An Analysis of the Chagrin Falls Fire Department Staffing Model

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CERTIFICATION STATEMENT

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ABSTRACT

This research paper addressed the problem the Chagrin Falls Fire Department (CFFD) has responding to concurrent calls for service with its current staffing model. The purpose of the descriptive study was to measure the problem in its relationship to today's fire service. The research questions used to measure the problem were: How many concurrent requests for service has the Chagrin Falls Fire Department received in the last 3 years? Is there a consistent difference between the average response times for initial versus subsequent calls for service? How does the CFFD's performance compare to fire departments with similar staffing models? How does the Chagrin Falls Fire Department's performance compare to NFPA 1720: Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations and Special Operations to the Public by Volunteer Fire Departments?

To find the answers to these questions, reporting records, in-depth research, and a survey of similar departments to Chagrin Falls Fire were completed. The results showed staffing levels which have measurable delayed responses to concurrent calls for service and, at times, are unable to send any units due to previous assignments. The results show similar departments with a higher ratio of staffing for calls. Lastly, the CFFD falls short of the minimum staffing levels set forth in NFPA 1720. Coincidentally, both NFPA 1720 and similarly surveyed departments call for a staffing of six for the CFFD's call volume and response area, rather than the current staffing of four.

The recommendations made from this descriptive study include a detailed gradual increase of on-duty staffing to six. At that time it is the recommendation to the CFFD to re-evaluate the current combination model utilizing paid (declining) volunteerism. (Appendix 3)

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INTRODUCTION

Statement of the Problem

Have you wondered what would happen if you needed help from the fire department but no one was able to respond due to an emergency that occurred before yours? The current staffing model for the Chagrin Falls Fire Department (CFFD) does not guarantee a consistent response time for concurrent calls for service. Mutual aid departments are spread over the suburban/rural area making responses lengthy, possibly endangering lives. The following study will serve as an analysis into how effective the current staffing model is for the CFFD when faced with multiple concurrent calls for service, and how those results compare to NFPA 1720: Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations and Special Operations to the Public by Volunteer Fire Departments.

The current staffing model of the CFFD includes four on-duty personnel supplemented by volunteer staff. The four on-duty personnel are equipped to handle two Advanced Life Support (ALS) Emergency Medical Service (EMS) calls for service or one engine company response. These four staff personnel operate in two person teams, staffing two ALS squads, two engines, a ladder truck or heavy rescue depending on the call type. The on-duty members jump staff these units to handle specific emergencies. With a growing community and the demand for service increasing, the frequency with which multiple concurrent calls occur is also increasing.

The CFFD is a true combination department with full-time and part-time members who are paid to volunteer for all emergencies when off-duty. These volunteers staff the station for the next call or respond to the scene of a multiple company incident. Volunteerism is random, there is no schedule displaying which volunteers will come for a given emergency. Chagrin Falls Fire Department volunteerism is also dwindling in recent years. (Appendix 3)

The inconsistency of volunteerism and the current staffing model have led to many questions regarding the CFFD staffing model and its ability to handle the run volume.

Purpose of the Study

The purpose of this descriptive study is to evaluate the current staffing model for efficiency and adequacy. The results will be presented to the current administration for consideration. If the administration views the results of this descriptive study as a problem for the CFFD, they may in turn use this research and subsequent recommendations to re-evaluate the adequacy of the current staffing level.

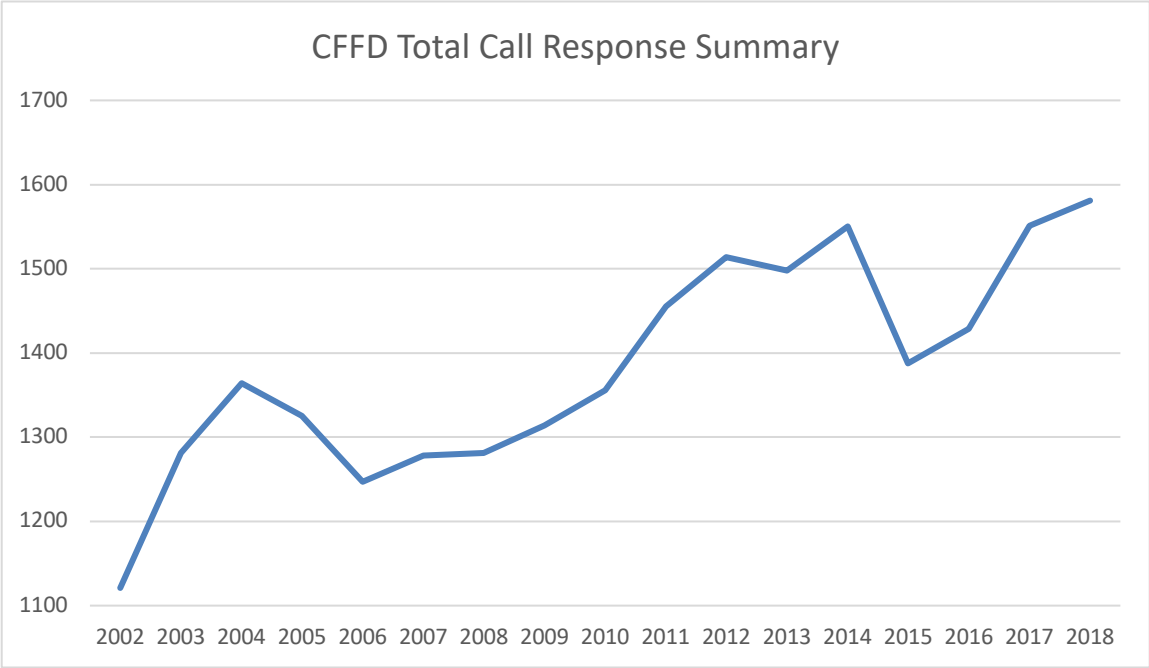
Research Questions

The following questions will be answered by this descriptive research:

1. How many concurrent requests for service has the Chagrin Falls Fire Department received in the last 3 years?
2. Is there a consistent difference between the average response times for initial versus subsequent calls for service?
3. How does the Chagrin Falls Fire Department's performance compare to departments with similar staffing models?
4. How does the Chagrin Falls Fire Department's performance compare to NFPA 1720: Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations and Special Operations to the Public by Volunteer Fire Departments?

BACKGROUND AND SIGNIFICANCE

The CFFD is staffed with four personnel to cover 5,000 residents spread over 32 square miles and 6 villages. The six communities contracted for service are the Village of Bentleyville, Chagrin Falls Township, Village of Chagrin Falls, Village of Hunting Valley, Village of Moreland Hills, and the Village of South Russell. The CFFD is a true combination fire department employing full-time and part-time employees while relying on all employees to volunteer from home for all calls for service. These volunteers staff the station in the event of another call, or for multiple company incidents, the volunteers will respond on whatever apparatus is needed. The CFFD increased their staffing from two to four in 2002 when the annual call volume averaged 1,100 calls. A steady annual increase in calls have stressed the current resources of the CFFD. Since 2002, the call volume has increased 44% with 1,581 calls for service in 2018 (Catani, 2019).



Volunteerism from personnel is inconsistent; under the current model it is impossible to predict the participation from volunteers. There are no defined requirements for minimum participation

or off-duty call responses.

The CFFD operates with two personnel on an ALS squad. The other two on-duty personnel staff either the engine, the second ALS squad, or the heavy rescue. The department can typically handle two concurrent ALS medical calls or one engine response with on-duty personnel before relying on volunteers or mutual aid. A third concurrent call for service is becoming a common occurrence. With volunteerism being unreliable, the third concurrent call for service will be handled by volunteers and or mutual aid. Mutual aid is a system which has been equally reciprocated in its use with CFFD and neighboring departments. However, the response times in this rural region are delayed from mutual aid departments of up to 15 minutes in some cases.

Historically, this problem has been a minor concern with concurrent calls for service being rare. In the department's history, volunteerism was better attended. In recent years the volunteer participation has decreased while the demand for services has increased. In 2011, an average of 12 volunteers would respond to a fire call and 10 volunteers would respond to an EMS call. In 2017, those numbers have decline to 8 and 7 respectively (Appendix 3). This decline warrants further research into the problem and potential solutions.

A problem of this nature needs to be measured by a descriptive research study. It is necessary to complete this study to see if an improvement can be made. The current staffing model effectiveness can be measured with real statistics on measured outcomes of response times and mutual aid requests. The fire department should be staffed for what could happen, not necessarily what does happen. With budgets being tight and highly scrutinized, sometimes safety services move away from staffing for potential incidents and are forced to do more with less, putting public safety servants and residents at risk.

This study will research the potential options for staffing and operations for the CFFD.

LITERATURE REVIEW

The CFFD falls into NFPA 1720 (Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Volunteer Fire Departments). NFPA standards are not legally binding unless OSHA adopts certain standards, in which case they do become legally binding. NFPA 1720 offers guidelines set forth for departments to measure performance (Appendix 4). Some fire departments will never be able to meet these standards for several reasons such as a lack of funding or geographic limitations which increase response times.

This topic within NFPA 1720 has been researched before. James Tauber used a risk assessment model for "pre-emergency deployment of fire department resources". Tauber addressed the need for a better model to replace those already in place. The disadvantages for pre-existing models include the inability to include how many stations were needed for a given geographical area, and determining a municipality's ability to address its needs based on risk assessment. (Tauber, 2000)

Tauber was, however, able to quantify risk and determine if the risks were "unprotected or acceptable." Unprotected risk would be an obvious gap separating a community from the resources needed at a given moment while acceptable risk would be a deficit in coverage a community would be willing accept. Tauber concluded a standard model for pre-emergency deployment of resources can be made but it would take a diverse sampling of communities ranging in risk and economic stability, as well as a partnership from recognized resources including the International Association of Fire Chiefs, International City/County Management Association, National Fire Protection Agency, and the International Association of Fire Fighters. (Tauber, 2000)

Jennifer Flynn researched NFPA 1720 for response time requirements when comparing fire service performance. Comparing performance to a standard performance level, also known as a benchmark, would assess the adequacy of local operations (Ammons, 2001). The term "benchmark" refers to the standard to which we measure, but also denotes the search for best practices. (Flynn 2009) Her recommendations for carefully selecting other departments to compare benchmarks were used in this descriptive study. The departments surveyed shared similar staffing, department size, call volume, and geography.

