

Fire Department Fire Run Profile

These short topical reports are designed to explore facets of the U.S. fire problem as depicted through data collected in USFA's National Fire Incident Reporting System (NFIRS). Each topical report briefly addresses the nature of the specific fire or fire-related topic, highlights important findings from the data, and may suggest other resources to consider for further information.

Findings:

- In 2004, U.S. fire departments ran an estimated 1,847,300 fire runs in response to 1,550,500 incidents.
- The largest proportion (42%) of fire department fire runs were to incidents involving structures.
- Fifty-three percent of fire runs occur during the winter and spring seasons.
- Fire department runs peak between the hours of 3 p.m. and 5 p.m.

Fire departments provide an invaluable service to our communities nationwide by responding to fire incidents in structures, outside areas, vehicles, and other areas. In 2004, the estimated 1,550,500 fire incidents required an estimated 1,847,300 fire department runs.^{1,2,3} This topical report profiles these fire department fire runs as reflected in the National Fire Incident Reporting System (NFIRS) 2004 data.

Overview of Fire Department Fire Runs

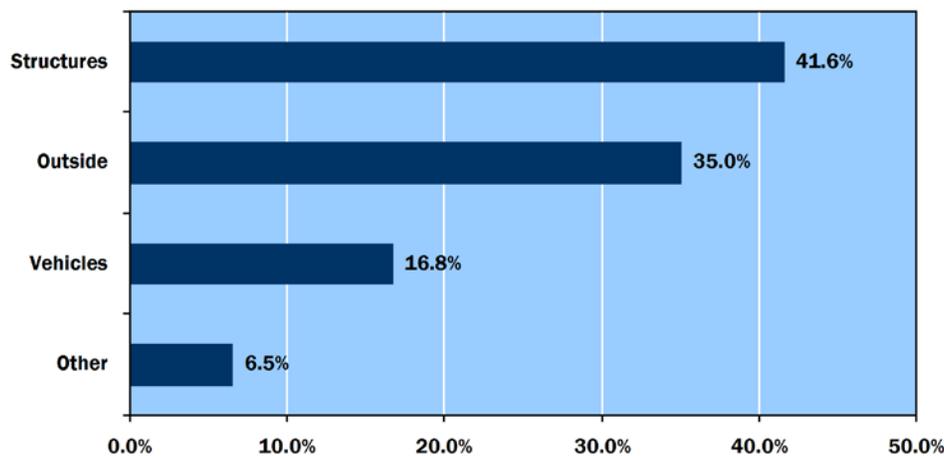
While outside fires and structure fires each comprise approximately 38% of all fires⁴, fire departments respond more frequently to structure fires, as shown in Figure 1.

Fire departments respond to fire incidents every day, at all times of the day. The demand for fire department fire-related services is at its lowest in the early morning, gradually increases until peak demand is reached in the late afternoon (3 p.m. to 5 p.m.), and slowly tapers off through the evening and night (Figure 2).

The volume of fire runs varies through the year. In 2004, the peak run volume occurred during March and April, due to the increase of outdoor fires, as shown in Figure 3 and Figure 7. Longer days and warmer temperatures, which can result in drier vegetation and increased outdoor activity,

