



Case Studies for Sprinklers

Bucks County, PA

The Home Fire Sprinkler Coalition (HSFC) is working with six (6) municipalities in Central Bucks County to study the impact of implemented residential sprinkler ordinances during 1989, 1995, 1999, and 2000. Several lives have been directly saved, and perhaps other deaths and injuries to occupants and firefighters have been averted as fires in sprinklered homes have been kept small, while numerous fire deaths have occurred in unsprinklered homes in other communities throughout the County. Damage to structures and contents from fires in unsprinklered homes in these six (6) municipalities is more than twelve (12) times the damage that was experienced in the fires that occurred in the sprinklered homes. Almost eighteen (18) times as much water was needed to extinguish fires in unsprinklered homes versus sprinklered homes. The cost to install sprinklers in new homes where public water was not provided ranged from \$1.23 to \$2.71 per square foot, with costs in one development where public water was provided being \$1.10 or less per square foot. Two similar townhouse developments constructed immediately next to each other during the same period in the same municipality by 2 different builders showed little market price difference between the sprinklered and unsprinklered homes.

Approximately 7,000 1-and 2-family dwellings have been sprinklered in Bucks County, PA, in areas both with and without public water. In just three of the six municipalities in the 1st part of the study, over \$268 million has been invested in constructing new homes in the 15 years since their residential sprinkler ordinances were adopted. Data consistently demonstrates around \$2 per square foot for rural installations with pump and tank, and around \$1 per square foot for systems tied to public water. Recent data shows that sprinkler costs in municipality with public water are about 1% of the construction cost of the homes. Fire losses in sprinklered homes are \$20,000 or less, with losses for unsprinklered homes averaging in the \$200,000-\$300,000 range.

Below is a comparison of similar Bucks County Fires with dissimilar outcomes:

Fire In Unsprinklered Home Kills 1, Fire In Sprinklered Home Saves 1. In January 2008 a 53 year old resident called 911 to report that the bed she was in was on fire and she could not get out of it. Police arrived at the residence within 2 minutes of the resident dialing 911, and initial arriving firefighters began rescue attempts 2-3 minutes after that. Unfortunately, firefighters were initially driven back by fire conditions and the woman perished with the home suffering tens, if not hundreds of thousands of dollars in damage. Firefighters spent hours on the scene, and the investigation and addressing of media issues lasted for weeks.

A very similar incident occurred a few months before this fire, and only a few miles away. In August 2007, a fire occurred in a township home that had a sprinkler ordinance. The occupant, a 74 year old woman with limited mobility, was asleep in bed. Her bedding and the padded headboard began to burn. The fire produced enough heat (155 degrees F at the ceiling) to activate a single sprinkler head of the residential sprinkler installed in the home.



Case Studies for Sprinklers (continued)

The water spray woke her up. She was scared and wet, but unhurt. The fire was extinguished within an estimated 30 seconds after the sprinkler activated. There was minor cosmetic damage to the home, but with some new drywall, carpet and paint, the woman was back in her home in two weeks. There was no structural damage or lingering odors in the home. Firefighters cleared the scene in well under 1 hour.

These incidents occurred a few miles apart and shared many similar pre-fire conditions. In both cases:

- the fires occurred during daytime hours
- the occupants lived alone
- the occupants had medical conditions that impaired their movement ability
- age of the home had no impact on the origin or spread of the fires

While the pre-fire conditions were very similar, there was one very different condition that drastically altered the results, a residential sprinkler system. There is no question that the residential sprinkler system saved the life of the occupant.

On Christmas Day, 2009, a residential sprinkler successfully extinguished a fire using less than 300 gallons of water in under 7 minutes as the fire began to spread up the walls from the initial point of origin. The home was built in 2005. The homeowners, who were preparing for their holiday celebration in the early afternoon, were only alerted to the fire by the activation of the sprinkler alarm in the house. They discovered an active fire and evacuated the home safely. Upon the arrival of the fire department, the fire was out – with the house suffering a total of \$12,000 in damages. There were no fire hydrants within more than a mile from the house, and the fire department estimates that damages would have been at least 15 times greater if the home was not equipped with residential sprinklers. Firefighters cleared the scene, and the home's occupants returned to their holiday celebration, in 33 minutes from the time the 911 call was received.

In August 2010, a late afternoon fire occurred in a township home that was built approximately 6 years prior to their adoption of a residential sprinkler ordinance. Heavy smoke could be seen from the neighborhood at the time firefighters were initially dispatched, and heavy fire was showing on arrival of the first fire officers approximately 6 minutes later. The Buckingham fire required over 65,000 gallons of water to extinguish, and resulted in an estimated \$1.5 Million in damages. Fire spread quickly throughout the house and firefighters were hampered by loss of continuity of the tanked water supply to the fireground. Firefighters were on the scene for well over 6 hours. These incidents occurred a few miles apart and shared many similar pre-fire conditions. In both cases:



Case Studies for Sprinklers (continued)

- the fires occurred in the daytime while residents were home
- there were similar response times by firefighters to both homes
- the fires occurred in areas not provided with fire hydrants, requiring the fire department to tank water to the scene
- the fires occurred in homes of a similar size, built 12 years apart
- age of the home had no impact on the origin or spread of the fires

In just this one incident, residential sprinklers saved perhaps hundreds of man hours of effort by the fire department (firefighters were on the scene of the fire for over 6 hours, and had to return later to extinguish smoldering hot spots), at least \$168,000 in damages, and as much as 64,000 gallons of water along with the equipment/fuel needed to apply that water.

Source; Greg Jakubowski, P.E., CSP, FSFPE, Principal and Chief Engineer, Fire Planning Associates