FIRE APPARATUS STAFFING LEVELS FOR THE RIVERSIDE FIRE DEPARTMENT

EXECUTIVE PLANNING

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ABSTRACT

The problem is the City of Riverside Fire Department does not have adequate personnel to staff fire apparatus. The purpose of this research project was to determine the appropriate fire apparatus staffing level and to develop an action plan for City Manager approval that will allow for additional personnel.

Action research methodology was employed to answer the following research questions:

1. What are acceptable standards or guidelines for the staffing of fire apparatus?
2. What are the benefits of adequate fire apparatus staffing?
3. What are the limiting factors that could preclude the Riverside Fire Department from increasing staff on fire apparatus?

The procedures used to complete this research project consisted of literature review and review of the City of Riverside policies, procedures and ordinances.

The results of this research indicate that the City of Riverside Fire Department was not providing an adequate number of firefighters on the fire engines. Nationally recognized standards and numerous staffing studies indicate that all fire engines should be staffed with four firefighters and no less than three firefighters. The available literatures in regards to fire apparatus staffing guidelines indicate that fire apparatus must arrive with adequate fire personnel. Specific criteria must be met in order to obtain and keep staffing numbers adequate. The City of Riverside must realize the importance of providing adequate manpower on apparatus and provide a commitment to a specific fire
apparatus staffing procedure. The residents expected that fire apparatus was
staffed with a sufficient number of firefighters to carry out tasks. The current
staffing arrangement of the Riverside fire apparatus will not provide an adequate
number of firefighters to assemble and complete required tasks at an emergency.
Due to the financial burden that the increasing of staff creates, short term and
long term revenue needs require review.

The recommendation of this research project is for the City of Riverside to
staff the two fire engines with four firefighters each and no less than three
firefighters. Due to cross staffing, it is recognized that this target goal will not be
obtainable all the time. The findings were incorporated into the action plan that
will be used for implementation of increasing fire apparatus staffing.
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INTRODUCTION

The Riverside Fire Department is a combination department comprised of full-time, part-time and volunteer firefighters and emergency medical technicians (EMT’s). There are currently 17 full-time and eight part-time employees. There are also three volunteers that assist the department as their personal time allows. Part-time and volunteer personnel are used to assist with staffing levels. None of the fire department personnel respond from home. The department provides fire and emergency medical service transportation to a community with a population of approximately 30,000 residents. Over the last three years, the fire department averaged approximately nine emergency incidents per day. These responses included fire and emergency medical incidents.

The problem is that the City of Riverside Fire Department does not have adequate personnel to staff fire apparatus. The City has not agreed to any written staffing standard for fire apparatus, or to any specific level of service to the community. The only written staffing agreement is between the City of Riverside and the International Association of Fire Fighters Union Local 2938. This agreement stipulates that the City will maintain five firefighter/EMT’s on duty 24 hours a day. This is not a fire apparatus staffing agreement or guideline. There are no stipulations for the number of fire personnel that are required to respond on fire apparatus.

The purpose of this research project is to determine the appropriate fire apparatus staffing level and to develop an action plan for City Council approval
that will allow for additional personnel on fire apparatus. Action research methodology was employed to answer the following research questions:

1. What are acceptable standards or guidelines for the staffing of fire apparatus?
2. What are the benefits of adequate fire apparatus staffing?
3. What are the limiting factors that could preclude the Riverside Fire Department from increasing staff on fire apparatus?

**BACKGROUND AND SIGNIFICANCE**

The Village of Riverside and Mad River Township merged seven years ago to form the City of Riverside. The Mad River Township Fire Department provided fire and emergency medical services for Mad River Township and the Village of Riverside. At that time, the department relied mostly on all volunteers to handle emergency calls. Volunteer personnel were able to staff four fire engines and responded with at least four firefighters on each. Due to a reduction in volunteer personnel over the years, the department implemented a part-time staffing program six years ago. These employees were used to staff apparatus during the daytime hours when the volunteer staff was unavailable. One year later, the department began to hire full-time career personnel. Presently, the fire department is a combination department made up of full-time, part-time and volunteer personnel. The career personnel work 24 hours on duty and 48 hours off duty. To help keep overtime to a minimum part-time personnel fill in for career personnel on leave. Part-time personnel are limited to 72 hours every two weeks. During 1999, extra staffing was approved to allow an
additional part-time person, when available, to work Monday through Friday after 4:00pm and 24 hours on Saturday and Sunday. Along with the additional part-time staffing, the Administrative Assistant position was reclassified as an Administrative Assistant/Paramedic. Currently, the fire department is authorized by legislative ordinance to only 12 part-time firefighter/EMT’s.

