

SPRINKLER SUCCESSES

**One-Stop Data Shop
Fire Analysis and Research Division
National Fire Protection Association**



**National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471
www.nfpa.org**

APARTMENTS

Sprinkler extinguishes apartment building fire – New Jersey

A heat detector activated a single sprinkler and alerted the fire department and the occupants of a six-story apartment building to a fire in the structure's boiler and trash compactor room.

The apartment building, which was 116 feet (35 meters) long and 65 feet (19 meters) wide, was of fire-resistive construction. It contained 35 units and was occupied at the time of the fire. There were smoke and heat detectors in the common area, hallways, laundry rooms, recycling rooms, and boiler room. A wet-pipe sprinkler system provided limited coverage to the trash chute.

Before the fire began, several dumpsters had been removed from the compactor room, and trash apparently fell out during the transfer, coming to rest near the two boilers. Radiant heat from the boilers ignited the trash, which burned until the sprinkler extinguished the fire.

Firefighters who responded to the 10:43 a.m. call opened the doors, which was sufficient to ventilate the room, and shut the sprinkler off once they confirmed the fire was out. The building, valued at \$1.5 million, sustained a \$2,000 loss; the contents, valued at an estimated \$500,000, were not damaged. There were no injuries.

Kenneth J. Tremblay. 2005. Firewatch. *NFPA Journal*, March/April, 22, 24.

Sprinkler extinguishes apartment fire - New Hampshire

A residential sprinkler system extinguished an early-morning fire in an apartment building, allowing occupants, who had been awakened by the building's fire detection system, to escape uninjured as smoke filled their first-floor apartment. A fire department officer later noted "at least one occupant had to pass the fire in order to egress from the apartment and was only able to do so because of the sprinkler activation."

The four-story building had brick exterior walls and a wooden roof with an asphalt covering. It covered approximately 11,000 square feet (1,022 square meters) and had a monitored sprinkler system.

Firefighters responding to the 6:05 a.m. alarm found heavy smoke in the first-floor unit when they arrived, but the sprinkler, which was still operating, confined the fire to the kitchen. The smoke detection system alerted residents before the sprinkler operated.

Investigators determined that the fire started when a stuffed animal in a wicker-shelving unit in the kitchen ignited. The toy was lying on top of a cell phone that had been plugged into an electric charging unit for 4 or 5 days. The equipment, overheated and ignited the toy. The fire spread up the wicker shelving to other items before the sprinkler activated. Value of the building and its contents wasn't reported, but losses were estimated at less than \$1,000.

Kenneth J. Tremblay. 2004. Firewatch. *NFPA Journal*, July/August, 17.

Sprinkler extinguishes unattended cooking fire – Washington

Cooking oil left heating unattended in a pan overheated, starting a fire that spread to cabinets above the stovetop. A sprinkler in the kitchen and another in an adjacent hallway operated and extinguished it, limiting fire damage to the area of origin.

The fire occurred in a third-floor apartment in a three-story, wood-framed apartment building protected by a wet-pipe automatic residential sprinkler system. The building also had single-station smoke detectors, but their location and coverage weren't reported.

One of the apartment's occupants had put a pan of cooking oil on the stove while making dinner and left the kitchen. When the oil ignited, the fire alarm activated, alerting the apartment complex's caretaker, who investigated and saw smoke around the apartment's balcony. The caretaker reported that the fire, which filled the apartment with smoke, had been extinguished, but that the stove was still on. He shut off the burner and evacuated the building's occupants. By the time firefighters responded to the 7:53 p.m. call, the fire had been extinguished and the occupants had been safely evacuated.

Investigators determined that the heat from the burning oil damaged an overhead ventilation hood and the ceiling panels, causing the panels to drop to the floor.

Damage to the structure was estimated at \$10,000 and to the building's contents at \$500. No one was injured.

Kenneth J. Tremblay. 2004. Firewatch. *NFPA Journal*, May/June, 18.

Fire sprinkler extinguishes cooking fire - Washington

A single fire sprinkler limited fire losses when an occupant of an apartment in a three-story building inadvertently turned the burner on under a pot of cooking oil and left the apartment. The building's monitored water-flow detector system activated the building's fire alarm and notified the fire department.

The wood-frame building, which measured 130 feet (40 meters) by 50 feet (15 meters), contained 12 two- and three-bedroom units. Manual pull stations and smoke alarms had been installed in compliance with a local ordinance, and emergency plans had been distributed to residents. Although he wasn't required to, the building's owner had also installed a residential wet-pipe fire-sprinkler system that provided full coverage. A central station alarm company monitored the alarms and fire sprinklers.

The fire started when the unattended oil heated to its ignition temperature and ignited, and spread from the stove to the area immediately above it.

The central station alarm company notified the fire department at 2:03 p.m., but by the time firefighters arrived, the apartment's fire sprinkler had extinguished the blaze.

Damage to the building, valued at \$1.25 million, and its contents, valued at \$50,000, were approximately \$15,000 and \$2,000, respectively. Much of the damage was attributed to water damage.

Kenneth J. Tremblay. 2004. Firewatch. *NFPA Journal*, January/February, 15.

