Executive Development

DETERMINING A TRUE RESPONSE TIME AND METHODS THAT COULD IMPROVE RESPONSE TIMES FOR THE CENTERVILLE-OSTERVILLE-MARSTONS MILLS (MA) DEPARTMENT OF FIRE-RESCUE & EMERGENCY SERVICES

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This paper is dedicated to my wonderful wife, Beth, and my two beautiful children, Nathaniel and Grayce, without who’s help, persistence, and patience, the good things in my personal and professional life would never have been possible.
ABSTRACT

The problem is that there are a number of variables that impact how the Centerville-Osterville-Marstons Mills Dept. of Fire-Rescue & Emergency Services (C-O-MM Fire) calculates an accurate response time. This has resulted in negative publicity and the difficulty in defending itself over conflict of times in the event of complaints, disputes, or potential lawsuits based upon response times. Additionally, no efforts have been made to identify strategies to reduce response times.

The purpose of this research was to determine what a true and accurate department response time is and develop strategies to reduce it. A descriptive research method was used. The following research questions were addressed:

- What data sources are used to determine response time and what internal and external factors affect response times?
- When does the response time clock start and how is the response timeline defined from the moment a call is initiated?
- What are other public safety agencies doing to determine and reduce response times?
- What policies or procedures could C-O-MM implement to reduce department response times?

The results found that the issue was more complicated than originally thought and that other fire departments were facing similar issues. Recommendations for change included developing SOGs that adopted the recommended time guidelines of NFPA 1710 and NFPA 1221, standardizing the department’s dispatch procedures, and synchronizing all potential data resource
times all in an effort to determine a true response time for the department and reduce that time where feasible.
INTRODUCTION

In October of 1998 the Centerville-Osterville-Marstons Mills Fire District commissioned a study by the MMA Consulting Group to determine if the fire district should consolidate its two outlying stations into one operation. With both outlying stations needing either replacement or drastic renovations, reducing the number of stations in the fire district from three to two would significantly reduce the district’s operating costs. (MMA Consulting Group, 1998) Though response times were a consideration, it was not a primary reason for the initial study. Though the option was considered district voters made it known that they preferred to maintain a fire station in each of the fire district’s three villages.

Since this report C-OMM Fire has undergone many changes. Those changes that have affected response times include the staffing of the third Marstons Mills Fire Station, the development of an enhanced 9-1-1 system in which the Barnstable Police Department would become the primary public safety answering point (PSAP) for the Town of Barnstable, including the Centerville-Osterville-Marstons Mills Fire District, and technological changes. Technology allows the department to have a computer aided dispatch (CAD) system that includes mobile data terminals in the apparatus with GIS mapping and GPS tracking.

Following the line of duty death of Massachusetts call firefighter Martin McNamara in Lancaster, Massachusetts, The Boston Globe conducted research into response times (Appendix A) to structure fires for all towns in Massachusetts. County. These times covered a 12-year period from 1990 to 2002 and many departments, including C-O-MM Fire, disputed the accuracy of these figures. Though these times reviewed only structure fire responses these became “the” response times for each department.
The problem is that there are a number of variables that impact how C-O-MM can calculate an accurate response time. This has resulted in negative publicity and the difficulty in defending itself in the event of complaints, disputes, or potential lawsuits based on response times. A descriptive research method was used. The following research questions were posed:

- What data sources are used to determine response time and what internal and external factors affect response times?
- When does the response time clock start and how is the response timeline defined from the moment a call is initiated?
- What are other public safety agencies doing to determine and reduce response times?
- What policies or procedures could C-O-MM implement to reduce department response times?
BACKGROUND AND SIGNIFICANCE

The Centerville-Osterville-Marstons Mills Fire District is located 70 miles south of Boston on Cape Cod in Massachusetts. Established in 1926 it is one of five different fire departments serving the Town of Barnstable. (Appendix B) With an annual population currently approaching 25,000 this figure soars to more than 40,000 (Barnstable, 2005) during the summer months.

The Fire District is independent of the Town of Barnstable and raises its own taxes or charges for services rendered as needed. As of 2005 the department operated three stations, one each located in the villages of Centerville, Osterville, and Marstons Mills.

Following the fatal fire death of a 22-month-old foster child, Amber-Lynn Gusman, in December of 1997, the citizens in the Marstons Mills section of the fire district demanded that the department look into staffing the district’s third, and last, fire station. With a nine-minute first due response time, time and staffing, in an area of one of the department’s longest response areas, citizens started asking questions and wanted answers into why their fire station did not have 24-hour coverage. Since opening in 1975 this station had depended upon recall of call and career firefighters.

In August of 1999, after the hiring of 12 additional firefighters, the department staffed the Marstons Mills fire station twenty-four hours a day. The hiring of these people also meant the end to the call department with C-O-MM Fire becoming a full career department at this time.

The department is a full service department offering all levels of EMS from basic through the paramedic level and is responsible for all fire calls including technical rescue, hazardous materials, water rescue and recovery and is the first responder to all incidents as needed.
To do this the department has a career staff of fifty-eight uniformed personnel including the Fire Chief, the Deputy Fire Chief, 4 Captains, 8 Lieutenants, 8 Senior Privates, a Firefighter-Mechanic, 2 Fire Prevention Officers who are also suppression firefighters, and 26 firefighters. All are certified to the emergency medical technician-basic, intermediate, or paramedic level. Dispatchers, a critical component of this research, are civilians. Operational personnel are assigned to 4 groups of 24-hour shifts. The department currently maintains minimum staffing of ten, three firefighters in each of the three district stations, and a Shift Commander who responds in a separate car. Though the dispatchers are also on 24-hour shifts their schedules rotate differently from suppression personnel. There is only one dispatcher on duty excluding times of major emergency incidents or during significant storms. The department responded to 3,738 calls (Centerville, 2005) in 2004. However the department also dispatches for the neighboring Cotuit Fire Department averaging an additional 600 calls a year. Dispatchers answer 9-1-1 telephone calls as a secondary public safety answering point (PSAP) from the Barnstable Police Department. Additionally these men and women radio dispatch calls for both departments monitoring, as a minimum, the fire alarm frequencies for Centerville-Osterville-Marstons Mills and Cotuit, a common county fire frequency, and at least one operations channel during major incidents. The dispatcher is responsible for answering most department business calls and is the first one to greet the public, as dispatch is located next to the lobby of the headquarters station.

There is a minimum of one ambulance, one engine-company, and a small rescue boat, assigned to the outlying stations, station 2 in Osterville and station 3 in Marstons Mills. The bulk of the equipment that includes a Quint Aerial, a Rescue-Engine, a reserve engine, a brushbreaker, a hovercraft and additional small boats are assigned to station 1, the headquarters fire station in Centerville.
The fire district conducted a study in October of 1998 by the MMA Consulting Group of Boston, Massachusetts. Their “Report Relative to the Fire Department” (Mma Consulting Group) was commissioned to specifically look at department operations and make recommendations regarding the consolidation of two of the three fire stations in the district. Since the Marstons Mills fire station was never built to accommodate 24 hour staffing, and the Osterville station, first built in 1926 with a variety of additions over the years, needed many improvements and probable replacement, the report was done to review cost effective options to the fire district. These options included the building of one new station, consolidating the Osterville and Marstons Mills stations into one-operation, staffing and response times. (Mma Consulting Group, 1998) It is important to note that since this study was done the district runs have increased from some 2700 calls a year to 3738 in 2004. (Centerville, 2005) Though this study was commissioned to see the impact in consolidating two outlying stations, response times were a consideration, but not the primary focus, of this report. There have been many changes in the C-O-MM Fire-Rescue Department, the Town of Barnstable, and the fire service itself since the report was commissioned.

As 24 hour staffing was first introduced, and staffing of outlying stations considered, discussions took place at numerous public forums. Some residents, concerned about tax increases, told others that not everyone can live near a fire station and they knew that when they bought their house. People had to review response times and the availability of emergency services versus the cost of providing that service. At the May, 1999 annual meeting of the fire district the voters recommended keeping the three station concept and approved funds for the hiring of twelve additional firefighters. (Centerville, 1999) The voters later approved, at the May 2000 annual meeting, the building of a new Marstons Mills Fire Station. (Centerville, 2000)
Each year the department receives complaints from citizens that it took “forever” for the fire truck or the ambulance to get to them. The department has revised how it actually records times from handwritten in the 1960’s, 70, and early 80’s to being entered into a computer database in 1987. In the next few years the department relied on different database systems for dispatch and record keeping finally adopting a commercial program called Firehouse Software and implementing it in November of 2003. One problem with writing or typing a response time is that even when dispatchers record the exact time of a transaction there is already room for error. For example should a call be dispatched at 1300 hours and the dispatcher record the time as 1300, in fact the time may be 1301.01, as seconds were never recorded. The dispatcher then logs the time for the first unit on the air at 1301 when, in fact, it may be 1301.59; a difference of 1.58 minutes but recorded as a one-minute time on the air. An additional problem was discovered in November of 2002 when it was found that ambulance crews calling for times to complete their Patient Care Reports (PCR) from hospital transports were being given on location times of the ambulance itself and not the first fire department vehicle on scene that may have already been rendering aid. (John M. Farrington, 2002) Many times this caused a discrepancy in response times and confused the fact that department records and the PCR did not have the same “on arrival” times. Though the department uses a recorded radio log for accurate response times the fact is that these tapes are not always reliable and even legible. One problem with advances in technology is that each piece of equipment, telephones, recording devices, computers and department logs each have their own clock and those clocks may not even be synchronized.

