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*Smoke Alarm Performance in Residential Structure Fires*, Vol. 1, Issue 16, March 2001

# Residential Structure Fires on Agricultural Properties

### FINDINGS

- The 1,100 residential structure fires that occur each year on agricultural properties are more costly and deadly than the national average.
- Heating is the leading cause of these fires; nationally, cooking is the leading cause. These properties tend to use of wood stoves, chimneys, and other alternative heating sources to a greater degree than the general population.
- Smoke alarms were present and operated in only 15% of residential structure fires on agricultural properties—versus 40% nationally in residential structure fires.

Between 1996 and 1998, there were an estimated 1,100 residential structure fires on agricultural properties, which are responsible for approximately 10 injuries, 10 fatalities, and nearly \$18 million in property loss.<sup>1</sup> This report examines the causes and characteristics of these fires.

### LOSS MEASURES

Figure 1 illustrates the loss measures for residential structure fires on agricultural properties. These fires cause more damage and are more deadly than those across all residential properties.

### CAUSES

The leading cause of agricultural structure fires is heating (Figure 2). Nationally, the leading cause of residential structure fires is cooking. In the late 1970s and early 1980s, heating was the leading cause of fires in U.S. residences due to a surge in the use of alternative space heaters and wood heating. However, the number of heating fires has plummeted since 1989, and by 1998 was the third leading cause of all residential fires.

**Figure 1. Loss Measures for Residential Structure Fires on Agricultural Properties**

(3-year average, NFIRS data 1996–98)

LOSS MEASURE	ALL RESIDENTIAL STRUCTURE FIRES	RESIDENTIAL STRUCTURE FIRES ON AGRICULTURAL PROPERTIES
Dollar Loss/Fire	\$11,271	\$16,758
Injuries/1,000 Fires	48.0	12.5
Fatalities/1,000 Fires	7.7	8.6

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Nevertheless, heating remains the leading cause of structure fires on agricultural properties. Cooking is responsible for only 5% of residential structure fires on agricultural properties (compared to 25% nationally). The incidence of children playing and smoking fires is also lower on agricultural properties; however, the incidence of exposure and natural fires is higher.<sup>2</sup>

**TIME OF YEAR**

As with national trends in residential structure and heating fires, residential structure fires in agricultural properties increase in the winter months and early spring (Figure 3).