Fire sprinkler controls apartment building fire - New Jersey

A single fire sprinkler controlled an incendiary fire in a trash room on the third floor of a six-story apartment building, alerting the fire department, which responded within a minute of the alarm.

The steel-framed apartment building had concrete block walls and a brick façade. Hardwired and interconnected heat and smoke alarms were monitored by a central station, and an automatic wet-pipe fire sprinkler system provided complete coverage.

The fire began when someone intentionally ignited seasonal decorations in the trash room using an undetermined heat source. As police and firefighters evacuated the residents, firefighters found that a single fire sprinkler had confined the fire to the trash room and extinguished it. No one was injured, and damage to the building's contents was limited to \$500.

Kenneth J. Tremblay. 2003. Firewatch. *NFPA Journal*, September/October, 16.

Unattended candle fire damages apartment - Massachusetts

An unattended candle left in an entertainment center in the living room of a fourth-floor apartment ignited the room's furniture. Fortunately, a sprinkler extinguished the fire as it began to spread up the wall.

The five-story building, originally a mill, had a hard-wired fire detection system and wet-pipe sprinkler system, both connected to the municipal fire alarm system.

Firefighters received the alarm at 3:50 p.m. and arrived three minutes later to find that the sprinkler system had activated. Fire companies responding to the fourth floor reported smoke in the hallway and the sound of water running in the locked apartment. By the time they entered the unit, the sprinkler had extinguished the blaze.

The apartment's resident told investigators that she'd come home from work during a break to do some cooking and lit the candle to mask the odor. When she left to go back to work, she forgot to extinguish the candle, the heat from which eventually broke the glass candleholder. Molten wax dripping down the front and back of the entertainment center ignited the cardboard covering its back, and the fire spread up the wall until the sprinkler extinguished it.

Smoke damage in the unit of origin and common areas of the fourth floor, and fire damage to the entertainment center, its contents, and the wall behind it were estimated at \$10,000. There were no injuries.

Kenneth J. Tremblay. 2003. Firewatch. *NFPA Journal*, May/June, 16.

Sprinklers control fire - Washington

After seeing smoke coming from a second-floor dryer vent of a three-story apartment building, a police patrolman alerted the building's occupants and notified the fire department at 10:38 p.m. He then retrieved the portable fire extinguisher from his cruiser and was using it on the flames coming from the dryer's open door when a sprinkler activated. By the time firefighters arrived, the patrolman and the sprinkler system had extinguished the fire.

The 12-unit, wood-frame apartment building, one of 13 in the complex, was 135 feet (41 meters) long and 35 feet (10.6 meters) wide. Each apartment had a local smoke alarm, and there were smoke detectors and manual pull stations in the common areas. The building was also protected by a residential, wet-pipe sprinkler system, and fire extinguishers were located throughout. The detection and suppression systems were monitored by a central station alarm company, which called the fire department when the water flow alarm activated in the unit of origin.

The fire began when clothes, towels, and other items the apartment's occupant was drying ignited after the occupant went to bed. It was the fourth fire in the apartment complex the sprinkler system controlled or extinguished, and a fire department spokesman noted that, without the sprinklers, the blaze could have been serious. As it was, damage to the \$450,000 structure was estimated at just \$5,000, and damage to the apartment's contents, valued at \$20,000, came to \$2,000.

Kenneth J. Tremblay. 2003. Firewatch. *NFPA Journal*, March/April, 22-23.

Sprinkler extinguishes fire – Washington

A sprinkler extinguished an apartment fire, even though the efforts of the unit's occupant to put out the blaze had caused the flames to spread further.

The wood-frame, three-story, 12-unit apartment building was 130 feet (40 meters) long and 50 feet (5 meters) wide and had an asphalt shingle roof. Single-station smoke alarms had been installed in the bedrooms, hallway, and living room of each apartment, and the building had a sprinkler system that complied with NFPA 13R, *Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height*. The system was connected to a central station alarm company.

A third-floor resident melting paraffin wax in a small saucepan on an electric range in the kitchen left the stove unattended, and when he returned, he found the wax had ignited. He threw a glass of water at the saucepan, spreading the flames from the pan onto the stove and counter. A sprinkler 8 feet (2 meters) from the stove activated and extinguished the flames.

Firefighters responding to the 11:13 a.m. water-flow alarm found that the fire had been extinguished. Damage to the building, valued at \$1.2 million, was estimated at \$30,000. Its contents, valued at \$50,000, sustained losses of \$2,750. Water damage to units below the unit of origin accounted for a huge share of the loss, although fire and water damage would probably have been much greater if the sprinkler hadn't activated. There were no injuries.

Kenneth J. Tremblay. 2001. Firewatch. *NFPA Journal*, July/August, 23.

Sprinklers douse fourth cooking fire in two years – Washington

For the fourth time in two years, residents of a 13-building apartment complex learned the benefit of residential sprinklers. In each case, sprinklers put out fires started by careless cooking.

The two-story, six-unit apartment building was 75 feet (23 meters) long and 37 feet (11 meters) wide, covering approximately 5,781 square feet (537square meters). Built of wood framing over a concrete slab, it had an asphalt shingle roof. Single-station smoke alarms were in the bedrooms, hallways, and living areas of each unit, and a wet-pipe residential sprinkler system provided full coverage in the living areas. Portable fire extinguishers were available in the common areas, and a central station monitored all systems.