In 2004 some 65.28% (Centerville-Osterville-Marstons Mills Dept. of Fire-Rescue & Emergency Services, 2004) of the department’s emergency calls come in via the Barnstable Police Department, the primary PSAP for the Town of Barnstable. Prior to implementing
enhanced 9-1-1, each fire department in town had its own emergency number. Now two call
takers and two dispatchers, supervised by a desk sergeant, handle the 9-1-1- calls for the town.
This communications center handles more then 50,000 9-1-1- calls annually. (Town of
Barnstable, 2004) Changes in department operations, opening additional stations, past studies,
changes in technology, have all been done with a reduced response time as one of the
department’s goals. These same changes have complicated the response time formula to the point
that C-O-MM can no longer rely on the old ways of calculating response times. Though these
response times noted in the *Globe* article (Appendix A) focused on structure fire responses they
came “the” response time for those departments listed. In light of the many changes C-O-MM
has had, most notably the opening and staffing of the Marstons Mills fire station, the accuracy of
these response times was questioned.

Another factor in our response time review was that of the Barnstable Police Department
being the primary 9-1-1 answering point for the Town of Barnstable including the Centerville-
Osterville-Marstons Mills Fire District. Since the Town of Barnstable is divided up into seven
villages (Appendix B), which include five fire districts, there are often duplicated street names
throughout the town. Some of these names are duplicated within our response district itself. For
example there is an Old Post Road in Marstons Mills, and an Old Post Road in Centerville.
These roads do not connect and are completely separate and distinct roads. There are seven
separate Main Streets located within the town (one in each village) and an alert call taker and/or
dispatcher must know which fire department to send the call too. Complicating matters further is
the fact that the Centerville-Osterville-Marstons Mills Fire-Rescue Department dispatches for
itself and the Cotuit Fire Department, the Hyannis Fire Department self dispatches, and the
Barnstable County Sheriff’s Office dispatches for the Barnstable and West Barnstable Fire
Departments. Though there is a system in place, the fact is that there have been some delays as calls have been sent to the wrong department or the wrong street address.

C-O-MM Fire Chief John M. Farrington has filed letters of complaints with the Barnstable Police Department regarding delaying notification. Police officers have been dispatched to reports of smoke investigations, medical assists, and related calls that are outside of, in our Chief’s opinion, the responsibility and jurisdiction of the police department. Chief Farrington noted that one dispatch to a medical assist resulted in an eighteen-minute delay before the police officer arrived on location, determined that this was an emergency medical manner, and then requested, “rescue”. Our department is working closely to resolve these issues, but many have come as a result of the police department going to civilian dispatchers and having a large turnover in personnel. Each of these problems potentially increases the response time to calls for help. This research will help the department to establish, considering the many internal and external factors, what a true and accurate department response times are. The research is intended to develop recommendations that, when implemented, will work to achieve this goals and lower response times in the areas needed or that can be controlled.

For the purpose of this research, since 65.28% (Centerville-Osterville-Marstons Mills Dept. of Fire-Rescue & Emergency Services, 2004) of C-O-MM’s emergency calls come in via 9-1-1 and the Barnstable Police Department, our focus will be on these calls. To better understand this research we must understand how a 9-1-1 call is processed from the time a 9-1-1 call is initiated. Due to enhanced 9-1-1 calls originating from alarm company central stations due not come in via 9-1-1 and on a separate emergency line. 21.63% of our calls come in that or over the department business phones. (Centerville-Osterville-Marstons Mills Dept. of Fire-Rescue & Emergency Services, 2004)
With the exception of cell phone calls, all 9-1-1 calls are sent to the primary PSAP for the Town of Barnstable at the communications center of the Barnstable Police Facility. Following standard procedures the call taker will answer the call stating “9-1-1 emergency, police, fire or ambulance?” Calls for fire or ambulance, since all Barnstable’s fire districts provide EMS, are diverted to the proper dispatching agency, with the police dispatcher asking the caller to stay on the line. The fire department dispatcher now answers with a “9-1-1, what is the location of your emergency?” The information on the 9-1-1 screen is also sent to the proper fire department as the secondary PSAP. There the fire department dispatcher has the same enhanced 9-1-1 information, including the address of where the call is originating from, and the fire department dispatcher can now speak to the caller and get more information to properly dispatch the call.

In the C-O-MM Fire District, after the dispatcher receives the initial calls the information is retrieved on the department’s computer aided dispatch computer, which determines the first due response information. Once the dispatcher “accepts” the call on this system it sends the call out to mobile data terminals in the selected apparatus. The dispatcher, using an in-house zetron PA system, announces in-house to the appropriate station and vehicle to respond. This announcement is followed by a dispatch tone and announcement over the department’s fire alarm frequency. With no technological “glitches” and with the system running at 100%, once in the vehicle, responders should have the type of call and address posted on a GIS map. Global positioning system tracking will help direct the vehicle to the location of the call.
LITERATURE REVIEW

The literature review started with the resources of the National Fire Academy’s Learning Resource Center. NFPA Standards, including NFPA 1710, NFPA 1221 and NFPA 1061, were reviewed along with the journals, records, standard operating guidelines and the library of the Centerville-Osterville-Marstons Mills Department of Fire-Rescue & Emergency Services. A tool utilized to review response time data was C-O-MM Fire’s own Firehouse Software. This system is used for computer-aided dispatch and all required reports including incident responses. Though there is always room for human error, in entering times, data, and other information, this software gives C-O-MM Fire the ability to generate much data, including response times. On May 28, 2005 a total of 3706 (Centerville-Osterville-Marstons Mills Dept. of Fire-Rescue & Emergency Services, 2004) available incident report records were run for incidents in 2004. Analysis of the data finds that C-O-MM Fire had an average response time of 7.15 minutes. (Appendix D) The average response time calculated includes all calls for service. This average includes non-emergency calls to public assists, lockouts, or similar, where time is not critical or a factor.

The November 29, 2003 line of duty death of Massachusetts call firefighter Martin McNamara, resulted in a January 30, 2004 seven part report from the Boston Globe (Bill Dedman, 2005) that reviewed structure fire response time data, based on the National Fire Incident Reporting System (NFIRS), for all fire departments in Massachusetts. Though these response times were based on structure fire responses they became “the” response times for those departments listed. In light of the many changes C-O-MM has had, most notably the opening and staffing of the Marstons Mills fire station, the accuracy of these response times was questioned.
The report, “Deadly Delays: The Decline of Fire Response”(Dedham, 2005) found that in Massachusetts, people waited 10 minutes or more for firefighters to arrive at 214 building fires in 2002, the last year for which data is available. (Bill Dedman, 2005) This same report stated that from 1986 to 1998 C-O-MM Fire had an on-time rate, building fires receiving a response within 6 minutes, 1986-2002 of 76.3%, on time rate from 1986 to 1998 was 74.1% and from 1999-2002 82.3%. (Bill Dedman, 2005)

A review of individual run reports for 2004 NFIRS code 111, building fires, finds that in 2004 C-O-MM Fire had a 6.71-minute response time average. (Centerville-Osterville-Marstons Mills Dept. of Fire-Rescue & Emergency Services, 2004) This particular code was looked at to compare with the Boston Globe’s data and it was found that 42% of the time C-O-MM had an on-time response rate within 6 minutes. C-O-MM Fire responded to a variety of calls coded differently, including emergency medical calls, however the structure fire responses were specifically looked at to give similar response time comparisons. “The dilemma, said USFA spokesman Tom Olshanski, in a follow up article “Globe Story Sparks Concerns About Response Time” posted on Firehouse.com, “is that fire departments measure response times differently. Some start from the time of dispatch, and others from the minute a call is received. Arrivals can be the moment a unit arrives at the hydrant, at the building, or when a battalion chief arrives on scene.” (Heather Caspi, 2005) The research into our own response time average was disappointing and required a more extensive review of our own dispatching procedures.

