



Residential Risks

In the UK, an average of 2 people die and 50 are injured in fires every day of the year. Sir George Pigot explains why residential sprinklers would be an effective means of reducing these numbers.



Figures recorded by the Home Office highlighted a steady decrease in fire deaths through the 1980s and early 1990s. Smoke alarm ownership was passing 80%, which was taken as a sign that the smoke alarm campaign was effective. But what seems to have been overlooked is that, despite fire deaths were decreasing, fire injuries have continued to rise at an alarming rate.

The period 1984-94 saw fire injuries rise by 62%.¹ While a proportion of this rise may have been due to reporting changes and an increase in the number of precautionary checks, the rise was too large to be fully explained away. Furthermore the number of dwelling fires were steeply

increasing - this reached a record high of 66,300 in 1997.²

The *Safe as Houses* report, prepared by the Community Fire Safety Task Force, highlighted that over 75% of all fire casualties occur in the home. To date this seems to have elicited little public attention. That people die randomly in ones and twos across the country is not newsworthy. As a society we are dismissive of the risks of fire and individually we assume that we are too intelligent to have fires. Fires only happen to "other people". Perhaps it is also our primeval fear of fire that we would simply prefer to ignore the danger and hide under the bedclothes.

¹ Home Office Statistical Bulletin Summary Fire Statistics United Kingdom 1994

² Home Office Statistical Bulletin Summary Fire Statistics United Kingdom 1997

Groups at Risk

Although fire strikes indiscriminately and everyone is at risk, analysis of fire statistics shows that certain groups suffer higher than average casualty rates. "The disadvantaged" include the young and the old, the physically and mentally disadvantaged, and those under the influence of drink and drugs. In the event of a fire these people may not be physically able to escape, or may not understand the danger – or both.

There is also a significant section of the community that does not respond to community fire safety campaigns. This group, sometimes referred to as the "hard to influence", has probably drifted through the education system with little benefit, and is unlikely to respond to further attempts at education.

These two groups are estimated to represent in the region of 25- 30% of the UK population but current fire policies make no specific provisions for their protection.

Similarly, certain types of property also pose higher risks of death or injury in the event of a fire. Amongst these properties are those known as Houses in Multiple Occupation (HMOs). HMOs are categorised by the Department of the Environment, Transport & Regions (DETR) as:-

- Bed-sits
- Shared houses
- Households with lodgers
- Purpose built HMOs
- Hostels, guest houses,
- Boarding houses, B&Bs
- Self contained converted flats.

In the report *Fire Risks in Houses in Multiple Occupation*³ Michael Wright analysed 87 fire brigade Fire Damage Reports (FDR1) from the years 1992 to 1996. From these he was able to determine the principle factors affecting fire risk in HMOs. It appeared that the most significant factor was the number of floors within the building. Properties of over 3 levels in height

showed a marked increase in risk. Only 16% of HMO residents occupy building of over 3 floors in height, but they account for over 50% of fire deaths in HMOs.

The English House Survey of 1996⁴ identified a total of 760,000 HMOs comprising 1,685,000 housing units that provided accommodation for an estimated 3,104,000 persons. Although all residents of HMOs are at higher risk, 500,000 of these live in properties over 3 floors in height.

HMOs are widely used for social housing, and therefore tend to house a higher than average proportion of the disadvantaged and the hard to influence. Thus those at highest risk are concentrated in the properties that pose the greatest danger. HMOs house just of the population but it should come as no surprise that, according to Home Office⁵ statistics, they account for 34.8% of fire deaths and 39.2% of fire casualties in buildings. It should be noted that there is no direct correlation between Home Office and DETR statistics, and deductions from these figures may not be entirely accurate. Nevertheless it is clear that a high proportion of fire casualties affect a very small but easily identified section of our community.

Fire Policy

The Government is aware of these risks and has made proposals to improve fire safety in HMOs. These are still under discussion. It was suggested that a greater duty of care to evaluate and eliminate fire risks be imposed on landlords under a Code of Practice. Whilst this may appear to be a reasonable proposal, history has shown that landlords, especially those at the lower end of the property market, are often reluctant to take on responsibilities, especially when it costs them money. The proposal has a number of other drawbacks. Most landlords lack the expertise to evaluate fire risks properly, they do not have the resources to ensure compliance, and would have little incentive to co-operate. So, although this proposal identifies landlord's responsibilities,

⁴ Source: DETR

⁵ Home Office Statistical Bulletin Summary Fire Statistics United Kingdom 1997

³ Fire Risks in Houses in Multiple Occupation: Research Report - Michael Wright ENTEC

effectively it leaves tenants no better protected.