At 6:28 a.m., firefighters responded to a water flow alarm, which was followed shortly by a smoke alarm activation. Apparently, a first-floor resident had been heating oil in a frying pan on an electric stove, when the oil overheated and ignited. The man moved the pan to the sink, trying unsuccessfully to put the fire out with water from the faucet. Heat from the fire fused the overhead sprinkler, which alerted the central station and the fire department. When firefighters arrived, the sprinkler had extinguished the fire.

The building, valued at \$450,000, suffered estimated losses of \$2,000. The contents of the unit, valued at \$20,000, suffered a loss of \$200. There were no injuries. The sprinkler was credited with preventing further damage to the unit and building.

Kenneth J. Tremblay. 2000. Firewatch. *NFPA Journal*, November/December, 17.

DWELLINGS

Sprinkler protects homeless shelter - New Hampshire

A pan of oil left cooking unattended in the kitchen of a homeless shelter ignited, and the ensuing fire spread to kitchen cabinets and curtains when an occupant tried to douse the flaming pan in the sink. Fortunately, a sprinkler activated and extinguished the flames.

The shelter was located in a two-story, wood-framed building 40 feet (12 meters) long and 24 feet (7 meters) wide. The structure, which had an asphalt-shingled roof, was equipped with an automatic fire detection system and a wet-pipe automatic sprinkler system.

A shelter resident, heating the cooking oil to deep-fry some chicken, left the pan unattended, and the hot oil ignited, tripping the fire detection system. This alerted the resident, who returned to the kitchen and tried to extinguish the fire with water in the kitchen sink. A violent reaction occurred, igniting nearby curtains and an upper cabinet.

Firefighters responding to the alarm at 4:08 p.m. arrived four minutes later to discover that a sprinkler had activated and already extinguished the fire. According to the fire department report, the "sprinkler system safely extinguished this particular fire using approximately 300 gallons (1,136 liters) of water over an 8-minute period, compared to the 1,600 gallons (6,066 liters) of water the fire department would have used in the same time frame from a single hose."

Damage to the building, valued at \$12,000, was estimated at \$3,000, while damage to its contents, valued at \$20,000, was estimated at \$500. There were no injuries.

Kenneth J. Tremblay. 2004. Firewatch. *NFPA Journal*, May/June, 20, 22.

Fire sprinkler extinguishes frat house fire – Maine

A shirt carelessly thrown over a reading lamp in a college fraternity house study room ignited, and the resulting fire spread to other combustibles in the room until the heat activated a fire sprinkler, which extinguished the blaze. The room's occupants and most other students evacuated the fraternity house when the fire alarm went off.

The three-story, wood-framed fraternity house, which was 52 feet (16 meters) long and 59 feet (18 meters) wide, had an asphalt roof. Over the years, it had been renovated, and a complete-coverage smoke and fire detection system had been installed, along with a complete-coverage automatic dry-pipe sprinkler system.

The fire began in a third-floor suite made up of a bedroom and a study room, on the floor of which was a mattress. At about 1 a.m., a student who lived in the suite decided to sleep in the study room and tossed off his shirt, which landed on a desk lamp on the floor next to the mattress. About two hours later, the shirt caught fire.

As the fire spread, it activated the single fire sprinkler and woke the student in the study room and his roommate in the bedroom. The two quickly left the suite and alerted other third-floor residents.

Fire sprinkler extinguishes frat house fire – Maine (continued)

The water flow and smoke detectors on the third floor tripped the fire alarm, alerting the fire department at 3:17 a.m. Firefighters arrived within five minutes, and one crew advanced a single hose line into the house, where they discovered that the sprinkler had extinguished the fire. Other crews conducted a primary search and evacuated a few students still sleeping on the second floor.

The property, valued at \$100,600, sustained \$20,000 in damage. Its contents, valued at \$100,000, sustained a \$3,000 loss. There were no injuries.

Kenneth J. Tremblay. 2003. Firewatch. *NFPA Journal*, September/October, 16.

Sprinkler extinguishes flash fire – California

A 2-year-old child was injured when he placed an open gasoline container next to an operating natural-gas water heater. The heater's pilot light ignited the gasoline fumes in a flash fire that severely burned the child and activated a sprinkler in the garage.

The one-story, single-family, wood-frame house, which was 40 feet (12 meters) long and 75 feet (23 meters) wide, was built on a concrete slab and had an asphalt shingle roof. A wet-pipe sprinkler system had been installed, but the system wasn't monitored. There was no report of smoke alarms.

An occupant called 911, and the father rescued the burned boy from the garage as a single sprinkler extinguished the fire. The toddler, who suffered burns to 80 percent of his body, and his father, who had burns on both arms, were taken to the hospital. Property loss was estimated at \$100.

Kenneth J. Tremblay. 2002. Firewatch. *NFPA Journal*, November/December, 21.

Residential sprinkler saves home – Washington

A residential sprinkler system in a single-family home under renovation proved its value when it extinguished a fire started by a cigarette in a waste barrel in the garage. Only the debris and the plastic barrel in which the fire started were damaged by fire.

