SUPPLEMENT 2

Scottsdale Residential Sprinkler Ordinance Data Review

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Editor’s Note: Supplement 2 provides a summary of the efforts in Scottsdale, Arizona, over the past 20 years (1986–2006) to implement the widespread use of automatic fire sprinkler protection as an effective tool to improve the emergency protection levels in that community.

In 1986, when the political leaders of Scottsdale, Arizona, approved an all-encompassing sprinkler ordinance, their hope was that this action would help reduce destruction brought about by fire. Scottsdale was indeed charting an innovative course by requiring automatic fire sprinkler protection in all new buildings, especially single-family homes. At the time, they did not foresee the tremendous impact and much larger effect their action would have on future generations of local residents. After all, at the time not many statistics were available about the positive impact of sprinklers on overall community safety and fire loss or about the effectiveness of these devices when used to help prevent the loss of life. However, a look back at the data compiled from Scottsdale’s residential sprinkler ordinance clearly shows that the work supports life safety benefits and infrastructure cost savings.

OVERVIEW

Background on Scottsdale’s Efforts

Scottsdale’s timing could not have been better. The city, a suburb of Phoenix located in the central Arizona desert, was about to face exploding growth that would push the population from slightly more than 110,000 in 1986 to almost a quarter of a million people today. With the rise in population came the construction of more commercial, single-family, and multi-family housing than the city had ever seen.

Community Accomplishments

In 2006, 20 years after the ordinance was passed, more than 75 percent of all commercial buildings in Scottsdale had automatic sprinkler protection. In the northern part of the city, nearly 97 percent of commercial buildings had fire sprinklers. The number of single-family houses with sprinklers had grown to more than 43,000 homes, which was 54 percent of the total housing stock. In addition, 60 percent of the multi-family housing units had installed automatic fire sprinkler systems. Citywide, 56 percent of all the community’s dwelling units were protected with automatic fire sprinklers.

IMPACT ON COMMUNITY SAFETY

Fifteen years after the ordinance was passed, the facts, experiences, and overall impact of this visionary local legislation were dramatic. Some of the major benefits have been a reduction in the following:

- Loss of life
- Fire loss
- Water damage
- Infrastructure costs
Loss of Life Reduction

Sprinkler activations have cut in half the number of people that would have perished in fires. At least 13 people in this community have been saved by automatic sprinkler activations. During the same time period, 13 people died from fires in nonsprinklered buildings (all in residential occupancies).

Fire Loss Reduction

The city’s annual fire loss consistently averages about one-third to one-half of the national average for communities of similar size in the United States.

Water Damage Reduction

One or two sprinklers controlled or extinguished the fire in 92 percent of the incidents. This statistic proves that a small amount of water applied early during a fire incident is more effective than the much larger amounts that are typically flowed by fire fighters. There was less water damage in sprinklered homes, with an average of 341 gallons of water/fire discharged from the sprinkler system, compared with an average of 2,935 gallons of water/fire that would have been released by fire fighter hoses.

Infrastructure Cost Savings

It has been estimated that the city will save approximately $7.5 million in future infrastructure cost for the water distribution system. This savings is primarily due to the difference in the legislatively required fire flows between sprinkler protected and nonprotected structures, which in many cases resulted in smaller overall water mains and increased fire hydrant spacing.

RESIDENTIAL AND COMMERCIAL OCCUPANCY SAFETY

Scottsdale is typical of many cities its size in the United States. A good mix of tourism, business, and residents keeps this city growing and vibrant. There are a wide variety of commercial and shopping sites, in addition to a downtown area filled with wooden structures built in the early 1900s. The city also has a busy executive airport, which is surrounded by businesses, many of which use hazardous materials. Homes range in size from the typical housing tract single-family homes to mansion-size estates, which are located in the foothills of the local mountain range.

The types of fire are just as typical. The primary causes of accidental fire in Scottsdale include cooking, smoking, electrical, and more recently, the increased use of candles. During the past 20 years, fire sprinklers have successfully controlled all of these fire types in a broad range of occupancies.

From January 1, 1986, through January 1, 2001, Scottsdale experienced 199 working fires in sprinklered buildings. Of those incidents, 102 were in commercial buildings, 48 in multi-family residences, and 49 in single-family homes. The average loss per incident was $3,534, compared with $39,672 average loss in a nonsprinklered building.

