WATER ONLINE

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Working Under Pressure: Making Reliable Repairs Without Going Off-Line

Source: JCM Industries, Inc.

Ever since the introduction of centralized water treatment and distribution systems, leaks have been the bane of their existence. Finding a way to make reliable repairs rapidly and without having to disrupt service goes a long way toward satisfying customer and utility concerns. Here are some strategies and tips for making the right choices easier, quicker, and less expensive, even in the midst of an emergency.

There's More to Repair Than Just Parts

For all the water distribution infrastructure options available — by types of piping material and fitting design options — a key to getting value from the investment is having the information to make the right choices. Being in a position to make the best decisions on repairs, replacements, or distribution system expansion relies on preparation. Here is a checklist of topic areas and questions that can prepare a utility to deal with unwelcome surprises:

- **Identify the Problem and Its Significance.** Utilizing networked flow meters or leak-detection systems within the distribution infrastructure to help identify the cause and location of a potential problem can go a long way toward being prepared to formulate the best plan of attack. Pinpointing the location, however, is just the start.

How extreme is the problem? Is it just seepage oozing up through the pavement, or is it a geyser shooting out of a collapsed street or mowed-down hydrant? How many customer service connections are affected by the leak, and are any of them critical (e.g., hospitals, institutions)? How critical is the need for repair, or how long can you live with the leak?

- **Assess the Scope of The Problem.** What is the pipe material, size, and age? How extensive is the length of area affected? How accessible is the area in terms of major traffic arteries or other infrastructure? Are there any special considerations about the repair location (e.g., accessibility, soil conditions, adjacent utility rights of way, etc.)? How many people will need to be informed or involved in the repair decision-making process — internally (maintenance crew, engineering, purchasing, legal) or externally (other utilities, hospital administrator, public safety director, mayor)?

  Mapping as much infrastructure with as much information as possible before leaks occur will make it easier to assess and respond in the event of an emergency. Knowing the larger and varied line sizes, valves, junction fittings, etc. can prepare you to draw up appropriate contingency plans with potential suppliers to make emergency response as streamlined as possible. Finally, making that information available to field personnel through an online access program can provide details where they are needed the most.

- **Assess the Viability of Making Repairs Without Shutting Down the System.** Can the repair be handled at full line pressure or at least a slightly reduced line pressure that will not require shutdown, boil water notices, or compliance issues? Can you isolate the repair area with nearby valves and by feeding customer connections from another zone of the distribution system? How many gallons of water would need to be drained to make the repair?

  Some of the simplest solutions for maintaining reliable water service during the repair phase include standard or heavy-duty repair clamps or bell joint clamps. For more complex tasks, using line stops with integral fixtures to create a bypass can keep the water flowing during longer duration repairs. In extremely complex situations, a full encapsulation might be the quickest, easiest, and ultimately most cost-effective solution as compared to repairing or rebuilding (Figure 1).

Figure 1. *Encapsulation can be an attractive, cost-saving option in complex applications where disruption to the service is highly problematic or where the mechanical complexity of conventional repair approaches makes them simply too labor-intensive or expensive.*

- **Vet Every Realistic Option.** Time is money, and with certain repair strategies that money can disappear quickly based on the approach used. Consider building tables, matrices, or spreadsheets of potential decision points and options for various piping materials and connections (Figure 2) as part of overall utility resiliency planning and emergency repairs. Even roughly estimated costs and timing can help to illustrate the best potential trade-offs to satisfy the remaining life expectancy of the water mains involved. Where possible, keep a file of broadly defined costs, potential resources, and potential lead times for the various infrastructure elements or challenges according to specific types of infrastructure.

Considerations	Option A	Option B	Option C
Criticality	High/Medium/Low	High/Medium/Low	High/Medium/Low
Immediacy Of Need	(hours/days)	(hours/days)	(hours/days)
Shut Down To Repair	Y/N	Y/N	Y/N
Water Loss Costs	$	$	$
Component Costs	$	$	$
Order Lead Time	(days)	(days)	(days)
Installation Costs	$	$	$
Installation Time	(hours)	(hours)	(hours)
Lifespan Expectancy	(years)	(years)	(years)

Figure 2. *Creating a spreadsheet or comparison chart can make it easier to organize data for better and more timely decision-making. Line entries can be as detailed as necessary, depending on the criticality or urgency of the repair situation.*

- **Consider the Value of Experience.** In the spirit of "forewarned is forearmed," don't wait until the gusher from a 100-psi or 150-psi water main break isswallowing up cars on Broad Street. Include emergency repair contingencies for out-of-the-ordinary possibilities as part of the utility's long-term resiliency planning. For example, utilities that do not make it a regular practice to repair or bypass complex infrastructure under pressure can prepare by familiarizing themselves in advance from other sources with more experience in that area.

    - **Maintain Relationships with All Levels of Suppliers**. The more specialized the topic (e.g., large-diameter or high-pressure applications), the greater the potential value of the specific experience they can provide in emergency instances. Also, collecting background information on standard practices, lead times, and cost implications for rare or custom-fabricated repair components beforehand can better prepare a utility for when an emergency strikes.

      Utilities that work with an outside engineering firm for infrastructure planning and repair might want to discuss that organization's experience and recommendations on making repairs to pipelines under full pressure.

      Most important of all, do some advance planning with manufacturers that have experience in specific repair applications, such as cast iron, asbestos cement, PCCP, HDPE, or PVC piping, or in large-diameter pipe repair. As most utility

repair crews know from experience, “as built” drawings are not always an accurate representation of what is buried in the ground. That is where maintaining relationships with suppliers who have been there, done that can be invaluable in the face of an emergency.

- **Build Relationships with Other Area Utilities.** If you don’t already have direct relationships with counterparts at local water utilities, consider developing them on a one-by-one basis or through an industry group such as a state AWWA chapter, rural utility assistance program, or industry association. Aside from being sources of referral for local component suppliers in a pinch, they can also provide region-specific experience on repair issues related to soil conditions, elevation changes, or other geographic influences.
- **Build A Repository of In-House Knowledge.** If it is not already a regular practice, gather feedback on the collective past approaches and outcomes with different approaches to repair tactics. This can be particularly important for smaller utilities where the most experienced personnel are approaching retirement age.