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Can Your Utility Handle an Emergency Main Replacement?

Replacing water mains usually involves extensive planning. However, the day may come when a water-main-break emergency requires your utility to take immediate action. Follow the steps here to be ready for that day.

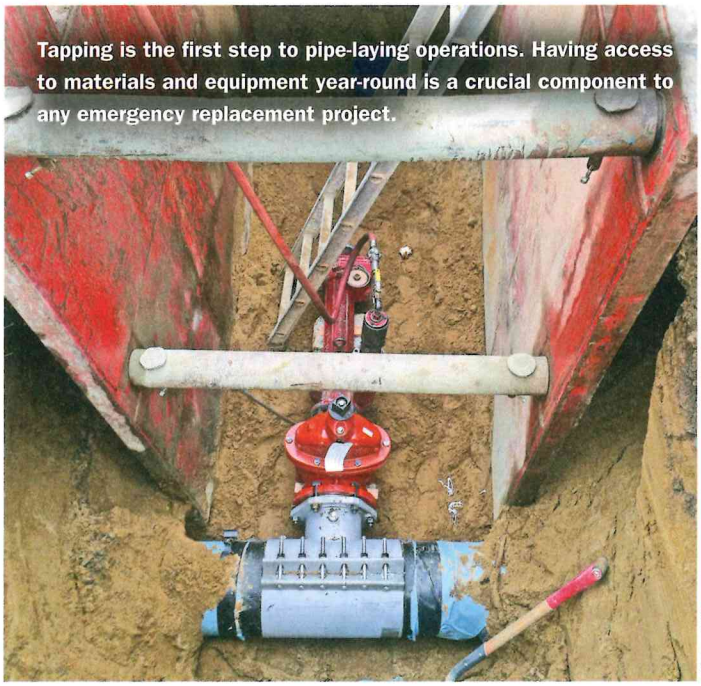
BY KEITH B. WATERHOUSE

A ROUTINE WATER MAIN installation project takes weeks to develop and coordinate. Design, bid preparations, stakeholder notifications, materials procurement, and obtaining approvals are inherent to any water main project. The process can take months, depending on the overall pipeline length, vicinity of other utilities, and other site complexities.

But what if there's no time to contemplate each step of a project at reasonable intervals? Is your utility ready to circumvent the traditional sequence and start laying pipe on a day's notice? That's the predicament Connecticut Water Company (CWC) faced in mid-December 2016. After a major water main failure, a 1,200-ft emergency main replacement was initiated and in service in 11 working days. The project was especially difficult because the failure happened during the busiest holiday season of the year when unusually cold temperatures were being experienced.

ACTING WHEN DISASTER STRIKES

After a rapid succession of four catastrophic water main breaks on Catalina Drive in Enfield, Conn., it was evident an immediate replacement was needed. The existing 6-in. transite main, having been recently tied to a new water main on an adjacent street, experienced its first failure on Dec. 6, 2016. A 6-ft longitudinal fracture released thousands of gallons of water in mere seconds, causing major flooding on the street.



Tapping is the first step to pipe-laying operations. Having access to materials and equipment year-round is a crucial component to any emergency replacement project.

Feeding the volatile main from an existing system was an essential component to the project's success. Because of the previous main failures, decreasing the internal stress with a pressure-reducing assembly was the most viable option.

PHOTOGRAPHS: CONNECTICUT WATER

Although not actively installed for more than 25 years in the United States and Canada, transite (asbestos–cement) water main remains in service for many utilities across North America. By virtue of its composition, transite water main can lose its structural integrity over time, leading to main breaks.

Fortunately, the main was isolated quickly. This minimized water loss from the break, but not before caverns undermining the street's integrity were created. The responding crews worked through the night and into the next morning to make consecutive repairs, only to realize their efforts were fruitless; the main continuously broke after each pressurization. Accordingly, the company decided an immediate replacement was the only corrective option.

Catalina Drive is a looped street in north-central Connecticut, just a mile shy of the Massachusetts border. The street spans approximately 1,200 ft with tie-in points on both ends. The aging water main's replacement, with 1,200 ft of 8-in. ductile-iron pipe and appurtenances, was incorporated into a hurried design: one new fire hydrant, one main line valve, one air relief valve, and 17 service taps.

The two mainline connections for the loop consisted of two tapping sleeves with valves. Luckily, the only existing underground utilities were a reinforced concrete pipe storm line and a transite sanitary sewer with corresponding laterals, which weren't in the same corridor as the water or were at depths that wouldn't conflict with the work. Electric, cable, and communication utilities were located overhead.

WORKING THE EMERGENCY PLAN

After an early morning meeting of CWC's leadership team and subsequent approval of the emergency installation, crews were dispatched to prepare for the project. Field operation crews were directed to retrieve stockpiled temporary water main and accessories that would backfeed the street's 17 customers through an existing hydrant. Also, to prevent further breaks during the replacement, a 2-in. pressure-reducing valve (PRV) was installed at the point of entry to lower pressures inside the volatile main. Meanwhile, an engineering team walked the site, outlining plans for the project.

