AGENDA Thursday, March 14, 2013

Sprinkler Task Force 9:00 AM

Carnegie Town Hall

235 W. 10th St.

NOTE: There will be no video recording of this meeting.

1. Call To Order

2. Introductions

3. Future Meeting Dates/Topics
4. Sprinklers 101
5. Open Discussion

6. Adjournment

Date: 2013-03-14
SIRE Meeting ID: 1903
Meeting Type: Committee Meeting
Subtype: Sprinkler Task Force
YouTube:https://youtu.be/JNstsZy0Bro
Agenda Item: Not Assigned
Item ID: 66977

Apartment Sprinkler Handbook

The fire problem in the U.S. is overwhelmingly a residential fire problem. According to the National Fire Protection Association's (NFPA) latest U.S. data, 92 percent of all civilian structure fire deaths resulted from residential structure fires. Quite clearly, any improvements in overall fire safety must be improvements in *residential* fire safety, and no strategy has as much documented life safety effectiveness as installed fire sprinkler systems.

With respect to life safety, the need for a sprinkler system is dependent on the occupant's ability to respond to a fire. Multifamily residential occupancies contain persons who may require assistance to evacuate such as infants, the elderly, people with disabilities, or people who are simply asleep in a fire emergency. Additionally, an occupant in a multifamily structure has little control of the negligence of a neighbor in the building.

History

Prior to 1988, there was no national standard for sprinklers in apartments. There was a local amendment that dated back to the '70s which required sprinklers in apartments that were in excess of 20,000 square feet and four or more stories in height.

The 1988 UBC required sprinklers in apartments that were three or more stories in height and contained more than 15 dwelling units, which was amended to the previous ordinance of 20,000 square feet and four or more stories. That provision was amended back to the '70s local amendment for the adoption of the 1988 and the 1991 UBC.

The 1994 UBC adopted the provision to require sprinklers based on apartments three or more stories in height and containing more than 15 units.

The 2000 IBC changed the requirement of three or more stories and greater than 16 units to three or more levels including basements, which was adopted with no local modification.

The 2003 IBC changed to require sprinklers in all apartments, which was amended locally to three levels and greater than 16 units, which was modified in the 2006 and the 2009 IBC code adoptions.

Over the last ten years, there have been zero fire deaths in sprinkled buildings. Additionally, property loss in sprinkled buildings has been minimal. Sprinklers operated in ". . . 98 percent of the apartment fires in 1999—2002 in which the fire was large enough to activate them."

Standards for Sprinkler Installation

NFPA 13R vs. NFPA 13. Since the '80s the minimum required automatic fire extinguishing system is an NFPA 13R system which is designed to protect lives as compared to an

NFPA 13 which additionally is designed to protect property. NFPA 13R covers those areas that are exposed to an interior fire exposure and does not cover closets, rooms less than 55 square feet, attic areas, and interstitial floor-ceiling spaces. The intent back in the ’80s was to have a notional model standard for residential sprinklers that is less expensive than a full system.

The IBC promotes sprinkler trade-offs on the basis of cost savings and the economic incentive to install active fire protection. According to the IBC, sprinklers:

- **Increase openings due to location on property.**
- **Eliminate fire-resistive barriers for laundry rooms and boiler rooms—incidental-use areas.**
- **Increase allowable areas.**
- **Increase allowable heights.**
- **Reduce finish classifications.**
- **Allow certain levels of hazardous materials without fire separation.**
- **Increase allowable travel distances.**
- **Eliminate requirements for smoke barriers at areas of refuge.**
- **Permit reductions in stair and exit widths that have been eliminated locally.**
- **Cancel the requirement for fire dampers where penetrating a one-hour fire partition or fire barrier.**
- **Eliminate the heat detector in current fire alarm systems.**
- **Eliminate draft stops in attics.**
- **Delete fire ratings of otherwise one-hour attics and crawl spaces for storage of combustibles.**

Comparative Analysis

Since 2004, there have been 3,866 apartment units that have been constructed in the city of Sioux Falls. By using an average of the last three years, half have sprinklers and the other half do not. Therefore, since 2003, there have been 1,933 apartments that could have had the life safety that sprinklers provide. That number will continue to grow with each code cycle that maintains the local amendment.

