

U.S. Fire Administration/National Fire Data Center

# Residential Structure Match- or Lighter-Ignited Fires

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**FEMA**



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### Findings

- Together, lighters and matches caused an estimated 20,200 residential structure fires in 2002, resulting in 276 deaths, 1,445 injuries, and \$322 million in dollar loss.
- The majority of these fires were ignited by lighters, and lighter fires cause more than twice the number of deaths and injuries as residential structure fires in general.
- The leading causes of residential structure lighter and match fires are incendiary/suspicious, open flame, and children playing.
- Bedrooms are the leading area of origin for residential structure lighter and match fires, and bedding materials were most often the first item ignited.
- Smoke alarms were present and operated in 32% of reported residential structure lighter and match fires.

Match and lighter fires are analyzed together because of their similar uses, easy availability, and universal recognition as fire ignition sources. While they are grouped for the purposes of this report, the characteristics of lighter fires are different from those of match fires.<sup>1</sup>

Only 19% of all fires ignited by lighters and matches occurred in residential structures in 2002.<sup>2</sup> These fires, however, account for approximately 80% of all fatalities, 76% of all injuries, and 68% of all property loss resulting from lighter and match fires. Injurious and costly, residential structure fires require focused analysis when investigating the lighter- and match-ignited fire problem.

Based on NFIRS data, lighters and matches were responsible for 5% of the residential structure fire problem in the United States during 2002. Lighters and matches ignited an estimated 20,200 fires, which killed 276 people, injured 1,445 more, and destroyed \$322 million in property.<sup>3</sup> Lighters ignited nearly 57% of lighter- or match-ignited residential structure fires.

### LOSS MEASURES

Residential structure fires ignited by lighters and matches yielded higher rates of injury and fatality than residential structure fires generally and had higher dollar losses per fire. As Figure 1 illustrates, lighter-ignited residential structure fires were particularly deadly and injurious, with rates of injury and fatality higher than those of match-ignited fires and more than double those of residential structure fires.

**FIGURE 1. LOSS MEASURES FOR LIGHTER AND MATCH RESIDENTIAL STRUCTURE FIRES**

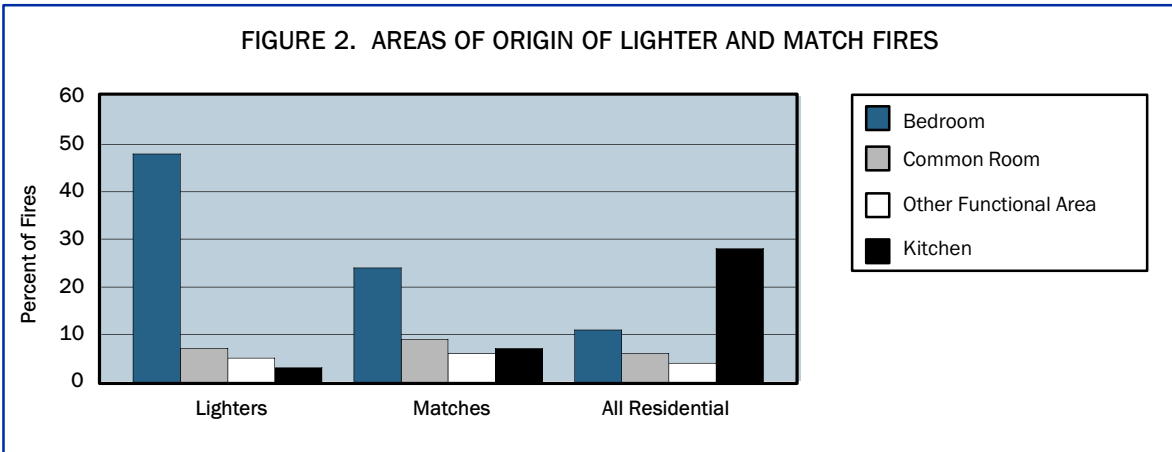
Loss Measure	All Residential Structure Fires	Lighters & Matches	Lighters Only	Matches Only
\$ Loss/Fire	\$13,465	\$14,239	\$14,532	\$13,857
Fatalities/1,000 Fires	7	14	15	12
Injuries/1,000 Fires	49	100	125	67

Source: NFIRS 5.0 only

**WHERE FIRES OCCUR**

The highest percentage of residential structure lighter and match fires (about 75%) took place in one- and two-family homes. Larger residential structures—such as apartment buildings, condominiums, and townhouses—had a much smaller percentage of fires and a proportionally smaller percentage of deaths.

