MINIMUM APPARATUS STAFFING LEVELS: WHAT IS THE CORRECT APPARATUS STAFFING FOR THE OMAHA FIRE DEPARTMENT?

Strategic Management of Change

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ABSTRACT

This research project looked at the apparatus staffing levels of the Omaha Fire Department. Both historic and evaluative research was used to look at options the Omaha Fire Department has in reducing apparatus staffing. The purpose of the project was to determine the number of firefighters needed per apparatus for the Omaha Fire Department to operate safely and efficiently.

Four questions were answered to satisfy the goals of this project:

1. What are the existing standards and/or guidelines for apparatus staffing?
2. Do OSHA regulations require or imply minimum apparatus staffing?
3. Is there a direct correlation between firefighter safety and apparatus staffing?
4. Can the Omaha Fire Department operate with less than their required four-person minimum on all apparatus and continue to accomplish the Omaha Fire Department’s purpose and mission?

Procedures for the project included an extensive literature review that included NFPA Standards, Federal OSHA Regulations, and studies concerning firefighters’ safety and efficiency. The results showed that there are standards, guidelines, and Federal OSHA Regulations that recommend and mandate minimum staffing for fire apparatus. There is also a direct relationship between decreased firefighter safety and injury and apparatus staffing.

Recommendations from this project were for the Omaha Fire Department to accept the minimum staffing requirements while working with Omaha Fire Department Local #385 to create more flexibility in the staffing requirement. With this staffing flexibility, the Omaha Fire Department would: explore roving engine companies, and an intensified pre-planning and
inspection program; evaluate standard operating procedures, traditional evolutions, and current hiring practices.
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INTRODUCTION

The Omaha Fire Department provides a full range of fire and rescue services (fire suppression, advanced life support and transport and special operations, including Hazardous Materials response, confined space, rapid intervention and high angle rope rescue). The Department staffs twenty-three fire stations with twenty-three engine companies, ten ladder companies, eleven medical units, one heavy rescue vehicle and one Special Operations Unit. The Omaha Fire Department is required by Contract and City Ordinance to staff each with the following: engine and aerial company with four firefighters, medical units with two firefighters, heavy rescue truck with two firefighters and the Special Operations Unit with four firefighters.

Safety is the main concern and goal of the Fire Union and Fire Management. The Omaha Fire Department must work under a limited budget that is only growing at approximately 2% annually.

**Problem Statement:** Omaha Fire Department Fire Management would like “minimum manning” requirements to be more flexible. This would allow Fire Management the flexibility to better deal with budget shortfalls and free up dollars for equipment and training. Omaha Fire Fighters Union Local #385 strongly opposes any move to relax or eliminate the minimum manning requirements, this opposition is primarily based on safety concerns and OSHA Standard 29 CFR 1910.134, “Two-in/Two-out.”

**Purpose Statement:** The purpose of this research project is to determine the number of Firefighters needed per apparatus for the Omaha Fire Department to operate safely and
efficiently. To satisfy this purpose, it is the goal of this research project to use historical and evaluative research to answer the following questions:

1) What are the existing standards and/or guidelines for apparatus staffing?

2) Do OSHA regulations require or imply minimum apparatus staffing?

3) Is there a direct correlation between Firefighter safety and apparatus staffing?

4) Can the Omaha Fire Department operate with less than their required four-person minimum staffing on all apparatus and continue to accomplish the Omaha Fire Department’s Purpose and Mission?

Answering these questions will help the Omaha Fire Department’s Management and Local Union #385 to come to an agreement on staffing requirements that will not compromise safety and will maximize the Omaha Fire Department’s efficiency.

**BACKGROUND AND SIGNIFICANCE**

Omaha, Nebraska, is a large mid-western city that has undergone substantial growth in the last twenty years. The Omaha Fire Department is a 600-person department comprised of three suppression shifts and nine support bureaus. The city is divided into six battalions. The Department’s six battalions include twenty-three fire stations, which are staffed by twenty-three engine companies, ten aerial companies, eleven medical units, one heavy rescue/air truck and a Special Operations Unit. A Battalion Chief manages each battalion. By Union contract and City Ordinance, these apparatus must be staffed as follows:

(a) An engine and aerial company must have one fire captain, one fire apparatus engineer (F.A.E.) and two firefighters.
(b) A Medic Unit: one paramedic fire captain, one paramedic driver.

(c) The Heavy Rescue/Air Truck: One Fire Captain, One F.A.E., both personnel must be a SCOTT air-pack certified repairman.

(d) The Special Operations Unit: One Captain, One F.A.E., two firefighters who are all trained as HazMat Technicians with training in rapid intervention, confined space and High-Angle Rescue techniques.

(e) The Battalion Chiefs: one Battalion Chief.

The Omaha Fire Department consists of the following Bureaus: Training Bureau, Inspection Bureau, Fire Investigation Bureau, Public Education Bureau, Special Operations Bureau, Technical Services Bureau, Administrative Services Bureau, Emergency Medical Services Bureau and the Safety Bureau. The staffing of these bureaus is also dictated by the Minimum Manning Contract and City Ordinance. Each of these bureaus must be managed by a Battalion Chief and only Fire Captains (with two exceptions) may serve in these Bureaus.

These staffing requirements were first implemented with the signing of the Union Contract between Local #385 and the City of Omaha. The contract was signed and took effect in January of 1998, and is binding through December 31, 2001.

