Development of a Post-incident Analysis Program for the Copley Fire Department

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Abstract

The problem was that the Copley Fire Department did not perform post-incident analysis for the fire and rescue division. The purpose of this research was to identify means and resources to appropriately perform post-incident analysis on fire and rescue emergencies. To determine this, an action research method was used to answer the four research questions: Can the Copley Fire Department benefit from a post-incident analysis program? How can a post-incident analysis program be designed? When should a post-incident analysis be performed? What information should be gathered to perform a post-incident analysis? During the research process three types of actions were performed. The first was to complete a literary review on the subject within the fire service and organizations outside the fire service. The second was to distribute a questionnaire to chief officers across the state of Ohio. The third action was to interview individuals that use post-incident analysis within their scope of duties. The result of this research determined that Copley Fire Department would benefit from the implementation of a post-incident analysis program. A standard operating guideline was developed and attached to this document. To facilitate the implementation of the program, the guideline suggests the use of both formal and informal post-incident analysis. The applied research project recommendations included the adoption of the attached standard operating guideline and the use of post-incident analysis, either formally or informally, after all emergency incidents.

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Certification Statement

I hereby certify that this paper constitutes my own product, that where the language of others is

set forth, quotation marks so indicate, and that appropriate credit is given where I have used the

language, ideas, expressions or writings of another.

Signed:_____

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Introduction

One of nine townships in Summit County, located in Northeast Ohio, Copley Township is a suburban community located on the western boundary of the city of Akron. Copley, like many other communities, has fallen prey to the 2008 economic downturn and the fire department has been forced to alter normal operations to maintain service within a diminishing budget. With a population exceeding 17,000 residents, the property owners, residents, guests and commercial occupants receive emergency services via a combination of full-time and part-time professional firefighter/paramedics. The Copley Township Fire Department (CFD) is composed of two fully equipped stations that provide emergency medical service, fire service and technical rescue operations. One of the two stations is dedicated solely to Copley Township, while the other is jointly operated with a neighboring township. The personnel makeup of the department consists of 18 full-time members, 21 part-time members and 20 contractual members. A contractual member of the department is generally a person that is employed full-time at another department and works at CFD when a full-time member has requested time off. A part-time member works for the department to increase daily staffing and is encouraged to return to the station during major call situations. The significance of the different employment classifications is relevant to this research document and will later become apparent.

Like many other emergency service departments, CFD increases staffing at emergency responses by integrating automatic and mutual aid response programs, while operating within budgetary constraints. Although other department personnel are utilized by CFD as needed, joint training between the departments does not exist. The current training program does not

mandate that contractual personnel attend, and part-time personnel are only responsible to attend

a portion of the training events offered.

The problem is that the Copley Fire Department does not perform post-incident analysis.

The purpose of this research is to identify means and resources to appropriately perform post-

incident analysis. To determine this, an action research method shall be used to answer the

following research questions: Can the Copley Fire Department benefit from a post-incident

analysis program? How can a post-incident analysis program be designed? When should a post-

incident analysis be performed? What information should be gathered to perform a post-incident

analysis?

Please note that this applied research paper shall conform with the *Publication Manual of

the American Psychological Association, 6th edition,* except when in conflict with the *Executive

Fire Officers Program Applied Research Guidelines* (United States Fire Administration, 2012).

Background and Significance

Formal departmental training is provided to all members of CFD every Monday, with the

exception of the first Monday of each month, and is generally conducted between the hours of

19:00 and 21:00. The second Monday of each month is dedicated solely to EMS activities,

while the third, fourth and possibly fifth Mondays are dedicated to fire/rescue training activities.

The department pays all those in attendance normal hourly or overtime wages. The burden on

the department's budget equates to an average of $2,259.63 per training. Due to the logistical

constraints, the CFD has not placed an emphasis on post-incident analysis in the fire or technical

rescue arena. The CFD does perform PIAs as part of a quality assurance program in the EMS

division. The lack of a formal PIA program has prevented the department from gaining valuable

knowledge from past practices and has limited team-building opportunities.

The collection of information beyond a basic incident report does not currently exist, so

incorporating PIA into current weekly trainings or even on-the-spot discussions is not possible.

Even if a list of guidelines was available to collect necessary information, dispersion to those

involved with mutual aid is not possible because training dates differ between neighboring

departments. The normal structure fire response consists of CFD members and equipment along

with equipment and personnel from three other departments. If the structure fire is commercial,

larger than normal or located outside the central water system, additional departments are added

to the response. This increases the difficulty in performing a formal PIA.

The CFD EMS program is overseen by Akron General Medical Center Emergency

Department. Included in this program is an emergency department physician assigned to CFD to

facilitate the training and a quality assurance program. Part of the quality assurance program is a

procedure to collect information and perform a PIA. As explained in a recent interview with the

EMS coordinator for CFD, the quality assurance program gives the shift commander a step-by-

step procedure that describes what type of incidents require a PIA, as well as what type of

information is to be gathered. A staff member is then assigned to collect, analyze and bring

about operational changes when needed (C. Bower, Lt., personal communication, April 27,

2012).

Not only is the EMS quality assurance program used in a local capacity, the State of

Ohio, through the Department of Public Safety, conducts similar activities. The Department of

Public safety offers annual EMS grants for equipment and training. To be eligible for these

grants, EMS providers must participate in several of the Department of Public Safety programs.

These programs include an electronic reporting system that allows the department to gather

patient information and treatment data. This data is analyzed for recurrent problems or to

identify effective treatments. This information is published and disseminated throughout the

state (Ohio Department of Public Safety, n.d.).

