

Beyond alerts: Analysing rising main performance with real-time data

By Lorenzo Pompa

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Anglian Water, UK

Anglian Water supplies water and sewer services to more than six million customers in the East of England, a service area of more than 27,500 square kilometres/17,000 square miles. The utility manages nearly 113,000 kilometres/8,000 miles of water and sewer pipe, including more than 6,000 rising mains (pressure mains) transporting sewage.

CHALLENGE: DETECTING BURSTS

Keeping track of this vast infrastructure is a major challenge. If a burst occurs on a rising main, allowing sewage to escape the system, rapid detection and mitigation is essential to minimize the environmental impact. To improve its ability to detect these bursts and optimize its operations, Anglian Water embarked on a major program of monitoring its rising mains.

Anglian Water partnered with Syrinix to install the company's **PIPEMINDER-ONE** monitors at key locations in rising mains throughout the utility's service area. These low-cost, automated monitors combine accurate pressure monitoring at 128 samples per second with network-synced time stamping, enabling transient event detection. Data is sent via mobile communications networks to the Syrinix **RADAR** cloud analysis platform, delivering burst alerts whenever rising main pressure falls below 90% of the normal operating level over a period of time—a drop in delivery pressure or static head pressure indicative of a burst.



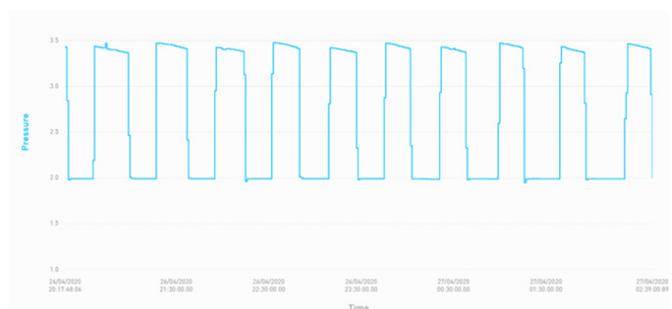
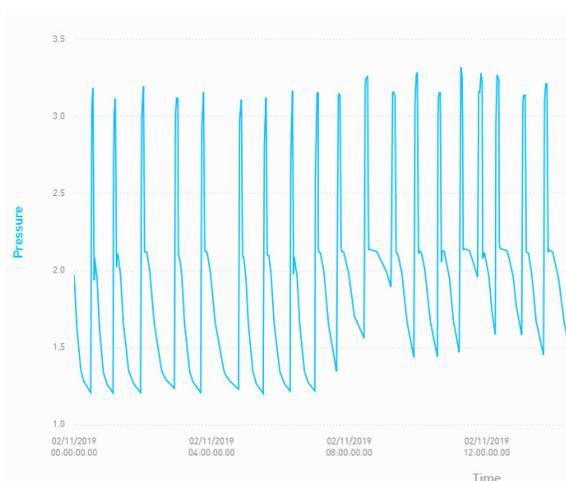
ACCELERATING MITIGATION

Armed with this information, Anglian Water can dispatch technicians rapidly to the affected area and walk the line to detect the precise burst location. Locating the burst faster reduces the amount of time that the issue is running, minimising the environmental impact—a strategic priority for the utility.

Building on this initial success, Anglian Water was keen to exploit the data generated by the Syrinix **PIPEMINDER-ONE** monitors to improve operational performance and efficiency throughout its sewerage system. Initially, this involved a manual process, using burst alert patterns to analyse inefficiencies or monitoring sites with known issues.

REVEALING VALUABLE INSIGHTS

Analysing the data revealed pressure transients indicative of problems within the rising main. In one case, the data indicated a drain back on a non-return valve, causing pumps to run more often than usual. Once the valves were unblocked, the pumps resumed their optimal run patterns. This resulted in a meaningful reduction in energy consumption, while reducing wear and tear on the pumps, valves, and other components impacted.



Pressure data before (left) and after (right) unblocking of the non-return valves.

MONITORING PERFORMANCE

Encouraged by this success, Anglian Water worked with the Syrinix team to develop a set of performance alerts, tracking data to measure five key performance factors:

- **Good pump/bad pump**
- **Low static head**
- **High static head**
- **Low delivery pressure**
- **High delivery pressure**

This analysis has revealed a range of performance issues requiring attention, from worn pump impellers to fouled valves to control philosophy issues. This complements the existing telemetry system, providing a clear view of how well assets are performing. To date, Anglian Water has identified more than 50 issues that affect performance and efficiency.

MODELLING HYDRAULIC TRANSIENTS

Anglian Water has not stopped there. The utility is now using advanced hydraulic modelling software to perform a deeper analysis of asset performance using the data generated by the Syrinix monitors.

