Fire Services

April 1999

A Best Practices Review

Photos courtesy of Spring Lake Park-Blaine-Mounds View Fire Department

Office of the Legislative Auditor
State of Minnesota

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Preface

This report is a best practices review of fire services in Minnesota. It is the fifth in a series of best practices reviews conducted by the Office of the Legislative Auditor.

The 1994 Legislature established best practices reviews as a way to identify practices that aid in delivering local government services efficiently and effectively. Our approach is similar in some respects to one used by the British Audit Commission in England and Wales to determine the state of the art in the delivery of local services.

The emphasis on identifying what local governments do well is one of the key distinctions between best practices reviews and traditional audits or program evaluations, which typically focus on compliance and performance deficiencies. The Legislature intended that best practices reviews help local governments improve their service delivery by learning about effective and efficient methods used by jurisdictions similar to them.

To determine which local services should be subjects of best practices reviews, the Legislature created a local government advisory council when it established the program. By law the advisory council comprises three members appointed by the Association of Minnesota Counties, three by the League of Minnesota Cities, two by the Association of Metropolitan Municipalities, and one each by the Minnesota Association of Townships and the Minnesota Association of School Administrators. This advisory council recommended the topic of fire protection to the Legislative Audit Commission, which approved it in May 1997.

Our best practices reviews look at effective and efficient methods of delivering local government services.

We acknowledge and appreciate the help provided by many local fire department personnel around the state. Their interest and cooperation in this review contributed greatly to the final report. The State Fire Marshal Division in the Department of Public Safety was among several state agencies that also willingly offered assistance.

The report was researched and written by Jody Hauer (project manager), Valerie Bombach, and Caryn Mohr, with technical assistance from Gregg Davies. For readers with access to the Internet, this report and related material may be found over the World Wide Web at http://www.auditor.leg.state.mn.us/pe9907.htm.

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Fire Services

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SUMMARY

Fire departments in Minnesota perform a variety of duties. They all fight fires, but many also conduct rescues, inspect buildings for compliance with fire code provisions, offer information and demonstrations on fire prevention, and respond to hazardous materials releases and emergencies requiring medical services.

This report identifies practices that fire departments should adopt to provide the high level of emergency services and fire protection the public expects. Several of these practices are already used by many fire departments around the state. We found that some practices, however, are not as widespread. We recommend that more fire departments become active in the areas of assessing local fire risks and developing long-range plans based on those risks, taking full advantage of cooperative opportunities, providing comprehensive fire prevention activities, customizing personnel recruitment strategies, and training fire fighters on preserving arson scenes.

In conducting our review, we sent questionnaires to all fire departments in communities with more than 8,000 people and to a large random sample of fire departments in smaller communities. The questionnaire asked departments for data on activities in 1997. We also conducted a broad review of literature on fire services, relying on national and local sources. Early in the study, we visited a number of fire departments to learn about their operations and observe them in action. After identifying standards of high performance in fire services, we convened focus groups of fire personnel in different regions of the state for feedback. We talked with other fire professionals around the state and made site visits to 11 fire departments to collect in-depth information. Throughout the review, we relied on the professional advice of a technical advisory panel consisting of fire fighters, fire chiefs, fire marshals, and others.

This review profiles certain effective and efficient fire departments and recommends that fire departments adopt identified best practices.

FIRE SERVICES IN MINNESOTA

Minnesota has nearly 800 fire departments, most of which have volunteers or paid on-call members who are employed elsewhere but respond to emergencies when contacted. Only 3 percent of fire departments had exclusively full-time paid staff in 1997. Another 5 percent, known as "combination" departments, employed both full-time fire fighters and others who were paid on-call or volunteer fire fighters.[1] Approximately 62 percent of fire departments had paid on-call fire fighters, and 30 percent had exclusively volunteer members who received no compensation but may have been eligible for pensions.

1 For our study, we defined "combination" departments as those with six or more full-time fire fighters. Those with five or fewer full-time members were grouped with volunteer and paid on-call departments because they are unlikely to be able to operate on an around-the-clock basis at their fire stations.

Purpose of This Report

This report identifies some of the effective and efficient practices related to fire services in Minnesota. It is based on a statewide study of activities in Minnesota's fire departments.

The purpose of this report is to profile effective practices, demonstrate the conditions under which they appear successful, and encourage their adoption wherever appropriate around the state. Unlike a regular audit or evaluation, this report does not focus on deficiencies, but instead it highlights successful practices.

We hope that Minnesota's local governments will actively use this report to examine their own practices and consider the ideas presented here that contribute to effective and efficient fire services elsewhere.

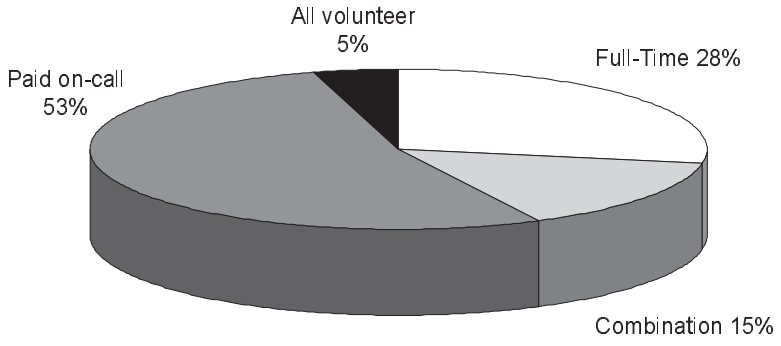
This review is part of a program established by the 1994 Legislature to identify best practices in local government service delivery.

Although few in number, most of the full-time fire departments had relatively large populations within their primary response areas, and they served about 28 percent of the state's population in 1997. Combination departments served about 15 percent of state residents, paid on-call departments about 53 percent, and all-volunteer departments about 5 percent of the population.

Full-time fire departments in Minnesota are typically found in areas with large populations, high densities, and older buildings; they are located in fairly equal proportions inside and outside the seven-county Twin Cities metropolitan area. Combination fire departments are also located both inside and outside the Twin Cities. They tend to serve in cities with mid-size populations that have relatively newer housing stock, but in areas much less dense than areas with full-time departments. Volunteer or on-call departments, on the other hand, typically serve the smallest and sparsest populations, and about 85 percent are located outside the Twin Cities area. They generally serve cities or towns that have older housing stock with a median age similar to that in cities with full-time fire departments.

Virtually all Minnesota fire departments rely on mutual aid agreements for additional resources during extraordinary emergencies. In a mutual aid response, fire departments respond free of charge to assist other departments with added personnel and equipment. Mutual aid allows fire departments to forego hiring the number of fire fighters and purchasing the apparatus (vehicles such as pumpers, ladder trucks, and tankers) they would otherwise need to handle infrequent, large-scale emergencies. A smaller share of fire departments use their mutual aid associations in additional ways, such as in making joint purchases of equipment or sharing facilities. Some fire departments engage in "automatic" aid, responding to fires in a neighboring community on the first alarm.

Percentage of Minnesota Population Served by Type of Fire Department, 1997



NOTE: Combination departments include those with at least six full-time fire fighters.

SOURCE: Legislative Auditor's Office Survey of Fire Departments, 1998.

The Range of Fire Department Services

Local fire departments have discretion to determine what type and level of service they provide. All active fire departments suppress fires, and only a handful limit their services to fire suppression alone. According to our survey data, for

every one response fire departments made to a fire in 1997, they made almost seven responses for other services, such as rescues, emergency medical services, and hazardous materials spills.

Many fire departments recognize the need to educate the public about fire prevention. Studies have shown that European countries and Japan, with stronger emphases on fire prevention, have had lower numbers of fires and lower rates of fire-related deaths and injuries than the U.S. It is more common in the U.S. than these other countries to spend a larger proportion of resources on suppressing fires.

More than 90 percent of Minnesota's fire departments reported that they had a public education program on fire safety, although the extent of the programs varied widely. Most fire departments scheduled fire-safety public awareness events in conjunction with national Fire Prevention Week, for instance; very few, conversely, conducted voluntary fire-safety inspections in residents' homes. Intervention programs to counter juvenile fire setting are part of fire prevention; some local fire department have such programs and the State Fire Marshal Division in the Minnesota Department of Public Safety offers intervention resources.

Fire prevention also includes reviewing construction plans and inspecting buildings for compliance with the fire code. About 43 percent of fire departments reported that they or their fire marshal enforced the fire code. Another 13 percent said the county, city, or some other local agency outside the fire department conducted fire-code inspections. The remaining 44 percent of fire departments, primarily volunteer or paid on-call departments, indicated that no local agency inspected buildings for fire-code provisions.

State statutes require local fire officials to ensure that the cause and origins of fires are investigated and that the results of their investigations are reported to the State Fire Marshal. Effective fire investigations require extensive training and expertise; as a result, many fire departments, especially in smaller jurisdictions and with volunteer or paid on-call personnel, relied heavily on the State Fire Marshal Division to assist with fire investigations in 1997.

Many fire departments serve as "first responders" at medical emergencies, administering basic medical care prior to the arrival of ambulances. A small number of fire departments also operate ambulance services, which must be licensed to transport victims to medical facilities. About 60 percent of fire departments offered some level of emergency medical services in 1997, according to our survey.

A large share of fire departments offer rescue services. Rescues include extricating victims from vehicle accidents, water and ice rescues, and wilderness search operations, among others. About 70 percent of Minnesota's fire departments offered some type of rescue service in 1997.

Similarly, most fire departments have prepared themselves at a basic level to respond to releases of hazardous materials that can cause harm to people or the environment. Although few fire departments are equipped and trained to actually stop a hazardous spill, nearly 79 percent required or offered training at the minimum "awareness" level of response, whereby fire fighters are trained to recognize a hazardous materials release and initiate an emergency response by contacting the appropriate authorities.

Private Sector Fire Services

Although many fire services are provided by government at the city or township levels, the private sector also has a role. Home smoke detectors are in most residences across the country (although many may not be in working order) and home security systems are increasingly common. Automatic sprinkler systems and other fire protection systems are often installed in commercial buildings, particularly in newly constructed or renovated buildings that comply with *State Building Code* and *Minnesota Uniform Fire Code* provisions. Moreover, some commercial enterprises with particularly high fire risks, such as oil refineries, employ their own fire brigades.

The Insurance Services Office, Inc. (ISO) is a private, nonprofit organization that evaluates local municipalities' fire suppression capabilities. An ISO fire suppression rating schedule assesses a community's water supply, fire department features and practices, and fire alarm system to estimate the

potential for property losses in the event of a fire. The ISO rating is one factor that insurance companies may use in setting insurance premiums. In addition, property insurance companies typically employ fire investigators who substantiate fire insurance claims and some have prevention specialists who identify ways that their clients can reduce fire risks.

State Agency Involvement in Fire Services

State agencies also play a role in locally provided fire services. The State Fire Marshal Division in the Minnesota Department of Public Safety investigates the cause and origin of fires at the request of local fire departments and investigates all fires involving fatalities. It has responsibility for enforcing the fire code in certain buildings around the state, including schools, hotels, and hospitals. As a resource to local fire departments, the State Fire Marshal Division offers technical expertise on fire code provisions, maintains a computerized arson investigation data system, coordinates a program of planned intervention to address juvenile fire-setting problems, collects and analyzes statewide data on fire incidence, and provides fire-safety information.

Together with the State Fire Marshal Division, the Division of Emergency Management in the Department of Public Safety contracts with specific fire departments and one private firm to provide regional teams for hazardous materials responses when local jurisdictions request help. The Division of Emergency Management offers grants to local response agencies for planning and training on hazardous materials responses. The division is involved with the coordination of responses and communication when multiple agencies respond to large-scale emergency incidents, and it houses the Minnesota Duty Officer, a one-stop office that local public-safety personnel call when they need assistance with emergencies.

The Division of Forestry in the Minnesota Department of Natural Resources (DNR) is responsible for preventing and extinguishing wildfires—those occurring in grassland, brush, cropland, or forests around the state. To help fight fires during the high fire-risk seasons, the division contracts with certain local fire departments for personnel and apparatus. It also manages the Interagency Fire Center in Grand Rapids. Local fire departments may use the Fire Center for several programs including loans of federal surplus equipment and vehicles, matching grants for purchasing equipment to fight wildfires, access to fire prevention materials, and the coordination of fire fighters and apparatus for emergencies outside Minnesota.

Fire departments must meet specific workplace standards that address fire fighter safety. The Minnesota Occupational Safety and Health Act and the federal Occupational Safety and Health Administration affect the level and content of fire departments' training, equipment, and procedures. Currently, the state does not, however, prescribe a training curriculum or minimum training level that all fire fighters must meet.

Financing Fire Services

Most fire departments rely heavily on property tax and other revenues from city and township general funds to finance their operations, although they also depend on a variety of additional revenue sources. About 54 percent of fire departments received revenue from contracts for service they provided to neighboring jurisdictions, and 42 percent charged fees for some of the services they provided. More than a third of fire departments reported using charitable gambling proceeds and contributions from civic organizations to help pay for some share of operations. According to our survey data, the median level of operating expenditures for fire departments around the state in 1997 was about $17 per capita, although the medians ranged from $16 per capita in volunteer and paid on-call departments to $76 per capita in full-time departments.[2]

2 Per capita estimates in our analysis contained the populations residing within the primary response area of each fire department, which often included multiple cities or townships.

Differences Among Types of Departments

We compared our survey data for three groups of departments: (1) full-time departments, (2) combination departments that had at least six full-time members along with their other volunteer or paid on-call members, and (3) departments with five or fewer full-time members and volunteer or paid on-call fire departments in larger communities with 8,000 or more people. Because we lacked certain data, the comparison did not include any all-volunteer departments or on-call departments in less populous areas.

On several measures we saw little difference when comparing performance in 1997 by type of department. While the typical response times for full-time and combination departments were lower than that for volunteer or on-call departments in the larger communities, high proportions of all types of departments reported that it took an average of eight minutes or less for the initial attack team to arrive after receiving the call, a threshold which the National Fire Protection Association suggests as an important rule of thumb. Similarly, approximately equal percentages of full-time, combination, and volunteer or paid on-call departments met standards of performance we identified in health and safety practices, certain necessary fire fighter training (such as on the use and limitations of personal protective equipment), and preventive maintenance of apparatus (fire department vehicles) and equipment (ladders, hoses, hand tools, protective clothing, and other gear).

At the same time, our survey data showed that full-time fire departments in 1997 were more likely than others to have a full range of public fire-safety education efforts and long-range master plans. Full-time fire departments in 1997 were more likely than other departments to have a high percentage of structure fires contained to the room of the fire's origin, an important measure of fire fighting effectiveness. About 64 percent of full-time departments had two-thirds of structure fires contained to the room of origin, compared to about 47 and 49 percent of the combination departments and volunteer or paid on-call departments, respectively, according to data reported to the State Fire Marshal Division.

Full-time and combination fire departments were more likely than others to have comprehensive fire code inspections and enforcement and complete preincident plans for advance fire-response preparations. And a higher share of combination fire departments than others had comprehensive fire investigation programs and training.

Because the volunteer or paid on-call departments had few or no full-time personnel, they had expenditures per capita that were far lower than other fire departments. Median operating expenditures in 1997 were $15 per capita for volunteer and paid on-call departments in the larger communities, $45 for combination, and $76 for full-time departments.

GOALS, ACTIONS, AND BEST PRACTICES FOR FIRE DEPARTMENTS

Based on state statutes, rules, and professional standards, we identified five goals for effective and efficient management of fire services. The goals are:

1. **To prevent the outbreak of fires and achieve fire-safety awareness throughout the community.**

2. **To ensure the enforcement of codes on fire and life safety for the prevention and control of structure fires**.

3. **To investigate the cause, origin, and circumstances of fires in the jurisdiction.**

4. **To maintain a response capability that is safe and effective.**

5. **To protect citizens' life safety and property against the dangers of fire and other emergencies that may occur in the response area.**

We identified seven actions that we believe fire departments should follow to meet the goals. They are not the only actions that affect fire departments' performance and they may apply in different degrees to full-time, combination, and volunteer or paid on-call departments. Nonetheless, the actions are all based on guidelines and standards from within the fire services industry.

Seven Actions for Successful Fire Department Management

1. Assess risks and develop long-range plans.
2. Evaluate fire department performance and use resources cost-effectively.
3. Promote public awareness of fire safety.
4. Ensure fire code enforcement.
5. Develop effective communications systems.
6. Prepare a competent work force and support safe operations.
7. Plan for on-scene responses.

The goals and actions helped us identify best practices for fire departments. Below we describe the seven actions plus examples of how some Minnesota fire departments have implemented them. Our examples profile only a small number of the many fire departments that use the best practices.

1. Assess risks and develop long-range plans.

Fire departments should write long-range plans describing how they will meet the fire fighting and other emergency needs in their response areas in light of their expected personnel and financial resources. Fire departments should develop the plans in collaboration with any broader community planning underway; they should base the plans on their assessment of fire risks and other potential emergency needs in the community, such as those for emergency medical responses and specialized rescues.

As part of their long-range planning, fire departments should develop contingency plans. Back-up plans prepare fire departments to provide year-round service even in the event of natural disasters or equipment malfunctions. About 32 percent of fire departments in larger communities (primarily those with populations of at least 8,000) reported that they had written long-range strategic plans based on community risk analyses and containing contingency plans. Similar data were not available for fire departments in smaller communities.

Long-range planning also involves preparing to replace fire apparatus and equipment. Fire departments should develop apparatus replacement plans to be financially prepared to replace obsolete or worn vehicles and equipment. About 48 percent of all fire departments had apparatus replacement plans in 1997, according to our survey.

In addition to the Gonvick Fire Department example described here, the Winnebago Fire Service is one of those we visited that expanded its services following an assessment of local needs. The Cotton Volunteer Fire Department is an example of a fire department that uses an apparatus-replacement plan.

Gonvick Fire Department

The Gonvick Fire Department in Clearwater County began providing first responder and basic life support services in 1992 following an assessment of needs for prehospital care in the response area. The department's analysis showed that many victims needing hospital care had to wait too long for ambulances to arrive from the nearest hospitals located 20 and 30 miles away.

Pooling resources with the Polk and Clearwater county hospitals, the Gonvick Fire Department trained 16 members to first responder level and 4 to emergency medical technician-basic level. The fire department purchased and modified a used ambulance and shares the costs of resupplying it with the hospitals. As a result, accident victims receive more immediate medical care while awaiting the arrival of hospital-based ambulances.

2. Evaluate fire department performance and use resources cost-effectively.

Fire departments should periodically reassess their performance to identify the strengths and weaknesses in their training, equipment, and personnel. They should analyze their performance following responses to emergencies to determine what worked well and what needs improvement. According to our survey, about 38 percent of fire departments in larger communities used a formal program of setting goals and objectives and measuring department progress toward those goals; nearly three-quarters of these departments conducted postincident analyses of their performance. Similar data were not available for fire departments in smaller communities.

Fire departments should also take a long-term look at the effectiveness of their individual programs to assess what impact each program may have on other department functions, such as how fire incidence trends can indicate a need for particular public education topics. To make strategic decisions about department services, fire departments need an information system for keeping and retrieving records on all aspects of their operations. About 63 percent of the fire departments in larger communities indicated they maintained an information system for recording data on department activities. Similar data were not available for fire departments in smaller communities.

Minnesota fire departments' long history of mutual aid has produced efficiencies in fire services. Automatic aid agreements have also proven cost-effective. Nearly all fire departments participate in mutual aid, most often for fire suppression purposes. Additional efficiencies can be gained, however, by using mutual aid arrangements for other services such as cooperative purchasing and fire-safety awareness activities. About 13 percent of fire departments we surveyed said they made cooperative purchases through mutual aid associations and about 30 percent used mutual aid associations for joint efforts in public education.

West Metro Fire - Rescue District

In mid-1998, the on-call fire departments in the adjoining cities of Crystal and New Hope began operating as a single department. In creating a joint fire district, Crystal and New Hope intended to meet their communities' rising expectations for service without raising property taxes.

Because of the merger, fire and rescue responses are now based on proximity to the three fire stations, not to city boundary lines. Improved first responder service is available because fire fighters equipped and trained to use defibrillators respond when needed by residents of either city. Fire prevention work, including code enforcement in building inspections and fire-safety education, are consistent throughout the district. For the first time in either city, a vehicle replacement program is in place. Cost reductions resulted from unfilled turnover in fire fighter positions, but more significant savings are expected over time as the fire department avoids the costs of replacing three pumpers while maintaining its ISO rating.

Alternative service delivery may be needed to correct major inefficiencies or provide adequate fire protection when existing fire departments lack the necessary resources. Alternatives include intergovernmental contracts for service, joint powers agreements, and consolidations. More than two-thirds of fire departments had contracts to provide some or all of their services in other jurisdictions during 1997, according to our survey. Only a handful, however, operated as a result of multiple fire departments having consolidated.

Besides the case described here of the West Metro Fire District, many other fire departments provide examples of using resources cost-effectively and sharing expertise and equipment. Among the fire departments we visited, several, including West Metro and Brooklyn Park, are members of the Minnesota Fire Agency Purchasing Consortium, which offers low prices on certain fire equipment due to taking bids for high-volume purchases. The Winnebago Fire Service and St. Louis Park Fire Department represent two examples of how departments gain advantages through mutual aid and automatic aid arrangements, respectively. The Pierz Fire Department shows the benefits of

contracts for fire services. Other examples of cost-effectiveness include the Duluth Fire Department's success with reduced costs through the standardization of apparatus and equipment and the Cotton Volunteer Fire Department's use of the DNR-managed excess property program and matching grants to obtain vehicles and equipment at low cost.

3. Promote public awareness of fire safety.

Fire departments should establish fire-safety education programs to improve the public's awareness of fire risks and fire prevention tactics. Basic fire-awareness information is useful for all residents, but fire departments should identify the most important fire risks in their response areas and tailor education programs accordingly.

Duluth Fire Department

The Duluth Fire Department began a voluntary home inspection program in 1998 to upgrade fire safety in private houses. Fire prevention staff inspected about 100 homes during the first year and expect to cover even more in the second year.

Once visits are scheduled, inspectors perform exterior and interior checks. Outside the houses, inspectors look for clearance between the home and combustible materials, among other items. Inside, inspectors check for frayed wiring, improperly stored materials, or combustibles located too near the furnace. Inspectors offer smoke detectors for homes without them and test those already installed. In the future, the fire department will target home inspections in neighborhoods that have not been visited in the past.

Education programs should include components targeted specifically to vulnerable groups, such as children, and they need to be available in languages spoken within the community. Comprehensive education programs include initiatives for homes and workplaces and steps to reduce departments' exposure to liability. Fire departments should evaluate their public education programs and modify them as needed to ensure they are effective.

More than 90 percent of fire departments reported they had a public education program on fire safety, although the extent of the programs varied widely. Only about 2 percent of fire departments had comprehensive fire-safety awareness activities that included education programs targeted to local fire risks, smoke detector programs, collaborations with teachers and others, and ongoing monitoring of the programs' effectiveness.

In addition to the Duluth example described here, fire departments in Alexandria, Brooklyn Park, Cotton Township, Maple Plain, and St. Louis Park were among those we visited with unique or comprehensive fire-safety awareness programs.

4. Ensure fire code enforcement.

Minnesota's *Uniform Fire Code* authorizes fire departments to (1) inspect buildings looking for conditions that could cause fire and (2) require them to be corrected. Fire departments involved with fire code enforcement should establish a program of inspections with a schedule that targets buildings posing hazards and potential threats to life safety and property. Because of the complexities of the *Minnesota Uniform Fire Code*, inspectors need appropriate and ongoing training in the field. According to our survey, about 56 percent of fire departments or other local agencies conducted fire-code related inspections; for the remaining 44 percent, no local agency conducted fire-code related inspections.

Some fire protection provisions are incorporated into Minnesota's *State Building Code*; the overlapping provisions of the two codes are enforced by building officials and fire inspectors. Fire departments must maintain a good working relationship with building code officials (in communities where the *State Building Code* has been adopted) to ensure that fire protection concerns are addressed in the construction or renovation of buildings. This means that fire personnel should be involved in preconstruction meetings, when the construction permit is issued, and before building owners receive certificates-of-occupancy.

Identifying potential fire hazards in advance of constructing or renovating buildings saves time and money for the building owners, who avoid having to rebuild should fire code violations be discovered

White Bear Lake Fire Department

In addition to aggressive fire-code related inspections, White Bear Lake has a 1989 city ordinance requiring the installation of hard-wired smoke detectors in single-family dwellings whenever homes undergo renovations in excess of $1,000 or require an electrical permit. Over time, the number of homes with hard-wired smoke detectors has gradually increased, and about half of all older homes in the city now have them.

The fire marshal reviews fire-code compliance in building plans for all new construction in the city except single-family homes. He works closely with building inspection staff, and builders must address fire code concerns before receiving certificates-of-occupancy from building inspectors. A city ordinance requires sprinkler installation in all buildings of more than 5,000 square feet. The fire marshal also inspects buildings and conducts plan reviews in nearby communities on a contract basis.

after construction is completed. About 90 percent of larger communities where fire departments or other local personnel conducted fire code inspections had personnel who participated in plan reviews for new building construction and 74 percent had personnel involved in the certificate-of-occupancy processes. Similar data were not available for fire departments in smaller communities.

Among the fire departments we visited, the Duluth and Pierz fire departments, in addition to the White Bear Lake example described above, inspect buildings for fire code enforcement. The St. Louis Park Fire Department has an extensive program for inspecting apartment units.

5. Develop effective communications systems.

Effective communication is essential for a well-functioning fire department. Once fire departments are contacted about an emergency, they need to immediately alert their members. On the scene, incident commanders need to communicate throughout the incident with each fire company as well as maintain contact with dispatchers. When involved in mutual aid responses, all fire fighters have to understand communication protocols and use common terminology.

Intradepartmental communication includes sharing information throughout the fire department. For instance, information gathered during building inspections can be useful to fire officials who are developing preincident plans in preparation for the possibility of fires. Among the fire departments we visited, the Winnebago Fire Service offers an example of the benefits of placing strong emphases on communication protocols and training.

Equally important, fire departments should maintain strong communication with outside groups, including city councils or town boards, water utility managers, and fuel pipeline companies. Besides the Alexandria Fire Department described here, the Duluth Fire Department is another example among the fire departments we visited that illustrates the value of active communication with others outside the department.

For reliable communication linkages, fire departments need hardware such as radios, pagers, sirens, and other equipment. They also need to prepare communication protocols and train members on their use. About 89 percent of fire departments in larger communities reported they

Alexandria Fire Department

The Alexandria Fire Department maintains close communications with officials from the city's water and building departments. Their coordinated working relationships enhance fire protection in the city.

Fire officers work with water utility officials on the planning and placement of the city's fire hydrants and water mains. Hydrant testing is done jointly. Working cooperatively, the fire department can better plan for fire suppression needs and develop contingency plans for water supplies.

Similarly, the fire marshal established ongoing communications with local building officials on fire code compliance. When new buildings are planned, inspectors issue building permits only after construction plans address fire code provisions identified by the fire marshal. This collaborative working relationship ensures that new or reconstructed buildings meet fire code provisions.

were somewhat or very satisfied in their communication systems' ability to perform in emergency situations and normal daily activities without excessive delays or interference. Similar data were not available for fire departments in smaller communities.

6. Prepare a competent work force and support safe operations.

For safe and effective emergency operations, fire departments need adequate staffing levels, training appropriate for all duties fire fighters will be expected to perform, standard operating guidelines, personal protective equipment for all active members, and health and safety procedures. To maintain an adequate number of fire department members, fire officials should establish a recruitment program based on their departments' identified personnel needs. About 46 percent of fire departments reported that they had a recruitment plan in 1997 structured according to their personnel needs.

Fire departments should be proactive in their efforts to retain members. This means identifying fire fighters' points of satisfaction and concern, as well as demonstrating good leadership, maintaining consistent standards of performance, and providing recognition for work done well, among other things. About 60 percent of fire departments with volunteer or paid on-call members reported high retention rates, retaining at least 80 percent of their members over the past five years.

All fire departments need training programs that set minimum training requirements for fire fighters. Effective training both contributes to smooth operations and reduces the risk of injury to fire fighters. Each function fire fighters perform—fighting fires, performing search and rescue operations, operating apparatus—requires specific training. More than 90 percent of fire departments in larger communities said that they required training for the specialized services they offered and on the use and limitations of personal protective equipment, according to our survey. Although similar data were not available for fire departments in smaller communities, 83 percent of these departments reported that they required or offered training in 1997 on fire suppression and on the use and limitations of personal protective equipment. Fire departments should periodically appraise fire fighters' performance to help identify training needs and improve operations.

Maple Plain Fire Department

The Maple Plain Fire Department reorganized to bring its on-call fire fighters closer to the planning, management, and evaluations of department services. Teams of fire fighters now have responsibility for specific functions, such as training and truck maintenance.

Fire department members serve on the team of their choice; each team selects its own team leader, assigns duties, evaluates service or equipment needs, and makes purchasing recommendations. Team leaders join fire officers in monthly evaluations of team activities and recommendations.

The changes brought greater camaraderie among members, increased fire fighter attendance at drills and meetings, and encouraged more individual initiative in improving department services. Over time, the team approach is expected to enhance staff retention.

Because of the inherently dangerous environments in which many fire fighters find themselves, fire departments need to adopt safety protocols for use during incidents, including a system for accounting for personnel whereabouts during responses and rapid intervention plans to rescue injured members. All fire fighters need appropriate protective clothing and gear to shield them from hazardous conditions. Protective equipment needed for fighting structure fires differs from that needed for wildland fires, first responder activities, and other fire-related services. All of the fire departments in larger communities indicated their protective gear and breathing apparatus were adequate or very adequate in 1997. Similar data were not available for fire departments in smaller communities.

Among the fire departments we visited, the Winnebago Fire Service is an example of a department with comprehensive health and safety programs. The Alexandria Fire Department exemplifies how fire departments must provide training for each service they expect fire fighters to

perform. The fire departments in Cotton Township, St. Louis Park, and White Bear Lake provide examples of how to retain fire department members.

7. Plan for on-scene responses.

Before fire departments actually respond to emergencies, they are involved with intensive advance planning. Fire departments should analyze the fire risks and other hazards in their response areas and gather sufficient information to prepare "preincident plans." Such plans prepare fire personnel with information, such as building construction and layout or fuel loads in wildland areas, that they need to know before deciding on appropriate attack strategies. All fire fighters should receive training to become familiar with preincident plan information. According to our survey, approximately 93 percent of fire departments in larger communities had preincident plans for at least some of their fire risks and structures; about 53 percent of the fire departments in smaller communities reported having written emergency response plans in preparation for their fire responses.

Fire departments should establish within their written plans an incident management system that defines roles and responsibilities for emergency responses. The incident management system outlines the management structure used during emergency responses and provides standard operating guidelines for each function to be performed there. To be useful for incidents of varying severity, the incident management system needs to be flexible. At the same time, departments should consistently follow their incident management systems to eliminate confusion at the scene. We found that about 77 percent of fire departments in larger communities had incident management systems in 1997 with written response plans describing their fire suppression duties. Similar data on incident management systems were not available for fire departments in smaller communities.

As part of advance preparations, fire departments should write standard operating guidelines for all operations they expect to perform. The guidelines provide a systematic and organized way of approaching specific tasks efficiently, and they help promote safety for fire personnel. According to our survey, about 86 percent of fire departments in larger communities and 55 percent of others had written standard operating guidelines for fire suppression in 1997. Standard guidelines for fire suppression should include guidelines for salvage, overhaul, and mop-up operations to ensure that fires are completely out and to minimize property damage.

Winnebago Fire Service

To prepare for the possibility of fires, the Winnebago Fire Service compiles information on building construction, on-site hazards, and fire protection systems for all businesses in the response area. Fire fighters tour commercial facilities after the fire department sends notice of upcoming visits to business owners. During the visits, fire fighters collect detailed information on numbers of employees by shift, the existence of fire plans, and the location of gas and electrical shut-offs; they also become familiar with building layouts.

For easy access to the preplan information, the department keeps copies on board its fire trucks. With the preplans, the fire department evaluates the adequacy of its fire fighting resources and improves fire fighters' awareness of potential safety hazards in particular buildings.

For determining fire causes and origins, fire departments should have a process for investigating fires and specific guidelines on when to contact the State Fire Marshal Division for assistance with investigations. To aid investigations, fire fighters need training on steps they should take to help preserve fire scenes. About 63 percent of all fire departments reported that in 1997 they instructed fire fighters in aspects of arson scenes and on how fire fighter actions affect the work of fire investigators.

Fire departments should undertake a routine maintenance program for all of their apparatus and equipment to ensure that they are operational when emergencies arise. Scheduled, routine maintenance of vehicles and regular testing of ladders, hoses, and other fire equipment are necessary to keep trucks and equipment in good operating condition. Eighty

percent of fire departments had preventive maintenance programs in place in 1997, according to our survey.

In addition to the Winnebago case listed above, the Brooklyn Park Fire Department is another of the fire departments we visited in this study that preplans for emergencies. The Duluth Fire Department represents an example of a strong fire investigation program. Both the Cotton Volunteer and White Bear Lake Fire Departments illustrate some of the benefits of setting standard operating guidelines for their emergency responses. The importance of preventive maintenance for apparatus is shown by the Alexandria and Gonvick fire departments.

CONCLUSION

Fire and other emergency services are largely decentralized functions provided primarily at the local level of government. Local fire departments determine the extent of their responsibilities, depending in part on specific hazards within response areas and on the resources available for planning, training, equipment, and personnel. Local fire departments, whether staffed by full-time members, paid on-call members, volunteers, or some combination, typically have multiple responsibilities in addition to fighting fires.

Our survey data from Minnesota fire departments showed that volunteer and paid on-call fire departments in larger communities generally performed well on many measures in 1997 and were very efficient on the basis of expenditures per capita within their response areas. At the same time, volunteer and paid on-call departments were less likely to offer the full array of services that most full-time and combination fire departments offered in 1997.

Based on laws, standards, and guidelines pertaining to fire services, we identified seven actions that are important for the successful management of fire services. In some cases, many fire departments are already engaged in these practices. For instance, most fire departments reported that they had adequate protective gear and self-contained breathing apparatus for their department members, items that are essential for fire fighter safety. High proportions of both full-time fire departments and those with volunteer or paid on-call members reported offering or requiring training on certain essential subjects. A majority of fire departments with volunteer or paid on-call members were taking steps to retain their members, as evidenced by their high retention rates over the past five years.

Along the same lines, many fire departments said they had in place preventive maintenance programs for their apparatus and regular testing of equipment. And most fire departments reported that they had some components of a public education program to inform the public about fire-safety measures.

At the same time, other actions important to effective and efficient fire services are not as widespread. As an example, many fire departments have not conducted fire-risk assessments in their localities or analyzed the balance between community needs and fire department resources, according to our survey data. Only about half of fire departments reported that they have apparatus-replacement plans.

While most of the fire departments in larger communities analyzed their performance following their responses to incidents, only about 38 percent reported that they evaluated their departments' effectiveness by setting goals and objectives and measured how well they met those goals. Similarly, nearly all fire departments participated in mutual aid, but far fewer used mutual aid associations to their fullest advantage, such as making joint purchases. Many fire departments have produced efficiencies by contracting with nearby jurisdictions for services or some components of service, but only a handful have consolidated operations.

Few fire departments had comprehensive public education programs on fire safety that: were tailored to the local fire risks and other hazards in the community; included smoke detector programs; had been produced in collaboration with school teachers and others; had materials available for businesses, community organizations, and in private residences; and were routinely evaluated for effectiveness. Although most of the full-time and combination fire departments were involved with fire-code related inspections, only about 43 percent of all the volunteer and on-call departments

inspected new or existing buildings for fire code compliance or were in communities where other local agencies did.

Most fire departments took steps to ensure they have competent, well trained fire fighters and to promote safe operations. Less than half, however, reported having personnel recruitment plans targeted at their personnel needs.

Effective and efficient fire services—from rescues to first responder activities to fire prevention—require tremendous advance planning and preparation. While nearly all of the fire departments in larger communities had prepared preincident plans for their fire risks, only about half of the volunteer or paid on-call departments in communities with less than 8,000 population had written emergency response plans in preparation for the possibility of fire outbreaks.

Finally, although it is important for fire fighters to follow department guidelines on preserving arson scenes for fire investigators, many volunteer and paid on-call departments did not train their fire fighters in this subject in 1997. Most full-time and combination fire departments reported that they instructed their fire fighters in aspects of arson scenes and how their actions affect the work of fire investigators, but only about 60 percent of volunteer or on-call departments did so.

We recommend that fire departments around Minnesota consider the seven actions we identified for effective and efficient operations. We encourage fire departments and local communities to adopt some of the practices that other fire departments have found to contribute to the successful prevention and management of fires and other emergencies.

Introduction

This report examines fire services in Minnesota. Over time, fire services have come to extend beyond "fire protection" to include other emergency services. In addition to fighting fires, many fire department members are also responsible for extricating victims from vehicle crashes, inspecting buildings for compliance with fire codes, providing medical services at emergency scenes, and responding to spills of hazardous materials, among other duties.

In this review we researched the operations, apparatus and equipment, and personnel of Minnesota's 790 local fire departments. Fire departments are typically run at the city or township level of government, although many fire departments serve areas that extend beyond a single municipal boundary line.[1] The great majority of departments operate with on-call or volunteer members, the latter of whom receive no hourly or per call compensation.

Our study looked at the overall structure and management of fire services but did not evaluate the individual actions of fire fighters at emergency incidents. For instance, although we identified the need for fire departments to develop incident management systems to determine in advance who has what responsibilities during an emergency, we did not examine how individual departments implemented their incident command once at the scene.

This review identifies best practices in delivering fire services.

At the project's start, we held a roundtable discussion to learn what local fire fighters, chiefs, fire marshals, state fire officials, legislators, local officials, fire prevention specialists, and others interested in fire services viewed as important issues. To define what actions are needed for successful fire services, we relied on guidelines developed and recommended by nationally recognized public safety organizations. We studied literature published by national groups, such as the National Fire Protection Association, as well as information from local organizations, such as the Minnesota State Fire Chiefs' Association. We also organized focus groups of fire fighters in four different regions of the state to gather feedback on the concepts we had identified as necessary for effective and efficient fire departments.

We toured several fire departments in different regions of the state, rode along on some emergency runs, observed different apparatus in action, and interviewed chiefs and fire fighters to better understand the nature of their work. To learn more details about specific fire departments, we surveyed an extensive sample of volunteer and on-call departments in

1 In addition, the Minnesota Department of Natural Resources has responsibility for preventing and extinguishing grass and forest fires in many areas around the state. See *Minn. Stat.* §88.10, subd. 1. The U.S. Forest Service, Bureau of Indian Affairs, and National Park Service have fire management responsibilities for land under their authority.

smaller communities and all of the departments in larger communities around Minnesota. After identifying effective and efficient departments—based on whether they met performance standards developed by fire organizations—we visited a small number to gather additional information on their particular practices.

Throughout the review we relied on the advice and expertise of a technical advisory panel established at the outset of the project. This 18-member panel, consisting of fire chiefs, fire fighters, fire marshals, a city manager, and representatives from the Minnesota Department of Public Safety, offered its professional input at various stages of our work. We also hired a retired fire officer to provide technical assistance. Appendix A lists the technical panel members and provides additional details on the methodology of this review.

This report has two chapters. In the first, we provide background information on how fire services are structured and financed in Minnesota as well as on the scope of fire department services. The chapter also explains the state's role in fire protection. Chapter 2 describes goals and actions for effective and efficient fire services and presents examples of Minnesota fire departments that use best practices in delivering their services.

Background

CHAPTER 1

People commonly associate fire departments with fire fighting. Most Minnesota fire departments, however, are involved in numerous emergency activities beyond suppressing fires. According to the State Fire Marshal Division in the Department of Public Safety, fire departments responded to nearly 147,000 calls in 1997, only 13 percent of which were for extinguishing fires.[1]

The breadth of duties performed by Minnesota fire departments includes serving as first responders in emergencies, providing emergency medical services at incidents and being licensed to transport victims to medical facilities, rescuing victims from incidents such as traffic accidents or mishaps on lakes and rivers, responding to spills of hazardous materials, inspecting buildings for fire hazards, preparing for the management of emergencies such as natural disasters, investigating the cause of fires, and educating children and other citizens about fire safety. Although not every department is involved with each of these activities, very few have limited their roles to fire suppression alone. According to a survey we conducted of Minnesota fire departments, about 98 percent offered other services in addition to fire fighting.

Fire departments also conduct rescues, offer emergency medical services, work on fire prevention, and manage hazardous materials spills.

Fire departments also vary in their organizational structure and staffing arrangements. We found that 92 percent of Minnesota fire departments in 1997 relied primarily on volunteers or paid on-call fire fighters. They were staffed largely by members who made their living in some occupation outside the fire department and either received no compensation for responding to incidents or were paid a stipend or on an hourly or per-call basis. The rest of Minnesota's departments were staffed by full-time career fire fighters or with a combination of full-time and volunteer or paid on-call members.

Regardless of their employment status, fire fighters perform essentially the same duties. They face a variety of occupational hazards due to their dangerous and unpredictable work environment. In 1997, 234 Minnesota fire fighters were injured on the job, according to the State Fire Marshal Division. This is a ratio of 0.5 fire fighter injuries for every 10,000 Minnesota citizens, as compared to 3.3 fire fighter injuries for every 10,000 residents across the country in 1996.[2] Two Minnesota fire fighters died in the line of duty in 1997, and none in the previous five years. Nationally, 57 volunteer and 37 full-time, career fire fighters died

1 Department of Public Safety, State Fire Marshal Division, *1997 Fire in Minnesota* (St. Paul, 1998), 3. The actual number of calls statewide may be somewhat higher because not every department regularly reports fire data to the State Fire Marshal. For 1997, about 88 percent of departments reported.

2 John R. Hall, *The U.S. Fire Problem Overview Report: Leading Causes and Other Patterns and Trends* (Quincy, Mass.: National Fire Protection Association, 1998), 2.

while on duty in 1997, for a total of 466 fire fighter on-duty fatalities from 1993 through 1997.[3]

Local expenditures on fire protection were $39 per capita in Minnesota compared to $65 per capita across the country during fiscal year 1995, the most recent year that comparable data were available.[4] Minnesota's per capita spending on fire services that year ranked 39th out of the 50 states and Washington D.C.[5]

Fire departments differ in their reliance on state resources. Some, for instance, rely heavily on the State Fire Marshal Division in conducting fire investigations; others conduct their own investigations. Local departments also vary in their involvement and coordination with other local agencies, such as local water utilities or building inspection agencies.

This chapter presents background information on the current structure, financing, and scope of fire services in Minnesota. In the chapter we ask the following questions:

- **How is the delivery of fire services structured?**
- **How are fire department services financed?**
- **What services do fire departments in Minnesota provide and how do they vary within the state?**
- **What is the state role in fire services?**

To answer these questions we relied in part on information gathered through a survey we conducted of an extensive sample of fire departments in Minnesota.[6] Most of the data we present in this report come from our survey, but not every fire department responded to the survey; all fire departments we surveyed are listed in Appendix A, along with the results of surveys from those who replied in time for our analysis. We also collected information by visiting and interviewing fire department personnel and others in the emergency response field. In addition, we used information published by a variety of associations and agencies within the fire and public safety industries.

THE STRUCTURE OF FIRE SERVICES IN MINNESOTA

Fire services in the public sector are largely local government functions. Minnesota had 790 fire departments in 1997, according to the State Fire Marshal.

More than 90 percent of fire departments were organized as municipal fire departments in 1997, that is, they were a department of a city, township, or group of municipalities, according to our survey. Nearly 70 percent of these departments provided fire-related services to nearby communities on a contract basis. About 7 percent of Minnesota fire departments indicated they were organized as private, nonprofit corporations. These departments also contract with local communities to provide fire services. They are typically run by boards of directors with membership prescribed in their bylaws.

3 Federal Emergency Management Agency (FEMA), *Firefighter Fatalities in the United States in 1997* (Washington D.C.: FEMA, 1998), 7-8.

4 U.S. Census Bureau, "State and Local Government Finances by Level of Government: 1994-1995," WWW document, URL: http://www.census.gov/govs/estimate/95stlus.txt, (February 1999).

5 Minnesota Taxpayers Association, *How Does Minnesota Compare? Fiscal Year 1995 Comparisons* (St. Paul: Minnesota Taxpayers Association, September 1998), 28.

6 We conducted two simultaneous surveys, one of all fire departments in larger communities, which we defined as those with 8,000 or larger populations. Eighty-eight departments responded to this survey, for an 87 percent response rate. The second survey was shorter to reduce the time burden of completing it for volunteer chiefs of departments in smaller communities. We sent this survey to 454 of the 689 fire departments in communities with fewer than 8,000 residents. We received 307 surveys returned in time for analysis, for a 68 percent response rate. Additional details on our methodology are available in Appendix A.

In a few areas, townships have organized special fire protection districts. These districts consist of contiguous property, at least 25 percent of which is classified as homestead property or other buildings or structures.[7] Property owners in these districts pay a special property tax rate with a levy specifically for fire services. Only slightly more than 1 percent of fire departments reported that they were part of such a fire protection district in 1997.

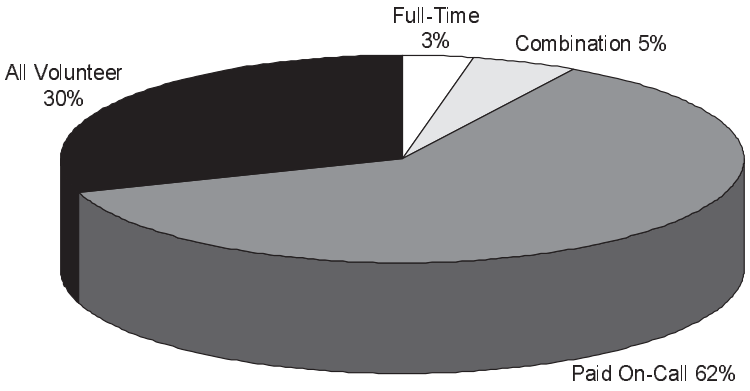
Fire Department Staffing Arrangements

Fire departments are staffed primarily in one of four ways: (1) with volunteer members; (2) with paid, on-call personnel; (3) with a combination of full-time staff and volunteer or paid on-call staff, known as "combination departments"; or (4) with exclusively full-time paid staff. As shown in Figure 1.1:

- **Most fire departments in Minnesota during 1997 used volunteer or paid on-call members.**

Some of these used entirely unpaid staff. About 30 percent of all Minnesota fire departments in 1997 had members that received no compensation for responding to emergencies, although they may have been eligible for retirement pensions. A larger proportion, approximately 62 percent, employed fire fighters who received compensation for their services either on a per call or per hour basis, or in the form of a stipend.[8] This group includes fire departments who employed up to five full-time members but relied primarily on volunteers or on-call fire fighters. About 5 percent of Minnesota fire departments in 1997 used at least six full-time members along with paid on-call or volunteer fire fighters (which we defined as "combination" departments) while slightly more than 3 percent had entirely full-time personnel.

Figure 1.1: Fire Departments by Type of Staffing, 1997



NOTE: Combination departments include those with at least six full-time members. Some on-call departments also have volunteer members.

SOURCE: Legislative Auditor's Office Survey of Fire Departments, 1998.

By comparison, approximately 6 percent of all fire departments in the United States in 1997 were staffed entirely with career fire fighters, and about 73 percent relied on volunteer or on-call members. The remaining 21 percent of U. S. departments used a mix of career and volunteer or on-call fire fighters.[9]

Throughout this report, when we compare fire departments we group those employing five or fewer full-time fire fighters together with volunteer and paid on-call departments, not with combination departments. We do this because departments with such a small number of full-time members would not be likely to operate on

7 *Minn. Stat.* §368.85, subd. 1.

8 Nearly 70 percent of the volunteer or on-call departments had fire chiefs who received compensation in 1997, although most of these chiefs were not full-time and did not earn full-time pay.

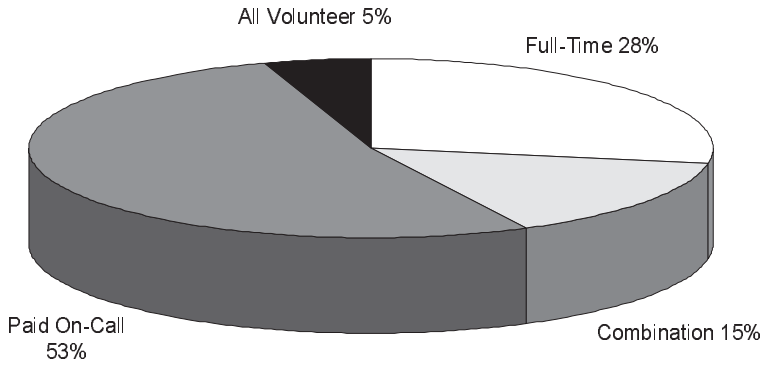
9 Nancy Schwartz, research assistant, National Fire Protection Association, interview by author, Telephone conversation, St. Paul, Minnesota, March 2, 1999.

an around-the-clock basis, and therefore, are not as comparable to combination departments.

When comparing the shares of population served in the primary response areas of the different types of departments, a somewhat different picture emerges, as shown in Figure 1.2. Although volunteer and paid on-call departments still served many citizens,

- **Fire departments with all volunteers served about 5 percent of Minnesota's population in 1997 and paid on-call departments served about 53 percent. Combination departments served about 15 percent and full-time departments about 28 percent of the state's residents.**

Figure 1.2: Percentage of Minnesota Population Served by Type of Fire Department, 1997



NOTE: Combination departments include those with at least six full-time fire fighters. Percentages do not add to 100 due to rounding.

SOURCE: Legislative Auditor's Office Survey of Fire Departments, 1998.

Community Characteristics by Department Type

Full-time fire departments in Minnesota are typically found in areas with large populations, high densities, and older buildings. In 1997, 11 full-time departments operated in response areas that generally held the largest populations, with a median population of 34,470; all but two full-time departments were in cities above the 95th percentile of Minnesota city populations.[10] By contrast, combination departments had response areas with a median 25,305 residents and the response areas for volunteer or on-call departments had a median 1,990 residents in 1997.

Full-time fire departments served densely concentrated populations, with a median 3,061 people per square mile within their primary response areas. This compares to median densities of 453 people per square mile for combination departments and 29 for volunteer or on-call departments. In addition, the full-time fire departments and volunteer or on-call departments were mostly located in cities with older housing units. About 73 percent of the full-time departments were in cities where the median housing units were built before 1965, whereas only 47 percent of combination departments were in communities with similar aged housing, and about 70 percent of the volunteer or on-call departments were in such communities.

Full-time and combination departments were fairly evenly divided between those located in the Twin Cities metropolitan area and those outside it. The volunteer or on-call departments, on the other hand, were predominantly outside the Twin Cities area, with 85 percent located in greater Minnesota.

Selecting Officers

The process for promoting officers within fire departments varies. We learned that unlike the managers for many local government services, fire chiefs in some departments are elected by department membership, in accordance with the department's bylaws. In other fire departments, chiefs are appointed by the mayor or local

10 Using 1997 population estimates, the 95th percentile included cities with at least 18,877 residents. Full-time departments also operate at the Minneapolis/St. Paul International Airport and at the Rochester Airport; they are not included in this comparison.

governing body. Appointments in some cases are based on qualifying examinations to help determine the candidates' skills, knowledge, and abilities. Data are not available on how many fire departments elect their fire chiefs as opposed to having them appointed.

Reliance on Mutual Aid

The fire service in Minnesota and elsewhere has a long history of participating in what is known as "mutual aid." Essentially, fire department members of mutual aid associations respond free of charge to requests for assistance at emergencies and other events occurring outside their primary response area. If an emergency requires resources, personnel, or expertise that is beyond the scope of a particular department, the department may request aid from other departments belonging to the association. From our survey we found that:

- **Virtually all Minnesota fire departments had mutual aid agreements for some components of their fire services.**

Because of the widespread use of mutual aid, individual fire departments do not have to hire the number of fire fighters or purchase the amount of equipment they would need to handle infrequent, large-scale emergencies. Of the fire departments with mutual aid agreements in 1997, 98 percent covered fire suppression in their mutual aid, about 57 percent included first responder services, and 51 percent included rescues. Beyond providing and receiving services, some departments use mutual aid associations for gaining efficiency in training personnel or making joint purchases. Three-quarters of Minnesota fire departments participating in mutual aid reported using it for cooperative drills and exercises, and 59 percent for using specialized equipment or apparatus (apparatus refers to fire department vehicles including pumpers, tankers, or ladder trucks).

Mutual aid produces efficiencies.

Some departments participate in "automatic aid," whereby members from multiple departments will automatically respond to incidents occurring in a predetermined area within a neighboring jurisdiction or within a given time frame. For instance, two neighboring departments might have automatic aid for any incident occurring within a predetermined distance of the boundary line separating two departments' jurisdictions. Or automatic aid may be given based on the time of day or day of the week; when one department's personnel resources are usually lower, for instance during daytime hours, another department may automatically respond, and the first department would reciprocate during nighttime hours.

Private Sector Roles in Fire-Related Services

Although public fire departments may represent one of the most visible components of fire protection, several important fire-related services exist independent of fire departments. Often, local fire departments that work on fire prevention complement these private sector efforts.

Privately-Purchased Fire Protection Systems

Home smoke detectors and security systems are a growing segment of private sector fire protection. For instance, as of 1993 in Minnesota, state law has required the installation of smoke detectors in all dwellings in the state intended to be occupied for living purposes.[11] Nationwide, it has been estimated that 95 percent of American households now have smoke detectors (although many may not be in working order) and 20 percent have monitored electronic security systems.[12] Realizing the value

11 *Minn. Laws* (1993), ch. 329, subd. 1. (b) and *Minn. Stat.* §299F.362.

12 National Burglar & Fire Alarm Association, Inc., "Facts and Stats About the Electronic Security Industry," WWW document, URL: http://www.alarm.org/consumer/quick.htm (March 1, 1999); Joe Freeman, CEO, J. P. Freeman Co., Inc., interview by author, Telephone conversation, St. Paul, Minnesota, January 20, 1999. The J. P. Freeman Co., Inc. specializes in electronic security and home and commercial automation and was referred by materials from the National Burglar and Fire Alarm Association.

of smoke detectors in alerting people to fires, fire departments often participate in smoke detector programs for privately owned buildings. According to our survey:

- **About 44 percent of fire departments have smoke detector programs to assist homeowners and others with the acquisition and installation of smoke detectors.**

Automatic sprinkler systems have been demonstrated to reduce the extent of damage and spread of fires because they act at the early stage of fires, according to the National Fire Protection Association.[13] Further, the association has concluded that in most cases sprinkler system activation causes much less water damage than when sprinklers are not present and fire departments extinguish fires. Some studies have indicated that the installation of sprinkler systems reduces insurance premiums for building owners (particularly of commercial buildings), and widespread sprinkler installation may help control the growth of public expenditures for fire stations, equipment, and personnel.[14]

In Minnesota and around the country, automatic fire extinguishing systems have been installed primarily in commercial, industrial, educational, and public assembly buildings. The *Minnesota Uniform Fire Code* requires the installation of automatic sprinkler systems during the construction of structures that meet certain size and occupancy thresholds and that are not dwellings, lodging houses, family day care, certain supervised living facilities, private garages, carports, or agricultural buildings.[15] Because many buildings were built prior to the fire code, however, many commercial buildings do not have sprinkler systems. About 27 percent of the larger fire departments we surveyed reported having full automatic sprinkler coverage in high percentages of their high-hazard occupancies, such as repair garages with open flames or welding, in 1997. Of the larger departments that could estimate percentages of homes that are sprinklered, 90 percent said that less than 5 percent of the single- and two-family homes, family day care facilities, and supervised living facilities in their service areas had sprinklers.

Larger and Smaller Fire Departments

Larger Fire Departments

Throughout this report, references to "larger" fire departments include: (1) volunteer and paid on-call departments in communities of 8,000 or more, (2) all departments with full-time personnel, and (3) departments with a combination of at least six full-time and other personnel.

We sent to these departments our full survey. Included in the group are three fire departments in cities under 8,000 population that received our full survey because preliminary data indicated they were combination departments; according to our survey results, they are actually paid on-call departments.

Smaller Fire Departments

The "smaller" fire departments are volunteer and paid on-call departments in communities of under 8,000 population.

Some data are not available for smaller departments because we mailed shorter surveys to the small volunteer or paid on-call departments, and therefore, collected less information from them. Appendix A contains details on the methodology of our survey.

Private Sector Fire Investigators and Fire Prevention Specialists

Property insurance companies employ fire investigators who investigate fire causes to verify and substantiate fire insurance claims. The investigators conduct their investigations independent of the fire marshal whose job it is to determine the cause and origin of fires and report on fires of unknown origin. Some insurance companies also employ prevention specialists who

13 Arthur E. Cote, ed., *Fire Protection Handbook*, 18th ed. (Quincy, Mass.: National Fire Protection Association, 1997), sec. 6-139.

14 U.S. Fire Administration, "The Major Conclusions For Experience with Sprinklers," October 1997, WWW document, URL http://www.usfa.fema.gov/safety/sprinkler.htm (August 5, 1998); Jim Ford, *Automatic Sprinklers A 10 Year Study* (Scottsdale, AZ: Rural/Metro Fire Department, 1997), 16-17, 20.

15 International Fire Code Institute, *1997 Uniform Fire Code Volume 1*, (Whittier, CA: International Fire Code Institute, 1997), part 3, art. 10, sec. 1003.2.2; *Minn. Rules*, ch. 7510.3530, art. 2, subp. 8. "Dwellings" mean single-family residences and congregate residences (such as a convent or dormitory) of 10 or fewer persons.

work with large insured parties, such as a county, to identify ways to reduce the insured party's exposure to risks including the risks of fire. The main purpose behind these specialists is to control losses by taking steps to reduce fire and other hazards and prevent the outbreak of fires. Often the specialists will conduct a risk assessment before writing an account for a client, and may recommend property protection systems. They typically view themselves as working in partnership with local fire departments.

Insurance Services Office, Inc.

As a service to insurance companies that determine fire insurance premiums, the Insurance Services Office, Inc. (ISO), a nonprofit organization, evaluates communities' abilities to suppress fires. The ISO produces a classification of properties based on their loss potential in the event of a fire. This classification (a ranking of 1 to 10 based on numerous factors within the community) is one variable among many that insurance companies may use in setting premiums. Large commercial structures within a city may have their own individual ISO classification; other smaller properties and residential structures, on the other hand, are rated as a group. In 1998, the ISO began a process of updating its fire suppression information, such as district boundaries and automatic aid agreements, for determining classifications. It is also developing a process to grade communities' building-code enforcement with the prospect of favorable insurance pricing for areas with strong support for enforcing building codes.

The ISO classification does not account for fire prevention efforts. It ordinarily includes an assessment of the community's water supply, fire department features and practices, and fire alarm system.

Fire Brigades and Safety Teams

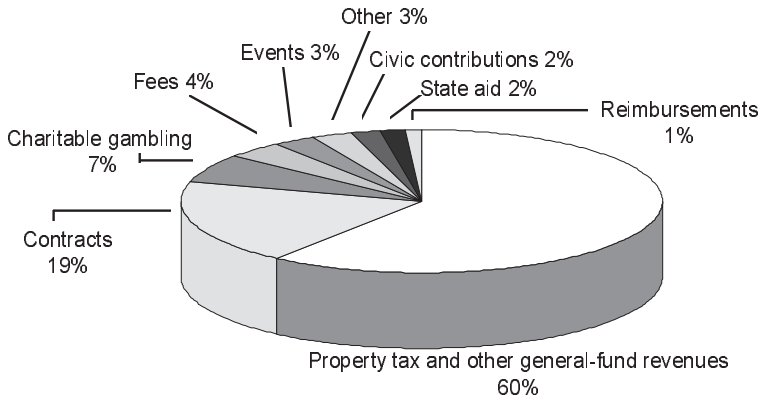
Some commercial enterprises employ their own fire fighters, known as fire brigades, due to the high-risk nature of their business. Oil refineries are an example of industries likely to have fire brigades with their own fire stations, trucks, and equipment. Other businesses, such as those storing or manufacturing certain chemicals, may not have fire brigades but may have safety teams. These are employees trained and equipped to diagnose fire or other emergency risks and administer first aid when necessary. Although we recognize that certain companies use fire brigades and safety teams, we did not include them in this review of local fire departments.

