

**THE IMPACT OF INADEQUATE STAFFING ON INITIAL FIRE ATTACK AT
PITTSFIELD TOWNSHIP FIRE DEPARTMENT**

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An applied research project submitted to the Department of Interdisciplinary Technology as part of the School of Fire Staff and Command Program

August 2002

ABSTRACT

Currently the Pittsfield Township Fire Department has three stations that respond to emergency calls within its borders. Two of these stations have a staffing level of one, while the other station's minimum is two. These levels are well below the industry standard and the recommendations of the NFPA (National Fire Protection Association). In order to increase safety and provide better, more efficient services for our customers, Pittsfield Township must increase its minimum staffing.

This paper and its base of research, obtained through the use of documented studies and literature, support the increase of the minimum staffing level of all three stations to a safe and efficient level as recognized by the fire service and NFPA. Practical tests have also been completed to show the difference in efficiency and safety of different staffing levels. This will not only benefit our customers but will also provide a safe working environment for the members of the fire department.

This project and its research supports the initial thesis that the increase in staffing levels will improve efficiency and provide a safer township for people to work in, live in, and to visit. If staffing levels are not brought up to industry standards, it is only a matter of time until a serious accident happens, an accident which can be avoided.

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INTRODUCTION

Pittsfield Township would be a much safer place to work, live, and visit if fire department staffing levels were brought up to a safe level. The current staffing levels are low by industry standards and are inviting of accidents, injuries, and inefficiency.

Pittsfield Township has been growing rapidly over the last fifteen years and the fire department staffing levels have not kept up with the additional demands placed on fire-rescue services. It is only by virtue of luck that there has not been a serious accident or injury as a result of the current staffing levels.

When a fire station is dispatched on a fire run, there are a number of tasks that need to be completed in an expedient manner before and after arrival at the scene. Such tasks include but are not limited to: looking up address and routing in the map book, looking up the location in the pre-incident survey book, driving the apparatus, operating the siren, operating the radio, dressing the hydrant, forward or reverse hose lays, scene size-up, connecting supply line, stretching and charging attack lines, apparatus placement, self contained breathing apparatus (SCBA) donning, search and rescue, fire suppression, etc. Each task is vitally important to the fire fighters and the people in need of our services. If these tasks are not completed in a short amount of time, lives and property will suffer.

Another safety concern is the fact that at two of the three Pittsfield fire stations, one person may be working by himself. This occurs approximately 32% of the time, and there is no mechanism in place to correct this.

With the tragic events of 9/11, we are more aware than ever of the awesome responsibilities of the fire fighter of today. As New York Fire Chief Joseph Pfeifer, (2002) the first fire chief to arrive at the World Trade Center on September 11, 2001 - in under four minutes - has pointed out:

You don't run into a burning building if you don't believe that your essence is being a fire fighter, if you don't believe you can make a real difference in someone's life. But we can't always run toward everything. We did as much as we could that day. We knew what was happening. But what we didn't know was that a high-rise building could collapse. The concept wasn't part of our language, our procedures.

Today, I'm working with a team to help make fire departments safer. Fire fighters will always be the first responders no matter what acts of terrorism are wreaked upon Americans, so we are trying to figure out how to make that response safer and still save lives (p. 68).

The question must be asked--can we do less in our own communities? Can we do less in Pittsfield Township? The safety and efficiency of our fire department personnel and our citizens should be paramount in the planning of our goals, budgets and civic resolutions. Adequate staffing of fire departments is a crucial component in achieving success in fire attack and search and rescue efforts.

BACKGROUND AND SIGNIFICANCE

The Pittsfield Township Fire Department was established in 1948 and currently employs 53 professionals: 1 Fire Marshal who is in charge of fire operations, 1 Training Officer/Asst. Fire

Marshal, 3 Lieutenants, 6 Sergeants, 3 Full-Time Fire Fighters and 39 Paid-on-Call Fire Fighters. Daily on-duty staff consists of one Lieutenant, two Sergeants, and one Full-Time Fire Fighter out of three stations. Stations One and Two respond with only one person, and Station Three responds with two.

Calls for service, such as emergency medical responses, car accidents, vehicle fires, small outside fires and similar incidents, are handled with the response of Station Three and Station One or Two (whichever is closer). Structure fires, vehicle extrications, aircraft emergencies and similar incidents are dispatched for response from all three stations, as well as the paid-on-call staff.