Within residential structures, most lighter- and match-ignited fires were started in bedrooms, as Figure 2 illustrates. Common rooms (or living rooms) and kitchens were also leading areas of origin for lighter- or match-ignited residential structure fires. When compared with statistics for all residential structure fires, fewer lighter- and match-ignited fires were started in kitchens.



Source: NFIRS 5.0 only

Consistent with the fact that most lighter and match fires occurred in bedrooms, the items most frequently ignited in these fires were bedding, mattresses or pillows, newspapers or magazines, and trash or rubbish.

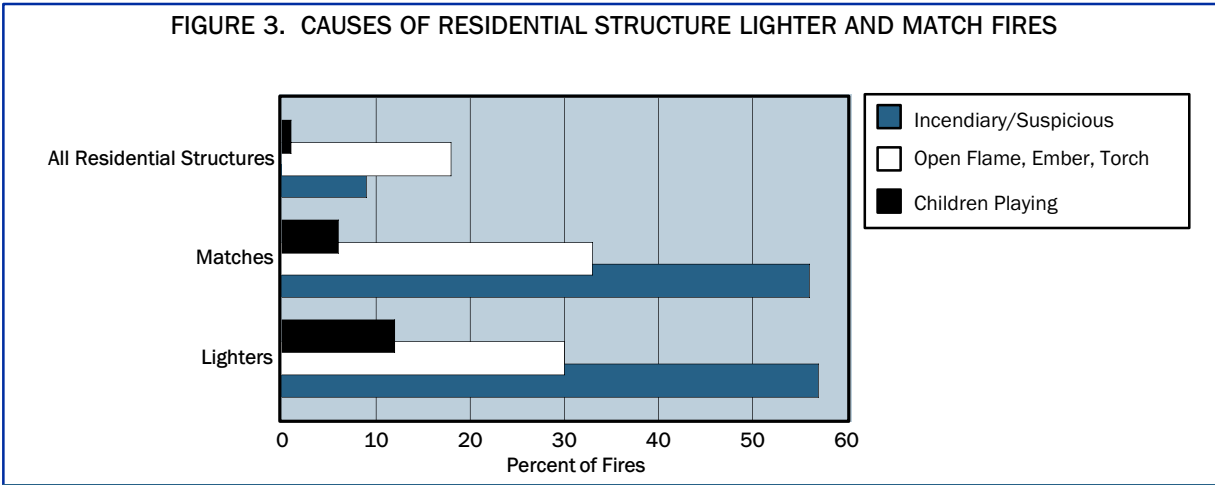
**CAUSES**

With residential structure fires representing the majority of fire injuries, deaths, and property loss resulting from all lighter- and match-ignited fires, the causes of fires ignited in residential structures by lighters and matches are particularly important.

The highest percentage of residential structure lighter and match fires in 2002 had incendiary or suspicious causes (57%), followed by those caused by open flame (31%) and children playing (9%).<sup>4</sup> Comparatively, incendiary and suspicious (arson) and children playing fires accounted for a smaller percentage of all residential structure fires, where a heat source was reported, as Figure 3 illustrates.

When analyzed by per fire loss in Figure 4, children playing fires were the most severe across all loss measures. Arson fires were less injurious and fatal. One reason for this may be that although residents might not be inside their home during an arson fire, they are more likely to be at home during a children playing fire.

