Collaboration makes for a safer water sector

In the latest issue of Current magazine, we explore the innovations making workplaces safer and discover that it's not all about the tech.

by **Martin Kovacs** — 14/10/2019 in **Workplace**

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Safety in the water sector has been bolstered by an influx of new technologies. However, it’s about a lot more than artificial intelligence, writes Martin Kovacs.

Water utilities prepared to take a proactive and collaborative approach to industry and community safety management can go a long way in bolstering a safer culture industry-wide.

While technologies such as virtual reality (VR) and machine learning can support a more focused safety approach, some utilities are making waves in knowledge-sharing to address safety challenges.

Collaborative forums such as the Urban Water Authority (UWA) – established by South East Water in early 2018 and comprising fellow Victorian metropolitan utilities Melbourne Water, Yarra Valley Water and City West Water – can help industry collectively tackle safety issues.

As noted by Kashif Azhar, South East Water Safety and Wellbeing Team Lead: “Our industry shares common risks”.

“It’s beneficial to collaborate on common issues, devise agreed solutions and share best practices. A lean and standardised approach is also beneficial for our contractors, to remove confusion and complexities, while working for us.”

Working together

Azhar described UWA’s collaborative approach as being based around the belief that there is no intellectual property attached to safety.

The forum had initially collaborated and agreed upon minimum requirements for the high-risk activity of confined space entry, benefiting the many contractors shared by the utilities. Since then, it has broadened its scope.

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“The agenda and attendees have evolved since the first meeting,” Azhar said.

“The forum now covers high-risk operational activities, the impact of new legislation and standards, culture, values and wellbeing.

“Collaboration occurs via two main committees: the strategic committee, represented by senior managers, setting the forum’s direction, and the focus group committee, represented by safety and operational staff, addressing specific topics and working with members to achieve standardisation.”

Azhar said there are a number of projects in UWA’s “collaboration pipeline” to continue playing an active role in the sector.

“UWA has the energy and resources to provide quick solutions to the water industry,” he said. “We have the capability to develop best practices, which can be utilised by the wider industry and our service providers.”

Virtual view

While VR has generated headlines as a consumer-focused technology, its capabilities are also being harnessed by industry to deliver safety benefits.

Ben Horan, Deakin University Associate Professor and Director of the Centre for Advanced Design in Engineering Training (CADET) VR laboratory, who has been working with Melbourne Water on a number of VR initiatives, explained that VR is rapidly advancing.

“I don’t believe we will get to the point where the realism of VR exceeds reality. However, it does facilitate access to virtual environments that wouldn’t be otherwise possible,” he said.

“In such cases, I would say it can be more effective than traditional training.”

Australian Water Association Podcast Series

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Horan advocates a balanced approach, employing both VR and traditional training, focusing on engaging users’ other senses when required.

“For instance, if we are training someone to isolate a complex piece of plant, we would like to have them use their hands to interact with the virtual environment to press buttons and turn valves,” he said.

“This is a much more natural way to interact, and means skills acquired during training can be more readily transferred to the real task.”

Scott McMillan, Melbourne Water Safety Manager, Technology and Innovation, also pointed to VR’s capacity to supplement traditional training programs.

“There’s really no replacement for actually operating a valve with a trainer standing next to you, but this isn’t always possible,” he said.

“We can’t always have equipment available to be worked on at the same time that people are available. Traditional training relies on remembering everything from your training session, but VR allows you to refresh yourself 10 minutes before you actually need to use those skills.”

Safer training

Melbourne Water has adopted VR as an integral component of its plant design review process, which McMillan said has allowed the utility to address ergonomics issues – staff are able to familiarise themselves with equipment before the concrete has been poured.

“VR is the best way to engage with all stakeholders from design, construction and operations,” he said.

“This initiative has changed the way people engage with plant design, improving people’s ownership of the site, and this always leads to better safety outcomes.”

“VR is the best way to engage with all stakeholders from design, construction and operations.”

Scott McMillan, Melbourne Water

McMillan said Melbourne Water continues to partner with Deakin University to design and build a multi-user platform that can be dialled in from anywhere in the world.

“We used this platform to build isolation training for our Eastern Treatment Plant’s ozone generators,” he said.

“This state-of-the-art training system uses hand-tracking and wireless headsets to let users interact with the virtual plant by closing valves and pressing buttons.”

Melbourne Water is exploring additional VR applications, with the utility having also used VR as a community engagement tool, helping a community understand what their local floodway would look like after modifications.

“Immersive technologies are a fantastic way to bring everyone together on the same page. Looking at drawings on a bit of paper doesn’t always work for everyone,” McMillan said.

Machine MIND Machine learning is another comparatively new technology with the potential to deliver industry and community safety benefits across a range of applications.

Veolia Australia and New Zealand Data Scientist Valentin Moreau explained that machine learning allows for reproducing human intuition through statistical analysis of large datasets, with the banking and power industries among those having actively deployed the technology.

Moreau noted the water industry rarely uses machine learning, but highlighted its potential to predict network issues.

“For these two applications, machine learning can help utilities move from reactive to proactive operations,” Moreau said.

“At the moment, most sewer blockages and water bursts are detected only when reported by customers. With machine learning, we can predict where these failures will happen and organise preventative maintenance to avoid these issues.”

This can result in direct safety benefits, with Veolia Project Manager Quentin Bechet pointing to the potential to prevent hazardous situations such as sewer blockages.

“These unfortunate events can lead to populations being exposed to sewage and can have a dramatic impact on the health of nearby residents,” Bechet said.

“Being able to prevent sewer blockages would definitely minimise these risks.”

Bechet also noted machine learning’s potential to detect water-quality issues.

“Water utilities must ensure that water provided to populations abides by quality standards, and this can in practice be very difficult when water has to travel in dozens-to-hundreds of kilometres of pipes before reaching customers,” he said.

“Again, the idea is to be really proactive and take action before water quality degrades and starts impacting the health of populations.”

Strong safety

Griffith University Research Fellow Jop Havinga stressed the importance of encouraging employees to take initiative in creating a productive safety culture, noting a compliance-based approach can produce counterproductive outcomes.

“What I think is behind a lot of compliance culture, or at least the people aiming for compliance, is the view that as long as we check for everything, make sure that things aren’t any different from the way we planned it, things will work out okay,” he said.

“However, reality is often different – there’s often multiple things happening at once, there’s always unexpected differences.”

Havinga recommends empowering employees and promoting open communication, noting it’s important not to limit conversations directly to safety.

“By taking time to listen to people, not limiting the conversation to typical safety language, you can find out a lot more. This works by letting the people who have the most knowledge, who see the actual status of the worksite, be the ones to make the call,” he said.

Additionally Havinga said approaching safety management as a constant learning process is important.

“I don’t even know if I would consider safety separate from work,” he said. “Often making things safer can also make work easier and more pleasant.”

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