STOP WASTING TIME

Monitoring system can determine how frequently you need to clean specific sections of your collections system

By Jay Boyd and Paul Forshtoefel

The city of La Mesa is located in San Diego County, California, 12 miles east of downtown San Diego. The "Jewel of the Hills" boasts being one of the earliest pioneer locations of the American movie industry. Its rolling hills and relatively arid landscape were ideal to make more than 100 Westerns.

Today, La Mesa has a population of more than 57,000. The city is a mix of quaint downtown villages, surrounding businesses and residential areas. To support these areas, the city owns and operates its collections system, employing a small, highly efficient staff of eight. This group keeps a regular, rigorous cleaning process as part of its preventive maintenance program.

Ten sites were selected for the La Mesa study, all of which had been on a monthly cleaning schedule. The sites were first cleaned to establish a clean-pipe baseline, and then the ADS ECHO monitors were installed.

The ADS ECHO is an Internet of Things monitoring system that includes sensing, data capture, communications, analytical and reporting functions. Monitors provide real-time feedback on changing levels in the invert, indicating when cleaning is necessary.

With 153 miles of sanitary sewer pipes and 50-plus miles of storm pipes to maintain, both the storm and the gravity pipe systems are cleaned on an annual basis. Adding to the annual workload, 100 sites are cleaned monthly to prevent potential overflow threats from such sources as roots and FOG.

MAINTENANCE DEMANDS

The city's preventive maintenance program has led to their excellent track record of preventing sanitary sewer overflows. However, the city recognized that regular, high-frequency cleaning was more than likely leading to overcleaning. At times, this practice was taxing on the field staff. Additionally, high-frequency cleaning was known to increase pipe wear from high-pressure sprays. In older parts of the city's collections system, this could threaten damage to already high-risk pipes and lead to premature asset replacement. As a result, the city looked for a new approach to:

- Reduce operational demands
- Alleviate premature pipe wear
- Continue to prevent overflows.

A NEW VISION

The city partnered with ADS Environmental Services, with whom they had successfully done flowmetering projects previously. Through technical discussions between the city and ADS Environmental Services, they agreed to setting up a pilot study to determine if sites were being overcleaned and whether the city could realize corresponding benefits from cleaning reduction.

The approach was to install a new generation of advanced level monitors, the ADS ECHO. These monitors provide real-time feedback on changing levels in the invert, increasing or decreasing, and therefore indicating when to clean.

Each remote site has an ECHO ultrasonic monitor that is equipped with the new generation LTE-M communication technology and an all-new antenna. The LTE-M and antenna combination enable installation without any drilling as the antenna is secured to the monitor in the manhole.

THE FOUR MAJOR BENEFITS

Whether the Optimized Cleaning Process demonstrates as little as, for example, a 40 percent reduction or as large as a 95 percent reduction, there are four major benefits that can be realized:

1. Reduction of time pressure on operations to clean with corresponding monetary savings.
2. Reduced pipe wear, lowering mechanical stress on high-risk pipes and reducing wear on all pipes, thus extending the life of the asset.
3. Acquire continuous monitoring to prevent SSOs at high-frequency sites where none existed previously.
4. Acquisition of data for further analysis of collections system behaviors (e.g., dry vs. wet weather).

Cost-effective technology now exists for utilities to gain savings, keener insights and better management of their collections system. To acquire these benefits, utilities must look forward to solutions rather than rely on conventional practices of the past.

Cost-effective technology now exists for utilities to gain savings, keener insights and better management of their collections system.

Ten sites were selected for study, all of which had been on a monthly cleaning schedule. The sites were first cleaned to establish a clean-pipe baseline, and then the ADS ECHO monitors were installed. Data was reviewed regularly and, in addition, automated "triggers" were set up as cleaning indicators.

MONITORING SYSTEMS

The ECHO is an Internet of Things monitoring system that includes sensing, data capture, communications, analytical and reporting functions. Installed at selected sites, these systems compose a collections system monitoring network.

Each remote site has an ECHO ultrasonic monitor that is equipped with the new generation LTE-M communication technology and an all-new antenna. The LTE-M and antenna combination enable installation without any drilling as the antenna is secured to the monitor in the manhole. This means that installation takes minutes and without any structural disruption to streets, manholes or covers.

Data is collected and transmitted in regular intervals. Software enables users to independently set level measurement and data transmission intervals. Furthermore, to provide assurance that overflows are prevented, ECHO has five level alarms, including four for high-level and one for low-level flow conditions.

Consistent quality data collection is assured with an alarm indicating sensor position change. The software user interface gives continuous visibility to remote sites with maps, hydrographs, dashboards, equipment status and summary reports.

RESULTS VERIFY SAVINGS

Using these new monitoring tools, data was continuously collected and cleaning was initiated based on the feedback from monitoring rather than a predetermined schedule known as an Optimized Cleaning Process, or OCP.

CLEANING REDUCTION

A review of the pilot study took place upon the completion of the first four months. Under the previous, schedule-driven process, cleaning would have taken place 40 times: Each of the 10 sites would have been cleaned four times. During the pilot study OCP where cleaning took place based on remote monitoring feedback, only two sites were cleaned.

This was a 95 percent overall reduction in cleaning, and the city determined that the schedule-driven process promoted overcleaning.

COST SAVINGS

Forty segments would have been cleaned under the previous, schedule-driven process. Using an average cost of $400 per segment cleaned, the total cost for 40 segments would be $16,000. The city cleaned two times over the course of four months and therefore incurred a cost of $800. The savings for the four-month period amounted to $15,200.

CONCLUSIONS

It can be safely assumed that over the course of a year, a 95 percent reduction in cleaning would not be sustained. The city has 100 sites being cleaned monthly. Some, based on conditions, will still need to be cleaned monthly.

This OCP helps utilities calibrate and determine the correct cleaning schedule for each site. There will be variability from site to site. This study demonstrated that two of the 10 sites required cleaning in the first two months. Yet, when monitors were deployed across a network of high-frequency sites, a significant reduction (95 percent) in cleaning occurred. I&I