

CATASTROPHIC MULTIPLE-DEATH FIRES IN 2012

**Stephen G. Badger
September 2013**



**National Fire Protection Association
Fire Analysis and Research Division**

CATASTROPHIC MULTIPLE-DEATH FIRES IN 2012

**Stephen G. Badger
September 2013**



**National Fire Protection Association
Fire Analysis and Research Division**

Acknowledgments

NFPA wishes to thank the U.S. fire service and the medical examiners for their contributions of data, without which this report would not be possible. The author would like to give a special thanks to Norma Candeloro and to his co-workers for their guidance in the completion of this report.

For more information about the National Fire Protection Association, visit [NFPA](#) or call

617-770-3000 To learn more about the One-Stop Data Shop go to [Statistical Reports](#) or call 617-984-7443.

Copies of this analysis are available from:

National Fire Protection Association
One-Stop Data Shop
1 Batterymarch Park
Quincy, MA 02169
www.nfpa.org
e-mail: osds@nfpa.org
phone: 617-984-7443

NFPA No. MDS10
Copyright © 2013, National Fire Protection Association, Quincy, MA

Catastrophic Multiple-Death Fires in 2012

In 2012, firefighters in the United States responded to an estimated 1.375 million fires, 381,000 of which occurred in residential structures, 99,500 in nonresidential structures, and 894,500 in fires outside of structures. These fires accounted for an estimated 2,855 deaths, 2,405 of which occurred in residential structures, 65 in nonresidential structures, and 385 in fires outside of structures.

Seventeen of these fires were categorized as catastrophic multiple-death fires, defined here as fires or explosions in homes or apartments that result in five or more fire-related deaths, or as fires or explosions in all other structures and outside of structures, such as wildfires and vehicle fires, that claim three or more lives.

These 17 fires killed 82 people, 16 of whom were children under age six. This accounted for 0.001 percent of the total estimated fires and 2.9 percent of the total fire deaths for 2012. By comparison, there were 24 catastrophic multiple-death fires in 2011, resulting in the deaths of 117 people, 16 of whom were children under age six.

The number of catastrophic multiple-death fires in 2012 was the lowest reported since 1987, when NFPA began using the current definition. To put this number in perspective, there were 62 catastrophic multiple-death fires in 1987, resulting in 332 deaths. Over the past 10 years, the annual average number of catastrophic multiple-death fires was 27, resulting in 160 deaths per year, with 25 of those deaths on average being children under age six.

Of the 17 catastrophic multiple-death fires that occurred in 2012, eight occurred in residential structures and resulted in 44 deaths; two took place in nonresidential structures and resulted in seven deaths; and seven were non-structure fires that resulted in 31 deaths. All of the 16 children under age six who died in multiple-death fires last year died in residential properties.

The Largest Loss-of-Life Fire of 2012

The largest loss-of-life fire of 2012 occurred on a Florida interstate on January 28, when 25 vehicles were involved in six separate crashes that claimed 11 lives. A wildfire had started near the highway at approximately 2:35 p.m. At 11:50 p.m., the highway patrol received the first call reporting that visibility on the highway had dropped to zero as a result of smoke from the wildfire and that a crash had occurred. Four minutes after that call, there was another crash, this one involving a semi-truck and several sport utility vehicles. Shortly afterward, the highway patrol closed the interstate in both directions.

The highway was reopened when visibility improved at 3:26 a.m. At 4 a.m., however, a highway maintenance worker called the highway patrol to report more thick smoke and fog, saying he could hear crashes occurring behind him. A trooper confirmed that visibility was less than 3 feet (1 meter) about nine minutes later. In all, the six crashes killed 11 motorists, many of whom were trapped in burning vehicles.

Catastrophic Home Fires

There were eight catastrophic multiple-death fires in homes in 2012, a decrease of 33 percent from the year before. Of these, four occurred in single-family homes, two occurred in duplexes, and two occurred in apartment buildings, one of which had six units and the other eight. These fires killed 44 people, 23 fewer than the number who died in 2011. Of the 44 victims, 16 were children under age six, which was the same as last year.

