LARGE-LOSS FIRES IN THE UNITED STATES 2013

Stephen G. Badger

November 2014

National Fire Protection Association
Fire Analysis and Research Division

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Acknowledgements
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Introduction

Last year, 21 fires in the United States resulted in losses of $10 million or more each, with the costliest accounting for $420.5 million

In seven of the past 10 years wildland fires have produced the largest direct property loss fires in the United States, and five of those have resulted in more than $400 million in damage. This includes 2013, when the Black Forest Fire in Colorado resulted in $420.5 million in damage, the highest loss in terms of direct property loss of any fire that occurred in the country.

The Black Forest Fire began early in the afternoon of June 11 in a bowl-like wildland/urban interface area not far from Colorado Springs. By the time it was over, it had burned 14,280 acres (57,789 hectares); destroyed 489 homes, a commercial property, and 188 outbuildings; and damaged an additional 31 homes and five outbuildings. It also killed two people who became trapped in their garage as they tried to evacuate.

The fire department began receiving calls about smoke in the area at about 1:30 p.m. By the time firefighters arrived at the scene and began suppression efforts, the wind had picked up, pushing the fire uphill to steeper terrain and forcing fire crews to withdraw or risk entrapment and burn over. Within the first eight hours, the fire traveled 8 miles (13 kilometers), producing flames more than 150 feet (46 meters) high, and additional companies from area fire departments were dispatched to protect structures.

On the second day, the fire traveled another 5 miles (8 kilometers) along several fronts. Firefighting operations were hindered by the rapid rate of fire spread, which was brought on by erratic winds and bolstered by dry, heavy fuel loads, creating secondary hazards such as heavy smoke that obscured street signs critical to firefighter orientation and escape. Aerial resources were also limited by the winds and extreme fire behavior.

After the fire was over, Pikes Peak Wildfire Prevention released a report, titled "Partners Report to The Governor of Colorado January 21, 2014," that noted contributing factors such as "narrow driveways and inadequate turn-around radii for fire engines, dense trees on either sides of the driveways that simultaneously ignited during the fire event, and un-thinned 'dog hair' trees in and around homes and rights of way." Most of the structure losses occurred within the first 24 hours, due in many cases to burning embers. The report also stated that "no amount of fire engines, firefighters, bulldozers, slurry bombers, or helicopters could have stopped the Black Forest Fire. Unmitigated forest fuels, combined with up-sloping terrain and high winds, immediately overwhelmed any attempts at containment."

However, the Black Forest Fire was only one of the large loss fires of 2013. Every year, NFPA reports on large-loss fires and explosions that occurred in the United States the year before. Such fires and explosions are defined as any event that results in property damage of at least $10 million. In 2013, U.S. fire departments responded to an estimated 1,240,000 structure and non-structure fires, which caused an estimated loss of $11.5 billion. Many of these fires were small or resulted in little or no reported property damage. However, 21 of them resulted in losses of $10 million or more each, for a total of almost $845 million in direct

property losses. Although these fires accounted for only 0.002 percent of the estimated number of fires in 2013, they accounted for 7.3 percent of the total estimated dollar loss. In human terms, these 21 fires killed nine firefighters and eight civilian, and injured another 18 firefighters and 278 civilians. To read the full report, go to www.bffire.org/District/Investigation_report.html.

The number of large-loss fires has ranged annually from 16 to 45 over the past 10 years, with an average of approximately 24 fires per year. When adjusted for inflation to 2004 dollars, the number of fires in 2013 that could be categorized as large-loss fires—that is, fires resulting in a loss of $10 million in 2004 dollars—drops to 12, with an adjusted loss of $606 million. Six of these fires resulted in more than $20 million each in property damage. One of these was the Black Forest Fire, and the other five occurred in structures, resulting in a combined property loss of $660.5 million. This represents 78.2 percent of the total loss in large-loss fires and 5.7 percent of the total fire losses in the United States in 2013.

Where fires occurred

Of the 21 large-loss fires that occurred last year, 17 involved structures, resulting in a total property loss of $387.7 million. Six of these structure fires occurred in manufacturing properties: a fertilizer plant, an egg processing plant, an oil reprocessing plant, a steel mill arc-furnace building, a plastics laminate plant, and an aluminum die-cast plant. These six fires resulted in total losses of $202.6 million.

Four more fires occurred in special properties. Two of the properties were apartment buildings under construction, and the other two were a highway tunnel and a highway interchange that were severely damaged following separate vehicle crashes. The combined loss of these four fires was $52.7 million.

Another three fires occurred in residential properties, one each in a single-family home, a high-rise apartment building, and a cluster of rental cabins. The combined losses for these fires totaled $76.9 million.

