



RESEARCH

Home Fires Involving Heating Equipment

December 2018

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Key Findings

Local fire departments responded to an estimated average of 52,050 fires involving heating equipment each year in 2012-2016.

Home fires involving heating equipment caused an estimated average of 490 civilian deaths and 1,400 civilian injuries each year in 2012-2016, as well as an estimated \$1.03 billion in direct property damage a year.

Space heaters accounted for more than two in five (44%) of home heating equipment fires, but these fires were responsible for 86% of civilian deaths and 78% of civilian injuries caused by heating fires.

Fires in which the heat source was too close to combustibles were associated with the largest shares of civilian deaths, civilian injuries, and direct property damage.

Home heating equipment fires are less likely to occur in the overnight hours between midnight and 8 a.m. (19% of total), but these fires account for almost half (48%) of the civilian deaths.

Nearly half (48%) of all home heating fires occurred in December, January, and February.

Home Fires Involving Heating Equipment

Heating equipment is a leading cause of fires in U.S. homes. Heating equipment was responsible for 15% of home structure fires in 2012-2016, ranking as the second leading cause behind fires caused by cooking equipment. Home heating equipment fires also accounted for nearly one-fifth (19%) of civilian deaths (tied for third behind fires caused by smoking materials and cooking equipment), 12% of civilian injuries (second behind cooking equipment), and 16% of direct property damage (third behind electrical distribution and lighting equipment and cooking equipment).

One dies, three injured when fireplace ember starts house fire

A 60-year-old man died and three female residents were injured in an early morning house fire that started when wind blew a fireplace ember onto a nearby sofa and the resulting fire rapidly spread, cutting off escape through the front door.

Investigators reported that the house was missing a window near the area of fire origin due to remodeling work and that there was no protective glass or screen in front of the fireplace. When a gust of wind entered the house through the window opening, hot coals were blown onto the sofa and spread to other combustibles. One of the home's residents called 911 to report the fire at 7:10 a.m.

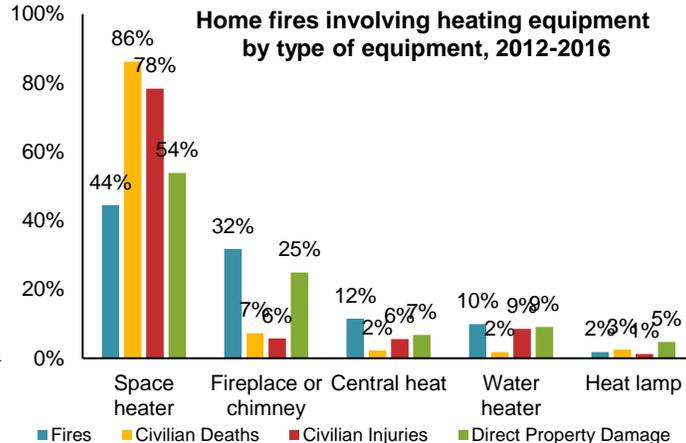
Newspaper reports indicated that the male victim was found by firefighters in a front bedroom. The female residents were reported to have been taken to the hospital with moderate injuries.

Source: "Firewatch," *NFPA Journal*, March/April, 2016.

Types of Heating Equipment Involved in Home Fires

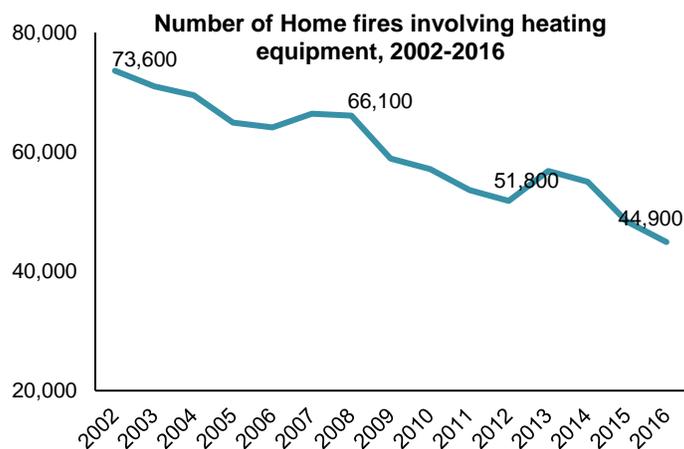
Space heaters, including wood stoves, account for the overwhelming majority of fatal and non-fatal injuries in home heating fires, as well as over half of direct property damages. Fireplaces or chimneys are also involved in a large share of heating fires (32%) and account for one-quarter of direct property damages. Other types of heating equipment include central heat, water heaters, and heat lamps.

