



New ways of working demand even bigger warehouse buildings.

Historically, the UK's largest fire losses, based on information from the Association of British Insurers (ABI) and the Fire Protection Association (FPA) have been in warehouses.

According to these figures, fire losses in warehouses make up around 10% of the total cost of all fires with average losses exceeding £1,000,000.

In 1999, 50 fires which caused losses of over £1.0 million were reported to the FPA. The total cost of these fires was estimated at £119.4 million. Of these reported fires, 5 were in distribution/warehouses.

While there may be fewer fires in warehouses than in manufacturing, the impact on business in financial terms can be disproportionately higher through loss of property, stock and the costs of business interruption and the liability implications which arise.

The official government figures make even more disturbing reading. These show that in 2001 there were 11,287 fires in retail distribution and industrial/transport premises. Of these, it is estimated that between 25% - 40% (ie. 2,800—4,500 a year) were in warehouse fires which resulted in 5 fatalities and 244 injuries (around 1% of all fire related injuries).

During the last 10 years warehouses have increased in height and size, to the point where units of 20,000 – 30,000m² are common place.

Many of these buildings are automated so there are fewer staff around. Modern logistics also demand large unpartitioned spaces, densely packed goods and high-bay storage. Widespread use of plastics, synthetics and other materials mean that fires are more toxic, smoke more acidic and fire spread enhanced. Even when goods may be **relatively non combustibile**, today's packaging means that virtually all storage buildings present serious risks of and from fire.

Tests undertaken by the Building Research Establishment (BRE) found that, particularly in the case of 'high bay' warehouses, unless a fire was attacked in the first two to three minutes it was highly unlikely that the blaze could be

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.**



Installation of High-Bay racking.

controlled and that the buildings and contents would be destroyed.

The Cause of Fire

The human factor is a major cause of warehouse fires and more than 25% of blazes are caused by arson. The next major cause of fires is electrical defects. Around 20% of fires result from hotwork/sparks and welding or other maintenance operations.

Of all the fires reported, nearly 30% occur between midnight and 6:00am. Usually when there is limited staff available to provide any sort of effective response.

Take Steps to Make Your Warehouses Fire Safe

Experience has shown that one of the most successful and reliable ways of making sure that your warehouse is fire safe is to fit an automatic fire sprinkler system designed and installed by a BASA member.

Automatic fire sprinkler systems have been installed in industrial and commercial occupancies since 1873 and provide automatic detection, alarm and fire fighting capability at all hours of the day and night, 365 days of the year.

Impressively, 99% of fires in sprinkler protected buildings are controlled or extinguished by the systems.

Why This Success?

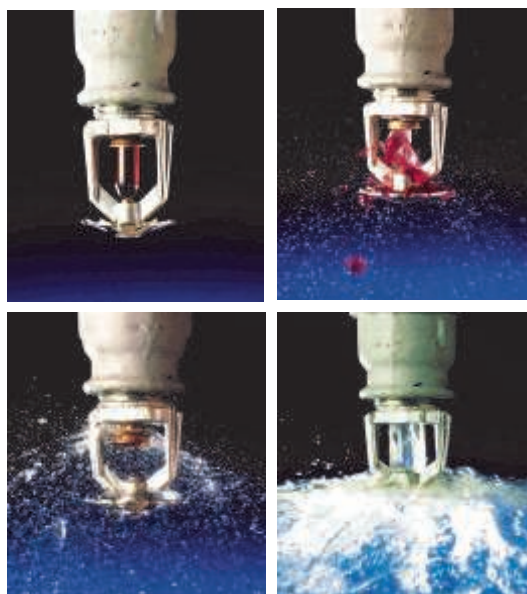
The success in part is due to the simplicity of the sprinkler system: there are no computers or wiring – so no false alarms. The cost of maintenance is extremely low – running to less than £1000 per year for the average system.

Sprinkler systems have a very long service life, 50 years is common and many systems in use today were originally installed in the 1920's. This is due to strict adherence to standards for components, design and installation. Systems in the UK are installed to BS5306 Part 2, an exacting standard which has evolved over the years. When systems are installed by a BASA member company, the client will be provided with a Certificate of Conformity under the LPCB's third party certification scheme LPS 1048. Due to the strict standards in place for sprinklers components, design, installation and the third party certification, the fire insurance industry will normally offer significant premium discounts and/or lower policy excesses for premises protected by automatic fire sprinklers.

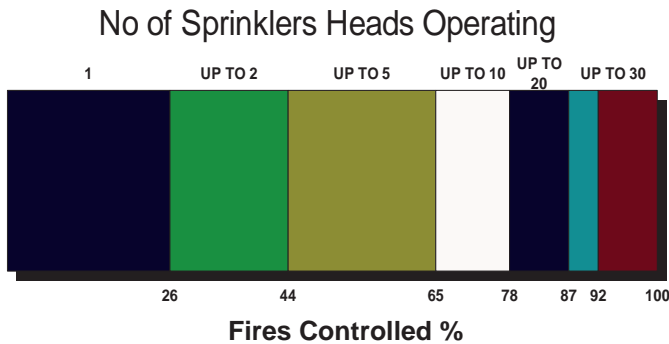
How Do They Work

It is essential that supply of water needed by automatic fire sprinkler systems is reliable and guaranteed. This means that water should be supplied directly from a suitably sized towns main or other approved sources of water as specified within BS5306 Part 2. This could be a river or canal or water storage tank.

