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The Epidemic of Corrosion, Part 2: The Importance of Communication

In the water and wastewater utility industry, corrosion is driving up utility operating, maintenance, and capital costs and, in some cases, degrading drinking water quality. "Part 1: Examining Pipe Life" (December 2011) discussed the widespread nature of corrosion, the different types of corrosion, and the required treatments as part of a corrosion control program. This article looks at some of the political aspects associated with corrosion and pipe repair, replacement, and rehabilitation.

Although the costs of repairing and replacing transmission, water distribution, and sewer collection systems are extremely high (nearly 60% of the total costs), a stable water distribution system is necessary for maintaining water quality and protecting public health. Pipes are not just standing assets. They endure a great deal of operational and environmental buffeting. They are hydraulic systems susceptible to varying pressures and loads. As a result, a distribution system can lose its integrity through pipe breaks, rapid changes in pressure and flow conditions, planned maintenance activities, unplanned emergency situations, poor operational planning, and internal corrosion, tuberculation, and scale formation in pipes.

Pipes are not just individual segments, but form a unit that works together as a whole. All water mains, regardless of the material they are made from, will require rehabilitation and eventual replacement. Aging pipe infrastructure and chronic water main breaks are a common problem for today's water utilities. The condition of water distribution system pipe is affected by age, the materials used in its construction, and service conditions such as line pressure, soils, installations, and other factors (Boulos et al, 2006).

COST IS OFTEN THE TIPPING POINT

All pipe materials are vulnerable to both chemical and physical deterioration, and no single type of pipe works in all design and soil conditions. There are many different types of pipe from which to choose, but durability, strength, longevity, cost, and future corrosion concerns should all be taken into consideration. Many politicians, however, focus mainly on the cost of pipe as the major factor in the decision-making process—especially when taxpayers and ratepayers are taken into consideration. Jennifer Hosterman, mayor of Pleasanton, Calif., and co-chair of the US Mayors Water Council, observed in the March 2011 issue of *U.S. Mayor* that PVC pipe is about 70% cheaper than ductile iron and that its installation is less labor-intensive. No one should be surprised that making sure taxpayers get the best bang for their buck is a primary goal of mayors and other local elected officials across the country (Hosterman, 2011).

The new generation of utility managers is being faced with more complex pipe design and material selection options and must justify procurement practices that take sustainability and life-cycle costs into consideration. Life-cycle cost, used to compare different alternative strategies among water main rehabilitation techniques, is an essential approach for identifying alternative rehabilitation strategies for water mains and demonstrates the value of a thorough financial analysis. Infrastructure asset management planning—combined with risk and consequence business analytics—provides the tools needed to make these important financial decisions. Decision analytics combined with hydraulic modeling produces a perfect blend of operational efficiency and sustainable asset decision-making. As the risks of failure in aging pipes continue to rise, utility managers must better educate their boards and councils on how to set realistic expectations with their customers. Part of the discussion will be about cost and the current level of service being offered; the other more immediate dialogue will likely be about the condition and age of the current system and the effects of corrosion.

As part of the asset management planning process, decision-support models can prioritize and evaluate renewal alternatives based on their applicability to project conditions, relative costs, and benefits. The US Environmental Protection Agency's newly published report "Decision Support for Renewal of Wastewater Collection and Water Distribution Systems" (Matthews et al, 2011) helps provide the overall renewal framework. This framework can be used within the parameters of a utility's asset management and replacement program and as an educational platform to explain cost outlays to management, finance, and elected officials.

COMMUNICATING ABOUT THE EFFECTS OF CORROSION

Water infrastructure has predominantly been made of cast- and ductile-iron materials. As these pipes age and fail as a result of corrosion, the news media will continue to focus on what is wrong with utilities, instead of noting the long-standing operational reliability that has been provided by the water industry—in large part because these materials performed so well for extremely long periods of time. This particular news angle of pointing out utility failures occurs from coast to coast, and no utility is left untouched. For example, the water utility in Albuquerque, N.M.—which follows a path of proactive asset management and a noncorrosive pipe replacement program to reduce overall capital and long-term maintenance costs—can still garner the headline "Water Main Break Turns Roads Into Skating Rink" (Sharpe, 2011).

