

U.S. Fire Administration/National Fire Data Center

Fires Ignited by Lighters and Matches

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Findings

- Together, lighters and matches ignited nearly 9% of all fires where the heat source for the fires was known.
- In 2002, there were approximately 144,000 lighter- or match-ignited fires. These fires killed an estimated 321 people, injured 1,877 people, and caused \$470 million in property loss.
- There were over twice as many match fires than lighter fires, but lighter fires killed and injured more people.
- More match and lighter fires occur outdoors, but structure fires were the most deadly, injurious, and costly of all lighter and match fires.
- The reported cause of 71% of fires ignited by lighters or matches was incendiary/suspicious (arson).
- Where age was cited as a factor in a fire's ignition by lighters or matches, 37% of these fires were started by juveniles aged 10–17.

Throughout the world, lighters and matches are prominent symbols of fire and fire ignition, transcending barriers of language, age, and culture—and for good reason. Lighters and matches ignite candles, pilot lights, campfires, cigarettes, fireplace fires, and countless other presumably safe fires. Easy to buy, easy to transport and easy to use, matches and lighters are convenient and effective, but can also be deadly and destructive. Although lighters and matches are similar in use and availability, match-ignited fires outnumber lighter-ignited fires by more than two to one.¹ It is important to recognize that lighter- and match-ignited fires have different characteristics and an unequal degree of severity.

Together, lighters and matches caused 9% of all fires where the heat source was specified, and estimates indicate that there were 144,000 reported fires ignited by lighters or matches in 2002. Combined, match and lighter fires were the source of ignition in fires that killed an estimated 321 civilians, injured 1,877, and caused \$470 million in property loss in 2002.²

This topical report examines the causes and characteristics of lighter and match fires, based on 2002 NFIRS data, and compares such characteristics with those of all fires.

LOSS MEASURES

Figure 1 compares the loss measures for match and lighter fires with all reported fires where the heat source is known. Match and lighter fires combined were more injurious and deadly, but less damaging to property than the average fire in 2002. However, when measured separately, lighter fires were more than twice as deadly and nearly three times more injurious than fires generally, but resulted in less property damage per fire. Match fires were less severe than the average fire across all loss measures.

FIGURE 1. LOSS MEASURES FOR LIGHTER- AND MATCH-IGNITED FIRES

Loss Measure	All Fires	Lighters & Matches	Lighters Only	Matches Only
\$ Loss/Fire	\$7,447	\$3,981	\$7,288	\$2,531
Fatalities/1,000 Fires	2.8	3.2	6.4	1.8
Injuries/1,000 Fires	20.8	24.9	56.7	10.9

Source: NFIRS 5.0 only

While matches ignited 70% of all lighter- or match-ignited fires, lighter-ignited fires killed and injured more people than match fires and caused more than half of reported property loss (Figure 2).

FIGURE 2. FIRE INCIDENTS AND LOSSES FOR LIGHTER AND MATCH FIRES (percent)

Ignition Source	Fires	Deaths	Injuries	Dollar Loss
Lighters	30.5	60.9	69.4	55.8
Matches	69.5	39.1	30.6	44.2
Total	100.0	100.0	100.0	100.0

Source: NFIRS 5.0 only

WHERE FIRES OCCUR

Figure 3 shows the leading property types of match and lighter fires as reported by the responding fire departments. In 2002, 31% of all reported fires with a known heat source occurred outdoors.³ A higher percentage (64%) of all lighter and match fires occur outdoors. When lighter and match fires are analyzed separately, data indicate that 46% of lighter fires occur in structures, and 71% of match fires occur outdoors. For both lighter and match fires that occur in structures, the majority originate in residential bedrooms. For lighter and match fires combined, structure fires were substantially more severe in terms of loss per fire than fires occurring outdoors or in vehicles across all loss measures (Figure 4).

FIGURE 3. LIGHTER AND MATCH FIRES BY GENERAL PROPERTY TYPE (percent)

Property Type	All Fires	Lighters & Matches	Lighters	Matches
Structure	42.2	27.4	46.3	19.1
Vehicle	26.8	9.0	7.0	9.9
Outside/Other	31.0	63.6	46.7	71.0
Total	100.0	100.0	100.0	100.0

Source: NFIRS 5.0 only

FIGURE 4. LOSS MEASURES FOR LIGHTER AND MATCH FIRES BY GENERAL PROPERTY TYPE

Loss Measure	Structure Fires	Vehicle Fires	Outside & Other Fires
\$ Loss/Fire	\$13,374	\$2,801	\$98
Fatalities/1,000 Fires	10	4	0
Injuries/1,000 Fires	75	16	5

Source: NFIRS 5.0 only

CAUSES

The leading known causes of lighter and match fires were incendiary or suspicious (which includes arson), open flames, and children playing (Figure 5).

