

Nothing Can Sink Major Plano Pipeburst

Proven Technology Is Supersized For Quadruple Upsize

As officials from Miller Pipeline Corporation and Earth Tool Company considered bidding on a major mainline sewer replacement project in Plano, TX, last February, they realized portions of it were bigger than anything either had tackled before. But, Mark Hallett, vice president of the utility division for Miller, and Mark Randa, Earth Tool Company's director of pneumatics, believed a quadruple upsize – 24-inch reinforced concrete pipe (RCP) to 32-inch outside diameter (OD) HDPE – could be done. It was just going to be a matter of having suitable planning, teamwork and the right primary tools and support equipment.

The overall job called for updating 6,200 feet of a 30-year-old RCP system deteriorating from H₂S gas and significant amounts of rain by replacing current pipe capacities of 24, 27 and 30 inches with 32-inch OD pipe. The city of Plano put the job on a fast track after experiencing line collapses almost weekly last winter, and Miller Pipeline, which had been doing work in Plano for about four years, immediately indicated interest. The length of the job didn't particularly bother Hallett and his team – Miller has done 50,000-foot projects before. But, as Hallett quickly points out, "those jobs were 8-, 10-, 12- or 18-inch pipe."

Miller Pipeline owns a 225-ton static bursting machine, which Hallett was confident could at least handle the size-on-size portions of the job.

"We weren't even too worried about the 30- to 32-inch bursts," Hallett says. "We were a little conservative on the 27- to 32-inch runs, but we were very concerned about the 24-inch RCP upsize."

Collaboration

As he became serious about bidding the project, Hallett called upon Randa and Earth Tool Company of Oconomowoc, WI, makers of the HammerHead Mole products, to lend some engineering expertise and custom equipment to help.

"Ninety-five percent of the equipment we own is HammerHead Mole," Hallett says. "But I knew we didn't have a piece of machinery that could handle a job like this, so I asked them to develop a system that could perform under these conditions."

"This is not the biggest job we've ever done in terms of length, but certainly the biggest that we've undertaken in terms of

complexity," he pointed out. Neither Randa nor Mike Walk, the ram and burst specialist from Earth Tool Company who later became involved with the project, had performed an upsize of this magnitude either.

On the "complexity" front, the upsize was just one of many challenges the team faced. Adding to the list of difficulties were above-ground obstacles, incredible bypass requirements, a right-of-way crowded with existing utilities, tough ground conditions and brutal weather. They all came into play at one point or another. In fact, one irony was that the very thing which forced urgency on the job in the first place – rain – pushed its completion back a month. The time allowed for the job was 130 days. Originally, the target finish date was Aug. 31, but it was moved back to Sept. 30 as Texas was hammered with more rainfall in June alone than that area of the state had received during all of 2006.

Bursting system

Earth Tool Company was primarily involved in just under 1,000 feet of the job, completed in four bursts – 230, 127, 272 and 188



feet, all of which involved upsizing from 24 to 32-inch OD HDPE pipe. Previously, Randa and Walk's largest upsize went to 30 inches, so equipment brought to the site was truly custom:

- Crews used a 36-inch bursting head;
- The head featured a long pilot on the front to keep the tool on line and to keep material from collapsing in front of the pipe and impeding progress; and

Contractor-Manufacturer Teamwork Pays Off

Does it seem odd that a contractor would enlist help from a manufacturer to tackle an underground construction job? Not anymore, according to Mark Hallett of Miller Pipeline and Mark Randa of Earth Tool Company. They both say that Earth Tool Company's ability to develop custom equipment was only one aspect that made them a good partner for Miller.

"Our expertise is obviously in pneumatic equipment," Randa says. "But customers also depend on us to provide consultation and engineering, and to help them anticipate problems and develop solutions in advance."

One example he points to is the burst-assist component of the job. Earth Tool Company utilized it on the quadruple-upsize runs, but Randa also engineered a backup for Miller's static bursting unit, just in case it ran into problems on some of the other bursts.

"The worst thing you can do is to rush through the preliminary planning," Randa says. "If you step back and take a few deep breaths, the problems can be anticipated. You have to think about everything that's going to be good and everything that's potentially going to be bad. Anticipate and create the right scenarios, and you'll end up being fully prepared."

Randa believes the industry may see more collaboration as large upsizes become even more common.