However, due to the size, height and fire loading in today's warehouses it is likely that many the towns' main will not be able to provide the necessary pressure and flow rates for the system and therefore it is common for pumps and tanks to be required.



Each sprinkler head has its own heat detector and operates at a predetermined temperature normally 68°C. Once this temperature has been reached, the sprinkler head operates and a fine spray of water is discharged on to the fire.



It is estimated by the FPA that 78% of fires are controlled with 10 sprinkler heads or less.

Source: FPA

Sprinkler heads are strategically positioned at roof level, and if appropriate, within storage racking. These heads are connected to the water supply via a network of hydraulically-balanced supply pipes, which are distributed throughout the warehouse.

Once the sprinkler installation has been activated, the fire is usually quickly brought under control. The system can also operate local alarms to aid evacuation and alert the fire brigade to the fact that there is a fire on the premises.

Water Damage

Some people have expressed concern that the water damage caused by automatic fire sprinklers will be worse than the fire, this is of course untrue. Only the sprinklers closest to the seat of the fire will operate and in many cases only one or two sprinklers will actually activate. Another common myth is that all sprinkler heads operate simultaneously, this simply does not happen. The water discharged by these few sprinklers is invariably less than the water which would have been used by the fire brigade. The FPA have said that in most situations sprinklers will only discharge 10-15% of the amount of water needed by the fire brigade. Over 40 million sprinklers are installed each year worldwide and every single sprinkler is pressure tested prior to leaving the factory. US, Australian and UK research suggest that less than 1 correctly installed sprinkler in 5 million will fail by discharging water other than in a fire.

The Legislation

There are some 100 pieces of legislation, which relate to fire safety in warehouses. The most important are:

- **Building Regulations 1991 – Approved Document B, 2003**

edition.

- **Fire Precautions (Workplace) Regulations 1997***, which provides a minimum safety fire standard for places where people work.
- **Fire Precautions (Workplace) (Amendments) Regulations 1999** extended the scope of the regulations to large employers i.e. those that are required to have a Fire Certificate.

*(A new Fire Safety Order is being prepared at the time of writing)

Cost Benefits of Sprinkler Protection

An independent study into the cost of benefits of incorporating sprinklers into buildings and structures carried out by Ove Arup concluded that the design constraints on a non-sprinklered alternative could mean that in practice it would never be built. Likewise, for many contents, it is unlikely that insurance cover would be available unless the premises were sprinklered. If it were built with sprinklers, the initial building costs would be higher but could be offset within as little as five years by reduced insurance premiums.

Safety of fire fighters

Recent cases have pointed out the dangers to which fire fighters are exposed - especially in very large single story buildings. This has resulted in suggestions that where there is no risk to life it is possible that the response of brigades in very large fires may have to be restricted. In warehouse fires, the fire brigades may only take such steps as are necessary to prevent fires from spreading. This will almost inevitably result in increased fire damage—and cost

Environmental Issues

There are a number of other reasons for reducing fire incidents and losses attributable to fires in un-sprinklered warehouses. With the ever increasing awareness of the impact on the environment of the products of combustion and of contaminated fire fighting water, a reduction of any kind would be beneficial. Products of combustion can travel extensively in the water used for fire fighting, and the contaminants in smoke may be deposited several miles downwind. Likewise, water used may enter domestic or agricultural water supplies and the effects experienced over a wide area with

High Fire Risk Storage

One of the issues which most concern the fire brigades is the storage of high-risk materials - especially those involving flammables, toxic chemicals or substances, which can produce serious environmental damage. Modern warehouse/logistics management often demands quick turnaround of consignments and it is possible that the warehouse managers may not sometimes be aware of exactly what is being stored.

In a recent Building Regulations Appeal, the Secretary of State has upheld the requirements of a local authority to demand sprinkler protection in a very large single storey building used both for food processing and warehousing. The proposed building consists of three separate areas; raw materials store (39,000m³), food processing area (7,035m²), and finished goods and distribution area (1,710m²). In addition a three-story office block would be attached to the building.

As the volume of the raw material store is in the order of 39,000m³- more than five times greater than the specified 7,000m³ which triggers the requirements of the local Act. The Borough Council and the fire service had requested that a fire sprinkler system should be fitted to prevent the outbreak or spread of fire from the building and to reduce danger from fire in the building. The Fire Authority was also concerned that an acceptable environment should exist to allow fire fighters to proceed efficiently and with adequate safety.

All parties accepted that the proposed building would fully comply with the Part B (Fire Safety) of the Building Regulations without a fire sprinkler installation and smoke ventilation system. However, the Secretary of State considered the nature of the products to be stored and the considerable size of that compartment. He concluded there was potential for a large and fast growing fire and that a fire sprinkler installation would help to control a fire and prevent further conflagration and or flashover until the arrival of the fire service. Therefore confirming the requirement for a sprinkler system was 'proportionate and reasonable in the circumstances'.

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 warehouses are extinguished by eight or fewer sprinkler heads operating.
- Only the sprinkler heads in the immediate vicinity of the fire actually operate.
- 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 or expensive to install.
- Sprinklers systems installed in full compliance with third party certification standards may attract insurance premium discounts.

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