In the meantime, after three code cycles, there are very few municipalities that have amended the sprinkler requirement for apartments. The IBC is adopted in every major jurisdiction and within all 50 states.

Mitchell, Aberdeen, Brookings, and Yankton have maintained the 16 or more units and 3 stories. Watertown requires sprinklers in more than 8 units in height and greater than 2 levels in height. Rapid City, Spearfish, Pierre, and Huron have not modified the Group R sprinkler section.

Fires Today "Burn Faster and Kill Quicker" Research conducted by the National Institute of Standards and Technology (NIST) has shown that home fires become deadly in as few as three minutes. "Fires today seem to burn faster and kill quicker because the contents of modern homes (such as furnishings) can burn faster and more intensely," says NIST Senior Engineer Richard Bukowski, P.E.

Frequently Asked Questions

Q: How long have fire sprinklers been in existence?
A: Automatic fire sprinklers have been in use since 1874.

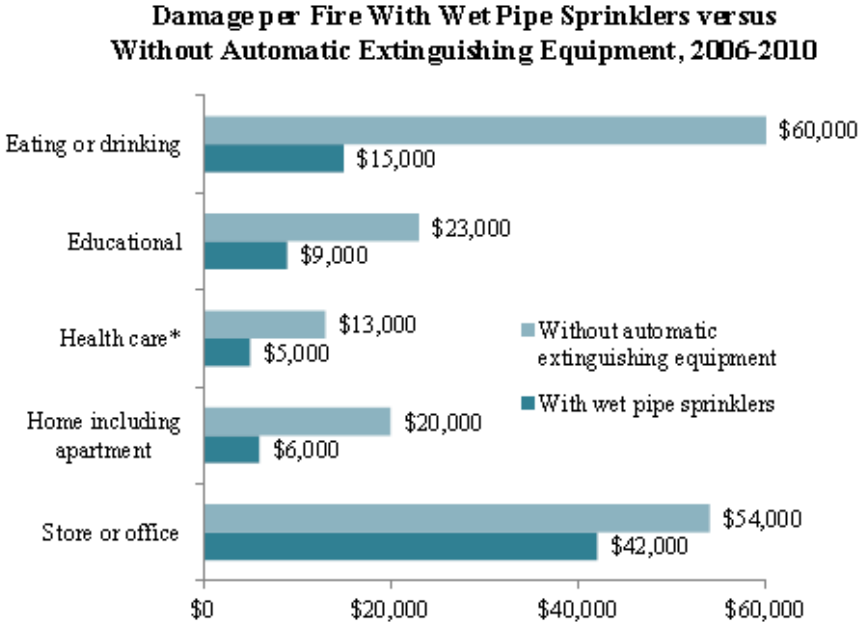
Q: How effective are fire sprinklers?
A: The National Fire Protection Association (NFPA) has no record of a fire killing more than two people in a completely sprinklered public assembly, educational, institutional, or residential building where the system was working properly. In cases where fatalities occur in a building equipped with fire sprinklers, the deceased are almost always in intimate contact with the fire and were burned severely before the sprinkler activated (i.e., smoking in bed, explosions, etc.). Sprinklers typically reduce chances of dying in a fire, and the average property loss is reduced by one-half to two-thirds in any kind of property where they are used.

