

WARM WATER SYSTEM

LEGIONELLA RISK MANAGEMENT FOR HOTELS



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With the recent Legionella outbreak at a hospital in Brisbane, it is a timely reminder; have you recently conducted a risk assessment of your warm water delivery system?

Health regulations in Australia regarding Legionella control in water piping differ from state-to-state. In all states however, building owners and operators have a duty of care to provide a safe environment for guests, visitors and staff. In addition to the trauma suffered by an individual and their family, the negative publicity arising from a Legionella-infected hotel guest exposed during a stay could be catastrophic for a hotel's branding.

WHAT IS LEGIONELLA?

Legionella bacteria including Legionella pneumophila (the cause of Legionnaires' disease) are naturally present in the environment and can be found in all water bodies and soils. Cooling towers and warm water systems provide ideal conditions for Legionella bacteria to multiply to significant numbers, within these systems. The operation of cooling towers and warm water systems generate aerosols, which can then distribute Legionella bacteria. People exposed to the aerosol can inhale the Legionella bacteria, which may lead to an infection known as legionellosis. Legionellosis is a notifiable disease that must be reported in all states and territories of Australia to the relevant health department. Detailed investigations are conducted which aim to identify the source of an outbreak, and negligent building owners and operators can be prosecuted.

To reduce the incidence of legionellosis, including Legionnaires' disease, the various states and the federal government have been developing a more comprehensive strategy since 2000. This has included a strengthened regulatory framework, increased maintenance requirements and legal responsibilities for landowners and operators of cooling tower and warm water systems.

WARM WATER DELIVERY SYSTEMS

Every state of Australia has different regulations for Legionella risk management and guidelines for warm water systems. Whilst we advise that state based guidelines should be followed, they are generally inadequate to eliminate Legionella that has already established in a delivery system. At best, they are a continuing maintenance guide, which control rather than eliminate the hazard. Furthermore, a failure to follow stringent maintenance procedures can lead to an outbreak that may result in fatal health consequences.

DEAD LEGS

The definition of a dead leg is a branch at least the length of the pipe diameter. Dead legs are the curse of all building managers and a firm favourite for Legionella and other bacterial accumulation. They house soil, plant and microbial debris as well as biofilms that provide ideal growth media for a wide range of bacterial species. Of particular concern, in unflushed and un-sanitized (i.e. low chlorine residuals) dead legs, is the amplification of specific bacterial and fungal growth. In addition, what is not often considered or assessed, is the production of metabolite chemicals from these species.

The management of dead legs is often simplified to removal and/or irrigation. However, in practice, access can be very difficult and highly disruptive in a busy hotel. The smaller dead legs can be difficult to find, since larger diameter dead legs can be difficult to manage simply because freezing or other isolation techniques are challenging.

It has been well recognised that fittings such as showerheads and taps can be points of accumulation and can act as dead legs. On a positive note, there are now manufacturers who are designing tapware that will minimise these risks.

PRACTICAL CONTROL MEASURES

As indicated in most state based Legionella risk guidelines, action should start with a detailed audit and inspection of the plumbing system and a concurrent update of the building plans. A proper maintenance procedure for all fittings, including thermal mixing valves (TMV) is essential, for not only minimising microbial contamination, but also to assess that they are operating correctly.

Despite not being encouraged by all state guidelines, probably the most effective defence against surprise infections is to establish a regular water monitoring program. This should include not only Legionella testing – but also heterotrophic plate count (HPC) testing – since the latter can be an early indicator of system or local contamination. The use of a NATA accredited laboratory is highly recommended. Expertise is required in order to properly assess microbial results, and elements such as sampling, storage and transport must also be considered.

MANAGEMENT

A detailed risk management plan (RMP) should not only consider maintenance and technical issues but also a clear plan on what to do when Legionella or high microbial levels are detected.

It can be difficult to obtain rapid test results during a crisis. During a recent facility infection that was made public due to a death, the high demand from other similar facilities for laboratory testing of water samples led to long delays in test results across Australia and

even delays in the availability of sterile bottles and lab supplies for sampling. The commercial consequences of a Legionella outbreak, even if it isn't fatal, can be very severe and long lasting. A shopping centre reported a five year recovery before normal business levels were returned.

The detailed management plan in the event of a Legionella outbreak, should also consider human resources strategies to manage scenarios involving possible escalations. It is feasible that in some cases union personnel, contractors and/or staff may not wish to enter an infected building. The use of professional outrage and media management techniques should also be considered in the management plan. The impact of media must not be underestimated, and appropriately managed this can be beneficial to a rapid return to business (e.g. Melbourne Aquarium). Negative media coverage can impact not only the specific local site, but more importantly the entire business brand or hotel chain.

COLD WATER

The focus on the development of Legionella risk guidelines is almost always on cooling towers and warm water systems with the contamination in cold water systems often being neglected.

Cold water system can be contaminated by earthworks, repairs and other water supply quality issues and can seed warm water system either directly or through thermal mixing valves (TMV). In addition, the placement of cold water pipes may cause the water

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temperature to rise above normal ambient conditions, especially if they are adjacent to warm water pipes, refrigeration and/or heating systems, etc. When the water temperature reaches between 30 and 60 degrees, these systems can become breeding grounds for Legionella bacteria that can be released directly from the cold water or be injected, without the high temperature thermal disinfection. It is common to find active Legionella breeding in the TMVs.

When assessing remediation strategies, both cold water and hot water systems should be assessed as potential candidates for disinfection. Building owners and operators also need to consider other microbial sources.

ACTION PLAN

So what to do now? Following initial consultation with an experienced consultant, the following items should be conducted in all hotels;

- Plumbing Audit (inspection of TMV's, valves, dead legs, zoning of pipe work, plumbing diagrams updates etc.)
- Water testing for Legionella and HPC
- Water temperature audit at outlets
- Develop an infection management plan in the event of a positive Legionella result

Dr Vyt Garnys is Principal Consultant and Managing Director of CETEC Pty Ltd. The CETEC team of consultants has been conducting cooling tower and warm water risk assessments since 1987. This includes audits and risk management for cleanliness, water treatment, corrosion, technology assessment and chemical composition.

In addition to other hospitals, most recently CETEC have been an external Legionella consultant for The Wesley Hospital in Brisbane and also on their independent expert panel. This project has required a holistic multidisciplinary team approach within the complexities of hospital operations. CETEC has also recently been appointed as a member of Queensland Health's Water System Expert Panel.

Dr Vyt Garnys has been a Certified Victorian Cooling Tower Auditor since 2002, and is an expert legal witness for Legionella. He also conducted the first commercial Legionella risk workshop in Victoria in 1987.

As well as Legionella risk management, CETEC provides a broad range of scientific services for building owners and operators including but not limited to hazardous materials audits & management, indoor environment quality assessments for occupant wellbeing and mould & corrosion investigations.

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