The call that C-O-MM Fire responds the most to would be NFIRS code 321 EMS call, excluding vehicle accident with injury. The average response time for 1950 calls of this type was 6.37 minutes. (Centerville-Osterville-Marstons Mills Dept. of Fire-Rescue & Emergency Services, 2004)
A review of MMA Consulting Groups 1998 report finds that response time data wasn’t even reviewed at the six-minute mark but they noted on all fire calls 59.6% of the time C-O-MM had a 5 minute or more response time on all fire calls. (Mma Consulting Group, 1998) On EMS calls with a 5-minute or more response time the average lowered to 48.9%

As response time lengthen, property damage escalates. Using the national database, which provides estimates of fire losses, the Globe calculated these averages for property damage in house fires: $27,000 when firefighters arrive in 3 minutes or less; at 5 minutes, $34,000; at 7 minutes $41,000; at 9 minutes or longer, $61,000. (Fire Chief, 2005) With the average home price in Barnstable County now $379,455.00 these numbers are potentially higher. (John F. Meade, 2005)

Though C-O-MM Fire has a number of sources that can be used to confirm response times, including taped phones and radio traffic, enhanced 9-1-1 screen information, and the EMS Patient Care Report (PCR), the fact is for long term the department relies on the Firehouse software database to gather most statistics.

In the event of a complaint or lawsuit emergency services will be held to national standards. One organization that sets standards for the fire department is the National Fire Protection Agency (NFPA) in Quincy, Massachusetts. The NFPA who’s mission is to reduce the burden of fire and other hazards on the quality of life by providing and advocating scientifically-based consensus codes and standards, research training and education (National Fire, 2005) is just one of the primary agencies who’s standards are often sited in cases of improving services, complaints, or lawsuits. NFPA 1710, Standard for the Organization and Development of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments. NFPA 1710 establishes the following time objectives:
1. One minute (60 seconds) for turnout time.

2. Four minutes (240 seconds) or less for the arrival of the first arriving engine company at a fire suppression incident and/or 8 minutes (480 seconds) or less for the deployment of a full first alarm assignment at a fire suppression incident.

3. Four minutes (240 seconds) or less for the arrival of a unit with first responder or higher-level capability at an emergency medical incident.

4. Eight minutes (480 seconds) or less for the arrival of an advanced life support unit at an emergency medical incident, where this service is provided by the fire department. (Sec. 4.1.2.1.1, 2001)

Two more sections of NFPA are directly related to response times and a fire department annual review of its response time performance:

1. The fire department shall establish a performance objective of not less than 90 percent for the achievement of each response time objective in 4.1.2.1.1 (Sec. 4.1.2.1.2, 2001)

2. The fire department shall evaluate its level of service and deployment delivery and response time objectives on an annual basis. The evaluations shall be based on data relating to level of service, deployment, and the achievement of each response time objective in each geographic area within the jurisdiction of the fire department. (Sec. 4.1.2.1.3, 2001)

Equally important are the time standards of NFPA 1221, Standard for the Installation, Maintenance and Use of Emergency Services Communications. Under section 6.4, operating procedures:
6.4.1 When alarms are received, they shall be recorded and tabulated to indicate the origin of the call.

6.4.2 Ninety-five percent of alarms shall be answered within 15 seconds, and 99 percent of alarms shall be answered within 40 seconds.

6.4.3 Ninety-five percent of emergency dispatching shall be completed within 60 seconds.

6.4.4 For law enforcement purposes, the authority having jurisdiction shall determine time frames for completion of dispatch.

6.4.5 Where alarms are transferred from the public safety answering point (PSAP), the transfer procedure shall not exceed 30 seconds for 95 percent of all alarms processed.

6.4.9 Records of the dispatch of emergency response units in response to alarms shall be maintained and shall identify the following:

(1) Units
(2) Companies and supervisors for emergencies and subsequent emergencies
(3) Supervisory officers for alarms and subsequent alarms
(4) Time of acknowledgment by each unit
(5) Time of arrival of each unit at the scene
(6) Time each unit returned to service

A review of C-O-MM Fire records, standard operating guidelines, and special orders, found no reference to response time goals including dispatch or turnout time. However, C-O-MM Fire Standard Operating Guidelines on Emergency Vehicle Operation (Centerville-Osterville-Marstons Mills Dept. of Fire-Rescue & Emergency Services, 2004) does address a number of response variables that are intended to reduce speed, reduce the possibility of accidents or injury to firefighters and potentially increase respond times in data review.

Response definitions:

- Respond: the allowed use of emergency lights and sirens and not to exceed the posted speed limit by more than ten (10) miles per hour where road conditions allow.
- Respond With Caution: The allowed use of emergency lights and sirens, and not exceeding the posted speed limit, to allow emergency vehicles to continue and not be held by traffic.

- Respond With Traffic: To proceed, without lights and sirens, obeying the rules of the road, with normal traffic.

This same Standard Operating Guideline, Emergency Vehicle Operations, also defines responses in which apparatus should respond in a “with traffic”, or no lights and sirens, mode:

1. Automatic fire alarms in a “trouble” mode.

2. Medical assists, lockouts, public assists, as well as vehicles responding for mutual aid station coverage.

Within the C-O-MM Fire-Rescue Department, and traditionally in record keeping, the on arrival time is recorded as the first piece of department apparatus, regardless of the vehicle type, that arrives on scene. These times do not address the time needed to implement effective rescue, fire suppression efforts or basic and advanced life support, or what this researcher considers to be reaction time. The on arrival time reflects only the first department unit to arrive. Though the purpose of this research is to determine a true and accurate response time for the department, using national standards, we have to have some understanding on why these response times are important.

As stated in NFPA 1710 5.2.2.2.1 “An early, aggressive, and offensive primary interior attack on a working fire, where feasible, is usually the most effective strategy to reduce loss of lives and property damage.” In NFPA 1710’s figure A.5.2.2.2.1, (Appendix E) the line represents a rate of fire propagation in an unsprinklered room, which combines temperature rise and time. It roughly corresponds to the percentage of property destruction. At approximately 10 minutes into
the fire sequence, the hypothetical room of origin flashes over. Extension outside the room begins at this point. Consequently, given that the progression of a structural fire to the point of flashover (i.e., the very rapid spreading of the fire due to superheating of room contents and other combustibles) generally occurs in less than 10 minutes, two of the most important elements in limiting fire spread are the quick arrival of sufficient numbers of personnel and equipment to attack and extinguish the fire as close to the point of its origin as possible.

Though life safety and property conservation are a priority of the fire service and a rapid response will increase the chances of success the ten minutes is important to the 21st century firefighter for another reason. An aggressive campaign by the fire service to promote smoke detectors, increased automatic fire alarm notifications, earlier notifications from the public, and more full time 24 hour staffing, will mean that the firefighter will often be in the fire building during the time of flashover.

From an emergency medical service standpoint a 6-minute response times also has important implications. According to the American Heart Association’s Chain of Survival (American Heart, 1990) developed in 1990, with each minute that passes the survival of a sudden cardiac arrest episode decreases 7-10%. Within 4-6 minutes brain damage and permanent death start to occur. After 10 minutes few attempts at resuscitation succeed. Though a sudden cardiac arrest is a worse case scenario, and public safety typically responds and is prepared to react to worse case scenarios, time is also a factor in other emergency medical incidents including airway obstructions and allergic reactions.

Dispatcher liability is a growing concern. According to Paul Johnson, city attorney for Orem, Utah, in an evaluation of 35 dispatcher-liability cases, he isolated five areas that result in the most claims; failure to send, delay in dispatch, failure to properly prioritize calls, failure to
send to the correct address, and sending the wrong unit. (Jennifer Hagstrom, 2001) This research found that many of these areas relate to each other and are just as much of a concern to C-O-MM Fire.

Though the reasons and importance of a reduced response time to both fire and emergency medical incidents are defined we must remember that a purpose of this study was to also determine what a true and accurate response time was for the Centerville-Osterville-Marstons Mills Department of Fire-Rescue & Emergency Services.
PROCEDURES

Since this research was based upon how things are presently done this research project utilized a descriptive research method to help determine a true response time for the Centerville-Osterville-Marstons Mills Department of Fire-Rescue and Emergency Services. The actual research started during this researcher’s class time at the National Fire Academy (NFA) in Emmitsburg, Maryland by taking advantage of the Academy’s Learning Resource Center and a review of the many fire journals, magazines, and trade publications available. The Centerville-Osterville-Marstons Mills Fire-Rescue Department also has an extensive library and those resources were utilized upon my return to Massachusetts. Included in my department research was an in depth review of 2004 run reports and statistics available through the department’s Firehouse software. The literature reviewed included the Standards of NFPA 1710, and 1221, the Standard Operating Guidelines of the Centerville-Osterville-Marstons Mills Fire-Rescue Department.

The fire district commissioned two separate reports, Fire Station Analysis and Conceptual Design of Fire Stations For Centerville-Osterville-Marstons Mills Fire District, Town of Barnstable, Massachusetts in June of 1988 and the CentervilleOsterville-Marstons Mills Fire District Report Relative to the Fire Department in October of 1998. Both these reports reviewed response times as part of their respective reports and were used as research.