The Fire Union and the Mayor of the City of Omaha both agreed in 1998 that the staffing requirements were a major safety issue. In the past three years, the minimum manning requirements have cost the Omaha Fire Department approximately $600,000 in overtime (City of Omaha, 1998-2000). This cost was not anticipated by the Mayor and has become a major issue between the Mayor, the Fire Chief, and the Union. In January of 2001, Local #385, with support of the Omaha City Council, decided to seek protection for the minimum manning
requirements in the 1998-2001 contract, by drafting a City Ordinance that adopted the contractual language on minimum manning. This Ordinance was passed in January, 2001. At the writing of this paper, the Mayor has ordered the Fire Chief to ignore this Ordinance based on a legal opinion from the City Attorney that the Ordinance violates contractually protected management rights.

The Omaha Fire Department faces the same manpower/staffing problems that confront the entire fire service. The Omaha Fire Department, like many career fire departments has seen staffing levels fall from as many as seven firefighters per apparatus to current levels of three firefighters per apparatus. The Omaha Fire Department followed the staffing trends of the time. Pre-World War II recommended manpower for fire companies was based upon a standard staffing of seven men for pumper and aerial ladder companies that were assigned to first alarm response in high value districts and five men for other pumper companies and six men for other truck companies. This was the manpower considered desirable for effective operations of these companies and reasonable utilization of their equipment (Kimball, 1966). As the cost of personnel increased, staffing at pre-World War II levels became financially prohibitive.

With the maturation of fire departments, firefighter time was used more productively for training and fire prevention activities. Fire apparatus and equipment became vastly improved. As such, it became possible for four or five firefighters to do the same work (or more) than their seven counterparts a generation earlier. The Omaha Fire Department reduced staffing levels in the 1950’s to five-man engine companies and five to six-man aerial companies. The Omaha Fire Department continued these staffing levels into the early 1970’s,
in the mid-1970’s the staffing levels dropped to four firefighters per engine company and four to five firefighters per aerial company. The increasing cost of personnel and the discontinuation of firefighter’s riding the tailboard of the apparatus led to the four and five-man companies. In 1979, the Omaha Fire Department operated its last five-firefighter companies. The Department’s policy was changed from utilizing surplus manpower on aerials to placing all surplus firefighter’s on Medic Units. The 1980’s brought about budget tightening and the advent of the first three-man fire companies on the Omaha Fire Department. The policy of not hiring firefighters until the Department is short of its manpower complement forced the Department to operate an average of fifteen to twenty firefighters short of its assigned strength. This led to the staffing of the less active aerial companies as three person companies. The Department averaged five to six of these three-person aerial companies per day.

The passage of NFPA 1500 energized the Omaha Fire Department Union Local #385 to start considering apparatus staffing as a safety issue that the Union needed to address. The Union took the position that a minimum staffing requirement for all Omaha Fire Department engines and aerials must be four firefighters. The Union’s stance based on NFPA 1500 was that firefighter safety could not be compromised. Apparatus staffing on the Omaha Fire Department became a point of disagreement between the Fire Union and Fire Management. Both agreed that firefighter safety was a top priority, but apparatus staffing numbers became and continues to be a serious point of disagreement. The Fire Union’s position is that firefighting requirements, safety and staffing numbers are not connected to an ever-changing budgetary process. Fire management, faced with a limited budget sees apparatus staffing as a
dynamic issue that can be safely and efficiently addressed by a majority of four-person companies with some three-person companies.

The City of Omaha and Omaha Fire Department Local #385 are set to begin contract negotiations for 2002. The findings of this project will be used to help both Fire Management and the Union leadership reach a reasonable agreement on the staffing issue. This project is being done as a requirement for the “Strategic Management of Change” course for the National Fire Academy’s Executive Fire Officer Program. This project relates to the Analysis Phase of the “Change Management Model,” used in the “Strategic Management of Change” course.

LITERATURE REVIEW

The literature review for this paper was accomplished by examining documents from Federal regulations, the National Fire Protection Standards, specific books and articles that have been published regarding staffing levels for fire departments. These documents helped in the determination of the ideal staffing levels for the Omaha Fire Department apparatus by helping to answer the following research questions:

1. What are the existing standards and/or guidelines for apparatus staffing?

   Fire Department apparatus staffing has been omitted from Federal Regulations, and until recently was relegated to traditional fire service practices and advisory standards. Pre-WWI recommended manpower for fire companies in high value districts were seven men for a pump and aerial ladder. Five men to a pump and six men for other truck companies in areas other than high value areas (Kimball, 1996). Post-WW II practices found the provision of a five-man company (pump operator, an officer, and three hosemen), allow the fire company to
quickly place hose lines, and attack the fire. Thus, a five-man company unit is normally considered to be a desirable standard; this has been demonstrated by time trials in performing standard firefighting evolutions (Kimball, 1969).

The Omaha Fire Department Standard Operating Procedures (S.O.P.) covered the standard pump and aerial staffing as four-man pumper and five-man aerial crews. The S.O.P. gave a pictorial placement of their position on the apparatus and a listing of the required tasks each position/man assigned to the crew were assigned to perform for initial fire attack evolutions (Omaha Fire Department S.O.P., 1991).