On a national level, the National Incident Management System (NIMS) has a similar

reporting system where data from any emergency response is recorded. The information is used

in a similar manner to the Department of Public Safety, except it is for large-scale events. This

information is reported to the National Fire Incident Reporting System, which is overseen by the

United States Fire Administration. The Department of Homeland Security, through NIMS, has

developed a list of criteria that is required to be collected along with recommendations for future

performance attached to the report. Failure to do so can eliminate the possibility for local

governments to receive federal funding and aid for disaster restoration (Homeland Security

Exercise and Evaluation Program [HSEEP], n.d.). In the past these reports have been used in

PIAs and alter how FEMA conducts emergency (Homeland Security Exercise and Evaluation

Program [HSEEP], "n.d."). The NIMS PIA procedure closely replicates the United States

military formal post-incident analysis program called 'after-action reviews'.

The military's after-action review program was originally designed to review combat operations; however, it has been modified many times over the years and is used in all aspects of the military. The United States Army describes after action reviews as a tool to be used by all teams who desire to maximize learning from their actions, no matter the size, scope, or duration of the project, regardless of the outcomes. The belief is that all projects, even if deemed to be a failure, have some type of successes and always have the ability to document lessons learned (United States Agency for International Development [USAID], 2006).

Arguably, the foremost authority in after-action reviews is the National Transportation and Safety Board (NTSB). For decades, the NTSB has gathered information, written in-depth reports and brought about change that has influenced traveler safety around our nation. A simple search of the internet will yield countless after-action reviews generated by the NTSB and recommendations for change (United States Agency for International Development [USAID], 2006).

As discussed above, multiple agencies have found that after-action reviews are an integral tool that can increase safety and improve organizational effectiveness. The CFD has embraced such practices for EMS and yielded positive results. An emergency department physician described how lessons learned through the quality assurance program have improved EMS delivered to residents and guests of Copley Township as well as EMS providers throughout the state. (S. Steer, MD, personal communication, April 27, 2012). Based on the successes of the quality assurance program utilized on a local and state level, CFD could potentially benefit from a similar program on the fire and rescue division.

With the creation and implementation of a post-incident analysis procedure, CFD will support four of the five United States Fire Administration's goals:

1. Reduce risk at the local level through prevention and mitigation.

2. Improve local planning and preparedness.

3. Improve the fire and emergency services' capability for response to and recovery from all hazards.

4. Improve the fire and emergency services' professional status (United States Fire Administration [USFA], 2012).

This research document is directly related to the Executive Fire Officer Program (EFOP) course curriculum by conducting an in-depth analysis into how Copley Fire Department can improve emergency medical and fire services. Specifically, the third year EFOP course, Executive Analysis of Fire Service Operations in Emergency Management, defines the need for post-incident analysis by reviewing the actions of students in the emergency operations training laboratory. These reviews highlight the positive actions of the students while simulating real-world emergency management procedures. These reviews also encourage discussions that allow students opportunities to explore other and possibly improved methods of emergency scene management.

<div align="center">Literature Review</div>

Upon reviewing the body of literature regarding post-incident analysis and its values to the fire service, it was necessary to narrow the subject parameters down to specific key points.

The articles, interviews and questionnaire had to relate directly to the proposed research

questions below:

- Can the Copley Fire Department benefit from a post-incident analysis program?

- How can a post-incident analysis program be designed?

- When should a post-incident analysis be performed?

- What information should be gathered to perform a post-incident analysis?

The importance of post-incident analysis can be determined by performing in depth

research into other agencies that currently use this practice. These agencies include, but are not

limited to the United States military, National Transportation Safety Board, Emergency Medical

Service and the fire service in general. Research began by enlisting the aid of medical

professionals well-versed in patient safety and quality assurance programs.

In a recent interview with Sheila Steer, M.D., the uses, benefits and requirements of

post-incident analysis were discussed. Dr. Steer explained that the EMS uses two types of post-

incident analysis programs. The first program is quality assurance that reviews the treatments

and outcomes of critically ill patients. The second program is Summa Health System Patient and

Crew Safety Analysis. The purpose of the quality assurance program is to review incidents and

crew actions to determine if these actions conform to the medical director's expectations. In the

past, the quality assurance reviews only affected the specific fire department that had delivered

the service; however, the advent of electronic quality assurance reporting systems has allowed

this information to be utilized on state level. Dr. Steer described the State of Ohio's efforts to

collect EMS data through a voluntary state-wide reporting system administered by the

Department of Public Safety. Although voluntary, failure to comply with this program results in

ineligibility for state emergency medical grants. The data collection program asks EMS

providers to electronically submit patient history, demographics and treatment information. The

Department of Public Safety uses this information to critique EMS activities and outcomes. This

information is then disseminated back to EMS providers with the hope that the information will

be used to develop training, purchase equipment, promote safe practices and reinforce effective

techniques (S. Steer, MD, personal communication, April 27, 2012).

Dr. Steer believes that the quality assurance and patient safety programs currently used

are valuable assets and have positive effects on the quality of service and has increased crew

safety. Dr. Steer emphasizes that an effective post-incident analysis should be developed around

an organization's specific needs. For example, an EMS provider that is located in an urban

setting may have different concerns then a provider in a rural community (S. Steer, MD,

personal communication, April 27, 2012).

When asked how post-incident analysis is an effective tool, Dr. Steer referred to the

"*Hawthorne Effect*" and learning from real-life historical events. The *"Hawthorne Effect"* was

the result of a study conducted in the late 1920s. This study unknowingly determined that when

action research is being performed within a work environment, worker performance will

increase. The study began when Western Electric Company began measuring worker

productivity and how it increased or decreased with plant lighting conditions. It was determined

that by simply changing the lighting in any direction brought positive production increases. It

was later determined that it was not the lighting conditions that caused a change in production

rather the change occurred due to the personnel knowing that their production rates were being

monitored (Coombs & Smith, 2003).   Dr. Steer brought out the importance of this study and

how it relates to management of EMS crew response. Specifically, she noticed that different

crews had a wide range of enroute times when responding to incidents in the early morning

hours. Not ever being assigned to a response crew, she was unfamiliar with what factors

influence these crucial times. However, she decided to evaluate if these times could be

decreased without determining the factors. She decided to advise response crews that a study

would be conducted to identify possible ways to reduce enroute times. Due to these comments,

enroute times reduced dramatically (S. Steer, MD, personal communication, April 27, 2012).