Of the final four structure fires, two occurred in restaurants and resulted in a combined loss of $25 million. The third and fourth fires occurred in a warehouse and a high school, and produced losses of $20 million and $10.5 million, respectively.

Of the four non-structure large-loss fires that occurred last year, one was a vehicle fire involving a passenger jet parked at the gate at an airport, which did $10 million in damage, and three were wildland fires that resulted in a combined loss of $447.1 million. One of these wildland fires was the Black Forest Fire, which alone resulted in almost 50 percent of the total large-loss fire losses in 2013. These four non-structure fires resulted in combined losses of $457.1 million, or 54.1 percent of the combined losses of all the large-loss fires.

The cause of ignition was reported for 11 of the 21 large-loss fires, including 10 structure fires and one non-structure fire. Three of the structure fires resulted from mechanical or part failures, including a gas line leak, a failure causing the release of molten materials, and a mechanical failure that caused equipment to overheat. The two fires that damaged highway

structures were started by vehicle crashes. Other structure fires occurred when a nail penetrated a wire, causing high-resistive heating; when an industrial furnace backfired; when a furnace was started improperly; and when smoking materials were abandoned or discarded too close to combustibles. The final structure fire for which the cause is known was an arson fire. The one non-structure fire for which the cause is known occurred in the aircraft when its lithium-ion cell battery ignited.
The operating status of the structure was reported for 14 of the structure fires. In 10 cases, the facility was open and operating, eight at full operation and two in partial operation. Four were closed and unoccupied. Eight of the 17 structure fires began between 11 p.m. and 7 a.m.

Detection and suppression systems
Information about automatic fire or smoke detection equipment was reported for 12 of the 17 large-loss structure fires. Seven of the properties had no automatic detection equipment. The other five structures had smoke detection equipment that provided complete coverage in one and unreported coverage in four. Three structures had heat and smoke detection systems that provided complete coverage in one structure and unreported coverage in two. Two structures had unreported types of systems that provided unknown coverage. Only two of the systems operated effectively. The operation of the other three was not known.

Information about automatic suppression equipment was reported for 14 of the 17 structure fires. Nine of the structures had no suppression equipment. Of the remaining five, three had wet-pipe sprinklers, one of which provided complete coverage and two unreported coverage. One structure had a dry-pipe system of unreported coverage, and one was an unreported type system.

Two of the five suppression systems operated, and three did not. Of the systems that operated, one was effective and helped contain the fire, and one system operated but was ineffective because of explosion damage. Of the two that did not operate, one system had not been completely installed, and one was not in the area of ignition. The operation of the final system was not reported.
Complete information on both detection and suppression equipment was reported for 12 of the 17 large-loss structure fires. Four of the structures had neither a detection nor a suppression system. Four structures had just detection equipment, and three had just suppression equipment. Only one structure had both types of systems.

What we can learn
In 2013, there were five fewer large-loss fires than there were the year before, and there was a drop in associated property losses of $617.9 million. This decrease in fires of 19.2 percent and decrease in damage of 42.2 percent is largely due to the fact that there was only one fire in 2013 that did more than $400 in damage. In 2012, there were two.
In seven of the past 10 years, at least one fire has resulted in a loss of more than $100 million. In 2013, there were two such fires: a wildfire and an explosion and fire in a fertilizer plant. Over the past 10 years, 21 fires have resulted in more than $100 million in losses, including one that did more than $1 billion in damage. Of these largest losses, 10 were wildland fires, nine were structure fires, and two were vehicle fires.

Adhering to the fire protection principles reflected in NFPA's codes and standards is essential if we are to reduce the occurrence of large-loss fires and explosions in the United States. Proper construction, proper use of equipment, and proper procedures in chemical processes, storage, and housekeeping will make fires less likely to occur and help limit fire spread should a fire occur. Proper design, maintenance, and operation of fire protection systems and features can keep a fire that does occur from becoming a large-loss fire.

Where we get our data

NFPA identifies potential large-loss incidents by reviewing national and local news media, including fire service publications. A clipping service reads all U.S. daily newspapers and notifies NFPA's Fire Analysis and Research Division of major large-loss fires. NFPA's annual survey of the U.S. fire experience is an additional data source, although not the principal one.

Once a fire has been identified, we request information about it from the fire department or agency having jurisdiction. We also contact federal agencies that have participated in investigations, as well as state fire marshals' offices and military sources. The diversity and redundancy of these data sources enable NFPA to collect the most complete data available on large-loss fires.

