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# Managing Assets: When Going With the Flow Doesn't Save Money

A 1,600-mile round trip makes for a long drive especially when part of it is in Los Angeles, Calif., traffic. Stop-and-go driving at 5 mph doesn't cover much distance very quickly. It may seem acceptable when everyone else in three solid lanes of cars is being faced with the same dilemma—a quarter tank of gas and just 20 miles of progress in one hour. If searching for a better route, you might notice the US Highway 91 express lanes has cars speedily covering the same distance in a fifth of the time—and traveling 85 miles on a quarter tank of gas.

## LESSONS LEARNED FROM A ROAD TRIP

Managing assets can feel the same way to a utility. Without a different perspective the normal operations and maintenance spending and capital planning processes seem acceptable. However, a zero-dollar budget increase does not necessarily equate to saving money and allocating resources more efficiently. Water leaks and water main breaks are being experienced everywhere—so the cost of repair, the damage claims, and the political and public outcries may all seem reasonable and normal until a fast-track approach is presented with a considerable return on investment (ROI).

**The express lane has an ROI.** Infrastructure asset management best practices represent the express lane to effective resource allocation and cost savings. When utilities in the United States are faced with a 40% level of inoperable valves, the combined factors of time, damage, and water loss increase the true cost of a water main break with a high actual consequence of failure (Wilson, 2011a). A quick search would reveal a best practice and a fast-track process for regaining control of the distribution system (Wachs Water Services, 2011).

One approach may be better than another depending on the system data that are available and the need to reduce the effects of no water service and low pressure during a water main break or construction project in which valves need to be shut. Cliff Wilson, president of a leading provider of water distribution system asset management solutions, explained that "Many utilities face dire situations and do not have the expertise, equipment, and personnel to locate, assess, operate, and document" their water asset. The ability to do so "would significantly improve efficiency and network control. By combining condition assessment and rehabilitation services for valves, hydrants, and water mains with documentation and integration of critical water GIS [geographic information system] asset information, utilities are able to regain control of their transmission and distribution systems" (Wilson, 2011b).

**Getting caught in rush-hour traffic results from not properly planning.** A recommended phased approach to an asset management program may include initially conducting a benchmark study of the current operability of the utility's valves. This step will test past maintenance efforts, offer a starting point to calculate an ROI, provide needed justification for capital expenditures, and determine the level of effort required to operate the control points of the system efficiently. Overall, a benchmarking program is valuable because it

- reduces the consequences of water main breaks,
- focuses capital improvement investments,
- demonstrates system improvements for Federal Emergency Management Agency funding,
- increases water distribution system efficiency,
- improves water quality,
- reduces power and chemical costs,
- reduces water losses,
- improves water pressure and fire protection, and
- communicates the water utility management efforts to the stakeholders.

For large utilities with adequate hydraulic and GIS data, in conjunction with a valve benchmarking program, a valve criticality-assessment tool can be used to identify which valves most critically affect the scale or impact of any potential water distribution system failure (Boulos, 2006).

> A critical valve may only affect a small section of the network if it closes, but would impact a much wider area if it failed and additional valves in the wider network had to be shut instead. Pinpointing these valves requires a thorough understanding of the risk (probability and consequence) posed should the valve fail to shut. Consequence is measured in terms of the numbers of properties (and customers) that would be disconnected or experience unacceptable levels of service like low pressure or loss of supply. Reasons for failing to close a valve include lack of maintenance (a seized valve or broken motor), inaccessibility (busy intersection), or unsuitability for manual operation (large diameter valve). By identifying critical valves, water utilities can effectively prioritize expenditure on solutions like maintenance, replacement, relocation, SCADA [supervisory control and data acquisition], motorization, or control.

**Beware of speed traps.** Proper care and maintenance of assets, or lack thereof, many times is a result of the type of computerized maintenance management system (CMMS) that is being used and the way it is being used. Whereas from a data management perspective, a GIS-centric open-architecture approach using the GIS geodatabase as the asset registry fully leverages the GIS investment without the added costs of integration or data synchronization, it is also prudent to consider the history of the CMMS product and company. Utilities need consistency to fully achieve the level of cost savings expected from asset management practices. The CMMS marketplace continues to roll over because venture capital demands high returns and quick growth that can force a sale of the product. Also, there can be an issue with larger software companies buying up competitive products to capture the maintenance fees of the client base while not offering similar client service support and product improvements, forcing a migration to a new product with possibly higher fees. The investors in these firms understand that many utilities are essentially "camping out" for three to five years with the current CMMS because of a past investment in the software and a lack of approved funding to invest in a new maintenance management/asset management system while continuing to pay high software maintenance fees. The product history and company profile create an early warning of a potential speed trap when a utility is striving to increase its ability to better manage its assets. An ROI can be achieved by investing in and leveraging a solid CMMS (Cityworks, 2011, 2005). The ROI can be enhanced with additional features such as permitting, licensing, inventory capabilities, and 311 mobile customer civic-engagement tools using smart phone devices that are applied to the work order process (CitySourced, 2011). Utilities are asset-intensive, and the work history data are extremely important in making asset maintenance, repair, and replacement decisions. The CMMS is at the core of leveraging these critical data into the infrastructure asset management environment for additional decision-support analytics and modeling based on asset lifecycle costing and risk (Riva, 2011). Asset managers require the best tools of the trade to manage and make decisions concerning hundreds of thousands of assets. Technology advancements continue to meet the data management side of infrastructure operations and planning. The control room operators' technology also continues to advance with the combination of hydraulic modeling, SCADA, and weather data with water distribution system models to create a new forecasting and scenario-evaluation tool that can be used on a daily basis to

improve operational control and effectiveness (Innovyze, 2011). These advanced tools continue to enhance an operators' expertise while protecting the utility from knowledge loss because of employee turnover, retirements, and other events that may drive up the costs of operations.