According to the United States military, post-incident analysis should be conducted after

all types of actions or projects. The military uses the term "after-action review" in lieu of post-

incident analysis, therefore the two terms will be considered synonymous for the remainder of

this document.   Originally, the military developed after-action reviews in the mid-1960s for

combat operations. However, over the years, the system has evolved into a program for all

actions and projects. Although the result of these after-action reviews is somewhat transparent

to the general public, the changes made from these reviews effect nearly everyone. An incident

that most can relate to is the federal response to the Hurricane Katrina disaster. As a result of the

after-action review conducted on this disaster, the Federal Emergency Management Agency

developed and changed communication procedures during emergency responses (United States

Agency for International Development [USAID], 2006).

The United States military describes after-action reviews as a structured approach designed to identify group strengths, weaknesses and areas that can be improved. The structure consists of four basic questions:

1. What was expected to happen?

2. What actually occurred?

3. What went well and why?

4. What can be improved and why?

The basic features of after-action review are as follows:

- An open and honest professional discussion

- Participation by everyone involved in the action

- A focus on results of an event or project

- Identification of ways to sustain what was done well

- Development of recommendations on ways to overcome obstacles

Further, the military suggests that after-action reviews should be used soon after an event or project or in a less formal manner during a project when the team's actions are not yielding desired effects (United States Agency for International Development [USAID], 2006).

When designing a standard procedure for conducting post-incident analysis there are several key aspects to consider. The first is the timeliness of the issue or event and the need for the review process. A formal analysis process may require one to three hours to complete and should be lead by a single facilitator. The facilitator, when possible, should not be a member of the team that was directly involved in the event. An outside facilitator will less likely be caught up in the conversation and more likely to focus on the content. It is generally accepted that

outside facilitators are more capable of eliciting effective conversation from event participants. This person will need to gather information pertinent to the event and then ask questions about the information gathered. This practice will spark the interest of the team members and begin the active participant process. Additional points that will set the tone for the review are explaining that all involved have equal views, all views are relevant, and no blame shall be placed on individuals. The process is designed to bring about new ideas, streamline future events and bring about creative solutions to barriers (Salem-Schatz, Ordin, & Mittman, 2010).

As mentioned previously, the foremost authority on bringing about organizational change based upon information gathered is the NTSB. The NTSB program is formatted after the military's after-action review process and is continuously modified as organizational makeup changes. The NTSB, in the beginning, focused investigations on mechanical engineering and design failures that caused accidents. As aero engineering technology improved and the numbers of mechanical failures decreased, it became evident that the leading cause of aviation accidents was human error. Due to this, the NTSB began to shift accident prevention methods to focus on near miss reporting. The near miss reporting became reality shortly after the NTSB filed an accident report in 1974 (United States Agency for International Development [USAID], 2006). In this report, the NTSB identified that individual airlines were aware of safety concerns within their own organizations. However, this information remained within that organization and there was no conduit available to pass information to other airlines. In the 1974 report the NTSB cited that there had an alert memorandum issued within one company addressing a specific safety concern and within two months a different airline company encountered an

identical safety issue which resulted in fatalities. By filing this report, the NTSB was able to

begin a cooperative effort with the Federal Aviation Administration and the National

Aeronautics and Space Administration thus creating the Aviation Safety Reporting System

(Salem-Schatz, Ordin, & Mittman, 2010).

Brunacini (2009) describes a five-step process in proper emergency service

management. The five steps are: Development of standard operating procedures, develop

training around the SOPs, apply the training in actual emergency ground actions, critique the

effectiveness of those actions and finally, revise the SOPs based upon information gained during

the critique. The process is a never-ending evolution that will cause fire officers to continually

look at operations and effectiveness of the operations. Brunacini (2009) states this process is

"keeping score" (Brunacini, 2009, p.64). Did the actions of emergency responders reflect how

they have been trained to react? Does the SOP reflect actions that are not practical on the actual

emergency ground? Do changes need to be made? These questions can only be answered

following a competent post-incident analysis (Brunacini, 2009).

Research performed by James Smith suggests that post-incident analysis should take

place after all incidents, either on a formal or informal level. Smith (2002) is an advocate for

both types of post-incident analysis, believing the two types have different purposes. The

informal post-incident can be held at the company level after the action has concluded but before

the cleanup of equipment. The informal and immediate post-incident analysis provides feedback

to the participants that reinforce SOPs, while the formal post-incident analysis is designed more

towards evaluating the usefulness and possible changes needed for the department's SOPs (Smith, 2002).

The International Society of Fire Service Instructors (ISFSI) felt strongly enough about the need and benefits of performing proper post-incident analysis that in 1999 a training guide to assist fire instructors was published. The training guide included a list of objectives, instructional aides, time allotment, preparation protocols and information collection ideas ("ISFSI", 1999).