FINANCING FIRE DEPARTMENT SERVICES

Revenues for Operating Expenses

Most Minnesota fire departments rely heavily on property tax revenues and other general-fund revenues for their operating expenses but also supplement them with revenues from other sources. Figure 1.3 shows the average percentage of various revenue sources received by fire departments in 1997. Our survey indicated that:

Figure 1.3: Fire Department Average Revenue Sources, 1997

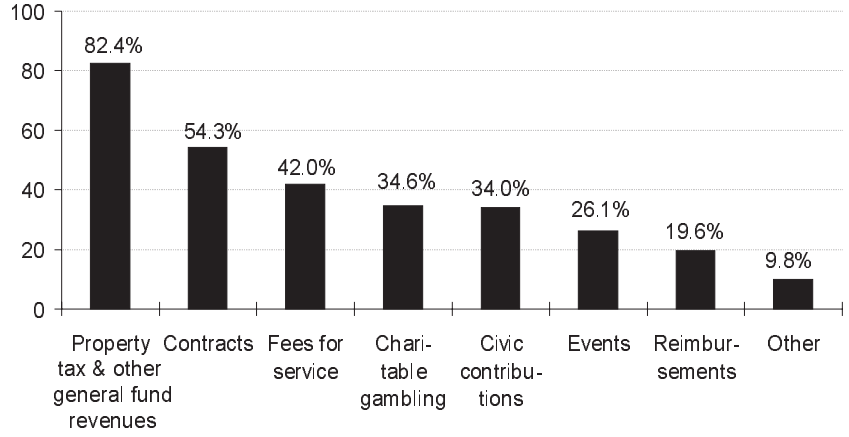


SOURCE: Legislative Auditor's Office Survey of Fire Departments, 1998.

- **Eighty-two percent of fire departments relied on property taxes and other general-fund revenues for at least some of their revenues in 1997.**

About 66 percent relied on property taxes and other general-fund revenues for half or more of their operating revenues. As explained below, many fire departments also received revenues from contracts for services they provided in 1997. Figure 1.4 illustrates how many fire departments relied on specific types of revenues that year.

Figure 1.4: Percentage of Fire Departments Receiving Revenue from Various Sources, 1997



SOURCE: Legislative Auditor's Office Survey of Fire Departments, 1998.

Approximately 42 percent of departments received revenue from fees they charged for providing certain services in 1997. Among those departments charging fees, a higher share of the full-time departments had fee revenue in 1997 than did combination or volunteer and paid on-call departments. We learned that one common activity for which fire departments charged fees was responding to repeat false alarms at a given location; after three or four false alarms, departments send invoices for additional responses to false alarms. Figure 1.5 shows other circumstances under which fire departments charged fees.

Townships have explicit authority to impose service charges for fire or rescue services they provide.[16] Townships may collect unpaid charges against the property owners' property at the time property taxes are levied. The authority extends to cities by virtue of statutes that confer certain township powers to cities.[17]

Some departments supplement their tax and fee revenues with other sources of funds. In 1997, more than half of all fire departments received revenues from contracts to provide services; 35 percent of departments, most of which were volunteer or paid on-call departments, received proceeds from charitable gambling; 34 percent of all fire departments received revenues in the form of contributions from civic organizations, such as Lions Clubs; and 26 percent from events, such as charitable balls or sporting events. About a fifth of all departments also received in-kind donations, such as defibrillators donated by a local group.

The state of Minnesota provides two sources of aid for fire-related purposes: fire state aid and amortization aid. We briefly describe these two aid programs later in this chapter where we discuss the state's role in fire services. Revenues from these state aids are primarily used for fire fighter pensions.[18]

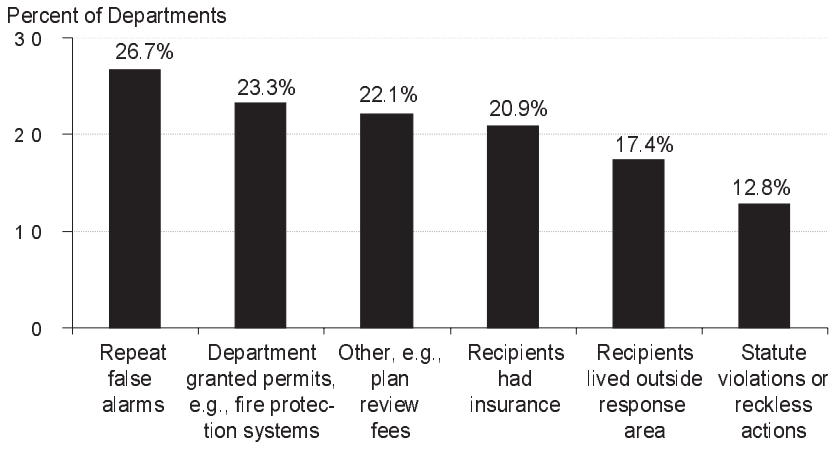
The fire departments that operate at the Minneapolis/St. Paul International Airport and at the Rochester Airport receive other types of

16 Minn. Stat. §366.011.

17 Minn. Stat. §415.01.

18 The management of fire fighter pensions is not considered in this report.

Figure 1.5: Circumstances Under Which Larger Fire Departments Charged Fees, 1997



NOTE: Data collected from volunteer or on-call fire departments in cities with more than 8,000 population and from full-time and combination departments.

SOURCE: Legislative Auditor's Office Survey of Fire Departments, 1998.

financing. Airport user fees paid by flyers at Minneapolis/St. Paul International finance that fire department's operations and apparatus. At the Rochester Airport, the fire department is part of a private, for-profit operation financed through earned revenues.

Operating Expenditures

In 1997, the median level of operating expenditures for fire departments was about $17 per capita, according to our survey data.[19] (Calculations include the populations of all communities within each department's primary response area.) The range was large, as may be expected. Median operating expenditures ranged from a low of about $16 per capita in volunteer or on-call departments to about $76 per capita in full-time departments. Differences in operating expenditures per capita result largely from the type of staffing in the department and from differences in the range of services departments provide, as discussed later in this chapter.

Revenues for Capital Expenses

Fire fighting requires the use of ladder trucks, pumpers, and other apparatus that can cost in the hundreds of thousands of dollars when purchased new. As with operating expenses, most departments finance capital purchases with property tax revenues. Some cities sell bonds to raise the capital funds they need when purchasing apparatus and financing the construction of major facilities, such as fire stations. In contrast to most other locally provided services where vehicles and equipment are purchased largely with revenues raised by local governments, many fire departments use revenues from civic organizations to defray the costs of their capital purchases. According to our survey,

- **Many volunteer and paid on-call fire departments rely on other sources outside the public sector to finance their purchases of fire department apparatus.**

More than 49 percent of all fire departments reported that they used some contributions from civic organizations or charitable gambling proceeds toward the purchase of apparatus during the last 10 years; all but 4 of those departments were volunteer or paid on-call departments. Four percent of fire departments received apparatus in exchange for fire services they provided by contract; again, all were volunteer or paid on-call departments.

According to our survey, fire departments estimated that they spent a median $57 per capita on capital expenditures for apparatus over the ten years between 1987 and 1997 (unadjusted for inflation). Estimates ranged from spending nothing on capital purchases in that time period to spending $488 per capita. The median capital expenditures were

19 Per capita data are based on population estimates provided by the State Demographer's Office; they do not account for shifts in population that communities may encounter due to the influx of daily commuters or seasonal variations caused by tourists or students.

higher for volunteer and paid on-call departments at $64 per capita over ten years than for full-time and combination departments at $22 and $26 per capita, respectively. Because many of the volunteer and paid on-call fire departments are located in communities with relatively small populations, their capital costs are spread over a smaller base of people.

SERVICES PROVIDED BY FIRE DEPARTMENTS

Because each fire department decides its own level of service based on its community's needs and resources, the type and level of service varies from department to department around the state. State statutes require that departments ensure the investigation of fire causes and origins and report the results of their investigations to the State Fire Marshal.[20] The scope of other fire department activities is a matter of local discretion.

Fire Suppression

All active fire departments suppress fires, although no statute requires them to do so. Around the state, fire departments that reported data to the State Fire Marshal responded to more than 19,300 fires in 1997, 5 percent less than the previous year.[21] About a third of the reported 1997 fires were in buildings, a quarter were vehicle fires, and the remaining 42 percent were other types such as wildland fires and dumpster fires.[22] Over the past five years, the number of reported fires remained fairly steady, increasing less than 3 percent, while other types of reported incidents increased more than 44 percent.[23]

Of the fires occurring in structures in 1997, 63 percent were in residential properties. Fires in residential buildings were most often caused by unattended cooking and by heating-related causes.[24] Two-thirds of the 54 civilians who died in fires in 1997 perished in residential buildings.[25] Over time, more civilian fire deaths per capita have occurred in rural Minnesota than in the seven-county Twin Cities metropolitan area. Conversely, the rate of incendiary fires is higher in the Twin Cities region: In 1997, the metropolitan area experienced 5.5 incendiary fires per 10,000 residents compared to 4.5 outside the Twin Cities area.[26] For fires in all buildings in 1997, the three primary causes of fires with known causes were heating, cooking, and incendiary, according to State Fire Marshal data.

According to our survey data, for every one response fire departments made to suppress fires in 1997, they made almost seven responses for other types of services, such as for rescues, emergency medical services, and hazardous materials spills. Fire departments in the Twin Cities area spent a median 39 percent of their person-hours involving responses in 1997 on fire suppression compared to 62 percent of person-hours by fire departments outside the Twin Cities. This means that metropolitan area fire fighters spent a larger share than fire fighters elsewhere of their response time on responses such as rescues, first responder services, investigations, and fire prevention.

Fire Prevention

Fire prevention often receives less attention.

Although fire prevention activities are widely acknowledged to be significant forces in reducing fire losses and fire-related injuries and deaths, many departments' fire suppression functions have largely overshadowed them. Many European countries and Japan place stronger emphases on fire prevention

20 *Minn. Stat.* §299F.04, subd. 1-3.

21 State Fire Marshal, *1997 Fire in Minnesota*, 3. Wildland fires managed exclusively by the Department of Natural Resources' Forestry Division are not included in this count.

22 State Fire Marshal, *1997 Fire in Minnesota*, 3.

23 State Fire Marshal, *1997 Fire in Minnesota*, 4.

24 State Fire Marshal, *1997 Fire in Minnesota*, 10, 16.

25 State Fire Marshal, *1997 Fire in Minnesota*, 31.

26 State Fire Marshal, *1997 Fire in Minnesota*, 25.

and have had lower numbers of fire incidents than the U.S., as well as lower rates of fire fighter and civilian fire deaths and injuries.[27] Although the average fire death rate across our country dropped significantly between 1979 and 1992, the U.S. still had one of the highest per capita fire death rates when compared to similar nations.[28] The high death rate is attributed in part to fewer resources committed to fire prevention activities.

While some Minnesota fire departments have strong fire prevention efforts, we found that fire suppression generally takes precedence over fire prevention. For instance, according to our survey:

- **For every 1 person-hour spent on public education and fire code enforcement in 1997, Minnesota fire departments spent 2.7 person hours on fire suppression.**

As Table 1.1 shows, the disparity in this ratio is larger outside the Twin Cities metropolitan area and for volunteer and paid on-call departments.

Public Education

Many departments recognize the need to provide public education to help prevent fires, mitigate those that start, and reduce personal injuries from fire. We found that:

- **More than 90 percent of fire departments indicated they had a public education program, although the extent of the programs varied widely.**

Table 1.2 shows the percentages of fire departments that had various elements in their fire-safety public education efforts in 1997.

The number of people affected by the larger fire departments' public education programs also varied. About 13 percent of the larger fire departments that offered fire safety education estimated that at least 75 percent of their population received public education materials in 1997. Approximately a third estimated that at least half of their populations received their fire-safety messages. Similar data are not available for fire departments in smaller jurisdictions.

Intervention Programs for Juvenile Fire-Setting

The sources of many incendiary fires have been traced to juveniles playing with fire, either out of curiosity or maliciousness. In 1997 more than 550 fires around the state, about 3 percent of all fires, involved children playing with fire; high percentages of juveniles who set fires once will do so again, lacking proper intervention.[29] Across the country, juveniles accounted for a higher share of arson arrests in the mid-1990s than a decade earlier.[30] Intervention programs are designed to identify children who have set fires in the

Table 1.1: Time Spent on Fire Prevention vs. Fire Suppression, by Type of Fire Department, 1997

Ratio of Person-Hours on Fire Prevention to Person-Hours on Fire Suppression

All Fire Departments (*N*=187)	Metropolitan Departments (*N*=36)	Rural Departments (*N*=151)	Full-Time (*N*=5)	Combination (*N*=6)	Volunteer or Paid On-Call (*N*=176)
1:2.7	1:1.5	1:5.4	1:0.5	1:3.5	1:3.1

NOTE: "*N*" refers to the number of fire departments responding to particular survey questions; not all respondents answered each question.

SOURCE: Legislative Auditor's Office Survey of Fire Departments, 1998.

27 Federal Emergency Management Agency (FEMA), *Fire in the United States 1985-1994*, ninth ed. (Washington D.C.: U.S. Fire Administration, National Fire Data Center, 1997), 179-183; Philip S. Schaenman, *International Concepts in Fire Protection* (Arlington, VA: TriData, 1982), 91-93.

28 FEMA, *Fire in the United States*, 180.

29 State Fire Marshal, *1997 Fire in Minnesota*, 4, 79.

30 John R. Hall, Jr., "Use of Fire Incident Data and Statistics," *Fire Protection Handbook*, 18th ed. (Quincy, MA: National Fire Protection Association, 1997), 11-23.

Table 1.2: Elements in Fire Departments' Public Education Programs, 1997

Element	All Fire Departments (*N*=387)
Participation in Fire Prevention Week	80.9%
Collaboration with school administrators and teachers	72.9
Use of public education materials and programs such as *Learn Not to Burn* and fire-safe demonstration houses	54.0
Use of media and community organizations to deliver fire-safety messages	52.5
Smoke detector program	44.2
Identification of local fire risks and targeting of information accordingly	39.0
Availability of fire education materials for use by citizens and civic groups	30.5
Availability of materials in languages spoken within community	20.7
Designation of qualified fire-safety public education officer	17.1
Routine monitoring of program's effectiveness	11.6
Program of fire-safety surveys in residences	10.1
Other	4.9

SOURCE: Legislative Auditor's Office Survey of Fire Departments, 1998.

past and prevent them from setting fires again. We found that:

- **About 51 percent of larger fire departments had established juvenile fire-setter intervention programs, and another 8 percent had them under development in 1997.**

About 74 percent of combination departments had such intervention programs; about 46 percent of full-time and 44 percent of larger volunteer or paid on-call departments also had them. Similar data are not available for departments in smaller jurisdictions.

Following a 1997 recommendation of the Attorney General's Arson Task Force and a subsequent legislative appropriation, the State Fire Marshal Division implemented a Juvenile Firesetter Intervention program in 1998 (described briefly later in this chapter).[31] The program has the potential to benefit fire departments around the state.

Fire-Code Inspections and Plan Reviews

Another component of fire prevention is inspecting buildings for compliance with the fire code. Minnesota's fire code, based largely on the *Uniform Fire Code* provisions promulgated by the International Conference of Building Officials and the Western Fire Chiefs Association, provides standards on fire safety for the construction and use of buildings.

The *Minnesota Uniform Fire Cod*e applies statewide and local fire chiefs and fire marshals have authority to enforce it, with the exception of specific types of buildings for which the State Fire Marshal has enforcement authority.[32] We found that:

- **Slightly more than half of fire departments reported that they or other local agencies conducted fire-code related inspections in 1997.**

Forty-three percent of the fire departments in 1997 inspected buildings for fire code enforcement or had their fire marshal do so. In another 13 percent of the departments, fire-code related inspections were conducted only by a county, city, or some other local agency not part of the fire department. For 44 percent of the departments, no local agency conducted fire-code related inspections.

31 Office of Minnesota Attorney General Hubert H. Humphrey III, *Report of the Attorney General's Arson Task Force* (St. Paul: February 1997), 22; *Minn. Laws* (1997), ch. 239, art. 1, sec. 7, subd. 4., (11) and art. 8, sec. 21.

32 *Minn. Stat.* §299F.011, subd. 4; International Fire Code Institute, *1997 Uniform Fire Code Volume 1,* part 1, art. 1, sec. 103.2.1.1.

We found that:

- **Fire code inspections were more likely in cities that have full-time or combination departments than in those with volunteer or paid on-call departments.**

All but two of the full-time and combination departments that answered our survey inspected buildings for fire-code compliance; by contrast, only 37 percent of the volunteer and paid on-call departments did so.

Some cities have adopted the *Minnesota Uniform Fire Code* to amend the code in ways that address local fire safety concerns. Local regulations can be more restrictive than the *Uniform Fire Code* but they must: (1) be directly related to fire or life safety; (2) be uniform for each class of buildings or hazard covered; and (3) not exceed the requirements of the *State Building Code*.[33]

The Uniform Fire Code applies statewide and is enforced locally.

The *State Building Code* applies to new construction and remodeling in those Minnesota cities or counties that have adopted the code. (Unlike the *Minnesota Uniform Fire Code*, the *State Building Code* does not apply statewide). Although parts of the state fire code are adopted by reference in the *State Building Code* or appear in both codes, other parts are not. For instance, both building and fire codes set requirements for fire-resistant materials and construction, yet only the fire code specifies fire department access to buildings and water supply. Further, building inspectors can grant variances, or equivalencies, from the *State Building Code*.

Therefore, fire personnel involvement in the early stages of building construction, such as in reviewing construction plans for compliance with the overlapping portions of the fire code, helps ensure that fire-safety criteria are considered before the building inspector grants a certificate-of-occupancy to the owner. A 1999 report from the Legislative Auditor's Office recommended that both building and fire officials be involved throughout the code enforcement process and that they give mutual approval on proposed equivalencies regarding the overlapping portions of the codes.[34]

About 98 percent of the larger communities had fire code inspections conducted by the fire department or another local agency in 1997. In our study, we found that:

- **About 90 percent of larger communities where fire departments or other local personnel were involved with fire code inspections had personnel participating in plan reviews for new building construction; 74 percent had them in certificate-of-occupancy processes.**

Similar data are not available for fire departments in smaller communities. Table 1.3 shows the level of fire department participation in plan reviews and certificate-of-occupancy by type of department.

Some fire departments rely at least in part on self-inspection of buildings by the building owner or manager to ascertain fire-code compliance. In these cases, fire departments require documentation of such inspections in lieu of conducting the inspections themselves. About 79 percent of fire departments in larger communities indicated that they requested documentation of code compliance in 1997. Most of these requests were made of certain types of buildings that represented less than half of the buildings subject to local inspection for fire code compliance.

Fire Investigations

State statutes require all fire chiefs to investigate, or cause to be investigated, the cause, origin, and circumstances of each fire in the jurisdiction when

33 *Minn. Stat.* §299F.011, subd. 4.

34 Minnesota Legislative Auditor's Office, *State Building Code* (St. Paul, 1999), 59-60.

Table 1.3: Fire Code Activity by Fire Departments or Fire Marshals in Larger Cities, 1997

	Full-Time Departments (*N*=12)	Combination Departments (*N*=18)	Volunteer or Paid On-Call Departments (*N*=46)
Conducted plan reviews	91.7%	94.4%	87.0%
Participated in certificate-of-occupancy process	75.0	77.8	71.7

NOTE: Data collected from volunteer or paid on-call fire departments in cities of 8,000 or more population and departments with full-time or combination personnel.

SOURCE: Legislative Auditor's Office Survey of Fire Departments, 1998.

damage exceeds $100.[35] Further, investigators must report investigation results within a week to the State Fire Marshal Division.[36]

Some fire departments conduct their own fire investigations, others rely on their local police or sheriff departments, and still others rely on the State Fire Marshal Division for this function. Some departments rely on outside investigative help only for very large or complex fires. Even when fire departments contact the State Fire Marshal Division, however, the local fire chief remains responsible for overseeing the investigation through to its conclusion. Table 1.4 shows that:

- **Fire departments in smaller jurisdictions and volunteer or paid on-call departments were more likely than others to have relied on the State Fire Marshal Division for investigations in 1997.**

Table 1.4 also shows that full-time fire departments were slightly more likely than other types of departments to rely frequently on local law enforcement for investigations.

Emergency Medical Services

Many fire departments of all types, whether staffed by full-time, paid on-call, or volunteer members, provide some level of emergency medical services (EMS). Fire departments became involved in EMS over time for several reasons: Their emergency training was a natural precursor to providing emergency medical help, cross-training fire fighters to assume EMS duties increased their productivity,

Table 1.4: Fire Departments that Relied on State Fire Marshal or Law Enforcement for Investigations, 1997

	Relied Frequently on State Fire Marshal or Law Enforcement			Relied Heavily on State Fire Marshal
	Full-Time Departments	Combination Departments	Volunteer or Paid On-Call Departments in Larger Communities	Volunteer or Paid On-Call Departments in Smaller Communities
State Fire Marshal	7.7% (*N*=13)	15.8% (*N*=19)	29.6% (*N*=54)	63.7% (*N*=289)
Law Enforcement	46.2 (*N*=13)	31.6 (*N*=19)	26.4 (*N*=53)	

NOTE: Fire departments not represented above relied sometimes or rarely (if at all) on the State Fire Marshal or law enforcement for investigations.

SOURCE: Legislative Auditor's Office Survey of Fire Departments, 1998.

35 Minn. Stat. §299F.04, subd. 1.

36 Minn. Stat. §299F.04, subd. 3.

and fire stations were often located in places that allowed fire fighters to respond efficiently to incidents requiring EMS.

In Minnesota, the Emergency Medical Services Regulatory Board licenses and regulates transporting ambulance services but does not regulate the nontransporting services.[37] Figure 1.6 briefly describes the differences between first responder services, basic life support (BLS), and advanced life support (ALS) services. The EMS Regulatory Board specifies training and issues certificates for three different levels of EMS, but it does not certify first responders. First responders may, however, register with the board after successfully completing certain training.[38] According to our survey:

- **About 60 percent of all fire departments offered some level of emergency medical services in 1997.**

As shown in Table 1.5, full-time departments were more likely than combination or volunteer and paid on-call departments to offer first responder and BLS service. A small number of fire departments have ambulances for transporting victims to medical facilities, which requires state licensure. Most fire departments involved with emergency medical services, though, provide prehospital care at emergency scenes and do not have ambulances to transport.

Rescues

Over the years, many fire departments have acquired the training and experience to add rescues to their services. Different types of rescues require different training, expertise, and equipment.

Perhaps one of the more common rescues performed by many fire departments, usually as part of their first responder activities, is the extrication of victims from vehicles involved in traffic accidents. Other types of rescue activities include:

Figure 1.6: Levels of Emergency Medical Service

First Responders	Basic Life Support (BLS)	Advanced Life Support (ALS)
The minimal level of service is first responder. First responders arrive first at the emergency scene, control the scene, and administer initial medical care before the arrival of a licensed ambulance. First responders are not certified in Minnesota, but can be registered by the EMS Regulatory Board after completing a 40-hour training program that meets U.S. Department of Transportation standards.	Persons certified at EMT-basic levels have completed at least 81 hours of instruction and been tested for certain skills including patient assessments, immobilization of spinal injuries, splinting of long bone fractures, wound care, care of shock, and CPR. BLS ambulances need at least two persons trained at the emergency medical technician (EMT)-basic level to transport people.	The highest level of EMS is advanced life support. ALS-licensed ambulances can offer more advanced services than BLS units and can administer drugs. ALS can provide advanced airway management, cardiac defibrillation, and intravenous administration. To transport, ALS crews must have a minimum of an EMT paramedic and EMT basic.

SOURCE: *Minn. Rules*, ch. 4690.3900 to 4690.7200; *Minn. Stat.* §144E.001; Bob Bailey, et al, *State of Minnesota A Reassessment of Emergency Medical Services* (St. Paul: EMS Regulatory Board), July 1997, 11-14.

37 According to the Emergency Medical Services (EMS) Regulatory Board, Minnesota registers first responders and certifies three additional levels of EMS providers: emergency medical technician (EMT)-basic, EMT-intermediate, and EMT-paramedic. Required training and experience increase for each level. Each EMT level requires completion of a prescribed content and number of continuing education hours, and requires ongoing training. Plus, *Minn. Stat*. §144E.16, subd. 6 requires ambulance drivers to complete an approved emergency vehicle drivers program if they use red lights and siren. Although the EMS Regulatory Board certifies EMTs and renews certification, it has no authority to revoke, suspend, deny, or place conditions on EMTs. Legislation introduced in 1999 would extend such authority to the board. (See *Minn. House* (1999), H.F. no. 476.)

38 *Minn. Stat*. §144E.27, subd. 2.

Table 1.5: Fire Departments Offering Emergency Medical Services, 1997

	Full-Time Departments	Combination Departments	Volunteer or Paid On-Call Departments
First Responder	83.3% (*N*=12)	68.8% (*N*=16)	54.3% (*N*=339)
Basic Life Support	92.3 (*N*=13)	61.1 (*N*=18)	17.6 (*N*=341)
Advanced Life Support	23.1 (*N*=13)	27.8 (*N*=18)	5.0 (*N*=341)

NOTE: Most fire departments reporting BLS or ALS services are not licensed transporting ambulance services.

SOURCE: Legislative Auditor's Office Survey of Fire Departments, 1998.

confined-space entry and rescue operations, trench rescues, structural collapse rescues, water and ice rescues, wilderness search and rescue, high- and low-angle rope rescues, and agricultural or industrial rescues. We found that:

- **About 70 percent of all fire departments offered rescue services, including vehicle extrications, in 1997.**

As with other specialized services, higher percentages of full-time and combination departments than volunteer or paid on-call departments offered rescues. Table 1.6 shows the differences. Fire departments typically spent less time on rescues than on fire suppression in 1997. For every 1 person-hour fire departments spent on suppression activities in 1997, they spent about 0.2 person-hours on rescues.

Hazardous Materials Responses

Many fire departments are equipped and trained to offer basic responses to accidents involving releases of hazardous materials. Hazardous materials are any gas, liquid, or solid that can cause harm to people or the environment. Vehicle accidents involving trucks carrying hazardous materials are a common source of hazardous materials spills. Safety standards established by the United States Occupational Safety and Health Administration (OSHA) set five different levels of preparedness for identifying and managing hazardous materials accidents. They also prescribe the nature of the training that personnel must receive before participating at any of the five levels of response. Figure 1.7 briefly describes these levels.

The minimum level of response and training is known as the "awareness" level, which encompasses any personnel who may be likely to witness or discover a hazardous materials spill and initiate a response. At the next level, known as the "operations" level, personnel act in a defensive fashion during the initial response to protect nearby people and property. Neither of these levels prepares personnel to actually stop or clean up a spill.

- **Nearly 79 percent of fire departments required or offered training at the minimum "awareness" level, and 41 percent at the "operations" level, of hazardous materials responses in 1997.**

All fire departments with full-time and combination personnel reported they had awareness level training, and 77 percent of volunteer or paid on-call departments had training at this level. According to OSHA regulations, fire departments must train their members at the level of hazardous material response they perform or are expected to perform.[39]

Table 1.6: Fire Departments Offering Rescues, 1997

Full-Time Departments (*N*=12)	Combination Departments (*N*=19)	Volunteer or Paid On-Call Departments (*N*=340)
91.7%	100%	67.4%

SOURCE: Legislative Auditor's Office Survey of Fire Departments, 1998.

39 29 Code of Federal Regulations, sec. 1910.120, (q), (6).

Figure 1.7: Levels of Hazardous Materials Response

First Responder-Awareness	First Responder-Operations	Hazardous Materials Technician	Hazardous Materials Specialist	On-Scene Commander
Personnel are likely to discover a hazardous substance release and have been trained to initiate an emergency response.	Personnel respond for the purpose of protecting nearby persons, property, or the environment from the release; they respond defensively and do not actually stop the release.	Personnel approach the point of hazardous materials release to stop the release.	Personnel support the technicians but have more specific knowledge of certain substances they may be called upon to contain.	Incident commanders assume control of the incident scene and implement the incident command system and emergency response plans.

NOTE: Each successive level of response requires specific training and knowledge.

SOURCE: 29 *Code of Federal Regulations,* ch. XVII, sec. 1910.120, (6)(i) - (v), (July 1997).

If a fire department, for instance, has been designated locally to contain releases of hazardous materials, evacuate residents, and prevent spills from spreading, its fire fighters must be trained at the first responder-operations level. Although hazardous materials training may vary among fire departments across the state, the level of training must correspond to the duties and functions performed by each responder.

Because of the expense and training needed for hazardous materials responses, and the sporadic nature of hazardous materials spills, in 1992 the Department of Public Safety began an effort to develop response teams of local fire officials who could respond to spills within specific regions of the state at the request of local officials. In lieu of each individual department acquiring the training, equipment, and expertise for full responses to hazardous material spills, the teams contracted by the department are available to assist local response units with these incidents. Even when the teams are contacted, however, the local incident commander retains command over the incident.

Nine local governments (and one private firm) around the state currently contract with the Department of Public Safety to provide specially trained and equipped personnel to respond to hazardous materials releases at the request of, and in support of, local authorities. Contracts are set for a two-year period. Training at least at the "technician" level is required for members of the regional teams.

At the request of local government officials, the Department of Public Safety will activate regional hazardous materials teams of two types: chemical assessment teams or hazardous materials emergency response teams. Chemical assessment teams provide technical advice to local incident commanders who must remain in command of the incident. The teams recommend to local commanders the actions necessary to protect life, property, and the environment that are in keeping with locally-available levels of hazardous materials training and response capability.

Emergency response teams take actions necessary to protect life, property, and the environment from the effects of a release of a hazardous material. Emergency actions include, but are not limited to: preventing the release, mitigating the effects of the release, and stabilizing the emergency situation. Neither chemical assessment teams nor emergency response teams may transport or dispose of hazardous materials; nor may they assume overall command of the incident.[40]

40 Minn. Rules, 7514.0900, subp 6.

Fire Fighter Training

Individual fire departments make their own training decisions based on the services their fire fighters are expected to provide. With the exception of extensive Minnesota Occupational and Safety Administration training requirements described below and other Minnesota Administrative Rules for specialized activities such as ambulance services and responses to hazardous materials spills, the state does not set general fire fighting training standards.[41] Most fire departments, however, require fire fighting training. According to our survey:

- **More than 97 percent of fire departments offered or required training in fighting structural and vehicle fires in 1997.**

About 86 percent offered or required first aid and cardiopulmonary resuscitation (CPR) training, and a similar percentage offered or required training on the use and limitations of personal protective equipment (the apparel and gear worn or carried by fire fighters to protect themselves from hazardous conditions).

Although the state does not certify fire fighters' qualifications, the Minnesota Fire Service Certification Board offers voluntary certification of fire fighters who complete certain requirements. Other certification programs from around the country are also available, such as that offered by the International Association of Arson Investigators.

Fire fighter training has become an issue in Minnesota because of perceived problems with the availability of training and its costs. In 1997 the Legislature created a Firefighter Training Study Committee to explore training issues.[42] The committee submitted a report to the Legislature in February 1998 stating that the fire service favors continued local determination of training needs. The report also identified several problems in the current training system, including inconsistent quality of instruction, inadequate curriculum standards, insufficient funding, and unclear accountability for the uses of some funding.

This report was predated by a joint advisory training committee, formed by the Minnesota State Fire Chiefs' Association, Minnesota State Fire Departments Association, and Minnesota Professional Fire Fighters Association in 1993. The joint committee concluded that training programs around the state were inconsistent in content and that local departments had inadequate funding to obtain training.

As an offshoot of the 1997 Firefighter Training Study, a bill introduced in the 1999 legislative session addresses fire fighter training.[43] The bill would establish a board of fire fighter training responsible for: reviewing fire fighters' educational needs, recommending ways to improve fire fighter training and skills, developing qualifications for training instructors, and establishing and administering a training reimbursement program.

Differences Among Types of Fire Departments

To look at differences in performance among types of fire departments serving larger communities, we compared 1997 survey data for three groups of departments: (1) full-time departments, (2) combination departments with six or more full-time members, and (3) departments with five or fewer full-time members and volunteer or paid on-call departments in communities with 8,000 or more people. For lack of data, all volunteer departments and on-call departments in smaller communities were not in this analysis. In many cases, we saw little difference when comparing the performance of full-time, combination, and larger volunteer or paid on-call departments. For instance:

41 Minn. Rules, 7514.0600 and 7514.0800, subp. 5 specifies the training necessary for members of chemical assessment teams and emergency response teams that respond to hazardous materials accidents on a contract basis with the Department of Public Safety. *Minn. Rules*, 4690.0400 and 4690.2100 prescribe training standards for persons involved with basic life support and advanced life support ambulances. Minnesota's Occupational Safety and Health Act (MNOSHA) defines worker-safety rules, some of which apply to working conditions that fire fighters face.

42 Minn. Laws (1997), ch. 239, art. 2, sec. 9.

43 Minn. House (1999), H.F. no. 465.

- **High percentages of full-time, combination, and larger volunteer or paid on-call departments reported acceptable median response times to fires for 1997.**

As shown in Table 1.7, while the typical response times for full-time and combination departments were lower than that for larger volunteer or paid on-call departments, high shares of all types of departments were at or below an eight-minute threshold for the initial attack team to arrive after receiving the call, which the National Fire Protection Association suggests as an important rule of thumb.[44]

Similarly, approximately equal percentages of full-time, combination, and larger volunteer or paid on-call departments reported: (1) implementing recommended health and safety practices for their members, (2) providing training that prepared fire fighters well for the services they were expected to perform, and (3) using preventive maintenance programs for department apparatus. High rates of all department types also reported having incident management systems in place for fire fighting. Table 1.8 shows the percentages of full-time, combination, and volunteer or paid on-call fire departments with these and other characteristics.

Table 1.7: Response Times and Expenditures per Capita by Type of Fire Department in Larger Cities, 1997

	Full-Time Departments	Combination Departments	Volunteer or Paid On-Call Departments
Median response time after receiving call for units capable of initial attack	3.5 minutes (*N*=10)	4.0 minutes (*N*=11)	6.0 minutes (*N*=42)
Percentage of fire departments within 8 minute response time to fires	100% (*N*=13)	95% (*N*=19)	88% (*N*=51)
Median operating expenditures per capita within primary response area	$76 (*N*=11)	$45 (*N*=18)	$15 (*N*=53)

NOTE: Data collected from surveys of volunteer or paid on-call fire departments in cities of 8,000 or more population and departments with full-time or combination personnel. Volunteer or paid on-call departments in communities under 8,000 population are not included.

SOURCE: Legislative Auditor's Office Survey of Fire Departments, 1998.

At the same time, our survey data for 1997 showed:

- **In some regards, full-time departments were more likely than others to provide more comprehensive services and advance planning.**

Full-time departments were more likely than others to offer a full range of public fire-safety education initiatives. A somewhat larger share of the full-time departments than others reported having long-range master plans for their department that included strategic planning, a community risk analysis, and contingency plans in the event of disasters. In addition, full-time and combination departments were more likely than volunteer or paid on-call departments to have complete preincident plans available with information needed to prepare in advance for the possibility of fire and comprehensive fire-code inspection and enforcement efforts. More full-time departments than others had high percentages of structure fires contained to the room of the fire's origin.

For many measures, on-call departments performed as well as others.

Although in several respects the performance of combination departments mirrored that of other departments, combination departments were somewhat more likely than others to have an incident management system. A slightly higher share of combination departments than others also

44 Cote, *Fire Protection Handbook*, sec. 10-31. This source also suggests a 12-minute average response time for volunteer departments using nonstaffed stations. All paid on-call departments in our analysis met this threshold. Response time is defined as the average time starting when companies were alerted and ending when a full response unit capable of initial attack arrived.

Table 1.8: Comparison of Select Performance Measures by Type of Fire Department in Larger Cities, 1997

	Full-Time Departments	Combination Departments	Volunteer or Paid On-Call Departments
Used preventive maintenance program for apparatus and equipment	100% (*N*=13)	100% (*N*=19)	96.4% (*N*=56)
Used incident management system with written emergency response plans	69.2 (*N*=13)	89.5 (*N*=19)	75.0 (*N*=56)
Conducted comprehensive fire code enforcement	66.6 (*N*=12)	61.1 (*N*=18)	37.8 (*N*=45)
Percent of departments with high rate of structure fires contained to room of origin	63.6 (*N*=11)	47.4 (*N*=19)	49.1 (*N*=53)
Had full range of information in preincident plans	61.5 (*N*=13)	57.9 (*N*=19)	44.6 (*N*=56)
Provided training that prepared fire fighters well in every service they were expected to perform	53.8 (*N*=13)	47.4 (*N*=19)	51.8 (*N*=56)
Wrote complete, long-term master plans for the department	46.2 (*N*=13)	10.5 (*N*=19)	35.7 (*N*=56)
Offered full range of initiatives on public fire-safety awareness	38.5 (*N*=13)	31.6 (*N*=19)	28.6 (*N*=56)
Had comprehensive investigation programs with ongoing training of investigators and fire fighters, among other things	30.8 (*N*=13)	42.1 (*N*=19)	31.5 (*N*=54)
Implemented specific health and safety practices	30.8 (*N*=13)	26.3 (*N*=19)	25.0 (*N*=56)
Had mutual aid agreements with standard procedures, communication protocols, and interagency training	23.1 (*N*=13)	31.6 (*N*=19)	64.8 (*N*=54)

NOTE: Data collected from volunteer or paid on-call fire departments in cities of 8,000 or more population and departments with full-time or combination personnel. Volunteer or paid on-call departments in communities under 8,000 population are not included.

SOURCE: Legislative Auditor's Office Survey of Fire Departments, 1998.

had fire investigation programs with standard operating guidelines, ongoing professional investigator training, instruction for fire fighters in preserving arson scenes, and joint investigation training with fire fighters and peace officers.

On the other hand, as shown in Table 1.7:

- **Volunteer or paid on-call departments in larger communities had far lower expenditures per capita in 1997 than full-time or combination departments.**

Not surprisingly, three-quarters of the volunteer or paid on-call departments had expenditures per capita for their primary response area that were below the median for all fire departments in communities with populations above 8,000. Given that these fire departments had few or no full-time personnel, this result was expected. In addition, a larger share of volunteer or paid on-call departments than either full-time or combination departments had mutual aid arrangements characterized by important features. These features included having a common agreement on standard operating procedures, interagency training,

familiarity of all fire fighters with mutual aid procedures, a uniform approach to incident command, and systems for interdepartmental communications, among others.

Speaking generally, our survey data for 1997 showed that many full-time, combination, and volunteer or paid on-call departments provided very good fire services in their communities. More volunteer and paid on-call departments had low per capita expenditures, but because of their reliance on part-time personnel, they did not have as full an array of comprehensive fire-related services as many full-time departments.

THE STATE ROLE IN FIRE SERVICES

As stated earlier, local officials generally organize and operate fire departments. At the same time, certain state agencies are involved with some components of local fire departments' work.

Department of Public Safety

State Fire Marshal Division

The State Fire Marshal Division has multiple responsibilities that involve it in operations with local fire departments. One already mentioned is state fire investigations. Twelve fire investigators from the State Fire Marshal Division investigated 582 fires in 1997, about a third of which were determined to be arson.[45] Besides conducting investigations at the request of local fire departments, the division investigates all fires involving fatalities.

The division is responsible for offering fire-scene investigation and preservation training to fire fighters and other local government personnel, in consultation with the Bureau of Criminal Apprehension among others.[46] Specifically to aid investigations and prosecutions of incendiary fires, the division maintains a computerized arson investigation data system.[47]

In 1998 the division implemented a juvenile fire-setting intervention program. This program offers materials outlining steps that local fire departments can take to identify juveniles at high risk of setting additional fires and intervene to help prevent juveniles from repeating their behavior. The material offers a sequence of techniques designed to provide the appropriate level of intervention for a range of firesetting behavior: from juveniles involved in firesetting out of curiosity to those setting fires maliciously. Also included are contact names and phone numbers of local resources in mental health and social services fields, to whom fire departments can refer juveniles when such treatment is warranted.

In addition, State Fire Marshal Division staff are organizing regional task forces of fire personnel and educators who agree to participate in the intervention programs. Personnel from local fire departments receive training to teach monthly classes to juveniles and their families who are referred to the program in lieu of prosecution.

Another role the State Fire Marshal Division plays is in fire code inspections. Certain buildings around the state are under the jurisdiction of the State Fire Marshal for inspections. These include schools, hotels, motels, hospitals, nursing homes, and certain resorts. The division inspects day-care facilities under contract with the Department of Human Services and health-care facilities licensed by the Department of Health under a contract with that department. The State Fire Marshal Division contracts with about 20 local fire departments whose local inspectors conduct inspections of these types of facilities (except hospitals and nursing homes) within their jurisdiction.

45 State Fire Marshal, *1997 Fire in Minnesota*, 64, 66. Local fire departments are not required to pay for fire investigations conducted by the State Fire Marshal.

46 *Minn. Stat.* §299F.051, subd. 1-subd. 4.

47 *Minn. Stat.* §299F.04, subd. 3a-subd. 5.

In addition to inspections, the State Fire Marshal Division is the key player in promulgating and administering the *Minnesota Uniform Fire Code*. The Fire Marshal may get involved in appeals of orders issued for code compliance: If local building owners disagree with the orders they can appeal to local boards of appeal that may exist at the municipal level, and then to the State Fire Marshal. Ultimately, the owners could go to an administrative law judge for a final appeal. State Fire Marshal Division code specialists conduct plan reviews of particular occupancies planned for construction. Division staff also provide technical assistance to local fire officials, building owners, general contractors, building code officials, and the public on fire safety statutes and code requirements. They also conduct training on fire safety and the *Uniform Fire Code* for fire and building code officials. On the division's website, viewers have access to provisions of the *Minnesota Uniform Fire Code.*

The State Fire Marshal Division is involved with equipping and training the hazardous materials regional response teams described earlier. It collects and analyzes the data reported by local fire departments to provide a statewide picture of fire incidence and trends. In addition, the division is involved with multiple fire-safety public education initiatives. It also plays a regulatory role in the fire-sprinkler industry and certifies fireworks operators.

Division of Emergency Management

Also in the Department of Public Safety, the Division of Emergency Management performs functions that affect local fire departments. The division works with the State Fire Marshal Division on the regional hazardous-materials response teams that assist at the request of local fire departments. It also takes the lead on reviewing emergency management plans, some of which are prepared by local fire departments, as well as developing the state's emergency operations plan used to prepare for natural disasters, civil emergencies, and other security events.

Along with the Department of Natural Resources Forestry Division and several federal agencies, the Division of Emergency Management plays a role in the Minnesota incident management system. The incident management system is an effort designed to coordinate responses and communication among multiple agencies responding to fires and other emergency incidents. Among other things, the Division of Emergency Management has trained response agencies in the incident management system and has worked to extend the concepts of incident management, such as common terminology, integrated communications, and a unified command structure, to all types of emergencies.

The Division of Emergency Management offers grants to local emergency response agencies for planning and training on local responses to hazardous materials releases. Grants of up to $2,000 are available for training or conducting drills in hazardous materials responses; others of up to $350 are available for division-led training on incident-management systems that incorporate multiple agencies in responses to hazardous materials. Some grants require matching funds from the participating local governments.

In addition, the division houses the Minnesota Duty Officer. This is a one-stop office which local emergency personnel can call whenever they need state assistance with hazardous materials releases, weather warnings, search and rescues, and other incidents. It is this office's responsibility to contact the appropriate state agency staff and provide a communication link between them and the local reporting agencies.

Public-Safety Training Facilities Study

In 1998 the Legislature directed the commissioner of public safety, in consultation with Minnesota State Colleges and Universities, the Department of Military Affairs, and the Peace Officer Standards and Training Board, to develop a statewide master plan for the siting, ownership, and operation of fire and public-safety training facilities.[48] The

48 Minn. Laws (1998), ch. 404, sec. 21, subd. 3.

committee compiled an inventory of existing and planned training facilities in the state as well as a set of decision-making criteria that legislators can use to evaluate proposals for funding new or expanding public safety training facilities. Based on its assessment of needs for specialized training facilities, the committee's report suggests that travel time and expenses are key barriers to obtaining adequate training, especially for small volunteer fire departments. The committee also found that while some facilities are not used to their maximum capacity, clear deficiencies exist in the availability of facilities for certain types of specialized training such as live-burn training and emergency-vehicle driving.

Among the criteria recommended for evaluating training-facility proposals is whether the project would be a multi-purpose facility and spread its cost and usage across several agencies. Further, the report recommends limiting state funding to 50 percent of a project's total capital costs and prohibiting operating subsidies from the state unless a state agency is an ongoing partner in a facility's operation.[49]

Department of Natural Resources, Division of Forestry

The Division of Forestry in the Minnesota Department of Natural Resources has responsibility for preventing and extinguishing wildland fires (on grassland, brush, cropland, or forest areas) around the state.[50] It has identified wildfire protection districts, including both public and private lands, where there are high probabilities of wildfires starting; consequently, more of the division's firefighting resources are focused on the more densely forested areas in the northern half of Minnesota. Public education on wildfire prevention is also part of its duties.

Although the Forestry Division has area offices with foresters who fight fires, it also contracts with local fire departments and individual fire fighters for supplementary personnel and equipment to extinguish wildfires. The division reimburses the fire departments for the calls to which they respond as well as for water hauling. It may also provide certain fire fighting apparatus and equipment to local fire departments as part of an agreement that the departments will assist when help is needed to extinguish wildland fires. Forestry Division personnel do not use local department apparatus in fire fighting unless local personnel operate them.

The DNR has responsibility for wildfires.

Before engaging in live-burn training exercises for fire fighters, local fire departments must first receive permits issued by the Forestry Division. Fire departments must meet certain criteria before receiving the live-burn permits, such as identifying asbestos in the structure to be burned and stipulating clean-up activities following the training.

In addition, the Forestry Division manages the Interagency Fire Center, located in Grand Rapids, which was created to improve wildfire management. It is a focal point for the exchange of wildfire information and available resources for planning and managing wildfires. The Interagency Fire Center is a central member of the Minnesota Incident Command System, which is a partnership for common terminology and collaborative planning among multiple agencies involved with managing wildfires and other emergencies. Fire Center duties include a wildland fire prevention campaign; local fire departments may use the Center's "Smokey Bear" materials as part of their public information efforts.

The Interagency Fire Center manages a federal excess property program, from which local fire departments receive loaned surplus federal equipment and vehicles for fire fighting needs at minimal costs charged for transporting the equipment and vehicles to the fire departments.

49 Commissioner of Public Safety, *Statewide Master Plan for Fire and Law Enforcement Training Facilities in Minnesota* (St. Paul: 1999), 45-46.

50 *Minn. Stat.* §88.10, subd. 1.

The state makes the equipment and vehicles available to local departments that may convert what they receive to meet their particular needs, such as outfitting a truck with a tank, portable pump, and hose reel for fighting wildland fires. Waiting lists exist for some items, particularly certain vehicles, and the selection of apparatus and equipment available through the program is limited. State statutes allow local governments to acquire another government unit's equipment or property without entering the competitive bidding process.[51] According to our survey:

- **Nearly a third of Minnesota fire departments had acquired fire fighting apparatus through the excess property program during the past 10 years.**

Local fire departments located outside the Twin Cities metropolitan area were more likely than metropolitan departments to purchase apparatus from the program. Similarly, the volunteer and paid on-call departments were more likely than full-time or combination departments to use the program.

The Fire Center also coordinates a program of "Forestry Assistance Matching Grants" available primarily to rural departments in cities with under 10,000 people or departments that have wildland firefighting responsibilities. Matching grants are available in amounts up to $2,000. Each year, the program matches local dollars used to: purchase fire department communications equipment, personal protective gear, hose, nozzles, and other equipment; help start up a new or inactive fire department; or retrofit excess property vehicles for local department needs such as grass fire rigs. To be eligible for the matching grants, fire departments must have submitted data on their fire incidents for the most recent year to the State Fire Marshal.

The Interagency Fire Center sells wildland fire fighting equipment to local departments for wildfire prevention and suppression. Equipment includes fire resistant apparel, headlamps, hose, nozzles, pumps, and hand tools. Local fire departments pay for the equipment and a shipping charge, but typically at a lower price than what the department itself could find. In addition, as part of its role in the Incident Command System, the Fire Center coordinates and reimburses local fire fighters and apparatus for helping in out-of-state emergencies.

Minnesota Occupational Safety and Health Act (MNOSHA)

MNOSHA sets standards for workplace safety, including provisions on training, equipment, and procedures that fire departments must meet. Because Minnesota has adopted by reference the federal occupational safety and health standards, these U. S. OSHA rules also apply.[52] In Minnesota's Department of Labor and Industry, the Occupational Safety and Health Enforcement Division oversees and enforces OSHA provisions.

Although the state of Minnesota does not prescribe a training program that all fire fighters must complete, many MNOSHA standards require training for any fire fighter involved in particular procedures. For instance, fire fighters who are expected to respond to releases of hazardous materials at the "awareness" level of response must first complete training that will allow them to demonstrate certain competencies. They must understand what hazardous materials are and their risks, and they must have the ability to recognize the presence of hazardous substances in an emergency, among other things.[53] As a different example, MNOSHA requires annual training on operating and rescue procedures and possible hazards of a confined space for workers who enter

OSHA rules affect training, equipment, and procedures.

51 Minn. Stat. §471.64 allows local governments to enter into contracts with the federal, state, or other local governments for the purchase, lease, or acquisition of equipment, supplies, and other property, without regard to statutory provisions.

52 Minn. Rules, 5205.0010, subp. 1, 2.

53 29 Code of Federal Regulations, sec. 1910.120, (q), (6), (i), (A) - (F).

such spaces.[54] Another requirement specifies the general content of training required for employees exposed to hazardous substances, harmful physical agents, or infectious agents.[55]

Some MNOSHA standards apply to equipment. For example, all fire fighters must use self-contained breathing apparatus when engaged in interior structural firefighting.[56] The standards also specify the function and maintenance of the respirators. Additional standards require the use of protective clothing, including protective footwear, coats, trousers, gloves, and helmets.[57]

Other MNOSHA standards mandate certain procedures that fire departments must follow. For any fire fighting conducted in an atmosphere which is immediately dangerous to life or health, one rule requires that at least two employees enter the atmosphere and remain in contact with one another, and two others must be stationed outside.[58] Fire fighters entering a burning building, for instance, must follow this so-called "two-in, two-out" rule. As another example, MNOSHA requires that fire departments maintain a log and summary of all occupational injuries and illnesses and make the log accessible to employees.

In addition, MNOSHA conducts inspections to ensure that fire departments meet health and safety standards. Some of these are programmed safety and health investigations, which are planned investigations based on the highest hazard operations. MNOSHA also conducts unprogrammed investigations whenever employees are in imminent danger of death or serious physical harm or in response to employee complaints about unsafe or unhealthful working conditions. We observed that some fire personnel find it difficult to know all of the numerous and often complex OSHA rules that apply to fire departments because they do not have a single comprehensive list of OSHA requirements.

FIRE/EMS/Safety Center

Another resource for fire departments is the FIRE/EMS/Safety Center, now under the jurisdiction of the Minnesota State Colleges and Universities or MnSCU. With its extensive library dedicated solely to fire-related research and information, the FIRE/EMS/Safety Center provides information and resources to fire departments and the public at large. Fire service specialists at the center develop training on fire services and other emergency responses, including annual Minnesota Fire Schools held in locations around the state, and the center coordinates training for fire personnel with each of Minnesota's technical colleges.

To offset fire fighter training expenses, the state has offered a partial subsidy since 1987 that reduces the technical colleges' costs for training. Recently, the state began issuing vouchers directly to fire departments in amounts based on the hours of training they had received at technical colleges over the past three-year period. Fire departments use the vouchers in partial payment of their technical college training costs, and the FIRE/EMS/Safety Center reimburses the colleges for the voucher amounts.

State Auditor's Office and Department of Revenue

The State Auditor's Office and Minnesota Department of Revenue play pension-oversight roles that affect fire fighters. The State Auditor oversees the financial and statutory operation of fire relief associations. Relief associations manage the pension funds provided to qualified fire fighters following their retirement. Both the state and the municipalities in which fire departments are located may make contributions to the special funds of fire relief associations, from which pension benefits are

54 *Minn. Rules*, 5205.1020.

55 *Minn. Rules*, 5206.0700.

56 *29 Code of Federal Regulations*, sec. 1910.134, (g), (4), (iii).

57 *29 Code of Federal Regulations*, sec. 1910.156, (e), (1) - (5).

58 *29 Code of Federal Regulations*, sec. 1910.134, (g), (4), (I) - (ii).

paid.[59] To qualify for state aid, fire relief associations file actuarial data and annual financial reports or audited financial statements for review by the State Auditor's Office.

Together with the State Auditor's review of financial records, the Minnesota Department of Revenue's Property Tax Division monitors fire relief associations' eligibility for aid through annual reports on operations submitted by the associations. Eligibility criteria include: having at least 10 fire fighters including a fire chief and assistant chief, conducting drills in fire-fighting tactics and the use of equipment, maintaining a communication system for receiving fire alarms, and having a motorized fire truck equipped with a 250-gallon water tank and other specified equipment.[60] Contingent on State Auditor and Department of Revenue assessments of relief associations' compliance with various statutory requirements, relief associations may qualify for state aid. The Revenue Department calculates the amounts of aid distributed annually on behalf of eligible relief associations.

Two types of state aid are available: (1) fire state aid and (2) amortization aid. The fire state aid comes from dedicated gross earnings taxes on property insurance premium revenues. Aid allocations depend on the population in a fire department's primary response area as a percent of the statewide population and the area's assessed tax capacity relative to total assessed tax capacity. Amortization aid from the state's general fund is intended to retire the unfunded liabilities of retirement plans for full-time, paid fire fighters, which the state closed to new members in 1980. A 1996 program reallocates 30 percent of any unallocated amortization aid to certain volunteer relief associations. The reallocated money is intended for those relief associations receiving the lowest amounts of aid per fire fighter, and therefore, mostly affects the smallest volunteer departments.

CHAPTER SUMMARY

Minnesota fire departments do far more than extinguish fires. Many are involved in rescues, fire code inspections, emergency medical services, and responses to hazardous materials releases, among other things. About 60 percent of all fire departments provided some level of emergency medical services in 1997, and 70 percent offered rescue services.

Fire services are mostly local government functions but the state is also involved.

Most Minnesota fire departments use personnel who are either volunteer or part-time. Volunteer fire fighters receive no compensation for their services; paid on-call members receive a stipend, or hourly or per-call wage. Only about 3 percent of Minnesota fire departments use exclusively full-time personnel. Combination departments with a mix of 6 or more full-time personnel and volunteer or paid on-call members represented about 5 percent of all departments in 1997. For comparability in our analysis, we grouped those departments with 5 or fewer full-time fire fighters together with the paid on-call departments.

To finance their services, most fire departments rely heavily on property tax revenues and other general-fund revenues. They also receive substantial revenues from contracts for service and, to a lesser degree, from charitable gambling proceeds. Unlike many other local government services, a large share of fire departments rely on civic organizations and other nontraditional sources of income for capital purchases.

Fire prevention efforts are not as widespread in the U.S. as in some other developed countries. Minnesota fire departments typically spend 1 person-hour of time on fire prevention activities for

59 Minn. Stat. §424A.05, subd. 2 and 3.

60 Minn. Stat. §69.011, subd. 4 (a)-(g).

every 2.7 hours they spend on fire suppression. Although most fire departments reported having some activities related to public fire-safety awareness, only a few had comprehensive public education programs.

By some measures, the volunteer and paid on-call departments performed as well as the full-time and combination departments. As one might expect, we found that they were far more likely to spend less on a per capita basis than full-time or combination departments. On the other hand, as a group, full-time departments were more likely than the volunteer departments to provide more comprehensive services.

Although fire departments operate as local units of government, many work closely with the State Fire Marshal Division and other state agencies. All fire departments are required to abide by extensive rules and statutes pertaining to operations, equipment, and training for certain services.

Best Practices

CHAPTER 2

This chapter describes best practices in managing fire services. In it we identify goals that represent broad, desired outcomes for fire departments. We also list seven actions that fire departments should take to meet the goals. For each action we describe specific best practices in use by fire departments around the state.

In this chapter we ask:

- **What are the primary goals of fire departments in Minnesota?**
- **What actions should fire departments take to help reach those goals effectively and efficiently?**
- **What practices now in use by fire departments reflect those actions?**

Fire department goals and the actions required to meet those goals are based on state statutes and rules that govern the provision of fire services in Minnesota and on professional standards established by national and international organizations within the fire and public-safety industries, such as the National Fire Protection Association. Although fire departments are not legally bound to abide by professional standards, the standards establish a level of performance that fire professionals across the country have agreed are desirable. The examples of fire departments presented below come from those we surveyed in the fall of 1998.[1]

Successfully managed fire departments plan services based on fire risks and other potential hazards in their response areas.

GOALS

We identified five primary goals for effective and efficient management of fire services. We believe these goals apply to all fire departments, although how they are achieved may vary from department to department and between full-time, combination, and volunteer or paid on-call departments. The goals are:

1. **Prevent the outbreak of fires and achieve fire safety awareness throughout the community.**[2] This goal acknowledges the value in educating citizens about fire-safe practices and the need to emphasize fire prevention.

1 We surveyed all fire departments that were either full-time career or combination departments according to State Fire Marshal data. We also surveyed all volunteer or on-call departments that were located in municipalities with 8,000 or greater populations (excluding populations in areas these departments may have served on a contract basis). Of the remaining 689 volunteer or on-call departments in cities or townships with less than 8,000 people, we chose a random sample of 454 to survey. Additional details on our methodology are available in Appendix A.

2 National Fire Protection Association, *NFPA 1201, Standard for Developing Fire Protection Services for the Public*, 1994 ed. (Quincy, Mass.: National Fire Protection Association, 1994), 2-1, 12-1, and 13-1; and Ronny J. Coleman and John A. Granito, eds., *Managing Fire Services*, 2d ed. (Washington, D.C.: International City Management Association, 1988), 94.

2. **To ensure the enforcement of fire and life safety codes for the prevention and control of structure fires**.[3] Fire chiefs are authorized to enforce the *Minnesota Uniform Fire Code*; local governments have authority to enact ordinances equal to or more stringent than the fire code's requirements, provided they do not exceed the *State Building Code,* are consistent for each class of buildings, and pertain to fire or life safety.

3. **To investigate the cause, origin, and circumstances of fires in the jurisdiction.**[4] Statutes require the fire chief or fire marshal to investigate the cause and origin of the fire, or ensure that someone else (such as the State Fire Marshal) conducts an investigation, for all fires with damage greater than $100. Statutes also require that they report all fires of unknown origin.

4. **To maintain a response capability that is safe and effective.**[5] This goal refers to the need to assure the safety of fire personnel and prevent or mitigate hazards inherent to the job.

5. **To protect citizens' life safety and property against the dangers of fire and other emergencies that may occur in the response area.**[6] This goal recognizes the expanded roles that many fire departments now serve in addition to fighting fires.

