

Taking Steps to Ensure a Legionella-free Future

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Background

In the summer of 1976, a group of more than 2,000 American Legionnaires gathered together to celebrate the 200th anniversary celebrations of the American Declaration of Independence. This convention was held at the Bellevue-Stratford Hotel in Philadelphia. Within days of the convention starting, attendees began feeling ill and a number had died from “unrelated” illnesses. It took nearly a year for health officials to discover a link between the deaths and illnesses, the bacteria that had been discovered (named *Legionella pneumophila*) and the hotel’s air conditioning cooling tower.

If we jump forward 30-plus years, we know that usually, if there is an outbreak of Legionnaires’ disease, it is often associated with a wet cooling tower. History reminds us, though, that these installations aren’t the only water systems that carry a risk. Due to their ubiquitous nature, general hot and cold water systems account for the majority of cases, and the recent rise in popularity of hot tubs and spa baths has led to an increase in cases associated with these systems. The latest Health and Safety Executive (HSE) L8 Approved Code of Practice, or ACoP, *The control of legionella bacteria in water systems*, Fourth Edition, 2013, and its supporting guidance documents (HSG274 parts 1, 2 & 3, *The control of legionella bacteria in evaporative cooling systems, hot and cold water systems, and “other risk systems”*) provide key insights into the associated risks.

What is the Risk?

Scientists who study the causes and transmission of legionellosis note with interest that the guidance for “other risk systems” contains a table of specific water systems that have at some point been associated with a case or outbreak of Legionnaires’ disease, and each time it is republished, the list gets longer. This shouldn’t come as a surprise to professionals who install water systems, as we know there are many types likely to pose a risk, especially if we consider the four criteria identified by the HSE as the root causes of an outbreak:

1. **A source** of *Legionella* being able to enter the water system in question
2. Conditions within the system that enable **bacterial growth** to occur
3. **Creation of an aerosol** or spray from the system during use or maintenance
4. **Exposure** of (susceptible) individuals to the aerosol

In order to comply with the relevant UK regulations, HSE publishes the L8 ACoP to bring together the various applicable regulations and provide Duty Holders with a specific procedure for managing *Legionella* risks within the systems they are responsible for. The latest ACoP provides the paragraph shown in the box, which identifies the major risks of exposure to *Legionella*: There is little to disagree or discuss with regard to items A–C, although in this and each previous edition of the ACoP, item D has always raised the most queries. What does it mean? What does it include? If a certain type of system has never been associated with *Legionella*, is it still a risk?

23 There is a reasonably foreseeable risk of exposure to legionella bacteria in:

- (a) cooling systems with cooling towers, evaporative condensers or dry/wet cooling systems;
- (b) hot and cold water systems;
- (c) spa pools;
- (d) other plant and systems containing water that can create and increase the risk from legionella during operation or when being maintained

The answer to these and other questions is always likely to be: “if a system meets the four risk criteria listed earlier (source, growth, aerosol and exposure), then there is a likely risk and measures need to be taken to mitigate these risks.”

Implications for the Paper Industry

For a number of years, the subject of whether or not paper processing poses a risk has been discussed in hushed tones. I have heard people make the claim that because there have been no proven cases of *Legionella* infection associated with paper processing, it’s not necessary to delve more deeply. However, over the past five years, the discussions have been getting louder, and when the HSE announced its “Programme of Legionella Intervention” in 2013, paper processing was specifically named as a type of process system that would be looked at as one of the stages of the inspection programme.

At this stage I think it is appropriate to evaluate why, *to date*, there have been no cases of Legionnaires’ disease associated with paper processing. Though it is impossible to say for certain, I am of the opinion that this isn’t simply due to luck. It should be noted that though we are specifically considering *Legionella* bacteria and the risks from it, the conditions that enable *Legionella* to thrive will also enable other bacteria to grow. Existing “good practice” surrounding hygiene, cleanliness and maintenance will often be having a positive effect on all bacteria, including *Legionella*. Ensuring that paper quality is good, machine runnability is optimised, and pumps and filters don’t suffer blockages associated with slime and other material means that almost all mills will have programmes in place that minimise problems and maximise production. These programmes, when looked at individually, would all help to control *Legionella*. However, the picture isn’t entirely rosy.