Seven of the eight home fires broke out between the hours of 11 p.m. and 7 a.m., killing 39 people, 15 of whom were children under age six (see “2012 Catastrophic Multiple-Death Fires by Type/Residential”).

The largest loss-of-life fire in a home killed nine people, including five children. This fire, the cause of which could not be determined, broke out in the first-story living room of a two-story, single-family home of unprotected wood-frame construction. The home had smoke alarms, but the fire department report did not say why the victims were unable to evacuate safely. Only one of the 10 occupants survived.

The other seven home fires killed five people each. Among the 35 victims were 10 children under age six.

The first fire broke out in a two-and-a-half story duplex of unprotected wood-frame construction. No additional information was reported due to ongoing investigations. The second involved a one-story duplex of unprotected ordinary construction when a pot of cooking oil ignited on the stove. The home had at least one smoke alarm, but the fire department report did not say whether it activated.

The third fire broke out on the second story of a vacant six-unit apartment building of unprotected wood-frame construction and spread to an occupied building of similar construction, in which the victims lived. There was no smoke detection equipment in the occupied building, and investigators could not determine the cause of the blaze.

The fourth fire broke out when ordinary combustibles near the furnace in the basement of a two-story, single-family home of unprotected wood-frame construction ignited. There were no smoke alarms present.

The fifth fire started behind a sofa in a second-story apartment in a two-story, eight-unit building of unprotected ordinary construction. The unit was equipped with smoke alarms, but the fire department report did not indicate whether they activated. The cause of the fire could not be determined.

The sixth fire, the cause of which was also undetermined, broke out in the first-story living room of a two-story, single-family home of unprotected wood-frame construction. Again, smoke alarms were present, but the fire department report did not say whether they activated.

The last fire started in a one-and-a-half-story, single-family home of unprotected wood-frame construction when a portable electric heater ignited nearby combustibles. The house was not equipped with smoke alarms.

Catastrophic Non-Home Structure Fires

Two of the 17 catastrophic multiple-death fires that occurred in 2012 started in non-home structures and resulted in seven fatalities. Both the number of fires and fatalities were lower last year than the year before, when six non-home structure fires resulted in 20 deaths (see “2012 Catastrophic Multiple-Death Fires by Type/Non-Home Structure Fires”).

The first non-home structure fire broke out in a two-story residential care facility for physically disabled residents, four of whom died. The facility, which was of unprotected wood-frame construction, had smoke alarms, but they did not operate. The cause and origin of the fire were not reported.

The second fire broke out in the back room of a barbershop on the first floor of a two-story, mixed occupancy building of unprotected ordinary construction between 11 p.m. and 7 a.m. The cause of the fire, which killed three people when it spread to a second-floor apartment, was not reported.

Catastrophic Non-Structure Fires

In 2012, seven non-structure fires killed 31 people. This is two more non-structure fires than occurred in 2011, resulting in 13 more deaths (see “2012 Catastrophic Multiple-Death Fires by Type/Non-Structure Fires”).

Five of these catastrophic non-structure fires involved vehicles. Vehicle crashes are included in this study if a fire in the vehicle caused the crash or the local coroner or medical examiner confirmed that the victims died of thermal injuries or inhalation of products of combustion, rather than impact injuries.

Two of the vehicle-related incidents occurred on highways. The first was the 11-fatality, multi-crash incident on a smoke- and fog-obscured interstate highway in Florida. The second occurred when the right front tire of a recreational vehicle failed as the RV was traveling on an interstate highway. When the tire blew out, the vehicle went off the roadway, through light brush, and then back onto the road. A fire broke out near the vehicle’s front exit and began to spread. The three victims, unable to escape via the door, tried to get out through a rear window but were unable to do so.

