



Wherever people congregate in large numbers there is always a potential danger to life. Perhaps there is no more serious example of this than the enclosed shopping precinct where any outbreak of fire presents a serious potential hazard to both people and property.

Consider the range and quantity of items likely to be stored in retail outlets large and small. When such locations are confined in enclosed spaces such as malls and shopping centres they all have one thing in common: a serious potential for fire resulting from the combustible nature of goods and packaging. Goods such as plastic and foam material also may emit large volumes of toxic smoke during a fire.

The range of goods stored significantly increases the risk from fire and the speed with which fires can develop and produce significant quantities of heat and other products of combustion. The way in which goods are stored can in themselves effect the potential for a serious fire – for example, high racked warehouses present particularly serious hazards.

The simplest way of providing protection for retail occupancies – and the people who might be there is by rapid application of water at the earliest possible stage of the fire. Water as a fire fighting agent offers many advantages, it is readily available, inexpensive and can be directed to the seat of a fire with immediate effect – without relying on the need for chemical additives. Water is also chemically inert and does not present an environmental hazard.

Automatic Fire Sprinkler Systems

- deliver water directly to the seat of a fire
- operate automatically – even when buildings are unoccupied
- are relatively inexpensive to install
- prevent deaths and injury
- allow design flexibility – for example in provision of travel distances to fire escapes
- may attract insurance discounts
- make innovative design concepts a reality
- minimise water damage

Sprinklers – The History

Fire sprinkler systems were first used as long ago as 1870 – primarily to combat fires in commercial and industrial property. Although today's sprinkler systems work in exactly the same way as those early systems, continuous research and development and a rigorous quality assurance programme has ensured that today's systems are among the most reliable protective systems available.

Following a number of serious fires in retail premises between 1980 and 1995 there was increasing concern over the hazard levels presented by large retail properties. In the 2000 edition of the Building Regulations for England and Wales (Approved Document B) there is now a specific requirement to install sprinklers in all single storey, non-compartmented retail outlets with a floor area exceeding 2000 square meters.

How Sprinklers Work

Sprinklers deal with a fire hazard at its source. The sprinkler heads are mechanical heat detectors that release water when heated by a fire. The detection method is very reliable, and not prone to false alarms in the same way as smoke detectors. Sprinklers work by wetting the fire and combustibles, removing heat from the fire and reducing the radiation from the fire onto other combustibles.

In addition to legal requirements many other groups have recognised the value of sprinklers and fire brigades, insurers and safety organisations have all agreed that sprinklers can play a key role in reducing fire hazards in retail properties.

'the light', Leeds

'the light' is a large retail and commercial complex in the centre of Leeds. The development is based around a number of listed buildings and provides shops, cinema, health club, night-clubs and a hotel – all connected by covered arcades.



This mix of different occupancies, involving new and old buildings, presented the fire design engineers with a challenge. Of particular concern was the escape of occupants located at high level in the cinema, bars and restaurants, where the escape routes crossed the main arcades. It was also necessary to consider the four levels in the arcades and the hotel corridors which opened onto the atria. A traditional design approach might have concluded that the building was 'unsatisfactory' in terms of life safety.

Sprinkler protection has been used extensively for both life safety and property protection, allowing a high level of flexibility and confidence in the fire protection design. With the smoke controlled within the atria, a phased evacuation strategy for the building can be used.



The choice of an automatic sprinkler system was not only good fire engineering but proved cost beneficial. Natural smoke ventilation could be used instead of the more expensive mechanical ventilation as the fire size and smoke levels would be reduced by the prompt action of the 'fast response' sprinklers. The fire compartmentation requirements were reduced from 120min to 60min in many areas. The original features of the listed building could be retained and the risk to firefighters was significantly lower.

The fire sprinkler system is central to the fire engineered solution, which made the clients concept of 'the light' a reality.

Benefits of Sprinkler Systems and increased flexibility

An expansion of the principles of strict liability and the duty of care owed by property owners and occupiers has greatly exercised the retail world. Sprinklers are the only fire protection system which will protect the property, contents and the developer's investment but more importantly the safety of people who use and work in these environments. This means not only customers and employees but also contractors and the emergency services. (It should be remembered that the only death of a British female fire fighter resulted from a supermarket blaze.)

Where life safety sprinkler systems are installed there is a need to ensure that sprinkler water supplies are always maintained, even during maintenance work. Zoning systems mean that segments of a sprinkler installation can be isolated for maintenance while the remainder of the system is kept operational.

Sprinkler systems can be provided with a remote signalling facility. This will advise a central station or fire brigade that the sprinkler system is actually operating. All sprinkler systems are also provided with a local mechanical alarm which will operate even if there is no electrical power available.

Sprinkler systems are the only devices that automatically attack the seat of a fire. Records show that most fires are controlled or extinguished by fewer than six sprinkler heads operating. The same records demonstrate that no fire deaths have occurred in a premises protected by a properly installed and maintained sprinkler system in the UK since 1945.

The Building Regulations recognise the enhanced levels of safety provided by sprinklers so when major shopping complexes are being designed the inclusion of sprinklers will permit alternative approaches to complying with the Building Regulations.

Types of Systems

While there are a range of different types of sprinkler systems (wet, dry and alternate) used for different risks, it is considered that wet systems should normally be specified as these provide the fastest response. These systems are the simplest and easiest to maintain. They are also the most cost effective system. Pipework can be in steel or CPVC (chlorinated polyvinyl chloride) which is approved for the purpose. If water pressure and flow are adequate then it is possible that the sprinkler system can be connected (subject the approval of the water supplier) directly to the service

The consequences of a serious fire in an unsprinklered supermarket. The building was rebuilt with sprinkler protection.





main where it enters the premises. When a water storage tank and pumps are required because the flow or pressure are inadequate these can be sourced from one of a number of BASA members who manufacture listed equipment.

System Design and Installation

There is nothing mysterious about sprinkler systems and the high reliability and effectiveness of these systems has come about over the years by strict adherence to the sprinkler rules and design standards. It would be wise to select a contractor who is not only capable and competent but who also has an established track record and who can offer proof of compliance with an established quality assurance system.

For example, all Installer members of the British Automatic Sprinkler Association can provide documentary proof of compliance with international quality assurance standards and all also hold an approval (Registration or Certification) from a third party certification service which itself is accredited by a Government-approved body, the United Kingdom Accreditation Service (UKAS).

Most BASA members have been in business for more than ten years and some for more than 30 – all can provide objective proof of their competence. BASA itself was founded in 1974.

(References to Building Regulations relate to England and Wales. Scotland and Northern Ireland have their own building standards which may differ.)

Facts about Fire Sprinklers:

- Since 1945 no one in the UK has ever died as a result of a fire in a building with a working sprinkler system.
- Most fires in retail occupancies are extinguished by six or fewer sprinkler heads operating.
- Only the sprinkler heads in the immediate vicinity of the fire actually operate.
- Sprinkler heads can be completely concealed.
- Sprinkler systems do not need pumps or tanks if mains pressure is adequate.
- Sprinklered buildings prevent fire fighter deaths.
- Sprinklers do not 'false alarm'; they will only operate if there is an actual fire.
- For a very small cost an alarm switch can be built-in to the system to call the fire brigade automatically should the sprinklers operate.
- Maintenance costs for sprinklers are very low.
- Sprinklers save lives – and property – and are the only devices which can detect a fire, sound the alarm, call the fire brigade and extinguish or control the fire.
- Despite preconceptions, sprinklers are not difficult, unsightly or expensive to install.
- Sprinkler systems installed in full compliance with third party certification standards may attract insurance premium discounts.

Presented by:

