

**LARGE-LOSS FIRES IN THE UNITED STATES – 2003**

**Stephen G. Badger  
National Fire Protection Association  
Fire Analysis and Research Division  
1 Batterymarch Park  
Quincy, MA 02169-7471  
[www.nfpa.org](http://www.nfpa.org)**

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## Introduction

Each year, NFPA reports on large fire and explosion losses in the United States, defined as events that resulted in property damage of at least \$5 million. In 2003, fire departments in the United States responded to 1,584,500 fires. These fires caused an estimated loss of \$12.3 billion.<sup>1</sup> Many of them were small with little or no property damage reported; however, 46 resulted in losses of \$5 million or more each.<sup>2</sup> Together, these large-loss fires resulted in \$ 2,759 million in direct property loss, killed 33 civilians and one firefighter, and injured 295 firefighters and civilians. Despite the fact that these fires accounted for only 0.003 percent of all the fires estimated to have occurred in the United States last year, they accounted for 22.4 percent of the total estimated dollar loss.

The direct property loss in large-loss fires for 2003 was four times the corresponding figure in 2002, when the loss was \$698 million. Even before inflation adjustments, the number of large-loss fires in 2003 was tied as the second lowest total in the 10 years since 1994 (see Table 1 and Figure 1 and Figure 2).<sup>3</sup> The increase in the losses for 2003 are due to two wildland fires in California, where the combined loss was \$2,035 million, or 73.8 percent of the total losses.

When adjusted for inflation to 1994 dollars, the fires that occurred in 2003 categorized as large-loss (i.e., loss of \$5 million in 1994 dollars) drops to 34, with a total adjusted loss of \$2,181 million. This is the second lowest number of large-loss fires since 1994. The adjusted loss is the highest in the 10-year period and is 76 percent higher than the 10-year average adjusted loss total.

The number of large-loss fires and explosions has been trending downward over the last few years. Losses in these fires are volatile and have shown no consistent trend.

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<sup>1</sup> Michael Karter Jr. "U.S. Fire Loss in 2003," NFPA Journal, November/December 2004.

<sup>2</sup> The 46 large-loss fires of 2003 are those for which losses were reported and verified.

<sup>3</sup> The figures reported for prior years might not be the same as those originally reported, due to late arriving information.

### **Costliest fires of 2003**

In October, California was hit with the Fire Storm 2003. Wildland fires broke out throughout the state, many in wildland/urban interface areas, and many burned their way into developed areas. The losses on many have not yet been reported to NFPA. Two of the most costly fires in 2003 were part of this fire breakout.

On October 25 at 5:37 p.m., the “Cedar Fire” broke out and wasn’t fully extinguished until December 5. During the six weeks, this fire burned over 273,000 acres, and damaged or destroyed 2,275 residential properties, 22 commercial properties, 576 outbuildings, and 148 vehicles. One firefighter and 13 civilians were killed, and 104 firefighters were injured. The civilians were either trying to escape the oncoming fire or attempting to save their homes. The firefighter was overrun by fire while attempting to protect homes. The estimated loss in this fire was listed as \$1.06 billion. The cause is still under investigation.

On the same day, the second fire, known as the “Old Fire,” broke out at 9:16 a.m. This fire burned over 91,000 acres, and damaged or destroyed 993 residential properties, and 10 commercial properties, and damaged 35 structures. There were six deaths in this fire. The fire loss was estimated at \$975 million. The cause is still under investigation.

These fires were two of 20 fires that caused a loss of \$10 million or more in property damage last year (see Table 2). Together these 20 costliest incidents resulted in a combined loss of \$2,584 million. This represented 94 percent of the total dollar loss in the 46 large-loss fires for 2003, and 21 percent of the total U.S. fire loss in 2003. The “Cedar Fire” alone accounted for 13 percent of the total U.S. fire loss in 2003.

NFPA maintains a list of the 25 largest fire losses in U.S. history (see Appendix A). With the addition of the Cedar Fire and the Old Fire, this list now includes four wildfires, all since 1991, led by the Oakland Fire Storm and including the 2000 New Mexico fire whose loss was similar to the losses in this years two California wildfires.

### **Where the fires occurred**

Large-loss fires occurred in every major property category except health care and correctional facilities (see Table 3 and Figure 3). Thirteen large-loss fires occurred in manufacturing properties, resulting in \$264 million in property loss. Eleven fires occurred in special properties, resulting in \$174 million in property loss. Four fires each occurred in wildlands, stores, and offices (of which one was in an office building), and residential properties, resulting in \$2,126 million, \$47 million, and \$35 million in property loss, respectively. There were three fires each in basic industry and storage properties, resulting in \$40 million and \$19 million in property loss, respectively. There were two fires in public assembly properties, resulting in \$16 million in property loss. There was one fire each in vehicles and educational properties, resulting in losses of \$32 and \$6 million, respectively.

Forty-one of 46 of the large-loss fires for 2003 occurred in structures, with a combined loss of \$601 million. Four wildland fires and a vehicle fire accounted for the rest of the loss. Twenty of the 41 structure properties were operating at the time of the fire, including 17 at full operation, two partially operating, and one that had roofers at the premises. Another 15 were closed or had no one on the site. The operating status of the other six structures was unknown or not reported.

Eleven of the 24 structure fires with known causes were intentionally set, as was one of the wildland fires. These 12 fires accounted for 26 percent of last year's large-loss fires, and resulted in a combined property loss of \$ 1,058 million, or 38 percent of the loss in these large-loss fires.

### **Detection and suppression systems**

Of the 41 structure fires, 21 were in properties that had no automatic detection equipment present. Some form of automatic detection equipment protected 12 properties, and it was unknown or not reported if the other eight properties had any detection equipment at all. This means that only 36 percent of the properties for which the presence of detection equipment was known had some type of automatic detection system.

Of the 12 structures protected by an automatic detection system, four had complete coverage -- one by smoke detection equipment, two by combination smoke/heat detection equipment, and one by an unreported type system. Two properties had partial coverage by automatic detection equipment, both by smoke detectors. The extent of coverage of detection equipment in the other six properties wasn't reported.

Eight of the 12 systems operated. Two didn't operate -- one system wasn't complete and no reason was given for the other. The operation of the other two systems wasn't reported.

Of the 41 structures involved in large-loss fires in 2003, only 12 were equipped with automatic suppression equipment. Twenty-two definitely had no automatic suppression equipment, and it is unknown or wasn't reported whether the other seven properties had any type of suppression equipment present. This means that only 35 percent of the structures for which the presence of automatic suppression equipment was known were equipped with some sort of system.