Of the full-time personnel, 12 are represented by collective bargaining, three are supervisors, one is an administrative assistant paramedic, and one is the fire chief.

Volunteer personnel assist in providing staffing for fire and emergency medical responses while in the fire station. Volunteers stay in-house to provide a quick response to emergency calls. The Riverside Fire Department provides no form of compensation to volunteers. Part-time personnel receive compensation and are paid by the hour. The only benefit the volunteer and part-time personnel receive is life insurance.

Staffing of fire apparatus has been a controversial and often talked about issue. Fire departments throughout the country continue to under staff fire apparatus (Pegram, 2001). Many arguments continue over the proper number of firefighters needed to staff fire engines. All sides to the staffing controversy have issues with budgets and safety of firefighters and citizens (Lawrence, 1995). In past years, staffing of fire apparatus was never a problem. The department had many volunteers that would respond from home to staff the fire apparatus. A majority of the time the fire apparatus responded with at least four firefighters. The volunteers no longer assist with the staffing of fire apparatus as in previous
years. The number of volunteers has decreased dramatically over the last seven years (City of Riverside Annual Report, 2002).

Currently, none of the volunteers are certified as firefighters. The department now relies on the five on-duty firefighters to respond. A majority of the time the two fire engines that respond to an emergency are staffed with two firefighters. Brennan (1990) states that it is insane to staff fire engines with less than four firefighters. Carter (1999) indicated that large loss fires are a result of inadequately staffed fire apparatus. Studies over the years prove that four firefighters on each fire engine is safer and more productive (Minnesota, 1994).

Fire department personnel staff two fire stations within the City of Riverside. One fire station is staffed with two full-time firefighter/EMT’s and the other is staffed with two full-time firefighter/EMT’s and a shift supervisor. Each station is equipped with a fire engine and medic. Personnel cross staff each piece and if one piece is on an emergency then the other piece is out of service. At best, if all fire personnel are in the station, then one engine responds with two firefighters and the other with three. Each medic call requires at least two personnel to respond and only leaves three ready to handle the next emergency. If two medics are handling an emergency at the same time, then only one person is left to handle other emergencies. With only one person left, the fire engines are placed out of service and are unable to respond.

This applied research project meets Module #1: “Overview” of the Executive Planning manual for the National Fire Academy.
LITERATURE REVIEW

Research Question 1.

What are acceptable standards or guidelines for the staffing of fire apparatus?

Currently, there are several documents that can be utilized in trying to establish the appropriate number of firefighters to fire apparatus. The fire service has had a difficult time trying to agree upon adequate staffing and many departments do not provide adequate personnel on apparatus (Pegram, 2001). Over the years, there has been a lot of discussion relating to the staffing of fire apparatus. Fire apparatus should never be staffed with less than four firefighters. These firefighters need to arrive together on the apparatus as a team. Fire departments need to not only deliver fire fighting apparatus, but sufficiently experienced well trained firefighters (Brennan, 1990).

National standards, recommended guidelines and practices of fire apparatus staffing exist for the fire service to follow. The National Fire Protection Association (NFPA) is an organization that provides written standards and recommended practices for the fire service. These are not mandatory standards. Fire departments having authority may adopt these standards as standard operating procedures. Currently, there are at least three NFPA Standards that address staffing recommendations. NFPA encourages voluntary compliance of the standards.

The NFPA Standard 1500, 1998 edition is the Standard on Fire Department Occupational Safety and Health Program. This standard
recommends four firefighters as an acceptable number that should respond on a
fire engine. According to the standard, this is an acceptable level of staffing for
all types of fire emergencies. Apparatus responding to high-risk areas should be
staffed with at least five firefighters (National Fire Protection Association, [NFPA]
1500, 1998).