**FIGURE 3. CAUSES OF RESIDENTIAL STRUCTURE LIGHTER AND MATCH FIRES**



Source: NFIRS 5.0 only

**FIGURE 4. LOSS MEASURES BY CAUSES OF LIGHTER AND MATCH RESIDENTIAL STRUCTURE FIRES**

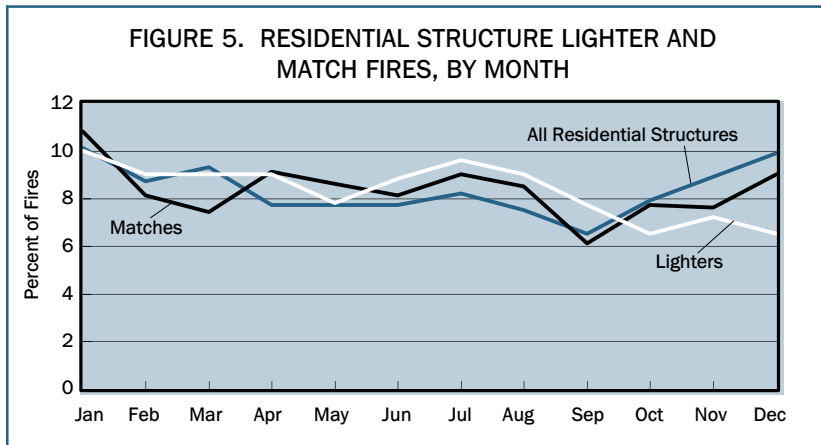
Loss Measure	Incendiary/Suspicious	Open Flame, Ember, Torch	Children Playing
\$ Loss/Fire	\$12,659	\$14,249	\$23,452
Fatalities/1,000 Fires	13	14	16
Injuries/1,000 Fires	83	116	140

Source: NFIRS 5.0 only

## WHEN FIRES OCCUR

Among all 2002 residential structure fires, more fires occurred in the winter months than the summer months, partly due to a seasonal peak in heating fires. As illustrated in Figure 5, residential structure lighter- and match-ignited fires had a more even monthly distribution. This may be the result of the causes of lighter and match fires, especially when compared to the causes of all residential structure fires. Heating and cooking—causes often associated with seasonal changes—are the primary causes of all residential structure fires, while nonseasonal-related factors cause the most lighter- and match-ignited residential structure fires.

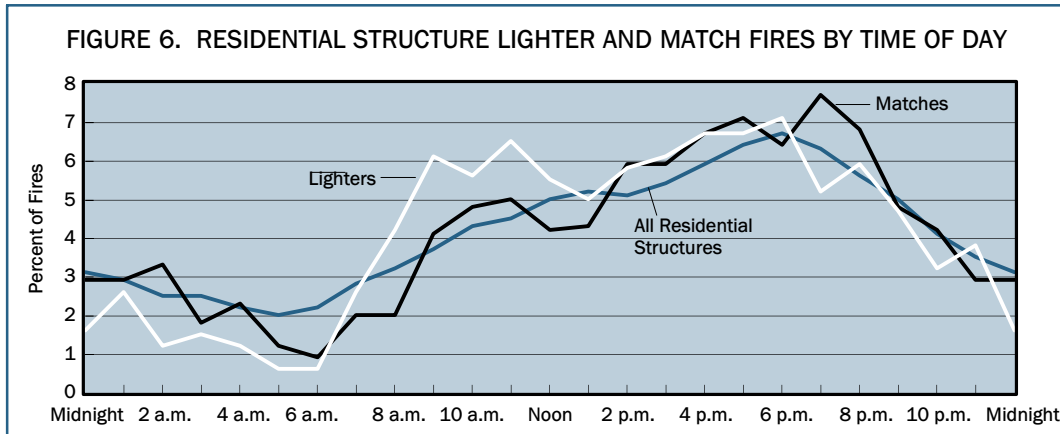
**FIGURE 5. RESIDENTIAL STRUCTURE LIGHTER AND MATCH FIRES, BY MONTH**



Source: NFIRS 5.0 only

## TIME OF DAY

Similar to the pattern in all residential structure fires, the highest percentage of lighter- and match-ignited fires occurred between 4 p.m. and 8 p.m. in 2002, with the least percentage of fires occurring between 3 a.m. and 7 a.m. Lighter fires, as shown in Figure 6, had a more dramatic decline in the overnight hours and increased sharply between 7 a.m. and 10 a.m., while the trend for match-ignited fires was more similar to the trend for all residential structure fires. Children playing fires, one of the primary causes of lighter fires, decline because children are often asleep during these overnight hours.



