ARSON HOTLINE

November 6, 2013

President's Message

The theme for the articles in this newsletter is Heating Season Fires.

I was happy to see many of you at our Annual Meeting in September.

My message is going to stay on technology as I have done in the last several messages. I was reading one of my technical magazines again. Only this time it was about unmanned helicopters. It talked about how they have managed to design the helicopter control system so it can land by itself on "nice" surfaces like an airport runway, etc. But surfaces like a battlefield or irregular terrain that forest fire fighter would encounter are not suitable for these unmanned helicopters yet. They have used remote controlled unmanned helicopters to drop off supplies and pickup people via a dropped rope arrangement. The remote controlled helicopter hovers instead of lands at the scene. The article specifically talked about rescuing fire fighters in a forest fire or dropping supplies and equipment to them. The main idea with the unmanned helicopters is to reduce loss of helicopter personnel during dangerous maneuvers.

I really don't have any new words of wisdom regarding new technology and fire investigation. But as I said in my last message, investigators and everyone involved in a fire investigation should be aware of the most recent technology and utilize it as needed.

As a reminder, WAIC does have several tools to help combat arson now. They are:

1. The **WISCONSIN ARSON HOTLINE (800-362-3005).** We have posters with the hotline number for you to use at arson fires. Tips can also be submitted on our website (www.wiarsonhotline.org).
2. The **Loss Investigation Equipment Grant Program** to help offset fire investigation costs. Our grant can help cover costs such as digging out a basement with heavy equipment.

William H. Schultz,
President, Wisconsin Arson Insurance Council
President@WIArsonHotline.org

Editor – Paul Hansen (EFIGlobal, Inc.)

WAIC 2013 ANNUAL REPORT

ARSON HOTLINE

AWARDS COMMITTEE PAYMENT SUMMARY

YEAR	CALLS	REWARDS	AMOUNT
1986	32	10	$5,850
1987	28	6	$1,100
1988	15	4	$850
1989	26	4	$1,500
1990	19	6	$1,675
1991	23	4	$800
1992	24	3	$1,200
1993	16	5	$1,450
1994	12	4	$950
1995	11	4	$3,400
1996	5	0	$0
1997	8	3	$1,000
1998	9	0	$0
1999	31	5	$7,250
2000	22	1	$400
2001	12	3	$1,500
2002	19	1	$1,000
2003	70	0	$0
2004	2	0	$0
2005	54	2	$300
2006	7	2	$3,500
2007	6	1	$1,000
2008	12	1	$500
2009	14	2	$2,000
2010	26	0	$0
2011	12	0	$0
2012		4	$5,000
TOTAL	**546**	**76**	**$39,113**

Sustaining Members

Acuity
Allmark Services
Sid Grinker Restoration Company
WE Energies
Wisconsin Insurance Plan

Financial Report

Available funds September 2011		$17,240.87
Income through August 2012	$ 1,000.00	
Expenses through August 2012		$ 1009.00
(web-site $750; spring conf. Schol. $249)		
2011 - 2012 Tips Paid	$ 5,000.00	
Dig Out Grant	$ 1,000.00	
Available Funds September 1, 2012		$11,031.87

WAIC awarded one IAAI Conference scholarship between September 2011 and August 2012.

Awards Committee Report

There were 12 tips submitted in the past year with one pending disposition.

Current Officers and Directors of the Wisconsin Arson Insurance Council

President – William Schultz - FM Global Insurance (retired)
Vice President – Randy Dolenshek - State Farm Insurance
Secretary – Gary Streicher - West Allis Fire Department
Treasurer – Rick Crouse - Allmark Services
Board Member - Barry Waddell - West Allis Police Department

Heating Fires in Residential Buildings

F.E.M.A. - National Fire Data Center
Emmitsburg, MD 21727
www.usfa.dhs.gov/statistics/reports/index.shtm
Volume 10, Issue 2 / January 2010

Findings

- An estimated 54,500 heating fires occur each year in the United States.
- Heating is the second leading cause of all residential building fires following cooking.
- Residential building heating fires peak in January and February; this peak accounts for 34 percent of fires.
- Confined heating fires, those fires confined to chimneys, fuels, fuel boxes, or boilers, account for 87 percent of residential building heating fires.
- Thirty-one percent of the nonconfined residential building heating fires occur because the heat source is too close to combustibles.
- Residential building heating fires peak in the early evening hours between 5 p.m. and 9 p.m. with the highest peak between 6 p.m. and 8 p.m. This 4-hour period accounts for 30 percent of all residential building heating fires.
- The percent of residential building heating fires declines to the lowest point during the summer months from June to August. Heating fires during these months tend to be confined fuel burner/boiler malfunction fires (64 percent) or involve water heaters (10 percent).

From 2005 to 2007, residential an estimated buildings average occurred of 54,500 heating fires in the United States each year. Heating fires account for 14 percent of residential building fires responded to by fire departments across the Nation.[1,2,3] These fires resulted in an average of 190 deaths, 625 injuries, and $286 million in property loss. The term heating fires applies to those fires that are caused by central heating units, fixed or portable local heating units, fireplaces, heating stoves, chimneys, and water heaters.[4] This topical report addresses the characteristics of residential building heating fires reported to the National Fire Incident Reporting System (NFIRS) between 2005 and 2007.

For the purpose of this report, the term "residential heating fires" is synonymous with "residential building heating fires" as residential heating fires commonly mean those fires caused by heating that occur in buildings. "Residential heating fires" is used throughout the body of this report; the findings, tables, charts, headings, and footnotes reflect the full category "residential building heating fires."

Between 2005 and 2007, heating fires were the second leading cause of all residential building fires. Previously, especially during the late 1970s and early 1980s, heating fires were by far the leading cause of residential building fires. Stimulated in part by an energy shortage, this surge in heating fires was the result of the sudden increased use of alternative heating, particularly wood heating stoves and space heaters. Since then, the overall numbers of heating fires have substantially decreased. In 1983, there were 200,000 heating fires, but by 2007, that number had fallen to approximately 54,000.[5]

Type of Fire

Building fires consist of two major categories of incidents: fires that are confined to specific types of

Table 1. Residential Building Heating Fires by Type of Incident (2005–2007)

Incident Type	Percent
Nonconfined fires	13.0
Confined fires	87.0
Chimney or flue fire, confined to chimney or flue	53.0
Fuel burner/boiler malfunction, fire confined	34.0
Total	100.0

Source: NFIRS 5.0.

equipment or objects (confined fires) and those that are not (nonconfined fires). Confined building fires are small fire incidents that are limited in scope, confined to noncombustible containers, rarely result in serious injury or large content losses, and are expected to have no significant accompanying property losses due to flame damage.[6] Eighty-seven percent of residential heating fires are confined fires as shown in Table 1. By comparison, just under half (47 percent) of all residential fires are confined fires.

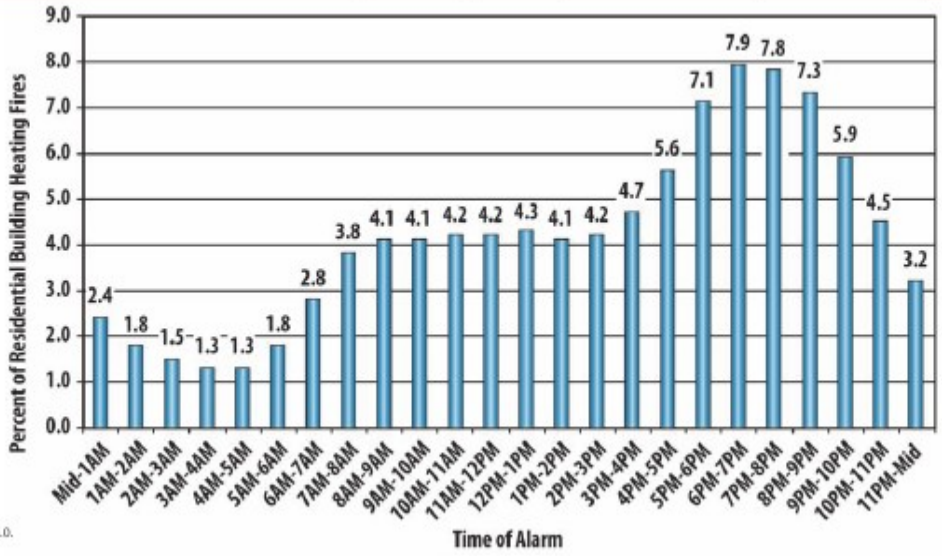
Table 2. Loss Measures for Residential Building Heating Fires (3-year average, 2005–2007)

Measure	Residential Building Fires	Residential Building Heating Fires	Confined Residential Building Heating Fires	Nonconfined Residential Building Heating Fires
Average Loss:				
Fatalities/1,000 Fires	5.4	1.9	0.0	14.4
Injuries/1,000 Fires	28.1	9.3	2.7	53.8
Dollar Loss/Fire	$14,560	$3,540	$240	$25,490

Source: NFIRS 5.0.