ACTIONS AND BEST PRACTICES TO MEET THE GOALS

We identified seven actions that we believe fire departments should follow to meet the goals outlined above. Figure 2.1 depicts each action and its components. The actions do not apply in the same degree to all fire departments because some that may be appropriate for paid on-call or volunteer departments may be less so for full-time departments, and vice versa. Nonetheless, the actions for efficient and effective fire departments are all based on ideas and standards from within the fire services industry.

The seven actions are:

1. **Assess risks and develop long-range plans.**
2. **Evaluate fire department performance and use resources cost-effectively.**
3. **Promote public awareness of fire safety.**
4. **Ensure fire code enforcement.**
5. **Develop effective communications systems.**
6. **Prepare a competent work force and support safe operations.**
7. **Plan for on-scene responses.**

In the remainder of this chapter we describe the seven actions. We define each action and then present examples of fire departments we visited that have put these actions into practice to improve their effectiveness or efficiency.

By highlighting specific departments, we do not suggest they are the only fire departments using these best practices. In fact, we learned of many others also using these practices but, due to resource constraints, we focused on only a handful of departments to illustrate how the practices have been implemented.

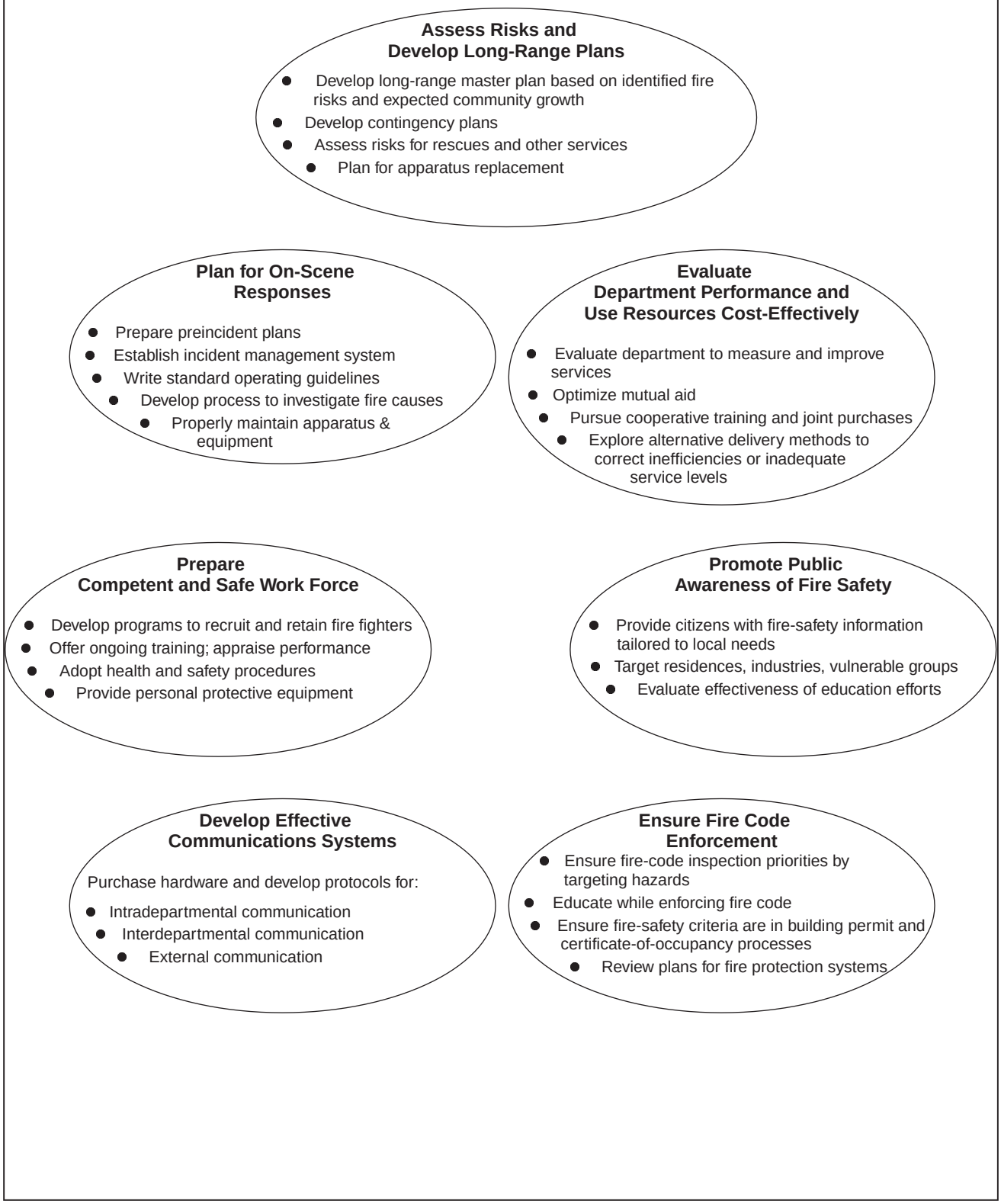
3 International Fire Code Institute, *1997 Uniform Fire Code Volume 1*, part 1, art. 1, sec. 103.2.1.1 is adopted by reference in *Minn. Rules*, 7510.3510; *Minn. Stat.* §299F.011, subd. 4; NFPA, *NFPA 1201*, 14-1.1 through 1.2.

4 *Minn. Stat.* §299F.04, subd. 1; *Minn. Stat.* §438.06 requires fire marshals in cities of the first class to investigate all fires.

5 *Minn. Stat.* §182.653 lists the duties of employers in complying with occupational safety and health standards. In addition, numerous state rules have been promulgated to implement the Minnesota Occupational Safety and Health Act as it pertains to fire departments.

6 NFPA, *NFPA 1201*, 2-3.1; and Cote, *Fire Protection Handbook*, sec. 10-5.

Figure 2.1: Actions for Successful Fire Department Management



To select effective and efficient fire departments we ranked fire departments responding to our survey according to how many measures of performance they met. We based the measures on standards or guidelines promulgated by organizations within the public safety industry and on state statutes and rules. We used 84 measures of performance to rank volunteer or paid on-call departments in larger communities and the full-time and combination departments; we used 34 measures for volunteer or paid on-call departments in smaller communities.[7] Examples of these performance measures are whether departments followed a preventive maintenance program for their apparatus and equipment and whether their average response times were within commonly accepted thresholds. (Appendix B contains all the measures of performance we used to gauge fire department performance.)

Using the measures of performance, we selected 11 fire departments to visit and collect more in-depth information on their practices. We use these departments as examples for each of our seven recommended actions. Following the examples of fire departments we visited, we list other fire departments we surveyed that met most or all of the standards of performance we used to measure a particular practice. Other fire departments may also meet our indicators of performance but may not be listed because they (1) were not selected in our random sample of volunteer or on-call departments in smaller jurisdictions, (2) did not respond to our survey in time to be analyzed, or (3) were unable to provide some of the data we used to measure performance.

1. Assess Risks and Develop Long-Range Plans

The following activities require long-range planning that considers all services the fire department provides. Planning required for activities at the scene of an incident is covered later in this chapter.

Conduct Strategic Planning

All fire departments should conduct strategic planning in conjunction with their community's planning process and write long-range plans, or master plans, for providing their services.[8] The master plan should describe how the fire department is to meet local fire protection and other service demands in light of its resources.[9] Long-range plans are needed to provide the department with a framework to develop goals and programs, acquire and allocate equipment and personnel, and adapt services according to projected changes and growth in the community.[10]

A master plan should cover a minimum of three years and include: (1) a mission statement of defined service goals or programs, (2) strategies and workplans for implementing programs and deploying resources, (3) operating and capital budget plans to support department programs, and (4) performance indicators for quality assurance and to measure the department's progress toward its goals.[11]

Fire departments should conduct planning activities in conjunction with local community administration, planning, and water utility departments, as well as other emergency response agencies, such as law enforcement, in the service area.[12] These other departments contribute to a comprehensive approach to long-range planning and provide valuable information on factors that should be considered when planning fire protection, such as trends in building and construction, projected population and demographic changes, and water distribution systems. As part of their planning, fire departments should be aware of fire-related statutes, rules, and local ordinances to

7 Because we collected less data from the volunteer and on-call departments in communities under 8,000 population, we had fewer performance measures for them.

8 NFPA, *NFPA 1201,* 4-1; Cote, *Fire Protection Handbook,* sec. 10-22.

9 Coleman and Granito, *Managing Fire Services*, 77-78.

10 Cote, *Fire Protection Handbook,* sec. 10-22.

11 International Association of Fire Chiefs (IAFC), National Fire Service Accreditation Task Force, *Fire and Emergency Service Self-Assessment Manual* (Fairfax, VA: IAFC, 1995), App. C.

12 NFPA, *NFPA 1201,* 4-1; Coleman and Granito, *Managing Fire Services*, 77-78, 82.

ensure they comply with the services required of them.[13]

Develop Contingency Plans

For continuous, year-round availability of emergency responses, fire departments should write contingency plans as part of their long-range planning in the event they are unable to provide their usual fire suppression, rescue, or other emergency response activities due to service outages, equipment malfunctions, or natural disasters.[14] Contingency plans prevent or help ease the disruption of emergency services needed to protect lives and property in the community.

Contingency plans should identify alternative resources, such as other jurisdictions' fire stations and apparatus, that can be used if the department's own apparatus are incapacitated. They should also identify alternative water supplies in the event of catastrophes that diminish or destroy traditional sources of water.[15] In these fallback plans, departments should outline ways to implement their backup procedures so that they are prepared to act even under dire circumstances or when situations change dramatically and quickly, such as following destructive tornadoes. The plans should be documented, easily accessible, and contain information for notifying appropriate authorities of needed resources.

Assess Risks

As part of the planning process, fire departments should identify the types and magnitude of fire risks and automatic sprinkler coverage throughout the primary response area to determine the needed levels of fire suppression resources, appropriate fire station locations, and response strategies.[16] The department should base its budget and financial planning on its assessment of risk in the community and on fire protection objectives.[17] For the service to be effective, a community's fire suppression capability should be directly related to local hazards and community needs.[18] As communities evolve, fire risks change; consequently, departments should periodically update their assessment of fire risks to keep pace with changes in their service areas. Fast-growing areas require more frequent reassessments of risk than others.

Fire departments should also periodically assess emergency risks that are not directly connected to fire hazards to evaluate demands for services beyond traditional fire suppression, such as emergency medical responses, specialized rescues, and hazardous materials responses.[19] The range of services to which the department responds should be based on local hazards, cost/benefit analyses, the extent of service demands, and department response capabilities.[20] In areas where fire departments lack resources to respond to emergencies other than fires, or where they would find it inefficient to do so, they should make arrangements with technical specialists or other agencies to provide these services.[21] As an example, jurisdictions with few hazardous materials risks or limited equipment and trained personnel for hazardous materials responses have the option of calling upon Minnesota's regional hazardous materials chemical assessment or emergency response teams.

Long-range planning activities should also include a periodic reassessment of the fire department's personnel make-up to determine whether the department can continue to perform acceptably in the future with its current share of paid on-call or

13 IAFC, *Fire and Emergency Service Self-Assessment Manual*, secs. 4-2, 4-3.

14 NFPA, *NFPA 1201*, 4-3.6, 16-4.2.

15 NFPA, *NFPA 1201*, sec. 18-2.1.

16 Cote, *Fire Protection Handbook*, sec. 10-13.

17 IAFC, *Fire and Emergency Service Self-Assessment Manual*, sec. 4-11.

18 Cote, *Fire Protection Handbook*, sec. 10-13; IAFC, *Fire and Emergency Service Self-Assessment Manual*, sec. 4-5.

19 IAFC, *Fire and Emergency Service Self-Assessment Manual*, sec. 4-6; Cote, *Fire Protection Handbook*, sec. 10-41.

20 Coleman and Granito, *Managing Fire Services*, 77; NFPA, *NFPA 1201*, ch. 4; Cote, *Fire Protection Handbook*, sec. 10-41; IAFC, *Fire and Emergency Service Self-Assessment Manual*, sec. 4-6.

21 Federal Emergency Management Agency (FEMA), *Technical Rescue Program Development Manual* (Washington D. C.: Federal Emergency Management Agency, 1995), 9-5.

volunteer members, full-time career members, or some combination. In assessing its personnel resources, the department should evaluate staffing and training costs, volunteer availability, incident volume, and community needs and financial resources.[22]

According to our survey, by 1997:

- **About 32 percent of the larger fire departments around Minnesota had written long-range strategic plans based on community risk analyses and containing contingency plans.**

These plans contained financial and strategic planning for personnel, apparatus, and fire stations. Another 25 percent of larger fire departments indicated they had long-range plans but the plans either did not contain the elements specified above or were not written. Similar data were not available for fire departments in smaller communities.

Larger and Smaller Fire Departments

Larger Fire Departments

Throughout this report, references to "larger" fire departments include: (1) volunteer and paid on-call departments in communities of 8,000 or more, (2) all departments with full-time personnel, and (3) departments with a combination of at least six full-time and other personnel.

We sent to these departments our full survey. Included in the group are three fire departments in cities under 8,000 population that received our full survey because preliminary data indicated they were combination departments; according to our survey results, they are actually paid on-call departments.

Smaller Fire Departments

The "smaller" fire departments are volunteer and paid on-call departments in communities of under 8,000 population.

Some data are not available for smaller departments because we mailed shorter surveys to the small volunteer or paid on-call departments, and therefore, collected less information from them. Appendix A contains details on the methodology of our survey.

Plan to Replace Equipment and Apparatus

Fire departments should also have a plan to prepare for the eventual replacement of obsolete or worn trucks and equipment and ensure they have the vehicles and tools needed for responding to incidents. An apparatus replacement plan allows the department to prepare for future capital expenditures.[23] In laying out a replacement plan, the department should analyze community service demands and the apparatus' expected life cycles.[24] Departments should include tools and equipment in the replacement plan so that all fire fighters and apparatus are properly equipped to respond effectively to emergencies.[25]

According to our survey:

- **More than 61 percent of full-time fire departments, 79 percent of combination departments, and 46 percent of all volunteer or paid on-call departments had replacement plans in place in 1997 for capital purchases.**

Another 12 percent of fire departments indicated they were developing capital replacement plans in 1997.

Summary and Examples Related to Risk Assessment and Planning

The chief benefit of assessing fire and other emergency risks in the community and taking a long-term look at fire department operations is the information gained on known emergency needs and department capabilities. Long-range planning produces an explicit analysis of hazards in the service area and resources in the fire department. Without this information, departments may face a mismatch between what the community and elected officials expect and what departments can provide in terms of equipment, person power, and expertise. Another important benefit is preparedness. Recognizing potential hazards in the community

22 Cote, *Fire Protection Handbook*, secs. 10-18, 10-19.

23 Cote, *Fire Protection Handbook.*, secs. 10-19, 10-208.

24 IAFC, *Fire and Emergency Service Self-Assessment Manual*, sec. 5-101; Cote, *Fire Protection Handbook*, sec. 10-208.

25 IAFC, *Fire and Emergency Service Self-Assessment Manual*, sec. 4-24.

Fire departments should develop apparatus replacement plans to plan for vehicle purchases.

allows departments to prepare to manage those hazards. With detailed contingency plans, departments always have a "plan B" ready to execute when normal operations fail. Planning ahead for apparatus and equipment purchases prevents the need for elected officials to raise high sums of revenues for such purchases in any single year.

The largest cost to risk assessment and long-term planning is the time involved. Particularly for departments with only paid on-call or volunteer personnel, time for long-range planning is difficult to find and may present an opportunity cost when other department activities are put off while planning is underway.

Assess Risks for Other Services

Gonvick Fire Department

The Gonvick Fire Department, a municipal volunteer department that provides services by contract in parts of Polk and Clearwater counties, provides first responder and basic life support services. After conducting a needs assessment, the department expanded its services in 1992 to include higher levels of prehospital care to fire and accident victims.

The Gonvick Fire Department chose to expand its services due to the distance between people with emergency medical needs and prehospital care services. The fire department is located approximately 30 miles from the Polk County Hospital and 20 miles from the Clearwater County Hospital. These hospitals provide the nearest advanced life support and ambulance transport for that region. With an aging population and increasing service calls requiring immediate medical care, Gonvick fire fighters were responding to incidents in which victims required more than simple first aid. The distance from the county hospitals forced victims to wait unacceptably long for advanced life support and ambulance transport service to arrive.

To fill the gap, the fire department and Polk County and Clearwater County hospitals worked together and pooled their personnel and equipment resources. The fire department assumed the costs to train 16 fire fighters to the first responder level and 4 to the emergency medical technician-basic level. The fire department and hospitals share the responsibility of paying for fire fighters' ongoing medical training. Polk County ambulance personnel donate their time to train the fire fighters.

The fire department and hospitals also share the costs for supplies and equipment. The fire department purchased a used ambulance using equipment replacement funds and some hospital contributions, then modified it to meet their local needs. Gonvick's fire department paid for the initial purchase of medical equipment and supplies, and pays for all ongoing vehicle and equipment maintenance. Both hospitals reimburse the fire department for medical supplies used during incidents.

Community fundraising enabled the fire department to purchase a defibrillator and vehicle extrication

equipment. Polk County Hospital also contributed money for the defibrillator.

Fire department costs include the initial purchase of all specialized equipment and supplies, the rescue unit, and ongoing classroom and hands-on training. Providing the enhanced medical service also requires the firefighters to volunteer additional time in training, as well as maintaining the specialized equipment.

The fire department, county ambulance services, and local medical directors communicate on an ongoing basis to provide a coordinated system of quality medical services. Participants meet twice a year to review communication and ambulance protocols and any procedural changes.

Because the Gonvick Fire Department provides basic life support services, citizens throughout the primary response area benefit from more immediate responses. The Gonvick Fire Department also provides emergency medical services through mutual aid when incidents occur in isolated regions of other fire department jurisdictions. Due to emergency medical training, the fire fighters provide better patient assessment and care for a greater variety of injuries and other medical crises prior to the arrival of paramedics.

Other departments can only decide to provide emergency medical services following a needs assessment that analyzes whether that care is necessary and how much it would cost. The costs for ongoing training, apparatus, and medical equipment for emergency medical services may be too high for departments that experience low volunteer response rates.

For more information contact:

Chief Ronald Rude
Gonvick Fire Department
218/487-5770

Winnebago Fire Service

In Winnebago, the fire service is a division of the city's Emergency Services Department. The fire department, which also provides emergency services by contract to several communities in Faribault and Martin counties, recently expanded its services to provide operations-level emergency responses to hazardous materials spills. By assessing risks for local hazardous materials releases and developing proper response and safety protocols, the department is better prepared to control potential injuries to residents. Fire fighters are also better prepared to effectively and safely control fire risks involving flammable materials, such as railroad or tanker truck accidents or pipeline explosions.

The fire department's primary response area covers approximately 115 square miles and has a population of 2,518 residents. As part of their risk assessment, fire officials identified ten manufacturing facilities containing high levels of extremely hazardous substances or other chemicals that pose a risk to health and safety. Fire officers also estimate that approximately 50 tanks or trucks containing dangerous chemicals travel through the city each day, either on roads or railway.

As the industrial base expanded in the primary response area, the fire department experienced an increase in hazardous materials-related calls; approximately 15 percent of its annual calls involve hazardous materials releases. Prior to 1998, the nearest fire department resource for diking spills and evacuating residents was located 35 miles away in Mankato.

In response to local service needs and concerns about citizen and fire fighter safety, the fire department trained 90 percent of its fire fighters to the operations level for hazardous materials responses. The training improves local emergency response capabilities, and ensures that initial fire attack teams are trained for the duties they would be expected to perform at the site of a spill. The fire fighters now have greater skills in approaching and sizing up spills and conveying incident severity to the appropriate emergency response agencies. They also have more knowledge in identifying types of chemicals and are now capable of taking defensive action, such as diking the spill and evacuating residents. All fire fighters receive annual refresher training. The department purchased the upgrade in personal protective equipment and response supplies out of its own budget.

The fire department keeps a written emergency operations plan that defines fire fighters' responsibilities during hazardous materials responses, as well as written standard operating guidelines for conducting the response, notifying appropriate state and local officials, and refraining from using specific fire suppression materials, such as water or foam. The department keeps information required under the Federal Superfund Amendments and Reauthorization Act on high-risk facilities' layouts and contents, in addition to a register identifying locations, types, and quantities of hazardous materials, and frequently used transportation routes of extremely hazardous materials and pipelines.

The Winnebago Fire Service costs for upgrading hazardous materials response capabilities from awareness level to operations level included approximately $1,500 for training and supplies. Fire officers expect a small increase in ongoing costs for training and supplies. Given the increase in hazardous materials in their response area, fire officials consider their risk management strategies appropriate. Departments that can access higher levels of hazardous materials response capabilities, such as through mutual aid, or that have a low incidence of hazardous materials in their response area may not need a similar upgrade in services.

For more information contact:

Chief Jerome Behnke
Winnebago Fire Service
507/893-3515

Other fire departments we surveyed also met our standards of performance related to assessing emergency risks and conducting long-range strategic planning. Some are listed here along with contact names:

Larger Volunteer or On-Call Departments: **Bloomington**, Chief Ulysses Seal, 612/881-4062; **North St. Paul**, Chief David Zick, 651/770-4480; and **Spring Lake Park-Blaine-Mounds View**, Chief Nyle Zikmund, 612/786-4436.

Apparatus Replacement Planning

Cotton Volunteer Fire Department and First Responders

The Cotton Volunteer Fire Department, a private nonprofit group of local citizens trained to fight fires and respond to emergency medical incidents, contracts to provide services throughout Cotton Township in St. Louis County and uses a truck depreciation fund. With the fund, the township is financially prepared to replace old or obsolete fire department and rescue vehicles.

Each year the Cotton Township board levies tax dollars and appropriates money to the truck depreciation fund. The fund is placed into a federally guaranteed account to accumulate interest during the years when purchases are not required. Using an equipment replacement plan developed by fire department members, the department and township spend money from the fund primarily for making capital purchases as they are needed. The department has also used the depreciation fund money in years when its apparatus needed extensive retrofitting.

Fire department members developed the replacement plan based on the years of useful life expected from the existing apparatus. They also considered the need for a Class A fire pumper and other equipment required to maintain the Insurance Services Office (ISO) rating for the township.

With the truck depreciation fund and equipment replacement plan, the Cotton Volunteer Fire Department has been able to make its truck purchases without asking for a significantly higher property tax levy the year of the purchase. The fund spreads out truck expenditures by setting aside small amounts each year, which is more acceptable to the township board and taxpayers. The success of this arrangement depends in part on the relationship built between the chief and the town board. To make it work, the chief familiarized himself with township operations and met monthly with town officers.

The Cotton Volunteer Fire Department uses the fund to purchase used apparatus sold by other fire departments or through the excess property program managed by the Department of Natural Resources. Because the fire department serves a township of under 500 people, this example indicates that even departments serving small populations and making frugal apparatus purchases can develop and benefit from advance planning for replacing apparatus.

For more information contact:

Chief Craig Kinsley
Cotton Volunteer Fire Department and First Responders
218/482-5538

Many other fire departments we surveyed also met our standards of performance for effectiveness and efficiency in apparatus replacement and some are listed here along with contact names.

Full-time departments: **Duluth**, Chief Duane Flynn, 218/723-320; **Rochester**, Chief David Kapler, 507/285-8072; **Richfield**, Assistant Chief Steven Sutter, 612/861-9855.

Combination departments: **Albert Lea**, Chief Richard Sydnes, 507/377-4340; **Bemidji**, Chief Bill Rabe, 218/751-8001; **Fridley**, Chief Chuck McKusick, 612/572-3610; **St. Louis Park**, Chief Robert Gill, 612/924-2594.

Larger volunteer or on-call departments: **Brooklyn Park**, Chief James Driste, 612/493-8026; **Elk River**, Chief Bruce West, 612/441-4919; **Little Falls,** Chief Fred Tabatt, 320/632-4461; **Minnetonka**, Chief Joe Wallin, 612/939-8598; **North St. Paul**, Chief David Zick, 651/770-4480; **St. Peter**, Chief Windy Block, 507/931-4840; and **White Bear Lake**, Chief Tim Vadnais, 651/429-8567.

Smaller volunteer or on-call departments: **Albany**, Chief Joseph Wedel, 320/845-4040; **Amboy**, Chief Tom Tallman, 507/674-3473; **Granite Falls,** Chief Mike Ohliger, 320/564-3011; **Greenbush**, Chief Russel Wicklund, 218/782-2570; **Isanti Volunteer**, Chief Randy Polzin, 612/444-8019; **Mora**, Chief Gene Anderson, 320/679-1511; **Ogilvie**, Chief Jon Cramsie, 320/272-4822; **St. Charles**, Chief Linus Soppa, 507/932-4090; **St. Paul Park Volunteer**, Chief Scott Gerry, 612/459-9918; **Spring Valley**, Chief Nevin Stender, 507/346-7367.

2. Evaluate Fire Department Performance and Use Resources Cost-Effectively

Evaluate Department Performance to Determine Cost-Effectiveness

To determine how effectively fire departments are using their resources, departments should periodically assess their own performance.[26] This means evaluating how well departments provide each service—everything from fire prevention to fire suppression. It includes evaluating departments' goals and objectives, determining whether they are consistent with community service demands, and modifying them accordingly.[27] By identifying strengths and weaknesses in their performance, departments can determine training, equipment, and personnel needs; modify and improve their programs and plans; reallocate resources as needed; and make informed strategic decisions about the types and levels of service they should provide.[28]

As mentioned above, a fire department's strategic plan (or master plan) should contain performance goals and service objectives. Even departments without such plans should develop goals and set objectives for themselves, and periodically measure their progress toward meeting the goals. In either case, fire departments should develop their goals and objectives in concert with any community planning taking place within their cities and townships.[29]

26 IAFC, *Fire and Emergency Service Self-Assessment Manual*, sec. 4-9.

27 IAFC, *Fire and Emergency Service Self-Assessment Manual*, sec. 4-9.

28 Coleman and Granito, *Managing Fire Services*, 103-104, 124-125.

29 NFPA, *NFPA 1201*, 4-1, 4-1.1.

Through measuring their own performance, departments can assess what they need for the future and base their budget requests on these needs.[30] Achieving a balance between objectives that departments set for themselves and the changing needs of their communities requires fostering good working relationships with local city councils and township boards, as well as interacting with building and planning officials and other local government personnel.

Self-evaluations are valuable as departmentwide reassessments; they are also useful following responses to incidents when departments can learn from their experiences. Evaluating fire department services includes assessing the effectiveness of individual services (for instance, the public education program), as well as the impact each service may have on other department functions.[31] For instance, understanding trends in fire incidents and the use of fire suppression resources can provide evidence of the impact of fire-safety awareness and code inspection programs. Similarly, analyzing the department's fire suppression performance after emergency incidents can reveal areas for improvement in training, personnel recruitment and scheduling, or health and safety protocols.[32]

As shown in Table 2.1:

- **Slightly more than 37 percent of the larger fire departments used a formal program of setting goals and objectives for themselves and measuring department performance toward those goals.**

Almost 74 percent of larger departments indicated that they conducted postincident analyses of their emergency responses. Similar data were not available for fire departments in smaller communities.

Table 2.1: Practices Fire Departments Used to Measure Performance, 1997

Practice	Percent (*N*=88)
Conducted postincident analysis following emergency responses	73.9%
Measured department progress informally	58.0
Kept log of on-scene incident activities	61.4
Measured progress with formal program of setting department goals and objectives	37.5
Followed a quality assurance program	18.2

NOTE: Data collected only from volunteer or paid on-call fire departments in cities of 8,000 or more population and departments with full-time or combination personnel.

SOURCE: Legislative Auditor's Office Survey of Fire Departments, 1998.

Manage an Information System

To make strategic decisions about their services, departments need a system for managing information. Many fire departments use computers for this purpose, and with the availability of low-cost personal computers most smaller departments are also able to automate much of their information. Even manual record keeping, though, can support the information needs of smaller departments, if it is periodically updated.[33]

Whatever information system fire departments use, departments should be able to efficiently keep and retrieve records on the whole realm of their activities. The information system should integrate such diverse information as: department purchases, personnel employment and performance histories, training records, emergency incident reports, apparatus and equipment maintenance, inspections, and code enforcement requirements, among other data.[34] With this information, departments are

30 NFPA, *NFPA 1201*, 4-3.7.

31 Coleman and Granito, *Managing Fire Services*, 103-104, 124-125.

32 Coleman and Granito, *Managing Fire Services*, 103-104, 124-125; NFPA, *NFPA 1500, Standard on Fire Department Occupational Safety and Health Program*, 1997 ed. (Quincy, Mass.: NFPA, 1997), 6-8; Federal Emergency Management Agency, *Fire Department Communications Manual* (Washington, D. C.: U. S. Fire Administration, 1995), 5-23, 5-24.

33 Cote, *Fire Protection Handbook*, sec. 10-45.

34 Cote, *Fire Protection Handbook*, sec. 10-51.

prepared to evaluate their performance and plan for the future by improving on past performance.

We found that:

- **About 63 percent of larger fire departments maintained a management information system to record information on fire department activities.**

Similar data were not available for fire departments in smaller communities.

Optimize Mutual Aid or Automatic Aid

Minnesota fire departments have a long tradition of coming to the assistance of other departments when extra fire fighters or equipment are needed for an emergency. Through mutual aid, fire departments rely on nearby departments to help manage large-scale events and disasters for which ordinary resources are inadequate.[35] With automatic aid, departments in close proximity to each other automatically respond to incidents on the first alarm. We found that:

- **All fire departments with the exception of 2 percent of volunteer or paid on-call departments participated in mutual aid for some fire-related services.**

Fire departments also use mutual aid associations for sharing information and other collaborative efforts including joint training exercises and equipment purchases, as described below.

Mutual aid supplements a fire department's personnel, equipment, and apparatus in a cost-effective way when agencies rely on neighboring departments instead of incurring the expense of being trained and fully equipped to respond to prolonged or extraordinary incidents. For most mutual aid responses, fire departments do not exchange money or charge fees.

As with other aspects of the fire department's services, advance planning is important to effective mutual aid. To be effective, mutual aid arrangements must be written prior to the occurrence of major emergencies so it is clear who assumes incident command, which department is liable for injuries that may be incurred, and what staffing and equipment will be available to respond.[36] Legislation passed in 1998 answers certain questions about liability for Minnesota fire departments operating without written mutual aid agreements.[37]

Equally important, department members must understand the operating procedures of the other mutual aid departments. For an integrated response between two or more departments, members should receive training on the mutual aid plans and the normal command procedures of each department.[38] When neighboring departments use compatible operating methods (to the extent that is practicable), they help ensure a systematic and coordinated response effort.

Coordinated responses also require mutual aid departments to prepare for effective communications between participants.[39] Agencies need arrangements to notify nearby departments when mutual aid is called for, as well as radio equipment (or other hardware) and communication protocols that enable members to communicate with other departments throughout an emergency incident. To communicate without disrupting their

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35 Cote, *Fire Protection Handbook*, sec. 10-14.

36 NFPA, *NFPA 1201,* 5-8.2.

37 *Minn. Stat.* §12.331 specifies that in instances when emergency assistance is provided without an existing mutual aid agreement, the sending city's workers compensation would cover any injuries to employees sent to another jurisdiction. Equipment damage is the responsibility of the equipment owner, that is, the sending city. Tort liabilities, on the other hand, fall under the responsibility of the city receiving assistance.

38 NFPA, *NFPA 1201*, 5-8.3.

39 NFPA, *NFPA 1201,* 5-8.4.

local frequencies, mutual aid departments should use separate mutual aid radio channels.[40] Dispatchers receiving and transmitting the calls for help must receive training on which fire officials to alert and when. Advance arrangements should allow interdepartmental communication without disrupting the use of departments' normal radio frequencies.

Mutual aid is not limited to suppressing fires. We found that in 1997:

- **In addition to responding to mutual aid calls for fire fighting, most fire departments conducted joint training and drills and shared the use of specialized equipment within their mutual aid associations, while far fewer departments used mutual aid associations for cooperative purchasing and fire prevention activities.**

Table 2.2 shows that interagency responses are common for providing emergency medical services and rescues, as well as for fire suppression. In cases where the likelihood of a particular type of incident is small, such as a confined space rescue, or where departments do not own the necessary specialized equipment, mutual aid agreements offer the ability to respond by using other departments that have appropriate training and equipment. We learned about many neighboring fire departments that have divided specialized services among themselves so that each has a specific area in which it excels and for which its members are fully trained and equipped.

This type of mutual aid arrangement increases efficiency because individual departments do not each have to spend resources on the specialized equipment and training. As with fire suppression, mutual aid for other emergency activities should be designed with common operating procedures, a standard approach to incident command, familiarity of department members with the procedures and equipment of other departments, and an effective communications system.[41]

Beyond mutual responses to incidents, some departments use mutual aid to gain other benefits. These include shared facilities, cooperative training sessions, joint purchases of specialized apparatus, and coordinated long-range planning with adjacent departments.[42] Table 2.2 also shows the percentage of fire departments using mutual aid in ways beyond responding to incidents. Obviously, fire departments without other departments in nearby proximity face a practical limitation on joint efforts. For others, however, extending mutual aid arrangements to include activities other than incident responses offers cost-effective opportunities.

Use Existing Services

By taking advantage of existing services available from other departments, state agencies, and industry associations, fire departments can offer services efficiently and avoid duplicating efforts. Although fire departments must assess their own local communities and match the appropriate materials to their particular needs, they may be able to purchase or use materials produced by others and even add their own local flavor to the materials at lower cost than creating materials themselves.[43]

For example, departments can purchase public education materials, such as the *Learn Not to Burn* program produced by the National Fire Protection Association, instead of incurring the expense of developing their own. The United States Fire Administration and American Red Cross also produce fire-related educational materials, some of which are available at no charge. Rural departments in particular may be able to use items such as the Smokey Bear materials produced by the Forestry Division of the Minnesota Department of Natural Resources. Organizations such as the Minnesota State Fire Chiefs' Association also offer resources to fire departments.

40 NFPA, *NFPA 1201,* 5-8.4.

41 FEMA, *Technical Rescue Program Development Manual, 10-2.*

42 Cote, *Fire Protection Handbook,* sec. 10-14.

43 Cote, *Fire Protection Handbook,* sec. 2-37.

Table 2.2: Activities Included in Fire Departments' Mutual Aid, 1997

Activity	Full-Time Departments (*N*=13)	Combination Departments (*N*=19)	Volunteer or Paid On-Call Departments (*N*=347)
Fire suppression	92.3%	100%	98.6%
Hazardous materials responses	76.9	52.6	37.5
Rescues	69.2	68.4	49.9
Training courses or seminars	69.2	73.7	65.4
Emergency Medical Services (Basic or Advanced Life Support)	69.2	42.1	40.9
Drills and exercises	61.5	84.2	76.1
Use of specialized equipment	53.8	78.9	58.2
Fire investigations	38.5	26.3	27.4
Use of facilities	38.5	68.4	48.7
First responders	30.8	47.4	58.5
Fire-safety awareness efforts	30.8	42.1	29.1
Cooperative purchasing	23.1	36.8	11.0

NOTE: Combination departments include those with six or more full-time fire fighters along with volunteer or paid on-call members.

SOURCE: Legislative Auditor's Office Survey of Fire Departments, 1998.

Rely on Joint Purchasing

Fire departments can gain efficiencies through joint purchasing arrangements. Contracts arranged at the state, county, or regional level enable local departments to buy equipment and apparatus at prices negotiated for large-scale purchases. For instance, the Minnesota Fire Agencies Purchasing Consortium, organized and run by local fire department officials, allows departments to purchase commonly replaced items, such as pager batteries and turnout gear, at substantial savings. Participation requires an annual $35 membership fee.

State statutes allow local governments to enter into agreements whereby one unit of government can solicit bids or quotations for purchasing supplies both for its own use and for that of other government units that are parties to the agreement.[44] In this way, multiple local governments can benefit from a bid or quotation without each actually going through the process and time of soliciting bids. Making purchases from state, county, or other collaborative contracts can save money due to the economies of scale gained from the increased purchasing power of large quantities.

As one may expect, joint purchases of equipment are more common than joint purchases of pumpers, ladder trucks, tankers, or other apparatus. According to our survey:

44 Minn. Stat. §471.59, subd. 1 allows two or more governmental units, by agreement of their governing bodies, to jointly or cooperatively exercise any power that they share in common.

- **Only about 2 percent of all fire departments indicated they had purchased apparatus jointly with another department in the past 10 years.**

Those few that purchased apparatus jointly tended to be smaller volunteer or paid on-call departments. This percentage does not account for fire departments that serve more than one community and, therefore, purchase and use apparatus for multiple jurisdictions. Further, some fire departments avoid purchasing equipment that they know is available through mutual aid at nearby jurisdictions.

As mentioned in Chapter 1, Minnesota fire departments may obtain trucks and equipment through the Federal Excess Property Program whereby the federal government funnels unused or surplus equipment to the state and the state makes it available at cost to local governments. We found that volunteer or paid on-call departments were more likely than others to use the excess property program.

- **About 16 percent of full-time and combination fire departments and 32 percent of volunteer or paid on-call departments had acquired vehicles through the Federal Excess Property Program in the past 10 years.**

Explore Alternative Service Delivery

To correct major inefficiencies or to provide adequate fire protection when existing departments lack the resources or are otherwise incapable of providing service, fire departments should consider alternatives to assuming sole responsibility for fire protection. Alternatives include intergovernmental contracts for service, joint powers agreements, or consolidation.

Intergovernmental contracts for service involve one jurisdiction providing service on behalf of others in exchange for payment. More than two-thirds of Minnesota fire departments have contracts for providing service, according to our survey. Some departments have contracts to provide their full range of emergency services to surrounding areas. Others have contracts for only a specific service, such as providing fire-code related building inspections. Such contracts allow the participating governments to effectively and efficiently use trained personnel and facilities, achieve economies of scale, and organize services in ways unconstrained by municipal boundary lines, while meeting citizen demands.[45] Communities control the level of service, assessment of costs, liability issues, and management authority only by specifying these items in the contract.[46] We found that:

- **Half of full-time and combination fire departments and 70 percent of volunteer or paid on-call departments provided some fire-related services by contract with other jurisdictions in 1997.**

Forming a joint powers agreement to provide services gives communities control over the services. Such an agreement allows the participating communities to determine how their joint purpose will be accomplished and to establish a joint powers board with members representative of the involved communities.[47] With a joint powers board, the participating communities do not relinquish decision making power; they share it. As with contracts for service, joint powers agreements may be used for a full range of fire-related emergency services or only one portion.

Beyond contracting for fire services, consolidating fire departments has the potential of providing a high level of service to residents at a lower overall cost. Sharing costs over a larger base enables successfully consolidated departments to afford highly trained personnel, adequate apparatus, and updated equipment more easily than individual departments.[48] Consolidations can also result in savings through the reduction of duplicate positions

45 Coleman and Granito, *Managing Fire Services*, 437.

46 Although the content of fire service contracts has been a point of some dispute in Minnesota, it is beyond the scope of this study to evaluate existing contracts.

47 *Minn. Stat.* §471.59, subd. 2, 11. Statutes allow joint powers boards to issue bonds or obligations.

48 Coleman and Granito, *Managing Fire Services*, 439.

or centralization of administrative and support services. Because the majority of Minnesota fire departments are on-call departments with few if any full-time staff, however, the salary savings involved with reducing positions may be small. Few Minnesota fire departments operate as the result of consolidations. According to our survey, in 1997:

- **Less than 4 percent of all fire departments operated as the result of multiple departments having consolidated.**

Communities that consider fire department consolidations or contracts for service must weigh all of the benefits and costs. For example, the size of the area being served can affect the level of service. Without appropriate planning a consolidation could result in longer response times, which would increase the communities' fire risks due to the possibility of more extensive fires and the spread of fires to nearby properties. A reasonable response time balances the level of service desired with the financial ability of the communities to provide the necessary stations, personnel, and equipment.[49]

Summary and Examples Related to Evaluating Performance and Using Resources Cost-Effectively

The advantages to fire departments of evaluating their own performance lie in the quantifiable information produced on the departments' impact, efficiency, and effectiveness. This allows departments to make informed decisions about improving their services and can support spending requests by demonstrating real needs. Performance data can enhance communication with elected officials and the public by focusing on actual results departments achieved. The costs to measuring performance come from the time involved and expenditures for computers and software or some other information system for maintaining data. The time required is significant and ongoing because departments have to: articulate their mission, goals, and objectives; set up a system to collect relevant information on their performance; actually record the pertinent data on a regular, ongoing basis; and analyze the data to determine implications for future operations.

The benefits of aggressively participating in mutual aid arrangements and using joint purchasing collaborations are saving money and time. Mutual aid and automatic aid give departments access to personnel and apparatus that they would otherwise have to provide themselves. Mutual aid also allows departments to focus on their strengths and avoid the costs of preparing to provide a full range of specialized emergency services. The costs involve the time needed to plan and maintain the mutual aid arrangements and the joint training required to implement them. Buying equipment through joint purchasing groups typically results in lower per unit costs as well as time saved by avoiding duplicate bidding processes by multiple jurisdictions. Some purchasing groups require annual membership fees.

Optimizing mutual aid opportunities saves money.

The benefits and costs of alternative service delivery will vary by community and by the extent of the proposed changes. Typically, improving services or realizing efficiencies are the driving forces behind a change. Implementing changes in service delivery is extremely time-intensive and involves not only the fire department but also city or township administrators and elected officials. In some cases, it may require legislative action to overcome legal barriers. Costs also include the political ramifications of changing a community's fire service delivery methods, which can overpower efforts for improved efficiency.

Sharing Expertise and Equipment

Because most fire departments cannot afford the equipment and training or accumulate the expertise to provide a wide range of specialized emergency services, such as confined-space rescues, many have collaborated on special services and equipment. In several of these collaborations, neighboring fire departments have come together and determined

49 Cote, *Fire Protection Handbook*, sec. 10-252.

jointly which departments would offer a particular specialized service. As a result, when such a service is needed anywhere in the participating departments' response area, the fire department with expertise in that specialty provides it.

The collaborations represent an efficient way to offer specialized services. Most of these specialized services are called for infrequently, yet require personnel who are trained and equipped to respond appropriately. It would be very costly to expect all departments in a mutual aid area to attain the expertise and equipment needed for a full range of services. Instead, the collaborations make the specialized service available at no direct cost to the requesting department. Each fire department pays the costs only for its specialized services and assumes the exchange of services over time balances overall costs among participating departments.

For example, in the North Suburban Regional Mutual Aid Association, participating departments have each developed specialized expertise that they share with others when emergencies arise. Brooklyn Park's Fire Department has experience with decontamination following spills of hazardous materials while West Metro has expertise and equipment in spill containment. The West Metro Fire Department also offers services in trench rescues. Fridley, Plymouth, and Maple Grove have extensive hazardous materials training, including how to stop a spill. Brooklyn Center has a dive team and is prepared to offer dive and rescue services.

To facilitate the collaboration, the participating fire departments hold joint training so all fire fighters know what to do while waiting for neighboring departments to arrive. Fire departments have written the specialized services into their standard operating guidelines; when an emergency occurs requiring specialized responses, they are prepared to alert the appropriate responding unit. Fire departments have also exchanged equipment to accommodate each other's specialties. For instance, Brooklyn Park gave floating booms used to contain spills of hazardous materials to the West Metro department, which specializes in spill containment.

In the area of shared equipment, some fire departments with expensive rescue equipment make it and their staff available to other departments when needed. As an example, sizable donations from local businesses and community organizations allowed the Pierz Fire Department to purchase a helmet-mounted infrared imaging system that enables a fire fighter to see through smoke to locate victims and the fire's origin more quickly. When neighboring departments are battling fires involving dense smoke, Pierz fire fighters will provide assistance using their infrared imaging system. Because the technology is very expensive, costing approximately $25,000 for a single infrared unit, the shared use of Pierz' equipment gives other departments who could not afford it the same advantages in extremely smoky structure fires.

Similarly, the Gonvick Fire Department is one of the few fire departments in its area with vehicle extrication tools. If an automobile accident occurs in a nearby fire department's response area,

Pierz firefighters use the helmet-mounted infrared imaging system for extremely smoky structure fires in their response areas and neighboring ones.

Gonvick fire fighters will respond with their specialized equipment to extricate accident victims.

Collaborative uses of expertise and equipment take advance planning and time to work out the details of the joint arrangements. They also require a willingness among participants to work with other fire departments. Departments of all sizes have the potential to benefit from similar joint efforts, although the need to collaborate may be more acute for fire departments with sharply limited budgets or those for whom limited staff availability make it unrealistic to provide a wide variety of specialized services, even though the local needs exist.

For more information contact:

Chief James Driste
Brooklyn Park Fire Department
612/493-8026

Chief Ronald Rude
Gonvick Fire Department
218/487-5770

Chief Dale Janson
Pierz Fire Department
320/632-7351

Chief Kevin J. McGinty
West Metro Fire - Rescue District
612/537-2323

Evaluating Performance

Cotton Volunteer Fire Department and First Responders

The Cotton Volunteer Fire Department has made a practice of critiquing each emergency response made by its fire fighters and first responders. Its intent is to ensure fire fighter safety and improve future emergency responses.

As part of the fire department's standard operations, a safety officer appointed by the chief and assistant chiefs monitors safety during emergency responses. After having received special training on safety procedures, the safety officers' role is to stand back during the incidents and observe how fire fighters and first responders perform their duties. They note what works well and not so well.

In addition, the department developed a one-page "incident critique form" that it encourages all members to fill out following emergency responses. On the form, members can explain what would have helped them do their job better, such as additional training or the availability of certain equipment. They also can describe activities they saw or were directed to do that they felt was unsafe or uncalled for. Members have the option of leaving the form anonymously.

At the department's monthly meetings, all members review the incidents using the safety officers' observations and the incident critique forms. They decide collectively what can be done to improve operations in the future. Using this approach systematically for all incidents encourages members to identify both positive and negative aspects of the responses, knowing that their concerns will be addressed.

The department has found the incident critiques to be a valuable way to review and improve its performance and increase safe operations for its members. Because the critique form is short, fire fighters need only a brief amount of time to fill it out. Implementing the program requires devoting time at each department meeting to review the critiques. Departments of any size may find it beneficial to make the time investment.

For more information contact:

Chief Craig Kinsley
Cotton Volunteer Fire Department and First Responders
218/482-5538

Brooklyn Park Fire Department

The Brooklyn Park Fire Department periodically surveys people who use its services. Answers to the surveys help the fire department understand how its customers perceive its services and identify what may need improvement.

In 1996 the fire department developed two one-page questionnaires, one targeted to residents and the second to businesses. Following a fire, the department sent a questionnaire to every fourth address on the sector sheet of locations receiving

service. The commercial service questionnaire was handed to business owners by fire department inspectors following inspections. Each questionnaire asks recipients to first indicate what service they received and then rate the performance of the fire department on several characteristics, such as the personnel's ability to address the problem and their professionalism. The questionnaires also contain room for writing comments.

The format of the questionnaire includes a postage-paid return address allowing recipients to complete the questions, seal the survey, and drop it in the mail. After about six months of collecting the returned questionnaires, the department analyzed the results looking for areas of customer satisfaction as well as information that could help improve some of its practices. After its first round of questionnaires, the department received back about 50 percent of the questionnaires sent following structure fires and about 60 percent from building inspections.

The fire department views the questionnaires as one way of providing personal service to residents and furthering its working relationships with businesses. Although most of the ratings have been positive, fire officials follow-up on any negative comments to determine whether they should modify their practices. The fire department does not rely solely on survey results to judge how well it is doing, but the ratings become part of the department's review of its overall performance.

Other fire departments interested in measuring their customers' satisfaction with fire services need to devote time to developing a questionnaire and periodically analyzing its results. Direct costs will vary depending on the number of surveys mailed and involve the price of printing and mailing the questionnaire and return postage. To increase the chances that people will answer the questionnaire, it should be designed so respondents can easily fill it out and return it.

For more information contact:

Chief James Driste
Brooklyn Park Fire Department
612/493-8026

Apparatus and Equipment Standardization

Duluth Fire Department

To hold down costs of purchasing and maintaining fire department vehicles and equipment, Duluth's Fire Department purchases standardized equipment and apparatus components. Most of the fire department trucks, for instance, have the same automatic transmissions, engines, and chassis. Relying on standardized components and bypassing customized fire trucks with unique features, the department saves substantial amounts, up to $20,000 per vehicle without any reduction in performance.

Using standardized parts and equipment has become a citywide practice that extends outside the fire department to include other city offices, such as public works and law enforcement. When these departments write specifications for vehicles, they include the same standardized components. As they have replaced vehicles over the past decade or so, they have purchased trucks and other rolling stock with the standardized components. Not only major vehicle components are standardized; smaller parts and equipment are also. Fire engines carry the same emergency lightbars on top as police cars, for instance. The fire department uses the same standardized portable and mobile radios as the police, public works, and parks departments.

Standardized parts improve efficiency.

Because all city departments use similar components and equipment, the city's fleet maintenance personnel, who manage all of the city's rolling stock, gain special expertise from working with the same or similar vehicles from day to day. This allows them to operate more efficiently than if each city department ordered different vehicles and equipment. Because of the standardization, the inventory of parts can be kept at a manageable level and there is less chance of running out of necessary replacement parts. As a result, vehicle downtime is reduced and apparatus are available when needed for emergency responses.

Determining which standardized components to include in specifications takes time and requires a department to periodically reassess whether the selected parts continue to perform well and economically. For a large fleet, a computerized system of maintenance and performance records helps determine which standardized components need replacement and which should continue to be ordered. Using standardized apparatus components and equipment is potentially beneficial for large and small fire departments, particularly those involved with their own vehicle maintenance. It may be less practical for fire departments that rely heavily on used apparatus purchased from other fire departments or from the excess property program.

For more information contact:

Chief Duane Flynn
Duluth Fire Department
218/723-3200

Excess Property Program and Matching Grants

Cotton Volunteer Fire Department and First Responders

To acquire equipment and fire rigs, the Cotton Volunteer Fire Department relies in part on the Federal Excess Property Program and matching grants available through the Department of Natural Resources (DNR).[50] Using these state-administered programs saves significant money for the fire department.

Although the Cotton Fire Department is relatively small, it provides fire and first responder emergency medical services throughout the 72-square mile township. To provide its services, the fire department needs pumper trucks sufficiently equipped to maintain the township's ISO insurance rating. The fire department has purchased fire trucks used from other fire departments and it has acquired trucks and pumps through the Federal Excess Property Program. Rigs loaned through the excess property program are typically acquired for small sums needed to cover costs for transporting the vehicles and for parts fees.

To meet local needs, the fire department has to convert or modify trucks loaned from the excess property program. But the costs of doing so are far less than purchasing a similar truck elsewhere. For instance, the Cotton Fire Department acquired a pick-up truck from the excess property program for a transportation fee of about $500. The department had to equip the truck with an $8,000 slip-in pump to make it useful as a grass fire rig. To further offset its costs, the fire department applied for and received a $2,000 matching grant that lowered its total cost for the truck and pump to about $6,500.

In addition to the grass rig, the fire department has acquired through the excess property program a 1,500 gallon tanker truck, a 750 gallon per minute portable pump, and a rig being converted to a rescue vehicle. Beyond the larger apparatus, the Cotton

The Cotton Volunteer Fire Department converted a truck from the Federal Excess Property Program into a grass fire fighting rig.

50 Chapter 1 contains a description of these programs.

Fire Department has acquired smaller items and equipment through the excess property program. Items include a computer for maintaining fire department records, communications equipment such as radios the department provides to all first responders, and fire-resistant apparel.

Fire departments have to be aware that the DNR often has waiting lists for trucks available through the excess property program. Plus the availability of equipment and other items varies from year to year; departments looking for a specific piece of equipment, or in need of a rig immediately, may not find the excess property program to be a good source. On the other hand, fire departments that have limited budgets and are willing to convert excess federal trucks may find apparatus to meet their needs at minimal cost. DNR matching grants are available primarily for rural fire departments that fight wildland fires.

For more information contact:

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Cotton Volunteer Fire Department and First Responders
218/482-5538

Transforming from a Full-time to Combination Fire Department

St. Louis Park Fire Department

In mid-1996, the St. Louis Park Fire Department added part-time, on-call fire fighters to what had been an exclusively full-time staff. At that time, the fire department was also working on reorganization. The personnel changes due to adding paid on-call members and reorganizing have increased efficiency and productivity in the fire department, although the department faced political difficulties in implementing them.

The department's reorganization included reducing the number of staff on shift by creating two daytime positions with an emphasis on fire prevention, enabling the department to begin an automatic response arrangement with two adjoining fire departments. Additionally, the captain position was eliminated through attrition and the department established three management positions classified as battalion chiefs to direct shift operations. The battalion chief positions gave the department an opportunity to develop shift managers for dealing with administrative problems and supervisory issues.

City council members favored returning to using part-time fire fighters, a practice that the St. Louis Park Fire Department had abandoned because over time too few showed up when called for service. Full-time fire fighters resisted the addition of part-time personnel out of concern over maintaining highly trained, skilled members and fear of losing their jobs.

Several factors helped those involved with the planning eventually reach agreement on adding on-call personnel. First, in exchange for support and cooperation by the fire fighters, the city council offered that no existing fire fighter would lose his job due to the creation of the paid on-call component. Several full-time fire fighters had been on committees examining other fire departments that had turned to combined personnel and they wanted to avoid changes that would substantially reduce the numbers of full-time fire fighters, as had occurred elsewhere. Not only have those who wanted to stay with the fire department retained their jobs, but also when the department recently filled two full-time positions it hired from among the part-time fire fighters.

Second, to assure high quality on-call staff, the fire department agreed to train its part-time members to the same standards as the full-time personnel. This instilled confidence in the paid on-call members. Those recruited underwent background checks, psychological testing, and an intensive interview process. Part-time fire fighters were also required to live within ten minutes of a city fire station so that they had a better chance of being able to respond quickly when called in as back up to the full-time fire fighters.

Around the same time that part-time fire fighters were being discussed, the fire department began offering first responder service along with the city's police department. Unlike the police, the full-time fire fighters had all received emergency medical technician training. The dual response improved services to emergency victims because of fire

fighters' higher training, their use of defibrillators which police did not have, and because the demands of community policing had reduced the police department's time to provide emergency medical services. In addition, part-time fire fighters became more valuable as emergency medical calls consumed increasing amounts of fire fighters' time.

Between 1991 and 1996, the department increased by 41 percent its number of responses to emergency calls, while maintaining a low response time and keeping its budget within a 3. 9 percent total increase over that period. Due to turnover, the department has 24 full-time fire fighters, compared to 28 in 1991. The part-time on-call members offer the department the availability of additional engine crews when there are large fires or multiple emergencies occurring simultaneously. In part because it now relies on calling back the part-time fire department members when full-time fire fighters are responding to calls, the department has reduced its overtime costs by about 30 percent over 4 years.

The process of adding part-time personnel to fire departments takes time and resources. St. Louis Park took about two and a half years to study and plan for the transition and hired a consultant to assist in the study. Such a substantial change also creates tension with existing members. Although it took steps to alleviate full-time fire fighters' concerns about training and loss of jobs, the department still encountered resistance. Focusing attention on communication with full-time fire fighters about the need for the change and about the transition as it takes place could help other departments undergoing similar staffing changes.

For more information contact:

Chief Robert Gill
St. Louis Park Fire Department
612/924-2594

Alternative Service Delivery Arrangement

West Metro Fire - Rescue District

In mid-1998 the on-call fire departments in the adjoining cities of Crystal and New Hope began operating as a single department. A decision in the early 1990s over whether to purchase a fairly expensive ladder truck led to discussions of other options including buying the truck jointly with the neighboring fire department and merging the departments. Following years of studying the merger issue, hiring consultants, analyzing the proposal's benefits and costs, and taking the necessary steps to begin implementation, the two cities established the West Metro Fire - Rescue District through a joint powers agreement. Although still in its early stages, the merger promises high quality fire and rescue services while saving money over time.

In creating a joint fire district, Crystal and New Hope intended to meet their communities' rising expectations for service without raising property taxes. To govern the new department, the joint agreement established a nine-member governing body consisting of elected officials and public appointments from each city council, as well as the two city managers. In addition to administration, compensation, and asset ownership matters, the agreement specifies the share each city bears of the fire department's annual budget. The allocation varies according to a formula that accounts for each city's relative share of emergency calls over the previous five years, population, and property market value.

The merger posed both political and administrative hurdles. Several fire fighters resisted the merger fearing changes to their pensions and part-time positions, among other things. To make it work, the cities needed special legislation that consolidated the two fire departments' separate fire fighter relief associations. Elected officials also promised that no fire fighters who wanted to stay would lose their jobs. Instead of adopting one or the other city's personnel policies, health coverage, workers' compensation, insurance, and other human resource arrangements, the new department developed its own, at the request of its governing board. For a variety of reasons, the new fire department has gone outside the two cities for services such as financial accounting, banking, and vehicle maintenance. It also had to purchase its own computer system file server and new fire department software.

As a result of the merger, fire and rescue responses are based, not on city boundary lines, but on proximity between incidents and the new fire

district's three fire stations. The new department uses a multiple station operation: Fire companies from two stations are dispatched to a structure fire; the first arriving officer determines whether the response is appropriate or needs to be scaled up or down. If more resources are needed, a second alarm goes out and additional personnel respond. Although this was a big adjustment for fire fighters, particularly those accustomed to a single-station operation, it proved more efficient than in the past when all on-call fire fighters responded to an alarm.

The merger produced other benefits. In a change from past practices, New Hope residents who call at any time with symptoms of heart attack will have fire fighters, who are equipped with and trained to use defibrillators, dispatched to assist as first responders. The two full-time fire marshals from the former departments now work hand-in-hand for concentrated fire prevention efforts, including consistent code enforcement in building inspections. For the first time in either city, the department has a vehicle replacement program. Each city sets aside money for future capital purchases based on planned equipment replacements.

Cost reductions came about due to turnover in fire fighter positions that went unfilled, reducing the number of personnel from 70 to 62. Plus, the deputy chief's salary was somewhat less than that paid to a former chief. Because the full-time positions in the former fire departments were brought into the new department, and because of some unexpected costs, such as the need for the department's own computer server, the reduction in operating expenses was less than some city council members had hoped.

The departments' merger is expected to reduce capital costs.

More significant savings are expected over time as the fire department can avoid the costs of replacing all of its existing fire trucks. With the new fire district, the department estimates it can reduce its vehicles by three pumpers and still maintain its ISO rating.

Based on the West Metro Fire - Rescue experience, it is important to have from the start the support of the majority of elected officials and administrators from both communities. Others considering mergers should take steps to ensure that fire fighters and the community at large know even during conceptual stages why a merger is being discussed and how it is expected to affect them. In addition, it is important to allot sufficient time to work out personnel matters and other administrative issues once the legal entity of the joint arrangement is made. Although the West Metro merger experienced resistance as it brought together two on-call departments, mergers between two dissimilar departments may find even more difficulties reconciling the concerns of full-time and part-time personnel. Proponents for any change of this magnitude can expect to meet criticism and should prepare for it.

For more information contact:

Chief Kevin J. McGinty
West Metro Fire - Rescue District
612/537-2323

Pierz Fire Department

The Pierz Fire Department, a municipal paid on-call department, contracts with the Department of Natural Resources (DNR) to provide wildfire suppression services for the DNR wildfire control program. The departments' interagency agreement, requiring the Pierz Fire Department to provide service on an as-needed basis, gives local taxpayers comprehensive wildfire protection; the cost is lower than would be required to fully staff a year-round DNR fire station in the region.

The service contract stipulates that Pierz fire fighters provide back-up support to DNR fire fighters. The DNR pays the Pierz department on an hourly basis per fire fighting unit, which varies by type of apparatus and number of fire fighters. Requesting a Pierz fire fighting unit is at the discretion of the DNR incident commander, as is the amount of time the unit is needed. Regardless of who arrives first at the scene during these coordinated activities, the ranking DNR fire fighter assumes the role of incident commander. The DNR uses the Pierz on-call fire fighters generally for

initial suppression activities and structure protection. Once a fire is under control and waning, the incident commander releases Pierz fire fighters and DNR fire fighters extinguish the fire and conduct mop-up.