Five percent of all reported home fires in 2012-2016 were classified as confined chimney or flue fires.¹ In some cases, these fires involved fireplaces, wood stoves, or other non-chimney equipment, but the main issue was that creosote build-up was oftentimes ignited when the equipment was used.



Trends in Home Fires Involving Heating Equipment

The number of home fires involving heating equipment have followed a distinct, if inconsistent, downward trend since 2002. From over 70,000 heating equipment fires each year in 2002-2003, the estimated number of fires has fallen to fewer than 50,000 fires in 2015 and 2016, with the 44,900 fires in 2016 representing a new low point. Improvements in safety standards, such as those requiring automatic cut-off devices that turn off electric or kerosene space heaters when tipped over and more guarding around heating coils of electric heaters and burners of kerosene heaters, are likely to contribute to the decline in home heating fires.² Confined chimney fires have decreased steadily over this period, possibly due to growing popularity of gas fireplaces.



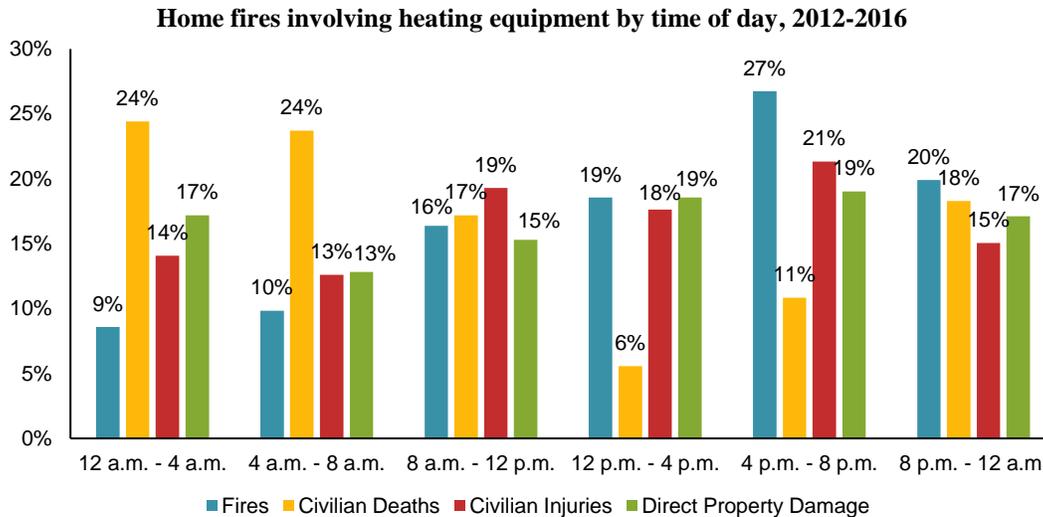
¹ Marty Ahrens. *Home Structure Fires*. Quincy, MA: National Fire Protection Association, December, 2018.

² Consumer Product Safety Commission. CPSC Offers Tips to Prevent Home Fires From Space Heaters. December 16, 2003.

Available at: <https://www.cpsc.gov/content/cpsc-offers-tips-to-prevent-home-fires-from-space-heaters>. Accessed October 9, 2018.

