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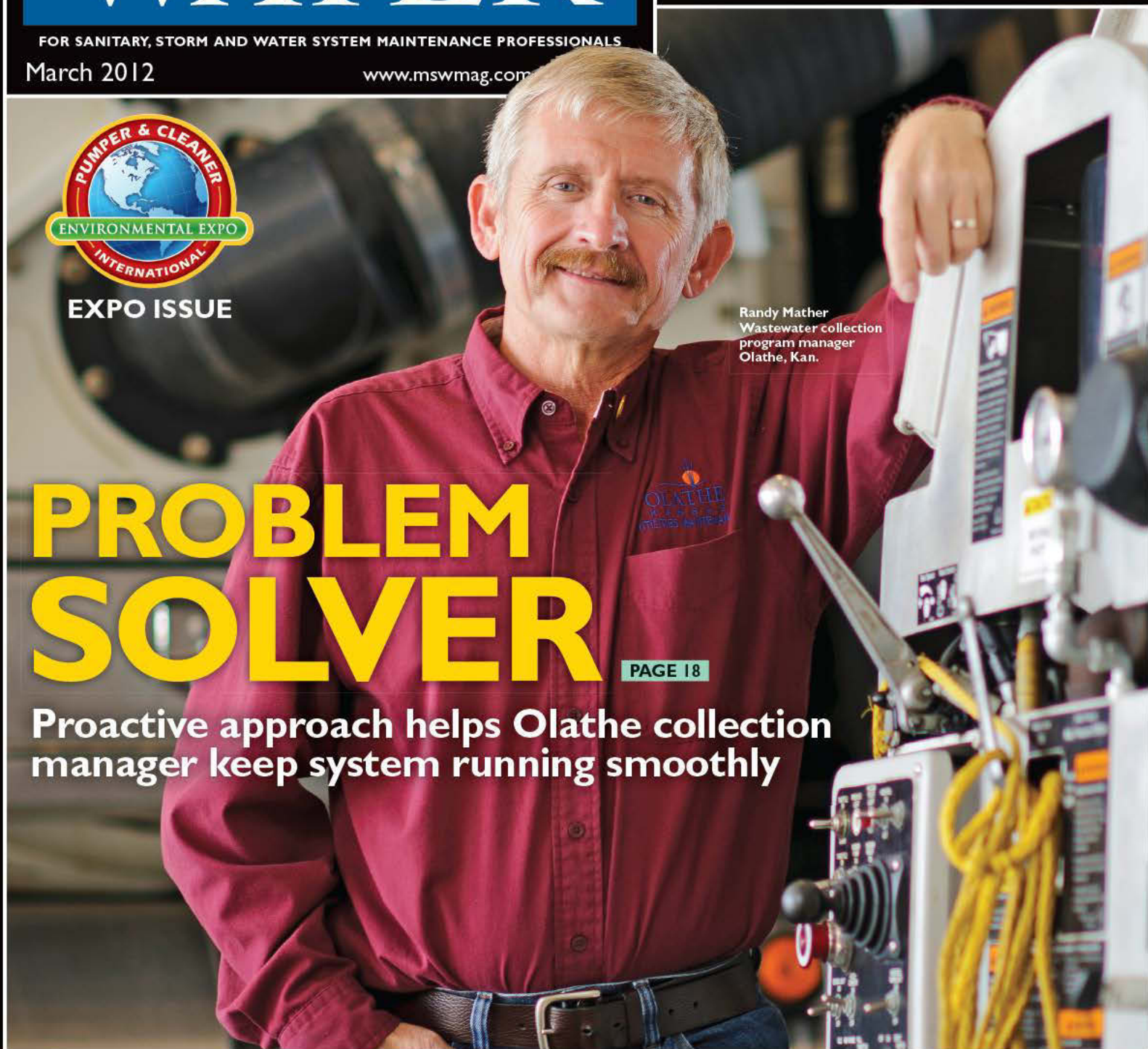
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Randy Mather
Wastewater collection
program manager
Olathe, Kan.





PolySpray SS-100 polyurea lines the inside of the rehabilitated culvert, providing excellent corrosion and abrasion resistance. (Photos courtesy of HydraTech Engineered Products)

BETTER MOUSETRAPS

PRODUCT:

PolySpray SS-100 coating

MANUFACTURER:

HydraTech Engineered Products, LLC
513/827-9169
www.hydratechllc.com

APPLICATION:

Culvert repair

BENEFITS:

Cost-effectively provided structurally strong repair

USER:

City of Englewood, Ohio

QUICK FIX

A semi-structural polyurea coating helps an Ohio city repair a culvert in a high-traffic business district without disruptive excavation

By Ted J. Rulseh

“At first I was skeptical that a spray-on liquid material could provide the durability and structural integrity of either sliplining or replacement. The final product has proven to be a tough, resilient technology, exceeding my expectations.”