The 1980’s saw staffing on engine and truck companies diminishing to the point that we now have two-member engine and truck companies. Three-member teams are most common (Bennett, 1989). In 1987, the NFPA adopted a new Occupational Health Standard, NFPA 1500. An earlier version of the Standard called for a minimum of four firefighters on each responding pumper and ladder truck. However, that specification was revised by compromise to accommodate volunteer firefighters who often respond directly to fires in their vehicles. The appendix of NFPA 1500 provides recommendations on minimum apparatus staffing. Five members are recommended for engine companies responding in high-risk areas and six members with each ladder company. NFPA 1410, Training Standards on Initial Attack, Appendix A-3-2.1, recommends that a minimum acceptable fire company staffing level consists of four members responding on or arriving with each engine or ladder company responding to any fire (IAFF, 1985, Pg. 12). In 1999, the NFPA has taken a step forward in regard to apparatus staffing with the Standard for Organization and Deployment of Fire
Suppression, Emergency Medical Operations, and Special Operations to the Public by Fire Departments, NFPA 1710 for career departments and NFPA 1720 for volunteer departments.

The Report on Proposal (ROP) for NFPA 1710 under Section 5.2.1 Staffing states that: “Fire companies whose primary functions are to pump and deliver water and perform basic firefighting at fires, including search and rescue, shall be known as engine companies. These companies shall be staffed with a minimum of four on-duty personnel.” In addition to the engine company it also states, “Fire companies whose primary functions are to perform the variety of services associated with truck work, such as forcible entry, ventilation, search and rescue, aerial operations for water delivery and rescue, utility control, illumination, overhaul and salvage work, shall be known as ladder or truck companies. These companies shall be staffed with a minimum of four on-duty personnel.” (NFPA 1710, 2001, p. 342).

2. Do OSHA Regulations require or imply minimum apparatus staffing?

The new “two-in/two-out rule” (29 CFR 1910.134) could not be any clearer. It states that “during interior structural firefighting, self-contained breathing apparatus is required, and two firefighters must be on stand-by to provide assistance or perform rescue when two firefighters are inside the burning building.” (IAFF, 1998). According to OSHA, the new rule (CFR 1910.134) does not require fire departments to hire additional fire fighters, it does not require four-person fire companies, and it does not require four persons on a fire truck. It does suggest assembling the members on the scene by waiting for others to arrive (Stevens, 1999).
A summary of Federal OSHA states:

1. Firefighters utilizing self-contained breathing apparatus (SCBA) in “immediately dangerous to life and health,” (IDLH), potentially “IDLH” or unknown atmospheres shall operate in a buddy system with two or more personnel.

2. Firefighters in the “buddy system” are required to be in direct voice or visual contact or tethered with a signal line.

3. Identically equipped and trained firefighters are required to be present outside the “immediately dangerous to life and health,” potentially IDLH or unknown atmosphere prior to a team-entering and during rescue members of the team working in the IDLH, potentially IDLH or unknown atmosphere.

4. A minimum of four individuals is required, consisting of two individuals working as a team in the IDLH atmosphere and two individuals present outside this atmosphere for assistance or rescue at emergency operations where entry into the danger area is required.

5. OSHA allows for one of the two individuals outside the hazard area to be engaged in other activities. However, OSHA does state that the assignment of Operator of Heavy Equipment as stand-by personnel could clearly jeopardize the safety and health of the workers in the danger area.

6. If a rescue operation is necessary, OSHA requires that the buddy system be maintained by the rescue team while entering the IDLH atmosphere and that this team shall be properly equipped and trained for this operation (IAFF, 1998-99).
Perhaps the most important OSHA requirement is the “General Duty Clause,” which holds employers to a general duty to provide a safe work place for their employees. Under this clause, an employer can be cited for a violation even if it has met the letter of the law. This allows OSHA to use national industry standards such as NFPA standard as the basis for citation. Thus, while NFPA Standards are not legal requirements in themselves, they have the force of law in many situations (Blackistone, 1997).

3. Is there a direct correlation between firefighters’ safety and apparatus staffing?

Safety for ourselves as firefighters and rescue workers as well as the citizens we serve, is the fire service’s top priority (Blackistone, 1997). Firefighters should be provided the safest possible working environment. Staffing affects not only the public’s safety but also the safety of the firefighters, and, as such, is a condition of employment. Although firefighting is by its nature dangerous, that does not justify employers increasing that inherent level of risk by reducing safe minimum staffing under the guise of financial difficulty (IAFF, 2000 Pg 2). A study conducted by the IAFF with cooperation of Johns Hopkins University reflected that injuries are influenced by inadequate staffing levels. Cities, which operated fire suppression companies with less that four personnel, had an injury rate per 100 workers that was 36.3% greater than cities which had staffing levels of four or more. The percentage of cities reporting 10 injuries or more per 100 firefighters was nearly double for those operating with less that four-person crews, than those operating with four or more. Firefighter injury rates per 100 alarms were an average of 38% greater in cities with minimum staffing of less than four personnel per apparatus (IAFF, 1995, Pg. 26).
The Dallas Fire Department, in 1969 and again in 1984, conducted textbook drills and live fire tests to compare effectiveness among various levels of staffing. The Dallas Fire Department concluded that in a residential fire:

1. The five-person crews demonstrated a more coordinated and effective attack on the fire and search and rescue operations.