To ensure an effective, coordinated response, the participants engage in joint training activities that focus on communication protocols, equipment use, safety issues, familiarity with the DNR incident command system, and wildfire suppression strategies. Due to high risks involved in setting forest fires for training purposes, much of the training involves classroom activities such as hypothetical incidents that are played out using an overhead projector with interactive scenarios of wildfire progression. Local law enforcement officials, dispatchers, and emergency medical response agencies also participate in these joint training efforts.

Because of the Pierz fire station's strategic location, it helps reduce response time within the large service area. By working cooperatively, the departments provide both wildfire and structural fire protection should a wildfire progress through developed areas. The Pierz Fire Department's costs for the DNR interagency service agreement include its time for one or two days of annual training and, when the department has available funds, compensating its fire fighters for participating in the joint training. Those fire departments with few wildfires or located in areas with minimal wildfire fuel load are less likely to have a need for interagency agreements with the DNR.

For more information contact:

Chief Dale Janson
Pierz Fire Department
320/632-7351

Joint Purchasing

West Metro Fire - Rescue District

The West Metro Fire Department is one of about 100 fire departments around the state that participate in the Minnesota Fire Agency Purchasing Consortium. Through the consortium, fire departments buy equipment at low prices. Equipment available through the consortium in 1998 included items that fire departments commonly replace such as self-contained breathing apparatus, turnout gear, hose of various diameters, foam, flashlights and batteries, personal safety devices, pagers, and radios.

Committees within the consortium jointly take competitive bids each year from vendors of fire service equipment. They award contracts to the low bidders. Vendors may extend their bid price for an additional year, but a contract may not be extended longer than two years. To ensure quality, all equipment must meet NFPA standards.

After the contracts have been established, consortium members may purchase what they need at the bid price. Because of its joint purchasing power, the consortium typically receives bids at prices lower than what an individual department might pay. For instance, in a recent consortium contract, the price for a set of turnout gear (including coats, pants, gloves, and hoods) was $100 less than what a fire department outside the purchasing consortium had just paid for the same gear.

To accommodate fire departments' different needs, the contracts typically offer options that allow departments to somewhat customize their equipment. The consortium only includes items for which it can attain low prices; some items, such as axes, are not available through the consortium because the bid did not produce a savings. Some fire departments use the purchasing consortium to buy only smaller quantities, for instance 4 or 5 items instead of 40, because they may find an even greater savings with their own large quantity purchases from a known vendor.

Members pay a $35 membership fee each year they belong to the consortium. Prospective members can view a table of contents from the bid book to see what items are available. They also receive a sample resolution that their city council or township board can use if needed to officially join the consortium.

Because purchasers pay shipping charges, fire departments have to be aware of how the items' cost plus shipping compares to prices they may be

offered locally. This is particularly important for rural departments who may be subject to larger shipping fees for their areas. Most fire departments regardless of size may find that the consortium's low bid offers them lower prices for quality merchandise that they replace frequently.

For more information contact:

Chief Kevin J. McGinty
West Metro Fire - Rescue District
612/537-2323

St. Louis Park and Hopkins Fire Departments

In an effort spearheaded by the Hopkins Fire Department, St. Louis Park's Fire Department joined with the 14 fire departments of the Southwest Mutual Aid Association in purchasing a "safe escape" house on a movable trailer in 1993 for fire education purposes. Equipped with a smoke generator, living room, fully appointed kitchen, furnished bedroom, and smoke detectors, the house is a tangible way to teach school children and other citizens about proper exiting from home fires, how to identify fire and safety hazards, and the importance of working smoke detectors.

Fire prevention personnel involved in the mutual aid association viewed a safe-escape house as a valuable fire-safety educational tool that made sense for a collaboration of departments to acquire because a single department was unlikely to need it frequently. Each fire department contributed an equal amount toward the purchase of the $32,000 trailer and home built on a mobile home frame; corporate contributions defrayed part of the expense. They did not purchase a truck for hauling the trailer, so departments use their own vehicles for transporting it. A joint service agreement signed by the participating cities details the ownership, scheduling, upkeep, and use of the safe escape house; it also addresses liability issues and establishes an operating committee of the mutual aid association to make decisions about the house's use.

14 fire departments collaborated on the safe-escape house.

For legal purposes, the Minnetonka Fire Department was designated as the owner of the safe house and that department schedules the house's use for the other departments. For maintenance, insurance, and to resupply the trailer, each participating fire department contributes about $75 annually. That amount may increase as the departments plan for the house's eventual replacement. Other departments outside the mutual aid association may also use the house for a $50 usage fee.

Some experienced fire prevention specialists prepared scripts to assist those operating the safe-escape house target the discussion to people of different ages. As tours progress through the house, the scripts provide fire fighters with information appropriate to each room; for instance, while in the bedroom the script suggests discussing the use of smoke detectors and the need for an escape plan.

Because the departments used the mutual aid association, they had an already established mechanism for administering the planning and purchase of the safe house and trailer. Other departments may find working with departments that have collaborated in the past makes the joint-purchasing process easier. It is important that one department agree to manage and maintain the equipment on behalf of the others. To assist those fire departments with less public-education experience, some participants should prepare scripts for use during tours. Plus, each department should be aware of the need for annual contributions to resupply the trailer and be willing to accommodate each other's schedules to share access to it.

For more information contact:

Chief Robert Gill or
Fire Marshal John Lindstrom
St. Louis Park Fire Department
612/924-2594 and 612/924-2599

or

Fire Marshal George Magdal
Hopkins Fire Department
612/939-1321

Other fire departments we surveyed also met our standards of performance for evaluating performance and using resources cost effectively, and some are listed here along with contact names.

Combination Departments: **Coon Rapids**, Chief Timothy Farmer, 612/767-6471; **Crookston**, Chief Richard Rock, 218/281-4584.

Larger Volunteer or On-Call Departments: **Alexandria,** Chief Rick Glade, 320/763-3501; **Oakdale**, Ronald Ehnstrom, 651/731-8886; **Spring Lake Park-Blaine-Mounds View**, Chief Nyle Zikmund, 612/786-4436.

Smaller Volunteer or On-Call Departments: **Albany**, Chief Joseph Wedel, 320/845-4040; **Dawson**, Chief Jeff Olson, 320/769-2154; **Janesville**, Chief Bruce Manthe, 507/234-5110; **Mora**, Chief Gene Anderson, 320/679-1511.

Mutual Aid

Winnebago Fire Service

The Winnebago Fire Service participates in mutual aid associations, joint purchasing and training, and shared facilities as part of a collaborative effort to reduce costs and enhance resources. By sharing equipment and expertise and developing standard protocols with law enforcement, emergency medical services, and other fire departments, the Winnebago Fire Service provides more cost-effective emergency operations for its primary and mutual aid response areas.

As part of the department's mutual aid activities, members meet periodically with fire fighters from all departments within Faribault and Martin counties and one department in Blue Earth County to update each other on protocols and concerns. The departments maintain master lists identifying other departments' equipment locations and specialized apparatus for use during prolonged or unusual incidents. Fire fighters are familiar with the layout of each others' fire halls so that if a fire crew needs to refill tankers during a fire, it can easily access water from the fire hall nearest to the incident. This shared expertise and knowledge of equipment locations also result in more appropriate pages for the type and amount of mutual aid assistance actually needed. Approximately 15 percent of the department's annual calls involve incoming or outgoing mutual aid.

All fire departments in Faribault County send their new fire fighters through initial training together as a cost-saving measure. By coordinating training activities, the fire departments can afford on-site training by instructors from the local technical college. Participating departments rotate hosting the training sessions to increase members' familiarity with other fire fighters and fire stations. The departments also plan their training and drills schedules out one year in advance; each department's schedule is distributed to all other fire departments. Fire officers reference these master training lists to determine well in advance

Mutual aid allows fire fighters to fill tankers from water sources nearest the incident.

opportunities for joint training. Winnebago fire officers say the joint training lowers their training costs.

Fire departments in the mutual aid associations conduct joint training on incident command systems, communication protocols, and standard operating guidelines to ensure smooth operations during an incident involving multiple fire departments. Local law enforcement, dispatchers, and emergency medical personnel become involved in these exercises periodically. Joint training activities within the city are easily organized since the Winnebago Fire Service, ambulance service, and public safety division share the same facility.

This collaborative training has proven worthwhile. During a recent missing-person search that lasted eight days in the Winnebago area, multiple state and local agencies converged on the Winnebago Municipal Center as a base for emergency operations. Fire officials credit the efficiency of the operations to the familiarity of local emergency response personnel with a common incident command system and knowledge of individuals' roles and responsibilities.

The Faribault County fire departments pursue joint purchasing opportunities on an annual basis. Depending on equipment needs, six to eight departments jointly apply for matching grants from the Department of Natural Resources. Because they apply together, the departments have consistently received grant money, which lowers costs for equipment and supplies.

Fire departments must communicate on an ongoing basis to effectively plan and take advantage of joint training opportunities and equipment purchases. Large, urban fire departments may be precluded from pursuing the Department of Natural Resource's matching grants, which are primarily for wildland fire fighting departments located in cities with less than 10,000 population.

For more information contact:

Chief Jerome Behnke
Winnebago Fire Service
507/893-3515

Automatic Aid

St. Louis Park, Golden Valley, Hopkins Fire Departments

St. Louis Park's Fire Department participates in an automatic aid agreement with the fire departments in Golden Valley and Hopkins. When structure fires occur in either Golden Valley or Hopkins on normal work days between 8 a.m. and 4 p.m., the St. Louis Park Fire Department is automatically dispatched. Similarly, when structure fires occur in St. Louis Park during the night, or on weekends or holidays, the fire department in either Golden Valley or Hopkins automatically responds, depending on the fire's location. This service extends above and beyond the mutual aid agreement that exists for the 14-member Southwest Mutual Aid Association, of which these three neighboring departments are members.

Automatic aid based on time of day and day of week works well for these departments due to their geographic proximity and the different personnel make-ups. St. Louis Park has a fire department that includes full-time members and has the strongest staffing complement during the day. Conversely, Golden Valley and Hopkins both have departments with part-time on-call fire fighters, and their strongest turnout of personnel occurs at night and on the weekends. The automatic aid builds on the respective strengths of each of the three fire departments.

The participating cities implemented automatic aid in the mid-1990s through a joint powers agreement that specified first-alarm response procedures, established a committee of the three chiefs to administer the arrangement, and detailed liability limits. The incident command structure remained as it had been set up under the Southwest Mutual Aid agreement, meaning that the city receiving the aid assumed command of the incident. Because the departments had worked together previously through mutual aid, they had the benefit of having trained together in the past and did not need extensive training or drills to become acquainted with the others' operations.

Aside from the time involved with planning and implementation, which stretched out over a year, the departments faced no direct costs for the automatic aid arrangement. The arrangement also produced other gains. With the automatic aid agreement, St. Louis Park could augment its fire prevention resources by shifting two of its 24-hour personnel to 40-hour per week fire prevention work. This improved the attention that the department could pay to fire prevention activities, including an aggressive apartment-inspection program. Because the agreement reduced the need for the fire department to call back its off-duty personnel when those on duty responded to a structure fire, the department gained additional control of overtime expenses. In addition, all three departments gained resources when most needed and supplemented their ISO credit without loss of their individual identities.

The strong support of each of the three chiefs was instrumental to the success of this automatic aid agreement. In addition, control over the dispatching of fire companies is an important consideration. Dispatchers required training to ensure they dispatch the appropriate companies for the particular time and day the fire occurs. This was less a concern in Golden Valley and St. Louis Park which were dispatched from a single public safety answering point.

After four years of success, all three departments have relied on this response agreement for day-to-day operations. For departments that may not have worked together previously, a similar automatic aid arrangement would require a mutual desire to join administrative and operational efforts, work out possible inconsistencies in communications, and begin joint training for fire fighters. Geographic proximity and the types of fire department staffing are important considerations. Automatic aid may not work as naturally elsewhere as it has in St. Louis Park, Golden Valley, and Hopkins if those fire departments considering it have entirely on-call fire fighters who are available only at similar hours.

For more information contact:

Chief Robert Gill
St. Louis Park Fire Department
612/924-2594

Other fire departments we surveyed also met our standards of performance related to optimizing mutual aid arrangements. Some are listed here along with contact names.

Combination Departments: **Austin**, Chief Dan Wilson, 507/433-3405.

Larger Volunteer or On-Call Departments: **Apple Valley**, Chief Marv Calvin, 612/423-5874; **Little Falls,** Chief Fred Tabatt, 320/632-4461; **Robbinsdale**, Chief Mark Fairchild, 612/537-4534; **Spring Lake Park-Blaine-Mounds View**, Chief Nyle Zikmund, 612/786-4436.

Smaller Volunteer or On-Call Departments: **Cotton Volunteer**, Chief Craig Kinsley 218/482-5538; **Spring Valley**, Chief Nevin Stender, 507/346-7367.

3. Promote Public Awareness of Fire Safety

Both urban and rural fire departments should establish a fire-safety education program to develop public awareness of fire risks, help prevent fires, and control the severity of fires and possible injuries.[51] Through a typical public education program, citizens learn about specific hazards (such as, the use of kerosene heaters in homes or the existence of fuel concentrations in possible wildfire areas), the need for exit drills and fire escape plans, and smoke detector and sprinkler system technology.

Although certain basic information is useful in all communities, it is important that a fire department identify the most important local fire risks in its service area and tailor its public education program accordingly.[52] Joint efforts with other agencies, such as the American Red Cross or the Department of Natural Resources, may offer fire departments

51 NFPA, *NFPA 1201,* 13-1; NFPA, *NFPA 295, Standard for Wildfire Control*, 1991 ed. (Quincy, Mass.: NFPA, 1991), 2-7, A-2.7 through A-2.7.1.

52 Coleman and Granito, *Managing Fire Services*, 380.

resources they would not otherwise have. The Minnesota State Fire Chiefs' Association has available for fire departments a packet of information on public fire-safety education, including a list of dozens of organizations that supply public education materials.

To make an education program useful to those in particular need, such as children, people with disabilities, non-English speaking populations, and nursing home occupants, departments should identify specific audiences or occupancies and target fire safety awareness efforts to them.[53] Department members should collaborate with the appropriate personnel outside the fire department, such as teachers or school administrators, in targeting information to these groups.

Because different communication techniques reach different people, departments should use a variety of media to communicate their fire safety education.[54] This means using a mix of public service announcements, press releases, handouts, newsletters, billboards, the Internet, radio and television media, and participation in the nationally observed annual Fire Prevention Week, among other things. It also means preparing department personnel to make presentations or give demonstrations on fire safety to targeted groups, civic organizations such as the Rotary or Lions Club, and occupants of commercial-industrial buildings.

Tailor fire-safety education to local needs.

Comprehensive fire safety education includes programs for industry and for residences.[55] Programs designed for industries and commercial enterprises help employees understand fire-safe work practices and instruct them in fire protection, such as the proper use of fire extinguishers. In providing such programs, fire departments must ensure they have the proper training and equipment to offer appropriate instruction. As with other fire-related activities not required by law, some legal experts suggest that fire departments can reduce their exposure to liability with a written disclaimer describing their activity as advisory, avoiding warranties as to the functioning of equipment such as smoke detectors or fire extinguishers, and stating that the fire department cannot be held liable for negligence in providing the activities.

Fire-safety messages targeted at residences are especially important because fires in Minnesota dwellings accounted for more than two-thirds of all fire deaths in 1997.[56] Voluntary home fire-safety surveys consist of personal visits to dwellings by fire fighters who monitor for fire hazards and inform residents about malfunctioning smoke detectors, fire escape routes, and potential fire hazards. According to our survey,

- **About 10 percent of Minnesota fire departments conducted home fire-safety surveys in 1997.**

Residence survey programs are voluntary on the part of homeowners and generally require advance publicity to motivate the community to accept the inspections. Fire department personnel conducting the surveys must receive training on common home hazards and appropriate procedures to follow during the inspections. Plus, some legal experts recommend fire departments reduce their exposure to liability by making it clear that they are offering the surveys as a public service but that they cannot guarantee a fire will not occur. With proper planning, home-safety surveys give fire departments a powerful form of direct contact with those at higher fire risk.[57] Some departments have found that incorporating the voluntary home surveys into

53 NFPA, *NFPA 1201,* 13-5.1; James C. Robertson, *Introduction to Fire Prevention,* 3d ed. (New York: Macmillan Publishing Co., 1989), 258.

54 NFPA, *NFPA 1201,* 13-6.1.

55 NFPA, *NFPA 1201,* 13-6.3, 13-6.4

56 State Fire Marshal Division, *1997 Fire in Minnesota*, 7.

57 NFPA, *NFPA 1452, Guide for Training Fire Service Personnel to Make Dwelling Fire Safety Surveys*, 1993 ed. (Quincy, Mass.: NFPA, 1993), 1-2 through 3-9.

their monthly training drill affords them the time to accomplish the program amidst their other commitments.

Juvenile fire setting has presented an ongoing problem for fire departments. To combat juvenile fire setting, fire departments need structured intervention programs. Such programs should identify juveniles who set fires, assess the juvenile's individual, family, and school situations, and then recommend appropriate treatment and restitution.[58] As explained in Chapter 1, efforts in the State Fire Marshal Division to create regionwide teams for juvenile fire setter intervention are intended to provide local fire departments with the necessary resources to address the problem. The program is designed to complement and strengthen local departments that have their own intervention programs.

As part of their self-evaluation, fire departments offering public education should evaluate these programs' effectiveness.[59] By determining what worked and what did not, departments can modify their education programs to make improvements and decide whether programs are worth repeating. It may be difficult to attribute reductions in the loss of life and property due to fires directly to public education efforts. Nevertheless, departments can take steps to measure the success of education programs. These include determining what share of the group targeted for information actually received it; measuring whether the audience understood the messages by conducting tests prior to and after the education campaign; and gauging whether people changed their behavior by randomly surveying people before and after the campaign or visiting a sample of homes with a fire-safety checklist of hazards.[60]

As described in Chapter 1,

- **Most Minnesota fire departments had at least a minimal level of public outreach with fire-safety information in 1997. But the extent of the education initiatives varied greatly, and full-time departments were more likely than others to have comprehensive education programs.**

Table 2.3 shows how many fire departments had some public education efforts in 1997 and what share had a comprehensive program including targeting education programs at identified local fire risks and hazards, offering a smoke detector program, collaborating with teachers and others, designating a public education officer in the department, establishing fire-safety surveys in homes, and monitoring the education program's effectiveness.

Summary and Examples Related to Promoting Fire Safety Awareness

The benefits of fire-safety education lie in the potential to prevent fires. Besides avoiding the direct costs of fire suppression, prevention efforts help avoid the personal losses and tragedies resulting from fires. In addition, the indirect costs

Table 2.3: Fire Departments with Fire-Safety Public Education, 1997

	Full-Time Departments (*N*=13)	Combination Departments (*N*=19)	Volunteer or Paid On-Call Departments (*N*=355)
Some fire-safety public awareness efforts	92.3%	100%	90.1%
Comprehensive fire-safety awareness including programs targeted to local fire risks, smoke detector programs, collaborations with teachers and others, and program evaluations	15.4	5.3	0.8

SOURCE: Legislative Auditor's Office Survey of Fire Departments, 1998.

58 State Fire Marshal, *1997 Fire in Minnesota*, 79.

59 NFPA, *NFPA 1201*, 13-5.1.

60 Federal Emergency Management Agency, *Short Guide to Evaluating Local Public Fire Education Programs* (Washington, D.C.: U. S. Fire Administration, 1991), 2-4.

of fires, such as reduced property values, lost business income, unemployment, the destruction of natural habitat, and diminished tax bases, represent a substantial savings when fires are prevented. Fire department costs for providing fire-safety education include those for planning and executing the program (including coordinating it with others outside the department) and measuring its impact. Training fire personnel and purchasing education materials are also costs. Although it is difficult to quantify whether education directly results in preventing fires, preventing one significant fire could easily offset the costs of fire prevention activities.

Promote Fire-Protection Systems

St. Louis Park Fire Department

To promote the installation of automatic sprinkler systems to protect against fires in existing buildings, St. Louis Park adopted a provision in the state statute on special assessments. With the provision, the city helps building owners pay for a fire protection system's costs through a special assessment on their properties. The provision is patterned after a program started by the Minnetonka Fire Department. The St. Louis Park Fire Department convinced its city council of the value of sprinkler systems in controlling fires quickly with minimal water and improved safety for fire fighters. They recognized that a common roadblock owners of existing buildings faced when considering installing sprinkler systems was the overall expense of systems and difficulty in financing them.

As a way of overcoming some of those difficulties, the city in 1995 approved a policy to pay for installing fire sprinkler systems in privately owned buildings and charging the owners a special assessment to cover the installation costs up to ten years. To participate, interested building owners must obtain three competitive bids for installation by state-approved sprinkler contractors and then submit a petition to the city. Following approval by the city council and installation of the sprinkler system, the city pays the owner for the costs of installation at the lowest bid amount.

In turn, the city places a special assessment on the property that is paid as the owner pays property taxes over the subsequent time period. Included in the special assessment is a small fee for city administrative expenses and interest charges set at market rates at the time the city initially approves the petition.

About ten building owners have used the special assessment program in the past three years, including some of the city's larger properties with particularly vulnerable occupancies, such as a private high school. The installations have ranged from about $15,000 to just under $200,000 per project. If demand increased greatly, the city council would bond for the money; however, this has not yet been necessary. Promotion of the program is low key: As fire department inspectors or building inspectors inspect buildings throughout the year, they tell property owners who might benefit from the program about its advantages. Interested owners receive a letter and packet of information detailing the procedures they must follow to qualify. The assessment can also be used with tax-exempt property.

Similar special assessment programs seem most likely to benefit communities with fairly large shares of existing buildings, as opposed to areas with high rates of new construction for buildings in which sprinklers are already required by the *State Building Code.* Implementing a special assessment program requires the support of the local governing board as well as the cooperation of other local agencies, such as the planning and zoning or assessor's office.

For more information contact:

Chief Robert Gill
St. Louis Park Fire Department
612/924-2594

or

Chief Joe Wallin
Minnetonka Fire Department
612/939-8598

Promote Public Fire-Safety Awareness

Alexandria Fire Department

The Alexandria Fire Department provides a comprehensive fire-safety awareness program for all members of its community. To ensure all age groups receive fire education messages, the fire department produced local access television programs and uses the National Fire Protection Association's *Learn Not to Burn* curriculum, among other activities.

To reach a large audience, the fire department collaborated with the local access television station to develop a series of fire-safety programs. The fire marshal wrote scripts for 18 segments of the fire department's program entitled "The Firehouse," with each 20-minute segment dedicated to a specific fire-safety message. To use fire department equipment and apparatus as props, the television crew taped the segments at the fire hall. The shows covered a full range of topics, such as home escape plans, holiday home safety, portable heaters, electrical safety, carbon monoxide detectors, and explanations of how fires burn and escalate. The local access television station ran a select segment of "The Firehouse" one day a week, several times per day.

The fire department periodically advertises "The Firehouse" programs through the local newspaper for minimal cost, and based on feedback from the community, will continue to include it as a component of its public education campaign. The costs for the programs include approximately two hours to develop and tape each segment. The local access television station did not charge a fee for taping or airing the shows; it viewed the fire-safety programs as public service announcements.

In 1996, the Alexandria Fire Department was selected to participate in the NFPA's *Learn Not To Burn* pilot program intended to improve the curriculum and instruction of the fire-safety education program. In collaboration with the local NFPA fire-education representative and a select group of teachers, the fire department integrated the 12-week program into the students' regular curriculum with take-home assignments requiring parent involvement. The pilot program introduced the current format and curriculum that includes age-appropriate materials targeted at children in kindergarten through third grade, specific timelines for conducting pretests and posttests, guidelines for teaching the curriculum, caregiver questionnaires, and teacher and program evaluation forms.

Due in part to the success of the NFPA pilot program, the fire marshal, fire fighters, and teachers continue to teach the *Learn Not To Burn* curriculum in 60 classrooms throughout the school year. The fire marshal tracks the success of the program by testing the children's knowledge of fire-safe behavior as they progress through early grade school. Fire officials believe they educate close to 100 percent of the children enrolled in kindergarten through third grade throughout Alexandria every year.

Knowing that a fire-safety awareness program should be ongoing, the Alexandria Fire Department engages in a variety of other education activities, such as smoke detector give-aways, open houses, public relations activities, and using a safe-escape house purchased jointly with other Douglas County fire departments for $18,000. A comprehensive fire-safety awareness program requires a significant investment of time and money, but even volunteer fire departments can take steps to provide fire-safety information in classrooms and other settings.

The Alexandria Fire Department's annual costs include approximately 200 member hours and $2,000 for education materials; business contributions help reduce their expenses. Many fire-related organizations provide published materials at minimal cost. Fire departments interested in local access or cable television programming should consult with television staff in the early stages of such a project to determine costs and time commitment. Departments without access to a local television station can consider using other media forms, such as newspaper advertisements or mailings.

For more information contact:

Chief Rick Glade
Alexandria Fire Department
320/763-3501

Brooklyn Park Fire Department

The Brooklyn Park Fire Department, a paid on-call department with three full-time members, has an extensive public education program aimed at children. The program includes school classroom presentations, an annual safety camp, and other events.

Part of Brooklyn Park's fire-safety program consists of annual visits to all the kindergarten through fifth grade classrooms in 11 schools located in the city, which encompasses parts of three school districts. Prior to the fire-education demonstrations, students in the third through fifth grade classes take a 13-question quiz on common fire-safety knowledge and practices. Following the demonstrations, the children go back over their answers to see what they have learned.

The education program targets appropriate information to different age levels. For instance, at the earliest ages, students learn about "stop, drop, and roll," how to use 9-1-1, and what fire fighters look like in turnout gear so that children do not fear them. They also receive coloring books or activity books on fire dangers and home fire-safety plans geared to their ages.

Third graders hear about the various jobs that fire fighters perform and review the importance of home inspections for fire safety. They view a fire prevention film and receive a home-inspection form with a checklist on common hazards for students to review with parents at home. Children who return the completed checklist receive a fire inspection badge for their efforts.

Fifth graders view a slide show and hear about how fire is used in people's every day lives and how to use it productively and safely. Some of the slides demonstrate the destructiveness of fire in homes. The students see badly destroyed jeans and a sweatshirt that have burned for five seconds. They also view a 9-1-1 film aimed at their age group.

The department has developed programs for each of the other age groups as well, using materials from the NFPA and incorporating their own information for a local flavor. Although the fire department began its public education program over 25 years ago, it updates its material and its presentation format regularly. As an example, although the department started making its presentations in school auditoriums, it found that children were more attentive and learned more when fire fighters spoke to them in their individual classrooms. The fire department prints some of its own educational materials and purchases others; it spends between $2,000 and $3,000 on materials each year.

Fire-safety programs are targeted to people of different ages.

The on-call fire fighters make the classroom presentations, after receiving training on how to teach the course, what material to cover, and what teaching techniques work with children of different ages. This is one way fire fighters receive volunteer work credit, which they are required to accumulate to remain with the department. Other fire departments considering similar educational programs need to have the support of a chief who is willing to dedicate time to fire prevention activities and an individual committed to planning and evaluating them.

For children and other groups, the fire department offers tours of its fire stations. Besides letting children see the buildings and fire apparatus, the tours provide fire-safety information. The fire department developed an instructor's guide outlining the format of the tours and describing what information the children should learn. For instance, the tour includes a smoke detector demonstration, instructions on how to act if fires occur at home, and films on fire-safety practices for children of different ages.

The Brooklyn Park Fire Department has also worked with the city's parks and recreation office and the police department to offer a safety program for children living in apartment complexes. These are one-day programs aimed at younger children

and held at the apartment buildings. The children participate in fun activities that also help teach them about fire safety and general safety practices.

In addition, the fire department works with other local and regional agencies in sponsoring a safety camp for boys and girls in second and third grades. At the day camp, children have supervised recreational activities and learn about general personal safety issues including bicycle use, seat-belt safety, and fire safety. Children receive a safety camp T-shirt and end the three-day camp with a family barbecue. Because the fire department works in partnership with other agencies and private businesses to sponsor the safety programs, the direct costs to the fire department are primarily for the time involved with advance planning and participating on the days of the events.

For more information contact:

Chief James Driste
Brooklyn Park Fire Department
612/493-8026

Cotton Volunteer Fire Department and First Responders

In addition to fire suppression and first responder emergency medical services (EMS), the Cotton Volunteer Fire Department promotes citizen awareness of fire safety through smoke detector give-aways, school programs, and information in a township newsletter. The department views these activities as part of its mission to save lives.

The fire department has taken advantage of state offers to fire departments for low-cost smoke detectors. In a recent offer, the fire department purchased about 150 smoke detectors at 50 cents per unit. The fire department plans to give the smoke detectors away at township functions and also make them available by request through the chief at other times of the year.

During fire prevention week in the fall, members of the fire department conduct fire-safety programs for children in kindergarten through third grade. Department members vary the program somewhat each year but typically cover basic fire awareness such as “stop, drop, and roll” and drive a fire engine to school so students see how it works. In advance of the program, the department acquires materials, such as Smokey Bear bookmarks, from the Department of Natural Resources and distributes them to children at the school.

Since the Cotton Fire Department began offering first responder service in 1990, it has occasionally staged mock accidents. These have been useful for first responder training, but the events have also served a public-safety education role. As an example, during EMS week in May 1997 the fire department staged a three-vehicle accident near the school. Some of the junior and senior high students posed as accident victims and the others observed the drill to help reinforce messages on seat-belt safety and other public safety issues.

The fire department writes articles on fire safety for a local newsletter that is distributed to Cotton Township residents. In each of the bimonthly newsletters the fire chief offers timely fire-safety advice, such as a reminder for homeowners to check their furnaces prior to heating season.

The fire chief has also used the community newsletter to offer fire preplanning to residents. Upon request, fire department members walk through residences with their owners to identify potentially dangerous conditions or fire hazards. This is in addition to the preplanning and building tours the fire department conducts for the school and some of the higher fire-risk occupancies such as local restaurants and gasoline stations.

Regardless of a fire department’s size, making fire prevention and protection measures work requires strong support from the chief and other department members. Fire personnel have to be committed to the value of preventive practices or other members of the public will not see them as worthwhile. Although the Cotton Volunteer Fire Department has focused on low-cost fire prevention and preplanning, the programs require time from the chief and other department members for planning and implementation. To find time for fire prevention activities, departments may make them part of the monthly training and meeting schedule.

For more information contact:

Chief Craig Kinsley
Cotton Volunteer Fire Department and First Responders
218/482-5538

Duluth Fire Department

Duluth's fire department began a voluntary home inspection program in 1998 to upgrade fire-safety in private dwellings. Among other fire prevention duties, Duluth's Fire Marshal inspected 100 homes in the first year of the program and expects to inspect more than that number again this year. The department confines its inspections to homes within the city but sends written materials it developed on home fire-safety practices to homeowners outside city limits upon request.

Because home inspections are voluntary, the Duluth Fire Department works with local media outlets to alert residents to the program and encourage them to participate. The fire marshal prepares news releases about the home inspections and provides them to radio, television, and newspaper representatives. Because of the working relationships established over the years between the fire department and the media, the department has been successful in getting its announcements into local broadcasts and in print.

Following a series of these public announcements in which residents are urged to contact the fire department, the fire marshal schedules visits with all who call. To accommodate people's work schedules, the fire marshal will conduct the investigation in early evening hours as well as during the day.

The home inspections include several steps for monitoring the outside and interior of homes. Outside the homes inspectors look for clearance between the home and combustible materials, clearly visible house numbers, and clear pathways leading to home entrances.

While inside the house, inspectors look for a predetermined list of items including frayed wiring, materials that are improperly stored, and combustibles located too close to the furnace. For homes without smoke detectors, the fire department has purchased smoke detectors to be given away, and inspectors will install the battery-operated detectors if homeowners are unable to do so. In homes that already contain smoke detectors, inspectors use canned smoke to test them; inspectors also test carbon monoxide detectors to ensure that they are operational.

Currently, the fire marshal and two fire prevention staff conduct all home inspections, however if the demand increases greatly, fire fighters could participate. Before fire fighters inspected homes the fire marshal would train them on how to conduct the inspections, appropriate interactions with homeowners, effective practices to follow while in homes, and the overall value of the program. With the department's recently acquired software, the fire marshal will be able to target neighborhoods that have not been visited in the past.

Although the Duluth Fire Department has full-time paid personnel, smaller departments with paid on-call or volunteer staff could also institute home fire-safety inspections. These departments first have to plan and promote the program; they could conduct home inspections in lieu of regularly scheduled monthly drills.

For more information contact:

Chief Duane Flynn or
Fire Marshal John Strongitharm
Duluth Fire Department
218/723-3200 or 218/723-3208

Maple Plain Fire Department

The Maple Plain Fire Department, with 30 paid on-call members, provides smoke detectors, conducts residential fire-safety surveys, and collaborates with local schools as part of its fire-safety awareness efforts. Through an ongoing public education program, fire officials have prepared residents to react appropriately in the event of a fire, as well as reduced instances of specific types of fires, such as chimney fires.

Maple Plain fire fighters emphasize teaching local residents both fire prevention activities and actions

to mitigate fires and injuries. In addition, by giving out free battery-operated smoke detectors upon request along with proper installation and testing instructions, the fire department provides residents with early warning systems. The fire department obtained the smoke detectors at reduced cost from the State Fire Marshal Division. Maple Plain fire officials estimate that approximately 99 percent of the homes in their primary response area have smoke detectors.

As part of the department's community fire-safety education, fire fighters and local school teachers developed a cooperative teaching program that targets young children in preschool through first grade. Both teachers and fire fighters provide classroom instruction with take-home materials on fire prevention behavior, the inherent dangers of fire, and home plans that include escape routes and periodic fire drills. The children also become familiar with fire fighter protective gear and equipment to reduce their fear of the fire fighter's appearance in the event of a home fire.

By focusing their education efforts at the preschool and early grade levels, they teach the children essential life safety skills for use throughout their lives. The department monitors the impact of its public education efforts by testing the children's knowledge and the prevalence of home fire plans as the children progress through their early grades. Additional community outreach efforts include a school auction in which two children are awarded lunch with the fire chief and a city tour in a fire truck.

The fire department also conducts open houses twice a year to educate citizens on the dangers of fires, proper use of fire extinguishers, proper chimney cleaning techniques, and to familiarize the public with fire fighting equipment and standard emergency scene activities. The department uses these events, in addition to local newspapers ads, to advertise its residential fire-safety surveys.

Upon request by the homeowner, a team of two or three fire fighters conducts a scheduled visit to identify potential fire hazards, plan escape routes and fire drills, discuss in-home sprinkler options, test smoke detectors, and advise on proper or additional detector locations. Department members developed the home-safety surveys and have since modified them in response to feedback. The department found residents more receptive to fewer fire fighters conducting visits rather than a large team, which can be overwhelming.

Each home survey lasts about one hour and fire fighters provide any additional fire information upon homeowners request. The department does not charge the homeowner for the service. The fire department has provided the home surveys over the past ten years and, due to positive feedback, plans to continue. Maple Plain fire fighters believe the home-safety program is successful because the homeowner's participation is voluntary, there are no fees for the service, the fire fighters employ a public relations approach rather than an inspection approach, and fire fighters are well trained to conduct the surveys.

Fire fighters use information obtained during these surveys to supplement the department's residential prefire plans. Advance knowledge of residence floorplans, occupancy information, and unusual conditions prepares the department for possible emergency operations and enhances fire fighter safety.

Annual costs for the department's public education program amount to approximately 300 person-hours and $1,900. Fire fighters receive training points for their public education activities. Other departments may find similar benefits from conducting public education campaigns, such as improved community relations, lower fire incidence, and increased awareness of in-home fire risks.

For more information contact:

Chief Dave Eisinger
Maple Plain Fire Department
612/479-2732

Other fire departments we surveyed also met our standards of performance related to providing fire-safety information. Some are listed here along with contact names.

Full-Time Department: **Burnsville**, Chief Ronald Payne, 612/895-4571.

Combination Department: **St. Anthony**, Chief Dick Johnson, 612/788-4885.

Larger Volunteer or On-Call Departments: **Chanhassen**, Fire Marshal Mark Littfin, 612/937-1900; **Golden Valley**, Chief Mark Kuhnly, 612/593-8080.

Smaller Volunteer or On-Call Department: **Zimmerman**, 1998 Chief Dave Greenlun, 612/856-4666.

4. Ensure Fire Code Enforcement

In accordance with the *Minnesota Uniform Fire Code*, fire department personnel have authority to (1) inspect buildings and premises looking for conditions that could cause fire and (2) require them to be corrected.[61] As one might expect, a greater share of Minnesota's full-time and combination fire departments than volunteer or paid on-call ones are involved with fire code enforcement. Our survey indicated that in 1997:

- **Nearly 94 percent of full-time and combination fire departments conducted fire-code related inspections, while 37 percent of volunteer and paid on-call departments conducted them.**

About 14 percent of the volunteer and paid on-call fire departments reported they were in areas where a city or county agency conducted all fire-code related inspections, and 46 percent were in areas where fire-code related inspections were not conducted. The status of fire code inspections was not clear for approximately 4 percent of volunteer and paid on-call departments.

During inspections, fire inspectors look for potential fire hazards, inspect fire protection systems (such as sprinkler systems), and test equipment and alarms. They may also train appropriate personnel on the use of portable fire extinguishers and review fire emergency procedures and exit drills.[62] Information gathered during inspections may be useful when departments develop preincident plans (described below under "Planning for On-Scene Responses") for particular buildings.[63]

Some fire protection code provisions are incorporated into Minnesota's *State Building Code*; the overlapping portions are enforced by building officials and fire inspectors. But others are solely a part of the *Minnesota Uniform Fire Code.* Because local building inspectors primarily enforce the *State Building Code* in those Minnesota communities that have adopted it, fire inspectors should interact with them on an ongoing basis.[64] To ensure that fire protection concerns remain a priority in the construction or alteration of buildings, it is important that fire departments maintain a good working relationship with building code officials.[65] Inviting building inspectors to fire departments' training sessions is one way of better understanding the inspector's role and how it dovetails with fire prevention concerns.

Both the *State Building Code* and *Minnesota Uniform Fire Code* include provisions for automatic sprinkler systems. Minnesota communities that adopt the *State Building Code* and an optional provision on fire protection systems extend their control over the installation of automatic sprinkler systems.[66] With the adoption of the code and chapter 1306 on fire protection systems, automatic sprinkler coverage is required in the greatest number of buildings and occupancies allowable.

In some Minnesota localities, building inspectors perform all building inspection duties; fire departments have not become involved. In others where the fire department has assumed an inspection role, however, departments should establish a program of inspections and fire-code

61 IFCI, *1997 Uniform Fire Code Volume 1*, part 1, art. 1, sec. 103.3.1.1.

62 Cote, *Fire Protection Handbook*, sec. 10-172.

63 NFPA, *NFPA 1201*, 14-6.2.

64 All jurisdictions in the Twin Cities metropolitan area are required to adopt the state building code. Ten other counties and about 170 cities and townships in the rest of the state have also adopted the code.

65 NFPA, *NFPA 1201*, 14-8.1.

66 *Minn. Rules*, ch. 1306, subp. 1-5.

enforcement. As a part of this program, departments should set priorities for inspection of buildings in the community by targeting hazards and potential threats to life safety and property.[67]

The fire department's inspection program should include procedures for addressing violations, issuing citations for them, and reinspecting buildings to ensure correction of documented violations.[68] To handle disputes over code violations, local governments may either appoint boards of appeal to hear and rule on appeals from orders issued regarding the fire code, or instead direct appeals to the elected city councils or township boards themselves.[69] Keeping records of inspections and the resolution of violations is important to verify compliance; the department should retain inspection records for at least three years.[70]

Fire code inspectors need ongoing training.

The *Minnesota Uniform Fire Code* involves many complexities and the job of inspector requires special expertise. For a successful inspections program, fire inspectors need appropriate training on fire code provisions as well as on locally accepted practices for conducting inspections.[71] The department should establish job performance requirements for its inspectors and evaluate inspectors periodically, including scheduled field checks of their inspections.[72] How the fire hazard message is communicated can be as important to getting the hazard corrected as the actual message itself. Training, therefore, should include information on educating and motivating building managers about fire prevention practices, in addition to addressing code violations.[73]

Not all fire departments have the resources or training to be involved in the building-plan reviews that may occur prior to construction in cities or counties that have adopted the building code. Those that are involved with plan reviews should: (1) take part in preconstruction meetings, (2) review the construction plans once submitted, (3) work in coordination with local building officials and the technical construction trades, (4) establish sign-off authority on the construction permit, and (5) participate in the certificate-of-occupancy process.[74] In addition, a recent Legislative Auditor's Office report recommends that building and fire officials give mutual approval for all building permits and proposed equivalencies regarding the overlapping portions of their codes.[75]

This extensive involvement helps ensure the enforcement of codes for the abatement and prevention of fire in newly built or remodeled structures.[76] In addition, contractors and building owners benefit because the reviews can eliminate potential problems or violations prior to construction, thereby avoiding the corrective orders and costs incurred to correct problems after the building is completed.[77]

Cities may adopt ordinances that require permits to perform work on fire protection systems, such as alarm or sprinkler systems. Those that do are required to conduct a plan review of the fire

67 David Diamantes, *Fire Prevention: Inspection and Code Enforcement* (Albany, NY: Delmar Publishers, 1998), 17-18.

68 NFPA, *NFPA 1201*, 14-5.3.3.

69 *Minn. Stat.* §299F.011, subd. 5a.

70 IFCI, *1997 Uniform Fire Code Volume 1*, part 1, art. 1, sec. 103.3.4.

71 NFPA, *NFPA 1201*, sec. 14-5.4.

72 NFPA, *NFPA 1201*, 14-5.3.2; and NFPA, *NFPA 1031, Standard for Professional Qualifications for Fire Inspector*, 1993 ed. (Quincy, Mass.: NFPA, 1993), 3-1 through 5-4.4.

73 John R. Hall, Jr., "Regular Inspections Prevent Fires," *Fire Command* (September 1979): 16-17.

74 NFPA, *NFPA 1201*, sec. 14-8.2

75 Minnesota Legislative Auditor's Office, *State Building Code* (St. Paul, 1999), 59-60.

76 Robertson, *Introduction to Fire Prevention*, 134-135.

77 Cote, *Fire Protection Handbook*, sec. 10-175.

protection system and inspect the system once installed.[78] Charging fees for fire-safety inspections is one way to offset the costs of a part-time or full-time inspector.

Summary and Examples Related to Ensuring Fire Code Enforcement

Like fire-safety education, the primary benefit of fire code enforcement and building-plan reviews lies in the potential to prevent fires. Identifying potential fire hazards in advance of constructing new buildings saves time and money for the building owners. Fire-code building inspections and other fire code work require an investment in ongoing training. The other significant costs are for the time inspection personnel conduct inspections and issue correction orders.

Ensure Fire Code Enforcement

Duluth Fire Department

For its fire code inspection program, the Duluth Fire Department conducts three different types of inspections of all buildings that are not single-family homes. By using fire suppression crews as well as fire code inspectors, the department inspects thousands of buildings each year.

The first type of inspection is done by fire fighters trained to conduct basic inspections. After analyzing the locations of previous inspections, the fire marshal targets an area of the city or type of occupancy, such as restaurants or bars, that is a priority for inspection. Each fire company (over three shifts of fire fighters) is assigned 60 buildings from within the targeted group to inspect during summer months, and about 2,500 buildings are inspected that way annually.

The fire marshal developed a form that fire fighters use during inspections and trained them on what to monitor. Among other things, fire fighters are instructed to look for exit doors of a certain width, proper exit labeling, and clear addressing on building exteriors. When the fire fighters find violations, they notify the fire marshal who uses the fire department's computer software to automatically send a personalized letter to the building owner. Fire companies conduct reinspections of the addresses with violations following a 30-day period during which building owners are to correct the fire-code problems.

Only the fire marshal and deputy fire marshal are involved in the second type of fire code inspection. These inspections are done in structures that have been identified as problem buildings and require someone with in-depth knowledge of the fire code and its intricacies. Computerization helps the fire marshal identify problem buildings based on analyses of building information and fire incidence data. New software the department recently acquired will also allow it to easily merge data collected during fire code inspections with information used to preplan fire attack strategies for particular structures.

The third type of inspection includes fire code activities for new buildings being planned and under construction. For new construction, Duluth's fire marshal typically gets involved at several different stages. First, the fire marshal reviews the plans submitted before construction commences. Then he inspects the building once the walls are up, the doors are in, and the fire protection systems are installed. He makes another inspection right before the building is completed to identify any items that need to be corrected before construction is finished. Along with the building, plumbing, and electrical inspectors, the fire marshal must sign off before owners of new buildings receive their certificates-of-occupancy.

The intensive inspection program for new construction requires a close working relationship between the fire marshal and local building inspectors. Each views the other's role as important and they work together as a team. Although architects and general contractors first resisted the extensive involvement of the fire marshal, most

78 *Minn. Rules,* ch. 7512.2800, subp. 2.

have come to see the value of having fire-code inspections conducted early in the construction process to avoid making costly corrections later.

Fire departments that conduct plan reviews need personnel who are well trained and highly experienced with the *Minnesota Uniform Fire Code* and architectural plans. Those relying on part-time personnel may have difficulty attaining the level of experience required. Especially in larger cities, computerization is essential for tracking fire code inspections over time. To be involved with inspections, inspectors need ongoing training and should not hesitate to confer with State Fire Marshal personnel or others with fire code expertise. It is important that fire departments beginning inspection programs demonstrate their value to the fire fighters who will be conducting them. Fire inspectors also benefit from taking steps to better understand the work of local building inspectors.

For more information contact:

Chief Duane Flynn and
Fire Marshal John Strongitharm
Duluth Fire Department
218/723-3200 and 218/723-3208

White Bear Lake Fire Department

Starting in 1988, the White Bear Lake Fire Department mounted an aggressive fire prevention program. This includes a smoke detector ordinance, smoke detector give-aways and home inspections, fire safety education in the schools, and involvement in plan reviews for new building construction. Since beginning this concentrated effort, the city has had no accidental fire deaths, compared to one death every 18 months in years prior to 1988. The fire department has three full-time and 47 paid on-call members.

The White Bear Lake City Council passed an ordinance in 1989 requiring the installation of hard-wired smoke detectors in single-family dwellings whenever they undergo renovations in excess of $1,000 or interior electrical repairs requiring an electrical permit. Homeowners in this situation must take out a permit for the installation and inspection of smoke detectors. As a result of the ordinance, each year between 3 and 5 percent of the older homes have had the hard-wired smoke detectors installed; currently approximately half of all older homes (about 3,000 houses) in the city have them.

In addition to the city's smoke detector ordinance, the fire department has a smoke detector give-away program and conducts annual home inspections to monitor the number and operating condition of smoke detectors. Over the years, the department has obtained smoke detectors through donations and local contributions. It keeps a supply of smoke detectors at the local senior center so senior citizens have easy access to them and the department gives detectors away to residents who request them. The fire department advertises its smoke detector program and inspections in a community newspaper distributed to all residents and in the senior citizens' quarterly newsletter.

To distribute smoke detectors and batteries and to conduct smoke detector inspections, fire department members travel to targeted neighborhoods during fire prevention week each fall. They focus on neighborhoods with pre-1980 construction where smoke detectors are less prevalent. Fire fighters approach the homes and inform homeowners about the purpose of their visit. If homeowners are reluctant, fire fighters are instructed to thank them and leave. When they do enter, fire fighters check for the correct number and placement of the smoke detectors. They carry cans of smoke to check the smoke detectors' operation. Although fire fighters do not install smoke detectors during the visits, if they find someone needing help with installation, they inform the fire marshal who schedules an appointment to install a smoke detector at a later time. The fire department surveys between 150 and 200 homes and distributes about 50 smoke detectors in this way each year.

A city ordinance requires hard-wired smoke detectors as part of home renovations.

To educate children on fire safety, the White Bear Lake Fire Department uses the NFPA's "Learn Not to Burn" curriculum and targets it to children in the first grade. The education program is a collaboration with other neighboring fire departments, and it takes place in elementary schools located in White Bear Lake and two nearby cities. The fire marshal and fire fighters go into the first grade classrooms three times each year. With each visit they focus on a different theme, such as fire safety in the home, and distribute age-appropriate materials the children can work on in the classroom and bring home to review their family's fire-safety practices.

Although the fire marshal conducts the bulk of the school presentations, other fire department members assist. New fire department members are required to put in ten hours a year on fire prevention activities and they receive credit for making the fire-safety presentations. The fire department spends about $3,000 a year on materials and videos to use in its public education effort.

Besides public education and outreach, the fire marshal reviews building plans for all new construction in the city except single-family homes. He works closely with the city's building inspection staff and together they have made life safety and building safety their priorities. A city ordinance requires sprinkler installation in all buildings of more than 5,000 square feet. The city building inspector will not grant a certificate-of-occupancy until fire code concerns have been addressed. Because inspection work is done prior to completing the building, the building owner does not face having to make fire-code related changes after having received the certificate-of-occupancy. In addition, the fire marshal inspects about 500 existing businesses annually, concentrating on inspecting all apartment buildings every two years.

The White Bear Lake Fire Department also provides fire prevention services to surrounding areas on a contract basis. For a contracted annual amount, the department inspects commercial properties, conducts plan reviews for all new construction proposals, inspects buildings under construction for fire code compliance, and provides education programs in the schools, among other duties. The contracts benefit the nearby communities that cannot afford their own fire inspector and they bring in revenues to reduce costs born by White Bear Lake residents for the fire inspector's position.

Although White Bear Lake's Fire Department has had multiple fire prevention practices in place for many years, other fire departments without such extensive activities can take small steps and build their program over time. To be successful, prevention programs need the full support of the fire chief and local elected officials who understand the importance of fire prevention and view prevention efforts as ongoing, long-term programs. With resources available from the State Fire Chiefs Association, State Fire Marshal, NFPA, and others, even departments without full-time personnel can emphasize fire-safety awareness.

For more information contact:

Chief Tim Vadnais and
Fire Inspector Mike Turnbull
White Bear Lake Fire Department
651/429-8567 and 651/429-8568

Inspecting Multiple-Occupant Housing

St. Louis Park Fire Department

Fire inspectors in the St. Louis Park Fire Department place a high priority on inspecting apartment buildings and other multiple-occupant housing, which account for about one-third of the city's housing. Of the 6,500 apartment units, inspectors visit half each year. St. Louis Park's aggressive inspection schedule is possible in part because of its full-time fire marshal and two fire prevention staff.

To avoid duplicate inspections by different inspectors in the same building, the city has combined the services of several inspectors into one function. Fire department inspectors are trained to look not only for fire code compliance but also for other problems related to provisions in state codes and relevant city ordinances. Members of the fire department's engine companies received training to inspect the smaller, newer apartment complexes, freeing the fire prevention staff to concentrate on the larger, more complicated buildings and on

follow-up work. The fire prevention division and city inspections department have worked to build a close working relationship and communicate on an ongoing basis, including holding weekly meetings to discuss common issues.

Apartment occupants receive notification of the inspection date and time six to eight weeks in advance. When occupants are not home, the inspection takes place with the caretakers in attendance. If code violations are found, building owners are notified and typically have 30 days to correct them. Fire prevention staff conduct reinspections and, if progress is not being made, may issue citations depending on the severity of the infraction.

To recover some of the costs of the program, the city charges building owners a nominal per unit fee. The inspection fee is included when owners pay their apartment license fee. City staff meet occasionally with representatives of the building owners to discuss their concerns and fire prevention staff have taught classes on inspections, fire safety, and basic first aid as part of apartment manager certification programs.

An analysis of 4 years of fire data indicated that 24 percent of the city's structure fires were unattended kitchen fires in apartment buildings with more than 20 units. To target the fire risks associated with cooking, the fire marshal developed in-house a single-page flyer entitled "Look While You Cook." Inspectors leave the handout with apartment dwellers in an attempt to reduce the high number of kitchen fires in apartment buildings. Included are common-sense tips about avoiding fires while cooking, how to prevent and extinguish cooking fires, where extinguishers are located in the building, and contact phone numbers for additional help. Developing the flyer took eight hours; total production and printing costs amounted to about $250.

Targeted prevention efforts lowered the incidence of apartment kitchen fires.

In 1994, inspectors began leaving the flyers with apartment dwellers following each inspection. Three years later, apartment kitchen fires had dropped to about 5 percent of structure fires; that percentage held constant in 1998. The flyers are also included in packets that some building managers prepare for new tenants. As a result of the program's success, the fire marshal is expanding it to target single-family homeowners through flyers distributed at block parties and with neighborhood watch groups, information in the city newsletter, and a cable television program.

Fire departments without full-time staff may find it difficult to adopt as ambitious a program of inspections as in St. Louis Park and may have to consider a system of inspection fees to finance even a part-time inspector. Fire-prevention flyers, on the other hand, are a low-cost yet potentially very beneficial step for fire departments in cities with substantial multiple-occupant housing. Because of the intricacies and complexities of the *Minnesota Uniform Fire Code*, competent inspectors require intensive and ongoing training. A successful inspection program also depends on a positive working relationship between fire inspectors and local building inspectors. Building this relationship requires everyone to develop an atmosphere that is conducive to staff working together on areas that affect each of them.

For more information contact:

Fire Marshal John Lindstrom or
Lieutenant Dale Antonson
St. Louis Park Fire Department
612/924-2599 or 612/924-2173

Conducting Inspections

Pierz Fire Department

To identify potential fire hazards and educate businesses on fire safety, the Pierz Fire Department conducts annual inspections of all businesses within its city limits. By addressing local businesses' maintenance practices, the adequacy of fire alarms and extinguishers, and chemical storage practices, the paid on-call fire department improves safe fire conditions in the community and gathers

information to prepare itself for possible fires in these buildings.

As part of their winter activities, Pierz volunteer fire fighters form teams of two, with each team responsible for inspecting eight sites. Inspections are conducted on Saturdays to accommodate the volunteers' regular work schedule. Fire fighters generally rotate the 80 business inspection assignments from year to year to increase their familiarity with building layouts and occupancy information in the primary response area.

The inspections include reviewing the operating conditions of stair doors and fire doors, heating equipment, and cleanliness of electrical and kitchen equipment. Fire fighters use an itemized checklist, based in part on state fire code provisions, to consistently cover all potential fire risks. Upon a finding of hazardous conditions, fire fighters educate the business owner on fire-safe practices and request the owner to correct the condition during the inspection. If the owner is unable to do so, fire fighters issue a notice of unsatisfactory conditions that require corrective action. The department allows 30 days for the business to rectify the condition, after which the fire chief and assistant chief conduct a follow-up inspection to ensure the hazard is abated. The fire department does not charge fees for inspections.

Because the fire fighters use the inspections as an opportunity to educate business owners and employees, not just enforce codes, response to the inspections is favorable. The business community is familiar with the fire departments' regular inspection policy and appreciates the periodic review and feedback on fire-safety practices. As a result of the inspection program, compliance with the fire departments' safety criteria is very high.

The fire department also uses the information gained from these site inspections to review fire suppression needs, as well as update prefire planning information, such as owners' names and phone numbers and changes in floor plans. The annual inspections enable the fire department to provide a more effective response, as well as reveal any potential hazards fire fighters may encounter, in the event of a fire.

When the local building inspector requests input from the fire chief on building plans or certificates-of-occupancy for new construction, the fire chief coordinates with representatives of the State Fire Marshal Division to ensure the proper fire code requirements are met. Pierz fire officials believe the feedback and advice from the State Fire Marshal is invaluable for local fire code enforcement. The new building owners also appreciate the fire chief's feedback early in the construction process.

The department benefits from the knowledge of local fire risks and businesses benefit from reduced fire hazards and safer working conditions. Costs to the fire department are primarily in volunteer person hours; fire fighters spend approximately 180 hours collectively each year conducting the inspections and processing the paperwork. Limited fire fighter availability may preclude other volunteer or paid on-call departments from providing a similar inspection program.

For more information contact:

Chief Dale Janson
Pierz Fire Department
320/632-7351

Other fire departments we surveyed also met our standards of performance on fire code inspections and enforcement. Some are listed here along with contact names.

Full-Time Departments: **Burnsville**, Chief Ronald Payne, 612/895-4571; **Richfield**, Assistant Chief Steven Sutter, 612/861-9855.

Larger Volunteer or On-Call Departments: **Brooklyn Park,** Chief James Driste, 612/493-8026.

Smaller Volunteer or On-Call Departments: **St. Paul Park Volunteer**, Chief Scott Gerry, 612/459-9918; **Spring Valley**, Chief Nevin Stender 507/346-7367.

5. Develop Effective Communications Systems

Because fire personnel interact with others on many levels—dispatchers to fire departments, incident commanders to fire companies, fire chiefs to water utility managers—they need effective communications. The need for effective communication extends to both internal operations and external ones that involve other fire departments, other agencies, and local elected officials.[79]

Internal Communication

Most calls for emergency help come through the public safety answering points in each Minnesota county, which are typically run by the county sheriff or city police department. Although this first point of contact between those in need of help and emergency responders is a critical one, the handling of these calls is typically beyond the control of local fire departments and, therefore, is not considered here.[80]

Once a call for help is communicated to the fire department, it is incumbent upon the department to have an effective system in place for alerting its members. Fire departments should have a reliable system to notify and summons members both night and day.[81] According to our survey, in 1997:

- **About 92 percent of larger fire departments were somewhat or very satisfied with their system for alerting members.**

We saw little difference in levels of satisfaction among the full-time, combination, and volunteer or paid on-call departments (in communities with 8,000 or more people). Similar data are not available for fire departments in smaller communities.

To be effective, departments should develop communications procedures and train department members (whether they are volunteer, paid on-call, or full-time fire fighters) on their use. The procedures should include protocols for giving priority to emergency messages over other radio traffic. To make sure dispatchers know the status of each available responding unit, fire companies need to follow established guidelines for maintaining contact with dispatchers.[82]

For reliable communication linkages, fire departments need resources to purchase the necessary hardware. Communications hardware may be radio, microwave, telephone, pagers, sirens, other hardware, or some combination of these. To help purchase the necessary communications equipment, some departments can use the excess property program, matching dollars program, and purchasing consortiums mentioned earlier.

Each emergency vehicle, incident commander, and company officer should have radio transmitters and receivers while assigned to emergencies.[83] This may require several radio channels to accommodate larger departments. In larger service areas, effective communication also requires equipment, such as repeaters, that allow fire companies to use radio systems at every geographic point within the service area.[84] Because of the need for redundancy in the system to prevent a loss of communication in case of equipment failure, fire departments should also have a back-up communications network.[85] We found fairly high satisfaction among larger fire departments regarding their communications systems. Our survey indicated that in 1997:

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79 NFPA, *NFPA 1201,* 16-1.1; FEMA, *Technical Rescue Program Development Manual,* 10-2.

80 Unlike most fire departments, the St. Paul Fire Department has operated its own Fire Communications Center. Plans were underway in 1998 to consolidate it with the city police communications center.

81 NFPA, *NFPA 1201,* 16-5.2.

82 Cote, *Fire Protection Handbook,* sec. 10-15.

83 NFPA, *NFPA 1201,* 16-5.1.

84 Cote, *Fire Protection Handbook,* sec. 10-15.

85 Cote, *Fire Protection Handbook,* sec. 10-15.

- **About 92 percent of full-time fire departments, 84 percent of combination departments, and 89 percent of volunteer or paid on-call departments in larger communities were somewhat or very satisfied in their communication system's ability to perform in emergency situations and normal daily activities without excessive delays or interference.**

Similar data are not available for volunteer or paid on-call departments in communities under 8,000 population.