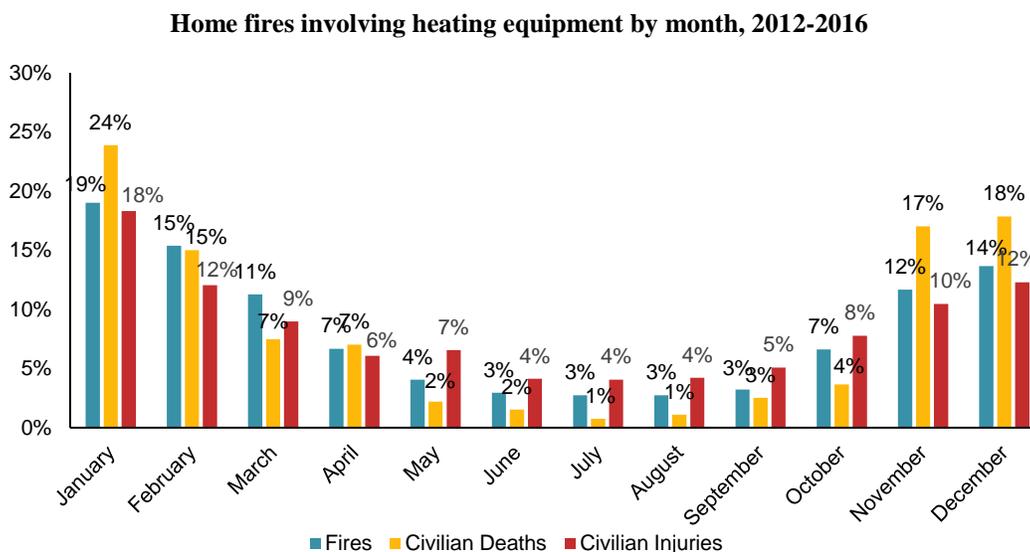
Home Fires Involving Heating Equipment by Time of Day

Home heating equipment fires are less likely to occur in the overnight hours between midnight and 8 a.m. (19% of total), but these fires account for almost half (48%) of the civilian deaths. It's important to remember to turn portable heaters off when leaving the room or going to bed.



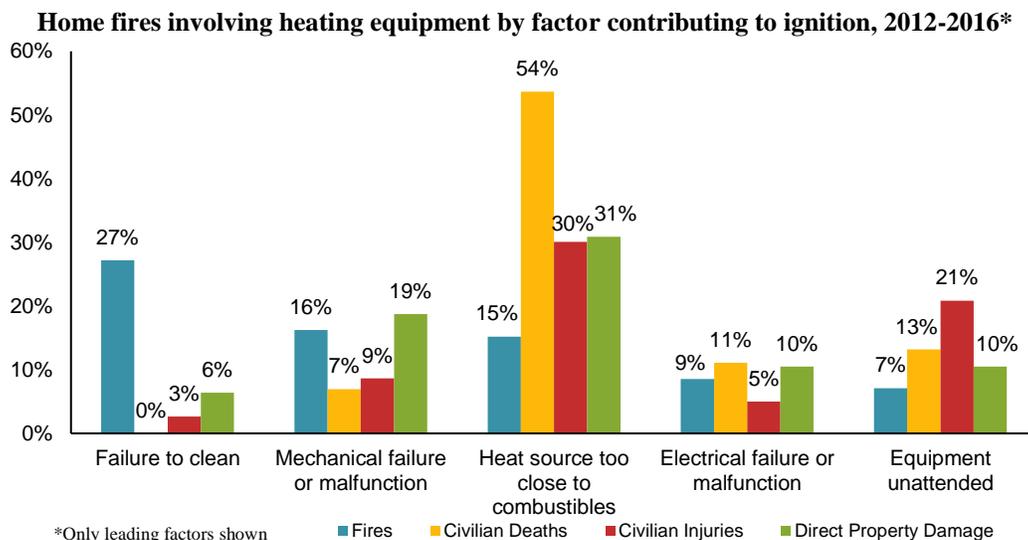
Home Fires Involving Heating Equipment by Month

Nearly half (48%) of all home heating fires occur in the cold weather months of December, January, and February. These fires also account for the majority of home heating fire deaths (57%), underscoring the importance of taking appropriate safety precautions with heating equipment.



