



# Murphy Pipelines:

Pioneers of Pre-Chlorinated Pipe Bursting Set the Standard in Michigan By Jim Schill

The Grundoburst features patented QuickLock bursting rods that are securely linked together, not screwed together, reducing torque and speeding the installation and breakdown process. Crews burst an average of 470 ft per day.

**T**he versatility and capability of the static pipe bursting method continues to accelerate thanks in large part to contractors like Murphy Pipeline Inc., Jacksonville, Fla., that continue to push the method to achieve better, more effective results. A recent project in Livonia, Mich., demonstrates this point.

The City of Livonia needed to replace approximately 23,000 ft of its undersized and deteriorated 6- and 8-in. cast iron and ductile iron water mains and the installation of about 4,000 ft of new main. This aged and undersized system had a history of breaks, along 14 different streets.

Engineering firm Hubbell, Roth & Clark Inc. (HRC), Detroit, was called in to develop the project to upgrade the system. According to HRC, the construction contract documents were developed so they would allow the trenchless and traditional approaches to be bid against each other, thereby allowing the bidding process to determine the most cost-effective means of replacement.

“Ultimately, a trenchless technique called pre-chlorinated pipe bursting proved to be the low-cost alternative,” said HRC project manager Dan Mitchell. “During the method pressure and disinfection testing are completed above ground, eliminating the installation of a temporary water distribution system, as well as the significant excavation associated with the traditional open-cut approach.”

To complete the pre-chlorination bursting project, Murphy Pipeline used a Grundoburst 800G static pipe bursting system from TT Technologies, Aurora, Ill.

## City of Livonia Background

The City of Livonia receives water and wastewater services from the Detroit Water and Sewerage Department (DWSD). According to its Web site, the DWSD is the third largest water and sewer utility in the United States. With its beginnings dating back to the early 1800s, the department’s original water system included wooden logs, brick and stone. Today, the utility has a 1,079-sq mile water service area and provides water services for approximately 1 million people in Detroit and 3 million people in the surrounding areas of southeastern Michigan. Wastewater service is provided to a 946-sq mile area that includes almost 35 percent of the state’s population.

With a population just more than 100,000, Livonia is the eighth largest city in Michigan. Its average daily water demand is approximately 16 million gallons for its 38,000 residential, commercial and industrial users. As typical with many communities in the Detroit area, Livonia’s infrastructure was constructed during the 1940s, 1950s and 1960s and is beginning to deteriorate. A majority of the system was composed of cast iron and ductile pipe.



## Pre-chlorination Pioneer

Mayer came to the United States from England almost 10 years ago and couldn't believe what he saw, a country with an infrastructure that was deteriorating and an opportunity to change that. "We came over in 2000 to look at a sewer project in Jacksonville, Fla., and ended up getting involved with the AWWA," Murphy Pipeline president Andy Mayer said. "I gave a presentation that year at the AWWA conference on pre-chlorinated pipe bursting and through a series of events, the method received approval in Florida."

Mayer began his career 30 years ago in England with British Gas, the original patent holder for pneumatic pipe bursting. He is a first generation trenchless contractor, having worked with trenchless applications his entire career, some from their conception. Since the first approval for the pre-chlorinated pipe bursting method in 2000, Mayer and Murphy Pipeline have worked diligently to obtain approval from other states around the country. So far, 37 states in the United States have approved the process of pre-chlorinated pipe bursting because of Mayer's efforts and the efforts of Murphy Pipeline business development director Todd Grafenauer. The project in Livonia would prove to be the largest pre-chlorinated pipe bursting project in North America so far.

According to Mitchell, pre-chlorinated bursting is a multi-faceted procedure. He said: "Pre-chlorinated pipe bursting utilizes HDPE pipe and entails the pre-assembly and testing of approximately 300- to 500-ft lengths of pipe above grade at a nearby staging location. Once the pipe is proven to be

sound by the pressure and disinfection testing, a series of small excavations are made and the new pipe is pulled into place by bursting the existing main. A post-chlorination and flushing of the main is then performed and the new line is connected into the distribution system. Ultimately, all services are connected into the new main and the surface area is backfilled to preconstruction grade. The entire process is completed within a single day, seven to 10 hours, thereby minimizing the disruption to area residents."

## Static Pipe Bursting

According to TT Technologies pipe bursting specialist Frank Fresneda, static pipe bursting has come to the forefront of trenchless methods in North America. "Static pipe bursting is quickly becoming one of the most preferred methods of pipe rehab and replacement," he said. "This has really come about for two main reasons. First, the versatility method really appeals to contractors and engineers alike. It provides multiple solutions for projects. Second, the reliability and effectiveness of this trenchless method is very attractive. It has established a solid project history here in the United States and that means a lot when choosing construction options."

The static bursting process is simple, yet effective. Specially designed bladed rollers are pulled through an existing line by a hydraulically powered bursting unit. As the bladed rollers are pulled through, they split the host pipe. An expander attached to the rollers forces the fragmented pipe into the surrounding soil while simultaneously pulling in the new pipe.

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Patented Quicklock bursting rods are linked not screwed together like traditional drill stems or other static systems. This system speeds the installation process as well as the breakdown procedure. The rods can be quickly removed one at a time at the exit pit as bursting is in operation. While HDPE is commonly used, new techniques and technologies are allowing contractors a choice when it comes to product pipe. According to Fresneda, the fact that static pipe bursting can be used to install a variety of pipe materials has really expanded the methods reach.

“Over the last several years TT Technologies, along with some partner contractors have developed techniques to allow for the use of a range of product pipes with the static bursting method, including ductile iron, PVC, specially designed clay and steel,” Fresneda said. “HDPE is still used as well, and, now, pre-chlorinated HDPE has made the method even more versatile. Contractors, engineers and municipalities have been very receptive to the continued growth of the method, making static pipe bursting a good choice in many instances.”

### On The Job

For the Livonia project, HRC identified and grouped 16 priority areas into five separate project areas. As part of the specifications Murphy Pipeline crews could not begin installing water main in a new project area until final restoration was under way in the previous area. This helped minimized the time residents were disrupted by construction.

Launch and exit pits measured approximately 5 ft wide by 12 ft long. Crews positioned pits as close as possible to proposed valves or hydrants, to limit the amount of total excavation. Typical pit depths ranged between 5 and 6 ft. Temporary shoring and bracing was also used throughout the project and open areas were fully surrounded with construction fencing.

For a typical bursting run, once pits were identified and prepared, Murphy Pipeline crews positioned a Grundoburst in the exit pit and prepared to pull in the 300- to 500-ft segment of pre-chlorinated 8-in. HDPE. Residents within the immediate service area of the installation only experienced a six- to 10-hour interruption in water service before being reconnected. Crews typically began preparations around 7 a.m. and by noon the new pre-chlorinated HDPE was in place. Usually between 3 p.m. and 5 p.m., residents were reconnected to the water system.

“Although this process was approved for water mains in 2005, this was the first successful pre-chlorinated pipe bursting project in Michigan,” Mitchell said. “The results have been good. Even though it took six months longer than anticipated to award the contract, the work was completed on schedule. Furthermore, the cost-savings to the city by using this technique were significant, enabling them to repair more pipe than originally anticipated.”

Jim Schill is a technical writer, based in Mankato, Minn.

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