Understandable communication between the incident commander and each company or team requires that fire department personnel use standardized communications procedures on the fire ground or at other incidents. In advance of responding to emergencies, departments should establish communications procedures and common signals; departments must ensure that all personnel use only this one standard set of communications rules if they are to retain control of fire ground operations.[86]

Effective intradepartmental communication is also important for planning purposes and for sharing information throughout the department. Fire personnel who gather information from conducting certain department activities, such as fire investigations, need methods to share the data in ways that inform other department functions, such as educating the public about the particular fire dangers identified in investigation results. Another example is using information gathered from fire code inspections to help develop prefire plans for structures in the community.[87]

External Communication

In addition to communication among department members, fire departments must prepare for effective communication with other departments, agencies, and locally elected officials. To perform fire fighting and other duties, fire departments rely on outside agencies for certain items or services. For example, departments may rely on the local water utility for adequate water supplies in areas with municipal water systems. Because of the interdependent nature of fire departments' interactions with outside agencies, including local water utilities, law enforcement, and local building inspection agencies, fire departments should develop positive relationships and exchange periodic, ongoing communication with personnel from these agencies.[88]

Coordinated mutual aid responses also require effective interdepartmental communication. Participating fire departments should write communications protocols and agree on uniform terminology, as described above in Action 2.[89] Joint training on communications protocols and terminology will lessen confusion during emergencies and ensure that fire fighters from all responding departments understand what is needed and requested.[90]

Interactions and networking among fire departments through fire-related associations offer opportunities to share information on common problems and solutions and avoid duplication of effort. They help fire officials stay abreast of new developments in fire fighting and other emergency technologies and safety. Most of the associations offer training, conferences, and other education opportunities.

In Minnesota, many fire associations provide these resources, including: the Minnesota State Fire Chiefs' Association (MSFCA), the Minnesota State Fire Department Association (MSFDA), the Fire Marshal's Association of Minnesota, the Minnesota

86 FEMA, *Fire Department Communications Manual,* 4-4, 5-1.

87 Cote, *Fire Protection Handbook,* sec. 10-172.

88 NFPA, *NFPA 1201,* 5-9.1.

89 FEMA, *Fire Department Communications Manual,* 4-18 through 4-21.

90 FEMA, *Technical Rescue Program Development Manual,* 10-2 through 10-3.

chapter of the International Association of Arson Investigators, the Fire Instructors Association of Minnesota, the Minnesota Fire Service Joint Council (consisting of the MSFCA, MSFDA, and the Minnesota Professional Fire Fighters), and the Governor's Council on Fire Prevention and Control.

Others with whom it is important for fire departments to maintain open communication are city councils and township boards, fuel pipeline companies, gas utility companies, juvenile justice and mental health authorities, hospital directors, and school personnel. Ongoing communication with these groups help identify what needs the departments are expected to fulfill and provide the coordination needed to jointly prepare for emergency responses, civil defense and civil disturbance planning, and fire prevention efforts.

Summary and Examples Related to Effective Communications Systems

Because fire departments rely so heavily on good communication to do their work, the benefits of effective communications systems are widespread. Communications hardware and protocols, and fire fighters' familiarity with them, are the underpinnings of successful emergency management. Without a well-functioning communications system, fire departments could not work effectively with fire companies on the scene, track the fire fighters' whereabouts, nor even be assured that a sufficient number of fire fighters were alerted to the emergency in the first place. Communicating with the media, citizens, and elected officials offers the advantage of keeping them informed about the value of fire department services. Interacting with other fire officials through fire-related organizations helps keep fire departments attuned to current practices and information.

The costs of communications systems include the radios, pagers, and other hardware used to communicate. Planning the communications system, standardizing guidelines for its use, and training fire fighters on the system require time and training expenditures. Communication with people and agencies outside the department require time and a commitment to keeping the public informed.

Communications

Winnebago Fire Service

To ensure proficient and reliable communications for all fire department activities, Winnebago fire officers require ongoing training for all fire fighters in standard radio communication protocols and the proper use of radio equipment. Fire officers emphasize ongoing communication among on-call members as well as with other agencies to reduce confusion and improve effectiveness during emergency responses.

As part of fire department internal operations, on-call members must update the fire department of their availability so that officers can determine who is available to respond in the event of an incident. Fire departments within Martin and Faribault counties rely heavily on assistance from neighboring departments and knowledge of fire fighter availability results in more appropriate pages for the correct type and amount of mutual aid.

The fire department relies on sixteen radio frequencies to conduct emergency and nonemergency operations. Some frequencies, such as the 9-1-1 dispatching channel, are available to fire fighters only for monitoring purposes. Fire fighters use other channels, however, on a daily basis, each designated for specific functions or to specific departments, such as mutual aid communications, fire ground operations, neighboring fire departments, county or statewide fire department communications, emergency medical services, law enforcement, and the National Weather Service, among others.

Because the fire department uses multiple radio frequencies, all members train regularly on using radio hardware and on proper communication protocols. Fire fighters participate in drills and tabletop simulations of fire ground operations, vehicle accidents, and technical rescues. They work on perfecting fire ground communications, such as requesting needed equipment from the fire hall or specialized equipment from other departments, and communicating with dispatchers and other emergency response agencies. The Winnebago Fire Service enlists other emergency response agencies' participation in interagency training sessions.

In the event of large-scale incidents or radio malfunctions, the Faribault County Sheriff's Department provides the use of extra base radios and a mobile command vehicle. By setting each radio to a different frequency and assigning exclusive use of each frequency to a different response agency, on-scene commanders can monitor multiple aspects of emergency operations, reduce "walk-over" communications traffic across frequencies, and effectively coordinate response activities.

Departments that consistently follow standard communication protocols, maintain effective internal and interagency communications, and ensure access to back-up equipment contribute to smoother, more effective operations. Coordinating interagency training requires long-range planning, especially for volunteer departments with limited fire fighter availability.

For more information contact:

Chief Jerome Behnke
Winnebago Fire Service
507/893-3515

External Communications

Alexandria Fire Department

To improve its fire protection services, the Alexandria Fire Department maintains a close working relationship with officials from the city's water and building departments. Ongoing interagency communications allow these departments to coordinate planning and building strategies for fire protection in the community.

To ensure the fire department has access to adequate water supplies, fire officers and water authorities coordinate planning and placement of the city's fire hydrants and water mains. The departments work together to determine proper location and fire-flow settings of fire hydrants throughout developing areas, so that new hydrants match the properties' fire suppression needs. They also work together to test hydrants and record their operational status.

The fire marshal uses computer software to develop maps of hydrant and water main locations and water flow capabilities. Copies of the maps are kept on first-alarm vehicles so that fire fighters can refer to them during emergency responses. The fire department tracks hydrant inspections, operational status, and fire-flow capabilities so it can determine fire suppression needs and develop contingency plans for alternative water supplies. The department regularly updates hydrant records and uses them as part of its preincident planning.

Because proper construction of new buildings is critical for fire prevention and protection, the fire marshal and local building officials worked together on a process for fire code compliance. For building plans reviewed locally, building officials issue building permits only after the construction plans meet specific provisions identified by the fire marshal as essential for safe construction. They also coordinate activities to ensure proper installation of automatic fire protection systems in new and existing buildings. Because of the fire marshal's involvement, builders can complete construction without costly corrections arising after the building is finished. By maintaining a close working relationship throughout the building process, the building and fire officials have a common understanding of each others' concerns and can avoid conflicts that may otherwise occur due to lack of communication.

The two departments are also working together to pass a local rental-housing ordinance that addresses the conversion of large houses or other buildings into student housing. With a growing student population attending the local technical college, fire officials have been concerned about fire hazards, such as the casual use of hot plates and barbecue grills in inappropriate locations, within student housing. The building inspector oversees conversion of the housing and ensures that the renovation accommodates the fire marshal's fire-safety concerns, such as sufficient means of egress and an adequate number of working smoke detectors.

Over the past three years, the fire marshal has conducted approximately 250 inspections and reinspections in this type of housing. Given the high number of reinspections, the fire marshal, city council, planning commission, and building inspector are proposing a rental-housing ordinance.

Under the proposed ordinance, the city will not issue building owners a rental license until the rental housing meets local fire-safety requirements. Fire officials will also conduct periodic inspections to ensure ongoing life-safety compliance. With this ordinance, the two departments hope to reduce the potential for large-scale incidents in rental housing.

Ongoing interagency communication is essential for providing comprehensive fire protection. Fire departments that work with other city officials on common concerns and services can improve overall job performance because both parties' needs are met.

For more information contact:

Chief Rick Glade
Alexandria Fire Department
320/763-3501

Duluth Fire Department

Over time, Duluth's Fire Department has actively cultivated a successful relationship with local media, including representatives of newspapers, radio, and television. In addition, the department has taken steps to become more closely involved at the neighborhood level when community issues arise. These activities are part of the department's emphasis on customer service and have proven mutually beneficial.

To provide a communication link with the media and for other general support during large emergency incidents, the on-scene commander has the option of calling a "group page." When this page is sent, the chief, off-duty assistant chiefs, and fire prevention staff respond to the incident and assume various roles to supplement the incident commander. All responding to the group page know what is expected of them at the scene due to advance planning. One role is liaison to the media. The liaison conveys information to reporters about the incident as it progresses. Meanwhile, the incident commander is free to concentrate on the fire attack.

Following incidents, the department provides additional information as requested. As an example, if an accident occurs where vehicle occupants were not wearing seat belts, the department might provide statistical information about seat belt use and safety. This benefits the reporter writing the story and educates members of the public who read or listen to a broadcast about the incident. It also helps make the work of the fire department visible to more of the department's customers.

The fire department encourages communi-cations with the media and others.

The fire department made a conscious decision to become proactive with the media realizing that if it did not provide timely information, reporters would print or broadcast what they want, even though the information may be incomplete or inaccurate. One practice the department follows is to allow more than one or two designated department members to speak with the media. When a reporter working on a particular fire story, for instance, asked to speak with the fire fighters who had responded, the department encouraged the fire fighters to participate. This provided the reporter with an insider's perspective that he would not have otherwise had. By participating, fire fighters boosted their own confidence and received public recognition for doing a good job, which benefited them as well as enhanced public relations for the department as a whole.

Cooperating with media requests has produced other benefits for the department. For instance, when the department sent press releases announcing the beginning of its home fire-safety inspection program, local media responded by printing and broadcasting the information. With the media's cooperation, the department has been able to reach more people with its fire-safety messages than it could alone.

In addition to interacting with the media, fire fighters actively participate in other community issues that are relevant to the fire department. As an example, several fire fighters attended a recent meeting held by the public works department regarding a street redesign project. The fire fighters described to the residents that one of the tradeoffs of the proposed redesign project would be limited use of fire trucks on the narrower, closed-off streets, which could result in a delay during a fire response. Fire fighters came away with the sense that they made a valuable contribution to the community's discussion and the residents had a better understanding of the ramifications of the street changes.

Although working cooperatively with the media may benefit fire departments in any part of the state, it may be especially important in larger communities where many events compete for the media's attention. Successful communication between the department and others requires a commitment from the chief and other department members to consider the needs of media and identify the potential for the department to be useful in other community venues.

For more information contact:

Chief Duane Flynn
Duluth Fire Department
218/723-3200

Other fire departments we surveyed also met our standards of performance related to internal and external communications systems. Some are listed here along with contact names.

Full-Time Departments: **Richfield**, Assistant Chief Steven Sutter, 612/861-9855; **St. Paul**, Chief Timothy Fuller, 651/224-7811.

Combination Department: **Winona**, Chief Ed Krall, 507-457-8266.

Larger Volunteer or On-Call Departments: **Eden Prairie**, Chief Spencer Conrad, 612/949-8335; **Golden Valley**, Chief Mark Kuhnly, 612/593-8080; **Lakeville**, Chief Barry Christensen, 612/985-4701; **Oakdale**, Ronald Ehnstrom, 651/731-8886; **Vadnais Heights**, Chief Jerry Auge, 651/490-1355.

Smaller Volunteer or On-Call Departments: **Amboy**, Chief Tom Tallman, 507/674-3473; **Cotton Volunteer**, Chief Craig Kinsley, 218/482-5538; **Dawson**, Chief Jeff Olson, 320/769-2154; **Gaylord**, Chief Bill Walsh, 507/237-5483; **Gonvick**, Chief Ronald Rude, 218/487-5770; **Greenbush**, Chief Russel Wicklund, 218/782-2570; **Janesville**, Chief Bruce Manthe, 507/234-5110; **Mora**, Chief Gene Anderson, 320/679-1511; **Ogilvie**, Chief Jon Cramsie, 320/272-4822; **Pierz**, Chief Dale Janson, 320/632-7351; **Zimmerman**, 1998 Chief Dave Greenlun, 612/856-4666.

6. Prepare a Competent Workforce and Support Safe Operations

Given the variety of demands for emergency assistance, most fire departments require a workforce with a broad range of skills and expertise. Regardless of the level of services departments provide, they must maintain a workforce capable of meeting community expectations.[91] Department programs and their members' duties may vary depending on whether they employ full-time fire fighters, paid on-call or volunteer fire fighters, or some combination. Whatever the type of department, however, adequate training requirements, minimum staffing levels, standard operating guidelines, health and safety procedures, personal protective equipment, and 24-hour-a-day availability of personnel resources are essential to conducting safe and effective operations.[92]

91 IAFC, *Fire and Emergency Service Self-Assessment Manual*, secs. 3-32, 4-13 through 4-19, and 4-31.

92 NFPA, *NFPA 1500*, 2-1.2, 2-2, 2-3.1, 3-1.3, 5-1.1; IAFC, *Fire and Emergency Service Self-Assessment Manual*, secs. 3-32, 4-13 through 4-19, and 4-31; Cote, *Fire Protection Handbook*, sec. 10-24; Federal Emergency Management Agency (FEMA), *Risk Management Practices in the Fire Service* (Washington, D.C.: FEMA, 1996), 91.

Recruit and Retain Members

To meet local service demands and maintain minimum staffing level requirements, fire departments should establish a recruiting program to prepare for those times the department has fewer members than it needs.[93] The process should begin with the department identifying specific deficiencies in expected service coverage and expertise, such as inadequate staffing of particular work shifts, apparatus maintenance, or emergency medical services.[94] We found that in 1997:

- **About 54 percent of full-time fire departments, 26 percent of combination departments, and 46 percent of volunteer or paid on-call departments had developed a recruitment plan that was structured according to their personnel needs.**

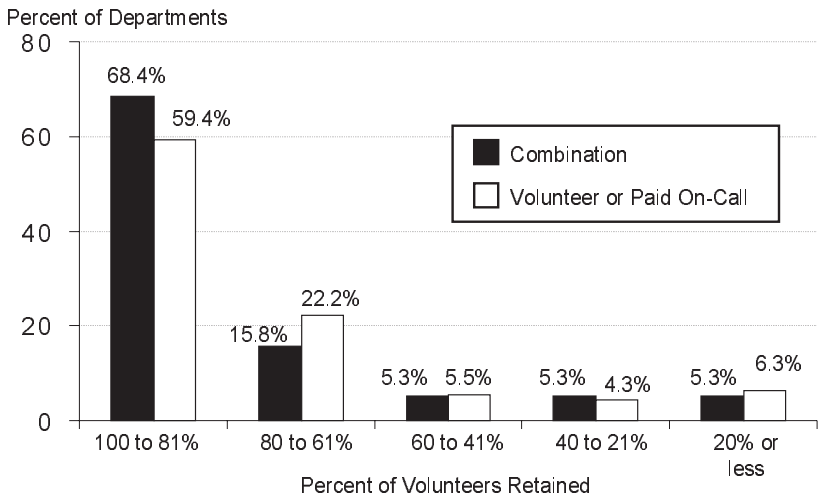
Recruitment should focus on individuals who are qualified or can be trained to meet the department's identified needs and performance standards.[95] The recruiting process should also comply with local, state, and federal standards, such as diversity requirements or residence location requirements.[96]

Due to sparse populations and a corresponding limited pool of potential recruits, small volunteer departments in rural areas frequently contend with simply maintaining the minimum number of staff they deem necessary for emergency responses. Under these circumstances, it is especially important that the department have an established recruiting process that is periodically assessed for its effectiveness at attracting qualified individuals.[97]

To maintain adequate staffing levels, fire departments should take proactive steps to retain their current members.[98] By minimizing fire fighter turnover, fire departments can reduce the time and costs associated with recruiting and initial training, and provide the community with a more experienced workforce. As Figure 2.2 illustrates:

- **Combination and volunteer or paid on-call fire departments had similar volunteer retention rates over the past five years, with about 68 percent of combination departments and 59 percent of volunteer or paid on-call departments retaining more than 80 percent of their members.**

Figure 2.2: Five-Year Volunteer Retention Rates, 1993-1997



SOURCE: Legislative Auditor's Office Survey of Fire Departments, 1998.

93 National Volunteer Fire Council, *Retention and Recruitment in the Volunteer Fire Service* (Washington D. C.: U.S. Fire Administration, 1995), 79; Cote, *Fire Protection Handbook*, sec. 10-24.

94 National Volunteer Fire Council, *Retention and Recruitment*, 80-81.

95 National Volunteer Fire Council, *Retention and Recruitment*, 80-81.

96 Cote, *Fire Protection Handbook*, sec. 10-20.

97 National Volunteer Fire Council, *Retention and Recruitment*, 79.

98 National Volunteer Fire Council, *Retention and Recruitment*, 7-8.

To understand why fire fighters choose to stay with or leave a department, fire departments should employ various methods to determine members' satisfaction and concerns with the department's policies, practices, and work environment.[99] Management can recognize problems early and take corrective action after surveying members, conducting performance reviews, or conducting exit interviews with members to determine their reasons for leaving.

To encourage members to stay active in the department, departments should engage in good management practices, such as: (1) demonstrating effective leadership, (2) maintaining clear and consistent standards of performance, (3) allowing flexibility in training and work assignments, (4) providing recognition for work well done, and (5) requiring training that is relevant and fits the volunteers' availability.[100] Management should also keep members informed about information relevant to their employment and the departments' service objectives, as well as state explicitly the mission and goals of the department so fire fighters know what is expected of them.[101]

Financial compensation also may play a part in retaining fire fighters.[102] Many Minnesota fire departments with on-call members offer an hourly or per call wage or stipend, as described in Chapter 1, to help members defray their expenses and reward them for the time they spend on fire department duties. Some offer medical, death, or disability benefits as indirect compensation. Fire fighter pension benefits may encourage fire fighters to stay active with the department after having invested time in it over the years, although pensions seem less of a tool to draw fire fighters initially in to fire services.[103] Fire officials should state clearly what constitutes an "active" year for determining pension eligibility. Table 2.4 illustrates how surveyed departments interacted with their volunteer and paid on-call members.

Table 2.4: Fire Department Interactions with Volunteer or Paid On-Call Members, 1997

Characteristic	Consistently Applied to Volunteer or Paid On-Call Members: Combination Departments	Consistently Applied to Volunteer or Paid On-Call Members: Volunteer or Paid On-Call Departments
Offered retirement or pension plan	100% (*N*=18)	93.3% (*N*=341)
Offered monetary incentives per hour or call, or as stipend	94.7 (*N*=19)	54.4 (*N*=333)
Required training that was relevant and fit volunteers' time availability	84.2 (*N*=19)	72.5 (*N*=335)
Communicated relevant information so members were informed	68.4 (*N*=19)	64.8 (*N*=338)
Maintained good reputation and positive image to keep volunteers interested, such as maintaining apparatus as point of pride	61.1 (*N*=18)	65.0 (*N*=340)
Offered medical, death, or disability benefits	61.1 (*N*=18)	59.3 (*N*=327)
Leadership used management style that encouraged member participation	47.4 (*N*=19)	60.0 (*N*=335)
Stated explicit mission and goals so volunteers knew what to expect	42.1 (*N*=19)	45.0 (*N*=333)
Used standard procedures for dealing equitably with grievances	38.9 (*N*=18)	43.6 (*N*=326)
Provided recognition for jobs well done (newsletters, banquets, etc.)	11.1 (*N*=18)	28.7 (*N*=334)

NOTE: Combination departments have six or more full-time fire fighters along with volunteer or paid on-call members.

SOURCE: Legislative Auditor's Office Survey of Fire Departments, 1998.

99 National Volunteer Fire Council, *Retention and Recruitment*, 23-26.

100 National Volunteer Fire Council, *Retention and Recruitment*, 7-8, 20-23, 26, 38, 53-55.

101 National Volunteer Fire Council, *Retention and Recruitment*, 11-12, 15.

102 National Volunteer Fire Council, *Retention and Recruitment*, 47.

103 National Volunteer Fire Council, *Retention and Recruitment*, 51-52.

Establish Minimum Training Requirements, Provide Ongoing Training and Incentives for Training

To support safe and effective operations at the emergency scene, fire departments should have a training program with minimum training requirements for all department members.[104] A well-trained workforce lends itself to efficient and effective operations, and reduces the risk of injury to fire fighters.[105] The program should provide initial and ongoing training of personnel, establish acceptable performance standards, and mandate training for all duties and functions a fire fighter is expected to perform, such as fighting structure fires, responding to hazardous materials spills, performing search and rescue operations, or operating apparatus.[106] As mentioned in Chapter 1, MNOSHA sets many standards regarding necessary training for fire department members, depending on the duties expected of them. According to our survey:

- **More than 90 percent of fire departments in larger communities said that they required training for the specialized services they offered and on the use and limitations of personal protective equipment in 1997.**

Although similar data were not available for fire departments in smaller communities, 83 percent of these departments reported that they required or offered training in 1997 on fire suppression and on the use and limitations of personal protective equipment. Table 2.5 shows what practices fire departments had in place as part of their health and safety programs in 1997.

Periodic appraisals of fire fighters' performance help identify particular training needs that can improve their own skills and affect the workings of the department as a whole.[107] In addition, by asking fire fighters about the skills and abilities about which they feel less confident, departments can identify appropriate training topics.

Departments using paid on-call or volunteer fire fighters should consider incentives, such as department-paid courses and book costs, for training their members. Because of family, work, and other demands on members' time, departments' training should be: focused on useful topics,

Fire fighters combat flames in a training exercise.

104 NFPA, *NFPA 1201,* 8.1; Cote, *Fire Protection Handbook,* sec. 10-17.

105 NFPA, *NFPA 1500,* A-6-2.1.1.

106 Cote, *Fire Protection Handbook,* sec. 10-17; NFPA, *NFPA 1500,* 3-1.3, 3-3, 3-4.1.

107 NFPA, *NFPA 1201,* 8-6.5, 8-6.6.

Table 2.5: Health and Safety Practices in Larger Fire Departments, 1997

Practice	Full-Time Departments (*N*=13)	Combination Departments (*N*=19)	Volunteer or Paid On-Call Departments in Larger Communities (*N*=56)
Personal protective equipment provided for all personnel	100%	100%	98.2%
Training required in the use and limitations of personal protective equipment	100	100	96.4
Ongoing training required for specialized services (e.g., water rescue), if department offers such services	100	100	85.7
Written description of safety procedures to limit risk of exposure to infectious and hazardous substances during emergency operations	92.3	84.2	89.3
Availability of critical incident stress debriefing	92.3	84.2	89.3
Requirement that apparatus are driven only by trained personnel	92.3	84.2	85.7
Local training based on level and type of risks in response area	84.6	78.9	76.8
Physical exam requirements for employment, including medical exams	76.9	63.2	82.1
Incident safety officer designated at each incident	61.5	84.2	75.0
Health and safety officer designated to manage department's health/safety program	53.8	57.9	62.5
Rapid intervention guidelines developed to assist injured fire fighters	46.2	63.2	58.9

NOTE: Data collected only from volunteer or paid on-call fire departments in cities of 8,000 or more population and departments with full-time or combination personnel.

SOURCE: Legislative Auditor's Office Survey of Fire Departments, 1998.

well-presented by competent instructors, taught by a variety of diverse instructors over time, and made to fit volunteers' time availability.[108]

Fire chiefs must be skilled not only in managing emergency operations, but also in department administration including fiscal planning, public relations, and human resource development.[109] Promotions to officer positions should be based on merit and awarded to those with the skills, knowledge, and abilities needed to perform the job.[110] Fire department officers should meet the requirements of officers as detailed in departments' job descriptions and as specified by the National Fire Protection Association.[111]

For safe operations during emergency responses, fire departments should prepare and implement written standard operating guidelines and establish communication protocols for all emergency activities and functions, as described elsewhere in

108 National Volunteer Fire Council, *Retention and Recruitment,* 38-42.

109 Coleman and Granito, *Managing Fire Services,* 446.

110 NFPA, *NFPA 1201,* 5-2.2

111 NFPA, *NFPA 1021 Standard for Fire Officer Professional Qualifications* (Quincy, Mass.: NFPA, 1992), 1-3.1 through 5-13.

this chapter.[112] Standard guidelines and protocols describe response procedures according to predetermined strategies, and establish a system of predictable and consistent operations.[113]

Equally important, members expected to respond to emergency incidents should be trained in the department's standard operating guidelines, such as those governing the department's incident management system, as well as communication protocols employed for different types of incidents.[114] By familiarizing fire fighters with established protocols and procedures and applying them consistently, departments reduce chaos and the chance of injury while helping emergency response activities run smoothly and efficiently.

Departments can use knowledge of standard operating guidelines as one of their criteria for personnel promotions.

Preincident planning is also critical to the health and safety of fire fighters.[115] As described in the following action, preincident planning identifies high-hazard fire risks and other hazards in the community, such as welding businesses or hazardous materials warehouses, and acquaints fire fighters with specific structures and their occupancies, unusual risk situations, extent of automatic sprinkler coverage, and terrain in the response area.[116] Training on preincident plan information should occur in advance of actual emergencies to raise fire fighters' awareness of hazards they may encounter.[117]

Adopt Safety Protocols and Provide Protective Equipment

Fire fighters frequently perform physically demanding activities, such as interior structure fire fighting or confined space rescues, in environments that can be dangerous to their health and safety. To reduce the risks of injury to fire fighters, departments should adopt safety protocols for emergency operations such as: (1) a system for accounting for personnel whereabouts during incidents, (2) periodic rest and recovery for members, and (3) rapid intervention plans to rescue injured members.[118] Departments should maintain the minimum staffing levels necessary to conduct responses safely, based on the type and severity of the incident.[119] Adopting and consistently implementing these safety protocols can reduce the chance and frequency of injury to members.

Given the adverse environmental conditions that fire fighters face, departments should provide each member with the protective clothing and equipment necessary to shield them from health hazards likely to be encountered during emergency operations, such as wildland fire fighting or hazardous materials responses.[120] Protective clothing and equipment, such as thermal coats and trousers, gloves, goggles, boots, and self-contained breathing apparatus, reduce the occurrence of heat stress, burns, abrasions and punctures, and exposure to blood-borne pathogens.

- **All of the larger fire departments responding to our survey indicated their protective gear and breathing apparatus were adequate or very adequate.**

112 NFPA, *NFPA 1500*, 2-1.2, 3-4.2, 4-2.6; FEMA, *Risk Management Practices in the Fire Service*, 91, 94.

113 FEMA, *Risk Management Practices in the Fire Service*, 91.

114 FEMA, *Risk Management Practices in the Fire Service*, 67, 75, 92; NFPA, *NFPA 1201*, 9-1, 16-5.6; NFPA, *NFPA 1500*, 2-1.2(d), 3-3.2, 6-1.2.

115 Jonathan D. Kipp and Murrey E. Loflin, *Emergency Incident Risk Management: A Safety and Health Perspective* (New York: Van Nostrand Reinhold, 1996), 180; NFPA, *NFPA 1201*, 8-6.2.

116 Kipp and Loflin, *Emergency Incident Risk Management*, 182.

117 Kipp and Loflin, *Emergency Incident Risk Management*, 182; FEMA, *Risk Management Practices in the Fire Service*, 86.

118 NFPA, *NFPA 1500*, 6-3, 6-5, 6-6.1; FEMA, *Technical Rescue Program Development Manual*, 5-3.

119 NFPA, *NFPA 1500*, 6-4.1, 6-4.4; FEMA, *Technical Rescue Program Development Manual*, 5-3.

120 NFPA, *NFPA 1500*, 5-1.1

While protective equipment can reduce the chance of injury, fire fighters should not rely on this to provide absolute protection during severe exposure situations.[121] For fire personnel to benefit from protective clothing and equipment, the department should offer training on their proper use and limitations.[122] Table 2.5 shows that virtually all the larger fire departments offer training on the use and limitations of personal protective equipment.

Fire departments can take additional steps to reduce the risk of injury to their members, such as appointing a health and safety officer to advise and train members on safety protocols for department operations, or providing members with personal alert safety systems for use in hazardous areas to alert others when a fire fighter becomes incapacitated.[123] According to our survey,

- **About 91 percent of larger fire departments had adequate or very adequate personal alert safety systems in 1997.**

Stress management programs and activities, such as critical incident stress debriefing following traumatic incidents, can also help maintain the psychological and physical well being of emergency response personnel.[124] Critical incident stress debriefing programs are available in regions around the state for use by anyone involved in emergency responses. Some departments also have chaplaincy programs in which trained clergy are available for counseling victims and emergency personnel.

Summary and Examples Related to Preparing a Competent Workforce and Supporting Safe Operations

Actively recruiting fire fighters, taking steps to encourage and retain them, and training them in all aspects of the services they are expected to perform are fundamental actions for fire departments. Without qualified personnel, fire departments simply would not be able to respond to emergencies. Especially for departments with volunteer and paid on-call members, plans for recruitment and retention are essential to providing the service. For all departments, training members appropriately and continually prepares them to do their jobs effectively and enhances safety.

Costs include significant expenditures of time for planning recruitment, retention, training, and safety programs. The time involved with attending drills and training exercises is substantial for most fire department members. Training off site or using guest lecturers can also involve monetary costs. Personal protective equipment for all members and training materials represent additional costs.

Recruit and Retain Members

Cotton Volunteer Fire Department and First Responders

To operate the Cotton Volunteer Fire Department and help retain its volunteer members, the department uses a collaborative approach to decision making. It recruits members through an annual event and uses a point system to record their involvement in the department. Since 1963 the department has provided fire suppression and prevention services, and as of 1990 it has provided first responder emergency medical services. The department has 29 active members, about half of whom have training in emergency medical services.

Because fire department members are more likely to be committed to their work when they feel they make valuable contributions to department operations, the chief follows a teamwork approach. All active fire department members make department decisions collectively so that they take ownership of department matters and do not view a decision as solely "the chief's decision."

121 NFPA, *NFPA 1977, Standard on Protective Clothing and Equipment for Wildland Fire Fighting*, 1993 ed. (Quincy, Mass.: NFPA, 1993), A-1-2.2.

122 NFPA, *NFPA 1500*, 5-1.3.

123 NFPA, *NFPA 1500*, 2-5.1, 5-8.1.

124 NFPA, *NFPA 1500*, 10-1.

Team-decision making keeps the volunteers closely involved in department operations. As an example, prior to submitting a budget to the township board each year, the chief presents it to fire department members at a monthly meeting. Fire fighters help decide what to propose to the township. Further, when the time comes to replace fire department rigs, all active members participate in the purchasing decisions. Team-decision making helps retain active volunteers.

To recruit members and showcase the work it does, the fire department holds an open house each year. Township residents are invited to the fire hall to see the apparatus and learn about fire department operations; smoke detectors are available at no charge. People with an interest in emergency medical services learn about first responder duties and training. Although its first responder work has given the Cotton Fire Department much greater community visibility than in the past, the open house allows department members to describe their work at length to potential department candidates.

Fire department members make decisions collectively.

The department has had a sufficient number of people willing to serve as volunteers over the years. About a third of active fire department members are female fire fighters. Many of the women are part of husband and wife teams serving together on the fire department. Husbands and wives that serve together tend to view their fire department involvement as time with their spouse instead of time away from their spouse. Because of the large time commitment members make to the fire department, this aids in retaining fire fighters.

Fire department members are also involved in other community activities, which promote good will for the department and provide a bond among members. As an example, they offer a dinner for Department of Natural Resources workers who meet annually in the town hall. For the broader community, they sponsor a holiday party in December and periodically serve dinners for senior citizens. The fire department supports the State Fiddler Championship held in Cotton each year and sells items there as fundraisers.

As an incentive for fire fighters to take training, the fire department pays for training costs. People who begin service with the fire department are encouraged to take a Firefighter I course, paid for by the department. Those who want to participate in emergency rescues must successfully complete training as first responders or emergency medical technicians. Many of the first responders have received training in vehicle extrications and school bus extrications, and fire fighters participate in the Minnesota Fire School, among other training opportunities, at department expense.

At one point, the fire department had a mix of active and inactive fire fighters but little certainty about which members considered themselves active. Consequently, the chief sent a letter reminding members that for their own safety, and to abide by department bylaws, fire fighters had to comply with department training requirements. The letter asked members to sign a statement indicating their willingness to participate in the required training and other department activities. This process enabled department members to affirm their commitment to the department or easily resign from active duty.

Department bylaws require fire fighters to acquire 50 points a year to remain in good standing and be eligible for pension benefits following 20 active years of service. Points are awarded based on members' level of participation. For instance, fire fighters receive four points for responding on a fire run, four points for monthly training exercises, or one point for fire hall maintenance such as shoveling snow from walkways. Officers receive two points a month for their additional administrative and planning duties. The point system rewards members who are actively participating in fire department operations and helps track pension eligibility. It serves as an incentive to keep members active in the department.

Significantly larger departments with a bigger membership base may find it impractical to practice collaborative, team-decision making on as broad a scale as used in Cotton. For these departments, committees of members assigned particular tasks

may provide a more workable process for decision making. For the smaller departments, though, activities that include as many members as possible may contribute to a sense of collective ownership in the department. Ongoing, proactive recruitment activities tailored to local conditions are necessary for departments of all sizes, particularly those working with volunteers or paid on-call members.

For more information contact:

Chief Craig Kinsley
Cotton Volunteer Fire Department and First Responders
218/482-5538

Maple Plain Fire Department

To improve work relations and retain members, Maple Plain fire officers reorganized fire department management functions to involve their on-call fire fighters in planning, controlling, and evaluating fire department services. Fire officers implemented the changes in early 1998, resulting in increased fire fighter attendance at training drills and meetings, greater camaraderie among members, and more member initiative in improving fire department services.

While the department was not experiencing fire fighter turnover, fire officers wanted to increase member interest and participation in department activities. Fire officers now use teams of fire fighters to manage designated department functions or services, such as training, truck maintenance, or the Fire Explorers Program. Members select those services they are interested in and, within those teams, select a team leader, assign themselves duties, evaluate service or equipment needs, and make recommendations for purchases to fire officers. The department only requires that every fire fighter be on at least one team. Members can rotate team assignments or be on multiple teams; each team and designated leader work under the direction of a fire officer.

The fire fighters appreciate the opportunity to participate in designing their own jobs and to work in areas of their personal interest, rather than receiving mandated duty assignments. Fire officers appreciate the insight and additional perspective offered by the fire fighters and see other improvements, such as more efficient fire hall maintenance and operations and increased participation in department activities.

The benefits of involving fire fighters in management carry over to the emergency scene; Maple Plain fire fighters exhibit greater attention to details and better performance related to their team assignments. Fire officers emphasize that their team approach, which delegates responsibility for fire department functions, has not undermined the command system or fire officer authority during emergency operations.

Team activities and recommendations are evaluated monthly by the fire officers and team leaders. The fire chief retains final authority for modifying department policies or purchasing equipment. Because the fire fighters were receptive to the job enrichment opportunities, fire officers experienced few problems with implementing the new management approach.

The department transition to a team structure required approximately 40 hours to plan and, initially, additional hours to provide direction to fire fighters on desired activities and strategies. Fire officers and leaders must also volunteer additional time for the monthly team evaluation meetings. The team assignments also require a minimal increase in volunteer fire fighter hours, however, officers indicate that fire fighter time is more productive than before. Departments experiencing low retention or member dissatisfaction could consider reorganizing to involve fire fighters in a teamwork approach to department operations, but only after determining member availability and willingness to assume the added responsibilities.

For more information contact:

Chief Dave Eisinger
Maple Plain Fire Department
612/479-2732

Maple Plain Fire Department

As part of its fire fighter recruitment effort, the Maple Plain Fire Department participates in the Boy Scouts of America's Fire Explorers Program.

Through the Fire Explorers program, the department provides insight into fire fighters' work environment and responsibilities to juveniles considering a fire fighting career.

Since beginning the Fire Explorers program in 1996, Maple Plain's paid on-call fire fighters have mentored ten high school students, males and females ages 14 through 18, after school and throughout summer break. The fire fighters (1) educate juveniles about fire department services, (2) teach fire fighting-related skills in a safe environment, and (3) provide realistic job previews by allowing the explorers to participate in fire hall activities and observe emergency response operations.

The fire department must meet several criteria to participate in the Fire Explorers program, and fulfill a stringent mandate ensuring that the juveniles are never put in harm's way during any activities. All explorer activities must be under the direct supervision of fire fighters with a ratio of two supervising fire fighters to every explorer. In addition, a minimum of five fire fighters must be assigned and trained to act as advisors to the juveniles, with at least one advisor available to respond to concerns at all times.

To qualify for the program, juveniles must maintain a satisfactory grade point average, and they must have a good performance record with the fire department to remain in the program. The fire chief and advisors meet periodically with the Fire Explorer's Program director to review the juveniles' performance and address any concerns.

The juveniles participate in fire department operations, such as monitoring the fire department's smoke detector give-away program, filling and maintaining fire fighters' self-contained breathing apparatus air bottles, and performing simple equipment maintenance. They also carry pagers and attend emergency incidents. Some explorers also provide administrative assistance to assigned fire officers during emergency operations, such as retrieving items from command vehicles or relaying communications. The explorers attend regular fire fighter meetings to learn about safety protocols and other department issues. They also participate in some fire fighter training activities and drills to become familiar with protocols and the physical demands of the job.

Maple Plain fire officers identify several benefits of the program. The explorers carry a strong fire prevention message to their peers as well as receive career direction from their fire department advisors. The fire department benefits from the assistance and perspective of the explorers on department operations, as well as the interaction with potential future fire fighters. Maple Plain fire officials believe it is likely that several of their explorers will seek additional fire fighting training, and possibly return to the Maple Plain Fire Department as fire fighters.

Despite the time commitment required of the five advisors, approximately 20 hours a month collectively, the Maple Plain Fire Department will continue its outreach efforts through the Fire Explorer program. The fire fighters favor the program and their explorers demonstrate commitment and proficiency in skills. While there are no monetary costs to the department, this long-range approach to recruiting requires some additional volunteer time to supervise and provide direction to the juveniles. Fire departments must determine member availability and support before incorporating such a program into its recruitment plans, and recognize that the program does not guarantee future recruits for the department.

For more information contact:

Chief Dave Eisinger
Maple Plain Fire Department
612/479-2732

St. Louis Park Fire Department

When the St. Louis Park Fire Department hired part-time, on-call fire fighters in 1996, it offered several benefits to help retain them. Seventeen of the original 21 part-time recruits are still with the department two and a half years later.

The fire department required its part-time staff to undergo Fire Fighter I and II training initially, and annual training following that. The recruits received $6.50 an hour to attend training. Because many of the recruits hoped to eventually find

careers in public safety, the training, as well as the experience they were gaining, was advantageous to their future. Because they went through the initial training as a group, the experience helped build cohesiveness among them.

To help retain the part-time fire fighters, the city included them among employees with access to the city's tuition reimbursement policy; the city pays up to $2,000 per year for employees taking classes. Like full-time staff, paid on-call members have access to city technology, such as computers. Although the part-time fire fighters do not have their own relief association as the full-time fire fighters do, they are eligible for annual performance bonuses. By performing well, the part-time fire fighters can receive an additional $1,200 during their first year and increasing amounts in successive years. Another incentive recently implemented was the addition of group leader positions in the part-time component. These positions give part-time staff the opportunity for professional development of leadership skills.

The part-time personnel receive their hourly wage for responses they make and for participating in training and drills. They may participate in the city's deferred compensation plan, allowing them to set aside before-tax dollars for future uses. When they participate in training outside the fire stations, the city pays the training costs.

Although the full effects of the city's practices will not be known for a few more years, these benefits have helped the fire department retain most of its 21 original recruits, and at a cost equivalent to that of about one full-time fire fighter. Because of the high standards the on-call members had to meet, when the fire department needed to hire an additional full-time fire fighter it could do so from its on-call group. Although volunteer departments operating on small budgets may not be able to afford the same level of benefits, combination departments that can may find similar advantages.

For more information contact:

Chief Robert Gill
St. Louis Park Fire Department
612/924-2594

White Bear Lake Fire Department

The White Bear Lake Fire Department uses several incentives to retain members in its paid on-call workforce. Among its incentives contributing to a low turnover rate are training reimbursements and a low-cost lodging program.

Because the department operates advanced life support ambulances, it has 20 members trained as paramedics and other members trained at the emergency medical technician (EMT) basic and intermediate levels. In exchange for agreeing to work with the White Bear Lake Fire Department for five years, department members receive reimbursements from the city for the costs of tuition and books for training up through the paramedic level. The contract between the city and department members is a pro rata arrangement. Fire department members who leave after a year with the department, for instance, have to repay the city for four-fifths of tuition costs.

Many recruits currently coming to the fire department are interested in careers as paramedics or fire fighters. They need high levels of training and on-the-job experience to further their careers. Thus, they tend to view the training reimbursements and experience with the department as significant reasons to continue as members. In return, the fire department receives services from strongly motivated and highly trained employees.

The fire department also offers a lodging program for single fire fighters. Young fire department members who have left their parents' homes but have not started families of their own are eligible to rent rooms that the city makes available at low cost. Dormitory rooms are available in the fire stations at $50 per month. Other rooms in housing adjacent to the fire stations are available at $100 monthly rents. These rooms are in housing units located within city-established redevelopment districts that were otherwise unoccupied and, if left vacant, could

A lodging program is available for single firefighters.

have been targets of vandalism or other problems. Monthly rent payments offset the costs of maintaining the properties.

In return for their living accommodations, the occupants offer the fire department more immediate service than if they lived farther from the stations. They begin operating the apparatus quickly and provide shorter response times at emergencies. Between eight and ten department members take advantage of the lodging program.

Like most other fire departments, the White Bear Lake Fire Department offers pension benefits to its members. The fire department acknowledges that few members appear to be initially attracted to the service because of the pension. On the other hand, pensions seem to serve as a retention tool because the benefits become available to members after 20 years of service.

For other fire departments, the cost of training reimbursements will vary depending on the programs in which students enroll and the number of enrollees. Fire departments can protect their investment in fire fighters' advanced training with contracts that require recipients to provide services equivalent to training costs. Lodging programs are most cost-effective when they take advantage of housing already available and may not be feasible for departments without sleeping rooms in their stations or other nearby alternatives.

For more information contact:

Chief Tim Vadnais
White Bear Lake Fire Department
651/429-8567

Other fire departments we surveyed also met our standards of performance related to recruiting and retaining fire department members. Some are listed here along with contact names.

Combination Departments: **Fridley**, Chief Chuck McKusick, 612/572-3610; **Hastings**, Chief Donald Latch, 651/437-5610.

Larger Volunteer or On-Call Departments: **Apple Valley**, Chief Marv Calvin, 612/423-5874; **Chanhassen**, Fire Marshal Mark Littfin, 612/937-1900; **Eden Prairie**, Chief Spencer Conrad, 612/949-8335; **Oakdale**, Ronald Ehnstrom, 651/731-8886; **Spring Lake Park-Blaine-Mounds View**, Chief Nyle Zikmund, 612/786-4436; **St. Peter**, Chief Windy Block, 507/931-4840.

Smaller Volunteer or On-Call Departments: **Albany**, Chief Joseph Wedel, 320/845-4040; **Amboy**, Chief Tom Tallman, 507/674-3473; **Browerville**, Chief William Buhl, 320/594-2201; **Canton**, Chief Donald Helgeson, 507/743-5000; **Dawson**, Chief Jeff Olson, 320/769-2154; **Granite Falls**, Chief Mike Ohliger, 320/564-3011; **Greenbush**, Chief Russel Wicklund, 218/782-2570; **Janesville**, Chief Bruce Manthe, 507/234-5110; **Mora**, Chief Gene Anderson, 320/679-1511; **Pierz**, Chief Dale Janson, 320/632-7351; **St. Charles**, Chief Linus Soppa, 507/932-4090; **St. Paul Park Volunteer**, Chief Scott Gerry, 612/459-9918; **Waite Park**, Chief Gary Curtis, 320/252-4712; **Winnebago Fire Service**, Chief Jerome Behnke, 507/893-3515; **Zimmerman,** 1998 Chief Dave Greenlun, 612/856-4666.

Support Safe Operations

Winnebago Fire Service

To prevent the occurrence of occupational injuries and illnesses, the Winnebago Fire Service worked with its city officials to develop a comprehensive health and safety program. The fire department's approach to manage risks to its fire fighters while still providing effective emergency response services includes: appointing a safety officer, developing strict safety protocols and training requirements, and investing in personal protective equipment customized to fit individual fire fighters.

The fire department emphasizes accident prevention by requiring ongoing training of all fire fighters in the duties they are expected to perform and in the use and limitations of personal protective equipment. Several of the departments' officers have attended training sessions at local technical colleges that enable them to better monitor safety practices, as well as provide some in-house training.

As part of their training curriculum, officers rely on materials approved for use by MNOSHA.

City officials developed an exposure control plan for the fire department that outlines safe work practices, such as minimizing exposure to bloodborne pathogens and consistent use of personal protective equipment. Fire officers maintain written standard operating guidelines that incorporate risk management protocols, such as maintaining minimum staffing levels during incidents and taking precautions during confined space activities and carbon monoxide release investigations. Fire officers periodically review and update the department's guidelines to reflect current OSHA standards. The fire department keeps copies of the written safety materials at the fire hall and on its apparatus so fire fighters can easily refer to them.

All fire fighters are trained annually on these safety protocols to maintain skills and awareness of the dangers inherent in their occupation. The safety officer and training officer work as a team and maintain fire fighter training records. Fire fighters that miss a mandatory safety training session cannot participate in emergency responses until they fulfill the requirement.

The safety officer is also the designated incident safety officer assigned to monitor hazards, identify unsafe conditions, and otherwise assess risks to fire fighters during emergency incidents. Playing this dual role, the safety officer assesses the effectiveness of the training program by monitoring fire ground activities and any occurrence of unsafe acts and practices. The fire department can then target its safety training to those areas needing improvement. The incident safety officer designates additional safety officers during large-scale incidents to adequately monitor fire fighter safety.

The fire department also uses a system to monitor the presence and location of all fire fighters throughout an incident. Using individual name tags and a personnel accountability board, the safety officer tracks fire fighters and determines when a member may be injured or incapacitated. The fire department supplements this tracking system by requiring all fire fighters to wear personal alert safety devices that sound alarms to notify others when the member is in need of assistance.

To protect fire fighters from exposure to burns, hazardous chemicals, or bloodborne pathogens, the fire department provides each fire fighter with adequate personal protective gear and ensures that the equipment fits properly. For example, several years ago the fire department began investing in face pieces for helmets and self contained breathing apparatus that are custom-fitted for each fire fighter. The custom-fit face pieces are far more effective than generic sized masks at limiting smoke inhalation during fire fighting. MNOSHA now recommends that all fire departments provide custom-fit face pieces for all fire fighters. Fire officials estimate their additional costs for upgrading to custom-fit turnout gear and equipment are approximately $800 per fire fighter.

The fire department requires all members to participate in familiarity tours of local businesses and high-hazard facilities to make them aware of potential risks they may encounter in the event a fire breaks out. As an incentive, members receive training points and a small stipend for participating. Fire fighters are also compensated for their time in training.

Fire departments' costs for maintaining updated safety guidelines, providing custom-fit personal protective equipment, and ensuring ongoing training for all members can be substantial and require significant person-hours. Because of the limit on fire fighters' time, volunteer departments may require the assistance of city administrators in developing and updating an exposure control plan. Departments that respond to concurrent or large-scale incidents require multiple safety officers to cover their emergency responses.

For more information contact:

Chief Jerome Behnke
Winnebago Fire Service
507/893-3515

Set Training Requirements

Alexandria Fire Department

To ensure the 30 volunteer members of the Alexandria Fire Department are well trained for a broad range of expected duties, fire officers use a comprehensive training program. Through its team approach to training, the fire department maintains a workforce capable of providing confined-space and high-angle rescues, vehicle extrications, and hazardous materials responses, in addition to fire fighting.

To make the most of fire fighters' time, fire officers structure training so that all members participate throughout the session. Rather than have fire fighters stand idle watching others learn methods and protocols, the training officer groups the members into small teams and conducts similar drills so that each member is always assigned a task or activity.

To enlist the participation of all members in training activities, fire officers organized the members into three companies. Under the training officer's direction, the companies rotate responsibility for researching and conducting training and drills for each month throughout the year. During the training sessions, members take turns acting as incident commander. Given the departments' range of services, fire fighters must become familiar with many safety protocols and emergency response strategies.

With the company approach to training, members have a better understanding of emergency responses and fire ground activities. Fire officers also benefit because members add their own perspectives on appropriate responses to emergencies. In addition to the fire department training, each fire fighter must complete 12 hours of training each year at a school or other training facility. Upon completing outside training, fire fighters incorporate what they have learned into their company training assignment so that all members benefit from each others' education.

Companies of fire fighters rotate training duties.

All members are trained in the proper use of equipment including radios and fire suppression and rescue equipment. The department's training schedule includes drills on communication protocols that require members to use their radios. All vehicle operators are required to practice driving the apparatus they are expected to operate during responses. By requiring members to practice starting and using the equipment, fire officers reduce operator error as a cause for equipment failure and thus the department avoids repairing or replacing equipment unnecessarily.

Fire fighters are also trained in the proper use and limitations of personal protective equipment and on safety protocols specific to each emergency response activity, such as following minimum staffing requirements for structural fire fighting and confined-space rescues. Fire fighters who fail to attend an OSHA-related training session must complete make-up assignments within one week and are not allowed to participate in emergency responses until they satisfy the requirement. To increase fire fighter awareness of potential fire risks and safety hazards, fire fighters also walk through local businesses and high-hazard facilities to become familiar with building construction and layouts.

To properly investigate the cause and origin of fires, several Alexandria fire officers train to the arson investigator level. The training officer trains fire fighters in appropriate methods of overhaul and salvage and precautionary steps for preserving the fire scene until the fire cause is determined.

To maintain its fire fighters' emergency response skills to large-scale incidents, the Alexandria Fire Department participates in annual drills with other public-safety agencies, such as local law enforcement and emergency medical services. Local teachers accompany students who role play injured victims. The departments jointly plan the interagency drills and incorporate as many response activities as possible into the emergency scenario. For example, the scenario may include a hypothetical train wreck involving vehicles, passenger injuries, hazardous materials spills, and

fires. Departments invite training instructors from technical colleges to critique their performance throughout the drill and recommend areas, such as radio communications or following standard operating guidelines, for additional training. The departments also critique each others' performance and identify areas for improving interagency coordination. The departments share any supplies expenses for the mock incidents.

While the Alexandria Fire Department does not pay its fire fighters for in-house training activities, it does pay tuition costs and per diems for the fire fighters' 12 annual hours of independent training. Volunteer fire departments may have difficulty affording similar requirements if they have not typically paid for training. Departments that wish to participate in countywide emergency response drills that involve hazardous materials training can apply for grants available through the Division of Emergency Management. Neighboring fire departments can reduce costs by pursuing joint training opportunities. Departments can increase member participation by using a flexible training schedule. Well-planned sessions and drills that involve all fire fighters make the most of members' time.

For more information contact:

Chief Rick Glade
Alexandria Fire Department
320/763-3501

Other fire departments we surveyed also met our standards of performance related to training and safety practices. Some are listed here along with contact names.

Full-Time Departments: **Burnsville**, Chief Ronald Payne, 612/895-4571; **Richfield**, Assistant Chief Steven Sutter, 612/861-9855; **St. Paul**, Chief Timothy Fuller, 651/224-7811.

Combination Departments: **Fridley**, Chief Chuck McKusick, 612/572-3610; **St. Anthony**, Chief Dick Johnson, 612/788-4885; **St. Louis Park**, Chief Robert Gill, 612/924-2594; **Winona**, Chief Ed Krall, 507-457-8266.

Larger Volunteer or On-Call Departments: **Eden Prairie**, Chief Spencer Conrad, 612/949-8335; **Lakeville**, Chief Barry Christensen, 612/985-4701; **Minnetonka**, Chief Joe Wallin, 612/939-8598; **Oakdale**, Ronald Ehnstrom, 651/731-8886; **Robbinsdale**, Chief Mark Fairchild, 612/537-4534; **White Bear Lake,** Chief Tim Vadnais, 651/429-8567.

Smaller Volunteer or On-Call Departments: **Amboy**, Chief Tom Tallman, 507/674-3473; **Cotton Volunteer**, Chief Craig Kinsley, 218/482-5538; **Dawson**, Chief Jeff Olson, 320/769-2154; **Gaylord**, Chief Bill Walsh, 507/237-5483; **Greenbush**, Chief Russel Wicklund, 218/782-2570; **Janesville**, Chief Bruce Manthe, 507/234-5110; **Mora**, Chief Gene Anderson, 320/679-1511; **Ogilvie**, Chief Jon Cramsie, 320/272-4822; **Pierz**, Chief Dale Janson, 320/632-7351.

7. Plan for On-Scene Responses

Each of the following relates directly to activities at the scenes of incidents. Yet they all require planning far in advance of incidents, consistent application of the plans, and training for the fire personnel expected to respond to the incidents.

Prepare Preincident Plans

To prepare for an effective response to structure and wildland fires, as well as other emergency incidents, such as water rescues or vehicle accidents, fire departments should collect information on all fire risks and hazards, hazardous materials facilities and transport routes, and other emergency risks in their response area.[125] Based on these identified risks,

125 NFPA, *NFPA 1620, Recommended Practice for Pre-Incident Planning,* 1998 ed. (Quincy, Mass.: NFPA, 1998), 1-1.1; NFPA, *NFPA 295,* A.2-5; IAFC, *Fire and Emergency Service Self-Assessment Manual,* secs. 4-5, 4-6, 5-11, 5-12, 5-129; NFPA, *NFPA 471, Recommended Practice for Responding to Hazardous Materials Incidents,* 1997 ed. (Quincy, Mass.: NFPA, 1997), 2-1; Cote, *Fire Protection Handbook,* secs. 10-5, 10-13; Kipp and Loflin, *Emergency Incident Risk Management,* 180.

departments should develop written "preincident plans" as a way to arm themselves with the information to effectively manage emergencies while preserving personnel safety. Most of the larger fire departments had preincident plans in 1997, according to our survey.

- **About 93 percent of larger fire departments had preincident plans for at least some of their fire risks and structures.**

More than 53 percent of volunteer or paid on-call departments in smaller communities reported having written emergency response plans in preparation for their fire responses.

Preincident planning helps incident commanders decide on appropriate strategies for controlling incidents by providing them and other department members with vital information about fire risks and other hazards; locations of additional available fire suppression resources such as tankers or foam; building construction, layout, means of egress and occupancy characteristics; fire protection features such as automatic sprinkler coverage and portable extinguishers; and the geography of the service area, as well as related reference materials such as maps of hydrant locations, roads, and other access points.[126] This information is critical for determining minimum staffing levels and equipment requirements, developing preattack plans, and assessing fire flow needs, all of which are necessary for conducting successful emergency operations and reducing losses.[127]

Written preincident plans also provide a resource for consistent management by all individuals expected to manage an emergency incident, in the event that the first-arriving officer changes from incident to incident or the fire chief or other assigned incident commander is absent.[128] To be useful, the plans must be accessible while response units are en route to and during the incident. For the safety of fire personnel, all members who are expected to respond to emergency incidents should be familiar with preincident plan information, such as the location and characteristics of complex occupancies, special hazards, wildland fire risks, water supplies, and roads and terrain of the response area.[129]

In the case of preincident planning for buildings, gathering structure and fire protection information for the plans differs from data gathering done while inspecting buildings for fire code compliance. The former is needed to prepare to manage emergencies once they occur and the latter to identify and correct hazards to prevent fires from ever happening. Despite this difference, departments may be able to collect pertinent information for preincident plans during inspections related to the fire code.

Preincident planning and the use of those plans should be an ongoing process with annual updates of plans and related materials, or more frequently if buildings or occupancies change.[130] The process should include: (1) gathering current information on fire and other risks or hazards, (2) analyzing the information for what is vital to fire service operations, (3) distributing plans in a format that is easy to use and gain access to at emergency scenes, and (4) reviewing the plans with response crews.[131]

Establish an Incident Management System

Fire departments should establish within their written plans an incident management system that defines the department's roles and responsibilities when responding to specific types of emergency incidents.[132] The plans should outline a standard management structure by which departments direct

126 Kipp and Loflin, *Emergency Incident Risk Management*, 180; NFPA, *NFPA 1620*, 3-1 through 6-4.7.

127 NFPA, *NFPA 1620*, 1-2.5, 2-3.1; NFPA, *NFPA 295*, A.2-5.

128 NFPA, *NFPA 295*, A.2-5; Cote, *Fire Protection Handbook*, sec. 10-6.

129 Cote, *Fire Protection Handbook*, sec. 10-5.

130 NFPA, *NFPA 1620*, 8-3.3; NFPA, *NFPA 295*, A.2-5; Kipp and Loflin, *Emergency Incident Risk Management*, 183.

131 Cote, *Fire Protection Handbook*, secs. 10-6, 10-7.

132 NFPA, *NFPA 1561, Standard on Fire Department Incident Management System*, 1995 ed. (Quincy, Mass.: NFPA, 1995), 2-1.

emergency incidents, and provide standard operating guidelines for specific on-scene function and location assignments.[133] For coordinated operations and compatibility with other emergency response agencies, such as law enforcement, the fire department should develop its incident management system in cooperation with these other agencies.[134] We found that in 1997:

- **About 69 percent of full-time fire departments, 90 percent of the combination departments, and 75 percent of the volunteer or paid on-call departments in larger communities had written incident management systems for their fire suppression duties.**

Another approximately 15 percent of these fire departments had an incident management system with response plans, but they were not written; the remaining larger fire departments were developing their incident management systems in 1997. Similar data are not available for volunteer or paid on-call departments in smaller communities.

Implementation of the incident management system is important. The incident management system should be flexible enough to allow the incident commander to adapt and apply the basic framework and principles to all sizes and types of incidents.[135] At the same time, regardless of the level of complexity of the incident, the department should always use the same incident management system to eliminate confusion when multiple agencies respond, to facilitate scene evaluation and strategic planning, and to maintain control of the incident.[136] Routine use of the same incident management system will enhance fire fighters' familiarity with on-scene operations, resulting in more rapid and effective responses.[137]

Write Standard Operating Guidelines

For successful operations at emergency incidents, fire departments should develop and use standard operating guidelines for all functions and activities.[138] Standard guidelines provide a structure for conducting operations in a systematic, organized manner, and enhance fire departments' capabilities for effective and reliable fire suppression, rescue, or other emergency responses.[139] As mentioned earlier, standard guidelines applied consistently also enhance safety for fire personnel. With such guidelines, members can coordinate and prioritize tasks based on a common understanding of standard approaches and strategies, regardless of the scale of the incident.[140] According to our survey, in 1997:

- **Seventy-five percent of full-time fire departments, 95 percent of combination departments, and 86 percent of volunteer or paid on-call departments in larger communities had written standard operating guidelines for their fire suppression activities. About 55 percent of volunteer or paid on-call departments in smaller communities reported that they had such guidelines.**

Another 8 percent of larger departments had standard operating guidelines, but they were not written; about 3 percent were developing such guidelines in 1997.