NFPA Standard 1410, 1995 edition is the Standard on Training for Initial
Fire Attack. This standard is based on fire fighting operations and the needed
manpower to complete task. This standard recommends that each engine be
staffed with at least four firefighters and five in high-risk response areas (National

Another NFPA Standard that was just recently adopted is a very
controversial staffing standard. This document is the NFPA 1710, 2001 edition,
Standard for the Organization and Deployment of Fire Suppression Operations,
Emergency Medical Operations, and Special Operations to the Public by Career
Fire Department. This standard addresses staffing levels that are at a minimum
level to help ensure firefighter safety. The standard states that each fire engine
is required to be staffed with a minimum of four firefighters. These firefighters
are to be on-duty personnel at the fire station. This standard is not intended to
over rule individual communities authority, but it is intended to be a benchmark
for the staffing of fire apparatus (Petrick, 2001)

There have been numerous staffing studies that have been conducted
throughout the years. These studies can be used as guidelines for all types of
fire departments. A City of Dallas, Texas study concluded that the most effective
fire attack could be done with five firefighters, but four firefighters could control a fire and implement rescue. It concluded that three firefighters could not handle, nor complete time critical tasks. Efficiency was noted to increase by 58% when fire apparatus was staffed with four firefighters (Fire Service Labor Monthly, 1994). Another study conducted by the Seattle, Washington Fire Department reported that fire apparatus that was staffed by three firefighters was inadequate in comparison to apparatus staffed with four (Clark, 1994).

Guidelines set forth but the International Association of Fire Fighters (IAFF) states that staffing standards should be at least four personnel on an engine and five on a truck. This guideline is based on numerous studies conducted over many years and professional expert opinions. The IAFF hopes that fire departments will utilize standard operating procedures to ensure adequate staffing of fire apparatus (International Association of Fire Fighters [IAFF], 1995).

**Research Question 2.**

What are benefits of adequate fire apparatus staffing?

Proper staffing of fire apparatus is essential in the fire service. When apparatus is staffed adequately, efficiency along with firefighter safety increases, and property loss decreases.

Fire operations demand an adequate number of firefighters to deliver the needed service to abate the hazard. Inadequate staffing of fire apparatus has related to an increase of large-loss fires. Fire operations require a lot of labor to obtain desired results (Carter, 1994). Studies conducted in Wisconsin and
Dallas, Texas both showed that fire operation objectives were accomplished quicker when more firefighters operated as a team. Austin, Texas concluded in their study that efficiency and safety increased when apparatus was staffed with four firefighters on each instead of three (IAFF, 1995).

Not only have studies shown the need for proper apparatus manning, but so have years of experience. Four to five firefighters staffed on each apparatus increases effectiveness and efficiency (Bruno, 1992). Efficiency can be increased by at least 58%. This increase in efficiency reduces the number of fire apparatus needed to respond to an emergency (Minnesota Fire Chief, 1994). When apparatus is not staffed adequately, fire fighting crews can be caught in an emergency situation that exceeds the crew’s capabilities (NFPA 1500, 1998). The lack of adequate personnel, during a time of an emergency, can prolong the desired outcome. The quicker enough firefighters arrive, the faster the desired outcomes are achieved. More firefighters allow tasks to be completed faster without jeopardizing safety and efficiency. Also, when more firefighters arrive on the apparatus and work as a team, there is less exertion on individuals and the desired outcomes are produced quicker (Lawrence, 1995).

For many years, an increase in firefighter injuries and lack of safety have been related to the inadequate staffing of fire apparatus. The International Association of Fire Fighters (IAFF) has collected data that indicates that firefighters injuries increase when staffing is reduced. The reductions of staff also increase the amount of energy necessary for each individual to complete a task. The lack of adequate fire apparatus staffing creates an increase in
physical stress (Clark, 1994). Four person crews had a decrease in pulse rate and respiration as compared to a three-person crew (Minnesota Fire Chief, 1994).

Erwin (1995) disagrees with labor organizations and the numerous studies that have been conducted. His analysis of 1991 statistics indicate that increased staffing created no benefit to fire scene safety in relationship to firefighter deaths or injuries. He states that the study conducted in 1992 by the Ottawa, Canada Fire Department shows that there is no evidence that indicates that firefighter injuries or deaths are reduced when apparatus is staffed with four firefighters at second alarm fires or greater. He did not provide statistical information with regards to firefighter deaths and injuries with apparatus staffed with four firefighters on initial first alarm response.

The NFPA standards indicate that the opposite is actually true. NFPA 1410 bases firefighter safety and efficiency as the need to respond with a minimum of four firefighters on each fire apparatus. This standard cites studies that demonstrate a significant reduction in effective operation performance and safety, when less than the recommended number of firefighters respond on apparatus (NFPA 1410, 1995). The recommendations made by NFPA are based on experiences from actual and simulated emergency operations. These experiences were evaluated for effectiveness. Once again, when less than four firefighters responded on apparatus, performance and safety was greatly reduced.
Fire suppression and search and rescue tasks improve when five firefighters respond on apparatus (NFPA 1500, 1998). A study conducted by the Westerville, Ohio Fire Department showed that performance was affected by manning. The data showed that the task of rescue could be accomplished 80% faster with a crew of four firefighters that three (IAFF, 1995).