In 2008, the United States Fire Administration (USFA) published a technical report that seeks to improve the fire service by disseminating "*lessons learned*" (United States Fire Administration [USFA], 2008, n.p.) throughout the fire service. It is the USFA belief that as the number of structure fires across the nation declines, so does the opportunity for fire fighters to gain experience. To combat this phenomena the USFA is suggesting that all fire incident participants attend a post-incident analysis meeting and the information gained from these meetings be collected for use at later dates. The USFA explains the importance of these meetings by citing Harry R. Carter's comments in a 2001 *Firehouse Magazine* article (United States Fire Administration [USFA], 2008). The citation follows: "the post-incident critique allows emergency responders to get a clear idea of the effects of their actions on the outcome of the operation. By comparing the expected outcome to the actual consequences, the fire department can make personal as well as organizational adjustments. And by assessing what worked, and what did not, improvements can be made." (Carter, 2001, p.64).

The National Fire Protection Association (NFPA) does not hold the power to mandate departmental policy but is held to be an industry standard and is often cited in fire department SOPs. The (NFPA) mentions post-incident analysis in several locations, specifically NFPA 1500 and 1521. The Standard of Fire Department Occupational Health and Safety recommends that fire departments adopt standard operating procedures that describe how and when to conduct a post-incident analysis. NFPA 1500 and 1521 further specify which departmental position is required to develop post-incident analysis procedures and which details are to be addressed (National Fire Protection Association [NFPA], 2007).

The United States Department of Homeland Security (DHS) instituted NIMS shortly after the September 11, 2001 terrorist attack. NIMS has served as a template for the response, management and recovery of emergency events and sets forth criteria for after-action reviews. DHS believes that retrieving, reporting and disseminating data to emergency responders has and will improve how incidents are mitigated in the future. As mentioned earlier, FEMA used after-action reviews as a guide that brought about a significant change in how the agency communicates during incident responses. The *National Response Guideline* describes clearly that an incident response and mitigation is not complete until an after-action report has been filed with FEMA. The emphasis placed on this requirement only illustrates its importance.

Procedures

The first task taken when planning this research project was to determine if Copley Fire Department could better serve its community by performing a post-incidence analysis without affecting the already strained budget. The following research questions were developed:

1. Can the Copley Fire Department benefit from a post-incident analysis program?

2. How can a post-incident analysis program be designed?

3. When should a post-incident analysis be performed?

4. What information should be gathered to perform a post-incident analysis?

To answer these research questions three basic actions were involved. The first was to complete

a literature research to determine if other emergency response agencies had conducted similar

research and if so, what the results were. The second action was to interview persons that

currently use some type of post-incident analysis and collect their thoughts and experiences. The

third action was to distribute a questionnaire to high-ranking fire officials in the state of Ohio.

Literature searches were conducted using periodicals, technical research documents and

journals from the Learning Resource Center at the National Fire Academy and Akron-Summit

Public Library. The review of literature yielded numerous fire service articles that brought forth

the positive and negative attributes surrounding post-incident analysis. However, there was

some difficulty noted while attempting to gather contemporary literature and locating seminole

sources. In-depth review of literature published by agencies outside the fire service yielded

several contemporary and relevant articles. For example, the Unites States military has

published recent articles that discuss the importance of after-action reviews and how to conduct

such reviews. Similar information was obtained from the NTSB, DHS and FAA, to name a few.

The second part of the procedural process was to seek out and interview individuals well-

versed in post-incident analysis (see Appendix A). The first interview was conducted in a

telephone conference with Sheila Steer, M.D., on Friday, April 27, 2012. Dr. Steer has been an

attending emergency department physician for over two decade and her expertise in this arena

comes with her experiences managing EMS units. The second interview was performed in

person with Lt. Christopher Bower, NREMT-P. Lt. Bower has been an EMS instructor for over

two decades and currently serves as EMS coordinator for at CFD. Lt. Bower is chairperson of

the committee that developed the quality assurance program utilized by Akron General Medical

Center Emergency Department.

The third action was the distribution of a questionnaire designed to high-ranking fire

officials throughout the State of Ohio. The questionnaire was hosted with the aid of an

independent, internet-based company (SurveyMonkey). Once the questionnaire was developed,

the URL link to the questionnaire was distributed to 955 fire officials via e-mail with the aid of

the Ohio Fire Chiefs Association contact list (Appendix B).

Limitations were noted concerning the questionnaire. While 955 persons received the

questionnaire, the number of responses equaled 176. This equates to a response percentage of

18.4 percent. This relatively low participation rate could cause a problem on its own. It is

reasonable to infer that the low participation rate from chief officers, regarding this subject

matter, could relate directly to its usefulness in the fire service.

<div align="center">Results</div>

As discussed previously, this action research consisted of three main methods: literature

research, personal interviews, and questionnaire distribution. The information acquired during

this research was used to answer the research questions. Listed below are the answers to the five

research questions. Each answer contains data collected from the three collection methods.

Research question one: Can the Copley Fire Department benefit from a post-incident

analysis program?

Numerous articles and literature revealed several different opinions concerning when and

if a post-incident analysis should be performed. The United States military has used after action

reviews for decades. However, in the beginning, they were only used after combat action.

Currently, the military uses after action reviews after all operations and programs. Often, they

will conduct a review during an operation especially when an outcome of a procedure produced

unexpected results (Salem-Schatz, Ordin, & Mittman, 2010).

DHS believes all events that involve implementation of NIMS are in need of a post-

incident analysis. As noted in the *National Response Guide,* the best method FEMA has at its

disposal to better prepare itself for disaster response is to review the positive and negative

outcomes of previous events. This needs to be kept within the context of FEMA's operational

scope. When comparing FEMA response to normal fire service operations, the size of the

incidents pale in comparison. With this in mind, after action reviews should be utilized when the

leadership, stakeholders or the sustainability of an event can dictate the need for a review process

to begin. The review process can be large-scale and far-reaching while other reviews can be

relatively narrow. This can be decided dependent upon outcomes of key portions of the response

or the entire event, as a whole (United States Agency for International Development [USAID],

2006).

