T-safe Talks

Steven Van Der Peer
Authorising Engineer (Water)

The Impact of Project Management on Water Safety

Welcome to T-safe Talks

In this edition of T-safe Talks, we explore the impact of project management on water safety with Steven Van Der Peer, Authorising Engineer (Water) and Consultant for Tetra. Interviewed by our own Nick Barsby, National Sales Manager for T-safe and Chairman of the Legionella Control Association, the pair discuss the impact of project process and the implications on water safety. Steven shares his experiences and how he feels project processes could be improved with insights and advice for various stakeholders along the way.

Meet the Interview Panel

Steven Van Der Peer: Authorising Engineer (Water), Tetra

Steven is an Authorising Engineer (AE) (Water) & consultant for Tetra, with over a decade of water safety experience. Being the AE for around ten NHS Trusts and some world-renowned Universities, where Tetra is contracted as an AE, gives Steven a unique insight into the challenges these establishments face. Furthermore, Tetra also acts as consultants across all sectors with a portfolio of clients that includes manufacturing, government, and commercial settings.

Having started in the facilities management industry working with Swimming Pools, Electrical and Mechanical works, Steven moved into solely managing water and quickly moved through the ranks. Steven was AE for a large facilities management provider covering hundreds of buildings across the public and private sector, including thirteen NHS Trusts, government organizations, MOD sites and schools.

Nick Barsby, MWMSoc, Chairman of the LCA and National Sales Lead – Water Hygiene for T-safe

Nick has over 15 years' experience in Legionella control, having worked for some of the UK's leading testing laboratories as a BDM, Sales Manager and Commercial Manager. He has a vast knowledge of analytical test methods and procedures and played a pivotal role in the introduction of MALDI-ToF confirmations in the UK market. Nick is currently National Sales Manager for T-safe and heads up our water hygiene service provider partner initiative. Nick is also the sitting Chairman and a Director of the Legionella Control Association and was heavily involved in the re-writing of the Service Standards and the subsequent roll out to its membership. Nick has also written and co-written numerous published articles on a range of subjects covering Microbiology and Laboratory methods.

Q1 Does project management have an impact on water safety?

Some years ago, there seemed to be a race to the bottom from the Water Hygiene sector that drove prices down in terms of Legionella risk assessment and tank cleans and other water hygiene services. The result of this was poor quality services being delivered and impacting negatively on the end users. This situation was especially concerning on healthcare sites. There is a sense that this appears to now be turning a corner. I get the impression that quality is becoming increasingly important possibly driven by the oversight and scrutiny provided by Authorising Engineers as well as the subsequent levels of litigation that are now being seen. The increase in quality is also being driven by better levels of understanding and increased levels of competency that can be seen in the end users.

Q2 Is project management covered sufficiently by guidance?

I don't think it is really. I think design is covered partially. In the Approved Code of Practice for Legionella and related Health and Safety Guidance 274 its quite light on project management and not a real focus. HTM04-01 goes a bit further, especially in Part A, that looks at design, the design processes and design nuances that exist in healthcare specifically.

However, none of them talk about project management or the affect the processes of project management can have on water quality. While covering the systems and technical matters, the documents do not describe the interaction between the project manager, contractor, or the NHS Trust. They don't expand on the wider world that ensures a good design is created, reviewed, and installed. There is BS8558 that covers, in depth, the design of water systems, but that's only a small part of project management.

Q3 Do any of the British Standards cover project management?

What we do have is BS8680. It's a Code of Practice for creating a Water Safety Plan; it goes into detail on the process of project management from cradle to grave and how an organisation should have this written down. It covers the stages of project management and who needs to talk to whom with reference to the appropriate guidance documents.

It is assumed that a Water Safety Plan is only for hospitals and healthcare settings. This isn't the case. Any organisation that has a wide portfolio of buildings with a variety of complex water systems should look to employ a Water Safety Plan to help deliver safe water if it is proportionate to do so.

We work with a world-renowned University who deal with a range of buildings from Stately Homes, Laboratories, Student Accommodation and rented premises on a healthcare estate. A Water Safety Plan would be very beneficial in this setting and in terms of project management it would help support the correct project processes are employed. This allows for a sufficient high-level process to be followed to achieve a safer water system. The BS8680 will help guide the process for the Project Management teams to follow and this will help eliminate Water Safety issues such as Legionella and Pseudomonas that can sometimes be designed into a system.

Q4 Why is BS8680 not used more widely?

The idea of the Water Safety Plan came through the HTM series; but it originally started out from a publication called "Water Safety in Buildings" from the World Health Organisation. It spoke about multiple sectors that would use it. It was used in the UK to drive the Healthcare sector via the HTM. It allows for scalability. So, if you have 1 building and 1 simple system then a Responsible Person is sufficient. However, if you have multiple buildings and/or lots of different processes then you need a set of rules to govern how you manage these things collectively and holistically. You may have various sources of water and numerous uses of the water; all of which need a scaled response based on the risk profile of the system and the use.