The research continued by physical observation of the C-OMM Fire Department dispatchers handling calls throughout the months of May, June and July, 2005 by each of the four permanent department dispatchers and spare dispatchers on select occasions.
Discussions were held regarding standard operating guidelines and procedures with both the Centerville-Osterville-Marstons Mills Fire Chief, John M. Farrington, Deputy Fire Chief Craig E. Whiteley and the Deputy Chief of Operations for the Barnstable Police, Craig Tamash, as well as department dispatchers Robyn Crosby, Jeff Gifford, William Monroe, and Laurie Motte. These discussions allowed the researcher to have a better understanding of the changes both agencies had undergone and what direction they were taking to improve responses.

A review of department responses for all calls in 2004 was done through an extensive review utilizing the department’s Firehouse Software. This software allowed the researcher to review all calls as well as particular call responses, such as emergency medical calls, structure fire responses, or motor vehicle crashes. Response times reviewed here were from the receipt and acknowledgment of the emergency call by the fire department dispatcher to the time of the first unit on scene. An analysis of response times between each of the four shifts finds no notable response time differences.

Finally some 60 survey’s (Appendix C) were sent by email to the Barnstable County Fire Chiefs, subscribers to the New England Fire Chiefs website, as well as to classmates from the March 2004 Executive Development Class of the National Fire Academy. A total of 26 surveys were returned with comments made that actually supplemented the survey data.
RESULTS

Research Question #1:

What data sources are used to determine response time and what internal and external factors affect response times?

Observation of the department’s four permanent dispatchers and select part-time dispatchers has shown that there are some deficiencies in our dispatching and communications system that could result in response time delays. In actual observations, during different times of the day, different dispatchers, during a variety of incidents over the past four months, it appears that internally, a lack of a formal standard operating guideline in communications is the cause for discrepancies in dispatching the proper first due apparatus.

9-1-1 calls are broadcast throughout each of the C-O-MM Fire Stations. Since C-O-MM personnel respond to both fire and emergency medical calls this is done to help expedite run responses. First responders actually hear the 9-1-1 emergency calls allowing them to start their “response” before being dispatched. One reason is to decrease delays in response times from outlying stations. These stations, staffed with a crew of three, dictate that the type of call will determine which piece of apparatus to take. They may have to secure other pieces of equipment, or the station itself, prior to responding. It is hoped that their “hearing” the call will allow them to start this process before the 9-1-1 call is even competed.

Talking with firefighters and officers on the pros and cons of listening to these calls finds that there is a common concern in the confidence of the dispatchers. Some expressed a “lack of trust” in the dispatcher’s ability to properly dispatch and handle the call and that’s why they prefer to hear the call themselves. This same lack of confidence finds that officers of the department want to hear the call so that they know better what they’re responding to and can
upgrade or change the original dispatch as needed. Though the intent of broadcasting the
calls is good, the concerns need to be addressed.

Broadcasting the calls also creates an unintentional “race” between the dispatcher and on
duty personnel. The problem presents itself primarily in the fire district’s Headquarter’s
station in which on duty personnel have a variety of pieces of equipment they could be
dispatched on, from an ambulance, to an engine, to a brushbreaker, or the Quint aerial.
Personnel could actually be on the wrong piece of equipment and already initiating a
response based upon “what they heard” and not what the dispatcher and/or the Shift
Commander intends to send to a particular call. To avoid this, or to avoid apparatus on the air
before the dispatcher has all the information, the dispatcher frequently “skips” steps in
handling a call and puts the calls out without having all the information.

Dispatchers compound the “race” problem, either thinking they know the responses and
response areas, and will dispatch the call bypassing the initial step of entering the call into
the computer aided dispatch system. From practical experience this is often confirmed when
the information comes up on the computer screen when you are already responding to the
call and not already on the screen when you get into the vehicle. Bypassing this step, though
resulting is a call being dispatched quicker, presents problems as we depend on computer-
aided dispatch to give us accurate response information. Wrong stations or wrong pieces of
equipment have been dispatched when the dispatcher fails to enter the information into the
computer first. C-O-MM Fire uses its computer system to continually update address and
response information and this is vital to initiate a proper department response. The
departments purchase of new apparatus, in particular a Quint aerial, creates an access
problem at some properties. When the dispatcher enters the call into the computer regarding

a particular address information, including first due information, comes up on the screen. It’s here where the dispatcher will learn if certain pieces of apparatus need to be dispatched due to access problems, water supply problems, or other reasons the department has determined from pre-plans, site inspections, or previous alarm responses. Failing to enter and access this information puts the department in a potential position of arriving on location and not being able to get into the property to initiate rescue, fire attack, or extinguishment. Accessing the computer must be one of the first steps in dispatching a call.

This particular computer aided dispatch program was implemented in November 2003 along with the department’s using Firehouse Software. Though the system is continually being refined it does not appear to be user friendly when dispatching for multiple calls, large scale/long duration incidents, or when dispatching for multiple departments. This has caused problems for documenting accurate response times for apparatus at larger incidents, when apparatus has been dispatched from one incident to another, or when multiple calls are in progress. Though was proven following a five-alarm fire at the Crosby Yacht Yard in December of 2003. Records for that incident were hard to access, or even recreate, due to problems with the, then new, system.

The department relies on many data sources that are available in the C-O-MM Fire communications center. Written and computer record times are backed up by clocks and times on radios, telephones, and the different computer programs, including the 9-1-1 screen. These systems are not always synchronized with variations in times been noted from one to two minutes in difference. Radio and telephone conversations, on certain lines, are recorded, but they way they are recorded finds that often telephone conversations and radio
transmissions interrupt each other and make finding certain data, times or important information difficult, if not impossible to find.

When C-O-MM Fire receives a 9-1-1 call from the Barnstable Police there is a noted time on the 9-1-1 call screen and it automatically prints out in dispatch. Providing the system is functioning normally the information is kept and filed for future reference if needed. However, a review of these times finds that though there is a time in minutes and seconds noted as soon as the 9-1-1 call is put through to the Barnstable Police Department, the call received time is noted only in minutes. This creates similar discrepancies in times, for potentially as long as a minute, and repeats the same problems noted in the background and significance portion of this paper when dispatchers recorded all times manually. More importantly, it helps us to define that C-O-MM Fire’s response times start upon our being notified of a call, not upon the call being initiated, or received from an outside agency such as the Barnstable Police or the central station of an alarm monitoring company.

The Firehouse Software program will allow you to review response times in a variety of different ways, from different stations, different shifts, and different pieces of apparatus. Again, the data requested is only as good as the data put into the system. A response time analysis can be done on a per call per piece basis if needed. A random check of time differences between EMS calls and Fire calls finds a longer “out the door” time due, in part, to C-O-MM Fire guidelines requiring personnel wear their protective clothing.

In 2001 due to a Fire Act grant that this researcher wrote and was awarded to C-O-MM Fire, the department started placing computers in its first due apparatus. Using the Town of Barnstable GIS mapping system these computers are “sent” calls from the dispatcher showing map locations of incidents. GPS tracking allows the dispatcher to “see” and dispatch the closest
appropriate unit, and the system allows the first responder to identify the location of the call and see the fastest potential route to get there. Hydrant locations, structures, and pre-plans are now available to the responding apparatus. First responders no longer have to rely on dispatchers for road directions or hydrant location. This dependence often caused confusion, delayed responses, or created unnecessary radio traffic, especially to major incidents. Many times the dispatcher just did not have the time to fulfill requests for directions due to the number of calls or the number of pieces of responding apparatus. During a time of an emergency it’s also easy to get different locations easily confused. Over the years C-O-MM Fire has received many emergency calls for responses to the City of Lowell, Massachusetts, about 75 miles away. Lowell has a Centerville section of town, with some corresponding streets and similar addresses. We’ve received emergency calls for the Cedarville section of Plymouth, 25 miles away, because Centerville and Cedarville sound so similar. The Town of Barnstable, separated into seven villages and five different fire districts, even with enhanced 9-1-1, doesn’t make a dispatcher’s job easy. In town there are seven different Main Streets. The town of Barnstable has three different Pine Streets, three different Pine Lanes, 2 separate Pine Avenues. Looking through street listing from the 2004 Town of Barnstable List of Persons (Town of Barnstable, 2004) lets look at all the derivatives of the “Pine” name.

Pine Road

Pine Way

Piney Road

Pine needle Lane

Pineridge Road

Pineview Drive
Pine Lane Ext.
Piney Point Rd.
Point of Pines Avenue
Pleasant Pines Avenue
Pine Valley Rd.
Pinecrest Road
Pine Tree Drive
Pineleigh Path
Pine Grove Avenue
Pinewood Rd.

It’s easy to see where similarities of addresses can easily be confused by public agencies, not to mention the public, or visitors, who may not be familiar with the area at all. Response delays from confusion by renters, especially summer vacationers, telephone operators, or emergency call takers, could not only send the fire department to the wrong address it may send the wrong fire department to the wrong corresponding address! The property phone number used to be a common way to confirm the correct address but the increased use and popularity of cellular phones makes it difficult, if not impossible, to confirm an address by telephone number. The potential for GPS tracking in newer cell phones may again provide an option to us in locating the true location of an emergency.

