

A STAFFING PLAN FOR MINOOKA FIRE PROTECTION

A Staffing Plan for Minooka Fire Protection District

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CERTIFICATION STATEMENT

I hereby certify that this paper constitutes my own product, that where the language of others is set forth, quotation marks so indicate, and that appropriate credit is given where I have used the language, ideas, and expressions, or writings of another.

Signed: _____

Abstract

The purpose of this research was to determine how Minooka Fire Protection District will resolve the problem of no established future staffing plan. A descriptive method of research was used to explore current staffing levels of the District, what national, state or local standards exist to help establish a fire department staffing plan, what are some recognized practices other departments use to determine staffing, and what combination staffing of volunteer and full-time has proven effective in growing departments.

The procedures for conducting this research included literature review of fire service periodicals and business journals. Use of the Zoomerang on-line program surveyed departments throughout Illinois using the Illinois Fire Chiefs Association and Illinois Association of Fire Protection District's email and notification network.

This research concluded that the District currently falls under National Fire Protection Association (NFPA) recommendation 1720 due to the majority population of the District's Firefighters currently in a volunteer status. Because the District is transitioning into additional career firefighters, and at some point in the future will have a majority population of career firefighters, the District must be striving to meet the NFPA 1710 recommendation. District staffing during the transition between 1720 and 1710 must be based on analysis of the local fire problem and demand on the District staffing during the typical call for service. The District must further research the longevity of a combination volunteer and career fire department based on volunteer retention rate and the District's ability to fund career firefighters.

The District knows future station plans and apparatus assignments to future stations and must now determine what the staffing of apparatus will be. Once apparatus staffing is known,

optimal station staffing is known. The District can then better determine overall staffing based on future stations and shifts.

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A Staffing Plan for Minooka Fire Protection District

Introduction

Minooka Fire Protection District currently does not have an established staffing plan to address the future staffing needs in a growing community. There is considerable debate and discussion in the fire service and fire service organizations about what staffing levels should be in general terms across the nation. The International Association of Firefighters, the National Fire Protection Association, and the International Association of Fire Chiefs have all debated the subject and produced documents that address staffing and deployment; however, it continues to be an issue that while debated at the national level, most affect local communities when faced with a seriously declining economy.

Local communities must determine what the staffing level will be when using a combination (paid, volunteer and part-time) staffing model and considering local economics, i.e. the taxpayer's ability and willingness to pay for the service. The current problem is that due to continuing, significant growth, and declining volunteer availability Minooka Fire Protection District does not have an established staffing plan on how the Fire District will need to staff the organization in the future. During this project, research will answer the following questions:

What national, state or local standards exist to help establish a fire department staffing plan?

What are some recognized practices other departments use to determine staffing?

What, if any, combination staffing of volunteer, part-time, and full-time has proven effective in growing departments?

Background and Significance

Minooka Fire Protection District, organized in 1955, is an Illinois Fire Protection District. The Minooka Volunteer Fire Department, which currently exists as a civic fraternal group of volunteer firefighters, is an Illinois certified non-profit corporation. The volunteer department provided fire protection in town and in the rural areas around the Village of Minooka before this organization became a legal special municipality under the statutes of Illinois. In the original organization, it was strictly a fire department and did not provide emergency medical service.

Volunteers, who provided all operations in 1955 until the mid 90's, came to the station when the fire whistle blew. The volunteers who arrived at the station from their homes and businesses responded to fire and medical calls and then returned to their regular lives. From 1955 until 2002, the District operated out of one fire station located in downtown Minooka.

Review of records and conversations with trustees indicates that in the 1990's the Fire District determined that the call volume for emergency medical calls was increasing to a point that volunteers were not able to respond in a prompt enough manner. The Fire District made the decision to contract with an outside service that provides paramedics to staff the District owned ambulances. The District provides two EMT-I's for a ten-hour day when volunteers were typically not available. In 1995, the District increased this staffing to provide two paramedics twenty-four hours a day schedule to operate the advanced life support ambulance.

For six years, the District staffed the ambulance with the contractual paramedics and in 2001 added a third paramedic. In 2001, the District also created the first part-time, paid-on-premise position that was a firefighter/EMT or firefighter only, which essentially created an engineer for the apparatus, providing a driver for the apparatus.

In 2002, the District finished construction on a second fire station, made it operational with the addition of a part-time position and added a third contract paramedic which provided 24-hour staffing of five between two stations. At this point, station two was staffed with two paramedics, running an ambulance only, and three firefighter/paramedics running as a “jump company”, meaning they jumped from the ambulance to the engine depending on the call type, and waited for a fourth person, a volunteer to arrive to respond.

An additional position added in 2004 allowed for a staffing of six on the shift, and allowing station one to have four personnel and, therefore better filling out the engine. Research of staffing studies in other communities helped in the drafting of this proposal.

The District found in 2006 that volunteers and outside hires could not support four part-time positions and hired three full-time EMT-B’s through the staffing contract service and cut back the part-time to three positions.

In 2007, the District did not add staffing but transitioned from using the contractual staffing service to hiring District employed firefighter/paramedics and shift lieutenants. Today, in 2009, the District maintains a staffing of eight on duty that is comprised of a staffing of District employees, contractual workers, and part-time employees.

A staffing plan is significant for Minooka Fire District because one currently does not exist. The District has added personnel when they generally believed we needed to add people, in an effort to meet some study, recommendation, or response requirement; however, nothing exists in writing or adoption based on empirical data and research to tell the District government and administration when staffing should be increased or how it should be managed.

The impact of not having an established staffing plan in the past has not been a concern, mostly because the community and the District remained relatively small and uncomplicated.

Volunteers and a minimal crew on-duty could provide medical service and fire protection safely and effectively for a community considered mostly rural and a bedroom community. The present impact is not significant to the District; the current staffing levels are appropriate when considering that the economy has slowed and almost halted growth in the District.

