CATASTROPHIC MULTIPLE-DEATH FIRES FOR 2007

Stephen G. Badger
Fire Analysis and Research Division
National Fire Protection Association

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In 2007, firefighters in the United States responded to an estimated 1,557,500 fires. Of these, 414,000 were in residential structures, 116,500 were in nonresidential structures, and 1,027,000 did not involve structures. Tragically, these fires caused 3,430 deaths, with 2,895 in residential properties, 105 in nonresidential properties, and 430 outside of structures.[1]

Thirty-seven of the incidents are classified as catastrophic multiple-death fires, defined by the NFPA as residential fires that kill five or more people, or nonresidential or nonstructural fires that kill three or more people. Seventeen of the fires occurred in residential properties, eight in nonresidential properties, and 12 outside of structures. These fires represented 0.002 percent of the total U.S. fires in 2007.

There were 190 deaths in these fires, a figure that represents 5.5 percent of the total estimated U.S. fire death toll last year. Of the 190 victims, 41 (or 21.6 percent) were children under age six. Eleven of the victims were firefighters.

The three most serious fires each killed 10 people. Two of the fires occurred in residential structures, both resulting in the deaths of five children under the age of six; one was a wildland fire. These fires are discussed in more detail below.

Compared to 2006, the number of catastrophic multiple-death fires increased by one, but the death toll went down by 33 deaths. The under-age-six toll went up 13, from 28 in 2006. The deadliest fires in 2007 accounted for 10 deaths each, contrasted with 2006, when one aircraft crash and fire killed 24 people.

Catastrophic residential fires

Seventeen fires occurred in residential properties, including 13 in single-family homes (of which two were manufactured homes), two in apartment buildings (one was in a nine-unit, and the other was in a 64-unit building), one in a two-family duplex, and one in a 40-unit motel.

Residential fires accounted for almost half of the total multiple-death fires, and 109, or 57.4 percent, of the deaths in these fires. This is three more than in 2006, when there were 106 deaths. The death toll to children under six was 35 (32.1 percent of the deaths in these fires)—up 10 from 2006. There were 13 of these fires that started between 11 p.m. and 7 a.m. This was three quarters of the residential fires, resulting in 86 deaths. Of these, 27 were children under age six. See Table 1 for details of all the fires. The largest of the fires are discussed in more detail here.

As mentioned above, two of the most severe fires in 2007, in terms of loss of life, occurred in residential structures, with each claiming 10 lives. The first fire broke out just before 4:00 a.m. in the living room of a one-story, single-family home. The cause was not determined; but it started in or around a living room chair. A smoke alarm was found in a small hallway; it did not operate and the reason for that was not determined. This was one of two factors that impaired or delayed the residents' escape. The other factor was the adults' elevated blood alcohol levels. Two children and an adult were in a front bedroom, three children were in a rear bedroom, an adult

[1]Michael J. Karter, Jr., "Fire Loss in the United States During 2007," *NFPA Journal*, September/October 2008.

and a child were located in a den near the kitchen, one adult was located in the kitchen, and one was found at the rear door. One person escaped this fire.

The second 10-fatality fire broke out in a four-story, four-unit home being used as a single-family residence when an electrical short in a first-story bedroom ignited nearby combustibles. A resident tried to extinguish the fire but was not successful. The fire spread horizontally throughout the room and through the open door to a stairwell and then to the second and third stories. Investigators located two smoke alarms within the residence, one in the fourth-story hallway and one in the basement. Neither alarm had a battery. Five of the victims were located on the fourth story, three on the third story, and two on the second story. Another six occupants escaped or were rescued by firefighters.

One fire resulted in nine deaths. This fire broke out at 11:00 p.m. in a second-story apartment in a five-story, 64-unit apartment building when smoking materials fell into a couch. The occupants thought the odor was from a bug bomb in a neighboring apartment and vacated their unit for one on the third story. Upon returning to air out their apartment, they found it on fire. They tried, unsuccessfully, to extinguish the fire with a handheld extinguisher. They then fled, leaving the door open. The fire spread rapidly out to the paneled hallway and throughout the building. There were single-station smoke alarms in the apartments and hallways. No information was reported on their operation. There was no automatic suppression equipment present. The victims were occupants of various units throughout the building, but no information was reported on where they lived or where they were found. Several additional people escaped or were rescued.

One fire killed eight people, including a child under age six. This fire broke out about 7:21 a.m. in a two-story, single-family row house when mishandled smoking materials ignited the victims' clothing or love seat in a first-story family room. The fire burned through the room and extended up the stairway to the second story. The home had no smoke alarms or suppression equipment. Six of the victims were located on the second story, four in a front bedroom and two in a rear bedroom. One victim was located on the bottom step of the stairway and the last victim was located on the walk in front of the house. In addition several people escaped or were rescued.