Investigators determined that the fire ignited after the construction workers had left for the day. Although the property wasn't yet occupied, a residential sprinkler system had already been installed in the 4,200-square-foot (390-square-meter) house following the requirements of NFPA 13D, *Installation of Sprinkler Systems in One-and Two-Family Dwellings and Manufactured Homes*. Upon the fire department's recommendation, the homeowner had also provided sprinkler protection in the garage where the fire occurred.

Because a local alarm had yet to be connected, the single activated sprinkler went unnoticed until the next morning. Fire damage was limited to \$30, or the cost of the plastic barrel. After 15 hours of operation, however, the sprinkler had caused \$2,400 worth of water damage to the drywall and three low-voltage lighting system transformers.

Residential sprinkler saves home – Washington (continued)

The combined fire and water damage was 1 percent or less of the total value of the property, estimated in the “hundreds of thousands of dollars.”

The fire marshal later noted that, “Automatic fire sprinklers aid in the detection and control of residential fires, providing improved protection against injury, life loss, and property damage.”

Kenneth J. Tremblay. 2001. Firewatch. *NFPA Journal*, January/February, 20-21.

Residential sprinkler contains dwelling fire – California

A residential sprinkler system prevented a fire from spreading into the living area of a single-family home.

The two-story wood-framed structure was 70 feet (21 meters) long and 40 feet (12 meters) wide. A residential sprinkler system was installed throughout. It was unclear whether smoke alarms were present.

A paper bag of fireplace ashes had been placed on the wooden deck by the front door the night before. Shortly after midnight, the bag ignited, and the fire spread to the deck, siding, and front door. The door’s seal failed, which allowed the fire to penetrate the building setting off the heat activated sprinkler.

The occupant used a garden hose on the deck to control the exterior fire and the residential sprinkler controlled the interior fire until firefighters arrived after receiving a 911 call at 12:50 a.m. The property, valued at \$330,000, suffered a structure loss of \$15,000 and a contents loss of \$2,000.

Kenneth J. Tremblay. 2000. Firewatch. *NFPA Journal*, July/August , 18.

Residential sprinkler contains dwelling fire - California

A residential sprinkler system prevented a fire from spreading into the living area of a single-family home.

The two-story wood-framed structure was 70 feet (21 meters) long and 40 feet (12 meters) wide. A residential sprinkler system was installed throughout. It was unclear whether smoke alarms were present.

A paper bag of fire place ashes had been placed on the wooden deck by the front door the night before. Shortly after midnight, the bag ignited, and the fire spread to the deck, siding, and front door. The door’s seal failed, which allowed the fire to penetrate the building setting off the heat activated sprinkler.

The occupant used a garden hose on the deck to control the exterior fire and the residential sprinkler controlled the interior fire until firefighters arrived after receiving a 911 call at 12:50 a.m. The property, valued at \$330,000, suffered a structure loss of \$15,000 and a contents loss of \$2,000.

Kenneth J. Tremblay. 2000. Firewatch. *NFPA Journal*, July/August, 18.

ASSISTED LIVING APARTMENT

Sprinkler controls fire in assisted-living unit – Colorado

A single sprinkler controlled a fire that began when a couch was intentionally ignited in an assisted-living apartment. No one in the unit was injured, and all the fire suppression and detection systems operated properly.

The complex, which had multiple additions, included an independent-living apartment building with 116 units and 51 assisted-living units. The fire occurred in the original structure, a steel-frame, four-story building, which had concrete floors and walls and a brick veneer. The building, which measured 200 by 50 feet (61 by 15 meters), had a metal-deck roof with built-up roof covering. Hardwired smoke detectors provided coverage in the common spaces, and the building was equipped with pull stations and a wet-pipe sprinkler system. A central station alarm company monitored all systems.

The fire was intentionally set in a second-floor unit, where it was discovered by an employee before the smoke alarm or sprinkler activated. Staff members removed the unit's occupant and used the pull station, thereby notifying the fire department at 5:30 a.m. The sprinkler then activated, controlling the flames and preventing fire spread.

Fire crews' response was upgraded when follow-up calls confirmed the fire. Upon arrival, firefighters were informed of a possible trapped victim and began a search and rescue. However, they were soon informed that the occupant was outside, so they proceeded to the unit of origin. Meanwhile, police officers worked with the facility's staff to evacuate the other units on the floor safely.

By the time firefighters entered the room, little fire remained. They used a fire extinguisher to put out the flames, then shut down the sprinkler and started ventilation. A secondary search confirmed that everyone had been evacuated safely from the area.

The building, estimated to be worth \$2.4 million, sustained only \$2,000 in damage. The total value of the contents wasn't reported, although losses were estimated at \$1,000.

The fire department sought criminal charges of first-degree arson in this case, but the judge reduced the charges to fourth-degree arson due to the lack of structural damage.

Kenneth J. Tremblay. 2002. Firewatch. *NFPA Journal*, March/April, 24-25.