According to NFPA 1720 (2016), the CFFD would fall under the demand zone of rural area. The six communities the department covers equate to approximately 166 people per square mile. This demand zone also recommends a minimum staffing of six personnel to respond within 14 minutes including automatic aid (Appendix 4).

Captain Mike Kirby (April, 2012) researched this topic in his Fire Rescue Magazine article. He points out NFPA 1710 and its recommendations for a minimum engine company staffing of four for interior structure firefighting operations. This minimum is based on a "typical" 2,000 square foot residential occupancy. The standard also recognizes the difficulty for advanced hose deployment, especially when the engine company officer is to stay with his company in fast-attack mode.

NFPA 1710 increases its recommendation to five or even six personnel to accomplish initial firefighting tasks for anything more than your high frequency, low hazard 2,000 square foot structure. Within the coverage area for the CFFD, there are many of these referenced 2,000 square feet residential structures. But there are also many high hazard, low frequency structures. In addition, there are many residential structures of 10,000 square feet and above. There are also large properties of commercial infrastructure, some of these include five schools, five

preschools, four churches, two nursing home campuses, and countless multi-family apartment buildings.

The National Institute of Standards and Technology (NIST) conducted evolutions based on a 2,000 square foot structure and were able to improve effectiveness of a four person engine company with one caveat: the first-due company did not establish its own water supply.

For operations and tactics for the CFFD, this is not an option for operations occurring in Chagrin Falls Village, Chagrin Falls Township, Bentleyville, and Moreland Hills. Within these four communities, Engine 1 is tasked with establishing its own water supply to a hydrant prior to running out of tank water, assuming continuous water flow.

Within these four communities, the hydrants are typically within 300 feet of the structure. Due to the potential for delay of mutual aid engine companies, it is necessary for the initial attack pumper to secure its own water supply. When flowing, a 1¾" attack line discharges 150 gallons per minute at proper operating pressure. A 2½" attack line used for larger bodies of fire discharges 300 gallons per minute at proper operating pressure.

Chagrin Engine 1 is the CFFD attack pumper and it stores 1000 gallons ready for use. When flowing constant water, a 1¾" attack line will drain the tank in 6 minutes 40 seconds. A 2½"attack line will drain the tank in 3 minutes 20 seconds. This is the amount of time a pump operator has to successfully gain access to a hydrant before the attack crew runs out of water.

Monday (2000) researched this topic within the confines of NFPA 1500, the Standard on Fire Department Occupational Safety and Health Program. He discussed the engine company officer and the two in/two out rule. The engine company officer has a decision to make for initial interior firefighting operations.

When the Officer in Charge (OIC) enters command mode for a larger incident, the OIC is not available as a member of the attack team. If the OIC enters the structure in fast attack mode, the only member left outside is the engine company operator. “At an emergency incident, the incident commander shall have the responsibility to develop an effective incident organization by managing resources, maintaining an effective span of control, and maintaining direct supervision over the entire incident, and designate supervisors in charge of specific areas or functions.”

With a minimum staffing of four, the first arriving engine company officer must choose to either neglect interior firefighting operations with his crew, or neglect the fast paced evolution of the incident from a command perspective.

The Occupational Safety and Health Administration (OSHA) regulation 29 CFR 1910.143 (g) (4) deals with firefighters wearing a Self-Contained Breathing Apparatus (SCBA) in an Immediately Dangerous to Life and Health (IDLH) atmosphere. Hall (2011) researched this topic as it pertains to the fire service. The two in/two out rule says when two personnel are working in an IDLH atmosphere, at least two personnel must be outside of that atmosphere ready to act if the respiratory protected personnel become endangered.

To relate this to the fire service, it is irresponsible to include the engine operator as part of the two-out. The engine operator is not donned with a SCBA and ready to rescue. With a minimum staffing of four for NFPA 1720, the engine operator is included in the two-out. This is a questionable step around that rule.

Chief Ron Coleman (1999) reiterated this sentiment. He wrote an article warning the fire service not to mess with the OSHA regulation. He reminded readers the OSHA standard is a regulation, not a guideline. The overall message was a reminder to stick to the two in/two out

rule and to cut budget items elsewhere. Every dollar saved can help big picture budgets, but ignorance of this OSHA regulation could result in firefighter deaths.

In summary, the basis for this topic has been researched and published before, influencing this study. NFPA 1720 includes a guideline for rural fire departments to staff six for initial responders for incidents. Tauber (2000) had research which recommended each municipality determine their risk profiles as unprotected or acceptable. This would allow departments and communities to assess possible risks and determine which risks are worth chancing with an inadequate staffing level.

Captain Mike Kirby (April, 2012) took the staffing levels into question with tactics and the proper sized engine company for initial alarms with "typical" structures. NIST continues with the same line of research and elaborated on water supply establishment. Taking water supply away from the attack crews would limit the amount of time for initial attack as stated above. Lastly, the CFFD's staffing of four was compared to OSHA's two in/two out. This is a standard which is not to be broken.

PROCEDURES

This process started with a defined problem. The CFFD currently uses a staffing model which relies on volunteerism and mutual aid for a second and usually third concurrent call for service. As a rural department, the CFFD has some far reaching areas from mutual aid departments which could allow for delay of response to an emergency.