Q: Do any studies exist that document the effectiveness of fire sprinklers?
A: "U.S. Experience with Sprinklers" (September, 2001) by Kimberly Rohr provides an excellent study of the use and experience of automatic fire sprinklers. This report was produced by and is available from the National Fire Protection Association. (See www.nfpa.org/Research/nfpafactsheets/sprinkler/sprinkler.asp). Residential sprinklers have been required by the city of Scottsdale, Arizona, for over 15 years. A comprehensive report on its experience with residential fire sprinkler systems is available from the Home Fire Sprinkler Coalition at www.homefiresprinkler.org/hfsc.html

Q: Are fire sprinklers prone to accidental discharge?
A: The odds of a sprinkler activation due to a manufacturing defect are about 1 in 16 million. Fire sprinklers have a long history of proven dependability and reliability. Although sprinklers can be damaged and activated through intentional or accidental abuse, this is rare. Sprinkler piping is no more likely to leak than existing plumbing piping in every home and building.

Q: Doesn't fire sprinkler activation result in a lot of water damage?
A: No, fire sprinklers are designed to control a fire in its early stages where less water is required. Most fires are completely controlled with the activation of only one or two sprinklers. Fire hoses, on average, use more than eight times the water that sprinklers do to contain a fire. According to the Scottsdale Report, a residential fire sprinkler uses, on average, 341 gallons of

water to control a fire. Firefighters, on average, use 2,935 gallons. Reduced water damage is a major source of savings.



Q: How much does a fire sprinkler system cost?
A: The cost per square foot can vary widely due to great differences in installation requirements, so this question can be answered effectively only after a review of the occupancy. A system installed in a warm-climate area with ample water supply and good water pressure will cost much less than a system installed in a cold-climate area with poor water pressure or an undependable/inadequate water supply. New installations will cost much less than retrofit installations. Generally speaking, most new construction will be in the range of $1-$2/sq. ft., while retrofits will be in the range of $2-$3/sq. ft.

Q: How many sprinklers are installed each year?
A: For the past five years, domestic sprinkler shipments have averaged about 38 million sprinklers per year.

Q: Why are fire sprinklers required in some areas and not in others? Why are there variations in sprinkler requirements?
A: Fire sprinkler systems are installed in accordance with consensus standards developed through the National Fire Protection Association (NFPA). These standards are very specific in defining how sprinklers are to be installed in different types of occupancies and different hazard classifications. The three primary standards that define the installation requirements are NFPA-13 (Installation of Sprinkler Systems), NFPA-13R (Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height), and NFPA-13D (Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes). The standards adopted by NFPA represent the best recommended practices, but the standards by themselves are not “law.” Development of the consensus is a dynamic process and the

standard is changed to reflect new technologies, science, and experience. Every three years a new version of the standard is issued that contains changes and updates.

The requirements for the installation of fire sprinklers are adopted as law by state or local jurisdictions as a part of their building code or local ordinance. At times, jurisdictions may vary some of the requirements contained in the NFPA documents. Differences in requirements will vary from city to city based on local changes made to the NFPA standards or the year of the standard adopted by the local jurisdiction. For example, if one city adopts the 1999 NFPA 13 standard and another city adopts the 2002 issue of the same standard, there will be differences.

Myth 1: "Water damage from a sprinkler system will be more extensive than fire damage."

Fact: Water damage from a home sprinkler system will be much less severe than the damage caused by water from firefighting hose lines or smoke and fire damage if the fire goes unabated. Quick-response sprinklers release 8 to 24 gallons of water per minute compared to 50 to 125 gallons per minute released by a fire hose.

Myth 2: "When a fire occurs, every sprinkler head goes off."

