



RM Insight[®]

Property Insurance – A Broker's Guide to Understanding Protection

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Insurance with insight

Understand fire protection systems, application and capabilities.

This is one in a four part series related to understanding COPE (construction, occupancy, protection, exposures). Historically, property underwriting has focused on COPE as the core principal of risk assessment.

For the purposes of this article, fire protection includes automatic fire sprinkler systems, detection systems (i.e. smoke and thermal), hydrants, hose reels and fire extinguishers. Together, or as individual items, their intent is to mitigate the unwanted effects of potentially destructive fires.





Fire protection systems

• Automatic fire sprinklers

A network of water-filled pipes which starts at a reliable water source and ends with an array of fire sprinkler heads covering the premises. Typical wet pipe sprinkler heads operate as individual heat detectors and actuate to release water over the fire to control or limit fire spread and raise an alarm.

The important thing to remember here is that a fire sprinkler system is available 24 hours, 7 days per week and does not typically require intervention to operate. Refer to Appendix A for a brief history of sprinkler systems and to our 'RM Insight' article on Automatic fire sprinklers.

• Detection systems

Could be smoke or thermal as individual units, or a single unit combining both smoke and thermal detection. Thermal detectors react to the change in temperature caused by fire. Smoke detectors detect the smoke generated by fire. Both sound an alarm and do not control or prevent the spread of fire. They typically operate earlier on in the development of a fire compared to sprinklers. Refer to our 'RM Insight' article on Fire Detection and Alarm Systems.

• Fire hydrants

A system of connected water pipes with couplings that fire fighters can connect fire hoses to a continuous pressurised water supply. Fire hydrants are essential to a building's fire protection. Hydrants are used to extinguish and control the spread of fire and protect neighbouring properties. Note: this system is typically for use by the public fire authority. In some countries, employees are specifically trained to use fire hoses.

• Hose reels

Fire hose reels are typically referred to as 'first attack' fire-fighting equipment. They are designed for ease of use by the general public in the early stages of a fire. Most hoses are connected to the public water mains and have an unlimited water supply. The hoses typically extend for 36 metres. The control nozzle attached to the end of the hose enables the operator to control the direction and flow of water to the fire.

• Extinguishers

Fire extinguishers are a small and portable appliance containing an extinguishing medium. The user can move them to the seat of the fire and expel the extinguishing medium to suppress or contain the fire. Users require training. They are not suitable for an out-of-control fire.

What are 'Active' and 'Passive' fire protection systems?

'Active' fire protection refers to systems that involve a triggered response to a fire. All the above listed items of fire protection are 'active' systems. Whereas 'passive' fire protection systems are all about preventing the spread of flame and resisting ignition in the first place (not extinguishing or detecting). Examples of passive systems include fire doors and walls, dampers, intumescent paint and sprayed on fire proofing. Refer to our 'RM Insight' article on Passive fire systems.

Fire system impairment and restoration notification

It is inevitable that situations will arise when fire protection systems will require complete or partial isolation due to an impromptu failure, upgrade, maintenance or building works that may impact upon the availability of systems. Planned impairments offer time to prepare but an emergency (pipe break) offers little or no advanced warning. It is vital that under all circumstances of impairment, brokers communicate the status of fire protection systems to the underwriter. Refer to our 'RM Insight' article on Impairment and Restoration of Fire Protection Systems.

Influence upon underwriting

Underwriters consider the existence and quality of fire protection systems in regard to their ability to lessen the amount of property damage. The underwriter will expect the property protection to match the particular building's construction and occupancy. Obviously, the type and extent of fire protection systems provided should match the level of risk. It's not cheap to install a sprinkler system for example, however it may be risk based and cost-effective justified. All premises should have the basics being adequate fire extinguishers of a type suitable for the hazards considering the size of the premise, not forgetting ongoing servicing. Some risks may warrant hose reels and in turn hydrants. Again, to a level commensurate to the hazards. The presence of detection systems may also be considered.

Now we turn to the provision of automatic sprinkler systems. The Building Code of Australia may require the premises to be sprinkler protected. Otherwise, the decision to install sprinkler protection will require an extensive cost-benefit analysis. For example: to install sprinklers in a restaurant with combined sums insured of say \$1 million would typically not be cost-effective considering an installation may cost say \$500,000. Nor would the risk dictate it. Whereas, a high-bay warehouse worth \$20 million may well justify sprinkler protection. A brief history of fire sprinkler systems.