Insights produced by modelling will provide valuable guidance on a range of operational issues—such as how to control pumps to reduce surge in the rising mains, reduce negative pressures, etc.—to maintain performance at optimal levels and keep asset wear and tear to a minimum. The modelling results have helped the Anglian Water team identify the most critical projects and perform less costly mitigation where appropriate, helping ensure the maximum impact for capital expenses. Given the utility's aging asset base, this has the potential to produce significant value by helping extend asset life and make the most efficient use of limited budget resources.

GENERATING TANGIBLE SAVINGS



In addition to improving operational efficiency, the monitoring program has been instrumental in identifying opportunities for financial savings. Rectifying the issues identified by the performance monitoring has already generated more than £30,000/\$40,400 per year in energy savings alone, based on completing 30 of the planned 50 mitigations. Add to this the reduced costs associated with investigating bursts. In fact, the utility anticipates a payback to the monitoring and analysis investment within just one year, largely through energy savings.

Anglian Water anticipates other cost savings, as well. Performance monitoring and modelling will help extend the service life of critical assets, generating longer-term cost efficiencies. Armed with accurate data, system managers can perform proactive maintenance, spotting and addressing performance problems early, before they impact component reliability. In addition, reducing the incidence and impact of sewage leaks will help reduce the costs associated with clean-up and regulatory fines.

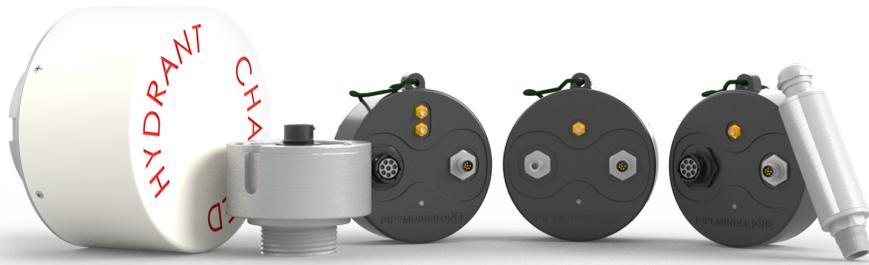
Most importantly, this data-driven approach to performance monitoring provides the Anglian Water team with visibility into their vast system that informs decisions with the power to improve the service to customers.

“With any intervention we undertake, we aim for a payback within a year and that seems to be the case for the pressure monitoring project.”

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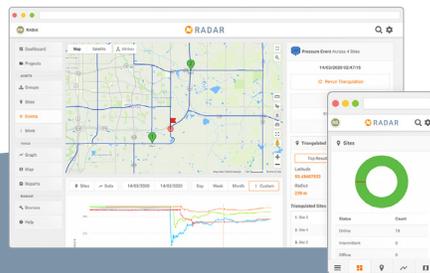
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PIPEMINDER ONE

Installed on water and wastewater pipelines of all sizes, the PIPEMINDER-ONE range combines high-resolution pressure monitoring with precision time stamping and, with the PIPEMINDER-ONE Acoustic, leak detection as well. The PIPEMINDER-ONE range provides utilities with the data-led insights they need to manage their networks more effectively and efficiently, to reduce leak and bursts, to save time and save money.

Future proof reliable cellular technology, that can use 4G, 3G and 2G networks, connects PIPEMINDER-ONE to RADAR, Syrinix's secure cloud-based platform. Empowered with proactive tools, the PIPEMINDER-ONE range provides burst alerts, transient event detection, operational and maintenance alarms and support for integrating flow, water quality, SCADA and other third-party data. In some markets, the PIPEMINDER-ONE Hydrant is available for quick mounting and start-up on commissioning. The PIPEMINDER-ONE Acoustic also provides reliable leak detection along with high resolution pressure monitoring. With data-led operational insights, operators can safely and reliably act to calm their networks to reduce leaks and bursts, to save time and money and to extend the life of their key assets.



Syrinix's **RADAR** cloud-based platform collects, analyses and alerts on data from Syrinix PIPEMINDER units, SCADA systems and third party flow, water quality, data loggers and data platforms. By combining multiple data types and sources from across your network, our analysis tools provide a new level of detailed insights into network operation and behaviour. These insights, alongside our smart, actionable alarms, empower utilities to enhance, mitigate and innovate to reduce leakage and breaks, calm networks and extend asset lifetimes.

www.syrinix.com

About Syrinix

Syrinix is an award-winning global market leader in developing intelligent pipeline monitoring technology, including the PIPEMINDER series of water and wastewater monitoring solutions, the RADAR cloud-based network analysis platform, and Syrinix Intelligence analysis and consultancy services. Syrinix helps cost-conscious utilities move network management from reactive to proactive, detecting and mitigating network issues before they become failures.

Syrinix
Intelligent Pipeline Monitoring