



LET'S TALK

KNOWLEDGE SHARING IN THE WATER INDUSTRY

Lisa Barrott, recently appointed chair of the CIWEM Water Supply and Quality Panel, and senior technical specialist at Stantec, talks about the importance of sharing knowledge to address the challenges of the water industry

Sitting around the table, at the end of the most recent meeting of CIWEM's Water Supply and Quality (WSQ) Panel meeting, I asked my colleagues, 'What are the most important issues facing the water industry today?' It was a question out of the blue as I wanted their immediate responses, on the issues that impact their everyday experiences. The

responses were varied and fascinating. This article describes how knowledge sharing is key to facing these challenges and presents several case studies of knowledge sharing that have allowed water companies to advance their understanding and benefit from exchanging experiences and expertise. It also explains what CIWEM's WSQ panel is doing to help.

THE CHALLENGES

The UK water industry faces a whole host of challenges over the next few decades:

- Climate change impacting on the quality and availability of resources
- A changing and potentially more demanding regulatory framework
- Increasing customer challenges in terms of acceptability and affordability
- An ageing workforce and a decreasing pool of young people studying STEM subjects
- Ageing assets needing replacing on a more frequent basis than planned currently

So, to put it mildly, we have our work cut out – particularly in the face of political uncertainty with its potential impact on both regulations and provision of skilled staff.

These challenges all have several things in common: their scale and impact are uncertain, they are common to many environmental problems and there will be no quick fixes. There are no rapid solutions to a workforce that will require three million engineers in the UK over the next ten years, or to underground assets that are spread out widely, difficult to reach, expensive to replace and whose future performance is difficult to predict. But the fact that these challenges are common and experienced by many businesses in many situations – can provide a key to their solution. An enormous amount of work is going on in the UK and internationally to provide solutions to overcome these challenges through innovation, research, development and trialing of new equipment and techniques. Experience, knowledge and different perspectives exist inside and outside of the water industry. How do we ensure that this knowledge is shared with those people who want (and need) to know?

HOW TO SHARE KNOWLEDGE

Managing knowledge – from the training of young staff, sharing UK industry experience on a regular basis, getting people talking to each other from different stages of the water supply process, to understanding international research, developing and sharing global best practice – is key to maintaining, sustaining and developing water supplies in the future. Social networking services such as Yammer®, provide platforms within companies allowing us to ask questions to global experts and receive responses within hours. In-house training happens throughout the industry using internal or external experts. Workshops and conferences are also a great way to share knowledge within the industry. All these approaches happen to some extent. However, in my work I often sense an enthusiastic appetite for more UK-wide collaboration between water companies in the field of sharing knowledge, particularly experience of new technologies. In

'The Leeuwarden trip was a fantastic opportunity to meet a really impressive group of researchers and hear about the exciting projects at Wetsus. I got to discuss my work with researchers and practitioners facing a different set of water treatment challenges. This really provoked me to think about collaborations beyond the UK and broadened my perspective of how my research could be relevant and impactful internationally.'

Andy Upton (STREAM student) now of Scottish Water

In addition, there is a distinct benefit to bringing an international perspective from work in other countries where different approaches are taken in everything from water and wastewater treatment, economic opportunities, to perception of risk and regulation of drinking water supplies.

BENEFITS OF ROUNDTABLES – OUT OF THE OFFICE

This appetite for knowledge sharing was demonstrated nicely this September (2017) when MWH hosted a roundtable to discuss industry experience of automatic coagulation control (ACC) in drinking water treatment. Technologies to control coagulant doses for clarification have been around for years but success has been limited. The systems that have worked well use algorithms and control systems developed in-house, which are based on measurement of turbidity and organics in the raw water. These systems are not suitable for all waters and there is an increasing recognition that new methods are needed to optimize coagulation and reduce both chemical costs and the costs associated with downstream filtration. The days of Jar Testing are not over just yet but any help to respond quickly to rapidly changing raw water quality has got to be a good thing, in terms of reliability of the processes.

