Out of Sight, Out of Mind

The hidden cost of failing water infrastructure

BY KATE SHIRLEY

Last summer in the Westside region of Los Angeles, the L.A. Fire Department arrived on the campus of the University of California to find a towering geyser rising from Sunset Boulevard. A 93-year old, 30-inch water main had burst, spewing water into the sky for over four hours, flooding the UCLA campus and neighboring areas with an estimated 10 million gallons of water – enough to supply 100,000 people for a day. Although the destruction was severe and costly to contain and clean up, this is just one break of many that happen across the United States every day. In fact, according to the American Society of Civil Engineers, there are an estimated 240,000 water main breaks per year in the U.S. These breaks cause disaster everywhere, but are acutely felt in drought-ravaged areas of the country like California, where residents are already facing mandatory water use restrictions as we enter the fifth year of an historic drought.

We all know America has an infrastructure problem. In its 2013 Report Card on America's Infrastructure, the American Society of Civil Engineers gave water infrastructure a grading of "D+." But while we can all plainly see dilapidated bridges and torn up roadways, because our water infrastructure is hidden out of sight and underground, we often don't realize there's a problem until a serious disaster occurs.

Locating the Leaks

Unfortunately, water main breaks aren't the only way water is wasted, they're just one of the most dramatic and high-profile. The reality is that each year 2.1 trillion gallons of potable water is leaked from outdated water infrastructure in the U.S. — about 14 to 18 percent of the water the nation treats, according to the American Water Works Association. To put that number into perspective, that's enough to submerge the entire island of Manhattan under almost 300 feet of water. Water loss comes from failing infrastructure, faulty metering, and theft, and it all represents lost revenue for utilities and higher rates for consumers. In fact, between 1996 and 2010, the cost of water services in the U.S. rose by nearly 90 percent.

A major reason for all this loss is that much of our water infrastructure is over 100 years old, having been installed in the baby boom period following World War II. In a survey conducted by the Environmental Protection Agency (EPA) in 2000, it was estimated that about 40 percent of potable water pipes are greater than 40 years old. Consider then that most pipes having a useful life of anywhere between 15 to over 100 years, depending on the type of materials used and the environment, and it is apparent that we are overdue for a major infrastructure overhaul. Still, pipe age is only one indicator of the need for rehabilitation or replacement. For example, in cold areas, frost during winter months can put extreme strain on underground pipes. As the ground freezes, it expands, and the cold causes metal pipes to chill and contract. The combination of these factors puts increased pressure on the pipe joints, often resulting in unseen leaks. Similarly, pipes placed in corrosive, sandy soils can also experience shorter-than-anticipated lifespans due to corrosion and rust.

Treating the Problem

In its 2011 national assessment of water infrastructure needs, the EPA estimated that upgrading drinking water infrastructure over the next 20 years would cost more than $384 billion. Half would be used to replace existing infrastructure, while the other half would be needed for new

infrastructure to serve population growth and areas that aren't currently receiving water. While this may seem like a high upfront cost, there is a much higher cost to replace a water main after it breaks, as well as an immeasurable impact on the affected neighborhoods.

Being able to rely on a program that can accurately evaluate the condition of assets is crucial. This ensures that investments are made where they are needed most and water loss is prevented as much as possible. Best practices include state-of-the-art auditing methods, leak detection monitoring, targeted repairs or upgrades, pressure management and better metering technologies. By adopting such practices, water service providers can save themselves and their communities money in the long run, while protecting resources and generating economic growth.

This scale of water management challenges will require the use of an information technology strategy that integrates data sources and automates analytics. These technologies can reduce the cost and improve the effectiveness of operation, maintenance, and replacement of aging and failing drinking water and wastewater treatment and conveyance systems. The combination of asset management and analytics—in which data gathered from the utilities' water assets are analyzed against other data streams including weather patterns, traffic patterns and geospatial information—is key to modernizing our infrastructure for the 21st century and beyond. ✪

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