Six of the 12 protected properties had complete coverage sprinkler systems. Five of the six had a wet-pipe system, and one had a dry-pipe system. Two properties had partial sprinkler system coverage -- one had a wet-pipe system, and the type system for the second property wasn't reported. The extent of coverage for four wasn't reported. One of the four had a wet-pipe sprinkler system, two had dry-pipe systems, and the fourth system wasn't described.

Suppression systems operated in five of the 12 properties protected; five systems did not operate. The operation of two systems is unknown or not reported. Two of the five systems that operated were effective in controlling or extinguishing the fire. Three systems were ineffective -- one each, due to being inadequate for the hazard, suffering collapse damage to the system, and not covering the area of origin. Of the five that did not operate, two systems had not yet been completely installed and so were not

operational, one system had been shut down before the fire, one system was not in the area and was not a factor, and the last system failed for an unreported reason

### **What we can learn**

In 2003, the number of large-loss fires remained the same as 2002, but the direct property loss in these fires was four times as high. In nine of the past 10 years, 1994 to 2003, there has been at least one fire with direct property loss in excess of \$100 million. In 2003, there were three fires with a loss of over \$100 million. These three fires accounted for a loss of \$2,185 million, or 79 percent of the total large loss fire loss. In only three of the past ten years has there been a billion dollar loss fire. This was one of those years.

Each year the large-loss fire study reports on the fraction of fires accounting for major losses that occurred in properties both protected and not protected by automatic detection or suppression systems. Each year a large fraction of large-loss fires are reported in properties with no such protection, with only partial protection, or with systems rendered ineffective by actions or omissions before fire began. Such was the case again this year. Initial explosions or structural collapse also sometimes damages a system to the point of being inoperable or ineffective, and sometimes systems were installed but not completed.

Table 4 shows that of the 33 structures for which the presence of both detection and suppression systems was fully reported, seven had both detection and suppression systems, five had just an automatic suppression system, and five had just an automatic detection system, and 16 had neither.

Adherence to the fire protection principles reflected in NFPA's codes and standards is essential to reducing the occurrence of large-loss fires and explosions in the United States. Human error or negligence is a major contributing factor in today's fires, but proper design, maintenance, and operation of fire protecting systems and features can keep a fire that starts through human error from becoming a large-loss fire. Reducing the risk of explosions is also important. Proper construction, storage methods, and housecleaning will make fires less likely and help control or limit the fire spread if fire occurs.

**Where we get our data**

The NFPA collects its data by reviewing national and local news media, including fire service publications. A clipping service reads all U.S. daily newspapers and notifies the NFPA's Fire Analysis and Research Division of major large-loss fires. The NFPA's annual survey of the U.S. fire experience is an additional data source, although not the principal one. We also contact federal agencies that have participated in investigations, the state fire marshal's offices, and military sources. Once an incident has been identified, we request information from the fire department or the agency having jurisdiction.

The diversity and redundancy of these data sources enables the NFPA to collect the most complete data available on large-loss fires.

**About the author**

Stephen G. Badger is a member of the NFPA Fire Analysis and Research Division, and is a retired firefighter from the Quincy, Massachusetts Fire Department.

**Acknowledgments**

NFPA thanks the U.S. fire service for its contributions of data, without which this report would not be possible. In many cases, the fire departments were unable to contribute information to NFPA because legal action is pending or ongoing, or they are unable to determine many pieces of information we need to make our study as complete as possible. The author wishes to thank Norma Candeloro for providing the support this study requires.

**Table 1.**  
**Large-Loss Fires that Caused \$5 million or More in Property Damage, 1994 - 2003**

<b>Year</b>	<b>Number of Fires</b>	<b>Number of Fires Causing \$5 million or More in 1994 Dollars</b>	<b>Property Loss (unadjusted) (in millions)</b>	<b>Property Loss 1994 Dollars (in millions)</b>
1994	52	52	\$837	\$837
1995	44	30	\$1,362	\$1,253
1996	63	55	\$1,544	\$1,414
1997	57	41	\$885	\$740
1998	57	45	\$1,167	\$1,006
1999	67	52	\$2,285	\$1,966
2000	65	51	\$2,029	\$1,683
2001*	52	39	\$978	\$766
2002	46	36	\$698	\$528
2003	46	34	\$2,759	\$2,181

\* Excluding the 9/11/01 World Trade center Incident from the loss totals and fire incident totals.

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 1994 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 \$10 Million or More in 2003**

<b>Incident and Location</b>	<b>Loss in Millions</b>
Wildland fire, California	\$1,060
Wildland fire, California	975
Pharmaceutical plant, explosion and fire, North Carolina	150
High-rise office building under construction, New York	80
Wildland fire, Arizona	70
Aircraft fire on runway, Tennessee	32
Manufacturing plant, Georgia	30
Medical office building, Pennsylvania	23
Wildland fire, California	21
Electric sub-station, California	20
Building under construction, Iowa	15
Railroad trestle, Georgia	15
Building under construction, Nevada	15
Manufacturing plant, Kentucky	14
Apartment house, Virginia	13
Single-family home, Texas	11
Museum, Maryland	10
Electric sub-station, Michigan	10
Electric sub-station, Virginia	10
Steel manufacturing plant, Ohio	10
 Total – 20 Fires	 \$2,584

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

**Table 3.  
Large-Loss Fires by Major Property Use Classification**

<b>Property Use</b>	<b>Number of Fires</b>	<b>Percent of Fires</b>	<b>Total Dollar Loss (in millions)</b>	<b>Percent of Loss</b>
Manufacturing	13	28%	\$264	9.6%
Special Properties	11	24%	\$174	6.3%
Wildlands	4	9%	\$2,126	77.1%
Stores and Offices	4	9%	\$47	1.7%
Residential	4	9%	\$35	1.3%
Industry	3	7%	\$40	1.4%
Storage	3	7%	\$19	0.7%
Public Assembly	2	4%	\$16	0.6%
Vehicle	1	2%	\$32	1.2%
Educational	1	2%	\$6	0.2%
<b>Total</b>	<b>46</b>	<b>100%</b>	<b>\$2,759</b>	<b>100.0%</b>

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

**Table 4**  
**2003 Large-Loss Incidents**

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**MANUFACTURING**

**North Carolina**

**Dollar Loss:** \$150,000,000

**Month:** January

**Time:** 1:27 p.m.

**Property Characteristics and Operating Status:** No property characteristics were reported on this pharmaceutical plant. The plant was operating at the time of the explosion and fire.

