

Identifying the Knowledge and Skills Needed for Successful  
Critical Thinking and Decision Making on the Fire Ground

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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 others.

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## Abstract

Fire ground decision making is very stressful as decisions are required to be made under severe time constraints, often with little information. The problem is the Cedar Rapids Fire Department does not currently have a comprehensive program to train our incident commanders on critical thinking and fire ground decision making, which may result in unsafe decisions that can compromise safety on the fire ground. The purpose of this research was to identify the knowledge and skills necessary for critical thinking and decision making on the fire ground as well as training programs that currently exist to develop said knowledge and skills. Descriptive research was used to answer the following questions: a) What knowledge and skills are required to establish successful critical thinking and decision making results?, b) What research and data currently exists on critical thinking and decision making skills?, c) What research and information currently exists in non-fire service fields requiring critical thinking that could benefit the fire service?, d) What research and information currently exists in fire service literature to address critical thinking on the fire ground?, e) What programs do other fire departments have to develop critical thinking and decision making skills for their incident commanders? Procedures utilized were a literature review and survey distributed to individuals in various emergency response organizations. The top skills selected were communication, ability to think globally, adaptive, sound decision maker, and listening; the top attributes chosen were command presence, self-confidence, self-control, maturity of judgment, and open-mindedness. Respondents felt RPDM and critical thinking skills were equally important. Past experience, hands-on training, and simulation training were the top methods selected to train fire ground decision makers. Recommendations include continued analysis of the literature and survey responses to identify current training models so fire ground decision making training programs can be developed.

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## Introduction

The situations which require critical thought and extensive decision making skills are varied. Some decisions can be made with little or no time constraints and the decision maker has a lot of time to gather information to make and execute the decision while other situations are emergent and require an immediate decision be made with little information almost immediately. Some of these emergency situations include military operations, emergency medical services (EMS), hospital emergency and operating rooms, law enforcement, and the fire service. Specifically, fire ground and emergency scene operations occur in a very dynamic and highly stressful environment. Part of these operations include the command and decision making activities required for safe and effective management of the emergency scene. As the National Institute for Occupational Safety and Health (NIOSH) states “emergency decision makers are required to process massive amounts of information, which is sometimes incomplete or faulty, usually under severe time constraints” (n.d., Introduction, para. 1). Emergency scene commanders operate under these conditions on a routine basis, with each event potentially having situational differences requiring the incident commander to quickly analyze the situation, process information, and develop and enact a plan of action, often in a matter of seconds. The experience level of emergency scene managers can range from acting shift commanders and company officers with little command experience to seasoned shift commanders who have an immense level of knowledge and experience.

The problem is the Cedar Rapids Fire Department (CRFD) does not currently have a program to train our incident commanders on critical thinking and fire ground decision making, which may result in unsafe decisions that can compromise safety on the fire ground. The purpose of this research is to identify the knowledge and skills necessary for critical thinking and

decision making on the fire ground and training programs that currently exist to develop said knowledge and skills. Through descriptive research, I will seek to answer the following questions: a) What knowledge and skills are required to establish successful critical thinking and decision making results?, b) What research and data currently exists on critical thinking and decision making skills?, c) What research and information currently exists in non-fire service fields requiring critical thinking that could benefit the fire service?, d) What research and information currently exists in fire service literature to address critical thinking on the fire ground?, e) What programs do other fire departments have to develop critical thinking and decision making skills for their incident commanders?

Functioning as a fire ground incident commander can be a very daunting task requiring a knowledge and skill set conducive to rapid decision making under stress. Through this research I hope to identify the knowledge and skills necessary for critical thinking and decision making. Additionally, I hope to find both fire service and non-fire service related training programs that exist to develop and refine said knowledge and skills. After this effort, I intend to use this information to develop and implement a program within the CRFD to increase the effectiveness of our incident commanders.

### Background and Significance

The CRFD provides fire suppression, EMS, hazmat response, special operations/technical rescue, and water rescue operations to a diverse community of approximately 128,000 residents within an area of approximately 72 square miles. The types of target hazards located within the response jurisdiction include several elementary and secondary schools, three colleges, several large manufacturing industries including defense contractors and paper and grain milling

industries, a coal fired power plant, railroads, interstate and divided highways, several miles of river and streams, two hospitals and a medical mall complex, a downtown district with several mid-rise buildings, and a regional airport. The City of Cedar Rapids was incorporated in 1849; therefore the nature of construction within the city ranges from very dated construction types to newer lightweight construction, including older ordinary and heavy timber construction, newer commercial style non-combustible construction, fire resistive construction and wood frame construction. Home construction types include older balloon frame construction, platform style construction and newer lightweight construction.

The CRFD consists of 149 personnel, with 130 shift fire fighters, officers, and shift commanders staffing thirteen front line response vehicles out of ten fire stations, including two temporary stations until Central Fire Station is rebuilt following its destruction in the Floods of 2008. The frontline staffed equipment includes eight engines, one quint, one ladder, one rescue, and two shift commander vehicles. Unstaffed primary response equipment includes a tanker, a hazmat response vehicle, a technical rescue/special operations vehicle, a foam trailer, and four water rescue boats. CRFD is also a host city for a state sponsored WMD response team and state USAR team and associated assets. In 2011, the department responded to 9886 incidents with total apparatus responses greater than 15,000 (Cedar Rapids Fire Department 2011 Annual Report, 2012). The diverse nature and age of the community presents many unique challenges to the fire department.

The CRFD has experienced many types of emergencies both large and small during its history, including Toxic Tuesday, which burned the city's sewage treatment plant, several large grain milling industrial fires, boat rescues and response to the Floods of 2008, as well as industrial accidents and hazmat releases. Because of the potential for similar disasters and the

increasing complexity of the emergency scene, it is becoming more imperative that we have personnel in command and decision making roles who have the knowledge, skills, and ability to safely and effectively manage the emergency scene. Another concern is employee turnover, mostly due to retirement, which results in the loss of institutional knowledge and experience. While there are minimum knowledge and education requirements, as well as a testing process, for personnel filling officer and shift commander vacancies, there is a learning curve for these individuals before they are comfortable in this role. Additionally, the hazards faced on the emergency scene today are drastically different than the past due to a variety of factors including types of construction, increased use of petroleum based furnishings (which burn hotter and emit more dense smoke), increased response to natural disasters, and response to terrorism related events. Another reason to be concerned about the knowledge and skill set of our incident commanders is the increased liability issues and the welcomed increase in focus on fire fighter and responder safety and accountability.

This issue has become more prominent within the CRFD over the last few years due to a variety of factors. These factors include a major turnover in the shift commanders and command staff of the department, as well as the changing dynamics of the emergency scene. In the last three years, CRFD has turned over more than 50% of our shift commanders and management staff. While this turnover has caused some loss of institutional knowledge and experience, we are also looking to capitalize on this turnover and new energy from recently promoted personnel by providing training and education on fire ground command. With this research, I intend to determine the knowledge and skills needed for effective emergency scene decision making so training programs can be developed to better prepare our personnel for command level decision making.

One of the goals of the *Executive Development* course is to help develop leaders within the fire service and challenge them to solve adaptive problems. The stressful environment of the fire ground and dynamic nature of fire ground decision making requires a unique set of knowledge and skills that requires a combination of education, training and experience to adequately develop. Adaptive leadership is required to ensure we are properly identifying the status and needs of our fire ground commanders so effective education and training programs can be developed. Additionally, this research supports USFA strategic goal 3, which is to improve the fire and emergency services' capability for response to and recovery from all hazards (United States Fire Administration Strategic Plan 2010-2014).

#### Literature Review

Critical thinking and decision making on the fire ground and emergency scene is an extremely important concept and is a challenge for any emergency service organization to ensure all personnel operating on the scene are properly trained and mentally equipped to perform. Varone (2001) states today's fire ground commander has a considerably more complex role to play which is more intellectually challenging now than ever before. He also notes it applies equally to firefighters, company officers, and command level officers.

This complexity comes from a variety of sources. One, today's building construction is drastically changed from the traditional construction types with the advent of lightweight construction. Lightweight construction significantly reduces the length of time a building can remain stable enough for safe firefighting operations (Underwriters Laboratories, 2008). Additionally, many cities across the country have a range of structure types, therefore personnel need to understand how fire will affect the various structure types in their response districts, as

well as understand that some older traditionally constructed buildings may have been renovated, sometimes significantly, using lightweight construction methods and materials.

Second, today's fire service has become very broad in its multi-disciplinary approach to emergency response. In addition to firefighting, the fire service responds to a variety of EMS calls; vehicle extrications; hazardous materials releases including potential weapons of mass destruction (WMD) events; special operations incidents such as low and high angle rope rescue, confined space rescue, trench rescue, and urban search and rescue (USAR); water rescue and flood response; and structural collapse. These situations require a breadth of knowledge and skills to safely mitigate; also, they are relatively infrequent events, which require means other than direct response experience to gain said knowledge and skills.

Third, there are a variety of legally required and recommended standards, as well as industry best practices, that apply to the fire service and emergency response focusing on operations and responder safety. While responder and citizen safety is and should be a top priority for emergency response personnel, these standards create additional requirements the incident commander must meet while making decisions under stress and time constraints. These standards include Occupational Safety and Health Administration (OSHA) standards, National Fire Protection Administration (NFPA) standards, as well as other industry best practices from organizations such as the National Fire Academy (NFA), National Fallen Fire Fighters Foundation (NFFF), National Institute of Standards and Technology (NIST), and National Institute of Occupational Safety and Health (NIOSH). These standards and best practices are very important, but they also add to the stress and workload of the incident commander and emergency scene decision makers.

Fourth, the incident commander can only respond with the resources they are given. Many standards make certain requirements and recommendations as to fire ground staffing and equipment, yet the reality is the incident commander is often given less than ideal levels of personnel and equipment due to budgetary constraints. Additionally, the public has a certain level of expectation for emergency response from their fire department. Fire department leaders have the added pressure of these high expectations that they must balance with their given resources. Finally, there is always the threat of legal ramifications if there are injuries or fatalities associated with the emergency, especially if there was any deviation from standard operating procedures or policies by the incident commander or their staff.

These factors, along with the stress of the emergency scene, contribute to the complexity of fire ground and emergency scene decision making. It is imperative the incident commander and other decision makers are given all available tools and training in order to ensure effective emergency incident management.

The literature review intends to identify current research in the field of critical thinking and decision making as it relates to emergency response and other stressful situations in both fire service and non-fire service organizations. The reason for reviewing both types of organizations is to be able to glean information and learn from other emergency response and high stress professions, including the military, police and law enforcement, nursing, emergency room physicians, and some private sector organizations that respond to emergency incidents. There is a lot of research that has been done in different aspects of critical thinking. In this review, I will analyze some of this research as it can be applied for the improvement of decision making and critical thinking in the fire service.

