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JULY 2002

TANK BATTLES

Strategies & Wisdom from the Front Lines

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To line a badly deteriorating tank while keeping it online until the very end, applicators from Advanced Roofing and Sheet Metal use

GRAY MATTER OVER GRAY WATER

Story and Photos by Lloyd Kanter

Picture this: four guys on a float, the sun shining warmly from pristine blue Florida skies above, and the only sound is the occasional slapping of the water. Sounds like the makings of a perfect day off, doesn't it? Suddenly, a loud buzzing disturbs the calm, and one of the men asks another to reposition the craft.

Fact is, these men are not on a pleasure trip. The craft they are on is a home-built raft. The water they are floating on is actually above ground level and contained by an old and leaking tank measuring 80 feet wide and 22 feet high. And the loud buzzing sound is the spray application of a polyurea lining system.

Ten feet above the men, standing on a thin metal ladder rung, hands on the four foot wide rim of the tank, Mike Shephard, President of Advanced Roofing & Sheet Metal, leans over the precipice and surveys the progress of the job.

The tank forms an integral part of a wastewater treatment facility owned by Heron's Glen, a golf community in Fort Myers, Florida. The plant processes the waste from the 750 homes in the community — about 105,000 gallons of water each day. Fresh water originates from the county water supply, but from there, the county's involvement ends, and Heron's Glen handles the rest.

Water that leaves these homes is fed first into a clarifier, which aerates the water and separates it from solid waste. The heavy matter settles out, and is mixed with lime with a pH of 12, disinfected, and then hauled away. It is used for fertilizing farmland.

The remaining water feeds into a sand filter, is chlorinated, and then flows into a holding tank, where the effluent is ultimately used as irrigation water for the golf courses. It is this tank that became a problem for Heron's Glen, and ultimately, a challenge for Advanced Roofing and Sheet Metal.

Using a floating platform to access the inside of this aging waste water tank as the water level was dropped in stages, the crew of Advanced Roofing and Sheet Metal apply the polyurea top coat. Kevin Heues *(far left)*, Uate Afu, a certified foam mechanic *(center)*, and Eddie Villareal use ropes and poles to position the platform. The various stages of metal preparation and coating can be seen, from the lower pressure washed surface, to the white level of primer and the final black polyurea.

Mike Shephard *(left)* and Uate Afu discuss thickness of the topcoat application. Light blasting, followed by a wiped on coat of Ospho, wiped down with MEK, then application of epoxy primer preceded the top coat.

Bill Banther, manager of the plant, suspects that at one time, the tank, built in 1992, contained water with too great a concentration of chlorine, which in turn attacked the coal tar epoxy lining and ultimately caused corrosion and leaks.

Banther discussed the situation with Harry Kuzel, a state-certified operator hired by Heron's Glen to maintain the plant in accordance with the Department of Environmental Protection. It was agreed that the existing coal tar epoxy had to be removed, and a new 80-mil polyurea lining system had to be installed to save the tank.

Coincidentally, Kuzel was once an employee of Advanced Roofing, and he and Mike Shephard know each other well. So, in short order, Shephard was called in to look at the project: remove the coal tar epoxy, prep the surface, prime, and install a polyurea coating.

There were several very big problems to overcome. First, the corrosion of the existing lining was so advanced that complete removal might leave gaping holes in the metal sides of the tank. And even more formidable, since this tank is such an integral part of the wastewater process, it could only be shut down for five days, not anywhere near enough time to accomplish the job.

This is where Mike Shephard's years of expertise — and gray matter — paid off. He knew that Ospho, a rust-converting

JOB at a GLANCE

PROJECT:
Wastewater Tank Renovation

COATINGS CONTRACTOR:
Advanced Roofing & Sheet Metal, Inc.
400 South Rd. • Fort Myers, FL 33907
(941) 939-4412

PRIME CLIENT:
Heron's Glen
Fort Myers, Florida

SIZE:
5,600 sq. ft.

