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 happening 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 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, 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 MWiH 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 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."

Hasan Alinowi, process engineer at MWiH Global commented: "The workshop was so practical and spot 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 is very rewarding. It is rewarding 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...
innovations that contribute significantly to the solution of the global water problems. During this visit there were opportunities for STREAM and Wetsus to talk about their work and to exchange ideas and concepts on how to develop sustainable 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 waters 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, 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 discoloration 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 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, 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 discoloration will occur in a network but its use is not universal and is only one index amongst many factors that should be considered.

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

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

FEEDBACK FROM THE ROUNDTABLE WORKSHOP

Phillip Dowe – process engineer at Severn Trent

I definitely found it useful – it contained the right number of presentations. I thought the interactive sessions worked well and was a good round up. Having sessions for the winter was a good idea too – with a summary at the end.

Emma Sharp – asset health and risk lead at Severn Trent

I definitely found it useful – it contained the right number of presentations. I thought the interactive sessions worked well and was a good round up. Having sessions for the winter was a good idea too – with a summary at the end.

Andy Spinks – STREAM researcher at Scottish Water

The workshop was really useful. I learned a lot. It was great to hear so many different experiences and perspectives from all of us.

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 and international practitioners. The WSQ Panel is one of CIWEM’s twelve technical panels and networks. These panels are the technical connections to CIWEM’s outputs. The main purpose of the Panel is to provide expert, professional views for CIWEM on developments in water supply and quality and several panel members represent CIWEM at 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’ (Ed 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 the 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.

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 the WSQ Panel encourages you 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.

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, with approximately 21,000 employees working in over 435 locations across the continent. We collaborate across disciplines and sectors 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 the interaction of community, economy, and client relationships.

This work is built on a nearly 200-year history. With a heritage in our, our world’s most precious resources, 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 personal ways. With a long-term commitment to the people and places we serve, we know the unique ability to connect to projects in a personal level and enhance the quality of life in communities around the globe.

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KNOWLEDGE SHARING

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