Notes: 1) One death in a confined fire was reported to NFIRS during 2005–2007; the resulting loss of 0.0 fatalities per 1,000 fires reflects only data reported to NFIRS.
2) Average loss for fatalities and injuries is computed per 1,000 fires; average dollar loss is computed **per fire** and is rounded to the nearest $10.

Figure 1. Residential Building Heating Fires by Time of Alarm (2005—2007)



Source: NFIRS 5.0.

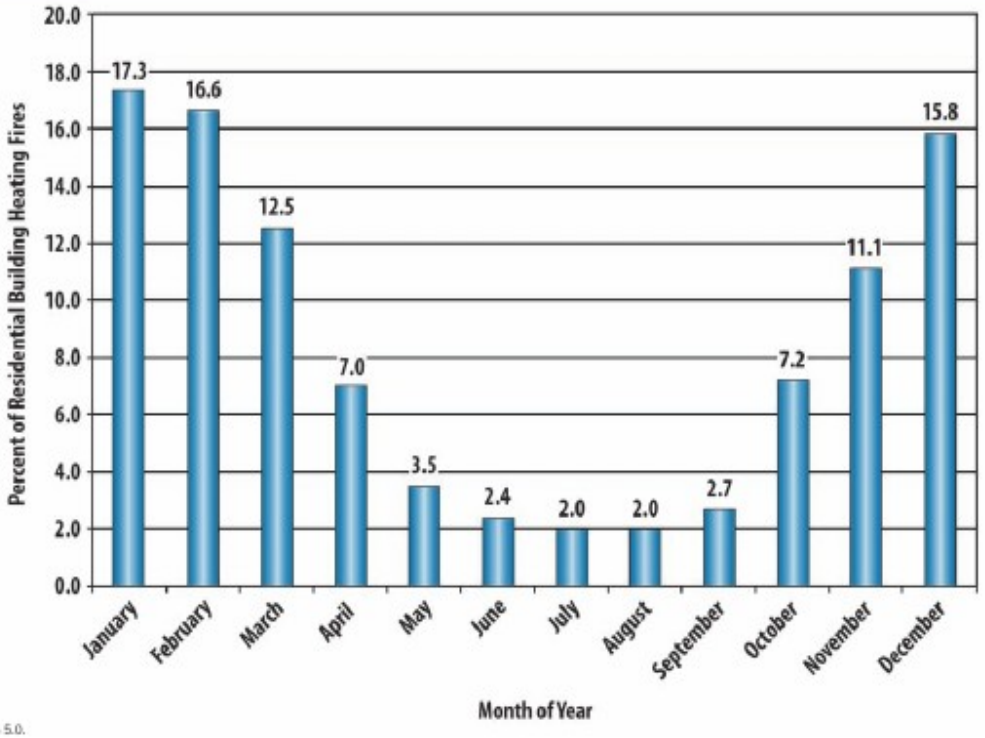
Loss Measures

Table 2 presents losses, averaged over this 3-year period, for residential building fires and heating fires reported to NFIRS.7

When Residential Building Heating Fires Occur

As shown in Figure 1, residential building heating fires occur mainly in the evening hours, 5 p.m. To 9 p.m., peaking from 6 p.m. to 8 p.m. They decline throughout the night and early morning and reach their lowest point during the morning hours (3 a.m. to 5 a.m.). The 4-hour evening period from 5 p.m. to 9 p.m. accounts for 30 percent of residential building heating fires and the 2-hour morning period between 3 a.m. and 5 a.m. accounts for 3 percent.[8] The small, confined fire incidents dominate the alarm profile and produce the pronounced peaks and valleys; the larger, nonconfined fires, experience an early morning low and an evening peak as well, but less pronounced. In general, they occur more regularly throughout the day.

Figure 2. Residential Building Heating Fires by Month (2005–2007)

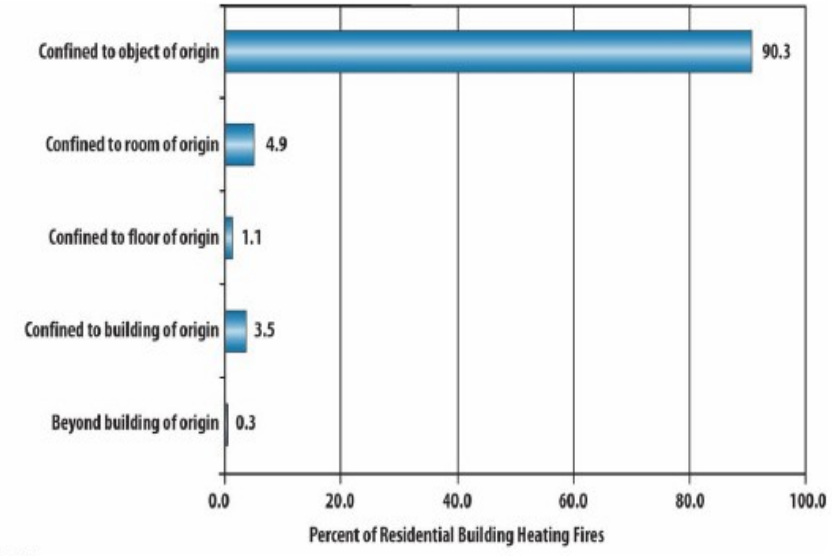


Source: NFIRS 5.0.

As to be expected, residential heating fires are most prevalent during the winter months from December through February when the use of central heating systems, portable heaters, and fireplaces is most common (Figure 2). The incidence of heating fires peaks in January and February at 17 percent each. From March to August, fires decline from 13 percent to 2 percent. The percent of fires declines to the lowest point during the summer months from June to August, corresponding to reduced heating activities in residential buildings. Both confined and nonconfined residential heating fires follow this overall pattern of winter peaks and summer lows. Residential heating fires during the summer months tend to be confined fuel burner/boiler malfunction fires (64 percent) or involve water heaters (10 percent).

Fire Spread in Residential Building Heating Fires

Figure 3. Extent of Fire Spread in Residential Building Heating Fires (2005–2007)



Source: NFIRS 5.0.

Ninety percent of residential heating fires are confined to the object of origin (Figure 3). These fires are primarily coded as confined fires in NFIRS—96 percent of residential heating fires confined to the object of origin are coded as confined fires.[9] Few fires, 5 percent, extend beyond the room of origin.

Confined Fires

NFIRS allows abbreviated reporting for confined fires and many reporting details of these fires are not required nor reported. Confined residential heating fires account for the majority of residential heating fire incidents and dominate the time of

alarm profile. The numbers of confined fires are greatest during the hours of 5 p.m. to 9 p.m. When they account for 91 percent of fires that occur during this period. Confined residential heating fires peak in January and February, decline through May, and are lowest during the months of June through August.

Nonconfined Fires

The next sections of this topical report will address nonconfined residential heating fires, where detailed fire data are available.

Where Nonconfined Residential Building Heating Fires Start

One- and two-family residences are disproportionately represented in residential heating fires. Heating fires in one- and two-family residences account for 81 percent of residential heating fires—yet one- and two-family residences represent only 66 percent of residential fires. Multifamily dwellings account for an additional 15 percent of these heating fires. Multifamily dwellings (apartments, condominiums, and the like) often have professionally maintained heating systems which may account for these differences in fire incidence.