Sprinkler saves occupants of assisted-living facility – Minnesota

An 84-year-old man living in an assisted-living facility ignited a cardboard box with a lighter, filling his apartment with smoke and trapping himself and his wife. A single sprinkler controlled the fire until firefighters rescued the pair and extinguished the blaze with an extinguisher.

The three-story, wood structure was 400 feet (122 meters) long and 70 feet (21 meters) high. Occupants lived independently in the building, although staff was onsite. A wet-pipe sprinkler system protected the living spaces, and a dry-pipe system covered the attic. A smoke detection system protected the common areas, and individual units had localized smoke alarms. All the interconnected systems were monitored.

Sprinkler saves occupants of assisted-living facility – Minnesota (continued)

At 11:26 p.m., the fire department received a water flow alarm, and the fire was confirmed while the fire department was en route. Staff members led firefighters to the third floor, where smoke coming from the doorway of the unit filled the hallway.

Entering the apartment, firefighters quickly rescued the elderly couple and used a pressurized water extinguisher to extinguish the fire in the bedroom. The sprinkler had confined the fire to the bedroom, though flames had spread from the cardboard box to a vacuum cleaner, carpet, and bedding before it was extinguished.

The man and his 76-year-old wife were treated for smoke inhalation at the scene. The husband was transferred to the facility's memory-loss unit for his own protection.

Valued at \$7 million, the building sustained \$30,000 in damage. Loss to the contents was undetermined.

Kenneth J. Tremblay. 2002. Firewatch. *NFPA Journal*, March/April, 24.

DORMITORY

Sprinkler controls dorm fire – Illinois

Discarded smoking materials ignited a couch in the basement of a dorm, and a sprinkler above the couch controlled it.

The five-story building of ordinary construction housed 240 students. A smoke detection system covered the corridors, and a wet-pipe sprinkler system covered the basement. Both systems were supervised and provided alarm to campus security. The dorm was occupied at the time of the fire but had been evacuated before the fire department arrived.

Firefighters responding to the 1:45 a.m. alarm were notified enroute of smoke in the building. A campus security officer led firefighters to a basement lounge where smoke had banked down about 1 to 2 feet (0.3 to 0.6 meters) from the ceiling and water was discharging from the fused sprinkler. They confirmed that the fire had been extinguished and ordered a fan to remove the smoke. They also shut off the sprinkler valve to limit water damage.

Investigators determined that discarded smoking materials led to the fire, which resulted in a loss estimated at \$2,000, compared to a building and its contents value of \$11 million.

Fire officials were quoted as saying, “If it weren’t for the sprinkler system, we would’ve had a very serious fire.”

Kenneth J. Tremblay. 2000. Firewatch. *NFPA Journal*, November/December, 16-17.

SENIOR HOUSING

Sprinkler saves occupant of senior housing – Nevada

An elderly woman suffered first-degree burns and smoke exposure during a fire in the bedroom of her apartment in a 236-unit building for older adults.

However, she escaped additional injury when her attempted escape by wheelchair came to a stop under an operating sprinkler, which controlled the blaze and kept most of the heat and smoke away from her.

Constructed of concrete and concrete-block, the four-story apartment building had complete coverage by smoke detection equipment and a wet-pipe sprinkler system. At the time of the fire, all but one unit was occupied.

The water-flow alarm system alerted the central station alarm company, which notified the fire department at 3:08 a.m. Arriving six minutes after the alarm, firefighters saw smoke and flames coming from the window of an apartment on the fourth floor. The incident commander ordered a second alarm, bringing a total of 20 units and 50 firefighters to the scene.

Reaching the fourth floor, two companies entered the burning apartment, one with a hose attached to a standpipe. They found the woman just inside the door under the spray of the sprinkler.

She was evacuated and taken to the hospital as additional fire crews ventilated the building and knocked the fire down. The rest of the fourth-floor occupants were evacuated to the lobby, and residents of the first, second, and third floors were evacuated or sheltered in place.

Investigators determined that the woman had been smoking in bed and touched her bed linens with her cigarette, starting the fire. As flames spread, she got into her wheelchair, but couldn't make it out of the unit.

The fire department credits the sprinkler with saving her life. The smoke alarm did not activate for undetermined reasons. Fire damage was limited to the woman's apartment, with losses estimated at \$15,000.

Kenneth J. Tremblay. 2005. Firewatch. *NFPA Journal*, September/October, 32.

ASSEMBLY

Sprinklers control fire in unoccupied restaurant - Maryland

When a malfunctioning dryer in an unoccupied restaurant heated its contents to ignition temperature, two sprinklers controlled the resulting fire. Arriving firefighters saw water coming from a rear door and smoke inside a window. When they entered the locked building, they quickly extinguished the remaining fire with a pressurized water extinguisher.

The single-story restaurant, which was closed for the night was of ordinary construction. It had a sprinkler system of unreported type and coverage.

Firefighters responded to a central station alarm company's water flow alarm at 6:57 a.m. When they arrived five minutes later, they found water coming from under a rear door and saw smoke and water spray hitting the inside of a security window. The firefighters requested a full alarm assignment and tried to enter the building using keys from a key repository. Unfortunately, the locks had been changed, and the keys were useless.