The average response time of the first arriving apparatus is 4.4 minutes, the second arriving apparatus is 9.4 minutes, and the third arriving apparatus is 11.3 minutes (Pittsfield Township Fire Department June 2002 Monthly Report). The busiest fire station is Station Two, and it is very common for that station (with one person) to arrive on an emergency incident and be alone for an average of 4.2 minutes until the second arriving apparatus is on the scene.

In the larger incidents when paid-on-call personnel are activated, the response is inconsistent and varies with the time of day. A major drawback of paid-on-call fire fighter response is that most of the staff in this category, work other daytime jobs Monday through Friday, which limits their response. There also is no guarantee how many paid-on-call fire fighters will respond to an emergency, sometimes none. Another drawback to paid-on-call response is the issue of experience and training. Pittsfield Township Fire Department has an annual turnover rate of 45% (Pittsfield Township Payroll Records) for paid-on-call fire fighters, which limits their ability to become well trained and experienced. Currently, the average amount of on-the-job experience for a paid-on-call fire fighter at Pittsfield is 2.6 years.

Paid-on-call fire fighters are encouraged to work 12 hour training shifts (stand-by shifts) at Station One or Two, but these shifts are commonly vacant. Stand-by shifts accommodate one fire fighter at a time and are used to train and familiarize fire fighters with all areas of the fire service. There is no requirement that these shifts be filled, so this is not viewed as part of daily manpower.

There have been multiple situations in the past ten years when a fire truck with only one fire fighter has arrived on a working structure fire and that person was alone for 4-5 minutes (Pittsfield Township Records Bureau). In these situations, fire fighters were faced with an unmanageable amount of tasks that needed to be completed immediately, putting lives at risk. Between 1995 and 1999 there were three incidents at Pittsfield Fire Department where fire fighters slipped and fell off fire apparatus and were injured. Fortunately, in those cases, there were other fire fighters around to assist. If those fire fighters were working alone at the time, they may not have been found until the next day.

Current fire department staffing at Pittsfield Fire Department is a major safety concern, both for the fire fighters and the citizens. Continuing to operate the fire department with its current staffing levels is an invitation to excessive property loss, serious injury, or even death.

Many of the statistics relating to Pittsfield Township Fire Department were obtained from the Pittsfield Township Records Bureau and the fire department monthly reports.

LITERATURE REVIEW

Because of the fact that inadequate staffing is an issue at many fire departments across the country, there is a wealth of information available on the subject, such as videos, news

articles, documented studies, and other term papers. All of these were helpful in researching this thesis, and they offered different perspectives on this sensitive subject.

The International Association of Fire Fighters (IAFF) produced a video “Staffing For Survival,” which touched on some very important statistics and studies. In this video, several key statistics from an independent staffing study done by the International City Management Association (ICMA) were highlighted. This study concluded that a five-person fire engine crew is 100% effective, a four-person crew is 65% effective, and a three-person crew is only 38% effective. According to these statistics, Pittsfield Fire Department is operating well below ICMA recommendations.

The National Fire Protection Association (NFPA) developed another useful document, NFPA 1710 (Standard for the Organization and Deployment of Fire Suppression Operations). This standard covers all areas of fire suppression, including the personnel needed to do the job safely. Listed in this standard are the tasks that need to be completed during fire suppression, and the amount of personnel it takes to complete each task safely and effectively. NFPA standards are followed in many jurisdictions and may be used in litigation should investigations arise from complications or errors in emergency response.

Overall, the total literature review confirmed the fact that inadequate staffing has a great impact on initial fire attack and rescue. The sum conclusion of the video and NFPA document, along with numerous other articles and papers used in the research of this paper, was that a staffing level of less than four fire fighters is dangerous and ineffective.

PROCEDURES

Conclusions of this project were initially derived through research obtained from various periodicals, books, articles, independent studies, and personal experience.

To verify and solidify the research findings, a live fire training staffing study was performed at Pittsfield Township Fire Department to show the discrepancies, if any, in the effectiveness of different sized fire crews on initial fire attack. The study was conducted by utilizing a consistent scenario and implementing four different sized crews to complete seven common tasks related to the primary fire service objectives.

Scenario: Two story, wood frame, single family dwelling of approximately 1800 square feet. Fire was set in furniture in a furnished upstairs bedroom and allowed to burn without interference. A smoke detector was placed on the ceiling of the upstairs hallway approximately eight feet from the fire room. Dispatch information included a report of a house fire with confirmation of a person trapped.

Parameters of the study:

- Fire was started.
- When smoke alarm sounded, a thirty- second delay was implemented to simulate a call to 911.
- An additional thirty- second delay was implemented to simulate scramble time.
- A four minute and forty second delay was added to simulate average response time.
- Crews exited fire truck and began their tasks.