Acknowledgments

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Table 1.
Large-Loss Fires that Caused $10 Million or more in Property Damage, 2004-2013

Year	Number of Fires	Number of Fires Causing $10 million or more in 2004 Dollars	Direct Property Damage (in Millions) unadjusted	In 2004 Dollars
20034	16	16	$337	$337
2005	16	8	$217	$133
2006	16	15	$380	$347
2007	45	39	$3,393	$3,036
2008	34	25	$2,322	$1,956
2009	25	20	$950	$792
2010	17	12	$652	$521
2011	23	16	$820	$628
2012	26	17	$1,463	$1,127
2013	21	12	$845	$606

Note: Number of fires and unadjusted loss are based on data from studies that appeared in previous annual large-loss studies. Some of the information may differ from previously published material because material was updated after publication.

Note: Adjustment for inflation is based on the Consumer Price Index using 2004 as a base year. Note that adjustment for inflation not only reduces the total dollar loss for each year but also reduces the number of fires when adjusted losses large enough to qualify as large-loss fires.

Source: NFPA's Fire Incident Data Organization (FIDO)

Table 2.
Large-Loss Fires of $20 Million or More in 2013

Incident and Location	Loss in Millions
Wildfire, Colorado	$420.5
Fertilizer manufacturing, Texas	$100.0
A single family mansion, Connecticut	$50.0
Egg processing plant, Wisconsin	$40.0
Aluminum die cast manufacturing plant, Arkansas	$30.0
Warehouse in Indiana	$20.0
Total Fires:	$660.5

Sums may not equal totals due to rounding errors.

Source: NFPA's Fire Incident Data Organization (FIDO)

Table 3.
2013 Large-Loss Fires by Major Property Use

Property Use	Number of Fires	Percent of Fires	Total Dollar Loss	Percent of Loss
Manufacturing	6	29%	$202,600,000	24.0%
Special Property	4	19%	$52,720,000	6.2%
Wildland	3	14%	$447,103,000	52.9%
Residential	3	14%	$76,856,512	9.1%
Public Assembly	2	10%	$25,000,000	3.0%
Storage	1	5%	$20,000,000	2.4%
Educational	1	5%	$10,500,000	1.2%
Vehicle	1	5%	$10,000,000	1.2%
Total	21	100.0%	$844,779,512	100.0%

Sums may not equal totals due to rounding errors.

Source: NFPA's Fire Incident Data Organization (FIDO)

Figure 1
Large-Loss Fires, Unadjusted and Adjusted for Inflation (2004- 2013)

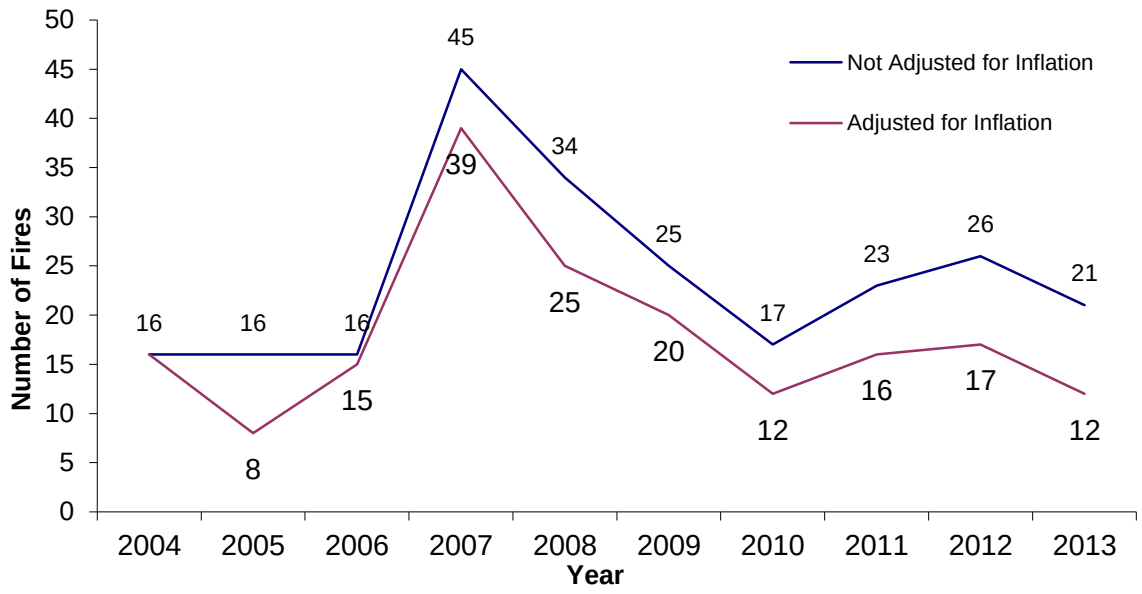


Figure 2
Direct Dollar Loss in Large-Loss Fires, Unadjusted and Adjusted (2004-2013)