Once this problem was defined, a plan to research this problem was created. From this research, the data will point to the findings for the solution. To find data, the problem was divided and narrowed into four questions to be answered by descriptive research: (1) How many concurrent requests for service has the Chagrin Falls Fire Department received in the last 3 years? (2) Is there a consistent difference between the average response times for initial versus subsequent calls for service? (3) How does the Chagrin Falls Fire Department's performance compare to departments with similar staffing models? (4) How does the Chagrin Falls Fire Department's performance compare to NFPA 1720: Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations and Special Operations to the Public by Volunteer Fire Departments?

The next step was to research these questions from verified sources via unbiased study. Research for questions one and two was completed within Firehouse Software, the reporting software for the CFFD. Multiple queries were made to report the performance statistics. The third question, "How does the Chagrin Falls Fire Department's performance compare to departments with similar staffing models?" required a survey to be completed by departments with similar staffing models. These departments met some or all of the following criteria: combination departments, number of annual calls for service, population, and/or coverage area in square miles. Of the 25 surveys sent, 18 were returned. Finally, question four was compared to

NFPA 1720 (Appendix 4).

Definition of Terms

Auto-Aid. True automatic aid includes several advantages: response from the closest station, avoiding apparatus duplication, sharing specialty services, and increased availability of staff officers for ICS at major incidents. (Rielage, 2018)

Command Mode. "Because of the size/severity of the situation, and complexity of the occupancy, the hazards present, or the possibility of the basic incident problem expanding (bigger fire/more patients/hazardous substance releases), some scenarios will demand early, strong, stationary command from the very outset. In these cases, the first arriving IC will assume command and, from the very beginning, stay outside the hazard area in a stationary exterior-command position." (Brunacini, 2002)

Concurrent. Operating or occurring at the same time (Merriam-Webster, 2019)

Fast Attack. "For critical, offensive fast fire attack (as an example), company officer may make a conscious decision (choice) to lead the operations while utilizing a portable radio to continue command, or the IC may transfer command to the second arriving company/command officer (who is on or close to being on the scene) before entering the structure/fire area." (Brunacini, 2002)

Limitations of the Study

A few limitations came into play for this study. The research questions involved call for specific information regarding the documentation and reporting of response times beyond the typical en route/on scene time. Some agencies utilize reporting software which allows for queries of concurrent calls for service and some agencies do not. At the time of this report, the author went through Firehouse software records for CFFD in the past three calendar years to find the number of concurrent calls and number of times other agencies responded mutual aid without a Chagrin unit responding. The response times of the mutual aid companies were not documented by responding personnel and therefore unable to report here.

Another limitation was the sample size of the survey. 25 fire departments were requested and of those 25 only 18 returned responses. Of the 18 responses, only two fire departments use a combination model including volunteerism. This is a very small sample size. The trends and statistics reported came from the 18 survey respondents.

RESULTS

Results of the research were compiled from Firehouse software, the distributed survey, and NFPA 1720 standards. To define the problem, Firehouse software was utilized to find requests for service, response times, and concurrent calls for all CFFD inquiries. Next, a list of comparable fire departments who fell within certain similar parameters was made for a study. Of the 25 fire departments requested, 18 departments returned results.

Research Question 1

How many multiple concurrent requests for service has the Chagrin Falls Fire Department received in the last 3 years? Firehouse software was used to compile this information. A sample size of 3 years was chosen for this data so the times were taken from 2015-2017. Within the three years, the department received 139 concurrent calls in 2015, 154 concurrent calls in 2016, and 182 concurrent calls for service in 2017. The total number of concurrent calls in the three years totaled 475, an average of 158 calls per year.

Research Question 2

Is there a consistent difference between the average response times for initial versus subsequent calls for service?

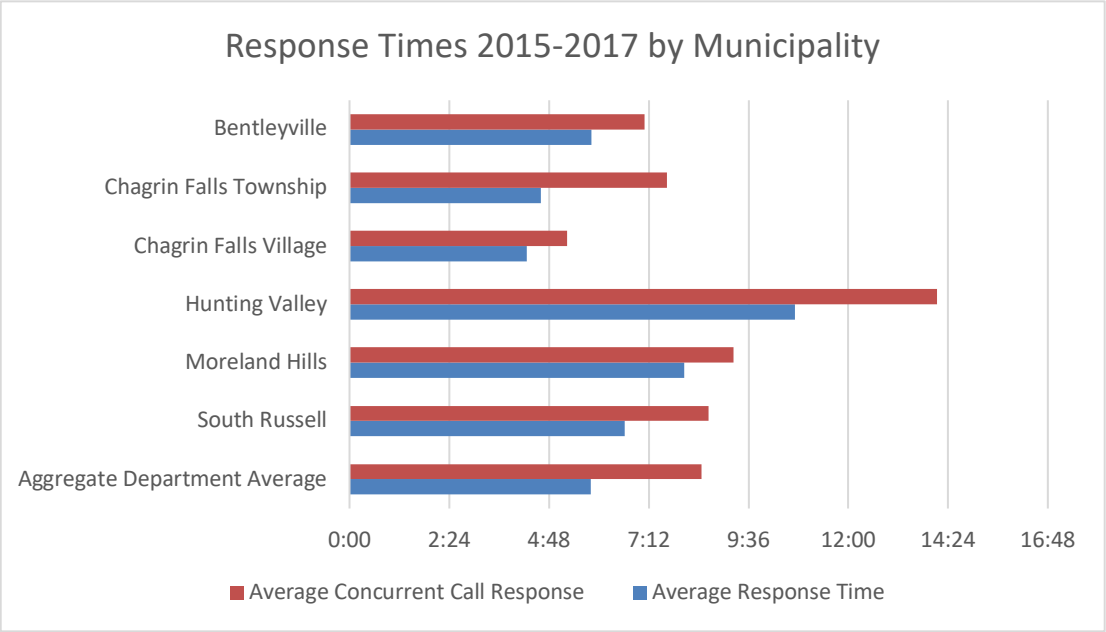


Figure 1

The chart above compares average response times for initial calls and the average response for concurrent calls by municipality. This chart illustrates the difference in response for each village/township. The fire station is located in Chagrin Falls Village and the farthest municipality is Hunting Valley.

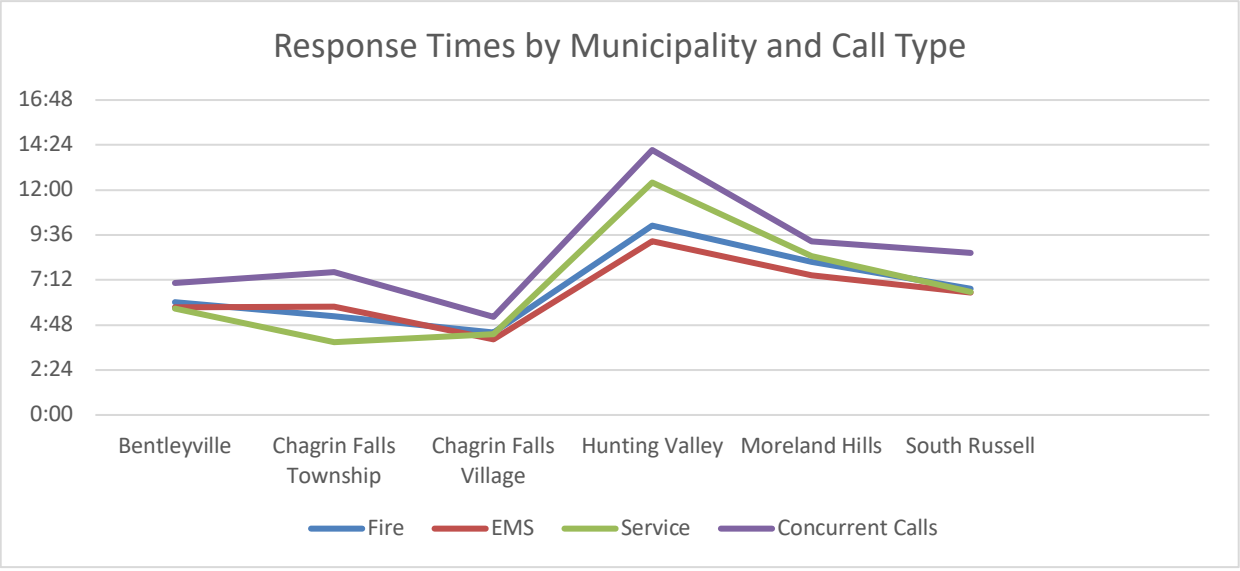


Figure 2

The above chart takes an average of the data from 2015-2017. This is a representation of average response times including fire, EMS, MVA, and service calls. As stated above, the concurrent response totals do not include if CFFD units were unable to respond. Those mutual aid initial responses are not included due to reporting constraints. This data does however show an average delay of 2 minutes and 27 seconds for each concurrent call for service.