Smith (2002) describes how less tenured emergency responders learn quickly when

shown how their actions directly affected the outcome of specific emergencies. In the interest of

improving the fire service it is Smith's beliefs that all types of actions or emergency responses

deserve to be reviewed either formally or informally. The informal method would be conducted

at the company level as soon as operational activities have ended, generally during the

rehabilitation phase. However, the formal post-incident analysis needs to fit a predetermined

procedure that includes: a lead person, specific incident information, the attendance of all the

key stakeholders and a majority of all involved with the incident, and held in a formal classroom

typesetting (Smith, 2002). The information obtained from the questionnaire also supports Smith

(2002) opinions concerning post-Incident analysis. The responses from chief officers across the

state of Ohio show that 77.1 percent of the departments use a post-incident analysis routinely and

87 percent believe their programs are either somewhat or very effective.

As most departments currently operate, the Copley Fire Department also provides EMS

and the development of a post-incident analysis program needs to include all aspects of the

department's responses. In a recent interview with Lt. Christopher Bower, NREMT-P and EMS

coordinator for Copley Fire Department, he explained that a post-incident analysis program for

EMS already exists however, the program, deemed quality assurance, is largely formatted by the

State of Ohio Division of Public Safety. As explained previously, the State of Ohio does not

mandate that quality assurance practices be implemented but they will deny requests for grant

considerations without a comprehensive program. The EMS quality assurance program, while

unwritten, does meet the state suggested guidelines. The program consists of the medical

director reviewing the patient report of every EMS call and conducting a formal classroom

analysis of any EMS activity that can either be improved upon or exhibits exemplary patient

treatment. Also, there are certain criteria that, if met will be cause for a formal analysis. These

criteria include: ST elevation myocardial infarction, trauma team activation, advanced airway

manipulation, cardioversion/external pacing, cardiac arrest or any activity deemed worthy of

review by the senior person in charge of the incident (C. Bower, Lt., personal communication,

April 27, 2012). This information is relevant to provide framework for post-incident analysis for

all types of emergency responses rather than the EMS portion alone.

       Research question two: How can a post-incident analysis program be designed?

       A proper post-incident analysis can be broken down into five different areas. These areas

are: conditions, actions, outcomes, lessons learned and plans for change. Information gathered

from the incident needs to describe each of these five areas. For example, the first area is

condition and a description of this would include, but not be limited to, weather, time of day,

type of incident, number and physical condition of civilians involved and physical barriers

(Brunacini, 2009). Further, the post-incident analysis should be designed to answer four basic

questions. These questions are: What was the expected outcome? What was the actual

outcome? What actions went well and why? How can the outcome be improved in the future

(United States Agency for International Development [USAID], 2006)?

       To facilitate the answering of these questions, a single facilitator should be chosen to

gather the information needed to conduct a formal post-incident analysis. To assist with this data

collection, a check-list containing key informational points can be used. Failure to provide the

needed information during the formal analysis will most likely result in failure of the process. A

complete list of recommended informational points can be found in appendixes C,D and E.

Also, in keeping with the USFA standards to increase firefighter safety, information concerning

how safety practices were followed or not followed must be included. As mentioned prior, once

individuals are aware that their actions will be reviewed, they are more likely to work more

closely within prescribed standards (Coombs & Smith, 2003).

      A majority of the literature reviewed during this research project revealed that having a

written procedure for conducting a post-incident analysis is imperative. Agencies such as the

United States military, NTSB, FAA and DHS all agree that written guidelines set forth a clear

path that will most likely bring out key points, ideas for improvement and highlight training

needs. However, the fire service questionnaire conducted shows that while a majority of fire

departments routinely conduct post-incident analysis, they do not have written guidelines to

assist in the process. It appears that this is a vulnerable area in fire service training.

      Research question three: When should a post-incident analysis be performed?

      When properly reviewed, the information gathered can improve the fire service

capabilities and emergency operation performance by evaluating the effectiveness of current

training, procedures and policies. Throughout this research a common thread was found. That

thread is that an agency that fails to learn from historical events is prone to continued failure.

The NTSB, FAA, United States military, DHS, FEMA and all professional athletic organizations

increase their effectiveness by reviewing past practices, discussing the expected outcome as

compared to actual outcomes and developing procedures that are designed to increase their

capabilities. The United States military has noted the benefits of after action reviews from

decades of work after combat operations. Due to the successes noted from their review program

the military began using the process for all projects and operations beginning in the early 1980's

(Morris, 1988).

As discussed in question one, James Smith believes that all incidents should have some

type of analysis performed. Either formally for major incidents or informally for less significant

incidents, handled at the company level as soon after the action as possible. In the fire service,

like other military or para-military organizations, the informal post-incident analysis is most

likely taking place without notice. The common discussion conducted during a rest period

normally consists of, the type of variables found, individual actions, group actions and the

results of these actions, is an informal post-incident analysis (Smith, 2002). This quick and

timely review of an incident offers valuable training opportunities for all involved and eliminates

the problem of requesting the attendance of key personnel at a later date.

The questionnaire distributed throughout chief officers in the state of Ohio indicates that

77.1 percent of all participating departments currently use some type post-incident analysis

procedure. When the review process is used varies widely. The questionnaire demonstrates that

a majority of departments have an operating guideline for conducting an incident review.

However, an overwhelming majority of departments do not follow a widely recognized post-

incident analysis program, such as DHS, OSHA or NFPA.

Research question number four: What information should be gathered to perform a post-incident analysis?