The importance of decision making skills as they relate to the emergency scene is summed up by NIOSH (n.d.) “in natural or human-induced emergencies, the decisions that are made in the first minutes, hours, and days of an emergency are critical to successful mitigation; damage control; prevention of death, injury, and structural loss; control of financial costs; and ...the overall resolution of the disaster.”The report additionally states “...critical judgments are frequently made under conditions of acute temporary or prolonged stress” (Introduction, para. 1). This is a great summation of why fire ground and emergency scene decision making is important for all levels of emergency response personnel, especially incident commanders and personnel in authority roles. Improved decision making leads to more positive outcomes including personnel accountability, which leads to increased life safety and quicker incident stabilization and property conservation, which ultimately results in a less costly incident in both direct and indirect costs to the affected communities and organizations.

NIOSH (n.d.) continues to offer some interesting perspectives and information on decision making under stress, pointing to research that indicates an ability to cope with stress is dependent upon the person’s interpretation of an event; it is the decision maker’s perceived experience of stress. In addition, NIOSH (n.d.) asserts “...both *improved performance and performance degradation* have been associated with increased stress” (Assumptions section, para. 1). In other words, similar to an athlete performing and excelling on the playing field, there is an optimal level of stress which brings peak performance from the decision maker, but excessive stress will degrade the decision maker’s capabilities. Thus, the goal of fire service training should be to create realistic training scenarios that re-create the stress level of the emergency scene so all personnel can experience the environment in order to better prepare for decision making under stress.

BusinessDictionary.com (n.d.) defines decision making as “the thought process of selecting a logical choice from the available options.” The NFA (2007) defines decision making as “the cognitive process leading to the selection of a course of action among alternatives” (p. 4-25). Analytical decision making is done by calculated selection of alternatives whereas intuitive decision making uses pattern recognition based on previous experience. I want to expand the discussion of these two types of decision making based upon research as it relates to emergency response.

As discussed by Schmitt (n.d.), the classical, analytical model of decision making is a rational and systematic process of analysis based on concurrent comparison of multiple options. This is a great decision making model when we have accurate information and time to perform a proper and thorough analysis. There are several important considerations regarding the analytical decision making model: 1) it’s time consuming, 2) it requires a high level of certainty and accuracy of information, and 3) it is process based requiring reasoning power but does not require experience and judgment. Most emergency response situations do not allow for this type of decision making. Schmitt (n.d.) alludes to this when he discusses military operations and states that timeliness is a critical factor in most decisions and uncertainty and ambiguity are pervasive characteristics of decision making. Schmitt was referring to military decisions, but the same logic applies to fire ground and emergency scene decision making. Therefore, we need to move the discussion to intuitive decision making.

Napoleon (as cited in Mission-Centered Solutions, 2007), in a briefing to his generals, stated “You can ask me for anything you want, except time” (p. 39). This statement is a great summation of fire ground and emergency scene decision making. There is not adequate time to fully analyze all options, thus decisions must be made rapidly with limited information and

feedback from other personnel on scene. Combine this with the fact that there is often not an optimal solution, thus requiring the incident commander/decision maker to make a less than optimal decision, with limited information and feedback, in a timely, often instantaneous, fashion. The solution to this can best be summed up by Patton (as cited in Schmitt, n.d., p. 2) when he stated “A good plan violently executed now is better than a perfect plan next week.” As this quote suggests, emergency scene and fire ground decision makers don’t have the time to collect and analyze substantial amounts of information, they must begin to mitigate a catastrophic situation immediately; thus the incident commander needs to quickly develop a plan of action and execute it immediately. While never perfect, if the fire ground commander has adequate training and experience, a plan can quickly be established that will successfully mitigate the situation.

The decision making process just described is what was originally referred to as naturalistic decision making. As Schmitt (n.d., p. 3) indicates, this type of decision making is characterized by:

- ill-structured, situation-unique problems;
- uncertain, dynamic environments;
- shifting, ill-defined or competing goals;
- lack of information;
- ongoing action with continuous feedback loops;
- high level stress and friction; and
- time stress.

Naturalistic decision making is based upon a true understanding of the situation through situational assessment and awareness where the decision maker intuitively knows what to do without having to compare options, or to compare more than one option simultaneously rather than concurrently. The essential element in this decision making process is experience. This naturalistic decision making model will be further discussed later in this section. I now want to evaluate and discuss critical thinking as it relates to emergency scene decision making.

One of the decision making concepts I want to study in this research as it relates to fire ground decision making is the concept of critical thinking. Some aspects of critical thinking are very much related to classical decision making, however, there is literature and research available discussing critical thinking in the emergency environment. Moore (2007) defines critical thinking as “a deliberative *thinking about thinking* and cognitive *thinking* act whereby a person reflects on the quality of the reasoning process simultaneously while reasoning to a conclusion” (p. 2). The thinker has two equally important goals, coming to a solution and improving the way she or he reasons. Paul and Elder (2009) define critical thinking as “...the act of analyzing and evaluating thinking with a view to improving it.... [it is] self-disciplined, self-motivated, and self-corrective thinking” (p. 2). Also, according to Paul and Elder (2009, p. 2), a well cultivated thinker:

- raises vital questions and problems, formulating them clearly and precisely;
- gathers and assesses relevant information, using abstract ideas to interpret it effectively;
- comes to well-reasoned conclusions and solutions, testing them against relevant criteria and standards;
- thinks open mindedly within alternative systems of thought, recognizing and assessing, as need be, their assumptions, implications, and practical consequences; and

- communicates effectively with others in figuring out solutions to complex problems.

As mentioned, there is literature support for critical thinking skills on the emergency scene. Johns (2009) states critical thinking (CT) training reduces normal human decision error in individual and group processes. The military has begun combining CT training with recognition primed decision making (RPD/RPDM) which has reduced decision errors in battlefield simulations. Johns (2009) also states the Army's internet based CT training program is appropriate and adaptable to wildland firefighting. Although RPDM has great advantages over more obvious and time consuming decision making processes, CT can be learned and combined with RPDM to reduce decision making errors that occur when using only RPDM. One of the working definitions of CT and the associated military training program Johns (2009) outlines is:

CT involves a deliberate, systematic awareness of the process and products of one's own thinking. The training program focuses on targeting common – and potentially serious – errors that people make when they fail to apply appropriate critical thinking skills. These errors include overlooking important details, misinterpreting information, and making incorrect assumptions – all of which can lead to poor decision-making. The training program highlights awareness of these errors and teaches specific techniques that can help people overcome them. (p. 3)

Lambert (2010) also discusses critical thought as it pertains to the fire service. He discusses critical thinking in terms of pre-planning and solving problems before they happen. Lambert (2010) states “fire ground commanders and firefighters can apply their experience, skills, and knowledge to a problem, but sometimes circumstances demand a higher degree of intellectual application” (p. 2). Pre-planning, which comes in many forms, contributes to better

fire ground decision making. Types of pre-planning includes inspecting and researching buildings and structures within your response area, analyzing response profiles, developing and updating standard operating procedures (SOP), training on SOP's and response procedures, table top exercises, after action reviews (AAR) and case studies.

The Army Research Institute (2001, p. 7) lists several examples of critical thinking skills.

The examples they list are:

- Questioning assumptions
- Framing a problem
- Inductive reasoning
- Deductive reasoning
- Mentally stimulating plans
- Avoiding reasoning fallacies
- Meta-cognition
- Extracting meaning from information
- Adopting multiple perspectives

The NFA (2007, pp. 4-12 – 4-13), points to an Army War College Study from a survey of troops in Iraq when discussing good military leadership. This study indicates a good military leader:

- Keeps cool under pressure
- Clearly explains the mission, standards, and priorities
- Sees the big picture; provides context and perspective
- Makes tough, sound decisions on time
- Adapts quickly to new situations; can handle bad news

- Gives useful feedback; sets a high ethical tone
- Is positive, encouraging, and realistically optimistic
- Trust and interpersonal skills, versus technical skills – learned by example

This list describes the skills of a good military leader and this skill set can directly apply to the fire ground and emergency scene incident commander. The goal is to implement these skills into our young emergency responders so they have this skill set when ready to lead on the fire ground and emergency scene.

Additionally, Moore (2007) has a table that compares different sets of critical thinker's competencies among several researchers. My point is not to compare what one researcher sets versus another in their analysis of what they feel are critical thinking competencies, rather to list potential competencies any given researcher may list as necessary for critical thinking. The competencies listed by Moore (2007, p. 14) are:

- Recognize problems or questions and find effective means of solution
- Engage in meta-cognitive activities that identify assumptions, biases, and performance as solutions are developed
- Interpret data, appraise evidence, and evaluate statements in order to recognize logical relationships between propositions
- Infer warranted conclusions and generalizations from evidence
- Test generalizations and conclusions by seeking out contradictory evidence that enables them to judge the credibility of claims
- Convey sound, well-reasoned arguments
- Focus on the process of reasoning with the intent of improving the process

The goal of meta-cognitive (critical) thinking is not to replace experiential knowledge, training, and protocols; rather it enhances these tools and improves one's ability to focus on making better decisions.

The NFA (2006, p 2-3) discusses both the classical decision making and recognition primed decision making methods. In the classical decision making method, the decision maker:

- gathers information;
- determines the problems that are present;
- selects and prioritizes those problems in order of importance;
- determines and prioritizes possible solutions;
- selects tactics from one or more possible options; and
- issues directives to have the tactics implemented.

This process is most appropriate when time is not a factor. Through training this method can be developed into a habit and utilized by commanding officers in unfamiliar emergency situations. Additionally, this method can be used to evaluate actions taken by other decision makers through AAR's, case studies, training, etc. Although not the most timely method, it is a vital tool in the arsenal of the decision maker and should be developed through training.

The NFA (2006, p. 2-3) states RPDM is a rapid and intuitive process where the decision makers:

- looks for certain critical cues (visual, verbal, touch, smell);
- relates those cues to similar situations (from experience or training);
- recalls the previous conclusion, results, and actions that most fit the new situation; and

- issues directives to have the tactics implemented.

The more experienced the decision maker is, the greater their ability to rapidly assess the situation and render a decision. Per NFA (2006 p. 2-4), this method utilizes almost instant recall of previously learned conclusions, results and actions. This results in the decision maker almost instantaneously analyzing the situation, deciding/developing a course of action, and implementing/communicating the decision. This RPDM is what is happening when Leland (2008) states that decisions in rapidly changing dangerous circumstances are made without thought.