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133 NFPA, *NFPA 1561*, 2-1, A-1-2.3.1, A-2-4.5 through A-2-4.5.3; NFPA, *NFPA 1201*, 2-6.1, 10-1; NFPA, *NFPA 1500*, 6-1.2; Coleman and Granito, *Managing Fire Services*, 336.

134 NFPA, *NFPA 1561*, 2-3.1; Coleman and Granito, *Managing Fire Services*, 336.

135 NFPA, *NFPA 1201*, 10-1; NFPA, *NFPA 1561*, A-2-1.3.

136 NFPA, *NFPA 1561*, A-2-1.3; Coleman and Granito, *Managing Fire Services*, 336.

137 NFPA, *NFPA 1561*, A-2-1.3.

138 IAFC, *Fire and Emergency Service Self-Assessment Manual*, sec. 4-13; NFPA, *NFPA 1201*, 9.1; FEMA, *Technical Rescue Program Development Manual*, 3-10.

139 NFPA, *NFPA 1201*, 9.1; FEMA, *Technical Rescue Program Development Manual*, 3-10.

140 Cote, *Fire Protection Handbook*, sec. 10-11.

Guidelines should be comprehensive enough to address the range of incidents to which the department may be expected to respond, yet flexible enough to allow fire fighters to react appropriately to the unpredictable nature of fires and natural disasters.[141] Guidelines should: (1) address administrative functions such as command structure, communication protocols, minimum staffing levels necessary for effective response, and personnel responsibilities; (2) provide instruction on how fire fighters should perform specific duties; and (3) describe tactical operating procedures that can accommodate variations in incident severity.[142]

Develop and Use Overhaul and Salvage Guidelines

As part of their standard operating guidelines for fire suppression, fire departments should develop and use guidelines for salvage, overhaul, and mop-up operations to ensure they are conducted in a consistent, comprehensive manner with minimal damage to property.[143] Well-thought out, systematic approaches establish a basis for uniform, thorough, and effective activities following suppression of the fire. We found that:

- **About 42 percent of full-time fire departments, 61 percent of the combination departments, and 48 percent of the volunteer or paid on-call departments in larger communities reported having standard operating guidelines that included procedures for overhaul and salvage or mop up in 1997.**

Departments should conduct overhaul operations (activities undertaken to ensure a fire is completely extinguished) according to well-formulated plans and standard operating guidelines.[144] Systematic use of guidelines for overhaul activities prevent unnecessary destruction of property and valuables. Overhaul plans should allow fire crews to make the premises safe, yet preserve the scene to aid investigators in determining the cause and origin of the fire.[145] As shown in Figure 2.3:

- **Combination and full-time fire departments were more likely than volunteer or paid on-call departments to instruct their fire fighters in aspects of arson scenes and how their actions affect the work of fire investigators.**

Developing and following plans for postfire salvage operations can reduce damage due to smoke and water.[146] Guidelines can prevent additional losses for the property owner when they specify using proper equipment and techniques for removing excess water, covering roof openings and windows to protect the interior structure and contents from exposure to the elements, and providing security for valuables removed from the structure by fire fighters.[147] Plans should detail restrictions on moving or removing contents or otherwise

141 Cote, *Fire Protection Handbook*, sec. 10-11.

142 NFPA, *NFPA 1201*, 9.1, 16-5.6; FEMA, *Technical Rescue Program Development Manual*, 3-10, 3-11.

143 Cote, *Fire Protection Handbook*, sec. 10-11, 10-12; FEMA, *Risk Management Practices in the Fire Service*, 91, 96; NFPA, *NFPA 1201*, 9-1, 9-2.1, A-9-2.2.

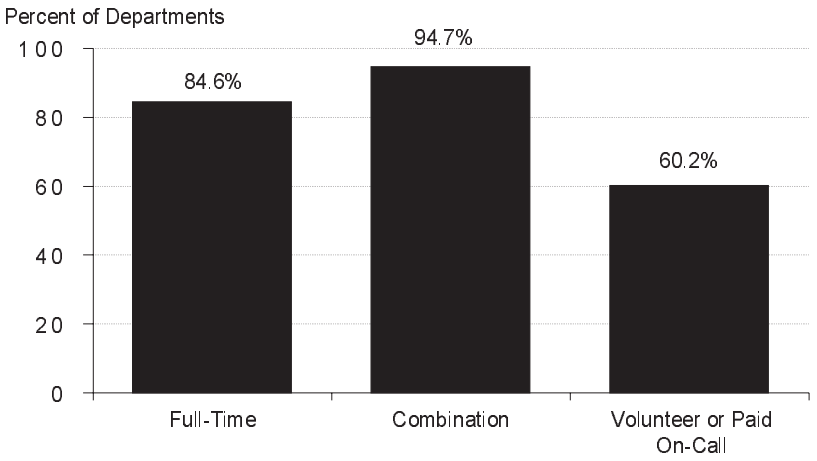
144 Eugene Mahoney, *Fire Suppression Practices and Procedures* (Englewood Cliffs, N. J.: Simon and Schuster, 1992), 99-100; William E. Clark, *Firefighting Principles and Practices*, 2d ed. (Saddle Brook, NJ: Fire Engineering, 1991), 140-141; Cote, *Fire Protection Handbook*, sec. 10-11.

145 John D. DeHaan, *Kirk's Fire Investigation*, 3d ed. (Englewood Cliffs, N. J.: Simon and Schuster, 1991), 103-105; Mahoney, *Fire Suppression Practices and Procedures*, 99-100, 104; Cote, *Fire Protection Handbook*, sec. 10-12; NFPA, *NFPA 921, Guide for Fire and Explosion Investigations*, 1998 ed. (Quincy, Mass.: NFPA, 1998), 9-3.4.2.2; International Fire Service Training Association (IFSTA), *Fire Service Practices for Volunteer and Small Community Fire Departments* (Stillwater, OK: Fire Protection Publications, Oklahoma State University, 1986), 287-290.

146 Mahoney, *Fire Suppression Practices and Procedures*, 110-111, 124.

147 Clark, *Firefighting Principles and Practices*, 139; International Association of Fire Chiefs, Risk Management and Liability Committee, *Readings in Fire Service Risk Management* (Fairfax, VA.: International Association of Fire Chiefs, 1996), sec. 2-36; Mahoney, *Fire Suppression Practices and Procedures*, 125.

Figure 2.3: Fire Departments That Instructed Members in Preserving Fire Scenes, 1997



SOURCE: Legislative Auditor's Office Survey of Fire Departments, 1998.

disturbing the area until a fire investigator is able to document and analyze the scene.[148]

Beyond typical salvage operations, fire departments can promote their image as a community resource and enhance public relations by being prepared to provide information for fire victims or refer them to other agencies with victim resources. As an example, this may mean giving Red Cross contact information to owners of burned residences who need temporary shelter. Information for victims may come in the form of booklets, pamphlets, or other formats. In addition to contact names and phone numbers, useful information would cover common actions that fire victims can take, such as clean-up procedures and steps to recover burned records and property.

Develop a Process to Investigate Fire Causes and Origins

Fire departments should have a process in place for investigating the origin and causes of fires when damage exceeds $100.[149] Identifying arson incidents and incendiary trends aids in the prosecution of criminal activities. Investigating fires also provides fire department and forestry officials with information to understand the circumstances under which fires occur, and helps them develop strategies and actions, such as refocusing fire safety awareness efforts or increasing code enforcement activities, to prevent similar incidents from occurring in the future.[150] Adequate staffing, equipment, and supplies are essential to conduct effective fire investigations.[151]

Several different agencies may perform investigations depending on the training and experience within the fire departments as well as variations in the nature and types of fires. Fire departments that do not conduct their own investigations are still responsible to make arrangements with other investigation resources, such as local law enforcement or the State Fire Marshal Division, and should oversee the investigations to their conclusion even when others conduct them.[152] As we reported in Chapter 1, about a quarter of the larger fire departments and almost two-thirds of the smaller ones relied heavily on the State Fire Marshal Division to conduct investigations. Fire departments also need general guidelines for notifying and cooperating with those designated investigators. In answer to our survey:

148 NFPA, *NFPA 921, Guide for Fire and Explosion Investigations*, 1998 ed. (Quincy, Mass.: NFPA, 1998), 9-3.4.2.3.

149 *Minn. Stat.* §299F.04, subd. 1; IAFC, *Fire and Emergency Service Self-Assessment Manual*, sec. 4-16.

150 Gerald J. Hoetmer, ed., *Fire Services Today, Managing a Changing Role and Mission* (Washington, D. C.: International City/County Management, 1996), 152; Cote, *Fire Protection Handbook*, sec. 10-11.

151 IAFC, *Fire and Emergency Service Self-Assessment Manual*, sec. 4-16.

152 IAFC, *Fire and Emergency Service Self-Assessment Manual*, sec. 4-16; *Minn. Stat.* §299F.04, subd. 1; NFPA, *NFPA 921*, 6-1.

- **Nearly three-quarters of all fire departments indicated that they had developed guidelines on when to contact the State Fire Marshal Division for fire investigations.**

Investigation programs should include guidelines for examining and documenting the scene, collecting and preserving evidence, conducting interviews, preparing reports, and presenting cases for prosecution.[153] For those Minnesota fire departments that did not rely heavily on or frequently use the State Fire Marshal for investigations, 67 percent of full-time departments, 94 percent of combination departments, and 72 percent of volunteer or paid on-call departments indicated they had such guidelines. Investigators should be trained in the scientific principles of combustion and fire behavior, basic fire-cause determination, arson detection, and investigation methodology, and should remain current with fire protection technology and code requirements.[154]

As mentioned earlier, fire fighters should consider the needs of the pending investigation when suppressing fires and conducting salvage and overhaul activities.[155] Fire crews can provide critical assistance to investigators by (1) taking note of points of origin and characteristics of the fire and (2) preserving the scene and taking precautions whenever possible to avoid destroying potential evidence of its cause.[156] Training can raise fire fighters' awareness of how certain actions facilitate successful investigations. The establishment of an arson training unit in the State Fire Marshal Division and reimbursements authorized for fire investigation training courses reinforce the importance of fire fighter awareness in this subject.[157]

Fire fighters' actions can preserve fire scenes for investigators.

Fire departments should work with investigators to develop specific management protocols that maintain continuous custody and control of the scene until an investigation commences.[158] By following guidelines that assign responsibility for preserving the fire scene, the incident commander and investigator can determine a time frame for discontinuing salvage and overhaul, while documenting and preserving relevant evidence.[159] Fire fighters also can help preserve the integrity of evidence essential to determining fire causes by monitoring activities and entry to the fire ground throughout the duration of the incident.[160]

Maintain Apparatus and Equipment

In addition to the long-term planning for replacing apparatus discussed in Action 1, fire departments should have a routine maintenance program in place to ensure that apparatus and equipment, including personal protective equipment, are fully functional when incidents occur.[161] Routine maintenance consists of (1) maintaining fluid levels and air pressure, checking major components such as brakes, belts, and hoses, and lubricating where needed, and (2) inspecting and testing apparatus and

153 NFPA, *NFPA 1033, Standard for Professional Qualifications for Fire Investigator*, 1993 ed. (Quincy, Mass.: NFPA, 1993), 3-2 through 3-7.

154 NFPA, *NFPA 1201*, 15-2.1; NFPA, *NFPA 1033*, 1-3.7.

155 NFPA, *NFPA 921*, 9-3.4.2.

156 DeHaan, *Kirk's Fire Investigation*, 102-104.

157 Minn. Stat. §299F.051, subd. 1-subd. 4.

158 IAFC, *Fire and Emergency Service Self-Assessment Manual*, sec. 4-16; DeHaan, *Kirk's Fire Investigation*, 105; NFPA, *NFPA 921*, 9.3, 16.1.

159 NFPA, *NFPA 921*, 9.3, 9.3.5, 16.3.

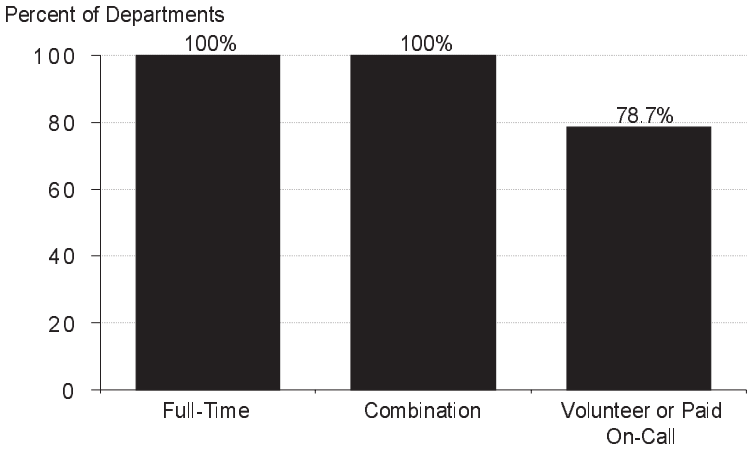
160 NFPA, *NFPA 921*, 9.3.

161 NFPA, *NFPA 1500*, 4-4.2; IAFC, *Fire and Emergency Service Self-Assessment Manual*, sec. 4-23; Cote, *Fire Protection Handbook*, sec. 10-209.

equipment according to an established schedule to identify and correct unsafe conditions.[162] As shown in Figure 2.4:

- **All full-time and combination fire departments and about 79 percent of volunteer or paid on-call departments had preventive maintenance programs in place in 1997.**

Figure 2.4: Fire Departments with Preventive Maintenance Programs, 1997



SOURCE: Legislative Auditor's Office Survey of Fire Departments, 1998.

Another 3 percent of the volunteer or paid on-call departments had preventive maintenance programs under development in 1997. Routine preventive maintenance, including checking the proper operation of all safety features, can reduce the cost of repairs, lessen the time apparatus is out of service, and result in efficient and reliable service over a long period.[163] A system of inspection and maintenance following the use of apparatus is essential for keeping apparatus serviceable and ready for subsequent incidents.[164] A maintenance schedule should require daily inspections of apparatus subject to daily use, at least weekly checks of all other apparatus, and inspections of all apparatus and equipment within 24 hours of use or repair.[165]

Ladders, aerial devices, pumps, fire hoses, and other equipment should be subject to periodic service tests to check for cracks, tears, weld defects, or loose couplings, and to otherwise ensure the equipment is in good operating condition.[166] Departments should test equipment, or use qualified mechanics, to determine whether it is safe and reliable for use.[167] Equipment failure during emergency operations, such as a burst hose or broken ladder rung, can result in serious injury to a fire fighter and loss of precious time in abating the emergency.

Qualified personnel familiar with fire department apparatus and equipment should inspect, maintain, and repair apparatus in accordance with manufacturers' recommendations.[168] In many departments, most preventive maintenance duties can be conducted in-house by assigned fire department personnel. Those departments without in-house maintenance should have access to a facility that can provide 24-hour service by qualified mechanics.[169]

162 NFPA, *NFPA 1500*, 4-4.1, 4-4.2, A-4-4.1; IFSTA, *Fire Service Practices for Volunteer and Small Community Fire Departments*, 193-194.

163 Cote, *Fire Protection Handbook*, sec. 10-16; IFSTA, *Fire Service Practices for Volunteer and Small Community Fire Departments*, 193-194.

164 Cote, *Fire Protection Handbook*, sec. 10-16.

165 NFPA, *NFPA 1500*, 4-4.1, 4-5.5, A-4-4.1, A-4-4.5.

166 NFPA, *NFPA 1500*, 4-5.5; Cote, *Fire Protection Handbook*, secs. 10-209 through 10-211.

167 Cote, *Fire Protection Handbook*, secs. 10-209 through 10-211.

168 Cote, *Fire Protection Handbook*, sec. 10-17.

169 Cote, *Fire Protection Handbook*, sec. 10-17; IAFC, *Fire and Emergency Service Self-Assessment Manual*, sec. 4-23.

Whether maintenance is performed in-house or outside the department, fire departments should keep complete, up-to-date records of all repair and service activities.[170] Service records provide a source of information for apparatus operating costs, are useful when developing equipment replacement plans, and provide guidance for decisions on the permanent removal or replacement of equipment from emergency service.[171]

Summary and Examples Related to Planning Prior to On-Scene Responses

Advance planning is crucial to effective fire department responses. Developing plans and guidelines, training fire department members in them, and then using them consistently, prepares the department to manage emergencies. With this advance preparation, fire personnel work as a team using appropriate strategies and tactics to control fires or other dangerous emergencies while preserving the safety of the force. Costs of the advance planning include the time involved with inspecting buildings; drawing maps, site layouts, and building features; identifying the variety of responses to which the department may be summoned and developing guidelines for each activity; and familiarizing fire fighters with the information once developed.

The key benefit of an effective fire investigation program is information gained about fire causes that can potentially prevent future fires and avoid injuries, deaths, and other personal losses. With incendiary fires, another important benefit is identifying the persons who set the fires, and thereby minimizing future criminal fire setting. Because fire investigation requires specialized knowledge, skills, and equipment, its costs are largely those for personnel, training, and investigative supplies. Another cost is the time investigators need to analyze fire investigations systematically.

Routine vehicle and equipment maintenance prevents minor mechanical problems from developing into major costly ones, and ensures the safety of fire fighters using the equipment. A routine preventive maintenance program involves costs for qualified mechanics as well as for the information system needed to establish a maintenance schedule and record repairs.

Preincident Planning

Brooklyn Park Fire Department

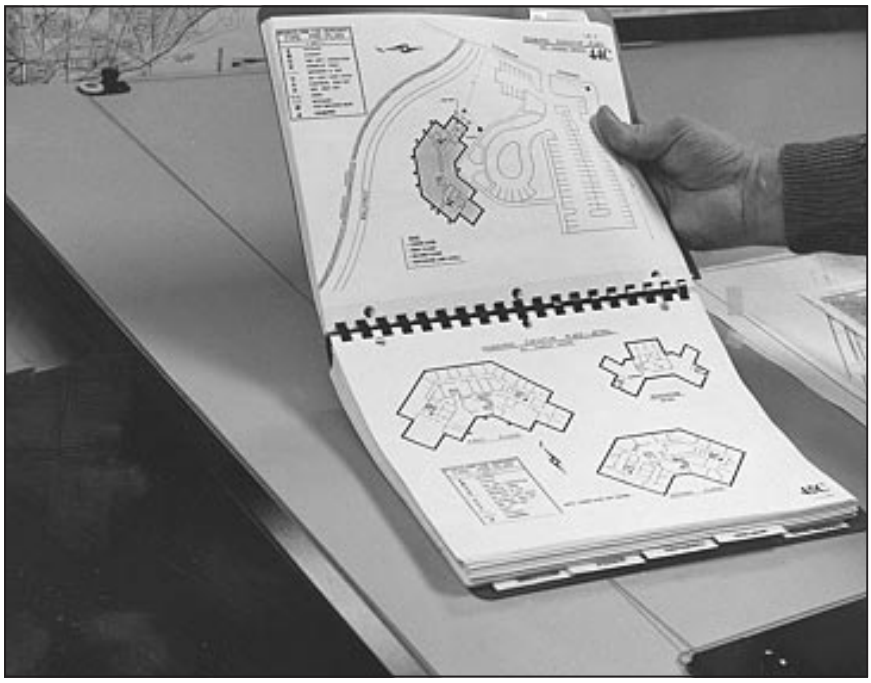
As part of its fire prevention work, the Brooklyn Park Fire Department is closely involved with reviewing plans for new building construction and inspecting existing buildings. With information coming from plan reviews and fire code inspections, the department has data to prepare plans for fire control in the city's large commercial structures.

As buildings are being built and inspections made, the fire inspector makes drawings of the buildings and their relevant features such as access points, hydrant locations, gas shut-offs, exits, and the locations of chemicals or corrosives. The fire department has drawings of all commercial buildings as well as apartment complexes and town houses. Working with the city engineering department, the fire department is computerizing the building drawings for easy modifications. It has assigned consistent labeling to building features so that all who use the drawings can quickly retrieve whatever information is needed.

The drawings become the basis for the fire department's preplanning activities. They provide information for the department to prepare in advance for specific fire risks in its community. The preplans also give fire fighters information on what hazards to expect and the location of exits and availability of fire protection systems before they arrive at the scene of a fire. Fire fighters review the plans at training sessions and receive orientations to new buildings annually. Each fire department rig carries copies of the preplan drawings so fire fighters can reacquaint themselves with the buildings on the way to incidents.

170 IFSTA, *Fire Service Practices for Volunteer and Small Community Fire Departments,* 193-194.

171 NFPA, *NFPA 1201,* A-17-3.3.1; Cote, *Fire Protection Handbook,* sec. 10-210.



Fire fighting rigs carry copies of the preplan drawings.

To give police officers ready access to pertinent building information, the department files copies of the preplan drawings with the police department. The department also provides information on chemical storage or other potential hazards to the public-safety answering point. This information is stored electronically and comes up on dispatchers' computer screens so that they can relay that information when dispatching fire crews to specific buildings.

In addition to the preplans, the fire department tracks the incidence of fire calls and identifies areas with inordinately high calls. When department personnel see high problem areas, a fire inspector goes out to assess the causes of the recurrences. The department's code of conduct for fire inspectors emphasizes the promotion of fire-safety ideas. As inspectors identify problems, they meet with building owners to discuss the problems and correct them. For instance, after a series of false alarms in certain apartment complexes, fire inspectors worked with apartment owners to replace over time all hand-pull fire alarms with more reliable hard-wired smoke detectors, thereby reducing the rate of false alarms there.

Fire departments in smaller jurisdictions without full-time personnel may not have the need for a full-time inspector. But with the commitment of the fire chief, they could incorporate building inspections for preplanning purposes into their monthly training. Sharing the costs of a fire inspector among several communities is another option to gather the information needed for preplanning. It is important that fire inspectors work cooperatively with local building inspectors and community planners because their work dovetails closely.

For more information contact:

Chief James Driste
Brooklyn Park Fire Department
612/493-8026

Winnebago Fire Service

As part of the Winnebago Fire Service's preincident planning, fire fighters conduct site visits, survey owners, and collect occupancy data of businesses within their response area. By compiling information on building construction, on-site hazards, and fire protection systems, the fire department is able to evaluate the adequacy of its resources and enhance fire fighter awareness of potential safety hazards in the event a fire occurs.

Fire fighters conduct scheduled site visits and interviews after the department sends notice of the visit to the business owner or manufacturer. To facilitate the preplan process and maintain good relations, the department limits the visit to preplanning activities and assures property owners that fire fighters are not there to enforce fire code provisions at that time.

During the site visit, fire fighters collect detailed information about the occupancy such as contact persons, number of employees by shift, and the existence of fire or emergency plans and back-up power. Fire fighters also record building characteristics such as roof construction, false

ceilings, or emergency lighting. If the building owner does not have a floor plan available, fire fighters compile building and room dimensions and draft floor plans that include pertinent information. The preplans follow a standard format and make note of on-site fire protection such as sprinklers and extinguishers, the locations of hydrants and all gas and electrical shut-offs, means of egress, and the existence and location of hazardous materials.

Copies of preplans are accessible by Winnebago fire fighters during incidents.

The fire department maintains copies of the preplans in files in its rescue truck and are easily accessible by all members during incidents. The fire department has preplans for all high-hazard occupancies in its response area, and is completing the plans for the remaining fifty businesses there. Fire fighters update the preplans periodically; some occupancies with vulnerable populations such as nursing homes, are reviewed more frequently.

The fire department also conducts tours of the businesses to familiarize all members with building layouts. The tours and preplans help incident commanders determine apparatus and personnel needs and develop attack strategies in the event a fire breaks out; they also reduce the risk of injury to fire fighters.

Winnebago Fire Service members are paid on-call fire fighters, however, they are awarded training points for conducting the preplan site visits and are paid stipends for participating in familiarity tours. Fire officials estimate their costs for preplanning activities are approximately 110 volunteer hours annually. Using standardized forms keeps department costs for supplies to a minimum. Strong support from members is necessary for conducting site visits and preparing preplans. Volunteer departments should determine fire fighter willingness and availability prior to implementing on ongoing preplanning program. Fire departments can minimize the time required for preplan site visits by requesting business owners to compile all necessary information prior to the fire fighters' visits.

For more information contact:

Chief Jerome Behnke
Winnebago Fire Service
507/893-3515

Standard Operating Guidelines

Cotton Volunteer Fire Department and First Responders

The chief of the Cotton Volunteer Fire Department wrote job descriptions and guidelines for department members to follow when providing first response services and when fighting fires. The job descriptions describe the duties and tasks assigned to fire fighters in various job classifications, and the guidelines outline the standard procedures fire fighters typically follow for different types of responses.

Some guidelines are intended for the safety of fire department members. For instance, a guideline on

infection control spells out procedures that volunteers should follow to prevent the transmission of disease and control infection while providing emergency medical responses.

Other guidelines are intended to give all fire department members a common understanding of typical procedures the department follows. As an example, the department wrote a policy on its incident command procedures. This helps all volunteers know who assumes command in an emergency and when control is to be transferred; it is especially useful for situations when the chief or specific officers are not available to respond.

In its job descriptions, the department itemizes the specific duties that fire fighters in particular job positions will be expected to perform. In a class "C" position for instance, members are expected to support other fire fighters at the exterior of a fire, lay down hose, and retrieve tools, among other things. Duties for class "B" fire fighters include setting up ladders and running the portable pumps on fire trucks. The fire department's training officer is responsible for keeping training records and making sure members have successfully completed training on the duties listed in job descriptions before being allowed to perform them.

When fire fighters begin their service with the Cotton Volunteer Fire Department, they receive a book that includes all of the job descriptions and operating guidelines. They learn about the various procedures and guidelines when they go through the fire department's orientation. The written materials are useful as a reference in helping protect the safety of fire department members. They also inform members about what training they will have to complete if they want to respond to fires or emergency medical incidents.

The fire department based many of the operating guidelines on materials produced by the Minnesota State Fire Chiefs' Association for this purpose, and the chief modified some to reflect Cotton's own unique needs. Developing and using the standards is an ongoing process requiring occasional modifications. The department updates the guidelines as rules or regulations change or when their own practices dictate.

For more information contact:

Chief Craig Kinsley
Cotton Volunteer Fire Department and First Responders
218/482-5538

White Bear Lake Fire Department

With a "silent alarm" policy and the use of on-call teams, the White Bear Lake Fire Department is able to more efficiently manage the deployment of its fire fighters and reduce the high numbers of personnel responding to numerous false alarms. Its practices allow the department to respond to an increasing volume of calls without supplementing its current workforce.

When calls come in indicating fire alarms are sounding but there is no evidence of smoke or flames, dispatchers ask specific questions of callers and call them back to determine whether they are likely to be making false or nuisance calls. If the call meets certain criteria that make it appear likely to be a false alarm, dispatchers alert the incident commander who responds to the incident. After assessing the scene, the incident commander makes a judgment about whether to alert other department members.

With this policy, the department reduced the number of personnel responding to the more than 300 false alarms received annually. Because of the single-person response to calls of this type, it has lowered payroll expenses by approximately $50,000. The practice enhances fire fighter safety and reduces risk of injury to other drivers because of the reduced number of calls to which fire companies must respond in an emergency mode with red lights and sirens.

Another practice to make more efficient use of fire department crews and retain the interest of department members is operating with on-call teams. The fire department divides its on-call members into two teams covering the northern and southern halves of the city. Teams are assigned times each week to be on standby. When emergency calls come in, the standby teams respond. Every fire fighter has a two-way radio and, once alerted, informs the incident commander

about his or her availability. Additional fire department members respond only when the incident commander determines it is necessary to call other personnel.

With this practice, the department is able to handle an increasing number of calls without inducing burnout among its members. It has also improved the diligence of on-call members to respond when summoned. Those on standby know they are responsible for emergencies during their shifts; in the past, some assumed that their personal response was unimportant because other department members who were also alerted made their presence unnecessary.

To make silent alarm policies work, fire departments must work with dispatchers to ensure they appropriately assess the nature of the calls. Without appropriate training, dispatchers could improperly classify a fire as a nonthreatening event and initial attack crews would be delayed. On-call teams are relevant mostly to fire departments operating with volunteer or paid on-call members. Fire departments in communities with relatively few calls may not have a need for on-call teams, particularly if they have not experienced a problem with too few volunteers showing up to responses.

For more information contact:

Chief Tim Vadnais
White Bear Lake Fire Department
651/429-8567

Other fire departments we surveyed also met our standards of performance related to emergency response preparations including preplanning, incident management systems, and standard operating guidelines. Some are listed here along with contact names.

Full-Time Department: **Duluth**, Chief Duane Flynn, 218/723-3200.

Combination Department: **St. Anthony**, Chief Dick Johnson, 612/788-4885.

Larger Volunteer or On-Call Departments: **Chanhassen**, Fire Marshal Mark Littfin, 612/937-1900; **Oakdale**, Ronald Ehnstrom, 651/731-8886; **Mendota Heights**, Chief John Maczko, 651/452-1850; **Eden Prairie**, Chief Spencer Conrad, 612/949-8335.

Smaller Volunteer or On-Call Departments: **Amboy**, Chief Tom Tallman, 507/674-3473; **Gaylord**, Chief Bill Walsh, 507/237-5483; **Gonvick**, Chief Ronald Rude, 218/487-5770; **Janesville**, Chief Bruce Manthe, 507/234-5110; **Zimmerman**, 1998 Chief Dave Greenlun, 612/856-4666.

Fire Investigations

Duluth Fire Department

The Duluth Fire Department participates in a fire and police arson task force, consisting of the fire marshal, deputy fire marshal, and a police investigator. Together the task force members provide complete fire investigation capabilities for Duluth and other areas outside the city.

Arson task force members received arson training through the Bureau of Criminal Apprehension and from other sources. Whenever a fire seems at all suspicious, the fire marshal pages the police investigator and they investigate as a team.

The task force represents a sharing of expertise and equipment. Among other items, the fire department supplied the police investigator with a camera and breathing apparatus, and equipped a police department vehicle with evidence collection equipment and additional protective gear for working around fire scenes. The police investigator can drive this vehicle from home when incidents occur after regular business hours. Duluth's Fire Department also fully equipped its own arson van to allow it to operate as an independent investigative unit.

Fire and police officials work together investigating fires.

Besides working together, the police and fire investigators made a point of becoming better

acquainted with local prosecutors. By familiarizing themselves with the prosecutors' needs, the investigators hoped to provide the kind of evidence that would lead to more cases being presented for prosecution.

The fire department committed additional resources to training on arson-related issues. More fire department officers received arson training, not to be able to conduct the investigation, but rather to know how to best preserve the fire scene so investigators could do their job. In turn, other fire fighters received training on preserving the scene and taking care to avoid destroying evidence.

Because of the collaboration and widespread arson training, the task force identifies many more cases of arson than when the departments did not share resources. The fire marshal estimates that up to 80 percent of arson fires went undetected in the past when only the most serious and flagrant cases were investigated for incendiary causes. Because of the importance of sharing information about arsonists and patterns of arson behavior, Duluth's fire marshal applied for and received a grant to organize an electronic database for a regional arson information exchange via the Internet.

Duluth's arson task force also assists investigations at the request of other fire departments in service areas outside the city. In these cases, the arson task force does not take over the investigation but offers assistance at no charge to other investigators or in advance of the arrival of an investigator from the State Fire Marshal Division. Assisting in this way helps other fire departments and Duluth because arsonists tend to move around and repeat their criminal behavior; if the arson task force's assistance leads to an arrest and prosecution, it may be preventing other fire incidents from occurring within the city. Plus, the additional investigation experience helps keep investigators' skills sharp.

Making the arson task force succeed required support from both the fire and police chiefs. It also required initiative and willingness on the part of the investigators to work together. Unlike many other fire departments, Duluth has a full-time fire marshal who can build the expertise and working relationships needed for effective investigations. Although this practice is not applicable to fire departments that do not conduct investigations, those departments with trained investigators may also find benefits from joint investigative efforts with local law enforcement.

For more information contact:

Chief Duane Flynn and
Fire Marshal John Strongitharm
Duluth Fire Department
218/723-3200 and 218/723-3208

Maple Plain Fire Department

To preserve fire scenes and facilitate effective fire investigations, the Maple Plain Fire Department follows guidelines on fire suppression, postfire activities, and investigation guidelines. The fire department also coordinates fire investigations with local law enforcement and State Fire Marshal investigators to ensure all responsibilities are covered while determining the cause and origin of fires.

All fire fighters are trained to the Fire Fighter II level to ensure any initial attack team can recognize signs of arson, such as the presence of incendiary liquids as indicated by the flames' color. The training also provides insight as to how suppression activities can affect the outcome of investigations. To minimize the damage to property and disruption to the fire scene, fire fighters use caution during fire suppression, overhaul, and salvage activities. They ensure the fire is extinguished, yet preserve the scene for investigators.

While the commanding officer's attack strategy depends on the severity of the situation and may require extensive use of water and building destruction, fire fighters use water filled extinguishers, rather than fire hoses, in isolated areas of the structure whenever possible to minimize damage to property. Fire fighters restrict moving items on the fire scene to a minimum, and rather than removing valuables they will cover the items with tarps. When a fire appears suspicious, the incident commander interviews all initial attack personnel and requires the fire fighters to complete an investigative report form for fire department, law enforcement, and State Fire Marshal records.

For those incidents when Maple Plain fire officers determine cause and origin, the fire department maintains custody and control of the scene until the investigation concludes. For incidents involving damages exceeding approximately $10,000, major injuries, or death, the incident commander requests the services of a State Fire Marshal investigator. The fire department turns over custody of the fire scene to the State Fire Marshal Division when its investigator arrives. The fire chief estimates between 3 and 5 percent of their structural and wildland fires involve arson.

Five members of the on-call Maple Plain department are employed elsewhere as police officers. By virtue of their law enforcement background, these fire fighters bring to the department outside expertise in investigation practices, such as maintaining the chain of custody of evidence, preserving the scene, and interview and interrogation techniques. Their experience has proven helpful during fire investigations as well as other incidents such as determining the cause of vehicle crashes while extricating victims from vehicle crashes.

A side benefit of having police officers serve as fire fighters is lower fire department training costs; as police officers, the fire fighters receive first responder and investigation training which they use to augment their fire fighter skills. Fire officials believe the officers also contribute to the excellent relations between local law enforcement agencies and the fire department. Each department benefits from the insight these members provide about the other department's activities. The fire and police departments coordinate training activities and have a clear understanding of each other's roles and responsibilities during emergency incidents. One drawback is that during large emergency incidents, the fire department loses the availability of those five members that respond first as police officers, and second as fire fighters.

Departments that cannot afford advanced investigation training should, at a minimum, instruct their fire fighters on their responsibilities in the fire investigation process. Volunteer or paid on-call departments seeking to improve their fire investigation capabilities may consider targeting recruitment efforts at individuals with investigation backgrounds. Volunteer departments with limited capability to maintain custody of a scene while awaiting an investigator can consider requesting owners to sign consent forms that permit investigators to return at a later date without the need for a search warrant.

For more information contact:

Chief Dave Eisinger
Maple Plain Fire Department
612/479-2732

Many other fire departments we surveyed also met our standards of performance related to fire investigations. Among them are the following departments listed here along with contact names.

Full-Time Departments: **Burnsville**, Chief Ronald Payne, 612/895-4571; **Rochester**, Chief David Kapler, 507/285-8072; **St. Paul**, Chief Timothy Fuller, 651/224-7811; **West St. Paul**, Chief John Ehret, 651/552-4230.

Combination Departments: **Albert Lea**, Chief Richard Sydnes, 507/377-4340; **Fridley**, Chief Chuck McKusick, 612/572-3610; **Hastings**, Chief Donald Latch, 651/437-5610; **St. Louis Park**, Chief Robert Gill, 612/924-2594.

Larger Volunteer or On-Call Departments: **Alexandria**, Chief Rick Glade, 320/763-3501; **Apple Valley**, Chief Marv Calvin, 612/423-5874; **Bloomington**, Chief Ulysses Seal, 612/881-4062; **Brooklyn Park,** Chief James Driste, 612/493-8026; **Chanhassen**, Fire Marshal Mark Littfin, 612/937-1900; **Eden Prairie**, Chief Spencer Conrad, 612/949-8335; **Elk River**, Chief Bruce West, 612/441-4919; **Lakeville**, Chief Barry Christensen, 612/985-4701; **Little Falls,** Chief Fred Tabatt, 320/632-4461; **Minnetonka**, Chief Joe Wallin, 612/939-8598; **New Ulm**, Chief David A. Wolf, 507/359-9261; **Oakdale**, Ronald Ehnstrom, 651/731-8886; **Robbinsdale**, Chief Mark Fairchild, 612/537-4534; **Spring Lake Park-Blaine-Mounds View**, Chief Nyle Zikmund, 612/786-4436.

Smaller Volunteer or On-Call Departments: **Amboy**, Chief Tom Tallman, 507/674-3473; **Cambridge**, 1998 Chief Thomas Minar, 612/689-3211; **Cotton Volunteer**, Chief Craig

Kinsley, 218/482-5538; **Granite Falls**, Chief Mike Ohliger, 320/564-3011; **Greenbush**, Chief Russel Wicklund, 218/782-2570; **Ogilvie**, Chief Jon Cramsie, 320/272-4822; **Pierz**, Chief Dale Janson, 320/632-7351; **St. Charles**, Chief Linus Soppa, 507/932-4090; **St. Paul Park Volunteer**, Chief Scott Gerry, 612/459-9918; **Spring Valley**, Chief Nevin Stender, 507/346-7367; **Waite Park**, Chief Gary Curtis, 320/252-4712.

Preventive Maintenance

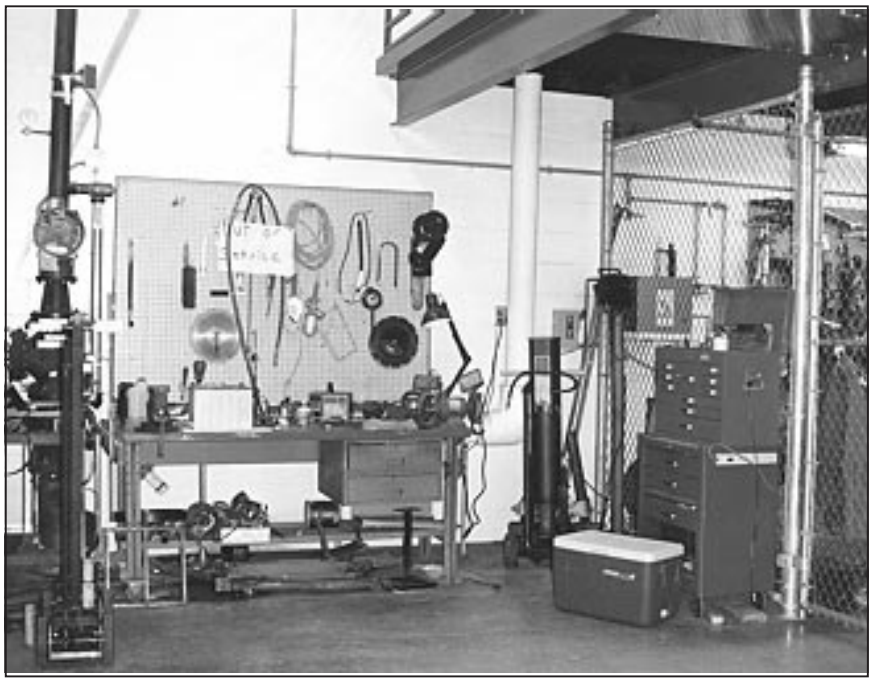
Alexandria Fire Department

The Alexandria Fire Department relies on a full-time paid mechanic with an on-site repair shop to maintain apparatus and equipment. With in-house maintenance and repair capabilities, the department receives consistent inspections and quick repairs of its large fleet resulting in equipment and apparatus being available when needed.

Prior to 1994, the fire department had relied on its volunteer members to conduct weekly and monthly inspections of its ten fire suppression vehicles. The department had at that time acquired several specialized apparatus and, because of the fire fighters' limited mechanical expertise, fire officers had to ship out all trucks for repairs, either to a vendor or the city garage. Due to the fire department's increasing call volume and frequent use of its apparatus, fire fighters had to devote a significant amount of time to apparatus maintenance. To reduce the volunteers' time on maintenance, fire officers worked with city officials to add a city staff position dedicated to fire-vehicle maintenance and repairs. As a result, volunteer fire fighters began devoting more time to fire duties and training without increasing their volunteer hours.

The full-time on-site mechanic provides consistent and regular preventive maintenance, such as checking engine oil and tire pressure, inspecting and conducting regular service tests of apparatus, and reinspecting equipment and vehicles within 24 hours of use. With a repair shop housed in the fire station, the mechanic quickly fixes most equipment and apparatus. Fire officers estimate this arrangement reduces apparatus down-time by several days because they do not have to rely on an outside mechanic's availability for the repairs, and it reduces the need to ship apparatus to and from a vendor.

Fire officers believe the in-house mechanic produces higher quality work than that done by outside vendors. Because the same individual works on the apparatus daily, he is familiar with their performance and can accurately assess the remaining service life of parts and equipment. This helps fire officers plan and budget to replace equipment and apparatus accordingly.



Alexandria's Fire Department has an on-site repair shop.

As part of the fire department's repair program, members report any equipment or apparatus malfunctions on a form, identifying the apparatus or equipment, detailing the date and purpose of its use, and describing the problem. Based on the fire fighters' reports, the mechanic assesses the damage

and repairs or replaces the equipment. In immediately addressing all apparatus and equipment deficiencies, the fire department reduces the risk of injury to its fire fighters by lowering the possibility that equipment will break down during emergency operations.

In addition to apparatus maintenance and repairs, the fire department assigns other in-house duties, such as maintaining the fire station, to the full-time employee. Alexandria fire officials estimate the city's costs for the full-time employee are comparable to the overall costs that would otherwise be incurred for vendors' repairs and fire station maintenance. They believe the full-time position is necessary, however, to ensure consistent quality apparatus maintenance and repairs and to reduce their volunteer fire fighters' time commitment. The costs of employing a full-time mechanic may be too high for small fire departments with a low number of incidents or a small fleet. Volunteer departments with limited fire fighter availability or little mechanical expertise may have to consider hiring part-time staff, sharing the costs of a mechanic with a neighboring department or city, or contracting with maintenance vendors.

For more information contact:

Chief Rick Glade
Alexandria Fire Department
320/763-3501

Gonvick Fire Department

To ensure apparatus are available for use and to maintain peak response capability 24 hours a day, the Gonvick Fire Department uses an in-house preventive maintenance program for its equipment and apparatus. Through routine maintenance and regular service tests and inspections, fire fighters identify equipment defects and, in most instances, make necessary repairs.

Five volunteer fire fighters employed elsewhere as full-time mechanics, and one employed elsewhere as an electrician, work together conducting weekly and monthly equipment checks. They rely on each others' expertise to diagnose the condition and reliability of equipment and apparatus. The members are also capable of making most repairs on the apparatus, including minor repairs on pumps, either on-site or they can use a local garage facility at no cost. To cover both anticipated and unanticipated costs for equipment, the fire fighters determine the life expectancy of the equipment and parts and allocate money to replace what is needed from the department's annual budget to its equipment replacement fund.

Based on experiences with outside vendors that specialize in fire suppression apparatus, the volunteers believe they provide better maintenance at a much lower cost. In the past, fire fighters have had to assist the vendors' mechanics during approximately half of the vendors' billable hours. Members also found it necessary to conduct follow-up quality assurance checks after the vendors completed their work.

Because they offer immediate repairs, they reduce apparatus down time and avoid delays that can occur when using outside services. The in-house maintenance and repairs, however, require a significant amount of volunteer time; members estimate they spend 30 to 40 hours a month collectively on preventive maintenance and repair.

Besides saving money, in-house preventive maintenance increases fire fighters' familiarity with the apparatus and equipment, which produces more efficient maintenance time and effective emergency operations. Proper use and maintenance of equipment and apparatus produces a longer service life. Local taxpayers also benefit due to money saved by avoiding outside repair services.

Volunteer or paid on-call departments seeking to reduce outside maintenance costs may benefit by targeting fire fighting recruitment efforts at individuals with mechanical skills to assist in on-site preventive maintenance activities. Due to the large time commitment required for an in-house program, however, it may be difficult for departments with a large fleet or specially equipped apparatus to ensure consistent, quality maintenance and repairs without specially trained mechanics.

For more information contact:

Chief Ronald Rude
Gonvick Fire Department
218/487-5770

Many other fire departments we surveyed also met our standards of performance related to preventive maintenance programs. Among them are the following departments listed here along with contact names.

Full-Time Departments: **Burnsville**, Chief Ronald Payne, 612/895-4571; **Duluth**, Chief Duane Flynn, 218/723-3200; **St. Paul**, Chief Timothy Fuller, 651/224-7811; **West St. Paul**, Chief John Ehret, 651/552-4230.

Combination Departments: **Albert Lea**, Chief Richard Sydnes, 507/377-4340; **Fridley**, Chief Chuck McKusick, 612/572-3610; **Hastings**, Chief Donald Latch, 651/437-5610; **St. Louis Park**, Chief Robert Gill, 612/924-2594; **Winona**, Chief Ed Krall, 507-457-8266.

Larger Volunteer or On-Call Departments: **Apple Valley**, Chief Marv Calvin, 612/423-5874; **Brooklyn Park,** Chief James Driste, 612/493-8026; **Chanhassen**, Fire Marshal Mark Littfin, 612/937-1900; **Eden Prairie**, Chief Spencer Conrad, 612/949-8335; **Lake Johanna Volunteer**, Chief Don Szurek, 651/481-7024; **New Ulm**, Chief David A. Wolf, 507/359-9261; **North St. Paul**, Chief David Zick, 651/770-4480; **Oakdale**, Ronald Ehnstrom, 651/731-8886; **Spring Lake Park-Blaine-Mounds View**, Chief Nyle Zikmund, 612/786-4436; **Vadnais Heights**, Chief Jerry Auge, 651/490-1355.

Smaller Volunteer or On-Call Departments: **Albany**, Chief Joseph Wedel, 320/845-4040; **Amboy**, Chief Tom Tallman, 507/674-3473; **Browerville**, Chief William Buhl, 320/594-2201; **Cambridge**, 1998 Chief Thomas Minar, 612/689-3211; **Canton**, Chief Donald Helgeson, 507/743-5000; **Cotton Volunteer**, Chief Craig Kinsley, 218/482-5538; **Dawson**, Chief Jeff Olson, 320/769-2154; **Gaylord**, Chief Bill Walsh, 507/237-5483; **Granite Falls**, Chief Mike Ohliger, 320/564-3011; **Greenbush**, Chief Russel Wicklund, 218/782-2570; **Isanti Volunteer**, Chief Randy Polzin, 612/444-8019; **Janesville**, Chief Bruce Manthe, 507/234-5110; **Maple Plain**, Chief Dave Eisinger, 612/479-2732; **Mora**, Chief Gene Anderson, 320/679-1511; **Pierz**, Chief Dale Janson, 320/632-7351; **St. Charles**, Chief Linus Soppa, 507/932-4090; **St. Paul Park Volunteer**, Chief Scott Gerry, 612/459-9918; **Spring Valley**, Chief Nevin Stender, 507/346-7367; **Waite Park**, Chief Gary Curtis, 320/252-4712; **Winnebago Fire Service**, Chief Jerome Behnke, 507/893-3515; **Zimmerman**, 1998 Chief Dave Greenlun, 612/856-4666.

CHAPTER SUMMARY

In this chapter we identify five goals for managing fire services. These goals apply to all fire departments, although departments may use different strategies for achieving them. The first goal is to prevent the outbreak of fires and achieve fire safety awareness throughout the community. A second goal is to ensure the enforcement of fire and life safety codes for the prevention and control of structure fires. The third goal is to investigate the cause, origin, and circumstances of fires in the fire department's jurisdiction. The fourth is to maintain a response capability that is safe and effective. Finally, the fifth goal is to protect citizens' life safety and property against the dangers of fires and other emergencies that may occur in the response area.

To help fire departments meet these goals, we recommend seven actions. These actions are based on state laws and rules as well as on guidelines and standards from within the fire industry. Although the actions are appropriate for all sizes and types of fire departments, the degree to which they apply may differ.

The first action is to assess risks and develop long-range plans. Long-range or master plans help fire departments evaluate local demands for fire protection and other services, adapt their services to these needs, and match their services to available resources. In developing the plans, fire departments should assess the types and magnitude of fire and other hazardous risks to determine needed levels of fire suppression resources and develop response

strategies. A fire department's response capabilities should be directly related to risks inherent to life and property in the service area.

A fire department's master plan should include contingency plans for ensuring continuous availability of emergency responses, even in the event of natural disasters or unplanned catastrophes. In addition, fire departments need capital replacement plans to be financially prepared to replace fire vehicles and equipment as they wear out or become obsolete.

A second action we recommend is to evaluate fire department performance and use resources cost-effectively. Setting goals and measuring how well they meet their objectives helps fire departments identify their strengths and weaknesses so they can reallocate resources and modify programs to meet community needs. Keeping and updating records on fire department activities allows departments to analyze their performance, identify current resource needs, and plan future services.

Mutual aid agreements are a cost-effective way for fire departments to supplement each others' resources during prolonged or extraordinary incidents; automatic aid provides additional staff and equipment on the first alarm, making productive use of nearby resources. Although less common, mutual aid can provide additional benefits when used for other joint activities, such as sharing facilities or providing help with fire investigations. Fire departments can also achieve economies of scale by pursuing intergovernmental service contracts or joint powers agreements with other jurisdictions, or consolidating service areas with neighboring departments. Using existing materials and resources and making joint purchases of equipment are also cost-effective.

Fire departments should adopt best practices.

The third action for meeting fire department goals is to promote public awareness of fire safety. Fire departments' public education efforts should be ongoing, tailored to specific audiences, and address both fire prevention and mitigation strategies. By using a variety of forums and communication strategies, fire departments can inform citizens of all age groups about preventing fires in the home and workplace.

The fourth action recommends that fire personnel ensure the enforcement of the *Minnesota Uniform Fire Code.* Fire department personnel have authority to conduct fire-code related inspections of buildings. Through fire code inspections, fire departments can identify fire hazards and order their correction, familiarize themselves with on-site sprinkler systems and other fire protection systems, and educate building owners and occupants on fire-safe practices. In communities that have adopted the *State Building Code*, adequate fire code enforcement requires the cooperation of building and fire officials throughout construction and remodeling processes.

The fifth action is to maintain an effective communications system. Fire departments need reliable hardware, standardized communication protocols, and adequate communication training to control emergency responses and coordinate with other fire departments. Ongoing communication with others, such as law enforcement, water utilities personnel, and local elected officials, helps fire departments identify mutual concerns and plan to meet their needs.

The sixth action recommends that fire departments maintain a well-trained workforce and take steps to support safe emergency operations. Fire departments with at least minimum training requirements, health and safety protocols, standard operating guidelines, and adequate personal protective equipment reduce the risk of injury to fire fighters and improve operations at emergency scenes. They also need a recruitment program based on their own personnel needs, and good management practices to retain members.

The seventh action recommends advance planning and preparation for emergency response operations. Fire departments need preincident planning information, an incident command system, standard operating guidelines, and well-maintained apparatus to provide effective, coordinated responses. Advance preparation also requires training for fire fighters to understand and use the plans and guidelines. Part of this training should instruct fire fighters on preserving fire scenes to aid the fire investigator. All fire departments need a process for investigating the origins and causes of fires to help prevent similar incidents from occurring and aid in the prosecution of criminal activities.

We used these goals and actions as a framework to identify best practices in fire departments. Some best practices are common throughout fire departments around the state, and others are less so. Although we were able to visit only a few of the fire departments that use best practices, we present examples of these departments' successful activities and recommend them for consideration by others.

Study Methodology

APPENDIX A

This appendix explains the process we followed to conduct this best practices review of fire services. It describes the steps we took, the general timeline we followed, and the assistance we received from fire service personnel and state and local government representatives.

BACKGROUND RESEARCH

In conducting this review we gathered information from a variety of sources. We began with a literature review of materials relevant to a broad range of fire department services. To help define the scope of this review, we invited fire personnel, state and local government officials, legislators, and others interested in fire department services to a roundtable discussion in June 1998. At this meeting, 54 participants, in addition to Legislative Auditor's Office staff, discussed key issues and presented ideas for topics to include in the review. We also spent time speaking with fire chiefs, visiting fire departments of different sizes located in various regions of the state to learn about their equipment and apparatus and observe their emergency responses, and interviewing state officials and others involved in this topic. We also attended meetings of fire service organizations to learn about current issues in the fire service.

TECHNICAL ADVISORY PANEL

Throughout this review, an 18-member panel comprised of fire service personnel and other professionals assisted us in our study. The role of this panel was to provide expertise and comments from the local fire departments' perspectives on various issues and draft materials as we conducted the study. To receive feedback from a variety of viewpoints, we selected technical panel members from various types and sizes of fire departments and different regions of the state, as well as representatives from state and local agencies. Members from the major fire organizations in the state served on the advisory panel.

We are grateful to the panel members for their advice and help. The Legislative Auditor's Office remains responsible for the content of this report; panel members may or may not agree with the conclusions and recommendations of our study. Table A.1 lists the individuals that served on our technical panel (titles indicate the person's position as our study began).

Table A.1: Technical Advisory Panel Members, 1999

Marilyn Arnlund, Fire Marshal, Maple Grove; Fire Marshal's Association of Minnesota (FMAM) Vice-President

Al Bataglia, Assistant Fire Chief, St. Paul Fire and Safety Services Department

Jeffrey Brennan, President, Minnesota Professional Fire Fighters

Duane Flynn, Fire Chief, Duluth Fire Department

David Ganfield, Member, Richfield Fire Department; Secretary, Minnesota State Fire Department Association (MSFDA)

Jeff Juntunen, Fire Chief, Esko Fire Department; Minnesota State Fire Chiefs' Association (MSFCA) Arrowhead Region 3 representative

Kim Kallestad, Fire Chief, Stillwater Fire Department

Kevin Leuer, Hazardous Materials Manager, Division of Emergency Management; District Fire Chief, Plymouth Fire Department

Tim Madigan, Faribault City Administrator

Charles McLaughlin, Captain, Crosby Fire Department; MSFDA Region 5 representative

Les Miller, Fire Chief, Rice Lake Township Fire Department

Jon Nisja, Code Development Bureau Chief, State Fire Marshal Division; FMAM President

Jerry Pawelk, Fire Chief, Lester Prairie Fire Department; MSFCA Region 10 representative

Tom Pressler, President, MSFDA; retired member of Bloomington Fire Department

Jerry Rosendahl, Fire Chief, Owatonna Fire Department; MSFCA Board of Directors Chair

Ulie Seal, Fire Chief, Bloomington Fire Department; MSFCA Parliamentarian

Dan Wilson, Fire Chief, Austin Fire Department

Nyle Zikmund, Fire Chief, Spring Lake Park - Blaine - Mounds View Fire Department; MSFCA legislative chair

Consultant

We retained a consultant to answer technical questions, comment on draft documents, and provide information on the strengths and weaknesses of various practices. He also joined us on a number of our site visits to fire departments around the state. Our consultant was **Gregg Davies,** former Carver County Emergency Management Director and Chaska Fire Department member.

SURVEY METHODOLOGY

To gather information on fire services in Minnesota, we surveyed fire departments and fire marshal offices on their operations, practices, revenues, and expenditures for the 1997 calendar year. We used the survey responses to supplement data obtained from the State Fire Marshal's Division, the Department of Revenue, and the State Demographer's office. We developed survey questions based on fire department standards compiled from our literature review, and pretested them with our technical panel members and other fire chiefs.

We developed two separate survey instruments: a full survey for larger fire departments and a shorter one to lessen the time burden for fire chiefs in small volunteer departments. We mailed the full 71-question survey to all departments that according to State Fire Marshal data were staffed by (1) entirely full-time members, (2) by a combination of full-time and volunteer or paid on-call members, or (3) volunteer or on-call departments in cities with populations greater than 8,000. We mailed a shorter 24-question survey to a stratified random sample of volunteer and paid on-call departments located in communities with less than 8,000 population. To ensure all geographic regions in the state were represented in the sample, we grouped these small departments according to the 13 economic development regions in the state and randomly selected 65 percent of fire departments in each region.

In mid-October 1998, we mailed surveys to 555 fire departments with an initial due date three weeks later. Along with the survey and cover letter, we enclosed a letter from the Minnesota State Fire Chiefs' Association encouraging fire chiefs to respond. For a higher response rate, we mailed follow-up letters and surveys to fire departments that had not responded by the first due date. Staff also made phone calls to several hundred fire chiefs requesting they return a completed survey.

We received completed surveys from 88 of the 101 large volunteer or on-call, combination, and full-time departments in time for analysis, for a response rate of 87 percent. The results have a margin of error between plus or minus 4 percentage points. Because many respondents did not answer all questions in the survey, the margin of error may be larger for responses where the number of respondents is low. In addition, the practical difficulties of conducting any opinion survey may introduce other sources of error that cannot be measured.

Of the 454 small volunteer departments we surveyed, 307 returned surveys in time for analysis for a response rate of 68 percent. Survey results from our sample have a margin of error ranging between plus or minus 4 percentage points due to sampling error. The margin of error may be larger for responses to particular questions where the number of respondents is low. The departments selected to participate are listed below. At the end of this appendix, we list the aggregate results for both surveys.

Fire Departments Included in Survey

Table A.2 lists the fire departments to which we mailed our full survey. Full-time and combination departments are footnoted. All other fire departments are either volunteer or paid on-call departments located in communities with populations greater than 8,000. Three departments, Chisholm, Ely, and Eveleth, received our full survey even though these cities have populations under 8,000 population because State Fire Marshal data designated them as combination departments. We included their responses in our analysis of the full surveys.

Some local fire marshals operate independently of the fire departments in their community. With help

Table A.2: Full-time, Combination, and Large Volunteer or Paid On-Call Departments Receiving Survey

* Albert Lea[1]	* Crookston[1]	* Hopkins	* New Ulm	*St. Peter
* Alexandria	* Duluth[2]	* Hutchinson	* North Mankato	*Sauk Rapids
Andover	Eagan	* International Falls	* North St. Paul	Savage
* Anoka-Champlin	East Bethel	* Inver Grove Heights	* Northfield	*Shakopee
* Apple Valley	East Grand Forks	* Lake Johanna Volunteer	* Oakdale	*South St. Paul[2]
* Austin[1]	* Eden Prairie	* Lakeville	* Owatonna[1]	*Spring Lake Park-
* Bemidji[1]	* Edina[1]	* Little Canada	* Plymouth	Blaine-Mounds View
* Bloomington	* Elk River	* Little Falls	* Prior Lake	*Stillwater[1]
* Brainerd City[1]	* Ely[3]	Mankato	* Ramsey	*Thief River Falls[1]
* Brooklyn Center	* Eveleth[3]	* Maple Grove	* Red Wing[1]	*Vadnais Heights
* Brooklyn Park	* Fairmont	* Maplewood	* Richfield[2]	*Virginia[2]
* Buffalo	Faribault	* Marshall	* Robbinsdale	*Waseca
* Burnsville[2]	* Farmington	* Mendota Heights	* Rochester[2]	*West Metro
Centennial	* Fergus Falls	* Minneapolis[2]	* Rochester Airport[2]	Fire-Rescue District
* Chanhassen	Fort Snelling	* Minnetonka	* Rosemount	*West St. Paul[2]
* Chaska	* Fridley[1]	Montevideo[4]	Roseville	*White Bear Lake
* Chisholm[3]	* Golden Valley	* Moorhead[2]	* St. Anthony[1]	*Willmar
* Cloquet[2]	* Grand Rapids	Mound	* St. Cloud[1]	*Winona[1]
* Columbia Heights[1]	* Ham Lake	* Minneapolis/St. Paul	* St. John's University	*Woodbury
* Coon Rapids[1]	* Hastings[1]	International Airport[2]	* St. Louis Park[1]	Worthington
* Cottage Grove	* Hibbing[1]	* New Brighton	* St. Paul[2]	

Note: An asterisk (*) depicts fire departments from which we received completed surveys in time for analysis.