Legionella isn't the only risk either; in healthcare there are a plethora of water borne pathogens; in manufacturing it may be a wide range of toxic metals or radiation. This needs more training and competence than a Legionella training course and therefore you need a water safety group to support the safe use of water on complex sites.

Q5 Are you asking people to go over and above the guidance that's currently available?

I have been involved in some sites in the past where clinical teams were responsible for flushing and it was common to get as little as 20% of the records completed and reported back. This could have been for numerous factors and the pandemic won't have helped making this a priority for clinical staff. The reasons we were given for this ultimately came down to a lack of understanding from those being tasked with a job. They didn't understand the importance of flushing, and how it contributes to keeping the water system safe for patients. Once this was rectified with training and toolbox talks the compliance records were completed and returned at a significantly improved rate.

Q6 Challenges with flushing is a recurring theme in healthcare, how can this be resolved?

The question that gets raised, with this kind of project process, that you won't find written in the guidance, is, "do you have to do it?" The answer is yes. Legislatively you still must:

- provide suitable and sufficient risk assessments
- provide suitable and safe systems that don't have an inherent health risk to the users under the Health & Safety at Work Act 1974 and limit exposure through design under the COSSH Regulations

Any way you can harm somebody through your undertaking is your responsibility to minimize. Although this process isn't written down anywhere, other than BS8680, I don't think it's over and above. Personally, I think it's the minimum.

If we look at the minimum legal requirements and the guidance. HSG 274 and its frequencies are not a legal minimum requirement. It provides guidance on the requirement. If we look at Project Management and the minimum process we have, it should be applicable to the risk, systems, and sector. If we use Flushing as the example – HSG 274 and HTM talk about weekly flushing, but most go over and above.

Now to use this example in reality; I supported a facility that, during COVID was emptied from thousands of staff using the site daily. Weekly flushing was employed. The weekly water turnover was nearly 1million litres a week; weekly flushing would never achieve this. The question is do we need to flush once a week or replicate weekly usage? Particularly when an entire

facility is empty. The legislative requirement is to have a safe water system; so, in this instance, weekly flushing is likely to lead to a non-compliant system. If you're flushing once a week with an unsafe system, you are still non-complaint.

Taking this into Project Process and managing a process from cradle to grave; it's not over and above guidance, it's in line with the legal requirement to deliver a safe system. We need to take guidance for what it is and apply the process scalable to the risk profile. If you understand your risk profile, you can take a scalable response.

If you take the risk profile for a project for a new ICU, you will have extremely vulnerable people using the space, so a great level of detail and review needs to go into the design including IPC, AE, RP, principal designer to make sure everything is appropriate and applicable to ensure that no one is harmed due to the results of poor process. If we had a process that was the bear minimum every time, then the approach would be the same for installing a new toilet or building a new ICU. If you have a scalable approach, you can ensure the risk profile drives the response.

Q7 What are some of the consequences of Project Management errors on water safety?

I have numerous examples of this.

Take a very small ward refurbishments at a Mental Health Hospital (which lacked cohesion between the stakeholders). Upon the project being completed Tetra enquired on the testing certificates before patients were admitted. The site had already allowed patients to enter the ward and the sites results had not been checked or approved. There was a second ward that had not been occupied that had a similar issue. On further investigation the lack of a commissioning process was found, and the clean and disinfection process hadn't complied with guidance and the number of samples taken was insufficient. Competency was a major factor on this small project.

On a wider scale we can look at the Children's hospital in Edinburgh that had a major issue with Construction standards, mainly ventilation, but also water quality. It recently opened during 2021 when it was supposed to be occupied in 2019; it cost approximately £28M to fix the issues. A lot of that was ventilation and a smaller part of that cost was water. The transfer of patients was stopped within a week of the scheduled date which caused significant disruption.

Both issues come down to process. The process of design and looking at specification and getting the right input through to having the correct sign-off. Every aspect needs reviewing. When you look at water safety; are we keeping our copper pipe clean and bagged before install? When we do cleaning as part of the hand over, this should have competent cleaners come in on a clear process and not a builders clean. Generally, it's a construction company that will sub this out to companies that don't have IPC cleaning experience and thus we potentially contaminate the site before its even opened. The details from cradle to grave are vitally important.

Q8 Could the implications and lessons have an impact on other factors, not just the water system?

This comes back to the concept of spatial design. When we are talking about project management, it is an umbrella concept that has all the different phase's underneath, design is one of these. We need to consider spatial design as well as water system design.