Though we’ve addressed first responder staffing, staffing in the communications center itself is also a problem. Staffing issues can severely hamper the ability of the dispatcher to handle multiple or large-scale incidents. Supply and demand applies not only to business but also in the ability to the dispatcher to properly handle department call volume. The C-O-MM Fire
communications center in routinely staffed with just one dispatcher. This center will handle an estimated 4500 emergency calls in 2005 and countless of business calls as well as walk-ins from the public. The dispatcher handles all emergency call for both the Centerville-Osterville-Marstons Mills Fire-Rescue Department and the Cotuit Fire Department. The tremendous call volume of both emergency and business traffic often results in some documentation discrepancies, or delays in dispatch due to the many talks the dispatcher must perform. After physical observation the accuracy of the records could easily be questioned.

The physical layout of the communications facility itself presents many obstacles in preventing the dispatcher in doing his/her job more efficiently. The dispatcher often has to get up and physically move away from radio and telephone consoles to greet the general public. The main console itself presents with the dispatcher’s back to anyone walking into the center. There have been many changes since this station was opened in 1991. The development of an operations channel, computer technology, increased call volume, more staff on duty, the opening and staffing of the Marstons Mills Fire Station and the 24 hour staffing of the Cotuit Fire Department have all impacted on the dispatcher’s job. The addition of a radio with an operations channel requires the dispatcher to physically move his/her chair from telephones and other radios to the radio with the operations channel. Though a bathroom is located in the dispatch office there are no phones or radios in the bathroom itself causing problems in the event emergency crews are out of the building and there is no one to cover the phones and radio when they “have to go!”

The addition of the operations channel also meant that during an incident dispatchers were now required to monitor Centerville-Osterville-Marstons Mills Fire Alarm, Cotuit Fire Alarm, the county regional dispatch channel, as well as the operations channel. Major incidents
may require other radio frequencies, additional operations channels, the marine band, as well as
the telephones that any incident may require.

To complicate matters further C-O-MM Fire dispatchers are also certified as emergency
medical dispatchers. This requires the dispatchers to give emergency medical care instructions to
callers. Advice on everything from bleeding control to telephone CPR, while dispatching
emergency apparatus to the same call, prevents the dispatcher from properly documenting the
call. NFPA 1221 section specifically calls for two dispatchers when an emergency agency is
using emergency medical dispatch (EMD). (Nfpa, 2002) The dispatcher just cant physically
handle the call volume, other calls, give out emergency medical instructions, dispatch, and
properly document the call. Though the telephone system previously outlined will help alleviate
business call volume it will have no impact on these types of emergency calls.

Though all Cape Cod fire department depend on the callback of career and/or call
personnel this callback dependency results in response time delays for additional calls. Multiple
calls, especially in the busy summer months, require more department callback. The frequency of
calls often means the department has received another call before callback personnel have
reported to the station. Calling of mutual aid resources, with longer response times, have the
same impact. Hyannis Deputy Fire Chief Dean Melanson noted in his survey, “The number one
factor that affects us is the high volume of calls we do out of one station, often multiple calls at
the same time. We utilize off-duty callback personnel and often they are delayed in arriving at
the station in a timely manner due to normal traffic conditions.” The Island of Nantucket is
located some 25 miles off the coast of Cape Cod, Massachusetts. As an island Nantucket has
limited mutual aid capabilities. Nantucket Fire Chief Everett Pierce had the same concerns as
Deputy Melanson. In a response to the survey Chief Pierce listed “external traffic” as one of the
external factors impacting his department’s response times the most, both in department responses (as an island Nantucket has limited ways to get to different areas) and for callback of personnel. All fire departments across Cape Cod from all career to all call depend of some system of callback and each presents a problem for that town. As traffic has increased, run volume has grown, departments across the region are also developing more automatic aid agreements to help meet this need.

Obviously weather is a factor any the response of any emergency agency and is a factor beyond the control of the public safety. The winter of 2004/2005 found record snowfall on Cape Cod. A 19-minute response time was found to one structure fire when responding apparatus had to physically wait for a snowplow to create a path to the incident. Though we can’t control the weather we can prepare for it. To keep our firefighters safe, and potentially reduce response times, during times of severe weather C-O-MM Fire will often put on additional staffing, increase all calls to a two-company response, and if needed work with the Department of Public Works in assigning a snowplow to each of our three stations. The department has its own plow that is dispatched with emergency equipment to facilitate our responses. Though weather creates and understanding of a delay, the department does take steps to keep response times down even in the worst of weather conditions.

**Research Question #2:**

When does the response time clock start and how is the response timeline defined from the moment a call is initiated?

Response time is directly related to response notification. The response time clock cannot realistically begin if the agency is unaware that it has an incident to respond to. Though this theory may seem to be one of common sense the routing of calls can delay a response. So
while our customers have already put us on the response time clock, watching the time, and wondering how long it may take, the responding agency may not even be aware of the problem. This relates directly to the American Heart Association’s first steps in their Links in the Chain or Survival (American Heart, 2004):

1. Early access

2. Recognize an Emergency

3. Call 9-1-1

So when does the response time clock start and how is the response timeline defined? In a perfect world a response time clock starts the moment an incident occurs. An event needs to be first recognized as requiring help! When somebody calls for help this is when their own time clock start? How long before help arrives? So while the layperson might say the time starts from the time of the actual incident public safety agencies may define the time as starting upon notification. The use of cell phones in Massachusetts can further delay a response agencies notification. Cell phones are routed through the Massachusetts State Police in Framingham, then forwarded to the Barnstable Police, and finally to C-O-MM Fire. So while we’ve “already be on the clock” by someone who needs help, in fact, our clock is just starting. A review of 9-1-1 data from random calls not only finds discrepancies because the two times are reported, but legitimate differences in the time it took the first dispatcher to take the initial information and forward it to the proper agency. A random check of times on 9-1-1 calls through 2005 to C-O-MM Fire finds that there is often a difference between 20 to 60 seconds while the initial information was gather and before the call was forwarded. An initial problem that C-O-MM Fire has is following up on is the increasing number of calls that have come in on the direct line from the police department. Many of these calls originated as 9-1-1 calls, the call information was taken by the police
dispatcher and yet, for some unknown reason, the 9-1-1 call was not forwarded to the fire department. The situation has become serious enough that Chief Farrington has asked C-O-MM Fire dispatchers to record what calls come in on the direct line so that we can follow up and find out if, in fact, they were 9-1-1 calls and why weren’t they forwarded to the fire department using proper procedures.

C-O-MM Fire Chief John Farrington has met with Deputy Chief Tamash, other representatives of the Barnstable Police, and followed up with letters of concern regarding 9-1-1 calls not being properly forwarded to our department. Neighboring Hyannis Fire has similar problems. Though some of the issues were previously addressed under changes the Barnstable Police have made the fact is these delays directly correspond to our response times, and more importantly, impact the potential outcome of an emergency incident. The police department has handled calls that come under the responsibility of fire and EMS. Smoke investigations, medical assists, and welfare checks; have often resulted in a delay in the fire department response because we have not been notified until the police have first investigated the call.

Deputy Tamash informed me that the Barnstable Police Department is now in the process of becoming accredited. That process will mean developing and adopting new standard operating guidelines in dispatch including defining times to take call information, the time to forward a call to another 9-1-1 agency and/or dispatch the Barnstable Police Department. Deputy Tamash is aware of the concerns and complaints that C-O-MM Fire and the other fire districts have had and have been working through the accreditation process to address these concerns. These concerns include delays in fire and rescue notification from the police department, complaints that the Barnstable Police has handled calls outside of areas of expertise (fire and medical), or that police
dispatchers did not get the required information to allow fire and EMS to dispatch a proper response.

In a post incident analysis of the Town of Barnstable’s response to blizzards and snowstorms in the winter of 2004/2005, which this researcher attended as C-O-MM Fire’s representative, both the police department and the town’s fire departments look at ways to improve dispatch capabilities both on a daily basis and during times of disasters. All agencies agreed that we must improve our working relationship. During times of disaster a rapid activation of the Town of Barnstable Emergency Operations Center would help to improve our responses, and our response times, to both the Centerville-Osterville-Marstons Mills Fire District and the Town of Barnstable. Following a post incident analysis of an August 20, 2005 drowning that first started as a rescue and later recovery incident that involved both the Barnstable Police, C-O-MM Fire, along with other public safety agencies, it was concluded that during incidents that involve the many resources of both departments, we must work harder to develop and work under a unified command. This would allow all agencies to better allocate resources, improve communications, and improve safety and accountability to all operating on the emergency scene. This would improve our responses, decreasing response times, to these types of incidents as well as to the emergency needs of the rest of the town. Many times these types of incidents can become long in duration and has an affect of the capabilities of the responding agencies to handle subsequent calls.