FIGURE 5. LEADING CAUSES OF LIGHTER/MATCH FIRES (percent)

Leading Causes	All Fires	Matches or		
		Lighters	Matches	
Incendiary/Suspicious	19.4	70.8	69.5	71.3
Open Flame, Ember, or Torch	18.1	26.0	24.9	26.0
Children Playing	0.6	2.2	4.7	1.1

Source: NFIRS 5.0 only

Children playing fires were most deadly when ignited by matches, while incendiary/suspicious and open flame fires were more severe when ignited by lighters. The loss measures for each of these leading causes show that children playing fires had the highest per-fire rates of dollar loss, injury, and fatality of the leading causes of lighter and match fires (Figure 6).

FIGURE 6. LOSS MEASURES BY LEADING CAUSE

Loss Measure	Incendiary/Suspicious	Open Flame, Ember, Torch	Children Playing
\$ Loss/Fire	\$3,168	\$4,702	\$19,181
Fatalities/1,000 Fires	2.5	3.7	15.5
Injuries/1,000 Fires	15.9	37.0	133.1

Source: NFIRS 5.0 only

Incendiary or suspicious fires had the highest estimated lighter and match fire losses in 2002 (Figure 7). Although children playing fires had higher per-fire losses, the total loss estimates for children playing were less than the other two leading causes.

FIGURE 7. LOSS ESTIMATES FOR LIGHTER AND MATCH FIRES BY LEADING CAUSE

L&M Loss Estimates	Incendiary/Suspicious	Open Flame, Ember, Torch	Children Playing
Fires	101,607	37,300	3,209
Dollar Loss	\$264,788,654	\$144,258,227	\$50,635,677
Fatalities	182	98	35
Injuries	850	725	224

Source: NFIRS 5.0 only

As illustrated in Figure 8, 72% of outside/other fires and 63% of structure fires lit with matches or lighters were incendiary or suspicious. The vast majority of vehicle fires lit with lighters or matches (84%) were also reported as incendiary or suspicious. More than one-quarter of structure and outside/other fires lit by lighters or matches were caused by open flame.

FIGURE 8. TYPES OF MATCH/LIGHTER FIRES BY LEADING CAUSES IN 2002 (percent)

Property Type	Incendiary/Suspicious	Open Flame, Ember, Torch	Children Playing
Structure	63.0	27.8	7.0
Vehicle	84.3	14.1	0.5
Outside/Other	72.1	26.8	0.4

Source: NFIRS 5.0 only

Incendiary and suspicious fires are sometimes started by juvenile fire-setters, indicating that lighter- and match-ignited fires started by young people may be an even larger problem than the children playing statistics indicate. One contributing factor to the predominance of children involved in lighter and match fires is smoking. If one or more of a child’s parents smoke, matches or lighters may be more readily available in the home. A child in a home with a smoker is twice as likely to be involved with fire play as a child in a home with a nonsmoker.⁴

Children between the ages of 6 and 9 caused 27% of all lighter- or match-ignited fires in 2002, where age was noted as a factor in the fire’s ignition (Figure 9). Juveniles between the ages of 10 and 17 caused 37% of such fires.

FIGURE 9. MATCH/LIGHTER FIRES IN 2002 WHERE AGE IS A FACTOR IN IGNITION (percent)

Age Range	Lighter and Match Fires
0 through 5 years	31.9
6 through 9 years	26.5
10 through 17 years	37.4
18+ years	4.2
Total	100.0

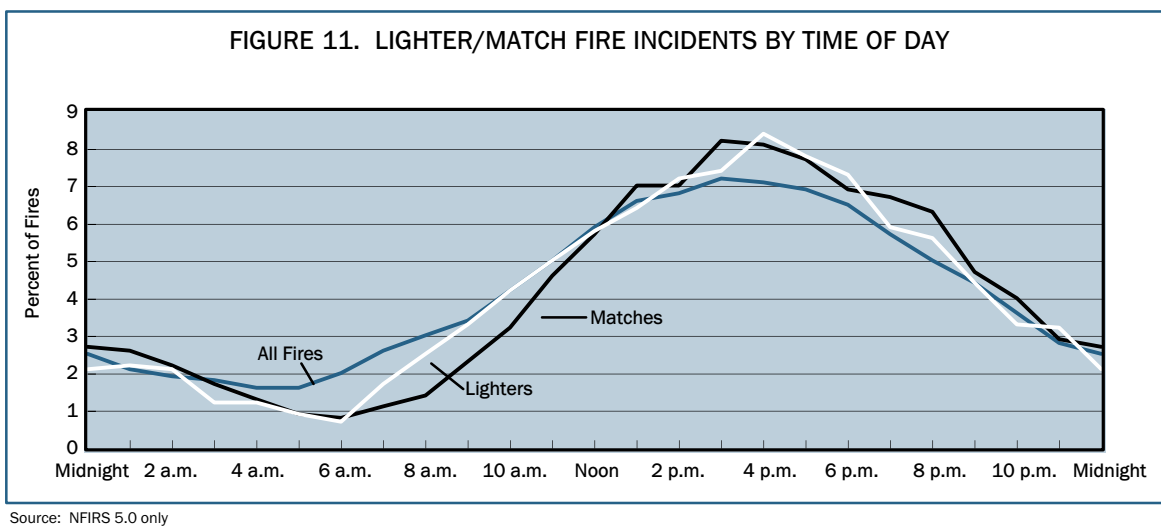
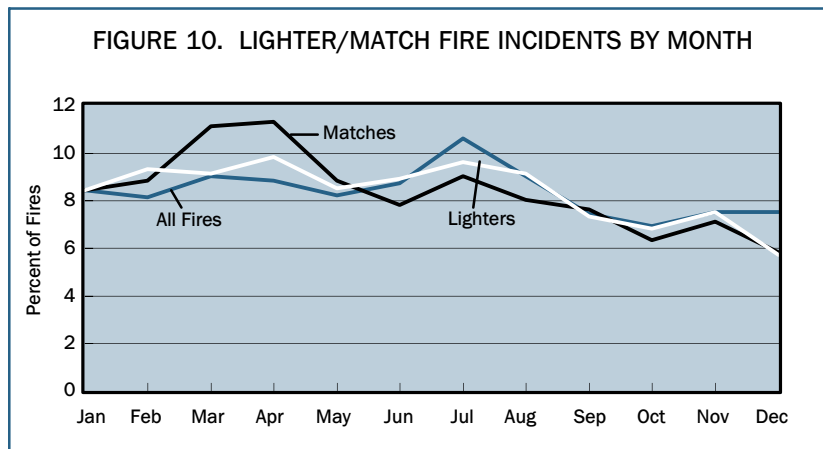
Source: NFIRS only