Table 3. Leading Areas of Fire Origin in Nonconfined Residential Building Heating Fires (2005–2007)

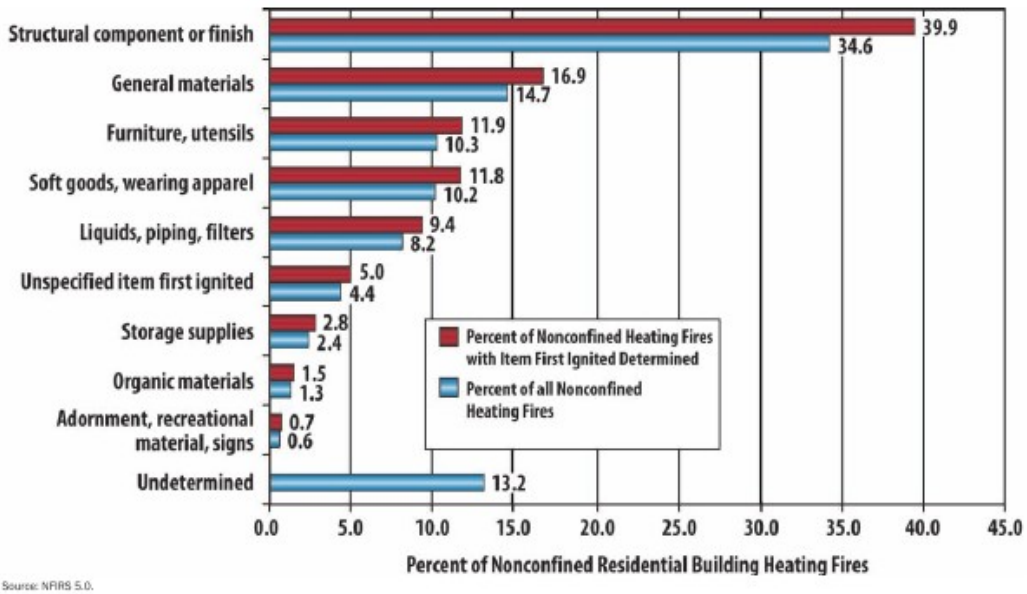
Area of Origin	Percent (Unknowns Apportioned)
Heating room or area, water heater area	16.1
Cooking area, kitchen	10.7
Common room, den, family room, living room, lounge	10.4
Bedrooms	8.8
Wall assembly, concealed wall space	6.7

Source: NFIRS 5.0.

Five areas in the home—heating rooms/areas or water heater areas (16 percent); cooking areas and kitchens (11 percent); common rooms or lounge areas (10 percent); bedrooms (9 percent), and walls or concealed wall spaces (7 percent)—account for over half of nonconfined residential heating fires (Table 3).

Items First Ignited in Nonconfined Residential Building Heating Fires

Figure 4. Item First Ignited in Nonconfined Residential Building Heating Fires by Major Category (2005–2007)



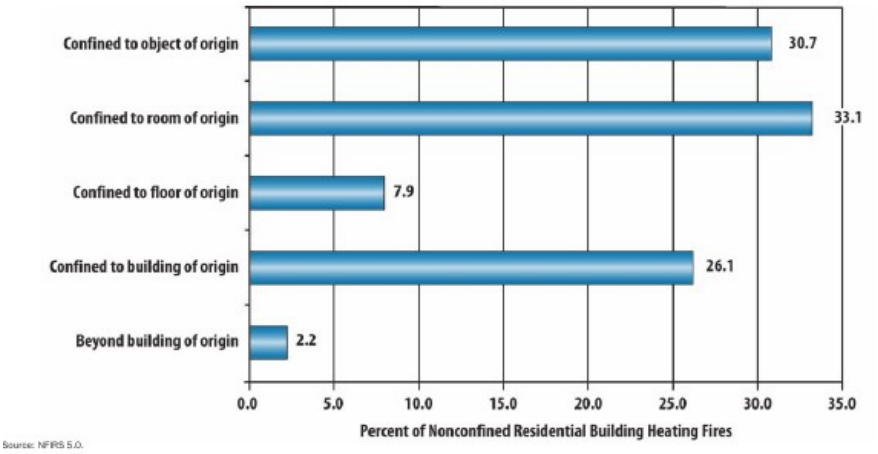
Source: NFIRS 5.0.

Forty percent of the items first ignited in nonconfined residential heating fires fall under the "structural component or finish" category (Figure 4). This category includes structural members or framing, exterior trim and finishes, interior wall coverings, insulation within the walls, partitions, and floor/ceiling surfaces. The second leading category is "general materials," a catch-all category that includes items such as electrical wire

insulation, trash/rubbish, and residues (such as chimney residue). The general materials category accounts for 17 percent of nonconfined residential heating fires. At 12 percent, "furniture" is the third leading category of items first ignited.

Structural members or framing (18 percent) and electrical wire and cable insulation (11 percent) are the specific items most often first ignited in nonconfined residential heating fires.

Figure 5. Extent of Fire Spread in Nonconfined Residential Building Heating Fires (2005–2007)



Source: NFIRS 5.0.

Fire Spread in Nonconfined Residential Building Heating Fires

The majority of nonconfined fires, 64 percent, are limited to the object or room of fire origin (Figure 5). The fire spread profile for nonconfined residential heating fires is similar to the fire spread profile for all nonconfined residential fires with slightly more nonconfined heating fires being confined to the room or object of origin.

Factors Contributing to Ignition

Table 4. Factors Contributing to Ignition for Nonconfined Residential Building Heating Fires by Major Category (Where Factor Contributing Specified, 2005–2007)

Factor Contributing to Ignition Category	Percent of Nonconfined Residential Building Heating Fires (Unknowns Apportioned)
Misuse of material or product	38.7
Mechanical failure, malfunction	22.7
Operational deficiency	17.6
Electrical failure, malfunction	17.2
Design, manufacture, installation deficiency	10.5
Other factors contributing to ignition	3.4
Natural condition	0.9
Fire spread or control	0.8

Source: NFIRS 5.0.
Notes: 1) Includes only incidents where factors that contributed to the ignition of the fire were specified.
2) Multiple factors contributing to fire ignition may be noted for each incident; total will exceed 100 percent.

Table 4 shows the categories of factors contributing to ignition for nonconfined residential heating fires. The "misuse of material or product" is the leading category contributing (39 percent) to the ignition of nonconfined residential heating fires. "Mechanical failure or malfunction" is the second leading category in 23 percent of residential heating fires and "operational deficiency" is the third leading category in 18 percent of the fires. These 3 categories play a role in 79 percent of nonconfined residential heating fires.

Heat source too close to combustibles (31 percent) is, by far, the leading specific factor contributing to ignition. Heat source too close to combustibles is more than twice the second leading factor contributing to ignition, miscellaneous mechanical failure/malfunction (13 percent).

Suppression/Alerting Systems in Residential Building Heating Fires

Table 5. NFIRS Smoke Alarm Data for Nonconfined Residential Building Heating Fires (NFIRS, 2005–2007)

Presence of Smoke Alarms	Smoke Alarm Operational Status	Smoke Alarm Effectiveness	Count	Percent
Present	Fire too small to activate smoke alarm		842	8.0
	Smoke alarm operated	Smoke alarm alerted occupants, occupants responded	2,336	22.2
		Smoke alarm alerted occupants, occupants failed to respond	109	1.0
		No occupants	353	3.3
		Smoke alarm failed to alert occupants	86	0.8
		Undetermined	240	2.3
	Smoke alarm failed to operate		1,005	9.5
	Undetermined		733	7.0
None present			2,371	22.5
Undetermined			2,468	23.4
Total Incidents			10,543	100.0

Source: NFIRS 5.0.
Notes: The data presented in this table are raw data counts from the NFIRS data set. They do not represent national estimates of smoke alarms in nonconfined residential building heating fires. They are presented for informational purposes. Total may not add to 100 percent due to rounding.

Smoke alarm data are available for both confined and nonconfined fires although for confined fires, the data are very limited in scope. Smoke alarms were present in 54 percent of nonconfined residential heating fires (Table 5). Smoke alarms are known to have operated in 30 percent of nonconfined heating fires. Smoke alarms were not present in 23 percent of the non confined residential heating fires. Firefighters were unable to determine if a smoke alarm was present in another 23 percent of these nonconfined fires. Of the nonconfined residential heating fires where a smoke alarm was present, the alarms failed to operate in 18 percent of the incidents.

Table 6. NFIRS Smoke Alarm Data for Confined Residential Building Heating Fires (NFIRS, 2005–2007)

Smoke Alarm Effectiveness	Count	Percent
Smoke alarm alerted occupants	14,356	20.4
Smoke alarm did not alert occupants	17,432	24.8
Unknown	38,501	54.8
Null/Blank	1	0.0
Total Incidents	70,290	100.0

Source: NFIRS 5.0.
Notes: The data presented in this table are raw data counts from the NFIRS data set. They do not represent national estimates of smoke alarms in confined residential building heating fires. They are presented for informational purposes. Total may not add to 100 percent due to rounding.

Smoke alarms operated and alerted occupants in 20 percent of confined fires (Table 6). Occupants were not alerted by the smoke alarm in 25 percent of confined residential heating fires.[10] Smoke alarm effectiveness was unknown in 55 percent of confined residential heating fires. Note that the data presented in Table 5 and Table 6 are the raw counts from the NFIRS data set and not scaled to national estimates of smoke alarms in residential heating fires.

