The system that never sleeps

Through automation, Hevasure and Caption Data are increasing efficiency and preventing costly asset failures. **Jonathan Penn** explains how.

The average design lifetime of a major heating or chilled water system is about 40 years. But without effective monitoring and maintenance, water systems are prone to corrosion.

If corrosion causes a large commercial heating system to fail 10 years after commissioning, the whole-lifecycle value of the system is drastically reduced: the asset owner gets just 10 years of operation for the price of 40. That price typically ranges from £1 million to £10 million, so the lost value is significant.

Hot and cold

On top of that, a failure of this kind also typically results in direct losses in the form of remedial action, asset replacement and litigation costs.

Hevasure is a consultancy specialising in corrosion monitoring and control, with hospitals, prisons, district heating schemes and data centres – all organisations with a lot to lose from a heating or cooling system failure – among its clients. Many of the organisations Hevasure works with have seen heating systems fail as a result of corrosion. The direct losses alone can sometimes be well in excess of £1 million.

To help prevent losses like these and optimise the lifecycle value of its clients' heating systems, Hevasure partners with Caption Data to provide continuous remote corrosion monitoring systems. At the time of writing, the partners have installed 20 of these systems for a range of clients.

> **"Periodic water sampling by maintenance staff can only provide a partial picture"**

The systems are designed to detect the possibility of corrosion and other adverse conditions in time for maintenance teams to prevent a catastrophic failure. They monitor and record a number of key parameters round the clock:

- dissolved oxygen (even moderate levels can corrode metal components)
- pressure (positive pressure keeps air out of the system, preventing oxidisation)
- make-up water intake (can reveal leaks in the system)
- water conductivity (reveals the level of corrosion-inhibiting chemicals left in the water)
- galvanic current (reveals the rate at which steel components are corroding)
- temperature (reveals whether heated water is circulating as designed)
- crevice corrosion (patent pending – reveals localised corrosion rates in crevices and under debris).

Caption Data specialises in monitoring devices that can be installed in remote, inaccessible or inhospitable locations such as plant rooms, where they operate completely autonomously. Devices like the RDL//Nano feature on-board data storage and battery back-up, so they can keep streaming data without interruption in the event of an on-site power failure. They can also be updated over the airwaves.

Hevasure staff can access and control their clients' units via smartphones, tablets and PCs. They can set the sampling and reporting frequency; view and analyse monitoring data and trends in an easy-to-understand graphical presentation; and define thresholds above or below which the system will issue an alert.

This lets Hevasure respond to its clients' issues proactively – in many cases, before the client even knows there is an issue.

Continuous remote monitoring systems have improved safety and efficiency for Hevasure: instead of spending their time travelling from site to site, gathering corrosion data in potentially hazardous environments, its staff can concentrate on addressing known issues.

The systems are also protecting Hevasure's clients from costly failures. Periodic water sampling by maintenance staff can only provide a partial picture, potentially obscuring important trends and hindering effective failure prevention. Continuous monitoring gives a much fuller picture. In Hevasure's experience, there is no reason why a properly monitored water system cannot be maintained in an "as new" conditions for decades.

The asset management profession has been slow to seize on the opportunities provided by continuous remote monitoring systems. But the investment needed to install such a system (around £10,000 capital expenditure, depending on the parameters to be measured, with monthly charges between £500 and £800) is negligible compared to the combined direct and indirect costs of a major heating system failure – and still falling, thanks to technological progress.

Author's biography

Jonathan Penn graduated in Mechanical Engineering, then pursued a career in sales, leading to general management positions in a variety of technology-driven businesses and stakeholder environments. Common themes alongside technology are international trade, product development and intellectual property, as well as "David and Goliath" relationships with major global companies.

Monitoring in other fields

Independent of its partnership with Hevasure, Caption Data has installed many thousands of remote continuous monitoring systems worldwide, measuring parameters such as:

- moisture in the roof timbers of the UK's Houses of Parliament
- turbidity in portable water supplies for UK utility companies
- vibration and shocks in lighthouses, traffic bridges, construction sites and other structures under frequent stress.

Some of Caption Data's larger clients use their monitoring systems to support their commitments to corporate social responsibility. They track the number of "virtual visits" to each site and calculate the carbon savings achieved by avoiding a physical visit.