WHEN FIRES OCCUR

There was no discernable seasonal pattern for match- and lighter-ignited fires in 2002, as illustrated in Figure 10. Both match and lighter fires peaked in April of 2002. The proportion of all fires during the summer months was greater than the proportion of lighter and match fires during the same period, due to a peak in natural outdoor fires in July.

As shown in Figure 11, fires in the early morning hours are lowest when people are presumably asleep and highest in the afternoon, peaking around 3 p.m. This is consistent with the fact that most lighter and match fires require a human action to ignite the fire, as about 70% of both lighter/match fires and all fires take place between 8 a.m. and 8 p.m. Incendiary/suspicious fires and children playing fires follow the same trend, peaking in the late afternoon and early evening hours.

Although structure fires follow this hourly pattern as well, vehicle fires occur more often in the late night and early morning. This may be a function of the cause of vehicle fires (84% of lighter- or match-ignited vehicle fires were reported as incendiary or suspicious). Because car use declines during those hours, owners are less likely to be in their vehicles.



EXAMPLES OF RECENT LIGHTER- OR MATCH-IGNITED FIRES

Omaha, NE: In August 2001, children playing with matches ignited a 76-acre brush fire that threatened nearby homes; it took 3 hours and 300 firefighters to extinguish the fire.⁵

Madison County, AL: In December 2003, an arsonist set fire to two residential structures and one mobile home. Officials believe the arsonist used a single lighter to set the fire, and suspect that the firesetter was a child or teenager.⁶

Baldwin, NY: In December 2003, A spree of incendiary and suspicious fires, including the ignition of a mattress, the back of a Chinese restaurant, piles of leaves outdoors, and a dumpster, was linked to two teenagers, who officials say used only lighters and matches to start all of the fires.⁷

CONCLUSION

Despite the differences in the characteristics of lighter fires and match fires, they are grouped in this report because of the common uses and abundance of both.

The widespread availability of lighters and matches pose serious fire risks. The prevalence of children playing fires involving lighters and matches confirms the need for adults to be more vigilant about concealing lighters and matches from children, while also teaching their children the dangers of fire play. Lighters and matches were the ignition sources of choice in 51% of all children playing fires in 2002, where the heat source was known.

Most importantly, lighter and match fires are two types of fires that ordinary citizens can actively seek to prevent through caution, preparation, and education. Increased education for children and adults regarding fire risks and the safe storage and use of matches and lighters may reduce the risk of fire from lighters or matches, as well as decrease the overall incidence of such fires.

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Notes:

- ¹ 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.
- ² Lighter and match loss estimates are based on the total number of NFIRS fires in 2002 for which the heat source was known and NFPA's *Fire Loss in the United States During 2002*. Approximately 42% of 2002 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 estimates would decrease to 59,700 fires, 158 deaths, 1,296 injuries, and \$250 million in dollar loss.
- ³ For all fires reported to NFIRS in 2002, including those with unknown heat sources, approximately 46% were outside or other fires.
- ⁴ Porth, Don, "Children with Fire," *IOS Fires: Youth Intervention Project*, October 1997.
- ⁵ "Child, Matches Add Up to House Fire, Injury," *Omaha World-Herald*, March 1, 2001.
- ⁶ "Arson investigators offer \$1,000 reward," *WAFF.com*, December 2, 2003.
- ⁷ "Two teens arrested in fire spree," *Baldwin Community Newspapers Online*, December 11, 2003.
http://www.zwire.com/site/news.cfm?BRD=1601&dept_id=477132&newsid=10653172&PAG=461&rft=9