T-safe Talks

Matt Morse
Legionella Control Association Manager,
Independent Consultant & Director of
Dragonfly Water Consultancy

Legionella Control, Back To Basics

Tsafe

Welcome to T-safe Talks

In this edition of T-safe Talks, we explore the UK Laws, Guidance and Regulations around Legionella control with Matt Morse (LCA Manager). We look at the documents that we all reference and highlight some of the details you may have missed and consider what the future of legionella control may hold discussing the impact of different Legionella species and remote monitoring. Interviewed by our own Nick Barsby, National Sales Manager for T-safe and Legionella Control Association (LCA) Chair, the pair discuss how the Approved Code of Practice for Legionella (ACoP) is deployed and how compliance can be achieved in different ways.

Matt Morse: Legionella Control Association Manager, Independent Consultant & Director of Dragonfly Water Consultancy

Matt has worked in the Legionella control industry for over 20-years, having started as Graduate Trainee, working his way through numerous service and sales roles, leaving the company as a Technical Manager in 2017; he moved to a small sized consultancy company setting up their Closed System consultancy before moving on to set up his own consultancy, Dragonfly Consulting.

Matt is a Member of the Water Treatment Group of the British Association of Chemical Specialties, BACS, who recently updated their name to the British Chemical Association (BCA). Matt joined the LCA Management Committee as a representative of BACS in 2009. Matt is a former Honorary Secretary, Vice Chairman and Chair of the LCA and is now the Manager for the Association part time. In 2016 Matt was part of the group that founded and was one of the directors of the Closed System Control Association (CSCA). Through the CSCA Matt was involved in the work to re-write BSRIA BG50 for the Closed System sector. Matt has also been involved in drafting numerous British standards, including, BS8680, BS7292, BS8580-1 and BS8580-2 as well as the re-write of the ACOP (including the creation of HSG274 Parts 1 and 2). Matt is a trainer for the Water Management Society (WMSoc) and acts as an independent consultant.

Over the years Matt has deal with over 20 NHS Trusts covering hundreds of buildings from the 1700's to new PFI builds. Additionally, Matt managed 5 Universities which also had a large estate with staff who reported to him being permanently based on campus to support Water Hygiene activities.

Q1 Where did the need for the Approved Code of Practice for Legionella (ACoP) stem from and what is the history of the guidance?

The need for ACoP is to bridge the gap between what the law says *"thou shalt do"* into something practical that you can do without being an expert (or as much of an expert possible!). ACoP L8 in its current guise is now quite thin, now that we have the Technical Guidance in HSG274 Parts 1, 2 and 3. The old ACoP – (3rd Edition from 2001) was a lot fatter as it contained the technical guidance. The Second Edition was even thinner than the current version. ACoP L8 does not contain much technical guidance and while it's been refined and developed, the core messages have been around for donkeys years.

A lot of people get confused about what an ACoP is and what it means. A previous (very senior!) colleague used to refer to HSG 274 as *"the regs"*; I still see things in Risk Assessments every day that say *"you must do this as it says so in the guidance"*; I think the term guidance is self-explanatory; it's just that, guidance, its optional and cannot be held to in a court of law. ACoP on the other hand, although you won't be held directly to it in a court of law, does have special legal status. You are guilty until you can prove yourself innocent if you are not following what it says. But the thing is, if you are doing Legionella control and not following the principles laid out in the ACoP then you're probably not doing effective Legionella control; the details in ACoP are not controversial and its pretty simple.

HSG70 and the older ACoP were along the right lines, they weren't what we have now, but they were good documents at the time. The current versions are much more advanced, especially with regards to Hot and Cold-Water Systems in HSG 274 Part 2. The one thing that happened from about 2000 onwards, the HSE guidance became what people worked to – before that it was brought together by industry specialists in the guise of the BACS Water Treatment Guide or the WMSoc Guide to Risk Assessments without the HSE badge. ACoP 2001 brought all of that together and covered a lot of the gaps. It's always stated that HSG 274 Part 3 doesn't cover everything, but it can't; ACoP 2001 covered even less than HSG274 does now. Part three must be about the first principles and in some ways, it would work better without the system specific advice because many of these systems vary so widely.

One of the main changes in 2013, the current version (4th Edition), was the removal of "Part 2 Technical Guidance" – this became HSG 274, but the divorce of those documents hasn't impacted what was in ACoP too much. The message is the same and as a lot of this came from research in the 1980's; it's not going to change much as it's based on the fundamental principles of Legionella control.

Q2 What is the legal status of ACoP L8?