**Fire Protection Systems:** No information reported.

**Fire Development:** An unknown ignition source ignited polyethylene dust particles released during the manufacturing of rubber products. The dust built up above ceiling tiles of a dropped ceiling. This ignition caused a dust explosion, and a fire followed.

**Contributing Factors and Other Details:** There were 6 deaths and 34 injuries reported.

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**Georgia**

**Dollar Loss:** \$30,000,000

**Month:** May

**Time:** 7:46 a.m.

**Property Characteristics and Operating Status:** This two-story food-preparation plant was of unprotected, noncombustible construction and covered 120,000 square feet (11,148 square meters). The plant was in full operation at the time of the fire.

**Fire Protection Systems:** No automatic detection or suppression systems were present.

**Fire Development:** A fire of undetermined cause broke out in a first-story equipment area, near a cooker that was used to place char marks on cooked chicken.

**Contributing Factors and Other Details:** Three injuries reported.

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**Kentucky**

**Dollar Loss:** \$14,000,000

**Month:** February

**Time:** 7:31 a.m.

**Property Characteristics and Operating Status:** This two-story automobile insulation plant of unprotected noncombustible construction covered 300,000 square feet (27,870 square meters). It was in full operation at the time of the explosion and fire.

**Fire Protection Systems:** A complete coverage, combination heat and smoke detection equipment was present. The system activated. There was a complete coverage, wet-pipe sprinkler system. The system operated and kept the fire from spreading.

**Fire Development:** The fire was in a curing oven used for fiberglass panels involved residual products. The open oven door allowed fire to ignite airborne fiberglass particles, which created an explosion.

**Contributing Factors and Other Details:** The explosion and flame caught workers at or near their workstations resulting in 7 deaths and 36 injuries. Loss to building was \$4,000,000 and loss to its contents was \$10,000,000.

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**Ohio**

**Dollar Loss:** \$10,000,000

**Month:** August

**Time:** 4:32 p.m.

**Property Characteristics and Operating Status:** This five-story blast furnace of unprotected noncombustible construction covered 36,000 square feet (3,344 square meters) and was in full operation at the time of the fire.

**Fire Protection Systems:** No automatic detection or suppression systems were present.

**Fire Development:** An electrical failure that occurred during a multi-state blackout caused the fire, however, the exact sequence of events wasn't reported.

**Contributing Factors and Other Details:** None reported.

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**North Carolina****Dollar Loss:** \$9,000,000**Month:** December**Time:** 12:24 p.m.

**Property Characteristics and Operating Status:** This one-story plastics item manufacturing plant of heavy timber construction covered 18,000 square feet (1,672 square meters) and was in full operation at the time of the fire.

**Fire Protection Systems:** No automatic detection equipment was present. A complete coverage wet-pipe sprinkler system was present and operated but it was ineffective due to damage from a collapse that caused a large loss of water to other sections of the system.

**Fire Development:** Welding on a piece of machinery ignited a pile of polyester waste on the floor. Employees attempted to extinguish the blaze with hand-held extinguishers but were unsuccessful against a large, spreading fire.

**Contributing Factors and Other Details:** Three firefighters were injured and loss to building was \$5,000,000 and loss to contents was \$4,000,000.

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**Louisiana****Dollar Loss:** \$8,000,000**Month:** April**Time:** 9:22 p.m.

**Property Characteristics and Operating Status:** This one-story, 20-foot-high (6-meter) bag manufacturing plant of unprotected noncombustible construction that covered 133,000 square feet (12,356 square meters) was closed for the night when the fire broke out.

**Fire Protection Systems:** No information was reported on automatic detection equipment and no automatic suppression equipment was present.

**Fire Development:** A fire of undetermined cause broke out in a loading-dock area.

**Contributing Factors and Other Details:** Access was limited due to parked vehicles and the large demand placed on the water system limited the hose streams needed for protecting exposures and fire extinguishment. There was an area evacuation due to hazardous materials in the plant. Loss to building was \$3,000,000 and loss to contents was \$5,000,000.

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**Ohio****Dollar Loss:** \$8,000,000**Month:** August**Time:** 11:48 a.m.

**Property Characteristics and Operating Status:** This grain processing area of protected noncombustible construction was in full operation at the time of the explosion and fire. The area covered wasn't reported. The site also contained several 7-story concrete silos. Fire Protection Systems: No information was reported on automatic detection equipment. No automatic suppression equipment was present.

**Fire Development:** The ignition source of this dust explosion is undetermined. Walls were blown out some 50 feet to 60 feet (15 meters to 18 meters). Ashock wave and fireball traveled up a 7-story silo.

**Contributing Factors and Other Details:** One civilian was killed. Three civilians and a firefighter were injured.

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**Iowa****Dollar Loss:** \$6,700,000**Month:** December**Time:** 12:40 p.m.

**Property Characteristics and Operating Status:** This two-story food preparation plant was operating at the time of the fire. The size and type of construction wasn't reported.

**Fire Protection Systems:** The plant's system of smoke detection equipment operated, but the coverage wasn't reported. No automatic suppression equipment was present.

**Fire Development:** A fire of unknown origin broke out in the service area. No other information was reported.

**Contributing Factors and Other Details:** Loss to building was \$1,950,000 and loss to contents was \$4,750,000.

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**California****Dollar Loss:** \$6,250,000**Month:** October**Time:** 5:29 a.m.

**Property Characteristics and Operating Status:** This two-story metal products plant of protected noncombustible construction covered 56,250 square feet (5,225 square meters) and was closed for the night when the fire broke out.

**Fire Protection Systems:** No automatic detection equipment was present. A complete coverage wet-pipe sprinkler system was present and operated with 12 heads opening, which helped to control the fire. An alarm sounded and an alarm company notified the fire department.

**Fire Development:** This incendiary fire was ignited in multiple locations on the plant's second floor.

**Contributing Factors and Other Details:** Loss to building was \$3,000,000 and loss to contents was \$3,250,000.

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**Kansas**

**Dollar Loss:** \$5,800,00

**Month:** May

**Time:** 1:52 a.m.

**Property Characteristics and Operating Status:** This one-story food preparation plant covered 19,000 square feet (1,765 square meters) and was in full operation when the fire broke out. The type of construction wasn't reported.

**Fire Protection Systems:** Automatic detection equipment was present but the type, coverage, and operation weren't reported. No automatic suppression equipment was present.

**Fire Development:** This fire broke out in the processing area when a failure in the heating equipment ignited structural insulation.

**Contributing Factors and Other Details:** None reported.

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**Washington**

**Dollar Loss:** \$5,500,000

**Month:** August

**Time:** 8:27 p.m.

**Property Characteristics and Operating Status:** This two-story metal products plant was of heavy timber construction and covered 45,000 square feet (4,180 square meters). The plant was operating when the fire broke out.

