U.S. Fire Administration/National Fire Data Center

New Year's Holiday Fires

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TOPICAL FIRE RESEARCH SERIES

New Year's Holiday Fires

November 2004 Volume 4, Issue 5

Findings

- Based on 2001 and 2002 data, an estimated 6,400 fires occurred during an average New Year's holiday, causing 30 deaths, 93 injuries, and $53 million in property loss.
- New Year's fires peaked between midnight and 1:00 a.m., largely due to a spike in outdoor fires after midnight.
- Nearly 28% of New Year's outdoor fires were caused by fireworks.
- Residential structure fires occurring during New Year's had a substantially higher rate of fatalities than an average winter residential structure fire, and moderately higher rates of injuries and property loss per fire.
- Cooking and heating were the two leading causes of New Year's residential structure fires, but not substantially different from an average winter day. Outside fires caused by other heat on New Year's, however, were double those on both an annual basis and an average winter day.

This topical report examines the patterns and characteristics of fires that occurred during the 2001 and 2002 New Year's holidays,[1] and it compares those characteristics with average fire patterns during comparable winter days[2] and annually. Approximately 6,400 fires in the United States occurred during the average New Year's holiday, claiming an estimated 30 lives, causing 93 injuries and $53 million in property damage.[3] Approximately 34% of all New Year's fires occurred in residential property structures.[4]

Loss Measures

Overall, New Year's fires incurred similar losses per fire as those occurring during the winter months of December and January (Figure 1, left side). The rates of fatalities and property loss were only moderately higher during the New Year's holiday than during the average winter day. Both New Year's and winter fires caused more casualties and property loss than the average annual fire during 2001 and 2002. The higher winter rates are partly due to a higher proportion of fires that normally occur in structures during the winter, which is due to an increase in indoor heating fires and a decrease in outdoor fires. Structure fires are more dangerous and costly on average than outdoor fires, and therefore drive up the average loss per fire.

New Year's residential structure fires had an average fatality rate 50% higher than winter residential structure fires on average (Figure 1, right side), and also produced a higher rate of injuries. Both New Year's and winter residential structure fires caused more fatalities than the average annual residential structure fire, with New Year's fires being more than twice as deadly. Property loss was slightly lower per fire during the New Year's period than during the winter months on average, and moderately lower than residential structure fires annually.

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FIGURE 1. LOSS MEASURES (ANNUAL AVERAGE 2001–2002)

Loss Measure	All Fires	December & January Fires	New Year's Fires
$ Loss/Fire	$6,245	$7,856	$8,425
Fatalities/1,000 Fires	2.5	4.3	5.5
Injuries/1,000 Fires	12.7	16.3	16.4

Loss Measure	Residential Fires	December & January Fires	New Year's Fires
$ Loss/Fire	$13,188	$12,508	$12,393
Fatalities/1,000 Fires	6.9	9.8	14.8
Injuries/1,000 Fires	35.8	35.7	44.4

Source: NFIRS 5.0 only

Where Fires Occur

Forty-two percent of New Year's fires occurred in structures (34% on residential property), 38% were outdoors, and 15% occurred in vehicles (Figure 2). Outdoor fires surged during the New Year's holiday compared to an average winter day (38% vs. 29%). Although there were more structure and vehicle fires during the New Year's holiday than during a comparable winter day, their proportion of all fires was lower due to the spike in outdoor fires. Both New Year's and winter fires occurred more often in structures and less often outside than annual fires, due to seasonal changes in human activity.