In Weick and Sutcliff's (2007) research on highly reliable organizations, they found that when problems occur, the decision making migrates to the people who have the most expertise to deal with the problem, which means expertise and experience are more highly valued than rank when unexpected decisions arise. This is essentially the model the fire service has adopted, where, typically, the most experienced fire ground decision makers are often the shift commanders who are ultimately the fire ground incident commanders. Another example is in the area of hazardous materials and technical rescue response where the traditional commanders may not carry the most expertise, thus they defer to lower ranks where the experience and expertise lies.

Regarding naturalistic decision making, there is a lot of research which discusses intuition as a major factor in rapid decision making. Exactly what is meant by intuition as it relates to decision making? According to Salka (2004), intuition is "our subconscious mind as it analyzes our previous experience and tells us how those experiences relate to what's happening right now" (p.105). Regarding decision making on the fire ground, Salka (2004) states "there is

no such thing as enough information and if you hold out too long it's likely the decision will already have come and gone" (pp. 112-113). This alludes to the need to avoid paralysis by analysis; the fire ground decision maker needs to be ready to make their decision quickly with limited information. Salka (2004) states "effective leaders don't make a truckload of decisions, instead they focus on the few that make a difference" (p. 113). This sums up the naturalistic decision making process of incident command on the fire ground very well. Emergency scene commanders need to focus on the few decisions that make a great difference and delegate all other decisions to other group/division supervisors, branch directors, and other leaders on the scene and trust the personnel reporting to you. This is the reason experience and expertise is important at all levels of the organization.

Klein (1998) is very comprehensive in his discussion of intuition as it relates to naturalistic decision making when he states "*intuition depends on the use of experience to recognize key patterns that indicate dynamics of the situation*" (p. 31). He states intuition has a strange reputation as oftentimes the patterns decision makers notice are subtle, thus causing people to be unable to describe what they noticed or how they judged the situation. This is what is happening when people state I just reacted or I don't know what I saw that caused me to make that decision – it was just a gut feeling. Klein (1998) delves into the research and analysis of why and how this transpires and how and why this relates to the experience, and ultimately expertise, of the decision maker. Klein (1998, p. 33) argues that intuition is not an inborn trait; rather it grows out of experience. Through his research, he finds that decision makers in time sensitive situations make decisions by recognizing when a typical situation is developing, recognizing subtle patterns of clues that don't fit together as they should, and noticing

mismatches or anomalies of the situation. It is through experience that decision makers amass the ability to recognize said patterns and anomalies.

Also, according to Klein (1998, pp. 148-149), there are many things experts can see that are invisible to novices including:

- patterns novices don't notice
- anomalies – violations of expectancies
- the big picture (situational awareness)
- the way things work (they see inside events and objects)
- opportunities and improvisations
- events that either already happened or are going to happen (they can piece it together through mental simulation)
- differences that are too small for novices to detect
- their own limitations (they can see inside their own thought processes – the process of metacognition)

As discussed, this perceptual expertise is developed through experience in similar situations and settings. Additionally, decision makers don't typically recall a specific previous experience; rather they simultaneously recall sets of similar previous incidents blended together. This is another reason decision makers in these settings can't pinpoint the reason they made a decision or knew why the patterns were mismatched or were an anomaly as compared to typical incidents or situations.

Training for naturalistic decision making

How do we train our emergency response personnel to more quickly obtain the experience and expertise to be effective fire ground and emergency scene decision makers? There is literature to support that we can develop training to better prepare our incident commanders at an earlier stage in their career rather than simply letting them learn solely through their own experiences.

As Clausewitz (1832) notes, “Friction is the only conception which in a general way corresponds to that which distinguishes real War from War on paper” (Chapter III, para. 3). Much can be learned from this quote as it relates to fire ground and emergency scene decision making. We can discuss many things in the classroom regarding fire ground and emergency scene dynamics, but it can only partially translate to the emergency scene much in the same way Clausewitz describes how friction is the difference between real war and war on paper. Clausewitz (1832) states “...to regulate the exercises in peace time as to include some of these causes of friction, that the judgment, circumspection, even resolution of the thing by experience... [one] should not have to encounter in War those things which, when seen for the first time, set him in astonishment and perplexity...this relates even to bodily fatigues” and further states “...in War the young soldier is very apt to regard unusual fatigues as the consequence of faults, mistakes, and embarrassment in the conduct of the whole, and to become distressed and despondent as a consequence. This would not happen if he had been prepared beforehand by exercises in peace” (Chapter VII, para. 4). This relates very well to McMaster (2008), in his discussion on adaptive leadership during the Vietnam War, when he noted many commanders failed at the beginning of the war because they took too long to adjust themselves to reality. McMaster details how Lieutenant Harold Moore developed a vision for combat

operations in Vietnam that established a basis for adaptation through pre-deployment training scenarios including unpredictable situations, casualties, and extraordinary physical exertion.

These discussions, though dated, are relevant to the nature of firefighting and a lot can be learned through this research and discussion on war. Basically, the concept is we need to train in peacetime (non-fire ground or emergency scene incidents) on the trials and tribulations we will encounter on the emergency scene, including the bodily fatigue and stressors we will be encountering. The question is how we best accomplish this so our incident commanders and other emergency scene decision makers are better prepared and experienced earlier in their careers.

One way to train and enhance decision making capabilities is to utilize some type of decision making diagram/matrix. One such diagram/matrix is Boyd's OODA loop, Figure 1, which Brehmer (2005) notes was developed in order to explain why American fighter pilots were more successful than their adversaries in the Korean War.

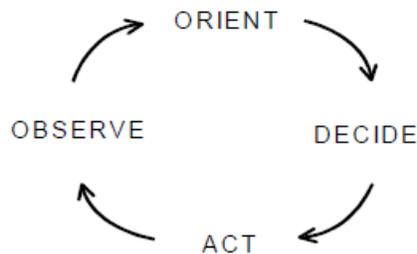


Figure 1: Boyd's OODA Loop

Note: Brehmer, B. (2005). The dynamic OODA loop: Amalgamating Boyd's OODA loop and the cybernetic approach to command and control. Retrieved July 3, 2012, from [http://www.dodccrp.org/events/10th\\_ICCRTS/CD/papers/365.pdf](http://www.dodccrp.org/events/10th_ICCRTS/CD/papers/365.pdf)

The diagram shows the four activities of the combat pilot. First, *Observe*, meant detecting enemy aircraft, second, *Orient*, referred to pointing the aircraft toward the enemy, third, *Decide*, involved deciding what to do next, and fourth, *Act*, involved implementing what had been decided. In his analysis, Boyd (as cited in Brehmer, 2005) found the American pilots were better trained, making them better at deciding and acting. Decision making trees/diagrams such as this can be utilized in training fire ground decision makers as well. While this is a simplified decision making process, it certainly is one that can be utilized. Figure 2 shows a more comprehensive version of the OODA Loop, which can also be utilized for a more in depth decision making process which is more of a stage model with multiple loops in the process.

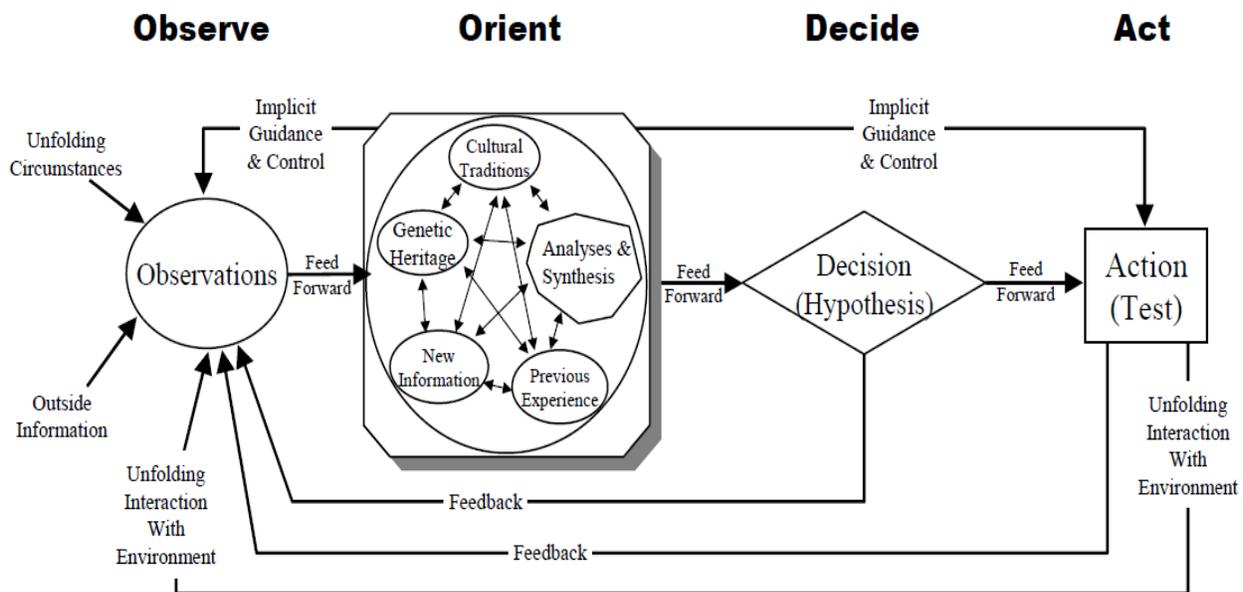


Figure 2: Boyd's Modified OODA Loop

Note: Brehmer, B. (2005). The dynamic OODA loop: Amalgamating Boyd's OODA loop and the cybernetic approach to command and control. Retrieved July 3, 2012, from [http://www.dodccrp.org/events/10th\\_ICCRTS/CD/papers/365.pdf](http://www.dodccrp.org/events/10th_ICCRTS/CD/papers/365.pdf)

This model allows feedback several times throughout the process, which allows for multiple decision points. While this is a theoretical model, it is a great model for teaching personnel the

different points in the decision making process so they develop a process of continuous improvement which gives them the tools necessary for positive outcomes on the emergency scene.

Clausewitz (1832) states "... 'knowing' is something different from 'doing' ... [they] are so different that they should not easily be mistaken the one for the other" (Chapter III, para. 1). This statement serves well for the fire service today as it shows we need more than knowledge for today's fire ground decision makers, we need to train on the doing part. In other words, we need to put our emergency scene decision makers in training scenarios that mimic the conditions in which they will be operating on the emergency scene. How do we incorporate this into our training today to ensure our personnel are fully equipped to operate in the conditions they will encounter on the fire ground and emergency scene?

