
Fire Services

A Best Practices Review

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,

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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.

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

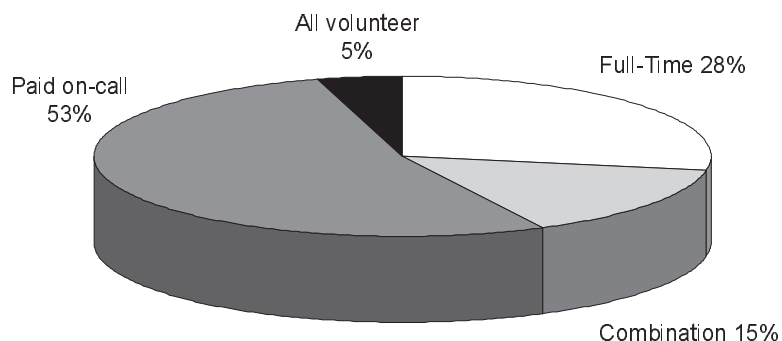
53 percent, and all-volunteer departments about 5 percent of the population.

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

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.

the use and limitations of personal protective equipment. Fire departments should periodically appraise fire fighters' performance to help identify training needs and improve operations.

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

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.

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.

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.