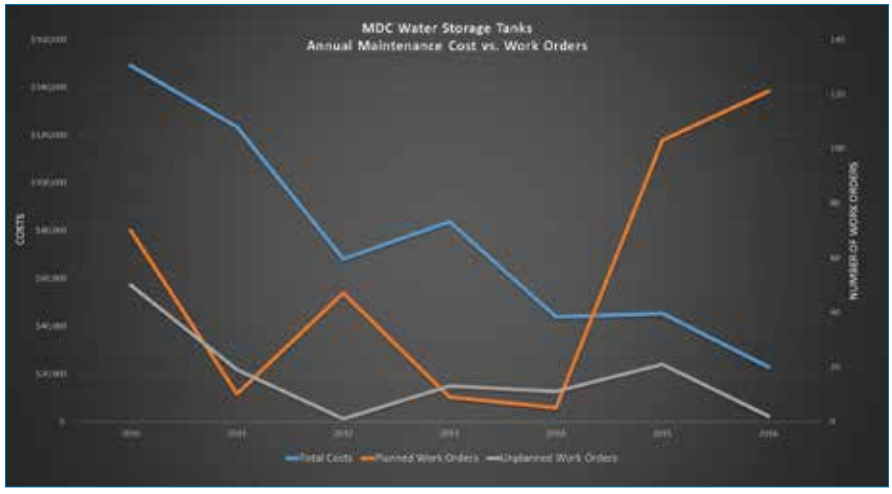
How Following **Scheduled Preventive Maintenance** Reduces Costs, Improves Service

By Carlos Cruz and Elizabeth Baldwin, P.E.

Many utilities work on razor-thin margins, squeezed between rising costs and customers' reluctance to accept rate increases. A leak in a major pipeline, broken pump, or other major expense can put the utility into crisis mode.

Conventional wisdom is to force maintenance costs as low as possible. Yet, experience at the Metropolitan District Commission (MDC), serving the greater Hartford area, has found that scheduled preventive maintenance, backed by effective use of a Computer Maintenance Management System (CMMS), can make costs more predictable, prevent crises, and reduce costs over the long term.



Unplanned work orders at the Hartford Water Pollution Control Facility decreased from 471 in 2010 to 16 in 2016, while planned work orders increased from 1,712 to 6,429 over the same time period.

Implementing a disciplined approach leads to success in CMMS

Data entered into the CMMS can guide the utility's managers so that preventive maintenance gets carried out on a regular and effective basis. This includes scheduling lubrication of all equipment as recommended by the manufacturer, along with inspection of the equipment and adjustment if needed. Work orders, lists of equipment needed and the skills required to do the job can all be generated in the CMMS to help with planning.

Back when MDC did not have a formal CMMS program, the reality at the time was high cost, more equipment failures, and difficulty planning for the work and for the budget required.

Now, MDC's maintenance costs are lower and the work is more predictable. For example, consider how the picture has changed with regard to MDC's vehicle fleet. The MDC went from performing an average of 14 or 15 transmission replacements every five years – at a cost of between $12,000 and $20,000 each – to perhaps one single replacement every five years. That change came from performing transmission oil flushes – and using the right lubricant. In another example, MDC now inspects each vehicle thoroughly twice a year with a rigorous safety check. Having more deliberate and planned maintenance and vehicle inspections has helped MDC to reduce staffing, which reduced salary and benefits costs.

MDC performs these functions for the water and wastewater treatment plants, the vehicles, the generators, and everything else. MDC also has an inspection process for the water storage tanks and water and wastewater pump stations. MDC is regulated; therefore, periodic inspections of these facilities are required. However, MDC takes pride in executing these inspection programs so we can improve equipment reliability,

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Water storage tank repairs.

lifespan, and uptime. From where MDC started, we are extremely successful in terms of improving reliability, or conversely, reducing *unreliability*. As a result, MDC is reducing overall longer-term costs.

The cost curve looks like this: high costs at the start, as the organization learns how to use the CMMS and it catches up on the backlog of service work and maintenance. Then, the savings kick in as there are fewer breakdowns and emergency repairs, and equipment has a longer service lifespan due to better maintenance. MDC expects that this cost decline, steep at first, will level out over the next few years.

Examining the financial and political hurdles

Implementing a CMMS can do great things for any utility, but it is a case of "short-term pain for long-term gain." That is never an easy sell, particularly as maintenance is so easy to drop off a budget to focus on what seem to be more urgent needs. But any piece of equipment has a lifespan, and that lifespan will be shorter if you do not inspect it, adjust it, balance it, and maintain it.

Some of the financial hurdles you are likely to encounter in implementing a CMMS are:

- The cost of the program itself – MDC utilizes SAP/PM, which is a powerful and reliable platform, but it may be more than many smaller municipalities need; there are less-costly, simpler programs available.
- Training staff to use the system.
- When you set up the system and hit "start," your CMMS will generate a stream of work orders that are part of the catching-up process, particularly if maintenance has not been completed according to the manufacturer's recommendations.
- The work orders will also indicate to you that you need more staff to do the work – and not just any staff, but people who have skills in mechanics, electronics, and other fields.
- The work orders will also call for more parts and supplies, particularly lubricants.

Getting buy-in from everyone in the utility, as well as the municipality's leaders, requires having someone who can convey those benefits in terms that the stakeholders will accept. Sometimes, outside professional expertise can help make this happen, particularly if the firm can describe the benefit that CMMS-based preventive maintenance has provided elsewhere.

It may be best to start with a pilot project. That might mean starting with a small vehicle fleet, because there are programs out there that can help you right out-of-the-box. You enter the equipment into the database and then start executing these preventive maintenance programs. That helps start the change, and builds discipline.

If you can do it with the fleet, you can do it with larger, more complex assets.

Building allies by 'selling' the benefits of CMMS

Any utility will require support from other stakeholders. For political leaders, it helps to point out the increased reliability of the system as a result of maintenance that is scheduled through a CMMS. This translates into higher quality water, fewer service outages, fewer service calls, and fewer surprises when it comes to spending. Leaders can bring forward a budget with greater confidence that the "expected" figures will more closely match the "actual" figures.

Employees like the predictability that a CMMS brings – they are more certain about what they will be doing that day, rather than responding to some emergency which may prevent them from

getting their other work done. Employees can complete their scheduled work in a timely manner, and they get judged on that. So, you will be wise to get your employees on board with the idea – this builds confidence in the leaders that if they pay for a CMMS system, it will actually get used and will result in better service and lower costs in the long term.

During the first two to three years in any CMMS programming, you are going to see a sharp rise in costs. If you are going to bring a piece of equipment or an organization to a certain standard, it is going to take money and manpower to get it to that standard you are trying to achieve. The organization must understand what is desired, what expectations are, financial implications, and staffing. It helps to think in terms of lifecycle costs, so that Management understands it is not just about the purchase price of the equipment or software. It is about a new and better way of managing water, one of our most precious resources.

In summary – predictive maintenance backed by a CMMS will certainly result in some up-front costs and a learning curve at the start. But the benefits show up quickly, in terms of cost reduction, employee satisfaction, customer benefits, and a less stressed organization. Part of the program's "success" also comes from a focus on annual lifecycle costs, extending equipment lifespans through wiser maintenance investment. These are wise, sound ideas that will probably not be a difficult "sell" to leaders and community stakeholders.

Carlos Cruz is Manager of Maintenance at The Metropolitan District serving the Hartford CT area; Elizabeth Baldwin, P.E., is Vice President at the engineering firm Tighe & Bond, Inc.