

Preventative Maintenance Pays Off

A Florida Municipality Finds an Efficient System for Preventing Corrosion in Manholes

By Melissa Forsyth



IPC Inc. used spin-casting equipment to apply Sauereisen Substrate Resurfacer F-121 to grout and repair manhole surfaces.

The City of Pace, Fla., located near Pensacola in the Florida panhandle, was experiencing significant corrosion in its manholes that made maintenance and construction of its wastewater system increasingly costly and inefficient. If not corrected, the municipality realized that the structural integrity of its system would be in jeopardy.

In 2003, Pace enacted a preventative maintenance program that dictates materials and methodology for the installation and rehabilitation of new and existing manholes. The program has proven to be cost-effective by extending the service life of manholes, as well as being an environmentally friendly alternative.

The Situation

The warm, humid climate in the Florida panhandle was facilitating significant corrosion in existing manholes, with up to 1 1/2 in. of concrete being corroded within 18 months of installation. "A number of the existing structures actually had rebar showing," said Bill Strength, wastewater manager for Pace Water Systems and initiator of the preventative maintenance program.

Pace had been addressing the rehabilitation of existing wastewater structures with an annual rehab program. However, because of rapid development in the area, the City has been installing 100 to 125 new manholes, plus numerous lift stations, every year. With this rate of growth, Pace officials realized that they could not keep up with rehab work if manholes were deteriorating so significantly within two years.

"We had tried to get this program started about two years before it actually got off the ground," said Strength. "But we had trouble finding the right contractors and products to make it work the way we knew it should. Either costs were too high or we couldn't get suppliers to test products and methods appropriately."

Before the new program was initiated, coal tar epoxy was used as preventative corrosion protection in manholes. Several factors contributed to its ineffectiveness: coal tar can be a food source to corrosion inducing Thiobaccili bacteria, little or no surface preparation was done in the manholes before coal tar was applied and the thickness of coating varied widely leaving some parts of the surface vulnerable to corrosion.

A Progressive Approach

Strength found the answer to his problems at a seminar near Pensacola where he met Dick Grof and Tony Oswald. Grof is the president of IPC Inc., a specialty coatings contractor based in Pensacola; Oswald the eastern regional manager for Sauereisen Inc., a manufacturer of corrosion-resistant construction materials based in Pittsburgh. Together, they worked to develop



Manholes in the City of Pace, Fla., were coated with Sauereisen's SewerGard 210 epoxy.



A highly corroded manhole before treatment in the City of Pace, Fla.'s preventative maintenance program was instituted.

and initiate a preventative maintenance program to ease corrosion and ensure that wastewater construction and rehabilitation dollars were being spent efficiently.

"Dick is incredibly knowledgeable in coatings. His ideas on products, methods, and testing procedures were central to the program's effectiveness," said Strength.

A large part of the program's success lay in the inspection and approval of all materials. In addition to expertise from Grof, Strength worked with Pace Water Systems engineer Damon Boutwell and general manager Ted Dotson to specify materials for the program. Grof had a long-standing relationship with Sauereisen and drew from its expertise to recommend products and advise on the application.

"This is a situation that required highly specialized products," said Oswald. "We had to make sure the products we were recommending would pass the rigorous testing Bill and his crew would put them through."

The Process

For new construction, materials and methods are controlled from the earliest stages, starting with careful surface preparation. As soon as pre-cast concrete rings are delivered to general contractors onsite, they are brush-blasted to remove weak laitance from the surface. Pace inspectors then scrutinize each section for cracks, voids and evidence of prior patching and return rejected sections to the manufacturer.

"We end up sending a lot of manhole rings back to our suppliers," said Strength. "If there are any imperfections, we're risking effectiveness."

Once pre-cast rings are deemed usable, their surface is skimmed with an epoxy block filler to fill any small voids and prevent air entrapment. Any irregular peaks of the concrete are sanded down so that the topcoat application will be smooth and even.

The manhole rings are placed together as they are inserted into the ground. IPC uses - and Pace has approved - Sauereisen's Substrate Resurfacer F-121, a high-strength, substrate repair material and waterproofing barrier to grout the seams between rings and prevent inflow.

"The F-121 is great in this situation for several reasons," said Grof. "It's made specifically for the sewer environment, it's very workable and easy to rebuild corroded walls with, and it can be coated soon after it is applied."

Once all seams are grouted, Strength's crew performs a vacuum test on each manhole to ensure there are no leaks.

IPC then finishes each manhole with an epoxy lining system in two coats for a total thickness of 25 mils dry. Grof chose a catalyzed epoxy polymer specially formulated for wastewater environments, Sauereisen's SewerGard 210 Glaze. The epoxy bonds to the concrete without a primer and cures with a glossy surface that keeps sewage from adhering to manhole walls.

"SewerGard has passed the Reddner test, which was very important with the Pace program because we needed proven material," said Grof.

Once the epoxy application is complete, each manhole is spark-tested in the presence of a Pace inspector and final approval is granted after any needed repairs are re-tested.

The Results

Pace has maintained strict standards for the program. New real estate development must comply with the program to link into the City's sewage system. But Strength says the stringent guidelines are making a difference.

"Based on performance to date, the manholes installed under the preventative maintenance program look like they will have a service life of 15 to 20 years," he said. He adds that in addition to the time and cost savings of lower-maintenance manholes, Pace also benefits from lowered levels of inflow and infiltration.

"Our treatment plants don't have to treat anything but sewage," Strength said.

This is one example of prudent public policy paying off. By planning ahead, Pace is minimizing the cost of future repairs and streamlining wastewater rehabilitation.

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An after picture of one of the rehabbed manholes in the City of Pace, Fla.