Teamwork Ensures Accountability. Accompanying CWC's team, an engineering representative from the town considered all propositions and provided feedback. Marking the proposed layout as they went, the two teams worked collaboratively to conclude a mutually beneficial scenario for the company and the town. Customer service teams canvassed the street, delivering bottled water and relaying critical information to affected customers. The contractor retained to perform the pipe installation had equipment and resources in the area and was more than willing to cooperate on the project.

Worksite Challenges. A main replacement project of this magnitude will no

BEST PRACTICES

ENSURE YOUR UTILITY IS READY FOR EMERGENCY REPAIRS

Is your utility ready to act in case of such an emergency? Having the wherewithal to act swiftly if faced with a monumental failure should be the first consideration of your contingency plan. The following recommendations should better prepare your utility for a successful emergency pipe replacement project:

Make Response Preparedness a Priority. Develop your talent to respond to an emergency without relying on the status quo. An emergency requires out-of-the-box thinking and an outcome-only approach. It's imperative that your teams understand the importance of restoring service, at any cost, after any catastrophic failure. Prove to your customers and peers that you can take action in the face of adversity.

Meet With Local Officials. Take the time to foster relationships with local and state officials *before* you have an emergency that requires their cooperation. Having the ability to obtain expedited approvals and assistance from officials is a crucial component of your emergency plan. Invite officials and representatives on tours of your assets and facilities. Giving them firsthand exposure garners a broader appreciation of your organization and the customers you serve. Otherwise, the officials won't fully comprehend the many issues you face during an emergency.

Communicate With Customers. If you face such an emergency, communicate with your customers. Face-to-face contact, mailings, signage, and social media updates are invaluable tools for active communication. Although you can't provide definitive answers, customer outreach efforts show you empathize with your customers' inconvenience and are working toward a resolution. However, customer communication shouldn't end there. Follow up with those affected to recap the *why* and *how* of the project; a simple letter detailing the events will suffice. Also, be mindful of customers in the neighborhood. Although their service may not have been affected, chances are their traffic flow and routines were.

Line up Suppliers. If you haven't already, create an expressway of communication to your supplier(s). Ask for a direct contact or a dedicated representative to call in case of an emergency. Moreover, have them provide an after-hours phone number or a monitored email address for you to contact, because every second counts in the midst of an emergency. Additionally, gain an understanding of your suppliers' inventory and ensure they have the available supply to meet your needs on short notice. Ask your suppliers these questions: Do they have more than one stockyard? If so, what's the distance to their next facility? Do they offer 24-hr emergency deliveries or pickup?

Foster Teamwork. Create a culture of cross-departmental cooperation within your utility. Often, when different groups don't work collaboratively every day, indifference can prevail among them. Yet, when an emergency arises, teamwork is the linchpin to overall effectiveness. Whether implicit or not, the importance of cross-departmental cooperation needs to be conveyed often. In doing so, teamwork will be evident during an emergency.

doubt pose challenges. However, the issues on Catalina Drive were more related to the weather and time of year. The daytime averages in northern Connecticut average around 40 °F in December; the overnight lows can easily hover below freezing. The actual forecasted weather called for much lower temperatures for the project's estimated time frame. Some overnight lows were even forecasted around 5 °F. It was obvious these temperatures would freeze any part of the unprotected temporary main and make installation more difficult.

With a sensitive PRV, piping, and hoses exposed to such extreme ambient temperatures, protective measures were taken to eliminate any service disruptions. In cooperation with a nearby homeowner, a power source allowed heat tape to be used around the PRV. Covering the entire assembly with concrete blankets ensured the valve wouldn't freeze. To protect any exposed temporary main, a bleeder line with backflow protection flowed into a catch basin, which kept the water moving.

Steps to Success. Once the temporary main was in service and protected, the pipe laying began. After conferring with the contractor regarding the layout, project crews commenced saw-cutting and tapping operations on Dec. 8. In the meantime, CWC contacted its supplier to arrange expeditious materials delivery to the site. With two of the contractor's crews working in opposing directions, it took fewer than three days to fill the first 300 ft of main on one side. This allowed sampling and testing procedures to begin the next day.

Unfortunately, on Dec. 12 a significant, late autumn storm dumped 6 in. of snow across the area. One day was lost to snow removal, but pipe-laying operations continued early on Dec. 13. By mid-day Dec. 14, the rest of the pipeline was filled and readied for sampling and testing.

With all testing complete, service installation began in earnest on Dec. 15. With both crews working in tandem, all of the customers were tied over by Dec. 23. This included backfilling, partial restoration, and laying reclaimed hot asphalt over all the trenches across the site. Although cleanup and abandonments took another full day, the main and service installation only took 11 working days to complete.