Eric Smith

For city leaders in Englewood, Ohio, rehabilitating a deteriorating culvert during an economic downturn could have been a costly proposition.

The 347-foot-long, 112- by 75-inch corrugated metal culvert on State Route 48, next to the Interstate 70 intersection, was deteriorating at the invert. Its galvanized metal bottom had eroded and corroded significantly.

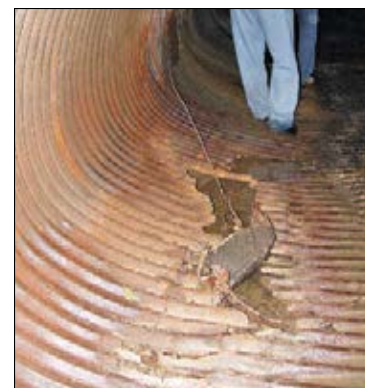
The culvert ran under a commercial business area with average daily traffic of 26,000 vehicles. If nothing were done, ground stability around the culvert would be compromised, possibly leading to sink holes and traffic disruption. A dig-and-replace solution would have disrupted traffic and disrupted businesses already fighting against a struggling economy.

During a cost assessment in 2009, consulting engineer Ken Griffiths of Griffiths-Vanden Bosch & Associates in Englewood proposed a way to repair rather than replace the pipe. D.A. Van Dam & Associates worked with him to develop a complete solution.

Ultimately, the city chose PolySpray SS-100 from HydraTech Engineered Products to repair the pipe and prevent further deterioration without disrupting traffic, businesses or residents. The environmentally friendly coating was sprayed inside the pipe, rehabilitating the culvert so that water would not erode the surrounding soil.

Patching the invert

E.B. Miller Contracting in Norwood, Ohio, did the work. The company, certified in the applica-



Initial inspection of the culvert revealed severe corrosion and structural failure.

tion of the PolySpray product, has served the area for 70 years. The project began in July 2011 and was completed in September, despite some unanticipated challenges created by groundwater.

To complete the repair, the contractor first bypassed the water flow through the culvert using a 4-inch automated pump system. Bypassing ran continuously for the duration of the job. Workers then removed the original tar lining from the culvert with a 40,000 psi waterjet.

The pipe bottom proved to be in unusable shape from groundwater damage, so the team decided to re-establish the entire invert by completely re-patching it. They prepared all surfaces using a garnet abrasive.

Next, workers repaired the corroded and damaged invert using welded wire concrete reinforcing mesh attached to the base material from the 5 o'clock to the 7 o'clock position. They poured Class C concrete over the entire length of the culvert, three to four inches thick.

The PolySpray product was applied with Graco heated plural component spraying equipment at 9-mm thick from the 4 o'clock to 8 o'clock position, and 5-mm thick for the remaining surfaces.

Capacity protected

The coating created a sound repair without reducing the pipe's hydraulic capacity and without any excavation. The material is a rapid-setting, semi-structural polyurea monolithic coating that provides moderate structural support to the host structure and resists incidental chemical exposure. It is designed for 30- to 120-inch pipes and can be applied in thicknesses from 0.25 inch to greater than 2 inches in a single pass.

The oval shape of the culvert made other rehabilitation methods, such as sliplining, impractical, notes HydraTech founder Peter Blais, P.E. The liner "gave the city a cost-effective, infrastructure-saving solution that could help them meet their timeline and budget requirements, without additional disruptions to the surrounding business community or traffic flow."

The material provided a liner around the circumference of the culvert, prevented erosion of soil at the invert, and maintained soil support around the culvert itself.

Englewood city manager Eric Smith observes, "At first I was skeptical that a spray-on liquid material could provide the durability and structural integrity of either sliplining or replacement. The final product has proven to be a tough, resilient technology, exceeding my expectations."

Engineer Griffiths adds, "The use of PolySpray SS-100 gave the city an excellent, cost-effective solution to repairing the deteriorating culvert. We are pleased with the outcome of the project and the work performed by E.B. Miller Contracting." ♦



Proper personal protective equipment is vital to employee safety during PolySpray application.