By removing the security window, firefighters were able to operate the panic hardware on the inside of the door and open it. Once enough personnel were on the scene to maintain a back-up team of two firefighters for the two-member entry team, firefighters quickly located the blaze in a rear storeroom. The only visible flames at this point were inside the dryer where the sprinklers couldn't reach them.

Using a pressurized water extinguisher, firefighters quickly extinguished the fire as other crews ventilated the building and conducted a primary search.

Investigators determined that a clothes dryer with a large load malfunctioned, preventing the heating element from cooling. The fire caused an estimated \$5,000 in structural damage and \$2,500 in content losses. The fire department instructed the manager to have the suppression system restored before reopening the business.

Kenneth J. Tremblay. 2000. Firewatch. *NFPA Journal*, January/February, 19.

Sprinkler controls fire in movie theater - Georgia

A single sprinkler controlled several fires set by an arsonist in an unoccupied movie theater. People were evacuated from the operating theaters in the multiplex before the fire department arrived.

The two-story theater had concrete block walls with a protected steel frame. An operating smoke detection system covered all areas, including the duct work in the HVAC system. The sprinklers system was a wet-pipe system built to an engineered design.

A theater manager called the fire department at 8:37 p.m. to report heavy smoke in the building. The first firefighters arrived three minutes later. As additional units arrived, they were deployed in primary search, fire attack, water supply, and sprinkler support.

Sprinkler controls fire in Movie Theater: Georgia (Continued)

Since the sprinklers were controlling the fire spread, firefighters were able to find the origin quickly. Fire fighters stretched a 1 ¾ -inch hose line into the unoccupied theater to extinguish remaining hot spots, and positive-pressure fans removed smoke, as the sprinkler system was shut down to limit water damage. Crews mopped up the area by removing standing water.

Investigators found multiple points of origin in the seating at the front of the theater and along a side walkway. No tickets had been sold for that particular theater at the time of the fire.

The fire was declared incendiary and remains under investigation. There was no damage to the structure, which was valued at \$500,000. Contents loss was estimated at \$30,000. There were no injuries.

Kenneth J. Tremblay. 2000. Firewatch. *NFPA Journal*, November/December, 14, 16.

STORE AND OTHER MERCANTILE

Sparks from electrical wiring ignite combustible - Washington

Vibrations from operating HVAC equipment led to a breakdown of electrical tape used to cover wiring splices in an electrical raceway in a large retail mall. The resulting arcing onto the metal raceway covering caused molten slag to drop onto improperly stored holiday decorations directly below the raceway. A single sprinkler controlled the fire, which caused only \$2,000 in damage.

The single-story mall contained more than 100 retail stores and covered 715,200 square feet (66,444 square meters). Constructed of concrete tilt-up walls, the mall had a wood roof that was supported by unprotected steel framing and topped with a built-up covering. Smoke detectors were in the HVAC system, but the system didn't cover the stores. A monitored wet-pipe sprinkler system provided full coverage with 165°F (74°C) sprinklers.

The mall was closed for the night with security guards on duty when the fire department received a water flow alarm at 4:30 a.m. Responding firefighters found that a single sprinkler had operated and extinguished a fire in a rear-exit corridor. The blaze had consumed a cardboard box of holiday decorations, which had been ignited by an arc from an electrical raceway 7 feet (2 meters) above grade.

Investigators determined that protective sleeves covered other splices, and these sleeves had now been applied to all splices.

The sprinkler not only extinguished the fire, but it also sounded the alarm before the HVAC smoke detectors or a security guard discovered the fire. The mall and its contents had a combined value of \$160 million and incurred losses of only \$2,000.

Kenneth J. Tremblay. 2000. Firewatch. *NFPA Journal*, May/June, 32.

Sprinkler prevents loss of shopping center - North Carolina

One sprinkler extinguished a small fire in a department store before it spread to the eight other tenants of a shopping mall. The fire occurred at night when the store was closed.

The single-story department store, which measured 50 by 20 feet (15 by 6 meters), had concrete block walls with a brick veneer and a flat, steel-supported roof. A monitored, wet-pipe sprinkler system that provided full coverage protected the property. There were no smoke detectors.

The fire department received the alarm at 11:23 p.m. from a municipal system alarm connected to the water flow. When firefighters arrived, they connected and supported the sprinkler system, forced the front door, and advanced a hose line into the retail display area.

When they discovered that the sprinkler had extinguished the fire, the crews overhauled the scene and began investigating its cause. Apparently, a large display cabinet had damaged an electrical cord under it, causing resistance which led to heat

Sprinkler prevents loss of shopping center: North Carolina (Continued)

build-up. The wooden cabinet and carpet ignited, and the fire spread to material on the wall before the sprinkler activated.

The unit of origin, which had a value of \$72,000, suffered \$5,000 in structural damage. Damage to its contents, valued at \$50,000, was estimated at \$2,000. There were no injuries, and adjoining tenants weren't affected by the incident.

Kenneth J. Tremblay. 2000. Firewatch. *NFPA Journal*, May/June, 34.

Single sprinkler controls big-box retail fire - Washington

A large home supply store suffered minor losses after a sprinkler activated during the night and extinguished a fire that began spontaneously in oil-soaked refuse.