**Beware of shortcuts.** Asset management can achieve two main cost-saving functions. The first, which many times is the main focus, is capital savings by developing a long-term capital replacement plan with prioritized projects based on age and verified through condition-assessment activities (Baird, 2010). Although those efforts are required, the heart and soul of asset management are how assets are actually managed through the maintenance program and related software (i.e., the CMMS). A lack of maintenance or inability to apply data to better decision-making will only accelerate the capital replacement plan. In the case of public–private partnership arrangements, it is best to avoid incentivizing a utility management company or staff to disregard preventive and planned maintenance for a better payoff by getting all of the capital project work. The private investment yield or ROI gained should be derived from the cost efficiencies of the operations captured by and demonstrated through the asset management process and system reporting. There may be perceived savings by only creating a long-term infrastructure capital plan during an asset management engagement, but the real work to achieve the promised long-term sustainable savings in operations and maintenance (O&M) is done in the data management and the application of resource allocations for the assets being managed through the CMMS. The O&M expenditures drive significant costs and fundamental financial metrics for a utility separate from the capitalized dollars. The US water and wastewater industry strives for the overall 20–30% cost savings promised by implementing asset management practices, but it is important to understand how to achieve these cost savings for both the capital and the O&M sides of the equation.

**Use a good map.** The US Environmental Protection Agency (USEPA) recognized the importance of infrastructure investment and asset management and looked to Australia's asset management models and best practices (Albee, 2009). As a result, the USEPA adopted engineering firm GHD's asset management models and processes as part of the USEPA's advanced asset management educational workshops with the accepted 10-step comprehensive approach offered across the nation over the past few years (USEPA, 2011). The approach asks a series of five main questions and includes additional question for clarification (Chung, 2011).

1. What is the current state of my assets?
   - What do I own?
   - Where is it?
   - What condition is it in?
   - What is its remaining useful life?
   - What is its remaining economic value?
2. What is my required level of service?
   - What is the demand for my services by my stakeholders?
   - What do regulators require?
   - What is my actual performance?
3. Which asset(s) is critical to sustained performance?
   - How does it fail? How can it fail?
   - What is the likelihood of failure?
   - What are the consequences of failure?
   - What does it cost to repair?
4. What are my best O&M and capital improvement project investment strategies?
   - What alternative management options exist?
   - Which are the most feasible for my organization?
5. What is my best long-term funding strategy?

**Follow a leader when the road is uncertain.** For the past 30 years Australian firms have played a leading role in developing improved working asset management practices for utility, transportation, and infrastructure stakeholders. GHD, Marchment Hill, and CH2M HILL were commissioned by the International Water Association and Water Services Association of Australia (WSAA) to undertake an asset management process benchmarking study. This study included 42 participants from water and wastewater utilities from around the world, including; Australia, Canada, Hong Kong, New Zealand, the Sultanate of Oman, United Arab Emirates, and the United States. The study used WSAA's Aquamark Framework to examine key asset management processes that are required to maintain the supply of reliable water and wastewater services. The study provided opportunities to identify leading asset management practices and to share information for the benefit of all participants. The highlight of the study was a best practices conference held in Sydney that hosted 130 water utility representatives. This conference, involving presentations and workshops, was organized across the following seven leading practice key themes:

- Culture and the asset management organization
- Future trends and managing uncertainty
- Efficiency, performance, and regulation
- Growth and capital programs
- Asset management planning
- Sustainability (people, environment, knowledge, and assets)
- Implementation for change

This study represents the first truly global benchmarking of water sector asset management, which will advance the cause of asset management among utility participants and enhance asset management knowledge across the sector (GHD, 2011). US utilities, both municipal and private, need to understand and continue to apply the asset management practices that have helped pave the way for greater asset cost-effectiveness and utility management.

**Obey the speed limit.** Asset management, like driving, requires education, training, and testing. At some point every utility will need to get behind the wheel and start

down a path toward sustainability and affordability. Comprehensive asset management is the long road that must be traveled to reach the desired destination. The good thing is that the road is paved and resources are available, so utilities can ask for help and directions. Benchmarking your current location will enable your utility to explain how far it has traveled and at what cost. Shortcuts and speeding may cause costly mistakes and waste time, but by using consistent, dedicated, and ongoing efforts and improvements, a utility can reach its destination safely. Map out the route, make adjustments as needed, and follow the plan at a manageable pace.

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