The future impact of not having a staffing plan is significant and could have negative effects on our service delivery if not addressed now. The slowed economy and all but halted growth has given the District an opportunity to breathe and consider current resources, and future operations and staffing. Minooka Fire District's comprehensive station plan is in process and calling for as many as five stations when the District is mostly developed. Currently, approximately 75% of the District remaining is undeveloped, and an estimated 75,000 – 100,000 people yet to move into the District in the next twenty years. In the future, satellite stations will staff six firefighters, including one lieutenant. One can do the math, five fire stations multiplied by six firefighters, multiplied by three shifts equals a minimum of ninety firefighters working shifts in stations, not including support staff, administrative staff and others. There will be a negative impact on the District's operations in the future if the District does not establish a staffing plan.

The relation of this research problem to the United States Fire Administrations (USFA) mission is to provide a solid foundation for our District to provide proper staffing of emergency services for the local community, in order to provide safe and effective prevention, preparedness and response. More specifically problem relates to the USFA mission with concern to its stated goal #3, to “improve the fire and emergency services’ capability for response to and recovery from all hazards” (United States Fire Administration [USFA], n.d.). The District wants to insure

we have the staffing levels appropriate to meet the service demands of our community so that we can properly respond to “all hazards” we may encounter.

This applied research project will focus on how the Fire District can best prepare a staffing plan for the future operations of the District. To plot this course, research will investigate what other departments are doing to plan their future staffing, review national initiatives, studies and recommendations on staffing, and look at other combination departments to identify successful staffing plans when using a combination of volunteer, paid and part-time personnel.

This project uses a descriptive research method. Currently there is no established staffing plan. Data collection will help determine how the District can best establish a staffing plan that includes sound, tested examples and supported criteria for establishing the plan that we will eventually create.

Literature Review

This literature review included periodicals obtained through the National Fire Academy Learning Resource Center (LRC) while on campus. The author used the research service of the Learning Resource Center, when no longer on campus. This is a service that any student of the National Fire Academy can use by requesting the LRC to conduct an article search on items related to a research topic. The author used books from local libraries, as well as college texts and books from the author’s personal professional library for research. Use of the Internet provided considerable research, using the search engines of www.google.com, and www.yahoo.com.

When using a search engine, the keywords “fire department staffing”, “fire department deployment”, “apparatus staffing”, and “combination fire department staffing” yielded on-line articles and information. The literature review led to new sources. Use of keywords of “OSHA

two-in/two-out”, and “NIOSH firefighter fatalities” led to valuable research. The United States Fire Administration Learning Resource Center on-line card catalog was used extensively as well using similar keywords as used in internet search engines.

Obviously, our profession of fire protection yields a significant amount of periodicals on the trade. Review of periodicals such as Fire Engineering, Fire Command and Firehouse for their content on staffing provided valuable information. These periodicals were very helpful in directing research toward other studies and recommendations such as the Insurance Service Office, the National Fire Protection Association and studies on staffing.

It was interesting to find that staffing has become a tremendous topic of discussions, debate, and litigation between unions and municipalities. “Staffing must be considered a liability issue. A department or locality can be held liable if it can be proven that the lack of sufficient staffing caused an accident” (Reeves, 2006, p. 106). It cites the reason for this is the existence of the National Institute for Occupational Safety and Health (NIOSH) weighing in on this issue by identifying “lack of staffing”. A NIOSH study the District used in previous presentations for staffing included NIOSH report F2002-40.

In NIOSH report F2002-40, a 53-year-old firefighter died while fighting a house fire. This report states the following apparatus with personnel responded, “Rescue Squad—1 Fire Fighter/paramedic and 1 Fire Fighter (Rapid Intervention Team [RIT]), Engine 1—Captain (Incident Commander [IC]) and 2 Fire Fighters, Aerial Platform Truck—Fire Fighter #1 and the victim (driver), Engine 2—Lieutenant and 1 Fire Fighter/Emergency Medical Technician” (National Institute for Occupational Safety and Health [NIOSH], May, 14, 2003) which is a total of nine personnel on initial arrival. This also indicates that there were two firefighters on the rescue, three firefighters on Engine #1, two firefighters on the truck, and two firefighters on

Engine #2. The NIOSH F2002-40 investigation report recommends “not fewer than 12 fire fighters and 1 chief officer”, and further indicates,

NFPA 1710 § 5.2.2 recommends that a minimum acceptable fire company staffing level should be four members responding on or arriving with each engine and each ladder company responding to this type of low-hazard fire. NFPA 1710 §5.2.1.1 states the following: "On-duty fire suppression personnel shall be comprised of the numbers necessary for fire-fighting performance relative to the expected fire-fighting conditions. These numbers shall be determined through task analyses that take the following factors into consideration: life hazard to the populace protected, provisions of safe and effective fire-fighting, performance conditions for the fire fighters, potential property loss, nature, configuration, hazards, and internal protection of the properties involved, types of fireground tactics and evolutions employed as standard procedure, type of apparatus used, and results expected to be obtained at the fire scene (NIOSH, May, 14, 2003)

This literature led to the question of what does NFPA 1710 have to say about the “minimal acceptable fire company staffing level” and how does it apply to our organization. Our District has access to the NFPA codes on-line. The District's on-line NFPA subscription gave access to research NFPA 1710. Review of 1710 indicates, “This standard contains minimum requirements relating to the organization and deployment of fire suppression operations, emergency medical operations, and special operations to the public by substantially all career fire departments” (National Fire Protection Association [NFPA], 2004).

“Substantially” is a relatively general term, so research becomes necessary to determine if Minooka Fire Protection District, with a combination of career, part-time and volunteer meets

the definition of “substantially”. An internet search was conducted first on “substantially” and that yielded no clear definition; Webster’s on-line dictionary was not clear other than to reference the word “largely”, which still does not answer the question of what number make one “substantially” something or other. On-line research discovered a document by Ray Crouch, Sr. University of Tennessee, Fire Management Consultant entitled “What’s all the Confusion about NFPA 1710?” In this article, Mr. Crouch addresses this word “substantially” with regard to NFPA 1710, “there is no specific definition of the word in the standard, nor is there any reference to a combination fire department. The conclusion that I draw from this is that you are going to have to choose between career and volunteer and be willing to defend how you picked the one that you did” (Crouch, pg. 5)).

