

Water industry moves to less data, more information

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Regulators are driving the water industry to adopt Whole Life Asset Management, as the best way to ensure overall efficiency, keep prices down and quality up. This has created a need, not for more data but for better information, so the recent 'Driving Innovations in the Water Industry Conference' hosted by Mitsubishi Electric Europe B.V.'s, UK Branch looked at how some companies are embracing the new regime.

Stephen Hawking's next best seller is unlikely to be called 'A brief history of data in the water industry' but such a study could in fact illustrate some important issues. Go back just a few decades and the water industry was not automated at all, but as technology has progressed so has the adoption of automation technology in the sector.

This created a focus on efficiency – a drive to improve delivery, quality, and reliability while reducing costs and containing head count. By the 1990s many medium to large treatment works and pumping stations had installed SCADA (supervisory control and data acquisition) systems and there was a definite increase in efficiency.

However, engineers realised that there was still a lot of work to do and spent the noughties networking the various SCADA systems together. Huge amounts of data were being collected and transmitted to the head office computer systems but for some reason, this did not create the step change in efficiency that many expected.

It took some head scratching but it was eventually realised that head office was not actually using much of this extra data. Further analysis divided the data into two: that which was not particularly relevant to head office and that which while useful was not in a format that head office would find easily understandable. For instance a data stream showing that a pump in a remote station had been switching on and off regularly for the last six months, may lead a head office middle manager to think: 'It ain't broke, so best not fix it. Where as a field engineer with a bit more affinity for machinery would probably know to check the pump.

Had this data been processed before the middle manager saw it, he may have understood the asset utilisation or energy consumption ramifications, issues of which he would certainly have had an understanding.

So now, approaching the terrible teens of the new millennium, a new concept is emerging. The idea is to let the users develop their own sub-systems and thus create an architecture that builds capability rather than warehouses data.

Mark Narbrough of systems specialist Gromtimj UK explains: 'We ask people what they do at work and what data would help them make decisions. Often the data is actually available on their system but it needs re-packaging into a format with which they are comfortable. Once they are using the data we can look at options for improving what they do, expanding their role and communicating better with a wide range of colleagues.'

The industry regulators are now looking at this issue very seriously, and it is worth noting that in the last price review they had the power and willingness to levy penalties of literally hundreds of millions of pounds on water companies that could not support investment plans with data packaged in the formats they want. They are also pushing the industry towards a Whole Life Asset Management philosophy, or Totex – the combining of asset and capital expenditure accounting.

Joined up thinking

“In fact the water industry is ahead of many other sectors in the way it joins up its management functions. It should not feel that it is lagging behind other industries; it is actually blazing a trail that others will later follow.”

Narbrough goes on to explain that when designing a system, each user must be asked what data they need, how often they need updates, how they process the information and what actions they initiate. They also need to explain their overall rationale - how their activities fit into the bigger company-wide system.

“We only collect data that is going to be converted into usable information, and we tend to report by exception rather than event – which is often the difference between data and information.”

One company that is putting this into practise is Scottish Water, which is in the process of rolling out a new system across the Highland and Islands. Expressed in the simplest terms, field engineers who visit very remote sites are filing records on tablet PCs rather than on paper but the deeper strategy is building a digital platform that will eventually network the whole organisation and all of its functions.

“We have run a pilot at over 100+ sites and we are now rolling out the project across Scottish Water,” says Sheila Campbell-Lloyd, Waste Water Operations Manager for the North region and one of the driving forces behind the adoption of the technology. “With the old paper system, central records could be months out of date. Currently the graphics on the tablet PCs are similar to the old charts and everybody has really taken to them. They are collecting the same data and the software is producing reports on process results, task schedules, routine and non-routine maintenance, energy, health & safety and environmental parameters.”

If everything seems OK, the reports are archived but if there are indicators of

potential issues a pre-emptive instruction is sent to either the engineer or to the centralised Intelligent Control Centre (ICC) as appropriate. Significantly, the tablets are 'intelligent' and will alert the engineer if data is out of expected limits. Better use is already being made of data and later in the project the data collection will become more detailed, leading to a further improvement in management efficiency.

"The guys are already taking ownership of their sites and becoming custodians rather than meter readers. Scottish Water recognises this project as a game-changer. The digital platform will eventually cover all sites and the entire network infrastructure – and will interface directly with the business systems, so that the whole company has unified and intelligently managed information."

Hardware

Ten years ago this level of systems integration would have been little short of science fiction but with today's plug-and-go technology it is perfectly achievable, as Jeremy Shinton, Product Manager – Business Solutions & Software, Automation Systems Division of Mitsubishi Electric Europe's UK Branch explained at the recent water industry conference.

"Manufacturing Enterprise Systems connect real time technical data into high level business systems and they are simple to implement using state of the art modular PLCs, such as Mitsubishi's Q Series. These have a central processor unit plus a rack onto which you simply mount speciality modules, to create a bespoke controller for each situation."

At a remote pumping station, for example, you might want to monitor the temperature of three different bearings, a motor's load and its run time, the flow rate and turbidity. Retrieving this data can be achieved by simply adding the appropriate data logging hardware and one or more communications options.

Standard off the shelf analytical software tools or dedicated solutions from Mitsubishi, can then convert the raw data into reports, each formatted

appropriately for the intended user. For instance a maintenance engineer would look at current temperatures and total run times; a process engineer would focus on flow rates and volume, while an environmental scientist would check the turbidity.

Once the data is transferred to head office, it is integrated with data from other pumping stations to produce management level reports.

Head office would also want the data to update its business systems and again Mitsubishi has an integrated solution for this.

“We have PAC based solutions, they are specifically designed to seamlessly connect process systems with enterprise systems,” explains Shinton.

It is a PLC module that can deliver real time data directly from a remote station to the head office business systems, such as SAP. Process data can thus be easily monitored and analysed, helping to increase plant visibility and boost productivity.

For engineers the IT is intuitively operable, while for commercial managers the information is presented in a manner which is readily usable and understandable. It allows direct, bi-directional exchange of data between a PLC and the business level systems, eliminating the need for intermediate PC based IT systems.

“The water industry across Europe has been quick to realise the potential of our IT connectivity solutions and Q-series combination,” says Shinton. “We have a number of installations in the field that typically started as a small system of say five or six sites but which have been expanded to many times their original size,” says Shinton. “It is a technology tailor- made to help the water sector move to Whole Life Asset Management.”

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Picture 1: 'Driving Innovations in the Water Industry Conference' hosted by Mitsubishi Electric Europe B.V., UK Branch looked at how some companies are embracing the new regime.



Picture 2: Regulators are driving the water industry to adopt Whole Life Asset Management, as the best way to ensure overall efficiency, keep prices down and quality up.

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Our sales offices, research & development centres and manufacturing plants are located in over 30 countries.

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www.mitsubishi-automation.com

www.mitsubishielectric.com

Mitsubishi Electric Europe B.V.

Factory Automation European Business Group

Monika Torkel

Marketing Communications Coordinator

Gothaer Str. 8

40880 Ratingen, Germany

Tel.: +49 (0)2102 486-2150

Fax: +49 (0)2102 486-7170

Monika.Torkel@meg.mee.com

PR agency:

DMA Europa Ltd.

Mr. Roland Renshaw

2nd Floor, Snuff Mill Warehouse

Park Lane, Bewdley.

Worcestershire. DY12 2EL, UK

Tel.: +44 (0)1299 405454

Fax: +44 (0)1299 403092

roland@dmaeuropa.com

www.dmaeuropa.com