some things grow better with age...

Unfortunately our underground infrastructure isn’t one of them

That’s why communities around the world today turn to Sprayroq and its team of Certified Partners for their structural rehabilitation and maintenance needs.

Our durable, spray applied polyurethane products are 100% VOC Free, NSF approved, offer fast cure times and have successfully passed numerous Third Party Tests.

Yes, getting old is hard on our infrastructure, but Sprayroq is here to make the aging process easier.

FOCUS: STORM

KEEP IT FLOWING

A sprayed-on structural coating enables rehabilitation of large stormwater pipes without traffic disruption and at major cost savings

By Mary Shafer

T here’s a word for traffic disruptions around Harrisburg, the Pennsylvania state capital: ugly. When two dual pipelines running deep beneath one of the area’s busiest arteries showed signs of deterioration, no one wanted to repair it by conventional dig-and-replace methods.

Instead, the Pennsylvania Department of Transportation (PennDOT) settled on a trenchless solution involving a spray-on structural coating. The job saved months of traffic disruption and an estimated $2.6 million.

Harrisburg nestles between the eastern slopes of the Allegheny Mountains and the Cumberland Narrows of the Susquehanna River. The city of nearly 50,000 people is surrounded by small towns that the city’s growth has absorbed.

Just across the river lies Camp Hill, home to the Book Clubs of America, which depends on Route 11/15 to transport inventory to and from its warehouses. Many other transportation-intensive businesses also rely on this artery, which runs along the river through the town of Wormleysburg.

The Harvey Taylor Bridge connects Route 11/15 (locally called North Front Street) with Harrisburg’s busy downtown and government complex. Beneath this bridge on the Wormleysburg side is a culvert that collects water from a small tributary, along with storm runoff from the bridge. It sends this water directly into the river through a double-barrel set of 75-foot-long, 54-inch-diameter corrugated metal pipes.

For more information call or visit us online today
(800) 634-0504

Abel Recon’s Sprayroq certified crew member applies SprayWall polyurethane lining to the prepared stormwater structure. (Photos courtesy of Abel Recon)

“...picked the top technologies that met our time, money, quality, safety, environmental and traffic impact requirements.”

Nexa Giboyeaux

Abel Recon’s Sprayroq certified crew member applies SprayW ater polyurethane lining to the prepared stormwater structure.
When we started this project in 2000, we tried to do it locally, in-house,” recalls Nexa Giboyeaux, PennDOT highway design project manager. “Due to traffic control issues, we never finished. We could never replace those pipes.” In 2007, Giboyeaux took control of the project, hiring the Larson Design Group engineering firm of Montoursville to analyze and solve the problem. The firm found that the problem was the pipes’ 20-foot depth. Replacement would mean digging a 10-by-20-foot trench on each site to enable upsizeing of the pipes to box culverts — necessary to bring the pipes, laid in the mid-1940s, up to modern code standards. Then the trenches would have to be backfilled and road approaches milled and re-paved — all without compromising the environment or the historic site.

Even with detours, most of the work would have to be done at night to reduce traffic disruption. The job would entail 10-weeks of site preparation followed by excavation and replacement for each pipe — a total of nine months for all four pipes.

The project was estimated to cost $42 million — providing the culvert beneath the bridge would not also require upsizeing. “If we had to replace those culverts, we probably would have had to upsize them for the new designs, probably to at least a box culvert,” says Kevin Keefe, PennDOT assistant construction engineer. “Then, you’re talking about an additional $700,000 to $1 million.”

Giboyeaux directed Larson to research alternatives while she sought information with the agency’s green initiatives — the material would not disrupt entry, no trenches would be needed.

In addition — in keeping with the agency’s green initiatives — the material would release no volatile organic chemicals (VOCs). Finally, the project would not release any debris or contaminants to the river. That meant it required no EPA permits — only Standard General Permits from the Department of Environmental Protection.

Abel Recon, infrastructure rehabilitation contractors based in Montoursville, won the bid to apply the material. The logistics of the two sites were not challenging — the pipes end to catch debris and keep it from entering the river.