2. The four-person crew was capable of performing satisfactorily in controlling the fire and in effecting the rescue operation.

3. The three-person crew could not accomplish all the required critical tasks within the given time span. The study emphasized at this level there was little margin for error and any appreciable delay in arrival might place the control of the fire beyond their capability.

The Dallas study placed a premium on safety. However, in actual fireground operations, firefighters operating in understaffed environments are often expected to perform beyond their capabilities. The study further points out when addressing the inadequate staffing issue:

1. A cumulative effect created by combined delays and lost functions on the part of each crew resulting in an even greater loss of overall effectiveness.

2. Increased physiological stresses on firefighters as they try to compensate for the lower staffing level.

3. Increased risk to firefighters when aggressive procedures are undertaken without the support necessary to complete them safely (IAFF, 2000 Pg. 18).
In 1993, the Austin Fire Department embarked on a study to determine whether companies staffed with four firefighters were safer and more effective than the three-person companies the Department was currently deploying. The survey concluded that inadequate staffing directly caused the following problems:

1. A higher risk for victims due to delays which are indirectly related to the likelihood of survival.
2. A loss of critical function.
3. An increased loss of overall effectiveness as a result of combined delays and loss of critical functions.
4. Higher physiological stress on firefighters as they attempt to compensate for lower crew sizes.
5. Higher risk to firefighters safety as aggressive procedures are conducted without necessary support.

The Austin study also concluded that increasing staffing levels from three to four provided substantial benefits:

1. A smaller number of multiple alarms.
2. Lower fire damage dollar loss and higher loss/save ratio.
3. Fewer injuries/deaths for civilians and Firefighters.
4. Fewer Worker's Compensation for Firefighters.
5. Retainment of tax base properties.
6. Lower civil liability for the City and the Fire Department (IAFF, 1995, Pg. 21-22).
Looking at apparatus staffing effectiveness, five-person fire suppression companies were judged to be 100% effective in their task performance, four-person companies were 65% effective, and three-person companies were 38% effective. Six-person companies were judged 20% faster than four-person companies. Along with these figures it was concluded that fifteen firefighters were needed on the scene of a working fire, or dollar loss and injuries were significantly increased as well as fire spread (Coleman and Granito, 1998, Pg. 119).

With three as the average staffing nationwide, it will take two rigs to start an interior attack and often leave firefighters waiting for the formation of an outside team before beginning ventilation. What could have been a quick knockdown has now turned into a challenging and potentially dangerous operation. Delays to pool firefighters could bring roofs down on those understaffed crews who make entry too late in the game (Stevens, 1999).

When considering safety, the Board of Directors for the Fire Department Safety Officers Association stated, “Our profession recognized that sufficient manpower on a fire scene is the key to reducing injuries. We continue, however, to try to do more with less.” Furthermore, “in court the precedent can be established that lack of manpower caused, or was likely to cause, death or serious physical harm.” (Soros, 1997).

4. Can the Omaha Fire Department operate with less that their required four persons minimum manning on all apparatus and continue to accomplish the Omaha Fire Department’s purpose and mission?

The purpose of the Omaha Fire Department is to “minimize death, injury, and property loss by adopting a proactive philosophy to prevent fire, but should fires occur, emergency response is structured to confine the fire, and extinguish them properly and effectively.”
Mission of the Omaha Fire Department is: “We believe in striving for excellence in the quality of our work and service to the citizens of Omaha.” (Omaha Fire Department Standard Operating Procedures, 1996, Pg. 1).

As the previous question indicated, few will argue the decreased efficiency and increased danger of two-and three-person suppression crews. However, the simple fact is that many fire departments have to prepare to operate until we get four people to the location of the fire scene. (Casey and Blocker, 1997). As we look across the nation at career fire departments, three-member teams are most common. Most would probably agree that this level of staffing, at least on the surface, is insufficient and unacceptable. They might be wrong. An examination of the big picture points to the need for departments to maintain service levels with three-member engine companies and two-member truck companies. (Bennett, 1989).

A comparison survey done by the Tulsa Fire Department of ten fire departments based on their size and geographic location to determine how Tulsa Fire Department measured up was completed on July 20, 2000. A portion of the survey dealt with minimum staffing. Of the ten cities surveyed, only Omaha, Dallas, and Tucson, staffs their engine and aerial companies with four persons. The remaining cities staffed with three-persons: Tulsa, Oklahoma; Austin, Texas; Fort Worth, Texas; Kansas City, Missouri (their aerials staff four-members); Nashville, Tennessee; Oklahoma City, Oklahoma; Wichita, Kansas (aerials only two-persons) (Krebs, 2000).

With fire departments across the country operating effectively with three-person companies, it is a reality that there are fewer people to do the same job. Casey and Blocker (1997) point out that the tasks that need to be completed, must be reviewed; less labor-intensive
methods for accomplishing them must be devised, until additional help arrives. These methods include the strategy that “anything that can be pre-connected, should be” (i.e., both small and large diameter attack lines, supply hose, and electric lights and reels). Other methods include: built-in foam systems rather than educators with buckets, small lighter ladders, pre-piped deluge guns, and ergonomic designs for apparatus and equipment placement. Jack Bennett (1989) in “How to Do More With Less,” rates pre-fire planning and inspections as the two most important tools at your disposal to compensate for reduced staffing. Use these activities to their fullest extent, discuss strategy and tactics while performing occupancy inspections and investigations. These discussions need to include both engine and aerial tactics. Bennett (1989) acknowledges that three-man operations are difficult but emphasizes that with great pre-fire planning and inspections, the Incident Commander will be able to make good priority decisions on the fire ground.