**Fire Protection Systems:** No automatic detection or suppression systems were present.

**Fire Development:** A spontaneous ignition of rags in the spray booth area caused the fire, which spread throughout the building and through the roof.

**Contributing Factors and Other Details:** Loss to building was \$3,000,000 and loss to contents was \$2,500,000.

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**California**

**Dollar Loss:** \$5,460,000

**Month:** February

**Time:** 1:30 a.m.

**Property Characteristics and Operating Status:** This one-story apparel plant of protected noncombustible construction covered 20,000 square feet (1,858 square meters) and was closed when the fire broke out.

**Fire Protection Systems:** No automatic detection or suppression systems were present.

**Fire Development:** This incendiary fire was set in a large textiles pile against the plant's rear exterior. Radiant heat entered through windows and ignited the interior then spread throughout the plant.

**Contributing Factors and Other Details:** A flashover occurred within 5 minutes of the fire department's arrival forcing firefighters to a defensive attack. Loss to the building was \$960,000 and loss to contents was \$4,500,000.

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**California**

**Dollar Loss:** \$5,000,000

**Month:** November

**Time:** 7:15 p.m.

**Property Characteristics and Operating Status:** This one-story manufacturing plant) of protected noncombustible construction covered 25,000 square feet (2,322 square meters) was closed for the night when the fire broke out.

**Fire Protection Systems:** No automatic detection or suppression systems were present.

**Fire Development:** A fire of undetermined cause broke out in the processing area.

**Contributing Factors and Other Details:** Loss to the building was \$2,000,000 and loss to the contents was \$3,000,000.

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## SPECIAL PROPERTIES

### New York

**Dollar Loss:** \$80,000,000

**Month:** April

**Time:** 12:30 p.m.

**Property Characteristics and Operating Status:** This 53-story high-rise office building was still under construction at the time of the fire.

**Fire Protection Systems and Fire Development:** No information reported.

**Contributing Factors and Other Details:** Twelve firefighters were injured.

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### Iowa

**Dollar Loss:** \$15,000,000

**Month:** April

**Time:** 5:28 a.m.

**Property Characteristics and Operating Status:** This five-story apartment complex of unprotected ordinary construction was still under construction. The ground floor area was not reported. No one was on the site when the fire broke out.

**Fire Protection Systems:** No automatic detection equipment was present. A complete coverage dry-pipe sprinkler system was present but the installation wasn't complete, so the system wasn't operational.

**Fire Development:** A passerby discovered this fire of undetermined origin. The complex was fully engulfed in fire when firefighters arrived.

**Contributing Factors and Other Details:** Two firefighters were injured.

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### Georgia

**Dollar Loss:** \$15,000,000,

**Month:** May

**Time:** 3:43 p.m.

**Property Characteristics and Operating Status:** A railroad trestle of heavy creosote-soaked timber construction.

**Fire Protection Systems:** No automatic detection or suppression systems were present.

**Fire Development:** High winds fanned a wildland fire back to life after it was thought to be extinguished. The fire jumped its breaks and burned unnoticed underneath the trestle until it ignited structural members. When firefighters arrived, 600 feet (182 meters) of the trestle was burning.

**Contributing Factors and Other Details:** One firefighter was injured. With poor access to the trestle, apparatus was unable to get near it. Firefighters using boats had problems at low tide until they obtained a swamp boat.

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**Nevada**

**Dollar Loss:** \$15,000,000

**Month:** September

**Time:** 8:27 p.m.

**Property Characteristics and Operating Status:** This two-story apartment complex of unprotected wood frame construction covered 30,000 square feet (2,787 square meters) and was under construction. No one was on the site at the time of the fire.

**Fire Protection Systems:** A detection system was present and activated, however the type and coverage weren't reported. No information was reported on any automatic suppression equipment.

**Fire Development:** Firefighters arriving at this incendiary fire found several multi-family dwellings fully engulfed in fire. The fire spread to, and destroyed or damaged, 23 structures.

**Contributing Factors and Other Details:** The fire spread rapidly due to the openness of the structures in the building phase.

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**California**

**Dollar Loss:** \$9,000,000

**Month:** May

**Time:** 4:38 a.m.

**Property Characteristics and Operating Status:** This three-story apartment was of unprotected wood frame construction. The ground floor area was not reported. No one was on the site at the time of the fire.

**Fire Protection Systems:** No automatic detection or suppression systems were present and the structures were still under construction.

**Fire Development:** Firefighters responding to this incendiary fire found two, three-story apartment buildings fully involved in fire and spreading rapidly. This fire destroyed or damaged numerous structures still in the construction phase, as well as several vehicles.

**Contributing Factors and Other Details:** Four firefighters were injured. Large amount of exposed wood spread the fire rapidly. Loss to the building was \$8,000,000 and loss to contents was \$1,000,000.

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**Oregon**

**Dollar Loss:** \$8,020,000

**Month:** March

**Time:** 6:23 a.m.

**Property Characteristics and Operating Status:** This three-story unprotected wood-frame apartment building that was under construction covered 75,000 square feet (6,967 square meters). The operating status wasn't reported.

**Fire Protection Systems:** No automatic detection or suppression systems were present.

**Fire Development:** Firefighters arriving at this incendiary fire found the structure heavily involved. The fire entered the attic area of a nearby-occupied senior citizen housing and burned throughout.

**Contributing Factors and Other Details:** One firefighter, two senior home occupants and a police officer who was assisting in evacuations, were injured. Open construction allowed the fire to spread rapidly. Loss to the building was \$6,500,000 and loss to contents \$1,520,000.

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**Minnesota**

**Dollar Loss:** \$8,000,000

**Month:** June

**Time:** 3:48 a.m.

**Property Characteristics and Operating Status:** This three to five-story, multi-family dwelling complex of unprotected wood frame construction was still under construction and covered an entire block. No one was on the site at the time of the fire.

**Fire Protection Systems:** No automatic detection or suppression systems were present.  
**Fire Development:** The fire's cause and origin are undetermined. Eight dwellings and several vehicles were destroyed or damaged.

**Contributing Factors and Other Details:** Two firefighters were injured. High winds contributed to the number of exposure fires.

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**New York****Dollar Loss:** \$7,000,000**Month:** March**Time:** 4:17 a.m.

**Property Characteristics and Operating Status:** This two-story adult group residence of unprotected wood frame construction covered 31,000 square feet (2,879 square meters) and was under construction. No one was on the site at the time of the fire.