Automatic Extinguishing System (AES) data are only available for nonconfined fires. Full or partial AESs were present in only 2 percent of nonconfined residential heating fires (Table 7). The lack of AES is not unexpected as only 3 percent of all nonconfined residential building fires have AES present.

Table 7. NFIRS Automatic Extinguishing System Data for Nonconfined Residential Building Heating Fires (2005–2007)

AES Presence	Count	Percent
AES present	256	2.4
Partial system present	5	0.0
AES not present	9,908	94.0
Undetermined	374	3.5
Total Incidents	10,543	100.0

Source: NFIRS 5.0.
Notes: The data presented in this table are raw data counts from the NFIRS data set. They do not represent national estimates of AESs in nonconfined residential building heating fires. They are presented for informational purposes. Totals may not add to 100 percent due to rounding.

Examples

The following are some recent examples of residential heating fires. These fires were reported by the media.

- June 2009: Hillsboro, OR, fire officials reported that a fire was caused in a home when the homeowner was replacing his water heater. The homeowner was using a propane torch to connect the water pipes when the flames erupted. The damage was contained to the crawl spaces of the home.[11]
- June 2009: A furnace that was overdue for repairs and that may have been modified is likely to blame for a fire in the Newman Building in Durango, CO, which displaced several tenants. The fire caused severe structural damage. Damaged insulation around electrical wiring and misplacement of an air filter in the furnace were under investigation as causes of the furnace fire.[12]
- October 2009: Firefighters responded to a multifamily building fire started by a boiler in the basement. Residents were evacuated and the fire was extinguished. This fire marked one of several boiler fires that the Providence, RI, firefighters had responded to over the past few weeks. The fire chief recommended that people call a heating professional each year to check their heating systems.[13]
- October 2009: Two people were displaced from their home in Lancaster, OH, when a baseboard heating fire destroyed their house. No one was injured and firefighters were able to control the blaze within minutes of arriving on the scene.[14]

Conclusion

Safer heating equipment and public awareness of heating fire prevention have substantially decreased the incidence of residential heating fires. Chimney maintenance is now more often the norm rather than the exception. Although the numbers of these fires have decreased, residential building heating fires still affect neighborhoods and communities, and therefore, continue to receive attention within local fire departments and State agencies. This attention is largely because residential building heating fires account for and cause injuries and deaths as well as property damage. Many of these fires can be prevented through proper maintenance and proper use of heating equipment.

Despite the decrease in residential building heating fires, they remain worrisome. The ebb and flow of energy pricing and availability affects the choices people make to heat their homes. As conventional energy sources—oil, electricity, natural gas, etc. — rise and fall in price and availability, alternative heating becomes more attractive, and with it, the potential for the reemergence of residential heating fires.

NFIRS Data Specifications for Residential Building Heating Fires

Data for this report were extracted from the NFIRS annual Public Data Release files for 2005, 2006, and 2007. Only version 5.0 data were extracted. Residential building heating fires were defined as:

- Incident Types 111, 112, 114, 116, 120 to 123:15

Incident Type	Description
111	Building fire
112	Fires in structure other than in a building
114	Chimney or flue fire, confined to chimney or flue
116	Fuel burner/boiler malfunction, fire confined
120	Fire in mobile property used as a fixed structure, other
121	Fire in mobile home used as fixed residence
122	Fire in motor home, camper, recreational vehicle
123	Fire in portable building, fixed location

Note that Incident Types 114 and 116 do not specify if the structure is a building.

Incident Type 112 is included as previous analyses have shown that Incident Types 111 and 112 are used interchangeably.

- Structure type:
  - 1 - Enclosed building
  - 2 - Fixed portable or mobile structure

Property Use	Description
400	Residential, other
419	One- and two-family dwelling
429	Multifamily dwelling
439	Boarding/Rooming house, residential hotels
449	Hotel/Motel, commercial
459	Residential board and care
460	Dormitory-type residence, other
462	Sorority house, fraternity house
464	Barracks, dormitory

— Structure type not specified (null entry)

- Aid types 3 (mutual aid given) and 4 (automatic aid given) were excluded to avoid double counting of incidents.
- Property use 400 to 464:
- The USFA cause hierarchy was used to determine residential building heating fire incidents:16
- Heating fire incidents involving heating stoves and food were believed to be cooking fires. As a result, fires with equipment involved in ignition code 124 (stove, heating) and item first ignited code 76 (cooking materials; includes edible materials for man or animal; excludes cooking utensils) were removed from the query

To request additional information or to comment on this report, visit http://www.usfa.dhs.gov/applications/feed-back/index.jsp

Notes:

[1] National estimates are based on 2005 to 2007 native version 5.0 data from the National Fire Incident Reporting System (NFIRS) and residential structure fire loss estimates from the National Fire Protection Association's (NFPA) annual surveys of fire loss. Fires are rounded to the nearest 100, deaths to the nearest 5, injuries to the nearest 25, and loss to the nearest $million.

[2] In NFIRS, version 5.0, a structure is a constructed item of which a building is one type. In previous versions of NFIRS, the term "residential structure" commonly referred to buildings where people live. To coincide with this concept, the definition of a residential structure fire for NFIRS 5.0 has, therefore, changed to include only those fires where the NFIRS 5.0 structure type is 1 or 2 (enclosed building and fixed portable or mobile structure) with a residential property use. Such fires are referred to as "residential buildings" to distinguish these buildings from other structures on residential properties that may include fences, sheds, and other uninhabitable structures. In addition, incidents that have a residential property use, but do not have a structure type specified are presumed to be buildings.

[3] Residential buildings include, but are not limited to, one- or two-family dwellings, multifamily dwellings, boarding houses or residential hotels, commercial hotels, college dormitories, and sorority/fraternity houses.

[4] For purposes of this analysis, residential building heating fires are defined as those residential buildings (defined above) for which the cause of the fire was determined to be heating. However, for the confined fire portion of residential building fires, only those with incident types 114 and 116 were included; all other confined fire types were excluded.

[5] Fire in the United States 1983–1990, Eighth Edition, U.S. Fire Administration, Federal Emergency Management Agency, October 1993.

[6] NFIRS distinguishes between "content" and "property" loss. Content loss includes loss to the contents of a structure due to damage by fire, smoke, water, and overhaul. Property loss includes losses to the structure itself or to the property itself. Total loss is the sum of the content loss and the property loss. For confined fires, the expectation is that the fire did not spread beyond the container (or rubbish for incident type 118) and hence, there was no property damage (damage to the structure itself) from the flames. There could be, however, property damage as a result of smoke, water, and overhaul.

[7] The average fire death and fire injury loss rates computed from the national estimates above will not agree with average fire death and fire injury loss rates computed from NFIRS data alone. The fire death rate computed from national estimates would be (1,000*(190/54,500)) = 3.5 deaths per 1,000

residential building heating fires and the fire injury rate would be (1,000*(625/54,500)) =11.5 injuries per 1,000 residential building heating fires.

[8] For the purposes of this report, the time of the fire alarm is used as an approximation for the general time the fire started. However, in NFIRS, it is the time the fire was reported to the fire department.

[9] In NFIRS, confined fires are defined by Incident Type codes 113 to 118.

[10] In confined fires, the entry "smoke alarm did not alert occupants" can mean: no smoke alarm was present, the smoke alarm was present but did not operate, or the smoke alarm was present and operated but the occupant was already aware of the fire.

[11] "Soldering Torch Sparks Residential Fire in Hillsboro," Salem-News.com, June 24, 2009. http://www.salem-news.com/articles/june242009/hillsboro_fire_6-24-09.php (accessed July 7, 2009).

[12] Garrett Andrews, "Furnace likely cause of April fire," durangoherald.com, June 27, 2009. http://durangoherald.com/sec-tions/News/2009/06/27/Furnace_likely_cause_of_April_fire/ (accessed July 10, 2009).

[13] Kate Bramson, "Weather keys rash of boiler fire calls," www.projo.com, October 17, 2009. http://www.projo.com/news/content/BOILER_FIRES_10-17-09_CAG499L_v6.353f3d9.html (accessed October 28, 2009).

[14] Morgan Day, "Residents say baseboard heating caused fire in home," www.lancastereaglegazette.com, October 27, 2009. http://www.lancastereaglegazette.com/article/20091027/NEWS01/910270305.

[15] Heating is defined by the equipment used to heat a residential building. Incident Types 113, 115, 117, and 118 were excluded because by definition these Incident Types were not heating fires.