There were also three aircraft crashes with fires last year. In the first, an aircraft bounced on the runway as the pilot attempted to land; the plane banked, and a wing hit the runway, causing the aircraft to overturn, crash, and catch fire. Four people on board were killed. In the second, three people died when an aircraft caught fire after hitting the ground and colliding with a large tree. In the third, a military aircraft being used to attack a wildfire crashed after flying through a microburst while preparing for a retardant drop, killing four of the six-member crew.

Another three people died in the sixth non-structure fire of 2012 when they tried to disconnect an obsolete flammable fluid storage tank from a pipeline. The pipe had not been purged, bonded, or blocked, and the liquid exploded, starting a fire, when one of the men cut into it with a rotary power saw.

The final non-structure fire was a wildfire that began when embers from a prescribed burn were blown outside the control lines and ignited three spot fires, one of which grew into a massive wildfire. Three people died when the wildfire spread to their homes in a nearby residential area.

Ignition Factors

Ignition factors were reported for only nine of the 17 catastrophic multiple-death fires of 2012—three of the home fires and six of the non-structure fires.

In one home fire, combustibles were located too close to an ignition source. In the second, a heat source had been installed too close to combustibles. And in the third, the property was located too close to another building in which a fire broke out.

Three of the non-structure fires were caused by vehicles colliding or overturning. One started when equipment failed, another began when a rotary saw was used too close to flammable fluids, and another started when winds carried hot embers from a controlled fire into a residential area.

The Role of Smoke Detection and Suppression Equipment

No suppression equipment was reported to have been present in any of the catastrophic multiple-death structure fires last year. This is unfortunate, because sprinklers are proven lifesaving systems across many different kinds of properties, including homes. The risk of dying in a reported fire in your home decreases by about 80 percent when sprinklers are present, and sprinklers reduce the average property loss in home fires by 71 percent per fire. More information about home fire sprinklers is available at www.firesprinklerinitiative.org.

Information about automatic smoke detection equipment was available for seven of the eight catastrophic home fires that occurred in 2012. Four homes were equipped with smoke alarms, but only one system is known to have operated. The fire department reports did not indicate whether the alarms in the other three activated. Three homes had no smoke alarms at all, and the fires in these homes killed 15 people, including one child under age six. This represents 19 percent of those killed in home fires.

Information about detection equipment was reported for only one of the two non-home structures. This structure had smoke detection equipment, but it did not operate. The reason was not reported.

Smoke alarms have proven effective in reducing the risk of death in home fires. The most effective arrangement is interconnected, multiple-station smoke alarms that are supplied by hardwired 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 home smoke alarms at least monthly.

Batteries should also be replaced according to manufacturer's recommendations; conventional batteries should be replaced at least yearly. If an alarm "chirps," a warning that the battery is low, the battery should be replaced right away. All smoke alarms, including alarms that use 10-

year batteries and hard-wired alarms, should be replaced when they are 10 years old or sooner if they do not respond properly when tested.

Smoke alarms are only effective if occupants leave the building when they sound. Children should be familiar with the sound of a properly operating smoke alarm and follow a practiced escape plan that emphasizes two exits from any location, as well as a designated meeting place once they have evacuated the structure. Exit drills in the home are part of many schools' curricula. Practicing the plan helps families determine whether children and others readily waken to the sound of a smoke alarm if it sounds during night, and that, along with assistance for family members who require it, can be factored into the plan. Practicing escape plans, as well as basic fire prevention principles, might have prevented many of the fires and deaths included in this report.

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 the 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 throughout the United States. We understand that, in many cases, a fire department cannot release information due to ongoing litigation. In other cases, fire departments have been unable to determine the information we requested.

***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. Home Structure Fires

West Virginia

Date, Time of Alarm, Number of Deaths

March, 3:23 a.m., 9 (5 under age 6)

Number of Stories, Occupancy Type, Construction Type

This was a two-story, single-family home of unprotected wood-frame construction. The floor area was not reported.