### CT Training

Moore (2007, p. 19) states that "Central to critical thinking are the twin foci on the way in which a person is reasoning and the goal of improving the process." In other words, critical thinking is making the decision at hand and simultaneously self-analyzing the decision making process to ensure they are improving the reasoning used in the decision making process. ARI Newsletter (2001) states "Army officers already have good sets of knowledge and skills, but providing explicit direction in how to think or reason can broaden and deepen those skills... [and] traditional training does not provide explicit direction in how to reason or think" (p. 7). The same can certainly be said for fire service personnel. The fire service has personnel with great knowledge and skills, the challenge is how to broaden and deepen those skills including teaching our personnel in ways to reason and think. Additionally, Moore (2007) informs us

“both critical thinking skills and the disposition to critically think are essential.... [and] emotions play a significant part in the process of critical thinking” (pp. 15-16).

ARI (2001) notes that there is research evidence that adults can be taught to improve their CT skills, including evidence that training can change dispositions to think critically. ARI has a framework for thinking about critical thinking, shown in figure 3, which is another method that could be used to train our fire ground commanders and officers.

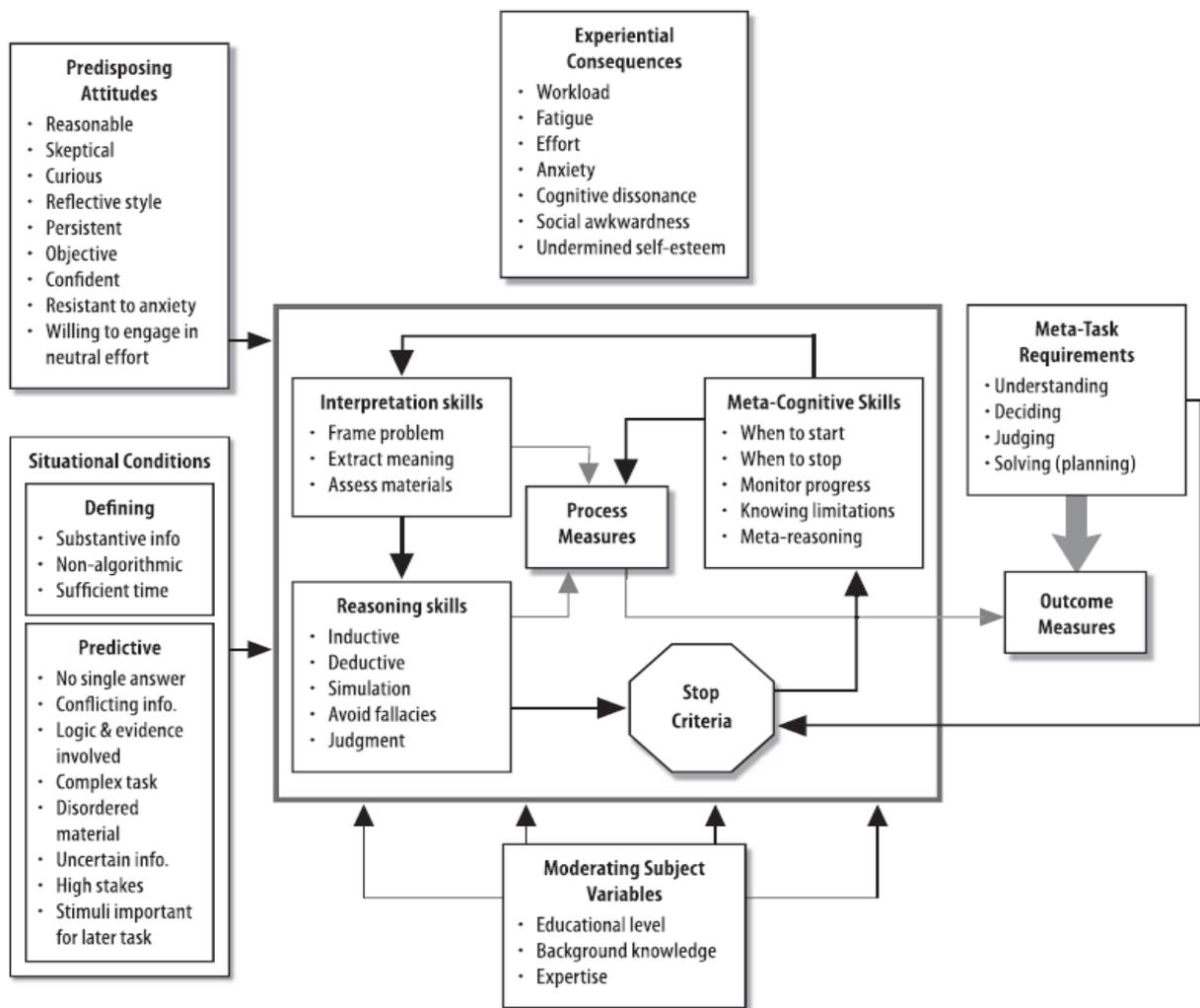


Figure 3: A Framework for Thinking about Critical Thinking

U.S. Army Research Institute for the Behavioral and Social Sciences. (2003, August). Critical thinking training for army schoolhouse and distance learning. *ARI Newsletter 13(2)*. Retrieved from [http://www.au.af.mil/au/awc/awcgate/army/ari\\_aug03\\_crit.pdf](http://www.au.af.mil/au/awc/awcgate/army/ari_aug03_crit.pdf)

They have also sponsored the development of a CD based training system for improving critical thinking skills, which includes structured instruction, historical examples, guided practice using scenarios, detailed feedback, and performance measures. Fischer, et al (2008, p. 9) issued a report on computerized training in critical thinking for army personnel. They list eight high payoff critical thinking skills as follows:

- Frame the message
- Recognize gist in the material
- Develop an explanation that ties information elements together in a plausible way
- Generalize from specific instances to broader classes
- Use mental imagery
- Challenge one's own bias
- Examine other peoples' perspectives
- Decide when to seek information based on its value and cost

They declare that the components of this training program will improve critical thinking skills as well as increase self-awareness of one's thinking. The computer based training consisted of modules for each of the eight skills and each module contained pretests, the training module itself, posttests, and other information to extend the training. The training modules adhered to the Army's themes and principles. This is obviously a very comprehensive training program for use by the Army. Some training programs may exist for the fire service, but at this point I am unaware of any that relate to critical thinking skills, although several exist for RPD based decision making.

RPD Model

Schmitt (n.d.) notes that in intuitive decision making, "...the process may be intuitive, the experience and judgment on which it is based are not" (p. 4). This is consistent with other research as it relates to intuitive decision making. Schmitt (n.d., p. 4) goes on to state these qualities must be acquired through repeated practice. He also discusses the need to start teaching intuitive decision making from the beginning if we want to develop masters in the art of command. While he is focused on the Marines, this certainly holds true in the fire service as well. We need to start aggressively training our personnel in the art of intuitive decision making from the time we get them on the job as probationers. The days of shut up and do your job and you don't have an opinion until you get some time on needs to be put behind us. Instead, we need to tell them to keep their ears open and listen to their senior officers and firefighters while also teaching them intuitive decision making. Today's young firefighters are educated and willing to be challenged early in their careers and this level of training and education will be motivational to their professional development.

Schmitt (n.d.) compares decision making to other skills we perform, like swinging a tennis racket, solving a crossword puzzle, and playing a video game. First, when we perform a skill without consciously thinking about it, we become more proficient in said skill by repeated practice. Second, intuitive decision making is an experience based skill, much in the same manner sports or musical instrument skills are learned and mastered. Miller (2006) echoes this sentiment as he states "The ability to deploy RPDM depends on a track record of knowledge and experience-expertise ... [it] is the same principle by which accomplished athletes, musicians, surgeons, hostage negotiators, and other experts carry out their craft with ease and skill... [and]

almost all practitioners can improve their proficiency through continued learning, practice, and application” (Making Rapid Critical Decisions, para. 8).

Gasaway (2009), in his research has stated that commanders have noted how important it is to conduct challenging real-life training scenarios and that it has helped them develop and enhanced their ability to utilize RPDM. He also states experience is the best way to develop these skills, but the next best thing is to mimic the real fire conditions and create the same challenges that would be encountered at a real fire. Klein (1998) gives two methods for teaching personnel to size up situations more quickly and accurately. One is to arrange for a person to receive more difficult cases and a second is to develop a good training program with exercises and realistic scenarios. In fact, Klein (1998, p. 43) mentions good training scenarios/simulations often provide more training value than direct experience due to the fact you can stop the scenario/simulation and give directives, answer questions, or discuss the scenario. Gasaway (2012) gives other options for assisting in growing the experience level of our fire service personnel including near-miss reports, line of duty death reports, and stories shared by senior members of their organization.

Another item mentioned that would be of assistance in gaining experience are SOP's and other policies. While these are necessary, they do not effectively stand alone in assisting fire ground officers in making efficient and accurate decisions. Klein (1998, p. 161) points out perceptual experience is still necessary to accomplish tasks that may seem simple because they can be reduced to rules and procedures. The procedures still require experience to interpret the situation when rules tell you to initiate a certain course of action when a certain condition occurs. This is akin to cooking and baking. We can all follow a recipe, but there are oftentimes we get confused during the process if we don't have the experience of having done it before. Although

the recipe may be simple, there are nuances that can only be learned through trial and experience and until learned, the product may be short of perfect. This is similar to rules and procedures; the decision maker still needs the experience of the situation to efficiently and accurately understand when to utilize what rule and procedure in what time frame. Therefore, SOP's and policies are necessary and beneficial; however, they cannot be utilized independent of appropriate experience.

Regarding experience, Gasaway (2012) states "The brain cannot distinguish fact from vividly imagined fiction...the more realistic these experiences, the more the experience is to be stored in the brain..." (Answer section, para. 2). In fact Gasaway (2012, Training for failure section, para. 1) feels that we should train to fail in some of our training scenarios, arguing field performance of tasks mirrors their training. By doing this, the knowledge and skills needed by officers and decision makers will be more easily recalled and applied almost instantly. This does have a consistency with the "practice as you would play" philosophy of athletes, and is transferrable to fire ground decision makers.

One type of training program that exists in assisting with the fire ground decision maker in learning necessary skills is the Blue Card<sup>R</sup> Command System training program offered by Alan Brunacini. This is an exclusively on line training program designed to assist personnel in a position to be a decision maker on the fire ground more efficiently and effectively assess fire ground situations and render an appropriate decision. I have started this program and it is very well suited to complement other training programs. I believe that any good training program in the area of decision making on the fire ground or emergency scene will be very well rounded with several aspects to the program. Thus, a computer based program like the Blue Card<sup>R</sup> Command System is an excellent aspect within a more comprehensive training program.