Mr. Crouch went on in his article to supply some questions that he believed a fire department should ask to help determine if a department should comply with 1710,

1. On a fire scene, within the first ten minutes, are there more volunteer or career firefighters present?
2. Do career firefighters supplement the volunteers?
3. Do volunteer firefighters supplement the career firefighters?
4. How many career firefighters do you have and how many volunteers? (C/V)
5. Can the first attack line be advanced into a structure without volunteers?
6. What percentages of calls are run exclusively by career firefighters?
7. How many firefighters come from a fire station or from home?
8. Is the staff being paid an hourly wage when responding to calls?

A firefighter would have to live in a bubble not to have heard about NFPA 1710 and its closest related standard, 1720. Mr. Crouch also references both standards. Going back to the on-line codes, a research of the 1720 literature ensued.

The NFPA 1720 on-line document reviewed was entitled “Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Volunteer Fire Departments 2004 Edition” and is the most current edition provided by the NFPA. Once again, NFPA 1720 states, “this standard contains minimum requirements relating to the organization and deployment of fire suppression operations, emergency medical operations, and special operations to the public by substantially all volunteer fire departments” (NFPA, 2004).

Later it will be necessary to review both NFPA 1710 and 1720 to determine which standard applies to Minooka Fire Protection District. It is; however, necessary to review what each document indicates as staffing. Due to the considerable size of both documents, the literature review was narrowed to what each document specifically included about staffing. NFPA 1710 under section 5.2.2 states,

On-duty fire suppression personnel shall be of the numbers necessary for fire-fighting performance relative to the expected fire-fighting conditions: life hazard to the populace protected, provisions of safe and effective fire-fighting performance conditions for the fire fighters, potential property loss, nature, configuration, hazards, and internal protection of the properties involved, types of fireground tactics and evolutions employed as standard procedure, type of apparatus used, and results expected to be obtained at the fire scene” (2004).

The standard goes on to state that there shall be a chief officer dispatched, a company officer who is considered a part of the company and that each engine company shall be comprised of four personnel, and a ladder company shall be comprised of four personnel except in high-hazard, high incident and various other localities where staffing should be increased to five to six, and any other companies that support the engine and ladder truck operations shall be staffed with a minimum number as determined by the local fire department (2004).

NFPA 1720 under section 4.1 is much less comprehensive about staffing. Section 4.3 outlines “staffing and deployment” and states, “The fire department shall identify minimum staffing requirements to ensure that a sufficient number of members are available to operate safely and effectively” (NFPA, 2004, Sec. 4.3). NFPA 1720, Section 4.3.2 provides a chart with reference to “demand zone”, “demographics”, “staffing and response time” and “percentage”, to guide the staffing and response needs must establish the department’s demand zone, demographics of the department’s protection area and then by determining this information the department can conclude what percentage of time they need to meet the required staffing and response time numbers. NFPA 1720 further states below the section 4.3.2. table that, “upon assembling the necessary resources at the emergency scene, the fire department should have the capability to safely commence an initial attack within 2 minutes 90 percent of the time” (2004).

An article published in 2001 reported on a study of staffing requirements in Auburn, Alabama. The experiment used four scenarios to “test crew size/time relationship” (Lawrence, 2001, p. 207). Several scenarios created in Auburn tested the capability of size of firefighting crews from two to six firefighters and the time it would take them to complete the various evolutions. This study began to help consider the staffing of future apparatus and weigh the need against the economical ability of the city to pay for the staffing. The study derived from the

Auburn Fire Department operations, “the first step in the process is for the organization under study to define the operational environment, its mission, and the level of service to be provided to support the mission statement” (Lawrence, p. 205). In order to better define the evolutions around the type of incidents Auburn Fire Department would respond to, Lawrence looked at historical data, “the next step in the analysis was to describe the fire problem specific to Auburn. The Auburn study indicated that in their research there was,

A propensity for fire service valuers to advocate testing for effectiveness in scenarios that are large, complex and divers. Such tests might be appropriate in some venues where a review of historical requirement and projections of future demands so indicate.

However, applying these results universally also opens the fire service to charges of “empire building” if the model used is inevitably the conflagration or complex fire rather than the simple, sing-family dwelling, “room-and-contents” fires with which most suburban fire organizations deal”.

Lawrence’s approach was to review historical data of the fire in Auburn. After reviewing historical data and running live tests Lawrence concluded that there is a point of, “diminishing return apparatus as the numbers go up on each exercise, i.e. four were never twice as effective as two and in some cases six firefighter are barely quicker than three” (Lawrence, 2001, p. 210).

Lawrence concluded that based on the historical data of the Auburn fire problem the test that most fit the fire problem,

Required a very short period of time to complete in any staffing scenario. The improvement in performance time from two to three firefighter staffing was consistent with the other experiments, but the total time improvement was only about 20 seconds” (Lawrence, 2001, p. 210).

The Auburn study offer some general recommendations that included,

The more hands available, the quicker the task is completed (to a point), more complex tasks require more people, elevation makes everything harder when firefighter have to move themselves, equipment and victims up and down floors, the environment is critical (weather, humidity, etc.), leadership (of the company) makes the difference. (Lawrence, 2001, p. 213)

The Insurance Service Office (ISO) is such a large part of fire departments focus when working toward a goal of reducing the property loss risk in communities. ISO grades a department on their fire protection capability and develops a grade that insurance companies use to set insurance property premiums. A review of the *ISO Fire Suppression Rating Scale* was conducted to determine their standards for staffing. ISO states, “Existing company personnel is the average number of fire fighters and company officers on duty for existing companies determined by the following criteria” (ISO Properties, Inc, 2003, p. 29). The document then goes on to outline the different types of criteria, which includes “on-duty strength”, “call and volunteer members”, “automatic-aid responses”, etc. It is a calculation of how many companies are required to respond within the community and then how they are staffed. It is a mathematical equation method that give ISO the number of personnel required according to their standard. The ISO document makes only one clear statement about staffing, “the department shall have sufficient membership to assure the response of at least 4 members to fires in structures. The chief may be one of the 4 responding members” (ISO Properties, Inc, p. 2)