A site I was at recently had the hand towel dispenser fitted over the sink in an Oncology ward. When the towels were used some small pieces broke off as they were extracted, and the waste dropped into the sink and down the drain. The result was that all these pieces of towel collect in the plug hole and clog the sink creating a reservoir of bacteria. Could we eliminate this issue if we move the towel dispenser 2 feet either side of its current location? The site was using PoU filters to manage the Pseudomonas risk here; but had inadvertently created the opportunity for retrograde contamination to occur due to poor spatial design, this is a very common issue across all of facilities management.

Outside healthcare, in leisure we might see a shower room with one TMV feeding a bank of showers in a linear run, all blended water round to the last shower at the end (which is under no circumstances ideal). What you might also find, is the door is sited as far away from the last shower as possible. The usage, due to general human behaviour, is always the first shower on the run. When its busy, the last shower might be used and will have essentially been a dead leg holding water around 37°C for a period of time. So, can we minimise this risk at the design stage using spatial design? The answer is simple; move the door to the other side and make the last shower in the run the first shower available to a user, thus drawing water across the bank of showers reducing the inadvertent dead-leg. This is the simple impact of spatial design; when it's combined with an explicit understanding of the usage of the site (such as users, frequency, activity) you can design the water system and the space to work in tandem.

Q9 What lessons can be learnt from this experience Steven?

If in doubt ask, especially in healthcare. Everyone has a sphere of knowledge. It's common for Project Managers to be given a brief before a project starts, they then take the brief to the designer who designs based on the brief. What I have very rarely seen is IPC and clinical teams be consulted on the design to add a real world and usage viewpoint and I think that's a significant area we can improve on. There needs to be a better way of informing industry and the wider sector as few of them will have been significantly trained in water quality and water safety. There is a lot of guidance about not designing risk in; but there is no point of reference to get the information to those who need it.

Q10 Are there some key factors that good Project Management should look like?

Reviewing the plans and design before a project starts would be a great step. This would stop basic errors in design.
A basic process to follow is:

- Conception. Idea conception – what do you want to do – i.e. I want to build an ICU.
- Design. Speak to projects, contractors, and designers to pull together, (alongside your process), a suitable design & commissioning plan.
- STOP. Stop to review the design and make it a real review by all stakeholders including the WSG (if you use one).

- Review. The length of the review and the number of relevant reviewers is scalable. A new ICU may need a 2-4 week review as opposed to a 1-day review for adding a new toilet facility.
- Sign off. Once the design is signed off, we should also review and sign off the commissioning plan.
- Soft landing. They know the system better than anyone and kinks are always going to occur. Having the installers on site will allow for issues to be resolved quicker.

Q11 Does applying the best practice above have any implications to costs?

Is there a cost of applying a better process; yes, there is. Any Senior Estates manager that has dealt with a major water safety issue, like an outbreak or a fatality, will tell you they would rather have spent the money up front on a better design than taking the physical, emotional and mental costs of the issue that arose from not spending that money; and it's not just monetary costs, it's the stress, jobs lost and time spent to resolve.

If we just apply time on a project, it actually will save time long term, save money and improve safety outcomes. Sometimes it may be pennies and sometimes it can be millions of pounds. It's a sliding scale; the less process you have the more you can save initially. If you have a good process at the beginning, you will spend more initially, but much less fixing any issues that occur. The issue is that people don't know what they are going to save until they must save it. It's the impact of short-term gains over long-term savings. A £15k saving now may cost £50-60k to fix in the future and sadly experience is the best educator in this. Spending a small amount on competent help can make significant savings. A project I am working on spent £3.5 million on a project, a significant amount of this cost wasn't necessary; the cost for a good consultant would have been a fraction of this.

I previously dealt with a PFI building built by a company that no longer exists, the FM company I worked for took the contract over. After a few weeks we sampled the entire site for Legionella, over 300 samples, to get an idea of the water quality across the site. Over 150 results came back positive. There was no pattern or trend to this. The concentrations were from >8000 to <20CFU/L. The temperature results at the outlets were fine, we were compliant. We did flow checks on all tertiary loops to check if the hot water system was flowing properly. What we found out was that not one balancing valve was installed in the entire building and so water was taking the path of least resistance, so a return was dead one day, and flowing the next, based on what was used around it. It would change daily and thus seed other areas of the system. The cost was over £2 million instead of the cost of a few hundred balancing valves; and this excludes the human cost of time, mitigation, management, missed appointments etc. It was all down to an error in design and commissioning and a key action being missed.

Q12 It seems that competency is critical here Steven?

My favourite subject! It's not competency of just one or two people but everyone in the entire process, from designers, constructors, IPC, authorising engineers. We all need to know our roles; understand our responsibilities and they need to be clearly demarcated. It's about managing the competent people too though; and too often it's a hands-off approach; the view is we have to manage the contractors. Unfortunately, the PMs are accountable for the services provided to them in the same way an AP is responsible for a poor job done by a Water Hygiene contractor. They must manage the experts.