Properly staffed apparatus can make a difference in the overall safety and health risk to firefighters (NFPA 1500, 1998). Staffing continues to be a risk associated to the well being of firefighter safety. Because fire fighting is very labor intensive, adequate personnel need to arrive on responding fire apparatus to improve safety and efficiency. In 1992 the Austin, Texas Fire Department conducted a study that documented numerous benefits to staffing fire apparatus with four personnel. Several benefits noted were associated with firefighter safety. The increased staffing reduced the number of injuries and deaths of firefighters and citizens. The reduction of injuries and deaths create a reduction in Workers’ Compensation claims. This data compares to the study conducted by the Dallas, Texas Fire Department 1984. The IAFF participated in a study with John Hopkins University and discovered that the injury rate per 100 workers was 36.3% higher with fire crews working in teams of three versus teams with four. When fire apparatus is staffed with a crew of four personnel, there are great reductions in the frequency and severity of injuries to firefighters (IAFF, 1995).

Not only is properly staffed apparatus important for firefighter safety, but properly staffed apparatus is also an important issue in regards to provide
protection of lives and property for citizens (Bruno, 1992). Public safety is minimized when proper staffing is not provided on apparatus (IAFF, 1995).

Research Question 3.

What are the limiting factors that could preclude the Riverside Fire Department from increasing staff on fire apparatus?

Full-time and part-time personnel increases are effected by budgetary constraints. Any staffing increases will create a financial burden on the City. Due to the financial status of the City of Riverside, fire fighting personnel increases have not been made. For the year 2001, 81% of the fire department budget was used for personnel salaries and benefits. The average salary per each full-time firefighter is $42,517. The average overtime is $3,067, and holiday pay is $1,200. Additional benefits also have a large impact on the annual budget.

The City contributes to a State of Ohio pension plan for full-time employees and social security contributions for part-time employees. For 2001, the average cost per full-time employee for pension contributions were $10,676 and the average cost per part-time employee was $5,890. The City also provides health insurance for full-time employees with an average per person expenditure for the year 2001 of $5,600. Medicare cost for 2001 was $754 per person for full-time and part-time employees. Full-time and part-time employees are also provided life insurance with an average cost of $105 per employee. The City must also contribute to the State of Ohio Workers’ Compensation Bureau. This expense is based on yearly payroll. For 2001, the average contribution per
employee for Workers’ Compensation was $2,969 (City of Riverside Budget, 2001).

Fire departments continue to experience budget cuts. Most cuts are made in personnel. Elected officials easily cut fire department budgets because they are not held accountable for understaffed apparatus. The citizens are unaware of fire department needs and they are unaware of the number of personnel needed to respond on each piece of apparatus (Bruno, 1996). The Riverside Fire Department budget has been reduced every year for the last three years, and the full-time staff has never been increased. In 1997, one full-time firefighter/EMT position was abolished by the City council (City of Riverside Budget, 2001).

There has not been any success in increasing on-duty staffing with volunteer personnel. All volunteer personnel are required to be certified as State of Ohio Emergency Medical Technicians. It has also been very difficult to maintain enough part-time personnel to cover minimum staffing requirements. Currently, the fire department strives to maintain at least one person on-duty above the minimum manning requirement. Over the last three years, volunteer and part-time staffing has decreased and the available pool of certified firefighters has declined (City of Riverside Annual Report, 2000).

Increases in personnel affect the budget in numerous ways. Not only are additional monies needed for salaries and benefits, but also additional monies are needed for operational expenses. Money is needed for the cost of physicals and immunizations. Additional monies need to be available to provide protective
clothing and uniforms. For the year 2001, it costs an average of $943 per person in protective clothing and uniforms. The 2001 medical expenses averaged $143 per person (City of Riverside Budget, 2001).