Training is another key to being effective with fewer Firefighters. Doing the job with fewer firefighters creates the challenge of trying to change behavior and tradition; this creates a substantial challenge for our departments and training personnel (Edwards, 1998). Spending dollars on training will have the greatest impact on this problem. Training is probably the most important function of the department with reduced staffing. (Bennett, 1989). Clark (1991) points out that while training, we have to think and prepare our fire officers on how to employ our firefighters to achieve the desired results in the most efficient manner. Standard Operating Procedures changes could be a consideration.

To ease the personnel problems at fire scenes and the delayed response of a second-in unit getting to the scene, peak load staffing/roving engine companies have been developed.
The basic idea is simple: put more units on the streets during periods of predictably higher demand and fewer units on the streets during periods of predictably low demand (Stout, 1989). Fire Chief A. Milone, in Stamford, Connecticut, says, “My intention was to find a way to better utilize the apparatus and manpower in the department, which is being stretched to the limit by circumstances beyond our control.” (Carbera, 2000). The Tualatin Valley Fire and Rescue District uses a Peak Activity Unit to serve as a District resource to cover peak activity and non-emergency needs that include area coverage due to classes, events, meetings, emergency move up and high-call volume (Tualatin, 2000).

In summary, the literature review revealed that staffing an apparatus has been given a secondary role to staffing on the emergency scene. The standards that are available seem to be ignored by the fire service as a whole, by using three-man companies. The literature did provide information on how departments could best utilize the staffing available to produce the most effective and efficient results. The literature review supported Chief A. Brunacini’s (1992) point: “It’s as though firefighting requirements are connected to and move along a mysterious sliding scale that adjusts to the dollars that are available to support those services.”

**PROCEDURES**

**Research/Methodology**

This research project employed historical research to examine written documents, regulations, policies, standards and articles. Evaluative research was used to determine and evaluate the past, present and future practices of the Omaha Fire Department with regards to apparatus staffing. The research procedures used in preparing this paper began with a
Literature Review at the Learning Resource Center (L.R.C.) at the National Fire Academy.

Additional literature was obtained at the University of Nebraska at Omaha Library and via their inter-library loan service. Material was also obtained from the Training Center Library of the Omaha Fire Department. The Omaha Fire Department Union Local #385 provides material on the topic from the International Association of Firefighters.

The procedures included first determining the position of the Omaha Fire Department in regards to minimum staffing. Then reviewing the existing standard and guidelines for minimum staffing. This process led to a review of Federal OSHA regulations that dealt with fire department staffing. The next step was to review the correlation between safety and staffing. This led to a final step of determining if the Omaha Fire Department could operate safely and effectively with some three-firefighter companies.

**Definition of Terms**

Omaha Fire Department Union Local #385: The Omaha Fire Department local union of the International Association of Firefighter AFL-CIO.

Minimum Manning: Article 45 of the contract between the City of Omaha and Omaha Fire Department Local #385 and the title of a new City Ordinance #35415, that mandates the staffing levels on the Omaha Fire Department apparatus and bureau positions.

Adequate Apparatus staffing: Four or more personnel assigned to an engine or aerial company.

Omaha Fire Department Aerial Company: Ladder companies perform a supporting role in fireground operations, including search and rescue, forcible entry, ventilation, salvage, and
overhaul. The basic ladder company apparatus is an aerial ladder or elevating platform device, which provides access above ground level or to rooftops, or directs elevated master streams on fires.

Omaha Fire Department Engine Company: The most common and basic company in the fire department, whose primary role in tactical operations is to deliver water through hose lines to control fire and deliver medical services at emergency medical incidents. The basic unit of apparatus is the pumper, which carries hose, nozzles, an on-board water tank, and a pump.

Immediately Dangerous to Live and Health (IDLH): An atmosphere that poses an immediate threat to life, that would cause irreversible adverse health effects, or that would impair an individual’s ability to escape from a dangerous atmosphere.

Self-Contained Breathing Apparatus (SCBA): An atmosphere-supply respirator for which the breathing air source is designed to be carried by the user.

Incident Commander (I.C.): Individual responsible for the management of all incident operations.

Limitations and Assumptions

Research was limited by the lack of material on apparatus staffing. Apparatus staffing has not been an area of great concern and is only now being coming to the forefront for career departments as they find that three- and two-man companies are becoming a fire department standard.
The majority of this research material with regard to safety correlations was supplied by the IAFF. The IAFF has long been an advocate of staffing apparatus with four or more personnel. The assumption is that Omaha Fire Department Management and the Mayor of the City of Omaha will have a future voice in apparatus staffing. Due to the current “Minimum Manning Ordinance” enacted by the Omaha City Council, the staffing question for the Omaha Fire Department may be answered for the next four years.

RESULTS

The literature review looked at research/reference materials for each research question.

1) What are the existing standards or guidelines for apparatus staffing?