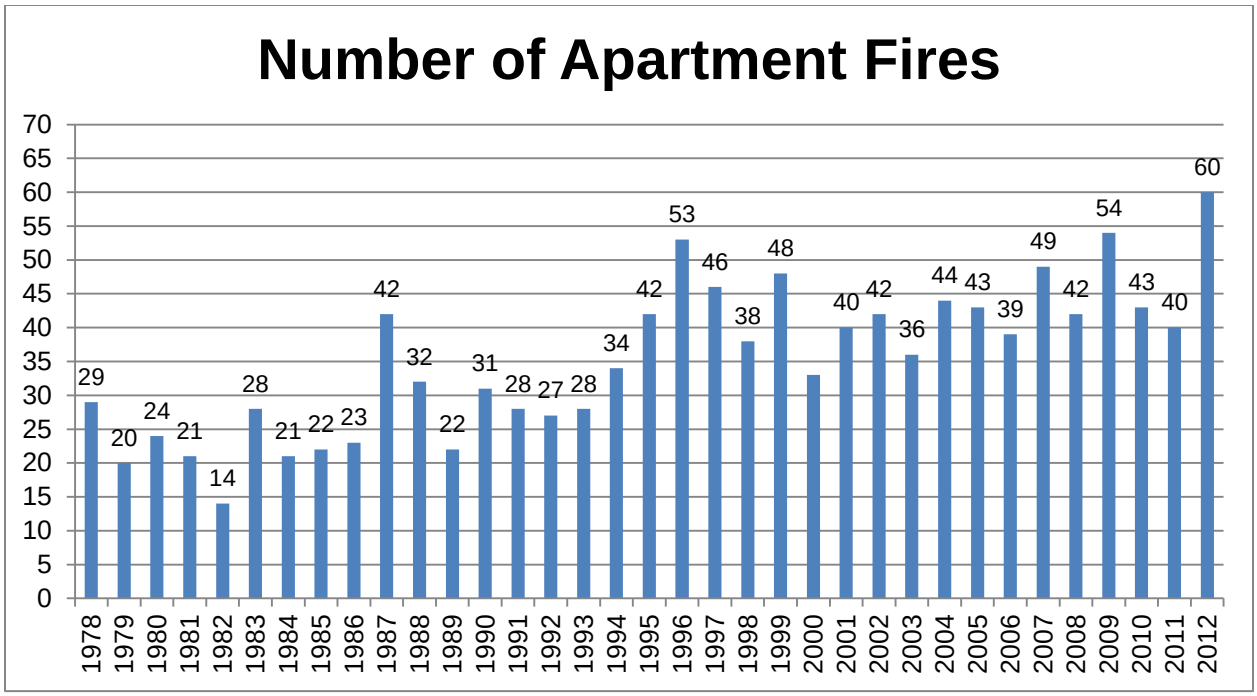
Fact: Sprinkler heads are individually activated by fire. Residential fires are usually controlled with one sprinkler head. Ninety percent of all fires are controlled with six or fewer heads, and a study conducted in Australia and New Zealand covering 82 years of automatic sprinkler use found that 82 percent of the fires that occurred were controlled by two or fewer sprinklers.

Myth 3: "A smoke detector provides enough protection."

Fact: Smoke detectors save lives by providing a warning system but can do nothing to extinguish a growing fire or protect those physically unable to escape on their own, such as the elderly or small children. Too often, battery-operated smoke detectors fail to function because the batteries are dead or have been removed. As the percent of homes in America that were "protected" with smoke detectors increased from zero to more than 70 percent, the number of fire deaths in homes did not significantly decrease.

Myth 4: "Sprinklers are designed to protect property, but are not effective for life safety."

Fact: Sprinklers provide a high level of life safety. Statistics demonstrate that there has never been any multiple loss of life in a building equipped with fire sprinklers. Property losses are 85 percent less in residences with fire sprinklers compared to those without sprinklers. The combination of automatic sprinklers and early warning systems in all buildings and residences could reduce overall injuries, loss of life, and property damage by at least 50 percent.



Sioux Falls Fire Rescue Statistics from NFPA Annual Report, 1978-2012

Sources of Information on Fire Sprinklers:

American Fire Sprinkler Association
National Fire Protection Association
U. S. Fire Administration
Home Fire Sprinkler Coalition
Residential Fire Safety Institute