If budgetary restraints restrict the increase of staffing on the fire engines, there are other ways that will allow for additional help on the scene. One way to assemble enough fire personnel fast enough to abate a hazard is the implementation of an automatic mutual aid response (AMAR) with neighboring communities. Automatic mutual aid can assist in providing needed help when the budget does not allow for adequate apparatus staffing (Brennan, 1990). Pegram, (2001) states that staffing has always been a problem in the fire service and it is important that neighboring communities assist each other to provide adequate staffing to ensure the safety of firefighters and citizens. Prior to the start of automatic mutual aid, response districts need planned, evaluated and written agreements must be in place (Paulsgrove, 1997). Neighboring fire departments have tried to participate in a regional automatic mutual aid response (AMAR), but many have not experienced much success. Several county fire departments have limited AMAR agreements and have not been able to extend a better service delivery plan. Many area fire chiefs have experienced stumbling blocks that hinder a countywide AMAR plan. These plans involve the closet fire departments assisting those in need. For AMAR agreements to be acceptable to local governments, the plan has to be reciprocating. Both willing departments must have adequately staffed apparatus to assist each other. A
written agreement between the participating communities must be established with legislative approval (City of Riverside Operating Procedures, 1995).

As Brennan (1990) points out, it is more optimal to have less apparatus arriving on the scene staffed with adequate personnel, than more apparatus with not enough personnel. The current Montgomery County Mutual Aid policy states that at least three firefighters are required to respond on fire apparatus when responding on a mutual aid response (City of Riverside Operating Procedures, 1995).

**PROCEDURES**

**Definition of Terms**

**Automatic Mutual Aid Response.** An immediate response of emergency fire apparatus and personnel from one community to another community.

**Engine Company.** A group of three to four firefighters that work as a team.

**Fire Engine.** A basic fire fighting apparatus used in the fire service.

**Fire Truck.** Apparatus that carries tools, ladders and has an aerial device.

**Medic.** A transport unit staffed with at least two emergency medical personnel.

This researcher was able to analyze and evaluate the collected data that was obtained through literature review.

The objective was to establish criteria to assist with developing an action plan to obtain City Council commitment and approval to increase fire apparatus staffing. Data was gathered that could be used to answer the research
questions. The material not only had to be relevant, but it also needed to be from nationally recognized sources or professional organizations.

Parameters were set to evaluate all types and sizes of staffed fire departments. This parameter was used because staffing of fire apparatus is not unique to any one community or fire department. All types and sizes of staffed departments were included. This includes departments that are staffed by either full-time, part-time, volunteer or a combination of each. The target goal was reached.

This researcher evaluated the data and measured the available benefits against the current level of service provided to the citizens along with safety and efficiency concerns of staffing.

**Research Methodology**

This research project employed an action research methodology to develop an action plan that could be used to implement an increase in additional personnel to adequately staff fire apparatus for the City of Riverside. The procedures used to conduct this research project included literature review, and the review of the City of Riverside policies, procedures and ordinances.

Literature searches were initiated at the National Emergency Training Center Learning Resource Center in August 2001. Other searches were conducted at the local public library and the City of Riverside City Administrative Offices. Additional research was conducted on-line through the Internet, but with no success on this topic. The Ohio Fire Chiefs' Association, the State of Ohio Fire Marshal's Office and the International Fire Chiefs’ Association were
contacted but none of these organizations could provide any additional data on the topic. Each organization made references to the available national standards, guidelines and recommendations along with the references to labor organization publications.

This researcher rechecked the problem statement and was satisfied with the statement clarity and comprehensiveness. The purpose statement was adequate.

**Assumptions and Limitations**

An assumption was made that even though some information that was obtained was more than five years old, the data is still accurate today. Another assumption was made that staffing is a national problem and there was no need to limit the scope of research to specific sizes or types of departments and communities.

A limitation of this applied research project is the current available information specific to the staffing of emergency equipment. This researcher had difficulty with obtaining staffing data from sources other than fire service labor organizations and national standards. This researcher attempted to obtain information on the staffing of requirements of other emergency organizations. An attempt was made to gather information that may allow for various staffing ideas and recommendations. The International Association of Police Chiefs’ was contacted for information on staffing justification for the police service, but was not able to provide information. Also, this researcher attempted to obtain
information of the recommended staffing of fire apparatus for the federal government but was unsuccessful.

An additional limiting factor was unavailable fire and emergency data from the Riverside Fire Department. No information is collected on how often fire engines in the City of Riverside are not staffed. No information is collected on average number of firefighters that respond on the fire apparatus. Also, information was not available on the number of simultaneous emergencies that occur within the City.

The data that was reviewed indicated safety concerns for personnel when staffing was not adequate, but it is difficult to compare fires and various unsafe conditions to final outcomes. Without specific data, no analysis could be determined on exactly how firefighter deaths and injuries could be reduced in comparison to fire apparatus staffed with two, three, or four firefighters. The literature review provided data on how adequate staffing is a benefit.