The single-story building had concrete tilt-up walls, with open web steel roof trusses and a plywood roof deck with a built-up covering. It was 560 feet (171 meters) long, 275 feet (84 meters) wide, and 25 feet (8 meters) high. The building had a heat detection system and five separate sprinkler systems. Three wet-pipe systems provided coverage to the main part of the building, while a fourth covered the rack storage area. A dry-pipe system covered the loading docks and canopy. A public fire service communication station monitored all the systems.

Firefighters responded to a water flow alarm at 11:58 p.m., four hours after the last employee left for the evening. When they arrived, they found that a cardboard box on the loading dock had ignited and a single sprinkler had extinguished the fire.

Investigators found that rags used to clean up a spill of linseed oil-based paint or stain earlier in the day had been placed in a cardboard box and left by the loading dock.

This type of spontaneous ignition fire had occurred before, only two weeks earlier, but employees had used fire extinguishers to put it out and hadn't called the fire department.

The building was valued at \$15 million, and its contents at \$9 million. The structure suffered \$1,000 in damage, with content loss estimated at \$2,000.

Kenneth J. Tremblay. 2000. Firewatch. *NFPA Journal*, March/April, 21.

Unattended heat gun ignites combustibles - Washington

An employee of a large sporting-goods store left a heat gun operating and unattended while he talked to a friend. Heat from the tool ignited nearby combustibles and started a fire. A single sprinkler extinguished the fire just as employees discharged two dry chemical fire extinguishers into the room.

The store was an anchor store in a two-story eight-unit strip mall. Each floor of the building, which was of concrete tilt-up construction with a wood joist roof structure, covered 7,800 square feet (725 square meters). The other stores in the mall were of similar construction but were only one story high and 6,000 square feet (557 square meters) in size. There was one smoke alarm per floor, and a wet-pipe ordinary hazard

Unattended heat gun ignites combustibles: Washington (Continued)

sprinkler system protected the entire building. The store was open for business at the time of the fire.

The employee was using the heat gun to repair ski boots in a first-floor room, and he left it operating and unattended when he went to talk to a friend on the second floor. It wasn't until they saw smoke coming through a wall that the employee remembered the still-operating heat gun.

The two men ran to the first-floor room, where they found flames reaching the ceiling and heavy smoke. They simultaneously discharged two fire extinguishers into the room, just as the sprinkler operated and extinguished the fire.

Firefighters responded to the 11:45 a.m. water flow alarm and found that the fire had already been extinguished by the sprinkler.

Damage to the \$2 million store was estimated at \$2,000. The store's contents valued at \$800,000, suffered a loss of \$18,000. The store re-opened in less than 24 hours, and the other mall stores reopened 30 minutes after the alarm. There were no injuries.

Kenneth J. Tremblay, 2000. Firewatch. *NFPA Journal*, March/April, 22.

OFFICE

State, Date, Time of Alarm, Dollar Loss	Property Characteristics and Operating Status	Fire Protection Systems	Fire Development	Contributing Factors
Illinois August 11, 1999 5:58 a.m. \$6,000,000	This four-story office building of fire resistive construction covered a ground-floor area of 45,375 square feet (4,215.4 square meters). The building was occupied, and areas undergoing renovation were closed off.	The building had a partial coverage smoke detector system, which activated, and a partial-coverage wet-pipe sprinkler system. Even though the sprinklers weren't in the area of ignition, 57 heads operated and helped contain the fire.	The fire broke out in electrical equipment and multiple forms of combustible materials on the second floor. One civilian was injured in this fire.	None reported.
Stephen G. Badger and Thomas Johnson. 2000. 1999 Large-Loss Fires and Explosions. <i>NFPA Journal</i> , November/December, 93.				

MANUFACTURING PROCESSING

Sprinkler foil arson attempt - Connecticut

Five sprinklers foiled an arsonist's attempt to damage a manufacturing plant.

The two-story building was constructed of steel columns and beams, with a brick exterior. Unprotected steel supported a metal deck roof shingled in asphalt. The building, which measured 150-feet (46-meters) by 116-feet (35-meters), included a basement. Heat detectors and a wet-pipe sprinkler system provided full coverage. The plant was operating at the time of the fire, although only a third of its employees were on site.

Nearly 10 minutes passed before the building's owner called the fire department after hearing the alarm because he went to investigate its cause. Upon confirming a fire in the basement, he dialed 911 at 11:58 a.m. When firefighters arrived with three engines, a tanker, a rescue vehicle, and an EMS vehicle, they found that the fire was almost out.

Investigators identified three points of origin in the basement, two between large rolls of paper stored on wooden pallets and another between cardboard boxes and the paper rolls. A cigarette lighter was used.

There were no injuries and the operating sprinklers limited the property loss to \$400 against nearly \$700,000 in structure and contents value.

Kenneth J. Tremblay. 2000. Firewatch. *NFPA Journal*, March/April, p.23.