FIGURE 2. WHERE NEW YEAR'S FIRES OCCUR (ANNUAL AVERAGE 2001–2002)

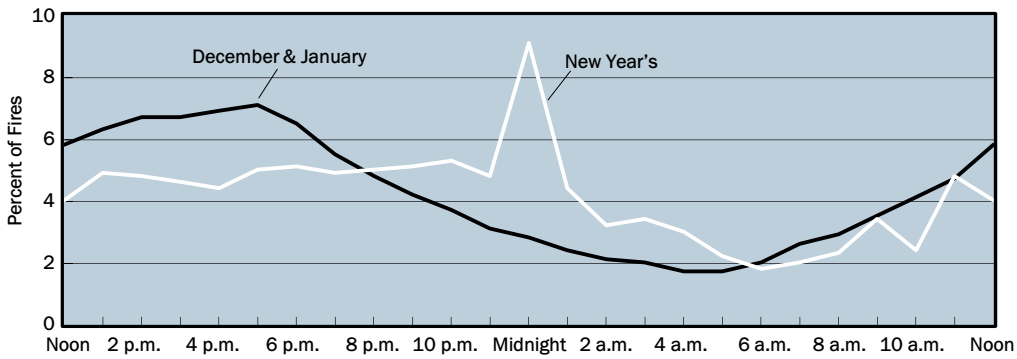
Property Type	All Fires	December & January Fires	New Year's Fires
Structure	34%	45%	42%
Outside	40%	29%	38%
Vehicle	20%	20%	15%
Other	5%	6%	5%

Source: NFIRS 5.0 only

When Fires Occur

The profile of fire incidence from noon on December 31st to noon on January 1st is clearly different from that of a comparable winter period, as shown in Figure 3. The New Year's profile shows a clear spike in fires immediately following midnight. During a normal winter period, fires tend to peak around dinner time, which is understandable given that 35% of winter fires occurred in residential structures and the leading cause of residential structure fires is cooking.

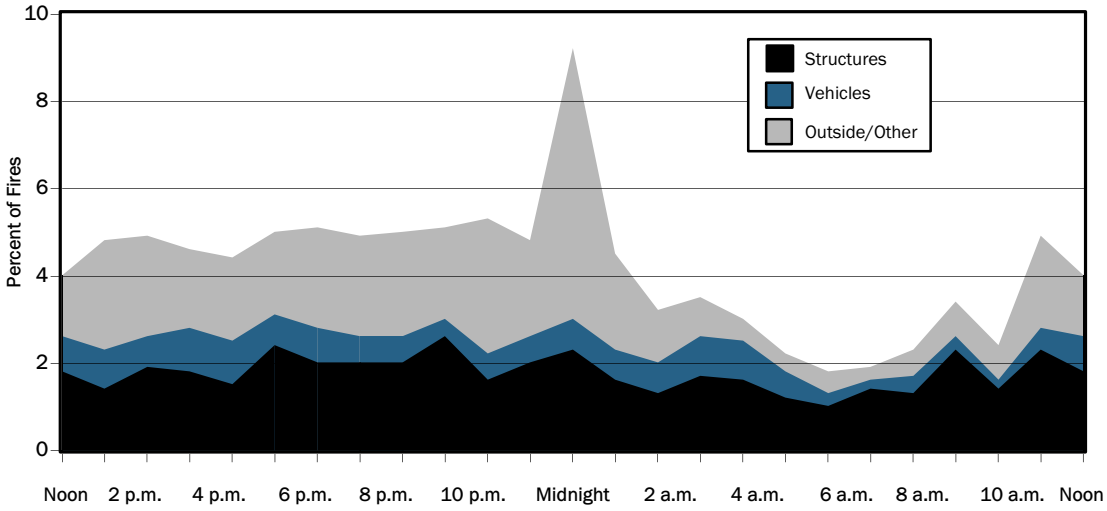
FIGURE 3. NEW YEAR'S FIRE PROFILE BY HOUR (ANNUAL AVERAGE 2001–2002)



Source: NFIRS 5.0 only

Looking at the New Year's hourly fire profile by the type of fire (Figure 4), it is clear that the midnight to 1:00 a.m. spike was largely caused by outdoor fires. However, there was a higher proportion of structure fires during the midnight hour than on an average winter night, and a noticeable period of fire activity between 2:00 a.m. and 4:00 a.m., when winter structure fires would typically be near their lowest.