The International Association of Fire Chiefs Volunteer and Combination Officer Section has been instrumental in preparing several ribbon reports. One of those reports is “Lighting the Path of Evolution-The Red Ribbon Report Leading the Transition in Volunteer and Combination

Fire Department” (2005). This report provides the reader with a study on what it takes for a leader to move from an all volunteer department into a combination of volunteer and career. The entire report centers on the idea of staffing, and what that model looks like, “what is the appropriate level and menu of emergency service to be offer in the community? How do we assure that those services are delivered reliably? If not by volunteers, then by whom” (International Association of Fire Chiefs Volunteer and Combination Officer Section [IAFC - VCOS], 2005, p. 1). The report goes on to discuss staffing options and how a fire department may choose to staff their department, based on the needs of the community, “departments can follow a progressive path that leads from a completely volunteer-staffed organization to one that is staffed by some combination of volunteer and paid personnel. A department can stop anywhere along the path when that step leads to satisfactory resolution of the community’s fire department problem” (IAFC - VCOS, p. 6).

The IAFC-VCOS report also refers to NFPA 1720, “sample performance goals include number of certified/qualified firefighters assembled on scene within a defined time period” (pg. 7). The report further discusses what the report calls “the benefits/risks of the common system designs” (IAFC - VCOS, 2005, p. 11). The report advises that a combination department, as is Minooka Fire District can provide,

- Enhanced staffing deployment as combination systems can capitalize on both the stability of a paid system and the manpower of the volunteer system during a major emergency, providing greater depth for staffing.
- Salary cost avoidance, which can free funds for essential equipment and apparatus.

- True integration of available resources and distribution of talent resulting in greater efficiency.

The IAFC-VCOS report addresses deployment but stops short recommending or advising a staffing level for a department or individual apparatus. The report does state, “It is imperative that leadership does not compare and try to create a system emulating large departments. Focus on what your department should be and create a model that is effective and efficient for your community” (IAFC - VCOS, 2005, p. 14). Much like the Lawrence article on the Auburn study, the IAFC-VCOS report states, “Deployment should take into account a means of getting the proper staffing, needed tools, and required resources to a predetermined location to effectively and efficiently mitigate the emergency” (IAFC - VCOS, p. 15). Regarding proper staffing levels, the report make a “note” stating, “A good reference for assisting in determining respond and delivery times is NFPA 1720...” (IAFC - VCOS, p. 15).

In November 2008, the National Institute for Occupation Safety and Health (NIOSH) published a report as the result of a study entitled NIOSH Firefighter Fatality Study and Prevention Program. The report is the summary of 1,286 recommendations made by NIOSH in the 335 firefighter fatality investigations it conducted from 1998 through 2005. In the report, NIOSH makes the following recommendations with regard to staffing,

- Ensure that at least four firefighters are on the scene before initiating interior fire-fighting operations at a structure fire: two-in and two-out.
- Ensure that adequate fire control forces and fire suppression equipment are on the scene and available for deployment for fire control activities.
- Ensure that adequate staff are available to immediately respond to emergency incident.

- Maintain team continuity.

(National Institute for Occupational Safety and Health [NIOSH], 2008, p. 30).

This section of the NIOSH report stops short of making any recommendations on the specific numbers of firefighters that a fire department should have or have on an apparatus; however, the reference to two-in and two-out refers to Occupational Safety and Health Administration (OSHA) regulation 29 CFR 1910.143(g)(4). This Federal Regulation references personnel using respirators or self-contained breathing apparatus (scba). When a firefighter is wearing a self-contained breathing apparatus 29 CFR 1910.143(g)(4) (i), (ii) and (iii) states, “at least two employees enter the IDLH (immediately dangerous to life and health) atmosphere and remain in visual or voice contact with one another at all times; (ii) at least two employees are located outside the IDLH atmosphere; (iii) and all employees engaged in interior structural firefighting use scba” (Respiratory Protection, January 8, 1998).

While researching 29 CFR 1910.134 an OSHA “Standard Interpretation” letter was found when in 1999, assistant secretary of OSHA, at the time, Charles Jeffress, responded to a letter from a New Jersey Congressman who believed the new two-in/two-out rule would now mandate six firefighters on duty at all times (Jeffress, 1999). In his letter, Mr. Jeffress responded,

“OSHA's respiratory protection standard codifies recommended practice. It does not require fire departments to hire additional firefighters; it does not require four-person fire companies; it does not require four persons on a fire truck. Most fire departments have more than four firefighters and can assemble the numbers required on the scene by waiting for others to arrive” (1999).

Mr. Jeffress goes on to state,

“It is anticipated that small fire departments may rely on "mutual aid" agreements with neighboring jurisdictions to supply additional firefighters to assist with interior structural firefighting, if that is necessary to ensure compliance with "two-in, two-out." The intent of the "two-in, two-out" rule is a worker safety practice requirement, not a staffing requirement” (1999).

During the research, there was no discovery of OSHA offering any recommendations on staffing, with the exception of the above Code of Federal Regulations requiring two-in/two-out for IDLH atmospheres.

The International Association of Fire Chiefs (IFCA) offers recommendation on combination staffing and how a department might address staffing shortages, “To meet the shortfalls in daytime staffing, combination fire department with paid daytime duty crews are a popular solution throughout the country” (Crosby & Windisch, 2008, p. 3). “A Leaders Guide for Combination Departments” addresses the issue of deployment with regard to staffing stating, “departments should have a method of monitoring the number of personnel responding to incidents so management can determine if sufficient staffing is going to be available to deliver the required service” (Crosby & Windisch, p. 135).

This begs the question of what really is “sufficient”. What is sufficient for one department may not be sufficient for another so how is this defined in our local jurisdiction. “A Leaders Guide for Combination Departments” makes a statement,

However resources are deployed, a minimum of four people per apparatus dispatched should be assembled on the fireground. With the needs of the community as the primary driver, fire department leaders can develop many possible solutions. Never design a

system to handle the worst-case scenario. Design it to properly address the vast majority of your responses” (Crosby & Windisch, 2008, p. 135 - 136).