Johns (2009) states “Teaching and using **both** RPD and CT exploits the best of both RPD and CT” (p. 4), referring to this combination as recognition/metacognition (R/M). He also states “CT is an effortful skill which is not regularly practiced in the general population, so we cannot assume that firefighters can effectively use CT without training and practice on the fireground” (p. 6). Basically, the thought process is that RPD is extremely important but CT “...serves as a check on RPD error and as a decision quality enhancer” (Johns 2009, p. 13).

The literature review covered various aspects of critical thought and naturalistic decision making. There is a significant amount of research in these arenas geared toward the military, law enforcement, and wildland firefighting, but less is directly applied to structural firefighting and other situations encountered by typical municipal fire departments. However, the concepts and ideas obtained and discussed do have direct application to the various emergency scenes encountered by municipal fire departments, thus my research is geared this direction. These concepts are only beginning to be discussed within the CRFD and this literature review helps shape my research so appropriate RPD and CT skill training and education can be developed.

### Procedures

Descriptive research through literature review and survey questionnaires was utilized to identify the skills and knowledge necessary for critical thinking and decision making on the fire ground. Much of the literature review was conducted online utilizing key word searches through internet search engines and analyzing the resources identified. This method led to the identification of both fire service and non-fire service related print materials in the area of decision making, which I either downloaded or obtained through purchase or loan. Additionally, materials from the author’s personal library were utilized.

The literature review and resultant survey were designed to answer the following research questions: a) What knowledge and skills are required to establish successful critical thinking and decision making results?, b) What research and data currently exists on critical thinking and decision making skills?, c) What research and information currently exists in non-fire service fields requiring critical thinking that could benefit the fire service?, d) What research and information currently exists in fire service literature to address critical thinking on the fire ground?, e) What programs do other fire departments have to develop critical thinking and decision making skills for their incident commanders?

The survey portion of my research was done using a survey questionnaire, which the author constructed and distributed electronically through SurveyMonkey.com<sup>TM</sup>. The survey was distributed to fire service and non-fire service emergency response personnel who are involved in decision making on the emergency scene. For fire service personnel, I included persons representing career departments, combination departments, and volunteer departments across the country. For non-fire service personnel, I targeted individuals in law enforcement, EMS, emergency management, military, government agencies, and private sector personnel who are involved with response to hazardous materials and other emergencies for the facilities with which they are employed.

The questionnaire consisted of ten questions. The first two questions of the survey asked respondents to identify the skills and personal attributes incident commanders should possess for effective fire ground and emergency scene decision making. Question one had 17 skill choices and question two had 26 attribute choices, including "other." I required five choices to be made for each question to ensure thoroughness of responses. I felt this was important as there are several skills and attributes that lead to effective decision making and this ensures several skill

and attribute sets are included. The skills and attributes listed in survey questions one and two were gleaned from the literature review material, as well as personal experience, and modified to fit a questionnaire style response. The third question was designed to determine whether the respondents felt RPDM or CT process was more important, or equally important, for fire ground decision making. The fourth question was designed to determine what methods are most important for developing fire ground decision making skills. For this question, I listed several options and asked them to rank them in order so I could get well-rounded results on what respondents felt are the top methods for developing decision making skills. The next three questions addressed whether the respondents organizations offered training or simulation exercises to prepare their personnel for emergency scene decision making, including number of hours per month and whether they felt it was adequate. Additionally, I had response boxes associated with each of these questions to elicit more information in this area, including training opportunities their organization offers. The final three questions were designed to gather demographic information on the respondents regarding years of experience and type and size of organization for which they work. A copy of the questionnaire is contained in Appendix B.

Several limitations were identified during the writing of this applied research project. First, there is a significant amount of material and research available in the areas of critical thinking and decision making. Time limitations of the project did not allow me to fully research and review all potential sources. Second, the vast majority of sources were geared toward non-emergency scene decision making. This research is extremely valuable and may relate to the fire service, however, with the vast majority of research available, I did not delve into this realm. Third, the majority of emergency or time stress decision making research is in the areas of law enforcement, military battleground, and the wildland fire arena, with relatively little research

existing on decision making for structural fire response. Again, all of the above research is relevant and valuable to structural firefighting; however, there are limitations in crossover to this arena. Finally, there were a couple of limitations with the questionnaire. The first being the questionnaire was designed to be answered using choices among given answers. There were a couple questions which had text boxes to solicit further information in the questionnaire, but not all participants responded to these portions of the question. The other problem with the questionnaire is that, because it was voluntary, not everyone responded. I had 68 persons complete the questionnaire out of the 101 I distributed.

### Results

The results of this applied research project come from both the literature review process and the questionnaire sent to the 101 individuals. 68 persons completed the questionnaire. The literature review provided answers to research questions two, three, and four, and the research questionnaire provided answers to the research questions one and five, with some crossover among questions.

Research question one asked what knowledge and skills are required to establish successful critical thinking and decision making results. The first three questions of my survey addressed this research question. My first survey question asked what skills you feel are the most essential for incident commanders to possess for effective fire ground and emergency scene decision making, please check the top five. The overwhelming top answer, 79.4% of respondents, chose communication. This skill led the second most common choice, ability to think globally/see the big picture (60.3% of respondents) by 19%. The rest of the top five, in order of rank, are adaptive (to dynamic situations) at 54.4%, sound decision maker at 41.2%, and

listening at 38.2%. Ability to manage risk (36.8%), ability to delegate (32.4%), and effective problem recognition (30.9%) were the next three skill choices. I include these in the results as they were included by several respondents, thus they are important skills although they did not make the top five.

My second survey question asked respondents to choose the top five attributes incident commanders should possess to operate effectively under stress. While these are listed as personal attributes, they are certainly attributes that can be developed and enhanced through training, education, and experience. The top choice of respondents was command presence at 70.6%, again a significantly higher percentage than the second top choice. The second and third chosen attributes were self-confidence and self-control at 54.4% and 52.9% respectively. The last two attributes to round out the top five are maturity of judgment at 44.1% and open-mindedness at 38.2%. A close sixth and seventh attribute were emotional maturity at 35.3% and analytical skills at 33.8%.

The third survey question defined RPDM and CT skills and asked if the respondent felt one process was better than the other as they relate to fire ground and emergency scene decision making. 30.3% of respondents felt RPDM is more important whereas only 6.1% felt CT was more important. A significant 60.6% feel both are equally important. One respondent listed other processes are more important and went on to explain both are equally important but one should also look at crew resource management and the Boyd Loop for critical decision making.

The skills and attributes necessary for effective critical thinking and decision making listed above are straight forward and self-explanatory. The top skill and personal attribute resulting from the survey, communication and command presence respectively, led by a fairly

wide margin, which indicates their importance. Respondents overwhelmingly felt RPDM and CT skills were equally important, pointing to the need to include both in decision making training for fire ground commanders.

Research question five asked what programs other fire departments have to develop critical thinking and decision making skills for their incident commanders. Survey questions four through seven, especially questions four and five, addressed this research question. The fourth survey question asked in what ways can fire ground and emergency scene decision making skills be developed and improved. I had a total of nine options listed and asked the respondents to rank them in order of importance for adequate training and development of emergency scene decision making skills. Table 1 lists question five results.

Table 1

*Rankings of Development Methods for Fire Ground Decision Making Skills*

| Training Method                                 | Rating Average |
|---|----------------|
| Past experience in similar situations/incidents | 2.66           |
| Hands-on training                               | 3.65           |
| Simulation training                             | 4.62           |
| After action reviews and critiques              | 5.00           |
| Pre-planning                                    | 5.22           |
| Table-top exercises                             | 5.46           |
| Classroom training                              | 5.68           |
| Job shadowing                                   | 5.74           |
| Reading/self-knowledge/ self-learning           | 6.97           |

*Note.* The rating system had one as the most important method, descending to nine for the lowest rating, thus the lower the rating, the more important the method.

As can be seen, past experience in similar situations/incidents was the most important method by a fairly significant margin. Hands-on training and simulation training were second and third respectively. Using the rating average as a guide, choices fell off rapidly after that, indicating that activities that are either direct experience or realistic hands-on and simulation training are felt to be most important for developing decision making skills.

Question five garnered information on whether the respondents department or organization offered training or simulation to prepare their personnel for fire ground decision making. 64.7% indicated their organization offered said training with 35.3% stating they did not, which means over one-third of organizations surveyed did not offer the training. Of the 44 individuals who responded that their organization did offer such training, 35 responded to the additional portion of the question, what opportunities are available within your organization. The responses covered a broad spectrum of training and education opportunities and provide a great starting point of development and expansion of current CRFD training in this arena. All additional written responses are listed in Appendix D.

Question six asked how many hours per month are dedicated to this type of training. The most common response, at 47.1%, was 1-5 hours per month. In descending order, 29.4% answered none, 17.6% answered 5-10, 4.4% answered 10-15, 0% answered 15-20, and 1.5% (one respondent) answered 20 or more. Question seven asked if the respondent felt the type and quantity of training was adequate. 63.2% answered no with 36.8% answering yes. Of the 68 total respondents, 31 answered the second part of the question, which asked what is an appropriate number of training hours to be proficient in decision making. Their answers ranged from two hours per month to 1000 hours overall to be proficient, with several respondents stating

that it varies by individual as well as experience level of the decision maker. As with question five, a full list of responses is listed in Appendix D.

The training necessary to develop decision making and critical thinking skills needs to be comprehensive. Table 1, page 38, lists an order of importance for decision making skills training methods, however all methods should be included in an appropriate capacity for a comprehensive program. The survey resulted in a variety of options other organizations utilize for training on this subject and they need to be analyzed and compared to the Table 1 list to assist in the development of a comprehensive program.

Questions eight through ten were demographically related questions. Question eight asked what the respondents years of experience were in the subject matter. 30.9% had experience of more than 25 years. In descending order, 27.9% had 20-25 years' experience, 23.5% had 15-20 years' experience, 11.8% had 10-15 years' experience, 4.4% had 5-10 years' experience, and none had less than five years' experience.

Question nine asked what type of organization the respondent was employed by or involved with. 63.2% were involved with the fire service, being employed by a career fire department (48.5%), a combination department (10.3%), or a volunteer department (4.4%). The remaining 36.8% were employed by police departments (11.8%); emergency management agencies (2.9%); military (1.5%); other government agency (10.3%), which includes federal law enforcement, state public health, and related governmental entities; and the private sector (10.3%), which includes nursing and employees of private sector hazmat and emergency response teams.

Question ten asked the size of the respondents department or organization, with the responses being fairly consistent. The most common range was 100-150 employees at 22.1% of respondents. The remaining were less than 25 employees at 8.8%, 25-50 employees at 14.7%, 50-75 employees at 16.2%, 75-100 employees at 13.2%, 15-200 employees at 10.3%, and 200 or more employees at 14.7%.

