

Appendix 4

Efficiency and Effectiveness of Sprinkler Systems in the United Kingdom: An Analysis from Fire Service Data

May 2017

Summary

1. This report provides a detailed analysis of data on fires in premises in the UK in which sprinkler systems were fitted over the period 2011 to 2016. Data were provided by 47 Fire and Rescue Services.
2. The cases analysed amounted to 2,294 incidents of which 1,725 (75%) were in nonresidential buildings and 414 (18%) in dwellings.
3. The aim of the analysis was to provide an authoritative assessment of the reliability and effectiveness of sprinkler systems in controlling and extinguishing fires and in preventing damage.
4. The effectiveness and reliability of sprinklers has been assessed with regard to two key criteria:
 - When sprinklers operate how effective are they in extinguishing or controlling fires and thus preventing damage? (performance effectiveness)
 - How reliable are sprinklers in coming into operation when a fire breaks out? (operational reliability)
5. In the data set there were 945 cases in which sprinklers were activated. The impact of the sprinkler system is known for 677 fires of these cases. Across all fires for which data were available, the sprinkler systems contained or controlled the fires in 62% of incidents and extinguished the fire in 37% of incidents. Hence, the performance effectiveness of sprinkler systems was 99% across all building types.
6. A further measure of effectiveness is obtained by comparing average areas of damage from fires in residential buildings with sprinklers and from all fires in residential buildings. Fires in dwellings where sprinkler systems operated had an average area of fire damage of under 4 sq. m. This compares to an average area of fire damage of 18 to 21 sq. m. for all dwelling fires in England between 2011/12 and 2015/161 .
7. The average area of fire damage in a non-residential building where a sprinkler system was present² was 30 sq. m. which is half the average area of fire damage of in comparable “other building” fires in England between 2011/12 and 2015/163
8. There were 1316 fires recorded in the data where a sprinkler system was present but did not operate. Information on the reasons why the sprinkler system did not operate was recorded for 879 fires. In 370 of these cases the fire was in an area not covered by the system; in 115 cases the fire was too small to activate the system; in

18 cases the system was turned off; and in 13 cases the fire was extinguished before activation. Only 57 cases out of 879 were identified where the system could have been expected to work but did not. This indicates that the operational reliability of the systems was 94%.

9. In brief, this extensive data analysis shows that sprinklers are highly reliable and effective. They work as intended in 94% of cases and control or extinguish fires in 99% of cases.

The full report produced for the National Fire Sprinkler Network and the National Fire Chiefs Council can be found at:

https://www.nationalfirechiefs.org.uk/write/MediaUploads/NFCC%20Guidance%20publications/Protection/Optimal_Sprinkler_Report.pdf