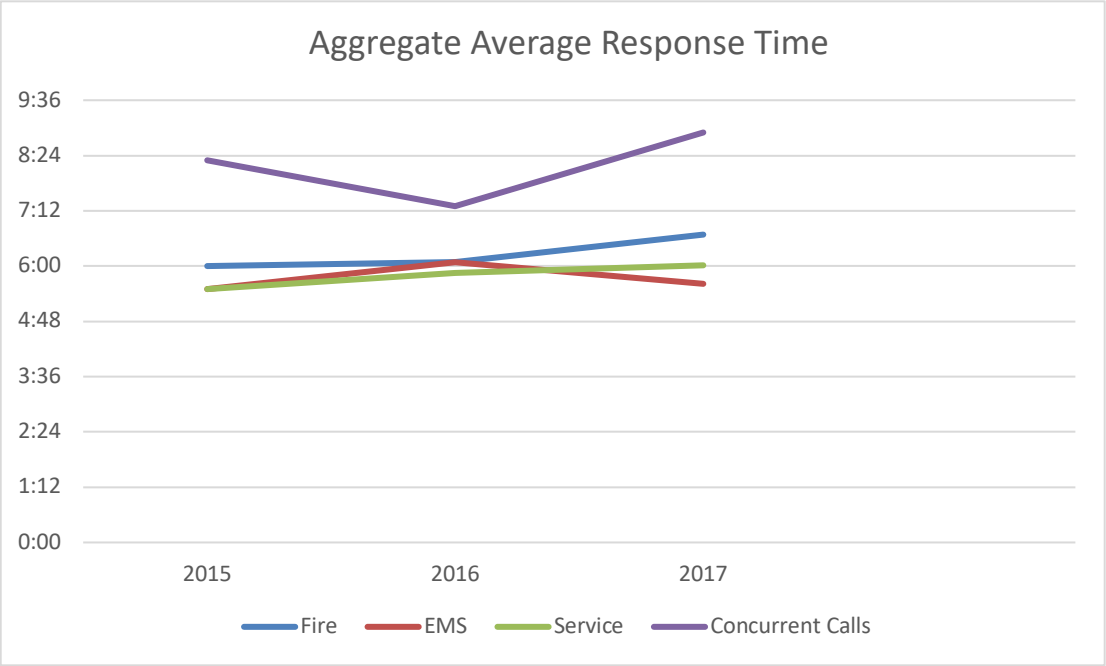


Figure 3

The average response for an EMS, fire and service calls for the CFFD is 5 minutes 51 seconds. When you compare it to the average of 8 minutes 12 seconds for concurrent runs, there is a marked difference.

As previously mentioned, the CFFD covers six municipalities spread over 32 square miles. The above chart does not tell the entire story for responses. The station is not centrally located, thus skewing the average response numbers.

When factoring response times by municipality, there is a more accurate correlation between initial responses by district and the subsequent concurrent service requests. Due to software reporting constraints, the number of concurrent requests per instance is not reported. In other words, it is impossible to show whether it was a second, third, fourth, etc. concurrent service request for the average. Also, these concurrent responses do not include mutual aid response times.

These numbers factor CFFD units responding to the concurrent calls. For example, if the concurrent request is a second EMS call, CFFD would most likely send a second squad or request a mutual aid squad. If a mutual aid squad was requested, the squad's response time is not included. Also, there were times where CFFD units were unable to respond due to previous assignments, and those response times are also impossible to include due to reporting constraints. It would be fair to say the totals above for concurrent response times are skewed toward a representation of having faster response averages than if they were to include incidents where CFFD units were unable to respond. These run types resulted in mutual aid departments initially respond to the incident, which resulted in a delay of service.

Research Question 3

How does the Chagrin Falls Fire Department's performance compare to departments with similar staffing models? To answer this question, 25 fire departments were chosen from surrounding areas (Appendix 2). These departments met some or all of the following criteria: similar staffing, number of annual calls for service, combination department model, population, and/or coverage area in square miles.

The survey was drafted using Survey Monkey and sent to department contacts via email (Appendix 1). Of the 25 organizations requested, 18 responded. The results of the survey were quantified to find averages for staffing and measureable comparable statistics to the CFFD.

For staffing, the CFFD responded to 1,581 calls in 2018 with a minimum of four duty crew members. This is an average of 395.25 calls per staffed position. The average survey respondent was on a department which responded to 261 calls per staffed position. If you were to compare this to the CFFD, the comparable shows CFFD understaffed in comparison to the average. The comparable average would increase CFFD's minimum staffing to 6.05 staff members.

For volunteerism (paid or unpaid), the CFFD utilizes a call-back system for every call. Only 12% of the departments polled utilize call-backs at this rate. Of those who still utilize volunteerism, the departments reported an average of 4.28 members per call-back. Of the departments still utilizing volunteerism polled, 100% reported a decrease in volunteerism over the last ten years. None of the departments reported a measureable loss due to all units being unavailable.

Research Question 4

How does the Chagrin Falls Fire Department's performance compare to NFPA 1720: Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations and Special Operations to the Public by Volunteer Fire Departments?

NFPA 1720 (2016) is a guideline for fire departments performance and staffing. With regard to the CFFD, demographics put the CFFD into the "rural area" category. The response time guideline states the department needs to respond within 14 minutes 80% of the time

(Appendix 4). This guideline has been accomplished, even for concurrent calls for service. The CFFD however does not meet the staffing guideline of 6 minimum staff to respond. The volunteers for call-back do not count toward this total.

While the department has reformed auto-aid in recent years, the auto-aid is for areas closer to neighboring fire departments. Those areas may meet the guideline but those departments are only requested auto-aid for fires, motor vehicle accidents with entrapment, and EMS calls with reports of an unstable patient. To sum it up, the CFFD does not meet the guideline for staffing in a rural area according to NFPA 1720.

DISCUSSION

The study results were surprisingly consistent. This research started with one problem, responses for concurrent calls were delayed and unreliable. The research questions warranted study in order. Once the problem was recognized, the questions were investigated in order to ascertain the magnitude of the problem. The research questions, in chronological order, indicated the department's concurrent call frequency is increasing, the responses for concurrent calls are measurably delayed, other departments have a higher level of staffing on average to respond to emergencies, and the CFFD's staffing does not meet NFPA 1720's staffing guideline.

There are many factors to take into consideration. There are other fire departments who respond to more calls with less staffing and smaller operating budgets. This does not however mean the CFFD is problem free. As previously stated, the department has increased calls by 44% since the last staffing increase in 2002. The 44% increase has increased the number of concurrent calls. 74% of the calls are EMS, and transports of EMS calls have also increased.