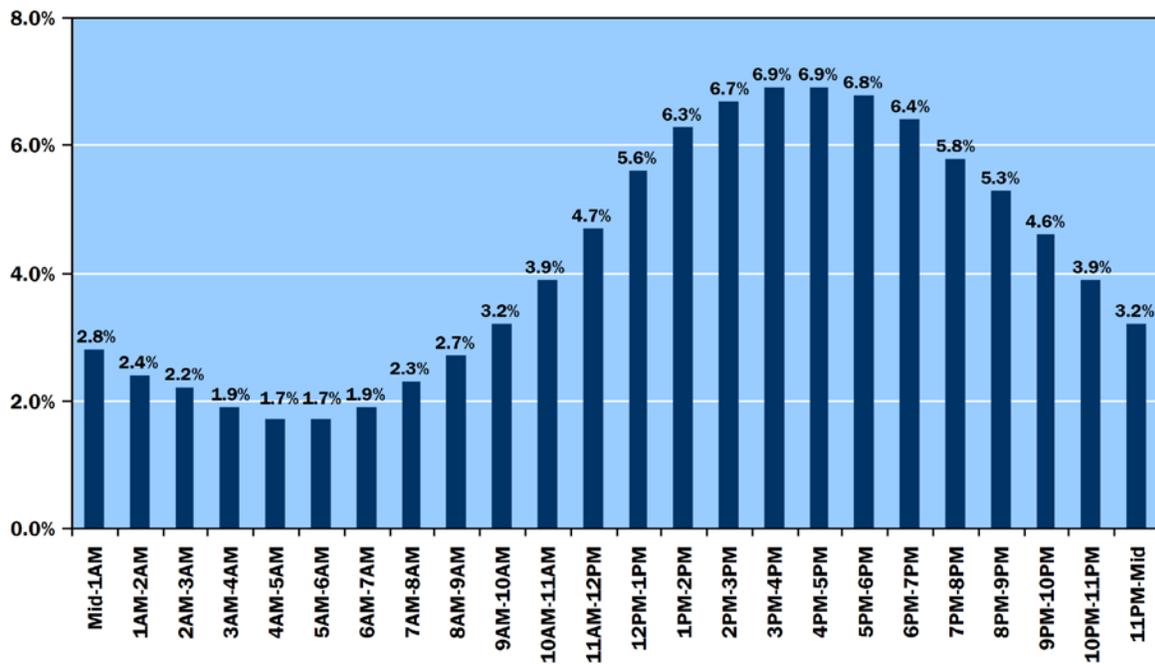
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Figure 1. Fire Department Fire Runs by General Incident Type (percent of runs, 2004)



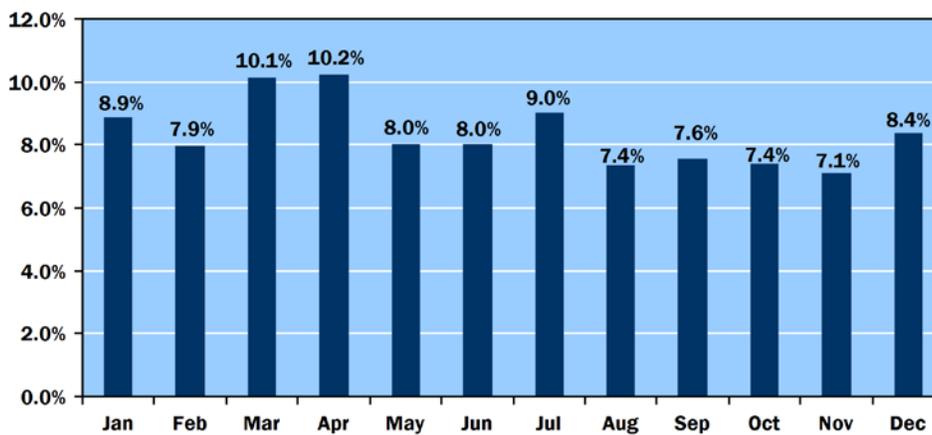
Source: 2004 NFIRS 5.0 data

Figure 2. Fire Department Fire Runs by Alarm Time (percent of runs, 2004)



Source: 2004 NFIRS 5.0 data

Figure 3. Fire Department Fire Runs by Month (percent of runs, 2004)



Source: 2004 NFIRS 5.0 data

factor into this increase in outdoor fires.⁵ The increase in July fire runs is a result of July 4th incidents (primarily fireworks-related)⁶. December and January increases are primarily a result of increases in heating-related fires in buildings.