State, Date, Time of Alarm, Dollar Loss	Property Characteristics and Operating Status	Fire Protection Systems	Fire Development	Contributing Factors
Texas June 23, 1999 11:29 a.m. \$20,000,000	This three-story plastics manufacturing plant was of open steel frame construction. The ground-floor area wasn't reported. The plant was operating when the fire broke out.	There was no information reported on automatic detection systems. The plant had a partial coverage deluge sprinkler system that operated and successfully contained the fire.	An unknown source ignited a leak of a flammable liquid, butadiene, causing an explosion and fire. Two civilians suffered fatal burns, and four were injured.	None reported.
Stephen G. Badger and Thomas Johnson. 2000. 1999 Large-Loss Fires and Explosions. <i>NFPA Journal</i> , November/December, 84.				

Location, Date, Time of Alarm, Number of Deaths	Occupancy Type and Use, Construction Type, Number of Stories, and Operating Status	Detection Systems	Suppression Systems	Fire Origin and Path	Contributing Factors
Massachusetts February 25, 1999 3:05 p.m. Three	Iron castings manufacturing plant; protected, noncombustible construction; one story; operating.	None.	Sixty-one of the plant's wet-pipe sprinklers helped control the fire.	The point of origin was a gas-fired oven, but the exact cause is unknown. The flexible exhaust duct drew in a fireball, which explosively ignited accumulated dusts. The blast blew off the building's roof and walls.	Poor housekeeping allowed explosive organic dusts to build up in the ductwork.
Robert S. McCarthy. 2000. 1999 Catastrophic Fires. <i>NFPA Journal</i> , September/October, 60.					

INCIDENTS OF INTEREST

Sprinklered apartment building destroyed by fire in unprotected area – Ohio

A fire that began on the balcony of a third-floor apartment spread to concealed spaces above the residential sprinkler system in this large building. The balconies allowed the fire to spread around the nearest fire wall, which meant the blaze burned in two fire divisions, as well as the concealed spaces.

The three-story, 27-unit apartment building was 210 feet (64 meters) long and 30 feet (9 meters) wide. Wood framing and trusses were used for walls and floors, and asphalt shingles covered the roof. The building was divided by two-hour-rated fire walls into three fire divisions, each containing three units on each floor. Sprinklers had been installed in each apartment based on NFPA 13R, *Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height*. Single-station smoke alarms were also present in each unit.

The fire was first detected by a resident returning home after work, who called the fire department at 4:45 a.m. Several other occupants were awakened by the sound of flames and by other occupants, who beat on their doors to sound the alarm. All the occupants evacuated safely, some with help from first arriving firefighters.

Responding within seven minutes of the alarm, firefighters noted flames coming from the roof. Firefighters from two engines and a medical unit placed two hose lines on the building's upper floors, while others completed the connection to the water supply. The incident commander immediately called for additional help, including an aerial platform and ladder.

The fire appeared concentrated in the attic at the center of the apartment building, but flames threatened to spread to either side of the structure. After aerial master streams had been used to slow down and shrink the fire, interior hose lines were used to attack remaining fire pockets. During what they thought was the overhaul phase, firefighters discovered that the flames had spread to the other fire divisions through the ceiling/floor voids. They opened up the ceilings and walls to complete extinguishment.

Investigators determined that the fire began on the balcony of a third-floor unit in the center of the building. Although the exact ignition scenario couldn't be confirmed, a propane-fired gas grill that had recently been used appears to have failed or been left partially turned-on, leading to the ignition. Flames spread to the attic, then above the sprinklers in the concealed space.

The blaze intensified as the grill's propane cylinder failed, releasing gas into the flames. The propane cylinder of the gas grill on the adjacent balcony also failed as the fire spread around the fire wall separating them. The two cylinders feeding the fire had what investigators called a "direct and devastating" effect. Three sprinklers operated late in the fire, when flames finally spread into areas protected by the sprinkler system.

One firefighter cut his hand during overhaul, and a resident was injured when she fell while leaving the building. The building, valued at \$1.2 million, suffered losses estimated at \$1 million. Damage to the contents, valued at \$275,000, was estimated at \$200,000.

Kenneth J. Tremblay. 2001. Firewatch. *NFPA Journal*, March/April, 22.

Sprinklers extinguish fire in home oxygen unit – Arizona

Careless disposal of smoking materials contributed to the smoke-inhalation death of a woman in her single-family home, despite the activation of two sprinklers that extinguished the flames.

The single-story, wood-frame house, which measured 50 feet (15 meters) by 40 feet (12 meters), had a stucco exterior and a tile roof. The home had a wet-pipe residential sprinkler system and a local smoke alarm, but neither system was monitored, and the smoke alarm may not have activated during the fire.

Investigators believe that smoking materials carelessly disposed of in a wastebasket ignited paper. When the occupant discovered the fire, she moved the wastebasket to the sink to extinguish it, but not before the fire burned through plastic oxygen tubing running under the basket. Flames spread along the oxygen-enriched tubing, igniting an upholstered stool and the oxygen generator in the first-floor living room. The fire was finally extinguished by two sprinklers, which operated above each burning item.

Water flowing from under the garage alerted a neighbor, who called the fire department at 9:30 a.m. Responding firefighters discovered the woman in the bathroom, where she had succumbed to smoke inhalation.

The house and its contents, valued at \$200,000, suffered an estimated loss of \$40,000.

Kenneth J. Tremblay. 2004. Firewatch. *NFPA Journal*, November/December, 17.