Smoke Alarm and Other Protection Devices

Smoke alarms were present, and they operated. No reason was given as to why the occupants were unable to flee. There was no automatic suppression equipment.

Fire Origin and Path

A fire of undetermined cause broke out in the first-story living room.

Contributing Factors and Victim Locations

Of the 10 occupants in the house at the time of the fire, only one survived. The fire department did not report whether the survivor was rescued or escaped on his own.

New Jersey

Date, Time of Alarm, Number of Deaths

February, 3:09 a.m., 5 (2 under age 6)

Number of Stories, Occupancy Type, Construction Type

This was a two-and-a-half-story, two-family duplex of unprotected wood-frame construction. No information was reported on the ground floor area.

Smoke Alarm and Other Protection Devices

The fire department is unable to report information due to an ongoing investigation.

Fire Origin and Path

The fire department is unable to report information due to an ongoing investigation.

Contributing Factors and Victim Locations

The fire department is unable to report information due to an ongoing investigation.

Arkansas

Date, Time of Alarm, Number of Deaths

March, 7:30 a.m., 5 (1 under age 6)

Number of Stories, Occupancy Type, Construction Type

This was a one-story, two-family duplex of unprotected ordinary construction. The ground floor area was not reported.

Smoke Alarm and Other Protection Devices

The house had an ionization-type smoke alarm, but its operation was not reported. There was no automatic suppression equipment.

Fire Origin and Path

The only information reported on the cause and origin was that the fire started on the stove with a pot of cooking oil.

Contributing Factors and Victim Locations

No information was reported.

New Jersey

Date, Time of Alarm, Number of Deaths

July, 1:41 a.m., 5 (3 under age 6)

Number of Stories, Occupancy Type, Construction Type

This was a three-story, six-unit apartment building of unprotected wood-frame construction. The floor area was not reported.

Smoke Alarm and Other Protection Devices

The building had no automatic detection or suppression systems.

Fire Origin and Path

A fire of undetermined cause broke out on the second-story of a vacant three-story, six-unit apartment building of unprotected wood-frame construction, and spread to an occupied building of similar construction, where the victims lived.

Contributing Factors and Victim Locations

No information was reported.

Maryland

Date, Time of Alarm, Number of Deaths

October, 1:58 a.m., 5 (3 under age 6)

Number of Stories, Occupancy Type, Construction Type

This was a two-story, single-family home of unprotected wood-frame construction that covered 1,224 square feet (114 square meters).

Smoke Alarm and Other Protection Devices

There were no smoke alarms or automatic suppression equipment.

Fire Origin and Path

Heat from the furnace ignited paper products in the basement near the furnace. The fire then spread to the furnace and the rest of the basement before spreading up a stairway to the first and second floors.

Contributing Factors and Victim Locations

At the time of the fire, this house was occupied by nine or 10 people, five of whom died. The five victims were all found on the second story, four in a bedroom and one just outside the bedroom door. One resident was injured when he jumped from a second-story window after being burned. Three firefighters were also injured.

Missouri

Date, Time of Alarm, Number of Deaths

November, 3:20 a.m., 5

Number of Stories, Occupancy Type, Construction Type

This was a two-story, eight-unit apartment building of unprotected ordinary construction that covered 3,645 square feet (339 square meters).

Smoke Alarm and Other Protection Devices

The building had smoke alarms, although their coverage and operation were not reported. There was no automatic suppression equipment.

Fire Origin and Path

The fire broke out in a second-story apartment behind a sofa. The cause was not reported.

Contributing Factors and Victim Locations

Plastic blinds above the area of the fire's origin helped fuel the fire.

Ohio

Date, Time of Alarm, Number of Deaths

November, 3:17 a.m., 5

Number of Stories, Occupancy Type, Construction Type

This was a two-story, single-family home of unprotected wood-frame construction that covered 2,820 square feet (262 square meters).

