

“THE RIGHT SOLUTION” SAVES PIPE AND ROADWAY

By: Angus W. Stocking, L.S.

When a two lane paved road in Jerseyville, Illinois was failing, City Engineer Robert Kincaid, PE, discovered a 60-inch by 100 foot long CMP sewer was in very bad shape. The invert was close to being completely rotted out and much of the pipe's top arc was also failing. The road was slumping due to a wide gap near the middle of the sewer run where sections were out of horizontal alignment by about eight inches.

Complicating matters, this sewer had limited staging areas, with a golf course on the south end and a treatment plant evaporation pool just 20 feet away on the north end leaving about a 14-foot pad for equipment. So trench-and-replace seemed like a bad strategy; Kincaid says, “Altogether, it would have been a horrible and costly dig for us.”

Kincaid first thought cured in place pipe (CIPP) might be used to save the pipe without digging, but found that contractors were reluctant to even bid on such a large diameter repair, and when they did, “The price seemed extremely high.”

Searching online for alternatives, Kincaid found CentriPipe, a centrifugally cast concrete pipe (CCCP) trenchless solution from AP/M Permaform that sounded promising. Proven over a decade or more, CentriPipe has been approved for use by many DOTs and other large agencies. Using a precisely controlled spincaster, pulled through pipe, the system applies PL-8,000, high-strength cementitious mortar, in thin, even layers, creating a new, structurally sound concrete pipe within the old pipe while requiring very minimal staging area. Since the new pipe is thin (two inches or less in most cases) and adheres tightly to the old substrate, pipe capacity is only minimally reduced. And since it is concrete, waterproofing or antimicrobial agents can be mixed in as part of the rehabilitation, if needed. Perhaps best of all, staging area requirements are modest,

trenching is avoided, and CCCP is exceptionally cost-effective compared to CIPP and similar solutions.

Jerseyville selected Ace Pipe Cleaning Inc., headquartered in Kansas City, Missouri, as their CentriPipe contractor. Bryan P. Dobson was the operations manager, and Jackson Lewis was the onsite project manager.

An Unpleasant Surprise

Dobson bid and planned the CentriPipe project based on photos, and when he arrived in Jerseyville on a Monday morning discovered a difficult challenge. “Photos taken in a wet season showed the pipe bottom covered with what looked like a shallow flow, of course,” he explains. “But in September (2014), when we showed up with everything we needed to get started with rehabilitation, we discovered that the seasonal flow had obscured a ‘canyon’ running along the bottom of the sewer—the CMP had failed so completely along the invert that erosion had created a three foot deep trench along 40-50 feet of the sewer bottom. That was a surprise for us and the city.”

A smooth bottom is needed for CentriPipe spincaster withdrawal, so most projects require some sort of resurfacing. In this case, Kincaid worked with a local batch plant to make a pumper truck available on short notice, and on Tuesday the Ace crew was able to fill in the eroded trench with ten cubic yards of diggable fill, which they then topped with a few inches of sprayed and troweled PL-8000, a high-strength, workable engineered cementitious product from AP/M Permaform. After a solid day's work, they had the smooth strong surface they needed to begin spincasting the next day; in the area of the eight-inch gap, they filled in and beveled to make an even transition. Dewatering was accomplished with coffer dams and a two-inch pump, and to complete



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pipe preparation, sewers are usually scoured with high-pressure spray (sometimes with the CentriPipe spincaster), and some hand troweling of pitted or peeling sewer sections is usually needed.

Work began on Wednesday morning with the placement of ‘depth pins’; since the cement layers applied are thin, it's important that each layer be applied evenly. Ace uses a standard rivet gun to set aluminum rivets at 12:00, 3:00, 9:00, and (sometimes) 6:00 (viewing the pipe diameter as a clock face), every 20 feet or so along the sewer, then trims the rivets to an inch. This gives CentriPipe sled operators a good visual gauge of thickness as layers are applied and, at project end, assures that the final design thickness—one and a half inches in this case—has been reached. For a redundant check on final thickness, Ace



Sewer rehabilitation was completed on schedule, even with the surprise 'canyon' to fill

also tracks material volume used; in Jerseyville, about 4.5 pallets were used, translating to an applied volume that exceeded design specifications.

One important detail to work out before spincasting begins is winch placement. "We knew when we started working with this system that we needed a good, flexible way to place and anchor the withdrawal winch," Dobson explains. "So we built a 'winch skid' out of planks and angle iron that can be carried by two people. If we're working from

were applied in two days. Hand troweling for a smooth bevel at the entrance and exit transitions completed the CentriPipe work. "We're getting better at doing the spincasting right to the sewer entrances," says Dobson. "But still, mainly for looks, we find that hand troweling and brushing is necessary to really finish off the ends well."

Final clean up, walk through, and inspection was performed by Kincaid on Friday

morning, completing the sewer rehabilitation on schedule, even with the surprise 'canyon' to fill. And in fact, Kincaid had been visiting the site regularly during work. "He stopped in every few hours to take a look and check the pins," says Lewis. "And he even brought by some of the local engineers to come see how things were progressing."

For his part, Kincaid says he is well pleased with Jerseyville's first CCCP project. "We had actually used a similar technology for man-hole rehabilitation," he says. "So I had a good idea that CentriPipe would work here. Still, it was a pleasure to see it go on so well and, four months later, I've walked through twice, once after a major rain event, it appears to be holding up perfectly—we'll inspect again after winter, but right now I believe this has been the right solution for us." †

ABOUT THE AUTHOR:



Angus W. Stocking, L.S. has been writing full time about infrastructure since 2002. Feature articles by Stocking have appeared in several dozen infrastructure trade journals. Prior to taking up writing full time, he enjoyed a 14-year career as a licensed land surveyor, working in California, Idaho, Kentucky, and Wisconsin, including stints as a right-of-way surveyor for CalTrans and survey manager at Midwest-based consulting firm MSA Professional Services.

"I believe this has been the right solution for us."

a grass surface, we can drive rebar to anchor the skid, and if we're on pavement we can set lag bolts through the angle iron, and patch up the holes when we're finished." On this particular project, since inline placement of the winch was difficult, a pulley arrangement had to be improvised so that the winch could be withdrawn in a straight line through the sewer.

Even with all this preparation, the first layer of PL-8000 was applied on Wednesday. Since the material cures quickly, within a few hours, new layers can be applied on successive days. In Jerseyville, two 3/4 inch layers

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