FIGURE 4. NEW YEAR'S FIRE PROFILE BY HOUR AND TYPE
(ANNUAL AVERAGE 2001–2002)



Source: NFIRS 5.0 only

Residential Structure and Confined Fires

During an average winter day, residential fires tend to peak around 6 p.m., the typical period for cooking dinner, and then decrease throughout the night, as shown by the overlay curve in Figure 5.[5] During New Year's, the residential structure fire profile had a similar spike in fires during dinner time, but celebratory activities and late-night cooking continued to cause fires through the night, and increased cooking and heating on New Year's Day produced the peak fire period between 9 a.m. and 10 a.m.

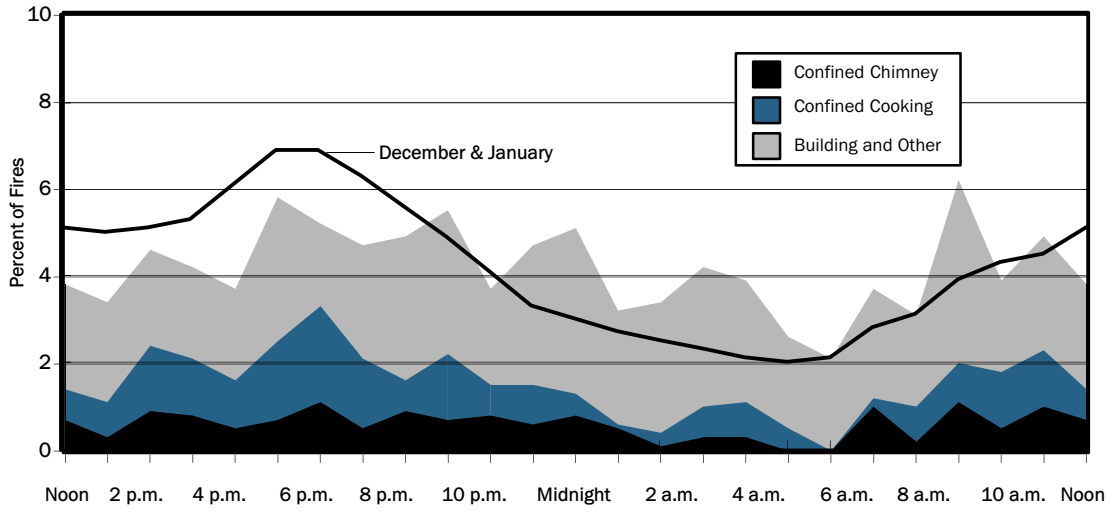
A large component of structure fires are those confined to the object in which they ignited. Cooking fires confined to a pan or oven and confined chimney fires caused by soot buildup were the two leading categories of confined fires during New Year's. Thirty-six percent of New Year's residential structure fires were confined cooking or chimney fires and, as Figure 5 shows, these confined fires contributed to the peak periods of residential structure fires.

Causes of Fire

Residential structure fires during New Year's had the same leading causes as the average winter or annual day: cooking, heating, open flame, and embers or torches (Figure 6, left side). New Year's residential fires had higher proportions of fires than the average winter day that were caused by other heat, flame, or sparks; open flame, embers, or torches; and exposure. Other heat and open flame fires include those ignited by fireworks, hot embers and ash, candles, matches, and smoking materials. Both New Year's and winter residential structure fires were caused by heating in substantially greater proportions than annual fires, and had lower proportions of cooking fires and incendiary or suspicious fires.