When transport of an EMS call is warranted, the time to hospital and back to quarters makes the average EMS call more than an hour. The department averages 4.33 calls/day. If 72% of those calls are EMS transports, this leaves the coverage area with at least two less personnel for the duration of the transport thus bringing staffing for 32 square miles down to two or less. When the department has two concurrent EMS calls, it is unstaffed and relies on volunteers and mutual aid for any further service requests.

The results of the Firehouse software queries were telling. If the average response delay is 2 minutes 27 seconds for concurrent service requests, this means the responses are sometimes longer than the average. This is also true for the average response for a CFFD unit to respond. There were 8 instances in 2017 where a Chagrin unit was unable to respond due to previous

assignments. These average times do not include initial responses for mutual aid departments to our jurisdiction. The CFFD typically receives mutual aid from five fire departments; Bainbridge, Orange Village, Pepper Pike, Solon, and Russell Township. Three of those five departments operate through other dispatch centers. This increases the response due to communication issues, another immeasurable statistic due to reporting software limitations.

Since the research showed an average delay for concurrent calls, the survey asked how other departments were handling their own staffing. Departments were asked about their annual call totals and the minimum staffing they have for calls. Since every department presented a different situation, the averages were used to determine a number of calls per staff member. The average number of calls per staff member at Chagrin is 395.25. This is 134 calls per staffed position higher than the average. If Chagrin were to adjust their staffing to match the comparable agencies offered by the study, the staffing would increase to 6.05 staff members for the 1,581 2018 call total. For the sake of simplicity, this will be rounded to an even six personnel. To bring this back full circle, what is NFPA 1720's recommendation for a rural fire department? They recommend a minimum staffing of six personnel.

This author's interpretation of the findings have become more apparent with each step. The results of the research coincidentally calls for a staffing of six. What would a staffing increase allow the CFFD to do?

A staffing of five would allow for the Officer in Charge of the shift to respond to all medical calls and jump staff to the engine's officer seat for all fire calls. This would provide an extra buffer to keep the officer within the municipalities rather than getting tied up with medical transports.

Based on the CFFD budget, a top grade firefighter/paramedic earns $18.76 per hour. Over the course of a year, that additional staffed position would cost the department an estimated $80,337.60 including IRA, taxes, workman's compensation, etc. This is also based on the 2018 pay scale.

If the CFFD were to increase its daily staffing to six, this would take the jump staffing out of the equation. The officer and engineer would remain with the engine and respond to ALS EMS calls, and remain in the station to respond to fire calls. This would give the department two fully staffed squads and a staffed engine. It would also give the CFFD the capability to respond with two staff members for a third concurrent call for service. Based on the same pay scale, the two additional staff members it would take to increase to six would cost an estimated $160,675.20 from the 2018 pay scale.

As discussed in the literature review, an increase in staffing would not only allow more personnel to respond to concurrent calls decreasing concurrent response times, it would also improve operations of personnel on the fire scene. With an initial fire crew of four, the CFFD is usually forced into fast-attack command mode. This forces the initial incident commander inside the structure for fire attack. The only member left outside is the pump-operator. This forces the pump operator to monitor the external conditions of a structure fire while connecting to a hydrant, setting pressure, deploying ladders, and setting up scene lighting. This potentially unsafe practice forces the initial incident commander to also coordinate resources and relay information to dispatch while wearing a mask in high heat, low visibility IDLH atmospheres.

What would the addition of one or even two personnel do for initial operations? It would allow the initial incident commander to have the choice between fast-attack and command mode. They would now have the option of staying outside the structure to monitor rapidly changing

conditions. It would also allow the initial commander to coordinate resources and keep accountability of personnel on scene. This is a major safety practice which is ignored in fast-attack mode. The first accountability board to arrive on scene for Chagrin fires is in Car 1. Within the response matrix, this is sometimes 15-20 minutes later due to the combination volunteerism model.

RECOMMENDATIONS

The Chagrin Falls Fire Department, like most departments, has an issue with its staffing. The department is responding to 44% more calls since 2002 with no increase to staffing. After defining the problem and researching the issues within the problem, it all pointed to the same results. In order to improve response times, EMS/fire outcomes, and improve safety, it is recommended for the CFFD to increase staffing. Based on the department's unique contractual obligations with six communities, the author recommends the following steps for staffing increase.

The first recommendation is for contract years 2020-2022, the administration needs to budget for the addition of an additional firefighter/paramedic (fifth staff member) for night shifts 18:00-06:00. During these hours, volunteerism is down. Also, the introduction of the fifth staff member at night provides a gradual increase to the budget rather than a burden for the six communities to cover. Inform the contracted communities of the intention to increase staffing to five members at all times for the next contract period.

The second recommendation is in contract years 2023-2025, increase the staffing to five members at all times. The fifth staff member must be a firefighter/paramedic.

It is the third recommendation at this point to re-evaluate the combination staffing model and weigh the benefits to continuing with volunteerism. If the current trends remain, volunteerism will remain on the decline. A cost comparison needs to be completed with the paid volunteerism versus the cost of a sixth on-duty staff member,

Lastly, for contract years 2026-2028, increase the on-duty staffing to six.