In larger properties most households probably act responsibly and practice safe housekeeping, but it only takes one careless person to put them all at risk. Moreover conventional forms of protection do not adequately deal with the smoke and fumes generated by modern fires, which are a major cause of fire casualties. Therefore the most effective way to provide tenants of HMOs with adequate fire protection is to engineer fire deaths out of buildings. Life safety residential fire sprinklers can do this by providing a safety net, which will actively and automatically save lives when all else has failed.

Residential Sprinklers

Although fire sprinklers were invented in the UK by Major Stewart Harrison in 1864, it was not until 1973 that the use of fire sprinklers for life safety was seriously investigated.

Much experimental work, including over 60 real fire tests, were carried out in the USA in the 1970's and early 1980's to establish the most effective spray patterns and flow rates for residential sprinkler heads. In the 15-20 years since these experiments were conducted residential sprinklers have been continually developed. Today they are increasingly economical in their use of water, and are also more aesthetically pleasing. Modern residential sprinklers can be obtained in almost any colour or finish, and there are now concealed heads, that are almost invisible, and virtually immune to tampering or vandalism.

The reason residential fire sprinklers are so effective is that they react to a fire very much faster than conventional sprinklers. This means that they deal with a fire at a much earlier stage in its development, when it is still quite small, thus minimising damage and utilising very little water to control the fire.

The US standard NFPA 13D: *Sprinkler systems for one and two family dwellings and manufactured homes* has been adopted around the world as the

model for residential sprinkler systems and is based on the following principles:

- ◆ cost is of major importance.
- ◆ life safety is the primary goal of a residential fire sprinkler system. Property protection is a secondary goal.
- ◆ system design should be such that a fire could be controlled for sufficient time to enable people to escape; that is, it should prevent flashover for at least 10 minutes whilst sounding an audible alarm.
- ◆ piping arrangements, components, and hangers must be compatible with residential construction techniques.
- ◆ the omission of sprinklers in areas of low historical incidence of fire deaths (such as roof spaces and the like) should be allowed, thus saving considerable cost.

With many millions of installations world-wide, *NFPA 13D* has a proven track record of effectiveness, which is why it was used as the basis of Canadian, Australian,



and New Zealand residential sprinkler standards. The Residential Sprinkler Association (RSA) therefore also used it as the basis of the draft submitted to British Standards in April 1997.

Operation Life Safety, a joint US fire administration/fire industry initiative, tracked

activations of residential sprinkler systems for several years. Of the 600 incidents they list there were no failures and no fatal casualties. There can be no doubt that these systems work, and therefore in developing a Standard for the UK there seemed little point in "reinventing the wheel". Why would one change an already successful line up? Although it has taken a long time, it is hoped that a workable British Standard will now be available before Easter 2000.

The Successes

Sprinklers have been so successful at reducing fire casualties around the world that many regions have passed local laws requiring fire sprinklers to be fitted to all new properties, both residential and industrial. One such place was Scottsdale in Arizona, which put such a law in place in 1985. Recently Scottsdale published a ten-year report, which showed :

- No fire deaths
- 80% reduction of fire injuries
- 80% reduction in property damage
- 95% reduction in water usage for fire control.

Vancouver, which has a similar climate to ours, also passed a similar law in 1990 and recently published an interim report that supports these findings.

HMO sprinkler campaign

Residential fire sprinklers are still a new concept in the UK. Despite the efforts of various people, vested interests and entrenched opinions have so far succeeded in preventing these systems saving lives in the UK. But now with very wide ranging support, especially from the Fire Service, we are on the edge of a breakthrough.

In order to provide first hand experience of these systems in the UK the RSA has sponsored the installation of sprinklers in 212 properties on a social housing estate at Studley Green in Wiltshire. Costs of sprinkler installation at Studley Green are currently estimated at between 75-100p/sq ft, thus a 3-bed house would cost around £1,250 to protect.

Trying to apply these costs to HMOs would be difficult without accurate details of

each property. Nevertheless an informed estimate suggests that the cost per life saved would be very cost beneficial; substantially less than the £900,000 used by the DETR to evaluate road traffic schemes. The Government has earmarked £1billion for improved rail safety as a result of the recent Paddington rail crash. While this would go a long way to preventing a similar disaster, it would probably cover the cost of protecting all of the highest risk properties, which could save 150-200 lives each and every year.



Various targets for reductions in fire casualties have been set in recent years. *In the Line of Fire* called for a 40% reduction. *Safe as Houses* called for 30%. The Treasury has called for 20%. If residential fire sprinklers were installed in all HMOs they would virtually eliminate fire deaths and reduce injuries by 80% in those properties. At a stroke total UK fire casualty rates could be reduced by over 30%. This, coupled with all the other proposed measures, would go a very long way indeed to remove the horror of fire from our lives.

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