



Baird

Moving a Mountain With Comprehensive Asset Management Planning

Every utility manager is faced with the inevitable task of developing a mountain of current and future infrastructure repair and replacement requirements. This mountain of infrastructure funding needs has been called the “Nessie Curve” and is based on when assets were originally installed. Many methods have been developed to attempt to shift the mountain further along the timeline in order to ease today’s financial burden; however, with rising project costs, the actual funding requirement many times will just increase. In many ways, the application of simplified asset management can create the mountain and with some effort even slide the mountain out a few years, but what is really needed is to reduce the mountain while moving it.

Moving a real mountain requires a comprehensive approach of planning, mining, conveying, crushing, concentrating, smelting, and refining. The Kennecott Copper Mine just southwest of Salt Lake City, Utah, is a perfect example of moving a mountain. Literally, a mountain is missing as the open-pit mine stretches $2\frac{3}{4}$ miles across and is $\frac{3}{4}$ mile deep, with 500 miles of road winding down to the bottom. This mine has produced more copper than any mine in history, and the total value of minerals extracted far exceeds the combined value of the California, Nevada, and Klondike gold and silver rushes. This comprehensive approach of mineral extraction takes ore with less than 2% of copper concentrate to 99.99% pure when finished but also produces a great deal of gold, silver, and molybdenum (Wikipedia, 2011a).

Comprehensive asset management planning and practices properly applied to utilities offer the same type of value by not only shifting the investment mountain to the correct timing, but also by reducing the capital replacement and operations and maintenance expenditures. A shortcut in the process may not allow

the utility to realize the potential of 99.99% pure or may result in failing to also produce silver and gold.

WHAT'S THE OBJECTIVE?

Infrastructure asset management, regardless of the myriad flavors offered by different consulting firms, should still be focused on managing assets in such a way that the investment for each asset can be optimized, thereby producing a reduction in capital budgets and operating expenditures, an efficient and cost-effective maintenance program based on risk, and an overall reduction in the cost of capital. Many utilities are following a path that only shifts the mountain of replacement costs out into the future, which, depending on project cost escalations and inflation, may not offer any real savings but only a chance to buy time during an economic downturn or rate implementation process. This issue evolves, in part, when engineering drives the capital agenda and the needs of operations and maintenance are overlooked. This is akin to focusing only on gold nuggets when the long-term wealth may be in the gold dust and flecks.

A comprehensive asset management approach with applied best practices will not only shift the mountain to an accurate location (timing), but will also work toward reducing segments of the mountains' capital investment and operating and maintenance expenditures. This process combined with a sustainable financial plan that includes a financial market and credit agency strategy can also help reduce the cost of capital (borrowing) with improved financial metrics or increase the utility's ranking in receiving low-interest state revolving funds that may require asset management plans (AMPs).

WHAT ARE YOU MINING FOR?

Full-service asset management professionals understand these concepts and have a global perspective and the ability to customize solutions to each utility. These professionals possess the expertise in and understanding of the International Infrastructure Management Manual, which is essentially the bible of asset management. Doug Stewart, GHD asset management principal consultant, along with Steve Allbee, author of the US Environmental Protection Agency's (USEPA's) drinking water infrastructure gap analysis, deliver asset management training on behalf of the USEPA in various infrastructure hot spots across the nation. This type of training is critical in establishing the foundational knowledge of the comprehensive process of modern asset management.

The USEPA-endorsed comprehensive 10-step process (USEPA, 2010) may seem rigid at first, but once merged with a unique utility environment, the best possibility of cost savings both short-term and long-term can occur. Short-cutting the process, for example ignoring measures such as the level of service (LOS) or the project

validation process's confidence level rating, business risk exposure (BRE), life-cycle cost, and business case evaluation (BCE), only allows the potential savings to be elusive and continue to slip away. Once the future requirements are known and understood, the work can be planned, budgeted, and prioritized based on the business risk exposure in a way that delivers the desired levels of service at the lowest life-cycle cost.

