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BUILDING COMMUNITY

HDPE Pipe Brings Life Back to Miami-Dade Water System

Property Protected and Narrow Work Area Problem Solved With Pipe Splitting Technique; Old Water Lines New Again

Miami-Dade's two-man crew easily installs a new 2-inch HDPE water pipeline. In just a few hours, residents have water pressure returned to normal.

MIAMI, Fla., – For anyone in the public sector, keeping citizens happy while improving their lives is not always an easy task. In Miami-Dade County, an ongoing water revitalization project that might have required ripping up streets and destroying highly-prized decorated driveways could have provoked a civil uprising, even though municipal water was dwindling to a trickle.

Fortunately, Miami-Dade's water distribution chief, Luis Aguiar, determined the old pipe system could be replaced and property protected by using high-density polyethylene (HDPE) pipe. To ensure the delicate nature of the project is handled properly, he established an in-house crew to do the work.

With a potable water system just approaching the halfway mark of its projected lifespan, Miami needed to start replacing the two-inch galvanized line in 1999 to address the vast number of leaks in pipe joints and walls, and a system that is constricted due to tuberculation down to the size of a pencil. Completion of the pipe replacement will take at least another 20 years.

"What is being experienced in Miami is the same as the rest of the country," stated Tony Radoszewski, executive director, Plastics Pipe Institute (PPI). "The infrastructure is crumbling. Water is being wasted. Costs keep going up. Rate-payers pay more -- and needlessly. There's a ready solution at hand, just as Luis Aguiar found.

"A leak-free system using HDPE pipe can be installed without a lot of property destruction, and because it is corrosion resistant, it will outlast any other type of system. Plus, high-density polyethylene is a material that eliminates the problem of tuberculation because it does not support biological growth.

"And the need is critical. Just last year, the Miami-Dade district requested from the state more than $4.5 billion to fund capital improvement projects," he said.

"There are at least 500 miles of water pipe that need to be replaced," explained Aguiar. "In addition to the restricted flow, in many places the pipes have been disturbed and broken from the hurricanes; it's the trees that have been pulled up and the roots taking the pipes. Plus the very low water table eats into the metal pipes."

From the PPI Director

How do you replace a cracked, clogged water pipeline without destroying property, knowing that your customers would much rather suffer with a trickle and a dribble than the water pressure they rightly deserve if it meant ripping up their prized, decorated driveways?

It's not easy to be a hero. Most times it requires risk and compromise. And generally, someone has to suffer.

Install a new water line? Get the backhoe and start digging a wide trench. Cut and cover gets the job done. Driveways, yards and roads can be replaced. It's messy and sometimes dangerous. Homeowners get upset, but that's the way it is.

Not really. Not when there's a practical alternative.

For the Miami-Dade Water and Sewer Department, the leadership of its water distribution chief, Luis Aguiar, provided the path to reviving the water lines and keeping residents happy.

He found the means and the method. Using high-density polyethylene pipe and trenchless technologies enabled his crew to thread new pipe within the old lines. This is almost like arthroscopic surgery: minimum intrusion with maximum effectiveness.

Maybe Luis Aguiar and his crew aren't surgeons, but they certainly are heroes. Just ask anyone with a new HDPE water line taking an invigorating shower now and for a long time to come.

Tony Radoszewski
Executive Director

The old galvanized metal pipe provides a path for the new HDPE pipe to follow. The Miami-Dade crew excavates a small hole, inserts metal rods to break the old pipe and pulls the new HDPE pipe back through.

The Miami-Dade Water and Sewer Department (MDWASD) is one of the largest public utilities in the United States. It provides service to more than 2.4 million customers. Approximately 330 million gallons of water are drawn every day from the Biscayne Aquifer for consumer use. MDWASD has more than 7,000 miles of water lines.

Water pressure for the system should be from 58-60 psi. Now because of the disintegration of the system, it is typical to find pressure in the low double digits, but no one complains.

"People don't realize they're not getting enough water out of the shower because tuberculation gradually slows it down. When we get a call it's usually because the flow is down to 1.5 cubic feet a second and the pressure is below 20 psi. It's like they have no water at all. Plus the underground lines leak. So we go in and supply a brand new 2-inch HDPE line. Water pressure is immediately restored and water is no longer being wasted from cracked pipes. For our customers it's like a brand new day, and they're seeing sunshine for the first time. And that's a good feeling for us," Aguiar said.

Because the water department must maintain the water lines, which are mostly found in alleyways behind the houses, Aguiar had to find an efficient method that would bring in the new pipe and be effective without creating a nightmare for the residents of Miami-Dade County.

In Miami there are many art deco driveways. Homeowners decorate their driveways with poured, colored and tinted concrete and they won't allow Miami-Dade to rip up it up, even to provide better water service.

For Aguiar's crew, the process is pretty straightforward because the pipe replacement technique they use is non-evasive and moves quickly.

Once the area for reclamation is determined, the smallest trench possible is dug and the galvanized pipe cut and split. Rods are inserted and pushed through the old pipe. At the end of the run, HDPE pipe is fed through and

pulled back.

"Galvanized pipe is tough and splitting it is really different from eliminating the newer cast iron," Aguiar explained. "Galvanized pipe reduces our efficiency but we make it happen. Because we're doing the work in-house, our crews get inventive. We designed our own cutter head in the shop and it is doing a great job."