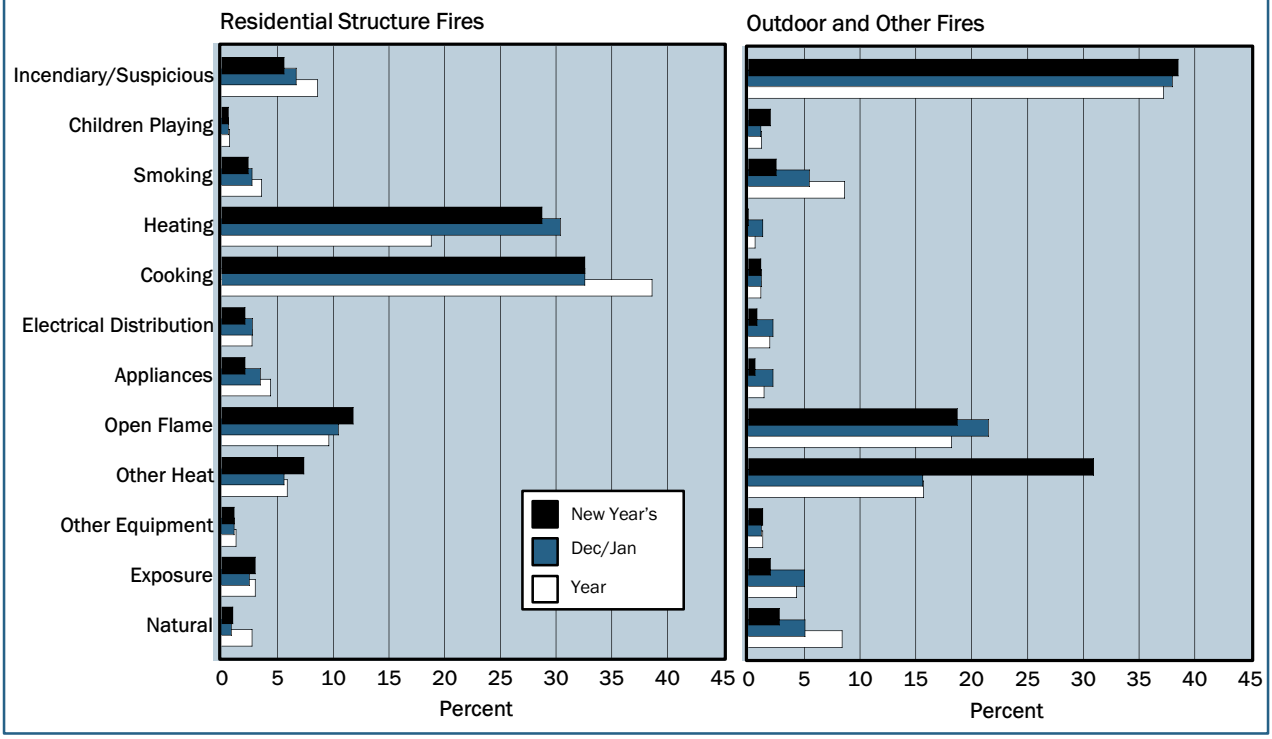
The cause distribution for outdoor fires shows a greater variation compared to the average winter day (Figure 6, right side). Other heat fires, which include those lit by fireworks, increased from 15% to 31% during New Year's. Children playing and incendiary or suspicious fires also increased during New Year's. Both New Year's and winter periods have lower proportions of smoking and natural fires than throughout the year, again due to seasonal patterns.

FIGURE 5. NEW YEAR'S RESIDENTIAL STRUCTURE FIRES BY HOUR
(ANNUAL AVERAGE 2001–2002)



Source: NFIRS 5.0 only

FIGURE 6. CAUSES OF NEW YEAR'S FIRES (ANNUAL AVERAGE 2001–2002)



Source: NFIRS 5.0 only

Heat Source

The leading heat source for both New Year's and winter residential structure fires is radiated or conducted heat from operating equipment, which includes cooking and heating equipment such as ovens and furnaces (Figure 7, left side). The second and third leading heat sources of New Year's residential structure fires are hot embers or ashes and heat from powered equipment, each of which is responsible for 11% of such fires, compared with 9% and 13%. respectively, during the average winter day.