"It used to be that anything over 20 or 24 inches was unheard of," he says. "But cities are finally changing many of the larger dig-and-place jobs to bursting. And with each job, we become more experienced and our tools become more proven."

"Miller is a great contractor and we've learned how to build the right tools – that's why we were able to win this job together," he says.

- It also had a cutting blade designed to cut through the old pipe's concrete and wire mesh.

Traditional equipment included:

- A 20-inch pneumatic tool mounted on the tail of the pipe designed for a "burst-assist";
- Three compressors: two 900 cfm units to run the bursting head and a 1,300 cfm unit for the burst-assist; and
- A 20-ton winch to pull the bursting head through.

Most of the custom concepts had been utilized before but on a much smaller scale. For example, Randa has added pilots to bursting heads before, but not for an upsize like this. "We basically stepped up what had already been proven technology," he says.

The 20-inch tool utilized for burst-assist was an interesting component. It's an application that has been used many times before, but most often to save a bore on an HDD project.

"We just turned the hammer on very slowly to relieve the pipe drag and keep forward progress," Randa says. "We wanted to have as much energy downhole as possible to complete the job."

The 20-inch tool was also on-hand to back up Miller's static bursting unit in case burst progress slowed or stalled. To save the burst, the rod could be shuttled out of the burst head, through the back end of the pipe. The hammer could be attached, pulled into place and locked into the burst head. The burst could then resume using a combination of static and pneumatic forces.

"Although we didn't use it, it's good to have a contingency plan on jobs of this magnitude," Hallett says.

Lube line

Randa, Walk and their crew also employed a continuous "lube line" just behind the bursting head, pumping 15 to 20 gallons of polymer per minute, just to keep things moving.

"Frictional drag is a problem with length," Walk says. "If you have instances where you have a large amount of hose on the ground, you can get a larger compressor to make up for it. But you cannot make up for the ground conditions, so we compensated a little, just to be safe."

In the end, the upsize bursts went faster than expected. On the first pull, they intended to gather much of their data, and crews planned on about a foot per minute, according to Randa. But with the rear hammer (burst-assist) and lube, they ended up getting faster than a foot per minute.

Even though rain pushed the job's completion back a month, Hallett still calls it "absolutely successful," especially given the challenges. He also says this could be the largest job of the year.

"I am not aware of anything this size or this complex going on," he says. "In fact, I cannot recall something this large in the past. The complexity of this job – with the upsize, traffic control, existing utilities, sense of urgency, bypassing, and rain events that we've had, I'm not sure there's been anything like it."

Hallett is particularly proud of his personnel – the superintendent managing the job day-to-day, Ray Gonzales, and the project manager, Brian Smith, working out of Indianapolis.

"And it was a great joint effort with Earth Tool Company," he says. "The partnership made this job successful."

FOR MORE INFORMATION:

- Miller Pipeline Corp., (800) 428-3742, millerpipeline.com
- Hammerhead (Earth Tool Corp.), (800) 331-6653, hammerheadmole.com
- Godwin Pumps, (856) 467-3636, godwinpumps.com
- ISCO Industries, (800) 345-4726, isco-pipe.com



Contending With Multiple Challenges

Few pipebursting jobs would have a quadruple RCP upsize and so many other challenges along with it. Miller Pipeline and Earth Tool Company had much to compete with to be successful in Plano:

Physical area – Crews were working very near Plano Parkway, a major east-west artery through the city. They had to close down one lane of traffic during work, but quarters were still extremely tight and traffic control was very extensive. Miller Pipeline's Mark Hallett says that had they not had the one lane to work in, it would have been very tough, if not impossible.

Bypassing – Miller, with help from Godwin Pumps, configured a completely redundant system capable of handling 16 million gallons per day, taking out 8,000 feet of bypass. Hallett says that at one point, though, their system ended up pumping through more than 36 million gallons of water per day because of all the infiltration from rainfall. "At times, we were pumping and using the same line just to keep things from surcharging," he says.

Existing utilities – Hallett says that there were no less than five separate utility companies with major trunkline systems in the area they were working. It became critical to relocate those lines during the operation.

Pipe needed – Another challenge was being able to get the necessary HDPE pipe, especially within the relatively short timeframe as they were gathering permits and materials approvals. "It's typically very difficult to get a manufacturer to commit to a quoted price and then deliver that quantity of pipe on short notice," he says. "But ISCO Pipe came through for us, and once the pipe was delivered, there was nothing stopping us."