Sophie Horne

Sophie Horne *is working in the water industry. She gained a MEng in Chemical Engineering with Energy Engineering at Heriot Watt University in 2018. She is an Associate Member of the Institution and works as Graduate Process Engineer with MWH Treatment*

Sophie, Can you start by describing your current job?

My role requires me to work within a multi-disciplinary project team to deliver robust, safe, and constructable water and wastewater treatment plant designs.

MWH Treatment is a design and build contractor, consequently, the designs I produce quickly go from being a concept on paper to being a physical installation; this makes the work hugely engaging.

Would you like to expand on the part process safety plays in your job?

Process safety is something I prioritise across the lifespan of my projects and I am always challenging myself to produce inherently safer solutions. For example, when I produce the hydraulic design, I work closely with the civil engineer to ensure we eliminate or minimise the need for deep excavations. When I am preparing the control philosophy, I will liaise with the electrical engineer to simplify the control, whilst still incorporating layers of protection

Perhaps one of the most nerve racking but informative aspects of process safety that applies to my work is taking the process design to a hazard assessment. Process safety will be assessed several times during design from a SWIFT right at the beginning of the project followed by a HAZOP at detailed design and if required a LOPA study.

In my experience, these assessments are a fantastic opportunity to engage with the operations team who have invaluable information on each site. The operatives are also the end user of these designs, so I find it so useful to get their input on the process safeguards we have put in place. Often, we find that what we think would work on paper is not always the best for the operators and the site specific needs.

Due to the design and build nature of the work at MWHT, we are in the position to get feedback from site during commissioning. This allows the designers to capture any valuable lessons that can be taken on to the next project. It also enables us to continually improve, and to produce inherently safer designs..

Is it possible to describe a normal working week?

Each day I am in contact with project team members, and each week I will have design review meetings with the wider project teams to discuss project progress; this typically involves all disciplines (civil, electrical, mechanical and process) as well as the design manager and the client.

What do you enjoy most about your job?

As much as I love an excel spreadsheet the most interesting part of my job is, without a doubt, getting to go to site.

The opportunity to see a site in operation is invaluable to your understanding. It gives you practical insight and allows you to visualise the process units you'd otherwise only see as a symbol on a P&ID. Being at the beginning of my career I've yet to go and see a site that I've helped to design but, hopefully, that's not too far off.

Is there an achievement in Process Safety that you are pleased with?

During the HAZOP of a water treatment project it became clear that there were historic problems with the existing equipment that needed to be prioritised. This resulted in a complete revision of the project scope, and it went back to the front end engineering development stage. Getting to drill down and 'optioneer' the overall best proposal was very satisfying. Although it meant that the original project timescale was de-railed, the satisfaction of stripping the project back to basics and producing a better design made it worth-while.

What skills and experience have been key to your work in Process Safety?

An experience that has been key to my achievements in process safety has been acting as a scribe at HAZOPs during my first two years with the business; this allowed me to gain not only technical knowledge but also insight into the calibre of process designs we should be putting on the table. Furthermore, being part of a HAZOP has taught me how to effectively communicate to different members of the team, so we all have an understanding of the process design. Having the right people at the right time throughout the design is paramount to process safety, and if those people have a good understanding of the process then safety can be tackled from all angles.

How does your role contribute to solving society's grand challenges?

Although working in the water industry doesn't appear as the most glamorous, it's at the very forefront of society's challenges. In addition to reducing pollution the industry is working to eliminate eutrophication and my role as a process engineer is to assess the best method to provide nutrient removal. This keeps our water ways clean and safe. The industry is also looking to identify technologies that will enable us to remove micro-pollutants.

Furthermore, with population growth comes extra strain on our resources - water is no different. Through design efficiency and robustness, we can minimise losses and help mitigate the risk of future water shortages.

What are the key Process Safety challenges being faced by the water industry as we move towards 'Net Zero'?

I think the challenge for the water industry will be maintaining the rigorous standards applied during hazard assessments even when new technologies come through. As an example of the new technologies that are being introduced, I was lucky enough to go to Minworth THP (*Thermal Hydrolysis Plant – essentially a fancy pressure cooker for sludge*) plant which is Severn Trent's largest sewage treatment works. Yes, I am aware I've used "lucky" and "sewage" in the same sentence. The THP plant gives the site the ability to create natural gas which can be delivered back into the grid.

Additionally, value engineering and process intensification are going to be crucial in moving our designs towards net zero.

What led you to choose a career in Chemical Engineering?

I have an inquisitive mind and like to understand how things work and why. Chemical engineering is the perfect mix of learning why and how things work, and then getting to manipulate that to propose different solutions.

Being a member of the Institution has provided opportunities to learn about a wide range of different topics from technical experts, and access to resources that have supported my learning.

Is there any advice you would like to give to someone thinking of working in Process Safety?

Do it! Process safety is best achieved when approached from a variety of perspectives. Fresh minds always bring that – whether you're straight out of university, college or coming in from another role.