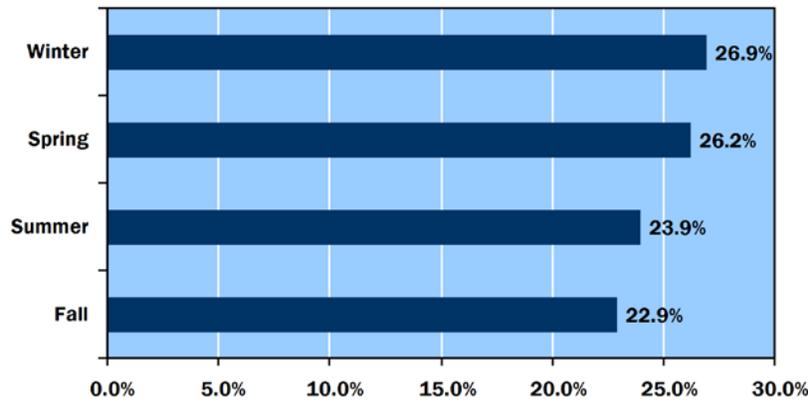
The monthly trends shown in Figure 3 result in more winter fire runs – 27% of fire department fire runs take place during the months of January through March (Figure 4). Spring fire runs are a close second with 26% of fire department fire runs. Fall has the fewest fire runs.⁷

Structure Fire Runs

Structures include buildings such as residences, hotels and motels, commercial and office buildings, schools, and manufacturing facilities as well as nonbuildings (bridges, towers, and the like). Nearly all (95%) of fire department fire runs to structure fires are to buildings. The leading property use for structure fire runs is residential structures (62%). Fire departments respond to more structure fires in December and January, with peak demand occurring in

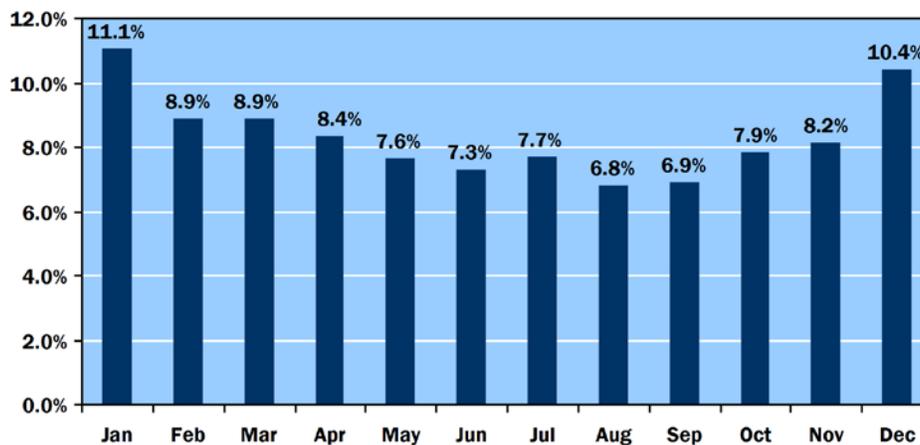
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Figure 4. Fire Department Fire Runs by Season (percent of runs, 2004)



Source: 2004 NFIRS 5.0 data

Figure 5. Fire Department Structure Fire Runs by Month (percent of runs, 2004)



Source: 2004 NFIRS 5.0 data

January, as shown in Figure 5. Overall, the winter months have the largest proportion of fire department structure fire runs (29%). Fall is a close second (26%). Holiday fires and heating play a large role in the prevalence of structure fire runs in the fall and winter⁸. The highest percentage of structure fires occur in the late afternoon between 5 p.m. and 7 p.m., as shown in Figure 6.