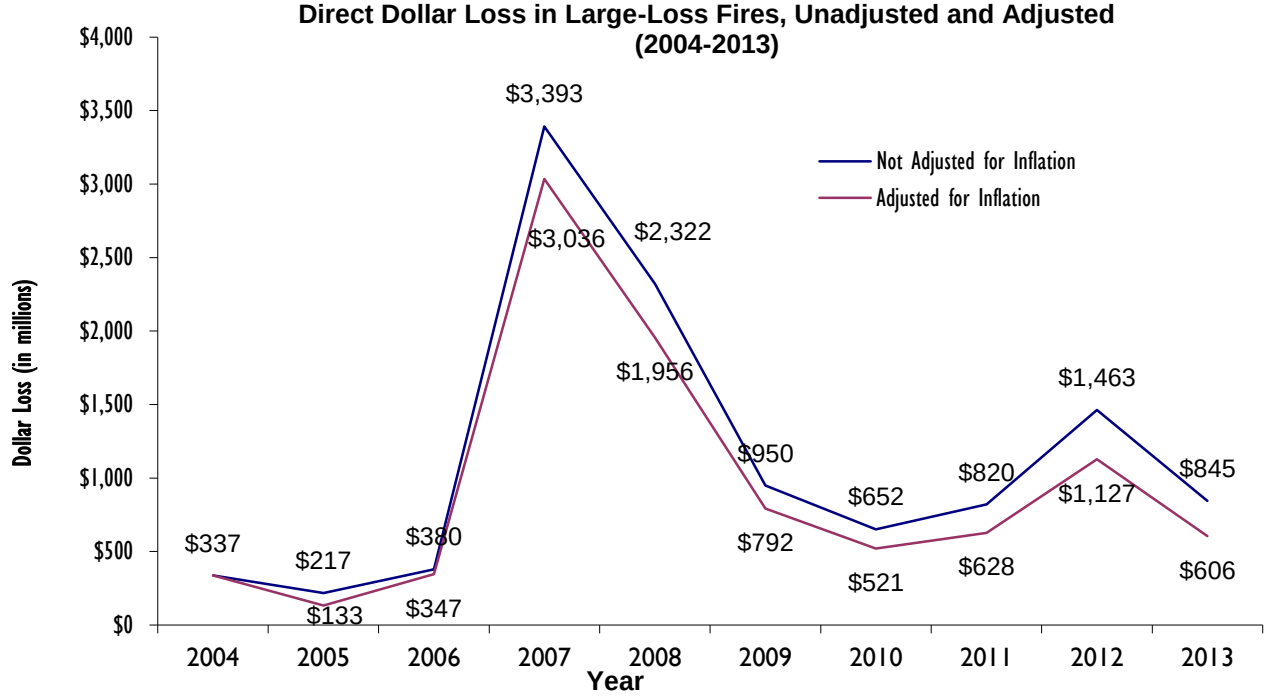
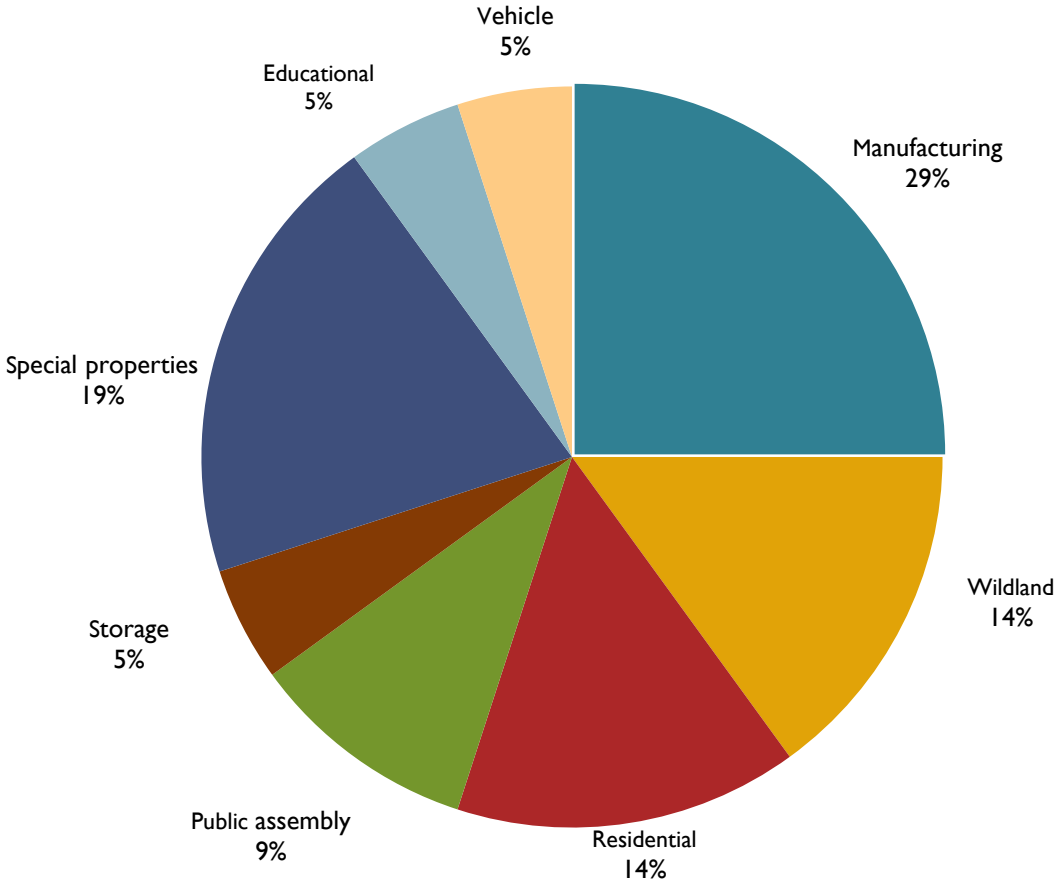