In recent years the Barnstable Police Department has changed its dispatching format from having patrol officers dispatching calls to hiring civilian dispatchers. The intent was to return police officers to patrol duty. Police officers were rotated in and out of dispatch and their time assigned to communications did not allow them to become proficient in the job. There are also
those police officers, like firefighters, who just did not handle the job of dispatching well. As the
job of dispatching has become a career in itself the concept of having full time dispatchers, often
hired at a cheaper rate then a police officer, appealed to both the Barnstable Police as well as the
Town of Barnstable, both that were facing budget problems.

The problem has been filling these jobs, and keeping them filled. The job is very stressful
and there has been a high turnover in personnel. Though there are dispatcher job requirements
the fact is that there has been few hired that has had extensive experience in both call taking and
dispatching emergency calls. This lack of experience, and personnel turnover, has been the
source of many of the problems with police dispatchers. Restructuring of the Barnstable Police
officer corps, adoption of new standard operating guidelines, a stable work force, along with the
requirement of the National Incident Management System (NIMS), should help to alleviate
problems and improve the Barnstable Police Department’s dispatching capabilities.

Similar delays in notifications have occurred with alarm companies in the notification of
automatic fire or rescue alarms. Obviously the problem presents itself when a complaint occurs
over response times. When a caller claims it took the ambulance ten minutes to get there and the
initial data sources and dispatch logs show that the fire department had an on scene time of seven
minutes, these complaints were quickly dismissed. We’re now learning that it did take us longer
then our records indicate because we never received a prompt notification to respond.

**Research Question #3:**

What are other public safety agencies doing to determine and reduce response times?

Out of 60 survey’s sent out, 26 were returned, many with comments and information that
supplemented the survey questions. In response to my survey, availability and response times are
a concern for all agencies. Each has addressed their response times in a variety of different ways.
The Cotuit Fire Department, a small department having only two firefighters on duty on a 24 hour basis, has gone as far as adopting a policy limiting the number of times personnel can use department vehicles or leave the station for personal use (meals, errands, etc.) to once in a 24 hour period. Cotuit Fire Chief, Paul Frazier, is concerned about the potential of leaving one firefighter alone back in the station, and the potential delays in response because one firefighter was not in quarters. A small department, with limited personnel, and staffing issues, all areas had to be explored to increase availability and decrease response times. Brewster Fire’s move to a regional dispatch center was also part of its program to reduce response times as well as dispatching fire and EMS calls more efficiently. Many times a person who is trained to be a police dispatcher may not be prepared to properly dispatch fire and EMS calls. According to Yarmouth Fire Chief C. Randall Sherman the Town of Yarmouth reduced the average response time for one section in town from “over 6 minutes to 4 minutes 21 seconds” by hiring twelve additional firefighters and opening a third station “for the express purpose of reducing response times to one-third of the community.” Other departments have continued requesting additional personnel or requested money to build new and better-located fire stations. The Town of Harwich, in recent budget cuts, had to first layoff firefighters. Hired back just recently after a tax override passed the current department budget demand that their outlying station be closed when staffing levels are reduced to five firefighters. Having some of the same concerns as the Town of Yarmouth C-O-MM Fire had already hired twelve additional firefighters in 1999, also opening a third station, to better meet the needs of increasing call volume as well as reduce times to the village of Marstons Mills. C-O-MM Fire, like every department on Cape Cod, depends on call back of its career firefighters to staff stations when on duty personnel get committed on calls. To better meet the demands of a still increasing call volume, keep firefighters safe, and reduced
response times, the department implemented, as of August 22, 2005, a three person call back policy in that the department would cover stations with three firefighters instead of the previous two when called to cover a station.

Numerous departments have adopted technology as a cost effective way to reduce response times. Computers and software programs already mentioned have been put into place to allow dispatchers to take and dispatch calls more efficiently. Opti-com units, mounted as part of an emergency vehicle’s warning light system, changes traffic lights from red to green, helping to keep traffic flowing in the direction emergency vehicles are responding. Locally, both C-O-MM and Hyannis Fire have utilized this system and found it to be a very effective way to keep traffic moving, keeping our firefighters safer, and reducing response times in the process.

A review of the surveys sent out most departments said they reviewed response times on at least an annual basis. Though many departments look to have response times of six minutes or less, and use NFPA 1710 as a guideline, few have written guidelines, policies, or procedures outlining times for dispatchers to take and process a call. A response to my survey by Captain Allison Cabral of the San Jose (CA) Fire Department finds that their communications procedures (San Jose Fire Department, 1998) outline times. “Emergency lines shall be answered prior to the third ring or not more then 15 seconds form the time the call enters the system.” Medical events for the appropriate level of response “shall not exceed 1 minute 30 seconds.” The Cary (NC) Fire Department states in its standard operating guideline that travel time to emergencies “to be five minutes or less 90% of the time.” (Max Garris, 2003) Locally only the Hyannis Fire Department responded that it had been a long standing policy to get vehicles out under a one-minute turnout time. Centerville-Osterville-Marstons Mills has no such policy.
This research has found that many departments, both locally, state, and nation wide share some response time concerns. It is again important to remember while we look at the importance of reducing response times the purpose of this paper was to determine a true and accurate response time for the department. Though recommendations will be made for change that will help to reduce department response times a review of 9-1-1 and dispatch logs, and an analysis of all 2004 calls to the Centerville-Osterville-Marstons Mills Department of Fire-Rescue & Emergency Services leads me that to determine a true response time for a call all data sources would have to be checked and confirmed. Considering all calls, and using the Firehouse data as a source, C-O-MM Fire has a 7.15 minute response time. (Centerville-Osterville-Marstons Mills Dept. of Fire-Rescue & Emergency Services, 2005) That time is deceiving as it calculates all department response times including delays from weather, non-emergency responses to public assists, and other calls where there was not a “lights and siren” response and time was not a factor. A review of all data sources, especially the 9-1-1 call logs leads me to determine that a true and accurate time for the department would require adding an additional 30 to 90 seconds additional time needed for other agencies to take, receive, and process the call through to C-O-MM Fire. Using an average of 45 seconds and the average response time for C-O-MM Fire to all events is 7.9 minutes. Adopting time standards as recommended by NFPA 1221 of 15 seconds to answer a call, 60 seconds to dispatch the call, and a one-minute turn out time as recommended by NFPA 1710, and quality assurance and proper follow up, potentially decreases response time of one minute. That’s based upon observations in dispatch and the response of emergency crews.

C-O-MM Fire utilizes the Firehouse Software program as its primary program for report, record keeping, business and residential information, and dispatching. There are many different
programs available to emergency services that provide similar capabilities and each agency must
determine which program may best serve each particular department. C-O-MM Fire, through its
computer information person, determined that Firehouse provided us the best options. A survey
of other departments found that many departments still use the times manually entered into the
system by the dispatcher, other departments, such as Nantucket Fire have elected to use Fire Pro
Dispatch Software. The Harwich Fire Department utilizes IMC Dispatch Software. No matter the
program, most times is dependant on a dispatcher manually recording times. Barnstable fire
Chief, Robert Crosby, says his department, which is dispatched by a regional dispatch center at
Barnstable County Control, also uses Firehouse to analyze response times but the problem Chief
Crosby states is “Dispatch giving us the correct times from their end…” The problem continues
to be that times kept by the department and personnel often due not correlate with each other.
Brewster Fire Chief Roy Jones III echoes the accuracy of response time concerns. Brewster Fire
has been dispatched by a joint police and fire dispatcher at the Brewster Police Department and
in his survey Chief Jones responded that they use the police dispatch logs but that the “data is
sometimes suspect.” Brewster Fire recently switched their dispatching from the local Brewster
Police to the regional Barnstable County Control and comparable data is not yet available. Other
departments who shared a joint dispatch with their police departments, or use their police as the
primary PSAP had similar problems as C-O-MM Fire and had either done the same as Brewster,
switched to a regional dispatch center, or were, at least, considering it.

Ironically, we should note that in the interest of keeping firefighters safe response times
present concerns in another way. Are apparatus responding too quickly? By “too quickly” this
researcher means beyond a safe traveling speed. C-O-MM Fire has adopted an SOG that clearly
states that the maximum speed allowed over the posted speed limit is 10 mph in the best of road
and weather conditions. Apparatus are advised to “respond with traffic” based upon the first due company’s report. The department is scrutinizing the use of lights and sirens, and so while the department looks to reduce response times it’s balancing those same times with firefighter safety. Firefighter safety is the department’s premier concern over response times.

In response to the survey question, how do you feel your department could better reduce its response times? The majority of the surveys returned noted staffing in some form, either through more on duty personnel, separate staffing for ambulance and engine companies, or to better develop ways to callback personnel. Only Cotuit Fire Chief Paul Frazier noted; “No particular ideas at this time; they appear to be as reasonable as can be expected.