Outside Fire Runs

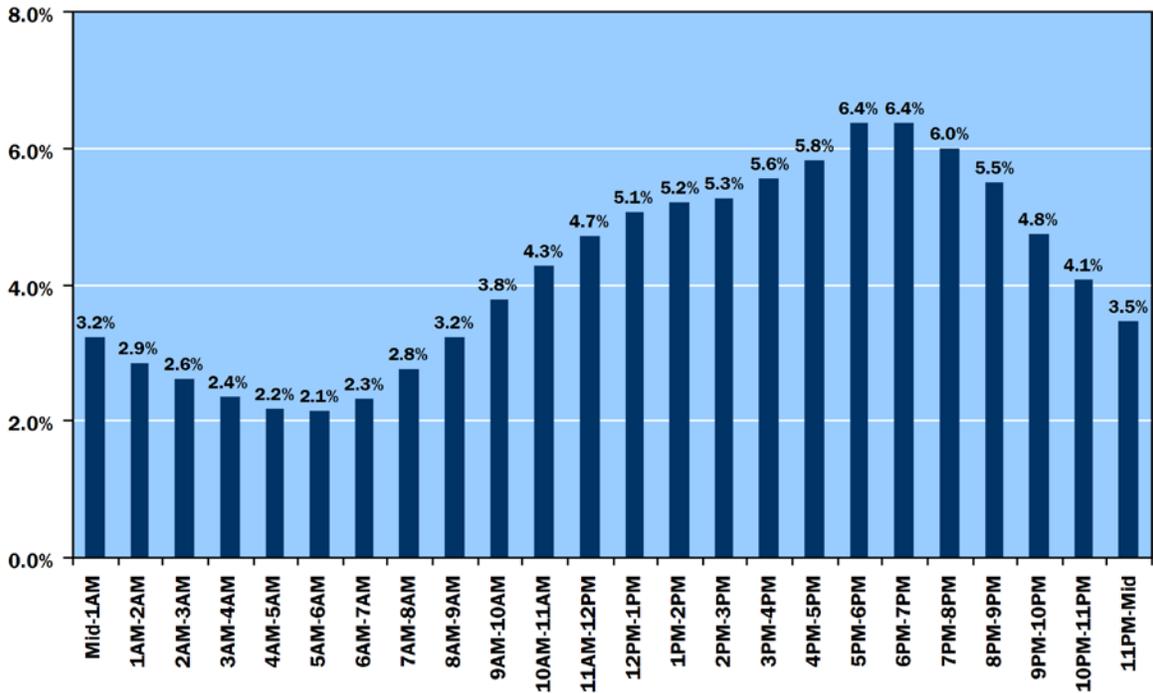
Outside fire runs include runs to vegetation incidents (grass, tree, brush, crops, and the like), rubbish and trash, and miscellaneous outside incidents such as outside storage. The leading incident types for outside fire runs are brush fires (23%), followed by outside trash or rubbish (20%), and grass fire incidents (18%).

Outdoor fire runs occur most often in March (13%), April (14%), and July (10%), as shown in Figure 7. The March-April increases reflect the weather and activity changes previously noted. The large spike in July fire runs occurs around July 4.⁹ Fire department runs to outside fires occur mostly during the early afternoon hours, with a peak between the hours of 2 p.m. and 4 p.m., as shown in Figure 8.

Vehicle Fire Runs

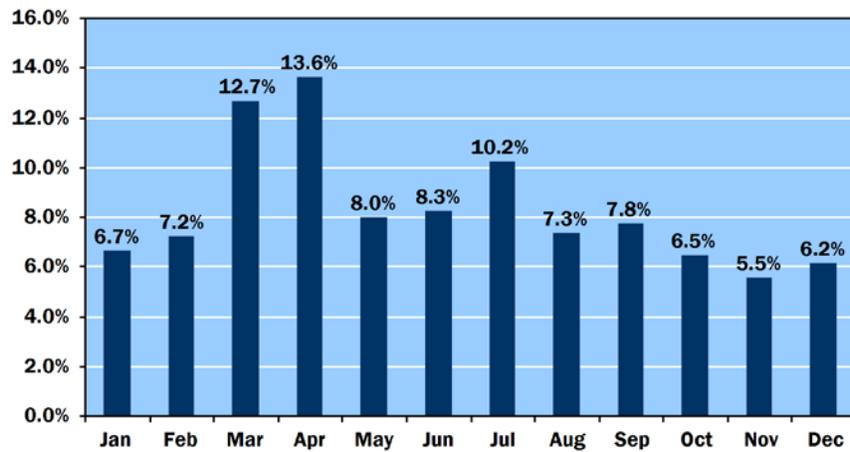
Vehicle fire runs are relatively constant throughout the year, with slightly higher percentages in the month of July (Figure 9). The highest percentage of vehicle fires takes place between the hours of 4 p.m. and 6 p.m., as shown in Figure 10.