**Fire Protection Systems:** Complete coverage automatic detection equipment of an unreported type was present, but not operational. A sprinkler system was installed but the type and coverage weren't reported. This system also was not yet operational.

**Fire Development:** This fire originated in the basement. A propane-fueled portable heater used to dry recently installed tile was too close to the combustible walls. Firefighters found the structure fully involved in fire when they arrived.

**Contributing Factors and Other Details:** One firefighter was injured.

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**Nevada****Dollar Loss:** \$6,900,000**Month:** January**Time:** 2:32 a.m.

**Property Characteristics and Operating Status:** This three-story apartment complex was of unprotected wood-frame construction, covered 50,000 square feet (4,645 square meters), and was still in the construction phase. No information was reported on the operation of the site.

**Fire Protection Systems:** No information was reported.

**Fire Development:** Firefighters arrived to find this incendiary fire had spread to and engulfed the entire project. At least three dwellings were damaged or destroyed.

**Contributing Factors and Other Details:** None reported.

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**Nevada****Dollar Loss:** \$5,500,000**Month:** May**Time:** 1:18 a.m.

**Property Characteristics and Operating Status:** This two- and three-story vacant casino of unprotected ordinary construction covered 10,000 square feet (929 square meters) was on the National Registry of Historic Places. No one was at the property when the fire broke out.

**Fire Protection Systems:** No automatic detection or suppression systems were present.

**Fire Development:** An incendiary fire was set on first floor.

**Contributing Factors and Other Details:** One firefighter and two civilians were injured.

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**Connecticut****Dollar Loss:** \$5,000,000**Month:** July**Time:** 4:34 p.m.

**Property Characteristics and Operating Status:** This three-story, vacant mill of heavy timber construction covered 48,060 square feet (4,464 square meters). No one was on the property when the fire broke out.

**Fire Protection Systems:** No automatic detection or suppression systems were present.

**Fire Development:** The fire's cause is undetermined. Upon arrival, firefighters found the entire building fully involved. The fire destroyed or damaged 10 structures.

**Contributing Factors and Other Details:** None reported.

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**WILDLANDS****California****Dollar Loss:** \$1,060,000,000**Month:** October**Time:** 5:37 p.m.

**Property Characteristics and Operating Status:** Wildland-urban interface

**Fire Development:** The cause is under investigation. This wildland fire burned 208,000 acres (84,175 hectares), and destroyed or damaged 2,444 homes, 155 commercial properties, and 3,356 vehicles.

**Contributing Factors and Other Details:** One firefighter was killed protecting a dwelling, and 104 firefighters were injured. Thirteen civilians also died and 9 were injured. The civilians were killed while attempting to escape or protecting their homes.

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**California**

**Dollar Loss:** \$975,000,000

**Month:** October

**Time:** 9:16 a.m.

**Property Characteristics and Operating Status:** Wildland-urban interface.

**Fire Development:** This fire was the result of two fires merging; the Old Fire and Grand Prix fire. The cause of the Old Fire was determined to be incendiary but the cause of the Grand Prix is undetermined. This combined wildland fire burned 150,729 acres (60,998 hectares), destroyed, or damaged 1,234 homes, 12 commercial properties, 70 outbuildings, 129 vehicles, and 36 miscellaneous properties.

**Contributing Factors and Other Details:** Six civilians were killed in this fire. There were 47 people injured but it wasn't reported whether they were firefighters or civilians. Deaths occurred as civilians attempted escape or tried to protect their property.

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**Arizona**

**Dollar Loss:** \$70,000,000

**Month:** June

**Time:** 3:00 p.m.

**Property Characteristics and Operating Status:** Wildland-urban interface. National Forest. Area consisted of heavy brush, ponderosa pine, mixed conifer, oak, and chaparral.

**Fire Development:** The cause is under investigation. This fire burned 84,750 acres (34,297 hectares) and destroyed 322 homes and cottages, 7 commercial properties and 4 outbuildings.

**Contributing Factors and Other Details:** None reported.

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**California**

**Dollar Loss:** \$20,900,000

**Month:** October

**Time:** 2:15 a.m.

**Property Characteristics and Operating Status:** Wildland-urban interface.

**Fire Development:** The cause is undetermined. Fire burned 108,204 acres (43,789 hectares) and destroyed 37 residential properties, 278 outbuildings, and 17 vehicles. Thirty-two structures were damaged.

**Contributing Factors and Other Details:** Twenty-one injuries were reported, but it's unknown whether they were firefighters or civilians.

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**STORES AND OFFICES****Pennsylvania**

**Dollar Loss:** \$23,000,000

**Month:** June

**Time:** 7:30 a.m.

**Property Characteristics and Operating Status:** This three-story medical office building of heavy timber construction covered 30,000 square feet (2,787 square meters). This building was originally built as a shirt-making factory, but later renovated for offices. The building was opening for the day.

**Fire Protection Systems:** No automatic detection or suppression systems were present.

**Fire Development:** A short circuit ignited wood structural members in the attic. Fire spread through a 4- to 6-foot (1.2-meter to 1.8-meter) void.

**Contributing Factors and Other Details:** There was a delay in the fire's discovery due to it starting in a void space. Loss to the building was \$20,000,000 and loss to the contents was \$3,000,000

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**Arizona**

**Dollar Loss:** \$9,260,000

**Month:** March

**Time:** 11:59 a.m.

**Property Characteristics and Operating Status:** This two-story furniture store of unprotected ordinary construction covered 30,000 square feet (9,144 square meters).

There was a tent in front of the store with sales items. The store was open at the time of the fire.

**Fire Protection Systems:** There was a system of unreported type detectors. The coverage was not reported, but the system operated once the fire extended into the store. No automatic suppression equipment was present.

**Fire Development:** The fire in this store was an exposure fire. An improperly discarded cigarette blew into the display tent and ignited cardboard boxes. The fire spread rapidly throughout the tent and spread into the store.

**Contributing Factors and Other Details:** There was a delay in notifying the fire department as employees attempted to extinguish the fire with a garden hose. High winds of 35 mph and gusts to 45 mph fanned the fire. Three firefighters were injured.

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### **Maryland**

**Dollar Loss:** \$9,000,000

**Month:** March

**Time:** 8:54 p.m.

**Property Characteristics and Operating Status:** This one-story grocery store of protected noncombustible construction was open at the time of the fire. The ground floor area wasn't reported.

**Fire Protection Systems:** No automatic detection equipment was present. There was a sprinkler system present, but its type, coverage, and operation weren't reported.