Study Tasks:

- Scene size-up
- Pull attack line.
- Charge attack line.
- Forcible entry.
- Advance attack line to fire.
- Extinguish fire.
- Search and rescue.

Note: It was not necessary to complete tasks in a specific order; fire fighters were allowed/encouraged to use their own discretion as long as all seven tasks were completed.

Study Focus:

Focus is on timing of above tasks to demonstrate relation of staffing to safe and efficient fire attack.

Limitations:

The available information used in this research did not necessarily come from fire departments with the same type of staffing structure; that is combination fire department versus full paid staff.

The possibility of bias exists in documents and studies prepared by other fire departments or fire department labor unions. Though these studies were completed using factual statistics and actual experiences, bias cannot be ruled out.

Fire study limitations include a familiarity with the scene, with the problem being presented and with the efforts of the study, and could allow for some pre-assessment and preparation. Prior knowledge of the situation could impact the timing results of the study

Definitions:

Combination Fire Department--A fire department that is staffed with both full paid staff and paid-on-call fire fighters.

Paid-on-call fire fighter: A fire fighter who is on call and receives compensation for emergency incidents and training.

RESULTS

A compilation of a significant literature review and a real life study conducted in the field combine to support the premise of this paper: **It is important to provide appropriate levels of staffing on initial fire attack in order to effectively and safely complete the primary fire service objectives--Life Safety, Incident Stabilization and Property Conservation.**

The independent study within Pittsfield Township was completed on August 5, 2002 to demonstrate the effects of various levels of staffing on the timing and efficiency of task completion during initial fire attack.

Pittsfield Fire Department Staffing Study:

This study was conducted at a training burn in Pittsfield Township using a predetermined scenario and four different sized crews. Each crew completed seven defined tasks and the time for completion of each task was recorded. The completion times of the required tasks are outlined in the table below:

Timing of Task Completion:

Tasks	Crew of 1*	Crew of 2*	Crew of 3*	Crew of 4*
Scene Size-Up	1 min 30 sec	1 min	25 sec	20 sec
Pull Attack Line	2 min 41 sec	1 min 30 sec	1 min 40 sec	30 sec
Charge Line	3 min 35 sec	2 min 10 sec	1 min 50 sec	59 sec
Forcible Entry	4 min	2 min 10 sec	40 sec	32 sec
Advance Line to Fire	4 min 38 sec	2 min 35 sec	2 min 10 sec	46 sec
Extinguish Fire	4 min 45 sec	2 min 40 sec	2 min 15 sec	1 min 21 sec
Search and Rescue	6 min 40 sec	3 min 10 sec	2 min 16 sec	1 min 40 sec
Total Completion Time	6 min 40 sec	3 min 10 sec	2 min 16 sec	1 min 40 sec

*Number of Fire Fighters on crew

Timing started when the respective crew exited the apparatus and began their tasks. A stopwatch was used to track the completion time of each task and was then recorded in the table above. It is important to note: all four fires were of approximately the same size with the same smoke condition, the same equipment was used each time, and a constant water supply was already initiated with large diameter supply hose. Safety personnel were positioned throughout the structure with a charged hose line in case of an emergency.

After completion of the tasks, the one and two man crews were physically exhausted and it was questionable whether they would be able to perform a rescue if a victim was located.

Another concern identified was that if a fire fighter were to be injured or incapacitated during this type of operation with a one or two man crew, the rescue effort would be seriously delayed due to lack of manpower. There is an obvious increased risk to the fire fighter when an interior fire attack is undertaken without the support necessary to complete it. Additionally, the one and two man crews noted that they experienced a burden of stress and urgency while trying to cope with the lower staffing levels.

With the three and four man crews, all interior tasks were completed with a minimum of two fire fighters, leaving no one alone in the structure. The fact that multiple tasks could be accomplished simultaneously decreased the completion time, thereby lessening property damage and increasing the chance for victim survival.

The results of this study clearly indicate that the larger the crew, the more quickly and efficiently these tasks can be completed. According to NFPA 1710 (2001).

- The fire department's fire suppression resources shall be deployed to provide for the arrival of an engine company within a 4-minute response time and/or the initial full alarm assignment within an 8-minute response time to 90 percent of the incidents.
- Personnel assigned to the initial arriving company shall have the capability to implement an initial rapid intervention crew (IRIC).
- The initial full alarm assignment shall provide for the following:
 - Establishment of incident command outside of the hazard area for the overall coordination and direction of the initial full alarm assignment. A minimum of one individual shall be dedicated to this task.