Duncan Rose, technical director of asset management and expert asset management trainer for GHD, stated: "Comprehensive asset management solution firms are dedicated to improving the process by assisting [the] Water Environment Research Foundation [WERF] and [the] American Water Works Association Research Foundation in order to develop educational, financial, and risk-analysis tools that will benefit our industry. Asset management can be described as a collection of best management practices that, when applied within a structured framework, systematically guides investment in all stages of an asset's life cycle—planning, acquisition, operations, maintenance, renewal, and decommissioning. This investment is intended to represent the best mix of operations, maintenance, and capital for sustained performance over the life of the asset. Ideally, asset performance is measured against a clearly defined level of service and is based upon calculated risk tolerance.

"The objective of asset management is to develop a concise but comprehensive set of integrated management strategies (including operations, maintenance, and capital) for all assets in the enterprise. These strategies form the heart of an asset management plan. This plan systematically

- identifies the current state (performance) of the assets;
- articulates the level of performance (service) that the assets need to sustain into the future;
- identifies those assets that are "critical" to sustained performance
- integrates operations, maintenance, and capital investment strategies (based on the above) to sustain performance at lowest total cost of ownership; and
- describes a fiscal strategy to fund the integrated strategies.

"In short, asset management is about rigorous investment decision-making—as ultimately manifested in the operating and capital budget arena" (Rose, 2011).

CONVEYING THE ORE

A comprehensive asset management approach has two main levels—a strategic level and a tactical level. The strategic level needs to be customized and phased in to develop the basis of the program within the organization through learning the fundamentals, conducting a gap analysis similar to the 160 questions developed by WERF, and developing the roadmap to create the common vision. Developing manageable pilot programs is

an effective method of training and testing the process before expanding to a wider audience. These basic and first steps set the foundation and the expectation that asset management as a philosophy is a process of continuous improvement and change.

CRUSHING THE ORE

At the tactical level, the five basic questions of asset management need to be addressed. The comprehensive 10-step process covers all of the important nuances and decision points necessary to develop the AMP. The AMP becomes an important tool used for project justification, funding eligibility, as well as long-term planning. The crowning or final touch of any AMP is the sustainable finance or funding plan. A funding plan should use a full set of financial tools and options available to the utility, and the effort should be fine-tuned with the utility finance staff. A comprehensive asset management effort always includes and maintains the ongoing financial dialogue in order to plan and solve for changing financial conditions and funding challenges.

The tactical level should also establish the goals and objectives in order for the organization to track its progress and establish performance indicators. A core component of the development of an enterprise AMP includes the creation of an asset registry representing the consolidations and inventory of all maintenance-managed items in a hierarchical format to enable easy location, a focus on high-risk areas, and the ability to roll up and report costs.

Asset valuation is part of the process required for financial planning and life-cycle cost analysis. This process develops replacement costs through various methods. Although forgotten by most utilities, the last step in the valuation process requires a synchronization of asset life data (remaining life) with the accounting system for accurate reporting.

THE MINERAL CONCENTRATION PROCESS

LOS often seems to be portrayed by firms as a simple or basic step; however, this effort is indispensable to truly balancing the elements of LOS, cost of service, and risk. LOS in this context evolves into one of the best public relations discussions when it comes to explaining and justifies rates and fees. The public normally sees the rates and assumes a high level of water availability and quality 24/7. In actuality, a utility needing but avoiding large rate increases maybe choosing to operate on a semiannual boil water notice agenda with an interruptible drinking water supply for its uninformed water board and citizens. The educational dialogue on the true cost or value of water is not complete without the LOS tied to the cost of service and balanced by quantifiable risk analysis, which is found within the framework of asset management. “The

infrastructure story” (asset management) should be at the core of any public relations program.