Two fires were responsible for seven deaths each, three killed six each and there were eight five-fatality fires. These fires are all described in Table 1.

Catastrophic nonresidential fires

There were eight fires in nonresidential structures, including two in stores, two in office buildings, and one each in a tunnel, a chemical laboratory, a fuel storage facility, and a test site. All of these fires occurred during the daytime or early evening. There were 34 victims, including 11 firefighters and one child under age six. Compared to 2006, there was one more incident and eight fewer deaths. See Table 2 for complete details of these fires.

The largest loss-of-life incident in a nonresidential structure was responsible for the deaths of nine firefighters. This fire broke out at 7:08 p.m. in a one-story, 50,000-square-foot (4,645-square-meter) furniture store and warehouse. Arriving firefighters fought this rapidly spreading fire from inside. The roof of the showroom area suddenly collapsed, trapping and killing nine.[2]

One fire killed five workers at a hydroelectric plant, in a 4,000-foot (1,219-meter) long by 12-foot (3.7-meter) wide tunnel that connected two reservoirs with the plant. This fire broke out at 2:00 p.m., 1,000 feet (305 meters) below grade, as nine workers were applying epoxy. The workers were cleaning a sprayer with a flammable solution when vapor from the solution ignited. The source of ignition was not reported. Four workers were below the fire and were able to escape by way of the main entrance at the lower end of the tunnel. The five who died were above the fire. They ascended as far as they could, until they reached a bend in the tunnel and could not climb the steep incline. They were trapped in the smoke and died. The U.S. Chemical Safety Board (CSB) is investigating this incident.

Two explosions and fires killed four people each. The first one occurred at a convenience store/gas station. Two gas company employees were transferring propane from one 500-lb (227-kilogram) tank to another when a valve malfunctioned, allowing propane to escape. As the gas dispersed, it found an unknown ignition source and exploded. The explosion killed two firefighters, who had responded earlier to a report of a gas leak, and the two gas company employees. Four other civilians and a firefighter were seriously injured.[2]

The second incident was an explosion at a chemical laboratory during the production of a gasoline additive, when a runaway chemical reaction in an overpressurized steel vessel ignited in a tremendous explosion, and sent a fire ball and mushroom cloud over 2,000 feet (610 meters) high. Very little information was reported on this laboratory and explosion. The CSB is investigating this incident as well.

Four fires killed three people each. The first was deliberately set shortly after 5:00 p.m. in a fifth-story storage area in a six-story office building. There was a partial-coverage sprinkler system in the atrium and common areas of the first story. The system operated and kept the fire from spreading to the atrium. The only smoke detection equipment was in the elevator lobbies for elevator recall; it was not reported if it operated. The three fatalities were all located on the fifth story in two different areas. A firefighter became trapped during a search of the fifth story, but was rescued. An arrest has been made in this case.

The second fire was an incendiary fire in an insurance office. A person entered the office and poured gasoline on two women and set them on fire. The badly burned women, one of whom was pregnant, escaped but died as a result of burns. The pregnant woman's baby was delivered by cesarean section. Sadly, the infant only survived for three days.

The third and fourth incidents were explosions involving tanks. The first, at a fuel storage facility, was caused when someone lit a match or lighter on or around a fuel storage tank. No other information was reported. The second was at a rocket testing facility when a nitrous oxide leak was ignited by an undetermined source.

Catastrophic nonstructural fires

There were 12 nonstructural fires, including five road crashes and fires, four road vehicle fires, two wildland fires, and one aircraft in flight. These fires accounted for 32 percent of the

[2]Rita F. Fahy, Paul R. LeBlanc, Joseph L. Molis, "Firefighter Fatalities in the United States—2007," *NFPA Journal*, July/August 2008.

catastrophic multiple-death fires, one more than in 2006 when there were 11 such fires. There were 47 deaths in these fires; down from the 75 deaths in 2006, which included a major aircraft crash that killed 24. Five children under age six died in these fires in 2007. A medical examiner's or coroner's office verified that the deaths in the vehicle crashes and fires were due to inhalation of products of combustion or thermal injuries, and not impact injuries. See Table 3 for details on these fires.

The largest loss-of-life fire was the wildfire that killed 10. The headlines in most newspapers, television, and radio news stories in the United States and in many areas around the world told of the California firestorms of 2007. These fires broke out over several days in late October and burned over 518,000 acres or 809 square miles (210,000 hectares), destroyed over 3,100 structures, including 2,100 residences, and caused the evacuation of almost a million residents. Tragically, there were at least 10 deaths directly related to these fires. In addition, several more deaths were attributed indirectly to these fires, mostly due to natural causes at various stages during the evacuations and fires.

The 10 deaths directly resulting from the fires occurred in two of the larger named fires. Eight died in the Harris fire and two died in the Witch fire. Five of the 10 victims were caught in the open, in a ravine or a cave near the Mexican border, three were in their homes, and two were in a garage. The exact location of two victims was not reported.