Next, workers used grout to restore the corrugated profile of the pipes near the exposed ends, where air and moisture had pitted and eaten through the metal. “There were some pinholes and maybe some 1-inch holes, but other than that, the rest of it was in fairly good shape,” says Witmier.

The surface preparation took on a single 12-hour day shift for each pipe. Then the night shift sprayed on the polyurethane coating, applying it at a relatively uniform 500 mil thickness, based on the ASTM 1216 material design equation for structural integrity of materials. Uniformity was audited by American Testing of Lancaster.

Application proceeded at about 10 feet per hour. The team used about 15,000 pounds of material for all four pipes. Because the coating cured quickly, water flow was restored within minutes after application and thickness testing. Abel Recon crews worked around the clock. Pleasant May weather with a favorable curing temperature of 50 degrees helped smooth progress.

In the end, the project saved significant time, labor and money and avoided months of traffic disruption that would have aggravated motorists.

Cost benefits The biggest benefit was cost re-direction. “The original scope for the project was to replace these pipes, and do ADA ramps in the intersections to current standards,” says Giboyeaux. “We’d have milled old pavement from the road, and then dug down into two inches of roadway. We’d have removed all that black material, then put down brand-new overlay on the road. With all that together, the budget scope was $4.2 million.”

Instead, the pipe rehabilitation alone cost $275,500, and the entire project cost $1.4 million — a savings of $2.6 million. Rehabilitation of each dual pipe took about four days. “Just to give you an idea, with $2.6 million, we can probably pave around seven to eight miles, if we just overlay,” says Giboyeaux.

“We minimized the traffic impact, minimized and in places elim-inated environmental impact, and saved money and time, all with one quality product. Often we don’t have the luxury to close down a road.”

Witmier finds his own satisfaction in a job well done. “You know, to be able to work with PennDOT on new materials and, hopefully, help them do projects a lot cheaper than just their nor-

nmal dig and replace — it’s exciting.”

WIGGLING THE FOOT IN THE DOOR

HIP WITMER, general manager of Abel Recon, isn’t one to let an opportunity pass by him once his company completed the Wermelsberg double pipe rehabilitation, he pursued more structural spray coating projects with PennDOT.

“I’m actually in the design phase for another corrugated pipe job,” he says. “It’s buried about 85 feet deep. When PennDOT built this road, which passes through a valley and then climbs a mountain, it laid a pipe to accommodate a stream at the valley bottom, then filled the rest in and paved over it. Now the pipe needs help.”

Abel can access the 72-inch corrugated pipe by parking its trucks at the top of the hill and stretching hoses down to it. Crews will be able to prepare and spray it even though the trucks can’t get down to the top.

Joe Knight, spray application technician, applies SprayWall lining to the host pipe.

Joe Knight, spray application technician, uses absorbent material to remove water from between the culverts before final drying of the pipes.

“Just to give you an idea, with $2.6 million, we can pave probably around seven to eight miles, if we just overlay.”

Nexa Giboyeaux
Due to traffic control issues, digging not an option

“When we started this project in 2000, we tried to do it locally, in house,” recalls Nena Giboyeaux, PennDOT highway design project manager. “Due to traffic control issues, we never replaced those pipes.”

“In 2007, Giboyeaux took control of the project, hiring the Larson Design Group engineer of Montoursville to provide the culvert beneath the river. The banks were not disturbed, and no restoration was needed. To prepare the river, and may be some 1-inch grout-filled voids. The project would not release no volatile organic compounds. Application proceeded at about 10 feet per hour. The entire project would not release no EPA permits — only Standard General Permits from the Department of Environmental Protection. Abel Recon, infrastructure rehabilitation contractors based in Montoursville, won the bid to apply the material. The epoxy offered good adhesion for the coating, but Abel Recon needed to pressure-wash any loose material, using pressures from 2,000 to 3,500 psi. Technicians installed tightly woven “silt sacks” (catchment bags) at the pipe ends to catch debris and keep it from entering the river.

Night spraying

Next, workers used grout to restore the corroded profile of the pipes near the exposed ends, where air and moisture had pitted and eaten through the metal. “There were some pinholes and maybe some 1-inch holes, but other than that, the rest of it was in fairly good shape,” says Witmer.

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