

Fire Safety & Technology Bulletin – October 2008

Editorial

Sprinkler Requirements

Last month the 2009 edition of the International Residential Code (IRC) was approved, and it will require the installation of sprinklers in new 1 and 2 family dwellings and in new townhouses in the US (*see FS&TB Sep. 08*). The 2006 editions of the NFPA Life Safety Code (NFPA 101) and NFPA Building Construction and Safety Code (NFPA 5000) already require that all new 1 and 2 family dwellings be sprinklered.

It is likely that every jurisdiction in the US will eventually adopt one of these codes. This would mean that, once one of the codes is adopted by a jurisdiction all new residential construction will have to be sprinklered, unless the jurisdiction specifically excludes the appropriate section from local applicability (something they are entitled to do).

This represents, at least in theory, a quantum change in the approach to new residential construction. It needs to be pointed out, however, that most fires and fire fatalities occur in existing homes, so that these new requirements will take some time to have major effects.

There is abundant evidence that sprinklers are very effective in both suppressing fires and saving lives, if they operate properly. The evidence is less clear about the reliability of their use, but various studies show reliability ranges of between 85% and 92%, meaning that they are generally effective.

Two additional concerns have been expressed by opponents of mandating sprinkler coverage: increased construction costs and potential lack of reliable water sources.

The National Association of State Fire Marshals (NASFM), a staunch supporter of mandatory sprinklers, has recently made some cost estimates. They estimate that multipurpose sprinkler systems, permitted by the residential NFPA 13D standard, will cost, for “affordable homes” in the 90-110 m² (1,000 to 1,200 ft²) range an additional \$0.25 to 0.30 per ft², while the sprinkler installation would require less than 8 hours of additional labor. With respect to the cost of sprinklers in larger homes, they estimate a cost of \$3,000 for a \$300,000 home. Opponents of mandatory sprinklers state that these cost estimates are low, but this will depend on local conditions.

The issue of reliable water sources can clearly be a concern in rural areas as well as in remote areas. In some of these areas, requiring the use of sprinklers will also involve additional cost because of the need to dig private wells (which can be of two types: deep or shallow) and/or use private pumps and special tanks. NASFM estimates that an additional tank capacity of 750-1150 liters (200-300 gallons) would be required. The lack of a reliable water supply is a particular concern in earthquake-prone areas, where the water supply would potentially fail at the time when fires are most likely to occur.

In reality, the key issue associated with the mandate for sprinkler use is not whether it is a good idea to have sprinklers: undoubtedly it is! The concern that is in the minds of many fire safety experts is the issue of sprinkler trade-offs.

Sprinklers are active fire protection systems that come into effect if everything works properly, i.e. if there is good water supply, proper system installation, open valves, and so on. Sprinkler trade-offs are the regulatory requirements that permit lower passive fire safety if the compartment or building is sprinklered.

Codes are full trade-offs. Usually as soon as a compartment is sprinklered, the fire safety requirement can be lowered or eliminated. This includes flame spread (or heat release) of interior finish and fire resistance rating of separations. This has the potential to come back as a problem because more often than not fires occur in buildings that are improperly maintained, for one reason or another, and are most likely not to keep up proper maintenance of the sprinkler system.

In the case of fire codes (or life safety codes) or some specific occupancy codes (such as ones for ships) the sprinkler trade-offs can apply to contents also (including upholstered furniture or mattresses). The concern here is that, in some cases, only certain rooms are sprinklered and the unsafe items can be moved to the unsprinklered areas, with potentially disastrous consequences. The only reason to have sprinkler trade-offs is as a cost-saving exercise!

In summary, anyone interested in fire safety should support the use of sprinklers and welcome its expansion. However, vigilance is needed to minimize the incorporation into requirements of sprinkler trade-offs.

Marcelo M. Hirschler