Santa Ana winds of over 70 miles (113 kilometers) per hour with gusts of over 100 miles (161 kilometers) swept the fires very rapidly, catching most victims before they even had a chance to evacuate. Reports also indicated that at least 27 other civilians were injured, along with over 130 firefighters. It appears that the dedicated actions of over 11,000 firefighters, as well as many law enforcement and government agencies from California and throughout the United States and Mexico, kept the death toll to a minimum.

In another incident, a pilot reported smoke in the cockpit of his small plane and declared an emergency. Before he was able to make an emergency landing, the aircraft crashed into two homes in a residential neighborhood near the airport. On arrival, firefighters found a one-story home fully engulfed in fire and the plane and a second two-story home heavily involved in fire. An off-duty firefighter reported to firefighters that a child was trapped on the second story. Rescue attempts were made to no avail. The child perished, as did a child and an adult in the other home and two onboard the aircraft. In all, five people, including two children under the age of six, died in this fire. The National Transportation Safety Board is investigating.

Two motor vehicle crashes and fires each killed four. The first occurred when a vehicle slammed into the rear of a car stopped in traffic. The second involved a car and truck colliding, with the truck then striking a van. The truck caught fire and consumed the car and van.

There were eight incidents that killed three each. Three of these were vehicle crashes and fires. The first occurred when a car and a tractor trailer collided, then both collided with two other trucks as a fire broke out. In the second incident, a fast-moving car struck a parked construction vehicle and burst into flames. The third occurred when a car went off the highway, through a fence, into a ravine, and caught fire.

Four other three-fatality incidents were road vehicle fires—two in cars, one in a van, and one in a travel trailer. The first occurred in the parking lot of a warehouse when a father locked himself and his children, including one under the age of six, in a car, poured gasoline over the children and the interior of the car and lit it on fire. The second incident was very much the same. It occurred at 1:35 a.m. with a car parked behind a service station. Gasoline was poured over the occupants and set on fire. The report did not identify who set the fire. Two of the victims were under the age of six.

The third incident occurred overnight while three youngsters were having a sleepover in a travel trailer in the yard of a residence. The fire was discovered by a father who went to investigate the lack of activity at about 9:00 a.m. The cause of this self-extinguished fire was listed as an unattended candle igniting furniture in an eating area of the trailer.

The fourth fire occurred at 2:04 a.m. in a van parked in a driveway of a residence. A group had filled their van's tank with gasoline then half-filled a 5-gallon (19-liter) plastic gas jug. During the ride home, the jug was on its side and gasoline seeped out and soaked the carpet. The group parked the van in a driveway while visiting a home. When they entered the van to leave, the gasoline vapors ignited from an undetermined source.

The last fire to kill three was a wildland fire. This fire broke out about 9:00 a.m. and burned in pine, spruce fir, and pinyon juniper as well as grass and sage. Three family members working in a field were caught by the fire's spread.

Role of smoke alarms and sprinklers

Information on detection equipment was reported for 13 of the 17 residential fires. Seven properties had detection equipment present. Of these seven, only one had complete coverage and two had partial coverage. Details on coverage were not available for the other four structures with detection equipment. Alarms were known to have operated in just one incident, where seven deaths occurred. The reason for their inability to evacuate was not reported, but this fire began on an outside deck, which could have resulted in some extended growth before fire spread into the coverage area and activated the alarms. There were two fires where it is known that smoke alarms did not operate. In one of those fires, neither smoke alarm had a battery and in the other fire, the single alarm had been tested and found nonoperational prior to the fire, but the reason it was not operational was not reported. There were 20 deaths in these fires, 10 of the victims were under age six. The operation of the equipment in the other four fires was not known or not reported.

Six residential structures, or 46 percent, had no detection equipment. There were 37 deaths in these fires, including 13 children under the age of six.

Information on detection equipment was only reported for four of the eight nonresidential properties. Three of the structures had no detection equipment and the fourth only had smoke alarms for the elevator recall system. The operation of that system was not reported.

None of the 17 residential properties had suppression equipment. Only one nonresidential structure was known to have suppression equipment, which operated and kept the fire from spreading.

Smoke alarms have been proven effective in reducing the risk of death in home fires. The most effective arrangement is to use interconnected multiple-station smoke alarms that are supplied by hard-wired AC power with a battery backup. These should be located outside each sleeping area, on each level, and in each bedroom. Homeowners should routinely test smoke alarms according to manufacturers' recommendations. NFPA recommends testing residential smoke alarms at least monthly. Batteries should also be replaced according to manufacturer's recommendations but, in the case of conventional batteries, at least yearly.

Smoke alarms are only effective if occupants exit the building when they sound.

Children should be familiar with the sound of a properly operating smoke alarm. They should follow a practiced escape plan that emphasizes two exits from any location in the home with a designated meeting place.