Figure 3
Large-Loss Fires by Major Property Use



2013 Large-Loss Fire Incident

Manufacturing

Texas

Month, Time of Alarm, Dollar Loss

April, 7:30 p.m., $100 million

Property Characteristics and Operating Status

This was a one-story, 12,000-square-foot (1,115-square-meter) fertilizer plant of unprotected wood-frame construction. The plant was closed at the time.

Fire Protection Systems

There was no automatic detection or suppression systems.

Fire Development

A fire of undetermined origin broke out in the seed and fertilizer building in the bulk processing plant, where pallets with bags of seed were stored. Between 28 to 34 tons (28,000 to 34,000 kilograms) of ammonium nitrate were stored in bins near the burning structure. Approximately 22 minutes after the fire was discovered, the ammonium nitrate detonated.

Contributing Factors and Other Details

The explosion left a crater 90 feet (27 meters) wide by 10 feet (3 meters) deep and damaged or destroyed more than 500 structures within a 37-block area, including homes, schools, and an elderly housing complex. Nine firefighters, an EMT, and five civilians were killed, and five firefighters and 250 civilians were injured in the explosion.

Wisconsin

Month, Time of Alarm, Dollar Loss

January, 6:04 p.m., $40 million

Property Characteristics and Operating Status

This was a two-story, 12,000-square-foot (1,115-square-meter) egg processing plant of unprotected ordinary construction that was at full operation at the time of the fire.

Fire Protection Systems

The plant had no automatic detection system, but it did have a wet-pipe sprinkler system. Sprinkler coverage was not reported, but the fire occurred in an area that was not protected, so the system did not operate.

Fire Development

The fire, of undetermined cause, began in a ground-floor mechanical room. No information on the fire's spread was reported. Upon arrival, firefighters saw flames coming from the building. They used water and foam in an attempt to extinguish the fire, but they had little effect. Soon thereafter, an exterior attack was initiated.

Contributing Factors and Other Details

Hazards in the building included ammonia, which leaked after a pipe containing residual product broke. Three firefighters were injured battling this fire. Structural losses were estimated at $30 million, and damage to its contents was estimated at $10 million.

Arkansas

Month, Time of Alarm, Dollar Loss

April, 9:21 a.m., $30 million

Property Characteristics and Operating Status

This was a one- and two-story, 250,000-square-foot (23,226-square-meter) aluminum die-cast manufacturing plant of unprotected, noncombustible construction that was operating with a partial crew.

Fire Protection Systems

There were no automatic detection or suppression systems in the building.

Fire Development

Molten metal spewed from a machine, for an unreported reason, and ignited ceiling insulation. Fire then flashed across the manufacturing area. Burning insulation fell on flammables on the floor and ignited them, then burned into a warehouse and a two-story break room.

Contributing Factors and Other Details

Handheld extinguishers, though present, were not used because the fire was too large for employees to handle. One firefighter was injured. Damage to the structure was estimated at $10 million. Damage to its contents, a large part of which was new machinery, was estimated at $20 million.

Ohio

Month, Time of Alarm, Dollar Loss

December, 4:06 p.m., $12.5 million

Property Characteristics and Operating Status

This was a one-story, 8,000-square-foot (743-square-meter) oil reprocessing plant that was operating at the time of the fire with only two people. The construction type was not reported.

Fire Protection Systems

There was a smoke detection system, but the coverage and activation were not reported. There was no sprinkler system.

Fire Development

The fire began in a ground-floor processing area. No additional information was reported.