Source: NFIRS 5.0 only

When the time of day for residential structure fires ignited by lighters or matches is analyzed by cause, children playing fires in 2002 were at their highest around noon, 3 p.m., and during the early evening, with few fires taking place overnight.

## SMOKE ALARM PERFORMANCE

As illustrated in Figure 7, more lighter and match fires were reported in residential structures where a smoke alarm was present than in residences without an alarm. Lighter and match fires occurred in residences without smoke alarms more often than residential structure fires generally, but not by a substantial percentage. Alarms were present and operated in 32% of lighter and match residential structure fires and approximately one-third of residential structure fires generally.

**FIGURE 7. SMOKE ALARM PERFORMANCE IN LIGHTER AND MATCH FIRES (percent)**

Performance and Operation of Alarm	All Residential Structures	Lighter & Matches
Present/Operated	33.8	31.7
Present/Not Operated	14.9	12.7
No Alarm	21.5	29.2
Unknown	29.8	26.4
Total	100.0	100.0

Source: NFIRS 5.0 only

## EXAMPLES OF RECENT LIGHTER- OR MATCH-IGNITED FIRES

Toledo, OH: In November 2003, a 5-year-old boy playing with matches set fire to his bedroom, causing \$20,000 in property damage. No one was hurt.<sup>5</sup>

Oregon City, OR: An elderly couple died of smoke inhalation in a house fire that may have been started by a discarded match. Their home was only slightly damaged, but they were not able to escape the November 2003 fire.<sup>6</sup>

Omaha, NE: In March 2001, a child playing in a bedroom with matches ignited a mattress, which caused approximately \$10,000 in damage. An older sibling was treated for smoke inhalation.<sup>7</sup>

## CONCLUSION

Residential structure lighter and match fires may be preventable. Educating adults about the proper use and storage of matches and lighters, as well as educating children about the dangers of these items and the ramifications of playing with them, might substantially reduce the number of residential structure fires ignited by matches and lighters.

In the short term, however, more residential structure lighter and match fires could likely be prevented if smoke alarms were installed in more residences. The lack of smoke alarms—and operating smoke alarms in the majority of residences impacted by lighter and match fires represents—the most easily preventable tragedy of the lighter and match fire problem in the United States.

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<http://www.usfa.fema.gov/feedback/>

## Notes:

- <sup>1</sup> Fires Ignited by Lighters and Matches, Topical Fire Research Series, Volume 4, Issue 1, October 2004.
- <sup>2</sup> Distribution statistics are based on data from the National Fire Incident Reporting System (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 accurately converting version 4.1 data to version 5.0, this report is based on data reported only in version 5.0.
- <sup>3</sup> Lighter and match loss estimates are based on the total number of NFIRS fires in 2002 for which the heat source was known and on NFPA's *Fire Loss in the United States During 2002*. Approximately 52% of 2002 residential structure fires in NFIRS reported a heat source. If the lighter and match estimates were based on all reported fires, including those with unknown heat sources, the residential structure estimates would decrease to 10,400 fires, 146 deaths, 1,018 injuries, and \$189 million in dollar loss.
- <sup>4</sup> Match and lighter fires are, by definition, caused by open flame sources. However, if associated with another activity, the cause may be coded differently (e.g., intentional ignition is coded as incendiary).
- <sup>5</sup> "Boy with matches starts \$20,000 home fire." *ToldeoBlade.com*, November 19, 2003.
- <sup>6</sup> "Elderly couple die in house fire." *The Oregonian*, November 7, 2003.
- <sup>7</sup> "Child, Matches Add Up to House Fire, Injury," *Omaha World-Herald*, March 1, 2001.