Exit drills in the home are part of many school curricula. Practicing the plan helps families determine if children and others readily waken to the sound of a smoke alarm, and that, along with assistance for family members who require it, can be factored into the plan. Practicing fire prevention principles could have prevented many of the fires.

Where we get our data

NFPA obtains its data by reviewing national and local news media, including fire service publications. A news clipping service reads all daily U.S. newspapers and notifies the NFPA Fire Analysis and Research Division of catastrophic fires. Once an incident has been identified, we request information from the local fire department or the agency having jurisdiction. NFPA's annual survey of U.S. fire experience and mailings to state fire marshals are additional data sources, although not principal ones. We also contact federal agencies that have participated in the investigation of such fires. The diversity and redundancy of these sources enable us to collect the most complete data available on catastrophic fires in the U.S. We understand that in many cases, due to ongoing litigation, a department cannot release information. Also in some cases departments have been unable to determine the information we request.

***Stephen G. Badger**, a fire data assistant with NFPA's Fire Analysis and Research Division, is retired from the Quincy, Massachusetts, Fire Department.*

TABLE 1. RESIDENTIAL FIRES

Kentucky

Date, Time of Alarm, Number of Deaths

February, 3:51 a.m., 10 (5 under age 6)

Number of Stories, Occupancy Type, Construction Type

This was a one-story single-family home of unprotected wood-frame construction with brick veneer.

Smoke Alarm and Other Protection Devices

A single smoke alarm located in a small hallway. The alarm did not operate. It had been tested by the occupants some time prior to the fire and was reported not working.

Fire Origin and Path

A fire of undetermined cause broke out in the living room. A survivor reported seeing fire in that area.

Contributing Factors and Victim Locations

Two factors impaired and delayed victims' chances of survival. A nonworking smoke alarm allowed the fire conditions to reach untenable levels before the occupants were aware of the fire, and the adults had elevated blood alcohol that impaired their ability to get out. Two children and an adult were in a front bedroom, three children were in a rear bedroom, an adult and a child were located in a den near the kitchen, one adult was located in the kitchen, and one was found at the rear door. One other person escaped the fire.

New York

Date, Time of Alarm, Number of Deaths

March, 11:08 p.m., 10 (5 under age 6)

Number of Stories, Occupancy Type, Construction Type

This four-story, four-unit building was used as a single-family home. It was of unprotected ordinary construction.

Smoke Alarm and Other Protection Devices

Investigators found two smoke alarms in this residence. One was located in the hallway of the fourth story and one was in the basement. Neither had batteries.

Fire Origin and Path

An electrical short ignited nearby combustibles in a first-story bedroom. A resident attempted to extinguish the fire but was unsuccessful. The fire spread throughout the room and into a hallway through a door left open by an occupant. The fire then spread up an open staircase to the second and third stories.

Contributing Factors and Victim Locations

Upon arrival, firefighters found heavy smoking issuing from this home and were faced with a person dropping children from the second story. They were also told that there were multiple trapped occupants on the third and fourth stories. Firefighters entered the upper stories via ground ladders, and located and removed several victims the same way. Meanwhile, engine companies attacked and knocked down the fire. Six people managed to escape on their own, or were rescued by firefighters, including a mother who dropped two children into the arms of

neighbors and jumped from the second story. These three survived as well as several others. Five of the victims were located on the fourth story, three were on the third story, and two were on the second story.

West Virginia

Date, Time of Alarm, Number of Deaths

January, 11:00 p.m., 9

Number of Stories, Occupancy Type, Construction Type

This was a five-story, 64-unit apartment building of protected noncombustible construction.

Smoke Alarm and Other Protection Devices

There were single station smoke alarms in the hallways and apartments. There was no information reported on their operation. There was no automatic suppression equipment installed.

Fire Origin and Path

This fire began when smoking materials fell into a couch in a second-story apartment. The occupants believed the odor was from a bug bomb and vacated their apartment to one on the third story. After returning to air out their apartment, they found it on fire and attempted to extinguish it with a handheld extinguisher. When their attempt failed, they fled, leaving the door open. The fire spread rapidly through the panel-lined hallway and throughout the building.

Contributing Factors and Victim Locations

Victims located at various locations escaped or were rescued by firefighters.

Maryland

Date, Time of Alarm, Number of Deaths

May, 7:21 a.m., 8 (1 under age 6)

Number of Stories, Occupancy Type, Construction Type

This two-story, single-family row house was located in the middle of a block of identical structures. It was of unprotected ordinary construction.

Smoke Alarm and Other Protection Devices

None.

Fire Origin and Path

Mishandled smoking materials ignited clothing or a love seat in a first-story family room. The fire spread throughout the room and extended to the second story via a stairway.