Contributing Factors and Other Details

The losses to the structure were $500,000, and losses to its contents were $12 million. There was no information on what the contents were.

Ohio

Month, Time of Alarm, Dollar Loss

November, 2:19 p.m., $10.1 million

Property Characteristics and Operating Status

This was a four-story, 3,000-square-foot (279-square-meter) arc furnace building of unprotected, non-combustible construction in a steel mill. It was at full operation at the time of the explosion and fire.

Fire Protection Systems

An unknown type of automatic detection system was present, although its coverage and activation were not reported. Neither were the coverage and activation information of the building's dry-pipe sprinkler system.

Fire Development
The fire was caused by a backfire in the furnace. Upon arrival, firefighters found heavy fire on several floors of the building. A leak in an oxygen line contributed to the spread of the fire.
Contributing Factors and Other Details
The first two fire hydrants firefighters tried to use were out of service, delaying the location of a water source. Five workers were injured in the fire. The loss was listed as $100,000 to the structure and $10 million to its contents.

Iowa
Month, Time of Alarm, Dollar Loss
June, 1:20 a.m., $10 million
Property Characteristics and Operating Status
This was a three-story, 150,000-square-foot (13,935-square-meter) plastic laminates manufacturing plant of protected, non-combustible construction. It was at full operation at the time of the explosion.
Fire Protection Systems
The plant had no automatic detection system. A wet-pipe sprinkler system provided complete coverage, but it was not effective because the explosion damaged the piping.
Fire Development
Vapor from chemicals used in the manufacturing process exploded when employees tried to restart a furnace that had shut down. Upon arrival, firefighters found smoke showing from the building. As they entered the building, they saw a few post-explosion fires burning and smelled natural gas. The gas main was shut down, and the fires were extinguished.
Contributing Factors and Other Details
Three workers were injured in the explosion, one critically. The loss was listed as $1 million to the structure and $9 million to its contents.

Special Properties

California
Month, Time of Alarm, Dollar Loss
July, 10:31 p.m., $16.5 million
Property Characteristics and Operating Status
This incident occurred in a tunnel on a freeway. At the time, the tunnel was open and traffic was flowing through it.
Fire Protection Systems
No information was reported on any type of protection systems.
Fire Development
A tanker truck carrying 8,500 gallons (32,176 liters) of gasoline crashed in a tunnel and caught fire. The cause of the crash was not reported.
Contributing Factors and Other Details:
The fire and heat caused extensive damage to the tunnel and roadway and to vegetation outside the tunnel. The fuel and fumes also entered storm drains, causing several manholes to explode.

Washington

Month, Time of Alarm, Dollar Loss

July, 3:18 a.m., $13 million

Property Characteristics and Operating Status

This four-story apartment building of unprotected wood-frame construction, which covered 11,700 square feet (1,087 square meters) and contained 32 units, was under construction. It was located in a complex of 10 buildings containing 216 units of similar construction. The property was closed, and no one was on site at the time of the fire.

Fire Protection Systems

The building had no automatic detection system. A wet-pipe sprinkler system was being installed, but it was not yet in service.

Fire Development

The fire, which was incendiary, destroyed two similar apartment buildings and two additional smaller buildings in addition to the building of origin. It also damaged several other buildings.

Contributing Factors and Other Details

No contributing factors were reported. The arsonist was arrested and convicted and is serving a prison sentence.

North Dakota

Month, Time of Alarm, Dollar Loss

December, 6:30 a.m., $12 million

Property Characteristics and Operating Status

This four-story apartment building of unprotected wood-frame construction was under construction at the time of the fire. The ground floor area was not reported. It was one of two building and six garages that burned. It was not reported that anyone was at the site at the time of the fire.

Fire Protection Systems

No automatic detection or suppression equipment was present.

Fire Development

The cause and origin of the fire are undetermined.

Contributing Factors and Other Details

Weather conditions were a factor in fighting this fire. The temperature was –6°F (–21°C), and winds were 22 miles (35 kilometers) per hour, with gusts of 32 miles (51 kilometers) per hour.

Pennsylvania

Month, Time of Alarm, Dollar Loss

May, 6:09 a.m., $11.2 million

Property Characteristics and Operating Status

This fire started when a tanker truck carrying 7,700 gallons (29,148 liters) of diesel fuel crashed on a highway interchange. At the time, the highway was open and traffic was flowing.

Fire Protection Systems

No information was reported on any type of protection systems.

Fire Development

A gasoline tanker truck overturned on an elevated roadway, and its contents ignited. The cause of the crash was not reported. Upon arrival, firefighters found the tanker fully involved in flames, with burning diesel fuel flowing down the highway and onto several levels of elevated roadways and ramps. The vehicle operator escaped on his own with minor burns.