**Fire Development:** This incendiary fire was ignited in merchandise on the sales floor.

**Contributing Factors and Other Details:** None reported.

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### **Ohio**

**Dollar Loss:** \$5,300,000

**Month:** November

**Time:** 2:52 a.m.

**Property Characteristics and Operating Status:** This two-story antique and craft store of unprotected ordinary construction covered 2,100 square feet (195 square meters). This shop was in a block of stores in a downtown area and was closed for the night.

**Fire Protection Systems:** There was no detection equipment in the store of origin. There was a system in an adjacent store that activated. No automatic suppression equipment was present.

**Fire Development:** This incendiary fire was set in available combustibles to cover up a break-in. The fire spread to stores on both sides.

**Contributing Factors and Other Details:** Live electrical wires at the rear of the building delayed the fire attack at that position. Four stores were destroyed or damaged. The building loss was \$5,000,000 and the loss to contents was \$300,000.

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## RESIDENTIAL

### Virginia

**Dollar Loss:** \$12,823,900

**Month:** February

**Time:** 4:45 a.m.

**Property Characteristics and Operating Status:** This 4-story senior citizen apartment house of protected wood-frame construction contained 100 units and covered 23,536 square feet (2,186 square meters). Of the 100 units, 81 were occupied.

**Fire Protection Systems:** There was a complete coverage combination heat and smoke detection equipment. The system operated but it wasn't in the area of origin. An arriving police officer activated a manual pull station to sound the alarm. There was a complete coverage wet-pipe sprinkler system but one head operated. This system also was not in the area of origin (outside balcony).

**Fire Development:** The cause of this fire is undetermined and it originated on a third-story balcony. The fire spread up the exterior and entered the attic through roof soffits. The fire spread horizontally then down to the apartments on the fourth and third floors.

**Contributing Factors and Other Details:** The balconies were of combustible materials, allowing for ignition. Two firefighters were injured. Loss to the building was \$9,823,900 and loss to contents was \$3,000,000.

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### Texas

**Dollar Loss:** \$11,000,000

**Month:** November

**Time:** 8:52 p.m.

**Property Characteristics and Operating Status:** This three-story, single-family house of unprotected ordinary construction covered 5,400 square feet (501 square meters). The occupants were away at the time of the fire.

**Fire Protection Systems:** There was a complete coverage smoke detection system that activated and alerted a central station alarm company. A residential sprinkler system

present, but the coverage wasn't reported. The system was not operational at the time of the fire. The reason for this was not reported, nor was the coverage.

**Fire Development:** An electrical short circuit in a concealed space between the first and second story ignited structural members and traveled upward through electrical chases to the attic.

**Contributing Factors and Other Details:** There was a gated entry to the property, a narrow driveway, and double security doors at all the entrances. Firefighters had made two previous responses to the residence for alarm activation but found no evidence of smoke or fire to justify a forced entry. Loss to the house was \$10,000,000 and loss to contents was \$1,000,000.

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## Georgia

**Dollar Loss:** \$6,000,000

**Month:** May

**Time:** 2:52 p.m.

**Property Characteristics and Operating Status:** This two-story single-family summer-rental property of unprotected wood frame construction covered 1,081 square feet (100 square meters). This dwelling was beachfront property and empty except for workers there at the time of the fire.

**Fire Protection Systems:** No automatic detection or suppression systems were present.

**Fire Development:** The open flame from a roofer's torch contacted wood roofing members. The fire smoldered unnoticed and after the roofers left, the winds off the water fanned the fire to a flaming stage. From this point, the fire spread rapidly and eventually destroyed or damaged three properties.

**Contributing Factors and Other Details:** Winds off the water increased the rate of fire spread. There was only a 9-foot separation between structures and access to one side of the structures was limited to foot traffic due to location on the beach. Loss to the structures was \$5,527,000 and loss to contents was \$473,000.

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## Texas

**Dollar Loss:** \$5,220,000

**Month:** March

**Time:** 12:05 a.m.

**Property Characteristics and Operating Status:** This three-story, single-family dwelling of protected wood-frame construction covered 14,585 square feet (1,354 square meters) and was occupied when the fire broke out.

**Fire Protection Systems:** A partial coverage smoke detection system present operated and a partial coverage sprinkler system was present. The type and operation weren't reported, but the system wasn't in the area of origin.

**Fire Development:** The cause is undetermined. Arriving firefighters found a fire in the ceiling between the first and second story, which spread rapidly in voids throughout the house. Firefighters were forced to a defensive attack.

**Contributing Factors and Other Details:** Loss to the house was \$3,250,000 and loss to contents was \$1,970,000.

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## INDUSTRY

### California

**Dollar Loss:** \$20,000,000

**Month:** March

**Time:** 6:39 p.m.

**Property Characteristics and Operating Status:** Operating electrical substation - 500-kilovolt (kV).

**Fire Protection Systems:** No information was reported.

**Fire Development:** This fire was caused by an electrical failure in a transformer. Arriving firefighters found three transformers involved in fire and a large amount of mineral oil used to insulate the transformers was burning. The fire department was assisted by an Air Force crash truck, which applied foam to the surrounding structures.

**Contributing Factors and Other Details:** The fire occurred in a remote area, making long hose layouts necessary.

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### Michigan

**Dollar Loss:** \$10,000,000

**Month:** October

**Time:** 11:45 a.m.

**Property Characteristics and Operating Status:** Operating electrical sub-station.

**Fire Protection Systems:** No information was reported.

**Fire Development:** Arcing in electrical equipment in a conduit ignited mineral oil.

**Contributing Factors and Other Details:** Firefighters couldn't access the fire area because of a gated entry and charged electrical equipment.

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**Virginia**

**Dollar Loss:** \$10,000,000

**Month:** November

**Time:** 8:54 a.m.

**Property Characteristics and Operating Status:** Operating electrical sub-station.

**Fire Protection Systems:** No automatic detection or suppression systems were present.

**Fire Development:** Several telephone poles were knocked over during high winds and one caused a fault in a nearby transformer. When the system attempted to reset itself, an explosion occurred, breaching the transformer, allowing hundreds of gallons of mineral oil to escape and ignite. The exact point of origin couldn't be determined due to the amount of fire damage.

**Contributing Factors and Other Details:** None reported.

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**STORAGE****Illinois**

**Dollar Loss:** \$6,800,000

**Month:** October

**Time:** 4:03 a.m.

**Property Characteristics and Operating Status:** This three-story warehouse containing tires was of heavy timber construction and covered 150,000 square feet (13,935 square meters). The warehouse was closed for the weekend.

**Fire Protection Systems:** No automatic detection equipment was present. A complete coverage wet-pipe sprinkler system was present and operated, but was ineffective due to the large fire load.