**Research Question #4:**

What policies or procedures could C-O-MM implement to reduce department response times?

Dispatch is a focal point in department response times. Notification, information, and dispatching the call with the proper apparatus all have an affect on response time. As the job of the dispatcher has changed, as technology has changed, the job has gotten increasingly more difficult. Unlike “the old days” not everyone has the ability to do the job well. Recognizing this the department hired its full time civilian dispatchers in 1980. Though the dispatcher’s answer to the Shift Commander as civilians they are technically under the Chief of Department. There is also no senior dispatcher who is in charge of dispatch operations, participates in senior staff meetings, or who’s responsible for the other dispatchers. For this reason many problems go unreported, or there is no chain of command to properly deal with. Many officers are reluctant to bring small problems to the Fire Chief. Developing one of the dispatching positions to senior position, I.E. Dispatch Supervisor, equal to officer rank would help the department address problems and facilitate both training and change. Some changes in dispatch, including
procedures and the introduction of new and changing software, have been done with little or no input. The department’s investment in new technology must be done in consideration of the dispatcher’s workload and job expectations. Previous purchases or designs have not always worked out to the dispatcher’s benefit. The result has been a system not user friendly to the dispatcher, and a dispatcher’s reluctance to work with the new system. Dispatchers, the people who use the system, must be a part of the testing and purchasing process.

Dispatchers are the stepchild of the fire service family and are often left out in important operational meetings or training. Command decisions, the use of incident command and dispatcher involvement must include these people in the training process. The department must take steps to better include them in department operations, as their job is a primary focus of all department operations and working towards successful incident conclusion.

My observations conclude that the department should develop a standard operating dispatch procedure that is followed by all dispatchers in the same order and is recommended by NFPA 1221. This would help to alleviate potential dispatch errors such as sending wrong stations or apparatus. Dispatchers must recognize that the department will continue to utilize a computer aided dispatch system more and more. More information, from location maps, pre-plans, and on site information will be entered into the computer and will become more valuable to determine a proper response. The procedures must be developed in working with the dispatchers and not why this researcher, or other department officers, may think is the best system. A formal procedure, as part of a standard operating guideline, would make response times more meaningful as call comparisons would be the same. Under the current system some discrepancies in response times could easily be a defined as the differences in the different ways dispatchers take and handle emergency calls.
The development of procedures should include the adoption of the elements of NFPA 1710, and NFPA 1221, in particular response time dispatch standards and turn out time. Currently the department does not have a standard reflecting the time it takes to process and dispatch a call and/or for a one-minute turn out time. Though these standards may be difficult to adhere to, the department must have a goal, and this goal should be within standards already set and recognized. Adopting standards serves no purpose unless the department plans to use the standard as a quality control measure to improve times. Times should be reviewed annually, as recommended by NFPA 1710, but not only on a department basis but a shift-by-shift basis. Included in this review should be a plan on how to work with the shifts to improve times should a problem exist. There is no sense in tracking and reviewing times if the department does not have a plan in place to both improve upon them and/or deal with those companies who cannot comply.

Additional procedures that should be considered are as simple as synchronizing all clocks and times on a regular basis, develop procedures to train administrative staff to help dispatchers during certain incidents or when requested, and developing a reporting process as all levels to identify calls with extended response times so the department is aware and prepared for a potential complaint, and to see what actions can be taken to address the problem. External factors such as multiple calls, weather, and staffing problems may account for some of these extended response times but these calls should be flagged and evaluated.

The communications center between the Barnstable Police and C-O-MM Fire should develop a better working relationship. This may help to alleviate some potential notification delays. It may actually help to take these problems out of the hands of senior officers such as the Fire Chief and Deputy Police Chief and place it more on an operational level between either the
Shift Commanders of both agencies or even those in charge of their respective communications centers. A program in which C-O-MM Fire dispatchers observe at the police station and BPD dispatchers observe fire operations.

Both agencies, as well as other local agencies that depend on the Barnstable Police Department as their primary PSAP, should use the required 2005 NIMS training as an opportunity to train and work together. This training can only help to improve the working relationship between both agencies, which will translate to a better understanding of each other’s problems, and may result in a more efficient system. More efficiency should decrease our notification and response times.

Finally, the call volume of the department has exceeded the ability of the dispatcher to efficiently do his or her job. Steps have been taken to make changes to better streamline the system. Both departments, for a three-month trial basis, operated on the same fire alarm frequency. Though easier for the dispatcher, and safer for fire personnel, the program was not successful due to complaints from fire service personnel in both departments about listening to the other department’s radio traffic. Serious consideration must be done to notifying the Cotuit Fire Department to either conform to our dispatch procedures, pay more for the dispatching service and allowing C-O-MM Fire to increase the communications staff, or find an alternate dispatch facility.
DISCUSSION

Since this researcher’s hiring as a full time dispatcher in August of 1980, the subject of response times has always been of particular interest. Each public service agency looks and boasts of its times without actually having an understanding of how those times came about. Back in the 1980’s I know that there were times when response times were not recorded properly, either due to error, “guessing”, or to insure that recorded times were those that would keep the Fire Chief from investigating why there were delays in crews getting out of the station or on scene. It’s always amazed me that though each agency strongly defended their times, in fact, each system had so many flaws and deficiencies built into the system that the department truly did not know what an accurate response time was.

All literature sources agree with NFPA 1710 on a six-minute response time. However few sources look to see how response times are calculated and if, in fact, the response times are accurate. Though C-O-MM Fire’s average response time for all calls is 7.15 minutes, I also defined those calls that show the department having less then a 7.15 minute response time. Data sources are often “suspect” as Brewster Fire Chief Roy Jones wrote in his returned survey.

*The Boston Globe* report brought to light the problem of response times across Massachusetts. Comparisons between call and permanent departments raise the question as to what level of service the taxpayer is willing to pay for. The West Barnstable Fire District, who’s line is shared to the north of Centerville-Osterville-Marstons Mills only recently hired enough full time people to allow then to have one paramedic around the clock 24 hours a day. West Barnstable averages about 450 calls a year and the tax base of the fire district resulted in a big jump in property taxes. However, for years, when West Barnstable could not get a paramedic on
an advanced life support call they would call to C-O-MM or other departments for a mutual aid paramedic. When is it no longer mutual aid? When do you tell the requesting agency that the people of West Barnstable voted not to have full time coverage and why should the taxpayers of C-O-MM supplement their department? We’re decreasing the response time for ALS care to West Barnstable residents but increasing that same time to C-O-MM taxpayers who may need a paramedic next.

From the surveys sent out and the information gathered this researcher was surprised at the many different approaches departments used to address response time concerns. The size and type of department, call versus career, also reflected in the ways the issue was addressed. The Cotuit Fire Department’s policy of limiting the amount of times personnel can leave the station to Yarmouth Fire’s opening a third station and hiring 12 firefighters. Callback of personnel is a key issue that reflects response times and the department’s ability to handle multiple calls all across Cape Cod.

Response times, though a consideration of most departments, was not an issue enough for NFPA 1710 to be adopted. Less then half of the department’s surveyed and returned reviewed response times annually as recommended by 1710. C-O-MM Fire Chief John Farrington, in responding to the same survey, uses ISO and 1710 to determine response times for the department, however, he noted, that the department did not conduct an annual review of response times. A review was done only on an informal basis, and the department did not have a written guideline, policy or procedure regarding a one-minute turn out time or the time a call is processed and dispatched. In today’s litigious society this researcher was surprised that more departments did not strive to meet the one-minute turnout time.
This research did not include the fact that the Town of Barnstable, with its five fire
districts, has often considered consolidating its fire departments. Frequently this has been raised
not from a response time respective but from a cost respective. Many, not the opinion of this
researcher or of C-O-MM Fire Chief John Farrington, feel that a consolidated fire department
would save the town money. In a recent Barnstable Patriot article featuring the latest Fire Study
Committee’s look at consolidation committee member Mike Ingham said that the study’s
parameters could exclude any degradation of response times. “The assumption that response
times are going to go down is a red herring” he said. (David Still II, 2005) Those on the
committee, composed of fire service and citizens from across the town, disagreed with that
assessment. Though the issue has been discussed and voted on before the fact is that so far no
committee, including this one, had been able to agree on even spending the estimated
$250,000.00 to even study potential consolidation.

The time elements defined in NFPA 1710 are an easy goal for C-O-MM Fire to adopt and
strive for providing that any problems found are followed up, and the department is willing to
make changes. A simple, cost effective, approach is to better define and formalize dispatch
procedures.

C-O-MM fire equipment, dispatching and on duty personnel are excellent compared to
many areas of Cape Cod. Many departments are going through the same growing pains that
C-O-MM did throughout the 1970’s and 80’s, the transition from a call to a permanent
department. Though the department has to seriously invest in updating to more computer friendly
software problems, many of the proposed changes are not expensive to implement. Most
expensive of all would be that of increasing the communications staff if the need to hire more
people is justified. A first step in this process is an extensive review of the costs and workload
that dispatching for the Cotuit Fire Department places on our communications staff. Changes in how they work, or potentially recommending them to use another dispatch center, has to be seriously considered as it is impacting in how C-O-MM calls are being handled.