These statements go back to the Auburn study mentioned earlier in the literature review where the evaluator looked at historical data of the fire departments responses.

“A Leaders Guide for Combination Departments” led to a report produced by the International Association of Fire Chiefs Volunteer and Combination Officer Section entitled “Lighting the path of evolution – The Red Ribbon Report”. This report provided some valuable information in terms of how to manage the evolution of a fire department that is moving from all volunteer to a combination of both volunteer and career. The report presents the indicators for change as generally being “community growth”, “community aging”, “missed calls”, “extended response times”, and “reduced staffing” (IAFC - VCOS, 2005, p. 3-5). In the section of the report pertaining to “community growth” it address the point that, “the larger the community, the higher level of service people expect”. The “Red Ribbon Report” further suggests, “A department should conduct a cost/benefit analysis during system design to determine which model will function most efficiently for its locality. System design need to recognize that volunteer/paid-on-call personnel are paid only for work performed. Career firefighters are paid for the POTENTIAL to be used” (IAFC - VCOS, 2005, p. 10).

Procedures

An on-line survey served as a tool for the purpose of this research. Another procedure that took place was a review of the Fire Districts Insurance Service Office (ISO) most recent grading of 2006.

Zoomerang is the service used for conducting the on-line survey. The Zoomerang on-line guide provided assistance to develop the survey. The survey size was restricted to the fire service

population in Illinois. The survey remained open for fourteen days and was verified by a through a requirement to submit name, telephone number, and contact information from the person responding. The Executive Directors of the Illinois Fire Chiefs Association, the Illinois Association of Fire Protection Districts distributed the through the respective agency email notification network. The target audience for this survey was combination fire departments.

The survey contained the following survey questions.

1. What is the total number of firefighters your department employs?
2. How many career firefighters does your department employ?
3. How many volunteer/part-time firefighters does your department employ?
4. Does your department have a written, internal, staffing plan document?
5. Benchmarks on when to hire additional career firefighters is included in our staffing plan. If yes, please provide general benchmarks.
6. Benchmarks on when to recruit/hire additional volunteer/part-time firefighters is included in our staffing plan. If yes, please provide general benchmarks.
7. What is your department's average daily staffing for an engine company?
 - 1
 - 2
 - 3
 - 4
 - Other, please specify
8. What is your department's average daily staffing for a truck company?
 - 1
 - 2

3

4

5

Other, please specify

9. What is your department's average number of personnel responding on a first alarm assignment to a working fire?

1-5

6-10

11-15

16-20

> 20

10. Which NFPA standard do you consider your department should comply?

NFPA 1710

NFPA 1720

11. Please provide the name of the person completing the survey, a phone number and email address in case follow up is necessary.

In the review of the Fire District ISO rating, it was discovered that in the category of *credit for company personnel* we did not get maximum credit for personnel. The grading sheet indicated that we would get additional credit if we increased our on-duty company personnel by one person and responding volunteers by one person. The information provided on the District's ISO grading sheet was compared with information provided in the *Fire Suppression Rating Scale* as produced by ISO. ISO states in the District's grading scale that the District is required to have three engine companies. Research of the District's report management system reveals that at the

time of ISO grading, the District had eight personnel on duty but for some reason only averaged seven firefighters responding to a call.

Results

The purpose of this research project is to determine a future five- year staffing plan for the Minooka Fire Protection District. Minooka Fire Protection District is a growing combination department. The community is developing and will require increased service levels from the fire department in the future. It is necessary to determine what the staffing will be in the coming years. The questions asked during the research project include the following:

What national, state, or local standards exist to help establish a fire department staffing plan?

What are some recognized practices other departments use to determine staffing?

What, if any, combination staffing of volunteer, part-time, full-time, has proven effective in growing departments?

What national, state or local standards exist?

Research revealed that there is a national standard for staffing and it is the recommendations provided by the National Fire Protection Association (NFPA). In the literature review, the NFPA had a recommendation on staffing for career fire departments through a standard entitled NFPA 1710. NFPA has a recommendation on staffing for a volunteer fire department through NFPA 1720. NFPA states that these two standards apply to a department that is “substantially” career or “substantially” volunteer. There was no definition anywhere on what number is considered “substantially”. This definition is easy to arrive at if a department is totally career staffed or totally volunteer staffed. Research shows that departments that are staffed with a combination of career and volunteer struggle with this definition of “substantially”.

There are no state or local standards that dictate how departments should be staffed. The Office of the Illinois State Fire Marshal (OSFM) is the states fire service regulatory, certification and oversight agency and there are no references to how a department should be staffed. Some certifications and operational standards within the State of Illinois refer to NFPA with regard to certification, operations, and safety; however, there is no reference to a requirement to use NFPA 1710 or 1720. Locally there is no standard on staffing.

ISO provides a basic guide for staffing. This staffing is based on how many firefighters are responding based on the number of companies that are required in the community. The research of ISO documents found only one specific reference to staffing where it stated a department must have four members to apply the grading scale (ISO Properties, Inc, 2003). In 2006, the District had eight firefighters on duty, responding four on an engine from Station #1 and three on an engine from Station #2 while covering an ambulance and we had approximately seven firefighters responding to calls.

What are some recognized practices other departments use for staffing?

An on-line *Zoomerang* survey was used to help determine what other departments were doing to determine staffing levels. The survey was sent to the Illinois Fire Chiefs Association, Illinois Association of Fire Protection Districts, and the Mutual Aid Box Alarm System Region within which Minooka Fire District is a member. Fifty-seven departments visited the survey; however, the survey asked that respondents answer only if their department is a combination (paid/part-time/volunteer) department. Twenty-eight departments responded to the survey.

In order to determine what other departments are doing to establish staffing, one question on the survey asked those departments with a written staffing plan what the benchmarks are to hiring additional career firefighter and benchmarks to recruiting additional volunteer/part-time

firefighters. Of the twenty-eight that responded to the survey, twelve, or 43% did have some type of written staffing plan. Of the twelve that have a written staffing plan, only seven indicated the benchmarks for their department to hire career firefighters. Of the twelve that have a written plan, only five indicated the benchmarks for their department to recruit volunteer/part-time firefighters.