Success in Residential Occupancies

During that time period, there were 598 home fires, 49 in homes protected with fire sprinklers. The average loss per incident in the sprinklered homes was $2,166, compared with $45,019 in the nonsprinklered homes.

Real World Example

In December 2003, Jim McCollister and his family were ready for the holidays. They kept their live Christmas tree watered, decorated it with low-heat lights, and made sure to turn them off when they went to bed. Despite these precautions, the tree still caught fire early one morning, a few days before Christmas. But the McCollisters’ residence was different from most of the homes in the United States. Their house had automatic fire sprinklers. Because these sprinklers controlled the fire, they were able to survive a potentially life-threatening incident with their daughter, two puppies, a cat, and two birds. The McCollister home sustained only a fraction of the normal fire damage thanks to this built-in protection.

“It [the fire] was just out of control in two or three minutes,” Mr. McCollister was quoted saying in a local newspaper. “Except for those fire sprinklers, we would be looking at a vacant lot.”

Success in Commercial Occupancies

Sprinkler activations in commercial buildings are one of the most telling ways to evaluate the potential for this type of system to make a broad impact on a community’s fire loss.

The type of positive outcome illustrated in the example below is a normal result, not the exception, in Scottsdale. Of the 102 working fires that occurred in commercial sprinklered buildings during the first 15 years of the ordinance, 91 percent were controlled with two or fewer sprinklers. The average loss per sprinkler incident was $2,698, com-
pared with the average loss per nonsprinklered incident of $23,247.

Real World Example

In June 1988, an ambulance responded to the Princess Resort for a minor medical emergency. The crew parked the ambulance in the underground parking and delivery area of the more than 186,000 square foot resort. After the medical incident was stabilized, the fire crews returned to quarters. However, when the medical crew returned to the ambulance, they found that a fuel leak had started a fire in the engine compartment. When the fire crews responded back to the scene, they found a rapidly growing, well-involved vehicle fire that was being fed by the oxygen carried on the unit. As crews began suppression activities, the ambulance exploded. Five sprinklers in the area activated, controlled the extension of the fire, and provided major assistance to fire suppression crews. Total loss was $50,000. Total potential loss was $50 million. The resort and its guests were allowed to resume daily operations with only a short interruption in the normal routine.

OBSTACLES AND IMPACT ON DEVELOPMENT

The installation impact and direct costs of the system are no longer major obstructions to acquiring this built-in protection. In residential properties, several design and technical improvements have allowed the installation cost to average between $0.55 and $0.75 per square foot for typical homes. This cost is usually less than 1 percent of the total cost of a new home and has not caused a negative impact on the development or construction of new homes in the community.

In fact, city planners and fire officials have worked closely with the development community and allowed the builders of fully sprinkled projects design freedoms such as fewer required fire hydrants, adjusted fire flows, reduced emergency access, narrower streets, and longer cul-de-sacs.

The report “Fire and Emergency Medical Services Assessment – Scottsdale, Arizona” offers a comprehensive review of the city’s fire and emergency medical services. The report concludes the following:

The cornerstone of the [Scottsdale] fire prevention program is the installation of fire sprinkler systems in all commercial and residential units. This has controlled, and will continue to control, the amount of fire risk in the community.

An objective evaluation of the actual impact over the past 20 years has proven this prediction to be correct.

CONCLUSION

Most fire service professionals agree that there is no single approach or device that can provide all the answers for a community when it evaluates and designs its emergency service needs. However, the proactive use of built-in, automatic fire protection has the potential to make a tremendous impact on a community’s ability to address the fire problem. The effectiveness of properly designed and installed automatic sprinkler protection allows responding fire units to return to service quickly and maintain a high level of availability for the wide variety of emergency services that are being provided by today’s fire service. Recognition of this fact is receiving much broader acceptance on a national and international basis. In fact, a recent document produced by the United States Fire Administration (USFA), “National Residential Fire Sprinkler Initiative,” states the following:

The United States Fire Administration advocates the use of automatic fire sprinklers to save lives, reduce injuries, and protect property. Based on an identified history of success, this technology should be employed in all residential occupancies.

The record and experiences of the past 20 years in Scottsdale make it clear that the widespread use of automatic fire sprinkler protection is no longer an experiment, but a tremendously effective tool that can be used to help improve the emergency protection levels in any community.

REFERENCES CITED

“Fire and Emergency Medical Services Assessment – Scottsdale, Arizona,” University City Science Center, 171 Elden Street, Suite 214, Herndon, VA 22070.