Other limitations included not exploring or evaluating the possibility of additional staffing with part-time or volunteer employees to meet recommended staffing levels. This researcher did not address revenue needs that may allow for additional personnel.

**RESULTS**

The action plan to provide additional personnel to staff fire apparatus is shown in Appendix A.

**Answers to Research Questions**

*Research Question 1.*
What are acceptable standards or guidelines for the staffing of fire apparatus?

The research shows that there are three nationally known standards along with numerous studies that provide apparatus staffing direction. Although fire apparatus staffing has been a controversial issue in the fire service, there are numerous documents that can provide justification for adequate fire apparatus staffing levels. This information can assist fire service leaders with staffing justification and guidelines (Pegram, 2001).

NFPA Standards 1410 (1995), NFPA 1500 (1998), and NFPA 1710 (2001) all provide recommended levels of apparatus staffing. All three standards recommend that each fire engine be staffed with four firefighters. Both NFPA 1410 (1995) and NFPA 1500 (1998) recommend that fire engines be staffed with five when responding to high-risk areas. NFPA 1710 (2001) recommends that the staffing of the fire apparatus be with on-duty personnel (Petrick, 2001). This recommendation precludes personnel from responding from home to staff the apparatus. The City of Dallas and the City of Seattle studies both indicate that staffing levels of four firefighters on apparatus is the most effective approach. The IAFF recommended guidelines also state that standards for staffing fire engines should be four firefighters (IAFF, 1995). Most of the literature review justifies staffing of four firefighters as a issue of safety, effectiveness and efficiency.

Research Question 2.

What are the benefits of adequate fire apparatus staffing?
After reviewing the literature review, this researcher found that there are several noted benefits to staffing fire apparatus with four firefighters. Proper staffing of apparatus increases efficiency, firefighter safety, and helps in reduction of property loss.

Fire fighting operations are very labor intensive. Operations require adequate personnel to abate hazards in a timely manner. When there is a lack of adequate fire personnel on apparatus, overall fire ground operations are affected (Carter, 1994). Firefighters operate in teams and the more in the team the quicker the task are completed (Clark, 1994). A study conducted by the City of Austin showed that efficiency increased with four firefighters. With four firefighters on fire apparatus, tasks were completed quicker and safer. By adequately staffing apparatus, efficiency increased. Some studies showed that efficiency increased by 58% with four firefighters staffed on each engine and rescue efforts increased by 80% (IAFF, 1995). Another benefit noted was that less apparatus is needed to response when properly staffed with four firefighters. Apparatus staffed with less than four firefighters required additional apparatus so that enough manpower is assembled on the fire ground to safely and effectively operate (Minnesota, 1994). Additional apparatus has an effect on response time, because it usually responds from farther away. Increased response time can greatly affect the amount of loss (Lawrence, 1995).

Staffing has been related to having an affect on firefighter safety. Labor organizations continue to indicate that when apparatus is not staffed with four firefighters, injuries to fire personnel increase. The Seattle study indicated that
the rate of injuries is 54% greater to fire personnel that respond on apparatus staffed with three compared to apparatus staffed with four (IAFF, 1995). Erwin (1995) reported that the 1992 Ottawa study proved that staffing fire apparatus with three firefighters reduced injuries in comparison to apparatus staffed with four firefighters. When injuries occurred, the fire engine was staffed with four firefighters, 90 percent of the time. Injuries occurred only 10 percent of the time, when the fire engine was staffed with three firefighters. Erwin (1995) states that additional surveys indicated that more firefighters on apparatus do not make the fire ground safer. Fire engines that are staffed on an average with three firefighters have fewer injuries that those staffed with four.

Large loss fires have increased over the last 30 years, because fire apparatus are not properly staffed. Apparatus must arrive with adequate personnel ready and able to safely abate the hazard. The longer it takes for additional apparatus to arrive so that enough firefighters are able to begin operations, the greater the loss of property and life (Carter, 1994).

Research Question 3.

What are the limiting factors that could preclude the Riverside Fire Department from increasing staff on fire apparatus?

The research shows that there are factors that may limit or restrict the Riverside Fire Department from increasing fire apparatus staffing. Increasing the level of personnel comes with a price. The fire department expenditures have been reduced over the last three years. Full-time personnel increases have a large financial impact on the overall budget. Currently, personnel cost already
take 81% of the available monies. With no expenditure increases, any cost in personnel would lower, if not drain, the available money for commodities and supplies.