This research also did not consider moving dispatch operations to the local regional dispatch center, Barnstable County Control. Though I understand that there are successful regional dispatch facilities all across the United States, C-O-MM Fire is fortunate enough to be able to afford and control its own dispatching operation. Chief Farrington believes, and I concur, that the public should have access to its fire department 24 hours a day. Moving our dispatch operation entails assigning on duty personnel as a watch person and/or having an empty station when personnel are out on calls. We want our department to be accessible to the public we serve and, at this time, there is no advantage to C-O-MM Fire to relocate to a regional dispatch center.

In the event of a complaint or lawsuit C-O-MM Fire must continue to review all data sources prior to confirming a response time, including the time that the Barnstable Police may have had to process the call. Only then can we correctly confirm how long the call actually took from the time it was initiated by the reporting party.

This research related to the Executive Development course through the Executive Fire Officer Program at the National Fire Academy by proving the to provide a proper and efficient emergency response requires a team effort. The team must include dispatch as a foundation that the call is built on, but all members of the team need to be integrated. Members of the team include the communications staff of both the Barnstable Police and C-O-MM Fire, the first responders themselves, and a command and administration staff willing to address and change problems in the process. The loss of one team member will collapse the whole process. The call
will be taken processed, dispatched and handled, but not in the most efficient manner that our response times and national standards demand.
RECOMMENDATIONS

As a result of my research, much of which was outlined in detail in the results section of this paper, the following recommendations are made:

1. Develop and adopt standard operating guidelines that format a strict dispatch procedure using NFPA 1710 and NFPA 1221 time elements. NFPA 1221 specifically addresses the need for a standard operating guideline. Included would be the adoption of a one-minute turnout time and developing an in-house system for tracking extended turn out or response times.

2. Review and purchase a computer aided dispatch program that is more “user friendly” and allows the dispatcher to track and run multiple alarms, as well as multiple pieces of apparatus.

3. Develop training with both the dispatchers of the Barnstable Police Department and the command staff of both the BPD and C-O-MM Fire.

4. Train administrative and secretarial staff to assist dispatchers in the time of high priority, large scale, or long duration events.

5. Develop from the existing dispatch positions a Dispatch Supervisor. This supervisor would have administrative rank and would work with the Fire Chief, administration, and command staff of the department. The supervisor would serve as a liaison between the dispatchers and department officers, would work with the administration on a communications budget, and would be held responsible to train, research and develop equipment, policies and procedures for the dispatch center. He/she would work with the Chief in hiring new dispatch personnel as needed.
These basic recommendations would go along way in re-developing the potential of the communications center, improve efficiency, with a goal that includes reducing the response times of our firefighters, EMTs, and Paramedics.
REFERENCES


*Town of Barnstable List of Person Seventeen Years of Age and Older.* (2004). Hyannis, MA: Town of Barnstable.


Appendix A

Centerville-Osterville-Marstons Mills Fire Department

- **Community served:** Barnstable, Mass.
- **Department type:** Career firefighters
- **Fire stations (department)**: 3
- **Fire stations (town):** 7
- **Square miles (town):** 62.6
- **Square miles per station (town):** 8.9 [See rankings]

Some communities have more than one fire department.

### On-time response rates

**SUMMARY:**

- **On-time rate, building fires receiving a response within 6 minutes, 1986-2002:** 76.3%
  - **On-time rate, early years, 1986-1998:** 74.1%
  - **On-time rate, recent years, 1999-2002:** 82.3%

**DETAILS:**

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>Fires with on-time response</td>
<td>157</td>
<td>65</td>
<td>222</td>
</tr>
<tr>
<td>Fires with slower response</td>
<td>55</td>
<td>14</td>
<td>69</td>
</tr>
<tr>
<td>Total building fires studied</td>
<td>212</td>
<td>79</td>
<td>291</td>
</tr>
</tbody>
</table>

### ISO Insurance Ratings

Insurance companies use ratings from ISO, a New Jersey company, to help determine fire insurance premiums. ISO rates communities on a scale from 1 (best) to 10 (no protection). The ratings are based on the community's fire department, water supply, and dispatch communications. The ratings are not based at all on response times. The same scale of 1 to 10 is applied to the effectiveness of building codes. In a split fire rating, such as 4/9, the second number applies to properties more than 1,000 feet from a hydrant.

- **ISO fire protection rating, Nov. 2004:** 4/9
- **ISO building code rating, residential, Nov. 2004:** 5
- **ISO building code rating, commercial, Nov. 2004:** 5
Appendix B
Appendix C

Run Response Survey

Centerville-Osterville-Marstons Mills
Dept. of Fire-Rescue & Emergency Services
1875 Route 28

Centerville, MA 02632

1. What data sources are used to determine response times?
2. NFPA 1710 requires an annual review of department response times. Does your department conduct this review?
3. Does your department have a written guideline, policy, or procedure regarding a one-minute turnout time for emergency responses?
4. Does your department have a written guideline, policy, or procedure that defines the time a call is processed and dispatched?
5. What steps has your department taken in the last 2 years to reduce response times?
6. Is your dispatching handled internally or by an outside agency?
7. What internal and external factors impact your department’s response times the most?
8. How do you feel your department could better reduce its response times?
Appendix D

C-O-MM Fire: Response Time Averages To All Calls

<table>
<thead>
<tr>
<th>Incident Type</th>
<th>Average Response Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Special type of incident, Other</td>
<td>5 minutes</td>
</tr>
<tr>
<td>Detector activation, no fire - unintentional</td>
<td>10 minutes</td>
</tr>
<tr>
<td>Unintentional transmission of alarm, Other</td>
<td>15 minutes</td>
</tr>
<tr>
<td>Heat detector activation due to malfunction</td>
<td>20 minutes</td>
</tr>
<tr>
<td>System malfunction, Other</td>
<td>25 minutes</td>
</tr>
<tr>
<td>False alarm or false call, Other</td>
<td>30 minutes</td>
</tr>
<tr>
<td>Steam, vapor, fog or dust thought to be smoke</td>
<td>35 minutes</td>
</tr>
<tr>
<td>Vicinity alarm (incident in other location)</td>
<td>40 minutes</td>
</tr>
<tr>
<td>Wrong location</td>
<td>45 minutes</td>
</tr>
<tr>
<td>Unauthorized burning</td>
<td>50 minutes</td>
</tr>
<tr>
<td>Assist police or other governmental agency</td>
<td>55 minutes</td>
</tr>
<tr>
<td>Animal problem</td>
<td>60 minutes</td>
</tr>
<tr>
<td>Water or steam leak</td>
<td>65 minutes</td>
</tr>
<tr>
<td>Ring or jewelry removal</td>
<td>70 minutes</td>
</tr>
<tr>
<td>Service Call, other</td>
<td>75 minutes</td>
</tr>
<tr>
<td>Aircraft standby</td>
<td>80 minutes</td>
</tr>
<tr>
<td>Breakdown of light fixture</td>
<td>85 minutes</td>
</tr>
<tr>
<td>Electrical wiring/equipment problem, Other</td>
<td>90 minutes</td>
</tr>
<tr>
<td>Oil or other combustible liquid spill</td>
<td>95 minutes</td>
</tr>
<tr>
<td>Combustible/flammable gas/liquid condition, other</td>
<td>100 minutes</td>
</tr>
<tr>
<td>Electrocution or potential electrocution</td>
<td>105 minutes</td>
</tr>
<tr>
<td>Swimming/recreational water area rescue</td>
<td>110 minutes</td>
</tr>
<tr>
<td>Search for person in water</td>
<td>115 minutes</td>
</tr>
<tr>
<td>Motor vehicle accident with injuries</td>
<td>120 minutes</td>
</tr>
<tr>
<td>Rescue, EMS incident, other</td>
<td>125 minutes</td>
</tr>
<tr>
<td>Overpressure rupture from steam, Other</td>
<td>130 minutes</td>
</tr>
<tr>
<td>Outside rubbish, trash or waste fire</td>
<td>135 minutes</td>
</tr>
<tr>
<td>Forest, woods or wildland fire</td>
<td>140 minutes</td>
</tr>
<tr>
<td>Road freight or transport vehicle fire</td>
<td>145 minutes</td>
</tr>
<tr>
<td>Fire in portable building, fixed location</td>
<td>150 minutes</td>
</tr>
<tr>
<td>Chimney or true fire, confined to chimney or true chimney</td>
<td>155 minutes</td>
</tr>
<tr>
<td>Fire, Other</td>
<td>160 minutes</td>
</tr>
</tbody>
</table>
Appendix E

Fire Propagation Curve