Work carried out by Emma Sharp and her colleagues at Cranfield University established that measuring zeta potential of the dosed water could be

used as a control parameter to control the coagulant dose, saving money and improving clarification. Since then there has been an explosion of interest in ACC and how best to include it in operational systems. Several water companies have carried out projects independently to determine how best to use zeta potential in real world operational systems and great strides have been made by working very closely with instrument suppliers.

The systems are now at the very exciting stage where the potential for the technology and the payback is evident and the situations in which the technology can be used are growing. What was needed was an opportunity for people to come together to share their experiences. The roundtable was attended by over 20 people from ten water companies. It gave people sufficient time and opportunities to discuss their experiences and exchange troubleshooting tips from their trials and tribulations with automatic control systems. Several attendees commented on how useful the workshop was.

For example, Phillip Davies – process engineer at Severn Trent said: 'Excellent workshop, was very nice to concentrate on a single topic in detail for a day.' Additionally they said how beneficial it was to hear so many different experiences and perspectives on systems in one event.

Hassan Alhweij, process engineer at MWH Global commented: 'The workshop was so practical and spots the realistic problems, concerns and potential solutions. There was no influence by the instrument or the technology providers. This makes the cases so realistic and not being biased by the intent for marketing specific tools.'

Of course, when people are so busy with their day jobs in the water industry it can be difficult to spare the time to do this. But for a small cost upfront the benefits can be huge in terms of avoiding mistakes or finding someone else has solved your very problem and networking for future collaboration. It was a chance to go deep, helped by the luxury of time and being away from the office, and the benefits are enormous.

INTERNATIONAL EXCHANGE VISITS

Bringing an international perspective and promoting collaboration can

be harder to achieve and it is best to start early. A great example of seeing how other countries approach mutual problems was the visit by STREAM Eng.D students to the Netherlands. STREAM is the Industrial Doctoral Centre for the water sector funded by the Engineering and Physical Sciences Research Council and companies who sponsor research projects. Projects are collaborations between industry, water companies and academic institutions (Imperial, Exeter, Newcastle, Sheffield and Cranfield). In July last year, and in a first for STREAM, Eng. D students from the UK visited Wetsus in Leeuwarden in the Netherlands as part of their challenge week.

Wetsus is a European Centre of excellence for sustainable water technology and promotes cooperation to develop profitable and sustainable state of the art, water treatment technology. Wetsus states that, 'the inspiring and multidisciplinary collaboration between companies and research institutes from all over Europe in Wetsus results in innovations that contribute significantly

to the solution of the global water problems'. During this visit there were opportunities for STREAM and Wetsus students to talk about their work and to hear about the work being carried out by their peers – and to drink beer in the evening and socialise.

The range of topics discussed during the week was impressive: from future water networks to development of microbial recharge batteries to phosphate recovery from wastewater. But just as important was the opportunity to develop working relationships with international researchers who do things in a different way with a different approach. This switch in perspective was neatly illustrated for me hearing of the development of a technology to filter and process humic and fulvic acids from drinking water. Vitens, one of the largest water companies in the Netherlands, has developed a way to use this former waste product as fertilizer in the agricultural sector. The application of purified humic and fulvic acids increases crop yields and reduces the use of pesticides and fertilizers. What was a waste, has now become a valuable by-product.

MIXING WATERS – A CONFERENCE?

An area that is currently gaining momentum—arguably it has never gone away – is that of mixing of water in networks. The ability to move waters from different sources around a network is critical for water companies in water-stressed areas and in emergency situations where supplies are suspended for some reason and need to be replaced by another. Some water companies can buy in water from neighbouring water companies and this has gone on for years. But what happens if processes change and new areas need to be supplied from these sources? Many water companies have experienced difficulties, and in some cases with very serious consequences, from either replacing one water with another or with introducing a new treatment process, which has fundamentally changed the water chemistry and subsequent interaction with the network.