Q13 How do you manage an expert in a field that is not your speciality?

You must have a level of competence to match your role. If you're a PM you should have some idea of what should and shouldn't be done with Water, Electrical systems Asbestos etc. You need to have a process and be aware of the limit of your sphere of knowledge. If you know your limitations, you will put your hand up and ask for help to ensure its checked and reviewed. A good process will do that and encourage that working relationship.

An example would be a commissioning plan coming in from the contractor. It's checked by the PM but they know their limitations and they pass it to the RP to review as they are more competent. They may look at it and perhaps they are not conversant with all of it, and so pass up to the AE or IPC for an expert view. Knowing your limitations is a massive part of competency. There is always a limit to your knowledge and competency. Managing an expert is knowing your own limitations.

There are no stupid questions; there are only stupid people who don't ask them. Attitude makes you more competent. As does having less pressures (time and money); if there are less factors affecting your decision you can take the time to make the correct decision more often.

Q14 Should the experience of your expertise be checked?

Managing the experts is about knowing your own limitations; but you should have a process for enough checks and balances to ensure that our experts are experts. That's not to say that the Project Manager must undertake these checks; but someone should be doing this as part of the process.

The competency checks will be determined by the role they are doing; the checks on Gas Safe Engineers are very different to Water, mainly because water is unregulated. There is no qualification that someone legally needs to work on water. The sort of checks I would be looking for would be reviewing training / qualifications; how active in the industry they are; are they well respected? what is their reputation? do you have any references and a professional CV? These will vary based on the equipment being installed and the project requirements.

For the installers and constructors, we expect a good level of knowledge. It's often purchased through procurement; and I don't know how much work and investigation is done on competency; my feeling is it's a little bit light, the procurement process is not always driven by the needs for IPC and high-quality design and engineering.

Q15 If projects go wrong, there is an increased risk to water safety, what are the biggest factors that increase this risk?

It's the big 4 – stagnation, cleanliness, temperature, and nutrients. Its understanding what these are in the context of a project, so site management is key to stopping unwanted circumstances in relation to your systems. Undertaking maintenance before a system is live is a very important step before putting anything through it. Its making sure it's as physically clean as possible.

The biggest factor in supporting legionella growth is stagnation. We are talking about Hot Water systems not installed properly and not circulating correctly, dead legs and oversized cold water storage tanks, such as tanks holding 30,000 litres that need 5,000 tanks.

If you lose temperature control but flush a system through entirely you can manage Legionella through turnover; you don't want to do that if you can avoid it, but it is possible. You could quite happily flush a system so much that it doesn't allow the water to stagnate and give time for the bacteria to proliferate.

As we come down though to temperature. Common and simple errors I see frequently here are lack of insulation which is then compounded with cold water pipes installed above hot water pipes; thus, allowing heat transfer from the hot to the cold system.

Past this point we see nutrients being a risk. These can be added through poor practices during project work.

Project management need to consider normal usage and flushing. One of the major issues is projects that don't touch the water system; yet affect the usage. If you rip out a ward and fit new lino over a 3-week period; nobody is using those taps for 3 weeks. As the water isn't being touched it's not thought about as a risk or an action. If it's reviewed someone with the correct knowledge will know this is a dead leg and it needs mitigating and not just left to stagnate.

Q16 When colonisation of a water system occurs; what steps should our readers consider?

Root cause analysis is the key here. The established guidance is good, especially for live water systems. It's not about over and above at this stage; it's still scalable but its root cause analysis.

Step one, consider the risk and who is exposed, then mitigate the risk; stop the infection pathway and break that chain. You could potentially take outlets out of use or use filters (always consult the WSG and IPC); just to stop the exposure. Once you understand the risk you can mitigate it accordingly.

Then its root cause. Step two is characterising the problem; give it a name and investigate the contributory factors to the problem and keep asking why. This will get you to the root cause.

- We have a legionella problem in ICU – why?
- The temperature on the hot is too low – why?
- Because the calorifiers aren't reaching temperature – why?
- We haven't been doing the PPM for years on these – why?
- It wasn't added to the CAFM system – root cause.
- Review the CAFM system as an audit action – what else has been missed?

You must frame the question right and understand where the answers lead. It's a common example and the easy step is to solve the contributing factor and not the root cause. What this gives is a repetitive problem; you can't say when it will occur again, but it will. Using the above example – not adding the asset to the CAFM system could lead to a full review of the Legionella Risk Assessment, or worse.

Do you have a message for our readers, that can have a positive impact on future projects?

It's about developing a process with competent people that guides actions. It's all well and good having a process; but if people don't follow them you will continue to have a risk. You need markers and validity checks along the way to audit the process and ensure each step is followed. If a step hasn't been followed, you have a learning process that needs to be put in place.

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