DURATION:
5 mobilizations, 5 days each over six weeks

SUBSTRATE:
sheet metal / coal tar epoxy

PROCESS/MATERIALS:
- Pressure wash
- Grind
- Apply OSPHO
- Wipe w/MEK
- Prime with United Coatings Primer 302
- Top coat with SPI's Polyurea HT

SAFETY CONSIDERATIONS:
Standard outdoor spray application issues of eye, ear, and breathing apparatus, plus life jackets.

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This is where Mike Shephard's years of expertise — and gray matter — paid off. He knew that Ospho, a rust-converting pre-primer, would allow subsequent coatings to bond to any remaining coal tar epoxy. And rather than trying to build 22-foot high scaffolding and attempting do the impossible in five days, he offered another solution.

Shephard proposed the work be done in five mobilizations, four of which could be performed with water still in the tank, by using a floating work platform. Each mobilization would involve the prep and installation of about 4½ feet, all the way around the tank. When finished, the owner would lower the water level a corresponding amount, and the process could begin again. Only on the last mobilization then, would the tank be totally off line.

Banther concurred that water in the tank could be pumped back and forth to other containment ponds in the development as a temporary measure during the first four mobilizations, to keep things running.

The job was put out for bid, but only one other company was considered for the project, and as they were unfamiliar to Banther and Kuzel, and were higher in price, Advanced Roofing and Sheet Metal was awarded the job.

Gray Matter • *Continued on Page 35*

The high-pressure spray application heaters and pumps are in a trailer custom-made by Advanced Roofing and Sheet Metal. Applicators mobilized five times as the water level was dropped in the tank, but keeping it operational. Finally all the water was emptied, and the bottom coated.

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Barrels of two-part polyurea components are stored adjacent to the Gusmer pumping system. Two are live, and the other two are backups.

Gray Matter • *Continued from Page 17*

Mike Shephard is no stranger to this kind of project. Advanced Roofing & Sheet Metal does about $4 million per year, installing standing sheet metal roofing, built-up roofing, single-ply roofing, asphalt shingles, and tile roofing (common in the Fort Myers area), as well as providing secondary containment, polyurea industrial coatings, and low density foam for envelopes (which insulate and make buildings airtight). Many of these products involve the use of plural component spray equipment.

With about 50 employees on board, Shephard claims that they are the only company in the area that has not gone out of business or changed their name. He attributes this success to the quality of their work, and the extensive product line they handle.

The first consideration was the construction of the purpose-built float from which they would prep and perform the installation. Utilizing empty foam barrels as floats, and wood decking, the float was constructed in the shop, then lifted into the tank by crane.

To prevent power cords from dragging in the water, a mast was built into the center of the raft to provide a safe anchoring spot. This also ensured there would be no interference with the workers' mobility. A wooden gang box was constructed to house all the tools, a supply of life jackets, masks, and other safety equipment.

Shephard conducted research to identify a polyurea product that would best suit the needs of the job. In the end, he chose Specialty Products, Inc.'s HT (High Tensile) Polyurea Coating. But much had to be done before the spray application would begin.

From the float, the sides of the tank were pressure washed. Then came the most time-consuming part of the entire project: the grinding. Two employees handled this arduous task, using hand-held side grinders with 7″ diameter disks mounted with #16 grit Aluminum Oxide/Epoxy pads. For this task, the men were equipped with paper masks, safety glasses, and hearing protection. Since the water in the

A storage bin on the floating platform holds tools, cleaning equipment and safety gear, including life jackets that need to be available when working over water.

Applicators reach the floating platform by descending a flexible ladder. Mostly sunny days, mostly blue skies and warm temperatures made weather a factor only in the comfort of the crew.

The Gusmer pump system is located in a trailer towed to a site adjacent to the tank. The two components were heated in the pumping system to 170˚F (77˚C). This temperature was maintained the length of the hose to the tip of the gun where the components were combined to form the polyurea coating.