In general, the benchmarks for hiring additional career firefighters included apparatus staffing levels, in other words, in order to maintain three people on an engine, four on a truck, etc. Other benchmarks were dictated by collective bargaining agreements that stated their must be a minimum number of firefighters on duty at all time and therefore the department must maintain a certain level to insure proper minimum staffing. The remaining responses are included in the survey results, which is in the appendix.

In the literature research of the project, there was a lot of discussion about staffing on individual apparatus. Because this was a topic of debate surrounding most literature on department staffing, a survey question pertained to individual apparatus staffing. On the question of what is your departments average daily staffing for an engine company, fifteen out of twenty eight, or 54% stated three firefighters, eight or 29% stated four firefighters, two or 7% stated two firefighters, another two or 7% stated 1, and one stated three full-time and one part-time which obviously is four, but a split staffing design.

The survey asked the question, what is your departments average daily staffing for a truck company. Twelve of the departments responding or 43% indicated they have no set staffing for their truck company and that is it not staffed, personnel jump from engine to truck depending on the call or they department does not own a truck. The remaining response split the answer with five departments indicating four, three and two firefighters, respectively, or 18%. One

department or 1% answered that they staff their truck with one firefighter. More detailed results on the answers to engine and truck staffing can be found in the survey results in the appendix.

The survey also asked the question, what is your department's average number of personnel responding on a first alarm assignment to working structure fire? Eleven departments or 39% of the departments responded that they have between eleven and fifteen firefighter responding to a first alarm assignment, eight departments or 29% answered indicated eight to ten firefighters responding, five departments or 18% indicated eighteen to twenty firefighters, three departments or 11% indicated three firefighters, one department or 4% indicated more than twenty firefighters.

The survey also sought to determine what NFPA standard departments were using to guide their staffing. The survey asked, which NFPA standard you consider your department should comply with, and provided the answer option of 1710 or 1720. The results were that seventeen departments or 61% indicated they were using 1710, seven departments or 25% indicated they were using 1720, and four departments or 14% indicated they used neither. In analyzing the results, it was apparent that some respondents did not know the difference between 1710 and 1720 because those who had almost no career firefighters indicated they were using 1710, which is contrary to the intent of the NFPA standard. Those departments that indicated they were using "neither" did not indicate what, if any standard or guide there are using to determine staffing.

It was necessary to analyze the result of the 1710 and 1720 question in more detail to determine individual responses to the question and compare the population of volunteer and career against their answer on which NFPA standard they use. A more detailed analysis shows that departments will use a standard according to the largest population in their departments, in

other words, if a department has 50 career and 45 volunteers they are using the career standard of 1710, and if they have a larger population of volunteers, they are using NFPA 1720. This was thrown off marginally by the discovery that a few departments are using the career standard of NFPA 1710, when clearly their department is staffed mostly by volunteer/part-time; however, narrative answers and follow-up indicates that they may be using the career standard because the department is growing to a point that very soon the population will be mostly career.

There was some follow-up to a couple of departments indicating they use neither standard and the answer, in simple terms, is that NFPA is not a regulatory agency and they do not have to follow the NFPA guides and simply do what works best for their department.

What, if any, combination staffing has proven effective in growing departments

The answer to this question is inconclusive. The survey had twenty-eight respondents and of the twenty-eight that responded, seventeen are combination departments; however, the intent of the survey was not to survey all career or all volunteer and these results were not intended. The survey fell short of providing value added results to this research question; however, additional analysis of the survey occurred in hope of discovering some type of trend or success.

Analysis revealed that one of the seven departments indicated that their department has an internal staffing plan and that they are no longer recruiting volunteer firefighters. Of the remaining seventeen combination departments, only seven answered the question of benchmarking to recruit additional volunteer/part-time and one of those was the department indicating they no longer recruit volunteer/part-time. Many of the departments that have a large career firefighter population have a very low volunteer population and in departments with a high population of volunteers either have a very low or no career population. The largest combination department had almost an equal balance of population across the staffing with

career being fifty-one and volunteers being fifty-four. Follow-up with the survey respondent revealed that this department is moving to career department; therefore, they are no longer recruiting volunteers and that many of the volunteers are not active responders.

One department responding to the survey, Tinley Park, Illinois Fire was an extreme situation in staffing. Tinley Park Fire District, which is also referenced in, “A Leaders Guide for Combination Departments”, has one hundred twenty-five volunteer firefighters. Consequently, while a very substantial size of volunteers and an apparent successful volunteer department, it probably is not a combination department in the sense of the survey’s intended population.

The departments responding did not reveal any significant information about success in a combination staffed department. The survey should have asked the question, “is combination staffing successful in your department and if so please provide some reasons why you find it successful”.

Discussion

The purpose of this research project is to determine a staffing plan for Minooka Fire Protection District. Not only was the goal to determine what our staffing should be now, but how to grow our staffing in the future. The “Fire Company Staffing Requirements” article by Lawrence (2001) provided a very valuable tool to the research. In order to determine what staffing would be for our apparatus, we must first decide the demand. Currently, our Fire District staffs a fire engine with a minimum of three and a ladder truck with a minimum of three. Lawrence provided an analytical approach to the staffing of apparatus based on “historical data” (Lawrence, 2001, p. 206) and analysis of company operations based on type of working incidents. That must be the first step for Minooka Fire District to determine staffing for the future. It appears from our own department’s current operations and incident observations, and

the Lawrence article, our department can be effective with a three person engine company, but may be pushing our effectiveness with a three person truck company. However, a three person engine company may not be ample personnel in the future depending on growth patterns and development.