On a typical day, a three-person crew installs 300 – 500 ft. of new HDPE pipe. "Our largest pull was 550 feet," Aguiar said.

According to Frank Lopez, HDPE product manager for HD Supply Waterworks (Thomasville, GA), who works closely with the water department, the pipe was selected because of convenience and performance. "Because the pipe is delivered in 500-foot coils, it's easier to transport and unroll at the job site. Plus it's just more economical and flexible to work with." HD Supply Waterworks distributes a complete line of water, sewer, fire protection, and storm drain products.

Endot Industries' (Rockaway, NJ) EndoTrace℠ HDPE pipe was selected because of its high ultraviolet protection and tracer wire that makes it easy for a crew above ground to find the buried pipe. The average temperature in Miami is in the mid to high 80s, and with the coils sitting out in the supply yard exposed to that intense sunlight for long periods of time, it's important that the pipe have the proper UV stabilization package.

Both HD Supply Waterworks and Edot Industries are PPI member companies.

Resource Sacrifice — Water Loss

"One of the most important aspects that should not be overlooked is that we have a tremendous water shortage in South Florida," explained Aguiar. "And so we must have the most waste-proof system possible. Being able to split the old pipe and install a single pipeline down the narrow alley in the long run is going to help tremendously. We believe that a great percentage of the water accountability problems we have are in those old lines.

"Our water loss is below 8 percent, but that is a significant number especially when you're pumping 360 MGDs (millions gallons per day), and the 500 plus miles of leaking alley mains are contributing," he said.

According to PPI, the cost of splitting an old line and inserting HDPE pipe can be 33 to 66 percent less than the traditional dig and replace method. And due to the longevity of the new HDPE pipe, the cost benefit can hit 300 percent.

"Replacing old pipe with a new line such as they're doing in Miami can be accomplished only with HDPE pipe, and the benefits are numerous aside from low material and labor costs," explained Bruce Kuffer, P.E., manager, polyethylene market development for PPI.

"Because there is significantly less road and environmental disturbance, a safer work area is promoted; there are about 50 people each year who die in trenching and excavation accidents. Plus there is less disruption to the neighborhood and a much shorter construction time which lowers liability exposure."

Kuffer elaborated on the process of this HDPE pipe installation. "The pipe used by Miami-Dade, which they considered the main line at the time it was installed, was originally two-inch diameter. And because it is being replaced by two-inch diameter HDPE pipe in 500 foot coils, it means that even long runs can be one, joint-free continuous piece. And when connections are made to homes, or pipe sections added, these are literally melted together which makes the system leak-free. This seamless, jointless system provides a longtime utility solution."

Dan Mathews, Miami-Dade's

Clogged galvanized pipe has restricted water flow to a trickle. Cracks in the pipeline have also reduced water pressure and caused water loss. HDPE pipe, which eliminates this problem of tuberculation, was selected to replace the old line.

assistant superintendent for the Water Transmission and Distribution division is a true fan of the operation, especially since it helps him solve a different puzzle nearly every day.

A single long-run of 2-inch leak-free HDPE pipe is laid out, ready for installation. But instead of digging up this Miami-Dade Water customer's yard, the pipe will be snaked underground without any property destruction.

"When the pipe was put in, there was no code enforcement or even a building code. That's why there is no dedicated easement for the pipelines and it runs under alleyways. If it weren't for the trenchless method and the HDPE pipe, I think we'd have a pretty messy situation and very angry customers because we'd have no choice other than to do major excavation.

"Even now, we run into gas and other utility lines crisscrossing our path. But again, because we're not in there with heavy equipment, we can control the path and the speed of the installation. That gives us a real advantage."

The crew uses a compact, hydraulically operated, static pipe splitting system that can fit in a small trench. It was selected also because it has the power to crack the older galvanized pipe, especially a coupling which doubles the thickness of the walls.

"In the trench, we feed the 1-meter long rods through the old pipe and hook into the cutter with an expanding cone that splits the pipe and knocks down any sharp edges inside the pipe. Then the HDPE pipe is hooked up at the other end and pulled back."

In Miami-Dade service runs to the property line where the meter is placed. Connection to the main is done by electrofusing side-saddle tees from Central Plastics, (Shawnee, Okla) also a PPI member company.

"We make the connection to the meter and water is running typically within a few hours," Mathews explained. "We want our operation to be safe, reliable and efficient."

"Miami-Dade is solving more than water loss and diminished water power," said PPI's Radoszewski. "It is safely providing a system that will last and perform for generations, which is keeping today's residents happy, improving their quality of life and protecting property. In light of what they are doing to save natural resources, protect the safety of their workers and deliver a value-enhanced pipeline, Luis Aguiar, Dan Mathews and the in-house crew are truly heroes in the community."

For additional information about HDPE pipe, its applications and technical information, contact the Plastics Pipe Institute at 469/499-1044 or www.plasticpipe.org.

Intricately designed, patterned and art-deco driveways are highly prized by Miami-Dade homeowners. In order to save them, the water department threads the much-needed new 2-inch HDPE water pipeline under the pavement and yards, which also saved time and labor costs.

PPI is the major trade association representing all segments of the plastics piping industry. Member companies share a common interest in broadening market opportunities that make effective use of plastic piping for water and gas distribution, sewer and wastewater, oil and gas production, industrial and mining uses, power and communications duct and irrigation. More information is available online at www.plasticpipe.org.

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