Safety: From Planning to Tailgate Meeting

At Advanced Roofing, environmental safety as well as the safety of the workers is always a big part of their projects. Of course, as prescribed by law, the organization has a safety manual, but they go beyond this.

During the pre-bid stage, Mike, his foreman, and superintendent all get together and discuss in detail the job they plan to bid. This meeting includes a discussion of logistics and safety. Then, the foreman and super look at the jobsite, and other recommendations are made as needed.

Once a contract is awarded, Mike or one of his staff will have a pre-installation meeting with the client. At this meeting, they go over the whole project, and discuss any safety issues that may be of concern to either party.

As a result of all these meetings, a shopping list of sorts is created which ensures that all required safety equipment and supplies will be on site at the beginning of the job.

And finally, at the beginning of each project, a "tailgate" safety meeting is held with all the crew members, so that they know what is expected of them.

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tank below is used only for irrigation, containment/recovery of the dust from grinding was not a concern.

In each mobilization, the process took the two men three days to accomplish — again, the goal being to remove as much of the coal tar epoxy as possible without going through it entirely. Already, there were a few places where the liner had worn out, and the owner patched pinholes in the metal from the outside of the tank.

Much thought went into the next phase of the project. Mike Shephard wanted to be certain that the primer and polyurea combination to be applied would bond well to the substrate. A grid was set up and taped off on the inside of the tank wall. Testing included the use of a rust inhibitor, and many different combinations of solvents and primers, underneath the coating. In all, there were over 14 different combinations applied.

After waiting 24 hours, a system of pull testing was devised, using a small scale, which would indicate which section adhered the best (see **Figure 1**). They found that using a rust inhibitor in combination with MEK wiping plus a #302 primer manufactured by United Coatings provided the best bond strength.

As such, the entire area was pre-primed with Skybryte Company's Ospho, a marine rust inhibitor. Made up of mostly phosphoric acid, Ospho converts iron oxides (rust) into phosphates, and seals the area from further oxidation. Amazingly, it can be purchased in hardware stores.

Then, the surface was wiped thoroughly with MEK to remove any residual dust and provide a clean surface for the primer application.

The primer and actual coating were spray applied

Figure 1: Before settling on the final coating system, Mike Shephard and crew tested various combinations of cleaners, a metal treatment liquid, and primers to find the best adhesion as measured by pull testing.

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with a Gusmer dual-component spraying system. Separate containers of resin and curing agents were heated in the pumping system to 170°F (77°C). This temperature is maintained all through the hoses, and right to the tip of the gun, where the components were combined.

As the materials are combined and sprayed, the chemical reaction increases the temperature to 250°F (121°C). Cooling begins immediately, and the final product is dry to the touch instantly, with most physical properties being achieved in 24 hours. This proves to be key to the success of this job.

Other than a water pumping problem, which caused a delay between mobilizations, the project went as planned. Prior to the final mobilization, the water was drained from the tank for the five-day offline window. After the work was complete, Shephard and his crew were able to make a final inspection of the tank. The situation was closely monitored as water was reintroduced to the tank, and no leaks or problems were encountered.

With all of the mobilizations complete, spanning a period of six weeks, Shephard commented that not only would he take on a similar project in the future, but added that he probably wouldn't do anything differently on the next one. That pretty much says it all.

As for the watercraft, it was given to one of the employees of Advanced Roofing & Sheet Metal who lives on a lake. More than likely, out on the blue water in the Florida sunshine, any subsequent use of the float will be far more relaxing. CP

Lloyd Kanter is a frequent contributor to CoatingsPro. *He operated a polymer flooring business for many years. Since retiring from the industry, he has served as a consultant. In 1995, Lloyd opened LBK Marketing, specializing in the coatings industry. He can be reached at lloyd@lbkonline.com*

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