Let me read this ad verbatim from ACoP:

> *This Code has been approved by the Health and Safety Executive, with the consent of the Secretary of State. It gives practical advice on how to comply with the law. If you follow the advice, you will be doing enough to comply with the law in respect of those specific matters on which the Code gives advice. You may use alternative methods to those set out in the Code to comply with the law.*
>
> *However, the Code has a special legal status. If you are prosecuted for breach of health and safety law, and it is proved that you did not follow the relevant provisions of the Code, you will need to show that you have complied with the law in some other way, or a Court will find you at fault.*

The basics is do what it says in the ACoP unless you can prove you have done equal to or better than. The challenge is the things that ACoP asks you to do are fundamental, so most people, whether they know this or not, are following the ACoP.

Q3 How does ACoP L8 sit in the legal hierarchy?

The legal hierarchy comes from the Health & Safety at Work Act (1974) (HSAW). Depending on where you're working – let's put the Health and Social Care Act to one side for a moment. The HSAW creates the principal of prevention of exposure to risk of harm. You only need to put someone at risk of harm to commit the offence. It's not necessarily about people being killed or outbreaks of disease – it's the risk of an outcome, we've seen this in lots of prosecutions where nobody has died but the risk wasn't managed putting people at risk of harm.

The HSE is born out of the HSAW. In 1974 when this law was created Legionnaires disease hadn't been invented, we hadn't exported it from the US. It's not written to deal with this, it's written to deal with all Health and Safety Risk, and it does this well. It's written in a bit of legalese; as it's the law but it's not a weighty document and its relatively simple. Within ACoP L8 we have identified paragraphs that cover regulation, then identified paragraphs as ACoP with other paragraphs identified as guidance.

Management Regs, COSHH, these put steering advice and principals underneath, around Risk Assessment. They both talk about the need to assess the risk; this means to identify the potential hazards, quantify how big are they and then work out the chances of the hazard causing harm. Risk assessments must identify hazard and quantify the risk and that's something that's missing from many risk assessments I see. Risk assessment is about just that – assessment. Not ticking boxes on a template. Legionella control is all about identifying risk and then taking steps to mitigate that risk.

COSHH talks about the hierarchy of how you deal with a risk – can you eliminate it? Can you substitute the risk? Can you apply any control measures to any risk left over? In Legionella we quickly jump to control measures before considerations of elimination. I did several risk assessments of the same water features at a shopping centre over many years. Every single risk assessment said *"are you sure you want fountains? Wouldn't you much rather have some nice flower beds?".* Week on week we would do our Bromine checks, make sure it was clean, etc. – control measures on an easily eliminated risk. Funnily enough fifteen years on they are now flower beds now. Much better to remove the risk than control the risk.

MHSAW talks about access to competent help – information, instruction and training for people that must deal with these challenges. This is where contractors come in and organisations like the LCA and CSCA come in, to assist the end user in bringing in competent, competent help, if that makes sense!

The ACoP L8 then sits under all that legal hierarchy. If you are prosecuted for Legionella failings, then it is likely to be against the HSAW Act with the ACoP and guidance used to illustrate how the HSWA has been breached.

Q4 Is it important that people know and understand ACoP L8 and its legal status?

I see a lot of is Risk Assessments and Engineers reports; these are not my own, the ones that I see through my own work and LCA audits. In the majority of these the operative is making a recommendation and pegging it back to the guidance. You will have something like *"X is this much of a risk the guidance says Y"*. The end user may read that as a reference to optional guidance that may not need to be followed. What the end users need to know, from the operative, is that it stems from the Risk Assessment or the Work Report back to the Law. It starts at the guidance and ACoP and it goes all the way up to the HSAW. It is important to know and understand this and how to use it and communicate this to the end user.

Too often we see the Risk Assessment picking up the same points every time its written; people need to understand that set-up of law, regulation, guidance etc. As an example. Clean and De-scale Shower heads is included in the guidance with a typical quarterly frequency. That's the guidance that should be considered when creating a control scheme, but it might need to be more frequent if there is a high rate of fouling. The point in the ACoP that relates to this is paragraph 59e – maintain the cleanliness of the system and the water in it. That's the aim of that piece of guidance and if the guidance for a typical system is not suitable to keep the shower heads clean in a specific system, the control scheme needs to go further.

One of the LCA assessors is ex HSE and he has a wonderful habit of starting off by saying *"if you don't do X and Y you are committing an offence"*. Its friendly but a strongly worded piece of language that is fundamentally true. If you are putting someone at risk of harm, you are committing a criminal offence.