The approximate annual salary and benefit cost per firefighter is $62,505. Additional cost for uniforms and physicals average $1,086 per employee (City of Riverside Budget, 2001). To staff the two fire engines with four firefighters, nine full-time firefighters would need to be hired. These additional personnel would have an annual cost impact of $572,319, including benefits and uniforms.

One way to assist with fire ground staffing is through the use of AMAR. Even though automatic mutual aid may assist with assembling adequate personnel on the fire ground, it still does not address the issue of adequately staffing the responding fire apparatus. Although mutual aid provides assistance to those departments in need, it will take longer for needed personnel to arrive and begin operations (Pegram, 2001). There are stumbling blocks and local political issues that needed to be addressed with automatic mutual aid agreements. Since agreements need to be reciprocating, the Riverside Fire Department must be able to assist other departments (Paulsgrove, 1997). All the fire departments in the county have a staffing agreement that would require the City of Riverside Fire Department apparatus to be staffed with at least three firefighters on any automatic mutual aid response (City of Riverside Operating Procedures, 1995).
DISCUSSION

By reviewing the data, this researcher discovered that the nationally recognized fire service standards all concurred that the proper staffing of fire apparatus should be four firefighters. Existing studies agree that four is an acceptable staffing level. This researcher also realized that even three firefighters would be a great improvement over two firefighters on an engine. Lawrence (1995) recommends to staff fire apparatus with three firefighters. Fire apparatus must arrive with adequate personnel to effectively, safely, and expeditiously abate a fire hazard. The data indicates that firefighters are safer when they operate in teams of four. They are also more efficient and more effective in completing time sensitive tasks (Clark, 1994). Although Erwin (1995) indicates that there was not a notable difference in staffing apparatus with four firefighters on multiple alarm fires, he made no recommendation on staffing apparatus on first alarm fires. Standards, procedures, and guidelines all indicate that the prudent thing to do is staff fire apparatus with four firefighters. Fire apparatus staffed with four can operate faster and safer. With the increase in fire operation speed, property loss and fire deaths can be reduced (IAFF, 1995).

The results show numerous benefits to staffing apparatus when adequate personnel arrive to abate the hazard. Additional staffing of the two fire engines in the City of Riverside is warranted. The benefits indicate that fire apparatus staffed with four firefighters makes sense. Apparatus needs to arrive with enough firefighters to begin the labor intensive job of abating all hazards. Fire crews need to have enough firefighters in their team to effectively carry out job
tasks fast and in a safe manner. Adequate manpower is crucial. The task of saving lives needs to be done quickly. Firefighters are constantly working against the clock and time is a major factor. Fire operational tasks cannot be carried out by one person and usually require three to four people (IAFF, 1995).

This researcher interprets the results from the literature review that additional staffing is needed on fire apparatus. The City of Riverside should strive to staff fire apparatus with four firefighters and never less than three. Extra staffing will have a large impact on the annual fire department budget and will cause a hardship in other areas. The last three fire department budget years created a reduction in available fire department monies (City of Riverside Budget, 2001). The City expenditures cannot be more than the available revenue. Additional revenue should be sought. Shouldn’t the voters be asked what level of service they expect and if they are willing to pay extra for improved service? Citizens expect fire apparatus to arrive quickly and with the needed manpower to overcome the emergency.

Elected officials must assist the fire department in providing the best level of service possible to the community. It is understandable with the cross staffing of fire engines and medics it will be difficult to provide proper staffing of fire apparatus 100 percent of the time. The commitment needs to be made from the elected officials and it must be recognized during the budgetary review process.

Fire departments will always need to rely on neighboring communities, but an adequate first response with enough personnel must be provided. The first
arriving fire apparatus must arrive quickly and with enough firefighters to react to and overcome the hazard (Paulsgrove, 1997).

The City of Riverside does have a minimum staffing agreement with the local bargaining unit. This agreement addresses the number of on duty personnel required, but it does not require a minimum number of firefighters to respond on apparatus (City of Riverside Standard Operating Procedures, 1995). A written commitment by the City to the fire department personnel and the community should be provided.

The results indicate there are problems with the existing fire apparatus staffing levels. From minute to minute, the fire department has no idea how many firefighters will be available to respond on the next emergency. Personnel are left guessing if enough personnel will be available to properly handle the next emergency. It is not fair or sensible to respond apparatus with less than three firefighters (Brennan, 1990).

The action plan can assist the City in taking the necessary steps in providing additional staff for the two fire engines.