[16] The USFA cause hierarchy is designed for structure fires. Buildings are a subset of structures. The cause hierarchy can be found at: http://www.usfa.dhs.gov/fireservice/nfirs/tools/fire_cause_category_matrix.shtm.

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[1] National estimates are based on 2005 to 2007 native version 5.0 data from the National Fire Incident Reporting System (NFIRS) and residential structure fire loss estimates from the National Fire Protection Association's (NFPA) annual surveys of fire loss. Fires are rounded to the nearest 100, deaths to the nearest 5, injuries to the nearest 25, and loss to the nearest $million.

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[4] For purposes of this analysis, residential building heating fires are defined as those residential buildings (defined above) for which the cause of the fire was determined to be heating. However, for the confined fire portion of residential building fires, only those with incident types 114 and 116 were included; all other confined fire types were excluded.

[5] Fire in the United States 1983–1990, Eighth Edition, U.S. Fire Administration, Federal Emergency Management Agency, October 1993.

[6] NFIRS distinguishes between "content" and "property" loss. Content loss includes loss to the contents of a structure due to damage by fire, smoke, water, and overhaul. Property loss includes losses to the structure itself or to the property itself. Total loss is the sum of the content loss and the property loss. For confined fires, the expectation is that the fire did not spread beyond the container (or rubbish for incident type 118) and hence, there was no property damage (damage to the structure itself) from the flames. There could be, however, property damage as a result of smoke, water, and overhaul.

[7] The average fire death and fire injury loss rates computed from the national estimates above will not agree with average fire death and fire injury loss rates computed from NFIRS data alone. The fire death rate computed from national estimates would be (1,000*(190/54,500)) = 3.5 deaths per 1,000 residential building heating fires and the fire injury rate would be (1,000*(625/54,500)) =11.5 injuries per 1,000 residential building heating fires.

[8] For the purposes of this report, the time of the fire alarm is used as an approximation for the general time the fire started. However, in NFIRS, it is the time the fire was reported to the fire department.

[9] In NFIRS, confined fires are defined by Incident Type codes 113 to 118.

[10] In confined fires, the entry "smoke alarm did not alert occupants" can mean: no smoke alarm was present, the smoke alarm was present but did not operate, or the smoke alarm was present and operated but the occupant was already aware of the fire.

[11] "Soldering Torch Sparks Residential Fire in Hillsboro," Salem-News.com, June 24, 2009. http://www.salem-news.com/articles/june242009/hillsboro_fire_6-24-09.php (accessed July 7, 2009).

[12] Garrett Andrews, "Furnace likely cause of April fire," durangoherald.com, June 27, 2009. http://durangoherald.com/sec-tions/News/2009/06/27/Furnace_likely_cause_of_April_fire/ (accessed July 10, 2009).
[13] Kate Bramson, "Weather keys rash of boiler fire calls," www.projo.com, October 17, 2009. http://www.projo.com/news/content/BOILER_FIRES_10-17-09_CAG499L_v6.353f3d9.html (accessed October 28, 2009).
[14] Morgan Day, "Residents say baseboard heating caused fire in home," www.lancastereaglegazette.com, October 27, 2009. http://www.lancastereaglegazette.com/article/20091027/NEWS01/910270305.
[15] Heating is defined by the equipment used to heat a residential building. Incident Types 113, 115, 117, and 118 were excluded because by definition these Incident Types were not heating fires.
[16] The USFA cause hierarchy is designed for structure fires. Buildings are a subset of structures. The cause hierarchy can be found at: http://www.usfa.dhs.gov/fireservice/nfirs/tools/fire_cause_category_matrix.shtm.

PORTABLE HEATER FIRES IN RESIDENTIAL BUILDINGS (2008-2010)

F.E.M.A. - National Fire Data Center
Emmitsburg, MD 21727
www.usfa.dhs.gov/statistics/reports/index.shtm
Volume 13, Issue 9 / September 2012

Findings

- An estimated 900 portable heater fires in residential buildings are reported to U.S. Fire departments each year and cause an estimated 70 deaths, 150 injuries, and $53 million in property loss.
- Only 2 percent of heating fires in residential buildings involved portable heaters; however, portable heaters were involved in 45 percent of all fatal heating fires in residential buildings.
- Portable heater fires in residential buildings peaked in January (26 percent).
- Fifty-two percent of portable heater fires in residential buildings occurred because the heat source was too close to combustibles.
- Thirty-eight percent of portable heater fires in residential buildings originated in bedrooms. In these fires, bedding, such as blankets, sheets, and comforters, was the leading item first ignited by portable heaters at 25 percent.

From 2008 to 2010, portable heater fires in residential buildings – a subset of heating fires in residential buildings – accounted for an estimated average of 900 fires in the United States each year.[1, 2] These fires resulted in an annual average of approximately 70 deaths, 150 injuries, and $53 million in property loss.[3] The term "portable heater fires" applies to those fires that are caused by catalytic heaters, oil-filled heaters, or other heaters that are designed to be carried or moved for use in a variety of locations.[4] Portable heaters are a subset of space heaters—small heaters designed to heat specific areas or rooms of a building.[5]

While portable heater fires in residential buildings were small in number, representing only 2 percent of all heating fires in residential buildings, their consequences were substantial: they accounted for 45 percent of fatal heating fires in residential buildings. Moreover, many of these fires were preventable as human error—placing the heater too close to combustible items or leaving the heater unattended—was a contributing factor to the fire.

This topical report addresses the characteristics of portable heater fires in residential buildings reported to the National Fire Incident Reporting System (NFIRS) from 2008 to 2010. For a broader overview of heating fires, see the companion topical report, "Heating Fires in Residential Buildings (2008-2010)" (Volume 13, Issue 8). For the purpose of this report, the term "portable heater fires" is synonymous with "portable heater fires in residential buildings." "Portable heater fires" is used throughout the body of this report; the findings, tables, charts, headings, and footnotes reflect the full category, "portable heater fires in residential buildings."

Type of Fire

Building fires are divided into two classes of severity in NFIRS: "confined fires," which are fires confined to certain types of equipment or objects, and "nonconfined fires," which are not. Confined building fires are small fire incidents that are limited in extent, staying within pots, fireplaces, or certain other noncombustible containers.[6] Confined fires rarely result in serious injury or large content losses and are expected to have no significant accompanying property losses due to flame damage.[7]

For these reasons, NFIRS allows abbreviated reporting for confined fires, and many reporting details of these fires are not required and, as a result, are often not reported.

Very few portable heater fires were confined fires—only 1 percent. The few fire incident records coded as "confined" portable heater fires in NFIRS had sufficient data to be included in the overall analyses. As a result, the remainder of this report addresses all portable heater fires in residential buildings and does not distinguish between confined and nonconfined fires.

Table 1 presents losses, averaged over the 3-year period from 2008 to 2010, of reported portable heater fires and heating fires in residential buildings (i.e., excluding portable heater fires).8 All of the loss measures for portable heater fires were substantially higher than the same loss measures for all other heating fires in residential buildings. As discussed, portable heater fires are mostly nonconfined fires (99 percent). As expected, their associated loss measures are higher since nonconfined fires are generally larger fires resulting in serious injury and more content losses. It is also expected that the loss measures for all other heating fires in residential buildings are lower as most are confined fires which are smaller and rarely result in serious injury or large content losses.[9]

Table 1. Loss Measures for Portable Heater Fires in Residential Buildings (3-year average, 2008–2010)

Measure	Portable Heater Fires in Residential Buildings	Heating Fires in Residential Buildings (Excluding Portable Heater Fires)
Average Loss:		
Fatalities/1,000 Fires	40.1	0.8
Injuries/1,000 Fires	112.2	6.6
Dollar Loss/Fire	$34,910	$3,380

Source: NFIRS 5.0.
Notes: 1) Average loss for fatalities and injuries is computed per 1,000 fires; average dollar loss is computed *per fire* and is rounded to the nearest $10.
2) When calculating the average dollar loss per fire for 2008–2010, the 2008 and 2009 dollar-loss values were adjusted to their equivalent 2010 dollar-loss values to account for inflation.

Where Portable Heater Fires in Residential Buildings Occur

Table 2. Portable Heater Fires in Residential Buildings by Property Use (2008–2010)

Property Use	Portable Heater Fires in Residential Buildings (Percent)
One- or two-family dwellings	89.3
Multifamily dwellings	7.5
Other residential buildings	3.2
Total	100.0

Source: NFIRS 5.0.