**FACTORS INFLUENCING IGNITION**

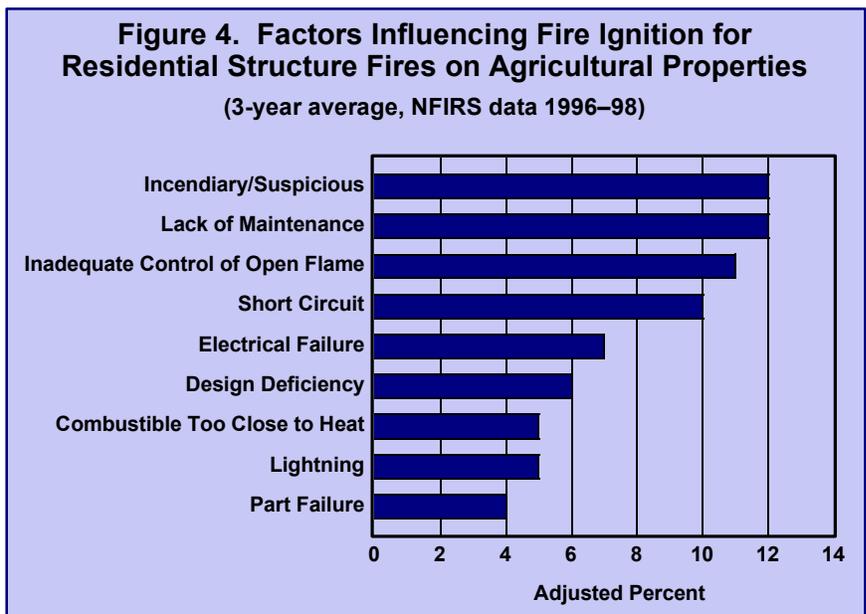
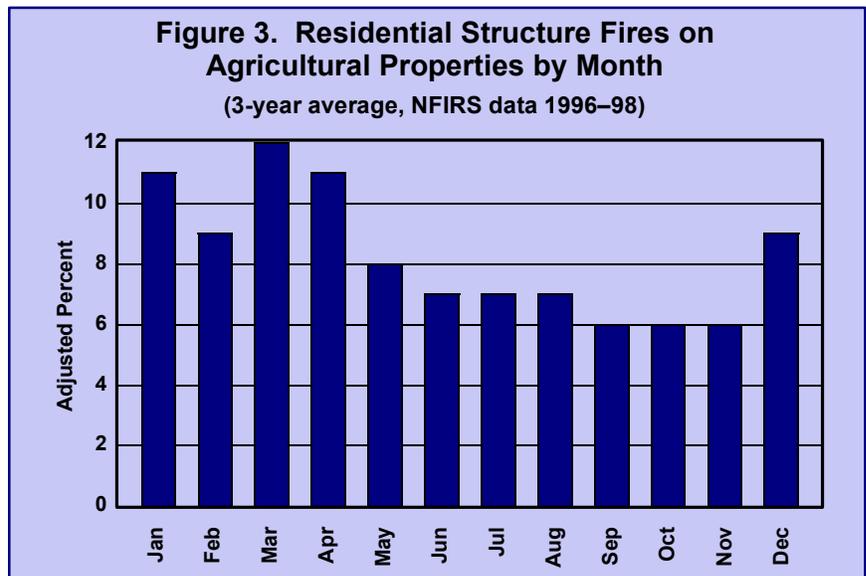
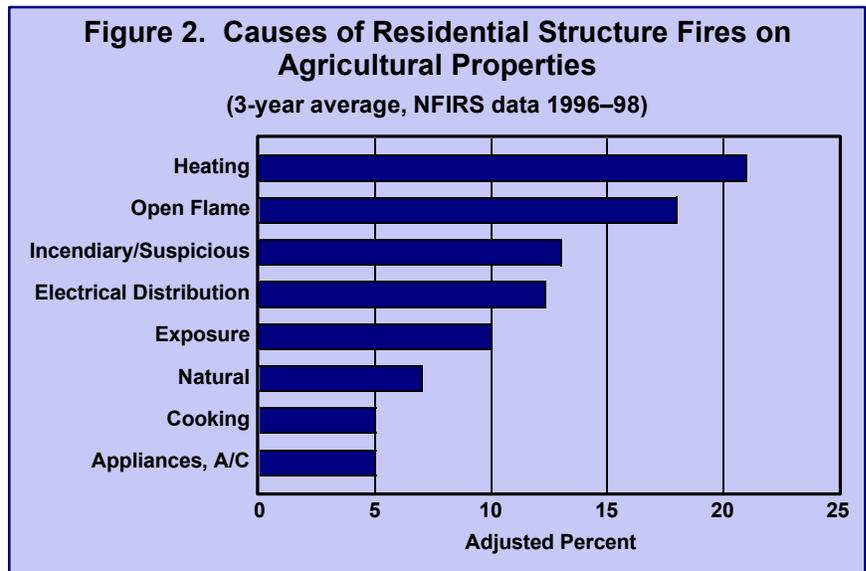
Approximately 36% of residential structure fires on agricultural properties are caused by some type of mechanical failure—part failures, leaks, lack of maintenance (Figure 3). This is 7% higher than the national average.

**WHERE FIRES START**

The leading areas of fire origin are shown in Figure 5. Approximately 11% of residential fires on agricultural properties originate in a chimney, which is consistent with the high incidence of heating fires. Other leading areas are exterior wall surfaces and kitchens.

**SMOKE ALARM PERFORMANCE**

A persistent problem in rural residential structure fires is a lack of operable smoke alarms. In only 15% of residential structure fires on agricultural properties were smoke alarms present in the home and operated. Nationally, smoke alarms are present and operate in 40% of residential structure fires.