Keep your customers informed. Each year winter weather causes more main breaks, potentially resulting in low pressure and/or discolored water. Additional public health outreach is needed to notify the thousands of residents in whose homes these conditions could occur. Just such a situation occurred in Annapolis, Md., in 2007. The utility told its customers: "Approximately 15 thousand homes will experience low water pressure for the next 24 to 36 hours as water has been redirected away from the damaged line. Officials are asking all customers in the affected service area to conserve water for the next 36 hours or until further notice in order to expedite the recovery process. Customers may be experiencing discolored water as pressure returns. The water is safe for drinking and cooking and will return to normal water quality as repairs are completed. The cause of the break is still under investigation" (AACDPW, 2007).

Although the utility did a good job of informing its customers about the possible results of the main break, it should have followed up more with its customers and not have left the story at "the break is still under investigation." Utilities have to change the perception that they are uncommunicative and that they withhold information. To do so, they must first become comfortable responding to and communicating with the media. Utility managers should develop good relations with local media editorial boards and remember that in the event of an emergency, cooperation and the conveyance of timely and proper information are critical. Utilities should always take the initiative and follow up on a story. The utility manager must make the effort to explain the type of system, its condition, and any associated potential risks and costs. Then customers should be reassured that the utility will continue to exercise fiscal responsibility and maintain water quality and system reliability. Individual reporters may still take occasional "pot shots" at the utility, but the long-term investment of cooperating with local media editorial boards will pay off in many ways, especially when rate increases are needed.

Water advisories can also present opportunities. Many times utilities are required to issue boil-water advisories because of the loss of pressure resulting from a variety of causes such as pipe breaks, corrosion, and so on. In Kentucky, Louisville Water issued a precautionary warning during a recent break as water samples were taken and tested, advising its customers to ". . . bring all water used for cooking and drinking to a rolling boil for three minutes before consuming [and] discard [the] ice in [your] ice dispenser. The advisory is precautionary and will be lifted once water quality tests confirm the water is safe to drink. Customers outside this boundary who had low pressure during the break should also boil their water" (LouisvilleKy.gov, 2011).

Whenever a utility finds itself part of a story that is being covered in the media, it should include praise for the crews who fix the pipes as well as recognize and express appreciation for the customers' patience and understanding while the repairs are completed. Again, use each communication opportunity to offer the assurance of fiscal responsibility—even in the face of the ris-

ing costs of maintaining water quality and reliability throughout the system.

Elected officials can help tell your story. Water main breaks caused by old pipes and corrosion can still create political firestorms that inflame media coverage. In these situations, elected officials have to communicate with the public, and utility managers should take this opportunity to provide backup and support for these officials. Doing so provides public officials with information to explain the needs of the utility and also helps lay the groundwork for when the utility will need the support of those officials.

Main breaks will likely continue to generate heated debates on water fee increases and replacement costs, but some officials have used the attention generated by such events to focus the spotlight on the needs of aging water and sewer infrastructure (Mogerman, 2011). For instance, in New York City after a massive water main break closed the subway and caused buildings to flood, Mayor Bloomberg redirected attention to how severe weather events affect the infrastructure and pointed out growing concerns that climate change could cause even greater weather-related effects (Bowen, 2011).

Aging infrastructure can shift the balance of power. In Los Angeles, Calif., realization of the high replacement costs involved in replacing, repairing, or rehabilitating water and sewer infrastructure has gone beyond political debates and finger-pointing and resulted in voters creating an independent ratepayers advocate office. The Office of Public Accountability will serve as a watchdog and monitor utility rates, revenue uses, and requests (*LA Times,* 2011). This could become a new trend at both municipal and state levels of government. A citizen-selected, independent advocate may increasingly be required to make decisions regarding the financial remedies for the rising utility infrastructure repair and replacement costs (Renschler, 2011).

CONCLUSION

The water industry continues to invest in the development of shared knowledge and best practices. Every utility is different in terms of its operations, system age, pipe materials, soils, treatment processes, and available funding. There is no one right answer for all of the conditions each utility faces. Industry experts such as Steve Folkman of the Buried Pipe Infrastructure Testing Facility at Utah State University and Sunil Sinha of the Water Infrastructure Center of Excellence at Virginia Tech both emphasize that a utility needs to make repair and replacement decisions based on a number of critical factors, many of which are unique to that particular utility (Folkman, 2011; Sinha, 2011).

The natural process of corrosion poses a great number of political challenges and necessitates renewal remedies. It is through these challenges that we can gain some clarity and make replacement decisions that could eliminate corrosion in pipes as an issue for future generations. Corrosion and repair and replacement discussions require a communication plan that can help us explain the ongoing story of our water assets to both our elected officials and our customers.

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