**Figure 6. Fire Department Structure Fire Runs by Alarm Time
(percent of runs, 2004)**



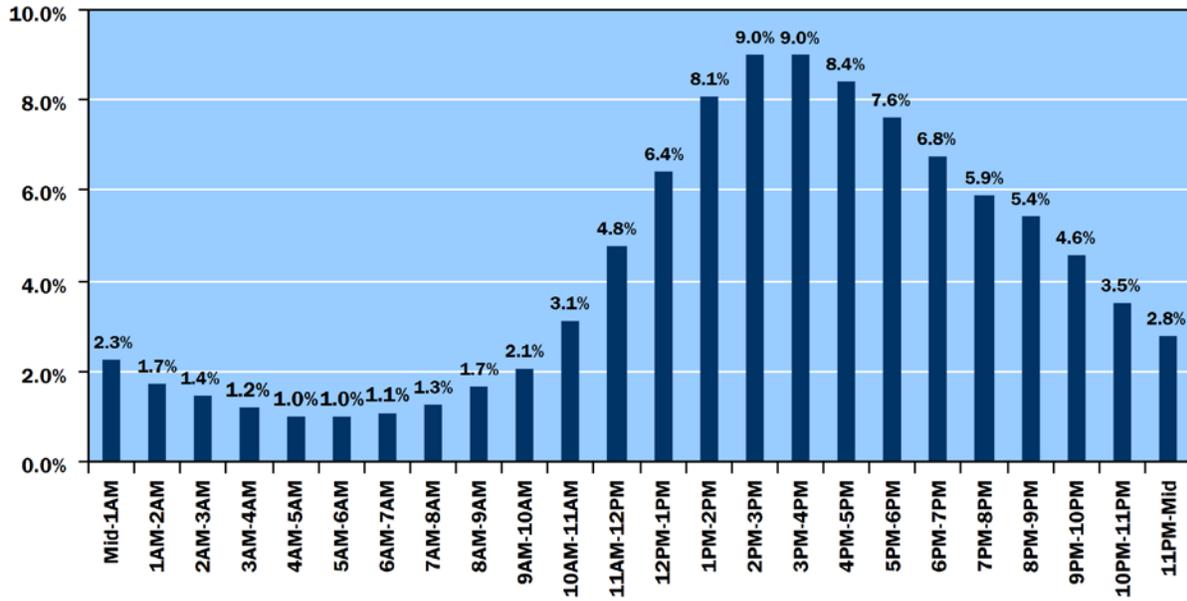
Source: 2004 NFIRS 5.0 data

**Figure 7. Fire Department Outside Fire Runs by Month
(percent of runs, 2004)**



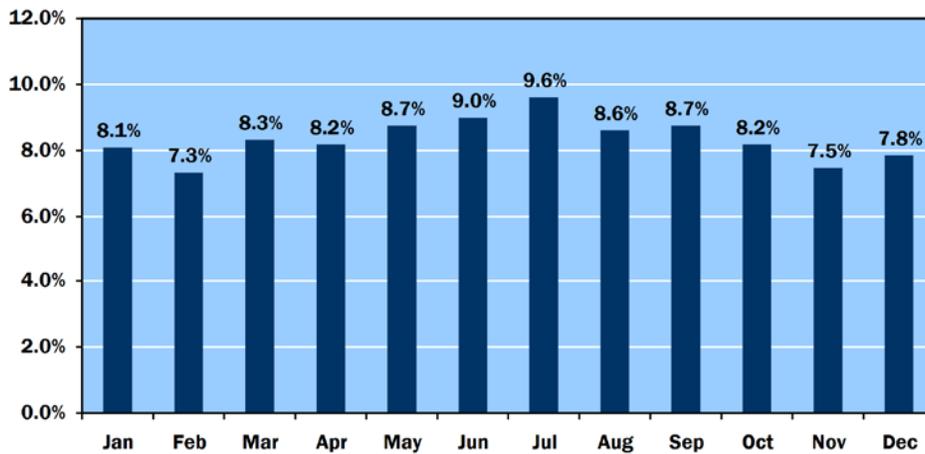
Source: 2004 NFIRS 5.0 data

**Figure 8. Fire Department Outside Fire Runs by Alarm Time
(percent of runs, 2004)**



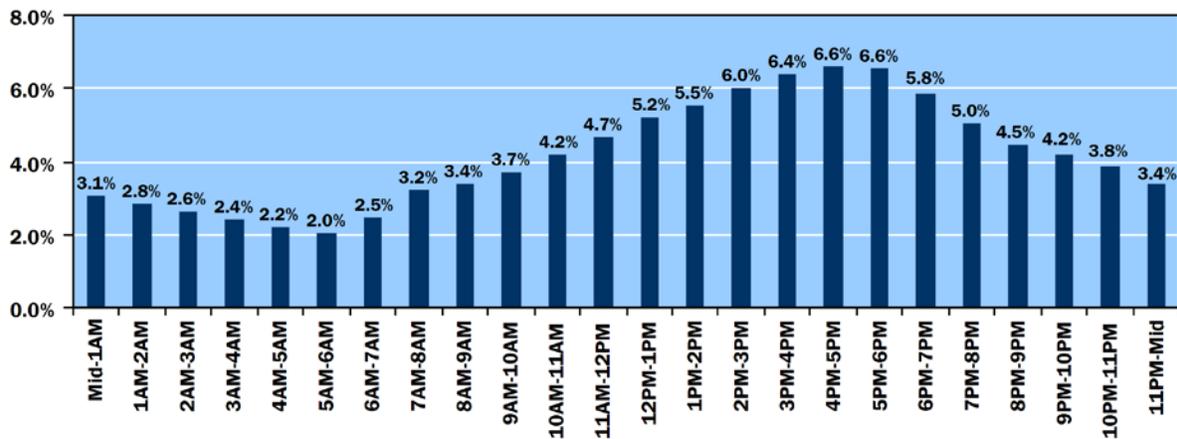
Source: 2004 NFIRS 5.0 data

**Figure 9. Fire Department Vehicle Fire Runs by Month
(percent of runs, 2004)**



Source: 2004 NFIRS 5.0 data

Figure 10. Fire Department Vehicle Fire Runs by Alarm Time (percent of runs, 2004)



Source: 2004 NFIRS 5.0 data

Aid

Aid offers additional resources to fire departments for large-scale or specialized incidents or when response time to an incident is faster by another jurisdiction. Aid is either given or received, either automatically or mutually, for a specific incident. Automatic aid involves prearranged agreements according to hazard conditions, jurisdictions, or incidents requiring special equipment. Mutual aid generally is requested on a reactive basis as resources are depleted at the incident.

Informal and formal aid relationships vary, depending on the location or the type of the incident. Innovative aid relationships, which focus on improving the allocation of resources and response times, continue to augment the advancement of fire department services. About one-quarter (26%) of fire department fire runs involve giving or receiving aid, either mutual or automatic.