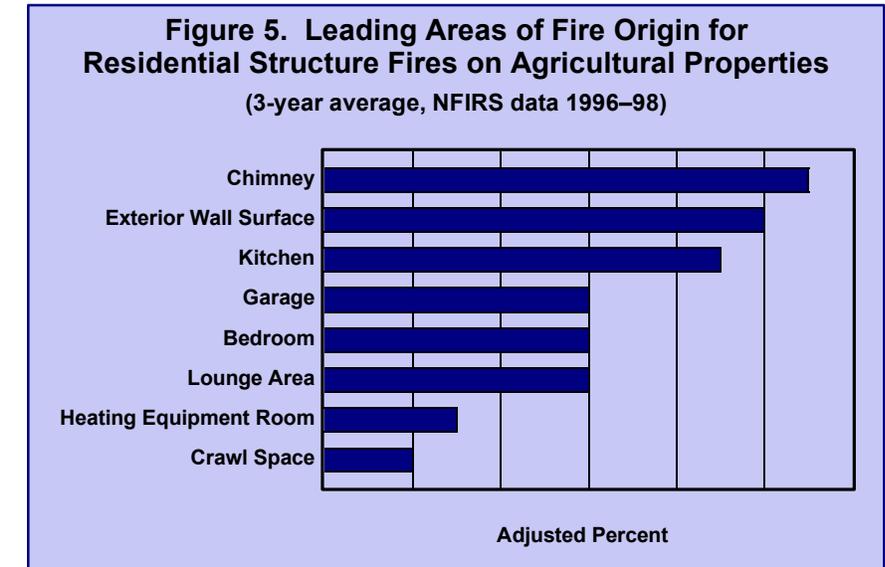


**EXAMPLES**

- In October 2000, six people were killed, including five children, when a fire destroyed their farmhouse. One adult and five other children escaped the fire by jumping from a second-story window. The fire is thought to have been ignited by a wood-burning stove.<sup>3</sup>
- In November 2000, a family escaped serious injury when a fire ignited in their farmhouse at 1 a.m. The home was leveled and threatened several adjacent barns, which housed pigs and livestock.<sup>4</sup>
- In January 2000, 6-year old triplets died when a fire engulfed their farmhouse, located in the center of a rural town. The fire, apparently accidental in nature, also led to death of a volunteer firefighter who suffered a fatal heart attack after fighting the blaze.<sup>5</sup>

**CONCLUSIONS**

The high incidence of heating fires associated with chimneys in resi-



dential structures on agricultural properties emphasizes the importance of properly maintaining and servicing chimneys as well as other heating systems.

Previous USFA studies, including *The Rural Fire Problem in the United States*,<sup>6</sup> have shown that the combination of a lack of working smoke alarms and poor maintenance of heating systems is deadly. These trends are also seen on agri-

cultural properties, which are often located in rural areas. Due to longer fire department response times (because of distance), it is critical that homeowners be vigilant about maintaining their home and installing smoke alarms.

For further information, contact your local fire department or the USFA. Also, see *The Rural Fire Problem in the United States* report.

To review the detailed methodology used in this analysis, click [METHODOLOGY](#)

**Footnotes**

1. National estimates are derived from analysis of data from the National Fire Incident Reporting System (NFIRS) and the National Fire Protection Association's (NFPA's) annual survey, "Fire Loss in the United States," *NFPA Journal*.
2. The percentages shown in this report have been adjusted to apportion the "unknowns" to the other causes.
3. "Blaze in Kansas Kills Six in Amish Family," *USA Today*, October 9, 2000.
4. "Fire Destroys 100-Year Old Farmhouse," *The Boston Globe*, November 27, 2000.
5. "A Rural Maine Community Unites in Grief Over Tragic Fatal Fire," *The Boston Globe*, January 15, 2000.
6. *The Rural Fire Problem in the United States*, USFA Report FA-180, 1998.