Contributing Factors and Victim Locations

One victim was located on the first step of the stairs leading to the second story. Six victims were located on the second story, with four in a front bedroom and two in a rear bedroom. The eighth victim was found on the sidewalk at the front of the house when firefighters arrived. Several other people escaped or were rescued by firefighters.

Pennsylvania

Date, Time of Alarm, Number of Deaths
February, 3:15 a.m., 7 (3 under age 6)
Number of Stories, Occupancy Type, Construction Type
This split-level, single-family home was of unprotected wood-frame construction.
Smoke Alarm and Other Protection Devices
None.
Fire Origin and Path
This fire began in a bedroom when bedding came in contact with some type of heater. The story of origin and details of the fire's spread were not reported. • Contributing Factors and Victim Locations Fire crews on an interior attack were withdrawn when fire conditions deteriorated and the roof began to sag. Five victims were located on the first level, two in a family room, and three in a bedroom. The other two victims were on the second level.

North Carolina

Date, Time of Alarm, Number of Deaths
October, 7:00 a.m., 7
Number of Stories, Occupancy Type, Construction Type
This was a two-story, single-family beach house of unprotected wood-frame construction built on pilings.
Smoke Alarm and Other Protection Devices
There were smoke alarms present. They operated and alerted the occupants. Why occupants failed to evacuate was not reported. There was no suppression system present.
Fire Origin and Path
A fire of undetermined cause broke out on an outside deck and spread into and throughout the home.
Contributing Factors and Victim Locations
None reported.

Louisiana

Date, Time of Alarm, Number of Deaths
February, 1:49 a.m., 6 (two under age 6)
Number of Stories, Occupancy Type, Construction Type
This was a manufactured home.
Smoke Alarm and Other Protection Devices
No information was reported.
Fire Origin and Path
No information was reported.
Contributing Factors and Victim Locations
The victims included two adults and four children. Two other adults escaped the fire. No other details were reported.

Michigan

Date, Time of Alarm, Number of Deaths
May, 2:30 a.m., 6 (3 under age 6)
Number of Stories, Occupancy Type, Construction Type
This was a two-story, single-family home of unprotected wood-frame construction.
Smoke Alarm and Other Protection Devices
None.
Fire Origin and Path
Unattended cooking was the cause of this fire. No additional details on spread were reported.
Contributing Factors and Victim Locations
The fire was mainly confined to the first story, with very heavy smoke on the second story where all the victims were located. Two children were found in a front bedroom. Two other children were found in one rear bedroom and an adult and an older child were in another rear bedroom.

Missouri

Date, Time of Alarm, Number of Deaths
August, 5:30 a.m., 6
Number of Stories, Occupancy Type, Construction Type
This was a two-story, single-family home of unprotected wood-frame construction.
Smoke Alarm and Other Protection Devices
None. (A smoke alarm found in a closet operated when a battery was installed as a test during the investigation.)
Fire Origin and Path
The damaged electrical cord to a living room air conditioner short-circuited and ignited wood structural members. The fire was mainly contained to the living room, with some extension to the stairway.
Contributing Factors and Victim Locations
All victims were located on the second story. A survivor escaped by jumping out a second-story window.

Maryland

Date, Time of Alarm, Number of Deaths
January, 10:17 a.m., 5 (3 under age 6)
Number of Stories, Occupancy Type, Construction Type
This was a two-story single-family home. Construction details were not reported.
Smoke Alarm and Other Protection Devices
No information was reported.
Fire Origin and Path
No information was reported.
Contributing Factors and Victim Locations
None reported.

Pennsylvania

Date, Time of Alarm, Number of Deaths
February, 3:20 a.m., 5 (3 under age 6)
Number of Stories, Occupancy Type, Construction Type
This was a two-story, single-family home of unprotected ordinary construction.
Smoke Alarm and Other Protection Devices
None.
Fire Origin and Path
An electrical malfunction in knob and tube wiring ignited wooden structural members above a second story ceiling. The fire spread throughout the ceiling causing heavy heat and smoke on the second story.
Contributing Factors and Victim Locations
None reported.

Florida

Date, Time of Alarm, Number of Deaths
March, 2:30 a.m., 5
Number of Stories, Occupancy Type, Construction Type
This was a single-family manufactured home.
Smoke Alarm and Other Protection Devices
Due to ongoing litigation no information can be reported.
Fire Origin and Path
Due to ongoing litigation no information can be reported.
Contributing Factors and Victim Locations
Due to ongoing litigation no information can be reported.

Illinois

Date, Time of Alarm, Number of Deaths
April, 3:00 a.m., 5 (2 under age 6)
Number of Stories, Occupancy Type, Construction Type
This was a two-story, single-family home of ordinary construction.
Smoke Alarm and Other Protection Devices
Smoke alarms were found in the fire debris, but it is not known if any operated.
Fire Origin and Path
A 27-year-old male admitted to setting this fire by pouring gasoline on the exterior of an entry door and igniting it. The fire spread rapidly into and through the home.
Contributing Factors and Victim Locations
Upon arrival, firefighters found a person on the roof of a one-story addition attempting to rescue the children. Firefighters made entry at several points to attack the fire. Once the fire was knocked down, they searched the second story, where all five victims were located. Three victims were found in the front bedroom and two others were in the bathroom.