**Fire Development:** The cause is undetermined.

**Contributing Factors and Other Details:** Fire growth was extremely fast due to the fire load. Firefighters were forced to withdraw to a defensive attack. Two firefighters were injured. Loss to the building was \$800,000 and loss to contents was \$6,000,000.

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**New York****Dollar Loss:** \$6,324,000**Month:** April**Time:** 9:14 p.m.

**Property Characteristics and Operating Status:** This one-story rubber products warehouse was operating when the fire broke out. The construction method and ground floor area weren't reported.

**Fire Protection Systems:** There was automatic detection equipment present, but the type and coverage weren't reported. The system didn't operate and the reason for this wasn't reported. There was a dry-pipe sprinkler present, but the coverage was not reported. This system also failed to operate but no reason for this was reported.

**Fire Development:** This incendiary fire was set in rubber goods stored on pallets in the shipping area.

**Contributing Factors and Other Details:** One firefighter was injured. Loss to the building was \$3,000,000 and loss to the contents was \$3,324,000.

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**California****Dollar Loss:** \$6,000,000**Month:** September**Time:** 10:29 p.m.

**Property Characteristics and Operating Status:** No details were reported on this storage facility fire.

**Fire Protection Systems and Fire Development:** No details reported.

**Contributing Factors and Other Details:** None reported

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**PUBLIC ASSEMBLY****Maryland****Dollar Loss:** \$10,150,000**Month:** September**Time:** 2 00 a.m.

**Property Characteristics and Operating Status:** This 20-foot-high (6-meter) vehicle museum was of unprotected ordinary construction and covered 4,000 square feet (371 square meters). The museum was closed for the night.

**Fire Protection Systems:** No automatic detection or suppression systems were present.

**Fire Development:** Cause is undetermined. The police department discovered the fire when they responded to motion detector activation in the building. The fire destroyed several old vehicles stored in the building.

**Contributing Factors and Other Details:** Loss to the building was \$150,000 and loss to contents was \$10,000,000.

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**Georgia**

**Dollar Loss:** \$6,000,000

**Month:** July

**Time:** 5:50 p.m.

**Property Characteristics and Operating Status:** This 7-story university library of protected noncombustible construction covered 200,000 square feet (18,580 square meters). There was an older (the original) building attached and the building was open and operating at the time of the fire.

**Fire Protection Systems:** A partial coverage smoke detection system was present and it activated, notifying the fire department. There was partial coverage wet-pipe system, but not in the area of origin.

**Fire Development:** This incendiary fire was set in a second-story storage area. The fire was contained to the floor of origin. An arson arrest has been made in the case.

**Contributing Factors and Other Details:** Loss to the building was \$1,000,000 and loss to the contents was \$5,000,000.

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**EDUCATIONAL**

**California**

**Dollar Loss:** \$5,750,000

**Month:** November

**Time:** 9:37 p.m.

**Property Characteristics and Operating Status:** This one-story elementary school covered 20,000 square feet (1,858 square meter). The construction method and operating status weren't reported.

**Fire Protection Systems:** Smoke detection equipment was present, but the coverage and activation weren't reported. No automatic suppression equipment was present.

**Fire Development:** The cause is undetermined. Neighbors spotted smoke issuing from the building and called 911.

**Contributing Factors and Other Details:** Two firefighters were injured. Loss to the building was \$5,000,000 and loss to the contents was \$750,000.

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## VEHICLE

**Tennessee**

**Dollar Loss:** \$32,000,000

**Month:** December

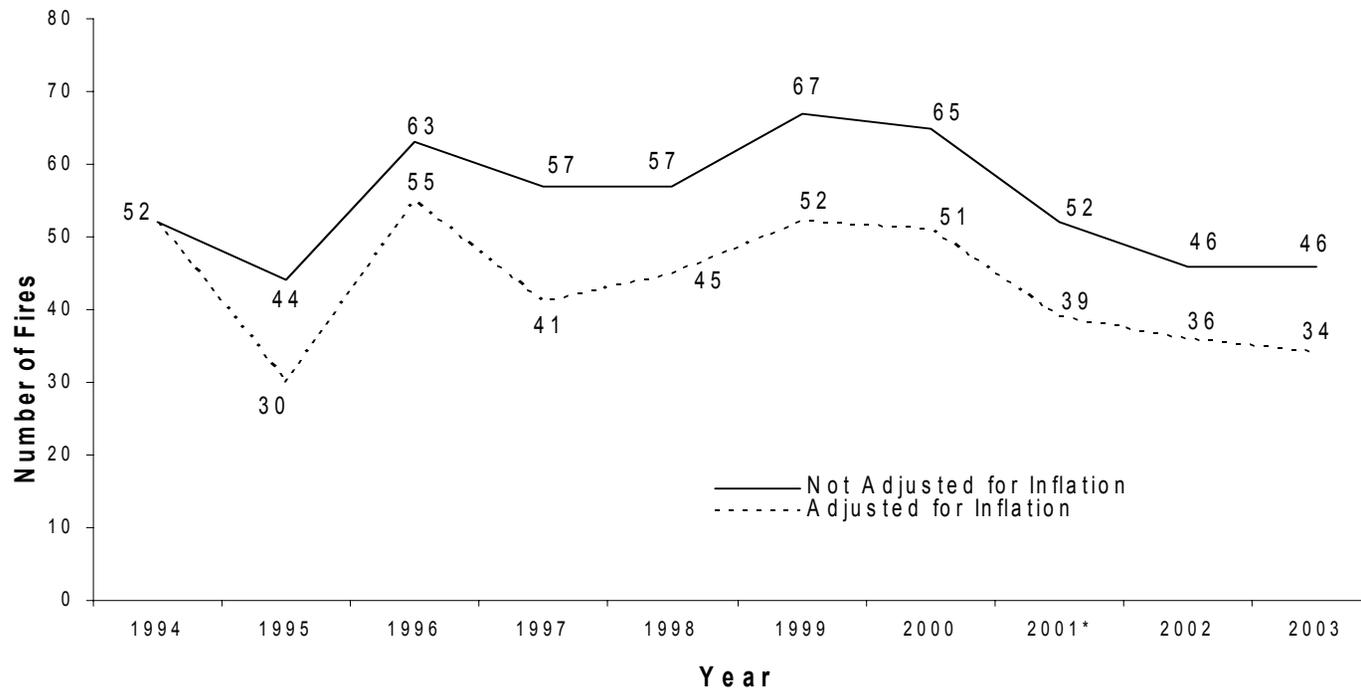
**Time:** 12:26 p.m.

**Property Characteristics and Operating Status:** This fire involved a cargo aircraft on landing at an operating airport.