This is a complex area and the science, including the chemistry, is not understood completely. The consequences of mixing waters is not entirely predictable, although there



are some indicators that have been used for a long time. The Langelier Saturation Index, based on calcium carbonate chemistry, is used by many water companies to predict whether corrosion and discolouration will occur in a network but its use is not universal and is only one index amongst many factors that should be considered. There is immense scope for knowledge sharing in this area and, as a consultant working in the water industry, one of my roles is to make sure this happens by sharing, passing on knowledge, experience and understanding. But in my view, great value would come from pooling information and experiences to better serve the industry, including getting to grips with the

and international practitioners. The WSQ Panel is one of CIWEM's twelve technical panels and networks. These panels are the technical cornerstones to CIWEM outputs. The main purpose of the WSQ Panel is to provide expert, professional views for CIWEM on developments in water supply and quality and several panel members represent CIWEM at forums and events, as I did at the Royal Society for Public Health a few years back. The Panel currently meets three times a year at CIWEM's London office, and members are in frequent contact via e-mail, indeed most of the work is carried out for the meetings via phone calls and e-mails.

There is a healthy mix of people on the Panel from water companies, academics, regulator, consultants and the early retired from the UK and overseas. At the meetings we have representatives from England, Wales and Scotland and some join by phone from Canada, Hong Kong and Malta. The WSQ Panel provides answers to questions from the public, and organises conferences and workshops for the industry and policy position statements (PPSs) describing CIWEM's views on current water supply issues. The PPSs are written for non-technical but interested members of the public and are updated regularly as science and technology advances and changes.

In August, the WSQ Panel published a PPS on 'Microplastic Pollution' (led by Nic Thomson), which describes CIWEM's current position on the topic of microplastics. The interest in microplastics, tiny particles of plastic which can accumulate in soil, freshwater and marine environments, has surged recently as the media has drawn public attention to their increased presence in the environment. The WSQ Panel's most recent PPS – 'Chlorination and Chloramination of Drinking Water' – has just been published. The PPS on 'Water Distribution Network Leakage in the UK' is a valuable summary of the situation with regards to leakage in the UK and includes a very helpful list of terms, issues and misconceptions surrounding leakage.

latest international experience. For example, US researchers have taken this subject the furthest. One way of sharing international knowledge is through conferences and there are plans to hold such a conference on 'The challenge of distributing water via ageing pipes' in 2018. But the timescales of conference planning mean that months can pass before information is shared. So how can the water industry make this happen more quickly for everyone's benefit?

PANELS CONNECTING PEOPLE

CIWEM's WSQ Panel plays its part in promoting knowledge sharing by connecting people in the industry with their peers and with customers, academics

YOUR INDUSTRY NEEDS YOU

The Panel remains keen to attract interest from professionals engaged in water supply operations and from manufacturers and suppliers of water

treatment equipment and water quality instrumentation. We really want to hear from those involved in the installation of household and building water supplies and are particularly keen for younger professionals to join us. If you are interested in this or any other panel and could devote some time to the work of the Institution in a voluntary capacity, please forward your CV to Alastair Chisholm, director of policy at CIWEM.

And so, to the future. The issues facing the water industry are multidimensional and difficult to forecast. But the sharing of knowledge, both inside and outside of the water industry, exchanging ideas and importantly making links and hearing about experiences from other countries are important factors in developing creative solutions to complex problems. ◉

Thanks to the members of the WSQ Panel for sharing their ideas and for their continued support of CIWEM's aims and objectives

Lisa Barrott is senior technical specialist, Stantec and chair of the Water Supply and Quality Panel of CIWEM

FURTHER INFORMATION ABOUT STANTEC

We are active members of the communities we serve. That's why at Stantec, we always design with community in mind.

Stantec, unites approximately 22,000 employees working in over 400 locations across six continents. We collaborate across disciplines and industries to bring water and infrastructure projects to life. Our work as architects, engineers, and consultants from initial project concept and planning through design, construction, and commissioning begins at the intersection of community, creativity, and client relationships. This work is built on a nearly 200-year history. With a heritage in water, our world's most precious resource, we safeguard and sustain lives, communities, and businesses worldwide.

Our local knowledge and relationships, coupled with our global expertise, qualify us to go anywhere to solve our clients' challenges in more creative and personalised ways. With a long-term commitment to the people and places we serve, we have the unique ability to connect to projects on a personal level and advance the quality of life in communities around the globe.