One- and two-family residences were disproportionately represented in portable heater fires (Table 2). 10 One- and two-family residences accounted for 89 percent of portable heater fires—yet they represented only 66 percent of residential building fires.[11] Multifamily dwellings accounted for an additional 8 percent of portable heater fires. Multifamily dwellings, especially older apartments, condominiums, and the like, often have building-wide heating systems and the need for portable heaters may be less, perhaps accounting for the differences in portable heater fire incidence.

Table 3. Leading Areas of Fire Origin in Portable Heater Fires in Residential Buildings (2008–2010)

Areas of Fire Origin	Percent of Portable Heater Fires in Residential Buildings (Unknowns Apportioned)
Bedrooms	37.5
Common room, den, family room, living room, lounge	17.6
Other function areas	7.0
Bathroom, checkroom, lavatory, locker room	5.6
Vehicle storage: garage, carport	5.4

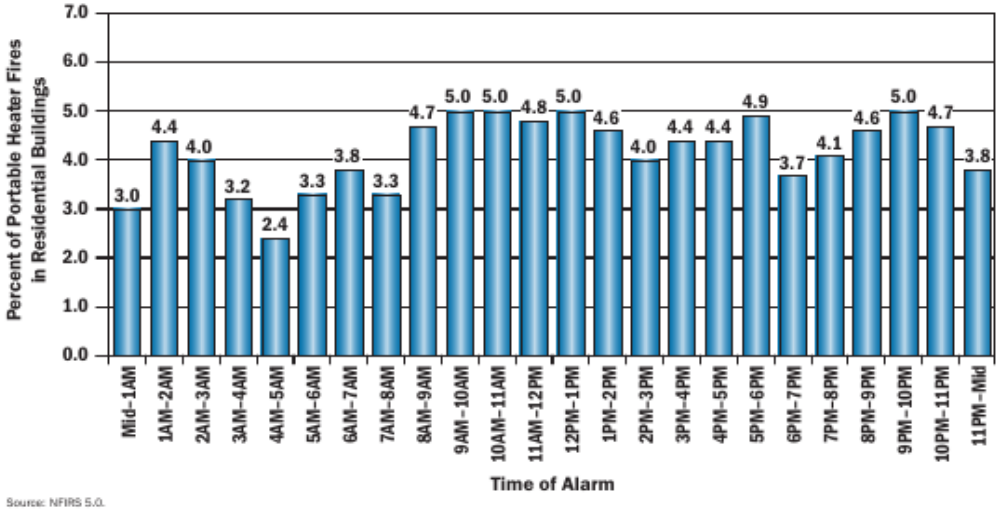
Source: NFIRS 5.0.

Most portable heater fires started in bedrooms (38 percent) or common rooms including dens, family rooms, living rooms, and lounges (18 percent). Fires that started in other function or activity areas accounted for 7 percent of fires (Table 3).

When Portable Heater Fires in Residential Buildings Occur

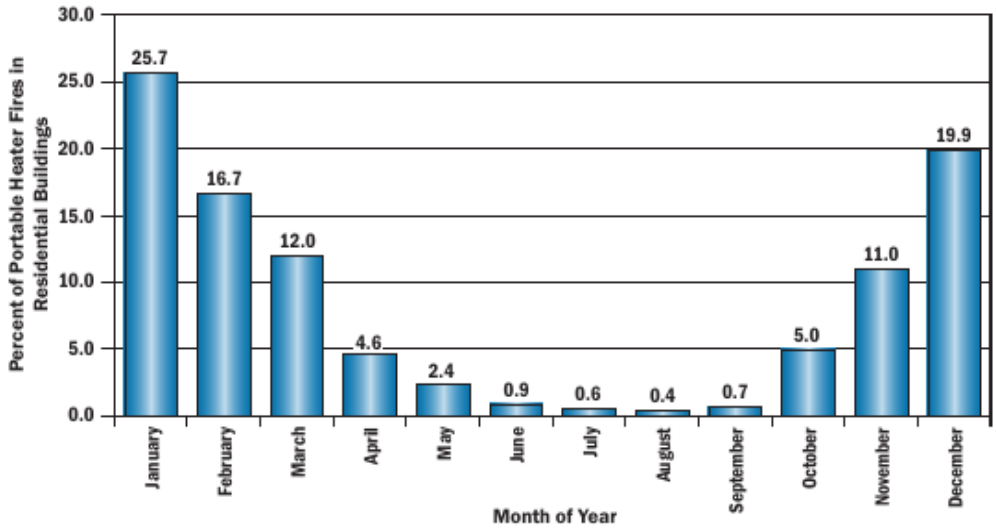
As shown in Figure 1, portable heater fires were relatively constant throughout the day with some variations. They were generally at their lowest in the early morning hours, roughly between midnight and 8 a.m., and at their highest from 9 a.m. to 1 p.m. This latter 4-hour period accounted for 20 percent of portable heater fires.[12]

Figure 1. Portable Heater Fires in Residential Buildings by Time of Alarm (2008–2010)



Source: NFIRS 5.0.
Note: Total does not add to 100 percent due to rounding.

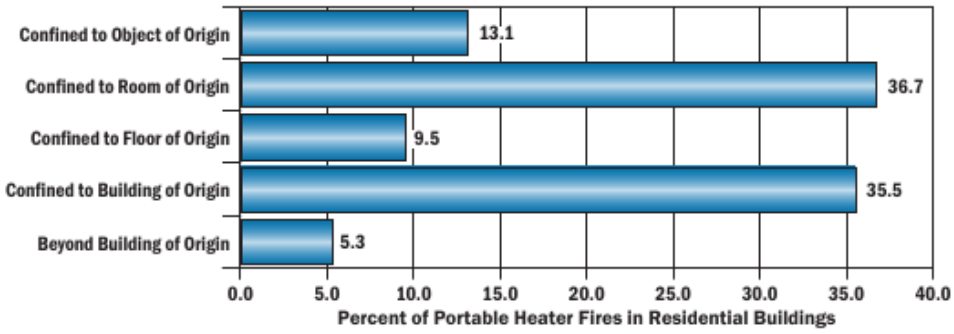
Figure 2. Portable Heater Fires in Residential Buildings by Month (2008–2010)



Source: NFIRS 5.0.
Note: Total does not add to 100 percent due to rounding.

Figure 2 shows the pattern of portable heater fires reported to NFIRS throughout the year. As expected, the number of portable heater fires increased during the late fall and winter months (November through March), peaking in January (26 percent). From April to September, fire incidence declined from 5 percent to less than 1 percent. This is not surprising as the use of portable heaters is less common during the spring, summer, and early fall months.

Figure 3. Extent of Fire Spread in Portable Heater Fires in Residential Buildings (2008–2010)



Source: NFIRS 5.0.
Note: Total does not add to 100 percent due to rounding.

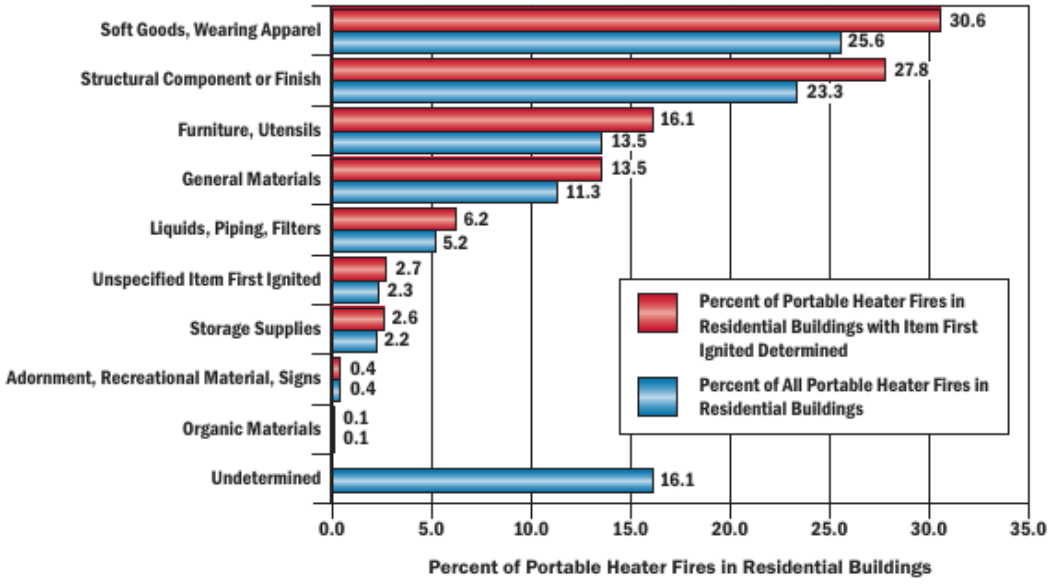
Fire Spread in Portable Heater Fires in Residential Buildings

Fifty percent of portable heater fires remained confined to the object or room of origin (Figure 3). When

compared to other residential heating-related fires, portable heater fires tended to spread further through the home. Fifty percent of portable heater fires spread beyond the room of fire origin. By contrast, only 38 percent of nonconfined heating fires (excluding portable heater fires) in residential buildings spread beyond the room of origin. This increased fire spread may be, in part, why portable heater fires tended to be more serious as evidenced in the loss measures shown in Table 1.