### Discussion

Decision making on the fire ground and emergency scene has become more complex and is more intellectually challenging now than ever before (Varone, 2001). This complexity comes from a variety of sources including increased use of lightweight construction methods, the fire service's multi-disciplinary approach to emergency response, the number of legally required and recognized industry standards, limited equipment and personnel resources, and the increased threat of legal ramifications from accidents or injuries that occur during the incident. As a result, it is imperative incident commanders and other potential emergency scene decision makers are given all available tools and training in order to ensure effective emergency incident management.

As stated in the NIOSH report (n.d.), the decisions that are made early in an emergency are essential to successful mitigation of the incident. Additionally, the report discusses the fact decisions are often made under conditions of extreme stress and time constraints and goes on to state the ability to cope with stress on the emergency scene is dependent on the decision maker's perception and interpretation of the event. Given this information and perspective, the resulting concern is how to ensure our personnel are given all the training and tools necessary to

effectively manage their perception of an event in order to reduce the stress they experience so they can more effectively manage the incident.

In the literature review portion, I found information in both fire service and non-fire service literature and research in the areas of critical thinking and decision making under stressful conditions, conditions similar to those one would find on the fire ground and emergency scene. The non-fire service literature reviewed, coming from fields such as law enforcement, the military, and the emergency medical professions, can be applied to the fire service. While the classical decision making model typically does not apply to the emergency scene because of the timeliness in which decision making is necessary, there is certainly a place for it within the fire service and parts of the critical thinking process of the classic decision making model can be utilized to benefit the emergency scene decision maker. Typically, fire ground and emergency scene commanders are going to utilize the naturalistic decision making method.

The stated purpose of my research is to identify the knowledge and skills necessary for critical thinking and decision making on the fire ground. I have found that a lot of information exists in the critical thinking and decision making arena; however, I was unsure of how many departments focused on this training for their officers and shift commanders. I chose this as a research area because CRFD does not currently have formal officer development or fire ground decision maker training.

Following are lists of critical thinking skills I discovered and discussed in the literature review. The Army Research Institute (2001, p. 7) lists the following:

- Questioning assumptions
- Framing a problem

- Inductive reasoning
- Deductive reasoning
- Mentally stimulating plans
- Avoiding reasoning fallacies
- Meta-cognition
- Extracting meaning from information
- Adopting multiple perspectives

The NFA in its (2007, pp. 4-12 – 4-13), from an Army War College Study lists the attributes of a good military leader:

- Keeps cool under pressure
- Clearly explains the mission, standards, and priorities
- Sees the big picture; provides context and perspective
- Makes tough, sound decisions on time
- Adapts quickly to new situations; can handle bad news
- Gives useful feedback; sets a high ethical tone
- Is positive, encouraging, and realistically optimistic
- Trust and interpersonal skills, versus technical skills – learned by example

According to Paul and Elder (2009, p. 2), a well cultivated thinker:

- raises vital questions and problems, formulating them clearly and precisely;
- gathers and assesses relevant information, using abstract ideas to interpret it effectively;

- comes to well-reasoned conclusions and solutions, testing them against relevant criteria and standards;
- thinks open mindedly within alternative systems of thought, recognizing and assessing, as need be, their assumptions, implications, and practical consequences; and
- communicates effectively with others in figuring out solutions to complex problems.

In my research survey, I extrapolated information from the above listed sources, as well as from personal experience, to develop a list of skills and attributes applicable to effective fire ground and emergency scene decision makers. My first survey question asked the respondents to choose the top five skills they felt were essential for incident commanders to possess for effective fire ground and emergency scene decision making and question two asked the same regarding attributes for incident commanders to operate effectively under stress.

Regarding the skills necessary to be an effective incident commander, the top five were communication, listening, ability to think globally/see the big picture, adaptive (to dynamic situations), and sound decision maker. The NFA list describing a good leader touches on four of the top five skills in a direct form, with the only one being absent is listening. However, among all of the above listed skills and attributes, one could argue that listening skills could be inferred from the literature review discussions. The other two above listed sources also allude to most of the five skills obtained from my questionnaire. Regarding attributes, I believe the research also supports the top five my research indicated. The top five are command presence, self-confident, self-control, maturity of judgment, and open-minded. The only attribute specifically listed is open-minded, and that was from Paul and Elder. However, it could be argued that self-control can be inferred from the ARI list in its mention of adopting multiple perspectives as well as from the NFA list when it mentions keeping cool under pressure. Keeping cool under pressure

supports the command presence and self-confident choices from my questionnaire. Also, the entire critical thinking methodology implies maturity of judgment, not to mention this should come naturally with experience.

Question three defined both RPDM and CT skills and asked whether one was better than the other. Just over sixty percent of respondents felt that both are equally important. It has been well documented that RPDM is utilized in the emergency response arena for decision making under stress and time constraints. Some of the research I found for CT skills indicated this would fall under the classical decision making methodology where time is not a major factor. ARI (2001) has conducted research in the area of critical thinking on the battlefield, which indicates that CT can be taught and utilized by emergency scene decision makers. ARI sponsored the development of a CD based training system for improving critical thinking skills among its battlefield commanders. Johns (2009) states “Teaching and using **both** RPD and CT exploits the best of both RPD and CT” (p. 4), and goes on to state RPD is extremely important but CT serves as a check on RPD error.

Klein (1998) states “*intuition depends on the use of experience to recognize key patterns that indicate dynamics of the situation*” (p. 31). Intuition has been discussed extensively as a description of the naturalistic decision making process and RPDM. As Klein’s statement defines, it is experience that gives us the intuition to make decisions in this fashion. One of the issues facing the fire service is how to get our current and future incident commanders and fire ground and emergency scene decision makers an appropriate level of experience to inculcate the ability to rely on intuition/RPDM. Survey question four asked how can fire ground and emergency scene decision making skills be developed and improved. The top method indicated is past experience in similar situations/incidents, which is consistent with the research. I asked

respondents to rank nine methods in order of importance. After experience, my survey ranked as follows: hands-on training, simulation training, after action reviews and critiques, pre-planning, table-top exercises, classroom training, job shadowing, and reading/self-knowledge/self-learning. As alluded to above, our challenge is to get our current and future emergency scene decision makers experience in their arena so they can effectively utilize naturalistic decision making. Since fires are continuing to decline and emergency scenes are becoming more complex, we need to get them this experience utilizing other methods. As is consistent with my findings, Schmitt (n.d.) states decision making qualities need to be acquired through repeated practice. Additionally, Gasaway (2012) indicates the mind cannot distinguish between real experiences and vividly imagined fiction, which can come in the form of realistic training scenarios. Klein (1998) echoes this as he states good training scenarios have the ability to provide more value than direct experience because you can stop the training scenario and ask questions, discuss options available, lessons to be learned, and other points about the scenario. While direct experience and realistic hands-on training are likely the most valuable, there is certainly value in the other methods as well in that lessons can be learned from several perspectives and training programs should incorporate all of them in appropriate proportion to produce the most desirable outcomes.

The other relevant survey questions (other than demographic information) I asked was whether the respondents organization offered training or simulation exercises to prepare their personnel for fire ground decision making and if so, what opportunities are available. I also asked if said training was adequate and what they felt an appropriate amount of training was required to become proficient. I did not focus much literature review on this particular aspect of the research, this was more of a question of direct experience of the respondents to obtain

information on what training programs and opportunities are available. Just under two-thirds of respondents indicated they did receive some type of training in this subject matter and about the same percentage indicated the training opportunities available were not enough to adequately prepare their personnel for fire ground or emergency scene decision making.

The training programs and opportunities listed in the responses indicated many opportunities that are currently available to CRFD personnel; however we do not have a formal program available to encompass a great majority of this training. Thus, the training our personnel receive is very piecemeal at best. There were trainings listed that have never been considered in the CRFD including in-depth training on the three components of situational awareness (perception, comprehension, and prediction), understanding of Boyd's OODA Loop, teaching the characteristics of personnel in highly reliable organizations, and utilizing fire simulation software. A formal officer development program for CRFD has been discussed and attempted a couple of times, but it has never been fully realized. CRFD does conduct many of the suggestions of the respondents including AAR's, NFA classes, table-top exercises, and drills with industry and within the department. Most of the other opportunities listed are available to our personnel, but a lot of them require significant motivation by the individual and is not required or significantly encouraged by the department.

I have long felt CRFD should formalize an officer development program as well as develop other career development programs and this research has solidified my position. While CRFD has professional, knowledgeable and talented personnel, it is imperative we continue to ensure our personnel have all of the training and resources they need to operate effectively on the emergency scene. This research has helped clarify the direction we need to proceed to develop our personnel.

### Recommendations

The information obtained from this research, both through the literature review and my survey questionnaire, substantiates the need for CRFD to establish further training and development programs to ensure our personnel are fully trained to be effective decision makers in the stressful emergency scene environment. Based on the research, the following are my recommendations:

- Clearly define classical decision making and naturalistic decision making methods for our personnel, including recognition primed decision making and critical thinking
- Incorporate the research information into a well-rounded, comprehensive training program on the decision making process and methods for developing these decision making skills
- Further analyze the programs I have found in the research literature that can be directly or indirectly incorporated into a training and development program for the CRFD
- Continue to analyze and compare my findings regarding the skills and attributes needed to be an effective emergency scene decision maker against prevailing industry research, both within and outside of the fire service, and incorporate that into decision making and critical thinking training as a part of an overall personnel development program
- Further analyze the written responses to my survey question of what opportunities the respondents personnel have within their organizations to prepare them for fire ground and emergency scene decision making
- With the information obtained from this research and the continued evaluation necessary, develop a comprehensive program that can be incorporated into the CRFD at all ranks to make them more effective decision makers and critical thinkers; this can be obtained

through opportunities made available to our personnel as well as through a program specifically designed for our department

- The comprehensive training and development program will likely be best suited to a task book type program where each individual is given a task book suitable for their position, and there is a series of internal and external training opportunities and requirements for them to pursue to ensure they have clearly defined and achievable progression opportunities and requirements

The CRFD can benefit greatly from the development of a comprehensive program designed to make our personnel more effective decision makers on the emergency scene. While there is certainly training available that performs this service already, there is a lack of a comprehensive program where an employee has a clear track to follow to fully develop them in this area.

Through this process, the CRFD can ensure that our personnel have the training and tools available to them for professional development within their current job function as well as preparation for future opportunities, with a major goal of the program being to ensure effective critical thinking and fire ground decision making. This will help ensure our employees are operating to their fullest abilities for the safety of our personnel and the community as well as to ensure we provide the greatest level of service to the citizens and visitors of the City of Cedar Rapids.