[1]Combination fire department staffed with 6 or more full-time members.
[2]Fire department staffed with all full-time members.
[3]Paid on-call fire department in communities with less than 8,000 population.
[4]Returned survey too late to be included in our analysis.

from the Fire Marshal's Association of Minnesota, we identified 11 such fire marshals and mailed to them questions pertinent to fire prevention, inspections, and fire-code enforcement. Table A.3 lists the communities of these fire marshals.

Table A.3: Local Fire Marshal Offices Receiving Survey

* Blaine	* Mendota Heights
* Bloomington	New Brighton
* Fairmont	* Plymouth Fire Inspector
* Farmington	* Rosemount
* Inver Grove Heights	* Roseville
* Little Canada	* Spring Lake Park
* Maple Grove Fire Prevention Bureau	

Note: An asterisk (*) depicts fire marshal offices from which we received completed surveys by the response deadline.

Table A.4 lists the smaller community fire departments to which we mailed our shorter survey. These communities all have populations less than 8,000.

PERFORMANCE MEASURES FOR FIRE SERVICES

To help identify effective and efficient fire department practices, we reviewed statutes, rules, standards, and guidelines from the state and federal governments and from the fire service industry. We relied on these laws and standards to identify goals and actions for effective and efficient fire department service. We reviewed the actions for successful fire services with our technical panel and with focus groups of fire fighters, as described below.

Table A.4: Small Volunteer and Paid On-Call Departments Receiving Survey

* Adrian
* Aitkin
* Albany
* Albertville
* Alden
* Almelund
* Alpha
Alvarado Volunteer[1]
* Amboy
* Annandale
* Arco
* Argyle
* Arrowhead
* Askov Volunteer
* Atwater
* Audubon
* Aurora
* Babbitt Volunteer
* Backus Volunteer
* Balsam Volunteer
* Barnesville
* Barrett
* Baudette
* Bear Creek
Bearville Twp.
* Beaver Bay Volunteer
* Belgrade
Bellingham
* Beltrami
Bena
* Bethel
* Big Lake
* Bigfork Volunteer
* Birchdale Rural
Bird Island
Biwabik Twp. Volunteer
* Biwabik Volunteer
Blackhoof
Blue Earth
Borup
* Bowlus
Boyd
* Brandon
Breckenridge
* Breitung
Brimson Area Volunteer
* Browerville
Browns Valley
* Brownsville
* Brownton Volunteer
* Bruno
* Buffalo Lake
* Buhl Volunteer
Butterfield
* Buyck Community Volunteer
Byron
Callaway
Calumet
* Cambridge
* Campbell
* Canby
* Cannon Falls
* Canton
* Carlos
Carlton Volunteer
* Carver
* Cass Lake
Central Lakes Volunteer
* Ceylon
Chisago City
* Chokio
* Clara City
Claremont
* Clarissa
Clarkfield
* Clarks Grove Volunteer
Clearbrook
* Clements
* Climax
* Clinton
* Clontarf
* Cohasset
Cokato
* Cologne
* Comfrey
Conger
* Cook
Correll
* Cotton Volunteer
Cottonwood
*Courtland
* Cromwell Volunteer
* Crooked Lake Volunteer
* Crosby Volunteer
Crosslake
Culver
Currie Volunteer
* Dalbo
* Dawson
Dayton[1]
De Graff
* Deer Creek
* Deerwood
* Delavan Volunteer
Dennison
* Dent
* Detroit Lakes
* Dexter Volunteer
* Dilworth
Dodge Center
* Dover
* Dumont
* Dunnell-Lake Fremont
* Eagle Lake Volunteer
* East Hubbard County Fire Protection District
* Echo
* Eden Valley
* Eitzen
Elbow Lake[1]
* Elgin
* Ellsworth
* Elmer
* Elrosa
* Elysian
Emily Volunteer
* Emmons
* Erskine
* Evansville
Eyota Volunteer
* Fairfax
* Fayal
Federal Dam
* Fertile
* Fifty Lakes
Finlayson
* Flensburg
* Floodwood
* Foley
* Forada Twp.
* Foreston
* Fountain
Franklin
* Fredenberg
* Freeport
* French Twp. Volunteer
Frost
* Fulda
Garfield
Garrison
* Garvin
* Gary Volunteer
* Gaylord
Geneva
Ghent
* Gibbon
Gilbert
* Glencoe
* Glyndon Volunteer
Gnesen Volunteer
* Gonvick
* Goodhue
* Goodland Volunteer
* Goodridge Area
* Granada
* Grand Lake Volunteer
* Grand Marais Volunteer
* Grand Meadow
Grand Portage
* Granite Falls
* Grasston
Greaney-Rauch-Silverdale
* Greenbush
Grygla
* Gunflint Trail Volunteer
Hackensack Area
Hallock
* Hamburg
* Hamel
* Hampton
* Hangaard Twp.
Hanska[1]
* Hardwick
* Harmony
Harris[1]
* Hawley
* Hayward
* Henning Volunteer
* Heron Lake Volunteer
* Hill City
* Hills
* Hitterdal
* Hoffman
Hokah Volunteer
* Holdingford
* Holland
* Hollandale
* Houston
Hovland
* Hoyt Lakes
Ideal Twp.
* Industrial Volunteer
* Iona
* Ironton
* Isanti Volunteer
Itasca Twp. Volunteer
Jackson
Jacobson
* Janesville
* Jasper
Jeffers
* Jordan
* Kabetogama
Kandiyohi
Karlstad Volunteer
* Kasota
* Keewatin Volunteer
Kelsey Volunteer
Kennedy
Kenneth Volunteer
* Kensington
Kent/Abercrombie Fire Protection District
* Kenyon
Kerrick
Kilkenny
Kimball
* La Salle
* La Crescent

Note: An asterisk (*) depicts fire departments from which we received completed surveys by the response deadline.

[1]Returned survey too late to be included in our analysis.

Table A.4: (continued)

* Lake Bronson
* Lake Crystal
* Lake Elmo
* Lake George
Lake Henry
* Lake Wilson
* Lancaster
* Lanesboro
La Porte/Lakeport
Le Center
* Le Roy
* Le Sueur
* Lester Prairie
* Lewisville
* Lexington
* Linwood Volunteer
* Lismore
* Litchfield
Littlefork
London
Long Lake
Lonsdale
* Loretto Volunteer
Lower St. Croix Valley
Lutsen Twp. Volunteer
* Luverne
* Lyle
Madelia
* Madison Lake
* Magnolia
* Mahnomen
Mahtomedi
* Makinen
* Manchester
* Maple Hill
* Maple Lake
* Maple Plain
* Mapleton
* Mapleview
Marietta[1]
* Mayer
* Mazeppa Volunteer
McDavitt
* McGrath
* McIntosh
McKinley Volunteer
* Meadowlands Area Volunteer
Medford Volunteer
Medicine Lake
* Melrose
* Miesville Volunteer
* Milaca
* Milan
* Millerville
* Milroy
* Minneota
* Minnesota City
* Minnesota Lake
Monticello
* Montrose
* Mora
* Morgan
* Morris
Morse Twp. Volunteer
Morton
* Motley
Mountain Iron
Mountain Lake
Murdock
* Nashwauk
* Nassau
* Nerstrand Volunteer
* Nevis
* New Auburn
* New Germany
New London
New Market
* New Munich
* New Prague
* New Richland
* New York Mills
Nielsville
* Nisswa
Normanna Volunteer
* North Branch
North Star Twp.
* Northome
Northrop
* Norwood-Young America
Oak Grove
* Odessa
* Ogilvie
Oklee
* Olivia
Ormsby
* Oronoco
Ortonville
* Oslo
* Ottertail
* Palisade Volunteer
* Palo Regional
Parkers Prairie
* Paynesville
* Pelican Rapids Volunteer
* Pemberton
* Pequaywan Lake Area
Pequot Lakes
* Perch Lake Volunteer
* Perley-Lee Twp.
* Pickwick Area
* Pierz
Pine City
* Pine Island
* Pipestone
Plato
Plummer
* Porter
* Preston
* Princeton
Prinsburg[1]
* Randall
* Randolph
* Raymond
* Redwood Falls
* Remer
* Renville
* Revere
* Richmond
* Riverton
Rockford
Rogers
* Rose Creek Area
* Rothsay
Round Lake
* Royalton
* Rushford
* Rushmore
* Sacred Heart
* St. Bonifacius
* St. Charles
St. Clair
* St. Francis
* St. Joseph Volunteer
* St. Martin
* St. Paul Park Volunteer
* St. Stephen
* Sanborn
* Sandstone Volunteer
* Sauk Centre
Scandia Valley
Scanlon Volunteer
* Seaforth
* Sedan
* Shelly
Shevlin
* Silver Bay
* Silver Lake
Slayton
* Sleepy Eye
Solway Twp.
* South Bend
Spring Grove
* Spring Valley
* Springfield Volunteer
* Squaw Lake
* Staples
Stephen
Stewartville
* Storden
* Sturgeon Lake
* Sturgeon Twp.
Sunburg
* Swanville
Taconite
* Taylors Falls
Tintah
* Tofte
Toivola Twp.[1]
* Tower
Trimont
Twin Lakes
Twin Lakes Volunteer
Two Harbors
Tyler
Ulen
* Underwood
Upsala
Vergas[1]
* Vermilion Lake
* Vernon Center
Vesta
* Villard Volunteer
Vining
* Wabasha
* Wabasso Volunteer
* Waite Park
Waldorf
Walnut Grove
Wanamingo
* Wanda
* Warba-Feeley-Sago
Warroad
Watkins
* Watson Community Fire Fighters Inc.
Waubun
Welcome
* Wendell
* West Brevator Volunteer
* West Concord
* Westbrook
* Wheaton
White Earth Volunteer
Williams
* Wilmont
* Wilson Volunteer
* Windom
Winger
* Winnebago Fire Service
* Winthrop Volunteer
Wolf Lake
Wolverton
* Wood Lake
Wright Volunteer
* Wykoff
* Wyoming
* Zimmerman
* Zumbro Falls

Note: An asterisk (*) depicts fire departments from which we received completed surveys by the response deadline.

[1]Returned survey too late to be included in our analysis.

We also used these standards to develop measures of performance for fire services. In September 1998, we met with our technical advisory panel to validate these standards of performance. Based on the panel's feedback, we revised the measures. Combined with data from fire departments' survey responses, we used the measures to compare performance of Minnesota fire departments and identify departments reporting effective and efficient practices.

FOCUS GROUP METHODOLOGY

To gather reactions and feedback to the actions we identified for effective and efficient service, we sponsored small group meetings, or "focus groups," of fire personnel in four locations around the state. In the focus groups, participants (1) reviewed the actions we identified as essential to high performance in fire departments, (2) suggested modifications, and (3) identified innovative practices and effective methods in their fire departments.

To organize and facilitate the focus groups, we hired an agency experienced in local government focus group research. The meetings were held in Albert Lea, Alexandria, Grand Rapids, and the Twin Cities in November 1998. Each group included 8 to 11 members from fire departments located in the vicinity of these communities. The participants were randomly selected from rosters supplied by nearby fire departments. For a variety of perspectives, we selected a cross-section of fire officers and fire fighters from all types and sizes of departments. To supplement the focus group responses, representatives of the St. Paul and Minneapolis Fire Departments were interviewed individually. Members of fire departments from 32 communities participated. Table A.5 lists them.

SITE VISITS OF SELECTED FIRE DEPARTMENTS

Using data from our survey and the State Fire Marshal Division to identify fire departments meeting our performance standards, we selected 11 departments to visit for in-depth interviews on their methods and practices. Based on survey responses, many fire departments around the state demonstrated effective and efficient services. Because we could not visit all of these departments, we chose a limited number representing different sizes, types, and geographic locations of fire departments.

Table A.5: Communities with Fire Departments Represented in Focus Groups

Albert Lea	Ham Lake
Alexandria	Hermantown
Austin	Loretto
Balsam	Lyle
Barrett	*Minneapolis
Bricelyn	North St. Paul
Canyon	Norwood - Young America
Carlos	Osakis
Cohasset	St. Anthony
Elrosa	*St. Paul
Ely	Scandia
Forest Lake	Shakopee
Freeborn	Stillwater
French Township	Villard
Fridley	Waseca
Grand Rapids	Wayzata

Note: An asterisk (*) depicts fire departments with representatives that were interviewed individually.

In January 1999, we visited these departments to collect additional detailed information on their specific practices and programs. The site visits also helped reveal circumstances under which certain practices are transferable to other departments. During the interviews, we asked fire personnel to describe the advantages and disadvantages of the practices, initial startup and ongoing costs, and savings in time, personnel, or other resources. Those interviewed also offered tips and advice for other departments considering similar practices. At each visit we used a standard questionnaire with 11 open-ended questions to systematically collect the information. A copy of the site-visit questionnaire is included in this appendix.

LOCAL GOVERNMENT ADVISORY COUNCIL

When the Minnesota Legislature established the program of best practices reviews, it charged a local

government advisory council with recommending local government services for review. The council recommended the topic of fire services in 1997. Council members also reviewed a draft report. The individuals that currently serve on the Local Government Advisory Council are listed in Table A.6.

Table A.6: Local Government Advisory Council Members, 1999

Dave Childs
Minnetonka City Manager

Don Helmstetter
Spring Lake Park Schools Superintendent

Tim Houle
Morrison County Coordinator

Lynn Lander
Hermantown City Administrator

Charles Meyer
St. Louis Park City Manager

Scott Neal
Northfield City Administrator

Brandt Richardson
Dakota County Administrator

Steve Sarkozy
Roseville City Manager

James Schug
Washington County Administrator

Lothar Wolter, Jr.
Norwood-Young America Township Clerk

Office of the Legislative Auditor

Fire Services: A Best Practices Review

SITE VISIT QUESTIONNAIRE

Staff: _____ Date: _____

Fire Dept.: _____ Phone: _____

Interviewee(s): _____ Title: _____

_____ Title: _____

Best Practices:

(1) _____

(2) _____

(3) _____

(4) _____

(5) _____

(6) _____

1. Describe the practice. What is it? How does it work? When did you start it?
2. Why did you first begin the practice? What problems, if any, were you hoping to overcome?
3. Did the practice solve these problems? Why or why not?
4. Does the practice produce savings in time, money, labor, resources, or hassles? Can you quantify savings?
5. Have you found other advantages from using the practice?
6. Have you found any problems or disadvantages with the practice? Have you had to modify it over time to improve it?
7. Thinking back to when you began the practice, did you have any problems with the initial startup? If so, how did you overcome them?
8. What are the costs of the practice? How much time and how many personnel are involved?
9. Do you think other fire departments could also use the practice? Does a department have to be of a certain size or type to successfully use the practice?
10. What tips or advice would you offer to another fire department considering starting this same practice?
11. Do you have any additional thoughts or comments?
12. Unless you object, I'd like to use your name as a contact person and list your number in the final report for readers who may want additional information. Is this all right with you?
    - ❑ Yes
    - ❑ No

Fire Services: A Best Practices Review

Survey of Minnesota Fire Departments

Office of the Legislative Auditor

Thank you for answering this survey of fire departments. Most of the questions pertain to the 1997 calendar year. We recognize that some questions may refer to data that you do not routinely collect, but we encourage you to provide us with estimated answers where you may not have precise data. Direct questions about the survey to Jody Hauer at 651/296-8501.

Please return the completed survey in the enclosed postage-paid envelope by November 25, 1998.

Name: _____ Phone: _____

1. How was your fire department structured in 1997?
(Mark one box.)

Number	Percent	(*N*=88)
79	89.8%	1. Municipal department
7	8.0	2. Private nonprofit organization
0	0.0	3. Special fire protection district
2	2.3	4. Other *(Please specify.)* _____

We received responses from 88 of 101 full-time, combination, and volunteer or paid on-call departments in areas with populations greater than 8,000, for a response rate of 87.1 percent.

2. How satisfied were you that the number and location of your fire station(s) permitted the department in 1997 to respond within a satisfactory response time in your primary response area? *(Circle one number for each statement.)*

		Very Satisfied		Somewhat Satisfied		Neither Satisfied Nor Dissatisfied		Somewhat Dissatisfied		Very Dissatisfied	
		Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
a.	Number of stations (*N*=87)	52	59.8%	20	23.0%	5	5.7%	6	6.9%	4	4.6%
b.	Location of stations (*N*=83)	39	47.0	22	26.5	4	4.8	16	19.3	2	2.4

Comments: _____

3. Did any of the following apply to your department in 1997? If so, please list the cities and townships involved. *(Circle one number for each statement and list communities if applicable.)* (*N*=88)

		Yes		No	
		Number	Percent	Number	Percent
a.	My department operated under a joint powers agreement (Cities and towns involved:)	6	6.8%	82	93.2%
b.	My department was a consolidated department (Cities and towns involved:)	2	2.3	86	97.7
c.	My department provided services by contract (Cities and towns involved:)	48	54.5	40	45.5
d.	A joint powers agreement or consolidation was under development (Cities and towns involved:)	4	4.5	84	95.5

4. How many cities or townships in your primary response area had by 1997 adopted any ordinances or zoning codes that affect the provision of fire services, such as local adoption of the Uniform Fire Code, ordinances on fire resistant construction materials, charging fees for fire services, or permits for installing fire protection systems? (*N*=85)

Total	Median		Number	Percent	
103	1.0	a. Number of cities or townships	10	11.8%	b. Unknown or unable to estimate

5. What percent of the following buildings in your primary response area (including contract areas) do you estimate had full automatic sprinkler coverage in 1997? *(Circle one response for each type of occupancy or "7" for not applicable if your area had no such occupancies.)* (*N*=85)

Type of Building by Main Occupancy	100 to 76% #	%	75 to 51% #	%	50 to 26% #	%	25 to 11% #	%	10 to 5% #	%	Less Than 5% #	%	N/A #	%	Unknown or Unable to Estimate #	%
a. Occupancies storing or processing high-hazard materials, e.g., repair garages with open flames or welding, facilities with high quantities of hazardous materials	21	24.7%	12	14.1%	20	23.5%	9	10.6%	3	3.5%	12	14.1%	1	1.2%	7	8.2%
b. Low- and moderate-hazard industrial and storage occupancies, e.g., bakeries, dry cleaners	12	14.1	12	14.1	16	18.8	12	14.1	11	12.9	14	16.5	2	2.4	6	7.1
c. Professional and service occupancies, e.g., mercantile and educational occupancies, hospitals, correctional institutions, nurseries	26	30.6	18	21.2	19	22.4	5	5.9	5	5.9	7	8.2	0	0.0	5	5.9
d. Single- and two-family homes, family day care, and living facilities for 10 or fewer persons	0	0.0	0	0.0	0	0.0	3	3.5	4	4.7	61	71.8	6	7.1	11	12.9

APPARATUS AND EQUIPMENT

6. Did the department use a preventive maintenance program for its apparatus and equipment in 1997 with routine, scheduled maintenance in accordance with manufacturers' recommendations? *(Mark one.)*

Number	Percent	(*N*=88)
86	97.7%	1. Yes
1	1.1	2. No *(Go to Question 9.)*
1	1.1	3. A preventive maintenance program was under development *(Go to Question 9.)*

7. Which of the following components of a preventive maintenance program for apparatus and equipment did your department have in 1997? *(Mark all that apply.)*

Number	Percent	(*N*=86)
86	100.0%	a. Routine maintenance (checking engine oil level, tire pressure, etc.) following a set checklist
84	97.7	b. Complete records were kept of repairs and service to apparatus and equipment
64	74.4	c. Within 24 hours of use or repair, inspections were conducted of apparatus and equipment they carried
81	94.2	d. Regular service tests were made on pumper engines and other fire apparatus
59	68.6	e. The equipment maintenance program included a system for inventory control
75	87.2	f. Replacement equipment was scheduled and budgeted for
75	87.2	g. Regular service tests and structural examination of ground ladders, hoses, and other equipment
0	0.0	h. None of the above

8. What percentage of the maintenance scheduled in your preventive maintenance program during 1997 was completed as scheduled? *(Mark one.)*

Number	Percent	(*N*=86)
38	44.2%	1. 100% was completed as scheduled
31	36.0	2. 95 to 99% was completed as scheduled
9	10.5	3. 90 to 94% was completed as scheduled
6	7.0	4. 85 to 89% was completed as scheduled
2	2.3	5. less than 85% was completed as scheduled

9. Did your department have in place in 1997 a replacement plan for capital purchases that estimated the expected replacement year of apparatus based on their expected life cycles and their costs? *(Mark one.)*

Number	Percent	(*N*=88)
68	77.3%	1. Yes
12	13.6	2. No
8	9.1	3. An apparatus replacement plan was under development

10. What purchasing arrangements has your department used in the past 10 years to purchase apparatus such as pumpers, ladder trucks, tankers, brush trucks, rescue rigs, or other types of vehicles? *(Mark all that apply.)*

Number	Percent	(*N*=87)
87	100.0%	a. Developed specifications and selected vendors through bidding process
14	16.1	b. Bought or leased vehicles through the Federal Excess Property Program
2	2.3	c. Purchased apparatus jointly with another department
1	1.1	d. Used lease arrangement with another department
17	19.5	e. Used contributions from civic organizations or charitable gambling proceeds in making the purchase
2	2.3	f. Received apparatus in exchange for service provided by contract
8	9.2	g. Other (*Please specify.*) _____

11. What percentage of your pumper apparatus would you estimate are properly matched to your local road conditions and to local fire fighting pumper performance needs, such as local needs for certain pump ratings (gpm), tank capacities and discharge rates, hose and nozzle loads, etc.? *(Mark one.)*

Number	Percent	(*N*=88)
68	77.3%	1. 100% of our pumper apparatus are suited to our local road conditions and pumping performance needs
15	17.0	2. At least 75% of our pumper apparatus are well suited, but about 25% are either overloaded or underpowered for our needs
4	4.5	3. At least 50% of our pumper apparatus are well suited, but about half are either overloaded or underpowered for our needs
1	1.1	4. Less than 50% of our pumper apparatus are well suited, and more than half of our apparatus are either overloaded or underpowered for our needs
0	0.0	5. Unknown or unable to estimate

12. How adequate was the following, if available to your department at the end of 1997? *(Circle one number for each category.)*

Category	Very Adequate		Adequate		Inadequate		Equipment Not Available		Department Does Not Provide		Not Applicable to Our Department	
	#	%	#	%	#	%	#	%	#	%	#	%
a. Protective clothing, hoods, helmets, goggles, gloves, and footwear appropriate to the tasks expected of each member (*N*=88)	73	83.0%	15	17.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
b. Protective breathing apparatus (*N*=88)	67	76.1	21	23.9	0	0.0	0	0.0	0	0.0	0	0.0
c. Standard attack hose (1.5 to 2.5 inch) (*N*=88)	72	81.8	14	15.9	2	2.3	0	0.0	0	0.0	0	0.0
d. Personal alert safety system to warn others when a firefighter is incapacitated (*N*=87)	58	66.7	21	24.1	3	3.4	0	0.0	4	4.6	1	1.1
e. For wildland fires, personal equipment for each fire fighter including a fire shelter, canteens, flares, and portable two-way radios (*N*=85)	2	2.4	15	17.6	12	14.1	4	4.7	5	5.9	47	55.3
f. Vehicles equipped with two-way radios (*N*=88)	72	81.8	14	15.9	2	2.3	0	0.0	0	0.0	0	0.0
g. For rural departments, year-round water drafting sites (*N*=85)	2	2.4	10	11.8	10	11.8	0	0.0	9	10.6	54	6.35
h. In areas with limited water supply accessibility, portable pumps (*N*=86)	5	5.8	30	34.9	5	5.8	3	3.5	3	3.5	40	46.5
i. Large diameter hose (3.5 inches or more) for moving rural water supplies or as back-up to gaps in municipal water systems when water mains are under repair (*N*=88)	60	68.2	24	27.3	0	0.0	0	0.0	3	3.4	1	1.1
j. Portable drop or folding water tanks (*N*=87)	35	40.2	21	24.1	1	1.1	3	3.4	3	3.4	24	27.6
k. Extrication tools, hydraulic tools, and torches (*N*=88)	54	61.4	31	35.2	2	2.3	0	0.0	0	0.0	1	1.1
l. Firefighter hand tools for cutting, striking, and prying (*N*=88)	59	67.0	29	33.0	0	0.0	0	0.0	0	0.0	0	0.0

13. How satisfied were you in 1997 with your department's system for alerting members to respond to an incident and the ability of your department's communication system (telephones, radio base station equipment, two-way radios, pagers, etc.) to perform in emergency situations and normal daily activities without excessive delays or interference? *(Circle one number for each statement.)*

		Very Satisfied		Somewhat Satisfied		Neither Satisfied Nor Dissatisfied		Somewhat Dissatisfied		Very Dissatisfied	
		Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
a.	System for alerting members (*N*=88)	65	73.9%	16	18.2%	2	2.3%	4	4.5	1	1.1%
b.	Department communication system (*N*=87)	55	63.2	22	25.3	3	3.4	4	4.6	3	3.4

14. What innovative or effective methods regarding the purchase or maintenance of apparatus and equipment are used by your department or other departments you are aware of? _____

MUTUAL AID

15. Which of the following activities were included in your department's mutual aid associations or automatic aid agreements during 1997 (not including services you provided by contract)? *(Circle "1" or "2" or both numbers to indicate whether you provided and/or received mutual aid. Circle "3" if the activity was not included in mutual aid agreements.)*

Number	Percent	(*N*=88)
1	1.1%	1. We did not participate in mutual aid or automatic aid *(Go to Question 21.)*

	Activity	Provided Mutual Aid		Received Mutual Aid		Not Part of Mutual Aid	
		Number	Percent	Number	Percent	Number	Percent
a.	Fire suppression (*N*=86)	82	95.3%	71	82.6%	1	1.2%
b.	Technical rescues (*N*=86)	59	68.6	29	33.7	24	27.9
c.	First Responders (*N*=85)	36	42.4	27	31.8	44	51.8
d.	Emergency Medical Services (EMS) Basic or Advanced Life Support (*N*=85)	39	45.9	29	34.1	42	49.4
e.	Hazardous materials responses (*N*=85)	48	56.5	40	47.1	24	28.2
f.	Enforcement of fire codes and/or related local ordinances, including inspections (*N*=86)	21	24.4	12	14.0	61	70.9
g.	Fire investigations (*N*=86)	25	29.1	25	29.1	50	58.1
h.	Fire safety awareness efforts (*N*=85)	32	37.6	18	21.2	52	61.2
i.	Public relations activities (*N*=85)	25	29.4	13	15.3	59	69.4
j.	Training courses or seminars (*N*=86)	57	66.3	43	50.0	23	26.7
k.	Drills and exercises (*N*=86)	64	74.4	56	65.1	16	18.6
l.	Use of specialized equipment or apparatus (*N*=86)	61	70.9	42	48.8	20	23.3
m.	Use of facilities (*N*=86)	51	59.3	32	37.2	32	37.2
n.	Cooperative purchasing arrangements (*N*=85)	16	18.8	17	20.0	63	74.1
o.	Exchanged information and expertise (*N*=86)	73	84.9	61	70.9	12	14.0
p.	Other *(Please specify.)* (*N*=85)	3	3.5	3	3.5	81	95.3

16. Of the departments or communities participating in your mutual aid association(s), list those in which you actually responded to mutual aid requests during 1996 or 1997. *(Use additional sheet, if needed.)*

Mutual Aid Association	Departments/Cities to Which We Responded with Aid
a. _____ (association name)	_____
b. _____ (association name)	_____
c. _____ (association name)	_____
d. _____ (association name)	_____

17. Which of the following was part of your mutual aid association(s) in 1997? *(Mark all that apply.)*

Number	Percent	(*N*=86)
40	46.5%	a. Standard operating procedures that were agreed to by the participating departments
53	61.6	b. Familiarity of all departments' members with mutual aid procedures, equipment, and safety measures
77	89.5	c. A standard approach to incident command
67	77.9	d. Designated radio frequencies and standard radio procedures or other communications system for interdepartmental communications
43	50.0	e. Interagency training on an ongoing basis
23	26.7	f. Coordinated approaches to long-term planning
3	3.5	g. None of the above

18. If you participated in mutual aid through written agreements in 1997, which of the following was described in them? *(Mark all that apply.)*

Number	Percent	(*N*=83)
6	7.2%	a. We participated in mutual aid but had no written agreements
51	61.4	b. Incident command responsibility
43	51.8	c. Clarification of jurisdictional issues
57	68.7	d. Insurance coverage
45	54.2	e. Defined legal responsibilities
40	48.2	f. Financing arrangements (if any)
41	49.4	g. Standardized communications and protocols
9	10.8	h. We had written mutual aid agreements but they did not contain the elements above

19. How satisfied were you with the following characteristics of your 1997 mutual aid? *(Circle one number for each characteristic or circle "6" if the characteristic was not available.)*

Characteristics	Very Satisfied #	Very Satisfied %	Somewhat Satisfied #	Somewhat Satisfied %	Neither Satisfied Nor Dissatisfied #	Neither Satisfied Nor Dissatisfied %	Somewhat Dissatisfied #	Somewhat Dissatisfied %	Very Dissatisfied #	Very Dissatisfied %	Not Available #	Not Available %
a. Access to or reaching additional fire fighters (*N*=85)	63	74.1%	13	15.3%	5	5.9%	1	1.2%	0	0.0%	3	3.5%
b. Coordination of fire fighters from multiple departments (*N*=83)	40	48.2	30	36.1	7	8.4	3	3.6	0	0.0	3	3.6
c. Use of apparatus/equipment from other departments (*N*=84)	60	71.4	12	14.3	8	9.5	1	1.2	0	0.0	3	3.6
d. Communication among departments (*N*=85)	32	37.6	32	37.6	9	10.6	8	9.4	1	1.2	3	3.5
e. Availability of staffing for prolonged or extraordinary incidents (*N*=80)	42	52.5	20	25.0	11	13.8	1	1.3	0	0.0	6	7.5
f. Response by other departments to your requests for aid (*N*=80)	64	80.0	9	11.3	3	3.8	2	2.5	0	0.0	2	2.5

20. What innovative or effective methods regarding mutual aid associations are used by your department or other departments you are aware of? *(Use additional sheet, if needed.)*

FIRE, RESCUE, EMS, AND HAZARDOUS MATERIALS RESPONSES

21. Did your fire department have an incident management system in place in 1997 with response plans that described your fire department's role and activities for fire suppression incidents? *(Mark one.)*

Number	Percent	(*N*=88)
68	77.3%	1. Yes, we had an incident management system with written response plans
13	14.8	2. Yes, we had an incident management system with response plans but they were not written
7	8.0	3. Incident management system with response plans was under development
0	0.0	4. No, we did not have an incident management system with response plans

22. How satisfied were you with (a.) the process of planning and providing water supplies for fire protection in your community, such as hydrant placement, and (b.) your involvement in that process? *(Circle one number for each statement; circle "6" if it does not apply.)*

	Very Satisfied Number	Very Satisfied Percent	Somewhat Satisfied Number	Somewhat Satisfied Percent	Neither Satisfied Nor Dissatisfied Number	Neither Satisfied Nor Dissatisfied Percent	Somewhat Dissatisfied Number	Somewhat Dissatisfied Percent	Very Dissatisfied Number	Very Dissatisfied Percent	N/A Number	N/A Percent
a. Process of planning water supplies for fire protection (*N*=88)	48	54.5%	28	31.8%	1	1.1%	6	6.8%	2	2.3%	3	3.4%
b. Fire department involvement in water planning process (*N*=87)	40	46.0	25	28.7	7	8.0	10	11.5	2	2.3	3	3.4

23. What credit for the water supply in your fire department's primary response area did the Insurance Services Office, Inc. assign as of 1997? *(Please provide the credit--ranging from 1 to 40--that applies to water supply only, not the overall ISO rating. Indicate the credit for each of your urban and rural areas or mark "NA" if not applicable in your area.)* (*N*=82)

Median (*N*=41)		Unknown		N/A	
		Number	Percent	Number	Percent
36.6 Credits	a. Total credits assigned by the ISO for water supply in urban areas	34	41.5%	6	7.3%
Median (*N*=4)					
17.6 Credits	b. Total credits assigned by the ISO for water supply in rural areas	38	46.3	24	29.3

24. Approximately what was your fire department's average response time in minutes to fire suppression calls for your primary response area in 1997 (starting from the time companies were alerted about the incident to the time a full response unit capable of initial attack arrived at the scene)? *(Fill in only <u>one</u> of the following. Fill in a. unless your department only records response times from the time a call comes in to the dispatcher, instead of the time fire fighters are alerted to an incident.)* (*N*=88)

Median (*N*=63)
5.0 Minutes — a. Average response time starting from time companies were alerted

OR

Median (*N*=20)
5.7 Minutes — b. Average response time starting from the time the call came in to the dispatcher

Number	Percent	
5	5.7%	c. Unknown or unable to estimate

25. Did your fire department have written standard operating guidelines for fire suppression activities in 1997? *(Mark one.)*

Number	Percent	(*N*=87)
75	86.2%	1. Yes, we had written standard operating guidelines
7	8.0	2. We had standard operating guidelines but they were not written *(Go to Question 27.)*
3	3.4	3. Standard operating guidelines were under development *(Go to Question 27.)*
2	2.3	4. We did not have standard operating guidelines *(Go to Question 27.)*

26. What information, if any, was included within your fire department's written standard operating guidelines for fire suppression activities in 1997? *(Mark all that apply.)*

Number	Percent	(*N*=74)
70	94.6%	a. Procedures for designation of an incident commander and command structure
57	77.0	b. Procedures for on-scene duty and apparatus assignments
33	44.6	c. Duty roster of fire fighters and their assignments
54	73.0	d. Minimum staffing levels and equipment requirements (for number of suppression personnel for first alarm assignment and other activities)
41	55.4	e. Provisions for developing pre-attack plans
56	75.7	f. Procedures for fireground search and rescue
68	91.9	g. System of accounting for fire fighter whereabouts during responses
51	68.9	h. Communications plan
45	60.8	i. Information management system, such as standardized tactical reference worksheets or status boards
49	66.2	j. Procedures for using available water supplies
37	50.0	k. Pre-fire plans for all target hazards
64	86.5	l. Standard incident reporting system
43	58.1	m. Procedures for overhaul and salvage or mop up
0	0.0	n. None of the above

27. Did your fire department have a long-range strategic plan (or master plan) in 1997 looking beyond a three-year horizon that (a) contained financial and strategic planning for personnel, apparatus, and fire stations based on a risk analysis in the community and (b) described contingency plans to guarantee service in the event of a disaster? *(Mark one.)*

Number	Percent	(*N*=87)
28	32.2%	1. Yes, we had a written strategic plan or master plan containing these elements
14	16.1	2. We had a strategic plan or master plan containing these elements but it was not written
8	9.2	3. We had a written strategic plan or master plan but it did not contain these elements
11	12.6	4. A strategic plan or master plan was under development
26	29.9	5. No, we did not have a strategic plan or master plan

28. Approximately what percentage of the fire risks and structures in your primary response area were covered by documented pre-incident planning in 1997? *(Mark one.)*

Number	Percent	(*N*=86)
13	15.1%	1. 100 to 81%
9	10.5	2. 80 to 61%
19	22.1	3. 60 to 41%
10	11.6	4. 40 to 21%
29	33.7	5. 20 to 1%
3	3.5	6. Pre-incident planning was under development *(Go to Question 30.)*
3	3.5	7. We did not document pre-incident plan information for any fire risks or structures *(Go to Question 30.)*

29. What written information was compiled as part of your pre-incident planning? *(Mark all that apply.)*

Number	Percent	(*N*=81)
58	71.6%	a. A list of cooperating agencies and how to contact them
45	55.6	b. A master list of additional available resources of personnel, equipment, supplies, and facilities
48	59.3	c. Mutual aid agreements, automatic response agreements, and other protection agreements
58	71.6	d. Up-to-date maps of protection areas, including boundaries, roads, and other means of access and egress
17	21.0	e. Site location of heliports and airports, as needed for wildland fire fighting (where applicable)
45	55.6	f. Identification of the types and levels of fire risks, such as fuel type and loading in forested areas, aviation hazards, or buildings with hazardous contents
72	88.9	g. Building floor plans, diagrams, site plans, or maps of specific hazards
59	72.8	h. On-site fire control equipment
64	79.0	i. Names and phone numbers of persons responsible for the security of specific hazards
68	84.0	j. Identification of sprinklered buildings
22	27.2	k. Identification of fire flow needs (minimum water supply required)
51	63.0	l. Occupancy information of high-hazard buildings
70	86.4	m. Hydrant locations (wet or dry) and sewer maps
29	35.8	n. Identification of alternative water sources
53	65.4	o. Requirements for familiarity tours by fire fighters of special hazards
4	4.9	p. Appropriate minimum staffing levels during DNR “Fire Weather Watch” (where applicable)
1	1.2	q. None of the above

30. What practices, if any, did your fire department have as part of a health and safety program for your members in 1997? *(Mark all that apply.)*

Number	Percent	(*N*=88)	
78	88.6%	a.	Written protocols that describe safety procedures and limit the risk of exposure to infectious and hazardous substances during response operations
87	98.9	b.	Provision of personal protective equipment to all personnel
86	97.7	c.	Training and education of fire fighters in the use and limitations of personal protective equipment
66	75.0	d.	Provision of an incident safety officer at each incident
53	60.2	e.	Designation of a health and safety officer to manage the fire department health and safety program
68	77.3	f.	Physical examination requirements for employment, including annual medical exams
78	88.6	g.	Critical incident stress debriefing
51	58.0	h.	Rapid intervention protocols to assist injured fire fighters
76	86.4	i.	Requirement that apparatus are driven and operated only by trained and qualified personnel
69	78.4	j.	Local training requirements based on level and type of risks in the response area
80	90.9	k.	Ongoing training for specialized services, such as hazardous materials responses and rescue services, if applicable
0	0.0	l.	None of the above

31. Which of the following, if any, did your fire department have in place for (1.) hazardous materials response or (2.) technical rescue activities in 1997? *(Circle the appropriate number(s) for each statement. If your department did not offer hazmat or technical rescue services, mark the appropriate box below and circle responses only for the service you offered.)* (*N*=87)

Number	Percent		
9	10.3%	1.	We did not offer hazardous materials responses
15	17.2	2.	We did not offer technical rescues

Practice		Hazardous Materials		Technical Rescue	
		Number	Percent	Number	Percent
a.	Written emergency response plan that defines the fire department's roles during the incident	63	72.4%	38	43.7%
b.	Written standard operating guidelines for conducting the services	57	65.5	32	36.8
c.	Risk assessment for rescue needs and target hazards in the community	32	36.8	20	23.0
d.	Minimum staffing level requirements according to OSHA and FEMA standards	40	46.0	26	29.9
e.	Written pre-incident plans specified for all target hazards and potential rescue needs	23	26.4	8	9.2
f.	Specialists (or contracts with them) to perform services in the event fire department does not provide service	43	49.4	18	20.7
g.	None of the above	3	3.4	7	8.0

32. What was the average response time in minutes by first responders to emergency medical incidents for your primary response area in 1997 (starting from the time responders were alerted to the time the response unit arrived at the emergency)? *(Fill in only one. Fill in a. unless your department only records response times from the time a call comes in to the dispatcher.)* (*N*=85)

Median (*N*=40)		Number	Percent	
5.0 Minutes	a. Average response time from time first responders were alerted to incident	0	0.0%	c. Unknown or unable to estimate
Median (*N*=11)	OR			
5.0 Minutes	b. Average response time starting from time call came in to dispatcher	33	38.8	d. Not applicable because department did not offer first response
		1	1.2	e. Not applicable because department did not receive calls for first responders in 1997

33. What was your fire department's average response time in minutes for responding to hazardous materials incidents--awareness and/or operations level responses--in 1997 (starting from the time a team was dispatched to the time the team arrived at the incident)? *(Fill in only one. Fill in a. unless your department only records response times from the time a call comes in to the dispatcher.)* (*N*=87)

Median (*N*=48)		Number	Percent	
5.1 Minutes	a. Average response time from time fire fighters were alerted	14	16.1%	c. Unknown or unable to estimate
Median (*N*=15)	OR			
5.7 Minutes	b. Average response time starting from time call came in to dispatcher	2	2.3	d. Not applicable because department did not offer hazmat responses
		8	9.2	e. Not applicable because department did not receive hazmat calls in 1997 within its primary response area

34. What practices, if any, did your fire department follow in 1997 to evaluate the efficiency and effectiveness of fire department activities? *(Mark all that apply.)*

Number	Percent	(*N*=88)
54	61.4%	a. Kept a log of all on-scene incident activities
55	62.5	b. Maintained a management information system to record information on all fire department activities
65	73.9	c. Conducted post-incident analysis and debriefing following emergency responses
33	37.5	d. Measured progress toward department goals with a formal program of setting goals and objectives and measuring department performance
16	18.2	e. Followed a quality assurance program
51	58.0	f. Measured department progress informally through budget process, employee performance evaluations, contract renewals, etc.
7	8.0	g. Other (*Please specify.*) _____
5	5.7	h. None of the above

35. What innovative or effective methods regarding the management of fire suppression, rescues, EMS, or hazmat responses are used by your department or other departments you are aware of?

_____

PERSONNEL

36. Did your department have a recruitment program in 1997 that was structured according to the department's ongoing personnel needs? *(Mark one.)*

Number	Percent	(*N*=88)
38	43.2%	1. We had a recruitment program based on a structured assessment of ongoing needs for personnel
13	14.8	2. We had a recruitment program that was based on an informal assessment of personnel needs
26	29.5	3. We had an informal recruitment program used only upon a position vacancy
1	1.1	4. A recruitment program was under development
10	11.4	5. We did not have a program for recruiting department members

37. How satisfied were you that your recruitment process in place during 1997 produced candidates able to perform their required duties? *(Mark one.)*

Number	Percent	(*N*=88)
39	44.3%	1. Very satisfied
29	33.0	2. Somewhat satisfied
7	8.0	3. Neither satisfied nor dissatisfied
4	4.5	4. Somewhat dissatisfied
2	2.3	5. Very dissatisfied
7	8.0	6. We did not have a recruitment process

38. For each of the following services in 1997, approximately how many person-hours of department staff time were spent, and how many responses did the department make? Also indicate whether your department charged fees for any of these services. *(If necessary, please check your records to verify number of hours and responses; if you do not record hours or number of responses, mark the "Don't Know" column. Include hours for fire marshal staff and support staff, where applicable, but exclude staff, such as city building inspectors, who were not part of or on contract with your department.)* (*N*=84)

Service	Total Person-Hours (Median)	Total Responses or Events (Median)	Did Not Offer #	Did Not Offer %	Don't Know #	Don't Know %	Department Charged Fees #	Department Charged Fees %
a. Fire suppression[I]	1,484.0 (*N*=48)	108.0 (*N*=76)	0	0.0%	2	2.4%	6	7.1%
b. False alarms	625.5 (*N*=46)	98.0 (*N*=70)	0	0.0	5	6.0	20	23.8
c. Technical rescues (e.g., vehicle extrications, water/ice rescues, etc.)[II]	252.0 (*N*=46)	31.0 (*N*=68)	4	4.8	4	4.8	8	9.5
d. EMS - First Responders[III]	351.0 (*N*=12)	102.0 (*N*=20)	32	38.1	5	6.0	1	1.2
e. EMS - Basic Life Support response services[IV]	*	222.5 (N=6)	46	54.8	4	4.8	2	2.4
f. EMS - Basic Life Support transport[V]	1,280.0 (*N*=5)	436.0 (*N*=6)	68	81.0	1	1.2	5	6.0
g. EMS - Advanced Life Support response services	*	*	65	77.4	2	2.4	2	2.4
h. EMS - Advanced Life Support transport[VI]	2,739.5 (*N*=6)	1,126.0 (*N*=9)	68	81.0	1	1.2	4	4.8
i. Hazardous materials response	82.0 (*N*=44)	19.0 (*N*=67)	1	1.2	4	4.8	13	15.5
j. Code enforcement (inspections and plan reviews)	695.0 (*N*=41)	649.0 (*N*=39)	12	14.3	8	9.5	15	17.9
k. Fire investigations	100.0 (*N*=47)	21.5 (*N*=46)	4	4.8	12	14.3	0	0.0

(Footnotes are explained at bottom of page 133.)

Question 38, continued ...

Service	Total Person-Hours Median	Total Responses or Events Median	Did Not Offer #	Did Not Offer %	Don't Know #	Don't Know %	Department Charged Fees #	Department Charged Fees %
l. Public education (e.g., school programs, fire-safe house)[VII]	200.0 (*N*=54)	(N/A)	2	2.4	13	15.5	1	1.2
m. Emergency management services	100.0 (*N*=26)	(N/A)	7	8.3	19	22.6		(N/A)
n. Public relations activities[VIII]	150.0 (*N*=47)	(N/A)	2	2.4	17	20.2		(N/A)
o. Apparatus/equipment maintenance[IX]	466.0 (*N*=52)	(N/A)	2	2.4	15	17.9		(N/A)
p. Building/grounds maintenance	365.0 (*N*=41)	(N/A)	6	7.1	18	21.4		(N/A)
q. Hydrant maintenance/ inspection	50.0 (*N*=18)	(N/A)	28	33.3	9	10.7		(N/A)
r. Reduction of flammable brush/vegetation	20.0 (*N*=13)	(N/A)	35	41.7	9	10.7		(N/A)
s. Training and drills	2,923.0 (*N*=64)	(N/A)	0	0.0	7	8.3		(N/A)
t. Administration	1,800.0 (N=47)	(N/A)	1	1.2	18	21.4		(N/A)
u. Support staff (not assigned to a specific service)	1,250.0 (*N*=24)	(N/A)	9	10.7	18	21.4		(N/A)
v. Standby time	257.5 (*N*=28)	(N/A)	6	7.1	21	25.0		(N/A)
w. Other *(Please specify below.)* _____	2,223.0 (*N*=20)	(N/A)	1	1.2	4	4.8	0	0.0
x. TOTALS	10,893.5 (*N*=74)	817.5 (*N*=78)						

*Too few responses to report median.

[I] Medians may differ slightly from actual because a few respondents included false alarms, hazardous materials response, technical rescues, EMS-First Responders, and/or BLS activities in their fire suppression estimates.

[II] Medians may differ slightly from actual because several respondents included EMS-First Responders and/or fire suppression activities in their technical rescue estimates.

[III] The person-hours median excludes 2 respondents and the responses median excludes 5 respondents who did not separate technical rescues, BLS, and/or ALS activities from their EMS-First Responder estimates.

[IV] The responses median excludes 9 respondents who did not separate technical rescues, first responder services, BLS transport, and/or ALS activities from their BLS response services estimate.

[V] The responses median may differ slightly from actual because 2 respondents included EMS-First Responders, BLS response services and/or ALS activities in their BLS transport estimate.

[VI] Medians may differ slightly from actual because several respondents included EMS-First Responders, BLS, and/or ALS response services in their ALS transport estimates.

[VII] Median may differ slightly from actual because 2 respondents included public relations activities in their public education estimates.

[VIII] Median may differ slightly from actual because 1 respondent included public education activities in the public relations estimate.

[IX] Median may differ slightly from actual because 2 respondents included building and grounds maintenance in their estimates for apparatus and equipment maintenance.

39. If your department charged fees for services in 1997, under what circumstances were those fees imposed? *(Mark all that apply.)*

Number	Percent	(*N*=86)
28	32.6%	1. The department did not charge fees for any services in 1997
18	20.9	2. The recipient of the service had insurance for the service provided
23	26.7	3. The department had responded to repeat false alarms at a particular occupancy
11	12.8	4. The department had to provide services due to reckless actions or violations of statutes or ordinances
15	17.4	5. Recipients of the service did not reside within the primary response area
20	23.3	6. The department granted permits
19	22.1	7. Other (*Please specify.*) _____

40. How many fire fighters, fire officers, and other staff were in your fire department or on contract to the department at the end of 1997? *(Exclude any staff, such as a building inspector, who is not a member of, or on contract to, the fire department.)* (*N*=88)

Number of Departments with Staff in Each Category		Number of Fire Fighters and Officers Mean	Number of Fire Fighters and Officers Median	Number of Other Staff (include support staff, if any) Mean	Number of Other Staff (include support staff, if any) Median	TOTAL Mean	TOTAL Median
62	a. Full-time career members	(1) 18.5	2.0	(2) 1.9	0.0	(3) 20.3	2.5
74	b. Members earning stipend, hourly or on-call wage	(1) 32.0	30.0	(2) 0.1	0.0	(3) 32.1	30.0
5	c. Volunteers earning pension but no compensation for responses	(1) 3.2	0.0	(2) 0.0	0.0	(3) 2.3	0.0
2	d. Volunteers earning neither compensation nor pension	(1) 0.2	0.0	(2) 0.0	0.0	(3) 0.2	0.0

41. Was the chief's position a paid one in 1997? *(Mark one.)*

Number	Percent	(*N*=88)
88	100.0%	1. The chief was paid
0	0.0	2. The chief was not paid but earned a pension
0	0.0	3. The chief earned neither compensation nor a pension

42. Of the number of fire suppression responses reported in Question 38a above, what percentage were for grass or forest fires (including those fires fought under contract with the Department of Natural Resources)?

Median	(*N*=70)
5.0	% of suppression responses

43. How sufficient do you consider the number of on-call or volunteer members who were located within an area that allowed them to promptly respond to calls in 1997? *(Mark one.)*

Number	Percent	(*N*=88)
14	15.9%	1. The department did not use on-call or volunteer members *(Go to Question 49.)*
41	46.6	2. Very sufficient
26	29.5	3. Somewhat sufficient
2	2.3	4. Neither sufficient nor insufficient
4	4.5	5. Somewhat insufficient
1	1.1	6. Very insufficient

44. How did your department identify the practices and activities in 1997 that encourage volunteers to continue as members and the issues or problems that may cause volunteers to resign? *(Mark all that apply.)*

Number	Percent	(*N*=73)	
23	31.5%	a.	The department surveyed or questioned members about what motivates them and what does not
22	30.1	b.	The department conducted exit interviews when volunteers resigned to determine their reasons for leaving
53	72.6	c.	The chief used informal approaches that allowed members to speak their minds about problems
9	12.3	d.	The department did not identify what motivates volunteers
8	11.0	e.	A process to identify motivational factors was under development
9	12.3	f.	Other *(Please specify.)* _____

45. How consistently did the following characterize your department's interactions with volunteers or on-call members in 1997? *(Circle one for each statement.)*

		Consistently		Sometimes		Rarely, If Ever	
		Number	Percent	Number	Percent	Number	Percent
a.	Provided recognition to volunteers for jobs well done (such as in newsletters, at banquets, with press releases, etc.) (*N*=70)	34	48.6%	27	38.6%	9	12.9%
b.	Took steps to maintain a good reputation and positive image to keep volunteers interested, such as maintaining apparatus and equipment as a point of pride (*N*=71)	59	83.1	7	9.9	5	7.0
c.	Leadership consistently used a management style that encouraged member participation (*N*=70)	49	70.0	20	28.6	1	1.4
d.	Stated an explicit mission and goals so volunteers knew what to expect (*N*=69)	37	53.6	26	37.7	6	8.7
e.	Used a process for communicating relevant information so members were informed (*N*=72)	54	75.0	18	25.0	0	0.0
f.	Used standard procedures for dealing equitably with grievances (*N*=68)	41	60.3	19	27.9	8	11.8
g.	Required training that was relevant and fit the volunteers' time availability (*N*=71)	61	85.9	10	14.1	0	0.0
h.	Offered monetary incentives per hour, per call, or as a stipend (*N*= 72)	66	91.7	3	4.2	3	4.2
i.	Offered medical, death, or disability benefits to its volunteers (*N*=69)	47	68.1	7	10.1	15	21.7
j.	Offered a retirement or pension plan for its volunteers (*N*= 72)	71	98.6	0	0.0	1	1.4
k.	None of the above (*N*=1)	0	0.0	0	0.0	1	100.0

46. On the average, of those volunteers or on-call members contacted for incidents in 1997, what percentage would you estimate responded to an average incident? *(Circle one.)* (*N*=72)

	100 to 81%		80 to 61%		60 to 41%		40 to 21%		20% or Less		N/A	
	#	%	#	%	#	%	#	%	#	%	#	%
Percentage of volunteers responding when contacted	9	12.5%	17	23.6%	40	55.6%	5	6.9%	1	1.4%	0	0.0%

47. What was the retention rate of volunteers in your department over the past five years (1993 - 1997), disregarding retirements due to age or injury? *(Circle one.)* (*N*=73)

	100 to 81%		80 to 61%		60 to 41%		40 to 21%		20% or Less		N/A	
	#	%	#	%	#	%	#	%	#	%	#	%
Retention rate	46	63.0%	16	21.9%	5	6.8%	3	4.1%	2	2.7%	1	1.4%

48. Did members of your department in 1997 serve as "sleepers" who slept at the station in anticipation of response to overnight incidents? *(Mark one.)*

Number	Percent	(*N*=74)
19	25.7%	1. Yes
48	64.9	2. No
7	9.5	3. Not applicable

49. How well did your department's training program and training requirements prepare your members to perform the following services in 1997? *(Circle one number for each service. If your department did not offer that service, circle "2.")*

Service	Training Not Available		Did Not Offer Services		Members Demonstrated Above Average Mastery of Skills		Members Demonstrated Average Mastery of Skills		Members Demonstrated Below Average Mastery of Skills	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
a. Structural and vehicle fires (*N*=86)	2	2.3%	0	0.0%	63	73.3%	21	24.4%	0	0.0%
b. Wildland fires (*N*=84)	8	9.5	16	19.0	20	23.8	40	47.6	0	0.0
c. Operating apparatus (*N*=86)	0	0.0	0	0.0	48	55.8	38	44.2	0	0.0
d. Maintenance of apparatus and equipment (*N*=85)	1	1.2	4	4.7	38	44.7	40	47.1	2	2.4
e. Public education (*N*=86)	1	1.2	2	2.3	45	52.3	37	43.0	1	1.2
f. Inspection/code enforcement (*N*=86)	6	7.0	14	16.3	24	27.9	37	43.0	5	5.8
g. Fire investigation (*N*=86)	2	2.3	6	7.0	36	41.9	41	47.7	1	1.2
h. Technical rescues (*N*=85)	0	0.0	3	3.5	38	44.7	41	48.2	3	3.5
i. HazMat first responder-Awareness Level (*N*=85)	0	0.0	0	0.0	37	43.5	46	54.1	2	2.4
j. HazMat first responder-Operations Level (*N*=84)	1	1.2	15	17.9	31	36.9	34	40.5	3	3.6
k. HazMat Technician (*N*=85)	6	7.1	43	50.6	21	24.7	15	17.6	0	0.0
l. HazMat Specialist (*N*=85)	7	8.2	51	60.0	15	17.6	10	11.8	2	2.4
m. HazMat On-Scene Incident Commander (*N*=84)	5	6.0	27	32.1	23	27.4	27	32.1	2	2.4
n. First response (medical incidents) (*N*=81)	1	1.2	21	25.9	45	55.6	13	16.0	1	1.2
o. First aid and CPR (*N*=82)	1	1.2	7	8.5	52	63.4	21	25.6	1	1.2
p. EMT-Basic (*N*=86)	2	2.3	37	43.0	40	46.5	7	8.1	0	0.0
q. EMT-Intermediate (*N*=83)	2	2.4	63	75.9	16	19.3	2	2.4	0	0.0
r. EMT-Paramedic (*N*=81)	2	2.5	68	84.0	8	9.9	2	2.5	1	1.2
s. Use and limitations of personal protective equipment (*N*=85)	0	0.0	3	3.5	64	75.3	18	21.2	0	0.0

50. How satisfied were you in 1997 with the availability of training facilities (for training on ground ladders, live smoke and fire operations, apparatus operation, etc.) and members' understanding of the department's standards for training and operations? *(Circle one number for each statement.)*

		Very Satisfied		Somewhat Satisfied		Neither Satisfied Nor Dissatisfied		Somewhat Dissatisfied		Very Dissatisfied	
		Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
a.	Availability of training facilities (*N*=88)	24	27.3%	24	27.3%	5	5.7%	23	26.1%	12	13.6%
b.	Members' understanding of training & operation standards (*N*=88)	35	39.8	37	42.0	12	13.6	4	4.5	0	0.0

51. Which of the following, if any, describes your department's policies in effect in 1997 regarding training? *(Mark all that apply.)*

Number	Percent	(*N*=88)
67	76.1%	a. The department identified the training needs of individual members
66	75.0	b. The department ensured that members received the training that supported their individual needs
79	89.8	c. The department had an assigned training officer(s)
86	97.7	d. The department maintained fire fighter training records
50	56.8	e. The department measured the effectiveness of the training that it provided
57	64.8	f. The department assessed its members' proficiency in the subjects for which training was received
0	0.0	g. None of the above

52. What was the minimum number of fire fighters typically required by your department for performing duties in the hazardous area of structural fires in 1997? *(Mark one.)*

Number	Percent	(*N*=88)
8	9.1%	1. 1 to 3 fire fighters
48	54.5	2. 4 to 6 fire fighters
13	14.8	3. 7 to 9 fire fighters
19	21.6	4. 10 or more fire fighters

53. What innovative or effective methods regarding recruitment or use of personnel are used by your department or other departments you are aware of? *(Use additional sheet, if needed.)*

_____

REVENUES AND EXPENDITURES

54. From which of the following sources did your department receive revenues in 1997? Approximately what percent of your total revenues in 1997 came from each source? *(For each revenue source, circle "1" if you received revenues from that source and then indicate its approximate percentage of total revenues).*

Source	Received Some in 1997? Number	Percent	(*N*=85)	Approximate Percentage of Total Revenues Mean	Median	(*N*=76)
a. Property taxes	81	95.3%	(1) Yes	81.6%	95.0%	
b. Fees for services	35	41.2	(1) Yes	2.6	0.0	
c. Charitable gambling proceeds, e.g., pull tabs	16	18.8	(1) Yes	1.4	0.0	
d. Contributions from civic organizations (Lions Clubs, Jaycees, etc.)	34	40.0	(1) Yes	.7	0.0	
e. Revenue from events (softball tournaments, dances, etc.)	13	15.3	(1) Yes	.8	0.0	
f. Revenues from contracts for services	40	47.1	(1) Yes	6.5	0.0	
g. Reimbursements for services provided	17	20.0	(1) Yes	.9	0.0	
h. State aid that came to department, not to relief association	10	11.8	(1) Yes	1.4	0.0	
i. Other (*Please specify.*) _____	6	7.1	(1) Yes	4.2	0.0	
			========		100.0%	

	Number	Percent	(*N*=71)
j. Did your department receive in-kind contributions, such as gifts of equipment, in 1997? *(Mark one.)*	23	32.4%	1. Yes
	48	67.6	2. No

55. What were your department's total operating expenditures in 1997 (excluding capital purchases of apparatus, land, computer hardware or other capital expenses)?

Median	(*N*=83)
$500,000.00	Total operating expenditures

56. Which of the following items were included in your estimate of 1997 operating expenditures reported above? *(Mark all that apply.)*

Number	Percent	(*N*=82)
81	98.8%	a. Salaries, wages, or stipends paid to department members, contracted employees, and other department staff
57	69.5	b. Benefits (vacation, sick leave, etc.) paid to members and other staff
82	100.0	c. Supplies (e.g., office supplies, manuals, and equipment purchases not part of a capital purchase)
82	100.0	d. Training, drills, certification fees, and equipment used in training
70	85.4	e. Building space rental, maintenance, and utilities
81	98.8	f. Maintenance of vehicles and equipment
63	76.8	g. Administrative and overhead expenses (legal services, human resources services, etc.)
68	82.9	h. Insurance premiums
13	15.9	i. Other operating expenditures *(Please specify.)* _____

57. What do you estimate were your department's capital expenditures on purchases of apparatus over the most recent ten-year period of 1987-1997 (not adjusted for inflation)? (*N*=86)

Median	(*N*=75)	
$600,000		a. Total capital expenditures on apparatus and equipment (1987-1997)
Number	Percent	
11	12.8%	b. Unknown or unable to estimate

FIRE PREVENTION

This section of the survey is intended to be completed by the fire marshal, if one is designated. If the department has no fire marshal designated, the person completing the first section of this survey should also complete this section. In answering these questions, consider all staff who are either members of the department or its fire marshal office, or on contract with the department. Exclude staff, such as a building inspector, who is not a member of, or on contract to, the fire department.