The standards and guidelines that refer to apparatus staffing fall into two categories. The first are standards based upon past practices and firefighting requirements. The apparatus manning issue as defined by W. Kimball in both Fire Attack 1 (1969) and Manning for Fire Attack (1969) recommend staffing levels based on fire department past practices for effective operations. Chief A. Brunacini (1992) reminds us that firefighter and fire ground activities are driven by a rigid set of realities. These realities are constant and require adequate firefighters to reach the scene quickly and begin work immediately.

The second categories are the written standards that can be found in the NFPA guidelines. The NFPA is clear on the issue of apparatus staffing. NFPA 1410, Training Standard on Initial Fire Attack (1995) states in its Appendix A-3-2 recommended minimum acceptable fire company staffing levels. Four Firefighters per engine or aerial company or five Firefighters for engine companies and six for aerials companies in high-risk areas. NFPA 1500
Standard on Fire Department Safety and Health (1997) copies the same language found in NFPA 1410 on apparatus staffing.

A new NFPA Standard on Deployment Standards, NFPA 1710 is in the Report on Proposal stage and within approximately 2 ½ years will be finalized. This standard will require four-person engine and aerial companies for career departments.

2) Do OSHA regulations require or imply minimum apparatus staffing?

No. Current OSHA regulations do not require minimum apparatus staffing standard. A case can be made that the same OSHA Standard may imply adequate apparatus staffing. OSHA 29 CFR.1910.134 (1997) determined that the “two-in/two-out rule” is in effect for any fire which is beyond the initial or beginning stage and which cannot be controlled or extinguished by portable fire extinguishers, Class II standpipe or small hose system without the need for protective clothing or breathing apparatus. Any fire beyond this “incipient stage” is considered by OSHA to be IDLH. Also, CFR 1910.134 recognizes deviations to regulations in an emergency or “good Samaritan” operation involving life-threatening situations where immediate action is necessary (OSHA, 1997). These situations described in the OSHA regulations indicate a dangerous situation that must be acted upon in a finite window of time. The only way to effectively begin fire control and rescue operations as soon as possible to take advantage of the narrow window of time firefighters have when they first arrive on the scene is to arrive at the scene with adequate manpower. This can only be accomplished with adequate apparatus staffing. OSHA 29 CFR 1910.134 Standard for Respiratory Protection and 29 CFR 1910.120, Hazardous Waste Operations and Emergency Response Standards, both mandate adequate staffing before offensive actions can be taken. The OSHA General Duty Requirement
enacted in 1970, allows OSHA to enforce NFPA Standards that do recommend minimum apparatus staffing.

3) Is there a direct correlation between firefighters’ safety and apparatus staffing?

Yes. The literature review showed a direct relationship between apparatus staffing and safety. The Dallas and Austin Fire Departments’ studies both documented a greater safety risk for fire apparatus companies as staffing levels decrease. Both of these Department studies showed increased stress to firefighters as staffing is reduced which led to greater risk of death, injury and overall safety. The Austin Study, concluded that fewer injuries/deaths for civilians and Firefighters as a benefit to increasing staffing levels from three to four persons.

The Johns Hopkins Study also reflects the fact that firefighters’ injuries are significantly influenced by inadequate staffing. The IAFF aggressively takes the stance that firefighters’ safety and the effectiveness of fire suppression services are closely linked. Firefighters cannot maintain the same level of aggressive fire suppression services while receiving fewer and fewer resources. Inappropriate reductions merely shift the burden of attempting to maintain the expected level of service to the firefighter at the expense of his/her own safety. The NFPA guidelines also make the correlation between staffing and safety by the numerous standards that recommend minimum apparatus staffing guidelines, NFPA 1410, 1500, and the yet unpublished 1710. These recommendations by the NFPA have grown out of experience and are empirically grounded in results from study after study showing the causal relationship of deficient foreground staffing and increased firefighters’ safety.

OSHA CFR 1910.134 and 1910.120 are both OSHA Standards that have grown out of the original Occupational Safety and Health Act of 1970. The General Safety Clause and all
OSHA Standards since are designed to assure so far as possible every working man and woman in the nation safe and healthful working conditions.

4) Can the Omaha Fire Department operate with less than their required four-person minimum staffing on all apparatus and continue to accomplish the Omaha Fire Department’s goals and mission?

The Omaha Fire Department cannot fully accomplish its stated goals and mission if it reduces the staffing on its apparatus. The mission of the Department is to provide “excellent” service to the citizens of Omaha. The purpose of the Department is to minimize death, injury and property loss. As the literature review revealed, even with the adoption of many or all of the “Do More With Less Strategies,” (anything that can be pre-connected should be; pre-fire planning and inspections; increase the number of companies responding to the incident; and peak activity staffing), the question of safety for the public and firefighters is very much in doubt. To provide “EXCELLENT” service to the citizens of Omaha the Omaha Fire Department must have adequate staffing to provide the resources necessary to the incident scene and have the ability to immediately put those resources to work. In a service where minutes count, we can not minimize death, injury and property loss if we do not have our most valuable resource--manpower--at the scene.