- Establishment of an uninterrupted water supply of a minimum 1480 L/min (400 gpm) for 30 minutes. Supply lines shall be maintained by an operator who shall ensure uninterrupted water flow application.
- Establishment of an effective water flow application rate of 1110 L/min (300 gpm) from two handlines, each of which shall have a minimum of 370 L/min (100 gpm). Attack and backup lines shall be operated by a minimum of two personnel each to effectively and safely maintain the line.
- Provision of one support person for each attack and backup line deployed to provide hydrant hookup and assist in line lays, utility control, and forcible entry.
- A minimum of one victim search and rescue team shall be part of the initial full alarm assignment. Each search and rescue team shall consist of a minimum of two people.
- A minimum of one ventilation team shall be part of the initial full alarm assignment. Each ventilation team shall consist of a minimum of two people.
- If an aerial device is used in operations, one person shall function as an aerial operator who shall maintain primary control of the aerial device at all times.
- Establishment of an IRIC that shall consist of a minimum of two properly trained and equipped personnel (p. 14 – 15).

This standard suggests that 15 fire fighters (four or more per company) are needed within the first eight minutes to adequately and safely handle a fire in a residential structure. This staffing level is rarely, if ever, met at Pittsfield Township. The importance of aggressive fire attack and search and rescue are paramount in the minds of fire fighters and civilians alike. The

NFPA concluded: (July 2001 NFPA 1710) “rapid and aggressive interior attack can substantially reduce the human and property losses associated with structural fires.” Without an adequate staffing level, an aggressive interior fire attack is impossible.

Additional staffing studies from Seattle, Dallas, and Providence all agree that 15 fire fighters are needed for a residential structure fire (four or more per company). The other important fact that these studies point out is that there are consistently significant increases in injuries in understaffed fire departments. The IAFF (1992) found that fire departments with staffing of less than four fire fighters per company reported an injury rate one-third higher than those with four or more (p.10).

DISCUSSION

The issue of inadequate fire department staffing is not unique to Pittsfield Township; it is an everyday issue across the nation. In December of 1999, the Keokuk, Iowa Fire Department was beset with a tragedy that will forever change their lives. They responded with four fire fighters and two pieces of apparatus to a report of a house fire. They arrived to find heavy smoke coming from the structure and a hysterical mother advising that three of her children were still in the house. With other off-duty fire fighters responding to the scene, the first arriving personnel attempted search and rescue and fire attack operations. The end result of this incident was that the three missing children died along with three Keokuk fire fighters. The NFPA, which regularly investigates fire fighter line of duty deaths, concluded that one of the possible factors leading to the deaths of these fire fighters was inadequate staffing. Many people feel that if the

Keokuk Fire Department had adequate staffing, the three fallen fire fighters would still be here today. L. Slepicka (2000) noted:

According to Duval (NFPA investigator), insufficient resources are a very obvious factor in the incident. Four fire fighters arrived on the scene with two pieces of apparatus. One stayed with the hydrant for hookup a block from the fire. Two were setting up the apparatus. That left one to face the burning building and do all the other functions necessary.

The size of the department at the time, eighteen members and the chief, met their first form of aid was callbacks. The procedure was to call off-duty fire fighters and get them to respond. Duval was not critical of this plan as opposed to calling for mutual aid from a neighboring town. The nearest department, he said, would not have arrived sooner than the callbacks. Most of the Keokuk department reached the scene and they brought the fire under control.

The on-duty fire fighters were finishing with an MVA when the fire call came out and the normally available five fire fighters were four when one went to the hospital with the MVA victims. Also, the ambulance crew could not respond immediately to the fire.

The four initially on the scene were not enough to handle many of the important functions at this fire (p. 2 – 3).

In comparing Pittsfield Township's situation, the following are points for consideration:

- Pittsfield Fire Department daily staffing is at four vs. Keokuk staffing of five.
- The four Pittsfield firefighters respond in 3 trucks vs. the two trucks utilized by the Keokuk Fire Department.

- Both departments rely on similar callbacks for additional manpower. This situation provides no guarantee of when or how many firefighters will be able to respond.

A second example of a short staffing tragedy is relayed by Harry Carter, PhD (2002) in one of his monthly commentaries:

The latest chapter in the continuing saga of short staffing tragedies comes to us from the Commonwealth of Massachusetts. A tragedy in Ipswich back in January, took the lives of a mother and her two children. A third child was saved when her mother threw her out of the third floor window of their blazing home. What makes this story so heartbreaking is that the first unit that arrived at the fire was a hook and ladder truck, with a lone fire fighter on board.

