



# RESEARCH

## **2014-2018 High-Rise Fire Estimates and Selected Previously Published Incidents**

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## 2014-2018 High-Rise Fire Estimates and Selected Previously Published Incidents

In 2014 through 2018, local fire departments in the US responded to an estimated average of 13,400 fires per year in buildings with heights of at least seven stories above grade. These fires caused an average of 39 civilian deaths, 464 civilian injuries, and \$204 million in direct property damage annually.

These high-rise fires accounted for 3 percent of reported structure fires, 1 percent of civilian deaths, 4 percent of civilian injuries, and 2 percent of the direct property damage associated with structure fires.

**Table 1. Annual Averages of High-Rise Fires by Occupancy for 2014-2018**

Occupancy	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (millions)	
Apartment or other multi-family housing	8,580	(64%)	29	(75%)	368	(79%)	\$118	(58%)
Hotel	530	(4%)	0	(1%)	14	(3%)	\$10	(5%)
Dormitory-type property	470	(3%)	0	(1%)	9	(2%)	\$0	(0%)
Office building	230	(2%)	0	(0%)	4	(1%)	\$8	(4%)
Hospital, hospice, or nursing home	280	(2%)	0	(0%)	12	(3%)	\$1	(0%)
<b>Subtotal</b>	<b>10,070</b>	<b>(75%)</b>	<b>30</b>	<b>(77%)</b>	<b>407</b>	<b>(88%)</b>	<b>\$137</b>	<b>(67%)</b>
All other occupancies	3,330	(25%)	9	(23%)	57	(12%)	\$67	(33%)
<b>Total</b>	<b>13,400</b>	<b>(100%)</b>	<b>39</b>	<b>(100%)</b>	<b>464</b>	<b>(100%)</b>	<b>\$204</b>	<b>(100%)</b>

Note: These are fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Estimates include proportional shares of fire with number of stories above ground coded as unknown, blank, zero, less than zero or greater than 100. Fires are rounded to the nearest ten, civilian deaths and injuries to the nearest one, and direct property damage to the nearest million dollars without adjustments for inflation. Estimates of death, injuries, or property damage can be significantly affected by the inclusion or exclusion of one unusually serious fire. Sums may not equal totals due to rounding errors.

Source: NFIRS and NFPA Fire Experience Survey.

**Table 2. Risk of Fire Casualty per Thousand Reported Fires and Average Loss per Fire  
2014-2018 Annual Averages**

Occupancy	High-Rise Buildings			Non-High-Rise		
	Civilian Deaths per 1,000 fires	Civilian Injuries per 1,000 fires	Average Loss per Fire	Civilian Deaths per 1,000 Fires	Civilian Injuries per 1,000 Fires	Average Loss per Fire
Apartment or other multi-family housing	3.4	42.9	\$13,700	3.7	34.4	\$13,900
Hotel or motel	0.7	26.6	\$19,800	3.1	35.3	\$25,600
Dormitory-type property	0.7	19.8	\$1,000	0.2	7.3	\$3,300
Office building	0.0	18.0	\$35,300	0.4	11.8	\$24,500
Hospital, hospice, or nursing home	0.0	43.5	\$2,800	0.6	24.1	\$5,400
Average of the five occupancy groups	3.0	40.4	\$13,600	3.6	37.9	\$14,000

Note: These are fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. Average loss per fire is rounded to the nearest hundred dollars and not adjusted for inflation. Estimates of deaths, injuries, or property damage can be significantly affected by the inclusion or exclusion of one unusually serious fire.

Source: NFIRS and NFPA Fire Experience Survey.

### **Selected incidents from *NFPA Journal's* Firewatch Column and NFPA's Large Loss Studies**

The incidents below are examples of what *can* happen. They are not representative of all high-rise fires.

#### **Sprinkler extinguishes cooking fire, Illinois**

A single sprinkler extinguished a fire in a high-rise apartment building that started when a pan of cooking oil left heating unattended on the stove ignited.