Research shows that the National Fire Protection Association (NFPA) provides a standard recommendation for deployment of fire departments. NFPA provides NFPA 1710 and 1720. 1710 is the deployment standard for career departments and 1720 is the deployment standard for volunteer departments. The research on NFPA proved helpful but also created more questions. NFPA provides that a department should use 1710 if they are substantially career and 1720 if they are substantially volunteer. The question became, what defines “substantially”. A University of Tennessee consultant provided an on-line article on this topic of which NFPA standard do you use, based on “substantially” and stated, “You are going to have to choose between career and volunteer and be willing to defend how you picked the one that you did” (Crouch, p. 52). Crouch also provided some questions in his article to help a department further narrow the department’s standard of service. If Crouch’s questions bring one to a conclusion, for Minooka Fire Protection District it is that currently we would be working under NFPA 1720.

In the author’s opinion, NFPA 1720 is vague and not a great tool for a department that is a combination of career and volunteer. However, NFPA 1710 does not provide a good benchmark either. Minooka Fire Protection District currently has a shift make-up of both career firefighters and volunteers who are hired back to work shift and are not “career” firefighters. When Minooka Fire District responds with the initial shift, it is a combination of career and volunteer, and scene operations are supported by volunteers who respond from home also. Some of the NFPA 1710 would be applicable to us when considering out the door and on-scene time

benchmarking. In spite of this, we are not responding all apparatus immediately; some are delayed by the arrival of volunteers to the station to respond additional apparatus. This goes back to the Lawrence article of “historical data” and the local “fire problem” (Lawrence, 2001).

NFPA 1710 under section 5.2.2 states,

On-duty fire suppression personnel shall be of the numbers necessary for fire-fighting performance relative to the expected fire-fighting conditions: life hazard to the populace protected, provisions of safe and effective fire-fighting performance conditions for the fire fighters, potential property loss, nature, configuration, hazards, and internal protection of the properties involved, types of fireground tactics and evolutions employed as standard procedure, type of apparatus used, and results expected to be obtained at the fire scene” (2004).

The standard goes on to state,

“There shall be a chief officer dispatched, a company officer who is considered a part of the company and that each engine company shall be comprised of four personnel, and a ladder company consist of four personnel except in high-hazard, high incident and various other localities where staffing should be increased to five to six, and any other companies that support the engine and ladder truck operations shall be staffed with a minimum number as determined by the local fire department (2004).

NFPA 1720, section 4.3.1 states, “The fire department shall identify minimum staffing requirements to ensure that a sufficient number of members are available to operate safely and effectively” (2004). The section then provides a table reference for “demand zone”, “demographics”, “staffing and response time” and “percentage” of time a department needs to meet the required on-scene staffing. In deciding the staffing and response needs, the

department's demand zone, and protection area demographics must be determined. This information will help guide the department on what percentage of time they need to meet the required staffing and response time numbers.

NFPA 1720, table 4.3.2 states, "upon assembling the necessary resources at the emergency scene, the fire department should have the capability to safely commence an initial attack within 2 minutes 90 percent of the time" (2004).

NFPA 1710 and 1720 leaves some questions; however, it provides a reference tool that Minooka Fire District can use. There is a standard, and while not a law, this is a standard that our District will be held to if called into question on our operations. Research has mostly revealed that it is a local issue more than anything. In the reference, "A Leadership Guide for Combination Fire Departments", a statement is made, "With the needs of the community as the primary driver, fire department leaders can develop many possible solutions. Never design a system to handle the worst-case scenario. Design it to properly address the vast majority of your responses" (Crosby & Windisch, 2008, p. 135 - 136). This is similar to the Auburn, Alabama study when Lawrence (2001) referenced studying "the fire problem specific to Auburn". NFPA states that departments should have four firefighters on a fire engine and four firefighters on a truck company. If a department applies NFPA 1710 exclusively the math renders an answer of four firefighters times however many engines, and trucks you respond. Insurance Service Office (ISO) will determine, based on community risk how many fire engines and trucks are required to respond to structure fires and automatic fire alarms. However, when considering the Auburn, Alabama study a department may take the apparatus response needs determined by the Insurance Service Office and multiply that by a number of firefighters per apparatus that is determined by "historical data" and "local fire problem" (Lawrence, 2001). The on-line survey conducted for

this research project revealed that departments would use either 1710 or 1720 according to the largest population group (volunteer or career) in their departments.

The majority of Minooka Fire District personnel are volunteers. Because Minooka is currently a department staffed by a combination of career and volunteers/part-time, the staffing question is a little more in-depth in that the department must not only agree on how much staffing will be available for apparatus and shifts, but how that staffing level will be accomplished. The IAFC-VCOC “Red Ribbon Report” provided some examples of very successful combination departments that use career staff for speed of response and volunteers for sustained response. The “Red Ribbon Report” states, “A department should conduct a cost/benefit analysis during system design to determine which model will function most efficiently for its locality. System design needs to recognize that volunteer/paid-on-call personnel are paid only for work performed. Career firefighters are paid for the POTENTIAL to be used” (IAFC - VCOS, 2005, p. 10). Obviously, Minooka Fire District can only provide what local finances will allow. Career firefighters are a perpetual expense that generally takes the majority of the fire department budget to support.

Recommendations

The purpose of the research project is to create a staffing plan for Minooka Fire Protection District based on literature review and research into other departments and standards. Based on the research, there are some short-term and long-term suggestions for creating a staffing plan for District. This document is not the District’s staffing plan but gives guidance to creation of a research-backed plan.

Based on the research, Minooka Fire Protection District needs to first conduct an analysis of the historical data for our incident response, assess our current community demand and make

a determination as to the current fire problem. Our operations (training, response, staffing, and planning) should be based first on what that research reveals as being our current fire problem in the community.

Upon completion of the analysis of the fire problem, the District must decide what the staffing level should be on our fire engines and ladder truck when considering several factors, including immediate local community fire problem, NFPA recommendations for staffing, peak times of day for possible shift increasing, ISO requirements, and budget capability. Currently, as a combination department, with volunteers responding in to the station, the District has a minimum staffing of three on an engine and a truck with four as the optimal number.