I have reviewed the Boston Globe stories about this fire. In essence, they are a rehash of the facts that have surrounded numerous tragedies over the past few years. You cannot say with any certainty that a full, minimal complement of twelve fire fighters responding on two engine companies and a truck under a chief officer would have saved these people. But I can damn sure say that one guy, all by himself, was not enough, no matter how brave or valiant that man was.

How can any thinking person, city administrators or politicians alike, think that one man is an adequate response to anything? That poor guy that got there all by his lonesome will have to live the rest of his days bathed in the aura of that sad night's tragic events.

Any guilt he feels comes as a result of those penurious political people who think that one fire fighter is enough (p 2).

Sadly, this is often the case in Pittsfield Township. Both my fellow fire fighters and I have been the lone respondent to fire calls on numerous occasions. This results in anxiety and inefficient fire fighting as well as greatly compromising the safety of all involved - staff and citizens.

Unfortunately it seems to be primarily economics that dictate fire department staffing levels in most communities, rather than fire fighter safety or efficiency. In many cities and towns across the nation, politicians decide to spend their money on things such as new buildings, park land and other politically strategic expenditures, while continuing to ignore the issue of fire department staffing, hoping it will go away. However, this issue will not simply go away, but will continue to be a factor every time an understaffed fire department answers an alarm.

RECOMMENDATIONS

Based on research results, there are two recommendations that must be made in order to improve safety, response time and efficiency of the Pittsfield Township Fire Department.

Recommendation 1:

Increase minimum daily staffing in the Pittsfield Township Fire Department to one lieutenant and three fire fighters per station and one shift commander who oversees the entire shift.

Current staffing is one fire fighter per station per shift at two of the three stations. The remaining station is staffed with two fire fighters per shift. One of the four fire fighters also functions as the overall fire shift commander. The recommendation to increase staffing would

result in the addition of three lieutenants (nine internal promotions), twenty-four fire fighters, and elimination of the sergeant position.

Components necessary for increasing staffing will include: recruiting, training, placement and scheduling.

Additional dollars for this proposal at present salary levels would be approximately:

WAGES AND BENEFITS - 27 ADDITIONAL FIRE FIGHTERS:

Salary	\$751,336
FICA	72,080
Workers Comp	48,176
Health Care	148,096
Dental	18,376
Optical	1,590
Life Insurance	1,422
MERS	36,664
Holiday Pay	34,200
TOTAL	\$1,111,940

EQUIPMENT - 27 ADDITIONAL FIRE FIGHTERS:

Uniforms	\$16,470
Turnout Gear	64,800
Footwear	8,640
Electronics	10,260
TOTAL	\$100,170

TRAINING

Training Costs --Minimal due to current in house training program

TOTAL APPROXIMATE COSTS TO ADD 27 FIRE POSITIONS: \$1,212,110.

Recommendation 2:

Each station will respond to calls for service - such as emergency medical responses, car accidents, vehicle fires, small outside fires and similar incidents - within its own district.

Structure fires, vehicle extrications, aircraft emergencies and similar incidents are dispatched for all three stations to respond, as well as the paid-on-call staff.

The advantages to this change include: decreased response time, decreased exposure to unnecessary traffic and mileage.

Follow-through on these recommendations is crucial to the safety and well being of the Pittsfield fire fighting personnel and the population of the entire township.

Imagine this: your home is on fire, all your meaningful possessions are inside and your family is at the upstairs window yelling for help...and one fire fighter arrives.

You are involved in a serious motor vehicle accident, your child is trapped inside the car, you have been thrown out of the car and are injured seriously enough that you can't get to your child and the car is on fire...one fire fighter arrives.

A small airplane crashes in your back field, the plane is on fire--and so is the field--there are two occupants in the plane screaming, the fire is nearing your home...and one fire fighter arrives.

The unfortunate reality to the problem of fire staffing is that most citizens assume that their municipal services are adequate for structure fires, emergency medical responses, car accidents, vehicle fires, small outside fires and similar incidents...until the fire happens to them. This paper shows the fallacy to that belief and provides an impetus to our civic officials to provide for responsible staffing of municipal fire stations.

As to general recommendations for others wishing to document and/or gather data to define their own staffing issues, there is a wealth of information available on the web and through the International Association of Fire Fighters. In addition, magazines like *Fire House*, *Fire Engineering* and *Fire Chief* can provide supportive material.

From a research study perspective, things that may enhance outcome statistics would include: adding additional tasks to be monitored during the study, to run more crews for each scenario as a comparison study, and to include different types of structures.

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