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## Appendix A

## Research Questionnaire Form Email

To: "g.smith@cedar-rapids.org via surveymonkey.com" <member@surveymonkey.com>

From: "g.smith@cedar-rapids.org via surveymonkey.com" <member@surveymonkey.com>

Subject: Fire Ground Decision Making Questionnaire

My name is Gregory Smith and I am an Assistant Chief with the Cedar Rapids (Iowa) Fire Department. I am working on my Executive Fire Officer certification through the National Fire Academy. I am conducting research in the area of critical thinking and decision making on the fire ground and emergency scene. As a part of this research, I am reaching out to personnel in both fire service and non-fire service organizations that may respond to emergency situations. To complete my research, I am requesting the attached survey be completed by July 1st.

Here is a link to the survey:

<http://www.surveymonkey.com/s.aspx>

This link is uniquely tied to this survey and your email address. Please do not forward this message.

Thank you very much for your participation!

Gregory Smith, MPA  
Assistant Chief - Operations  
Cedar Rapids Fire Department  
Central Fire Station  
1010 1st St. NW  
Cedar Rapids, Iowa 52405

Office: (319) 286-5224  
Cell: (319) 538-2593  
Fax: (319) 286-5250  
Email: g.smith@cedar-rapids.org

Web Site: [www.cedar-rapids.org](http://www.cedar-rapids.org)

Please note: If you do not wish to receive further emails from us, please click the link below, and you will be automatically removed from our mailing list.

<http://www.surveymonkey.com/optout.aspx>

## Appendix B

## Effective Fire Ground Decision Making Questionnaire

**1. Which of the following skills do you feel are the most essential for incident commanders to possess for effective fire ground and emergency scene decision making? Please check what you feel are the top five.**

- |  |   |
|--|---|
| <input type="checkbox"/> Communication   | <input type="checkbox"/> Data interpretation and evaluation skills                        |
| <input type="checkbox"/> Listening   | <input type="checkbox"/> Ability to reason  |
| <input type="checkbox"/> Ability to think globally/see the big picture                               | <input type="checkbox"/> Ability to plan  |
| <input type="checkbox"/> Adaptive (to dynamic situations)  | <input type="checkbox"/> Ability to delegate  |
| <input type="checkbox"/> Sound decision maker  | <input type="checkbox"/> Understanding of tactics of command                              |
| <input type="checkbox"/> Interpersonal skills  | <input type="checkbox"/> Ability to manage risk   |
| <input type="checkbox"/> Technically skilled   | <input type="checkbox"/> Effective problem recognition                                    |
| <input type="checkbox"/> Ability to infer conclusions and generalizations from evidence and feedback | <input type="checkbox"/> Ability to convey sound and well-reasoned arguments/instructions |

Other (please specify)

**2. What attributes should incident commanders possess to operate effectively under stress? Please check what you feel are the top five attributes necessary for effective fire ground or emergency scene decision making.**

- |  |   |   |
|--|---|---|
| <input type="checkbox"/> Truth-seeking             | <input type="checkbox"/> Intellectual curiosity | <input type="checkbox"/> Intuitive        |
| <input type="checkbox"/> Open-minded               | <input type="checkbox"/> Self-motivated         | <input type="checkbox"/> Positive         |
| <input type="checkbox"/> Analytical                | <input type="checkbox"/> Emotionally mature     | <input type="checkbox"/> Optimistic       |
| <input type="checkbox"/> Systematic                | <input type="checkbox"/> Trustworthy            | <input type="checkbox"/> Well-grounded    |
| <input type="checkbox"/> Self-confident            | <input type="checkbox"/> Honest                 | <input type="checkbox"/> Respectful       |
| <input type="checkbox"/> Inquisitive               | <input type="checkbox"/> Loyal                  | <input type="checkbox"/> Command presence |
| <input type="checkbox"/> Maturity of judgment      | <input type="checkbox"/> Wise                   | <input type="checkbox"/> Self-control     |
| <input type="checkbox"/> Fair-minded               | <input type="checkbox"/> Open                   |   |
| <input type="checkbox"/> Intellectual perseverance | <input type="checkbox"/> Patient                |   |

Other (please specify)

**3. Recognition-primed decision-making (RPDM) is a decision making process by which the decision maker utilizes past experiences to quickly analyze and size-up the situation and render a plan of action - all based upon rapid recognition and analysis of situational cues.**

**Critical thinking (CT) is a deliberative act whereby the decision maker simultaneously reaches a solution and works to improve their reasoning process.**

**Regarding these decision making processes as they relate to the fire ground and emergency scene, is one process better than the other?**

- RPDM is more important
- CT is more important
- Both are equally important
- Other processes are more important - please explain

**4. In what ways can fire ground and emergency scene decision making skills be developed and improved? Please rank them in order of importance for adequate training and development of said skills.**

- Classroom training
- After action reviews and critiques
- Table-top exercises
- Pre-planning
- Past experience in similar situations/incidents
- Hands-on training
- Readings/self-knowledge/self-learning
- Job shadowing
- Simulation training

**5. Does your department or organization offer training or simulation exercises to prepare your personnel for fire ground decision making?**

- Yes
- No

If yes, what opportunities are available or required?

**6. How many hours per month (on average) are dedicated to this type of training or preparation?**

- None
- 1 - 5
- 5 - 10
- 10 - 15
- 15 - 20
- 20 or more

**7. Do you feel the type and quantity of training offered in your organization is adequate to prepare them for fire ground decision making?**

- Yes  
 No

What is an appropriate number of training hours to be proficient in emergency scene decision making?

**8. What are your years of experience in the emergency response field (or as a member of an emergency response team within your organization)?**

- 1 - 5 years  
 5 - 10 years  
 10 - 15 years  
 15 - 20 years  
 20 - 25 years  
 More than 25 years  
 Not applicable

**9. What is your organization type?**

- Career Fire Department  
 Combination Fire Department  
 Volunteer Fire Department  
 Police Department  
 Emergency Management Agency  
 Military  
 Government Agency  
 Private Sector

Other (please specify)

**10. What is the size of your department or organization?**

- Less than 25 employees  
 25 - 50 employees  
 50 - 75 employees  
 75 - 100 employees  
 100 - 150 employees  
 150 - 200 employees  
 200 or more employees

## Appendix C

## Effective Fire Ground Decision Making Questionnaire Results

1. Which of the following skills do you feel are the most essential for incident commanders to possess for effective fire ground and emergency scene decision making? Please check what you feel are the top five.

|   | Response Percent | Response Count |
|---|------------------|----------------|
| Communication   | 79.4%            | 54             |
| Listening   | 38.2%            | 26             |
| Ability to think globally/see the big picture                               | 60.3%            | 41             |
| Adaptive (to dynamic situations)  | 54.4%            | 37             |
| Sound decision maker  | 41.2%            | 28             |
| Interpersonal skills  | 2.9%             | 2              |
| Technically skilled   | 14.7%            | 10             |
| Effective problem recognition   | 30.9%            | 21             |
| Ability to infer conclusions and generalizations from evidence and feedback | 22.1%            | 15             |
| Data interpretation and evaluation skills                                   | 8.8%             | 6              |
| Ability to convey sound and well-reasoned arguments/instructions            | 14.7%            | 10             |
| Ability to reason   | 10.3%            | 7              |
| Ability to plan   | 22.1%            | 15             |
| Ability to delegate   | 32.4%            | 22             |
| Understanding of tactics of command   | 27.9%            | 19             |
| Ability to manage risk  | 36.8%            | 25             |
| Other (please specify)  | 3.0%             | 2              |

2. What attributes should incident commanders possess to operate effectively under stress? Please check what you feel are the top five attributes necessary for effective fire ground or emergency decision making.

|                           | Response Percent | Response Count |
|---------------------------|------------------|----------------|
| Truth-seeking             | 5.9%             | 4              |
| Open-minded               | 38.2%            | 26             |
| Analytical                | 33.8%            | 23             |
| Systematic                | 26.5%            | 18             |
| Self-confident            | 54.4%            | 37             |
| Inquisitive               | 5.9%             | 4              |
| Maturity of judgment      | 44.1%            | 30             |
| Fair-minded               | 0.0%             | 0              |
| Intellectual perseverance | 5.9%             | 4              |
| Intellectual curiosity    | 0.0%             | 0              |
| Self-motivated            | 1.5%             | 1              |

|                        |       |    |
|------------------------|-------|----|
| Emotionally mature     | 35.3% | 24 |
| Trustworthy            | 14.7% | 10 |
| Honest                 | 8.8%  | 6  |
| Loyal                  | 2.9%  | 2  |
| Wise                   | 5.9%  | 4  |
| Open                   | 5.9%  | 4  |
| Patient                | 23.5% | 16 |
| Intuitive              | 20.6% | 14 |
| Positive               | 10.3% | 7  |
| Optimistic             | 1.5%  | 1  |
| Well-grounded          | 14.7% | 10 |
| Respectful             | 10.3% | 7  |
| Command presence       | 70.6% | 48 |
| Self-control           | 52.9% | 36 |
| Other (please specify) | 5.9%  | 4  |

- Recognition-primed decision making (RPDM) is a decision making process by which the decision maker utilizes past experiences to quickly analyze and size-up the situation and render a plan of action – all based upon rapid recognition and analysis of situational cues.

Critical thinking (CT) is a deliberative act whereby the decision maker simultaneously reaches a solution and works to improve their reasoning process.