Once the District knows the staffing levels of our fire apparatus, based on local fire problem, we can begin determining our staffing levels for the District as a whole. It is known that in an average year our responses are sixty to seventy percent emergency medical service (EMS) and approximately thirty percent other (motor vehicle crashes, automatic alarms, and fires). Because of the EMS demand and the District operations at the advanced life support (ALS) ambulance service, we must have a staffing of two personnel, one emergency medical technician – basic level and one emergency medical technician – paramedic level. Our current emergency medical service demands require us to staff two ambulances due to the District's geographic area and our goal of arrival on the scene of medical calls within the national standard of three to five minutes. Due to the EMS demand, the District requires four medical licensed technicians on-duty twenty four hours a day, seven days a week before the fire problem is known.

The foundation for District staffing is creating safe, effective operations. We will then institute the apparatus staffing response requirement based on ISO risk analysis times the number

of stations, and the assignments of apparatus to those stations. The District's current station plan outlines four and possibly five stations with most stations equipped with an engine and ALS ambulance. Based on current operations, the station staffing would be a minimum of five firefighters. Once staffing of the apparatus is settled, each station will need to be staffed with the number of firefighters per apparatus multiplied by our current rotation of three shifts.

Research and survey results indicate that Minooka Fire District should first be working under the NFPA 1720 recommended standard; however, because NFPA 1710 is more definitive and specific, and our growth, the District should be striving to meet NFPA 1710 in the long term.

Additional research must occur to determine the make-up of the staffing. Minooka is a combination department. If we are going to staff each station with the NFPA requirement of four on an engine and Illinois Department of Public Health required two on an ambulance for a staffing of five, the District must determine what employment classification and combination the personnel will be. ISO grading will specify what type of apparatus the District must respond, and NFPA will recommend how quickly operations should begin and what functions should be filled. However, the District must determine what combination (volunteer and career) staffing types will meet the NFPA requirement effectively.

The research on the type of staffing, career or volunteer will be determined from research on our retention rate, the availability of our volunteers to respond to the required apparatus, and the budget funds required to hire additional career firefighters and maintain volunteers. The retention rate of volunteers will influence the lifespan of the District's combination system.

Within the coming months, the District will conduct research on the fire problem, use NFPA 1720 as a guide for immediate deployment operations, and NFPA 1710 as a goal. The District will establish what the minimum staffing for apparatus that will lead to station staffing

and overall District staffing. The District will verify the current and trended retention and response rate of volunteers to determine the future retention rate. Once the District knows the people count needed and the ability to provide it through career or volunteer, the District will match the personnel costs to the budgets ability to support the personnel.

In conclusion, it is recommended that other researchers use the on-line survey process and refine the questions to draw from the responder why a department is using the staffing they are, or are they just doing it because that is what every other department does. It is recommended that researchers spend time in the National Fire Academy Learning Resource Center conducting research and not simply rely on mailing of periodicals, books, etc. Spend time concentrating research on departments that are similar in type, size, budget, and call volume to determine those department's staffing futures until you find a model organization. The International Volunteer and Combination Officer Section is an excellent source for finding model combination departments. This type of research yielded worthwhile information for the Minooka Fire Protection District and will allow the District to establish a solid, research based staffing plan.

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Appendix

The following pages are Appendix A: Zoomerang survey and results.

Note that if viewing this from the disk, the survey results are on the disk as a PDF document.

Fire Department Staffing Research Project

The following survey is part of an Executive Fire Officer Program research project. ONLY Complete this survey if you consider your department to be a "combination" (uses career and volunteer or part-time firefighters). Please, the fire chief or his/her designee should complete this survey. Thank you!

1 What is the total number of active firefighters your department employs?

2 How many career firefighters does your department employ?

3 How many volunteer/part-time firefighters does your department employ?

4 Does your department have a written, internal, staffing plan document?

YES NO

5 Benchmarks on when to hire additional career firefighters are included in our department staffing plan.

YES NO

If yes, please provide general benchmarks.

6 Benchmarks on when to recruit/hire additional volunteer/part-time firefighters are included in our department staffing plan.

YES NO

If yes, please provide general benchmarks.

7 What is your department's average daily staffing for an engine company?

- 1
 - 2
 - 3
 - 4
 - Other, please specify
-

8 What is your average daily staffing for a truck company?

- 1
 - 2
 - 3
 - 4
 - 5
 - Other, please specify
-

9 What is your departments average number of personnel responding on a first alarm assignment to working structure fire?

- 1 - 5
 - 6 - 10
 - 11 - 15
 - 16 - 20
 - > 20
-

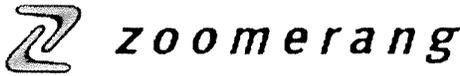
10 Which NFPA standard do you consider your department should comply with?

- 1710
 - 1720
 - Neither
-

11 Please provide name of person completing survey, a phone number and email address in case additional follow-up is necessary.

EFO Staffing Survey

Results Overview



Date: 4/13/2009 7:42 AM PST
 Responses: Completes
 Filter: No filter applied

The following survey is part of an Executive Fire Officer Program research project. ONLY Complete this survey if you consider your department to be a "combination" (uses career and volunteer or part-time firefighters). Please, the fire chief or his/her designee should complete this survey. Thank you!

4. Does your department have a written, internal, staffing plan document?

Yes		12	43%
No		16	57%
		Total	28
			100%

5. Benchmarks on when to hire additional career firefighters are included in our department staffing plan.

Yes		7	25%
No		21	75%
		Total	28
			100%

7 Responses

6. Benchmarks on when to recruit/hire additional volunteer/part-time firefighters are included in our department staffing plan.

Yes		5	18%
No		23	82%
		Total	28
			100%

7 Responses

7. What is your department's average daily staffing for an engine company?

1		2	7%
2		2	7%
3		15	54%
4		8	29%
Other, please specify		1	4%
		Total	28
			100%

8. What is your average daily staffing for a truck company?

1		1	4%
2		5	18%
3		5	18%
4		5	18%
5		0	0%
Other, please specify		12	43%
Total		28	100%

9. What is your departments average number of personnel responding on a first alarm assignment to working structure fire?

1 - 5		3	11%
6 - 10		8	29%
11 - 15		11	39%
16 - 20		5	18%
> 20		1	4%
Total		28	100%

10. Which NFPA standard do you consider your department should comply with?

1710		17	61%
1720		7	25%
Neither		4	14%
Total		28	100%