This needs to be used carefully though. HSG274 guidance is not a compliance document. There can be more than one way to skin a cat and therefore you cannot comply with it as such. To comply with ACoP L8 is slightly clearer. Paragraph 59 of ACoP L8 talks about principles of Legionella control and each sub-paragraph is a statement of one of the different things we must do and these all carry through into the guidance. Some of those sub-paragraphs can be impossible to achieve, for example we cannot follow 59a and avoid growth temperatures in a Spa pool, so we follow 59f and use water treatment.

Q5 If we do everything that's outlined in ACoP L8 then our systems won't have any issues? Is that a fair comment?

I would agree with that. If you do everything *properly* in ACoP then you won't have any problems.

It starts off with the Risk Assessment. The problem isn't that you've done everything outlined in ACoP, its with *identifying* everything that you need to do and that starts with a good risk assessment. You can't do Legionella control well, unless you have a good risk assessment that starts off that process. If we look at the things ACoP L8 talks about, Paragraph 59 talks about growth temperatures, stagnation, growth nutrients, water spray, keeping it clean, water treatment and maintenance of the system. Unless your risk assessment identifies where you have potential growth risk factors you won't develop a control scheme to identify and manage this area of risk.

If the questions are *"if you follow the guidance, will you be fine?"* then absolutely not. Especially if you just follow the guidance without understanding the risk. There are all sorts of pitfalls you could well fall foul of. An example of this was a complaint we received a few years ago. A

complaint was made after a main contractor to a client identified a rainwater harvesting system in their Legionella risk assessment but did not include the system in their Legionella control work. The Client complained to the LCA about their contractor's omission, but it turned out that the Client had put out a contract specification to the guidance in HSG274 Part 2 which didn't include Rainwater Harvesting systems. Their risk assessment had identified the risk; but the control scheme was created to the guidance with no reference to the risk assessment.

You have to do everything ACoP L8 requires, starting with a risk assessment. If it's all done to a good standard, then you have a solid statuary defense in court. But people don't, that's the bottom line. People jump straight to the guidance. They may have a risk assessment in place, and it may be a reasonable risk assessment, but if they don't read the risk assessment and understand the risk specific to that site, they might not be doing enough to control risk.

One thing that people miss is that the guidance paragraphs and tables often start with the words: 'typical example'. This means it's not applicable everywhere. An example of this comes from when the change to ACoP L8 3rd edition (2001) came in, the table of cooling tower analytical tests (what is now Table 1.8) added sulphate. The company I worked for at the time rushed out and bought sulphate test kits for everybody. It was a pain of an onsite test to do and there was no guidance on the action limits for sulphate, but we kept on with it for a while. Much, much later when I was involved in the re-write to the current version, I got to ask the background about this test. It turns out the table was lifted from the manual of one of the drafting panel member's companies for their typical example of Cooling Tower system tests. However, they used a lot of Sulphuric Acid dosing on Cooling Towers for scale control and so sulphate testing was very relevant to them – but it wasn't applicable to all systems and certainly not ours. A perfect example of not understanding the principles behind the guidance and following the guidance blindly without relating it to risk. The word typical in guidance became quite visible after that!

Q6 ACoP L8 talks a lot about training and competence, do you think these are done well in reality?

There are two factors to this. When we teach risk assessment, we are trying to teach the assessors that they need to have assessed the competence of the people in the management chain as part of their risk assessment. They also need to demonstrate their competence and prove their competence to the people that are employing them. Is it done well in the real word? Sometimes, I think it could be improved.

When we look at outbreaks in the real world, they almost always stem back to competence. Competent people can make mistakes, but the law of averages suggests they won't, and good procedures will catch some mistakes. If they are well trained and competent (and they aren't having a bad day!) you won't tend to get an issue. There is always the argument you can have very good procedures and processes and send a monkey; or you can have someone that knows their game inside out and needs little instruction to do a good job. The reality is a blend of the two. Hopefully not a badly trained monkey with a bad procedure – if you have that you're onto a loser. If someone is reasonably trained with reasonable procedures, then they should do a reasonable job.

In terms of competence, I think the Legionella control industry has improved over the last decade. I think it's become more visible and there are more people talking about this, such as AE's. Some of those AE's competence could be challenged too but that's another story. There are a lot of people out there that are flying the flag from the end users' side of this and who know what they are talking about. To a certain extent training and competence needs to be

driven from the Duty Holder but not very many know they should be driving it or how. ACoP L8 talks about the Duty Holder carrying out a Risk Assessment and appointing a Responsible Person to take day to day responsibility. That's often not the way round it happens. Commonly there is a Responsible Person who has effectively identified themselves and they look upwards in the management structure and identify the Duty Holder.