PUBLIC EDUCATION

58. Approximately what percent of the population in your primary response area do you estimate received public education information or materials (including people reached by school programs, home inspections, fire safety information, etc.) from your department or its fire marshal office in 1997? *(Mark one.)*

Number	Percent	(*N*=86)
11	12.8%	1. 100 to 75 percent
18	20.9	2. 75 to 51 percent
21	24.4	3. 50 to 26 percent
31	36.0	4. 25 to 1 percent
5	5.8	5. Unknown or unable to estimate
0	0.0	6. Not applicable

59. Which of the following components of a public education program, if any, did your department or its fire marshal office have in 1997? *(Mark all that apply.)*

Number	Percent	(*N*=87)
51	58.6%	a. Identification of the most important local fire risks and hazards, and targeting of specific audiences based on community risks
57	65.5	b. Availability of a smoke detector program
84	96.6	c. Participation in the nationally observed annual Fire Prevention Week
78	89.7	d. Collaboration with school teachers and administrators in the fire prevention effort
73	83.9	e. Use of public education programs, tools, and literature available from other sources (NFPA's "Learn Not to Burn" program, a safe house, etc.)
34	39.1	f. Availability of materials published in languages spoken within the community
22	25.3	g. Monitoring of program's effectiveness on a routine basis
34	39.1	h. Designation of a public fire safety education officer, to coordinate all fire safety education programs, who meets professional qualifications in line with industry standards, such as NFPA 1035, *Standard for Professional Qualifications for Public Fire and Life Safety Educator*
69	79.3	i. Use of media and other community organizations for delivering fire safety messages
61	70.1	j. Availability and promotion of public education services and materials for use by individuals, businesses, and community organizations
21	24.1	k. Establishment of a program of fire-safety surveys in private homes
9	10.3	l. Other *(Please specify.)* _____
4	4.6	m. None of the above

60. Did your department or its fire marshal office have a juvenile fire-setter program in 1997? *(Mark one.)*

Number	Percent	(*N*=87)
44	50.6%	1. Yes
36	41.4	2. No
7	8.0	3. A juvenile fire-setter program was under development

INSPECTIONS/CODE ENFORCEMENT

61. Who was responsible for conducting fire code-related inspections in your primary response area in 1997? *(Mark one.)*

Number	Percent	(*N*=87)	
75	86.2%	1.	The fire department, its fire marshal, or an agency contracted by the fire department conducted some or all fire code-related inspections
10*	11.5	2.	Fire code-related inspections were conducted only by a county or city agency or some other agency not under contract with the fire department or part of the department's budget *(Go to Question 65.)*
2	2.3	3.	Fire code-related inspections were not conducted *(Go to Question 65.)*

62. Please circle the percentage of new and existing buildings and premises in your fire department's primary response area that your department or its fire marshal office inspected or from which you received documentation of code compliance during 1997. *(Circle "6" for not applicable if your department was not involved with that type of inspection. The following statements do not apply to single- and two-family homes and other occupancies where automatic fire-extinguishing systems are not required, or to hotels and other buildings under the State Fire Marshal's inspection jurisdiction.)*

		100 to 76%		75 to 51%		50 to 26%		25 to 6%		5% or less		N/A	
		#	%	#	%	#	%	#	%	#	%	#	%
a.	Percent of existing buildings that you inspected in 1997 (*N*=77)	6	7.8%	10	13.0%	24	31.2%	21	27.3%	13	16.9%	3	3.9%
b.	Percent of existing buildings from which you requested documentation of code compliance in 1997 (*N*=70)	5	7.1	6	8.6	15	21.4	16	22.9	13	18.6	15	21.4
c.	Percent of existing buildings from which you received documentation of code compliance in 1997 (*N*=70)	4	5.7	7	10.0	13	18.6	19	27.1	15	21.4	12	17.1
d.	Percent of new buildings constructed in 1997 for which you performed inspections or plan reviews (*N*=76)	55	72.4	7	9.2	7	9.2	3	3.9	2	2.6	2	2.6

63. Which of the following components of an inspection/code enforcement program, if any, did your department or its fire marshal office have in 1997 (excluding inspections conducted by the State Fire Marshal's Office of buildings such as schools, motels, nursing homes, etc.)? *(Mark all that apply.)*

Number	Percent	(*N*=76)	
53	69.7%	a.	Process for determining inspection priorities that targets life-safety and property hazards and specifies inspection frequency
27	35.5	b.	Establishment of job performance requirements for inspectors consistent with industry standards, such as NFPA 1031, *Standard for Professional Qualifications for Fire Inspector*
23	30.3	c.	Evaluation of inspectors based on their performance of job requirements, including scheduled field checks to determine the quality of inspections performed
71	93.4	d.	Collaboration with other agencies, such as a building inspections agency, involved in code administration and enforcement
60	78.9	e.	Interaction between code enforcement and fire suppression staff in developing prefire plans
57	75.0	f.	Consultation with a fire protection engineer when necessary for plan reviews, interpretations, and variances (through a staff fire protection engineer, a contract, or the State Fire Marshal)
36	47.4	g.	Establishment of a board of appeals to appeal orders issued under the fire code
66	86.8	h.	Retention for at least three years of records of each inspection made
1	1.3	i.	None of the above

*The analysis for questions 62-64 includes responses from 2 fire marshal offices that conducted code enforcement but were not included in their fire department budgets.

64. In which of the following ways, if any, was your department or its fire marshal office involved in the plan review process for new buildings constructed in your jurisdiction in 1997? *(Mark all that apply.)*

Number	Percent	(*N*=76)
60	78.9%	a. Participation in preconstruction meetings (taking place before construction plans were submitted)
68	89.5	b. Involvement in the plan review process once construction plans were submitted
58	76.3	c. Coordination of reviews with local building department and technical construction trades
50	65.8	d. Establishment of fire prevention sign-off authority on the construction permit
56	73.7	e. Participation in certificate of occupancy process
3	3.9	f. None of the above

INVESTIGATIONS

65. To what extent did your department or its fire marshal office rely on the State Fire Marshal's Office or local law enforcement for fire investigations in 1997? *(Circle one number for each line.)*

		Frequently		Sometimes		Rarely, If Ever	
		Number	Percent	Number	Percent	Number	Percent
a.	State Fire Marshal's Office (*N*=86)	20	23.3%	47	54.7%	19	22.1%
b.	Local law enforcement (*N*=85)	26	30.6	38	44.7	21	24.7

66. Of the total 1997 investigations of suspicious fire origins investigated by investigators from your department, approximately what percentage do you estimate were presented for prosecution? *(Mark one.)*

Number	Percent	(*N*=80)
2	2.5%	1. 100 to 81%
1	1.3	2. 80 to 61%
4	5.0	3. 60 to 41%
5	6.3	4. 40 to 21%
42	52.5	5. 20% or less
26	32.5	6. Not applicable because the State Fire Marshal's Office or local law enforcement conducted all criminal investigations

67. Which of the following components of an investigation program, if any, did your department or its fire marshal office have in 1997? *(Mark all that apply.)*

Number	Percent	(*N*=85)
65	76.5%	a. Guidelines for when to contact the State Fire Marshal
46	54.1	b. Establishment of general guidelines for conducting scene examinations, scene documentation, interviews and interrogation, post-incident investigations, and presentations of findings which are in line with industry standards, such as those outlined in NFPA 1033, *Standard for Professional Qualifications for Fire Investigator*
63	74.1	c. Ongoing training and professional information for investigators provided in the areas of investigation methodology, fire protection technology, and current code requirements
23	27.1	d. State Fire Marshal provided with a written statement of all the facts relating to the cause and origin of the fire within one week of fire's occurrence
77	90.6	e. Fire fighters instructed in aspects of arson scenes, how their actions impact the work of fire investigators, and cautionary measures they can take in the suppression, overhaul, and salvage of a fire scene
33	38.8	f. Fire fighters and peace officers from your jurisdiction jointly attended investigation training courses offered by the Bureau of Criminal Apprehension
3	3.5	g. None of the above

68. In approximately what percent of fires to which your fire department responded in 1997 would you estimate an investigator (including State Fire Marshal investigators) was on the scene of the fire immediately after the fire was extinguished (or earlier)? *(Mark one.)*

Number	Percent	(*N*=84)
17	20.2%	1. 100 percent
18	21.4	2. 90 to 99 percent
9	10.7	3. 80 to 89 percent
11	13.1	4. 70 to 79 percent
24	28.6	5. Less than 70 percent
5	6.0	6. Unknown or unable to estimate

69. How satisfied were you with the quality of the services your department or its fire marshal office provided in the following areas in 1997? *(Circle one response for each service; if your office did not offer that service, circle "6" for not applicable.)*

		Very Satisfied		Somewhat Satisfied		Neither Satisfied Nor Dissatisfied		Somewhat Dissatisfied		Very Dissatisfied		N/A	
		#	%	#	%	#	%	#	%	#	%	#	%
a.	Public education (*N*=86)	43	50.0%	28	32.6%	7	8.1%	5	5.8%	1	1.2%	2	2.3%
b.	Inspection/code enforcement (*N*=87)	35	40.2	24	27.6	10	11.5	4	4.6	6	6.9	8	9.2
c.	Investigation (*N*=87)	51	58.6	22	25.3	7	8.0	3	3.4	0	0.0	4	4.6

70. What innovative or effective methods regarding fire prevention activities are used by your department or other departments you are aware of? *(Use additional sheet, if needed.)*

_____

71. Do you have any additional comments?

_____

Thank you for completing this survey!

Please return the completed survey in the postage-paid envelope by November 25th to:

Legislative Auditor's Office
Centennial Building - First Floor South
658 Cedar Street
St. Paul, MN 55155

Or fax to: 651/296-4712

Fire Services: A Best Practices Review

Survey of Minnesota Fire Departments

Office of the Legislative Auditor

Thank you for answering this survey of fire departments. Most of the questions pertain to the 1997 calendar year. We recognize that some questions may refer to data that you do not routinely collect, but we encourage you to provide us with estimated answers where you may not have precise data. Direct questions about the survey to Jody Hauer at 651/296-8501.

Please return the completed survey in the enclosed postage-paid envelope by November 25, 1998.

Name: _____ Phone: _____

1. How was your fire department structured in 1997? *(Mark one box.)*

Number	Percent	(*N*=304)
276	90.8%	1. Municipal department
20	6.6	2. Private nonprofit organization
5	1.6	3. Special fire protection district
3	1.0	4. Other *(Please specify.)* _____

We received responses from 307 of a sample of 454 volunteer or on-call departments in areas under 8,000 population, for a response rate of 67.6 percent.

2. Did any of the following apply to your department in 1997? If so, please list the cities and townships involved. *(Circle one number and list communities if applicable.)*

		Yes		No	
		Number	Percent	Number	Percent
a.	My department operated under a joint powers agreement (Cities and towns involved:) (*N*=298)	42	14.1%	256	85.9%
b.	My department was a consolidated department (Cities and towns involved:) (*N*=298)	11	3.7	287	96.3
c.	My department provided services by contract (Cities and towns involved:) (*N*=298)	214	71.8	84	28.2
d.	A joint powers agreement or consolidation was under development (Cities and towns involved:) (*N*=297)	3	1.0	294	99.0

3. Did your department have in place in 1997 a preventive maintenance program for apparatus and equipment that prescribed routine, scheduled maintenance? *(Mark one.)*

Number	Percent	(*N*=306)
231	75.5%	1. Yes
51	16.7	2. No
24	7.8	3. Preventive maintenance program was under development

4. Did your department have in place in 1997 a replacement plan for capital purchases that estimated the expected replacement year of apparatus based on their expected life cycles and their costs? *(Mark one.)*

Number	Percent	(*N*=305)
120	39.3%	1. Yes
147	48.2	2. No
38	12.5	3. Replacement plan was under development

5. What purchasing arrangements has your department used in the past 10 years to purchase pumpers, ladder trucks, tankers, brush trucks, or other apparatus? *(Mark all that apply.)*

Number	Percent	(*N*=301)	
211	70.1%	a.	Developed specifications and selected vendors through bidding process
106	35.2	b.	Bought or leased vehicles through the Federal Excess Property Program
6	2.0	c.	Purchased apparatus jointly with another department
2	0.7	d.	Used lease arrangement with another department
173	57.5	e.	Used contributions from civic organizations or charitable gambling proceeds in making the purchase
14	4.7	f.	Received apparatus in exchange for service provided by contract
54	17.9	g.	Other (*Please specify*.) _____

6. How many fire fighters, fire officers, and other staff were in your fire department or on contract to the department at the end of 1997? *(Exclude any staff, such as a building inspector, who was not a member of, or on contract to, the fire department.)* (*N*=305)

Number of Responding Departments		Number of Fire Fighters and Officers Mean	Number of Fire Fighters and Officers Median	Number of Other Staff (include support staff, if any) Mean	Number of Other Staff (include support staff, if any) Median	TOTAL Mean	TOTAL Median
1	a. Full-time career members	(1) 0.0	0.0	(2) 0.0	*	(3) 0.0	0.0
186	b. Members earning stipend, hourly or on-call wage	(1) 11.0	2.0	(2) 0.2	0.0	(3) 11.2	2.0
144	c. Volunteers earning pension but no compensation for responses	(1) 10.1	0.0	(2) 0.1	0.0	(3) 10.2	0.0
21	d. Volunteers earning neither compensation nor pension	(1) 1.0	0.0	(2) 0.1	0.0	(3) 1.0	0.0

(Mark one response for each statement.)

e. The chief's position was a paid one

Number	Percent	(*N*=306)	
196	64.1%	1.	Yes
110	35.9	2.	No

f. City or county inspectors (who were not fire department members or on contract through the department) performed building inspections

Number	Percent	(*N*=273)	
67	24.5%	1.	Yes
206	75.5	2.	No

7. Which of the following, if any, did your fire department have in place for fire suppression, hazardous materials response, or technical rescue activities in 1997? *(Circle a number in each column if the practice was available for that service and your department offered the service. If your department did not offer hazmat or technical rescue services, mark the appropriate box below and circle responses only for the services you offered.)* (*N*=298)

Number	Percent		
145	48.7%	1.	We did not offer hazardous materials responses
124	41.6	2.	We did not offer technical rescues

*Too few responses to report median.

Question 7, continued ...

Practice	Fire Suppression Number	Fire Suppression Percent	Hazardous Materials Number	Hazardous Materials Percent	Technical Rescue Number	Technical Rescue Percent
a. Written emergency response plan that defines the fire department's roles during the incident	159	53.4%	70	23.5%	54	18.1%
b. Written standard operating guidelines for conducting the services	165	55.4	69	23.2	59	19.8
c. Risk assessment for rescue needs and target hazards in the community	97	32.6	42	14.1	33	11.1
d. Minimum staffing level requirements according to OSHA and FEMA standards	112	37.6	46	15.4	31	10.4
e. Written pre-incident plans specified for all fire risks, target hazards, or potential rescue needs	84	28.2	39	13.1	33	11.1
f. Specialists (or contracts with them) to perform services in the event fire department does not provide service	39	13.1	47	15.8	23	7.7
g. None of the above	39	13.1	46	15.4	53	17.8

8. Which of the following activities were included in your department's mutual aid associations or automatic aid agreements during 1997? *(Circle "1," "2," or both numbers to indicate whether you provided and/or received mutual aid. Circle "3" if the activity was not included in your mutual aid.)* (*N*=301)

Number	Percent	
7	2.3%	1. We did not participate in mutual aid or automatic aid

Activity	Provided Mutual Aid Number	Provided Mutual Aid Percent	Received Mutual Aid Number	Received Mutual Aid Percent	Not Part of Mutual Aid Number	Not Part of Mutual Aid Percent
a. Fire suppression	279	92.7%	250	83.1%	5	1.7%
b. Technical rescues	106	35.2	109	36.2	160	53.2
c. First responders	156	51.8	127	42.2	118	39.2
d. Emergency Medical Services (EMS) Basic or Advanced Life Support	74	24.6	99	32.9	177	58.8
e. Hazardous materials responses	56	18.6	77	25.6	204	67.8
f. Enforcement of fire codes and/or related local ordinances, inspections	22	7.3	26	8.6	258	85.7
g. Fire investigations	33	11.0	55	18.3	224	74.4
h. Fire safety awareness efforts	76	25.2	43	14.3	213	70.8
i. Public relations activities	78	25.9	35	11.6	214	71.1
j. Training courses or seminars	158	52.5	149	49.5	106	35.2
k. Drills and exercises	201	66.8	180	59.8	75	24.9
l. Use of specialized equipment or apparatus	132	43.9	129	42.9	135	44.9
m. Use of facilities	123	40.9	98	32.6	160	53.2
n. Cooperative purchasing arrangements	23	7.6	24	8.0	267	88.7
o. Other *(Please specify.)*	0	0.0	1	0.3	293	97.3

9. How satisfied were you with the following characteristics of your 1997 mutual aid? *(Circle one number for each characteristic or circle "6" if the characteristic was not available.)*

Characteristics	Very Satisfied #	Very Satisfied %	Somewhat Satisfied #	Somewhat Satisfied %	Neither Satisfied Nor Dissatisfied #	Neither Satisfied Nor Dissatisfied %	Somewhat Dissatisfied #	Somewhat Dissatisfied %	Very Dissatisfied #	Very Dissatisfied %	Not Available #	Not Available %
a. Access to or reaching additional fire fighters (*N*=300)	239	79.7%	39	13.0%	13	4.3%	3	1.0%	2	0.7%	4	1.3%
b. Coordination of fire fighters from multiple departments (*N*=297)	186	62.6	75	25.3	25	8.4	5	1.7	0	0.0	6	2.0
c. Use of apparatus/equipment from other departments (*N*=295)	204	69.2	55	18.6	28	9.5	1	0.3	0	0.0	7	2.4
d. Communication among departments (*N*=299)	135	45.2	94	31.4	40	13.4	22	7.4	4	1.3	4	1.3
e. Availability of staffing for prolonged or extraordinary incidents (*N*=287)	123	42.9	71	24.7	53	18.5	6	2.1	2	0.7	32	11.1
f. Response by other departments to your requests for aid (*N*=299)	252	84.3	32	10.7	10	3.3	1	0.3	0	0.0	4	1.3

10. Approximately what was your fire department's average response time in minutes to incidents in your primary response area in 1997 (starting from the time companies were alerted to the time a full response unit arrived at the scene)? *(Fill in only <u>one</u> response. Fill in a. unless your department only records response times from the time a call comes in to the dispatcher, instead of the time firefighters are alerted.)* (*N*=292)

Median (*N*=179)
7.0 Minutes

a. Average response time starting from time companies were alerted

OR

Median (*N*=50)
8.0 Minutes

b. Average response time starting from the time the call came in to the dispatcher

Number	Percent	
63	21.6%	c. Unknown or unable to estimate

11. For each of the following services, approximately how many person-hours of staff time were spent in 1997, and how many responses did the department make? Also indicate whether your department charged fees for any of these services. *(If necessary, please check your records to verify number of hours and responses; if you do not record hours or number of responses, mark the "Don't Know" column. Include hours for fire marshal staff and support staff, where applicable, but exclude staff, such as city building inspectors, who were not part of or on contract with your department.)* (*N*=291)

Service	Total Person-Hours Median	Total Responses or Events Median	Did Not Offer Number	Did Not Offer Percent	Don't Know Number	Don't Know Percent	Department Charged Fees Number	Department Charged Fees Percent
a. Fire suppression	213.0 (*N*=192)	13.0 (*N*=218)	0	0.0%	40	13.7%	93	32.0%
b. False alarms	14.0 (*N*=156)	3.0 (*N*=173)	8	2.7	49	16.8	17	5.8
c. Technical rescues[I] (e.g., vehicle extrications, water/ice rescues, etc.)	35.5 (*N*=132)	3.0 (*N*=145)	73	25.1	27	9.3	31	10.7
d. EMS - First[II] Responders	120.0 (*N*=89)	27.0 (*N*=107)	112	38.5	36	12.4	11	3.8

[I] Medians may differ slightly from actual because two respondents included EMS-First Responders activities in their estimates for technical rescues.

[II] Medians may differ slightly from actual because several respondents included BLS, ALS, and/or technical rescues in their estimates for EMS-First Responders.

Question 11, continued ...

Service	Total Person-Hours Median	Total Responses or Events Median	Did Not Offer Number	Did Not Offer Percent	Don't Know Number	Don't Know Percent	Department Charged Fees Number	Department Charged Fees Percent
e. EMS - Basic Life[III] Support response services	150.0 (*N*=21)	46.5 (*N*=18)	218	74.9	16	5.5	1	0.3
f. EMS - Basic Life[IV] Support transport	2.0 (*N*=5)	1.0 (*N*=5)	249	85.6	12	4.1	3	1.0
g. EMS - Advanced Life Support response services	*	*	263	90.4	6	2.1	0	0.0
h. EMS - Advanced Life Support transport	*	*	263	90.4	7	2.4	1	0.3
i. Hazardous materials response	0.0 (*N*=98)	0.0 (*N*=100)	72	24.7	27	9.3	11	3.8
j. Code enforcement (inspections and plan reviews)	10.0 (*N*=42)	3.0 (*N*=35)	199	68.4	12	4.1	1	0.3
k. Fire investigations	8.0 (*N*=78)	2.0 (*N*=75)	105	36.1	40	13.7	2	0.7
l. Public education (e.g., school programs, fire-safe house)	20.0 (*N*=172)	(N/A)	40	13.7	35	12.0	0	0.0
m. Emergency management services	10.0 (*N*=56)	(N/A)	93	32.0	46	15.8	(N/A)	
n. Public relations activities	20.0 (*N*=132)	(N/A)	42	14.4	54	18.6	(N/A)	
o. Apparatus/equipment maintenance	60.0 (*N*=177)	(N/A)	7	2.4	59	20.3	(N/A)	
p. Building/grounds maintenance	30.0 (*N*=118)	(N/A)	39	13.4	61	21.0	(N/A)	
q. Hydrant maintenance/ inspection	10.0 (*N*=83)	(N/A)	88	30.2	46	15.8	(N/A)	
r. Reduction of flammable brush/vegetation	13.0 (*N*=62)	(N/A)	97	33.3	41	14.1	(N/A)	
s. Training and drills	441.0 (*N*=202)	(N/A)	2	0.7	45	15.5	(N/A)	
t. Administration	60.0 (*N*=136)	(N/A)	20	6.9	64	22.0	(N/A)	
u. Support staff (not assigned to a specific service)	0.0 (*N*=44)	(N/A)	79	27.1	62	21.3	(N/A)	
v. Standby time	10.0 (*N*=77)	(N/A)	46	15.8	73	25.1	(N/A)	
w. Other *(Please specify below.)* _____	57.0 (*N*=23)	(N/A)	17	5.8	27	9.3	0	0.0
x. TOTALS	894.0 (*N*=237)	32.5 (*N*=222)						

* Too few responses to report median.

[III] Medians may differ slightly from actual because several respondents included EMS-First Responders, BLS transport, and/or ALS activities in their estimates for BLS response services. The person-hours median includes some numbers that are estimates based on a ratio of person-hours for BLS response services to person-hours for BLS transport.

[IV] Medians exclude those responses that did not separate time spent on BLS transport from time spent on EMS-First Responders, BLS response, or ALS activities.

12. How consistently did the following characterize your department's interactions with volunteers or on-call members in 1997? *(Circle one number for each statement.)*

	Characteristic	Consistently		Sometimes		Rarely, If Ever	
		Number	Percent	Number	Percent	Number	Percent
a.	Provided recognition to volunteers for jobs well done (such as in newsletters, at banquets, with press releases, etc.) (*N*=282)	64	22.7%	137	48.6%	81	28.7%
b.	Took steps to maintain a good reputation and positive image to keep volunteers interested, such as maintaining apparatus and equipment as a point of pride (*N*=287)	173	60.3	108	37.6	6	2.1
c.	Leadership used a management style that encouraged member participation (*N*=284)	161	56.7	102	35.9	21	7.4
d.	Stated an explicit mission and goals so volunteers knew what to expect (*N*=283)	121	42.8	126	44.5	36	12.7
e.	Used a process for communicating relevant information so members were informed (*N*=285)	178	62.5	95	33.3	12	4.2
f.	Used standard procedures for dealing equitably with grievances (*N*=276)	108	39.1	92	33.3	76	27.5
g.	Required training that was relevant and fit the volunteers' time availability (*N*=283)	198	70.0	78	27.6	7	2.5
h.	Offered monetary incentives per hour, per call, or as a stipend (*N*=280)	133	47.5	24	8.6	123	43.9
i.	Offered medical, death, or disability benefits to its volunteers (*N*=276)	158	57.2	17	6.2	101	36.6
j.	Offered a retirement or pension plan for its volunteers (*N*=287)	265	92.3	1	0.3	21	7.3
k.	Used a recruitment plan that was structured according to the department's personnel needs (*N*=281)	130	46.3	77	27.4	74	26.3

13. Did your department offer or require training for all members expected to perform the following services in 1997? *(Circle"1" if training was offered or required. If your department did not offer that service, circle "2.")* (*N*=302)

	Service	Training Offered or Required		Did Not Offer Service	
		Number	Percent	Number	Percent
a.	Structural and vehicle fires	293	97.0%	0	0.0%
b.	Wildland fires	232	76.8	60	19.9
c.	Operating apparatus	298	98.7	2	0.7
d.	Maintenance of apparatus and equipment	262	86.8	20	6.6
e.	Public education	162	53.6	54	17.9
f.	Inspection/code enforcement	58	19.2	211	69.9
g.	Fire investigation	126	41.7	117	38.7
h.	Technical rescues	184	60.9	77	25.5
i.	HazMat first responder-Awareness Level	219	72.5	73	24.2
j.	HazMat first responder-Operations Level	90	29.8	197	65.2
k.	First response (medical incidents)	191	63.2	106	35.1
l.	First aid and CPR	255	84.4	38	12.6
m.	EMT-Basic	91	30.1	202	66.9
n.	EMT-Intermediate	21	7.0	266	88.1
o.	EMT-Paramedic	11	3.6	274	90.7
p.	Use and limitations of personal protective equipment	254	84.1	34	11.3

14. On the average, of those volunteers or on-call members contacted for incidents in 1997, what percentage would you estimate responded to an average incident? *(Circle one.)* (*N*=301)

	100 to 81%		80 to 61%		60 to 41%		40 to 21%		20% or Less		N/A	
	#	%	#	%	#	%	#	%	#	%	#	%
Percentage of volunteers responding when contacted	36	12.0%	127	42.2%	114	37.9%	18	6.0%	2	0.7%	4	1.3%

15. What was the retention rate of volunteers in your department over the past five years (1993 - 1997), disregarding retirements due to age or injury? *(Circle one.)* (*N*=293)

	100 to 81%		80 to 61%		60 to 41%		40 to 21%		20% or Less		N/A	
	#	%	#	%	#	%	#	%	#	%	#	%
Retention rate	173	59.0%	64	21.8%	15	5.1%	13	4.4%	21	7.2%	7	2.4%

16. From which of the following sources did your department receive revenues in 1997? Approximately what percent of your total revenues in 1997 came from each source? *(For each revenue source, circle "1" if you received revenues from that source and then indicate its approximate percentage of total revenues.)*

Source	Received Some in 1997?			Approximate Percentage of Total Revenues	
	Number	Percent	(*N=293)*	Mean	Median (*N*=243)
a. Property taxes	229	78.2%	(1) Yes	53.5%	60.0%
b. Fees for services	123	42.0	(1) Yes	4.4	0.0
c. Charitable gambling proceeds, e.g., pull tabs	114	38.9	(1) Yes	8.1	0.0
d. Contributions from civic organizations (Lions Clubs, Jaycees, etc.)	94	32.1	(1) Yes	2.4	0.0
e. Revenue from events (softball tournaments, dances, etc.)	85	29.0	(1) Yes	3.3	0.0
f. Revenues from contracts for services	164	56.0	(1) Yes	23.1	5.0
g. Reimbursements for services provided	57	19.5	(1) Yes	1.3	0.0
h. State aid that came to department, not to relief association	48	16.4	(1) Yes	1.7	0.0
i. Other (*Please specify.)* _____	31	10.6	(1) Yes	2.2	0.0

	Number	Percent	(*N*=276)
j. Did your department receive in-kind contributions, such as gifts of equipment, in 1997? *(Mark one box.)*	42	15.2%	1. Yes
	234	84.8	2. No

17. What were your fire department's total operating expenditures in 1997 (excluding capital purchases of apparatus, land, computer hardware or other capital expenses)?

Mean	Median	(*N*=257)
$39,461.00	$29,500.00	Total operating expenditures

18. Which of the following items were included in your estimate of 1997 operating expenditures reported above? *(Mark all that apply.)*

Number	Percent	(*N*=259)
183	70.7%	a. Salaries, wages, or stipends paid to department members, contracted employees, other department staff
16	6.2	b. Benefits (vacation, sick leave, etc.) paid to members and other department staff
240	92.7	c. Supplies (e.g., office supplies, manuals, and equipment purchases not part of a capital purchase)
253	97.7	d. Training, drills, certification fees, and equipment used in training
190	73.4	e. Building space rental, maintenance, and utilities
253	97.7	f. Maintenance of vehicles and equipment
179	69.1	g. Administrative and overhead expenses (legal services, human resources services, insurance, etc.)
20	7.7	h. Other operating expenditures *(Please specify.)* _____

19. What do you estimate were your department's capital expenditures on purchases of apparatus over the most recent ten-year period of 1987-97 (not adjusted for inflation)? (*N*=295)

Mean	Median	(*N*=217)	
$166,890.63	$120,000.00	a.	Total capital expenditures on apparatus and equipment (1987-97)

Number	Percent		
78	26.4%	b.	Unknown or unable to estimate

20. Which of the following components of a public education program, if any, did your department have in 1997? *(Mark all that apply.)*

Number	Percent	(*N*=300)	
100	33.3%	a.	Identification of the most important local fire risks and hazards, and targeting of specific audiences based on community risks
114	38.0	b.	Availability of a smoke detector program
229	76.3	c.	Participation in the nationally observed annual Fire Prevention Week
204	68.0	d.	Collaboration with school teachers and administrators in the fire prevention effort
136	45.3	e.	Use of public education programs, tools, and literature available from other sources (NFPA's "Learn Not to Burn" program, a safe house, etc.)
46	15.3	f.	Availability of materials published in languages spoken within the community
23	7.7	g.	Monitoring of program's effectiveness on a routine basis
32	10.7	h.	Designation of a public fire safety education officer, to coordinate all fire safety education programs, who meets professional qualifications in line with industry standards, such as NFPA 1035, *Standard for Professional Qualifications for Public Fire and Life Safety Educator*
134	44.7	i.	Use of media and other community organizations for delivering fire safety messages
57	19.0	j.	Availability and promotion of public education services and materials for use by individuals, businesses, and community organizations
18	6.0	k.	Establishment of a program of fire-safety surveys in private homes
10	3.3	l.	Other *(Please specify.)* _____
35	11.7	m.	None of the above

21. Which of the following components of an inspection/code enforcement program, if any, did your department have in 1997 (excluding inspections conducted by the State Fire Marshal's Office of buildings such as schools, hotels, nursing homes, etc.)? *(Mark all that apply.)*

Number	Percent	(*N*=194)	
137	70.6%	a.	An inspection/code enforcement program was not provided by the fire department nor contracted through it
13	6.7	b.	Process for determining inspection priorities that targets life-safety and property hazards and specifies inspection frequency
4	2.1	c.	Establishment of job performance requirements for inspectors consistent with industry standards, such as NFPA 1031, *Standard for Professional Qualifications for Fire Inspector*
3	1.5	d.	Evaluation of inspectors based on their performance of job requirements, including scheduled field checks to determine the quality of inspections performed
38	19.6	e.	Collaboration with other agencies, such as a building inspections agency, involved in code administration and enforcement
28	14.4	f.	Interaction between code enforcement and fire suppression staff in developing prefire plans
28	14.4	g.	Consultation with a fire protection engineer when necessary for plan reviews, interpretations, and variances (through a staff fire protection engineer, a contract, or the State Fire Marshal)
3	1.5	h.	Establishment of a board of appeals to appeal orders issued under the fire code
18	9.3	i.	Retention for at least three years of records of each inspection made
9	4.6	j.	Other (*Please specify*.) _____

22. Which of the following components of an investigation program, if any, did your department have in 1997? *(Mark all that apply.)*

Number	Percent	(*N*=289)	
211	73.0%	a.	Guidelines for when to contact the State Fire Marshal
54	18.7	b.	Establishment of general guidelines for conducting scene examinations, scene documentation, interviews and interrogation, post-incident investigations, and presentations of findings which are in line with industry standards, such as those outlined in NFPA 1033, *Standard for Professional Qualifications for Fire Investigator*
41	14.2	c.	Ongoing training and professional information for investigators provided in the areas of investigation methodology, fire protection technology, and current code requirements
53	18.3	d.	State Fire Marshal provided with a written statement of all the facts relating to the cause and origin of the fire within one week of fire's occurrence
158	54.7	e.	Fire fighters instructed in aspects of arson scenes, how their actions impact the work of fire investigators, and cautionary measures they can take in the suppression, overhaul, and salvage of a fire scene
26	9.0	f.	Fire fighters and peace officers from your jurisdiction jointly attended investigation training courses offered by the Bureau of Criminal Apprehension
184	63.7	g.	The department relied heavily on the State Fire Marshal's Office for investigations
27	9.3	h.	None of the above

23. What innovative or effective methods regarding fire suppression, rescues, first response or EMS, hazmat, mutual aid, or fire prevention activities are used by your department or other departments you are aware of? *(Use additional sheets if needed.)*

24. Do you have any additional comments?

Thank you for completing this survey!

Please return the completed survey in the postage-paid envelope by November 25th to:

Legislative Auditor's Office
Centennial Building - First Floor South
658 Cedar Street
St. Paul, MN 55155

Or fax to: 651/296-4712

A Checklist for Measuring Performance

APPENDIX B

This appendix describes the measures we used to evaluate the performance of fire departments for our study. It also offers a checklist of performance measures that fire departments may wish to use in assessing their own performance. We first explain briefly the importance of measuring performance and the process for doing so. Then we list the measures of performance we identified for this review, many of which we used in our analysis. Fire departments that measure their performance may choose to use these measures or develop ones of their own.

THE VALUE OF PERFORMANCE MEASUREMENT

Fire departments that develop goals, objectives, and performance measures are able to evaluate the level of services they provide. They analyze information on their departments' impact, efficiency, and effectiveness. Performance data provide a record of the value a fire department offers for the dollars it expends.

Fire departments that measure their performance over time will have information to quantify their achievements as well as identify areas needing improvement. Performance data show the actual results of fire departments' actions. They allow fire departments to demonstrate their real needs with verifiable data on workload, personnel, and other resources, which can be helpful in justifying budget requests, charting a direction for the department's future, and suggesting changes in service.

It is important to note that, when done correctly, measuring the performance of any government function, including fire services, is a sizable task. It requires resources and time for identifying the mission and goals of the department, developing yardsticks to measure performance, actually recording all the department's activities, and then analyzing what is measured. An automated system helps in the collection, recording, and analysis of data. To provide useful information, evaluating performance must be done consistently and over time; it is not something to do quickly or only once. Further, support for performance measurement must come from fire department leadership if the data are to provide meaningful help in setting direction for the department.

Defining a Mission, Goals, Objectives, and Measures

Before evaluating its performance, a fire department should define its mission. A fire department's mission describes its fundamental purpose and programs. This is the foundation from which a department's goals, objectives, and performance measures come.

The next step is setting goals. Goals are broad statements that outline the outcomes a fire department intends to produce. For fire departments, goals should cover all aspects of their service—whether it is fighting fires, educating the public on fire safety, providing emergency medical services, conducting rescues, or other activities.

After articulating its mission and goals, a fire department sets objectives for what it hopes to achieve and by when. Objectives are typically very specific and measurable, targeted to individual activities or programs, and they relate directly to the department's goals. For example, in line with a general goal to provide fire education materials to school students, a fire department's objective might be to increase by 5 percent the number of third graders demonstrating knowledge of appropriate actions to take when confronted by a fire, as determined by testing.

Then, to determine how well it is meeting its objectives, a fire department has to develop

measures of its performance. The measures are quantifiable and are typically one of four types: measures of outputs, outcomes, efficiency, and cost-effectiveness. "Output" measures are usually simple counts of services, such as the number of calls for fire suppression in a given year. The "outcome" measures indicate the actual results of fire department actions. An example might be the high percentage of incidents to which the fire department responded within an acceptable response time. "Efficiency" measures look at costs (in terms of dollars, personnel, or time) per output. One example of an efficiency measure is expenditures per number of fire calls in a year. Finally, "cost-effectiveness" measures assess costs per unit of outcome. An example is expenditures per number of incidents responded to within an acceptable response time.

PERFORMANCE MEASURES FOR FIRE SERVICES

We identified numerous performance measures related to the five goals and seven actions recommended in Chapter 2. We based the measures on state statutes and rules, as well as on recommendations of national organizations such as the National Fire Protection Association and the International Association of Fire Chiefs.

Because the measures we used in this study are also usable by individual fire departments, we arranged them below in a way that allows fire departments to review their own performance. In some measures used during our analysis, we compared fire departments to statewide median rankings, such as the number of fire fighter hours spent on fire-safety education. For these measures, fire departments making their own evaluations may compare their actions to their individual baseline data instead of statewide data. That is, to measure changes a department would compare its number of fire-safety education hours one year to that in a subsequent year.

We list the following measures in an order that corresponds to the seven actions we recommend in Chapter 2. We have converted them to a "yes or no" format to make it easier for fire departments to apply to their own performance; questions answered "yes" indicate the fire department meets that performance measure. Some measures may relate to several of the actions we recommend. For instance, having adequate health and safety practices applies both to our Action 6 related to supporting safe operations and to Action 7 related to preparing for on-scene responses.

This is not a comprehensive list of all measures to review fire department performance, and fire departments may wish to supplement it with appropriate measures of their own. A final caveat: Because fire departments did not collect data for some of these measures, we used most, but not all, of them in this study.

Checklist of Performance Measures

1. Action: Assess risks and develop long-range plans.

These performance measures relate to the need for assessing the risks of fire and other emergencies in the response area and developing long-range plans for the fire department based on the identified risks and on community resources.

	Measure	Yes	No
A.	Has the fire department written a long-range strategic plan that looks out at least three years into the future? The plan should be based on a risk analysis of the response area and contain (1) financial and strategic planning for personnel, apparatus, and fire stations and (2) contingency plans to guarantee service in the event of a disaster.	❑	❑

Action 1, continued ...

	Measure	Yes	No
B.	Are fire stations sufficient in number and located in areas that permit the fire department to respond to all points within its response area in an acceptable response time for 90 percent of the calls? (One NFPA rule of thumb for response times is 8 minutes from receipt of alarm to when an initial attack team is on the scene; for volunteer, non-staffed stations, the rule of thumb is about 12 minutes.)	❑	❑
C.	For fire departments in areas with municipal water systems, has the fire department been involved and satisfied with the process for planning and providing water supplies for fire protection in the response area?	❑	❑
D.	Has the ISO credit for water supply been maintained at or improved to acceptable levels (the credit includes measures of fire flow capacity, hydrant spacing, water storage and pumping capacity)?	❑	❑
E.	Do all fire pumper apparatus properly match local road conditions and local fire fighting pumper performance needs (such as gallon per minute ratings, tank capacities and discharge rates, hose and nozzle loads)?	❑	❑
F.	Does the fire department have a replacement plan for capital purchases that provides for future acquisitions and estimates the expected replacement year of apparatus based on their projected life cycles and costs?	❑	❑
G.	Are the fire department's capital expenditures per capita over the past ten years at or below the median for similar departments in the region (or, alternatively, within acceptable levels in the community)?	❑	❑
H.	Are the fire department's capital expenditures per capita over the past ten years at or below the median for similar fire departments in the region that have properly matched their pumper apparatus to local road conditions and pumper performance needs?	❑	❑
I.	Does the fire department have a systematic process of determining road and fire fighting performance requirements that can be used in developing bid specifications for purchasing department vehicles?	❑	❑

2. Action: Evaluate fire department performance and use resources cost-effectively.

The following performance measures relate to evaluating the fire department's response activities and its overall performance over time. They also refer to the extent of the fire department's involvement with mutual aid activities and examination of alternative service-delivery mechanisms.

	Measure	Yes	No
A.	Does the fire department take steps throughout the year to evaluate the effectiveness and efficiency of its activities?	❑	❑
B.	Does the fire department keep a log of on-scene activities at emergency incidents?	❑	❑
C.	Does the fire department maintain an information system (such as a computer program or regularly updated manual system) to record and retrieve information on fire department activities?	❑	❑
D.	Does the fire department conduct postincident analyses and debriefings following emergency responses to identify what to either change or reinforce in future responses?	❑	❑

Action 2, continued ...

	Measure	Yes	No
E.	Has the fire department developed a formal program of setting goals and objectives and measuring its progress toward meeting those goals?	❑	❑
F.	Has the fire department used alternative means of purchasing apparatus (pumpers, ladder trucks, tankers, grass rigs, other vehicles) such as acquiring vehicles either in exchange for services delivered by contract, or jointly with another fire department, or through the Federal Excess Property Program, or via bids developed in collaboration with other fire departments?	❑	❑
G.	Are the fire department's total expenditures per capita at or below the median for similar departments in the region (or, alternatively, within acceptable levels in its community)?	❑	❑
H.	Are the fire department's total expenditures per emergency response at or below the median for similar departments in the region (or, alternatively, within acceptable levels in its community)?	❑	❑
I.	For those responses made within acceptable response times, are the fire department's number of work hours spent per incident, and the expenditures per incident, at or below the median for other fire departments responding to similar incidents?	❑	❑
J.	Does the fire department participate in a mutual aid association and, if so, does it conduct joint operations using standard operating guidelines agreed to by participating departments?	❑	❑
K.	Are all of the fire departments' active members familiar with mutual aid procedures, equipment, standard operating guidelines, and safety measures?	❑	❑
L.	Does the fire department and its mutual aid association offer interagency training on an ongoing basis?	❑	❑
M.	Has the fire department and its mutual aid association agreed on a standard approach to incident command?	❑	❑
N.	Has the fire department designated radio frequencies and standard radio procedures for interdepartmental communications with those departments for whom mutual aid is commonly provided?	❑	❑
O.	Has the fire department and its mutual aid association agreed to operate with written agreements that address: incident command responsibility, jurisdictional issues, insurance coverage, legal responsibilities, and standardized communications systems and protocols?	❑	❑
P.	Is the fire department highly satisfied with its ability through mutual aid to: receive access to additional fire fighters; coordinate fire fighters from multiple departments; get access to apparatus or equipment from other departments; allow for effective communication; and provide quick, effective response to its requests for aid?	❑	❑
Q.	For fire departments satisfied with the effectiveness of their mutual aid arrangements, is the fire department's expenditures per capita at or below the median for similar departments in the region satisfied with the effectiveness of their mutual aid (or, alternatively, within acceptable levels in its community)?	❑	❑
R.	Does the fire department participate with its mutual aid association in: educating the public about fire safety, making cooperative purchases of equipment, jointly using specialized equipment or apparatus and facilities, investigating fires, and providing other specialized services?	❑	❑

3. Action: Promote public awareness of fire safety.

These indicators measure fire departments' activities regarding public education on fire safety.

	Measure	Yes	No
A.	Are the fire department's fire-safety awareness efforts based on local fire risks and hazards it identified in the community?	❑	❑
B.	Are the fire department's fire-safety messages targeted to specific audiences?	❑	❑
C.	Does the fire department conduct activities in conjunction with the annual Fire Prevention Week in October?	❑	❑
D.	Does the fire department collaborate with local teachers and school administrators on fire education programs?	❑	❑
E.	Does the fire department use public-education materials and literature available from other sources, such as NFPA's "Learn Not to Burn," a safe-escape house owned by another department or group, etc.?	❑	❑
F.	Does the fire department provide fire-safety materials in languages other than English if they are spoken within the community?	❑	❑
G.	Does the fire department monitor its education programs on an ongoing basis to determine their effectiveness?	❑	❑
H.	Has the fire department designated a fire-safety public education officer who coordinates education programs and who meets professional qualifications (such as those specified by NFPA 1035, *Standard for Professional Qualifications for Public Fire and Life Safety Educator*)?	❑	❑
I.	Does the fire department use a variety of media to convey fire-safety messages and use other community organizations as partners in delivering the messages?	❑	❑
J.	Does the fire department's education program include activities with businesses, such as instructing employees on fire-safety practices?	❑	❑
K.	Does the fire department offer voluntary fire-safety surveys for private residences?	❑	❑
L.	Does the fire department participate in an intervention program to prevent repeat behavior by juvenile fire setters?	❑	❑
M.	Does a high percentage of the population in the fire department's response area receive fire-safety messages on an ongoing basis?	❑	❑
N.	Does a high percentage of people receiving the fire-safety messages understand what the fire department conveyed, as measured through mechanisms such as citizen surveys or tests administered before and after the instruction?	❑	❑
O.	Is the fire department highly satisfied with the quality of the services provided for public fire-safety awareness?	❑	❑
P.	Is the rate of fire incidents per capita at or below the median rate for similar communities in the region?	❑	❑
Q.	Is the number of fire fighter work hours spent on fire-safety education activities at or above the median hours for similar fire departments in the region (or, alternatively, within acceptable levels in its community)?	❑	❑
R.	Are the fire department's expenditures per capita on fire-safety education at or below the median for similar departments in the region that have reached a high percentage of their populations with fire prevention messages (or, alternatively, within acceptable levels in the community)?	❑	❑

4. Action: Ensure fire code enforcement.

The measures below help evaluate the effectiveness and efficiency of ensuring fire-code inspection and enforcement.

	Measure	Yes	No
A.	Do a high percentage of the buildings covered by the fire code receive inspections by the fire department or local building inspectors within a time cycle established locally?	❑	❑
B.	Does the fire department or local building inspectors set code inspection priorities among life-safety hazards and property hazards in the community?	❑	❑
C.	If directly involved with code inspections, has the fire department established job performance requirements for its inspectors, and does it offer training in line with professional qualifications (such as those specified by NFPA 1031, *Standard for Professional Qualifications for Fire Inspector*)?	❑	❑
D.	If directly involved with code inspections, does the fire department evaluate inspectors based on their performance, including scheduled field checks to assess the quality of inspections performed?	❑	❑
E.	If directly involved with code inspections, do fire department fire-code inspectors routinely gather prefire planning information to share with other fire fighters for use when responding to fires?	❑	❑
F.	If directly involved with code inspections, do fire department fire-code inspectors emphasize educating building owners on fire safety as well as enforcing code provisions?	❑	❑
G.	If directly involved with code inspections, do fire department fire-code inspectors participate in preconstruction meetings, review construction plans for compliance with fire codes, participate in the sign-off for construction permits and certificates-of-occupancy, and coordinate reviews with local building officials and design professionals?	❑	❑
H.	If directly involved with code inspections, does the fire department retain records of all inspections and their dispositions for at least three years?	❑	❑
I.	If directly involved with code inspections, is the number of fire-code inspections per hour of inspection activities at or above the median number for fire departments in the region with similar building structures (or, alternatively, within acceptable levels in the community)?	❑	❑
J.	Does the fire department collaborate with other agencies involved with code administration and enforcement, such as a local building inspection agency?	❑	❑
K.	Does the fire department consult with a fire protection engineer, when necessary, for plan reviews, interpretations, and variances (through a staff fire protection engineer, by contract, or the State Fire Marshal Division)?	❑	❑
L.	Does the fire department or local building inspector work to ensure that code violations are corrected within a reasonable time after providing initial notice of the violations?	❑	❑
M.	If directly involved with requesting occupancies to document code compliance, does the fire department receive a high percentage of code compliance documentation?	❑	❑
N.	Is a board of appeals in place allowing building owners to appeal orders issued pursuant to the fire code?	❑	❑
O.	Is the fire department highly satisfied with the quality of fire-code inspection and enforcement activities?	❑	❑
P.	Is the rate of fires low in occupancies inspected for fire-code provisions within a locally set time cycle?	❑	❑

5. Action: Develop effective communications systems.

The following measures relate to fire departments' communication abilities and systems. They apply to communication within the department, and they apply to communication between the department and individuals and organizations outside it.

	Measure	Yes	No
A.	Is the fire department highly satisfied with its system for alerting members to respond to an incident?	❑	❑
B.	Is the fire department highly satisfied with the ability of its communications system (telephones, radio base station equipment, two-way radios, pagers, etc.) to perform without excessive delays or interference in emergencies as well as in normal daily activities?	❑	❑
C.	Is the fire department's communication system adequate to allow emergency responses to fires, EMS calls, and other incidents within acceptable response times?	❑	❑
D.	Is the fire department highly satisfied with the ability of its communications system to transmit and receive information between incident commanders and department members and among mutual aid departments?	❑	❑
E.	Is the fire department's communication system adequate to allow fire department responses that contain flames to the room of origin in a high percentage of structure fires?	❑	❑
F.	Does the fire department use standard operating guidelines for radio communications with common terminology and integrated radio frequencies?	❑	❑
G.	Does the fire department include a written description of its communications system with standard protocols for transmitting messages in its incident management system and response plans (which are drawn up in advance of actual emergencies)?	❑	❑
H.	Does the fire department have access to mobile command units or similar arrangements to provide a central emergency communications point for prolonged incidents?	❑	❑
I.	Does the fire department actively and regularly communicate with others outside the department, including local elected officials, utility companies, fire-related associations, law enforcement, local water and building agencies, and school officials?	❑	❑

6. Action: Prepare a competent work force and support safe operations.

The following measures relate to fire fighter recruitment and retention, training, and personal protective equipment. They also refer to necessary procedures and guidelines for safety.

	Measure	Yes	No
A.	For fire departments with volunteer or on-call members, has the fire department's recruitment process provided it with a sufficient number of on-call or volunteer members located within an area that allowed them to promptly respond to calls?	❑	❑
B.	For fire departments with volunteer or on-call members, does the fire department consistently receive an adequate number of volunteer or on-call members responding when contacted for incidents?	❑	❑
C.	For fire departments with volunteer or on-call members, does the fire department have a high retention rate of its active members?	❑	❑
D.	For fire departments with volunteer or on-call members, does the fire department identify what encourages members to continue and what causes them to resign through means such as formally surveying members, conducting exit interviews when they opt to resign, or consistently following procedures designed to help members resolve problems?	❑	❑
E.	For fire departments with volunteer or on-call members, does the fire department provide recognition to members for jobs well done (in newsletters, at banquets, etc.)	❑	❑
F.	For fire departments with volunteer or on-call members, does the fire department maintain a good reputation and positive image to keep members interested (such as maintaining apparatus in prime condition as a point of departmental pride)?	❑	❑
G.	For fire departments with volunteer or on-call members, does fire department leadership consistently exhibit a management style that encourages member participation?	❑	❑
H.	For fire departments with volunteer or on-call members, has the fire department stated an explicit mission and goals so members know what to expect?	❑	❑
I.	For fire departments with volunteer or on-call members, does the fire department follow a process for communicating relevant information so members stay informed about department business?	❑	❑
J.	For fire departments with volunteer or on-call members, does the fire department consistently follow procedures to deal equitably with grievances?	❑	❑
K.	For fire departments with volunteer or on-call members, does the fire department require training that is relevant and fits volunteers' time availability to the extent possible?	❑	❑
L.	For fire departments with volunteer or on-call members, does the fire department offer incentives in the form of monetary compensation, medical or disability benefits, or retirement or pension plans?	❑	❑
M.	Has the fire department developed a recruitment program based on its identified ongoing personnel needs?	❑	❑
N.	Is the fire department highly satisfied that its recruitment process produces candidates able to perform the required duties?	❑	❑
O.	Does the fire department offer or require training that prepares members in all areas of service in which they are expected to perform and that is based on the types of risks in the response area?	❑	❑
P.	Does the fire department offer or require ongoing training in any specialized services that fire fighters perform, such as hazardous materials responses or emergency medical services?	❑	❑

Action 6, continued ...

	Measure	Yes	No
Q.	Does the fire department identify the training needs of individual members and ensure they receive the training to support those needs?	❑	❑
R.	Has the fire department designated training officers, and does it maintain fire fighter training records?	❑	❑
S.	Does the fire department measure the effectiveness of the training offered or assess members' proficiency after receiving training?	❑	❑
T.	Is the fire department highly satisfied with its members' understanding of department standards for training and operations?	❑	❑
U.	Is the fire department highly satisfied with the availability of training facilities for various training and drills, including use of ground ladders, live smoke and fire operations, and apparatus operation?	❑	❑
V.	Does the fire department follow written protocols describing safety procedures designed to limit the risk of exposure to infectious and hazardous substances during responses?	❑	❑
W.	Does the fire department provide to all personnel adequate personal protective equipment designed for the tasks they are expected to perform?	❑	❑
X.	Does the fire department offer or require training on the use and limitations of personal protective equipment?	❑	❑
Y.	Does the fire department designate a safety officer at all incidents?	❑	❑
Z.	Does the fire department designate a health and safety officer to manage the department's safety program?	❑	❑
AA.	Does the fire department require physical examinations and periodic medical exams for members on active duty?	❑	❑
BB.	Does the fire department follow a system for monitoring the whereabouts of fire fighters during incidents and has it developed rapid intervention protocols to assist injured fire fighters?	❑	❑
CC.	Does the fire department require that only trained and qualified fire fighters drive and operate department apparatus?	❑	❑
DD.	During its responses, does the fire department consistently maintain the number of fire fighters required to operate in atmospheres that are immediately dangerous to life and health?	❑	❑
EE.	Do fire department members have access to stress debriefing following critical or traumatic incidents?	❑	❑
FF.	Are the fire department's expenditures per capita at or below the median for similar fire departments that consistently follow safety procedures and maintain the required number of fire fighters in immediately dangerous atmospheres?	❑	❑
GG.	Is the fire department's ratio of fire fighter injuries to incidents at or below the median of similar fire departments in the region (or, alternatively, within acceptable levels in the community)?	❑	❑
HH.	Is the training offered or required by the fire department adequate to allow fire fighters to respond to emergencies within acceptable response times?	❑	❑
II.	Is the training offered or required by the fire department adequate to allow fire department responses that contain flames to the room of origin in a high percentage of structure fires?	❑	❑

7. Action: Plan for on-scene responses.

The following measures relate to the advance planning and activities required to operate successfully at emergency incidents. They also include measures for fire investigations and maintenance of equipment and apparatus.

	Measure	Yes	No
A.	Does the fire department have an incident management system that details department roles and activities during fire suppression and other emergency incidents? The incident management system should include: designation of incident commander and other roles for completing functions at the scene, standard operating guidelines for radio and other communication, plans for interagency coordination, and provisions for managing reserve personnel and equipment. Further, all fire fighters should be trained in the incident management system, and it should be periodically reviewed and updated.	❑	❑
B.	Does the fire department have written standard operating guidelines for fire suppression as well as any other emergency service its members may be expected to perform?	❑	❑
C.	Do the fire department's standard operating guidelines include provisions for: designating an incident commander and other on-scene duties, maintaining the predetermined minimum number of fire fighters for effective operations, developing preattack plans, accounting for fire fighter whereabouts and conducting search and rescue on the fire ground, resting fire fighters during operations, ongoing communications, using available water supplies, overhaul and salvage or mop up, and recording and reporting information.	❑	❑
D.	For fire departments providing rescue services, emergency medical services, hazardous materials management, or other specialized services, has the fire department: assessed the risks and target hazards in the response area for those services? written emergency response plans describing department responsibilities and members' roles during responses? consistently maintained the number of fire fighters required to effectively provide the response? developed preincident plans for responding to target hazards and identified risks?	❑	❑
E.	Does the fire department have contacts with adequately trained and equipped personnel to conduct rescues, emergency medical services, hazardous materials management, or other specialized services, if the department does not itself provide these services?	❑	❑
F.	Has the fire department written, and periodically updated, preincident plans for the targeted fire risks and hazards in its response area?	❑	❑
G.	Do the fire department's preincident plans for fire suppression contain the following information: identification of fire risks and hazards; current maps with property boundaries, roads, and means of access and egress; building floor plans, site plans, or maps of specific hazards; location of on-site fire control equipment; occupancy information for high-hazard buildings; fire flow needs, hydrant locations, and primary and back-up water supplies; location of airports and airstrips if needed for wildland fire fighting; lists of cooperating agencies and contact names; and lists of reserve personnel and equipment and mutual aid resources.	❑	❑
H.	Does the fire department use a preventive maintenance program for its apparatus and equipment with routine, scheduled maintenance in accordance with manufacturers' recommendations?	❑	❑

Action 7, continued ...

	Measure	Yes	No
I.	Does the fire department's preventive maintenance program include the following: providing routine maintenance following a set checklist (checking fluid levels, tire pressure, etc.), keeping complete records of repairs and service; conducting inspections of apparatus and equipment within 24 hours of their use; making regular service tests on pumper engines and other apparatus; maintaining a system of inventory control for equipment; scheduling and budgeting for replacing equipment as needed; and conducting regular service tests of ground ladders, hoses, and other equipment?	❑	❑
J.	Does the fire department's preventive maintenance program complete 100 percent of the maintenance scheduled within a year?	❑	❑
K.	Does the fire department have adequate protective clothing and self-contained breathing apparatus for its fire fighters, including personal equipment such as fire shelters and portable radios for wildland fire fighters?	❑	❑
L.	Does the fire department have an adequate personal alert safety system or alternative to warn others when a fire fighter is incapacitated?	❑	❑
M.	Does the fire department have adequate hose for standard attack and large diameter hose?	❑	❑
N.	Does the fire department have adequate extrication tools, hydraulic tools, torches, and hand tools for cutting, striking, and prying?	❑	❑
O.	In areas with limited water supplies, does the fire department have adequate year-round water drafting sites, portable pumps, and portable drop or folding water tanks?	❑	❑
P.	Are the fire department's equipment and advance planning adequate to allow fire fighters to respond to emergencies within acceptable response times?	❑	❑
Q.	Are the fire department's equipment and advance planning adequate to allow the number of work hours per incident to be at or below the median for other fire departments responding to similar types of incidents in the region?	❑	❑
R.	For fire investigations, does the fire department have predetermined guidelines for when to contact the State Fire Marshal Division?	❑	❑
S.	Has the fire department established fire investigation guidelines for conducting scene examinations and documenting scenes, interviewing witnesses, conducting postincident investigations, and presenting analyses and findings?	❑	❑
T.	Does the fire department offer or require ongoing training for investigators in investigation methodology, fire protection technology, and current fire code requirements?	❑	❑
U.	Does the fire department provide the State Fire Marshal Division with written statements of facts on the cause and origin of the fire within one week of the fire's occurrence?	❑	❑
V.	Does the fire department offer or require instruction for fire fighters in: aspects of arson scenes, how their actions impact the work of investigators, and cautionary measures they can take in suppression, overhaul, and salvage to aid the investigation?	❑	❑
W.	Does the fire department offer or require joint investigation training with local law enforcement?	❑	❑
X.	Is the fire investigator on the scene immediately after the fire was extinguished (if not before) for a high percentage of fire investigations?	❑	❑
Y.	Is the fire department highly satisfied with the quality of fire investigation activities?	❑	❑
Z.	Is a high percentage of investigations of suspicious fires presented for prosecution?	❑	❑

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