Regarding these decision making processes as they relate to the fire ground and emergency scene, is one better than the other?

|   | Response Percent | Response Count |
|---|------------------|----------------|
| RPDM is more important                              | 30.3%            | 20             |
| CT is more important                                | 6.1%             | 4              |
| Both are equally important                          | 60.6%            | 42             |
| Other processes are more important – please explain | 3.0%             | 2              |

- In what ways can fire ground and emergency scene decision making skills be developed and improved? Please rank them in order of importance for adequate training and development of said skills.

|   | 1             | 2             | 3             | 4             | 5             | 6             | 7             | 8             | 9             | Rating Avg. |
|---|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|-------------|
| Past experience in similar situations/incidents | 42.6%<br>(29) | 17.6%<br>(12) | 14.7%<br>(10) | 4.4%<br>(3)   | 5.9%<br>(4)   | 10.3%<br>(7)  | 1.5%<br>(1)   | 1.5%<br>(1)   | 1.5%<br>(1)   | 2.66        |
| Hands-on training                               | 19.1%<br>(13) | 25.0%<br>(17) | 10.3%<br>(7)  | 16.2%<br>(11) | 8.8%<br>(6)   | 5.9%<br>(4)   | 1.5%<br>(1)   | 8.8%<br>(6)   | 4.4%<br>(3)   | 3.65        |
| Simulation training                             | 5.9%<br>(4)   | 13.2%<br>(9)  | 19.1%<br>(13) | 16.2%<br>(11) | 16.2%<br>(11) | 1.5%<br>(1)   | 13.2%<br>(9)  | 7.4%<br>(5)   | 7.4%<br>(5)   | 4.62        |
| Table-top exercises                             | 0.0%<br>(0)   | 10.3%<br>(7)  | 10.3%<br>(7)  | 11.8%<br>(8)  | 16.2%<br>(11) | 23.5%<br>(16) | 4.4%<br>(3)   | 17.6%<br>(12) | 5.9%<br>(4)   | 5.46        |
| After action reviews and critiques              | 5.9%<br>(4)   | 14.7%<br>(10) | 11.8%<br>(8)  | 11.8%<br>(8)  | 10.3%<br>(7)  | 14.7%<br>(10) | 11.8%<br>(8)  | 11.8%<br>(8)  | 7.4%<br>(5)   | 5.00        |
| Classroom training                              | 8.8%<br>(6)   | 4.4%<br>(3)   | 11.8%<br>(8)  | 5.9%<br>(4)   | 13.2%<br>(9)  | 8.8%<br>(6)   | 20.6%<br>(14) | 8.8%<br>(6)   | 17.6%<br>(12) | 5.68        |

|  |              |             |              |              |               |               |               |               |               |      |
|--|--------------|-------------|--------------|--------------|---------------|---------------|---------------|---------------|---------------|------|
| Job shadowing                            | 4.4%<br>(3)  | 8.8%<br>(6) | 11.8%<br>(8) | 11.8%<br>(8) | 7.4%<br>(5)   | 7.4%<br>(5)   | 17.6%<br>(12) | 13.2%<br>(9)  | 17.6%<br>(12) | 5.74 |
| Pre-planning                             | 11.8%<br>(8) | 4.4%<br>(3) | 7.4%<br>(5)  | 10.3%<br>(7) | 16.2%<br>(11) | 22.1%<br>(15) | 10.3%<br>(7)  | 5.9%<br>(4)   | 11.8%<br>(8)  | 5.22 |
| Reading/self-knowledge/<br>self-learning | 1.5%<br>(1)  | 1.5%<br>(1) | 2.9%<br>(2)  | 11.8%<br>(8) | 5.9%<br>(4)   | 5.9%<br>(4)   | 19.1%<br>(13) | 25.0%<br>(17) | 26.5%<br>(18) | 6.97 |

5. Does your department or organization offer training or simulation exercises to prepare your personnel for fire ground decision making?

|  | Response Percent | Response Count |
|--|------------------|----------------|
| Yes                                      | 64.7%            | 44             |
| No                                       | 35.3%            | 24             |
| If yes, what opportunities are available |                  | 35             |

6. How many hours per month (on average) are dedicated to this type of training or preparation?

|            | Response Percent | Response Count |
|------------|------------------|----------------|
| None       | 29.4%            | 20             |
| 1 – 5      | 47.1%            | 32             |
| 5 – 10     | 17.6%            | 12             |
| 10 – 15    | 4.4%             | 3              |
| 15 – 20    | 0.0%             | 0              |
| 20 or more | 1.5%             | 1              |

7. Do you feel the type and quantity of training offered in your organization is adequate to prepare them for fire ground decision making?

|  | Response Percent | Response Count |
|--|------------------|----------------|
| Yes  | 36.8%            | 25             |
| No   | 63.2%            | 43             |
| What is an appropriate number of training hours to be proficient in emergency scene decision making? |                  | 31             |

8. What are your years of experience in the emergency response field (or as a member of an emergency response team within your organization)?

|                    | Response Percent | Response Count |
|--------------------|------------------|----------------|
| 1 – 5 years        | 0.0%             | 0              |
| 5 – 10 years       | 4.4%             | 3              |
| 10 – 15 years      | 11.8%            | 8              |
| 15 – 20 years      | 23.5%            | 16             |
| 20 – 25 years      | 27.9%            | 19             |
| More than 25 years | 30.9%            | 21             |
| Not applicable     | 1.5%             | 1              |

## 9. What is your organization type?

|  | Response Percent | Response Count |
|--|------------------|----------------|
| Career Fire Department   | 48.5%            | 33             |
| Combination Fire Department  | 10.3%            | 7              |
| Volunteer Fire Department  | 4.4%             | 3              |
| Police Department  | 11.8%            | 8              |
| Emergency Management Agency  | 2.9%             | 2              |
| Military   | 1.5%             | 1              |
| Government Agency  | 10.3%            | 7              |
| Private Sector   | 10.3%            | 7              |
| Other (please specify – also please specify if you answered government agency or private sector) |                  | 11             |

## 10. What is the size of your department or organization?

|                        | Response Percent | Response Count |
|------------------------|------------------|----------------|
| Less than 25 employees | 8.8%             | 6              |
| 25 – 50 employees      | 14.7%            | 10             |
| 50 – 75 employees      | 16.2%            | 11             |
| 75 – 100 employees     | 13.2%            | 9              |
| 100 – 150 employees    | 22.1%            | 15             |
| 150 – 200 employees    | 10.3%            | 7              |
| 200 or more employees  | 14.7%            | 10             |

## Appendix D

## Written Responses to Survey Questionnaire

|  |
|--|
| <b>Question 1 – Other (2 Responses)</b>                      |
|  |
| Thorough understanding of what true situational awareness is |
| multitask  |

|   |
|---|
| <b>Question 2 – Other (4 Responses)</b> |
|   |
| calmness                                |
| Experience                              |
| Calm / confident communicator           |
| Integrity                               |

|  |
|--|
| <b>Question 3 – Other processes are more important. Please explain. (2 Responses)</b>  |
|  |
| RPDM is more important,(in my opinion) CT solution process requires improvement AFTER the solution is derived. I feel all information that is available should be digested and then a decision/solution confirmed. |
| Both are equally important but you should also look at Crew resource management and the Boyd Loop for critical decision making.  |

|  |
|--|
| <b>Question 5 – If yes, what other opportunities are available or required.(35 Responses)</b>  |
|  |
| Smoke Reading, Incident command, Ventilation Profiling   |
| Live Fire, Basic Skills, Classroom Training, Video and computer based, hands-on  |
| We provide in-depth training on the three components of situational awareness (perception, comprehension, and prediction); teach a true understanding of John Boyd's OODA Loop (observe, orient, decide, act); teach high reliability organizations; teach the concept of pentimento (seeing, seeing without seeing, and seeing again), utilize Blue Card certification, sand table exercises, table top exercises, etc. |
| Classroom training and After action reviews  |

|  |
|--|
| Training is given to the department as a whole and on an individual basis and at company level training with company officers.   |
| Drills that include fire ground decision making, critiques, NFA command and control classes & Operations classes. I would like to see a simulation tool developed for our department |
| Blue Card Local Hazard Zone Incident Command Certification   |
| Specialized CBRNE Courses Monthly hands-on equipment training Industrial and transportation spill/Fire simulations   |
| Ammonia HazMat training specifically for anhydrous ammonia.  |
| Classroom training, live fire ground training, training exercises  |
| Table-top and computer simulations   |
| NFA classes  |
| EMS Agency only  |
| they are offered to new officers and then it gets more detailed as you climb the rank to BC or Deputy Chief  |
| Simulator training in preparation for promotion, during the promotional assessment center, and during the probationary period.   |
| critical incidents/ emergency response but not specifically fire ground training.  |
| Walk through scenarios.  |
| Table top exercises, leadership and communication training, effective decision making classes  |
| Minimum amount of opportunities  |
| Training fires and simulations using fire simulator software.  |
| However, we are integrating this concept in the coming year.   |
| Not a fire based organization  |
| Classroom and hands on training.   |
| 4 drills a year, using a simulated control room at a nuclear power plant, which drives data to offsite decision makers.  |
| Several training centers exist that provide excellent simulation training  |
| Live fire training and national classroom and online training is part of job description.  |
| Full scale state drills and federally evaluated exercises  |
| When available live fire training where potential IC's are put in a command role to conduct operations. Other opportunities range from formal classes to in-house training.          |
| Blue Card ICS training/certification   |

|   |
|---|
| Large scale drills with local industry that simulate fire, hazmat, or mass casualty that require company deployment to mitigate a simulated emergency. Computer fire simulations are also utilized. |
| Through the established departments -fire officer development program   |
| All 9 of the above skills   |
| continual pre-planning and exercises  |
| Table top exercise Formal training  |
| I am currently working on simulation training for our officers working in the Hazard Zone.  |

|  |
|--|
| <b>Question 7</b> – What is an appropriate number of training hours to be proficient in emergency scene decision making? (31 Responses)                                |
| 40-80 per year   |
| 4-6 per month  |
| A number is difficult to pin down, but our SA and decision making classes have been 12 hours at the minimum and I would like to add more.                              |
| 10 to 15 hrs, but is dependent on the persons experience   |
| Many times it depends on self motivated company officers. Those motivated do quite a bit, vs. those who are unmotivated that wait for the department to offer and give |
| 5 per month  |
| 10+  |
| 1000   |
| 1-5  |
| N/A  |
| Varies greatly by individual and individual experience   |
| 10 plus hours  |
| 8  |
| experience is needed to supplement the training hours  |
| 2 to 4 hours per month   |
| I really depends on the person and their experience level  |
| Depends on quality of training and expertise of students   |
| Not a firebased organization so this does not apply  |

|  |
|--|
| 10-15  |
| Numerous hours of prior experience and training are required.        |
| 16 hours / month   |
| 5 plus dependant on the individual                                   |
| Use simulation skills certification rather than X number of hours    |
| 2 per month would give 24 hours a year...that would be a good start. |
| I could not make an informed estimate.                               |
| 3  |
| 5-10 hours per month.  |
| 10+ per month  |
| 10/month minimum   |
| unsure   |
| After the original training, I feel this will be adequate.           |

|  |
|--|
| <b>Question 9</b> – Other - please specify - also please specify if you answered government agency or private sector. (11 Responses) |
|  |
| Nursing - University Hospital  |
| Linn County Public Health / Linn County Regional Hazmat Team   |
| Mechanical Contractor  |
| EMS Agency   |
| Federal Law Enforcement  |
| EMS Ambulance  |
| State Training   |
| State Public Health / Bureau of EMS  |
| Medical director and volunteer FF  |
| Previous yrs with combination dept and ems programs also   |
| Currently a fire investigator, previously with Fire Institute & 23+ years in volunteer FD.   |