What Ignites First in Portable Heater Fires in Residential Buildings

Figure 4. Item First Ignited in Portable Heater Fires in Residential Buildings (2008–2010)



Source: NFIRS 5.0.

Thirty-one percent of items first ignited in portable heater fires fell under the "soft goods, wearing apparel" category (Figure 4). This category includes bedding, curtains, and clothing. The next leading category, "structural component or finish," accounted for another 28 percent of portable heater fires. "Furniture, utensils" was the third leading category at 16 percent.

Of the fires that originated in bedrooms (Table 3), bedding, such as blankets, sheets, and comforters, was the leading item first ignited by portable heaters (25 percent). Clothing not on a person accounted for another 13 percent. For portable heater fires that originated in common rooms, 24 percent were started with the ignition of upholstered sofas and chairs. Floor coverings such as rugs, carpets, or mats accounted for an additional 18 percent.

Factors Contributing to Ignition in Portable Heater Fires in Residential Buildings

Table 4. Leading Factors Contributing to Ignition for Portable Heater Fires in Residential Buildings (Where Factor Contributing to Ignition Specified, 2008–2010)

Factor Contributing to Ignition	Percent of Portable Heater Fires in Residential Buildings (Unknowns Apportioned)
Heat source too close to combustibles	52.4
Equipment unattended	11.5
Unspecified electrical failure, malfunction	9.0
Unspecified short-circuit arc	6.4
Unspecified mechanical failure, malfunction	5.2

Source: NFIRS 5.0.
Notes: 1) Includes only incidents where factors that contributed to the ignition of the fire were specified.
2) Multiple factors contributing to fire ignition may be noted for each incident.

Table 4 shows the leading factors contributing to ignition of portable heater fires. Placing a heat source too close to combustible objects was the leading contributing factor (52 percent). Unattended equipment was a contributing factor in another 12 percent of portable heater fires, and electrical failure or malfunction was a contributing factor in 9 percent of the fires. These 3 contributing factors played a role in 73 percent of residential portable heater fires.

Suppression/Alerting Systems in Portable Heater Fires in Residential Buildings

Over the past 30 years, technologies to detect and extinguish fires have been major contributors in the drop in fire fatalities and injuries. Smoke alarms are now present in the majority of residential

buildings. In addition, the use of residential sprinklers is widely supported by the fire service and is gaining support within residential communities.

Table 5. Presence of Smoke Alarms in Portable Heater Fires in Residential Buildings (2008–2010)

Presence of Smoke Alarms	Percent
Present	40.4
None present	31.5
Undetermined	27.5
Null/Blank	0.6
Total	100.0

Source: NFIRS 5.0.

Note that the data presented in Tables 5 to 7 are the raw counts from the NFIRS data set and are not scaled to national estimates of smoke alarms and sprinklers in portable heater fires. In addition, NFIRS does not allow for the determination of the type of smoke alarm (i.e., photoelectric or ionization) or the location of the smoke alarm with respect to the area of fire origin.

Smoke Alarms

As shown in Table 5, smoke alarms were present in 40 percent of portable heater fires. Smoke alarms were not present in 32 percent of portable heater fires, and firefighters were unable to determine if a smoke alarm was present in another 28 percent of these fires. Additionally, smoke alarm presence status was not reported in less than 1 percent of incidents.13, 14 Thus, smoke alarms were potentially missing in between 32 and 60 percent of these fires with the ability to spread and possibly result in fatalities.

Only 8 percent of all portable heater fires occurred in residential buildings that are not currently or routinely occupied. These occupancies—buildings under construction, undergoing major renovation, vacant, and the like—are more unlikely to have alerting and suppression systems that are in place and, if in place, that operate.[15] As a result, the detailed smoke alarm analyses in the next section focus only on portable heater fires in occupied residential buildings.

Smoke Alarms in Portable Heater Fires in Occupied Residential Buildings

Table 6. NFIRS Smoke Alarm Data for Portable Heater Fires in Occupied Residential Buildings (2008-2010)

Presence of Smoke Alarms	Smoke Alarm Operational Status	Smoke Alarm Effectiveness	Count	Percent
Present	Fire too small to activate smoke alarm		41	2.8
	Smoke alarm operated	Smoke alarm alerted occupants, occupants responded	257	17.6
		Smoke alarm alerted occupants, occupants failed to respond	7	0.5
		No occupants	38	2.6
		Smoke alarm failed to alert occupants	14	1.0
		Undetermined	44	3.0
	Smoke alarm failed to operate		117	8.0
	Undetermined		102	7.0
None present			435	29.9
Undetermined			402	27.6
Total incidents			1,457	100.0

Source: NFIRS 5.0.
Note: The data presented in this table are raw data counts from the NFIRS data set. They do not represent national estimates of smoke alarms in portable heater fires in residential buildings. They are presented for informational purposes.

Smoke alarms were reported as present in 43 percent of portable heater fires in occupied residential buildings (Table 6). No smoke alarms were present in 30 percent of portable heater fires in occupied residential buildings, and firefighters were unable to determine if a smoke alarm was present in another 28 percent of these fires.[16]

When smoke alarms were present (43 percent) and the alarm operational status is considered, the percentage of smoke alarms reported as present consisted of:

- present and operated—25 percent;

- present but did not operate—11 percent (alarm failed to operate, 8 percent; fire too small, 3 percent); and
- present, but operational status unknown—7 percent.

When the subset of incidents where smoke alarms were reported as present are analyzed separately and as a whole, smoke alarms were reported to have operated in 58 percent of the incidents. Smoke alarms failed to operate in 19 percent of the incidents and in another 7 percent, the fire was too small to activate the alarm. The operational status of the alarm was undetermined in 16 percent of the incidents.

Automatic Extinguishing Systems in Portable Heater Fires in Residential Buildings

Table 7. NFIRS Automatic Extinguishing System (AES) Data for Portable Heater Fires in Residential Buildings (2008-2010)

AES Presence	Count	Percent
AES present	17	1.1
Partial system present	0	0.0
AES not present	1,503	94.2
Unknown	65	4.1
Null/Blank	10	0.6
Total incidents	1,595	100.0

Source: NFIRS 5.0.
Note: The data presented in this table are raw data counts from the NFIRS data set. They do not represent national estimates of AESs in portable heater fires in residential buildings. They are presented for informational purposes.

The analyses presented here do not differentiate between occupied and unoccupied housing, as extremely few reported fires in unoccupied housing have automatic extinguishing systems (AESs) present. Full AESs were present in only 1 percent of portable heater fires (Table 7).[17] While the use of residential sprinklers is widely supported by the fire service and is gaining support within residential communities, the lack of AESs is not unexpected as they are not yet widely installed.

Examples

The following recent examples of portable heater fires reported by the media illustrate the leading factors contributing to ignition of these fires—unattended equipment left too close to combustibles—and the damage they cause:

- April 2012: A police officer reported hearing a small explosion in the garage of a Yakima, WA, condominium. Upon arrival, firefighters found smoke and fire coming from the garage. The fire was reportedly caused when a portable heater, which was left on to warm up the garage, was placed too close to combustible objects. The fire destroyed two vehicles located in the garage and heavily damaged the condominium. Damage was estimated at over $140,000.[18]
- January 2012: A fire believed to have started by a portable heater in a bedroom forced a family from their home in Baton Rouge, LA. Investigators reported that the fire started around the heater that was next to a bed. A smoke alarm in the bedroom woke the homeowner, and after unsuccessfully attempting to extinguish the fire, the family of four escaped. Flame damage occurred in the bedroom as well as in the home's living room. The remainder of the house suffered smoke damage.[19]
- January 2011: Fairfax County Fire and Rescue Department units responded to a late afternoon single-family house fire near Clifton, VA. When firefighters arrived, fire could be seen from the front of the house and heavy smoke was coming from all sides. Firefighters conducted a fire attack and entered through a side door where they found and rescued an adult male who was trapped. The man was treated at the scene and then transported to a hospital with life-threatening injuries. Damage to the home was estimated at $80,000. The fire, which was accidental and originated in a bedroom, was caused by a portable heater placed too close to combustible materials.[20]

NFIRS Data Specifications for Portable Heater Fires in Residential Buildings

Data for this report were extracted from the NFIRS annual Public Data Release (PDR) files for 2008, 2009, and 2010. Only version 5.0 data were extracted.
Portable heater fires in residential buildings were defined by the following criteria:

- Aid Types 3 (mutual aid given) and 4 (automatic aid given) are excluded to avoid double counting of incidents.
- Incident types 111, 114, 116, 120-123:21

Incident Type	Description
111	Building fire
114	Chimney or flue fire, confined to chimney or flue
116	Fuel burner/boiler malfunction, fire confined
120	Fire in mobile property used as a fixed structure, other
121	Fire in mobile home used as fixed residence
122	Fire in motor home, camper, recreational vehicle
123	Fire in portable building, fixed location

Notes: 1) Incident types 114 and 116 do not specify if the structure is a building.
2) Incident Type 112 was included in data analyses prior to 2008 as previous analyses showed that Incident Types 111 and 112 were used interchangeably. As of 2008, Incident Type 112 is excluded.