When the HSE published the recent report HEX/12/07, “Legionella outbreaks and HSE investigations; an analysis of contributory factors,” they identified some key failings, which were similar whether an investigation followed a suspected outbreak or was as the result of a formal Notice (Improvement Notice or Prohibition Notice). Typically, 25–30% of failings stemmed from lack of suitable risk assessment, and 60–65% of failings stemmed from a suitable (written) control scheme. But what does this actually mean? Approximately 90% of outbreaks or breaches of health and safety regulations occur because people don’t understand the risks associated with the systems they operate or, when they do know the risks, the controls they put in place are

either not sufficient or not correctly followed. This is a key point when looking at the paper industry, for the same could be said for the process side of manufacturing. We don't fully understand the risks, and where we do have controls, they aren't formalised or managed from a *Legionella* perspective (i.e., the activities are driven by production needs rather than compliance needs).

Confederation of Paper Industries (CPI) Legionella Working Group

As a result of this report and the fact that various mills were looking to improve controls individually, the HSE encouraged the industry to put a collective strategy in place for managing these risks, which prompted the CPI to put together a working group to look at the topic of *Legionella*. The group was comprised of representatives from the paper industry, the Legionella control industry and specialists. There were two key objectives of the group: to better understand what the risks actually were by partnering with the Health and Safety Laboratory (HSE's research arm) to undertake a major sampling and monitoring programme across a number of mills; and to create a workable guidance document that could provide paper manufacturers with a set of tools to manage the risk.

The early drafts of the guidance document have been circulated for consultation and though the final version is likely to change slightly, the bulk of content is complete. To those familiar with *Legionella* and control strategies, there are few surprises in the document, although because it focuses on paper processing, it can more easily provide specific plant guidance.

Legionella Control in Paper Mills – Guidance from the Paper and Board Industry Advisory Committee (PABIAC)

As would be expected, the first step in the process will always be to understand the risks. The guidance specifies that any *Legionella* risk assessment should include all aspects of water-based site operations. This means including all production processes, as well as the typical "utility" type water applications considered in the past. It also advises that the competence of the person conducting the assessment is vital to its success. In all likelihood, the unique nature of paper processing means that the site person supporting the assessor is critical in ensuring the quality of the final assessment.

Once an appropriate assessment is in place, it should include advice for control strategies to minimise the risks that have been identified. As with all risk systems, risks should ideally be eliminated, but where prevention is not possible, then suitable controls have to be put in place. For any *Legionella* risk, these control strategies will focus on the causation factors referred to earlier, and how to remove them. What this typically means is:

- Reduce the conditions in which bacteria can grow
- Reduce the areas that aerosol can be created (or access to them)

The specific PABIAC Guidance* suggests that plants pay particular attention to the following areas within the paper-processing environment:

- a) Engineering controls
- b) Temperature control
- c) Minimising sources of nutrients
- d) Applying suitable water treatment
- e) Prevention of stagnation
- f) System cleanliness

(*Please refer to the guidance for more information on the points above.)

It should be pointed out that these recommendations might not apply to every situation. Each mill has different conditions

— water supply, process designs, operational strategies, etc. — so the guidance is designed to enable Duty Holders to identify what is applicable for their particular mill and implement additional strategies where required. A formal programme, however, is required so that any gaps or deviations ("we can't carry out the routine clean this week because...") can be managed correctly to ensure that a minimal risk does not escalate and does not lead the mill to become simply another HSE statistic in the "failed to follow the written scheme" box.

Conclusion

While we await the final results of the HSL research project, we need to remember that though the results will identify whether *Legionella* bacteria is prevalent within the paper manufacturing industry, it is highly unlikely to say that there is no risk. The factors leading to a *Legionella* risk are all met within the paper industry and, as such, there is a legal duty to ensure these are controlled. The PABIAC guidance provides an excellent starting point for formalising what is already in place, what needs to be put in place and, finally, how this specifically relates to paper manufacturing.

As was demonstrated at the recent Confederation of Paper Industries Biannual Safety Seminar, not every mill will be able to (or "need to") immediately implement all of the controls. In some cases, mills will need to do nothing more than formally acknowledge what is already in place. What is certain, however, is that the problem is not going to go away. With the commitment of the industry and the publication of this guidance, we will hopefully be able to say, in another 10 years, that we still have no cases of *Legionella* related to paper processing.



INTERNATIONAL SEMINAR 2015
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