RECOMMENDATIONS

The City of Riverside must provide additional personnel to staff fire apparatus. The City can not rely on part-time and volunteer personnel to increase to a level that would assist in the daily staffing of apparatus. A formal written agreement should be developed that would provide direction in service expectations. This agreement should indicate that the fire department target for apparatus staffing will be four firefighters per engine and no less than three. It is
understandable that emergencies are on first come first served basis and the City of Riverside apparatus is crossed staffed. This staffing level will not be obtainable when personnel are on a medical emergency.

Due to budgetary restraints, this staffing level will need to be phased in over time. As a start, each fire engine needs to be staffed with at least three firefighters. The City needs to set a target goal with a time frame to allow the staffing of the fire engines with four firefighters. A mixture of full-time, part-time and volunteer personnel may allow for the increase of four firefighters to an engine. The part-time and volunteer program needs to be reevaluated. The requirement of personnel to be emergency medical certified may need to be waived. This may assist with increasing the pool of available firefighters to assist with staffing.

The City of Riverside Council needs to pass legislation to approve the action plan to provide additional personnel to staff the fire apparatus.

Also, the Ohio Fire Chiefs’ Association and the International Fire Chiefs’ Association need to seek a common solution and bring resolve to the controversial minimum staffing disagreements. Elected officials, Fire Chiefs’ and labor organizations must find solution to the staffing issue. Currently, everyone continues to point fingers at the other and nobody is willing to trust. Unfortunately, this topic is viewed by some as just another way for fire departments to increase staff for no real reason or justification.
REFERENCES


City of Riverside (Riverside, Ohio). (1996). *City of Riverside, Ohio fire department standard operating procedures*. Author.

City of Riverside (Riverside, Ohio). (2001). City of Riverside, Ohio annual budget. Author.

City of Riverside (Riverside, Ohio). (2000). City of Riverside, Ohio fire department annual report. Author.


APPENDIX A

ACTION PLAN

January 7, 2002

TO: Mr. Kevin Carver, City Manager

FROM: Dan Alig, Fire Chief

SUBJECT: Fire Apparatus Staffing

ISSUE: Should the City of Riverside increase fire apparatus staffing levels?

BACKGROUND: Currently, the fire department staffs one fire engine with two firefighters at station six and the other with two firefighters and a shift supervisor at station five. The fire personnel cross staff two medics and two engines. Fire personnel respond to an average of nine emergencies a day and average one working fire every 12 days. If the medic responds on an emergency, there are only two firefighters available for the next emergency and if both medics are out, only the shift supervisor is left.

The fire department utilizes full-time, part-time, and volunteer personnel to staff fire apparatus. Full-time and part-time staff is required to be certified as firefighters and emergency medical technicians. During the days of a complete volunteer fire department, the fire apparatus responded with four firefighters and the fire department personnel staffed four engines. Now fire department personnel do not respond from home to assist with emergency calls. At this time, only five on duty personnel protect the City of Riverside.
DISCUSSION: After conducting a literature review for my applied research paper for the National Fire Academy, I have concluded that additional firefighters are needed to staff the two fire engines. There are numerous benefits to staffing apparatus with a crew of four firefighters. Fire fighting operations are labor intensive and time sensitive. When fire apparatus arrives with four firefighters, efficiency of the operations dramatically increase and firefighter safety is improved. Hazards are abated faster when enough firefighters arrive in a timely manner to carry out the multiple task that need completed. A majority of tasks need completed at the same time for the proper and desired outcomes. Fire apparatus that arrive with four firefighters help with the reduction of property loss more than apparatus that arrive without adequate manpower. Fire crews need to arrive in teams of four and no less than three, so that fire operations can be safely conducted.

RECOMMENDATION: The City of Riverside should provide additional personnel to staff fire apparatus. The following steps should be taken to implement this commitment:

1. The City Personnel and Policy Manual must show a commitment to staff the fire engines with four firefighters and no less than three firefighters.
2. The City of Riverside Personnel Director must be given direction to provide council with cost analysis of additional personnel and the
budgetary impact of the extra staff. Recommendations will be needed on the potential need to increase revenue.

3. The City of Riverside Personnel Director must be authorized to begin the hiring process of additional fire personnel.

4. The current requirements that all full-time and part-time personnel must be both firefighter and emergency medical certified must be reviewed and amended.

5. Submit an ordinance to council to appropriate the needed funds to increase fire apparatus staffing to recommended levels.