The strategies that enable fire departments to maximize the capabilities of under-staffed companies are a help in the staffing battle. The literature reviewed showed that even the authors who discussed the “Do More With Less Strategies” prefaced their discussion with an acknowledgment that three-and two-person staffing was insufficient and put firefighters at risk.
DISCUSSION

The research done for this project revealed that there are standards and guidelines for fire department managers to use when justifying staffing decisions. Starting with experience and the standards set by Warren Kimball’s Manning for Fire Attack (1969). He looked at apparatus staffing from an efficiency aspect clearly stating what specific jobs are entailed. His conclusion was “a five-man company unit normally is considered to be a desirable standard.” When experience and traditional standards are cited as today’s staffing needs, it is helpful to remember that fires have not changed over the years. Fires are a function of physics, chemistry, thermodynamics, mechanical engineering and gravity. (Brunacini, 1992) If the nature of the fire does not change and the level of technology and critical tasks that must be performed at the scene of a structure fire remain essentially unchanged, firefighter staffing should also remain unchanged (IAFF, 2000, Pg. 8).

The NFPA Standards also provide recommendations for apparatus staffing. The NFPA has been involved with manning standards since 1962. NFPA 1410, A-3-2.1, Training Standard on Initial Attack, was the first specific listing of minimum acceptable staffing levels for interior fire attack and linked that requirement to firefighter safety (NFPA 1995). These minimum staffing levels, “four members responding on or arriving with each engine or aerial ladder company responding to any type of fire”, were added to NFPA 1500, Standard on Fire Department Occupational Safety and Health Program. This Standard, in conjunction with NFPA 1410, takes the staffing issue and makes it an issue of firefighting safety (IAFF, 2000, Pg. 13). NFPA 1710, Organization and Development of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire
Departments, which is now in the ROP stage, will give a strong recommendation to the nation’s fire chiefs that minimum apparatus staffing is necessary. Engine companies and aerial companies shall be staffed with a minimum of four on-duty personnel, which is critical for fire departments to be considered efficient and effective (NFPA, 2000).

Time, tradition, experience and the NFPA Standards have established apparatus staffing guidelines for the fire service, while OSHA has given us fireground staffing directives. These Federal regulations do not specifically call for apparatus staffing but do imply the need for minimum apparatus staffing. OSHA 29 CFR 1910.134, branded the “Two-in/Two-out Rule,” states that two firefighters must be on standby to provide assistance or rescue when two firefighters are inside the building. The regulation also states that the “Two-In/Two-Out Rule” is in effect at any fire which is beyond the initial stage, such fires will be considered to be immediately dangerous to life and health (OSHA, 1997). OSHA 29 CFR 1910.134 makes an important exception where immediate action is necessary to save lives. This exception allows firefighters to immediately enter burning structures when people are in danger. It is this exception that implies the need for minimum staffing. We cannot have adequate fireground staffing without adequate apparatus staffing. Effective fireground tactics must be initiated immediately upon arrival at the fireground. Both rescue and fire control exist in an unforgiving and narrow window of opportunity (Brunacini, 1992). With three as the average staffing nationwide, it will take two rigs to start an interior attack. Delays to pool firefighters could burn the roofs down on those understaffed crews who make entry too late in the game (Edwards, 1998).
The “General Duty Clause” of the Occupational Safety and Health Act of 1970 gives OSHA the ability to monitor the nation's workplaces to make sure that all workplaces are free of known hazards. This clause allows fire departments to make the argument that minimum apparatus staffing is necessary to comply with the Federal Regulations that have the ability to site National Standards. Under this clause, an employer can be cited for a violation, even if the employer has met the letter of the law. This allows OSHA to use National Industry Standards such as NFPA Standards as the basis for a citation. Thus, while NFPA Standards are not legal requirements in themselves, they have the force by law in many situations (Blackistone, 1997).

As stated, the research showed that minimum apparatus staffing is supported by tradition, experience, NFPA Standards and Federal OSHA Regulations. The research, more importantly, showed a direct correlation between apparatus staffing and firefighter safety. Safety must be the fire service’s number one concern. The Fire Chiefs Handbook states, “The ultimate objective of the fire chief is to deliver the highest level of emergency response with the greatest margin of safety for firefighters in the most fiscally responsible way.” (Bachtler and Brennan, 1995). The Essentials of Firefighting Manual begins Chapter 1 emphasizing safety. “Firefighting is one of the world’s most honored but hazardous occupations. It is the duty of every fire department to practice life safety, incident stabilization, and property conservation.” (Essentials, 1998)

It becomes clear that staffing, both fireground and apparatus, is driven by firefighter safety. The research showed that adequate manpower is more efficient and effective and that it reduces firefighter and civilian injuries. The efficiency cited by the Austin, Texas, Fire Department included few multiple alarms, lower fire dollar loss, and higher loss/save ratios and
retainment of tax base properties. The Austin Study also concluded that effectiveness significantly improved when the company was increased from three to four personnel. In the two-story residential fire, the efficiency/time improvement between the three-person and four-person crew was 73%. In the aerial evolution the efficiency improvement between three and four person crews was 66%. In the engine company high-rise fire, the efficiency improvement between three and four person crews was 35% (IAFF, 2000 Pg 21). Managing the Fire Service by Coleman and Granito (1998) defines an effective staffing as a five-person suppression company being 100% effective, a four-person company 65% effective and a three-person company as 38% effective. The Dallas Fire Department’s studies also concluded that the five-person crews demonstrated a more coordinated and effective attack on the fire and search and rescue operations, while the four-person was capable of performing satisfactorily in the same situations. The three-person crew could not accomplish all the required critical tasks within the given time span. Inadequate staffing resulted in a cumulative effect, created by combined delays and lost functions on the part of each crew resulting in an even greater loss of overall effectiveness.