Georgia

Date, Time of Alarm, Number of Deaths

June, 7:30 a.m., 5

Number of Stories, Occupancy Type, Construction Type, Operating Status

This was a two-story, 8,000-square-foot (743-square-meter), 40-unit extended-stay motel of unprotected ordinary construction.

Detection Systems and Suppression Systems

No information available due to litigation.

Fire Origin and Path

This incendiary fire involved a discarded mattress in an exterior stairwell on the first story. Due to ongoing litigation there is no additional information available. An arrest has been made.

Contributing Factors and Victim Locations

Due to ongoing litigation there is no information available.

Pennsylvania

Date, Time of Alarm, Number of Deaths

June, 1:23 a.m., 5 (3 under age 6)

Number of Stories, Occupancy Type, Construction Type

This was a three-story, single-family home of unprotected wood-frame construction.

Smoke Alarm and Other Protection Devices

None.

Fire Origin and Path

Children playing with fire ignited ordinary combustibles in a second-story hallway. The fire extended horizontally then vertically through the second story, then down to the first story and up to the third.

Contributing Factors and Victim Locations

The five victims were located in a second-story bedroom. They, and two surviving children, had been left home alone. Locked doors hindered the escape of the victims.

California

Date, Time of Alarm, Number of Deaths

July, 1:19 a.m., 5 (3 under age 6)

Number of Stories, Occupancy Type, Construction Type

This was a two-story, 90,000-square-foot (8,361-square-meter), 23-unit apartment complex of unprotected wood-frame construction.

Smoke Alarm and Other Protection Devices

There were hardwired smoke alarms present. Their coverage and effectiveness was not reported. No information was reported on automatic suppression equipment.

Fire Origin and Path

A fire of undetermined cause broke out in the attic. No additional details were reported.

Contributing Factors and Victim Locations

None reported.

Ohio

Date, Time of Alarm, Number of Deaths

September, 9:11 a.m., 5 (2 under age 6)

Number of Stories, Occupancy Type, Construction Type

This two-story duplex was of unprotected woodframe construction.

Smoke Alarm and Other Protection Devices

There were battery-operated smoke alarms present; their coverage and performance was not reported.

Fire Origin and Path

This incendiary fire was set by a 10-year-old boy in the living room on the first story, using a cigarette lighter and papers. The fire spread throughout the apartment and through the attic into the adjacent apartment.

Contributing Factors and Victim Locations

Upon arrival, firefighters found three of the victims outside the structure already, and removed two others from the second story. All the victims had been on the second story where the fire originated, according to survivors. Four others people were injured, two of whom jumped from second-story windows.

TABLE 2. NONRESIDENTIAL FIRES

South Carolina

Date, Time of Alarm, Number of Deaths

June, 7:08 p.m., 9 firefighters

Number of Stories, Occupancy Type, Construction Type, Operating Status

This one-story, approximately 50,000-square-foot (4,645-square-meter) furniture store and warehouse was a metal-frame building with metal roof trusses and a metal roof deck.

Detection Systems and Suppression Systems

There was no detection or suppression equipment present in the building.

Fire Origin and Path

The cause of this fire, which broke out in the loading dock area between the store and the warehouse, is listed as undetermined.

Contributing Factors and Victim Locations

As firefighters fought the fire from inside the structure, the fire spread rapidly from the middle of the building, through the showroom, to the front of the store. The rapid fire spread was followed by a collapse of structural members in the showroom, trapping the nine firefighters.

Colorado

Date, Time of Alarm, Number of Deaths

October, 2:00 p.m., 5

Number of Stories, Occupancy Type, Construction Type, Operating Status

This fire occurred in a 4,000-foot (1,219-meter) tunnel that connected two reservoirs at a hydroelectric plant.

Detection Systems and Suppression Systems

No information was reported.

Fire Origin and Path

The fire started approximately 1,000 feet (305 meters) below grade, when contractors were applying an epoxy and vapor from a flammable solvent being used to clean a sprayer ignited. The source of ignition was not reported.

Contributing Factors and Victim Locations

Nine contractors were working in this 4,000-foot (1,219-meter) long, 12-foot (3.7-meter) wide tunnel. When the fire broke out, four workers were located below the fire and were able to escape by way of the main tunnel entrance. The five who died were above the fire and tried escaping upward till they reached a point of a bend and were unable to climb the slope. They were overcome by heavy smoke.

