



The manhole after application of the final corrosion barrier.

BETTER MOUSETRAPS

PRODUCT:
SpectraShield liner system

APPLICATION:
Relining brick, concrete or steel wastewater structures

BENEFITS:
Stops corrosion, infiltration and exfiltration; cost-effective

USER:
Department of Public Services, Kalamazoo, Mich.

INSTALLER:
Advanced Rehabilitation Technology, Bryan, Ohio

MANUFACTURER:
CCI Spectrum, Jacksonville, Fla.

CONTACT:
904/268-4951
www.spectrashield.com

PLUGGING THE LEAKS

A multilayered poly resin liner system enables a Michigan utility to conquer inflow and infiltration in manholes

By *Scottie Dayton*

“The actual lining took two hours with minimal disruption. We returned the lines to service within minutes of the application.”

Frank Renaldi

High levels of hydrogen sulfide had corroded 1/2 to 1 inch of the concrete-brick and precast concrete manholes in Kalamazoo, Mich., causing infiltration as high as 20 gpm. The worst of four targeted offenders had leaks that squirted water like leaking garden hoses.

Frank Renaldi, P.E., senior civil engineer at the Department of Public Services, researched manhole rehabilitation extensively.

“Some products are cementitious grout, which reacts with hydrogen sulfide and doesn’t provide a permanent solution,” he says. “Epoxy paint cracks over time, and the manholes continue to deteriorate behind it.”

Renaldi was familiar with Advanced Rehabilitation Technology (ART) in Bryan, Ohio, from a presentation on sealing of wet wells using a multicomponent stress skin panel liner system (SpectraShield).

“When I compared it, the best other lining systems could offer was a 50-year design life and one-year warranty,” he says. “The SpectraShield system has a 10-year warranty and a 100-year design life. That, and how quickly it is installed, sold me.”

Prep work

After monitoring the atmosphere for gases, Junior Garcia and Josh Kimple from ART prepared the manholes for lining. The steel

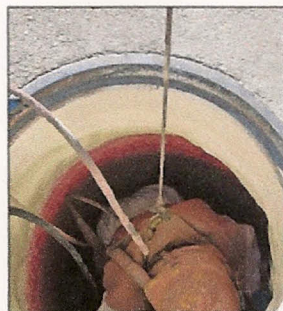
stairs in three manholes were so corroded that they fell off when hit with a hammer. The fourth manhole had coated steel stairs in good condition.

Because the lining extends just below the lid, the men cleaned the flaking, corroded steel castings with a power chisel. Following OSHA confined-space entry specifications, Garcia entered the 12-foot-deep manholes and jetted the walls with water at 6 gpm/4,000 psi, creating a smooth, clean surface to which the layers of polymer resins could bond.

"Waterblasting removed another half inch of the walls," says Renaldi. "One interesting note is that the



Three manholes had steel stairs so badly corroded that they fell off when hit with a hammer. Note water infiltration.



The corrosion barrier was applied by a technician fully equipped for confined-space entry.

mortar held up better against the hydrogen sulfide than the concrete brick."

Screens at the bottom of the manholes trapped debris but allowed water to drain away. The city removed the material with its 2100 Series vacuum loading truck from Vector Manufacturing. To stop severe leaks, Garcia and Kimple drilled into the bricks and injected fast-acting SpectraGrout. They plugged minor leaks with hydraulic cement.

Flexible skin

To apply the multilayered stress skin system from CCI Spectrum in Jacksonville, Fla., Kimple first sprayed on a coat of silicone-modified polyurea. This moisture barrier provides adhesion to the substrate and dries tack-free in seconds. He then sprayed a layer of tight closed-cell polyurethane foam to fill all voids and restore the surface to its original placement.

Kimple followed it with a second coat of silicone-modified polyurea, which provides the final corrosion barrier. The layers combine strength with some flexibility, enabling them to resist failures due to freeze and thaw cycles and ground movement. The system also eliminates the need for separate chimney sealing.

"The actual lining took about two hours with minimal disruption," says Renaldi. "We returned the lines to service within minutes of the application." City crews have since identified more manholes for rehabilitation using the SpectraShield lining system. ♦

MORE INFO:

93 CCI Spectrum
904/268-4951
www.spectrashield.com