Factors that Contribute to Home Fires Involving Heating Equipment

The leading factor contributing to the ignition of home heating fires was a failure to clean equipment, a factor often seen in chimney fires. Fires in which the heat source was too close to combustibles were associated with the largest shares of civilian deaths, civilian injuries, and direct property damage. Anything that can burn should be kept at least three feet away from heating equipment, whether a furnace, fireplace, wood stove, or space heater. Fires involving unattended heating equipment (7% of fires) accounted for a disproportionate share of losses – 13% of civilian deaths, 21% of civilian injuries, and 10% of direct property damage. While unattended equipment is not itself a cause of fires, problems can start and grow unnoticed if no one is present.



Factors Contributing to Space Heater Fires

As noted, space heaters play an outsize role in igniting fires that result in civilian injuries or death. Over half of these fires occurred when a space heater was either positioned too close to combustible materials that could ignite or were left unattended. Fires involving space heaters too close to combustibles accounted for the majority of civilian deaths from space heater fires, as well as sizeable shares of civilian injuries and direct property damage. Other leading factors contributing to space heater fires include electrical failures or malfunctions, mechanical failures or malfunctions, and equipment that is accidentally turned on or not turned off.

Elderly woman dies when space heater starts house fire

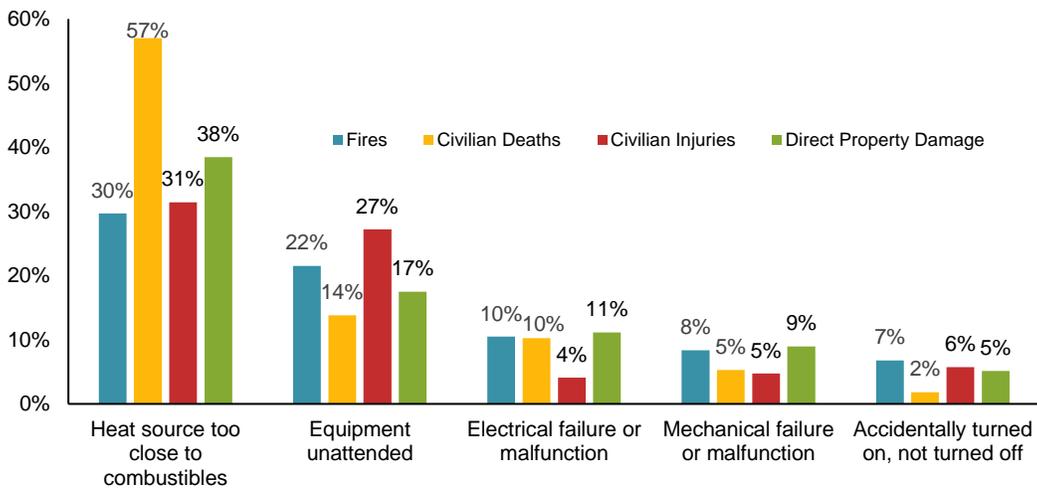
Firefighters were alerted to an early morning house fire by a phone call from a passerby at 5:39 a.m., but the fire claimed the life of an elderly resident due to smoke inhalation and burn injuries.

Investigators determined that the fire started in the living room when a space heater ignited unknown combustibles sitting underneath it. The space heater was reported to be resting in an angular position atop a two-by-four. It was unclear how long the fire had been burning before it was spotted by the passerby.

Investigators indicated that a mobility impairment was likely to have undermined the victim's ability to escape.

Source: "Firewatch," *NFPA Journal*, March/April, 2016.

Leading Factors that Contribute to Home Fires Involving Space Heaters, 2012-2016*

