

## Sprinklers in Care Homes and HMO's (A Report by ADO John Streets, Fire Service College).

Traditionally anyone involved in life safety from fire has shied away from residential and domestic sprinklers, having heard horror stories regarding expense and water connection problems. It is hoped to dispel those fears and share my experience in finding that sprinkler systems can work out considerably cheaper than traditional passive measures.

### Case 1. Residential Care Home for Young Adults

A proposal was received for a residential care home for young adults. There were some fundamental flaws in the plans with specific regard to excessive travel distance on the first floor and inadequate protection to the single stair. (The West Yorkshire Fire Service has adopted the principles of HTM84 as an appropriate reporting standard) Investigations were carried out to identify any problems the user group may have, to ensure requirements were risk appropriate. The results of the investigations were that the user group had learning difficulties and a degree of physical handicap which resulted in mobility impairment. It was immediately apparent that excessive travel and reduced stair protection were not acceptable and the plans were rejected.

The owners requested a consultation to help move the project forward and it emerged that the normal solutions to these problems were difficult to implement. The building already existed, it was adjacent to green belt land, and building works either internal or external were not viable.

**A residential sprinkler system was recommended which would allow no further remedial work to be required, the principles underpinning this were:**

- If a fire occurred anywhere in the home it would not grow and would be contained in the room of origin.
- Smoke production, travel and buoyancy would be reduced keeping escape routes available indefinitely
- A fire could not affect the stair

**Cost effective issues that arose.**

- There was a marked reduction in the commercial insurance premium
- It was agreed to adopt a stay put policy where staff would evacuate the room of origin only. This reduced the staffing requirement for evacuation purposes
- The life of the system was in excess of 50 yrs and the maintenance requirement is very low.
- In some brigades this may have an effect on the size of the pre-determined attendance and the attendance times.
- The system was fitted with Institutional heads similar to the one shown below.

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The heat is conducted into the head by the prominent vanes. The vanes are designed to detach at 70lbs weight, which makes it impossible for anyone to hang himself or herself, and importantly, if the vanes are removed it will not result in the discharge of water. This makes them ideal for situations where vandalism is likely.

The valve set can be seen to be very compact and unobtrusive. The gauges are not required under DD251 however some water authorities have a problem with leakage from their networks and try to minimise the leakage by reducing the pressure in the mains.

If the pressure is reduced below the design pressure of the sprinkler system it may not function correctly, it seems sensible therefore to have a gauge on the town mains at least so the pressure can be seen.

In this case it was made a condition of acceptance that the management recorded the pressure reading weekly in the fire alarm logbook so that any downward trends could be identified early before a problem occurred.

The red box above the valves is a flow switch which detects any flow in the system and transmits a signal to an audible alarm. It can be wired into an existing fire alarm system in the place of a break glass call point.

This shows how unobtrusive sprinkler heads can be compared with other fire precautions that we already take for granted.



The system was fitted with Institutional heads similar to the one shown above

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### Case 2. House of Multiple Occupancy for Young Females

A local charity purchased a farmhouse type building to run it as a House in Multiple Occupation to house young females who had suffered abuse.

As an HMO it came under the Housing Act, the Fire Service were consulted when Environmental Health proposed to serve a notice to correct inadequate means of escape.

The problem with the means of escape revolved around having to pass through the head of an accommodation stairway to reach an alternative exit. This meant that if a fire started on the ground floor, the heat and smoke would rise up the stairway and prevent anyone passing the head to get to the exit.

This would leave people trapped in a dead end situation. The obvious solution to the problem was to enclose the head of the stair in fire resisting construction and thereby create a bypass, allowing travel to the alternative exit in fresh air.



The proposal to enclose the head of the stair met with a great deal of resistance from the charity, which was surprising, until it was explained that the residents were young girls who had suffered abuse at home, and an essential feature of the accommodation was an open aspect. The dark area and narrow corridor that would have been created would have been a no-go area for the girls and caused them apprehension.

A meeting with the charity directors revealed their concerns and emphasized that they wanted the fire precautions to last as long as possible because it is the policy of the charity never to ask anyone to leave. If the girls wish to stay for the rest of their lives they are free to do so and it was hoped to ensure they were as safe as possible for as long as possible.

It was suggested that if a residential sprinkler system were fitted, any fire on the ground floor would be suppressed sufficiently to prevent heat and smoke rising up the stair; this would therefore negate the need to enclose the head and maintain the open aspect. The system would be guaranteed for 30 years and its life expectancy estimated to be in excess of 50yrs.

The charity was delighted to overcome the problems with one solution and was able to report to their benefactors that they had provided the highest available level of fire safety in an extremely cost effective way.

What seemed to be an insignificant problem caused great difficulties as the stair in question can be seen above.

After having the system for 12 months the charity found that all the claims were true and were so pleased that they have had a similar home for young men retro-fitted with a residential sprinkler system.

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### Case 3. Asylum Seekers Hostel

It was proposed to change the use of a local council building to accommodate asylum seekers. The building was an ex- aged persons home, which had been decommissioned and been empty for 6 months.

The change of use from a care home to a hostel involved the responsibility for fire safety changing from Social Services to Environmental Health (Housing Act 1985). The premises required a significant amount of work to bring the standards up to modern requirements. This included upgrading all the doors to FD30S by fitting new door sets and some remedial building works to improve the means of escape. Initial costing for the doors produced a quote of £400 per door set- 55 were required leaving a bill for doors alone of £22,500.

The letter of recommendations from the fire service contained a paragraph explaining that a residential sprinkler system may provide a viable alternative. The paragraph was included as it was recognised that a sprinkler system could overcome a number of problems in this specific premises. Most importantly it would ensure as far as humanly possible that no one would die as a result of a fire.