SMELTING

Risk assessment or BRE is important to determine the asset criticality and therefore the decision-making process on which assets require additional condition assessment. Condition-assessment activities and intensity also increase costs, and many organizations are struggling with issues of determining the appropriate level of condition assessment. Although there is no standard or general rule, the BRE process will help answer the question and aid in prioritizing limited budgets. In this area of risk assessment, the estimate of the probability of failure involves reviewing the four ways an asset can fail. Most organizations accept and understand “mortality,” which is physical failure and sometimes capacity failure; however, the performance of the assets as it relates to LOS and “financial efficiency” when there is a lower-cost alternative replacement option is less understood. This financial efficiency concept, readily embraced by utility chief financial officers, requires life-cycle cost data and BCE to make the final determination.

REFINING

Business processes and practices should be documented and reviewed and benchmarked against industry best practices. Improvements can only be made and efficiency maintained when there exists a process of review and adjustment. Copper extraction requires physical, chemical, and electrochemical processes (Wikipedia, 2011b) just as asset management extraction requires people, systems (e.g., geographic information systems, financial systems), and physical inspections (condition assessment). Although the comprehensive approach strives to capture all of the potential efficiencies and the extraction processes are similar regardless of location, each location is a little different based on the ore source, quality, and local conditions and requires some customization and change management. The continuing effort to improve allows for the discovery of new technologies, reaching the goal of sustainable water and energy supplies with improved customer service, system reliability, and environmental balance. Roop Lutchman, the North American leader in strategic business consulting for GHD, explained that comprehensive asset management occurs when utility senior management leads the change moving toward a world of calculated risk decision-making by using tools and processes to turn raw data into intelligence. Asset management program benefits need to be tracked and reported in order to maintain executive level support and understanding. Comprehensive asset management takes known business concepts, practices, and principles and then packages them into a framework of success and effectiveness.

Simplified AMP can produce an inventory of assets creating a historical snapshot of installed infrastructure

to only lead farther down the path of discovery. From age-based-only capital replacement programs, additional expertise in condition assessment and failure probability and decay curves can plot a new reprioritized capital plan. The new capital plan is more accurate and holds up better to public scrutiny and rate justification; however, the true magic and essence of asset management and its benefits have still not been fully implemented. A comprehensive AMP ensures all potential savings will be discovered.

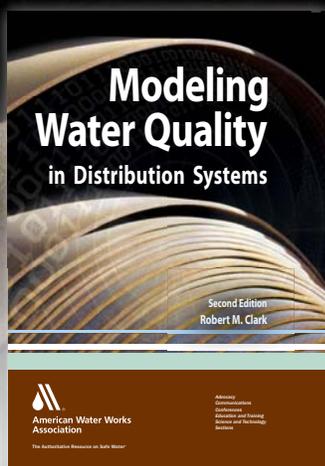
FIND THE PURE SOURCE AND SIGN-UP FOR TRAINING

Over the past half century, the United States has spent trillions of dollars building some of the finest infrastructure that history has ever seen. This investment has played a substantial role in the sustained prosperity and quality of life of our country. But in many communities, this infrastructure is severely stressed from overuse, underfunding of maintenance and renewal, and aging. A comprehensive approach to management of our capital assets is overdue—one that brings “state of the practice” advanced asset management concepts, tools, and techniques to bear on managing for cost-effective performance. This approach focuses relentlessly on providing sustained performance to the customer at the lowest life-cycle cost and at an acceptable level of risk to the organization (USEPA, 2011).

—Gregory M. Baird (greg.m.baird@agingwaterinfrastructure.org) is managing director and chief financial officer (CFO) of AWI Consulting. He served as the CFO of Colorado’s third-largest utility with financial oversight on the Prairie Waters Project and as a California municipal finance officer. Baird is a graduate of Brigham Young University’s Marriott School of Management with a master’s degree in Public Administration. An active member of AWWA, Baird also serves on the Economic Development and Capital Planning Committee with the Government Finance Officers Association for the United States and Canada.

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