Care must be taken that the information gathered will not be used as an investigation into who may not have contributed to the emergency operations in the manner expected. This is not a disciplinary procedure, it is a tool needed to analyze the performance of an organization as a whole. The failure of individuals occurs when individuals are unable or unwilling to learn from their shortcomings. Brunacini (2009) discusses how one of the most effective training methods is the passing of experience. Young firefighters learn the best when shown the most effective methods and then practice those methods. Their actions need to be reviewed by discussing the expected results and exhibiting the actual results (Brunacini, 2009).

IFSTA (1999) lists the pertinent information needed to conduct a formal post-incident analysis. This list includes:

- Incident number

- Incident date

- Review date

- Written description of the incident

- Incident location

- Incident audio tape

- Responding units and personnel

- Observations of first arriving personnel

- Initial actions

- Command structure

- Written timeline sequence

- Incident commander's action plan

- Responder injuries reported

- Civilian injury reports

- Information disseminated to the public

- Noted actions and results of those actions

These items coincide closely with the information provided by NFPA 1500 with an emphasis

levied on firefighter safety. NFPA suggests that information collected relate directly to actions

taken that affected health and safety of responders. The post-incident analysis should also

identify standard procedures that either pose a threat to health and safety or can improve the

welfare of responders.

    To further detail the information needed to support a functional post-incident analysis

specific for the fire service Brunacini (2009) expresses the importance of:

- Building type and construction

- Items out of the ordinary

- weather or geographic location that posed specific problems

- Early warning devices, such as alarm or suppression systems

- Known fire or building code violations

- Information obtained by dispatch and information forwarded to responding units through

  dispatch

- Specific communication problems encountered

- Where pre-fire plans available, were they used and were they accurate

- What was the structural integrity of the building upon arrival of first due units and how did the structure degrade throughout the incident

- A list of comments or orders from command that include, but not limited to, initial size-up, any change in size-up, offensive or defensive attack plan verbalized and comments referring to life safety

Upon answering the above research questions through literature review, personal interviews with professionals well versed in post-incident reviews and analysis of a related questionnaire, this action research has resulted in the production of a standard operating guideline. This guideline outlines the need for a post-incident analysis, how to perform an analysis and what type of incidents a post-incident analysis should receive a review. The standard operating guideline can be found in appendix C. The questionnaire results and related tables are located in appendix B.

Discussion

The purpose of this applied research project was to identify the usefulness and possible need for a post-incident analysis program that would be designed to offer the best possible training improvement to the Copley Fire Department. The research conducted clearly shows the benefits provided by conducting post-incident analysis after all operations performed in the fire service. This includes both the formal and informal review (Smith, 2002). As the number of actual fire incidents decline across the United States, the opportunity for younger firefighters to gain experience and on-the-job training is also declining (Brunacini, 2009). The collection of historical information and design of training evolutions, standard operating guidelines and

procedures based upon this historical information only improves how the department delivers its

services in the future.

Currently, the Copley Fire Department routinely only conducts a post-incident analysis

on the EMS side of their operations. This analysis is completed through the medical director's

quality assurance program. In a recent interview Dr. Sheila Steer noted how the Copley Fire

Department has obtained the reputation of a high functioning advanced life support provider and

received two Star of Life awards. She attributes a large amount of this success to the diverse

EMS training program implemented within the department. A large part of this training program

includes the routine review of historical events (S. Steer, MD, personal communication, April

27, 2012).

A standard operating guideline that describes who will conduct a post-incident analysis,

what standard information should be included in the review and when a review should be

performed will assist the department in conforming to current industry standards (NFPA, 2007).

The premise for this is to identify and gather information and experiences that may assist other

firefighters in performing their duties in a safe and effective manner. The research derived from

the NFPA does not support performing a post-incident analysis after every event. The rigid use

of a program is not always necessary. According to NFPA the program should be centered

around the identification of safety and welfare issues. Therefore, the need of a post-incident

analysis should only exist when service calls of significance occur or a safety concern has

become apparent (NFPA, 2007).

The United States military disagrees with this by mandating the use of after action review after all operations or projects have been completed. The military goes on to describe how the after action reviews can and should be used whenever an action has been performed and it resulted in something unexpected (United States Agency for International Development [USAID], 2006). As mentioned, the design of the military's after action review procedure closely resembles the NFPA standards, OSHA recommendations and the program currently in use by the NTSB (Salem-Schatz, Ordin, & Mittman, 2010). However, there is a noticeable difference. This difference is that only the NFPA implies that a post-incident analysis is not needed after each action or event. The research provided implies that the reason for this difference is the size of the organization and the effect of the organization on national scale. For example, the NTSB reviews incidents or actions that have and continue to shape the safety of public transportation. No matter the magnitude of the incident, the safety of future travelers weighs in the balance. Also, the military's organizational size makes the transfer of information difficult and the safety of civilian and military personnel depends heavily on lessons learned (United States Agency for International Development [USAID], 2006). For these reasons, these organizations have benefited from the continued use of post-incident analysis for all operations, incidents and events.

The problem of conducting a post-incident analysis in the attendance of all personnel involved was not thoroughly addressed in the research other than a comment made by Dr. Sheila Steer. While conducting an interview with Dr. Steer, the problem of having all key personnel in attendance during a formal incident review was highlighted. Dr. Steer stated that this is also a

problem in EMS operations. With some thought, Dr. Steer recommended the use of an internet

type of virtual meeting such as Skype.com. She recommended this type of virtual meeting rather

than a webinar because of the possible lack of participation of individuals when they cannot be

suggests that when personal actions can be visualized, then attendants are more likely to take an

active role (S. Steer, MD, personal communication, April 27, 2012).

