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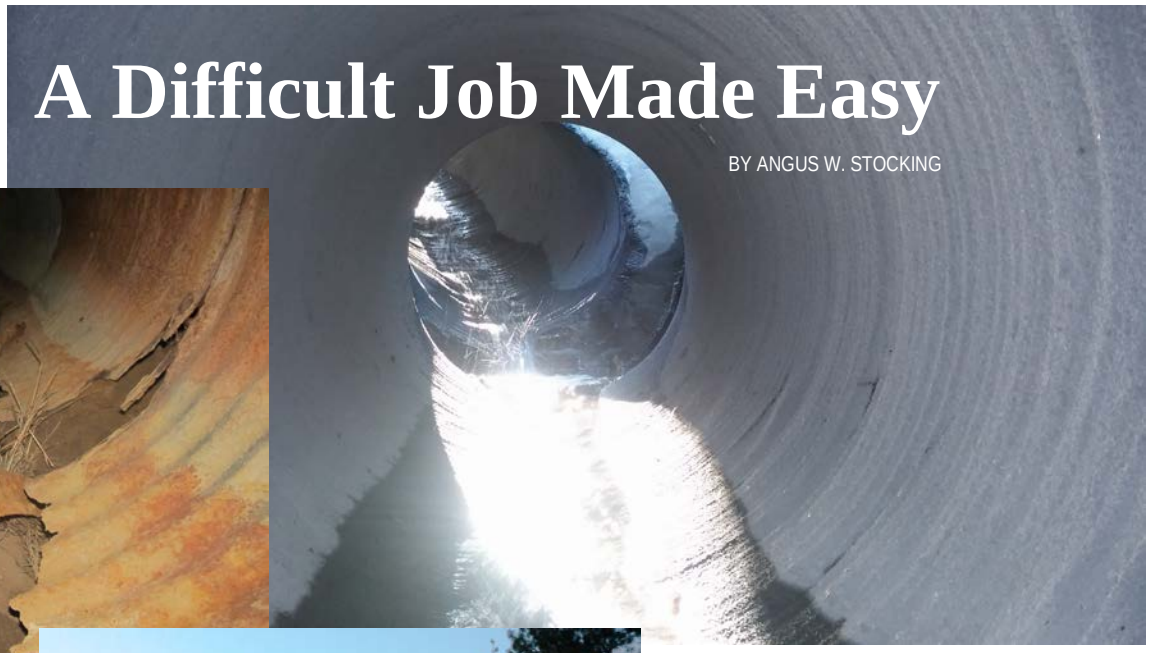
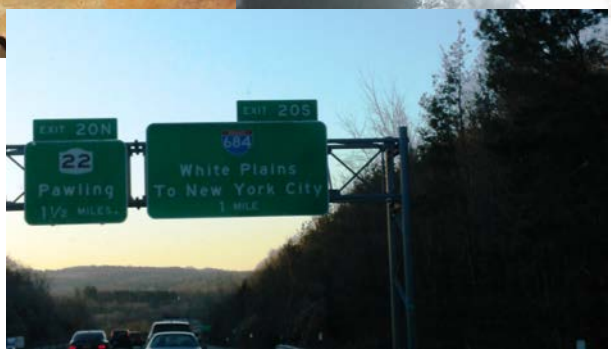
PROJECT PROFILE

A Difficult Job Made Easy

BY ANGUS W. STOCKING





New York Interstate 684 connects Connecticut with New York City, and is one of the state's busiest thoroughfares. Near the border, its six lanes of traffic are nearly always busy. Shutting down 684 for something as mundane as culvert rehabilitation isn't really an option. When Arold Construction Company won a bid to apply centrifugally cast concrete pipe (CCCP) to 300 feet of 36-inch CMP culvert running under I-684, they expected traffic logistics would be difficult. But even so, they were surprised by the amount of driving on this project. "This was 65 mph traffic, and it never really let up," says President Ryan Arold. "It made everything more tedious. Often, to get somewhere just 60 feet away, we'd have to crawl through the pipe, or get in the truck and drive 20 minutes to an exit and back."

But this was an emergency project; the culvert's invert was rotted out and there was rust everywhere. Arold Construction had to be efficient, and work fast in a very cold New York December. Fortunately, the CCCP solution they used, CentriPipe from AP/M Permaform, is a fast, efficient process and the culverts were repaired, despite challenges, in about two weeks.

Though CentriPipe is relatively new, compared to conventional solutions like cured in place pipe (CIPP) or sliplining, the New York State Department of Transportation (NYSDOT) has used it on several projects, and they specified it for this emergency project.

CentriPipe is based on technology developed for manhole repair, and is built around a high-pressure spincaster that is drawn through failing pipes while applying thin layers of high-strength cementitious grouts developed by AP/M Permaform. It has several advantages compared to competing technologies:

- CentriPipe is a structural solution. The layers of grout build up a brand new concrete pipe inside the old sewer or culvert, and the new pipe does not rely on the old substrate for support.
- The new pipe is smooth and seamless from end to end, with no joints, even at bends. So the rehabilitated pipe is likely to last indefinitely. If needed, the grouts applied can be mixed with waterproofing or anti-microbial admixtures that make the new pipe intrinsically resistant to hydrogen sulfide and freeze/thaw cycles.
- Because CentriPipe rehabilitations are thin—just one inch in this case—and adhere tightly to the substrate, they don't significantly reduce culvert capacity. The annular space between the old and new pipes is completely sealed, eliminating water flow around the new pipe.
- CentriPipe can be applied to curved or bent pipe. In this case, some culvert sections had bends, including a 45º bend in the middle of one section.
- CentriPipe is trenchless, and requires minimal staging areas compared to CIPP or sliplining.
- CentriPipe is cost-effective for large diameter pipe. Dozens of projects have shown CentriPipe to cost significantly less per foot than CIPP or sliplining.

To get started on the NY 684 project, Arold began by pouring new inverts in the failing CMP—this gave the CentriPipe spincaster a smooth surface to facilitate withdrawal. The spincaster was then used as a high-pressure washer and pulled through pipes to clear out debris. A few spot repairs were made to provide a good surface for the sprayed grout.

The cold was a consideration, but Arold says that it wasn't too big a problem; "We heated the mix water, and we certainly had some heaters around," he says. "But we found that cure times were not affected, and we were still able to do one pull per section, per day." This was important; CentriPipe is applied in thin layers, about half an inch, and cures quickly so that layers can be applied on successive days.

Arold was able to break up the 300 feet of culvert into five sections, working from manhole to manhole, with staging areas in the median and adjoining land. Two passes were enough for most sections. To ensure the specified thickness of one inch (from top of corrugation) was being met uniformly, interior diameter measurements were taken at spots along each section, and then the spots were remeasured after each pass. The material used was PL-8,000, a fiber-reinforced, engineered grout from AP/M Permaform. For the new inverts, Arold used PL-12,000, a self-leveling grout also made by AP/M Permaform.

This was a small diameter rehabilitation for a CentriPipe project. Usually, an operator rides on the spincaster, and signals exterior crews to speed up or slow down as needed, to ensure an even application. In this case, the operator stayed just behind the sled, moving back as needed and using a radio to communicate.

But really, despite the extra driving and the cold, this was a smooth project, nearly routine. It's good to know that a cost-effective, completely structural rehabilitation solution is becoming the norm for NYSDOT, and around the world.

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