The leading heat source for outdoor fires during New Year's and, in particular, fires during the midnight to 1:00 a.m. hour was fireworks (Figure 7, right side). Nearly 28% of outdoor New Year's fires were caused by fireworks, compared with under 4% for winter fires on average. Hot embers or ash and matches were the second and

FIGURE 7. LEADING HEAT SOURCES FOR NEW YEAR'S FIRES
(ANNUAL AVERAGE 2001–2002)

Residential Structures

Heat Source	December & January Fires	New Year's Fires
Radiated, conducted heat from equipment	18.5%	17.2%
Hot ember or ash	8.7%	11.3%
Heat from powered equipment	13.5%	10.8%

Outside

Heat Source	December & January Fires	New Year's Fires
Fireworks	3.4%	27.8%
Hot ember or ash	17.7%	17.3%
Match	17.0%	15.3%

Source: NFIRS 5.0 only

third leading heat sources for New Year's outdoor fires, respectively, and caused similar proportions of fires during the average winter day.

Examples

January 1, 2001. Poughkeepsie, NY firefighters battled a building fire in the early morning hours of New Year's Day, 2001. The fire burned through three apartment buildings, killing 5 people, injuring 10 others, and leaving as many as 40 people homeless. The cause of the fire was unspecified.[6]

December 31, 2000. A New Year's Eve 2000 celebration complete with fireworks caused a house fire in Honolulu that killed an elderly woman. The New Year's Eve house fire was believed to have been caused by illegal aerial fireworks.[7]

Conclusion

The New Year's holidays in 2001 and 2002 produced a unique hourly fire profile due to activities and celebrations during New Year's Eve and New Year's Day. In particular, the use of fireworks caused a spike in outdoor fires just after midnight, celebratory activities and late night cooking caused structure fires throughout the night, and heating and cooking fires caused the peak fire activity after 9:00 a.m. New Year's Day morning. The increased frequency of fires from fireworks, embers from wood fires, candles, and matches during New Year's suggests that individuals can prevent such fires by following local ordinances and common fire safety procedures related to fireworks and outdoor fires, and by simply being more observant during the holiday festivities. A substantial proportion of New Year's structure fires are small, confined fires, particularly related to cooking, which highlights the need for individuals to keep fire extinguishers in their homes. More information about how you can help prevent fires on New Year's and other holidays can be obtained from your local fire department or the USFA.

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

Notes:

1 For purposes of this report, *New Year's holiday* is defined as the 24-hour period between noon Dec. 31st and noon Jan. 1st. New Year's statistics in this report are based on data from 1/1/2001, 12/31/2001, 1/1/2002, and 12/31/2002. This period captures most of the unique fire patterns surrounding New Year's Eve and allows for direct comparison with 24-hour periods during the winter and annually.

2 *Winter days* is defined in this report as the average day during the months of December and January, 2001 and 2002. The months bracketing New Year's Eve were chosen in order to minimize seasonal variations in fire patterns.

3 New Year's loss estimates are based on 2001 and 2002 National Fire Incident Reporting System (NFIRS) data and national fire loss estimates from the National Fire Protection Association's (NFPA's) *Fire Loss in the United States During 2001* and *Fire Loss in the United States During 2002*.

4 Distribution statistics are based on data from NFIRS 2002. At the time of this report, NFIRS is continuing to transition from version 4.1 to 5.0. Due to issues related to accurate conversion of version 4.1 data to version 5.0, this report is based on version 5.0 data only.

5 The "building and other" category in Figure 5 is comprised of unconfined building fires, fires in mobile structures, and other types of confined fires.

6 Arlington Fire District, Town of Poughkeepsie, New York, http://www.afd.org/HottopicsTaylor.html

7 Gonser, James. "New Year's Eve fatal fire unsolved," *The Honolulu Advertiser*, December 29, 2001, http://the.honoluluadvertiser.com/article/2001/Dec/29/ln/ln02a.html