# Static Pipe Bursting Used

## to Replace Force Main in Hallandale Beach, Fla.

By Todd Grafenauer

Replacing utilities in urban areas presents challenges to all stake holders. Easement issues, street closures, traffic congestion, disturbing surface works and customer inconvenience are all areas of concern that communities must address. City administrators, engineers and residents are starting to demand more efficient and less disruptive methods of replacement to ease these concerns. As pipelines are coming to an end of their useful life, replacement methods such as static pipe bursting are being selected to add value to all stake holders involved.

The history of pipe bursting dates back to the 1970s, when British Gas in the United Kingdom began the research, development and implementation of many of the trenchless technologies that are in use today. They did so out of necessity to replace and rehabilitate their aging pipeline systems with the criteria of cutting costs and increasing efficiency. Two of the most well known methods, which now carry a history in excessive of 30 years, are pipe bursting and swagelining. Both methods have seen tremendous growth in North America to replace pressure pipelines such as water and force mains. The pipe bursting method has been credited as the only trenchless method in which increasing the size of the main is possible, while still following the existing utility path.

The process of pipe bursting is one of the most cost-effective methods of replacing pipes or upsizing them to meet increased demand. A typical day of bursting operations can include replacing between 400 to 600 ft.

The City of Hallandale Beach, Fla., located between Miami and Fort Lauderdale, was originally settled in the late 1800s as the Florida East Coast Railway was extended through the area. Over the last half century, the City has enjoyed significant development due to its proximity to major cities and southern Florida charm. During this growth period, the City developed its infrastructure to meet the growing demands of its residents. Like many developed communities today, the water and sewer pipelines installed during these high-growth periods have exceeded their life expectancy. Louis Granda, utilities superintendent overseeing the City's replacement program, said, "We have an in-house team to replace our water and gravity sewers and now that our force main system is experiencing frequent breaks — we've begun to budget and plan for its replacement."

## Project Overview

The City of Hallandale Beach had three segments of force mains that experienced the majority of breaks over recent years. The existing host pipe was incurring extensive pitting, caused by high concentrations of salt in the groundwater. This, in time, caused major breaks resulting in significant cost to repair, environmental damage and inconvenience to residents and business. The force main routes included mature residential corridors, tight easements and high traffic areas. These sections totaled 3,200 ft of 14-, 16- and 20-in of existing cast and ductile iron mains. Several construction methods were evaluated, with static pipe bursting being selected to replace the pipeline with new size on size HDPE. Selection criteria was based on limiting excavation, following the existing utility path and speed of installation. As the project was an emergency due to recurring breaks, procurement options were vital as the City did not have time to design, bid and build the work.

To fast track the project, a cooperative purchasing contract recently awarded to SAK Construction/Murphy Pipelines by Choice Facility Partners was used. Choice Facility Partners is a Houston, based cooperative purchasing organization that brings legal, competitively bid contracts to municipalities and governmental entities across the United States. The Trenchless Technology Rehabilitation contract awarded revolves around all aspects of trenchless construction methods such as pipe bursting, swagelining, cured-in-place pipe (CIPP), manhole rehabilitation and sliplining. Hallandale Beach selected the line items off the contract corresponding with their force main replacement project. After approval from city officials, the contract was initiated and crews were onsite in five days. While Murphy Pipelines has become known for its pre-chlorinated pipe bursting method to replace water main, it also has significant experience replacing force main with static pipe bursting.

When Murphy Pipeline crews arrived, a staging area was first selected. To further minimize the impact of construction to the residents, the staging area was located away from actual burst locations. Forty-foot sections of HDPE pipe were delivered and butt fused, according to the burst program of 500-ft sections. HDPE was selected as the new replacement pipe due to its 100-plus-year service life, corrosion protection properties, ability to use standard mechanical connections and resistance to cyclical fatigue. While fusing operations were under way, crews also implemented a temporary by-pass

program to re-route flow of the force mains. With fusing of pipe and the by-pass plan completed, focus was shifted to pipe bursting operations.

To minimize the impact of construction on the sensitive surroundings, the goal of each burst was to replace at least 500-ft sections. To accomplish this, Murphy Pipelines developed an aggressive burst program. Each day by 7 a.m., launch and exit pits were excavated and measured approximately 4-ft wide by 12-ft long. Crews positioned pits as close as possible to proposed connections, to limit the amount of total excavation. Typical pit depths ranged between 3 and 5 ft.

By 8 a.m., bursting equipment was set in place. To complete the project, Murphy Pipelines used a Grundoburst 800G static pipe bursting system from trenchless equipment manufacturer TT Technologies. Next, rods were shuttled through the existing main until they reached the launch pit. The tooling, expander and new HDPE were then attached and the pullback process began. During the static bursting process, a blade set or bladed rollers are pulled through the existing line by a hydraulically powered bursting unit. As the blade set or bladed rollers are pulled through, the host pipe is split. An expander attached to the tooling forces the fragmented pipe into the surrounding soil while simultaneously pulling in the new pipe.

The bursts averaged around two hours to replace each 500-ft section. After crews systematically replaced each section of pipe, final connections were made using standard ductile iron fittings and the line was pressure tested. "Pipe bursting will definitely be considered for all future pipeline replacement projects, as we've seen firsthand the reduction in social, environmental and construction costs," said Granda.

The small footprint of using the static pipe bursting technology resulted in a significant reduction in social and environmental costs. Excavation was 90 percent less than what open-cut trenching would have required. Rapid installation of 500-ft bursts allowed the project to be completed within the emergency time constraints of the project. The specific problem of pitting on the iron pipes was also addressed as the new HDPE replacement pipe will provide a long-term corrosion protection barrier in which the PE pipe will never rust or corrode in the future.

While static pipe bursting has a significant history to replace water distribution systems, the method has seen an increased use for the replacement of force mains as they come to an end of their useful life.

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