

## Fire Safety in Building Design: The Sprinkler Answer

Fire protection legislation is tighter now than ever before – and with good reason. House fires continue to cost lives, often making grim headlines when young children and entire families are lost. And while regulations are designed to minimise these types of tragedy, they also create problems for building designers.

Fire brigade access, escape routes and compartmentation must all be taken into consideration, and many a plan has failed when these demands have not been met. However, the gradual introduction of domestic and residential sprinkler systems has shifted the ground in favour of the building designer, who can now use the latest sprinkler technology as a ‘trade-off’, in much the same way that this has been done in industrial and commercial properties for more than 100 years.

Leading fire engineering companies have pioneered the use of domestic and residential sprinklers in the UK, and have successfully designed and installed scores of systems, many of which have enabled designers to achieve a result that would otherwise be impossible.

Here, Les Fielding, Secretary of the NFSN reviews three examples of how sprinklers have saved the day.

## Lymm Water Tower

Lymm Water Tower is a 130-year-old grade II listed landmark of special architectural and historical interest. It was purchased by the Harris family with the idea of rescuing the derelict building, creating a design-led, minimalist family home of the future and, at the same time, making a contribution to safeguarding local heritage.

But planning permission was rejected by the local fire authorities and Building Control department because the proposed design failed to meet both current 'adequate means of escape' criteria and fire compartment requirements.

With their dream home likely to remain just an idea – and faced with the prospect of spiralling costs in order to meet the proposed fire safety requirements – the family turned to a local fire sprinkler company for advice.

“We needed an alternative way forward that would allow us to put our design into practice, without the stumbling blocks and costs associated with doing things the usual way,” said Russell Harris. “We did not want to have expensive compartmentation, fire doors and obtrusive ladders, and the integrated fire protection design put together by the sprinkler company took all this into consideration.

“The result was a fire protection system that was instantly accepted by the fire and Building Control authorities.”

Central to the Fire Protection Companies problem-solving design was a combined sprinkler and fire detection system that would satisfy all the relevant regulations – and protect the family and their home – without affecting the look and feel of the property.

Concealed sprinkler heads were fitted into the distribution pipework and are barely visible against the white ceilings. (In the event of a fire, the sprinkler concealment plate is designed to fall away at 57oC and the sprinkler head will only operate if a temperature of 68oC is reached.)

The aesthetics of the sprinkler system are complimented by the fire detection and alarm system that features Very Early Smoke Detection and Alarm (VESDA) capability.

Even the new, open plan, wrap-around extension that follows the shape of the octagonal tower benefited from a fire engineering approach, with copper pipework being used to construct the sprinkler distribution pipework, allowing it to follow the unique contours of the building.

“From an aesthetic perspective, nobody would even know that a combined sprinkler and fire detection system was present within the house. It is barely visible to the human eye, and fits in perfectly with our aim to blend contemporary design with the building’s traditional features, resulting in simple, powerful detailing,” said Russell Harris.

“Thanks to this innovative approach, my family and I are finally living in the home of our dreams, safe in the knowledge that we are fully protected from fire.”

## Heron Quay, Bedford

The innovative use of residential sprinklers also solved a dilemma for property developers, Saxon, and Bedfordshire and Luton Fire & Rescue Service

In the first residential sprinkler installation in Bedfordshire, a local sprinkler company was contracted to design and install a system in three blocks of timber-framed luxury apartments that front onto the Great Ouse river at Heron Quay, Bedford.

The 4-storey apartment towers are part of a large, exclusive development of 55 two-bedroom properties, with the earlier blocks being constructed without sprinklers. These have concrete stairs, but as Saxon wished to install wooden stairs in the latter phases, adequate means of escape for residents became an issue.

The location of the apartment towers meant the fire service could not gain access as required by the Building Regulations Approved Document 'B'. This was because there is no access on the river side, and the land-approach involves a raised area with a weight limit – covering an existing underground car park – that was deemed unsuitable for fire appliances.

Saxon Homes discussed the dilemma with the fire service, and two options emerged: the installation of a complex and expensive dry riser system, or a less expensive but more effective residential automatic sprinkler system.

A fire service spokesman said; "As a fire service we have been promoting the use of residential sprinklers for a number of years, and we had no hesitation in recommending that these were the answer to this particular problem.

"The apartment towers are part of a large complex which would give us access problems in an emergency, but the sprinklers solve those problems at a stroke.

"We are confident that Saxon Homes and their residents now have the safest and, incidentally, least expensive fire protection system that could be provided in this case. The sprinklers satisfy a number of requirements: our own concern for life safety, the Building Regulations, and Saxon's desire to use wooden stairs."

The sprinkler systems were specifically designed for this application, and are fed by the town's water main. They feature concealed CPVC pipework that is specially fire-rated and that leads to unobtrusive sprinkler heads that do not detract from the aesthetics of these exclusive apartments.

Each block has an integral control panel and sprinkler stop valve, together with an internal siren that will alert residents if the sprinklers are activated.

Commenting on the development, NFSN Secretary, Les Fielding, said; "It is indisputable that residential sprinkler systems save lives and protect property, but this particular case shows clearly how these systems can help architects, builders, contractors and developers to overcome specific fire-related problems, while at the same time providing a safer building for the residents.

"Without sprinklers – or a more complex, costly and time-consuming alternative – Saxon would not have been able to use wooden stairs as they wished.

"We are obviously very pleased to have these sprinkler systems installed. Sprinklers are also to be able to demonstrate that, aside from their main aims of saving life and property, and protecting the environment, sprinklers also have valuable commercial benefits."

## Crocus Grove, Peterborough

When Nene Housing Association commissioned F.E. Peacock Construction Ltd to build three houses in a remote area, the local fire authorities and Building Control department raised serious issues regarding the narrow access route to the houses.

Access to the opposite side of the houses was restricted by a cycle path, and in the event of a fire, neither access route was accessible by fire brigade vehicles.

With this in mind, a feasibility study was conducted into the cost of widening the access road, redeveloping the cycle path to gain access, or installing residential sprinklers within the houses.

Of the three options investigated, a residential sprinkler system proved to be the most cost effective solution. F.E. Peacock invited a local sprinkler company to design and install a system that featured concealed sprinkler heads and distribution pipework, so the aesthetics of the new properties would not be compromised.