West Virginia

Date, Time of Alarm, Number of Deaths

January, 10:42 a.m., 4 (2 were firefighters)

Number of Stories, Occupancy Type, Construction Type, Operating Status

This was a one-story service station and convenience store. No other information was reported on the building.

Detection Systems and Suppression Systems
No information was reported.
Fire Origin and Path
The explosion occurred when gas company employees were transferring propane from one 500-pound (227-kilogram) tank to another. The valve on one of the tanks malfunctioned, allowing LPG to escape. As the propane dispersed, it found an ignition source.
Contributing Factors and Victim Locations
Firefighters who had been dispatched to the scene for a reported gas leak were keeping the scene clear and assessing the situation when the explosion occurred. Two firefighter/EMTs and two gas company workers were killed. Four other civilians and a firefighter were seriously injured.

Florida

Date, Time of Alarm, Number of Deaths
December, 1:30 p.m., 4
Number of Stories, Occupancy Type, Construction Type, Operating Status
No details on this chemical laboratory have been reported.
Detection Systems and Suppression Systems
No information reported.
Fire Origin and Path
The explosion occurred during the production of a gasoline additive. It was caused by a runaway chemical reaction in a steel vessel that overpressurized and ignited in a fire ball and mushroom cloud over 2,000 feet (610 meters) high.
Contributing Factors and Victim Locations
The four victims were workers at the plant. Most of the 33 people injured in the incident were off-site, and were struck by flying or falling debris. No other details are available.

Texas

Date, Time of Alarm, Number of Deaths
March, 5:11 p.m., 3
Number of Stories, Occupancy Type, Construction Type, Operating Status
This six-story office building of protected noncombustible construction was open with workers inside. The ground floor area was not reported.
Detection Systems and Suppression Systems
There were smoke alarms for an elevator recall system in the elevator lobby only. It was not reported if this system operated. There was no other detection or alarm system in the building. There was a partialcoverage sprinkler system in the atrium and the common areas of the first story. This system operated and kept the fire from spreading into the atrium.
Fire Origin and Path
This incendiary fire was set in a storage area of the fifth story. An arrest was made in the case.
Contributing Factors and Victim Locations
The three fatalities were located on the fifth story in two different areas. A firefighter became trapped when he exhausted his air supply while on the fifth story searching for victims. He was rescued. Three civilians and three firefighters were injured.

Texas

Date, Time of Alarm, Number of Deaths
May, 2:39 p.m., 3
Number of Stories, Occupancy Type, Construction Type, Operating Status
This explosion and fire occurred in an unknown type fuel storage tank area.
Detection Systems and Suppression Systems
None.
Fire Origin and Path
Three teenagers were killed when a match or lighter ignited fumes or contents of a metal fuel storage tank. The three suffered fatal head injuries in the resulting explosion. No other information was reported.
Contributing Factors and Victim Locations
None reported.

California

Date, Time of Alarm, Number of Deaths
July, 2:34 p.m., 3
Number of Stories, Occupancy Type, Construction Type, Operating Status
This involved a tank explosion at a rocket testing facility. No information about the tank was reported.
Detection Systems and Suppression Systems
No information reported.
Fire Origin and Path
A nitrous oxide leak was ignited by an unreported source.
Contributing Factors and Victim Locations
None reported.

Florida

Date, Time of Alarm, Number of Deaths
December, 3:40 p.m., 3 (1 under age 6)
Number of Stories, Occupancy Type, Construction Type, Operating Status
This fire involved a one-story insurance office of unprotected-ordinary construction that was open for business.
Detection Systems and Suppression Systems
None
Fire Origin and Path
This incendiary fire was set by a person who entered the office for an unknown reason. During the visit, he poured gasoline on the two female employees and set them on fire. The fire spread was limited to the room and contents and the victims.
Contributing Factors and Victim Locations
Both victims were able to escape on their own. One victim was pregnant and the baby was taken by cesarean section at the hospital. The infant lived for several days before passing away.

TABLE 3. NONSTRUCTURAL

California

Date, Time of Alarm, Number of Deaths
October, 9:42 p.m., 10
Setting
California Firestorm 2007.
Climate
Very dry, Santa Ana dry winds of 70 mph (113 kph) the first day and gusts to 100 mph (161 kph).
Fire Origin and Path
This firestorm of 23 wildfires burned 518,000 acres or 809 square miles (210,000 hectares), destroyed over 3,100 structures, of which 2,180 were residential properties.
Factors Hindering Occupant Escape
The 10 victims were trapped within two of the larger fires. Eight people died in one fire—five were in open areas, two were in a garage, one was at home, and the location of two was not reported. The two who died in the second fire were in their home. At least four other deaths were attributed to these fires but were not listed as fire deaths.