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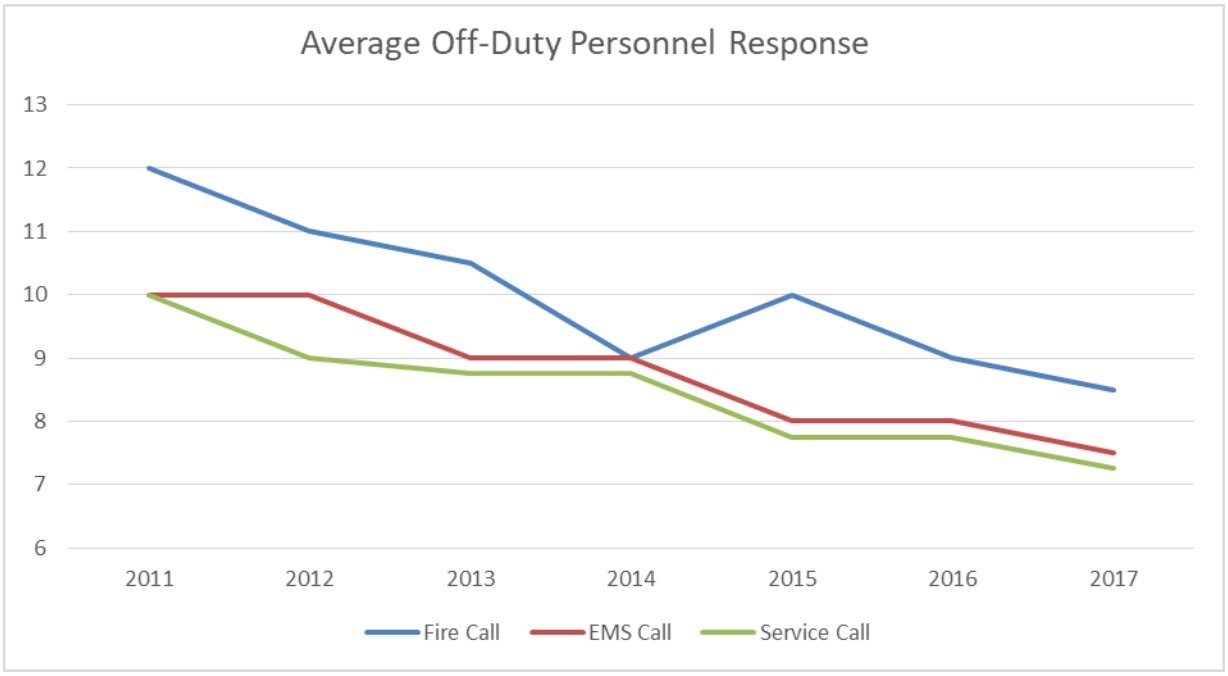
APPENDIX 1 – SURVEY QUESTIONS

1. How many calls for service did your organization respond to in 2016 and 2017?
2. What was your department's minimum staffing for call response in 2016 and 2017?
3. Has your department's on-duty staffing increased or decreased in the last 10 years?
4. If yes to question 3, by how many has it increased or decreased?
5. How many full-time personnel does your department employ?
6. How many part-time personnel does your department employ?
7. Does your department's combination model include volunteerism (members reporting to the station to staff vehicles until on-duty personnel return to service, regardless of compensation)?
8. If yes to question 7, how many respond per call-back?
9. Has that answer from question 8 increased or decreased over the last 10 years?
10. How many times did you request mutual aid in 2016 and 2017?
11. How many times did your department provide mutual aid in 2016 and 2017?
12. Do your mutual aid departments receive requests through true auto-aid or are they form other dispatch centers?
13. Has a lack of staffing adversely affected response times resulting in measurable loss or poor EMS outcomes with your current staffing model?
14. How many concurrent calls for service did your department receive in 2016 and 2017?
15. How many of your alarms were primarily handled by mutual/true auto-aid due to units being unavailable in 2016 and 2017?

APPENDIX 2 – FIRE DEPARTMENTS REQUESTED FOR SURVEY

Aurora	Bainbridge
Bath	Brecksville
Burton	Chardon
Chesterland	Hambden
Highland Hills	Independence
Mantua/Shalersville	Mayfield Village
Middlefield	Munson
Oakwood	Orange
Pepper Pike	Ravenna
Ravenna Township	Rootstown
Russell	Seven Hills
Streetsboro	Wadsworth
Willoughby Hills	

APPENDIX 3- OFF DUTY CALL RESPONSE



APPENDIX 4 – NFPA 1720 TABLE 4.3.2

Table 4.3.2 Staffing and Response Time

Demand Zone[a]	Demographics	Minimum Staff to Respond[b]	Response Time (minutes)[c]	Meets Objective (%)
Urban area	>1000 people/mi^2	15	9	90
Suburban area	500–1000 people/mi^2	10	10	80
Rural area	<500 people/mi^2	6	14	80
Remote area	Travel distance ≥ 8 mi	4	Directly dependent on travel distance	90
Special risks	Determined by AHJ	Determined by AHJ based on risk	Determined by AHJ	90

[a] A jurisdiction can have more than one demand zone.

[b] Minimum staffing includes members responding from the AHJs department and automatic aid

[c] Response time begins upon completion of the dispatch notification and ends at the time interval shown in the table.