Safety Corner

What can Engineers do about Legionnaires' disease?

Legionnaires' disease (LD) is an infectious disease caused by legionella pneumophila bacteria, which are usually found in warm water and wet environment. The earliest documented outbreak of this disease occurred in 1957 but the disease did not take on the current name until after 34 people died from an outbreak while attending a US Legion Convention in 1976. Since 1994, LD has been listed as statutory notifiable disease in Hong Kong.

People can contract LD by the inhalation of water droplets contaminated with the bacteria. This often occurs in poorly ventilated areas where condensating air conditioner spread bacteria infected droplets infecting personnel. The disease is particularly associated with hotels, cruise ships and hospitals with older, poorly maintained pipe work and cooling systems, or water system with defective filter. Potential sources of bacteria-contaminated water also include cooling towers used in industrial cooling water systems as well as in building's ventilation system, evaporative condensers, decorative water fountains, hot water systems, room-air humidifiers, ice making machines, and medical apparatus that support breathing.

Prevention measures to LD outbreak should begin with proper engineering design, and sound maintenance and operation of air and water handling systems. Cooling towers should be regularly serviced with mechanical cleaning on a periodic basis. Water systems would be better off if they could be drained when not in use. Any sort of scale or sediment should be immediately removed. Appropriate biocides could be introduced to minimize the growth of bacteria or fungi.

As contaminated aerosols may enter ventilation systems from outside, engineers should consider designing fresh air intakes away from cooling towers and possible source of LD contamination. Filtering systems should be checked, cleaned and replaced according to preventive maintenance programme and as needed. Hot water systems should be kept at temperatures above 50ºC in order to reduce the risk of transmission. When using water for respiratory therapy devices, tap water should be avoided.

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