Contributing Factors and Other Details

None were reported.

Wildland

Colorado

Month, Time of Alarm, Dollar Loss

June, 1:42 p.m., $420.5 million

Setting:

This was a wildland/urban interface fire in a Ponderosa pine forest.

Climate

On the day the fire started, the temperature was 95°F (35°C), and relative humidity was 4 percent, with winds 14 miles (22 kilometers) per hour. It was a red-flag fire warning day.

Origin and path

The fire started in a bowl-shaped area near several homes and spread rapidly when rising winds pushed the fire uphill. The fire traveled eight miles (13 kilometers) on the first day alone. Its cause was not determined.

Contributing Factors and Other Details

Erratic winds and dry, heavy fuel loads contributed to the rapid fire spread. Heavy smoke and low visibility obscured street signs critical to firefighter orientation and escape, and winds and extreme fire behavior hampered aerial suppression efforts. Two civilians who died trying to evacuate were found in their burned-out attached garage. The fire burned 14,280 acres (57,789 hectares) and destroyed 489 homes, one commercial property, and 188 out buildings. It damaged an additional 31 homes and five out buildings. Further information can be found at http://www.bffire.org/District/Investigation_report.html.

South Carolina

Month, Time of Alarm, Dollar Loss

March, 5 p.m., $11.6 million

Setting

Wildland/urban interface in grass and brush.

Climate

On the day of the fire the temperature was 78°F (25.6°C), relative humidity was 45 percent, and winds were 9 to 17 miles (15 to 27 kilometers) per hour, with gusts of 28 miles (45 kilometers) per hour.

Origin and path

This fire began as a brush fire of undetermined cause burning in a wooded area next to a condominium complex and quickly spread into the complex.

Contributing Factors and Other Details

At the time of the fire, there were high winds and low humidity. Thirty buildings containing 124 units were destroyed, as was a clubhouse. Four buildings containing 14 units were also damaged. One firefighter was injured battling this fire, as were four civilians.

California

Month, Time of Alarm, Dollar Loss

December, 12 a.m., $15 million

Setting

This fire burned in a forest of chaparral and heavy timber.

Climate

The temperature that day ranged from a high of 75°F (24°C) to a low of 42°F (6°C), humidity was approximately 42 percent, and winds were approximately 2 miles (3 kilometers) per hour with gusts of 9 miles (14 kilometers) per hour.

Origin and path

No information was reported.

Contributing Factors and Other Details

Conditions were very dry, as there had been only about 1¼ inches (3 centimeters) of rain in the past six months. The fire, which spread over 917 acres (371 hectares), damaged or destroyed 34 homes and four out buildings. Area evacuations were called.

Residential

Connecticut

Month, Time of Alarm, Dollar Loss

April, 4:35 p.m., $50 million

Property Characteristics and Operating Status

This was a two-story, 9,548-square-foot (887-square-meter) single-family home of heavy-timber construction. The owner was at home at the time of the fire.

Fire Protection Systems

The mansion had a complete coverage smoke detection system connected to an off-site alarm company. The system activated, notifying the alarm company and the owner, who heard the alarm go off while he was outside. There was no sprinkler system.

Fire Development

The fire began on the second floor in a wall. During remodeling, a dry wall screw had penetrated an electrical wire located against a wooden wall stud in a void of 4 to 6 inches (10 to 15 centimeters) between the sheetrock and outer wall. Over time, high resistance heating charred the wood, resulting in a fire that ignited the framing before it broke through the sheetrock.

Contributing Factors and Other Details

Structural damage was estimated at $1.1 million. Damage to its contents was estimated at $48.9 million because of the many collectibles and irreplaceable antiques in the wing of the mansion where the fire occurred.

California

Month, Time of Alarm, Dollar Loss

October, 11:43 a.m., $15 million

Property Characteristics and Operating Status

This was a 25-story high-rise apartment building of protected noncombustible construction. The ground floor area of the apartment of origin was 900 square feet (83.6 square meters). The building was occupied at the time.

Fire Protection Systems

Alarms were reported to have been installed in the public areas. There was no automatic suppression equipment. The coverage and activation were not reported.

Fire Development

The fire began when heat from abandoned or discarded smoking materials ignited combustibles placed too close to them in the kitchen of a two-bedroom apartment on the eleventh floor of the building. No additional information was reported on the fire's development.

Contributing Factors and Other Details

No information was reported.

Tennessee

Month, Time of Alarm, Dollar Loss

March, 4:19 p.m., $11.8 million

Property Characteristics and Operating Status

This fire started in a two-story, 1,040-square-foot (97-square-meter), single-family rental cabin of unprotected wood-frame construction. The cabin, which was empty at the time of the fire, was one of many in a resort that covered 160 acres (65 hectares) of hilly terrain.