Property Use	Description
400	Residential, other
419	One- or two-family dwelling
429	Multifamily dwelling
439	Boarding/Rooming house, residential hotels
449	Hotel/Motel, commercial
459	Residential board and care
460	Dormitory-type residence, other
462	Sorority house, fraternity house
464	Barracks, dormitory

- Property use 400–464 is included to specify residential buildings:
- Structure Type:
  — For Incident Types 114 and 116:
    1—Enclosed building,
    2—Fixed portable or mobile structure, and
    Structure Type not specified (null entry).
  — For Incident Types 111 and 120–123:
    1—Enclosed building, and
    2—Fixed portable or mobile structure.
- Equipment involved in ignition codes 141 to 143:
- Equipment portability code 1 was used to identify portability.

Equipment Involved in Ignition	Description
141	Heater; includes floor furnaces, wall heaters, and baseboard heaters; excludes hot water heaters
142	Heater, catalytic
143	Heater, oil-filled

The analyses contained in this report reflect the current methodologies used by the USFA. The USFA is committed to providing the best and most current information on the United States fire problem and continually examines its data and methodology to fulfill this goal. Because of this commitment, data collection strategies and methodological changes are possible and do occur. As a result, analyses and estimates of the fire problem may change slightly over time. Previous analyses and estimates on specific issues (or similar issues) may have used different methodologies or data definitions and may not be directly comparable to the current ones.

To request additional information or to comment on this report, visit http://apps.usfa.fema.gov/feedback/

Notes:
[1] In the National Fire Incident Reporting System (NFIRS), Version 5.0, a structure is a constructed item of which a building is one type. In previous versions of NFIRS, the term "residential structure" commonly referred to buildings where people live. To coincide with this concept, the definition of a residential structure fire for NFIRS 5.0 has, therefore, changed to include only those fires where the NFIRS 5.0 Structure Type is 1 or 2 (enclosed building and fixed portable or mobile structure) with a residential property use. Such fires are referred to as "residential buildings" to distinguish these buildings from other structures on residential properties that may include fences, sheds, and other uninhabitable structures. In addition, confined fire incidents that have a residential

property use, but do not have a structure type specified, are presumed to be buildings. Nonconfined fire incidents that have a residential property use without a structure type specified are considered to be invalid incidents (structure type is a required field) and are not included.

[2] The term "residential buildings" includes what are commonly referred to as "homes," whether they are one- or two-family dwellings or multifamily buildings. It also includes manufactured housing, hotels and motels, residential hotels, dormitories, assisted living facilities, and halfway houses—residences for formerly institutionalized individuals (patients with mental disabilities, drug addicts, or those formerly incarcerated) that are designed to facilitate their readjustment to private life. The term "residential buildings" does not include institutions such as prisons, nursing homes, juvenile care facilities, or hospitals, even though people may reside in these facilities for short or long periods of time.

[3] National estimates are based on 2008–2010 native Version 5.0 data from NFIRS, residential structure fire-loss estimates from the National Fire Protection Association's (NFPA's) annual surveys of fire loss, and the U.S. Fire Administration's (USFA's) residential building fire-loss estimates. Fires are rounded to the nearest 100, deaths to the nearest 5, injuries to the nearest 25, and loss to the nearest million dollars.

[4] For purposes of this analysis, portable heater fires in residential buildings are defined as those residential buildings (defined above) for which the cause of the fire was determined to be portable heaters.

[5] Space heaters may be fixed (stationary) or portable. Space heaters typically include: heating and wood stoves; heaters (including portable kerosene heaters, portable electric heaters, oil-filled heaters, and catalytic heaters); local furnaces; and fireplace inserts.

[6] In NFIRS, confined fires are defined by Incident Type codes 113–118.

[7] NFIRS distinguishes between "content" and "property" loss. Content loss includes loss to the contents of a structure due to damage by fire, smoke, water, and overhaul. Property loss includes losses to the structure itself or to the property itself. Total loss is the sum of the content loss and the property loss. For confined fires, the expectation is that the fire did not spread beyond the container, and hence, there was no property damage (damage to the structure itself) from the flames. There could be, however, property damage as a result of smoke, water, and overhaul.

[8] The average fire death and fire injury loss rates computed from the national estimates above do not agree with average fire death and fire injury loss rates computed from NFIRS data alone. The fire death rate computed from national estimates is (1,000*(70/900)) = 77.8 deaths per 1,000 portable heater fires in residential buildings, and the fire injury rate is (1,000*(150/900)) =166.7 injuries per 1,000 portable heater fires in residential buildings.

[9] "Heating Fires in Residential Buildings (2008–2010)," USFA, September 2012, Volume 13, Issue 8, http://www.usfa.fema.gov/downloads/pdf/statistics/v13i8.pdf.

[10] "One- and two-family residential buildings" include detached dwellings, manufactured homes, mobile homes not in transit, and duplexes. "Multifamily residential buildings" include apartments, townhouses, rowhouses, condominiums, and other tenement properties. "Other residential buildings" include boarding/rooming houses, hotel/motels, residential board and care facilities, dormitory-type residences, sorority/fraternity houses, and barracks.

[11] "Residential Building Fires (2008–2010)," USFA, April 2012, Volume 13, Issue 2, http://www.usfa.fema.gov/downloads/pdf/statistics/v13i2.pdf.

[12] For the purposes of this report, the time of the fire alarm is used as an approximation for the general time the fire started. However, in NFIRS, it is the time the fire was reported to the fire department.

[13] All incidents where smoke alarm presence was not reported (i.e., null/blank) were confined fires (Incident Type codes 114 and 116). NFIRS allows abbreviated reporting for confined fires, and

many reporting details of these fires including smoke alarm presence are not required and, as a result, may not be reported.

[14] Total does not add to 100 percent due to rounding.

[15] "Residential Building Fires (2008–2010)," USFA, April 2012, Volume 13, Issue 2, http://www.usfa.fema.gov/downloads/pdf/statistics/v13i2.pdf.

[16] Total does not add to 100 percent due to rounding.

[17] All incidents where automatic extinguishing system (AES) presence was not reported (i.e., null/blank) were confined fires (Incident Type codes 114 and 116). NFIRS allows abbreviated reporting for confined fires, and many reporting details of these fires including AES presence are not required and, as a result, may not be reported.

[18] David Mance, "Portable Heater Near Objects Causes Condo Fire," www.kvewtv.com, April 2, 2012, http://www.kvewtv.com/article/2012/apr/02/portable-heater-near-objects-causes-condo-fire/ (accessed June 15, 2012).

[19] Joshua Auzenne, "Portable Heater Sparks House Fire," www.wafb.com, January 12, 2012, http://www.wafb.com/story/16451162/fire-sparks-in-baton-rouge-home (accessed June 15, 2012).

[20] "Fairfax County Crews Respond to House Fire Caused By Portable Heater," www.fdnntv.com, January 17, 2011, http://www.fdnntv.com/Fairfax-County-Crews-Respond-House-Fire-Portable-Heater (accessed June 15, 2012).

[21] Heating is defined by the equipment used to heat a residential building. Incident Types 113, 115, 117, and 118 were excluded because by definition these Incident Types were not heating fires.

[22] The USFA Structure Fire Cause Methodology is designed for structure fires of which buildings are a subset. The cause definitions can be found at http://www.usfa.fema.gov/fireservice/nfirs/tools/fire_cause_category_matrix.shtm.

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