The 17-story, steel-frame high-rise which was 325 feet (99 meters) long and 125 feet (38 meters) wide, was protected by a wet-pipe sprinkler system. A monitored fire detection system that included smoke detectors and manual pull stations had been installed in the common hallways, and there were heat detectors and local smoke alarms in each unit.

The fire department received the water flow alarm at 9:45 a.m. While firefighters were en route to the address, dispatch received a 911 call from the apartment of fire origin and heard an occupant yelling to others to get out of the apartment. By the time fire crews arrived, the sprinkler had extinguished the blaze, which had spread from the stove to a microwave and cabinets overhead. The firefighters helped control the water flow to the sprinkler and placed salvage covers in units below the fire to prevent damage.

Damage to the \$20 million building came to \$5,000. EMTs evaluated the unit's residents at the scene, but the three did not require any treatment.

Kenneth J. Tremblay, 2014, "Firewatch", *NFPA Journal*, January/February 35-36.

### **Roof deck of high rise ignites, Nebraska**

Smoking materials discarded on the roof deck of a 10-story apartment building started a fire that spread to the built-up deck surface before firefighters were able to extinguish the flames.

The steel-frame apartment building, which was 97 feet (30 meters) long by 32 feet (10 meters) wide, had an operating fire alarm system and a wet-pipe sprinkler system. Its roof deck consisted of wooden decking laid on top of a built-up surface of asphalt and crushed rock. Two natural gas-fired cooking grills were located on the deck, where building occupants often gathered to barbecue.

Several passerby noticed the fire and called the fire department at 12:57 p.m. When firefighters arrived minutes later, they saw smoke coming from the building's roof. Once on the roof, they extinguished the flames on the deck and portions of the roof that had also become involved.

Investigators interviewed many of the building's residents, but none admitted to having been on the roof or smoking, despite evidence of discarded cigarettes between the decking and the report of an occupant who heard people on the roof the night before the fire. The investigators determined that discarded cigarettes were responsible for the blaze.

Damage, estimated at \$10,000, was limited to a portion of the deck and roof. There were no injuries.

Kenneth J. Tremblay, 2014, "Firewatch", *NFPA Journal*, May/June, 46-48.

### **Resident dies when smoking materials ignite bedding, New York**

An early morning apartment fire caused by smoking materials claimed the life of a male resident who was unable to escape due to a mobility disability.

The fire department was dispatched to the scene, a multi-unit apartment complex, following notification by an alarm monitoring company at 3 a.m.

Investigators determined that the fire began when smoking materials ignited a mattress or bedding on a bed in the living room. They described the bed as severely burned on the right side, closest to a nightstand where an ashtray was located.

Firefighters reported that a sprinkler system activated and extinguished 90 percent of the fire by the time they arrived, but the victim suffered severe burn injuries. Crews evacuated the victim, who was transported to the hospital and later died from his injuries.

The apartment was located on the third floor of a 12-story building. The building was protected by smoke detectors and a wet-pipe sprinkler system, which firefighters noted had operated as designed. The building had a ground-floor area of 16,000 square feet (1,486 square meters), was constructed with steel beams, and had a concrete roof deck with a rubber covering.

The fire caused an estimated \$15,000 in damage to the building and \$5,000 in damage to building contents.

Richard Campbell, "Firewatch," *NFPA Journal*, March/April 2017

**Large-loss high-rise hospital fire, Texas 2017**

January, 1:20 p.m., \$10 million

This was a 12-story hospital of unprotected ordinary construction that covered 34,700 square feet (3,224 square meters). The hospital was operating but construction was underway in the area of fire origin.

There was a full-coverage detection system present and it operated. There was a sprinkler system present; its type was not reported. It was not located in the area of origin and it was not clear if the system operated.

This fire was incendiary and was set in a second-floor waiting area. The fire was confined to the area of origin.

Heavy black smoke spread throughout the building via stairways and elevator shafts. The fire is still under investigation.

Stephen G. Badger, 2018, "Large-Loss Fires for 2017" *NFPA Journal*, November/December.