled across the coating surface before it cured on the walkways around the tanks.

An area of concern was the fill station, where trucks pump the chemical into the tanks. Some minor spillage there is unavoidable, so a collection box was installed and lined with SprayWall to contain any spills and limit surface damage.

Since part of the containment wall was missing, it was easy for the spray applicators to monitor coating thickness for accuracy. They also sprayed a sample and left it for the construction manager. Cure time on the initial application was six hours.

After the new tanks were installed and the wall section rebuilt, the crews returned to coat the new section. They covered the wall all the way to the top, creating one solid coating to contain any future leaks when the tanks show their age. The second application adhered seamlessly to the first. No special equipment was needed other than what Conco usually uses to maintain consistent temperature and humidity during application.



A Conco Spray Solutions crew member cuts grooves into the cleaned and prepped surface before applying the polyurethane coating material to ensure optimum adhesion and uniform coverage.

Jay Thorne, deputy project manager for the Department of Public Works, believes the new floor will be easier to clean, but he was happiest about the future savings from the rehabilitation. The corroded equipment would have had to be replaced in any case, but without the coating, he says, "We would have had to replace the building as well as the equipment, rather than having the project become part of a long-term solution." tpo