**Fire Development:** A crash during landing caused the wing to contact the ground and ignite. The fire destroyed the wing and the cargo area loaded with packages.

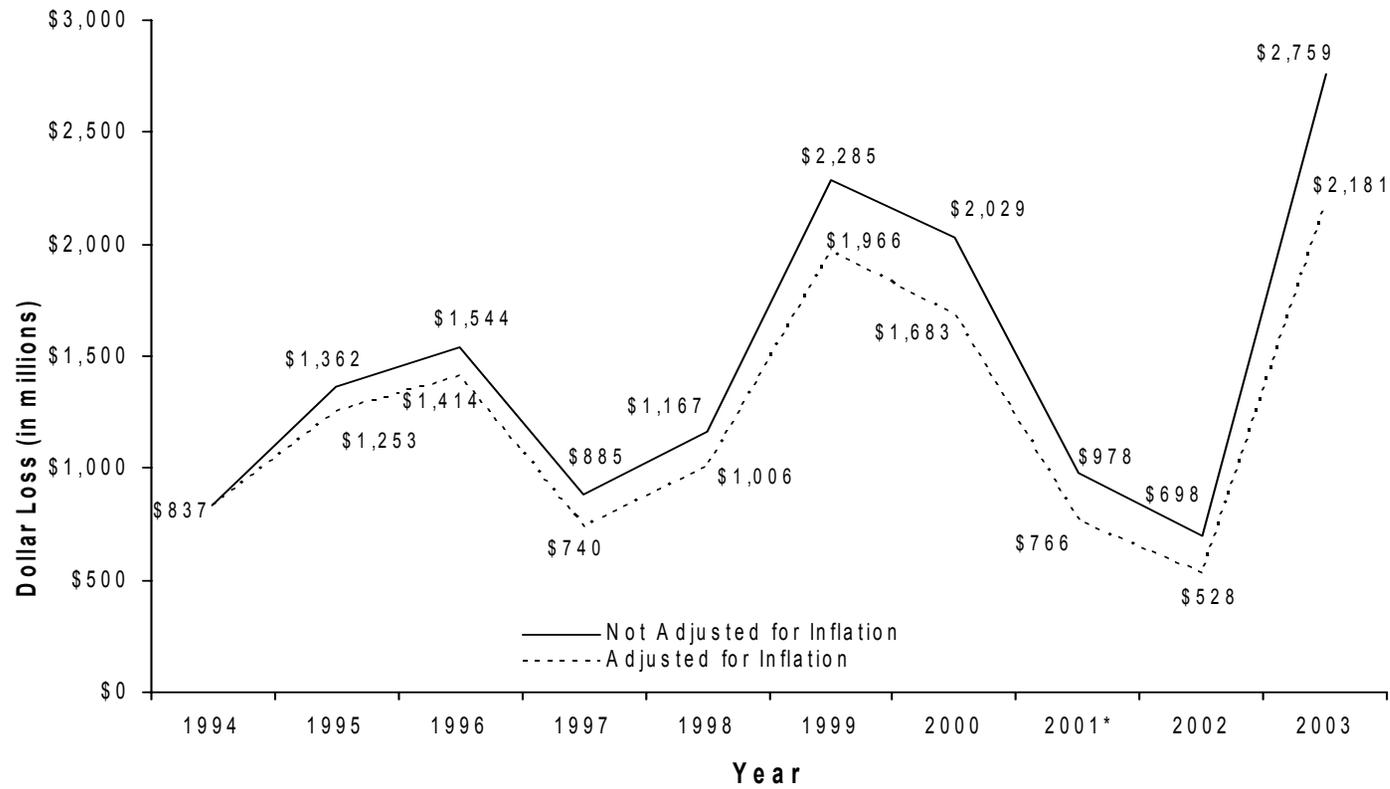
**Contributing Factors and Other Details:** Two crewmembers were injured by fire and smoke. An FAA report is pending.

**Figure 1**  
**Large-Loss Fires, 1993-2002**  
**Unadjusted and Adjusted for Inflation**



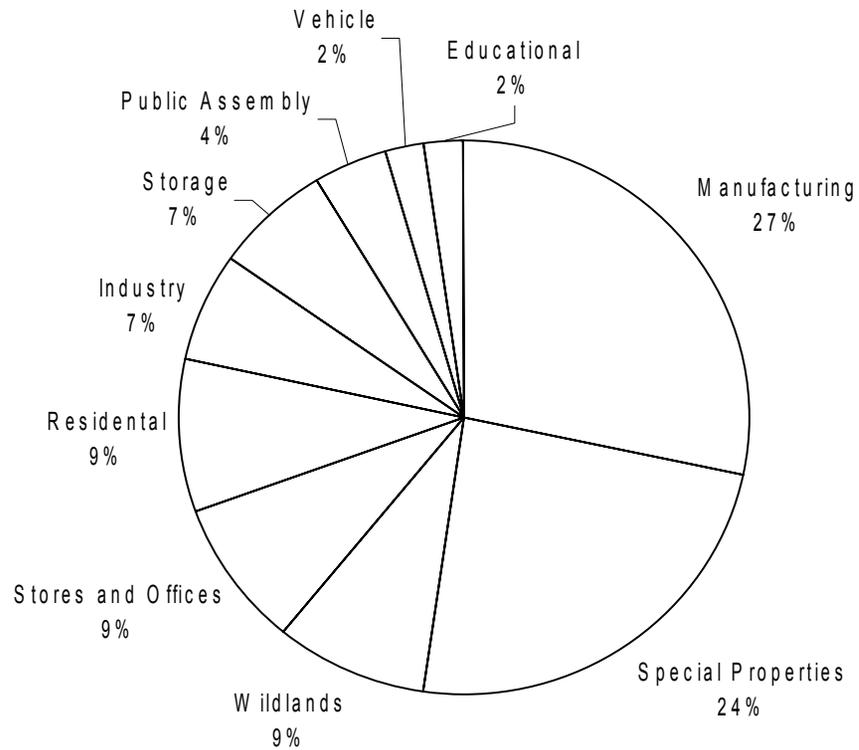
\*The figures shown for 2001 do not include the 9/11/2001 World Trade Center Incident.  
 Source: NFPA's Fire Incident Data Organization (FIDO).

**Figure 2**  
**Direct Dollar Loss in Large-Loss Fires, 1994-2003**  
**Unadjusted and Adjusted**



\*The figures shown for 2001 do not include the 9/11/2001 World Trade Center Incident.  
 Source: NFPA's Fire Incident Data Organization (FIDO).

**Figure 3**  
**Large-Loss Fires by Major Property Use**



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