Small rural areas generally follow informal agreements, where it is understood that large-scale incidents will require all available resources from several community fire departments, and that each department sustains its own resources when providing aid. However, informal relationships in rural areas are giving way to more formal automatic relationships between jurisdictions as rural areas experience huge growth and do not have the resources to meet the fire demands that increasingly point toward “metropolitan risk” levels.¹⁰

Formal aid relationships provide better access to resources. Many local jurisdictions and States maintain exemplary aid systems. The key issues facing aid agreements deal with liability and reimbursement. Resolving these issues results in

better fire services. The Emergency Management Assistance Compact (EMAC) and Urban Search-and-Rescue (USAR) teams have greatly improved the ability to overcome these issues and move resources from State to State. A national aid and resource system initiative is in development to manage greater threats facing the United States, including terrorism and natural disasters.¹¹

Types of Aid

While about three quarters (74%) of fire department fire runs are not aid-related, the level of aid runs varies with the type of incident. Structure fire incidents involve aid runs more often than other types of fires (Table 1). A more detailed analysis of aid relationships and resulting runs is necessary to draw definitive conclusions on the use and frequency of aid.

Table 1. Fire Department Fire Runs by General Type of Aid (percent of incidents, 2004)

Incident Type	Aid		Total	No Aid	Total
	Aid Received	Aid Given			
Structure	14.4%	24.4%	38.8%	61.2%	100.0%
Outside	6.5%	10.0%	16.5%	83.5%	100.0%
Vehicle	5.6%	7.5%	13.1%	86.9%	100.0%
Other	8.1%	18.5%	26.6%	73.4%	100.0%
OVERALL	9.8%	16.1%	25.9%	74.1%	100.0%

Source: 2004 NFIRS 5.0 data

Note: Totals may not add due to rounding

Conclusion

Fires occur at any time and anywhere. Fire departments respond to these fires every hour of the day, each day of the year. Structure fires require more runs from fire departments than other types of fires. Outside fire runs are a close second.

Some emergencies exceed local area resources and require aid from other jurisdictions. Formalized aid agreements help manage resource and fire service demand.

To request additional information or to comment on this report, visit <http://www.usfa.dhs.gov/applications/feedback/>

Notes

¹“Runs” and “responses” have different meanings for different fire departments. As NFIRS incident data reflect summary data from individual fire departments (not from individual fire stations in a fire department), a “run” as used in this topical report means the fire department’s collective response to an incident. As some incidents exceed local area resources and require aid from other jurisdictions, the number of fire department runs to incidents will be larger than the number of incidents themselves.

The estimate of the number of fire runs made to fire incidents in 2004 is determined by applying the NFIRS ratio ((fire incidents + fire aid incidents)/fire incidents) to the 2004 NFPA estimate of fire incidents. For 2004, this ratio was approximately 1.19 or 19% more runs than incidents.

²NFIRS 5.0 contains both converted NFIRS 4.1 data and native NFIRS 5.0 data. This topical report includes only native 5.0 data. Incident type 110 (structure fire, other) is not included in this analysis as it is a “conversion only” code. That is, incident type 110 is technically a version 4.1 incident and, as such, is not included in this analysis. Aid runs, usually excluded in incident-based analyses, are included in the data for this report.

³National estimates are based on 2004 native version 5.0 data from the NFIRS and national fire loss estimates from the National Fire Protection Association’s (NFPA) annual survey of fire loss. Fires are rounded to the nearest 100.

⁴U.S. Fire Administration, *Fire in the United States 1995-2004*, Fourteenth Edition, pp. 39-40.

⁵U.S. Fire Administration, *The Seasonal Nature of Fires*, FA-236, January 2005.

⁶Ibid.

⁷For ease of analysis, the seasons are defined as Winter—January through March; Spring—April through June; Summer—July through September; Fall—October through December.

⁸U.S. Fire Administration, *The Seasonal Nature of Fires*, FA-236, January 2005.

⁹Ibid.

¹⁰Discussions with Mr. Patrick Simpson, former Fire Chief and current Sr. Analyst at the TriData Division of System Planning Corporation.

¹¹FEMA, “National Mutual Aid and Resource Management Initiative Frequently Asked Questions,” http://www.scd.state.hi.us/NIMS/FAQ_6_09_04.doc