Competence is not the easiest area to standardize on. If we look at Gas, we have Gas Safe and before that we had CORGI. We have qualifications that are competence based and you know if someone has the qualification or not – it's a clear yes/no question. There are not many competence-based qualifications in the Legionella control industry although there are some. We did have apprenticeships in the past and hopefully we will have these again in the future. The appetite for these competence-based qualifications is low in the industry as they are significant cost. Unfortunately, the bar is quite low to set yourself up in Legionella control and to go off and be an "expert". It's a difficult area with no external regulation.

The term Authorising Engineer gets used a lot; but it's not a qualification. Fundamentally, it's an appointment, it's a role that you do not a qualification that you hold – its defined in HTM 00 about governance. You are appointed by a trust as an AE by a trust/site.

When we talk about how you prove competence, you do it with CPD, experience and possibly qualifications. The LCA requires members to have a process to assess competence of individuals and the LCA audits the process and a sample of the output. Being able to evidence a documented process of competence assessment is the current standard for the industry. Ultimately you are as competent as the people employing you think you are, until there is a set of universally adopted competence-based industry qualifications.

The only people who can drive this are the employers of the competent help. The challenge is they may not have the appetite or financial freedom to do that or drive it. If they are asking for competence-based courses, these will take time and a significant amount of money and that's a cost that's going to need to be recouped and ultimately paid for by the end users of services.

Q7 In ACoP L8, there is no stated frequency for routine sampling activity, do you think this is an oversight?

ACoP doesn't say much about sampling at all. The Guidance does give some frequencies in there. Cooling Towers have a recommended frequency, that may not be enough though. One thing I often challenge people on when they are risk assessing cooling systems is how do you determine the frequency you look at that tower, and its more than just sampling for legionella – it's all the checks. How quickly can it go from being safe to unsafe? This should drive your frequency; if that means weekly checks are insufficient then you need to rectify that.

The Risk Assessment will drive the need for sampling. The guidance for domestic systems says along the lines of *"if the system is under control you don't need to sample"*. If the system is under control, is a broad statement. We see lots of Risk Assessments with no recommendations for sampling. If the risk assessment highlights black spots on the tank, deadlegs etc. then these are signs that the systems might not be under control and thus you might want to sample to check if the hazard has occurred. Unless the system is perfect then there could be a question of "do you need to be monitoring for the hazard?"

One other thing often misunderstood is that sampling isn't a control measure: it's a monitoring tool. It tells you when the loss of control leads to a hazard. The fact you have issues with poor temperature or low biocide isn't the hazard, that won't kill anybody, but it could lead to

Legionella growth which could. Why test when under control – I say you probably wouldn't, but do you know it's under control? The lack of control on legionella growth factors is what constitutes the risk of harm and a 'not detected' sample where poor control persists cannot give any confidence beyond the minute that sample was taken.

Remote monitoring is an interesting subject that's been discussed recently in our industry. We have seen systems settling between 25 to 35°C for around 20 hours a day. We haven't seen outbreaks of disease from these. I have experience of this myself. In the past I managed a project with upwards of 100 buildings, all built to the same pattern, that were very modern with lots of insulation but had lots of glass and the core areas were essentially a green house. The domestic hot and cold systems ran in the same voids to the relevant industry standards of the day. The buildings were potentially under used, or the water storage provision planned may have been ambitious; either way the buildings were very warm, and the cold water warmed and the hot cooled down. Hot and cold both sat around 35°C for around 22 hours a day. They had huge issues with Legionella and biofilms. When we put on remote monitoring, we found that was the water temperatures in the building sat at around 35°C for most of the time despite the risk assessment and monitoring indicating that everything was compliant. The routine monitoring showed that the cold was <20°C in under 2 minutes; the hot reached 50°C in under 20 seconds. Nevertheless, control of legionella growth was lost. Did we have disease? We had a couple of pneumonia scares but nothing that confirmed as Legionnaires Disease, and we know the flaws in the confirmation test. Should you test every building? Probably not. Should you trust its under control because the compliance monitoring says it is? Maybe not – it's up to the Responsible Person to decide if it should be.

Q8 What are your views on random & reactive sampling?

Should you do random samples? No, not really. I think regular sampling activity may be over-stated and disproportionate but if you have a susceptible population or issues identified at risk assessment and certainly if you have any high-risk outlets then sampling would be a consideration for me. Planned samples though with a thought through and documented rationale – not random.