Fire Protection Systems

It was not determined if a detection system was present. There was no sprinkler system.

Fire Development

The fire began on the rear deck near a hot tub. Although the cause of the fire could not be determined, investigators listed it as unintentional. The fire spread to 73 similar structures and the woods.

Contributing Factors and Other Details

The fire quickly escalated due to high winds, the close proximity of the structures, the steep terrain, and the poor water supply. It destroyed 53 of the cabins, damaged the other 20 to varying degrees, and injured three firefighters.

Public Assembly Properties

Missouri

Month, Time of Alarm, Dollar Loss

February, 6:04 a.m., $15 million

Property Characteristics and Operating Status

This one-story restaurant of protected noncombustible construction covered 5,000 square feet (465 square meters). The restaurant was open at the time of the explosion and fire.

Fire Protection Systems
No information was reported on automatic detection equipment. A sprinkler system providing full coverage was operating when firefighters arrived, although no information on its effectiveness was reported.

Fire Development
This explosion and fire occurred when natural gas from a damaged line outside the restaurant leaked into the building and came into contact with heat from operating cooking equipment.

Contributing Factors and Other Details
Six buildings in the area were damaged to varying degrees. The fire killed one person and injured at least 15.

Maryland

Month, Time of Alarm, Dollar Loss
October, 12:11 a.m., $10 million

Property Characteristics and Operating Status
This was a one-story pizza parlor of unprotected noncombustible construction in a strip mall that covered 240,000 square feet (22,297 square meters). Its operating status was not reported.

Fire Protection Systems
Neither automatic detection nor suppression equipment was present.

Fire Development
The fire, which was of undetermined cause, began in the food preparation and storage area. No further information was reported.

Contributing Factors and Other Details
Due to heavy smoke, extreme heat, and the lack of structural integrity of the building, firefighters abandoned their interior attack and went to a defensive attack. Damage to the structure was listed as $6 million, while damage to its contents was listed at $4 million.

Storage Properties

Indiana

Month, Time of Alarm, Dollar Loss
June, 12:59 p.m., $20 million

Property Characteristics and Operating Status
This two-story warehouse of unprotected ordinary construction, which covered 440,000 square feet (40,877 square meters), contained a 500-gallon (1,893-liter) propane tank, tires, wood pallets, shingles, siding, and heavy equipment. Whether the warehouse was operating or closed at the time of the fire is unknown.

Fire Protection Systems
No information was reported on automatic detection or suppression systems.

Fire Development
The cause of this fire was not determined. When they arrived, firefighters saw heavy fire and smoke coming from the building and noted that it had partially collapsed.

Contributing Factors and Other Details

Contributing to the difficulties of fighting the fire were 30 exploding propane tanks, the sizes of which were not reported; difficulties with private hydrants; high winds; train tracks; and spot fires caused by flying embers. Four firefighters were injured battling this fire.

Educational Properties

California

Month, Time of Alarm, Dollar Loss

January, 2:27 a.m., $10.5 million

Property Characteristics and Operating Status

This one-story, L-shaped high school of unprotected ordinary construction covered 40,000 square feet (3,716 square meters) and was closed at the time of the fire.

Fire Protection Systems

Smoke detectors were present and operated, although their coverage was not reported. There was no suppression equipment.

Fire Development

The fire began when an ice-making machine in the school's kitchen malfunctioned and overheated. The fire spread from the machine to the wall and into a void that extended to the attic without fire stops. The fire then spread throughout the attic, causing a ceiling below the fire to collapse, forcing the firefighters to withdraw and go to a defensive attack.

Contributing Factors and Other Details

Once the fire entered the void, it spread throughout the building because there were no fire stops. One firefighter was injured battling this fire.

Vehicles

Massachusetts

Month, Time of Alarm, Dollar Loss

January, 10:37 a.m., $10 million

Property Characteristics and Operating Status

The fire started in a commercial Boeing 787 jet aircraft parked at a gate at the airport.

Fire Protection Systems

No information was reported on detection or suppression equipment on the aircraft.

Fire Development

The jetliner had been parked at a gate for 15 minutes when cleaning and maintenance personnel noticed smoke in the cabin and cockpit and discovered that an auxiliary power unit had shut down automatically. Soon afterwards, a mechanic found smoke and heavy fire coming from an aft electronics bay. Investigators are still investigating a lithium-ion battery and several components from the plane's electronics bay.

Contributing Factors and Other Details

There were no passengers on board the aircraft. One firefighter was injured during the fire. An investigation by the National Transportation Safety Board (NTSB) is still underway. The NTSB's preliminary report can be found at ntsb.gov/investigations.