Smoke Alarm and Other Protection Devices

There were smoke alarms, but their coverage and effectiveness were not reported. There was no automatic suppression system.

Fire Origin and Path

This fire began in a first-floor living room, but the cause was undetermined.

Contributing Factors and Victim Locations

The house was fully engulfed when firefighters arrived, and an exterior attack was initiated. Two victims were found on the first floor, and the other three were found in the basement.

Oklahoma

Date, Time of Alarm, Number of Deaths

December, 6:33 a.m., 5 (2 under age 6)

Number of Stories, Occupancy Type, Construction Type

This was a one-and-a-half-story, single-family home of unprotected wood-frame construction. The ground floor area was not reported.

Smoke Alarm and Other Protection Devices

There were no smoke alarms. No information was reported on automatic suppression equipment.

Fire Origin and Path

This fire began when a portable electric heater was placed too close to combustibles in the living room. Burn patterns indicated full room involvement with smoke traveling up the stairwell and throughout the structure. At least five electric heaters were being used throughout the house as the primary heat source.

Contributing Factors and Victim Locations

Arriving firefighters found the home fully involved in fire. All the victims were found in bedrooms on the second level. A bystander saw one of the victims appear at a second-floor window, but she disappeared back into the smoke. Four children were found on the floor in one bedroom, and the woman was located in a different bedroom on the floor near a window.

Table 2. Non-Home Structure Fires

Texas

Date, Time of Alarm, Number of Deaths

August, 10:40 p.m., 4

Number of Stories, Occupancy Type,

Construction Type, Operating Status

This was a two-story residential care facility for physically disabled residents. It covered 3,000 square feet (279 square meters) and was of unprotected wood-frame construction.

Detection Systems and Suppression Systems

Smoke detection equipment was present. The type and coverage was not reported, but they did not operate; the reason why was not reported. There was no automatic suppression equipment.

Fire Origin and Path

No information was reported.

Contributing Factors and Victim Locations

Firefighters initiated an offensive attack to allow for search and rescue for the occupants who were reported missing. In addition to the four residents who died, nine others evacuated uninjured.

Pennsylvania

Date, Time of Alarm, Number of Deaths

January, 4:44 a.m., 3

Number of Stories, Occupancy Type,

Construction Type, Operating Status

This was a two-story mixed occupancy of unprotected ordinary construction with a barber shop on the ground floor and an apartment on the second. The barber shop was closed, but the apartment was occupied.

Detection Systems and Suppression Systems

No information reported.

Fire Origin and Path

The fire, of unreported cause, broke out in a back room of the first-floor barber shop.

Contributing Factors and Victim Locations

None reported.

Table 3. Non-Structural Fires

Florida

Date, Time of Alarm, Number of Deaths

January, 3:50 a.m., 11

Setting

A series of vehicle crashes and fires occurred on an interstate highway while visibility was reduced by fog and smoke from a nearby wildfire.

Climate

No information has been reported.

Fire Origin and Path

Six crashes involving 25 vehicles resulted in several vehicles erupting in flames.

Factors Hindering Occupant Escape

Vehicle crashes trapped victims in their vehicles, several of which caught fire. To read more about the incident, visit

http://media.cmgdigital.com/shared/news/documents/2012/04/26/Interstate_75_Investigation_Final_Report_1.pdf

North Carolina

Date, Time of Alarm, Number of Deaths

March, 1:51 p.m., 4

Setting

An aircraft overturned next to the airport runway and caught fire.

Climate

At the time of the crash, the sky was clear, wind was at 3.5 mph (6 kph), visibility was 10 miles (16 kilometers), and the temperature was 73°F (23°C).

