SWS
STORM WATER SOLUTIONS

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Indiana city saves critical brick storm sewer by going trenchless

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There were issues with the bottom of the 48-in. storm sewer pipe, as well as cracks running along the length of it.

Warsaw, Ind.—the "Lake City"—is snuggled in the midst of four lakes and generates seasonally high quantities of storm water runoff to the Tippecanoe River. Inflow and infiltration make erosion a continuing challenge. So when a 48-in. storm sewer pipe, made of paving brick and mortar, appeared to be failing, the city took it very seriously.

"This is a round pipe made of brick and mortar," said Warsaw Superintendent of Public Works Lacy Francis. "It sits low in the water table. There were some issues with the bottom of the pipe and long cracks running the length of a pipe—it seemed to be cracking like an egg. We worried that if bricks started falling out, there could be a sudden collapse."

Warsaw needed a fast, structural, cost-effective solution.

"I'd seen manholes rehabilitated with a 'sling' [centrifugally casted] method that coated the manhole with high-strength grouts," Francis said, "and I figured that it would work on horizontal pipe as well, even though I'd never seen it done."

A tradeshow led Francis to Iowa-based AP/M Permaform. The Permacast system AP/M Permaform has been using to repair and seal manholes since 1985 has been adapted for use in horizontal pipe, and there are hundreds of successfully completed projects in the U.S.

The horizontal lining system is called CentriPipe. Based on a computer-controlled spincaster, it is pulled backwards through pipes to precisely apply thin layers of high strength grouts, sealing and structurally reinforcing the failing pipe. The final product is waterproof, smooth and relatively thin, so flows are not restricted. It is especially cost-effective for larger-diameter pipe and costs less per foot than other trenchless repair methods like cured in place pipe.

How It Worked In Warsaw

The Warsaw rehabilitation took about five weeks total, but work with the spincaster was only about one week. First the pipe was plugged and dewatered, and the bottom was sealed with underwater cement due to greater-than-expected inflow and infiltration; this also provided a smooth bottom surface for the spincaster sled to travel on. Long cracks were sealed with MS-10000, a fiber-reinforced cement from AP/M Permaform.

After plugging holes, filling cracks, stabilizing loose brick and cleaning the pipe with high-pressure jetting, PL-8000, an AP/M Permaform cementitious grout designed for brick and concrete pipe relining, was applied in two passes of about ½ -in. each.

Application thickness is controlled by adjusting the withdrawal speed according to the project requirements. To verify layer thickness during application, a thin-wire wet gauge is inserted into the grout at random points for precise spot checks of actual applied thickness. Bag counts (of PL-8000) are kept during passes to keep track of applied volume and are compared with calculated volumes for the exact pipe lengths.

The rehabbed pipe is waterproof, smooth and relatively thin, so flows are not restricted.

The passes also were videotaped. “I could drop by during passes and watch the work being done, and that was reassuring,” Francis said. “And I’ll have a copy of the video for review later.”

Francis knows that the effectiveness of the project will have to be judged in five to 10 years, but he said, “I’m feeling good about it.”

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