It would be ironic in the extreme if someone sought safe haven in this country, and were let down badly by poor safety standards and died in a fire. There is always the possibility of unrest between different cultures internally and externally which could result in an arson attack. The response to the fire alarm may not be adequate due to communication problems or general confusion. The staffing levels may not be sufficient to effectively evacuate families and their children, particularly at night.

A residential sprinkler system would ensure that a fire did not extend beyond the room of origin; the fact that the spray would wet the doors would ensure that they maintained their integrity and negated the need for expensive door sets.

Smoke stopping would need to be addressed to stop a cold smouldering fire affecting the means of escape. An interesting feature was that the intumescence was relaxed on the doors as the sprinklers would actuate at temperatures far lower than those needed to actuate the strips, and once the sprinklers had actuated the door would be wetted and never reach the temperature needed to actuate the intumescence.

Corridor doors were relaxed allowing free movement throughout the premise as any smoke would be cooled by the sprinkler system, be less buoyant, cleaner, and less likely to produce any smoke logging.

These advantages were looked on favourably and even more so when the quote for the system came in at £ 20,000 pounds- considerably less than the bill for the fire doors.!!

The system was fitted quicker than building works could have been completed and has provided an extremely cost effective solution to all the problems encountered.

It has also provided peace of mind to all involved, particularly in the light of recent events in other asylum seekers accommodation.



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### Case 4. Convalescent Home

It was proposed to open a home for "Bed Blockers"- These are people who are simply convalescing or who have a medical condition that requires some degree of monitoring but not of a standard that requires hospitalisation. It also includes many older people who are well enough to leave hospital but cannot be discharged, as there is no one to look after them at home.

Hospital beds are "Blocked " by these people, which contributes to waiting lists etc. The home was designed generally around the guidelines for a residential care home but it was realised that the client group was very transient and would vary greatly from time to time.

At some times the proportion of patients who were unable to get out of bed may exceed the number that staff could safely evacuate. The transient nature of the residents could not ensure that they were located according to risk assessment- i.e. the least ambulant ground floor nearest the exits etc. There are also clearly not the facilities to evacuate residents in their beds, as may be the case in hospital.

A solution was necessary that addressed mobility impairment, staffing levels, and adequacy of the means of escape of a transient client group.

A residential sprinkler system was proposed on the basis that as the fire could not leave the room of origin and would be suppressed and held in a static dynamic state, therefore there was only a need to evacuate the patient in the room of origin.

The normal staff levels, making efficient use of the resources available, could achieve this easily. The rest of the residents could simply "stay put"

The proportions of bed-ridden clients and their location within the building would be immaterial. The effect of a fire on the running of the home and the availability of hospital beds would be negligible.



The premises can be seen under refurbishment

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### Conclusion

Sprinkler systems of this kind are now established in West Yorkshire as a cost effective, long term, low maintenance solution to previously insurmountable or simply ignored problems.

It would be naive to pretend there have not been problems along the way particularly with misunderstandings with water supplies. Local contacts and partnerships have been established and the majority of problems have been resolved or are in the process of being discussed. The team approach seems to be the key with the same people from each organisation dealing with these systems, they build up a working relationship and respect for each other, which enables them to pool ideas and improve on each project.

As a Fire Safety Practitioner I have put in a great deal of time and thought to both present and future standards. I feel uncomfortable with many existing standards a good example of which is the guidance relating to Houses in Multiple Occupation.

The traditional fire precautions are passive measures and consist of fire resisting construction around the means of escape and an alarm system with automatic detection designed to protect the means of escape. Looking at a typical HMO occupied by students, we know that they will wedge open the fire doors to enable free movement round the accommodation, we also know that they will have a poor response to the fire alarm depending on their state of awareness (we've all been there).

In extreme cases the alarm system has been disabled following numerous false alarms or simply by lack of maintenance. Any operational fire fighter in a large city will provide evidence of this and will recount the number of times they attend incidents and find residents still in bed.

If we know that these provisions are not effective and are impossible to manage why do we persist in asking for them? It seems the worst kind of prescription to make owners and landlords pay money for measures, which do not do the job.

We know of measures such as sprinklers, which are effective and compensate for the shortfalls described surely as professionals we should be promoting such systems on a national basis.

A landlord in Headingley, Leeds saw a presentation on Residential sprinklers and decided to look at the possibility of fitting a system in a house he was renovating for students and had no existing fire precautions. In collaboration with local sprinkler engineers we decided to try and design the cheapest possible system whilst still complying with accepted rules. The premises consisted of a 4-storey terrace type property with 8 bedrooms and a shared lounge and Kitchen.

The proposal was to use residential sprinklers with an extended coverage of 20ft x 20ft, this meant that only 1 head was required per room. This immediately cut down on the amount of heads and pipe work needed. The most significant factor involved the water supply- if only one head was present in each compartment it is reasonable to assume that only the water to supply one head is required.

This reduces the requirement to 60l/min. The existing domestic supply may be adequate to supply this and if not the water authority have no objection to a small inline booster pump for such a small demand. The sprinkler system acts as an L2 type heat detection system with either 68 or 57 deg C heads, all that remains to be done is to alert the occupant of a room that there is a fire in their room and this can be done by single point smoke detection (hard wired preferred).

- The quote for the traditional static fire precautions (FD30S doors and L2 fire alarm) was £9000 pounds
- The quote for the sprinkler system was £4500
- The sprinkler company have offered a discount to the landlords association if they fit 10 systems in Headingley of 10% on top of that.

This resulted in Effective Fire Precautions at a fraction of the normal cost! I think were getting there!!! (slowly)