Firefighter injuries are the second result of inadequate staffing. The research showed that inadequate apparatus staffing led to higher firefighter injuries. The Dallas Fire Department Study (1969 and 1984), concluded that firefighters suffer from increased physiological stress and increased the risk of firefighters for injury (IAFF, 2000, Pg. 18). The Austin Fire Department Study (1993) also concluded an increased physiological stress, increased injuries/deaths for firefighters and civilians. Also, the conclusion of the physiological testing
on firefighters showed a notable decrease in the pulse rate (cardiovascular stress level) and respirations of four-person crews as compared with three-person crews (IAFF, 2000, Pg. 21).

The Johns Hopkins Study helps put the injury statistics in a more tangible light. The analysis compared the rate of injuries per 100 firefighters and per 100 alarms for cities operating four-person staffing versus those operating three-person units. The analysis showed that cities that operate with less than four personnel per apparatus had an injury rate per 100 workers that was 36.3% greater than cities with staffing levels of four or more. Firefighter injury rate per 100 alarms was an average of 38% greater in cities with staffing of less than four personnel per apparatus and the percentage of cities having an injury rate of 10 injuries or more per 100 firefighters was nearly double for those operating with less than four-person crews (IAFF, 2000, Pg. 26).

Staffing is an issue with which every Fire Chief must wrestle in relationship to the overall fire department budget. Manpower is the most expensive line item in a fire department budget. The budget for a paid-labor fire department is composed mostly of salaries—90%, in fact. This is a constant and fairly straightforward fact (Brunacini, 1992). The Chief of the Omaha Fire Department faces this very issue. He is in the enviable position to command a department that operates with a “minimum staffing requirement.” Unfortunately, his budget is being consumed by manpower costs and future funding increases will be small. The purpose of this project was to determine if the Omaha Fire Department could reduce its mandatory staffing and still meet its purpose and mission. The research outlined strategies that allow departments to maximize manpower when under-staffing is a financial reality. The Universal Cities Fire Department Profile and Comparison Survey done by the Tulsa Fire Department (2000) is an
excellent sampling of how many of our nation’s fire departments are operating with understaffed apparatus and are still “getting the job done.” Ironically, the Austin, Texas, Fire Department is one of those departments that staffs apparatus with three-person crews.

These “do more with less” strategies are an economic necessity. The strategies employed include pre-fire planning and inspections. Pre-plan and discuss strategy and tactics for both the engine and the aerial companies. Tasks as simple as hydrant operations should be discussed and pre-planned. Ventilation procedures, search and rescue can both be accomplished with smaller crews with planning and training (Bennett, 1989). Training is the key to any successful fire department, but even becomes more important when fire companies are under-staffed. Bennett (1989) states that training is probably the most important function of the department with reduced staffing. We will be doing training that breaks with tradition and changing behaviors. This is important and very difficult (Edwards, 1998). Reevaluate standard operating procedures and evolutions, and make training plans to carry them out (Bennett, 1989). Casey and Blocker (1997) point out that “with fewer people doing the same job, we need to find ways to do the same tasks with less labor-intensive methods.” They suggest “anything that can be pre-connected, should be.” These pre-connects include attack lines, pre-piped deluge guns, on-board foam systems, soft-suction supply line, electric lights and reels, extrication equipment and any other item that can reduce the labor-intensive nature of firefighting. One of the more creative strategies for getting adequate staffing to the fire scene is peak-activity staffing or roving engine companies. This idea simply puts more units on the streets during periods of predictably higher demands (Stout, 1989).
These strategies can help the Omaha Fire Department operate with reduced staffing if that becomes a financial necessity. The Omaha Fire Department will still “get the job done” if staffing is reduced. The Omaha Fire Department will not be able to fully accomplish its mission of striving for “excellence” in the quality of its firefighters work and service to the citizens of Omaha. Nor will its purpose be fully obtainable. The Department cannot “minimize death, injury and property loss and be effective. It is compromising safety, efficiency, and effectiveness with inadequate staffing.

**RECOMMENDATIONS**

This research supports the following recommendations for the Omaha Fire Department:

1. The Omaha Fire Department Management accept the current minimum staffing requirement.

2. The Omaha Fire Department management work with Omaha Fire Local #385 to draft a replacement ordinance for the current City Minimum Manning Ordinance that allows some flexibility in staffing.

3. The Omaha Fire Department management initiate a thorough evaluation of the Omaha Fire Department Standard Operating Procedures. This evaluation would target labor-intensive operations and evolutions and replace them where possible with less labor-intensive methods.

4. The Omaha Fire Department management revise the existing Omaha Fire Department company inspection and pre-planning program. Take the emphasis off familiarization and place it on pre-planning fire strategy and tactics.
5. The Omaha Fire Department management form a committee to study the implementation of roving engine companies.

6. The Omaha Fire Department management initiate a hiring process that anticipates personnel shortages. The goal of the process would be to hire and train candidates before the Omaha Fire Department personnel complement dropped below its authorized limit.

7. The Omaha Fire Department management begin long-range staffing objectives that gradually increase the Department’s personnel complement.
REFERENCES


City of Omaha, Omaha Fire Department Budget (1998-2000). Personnel section. City of Omaha, Omaha, Nebraska.