Resources

LMI RiskCoach

Internet based risk management and insurance resource. Factory Mutual Global Property Loss Prevention Data Sheets.

AS1851 – Maintenance of Fire Protection Systems & Equipment.



Appendix A

From the Fire Journal (official publication of the Australian Fire Prevention Association Ltd) Winter 1986. An article by Harry W. Marryat, AM... entitled 'The Centenary of Automatic Sprinkler Systems in Australia'.

As far back as the 18th century, attempts were made to invent a device which would extinguish any fire automatically. In 1723, a patent was taken out in London by Ambrose Godfrey, a well-known chemist of the day for a unit which consisted of a 'cask' of fire extinguishing liquid containing a pewter chamber of gunpowder. This was connected by a system of fuses which were ignited when a fire occurred, exploding the gunpowder and scattering the solution (ref: Gorham Dana).

In 1729, it was reported that the device 'stopped a fire in London' however it was not until 1878 (nearly 150 years later) that the forerunner of the modern automatic sprinkler system was installed in a building using a sprinkler head invented by Henry Parmelee.

In 1882, Frederick Grinnell, of Providence Rhode Island patented his sprinkler head and from that date the use of automatic sprinkler systems grew rapidly.

The first automatic sprinkler system to be installed in Australia was imported from England and erected and commissioned at the premises of Laycock Son and Nettleton at South Melbourne, Victoria in February 1886. It was this system that used 'Grinnell' sprinkler heads which controlled the first fire on the 9th of December that same year. It was on the 23rd of March 1889 that the partnership of Russell and Wormald was established and from this point the growth of automatic fire sprinkler protection in Australia really commenced with the acquisition by the partnership of the agency for the 'Grinnell' automatic sprinkler system.

Comparatively few buildings had been equipped with automatic sprinkler systems when the Great 'Block' Fire occurred in Melbourne on the 21st of November 1897.

The only one of 17 buildings in a group between Flinders Street and Flinders Lane to survive the fire was the Mutual Store (a building which still stands today) which had a complete 'Grinnell' system installed.

This fire, with its demonstration of the effectiveness of automatic sprinkler systems under extreme conditions gave a great stimulus to automatic sprinkler protection in both Australia and New Zealand.

Detailed record keeping of fires in which automatic sprinklers were involved provided the basis of design standards such as the orifice size of sprinkler heads, water flow rates and pressures, pipe sizes and sprinkler head spacing for example have remained practically unaltered for most of the normal hazards in industry and commerce for the last 100 plus years.

In 1885 Sir John Wormald wrote what is believed to be the first standard for installing automatic sprinkler systems and which became the basis for the first edition of the rules for automatic sprinkler installations of the Fire Officers' Committee, London published in September 1888.



Successive editions were published from time to time to incorporate changes up to the 28th edition which was endorsed as an Australian Standard. In 1960, standard 13 of the National Fire Protection Association was accepted as an alternative to the Committees rules, 28th edition.

Further developments ensued over the years with changes to and new styles of sprinkler heads (first glass bulb was in 1924), spray sprinkler in 1953, on-off sprinkler heads, large drop and fast response sprinkler heads. In 1971 the Australian Fire Protection Association published a book 'fire-automatic sprinkler performance in Australia and New Zealand – 1886 – 1968' which recorded 5,734 fires of which sprinklers successfully controlled 5,720 (or 99.76%). Other countries had similar performance statistics however Australia and New Zealand stood on top.

There are several reasons why the Australian record has been so outstanding. The first and probably the most important is that commencing from 1909, close to 100% of systems were equipped with direct brigade alarms to the fire brigade stations. Next of importance was the introduction of weekly inspection and testing of alarms and valves, made necessary by the installation of the direct brigade alarms and finally the observance of design fundamentals with the support of the insurance authorities.

Another important aspect of the Australasian experience is that the average number of sprinklers operating on fires is the lowest in the world. One sprinkler head in operation controlled 60% of fires, two controlled 80% while 94.7% were controlled by 10 or fewer sprinklers in operation. These statistics have improved over the years.

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