As discussed previously, Smith (2002) advocates the use of both formal and informal

post-incident analysis. Smith states, "The informal critique is for a company of multiple

companies. It can take place at the incident scene or at the station." (Smith, 2002, p. 16). This

coincides with other research documents that believe conducting an analysis as soon after the

incident as is practical will be beneficial. The two concepts can be melded together to form a

program that will provide the greatest benefit possible. Directly after the completion of an

incident the personnel involved will have the clearest memory of their actions and the results of

those actions. If the incident commander or company officer takes a few minutes at the scene

and performs an informal review, then the key points of the incident are more likely to be

cemented into the memory of each individual. This will allow for a more accurate and complete

formal review at some date in the future (Brunacini, 2009).

<div align="center">Recommendations</div>

Literature, personal interviews and information formulated from a questionnaire resulted

in definitively recommending that some type of review process be implemented. This is

especially important for organizations that conduct hazardous activities during their normal

operations. The foremost example of this is the United States military. Earlier in this research

document a discussion describing how the military's use of after action reviews began with the review of combat operations. As the military evolved, it was decided that after action reviews offered benefits that far outreached combat operations. In addition, other organizations, such as the NTSB, NTSB and IFSTA, stress the importance of post-incident analysis. Specifically for the fire service, experts like Chief Alan Brunacini and Deputy Chief James P. Smith agree that young firefighters learn from their own experiences as well as the historical experiences of their predecessors. Failure to gather historical data and disseminate this information throughout the fire service will cause a weakness in the training process.

The NFPA aspires to improve training and operational procedures in the fire service by incorporating techniques that have been proven over time. Although the NFPA does not have regulatory authority over the fire service in the State of Ohio, it is a widely accepted standard. Committees chosen by the NFPA formulate articles found within the NFPA standard. These committees are generally made up of individuals that are thought to be experts in the areas they are asked to write articles for. From this, the NFPA has printed a standard list of information that should be gathered and how to perform a complete post-incident analysis. Closely mimicking the NFPA, the NTSB and the United States military have set forth criteria that defines procedures for their after action reviews. These procedures can also be of value to when developing a PIA program for the CFD. It should be noted that both the NTSB and the United States military suggest that the formal after action review be performed after all operations or incidents.

When determining when a PIA should be conducted for the CFD, the opinions of experts within the fire service should be used. Research has shown that conducting PIAs are beneficial on many levels and should be conducted as often as possible. However, much of the research material came from outside the fire service and may not always be relevant to the goals of the CFD. Organizations such as the NTSB, military, DHS and FEMA are different from the fire service and these differences include the size of the organizations, goals and services delivered. When comparing some the major differences it is evident these larger organizations do not have similar budgetary constraints and the inability to bring all key personnel involved in an emergency incident together, at the same time. Referring back to the opinions of fire service experts, it is recommended that CFD train their shift officers and incident commanders on the benefits and methods to conduct informal PIA. The informal PIA should be used when the emergency incident is routine in nature or when performing a formal PIA is logistical improbable. The difficult aspect in conducting an informal PIA will be the collection of information. However, a reference list that contains all details needed for a PIA, should be placed in the incident commander's vehicle and used when needed.

No matter the type of PIA being conducted the information needed will be the same. As the research has shown, the general categories listed below cover a broad spectrum and can be used in nearly all emergency incident reviews.

- Overview of the notification of alarm

- Geographic layout of scene

- Alarm time, weather conditions, availability of resources such as water, etc.

- Type of scene or building, including known facts about the building i.e. code violations, occupancy, suppression systems and/or construction type

- Where pre-fire plans available and used, if so, were they accurate

- Responding personnel and units, including problems with response, if any

- Observations of first in units

- Overview of the communication system used and problems encountered, providing audio tape is helpful when available

- Overview of the command structure and the initial actions of the incident commander

- Did the actions of the incident commander and command structure fit with current standard operating procedures

- List of near misses or safety concerns, where the actions performed in the safest possible methods and was there personnel accountability

- Description of injuries to both emergency responders and civilians and how the injuries occurred

- Was a rapid intervention team available

- List of strategically objectives

- The actions taken to meet the objectives

- The actual results of these methods

- List the support groups and how they affected the incident. These support include, but not limited to; Red Cross, water shuttle departments, EMS, rehabilitation, police and service departments

- Provide an overview of the end result and how the actions of all responders affected this

    result

In closing, the research has shown the need for a PIA procedure and how this procedure should be formatted. It is the recommendation of the research that the CFD implement a standard operating guideline that outlines how and when to perform PIA. In accordance with action research, a standard operating guideline for a PIA program is contained within appendix C. It is also recommended that the CFD adopt the forms provided in appendixes D and E to facilitate the PIA process.

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Appendix A

Interview questions:

1. Within your scope of duties, do you perform some type of post-incident analysis? If so,

   please describe.

2. Do you measure the effectiveness of the analysis? Is so, how?

3. Is performing a post-incident analysis a requirement within your organization or scope of

   duties?

4. Are there benefits of performing post-incident analysis?

5. Are there problems associated with post-incident analysis?

6. What are your opinions concerning post-incident analysis?

Appendix B

Question #1. The fire department you are affiliated with would be considered

Volunteer	18.3%	32
Career	34.9%	61
Combination	**46.9%**	**82**

Question #2. What is the population of the community your fire department serves?

0-10,000	33.7%	60
10,001-25,000	**42.1%**	**75**
25,001-50,000	16.3%	29
Over 50,000	7.9%	14

Question #3. Please indicate the services provided by your fire department.

Fire	**100.0%**	**179**
Emergency Medical Service (EMS)	86.0%	154
HAZMAT	70.9%	127
Fire Prevention/Education	94.4%	169
Fire Inspection	92.7%	166

Question #4. Does your department have a quality control system or critical incident review process for high-impact calls for emergency medical services?

Yes	**63.0%**	**109**
No	37.0%	64

Question #5. Does your department have a critical incident review process for calls for service for incidents other than EMS?