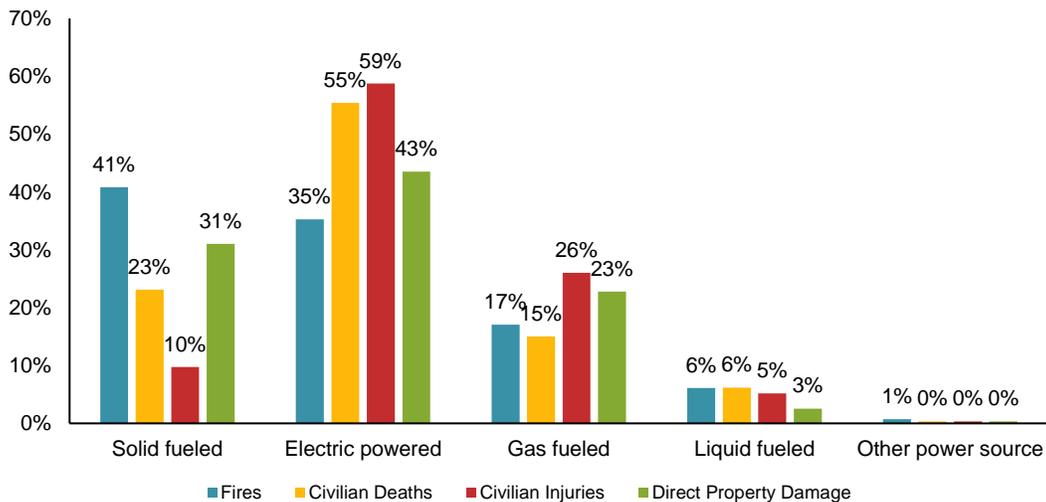


*Analysis restricted to non-confined fires. Only leading factors shown here.

Type of Fuel or Power Source in Home Fires Involving Heating Equipment

Approximately two of five home heating equipment fires involved equipment that relied upon a solid fuel, such as wood-burning or pellet stoves or wood-burning fireplaces. It is important to have annual inspections and cleaning of wood-fueled fireplace chimneys to prevent the build-up of creosote, a highly flammable byproduct of wood combustion. However, electric-powered heating devices, responsible for a third of home heating equipment fires, were the type of equipment associated with the largest losses, as shown below. Gas-fueled heating equipment accounted for a disproportionate share of injuries relative to its share of fires. Liquid-fueled equipment, such as those using fuel oil or kerosene, accounted for the vast majority of remaining fires.

Type of Fuel or Power Source in Home Fires Involving Heating Equipment, 2012-2016



Heating Equipment Safety Tips

In order to prevent fires from heating equipment, NFPA identifies a number of simple steps to prevent these destructive fires:

- Keep anything that can burn at least three feet away from heating equipment, like the furnace, fireplace, wood stove, or portable space heater.
- Have a three-foot “kid-free zone” around home fires and space heaters.
- Never use your oven to heat your home.
- Have a qualified professional install stationary space heating equipment, water heaters, or central heating equipment according to the local codes and manufacturer’s instructions.
- Have heating equipment and chimneys cleaned and inspected every year by a qualified professional.
- Remember to turn portable heaters off when leaving the room or going to bed.
- Always use the right kind of fuel, specified by the manufacturer, for fuel burning space heaters.
- Make sure the fireplace has a sturdy scree to stop embers from flying into the room. Ashes should be cool before putting them in a metal container. Keep the container a safe distance away from your home.

Source: National Fire Protection Association. *Heating Safety Tips*. Available at: [NFPA Heating Safety](#).

The Consumer Product Safety Commission has additional tips for space heater safety, including:

- Never leave the heater operating while unattended, or while you are sleeping.
- Never power the heater with an extension cord or power strip.
- Check frequently to determine if the heater plug, cord, wall outlet, or faceplate is hot. If so, turn it off and have a qualified electrician inspect.
- Ensure that the heater is placed on a stable, level surface and located where it will not be knocked over.
- Never operate a heater you suspect is damaged. Before use, inspect the heater, cord, and plug for damage.
- Never run the heater’s cord under rugs or carpeting. This can damage the cord, causing it and nearby objects to burn.

Source: U.S. Consumer Product Safety Commission. *Reducing Fire Hazards for Portable Electric Heaters*. Available at: <https://www.cpsc.gov/s3fs-public/heaters.pdf>.

Acknowledgements

The National Fire Protection Association thanks all the fire departments and state fire authorities who participate in the National Fire Incident Reporting System (NFIRS) and the annual NFPA fire experience survey. These firefighters are the original sources of the detailed data that make this analysis possible. Their contributions allow us to estimate the size of the fire problem.

We are also grateful to the U.S. Fire Administration for its work in developing, coordinating, and maintaining NFIRS. To learn more about research at NFPA visit www.nfpa.org/research.
E-mail: research@nfpa.org.

NFPA No. USS09