One thing often missed is reactive sampling when you lose control and what a loss of control looks like. If you get an incoming mains temperature of 25°C in the summer for several months and the cold system is at growth temperature the hazard will develop if Legionella gets into the system - Legionella doesn't care, it's the summer. Many control schemes lift the detail out of the guidance paragraph 2.120 that they will sample every week when control is lost; how many do this though? Not very many in my experience. There are risks with doing this with the culture method too, as the results overlap. If you are following the guidance this process should be in your written scheme of control. If those circumstances come to pass and you don't follow your own written scheme it is a significant failing and can lead to prosecution.

Q9 We have seen Legionella positivity data increase in the UK (and globally) post COVID, what do you think has driven this?

Funnily enough the things that support Legionella growth have not changed. Give it the right temperature, give it nutrients, give it time to grow and if it is there, it will grow. Lockdown and now reduced occupancy give all those factors so it's no surprise that Legionella in water systems is on the rise.

One thing that has driven all of this is complacency. There is a circumstance called the hierarchy of risk; where you look at what is going to kill you and how quickly; you deal with the thing that's most likely to kill you first. That doesn't mean you can completely ignore the less immediate risks. This is what happened on many sites during lockdown; we left for COVID risk reduction but forgot Legionella control.

There were examples in the first lockdowns where buildings were shut in haste, and nothing was done to prevent bacterial growth. Once you get colonization of a water system it's very difficult to get rid of; if something takes a year or two to get in there it will take a year or two to get out. It's not a case of doing a disinfection at 50PPM of Chlorine and problem solved.
The second issue is that people haven't started Legionella control at the risk assessment. Some haven't updated their risk assessment to consider the changes in building use post COVID. If you have something that changes the risk and do not update your risk assessment you are committing a criminal offence and you can be prosecuted for it.

You need to assess the risk that's present in the circumstances and develop a fundamentally appropriate control measure rather than just following a piece of guidance. For example, flushing little used outlets once a week. If the building is in normal use with two taps down out of two hundred that's probably appropriate and a sensible thing to do to deal with stagnation. That weekly flush is probably going to be ineffective if all two hundred taps are out of action; it cannot replicate "normal" building use, so we need to come up with a better solution – be that daily flushing, filters, chemicals etc.

There are all sorts of issues post covid and possibly one is more sampling – the more you look, the more you will find. However, the positivity rate has increased as a percentage figure, so that indicates it's a growing concern. Some may have been sites that had never been sampled and some may have been previously unidentified positive sites. Either way, I would not expect the significant increase to have occurred without the impact of lockdowns and poor shutdown procedures. This increase in Legionella positivity has also been highlighted by the HSE at a series of recent conferences, with global warming and the net zero agenda potentially having impacts on the pathogen's proliferation within the built environment.

Q10 The guidance talks about Legionella as a genus and does not focus on a specific species; what are your views on this?

There was a figure quoted to me a few years ago on the number of peer reviewed scientific journals and papers created each year and the number that were funded by vested interests. It was hundreds of thousands of papers each year in tens of thousands of journals. I do see the whole question of legionella as a genus and species as a cloudy issue that seems to be at least partly driven by vested interests in products that do, or do not look at species, genus or even Sero Group level. There are some very well-respected names in the industry that have done lots of research, but the picture is not clear. Read the research, but always be aware who is funding it. I am very happy that the HSE have taken this subject up as a research project.

The overwhelming evidence points to the fact that a high percentage of confirmed cases of Legionnaires' disease is caused by Legionella pneumophila Sero-Group 1 (LpSG1). The word confirmed is critical here and one often dropped from marketing literature. The first line confirmation tool in the UK is the urinary antigen test and it generally only looks for LpSG1. When we look at evidence from other countries, we see a wider variety and the published research varies but what we don't see is overwhelming evidence that LpSG1 is the only one to worry about. The only thing we can be certain of is that we don't know for sure.

The sensible thing we can do now is look at the genus level, be that *anisa*, pneumophilia or any other species. If the testing is by culture the confirmation step won't be from every colony on the plate. If conditions are there to grow one species, they are probably there to grow other species. The one person I always listen to on this is Duncan Smith (HM Principal Specialist Inspector); and his view is that Legionella as a genus is the concern, the species is less important as growth conditions for one could harbor growth conditions for any species.

Q11 And finally Matt, what are your key take home messages to our readers?

Don't lose perspective; don't get bogged down in the guidance when you should be pegging things back to the law.

Fundamentally we are dealing with something that can kill people and while it may not kill tens of thousands, one death from something preventable is a death too many. Always tie everything back to the law; don't go solely on guidance, work it back through the hierarchy and bring it back to the law. Bring it back to the offence that may or may not be being committed and make sure your client understands the implications and the consequences of their action or inaction.

t-safe.com