Fire Origin and Path

The National Transportation Safety Board Probable Cause report stated that “the nose gear touched down approximately half-way down the runway, followed by the main gear touchdown. The airplane then bounced, and the witnesses heard the engine noise increase. It then banked to the right, and the right wing contacted the ground. The airplane subsequently flipped over off the right side of the runway, and a post crash fire ensued.” Arriving firefighters found the aircraft fully engulfed in fire.

Factors Hindering Occupant Escape

Read the National Transportation Safety Board Probable Cause report at

www.nts.gov/aviationquery/brief2.aspx?ev_id=20120315X52136&ntsbno=ERA12FA225&akey=1. A fifth person, the pilot, died of traumatic injuries.

South Dakota

Date, Time of Alarm, Number of Deaths

June, 5:30 p.m., 4 crew members

Setting

A military transport plane used to fight wildfire.

Climate

No information was reported.

Fire Origin and Path

No information was reported.

Factors Hindering Occupant Escape

As the aircraft was setting up for a retardant drop, it flew through a microburst, including strong winds, and crashed. Four members of a six-person crew died in the crash. To see the complete report, go to www.wildfirelessons.net/documents/White_Draw_Fire_MAFFS_%20Report.pdf

Kansas

Date, Time of Alarm, Number of Deaths

May, 4:36 p.m., 3

Setting

This aircraft crash occurred in a tree line between a grass field and a cornfield.

Climate

No information was reported.

Fire Origin and Path

The aircraft made contact with the ground then collided with a large tree. A post crash fire ensued.

Factors Hindering Occupant Escape

Read the National Transportation Safety Board Preliminary Report at

www.nts.gov/aviationquery/brief.aspx?ev_id=20120511X83220&key=1

In addition, one person died of multiple blunt-force injuries.

Arizona

Date, Time of Alarm, Number of Deaths

May, 12:09 p.m., 3

Setting

This incident involving an RV occurred on an interstate highway.

Climate

No information was reported.

Fire Origin and Path

The front right tire failed.

Factors Hindering Occupant Escape

As this recreational vehicle was traveling on an interstate highway, the front right tire blew out, causing the RV to leave the road and travel through light brush before it came back onto the highway. A fire broke out in the area of the right front wheel well near the main exit door and involved the generator and the fuel and power lines. The fire blocked the exit, forcing the three occupants to the rear sleeping area of the vehicle, where they tried unsuccessfully to escape through a window, with assistance of bystanders.

Arkansas

Date, Time of Alarm, Number of Deaths

May, 3:27 p.m., 3

Setting

This explosion and fire involved piping connected to an obsolete flammable liquid storage tank at an oil well.

Climate

No information was reported.

Fire Origin and Path

This explosion and fire occurred as a worker (one of the victims) used a power rotary saw to cut a pipeline that contained flammable vapors. The pipeline had not been purged, bonded, or blocked before the cutting operations began.

Contributing Factors and Victim Locations

The three victims were engulfed in the fire following the explosion.

Colorado

Date, Time of Alarm, Number of Deaths

March, 1:30 p.m., 3

Setting

Residences burned in the wildland/urban interface.

Climate

On the day the fire started, winds were a steady 15 to 20 miles (24 to 32 kilometers) per hour, gusting up to 55 miles (89 kilometers) per hour.

Fire Origin and Path

This fire began when wind carried ground-level embers across the established prescribed burn control lines.

Contributing Factors and Victim Locations

A 50-acre (20-hectare) prescribed burn took place four days before this fire. The controlled burn was secured the next day and was patrolled and monitored for the next two days. The day before the fatal fire, a red-flag warning was issued for strong and gusty winds. On the day of the fire, winds carried ground-level embers across the prescribed burn fire-control lines, where they ignited three spot fires. Two of the spot fires were quickly contained, but the third became established and could not be controlled by ground crews. It subsequently became a wildfire and spread rapidly to a nearby residential area. The fire killed three people, burned 4,140 acres (1,675 hectares), and destroyed 27 structures. Two of the victims, a married couple, were found at their home, one inside and one outside. The third victim was found in her home.