

Daytona Beach Races Ahead With HDD Solutions

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In June 2008, a 16-inch-diameter cast iron water main ruptured in Daytona Beach, FL. The main, one of three that service nearby barrier islands and beaches, was 61 years old.

The city of Daytona Beach's Utilities Department sought a speedy solution to the faulty main that put additional stress on two remaining water mains, both of which are also 50 to 60-years old. Only three months were needed to get from mobilization to activation of a new replacement line.

Since the repairs were critical in nature, an Agenda Summary available through the city stated that "considerable additional stress" was placed on the remaining two mains and that because of the age of the mains crossing the Halifax River, there was "considerable uncertainty as to how long the two currently serviceable water mains would be able to sustain the increased stress levels of an extended emergency."

City officials decided to enlarge the main to approximately 24-inches inner diameter to accommodate anticipated growth and redevelopment on the beach side and barrier island. The new line crossing was placed 1,500 feet south of the existing line that ruptured due to constraints on space available for layout.

Utility Services Authority LLC (USA) won a bid for the \$1.5 million Earl Street Water Main Replacement project that included directional drilling and pipe

installation underneath the Halifax River. The bidding process included multiple pipe material options, with high-density polyethylene (HDPE) pipe getting the winning nod.



“We will always bid multiple materials to be good stewards of the public’s money,” said Frank Van Pelt, project manager for the Daytona Beach’s Utilities Department Engineering Division. “We chose HDPE because it has a better bend radius for our layout area.”

The bend radius of the pipe was important as the city allocated a very small footprint in a city park adjacent to the Main Street Bridge out to the barrier island. As the 50-foot sticks of HDPE were fused together, they were pulled along a street running parallel to the Halifax River, almost at a 90-degree angle to the insertion pit. Pipe rollers kept the pipeline from being pulled along the porous asphalt of the street.

Fusing process

To join the approximately 2,900 feet of JM Eagle 30-inch IPS DR 9 HDPE, USA used a McElroy TracStar 900, MegaMc PolyHorse and DataLogger to perform the pipe fusion operations.

Pipe fusion, also known as butt fusion, is a widely accepted process that joins two pieces of thermoplastic pipe together with heat and pressure. Commonly associated with HDPE, the butt fusion process starts by “facing” or shaving the pipe ends simultaneously so that they can be joined together with heat to create a continuous, sealed pipeline. The welding of the pipes is accomplished by using a hot plate in contact with the pipe ends, which heats the

plastic to a molten state. Then, after its removal, the pipe ends are pressed together under a controlled force to form a weld that is as strong as or stronger than the pipe itself. Third-party industry research indicates that HDPE pipe and joints can have a lifespan of more than 100 years.

The Daytona Beach jobsite was restricted to a very small footprint in a park area between North Beach Street and the waterfront, which made it perfect site to test a prototype MegaMc PolyHorse. The tool allows pipe to be placed on a series of racks directly from a delivery truck. The MegaMc PolyHorse can hold a shift’s worth of fusion work, keeping the pipe stored in a location where it is



ready to be used. The MegaMc PolyHorse held 10 50-foot sticks of 30-inch pipe on the rack system that feeds to a dispenser device, and finally, to a pair of powered rollers. One of the rollers features a tracked system that grips and feeds the pipe into the fusion machine, making the fusion process easier on the operator. In tandem, the two powered rollers of the MegaMc PolyHorse help maneuver a stick of pipe up to 24 inches laterally and 34 inches vertically. The device is designed for 20- to 48-inch IPS pipes.

Personnel from USA were excited about the prospect of this equipment on the job because it frees up heavy machinery, such as loaders and excavators. Additional machinery isn't required to hold and position sticks of pipe in place for fusion operations when using the MegaMc PolyHorse.

Fusion technicians on site were able to release and load sticks of pipe for fusing with the use of the remote control, which directs all of the functions from the carriage of the fusion machine.

Once pipe was ready and in position, a McElroy TracStar 900 was used to butt fuse the pipe into a long, monolithic pipeline. A TracStar 900 is capable of fusing pipe sizes from 12-inch IPS to 36 inches of outer diameter, and is a track-mounted, self-contained, self-propelled fusion machine that doesn't require a generator for power. The TracStar proved an advantageous choice on the job, as the fusion operator was able to fine tune the position of the fusion machine underneath the pipe to get ideal placement before beginning the fusion process.



As part of the joining process, USA personnel used a DataLogger to record and document the key parameters of the fusion joint as it was made. The device helps engineers, contractors and inspectors verify that proper fusion procedures have been followed. McElroy's DataLogger consists of a rugged handheld computer that serves as a recording device connected to a data-collection device that records the temperature of the heater and fusion pressure profile over time. All of the data is recorded and transmitted to the handheld computer, where the joint report is stored and can be viewed, printed or transferred to a computer for archiving. The quality assurance device is a great way to document the pipeline that is put into the ground.

With 2,900 feet of pipe going underneath a river, it was important to ensure that the pipeline was joined properly and could withstand the pull-through under the Halifax River.

As the pipe was fused, workers pulled the pipe down a series of rollers running in the outside lane of Beach St., next to the curb. An American Augers DD-440 was used to perform the 2,800 foot drill across the Halifax River while a Vermeer 330x500 directional drill was used for a secondary bore down Halifax Avenue.

USA started mobilizing for the project at the end of July and completed drilling operations on two separate bores at the end of August 2010. The project was complete by the first of November after open cut, tie-ins and testing operations were successful.

FOR MORE INFO:

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