Yes	**60.1%**	**107**
No	39.9%	71

Question #6. Does your department routinely conduct after action reports, critiques, post-incident analysis, etc.?

Yes	**77.1%**	**138**
No	22.9%	41

Question #7. If so, in your opinion, how effective are the post-incident analyses? (For example, training evolutions are modified due to an analysis or SOGs are changed after identification of a possible problem.)

Very effective	34.4%	53
Somewhat effective	**52.6%**	**81**
Neutral	8.4%	13
Somewhat ineffective	3.2%	5
Ineffective	1.3%	2

Question #8. If your department does not routinely conduct post-incident analysis for service calls other than EMS, what is the reason?

Lack of time	**51.7%**	**31**
Lack of funds to provide training	15.0%	9
Department leadership does not believe it to be important	16.7%	10
Department members do not believe it to be important	16.7%	10

Question #9. If the incident commander or other ranking official desires that a post-incident analysis be conducted for a specific incident, how does that person institute the request?

Formal reporting system	6.6%	10
Sends e-mail to training division	3.3%	5
Simply asks superior for a PIA	**90.1%**	**136**

Question #10. If your department has a post-incident analysis system, does it conform with the following standards? Please check all that apply.

NFPA	21.7%	34
National Incident Management System	22.3%	35
OSHA Standards	5.1%	8
US Military After Action Reporting Critieria	3.2%	5
None	**66.9%**	**105**

Question #11. If you conduct formal post-incident analysis, do you require the attendance of all personnel that were involved with the incident, regardless of their work schedule or overtime issues?

Yes	20.7%	34
No	34.8%	57
Depends upon the severity of the incident	**44.5%**	**73**

Appendix C

I. PURPOSE
    To provide the procedure and standard format for preparing and disseminating important post-incident review information.

II. POLICY
    Post-incident analyses (PIAs) provide a mechanism to disseminate information regarding significant or unusual incidents, regardless if the call for service was EMS or fire/rescue in origin. Information derived from a PIA will be used to improve services to the public and to identify operational procedures, tactics, and safety policies that may be improved through training.

III. PROCEDURE
    A. Incidents that may require a PIA
        1. The Assistant Chief will determine when a PIA shall be completed based on, but not limited to, the following criteria.
            a. Incidents which are greater than one alarm or present extraordinary circumstances.
            b. Incidents that require a non-routine tactic.
            c. Incidents that require specialized equipment for mitigation, such as hazardous materials, cave-in, or building collapse incidents.
            d. Incidents involving or had the potential for significant injuries to firefighters and/or civilians.
            e. Incidents involving mass causalities.
            f. Any EMS incident that requires an unusual amount of resources, tactics, equipment or as indicated by the EMS officer.
            g. Any other event at the discretion of the incident commander or OIC in the Fire and Rescue Department.
    B. Preparation and Finalization of the PIA.
        1. Unit Officer Responsibilities
            a. Each unit officer shall complete form FD-PIA, Post-incident Unit Action Summary, and forward copies within two working days of the incident to the Incident Commander, training officer and Asst. Chief.
        2. Incident Commander Responsibilities
            a. The incident commander shall use the FD-PIA (Post-incident Unit Action Summary) and FD-PIA1 (Significant Incident Report) to prepare the PIA.
            b. The PIA should provide specific and concise information about the incident. The PIA is intended as a training tool and should not be used in a possible disciplinary investigation.

    c. The PIA shall be completed with the following information.
   - i. Incident – a brief description of the dispatch information and the incident.
   - ii. Weather – a description of the conditions during the incident.
   - iii. Resources – list the resources dispatched to the incident according to the alarm dispatched.
   - iv. Building Construction – describe the building construction and access (if applicable).
   - v. Conditions Upon Arrival – give a brief description of the conditions reported by the first arriving unit. Provide a description of strategy and tactics utilized.
   - vi. Initial Actions – list the unit actions under each division or group including the command structure of each sector in a concise format.
   - vii. Lessons Learned – list actions that could be improved upon in an objective and positive manner.
   - viii. Incident Summary – summarize the incident, incident actions, and any positive points of the incident.

    d. The PIA shall be forwarded to the Assistant Chief within 15 calendar days of the incident review.

    e. The PIA shall be reviewed and approved by the Assistant Chief and the Fire Chief and posted within 30 calendar days of the incident review.

C. Review
   1. Shift officers shall ensure that PIAs are reviewed by all shifts and a training attendance and summary sheet completed before forwarding it to the training officer.
   2. The training summary and attendance shall then be added to the FireHouse® Software.

	FIRE DEPARTMENT FORMS	**FD-PIA**	**Appendix D**
	POST INCIDENT ANALYSIS SUMMARY		
	DATE:_____/_____	**Shift: _____**	
	Special Notes: Form to be completed and returned to incident commander within 48 hours.		

Unit: _____

Incident Number: _____

Incident Date: / /20 _____

Location of Incident: _____

Unit OIC: _____ **Driver:** _____

Crew Member(s): _____

1. **Conditions observed upon arrival:**

2. **Initial assignment:**

3. **Unit action(s):**

4. **Problems/obstacles:**

5. **General comments:**

	FIRE DEPARTMENT FORMS	*FD-PIA₁*	Appendix E
	SIGNIFICANT INCIDENT REPORT		
	DATE:_____/_____	**APPARATUS: _____**	
	Special Notes:		

Unit: _____   **Incident Number:** _____   **Incident Date:** ___/___/20 _____

Location of Incident: _____

Unit OIC: _____   **Driver:** _____

Crew Member(s): _____

6. **Conditions observed upon arrival:**

7. **Initial assignment:**

8. **Unit action(s):**

9. **Problems/obstacles:**

10. **General comments:**