Florida

Date, Time of Alarm, Number of Deaths
July, 8:46 a.m., 5 (2 under age 6)
Setting
An aircraft pilot reported smoke in the cockpit and declared an emergency prior to crashing into two single-family houses.
Climate
Temperature was 84°F (29°C), light wind and clear.
Fire Origin and Path
The aircraft struck the first story of both homes and aviation fuel ignited and set fire to both homes. One house was two stories and the other was one story. The FAA is still investigating the cause of the smoke and crash.
Factors Hindering Occupant Escape
On arrival, firefighters found the two-story dwelling 70 percent involved in fire and the single-story was fully involved. An off-duty firefighter who lived nearby reported to arriving firefighters that a youngster was trapped on the second story, at which time attempts were made to locate and rescue her to no avail. Two of the victims were located in the aircraft, two were in the one-story home, and one was in the two-story home, as were three others with major injuries.

California

Date, Time of Alarm, Number of Deaths
January, 6:07 p.m., 4
Setting
This was a crash and fire involving three passenger vehicles on a highway.
Climate
Not reported.
Fire Origin and Path
Gasoline was ignited by friction from the crash.
Factors Hindering Occupant escape
One vehicle slammed into the rear of another car stopped in traffic, causing the struck car to burst into flames.

South Carolina

Date, Time of Alarm, Number of Deaths
July, 4:21p.m., 4
Setting
This was a passenger vehicle, truck, and van crash and fire on highway.
Climate
Not reported.
Fire Origin and Path
Collision.
Factors Hindering Occupant Escape
A truck involved in the crash exploded in flames which consumed the car and a van.

Alabama

Date, Time of Alarm, Number of Deaths
February, 3:00 p.m., 3
Setting
This was a tractor trailer/passenger vehicle crash and fire on a highway. A total of three tractor trailers and one car were involved.
Climate
Not reported
Fire Origin and Path
A tractor trailer struck a car and then both vehicles struck two other trucks when fire broke out.
Factors Hindering Occupant escape
No information reported.

Masachusetts

Date, Time of Alarm, Number of Deaths
March, 9:31 a.m., 3 (1 under age 6)
Setting
This was a passenger vehicle in the parking lot of a warehouse.
Climate
Not reported.
Fire Origin and Path
A father spread gasoline over himself, two other victims, and interior of the vehicle and set it on fire.
Factors Hindering Occupant Escape
The two children were locked in the car by and with their father in this murder/suicide.

Oregon

Date, Time of Alarm, Number of Deaths
March, 8:41 a.m., 3
Setting
Travel trailer used in back yard during a sleepover.
Climate
Not reported.
Fire Origin and Path
A candle left unattended as the three victims slept ignited furniture covering in the eating area of this travel trailer. The fire self-extinguished prior to discovery by a family member.
Factors Hindering Occupant Escape
No information was reported.

Idaho

Date, Time of Alarm, Number of Deaths
June, 4:00 a.m., 3
Setting
This was a passenger vehicle crash and fire on a country road.
Climate
Not reported.
Fire Origin and Path
A fast-moving car struck a construction vehicle and caught on fire. The three victims were occupants of the vehicle.
Factors Hindering Occupant escape
No information reported.

Utah

Date, Time of Alarm, Number of Deaths
June, 9:00 a.m., 3
Setting
Wildland urban interface. The fire involved lodgepole pine, spruce fir, pinyon juniper, grass, and sage.
Climate
Winds 5 to 8 mph (8 to 13 kph), relative humidity 15 percent, temperature 82°F (28°C).

Fire Origin and Path
Not reported.
Factors Hindering Occupant Escape
The three victims were working in a field when they were caught in the fire.

Utah

Date, Time of Alarm, Number of Deaths
August, 1:35 a.m., 3 (2 under age 6)
Setting
Car parked at a gas station.
Climate
Not reported
Fire Origin and Path
This incendiary fire was set when gasoline was poured over the occupants and ignited with a match. It was not stated who set the fire. The fire also ignited the nearby gas station and gasoline pumps.
Factors Hindering Occupant Escape
No information was reported.

Indiana

Date, Time of Alarm, Number of Deaths
December, 2:04 a.m., 3
Setting
This was a passenger van in a driveway.
Climate
Cloudy and temperature approximately 30°F (-1°C)
Fire Origin and Path
Upon filling the van with gasoline, this group halffilled a 5-gallon (19-liter) red plastic container. During the trip home, it is believed the container was on its side and gasoline seeped out and soaked into the floor carpet. After parking the van for a short time, the group reentered the van to leave. The gasoline vapors were ignited by a still-undetermined source.
Factors Hindering Occupant Escape
One victim was located in the middle row seat, one was in the rear bench seat and one was located in the rear cargo area.

California

Date, Time of Alarm, Number of Deaths

December, 7:30 p.m., 3

Setting

This was a single passenger vehicle crash and fire.

Climate

Not reported.

Fire Origin and Path

This car went off the highway, through a fence, hit a ravine and burst into flames.

Factors Hindering Occupant Escape

No information was reported.